Stratix III Device Handbook, Volume 2

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Chapter Revision Dates

The chapter in this book was revised on the following date. Where chapters or groups of chapters are available separately, part numbers are listed.

Chapter 1 Stratix III Device Datasheet: DC and Switching Characteristics
Revised: *July 2010*
Part Number: *SIII52001-2.3*

This handbook provides comprehensive information about the Altera® Stratix® III family of devices.

How to Contact Altera

For the most up-to-date information about Altera products, see the following table.

Contact *(Note 1)*	Contact Method	Address
Technical support	Website	www.altera.com/support
Technical training	Website	www.altera.com/training
	Email	custrain@altera.com
Product literature	Website	www.altera.com/literature
Non-technical support (General)	Email	nacomp@altera.com
(Software Licensing)	Email	authorization@altera.com

Note:

(1) You can also contact your local Altera sales office or sales representative.

Typographic Conventions

The following table shows the typographic conventions that this document uses.

Visual Cue	Meaning
Bold Type with Initial Capital Letters	Command names, dialog box titles, checkbox options, and dialog box options are shown in bold, initial capital letters. Example: **Save As** dialog box.
bold type	External timing parameters, directory names, project names, disk drive names, file names, file name extensions, and software utility names are shown in bold type. Examples: $\mathbf{f_{MAX}}$, **\qdesigns** directory, **d:** drive, **chiptrip.gdf** file.
Italic Type with Initial Capital Letters	Document titles are shown in italic type with initial capital letters. Example: *AN 75: High-Speed Board Design.*
Italic type	Internal timing parameters and variables are shown in italic type. Examples: t_{PIA}, $n + 1$. Variable names are enclosed in angle brackets (< >) and shown in italic type. Example: *<file name>*, *<project name>***.pof** file.
Initial Capital Letters	Keyboard keys and menu names are shown with initial capital letters. Examples: Delete key, the Options menu.
"Subheading Title"	References to sections within a document and titles of on-line help topics are shown in quotation marks. Example: "Typographic Conventions."

Visual Cue	Meaning
`Courier type`	Signal and port names are shown in lowercase Courier type. Examples: `data1`, `tdi`, `input`. Active-low signals are denoted by suffix `n`, e.g., `resetn`. Anything that must be typed exactly as it appears is shown in Courier type. For example: `c:\qdesigns\tutorial\chiptrip.gdf`. Also, sections of an actual file, such as a Report File, references to parts of files (e.g., the AHDL keyword `SUBDESIGN`), as well as logic function names (e.g., `TRI`) are shown in Courier.
1., 2., 3., and a., b., c., etc.	Numbered steps are used in a list of items when the sequence of the items is important, such as the steps listed in a procedure.
■ ■	Bullets are used in a list of items when the sequence of the items is not important.
✓	The checkmark indicates a procedure that consists of one step only.
☞	The hand points to information that requires special attention.
CAUTION	A caution calls attention to a condition or possible situation that can damage or destroy the product or the user's work.
WARNING	A warning calls attention to a condition or possible situation that can cause injury to the user.
↵	The angled arrow indicates you should press the Enter key.
👣	The feet direct you to more information on a particular topic.

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Section I. DC & Switching Characteristics of Stratix III Devices

When Stratix® III devices are implemented in a system, they are rated according to a set of defined parameters. To maintain the highest possible performance and reliability of Stratix III devices, system designers must consider the operating requirements discussed in the following chapter:

- Chapter 1, Stratix III Device Datasheet: DC and Switching Characteristics

Revision History

Refer to each chapter for its own specific revision history. For information on when each chapter was updated, refer to the Chapter Revision Dates section, which appears in the full handbook.

1. Stratix III Device Datasheet: DC and Switching Characteristics

SIII52001-2.3

Electrical Characteristics

This chapter describes the electrical characteristics, switching characteristics, and I/O timing for Stratix® III devices. Electrical characteristics include operating conditions and power consumption. Switching characteristics include core performance specifications and periphery performance. A glossary is also included for your reference.

Operating Conditions

When Stratix III devices are implemented in a system, they are rated according to a set of defined parameters. To maintain the highest possible performance and reliability of Stratix III devices, system designers must consider the operating requirements described in this chapter.

Stratix III devices are offered in both commercial and industrial grades. Commercial devices are offered in –2 (fastest), –3, –4, and –4L speed grades. Industrial devices are offered only in –3, –4, and –4L speed grades.

In this chapter, a prefix associated with the operating temperature range is attached to the speed grades; commercial with a "C" prefix and industrial with an "I" prefix. For example, commercial devices are indicated as C2, C3, C4, and C4L per respective speed grades. Industrial devices are indicated as I3, I4, and I4L.

Absolute Maximum Ratings

Absolute maximum ratings define the maximum operating conditions for Stratix III devices. The values are based on experiments conducted with the device and theoretical modeling of breakdown and damage mechanisms. The functional operation of the device is not implied at these conditions. Conditions beyond those listed in Table 1–1 may cause permanent damage to the device. Additionally, device operation at the absolute maximum ratings for extended periods may have adverse effects on the device.

Table 1–1. Absolute Maximum Ratings for Stratix III Devices *(Note 1)* (Part 1 of 2)

Symbol	Parameter	Minimum	Maximum	Unit
V_{CCL}	Selectable core voltage power supply	-0.5	1.65	V
V_{CC}	I/O registers power supply	-0.5	1.65	V
V_{CCD_PLL}	Phase-locked loop (PLL) digital power supply	-0.5	1.65	V
V_{CCA_PLL}	PLL analog power supply	-0.5	3.75	V
V_{CCPT}	Programmable power technology power supply	-0.5	3.75	V
V_{CCPGM}	Configuration pins power supply	-0.5	3.9	V
V_{CCPD}	I/O pre-driver power supply	-0.5	3.9	V
V_{CCIO}	I/O power supply	-0.5	3.9	V

Table 1–1. Absolute Maximum Ratings for Stratix III Devices *(Note 1)* (Part 2 of 2)

Symbol	Parameter	Minimum	Maximum	Unit
V_{CC_CLKIN}	Differential clock input power supply (top and bottom I/O banks only)	-0.5	3.75	V
V_{CCBAT}	Battery back-up power supply for design security volatile key register	-0.5	3.75	V
V_I	DC Input voltage	-0.5	4.0	V
T_J	Operating junction temperature	-55	125	°C
I_{OUT}	DC output current, per pin	-25	40	mA
T_{STG}	Storage temperature (No bias)	-65	150	°C

Note to Table 1–1:

(1) Supply voltage specifications apply to voltage readings taken at the device pins, not the power supply.

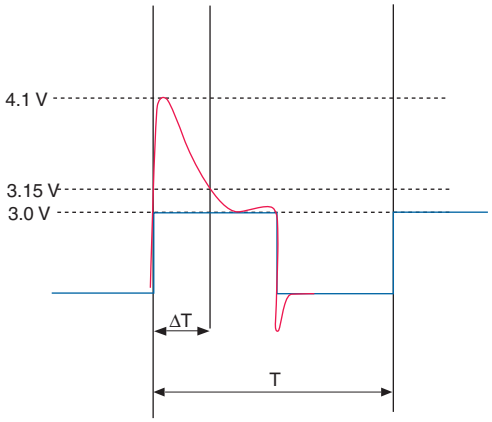
Sinusoidal Maximum Allowed Overshoot/Undershoot Voltage

During transitions, input signals may overshoot to the voltage listed in Table 1–2 and undershoot to –2.0 V for input currents less than 100 mA and periods shorter than 20 ns.

Table 1–2 lists the maximum allowed input overshoot voltage and the duration of the overshoot voltage as a percentage over the lifetime of the device. The maximum allowed overshoot duration is specified as percentage of high-time over the lifetime of the device.

A DC signal is equivalent to 100% duty cycle. For example, a signal that overshoots to 4.2 V can only be at 4.2 V for 15.8% over the lifetime of the device; for a device lifetime of 10 years, this is equivalent to 15.8% of ten years which is 18.96 months. Figure 1–1 shows how to determine the overshoot duration.

Figure 1–1. Overshoot Duration



In the example shown in Figure 1–1, the overshoot voltage is shown in red and is present at the Stratix III pin, up to 4.1 V. From Table 1–2, for an overshoot of up to 4.1 V, the percentage of high time for overshoot > 3.15 V can be as high as 46% over an 11.4-year period. The percentage of high time is calculated as (delta T/T) * 100. This 11.4-year period assumes the device is always turned on with 100% I/O toggle rate and 50% duty cycle signal. For lower I/O toggle rates and situations where the device is in an idle state, lifetimes are increased.

Table 1–2. Maximum Allowed Overshoot During Transitions

Symbol	Parameter	Condition	Overshoot Duration as a % of High Time	Unit
Vi (AC)	AC Input Voltage *(1)*	4	100.000	%
		4.05	79.330	%
		4.1	46.270	%
		4.15	27.030	%
		4.2	15.800	%
		4.25	9.240	%
		4.3	5.410	%
		4.35	3.160	%
		4.4	1.850	%
		4.45	1.080	%
		4.5	0.630	%
		4.55	0.370	%
		4.6	0.220	%
		4.65	0.130	%
		4.7	0.074	%
		4.75	0.043	%
		4.8	0.025	%
		4.85	0.015	%

Note to Table 1–2:

(1) This input voltage is regardless of the V_{CCIO} supply which is used to power up the input buffer.

Recommended Operating Conditions

This section lists the functional operation limits for AC and DC parameters for Stratix III devices. Table 1–3 lists the steady-state voltage and current values expected from Stratix III devices. All supplies are required to monotonically reach their full-rail values within t_{RAMP}.

Table 1–3. Recommended Operating Conditions for Stratix III Devices (Part 1 of 2)

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
V_{CCL}	Selectable core voltage power supply for internal logic and input buffers	—	1.05	1.1	1.15	V
	Selectable core voltage power supply for internal logic and input buffers	—	0.86	0.9	0.94	V
V_{CC}	I/O registers power supply	—	1.05	1.1	1.15	V
V_{CCD_PLL}	PLL digital power supply	—	1.05	1.1	1.15	V
V_{CCA_PLL}	PLL analog power supply	—	2.375	2.5	2.625	V
V_{CCPT}	Power supply for the programmable power technology	—	2.375	2.5	2.625	V

Table 1–3. Recommended Operating Conditions for Stratix III Devices (Part 2 of 2)

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
V_{CCPGM}	Configuration pins power supply, 3.3 V	—	3.135	3.3	3.465	V
	Configuration pins power supply, 3.0 V	—	2.85	3	3.15	V
	Configuration pins power supply, 2.5 V	—	2.375	2.5	2.625	V
	Configuration pins power supply, 1.8 V	—	1.71	1.8	1.89	V
V_{CCPD} *(1)*	I/O pre-driver power supply, 3.3 V	—	3.135	3.3	3.465	V
	I/O pre-driver power supply, 3.0 V	—	2.85	3	3.15	V
	I/O pre-driver power supply, 2.5 V	—	2.375	2.5	2.625	V
V_{CCIO}	I/O power supply, 3.3 V	—	3.135	3.3	3.465	V
	I/O power supply, 3.0 V	—	2.85	3	3.15	V
	I/O power supply, 2.5 V	—	2.375	2.5	2.625	V
	I/O power supply, 1.8 V	—	1.71	1.8	1.89	V
	I/O power supply, 1.5 V	—	1.425	1.5	1.575	V
	I/O power supply, 1.2 V	—	1.14	1.2	1.26	V
V_{CC_CLKIN}	Differential clock input power supply (top and bottom I/O banks only)	—	2.375	2.5	2.625	V
V_{CCBAT} *(3)*	Battery back-up power supply for design security volatile key register	—	1.0	—	3.3	V
V_I	DC Input voltage	—	-0.3	—	3.6	V
V_O	Output voltage	—	0	—	V_{CCIO}	V
T_J	Operating junction temperature	For commercial use	0	—	85	°C
		For industrial use *(2)*	-40	—	100	°C
t_{RAMP}	Power Supply Ramptime (For V_{CCPT})	Normal POR (PORSEL=0)	50 µs	—	5 ms	—
		Fast POR (PORSEL=1)	50 µs	—	5 ms	—
	Power Supply Ramptime (For all power supplies except V_{CCPT})	Normal POR (PORSEL=0)	50 µs	—	100 ms	—
		Fast POR (PORSEL=1)	50 µs	—	12 ms	—

Notes to Table 1–3:

(1) V_{CCPD} is 2.5, 3.0, or 3.3 V. For a 3.3-V I/O standard, V_{CCPD} = 3.3 V. For a 3.0-V I/O standard, V_{CCPD} = 3.0 V. For a 2.5-V or lower I/O standard, V_{CCPD} = 2.5 V.

(2) For the EP3SL340, EP3SE260, and EP3SL200 devices in the I4L ordering code, the industrial junction temperature range is from 0° C to 100° C, regardless of supply voltage.

(3) Altera recommends a 3.0-V nominal battery voltage when connecting V_{CCBAT} to a battery for volatile key backup. If you do not use the volatile security key, you may connect the V_{CCBAT} to either GND or a 3.0-V power supply.

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DC Characteristics

This section lists the input pin capacitances, on-chip termination tolerance, and hot- socketing specifications.

Supply Current

Standby current is the current the device draws after the device is configured with no inputs/outputs toggling and no activity in the device. Because these currents vary largely with the resources used, use the Excel-based Early Power Estimator (EPE) to get supply current estimates for your design.

Table 1–4 lists supply current specifications for V_{CC_CLKIN} and V_{CCPGM}. Use the EPE to get supply current estimates for the remaining power supplies.

Table 1–4. Supply Current Specifications for V_{CC_CLKIN} and V_{CCPGM}

Symbol	Parameter	Min	Max	Unit
I_{CLKIN}	V_{CC_CLKIN} current specifications	0	250	mA
I_{PGM}	V_{CCPGM} current specifications	0	250	mA

I/O Pin Leakage Current

Table 1–5 lists Stratix III I/O pin leakage current specifications.

Table 1–5. I/O Pin Leakage Current for Stratix III Devices *(Note 1)*, *(2)*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_I	Input Pin Leakage Current	$V_I = V_{CCIOMAX}$ to 0 V	-10	—	10	µA
I_{OZ}	Tri-stated I/O Pin Leakage Current	$V_O = V_{CCIOMAX}$ to 0 V	-10	—	10	µA

Notes to Table 1–5:

(1) This value is specified for normal device operation. The value may vary during power-up. This applies for all V_{CCIO} settings (3.3, 3.0, 2.5, 1.8, 1.5, and 1.2 V).

(2) The 10-µA I/O leakage current limit is applicable when the internal clamping diode is off. A higher current can be observed when the diode is on.

Bus Hold Specifications

Table 1–6 lists the Stratix III device family bus hold specifications.

Table 1–6. Bus Hold Parameters for Stratix III Devices (Part 1 of 2)

Parameter	Symbol	Conditions	V_{CCIO}										Unit
			1.2 V		1.5 V		1.8 V		2.5 V		3.0 V/3.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Low sustaining current	I_{SUSL}	$V_{IN} > V_{IL}$ (maximum)	22.5	—	25.0	—	30.0	—	50.0	—	70.0	—	µA
High sustaining current	I_{SUSH}	$V_{IN} < V_{IH}$ (minimum)	-22.5	—	-25.0	—	-30.0	—	-50.0	—	-70.0	—	µA
Low overdrive current	I_{ODL}	$0V < V_{IN} < V_{CCIO}$	—	120	—	160	—	200	—	300	—	500	µA

Table 1–6. Bus Hold Parameters for Stratix III Devices (Part 2 of 2)

Parameter	Symbol	Conditions	V_{CCIO}										Unit
			1.2 V		1.5 V		1.8 V		2.5 V		3.0 V/3.3 V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
High overdrive current	I_{ODH}	$0V < V_{IN} < V_{CCIO}$	—	-120	—	-160	—	-200	—	-300	—	-500	µA
Bus-hold trip point	V_{TRIP}	—	0.45	0.95	0.50	1.00	0.68	1.07	0.70	1.70	0.80	2.00	V

On-Chip Termination (OCT) Specifications

If you enable OCT calibration, calibration is automatically performed at power-up for the I/Os connected to the calibration block. Table 1–7 lists the Stratix III OCT calibration block accuracy specifications.

Table 1–7. On-Chip Termination Calibration Accuracy Specifications for Stratix III Devices *(Note 1)*

Symbol	Description	Conditions	Calibration Accuracy			Unit
			C2	C3, I3	C4, I4	
25-Ω R_S *(2)* 3.3, 3.0, 2.5, 1.8, 1.5, 1.2	Internal series termination with calibration (25-Ω setting)	V_{CCIO} = 3.3, 3.0, 2.5, 1.8, 1.5, 1.2 V	±8	±8	±8	%
50-Ω R_S 3.3, 3.0, 2.5, 1.8, 1.5, 1.2	Internal series termination with calibration (50-Ω setting)	V_{CCIO} = 3.3, 3.0, 2.5, 1.8, 1.5, 1.2 V	±8	±8	±8	%
50-Ω R_T 2.5, 1.8, 1.5, 1.2	Internal parallel termination with calibration (50-Ω setting)	V_{CCIO} = 2.5, 1.8, 1.5, 1.2 V	±10	±10	±10	%
20-Ω R_S to 60-Ω R_S 3.3, 3.0, 2.5, 1.8, 1.5, 1.2	Expanded range for internal series termination with calibration (Between 20-Ω to 60-Ω setting)	V_{CCIO} = 3.3, 3.0, 2.5, 1.8, 1.5, 1.2 V *(3)*	±10	±10	±10	%
25-Ω $R_{S_left_shift}$	Internal left shift series termination with calibration (25-Ω $R_{S_left_shift}$ setting)	V_{CCIO} = 3.3, 3.0, 2.5, 1.8, 1.5, 1.2 V	±10	±10	±10	%
R_{OCT_CAL}	Internal series termination with calibration	*(4)*				

Notes to Table 1–7:

(1) OCT calibration accuracy is valid at the time of calibration only.
(2) 25-Ω R_S not supported for 1.5 V and 1.2 V in Row I/O.
(3) 1.5 V and 1.2 V only supports 40-Ω to 60-Ω expanded range.
(4) For resistance tolerance after power-up calibration, refer to Equation 1–1 and Table 1–9 on page 1–8.

The accuracy listed in Table 1–7 is valid at the time of calibration. If the voltage or temperature changes, the termination resistance value varies. Table 1–8 lists the resistance tolerance for Stratix III OCT.

Table 1–8. On-Chip Termination Resistance Tolerance Specification for Stratix III Devices

Symbol	Description	Conditions	Resistance Tolerance			Unit
			C2	C3, I3	C4, I4	
R_{OCT_UNCAL}	Internal series termination without calibration	—				
25-Ω R_S 3.3, 3.0, 2.5	Internal series termination without calibration (25-Ω setting)	V_{CCIO} = 3.3, 3.0, 2.5 V	±30	±40	±40	%
25-Ω R_S 1.8, 1.5	Internal series termination without calibration (25-Ω setting)	V_{CCIO} = 1.8, 1.5 V	±30	±50	±50	%
25-Ω R_S 1.2	Internal series termination without calibration (25-Ω setting)	V_{CCIO} = 1.2 V	±35	±60	±60	%
50-Ω R_S 3.3, 3.0, 2.5	Internal series termination without calibration (50-Ω setting)	V_{CCIO} = 3.3, 3.0, 2.5 V	±30	±40	±40	%
50-Ω R_S 1.8, 1.5	Internal series termination without calibration (50-Ω setting)	V_{CCIO} = 1.8, 1.5 V	±30	±50	±50	%
50-Ω R_S 1.2	Internal series termination without calibration (50-Ω setting)	V_{CCIO} = 1.2 V	±35	±60	±60	%
R_D	Internal differential termination for LVDS technology (100-Ω setting)	V_{CCIO} = 2.5 V	-15 to 35			%

Table 1–9 lists OCT variation with temperature and voltage after power-up calibration. Use Table 1–9 and Equation 1–1 to determine OCT variation without re-calibration.

Equation 1–1. OCT Variation Without Re-Calibration *(Note 1)*

$$R_{OCT} = R_{SCAL}\left(1 + \langle \frac{dR}{dT} \times \Delta T \rangle \pm \langle \frac{dR}{dV} \times \Delta V \rangle\right)$$

Notes to Equation 1–1:

(1) R_{OCT} value calculated from Equation 1–1 shows the range of OCT resistance with the variation of temperature and V_{CCIO}.
(2) R_{SCAL} is the OCT resistance value at power-up.
(3) ΔT is the variation of temperature with respect to the temperature at power-up.
(4) ΔV is the variation of voltage with respect to the V_{CCIO} at power-up.
(5) dR/dT is the percentage change of R_{SCAL} with temperature.
(6) dR/dV is the percentage change of R_{SCAL} with voltage.

Table 1–9. On-Chip Termination Variation after Power-up Calibration *(Note 1)*

Symbol	Description	V_{CCIO} (V)	Commercial Typical	Unit
dR/dV	OCT variation with voltage without re-calibration	3	0.029	%/mV
		2.5	0.036	%/mV
		1.8	0.065	%/mV
		1.5	0.104	%/mV
		1.2	0.177	%/mV
dR/dT	OCT variation with temperature without re-calibration	3	0.294	%/°C
		2.5	0.301	%/°C
		1.8	0.355	%/°C
		1.5	0.344	%/°C
		1.2	0.348	%/°C

Note to Table 1–9:

(1) Valid for V_{CCIO} range of ± 5% and temperature range of 0° to 85° C.

Pin Capacitance

Table 1–10 lists the Stratix III device family pin capacitance.

Table 1–10. Pin Capacitance for Stratix III Device Family

Symbol	Parameter	Typical	Unit
C_{IOTB}	Input capacitance on top and bottom I/O pins	4	pF
C_{IOLR}	Input capacitance on left and right I/O pins	4	pF
C_{CLKTB}	Input capacitance on top and bottom non-dedicated clock input pins	4	pF
C_{CLKLR}	Input capacitance on left and right non-dedicated clock input pins	4	pF
C_{OUTFB}	Input capacitance on dual-purpose clock output and feedback pins	5	pF
C_{CLK1}, C_{CLK3}, C_{CLK8}, and C_{CLK10}	Input capacitance for dedicated clock input pins	2	pF

Hot-Socketing

Table 1–11 lists the hot-socketing specifications for Stratix III devices.

Table 1–11. Hot-Socketing Specifications for Stratix III Devices

Symbol	Parameter	Maximum
$\lvert I_{IOPIN}\rvert$(DC)	DC current per I/O pin	300 µA
$\lvert I_{IOPIN}\rvert$(AC)	AC current per I/O pin	8 mA *(1)*

Note to Table 1–11:

(1) The I/O ramp rate is 10 ns or more. For ramp rates faster than 10 ns, $\lvert I_{IOPIN}\rvert$ = C dv/dt, in which C is I/O pin capacitance and dv/dt is the slew rate.

Internal Weak Pull-Up Resistor

Table 1–12 lists the weak pull-up resistor values for Stratix III devices.

Table 1–12. Internal Weak Pull-Up Resistor for Stratix III Devices *(Note 1)*, *(3)*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R_{PU}	Value of the I/O pin pull-up resistor before and during configuration, as well as user mode if the programmable pull-up resistor option is enabled	V_{CCIO} = 3.3 V ± 5% *(2)*	—	25	—	kΩ
		V_{CCIO} = 3.0 V ± 5% *(2)*	—	25	—	kΩ
		V_{CCIO} = 2.5 V ± 5% *(2)*	—	25	—	kΩ
		V_{CCIO} = 1.8 V ± 5% *(2)*	—	25	—	kΩ
		V_{CCIO} = 1.5 V ± 5% *(2)*	—	25	—	kΩ
		V_{CCIO} = 1.2 V ± 5% *(2)*	—	25	—	kΩ

Notes to Table 1–12:

(1) All I/O pins have an option to enable weak pull-up except configuration, test, and JTAG pins.

(2) Pin pull-up resistance values may be lower if an external source drives the pin higher than V_{CCIO}.

(3) The internal weak pull-down feature is only available for the JTAG TCK pin. The typical value for this internal weak pull-down resistor is approximately 25k Ω.

I/O Standard Specifications

The following tables list input voltage sensitivities (V_{IH} and V_{IL}), output voltages (V_{OH} and V_{OL}), and current drive characteristics (I_{OH} and I_{OL}) for all I/O standards supported by Stratix III devices. V_{OL} and V_{OH} values are valid at the corresponding I_{OL} and I_{OH}, respectively.

Table 1–13 through Table 1–18 list the Stratix III device family I/O standard specifications. Refer to "Glossary" on page 1–326 for an explanation of terms used in the Table 1–14 through Table 1–18.

Table 1–13. Single-Ended I/O Standards Specifications

I/O Standard	V_{CCIO} (V)			V_{IL} (V)		V_{IH} (V)		V_{OL} (V)	V_{OH} (V)	IOL (mA)	IOH (mA)
	Min	Typ	Max	Min	Max	Min	Max	Max	Min		
3.3-V LVTTL	3.135	3.3	3.465	-0.3	0.8	1.7	3.6	0.4	2.4	2	-2
3.0-V LVTTL	2.85	3	3.15	-0.3	0.8	1.7	3.6	0.4	2.4	2	-2
3.3-V LVCMOS	3.135	3.3	3.465	-0.3	0.8	1.7	3.6	0.2	V_{CCIO} - 0.2	0.1	-0.1
3.0-V LVCMOS	2.85	3	3.15	-0.3	0.8	1.7	3.6	0.2	V_{CCIO} - 0.2	0.1	-0.1
2.5-V LVTTL/ LVCMOS	2.375	2.5	2.625	-0.3	0.7	1.7	3.6	0.2	2.1	0.1	-0.1
		2.5	2.625	-0.3	0.7	1.7	3.6	0.4	2	1	-1
		2.5	2.625	-0.3	0.7	1.7	3.6	0.7	1.7	2	-2
1.8-V LVTTL / LVCMOS	1.71	1.8	1.89	-0.3	0.35 * V_{CCIO}	0.65 * V_{CCIO}	V_{CCIO} + 0.3	0.45	V_{CCIO} - 0.45	2	-2
1.5-V LVTTL/ LVCMOS	1.425	1.5	1.575	-0.3	0.35 * V_{CCIO}	0.65 * V_{CCIO}	V_{CCIO} + 0.3	0.25 * V_{CCIO}	0.75 * V_{CCIO}	2	-2
1.2-V LVTTL / LVCMOS	1.14	1.2	1.26	-0.3	0.35 * V_{CCIO}	0.65 * V_{CCIO}	V_{CCIO} + 0.3	0.25 * V_{CCIO}	0.75 * V_{CCIO}	2	-2
3.0-V PCI	2.85	3	3.15	—	0.3 * V_{CCIO}	0.5 * V_{CCIO}	3.6	0.1 * V_{CCIO}	0.9 * V_{CCIO}	1.5	-0.5
3.0-V PCI-X	2.85	3	3.15	—	0.35 * V_{CCIO}	0.5 * V_{CCIO}	—	0.1 * V_{CCIO}	0.9 * V_{CCIO}	1.5	-0.5

Refer to the figure in "Single-Ended Voltage Referenced I/O Standard" in the "Glossary" on page 1–326 for voltage referenced receiver input waveform and explanation of terms used in Table 1–14.

Table 1–14. Single-Ended SSTL and HSTL I/O Reference Voltage Specifications

I/O Standard	V_{CCIO} (V)			V_{REF} (V)			V_{TT} (V)		
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
SSTL-2 CLASS I, II	2.375	2.5	2.625	0.49 * V_{CCIO}	0.5 * V_{CCIO}	0.51 * V_{CCIO}	V_{REF} - 0.04	V_{REF}	V_{REF} + 0.04
SSTL-18 CLASS I, II	1.71	1.8	1.89	0.833	0.9	0.969	V_{REF} - 0.04	V_{REF}	V_{REF} + 0.04
SSTL-15 CLASS I, II	1.425	1.5	1.575	0.47 * V_{CCIO}	0.5 * V_{CCIO}	0.53 * V_{CCIO}	0.47 * V_{CCIO}	V_{REF}	0.53 * V_{CCIO}
HSTL-18 CLASS I, II	1.71	1.8	1.89	0.85	0.9	0.95	—	V_{CCIO}/2	—
HSTL-15 CLASS I, II	1.425	1.5	1.575	0.68	0.75	0.9	—	V_{CCIO}/2	—
HSTL-12 CLASS I, II	1.14	1.2	1.26	0.47 * V_{CCIO}	0.5 * V_{CCIO}	0.53 * V_{CCIO}	—	V_{CCIO}/2	—

Table 1–15. Single-Ended SSTL and HSTL I/O Standards Signal Specifications *(Note 1)* (Part 1 of 2)

I/O Standard	$V_{IL(DC)}$ (V)		$V_{IH(DC)}$ (V)		$V_{IL(AC)}$ (V)	$V_{IH(AC)}$ (V)	V_{OL} (V)	V_{OH} (V)	IOL (mA)	I_{OH} (mA)
	Min	Max	Min	Max	Max	Min	Max	Min		
SSTL-2 CLASS I	-0.3	V_{REF} - 0.15	V_{REF} +0.15	V_{CCIO} + 0.3	V_{REF} - 0.31	V_{REF} + 0.31	VTT - 0.57	VTT + 0.57	8.1	-8.1
SSTL-2 CLASS II	-0.3	V_{REF} - 0.15	V_{REF} +0.15	V_{CCIO} + 0.3	V_{REF} - 0.31	V_{REF} + 0.31	VTT - 0.76	VTT + 0.76	16.2	-16.2
SSTL-18 CLASS I	-0.3	V_{REF} -0.125	V_{REF} +0.125	V_{CCIO} + 0.3	V_{REF} -0.25	V_{REF} + 0.25	VTT - 0.475	VTT + 0.475	6.7	-6.7
SSTL-18 CLASS II	-0.3	V_{REF} -0.125	V_{REF} +0.125	V_{CCIO} + 0.3	V_{REF} -0.25	V_{REF} + 0.25	0.28	V_{CCIO} - 0.28	13.4	-13.4
SSTL-15 CLASS I	-0.3	V_{REF} -0.1	V_{REF} +0.1	V_{CCIO} + 0.3	V_{REF} -0.175	V_{REF} + 0.175	0.2 * V_{CCIO}	0.8 * V_{CCIO}	8	-8
SSTL-15 CLASS II	-0.3	V_{REF} -0.1	V_{REF} +0.1	V_{CCIO} + 0.3	V_{REF} -0.175	V_{REF} + 0.175	0.2 * V_{CCIO}	0.8 * V_{CCIO}	16	-16
HSTL-18 CLASS I	-0.3	V_{REF} -0.1	V_{REF} +0.1	V_{CCIO} + 0.3	V_{REF} -0.2	V_{REF} + 0.2	0.4	V_{CCIO} - 0.4	8	-8
HSTL-18 CLASS II	-0.3	V_{REF} -0.1	V_{REF} +0.1	V_{CCIO} + 0.3	V_{REF} -0.2	V_{REF} + 0.2	0.4	V_{CCIO} - 0.4	16	-16
HSTL-15 CLASS I	-0.3	V_{REF} -0.1	V_{REF} +0.1	V_{CCIO} + 0.3	V_{REF} -0.2	V_{REF} + 0.2	0.4	V_{CCIO} - 0.4	8	-8
HSTL-15 CLASS II	-0.3	V_{REF} -0.1	V_{REF} +0.1	V_{CCIO} + 0.3	V_{REF} -0.2	V_{REF} + 0.2	0.4	V_{CCIO} - 0.4	16	-16
HSTL-12 CLASS I	-0.15	V_{REF} -0.08	V_{REF} +0.08	V_{CCIO} + 0.15	V_{REF} -0.15	V_{REF} + 0.15	0.25* V_{CCIO}	0.75 * V_{CCIO}	8	-8

Table 1–15. Single-Ended SSTL and HSTL I/O Standards Signal Specifications *(Note 1)* (Part 2 of 2)

I/O Standard	$V_{IL(DC)}$ (V)		$V_{IH(DC)}$ (V)		$V_{IL(AC)}$ (V)	$V_{IH(AC)}$ (V)	V_{OL} (V)	V_{OH} (V)	IOL (mA)	I_{OH} (mA)
	Min	Max	Min	Max	Max	Min	Max	Min		
HSTL-12 CLASS II	-0.15	V_{REF} -0.08	V_{REF} +0.08	V_{CCIO} + 0.15	V_{REF} -0.15	V_{REF} + 0.15	0.25* V_{CCIO}	0.75 * V_{CCIO}	16	-16

Note to Table 1–15:

(1) Use the current strength settings that are equal or larger than the I_{OL} and I_{OH} values listed to meet the V_{OL} and V_{OH} specifications for each line. OCT or lower current strengths may provide better signal integrity and lower power.

Refer to the figures for "Differential I/O Standards" in "Glossary" on page 1–326 for the receiver input and transmitter output waveforms, and for all the differential I/O standards (LVDS, mini-LVDS, RSDS). V_{CC_CLKIN} is the power supply for the differential column clock input pins. V_{CCPD} is the power supply for the row I/Os and all other column I/Os.

Table 1–16. Differential SSTL I/O Standard Specifications

I/O Standard	V_{CCIO} (V)			$V_{SWING\ (DC)}$ (V)		$V_{X\ (AC)}$ (V)			$V_{SWING(AC)}$ (V)		$V_{OX\ (AC)}$ (V)		
	Min	Typ	Max	Min	Max	Min	Typ	Max	Min	Max	Min	Typ	Max
SSTL-2 CLASS I, II	2.375	2.5	2.625	0.3	V_{CCIO} + 0.6	$V_{CCIO}/2$ - 0.2	—	$V_{CCIO}/2$ + 0.2	0.62	V_{CCIO} + 0.6	$V_{CCIO}/2$ - 0.15	—	$V_{CCIO}/2$ + 0.15
SSTL-18 CLASS I, II	1.71	1.8	1.89	0.25	V_{CCIO} + 0.6	$V_{CCIO}/2$ -0.175	—	$V_{CCIO}/2$ + 0.175	0.5	V_{CCIO} + 0.6	$V_{CCIO}/2$ -0.125	—	$V_{CCIO}/2$ +0.125
SSTL-15 CLASS I, II	1.425	1.5	1.575	0.2	—	—	$V_{CCIO}/2$	—	0.35	—	—	$V_{CCIO}/2$	—

Table 1–17. Differential HSTL I/O Standards Specifications

I/O Standard	V_{CCIO} (V)			$V_{DIF(DC)}$ (V)		$V_{X(AC)}$ (V)			$V_{CM(DC)}$ (V)			$V_{DIF(AC)}$ (V)	
	Min	Typ	Max	Min	Max	Min	Typ	Max	Min	Typ	Max	Min	Max
HSTL-18 CLASS I, II	1.71	1.8	1.89	0.2	—	0.78	—	1.12	0.78	—	1.12	0.4	—
HSTL-15 CLASS I, II	1.425	1.5	1.575	0.2	—	0.68	—	0.9	0.68	—	0.9	0.4	—
HSTL-12 CLASS I, II	1.14	1.2	1.26	0.16	V_{CCIO} + 0.3	—	0.5* V_{CCIO}	—	0.4* V_{CCIO}	0.5* V_{CCIO}	0.6* V_{CCIO}	0.3	V_{CCIO} + 0.48

Table 1–18. Differential I/O Standard Specifications (Part 1 of 2)

I/O Standard	V_{CCIO} (V)			V_{ID} (V) *(1)*			$V_{ICM(DC)}$ (V)			V_{OD} (V) *(2)*			V_{OCM} (V) *(2)*		
	Min	Typ	Max	Min	Condition	Max	Min	Condition	Max	Min	Typ	Max	Min	Typ	Max
2.5 V LVDS (Row I/O)	2.375	2.5	2.625	0.1	V_{CM} = 1.25	—	0.05 *(6)*	$D_{max} \leq 700$ Mbps	1.8 *(6)*	0.247	—	0.6	1.125	1.25	1.375
	2.375	2.5	2.625	0.1	V_{CM} = 1.25	—	1.05 *(6)*	$D_{max} > 700$ Mbps	1.55 *(6)*	0.247	—	0.6	1.125	1.25	1.375

Table 1–18. Differential I/O Standard Specifications (Part 2 of 2)

I/O Standard	V_{CCIO} (V)			V_{ID} (V) *(1)*			$V_{ICM(DC)}$ (V)			V_{OD} (V) *(2)*			V_{OCM} (V) *(2)*		
	Min	Typ	Max	Min	Condition	Max	Min	Condition	Max	Min	Typ	Max	Min	Typ	Max
2.5 V LVDS (Column I/O)	2.375	2.5	2.625	0.1	V_{CM} = 1.25	—	0.05 *(6)*	$D_{max} \leq 700$ Mbps	1.8 *(6)*	0.247	—	0.6	1.0	1.25	1.5
	2.375	2.5	2.625	0.1	V_{CM} = 1.25	—	1.05 *(6)*	$D_{max} > 700$ Mbps	1.55 *(6)*	0.247	—	0.6	1.0	1.25	1.5
RSDS (Row I/O)	2.375	2.5	2.625	0.1	V_{CM} = 1.25	—	0.3	—	1.4	0.1	0.2	0.6	0.5	1.2	1.4
RSDS (Column I/O)	2.375	2.5	2.625	0.1	V_{CM} = 1.25	—	0.3	—	1.4	0.1	0.2	0.6	0.5	1.2	1.5
Mini-LVDS (Row I/O)	2.375	2.5	2.625	0.2	—	0.6	0.4	—	1.325	0.25	—	0.6	0.5	1.2	1.4
Mini-LVDS (Column I/O)	2.375	2.5	2.625	0.2	—	0.6	0.4	—	1.325	0.25	—	0.6	0.5	1.2	1.5
LVPECL *(3)*	2.375 *(5)*	2.5 *(5)*	2.625 *(5)*	0.3	—	—	0.6	$D_{max} \leq 700$ Mbps	1.8 *(4)*	—	—	—	—	—	—
	2.375 *(5)*	2.5 *(5)*	2.625 *(5)*	0.3	—	—	1.0	$D_{max} > 700$ Mbps	1.6 *(4)*	—	—	—	—	—	—

Notes to Table 1–18:

(1) The minimum V_{ID} value is applicable over the entire common mode range, V_{CM}.

(2) RL range: $90 \leq RL \leq 110\ \Omega$.

(3) Column and row I/O banks support LVPECL I/O standards for input operation only on dedicated clock input pins. Differential clock inputs in column I/O use V_{CC_CLKIN} that must be powered by 2.5 V. Differential clock inputs in row I/O banks are powered by V_{CCPD}.

(4) The receiver voltage input range for the data rate when $D_{max} > 700$ Mbps is $0.85\ V \leq V_{IN} \leq 1.75\ V$.
The receiver voltage input range for the data rate when $D_{max} \leq 700$ Mbps is $0.45\ V \leq V_{IN} \leq 1.95\ V$.

(5) Power supply for the column I/O LVPECL differential clock input buffer is V_{CC_CLKIN}.

(6) The receiver voltage input range for the data rate when $D_{max} > 700$ Mbps is $1.0\ V \leq V_{IN} \leq 1.6\ V$.
The receiver voltage input range for the data rate when $D_{max} \leq 700$ Mbps is zero $V \leq V_{IN} \leq 1.85\ V$.

Power Consumption

Altera offers two ways to estimate power for a design: the Excel-based Early Power Estimator (EPE) and the Quartus® II **PowerPlay Power Analyzer** feature.

The interactive Excel-based Early Power Estimator is typically used prior to designing the FPGA in order to get a magnitude estimate of the device power. The Quartus II **PowerPlay Power Analyzer** provides estimation based on the specifics of the design after place-and-route is complete. The **PowerPlay Power Analyzer** can apply a combination of user-entered, simulation-derived, and estimated signal activities which, when combined with detailed circuit models, can yield very accurate power estimation.

Refer to Table 1–4 on page 1–5 for supply current estimates for V_{CCPGM} and V_{CC_CLKIN}. Use the EPE and PowerPlay Power Analyzer for current estimates of remaining power supplies.

For more information about power estimation tools, refer to the *PowerPlay Early Power Estimator User Guide For Stratix III FPGAs* and the *PowerPlay Power Analysis* chapter in the *Quartus II Handbook*.

Switching Characteristics

This section provides performance characteristics of Stratix III core and periphery blocks for commercial grade devices.

These characteristics can be designated as **Preliminary** and **Final** and each designation is defined below.

Preliminary—Preliminary characteristics are created using simulation results, process data, and other known parameters.

Final—Final numbers are based on actual silicon characterization and testing. These numbers reflect the actual performance of the device under worst-case silicon process, voltage, and junction temperature conditions. The upper-right hand corner of a table shows the designation as **Preliminary** or **Final**.

Core Performance Specifications

These sections describe the Clock Tree, PLL, digital signal processing (DSP), TriMatrix, and Configuration and JTAG specifications.

Clock Tree Specifications

Table 1–19 lists the clock tree performance specifications for the logic array, DSP blocks, and TriMatrix Memory blocks for Stratix III devices.

Table 1–19. Clock Tree Performance for Stratix III Devices

Device	C2	C3, I3	C4, I4	C4L, I4L		Unit
	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	
EP3SL50	730	700	450	450	375	MHz
EP3SL70	730	700	450	450	375	MHz
EP3SL110	730	700	450	450	375	MHz
EP3SL150	730	700	450	450	375	MHz
EP3SL200	730	700	450	450	375	MHz
EP3SE260	730	700	450	450	375	MHz
EP3SL340	730	700	450	450	375	MHz
EP3SE50	730	700	450	450	375	MHz
EP3SE80	730	700	450	450	375	MHz
EP3SE110	730	700	450	450	375	MHz

PLL Specifications

Table 1–20 lists the Stratix III PLL specifications when operating in both the commercial junction temperature range (0 to 85° C) and the industrial junction temperature range (-40 to 100° C), except for EP3SL340, EP3SE260, and EP3SL200 devices in the I4L ordering code, where the industrial junction temperature range is from 0° C to 100° C, regardless of supply voltage. Refer to the figure in "PLL Specifications" in "Glossary" on page 1–326 for the PLL block diagram.

Table 1–20. PLL Specifications for Stratix III Devices (Part 1 of 3)

Symbol	Parameter	C2			C3, I3			C4, I4			C4L, I4L						Unit
		V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 0.9 V			
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{IN}	Input clock frequency	5	—	800 *(1)*	5	—	717 *(1)*	5	—	717 *(1)*	5	—	717 *(1)*	5	—	717 *(1)*	MHz
f_{INPFD}	Input frequency to the PFD	5	—	325	5	—	325	5	—	325	5	—	325	5	—	325	MHz
f_{VCO}	PLL VCO operating range	600	—	1600	600	—	1300	600	—	1300	600	—	1300	600	—	1300	MHz
$t_{EINDUTY}$	Input clock or external feedback clock input duty cycle	40	—	60	40	—	60	40	—	60	40	—	60	40	—	60	%
f_{OUT}	Output frequency for internal global or regional clock	—	—	600 *(2)*	—	—	500 *(2)*	—	—	450 *(2)*	—	—	450 *(2)*	—	—	375 *(2)*	MHz
f_{OUT_EXT}	Output frequency for dedicated external clock output	—	—	800 *(2)*	—	—	717 *(2)*	—	—	717 *(2)*	—	—	717 *(2)*	—	—	717 *(2)*	MHz
$t_{OUTDUTY}$	Duty cycle for external clock output (when set to 50%)	45	50	55	45	50	55	45	50	55	45	50	55	45	50	55	%
t_{FCOMP}	External feedback clock compensation time	—	—	10	—	—	10	—	—	10	—	—	10	—	—	10	ns
$t_{CONFIGPLL}$	Time required to reconfigure scan chain	—	3.5	—	—	3.5	—	—	3.5	—	—	3.5	—	—	3.5	—	scanclk cycles
$t_{CONFIGPHASE}$	Time required to reconfigure phase shift	—	1	—	—	1	—	—	1	—	—	1	—	—	1	—	scanclk cycles
$f_{SCANCLK}$	`scanclk` frequency	—	—	100	—	—	100	—	—	100	—	—	100	—	—	100	MHz
t_{LOCK}	Time required to lock from end of device configuration	—	—	1	—	—	1	—	—	1	—	—	1	—	—	1	ms
t_{DLOCK}	Time required to lock dynamically (after switchover or reconfiguring any non-post-scale counters/delays)	—	—	1	—	—	1	—	—	1	—	—	1	—	—	1	ms

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Table 1–20. PLL Specifications for Stratix III Devices (Part 2 of 3)

Symbol	Parameter	C2			C3, I3			C4, I4			C4L, I4L						Unit
		V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 0.9 V			
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{CLBW}	PLL closed-loop low bandwidth	—	0.3	—	—	0.3	—	—	0.3	—	—	0.3	—	—	0.3	—	MHz
	PLL closed-loop medium bandwidth	—	1.5	—	—	1.5	—	—	1.5	—	—	1.5	—	—	1.5	—	MHz
	PLL closed-loop high bandwidth *(6)*	—	4	—	—	4	—	—	4	—	—	4	—	—	4	—	MHz
t_{PLL_PSERR}	Accuracy of PLL phase shift	—	—	±50	—	—	±50	—	—	±50	—	—	±50	—	—	±50	ps
t_{ARESET}	Minimum pulse width on areset signal	10	—	—	10	—	—	10	—	—	10	—	—	10	—	—	ns
t_{INCCJ} *(3)*, *(4)*	Input clock cycle to cycle jitter ($F_{REF} \geq 100$ MHz)	—	—	0.15	—	—	0.15	—	—	0.15	—	—	0.15	—	—	0.1	UI (p-p)
	Input clock cycle to cycle jitter ($F_{REF} < 100$ MHz)	—	—	±750	—	—	±750	—	—	±750	—	—	±750	—	—	±500	ps (p-p)
t_{OUTPJ_DC} *(5)*	Period Jitter for dedicated clock output ($F_{OUT} \geq 100$ MHz)	—	—	175	—	—	175	—	—	175	—	—	175	—	—	225	ps (p-p)
	Period Jitter for dedicated clock output ($F_{OUT} < 100$ MHz)	—	—	17.5	—	—	17.5	—	—	17.5	—	—	17.5	—	—	22.5	mUI (p-p)
t_{OUTCCJ_DC} *(5)*	Cycle to Cycle Jitter for dedicated clock output ($F_{OUT} \geq 100$ MHz)	—	—	175	—	—	175	—	—	175	—	—	175	—	—	225	ps (p-p)
	Cycle to Cycle Jitter for dedicated clock output ($F_{OUT} < 100$ MHz)	—	—	17.5	—	—	17.5	—	—	17.5	—	—	17.5	—	—	22.5	mUI (p-p)
t_{OUTPJ_IO} *(5)*, *(8)*	Period Jitter for clock output on regular IO ($F_{OUT} \geq 100$ MHz)	—	—	600	—	—	600	—	—	600	—	—	600	—	—	750	ps (p-p)
	Period Jitter for clock output on regular IO ($F_{OUT} < 100$ MHz)	—	—	60	—	—	60	—	—	60	—	—	60	—	—	75	mUI (p-p)

Table 1–20. PLL Specifications for Stratix III Devices (Part 3 of 3)

Symbol	Parameter	C2			C3, I3			C4, I4			C4L, I4L						Unit
		V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 1.1 V			V_{CCL} = 0.9 V			
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t_{OUTCCJ_IO} *(5)*, *(8)*	Cycle to Cycle Jitter for clock output on regular IO ($F_{OUT} \geq 100$ MHz)	—	—	600	—	—	600	—	—	600	—	—	600	—	—	750	ps (p-p)
	Cycle to Cycle Jitter for clock output on regular IO ($F_{OUT} < 100$ MHz)	—	—	60	—	—	60	—	—	60	—	—	60	—	—	75	mUI (p-p)
$t_{CASC_OUTPJ_DC}$ *(5)*, *(7)*	Period Jitter for dedicated clock output in cascaded PLLs ($F_{OUT} \geq$ 100 MHz)	—	—	250	—	—	250	—	—	250	—	—	250	—	—	325	ps (p-p)
	Period Jitter for dedicated clock output in cascaded PLLs (F_{OUT} <100 MHz)	—	—	25	—	—	25	—	—	25	—	—	25	—	—	32.5	mUI (p-p)
f_{DRIFT}	Frequency drift after PFDENA is disabled for duration of 100 µs	—	—	±10	—	—	±10	—	—	±10	—	—	±10	—	—	±10	%

Notes to Table 1–20:

(1) This specification is limited in the Quartus II software by the I/O maximum frequency. The maximum I/O frequency is different for each I/O standard.

(2) This specification is limited by the lower of the two: I/O f_{max} or f_{out} of the PLL.

(3) A high input jitter directly affects the PLL output jitter. To have low PLL output clock jitter, you must provide a clean clock source, which is less than 120 ps.

(4) F_{REF} is fIN/N when N = 1.

(5) Peak-to-peak jitter with a probability level of 10^{-12} (14 sigma, 99.99999999974404% confidence level). The output jitter specification applies to the intrinsic jitter of the PLL, when an input jitter of 30 ps is applied.

(6) High bandwidth PLL settings are not supported in external feedback mode.

(7) The cascaded PLL specification is only applicable with the following conditions:
a) Upstream PLL: 0.59 MHz ≤ Upstream PLL BW < 1 MHz
b) Downstream PLL: Downstream PLL BW > 2 MHz

(8) External memory interface clock output jitter specifications use a different measurement method and are available in Table 1–33 on page 1–29.

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DSP Block Specifications

Table 1–21 lists the Stratix III DSP block performance specifications.

Table 1–21. DSP Block Performance Specifications for Stratix III Devices *(Note 1)*

Mode	Number of Multipliers	C2 *(5)*	C3	C4	C4L		I3	I4	I4L	Unit
		V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
9×9-bit multiplier (a, c, e, g) *(2)*	1	440	365	315	315	240	345	315	225	MHz
9×9-bit multiplier (b, d, f, h) *(2)*	1	500	410	375	375	270	385	375	250	MHz
12×12-bit multiplier (a, e) *(3)*	1	440	365	315	315	240	345	315	225	MHz
12×12-bit multiplier (b, d, f, h) *(3)*	1	500	410	375	375	270	385	375	250	MHz
18×18-bit multiplier	1	600	495	440	440	320	470	440	300	MHz
36×36-bit multiplier	1	440	365	315	315	220	345	315	205	MHz
Double mode	1	440	365	315	315	220	345	315	205	MHz
18×18-bit multiply adder	2	490	405	345	345	250	380	345	235	MHz
18×18-bit multiply adder	4	490	405	345	345	250	380	345	235	MHz
18×18-bit multiply adder with loop back	2	490	405	345	345	250	380	345	235	MHz
18×18-bit multiply adder with loop back *(4)*	2	390	320	300	240	180	300	300	135	MHz
18×18-bit multiply accumulator	4	475	390	330	330	240	370	330	225	MHz
18×18-bit multiply adder with chainout	4	475	390	330	330	240	370	330	225	MHz
Input Cascade Independent output of four 18×18 bit multiplier	4	550	455	415	415	270	430	415	250	MHz
36-bit shift (32 bit data)	1	475	390	330	330	250	370	330	235	MHz

Notes to Table 1–21:

(1) Maximum is for a fully pipelined block with **Round** and **Saturation** disabled.

(2) The DSP block implements eight independent 9b×9b multiplies using a, b, c, d for the top DSP half block and e, f, g, h for the bottom DSP half block multipliers.

(3) The DSP block implements six independent 12b×12b multiplies using a, b, d for the top DSP half block and e, f, h for the bottom DSP half block multipliers.

(4) Maximum for loopback input registers disabled, **Round** and **Saturation** disabled, pipeline and output registers enabled.

(5) The F_{max} for the EP3SL200, EP3SE260, and EP3SL340 devices at the C2 speed grade is 7% slower than the C2 values shown in the table.

TriMatrix Memory Block Specifications

Table 1–22 lists the Stratix III TriMatrix Memory Block specifications.

Table 1–22. TriMatrix Memory Block Performance Specifications for Stratix III Devices *(Note 1)* (Part 1 of 3)

Memory Block Type	Mode	ALUTs	TriMatrix Memory	C2 *(6)*	C3	C4	C4L		I3	I4	I4L	Unit
				V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
MLAB	Single port 16 × 10	0	1	600	500	450	450	340	475	450	320	MHz
	Simple dual-port 16 × 20	0	1	600	500	450	450	340	475	450	320	MHz
	ROM 64 × 10	0	1	600	500	450	450	370	475	450	350	MHz
	ROM 32 × 20	0	1	600	500	450	450	340	475	450	320	MHz
M9K *(2)*	Single-port 8K × 1	0	1	550	465	390	390	245	440	390	230	MHz
	Single-port 4K × 2 or 2K × 4	0	1	575	485	405	405	255	460	405	230	MHz
	Single-port 1K × 9, 512 × 18, or 256 × 36	0	1	565	475	395	395	245	450	395	220	MHz
	Simple dual-port, 8K × 1	0	1	545	460	385	385	240	435	385	225	MHz
	Simple dual-port, 4K × 2 or 2K × 4	0	1	570	480	400	400	250	455	400	225	MHz
	Simple dual-port, 1K × 9, 512 × 18, or 256 × 36	0	1	565	475	395	395	245	450	395	220	MHz
	Simple dual-port, 8K × 1, 4K × 2 or 2K × 4 with read-during-write option set to **Old Data**	0	1	375	312	265	265	205	295	265	185	MHz
	Simple dual-port, 1K × 9, 512 × 18, 256 × 36 with read-during-write option set to **Old Data**	0	1	375	312	265	265	200	295	265	180	MHz
	True dual-port, 8K × 1	0	1	530	440	370	370	230	420	370	215	MHz
	True dual-port, 4K × 2 or 2K × 4	0	1	550	460	385	385	240	435	385	215	MHz
	True dual-port, 1K × 9 or 512 × 18	0	1	545	460	380	380	235	435	380	210	MHz
	True dual-port, 8K × 1, 4K × 2, or 2K × 4 with read-during-write option set to **Old Data**	0	1	350	295	245	245	175	280	245	160	MHz
	True dual-port, 1K × 9 or 512 × 18 with read-during-write option set to **Old Data**	0	1	340	285	240	240	165	270	240	150	MHz
	ROM 1P, 8K × 1, 4K × 2, or 2K × 4	0	1	580	485	405	405	260	460	405	235	MHz
	ROM 1P, 1K × 9, 512 × 18, or 256 × 36	0	1	575	485	405	405	255	460	405	230	MHz
	ROM 2P, 8K × 1, 4K × 2, or 2K × 4	0	1	580	485	405	405	265	460	405	240	MHz
	ROM 2P, 1K × 9, or 512 × 18	0	1	575	485	405	405	260	460	405	235	MHz
	Min Pulse Width (Clock High Time)	—	—	800	1000	1100	1100	1800	1000	1100	1800	ps
	Min Pulse Width (Clock Low Time)	—	—	500	625	690	690	1100	625	690	1100	ps

Table 1–22. TriMatrix Memory Block Performance Specifications for Stratix III Devices *(Note 1)* (Part 2 of 3)

Memory Block Type	Mode	ALUTs	TriMatrix Memory	C2 *(6)*	C3	C4	C4L		I3	I4	I4L	Unit
				V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
M144K *(3)*, *(4)*	True dual-port 16K × 9 or 8K × 18	0	1	350	300	245	245	180	280	245	170	MHz
	True dual-port 4K × 36	0	1	520	430	365	365	250	405	365	235	MHz
	Simple dual-port 16K × 9 or 8K × 18	0	1	350	300	245	245	180	280	245	170	MHz
	Simple dual-port 4K × 36 or 2K × 72	0	1	565	470	395	395	225	440	395	210	MHz
	ROM 1Port	0	1	580	470	425	425	260	470	425	260	MHz
	ROM 2 Port	0	1	545	450	380	380	260	425	380	245	MHz
	Single-port 16K × 9 or 8K × 18	0	1	385	330	270	270	240	310	270	195	MHz
	Single-port 4K × 36	0	1	580	470	425	425	210	470	425	195	MHz
	True dual-port 16K × 9, 8K × 18, or 4K × 36 with read-during-write option set to **Old Data**	0	1	325	270	225	225	165	255	225	155	MHz
	Simple dual-port 16K × 9, 8K × 18, 4K × 36, or 2K × 72 with read-during-write option set to "Old Data"	0	1	350	292	250	250	200	275	250	190	MHz
	Simple dual-port 2K × 64 (with ECC)	0	1	255	210	180	180	130	195	180	120	MHz
	Min Pulse Width (Clock High Time)	—	—	800	1000	1100	1100	1800	1000	1100	1800	ps
	Min Pulse Width (Clock Low Time)	—	—	500	625	690	690	1100	625	690	1100	ps
M144K *(3)*, *(5)*	True dual-port 16K × 9 or 8K × 18	0	1	425	360	300	300	210	340	300	195	MHz
	True dual-port 4K × 36	0	1	520	430	365	365	250	405	365	235	MHz
	Simple dual-port 16K × 9 or 8K × 18	0	1	425	360	300	300	210	340	300	195	MHz
	Simple dual-port 4K × 36 or 2K × 72	0	1	565	470	395	395	225	440	395	210	MHz
	ROM 1Port	0	1	580	470	425	425	260	470	425	260	MHz
	ROM 2 Port	0	1	545	450	380	380	260	425	380	245	MHz
	Single-port 16K × 9 or 8K × 18	0	1	475	405	335	335	210	380	335	195	MHz
	Single-port 4K × 36	0	1	580	470	425	425	210	470	425	195	MHz
	True dual-port 16K × 9, 8K × 18, or 4K × 36 with read-during-write option set to **Old Data**	0	1	325	270	225	225	165	255	225	155	MHz
	Simple dual-port 16K × 9, 8K × 18, 4K × 36, or 2K × 72 with read-during-write option set to **Old Data**	0	1	350	292	250	250	200	275	250	190	MHz

Table 1–22. TriMatrix Memory Block Performance Specifications for Stratix III Devices *(Note 1)* (Part 3 of 3)

Memory Block Type	Mode	ALUTs	TriMatrix Memory	C2 *(6)*	C3	C4	C4L		I3	I4	I4L	Unit
				V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
M144K *(3)*, *(5)*	Simple dual-port 2K × 64 (with ECC)	0	1	255	210	180	180	130	195	180	120	MHz
	Min Pulse Width (Clock High Time)	—	—	800	1000	1100	1100	1800	1000	1100	1800	ps
	Min Pulse Width (Clock Low Time)	—	—	500	625	690	690	1100	625	690	1100	ps

Notes to Table 1–22:

(1) Use a memory block clock that comes through global clock routing from an on-chip PLL set to 50% output duty cycle to achieve the maximum memory block performance. Use the Quartus II software to report timing for this and other memory block clocking schemes.

(2) The F_{max} shown for M9K degrades 2% when you use the Error Detection CRC feature on the device, except for the C4L speed grade with V_{CCL} = 0.9 V. For the C4L speed grade with V_{CCL} = 0.9V, there is no degradation in F_{max} when you use the Error Detection CRC feature.

(3) The F_{max} shown for M144K degrades 10 MHz when you use byte-enable support on M144K.

(4) F_{max} is applicable when the **COMPTABILITY** option is turned ON.

(5) F_{max} is applicable when the **COMPTABILITY** option is turned OFF. This option is turned ON by default in Quartus II software.

(6) The F_{max} for the EP3SL200, EP3SE260, and EP3SL340 devices at the C2 speed grade is 7% slower than the C2 values shown in the table.

Configuration and JTAG Specifications

Table 1–23 lists the Stratix III configuration mode specifications.

Table 1–23. Configuration Mode Specifications for Stratix III Devices *(Note 1)*

Programming Mode	DCLK F_{max}	Unit
Passive Serial	100	MHz
Fast Passive Parallel *(2)*	100	MHz
Fast Active Serial *(3)*	40	MHz

Notes to Table 1–23:

(1) DCLK F_{max} is restricted when you enable the Remote Update feature. For more information, refer to the *Remote Update Circuitry (ALTREMOTE_UPDATE) Megafunction User Guide*.

(2) The data rate must be 4× slower than the clock when you use decompression and/or encryption.

(3) For more information about the minimum and typical DCLK F_{max} value in Fast Active Serial configuration, refer to the *Configuring Stratix III Devices* chapter.

Table 1–24 lists the JTAG timing parameters and values for Stratix III devices. Refer to the figure for "HIGH-SPEED I/O Block" in the "Glossary" on page 1–326 for the JTAG timing requirements.

Table 1–24. JTAG Timing Parameters and Values for Stratix III Devices

Symbol	Parameter	Min	Max	Unit
t_{JCP}	TCK clock period	30	—	ns
t_{JCH}	TCK clock high time	14	—	ns
t_{JCL}	TCK clock low time	14	—	ns
t_{JPSU} (TDI)	JTAG port setup time for TDI	1	—	ns
t_{JPSU} (TMS)	JTAG port setup time for TMS	3	—	ns
t_{JPH}	JTAG port hold time	5	—	ns
t_{JPCO}	JTAG port clock to output	—	11	ns
t_{JPZX}	JTAG port high impedance to valid output	—	14	ns
t_{JPXZ}	JTAG port valid output to high impedance	—	14	ns

Periphery Performance

This section describes periphery performance, including high-speed I/O and external memory interface.

I/O performance supports several system interfacing, such as the LVDS high-speed I/O interface, external memory interface, and the PCI/PCI-X bus interface. For example, Stratix III devices I/O configured with voltage referenced I/O standards can achieve up to the stated system interfacing speed as indicated in "External Memory Interface Specifications" on page 1–25. General-purpose I/O standards such as 3.3, 3.0, 2.5, 1.8, or 1.5 LVTTL/LVCMOS are capable of typical 167 MHz and 1.2 LVCMOS at 100MHz interfacing frequency with 10pF load.

Actual achievable frequency depends on design- and system-specific factors. You must perform HSPICE/IBIS simulations based on your specific design and system setup to determine the maximum achievable frequency in your system.

High-Speed I/O Specifications

Refer to the "Glossary" on page 1–326 for the definitions of the high-speed timing specifications.

Table 1–25 lists the true and emulated LVDS specifications for Stratix III devices.

Table 1–25. True and Emulated LVDS Specifications for Stratix III Devices *(Note 1)*, *(2)* (Part 1 of 3)

Symbol	Conditions	C2			C3, I3			C4, I4			C4L, I4L			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{HSCLK_in} (input clock frequency)—True Differential I/O Standards	Clock boost factor W = 1 to 40 *(3)*	5	—	800	5	—	717	5	—	717	5	—	717	MHz
f_{HSCLK_in} (input clock frequency)—Single Ended I/O Standards *(9)*	Clock boost factor W = 1 to 40 *(3)*	5	—	800	5	—	717	5	—	717	5	—	717	MHz
f_{HSCLK_out} (output clock frequency)	—	5	—	800 *(7)*	5	—	717 *(7)*	5	—	717 *(7)*	5	—	717 *(7)*	MHz
Transmitter														
f_{HSDR} (data rate)	SERDES factor J = 3 to 10 *(8)*	*(4)*	—	1600	*(4)*	—	1250	*(4)*	—	1250	*(4)*	—	1250	Mbps
	SERDES factor J = 2, Uses DDR Register	*(4)*	—	*(4)*	*(4)*	—	*(4)*	*(4)*	—	*(4)*	*(4)*	—	*(4)*	Mbps
	SERDES factor J = 1, Uses SDR Register	*(4)*	—	*(4)*	*(4)*	—	*(4)*	*(4)*	—	*(4)*	*(4)*	—	*(4)*	Mbps
LVDS_E_3R -f_{HSDR} (data rate)	SERDES factor J = 4 to 10	*(4)*	—	1100	*(4)*	—	1100	*(4)*	—	800	*(4)*	—	800	Mbps

Table 1–25. True and Emulated LVDS Specifications for Stratix III Devices *(Note 1)*, *(2)* (Part 2 of 3)

Symbol	Conditions	C2			C3, I3			C4, I4			C4L, I4L			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
LVDS_E_1R -f_{HSDR} (data rate)	SERDES factor J = 4 to 10	*(4)*	—	311	*(4)*	—	200	*(4)*	—	200	*(4)*	—	200	Mbps
$t_{x\ Jitter}$ *(5)*	Total Jitter for Data Rate, 600 Mbps – 1.6 Gbps	—	—	160	—	—	160	—	—	160	—	—	160	ps
	Total Jitter for Data Rate, < 600 Mbps	—	—	0.1	—	—	0.1	—	—	0.1	—	—	0.1	UI
t_{DUTY}	T_X output duty cycle for both True and Emulated Differential I/O	45	50	55	45	50	55	45	50	55	45	50	55	%
t_{RISE} & t_{FALL}	True Differential I/O Standards	—	—	160	—	—	200	—	—	200	—	—	200	ps
t_{RISE} & t_{FALL}	Emulated Differential I/O Standards with Three External Output Resistor Network	—	—	310	—	—	310	—	—	350	—	—	350	ps
t_{RISE} & t_{FALL}	Emulated Differential I/O Standards with One External Output Resistor Network	—	—	460	—	—	500	—	—	500	—	—	500	ps
TCCS	True Differential I/O Standards	—	—	100	—	—	100	—	—	100	—	—	100	ps
TCCS	Emulated Differential I/O Standards	—	—	250	—	—	250	—	—	250	—	—	250	ps
Receiver														
$f_{HSDRDPA}$ (data rate)	SERDES factor J = 3 to 10	150	—	1600	150	—	1250	150	—	1250	150	—	1250	Mbps
f_{HSDR} (data rate)	SERDES factor J = 3 to 10	*(4)*	—	*(6)*	*(4)*	—	*(6)*	*(4)*	—	*(6)*	*(4)*	—	*(6)*	Mbps
	SERDES factor J = 2, Uses DDR Registers	*(4)*	—	*(6)*	*(4)*	—	*(6)*	*(4)*	—	*(6)*	*(4)*	—	*(6)*	Mbps
	SERDES factor J = 1, Uses an SDR Register	*(4)*	—	*(6)*	*(4)*	—	*(6)*	*(4)*	—	*(6)*	*(4)*	—	*(6)*	Mbps
DPA														
DPA run length	—	—	—	10000	—	—	10000	—	—	10000	—	—	10000	UI
Soft CDR mode														
Soft-CDR PPM tolerance	—	—	—	300	—	—	300	—	—	300	—	—	300	± PPM

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Table 1–25. True and Emulated LVDS Specifications for Stratix III Devices *(Note 1)*, *(2)* (Part 3 of 3)

Symbol	Conditions	C2			C3, I3			C4, I4			C4L, I4L			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Non DPA Mode														
Sampling Window	—	—	—	300	—	—	300	—	—	300	—	—	300	ps

Notes to Table 1–25:

(1) When J = 3 to 10, the SERDES block is used.

(2) When J = 1 or 2, the SERDES block is bypassed.

(3) Clock Boost Factor (W) is the ratio between the input data rate to the input clock rate.

(4) The minimum and maximum specification depends on the clock source (for example, the PLL and clock pin) and the clock routing resource (global, regional, or local) used. The I/O differential buffer and input register do not have a minimum toggle rate.

(5) The $t_{xJitter}$ specification is for the true LVDS I/O standard only.

(6) You can estimate the achievable maximum data rate for non-DPA mode by performing link timing closure analysis. Consider the board skew margin, transmitter delay margin, as well as the receiver sampling margin to determine the maximum data rate supported.

(7) This is achieved by using the LVDS and DPA clock network.

(8) If the receiver (with DPA enabled) and the transmitter are using shared PLLs, the minimum data rate is 150 Mbps.

(9) This is only applied to DPA and Soft-CDR modes.

Table 1–26 lists the DPA lock time specifications for Stratix III devices.

Table 1–26. DPA Lock Time Specifications for Stratix III Devices *(Note 1)*, *(2)*, *(3)* (Part 1 of 2)

Standard	Training Pattern	Number of Data Transitions in one Repetition of Training Pattern	Number of repetitions per 256 Data Transition *(4)*	Condition *(5)*	Min	Typ	Max
SPI-4	0000000000 1111111111	2	128	without DPA PLL calibration	256 data transitions	—	—
				with DPA PLL calibration	3×256 data transitions + 2×96 slow clock cycles *(6)*	—	—
Parallel Rapid I/O	00001111	2	128	without DPA PLL calibration	256 data transitions	—	—
				with DPA PLL calibration	3×256 data transitions + 2×96 slow clock cycles *(6)*	—	—
	10010000	4	64	without DPA PLL calibration	256 data transitions	—	—
				with DPA PLL calibration	3×256 data transitions + 2×96 slow clock cycles *(6)*	—	—

Table 1–26. DPA Lock Time Specifications for Stratix III Devices *(Note 1)*, *(2)*, *(3)* (Part 2 of 2)

Standard	Training Pattern	Number of Data Transitions in one Repetition of Training Pattern	Number of repetitions per 256 Data Transition *(4)*	Condition *(5)*	Min	Typ	Max
Miscellaneous	10101010	8	32	without DPA PLL calibration	256 data transitions	—	—
				with DPA PLL calibration	3×256 data transitions + 2×96 slow clock cycles *(6)*	—	—
	01010101	8	32	without DPA PLL calibration	256 data transitions	—	—
				with DPA PLL calibration	3×256 data transitions + 2×96 slow clock cycles *(6)*	—	—

Notes to Table 1–26:

(1) The DPA lock time is for one channel.

(2) One data transition is defined as a 0-to-1 or 1-to-0 transition.

(3) The DPA lock time stated in this table applies to both commercial and industrial grade.

(4) These are the number of repetitions for the stated training pattern to achieve 256 data transitions.

(5) Altera recommends PLL re-calibration for the situations below to guarantee DPA locking:

- Sparse data transitions. For example: Repeating sequences of ten 1s and ten 0s.
- 0 PPM frequency difference and/or 0° phase difference between the clock and data.

(6) Slow clock = data rate (Hz)/ Deserialization factor.

Figure 1–2 shows the DPA time specification with DPA PLL calibration enabled.

Figure 1–2. DPA Lock Time Specification with DPA PLL Calibration Enabled

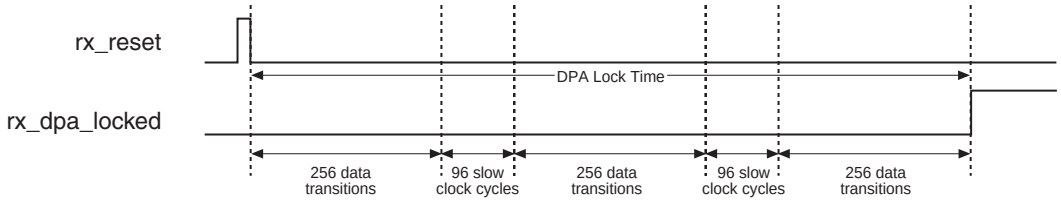


Figure 1–3 shows the LVDS Soft-CDR/ DPA sinusoidal jitter tolerance specifications for Stratix III devices.

Figure 1–3. LVDS Soft-CDR/DPA Sinusiodal Jitter Tolerance Specification for Stratix III Devices

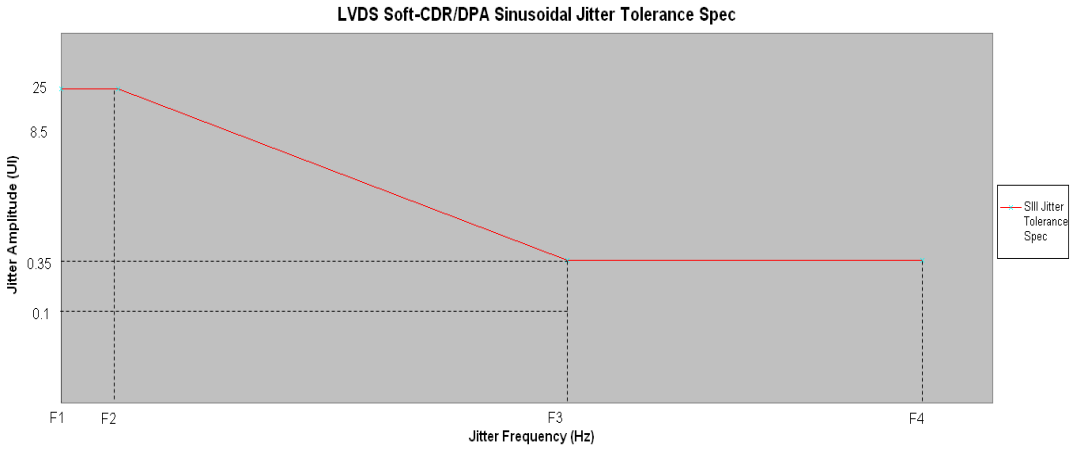


Table 1–27 lists the LVDS Soft-CDR/ DPA sinusiodal jitter mask values for Stratix III devices.

Table 1–27. LVDS Soft-CDR/DPA Sinusoidal Jitter Mask Values for Stratix III Devices

Jitter Frequency (Hz)		Jitter Amplitude	Unit
F1	10,000	25.000	UI
F2	17,565	25.000	UI
F3	1,493,000	0.350	UI
F4	50,000,000	0.350	UI

External Memory Interface Specifications

The following sections describe the external memory I/O timing specifications and the DLL and DQS block specifications.

For more information about the maximum clock rate support for external memory interfaces with a half-rate or full-rate controller, refer to *Section III: System Performance Specifications* of the *External Memory Interfaces Handbook*.

External Memory I/O Timing Specifications

Table 1–28 and Table 1–29 list Stratix III device timing uncertainties on the read and write data paths. Use these specifications to determine timing margins for source synchronous paths between the Stratix III FPGA and the external memory device. For more information, refer to the figure for "SW (sampling window)" in the "Glossary" on page 1–326.

Table 1–28. Sampling Window (SW)—Read Side *(Note 1)*

Memory Type	I/O Standard	Width	C2		C3, I3		C4, I4		C4L, I4L		C4L, I4L	
			V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 0.9 V	
			SW (ps)		SW (ps)		SW (ps)		SW (ps)		SW (ps)	
			Setup	Hold	Setup	Hold	Setup	Hold	Setup	Hold	Setup	Hold
DDR3 SDRAM (with 8 or 10 tap phase offset, 300 MHz–400 MHz)	1.5-V SSTL	×4, ×8	172	296	234	296	257	311	257	311	257	311
DDR3 SDRAM (with Deskew circuitry, 401 MHz–533 MHz)	1.5-V SSTL	×4, ×8	300	213	—	—	—	—	—	—	—	—
DDR3 SDRAM (Non-leveling interface)	1.5-V SSTL	×4, ×8	172	296	234	296	257	311	257	311	257	311
DDR2 SDRAM Differential DQS	1.8-V SSTL	×4, ×8	181	306	234	326	257	326	257	326	257	326
DDR2 SDRAM Single-ended DQS	1.8-V SSTL	×4, ×8	231	256	284	276	307	276	307	276	307	276
DDR SDRAM Single-ended DQS	2.5-V SSTL	×4, ×8	231	256	284	261	307	261	307	261	307	261
QDRII/II+ SRAM	1.5-V HSTL	×9, ×18, ×36	261	286	314	291	337	291	337	291	337	291
QDRII/II+ SRAM Emulation *(2)*	1.5-V HSTL	×36	261	328	314	337	337	350	337	350	337	350
QDRII/II+ SRAM	1.8-V HSTL	×9, ×18, ×36	261	286	314	291	337	291	337	291	337	291
QDRII/II+ SRAM Emulation *(2)*	1.8-V HSTL	×36	261	328	314	337	337	350	337	350	337	350
RLDRAM II	1.5-V HSTL	×9, ×18	211	336	264	356	287	356	287	356	287	356
RLDRAM II	1.8-V HSTL	×9, ×18	211	336	264	356	287	356	287	356	287	356

Notes to Table 1–28:

(1) The values apply to Column I/Os, Row I/Os and Hybrid mode interface. Column I/Os refer to top and bottom I/Os. Hybrid mode refers to DQ/DQS groups wrapping over Column I/Os and Row I/Os of the device.

(2) For implementation, refer to the "Supporting ×36 QDRII+/QDRII SRAM Interfaces in the F780 and F1152-Pin Packages" section in the *External Memory Interfaces in Stratix III Devices* chapter.

Table 1–29. Transmitter Channel-to-Channel Skew (TCCS)—Write Side *(Note 1)* (Part 1 of 2)

Memory Type	I/O Standard	Width	C2		C3, I3		C4, I4		C4L, I4L		C4L, I4L	
			V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 0.9 V	
			TCCS (ps)		TCCS (ps)		TCCS (ps)		TCCS (ps)		TCCS (ps)	
			Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
DDR3 SDRAM (with Deskew circuitry, 401 MHz–533 MHz)	1.5-V SSTL	×4, ×8	253	262	—	—	—	—	—	—	—	—
DDR3 SDRAM (8-tap phase offset, 375 MHz–400 MHz)	1.5-V SSTL	×4, ×8	293	284	341	332	—	—	—	—	—	—
DDR3 SDRAM (8-tap phase offset, 360 MHz–375 MHz)	1.5-V SSTL	×4, ×8	293	284	341	373	—	—	—	—	—	—
DDR3 SDRAM (10-tap phase offset, 333 MHz–360 MHz)	1.5-V SSTL	×4, ×8	169	470	217	496	258	528	258	528	—	—
DDR3 SDRAM (10-tap phase offset, 300 MHz–333 MHz)	1.5-V SSTL	×4, ×8	169	470	217	496	258	528	258	528	—	—
DDR3 SDRAM (Non-leveling interface)	1.5-V SSTL	×4, ×8	268	246	230	355	250	388	250	388	250	388
DDR2 SDRAM Differential DQS	1.8-V SSTL	×4, ×8	229	246	230	355	250	388	250	388	350	488
DDR2 SDRAM Single-ended DQS	1.8-V SSTL	×4, ×8	316	168	318	239	346	260	346	260	446	360
DDR SDRAM Single-ended DQS	2.5-V SSTL	×4, ×8	313	157	315	222	343	242	343	242	443	342
QDRII/II+ SRAM	1.5-V HSTL	×9, ×18, ×36	290	278	292	388	315	421	315	421	415	521
QDRII/II+ SRAM Emulation *(2)*	1.5-V HSTL	×36	310	298	312	408	335	441	335	441	435	541

Table 1–29. Transmitter Channel-to-Channel Skew (TCCS)—Write Side *(Note 1)* (Part 2 of 2)

Memory Type	I/O Standard	Width	C2		C3, I3		C4, I4		C4L, I4L		C4L, I4L	
			V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 1.1 V		V_{CCL} = 0.9 V	
			TCCS (ps)		TCCS (ps)		TCCS (ps)		TCCS (ps)		TCCS (ps)	
			Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
QDRII/II+ SRAM	1.8-V HSTL	×9, ×18, ×36	259	276	260	385	280	418	280	418	380	518
QDRII/II+ SRAM Emulation *(2)*	1.8-V HSTL	×36	279	296	280	405	300	438	300	438	400	538
RLDRAM II	1.5-V HSTL	×9, ×18	290	278	292	388	315	421	315	421	415	521
RLDRAM II	1.8-V HSTL	×9, ×18	259	276	260	385	280	418	280	418	380	518

Notes to Table 1–29:

(1) The values apply to Column I/Os, Row I/Os, and Hybrid mode interfaces. Column I/Os refer to top and bottom I/Os. Hybrid mode refers to DQ/DQS groups wrapping over Column I/Os and Row I/Os of the device.

(2) For implementation, refer to the "Supporting ×36 QDRII+/QDRII SRAM Interfaces in the F780 and F1152-Pin Packages" section in the *External Memory Interfaces in Stratix III Devices* chapter.

DLL and DQS Logic Block Specifications

Table 1–30 lists the DLL frequency range specifications for Stratix III devices.

Table 1–30. DLL Frequency Range Specifications for Stratix III Devices

Frequency Mode	Frequency Range (MHz)				Available Phase Shift	Number of Delay Chains	DQS Delay Buffer Mode *(1)*
	C2	C3, I3	C4, I4	C4L, I4L			
0	90 – 150	90 – 140	90 – 120	90 – 120	22.5°, 45°, 67.5°, 90°	16	Low
1	120 – 200	120 – 190	120 – 170	120 – 170	30°, 60°, 90°, 120°	12	Low
2	150 – 240	150 – 230	150 – 200	150 – 200	36°, 72°, 108°, 144°	10	Low
3	180 – 300	180 – 290	180 – 250	180 – 250	45°, 90°,135°, 180°	8	Low
4	240 – 370	240 – 350	240 – 310	240 – 310	30°, 60°, 90°,120°	12	High
5	290 – 450	290 – 420	290 – 370	290 – 370	36°, 72°, 108°, 144°	10	High
6	360 – 560	360 – 530	360 – 460	360 – 460	45°, 90°, 135°, 180°	8	High
7	470 – 740	470 – 700	470 – 610	470 – 610	60°, 120°, 180°, 240°	6	High

Note to Table 1–30:

(1) "Low" indicates a 6-bit DQS delay setting; "high" indicates a 5-bit DQS delay setting.

Table 1–31 lists the average DQS phase offset delay per setting for Stratix III devices.

Table 1–31. Average DQS Phase Offset Delay per Setting for Stratix III Devices *(Note 1)*, *(2)*, *(3)*

Speed Grade	Min	Typ	Max	Unit
C2	7	10	13	ps
C3, I3	7	11	15	ps
C4, I4	7	11.5	16	ps
C4L, I4L	7	11.5	16	ps

Notes to Table 1–31:

(1) The valid settings for phase offset are -64 to +63 for frequency modes 0 to 3 and -32 to +31 for frequency modes 4 to 6.

(2) The typical value equals the average of the minimum and maximum values.

(3) The delay settings are linear with a cumulative delay variation of ± 20 ps for all speed grades. For example, when using a C2 speed grade and applying 10° phase offset settings to a 90° phase shift at 400 MHz, the expected minimum cumulative delay is [625 ps + (10*7 ps) - 20 ps] = 675 ps.

Table 1–32 lists the DQS phase shift error specification for DLL-delayed clock (t_{DQS_PSERR}) for Stratix III devices.

Table 1–32. DQS Phase Shift Error Specification for DLL-Delayed Clock (t_{DQS_PSERR}) for Stratix III Devices *(Note 1)*

Number of DQS Delay Buffer	C2	C3, I3	C4, C4L, I4, I4L	Unit
1	±13	±14	±15	ps
2	±26	±28	±30	ps
3	±39	±42	±45	ps
4	±52	±56	±60	ps

Note to Table 1–32:

(1) This error specification is the absolute maximum and minimum error. For example, skew on three DQS delay buffers in a C2 speed grade is ± 39 ps.

Table 1–33 lists the memory output jitter specification for Stratix III devices.

Table 1–33. Memory Output Clock Jitter Specification for Stratix III Devices *(Note 1)*, *(2)*

Parameter	Clock Network	Symbol	C2		C3, I3		C4, I4		C4L, I4L				Unit
			V_{CCL} = 1.1V		V_{CCL} = 1.1V		V_{CCL} = 1.1V		V_{CCL} = 1.1V		V_{CCL} = 0.9V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Clock period jitter	Regional	tJIT(per)	–75	75	–85	85	–100	100	–100	100	–120	120	ps
Cycle-to-cycle period jitter	Regional	tJIT(cc)	–150	150	–170	170	–190	190	–190	190	–230	230	ps
Duty cycle jitter	Regional	tJIT(duty)	–80	80	–90	90	–100	100	–100	100	–140	140	ps
Clock period jitter	Global	tJIT(per)	–113	113	–128	128	–150	150	–150	150	–180	180	ps
Cycle-to-cycle period jitter	Global	tJIT(cc)	–225	225	–255	255	–285	285	–285	285	–340	340	ps
Duty cycle jitter	Global	tJIT(duty)	–120	120	–135	135	–150	150	–150	150	–180	180	ps

Notes to Table 1–33:

(1) The memory output clock jitter measurements are for 200 consecutive clock cycles, as specified in the JEDEC DDR2/DDR3 standard.

(2) The clock jitter specification applies to memory output clock pins generated using differential signal-splitter and DDIO circuits clocked by a PLL output routed on a regional or global clock network as specified. Altera recommends using the regional clock networks whenever possible.

OCT Calibration Block Specifications

Table 1–34 lists the on-chip termination calibration block specifications for Stratix III devices.

Table 1–34. On-Chip Termination Calibration Block Specification

Symbol	Description	Min	Typical	Max	Unit
OCTUSRCLK	Clock required by OCT calibration blocks	—	—	20	MHz
t_{OCTCAL}	Number of OCTUSRCLK clock cycles required for OCT Rs and Rt calibration	—	1000	—	cycles
$t_{OCTSHIFT}$	Number of OCTUSRCLK clock cycles required for OCT code to shift out per OCT calibration block	—	28	—	cycles
t_{RS_RT}	Time required to dynamically switch from Rs to Rt	—	2.5	—	ns

DCD Specifications

Table 1–35 lists the worst case duty cycle distortion for Stratix III devices.

Table 1–35. Duty Cycle Distortion on Stratix III I/O Pins *(Note 1)*

Symbol	C2		C3		C4		Unit
	Min	Max	Min	Max	Min	Max	
Output Duty Cycle	45	55	45	55	45	55	%

Note to Table 1–35:

(1) The DCD specification applies to clock outputs from the PLLs, global clock tree, and IOE driving dedicated and general-purpose I/O pins.

I/O Timing

The following sections describe the timing models, preliminary and final timings, I/O timing measurement methodology, I/O default capacitive loading, programmable IOE delay, programmable output buffer delay, user I/O timing, and dedicated clock pin timing.

Timing Model

The DirectDrive technology and MultiTrack interconnect ensure predictable performance, accurate simulation, and accurate timing analysis across all Stratix III device densities and speed grades. This section describes the performance of the Stratix III device I/Os.

All specifications except the fast model are representative of worst-case supply voltage and junction temperature conditions. Fast model specifications are representative of best case process, supply voltage, and junction temperature conditions.

The timing numbers listed in this section are extracted from the Quartus II software version 8.1.

Preliminary and Final Timing

Timing models can have either preliminary or final status. The Quartus II software issues an informational message during design compilation if the timing models are preliminary. Table 1–36 lists the status of the Stratix III device timing models.

Preliminary status means that the timing models are subject to change in future Quartus II releases. Initially, timing numbers are created using simulation results, process data, and other known parameters. Parts of the timing models may be correlated to silicon measurements. Various tests are used to make the preliminary numbers as close to the actual timing parameters as possible.

Final timing models are based on simulation models that are characterized versus the actual device measurements under all allowable operating conditions. When the timing models are final, all or most of the Stratix III family devices have been completely characterized and no further changes to the timing model are expected.

Table 1–36. Timing Model Status for Stratix III Devices

Device	Preliminary	Final
EP3SL50	—	✓
EP3SL70	—	✓
EP3SL110	—	✓
EP3SL150	—	✓
EP3SL200	—	✓
EP3SL340	—	✓
EP3SE50	—	✓
EP3SE80	—	✓
EP3SE110	—	✓
EP3SE260	—	✓

I/O Timing Measurement Methodology

Altera characterizes timing delays at the worst-case process, minimum voltage, and maximum temperature for input register setup time (t_{su}) and hold time (t_h). The Quartus II software uses the following equations to calculate t_{su} and t_h timing for the Stratix III devices input signals.

t_{su} =

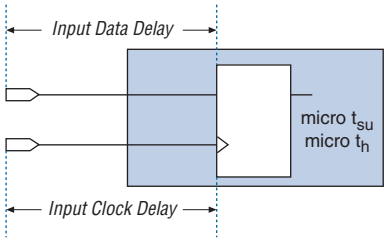
+ data delay from the input pin to the input register
+ micro setup time of the input register
- clock delay from the input pin to the input register

t_h =

- data delay from the input pin to the input register
+ micro hold time of the input register
+ clock delay from the input pin to the input register

Figure 1–4 shows the setup and hold timing diagram for input registers.

Figure 1–4. Input Register Setup and Hold Timing Diagram



For output timing, different I/O standards require different baseline loading techniques for reporting timing delays. Altera characterizes timing delays with the required termination for each I/O standard and with 0 pF (except for PCI and PCI-X, which use 10 pF) loading. The timing is specified up to the output pin of the FPGA device. The Quartus II software calculates I/O timing for each I/O standard with a default baseline loading as specified by the I/O standards.

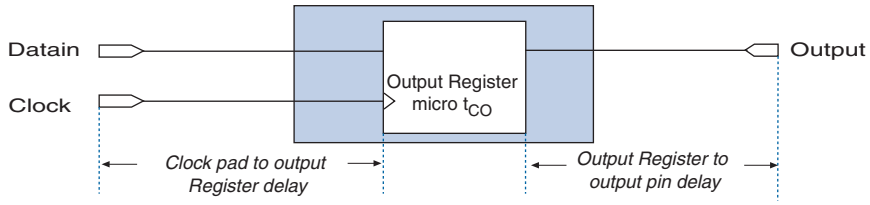
The following measurements are made during device characterization. Altera measures clock-to-output delays (t_{co}) at worst-case process, minimum voltage, and maximum temperature (PVT) for default loading conditions listed in Table 1–37 on page 1–34. The following equation describes clock-pin-to-output-pin timing for Stratix III devices.

The t_{co} from the clock pin to the I/O pin =

+ delay from the clock pad to the I/O output register
+ IOE output register clock-to-output delay
+ delay from the output register to the output pin

Figure 1–5 shows the output register clock to output timing diagram.

Figure 1–5. Output Register Clock to Output Timing Diagram



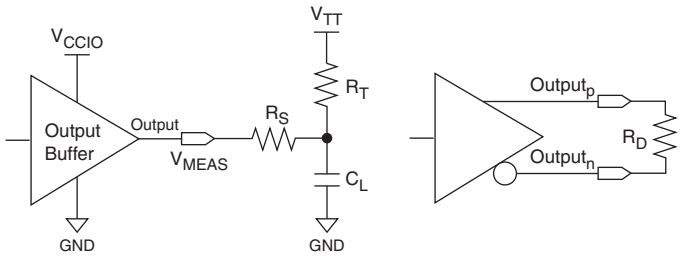
Simulation using IBIS models is required to determine the delays on the PCB traces in addition to the output pin delay timing reported by the Quartus II software and the timing model in the Stratix III Device Handbook. Perform the following steps:

1. Simulate the output driver of choice into the generalized test setup using values from Table 1–37.
2. Record the time to V_{MEAS} at the far end of the PCB trace.
3. Simulate the output driver of choice into the actual PCB trace and load using the appropriate IBIS model or capacitance value to represent the load.
4. Record the time to V_{MEAS} at the far end of the PCB trace.

5. Compare the results of steps 2 and 4. The increase or decrease in delay must be added to or subtracted from the I/O Standard Output Adder delays to yield the actual worst-case propagation delay (clock-to-output) of the PCB trace.

The Quartus II software reports the timing with the conditions listed in Table 1–37 using Equation 1–1 on page 1–7. Figure 1–6 shows the circuit that is represented by the output timing of the Quartus II software.

Figure 1–6. Output Delay Timing Report Setup for Single-Ended Outputs and Dedicated Differential Outputs *(Note 1)*



Note to Figure 1–6:

(1) Output pin timing is reported at the output pin of the FPGA device. Additional delays for loading and board trace delay must be accounted for with IBIS model simulations.

Figure 1–7 and Figure 1–8 show the circuit that is represented by the output timing of the Quartus II software for differential outputs with single and multiple external resistors, respectively.

Figure 1–7. Output Delay Timing Report Setup for Differential Outputs with Single External Resistor

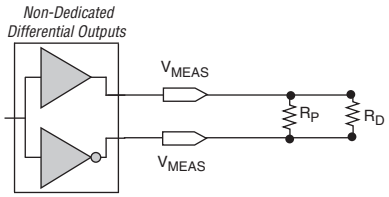


Figure 1–8. Output Delay Timing Report Setup for Differential Outputs with Three External Resistor

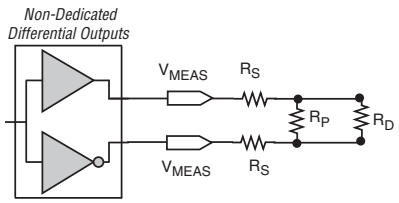


Table 1–37. Output Timing Measurement Methodology for Output Pins (Part 1 of 3)

I/O Standard	Loading and Termination									Measurement Point
	R_S	R_D	R_T	R_P	V_{CCIO}	V_{CCPD}	V_{CC}	V_{TT}	C_L (pF)	V_{MEAS} (v)
3.3-V LVTTL	—	—	—	—	3.135	3.135	1.05	—	0	1.5675
3.3-V LVCMOS	—	—	—	—	3.135	3.135	1.05	—	0	1.5675
3.0-V LVTTL	—	—	—	—	2.85	2.85	1.05	—	0	1.425
3.0-V LVCMOS	—	—	—	—	2.85	2.85	1.05	—	0	1.425
2.5-V	—	—	—	—	2.375	2.375	1.05	—	0	1.1875
1.8-V	—	—	—	—	1.71	2.375	1.05	—	0	0.855
1.5-V	—	—	—	—	1.425	2.375	1.05	—	0	0.7125
1.2-V	—	—	—	—	1.14	2.375	1.05	—	0	0.57
PCI	—	—	—	—	2.85	2.85	1.05	—	10	1.425
PCI-X	—	—	—	—	2.85	2.85	1.05	—	10	1.425
SSTL-2 CLASS I	25	—	50	—	2.325	2.325	1.02	1.25	0	1.1625
SSTL-2 CLASS II	25	—	25	—	2.325	2.325	1.02	1.25	0	1.1625
SSTL-18 CLASS I	25	—	50	—	1.66	2.325	1.02	0.90	0	0.83
SSTL-18 CLASS II	25	—	25	—	1.66	2.325	1.02	0.90	0	0.83
SSTL-15 CLASS I	25	—	50	—	1.375	2.325	1.02	0.75	0	0.6875
SSTL-15 CLASS II	25	—	25	—	1.375	2.325	1.02	0.75	0	0.6875
1.8-V HSTL CLASS I	—	—	50	—	1.66	2.325	1.02	0.90	0	0.83
1.8-V HSTL CLASS II	—	—	25	—	1.66	2.325	1.02	0.90	0	0.83
1.5-V HSTL CLASS I	—	—	50	—	1.375	2.325	1.02	0.75	0	0.6875
1.5-V HSTL CLASS II	—	—	25	—	1.375	2.325	1.02	0.75	0	0.6875
1.2-V HSTL CLASS I	—	—	50	—	1.09	2.325	1.02	0.60	0	0.545
1.2-V HSTL CLASS II	—	—	25	—	1.09	2.325	1.02	0.60	0	0.545
Differential SSTL-2 CLASS I	25	—	50	—	2.325	2.325	1.02	1.25	0	1.1625
Differential SSTL-2 CLASS II	25	—	25	—	2.325	2.325	1.02	1.25	0	1.1625
Differential SSTL-18 CLASS I	25	—	50	—	1.66	2.325	1.02	0.90	0	0.83
Differential SSTL-18 CLASS II	25	—	25	—	1.66	2.325	1.02	0.90	0	0.83
1.8-V Differential HSTL CLASS I	—	—	50	—	1.66	2.325	1.02	0.90	0	0.83
1.8-V Differential HSTL CLASS II	—	—	25	—	1.66	2.325	1.02	0.90	0	0.83
1.5-V Differential HSTL CLASS I	—	—	50	—	1.375	2.325	1.02	0.75	0	0.6875

Table 1–37. Output Timing Measurement Methodology for Output Pins (Part 2 of 3)

I/O Standard	Loading and Termination									Measurement Point
	R_S	R_D	R_T	R_P	V_{CCIO}	V_{CCPD}	V_{CC}	V_{TT}	C_L (pF)	V_{MEAS} (v)
1.5-V Differential HSTL CLASS II	—	—	25	—	1.375	2.325	1.02	0.75	0	0.6875
1.2-V Differential HSTL CLASS I	—	—	50	—	1.09	2.325	1.02	0.60	0	0.545
1.2-V Differential HSTL CLASS II	—	—	25	—	1.09	2.325	1.02	0.60	0	0.545
LVDS	—	100	—	—	2.325	2.325	1.02	—	0	1.1625
MINI-LVDS	—	100	—	—	2.325	2.325	1.02	—	0	1.1625
RSDS	—	100	—	—	2.325	2.325	1.02	—	0	1.1625
LVDS_E_1R	—	100	—	120	2.325	2.325	1.02	—	0	1.1625
LVDS_E_3R	120	100	—	170	2.325	2.325	1.02	—	0	1.1625

Table 1–37. Output Timing Measurement Methodology for Output Pins (Part 3 of 3)

I/O Standard	Loading and Termination									Measurement Point
	R_S	R_D	R_T	R_P	V_{CCIO}	V_{CCPD}	V_{CC}	V_{TT}	C_L (pF)	V_{MEAS} (v)
MINI-LVDS_E_1R	—	100	—	120	2.325	2.325	1.02	—	0	1.1625
MINI-LVDS_E_3R	120	100	—	170	2.325	2.325	1.02	—	0	1.1625
RSDS_E_1R	—	100	—	120	2.325	2.325	1.02	—	0	1.1625
RSDS_E_3R	120	100	—	170	2.325	2.325	1.02	—	0	1.1625

Notes to Table 1–37:

(1) Hyper transport is not supported by Stratix III devices.
(2) LVPECL outputs are not supported by Stratix III devices.
(3) You can change the Quartus II timing conditions using the Advanced I/O Timing feature.
(4) V_{CC} is nominally 1.1 V less 50 mV (1.05 V).
(5) Terminated I/O standards require an additional 30 mV IR drop on V_{CC} (1.02 V).
(6) Terminated I/O standards require an additional 50 mV IR drop on V_{CCIO} and V_{CCPD}.

I/O Default Capacitive Loading

Table 1–38 lists the default capacitive loading of various I/O standards.

Table 1–38. Default Loading of Various I/O Standards for Stratix III Devices (Part 1 of 2)

I/O Standard	Capacitive Load	Unit
3.3-V LVTTL	0	pF
3.3-V LVCMOS	0	pF
3.0-V LVTTL	0	pF
3.0-V LVCMOS	0	pF
2.5-V LVTTL/LVCMOS	0	pF
1.8-V LVTTL/LVCMOS	0	pF
1.5-V LVTTL/LVCMOS	0	pF
3.0-V PCI	10	pF
3.0-V PCI-X	10	pF
SSTL-2 CLASS I	0	pF
SSTL-2 CLASS II	0	pF
SSTL-18 CLASS I	0	pF
SSTL-18 CLASS II	0	pF
1.5-V HSTL CLASS I	0	pF
1.5-V HSTL CLASS II	0	pF
1.8-V HSTL CLASS I	0	pF
1.8-V HSTL CLASS II	0	pF
1.2-V HSTL	0	pF
Differential SSTL-2 CLASS I	0	pF
Differential SSTL-2 CLASS II	0	pF
Differential SSTL-18 CLASS I	0	pF

Table 1–38. Default Loading of Various I/O Standards for Stratix III Devices (Part 2 of 2)

I/O Standard	Capacitive Load	Unit
Differential SSTL-18 CLASS II	0	pF
1.8-V Differential HSTL CLASS I	0	pF
1.8-V Differential HSTL CLASS II	0	pF
1.5-V Differential HSTL CLASS I	0	pF
1.5-V Differential HSTL CLASS II	0	pF
1.2-V Differential HSTL CLASS I	0	pF
1.2-V Differential HSTL CLASS II	0	pF
LVDS	0	pF

Programmable IOE Delay

Table 1–39 lists the Stratix III IOE programmable delay settings.

For more information about the annotation of delays in the IOE, refer to Figure 7–7 in the *Stratix III Device I/O Features* chapter.

Table 1–39. IOE Programmable Delay for Stratix III Devices *(Note 1)*

Parameter	Available Settings	Min Offset *(2)*	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Unit
			Industrial	Commercial	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 1.1 V	V_{CCL} = 0.9 V	
			Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	Max Offset	
D1	15	0	442	491	748	829	916	871	833	870	957	915	833	ps
D2	7	0	248	285	387	412	442	427	411	433	464	448	411	ps
D3	7	0	1625	1806	2747	3058	3371	3218	3084	3210	3540	3382	3084	ps
D4	15	0	491	517	726	872	884	844	808	845	928	887	808	ps
D5	15	0	452	503	764	801	930	887	850	889	977	932	850	ps
D6	6	0	179	199	305	337	370	354	339	354	389	371	339	ps

Notes to Table 1–39:

(1) You can set the parameter values in the Quartus II software by selecting D1, D2, D3, D4, D5, and D6 in the Assignment Name column.

(2) The minimum offset represented in this table does not include the intrinsic delay.

Programmable Output Buffer Delay

Table 1–40 lists the delay chain settings that control the rising and falling edge delays of the output buffer. The default delay is 0 ps.

Table 1–40. Programmable Output Buffer Delay *(Note 1)*

Symbol	Parameter	Typical	Unit
D_{OUTBUF}	Rising and/or Falling Edge delay	0 (default)	ps
		50	ps
		100	ps
		150	ps

Note to Table 1–40:

(1) You can set the programmable output buffer delay in the Quartus II software by setting the **Output Buffer Delay Control** assignment to either positive, negative, or both edges with the specific values stated in this table for the **Output Buffer Delay** assignment.

User I/O Pin Timing

Table 1–41 through Table 1–140 list user I/O pin timing for Stratix III devices. I/O buffer t_{su}, t_h, and t_{co} are reported for the cases when the I/O clock is driven by a non-PLL global clock (GCLK) and the PLL is driven by the global clock (GCLK-PLL). For t_{su}, t_h, and t_{co} using the regional clock, add the value from the adder tables listed for each device to the GCLK/GCLK-PLL values for the device.

EP3SL50 I/O Timing Parameters

Table 1–41 through Table 1–44 list the maximum I/O timing parameters for EP3SL50 devices for single-ended I/O standards.

Table 1–41 lists the EP3SL50 column pins input timing parameters for single-ended I/O standards.

Table 1–41. EP3SL50 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.690	-0.689	-1.004	-1.103	-1.311	-1.266	-1.627	-1.103	-1.311	-1.266	-1.627	ns
		t_h	0.816	0.814	1.182	1.304	1.531	1.475	1.830	1.304	1.531	1.475	1.830	ns
	GCLK PLL	t_{su}	-0.975	-0.975	-1.405	-1.532	-1.773	-1.713	-2.026	-1.532	-1.773	-1.713	-2.026	ns
		t_h	1.226	1.226	1.774	1.947	2.232	2.148	2.471	1.947	2.232	2.148	2.471	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.690	-0.689	-1.004	-1.103	-1.311	-1.266	-1.627	-1.103	-1.311	-1.266	-1.627	ns
		t_h	0.816	0.814	1.182	1.304	1.531	1.475	1.830	1.304	1.531	1.475	1.830	ns
	GCLK PLL	t_{su}	-0.975	-0.975	-1.405	-1.532	-1.773	-1.713	-2.026	-1.532	-1.773	-1.713	-2.026	ns
		t_h	1.226	1.226	1.774	1.947	2.232	2.148	2.471	1.947	2.232	2.148	2.471	ns
3.0-V LVTTL	GCLK	t_{su}	-0.701	-0.700	-1.003	-1.105	-1.310	-1.265	-1.626	-1.105	-1.310	-1.265	-1.626	ns
		t_h	0.827	0.825	1.181	1.306	1.530	1.474	1.829	1.306	1.530	1.474	1.829	ns
	GCLK PLL	t_{su}	-0.986	-0.986	-1.404	-1.534	-1.772	-1.712	-2.025	-1.534	-1.772	-1.712	-2.025	ns
		t_h	1.237	1.237	1.773	1.949	2.231	2.147	2.470	1.949	2.231	2.147	2.470	ns

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Table 1–41. EP3SL50 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	GCLK	t_{su}	-0.701	-0.700	-1.003	-1.105	-1.310	-1.265	-1.626	-1.105	-1.310	-1.265	-1.626	ns
		t_h	0.827	0.825	1.181	1.306	1.530	1.474	1.829	1.306	1.530	1.474	1.829	ns
	GCLK PLL	t_{su}	-0.986	-0.986	-1.404	-1.534	-1.772	-1.712	-2.025	-1.534	-1.772	-1.712	-2.025	ns
		t_h	1.237	1.237	1.773	1.949	2.231	2.147	2.470	1.949	2.231	2.147	2.470	ns
2.5 V	GCLK	t_{su}	-0.696	-0.695	-1.012	-1.117	-1.329	-1.284	-1.645	-1.117	-1.329	-1.284	-1.645	ns
		t_h	0.822	0.820	1.190	1.318	1.549	1.493	1.848	1.318	1.549	1.493	1.848	ns
	GCLK PLL	t_{su}	-0.981	-0.981	-1.413	-1.546	-1.791	-1.731	-2.044	-1.546	-1.791	-1.731	-2.044	ns
		t_h	1.232	1.232	1.782	1.961	2.250	2.166	2.489	1.961	2.250	2.166	2.489	ns
1.8 V	GCLK	t_{su}	-0.716	-0.715	-1.052	-1.153	-1.327	-1.282	-1.643	-1.153	-1.327	-1.282	-1.643	ns
		t_h	0.844	0.842	1.230	1.354	1.547	1.491	1.846	1.354	1.547	1.491	1.846	ns
	GCLK PLL	t_{su}	-1.003	-1.003	-1.453	-1.582	-1.789	-1.729	-2.042	-1.582	-1.789	-1.729	-2.042	ns
		t_h	1.256	1.256	1.822	1.997	2.248	2.164	2.487	1.997	2.248	2.164	2.487	ns
1.5 V	GCLK	t_{su}	-0.706	-0.705	-1.029	-1.121	-1.257	-1.212	-1.573	-1.121	-1.257	-1.212	-1.573	ns
		t_h	0.834	0.832	1.207	1.322	1.477	1.421	1.776	1.322	1.477	1.421	1.776	ns
	GCLK PLL	t_{su}	-0.993	-0.993	-1.430	-1.550	-1.719	-1.659	-1.972	-1.550	-1.719	-1.659	-1.972	ns
		t_h	1.246	1.246	1.799	1.965	2.178	2.094	2.417	1.965	2.178	2.094	2.417	ns
1.2 V	GCLK	t_{su}	-0.654	-0.653	-0.952	-1.022	-1.101	-1.056	-1.417	-1.022	-1.101	-1.056	-1.417	ns
		t_h	0.782	0.780	1.130	1.223	1.321	1.265	1.620	1.223	1.321	1.265	1.620	ns
	GCLK PLL	t_{su}	-0.941	-0.941	-1.353	-1.451	-1.563	-1.503	-1.816	-1.451	-1.563	-1.503	-1.816	ns
		t_h	1.194	1.194	1.722	1.866	2.022	1.938	2.261	1.866	2.022	1.938	2.261	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.625	-0.624	-0.924	-1.006	-1.103	-1.058	-1.419	-1.006	-1.103	-1.058	-1.419	ns
		t_h	0.753	0.751	1.102	1.207	1.323	1.267	1.622	1.207	1.323	1.267	1.622	ns
	GCLK PLL	t_{su}	-0.912	-0.912	-1.325	-1.435	-1.565	-1.505	-1.818	-1.435	-1.565	-1.505	-1.818	ns
		t_h	1.165	1.165	1.694	1.850	2.024	1.940	2.263	1.850	2.024	1.940	2.263	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.625	-0.624	-0.924	-1.006	-1.103	-1.058	-1.419	-1.006	-1.103	-1.058	-1.419	ns
		t_h	0.753	0.751	1.102	1.207	1.323	1.267	1.622	1.207	1.323	1.267	1.622	ns
	GCLK PLL	t_{su}	-0.912	-0.912	-1.325	-1.435	-1.565	-1.505	-1.818	-1.435	-1.565	-1.505	-1.818	ns
		t_h	1.165	1.165	1.694	1.850	2.024	1.940	2.263	1.850	2.024	1.940	2.263	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.619	-0.618	-0.912	-1.001	-1.103	-1.056	-1.417	-1.001	-1.103	-1.056	-1.417	ns
		t_h	0.747	0.745	1.089	1.199	1.320	1.264	1.615	1.199	1.320	1.264	1.615	ns
	GCLK PLL	t_{su}	-0.906	-0.906	-1.312	-1.427	-1.562	-1.500	-1.816	-1.427	-1.562	-1.500	-1.816	ns
		t_h	1.159	1.159	1.681	1.839	2.018	1.934	2.256	1.839	2.018	1.934	2.256	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.619	-0.618	-0.912	-1.001	-1.103	-1.056	-1.417	-1.001	-1.103	-1.056	-1.417	ns
		t_h	0.747	0.745	1.089	1.199	1.320	1.264	1.615	1.199	1.320	1.264	1.615	ns
	GCLK PLL	t_{su}	-0.906	-0.906	-1.312	-1.427	-1.562	-1.500	-1.816	-1.427	-1.562	-1.500	-1.816	ns
		t_h	1.159	1.159	1.681	1.839	2.018	1.934	2.256	1.839	2.018	1.934	2.256	ns

Table 1–41. EP3SL50 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-15 CLASS I	GCLK	t_{su}	-0.608	-0.607	-0.903	-0.990	-1.084	-1.037	-1.398	-0.990	-1.084	-1.037	-1.398	ns
		t_h	0.736	0.734	1.079	1.188	1.301	1.245	1.596	1.188	1.301	1.245	1.596	ns
	GCLK PLL	t_{su}	-0.895	-0.895	-1.301	-1.416	-1.543	-1.481	-1.797	-1.416	-1.543	-1.481	-1.797	ns
		t_h	1.148	1.148	1.669	1.828	1.999	1.915	2.237	1.828	1.999	1.915	2.237	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.608	-0.607	-0.903	-0.990	-1.084	-1.037	-1.398	-0.990	-1.084	-1.037	-1.398	ns
		t_h	0.736	0.734	1.079	1.188	1.301	1.245	1.596	1.188	1.301	1.245	1.596	ns
	GCLK PLL	t_{su}	-0.895	-0.895	-1.301	-1.416	-1.543	-1.481	-1.797	-1.416	-1.543	-1.481	-1.797	ns
		t_h	1.148	1.148	1.669	1.828	1.999	1.915	2.237	1.828	1.999	1.915	2.237	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.619	-0.618	-0.912	-1.001	-1.103	-1.056	-1.417	-1.001	-1.103	-1.056	-1.417	ns
		t_h	0.747	0.745	1.089	1.199	1.320	1.264	1.615	1.199	1.320	1.264	1.615	ns
	GCLK PLL	t_{su}	-0.906	-0.906	-1.312	-1.427	-1.562	-1.500	-1.816	-1.427	-1.562	-1.500	-1.816	ns
		t_h	1.159	1.159	1.681	1.839	2.018	1.934	2.256	1.839	2.018	1.934	2.256	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.619	-0.618	-0.912	-1.001	-1.103	-1.056	-1.417	-1.001	-1.103	-1.056	-1.417	ns
		t_h	0.747	0.745	1.089	1.199	1.320	1.264	1.615	1.199	1.320	1.264	1.615	ns
	GCLK PLL	t_{su}	-0.906	-0.906	-1.312	-1.427	-1.562	-1.500	-1.816	-1.427	-1.562	-1.500	-1.816	ns
		t_h	1.159	1.159	1.681	1.839	2.018	1.934	2.256	1.839	2.018	1.934	2.256	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.608	-0.607	-0.903	-0.990	-1.084	-1.037	-1.398	-0.990	-1.084	-1.037	-1.398	ns
		t_h	0.736	0.734	1.079	1.188	1.301	1.245	1.596	1.188	1.301	1.245	1.596	ns
	GCLK PLL	t_{su}	-0.895	-0.895	-1.301	-1.416	-1.543	-1.481	-1.797	-1.416	-1.543	-1.481	-1.797	ns
		t_h	1.148	1.148	1.669	1.828	1.999	1.915	2.237	1.828	1.999	1.915	2.237	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.608	-0.607	-0.903	-0.990	-1.084	-1.037	-1.398	-0.990	-1.084	-1.037	-1.398	ns
		t_h	0.736	0.734	1.079	1.188	1.301	1.245	1.596	1.188	1.301	1.245	1.596	ns
	GCLK PLL	t_{su}	-0.895	-0.895	-1.301	-1.416	-1.543	-1.481	-1.797	-1.416	-1.543	-1.481	-1.797	ns
		t_h	1.148	1.148	1.669	1.828	1.999	1.915	2.237	1.828	1.999	1.915	2.237	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.596	-0.595	-0.893	-0.979	-1.068	-1.021	-1.382	-0.979	-1.068	-1.021	-1.382	ns
		t_h	0.724	0.722	1.069	1.177	1.285	1.229	1.580	1.177	1.285	1.229	1.580	ns
	GCLK PLL	t_{su}	-0.883	-0.883	-1.291	-1.405	-1.527	-1.465	-1.781	-1.405	-1.527	-1.465	-1.781	ns
		t_h	1.136	1.136	1.659	1.817	1.983	1.899	2.221	1.817	1.983	1.899	2.221	ns
3.0-V PCI	GCLK	t_{su}	-0.596	-0.595	-0.893	-0.979	-1.068	-1.021	-1.382	-0.979	-1.068	-1.021	-1.382	ns
		t_h	0.724	0.722	1.069	1.177	1.285	1.229	1.580	1.177	1.285	1.229	1.580	ns
	GCLK PLL	t_{su}	-0.883	-0.883	-1.291	-1.405	-1.527	-1.465	-1.781	-1.405	-1.527	-1.465	-1.781	ns
		t_h	1.136	1.136	1.659	1.817	1.983	1.899	2.221	1.817	1.983	1.899	2.221	ns
3.0-V PCI-X	GCLK	t_{su}	-0.701	-0.700	-1.003	-1.105	-1.310	-1.265	-1.626	-1.105	-1.310	-1.265	-1.626	ns
		t_h	0.827	0.825	1.181	1.306	1.530	1.474	1.829	1.306	1.530	1.474	1.829	ns
	GCLK PLL	t_{su}	-0.986	-0.986	-1.404	-1.534	-1.772	-1.712	-2.025	-1.534	-1.772	-1.712	-2.025	ns
		t_h	1.237	1.237	1.773	1.949	2.231	2.147	2.470	1.949	2.231	2.147	2.470	ns

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Table 1–42 lists the EP3SL50 row pins input timing parameters for single-ended I/O standards.

Table 1–42. EP3SL50 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.884	-0.914	-1.291	-1.412	-1.634	-1.580	-1.842	-1.428	-1.639	-1.588	-1.875	ns
		t_h	0.997	1.040	1.554	1.774	1.924	1.808	1.834	1.768	1.931	1.777	1.885	ns
	GCLK PLL	t_{su}	0.910	0.917	1.476	1.619	1.864	1.796	2.057	1.645	1.878	1.814	2.090	ns
		t_h	-0.661	-0.656	-1.291	-1.412	-1.634	-1.580	-1.842	-1.428	-1.639	-1.588	-1.875	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.884	-0.914	-1.291	-1.412	-1.634	-1.580	-1.842	-1.428	-1.639	-1.588	-1.875	ns
		t_h	0.997	1.040	1.554	1.774	1.924	1.808	1.834	1.768	1.931	1.777	1.885	ns
	GCLK PLL	t_{su}	0.910	0.917	1.476	1.619	1.864	1.796	2.057	1.645	1.878	1.814	2.090	ns
		t_h	-0.661	-0.656	-1.288	-1.413	-1.637	-1.583	-1.845	-1.427	-1.644	-1.593	-1.880	ns
3.0-V LVTTL	GCLK	t_{su}	-0.890	-0.925	1.473	1.620	1.867	1.799	2.060	1.644	1.883	1.819	2.095	ns
		t_h	1.003	1.051	-1.288	-1.413	-1.637	-1.583	-1.845	-1.427	-1.644	-1.593	-1.880	ns
	GCLK PLL	t_{su}	0.904	0.906	1.557	1.773	1.921	1.805	1.831	1.769	1.926	1.772	1.880	ns
		t_h	-0.655	-0.645	1.473	1.620	1.867	1.799	2.060	1.644	1.883	1.819	2.095	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.890	-0.925	1.482	1.633	1.882	1.814	2.075	1.653	1.893	1.829	2.105	ns
		t_h	1.003	1.051	-1.297	-1.426	-1.652	-1.598	-1.860	-1.436	-1.654	-1.603	-1.890	ns
	GCLK PLL	t_{su}	0.904	0.906	1.548	1.760	1.906	1.790	1.816	1.760	1.916	1.762	1.870	ns
		t_h	-0.655	-0.645	1.482	1.633	1.882	1.814	2.075	1.653	1.893	1.829	2.105	ns
2.5 V	GCLK	t_{su}	-0.878	-0.918	1.551	1.770	1.914	1.799	1.828	1.772	1.922	1.804	1.879	ns
		t_h	0.991	1.044	1.554	1.698	1.914	1.845	2.111	1.718	1.928	1.862	2.141	ns
	GCLK PLL	t_{su}	0.916	0.913	-1.369	-1.491	-1.684	-1.629	-1.895	-1.501	-1.688	-1.635	-1.926	ns
		t_h	-0.667	-0.652	1.551	1.770	1.914	1.799	1.828	1.772	1.922	1.804	1.879	ns
1.8 V	GCLK	t_{su}	-0.940	-0.982	1.575	1.802	1.982	1.867	1.896	1.803	1.987	1.869	1.944	ns
		t_h	0.930	0.925	1.530	1.666	1.846	1.777	2.043	1.687	1.863	1.797	2.076	ns
	GCLK PLL	t_{su}	1.054	1.109	-1.345	-1.459	-1.616	-1.561	-1.827	-1.470	-1.623	-1.570	-1.861	ns
		t_h	-0.930	-0.971	1.654	1.903	2.141	2.026	2.055	1.899	2.142	2.024	2.099	ns
1.5 V	GCLK	t_{su}	0.940	0.936	1.451	1.565	1.687	1.618	1.884	1.591	1.708	1.642	1.921	ns
		t_h	1.044	1.098	-1.266	-1.358	-1.457	-1.402	-1.668	-1.374	-1.468	-1.415	-1.706	ns
	GCLK PLL	t_{su}	-0.870	-0.918	1.634	1.869	2.126	2.010	2.036	1.872	2.133	1.979	2.087	ns
		t_h	1.000	0.989	1.396	1.524	1.662	1.594	1.855	1.541	1.676	1.612	1.888	ns
1.2 V	GCLK	t_{su}	0.984	1.045	-1.228	-1.331	-1.452	-1.396	-1.664	-1.342	-1.461	-1.407	-1.699	ns
		t_h	-0.821	-0.860	1.692	-1.331	-1.452	-1.396	-1.664	-1.342	-1.461	-1.407	-1.699	ns
	GCLK PLL	t_{su}	0.973	0.971	1.413	1.536	1.680	1.611	1.876	1.557	1.698	1.633	1.910	ns
		t_h	0.935	0.987	-1.228	1.930	2.146	2.032	2.059	1.931	2.149	2.032	2.106	ns

Table 1–42. EP3SL50 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS I	GCLK	t_{su}	-0.821	-0.860	1.692	1.930	2.146	2.032	2.059	1.931	2.149	2.032	2.106	ns
		t_h	0.973	0.971	1.413	-1.483	-1.648	-1.564	-1.586	-1.477	-1.641	-1.554	-1.632	ns
	GCLK PLL	t_{su}	0.935	0.987	-1.228	-1.331	-1.452	-1.396	-1.664	-1.342	-1.461	-1.407	-1.699	ns
		t_h	-0.844	-0.883	1.692	1.536	1.680	1.611	1.876	1.557	1.698	1.633	1.910	ns
SSTL-2 CLASS II	GCLK	t_{su}	1.026	1.024	1.413	1.930	2.146	2.032	2.059	1.931	2.149	2.032	2.106	ns
		t_h	0.958	1.010	-1.228	-1.483	-1.648	-1.564	-1.586	-1.477	-1.641	-1.554	-1.632	ns
	GCLK PLL	t_{su}	-0.844	-0.883	-1.309	-1.321	-1.434	-1.378	-1.646	-1.331	-1.444	-1.390	-1.682	ns
		t_h	1.026	1.024	-1.213	1.526	1.662	1.593	1.858	1.546	1.681	1.616	1.893	ns
SSTL-18 CLASS I	GCLK	t_{su}	0.958	1.010	1.399	1.940	2.164	2.050	2.077	1.942	2.166	2.049	2.123	ns
		t_h	-0.830	-0.871	1.692	1.940	2.164	2.050	2.077	1.942	2.166	2.049	2.123	ns
	GCLK PLL	t_{su}	1.040	1.036	1.413	-1.493	-1.666	-1.582	-1.604	-1.488	-1.658	-1.571	-1.649	ns
		t_h	0.944	0.998	-1.228	-1.321	-1.434	-1.378	-1.646	-1.331	-1.444	-1.390	-1.682	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.844	-0.883	1.692	-1.483	-1.648	-1.564	-1.586	-1.477	-1.641	-1.554	-1.632	ns
		t_h	1.026	1.024	1.413	-1.331	-1.452	-1.396	-1.664	-1.342	-1.461	-1.407	-1.699	ns
	GCLK PLL	t_{su}	0.958	1.010	-1.228	1.536	1.680	1.611	1.876	1.557	1.698	1.633	1.910	ns
		t_h	-0.844	-0.883	-1.309	1.930	2.146	2.032	2.059	1.931	2.149	2.032	2.106	ns
SSTL-15 CLASS I	GCLK	t_{su}	1.026	1.024	-1.213	-1.483	-1.648	-1.564	-1.586	-1.477	-1.641	-1.554	-1.632	ns
		t_h	0.958	1.010	1.399	-1.331	-1.452	-1.396	-1.664	-1.342	-1.461	-1.407	-1.699	ns
	GCLK PLL	t_{su}	-0.830	-0.871	1.707	1.536	1.680	1.611	1.876	1.557	1.698	1.633	1.910	ns
		t_h	1.040	1.036	-1.309	1.930	2.146	2.032	2.059	1.931	2.149	2.032	2.106	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	0.944	0.998	-1.213	-1.483	-1.648	-1.564	-1.586	-1.477	-1.641	-1.554	-1.632	ns
		t_h	-0.830	-0.871	-1.318	1.940	2.164	2.050	2.077	1.942	2.166	2.049	2.123	ns
	GCLK PLL	t_{su}	1.040	1.036	-1.204	-1.493	-1.666	-1.582	-1.604	-1.488	-1.658	-1.571	-1.649	ns
		t_h	0.944	0.998	1.390	-1.321	-1.434	-1.378	-1.646	-1.331	-1.444	-1.390	-1.682	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.821	-0.859	1.716	1.526	1.662	1.593	1.858	1.546	1.681	1.616	1.893	ns
		t_h	1.049	1.048	-1.318	1.940	2.164	2.050	2.077	1.942	2.166	2.049	2.123	ns
	GCLK PLL	t_{su}	0.935	0.986	-1.204	-1.493	-1.666	-1.582	-1.604	-1.488	-1.658	-1.571	-1.649	ns
		t_h	-0.821	-0.859	-1.318	1.950	2.180	2.066	2.093	1.951	2.182	2.065	2.139	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	1.049	1.048	-1.288	-1.503	-1.682	-1.598	-1.620	-1.497	-1.674	-1.587	-1.665	ns
		t_h	0.935	0.986	1.557	-1.311	-1.418	-1.362	-1.630	-1.322	-1.428	-1.374	-1.666	ns
	GCLK PLL	t_{su}	-0.890	-0.925	1.473	1.516	1.646	1.577	1.842	1.537	1.665	1.600	1.877	ns
		t_h	1.003	1.051	-1.288	1.950	2.180	2.066	2.093	1.951	2.182	2.065	2.139	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	0.904	0.906	1.557	-1.503	-1.682	-1.598	-1.620	-1.497	-1.674	-1.587	-1.665	ns
		t_h	-0.655	-0.645	1.473	-1.311	-1.418	-1.362	-1.630	-1.322	-1.428	-1.374	-1.666	ns
	GCLK PLL	t_{su}	-0.890	-0.925	1.473	1.516	1.646	1.577	1.842	1.537	1.665	1.600	1.877	ns
		t_h	1.003	1.051	1.473	1.950	2.180	2.066	2.093	1.951	2.182	2.065	2.139	ns

Table 1–42. EP3SL50 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	GCLK	t_{su}	0.904	0.906	1.473	-1.503	-1.682	-1.598	-1.620	-1.497	-1.674	-1.587	-1.665	ns
		t_h	-0.655	-0.645	1.473	-1.311	-1.418	-1.362	-1.630	-1.322	-1.428	-1.374	-1.666	ns
	GCLK PLL	t_{su}	-0.884	-0.914	-1.291	-1.412	-1.634	-1.580	-1.842	-1.428	-1.639	-1.588	-1.875	ns
		t_h	0.997	1.040	1.554	1.774	1.924	1.808	1.834	1.768	1.931	1.777	1.885	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	0.910	0.917	1.476	1.619	1.864	1.796	2.057	1.645	1.878	1.814	2.090	ns
		t_h	-0.661	-0.656	-1.291	-1.412	-1.634	-1.580	-1.842	-1.428	-1.639	-1.588	-1.875	ns
	GCLK PLL	t_{su}	-0.884	-0.914	-1.291	-1.412	-1.634	-1.580	-1.842	-1.428	-1.639	-1.588	-1.875	ns
		t_h	0.997	1.040	1.554	1.774	1.924	1.808	1.834	1.768	1.931	1.777	1.885	ns
3.0-V PCI	GCLK	t_{su}	0.910	0.917	1.476	1.619	1.864	1.796	2.057	1.645	1.878	1.814	2.090	ns
		t_h	-0.661	-0.656	-1.288	-1.413	-1.637	-1.583	-1.845	-1.427	-1.644	-1.593	-1.880	ns
	GCLK PLL	t_{su}	-0.890	-0.925	1.473	1.620	1.867	1.799	2.060	1.644	1.883	1.819	2.095	ns
		t_h	1.003	1.051	-1.288	-1.413	-1.637	-1.583	-1.845	-1.427	-1.644	-1.593	-1.880	ns
3.0-V PCI-X	GCLK	t_{su}	0.904	0.906	1.557	1.773	1.921	1.805	1.831	1.769	1.926	1.772	1.880	ns
		t_h	-0.655	-0.645	1.473	1.620	1.867	1.799	2.060	1.644	1.883	1.819	2.095	ns
	GCLK PLL	t_{su}	-0.890	-0.925	1.482	1.633	1.882	1.814	2.075	1.653	1.893	1.829	2.105	ns
		t_h	1.003	1.051	-1.297	-1.426	-1.652	-1.598	-1.860	-1.436	-1.654	-1.603	-1.890	ns

Table 1–43 lists the EP3SL50 column pins output timing parameters for single-ended I/O standards.

Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.168	3.156	4.382	4.742	5.210	5.092	5.294	4.742	5.210	5.092	5.294	ns
		GCLK PLL	t_{co}	3.524	3.524	4.905	5.304	5.820	5.677	5.944	5.304	5.820	5.677	5.944	ns
	8mA	GCLK	t_{co}	3.101	3.089	4.273	4.631	5.097	4.979	5.181	4.631	5.097	4.979	5.181	ns
		GCLK PLL	t_{co}	3.457	3.457	4.796	5.193	5.707	5.564	5.831	5.193	5.707	5.564	5.831	ns
	12mA	GCLK	t_{co}	3.015	3.003	4.170	4.532	5.005	4.887	5.089	4.532	5.005	4.887	5.089	ns
		GCLK PLL	t_{co}	3.371	3.371	4.692	5.094	5.615	5.472	5.739	5.094	5.615	5.472	5.739	ns
	16mA	GCLK	t_{co}	3.008	2.996	4.153	4.504	4.964	4.846	5.048	4.504	4.964	4.846	5.048	ns
		GCLK PLL	t_{co}	3.364	3.364	4.675	5.066	5.574	5.431	5.698	5.066	5.574	5.431	5.698	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.174	3.162	4.387	4.747	5.217	5.099	5.301	4.747	5.217	5.099	5.301	ns
		GCLK PLL	t_{co}	3.530	3.530	4.909	5.309	5.827	5.684	5.951	5.309	5.827	5.684	5.951	ns
	8mA	GCLK	t_{co}	3.019	3.007	4.180	4.549	5.016	4.898	5.100	4.549	5.016	4.898	5.100	ns
		GCLK PLL	t_{co}	3.375	3.375	4.702	5.111	5.626	5.483	5.750	5.111	5.626	5.483	5.750	ns
	12mA	GCLK	t_{co}	3.026	3.014	4.174	4.528	4.990	4.872	5.074	4.528	4.990	4.872	5.074	ns
		GCLK PLL	t_{co}	3.382	3.382	4.696	5.090	5.600	5.457	5.724	5.090	5.600	5.457	5.724	ns
	16mA	GCLK	t_{co}	3.010	2.998	4.151	4.503	4.961	4.843	5.045	4.503	4.961	4.843	5.045	ns
		GCLK PLL	t_{co}	3.366	3.366	4.674	5.065	5.571	5.428	5.695	5.065	5.571	5.428	5.695	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.132	3.120	4.349	4.710	5.177	5.059	5.261	4.710	5.177	5.059	5.261	ns
		GCLK PLL	t_{co}	3.488	3.488	4.872	5.272	5.787	5.644	5.911	5.272	5.787	5.644	5.911	ns
	8mA	GCLK	t_{co}	3.021	3.009	4.219	4.576	5.040	4.923	5.122	4.576	5.040	4.923	5.122	ns
		GCLK PLL	t_{co}	3.377	3.377	4.742	5.138	5.650	5.508	5.773	5.138	5.650	5.508	5.773	ns
	12mA	GCLK	t_{co}	2.985	2.973	4.156	4.507	4.966	4.849	5.049	4.507	4.966	4.849	5.049	ns
		GCLK PLL	t_{co}	3.341	3.341	4.679	5.069	5.576	5.434	5.699	5.069	5.576	5.434	5.699	ns
	16mA	GCLK	t_{co}	2.967	2.955	4.127	4.479	4.937	4.819	5.021	4.479	4.937	4.819	5.021	ns
		GCLK PLL	t_{co}	3.323	3.323	4.650	5.041	5.547	5.404	5.671	5.041	5.547	5.404	5.671	ns

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Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.046	3.034	4.253	4.610	5.075	4.958	5.157	4.610	5.075	4.958	5.157	ns
		GCLK PLL	t_{co}	3.402	3.402	4.776	5.172	5.685	5.543	5.808	5.172	5.685	5.543	5.808	ns
	8mA	GCLK	t_{co}	2.967	2.955	4.130	4.481	4.940	4.823	5.022	4.481	4.940	4.823	5.022	ns
		GCLK PLL	t_{co}	3.323	3.323	4.652	5.043	5.550	5.408	5.673	5.043	5.550	5.408	5.673	ns
	12mA	GCLK	t_{co}	2.962	2.950	4.122	4.474	4.931	4.813	5.015	4.474	4.931	4.813	5.015	ns
		GCLK PLL	t_{co}	3.318	3.318	4.645	5.036	5.541	5.398	5.665	5.036	5.541	5.398	5.665	ns
	16mA	GCLK	t_{co}	2.953	2.941	4.108	4.459	4.916	4.798	5.000	4.459	4.916	4.798	5.000	ns
		GCLK PLL	t_{co}	3.309	3.309	4.631	5.021	5.526	5.383	5.650	5.021	5.526	5.383	5.650	ns
2.5 V	4mA	GCLK	t_{co}	3.168	3.156	4.460	4.837	5.322	5.205	5.405	4.837	5.322	5.205	5.405	ns
		GCLK PLL	t_{co}	3.524	3.524	4.983	5.399	5.932	5.790	6.055	5.399	5.932	5.790	6.055	ns
	8mA	GCLK	t_{co}	3.068	3.056	4.341	4.711	5.190	5.073	5.272	4.711	5.190	5.073	5.272	ns
		GCLK PLL	t_{co}	3.424	3.424	4.864	5.273	5.800	5.658	5.923	5.273	5.800	5.658	5.923	ns
	12mA	GCLK	t_{co}	3.024	3.012	4.254	4.620	5.094	4.976	5.178	4.620	5.094	4.976	5.178	ns
		GCLK PLL	t_{co}	3.380	3.380	4.777	5.182	5.704	5.561	5.828	5.182	5.704	5.561	5.828	ns
	16mA	GCLK	t_{co}	2.986	2.974	4.215	4.578	5.051	4.933	5.135	4.578	5.051	4.933	5.135	ns
		GCLK PLL	t_{co}	3.342	3.342	4.738	5.140	5.661	5.518	5.785	5.140	5.661	5.518	5.785	ns

Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.359	3.347	4.782	5.197	5.726	5.608	5.810	5.197	5.726	5.608	5.810	ns
		GCLK PLL	t_{co}	3.715	3.715	5.304	5.759	6.336	6.193	6.460	5.759	6.336	6.193	6.460	ns
	4mA	GCLK	t_{co}	3.178	3.166	4.503	4.888	5.379	5.262	5.461	4.888	5.379	5.262	5.461	ns
		GCLK PLL	t_{co}	3.534	3.534	5.025	5.450	5.989	5.847	6.112	5.450	5.989	5.847	6.112	ns
	6mA	GCLK	t_{co}	3.096	3.084	4.396	4.773	5.268	5.150	5.352	4.773	5.268	5.150	5.352	ns
		GCLK PLL	t_{co}	3.452	3.452	4.918	5.335	5.878	5.735	6.002	5.335	5.878	5.735	6.002	ns
	8mA	GCLK	t_{co}	3.076	3.064	4.337	4.719	5.202	5.084	5.286	4.719	5.202	5.084	5.286	ns
		GCLK PLL	t_{co}	3.432	3.432	4.860	5.281	5.812	5.669	5.936	5.281	5.812	5.669	5.936	ns
	10mA	GCLK	t_{co}	3.013	3.001	4.276	4.644	5.121	5.003	5.205	4.644	5.121	5.003	5.205	ns
		GCLK PLL	t_{co}	3.369	3.369	4.799	5.206	5.731	5.588	5.855	5.206	5.731	5.588	5.855	ns
	12mA	GCLK	t_{co}	2.995	2.983	4.256	4.623	5.098	4.980	5.182	4.623	5.098	4.980	5.182	ns
		GCLK PLL	t_{co}	3.351	3.351	4.778	5.185	5.708	5.565	5.832	5.185	5.708	5.565	5.832	ns
1.5 V	2mA	GCLK	t_{co}	3.305	3.293	4.710	5.129	5.664	5.546	5.748	5.129	5.664	5.546	5.748	ns
		GCLK PLL	t_{co}	3.661	3.661	5.233	5.691	6.274	6.131	6.398	5.691	6.274	6.131	6.398	ns
	4mA	GCLK	t_{co}	3.093	3.081	4.391	4.773	5.272	5.154	5.356	4.773	5.272	5.154	5.356	ns
		GCLK PLL	t_{co}	3.449	3.449	4.914	5.335	5.882	5.739	6.006	5.335	5.882	5.739	6.006	ns
	6mA	GCLK	t_{co}	3.068	3.056	4.324	4.713	5.205	5.087	5.289	4.713	5.205	5.087	5.289	ns
		GCLK PLL	t_{co}	3.424	3.424	4.847	5.275	5.815	5.672	5.939	5.275	5.815	5.672	5.939	ns
	8mA	GCLK	t_{co}	3.057	3.045	4.307	4.688	5.185	5.067	5.269	4.688	5.185	5.067	5.269	ns
		GCLK PLL	t_{co}	3.413	3.413	4.830	5.250	5.795	5.652	5.919	5.250	5.795	5.652	5.919	ns
	10mA	GCLK	t_{co}	3.002	2.990	4.269	4.637	5.115	4.997	5.199	4.637	5.115	4.997	5.199	ns
		GCLK PLL	t_{co}	3.358	3.358	4.792	5.199	5.725	5.582	5.849	5.199	5.725	5.582	5.849	ns
	12mA	GCLK	t_{co}	2.997	2.985	4.253	4.626	5.104	4.986	5.188	4.626	5.104	4.986	5.188	ns
		GCLK PLL	t_{co}	3.353	3.353	4.775	5.188	5.714	5.571	5.838	5.188	5.714	5.571	5.838	ns

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Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.221	3.209	4.636	5.065	5.608	5.490	5.692	5.065	5.608	5.490	5.692	ns
		GCLK PLL	t_{co}	3.577	3.577	5.159	5.627	6.218	6.075	6.342	5.627	6.218	6.075	6.342	ns
	4mA	GCLK	t_{co}	3.098	3.086	4.411	4.803	5.322	5.204	5.406	4.803	5.322	5.204	5.406	ns
		GCLK PLL	t_{co}	3.454	3.454	4.933	5.365	5.932	5.789	6.056	5.365	5.932	5.789	6.056	ns
	6mA	GCLK	t_{co}	3.060	3.048	4.318	4.714	5.209	5.091	5.293	4.714	5.209	5.091	5.293	ns
		GCLK PLL	t_{co}	3.416	3.416	4.841	5.276	5.819	5.676	5.943	5.276	5.819	5.676	5.943	ns
	8mA	GCLK	t_{co}	3.013	3.001	4.290	4.665	5.153	5.035	5.237	4.665	5.153	5.035	5.237	ns
		GCLK PLL	t_{co}	3.369	3.369	4.813	5.227	5.763	5.620	5.887	5.227	5.763	5.620	5.887	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.013	3.001	4.247	4.612	5.084	4.966	5.168	4.612	5.084	4.966	5.168	ns
		GCLK PLL	t_{co}	3.369	3.369	4.770	5.174	5.694	5.551	5.818	5.174	5.694	5.551	5.818	ns
	10mA	GCLK	t_{co}	3.010	2.998	4.244	4.609	5.080	4.962	5.164	4.609	5.080	4.962	5.164	ns
		GCLK PLL	t_{co}	3.366	3.366	4.767	5.171	5.690	5.547	5.814	5.171	5.690	5.547	5.814	ns
	12mA	GCLK	t_{co}	3.008	2.996	4.244	4.610	5.081	4.963	5.165	4.610	5.081	4.963	5.165	ns
		GCLK PLL	t_{co}	3.364	3.364	4.767	5.172	5.691	5.548	5.815	5.172	5.691	5.548	5.815	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	2.999	2.987	4.230	4.594	5.066	4.948	5.150	4.594	5.066	4.948	5.150	ns
		GCLK PLL	t_{co}	3.355	3.355	4.752	5.156	5.676	5.533	5.800	5.156	5.676	5.533	5.800	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.020	3.008	4.259	4.626	5.100	4.982	5.184	4.626	5.100	4.982	5.184	ns
		GCLK PLL	t_{co}	3.376	3.376	4.782	5.188	5.710	5.567	5.834	5.188	5.710	5.567	5.834	ns
	6mA	GCLK	t_{co}	3.016	3.004	4.257	4.624	5.098	4.980	5.182	4.624	5.098	4.980	5.182	ns
		GCLK PLL	t_{co}	3.372	3.372	4.780	5.186	5.708	5.565	5.832	5.186	5.708	5.565	5.832	ns
	8mA	GCLK	t_{co}	3.005	2.993	4.247	4.615	5.089	4.971	5.173	4.615	5.089	4.971	5.173	ns
		GCLK PLL	t_{co}	3.361	3.361	4.770	5.177	5.699	5.556	5.823	5.177	5.699	5.556	5.823	ns
	10mA	GCLK	t_{co}	2.994	2.982	4.235	4.602	5.076	4.958	5.160	4.602	5.076	4.958	5.160	ns
		GCLK PLL	t_{co}	3.350	3.350	4.757	5.164	5.686	5.543	5.810	5.164	5.686	5.543	5.810	ns
	12mA	GCLK	t_{co}	2.994	2.982	4.234	4.602	5.076	4.958	5.160	4.602	5.076	4.958	5.160	ns
		GCLK PLL	t_{co}	3.350	3.350	4.757	5.164	5.686	5.543	5.810	5.164	5.686	5.543	5.810	ns

Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.000	2.988	4.233	4.599	5.071	4.953	5.155	4.599	5.071	4.953	5.155	ns
		GCLK PLL	t_{co}	3.356	3.356	4.756	5.161	5.681	5.538	5.805	5.161	5.681	5.538	5.805	ns
	16mA	GCLK	t_{co}	3.003	2.991	4.241	4.608	5.083	4.965	5.167	4.608	5.083	4.965	5.167	ns
		GCLK PLL	t_{co}	3.359	3.359	4.764	5.170	5.693	5.550	5.817	5.170	5.693	5.550	5.817	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.024	3.012	4.269	4.638	5.113	4.995	5.197	4.638	5.113	4.995	5.197	ns
		GCLK PLL	t_{co}	3.380	3.380	4.791	5.200	5.723	5.580	5.847	5.200	5.723	5.580	5.847	ns
	6mA	GCLK	t_{co}	3.010	2.998	4.258	4.628	5.104	4.986	5.188	4.628	5.104	4.986	5.188	ns
		GCLK PLL	t_{co}	3.366	3.366	4.781	5.190	5.714	5.571	5.838	5.190	5.714	5.571	5.838	ns
	8mA	GCLK	t_{co}	2.999	2.987	4.245	4.614	5.090	4.972	5.174	4.614	5.090	4.972	5.174	ns
		GCLK PLL	t_{co}	3.355	3.355	4.767	5.176	5.700	5.557	5.824	5.176	5.700	5.557	5.824	ns
	10mA	GCLK	t_{co}	2.998	2.986	4.248	4.617	5.094	4.976	5.178	4.617	5.094	4.976	5.178	ns
		GCLK PLL	t_{co}	3.354	3.354	4.770	5.179	5.704	5.561	5.828	5.179	5.704	5.561	5.828	ns
	12mA	GCLK	t_{co}	2.995	2.983	4.242	4.612	5.088	4.970	5.172	4.612	5.088	4.970	5.172	ns
		GCLK PLL	t_{co}	3.351	3.351	4.765	5.174	5.698	5.555	5.822	5.174	5.698	5.555	5.822	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	2.997	2.985	4.231	4.598	5.071	4.953	5.155	4.598	5.071	4.953	5.155	ns
		GCLK PLL	t_{co}	3.353	3.353	4.754	5.160	5.681	5.538	5.805	5.160	5.681	5.538	5.805	ns
	16mA	GCLK	t_{co}	3.000	2.988	4.238	4.607	5.082	4.964	5.166	4.607	5.082	4.964	5.166	ns
		GCLK PLL	t_{co}	3.356	3.356	4.761	5.169	5.692	5.549	5.816	5.169	5.692	5.549	5.816	ns

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Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.007	2.995	4.233	4.598	5.069	4.951	5.153	4.598	5.069	4.951	5.153	ns
		GCLK PLL	t_{co}	3.363	3.363	4.756	5.160	5.679	5.536	5.803	5.160	5.679	5.536	5.803	ns
	6mA	GCLK	t_{co}	3.000	2.988	4.231	4.596	5.068	4.950	5.152	4.596	5.068	4.950	5.152	ns
		GCLK PLL	t_{co}	3.356	3.356	4.754	5.158	5.678	5.535	5.802	5.158	5.678	5.535	5.802	ns
	8mA	GCLK	t_{co}	2.992	2.980	4.224	4.589	5.061	4.943	5.145	4.589	5.061	4.943	5.145	ns
		GCLK PLL	t_{co}	3.348	3.348	4.746	5.151	5.671	5.528	5.795	5.151	5.671	5.528	5.795	ns
	10mA	GCLK	t_{co}	2.995	2.983	4.227	4.592	5.065	4.947	5.149	4.592	5.065	4.947	5.149	ns
		GCLK PLL	t_{co}	3.351	3.351	4.749	5.154	5.675	5.532	5.799	5.154	5.675	5.532	5.799	ns
	12mA	GCLK	t_{co}	2.992	2.980	4.229	4.596	5.069	4.951	5.153	4.596	5.069	4.951	5.153	ns
		GCLK PLL	t_{co}	3.348	3.348	4.752	5.158	5.679	5.536	5.803	5.158	5.679	5.536	5.803	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.000	2.988	4.228	4.593	5.065	4.947	5.149	4.593	5.065	4.947	5.149	ns
		GCLK PLL	t_{co}	3.356	3.356	4.751	5.155	5.675	5.532	5.799	5.155	5.675	5.532	5.799	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.012	3.000	4.242	4.608	5.080	4.962	5.164	4.608	5.080	4.962	5.164	ns
		GCLK PLL	t_{co}	3.368	3.368	4.764	5.170	5.690	5.547	5.814	5.170	5.690	5.547	5.814	ns
	6mA	GCLK	t_{co}	3.008	2.996	4.243	4.609	5.083	4.965	5.167	4.609	5.083	4.965	5.167	ns
		GCLK PLL	t_{co}	3.364	3.364	4.765	5.171	5.693	5.550	5.817	5.171	5.693	5.550	5.817	ns
	8mA	GCLK	t_{co}	3.004	2.992	4.238	4.605	5.078	4.960	5.162	4.605	5.078	4.960	5.162	ns
		GCLK PLL	t_{co}	3.360	3.360	4.761	5.167	5.688	5.545	5.812	5.167	5.688	5.545	5.812	ns
	10mA	GCLK	t_{co}	2.997	2.985	4.231	4.598	5.071	4.953	5.155	4.598	5.071	4.953	5.155	ns
		GCLK PLL	t_{co}	3.353	3.353	4.754	5.160	5.681	5.538	5.805	5.160	5.681	5.538	5.805	ns
	12mA	GCLK	t_{co}	2.998	2.986	4.238	4.606	5.081	4.963	5.165	4.606	5.081	4.963	5.165	ns
		GCLK PLL	t_{co}	3.354	3.354	4.761	5.168	5.691	5.548	5.815	5.168	5.691	5.548	5.815	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	2.996	2.984	4.219	4.584	5.055	4.937	5.139	4.584	5.055	4.937	5.139	ns
		GCLK PLL	t_{co}	3.352	3.352	4.742	5.146	5.665	5.522	5.789	5.146	5.665	5.522	5.789	ns

Table 1–43. EP3SL50 Column Pins output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.015	3.003	4.256	4.625	5.101	4.983	5.185	4.625	5.101	4.983	5.185	ns
		GCLK PLL	t_{co}	3.371	3.371	4.778	5.187	5.711	5.568	5.835	5.187	5.711	5.568	5.835	ns
	6mA	GCLK	t_{co}	3.007	2.995	4.247	4.616	5.092	4.974	5.176	4.616	5.092	4.974	5.176	ns
		GCLK PLL	t_{co}	3.363	3.363	4.769	5.178	5.702	5.559	5.826	5.178	5.702	5.559	5.826	ns
	8mA	GCLK	t_{co}	3.008	2.996	4.254	4.624	5.101	4.983	5.185	4.624	5.101	4.983	5.185	ns
		GCLK PLL	t_{co}	3.364	3.364	4.777	5.186	5.711	5.568	5.835	5.186	5.711	5.568	5.835	ns
	10mA	GCLK	t_{co}	2.997	2.985	4.241	4.611	5.087	4.969	5.171	4.611	5.087	4.969	5.171	ns
		GCLK PLL	t_{co}	3.353	3.353	4.764	5.173	5.697	5.554	5.821	5.173	5.697	5.554	5.821	ns
	12mA	GCLK	t_{co}	2.997	2.985	4.241	4.611	5.088	4.970	5.172	4.611	5.088	4.970	5.172	ns
		GCLK PLL	t_{co}	3.353	3.353	4.764	5.173	5.698	5.555	5.822	5.173	5.698	5.555	5.822	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.018	3.006	4.257	4.626	5.101	4.983	5.185	4.626	5.101	4.983	5.185	ns
		GCLK PLL	t_{co}	3.374	3.374	4.780	5.188	5.711	5.568	5.835	5.188	5.711	5.568	5.835	ns
3.0-V PCI	—	GCLK	t_{co}	3.121	3.109	4.302	4.660	5.126	5.008	5.210	4.660	5.126	5.008	5.210	ns
		GCLK PLL	t_{co}	3.477	3.477	4.825	5.222	5.736	5.593	5.860	5.222	5.736	5.593	5.860	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.121	3.109	4.302	4.660	5.126	5.008	5.210	4.660	5.126	5.008	5.210	ns
		GCLK PLL	t_{co}	3.477	3.477	4.825	5.222	5.736	5.593	5.860	5.222	5.736	5.593	5.860	ns

Table 1–44 lists the EP3SL50 row pins output timing parameters for single-ended I/O standards.

Table 1–44. EP3SL50 Row Pins output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.197	3.438	4.781	5.176	5.684	5.549	5.751	5.305	5.818	5.682	5.828	ns
		GCLK PLL	t_{co}	1.482	1.677	2.061	2.175	2.372	2.388	2.308	2.295	2.495	2.512	2.303	ns
	8mA	GCLK	t_{co}	3.104	3.333	4.651	5.038	5.540	5.405	5.607	5.164	5.669	5.533	5.679	ns
		GCLK PLL	t_{co}	1.415	1.606	1.951	2.037	2.228	2.244	2.164	2.154	2.346	2.363	2.154	ns
	12mA	GCLK	t_{co}	3.014	3.233	4.532	4.915	5.412	5.277	5.479	5.037	5.537	5.401	5.547	ns
		GCLK PLL	t_{co}	1.336	1.517	1.845	1.930	2.100	2.116	2.036	2.046	2.214	2.260	2.022	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.207	3.442	4.789	5.181	5.689	5.554	5.756	5.311	5.823	5.687	5.833	ns
		GCLK PLL	t_{co}	1.492	1.684	2.065	2.180	2.377	2.393	2.313	2.301	2.500	2.517	2.308	ns
	8mA	GCLK	t_{co}	3.018	3.237	4.538	4.921	5.418	5.283	5.485	5.043	5.544	5.408	5.554	ns
		GCLK PLL	t_{co}	1.340	1.521	1.856	1.945	2.106	2.122	2.042	2.058	2.221	2.269	2.029	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.151	3.384	4.733	5.129	5.641	5.506	5.708	5.262	5.776	5.640	5.786	ns
		GCLK PLL	t_{co}	1.442	1.638	2.028	2.128	2.329	2.345	2.265	2.252	2.453	2.470	2.261	ns
	8mA	GCLK	t_{co}	3.026	3.257	4.580	4.970	5.477	5.342	5.544	5.100	5.612	5.475	5.621	ns
		GCLK PLL	t_{co}	1.341	1.526	1.891	1.969	2.165	2.181	2.101	2.090	2.289	2.305	2.096	ns
	12mA	GCLK	t_{co}	2.987	3.206	4.498	4.887	5.389	5.254	5.456	5.014	5.519	5.382	5.528	ns
		GCLK PLL	t_{co}	1.304	1.488	1.831	1.903	2.077	2.093	2.013	2.016	2.196	2.222	2.003	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.065	3.303	4.627	5.022	5.530	5.395	5.597	5.154	5.665	5.528	5.674	ns
		GCLK PLL	t_{co}	1.363	1.550	1.926	2.021	2.218	2.234	2.154	2.144	2.342	2.358	2.149	ns
	8mA	GCLK	t_{co}	2.969	3.188	4.463	4.848	5.350	5.215	5.417	4.974	5.479	5.342	5.488	ns
		GCLK PLL	t_{co}	1.291	1.472	1.803	1.874	2.038	2.054	1.974	1.986	2.156	2.193	1.963	ns
2.5 V	4mA	GCLK	t_{co}	3.177	3.420	4.865	5.283	5.813	5.678	5.880	5.422	5.955	5.818	5.964	ns
		GCLK PLL	t_{co}	1.468	1.675	2.136	2.282	2.501	2.517	2.437	2.412	2.632	2.648	2.439	ns
	8mA	GCLK	t_{co}	3.067	3.321	4.710	5.120	5.643	5.508	5.710	5.255	5.781	5.644	5.790	ns
		GCLK PLL	t_{co}	1.383	1.572	2.012	2.119	2.331	2.347	2.267	2.245	2.458	2.474	2.265	ns
	12mA	GCLK	t_{co}	3.021	3.245	4.599	5.001	5.517	5.382	5.584	5.132	5.651	5.514	5.660	ns
		GCLK PLL	t_{co}	1.326	1.528	1.928	2.015	2.205	2.221	2.141	2.132	2.328	2.354	2.135	ns

Table 1–44. EP3SL50 Row Pins output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.410	3.667	5.251	5.711	6.288	6.153	6.355	5.859	6.439	6.303	6.449	ns
		GCLK PLL	t_{co}	1.695	1.941	2.589	2.710	2.976	2.992	2.912	2.849	3.116	3.133	2.924	ns
	4mA	GCLK	t_{co}	3.191	3.465	4.924	5.343	5.883	5.748	5.950	5.494	6.033	5.896	6.042	ns
		GCLK PLL	t_{co}	1.470	1.739	2.262	2.342	2.571	2.587	2.507	2.484	2.710	2.726	2.517	ns
	6mA	GCLK	t_{co}	3.120	3.363	4.771	5.193	5.724	5.589	5.791	5.326	5.860	5.724	5.870	ns
		GCLK PLL	t_{co}	1.405	1.637	2.109	2.192	2.412	2.428	2.348	2.316	2.537	2.554	2.345	ns
	8mA	GCLK	t_{co}	3.098	3.327	4.698	5.111	5.630	5.494	5.701	5.242	5.766	5.630	5.776	ns
		GCLK PLL	t_{co}	1.367	1.563	2.032	2.099	2.316	2.332	2.252	2.221	2.443	2.460	2.251	ns
1.5 V	2mA	GCLK	t_{co}	3.321	3.585	5.161	5.625	6.216	6.081	6.283	5.766	6.363	6.227	6.373	ns
		GCLK PLL	t_{co}	1.606	1.859	2.499	2.624	2.904	2.920	2.840	2.756	3.040	3.057	2.848	ns
	4mA	GCLK	t_{co}	3.114	3.344	4.756	5.188	5.725	5.590	5.792	5.320	5.859	5.723	5.869	ns
		GCLK PLL	t_{co}	1.383	1.602	2.094	2.187	2.413	2.429	2.349	2.310	2.536	2.553	2.344	ns
	6mA	GCLK	t_{co}	3.087	3.318	4.683	5.103	5.630	5.494	5.701	5.235	5.762	5.627	5.773	ns
		GCLK PLL	t_{co}	1.356	1.554	2.021	2.091	2.307	2.323	2.243	2.212	2.431	2.448	2.239	ns
	8mA	GCLK	t_{co}	3.068	3.307	4.666	5.079	5.611	5.475	5.682	5.211	5.743	5.608	5.754	ns
		GCLK PLL	t_{co}	1.337	1.545	1.999	2.073	2.288	2.304	2.224	2.194	2.409	2.426	2.217	ns
1.2 V	2mA	GCLK	t_{co}	3.264	3.510	5.071	5.539	6.141	6.006	6.208	5.678	6.279	6.143	6.289	ns
		GCLK PLL	t_{co}	1.549	1.784	2.409	2.538	2.829	2.845	2.765	2.668	2.956	2.973	2.764	ns
	4mA	GCLK	t_{co}	3.119	3.348	4.778	5.216	5.766	5.631	5.833	5.345	5.901	5.765	5.911	ns
		GCLK PLL	t_{co}	1.388	1.595	2.116	2.215	2.454	2.470	2.390	2.335	2.578	2.595	2.386	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.008	3.232	4.577	4.973	5.485	5.350	5.552	5.099	5.613	5.477	5.623	ns
		GCLK PLL	t_{co}	1.330	1.516	1.921	2.006	2.173	2.189	2.109	2.119	2.290	2.340	2.098	ns
	12mA	GCLK	t_{co}	3.003	3.228	4.571	4.968	5.477	5.342	5.544	5.095	5.606	5.470	5.616	ns
		GCLK PLL	t_{co}	1.325	1.512	1.918	2.004	2.166	2.184	2.106	2.118	2.284	2.339	2.096	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	2.994	3.217	4.556	4.952	5.450	5.315	5.517	5.078	5.579	5.452	5.589	ns
		GCLK PLL	t_{co}	1.316	1.501	1.903	1.988	2.149	2.167	2.089	2.101	2.266	2.321	2.078	ns

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Table 1–44. EP3SL50 Row Pins output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.047	3.271	4.617	5.015	5.525	5.389	5.596	5.141	5.653	5.518	5.664	ns
		GCLK PLL	t_{co}	1.316	1.519	1.927	1.998	2.198	2.216	2.138	2.111	2.316	2.333	2.127	ns
	6mA	GCLK	t_{co}	3.042	3.266	4.615	5.014	5.524	5.388	5.595	5.139	5.651	5.516	5.662	ns
		GCLK PLL	t_{co}	1.311	1.505	1.924	1.997	2.197	2.215	2.137	2.109	2.314	2.331	2.125	ns
	8mA	GCLK	t_{co}	3.031	3.255	4.605	5.004	5.514	5.378	5.585	5.130	5.642	5.507	5.653	ns
		GCLK PLL	t_{co}	1.300	1.493	1.907	1.987	2.187	2.205	2.127	2.100	2.305	2.322	2.116	ns
	10mA	GCLK	t_{co}	3.020	3.244	4.592	4.991	5.501	5.365	5.572	5.118	5.630	5.495	5.641	ns
		GCLK PLL	t_{co}	1.289	1.476	1.891	1.974	2.174	2.192	2.114	2.088	2.293	2.310	2.104	ns
	12mA	GCLK	t_{co}	3.020	3.243	4.592	4.991	5.501	5.365	5.572	5.117	5.630	5.495	5.641	ns
		GCLK PLL	t_{co}	1.289	1.475	1.890	1.974	2.174	2.192	2.114	2.087	2.293	2.310	2.104	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.028	3.250	4.591	4.988	5.496	5.360	5.567	5.113	5.624	5.489	5.635	ns
		GCLK PLL	t_{co}	1.297	1.482	1.888	1.971	2.169	2.187	2.109	2.083	2.287	2.304	2.098	ns
	16mA	GCLK	t_{co}	3.029	3.253	4.597	4.996	5.506	5.370	5.577	5.122	5.635	5.500	5.646	ns
		GCLK PLL	t_{co}	1.298	1.485	1.892	1.979	2.179	2.197	2.119	2.092	2.298	2.315	2.109	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.050	3.274	4.626	5.026	5.538	5.402	5.609	5.151	5.665	5.530	5.676	ns
		GCLK PLL	t_{co}	1.319	1.515	1.938	2.009	2.211	2.229	2.151	2.121	2.328	2.345	2.139	ns
	6mA	GCLK	t_{co}	3.036	3.260	4.615	5.016	5.528	5.392	5.599	5.142	5.656	5.521	5.667	ns
		GCLK PLL	t_{co}	1.305	1.493	1.920	1.999	2.201	2.219	2.141	2.112	2.319	2.336	2.130	ns
	8mA	GCLK	t_{co}	3.025	3.248	4.602	5.003	5.515	5.379	5.586	5.129	5.643	5.508	5.654	ns
		GCLK PLL	t_{co}	1.294	1.480	1.903	1.986	2.188	2.206	2.128	2.099	2.306	2.323	2.117	ns

Table 1–44. EP3SL50 Row Pins output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.035	3.256	4.590	4.986	5.494	5.358	5.565	5.112	5.621	5.486	5.632	ns
		GCLK PLL	t_{co}	1.304	1.491	1.894	1.969	2.167	2.185	2.107	2.082	2.284	2.301	2.095	ns
	6mA	GCLK	t_{co}	3.028	3.250	4.588	4.985	5.493	5.357	5.564	5.111	5.621	5.486	5.632	ns
		GCLK PLL	t_{co}	1.297	1.482	1.885	1.968	2.166	2.184	2.106	2.081	2.284	2.301	2.095	ns
	8mA	GCLK	t_{co}	3.019	3.242	4.581	4.978	5.486	5.350	5.557	5.104	5.614	5.479	5.625	ns
		GCLK PLL	t_{co}	1.288	1.474	1.877	1.961	2.159	2.177	2.099	2.074	2.277	2.294	2.088	ns
	10mA	GCLK	t_{co}	3.022	3.244	4.584	4.981	5.490	5.354	5.561	5.107	5.617	5.482	5.628	ns
		GCLK PLL	t_{co}	1.291	1.476	1.879	1.964	2.163	2.181	2.103	2.077	2.280	2.297	2.091	ns
	12mA	GCLK	t_{co}	3.018	3.241	4.586	4.984	5.493	5.357	5.564	5.110	5.622	5.487	5.633	ns
		GCLK PLL	t_{co}	1.287	1.473	1.881	1.967	2.166	2.184	2.106	2.080	2.285	2.302	2.096	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.026	3.249	4.584	4.981	5.489	5.353	5.560	5.106	5.616	5.481	5.627	ns
		GCLK PLL	t_{co}	1.295	1.481	1.879	1.964	2.162	2.180	2.102	2.076	2.279	2.296	2.090	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.041	3.262	4.599	4.996	5.505	5.369	5.576	5.121	5.632	5.497	5.643	ns
		GCLK PLL	t_{co}	1.310	1.498	1.905	1.979	2.178	2.196	2.118	2.091	2.295	2.312	2.106	ns
	6mA	GCLK	t_{co}	3.035	3.257	4.600	4.998	5.507	5.371	5.578	5.123	5.635	5.500	5.646	ns
		GCLK PLL	t_{co}	1.304	1.489	1.901	1.981	2.180	2.198	2.120	2.093	2.298	2.315	2.109	ns
	8mA	GCLK	t_{co}	3.031	3.253	4.595	4.993	5.502	5.366	5.573	5.118	5.629	5.494	5.640	ns
		GCLK PLL	t_{co}	1.300	1.485	1.895	1.976	2.175	2.193	2.115	2.088	2.292	2.309	2.103	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.043	3.264	4.612	5.012	5.524	5.388	5.595	5.137	5.651	5.516	5.662	ns
		GCLK PLL	t_{co}	1.312	1.497	1.916	1.995	2.197	2.215	2.137	2.107	2.314	2.331	2.125	ns
	6mA	GCLK	t_{co}	3.034	3.256	4.603	5.003	5.515	5.379	5.586	5.128	5.642	5.507	5.653	ns
		GCLK PLL	t_{co}	1.303	1.488	1.905	1.986	2.188	2.206	2.128	2.098	2.305	2.322	2.116	ns
	8mA	GCLK	t_{co}	3.033	3.256	4.610	5.011	5.524	5.388	5.595	5.137	5.652	5.517	5.663	ns
		GCLK PLL	t_{co}	1.302	1.488	1.909	1.994	2.197	2.215	2.137	2.107	2.315	2.332	2.126	ns
3.0-V PCI	—	GCLK	t_{co}	3.114	3.338	4.626	5.016	5.494	5.359	5.561	5.144	5.625	5.513	5.635	ns
		GCLK PLL	t_{co}	1.436	1.622	1.973	2.052	2.208	2.226	2.148	2.167	2.327	2.382	2.139	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.114	3.338	4.626	5.016	5.494	5.359	5.561	5.144	5.625	5.513	5.635	ns
		GCLK PLL	t_{co}	1.436	1.622	1.973	2.052	2.208	2.226	2.148	2.167	2.327	2.382	2.139	ns

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Table 1–45 through Table 1–48 list the maximum I/O timing parameters for EP3SL50 devices for differential I/O standards.

Table 1–45 lists the EP3SL50 column pins input timing parameters for differential I/O standards.

Table 1–45. EP3SL50 Column Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
MINI-LVDS	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
RSDS	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns

Table 1–45. EP3SL50 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.724	-0.746	-1.103	-1.209	-1.329	-1.274	-1.558	-1.209	-1.324	-1.273	-1.591	ns
		t_h	0.841	0.878	1.290	1.419	1.560	1.492	1.779	1.427	1.565	1.501	1.811	ns
	GCLK PLL	t_{su}	1.116	1.130	1.790	2.026	2.244	2.129	2.138	2.037	2.260	2.142	2.190	ns
		t_h	-0.865	-0.864	-1.391	-1.576	-1.743	-1.658	-1.657	-1.579	-1.749	-1.662	-1.708	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.724	-0.746	-1.103	-1.209	-1.329	-1.274	-1.558	-1.209	-1.324	-1.273	-1.591	ns
		t_h	0.841	0.878	1.290	1.419	1.560	1.492	1.779	1.427	1.565	1.501	1.811	ns
	GCLK PLL	t_{su}	1.116	1.130	1.790	2.026	2.244	2.129	2.138	2.037	2.260	2.142	2.190	ns
		t_h	-0.865	-0.864	-1.391	-1.576	-1.743	-1.658	-1.657	-1.579	-1.749	-1.662	-1.708	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns

Table 1–46 lists the EP3SL50 row pins input timing parameters for differential I/O standards.

Table 1–46. EP3SL50 Row Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
MINI-LVDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
RSDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.734	-0.764	-1.085	-1.186	-1.286	-1.234	-1.505	-1.193	-1.291	-1.242	-1.543	ns
		t_h	0.850	0.893	1.274	1.394	1.516	1.451	1.720	1.410	1.531	1.470	1.758	ns
	GCLK PLL	t_{su}	1.077	1.081	1.776	2.019	2.257	2.138	2.163	2.024	2.263	2.144	2.209	ns
		t_h	-0.827	-0.819	-1.375	-1.570	-1.756	-1.667	-1.687	-1.565	-1.751	-1.663	-1.730	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.734	-0.764	-1.085	-1.186	-1.286	-1.234	-1.505	-1.193	-1.291	-1.242	-1.543	ns
		t_h	0.850	0.893	1.274	1.394	1.516	1.451	1.720	1.410	1.531	1.470	1.758	ns
	GCLK PLL	t_{su}	1.077	1.081	1.776	2.019	2.257	2.138	2.163	2.024	2.263	2.144	2.209	ns
		t_h	-0.827	-0.819	-1.375	-1.570	-1.756	-1.667	-1.687	-1.565	-1.751	-1.663	-1.730	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns

Table 1–46. EP3SL50 Row Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.756	-0.787	-1.112	-1.212	-1.321	-1.270	-1.540	-1.214	-1.320	-1.273	-1.573	ns
		t_h	0.872	0.916	1.300	1.422	1.554	1.489	1.759	1.434	1.563	1.502	1.792	ns
	GCLK PLL	t_{su}	1.045	1.048	1.739	1.983	2.212	2.092	2.118	1.993	2.224	2.103	2.169	ns
		t_h	-0.795	-0.786	-1.339	-1.532	-1.708	-1.619	-1.638	-1.531	-1.709	-1.621	-1.686	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.756	-0.787	-1.112	-1.212	-1.321	-1.270	-1.540	-1.214	-1.320	-1.273	-1.573	ns
		t_h	0.872	0.916	1.300	1.422	1.554	1.489	1.759	1.434	1.563	1.502	1.792	ns
	GCLK PLL	t_{su}	1.045	1.048	1.739	1.983	2.212	2.092	2.118	1.993	2.224	2.103	2.169	ns
		t_h	-0.795	-0.786	-1.339	-1.532	-1.708	-1.619	-1.638	-1.531	-1.709	-1.621	-1.686	ns

Table 1–47 lists the EP3SL50 column pins output timing parameters for differential I/O standards.

Table 1–47. EP3SL50 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
LVDS_E_3R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.056	3.279	4.646	5.054	5.571	5.431	5.649	5.181	5.698	5.560	5.717	ns
		GCLK PLL	t_{co}	3.046	3.269	4.636	5.043	5.561	5.421	5.639	5.170	5.688	5.550	5.707	ns
RSDS_E_1R	—	GCLK	t_{co}	3.046	3.269	4.639	5.047	5.565	5.425	5.643	5.175	5.693	5.555	5.712	ns
		GCLK PLL	t_{co}	3.039	3.263	4.632	5.041	5.559	5.419	5.637	5.168	5.687	5.549	5.706	ns
RSDS_E_3R	—	GCLK	t_{co}	3.038	3.261	4.629	5.038	5.556	5.416	5.634	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.060	3.283	4.650	5.058	5.575	5.435	5.653	5.185	5.703	5.565	5.722	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.050	3.272	4.629	5.035	5.550	5.410	5.628	5.161	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.045	3.268	4.629	5.035	5.551	5.411	5.629	5.162	5.678	5.540	5.697	ns
	6mA	GCLK	t_{co}	3.043	3.266	4.628	5.034	5.549	5.409	5.627	5.161	5.677	5.539	5.696	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
	8mA	GCLK	t_{co}	3.036	3.259	4.624	5.031	5.548	5.408	5.626	5.159	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.035	3.256	4.607	5.012	5.526	5.386	5.604	5.138	5.652	5.514	5.671	ns
	10mA	GCLK	t_{co}	3.047	3.269	4.625	5.030	5.544	5.404	5.622	5.157	5.671	5.533	5.690	ns
		GCLK PLL	t_{co}	3.043	3.266	4.626	5.032	5.548	5.408	5.626	5.159	5.675	5.537	5.694	ns
	12mA	GCLK	t_{co}	3.033	3.255	4.615	5.021	5.536	5.396	5.614	5.148	5.663	5.525	5.682	ns
		GCLK PLL	t_{co}	3.031	3.253	4.613	5.018	5.534	5.394	5.612	5.146	5.661	5.523	5.680	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.031	3.254	4.616	5.023	5.539	5.399	5.617	5.150	5.667	5.529	5.686	ns
		GCLK PLL	t_{co}	3.035	3.257	4.613	5.018	5.533	5.393	5.611	5.145	5.660	5.522	5.679	ns

Table 1–47. EP3SL50 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.061	3.286	4.658	5.066	5.583	5.443	5.661	5.193	5.710	5.572	5.729	ns
		GCLK PLL	t_{co}	3.047	3.272	4.646	5.055	5.573	5.433	5.651	5.183	5.701	5.563	5.720	ns
	6mA	GCLK	t_{co}	3.035	3.259	4.629	5.037	5.555	5.415	5.633	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.035	3.259	4.632	5.041	5.559	5.419	5.637	5.169	5.688	5.550	5.707	ns
	8mA	GCLK	t_{co}	3.031	3.255	4.625	5.033	5.552	5.412	5.630	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
	10mA	GCLK	t_{co}	3.036	3.259	4.626	5.034	5.551	5.411	5.629	5.161	5.679	5.541	5.698	ns
		GCLK PLL	t_{co}	3.064	3.289	4.657	5.064	5.581	5.441	5.659	5.192	5.708	5.570	5.727	ns
	12mA	GCLK	t_{co}	3.053	3.277	4.645	5.052	5.569	5.429	5.647	5.180	5.696	5.558	5.715	ns
		GCLK PLL	t_{co}	3.048	3.273	4.645	5.053	5.570	5.430	5.648	5.181	5.698	5.560	5.717	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.034	3.258	4.627	5.034	5.551	5.411	5.629	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.032	3.256	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.036	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns
		GCLK PLL	t_{co}	3.036	3.259	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
	6mA	GCLK	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
		GCLK PLL	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
	8mA	GCLK	t_{co}	3.042	3.266	4.631	5.037	5.553	5.413	5.631	5.165	5.681	5.543	5.700	ns
		GCLK PLL	t_{co}	3.035	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns
	10mA	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
	12mA	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns

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Table 1–47. EP3SL50 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.056	3.279	4.646	5.054	5.571	5.431	5.649	5.181	5.698	5.560	5.717	ns
		GCLK PLL	t_{co}	3.046	3.269	4.636	5.043	5.561	5.421	5.639	5.170	5.688	5.550	5.707	ns
	6mA	GCLK	t_{co}	3.046	3.269	4.639	5.047	5.565	5.425	5.643	5.175	5.693	5.555	5.712	ns
		GCLK PLL	t_{co}	3.039	3.263	4.632	5.041	5.559	5.419	5.637	5.168	5.687	5.549	5.706	ns
	8mA	GCLK	t_{co}	3.038	3.261	4.629	5.038	5.556	5.416	5.634	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.060	3.283	4.650	5.058	5.575	5.435	5.653	5.185	5.703	5.565	5.722	ns
	10mA	GCLK	t_{co}	3.050	3.272	4.629	5.035	5.550	5.410	5.628	5.161	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.045	3.268	4.629	5.035	5.551	5.411	5.629	5.162	5.678	5.540	5.697	ns
	12mA	GCLK	t_{co}	3.043	3.266	4.628	5.034	5.549	5.409	5.627	5.161	5.677	5.539	5.696	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.036	3.259	4.624	5.031	5.548	5.408	5.626	5.159	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.035	3.256	4.607	5.012	5.526	5.386	5.604	5.138	5.652	5.514	5.671	ns
	16mA	GCLK	t_{co}	3.047	3.269	4.625	5.030	5.544	5.404	5.622	5.157	5.671	5.533	5.690	ns
		GCLK PLL	t_{co}	3.043	3.266	4.626	5.032	5.548	5.408	5.626	5.159	5.675	5.537	5.694	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.033	3.255	4.615	5.021	5.536	5.396	5.614	5.148	5.663	5.525	5.682	ns
		GCLK PLL	t_{co}	3.031	3.253	4.613	5.018	5.534	5.394	5.612	5.146	5.661	5.523	5.680	ns
	6mA	GCLK	t_{co}	3.031	3.254	4.616	5.023	5.539	5.399	5.617	5.150	5.667	5.529	5.686	ns
		GCLK PLL	t_{co}	3.035	3.257	4.613	5.018	5.533	5.393	5.611	5.145	5.660	5.522	5.679	ns
	8mA	GCLK	t_{co}	3.061	3.286	4.658	5.066	5.583	5.443	5.661	5.193	5.710	5.572	5.729	ns
		GCLK PLL	t_{co}	3.047	3.272	4.646	5.055	5.573	5.433	5.651	5.183	5.701	5.563	5.720	ns
	10mA	GCLK	t_{co}	3.035	3.259	4.629	5.037	5.555	5.415	5.633	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.035	3.259	4.632	5.041	5.559	5.419	5.637	5.169	5.688	5.550	5.707	ns
	12mA	GCLK	t_{co}	3.031	3.255	4.625	5.033	5.552	5.412	5.630	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.036	3.259	4.626	5.034	5.551	5.411	5.629	5.161	5.679	5.541	5.698	ns
		GCLK PLL	t_{co}	3.064	3.289	4.657	5.064	5.581	5.441	5.659	5.192	5.708	5.570	5.727	ns
	16mA	GCLK	t_{co}	3.053	3.277	4.645	5.052	5.569	5.429	5.647	5.180	5.696	5.558	5.715	ns
		GCLK PLL	t_{co}	3.048	3.273	4.645	5.053	5.570	5.430	5.648	5.181	5.698	5.560	5.717	ns

Table 1–47. EP3SL50 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.034	3.258	4.627	5.034	5.551	5.411	5.629	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.032	3.256	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
	10mA	GCLK	t_{co}	3.036	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns
		GCLK PLL	t_{co}	3.036	3.259	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
	12mA	GCLK	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
		GCLK PLL	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.042	3.266	4.631	5.037	5.553	5.413	5.631	5.165	5.681	5.543	5.700	ns
		GCLK PLL	t_{co}	3.035	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns

Table 1–48 lists the EP3SL50 row pins output timing parameters for differential I/O standards.

Table 1–48. EP3SL50 Row Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
LVDS_E_1R	—	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
LVDS_E_3R	—	GCLK	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
		GCLK PLL	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
MINI-LVDS	—	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	3.098	3.331	4.730	5.145	5.672	5.528	5.727	5.280	5.809	5.665	5.794	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.084	3.317	4.717	5.132	5.659	5.515	5.714	5.266	5.796	5.652	5.781	ns
		GCLK PLL	t_{co}	3.080	3.313	4.715	5.132	5.660	5.516	5.715	5.266	5.798	5.654	5.783	ns
RSDS	—	GCLK	t_{co}	3.096	3.328	4.716	5.129	5.654	5.510	5.709	5.263	5.791	5.647	5.776	ns
		GCLK PLL	t_{co}	3.085	3.318	4.712	5.125	5.651	5.507	5.706	5.260	5.788	5.644	5.773	ns

Table 1–48. EP3SL50 Row Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RSDS_E_1R	—	GCLK	t_{co}	3.082	3.315	4.710	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.093	3.325	4.711	5.124	5.648	5.504	5.703	5.257	5.785	5.641	5.770	ns
RSDS_E_3R	—	GCLK	t_{co}	3.083	3.316	4.709	5.122	5.647	5.503	5.702	5.257	5.785	5.641	5.770	ns
		GCLK PLL	t_{co}	3.069	3.302	4.694	5.107	5.633	5.489	5.688	5.242	5.770	5.626	5.755	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.066	3.298	4.690	5.103	5.629	5.485	5.684	5.238	5.766	5.622	5.751	ns
		GCLK PLL	t_{co}	3.063	3.296	4.691	5.106	5.632	5.488	5.687	5.241	5.770	5.626	5.755	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	6mA	GCLK	t_{co}	3.064	3.296	4.681	5.094	5.619	5.475	5.674	5.228	5.756	5.612	5.741	ns
		GCLK PLL	t_{co}	3.113	3.349	4.752	5.167	5.695	5.551	5.750	5.302	5.832	5.688	5.817	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	8mA	GCLK	t_{co}	3.089	3.325	4.734	5.150	5.678	5.534	5.733	5.285	5.817	5.673	5.802	ns
		GCLK PLL	t_{co}	3.071	3.306	4.712	5.128	5.656	5.512	5.711	5.263	5.795	5.651	5.780	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.117	3.352	4.752	5.167	5.694	5.550	5.749	5.302	5.832	5.688	5.817	ns
		GCLK PLL	t_{co}	3.102	3.337	4.738	5.152	5.679	5.535	5.734	5.287	5.817	5.673	5.802	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	6mA	GCLK	t_{co}	3.091	3.326	4.733	5.149	5.676	5.532	5.731	5.284	5.815	5.671	5.800	ns
		GCLK PLL	t_{co}	3.071	3.306	4.710	5.125	5.653	5.509	5.708	5.261	5.791	5.647	5.776	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	8mA	GCLK	t_{co}	3.068	3.302	4.706	5.122	5.649	5.505	5.704	5.257	5.788	5.644	5.773	ns
		GCLK PLL	t_{co}	3.073	3.306	4.697	5.110	5.635	5.491	5.690	5.244	5.772	5.628	5.757	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.066	3.299	4.696	5.111	5.638	5.494	5.693	5.247	5.777	5.633	5.762	ns
		GCLK PLL	t_{co}	3.094	3.328	4.724	5.138	5.664	5.520	5.719	5.273	5.802	5.658	5.787	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	6mA	GCLK	t_{co}	3.076	3.311	4.709	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.062	3.295	4.686	5.099	5.624	5.480	5.679	5.234	5.762	5.618	5.747	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	8mA	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	10mA	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	12mA	GCLK	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
		GCLK PLL	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns

Table 1–48. EP3SL50 Row Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	3.098	3.331	4.730	5.145	5.672	5.528	5.727	5.280	5.809	5.665	5.794	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	6mA	GCLK	t_{co}	3.084	3.317	4.717	5.132	5.659	5.515	5.714	5.266	5.796	5.652	5.781	ns
		GCLK PLL	t_{co}	3.080	3.313	4.715	5.132	5.660	5.516	5.715	5.266	5.798	5.654	5.783	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.096	3.328	4.716	5.129	5.654	5.510	5.709	5.263	5.791	5.647	5.776	ns
		GCLK PLL	t_{co}	3.085	3.318	4.712	5.125	5.651	5.507	5.706	5.260	5.788	5.644	5.773	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.082	3.315	4.710	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.093	3.325	4.711	5.124	5.648	5.504	5.703	5.257	5.785	5.641	5.770	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	6mA	GCLK	t_{co}	3.083	3.316	4.709	5.122	5.647	5.503	5.702	5.257	5.785	5.641	5.770	ns
		GCLK PLL	t_{co}	3.069	3.302	4.694	5.107	5.633	5.489	5.688	5.242	5.770	5.626	5.755	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	8mA	GCLK	t_{co}	3.066	3.298	4.690	5.103	5.629	5.485	5.684	5.238	5.766	5.622	5.751	ns
		GCLK PLL	t_{co}	3.063	3.296	4.691	5.106	5.632	5.488	5.687	5.241	5.770	5.626	5.755	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	10mA	GCLK	t_{co}	3.064	3.296	4.681	5.094	5.619	5.475	5.674	5.228	5.756	5.612	5.741	ns
		GCLK PLL	t_{co}	3.113	3.349	4.752	5.167	5.695	5.551	5.750	5.302	5.832	5.688	5.817	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	12mA	GCLK	t_{co}	3.089	3.325	4.734	5.150	5.678	5.534	5.733	5.285	5.817	5.673	5.802	ns
		GCLK PLL	t_{co}	3.071	3.306	4.712	5.128	5.656	5.512	5.711	5.263	5.795	5.651	5.780	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.117	3.352	4.752	5.167	5.694	5.550	5.749	5.302	5.832	5.688	5.817	ns
		GCLK PLL	t_{co}	3.102	3.337	4.738	5.152	5.679	5.535	5.734	5.287	5.817	5.673	5.802	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	16mA	GCLK	t_{co}	3.091	3.326	4.733	5.149	5.676	5.532	5.731	5.284	5.815	5.671	5.800	ns
		GCLK PLL	t_{co}	3.071	3.306	4.710	5.125	5.653	5.509	5.708	5.261	5.791	5.647	5.776	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.068	3.302	4.706	5.122	5.649	5.505	5.704	5.257	5.788	5.644	5.773	ns
		GCLK PLL	t_{co}	3.073	3.306	4.697	5.110	5.635	5.491	5.690	5.244	5.772	5.628	5.757	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	12mA	GCLK	t_{co}	3.066	3.299	4.696	5.111	5.638	5.494	5.693	5.247	5.777	5.633	5.762	ns
		GCLK PLL	t_{co}	3.094	3.328	4.724	5.138	5.664	5.520	5.719	5.273	5.802	5.658	5.787	ns

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Table 1–48. EP3SL50 Row Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.076	3.311	4.709	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.062	3.295	4.686	5.099	5.624	5.480	5.679	5.234	5.762	5.618	5.747	ns

Table 1–49 and Table 1–50 list the EP3SL50 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–49 lists the EP3SL50 column pin delay adders when using the regional clock.

Table 1–49. EP3SL50 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.239	0.258	0.341	0.365	0.39	0.377	0.439	0.375	0.399	0.388	0.441	ns
RCLK PLL input adder	0.008	0.009	0.014	0.017	0.019	0.017	0.02	0.018	0.019	0.017	0.02	ns
RCLK output adder	-0.068	-0.07	-0.09	-0.092	-0.094	-0.091	-0.169	-0.086	-0.087	-0.09	-0.17	ns
RCLK PLL output adder	1.614	1.649	2.575	2.89	3.164	3.011	3.22	2.908	3.217	3.063	3.338	ns

Table 1–50 lists the EP3SL50 row pin delay adders when using the regional clock.

Table 1–50. EP3SL50 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.111	0.124	0.178	0.193	0.208	0.2	0.263	0.197	0.213	0.203	0.266	ns
RCLK PLL input adder	0.101	0.107	0.156	0.174	0.194	0.184	0.251	0.177	0.196	0.188	0.249	ns
RCLK output adder	-0.113	-0.127	-0.181	-0.196	-0.213	-0.205	-0.271	-0.199	-0.217	-0.209	-0.273	ns
RCLK PLL output adder	-0.107	-0.113	-0.164	-0.185	-0.213	-0.2	-0.266	-0.184	-0.212	-0.198	-0.262	ns

EP3SL70 I/O Timing Parameters

Table 1–51 through Table 1–54 list the maximum I/O timing parameters for EP3SL70 devices for single-ended I/O standards.

Table 1–51 lists the EP3SL70 column pins input timing parameters for single-ended I/O standards.

Table 1–51. EP3SL70 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.812	-0.811	-1.154	-1.261	-1.312	-1.266	-1.645	-1.261	-1.312	-1.266	-1.645	ns
		t_h	0.934	0.934	1.327	1.457	1.533	1.475	1.850	1.457	1.533	1.475	1.850	ns
	GCLK PLL	t_{su}	-0.965	-0.965	-1.395	-1.522	-1.763	-1.703	-2.094	-1.522	-1.763	-1.703	-2.094	ns
		t_h	1.216	1.216	1.764	1.937	2.222	2.138	2.540	1.937	2.222	2.138	2.540	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.812	-0.811	-1.154	-1.261	-1.312	-1.266	-1.645	-1.261	-1.312	-1.266	-1.645	ns
		t_h	0.934	0.934	1.327	1.457	1.533	1.475	1.850	1.457	1.533	1.475	1.850	ns
	GCLK PLL	t_{su}	-0.965	-0.965	-1.395	-1.522	-1.763	-1.703	-2.094	-1.522	-1.763	-1.703	-2.094	ns
		t_h	1.216	1.216	1.764	1.937	2.222	2.138	2.540	1.937	2.222	2.138	2.540	ns
3.0-V LVTTL	GCLK	t_{su}	-0.823	-0.822	-1.153	-1.263	-1.311	-1.265	-1.644	-1.263	-1.311	-1.265	-1.644	ns
		t_h	0.945	0.945	1.326	1.459	1.532	1.474	1.849	1.459	1.532	1.474	1.849	ns
	GCLK PLL	t_{su}	-0.976	-0.976	-1.394	-1.524	-1.762	-1.702	-2.093	-1.524	-1.762	-1.702	-2.093	ns
		t_h	1.227	1.227	1.763	1.939	2.221	2.137	2.539	1.939	2.221	2.137	2.539	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.823	-0.822	-1.153	-1.263	-1.311	-1.265	-1.644	-1.263	-1.311	-1.265	-1.644	ns
		t_h	0.945	0.945	1.326	1.459	1.532	1.474	1.849	1.459	1.532	1.474	1.849	ns
	GCLK PLL	t_{su}	-0.976	-0.976	-1.394	-1.524	-1.762	-1.702	-2.093	-1.524	-1.762	-1.702	-2.093	ns
		t_h	1.227	1.227	1.763	1.939	2.221	2.137	2.539	1.939	2.221	2.137	2.539	ns
2.5 V	GCLK	t_{su}	-0.818	-0.817	-1.162	-1.275	-1.330	-1.284	-1.663	-1.275	-1.330	-1.284	-1.663	ns
		t_h	0.940	0.940	1.335	1.471	1.551	1.493	1.868	1.471	1.551	1.493	1.868	ns
	GCLK PLL	t_{su}	-0.971	-0.971	-1.403	-1.536	-1.781	-1.721	-2.112	-1.536	-1.781	-1.721	-2.112	ns
		t_h	1.222	1.222	1.772	1.951	2.240	2.156	2.558	1.951	2.240	2.156	2.558	ns
1.8 V	GCLK	t_{su}	-0.840	-0.839	-1.202	-1.311	-1.328	-1.282	-1.661	-1.311	-1.328	-1.282	-1.661	ns
		t_h	0.964	0.964	1.375	1.507	1.549	1.491	1.866	1.507	1.549	1.491	1.866	ns
	GCLK PLL	t_{su}	-0.993	-0.993	-1.443	-1.572	-1.779	-1.719	-2.110	-1.572	-1.779	-1.719	-2.110	ns
		t_h	1.246	1.246	1.812	1.987	2.238	2.154	2.556	1.987	2.238	2.154	2.556	ns
1.5 V	GCLK	t_{su}	-0.830	-0.829	-1.179	-1.279	-1.258	-1.212	-1.591	-1.279	-1.258	-1.212	-1.591	ns
		t_h	0.954	0.954	1.352	1.475	1.479	1.421	1.796	1.475	1.479	1.421	1.796	ns
	GCLK PLL	t_{su}	-0.983	-0.983	-1.420	-1.540	-1.709	-1.649	-2.040	-1.540	-1.709	-1.649	-2.040	ns
		t_h	1.236	1.236	1.789	1.955	2.168	2.084	2.486	1.955	2.168	2.084	2.486	ns
1.2 V	GCLK	t_{su}	-0.778	-0.777	-1.102	-1.180	-1.102	-1.056	-1.435	-1.180	-1.102	-1.056	-1.435	ns
		t_h	0.902	0.902	1.275	1.376	1.323	1.265	1.640	1.376	1.323	1.265	1.640	ns
	GCLK PLL	t_{su}	-0.931	-0.931	-1.343	-1.441	-1.553	-1.493	-1.884	-1.441	-1.553	-1.493	-1.884	ns
		t_h	1.184	1.184	1.712	1.856	2.012	1.928	2.330	1.856	2.012	1.928	2.330	ns

Table 1–51. EP3SL70 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS I	GCLK	t_{su}	-0.749	-0.748	-1.074	-1.164	-1.104	-1.058	-1.437	-1.164	-1.104	-1.058	-1.437	ns
		t_h	0.873	0.873	1.247	1.360	1.325	1.267	1.642	1.360	1.325	1.267	1.642	ns
	GCLK PLL	t_{su}	-0.902	-0.902	-1.315	-1.425	-1.555	-1.495	-1.886	-1.425	-1.555	-1.495	-1.886	ns
		t_h	1.155	1.155	1.684	1.840	2.014	1.930	2.332	1.840	2.014	1.930	2.332	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.749	-0.748	-1.074	-1.164	-1.104	-1.058	-1.437	-1.164	-1.104	-1.058	-1.437	ns
		t_h	0.873	0.873	1.247	1.360	1.325	1.267	1.642	1.360	1.325	1.267	1.642	ns
	GCLK PLL	t_{su}	-0.902	-0.902	-1.315	-1.425	-1.555	-1.495	-1.886	-1.425	-1.555	-1.495	-1.886	ns
		t_h	1.155	1.155	1.684	1.840	2.014	1.930	2.332	1.840	2.014	1.930	2.332	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.743	-0.742	-1.061	-1.156	-1.104	-1.056	-1.435	-1.156	-1.104	-1.056	-1.435	ns
		t_h	0.867	0.867	1.234	1.349	1.322	1.264	1.635	1.349	1.322	1.264	1.635	ns
	GCLK PLL	t_{su}	-0.896	-0.896	-1.302	-1.417	-1.552	-1.490	-1.884	-1.417	-1.552	-1.490	-1.884	ns
		t_h	1.149	1.149	1.671	1.829	2.008	1.924	2.325	1.829	2.008	1.924	2.325	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.743	-0.742	-1.061	-1.156	-1.104	-1.056	-1.435	-1.156	-1.104	-1.056	-1.435	ns
		t_h	0.867	0.867	1.234	1.349	1.322	1.264	1.635	1.349	1.322	1.264	1.635	ns
	GCLK PLL	t_{su}	-0.896	-0.896	-1.302	-1.417	-1.552	-1.490	-1.884	-1.417	-1.552	-1.490	-1.884	ns
		t_h	1.149	1.149	1.671	1.829	2.008	1.924	2.325	1.829	2.008	1.924	2.325	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.732	-0.731	-1.050	-1.145	-1.085	-1.037	-1.416	-1.145	-1.085	-1.037	-1.416	ns
		t_h	0.856	0.856	1.222	1.338	1.303	1.245	1.616	1.338	1.303	1.245	1.616	ns
	GCLK PLL	t_{su}	-0.885	-0.885	-1.291	-1.406	-1.533	-1.471	-1.865	-1.406	-1.533	-1.471	-1.865	ns
		t_h	1.138	1.138	1.659	1.818	1.989	1.905	2.306	1.818	1.989	1.905	2.306	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.732	-0.731	-1.050	-1.145	-1.085	-1.037	-1.416	-1.145	-1.085	-1.037	-1.416	ns
		t_h	0.856	0.856	1.222	1.338	1.303	1.245	1.616	1.338	1.303	1.245	1.616	ns
	GCLK PLL	t_{su}	-0.885	-0.885	-1.291	-1.406	-1.533	-1.471	-1.865	-1.406	-1.533	-1.471	-1.865	ns
		t_h	1.138	1.138	1.659	1.818	1.989	1.905	2.306	1.818	1.989	1.905	2.306	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.743	-0.742	-1.061	-1.156	-1.104	-1.056	-1.435	-1.156	-1.104	-1.056	-1.435	ns
		t_h	0.867	0.867	1.234	1.349	1.322	1.264	1.635	1.349	1.322	1.264	1.635	ns
	GCLK PLL	t_{su}	-0.896	-0.896	-1.302	-1.417	-1.552	-1.490	-1.884	-1.417	-1.552	-1.490	-1.884	ns
		t_h	1.149	1.149	1.671	1.829	2.008	1.924	2.325	1.829	2.008	1.924	2.325	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.743	-0.742	-1.061	-1.156	-1.104	-1.056	-1.435	-1.156	-1.104	-1.056	-1.435	ns
		t_h	0.867	0.867	1.234	1.349	1.322	1.264	1.635	1.349	1.322	1.264	1.635	ns
	GCLK PLL	t_{su}	-0.896	-0.896	-1.302	-1.417	-1.552	-1.490	-1.884	-1.417	-1.552	-1.490	-1.884	ns
		t_h	1.149	1.149	1.671	1.829	2.008	1.924	2.325	1.829	2.008	1.924	2.325	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.732	-0.731	-1.050	-1.145	-1.085	-1.037	-1.416	-1.145	-1.085	-1.037	-1.416	ns
		t_h	0.856	0.856	1.222	1.338	1.303	1.245	1.616	1.338	1.303	1.245	1.616	ns
	GCLK PLL	t_{su}	-0.885	-0.885	-1.291	-1.406	-1.533	-1.471	-1.865	-1.406	-1.533	-1.471	-1.865	ns
		t_h	1.138	1.138	1.659	1.818	1.989	1.905	2.306	1.818	1.989	1.905	2.306	ns

Table 1–51. EP3SL70 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.732	-0.731	-1.050	-1.145	-1.085	-1.037	-1.416	-1.145	-1.085	-1.037	-1.416	ns
		t_h	0.856	0.856	1.222	1.338	1.303	1.245	1.616	1.338	1.303	1.245	1.616	ns
	GCLK PLL	t_{su}	-0.885	-0.885	-1.291	-1.406	-1.533	-1.471	-1.865	-1.406	-1.533	-1.471	-1.865	ns
		t_h	1.138	1.138	1.659	1.818	1.989	1.905	2.306	1.818	1.989	1.905	2.306	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.720	-0.719	-1.040	-1.134	-1.069	-1.021	-1.400	-1.134	-1.069	-1.021	-1.400	ns
		t_h	0.844	0.844	1.212	1.327	1.287	1.229	1.600	1.327	1.287	1.229	1.600	ns
	GCLK PLL	t_{su}	-0.873	-0.873	-1.281	-1.395	-1.517	-1.455	-1.849	-1.395	-1.517	-1.455	-1.849	ns
		t_h	1.126	1.126	1.649	1.807	1.973	1.889	2.290	1.807	1.973	1.889	2.290	ns
3.0-V PCI	GCLK	t_{su}	-0.720	-0.719	-1.040	-1.134	-1.069	-1.021	-1.400	-1.134	-1.069	-1.021	-1.400	ns
		t_h	0.844	0.844	1.212	1.327	1.287	1.229	1.600	1.327	1.287	1.229	1.600	ns
	GCLK PLL	t_{su}	-0.873	-0.873	-1.281	-1.395	-1.517	-1.455	-1.849	-1.395	-1.517	-1.455	-1.849	ns
		t_h	1.126	1.126	1.649	1.807	1.973	1.889	2.290	1.807	1.973	1.889	2.290	ns
3.0-V PCI-X	GCLK	t_{su}	-0.823	-0.822	-1.153	-1.263	-1.311	-1.265	-1.644	-1.263	-1.311	-1.265	-1.644	ns
		t_h	0.945	0.945	1.326	1.459	1.532	1.474	1.849	1.459	1.532	1.474	1.849	ns
	GCLK PLL	t_{su}	-0.976	-0.976	-1.394	-1.524	-1.762	-1.702	-2.093	-1.524	-1.762	-1.702	-2.093	ns
		t_h	1.227	1.227	1.763	1.939	2.221	2.137	2.539	1.939	2.221	2.137	2.539	ns

Table 1–52 lists the EP3SL70 row pins input timing parameters for single-ended I/O standards.

Table 1–52. EP3SL70 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.811	-0.836	-1.185	-1.296	-1.513	-1.460	-1.732	-1.306	-1.513	-1.464	-1.763	ns
		t_h	0.925	0.962	1.582	1.801	1.915	1.799	1.814	1.796	1.923	1.804	1.865	ns
	GCLK PLL	t_{su}	0.937	0.945	1.371	1.505	1.747	1.679	1.951	1.526	1.756	1.693	1.982	ns
		t_h	-0.688	-0.684	-1.185	-1.296	-1.513	-1.460	-1.732	-1.306	-1.513	-1.464	-1.763	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.811	-0.836	-1.185	-1.296	-1.513	-1.460	-1.732	-1.306	-1.513	-1.464	-1.763	ns
		t_h	0.925	0.962	1.582	1.801	1.915	1.799	1.814	1.796	1.923	1.804	1.865	ns
	GCLK PLL	t_{su}	0.937	0.945	1.371	1.505	1.747	1.679	1.951	1.526	1.756	1.693	1.982	ns
		t_h	-0.688	-0.684	-1.182	-1.297	-1.516	-1.463	-1.735	-1.305	-1.518	-1.469	-1.768	ns
3.0-V LVTTL	GCLK	t_{su}	-0.817	-0.847	1.368	1.506	1.750	1.682	1.954	1.525	1.761	1.698	1.987	ns
		t_h	0.931	0.973	-1.182	-1.297	-1.516	-1.463	-1.735	-1.305	-1.518	-1.469	-1.768	ns
	GCLK PLL	t_{su}	0.931	0.934	1.585	1.800	1.912	1.796	1.811	1.797	1.918	1.799	1.860	ns
		t_h	-0.682	-0.673	1.368	1.506	1.750	1.682	1.954	1.525	1.761	1.698	1.987	ns

Table 1–52. EP3SL70 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	GCLK	t_{su}	-0.817	-0.847	1.377	1.519	1.765	1.697	1.969	1.534	1.771	1.708	1.997	ns
		t_h	0.931	0.973	-1.191	-1.310	-1.531	-1.478	-1.750	-1.314	-1.528	-1.479	-1.778	ns
	GCLK PLL	t_{su}	0.931	0.934	1.576	1.787	1.897	1.781	1.796	1.788	1.908	1.789	1.850	ns
		t_h	-0.682	-0.673	1.377	1.519	1.765	1.697	1.969	1.534	1.771	1.708	1.997	ns
2.5 V	GCLK	t_{su}	-0.805	-0.840	1.518	1.758	1.994	1.874	1.798	1.758	1.917	1.798	1.849	ns
		t_h	0.919	0.966	1.447	1.676	1.892	1.823	2.114	1.723	1.933	1.867	2.146	ns
	GCLK PLL	t_{su}	0.943	0.941	-1.259	-1.469	-1.662	-1.607	-1.898	-1.507	-1.694	-1.641	-1.931	ns
		t_h	-0.694	-0.680	1.518	1.758	1.994	1.874	1.798	1.758	1.917	1.798	1.849	ns
1.8 V	GCLK	t_{su}	-0.946	-0.899	1.542	1.790	2.062	1.942	1.866	1.789	1.982	1.863	1.914	ns
		t_h	0.914	0.891	1.423	1.644	1.824	1.755	2.046	1.692	1.868	1.802	2.081	ns
	GCLK PLL	t_{su}	1.060	1.028	-1.235	-1.437	-1.594	-1.539	-1.830	-1.476	-1.629	-1.576	-1.866	ns
		t_h	-0.936	-0.888	1.621	1.891	2.221	2.101	2.025	1.885	2.137	2.018	2.069	ns
1.5 V	GCLK	t_{su}	0.924	0.902	1.344	1.543	1.665	1.596	1.887	1.596	1.713	1.647	1.926	ns
		t_h	1.050	1.017	-1.156	-1.336	-1.435	-1.380	-1.671	-1.380	-1.474	-1.421	-1.711	ns
	GCLK PLL	t_{su}	-0.876	-0.835	1.662	1.896	2.117	2.001	2.016	1.900	2.125	2.006	2.067	ns
		t_h	0.984	0.955	1.291	1.410	1.545	1.477	1.749	1.422	1.554	1.491	1.780	ns
1.2 V	GCLK	t_{su}	0.990	0.964	-1.118	-1.309	-1.430	-1.374	-1.667	-1.348	-1.467	-1.413	-1.704	ns
		t_h	-0.747	-0.781	1.659	-1.309	-1.430	-1.374	-1.667	-1.348	-1.467	-1.413	-1.704	ns
	GCLK PLL	t_{su}	1.000	0.999	1.306	1.514	1.658	1.589	1.879	1.562	1.703	1.638	1.915	ns
		t_h	0.862	0.908	-1.118	1.918	2.223	2.104	2.029	1.917	2.144	2.026	2.076	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.747	-0.781	1.659	1.918	2.223	2.104	2.029	1.917	2.144	2.026	2.076	ns
		t_h	1.000	0.999	1.306	-1.472	-1.722	-1.633	-1.557	-1.461	-1.635	-1.548	-1.601	ns
	GCLK PLL	t_{su}	0.862	0.908	-1.118	-1.309	-1.430	-1.374	-1.667	-1.348	-1.467	-1.413	-1.704	ns
		t_h	-0.850	-0.800	1.659	1.514	1.658	1.589	1.879	1.562	1.703	1.638	1.915	ns
SSTL-2 CLASS II	GCLK	t_{su}	1.010	0.990	1.306	1.918	2.223	2.104	2.029	1.917	2.144	2.026	2.076	ns
		t_h	0.964	0.929	-1.118	-1.472	-1.722	-1.633	-1.557	-1.461	-1.635	-1.548	-1.601	ns
	GCLK PLL	t_{su}	-0.850	-0.800	-1.276	-1.299	-1.412	-1.356	-1.649	-1.337	-1.450	-1.396	-1.687	ns
		t_h	1.010	0.990	-1.105	1.504	1.640	1.571	1.861	1.551	1.686	1.621	1.898	ns
SSTL-18 CLASS I	GCLK	t_{su}	0.964	0.929	1.294	1.928	2.241	2.122	2.047	1.928	2.161	2.043	2.093	ns
		t_h	-0.836	-0.788	1.659	1.928	2.241	2.122	2.047	1.928	2.161	2.043	2.093	ns
	GCLK PLL	t_{su}	1.024	1.002	1.306	-1.482	-1.740	-1.651	-1.575	-1.472	-1.652	-1.565	-1.618	ns
		t_h	0.950	0.917	-1.118	-1.299	-1.412	-1.356	-1.649	-1.337	-1.450	-1.396	-1.687	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.850	-0.800	1.659	-1.472	-1.722	-1.633	-1.557	-1.461	-1.635	-1.548	-1.601	ns
		t_h	1.010	0.990	1.306	-1.309	-1.430	-1.374	-1.667	-1.348	-1.467	-1.413	-1.704	ns
	GCLK PLL	t_{su}	0.964	0.929	-1.118	1.514	1.658	1.589	1.879	1.562	1.703	1.638	1.915	ns
		t_h	-0.850	-0.800	-1.276	1.918	2.223	2.104	2.029	1.917	2.144	2.026	2.076	ns

Table 1–52. EP3SL70 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-15 CLASS I	GCLK	t_{su}	1.010	0.990	-1.105	-1.472	-1.722	-1.633	-1.557	-1.461	-1.635	-1.548	-1.601	ns
		t_h	0.964	0.929	1.294	-1.309	-1.430	-1.374	-1.667	-1.348	-1.467	-1.413	-1.704	ns
	GCLK PLL	t_{su}	-0.836	-0.788	1.674	1.514	1.658	1.589	1.879	1.562	1.703	1.638	1.915	ns
		t_h	1.024	1.002	-1.276	1.918	2.223	2.104	2.029	1.917	2.144	2.026	2.076	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	0.950	0.917	-1.105	-1.472	-1.722	-1.633	-1.557	-1.461	-1.635	-1.548	-1.601	ns
		t_h	-0.836	-0.788	-1.285	1.928	2.241	2.122	2.047	1.928	2.161	2.043	2.093	ns
	GCLK PLL	t_{su}	1.024	1.002	-1.096	-1.482	-1.740	-1.651	-1.575	-1.472	-1.652	-1.565	-1.618	ns
		t_h	0.950	0.917	1.285	-1.299	-1.412	-1.356	-1.649	-1.337	-1.450	-1.396	-1.687	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.827	-0.776	1.683	1.504	1.640	1.571	1.861	1.551	1.686	1.621	1.898	ns
		t_h	1.033	1.014	-1.285	1.928	2.241	2.122	2.047	1.928	2.161	2.043	2.093	ns
	GCLK PLL	t_{su}	0.941	0.905	-1.096	-1.482	-1.740	-1.651	-1.575	-1.472	-1.652	-1.565	-1.618	ns
		t_h	-0.827	-0.776	-1.285	1.938	2.257	2.138	2.063	1.937	2.177	2.059	2.109	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	1.033	1.014	-1.182	-1.492	-1.756	-1.667	-1.591	-1.481	-1.668	-1.581	-1.634	ns
		t_h	0.941	0.905	1.585	-1.289	-1.396	-1.340	-1.633	-1.328	-1.434	-1.380	-1.671	ns
	GCLK PLL	t_{su}	-0.817	-0.847	1.368	1.494	1.624	1.555	1.845	1.542	1.670	1.605	1.882	ns
		t_h	0.931	0.973	-1.182	1.938	2.257	2.138	2.063	1.937	2.177	2.059	2.109	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	0.931	0.934	1.585	-1.492	-1.756	-1.667	-1.591	-1.481	-1.668	-1.581	-1.634	ns
		t_h	-0.682	-0.673	1.368	-1.289	-1.396	-1.340	-1.633	-1.328	-1.434	-1.380	-1.671	ns
	GCLK PLL	t_{su}	-0.817	-0.847	1.368	1.494	1.624	1.555	1.845	1.542	1.670	1.605	1.882	ns
		t_h	0.931	0.973	1.368	1.938	2.257	2.138	2.063	1.937	2.177	2.059	2.109	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	0.931	0.934	1.368	-1.492	-1.756	-1.667	-1.591	-1.481	-1.668	-1.581	-1.634	ns
		t_h	-0.682	-0.673	1.368	-1.289	-1.396	-1.340	-1.633	-1.328	-1.434	-1.380	-1.671	ns
	GCLK PLL	t_{su}	-0.811	-0.836	-1.185	-1.296	-1.513	-1.460	-1.732	-1.306	-1.513	-1.464	-1.763	ns
		t_h	0.925	0.962	1.582	1.801	1.915	1.799	1.814	1.796	1.923	1.804	1.865	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	0.937	0.945	1.371	1.505	1.747	1.679	1.951	1.526	1.756	1.693	1.982	ns
		t_h	-0.688	-0.684	-1.185	-1.296	-1.513	-1.460	-1.732	-1.306	-1.513	-1.464	-1.763	ns
	GCLK PLL	t_{su}	-0.811	-0.836	-1.185	-1.296	-1.513	-1.460	-1.732	-1.306	-1.513	-1.464	-1.763	ns
		t_h	0.925	0.962	1.582	1.801	1.915	1.799	1.814	1.796	1.923	1.804	1.865	ns
3.0-V PCI	GCLK	t_{su}	0.937	0.945	1.371	1.505	1.747	1.679	1.951	1.526	1.756	1.693	1.982	ns
		t_h	-0.688	-0.684	-1.182	-1.297	-1.516	-1.463	-1.735	-1.305	-1.518	-1.469	-1.768	ns
	GCLK PLL	t_{su}	-0.817	-0.847	1.368	1.506	1.750	1.682	1.954	1.525	1.761	1.698	1.987	ns
		t_h	0.931	0.973	-1.182	-1.297	-1.516	-1.463	-1.735	-1.305	-1.518	-1.469	-1.768	ns
3.0-V PCI-X	GCLK	t_{su}	0.931	0.934	1.585	1.800	1.912	1.796	1.811	1.797	1.918	1.799	1.860	ns
		t_h	-0.682	-0.673	1.368	1.506	1.750	1.682	1.954	1.525	1.761	1.698	1.987	ns
	GCLK PLL	t_{su}	-0.817	-0.847	1.377	1.519	1.765	1.697	1.969	1.534	1.771	1.708	1.997	ns
		t_h	0.931	0.973	-1.191	-1.310	-1.531	-1.478	-1.750	-1.314	-1.528	-1.479	-1.778	ns

Table 1–53 lists the EP3SL70 column pins output timing parameters for single-ended I/O standards.

Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.187	3.187	4.411	4.765	5.226	5.105	5.313	4.765	5.226	5.105	5.313	ns
		GCLK PLL	t_{co}	3.514	3.514	4.895	5.293	5.823	5.680	5.963	5.293	5.823	5.680	5.963	ns
	8mA	GCLK	t_{co}	3.120	3.120	4.302	4.654	5.113	4.992	5.200	4.654	5.113	4.992	5.200	ns
		GCLK PLL	t_{co}	3.447	3.447	4.786	5.182	5.710	5.567	5.850	5.182	5.710	5.567	5.850	ns
	12mA	GCLK	t_{co}	3.034	3.034	4.198	4.556	5.021	4.900	5.108	4.556	5.021	4.900	5.108	ns
		GCLK PLL	t_{co}	3.361	3.361	4.682	5.083	5.618	5.475	5.760	5.083	5.618	5.475	5.760	ns
	16mA	GCLK	t_{co}	3.028	3.028	4.182	4.528	4.980	4.859	5.067	4.528	4.980	4.859	5.067	ns
		GCLK PLL	t_{co}	3.354	3.354	4.665	5.055	5.577	5.434	5.718	5.055	5.577	5.434	5.718	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.193	3.193	4.415	4.770	5.233	5.112	5.320	4.770	5.233	5.112	5.320	ns
		GCLK PLL	t_{co}	3.520	3.520	4.899	5.298	5.830	5.687	5.971	5.298	5.830	5.687	5.971	ns
	8mA	GCLK	t_{co}	3.038	3.038	4.209	4.573	5.032	4.911	5.119	4.573	5.032	4.911	5.119	ns
		GCLK PLL	t_{co}	3.365	3.365	4.692	5.100	5.629	5.486	5.770	5.100	5.629	5.486	5.770	ns
	12mA	GCLK	t_{co}	3.045	3.045	4.203	4.552	5.006	4.885	5.093	4.552	5.006	4.885	5.093	ns
		GCLK PLL	t_{co}	3.372	3.372	4.686	5.079	5.603	5.460	5.746	5.079	5.603	5.460	5.746	ns
	16mA	GCLK	t_{co}	3.029	3.029	4.180	4.527	4.977	4.856	5.064	4.527	4.977	4.856	5.064	ns
		GCLK PLL	t_{co}	3.356	3.356	4.664	5.054	5.574	5.431	5.717	5.054	5.574	5.431	5.717	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.150	3.150	4.378	4.733	5.193	5.072	5.280	4.733	5.193	5.072	5.280	ns
		GCLK PLL	t_{co}	3.478	3.478	4.862	5.261	5.790	5.647	5.954	5.261	5.790	5.647	5.954	ns
	8mA	GCLK	t_{co}	3.043	3.043	4.250	4.602	5.056	4.936	5.142	4.602	5.056	4.936	5.142	ns
		GCLK PLL	t_{co}	3.367	3.367	4.732	5.127	5.652	5.510	5.837	5.127	5.652	5.510	5.837	ns
	12mA	GCLK	t_{co}	3.005	3.005	4.184	4.530	4.982	4.862	5.068	4.530	4.982	4.862	5.068	ns
		GCLK PLL	t_{co}	3.331	3.331	4.669	5.058	5.578	5.436	5.773	5.058	5.578	5.436	5.773	ns
	16mA	GCLK	t_{co}	2.986	2.986	4.156	4.503	4.953	4.832	5.040	4.503	4.953	4.832	5.040	ns
		GCLK PLL	t_{co}	3.313	3.313	4.640	5.030	5.550	5.407	5.750	5.030	5.550	5.407	5.750	ns

Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.067	3.067	4.284	4.635	5.091	4.971	5.177	4.635	5.091	4.971	5.177	ns
		GCLK PLL	t_{co}	3.392	3.392	4.766	5.161	5.687	5.545	5.873	5.161	5.687	5.545	5.873	ns
	8mA	GCLK	t_{co}	2.988	2.988	4.160	4.505	4.956	4.836	5.042	4.505	4.956	4.836	5.042	ns
		GCLK PLL	t_{co}	3.313	3.313	4.642	5.032	5.552	5.410	5.763	5.032	5.552	5.410	5.763	ns
	12mA	GCLK	t_{co}	2.981	2.981	4.152	4.498	4.947	4.826	5.034	4.498	4.947	4.826	5.034	ns
		GCLK PLL	t_{co}	3.308	3.308	4.635	5.025	5.544	5.401	5.732	5.025	5.544	5.401	5.732	ns
	16mA	GCLK	t_{co}	2.972	2.972	4.137	4.482	4.932	4.811	5.019	4.482	4.932	4.811	5.019	ns
		GCLK PLL	t_{co}	3.299	3.299	4.621	5.010	5.529	5.386	5.737	5.010	5.529	5.386	5.737	ns
2.5 V	4mA	GCLK	t_{co}	3.187	3.187	4.490	4.860	5.338	5.218	5.424	4.860	5.338	5.218	5.424	ns
		GCLK PLL	t_{co}	3.514	3.514	4.973	5.388	5.934	5.792	6.081	5.388	5.934	5.792	6.081	ns
	8mA	GCLK	t_{co}	3.090	3.090	4.371	4.735	5.206	5.086	5.292	4.735	5.206	5.086	5.292	ns
		GCLK PLL	t_{co}	3.414	3.414	4.854	5.262	5.802	5.660	5.957	5.262	5.802	5.660	5.957	ns
	12mA	GCLK	t_{co}	3.045	3.045	4.284	4.644	5.110	4.989	5.197	4.644	5.110	4.989	5.197	ns
		GCLK PLL	t_{co}	3.370	3.370	4.767	5.171	5.707	5.564	5.879	5.171	5.707	5.564	5.879	ns
	16mA	GCLK	t_{co}	3.006	3.006	4.245	4.602	5.067	4.946	5.154	4.602	5.067	4.946	5.154	ns
		GCLK PLL	t_{co}	3.332	3.332	4.728	5.129	5.664	5.521	5.822	5.129	5.664	5.521	5.822	ns

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Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.378	3.378	4.810	5.219	5.742	5.621	5.829	5.219	5.742	5.621	5.829	ns
		GCLK PLL	t_{co}	3.705	3.705	5.294	5.748	6.339	6.196	6.478	5.748	6.339	6.196	6.478	ns
	4mA	GCLK	t_{co}	3.200	3.200	4.533	4.912	5.395	5.275	5.481	4.912	5.395	5.275	5.481	ns
		GCLK PLL	t_{co}	3.524	3.524	5.015	5.439	5.991	5.849	6.147	5.439	5.991	5.849	6.147	ns
	6mA	GCLK	t_{co}	3.115	3.115	4.424	4.796	5.284	5.163	5.371	4.796	5.284	5.163	5.371	ns
		GCLK PLL	t_{co}	3.442	3.442	4.908	5.324	5.881	5.738	6.035	5.324	5.881	5.738	6.035	ns
	8mA	GCLK	t_{co}	3.095	3.095	4.366	4.742	5.218	5.097	5.305	4.742	5.218	5.097	5.305	ns
		GCLK PLL	t_{co}	3.422	3.422	4.850	5.270	5.815	5.672	5.958	5.270	5.815	5.672	5.958	ns
	10mA	GCLK	t_{co}	3.032	3.032	4.306	4.668	5.137	5.016	5.224	4.668	5.137	5.016	5.224	ns
		GCLK PLL	t_{co}	3.359	3.359	4.789	5.195	5.734	5.591	5.889	5.195	5.734	5.591	5.889	ns
	12mA	GCLK	t_{co}	3.015	3.015	4.285	4.647	5.114	4.993	5.201	4.647	5.114	4.993	5.201	ns
		GCLK PLL	t_{co}	3.341	3.341	4.768	5.174	5.711	5.568	5.856	5.174	5.711	5.568	5.856	ns
1.5 V	2mA	GCLK	t_{co}	3.324	3.324	4.739	5.152	5.680	5.559	5.767	5.152	5.680	5.559	5.767	ns
		GCLK PLL	t_{co}	3.651	3.651	5.223	5.680	6.277	6.134	6.423	5.680	6.277	6.134	6.423	ns
	4mA	GCLK	t_{co}	3.112	3.112	4.420	4.795	5.288	5.167	5.375	4.795	5.288	5.167	5.375	ns
		GCLK PLL	t_{co}	3.439	3.439	4.904	5.324	5.885	5.742	6.037	5.324	5.885	5.742	6.037	ns
	6mA	GCLK	t_{co}	3.088	3.088	4.353	4.737	5.221	5.100	5.308	4.737	5.221	5.100	5.308	ns
		GCLK PLL	t_{co}	3.414	3.414	4.837	5.264	5.818	5.675	5.960	5.264	5.818	5.675	5.960	ns
	8mA	GCLK	t_{co}	3.076	3.076	4.337	4.712	5.201	5.080	5.288	4.712	5.201	5.080	5.288	ns
		GCLK PLL	t_{co}	3.403	3.403	4.820	5.239	5.798	5.655	5.943	5.239	5.798	5.655	5.943	ns
	10mA	GCLK	t_{co}	3.021	3.021	4.298	4.661	5.131	5.010	5.218	4.661	5.131	5.010	5.218	ns
		GCLK PLL	t_{co}	3.348	3.348	4.782	5.188	5.728	5.585	5.880	5.188	5.728	5.585	5.880	ns
	12mA	GCLK	t_{co}	3.015	3.015	4.281	4.648	5.120	4.999	5.207	4.648	5.120	4.999	5.207	ns
		GCLK PLL	t_{co}	3.343	3.343	4.765	5.177	5.717	5.574	5.859	5.177	5.717	5.574	5.859	ns

Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.240	3.240	4.665	5.087	5.624	5.503	5.711	5.087	5.624	5.503	5.711	ns
		GCLK PLL	t_{co}	3.567	3.567	5.149	5.616	6.221	6.078	6.363	5.616	6.221	6.078	6.363	ns
	4mA	GCLK	t_{co}	3.118	3.118	4.440	4.827	5.338	5.217	5.425	4.827	5.338	5.217	5.425	ns
		GCLK PLL	t_{co}	3.444	3.444	4.923	5.354	5.935	5.792	6.078	5.354	5.935	5.792	6.078	ns
	6mA	GCLK	t_{co}	3.080	3.080	4.347	4.737	5.225	5.104	5.312	4.737	5.225	5.104	5.312	ns
		GCLK PLL	t_{co}	3.406	3.406	4.831	5.265	5.822	5.679	5.964	5.265	5.822	5.679	5.964	ns
	8mA	GCLK	t_{co}	3.031	3.031	4.318	4.687	5.169	5.048	5.256	4.687	5.169	5.048	5.256	ns
		GCLK PLL	t_{co}	3.359	3.359	4.803	5.216	5.766	5.623	5.917	5.216	5.766	5.623	5.917	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.032	3.032	4.275	4.634	5.100	4.979	5.187	4.634	5.100	4.979	5.187	ns
		GCLK PLL	t_{co}	3.359	3.359	4.760	5.163	5.697	5.554	5.874	5.163	5.697	5.554	5.874	ns
	10mA	GCLK	t_{co}	3.029	3.029	4.272	4.630	5.096	4.975	5.183	4.630	5.096	4.975	5.183	ns
		GCLK PLL	t_{co}	3.356	3.356	4.757	5.160	5.693	5.550	5.869	5.160	5.693	5.550	5.869	ns
	12mA	GCLK	t_{co}	3.028	3.028	4.272	4.631	5.097	4.976	5.184	4.631	5.097	4.976	5.184	ns
		GCLK PLL	t_{co}	3.354	3.354	4.757	5.161	5.694	5.551	5.870	5.161	5.694	5.551	5.870	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.019	3.019	4.259	4.617	5.082	4.961	5.169	4.617	5.082	4.961	5.169	ns
		GCLK PLL	t_{co}	3.345	3.345	4.742	5.145	5.679	5.536	5.854	5.145	5.679	5.536	5.854	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.039	3.039	4.287	4.648	5.116	4.995	5.203	4.648	5.116	4.995	5.203	ns
		GCLK PLL	t_{co}	3.366	3.366	4.772	5.177	5.713	5.570	5.893	5.177	5.713	5.570	5.893	ns
	6mA	GCLK	t_{co}	3.035	3.035	4.285	4.646	5.114	4.993	5.201	4.646	5.114	4.993	5.201	ns
		GCLK PLL	t_{co}	3.362	3.362	4.770	5.175	5.711	5.568	5.891	5.175	5.711	5.568	5.891	ns
	8mA	GCLK	t_{co}	3.025	3.025	4.276	4.637	5.105	4.984	5.192	4.637	5.105	4.984	5.192	ns
		GCLK PLL	t_{co}	3.351	3.351	4.760	5.166	5.702	5.559	5.889	5.166	5.702	5.559	5.889	ns
	10mA	GCLK	t_{co}	3.013	3.013	4.263	4.624	5.092	4.971	5.179	4.624	5.092	4.971	5.179	ns
		GCLK PLL	t_{co}	3.340	3.340	4.747	5.153	5.689	5.546	5.864	5.153	5.689	5.546	5.864	ns
	12mA	GCLK	t_{co}	3.013	3.013	4.263	4.624	5.092	4.971	5.179	4.624	5.092	4.971	5.179	ns
		GCLK PLL	t_{co}	3.340	3.340	4.747	5.153	5.689	5.546	5.863	5.153	5.689	5.546	5.863	ns

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Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.020	3.020	4.262	4.621	5.087	4.966	5.174	4.621	5.087	4.966	5.174	ns
		GCLK PLL	t_{co}	3.346	3.346	4.746	5.150	5.684	5.541	5.866	5.150	5.684	5.541	5.866	ns
	16mA	GCLK	t_{co}	3.022	3.022	4.269	4.630	5.099	4.978	5.186	4.630	5.099	4.978	5.186	ns
		GCLK PLL	t_{co}	3.349	3.349	4.754	5.159	5.696	5.553	5.889	5.159	5.696	5.553	5.889	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.042	3.042	4.297	4.659	5.129	5.008	5.216	4.659	5.129	5.008	5.216	ns
		GCLK PLL	t_{co}	3.370	3.370	4.781	5.189	5.726	5.583	5.908	5.189	5.726	5.583	5.908	ns
	6mA	GCLK	t_{co}	3.030	3.030	4.287	4.650	5.120	4.999	5.207	4.650	5.120	4.999	5.207	ns
		GCLK PLL	t_{co}	3.356	3.356	4.771	5.179	5.717	5.574	5.894	5.179	5.717	5.574	5.894	ns
	8mA	GCLK	t_{co}	3.018	3.018	4.273	4.636	5.106	4.985	5.193	4.636	5.106	4.985	5.193	ns
		GCLK PLL	t_{co}	3.345	3.345	4.757	5.165	5.703	5.560	5.879	5.165	5.703	5.560	5.879	ns
	10mA	GCLK	t_{co}	3.017	3.017	4.275	4.639	5.110	4.989	5.197	4.639	5.110	4.989	5.197	ns
		GCLK PLL	t_{co}	3.344	3.344	4.760	5.168	5.707	5.564	5.876	5.168	5.707	5.564	5.876	ns
	12mA	GCLK	t_{co}	3.014	3.014	4.270	4.633	5.104	4.983	5.191	4.633	5.104	4.983	5.191	ns
		GCLK PLL	t_{co}	3.341	3.341	4.755	5.163	5.701	5.558	5.870	5.163	5.701	5.558	5.870	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.016	3.016	4.260	4.620	5.087	4.966	5.174	4.620	5.087	4.966	5.174	ns
		GCLK PLL	t_{co}	3.343	3.343	4.744	5.149	5.684	5.541	5.867	5.149	5.684	5.541	5.867	ns
	16mA	GCLK	t_{co}	3.019	3.019	4.267	4.628	5.098	4.977	5.185	4.628	5.098	4.977	5.185	ns
		GCLK PLL	t_{co}	3.346	3.346	4.751	5.158	5.695	5.552	5.891	5.158	5.695	5.552	5.891	ns

Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.026	3.026	4.261	4.619	5.085	4.964	5.172	4.619	5.085	4.964	5.172	ns
		GCLK PLL	t_{co}	3.353	3.353	4.746	5.149	5.682	5.539	5.868	5.149	5.682	5.539	5.868	ns
	6mA	GCLK	t_{co}	3.020	3.020	4.260	4.619	5.084	4.963	5.171	4.619	5.084	4.963	5.171	ns
		GCLK PLL	t_{co}	3.346	3.346	4.744	5.147	5.681	5.538	5.873	5.147	5.681	5.538	5.873	ns
	8mA	GCLK	t_{co}	3.012	3.012	4.252	4.611	5.077	4.956	5.164	4.611	5.077	4.956	5.164	ns
		GCLK PLL	t_{co}	3.338	3.338	4.736	5.140	5.674	5.531	5.855	5.140	5.674	5.531	5.855	ns
	10mA	GCLK	t_{co}	3.014	3.014	4.255	4.614	5.081	4.960	5.168	4.614	5.081	4.960	5.168	ns
		GCLK PLL	t_{co}	3.341	3.341	4.739	5.143	5.678	5.535	5.858	5.143	5.678	5.535	5.858	ns
	12mA	GCLK	t_{co}	3.011	3.011	4.257	4.617	5.085	4.964	5.172	4.617	5.085	4.964	5.172	ns
		GCLK PLL	t_{co}	3.338	3.338	4.742	5.147	5.682	5.539	5.865	5.147	5.682	5.539	5.865	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.019	3.019	4.256	4.615	5.081	4.960	5.168	4.615	5.081	4.960	5.168	ns
		GCLK PLL	t_{co}	3.346	3.346	4.741	5.144	5.678	5.535	5.869	5.144	5.678	5.535	5.869	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.031	3.031	4.269	4.629	5.096	4.975	5.183	4.629	5.096	4.975	5.183	ns
		GCLK PLL	t_{co}	3.358	3.358	4.754	5.159	5.693	5.550	5.881	5.159	5.693	5.550	5.881	ns
	6mA	GCLK	t_{co}	3.027	3.027	4.272	4.632	5.099	4.978	5.186	4.632	5.099	4.978	5.186	ns
		GCLK PLL	t_{co}	3.354	3.354	4.755	5.160	5.696	5.553	5.878	5.160	5.696	5.553	5.878	ns
	8mA	GCLK	t_{co}	3.023	3.023	4.267	4.627	5.094	4.973	5.181	4.627	5.094	4.973	5.181	ns
		GCLK PLL	t_{co}	3.350	3.350	4.751	5.156	5.691	5.548	5.873	5.156	5.691	5.548	5.873	ns
	10mA	GCLK	t_{co}	3.016	3.016	4.260	4.620	5.087	4.966	5.174	4.620	5.087	4.966	5.174	ns
		GCLK PLL	t_{co}	3.343	3.343	4.744	5.149	5.684	5.541	5.867	5.149	5.684	5.541	5.867	ns
	12mA	GCLK	t_{co}	3.016	3.016	4.266	4.627	5.097	4.976	5.184	4.627	5.097	4.976	5.184	ns
		GCLK PLL	t_{co}	3.344	3.344	4.751	5.157	5.694	5.551	5.870	5.157	5.694	5.551	5.870	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.014	3.014	4.247	4.605	5.071	4.950	5.158	4.605	5.071	4.950	5.158	ns
		GCLK PLL	t_{co}	3.342	3.342	4.732	5.135	5.668	5.525	5.855	5.135	5.668	5.525	5.855	ns

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Table 1–53. EP3SL70 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.035	3.035	4.284	4.647	5.117	4.996	5.204	4.647	5.117	4.996	5.204	ns
		GCLK PLL	t_{co}	3.361	3.361	4.768	5.176	5.714	5.571	5.900	5.176	5.714	5.571	5.900	ns
	6mA	GCLK	t_{co}	3.026	3.026	4.275	4.638	5.108	4.987	5.195	4.638	5.108	4.987	5.195	ns
		GCLK PLL	t_{co}	3.353	3.353	4.759	5.167	5.705	5.562	5.888	5.167	5.705	5.562	5.888	ns
	8mA	GCLK	t_{co}	3.026	3.026	4.282	4.646	5.117	4.996	5.204	4.646	5.117	4.996	5.204	ns
		GCLK PLL	t_{co}	3.354	3.354	4.767	5.175	5.714	5.571	5.891	5.175	5.714	5.571	5.891	ns
	10mA	GCLK	t_{co}	3.016	3.016	4.269	4.632	5.103	4.982	5.190	4.632	5.103	4.982	5.190	ns
		GCLK PLL	t_{co}	3.343	3.343	4.754	5.162	5.700	5.557	5.885	5.162	5.700	5.557	5.885	ns
	12mA	GCLK	t_{co}	3.016	3.016	4.270	4.633	5.104	4.983	5.191	4.633	5.104	4.983	5.191	ns
		GCLK PLL	t_{co}	3.343	3.343	4.754	5.162	5.701	5.558	5.877	5.162	5.701	5.558	5.877	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.037	3.037	4.286	4.648	5.117	4.996	5.204	4.648	5.117	4.996	5.204	ns
		GCLK PLL	t_{co}	3.364	3.364	4.770	5.177	5.714	5.571	5.914	5.177	5.714	5.571	5.914	ns
3.0-V PCI	—	GCLK	t_{co}	3.140	3.140	4.331	4.684	5.142	5.021	5.229	4.684	5.142	5.021	5.229	ns
		GCLK PLL	t_{co}	3.467	3.467	4.815	5.211	5.739	5.596	5.945	5.211	5.739	5.596	5.945	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.140	3.140	4.331	4.684	5.142	5.021	5.229	4.684	5.142	5.021	5.229	ns
		GCLK PLL	t_{co}	3.467	3.467	4.815	5.211	5.739	5.596	5.945	5.211	5.739	5.596	5.945	ns

Table 1–54 lists the EP3SL70 row pins output timing parameters for single-ended I/O standards.

Table 1–54. EP3SL70 Row Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.182	3.424	4.767	5.163	5.668	5.532	5.739	5.293	5.802	5.667	5.813	ns
		GCLK PLL	t_{co}	1.474	1.669	2.054	2.135	2.377	2.393	2.266	2.251	2.501	2.515	2.258	ns
	8mA	GCLK	t_{co}	3.089	3.319	4.637	5.025	5.524	5.388	5.595	5.152	5.653	5.518	5.664	ns
		GCLK PLL	t_{co}	1.408	1.598	1.944	2.023	2.233	2.249	2.152	2.138	2.352	2.366	2.142	ns
	12mA	GCLK	t_{co}	2.990	3.213	4.518	4.902	5.396	5.260	5.467	5.025	5.521	5.386	5.532	ns
		GCLK PLL	t_{co}	1.329	1.509	1.838	1.923	2.119	2.138	2.056	2.039	2.235	2.252	2.043	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.192	3.428	4.775	5.168	5.673	5.537	5.744	5.299	5.807	5.672	5.818	ns
		GCLK PLL	t_{co}	1.476	1.676	2.058	2.140	2.382	2.398	2.275	2.259	2.506	2.520	2.270	ns
	8mA	GCLK	t_{co}	2.994	3.219	4.524	4.908	5.402	5.266	5.473	5.031	5.528	5.393	5.539	ns
		GCLK PLL	t_{co}	1.333	1.513	1.849	1.938	2.129	2.148	2.066	2.051	2.244	2.261	2.052	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.136	3.370	4.719	5.116	5.625	5.489	5.696	5.250	5.760	5.625	5.771	ns
		GCLK PLL	t_{co}	1.435	1.630	2.021	2.103	2.334	2.350	2.232	2.219	2.459	2.473	2.224	ns
	8mA	GCLK	t_{co}	3.011	3.243	4.566	4.957	5.461	5.325	5.532	5.088	5.596	5.460	5.606	ns
		GCLK PLL	t_{co}	1.334	1.518	1.884	1.961	2.170	2.186	2.087	2.077	2.295	2.308	2.078	ns
	12mA	GCLK	t_{co}	2.972	3.192	4.484	4.874	5.373	5.237	5.444	5.002	5.503	5.367	5.513	ns
		GCLK PLL	t_{co}	1.297	1.480	1.824	1.896	2.082	2.099	2.017	2.009	2.202	2.215	2.005	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.050	3.289	4.613	5.009	5.514	5.378	5.585	5.142	5.649	5.513	5.659	ns
		GCLK PLL	t_{co}	1.356	1.542	1.919	1.996	2.223	2.239	2.123	2.111	2.348	2.361	2.114	ns
	8mA	GCLK	t_{co}	2.950	3.170	4.449	4.835	5.334	5.198	5.405	4.962	5.463	5.327	5.473	ns
		GCLK PLL	t_{co}	1.284	1.464	1.796	1.867	2.052	2.071	1.989	1.979	2.169	2.185	1.976	ns
2.5 V	4mA	GCLK	t_{co}	3.162	3.406	4.851	5.270	5.797	5.661	5.868	5.410	5.939	5.803	5.949	ns
		GCLK PLL	t_{co}	1.461	1.667	2.129	2.229	2.506	2.522	2.377	2.351	2.638	2.651	2.376	ns
	8mA	GCLK	t_{co}	3.052	3.307	4.696	5.107	5.627	5.491	5.698	5.243	5.765	5.629	5.775	ns
		GCLK PLL	t_{co}	1.376	1.564	2.005	2.094	2.336	2.352	2.235	2.214	2.464	2.477	2.231	ns
	12mA	GCLK	t_{co}	3.006	3.231	4.585	4.988	5.501	5.365	5.572	5.120	5.635	5.499	5.645	ns
		GCLK PLL	t_{co}	1.319	1.520	1.921	2.008	2.210	2.226	2.144	2.125	2.334	2.347	2.137	ns

Table 1–54. EP3SL70 Row Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.350	3.691	5.275	5.573	6.134	5.998	6.210	5.723	6.286	6.151	6.297	ns
		GCLK PLL	t_{co}	1.728	1.915	2.562	2.717	2.981	2.999	2.946	2.881	3.150	3.167	2.958	ns
	4mA	GCLK	t_{co}	3.177	3.489	4.948	5.247	5.774	5.638	5.850	5.397	5.925	5.789	5.935	ns
		GCLK PLL	t_{co}	1.503	1.713	2.235	2.349	2.576	2.594	2.541	2.516	2.744	2.760	2.551	ns
	6mA	GCLK	t_{co}	3.102	3.387	4.795	5.142	5.673	5.537	5.749	5.283	5.819	5.684	5.830	ns
		GCLK PLL	t_{co}	1.438	1.611	2.082	2.199	2.417	2.435	2.382	2.348	2.571	2.588	2.379	ns
	8mA	GCLK	t_{co}	3.084	3.313	4.718	5.089	5.608	5.472	5.684	5.227	5.747	5.612	5.758	ns
		GCLK PLL	t_{co}	1.378	1.557	2.005	2.106	2.321	2.339	2.286	2.253	2.477	2.494	2.285	ns
1.5 V	2mA	GCLK	t_{co}	3.292	3.609	5.185	5.500	6.071	5.935	6.147	5.644	6.221	6.086	6.232	ns
		GCLK PLL	t_{co}	1.639	1.833	2.472	2.631	2.909	2.927	2.874	2.788	3.074	3.091	2.882	ns
	4mA	GCLK	t_{co}	3.100	3.352	4.780	5.142	5.677	5.541	5.753	5.280	5.820	5.685	5.831	ns
		GCLK PLL	t_{co}	1.397	1.576	2.067	2.194	2.418	2.436	2.383	2.342	2.570	2.587	2.378	ns
	6mA	GCLK	t_{co}	3.073	3.304	4.707	5.081	5.608	5.472	5.684	5.220	5.747	5.612	5.758	ns
		GCLK PLL	t_{co}	1.370	1.548	1.994	2.098	2.312	2.330	2.277	2.244	2.465	2.482	2.273	ns
	8mA	GCLK	t_{co}	3.054	3.295	4.685	5.057	5.589	5.453	5.665	5.196	5.728	5.593	5.739	ns
		GCLK PLL	t_{co}	1.361	1.537	1.972	2.080	2.293	2.311	2.258	2.226	2.443	2.460	2.251	ns
1.2 V	2mA	GCLK	t_{co}	3.222	3.534	5.095	5.432	6.010	5.874	6.086	5.576	6.152	6.017	6.163	ns
		GCLK PLL	t_{co}	1.582	1.758	2.382	2.545	2.834	2.852	2.799	2.700	2.990	3.007	2.798	ns
	4mA	GCLK	t_{co}	3.105	3.345	4.802	5.170	5.725	5.589	5.801	5.309	5.864	5.729	5.875	ns
		GCLK PLL	t_{co}	1.402	1.578	2.089	2.222	2.459	2.477	2.424	2.367	2.612	2.629	2.420	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	2.991	3.217	4.563	4.960	5.469	5.333	5.540	5.087	5.597	5.462	5.608	ns
		GCLK PLL	t_{co}	1.323	1.508	1.914	1.999	2.197	2.216	2.134	2.112	2.315	2.332	2.123	ns
	12mA	GCLK	t_{co}	2.979	3.205	4.555	4.952	5.461	5.325	5.532	5.079	5.590	5.455	5.601	ns
		GCLK PLL	t_{co}	1.318	1.504	1.911	1.997	2.195	2.214	2.132	2.111	2.314	2.331	2.122	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	2.963	3.187	4.530	4.927	5.434	5.298	5.505	5.053	5.563	5.428	5.574	ns
		GCLK PLL	t_{co}	1.309	1.493	1.896	1.981	2.178	2.197	2.115	2.094	2.296	2.313	2.104	ns

Table 1–54. EP3SL70 Row Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.033	3.269	4.613	4.993	5.503	5.367	5.579	5.126	5.638	5.503	5.649	ns
		GCLK PLL	t_{co}	1.339	1.501	1.909	1.997	2.194	2.212	2.159	2.134	2.340	2.357	2.148	ns
	6mA	GCLK	t_{co}	3.028	3.255	4.610	4.992	5.502	5.366	5.578	5.124	5.636	5.501	5.647	ns
		GCLK PLL	t_{co}	1.324	1.496	1.907	1.996	2.192	2.210	2.157	2.132	2.338	2.355	2.146	ns
	8mA	GCLK	t_{co}	3.017	3.243	4.593	4.982	5.492	5.356	5.568	5.115	5.627	5.492	5.638	ns
		GCLK PLL	t_{co}	1.313	1.485	1.897	1.986	2.175	2.193	2.140	2.115	2.322	2.339	2.130	ns
	10mA	GCLK	t_{co}	3.006	3.220	4.577	4.969	5.479	5.343	5.555	5.103	5.615	5.480	5.626	ns
		GCLK PLL	t_{co}	1.290	1.474	1.884	1.973	2.160	2.178	2.125	2.100	2.307	2.324	2.115	ns
	12mA	GCLK	t_{co}	3.006	3.219	4.576	4.969	5.479	5.343	5.555	5.102	5.615	5.480	5.626	ns
		GCLK PLL	t_{co}	1.290	1.473	1.884	1.973	2.159	2.177	2.124	2.099	2.306	2.323	2.114	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.014	3.228	4.574	4.966	5.474	5.338	5.550	5.098	5.609	5.474	5.620	ns
		GCLK PLL	t_{co}	1.299	1.480	1.883	1.970	2.153	2.171	2.118	2.094	2.299	2.316	2.107	ns
	16mA	GCLK	t_{co}	3.015	3.223	4.573	4.974	5.484	5.348	5.560	5.107	5.620	5.485	5.631	ns
		GCLK PLL	t_{co}	1.299	1.483	1.889	1.978	2.155	2.173	2.120	2.096	2.303	2.320	2.111	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.036	3.265	4.624	5.004	5.516	5.380	5.592	5.136	5.650	5.515	5.661	ns
		GCLK PLL	t_{co}	1.335	1.504	1.918	2.008	2.211	2.229	2.176	2.147	2.356	2.373	2.164	ns
	6mA	GCLK	t_{co}	3.022	3.243	4.606	4.994	5.506	5.370	5.582	5.127	5.641	5.506	5.652	ns
		GCLK PLL	t_{co}	1.312	1.490	1.907	1.998	2.194	2.212	2.159	2.131	2.340	2.357	2.148	ns
	8mA	GCLK	t_{co}	3.011	3.226	4.589	4.981	5.493	5.357	5.569	5.114	5.628	5.493	5.639	ns
		GCLK PLL	t_{co}	1.295	1.478	1.894	1.985	2.176	2.194	2.141	2.113	2.323	2.340	2.131	ns

Table 1–54. EP3SL70 Row Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.021	3.241	4.580	4.964	5.472	5.336	5.548	5.097	5.606	5.471	5.617	ns
		GCLK PLL	t_{co}	1.314	1.486	1.882	1.968	2.156	2.174	2.121	2.098	2.302	2.319	2.110	ns
	6mA	GCLK	t_{co}	3.014	3.229	4.571	4.963	5.471	5.335	5.547	5.096	5.606	5.471	5.617	ns
		GCLK PLL	t_{co}	1.302	1.480	1.880	1.967	2.148	2.166	2.113	2.090	2.295	2.312	2.103	ns
	8mA	GCLK	t_{co}	3.005	3.217	4.563	4.956	5.464	5.328	5.540	5.089	5.599	5.464	5.610	ns
		GCLK PLL	t_{co}	1.289	1.472	1.873	1.960	2.140	2.158	2.105	2.082	2.287	2.304	2.095	ns
	10mA	GCLK	t_{co}	3.008	3.219	4.565	4.959	5.468	5.332	5.544	5.092	5.602	5.467	5.613	ns
		GCLK PLL	t_{co}	1.292	1.474	1.876	1.963	2.143	2.161	2.108	2.085	2.290	2.307	2.098	ns
	12mA	GCLK	t_{co}	3.004	3.214	4.563	4.962	5.471	5.335	5.547	5.095	5.607	5.472	5.618	ns
		GCLK PLL	t_{co}	1.288	1.471	1.878	1.966	2.143	2.161	2.108	2.085	2.291	2.308	2.099	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.012	3.218	4.558	4.959	5.467	5.331	5.543	5.091	5.601	5.466	5.612	ns
		GCLK PLL	t_{co}	1.296	1.479	1.876	1.963	2.134	2.152	2.099	2.078	2.280	2.297	2.088	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.027	3.248	4.591	4.974	5.483	5.347	5.559	5.106	5.617	5.482	5.628	ns
		GCLK PLL	t_{co}	1.321	1.492	1.891	1.978	2.171	2.189	2.136	2.110	2.316	2.333	2.124	ns
	6mA	GCLK	t_{co}	3.021	3.238	4.587	4.976	5.485	5.349	5.561	5.108	5.620	5.485	5.631	ns
		GCLK PLL	t_{co}	1.309	1.487	1.892	1.980	2.167	2.185	2.132	2.107	2.313	2.330	2.121	ns
	8mA	GCLK	t_{co}	3.017	3.233	4.581	4.971	5.480	5.344	5.556	5.103	5.614	5.479	5.625	ns
		GCLK PLL	t_{co}	1.305	1.483	1.887	1.975	2.161	2.179	2.126	2.101	2.307	2.324	2.115	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.029	3.247	4.602	4.990	5.502	5.366	5.578	5.122	5.636	5.501	5.647	ns
		GCLK PLL	t_{co}	1.320	1.494	1.904	1.994	2.189	2.207	2.154	2.124	2.333	2.350	2.141	ns
	6mA	GCLK	t_{co}	3.020	3.235	4.591	4.981	5.493	5.357	5.569	5.113	5.627	5.492	5.638	ns
		GCLK PLL	t_{co}	1.308	1.486	1.895	1.985	2.177	2.195	2.142	2.113	2.322	2.339	2.130	ns
	8mA	GCLK	t_{co}	3.019	3.233	4.595	4.989	5.502	5.366	5.578	5.122	5.637	5.502	5.648	ns
		GCLK PLL	t_{co}	1.305	1.486	1.902	1.993	2.183	2.201	2.148	2.119	2.329	2.346	2.137	ns
3.0-V PCI	—	GCLK	t_{co}	3.076	3.300	4.588	4.978	5.480	5.342	5.550	5.105	5.610	5.474	5.621	ns
		GCLK PLL	t_{co}	1.429	1.614	1.966	2.045	2.237	2.256	2.174	2.160	2.357	2.374	2.165	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.076	3.300	4.588	4.978	5.480	5.342	5.550	5.105	5.610	5.474	5.621	ns
		GCLK PLL	t_{co}	1.429	1.614	1.966	2.045	2.237	2.256	2.174	2.160	2.357	2.374	2.165	ns

Table 1–55 through Table 1–60 list the maximum I/O timing parameters for EP3SL70 devices for differential I/O standards.

Table 1–55 lists the EP3SL70 column pins input timing parameters for differential I/O standards.

Table 1–55. EP3SL70 Column Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
MINI-LVDS	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
RSDS	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns

Table 1–55. EP3SL70 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.717	-0.740	-1.091	-1.204	-1.329	-1.272	-1.559	-1.205	-1.329	-1.275	-1.595	ns
		t_h	0.834	0.872	1.277	1.411	1.557	1.489	1.775	1.420	1.565	1.502	1.810	ns
	GCLK PLL	t_{su}	1.123	1.136	1.802	2.031	2.244	2.131	2.137	2.041	2.255	2.140	2.186	ns
		t_h	-0.872	-0.870	-1.404	-1.584	-1.746	-1.661	-1.661	-1.586	-1.749	-1.661	-1.709	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.724	-0.746	-1.103	-1.209	-1.329	-1.274	-1.558	-1.209	-1.324	-1.273	-1.591	ns
		t_h	0.841	0.878	1.290	1.419	1.560	1.492	1.779	1.427	1.565	1.501	1.811	ns
	GCLK PLL	t_{su}	1.116	1.130	1.790	2.026	2.244	2.129	2.138	2.037	2.260	2.142	2.190	ns
		t_h	-0.865	-0.864	-1.391	-1.576	-1.743	-1.658	-1.657	-1.579	-1.749	-1.662	-1.708	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.724	-0.746	-1.103	-1.209	-1.329	-1.274	-1.558	-1.209	-1.324	-1.273	-1.591	ns
		t_h	0.841	0.878	1.290	1.419	1.560	1.492	1.779	1.427	1.565	1.501	1.811	ns
	GCLK PLL	t_{su}	1.116	1.130	1.790	2.026	2.244	2.129	2.138	2.037	2.260	2.142	2.190	ns
		t_h	-0.865	-0.864	-1.391	-1.576	-1.743	-1.658	-1.657	-1.579	-1.749	-1.662	-1.708	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.697	-0.717	-1.072	-1.182	-1.294	-1.237	-1.524	-1.183	-1.296	-1.242	-1.562	ns
		t_h	0.814	0.849	1.257	1.389	1.522	1.454	1.740	1.398	1.532	1.469	1.777	ns
	GCLK PLL	t_{su}	1.143	1.159	1.821	2.053	2.279	2.166	2.172	2.063	2.288	2.173	2.219	ns
		t_h	-0.892	-0.893	-1.424	-1.606	-1.781	-1.696	-1.696	-1.608	-1.782	-1.694	-1.742	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.705	-0.729	-1.082	-1.193	-1.310	-1.253	-1.540	-1.194	-1.311	-1.257	-1.577	ns
		t_h	0.822	0.861	1.267	1.400	1.538	1.470	1.756	1.409	1.547	1.484	1.792	ns
	GCLK PLL	t_{su}	1.135	1.147	1.811	2.042	2.263	2.150	2.156	2.052	2.273	2.158	2.204	ns
		t_h	-0.884	-0.881	-1.414	-1.595	-1.765	-1.680	-1.680	-1.597	-1.767	-1.679	-1.727	ns

Table 1–56 lists the EP3SL70 row pins input timing parameters for differential I/O standards.

Table 1–56. EP3SL70 Row Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
MINI-LVDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
RSDS	GCLK	t_{su}	-0.919	-0.939	-0.988	-0.952	-1.089	-1.040	-1.316	-0.916	-1.048	-1.000	-1.349	ns
		t_h	1.042	1.077	1.209	1.205	1.369	1.306	1.580	1.182	1.339	1.280	1.613	ns
	GCLK PLL	t_{su}	0.882	0.896	1.863	2.243	2.446	2.322	2.342	2.291	2.500	2.376	2.393	ns
		t_h	-0.625	-0.625	-1.430	-1.749	-1.896	-1.802	-1.817	-1.783	-1.936	-1.843	-1.865	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.734	-0.764	-1.085	-1.186	-1.286	-1.234	-1.505	-1.193	-1.291	-1.242	-1.543	ns
		t_h	0.850	0.893	1.274	1.394	1.516	1.451	1.720	1.410	1.531	1.470	1.758	ns
	GCLK PLL	t_{su}	1.077	1.081	1.776	2.019	2.257	2.138	2.163	2.024	2.263	2.144	2.209	ns
		t_h	-0.827	-0.819	-1.375	-1.570	-1.756	-1.667	-1.687	-1.565	-1.751	-1.663	-1.730	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.734	-0.764	-1.085	-1.186	-1.286	-1.234	-1.505	-1.193	-1.291	-1.242	-1.543	ns
		t_h	0.850	0.893	1.274	1.394	1.516	1.451	1.720	1.410	1.531	1.470	1.758	ns
	GCLK PLL	t_{su}	1.077	1.081	1.776	2.019	2.257	2.138	2.163	2.024	2.263	2.144	2.209	ns
		t_h	-0.827	-0.819	-1.375	-1.570	-1.756	-1.667	-1.687	-1.565	-1.751	-1.663	-1.730	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns

Table 1–56. EP3SL70 Row Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.743	-0.776	-1.094	-1.196	-1.302	-1.250	-1.521	-1.202	-1.307	-1.258	-1.559	ns
		t_h	0.859	0.905	1.283	1.404	1.532	1.467	1.736	1.419	1.547	1.486	1.774	ns
	GCLK PLL	t_{su}	1.068	1.069	1.767	2.009	2.241	2.122	2.147	2.015	2.247	2.128	2.193	ns
		t_h	-0.818	-0.807	-1.366	-1.560	-1.740	-1.651	-1.671	-1.556	-1.735	-1.647	-1.714	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.757	-0.788	-1.107	-1.206	-1.320	-1.268	-1.539	-1.213	-1.324	-1.275	-1.576	ns
		t_h	0.873	0.917	1.295	1.414	1.550	1.485	1.754	1.430	1.564	1.503	1.791	ns
	GCLK PLL	t_{su}	1.054	1.057	1.754	1.999	2.223	2.104	2.129	2.004	2.230	2.111	2.176	ns
		t_h	-0.804	-0.795	-1.354	-1.550	-1.722	-1.633	-1.653	-1.545	-1.718	-1.630	-1.697	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.756	-0.787	-1.112	-1.212	-1.321	-1.270	-1.540	-1.214	-1.320	-1.273	-1.573	ns
		t_h	0.872	0.916	1.300	1.422	1.554	1.489	1.759	1.434	1.563	1.502	1.792	ns
	GCLK PLL	t_{su}	1.045	1.048	1.739	1.983	2.212	2.092	2.118	1.993	2.224	2.103	2.169	ns
		t_h	-0.795	-0.786	-1.339	-1.532	-1.708	-1.619	-1.638	-1.531	-1.709	-1.621	-1.686	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.756	-0.787	-1.112	-1.212	-1.321	-1.270	-1.540	-1.214	-1.320	-1.273	-1.573	ns
		t_h	0.872	0.916	1.300	1.422	1.554	1.489	1.759	1.434	1.563	1.502	1.792	ns
	GCLK PLL	t_{su}	1.045	1.048	1.739	1.983	2.212	2.092	2.118	1.993	2.224	2.103	2.169	ns
		t_h	-0.795	-0.786	-1.339	-1.532	-1.708	-1.619	-1.638	-1.531	-1.709	-1.621	-1.686	ns

Table 1–57 lists the EP3SL70 column pins output timing parameters for differential I/O standards.

Table 1–57. EP3SL70 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
LVDS_E_3R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.056	3.279	4.646	5.054	5.571	5.431	5.649	5.181	5.698	5.560	5.717	ns
		GCLK PLL	t_{co}	3.046	3.269	4.636	5.043	5.561	5.421	5.639	5.170	5.688	5.550	5.707	ns
RSDS_E_1R	—	GCLK	t_{co}	3.046	3.269	4.639	5.047	5.565	5.425	5.643	5.175	5.693	5.555	5.712	ns
		GCLK PLL	t_{co}	3.039	3.263	4.632	5.041	5.559	5.419	5.637	5.168	5.687	5.549	5.706	ns
RSDS_E_3R	—	GCLK	t_{co}	3.038	3.261	4.629	5.038	5.556	5.416	5.634	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.060	3.283	4.650	5.058	5.575	5.435	5.653	5.185	5.703	5.565	5.722	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.050	3.272	4.629	5.035	5.550	5.410	5.628	5.161	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.045	3.268	4.629	5.035	5.551	5.411	5.629	5.162	5.678	5.540	5.697	ns
	6mA	GCLK	t_{co}	3.043	3.266	4.628	5.034	5.549	5.409	5.627	5.161	5.677	5.539	5.696	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
	8mA	GCLK	t_{co}	3.036	3.259	4.624	5.031	5.548	5.408	5.626	5.159	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.035	3.256	4.607	5.012	5.526	5.386	5.604	5.138	5.652	5.514	5.671	ns
	10mA	GCLK	t_{co}	3.047	3.269	4.625	5.030	5.544	5.404	5.622	5.157	5.671	5.533	5.690	ns
		GCLK PLL	t_{co}	3.043	3.266	4.626	5.032	5.548	5.408	5.626	5.159	5.675	5.537	5.694	ns
	12mA	GCLK	t_{co}	3.033	3.255	4.615	5.021	5.536	5.396	5.614	5.148	5.663	5.525	5.682	ns
		GCLK PLL	t_{co}	3.031	3.253	4.613	5.018	5.534	5.394	5.612	5.146	5.661	5.523	5.680	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.031	3.254	4.616	5.023	5.539	5.399	5.617	5.150	5.667	5.529	5.686	ns
		GCLK PLL	t_{co}	3.035	3.257	4.613	5.018	5.533	5.393	5.611	5.145	5.660	5.522	5.679	ns

Table 1–57. EP3SL70 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.061	3.286	4.658	5.066	5.583	5.443	5.661	5.193	5.710	5.572	5.729	ns
		GCLK PLL	t_{co}	3.047	3.272	4.646	5.055	5.573	5.433	5.651	5.183	5.701	5.563	5.720	ns
	6mA	GCLK	t_{co}	3.035	3.259	4.629	5.037	5.555	5.415	5.633	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.035	3.259	4.632	5.041	5.559	5.419	5.637	5.169	5.688	5.550	5.707	ns
	8mA	GCLK	t_{co}	3.031	3.255	4.625	5.033	5.552	5.412	5.630	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
	10mA	GCLK	t_{co}	3.036	3.259	4.626	5.034	5.551	5.411	5.629	5.161	5.679	5.541	5.698	ns
		GCLK PLL	t_{co}	3.064	3.289	4.657	5.064	5.581	5.441	5.659	5.192	5.708	5.570	5.727	ns
	12mA	GCLK	t_{co}	3.053	3.277	4.645	5.052	5.569	5.429	5.647	5.180	5.696	5.558	5.715	ns
		GCLK PLL	t_{co}	3.048	3.273	4.645	5.053	5.570	5.430	5.648	5.181	5.698	5.560	5.717	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.034	3.258	4.627	5.034	5.551	5.411	5.629	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.032	3.256	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.036	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns
		GCLK PLL	t_{co}	3.036	3.259	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
	6mA	GCLK	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
		GCLK PLL	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
	8mA	GCLK	t_{co}	3.042	3.266	4.631	5.037	5.553	5.413	5.631	5.165	5.681	5.543	5.700	ns
		GCLK PLL	t_{co}	3.035	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns
	10mA	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
	12mA	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.029	3.246	4.575	4.976	5.487	5.347	5.565	5.101	5.612	5.474	5.631	ns
		GCLK PLL	t_{co}	3.025	3.249	4.622	5.031	5.549	5.409	5.627	5.160	5.678	5.540	5.697	ns

Table 1–57. EP3SL70 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.056	3.279	4.646	5.054	5.571	5.431	5.649	5.181	5.698	5.560	5.717	ns
		GCLK PLL	t_{co}	3.046	3.269	4.636	5.043	5.561	5.421	5.639	5.170	5.688	5.550	5.707	ns
	6mA	GCLK	t_{co}	3.046	3.269	4.639	5.047	5.565	5.425	5.643	5.175	5.693	5.555	5.712	ns
		GCLK PLL	t_{co}	3.039	3.263	4.632	5.041	5.559	5.419	5.637	5.168	5.687	5.549	5.706	ns
	8mA	GCLK	t_{co}	3.038	3.261	4.629	5.038	5.556	5.416	5.634	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.060	3.283	4.650	5.058	5.575	5.435	5.653	5.185	5.703	5.565	5.722	ns
	10mA	GCLK	t_{co}	3.050	3.272	4.629	5.035	5.550	5.410	5.628	5.161	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.045	3.268	4.629	5.035	5.551	5.411	5.629	5.162	5.678	5.540	5.697	ns
	12mA	GCLK	t_{co}	3.043	3.266	4.628	5.034	5.549	5.409	5.627	5.161	5.677	5.539	5.696	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.036	3.259	4.624	5.031	5.548	5.408	5.626	5.159	5.676	5.538	5.695	ns
		GCLK PLL	t_{co}	3.035	3.256	4.607	5.012	5.526	5.386	5.604	5.138	5.652	5.514	5.671	ns
	16mA	GCLK	t_{co}	3.047	3.269	4.625	5.030	5.544	5.404	5.622	5.157	5.671	5.533	5.690	ns
		GCLK PLL	t_{co}	3.043	3.266	4.626	5.032	5.548	5.408	5.626	5.159	5.675	5.537	5.694	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.033	3.255	4.615	5.021	5.536	5.396	5.614	5.148	5.663	5.525	5.682	ns
		GCLK PLL	t_{co}	3.031	3.253	4.613	5.018	5.534	5.394	5.612	5.146	5.661	5.523	5.680	ns
	6mA	GCLK	t_{co}	3.031	3.254	4.616	5.023	5.539	5.399	5.617	5.150	5.667	5.529	5.686	ns
		GCLK PLL	t_{co}	3.035	3.257	4.613	5.018	5.533	5.393	5.611	5.145	5.660	5.522	5.679	ns
	8mA	GCLK	t_{co}	3.061	3.286	4.658	5.066	5.583	5.443	5.661	5.193	5.710	5.572	5.729	ns
		GCLK PLL	t_{co}	3.047	3.272	4.646	5.055	5.573	5.433	5.651	5.183	5.701	5.563	5.720	ns
	10mA	GCLK	t_{co}	3.035	3.259	4.629	5.037	5.555	5.415	5.633	5.165	5.683	5.545	5.702	ns
		GCLK PLL	t_{co}	3.035	3.259	4.632	5.041	5.559	5.419	5.637	5.169	5.688	5.550	5.707	ns
	12mA	GCLK	t_{co}	3.031	3.255	4.625	5.033	5.552	5.412	5.630	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.035	3.257	4.618	5.024	5.540	5.400	5.618	5.151	5.667	5.529	5.686	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.036	3.259	4.626	5.034	5.551	5.411	5.629	5.161	5.679	5.541	5.698	ns
		GCLK PLL	t_{co}	3.064	3.289	4.657	5.064	5.581	5.441	5.659	5.192	5.708	5.570	5.727	ns
	16mA	GCLK	t_{co}	3.053	3.277	4.645	5.052	5.569	5.429	5.647	5.180	5.696	5.558	5.715	ns
		GCLK PLL	t_{co}	3.048	3.273	4.645	5.053	5.570	5.430	5.648	5.181	5.698	5.560	5.717	ns

Table 1–57. EP3SL70 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.034	3.258	4.627	5.034	5.551	5.411	5.629	5.162	5.680	5.542	5.699	ns
		GCLK PLL	t_{co}	3.032	3.256	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
	10mA	GCLK	t_{co}	3.036	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns
		GCLK PLL	t_{co}	3.036	3.259	4.625	5.032	5.549	5.409	5.627	5.160	5.677	5.539	5.696	ns
	12mA	GCLK	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
		GCLK PLL	t_{co}	3.052	3.276	4.641	5.047	5.563	5.423	5.641	5.175	5.690	5.552	5.709	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.042	3.266	4.631	5.037	5.553	5.413	5.631	5.165	5.681	5.543	5.700	ns
		GCLK PLL	t_{co}	3.035	3.258	4.617	5.022	5.537	5.397	5.615	5.149	5.664	5.526	5.683	ns

Table 1–58 lists the EP3SL70 row pins output timing parameters for differential I/O standards.

Table 1–58. EP3SL70 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
LVDS_E_1R	—	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
LVDS_E_3R	—	GCLK	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
		GCLK PLL	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
MINI-LVDS	—	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	3.098	3.331	4.730	5.145	5.672	5.528	5.727	5.280	5.809	5.665	5.794	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.084	3.317	4.717	5.132	5.659	5.515	5.714	5.266	5.796	5.652	5.781	ns
		GCLK PLL	t_{co}	3.080	3.313	4.715	5.132	5.660	5.516	5.715	5.266	5.798	5.654	5.783	ns
RSDS	—	GCLK	t_{co}	3.096	3.328	4.716	5.129	5.654	5.510	5.709	5.263	5.791	5.647	5.776	ns
		GCLK PLL	t_{co}	3.085	3.318	4.712	5.125	5.651	5.507	5.706	5.260	5.788	5.644	5.773	ns
RSDS_E_1R	—	GCLK	t_{co}	3.082	3.315	4.710	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.093	3.325	4.711	5.124	5.648	5.504	5.703	5.257	5.785	5.641	5.770	ns
RSDS_E_3R	—	GCLK	t_{co}	3.083	3.316	4.709	5.122	5.647	5.503	5.702	5.257	5.785	5.641	5.770	ns
		GCLK PLL	t_{co}	3.069	3.302	4.694	5.107	5.633	5.489	5.688	5.242	5.770	5.626	5.755	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.066	3.298	4.690	5.103	5.629	5.485	5.684	5.238	5.766	5.622	5.751	ns
		GCLK PLL	t_{co}	3.063	3.296	4.691	5.106	5.632	5.488	5.687	5.241	5.770	5.626	5.755	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	6mA	GCLK	t_{co}	3.064	3.296	4.681	5.094	5.619	5.475	5.674	5.228	5.756	5.612	5.741	ns
		GCLK PLL	t_{co}	3.113	3.349	4.752	5.167	5.695	5.551	5.750	5.302	5.832	5.688	5.817	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	8mA	GCLK	t_{co}	3.089	3.325	4.734	5.150	5.678	5.534	5.733	5.285	5.817	5.673	5.802	ns
		GCLK PLL	t_{co}	3.071	3.306	4.712	5.128	5.656	5.512	5.711	5.263	5.795	5.651	5.780	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.117	3.352	4.752	5.167	5.694	5.550	5.749	5.302	5.832	5.688	5.817	ns
		GCLK PLL	t_{co}	3.102	3.337	4.738	5.152	5.679	5.535	5.734	5.287	5.817	5.673	5.802	ns

Table 1–58. EP3SL70 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	6mA	GCLK	t_{co}	3.091	3.326	4.733	5.149	5.676	5.532	5.731	5.284	5.815	5.671	5.800	ns
		GCLK PLL	t_{co}	3.071	3.306	4.710	5.125	5.653	5.509	5.708	5.261	5.791	5.647	5.776	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	8mA	GCLK	t_{co}	3.068	3.302	4.706	5.122	5.649	5.505	5.704	5.257	5.788	5.644	5.773	ns
		GCLK PLL	t_{co}	3.073	3.306	4.697	5.110	5.635	5.491	5.690	5.244	5.772	5.628	5.757	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.066	3.299	4.696	5.111	5.638	5.494	5.693	5.247	5.777	5.633	5.762	ns
		GCLK PLL	t_{co}	3.094	3.328	4.724	5.138	5.664	5.520	5.719	5.273	5.802	5.658	5.787	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	6mA	GCLK	t_{co}	3.076	3.311	4.709	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.062	3.295	4.686	5.099	5.624	5.480	5.679	5.234	5.762	5.618	5.747	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	8mA	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	10mA	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	12mA	GCLK	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
		GCLK PLL	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	2.668	2.842	3.979	4.346	4.821	4.685	4.892	4.453	4.930	4.795	4.940	ns
		GCLK PLL	t_{co}	3.062	3.288	4.646	5.055	5.575	5.431	5.630	5.186	5.709	5.565	5.694	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.044	3.278	4.684	5.101	5.629	5.485	5.684	5.237	5.770	5.626	5.755	ns
		GCLK PLL	t_{co}	3.098	3.331	4.730	5.145	5.672	5.528	5.727	5.280	5.809	5.665	5.794	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	6mA	GCLK	t_{co}	3.084	3.317	4.717	5.132	5.659	5.515	5.714	5.266	5.796	5.652	5.781	ns
		GCLK PLL	t_{co}	3.080	3.313	4.715	5.132	5.660	5.516	5.715	5.266	5.798	5.654	5.783	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.096	3.328	4.716	5.129	5.654	5.510	5.709	5.263	5.791	5.647	5.776	ns
		GCLK PLL	t_{co}	3.085	3.318	4.712	5.125	5.651	5.507	5.706	5.260	5.788	5.644	5.773	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.082	3.315	4.710	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.093	3.325	4.711	5.124	5.648	5.504	5.703	5.257	5.785	5.641	5.770	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	6mA	GCLK	t_{co}	3.083	3.316	4.709	5.122	5.647	5.503	5.702	5.257	5.785	5.641	5.770	ns
		GCLK PLL	t_{co}	3.069	3.302	4.694	5.107	5.633	5.489	5.688	5.242	5.770	5.626	5.755	ns

Table 1–58. EP3SL70 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	8mA	GCLK	t_{co}	3.066	3.298	4.690	5.103	5.629	5.485	5.684	5.238	5.766	5.622	5.751	ns
		GCLK PLL	t_{co}	3.063	3.296	4.691	5.106	5.632	5.488	5.687	5.241	5.770	5.626	5.755	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	10mA	GCLK	t_{co}	3.064	3.296	4.681	5.094	5.619	5.475	5.674	5.228	5.756	5.612	5.741	ns
		GCLK PLL	t_{co}	3.113	3.349	4.752	5.167	5.695	5.551	5.750	5.302	5.832	5.688	5.817	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	12mA	GCLK	t_{co}	3.089	3.325	4.734	5.150	5.678	5.534	5.733	5.285	5.817	5.673	5.802	ns
		GCLK PLL	t_{co}	3.071	3.306	4.712	5.128	5.656	5.512	5.711	5.263	5.795	5.651	5.780	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.117	3.352	4.752	5.167	5.694	5.550	5.749	5.302	5.832	5.688	5.817	ns
		GCLK PLL	t_{co}	3.102	3.337	4.738	5.152	5.679	5.535	5.734	5.287	5.817	5.673	5.802	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	16mA	GCLK	t_{co}	3.091	3.326	4.733	5.149	5.676	5.532	5.731	5.284	5.815	5.671	5.800	ns
		GCLK PLL	t_{co}	3.071	3.306	4.710	5.125	5.653	5.509	5.708	5.261	5.791	5.647	5.776	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.068	3.302	4.706	5.122	5.649	5.505	5.704	5.257	5.788	5.644	5.773	ns
		GCLK PLL	t_{co}	3.073	3.306	4.697	5.110	5.635	5.491	5.690	5.244	5.772	5.628	5.757	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	12mA	GCLK	t_{co}	3.066	3.299	4.696	5.111	5.638	5.494	5.693	5.247	5.777	5.633	5.762	ns
		GCLK PLL	t_{co}	3.094	3.328	4.724	5.138	5.664	5.520	5.719	5.273	5.802	5.658	5.787	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.076	3.311	4.709	5.123	5.649	5.505	5.704	5.258	5.787	5.643	5.772	ns
		GCLK PLL	t_{co}	3.062	3.295	4.686	5.099	5.624	5.480	5.679	5.234	5.762	5.618	5.747	ns

Table 1–59 and Table 1–60 list the EP3SL70 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–59 lists the EP3SL70 column pin delay adders when using the regional clock.

Table 1–59. EP3SL70 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.158	0.168	0.225	0.241	0.257	0.247	0.313	0.244	0.258	0.252	0.315	ns
RCLK PLL input adder	-0.014	-0.012	-0.007	-0.003	-0.002	-0.005	0.191	-0.003	-0.003	-0.004	0.191	ns
RCLK output adder	-0.114	-0.116	-0.137	-0.139	-0.141	-0.137	-0.215	-0.132	-0.133	-0.136	-0.215	ns
RCLK PLL output adder	1.642	1.675	2.599	2.912	3.223	3.071	3.22	2.931	3.238	3.083	3.338	ns

Table 1–60 lists the EP3SL70 row pin delay adders when using the regional clock.

Table 1–60. EP3SL70 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.111	0.123	0.177	0.192	0.207	0.198	0.263	0.194	0.212	0.201	0.266	ns
RCLK PLL input adder	0.099	0.105	0.156	0.175	0.195	0.185	0.263	0.177	0.195	0.188	0.263	ns
RCLK output adder	-0.113	-0.127	-0.183	-0.198	-0.213	-0.205	-0.272	-0.202	-0.216	-0.21	-0.273	ns
RCLK PLL output adder	-0.107	-0.112	-0.164	-0.185	-0.202	-0.193	-0.258	-0.184	-0.204	-0.197	-0.257	ns

EP3SL110 I/O Timing Parameters

Table 1–61 through Table 1–65 list the maximum I/O timing parameters for EP3SL110 devices for single-ended I/O standards.

Table 1–61 lists the EP3SL110 column pins input timing parameters for single-ended I/O standards.

Table 1–61. EP3SL110 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.917	-0.917	-1.333	-1.452	-1.682	-1.627	-1.980	-1.452	-1.682	-1.627	-1.980	ns
		t_h	1.053	1.053	1.524	1.667	1.918	1.850	2.205	1.667	1.918	1.850	2.205	ns
	GCLK PLL	t_{su}	-1.234	-1.176	-1.704	-1.940	-2.210	-2.135	-2.470	-1.940	-2.210	-2.135	-2.470	ns
		t_h	1.512	1.460	2.116	2.394	2.710	2.610	2.971	2.394	2.710	2.610	2.971	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.917	-0.917	-1.333	-1.452	-1.682	-1.627	-1.980	-1.452	-1.682	-1.627	-1.980	ns
		t_h	1.053	1.053	1.524	1.667	1.918	1.850	2.205	1.667	1.918	1.850	2.205	ns
	GCLK PLL	t_{su}	-1.234	-1.176	-1.704	-1.940	-2.210	-2.135	-2.470	-1.940	-2.210	-2.135	-2.470	ns
		t_h	1.512	1.460	2.116	2.394	2.710	2.610	2.971	2.394	2.710	2.610	2.971	ns
3.0-V LVTTL	GCLK	t_{su}	-0.928	-0.928	-1.332	-1.454	-1.681	-1.626	-1.979	-1.454	-1.681	-1.626	-1.979	ns
		t_h	1.064	1.064	1.523	1.669	1.917	1.849	2.204	1.669	1.917	1.849	2.204	ns
	GCLK PLL	t_{su}	-1.245	-1.187	-1.703	-1.942	-2.209	-2.134	-2.469	-1.942	-2.209	-2.134	-2.469	ns
		t_h	1.523	1.471	2.115	2.396	2.709	2.609	2.970	2.396	2.709	2.609	2.970	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.928	-0.928	-1.332	-1.454	-1.681	-1.626	-1.979	-1.454	-1.681	-1.626	-1.979	ns
		t_h	1.064	1.064	1.523	1.669	1.917	1.849	2.204	1.669	1.917	1.849	2.204	ns
	GCLK PLL	t_{su}	-1.245	-1.187	-1.703	-1.942	-2.209	-2.134	-2.469	-1.942	-2.209	-2.134	-2.469	ns
		t_h	1.523	1.471	2.115	2.396	2.709	2.609	2.970	2.396	2.709	2.609	2.970	ns
2.5 V	GCLK	t_{su}	-0.923	-0.923	-1.341	-1.466	-1.700	-1.645	-1.998	-1.466	-1.700	-1.645	-1.998	ns
		t_h	1.059	1.059	1.532	1.681	1.936	1.868	2.223	1.681	1.936	1.868	2.223	ns
	GCLK PLL	t_{su}	-1.240	-1.182	-1.712	-1.954	-2.228	-2.153	-2.488	-1.954	-2.228	-2.153	-2.488	ns
		t_h	1.518	1.466	2.124	2.408	2.728	2.628	2.989	2.408	2.728	2.628	2.989	ns

Table 1–61. EP3SL110 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	GCLK	t_{su}	-0.943	-0.943	-1.381	-1.502	-1.698	-1.643	-1.996	-1.502	-1.698	-1.643	-1.996	ns
		t_h	1.081	1.081	1.572	1.717	1.934	1.866	2.221	1.717	1.934	1.866	2.221	ns
	GCLK PLL	t_{su}	-1.262	-1.202	-1.752	-1.990	-2.226	-2.151	-2.486	-1.990	-2.226	-2.151	-2.486	ns
		t_h	1.542	1.488	2.164	2.444	2.726	2.626	2.987	2.444	2.726	2.626	2.987	ns
1.5 V	GCLK	t_{su}	-0.933	-0.933	-1.358	-1.470	-1.628	-1.573	-1.926	-1.470	-1.628	-1.573	-1.926	ns
		t_h	1.071	1.071	1.549	1.685	1.864	1.796	2.151	1.685	1.864	1.796	2.151	ns
	GCLK PLL	t_{su}	-1.252	-1.192	-1.729	-1.958	-2.156	-2.081	-2.416	-1.958	-2.156	-2.081	-2.416	ns
		t_h	1.532	1.478	2.141	2.412	2.656	2.556	2.917	2.412	2.656	2.556	2.917	ns
1.2 V	GCLK	t_{su}	-0.881	-0.881	-1.281	-1.371	-1.472	-1.417	-1.770	-1.371	-1.472	-1.417	-1.770	ns
		t_h	1.019	1.019	1.472	1.586	1.708	1.640	1.995	1.586	1.708	1.640	1.995	ns
	GCLK PLL	t_{su}	-1.200	-1.140	-1.652	-1.859	-2.000	-1.925	-2.260	-1.859	-2.000	-1.925	-2.260	ns
		t_h	1.480	1.426	2.064	2.313	2.500	2.400	2.761	2.313	2.500	2.400	2.761	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.852	-0.852	-1.253	-1.355	-1.474	-1.419	-1.772	-1.355	-1.474	-1.419	-1.772	ns
		t_h	0.990	0.990	1.444	1.570	1.710	1.642	1.997	1.570	1.710	1.642	1.997	ns
	GCLK PLL	t_{su}	-1.171	-1.111	-1.624	-1.843	-2.002	-1.927	-2.262	-1.843	-2.002	-1.927	-2.262	ns
		t_h	1.451	1.397	2.036	2.297	2.502	2.402	2.763	2.297	2.502	2.402	2.763	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.852	-0.852	-1.253	-1.355	-1.474	-1.419	-1.772	-1.355	-1.474	-1.419	-1.772	ns
		t_h	0.990	0.990	1.444	1.570	1.710	1.642	1.997	1.570	1.710	1.642	1.997	ns
	GCLK PLL	t_{su}	-1.171	-1.111	-1.624	-1.843	-2.002	-1.927	-2.262	-1.843	-2.002	-1.927	-2.262	ns
		t_h	1.451	1.397	2.036	2.297	2.502	2.402	2.763	2.297	2.502	2.402	2.763	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.846	-0.846	-1.241	-1.350	-1.474	-1.417	-1.773	-1.350	-1.474	-1.417	-1.773	ns
		t_h	0.984	0.984	1.431	1.562	1.707	1.639	1.993	1.562	1.707	1.639	1.993	ns
	GCLK PLL	t_{su}	-1.165	-1.105	-1.612	-1.835	-1.999	-1.922	-2.263	-1.835	-1.999	-1.922	-2.263	ns
		t_h	1.445	1.391	2.023	2.286	2.496	2.396	2.759	2.286	2.496	2.396	2.759	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.846	-0.846	-1.241	-1.350	-1.474	-1.417	-1.773	-1.350	-1.474	-1.417	-1.773	ns
		t_h	0.984	0.984	1.431	1.562	1.707	1.639	1.993	1.562	1.707	1.639	1.993	ns
	GCLK PLL	t_{su}	-1.165	-1.105	-1.612	-1.835	-1.999	-1.922	-2.263	-1.835	-1.999	-1.922	-2.263	ns
		t_h	1.445	1.391	2.023	2.286	2.496	2.396	2.759	2.286	2.496	2.396	2.759	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.835	-0.835	-1.232	-1.339	-1.455	-1.398	-1.754	-1.339	-1.455	-1.398	-1.754	ns
		t_h	0.973	0.973	1.421	1.551	1.688	1.620	1.974	1.551	1.688	1.620	1.974	ns
	GCLK PLL	t_{su}	-1.154	-1.094	-1.603	-1.824	-1.980	-1.903	-2.244	-1.824	-1.980	-1.903	-2.244	ns
		t_h	1.434	1.380	2.013	2.275	2.477	2.377	2.740	2.275	2.477	2.377	2.740	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.835	-0.835	-1.232	-1.339	-1.455	-1.398	-1.754	-1.339	-1.455	-1.398	-1.754	ns
		t_h	0.973	0.973	1.421	1.551	1.688	1.620	1.974	1.551	1.688	1.620	1.974	ns
	GCLK PLL	t_{su}	-1.154	-1.094	-1.603	-1.824	-1.980	-1.903	-2.244	-1.824	-1.980	-1.903	-2.244	ns
		t_h	1.434	1.380	2.013	2.275	2.477	2.377	2.740	2.275	2.477	2.377	2.740	ns

Table 1–61. EP3SL110 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.846	-0.846	-1.241	-1.350	-1.474	-1.417	-1.773	-1.350	-1.474	-1.417	-1.773	ns
		t_h	0.984	0.984	1.431	1.562	1.707	1.639	1.993	1.562	1.707	1.639	1.993	ns
	GCLK PLL	t_{su}	-1.165	-1.105	-1.612	-1.835	-1.999	-1.922	-2.263	-1.835	-1.999	-1.922	-2.263	ns
		t_h	1.445	1.391	2.023	2.286	2.496	2.396	2.759	2.286	2.496	2.396	2.759	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.846	-0.846	-1.241	-1.350	-1.474	-1.417	-1.773	-1.350	-1.474	-1.417	-1.773	ns
		t_h	0.984	0.984	1.431	1.562	1.707	1.639	1.993	1.562	1.707	1.639	1.993	ns
	GCLK PLL	t_{su}	-1.165	-1.105	-1.612	-1.835	-1.999	-1.922	-2.263	-1.835	-1.999	-1.922	-2.263	ns
		t_h	1.445	1.391	2.023	2.286	2.496	2.396	2.759	2.286	2.496	2.396	2.759	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.835	-0.835	-1.232	-1.339	-1.455	-1.398	-1.754	-1.339	-1.455	-1.398	-1.754	ns
		t_h	0.973	0.973	1.421	1.551	1.688	1.620	1.974	1.551	1.688	1.620	1.974	ns
	GCLK PLL	t_{su}	-1.154	-1.094	-1.603	-1.824	-1.980	-1.903	-2.244	-1.824	-1.980	-1.903	-2.244	ns
		t_h	1.434	1.380	2.013	2.275	2.477	2.377	2.740	2.275	2.477	2.377	2.740	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.835	-0.835	-1.232	-1.339	-1.455	-1.398	-1.754	-1.339	-1.455	-1.398	-1.754	ns
		t_h	0.973	0.973	1.421	1.551	1.688	1.620	1.974	1.551	1.688	1.620	1.974	ns
	GCLK PLL	t_{su}	-1.154	-1.094	-1.603	-1.824	-1.980	-1.903	-2.244	-1.824	-1.980	-1.903	-2.244	ns
		t_h	1.434	1.380	2.013	2.275	2.477	2.377	2.740	2.275	2.477	2.377	2.740	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.823	-0.823	-1.222	-1.328	-1.439	-1.382	-1.738	-1.328	-1.439	-1.382	-1.738	ns
		t_h	0.961	0.961	1.411	1.540	1.672	1.604	1.958	1.540	1.672	1.604	1.958	ns
	GCLK PLL	t_{su}	-1.142	-1.082	-1.593	-1.813	-1.964	-1.887	-2.228	-1.813	-1.964	-1.887	-2.228	ns
		t_h	1.422	1.368	2.003	2.264	2.461	2.361	2.724	2.264	2.461	2.361	2.724	ns
3.0-V PCI	GCLK	t_{su}	-0.823	-0.823	-1.222	-1.328	-1.439	-1.382	-1.738	-1.328	-1.439	-1.382	-1.738	ns
		t_h	0.961	0.961	1.411	1.540	1.672	1.604	1.958	1.540	1.672	1.604	1.958	ns
	GCLK PLL	t_{su}	-1.142	-1.082	-1.593	-1.813	-1.964	-1.887	-2.228	-1.813	-1.964	-1.887	-2.228	ns
		t_h	1.422	1.368	2.003	2.264	2.461	2.361	2.724	2.264	2.461	2.361	2.724	ns
3.0-V PCI-X	GCLK	t_{su}	-0.928	-0.928	-1.332	-1.454	-1.681	-1.626	-1.979	-1.454	-1.681	-1.626	-1.979	ns
		t_h	1.064	1.064	1.523	1.669	1.917	1.849	2.204	1.669	1.917	1.849	2.204	ns
	GCLK PLL	t_{su}	-1.245	-1.187	-1.703	-1.942	-2.209	-2.134	-2.469	-1.942	-2.209	-2.134	-2.469	ns
		t_h	1.523	1.471	2.115	2.396	2.709	2.609	2.970	2.396	2.709	2.609	2.970	ns

Table 1–62 lists the EP3SL110 row pins input timing parameters for single-ended I/O standards.

Table 1–62. EP3SL110 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.910	-0.883	-1.252	-1.441	-1.559	-1.604	-1.843	-1.465	-1.551	-1.605	-1.881	ns
		t_h	1.025	1.015	1.440	1.648	1.792	1.822	2.066	1.682	1.794	1.831	2.104	ns
	GCLK PLL	t_{su}	0.992	1.013	1.646	1.862	1.976	1.860	1.804	1.870	1.998	1.880	1.856	ns
		t_h	-0.741	-0.746	-1.246	-1.412	-1.475	-1.388	-1.322	-1.411	-1.486	-1.398	-1.371	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.910	-0.883	-1.252	-1.441	-1.559	-1.604	-1.843	-1.465	-1.551	-1.605	-1.881	ns
		t_h	1.025	1.015	1.440	1.648	1.792	1.822	2.066	1.682	1.794	1.831	2.104	ns
	GCLK PLL	t_{su}	0.992	1.013	1.646	1.862	1.976	1.860	1.804	1.870	1.998	1.880	1.856	ns
		t_h	-0.741	-0.746	-1.246	-1.412	-1.475	-1.388	-1.322	-1.411	-1.486	-1.398	-1.371	ns
3.0-V LVTTL	GCLK	t_{su}	-0.916	-0.894	-1.249	-1.442	-1.562	-1.607	-1.846	-1.464	-1.556	-1.610	-1.886	ns
		t_h	1.031	1.026	1.437	1.649	1.795	1.825	2.069	1.681	1.799	1.836	2.109	ns
	GCLK PLL	t_{su}	0.986	1.002	1.649	1.861	1.973	1.857	1.801	1.871	1.993	1.875	1.851	ns
		t_h	-0.735	-0.735	-1.249	-1.411	-1.472	-1.385	-1.319	-1.412	-1.481	-1.393	-1.366	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.916	-0.894	-1.249	-1.442	-1.562	-1.607	-1.846	-1.464	-1.556	-1.610	-1.886	ns
		t_h	1.031	1.026	1.437	1.649	1.795	1.825	2.069	1.681	1.799	1.836	2.109	ns
	GCLK PLL	t_{su}	0.986	1.002	1.649	1.861	1.973	1.857	1.801	1.871	1.993	1.875	1.851	ns
		t_h	-0.735	-0.735	-1.249	-1.411	-1.472	-1.385	-1.319	-1.412	-1.481	-1.393	-1.366	ns
2.5 V	GCLK	t_{su}	-0.904	-0.887	-1.258	-1.455	-1.577	-1.622	-1.861	-1.473	-1.566	-1.620	-1.896	ns
		t_h	1.019	1.019	1.446	1.662	1.810	1.840	2.084	1.690	1.809	1.846	2.119	ns
	GCLK PLL	t_{su}	0.998	1.009	1.640	1.848	1.958	1.842	1.786	1.862	1.983	1.865	1.841	ns
		t_h	-0.747	-0.742	-1.240	-1.398	-1.457	-1.370	-1.304	-1.403	-1.471	-1.383	-1.356	ns
1.8 V	GCLK	t_{su}	-0.873	-0.918	-1.298	-1.402	-1.575	-1.530	-1.859	-1.402	-1.567	-1.526	-1.897	ns
		t_h	0.990	1.051	1.486	1.612	1.808	1.751	2.082	1.622	1.810	1.756	2.120	ns
	GCLK PLL	t_{su}	0.968	0.977	1.600	1.815	1.960	1.844	1.788	1.829	1.982	1.864	1.840	ns
		t_h	-0.716	-0.709	-1.200	-1.365	-1.459	-1.372	-1.306	-1.370	-1.470	-1.382	-1.355	ns
1.5 V	GCLK	t_{su}	-0.863	-0.907	-1.274	-1.370	-1.507	-1.462	-1.791	-1.371	-1.502	-1.461	-1.832	ns
		t_h	0.980	1.040	1.462	1.580	1.740	1.683	2.014	1.591	1.745	1.691	2.055	ns
	GCLK PLL	t_{su}	0.978	0.988	1.624	1.847	2.028	1.912	1.856	1.860	2.047	1.929	1.905	ns
		t_h	-0.726	-0.720	-1.224	-1.397	-1.527	-1.440	-1.374	-1.401	-1.535	-1.447	-1.420	ns
1.2 V	GCLK	t_{su}	-0.803	-0.854	-1.195	-1.269	-1.348	-1.303	-1.632	-1.275	-1.347	-1.306	-1.677	ns
		t_h	0.920	0.987	1.383	1.479	1.581	1.524	1.855	1.495	1.590	1.536	1.900	ns
	GCLK PLL	t_{su}	1.038	1.041	1.703	1.948	2.187	2.071	2.015	1.956	2.202	2.084	2.060	ns
		t_h	-0.786	-0.773	-1.303	-1.498	-1.686	-1.599	-1.533	-1.497	-1.690	-1.602	-1.575	ns

Table 1–62. EP3SL110 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS I	GCLK	t_{su}	-0.847	-0.828	-1.172	-1.346	-1.357	-1.402	-1.641	-1.361	-1.349	-1.403	-1.679	ns
		t_h	0.963	0.961	1.360	1.553	1.590	1.620	1.864	1.578	1.592	1.629	1.902	ns
	GCLK PLL	t_{su}	1.055	1.067	1.726	1.957	2.178	2.062	2.006	1.974	2.200	2.082	2.058	ns
		t_h	-0.803	-0.799	-1.326	-1.507	-1.677	-1.590	-1.524	-1.515	-1.688	-1.600	-1.573	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.847	-0.828	-1.172	-1.346	-1.357	-1.402	-1.641	-1.361	-1.349	-1.403	-1.679	ns
		t_h	0.963	0.961	1.360	1.553	1.590	1.620	1.864	1.578	1.592	1.629	1.902	ns
	GCLK PLL	t_{su}	1.055	1.067	1.726	1.957	2.178	2.062	2.006	1.974	2.200	2.082	2.058	ns
		t_h	-0.803	-0.799	-1.326	-1.507	-1.677	-1.590	-1.524	-1.515	-1.688	-1.600	-1.573	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.777	-0.819	-1.157	-1.244	-1.346	-1.300	-1.630	-1.246	-1.343	-1.300	-1.672	ns
		t_h	0.894	0.952	1.345	1.452	1.576	1.519	1.849	1.463	1.583	1.529	1.891	ns
	GCLK PLL	t_{su}	1.064	1.076	1.741	1.975	2.192	2.077	2.019	1.988	2.209	2.092	2.067	ns
		t_h	-0.812	-0.808	-1.341	-1.527	-1.693	-1.606	-1.541	-1.531	-1.700	-1.611	-1.586	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.777	-0.819	-1.157	-1.244	-1.346	-1.300	-1.630	-1.246	-1.343	-1.300	-1.672	ns
		t_h	0.894	0.952	1.345	1.452	1.576	1.519	1.849	1.463	1.583	1.529	1.891	ns
	GCLK PLL	t_{su}	1.064	1.076	1.741	1.975	2.192	2.077	2.019	1.988	2.209	2.092	2.067	ns
		t_h	-0.812	-0.808	-1.341	-1.527	-1.693	-1.606	-1.541	-1.531	-1.700	-1.611	-1.586	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.763	-0.807	-1.144	-1.234	-1.328	-1.282	-1.612	-1.235	-1.326	-1.283	-1.655	ns
		t_h	0.880	0.940	1.333	1.442	1.558	1.501	1.831	1.452	1.566	1.512	1.874	ns
	GCLK PLL	t_{su}	1.078	1.088	1.756	1.985	2.210	2.095	2.037	1.999	2.226	2.109	2.084	ns
		t_h	-0.826	-0.820	-1.355	-1.537	-1.711	-1.624	-1.559	-1.542	-1.717	-1.628	-1.603	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.777	-0.819	-1.157	-1.244	-1.346	-1.300	-1.630	-1.246	-1.343	-1.300	-1.672	ns
		t_h	0.894	0.952	1.345	1.452	1.576	1.519	1.849	1.463	1.583	1.529	1.891	ns
	GCLK PLL	t_{su}	1.064	1.076	1.741	1.975	2.192	2.077	2.019	1.988	2.209	2.092	2.067	ns
		t_h	-0.812	-0.808	-1.341	-1.527	-1.693	-1.606	-1.541	-1.531	-1.700	-1.611	-1.586	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.777	-0.819	-1.157	-1.244	-1.346	-1.300	-1.630	-1.246	-1.343	-1.300	-1.672	ns
		t_h	0.894	0.952	1.345	1.452	1.576	1.519	1.849	1.463	1.583	1.529	1.891	ns
	GCLK PLL	t_{su}	1.064	1.076	1.741	1.975	2.192	2.077	2.019	1.988	2.209	2.092	2.067	ns
		t_h	-0.812	-0.808	-1.341	-1.527	-1.693	-1.606	-1.541	-1.531	-1.700	-1.611	-1.586	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.763	-0.807	-1.144	-1.234	-1.328	-1.282	-1.612	-1.235	-1.326	-1.283	-1.655	ns
		t_h	0.880	0.940	1.333	1.442	1.558	1.501	1.831	1.452	1.566	1.512	1.874	ns
	GCLK PLL	t_{su}	1.078	1.088	1.756	1.985	2.210	2.095	2.037	1.999	2.226	2.109	2.084	ns
		t_h	-0.826	-0.820	-1.355	-1.537	-1.711	-1.624	-1.559	-1.542	-1.717	-1.628	-1.603	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.763	-0.807	-1.144	-1.234	-1.328	-1.282	-1.612	-1.235	-1.326	-1.283	-1.655	ns
		t_h	0.880	0.940	1.333	1.442	1.558	1.501	1.831	1.452	1.566	1.512	1.874	ns
	GCLK PLL	t_{su}	1.078	1.088	1.756	1.985	2.210	2.095	2.037	1.999	2.226	2.109	2.084	ns
		t_h	-0.826	-0.820	-1.355	-1.537	-1.711	-1.624	-1.559	-1.542	-1.717	-1.628	-1.603	ns

Table 1–62. EP3SL110 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.754	-0.795	-1.135	-1.224	-1.312	-1.266	-1.596	-1.226	-1.310	-1.267	-1.639	ns
		t_h	0.871	0.928	1.324	1.432	1.542	1.485	1.815	1.443	1.550	1.496	1.858	ns
	GCLK PLL	t_{su}	1.087	1.100	1.765	1.995	2.226	2.111	2.053	2.008	2.242	2.125	2.100	ns
		t_h	-0.835	-0.832	-1.364	-1.547	-1.727	-1.640	-1.575	-1.551	-1.733	-1.644	-1.619	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.754	-0.795	-1.135	-1.224	-1.312	-1.266	-1.596	-1.226	-1.310	-1.267	-1.639	ns
		t_h	0.871	0.928	1.324	1.432	1.542	1.485	1.815	1.443	1.550	1.496	1.858	ns
	GCLK PLL	t_{su}	1.087	1.100	1.765	1.995	2.226	2.111	2.053	2.008	2.242	2.125	2.100	ns
		t_h	-0.835	-0.832	-1.364	-1.547	-1.727	-1.640	-1.575	-1.551	-1.733	-1.644	-1.619	ns
3.0-V PCI	GCLK	t_{su}	-0.916	-0.894	-1.249	-1.442	-1.562	-1.607	-1.846	-1.464	-1.556	-1.610	-1.886	ns
		t_h	1.031	1.026	1.437	1.649	1.795	1.825	2.069	1.681	1.799	1.836	2.109	ns
	GCLK PLL	t_{su}	0.986	1.002	1.649	1.861	1.973	1.857	1.801	1.871	1.993	1.875	1.851	ns
		t_h	-0.735	-0.735	-1.249	-1.411	-1.472	-1.385	-1.319	-1.412	-1.481	-1.393	-1.366	ns
3.0-V PCI-X	GCLK	t_{su}	-0.916	-0.894	-1.249	-1.442	-1.562	-1.607	-1.846	-1.464	-1.556	-1.610	-1.886	ns
		t_h	1.031	1.026	1.437	1.649	1.795	1.825	2.069	1.681	1.799	1.836	2.109	ns
	GCLK PLL	t_{su}	0.986	1.002	1.649	1.861	1.973	1.857	1.801	1.871	1.993	1.875	1.851	ns
		t_h	-0.735	-0.735	-1.249	-1.411	-1.472	-1.385	-1.319	-1.412	-1.481	-1.393	-1.366	ns

Table 1–63 lists the EP3SL110 column pins output timing parameters for single-ended I/O standards.

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.439	3.439	4.768	5.145	5.638	5.507	5.801	5.145	5.638	5.507	5.801	ns
		GCLK PLL	t_{co}	3.829	3.829	5.344	5.778	6.326	6.168	6.550	5.778	6.326	6.168	6.550	ns
	8mA	GCLK	t_{co}	3.372	3.372	4.659	5.034	5.525	5.394	5.688	5.034	5.525	5.394	5.688	ns
		GCLK PLL	t_{co}	3.762	3.762	5.235	5.667	6.213	6.055	6.437	5.667	6.213	6.055	6.437	ns
	12mA	GCLK	t_{co}	3.286	3.286	4.556	4.936	5.433	5.302	5.596	4.936	5.433	5.302	5.596	ns
		GCLK PLL	t_{co}	3.676	3.676	5.131	5.568	6.121	5.963	6.345	5.568	6.121	5.963	6.345	ns
	16mA	GCLK	t_{co}	3.279	3.279	4.539	4.908	5.392	5.261	5.555	4.908	5.392	5.261	5.555	ns
		GCLK PLL	t_{co}	3.669	3.669	5.114	5.540	6.080	5.922	6.304	5.540	6.080	5.922	6.304	ns

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Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.445	3.445	4.773	5.150	5.645	5.514	5.808	5.150	5.645	5.514	5.808	ns
		GCLK PLL	t_{co}	3.835	3.835	5.348	5.783	6.333	6.175	6.557	5.783	6.333	6.175	6.557	ns
	8mA	GCLK	t_{co}	3.290	3.290	4.566	4.953	5.444	5.313	5.607	4.953	5.444	5.313	5.607	ns
		GCLK PLL	t_{co}	3.680	3.680	5.141	5.585	6.132	5.974	6.356	5.585	6.132	5.974	6.356	ns
	12mA	GCLK	t_{co}	3.297	3.297	4.560	4.932	5.418	5.287	5.581	4.932	5.418	5.287	5.581	ns
		GCLK PLL	t_{co}	3.687	3.687	5.135	5.564	6.106	5.948	6.330	5.564	6.106	5.948	6.330	ns
	16mA	GCLK	t_{co}	3.281	3.281	4.537	4.906	5.389	5.258	5.552	4.906	5.389	5.258	5.552	ns
		GCLK PLL	t_{co}	3.671	3.671	5.113	5.539	6.077	5.919	6.301	5.539	6.077	5.919	6.301	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.403	3.403	4.735	5.114	5.605	5.474	5.768	5.114	5.605	5.474	5.768	ns
		GCLK PLL	t_{co}	3.793	3.793	5.311	5.746	6.293	6.135	6.517	5.746	6.293	6.135	6.517	ns
	8mA	GCLK	t_{co}	3.292	3.292	4.605	4.980	5.467	5.337	5.629	4.980	5.467	5.337	5.629	ns
		GCLK PLL	t_{co}	3.682	3.682	5.181	5.612	6.156	5.999	6.379	5.612	6.156	5.999	6.379	ns
	12mA	GCLK	t_{co}	3.256	3.256	4.542	4.911	5.393	5.263	5.556	4.911	5.393	5.263	5.556	ns
		GCLK PLL	t_{co}	3.646	3.646	5.118	5.543	6.082	5.925	6.305	5.543	6.082	5.925	6.305	ns
	16mA	GCLK	t_{co}	3.238	3.238	4.513	4.883	5.365	5.234	5.528	4.883	5.365	5.234	5.528	ns
		GCLK PLL	t_{co}	3.628	3.628	5.089	5.515	6.053	5.895	6.277	5.515	6.053	5.895	6.277	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.317	3.317	4.639	5.013	5.502	5.372	5.664	5.013	5.502	5.372	5.664	ns
		GCLK PLL	t_{co}	3.707	3.707	5.215	5.646	6.191	6.034	6.414	5.646	6.191	6.034	6.414	ns
	8mA	GCLK	t_{co}	3.238	3.238	4.516	4.884	5.367	5.237	5.529	4.884	5.367	5.237	5.529	ns
		GCLK PLL	t_{co}	3.628	3.628	5.091	5.517	6.056	5.899	6.279	5.517	6.056	5.899	6.279	ns
	12mA	GCLK	t_{co}	3.233	3.233	4.508	4.877	5.359	5.228	5.522	4.877	5.359	5.228	5.522	ns
		GCLK PLL	t_{co}	3.623	3.623	5.084	5.510	6.047	5.889	6.271	5.510	6.047	5.889	6.271	ns
	16mA	GCLK	t_{co}	3.224	3.224	4.494	4.862	5.344	5.213	5.507	4.862	5.344	5.213	5.507	ns
		GCLK PLL	t_{co}	3.614	3.614	5.070	5.495	6.032	5.874	6.256	5.495	6.032	5.874	6.256	ns

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
2.5 V	4mA	GCLK	t_{co}	3.439	3.439	4.846	5.240	5.749	5.619	5.912	5.240	5.749	5.619	5.912	ns
		GCLK PLL	t_{co}	3.829	3.829	5.422	5.873	6.438	6.281	6.661	5.873	6.438	6.281	6.661	ns
	8mA	GCLK	t_{co}	3.339	3.339	4.727	5.114	5.617	5.487	5.779	5.114	5.617	5.487	5.779	ns
		GCLK PLL	t_{co}	3.729	3.729	5.303	5.747	6.306	6.149	6.529	5.747	6.306	6.149	6.529	ns
	12mA	GCLK	t_{co}	3.295	3.295	4.640	5.024	5.522	5.391	5.685	5.024	5.522	5.391	5.685	ns
		GCLK PLL	t_{co}	3.685	3.685	5.216	5.656	6.210	6.052	6.434	5.656	6.210	6.052	6.434	ns
	16mA	GCLK	t_{co}	3.257	3.257	4.601	4.981	5.479	5.348	5.642	4.981	5.479	5.348	5.642	ns
		GCLK PLL	t_{co}	3.647	3.647	5.177	5.614	6.167	6.009	6.391	5.614	6.167	6.009	6.391	ns
1.8 V	2mA	GCLK	t_{co}	3.630	3.630	5.168	5.600	6.154	6.023	6.317	5.600	6.154	6.023	6.317	ns
		GCLK PLL	t_{co}	4.020	4.020	5.743	6.233	6.842	6.684	7.066	6.233	6.842	6.684	7.066	ns
	4mA	GCLK	t_{co}	3.449	3.449	4.889	5.291	5.806	5.676	5.968	5.291	5.806	5.676	5.968	ns
		GCLK PLL	t_{co}	3.839	3.839	5.464	5.924	6.495	6.338	6.718	5.924	6.495	6.338	6.718	ns
	6mA	GCLK	t_{co}	3.367	3.367	4.782	5.176	5.696	5.565	5.859	5.176	5.696	5.565	5.859	ns
		GCLK PLL	t_{co}	3.757	3.757	5.357	5.809	6.384	6.226	6.608	5.809	6.384	6.226	6.608	ns
	8mA	GCLK	t_{co}	3.347	3.347	4.723	5.123	5.630	5.499	5.793	5.123	5.630	5.499	5.793	ns
		GCLK PLL	t_{co}	3.737	3.737	5.299	5.755	6.318	6.160	6.542	5.755	6.318	6.160	6.542	ns
	10mA	GCLK	t_{co}	3.284	3.284	4.662	5.048	5.549	5.418	5.712	5.048	5.549	5.418	5.712	ns
		GCLK PLL	t_{co}	3.674	3.674	5.238	5.680	6.237	6.079	6.461	5.680	6.237	6.079	6.461	ns
	12mA	GCLK	t_{co}	3.266	3.266	4.642	5.026	5.526	5.395	5.689	5.026	5.526	5.395	5.689	ns
		GCLK PLL	t_{co}	3.656	3.656	5.217	5.659	6.214	6.056	6.438	5.659	6.214	6.056	6.438	ns

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.576	3.576	5.096	5.533	6.092	5.961	6.255	5.533	6.092	5.961	6.255	ns
		GCLK PLL	t_{co}	3.966	3.966	5.672	6.165	6.780	6.622	7.004	6.165	6.780	6.622	7.004	ns
	4mA	GCLK	t_{co}	3.364	3.364	4.777	5.176	5.700	5.569	5.863	5.176	5.700	5.569	5.863	ns
		GCLK PLL	t_{co}	3.754	3.754	5.353	5.809	6.388	6.230	6.612	5.809	6.388	6.230	6.612	ns
	6mA	GCLK	t_{co}	3.339	3.339	4.710	5.116	5.633	5.502	5.796	5.116	5.633	5.502	5.796	ns
		GCLK PLL	t_{co}	3.729	3.729	5.286	5.749	6.321	6.163	6.545	5.749	6.321	6.163	6.545	ns
	8mA	GCLK	t_{co}	3.328	3.328	4.693	5.091	5.613	5.482	5.776	5.091	5.613	5.482	5.776	ns
		GCLK PLL	t_{co}	3.718	3.718	5.269	5.724	6.301	6.143	6.525	5.724	6.301	6.143	6.525	ns
	10mA	GCLK	t_{co}	3.273	3.273	4.655	5.041	5.543	5.412	5.706	5.041	5.543	5.412	5.706	ns
		GCLK PLL	t_{co}	3.663	3.663	5.231	5.673	6.231	6.073	6.455	5.673	6.231	6.073	6.455	ns
	12mA	GCLK	t_{co}	3.268	3.268	4.639	5.029	5.532	5.401	5.695	5.029	5.532	5.401	5.695	ns
		GCLK PLL	t_{co}	3.658	3.658	5.214	5.662	6.220	6.062	6.444	5.662	6.220	6.062	6.444	ns
1.2 V	2mA	GCLK	t_{co}	3.492	3.492	5.022	5.468	6.036	5.905	6.199	5.468	6.036	5.905	6.199	ns
		GCLK PLL	t_{co}	3.882	3.882	5.598	6.101	6.724	6.566	6.948	6.101	6.724	6.566	6.948	ns
	4mA	GCLK	t_{co}	3.369	3.369	4.797	5.207	5.750	5.619	5.913	5.207	5.750	5.619	5.913	ns
		GCLK PLL	t_{co}	3.759	3.759	5.372	5.839	6.438	6.280	6.662	5.839	6.438	6.280	6.662	ns
	6mA	GCLK	t_{co}	3.331	3.331	4.704	5.117	5.637	5.506	5.800	5.117	5.637	5.506	5.800	ns
		GCLK PLL	t_{co}	3.721	3.721	5.280	5.750	6.325	6.167	6.549	5.750	6.325	6.167	6.549	ns
	8mA	GCLK	t_{co}	3.284	3.284	4.676	5.068	5.581	5.450	5.744	5.068	5.581	5.450	5.744	ns
		GCLK PLL	t_{co}	3.674	3.674	5.252	5.701	6.269	6.111	6.493	5.701	6.269	6.111	6.493	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.284	3.284	4.633	5.016	5.512	5.381	5.675	5.016	5.512	5.381	5.675	ns
		GCLK PLL	t_{co}	3.674	3.674	5.209	5.648	6.200	6.042	6.424	5.648	6.200	6.042	6.424	ns
	10mA	GCLK	t_{co}	3.281	3.281	4.630	5.012	5.508	5.377	5.671	5.012	5.508	5.377	5.671	ns
		GCLK PLL	t_{co}	3.671	3.671	5.206	5.645	6.196	6.038	6.420	5.645	6.196	6.038	6.420	ns
	12mA	GCLK	t_{co}	3.279	3.279	4.630	5.013	5.509	5.378	5.672	5.013	5.509	5.378	5.672	ns
		GCLK PLL	t_{co}	3.669	3.669	5.206	5.646	6.197	6.039	6.421	5.646	6.197	6.039	6.421	ns

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.270	3.270	4.616	4.998	5.494	5.363	5.657	4.998	5.494	5.363	5.657	ns
		GCLK PLL	t_{co}	3.660	3.660	5.191	5.630	6.182	6.024	6.406	5.630	6.182	6.024	6.406	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.291	3.291	4.645	5.030	5.528	5.397	5.691	5.030	5.528	5.397	5.691	ns
		GCLK PLL	t_{co}	3.681	3.681	5.221	5.662	6.216	6.058	6.440	5.662	6.216	6.058	6.440	ns
	6mA	GCLK	t_{co}	3.287	3.287	4.643	5.028	5.526	5.395	5.689	5.028	5.526	5.395	5.689	ns
		GCLK PLL	t_{co}	3.677	3.677	5.219	5.660	6.214	6.056	6.438	5.660	6.214	6.056	6.438	ns
	8mA	GCLK	t_{co}	3.276	3.276	4.633	5.018	5.517	5.386	5.680	5.018	5.517	5.386	5.680	ns
		GCLK PLL	t_{co}	3.666	3.666	5.209	5.651	6.205	6.047	6.429	5.651	6.205	6.047	6.429	ns
	10mA	GCLK	t_{co}	3.265	3.265	4.621	5.005	5.504	5.373	5.667	5.005	5.504	5.373	5.667	ns
		GCLK PLL	t_{co}	3.655	3.655	5.196	5.638	6.192	6.034	6.416	5.638	6.192	6.034	6.416	ns
	12mA	GCLK	t_{co}	3.265	3.265	4.620	5.005	5.504	5.373	5.667	5.005	5.504	5.373	5.667	ns
		GCLK PLL	t_{co}	3.655	3.655	5.196	5.638	6.192	6.034	6.416	5.638	6.192	6.034	6.416	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.271	3.271	4.619	5.002	5.499	5.368	5.662	5.002	5.499	5.368	5.662	ns
		GCLK PLL	t_{co}	3.661	3.661	5.195	5.635	6.187	6.029	6.411	5.635	6.187	6.029	6.411	ns
	16mA	GCLK	t_{co}	3.274	3.274	4.627	5.012	5.511	5.380	5.674	5.012	5.511	5.380	5.674	ns
		GCLK PLL	t_{co}	3.664	3.664	5.203	5.644	6.199	6.041	6.423	5.644	6.199	6.041	6.423	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.295	3.295	4.655	5.041	5.541	5.410	5.704	5.041	5.541	5.410	5.704	ns
		GCLK PLL	t_{co}	3.685	3.685	5.230	5.674	6.229	6.071	6.453	5.674	6.229	6.071	6.453	ns
	6mA	GCLK	t_{co}	3.281	3.281	4.644	5.031	5.532	5.401	5.695	5.031	5.532	5.401	5.695	ns
		GCLK PLL	t_{co}	3.671	3.671	5.220	5.664	6.220	6.062	6.444	5.664	6.220	6.062	6.444	ns
	8mA	GCLK	t_{co}	3.270	3.270	4.631	5.017	5.518	5.387	5.681	5.017	5.518	5.387	5.681	ns
		GCLK PLL	t_{co}	3.660	3.660	5.206	5.650	6.206	6.048	6.430	5.650	6.206	6.048	6.430	ns
	10mA	GCLK	t_{co}	3.269	3.269	4.634	5.021	5.522	5.391	5.685	5.021	5.522	5.391	5.685	ns
		GCLK PLL	t_{co}	3.659	3.659	5.209	5.653	6.210	6.052	6.434	5.653	6.210	6.052	6.434	ns
	12mA	GCLK	t_{co}	3.266	3.266	4.628	5.015	5.516	5.385	5.679	5.015	5.516	5.385	5.679	ns
		GCLK PLL	t_{co}	3.656	3.656	5.204	5.648	6.204	6.046	6.428	5.648	6.204	6.046	6.428	ns

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.268	3.268	4.617	5.001	5.499	5.368	5.662	5.001	5.499	5.368	5.662	ns
		GCLK PLL	t_{co}	3.658	3.658	5.193	5.634	6.187	6.029	6.411	5.634	6.187	6.029	6.411	ns
	16mA	GCLK	t_{co}	3.271	3.271	4.624	5.010	5.510	5.379	5.673	5.010	5.510	5.379	5.673	ns
		GCLK PLL	t_{co}	3.661	3.661	5.200	5.643	6.198	6.040	6.422	5.643	6.198	6.040	6.422	ns
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.278	3.278	4.619	5.001	5.497	5.366	5.660	5.001	5.497	5.366	5.660	ns
		GCLK PLL	t_{co}	3.668	3.668	5.195	5.634	6.185	6.027	6.409	5.634	6.185	6.027	6.409	ns
	6mA	GCLK	t_{co}	3.271	3.271	4.617	5.000	5.496	5.365	5.659	5.000	5.496	5.365	5.659	ns
		GCLK PLL	t_{co}	3.661	3.661	5.193	5.632	6.184	6.026	6.408	5.632	6.184	6.026	6.408	ns
	8mA	GCLK	t_{co}	3.263	3.263	4.610	4.992	5.489	5.358	5.652	4.992	5.489	5.358	5.652	ns
		GCLK PLL	t_{co}	3.653	3.653	5.185	5.625	6.177	6.019	6.401	5.625	6.177	6.019	6.401	ns
	10mA	GCLK	t_{co}	3.266	3.266	4.613	4.996	5.493	5.362	5.656	4.996	5.493	5.362	5.656	ns
		GCLK PLL	t_{co}	3.656	3.656	5.188	5.628	6.181	6.023	6.405	5.628	6.181	6.023	6.405	ns
	12mA	GCLK	t_{co}	3.263	3.263	4.615	4.999	5.497	5.366	5.660	4.999	5.497	5.366	5.660	ns
		GCLK PLL	t_{co}	3.653	3.653	5.191	5.632	6.185	6.027	6.409	5.632	6.185	6.027	6.409	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.271	3.271	4.614	4.997	5.493	5.362	5.656	4.997	5.493	5.362	5.656	ns
		GCLK PLL	t_{co}	3.661	3.661	5.190	5.629	6.181	6.023	6.405	5.629	6.181	6.023	6.405	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.283	3.283	4.628	5.011	5.508	5.377	5.671	5.011	5.508	5.377	5.671	ns
		GCLK PLL	t_{co}	3.673	3.673	5.203	5.644	6.196	6.038	6.420	5.644	6.196	6.038	6.420	ns
	6mA	GCLK	t_{co}	3.279	3.279	4.629	5.013	5.511	5.380	5.674	5.013	5.511	5.380	5.674	ns
		GCLK PLL	t_{co}	3.669	3.669	5.204	5.645	6.199	6.041	6.423	5.645	6.199	6.041	6.423	ns
	8mA	GCLK	t_{co}	3.275	3.275	4.624	5.008	5.506	5.375	5.669	5.008	5.506	5.375	5.669	ns
		GCLK PLL	t_{co}	3.665	3.665	5.200	5.641	6.194	6.036	6.418	5.641	6.194	6.036	6.418	ns
	10mA	GCLK	t_{co}	3.268	3.268	4.617	5.001	5.499	5.368	5.662	5.001	5.499	5.368	5.662	ns
		GCLK PLL	t_{co}	3.658	3.658	5.193	5.634	6.187	6.029	6.411	5.634	6.187	6.029	6.411	ns
	12mA	GCLK	t_{co}	3.269	3.269	4.624	5.009	5.509	5.378	5.672	5.009	5.509	5.378	5.672	ns
		GCLK PLL	t_{co}	3.659	3.659	5.200	5.642	6.197	6.039	6.421	5.642	6.197	6.039	6.421	ns

Table 1–63. EP3SL110 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.267	3.267	4.605	4.987	5.483	5.352	5.646	4.987	5.483	5.352	5.646	ns
		GCLK PLL	t_{co}	3.657	3.657	5.181	5.620	6.171	6.013	6.395	5.620	6.171	6.013	6.395	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.286	3.286	4.642	5.028	5.529	5.398	5.692	5.028	5.529	5.398	5.692	ns
		GCLK PLL	t_{co}	3.676	3.676	5.217	5.661	6.217	6.059	6.441	5.661	6.217	6.059	6.441	ns
	6mA	GCLK	t_{co}	3.278	3.278	4.633	5.019	5.520	5.389	5.683	5.019	5.520	5.389	5.683	ns
		GCLK PLL	t_{co}	3.668	3.668	5.208	5.652	6.208	6.050	6.432	5.652	6.208	6.050	6.432	ns
	8mA	GCLK	t_{co}	3.279	3.279	4.640	5.028	5.529	5.398	5.692	5.028	5.529	5.398	5.692	ns
		GCLK PLL	t_{co}	3.669	3.669	5.216	5.660	6.217	6.059	6.441	5.660	6.217	6.059	6.441	ns
	10mA	GCLK	t_{co}	3.268	3.268	4.627	5.014	5.515	5.384	5.678	5.014	5.515	5.384	5.678	ns
		GCLK PLL	t_{co}	3.658	3.658	5.203	5.647	6.203	6.045	6.427	5.647	6.203	6.045	6.427	ns
	12mA	GCLK	t_{co}	3.268	3.268	4.627	5.014	5.516	5.385	5.679	5.014	5.516	5.385	5.679	ns
		GCLK PLL	t_{co}	3.658	3.658	5.203	5.647	6.204	6.046	6.428	5.647	6.204	6.046	6.428	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.289	3.289	4.643	5.029	5.529	5.398	5.692	5.029	5.529	5.398	5.692	ns
		GCLK PLL	t_{co}	3.679	3.679	5.219	5.662	6.217	6.059	6.441	5.662	6.217	6.059	6.441	ns
3.0-V PCI	—	GCLK	t_{co}	3.392	3.392	4.688	5.063	5.554	5.423	5.717	5.063	5.554	5.423	5.717	ns
		GCLK PLL	t_{co}	3.782	3.782	5.264	5.696	6.242	6.084	6.466	5.696	6.242	6.084	6.466	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.392	3.392	4.688	5.063	5.554	5.423	5.717	5.063	5.554	5.423	5.717	ns
		GCLK PLL	t_{co}	3.782	3.782	5.264	5.696	6.242	6.084	6.466	5.696	6.242	6.084	6.466	ns

Table 1–64 lists the EP3SL110 row pins output timing parameters for single-ended I/O standards.

Table 1–64. EP3SL110 Row Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.182	3.481	4.833	5.216	5.678	5.579	5.814	5.256	5.802	5.703	5.896	ns
		GCLK PLL	t_{co}	1.457	1.650	2.051	2.136	2.329	2.349	2.337	2.239	2.435	2.454	2.331	ns
	8mA	GCLK	t_{co}	3.116	3.376	4.703	5.078	5.533	5.434	5.669	5.143	5.653	5.554	5.747	ns
		GCLK PLL	t_{co}	1.364	1.545	1.921	1.998	2.184	2.204	2.192	2.098	2.286	2.305	2.182	ns
	12mA	GCLK	t_{co}	3.037	3.270	4.584	4.955	5.405	5.306	5.541	5.044	5.521	5.422	5.615	ns
		GCLK PLL	t_{co}	1.265	1.439	1.802	1.875	2.056	2.076	2.064	1.971	2.154	2.173	2.050	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.184	3.485	4.841	5.221	5.682	5.583	5.818	5.264	5.806	5.707	5.900	ns
		GCLK PLL	t_{co}	1.467	1.654	2.059	2.141	2.333	2.353	2.341	2.245	2.439	2.458	2.335	ns
	8mA	GCLK	t_{co}	3.041	3.276	4.590	4.961	5.411	5.312	5.548	5.056	5.528	5.429	5.622	ns
		GCLK PLL	t_{co}	1.269	1.445	1.808	1.881	2.062	2.082	2.070	1.977	2.161	2.180	2.057	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.143	3.427	4.785	5.169	5.634	5.535	5.770	5.224	5.760	5.661	5.854	ns
		GCLK PLL	t_{co}	1.411	1.596	2.003	2.089	2.285	2.305	2.293	2.196	2.393	2.412	2.289	ns
	8mA	GCLK	t_{co}	3.042	3.300	4.632	5.010	5.470	5.371	5.606	5.082	5.596	5.496	5.689	ns
		GCLK PLL	t_{co}	1.286	1.469	1.850	1.930	2.121	2.141	2.129	2.034	2.229	2.247	2.124	ns
	12mA	GCLK	t_{co}	3.005	3.249	4.550	4.927	5.382	5.283	5.518	5.014	5.503	5.403	5.596	ns
		GCLK PLL	t_{co}	1.247	1.418	1.768	1.847	2.033	2.053	2.041	1.948	2.136	2.154	2.031	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.064	3.346	4.679	5.062	5.524	5.425	5.660	5.115	5.649	5.549	5.742	ns
		GCLK PLL	t_{co}	1.325	1.515	1.897	1.982	2.175	2.195	2.183	2.088	2.282	2.300	2.177	ns
	8mA	GCLK	t_{co}	2.992	3.227	4.515	4.888	5.343	5.244	5.479	4.984	5.463	5.363	5.556	ns
		GCLK PLL	t_{co}	1.225	1.396	1.733	1.808	1.994	2.014	2.002	1.908	2.096	2.114	1.991	ns
2.5 V	4mA	GCLK	t_{co}	3.169	3.463	4.917	5.323	5.806	5.707	5.942	5.356	5.939	5.839	6.032	ns
		GCLK PLL	t_{co}	1.437	1.632	2.135	2.243	2.457	2.477	2.465	2.356	2.572	2.590	2.467	ns
	8mA	GCLK	t_{co}	3.084	3.365	4.762	5.160	5.636	5.537	5.772	5.219	5.765	5.665	5.858	ns
		GCLK PLL	t_{co}	1.327	1.534	1.980	2.080	2.287	2.307	2.295	2.189	2.398	2.416	2.293	ns
	12mA	GCLK	t_{co}	3.027	3.288	4.651	5.041	5.510	5.411	5.646	5.130	5.635	5.535	5.728	ns
		GCLK PLL	t_{co}	1.281	1.457	1.869	1.961	2.161	2.181	2.169	2.066	2.268	2.286	2.163	ns

Table 1–64. EP3SL110 Row Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.438	3.706	5.298	5.747	6.303	6.177	6.439	5.888	6.445	6.318	6.538	ns
		GCLK PLL	t_{co}	1.670	1.879	2.521	2.672	2.932	2.952	2.937	2.793	3.056	3.075	2.949	ns
	4mA	GCLK	t_{co}	3.213	3.504	4.971	5.378	5.898	5.772	6.034	5.523	6.039	5.911	6.131	ns
		GCLK PLL	t_{co}	1.445	1.677	2.194	2.303	2.527	2.547	2.532	2.428	2.650	2.668	2.542	ns
	6mA	GCLK	t_{co}	3.148	3.402	4.818	5.228	5.739	5.613	5.875	5.355	5.866	5.739	5.959	ns
		GCLK PLL	t_{co}	1.380	1.575	2.041	2.153	2.368	2.388	2.373	2.260	2.477	2.496	2.370	ns
	8mA	GCLK	t_{co}	3.088	3.328	4.741	5.134	5.642	5.516	5.778	5.260	5.772	5.645	5.865	ns
		GCLK PLL	t_{co}	1.320	1.501	1.964	2.059	2.271	2.291	2.276	2.165	2.383	2.402	2.276	ns
1.5 V	2mA	GCLK	t_{co}	3.349	3.624	5.208	5.660	6.231	6.105	6.367	5.795	6.369	6.242	6.462	ns
		GCLK PLL	t_{co}	1.581	1.797	2.431	2.585	2.860	2.880	2.865	2.700	2.980	2.999	2.873	ns
	4mA	GCLK	t_{co}	3.107	3.366	4.803	5.223	5.740	5.614	5.876	5.349	5.865	5.738	5.958	ns
		GCLK PLL	t_{co}	1.339	1.539	2.026	2.148	2.369	2.389	2.374	2.254	2.476	2.495	2.369	ns
	6mA	GCLK	t_{co}	3.080	3.319	4.730	5.127	5.634	5.508	5.770	5.251	5.760	5.633	5.853	ns
		GCLK PLL	t_{co}	1.312	1.492	1.953	2.052	2.263	2.283	2.268	2.156	2.371	2.390	2.264	ns
	8mA	GCLK	t_{co}	3.071	3.310	4.708	5.109	5.615	5.489	5.751	5.233	5.738	5.611	5.831	ns
		GCLK PLL	t_{co}	1.303	1.483	1.931	2.034	2.244	2.264	2.249	2.138	2.349	2.368	2.242	ns
1.2 V	2mA	GCLK	t_{co}	3.292	3.549	5.118	5.574	6.156	6.030	6.292	5.707	6.285	6.158	6.378	ns
		GCLK PLL	t_{co}	1.524	1.722	2.341	2.499	2.785	2.805	2.790	2.612	2.896	2.915	2.789	ns
	4mA	GCLK	t_{co}	3.112	3.360	4.825	5.251	5.781	5.655	5.917	5.374	5.907	5.780	6.000	ns
		GCLK PLL	t_{co}	1.344	1.533	2.048	2.176	2.410	2.430	2.415	2.279	2.518	2.537	2.411	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.031	3.274	4.629	5.013	5.478	5.379	5.616	5.117	5.597	5.498	5.692	ns
		GCLK PLL	t_{co}	1.266	1.443	1.847	1.933	2.129	2.149	2.137	2.033	2.230	2.249	2.126	ns
	12mA	GCLK	t_{co}	3.026	3.262	4.621	5.005	5.476	5.371	5.614	5.116	5.596	5.491	5.691	ns
		GCLK PLL	t_{co}	1.254	1.431	1.839	1.925	2.121	2.141	2.129	2.025	2.223	2.242	2.119	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.017	3.244	4.596	4.980	5.459	5.344	5.597	5.099	5.578	5.464	5.673	ns
		GCLK PLL	t_{co}	1.238	1.413	1.814	1.900	2.094	2.114	2.102	1.999	2.196	2.215	2.092	ns

Table 1–64. EP3SL110 Row Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.049	3.284	4.636	5.022	5.516	5.390	5.652	5.141	5.635	5.508	5.728	ns
		GCLK PLL	t_{co}	1.281	1.457	1.859	1.947	2.145	2.165	2.150	2.046	2.246	2.265	2.139	ns
	6mA	GCLK	t_{co}	3.034	3.270	4.633	5.020	5.514	5.388	5.650	5.139	5.633	5.506	5.726	ns
		GCLK PLL	t_{co}	1.266	1.443	1.856	1.945	2.143	2.163	2.148	2.044	2.244	2.263	2.137	ns
	8mA	GCLK	t_{co}	3.023	3.258	4.616	5.003	5.497	5.371	5.633	5.122	5.617	5.490	5.710	ns
		GCLK PLL	t_{co}	1.255	1.431	1.839	1.928	2.126	2.146	2.131	2.027	2.228	2.247	2.121	ns
	10mA	GCLK	t_{co}	2.999	3.235	4.600	4.987	5.482	5.356	5.618	5.107	5.602	5.475	5.695	ns
		GCLK PLL	t_{co}	1.231	1.408	1.823	1.912	2.111	2.131	2.116	2.012	2.213	2.232	2.106	ns
	12mA	GCLK	t_{co}	2.999	3.234	4.599	4.986	5.481	5.355	5.617	5.106	5.601	5.474	5.694	ns
		GCLK PLL	t_{co}	1.231	1.407	1.822	1.911	2.110	2.130	2.116	2.011	2.212	2.231	2.106	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.009	3.243	4.597	4.982	5.475	5.349	5.611	5.101	5.594	5.467	5.687	ns
		GCLK PLL	t_{co}	1.241	1.416	1.820	1.907	2.104	2.124	2.111	2.006	2.205	2.224	2.100	ns
	16mA	GCLK	t_{co}	3.004	3.238	4.596	4.983	5.477	5.351	5.613	5.103	5.598	5.471	5.691	ns
		GCLK PLL	t_{co}	1.235	1.411	1.819	1.908	2.106	2.126	2.121	2.008	2.209	2.228	2.111	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.045	3.280	4.647	5.036	5.533	5.407	5.669	5.154	5.651	5.524	5.744	ns
		GCLK PLL	t_{co}	1.277	1.453	1.870	1.961	2.162	2.182	2.167	2.059	2.262	2.281	2.155	ns
	6mA	GCLK	t_{co}	3.022	3.258	4.629	5.019	5.516	5.390	5.652	5.138	5.635	5.508	5.728	ns
		GCLK PLL	t_{co}	1.254	1.431	1.852	1.944	2.145	2.165	2.150	2.043	2.246	2.265	2.139	ns
	8mA	GCLK	t_{co}	3.005	3.241	4.612	5.001	5.498	5.372	5.634	5.120	5.618	5.491	5.711	ns
		GCLK PLL	t_{co}	1.237	1.414	1.835	1.926	2.127	2.147	2.132	2.025	2.229	2.248	2.122	ns

Table 1–64. EP3SL110 Row Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.024	3.256	4.603	4.987	5.478	5.352	5.614	5.105	5.597	5.470	5.690	ns
		GCLK PLL	t_{co}	1.256	1.429	1.826	1.912	2.107	2.127	2.112	2.010	2.208	2.227	2.101	ns
	6mA	GCLK	t_{co}	3.012	3.244	4.594	4.979	5.470	5.344	5.606	5.097	5.590	5.463	5.683	ns
		GCLK PLL	t_{co}	1.244	1.417	1.817	1.904	2.099	2.119	2.108	2.002	2.201	2.220	2.097	ns
	8mA	GCLK	t_{co}	2.999	3.232	4.585	4.970	5.462	5.336	5.598	5.089	5.582	5.455	5.675	ns
		GCLK PLL	t_{co}	1.231	1.405	1.808	1.895	2.091	2.111	2.101	1.994	2.193	2.212	2.090	ns
	10mA	GCLK	t_{co}	3.001	3.234	4.588	4.973	5.465	5.339	5.601	5.092	5.585	5.458	5.678	ns
		GCLK PLL	t_{co}	1.233	1.407	1.811	1.898	2.094	2.114	2.105	1.997	2.196	2.215	2.093	ns
	12mA	GCLK	t_{co}	2.994	3.229	4.586	4.972	5.465	5.339	5.601	5.092	5.586	5.459	5.679	ns
		GCLK PLL	t_{co}	1.226	1.402	1.809	1.897	2.094	2.114	2.108	1.997	2.197	2.216	2.098	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.001	3.234	4.581	4.964	5.457	5.330	5.595	5.083	5.575	5.448	5.670	ns
		GCLK PLL	t_{co}	1.232	1.406	1.804	1.889	2.085	2.105	2.104	1.988	2.186	2.205	2.092	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.031	3.263	4.614	5.000	5.493	5.367	5.629	5.117	5.611	5.484	5.704	ns
		GCLK PLL	t_{co}	1.263	1.436	1.837	1.925	2.122	2.142	2.127	2.022	2.222	2.241	2.115	ns
	6mA	GCLK	t_{co}	3.019	3.253	4.610	4.996	5.489	5.363	5.625	5.114	5.608	5.481	5.701	ns
		GCLK PLL	t_{co}	1.251	1.426	1.833	1.921	2.118	2.138	2.123	2.019	2.219	2.238	2.112	ns
	8mA	GCLK	t_{co}	3.015	3.248	4.604	4.990	5.483	5.357	5.619	5.108	5.602	5.475	5.695	ns
		GCLK PLL	t_{co}	1.247	1.421	1.827	1.915	2.112	2.132	2.117	2.013	2.213	2.232	2.106	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.030	3.262	4.625	5.014	5.511	5.385	5.647	5.131	5.628	5.501	5.721	ns
		GCLK PLL	t_{co}	1.262	1.435	1.848	1.939	2.140	2.160	2.145	2.036	2.239	2.258	2.132	ns
	6mA	GCLK	t_{co}	3.018	3.250	4.614	5.002	5.499	5.373	5.635	5.120	5.617	5.490	5.710	ns
		GCLK PLL	t_{co}	1.250	1.423	1.837	1.927	2.128	2.148	2.133	2.025	2.228	2.247	2.121	ns
	8mA	GCLK	t_{co}	3.014	3.248	4.618	5.007	5.505	5.379	5.641	5.126	5.624	5.497	5.717	ns
		GCLK PLL	t_{co}	1.246	1.421	1.841	1.932	2.134	2.154	2.139	2.031	2.235	2.254	2.128	ns
3.0-V PCI	—	GCLK	t_{co}	3.137	3.357	4.654	5.031	5.518	5.390	5.656	5.165	5.639	5.511	5.734	ns
		GCLK PLL	t_{co}	1.351	1.526	1.872	1.951	2.138	2.158	2.146	2.051	2.242	2.261	2.138	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.137	3.357	4.654	5.031	5.518	5.390	5.656	5.165	5.639	5.511	5.734	ns
		GCLK PLL	t_{co}	1.351	1.526	1.872	1.951	2.138	2.158	2.146	2.051	2.242	2.261	2.138	ns

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Table 1–65 through Table 1–70 list the maximum I/O timing parameters for EP3SL110 devices for differential I/O standards.

Table 1–65 lists the EP3SL110 column pins input timing parameters for differential I/O standards.

Table 1–65. EP3SL110 Column Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.978	-1.006	-1.151	-1.135	-1.286	-1.233	-1.594	-1.098	-1.339	-1.193	-1.632	ns
		t_h	1.104	1.152	1.371	1.387	1.564	1.502	1.860	1.361	1.634	1.471	1.898	ns
	GCLK PLL	t_{su}	0.967	1.001	1.885	2.230	2.404	2.293	2.197	2.284	2.556	2.353	2.249	ns
		t_h	-0.707	-0.719	-1.450	-1.735	-1.855	-1.769	-1.669	-1.780	-1.984	-1.818	-1.718	ns
MINI-LVDS	GCLK	t_{su}	-0.978	-1.006	-1.151	-1.135	-1.286	-1.233	-1.594	-1.098	-1.339	-1.193	-1.632	ns
		t_h	1.104	1.152	1.371	1.387	1.564	1.502	1.860	1.361	1.634	1.471	1.898	ns
	GCLK PLL	t_{su}	0.967	1.001	1.885	2.230	2.404	2.293	2.197	2.284	2.556	2.353	2.249	ns
		t_h	-0.707	-0.719	-1.450	-1.735	-1.855	-1.769	-1.669	-1.780	-1.984	-1.818	-1.718	ns
RSDS	GCLK	t_{su}	-0.978	-1.006	-1.151	-1.135	-1.286	-1.233	-1.594	-1.098	-1.339	-1.193	-1.632	ns
		t_h	1.104	1.152	1.371	1.387	1.564	1.502	1.860	1.361	1.634	1.471	1.898	ns
	GCLK PLL	t_{su}	0.967	1.001	1.885	2.230	2.404	2.293	2.197	2.284	2.556	2.353	2.249	ns
		t_h	-0.707	-0.719	-1.450	-1.735	-1.855	-1.769	-1.669	-1.780	-1.984	-1.818	-1.718	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.794	-0.829	-1.228	-1.334	-1.445	-1.387	-1.743	-1.333	-1.443	-1.391	-1.786	ns
		t_h	0.913	0.967	1.416	1.546	1.677	1.610	1.964	1.554	1.684	1.621	2.007	ns
	GCLK PLL	t_{su}	1.151	1.178	1.808	2.031	2.245	2.139	2.048	2.049	2.266	2.155	2.095	ns
		t_h	-0.898	-0.904	-1.405	-1.576	-1.742	-1.661	-1.565	-1.587	-1.753	-1.668	-1.609	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.794	-0.829	-1.228	-1.334	-1.445	-1.387	-1.743	-1.333	-1.443	-1.391	-1.786	ns
		t_h	0.913	0.967	1.416	1.546	1.677	1.610	1.964	1.554	1.684	1.621	2.007	ns
	GCLK PLL	t_{su}	1.151	1.178	1.808	2.031	2.245	2.139	2.048	2.049	2.266	2.155	2.095	ns
		t_h	-0.898	-0.904	-1.405	-1.576	-1.742	-1.661	-1.565	-1.587	-1.753	-1.668	-1.609	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns

Table 1–65. EP3SL110 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.821	-0.858	-1.259	-1.361	-1.480	-1.424	-1.777	-1.359	-1.471	-1.422	-1.815	ns
		t_h	0.940	0.996	1.449	1.576	1.715	1.648	2.003	1.583	1.717	1.653	2.041	ns
	GCLK PLL	t_{su}	1.124	1.149	1.777	2.004	2.210	2.102	2.014	2.023	2.238	2.124	2.066	ns
		t_h	-0.871	-0.875	-1.372	-1.546	-1.704	-1.623	-1.526	-1.558	-1.720	-1.636	-1.575	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.821	-0.858	-1.259	-1.361	-1.480	-1.424	-1.777	-1.359	-1.471	-1.422	-1.815	ns
		t_h	0.940	0.996	1.449	1.576	1.715	1.648	2.003	1.583	1.717	1.653	2.041	ns
	GCLK PLL	t_{su}	1.124	1.149	1.777	2.004	2.210	2.102	2.014	2.023	2.238	2.124	2.066	ns
		t_h	-0.871	-0.875	-1.372	-1.546	-1.704	-1.623	-1.526	-1.558	-1.720	-1.636	-1.575	ns

Table 1–66 lists the EP3SL110 parameters for differential I/O standards.

Table 1–66. EP3SL110 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.919	-0.950	-1.021	-0.981	-1.115	-1.070	-1.404	-0.940	-1.066	-1.023	-1.442	ns
		t_h	1.043	1.092	1.245	1.237	1.395	1.339	1.672	1.207	1.358	1.303	1.711	ns
	GCLK PLL	t_{su}	0.959	0.987	1.949	2.324	2.527	2.403	2.334	2.384	2.597	2.470	2.387	ns
		t_h	-0.698	-0.708	-1.513	-1.828	-1.977	-1.881	-1.804	-1.875	-2.032	-1.933	-1.853	ns

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Table 1–66. EP3SL110 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
MINI-LVDS	GCLK	t_{su}	-0.919	-0.950	-1.021	-0.981	-1.115	-1.070	-1.404	-0.940	-1.066	-1.023	-1.442	ns
		t_h	1.043	1.092	1.245	1.237	1.395	1.339	1.672	1.207	1.358	1.303	1.711	ns
	GCLK PLL	t_{su}	0.959	0.987	1.949	2.324	2.527	2.403	2.334	2.384	2.597	2.470	2.387	ns
		t_h	-0.698	-0.708	-1.513	-1.828	-1.977	-1.881	-1.804	-1.875	-2.032	-1.933	-1.853	ns
RSDS	GCLK	t_{su}	-0.919	-0.950	-1.021	-0.981	-1.115	-1.070	-1.404	-0.940	-1.066	-1.023	-1.442	ns
		t_h	1.043	1.092	1.245	1.237	1.395	1.339	1.672	1.207	1.358	1.303	1.711	ns
	GCLK PLL	t_{su}	0.959	0.987	1.949	2.324	2.527	2.403	2.334	2.384	2.597	2.470	2.387	ns
		t_h	-0.698	-0.708	-1.513	-1.828	-1.977	-1.881	-1.804	-1.875	-2.032	-1.933	-1.853	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.724	-0.765	-1.113	-1.210	-1.304	-1.254	-1.583	-1.211	-1.303	-1.255	-1.626	ns
		t_h	0.841	0.898	1.302	1.420	1.535	1.474	1.802	1.429	1.543	1.483	1.846	ns
	GCLK PLL	t_{su}	1.154	1.172	1.862	2.100	2.338	2.219	2.155	2.117	2.360	2.238	2.203	ns
		t_h	-0.900	-0.902	-1.458	-1.649	-1.837	-1.746	-1.674	-1.657	-1.847	-1.753	-1.718	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.724	-0.765	-1.113	-1.210	-1.304	-1.254	-1.583	-1.211	-1.303	-1.255	-1.626	ns
		t_h	0.841	0.898	1.302	1.420	1.535	1.474	1.802	1.429	1.543	1.483	1.846	ns
	GCLK PLL	t_{su}	1.154	1.172	1.862	2.100	2.338	2.219	2.155	2.117	2.360	2.238	2.203	ns
		t_h	-0.900	-0.902	-1.458	-1.649	-1.837	-1.746	-1.674	-1.657	-1.847	-1.753	-1.718	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns

Table 1–66. EP3SL110 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.756	-0.798	-1.145	-1.241	-1.345	-1.296	-1.623	-1.238	-1.337	-1.291	-1.661	ns
		t_h	0.873	0.931	1.336	1.454	1.579	1.518	1.847	1.459	1.582	1.521	1.886	ns
	GCLK PLL	t_{su}	1.122	1.139	1.825	2.064	2.293	2.173	2.110	2.086	2.321	2.197	2.163	ns
		t_h	-0.868	-0.869	-1.422	-1.611	-1.789	-1.698	-1.625	-1.623	-1.805	-1.711	-1.674	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.756	-0.798	-1.145	-1.241	-1.345	-1.296	-1.623	-1.238	-1.337	-1.291	-1.661	ns
		t_h	0.873	0.931	1.336	1.454	1.579	1.518	1.847	1.459	1.582	1.521	1.886	ns
	GCLK PLL	t_{su}	1.122	1.139	1.825	2.064	2.293	2.173	2.110	2.086	2.321	2.197	2.163	ns
		t_h	-0.868	-0.869	-1.422	-1.611	-1.789	-1.698	-1.625	-1.623	-1.805	-1.711	-1.674	ns

Table 1–67 lists the EP3SL110 column pins output timing parameters for differential I/O standards.

Table 1–67. EP3SL110 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.100	3.330	4.687	5.079	5.586	5.447	5.731	5.200	5.706	5.570	5.803	ns
		GCLK PLL	t_{co}	1.308	1.480	1.885	1.978	2.188	2.199	2.226	2.081	2.293	2.303	2.211	ns
LVDS_E_3R	—	GCLK	t_{co}	3.096	3.333	4.734	5.134	5.648	5.509	5.793	5.259	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.304	1.483	1.932	2.033	2.250	2.261	2.288	2.140	2.359	2.369	2.277	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.100	3.330	4.687	5.079	5.586	5.447	5.731	5.200	5.706	5.570	5.803	ns
		GCLK PLL	t_{co}	1.308	1.480	1.885	1.978	2.188	2.199	2.226	2.081	2.293	2.303	2.211	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.096	3.333	4.734	5.134	5.648	5.509	5.793	5.259	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.304	1.483	1.932	2.033	2.250	2.261	2.288	2.140	2.359	2.369	2.277	ns

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Table 1–67. EP3SL110 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RSDS_E_1R	—	GCLK	t_{co}	3.100	3.330	4.687	5.079	5.586	5.447	5.731	5.200	5.706	5.570	5.803	ns
		GCLK PLL	t_{co}	1.308	1.480	1.885	1.978	2.188	2.199	2.226	2.081	2.293	2.303	2.211	ns
RSDS_E_3R	—	GCLK	t_{co}	3.096	3.333	4.734	5.134	5.648	5.509	5.793	5.259	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.304	1.483	1.932	2.033	2.250	2.261	2.288	2.140	2.359	2.369	2.277	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.127	3.363	4.758	5.157	5.670	5.531	5.815	5.280	5.792	5.656	5.889	ns
		GCLK PLL	t_{co}	1.335	1.513	1.956	2.056	2.272	2.283	2.310	2.161	2.379	2.389	2.297	ns
	6mA	GCLK	t_{co}	3.117	3.353	4.748	5.146	5.660	5.521	5.805	5.269	5.782	5.646	5.879	ns
		GCLK PLL	t_{co}	1.325	1.503	1.946	2.045	2.262	2.273	2.300	2.150	2.369	2.379	2.287	ns
	8mA	GCLK	t_{co}	3.117	3.353	4.751	5.150	5.664	5.525	5.809	5.274	5.787	5.651	5.884	ns
		GCLK PLL	t_{co}	1.325	1.503	1.949	2.049	2.266	2.277	2.304	2.155	2.374	2.384	2.292	ns
	10mA	GCLK	t_{co}	3.110	3.347	4.744	5.144	5.658	5.519	5.803	5.267	5.781	5.645	5.878	ns
		GCLK PLL	t_{co}	1.318	1.497	1.942	2.043	2.260	2.271	2.298	2.148	2.368	2.378	2.286	ns
	12mA	GCLK	t_{co}	3.109	3.345	4.741	5.141	5.655	5.516	5.800	5.264	5.777	5.641	5.874	ns
		GCLK PLL	t_{co}	1.317	1.495	1.939	2.040	2.257	2.268	2.295	2.145	2.364	2.374	2.282	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.131	3.367	4.762	5.161	5.674	5.535	5.819	5.284	5.797	5.661	5.894	ns
		GCLK PLL	t_{co}	1.339	1.517	1.960	2.060	2.276	2.287	2.314	2.165	2.384	2.394	2.302	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.121	3.356	4.741	5.138	5.649	5.510	5.794	5.260	5.770	5.634	5.867	ns
		GCLK PLL	t_{co}	1.329	1.506	1.939	2.037	2.251	2.262	2.289	2.141	2.357	2.367	2.275	ns
	6mA	GCLK	t_{co}	3.116	3.352	4.741	5.138	5.650	5.511	5.795	5.261	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.324	1.502	1.939	2.037	2.252	2.263	2.290	2.142	2.359	2.369	2.277	ns
	8mA	GCLK	t_{co}	3.114	3.350	4.740	5.137	5.648	5.509	5.793	5.260	5.771	5.635	5.868	ns
		GCLK PLL	t_{co}	1.322	1.500	1.938	2.036	2.250	2.261	2.288	2.141	2.358	2.368	2.276	ns
	10mA	GCLK	t_{co}	3.106	3.341	4.730	5.127	5.639	5.500	5.784	5.250	5.761	5.625	5.858	ns
		GCLK PLL	t_{co}	1.314	1.491	1.928	2.026	2.241	2.252	2.279	2.131	2.348	2.358	2.266	ns
	12mA	GCLK	t_{co}	3.107	3.343	4.736	5.134	5.647	5.508	5.792	5.258	5.770	5.634	5.867	ns
		GCLK PLL	t_{co}	1.315	1.493	1.934	2.033	2.249	2.260	2.287	2.139	2.357	2.367	2.275	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.340	4.719	5.115	5.625	5.486	5.770	5.237	5.746	5.610	5.843	ns
		GCLK PLL	t_{co}	1.314	1.490	1.917	2.014	2.227	2.238	2.265	2.118	2.333	2.343	2.251	ns

Table 1–67. EP3SL110 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.118	3.353	4.737	5.133	5.643	5.504	5.788	5.256	5.765	5.629	5.862	ns
		GCLK PLL	t_{co}	1.326	1.503	1.935	2.032	2.245	2.256	2.283	2.137	2.352	2.362	2.270	ns
	6mA	GCLK	t_{co}	3.114	3.350	4.738	5.135	5.647	5.508	5.792	5.258	5.769	5.633	5.866	ns
		GCLK PLL	t_{co}	1.322	1.500	1.936	2.034	2.249	2.260	2.287	2.139	2.356	2.366	2.274	ns
	8mA	GCLK	t_{co}	3.104	3.339	4.727	5.124	5.635	5.496	5.780	5.247	5.757	5.621	5.854	ns
		GCLK PLL	t_{co}	1.312	1.489	1.925	2.023	2.237	2.248	2.275	2.128	2.344	2.354	2.262	ns
	10mA	GCLK	t_{co}	3.102	3.337	4.725	5.121	5.633	5.494	5.778	5.245	5.755	5.619	5.852	ns
		GCLK PLL	t_{co}	1.310	1.487	1.923	2.020	2.235	2.246	2.273	2.126	2.342	2.352	2.260	ns
	12mA	GCLK	t_{co}	3.102	3.338	4.728	5.126	5.638	5.499	5.783	5.249	5.761	5.625	5.858	ns
		GCLK PLL	t_{co}	1.310	1.488	1.926	2.025	2.240	2.251	2.278	2.130	2.348	2.358	2.266	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.341	4.725	5.121	5.632	5.493	5.777	5.244	5.754	5.618	5.851	ns
		GCLK PLL	t_{co}	1.314	1.491	1.923	2.020	2.234	2.245	2.272	2.125	2.341	2.351	2.259	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.132	3.370	4.770	5.169	5.682	5.543	5.827	5.292	5.804	5.668	5.901	ns
		GCLK PLL	t_{co}	1.340	1.520	1.968	2.068	2.284	2.295	2.322	2.173	2.391	2.401	2.309	ns
	6mA	GCLK	t_{co}	3.118	3.356	4.758	5.158	5.672	5.533	5.817	5.282	5.795	5.659	5.892	ns
		GCLK PLL	t_{co}	1.326	1.506	1.956	2.057	2.274	2.285	2.312	2.163	2.382	2.392	2.300	ns
	8mA	GCLK	t_{co}	3.106	3.343	4.741	5.140	5.654	5.515	5.799	5.264	5.777	5.641	5.874	ns
		GCLK PLL	t_{co}	1.314	1.493	1.939	2.039	2.256	2.267	2.294	2.145	2.364	2.374	2.282	ns
	10mA	GCLK	t_{co}	3.106	3.343	4.744	5.144	5.658	5.519	5.803	5.268	5.782	5.646	5.879	ns
		GCLK PLL	t_{co}	1.314	1.493	1.942	2.043	2.260	2.271	2.298	2.149	2.369	2.379	2.287	ns
	12mA	GCLK	t_{co}	3.102	3.339	4.737	5.136	5.651	5.512	5.796	5.261	5.774	5.638	5.871	ns
		GCLK PLL	t_{co}	1.310	1.489	1.935	2.035	2.253	2.264	2.291	2.142	2.361	2.371	2.279	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.106	3.341	4.730	5.127	5.639	5.500	5.784	5.250	5.761	5.625	5.858	ns
		GCLK PLL	t_{co}	1.314	1.491	1.928	2.026	2.241	2.252	2.279	2.131	2.348	2.358	2.266	ns
	16mA	GCLK	t_{co}	3.107	3.343	4.738	5.137	5.650	5.511	5.795	5.260	5.773	5.637	5.870	ns
		GCLK PLL	t_{co}	1.315	1.493	1.936	2.036	2.252	2.263	2.290	2.141	2.360	2.370	2.278	ns

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Table 1–67. EP3SL110 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.135	3.373	4.769	5.167	5.680	5.541	5.825	5.291	5.802	5.666	5.899	ns
		GCLK PLL	t_{co}	1.343	1.523	1.967	2.066	2.282	2.293	2.320	2.172	2.389	2.399	2.307	ns
	6mA	GCLK	t_{co}	3.124	3.361	4.757	5.155	5.668	5.529	5.813	5.279	5.790	5.654	5.887	ns
		GCLK PLL	t_{co}	1.332	1.511	1.955	2.054	2.270	2.281	2.308	2.160	2.377	2.387	2.295	ns
	8mA	GCLK	t_{co}	3.119	3.357	4.757	5.156	5.669	5.530	5.814	5.280	5.792	5.656	5.889	ns
		GCLK PLL	t_{co}	1.327	1.507	1.955	2.055	2.271	2.282	2.309	2.161	2.379	2.389	2.297	ns
	10mA	GCLK	t_{co}	3.105	3.342	4.739	5.137	5.650	5.511	5.795	5.261	5.774	5.638	5.871	ns
		GCLK PLL	t_{co}	1.313	1.492	1.937	2.036	2.252	2.263	2.290	2.142	2.361	2.371	2.279	ns
	12mA	GCLK	t_{co}	3.103	3.340	4.737	5.135	5.648	5.509	5.793	5.259	5.771	5.635	5.868	ns
		GCLK PLL	t_{co}	1.311	1.490	1.935	2.034	2.250	2.261	2.288	2.140	2.358	2.368	2.276	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.107	3.342	4.729	5.125	5.636	5.497	5.781	5.248	5.758	5.622	5.855	ns
		GCLK PLL	t_{co}	1.315	1.492	1.927	2.024	2.238	2.249	2.276	2.129	2.345	2.355	2.263	ns
	16mA	GCLK	t_{co}	3.107	3.343	4.737	5.135	5.648	5.509	5.793	5.259	5.771	5.635	5.868	ns
		GCLK PLL	t_{co}	1.315	1.493	1.935	2.034	2.250	2.261	2.288	2.140	2.358	2.368	2.276	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.123	3.360	4.753	5.150	5.662	5.523	5.807	5.274	5.784	5.648	5.881	ns
		GCLK PLL	t_{co}	1.331	1.510	1.951	2.049	2.264	2.275	2.302	2.155	2.371	2.381	2.289	ns
	10mA	GCLK	t_{co}	3.123	3.360	4.753	5.150	5.662	5.523	5.807	5.274	5.784	5.648	5.881	ns
		GCLK PLL	t_{co}	1.331	1.510	1.951	2.049	2.264	2.275	2.302	2.155	2.371	2.381	2.289	ns
	12mA	GCLK	t_{co}	3.113	3.350	4.743	5.140	5.652	5.513	5.797	5.264	5.775	5.639	5.872	ns
		GCLK PLL	t_{co}	1.321	1.500	1.941	2.039	2.254	2.265	2.292	2.145	2.362	2.372	2.280	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.342	4.729	5.125	5.636	5.497	5.781	5.248	5.758	5.622	5.855	ns
		GCLK PLL	t_{co}	1.314	1.492	1.927	2.024	2.238	2.249	2.276	2.129	2.345	2.355	2.263	ns

Table 1–68 lists the EP3SL110 row pins output timing parameters for differential I/O standards.

Table 1–68. EP3SL110 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.711	2.894	4.033	4.387	4.843	4.717	4.978	4.486	4.943	4.816	5.035	ns
		GCLK PLL	t_{co}	0.934	1.059	1.248	1.300	1.459	1.480	1.491	1.379	1.542	1.561	1.459	ns
LVDS_E_1R	—	GCLK	t_{co}	3.106	3.342	4.709	5.107	5.611	5.475	5.730	5.229	5.736	5.599	5.802	ns
		GCLK PLL	t_{co}	1.326	1.503	1.919	2.016	2.222	2.235	2.238	2.120	2.330	2.340	2.222	ns
LVDS_E_3R	—	GCLK	t_{co}	3.088	3.332	4.747	5.153	5.665	5.529	5.784	5.280	5.797	5.660	5.863	ns
		GCLK PLL	t_{co}	1.308	1.493	1.957	2.062	2.276	2.289	2.292	2.171	2.391	2.401	2.283	ns
MINI-LVDS	—	GCLK	t_{co}	2.711	2.894	4.033	4.387	4.843	4.717	4.978	4.486	4.943	4.816	5.035	ns
		GCLK PLL	t_{co}	0.934	1.059	1.248	1.300	1.459	1.480	1.491	1.379	1.542	1.561	1.459	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.106	3.342	4.709	5.107	5.611	5.475	5.730	5.229	5.736	5.599	5.802	ns
		GCLK PLL	t_{co}	1.326	1.503	1.919	2.016	2.222	2.235	2.238	2.120	2.330	2.340	2.222	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.088	3.332	4.747	5.153	5.665	5.529	5.784	5.280	5.797	5.660	5.863	ns
		GCLK PLL	t_{co}	1.308	1.493	1.957	2.062	2.276	2.289	2.292	2.171	2.391	2.401	2.283	ns
RSDS	—	GCLK	t_{co}	2.711	2.894	4.033	4.387	4.843	4.717	4.978	4.486	4.943	4.816	5.035	ns
		GCLK PLL	t_{co}	0.934	1.059	1.248	1.300	1.459	1.480	1.491	1.379	1.542	1.561	1.459	ns
RSDS_E_1R	—	GCLK	t_{co}	3.106	3.342	4.709	5.107	5.611	5.475	5.730	5.229	5.736	5.599	5.802	ns
		GCLK PLL	t_{co}	1.326	1.503	1.919	2.016	2.222	2.235	2.238	2.120	2.330	2.340	2.222	ns
RSDS_E_3R	—	GCLK	t_{co}	3.088	3.332	4.747	5.153	5.665	5.529	5.784	5.280	5.797	5.660	5.863	ns
		GCLK PLL	t_{co}	1.308	1.493	1.957	2.062	2.276	2.289	2.292	2.171	2.391	2.401	2.283	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.132	3.375	4.783	5.187	5.698	5.562	5.817	5.313	5.826	5.689	5.892	ns
		GCLK PLL	t_{co}	1.352	1.536	1.993	2.096	2.309	2.322	2.325	2.204	2.420	2.430	2.312	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	6mA	GCLK	t_{co}	3.118	3.361	4.770	5.174	5.685	5.549	5.804	5.299	5.813	5.676	5.879	ns
		GCLK PLL	t_{co}	1.338	1.522	1.980	2.083	2.296	2.309	2.312	2.190	2.407	2.417	2.299	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	8mA	GCLK	t_{co}	3.114	3.357	4.768	5.174	5.686	5.550	5.805	5.299	5.815	5.678	5.881	ns
		GCLK PLL	t_{co}	1.334	1.518	1.978	2.083	2.297	2.310	2.313	2.190	2.409	2.419	2.301	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.130	3.372	4.769	5.171	5.680	5.544	5.799	5.296	5.808	5.671	5.874	ns
		GCLK PLL	t_{co}	1.350	1.533	1.979	2.080	2.291	2.304	2.307	2.187	2.402	2.412	2.294	ns

Table 1–68. EP3SL110 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	6mA	GCLK	t_{co}	3.119	3.362	4.765	5.167	5.677	5.541	5.796	5.293	5.805	5.668	5.871	ns
		GCLK PLL	t_{co}	1.339	1.523	1.975	2.076	2.288	2.301	2.304	2.184	2.399	2.409	2.291	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	8mA	GCLK	t_{co}	3.116	3.359	4.763	5.165	5.675	5.539	5.794	5.291	5.804	5.667	5.870	ns
		GCLK PLL	t_{co}	1.336	1.520	1.973	2.074	2.286	2.299	2.302	2.182	2.398	2.408	2.290	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.127	3.369	4.764	5.166	5.674	5.538	5.793	5.291	5.802	5.665	5.868	ns
		GCLK PLL	t_{co}	1.347	1.530	1.974	2.075	2.285	2.298	2.301	2.182	2.396	2.406	2.288	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	6mA	GCLK	t_{co}	3.117	3.360	4.762	5.164	5.673	5.537	5.792	5.290	5.802	5.665	5.868	ns
		GCLK PLL	t_{co}	1.337	1.521	1.972	2.073	2.284	2.297	2.300	2.181	2.396	2.406	2.288	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	8mA	GCLK	t_{co}	3.103	3.346	4.747	5.149	5.659	5.523	5.778	5.275	5.787	5.650	5.853	ns
		GCLK PLL	t_{co}	1.323	1.507	1.957	2.058	2.270	2.283	2.286	2.166	2.381	2.391	2.273	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	10mA	GCLK	t_{co}	3.100	3.342	4.743	5.145	5.655	5.519	5.774	5.271	5.783	5.646	5.849	ns
		GCLK PLL	t_{co}	1.320	1.503	1.953	2.054	2.266	2.279	2.282	2.162	2.377	2.387	2.269	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	12mA	GCLK	t_{co}	3.097	3.340	4.744	5.148	5.658	5.522	5.777	5.274	5.787	5.650	5.853	ns
		GCLK PLL	t_{co}	1.317	1.501	1.954	2.057	2.269	2.282	2.285	2.165	2.381	2.391	2.273	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.098	3.340	4.734	5.136	5.645	5.509	5.764	5.261	5.773	5.636	5.839	ns
		GCLK PLL	t_{co}	1.318	1.501	1.944	2.045	2.256	2.269	2.272	2.152	2.367	2.377	2.259	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.147	3.393	4.805	5.209	5.721	5.585	5.840	5.335	5.849	5.712	5.915	ns
		GCLK PLL	t_{co}	1.367	1.554	2.015	2.118	2.332	2.345	2.348	2.226	2.443	2.453	2.335	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	6mA	GCLK	t_{co}	3.123	3.369	4.787	5.192	5.704	5.568	5.823	5.318	5.834	5.697	5.900	ns
		GCLK PLL	t_{co}	1.343	1.530	1.997	2.101	2.315	2.328	2.331	2.209	2.428	2.438	2.320	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.106	3.350	4.765	5.170	5.682	5.546	5.801	5.296	5.812	5.675	5.878	ns
		GCLK PLL	t_{co}	1.326	1.511	1.975	2.079	2.293	2.306	2.309	2.187	2.406	2.416	2.298	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.151	3.396	4.805	5.209	5.720	5.584	5.839	5.335	5.849	5.712	5.915	ns
		GCLK PLL	t_{co}	1.371	1.557	2.015	2.118	2.331	2.344	2.347	2.226	2.443	2.453	2.335	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	6mA	GCLK	t_{co}	3.136	3.381	4.791	5.194	5.705	5.569	5.824	5.320	5.834	5.697	5.900	ns
		GCLK PLL	t_{co}	1.356	1.542	2.001	2.103	2.316	2.329	2.332	2.211	2.428	2.438	2.320	ns

Table 1–68. EP3SL110 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	8mA	GCLK	t_{co}	3.125	3.370	4.786	5.191	5.702	5.566	5.821	5.317	5.832	5.695	5.898	ns
		GCLK PLL	t_{co}	1.345	1.531	1.996	2.100	2.313	2.326	2.329	2.208	2.426	2.436	2.318	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	10mA	GCLK	t_{co}	3.105	3.350	4.763	5.167	5.679	5.543	5.798	5.294	5.808	5.671	5.874	ns
		GCLK PLL	t_{co}	1.325	1.511	1.973	2.076	2.290	2.303	2.306	2.185	2.402	2.412	2.294	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	12mA	GCLK	t_{co}	3.102	3.346	4.759	5.164	5.675	5.539	5.794	5.290	5.805	5.668	5.871	ns
		GCLK PLL	t_{co}	1.322	1.507	1.969	2.073	2.286	2.299	2.302	2.181	2.399	2.409	2.291	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.107	3.350	4.750	5.152	5.661	5.525	5.780	5.277	5.789	5.652	5.855	ns
		GCLK PLL	t_{co}	1.327	1.511	1.960	2.061	2.272	2.285	2.288	2.168	2.383	2.393	2.275	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	16mA	GCLK	t_{co}	3.100	3.343	4.749	5.153	5.664	5.528	5.783	5.280	5.794	5.657	5.860	ns
		GCLK PLL	t_{co}	1.320	1.504	1.959	2.062	2.275	2.288	2.291	2.171	2.388	2.398	2.280	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.138	3.382	4.787	5.190	5.700	5.564	5.819	5.316	5.829	5.692	5.895	ns
		GCLK PLL	t_{co}	1.358	1.543	1.997	2.099	2.311	2.324	2.327	2.207	2.423	2.433	2.315	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	12mA	GCLK	t_{co}	3.120	3.365	4.772	5.175	5.685	5.549	5.804	5.301	5.814	5.677	5.880	ns
		GCLK PLL	t_{co}	1.340	1.526	1.982	2.084	2.296	2.309	2.312	2.192	2.408	2.418	2.300	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.349	4.749	5.151	5.660	5.524	5.779	5.277	5.789	5.652	5.855	ns
		GCLK PLL	t_{co}	1.326	1.510	1.959	2.060	2.271	2.284	2.287	2.168	2.383	2.393	2.275	ns

Table 1–69 and Table 1–70 list the EP3SL110 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–69 lists the EP3SL110 column pin delay adders when using the regional clock.

Table 1–69. EP3SL110 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.186	0.171	0.245	0.255	0.268	0.261	0.393	0.248	0.277	0.267	0.364	ns
RCLK PLL input adder	2.391	2.371	3.577	4.036	4.418	4.225	4.574	4.044	4.442	4.246	4.635	ns
RCLK output adder	-0.374	-0.162	-0.226	-0.233	-0.244	-0.239	-0.367	-0.111	-0.123	-0.116	-0.296	ns
RCLK PLL output adder	-2.001	-1.786	-2.669	-2.844	-2.996	-2.879	-2.722	-2.699	-3.067	-2.798	-2.773	ns

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Table 1–70 lists the EP3SL110 row pin delay adders when using the regional clock.

Table 1–70. EP3SL110 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.086	0.109	0.158	0.16	0.161	0.159	0.281	0.137	0.153	0.153	0.285	ns
RCLK PLL input adder	0.075	0.075	0.117	0.123	0.129	0.125	0.222	0.113	0.118	0.114	0.226	ns
RCLK output adder	-0.072	-0.097	-0.137	-0.135	-0.116	-0.134	-0.24	-0.11	-0.104	-0.124	-0.244	ns
RCLK PLL output adder	-0.063	-0.065	-0.097	-0.1	-0.104	-0.101	-0.198	-0.088	-0.09	-0.088	-0.201	ns

EP3SL150 I/O Timing Parameters

Table 1–71 through Table 1–74 list the maximum I/O timing parameters for EP3SL150 devices for single-ended I/O standards.

Table 1–71 lists the EP3SL150 column pins input timing parameters for single-ended I/O standards.

Table 1–71. EP3SL150 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.986	-0.964	-1.402	-1.558	-1.797	-1.778	-2.106	-1.558	-1.797	-1.778	-2.106	ns
		t_h	1.119	1.093	1.584	1.767	2.027	1.996	2.327	1.767	2.027	1.996	2.327	ns
	GCLK PLL	t_{su}	-1.278	-1.221	-1.771	-1.984	-2.197	-2.123	-2.542	-1.984	-2.197	-2.123	-2.542	ns
		t_h	1.556	1.499	2.175	2.439	2.697	2.598	3.034	2.439	2.697	2.598	3.034	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.986	-0.964	-1.402	-1.558	-1.797	-1.778	-2.106	-1.558	-1.797	-1.778	-2.106	ns
		t_h	1.119	1.093	1.584	1.767	2.027	1.996	2.327	1.767	2.027	1.996	2.327	ns
	GCLK PLL	t_{su}	-1.278	-1.221	-1.771	-1.984	-2.197	-2.123	-2.542	-1.984	-2.197	-2.123	-2.542	ns
		t_h	1.556	1.499	2.175	2.439	2.697	2.598	3.034	2.439	2.697	2.598	3.034	ns
3.0-V LVTTL	GCLK	t_{su}	-0.997	-0.975	-1.401	-1.560	-1.796	-1.777	-2.105	-1.560	-1.796	-1.777	-2.105	ns
		t_h	1.130	1.104	1.583	1.769	2.026	1.995	2.326	1.769	2.026	1.995	2.326	ns
	GCLK PLL	t_{su}	-1.289	-1.232	-1.770	-1.986	-2.196	-2.122	-2.541	-1.986	-2.196	-2.122	-2.541	ns
		t_h	1.567	1.510	2.174	2.441	2.696	2.597	3.033	2.441	2.696	2.597	3.033	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.997	-0.975	-1.401	-1.560	-1.796	-1.777	-2.105	-1.560	-1.796	-1.777	-2.105	ns
		t_h	1.130	1.104	1.583	1.769	2.026	1.995	2.326	1.769	2.026	1.995	2.326	ns
	GCLK PLL	t_{su}	-1.289	-1.232	-1.770	-1.986	-2.196	-2.122	-2.541	-1.986	-2.196	-2.122	-2.541	ns
		t_h	1.567	1.510	2.174	2.441	2.696	2.597	3.033	2.441	2.696	2.597	3.033	ns
2.5 V	GCLK	t_{su}	-0.992	-0.970	-1.410	-1.572	-1.815	-1.796	-2.124	-1.572	-1.815	-1.796	-2.124	ns
		t_h	1.125	1.099	1.592	1.781	2.045	2.014	2.345	1.781	2.045	2.014	2.345	ns
	GCLK PLL	t_{su}	-1.284	-1.227	-1.779	-1.998	-2.215	-2.141	-2.560	-1.998	-2.215	-2.141	-2.560	ns
		t_h	1.562	1.505	2.183	2.453	2.715	2.616	3.052	2.453	2.715	2.616	3.052	ns

Table 1–71. EP3SL150 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	GCLK	t_{su}	-1.014	-0.992	-1.450	-1.608	-1.813	-1.794	-2.122	-1.608	-1.813	-1.794	-2.122	ns
		t_h	1.149	1.123	1.632	1.817	2.043	2.012	2.343	1.817	2.043	2.012	2.343	ns
	GCLK PLL	t_{su}	-1.306	-1.249	-1.819	-2.034	-2.213	-2.139	-2.558	-2.034	-2.213	-2.139	-2.558	ns
		t_h	1.586	1.529	2.223	2.489	2.713	2.614	3.050	2.489	2.713	2.614	3.050	ns
1.5 V	GCLK	t_{su}	-1.004	-0.982	-1.427	-1.576	-1.743	-1.724	-2.052	-1.576	-1.743	-1.724	-2.052	ns
		t_h	1.139	1.113	1.609	1.785	1.973	1.942	2.273	1.785	1.973	1.942	2.273	ns
	GCLK PLL	t_{su}	-1.296	-1.239	-1.796	-2.002	-2.143	-2.069	-2.488	-2.002	-2.143	-2.069	-2.488	ns
		t_h	1.576	1.519	2.200	2.457	2.643	2.544	2.980	2.457	2.643	2.544	2.980	ns
1.2 V	GCLK	t_{su}	-0.952	-0.930	-1.350	-1.477	-1.587	-1.568	-1.896	-1.477	-1.587	-1.568	-1.896	ns
		t_h	1.087	1.061	1.532	1.686	1.817	1.786	2.117	1.686	1.817	1.786	2.117	ns
	GCLK PLL	t_{su}	-1.244	-1.187	-1.719	-1.903	-1.987	-1.913	-2.332	-1.903	-1.987	-1.913	-2.332	ns
		t_h	1.524	1.467	2.123	2.358	2.487	2.388	2.824	2.358	2.487	2.388	2.824	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.923	-0.901	-1.322	-1.461	-1.589	-1.570	-1.898	-1.461	-1.589	-1.570	-1.898	ns
		t_h	1.058	1.032	1.504	1.670	1.819	1.788	2.119	1.670	1.819	1.788	2.119	ns
	GCLK PLL	t_{su}	-1.215	-1.158	-1.691	-1.887	-1.989	-1.915	-2.334	-1.887	-1.989	-1.915	-2.334	ns
		t_h	1.495	1.438	2.095	2.342	2.489	2.390	2.826	2.342	2.489	2.390	2.826	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.923	-0.901	-1.322	-1.461	-1.589	-1.570	-1.898	-1.461	-1.589	-1.570	-1.898	ns
		t_h	1.058	1.032	1.504	1.670	1.819	1.788	2.119	1.670	1.819	1.788	2.119	ns
	GCLK PLL	t_{su}	-1.215	-1.158	-1.691	-1.887	-1.989	-1.915	-2.334	-1.887	-1.989	-1.915	-2.334	ns
		t_h	1.495	1.438	2.095	2.342	2.489	2.390	2.826	2.342	2.489	2.390	2.826	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.917	-0.895	-1.309	-1.453	-1.586	-1.565	-1.896	-1.453	-1.586	-1.565	-1.896	ns
		t_h	1.052	1.026	1.491	1.659	1.813	1.782	2.112	1.659	1.813	1.782	2.112	ns
	GCLK PLL	t_{su}	-1.209	-1.152	-1.678	-1.879	-1.986	-1.910	-2.332	-1.879	-1.986	-1.910	-2.332	ns
		t_h	1.489	1.432	2.082	2.331	2.483	2.384	2.819	2.331	2.483	2.384	2.819	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.917	-0.895	-1.309	-1.453	-1.586	-1.565	-1.896	-1.453	-1.586	-1.565	-1.896	ns
		t_h	1.052	1.026	1.491	1.659	1.813	1.782	2.112	1.659	1.813	1.782	2.112	ns
	GCLK PLL	t_{su}	-1.209	-1.152	-1.678	-1.879	-1.986	-1.910	-2.332	-1.879	-1.986	-1.910	-2.332	ns
		t_h	1.489	1.432	2.082	2.331	2.483	2.384	2.819	2.331	2.483	2.384	2.819	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.906	-0.884	-1.298	-1.442	-1.567	-1.546	-1.877	-1.442	-1.567	-1.546	-1.877	ns
		t_h	1.041	1.015	1.479	1.648	1.794	1.763	2.093	1.648	1.794	1.763	2.093	ns
	GCLK PLL	t_{su}	-1.198	-1.141	-1.667	-1.868	-1.967	-1.891	-2.313	-1.868	-1.967	-1.891	-2.313	ns
		t_h	1.478	1.421	2.070	2.320	2.464	2.365	2.800	2.320	2.464	2.365	2.800	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.906	-0.884	-1.298	-1.442	-1.567	-1.546	-1.877	-1.442	-1.567	-1.546	-1.877	ns
		t_h	1.041	1.015	1.479	1.648	1.794	1.763	2.093	1.648	1.794	1.763	2.093	ns
	GCLK PLL	t_{su}	-1.198	-1.141	-1.667	-1.868	-1.967	-1.891	-2.313	-1.868	-1.967	-1.891	-2.313	ns
		t_h	1.478	1.421	2.070	2.320	2.464	2.365	2.800	2.320	2.464	2.365	2.800	ns

Table 1–71. EP3SL150 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.917	-0.895	-1.309	-1.453	-1.586	-1.565	-1.896	-1.453	-1.586	-1.565	-1.896	ns
		t_h	1.052	1.026	1.491	1.659	1.813	1.782	2.112	1.659	1.813	1.782	2.112	ns
	GCLK PLL	t_{su}	-1.209	-1.152	-1.678	-1.879	-1.986	-1.910	-2.332	-1.879	-1.986	-1.910	-2.332	ns
		t_h	1.489	1.432	2.082	2.331	2.483	2.384	2.819	2.331	2.483	2.384	2.819	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.917	-0.895	-1.309	-1.453	-1.586	-1.565	-1.896	-1.453	-1.586	-1.565	-1.896	ns
		t_h	1.052	1.026	1.491	1.659	1.813	1.782	2.112	1.659	1.813	1.782	2.112	ns
	GCLK PLL	t_{su}	-1.209	-1.152	-1.678	-1.879	-1.986	-1.910	-2.332	-1.879	-1.986	-1.910	-2.332	ns
		t_h	1.489	1.432	2.082	2.331	2.483	2.384	2.819	2.331	2.483	2.384	2.819	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.906	-0.884	-1.298	-1.442	-1.567	-1.546	-1.877	-1.442	-1.567	-1.546	-1.877	ns
		t_h	1.041	1.015	1.479	1.648	1.794	1.763	2.093	1.648	1.794	1.763	2.093	ns
	GCLK PLL	t_{su}	-1.198	-1.141	-1.667	-1.868	-1.967	-1.891	-2.313	-1.868	-1.967	-1.891	-2.313	ns
		t_h	1.478	1.421	2.070	2.320	2.464	2.365	2.800	2.320	2.464	2.365	2.800	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.906	-0.884	-1.298	-1.442	-1.567	-1.546	-1.877	-1.442	-1.567	-1.546	-1.877	ns
		t_h	1.041	1.015	1.479	1.648	1.794	1.763	2.093	1.648	1.794	1.763	2.093	ns
	GCLK PLL	t_{su}	-1.198	-1.141	-1.667	-1.868	-1.967	-1.891	-2.313	-1.868	-1.967	-1.891	-2.313	ns
		t_h	1.478	1.421	2.070	2.320	2.464	2.365	2.800	2.320	2.464	2.365	2.800	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.894	-0.872	-1.288	-1.431	-1.551	-1.530	-1.861	-1.431	-1.551	-1.530	-1.861	ns
		t_h	1.029	1.003	1.469	1.637	1.778	1.747	2.077	1.637	1.778	1.747	2.077	ns
	GCLK PLL	t_{su}	-1.186	-1.129	-1.657	-1.857	-1.951	-1.875	-2.297	-1.857	-1.951	-1.875	-2.297	ns
		t_h	1.466	1.409	2.060	2.309	2.448	2.349	2.784	2.309	2.448	2.349	2.784	ns
3.0-V PCI	GCLK	t_{su}	-0.894	-0.872	-1.288	-1.431	-1.551	-1.530	-1.861	-1.431	-1.551	-1.530	-1.861	ns
		t_h	1.029	1.003	1.469	1.637	1.778	1.747	2.077	1.637	1.778	1.747	2.077	ns
	GCLK PLL	t_{su}	-1.186	-1.129	-1.657	-1.857	-1.951	-1.875	-2.297	-1.857	-1.951	-1.875	-2.297	ns
		t_h	1.466	1.409	2.060	2.309	2.448	2.349	2.784	2.309	2.448	2.349	2.784	ns
3.0-V PCI-X	GCLK	t_{su}	-0.997	-0.975	-1.401	-1.560	-1.796	-1.777	-2.105	-1.560	-1.796	-1.777	-2.105	ns
		t_h	1.130	1.104	1.583	1.769	2.026	1.995	2.326	1.769	2.026	1.995	2.326	ns
	GCLK PLL	t_{su}	-1.289	-1.232	-1.770	-1.986	-2.196	-2.122	-2.541	-1.986	-2.196	-2.122	-2.541	ns
		t_h	1.567	1.510	2.174	2.441	2.696	2.597	3.033	2.441	2.696	2.597	3.033	ns

Table 1–72 lists the EP3SL150 row pins input timing parameters for single-ended I/O standards.

Table 1–72. EP3SL150 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.925	-0.964	-1.360	-1.470	-1.682	-1.633	-1.954	-1.480	-1.679	-1.634	-1.993	ns
		t_h	1.040	1.094	1.544	1.677	1.910	1.851	2.173	1.698	1.917	1.860	2.212	ns
	GCLK PLL	t_{su}	0.988	1.009	1.642	1.858	1.971	1.855	1.796	1.865	1.993	1.875	1.848	ns
		t_h	-0.737	-0.741	-1.241	-1.407	-1.471	-1.383	-1.314	-1.407	-1.482	-1.393	-1.363	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.925	-0.964	-1.360	-1.470	-1.682	-1.633	-1.954	-1.480	-1.679	-1.634	-1.993	ns
		t_h	1.040	1.094	1.544	1.677	1.910	1.851	2.173	1.698	1.917	1.860	2.212	ns
	GCLK PLL	t_{su}	0.988	1.009	1.642	1.858	1.971	1.855	1.796	1.865	1.993	1.875	1.848	ns
		t_h	-0.737	-0.741	-1.241	-1.407	-1.471	-1.383	-1.314	-1.407	-1.482	-1.393	-1.363	ns
3.0-V LVTTL	GCLK	t_{su}	-0.931	-0.975	-1.357	-1.471	-1.685	-1.636	-1.957	-1.479	-1.684	-1.639	-1.998	ns
		t_h	1.046	1.105	1.541	1.678	1.913	1.854	2.176	1.697	1.922	1.865	2.217	ns
	GCLK PLL	t_{su}	0.982	0.998	1.645	1.857	1.968	1.852	1.793	1.866	1.988	1.870	1.843	ns
		t_h	-0.731	-0.730	-1.244	-1.406	-1.468	-1.380	-1.311	-1.408	-1.477	-1.388	-1.358	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.931	-0.975	-1.357	-1.471	-1.685	-1.636	-1.957	-1.479	-1.684	-1.639	-1.998	ns
		t_h	1.046	1.105	1.541	1.678	1.913	1.854	2.176	1.697	1.922	1.865	2.217	ns
	GCLK PLL	t_{su}	0.982	0.998	1.645	1.857	1.968	1.852	1.793	1.866	1.988	1.870	1.843	ns
		t_h	-0.731	-0.730	-1.244	-1.406	-1.468	-1.380	-1.311	-1.408	-1.477	-1.388	-1.358	ns
2.5 V	GCLK	t_{su}	-0.919	-0.968	-1.366	-1.484	-1.700	-1.651	-1.972	-1.488	-1.694	-1.649	-2.008	ns
		t_h	1.034	1.098	1.550	1.691	1.928	1.869	2.191	1.706	1.932	1.875	2.227	ns
	GCLK PLL	t_{su}	0.994	1.005	1.636	1.844	1.953	1.837	1.778	1.857	1.978	1.860	1.833	ns
		t_h	-0.743	-0.737	-1.235	-1.393	-1.453	-1.365	-1.296	-1.399	-1.467	-1.378	-1.348	ns
1.8 V	GCLK	t_{su}	-0.949	-1.000	-1.406	-1.530	-1.590	-1.662	-1.875	-1.521	-1.582	-1.663	-1.913	ns
		t_h	1.065	1.131	1.590	1.738	1.824	1.880	2.098	1.739	1.826	1.889	2.137	ns
	GCLK PLL	t_{su}	0.964	0.966	1.589	1.806	1.955	1.835	1.780	1.824	1.977	1.854	1.832	ns
		t_h	-0.712	-0.698	-1.190	-1.356	-1.455	-1.362	-1.298	-1.366	-1.466	-1.372	-1.347	ns
1.5 V	GCLK	t_{su}	-0.939	-0.989	-1.382	-1.498	-1.522	-1.594	-1.807	-1.490	-1.517	-1.598	-1.848	ns
		t_h	1.055	1.120	1.566	1.706	1.756	1.812	2.030	1.708	1.761	1.824	2.072	ns
	GCLK PLL	t_{su}	0.974	0.977	1.613	1.838	2.023	1.903	1.848	1.855	2.042	1.919	1.897	ns
		t_h	-0.722	-0.709	-1.214	-1.388	-1.523	-1.430	-1.366	-1.397	-1.531	-1.437	-1.412	ns
1.2 V	GCLK	t_{su}	-0.879	-0.936	-1.303	-1.397	-1.363	-1.435	-1.648	-1.394	-1.362	-1.443	-1.693	ns
		t_h	0.995	1.067	1.487	1.605	1.597	1.653	1.871	1.612	1.606	1.669	1.917	ns
	GCLK PLL	t_{su}	1.034	1.030	1.692	1.939	2.182	2.062	2.007	1.951	2.197	2.074	2.052	ns
		t_h	-0.782	-0.762	-1.293	-1.489	-1.682	-1.589	-1.525	-1.493	-1.686	-1.592	-1.567	ns

Table 1–72. EP3SL150 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS I	GCLK	t_{su}	-0.862	-0.910	-1.280	-1.375	-1.480	-1.431	-1.752	-1.376	-1.477	-1.432	-1.791	ns
		t_h	0.978	1.041	1.464	1.582	1.708	1.649	1.971	1.594	1.715	1.658	2.010	ns
	GCLK PLL	t_{su}	1.051	1.063	1.722	1.953	2.173	2.057	1.998	1.969	2.195	2.077	2.050	ns
		t_h	-0.799	-0.794	-1.321	-1.502	-1.673	-1.585	-1.516	-1.511	-1.684	-1.595	-1.565	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.862	-0.910	-1.280	-1.375	-1.480	-1.431	-1.752	-1.376	-1.477	-1.432	-1.791	ns
		t_h	0.978	1.041	1.464	1.582	1.708	1.649	1.971	1.594	1.715	1.658	2.010	ns
	GCLK PLL	t_{su}	1.051	1.063	1.722	1.953	2.173	2.057	1.998	1.969	2.195	2.077	2.050	ns
		t_h	-0.799	-0.794	-1.321	-1.502	-1.673	-1.585	-1.516	-1.511	-1.684	-1.595	-1.565	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.853	-0.901	-1.265	-1.370	-1.361	-1.429	-1.646	-1.362	-1.358	-1.435	-1.688	ns
		t_h	0.969	1.032	1.449	1.576	1.592	1.646	1.865	1.578	1.599	1.660	1.908	ns
	GCLK PLL	t_{su}	1.060	1.065	1.730	1.966	2.187	2.068	2.011	1.983	2.204	2.082	2.059	ns
		t_h	-0.808	-0.797	-1.331	-1.518	-1.689	-1.596	-1.533	-1.527	-1.696	-1.601	-1.578	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.853	-0.901	-1.265	-1.370	-1.361	-1.429	-1.646	-1.362	-1.358	-1.435	-1.688	ns
		t_h	0.969	1.032	1.449	1.576	1.592	1.646	1.865	1.578	1.599	1.660	1.908	ns
	GCLK PLL	t_{su}	1.060	1.065	1.730	1.966	2.187	2.068	2.011	1.983	2.204	2.082	2.059	ns
		t_h	-0.808	-0.797	-1.331	-1.518	-1.689	-1.596	-1.533	-1.527	-1.696	-1.601	-1.578	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.839	-0.889	-1.250	-1.360	-1.343	-1.411	-1.628	-1.351	-1.341	-1.418	-1.671	ns
		t_h	0.955	1.020	1.435	1.566	1.574	1.628	1.847	1.567	1.582	1.643	1.891	ns
	GCLK PLL	t_{su}	1.074	1.077	1.745	1.976	2.205	2.086	2.029	1.994	2.221	2.099	2.076	ns
		t_h	-0.822	-0.809	-1.345	-1.528	-1.707	-1.614	-1.551	-1.538	-1.713	-1.618	-1.595	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.853	-0.901	-1.265	-1.370	-1.361	-1.429	-1.646	-1.362	-1.358	-1.435	-1.688	ns
		t_h	0.969	1.032	1.449	1.576	1.592	1.646	1.865	1.578	1.599	1.660	1.908	ns
	GCLK PLL	t_{su}	1.060	1.065	1.730	1.966	2.187	2.068	2.011	1.983	2.204	2.082	2.059	ns
		t_h	-0.808	-0.797	-1.331	-1.518	-1.689	-1.596	-1.533	-1.527	-1.696	-1.601	-1.578	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.853	-0.901	-1.265	-1.370	-1.361	-1.429	-1.646	-1.362	-1.358	-1.435	-1.688	ns
		t_h	0.969	1.032	1.449	1.576	1.592	1.646	1.865	1.578	1.599	1.660	1.908	ns
	GCLK PLL	t_{su}	1.060	1.065	1.730	1.966	2.187	2.068	2.011	1.983	2.204	2.082	2.059	ns
		t_h	-0.808	-0.797	-1.331	-1.518	-1.689	-1.596	-1.533	-1.527	-1.696	-1.601	-1.578	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.839	-0.889	-1.250	-1.360	-1.343	-1.411	-1.628	-1.351	-1.341	-1.418	-1.671	ns
		t_h	0.955	1.020	1.435	1.566	1.574	1.628	1.847	1.567	1.582	1.643	1.891	ns
	GCLK PLL	t_{su}	1.074	1.077	1.745	1.976	2.205	2.086	2.029	1.994	2.221	2.099	2.076	ns
		t_h	-0.822	-0.809	-1.345	-1.528	-1.707	-1.614	-1.551	-1.538	-1.713	-1.618	-1.595	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.839	-0.889	-1.250	-1.360	-1.343	-1.411	-1.628	-1.351	-1.341	-1.418	-1.671	ns
		t_h	0.955	1.020	1.435	1.566	1.574	1.628	1.847	1.567	1.582	1.643	1.891	ns
	GCLK PLL	t_{su}	1.074	1.077	1.745	1.976	2.205	2.086	2.029	1.994	2.221	2.099	2.076	ns
		t_h	-0.822	-0.809	-1.345	-1.528	-1.707	-1.614	-1.551	-1.538	-1.713	-1.618	-1.595	ns

Table 1–72. EP3SL150 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.830	-0.877	-1.241	-1.350	-1.327	-1.395	-1.612	-1.342	-1.325	-1.402	-1.655	ns
		t_h	0.946	1.008	1.426	1.556	1.558	1.612	1.831	1.558	1.566	1.627	1.875	ns
	GCLK PLL	t_{su}	1.083	1.089	1.754	1.986	2.221	2.102	2.045	2.003	2.237	2.115	2.092	ns
		t_h	-0.831	-0.821	-1.354	-1.538	-1.723	-1.630	-1.567	-1.547	-1.729	-1.634	-1.611	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.830	-0.877	-1.241	-1.350	-1.327	-1.395	-1.612	-1.342	-1.325	-1.402	-1.655	ns
		t_h	0.946	1.008	1.426	1.556	1.558	1.612	1.831	1.558	1.566	1.627	1.875	ns
	GCLK PLL	t_{su}	1.083	1.089	1.754	1.986	2.221	2.102	2.045	2.003	2.237	2.115	2.092	ns
		t_h	-0.831	-0.821	-1.354	-1.538	-1.723	-1.630	-1.567	-1.547	-1.729	-1.634	-1.611	ns
3.0-V PCI	GCLK	t_{su}	-0.931	-0.975	-1.357	-1.471	-1.685	-1.636	-1.957	-1.479	-1.684	-1.639	-1.998	ns
		t_h	1.046	1.105	1.541	1.678	1.913	1.854	2.176	1.697	1.922	1.865	2.217	ns
	GCLK PLL	t_{su}	0.982	0.998	1.645	1.857	1.968	1.852	1.793	1.866	1.988	1.870	1.843	ns
		t_h	-0.731	-0.730	-1.244	-1.406	-1.468	-1.380	-1.311	-1.408	-1.477	-1.388	-1.358	ns
3.0-V PCI-X	GCLK	t_{su}	-0.931	-0.975	-1.357	-1.471	-1.685	-1.636	-1.957	-1.479	-1.684	-1.639	-1.998	ns
		t_h	1.046	1.105	1.541	1.678	1.913	1.854	2.176	1.697	1.922	1.865	2.217	ns
	GCLK PLL	t_{su}	0.982	0.998	1.645	1.857	1.968	1.852	1.793	1.866	1.988	1.870	1.843	ns
		t_h	-0.731	-0.730	-1.244	-1.406	-1.468	-1.380	-1.311	-1.408	-1.477	-1.388	-1.358	ns

Table 1–73 lists the EP3SL150 column pins output timing parameters for single-ended I/O standards.

Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.422	3.439	4.768	5.127	5.625	5.473	5.808	5.127	5.625	5.473	5.808	ns
		GCLK PLL	t_{co}	3.898	3.841	5.355	5.880	6.341	6.161	6.543	5.880	6.341	6.161	6.543	ns
	8mA	GCLK	t_{co}	3.355	3.372	4.659	5.016	5.512	5.360	5.695	5.016	5.512	5.360	5.695	ns
		GCLK PLL	t_{co}	3.781	3.774	5.246	5.718	6.228	6.048	6.430	5.718	6.228	6.048	6.430	ns
	12mA	GCLK	t_{co}	3.269	3.286	4.555	4.918	5.420	5.268	5.603	4.918	5.420	5.268	5.603	ns
		GCLK PLL	t_{co}	3.692	3.688	5.142	5.583	6.136	5.956	6.338	5.583	6.136	5.956	6.338	ns
	16mA	GCLK	t_{co}	3.262	3.279	4.538	4.890	5.379	5.227	5.562	4.890	5.379	5.227	5.562	ns
		GCLK PLL	t_{co}	3.685	3.681	5.125	5.555	6.095	5.915	6.297	5.555	6.095	5.915	6.297	ns

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Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.428	3.445	4.772	5.132	5.632	5.480	5.815	5.132	5.632	5.480	5.815	ns
		GCLK PLL	t_{co}	3.901	3.847	5.359	5.892	6.348	6.168	6.550	5.892	6.348	6.168	6.550	ns
	8mA	GCLK	t_{co}	3.273	3.290	4.565	4.935	5.431	5.279	5.614	4.935	5.431	5.279	5.614	ns
		GCLK PLL	t_{co}	3.701	3.692	5.152	5.600	6.147	5.967	6.349	5.600	6.147	5.967	6.349	ns
	12mA	GCLK	t_{co}	3.280	3.297	4.559	4.914	5.405	5.253	5.588	4.914	5.405	5.253	5.588	ns
		GCLK PLL	t_{co}	3.703	3.699	5.146	5.579	6.121	5.941	6.323	5.579	6.121	5.941	6.323	ns
	16mA	GCLK	t_{co}	3.264	3.281	4.537	4.888	5.376	5.224	5.559	4.888	5.376	5.224	5.559	ns
		GCLK PLL	t_{co}	3.687	3.683	5.124	5.553	6.092	5.912	6.294	5.553	6.092	5.912	6.294	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.386	3.403	4.735	5.096	5.592	5.440	5.775	5.096	5.592	5.440	5.775	ns
		GCLK PLL	t_{co}	3.843	3.805	5.322	5.831	6.308	6.128	6.510	5.831	6.308	6.128	6.510	ns
	8mA	GCLK	t_{co}	3.275	3.292	4.605	4.962	5.455	5.303	5.637	4.962	5.455	5.303	5.637	ns
		GCLK PLL	t_{co}	3.713	3.694	5.192	5.659	6.170	5.991	6.371	5.659	6.170	5.991	6.371	ns
	12mA	GCLK	t_{co}	3.239	3.256	4.542	4.893	5.381	5.229	5.563	4.893	5.381	5.229	5.563	ns
		GCLK PLL	t_{co}	3.662	3.658	5.129	5.560	6.096	5.917	6.298	5.560	6.096	5.917	6.298	ns
	16mA	GCLK	t_{co}	3.221	3.238	4.513	4.865	5.352	5.200	5.535	4.865	5.352	5.200	5.535	ns
		GCLK PLL	t_{co}	3.644	3.640	5.100	5.530	6.070	5.888	6.270	5.530	6.070	5.888	6.270	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.300	3.317	4.639	4.995	5.490	5.338	5.672	4.995	5.490	5.338	5.672	ns
		GCLK PLL	t_{co}	3.751	3.719	5.226	5.712	6.205	6.026	6.406	5.712	6.205	6.026	6.406	ns
	8mA	GCLK	t_{co}	3.221	3.238	4.515	4.866	5.355	5.203	5.537	4.866	5.355	5.203	5.537	ns
		GCLK PLL	t_{co}	3.644	3.640	5.102	5.531	6.083	5.891	6.271	5.531	6.083	5.891	6.271	ns
	12mA	GCLK	t_{co}	3.216	3.233	4.508	4.859	5.346	5.194	5.529	4.859	5.346	5.194	5.529	ns
		GCLK PLL	t_{co}	3.639	3.635	5.095	5.524	6.062	5.882	6.264	5.524	6.062	5.882	6.264	ns
	16mA	GCLK	t_{co}	3.207	3.224	4.494	4.844	5.331	5.179	5.514	4.844	5.331	5.179	5.514	ns
		GCLK PLL	t_{co}	3.630	3.626	5.081	5.509	6.057	5.867	6.249	5.509	6.057	5.867	6.249	ns

Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
2.5 V	4mA	GCLK	t_{co}	3.422	3.439	4.846	5.222	5.737	5.585	5.919	5.222	5.737	5.585	5.919	ns
		GCLK PLL	t_{co}	3.898	3.841	5.433	5.991	6.452	6.273	6.654	5.991	6.452	6.273	6.654	ns
	8mA	GCLK	t_{co}	3.322	3.339	4.727	5.096	5.605	5.453	5.787	5.096	5.605	5.453	5.787	ns
		GCLK PLL	t_{co}	3.773	3.741	5.314	5.807	6.320	6.141	6.521	5.807	6.320	6.141	6.521	ns
	12mA	GCLK	t_{co}	3.278	3.295	4.640	5.006	5.509	5.357	5.692	5.006	5.509	5.357	5.692	ns
		GCLK PLL	t_{co}	3.701	3.697	5.227	5.671	6.225	6.045	6.427	5.671	6.225	6.045	6.427	ns
	16mA	GCLK	t_{co}	3.240	3.257	4.601	4.963	5.466	5.314	5.649	4.963	5.466	5.314	5.649	ns
		GCLK PLL	t_{co}	3.663	3.659	5.188	5.628	6.182	6.002	6.384	5.628	6.182	6.002	6.384	ns
1.8 V	2mA	GCLK	t_{co}	3.613	3.630	5.167	5.582	6.141	5.989	6.324	5.582	6.141	5.989	6.324	ns
		GCLK PLL	t_{co}	4.161	4.032	5.754	6.474	6.857	6.677	7.059	6.474	6.857	6.677	7.059	ns
	4mA	GCLK	t_{co}	3.432	3.449	4.888	5.273	5.794	5.642	5.976	5.273	5.794	5.642	5.976	ns
		GCLK PLL	t_{co}	3.920	3.851	5.475	6.068	6.509	6.330	6.710	6.068	6.509	6.330	6.710	ns
	6mA	GCLK	t_{co}	3.350	3.367	4.781	5.158	5.683	5.531	5.866	5.158	5.683	5.531	5.866	ns
		GCLK PLL	t_{co}	3.802	3.769	5.368	5.878	6.399	6.219	6.601	5.878	6.399	6.219	6.601	ns
	8mA	GCLK	t_{co}	3.330	3.347	4.723	5.105	5.617	5.465	5.800	5.105	5.617	5.465	5.800	ns
		GCLK PLL	t_{co}	3.753	3.749	5.310	5.780	6.333	6.153	6.535	5.780	6.333	6.153	6.535	ns
	10mA	GCLK	t_{co}	3.267	3.284	4.662	5.030	5.536	5.384	5.719	5.030	5.536	5.384	5.719	ns
		GCLK PLL	t_{co}	3.690	3.686	5.249	5.695	6.252	6.072	6.454	5.695	6.252	6.072	6.454	ns
	12mA	GCLK	t_{co}	3.249	3.266	4.641	5.008	5.513	5.361	5.696	5.008	5.513	5.361	5.696	ns
		GCLK PLL	t_{co}	3.672	3.668	5.228	5.673	6.229	6.049	6.431	5.673	6.229	6.049	6.431	ns

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Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.559	3.576	5.096	5.515	6.079	5.927	6.262	5.515	6.079	5.927	6.262	ns
		GCLK PLL	t_{co}	4.069	3.978	5.683	6.384	6.795	6.615	6.997	6.384	6.795	6.615	6.997	ns
	4mA	GCLK	t_{co}	3.347	3.364	4.777	5.158	5.687	5.535	5.870	5.158	5.687	5.535	5.870	ns
		GCLK PLL	t_{co}	3.786	3.766	5.364	5.871	6.403	6.223	6.605	5.871	6.403	6.223	6.605	ns
	6mA	GCLK	t_{co}	3.322	3.339	4.710	5.098	5.620	5.468	5.803	5.098	5.620	5.468	5.803	ns
		GCLK PLL	t_{co}	3.745	3.741	5.297	5.763	6.336	6.156	6.538	5.763	6.336	6.156	6.538	ns
	8mA	GCLK	t_{co}	3.311	3.328	4.693	5.073	5.600	5.448	5.783	5.073	5.600	5.448	5.783	ns
		GCLK PLL	t_{co}	3.734	3.730	5.280	5.742	6.316	6.136	6.518	5.742	6.316	6.136	6.518	ns
	10mA	GCLK	t_{co}	3.256	3.273	4.655	5.023	5.530	5.378	5.713	5.023	5.530	5.378	5.713	ns
		GCLK PLL	t_{co}	3.679	3.675	5.242	5.688	6.246	6.066	6.448	5.688	6.246	6.066	6.448	ns
	12mA	GCLK	t_{co}	3.251	3.268	4.638	5.011	5.519	5.367	5.702	5.011	5.519	5.367	5.702	ns
		GCLK PLL	t_{co}	3.674	3.670	5.225	5.676	6.235	6.055	6.437	5.676	6.235	6.055	6.437	ns
1.2 V	2mA	GCLK	t_{co}	3.475	3.492	5.022	5.450	6.023	5.871	6.206	5.450	6.023	5.871	6.206	ns
		GCLK PLL	t_{co}	3.959	3.894	5.609	6.283	6.739	6.559	6.941	6.283	6.739	6.559	6.941	ns
	4mA	GCLK	t_{co}	3.352	3.369	4.796	5.189	5.737	5.585	5.920	5.189	5.737	5.585	5.920	ns
		GCLK PLL	t_{co}	3.786	3.771	5.383	5.902	6.453	6.273	6.655	5.902	6.453	6.273	6.655	ns
	6mA	GCLK	t_{co}	3.314	3.331	4.704	5.099	5.624	5.472	5.807	5.099	5.624	5.472	5.807	ns
		GCLK PLL	t_{co}	3.737	3.733	5.291	5.764	6.340	6.160	6.542	5.764	6.340	6.160	6.542	ns
	8mA	GCLK	t_{co}	3.267	3.284	4.676	5.050	5.568	5.416	5.751	5.050	5.568	5.416	5.751	ns
		GCLK PLL	t_{co}	3.690	3.686	5.263	5.715	6.284	6.104	6.486	5.715	6.284	6.104	6.486	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.267	3.284	4.633	4.998	5.499	5.347	5.682	4.998	5.499	5.347	5.682	ns
		GCLK PLL	t_{co}	3.690	3.686	5.220	5.663	6.215	6.035	6.417	5.663	6.215	6.035	6.417	ns
	10mA	GCLK	t_{co}	3.264	3.281	4.630	4.994	5.495	5.343	5.678	4.994	5.495	5.343	5.678	ns
		GCLK PLL	t_{co}	3.687	3.683	5.217	5.659	6.211	6.031	6.413	5.659	6.211	6.031	6.413	ns
	12mA	GCLK	t_{co}	3.262	3.279	4.630	4.995	5.496	5.344	5.679	4.995	5.496	5.344	5.679	ns
		GCLK PLL	t_{co}	3.685	3.681	5.217	5.660	6.212	6.032	6.414	5.660	6.212	6.032	6.414	ns

Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.253	3.270	4.615	4.980	5.481	5.329	5.664	4.980	5.481	5.329	5.664	ns
		GCLK PLL	t_{co}	3.676	3.672	5.202	5.645	6.197	6.017	6.399	5.645	6.197	6.017	6.399	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.274	3.291	4.645	5.012	5.515	5.363	5.698	5.012	5.515	5.363	5.698	ns
		GCLK PLL	t_{co}	3.697	3.693	5.232	5.677	6.231	6.051	6.433	5.677	6.231	6.051	6.433	ns
	6mA	GCLK	t_{co}	3.270	3.287	4.643	5.010	5.513	5.361	5.696	5.010	5.513	5.361	5.696	ns
		GCLK PLL	t_{co}	3.693	3.689	5.230	5.675	6.229	6.049	6.431	5.675	6.229	6.049	6.431	ns
	8mA	GCLK	t_{co}	3.259	3.276	4.633	5.000	5.504	5.352	5.687	5.000	5.504	5.352	5.687	ns
		GCLK PLL	t_{co}	3.682	3.678	5.220	5.665	6.220	6.040	6.422	5.665	6.220	6.040	6.422	ns
	10mA	GCLK	t_{co}	3.248	3.265	4.620	4.987	5.491	5.339	5.674	4.987	5.491	5.339	5.674	ns
		GCLK PLL	t_{co}	3.671	3.667	5.207	5.652	6.207	6.027	6.409	5.652	6.207	6.027	6.409	ns
	12mA	GCLK	t_{co}	3.248	3.265	4.620	4.987	5.491	5.339	5.674	4.987	5.491	5.339	5.674	ns
		GCLK PLL	t_{co}	3.671	3.667	5.207	5.652	6.207	6.027	6.409	5.652	6.207	6.027	6.409	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.254	3.271	4.619	4.984	5.486	5.334	5.669	4.984	5.486	5.334	5.669	ns
		GCLK PLL	t_{co}	3.677	3.673	5.206	5.649	6.202	6.022	6.404	5.649	6.202	6.022	6.404	ns
	16mA	GCLK	t_{co}	3.257	3.274	4.627	4.994	5.498	5.346	5.681	4.994	5.498	5.346	5.681	ns
		GCLK PLL	t_{co}	3.680	3.676	5.214	5.659	6.214	6.034	6.416	5.659	6.214	6.034	6.416	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.278	3.295	4.654	5.023	5.528	5.376	5.711	5.023	5.528	5.376	5.711	ns
		GCLK PLL	t_{co}	3.701	3.697	5.241	5.688	6.244	6.064	6.446	5.688	6.244	6.064	6.446	ns
	6mA	GCLK	t_{co}	3.264	3.281	4.644	5.013	5.519	5.367	5.702	5.013	5.519	5.367	5.702	ns
		GCLK PLL	t_{co}	3.687	3.683	5.231	5.678	6.235	6.055	6.437	5.678	6.235	6.055	6.437	ns
	8mA	GCLK	t_{co}	3.253	3.270	4.630	4.999	5.505	5.353	5.688	4.999	5.505	5.353	5.688	ns
		GCLK PLL	t_{co}	3.676	3.672	5.217	5.664	6.221	6.041	6.423	5.664	6.221	6.041	6.423	ns
	10mA	GCLK	t_{co}	3.252	3.269	4.633	5.003	5.509	5.357	5.692	5.003	5.509	5.357	5.692	ns
		GCLK PLL	t_{co}	3.675	3.671	5.220	5.668	6.225	6.045	6.427	5.668	6.225	6.045	6.427	ns
	12mA	GCLK	t_{co}	3.249	3.266	4.628	4.997	5.503	5.351	5.686	4.997	5.503	5.351	5.686	ns
		GCLK PLL	t_{co}	3.672	3.668	5.215	5.662	6.219	6.039	6.421	5.662	6.219	6.039	6.421	ns

Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.251	3.268	4.617	4.983	5.486	5.334	5.669	4.983	5.486	5.334	5.669	ns
		GCLK PLL	t_{co}	3.674	3.670	5.204	5.648	6.202	6.022	6.404	5.648	6.202	6.022	6.404	ns
	16mA	GCLK	t_{co}	3.254	3.271	4.624	4.992	5.497	5.345	5.680	4.992	5.497	5.345	5.680	ns
		GCLK PLL	t_{co}	3.677	3.673	5.211	5.657	6.213	6.033	6.415	5.657	6.213	6.033	6.415	ns
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.261	3.278	4.619	4.983	5.484	5.332	5.667	4.983	5.484	5.332	5.667	ns
		GCLK PLL	t_{co}	3.684	3.680	5.206	5.648	6.200	6.020	6.402	5.648	6.200	6.020	6.402	ns
	6mA	GCLK	t_{co}	3.254	3.271	4.617	4.982	5.483	5.331	5.666	4.982	5.483	5.331	5.666	ns
		GCLK PLL	t_{co}	3.677	3.673	5.204	5.647	6.199	6.019	6.401	5.647	6.199	6.019	6.401	ns
	8mA	GCLK	t_{co}	3.246	3.263	4.609	4.974	5.476	5.324	5.659	4.974	5.476	5.324	5.659	ns
		GCLK PLL	t_{co}	3.669	3.665	5.196	5.639	6.192	6.012	6.394	5.639	6.192	6.012	6.394	ns
	10mA	GCLK	t_{co}	3.249	3.266	4.612	4.978	5.480	5.328	5.663	4.978	5.480	5.328	5.663	ns
		GCLK PLL	t_{co}	3.672	3.668	5.199	5.643	6.196	6.016	6.398	5.643	6.196	6.016	6.398	ns
	12mA	GCLK	t_{co}	3.246	3.263	4.615	4.981	5.484	5.332	5.667	4.981	5.484	5.332	5.667	ns
		GCLK PLL	t_{co}	3.669	3.665	5.202	5.646	6.200	6.020	6.402	5.646	6.200	6.020	6.402	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.254	3.271	4.614	4.979	5.480	5.328	5.663	4.979	5.480	5.328	5.663	ns
		GCLK PLL	t_{co}	3.677	3.673	5.201	5.644	6.196	6.016	6.398	5.644	6.196	6.016	6.398	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.266	3.283	4.627	4.993	5.495	5.343	5.678	4.993	5.495	5.343	5.678	ns
		GCLK PLL	t_{co}	3.689	3.685	5.214	5.658	6.211	6.031	6.413	5.658	6.211	6.031	6.413	ns
	6mA	GCLK	t_{co}	3.262	3.279	4.628	4.995	5.498	5.346	5.681	4.995	5.498	5.346	5.681	ns
		GCLK PLL	t_{co}	3.685	3.681	5.215	5.660	6.214	6.034	6.416	5.660	6.214	6.034	6.416	ns
	8mA	GCLK	t_{co}	3.258	3.275	4.624	4.990	5.493	5.341	5.676	4.990	5.493	5.341	5.676	ns
		GCLK PLL	t_{co}	3.681	3.677	5.211	5.655	6.209	6.029	6.411	5.655	6.209	6.029	6.411	ns
	10mA	GCLK	t_{co}	3.251	3.268	4.617	4.983	5.486	5.334	5.669	4.983	5.486	5.334	5.669	ns
		GCLK PLL	t_{co}	3.674	3.670	5.204	5.648	6.202	6.022	6.404	5.648	6.202	6.022	6.404	ns
	12mA	GCLK	t_{co}	3.252	3.269	4.624	4.991	5.496	5.344	5.679	4.991	5.496	5.344	5.679	ns
		GCLK PLL	t_{co}	3.675	3.671	5.211	5.656	6.212	6.032	6.414	5.656	6.212	6.032	6.414	ns

Table 1–73. EP3SL150 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.250	3.267	4.605	4.969	5.470	5.318	5.653	4.969	5.470	5.318	5.653	ns
		GCLK PLL	t_{co}	3.673	3.669	5.192	5.634	6.186	6.006	6.388	5.634	6.186	6.006	6.388	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.269	3.286	4.641	5.010	5.516	5.364	5.699	5.010	5.516	5.364	5.699	ns
		GCLK PLL	t_{co}	3.692	3.688	5.228	5.675	6.232	6.052	6.434	5.675	6.232	6.052	6.434	ns
	6mA	GCLK	t_{co}	3.261	3.278	4.632	5.001	5.507	5.355	5.690	5.001	5.507	5.355	5.690	ns
		GCLK PLL	t_{co}	3.684	3.680	5.219	5.666	6.223	6.043	6.425	5.666	6.223	6.043	6.425	ns
	8mA	GCLK	t_{co}	3.262	3.279	4.640	5.010	5.516	5.364	5.699	5.010	5.516	5.364	5.699	ns
		GCLK PLL	t_{co}	3.685	3.681	5.227	5.675	6.232	6.052	6.434	5.675	6.232	6.052	6.434	ns
	10mA	GCLK	t_{co}	3.251	3.268	4.627	4.996	5.502	5.350	5.685	4.996	5.502	5.350	5.685	ns
		GCLK PLL	t_{co}	3.674	3.670	5.214	5.661	6.218	6.038	6.420	5.661	6.218	6.038	6.420	ns
	12mA	GCLK	t_{co}	3.251	3.268	4.627	4.996	5.503	5.351	5.686	4.996	5.503	5.351	5.686	ns
		GCLK PLL	t_{co}	3.674	3.670	5.214	5.661	6.219	6.039	6.421	5.661	6.219	6.039	6.421	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.272	3.289	4.643	5.011	5.516	5.364	5.699	5.011	5.516	5.364	5.699	ns
		GCLK PLL	t_{co}	3.695	3.691	5.230	5.676	6.233	6.052	6.434	5.676	6.233	6.052	6.434	ns
3.0-V PCI	—	GCLK	t_{co}	3.375	3.392	4.688	5.045	5.541	5.389	5.724	5.045	5.541	5.389	5.724	ns
		GCLK PLL	t_{co}	3.798	3.794	5.275	5.710	6.264	6.077	6.459	5.710	6.264	6.077	6.459	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.375	3.392	4.688	5.045	5.541	5.389	5.724	5.045	5.541	5.389	5.724	ns
		GCLK PLL	t_{co}	3.798	3.794	5.275	5.710	6.264	6.077	6.459	5.710	6.264	6.077	6.459	ns

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Table 1–74 lists the EP3SL150 row pins output timing parameters for single-ended I/O standards.

Table 1–74. EP3SL150 Row Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.214	3.466	4.819	5.204	5.693	5.566	5.831	5.325	5.817	5.689	5.913	ns
		GCLK PLL	t_{co}	1.420	1.606	1.985	2.065	2.256	2.277	2.285	2.167	2.360	2.380	2.277	ns
	8mA	GCLK	t_{co}	3.121	3.361	4.689	5.066	5.548	5.421	5.686	5.184	5.668	5.540	5.764	ns
		GCLK PLL	t_{co}	1.354	1.535	1.875	1.954	2.142	2.163	2.171	2.054	2.245	2.265	2.162	ns
	12mA	GCLK	t_{co}	3.042	3.271	4.570	4.943	5.420	5.293	5.558	5.057	5.536	5.408	5.632	ns
		GCLK PLL	t_{co}	1.275	1.446	1.769	1.854	2.046	2.067	2.075	1.955	2.145	2.165	2.062	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.224	3.470	4.827	5.209	5.697	5.570	5.835	5.331	5.821	5.693	5.917	ns
		GCLK PLL	t_{co}	1.422	1.613	1.989	2.071	2.265	2.286	2.294	2.175	2.372	2.392	2.289	ns
	8mA	GCLK	t_{co}	3.046	3.275	4.576	4.949	5.427	5.301	5.564	5.063	5.543	5.417	5.639	ns
		GCLK PLL	t_{co}	1.279	1.450	1.780	1.869	2.056	2.077	2.085	1.967	2.154	2.174	2.071	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.168	3.412	4.771	5.157	5.649	5.522	5.787	5.282	5.775	5.647	5.871	ns
		GCLK PLL	t_{co}	1.381	1.567	1.952	2.034	2.222	2.243	2.251	2.135	2.326	2.346	2.243	ns
	8mA	GCLK	t_{co}	3.047	3.285	4.618	4.998	5.485	5.358	5.623	5.120	5.611	5.482	5.706	ns
		GCLK PLL	t_{co}	1.280	1.455	1.815	1.892	2.077	2.098	2.106	1.993	2.181	2.200	2.097	ns
	12mA	GCLK	t_{co}	3.010	3.242	4.536	4.915	5.397	5.270	5.535	5.034	5.518	5.389	5.613	ns
		GCLK PLL	t_{co}	1.243	1.417	1.755	1.827	2.007	2.028	2.036	1.925	2.107	2.127	2.024	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.082	3.331	4.665	5.050	5.539	5.412	5.677	5.174	5.664	5.535	5.759	ns
		GCLK PLL	t_{co}	1.302	1.479	1.850	1.927	2.113	2.134	2.142	2.026	2.217	2.236	2.133	ns
	8mA	GCLK	t_{co}	2.997	3.226	4.502	4.876	5.358	5.231	5.496	4.994	5.478	5.349	5.573	ns
		GCLK PLL	t_{co}	1.230	1.401	1.727	1.798	1.979	2.000	2.008	1.895	2.079	2.098	1.995	ns
2.5 V	4mA	GCLK	t_{co}	3.194	3.448	4.903	5.311	5.821	5.694	5.959	5.442	5.954	5.825	6.049	ns
		GCLK PLL	t_{co}	1.407	1.604	2.060	2.160	2.367	2.388	2.396	2.267	2.478	2.498	2.395	ns
	8mA	GCLK	t_{co}	3.089	3.350	4.748	5.148	5.651	5.524	5.789	5.275	5.780	5.651	5.875	ns
		GCLK PLL	t_{co}	1.322	1.501	1.936	2.025	2.225	2.246	2.254	2.130	2.334	2.353	2.250	ns
	12mA	GCLK	t_{co}	3.038	3.282	4.637	5.029	5.525	5.398	5.663	5.152	5.650	5.521	5.745	ns
		GCLK PLL	t_{co}	1.265	1.457	1.852	1.939	2.134	2.155	2.163	2.041	2.239	2.259	2.156	ns

Table 1–74. EP3SL150 Row Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.431	3.699	5.291	5.740	6.296	6.169	6.434	5.882	6.438	6.310	6.534	ns
		GCLK PLL	t_{co}	1.655	1.850	2.491	2.527	2.770	2.796	2.799	2.776	2.888	2.913	2.805	ns
	4mA	GCLK	t_{co}	3.206	3.497	4.964	5.371	5.891	5.764	6.029	5.517	6.032	5.903	6.127	ns
		GCLK PLL	t_{co}	1.430	1.648	2.164	2.201	2.410	2.436	2.439	2.411	2.527	2.551	2.443	ns
	6mA	GCLK	t_{co}	3.141	3.395	4.811	5.221	5.732	5.605	5.870	5.349	5.859	5.731	5.955	ns
		GCLK PLL	t_{co}	1.365	1.546	2.011	2.096	2.310	2.336	2.339	2.243	2.421	2.446	2.338	ns
	8mA	GCLK	t_{co}	3.081	3.321	4.734	5.127	5.635	5.508	5.773	5.254	5.765	5.637	5.861	ns
		GCLK PLL	t_{co}	1.327	1.508	1.937	2.043	2.244	2.270	2.273	2.148	2.349	2.374	2.266	ns
1.5 V	2mA	GCLK	t_{co}	3.342	3.617	5.201	5.653	6.224	6.097	6.362	5.789	6.362	6.234	6.458	ns
		GCLK PLL	t_{co}	1.566	1.768	2.401	2.454	2.707	2.733	2.736	2.683	2.823	2.848	2.740	ns
	4mA	GCLK	t_{co}	3.100	3.359	4.796	5.216	5.733	5.606	5.871	5.343	5.858	5.730	5.954	ns
		GCLK PLL	t_{co}	1.343	1.525	1.996	2.096	2.313	2.339	2.342	2.237	2.422	2.447	2.339	ns
	6mA	GCLK	t_{co}	3.073	3.312	4.723	5.120	5.627	5.502	5.765	5.245	5.753	5.625	5.849	ns
		GCLK PLL	t_{co}	1.316	1.499	1.923	2.035	2.244	2.270	2.273	2.139	2.349	2.374	2.266	ns
	8mA	GCLK	t_{co}	3.064	3.303	4.701	5.102	5.608	5.483	5.746	5.227	5.731	5.606	5.827	ns
		GCLK PLL	t_{co}	1.297	1.488	1.905	2.010	2.225	2.251	2.254	2.121	2.330	2.355	2.247	ns
1.2 V	2mA	GCLK	t_{co}	3.285	3.542	5.111	5.567	6.149	6.022	6.287	5.701	6.278	6.150	6.374	ns
		GCLK PLL	t_{co}	1.509	1.693	2.311	2.386	2.646	2.672	2.675	2.595	2.754	2.779	2.671	ns
	4mA	GCLK	t_{co}	3.105	3.353	4.818	5.244	5.774	5.647	5.912	5.368	5.900	5.772	5.996	ns
		GCLK PLL	t_{co}	1.348	1.529	2.018	2.124	2.361	2.387	2.390	2.262	2.466	2.491	2.383	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.036	3.270	4.620	5.004	5.495	5.369	5.631	5.123	5.614	5.488	5.708	ns
		GCLK PLL	t_{co}	1.269	1.445	1.845	1.930	2.124	2.145	2.153	2.028	2.225	2.245	2.142	ns
	12mA	GCLK	t_{co}	3.031	3.266	4.617	5.002	5.493	5.367	5.628	5.122	5.613	5.487	5.706	ns
		GCLK PLL	t_{co}	1.264	1.441	1.842	1.928	2.122	2.143	2.151	2.027	2.224	2.244	2.141	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.022	3.255	4.602	4.986	5.476	5.350	5.611	5.105	5.595	5.469	5.688	ns
		GCLK PLL	t_{co}	1.255	1.430	1.827	1.912	2.105	2.126	2.134	2.010	2.206	2.226	2.123	ns

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Table 1–74. EP3SL150 Row Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.042	3.277	4.629	5.031	5.512	5.397	5.647	5.135	5.631	5.516	5.724	ns
		GCLK PLL	t_{co}	1.276	1.452	1.856	1.947	2.139	2.165	2.168	2.041	2.240	2.265	2.157	ns
	6mA	GCLK	t_{co}	3.027	3.263	4.626	5.030	5.511	5.396	5.646	5.133	5.629	5.514	5.722	ns
		GCLK PLL	t_{co}	1.271	1.447	1.854	1.946	2.138	2.164	2.167	2.039	2.238	2.263	2.155	ns
	8mA	GCLK	t_{co}	3.016	3.251	4.609	5.020	5.501	5.386	5.636	5.116	5.620	5.505	5.713	ns
		GCLK PLL	t_{co}	1.260	1.436	1.844	1.936	2.128	2.154	2.157	2.030	2.229	2.254	2.146	ns
	10mA	GCLK	t_{co}	2.992	3.228	4.593	5.007	5.488	5.373	5.623	5.101	5.608	5.493	5.701	ns
		GCLK PLL	t_{co}	1.249	1.425	1.831	1.923	2.115	2.141	2.144	2.018	2.217	2.242	2.134	ns
	12mA	GCLK	t_{co}	2.992	3.227	4.592	5.007	5.488	5.373	5.623	5.100	5.608	5.493	5.701	ns
		GCLK PLL	t_{co}	1.249	1.424	1.831	1.923	2.115	2.141	2.144	2.017	2.217	2.242	2.134	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.002	3.236	4.590	5.004	5.483	5.368	5.618	5.095	5.602	5.487	5.695	ns
		GCLK PLL	t_{co}	1.257	1.431	1.830	1.920	2.110	2.136	2.139	2.013	2.211	2.236	2.128	ns
	16mA	GCLK	t_{co}	2.996	3.231	4.589	5.012	5.493	5.378	5.628	5.097	5.613	5.498	5.706	ns
		GCLK PLL	t_{co}	1.258	1.434	1.836	1.928	2.120	2.146	2.149	2.022	2.222	2.247	2.139	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.038	3.273	4.640	5.042	5.526	5.410	5.664	5.148	5.644	5.528	5.740	ns
		GCLK PLL	t_{co}	1.279	1.455	1.865	1.958	2.152	2.178	2.181	2.051	2.252	2.277	2.169	ns
	6mA	GCLK	t_{co}	3.015	3.251	4.622	5.032	5.515	5.400	5.650	5.132	5.634	5.519	5.727	ns
		GCLK PLL	t_{co}	1.265	1.441	1.854	1.948	2.142	2.168	2.171	2.042	2.243	2.268	2.160	ns
	8mA	GCLK	t_{co}	2.998	3.234	4.605	5.019	5.502	5.387	5.637	5.114	5.621	5.506	5.714	ns
		GCLK PLL	t_{co}	1.254	1.429	1.841	1.935	2.129	2.155	2.158	2.029	2.230	2.255	2.147	ns

Table 1–74. EP3SL150 Row Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.017	3.249	4.596	5.002	5.481	5.366	5.616	5.099	5.599	5.484	5.692	ns
		GCLK PLL	t_{co}	1.264	1.437	1.829	1.918	2.108	2.134	2.137	2.012	2.208	2.233	2.125	ns
	6mA	GCLK	t_{co}	3.005	3.237	4.587	5.001	5.480	5.365	5.615	5.091	5.599	5.484	5.692	ns
		GCLK PLL	t_{co}	1.257	1.431	1.827	1.917	2.107	2.133	2.136	2.011	2.208	2.233	2.125	ns
	8mA	GCLK	t_{co}	2.992	3.225	4.578	4.994	5.473	5.358	5.608	5.083	5.592	5.477	5.685	ns
		GCLK PLL	t_{co}	1.248	1.423	1.820	1.910	2.100	2.126	2.129	2.004	2.201	2.226	2.118	ns
	10mA	GCLK	t_{co}	2.994	3.227	4.581	4.997	5.477	5.362	5.612	5.086	5.595	5.480	5.688	ns
		GCLK PLL	t_{co}	1.251	1.425	1.823	1.913	2.104	2.130	2.133	2.007	2.204	2.229	2.121	ns
	12mA	GCLK	t_{co}	2.987	3.222	4.579	5.000	5.480	5.365	5.615	5.086	5.600	5.485	5.693	ns
		GCLK PLL	t_{co}	1.247	1.422	1.825	1.916	2.107	2.133	2.136	2.010	2.209	2.234	2.126	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	2.993	3.226	4.574	4.997	5.476	5.361	5.611	5.077	5.594	5.479	5.687	ns
		GCLK PLL	t_{co}	1.255	1.430	1.823	1.913	2.103	2.129	2.132	2.006	2.203	2.228	2.120	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.024	3.256	4.607	5.012	5.492	5.377	5.627	5.111	5.610	5.495	5.703	ns
		GCLK PLL	t_{co}	1.270	1.443	1.838	1.928	2.119	2.145	2.148	2.021	2.219	2.244	2.136	ns
	6mA	GCLK	t_{co}	3.012	3.246	4.603	5.014	5.494	5.379	5.629	5.108	5.613	5.498	5.706	ns
		GCLK PLL	t_{co}	1.264	1.438	1.839	1.930	2.121	2.147	2.150	2.023	2.222	2.247	2.139	ns
	8mA	GCLK	t_{co}	3.008	3.241	4.597	5.009	5.489	5.374	5.624	5.102	5.607	5.492	5.700	ns
		GCLK PLL	t_{co}	1.260	1.434	1.834	1.925	2.116	2.142	2.145	2.018	2.216	2.241	2.133	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.023	3.255	4.618	5.028	5.511	5.396	5.646	5.125	5.629	5.514	5.722	ns
		GCLK PLL	t_{co}	1.272	1.445	1.851	1.944	2.138	2.164	2.167	2.037	2.238	2.263	2.155	ns
	6mA	GCLK	t_{co}	3.011	3.243	4.607	5.019	5.502	5.387	5.637	5.114	5.620	5.505	5.713	ns
		GCLK PLL	t_{co}	1.263	1.437	1.842	1.935	2.129	2.155	2.158	2.028	2.229	2.254	2.146	ns
	8mA	GCLK	t_{co}	3.007	3.241	4.611	5.027	5.511	5.396	5.646	5.120	5.630	5.515	5.723	ns
		GCLK PLL	t_{co}	1.262	1.437	1.849	1.943	2.138	2.164	2.167	2.037	2.239	2.264	2.156	ns
3.0-V PCI	—	GCLK	t_{co}	3.142	3.376	4.672	5.050	5.535	5.409	5.670	5.171	5.656	5.530	5.749	ns
		GCLK PLL	t_{co}	1.375	1.551	1.897	1.976	2.164	2.185	2.193	2.076	2.267	2.287	2.184	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.142	3.376	4.672	5.050	5.535	5.409	5.670	5.171	5.656	5.530	5.749	ns
		GCLK PLL	t_{co}	1.375	1.551	1.897	1.976	2.164	2.185	2.193	2.076	2.267	2.287	2.184	ns

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Table 1–75 through Table 1–75 list the maximum I/O timing parameters for EP3SL150 devices for differential I/O standards.

Table 1–75 lists the EP3SL150 column pins input timing parameters for differential I/O standards.

Table 1–75. EP3SL150 Column Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.978	-1.006	-1.151	-1.135	-1.286	-1.233	-1.594	-1.098	-1.339	-1.193	-1.632	ns
		t_h	1.104	1.152	1.371	1.387	1.564	1.502	1.860	1.361	1.634	1.471	1.898	ns
	GCLK PLL	t_{su}	0.967	1.001	1.885	2.230	2.404	2.293	2.197	2.284	2.556	2.353	2.249	ns
		t_h	-0.707	-0.719	-1.450	-1.735	-1.855	-1.769	-1.669	-1.780	-1.984	-1.818	-1.718	ns
MINI-LVDS	GCLK	t_{su}	-0.978	-1.006	-1.151	-1.135	-1.286	-1.233	-1.594	-1.098	-1.339	-1.193	-1.632	ns
		t_h	1.104	1.152	1.371	1.387	1.564	1.502	1.860	1.361	1.634	1.471	1.898	ns
	GCLK PLL	t_{su}	0.967	1.001	1.885	2.230	2.404	2.293	2.197	2.284	2.556	2.353	2.249	ns
		t_h	-0.707	-0.719	-1.450	-1.735	-1.855	-1.769	-1.669	-1.780	-1.984	-1.818	-1.718	ns
RSDS	GCLK	t_{su}	-0.978	-1.006	-1.151	-1.135	-1.286	-1.233	-1.594	-1.098	-1.339	-1.193	-1.632	ns
		t_h	1.104	1.152	1.371	1.387	1.564	1.502	1.860	1.361	1.634	1.471	1.898	ns
	GCLK PLL	t_{su}	0.967	1.001	1.885	2.230	2.404	2.293	2.197	2.284	2.556	2.353	2.249	ns
		t_h	-0.707	-0.719	-1.450	-1.735	-1.855	-1.769	-1.669	-1.780	-1.984	-1.818	-1.718	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.794	-0.829	-1.228	-1.334	-1.445	-1.387	-1.743	-1.333	-1.443	-1.391	-1.786	ns
		t_h	0.913	0.967	1.416	1.546	1.677	1.610	1.964	1.554	1.684	1.621	2.007	ns
	GCLK PLL	t_{su}	1.151	1.178	1.808	2.031	2.245	2.139	2.048	2.049	2.266	2.155	2.095	ns
		t_h	-0.898	-0.904	-1.405	-1.576	-1.742	-1.661	-1.565	-1.587	-1.753	-1.668	-1.609	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.794	-0.829	-1.228	-1.334	-1.445	-1.387	-1.743	-1.333	-1.443	-1.391	-1.786	ns
		t_h	0.913	0.967	1.416	1.546	1.677	1.610	1.964	1.554	1.684	1.621	2.007	ns
	GCLK PLL	t_{su}	1.151	1.178	1.808	2.031	2.245	2.139	2.048	2.049	2.266	2.155	2.095	ns
		t_h	-0.898	-0.904	-1.405	-1.576	-1.742	-1.661	-1.565	-1.587	-1.753	-1.668	-1.609	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns

Table 1–75. EP3SL150 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.802	-0.841	-1.238	-1.345	-1.461	-1.403	-1.759	-1.344	-1.458	-1.406	-1.801	ns
		t_h	0.921	0.979	1.426	1.557	1.693	1.626	1.980	1.565	1.699	1.636	2.022	ns
	GCLK PLL	t_{su}	1.143	1.166	1.798	2.020	2.229	2.123	2.032	2.038	2.251	2.140	2.080	ns
		t_h	-0.890	-0.892	-1.395	-1.565	-1.726	-1.645	-1.549	-1.576	-1.738	-1.653	-1.594	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.814	-0.852	-1.247	-1.356	-1.480	-1.422	-1.778	-1.355	-1.476	-1.424	-1.819	ns
		t_h	0.933	0.990	1.436	1.568	1.712	1.645	1.999	1.576	1.717	1.654	2.040	ns
	GCLK PLL	t_{su}	1.131	1.155	1.789	2.009	2.210	2.104	2.013	2.027	2.233	2.122	2.062	ns
		t_h	-0.878	-0.881	-1.385	-1.554	-1.707	-1.626	-1.530	-1.565	-1.720	-1.635	-1.576	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.821	-0.858	-1.259	-1.361	-1.480	-1.424	-1.777	-1.359	-1.471	-1.422	-1.815	ns
		t_h	0.940	0.996	1.449	1.576	1.715	1.648	2.003	1.583	1.717	1.653	2.041	ns
	GCLK PLL	t_{su}	1.124	1.149	1.777	2.004	2.210	2.102	2.014	2.023	2.238	2.124	2.066	ns
		t_h	-0.871	-0.875	-1.372	-1.546	-1.704	-1.623	-1.526	-1.558	-1.720	-1.636	-1.575	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.821	-0.858	-1.259	-1.361	-1.480	-1.424	-1.777	-1.359	-1.471	-1.422	-1.815	ns
		t_h	0.940	0.996	1.449	1.576	1.715	1.648	2.003	1.583	1.717	1.653	2.041	ns
	GCLK PLL	t_{su}	1.124	1.149	1.777	2.004	2.210	2.102	2.014	2.023	2.238	2.124	2.066	ns
		t_h	-0.871	-0.875	-1.372	-1.546	-1.704	-1.623	-1.526	-1.558	-1.720	-1.636	-1.575	ns

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Table 1–76 lists the EP3SL150 row pins input timing parameters for differential I/O standards.

Table 1–76. EP3SL150 Row Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.919	-0.950	-1.021	-0.981	-1.115	-1.070	-1.404	-0.940	-1.066	-1.023	-1.442	ns
		t_h	1.043	1.092	1.245	1.237	1.395	1.339	1.672	1.207	1.358	1.303	1.711	ns
	GCLK PLL	t_{su}	0.959	0.987	1.949	2.324	2.527	2.403	2.334	2.384	2.597	2.470	2.387	ns
		t_h	-0.698	-0.708	-1.513	-1.828	-1.977	-1.881	-1.804	-1.875	-2.032	-1.933	-1.853	ns
MINI-LVDS	GCLK	t_{su}	-0.919	-0.950	-1.021	-0.981	-1.115	-1.070	-1.404	-0.940	-1.066	-1.023	-1.442	ns
		t_h	1.043	1.092	1.245	1.237	1.395	1.339	1.672	1.207	1.358	1.303	1.711	ns
	GCLK PLL	t_{su}	0.959	0.987	1.949	2.324	2.527	2.403	2.334	2.384	2.597	2.470	2.387	ns
		t_h	-0.698	-0.708	-1.513	-1.828	-1.977	-1.881	-1.804	-1.875	-2.032	-1.933	-1.853	ns
RSDS	GCLK	t_{su}	-0.919	-0.950	-1.021	-0.981	-1.115	-1.070	-1.404	-0.940	-1.066	-1.023	-1.442	ns
		t_h	1.043	1.092	1.245	1.237	1.395	1.339	1.672	1.207	1.358	1.303	1.711	ns
	GCLK PLL	t_{su}	0.959	0.987	1.949	2.324	2.527	2.403	2.334	2.384	2.597	2.470	2.387	ns
		t_h	-0.698	-0.708	-1.513	-1.828	-1.977	-1.881	-1.804	-1.875	-2.032	-1.933	-1.853	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.724	-0.765	-1.113	-1.210	-1.304	-1.254	-1.583	-1.211	-1.303	-1.255	-1.626	ns
		t_h	0.841	0.898	1.302	1.420	1.535	1.474	1.802	1.429	1.543	1.483	1.846	ns
	GCLK PLL	t_{su}	1.154	1.172	1.862	2.100	2.338	2.219	2.155	2.117	2.360	2.238	2.203	ns
		t_h	-0.900	-0.902	-1.458	-1.649	-1.837	-1.746	-1.674	-1.657	-1.847	-1.753	-1.718	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.724	-0.765	-1.113	-1.210	-1.304	-1.254	-1.583	-1.211	-1.303	-1.255	-1.626	ns
		t_h	0.841	0.898	1.302	1.420	1.535	1.474	1.802	1.429	1.543	1.483	1.846	ns
	GCLK PLL	t_{su}	1.154	1.172	1.862	2.100	2.338	2.219	2.155	2.117	2.360	2.238	2.203	ns
		t_h	-0.900	-0.902	-1.458	-1.649	-1.837	-1.746	-1.674	-1.657	-1.847	-1.753	-1.718	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns

Table 1–76. EP3SL150 Row Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.733	-0.777	-1.122	-1.220	-1.320	-1.270	-1.599	-1.220	-1.319	-1.271	-1.642	ns
		t_h	0.850	0.910	1.311	1.430	1.551	1.490	1.818	1.438	1.559	1.499	1.862	ns
	GCLK PLL	t_{su}	1.145	1.160	1.853	2.090	2.322	2.203	2.139	2.108	2.344	2.222	2.187	ns
		t_h	-0.891	-0.890	-1.449	-1.639	-1.821	-1.730	-1.658	-1.648	-1.831	-1.737	-1.702	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.747	-0.789	-1.131	-1.230	-1.338	-1.288	-1.617	-1.231	-1.336	-1.288	-1.659	ns
		t_h	0.864	0.922	1.321	1.440	1.569	1.508	1.836	1.449	1.576	1.516	1.879	ns
	GCLK PLL	t_{su}	1.131	1.148	1.840	2.080	2.304	2.185	2.121	2.097	2.327	2.205	2.170	ns
		t_h	-0.877	-0.878	-1.437	-1.629	-1.803	-1.712	-1.640	-1.637	-1.814	-1.720	-1.685	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.756	-0.798	-1.145	-1.241	-1.345	-1.296	-1.623	-1.238	-1.337	-1.291	-1.661	ns
		t_h	0.873	0.931	1.336	1.454	1.579	1.518	1.847	1.459	1.582	1.521	1.886	ns
	GCLK PLL	t_{su}	1.122	1.139	1.825	2.064	2.293	2.173	2.110	2.086	2.321	2.197	2.163	ns
		t_h	-0.868	-0.869	-1.422	-1.611	-1.789	-1.698	-1.625	-1.623	-1.805	-1.711	-1.674	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.756	-0.798	-1.145	-1.241	-1.345	-1.296	-1.623	-1.238	-1.337	-1.291	-1.661	ns
		t_h	0.873	0.931	1.336	1.454	1.579	1.518	1.847	1.459	1.582	1.521	1.886	ns
	GCLK PLL	t_{su}	1.122	1.139	1.825	2.064	2.293	2.173	2.110	2.086	2.321	2.197	2.163	ns
		t_h	-0.868	-0.869	-1.422	-1.611	-1.789	-1.698	-1.625	-1.623	-1.805	-1.711	-1.674	ns

Table 1–77 lists the EP3SL150 column pins output timing parameters for differential I/O standards.

Table 1–77. EP3SL150 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.100	3.330	4.687	5.079	5.586	5.447	5.731	5.200	5.706	5.570	5.803	ns
		GCLK PLL	t_{co}	1.308	1.480	1.885	1.978	2.188	2.199	2.226	2.081	2.293	2.303	2.211	ns
LVDS_E_3R	—	GCLK	t_{co}	3.096	3.333	4.734	5.134	5.648	5.509	5.793	5.259	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.304	1.483	1.932	2.033	2.250	2.261	2.288	2.140	2.359	2.369	2.277	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.100	3.330	4.687	5.079	5.586	5.447	5.731	5.200	5.706	5.570	5.803	ns
		GCLK PLL	t_{co}	1.308	1.480	1.885	1.978	2.188	2.199	2.226	2.081	2.293	2.303	2.211	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.096	3.333	4.734	5.134	5.648	5.509	5.793	5.259	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.304	1.483	1.932	2.033	2.250	2.261	2.288	2.140	2.359	2.369	2.277	ns
RSDS_E_1R	—	GCLK	t_{co}	3.100	3.330	4.687	5.079	5.586	5.447	5.731	5.200	5.706	5.570	5.803	ns
		GCLK PLL	t_{co}	1.308	1.480	1.885	1.978	2.188	2.199	2.226	2.081	2.293	2.303	2.211	ns
RSDS_E_3R	—	GCLK	t_{co}	3.096	3.333	4.734	5.134	5.648	5.509	5.793	5.259	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.304	1.483	1.932	2.033	2.250	2.261	2.288	2.140	2.359	2.369	2.277	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.127	3.363	4.758	5.157	5.670	5.531	5.815	5.280	5.792	5.656	5.889	ns
		GCLK PLL	t_{co}	1.335	1.513	1.956	2.056	2.272	2.283	2.310	2.161	2.379	2.389	2.297	ns
	6mA	GCLK	t_{co}	3.117	3.353	4.748	5.146	5.660	5.521	5.805	5.269	5.782	5.646	5.879	ns
		GCLK PLL	t_{co}	1.325	1.503	1.946	2.045	2.262	2.273	2.300	2.150	2.369	2.379	2.287	ns
	8mA	GCLK	t_{co}	3.117	3.353	4.751	5.150	5.664	5.525	5.809	5.274	5.787	5.651	5.884	ns
		GCLK PLL	t_{co}	1.325	1.503	1.949	2.049	2.266	2.277	2.304	2.155	2.374	2.384	2.292	ns
	10mA	GCLK	t_{co}	3.110	3.347	4.744	5.144	5.658	5.519	5.803	5.267	5.781	5.645	5.878	ns
		GCLK PLL	t_{co}	1.318	1.497	1.942	2.043	2.260	2.271	2.298	2.148	2.368	2.378	2.286	ns
	12mA	GCLK	t_{co}	3.109	3.345	4.741	5.141	5.655	5.516	5.800	5.264	5.777	5.641	5.874	ns
		GCLK PLL	t_{co}	1.317	1.495	1.939	2.040	2.257	2.268	2.295	2.145	2.364	2.374	2.282	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.131	3.367	4.762	5.161	5.674	5.535	5.819	5.284	5.797	5.661	5.894	ns
		GCLK PLL	t_{co}	1.339	1.517	1.960	2.060	2.276	2.287	2.314	2.165	2.384	2.394	2.302	ns

Table 1–77. EP3SL150 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.121	3.356	4.741	5.138	5.649	5.510	5.794	5.260	5.770	5.634	5.867	ns
		GCLK PLL	t_{co}	1.329	1.506	1.939	2.037	2.251	2.262	2.289	2.141	2.357	2.367	2.275	ns
	6mA	GCLK	t_{co}	3.116	3.352	4.741	5.138	5.650	5.511	5.795	5.261	5.772	5.636	5.869	ns
		GCLK PLL	t_{co}	1.324	1.502	1.939	2.037	2.252	2.263	2.290	2.142	2.359	2.369	2.277	ns
	8mA	GCLK	t_{co}	3.114	3.350	4.740	5.137	5.648	5.509	5.793	5.260	5.771	5.635	5.868	ns
		GCLK PLL	t_{co}	1.322	1.500	1.938	2.036	2.250	2.261	2.288	2.141	2.358	2.368	2.276	ns
	10mA	GCLK	t_{co}	3.106	3.341	4.730	5.127	5.639	5.500	5.784	5.250	5.761	5.625	5.858	ns
		GCLK PLL	t_{co}	1.314	1.491	1.928	2.026	2.241	2.252	2.279	2.131	2.348	2.358	2.266	ns
	12mA	GCLK	t_{co}	3.107	3.343	4.736	5.134	5.647	5.508	5.792	5.258	5.770	5.634	5.867	ns
		GCLK PLL	t_{co}	1.315	1.493	1.934	2.033	2.249	2.260	2.287	2.139	2.357	2.367	2.275	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.340	4.719	5.115	5.625	5.486	5.770	5.237	5.746	5.610	5.843	ns
		GCLK PLL	t_{co}	1.314	1.490	1.917	2.014	2.227	2.238	2.265	2.118	2.333	2.343	2.251	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.118	3.353	4.737	5.133	5.643	5.504	5.788	5.256	5.765	5.629	5.862	ns
		GCLK PLL	t_{co}	1.326	1.503	1.935	2.032	2.245	2.256	2.283	2.137	2.352	2.362	2.270	ns
	6mA	GCLK	t_{co}	3.114	3.350	4.738	5.135	5.647	5.508	5.792	5.258	5.769	5.633	5.866	ns
		GCLK PLL	t_{co}	1.322	1.500	1.936	2.034	2.249	2.260	2.287	2.139	2.356	2.366	2.274	ns
	8mA	GCLK	t_{co}	3.104	3.339	4.727	5.124	5.635	5.496	5.780	5.247	5.757	5.621	5.854	ns
		GCLK PLL	t_{co}	1.312	1.489	1.925	2.023	2.237	2.248	2.275	2.128	2.344	2.354	2.262	ns
	10mA	GCLK	t_{co}	3.102	3.337	4.725	5.121	5.633	5.494	5.778	5.245	5.755	5.619	5.852	ns
		GCLK PLL	t_{co}	1.310	1.487	1.923	2.020	2.235	2.246	2.273	2.126	2.342	2.352	2.260	ns
	12mA	GCLK	t_{co}	3.102	3.338	4.728	5.126	5.638	5.499	5.783	5.249	5.761	5.625	5.858	ns
		GCLK PLL	t_{co}	1.310	1.488	1.926	2.025	2.240	2.251	2.278	2.130	2.348	2.358	2.266	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.341	4.725	5.121	5.632	5.493	5.777	5.244	5.754	5.618	5.851	ns
		GCLK PLL	t_{co}	1.314	1.491	1.923	2.020	2.234	2.245	2.272	2.125	2.341	2.351	2.259	ns

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Table 1–77. EP3SL150 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.132	3.370	4.770	5.169	5.682	5.543	5.827	5.292	5.804	5.668	5.901	ns
		GCLK PLL	t_{co}	1.340	1.520	1.968	2.068	2.284	2.295	2.322	2.173	2.391	2.401	2.309	ns
	6mA	GCLK	t_{co}	3.118	3.356	4.758	5.158	5.672	5.533	5.817	5.282	5.795	5.659	5.892	ns
		GCLK PLL	t_{co}	1.326	1.506	1.956	2.057	2.274	2.285	2.312	2.163	2.382	2.392	2.300	ns
	8mA	GCLK	t_{co}	3.106	3.343	4.741	5.140	5.654	5.515	5.799	5.264	5.777	5.641	5.874	ns
		GCLK PLL	t_{co}	1.314	1.493	1.939	2.039	2.256	2.267	2.294	2.145	2.364	2.374	2.282	ns
	10mA	GCLK	t_{co}	3.106	3.343	4.744	5.144	5.658	5.519	5.803	5.268	5.782	5.646	5.879	ns
		GCLK PLL	t_{co}	1.314	1.493	1.942	2.043	2.260	2.271	2.298	2.149	2.369	2.379	2.287	ns
	12mA	GCLK	t_{co}	3.102	3.339	4.737	5.136	5.651	5.512	5.796	5.261	5.774	5.638	5.871	ns
		GCLK PLL	t_{co}	1.310	1.489	1.935	2.035	2.253	2.264	2.291	2.142	2.361	2.371	2.279	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.106	3.341	4.730	5.127	5.639	5.500	5.784	5.250	5.761	5.625	5.858	ns
		GCLK PLL	t_{co}	1.314	1.491	1.928	2.026	2.241	2.252	2.279	2.131	2.348	2.358	2.266	ns
	16mA	GCLK	t_{co}	3.107	3.343	4.738	5.137	5.650	5.511	5.795	5.260	5.773	5.637	5.870	ns
		GCLK PLL	t_{co}	1.315	1.493	1.936	2.036	2.252	2.263	2.290	2.141	2.360	2.370	2.278	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.135	3.373	4.769	5.167	5.680	5.541	5.825	5.291	5.802	5.666	5.899	ns
		GCLK PLL	t_{co}	1.343	1.523	1.967	2.066	2.282	2.293	2.320	2.172	2.389	2.399	2.307	ns
	6mA	GCLK	t_{co}	3.124	3.361	4.757	5.155	5.668	5.529	5.813	5.279	5.790	5.654	5.887	ns
		GCLK PLL	t_{co}	1.332	1.511	1.955	2.054	2.270	2.281	2.308	2.160	2.377	2.387	2.295	ns
	8mA	GCLK	t_{co}	3.119	3.357	4.757	5.156	5.669	5.530	5.814	5.280	5.792	5.656	5.889	ns
		GCLK PLL	t_{co}	1.327	1.507	1.955	2.055	2.271	2.282	2.309	2.161	2.379	2.389	2.297	ns
	10mA	GCLK	t_{co}	3.105	3.342	4.739	5.137	5.650	5.511	5.795	5.261	5.774	5.638	5.871	ns
		GCLK PLL	t_{co}	1.313	1.492	1.937	2.036	2.252	2.263	2.290	2.142	2.361	2.371	2.279	ns
	12mA	GCLK	t_{co}	3.103	3.340	4.737	5.135	5.648	5.509	5.793	5.259	5.771	5.635	5.868	ns
		GCLK PLL	t_{co}	1.311	1.490	1.935	2.034	2.250	2.261	2.288	2.140	2.358	2.368	2.276	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.107	3.342	4.729	5.125	5.636	5.497	5.781	5.248	5.758	5.622	5.855	ns
		GCLK PLL	t_{co}	1.315	1.492	1.927	2.024	2.238	2.249	2.276	2.129	2.345	2.355	2.263	ns
	16mA	GCLK	t_{co}	3.107	3.343	4.737	5.135	5.648	5.509	5.793	5.259	5.771	5.635	5.868	ns
		GCLK PLL	t_{co}	1.315	1.493	1.935	2.034	2.250	2.261	2.288	2.140	2.358	2.368	2.276	ns

Table 1–77. EP3SL150 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.123	3.360	4.753	5.150	5.662	5.523	5.807	5.274	5.784	5.648	5.881	ns
		GCLK PLL	t_{co}	1.331	1.510	1.951	2.049	2.264	2.275	2.302	2.155	2.371	2.381	2.289	ns
	10mA	GCLK	t_{co}	3.123	3.360	4.753	5.150	5.662	5.523	5.807	5.274	5.784	5.648	5.881	ns
		GCLK PLL	t_{co}	1.331	1.510	1.951	2.049	2.264	2.275	2.302	2.155	2.371	2.381	2.289	ns
	12mA	GCLK	t_{co}	3.113	3.350	4.743	5.140	5.652	5.513	5.797	5.264	5.775	5.639	5.872	ns
		GCLK PLL	t_{co}	1.321	1.500	1.941	2.039	2.254	2.265	2.292	2.145	2.362	2.372	2.280	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.106	3.342	4.729	5.125	5.636	5.497	5.781	5.248	5.758	5.622	5.855	ns
		GCLK PLL	t_{co}	1.314	1.492	1.927	2.024	2.238	2.249	2.276	2.129	2.345	2.355	2.263	ns

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Table 1–78 lists the EP3SL150 row pins output timing parameters for differential I/O standards.

Table 1–78. EP3SL150 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.711	2.894	4.033	4.387	4.843	4.717	4.978	4.486	4.943	4.816	5.035	ns
		GCLK PLL	t_{co}	0.934	1.059	1.248	1.300	1.459	1.480	1.491	1.379	1.542	1.561	1.459	ns
LVDS_E_1R	—	GCLK	t_{co}	3.106	3.342	4.709	5.107	5.611	5.475	5.730	5.229	5.736	5.599	5.802	ns
		GCLK PLL	t_{co}	1.326	1.503	1.919	2.016	2.222	2.235	2.238	2.120	2.330	2.340	2.222	ns
LVDS_E_3R	—	GCLK	t_{co}	3.088	3.332	4.747	5.153	5.665	5.529	5.784	5.280	5.797	5.660	5.863	ns
		GCLK PLL	t_{co}	1.308	1.493	1.957	2.062	2.276	2.289	2.292	2.171	2.391	2.401	2.283	ns
MINI-LVDS	—	GCLK	t_{co}	2.711	2.894	4.033	4.387	4.843	4.717	4.978	4.486	4.943	4.816	5.035	ns
		GCLK PLL	t_{co}	0.934	1.059	1.248	1.300	1.459	1.480	1.491	1.379	1.542	1.561	1.459	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.106	3.342	4.709	5.107	5.611	5.475	5.730	5.229	5.736	5.599	5.802	ns
		GCLK PLL	t_{co}	1.326	1.503	1.919	2.016	2.222	2.235	2.238	2.120	2.330	2.340	2.222	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.088	3.332	4.747	5.153	5.665	5.529	5.784	5.280	5.797	5.660	5.863	ns
		GCLK PLL	t_{co}	1.308	1.493	1.957	2.062	2.276	2.289	2.292	2.171	2.391	2.401	2.283	ns
RSDS	—	GCLK	t_{co}	2.711	2.894	4.033	4.387	4.843	4.717	4.978	4.486	4.943	4.816	5.035	ns
		GCLK PLL	t_{co}	0.934	1.059	1.248	1.300	1.459	1.480	1.491	1.379	1.542	1.561	1.459	ns
RSDS_E_1R	—	GCLK	t_{co}	3.106	3.342	4.709	5.107	5.611	5.475	5.730	5.229	5.736	5.599	5.802	ns
		GCLK PLL	t_{co}	1.326	1.503	1.919	2.016	2.222	2.235	2.238	2.120	2.330	2.340	2.222	ns
RSDS_E_3R	—	GCLK	t_{co}	3.088	3.332	4.747	5.153	5.665	5.529	5.784	5.280	5.797	5.660	5.863	ns
		GCLK PLL	t_{co}	1.308	1.493	1.957	2.062	2.276	2.289	2.292	2.171	2.391	2.401	2.283	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.132	3.375	4.783	5.187	5.698	5.562	5.817	5.313	5.826	5.689	5.892	ns
		GCLK PLL	t_{co}	1.352	1.536	1.993	2.096	2.309	2.322	2.325	2.204	2.420	2.430	2.312	ns
	6mA	GCLK	t_{co}	3.118	3.361	4.770	5.174	5.685	5.549	5.804	5.299	5.813	5.676	5.879	ns
		GCLK PLL	t_{co}	1.338	1.522	1.980	2.083	2.296	2.309	2.312	2.190	2.407	2.417	2.299	ns
	8mA	GCLK	t_{co}	3.114	3.357	4.768	5.174	5.686	5.550	5.805	5.299	5.815	5.678	5.881	ns
		GCLK PLL	t_{co}	1.334	1.518	1.978	2.083	2.297	2.310	2.313	2.190	2.409	2.419	2.301	ns

Table 1–78. EP3SL150 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.130	3.372	4.769	5.171	5.680	5.544	5.799	5.296	5.808	5.671	5.874	ns
		GCLK PLL	t_{co}	1.350	1.533	1.979	2.080	2.291	2.304	2.307	2.187	2.402	2.412	2.294	ns
	6mA	GCLK	t_{co}	3.119	3.362	4.765	5.167	5.677	5.541	5.796	5.293	5.805	5.668	5.871	ns
		GCLK PLL	t_{co}	1.339	1.523	1.975	2.076	2.288	2.301	2.304	2.184	2.399	2.409	2.291	ns
	8mA	GCLK	t_{co}	3.116	3.359	4.763	5.165	5.675	5.539	5.794	5.291	5.804	5.667	5.870	ns
		GCLK PLL	t_{co}	1.336	1.520	1.973	2.074	2.286	2.299	2.302	2.182	2.398	2.408	2.290	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.127	3.369	4.764	5.166	5.674	5.538	5.793	5.291	5.802	5.665	5.868	ns
		GCLK PLL	t_{co}	1.347	1.530	1.974	2.075	2.285	2.298	2.301	2.182	2.396	2.406	2.288	ns
	6mA	GCLK	t_{co}	3.117	3.360	4.762	5.164	5.673	5.537	5.792	5.290	5.802	5.665	5.868	ns
		GCLK PLL	t_{co}	1.337	1.521	1.972	2.073	2.284	2.297	2.300	2.181	2.396	2.406	2.288	ns
	8mA	GCLK	t_{co}	3.103	3.346	4.747	5.149	5.659	5.523	5.778	5.275	5.787	5.650	5.853	ns
		GCLK PLL	t_{co}	1.323	1.507	1.957	2.058	2.270	2.283	2.286	2.166	2.381	2.391	2.273	ns
	10mA	GCLK	t_{co}	3.100	3.342	4.743	5.145	5.655	5.519	5.774	5.271	5.783	5.646	5.849	ns
		GCLK PLL	t_{co}	1.320	1.503	1.953	2.054	2.266	2.279	2.282	2.162	2.377	2.387	2.269	ns
	12mA	GCLK	t_{co}	3.097	3.340	4.744	5.148	5.658	5.522	5.777	5.274	5.787	5.650	5.853	ns
		GCLK PLL	t_{co}	1.317	1.501	1.954	2.057	2.269	2.282	2.285	2.165	2.381	2.391	2.273	ns
	16mA	GCLK	t_{co}	3.098	3.340	4.734	5.136	5.645	5.509	5.764	5.261	5.773	5.636	5.839	ns
		GCLK PLL	t_{co}	1.318	1.501	1.944	2.045	2.256	2.269	2.272	2.152	2.367	2.377	2.259	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.147	3.393	4.805	5.209	5.721	5.585	5.840	5.335	5.849	5.712	5.915	ns
		GCLK PLL	t_{co}	1.367	1.554	2.015	2.118	2.332	2.345	2.348	2.226	2.443	2.453	2.335	ns
	6mA	GCLK	t_{co}	3.123	3.369	4.787	5.192	5.704	5.568	5.823	5.318	5.834	5.697	5.900	ns
		GCLK PLL	t_{co}	1.343	1.530	1.997	2.101	2.315	2.328	2.331	2.209	2.428	2.438	2.320	ns
	8mA	GCLK	t_{co}	3.106	3.350	4.765	5.170	5.682	5.546	5.801	5.296	5.812	5.675	5.878	ns
		GCLK PLL	t_{co}	1.326	1.511	1.975	2.079	2.293	2.306	2.309	2.187	2.406	2.416	2.298	ns

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Table 1–78. EP3SL150 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.151	3.396	4.805	5.209	5.720	5.584	5.839	5.335	5.849	5.712	5.915	ns
		GCLK PLL	t_{co}	1.371	1.557	2.015	2.118	2.331	2.344	2.347	2.226	2.443	2.453	2.335	ns
	6mA	GCLK	t_{co}	3.136	3.381	4.791	5.194	5.705	5.569	5.824	5.320	5.834	5.697	5.900	ns
		GCLK PLL	t_{co}	1.356	1.542	2.001	2.103	2.316	2.329	2.332	2.211	2.428	2.438	2.320	ns
	8mA	GCLK	t_{co}	3.125	3.370	4.786	5.191	5.702	5.566	5.821	5.317	5.832	5.695	5.898	ns
		GCLK PLL	t_{co}	1.345	1.531	1.996	2.100	2.313	2.326	2.329	2.208	2.426	2.436	2.318	ns
	10mA	GCLK	t_{co}	3.105	3.350	4.763	5.167	5.679	5.543	5.798	5.294	5.808	5.671	5.874	ns
		GCLK PLL	t_{co}	1.325	1.511	1.973	2.076	2.290	2.303	2.306	2.185	2.402	2.412	2.294	ns
	12mA	GCLK	t_{co}	3.102	3.346	4.759	5.164	5.675	5.539	5.794	5.290	5.805	5.668	5.871	ns
		GCLK PLL	t_{co}	1.322	1.507	1.969	2.073	2.286	2.299	2.302	2.181	2.399	2.409	2.291	ns
	8mA	GCLK	t_{co}	3.107	3.350	4.750	5.152	5.661	5.525	5.780	5.277	5.789	5.652	5.855	ns
		GCLK PLL	t_{co}	1.327	1.511	1.960	2.061	2.272	2.285	2.288	2.168	2.383	2.393	2.275	ns
	16mA	GCLK	t_{co}	3.100	3.343	4.749	5.153	5.664	5.528	5.783	5.280	5.794	5.657	5.860	ns
		GCLK PLL	t_{co}	1.320	1.504	1.959	2.062	2.275	2.288	2.291	2.171	2.388	2.398	2.280	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.138	3.382	4.787	5.190	5.700	5.564	5.819	5.316	5.829	5.692	5.895	ns
		GCLK PLL	t_{co}	1.358	1.543	1.997	2.099	2.311	2.324	2.327	2.207	2.423	2.433	2.315	ns
	12mA	GCLK	t_{co}	3.120	3.365	4.772	5.175	5.685	5.549	5.804	5.301	5.814	5.677	5.880	ns
		GCLK PLL	t_{co}	1.340	1.526	1.982	2.084	2.296	2.309	2.312	2.192	2.408	2.418	2.300	ns
	16mA	GCLK	t_{co}	3.106	3.349	4.749	5.151	5.660	5.524	5.779	5.277	5.789	5.652	5.855	ns
		GCLK PLL	t_{co}	1.326	1.510	1.959	2.060	2.271	2.284	2.287	2.168	2.383	2.393	2.275	ns

Table 1–79 and Table 1–80 list the EP3SL150 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–79 lists the EP3SL150 column pin delay adders when using the regional clock.

Table 1–79. EP3SL150 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.198	0.152	0.22	0.258	0.27	0.262	0.393	0.244	0.271	0.261	0.495	ns
RCLK PLL input adder	2.453	2.426	3.654	4.098	4.422	4.224	4.664	4.106	4.447	4.101	4.707	ns
RCLK output adder	-0.374	-0.152	-0.216	-0.232	-0.248	-0.227	-0.367	-0.11	-0.127	-0.106	-0.303	ns
RCLK PLL output adder	-2.017	-1.798	-2.68	-2.859	-3.011	-2.872	-2.715	-2.714	-3.082	-2.791	-2.766	ns

Table 1–80 lists the EP3SL150 row pin delay adders when using the regional clock.

Table 1–80. EP3SL150 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.107	0.115	0.164	0.165	0.167	0.165	0.285	0.158	0.159	0.158	0.29	ns
RCLK PLL input adder	0.074	0.075	0.116	0.123	0.129	0.126	0.218	0.114	0.118	0.114	0.223	ns
RCLK output adder	-0.093	-0.103	-0.137	-0.136	-0.133	-0.134	-0.257	-0.125	-0.121	-0.122	-0.261	ns
RCLK PLL output adder	-0.063	-0.065	-0.097	-0.102	-0.103	-0.102	-0.198	-0.088	-0.089	-0.088	-0.202	ns

EP3SL200 I/O Timing Parameters

Table 1–81 through Table 1–84 list the maximum I/O timing parameters for EP3SL200 devices for single-ended I/O standards.

Table 1–81 lists the EP3SL200 column pins input timing parameters for single-ended I/O standards.

Table 1–81. EP3SL200 Column Pins Input Timing Parameters (Part 1 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.137	-1.173	-1.810	-1.775	-2.002	-1.934	-2.482	-1.775	-2.002	-1.934	-2.482	ns
		t_h	1.285	1.319	2.032	2.008	2.259	2.177	2.724	2.008	2.259	2.177	2.724	ns
	GCLK PLL	t_{su}	-1.465	-1.465	-2.238	-2.271	-2.558	-2.477	-2.997	-2.271	-2.558	-2.477	-2.997	ns
		t_h	1.778	1.778	2.727	2.776	3.113	3.000	3.543	2.776	3.113	3.000	3.543	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.137	-1.173	-1.810	-1.775	-2.002	-1.934	-2.482	-1.775	-2.002	-1.934	-2.482	ns
		t_h	1.285	1.319	2.032	2.008	2.259	2.177	2.724	2.008	2.259	2.177	2.724	ns
	GCLK PLL	t_{su}	-1.465	-1.465	-2.238	-2.271	-2.558	-2.477	-2.997	-2.271	-2.558	-2.477	-2.997	ns
		t_h	1.778	1.778	2.727	2.776	3.113	3.000	3.543	2.776	3.113	3.000	3.543	ns

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Table 1–81. EP3SL200 Column Pins Input Timing Parameters (Part 2 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVTTL	GCLK	t_{su}	-1.148	-1.184	-1.809	-1.777	-2.001	-1.933	-2.481	-1.777	-2.001	-1.933	-2.481	ns
		t_h	1.296	1.330	2.031	2.010	2.258	2.176	2.723	2.010	2.258	2.176	2.723	ns
	GCLK PLL	t_{su}	-1.476	-1.476	-2.237	-2.273	-2.557	-2.476	-2.996	-2.273	-2.557	-2.476	-2.996	ns
		t_h	1.789	1.789	2.726	2.778	3.112	2.999	3.542	2.778	3.112	2.999	3.542	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.148	-1.184	-1.809	-1.777	-2.001	-1.933	-2.481	-1.777	-2.001	-1.933	-2.481	ns
		t_h	1.296	1.330	2.031	2.010	2.258	2.176	2.723	2.010	2.258	2.176	2.723	ns
	GCLK PLL	t_{su}	-1.476	-1.476	-2.237	-2.273	-2.557	-2.476	-2.996	-2.273	-2.557	-2.476	-2.996	ns
		t_h	1.789	1.789	2.726	2.778	3.112	2.999	3.542	2.778	3.112	2.999	3.542	ns
2.5 V	GCLK	t_{su}	-1.143	-1.179	-1.818	-1.789	-2.020	-1.952	-2.500	-1.789	-2.020	-1.952	-2.500	ns
		t_h	1.291	1.325	2.040	2.022	2.277	2.195	2.742	2.022	2.277	2.195	2.742	ns
	GCLK PLL	t_{su}	-1.471	-1.471	-2.246	-2.285	-2.576	-2.495	-3.015	-2.285	-2.576	-2.495	-3.015	ns
		t_h	1.784	1.784	2.735	2.790	3.131	3.018	3.561	2.790	3.131	3.018	3.561	ns
1.8 V	GCLK	t_{su}	-1.163	-1.201	-1.858	-1.825	-2.018	-1.950	-2.498	-1.825	-2.018	-1.950	-2.498	ns
		t_h	1.313	1.349	2.080	2.058	2.275	2.193	2.740	2.058	2.275	2.193	2.740	ns
	GCLK PLL	t_{su}	-1.493	-1.493	-2.286	-2.321	-2.574	-2.493	-3.013	-2.321	-2.574	-2.493	-3.013	ns
		t_h	1.808	1.808	2.775	2.826	3.129	3.016	3.559	2.826	3.129	3.016	3.559	ns
1.5 V	GCLK	t_{su}	-1.153	-1.191	-1.835	-1.793	-1.948	-1.880	-2.428	-1.793	-1.948	-1.880	-2.428	ns
		t_h	1.303	1.339	2.057	2.026	2.205	2.123	2.670	2.026	2.205	2.123	2.670	ns
	GCLK PLL	t_{su}	-1.483	-1.483	-2.263	-2.289	-2.504	-2.423	-2.943	-2.289	-2.504	-2.423	-2.943	ns
		t_h	1.798	1.798	2.752	2.794	3.059	2.946	3.489	2.794	3.059	2.946	3.489	ns
1.2 V	GCLK	t_{su}	-1.101	-1.139	-1.758	-1.694	-1.792	-1.724	-2.272	-1.694	-1.792	-1.724	-2.272	ns
		t_h	1.251	1.287	1.980	1.927	2.049	1.967	2.514	1.927	2.049	1.967	2.514	ns
	GCLK PLL	t_{su}	-1.431	-1.431	-2.186	-2.190	-2.348	-2.267	-2.787	-2.190	-2.348	-2.267	-2.787	ns
		t_h	1.746	1.746	2.675	2.695	2.903	2.790	3.333	2.695	2.903	2.790	3.333	ns
SSTL-2 CLASS I	GCLK	t_{su}	-1.072	-1.110	-1.730	-1.678	-1.794	-1.726	-2.274	-1.678	-1.794	-1.726	-2.274	ns
		t_h	1.222	1.258	1.952	1.911	2.051	1.969	2.516	1.911	2.051	1.969	2.516	ns
	GCLK PLL	t_{su}	-1.402	-1.402	-2.158	-2.174	-2.350	-2.269	-2.789	-2.174	-2.350	-2.269	-2.789	ns
		t_h	1.717	1.717	2.647	2.679	2.905	2.792	3.335	2.679	2.905	2.792	3.335	ns
SSTL-2 CLASS II	GCLK	t_{su}	-1.072	-1.110	-1.730	-1.678	-1.794	-1.726	-2.274	-1.678	-1.794	-1.726	-2.274	ns
		t_h	1.222	1.258	1.952	1.911	2.051	1.969	2.516	1.911	2.051	1.969	2.516	ns
	GCLK PLL	t_{su}	-1.402	-1.402	-2.158	-2.174	-2.350	-2.269	-2.789	-2.174	-2.350	-2.269	-2.789	ns
		t_h	1.717	1.717	2.647	2.679	2.905	2.792	3.335	2.679	2.905	2.792	3.335	ns
SSTL-18 CLASS I	GCLK	t_{su}	-1.066	-1.104	-1.717	-1.673	-1.794	-1.724	-2.272	-1.673	-1.794	-1.724	-2.272	ns
		t_h	1.216	1.252	1.939	1.903	2.048	1.966	2.509	1.903	2.048	1.966	2.509	ns
	GCLK PLL	t_{su}	-1.396	-1.396	-2.145	-2.166	-2.347	-2.264	-2.787	-2.166	-2.347	-2.264	-2.787	ns
		t_h	1.711	1.711	2.634	2.668	2.899	2.786	3.328	2.668	2.899	2.786	3.328	ns

Table 1–81. EP3SL200 Column Pins Input Timing Parameters (Part 3 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	GCLK	t_{su}	-1.066	-1.104	-1.717	-1.673	-1.794	-1.724	-2.272	-1.673	-1.794	-1.724	-2.272	ns
		t_h	1.216	1.252	1.939	1.903	2.048	1.966	2.509	1.903	2.048	1.966	2.509	ns
	GCLK PLL	t_{su}	-1.396	-1.396	-2.145	-2.166	-2.347	-2.264	-2.787	-2.166	-2.347	-2.264	-2.787	ns
		t_h	1.711	1.711	2.634	2.668	2.899	2.786	3.328	2.668	2.899	2.786	3.328	ns
SSTL-15 CLASS I	GCLK	t_{su}	-1.055	-1.093	-1.706	-1.662	-1.775	-1.705	-2.253	-1.662	-1.775	-1.705	-2.253	ns
		t_h	1.205	1.241	1.927	1.892	2.029	1.947	2.490	1.892	2.029	1.947	2.490	ns
	GCLK PLL	t_{su}	-1.385	-1.385	-2.134	-2.155	-2.328	-2.245	-2.768	-2.155	-2.328	-2.245	-2.768	ns
		t_h	1.700	1.700	2.622	2.657	2.880	2.767	3.309	2.657	2.880	2.767	3.309	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-1.055	-1.093	-1.706	-1.662	-1.775	-1.705	-2.253	-1.662	-1.775	-1.705	-2.253	ns
		t_h	1.205	1.241	1.927	1.892	2.029	1.947	2.490	1.892	2.029	1.947	2.490	ns
	GCLK PLL	t_{su}	-1.385	-1.385	-2.134	-2.155	-2.328	-2.245	-2.768	-2.155	-2.328	-2.245	-2.768	ns
		t_h	1.700	1.700	2.622	2.657	2.880	2.767	3.309	2.657	2.880	2.767	3.309	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-1.066	-1.104	-1.717	-1.673	-1.794	-1.724	-2.272	-1.673	-1.794	-1.724	-2.272	ns
		t_h	1.216	1.252	1.939	1.903	2.048	1.966	2.509	1.903	2.048	1.966	2.509	ns
	GCLK PLL	t_{su}	-1.396	-1.396	-2.145	-2.166	-2.347	-2.264	-2.787	-2.166	-2.347	-2.264	-2.787	ns
		t_h	1.711	1.711	2.634	2.668	2.899	2.786	3.328	2.668	2.899	2.786	3.328	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-1.066	-1.104	-1.717	-1.673	-1.794	-1.724	-2.272	-1.673	-1.794	-1.724	-2.272	ns
		t_h	1.216	1.252	1.939	1.903	2.048	1.966	2.509	1.903	2.048	1.966	2.509	ns
	GCLK PLL	t_{su}	-1.396	-1.396	-2.145	-2.166	-2.347	-2.264	-2.787	-2.166	-2.347	-2.264	-2.787	ns
		t_h	1.711	1.711	2.634	2.668	2.899	2.786	3.328	2.668	2.899	2.786	3.328	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-1.055	-1.093	-1.706	-1.662	-1.775	-1.705	-2.253	-1.662	-1.775	-1.705	-2.253	ns
		t_h	1.205	1.241	1.927	1.892	2.029	1.947	2.490	1.892	2.029	1.947	2.490	ns
	GCLK PLL	t_{su}	-1.385	-1.385	-2.134	-2.155	-2.328	-2.245	-2.768	-2.155	-2.328	-2.245	-2.768	ns
		t_h	1.700	1.700	2.622	2.657	2.880	2.767	3.309	2.657	2.880	2.767	3.309	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-1.055	-1.093	-1.706	-1.662	-1.775	-1.705	-2.253	-1.662	-1.775	-1.705	-2.253	ns
		t_h	1.205	1.241	1.927	1.892	2.029	1.947	2.490	1.892	2.029	1.947	2.490	ns
	GCLK PLL	t_{su}	-1.385	-1.385	-2.134	-2.155	-2.328	-2.245	-2.768	-2.155	-2.328	-2.245	-2.768	ns
		t_h	1.700	1.700	2.622	2.657	2.880	2.767	3.309	2.657	2.880	2.767	3.309	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-1.043	-1.081	-1.696	-1.651	-1.759	-1.689	-2.237	-1.651	-1.759	-1.689	-2.237	ns
		t_h	1.193	1.229	1.917	1.881	2.013	1.931	2.474	1.881	2.013	1.931	2.474	ns
	GCLK PLL	t_{su}	-1.373	-1.373	-2.124	-2.144	-2.312	-2.229	-2.752	-2.144	-2.312	-2.229	-2.752	ns
		t_h	1.688	1.688	2.612	2.646	2.864	2.751	3.293	2.646	2.864	2.751	3.293	ns
3.0-V PCI	GCLK	t_{su}	-1.043	-1.081	-1.696	-1.651	-1.759	-1.689	-2.237	-1.651	-1.759	-1.689	-2.237	ns
		t_h	1.193	1.229	1.917	1.881	2.013	1.931	2.474	1.881	2.013	1.931	2.474	ns
	GCLK PLL	t_{su}	-1.373	-1.373	-2.124	-2.144	-2.312	-2.229	-2.752	-2.144	-2.312	-2.229	-2.752	ns
		t_h	1.688	1.688	2.612	2.646	2.864	2.751	3.293	2.646	2.864	2.751	3.293	ns

Table 1–81. EP3SL200 Column Pins Input Timing Parameters (Part 4 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V PCI-X	GCLK	t_{su}	-1.148	-1.184	-1.809	-1.777	-2.001	-1.933	-2.481	-1.777	-2.001	-1.933	-2.481	ns
		t_h	1.296	1.330	2.031	2.010	2.258	2.176	2.723	2.010	2.258	2.176	2.723	ns
	GCLK PLL	t_{su}	-1.476	-1.476	-2.237	-2.273	-2.557	-2.476	-2.996	-2.273	-2.557	-2.476	-2.996	ns
		t_h	1.789	1.789	2.726	2.778	3.112	2.999	3.542	2.778	3.112	2.999	3.542	ns

Table 1–82 lists the EP3SL200 row pins input timing parameters for single-ended I/O standards.

Table 1–82. EP3SL200 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.298	-1.321	-1.972	-1.978	-2.368	-2.291	-2.712	-2.132	-2.388	-2.291	-2.712	ns
		t_h	1.432	1.473	1.671	1.862	1.969	1.850	1.775	1.751	1.869	1.850	1.775	ns
	GCLK PLL	t_{su}	0.915	0.938	2.210	2.223	2.633	2.541	2.966	2.384	2.665	2.541	2.966	ns
		t_h	-0.638	-0.643	-1.972	-1.978	-2.368	-2.291	-2.712	-2.132	-2.388	-2.291	-2.712	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.298	-1.321	-1.972	-1.978	-2.368	-2.291	-2.712	-2.132	-2.388	-2.291	-2.712	ns
		t_h	1.432	1.473	1.671	1.862	1.969	1.850	1.775	1.751	1.869	1.850	1.775	ns
	GCLK PLL	t_{su}	0.915	0.938	2.210	2.223	2.633	2.541	2.966	2.384	2.665	2.541	2.966	ns
		t_h	-0.638	-0.643	-1.969	-1.979	-2.371	-2.294	-2.715	-2.131	-2.393	-2.294	-2.715	ns
3.0-V LVTTL	GCLK	t_{su}	-1.304	-1.332	2.207	2.224	2.636	2.544	2.969	2.383	2.670	2.544	2.969	ns
		t_h	1.438	1.484	-1.969	-1.979	-2.371	-2.294	-2.715	-2.131	-2.393	-2.294	-2.715	ns
	GCLK PLL	t_{su}	0.909	0.927	1.674	1.861	1.966	1.847	1.772	1.752	1.864	1.847	1.772	ns
		t_h	-0.632	-0.632	2.207	2.224	2.636	2.544	2.969	2.383	2.670	2.544	2.969	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.304	-1.332	2.216	2.237	2.651	2.559	2.984	2.392	2.680	2.559	2.984	ns
		t_h	1.438	1.484	-1.978	-1.992	-2.386	-2.309	-2.730	-2.140	-2.403	-2.309	-2.730	ns
	GCLK PLL	t_{su}	0.909	0.927	1.665	1.848	1.951	1.832	1.757	1.743	1.854	1.832	1.757	ns
		t_h	-0.632	-0.632	2.216	2.237	2.651	2.559	2.984	2.392	2.680	2.559	2.984	ns
2.5 V	GCLK	t_{su}	-1.292	-1.325	1.625	1.722	1.945	1.834	1.742	1.710	1.853	1.834	1.742	ns
		t_h	1.426	1.477	2.254	2.297	2.649	2.557	2.982	2.425	2.681	2.557	2.982	ns
	GCLK PLL	t_{su}	0.921	0.934	-2.017	-2.051	-2.384	-2.307	-2.728	-2.173	-2.404	-2.307	-2.728	ns
		t_h	-0.644	-0.639	1.625	1.722	1.945	1.834	1.742	1.710	1.853	1.834	1.742	ns
1.8 V	GCLK	t_{su}	-1.322	-1.354	1.649	1.754	2.013	1.902	1.810	1.741	1.918	1.902	1.810	ns
		t_h	0.891	0.902	2.230	2.265	2.581	2.489	2.914	2.394	2.616	2.489	2.914	ns
	GCLK PLL	t_{su}	1.457	1.507	-1.993	-2.019	-2.316	-2.239	-2.660	-2.142	-2.339	-2.239	-2.660	ns
		t_h	-1.312	-1.343	1.728	1.855	2.172	2.061	1.969	1.837	2.073	2.061	1.969	ns

Table 1–82. EP3SL200 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	GCLK	t_{su}	0.901	0.913	2.151	2.164	2.422	2.330	2.755	2.298	2.461	2.330	2.755	ns
		t_h	1.447	1.496	-1.914	-1.918	-2.157	-2.080	-2.501	-2.046	-2.184	-2.080	-2.501	ns
	GCLK PLL	t_{su}	-1.252	-1.290	1.751	1.957	2.171	2.052	1.977	1.855	2.071	2.052	1.977	ns
		t_h	0.961	0.966	2.130	2.128	2.431	2.339	2.764	2.280	2.463	2.339	2.764	ns
1.2 V	GCLK	t_{su}	1.387	1.443	-1.876	-1.893	-2.152	-2.074	-2.497	-2.014	-2.177	-2.074	-2.497	ns
		t_h	-1.235	-1.266	1.766	-1.893	-2.152	-2.074	-2.497	-2.014	-2.177	-2.074	-2.497	ns
	GCLK PLL	t_{su}	0.978	0.992	2.113	2.137	2.415	2.323	2.747	2.264	2.451	2.323	2.747	ns
		t_h	1.370	1.419	-1.876	1.882	2.174	2.064	1.973	1.869	2.080	2.064	1.973	ns
SSTL-2 CLASS I	GCLK	t_{su}	-1.235	-1.266	1.766	1.882	2.174	2.064	1.973	1.869	2.080	2.064	1.973	ns
		t_h	0.978	0.992	2.113	-1.387	-1.620	-1.542	-1.441	-1.361	-1.518	-1.542	-1.441	ns
	GCLK PLL	t_{su}	1.370	1.419	-1.876	-1.893	-2.152	-2.074	-2.497	-2.014	-2.177	-2.074	-2.497	ns
		t_h	-1.226	-1.255	1.766	2.137	2.415	2.323	2.747	2.264	2.451	2.323	2.747	ns
SSTL-2 CLASS II	GCLK	t_{su}	0.987	1.001	2.113	1.882	2.174	2.064	1.973	1.869	2.080	2.064	1.973	ns
		t_h	1.361	1.408	-1.876	-1.387	-1.620	-1.542	-1.441	-1.361	-1.518	-1.542	-1.441	ns
	GCLK PLL	t_{su}	-1.226	-1.255	-1.302	-1.883	-2.134	-2.056	-2.479	-2.003	-2.160	-2.056	-2.479	ns
		t_h	0.987	1.001	-1.863	2.127	2.397	2.305	2.729	2.253	2.434	2.305	2.729	ns
SSTL-18 CLASS I	GCLK	t_{su}	1.361	1.408	2.101	1.892	2.192	2.082	1.991	1.880	2.097	2.082	1.991	ns
		t_h	-1.212	-1.243	1.766	1.892	2.192	2.082	1.991	1.880	2.097	2.082	1.991	ns
	GCLK PLL	t_{su}	1.001	1.013	2.113	-1.397	-1.638	-1.560	-1.459	-1.372	-1.535	-1.560	-1.459	ns
		t_h	1.347	1.396	-1.876	-1.883	-2.134	-2.056	-2.479	-2.003	-2.160	-2.056	-2.479	ns
SSTL-18 CLASS II	GCLK	t_{su}	-1.226	-1.255	1.766	-1.387	-1.620	-1.542	-1.441	-1.361	-1.518	-1.542	-1.441	ns
		t_h	0.987	1.001	2.113	-1.893	-2.152	-2.074	-2.497	-2.014	-2.177	-2.074	-2.497	ns
	GCLK PLL	t_{su}	1.361	1.408	-1.876	2.137	2.415	2.323	2.747	2.264	2.451	2.323	2.747	ns
		t_h	-1.226	-1.255	-1.302	1.882	2.174	2.064	1.973	1.869	2.080	2.064	1.973	ns
SSTL-15 CLASS I	GCLK	t_{su}	0.987	1.001	-1.863	-1.387	-1.620	-1.542	-1.441	-1.361	-1.518	-1.542	-1.441	ns
		t_h	1.361	1.408	2.101	-1.893	-2.152	-2.074	-2.497	-2.014	-2.177	-2.074	-2.497	ns
	GCLK PLL	t_{su}	-1.212	-1.243	1.781	2.137	2.415	2.323	2.747	2.264	2.451	2.323	2.747	ns
		t_h	1.001	1.013	-1.302	1.882	2.174	2.064	1.973	1.869	2.080	2.064	1.973	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	1.347	1.396	-1.863	-1.387	-1.620	-1.542	-1.441	-1.361	-1.518	-1.542	-1.441	ns
		t_h	-1.212	-1.243	-1.311	1.892	2.192	2.082	1.991	1.880	2.097	2.082	1.991	ns
	GCLK PLL	t_{su}	1.001	1.013	-1.854	-1.397	-1.638	-1.560	-1.459	-1.372	-1.535	-1.560	-1.459	ns
		t_h	1.347	1.396	2.092	-1.883	-2.134	-2.056	-2.479	-2.003	-2.160	-2.056	-2.479	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-1.203	-1.231	1.790	2.127	2.397	2.305	2.729	2.253	2.434	2.305	2.729	ns
		t_h	1.010	1.025	-1.311	1.892	2.192	2.082	1.991	1.880	2.097	2.082	1.991	ns
	GCLK PLL	t_{su}	1.338	1.384	-1.854	-1.397	-1.638	-1.560	-1.459	-1.372	-1.535	-1.560	-1.459	ns
		t_h	-1.203	-1.231	-1.311	1.902	2.208	2.098	2.007	1.889	2.113	2.098	2.007	ns

Table 1–82. EP3SL200 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS I	GCLK	t_{su}	1.010	1.025	-1.969	-1.407	-1.654	-1.576	-1.475	-1.381	-1.551	-1.576	-1.475	ns
		t_h	1.338	1.384	1.674	-1.873	-2.118	-2.040	-2.463	-1.994	-2.144	-2.040	-2.463	ns
	GCLK PLL	t_{su}	-1.304	-1.332	2.207	2.117	2.381	2.289	2.713	2.244	2.418	2.289	2.713	ns
		t_h	1.438	1.484	-1.969	1.902	2.208	2.098	2.007	1.889	2.113	2.098	2.007	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	0.909	0.927	1.674	-1.407	-1.654	-1.576	-1.475	-1.381	-1.551	-1.576	-1.475	ns
		t_h	-0.632	-0.632	2.207	-1.873	-2.118	-2.040	-2.463	-1.994	-2.144	-2.040	-2.463	ns
	GCLK PLL	t_{su}	-1.304	-1.332	2.207	2.117	2.381	2.289	2.713	2.244	2.418	2.289	2.713	ns
		t_h	1.438	1.484	2.207	1.902	2.208	2.098	2.007	1.889	2.113	2.098	2.007	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	0.909	0.927	2.207	-1.407	-1.654	-1.576	-1.475	-1.381	-1.551	-1.576	-1.475	ns
		t_h	-0.632	-0.632	2.207	-1.873	-2.118	-2.040	-2.463	-1.994	-2.144	-2.040	-2.463	ns
	GCLK PLL	t_{su}	-1.298	-1.321	-1.972	-1.978	-2.368	-2.291	-2.712	-2.132	-2.388	-2.291	-2.712	ns
		t_h	1.432	1.473	1.671	1.862	1.969	1.850	1.775	1.751	1.869	1.850	1.775	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	0.915	0.938	2.210	2.223	2.633	2.541	2.966	2.384	2.665	2.541	2.966	ns
		t_h	-0.638	-0.643	-1.972	-1.978	-2.368	-2.291	-2.712	-2.132	-2.388	-2.291	-2.712	ns
	GCLK PLL	t_{su}	-1.298	-1.321	-1.972	-1.978	-2.368	-2.291	-2.712	-2.132	-2.388	-2.291	-2.712	ns
		t_h	1.432	1.473	1.671	1.862	1.969	1.850	1.775	1.751	1.869	1.850	1.775	ns
3.0-V PCI	GCLK	t_{su}	0.915	0.938	2.210	2.223	2.633	2.541	2.966	2.384	2.665	2.541	2.966	ns
		t_h	-0.638	-0.643	-1.969	-1.979	-2.371	-2.294	-2.715	-2.131	-2.393	-2.294	-2.715	ns
	GCLK PLL	t_{su}	-1.304	-1.332	2.207	2.224	2.636	2.544	2.969	2.383	2.670	2.544	2.969	ns
		t_h	1.438	1.484	-1.969	-1.979	-2.371	-2.294	-2.715	-2.131	-2.393	-2.294	-2.715	ns
3.0-V PCI-X	GCLK	t_{su}	0.909	0.927	1.674	1.861	1.966	1.847	1.772	1.752	1.864	1.847	1.772	ns
		t_h	-0.632	-0.632	2.207	2.224	2.636	2.544	2.969	2.383	2.670	2.544	2.969	ns
	GCLK PLL	t_{su}	-1.304	-1.332	2.216	2.237	2.651	2.559	2.984	2.392	2.680	2.559	2.984	ns
		t_h	1.438	1.484	-1.978	-1.992	-2.386	-2.309	-2.730	-2.140	-2.403	-2.309	-2.730	ns

Table 1–83 lists the EP3SL200 column pins output timing parameters for single-ended I/O standards.

Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.677	3.677	5.302	5.492	5.997	5.854	6.259	5.492	5.997	5.854	6.259	ns
		GCLK PLL	t_{co}	4.076	4.076	5.937	6.132	6.701	6.529	7.016	6.132	6.701	6.529	7.016	ns
	8mA	GCLK	t_{co}	3.610	3.610	5.193	5.381	5.884	5.741	6.146	5.381	5.884	5.741	6.146	ns
		GCLK PLL	t_{co}	4.009	4.009	5.828	6.021	6.588	6.416	6.903	6.021	6.588	6.416	6.903	ns
	12mA	GCLK	t_{co}	3.524	3.524	5.089	5.282	5.792	5.649	6.054	5.282	5.792	5.649	6.054	ns
		GCLK PLL	t_{co}	3.923	3.923	5.724	5.922	6.496	6.324	6.811	5.922	6.496	6.324	6.811	ns
	16mA	GCLK	t_{co}	3.517	3.517	5.072	5.254	5.751	5.608	6.013	5.254	5.751	5.608	6.013	ns
		GCLK PLL	t_{co}	3.916	3.916	5.707	5.894	6.455	6.283	6.770	5.894	6.455	6.283	6.770	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.683	3.683	5.306	5.497	6.004	5.861	6.266	5.497	6.004	5.861	6.266	ns
		GCLK PLL	t_{co}	4.082	4.082	5.941	6.137	6.708	6.536	7.023	6.137	6.708	6.536	7.023	ns
	8mA	GCLK	t_{co}	3.528	3.528	5.099	5.299	5.803	5.660	6.065	5.299	5.803	5.660	6.065	ns
		GCLK PLL	t_{co}	3.927	3.927	5.734	5.939	6.507	6.335	6.822	5.939	6.507	6.335	6.822	ns
	12mA	GCLK	t_{co}	3.535	3.535	5.093	5.278	5.777	5.634	6.039	5.278	5.777	5.634	6.039	ns
		GCLK PLL	t_{co}	3.934	3.934	5.728	5.918	6.481	6.309	6.796	5.918	6.481	6.309	6.796	ns
	16mA	GCLK	t_{co}	3.519	3.519	5.071	5.253	5.748	5.605	6.010	5.253	5.748	5.605	6.010	ns
		GCLK PLL	t_{co}	3.918	3.918	5.706	5.893	6.452	6.280	6.767	5.893	6.452	6.280	6.767	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.641	3.641	5.269	5.460	5.964	5.821	6.226	5.460	5.964	5.821	6.226	ns
		GCLK PLL	t_{co}	4.040	4.040	5.904	6.100	6.668	6.496	6.983	6.100	6.668	6.496	6.983	ns
	8mA	GCLK	t_{co}	3.530	3.530	5.139	5.326	5.826	5.684	6.088	5.326	5.826	5.684	6.088	ns
		GCLK PLL	t_{co}	3.929	3.929	5.774	5.966	6.531	6.360	6.845	5.966	6.531	6.360	6.845	ns
	12mA	GCLK	t_{co}	3.494	3.494	5.076	5.257	5.752	5.610	6.014	5.257	5.752	5.610	6.014	ns
		GCLK PLL	t_{co}	3.893	3.893	5.711	5.897	6.457	6.286	6.771	5.897	6.457	6.286	6.771	ns
	16mA	GCLK	t_{co}	3.476	3.476	5.047	5.229	5.724	5.581	5.986	5.229	5.724	5.581	5.986	ns
		GCLK PLL	t_{co}	3.875	3.875	5.682	5.869	6.428	6.256	6.743	5.869	6.428	6.256	6.743	ns

Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.555	3.555	5.173	5.360	5.861	5.719	6.123	5.360	5.861	5.719	6.123	ns
		GCLK PLL	t_{co}	3.954	3.954	5.808	6.000	6.566	6.395	6.880	6.000	6.566	6.395	6.880	ns
	8mA	GCLK	t_{co}	3.476	3.476	5.049	5.231	5.726	5.584	5.988	5.231	5.726	5.584	5.988	ns
		GCLK PLL	t_{co}	3.875	3.875	5.684	5.871	6.431	6.260	6.745	5.871	6.431	6.260	6.745	ns
	12mA	GCLK	t_{co}	3.471	3.471	5.042	5.224	5.718	5.575	5.980	5.224	5.718	5.575	5.980	ns
		GCLK PLL	t_{co}	3.870	3.870	5.677	5.864	6.422	6.250	6.737	5.864	6.422	6.250	6.737	ns
	16mA	GCLK	t_{co}	3.462	3.462	5.028	5.209	5.703	5.560	5.965	5.209	5.703	5.560	5.965	ns
		GCLK PLL	t_{co}	3.861	3.861	5.663	5.849	6.407	6.235	6.722	5.849	6.407	6.235	6.722	ns
2.5 V	4mA	GCLK	t_{co}	3.677	3.677	5.380	5.587	6.108	5.966	6.370	5.587	6.108	5.966	6.370	ns
		GCLK PLL	t_{co}	4.076	4.076	6.015	6.227	6.813	6.642	7.127	6.227	6.813	6.642	7.127	ns
	8mA	GCLK	t_{co}	3.577	3.577	5.261	5.461	5.976	5.834	6.238	5.461	5.976	5.834	6.238	ns
		GCLK PLL	t_{co}	3.976	3.976	5.896	6.101	6.681	6.510	6.995	6.101	6.681	6.510	6.995	ns
	12mA	GCLK	t_{co}	3.533	3.533	5.174	5.370	5.881	5.738	6.143	5.370	5.881	5.738	6.143	ns
		GCLK PLL	t_{co}	3.932	3.932	5.809	6.010	6.585	6.413	6.900	6.010	6.585	6.413	6.900	ns
	16mA	GCLK	t_{co}	3.495	3.495	5.135	5.328	5.838	5.695	6.100	5.328	5.838	5.695	6.100	ns
		GCLK PLL	t_{co}	3.894	3.894	5.770	5.968	6.542	6.370	6.857	5.968	6.542	6.370	6.857	ns

Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.868	3.868	5.701	5.947	6.513	6.370	6.775	5.947	6.513	6.370	6.775	ns
		GCLK PLL	t_{co}	4.267	4.267	6.336	6.587	7.217	7.045	7.532	6.587	7.217	7.045	7.532	ns
	4mA	GCLK	t_{co}	3.687	3.687	5.422	5.638	6.165	6.023	6.427	5.638	6.165	6.023	6.427	ns
		GCLK PLL	t_{co}	4.086	4.086	6.057	6.278	6.870	6.699	7.184	6.278	6.870	6.699	7.184	ns
	6mA	GCLK	t_{co}	3.605	3.605	5.315	5.523	6.055	5.912	6.317	5.523	6.055	5.912	6.317	ns
		GCLK PLL	t_{co}	4.004	4.004	5.950	6.163	6.759	6.587	7.074	6.163	6.759	6.587	7.074	ns
	8mA	GCLK	t_{co}	3.585	3.585	5.257	5.469	5.989	5.846	6.251	5.469	5.989	5.846	6.251	ns
		GCLK PLL	t_{co}	3.984	3.984	5.892	6.109	6.693	6.521	7.008	6.109	6.693	6.521	7.008	ns
	10mA	GCLK	t_{co}	3.522	3.522	5.196	5.394	5.908	5.765	6.170	5.394	5.908	5.765	6.170	ns
		GCLK PLL	t_{co}	3.921	3.921	5.831	6.034	6.612	6.440	6.927	6.034	6.612	6.440	6.927	ns
	12mA	GCLK	t_{co}	3.504	3.504	5.175	5.373	5.885	5.742	6.147	5.373	5.885	5.742	6.147	ns
		GCLK PLL	t_{co}	3.903	3.903	5.810	6.013	6.589	6.417	6.904	6.013	6.589	6.417	6.904	ns
1.5 V	2mA	GCLK	t_{co}	3.814	3.814	5.630	5.879	6.451	6.308	6.713	5.879	6.451	6.308	6.713	ns
		GCLK PLL	t_{co}	4.213	4.213	6.265	6.519	7.155	6.983	7.470	6.519	7.155	6.983	7.470	ns
	4mA	GCLK	t_{co}	3.602	3.602	5.311	5.523	6.059	5.916	6.321	5.523	6.059	5.916	6.321	ns
		GCLK PLL	t_{co}	4.001	4.001	5.946	6.163	6.763	6.591	7.078	6.163	6.763	6.591	7.078	ns
	6mA	GCLK	t_{co}	3.577	3.577	5.244	5.463	5.992	5.849	6.254	5.463	5.992	5.849	6.254	ns
		GCLK PLL	t_{co}	3.976	3.976	5.879	6.103	6.696	6.524	7.011	6.103	6.696	6.524	7.011	ns
	8mA	GCLK	t_{co}	3.566	3.566	5.227	5.438	5.972	5.829	6.234	5.438	5.972	5.829	6.234	ns
		GCLK PLL	t_{co}	3.965	3.965	5.862	6.078	6.676	6.504	6.991	6.078	6.676	6.504	6.991	ns
	10mA	GCLK	t_{co}	3.511	3.511	5.189	5.387	5.902	5.759	6.164	5.387	5.902	5.759	6.164	ns
		GCLK PLL	t_{co}	3.910	3.910	5.824	6.027	6.606	6.434	6.921	6.027	6.606	6.434	6.921	ns
	12mA	GCLK	t_{co}	3.506	3.506	5.172	5.376	5.891	5.748	6.153	5.376	5.891	5.748	6.153	ns
		GCLK PLL	t_{co}	3.905	3.905	5.807	6.016	6.595	6.423	6.910	6.016	6.595	6.423	6.910	ns

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Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.730	3.730	5.556	5.815	6.395	6.252	6.657	5.815	6.395	6.252	6.657	ns
		GCLK PLL	t_{co}	4.129	4.129	6.191	6.455	7.099	6.927	7.414	6.455	7.099	6.927	7.414	ns
	4mA	GCLK	t_{co}	3.607	3.607	5.330	5.553	6.109	5.966	6.371	5.553	6.109	5.966	6.371	ns
		GCLK PLL	t_{co}	4.006	4.006	5.965	6.193	6.813	6.641	7.128	6.193	6.813	6.641	7.128	ns
	6mA	GCLK	t_{co}	3.569	3.569	5.238	5.464	5.996	5.853	6.258	5.464	5.996	5.853	6.258	ns
		GCLK PLL	t_{co}	3.968	3.968	5.873	6.104	6.700	6.528	7.015	6.104	6.700	6.528	7.015	ns
	8mA	GCLK	t_{co}	3.522	3.522	5.210	5.415	5.940	5.797	6.202	5.415	5.940	5.797	6.202	ns
		GCLK PLL	t_{co}	3.921	3.921	5.845	6.055	6.644	6.472	6.959	6.055	6.644	6.472	6.959	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.522	3.522	5.167	5.362	5.871	5.728	6.133	5.362	5.871	5.728	6.133	ns
		GCLK PLL	t_{co}	3.921	3.921	5.802	6.002	6.575	6.403	6.890	6.002	6.575	6.403	6.890	ns
	10mA	GCLK	t_{co}	3.519	3.519	5.164	5.359	5.867	5.724	6.129	5.359	5.867	5.724	6.129	ns
		GCLK PLL	t_{co}	3.918	3.918	5.799	5.999	6.571	6.399	6.886	5.999	6.571	6.399	6.886	ns
	12mA	GCLK	t_{co}	3.517	3.517	5.164	5.360	5.868	5.725	6.130	5.360	5.868	5.725	6.130	ns
		GCLK PLL	t_{co}	3.916	3.916	5.799	6.000	6.572	6.400	6.887	6.000	6.572	6.400	6.887	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.508	3.508	5.149	5.344	5.853	5.710	6.115	5.344	5.853	5.710	6.115	ns
		GCLK PLL	t_{co}	3.907	3.907	5.784	5.984	6.557	6.385	6.872	5.984	6.557	6.385	6.872	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.529	3.529	5.179	5.376	5.887	5.744	6.149	5.376	5.887	5.744	6.149	ns
		GCLK PLL	t_{co}	3.928	3.928	5.814	6.016	6.591	6.419	6.906	6.016	6.591	6.419	6.906	ns
	6mA	GCLK	t_{co}	3.525	3.525	5.177	5.374	5.885	5.742	6.147	5.374	5.885	5.742	6.147	ns
		GCLK PLL	t_{co}	3.924	3.924	5.812	6.014	6.589	6.417	6.904	6.014	6.589	6.417	6.904	ns
	8mA	GCLK	t_{co}	3.514	3.514	5.167	5.365	5.876	5.733	6.138	5.365	5.876	5.733	6.138	ns
		GCLK PLL	t_{co}	3.913	3.913	5.802	6.005	6.580	6.408	6.895	6.005	6.580	6.408	6.895	ns
	10mA	GCLK	t_{co}	3.503	3.503	5.154	5.352	5.863	5.720	6.125	5.352	5.863	5.720	6.125	ns
		GCLK PLL	t_{co}	3.902	3.902	5.789	5.992	6.567	6.395	6.882	5.992	6.567	6.395	6.882	ns
	12mA	GCLK	t_{co}	3.503	3.503	5.154	5.352	5.863	5.720	6.125	5.352	5.863	5.720	6.125	ns
		GCLK PLL	t_{co}	3.902	3.902	5.789	5.992	6.567	6.395	6.882	5.992	6.567	6.395	6.882	ns

Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.509	3.509	5.153	5.349	5.858	5.715	6.120	5.349	5.858	5.715	6.120	ns
		GCLK PLL	t_{co}	3.908	3.908	5.788	5.989	6.562	6.390	6.877	5.989	6.562	6.390	6.877	ns
	16mA	GCLK	t_{co}	3.512	3.512	5.161	5.358	5.870	5.727	6.132	5.358	5.870	5.727	6.132	ns
		GCLK PLL	t_{co}	3.911	3.911	5.796	5.998	6.574	6.402	6.889	5.998	6.574	6.402	6.889	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.533	3.533	5.188	5.388	5.900	5.757	6.162	5.388	5.900	5.757	6.162	ns
		GCLK PLL	t_{co}	3.932	3.932	5.823	6.028	6.604	6.432	6.919	6.028	6.604	6.432	6.919	ns
	6mA	GCLK	t_{co}	3.519	3.519	5.178	5.378	5.891	5.748	6.153	5.378	5.891	5.748	6.153	ns
		GCLK PLL	t_{co}	3.918	3.918	5.813	6.018	6.595	6.423	6.910	6.018	6.595	6.423	6.910	ns
	8mA	GCLK	t_{co}	3.508	3.508	5.164	5.364	5.877	5.734	6.139	5.364	5.877	5.734	6.139	ns
		GCLK PLL	t_{co}	3.907	3.907	5.799	6.004	6.581	6.409	6.896	6.004	6.581	6.409	6.896	ns
	10mA	GCLK	t_{co}	3.507	3.507	5.167	5.367	5.881	5.738	6.143	5.367	5.881	5.738	6.143	ns
		GCLK PLL	t_{co}	3.906	3.906	5.802	6.007	6.585	6.413	6.900	6.007	6.585	6.413	6.900	ns
	12mA	GCLK	t_{co}	3.504	3.504	5.162	5.362	5.875	5.732	6.137	5.362	5.875	5.732	6.137	ns
		GCLK PLL	t_{co}	3.903	3.903	5.797	6.002	6.579	6.407	6.894	6.002	6.579	6.407	6.894	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.506	3.506	5.151	5.348	5.858	5.715	6.120	5.348	5.858	5.715	6.120	ns
		GCLK PLL	t_{co}	3.905	3.905	5.786	5.988	6.562	6.390	6.877	5.988	6.562	6.390	6.877	ns
	16mA	GCLK	t_{co}	3.509	3.509	5.158	5.357	5.869	5.726	6.131	5.357	5.869	5.726	6.131	ns
		GCLK PLL	t_{co}	3.908	3.908	5.793	5.997	6.573	6.401	6.888	5.997	6.573	6.401	6.888	ns

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Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.516	3.516	5.153	5.348	5.856	5.713	6.118	5.348	5.856	5.713	6.118	ns
		GCLK PLL	t_{co}	3.915	3.915	5.788	5.988	6.560	6.388	6.875	5.988	6.560	6.388	6.875	ns
	6mA	GCLK	t_{co}	3.509	3.509	5.151	5.346	5.855	5.712	6.117	5.346	5.855	5.712	6.117	ns
		GCLK PLL	t_{co}	3.908	3.908	5.786	5.986	6.559	6.387	6.874	5.986	6.559	6.387	6.874	ns
	8mA	GCLK	t_{co}	3.501	3.501	5.143	5.339	5.848	5.705	6.110	5.339	5.848	5.705	6.110	ns
		GCLK PLL	t_{co}	3.900	3.900	5.778	5.979	6.552	6.380	6.867	5.979	6.552	6.380	6.867	ns
	10mA	GCLK	t_{co}	3.504	3.504	5.146	5.342	5.852	5.709	6.114	5.342	5.852	5.709	6.114	ns
		GCLK PLL	t_{co}	3.903	3.903	5.781	5.982	6.556	6.384	6.871	5.982	6.556	6.384	6.871	ns
	12mA	GCLK	t_{co}	3.501	3.501	5.149	5.346	5.856	5.713	6.118	5.346	5.856	5.713	6.118	ns
		GCLK PLL	t_{co}	3.900	3.900	5.784	5.986	6.560	6.388	6.875	5.986	6.560	6.388	6.875	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.509	3.509	5.148	5.343	5.852	5.709	6.114	5.343	5.852	5.709	6.114	ns
		GCLK PLL	t_{co}	3.908	3.908	5.783	5.983	6.556	6.384	6.871	5.983	6.556	6.384	6.871	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.521	3.521	5.161	5.358	5.867	5.724	6.129	5.358	5.867	5.724	6.129	ns
		GCLK PLL	t_{co}	3.920	3.920	5.796	5.998	6.571	6.399	6.886	5.998	6.571	6.399	6.886	ns
	6mA	GCLK	t_{co}	3.517	3.517	5.162	5.359	5.870	5.727	6.132	5.359	5.870	5.727	6.132	ns
		GCLK PLL	t_{co}	3.916	3.916	5.797	5.999	6.574	6.402	6.889	5.999	6.574	6.402	6.889	ns
	8mA	GCLK	t_{co}	3.513	3.513	5.158	5.355	5.865	5.722	6.127	5.355	5.865	5.722	6.127	ns
		GCLK PLL	t_{co}	3.912	3.912	5.793	5.995	6.569	6.397	6.884	5.995	6.569	6.397	6.884	ns
	10mA	GCLK	t_{co}	3.506	3.506	5.151	5.348	5.858	5.715	6.120	5.348	5.858	5.715	6.120	ns
		GCLK PLL	t_{co}	3.905	3.905	5.786	5.988	6.562	6.390	6.877	5.988	6.562	6.390	6.877	ns
	12mA	GCLK	t_{co}	3.507	3.507	5.158	5.356	5.868	5.725	6.130	5.356	5.868	5.725	6.130	ns
		GCLK PLL	t_{co}	3.906	3.906	5.793	5.996	6.572	6.400	6.887	5.996	6.572	6.400	6.887	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.505	3.505	5.139	5.334	5.842	5.699	6.104	5.334	5.842	5.699	6.104	ns
		GCLK PLL	t_{co}	3.904	3.904	5.774	5.974	6.546	6.374	6.861	5.974	6.546	6.374	6.861	ns

Table 1–83. EP3SL200 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.524	3.524	5.175	5.375	5.888	5.745	6.150	5.375	5.888	5.745	6.150	ns
		GCLK PLL	t_{co}	3.923	3.923	5.810	6.015	6.592	6.420	6.907	6.015	6.592	6.420	6.907	ns
	6mA	GCLK	t_{co}	3.516	3.516	5.166	5.366	5.879	5.736	6.141	5.366	5.879	5.736	6.141	ns
		GCLK PLL	t_{co}	3.915	3.915	5.801	6.006	6.583	6.411	6.898	6.006	6.583	6.411	6.898	ns
	8mA	GCLK	t_{co}	3.517	3.517	5.174	5.374	5.888	5.745	6.150	5.374	5.888	5.745	6.150	ns
		GCLK PLL	t_{co}	3.916	3.916	5.809	6.014	6.592	6.420	6.907	6.014	6.592	6.420	6.907	ns
	10mA	GCLK	t_{co}	3.506	3.506	5.161	5.361	5.874	5.731	6.136	5.361	5.874	5.731	6.136	ns
		GCLK PLL	t_{co}	3.905	3.905	5.796	6.001	6.578	6.406	6.893	6.001	6.578	6.406	6.893	ns
	12mA	GCLK	t_{co}	3.506	3.506	5.161	5.361	5.875	5.732	6.137	5.361	5.875	5.732	6.137	ns
		GCLK PLL	t_{co}	3.905	3.905	5.796	6.001	6.579	6.407	6.894	6.001	6.579	6.407	6.894	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.527	3.527	5.177	5.376	5.888	5.745	6.150	5.376	5.888	5.745	6.150	ns
		GCLK PLL	t_{co}	3.926	3.926	5.812	6.016	6.592	6.420	6.907	6.016	6.592	6.420	6.907	ns
3.0-V PCI	—	GCLK	t_{co}	3.630	3.630	5.222	5.410	5.913	5.770	6.175	5.410	5.913	5.770	6.175	ns
		GCLK PLL	t_{co}	4.029	4.029	5.857	6.050	6.617	6.445	6.932	6.050	6.617	6.445	6.932	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.630	3.630	5.222	5.410	5.913	5.770	6.175	5.410	5.913	5.770	6.175	ns
		GCLK PLL	t_{co}	4.029	4.029	5.857	6.050	6.617	6.445	6.932	6.050	6.617	6.445	6.932	ns

Table 1–84 lists the EP3SL200 row pins output timing parameters for single-ended I/O standards.

Table 1–84. EP3SL200 Row Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.639	3.902	5.663	5.916	6.397	6.238	6.709	6.053	6.634	6.238	6.709	ns
		GCLK PLL	t_{co}	1.551	1.768	2.210	2.317	2.505	2.518	2.444	2.409	2.649	2.518	2.444	ns
	8mA	GCLK	t_{co}	3.548	3.813	5.533	5.778	6.283	6.124	6.565	5.912	6.485	6.124	6.565	ns
		GCLK PLL	t_{co}	1.468	1.663	2.080	2.179	2.361	2.374	2.300	2.268	2.500	2.374	2.300	ns
	12mA	GCLK	t_{co}	3.469	3.724	5.414	5.655	6.187	6.028	6.437	5.785	6.353	6.028	6.437	ns
		GCLK PLL	t_{co}	1.389	1.560	1.961	2.056	2.233	2.246	2.172	2.147	2.368	2.246	2.172	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.649	3.906	5.671	5.921	6.406	6.247	6.714	6.059	6.639	6.247	6.714	ns
		GCLK PLL	t_{co}	1.561	1.772	2.218	2.322	2.510	2.523	2.449	2.415	2.654	2.523	2.449	ns
	8mA	GCLK	t_{co}	3.473	3.728	5.420	5.661	6.197	6.038	6.443	5.794	6.360	6.038	6.443	ns
		GCLK PLL	t_{co}	1.393	1.564	1.967	2.062	2.239	2.252	2.178	2.159	2.375	2.252	2.178	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.593	3.848	5.615	5.869	6.363	6.204	6.666	6.010	6.592	6.204	6.666	ns
		GCLK PLL	t_{co}	1.505	1.714	2.162	2.270	2.462	2.475	2.401	2.366	2.607	2.475	2.401	ns
	8mA	GCLK	t_{co}	3.474	3.733	5.463	5.710	6.218	6.059	6.502	5.848	6.428	6.059	6.502	ns
		GCLK PLL	t_{co}	1.394	1.587	2.010	2.111	2.298	2.311	2.237	2.204	2.443	2.311	2.237	ns
	12mA	GCLK	t_{co}	3.437	3.695	5.395	5.627	6.148	5.989	6.414	5.762	6.335	5.989	6.414	ns
		GCLK PLL	t_{co}	1.357	1.536	1.928	2.028	2.210	2.223	2.149	2.118	2.350	2.223	2.149	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.507	3.767	5.510	5.762	6.254	6.095	6.555	5.902	6.481	6.095	6.555	ns
		GCLK PLL	t_{co}	1.419	1.633	2.057	2.163	2.351	2.364	2.290	2.258	2.496	2.364	2.290	ns
	8mA	GCLK	t_{co}	3.424	3.679	5.368	5.588	6.120	5.961	6.375	5.722	6.295	5.961	6.375	ns
		GCLK PLL	t_{co}	1.344	1.515	1.893	1.989	2.171	2.184	2.110	2.087	2.310	2.184	2.110	ns
2.5 V	4mA	GCLK	t_{co}	3.619	3.884	5.748	6.023	6.508	6.349	6.838	6.170	6.771	6.349	6.838	ns
		GCLK PLL	t_{co}	1.531	1.750	2.295	2.424	2.634	2.647	2.573	2.526	2.786	2.647	2.573	ns
	8mA	GCLK	t_{co}	3.516	3.785	5.593	5.860	6.366	6.207	6.668	6.003	6.597	6.207	6.668	ns
		GCLK PLL	t_{co}	1.436	1.651	2.140	2.261	2.464	2.477	2.403	2.359	2.612	2.477	2.403	ns
	12mA	GCLK	t_{co}	3.463	3.735	5.492	5.741	6.275	6.116	6.542	5.880	6.467	6.116	6.542	ns
		GCLK PLL	t_{co}	1.379	1.575	2.029	2.142	2.338	2.351	2.277	2.236	2.482	2.351	2.277	ns

Table 1–84. EP3SL200 Row Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.863	4.170	6.174	6.451	7.093	6.933	7.278	6.617	7.250	6.933	7.278	ns
		GCLK PLL	t_{co}	1.795	2.018	2.703	2.852	3.121	3.130	3.066	2.995	3.095	3.130	3.066	ns
	4mA	GCLK	t_{co}	3.638	3.968	5.848	6.083	6.688	6.528	6.873	6.252	6.844	6.528	6.873	ns
		GCLK PLL	t_{co}	1.570	1.816	2.377	2.484	2.716	2.725	2.661	2.630	2.734	2.725	2.661	ns
	6mA	GCLK	t_{co}	3.573	3.866	5.694	5.933	6.529	6.369	6.714	6.084	6.671	6.369	6.714	ns
		GCLK PLL	t_{co}	1.505	1.714	2.223	2.334	2.557	2.566	2.502	2.462	2.628	2.566	2.502	ns
	8mA	GCLK	t_{co}	3.521	3.792	5.617	5.840	6.433	6.273	6.618	5.989	6.577	6.273	6.618	ns
		GCLK PLL	t_{co}	1.445	1.640	2.146	2.241	2.461	2.470	2.406	2.367	2.556	2.470	2.406	ns
1.5 V	2mA	GCLK	t_{co}	3.774	4.088	6.084	6.365	7.021	6.861	7.206	6.524	7.174	6.861	7.206	ns
		GCLK PLL	t_{co}	1.706	1.936	2.613	2.766	3.049	3.058	2.994	2.902	3.030	3.058	2.994	ns
	4mA	GCLK	t_{co}	3.537	3.831	5.679	5.928	6.530	6.370	6.715	6.078	6.670	6.370	6.715	ns
		GCLK PLL	t_{co}	1.464	1.679	2.208	2.329	2.558	2.567	2.503	2.456	2.629	2.567	2.503	ns
	6mA	GCLK	t_{co}	3.510	3.783	5.606	5.832	6.424	6.264	6.609	5.980	6.565	6.264	6.609	ns
		GCLK PLL	t_{co}	1.437	1.631	2.135	2.233	2.452	2.461	2.397	2.358	2.556	2.461	2.397	ns
	8mA	GCLK	t_{co}	3.496	3.774	5.584	5.814	6.405	6.245	6.590	5.962	6.543	6.245	6.590	ns
		GCLK PLL	t_{co}	1.428	1.622	2.113	2.215	2.433	2.442	2.378	2.340	2.537	2.442	2.378	ns
1.2 V	2mA	GCLK	t_{co}	3.717	4.013	5.994	6.279	6.946	6.786	7.131	6.436	7.090	6.786	7.131	ns
		GCLK PLL	t_{co}	1.649	1.861	2.523	2.680	2.974	2.983	2.919	2.814	2.961	2.983	2.919	ns
	4mA	GCLK	t_{co}	3.542	3.824	5.701	5.956	6.571	6.411	6.756	6.103	6.712	6.411	6.756	ns
		GCLK PLL	t_{co}	1.469	1.672	2.230	2.357	2.599	2.608	2.544	2.481	2.673	2.608	2.544	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.463	3.723	5.485	5.713	6.265	6.106	6.510	5.855	6.429	6.106	6.510	ns
		GCLK PLL	t_{co}	1.383	1.561	2.006	2.114	2.306	2.319	2.245	2.220	2.444	2.319	2.245	ns
	12mA	GCLK	t_{co}	3.458	3.719	5.482	5.705	6.263	6.104	6.502	5.854	6.422	6.104	6.502	ns
		GCLK PLL	t_{co}	1.378	1.555	1.999	2.106	2.298	2.311	2.237	2.219	2.437	2.311	2.237	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.449	3.708	5.467	5.680	6.246	6.087	6.475	5.837	6.395	6.087	6.475	ns
		GCLK PLL	t_{co}	1.369	1.544	1.984	2.081	2.271	2.284	2.210	2.202	2.413	2.284	2.210	ns

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Table 1–84. EP3SL200 Row Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.474	3.748	5.512	5.727	6.306	6.146	6.491	5.870	6.440	6.146	6.491	ns
		GCLK PLL	t_{co}	1.406	1.596	2.041	2.128	2.334	2.343	2.279	2.248	2.447	2.343	2.279	ns
	6mA	GCLK	t_{co}	3.465	3.734	5.509	5.725	6.304	6.144	6.489	5.868	6.438	6.144	6.489	ns
		GCLK PLL	t_{co}	1.391	1.582	2.038	2.126	2.332	2.341	2.277	2.246	2.445	2.341	2.277	ns
	8mA	GCLK	t_{co}	3.454	3.722	5.492	5.708	6.287	6.127	6.472	5.857	6.422	6.127	6.472	ns
		GCLK PLL	t_{co}	1.380	1.570	2.021	2.109	2.315	2.324	2.260	2.229	2.436	2.324	2.260	ns
	10mA	GCLK	t_{co}	3.443	3.699	5.476	5.692	6.272	6.112	6.457	5.845	6.407	6.112	6.457	ns
		GCLK PLL	t_{co}	1.363	1.547	2.005	2.093	2.300	2.309	2.245	2.214	2.424	2.309	2.245	ns
	12mA	GCLK	t_{co}	3.443	3.698	5.475	5.691	6.271	6.111	6.456	5.844	6.406	6.111	6.456	ns
		GCLK PLL	t_{co}	1.363	1.546	2.004	2.092	2.299	2.308	2.244	2.213	2.424	2.308	2.244	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.451	3.707	5.473	5.687	6.265	6.105	6.450	5.840	6.399	6.105	6.450	ns
		GCLK PLL	t_{co}	1.371	1.555	2.002	2.088	2.293	2.302	2.238	2.208	2.418	2.302	2.238	ns
	16mA	GCLK	t_{co}	3.452	3.702	5.472	5.688	6.267	6.107	6.458	5.849	6.408	6.107	6.458	ns
		GCLK PLL	t_{co}	1.372	1.550	2.001	2.093	2.295	2.304	2.240	2.214	2.429	2.304	2.240	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.473	3.744	5.523	5.741	6.323	6.163	6.508	5.883	6.456	6.163	6.508	ns
		GCLK PLL	t_{co}	1.402	1.592	2.052	2.142	2.351	2.360	2.296	2.261	2.459	2.360	2.296	ns
	6mA	GCLK	t_{co}	3.459	3.722	5.505	5.724	6.306	6.146	6.491	5.869	6.440	6.146	6.491	ns
		GCLK PLL	t_{co}	1.379	1.570	2.034	2.125	2.334	2.343	2.279	2.245	2.450	2.343	2.279	ns
	8mA	GCLK	t_{co}	3.448	3.705	5.488	5.706	6.288	6.128	6.473	5.856	6.423	6.128	6.473	ns
		GCLK PLL	t_{co}	1.368	1.553	2.017	2.107	2.316	2.325	2.261	2.227	2.437	2.325	2.261	ns

Table 1–84. EP3SL200 Row Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.458	3.720	5.479	5.692	6.268	6.108	6.453	5.839	6.402	6.108	6.453	ns
		GCLK PLL	t_{co}	1.381	1.568	2.008	2.093	2.296	2.305	2.241	2.212	2.415	2.305	2.241	ns
	6mA	GCLK	t_{co}	3.451	3.708	5.470	5.684	6.260	6.100	6.445	5.838	6.395	6.100	6.445	ns
		GCLK PLL	t_{co}	1.371	1.556	1.999	2.085	2.288	2.297	2.233	2.204	2.415	2.297	2.233	ns
	8mA	GCLK	t_{co}	3.442	3.696	5.462	5.675	6.252	6.092	6.438	5.831	6.387	6.092	6.438	ns
		GCLK PLL	t_{co}	1.362	1.544	1.991	2.076	2.280	2.289	2.225	2.196	2.408	2.289	2.225	ns
	10mA	GCLK	t_{co}	3.445	3.698	5.464	5.678	6.255	6.095	6.442	5.834	6.390	6.095	6.442	ns
		GCLK PLL	t_{co}	1.365	1.546	1.993	2.079	2.283	2.292	2.228	2.199	2.411	2.292	2.228	ns
	12mA	GCLK	t_{co}	3.441	3.693	5.462	5.677	6.255	6.095	6.445	5.837	6.395	6.095	6.445	ns
		GCLK PLL	t_{co}	1.361	1.541	1.991	2.081	2.283	2.292	2.228	2.202	2.416	2.292	2.228	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.449	3.697	5.457	5.669	6.246	6.086	6.441	5.833	6.389	6.086	6.441	ns
		GCLK PLL	t_{co}	1.369	1.545	1.986	2.078	2.274	2.283	2.219	2.198	2.410	2.283	2.219	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.464	3.727	5.490	5.705	6.283	6.123	6.468	5.848	6.416	6.123	6.468	ns
		GCLK PLL	t_{co}	1.388	1.575	2.019	2.106	2.311	2.320	2.256	2.224	2.426	2.320	2.256	ns
	6mA	GCLK	t_{co}	3.458	3.717	5.486	5.701	6.279	6.119	6.464	5.850	6.413	6.119	6.464	ns
		GCLK PLL	t_{co}	1.378	1.565	2.015	2.102	2.307	2.316	2.252	2.221	2.429	2.316	2.252	ns
	8mA	GCLK	t_{co}	3.454	3.712	5.480	5.695	6.273	6.113	6.458	5.845	6.407	6.113	6.458	ns
		GCLK PLL	t_{co}	1.374	1.560	2.009	2.096	2.301	2.310	2.246	2.215	2.423	2.310	2.246	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.466	3.726	5.501	5.719	6.301	6.141	6.486	5.864	6.433	6.141	6.486	ns
		GCLK PLL	t_{co}	1.387	1.574	2.030	2.120	2.329	2.338	2.274	2.238	2.445	2.338	2.274	ns
	6mA	GCLK	t_{co}	3.457	3.714	5.490	5.707	6.289	6.129	6.474	5.855	6.422	6.129	6.474	ns
		GCLK PLL	t_{co}	1.377	1.562	2.019	2.108	2.317	2.326	2.262	2.227	2.436	2.326	2.262	ns
	8mA	GCLK	t_{co}	3.456	3.712	5.494	5.712	6.295	6.135	6.480	5.864	6.429	6.135	6.480	ns
		GCLK PLL	t_{co}	1.376	1.560	2.023	2.113	2.323	2.332	2.268	2.233	2.446	2.332	2.268	ns
3.0-V PCI	—	GCLK	t_{co}	3.569	3.829	5.537	5.731	6.305	6.146	6.519	5.903	6.453	6.146	6.519	ns
		GCLK PLL	t_{co}	1.489	1.665	2.054	2.132	2.315	2.328	2.267	2.268	2.474	2.328	2.267	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.569	3.829	5.537	5.731	6.305	6.146	6.519	5.903	6.453	6.146	6.519	ns
		GCLK PLL	t_{co}	1.489	1.665	2.054	2.132	2.315	2.328	2.267	2.268	2.474	2.328	2.267	ns

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Table 1–85 through Table 1–88 list the maximum I/O timing parameters for EP3SL200 devices for differential I/O standards.

Table 1–85 lists the EP3SL200 column pins input timing parameters for differential I/O standards.

Table 1–85. EP3SL200 Column Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
MINI-LVDS	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
RSDS	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns

Table 1–85. EP3SL200 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-1.180	-1.250	-1.910	-1.938	-2.102	-2.024	-2.493	-1.954	-2.112	-2.024	-2.493	ns
		t_h	1.316	1.405	2.146	2.180	2.368	2.275	2.750	2.206	2.388	2.275	2.750	ns
	GCLK PLL	t_{su}	1.076	1.093	1.851	1.959	2.172	2.062	2.062	1.972	2.189	2.062	2.062	ns
		t_h	-0.797	-0.792	-1.371	-1.463	-1.621	-1.542	-1.523	-1.464	-1.626	-1.542	-1.523	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.180	-1.250	-1.910	-1.938	-2.102	-2.024	-2.493	-1.954	-2.112	-2.024	-2.493	ns
		t_h	1.316	1.405	2.146	2.180	2.368	2.275	2.750	2.206	2.388	2.275	2.750	ns
	GCLK PLL	t_{su}	1.076	1.093	1.851	1.959	2.172	2.062	2.062	1.972	2.189	2.062	2.062	ns
		t_h	-0.797	-0.792	-1.371	-1.463	-1.621	-1.542	-1.523	-1.464	-1.626	-1.542	-1.523	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns

Table 1–86 lists the EP3SL200 row pins input timing parameters for differential I/O standards.

Table 1–86. EP3SL200 Row Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-1.332	-1.401	-1.719	-1.648	-1.841	-1.769	-2.221	-1.630	-1.815	-1.769	-2.221	ns
		t_h	1.476	1.563	1.994	1.939	2.157	2.071	2.526	1.934	2.145	2.071	2.526	ns
	GCLK PLL	t_{su}	0.869	0.886	1.991	2.205	2.405	2.282	2.297	2.252	2.458	2.282	2.297	ns
		t_h	-0.581	-0.578	-1.475	-1.662	-1.803	-1.711	-1.711	-1.692	-1.839	-1.711	-1.711	ns
MINI-LVDS	GCLK	t_{su}	-1.332	-1.401	-1.719	-1.648	-1.841	-1.769	-2.221	-1.630	-1.815	-1.769	-2.221	ns
		t_h	1.476	1.563	1.994	1.939	2.157	2.071	2.526	1.934	2.145	2.071	2.526	ns
	GCLK PLL	t_{su}	0.869	0.886	1.991	2.205	2.405	2.282	2.297	2.252	2.458	2.282	2.297	ns
		t_h	-0.581	-0.578	-1.475	-1.662	-1.803	-1.711	-1.711	-1.692	-1.839	-1.711	-1.711	ns
RSDS	GCLK	t_{su}	-1.332	-1.401	-1.719	-1.648	-1.841	-1.769	-2.221	-1.630	-1.815	-1.769	-2.221	ns
		t_h	1.476	1.563	1.994	1.939	2.157	2.071	2.526	1.934	2.145	2.071	2.526	ns
	GCLK PLL	t_{su}	0.869	0.886	1.991	2.205	2.405	2.282	2.297	2.252	2.458	2.282	2.297	ns
		t_h	-0.581	-0.578	-1.475	-1.662	-1.803	-1.711	-1.711	-1.692	-1.839	-1.711	-1.711	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-1.137	-1.216	-1.849	-1.877	-2.030	-1.953	-2.400	-1.901	-2.052	-1.953	-2.400	ns
		t_h	1.274	1.369	2.088	2.122	2.297	2.206	2.656	2.156	2.330	2.206	2.656	ns
	GCLK PLL	t_{su}	1.064	1.071	1.866	1.981	2.216	2.098	2.118	1.985	2.221	2.098	2.118	ns
		t_h	-0.783	-0.772	-1.384	-1.483	-1.663	-1.576	-1.581	-1.474	-1.654	-1.576	-1.581	ns
	GCLK	t_{su}	-1.137	-1.216	-1.849	-1.877	-2.030	-1.953	-2.400	-1.901	-2.052	-1.953	-2.400	ns
		t_h	1.274	1.369	2.088	2.122	2.297	2.206	2.656	2.156	2.330	2.206	2.656	ns
	GCLK PLL	t_{su}	1.064	1.071	1.866	1.981	2.216	2.098	2.118	1.985	2.221	2.098	2.118	ns
		t_h	-0.783	-0.772	-1.384	-1.483	-1.663	-1.576	-1.581	-1.474	-1.654	-1.576	-1.581	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns

Table 1–86. EP3SL200 Row Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.169	-1.249	-1.881	-1.908	-2.071	-1.995	-2.440	-1.928	-2.086	-1.995	-2.440	ns
		t_h	1.306	1.402	2.121	2.156	2.341	2.250	2.701	2.186	2.369	2.250	2.701	ns
	GCLK PLL	t_{su}	1.032	1.038	1.829	1.945	2.171	2.052	2.073	1.954	2.182	2.052	2.073	ns
		t_h	-0.751	-0.739	-1.348	-1.445	-1.615	-1.528	-1.532	-1.440	-1.612	-1.528	-1.532	ns
	GCLK	t_{su}	-1.169	-1.249	-1.881	-1.908	-2.071	-1.995	-2.440	-1.928	-2.086	-1.995	-2.440	ns
		t_h	1.306	1.402	2.121	2.156	2.341	2.250	2.701	2.186	2.369	2.250	2.701	ns
	GCLK PLL	t_{su}	1.032	1.038	1.829	1.945	2.171	2.052	2.073	1.954	2.182	2.052	2.073	ns
		t_h	-0.751	-0.739	-1.348	-1.445	-1.615	-1.528	-1.532	-1.440	-1.612	-1.528	-1.532	ns

Table 1–87 lists the EP3SL200 column pins output timing parameters for differential I/O standards.

Table 1–87. EP3SL200 Column Pins output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
LVDS_E_3R	—	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.506	3.783	5.577	5.790	6.354	6.190	6.597	5.934	6.497	6.190	6.597	ns
		GCLK PLL	t_{co}	3.496	3.773	5.567	5.779	6.344	6.180	6.587	5.923	6.487	6.180	6.587	ns
RSDS_E_1R	—	GCLK	t_{co}	3.496	3.773	5.570	5.783	6.348	6.184	6.591	5.928	6.492	6.184	6.591	ns
		GCLK PLL	t_{co}	3.489	3.767	5.563	5.777	6.342	6.178	6.585	5.921	6.486	6.178	6.585	ns
RSDS_E_3R	—	GCLK	t_{co}	3.488	3.765	5.560	5.774	6.339	6.175	6.582	5.918	6.482	6.175	6.582	ns
		GCLK PLL	t_{co}	3.510	3.787	5.581	5.794	6.358	6.194	6.601	5.938	6.502	6.194	6.601	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.500	3.776	5.560	5.771	6.333	6.169	6.576	5.914	6.475	6.169	6.576	ns
		GCLK PLL	t_{co}	3.495	3.772	5.560	5.771	6.334	6.170	6.577	5.915	6.477	6.170	6.577	ns
	6mA	GCLK	t_{co}	3.493	3.770	5.559	5.770	6.332	6.168	6.575	5.914	6.476	6.168	6.575	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
	8mA	GCLK	t_{co}	3.486	3.763	5.555	5.767	6.331	6.167	6.574	5.912	6.475	6.167	6.574	ns
		GCLK PLL	t_{co}	3.485	3.760	5.538	5.748	6.309	6.145	6.552	5.891	6.451	6.145	6.552	ns
	10mA	GCLK	t_{co}	3.497	3.773	5.556	5.766	6.327	6.163	6.570	5.910	6.470	6.163	6.570	ns
		GCLK PLL	t_{co}	3.493	3.770	5.557	5.768	6.331	6.167	6.574	5.912	6.474	6.167	6.574	ns
	12mA	GCLK	t_{co}	3.483	3.759	5.546	5.757	6.319	6.155	6.562	5.901	6.462	6.155	6.562	ns
		GCLK PLL	t_{co}	3.481	3.757	5.544	5.754	6.317	6.153	6.560	5.899	6.460	6.153	6.560	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.481	3.758	5.547	5.759	6.322	6.158	6.565	5.903	6.466	6.158	6.565	ns
		GCLK PLL	t_{co}	3.485	3.761	5.544	5.754	6.316	6.152	6.559	5.898	6.459	6.152	6.559	ns

Table 1–87. EP3SL200 Column Pins output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.511	3.790	5.589	5.802	6.366	6.202	6.609	5.946	6.509	6.202	6.609	ns
		GCLK PLL	t_{co}	3.497	3.776	5.577	5.791	6.356	6.192	6.599	5.936	6.500	6.192	6.599	ns
	6mA	GCLK	t_{co}	3.485	3.763	5.560	5.773	6.338	6.174	6.581	5.918	6.482	6.174	6.581	ns
		GCLK PLL	t_{co}	3.485	3.763	5.563	5.777	6.342	6.178	6.585	5.922	6.487	6.178	6.585	ns
	8mA	GCLK	t_{co}	3.481	3.759	5.556	5.769	6.335	6.171	6.578	5.915	6.479	6.171	6.578	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
	10mA	GCLK	t_{co}	3.486	3.763	5.557	5.770	6.334	6.170	6.577	5.914	6.478	6.170	6.577	ns
		GCLK PLL	t_{co}	3.514	3.793	5.588	5.800	6.364	6.200	6.607	5.945	6.507	6.200	6.607	ns
	12mA	GCLK	t_{co}	3.503	3.781	5.576	5.788	6.352	6.188	6.595	5.933	6.495	6.188	6.595	ns
		GCLK PLL	t_{co}	3.498	3.777	5.576	5.789	6.353	6.189	6.596	5.934	6.497	6.189	6.596	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.484	3.762	5.558	5.770	6.334	6.170	6.577	5.915	6.479	6.170	6.577	ns
		GCLK PLL	t_{co}	3.482	3.760	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.486	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
		GCLK PLL	t_{co}	3.486	3.763	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	6mA	GCLK	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
		GCLK PLL	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
	8mA	GCLK	t_{co}	3.492	3.770	5.562	5.773	6.336	6.172	6.579	5.918	6.480	6.172	6.579	ns
		GCLK PLL	t_{co}	3.485	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
	10mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
	12mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns

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Table 1–87. EP3SL200 Column Pins output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.506	3.783	5.577	5.790	6.354	6.190	6.597	5.934	6.497	6.190	6.597	ns
		GCLK PLL	t_{co}	3.496	3.773	5.567	5.779	6.344	6.180	6.587	5.923	6.487	6.180	6.587	ns
	6mA	GCLK	t_{co}	3.496	3.773	5.570	5.783	6.348	6.184	6.591	5.928	6.492	6.184	6.591	ns
		GCLK PLL	t_{co}	3.489	3.767	5.563	5.777	6.342	6.178	6.585	5.921	6.486	6.178	6.585	ns
	8mA	GCLK	t_{co}	3.488	3.765	5.560	5.774	6.339	6.175	6.582	5.918	6.482	6.175	6.582	ns
		GCLK PLL	t_{co}	3.510	3.787	5.581	5.794	6.358	6.194	6.601	5.938	6.502	6.194	6.601	ns
	10mA	GCLK	t_{co}	3.500	3.776	5.560	5.771	6.333	6.169	6.576	5.914	6.475	6.169	6.576	ns
		GCLK PLL	t_{co}	3.495	3.772	5.560	5.771	6.334	6.170	6.577	5.915	6.477	6.170	6.577	ns
	12mA	GCLK	t_{co}	3.493	3.770	5.559	5.770	6.332	6.168	6.575	5.914	6.476	6.168	6.575	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.486	3.763	5.555	5.767	6.331	6.167	6.574	5.912	6.475	6.167	6.574	ns
		GCLK PLL	t_{co}	3.485	3.760	5.538	5.748	6.309	6.145	6.552	5.891	6.451	6.145	6.552	ns
	16mA	GCLK	t_{co}	3.497	3.773	5.556	5.766	6.327	6.163	6.570	5.910	6.470	6.163	6.570	ns
		GCLK PLL	t_{co}	3.493	3.770	5.557	5.768	6.331	6.167	6.574	5.912	6.474	6.167	6.574	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.483	3.759	5.546	5.757	6.319	6.155	6.562	5.901	6.462	6.155	6.562	ns
		GCLK PLL	t_{co}	3.481	3.757	5.544	5.754	6.317	6.153	6.560	5.899	6.460	6.153	6.560	ns
	6mA	GCLK	t_{co}	3.481	3.758	5.547	5.759	6.322	6.158	6.565	5.903	6.466	6.158	6.565	ns
		GCLK PLL	t_{co}	3.485	3.761	5.544	5.754	6.316	6.152	6.559	5.898	6.459	6.152	6.559	ns
	8mA	GCLK	t_{co}	3.511	3.790	5.589	5.802	6.366	6.202	6.609	5.946	6.509	6.202	6.609	ns
		GCLK PLL	t_{co}	3.497	3.776	5.577	5.791	6.356	6.192	6.599	5.936	6.500	6.192	6.599	ns
	10mA	GCLK	t_{co}	3.485	3.763	5.560	5.773	6.338	6.174	6.581	5.918	6.482	6.174	6.581	ns
		GCLK PLL	t_{co}	3.485	3.763	5.563	5.777	6.342	6.178	6.585	5.922	6.487	6.178	6.585	ns
	12mA	GCLK	t_{co}	3.481	3.759	5.556	5.769	6.335	6.171	6.578	5.915	6.479	6.171	6.578	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.486	3.763	5.557	5.770	6.334	6.170	6.577	5.914	6.478	6.170	6.577	ns
		GCLK PLL	t_{co}	3.514	3.793	5.588	5.800	6.364	6.200	6.607	5.945	6.507	6.200	6.607	ns
	16mA	GCLK	t_{co}	3.503	3.781	5.576	5.788	6.352	6.188	6.595	5.933	6.495	6.188	6.595	ns
		GCLK PLL	t_{co}	3.498	3.777	5.576	5.789	6.353	6.189	6.596	5.934	6.497	6.189	6.596	ns

Table 1–87. EP3SL200 Column Pins output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.484	3.762	5.558	5.770	6.334	6.170	6.577	5.915	6.479	6.170	6.577	ns
		GCLK PLL	t_{co}	3.482	3.760	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	10mA	GCLK	t_{co}	3.486	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
		GCLK PLL	t_{co}	3.486	3.763	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	12mA	GCLK	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
		GCLK PLL	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.492	3.770	5.562	5.773	6.336	6.172	6.579	5.918	6.480	6.172	6.579	ns
		GCLK PLL	t_{co}	3.485	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns

Table 1–88 lists the EP3SL200 row pins output timing parameters for differential I/O standards.

Table 1–88. EP3SL200 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
LVDS_E_1R	—	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
LVDS_E_3R	—	GCLK	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
		GCLK PLL	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
MINI-LVDS	—	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.562	3.845	5.678	5.894	6.468	6.301	6.680	6.046	6.621	6.301	6.680	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.548	3.831	5.665	5.881	6.455	6.288	6.667	6.032	6.608	6.288	6.667	ns
		GCLK PLL	t_{co}	3.544	3.827	5.663	5.881	6.456	6.289	6.668	6.032	6.610	6.289	6.668	ns
RSDS	—	GCLK	t_{co}	3.560	3.842	5.664	5.878	6.450	6.283	6.662	6.029	6.603	6.283	6.662	ns
		GCLK PLL	t_{co}	3.549	3.832	5.660	5.874	6.447	6.280	6.659	6.026	6.600	6.280	6.659	ns
RSDS_E_1R	—	GCLK	t_{co}	3.546	3.829	5.658	5.872	6.445	6.278	6.657	6.024	6.599	6.278	6.657	ns
		GCLK PLL	t_{co}	3.557	3.839	5.659	5.873	6.444	6.277	6.656	6.023	6.597	6.277	6.656	ns
RSDS_E_3R	—	GCLK	t_{co}	3.547	3.830	5.657	5.871	6.443	6.276	6.655	6.023	6.597	6.276	6.655	ns
		GCLK PLL	t_{co}	3.533	3.816	5.642	5.856	6.429	6.262	6.641	6.008	6.582	6.262	6.641	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.530	3.812	5.638	5.852	6.425	6.258	6.637	6.004	6.578	6.258	6.637	ns
		GCLK PLL	t_{co}	3.527	3.810	5.639	5.855	6.428	6.261	6.640	6.007	6.582	6.261	6.640	ns
	6mA	GCLK	t_{co}	3.528	3.810	5.629	5.843	6.415	6.248	6.627	5.994	6.568	6.248	6.627	ns
		GCLK PLL	t_{co}	3.577	3.863	5.700	5.916	6.491	6.324	6.703	6.068	6.644	6.324	6.703	ns
	8mA	GCLK	t_{co}	3.553	3.839	5.682	5.899	6.474	6.307	6.686	6.051	6.629	6.307	6.686	ns
		GCLK PLL	t_{co}	3.535	3.820	5.660	5.877	6.452	6.285	6.664	6.029	6.607	6.285	6.664	ns

Table 1–88. EP3SL200 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.581	3.866	5.700	5.916	6.490	6.323	6.702	6.068	6.644	6.323	6.702	ns
		GCLK PLL	t_{co}	3.566	3.851	5.686	5.901	6.475	6.308	6.687	6.053	6.629	6.308	6.687	ns
	6mA	GCLK	t_{co}	3.555	3.840	5.681	5.898	6.472	6.305	6.684	6.050	6.627	6.305	6.684	ns
		GCLK PLL	t_{co}	3.535	3.820	5.658	5.874	6.449	6.282	6.661	6.027	6.603	6.282	6.661	ns
	8mA	GCLK	t_{co}	3.532	3.816	5.654	5.871	6.445	6.278	6.657	6.023	6.600	6.278	6.657	ns
		GCLK PLL	t_{co}	3.537	3.820	5.645	5.859	6.431	6.264	6.643	6.010	6.584	6.264	6.643	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.530	3.813	5.644	5.860	6.434	6.267	6.646	6.013	6.589	6.267	6.646	ns
		GCLK PLL	t_{co}	3.568	3.852	5.682	5.897	6.470	6.303	6.682	6.049	6.624	6.303	6.682	ns
	6mA	GCLK	t_{co}	3.550	3.835	5.667	5.882	6.455	6.288	6.667	6.034	6.609	6.288	6.667	ns
		GCLK PLL	t_{co}	3.536	3.819	5.644	5.858	6.430	6.263	6.642	6.010	6.584	6.263	6.642	ns
	8mA	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
	10mA	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
	12mA	GCLK	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
		GCLK PLL	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
	16mA	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.562	3.845	5.678	5.894	6.468	6.301	6.680	6.046	6.621	6.301	6.680	ns
	6mA	GCLK	t_{co}	3.548	3.831	5.665	5.881	6.455	6.288	6.667	6.032	6.608	6.288	6.667	ns
		GCLK PLL	t_{co}	3.544	3.827	5.663	5.881	6.456	6.289	6.668	6.032	6.610	6.289	6.668	ns
	8mA	GCLK	t_{co}	3.560	3.842	5.664	5.878	6.450	6.283	6.662	6.029	6.603	6.283	6.662	ns
		GCLK PLL	t_{co}	3.549	3.832	5.660	5.874	6.447	6.280	6.659	6.026	6.600	6.280	6.659	ns

Table 1–88. EP3SL200 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.546	3.829	5.658	5.872	6.445	6.278	6.657	6.024	6.599	6.278	6.657	ns
		GCLK PLL	t_{co}	3.557	3.839	5.659	5.873	6.444	6.277	6.656	6.023	6.597	6.277	6.656	ns
	6mA	GCLK	t_{co}	3.547	3.830	5.657	5.871	6.443	6.276	6.655	6.023	6.597	6.276	6.655	ns
		GCLK PLL	t_{co}	3.533	3.816	5.642	5.856	6.429	6.262	6.641	6.008	6.582	6.262	6.641	ns
	8mA	GCLK	t_{co}	3.530	3.812	5.638	5.852	6.425	6.258	6.637	6.004	6.578	6.258	6.637	ns
		GCLK PLL	t_{co}	3.527	3.810	5.639	5.855	6.428	6.261	6.640	6.007	6.582	6.261	6.640	ns
	10mA	GCLK	t_{co}	3.528	3.810	5.629	5.843	6.415	6.248	6.627	5.994	6.568	6.248	6.627	ns
		GCLK PLL	t_{co}	3.577	3.863	5.700	5.916	6.491	6.324	6.703	6.068	6.644	6.324	6.703	ns
	12mA	GCLK	t_{co}	3.553	3.839	5.682	5.899	6.474	6.307	6.686	6.051	6.629	6.307	6.686	ns
		GCLK PLL	t_{co}	3.535	3.820	5.660	5.877	6.452	6.285	6.664	6.029	6.607	6.285	6.664	ns
	8mA	GCLK	t_{co}	3.581	3.866	5.700	5.916	6.490	6.323	6.702	6.068	6.644	6.323	6.702	ns
		GCLK PLL	t_{co}	3.566	3.851	5.686	5.901	6.475	6.308	6.687	6.053	6.629	6.308	6.687	ns
	16mA	GCLK	t_{co}	3.555	3.840	5.681	5.898	6.472	6.305	6.684	6.050	6.627	6.305	6.684	ns
		GCLK PLL	t_{co}	3.535	3.820	5.658	5.874	6.449	6.282	6.661	6.027	6.603	6.282	6.661	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.532	3.816	5.654	5.871	6.445	6.278	6.657	6.023	6.600	6.278	6.657	ns
		GCLK PLL	t_{co}	3.537	3.820	5.645	5.859	6.431	6.264	6.643	6.010	6.584	6.264	6.643	ns
	12mA	GCLK	t_{co}	3.530	3.813	5.644	5.860	6.434	6.267	6.646	6.013	6.589	6.267	6.646	ns
		GCLK PLL	t_{co}	3.568	3.852	5.682	5.897	6.470	6.303	6.682	6.049	6.624	6.303	6.682	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.550	3.835	5.667	5.882	6.455	6.288	6.667	6.034	6.609	6.288	6.667	ns
		GCLK PLL	t_{co}	3.536	3.819	5.644	5.858	6.430	6.263	6.642	6.010	6.584	6.263	6.642	ns

Table 1–89 and Table 1–90 list the EP3SL200 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–89 lists the EP3SL200 column pin delay adders when using the regional clock.

Table 1–89. EP3SL200 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.204	0.235	0.378	0.378	0.403	0.392	0.509	0.387	0.411	0.392	0.509	ns
RCLK PLL input adder	0.036	0.046	0.078	0.078	-0.047	-0.038	-0.036	0.085	-0.046	-0.038	-0.036	ns
RCLK output adder	-0.211	-0.234	-0.332	-0.328	-0.34	-0.334	-0.464	-0.327	-0.339	-0.334	-0.464	ns
RCLK PLL output adder	1.904	1.965	3.193	3.323	3.688	3.496	3.804	3.351	3.716	3.496	3.804	ns

Table 1–90 lists the EP3SL200 row pin delay adders when using the regional clock.

Table 1–90. EP3SL200 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.272	0.301	0.446	0.424	0.473	0.46	0.547	0.454	0.481	0.46	0.547	ns
RCLK PLL input adder	0.14	0.149	0.226	0.216	0.235	0.226	0.306	0.232	0.254	0.226	0.306	ns
RCLK output adder	-0.278	-0.306	-0.418	-0.434	-0.486	-0.472	-0.592	-0.464	-0.493	-0.472	-0.592	ns
RCLK PLL output adder	-0.15	-0.15	-0.227	-0.233	-0.254	-0.243	-0.322	-0.243	-0.258	-0.243	-0.322	ns

EP3SL340 I/O Timing Parameters

Table 1–91 through Table 1–94 list the maximum I/O timing parameters for EP3SL340 devices for single-ended I/O standards.

Table 1–91 lists the EP3SL340 column pins input timing parameters for single-ended I/O standards.

Table 1–91. EP3SL340 Column Pins Input Timing Parameters (Part 1 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.345	-1.335	-2.017	-2.061	-2.330	-2.245	-2.542	-2.061	-2.330	-2.245	-2.542	ns
		t_h	1.486	1.476	2.232	2.284	2.574	2.476	2.783	2.284	2.574	2.476	2.783	ns
	GCLK PLL	t_{su}	-1.691	-1.691	-2.554	-2.585	-2.890	-2.799	-3.373	-2.585	-2.890	-2.799	-3.373	ns
		t_h	1.996	1.996	3.031	3.081	3.434	3.313	3.912	3.081	3.434	3.313	3.912	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.345	-1.335	-2.017	-2.061	-2.330	-2.245	-2.542	-2.061	-2.330	-2.245	-2.542	ns
		t_h	1.486	1.476	2.232	2.284	2.574	2.476	2.783	2.284	2.574	2.476	2.783	ns
	GCLK PLL	t_{su}	-1.691	-1.691	-2.554	-2.585	-2.890	-2.799	-3.373	-2.585	-2.890	-2.799	-3.373	ns
		t_h	1.996	1.996	3.031	3.081	3.434	3.313	3.912	3.081	3.434	3.313	3.912	ns

Table 1–91. EP3SL340 Column Pins Input Timing Parameters (Part 2 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVTTL	GCLK	t_{su}	-1.356	-1.346	-2.016	-2.063	-2.329	-2.244	-2.541	-2.063	-2.329	-2.244	-2.541	ns
		t_h	1.497	1.487	2.231	2.286	2.573	2.475	2.782	2.286	2.573	2.475	2.782	ns
	GCLK PLL	t_{su}	-1.702	-1.702	-2.553	-2.587	-2.889	-2.798	-3.372	-2.587	-2.889	-2.798	-3.372	ns
		t_h	2.007	2.007	3.030	3.083	3.433	3.312	3.911	3.083	3.433	3.312	3.911	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.356	-1.346	-2.016	-2.063	-2.329	-2.244	-2.541	-2.063	-2.329	-2.244	-2.541	ns
		t_h	1.497	1.487	2.231	2.286	2.573	2.475	2.782	2.286	2.573	2.475	2.782	ns
	GCLK PLL	t_{su}	-1.702	-1.702	-2.553	-2.587	-2.889	-2.798	-3.372	-2.587	-2.889	-2.798	-3.372	ns
		t_h	2.007	2.007	3.030	3.083	3.433	3.312	3.911	3.083	3.433	3.312	3.911	ns
2.5 V	GCLK	t_{su}	-1.351	-1.341	-2.025	-2.075	-2.348	-2.263	-2.560	-2.075	-2.348	-2.263	-2.560	ns
		t_h	1.492	1.482	2.240	2.298	2.592	2.494	2.801	2.298	2.592	2.494	2.801	ns
	GCLK PLL	t_{su}	-1.697	-1.697	-2.562	-2.599	-2.908	-2.817	-3.391	-2.599	-2.908	-2.817	-3.391	ns
		t_h	2.002	2.002	3.039	3.095	3.452	3.331	3.930	3.095	3.452	3.331	3.930	ns
1.8 V	GCLK	t_{su}	-1.373	-1.363	-2.065	-2.111	-2.346	-2.261	-2.558	-2.111	-2.346	-2.261	-2.558	ns
		t_h	1.516	1.506	2.280	2.334	2.590	2.492	2.799	2.334	2.590	2.492	2.799	ns
	GCLK PLL	t_{su}	-1.719	-1.719	-2.602	-2.635	-2.906	-2.815	-3.389	-2.635	-2.906	-2.815	-3.389	ns
		t_h	2.026	2.026	3.079	3.131	3.450	3.329	3.928	3.131	3.450	3.329	3.928	ns
1.5 V	GCLK	t_{su}	-1.363	-1.353	-2.042	-2.079	-2.276	-2.191	-2.488	-2.079	-2.276	-2.191	-2.488	ns
		t_h	1.506	1.496	2.257	2.302	2.520	2.422	2.729	2.302	2.520	2.422	2.729	ns
	GCLK PLL	t_{su}	-1.709	-1.709	-2.579	-2.603	-2.836	-2.745	-3.319	-2.603	-2.836	-2.745	-3.319	ns
		t_h	2.016	2.016	3.056	3.099	3.380	3.259	3.858	3.099	3.380	3.259	3.858	ns
1.2 V	GCLK	t_{su}	-1.311	-1.301	-1.965	-1.980	-2.120	-2.035	-2.332	-1.980	-2.120	-2.035	-2.332	ns
		t_h	1.454	1.444	2.180	2.203	2.364	2.266	2.573	2.203	2.364	2.266	2.573	ns
	GCLK PLL	t_{su}	-1.657	-1.657	-2.502	-2.504	-2.680	-2.589	-3.163	-2.504	-2.680	-2.589	-3.163	ns
		t_h	1.964	1.964	2.979	3.000	3.224	3.103	3.702	3.000	3.224	3.103	3.702	ns
SSTL-2 CLASS I	GCLK	t_{su}	-1.282	-1.272	-1.937	-1.964	-2.122	-2.037	-2.334	-1.964	-2.122	-2.037	-2.334	ns
		t_h	1.425	1.415	2.152	2.187	2.366	2.268	2.575	2.187	2.366	2.268	2.575	ns
	GCLK PLL	t_{su}	-1.628	-1.628	-2.474	-2.488	-2.682	-2.591	-3.165	-2.488	-2.682	-2.591	-3.165	ns
		t_h	1.935	1.935	2.951	2.984	3.226	3.105	3.704	2.984	3.226	3.105	3.704	ns
SSTL-2 CLASS II	GCLK	t_{su}	-1.282	-1.272	-1.937	-1.964	-2.122	-2.037	-2.334	-1.964	-2.122	-2.037	-2.334	ns
		t_h	1.425	1.415	2.152	2.187	2.366	2.268	2.575	2.187	2.366	2.268	2.575	ns
	GCLK PLL	t_{su}	-1.628	-1.628	-2.474	-2.488	-2.682	-2.591	-3.165	-2.488	-2.682	-2.591	-3.165	ns
		t_h	1.935	1.935	2.951	2.984	3.226	3.105	3.704	2.984	3.226	3.105	3.704	ns
SSTL-18 CLASS I	GCLK	t_{su}	-1.276	-1.266	-1.924	-1.956	-2.119	-2.032	-2.335	-1.956	-2.119	-2.032	-2.335	ns
		t_h	1.419	1.409	2.139	2.176	2.360	2.262	2.571	2.176	2.360	2.262	2.571	ns
	GCLK PLL	t_{su}	-1.622	-1.622	-2.461	-2.480	-2.679	-2.586	-3.163	-2.480	-2.679	-2.586	-3.163	ns
		t_h	1.929	1.929	2.938	2.973	3.220	3.099	3.697	2.973	3.220	3.099	3.697	ns

Table 1–91. EP3SL340 Column Pins Input Timing Parameters (Part 3 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
SSTL-15 CLASS I	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns
3.0-V PCI	GCLK	t_{su}	-1.397	-1.354	-2.096	-2.121	-2.299	-2.366	-2.766	-2.321	-2.476	-2.366	-2.766	ns
		t_h	1.530	1.508	2.327	2.361	2.563	2.611	3.023	2.566	2.745	2.611	3.023	ns
	GCLK PLL	t_{su}	0.785	0.779	1.380	1.479	1.654	1.670	1.679	1.480	1.660	1.670	1.679	ns
		t_h	-0.510	-0.485	-0.912	-0.992	-1.113	-1.156	-1.144	-0.982	-1.107	-1.156	-1.144	ns

Table 1–91. EP3SL340 Column Pins Input Timing Parameters (Part 4 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V PCI-X	GCLK	t_{su}	-1.356	-1.346	-2.016	-2.063	-2.329	-2.244	-2.541	-2.063	-2.329	-2.244	-2.541	ns
		t_h	1.497	1.487	2.231	2.286	2.573	2.475	2.782	2.286	2.573	2.475	2.782	ns
	GCLK PLL	t_{su}	-1.702	-1.702	-2.553	-2.587	-2.889	-2.798	-3.372	-2.587	-2.889	-2.798	-3.372	ns
		t_h	2.007	2.007	3.030	3.083	3.433	3.312	3.911	3.083	3.433	3.312	3.911	ns

Table 1–92 lists the EP3SL340 row pins input timing parameters for single-ended I/O standards.

Table 1–92. EP3SL340 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.239	-1.296	-1.925	-1.956	-2.199	-2.135	-2.587	-1.973	-2.204	-2.142	-2.522	ns
		t_h	1.362	1.435	2.137	2.177	2.442	2.366	2.822	2.205	2.456	2.382	2.763	ns
	GCLK PLL	t_{su}	0.879	0.945	1.670	1.687	1.786	1.680	1.689	1.689	1.807	1.695	1.746	ns
		t_h	-0.615	-0.660	-1.216	-1.217	-1.263	-1.188	-1.178	-1.208	-1.273	-1.193	-1.231	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.239	-1.296	-1.925	-1.956	-2.199	-2.135	-2.587	-1.973	-2.204	-2.142	-2.522	ns
		t_h	1.362	1.435	2.137	2.177	2.442	2.366	2.822	2.205	2.456	2.382	2.763	ns
	GCLK PLL	t_{su}	0.879	0.945	1.670	1.687	1.786	1.680	1.689	1.689	1.807	1.695	1.746	ns
		t_h	-0.615	-0.660	-1.216	-1.217	-1.263	-1.188	-1.178	-1.208	-1.273	-1.193	-1.231	ns
3.0-V LVTTL	GCLK	t_{su}	-1.245	-1.307	-1.922	-1.957	-2.202	-2.138	-2.590	-1.972	-2.209	-2.147	-2.527	ns
		t_h	1.368	1.446	2.134	2.178	2.445	2.369	2.825	2.204	2.461	2.387	2.768	ns
	GCLK PLL	t_{su}	0.873	0.934	1.673	1.686	1.783	1.677	1.686	1.690	1.802	1.690	1.741	ns
		t_h	-0.609	-0.649	-1.219	-1.216	-1.260	-1.185	-1.175	-1.209	-1.268	-1.188	-1.226	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.245	-1.307	-1.922	-1.957	-2.202	-2.138	-2.590	-1.972	-2.209	-2.147	-2.527	ns
		t_h	1.368	1.446	2.134	2.178	2.445	2.369	2.825	2.204	2.461	2.387	2.768	ns
	GCLK PLL	t_{su}	0.873	0.934	1.673	1.686	1.783	1.677	1.686	1.690	1.802	1.690	1.741	ns
		t_h	-0.609	-0.649	-1.219	-1.216	-1.260	-1.185	-1.175	-1.209	-1.268	-1.188	-1.226	ns
2.5 V	GCLK	t_{su}	-1.233	-1.300	-1.931	-1.970	-2.217	-2.153	-2.605	-1.981	-2.219	-2.157	-2.537	ns
		t_h	1.356	1.439	2.143	2.191	2.460	2.384	2.840	2.213	2.471	2.397	2.778	ns
	GCLK PLL	t_{su}	0.885	0.941	1.664	1.673	1.768	1.662	1.671	1.681	1.792	1.680	1.731	ns
		t_h	-0.621	-0.656	-1.210	-1.203	-1.245	-1.170	-1.160	-1.200	-1.258	-1.178	-1.216	ns
1.8 V	GCLK	t_{su}	-1.251	-1.343	-1.980	-1.995	-2.204	-2.138	-2.582	-2.003	-2.208	-2.153	-2.621	ns
		t_h	1.377	1.482	2.193	2.216	2.447	2.369	2.817	2.234	2.461	2.393	2.859	ns
	GCLK PLL	t_{su}	0.827	0.910	1.624	1.634	1.857	1.742	1.565	1.620	1.886	1.762	1.619	ns
		t_h	-0.562	-0.624	-1.170	-1.164	-1.330	-1.246	-1.060	-1.140	-1.347	-1.255	-1.107	ns

Table 1–92. EP3SL340 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	GCLK	t_{su}	-1.241	-1.332	-1.956	-1.963	-2.136	-2.070	-2.514	-1.972	-2.143	-2.088	-2.556	ns
		t_h	1.367	1.471	2.169	2.184	2.379	2.301	2.749	2.203	2.396	2.328	2.794	ns
	GCLK PLL	t_{su}	0.837	0.921	1.648	1.666	1.925	1.810	1.633	1.651	1.951	1.827	1.684	ns
		t_h	-0.572	-0.635	-1.194	-1.196	-1.398	-1.314	-1.128	-1.171	-1.412	-1.320	-1.172	ns
1.2 V	GCLK	t_{su}	-1.181	-1.279	-1.877	-1.862	-1.977	-1.911	-2.355	-1.876	-1.988	-1.933	-2.401	ns
		t_h	1.307	1.418	2.090	2.083	2.220	2.142	2.590	2.107	2.241	2.173	2.639	ns
	GCLK PLL	t_{su}	0.897	0.974	1.727	1.767	2.084	1.969	1.792	1.747	2.106	1.982	1.839	ns
		t_h	-0.632	-0.688	-1.273	-1.297	-1.557	-1.473	-1.287	-1.267	-1.567	-1.475	-1.327	ns
SSTL-2 CLASS I	GCLK	t_{su}	-1.176	-1.242	-1.845	-1.861	-1.997	-1.933	-2.385	-1.869	-2.002	-1.940	-2.320	ns
		t_h	1.300	1.382	2.057	2.082	2.240	2.164	2.620	2.101	2.254	2.180	2.561	ns
	GCLK PLL	t_{su}	0.942	1.000	1.750	1.782	1.988	1.882	1.891	1.793	2.009	1.897	1.948	ns
		t_h	-0.677	-0.714	-1.296	-1.312	-1.465	-1.390	-1.380	-1.312	-1.475	-1.395	-1.433	ns
SSTL-2 CLASS II	GCLK	t_{su}	-1.176	-1.242	-1.845	-1.861	-1.997	-1.933	-2.385	-1.869	-2.002	-1.940	-2.320	ns
		t_h	1.300	1.382	2.057	2.082	2.240	2.164	2.620	2.101	2.254	2.180	2.561	ns
	GCLK PLL	t_{su}	0.942	1.000	1.750	1.782	1.988	1.882	1.891	1.793	2.009	1.897	1.948	ns
		t_h	-0.677	-0.714	-1.296	-1.312	-1.465	-1.390	-1.380	-1.312	-1.475	-1.395	-1.433	ns
SSTL-18 CLASS I	GCLK	t_{su}	-1.155	-1.244	-1.839	-1.835	-1.972	-1.905	-2.351	-1.844	-1.981	-1.925	-2.394	ns
		t_h	1.281	1.383	2.052	2.054	2.213	2.135	2.582	2.073	2.231	2.164	2.628	ns
	GCLK PLL	t_{su}	0.923	1.009	1.765	1.794	2.086	1.972	1.796	1.779	2.110	1.988	1.846	ns
		t_h	-0.658	-0.723	-1.311	-1.326	-1.562	-1.478	-1.295	-1.301	-1.574	-1.482	-1.338	ns
SSTL-18 CLASS II	GCLK	t_{su}	-1.155	-1.244	-1.839	-1.835	-1.972	-1.905	-2.351	-1.844	-1.981	-1.925	-2.394	ns
		t_h	1.281	1.383	2.052	2.054	2.213	2.135	2.582	2.073	2.231	2.164	2.628	ns
	GCLK PLL	t_{su}	0.923	1.009	1.765	1.794	2.086	1.972	1.796	1.779	2.110	1.988	1.846	ns
		t_h	-0.658	-0.723	-1.311	-1.326	-1.562	-1.478	-1.295	-1.301	-1.574	-1.482	-1.338	ns
SSTL-15 CLASS I	GCLK	t_{su}	-1.141	-1.232	-1.824	-1.825	-1.954	-1.887	-2.333	-1.833	-1.964	-1.908	-2.377	ns
		t_h	1.267	1.371	2.038	2.044	2.195	2.117	2.564	2.062	2.214	2.147	2.611	ns
	GCLK PLL	t_{su}	0.937	1.021	1.778	1.804	2.104	1.990	1.814	1.790	2.127	2.005	1.863	ns
		t_h	-0.672	-0.735	-1.323	-1.336	-1.580	-1.496	-1.313	-1.312	-1.591	-1.499	-1.355	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-1.155	-1.244	-1.839	-1.835	-1.972	-1.905	-2.351	-1.844	-1.981	-1.925	-2.394	ns
		t_h	1.281	1.383	2.052	2.054	2.213	2.135	2.582	2.073	2.231	2.164	2.628	ns
	GCLK PLL	t_{su}	0.923	1.009	1.765	1.794	2.086	1.972	1.796	1.779	2.110	1.988	1.846	ns
		t_h	-0.658	-0.723	-1.311	-1.326	-1.562	-1.478	-1.295	-1.301	-1.574	-1.482	-1.338	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-1.155	-1.244	-1.839	-1.835	-1.972	-1.905	-2.351	-1.844	-1.981	-1.925	-2.394	ns
		t_h	1.281	1.383	2.052	2.054	2.213	2.135	2.582	2.073	2.231	2.164	2.628	ns
	GCLK PLL	t_{su}	0.923	1.009	1.765	1.794	2.086	1.972	1.796	1.779	2.110	1.988	1.846	ns
		t_h	-0.658	-0.723	-1.311	-1.326	-1.562	-1.478	-1.295	-1.301	-1.574	-1.482	-1.338	ns

Table 1–92. EP3SL340 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS I	GCLK	t_{su}	-1.141	-1.232	-1.824	-1.825	-1.954	-1.887	-2.333	-1.833	-1.964	-1.908	-2.377	ns
		t_h	1.267	1.371	2.038	2.044	2.195	2.117	2.564	2.062	2.214	2.147	2.611	ns
	GCLK PLL	t_{su}	0.937	1.021	1.778	1.804	2.104	1.990	1.814	1.790	2.127	2.005	1.863	ns
		t_h	-0.672	-0.735	-1.323	-1.336	-1.580	-1.496	-1.313	-1.312	-1.591	-1.499	-1.355	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-1.141	-1.232	-1.824	-1.825	-1.954	-1.887	-2.333	-1.833	-1.964	-1.908	-2.377	ns
		t_h	1.267	1.371	2.038	2.044	2.195	2.117	2.564	2.062	2.214	2.147	2.611	ns
	GCLK PLL	t_{su}	0.937	1.021	1.778	1.804	2.104	1.990	1.814	1.790	2.127	2.005	1.863	ns
		t_h	-0.672	-0.735	-1.323	-1.336	-1.580	-1.496	-1.313	-1.312	-1.591	-1.499	-1.355	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-1.132	-1.220	-1.815	-1.815	-1.938	-1.871	-2.317	-1.824	-1.948	-1.892	-2.361	ns
		t_h	1.258	1.359	2.029	2.034	2.179	2.101	2.548	2.053	2.198	2.131	2.595	ns
	GCLK PLL	t_{su}	0.946	1.033	1.787	1.814	2.120	2.006	1.830	1.799	2.143	2.021	1.879	ns
		t_h	-0.681	-0.747	-1.332	-1.346	-1.596	-1.512	-1.329	-1.321	-1.607	-1.515	-1.371	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-1.132	-1.220	-1.815	-1.815	-1.938	-1.871	-2.317	-1.824	-1.948	-1.892	-2.361	ns
		t_h	1.258	1.359	2.029	2.034	2.179	2.101	2.548	2.053	2.198	2.131	2.595	ns
	GCLK PLL	t_{su}	0.946	1.033	1.787	1.814	2.120	2.006	1.830	1.799	2.143	2.021	1.879	ns
		t_h	-0.681	-0.747	-1.332	-1.346	-1.596	-1.512	-1.329	-1.321	-1.607	-1.515	-1.371	ns
3.0-V PCI	GCLK	t_{su}	-1.245	-1.307	-1.922	-1.957	-2.202	-2.138	-2.590	-1.972	-2.209	-2.147	-2.527	ns
		t_h	1.368	1.446	2.134	2.178	2.445	2.369	2.825	2.204	2.461	2.387	2.768	ns
	GCLK PLL	t_{su}	0.873	0.934	1.673	1.686	1.783	1.677	1.686	1.690	1.802	1.690	1.741	ns
		t_h	-0.609	-0.649	-1.219	-1.216	-1.260	-1.185	-1.175	-1.209	-1.268	-1.188	-1.226	ns
3.0-V PCI-X	GCLK	t_{su}	-1.245	-1.307	-1.922	-1.957	-2.202	-2.138	-2.590	-1.972	-2.209	-2.147	-2.527	ns
		t_h	1.368	1.446	2.134	2.178	2.445	2.369	2.825	2.204	2.461	2.387	2.768	ns
	GCLK PLL	t_{su}	0.873	0.934	1.673	1.686	1.783	1.677	1.686	1.690	1.802	1.690	1.741	ns
		t_h	-0.609	-0.649	-1.219	-1.216	-1.260	-1.185	-1.175	-1.209	-1.268	-1.188	-1.226	ns

Table 1–93 lists the EP3SL340 column pins output timing parameters for single-ended I/O standards.

Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.705	3.705	5.372	5.559	6.083	5.935	6.364	5.559	6.083	5.935	6.364	ns
		GCLK PLL	t_{co}	4.269	4.269	6.214	6.409	6.992	6.812	7.355	6.409	6.992	6.812	7.355	ns
	8mA	GCLK	t_{co}	3.638	3.638	5.263	5.448	5.970	5.822	6.251	5.448	5.970	5.822	6.251	ns
		GCLK PLL	t_{co}	4.202	4.202	6.105	6.298	6.879	6.699	7.242	6.298	6.879	6.699	7.242	ns
	12mA	GCLK	t_{co}	3.552	3.552	5.160	5.350	5.878	5.730	6.159	5.350	5.878	5.730	6.159	ns
		GCLK PLL	t_{co}	4.116	4.116	6.001	6.200	6.789	6.609	7.152	6.200	6.789	6.609	7.152	ns
	16mA	GCLK	t_{co}	3.545	3.545	5.143	5.322	5.837	5.689	6.118	5.322	5.837	5.689	6.118	ns
		GCLK PLL	t_{co}	4.110	4.110	5.985	6.172	6.747	6.567	7.110	6.172	6.747	6.567	7.110	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.711	3.711	5.377	5.564	6.090	5.942	6.371	5.564	6.090	5.942	6.371	ns
		GCLK PLL	t_{co}	4.275	4.275	6.218	6.414	7.000	6.820	7.363	6.414	7.000	6.820	7.363	ns
	8mA	GCLK	t_{co}	3.556	3.556	5.170	5.367	5.889	5.741	6.170	5.367	5.889	5.741	6.170	ns
		GCLK PLL	t_{co}	4.120	4.120	6.012	6.217	6.799	6.619	7.162	6.217	6.799	6.619	7.162	ns
	12mA	GCLK	t_{co}	3.563	3.563	5.164	5.346	5.863	5.715	6.144	5.346	5.863	5.715	6.144	ns
		GCLK PLL	t_{co}	4.127	4.127	6.006	6.196	6.775	6.595	7.138	6.196	6.775	6.595	7.138	ns
	16mA	GCLK	t_{co}	3.547	3.547	5.141	5.320	5.834	5.686	6.115	5.320	5.834	5.686	6.115	ns
		GCLK PLL	t_{co}	4.111	4.111	5.983	6.171	6.746	6.566	7.109	6.171	6.746	6.566	7.109	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.669	3.669	5.339	5.528	6.050	5.902	6.331	5.528	6.050	5.902	6.331	ns
		GCLK PLL	t_{co}	4.232	4.232	6.181	6.377	6.983	6.803	7.346	6.377	6.983	6.803	7.346	ns
	8mA	GCLK	t_{co}	3.558	3.558	5.209	5.394	5.912	5.765	6.193	5.394	5.912	5.765	6.193	ns
		GCLK PLL	t_{co}	4.125	4.125	6.053	6.246	6.867	6.688	7.229	6.246	6.867	6.688	7.229	ns
	12mA	GCLK	t_{co}	3.522	3.522	5.146	5.325	5.838	5.691	6.119	5.325	5.838	5.691	6.119	ns
		GCLK PLL	t_{co}	4.087	4.087	5.987	6.174	6.803	6.624	7.165	6.174	6.803	6.624	7.165	ns
	16mA	GCLK	t_{co}	3.504	3.504	5.117	5.297	5.810	5.662	6.091	5.297	5.810	5.662	6.091	ns
		GCLK PLL	t_{co}	4.068	4.068	5.959	6.147	6.780	6.601	7.142	6.147	6.780	6.601	7.142	ns

Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.583	3.583	5.243	5.427	5.947	5.800	6.228	5.427	5.947	5.800	6.228	ns
		GCLK PLL	t_{co}	4.149	4.149	6.087	6.279	6.903	6.724	7.265	6.279	6.903	6.724	7.265	ns
	8mA	GCLK	t_{co}	3.504	3.504	5.120	5.298	5.812	5.665	6.093	5.298	5.812	5.665	6.093	ns
		GCLK PLL	t_{co}	4.070	4.070	5.963	6.149	6.793	6.614	7.155	6.149	6.793	6.614	7.155	ns
	12mA	GCLK	t_{co}	3.499	3.499	5.112	5.291	5.804	5.656	6.085	5.291	5.804	5.656	6.085	ns
		GCLK PLL	t_{co}	4.063	4.063	5.955	6.142	6.761	6.581	7.124	6.142	6.761	6.581	7.124	ns
	16mA	GCLK	t_{co}	3.490	3.490	5.098	5.276	5.789	5.641	6.070	5.276	5.789	5.641	6.070	ns
		GCLK PLL	t_{co}	4.054	4.054	5.940	6.126	6.767	6.588	7.129	6.126	6.767	6.588	7.129	ns
2.5 V	4mA	GCLK	t_{co}	3.705	3.705	5.450	5.654	6.194	6.047	6.475	5.654	6.194	6.047	6.475	ns
		GCLK PLL	t_{co}	4.269	4.269	6.293	6.504	7.111	6.932	7.473	6.504	7.111	6.932	7.473	ns
	8mA	GCLK	t_{co}	3.605	3.605	5.331	5.528	6.062	5.915	6.343	5.528	6.062	5.915	6.343	ns
		GCLK PLL	t_{co}	4.172	4.172	6.174	6.379	6.987	6.808	7.349	6.379	6.987	6.808	7.349	ns
	12mA	GCLK	t_{co}	3.561	3.561	5.244	5.438	5.967	5.819	6.248	5.438	5.967	5.819	6.248	ns
		GCLK PLL	t_{co}	4.127	4.127	6.087	6.288	6.909	6.730	7.271	6.288	6.909	6.730	7.271	ns
	16mA	GCLK	t_{co}	3.523	3.523	5.205	5.395	5.924	5.776	6.205	5.395	5.924	5.776	6.205	ns
		GCLK PLL	t_{co}	4.088	4.088	6.048	6.246	6.852	6.673	7.214	6.246	6.852	6.673	7.214	ns

Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.896	3.896	5.772	6.014	6.599	6.451	6.880	6.014	6.599	6.451	6.880	ns
		GCLK PLL	t_{co}	4.460	4.460	6.613	6.863	7.507	7.327	7.870	6.863	7.507	7.327	7.870	ns
	4mA	GCLK	t_{co}	3.715	3.715	5.493	5.705	6.251	6.104	6.532	5.705	6.251	6.104	6.532	ns
		GCLK PLL	t_{co}	4.282	4.282	6.336	6.556	7.177	6.998	7.539	6.556	7.177	6.998	7.539	ns
	6mA	GCLK	t_{co}	3.633	3.633	5.386	5.590	6.141	5.993	6.422	5.590	6.141	5.993	6.422	ns
		GCLK PLL	t_{co}	4.197	4.197	6.227	6.440	7.064	6.884	7.427	6.440	7.064	6.884	7.427	ns
	8mA	GCLK	t_{co}	3.613	3.613	5.327	5.537	6.075	5.927	6.356	5.537	6.075	5.927	6.356	ns
		GCLK PLL	t_{co}	4.177	4.177	6.169	6.386	6.987	6.807	7.350	6.386	6.987	6.807	7.350	ns
	10mA	GCLK	t_{co}	3.550	3.550	5.266	5.462	5.994	5.846	6.275	5.462	5.994	5.846	6.275	ns
		GCLK PLL	t_{co}	4.114	4.114	6.109	6.312	6.918	6.738	7.281	6.312	6.918	6.738	7.281	ns
	12mA	GCLK	t_{co}	3.532	3.532	5.246	5.440	5.971	5.823	6.252	5.440	5.971	5.823	6.252	ns
		GCLK PLL	t_{co}	4.097	4.097	6.088	6.291	6.885	6.705	7.248	6.291	6.885	6.705	7.248	ns
1.5 V	2mA	GCLK	t_{co}	3.842	3.842	5.700	5.947	6.537	6.389	6.818	5.947	6.537	6.389	6.818	ns
		GCLK PLL	t_{co}	4.406	4.406	6.542	6.796	7.452	7.272	7.815	6.796	7.452	7.272	7.815	ns
	4mA	GCLK	t_{co}	3.630	3.630	5.381	5.590	6.145	5.997	6.426	5.590	6.145	5.997	6.426	ns
		GCLK PLL	t_{co}	4.194	4.194	6.223	6.439	7.066	6.886	7.429	6.439	7.066	6.886	7.429	ns
	6mA	GCLK	t_{co}	3.605	3.605	5.314	5.530	6.078	5.930	6.359	5.530	6.078	5.930	6.359	ns
		GCLK PLL	t_{co}	4.170	4.170	6.156	6.381	6.989	6.809	7.352	6.381	6.989	6.809	7.352	ns
	8mA	GCLK	t_{co}	3.594	3.594	5.297	5.505	6.058	5.910	6.339	5.505	6.058	5.910	6.339	ns
		GCLK PLL	t_{co}	4.158	4.158	6.140	6.356	6.972	6.792	7.335	6.356	6.972	6.792	7.335	ns
	10mA	GCLK	t_{co}	3.539	3.539	5.259	5.455	5.988	5.840	6.269	5.455	5.988	5.840	6.269	ns
		GCLK PLL	t_{co}	4.103	4.103	6.101	6.305	6.909	6.729	7.272	6.305	6.909	6.729	7.272	ns
	12mA	GCLK	t_{co}	3.534	3.534	5.243	5.443	5.977	5.829	6.258	5.443	5.977	5.829	6.258	ns
		GCLK PLL	t_{co}	4.097	4.097	6.084	6.292	6.888	6.708	7.251	6.292	6.888	6.708	7.251	ns

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Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.758	3.758	5.626	5.882	6.481	6.333	6.762	5.882	6.481	6.333	6.762	ns
		GCLK PLL	t_{co}	4.322	4.322	6.468	6.731	7.392	7.212	7.755	6.731	7.392	7.212	7.755	ns
	4mA	GCLK	t_{co}	3.635	3.635	5.401	5.621	6.195	6.047	6.476	5.621	6.195	6.047	6.476	ns
		GCLK PLL	t_{co}	4.200	4.200	6.243	6.471	7.107	6.927	7.470	6.471	7.107	6.927	7.470	ns
	6mA	GCLK	t_{co}	3.597	3.597	5.308	5.531	6.082	5.934	6.363	5.531	6.082	5.934	6.363	ns
		GCLK PLL	t_{co}	4.162	4.162	6.150	6.381	6.993	6.813	7.356	6.381	6.993	6.813	7.356	ns
	8mA	GCLK	t_{co}	3.550	3.550	5.280	5.482	6.026	5.878	6.307	5.482	6.026	5.878	6.307	ns
		GCLK PLL	t_{co}	4.113	4.113	6.121	6.331	6.946	6.766	7.309	6.331	6.946	6.766	7.309	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.550	3.550	5.237	5.430	5.957	5.809	6.238	5.430	5.957	5.809	6.238	ns
		GCLK PLL	t_{co}	4.114	4.114	6.078	6.278	6.903	6.723	7.266	6.278	6.903	6.723	7.266	ns
	10mA	GCLK	t_{co}	3.547	3.547	5.234	5.426	5.953	5.805	6.234	5.426	5.953	5.805	6.234	ns
		GCLK PLL	t_{co}	4.111	4.111	6.075	6.274	6.899	6.720	7.261	6.274	6.899	6.720	7.261	ns
	12mA	GCLK	t_{co}	3.545	3.545	5.234	5.427	5.954	5.806	6.235	5.427	5.954	5.806	6.235	ns
		GCLK PLL	t_{co}	4.110	4.110	6.075	6.275	6.899	6.719	7.262	6.275	6.899	6.719	7.262	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.536	3.536	5.220	5.412	5.939	5.791	6.220	5.412	5.939	5.791	6.220	ns
		GCLK PLL	t_{co}	4.101	4.101	6.062	6.261	6.883	6.703	7.246	6.261	6.883	6.703	7.246	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.557	3.557	5.249	5.444	5.973	5.825	6.254	5.444	5.973	5.825	6.254	ns
		GCLK PLL	t_{co}	4.121	4.121	6.090	6.292	6.923	6.744	7.285	6.292	6.923	6.744	7.285	ns
	6mA	GCLK	t_{co}	3.553	3.553	5.247	5.442	5.971	5.823	6.252	5.442	5.971	5.823	6.252	ns
		GCLK PLL	t_{co}	4.117	4.117	6.088	6.290	6.920	6.740	7.283	6.290	6.920	6.740	7.283	ns
	8mA	GCLK	t_{co}	3.542	3.542	5.237	5.432	5.962	5.814	6.243	5.432	5.962	5.814	6.243	ns
		GCLK PLL	t_{co}	4.107	4.107	6.079	6.281	6.919	6.740	7.281	6.281	6.919	6.740	7.281	ns
	10mA	GCLK	t_{co}	3.531	3.531	5.225	5.419	5.949	5.801	6.230	5.419	5.949	5.801	6.230	ns
		GCLK PLL	t_{co}	4.095	4.095	6.066	6.268	6.894	6.715	7.256	6.268	6.894	6.715	7.256	ns
	12mA	GCLK	t_{co}	3.531	3.531	5.224	5.419	5.949	5.801	6.230	5.419	5.949	5.801	6.230	ns
		GCLK PLL	t_{co}	4.095	4.095	6.066	6.268	6.892	6.712	7.255	6.268	6.892	6.712	7.255	ns

Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.537	3.537	5.223	5.416	5.944	5.796	6.225	5.416	5.944	5.796	6.225	ns
		GCLK PLL	t_{co}	4.102	4.102	6.065	6.265	6.895	6.715	7.258	6.265	6.895	6.715	7.258	ns
	16mA	GCLK	t_{co}	3.540	3.540	5.231	5.426	5.956	5.808	6.237	5.426	5.956	5.808	6.237	ns
		GCLK PLL	t_{co}	4.104	4.104	6.072	6.274	6.918	6.738	7.281	6.274	6.918	6.738	7.281	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.561	3.561	5.259	5.455	5.986	5.838	6.267	5.455	5.986	5.838	6.267	ns
		GCLK PLL	t_{co}	4.124	4.124	6.100	6.303	6.937	6.757	7.300	6.303	6.937	6.757	7.300	ns
	6mA	GCLK	t_{co}	3.547	3.547	5.248	5.445	5.977	5.829	6.258	5.445	5.977	5.829	6.258	ns
		GCLK PLL	t_{co}	4.112	4.112	6.090	6.294	6.923	6.743	7.286	6.294	6.923	6.743	7.286	ns
	8mA	GCLK	t_{co}	3.536	3.536	5.235	5.431	5.963	5.815	6.244	5.431	5.963	5.815	6.244	ns
		GCLK PLL	t_{co}	4.100	4.100	6.076	6.280	6.908	6.728	7.271	6.280	6.908	6.728	7.271	ns
	10mA	GCLK	t_{co}	3.535	3.535	5.238	5.435	5.967	5.819	6.248	5.435	5.967	5.819	6.248	ns
		GCLK PLL	t_{co}	4.099	4.099	6.078	6.283	6.905	6.726	7.268	6.283	6.905	6.726	7.268	ns
	12mA	GCLK	t_{co}	3.532	3.532	5.232	5.429	5.961	5.813	6.242	5.429	5.961	5.813	6.242	ns
		GCLK PLL	t_{co}	4.096	4.096	6.073	6.277	6.899	6.719	7.262	6.277	6.899	6.719	7.262	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.534	3.534	5.221	5.415	5.944	5.796	6.225	5.415	5.944	5.796	6.225	ns
		GCLK PLL	t_{co}	4.098	4.098	6.063	6.264	6.896	6.716	7.259	6.264	6.896	6.716	7.259	ns
	16mA	GCLK	t_{co}	3.537	3.537	5.228	5.424	5.955	5.807	6.236	5.424	5.955	5.807	6.236	ns
		GCLK PLL	t_{co}	4.101	4.101	6.070	6.272	6.920	6.740	7.283	6.272	6.920	6.740	7.283	ns

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Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.544	3.544	5.223	5.415	5.942	5.794	6.223	5.415	5.942	5.794	6.223	ns
		GCLK PLL	t_{co}	4.108	4.108	6.064	6.263	6.897	6.717	7.260	6.263	6.897	6.717	7.260	ns
	6mA	GCLK	t_{co}	3.537	3.537	5.221	5.414	5.941	5.793	6.222	5.414	5.941	5.793	6.222	ns
		GCLK PLL	t_{co}	4.102	4.102	6.063	6.263	6.903	6.724	7.265	6.263	6.903	6.724	7.265	ns
	8mA	GCLK	t_{co}	3.529	3.529	5.214	5.406	5.934	5.786	6.215	5.406	5.934	5.786	6.215	ns
		GCLK PLL	t_{co}	4.094	4.094	6.055	6.255	6.885	6.706	7.247	6.255	6.885	6.706	7.247	ns
	10mA	GCLK	t_{co}	3.532	3.532	5.217	5.410	5.938	5.790	6.219	5.410	5.938	5.790	6.219	ns
		GCLK PLL	t_{co}	4.096	4.096	6.058	6.258	6.887	6.707	7.250	6.258	6.887	6.707	7.250	ns
	12mA	GCLK	t_{co}	3.529	3.529	5.219	5.413	5.942	5.794	6.223	5.413	5.942	5.794	6.223	ns
		GCLK PLL	t_{co}	4.093	4.093	6.060	6.261	6.895	6.716	7.257	6.261	6.895	6.716	7.257	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.537	3.537	5.218	5.411	5.938	5.790	6.219	5.411	5.938	5.790	6.219	ns
		GCLK PLL	t_{co}	4.101	4.101	6.059	6.259	6.898	6.718	7.261	6.259	6.898	6.718	7.261	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.549	3.549	5.232	5.425	5.953	5.805	6.234	5.425	5.953	5.805	6.234	ns
		GCLK PLL	t_{co}	4.113	4.113	6.072	6.273	6.910	6.730	7.273	6.273	6.910	6.730	7.273	ns
	6mA	GCLK	t_{co}	3.545	3.545	5.233	5.427	5.956	5.808	6.237	5.427	5.956	5.808	6.237	ns
		GCLK PLL	t_{co}	4.109	4.109	6.075	6.276	6.907	6.727	7.270	6.276	6.907	6.727	7.270	ns
	8mA	GCLK	t_{co}	3.541	3.541	5.228	5.422	5.951	5.803	6.232	5.422	5.951	5.803	6.232	ns
		GCLK PLL	t_{co}	4.105	4.105	6.070	6.271	6.902	6.722	7.265	6.271	6.902	6.722	7.265	ns
	10mA	GCLK	t_{co}	3.534	3.534	5.221	5.415	5.944	5.796	6.225	5.415	5.944	5.796	6.225	ns
		GCLK PLL	t_{co}	4.098	4.098	6.063	6.264	6.896	6.716	7.259	6.264	6.896	6.716	7.259	ns
	12mA	GCLK	t_{co}	3.535	3.535	5.228	5.423	5.954	5.806	6.235	5.423	5.954	5.806	6.235	ns
		GCLK PLL	t_{co}	4.098	4.098	6.069	6.271	6.900	6.721	7.262	6.271	6.900	6.721	7.262	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.533	3.533	5.209	5.401	5.928	5.780	6.209	5.401	5.928	5.780	6.209	ns
		GCLK PLL	t_{co}	4.096	4.096	6.050	6.249	6.884	6.704	7.247	6.249	6.884	6.704	7.247	ns

Table 1–93. EP3SL340 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.552	3.552	5.246	5.442	5.974	5.826	6.255	5.442	5.974	5.826	6.255	ns
		GCLK PLL	t_{co}	4.117	4.117	6.087	6.291	6.929	6.749	7.292	6.291	6.929	6.749	7.292	ns
	6mA	GCLK	t_{co}	3.544	3.544	5.237	5.433	5.965	5.817	6.246	5.433	5.965	5.817	6.246	ns
		GCLK PLL	t_{co}	4.108	4.108	6.078	6.282	6.917	6.737	7.280	6.282	6.917	6.737	7.280	ns
	8mA	GCLK	t_{co}	3.545	3.545	5.244	5.442	5.974	5.826	6.255	5.442	5.974	5.826	6.255	ns
		GCLK PLL	t_{co}	4.108	4.108	6.085	6.290	6.920	6.740	7.283	6.290	6.920	6.740	7.283	ns
	10mA	GCLK	t_{co}	3.534	3.534	5.231	5.428	5.960	5.812	6.241	5.428	5.960	5.812	6.241	ns
		GCLK PLL	t_{co}	4.098	4.098	6.072	6.276	6.915	6.736	7.277	6.276	6.915	6.736	7.277	ns
	12mA	GCLK	t_{co}	3.534	3.534	5.231	5.428	5.961	5.813	6.242	5.428	5.961	5.813	6.242	ns
		GCLK PLL	t_{co}	4.098	4.098	6.073	6.277	6.906	6.727	7.269	6.277	6.906	6.727	7.269	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.555	3.555	5.247	5.443	5.974	5.826	6.255	5.443	5.974	5.826	6.255	ns
		GCLK PLL	t_{co}	4.119	4.119	6.089	6.292	6.943	6.763	7.306	6.292	6.943	6.763	7.306	ns
3.0-V PCI	—	GCLK	t_{co}	3.658	3.658	5.292	5.477	5.999	5.851	6.280	5.477	5.999	5.851	6.280	ns
		GCLK PLL	t_{co}	4.222	4.222	6.134	6.328	6.974	6.794	7.337	6.328	6.974	6.794	7.337	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.658	3.658	5.292	5.477	5.999	5.851	6.280	5.477	5.999	5.851	6.280	ns
		GCLK PLL	t_{co}	4.222	4.222	6.134	6.328	6.974	6.794	7.337	6.328	6.974	6.794	7.337	ns

Table 1–94 lists the EP3SL340 row pins output timing parameters for single-ended I/O standards.

Table 1–94. EP3SL340 Row Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.479	3.781	5.469	5.657	6.238	6.095	6.481	5.741	6.370	6.120	6.565	ns
		GCLK PLL	t_{co}	1.562	1.782	2.243	2.285	2.559	2.570	2.578	2.386	2.666	2.671	2.594	ns
	8mA	GCLK	t_{co}	3.413	3.681	5.339	5.519	6.093	5.950	6.336	5.628	6.221	6.005	6.416	ns
		GCLK PLL	t_{co}	1.496	1.677	2.113	2.174	2.414	2.425	2.433	2.273	2.517	2.522	2.445	ns
	12mA	GCLK	t_{co}	3.334	3.592	5.220	5.398	5.965	5.822	6.208	5.529	6.089	5.905	6.284	ns
		GCLK PLL	t_{co}	1.417	1.575	1.994	2.074	2.286	2.297	2.305	2.174	2.385	2.390	2.313	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.481	3.785	5.477	5.662	6.242	6.099	6.485	5.749	6.374	6.132	6.569	ns
		GCLK PLL	t_{co}	1.564	1.786	2.251	2.291	2.563	2.574	2.582	2.394	2.670	2.675	2.598	ns
	8mA	GCLK	t_{co}	3.338	3.596	5.226	5.413	5.971	5.828	6.214	5.541	6.096	5.914	6.291	ns
		GCLK PLL	t_{co}	1.421	1.579	2.000	2.089	2.292	2.303	2.311	2.186	2.392	2.397	2.320	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.440	3.727	5.421	5.610	6.194	6.051	6.437	5.709	6.328	6.086	6.523	ns
		GCLK PLL	t_{co}	1.523	1.728	2.195	2.254	2.515	2.526	2.534	2.354	2.624	2.629	2.552	ns
	8mA	GCLK	t_{co}	3.339	3.601	5.269	5.451	6.030	5.887	6.273	5.567	6.164	5.940	6.358	ns
		GCLK PLL	t_{co}	1.422	1.601	2.043	2.112	2.351	2.362	2.370	2.212	2.460	2.464	2.387	ns
	12mA	GCLK	t_{co}	3.302	3.563	5.188	5.371	5.942	5.799	6.185	5.499	6.071	5.867	6.265	ns
		GCLK PLL	t_{co}	1.385	1.550	1.961	2.047	2.263	2.274	2.282	2.144	2.367	2.371	2.294	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.361	3.646	5.316	5.503	6.084	5.941	6.327	5.600	6.217	5.976	6.411	ns
		GCLK PLL	t_{co}	1.444	1.647	2.090	2.147	2.405	2.416	2.424	2.245	2.513	2.517	2.440	ns
	8mA	GCLK	t_{co}	3.289	3.547	5.161	5.342	5.903	5.760	6.146	5.469	6.031	5.838	6.225	ns
		GCLK PLL	t_{co}	1.372	1.530	1.926	2.018	2.224	2.235	2.243	2.114	2.327	2.331	2.254	ns
2.5 V	4mA	GCLK	t_{co}	3.466	3.763	5.554	5.764	6.366	6.223	6.609	5.841	6.507	6.238	6.701	ns
		GCLK PLL	t_{co}	1.549	1.764	2.328	2.380	2.687	2.698	2.706	2.486	2.803	2.807	2.730	ns
	8mA	GCLK	t_{co}	3.381	3.665	5.399	5.601	6.196	6.053	6.439	5.704	6.333	6.093	6.527	ns
		GCLK PLL	t_{co}	1.464	1.666	2.173	2.245	2.517	2.528	2.536	2.349	2.629	2.633	2.556	ns
	12mA	GCLK	t_{co}	3.324	3.603	5.288	5.483	6.070	5.927	6.313	5.615	6.203	5.999	6.397	ns
		GCLK PLL	t_{co}	1.407	1.589	2.062	2.159	2.391	2.402	2.410	2.260	2.499	2.503	2.426	ns

Table 1–94. EP3SL340 Row Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.692	3.942	5.817	6.193	6.841	6.698	7.084	6.248	6.991	6.682	7.186	ns
		GCLK PLL	t_{co}	1.785	1.925	2.574	2.860	3.162	3.173	3.192	2.985	3.287	3.292	3.203	ns
	4mA	GCLK	t_{co}	3.519	3.756	5.527	5.824	6.436	6.293	6.679	5.922	6.585	6.320	6.779	ns
		GCLK PLL	t_{co}	1.562	1.739	2.284	2.491	2.757	2.768	2.787	2.620	2.881	2.885	2.796	ns
	6mA	GCLK	t_{co}	3.444	3.674	5.427	5.674	6.277	6.134	6.520	5.808	6.412	6.215	6.607	ns
		GCLK PLL	t_{co}	1.495	1.657	2.184	2.341	2.598	2.609	2.628	2.452	2.708	2.713	2.624	ns
	8mA	GCLK	t_{co}	3.426	3.654	5.370	5.595	6.180	6.037	6.423	5.752	6.318	6.143	6.513	ns
		GCLK PLL	t_{co}	1.469	1.637	2.127	2.259	2.501	2.512	2.531	2.361	2.614	2.619	2.530	ns
1.5 V	2mA	GCLK	t_{co}	3.634	3.885	5.745	6.106	6.769	6.626	7.012	6.169	6.915	6.617	7.110	ns
		GCLK PLL	t_{co}	1.696	1.868	2.502	2.773	3.090	3.101	3.120	2.892	3.211	3.216	3.127	ns
	4mA	GCLK	t_{co}	3.442	3.671	5.423	5.669	6.278	6.135	6.521	5.805	6.411	6.216	6.606	ns
		GCLK PLL	t_{co}	1.485	1.654	2.180	2.336	2.599	2.610	2.629	2.446	2.707	2.712	2.623	ns
	6mA	GCLK	t_{co}	3.415	3.645	5.355	5.587	6.172	6.029	6.415	5.745	6.306	6.143	6.501	ns
		GCLK PLL	t_{co}	1.458	1.628	2.112	2.251	2.493	2.504	2.523	2.354	2.602	2.607	2.518	ns
	8mA	GCLK	t_{co}	3.396	3.634	5.338	5.562	6.153	6.010	6.396	5.721	6.284	6.124	6.479	ns
		GCLK PLL	t_{co}	1.439	1.617	2.095	2.226	2.474	2.485	2.504	2.330	2.580	2.585	2.496	ns
1.2 V	2mA	GCLK	t_{co}	3.564	3.798	5.666	6.020	6.694	6.551	6.937	6.100	6.831	6.548	7.026	ns
		GCLK PLL	t_{co}	1.639	1.781	2.423	2.687	3.015	3.026	3.045	2.804	3.127	3.132	3.043	ns
	4mA	GCLK	t_{co}	3.447	3.675	5.440	5.697	6.319	6.176	6.562	5.834	6.453	6.260	6.648	ns
		GCLK PLL	t_{co}	1.490	1.658	2.197	2.364	2.640	2.651	2.670	2.471	2.749	2.754	2.665	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.328	3.591	5.278	5.474	6.038	5.895	6.281	5.602	6.165	5.985	6.360	ns
		GCLK PLL	t_{co}	1.411	1.575	2.039	2.150	2.359	2.370	2.378	2.247	2.461	2.466	2.389	ns
	12mA	GCLK	t_{co}	3.323	3.587	5.275	5.472	6.030	5.887	6.273	5.601	6.158	5.984	6.353	ns
		GCLK PLL	t_{co}	1.406	1.570	2.032	2.148	2.351	2.362	2.370	2.246	2.454	2.459	2.382	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.314	3.576	5.260	5.456	6.003	5.860	6.246	5.584	6.131	5.966	6.326	ns
		GCLK PLL	t_{co}	1.397	1.559	2.017	2.132	2.324	2.335	2.343	2.229	2.427	2.432	2.355	ns

Table 1–94. EP3SL340 Row Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.375	3.598	5.289	5.499	6.054	5.911	6.297	5.651	6.181	6.034	6.376	ns
		GCLK PLL	t_{co}	1.418	1.581	2.046	2.163	2.375	2.386	2.405	2.260	2.477	2.482	2.393	ns
	6mA	GCLK	t_{co}	3.370	3.593	5.287	5.498	6.052	5.909	6.295	5.649	6.179	6.032	6.374	ns
		GCLK PLL	t_{co}	1.413	1.576	2.044	2.162	2.373	2.384	2.403	2.258	2.475	2.480	2.391	ns
	8mA	GCLK	t_{co}	3.359	3.582	5.277	5.488	6.035	5.895	6.278	5.640	6.163	6.023	6.358	ns
		GCLK PLL	t_{co}	1.402	1.565	2.034	2.152	2.356	2.367	2.386	2.249	2.459	2.464	2.375	ns
	10mA	GCLK	t_{co}	3.348	3.571	5.264	5.475	6.020	5.882	6.263	5.628	6.148	6.011	6.343	ns
		GCLK PLL	t_{co}	1.391	1.554	2.021	2.139	2.341	2.352	2.371	2.237	2.444	2.449	2.360	ns
	12mA	GCLK	t_{co}	3.348	3.570	5.264	5.475	6.019	5.882	6.262	5.627	6.147	6.011	6.342	ns
		GCLK PLL	t_{co}	1.391	1.553	2.021	2.139	2.340	2.351	2.370	2.236	2.443	2.448	2.359	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.356	3.577	5.263	5.472	6.013	5.877	6.256	5.623	6.140	6.005	6.335	ns
		GCLK PLL	t_{co}	1.399	1.560	2.020	2.136	2.334	2.345	2.364	2.232	2.436	2.441	2.352	ns
	16mA	GCLK	t_{co}	3.357	3.580	5.269	5.480	6.015	5.887	6.258	5.632	6.144	6.016	6.339	ns
		GCLK PLL	t_{co}	1.400	1.563	2.026	2.144	2.336	2.347	2.366	2.241	2.440	2.445	2.356	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.378	3.601	5.298	5.510	6.071	5.928	6.314	5.661	6.197	6.046	6.392	ns
		GCLK PLL	t_{co}	1.421	1.584	2.055	2.174	2.392	2.403	2.422	2.270	2.493	2.498	2.409	ns
	6mA	GCLK	t_{co}	3.364	3.587	5.287	5.500	6.054	5.911	6.297	5.652	6.181	6.037	6.376	ns
		GCLK PLL	t_{co}	1.407	1.570	2.044	2.164	2.375	2.386	2.405	2.261	2.477	2.482	2.393	ns
	8mA	GCLK	t_{co}	3.353	3.575	5.274	5.487	6.036	5.896	6.279	5.639	6.164	6.024	6.359	ns
		GCLK PLL	t_{co}	1.396	1.558	2.031	2.151	2.357	2.368	2.387	2.248	2.460	2.465	2.376	ns

Table 1–94. EP3SL340 Row Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.363	3.583	5.262	5.470	6.016	5.875	6.259	5.622	6.143	6.002	6.338	ns
		GCLK PLL	t_{co}	1.406	1.566	2.019	2.134	2.337	2.348	2.367	2.231	2.439	2.444	2.355	ns
	6mA	GCLK	t_{co}	3.356	3.577	5.260	5.469	6.008	5.874	6.251	5.621	6.136	6.002	6.331	ns
		GCLK PLL	t_{co}	1.399	1.560	2.017	2.133	2.329	2.340	2.359	2.230	2.432	2.437	2.348	ns
	8mA	GCLK	t_{co}	3.347	3.569	5.253	5.462	6.000	5.867	6.243	5.614	6.128	5.995	6.323	ns
		GCLK PLL	t_{co}	1.390	1.552	2.010	2.126	2.321	2.332	2.351	2.223	2.424	2.429	2.340	ns
	10mA	GCLK	t_{co}	3.350	3.571	5.256	5.465	6.003	5.871	6.246	5.617	6.131	5.998	6.326	ns
		GCLK PLL	t_{co}	1.393	1.554	2.013	2.129	2.324	2.335	2.354	2.226	2.427	2.432	2.343	ns
	12mA	GCLK	t_{co}	3.346	3.568	5.258	5.468	6.003	5.874	6.246	5.620	6.132	6.003	6.327	ns
		GCLK PLL	t_{co}	1.389	1.551	2.015	2.132	2.324	2.335	2.354	2.229	2.428	2.433	2.344	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.354	3.576	5.256	5.465	5.994	5.870	6.237	5.616	6.121	5.997	6.316	ns
		GCLK PLL	t_{co}	1.397	1.559	2.013	2.129	2.315	2.326	2.345	2.225	2.417	2.422	2.333	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.369	3.589	5.271	5.480	6.031	5.888	6.274	5.631	6.157	6.013	6.352	ns
		GCLK PLL	t_{co}	1.412	1.572	2.028	2.144	2.352	2.363	2.382	2.240	2.453	2.458	2.369	ns
	6mA	GCLK	t_{co}	3.363	3.584	5.272	5.482	6.027	5.888	6.270	5.633	6.154	6.016	6.349	ns
		GCLK PLL	t_{co}	1.406	1.567	2.029	2.146	2.348	2.359	2.378	2.242	2.450	2.455	2.366	ns
	8mA	GCLK	t_{co}	3.359	3.580	5.267	5.477	6.021	5.883	6.264	5.628	6.148	6.010	6.343	ns
		GCLK PLL	t_{co}	1.402	1.563	2.024	2.141	2.342	2.353	2.372	2.237	2.444	2.449	2.360	ns
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.371	3.591	5.284	5.496	6.049	5.906	6.292	5.647	6.174	6.032	6.369	ns
		GCLK PLL	t_{co}	1.414	1.574	2.041	2.160	2.370	2.381	2.400	2.256	2.470	2.475	2.386	ns
	6mA	GCLK	t_{co}	3.362	3.583	5.275	5.487	6.037	5.896	6.280	5.638	6.163	6.023	6.358	ns
		GCLK PLL	t_{co}	1.405	1.566	2.032	2.151	2.358	2.369	2.388	2.247	2.459	2.464	2.375	ns
	8mA	GCLK	t_{co}	3.361	3.583	5.282	5.495	6.043	5.905	6.286	5.647	6.170	6.033	6.365	ns
		GCLK PLL	t_{co}	1.404	1.566	2.039	2.159	2.364	2.375	2.394	2.256	2.466	2.471	2.382	ns
3.0-V PCI	—	GCLK	t_{co}	3.434	3.697	5.330	5.520	6.047	5.904	6.299	5.650	6.177	6.027	6.372	ns
		GCLK PLL	t_{co}	1.517	1.680	2.087	2.196	2.378	2.386	2.387	2.295	2.482	2.493	2.401	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.434	3.697	5.330	5.520	6.047	5.904	6.299	5.650	6.177	6.027	6.372	ns
		GCLK PLL	t_{co}	1.517	1.680	2.087	2.196	2.378	2.386	2.387	2.295	2.482	2.493	2.401	ns

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Table 1–95 through Table 1–98 list the maximum I/O timing parameters for EP3SL340 devices for differential I/O standards.

Table 1–95 lists the EP3SL340 column pins input timing parameters for differential I/O standards.

Table 1–95. EP3SL340 Column Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-1.278	-1.335	-1.674	-1.607	-1.788	-1.721	-2.204	-1.580	-2.013	-1.689	-2.242	ns
		t_h	1.414	1.489	1.926	1.873	2.080	2.002	2.485	1.857	2.327	1.981	2.527	ns
	GCLK PLL	t_{su}	0.857	0.885	1.872	2.050	2.211	2.107	1.975	2.104	2.409	2.165	2.031	ns
		t_h	-0.582	-0.589	-1.382	-1.537	-1.640	-1.565	-1.423	-1.579	-1.804	-1.612	-1.474	ns
MINI-LVDS	GCLK	t_{su}	-1.278	-1.335	-1.674	-1.607	-1.788	-1.721	-2.204	-1.580	-2.013	-1.689	-2.242	ns
		t_h	1.414	1.489	1.926	1.873	2.080	2.002	2.485	1.857	2.327	1.981	2.527	ns
	GCLK PLL	t_{su}	0.857	0.885	1.872	2.050	2.211	2.107	1.975	2.104	2.409	2.165	2.031	ns
		t_h	-0.582	-0.589	-1.382	-1.537	-1.640	-1.565	-1.423	-1.579	-1.804	-1.612	-1.474	ns
RSDS	GCLK	t_{su}	-1.278	-1.335	-1.674	-1.607	-1.788	-1.721	-2.204	-1.580	-2.013	-1.689	-2.242	ns
		t_h	1.414	1.489	1.926	1.873	2.080	2.002	2.485	1.857	2.327	1.981	2.527	ns
	GCLK PLL	t_{su}	0.857	0.885	1.872	2.050	2.211	2.107	1.975	2.104	2.409	2.165	2.031	ns
		t_h	-0.582	-0.589	-1.382	-1.537	-1.640	-1.565	-1.423	-1.579	-1.804	-1.612	-1.474	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-1.094	-1.158	-1.787	-1.806	-1.947	-1.875	-2.353	-1.815	-1.953	-1.887	-2.396	ns
		t_h	1.223	1.304	2.006	2.032	2.193	2.110	2.589	2.050	2.208	2.131	2.636	ns
	GCLK PLL	t_{su}	1.041	1.062	1.759	1.851	2.052	1.953	1.826	1.869	2.073	1.967	1.877	ns
		t_h	-0.773	-0.774	-1.302	-1.378	-1.527	-1.457	-1.319	-1.386	-1.537	-1.462	-1.365	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-1.094	-1.158	-1.787	-1.806	-1.947	-1.875	-2.353	-1.815	-1.953	-1.887	-2.396	ns
		t_h	1.223	1.304	2.006	2.032	2.193	2.110	2.589	2.050	2.208	2.131	2.636	ns
	GCLK PLL	t_{su}	1.041	1.062	1.759	1.851	2.052	1.953	1.826	1.869	2.073	1.967	1.877	ns
		t_h	-0.773	-0.774	-1.302	-1.378	-1.527	-1.457	-1.319	-1.386	-1.537	-1.462	-1.365	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-1.102	-1.170	-1.797	-1.817	-1.963	-1.891	-2.369	-1.826	-1.968	-1.902	-2.411	ns
		t_h	1.231	1.316	2.016	2.043	2.209	2.126	2.605	2.061	2.223	2.146	2.651	ns
	GCLK PLL	t_{su}	1.033	1.050	1.749	1.840	2.036	1.937	1.810	1.858	2.058	1.952	1.862	ns
		t_h	-0.765	-0.762	-1.292	-1.367	-1.511	-1.441	-1.303	-1.375	-1.522	-1.447	-1.350	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-1.102	-1.170	-1.797	-1.817	-1.963	-1.891	-2.369	-1.826	-1.968	-1.902	-2.411	ns
		t_h	1.231	1.316	2.016	2.043	2.209	2.126	2.605	2.061	2.223	2.146	2.651	ns
	GCLK PLL	t_{su}	1.033	1.050	1.749	1.840	2.036	1.937	1.810	1.858	2.058	1.952	1.862	ns
		t_h	-0.765	-0.762	-1.292	-1.367	-1.511	-1.441	-1.303	-1.375	-1.522	-1.447	-1.350	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.114	-1.181	-1.806	-1.828	-1.982	-1.910	-2.388	-1.837	-1.986	-1.920	-2.429	ns
		t_h	1.243	1.327	2.025	2.054	2.228	2.145	2.624	2.072	2.241	2.164	2.669	ns
	GCLK PLL	t_{su}	1.021	1.039	1.740	1.829	2.017	1.918	1.791	1.847	2.040	1.934	1.844	ns
		t_h	-0.753	-0.751	-1.283	-1.356	-1.492	-1.422	-1.284	-1.364	-1.504	-1.429	-1.332	ns

Table 1–95. EP3SL340 Column Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-1.114	-1.181	-1.806	-1.828	-1.982	-1.910	-2.388	-1.837	-1.986	-1.920	-2.429	ns
		t_h	1.243	1.327	2.025	2.054	2.228	2.145	2.624	2.072	2.241	2.164	2.669	ns
	GCLK PLL	t_{su}	1.021	1.039	1.740	1.829	2.017	1.918	1.791	1.847	2.040	1.934	1.844	ns
		t_h	-0.753	-0.751	-1.283	-1.356	-1.492	-1.422	-1.284	-1.364	-1.504	-1.429	-1.332	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.102	-1.170	-1.797	-1.817	-1.963	-1.891	-2.369	-1.826	-1.968	-1.902	-2.411	ns
		t_h	1.231	1.316	2.016	2.043	2.209	2.126	2.605	2.061	2.223	2.146	2.651	ns
	GCLK PLL	t_{su}	1.033	1.050	1.749	1.840	2.036	1.937	1.810	1.858	2.058	1.952	1.862	ns
		t_h	-0.765	-0.762	-1.292	-1.367	-1.511	-1.441	-1.303	-1.375	-1.522	-1.447	-1.350	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-1.102	-1.170	-1.797	-1.817	-1.963	-1.891	-2.369	-1.826	-1.968	-1.902	-2.411	ns
		t_h	1.231	1.316	2.016	2.043	2.209	2.126	2.605	2.061	2.223	2.146	2.651	ns
	GCLK PLL	t_{su}	1.033	1.050	1.749	1.840	2.036	1.937	1.810	1.858	2.058	1.952	1.862	ns
		t_h	-0.765	-0.762	-1.292	-1.367	-1.511	-1.441	-1.303	-1.375	-1.522	-1.447	-1.350	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.114	-1.181	-1.806	-1.828	-1.982	-1.910	-2.388	-1.837	-1.986	-1.920	-2.429	ns
		t_h	1.243	1.327	2.025	2.054	2.228	2.145	2.624	2.072	2.241	2.164	2.669	ns
	GCLK PLL	t_{su}	1.021	1.039	1.740	1.829	2.017	1.918	1.791	1.847	2.040	1.934	1.844	ns
		t_h	-0.753	-0.751	-1.283	-1.356	-1.492	-1.422	-1.284	-1.364	-1.504	-1.429	-1.332	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-1.114	-1.181	-1.806	-1.828	-1.982	-1.910	-2.388	-1.837	-1.986	-1.920	-2.429	ns
		t_h	1.243	1.327	2.025	2.054	2.228	2.145	2.624	2.072	2.241	2.164	2.669	ns
	GCLK PLL	t_{su}	1.021	1.039	1.740	1.829	2.017	1.918	1.791	1.847	2.040	1.934	1.844	ns
		t_h	-0.753	-0.751	-1.283	-1.356	-1.492	-1.422	-1.284	-1.364	-1.504	-1.429	-1.332	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.121	-1.187	-1.818	-1.833	-1.982	-1.912	-2.387	-1.841	-1.981	-1.918	-2.425	ns
		t_h	1.250	1.333	2.038	2.062	2.231	2.148	2.628	2.079	2.241	2.163	2.670	ns
	GCLK PLL	t_{su}	1.014	1.033	1.728	1.824	2.017	1.916	1.792	1.843	2.045	1.936	1.848	ns
		t_h	-0.746	-0.745	-1.270	-1.348	-1.489	-1.419	-1.280	-1.357	-1.504	-1.430	-1.331	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-1.121	-1.187	-1.818	-1.833	-1.982	-1.912	-2.387	-1.841	-1.981	-1.918	-2.425	ns
		t_h	1.250	1.333	2.038	2.062	2.231	2.148	2.628	2.079	2.241	2.163	2.670	ns
	GCLK PLL	t_{su}	1.014	1.033	1.728	1.824	2.017	1.916	1.792	1.843	2.045	1.936	1.848	ns
		t_h	-0.746	-0.745	-1.270	-1.348	-1.489	-1.419	-1.280	-1.357	-1.504	-1.430	-1.331	ns

Table 1–96 lists the EP3SL340 row pins input timing parameters for differential I/O standards.

Table 1–96. EP3SL340 Row Pins Input Timing Parameters (Part 1 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-1.246	-1.308	-1.577	-1.488	-1.656	-1.595	-2.046	-1.456	-1.615	-1.558	-2.087	ns
		t_h	1.380	1.458	1.832	1.758	1.950	1.878	2.332	1.738	1.920	1.853	2.374	ns
	GCLK PLL	t_{su}	0.822	0.846	1.911	2.121	2.309	2.193	2.091	2.181	2.377	2.260	2.149	ns
		t_h	-0.548	-0.552	-1.422	-1.604	-1.736	-1.650	-1.536	-1.651	-1.790	-1.702	-1.588	ns
MINI-LVDS	GCLK	t_{su}	-1.246	-1.308	-1.577	-1.488	-1.656	-1.595	-2.046	-1.456	-1.615	-1.558	-2.087	ns
		t_h	1.380	1.458	1.832	1.758	1.950	1.878	2.332	1.738	1.920	1.853	2.374	ns
	GCLK PLL	t_{su}	0.822	0.846	1.911	2.121	2.309	2.193	2.091	2.181	2.377	2.260	2.149	ns
		t_h	-0.548	-0.552	-1.422	-1.604	-1.736	-1.650	-1.536	-1.651	-1.790	-1.702	-1.588	ns
RSDS	GCLK	t_{su}	-1.246	-1.308	-1.577	-1.488	-1.656	-1.595	-2.046	-1.456	-1.615	-1.558	-2.087	ns
		t_h	1.380	1.458	1.832	1.758	1.950	1.878	2.332	1.738	1.920	1.853	2.374	ns
	GCLK PLL	t_{su}	0.822	0.846	1.911	2.121	2.309	2.193	2.091	2.181	2.377	2.260	2.149	ns
		t_h	-0.548	-0.552	-1.422	-1.604	-1.736	-1.650	-1.536	-1.651	-1.790	-1.702	-1.588	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-1.051	-1.123	-1.707	-1.717	-1.845	-1.779	-2.225	-1.727	-1.852	-1.790	-2.271	ns
		t_h	1.178	1.264	1.926	1.941	2.090	2.013	2.462	1.960	2.105	2.033	2.509	ns
	GCLK PLL	t_{su}	1.007	1.021	1.776	1.887	2.110	1.999	1.902	1.904	2.130	2.018	1.955	ns
		t_h	-0.740	-0.736	-1.321	-1.415	-1.586	-1.505	-1.396	-1.423	-1.595	-1.512	-1.443	ns
	GCLK	t_{su}	-1.051	-1.123	-1.707	-1.717	-1.845	-1.779	-2.225	-1.727	-1.852	-1.790	-2.271	ns
		t_h	1.178	1.264	1.926	1.941	2.090	2.013	2.462	1.960	2.105	2.033	2.509	ns
	GCLK PLL	t_{su}	1.007	1.021	1.776	1.887	2.110	1.999	1.902	1.904	2.130	2.018	1.955	ns
		t_h	-0.740	-0.736	-1.321	-1.415	-1.586	-1.505	-1.396	-1.423	-1.595	-1.512	-1.443	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-1.060	-1.135	-1.716	-1.727	-1.861	-1.795	-2.241	-1.736	-1.868	-1.806	-2.287	ns
		t_h	1.187	1.276	1.935	1.951	2.106	2.029	2.478	1.969	2.121	2.049	2.525	ns
	GCLK PLL	t_{su}	0.998	1.009	1.767	1.877	2.094	1.983	1.886	1.895	2.114	2.002	1.939	ns
		t_h	-0.731	-0.724	-1.312	-1.405	-1.570	-1.489	-1.380	-1.414	-1.579	-1.496	-1.427	ns
	GCLK	t_{su}	-1.060	-1.135	-1.716	-1.727	-1.861	-1.795	-2.241	-1.736	-1.868	-1.806	-2.287	ns
		t_h	1.187	1.276	1.935	1.951	2.106	2.029	2.478	1.969	2.121	2.049	2.525	ns
	GCLK PLL	t_{su}	0.998	1.009	1.767	1.877	2.094	1.983	1.886	1.895	2.114	2.002	1.939	ns
		t_h	-0.731	-0.724	-1.312	-1.405	-1.570	-1.489	-1.380	-1.414	-1.579	-1.496	-1.427	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.074	-1.147	-1.725	-1.737	-1.879	-1.813	-2.259	-1.747	-1.885	-1.823	-2.304	ns
		t_h	1.201	1.288	1.944	1.961	2.124	2.047	2.496	1.980	2.138	2.066	2.542	ns
	GCLK PLL	t_{su}	0.984	0.997	1.754	1.867	2.076	1.965	1.868	1.884	2.097	1.985	1.922	ns
		t_h	-0.717	-0.712	-1.300	-1.395	-1.552	-1.471	-1.362	-1.403	-1.562	-1.479	-1.410	ns

Table 1–96. EP3SL340 Row Pins Input Timing Parameters (Part 2 of 2)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-1.074	-1.147	-1.725	-1.737	-1.879	-1.813	-2.259	-1.747	-1.885	-1.823	-2.304	ns
		t_h	1.201	1.288	1.944	1.961	2.124	2.047	2.496	1.980	2.138	2.066	2.542	ns
	GCLK PLL	t_{su}	0.984	0.997	1.754	1.867	2.076	1.965	1.868	1.884	2.097	1.985	1.922	ns
		t_h	-0.717	-0.712	-1.300	-1.395	-1.552	-1.471	-1.362	-1.403	-1.562	-1.479	-1.410	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.060	-1.135	-1.716	-1.727	-1.861	-1.795	-2.241	-1.736	-1.868	-1.806	-2.287	ns
		t_h	1.187	1.276	1.935	1.951	2.106	2.029	2.478	1.969	2.121	2.049	2.525	ns
	GCLK PLL	t_{su}	0.998	1.009	1.767	1.877	2.094	1.983	1.886	1.895	2.114	2.002	1.939	ns
		t_h	-0.731	-0.724	-1.312	-1.405	-1.570	-1.489	-1.380	-1.414	-1.579	-1.496	-1.427	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-1.060	-1.135	-1.716	-1.727	-1.861	-1.795	-2.241	-1.736	-1.868	-1.806	-2.287	ns
		t_h	1.187	1.276	1.935	1.951	2.106	2.029	2.478	1.969	2.121	2.049	2.525	ns
	GCLK PLL	t_{su}	0.998	1.009	1.767	1.877	2.094	1.983	1.886	1.895	2.114	2.002	1.939	ns
		t_h	-0.731	-0.724	-1.312	-1.405	-1.570	-1.489	-1.380	-1.414	-1.579	-1.496	-1.427	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.074	-1.147	-1.725	-1.737	-1.879	-1.813	-2.259	-1.747	-1.885	-1.823	-2.304	ns
		t_h	1.201	1.288	1.944	1.961	2.124	2.047	2.496	1.980	2.138	2.066	2.542	ns
	GCLK PLL	t_{su}	0.984	0.997	1.754	1.867	2.076	1.965	1.868	1.884	2.097	1.985	1.922	ns
		t_h	-0.717	-0.712	-1.300	-1.395	-1.552	-1.471	-1.362	-1.403	-1.562	-1.479	-1.410	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-1.074	-1.147	-1.725	-1.737	-1.879	-1.813	-2.259	-1.747	-1.885	-1.823	-2.304	ns
		t_h	1.201	1.288	1.944	1.961	2.124	2.047	2.496	1.980	2.138	2.066	2.542	ns
	GCLK PLL	t_{su}	0.984	0.997	1.754	1.867	2.076	1.965	1.868	1.884	2.097	1.985	1.922	ns
		t_h	-0.717	-0.712	-1.300	-1.395	-1.552	-1.471	-1.362	-1.403	-1.562	-1.479	-1.410	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.083	-1.156	-1.739	-1.748	-1.886	-1.821	-2.265	-1.754	-1.886	-1.826	-2.306	ns
		t_h	1.210	1.297	1.959	1.975	2.134	2.057	2.507	1.990	2.144	2.071	2.549	ns
	GCLK PLL	t_{su}	0.985	0.998	1.749	1.861	2.075	1.963	1.867	1.883	2.101	1.987	1.925	ns
		t_h	-0.718	-0.713	-1.295	-1.387	-1.548	-1.467	-1.357	-1.399	-1.563	-1.480	-1.409	ns
	GCLK	t_{su}	-1.083	-1.156	-1.739	-1.748	-1.886	-1.821	-2.265	-1.754	-1.886	-1.826	-2.306	ns
		t_h	1.210	1.297	1.959	1.975	2.134	2.057	2.507	1.990	2.144	2.071	2.549	ns
	GCLK PLL	t_{su}	0.985	0.998	1.749	1.861	2.075	1.963	1.867	1.883	2.101	1.987	1.925	ns
		t_h	-0.718	-0.713	-1.295	-1.387	-1.548	-1.467	-1.357	-1.399	-1.563	-1.480	-1.409	ns

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Table 1–97 lists the EP3SL340 column pins output timing parameters for differential I/O standards.

Table 1–97. EP3SL340 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.438	3.700	5.415	5.607	6.143	5.991	6.399	5.739	6.274	6.122	6.475	ns
		GCLK PLL	t_{co}	1.427	1.606	2.089	2.181	2.406	2.407	2.475	2.287	2.511	2.514	2.459	ns
LVDS_E_3R	—	GCLK	t_{co}	3.434	3.703	5.462	5.662	6.205	6.053	6.461	5.798	6.340	6.188	6.541	ns
		GCLK PLL	t_{co}	1.423	1.609	2.136	2.236	2.468	2.469	2.537	2.346	2.577	2.580	2.525	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.438	3.700	5.415	5.607	6.143	5.991	6.399	5.739	6.274	6.122	6.475	ns
		GCLK PLL	t_{co}	1.427	1.606	2.089	2.181	2.406	2.407	2.475	2.287	2.511	2.514	2.459	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.434	3.703	5.462	5.662	6.205	6.053	6.461	5.798	6.340	6.188	6.541	ns
		GCLK PLL	t_{co}	1.423	1.609	2.136	2.236	2.468	2.469	2.537	2.346	2.577	2.580	2.525	ns
RSDS_E_1R	—	GCLK	t_{co}	3.438	3.700	5.415	5.607	6.143	5.991	6.399	5.739	6.274	6.122	6.475	ns
		GCLK PLL	t_{co}	1.427	1.606	2.089	2.181	2.406	2.407	2.475	2.287	2.511	2.514	2.459	ns
RSDS_E_3R	—	GCLK	t_{co}	3.434	3.703	5.462	5.662	6.205	6.053	6.461	5.798	6.340	6.188	6.541	ns
		GCLK PLL	t_{co}	1.423	1.609	2.136	2.236	2.468	2.469	2.537	2.346	2.577	2.580	2.525	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.465	3.733	5.486	5.685	6.227	6.075	6.483	5.819	6.360	6.208	6.561	ns
		GCLK PLL	t_{co}	1.454	1.639	2.160	2.259	2.490	2.491	2.559	2.367	2.597	2.600	2.545	ns
	6mA	GCLK	t_{co}	3.455	3.723	5.476	5.674	6.217	6.065	6.473	5.808	6.350	6.198	6.551	ns
		GCLK PLL	t_{co}	1.444	1.629	2.150	2.248	2.480	2.481	2.549	2.356	2.587	2.590	2.535	ns
	8mA	GCLK	t_{co}	3.455	3.723	5.479	5.678	6.221	6.069	6.477	5.813	6.355	6.203	6.556	ns
		GCLK PLL	t_{co}	1.444	1.629	2.153	2.252	2.484	2.485	2.553	2.361	2.592	2.595	2.540	ns
	10mA	GCLK	t_{co}	3.448	3.717	5.472	5.672	6.215	6.063	6.471	5.806	6.349	6.197	6.550	ns
		GCLK PLL	t_{co}	1.437	1.623	2.146	2.246	2.478	2.479	2.547	2.354	2.586	2.589	2.534	ns
	12mA	GCLK	t_{co}	3.447	3.715	5.469	5.669	6.212	6.060	6.468	5.803	6.345	6.193	6.546	ns
		GCLK PLL	t_{co}	1.436	1.621	2.143	2.243	2.475	2.476	2.544	2.351	2.582	2.585	2.530	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.469	3.737	5.490	5.689	6.231	6.079	6.487	5.823	6.365	6.213	6.566	ns
		GCLK PLL	t_{co}	1.458	1.643	2.164	2.263	2.494	2.495	2.563	2.371	2.602	2.605	2.550	ns

Table 1–97. EP3SL340 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.459	3.726	5.469	5.666	6.206	6.054	6.462	5.799	6.338	6.186	6.539	ns
		GCLK PLL	t_{co}	1.448	1.632	2.143	2.240	2.469	2.470	2.538	2.347	2.575	2.578	2.523	ns
	6mA	GCLK	t_{co}	3.454	3.722	5.469	5.666	6.207	6.055	6.463	5.800	6.340	6.188	6.541	ns
		GCLK PLL	t_{co}	1.443	1.628	2.143	2.240	2.470	2.471	2.539	2.348	2.577	2.580	2.525	ns
	8mA	GCLK	t_{co}	3.452	3.720	5.468	5.665	6.205	6.053	6.461	5.799	6.339	6.187	6.540	ns
		GCLK PLL	t_{co}	1.441	1.626	2.142	2.239	2.468	2.469	2.537	2.347	2.576	2.579	2.524	ns
	10mA	GCLK	t_{co}	3.444	3.711	5.458	5.655	6.196	6.044	6.452	5.789	6.329	6.177	6.530	ns
		GCLK PLL	t_{co}	1.433	1.617	2.132	2.229	2.459	2.460	2.528	2.337	2.566	2.569	2.514	ns
	12mA	GCLK	t_{co}	3.445	3.713	5.464	5.662	6.204	6.052	6.460	5.797	6.338	6.186	6.539	ns
		GCLK PLL	t_{co}	1.434	1.619	2.138	2.236	2.467	2.468	2.536	2.345	2.575	2.578	2.523	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.444	3.710	5.447	5.643	6.182	6.030	6.438	5.776	6.314	6.162	6.515	ns
		GCLK PLL	t_{co}	1.433	1.616	2.121	2.217	2.445	2.446	2.514	2.324	2.551	2.554	2.499	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.456	3.723	5.465	5.661	6.200	6.048	6.456	5.795	6.333	6.181	6.534	ns
		GCLK PLL	t_{co}	1.445	1.629	2.139	2.235	2.463	2.464	2.532	2.343	2.570	2.573	2.518	ns
	6mA	GCLK	t_{co}	3.452	3.720	5.466	5.663	6.204	6.052	6.460	5.797	6.337	6.185	6.538	ns
		GCLK PLL	t_{co}	1.441	1.626	2.140	2.237	2.467	2.468	2.536	2.345	2.574	2.577	2.522	ns
	8mA	GCLK	t_{co}	3.442	3.709	5.455	5.652	6.192	6.040	6.448	5.786	6.325	6.173	6.526	ns
		GCLK PLL	t_{co}	1.431	1.615	2.129	2.226	2.455	2.456	2.524	2.334	2.562	2.565	2.510	ns
	10mA	GCLK	t_{co}	3.440	3.707	5.453	5.649	6.190	6.038	6.446	5.784	6.323	6.171	6.524	ns
		GCLK PLL	t_{co}	1.429	1.613	2.127	2.223	2.453	2.454	2.522	2.332	2.560	2.563	2.508	ns
	12mA	GCLK	t_{co}	3.440	3.708	5.456	5.654	6.195	6.043	6.451	5.788	6.329	6.177	6.530	ns
		GCLK PLL	t_{co}	1.429	1.614	2.130	2.228	2.458	2.459	2.527	2.336	2.566	2.569	2.514	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.444	3.711	5.453	5.649	6.189	6.037	6.445	5.783	6.322	6.170	6.523	ns
		GCLK PLL	t_{co}	1.433	1.617	2.127	2.223	2.452	2.453	2.521	2.331	2.559	2.562	2.507	ns

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Table 1–97. EP3SL340 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.470	3.740	5.498	5.697	6.239	6.087	6.495	5.831	6.372	6.220	6.573	ns
		GCLK PLL	t_{co}	1.459	1.646	2.172	2.271	2.502	2.503	2.571	2.379	2.609	2.612	2.557	ns
	6mA	GCLK	t_{co}	3.456	3.726	5.486	5.686	6.229	6.077	6.485	5.821	6.363	6.211	6.564	ns
		GCLK PLL	t_{co}	1.445	1.632	2.160	2.260	2.492	2.493	2.561	2.369	2.600	2.603	2.548	ns
	8mA	GCLK	t_{co}	3.444	3.713	5.469	5.668	6.211	6.059	6.467	5.803	6.345	6.193	6.546	ns
		GCLK PLL	t_{co}	1.433	1.619	2.143	2.242	2.474	2.475	2.543	2.351	2.582	2.585	2.530	ns
	10mA	GCLK	t_{co}	3.444	3.713	5.472	5.672	6.215	6.063	6.471	5.807	6.350	6.198	6.551	ns
		GCLK PLL	t_{co}	1.433	1.619	2.146	2.246	2.478	2.479	2.547	2.355	2.587	2.590	2.535	ns
	12mA	GCLK	t_{co}	3.440	3.709	5.465	5.664	6.208	6.056	6.464	5.800	6.342	6.190	6.543	ns
		GCLK PLL	t_{co}	1.429	1.615	2.139	2.238	2.471	2.472	2.540	2.348	2.579	2.582	2.527	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.444	3.711	5.458	5.655	6.196	6.044	6.452	5.789	6.329	6.177	6.530	ns
		GCLK PLL	t_{co}	1.433	1.617	2.132	2.229	2.459	2.460	2.528	2.337	2.566	2.569	2.514	ns
	16mA	GCLK	t_{co}	3.445	3.713	5.466	5.665	6.207	6.055	6.463	5.799	6.341	6.189	6.542	ns
		GCLK PLL	t_{co}	1.434	1.619	2.140	2.239	2.470	2.471	2.539	2.347	2.578	2.581	2.526	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.473	3.743	5.497	5.695	6.237	6.085	6.493	5.830	6.370	6.218	6.571	ns
		GCLK PLL	t_{co}	1.462	1.649	2.171	2.269	2.500	2.501	2.569	2.378	2.607	2.610	2.555	ns
	6mA	GCLK	t_{co}	3.462	3.731	5.485	5.683	6.225	6.073	6.481	5.818	6.358	6.206	6.559	ns
		GCLK PLL	t_{co}	1.451	1.637	2.159	2.257	2.488	2.489	2.557	2.366	2.595	2.598	2.543	ns
	8mA	GCLK	t_{co}	3.457	3.727	5.485	5.684	6.226	6.074	6.482	5.819	6.360	6.208	6.561	ns
		GCLK PLL	t_{co}	1.446	1.633	2.159	2.258	2.489	2.490	2.558	2.367	2.597	2.600	2.545	ns
	10mA	GCLK	t_{co}	3.443	3.712	5.467	5.665	6.207	6.055	6.463	5.800	6.342	6.190	6.543	ns
		GCLK PLL	t_{co}	1.432	1.618	2.141	2.239	2.470	2.471	2.539	2.348	2.579	2.582	2.527	ns
	12mA	GCLK	t_{co}	3.441	3.710	5.465	5.663	6.205	6.053	6.461	5.798	6.339	6.187	6.540	ns
		GCLK PLL	t_{co}	1.430	1.616	2.139	2.237	2.468	2.469	2.537	2.346	2.576	2.579	2.524	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.445	3.712	5.457	5.653	6.193	6.041	6.449	5.787	6.326	6.174	6.527	ns
		GCLK PLL	t_{co}	1.434	1.618	2.131	2.227	2.456	2.457	2.525	2.335	2.563	2.566	2.511	ns
	16mA	GCLK	t_{co}	3.445	3.713	5.465	5.663	6.205	6.053	6.461	5.798	6.339	6.187	6.540	ns
		GCLK PLL	t_{co}	1.434	1.619	2.139	2.237	2.468	2.469	2.537	2.346	2.576	2.579	2.524	ns

Table 1–97. EP3SL340 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.461	3.730	5.481	5.678	6.219	6.067	6.475	5.813	6.352	6.200	6.553	ns
		GCLK PLL	t_{co}	1.450	1.636	2.155	2.252	2.482	2.483	2.551	2.361	2.589	2.592	2.537	ns
	10mA	GCLK	t_{co}	3.461	3.730	5.481	5.678	6.219	6.067	6.475	5.813	6.352	6.200	6.553	ns
		GCLK PLL	t_{co}	1.450	1.636	2.155	2.252	2.482	2.483	2.551	2.361	2.589	2.592	2.537	ns
	12mA	GCLK	t_{co}	3.451	3.720	5.471	5.668	6.209	6.057	6.465	5.803	6.343	6.191	6.544	ns
		GCLK PLL	t_{co}	1.440	1.626	2.145	2.242	2.472	2.473	2.541	2.351	2.580	2.583	2.528	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.444	3.712	5.457	5.653	6.193	6.041	6.449	5.787	6.326	6.174	6.527	ns
		GCLK PLL	t_{co}	1.433	1.618	2.131	2.227	2.456	2.457	2.525	2.335	2.563	2.566	2.511	ns

Table 1–98 lists the EP3SL340 row pins output timing parameters for differential I/O standards.

Table 1–98. EP3SL340 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	3.022	3.234	4.714	4.872	5.362	5.217	5.602	4.981	5.467	5.326	5.662	ns
		GCLK PLL	t_{co}	1.063	1.193	1.445	1.501	1.678	1.690	1.735	1.583	1.761	1.772	1.704	ns
LVDS_E_1R	—	GCLK	t_{co}	3.414	3.678	5.396	5.588	6.125	5.972	6.349	5.722	6.255	6.105	6.425	ns
		GCLK PLL	t_{co}	1.455	1.637	2.127	2.217	2.441	2.445	2.482	2.324	2.549	2.551	2.467	ns
LVDS_E_3R	—	GCLK	t_{co}	3.396	3.668	5.434	5.634	6.179	6.026	6.403	5.773	6.316	6.166	6.486	ns
		GCLK PLL	t_{co}	1.437	1.627	2.165	2.263	2.495	2.499	2.536	2.375	2.610	2.612	2.528	ns
MINI-LVDS	—	GCLK	t_{co}	3.022	3.234	4.714	4.872	5.362	5.217	5.602	4.981	5.467	5.326	5.662	ns
		GCLK PLL	t_{co}	1.063	1.193	1.445	1.501	1.678	1.690	1.735	1.583	1.761	1.772	1.704	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.414	3.678	5.396	5.588	6.125	5.972	6.349	5.722	6.255	6.105	6.425	ns
		GCLK PLL	t_{co}	1.455	1.637	2.127	2.217	2.441	2.445	2.482	2.324	2.549	2.551	2.467	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.396	3.668	5.434	5.634	6.179	6.026	6.403	5.773	6.316	6.166	6.486	ns
		GCLK PLL	t_{co}	1.437	1.627	2.165	2.263	2.495	2.499	2.536	2.375	2.610	2.612	2.528	ns
RSDS	—	GCLK	t_{co}	3.022	3.234	4.714	4.872	5.362	5.217	5.602	4.981	5.467	5.326	5.662	ns
		GCLK PLL	t_{co}	1.063	1.193	1.445	1.501	1.678	1.690	1.735	1.583	1.761	1.772	1.704	ns
RSDS_E_1R	—	GCLK	t_{co}	3.414	3.678	5.396	5.588	6.125	5.972	6.349	5.722	6.255	6.105	6.425	ns
		GCLK PLL	t_{co}	1.455	1.637	2.127	2.217	2.441	2.445	2.482	2.324	2.549	2.551	2.467	ns
RSDS_E_3R	—	GCLK	t_{co}	3.396	3.668	5.434	5.634	6.179	6.026	6.403	5.773	6.316	6.166	6.486	ns
		GCLK PLL	t_{co}	1.437	1.627	2.165	2.263	2.495	2.499	2.536	2.375	2.610	2.612	2.528	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.440	3.711	5.470	5.668	6.212	6.059	6.436	5.806	6.345	6.195	6.515	ns
		GCLK PLL	t_{co}	1.491	1.680	2.211	2.307	2.538	2.542	2.579	2.418	2.649	2.651	2.567	ns
	6mA	GCLK	t_{co}	3.426	3.697	5.457	5.655	6.199	6.046	6.423	5.792	6.332	6.182	6.502	ns
		GCLK PLL	t_{co}	1.477	1.666	2.198	2.294	2.525	2.529	2.566	2.404	2.636	2.638	2.554	ns
	8mA	GCLK	t_{co}	3.422	3.693	5.455	5.655	6.200	6.047	6.424	5.792	6.334	6.184	6.504	ns
		GCLK PLL	t_{co}	1.473	1.662	2.196	2.294	2.526	2.530	2.567	2.404	2.638	2.640	2.556	ns

Table 1–98. EP3SL340 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.438	3.708	5.456	5.652	6.194	6.041	6.418	5.789	6.327	6.177	6.497	ns
		GCLK PLL	t_{co}	1.489	1.677	2.197	2.291	2.520	2.524	2.561	2.401	2.631	2.633	2.549	ns
	6mA	GCLK	t_{co}	3.427	3.698	5.452	5.648	6.191	6.038	6.415	5.786	6.324	6.174	6.494	ns
		GCLK PLL	t_{co}	1.478	1.667	2.193	2.287	2.517	2.521	2.558	2.398	2.628	2.630	2.546	ns
	8mA	GCLK	t_{co}	3.424	3.695	5.450	5.646	6.189	6.036	6.413	5.784	6.323	6.173	6.493	ns
		GCLK PLL	t_{co}	1.475	1.664	2.191	2.285	2.515	2.519	2.556	2.396	2.627	2.629	2.545	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.435	3.705	5.451	5.647	6.188	6.035	6.412	5.784	6.321	6.171	6.491	ns
		GCLK PLL	t_{co}	1.486	1.674	2.192	2.286	2.514	2.518	2.555	2.396	2.625	2.627	2.543	ns
	6mA	GCLK	t_{co}	3.425	3.696	5.449	5.645	6.187	6.034	6.411	5.783	6.321	6.171	6.491	ns
		GCLK PLL	t_{co}	1.476	1.665	2.190	2.284	2.513	2.517	2.554	2.395	2.625	2.627	2.543	ns
	8mA	GCLK	t_{co}	3.411	3.682	5.434	5.630	6.173	6.020	6.397	5.768	6.306	6.156	6.476	ns
		GCLK PLL	t_{co}	1.462	1.651	2.175	2.269	2.499	2.503	2.540	2.380	2.610	2.612	2.528	ns
	10mA	GCLK	t_{co}	3.408	3.678	5.430	5.626	6.169	6.016	6.393	5.764	6.302	6.152	6.472	ns
		GCLK PLL	t_{co}	1.459	1.647	2.171	2.265	2.495	2.499	2.536	2.376	2.606	2.608	2.524	ns
	12mA	GCLK	t_{co}	3.405	3.676	5.431	5.629	6.172	6.019	6.396	5.767	6.306	6.156	6.476	ns
		GCLK PLL	t_{co}	1.456	1.645	2.172	2.268	2.498	2.502	2.539	2.379	2.610	2.612	2.528	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.406	3.676	5.421	5.617	6.159	6.006	6.383	5.754	6.292	6.142	6.462	ns
		GCLK PLL	t_{co}	1.457	1.645	2.162	2.256	2.485	2.489	2.526	2.366	2.596	2.598	2.514	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.455	3.729	5.492	5.690	6.235	6.082	6.459	5.828	6.368	6.218	6.538	ns
		GCLK PLL	t_{co}	1.506	1.698	2.233	2.329	2.561	2.565	2.602	2.440	2.672	2.674	2.590	ns
	6mA	GCLK	t_{co}	3.431	3.705	5.474	5.673	6.218	6.065	6.442	5.811	6.353	6.203	6.523	ns
		GCLK PLL	t_{co}	1.482	1.674	2.215	2.312	2.544	2.548	2.585	2.423	2.657	2.659	2.575	ns
	8mA	GCLK	t_{co}	3.414	3.686	5.452	5.651	6.196	6.043	6.420	5.789	6.331	6.181	6.501	ns
		GCLK PLL	t_{co}	1.465	1.655	2.193	2.290	2.522	2.526	2.563	2.401	2.635	2.637	2.553	ns

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Table 1–98. EP3SL340 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.459	3.732	5.492	5.690	6.234	6.081	6.458	5.828	6.368	6.218	6.538	ns
		GCLK PLL	t_{co}	1.510	1.701	2.233	2.329	2.560	2.564	2.601	2.440	2.672	2.674	2.590	ns
	6mA	GCLK	t_{co}	3.444	3.717	5.478	5.675	6.219	6.066	6.443	5.813	6.353	6.203	6.523	ns
		GCLK PLL	t_{co}	1.495	1.686	2.219	2.314	2.545	2.549	2.586	2.425	2.657	2.659	2.575	ns
	8mA	GCLK	t_{co}	3.433	3.706	5.473	5.672	6.216	6.063	6.440	5.810	6.351	6.201	6.521	ns
		GCLK PLL	t_{co}	1.484	1.675	2.214	2.311	2.542	2.546	2.583	2.422	2.655	2.657	2.573	ns
	10mA	GCLK	t_{co}	3.413	3.686	5.450	5.648	6.193	6.040	6.417	5.787	6.327	6.177	6.497	ns
		GCLK PLL	t_{co}	1.464	1.655	2.191	2.287	2.519	2.523	2.560	2.399	2.631	2.633	2.549	ns
	12mA	GCLK	t_{co}	3.410	3.682	5.446	5.645	6.189	6.036	6.413	5.783	6.324	6.174	6.494	ns
		GCLK PLL	t_{co}	1.461	1.651	2.187	2.284	2.515	2.519	2.556	2.395	2.628	2.630	2.546	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.415	3.686	5.437	5.633	6.175	6.022	6.399	5.770	6.308	6.158	6.478	ns
		GCLK PLL	t_{co}	1.466	1.655	2.178	2.272	2.501	2.505	2.542	2.382	2.612	2.614	2.530	ns
	16mA	GCLK	t_{co}	3.408	3.679	5.436	5.634	6.178	6.025	6.402	5.773	6.313	6.163	6.483	ns
		GCLK PLL	t_{co}	1.459	1.648	2.177	2.273	2.504	2.508	2.545	2.385	2.617	2.619	2.535	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.446	3.718	5.474	5.671	6.214	6.061	6.438	5.809	6.348	6.198	6.518	ns
		GCLK PLL	t_{co}	1.487	1.677	2.205	2.300	2.530	2.534	2.571	2.411	2.642	2.644	2.560	ns
	12mA	GCLK	t_{co}	3.428	3.701	5.459	5.656	6.199	6.046	6.423	5.794	6.333	6.183	6.503	ns
		GCLK PLL	t_{co}	1.469	1.660	2.190	2.285	2.515	2.519	2.556	2.396	2.627	2.629	2.545	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.414	3.685	5.436	5.632	6.174	6.021	6.398	5.770	6.308	6.158	6.478	ns
		GCLK PLL	t_{co}	1.455	1.644	2.167	2.261	2.490	2.494	2.531	2.372	2.602	2.604	2.520	ns

Table 1–99 and Table 1–100 list the EP3SL340 regional (RCLK) clock adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–99 lists the EP3SL340 column pin delay adders when using the regional clock.

Table 1–99. EP3SL340 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.318	0.171	0.255	0.247	0.257	0.244	0.369	0.37	0.253	0.232	0.336	ns
RCLK PLL input adder	2.716	2.739	4.379	4.508	4.926	4.717	5.376	4.508	4.94	4.89	5.434	ns
RCLK output adder	-0.341	-0.107	-0.18	-0.169	-0.171	-0.167	-0.362	-0.03	-0.043	-0.034	-0.287	ns
RCLK PLL output adder	-2.36	-2.128	-3.344	-3.384	-3.571	-3.487	-3.545	-3.246	-3.636	-3.357	-3.544	ns

Table 1–100 lists the EP3SL340 row pin delay adders when using the regional clock.

Table 1–100. EP3SL340 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.075	0.079	0.133	0.124	0.125	0.124	0.307	0.117	0.116	0.117	0.31	ns
RCLK PLL input adder	0.157	0.151	0.262	0.274	0.306	0.288	0.464	0.268	0.291	0.278	0.46	ns
RCLK output adder	-0.052	-0.066	-0.107	-0.098	-0.127	-0.129	-0.282	-0.082	-0.118	-0.085	-0.285	ns
RCLK PLL output adder	-0.157	-0.139	-0.232	-0.248	-0.272	-0.259	-0.422	-0.252	-0.256	-0.244	-0.444	ns

EP3SE50 I/O Timing Parameters

Table 1–101 through Table 1–104 list the maximum I/O timing parameters for EP3SE50 devices for single-ended I/O standards.

Table 1–101 lists the EP3SE50 column pins input timing parameters for single-ended I/O standards.

Table 1–101. EP3SE50 Column Pins Input Timing Parameters (Part 1 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.743	-0.742	-1.063	-1.165	-1.374	-1.329	-1.605	-1.165	-1.374	-1.329	-1.605	ns
		t_h	0.870	0.869	1.241	1.366	1.595	1.538	1.815	1.366	1.595	1.538	1.815	ns
	GCLK PLL	t_{su}	-1.037	-1.037	-1.466	-1.593	-1.830	-1.772	-2.038	-1.593	-1.830	-1.772	-2.038	ns
		t_h	1.290	1.290	1.836	2.009	2.292	2.207	2.484	2.009	2.292	2.207	2.484	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.743	-0.742	-1.063	-1.165	-1.374	-1.329	-1.605	-1.165	-1.374	-1.329	-1.605	ns
		t_h	0.870	0.869	1.241	1.366	1.595	1.538	1.815	1.366	1.595	1.538	1.815	ns
	GCLK PLL	t_{su}	-1.037	-1.037	-1.466	-1.593	-1.830	-1.772	-2.038	-1.593	-1.830	-1.772	-2.038	ns
		t_h	1.290	1.290	1.836	2.009	2.292	2.207	2.484	2.009	2.292	2.207	2.484	ns

Table 1–101. EP3SE50 Column Pins Input Timing Parameters (Part 2 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVTTL	GCLK	t_{su}	-0.754	-0.753	-1.062	-1.167	-1.373	-1.328	-1.604	-1.167	-1.373	-1.328	-1.604	ns
		t_h	0.881	0.880	1.240	1.368	1.594	1.537	1.814	1.368	1.594	1.537	1.814	ns
	GCLK PLL	t_{su}	-1.048	-1.048	-1.465	-1.595	-1.829	-1.771	-2.037	-1.595	-1.829	-1.771	-2.037	ns
		t_h	1.301	1.301	1.835	2.011	2.291	2.206	2.483	2.011	2.291	2.206	2.483	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.754	-0.753	-1.062	-1.167	-1.373	-1.328	-1.604	-1.167	-1.373	-1.328	-1.604	ns
		t_h	0.881	0.880	1.240	1.368	1.594	1.537	1.814	1.368	1.594	1.537	1.814	ns
	GCLK PLL	t_{su}	-1.048	-1.048	-1.465	-1.595	-1.829	-1.771	-2.037	-1.595	-1.829	-1.771	-2.037	ns
		t_h	1.301	1.301	1.835	2.011	2.291	2.206	2.483	2.011	2.291	2.206	2.483	ns
2.5 V	GCLK	t_{su}	-0.749	-0.748	-1.071	-1.179	-1.392	-1.347	-1.623	-1.179	-1.392	-1.347	-1.623	ns
		t_h	0.876	0.875	1.249	1.380	1.613	1.556	1.833	1.380	1.613	1.556	1.833	ns
	GCLK PLL	t_{su}	-1.043	-1.043	-1.474	-1.607	-1.848	-1.790	-2.056	-1.607	-1.848	-1.790	-2.056	ns
		t_h	1.296	1.296	1.844	2.023	2.310	2.225	2.502	2.023	2.310	2.225	2.502	ns
1.8 V	GCLK	t_{su}	-0.769	-0.768	-1.111	-1.215	-1.390	-1.345	-1.621	-1.215	-1.390	-1.345	-1.621	ns
		t_h	0.898	0.897	1.289	1.416	1.611	1.554	1.831	1.416	1.611	1.554	1.831	ns
	GCLK PLL	t_{su}	-1.065	-1.065	-1.514	-1.643	-1.846	-1.788	-2.054	-1.643	-1.846	-1.788	-2.054	ns
		t_h	1.320	1.320	1.884	2.059	2.308	2.223	2.500	2.059	2.308	2.223	2.500	ns
1.5 V	GCLK	t_{su}	-0.759	-0.758	-1.088	-1.183	-1.320	-1.275	-1.551	-1.183	-1.320	-1.275	-1.551	ns
		t_h	0.888	0.887	1.266	1.384	1.541	1.484	1.761	1.384	1.541	1.484	1.761	ns
	GCLK PLL	t_{su}	-1.055	-1.055	-1.491	-1.611	-1.776	-1.718	-1.984	-1.611	-1.776	-1.718	-1.984	ns
		t_h	1.310	1.310	1.861	2.027	2.238	2.153	2.430	2.027	2.238	2.153	2.430	ns
1.2 V	GCLK	t_{su}	-0.707	-0.706	-1.011	-1.084	-1.164	-1.119	-1.395	-1.084	-1.164	-1.119	-1.395	ns
		t_h	0.836	0.835	1.189	1.285	1.385	1.328	1.605	1.285	1.385	1.328	1.605	ns
	GCLK PLL	t_{su}	-1.003	-1.003	-1.414	-1.512	-1.620	-1.562	-1.828	-1.512	-1.620	-1.562	-1.828	ns
		t_h	1.258	1.258	1.784	1.928	2.082	1.997	2.274	1.928	2.082	1.997	2.274	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.678	-0.677	-0.983	-1.068	-1.166	-1.121	-1.397	-1.068	-1.166	-1.121	-1.397	ns
		t_h	0.807	0.806	1.161	1.269	1.387	1.330	1.607	1.269	1.387	1.330	1.607	ns
	GCLK PLL	t_{su}	-0.974	-0.974	-1.386	-1.496	-1.622	-1.564	-1.830	-1.496	-1.622	-1.564	-1.830	ns
		t_h	1.229	1.229	1.756	1.912	2.084	1.999	2.276	1.912	2.084	1.999	2.276	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.678	-0.677	-0.983	-1.068	-1.166	-1.121	-1.397	-1.068	-1.166	-1.121	-1.397	ns
		t_h	0.807	0.806	1.161	1.269	1.387	1.330	1.607	1.269	1.387	1.330	1.607	ns
	GCLK PLL	t_{su}	-0.974	-0.974	-1.386	-1.496	-1.622	-1.564	-1.830	-1.496	-1.622	-1.564	-1.830	ns
		t_h	1.229	1.229	1.756	1.912	2.084	1.999	2.276	1.912	2.084	1.999	2.276	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.672	-0.671	-0.971	-1.063	-1.166	-1.119	-1.398	-1.063	-1.166	-1.119	-1.398	ns
		t_h	0.801	0.800	1.148	1.261	1.384	1.327	1.603	1.261	1.384	1.327	1.603	ns
	GCLK PLL	t_{su}	-0.968	-0.968	-1.373	-1.488	-1.619	-1.559	-1.828	-1.488	-1.619	-1.559	-1.828	ns
		t_h	1.223	1.223	1.743	1.901	2.078	1.993	2.269	1.901	2.078	1.993	2.269	ns

Table 1–101. EP3SE50 Column Pins Input Timing Parameters (Part 3 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	GCLK	t_{su}	-0.672	-0.671	-0.971	-1.063	-1.166	-1.119	-1.398	-1.063	-1.166	-1.119	-1.398	ns
		t_h	0.801	0.800	1.148	1.261	1.384	1.327	1.603	1.261	1.384	1.327	1.603	ns
	GCLK PLL	t_{su}	-0.968	-0.968	-1.373	-1.488	-1.619	-1.559	-1.828	-1.488	-1.619	-1.559	-1.828	ns
		t_h	1.223	1.223	1.743	1.901	2.078	1.993	2.269	1.901	2.078	1.993	2.269	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.661	-0.660	-0.962	-1.052	-1.147	-1.100	-1.379	-1.052	-1.147	-1.100	-1.379	ns
		t_h	0.790	0.789	1.138	1.250	1.365	1.308	1.584	1.250	1.365	1.308	1.584	ns
	GCLK PLL	t_{su}	-0.957	-0.957	-1.362	-1.477	-1.600	-1.540	-1.809	-1.477	-1.600	-1.540	-1.809	ns
		t_h	1.212	1.212	1.731	1.890	2.059	1.974	2.250	1.890	2.059	1.974	2.250	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.661	-0.660	-0.962	-1.052	-1.147	-1.100	-1.379	-1.052	-1.147	-1.100	-1.379	ns
		t_h	0.790	0.789	1.138	1.250	1.365	1.308	1.584	1.250	1.365	1.308	1.584	ns
	GCLK PLL	t_{su}	-0.957	-0.957	-1.362	-1.477	-1.600	-1.540	-1.809	-1.477	-1.600	-1.540	-1.809	ns
		t_h	1.212	1.212	1.731	1.890	2.059	1.974	2.250	1.890	2.059	1.974	2.250	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.672	-0.671	-0.971	-1.063	-1.166	-1.119	-1.398	-1.063	-1.166	-1.119	-1.398	ns
		t_h	0.801	0.800	1.148	1.261	1.384	1.327	1.603	1.261	1.384	1.327	1.603	ns
	GCLK PLL	t_{su}	-0.968	-0.968	-1.373	-1.488	-1.619	-1.559	-1.828	-1.488	-1.619	-1.559	-1.828	ns
		t_h	1.223	1.223	1.743	1.901	2.078	1.993	2.269	1.901	2.078	1.993	2.269	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.672	-0.671	-0.971	-1.063	-1.166	-1.119	-1.398	-1.063	-1.166	-1.119	-1.398	ns
		t_h	0.801	0.800	1.148	1.261	1.384	1.327	1.603	1.261	1.384	1.327	1.603	ns
	GCLK PLL	t_{su}	-0.968	-0.968	-1.373	-1.488	-1.619	-1.559	-1.828	-1.488	-1.619	-1.559	-1.828	ns
		t_h	1.223	1.223	1.743	1.901	2.078	1.993	2.269	1.901	2.078	1.993	2.269	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.661	-0.660	-0.962	-1.052	-1.147	-1.100	-1.379	-1.052	-1.147	-1.100	-1.379	ns
		t_h	0.790	0.789	1.138	1.250	1.365	1.308	1.584	1.250	1.365	1.308	1.584	ns
	GCLK PLL	t_{su}	-0.957	-0.957	-1.362	-1.477	-1.600	-1.540	-1.809	-1.477	-1.600	-1.540	-1.809	ns
		t_h	1.212	1.212	1.731	1.890	2.059	1.974	2.250	1.890	2.059	1.974	2.250	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.661	-0.660	-0.962	-1.052	-1.147	-1.100	-1.379	-1.052	-1.147	-1.100	-1.379	ns
		t_h	0.790	0.789	1.138	1.250	1.365	1.308	1.584	1.250	1.365	1.308	1.584	ns
	GCLK PLL	t_{su}	-0.957	-0.957	-1.362	-1.477	-1.600	-1.540	-1.809	-1.477	-1.600	-1.540	-1.809	ns
		t_h	1.212	1.212	1.731	1.890	2.059	1.974	2.250	1.890	2.059	1.974	2.250	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.649	-0.648	-0.952	-1.041	-1.131	-1.084	-1.363	-1.041	-1.131	-1.084	-1.363	ns
		t_h	0.778	0.777	1.128	1.239	1.349	1.292	1.568	1.239	1.349	1.292	1.568	ns
	GCLK PLL	t_{su}	-0.945	-0.945	-1.352	-1.466	-1.584	-1.524	-1.793	-1.466	-1.584	-1.524	-1.793	ns
		t_h	1.200	1.200	1.721	1.879	2.043	1.958	2.234	1.879	2.043	1.958	2.234	ns
3.0-V PCI	GCLK	t_{su}	-0.649	-0.648	-0.952	-1.041	-1.131	-1.084	-1.363	-1.041	-1.131	-1.084	-1.363	ns
		t_h	0.778	0.777	1.128	1.239	1.349	1.292	1.568	1.239	1.349	1.292	1.568	ns
	GCLK PLL	t_{su}	-0.945	-0.945	-1.352	-1.466	-1.584	-1.524	-1.793	-1.466	-1.584	-1.524	-1.793	ns
		t_h	1.200	1.200	1.721	1.879	2.043	1.958	2.234	1.879	2.043	1.958	2.234	ns

Table 1–101. EP3SE50 Column Pins Input Timing Parameters (Part 4 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V | PCI-X	GCLK	t_{su}	-0.754	-0.753	-1.062	-1.167	-1.373	-1.328	-1.604	-1.167	-1.373	-1.328	-1.604	ns
		t_h	0.881	0.880	1.240	1.368	1.594	1.537	1.814	1.368	1.594	1.537	1.814	ns
	GCLK PLL	t_{su}	-1.048	-1.048	-1.465	-1.595	-1.829	-1.771	-2.037	-1.595	-1.829	-1.771	-2.037	ns
		t_h	1.301	1.301	1.835	2.011	2.291	2.206	2.483	2.011	2.291	2.206	2.483	ns

Table 1–102 lists the EP3SE50 row pins input timing parameters for single-ended I/O standards.

Table 1–102. EP3SE50 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.896	-0.926	-1.311	-1.433	-1.658	-1.605	-1.896	-1.451	-1.663	-1.612	-1.927	ns
		t_h	1.009	1.052	1.597	1.816	1.931	1.813	1.843	1.809	1.936	1.818	1.895	ns
	GCLK PLL	t_{su}	0.952	0.960	1.494	1.640	1.888	1.819	2.111	1.667	1.903	1.836	2.144	ns
		t_h	-0.703	-0.700	-1.311	-1.433	-1.658	-1.605	-1.896	-1.451	-1.663	-1.612	-1.927	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.896	-0.926	-1.311	-1.433	-1.658	-1.605	-1.896	-1.451	-1.663	-1.612	-1.927	ns
		t_h	1.009	1.052	1.597	1.816	1.931	1.813	1.843	1.809	1.936	1.818	1.895	ns
	GCLK PLL	t_{su}	0.952	0.960	1.494	1.640	1.888	1.819	2.111	1.667	1.903	1.836	2.144	ns
		t_h	-0.703	-0.700	-1.308	-1.434	-1.661	-1.608	-1.899	-1.450	-1.668	-1.617	-1.932	ns
3.0-V LVTTL	GCLK	t_{su}	-0.902	-0.937	1.491	1.641	1.891	1.822	2.114	1.666	1.908	1.841	2.149	ns
		t_h	1.015	1.063	-1.308	-1.434	-1.661	-1.608	-1.899	-1.450	-1.668	-1.617	-1.932	ns
	GCLK PLL	t_{su}	0.946	0.949	1.600	1.815	1.928	1.810	1.840	1.810	1.931	1.813	1.890	ns
		t_h	-0.697	-0.689	1.491	1.641	1.891	1.822	2.114	1.666	1.908	1.841	2.149	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.902	-0.937	1.500	1.654	1.906	1.837	2.129	1.675	1.918	1.851	2.159	ns
		t_h	1.015	1.063	-1.317	-1.447	-1.676	-1.623	-1.914	-1.459	-1.678	-1.627	-1.942	ns
	GCLK PLL	t_{su}	0.946	0.949	1.591	1.802	1.913	1.795	1.825	1.801	1.921	1.803	1.880	ns
		t_h	-0.697	-0.689	1.500	1.654	1.906	1.837	2.129	1.675	1.918	1.851	2.159	ns
2.5 V	GCLK	t_{su}	-0.890	-0.930	1.510	1.730	1.876	1.758	1.788	1.729	1.881	1.762	1.840	ns
		t_h	1.003	1.056	1.458	1.596	1.807	1.742	2.015	1.614	1.817	1.754	2.048	ns
	GCLK PLL	t_{su}	0.958	0.956	-1.272	-1.388	-1.573	-1.523	-1.797	-1.395	-1.573	-1.526	-1.829	ns
		t_h	-0.709	-0.696	1.510	1.730	1.876	1.758	1.788	1.729	1.881	1.762	1.840	ns
1.8 V	GCLK	t_{su}	-0.869	-0.907	1.534	1.762	1.944	1.826	1.856	1.760	1.946	1.827	1.905	ns
		t_h	0.890	0.886	1.434	1.564	1.739	1.674	1.947	1.583	1.752	1.689	1.983	ns
	GCLK PLL	t_{su}	0.986	1.035	-1.248	-1.356	-1.505	-1.455	-1.729	-1.364	-1.508	-1.461	-1.764	ns
		t_h	-0.859	-0.896	1.613	1.863	2.103	1.985	2.015	1.856	2.101	1.982	2.060	ns

Table 1–102. EP3SE50 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	GCLK	t_{su}	0.900	0.897	1.355	1.463	1.580	1.515	1.788	1.487	1.597	1.534	1.828	ns
		t_h	0.976	1.024	-1.169	-1.255	-1.346	-1.296	-1.570	-1.268	-1.353	-1.306	-1.609	ns
	GCLK PLL	t_{su}	-0.799	-0.843	1.677	1.911	2.133	2.015	2.045	1.913	2.138	2.020	2.097	ns
		t_h	0.960	0.950	1.414	1.545	1.686	1.617	1.909	1.563	1.701	1.634	1.942	ns
1.2 V	GCLK	t_{su}	0.916	0.971	-1.131	-1.230	-1.344	-1.293	-1.568	-1.239	-1.349	-1.300	-1.604	ns
		t_h	-0.833	-0.872	1.651	-1.230	-1.344	-1.293	-1.568	-1.239	-1.349	-1.300	-1.604	ns
	GCLK PLL	t_{su}	1.015	1.014	1.317	1.436	1.575	1.510	1.782	1.455	1.590	1.527	1.819	ns
		t_h	0.947	0.999	-1.131	1.890	2.108	1.991	2.019	1.888	2.108	1.990	2.067	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.833	-0.872	1.651	1.890	2.108	1.991	2.019	1.888	2.108	1.990	2.067	ns
		t_h	1.015	1.014	1.317	-1.442	-1.607	-1.521	-1.544	-1.432	-1.599	-1.511	-1.589	ns
	GCLK PLL	t_{su}	0.947	0.999	-1.131	-1.230	-1.344	-1.293	-1.568	-1.239	-1.349	-1.300	-1.604	ns
		t_h	-0.773	-0.808	1.651	1.436	1.575	1.510	1.782	1.455	1.590	1.527	1.819	ns
SSTL-2 CLASS II	GCLK	t_{su}	0.986	0.985	1.317	1.890	2.108	1.991	2.019	1.888	2.108	1.990	2.067	ns
		t_h	0.890	0.936	-1.131	-1.442	-1.607	-1.521	-1.544	-1.432	-1.599	-1.511	-1.589	ns
	GCLK PLL	t_{su}	-0.773	-0.808	-1.267	-1.220	-1.326	-1.275	-1.550	-1.228	-1.332	-1.283	-1.587	ns
		t_h	0.986	0.985	-1.118	1.426	1.557	1.492	1.764	1.444	1.573	1.510	1.802	ns
SSTL-18 CLASS I	GCLK	t_{su}	0.890	0.936	1.305	1.900	2.126	2.009	2.037	1.899	2.125	2.007	2.084	ns
		t_h	-0.759	-0.796	1.651	1.900	2.126	2.009	2.037	1.899	2.125	2.007	2.084	ns
	GCLK PLL	t_{su}	1.000	0.997	1.317	-1.452	-1.625	-1.539	-1.562	-1.443	-1.616	-1.528	-1.606	ns
		t_h	0.876	0.924	-1.131	-1.220	-1.326	-1.275	-1.550	-1.228	-1.332	-1.283	-1.587	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.773	-0.808	1.651	-1.442	-1.607	-1.521	-1.544	-1.432	-1.599	-1.511	-1.589	ns
		t_h	0.986	0.985	1.317	-1.230	-1.344	-1.293	-1.568	-1.239	-1.349	-1.300	-1.604	ns
	GCLK PLL	t_{su}	0.890	0.936	-1.131	1.436	1.575	1.510	1.782	1.455	1.590	1.527	1.819	ns
		t_h	-0.773	-0.808	-1.267	1.890	2.108	1.991	2.019	1.888	2.108	1.990	2.067	ns
SSTL-15 CLASS I	GCLK	t_{su}	0.986	0.985	-1.118	-1.442	-1.607	-1.521	-1.544	-1.432	-1.599	-1.511	-1.589	ns
		t_h	0.890	0.936	1.305	-1.230	-1.344	-1.293	-1.568	-1.239	-1.349	-1.300	-1.604	ns
	GCLK PLL	t_{su}	-0.759	-0.796	1.666	1.436	1.575	1.510	1.782	1.455	1.590	1.527	1.819	ns
		t_h	1.000	0.997	-1.267	1.890	2.108	1.991	2.019	1.888	2.108	1.990	2.067	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	0.876	0.924	-1.118	-1.442	-1.607	-1.521	-1.544	-1.432	-1.599	-1.511	-1.589	ns
		t_h	-0.759	-0.796	-1.276	1.900	2.126	2.009	2.037	1.899	2.125	2.007	2.084	ns
	GCLK PLL	t_{su}	1.000	0.997	-1.109	-1.452	-1.625	-1.539	-1.562	-1.443	-1.616	-1.528	-1.606	ns
		t_h	0.876	0.924	1.296	-1.220	-1.326	-1.275	-1.550	-1.228	-1.332	-1.283	-1.587	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.750	-0.784	1.675	1.426	1.557	1.492	1.764	1.444	1.573	1.510	1.802	ns
		t_h	1.009	1.009	-1.276	1.900	2.126	2.009	2.037	1.899	2.125	2.007	2.084	ns
	GCLK PLL	t_{su}	0.867	0.912	-1.109	-1.452	-1.625	-1.539	-1.562	-1.443	-1.616	-1.528	-1.606	ns
		t_h	-0.750	-0.784	-1.276	1.910	2.142	2.025	2.053	1.908	2.141	2.023	2.100	ns

Table 1–102. EP3SE50 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS I	GCLK	t_{su}	1.009	1.009	-1.308	-1.462	-1.641	-1.555	-1.578	-1.452	-1.632	-1.544	-1.622	ns
		t_h	0.867	0.912	1.600	-1.210	-1.310	-1.259	-1.534	-1.219	-1.316	-1.267	-1.571	ns
	GCLK PLL	t_{su}	-0.902	-0.937	1.491	1.416	1.541	1.476	1.748	1.435	1.557	1.494	1.786	ns
		t_h	1.015	1.063	-1.308	1.910	2.142	2.025	2.053	1.908	2.141	2.023	2.100	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	0.946	0.949	1.600	-1.462	-1.641	-1.555	-1.578	-1.452	-1.632	-1.544	-1.622	ns
		t_h	-0.697	-0.689	1.491	-1.210	-1.310	-1.259	-1.534	-1.219	-1.316	-1.267	-1.571	ns
	GCLK PLL	t_{su}	-0.902	-0.937	1.491	1.416	1.541	1.476	1.748	1.435	1.557	1.494	1.786	ns
		t_h	1.015	1.063	1.491	1.910	2.142	2.025	2.053	1.908	2.141	2.023	2.100	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	0.946	0.949	1.491	-1.462	-1.641	-1.555	-1.578	-1.452	-1.632	-1.544	-1.622	ns
		t_h	-0.697	-0.689	1.491	-1.210	-1.310	-1.259	-1.534	-1.219	-1.316	-1.267	-1.571	ns
	GCLK PLL	t_{su}	-0.896	-0.926	-1.311	-1.433	-1.658	-1.605	-1.896	-1.451	-1.663	-1.612	-1.927	ns
		t_h	1.009	1.052	1.597	1.816	1.931	1.813	1.843	1.809	1.936	1.818	1.895	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	0.952	0.960	1.494	1.640	1.888	1.819	2.111	1.667	1.903	1.836	2.144	ns
		t_h	-0.703	-0.700	-1.311	-1.433	-1.658	-1.605	-1.896	-1.451	-1.663	-1.612	-1.927	ns
	GCLK PLL	t_{su}	-0.896	-0.926	-1.311	-1.433	-1.658	-1.605	-1.896	-1.451	-1.663	-1.612	-1.927	ns
		t_h	1.009	1.052	1.597	1.816	1.931	1.813	1.843	1.809	1.936	1.818	1.895	ns
3.0-V PCI	GCLK	t_{su}	0.952	0.960	1.494	1.640	1.888	1.819	2.111	1.667	1.903	1.836	2.144	ns
		t_h	-0.703	-0.700	-1.308	-1.434	-1.661	-1.608	-1.899	-1.450	-1.668	-1.617	-1.932	ns
	GCLK PLL	t_{su}	-0.902	-0.937	1.491	1.641	1.891	1.822	2.114	1.666	1.908	1.841	2.149	ns
		t_h	1.015	1.063	-1.308	-1.434	-1.661	-1.608	-1.899	-1.450	-1.668	-1.617	-1.932	ns
3.0-V PCI-X	GCLK	t_{su}	0.946	0.949	1.600	1.815	1.928	1.810	1.840	1.810	1.931	1.813	1.890	ns
		t_h	-0.697	-0.689	1.491	1.641	1.891	1.822	2.114	1.666	1.908	1.841	2.149	ns
	GCLK PLL	t_{su}	-0.902	-0.937	1.500	1.654	1.906	1.837	2.129	1.675	1.918	1.851	2.159	ns
		t_h	1.015	1.063	-1.317	-1.447	-1.676	-1.623	-1.914	-1.459	-1.678	-1.627	-1.942	ns

Table 1–103 lists the EP3SE50 column pins output timing parameters for single-ended I/O standards.

Table 1–103. EP3SE50 Column Pins Output Timing Parameters (Part 1 of 6)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.293	3.293	4.559	4.925	5.402	5.282	5.365	4.925	5.402	5.282	5.365	ns
		GCLK PLL	t_{co}	3.550	3.524	4.903	5.329	5.819	5.674	5.973	5.329	5.819	5.674	5.973	ns
	8mA	GCLK	t_{co}	3.176	3.176	4.405	4.763	5.232	5.112	5.252	4.763	5.232	5.112	5.252	ns
		GCLK PLL	t_{co}	3.483	3.457	4.794	5.218	5.706	5.561	5.860	5.218	5.706	5.561	5.860	ns
	12mA	GCLK	t_{co}	3.081	3.081	4.268	4.620	5.080	4.960	5.162	4.620	5.080	4.960	5.162	ns
		GCLK PLL	t_{co}	3.397	3.371	4.691	5.120	5.614	5.469	5.768	5.120	5.614	5.469	5.768	ns
	16mA	GCLK	t_{co}	3.041	3.051	4.243	4.596	5.055	4.935	5.120	4.596	5.055	4.935	5.120	ns
		GCLK PLL	t_{co}	3.390	3.364	4.674	5.092	5.573	5.428	5.727	5.092	5.573	5.428	5.727	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.296	3.296	4.563	4.937	5.416	5.296	5.373	4.937	5.416	5.296	5.373	ns
		GCLK PLL	t_{co}	3.556	3.530	4.908	5.334	5.826	5.681	5.980	5.334	5.826	5.681	5.980	ns
	8mA	GCLK	t_{co}	3.096	3.096	4.273	4.625	5.086	4.966	5.172	4.625	5.086	4.966	5.172	ns
		GCLK PLL	t_{co}	3.401	3.375	4.701	5.137	5.625	5.480	5.779	5.137	5.625	5.480	5.779	ns
	12mA	GCLK	t_{co}	3.059	3.069	4.236	4.594	5.055	4.935	5.148	4.594	5.055	4.935	5.148	ns
		GCLK PLL	t_{co}	3.408	3.382	4.695	5.116	5.599	5.454	5.753	5.116	5.599	5.454	5.753	ns
	16mA	GCLK	t_{co}	3.043	3.053	4.212	4.553	5.025	4.904	5.119	4.553	5.025	4.904	5.119	ns
		GCLK PLL	t_{co}	3.392	3.366	4.672	5.090	5.570	5.425	5.724	5.090	5.570	5.425	5.724	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.238	3.238	4.508	4.876	5.367	5.247	5.356	4.876	5.367	5.247	5.356	ns
		GCLK PLL	t_{co}	3.514	3.488	4.870	5.298	5.786	5.641	5.940	5.298	5.786	5.641	5.940	ns
	8mA	GCLK	t_{co}	3.108	3.108	4.339	4.704	5.205	5.086	5.239	4.704	5.205	5.086	5.239	ns
		GCLK PLL	t_{co}	3.403	3.377	4.740	5.164	5.648	5.504	5.801	5.164	5.648	5.504	5.801	ns
	12mA	GCLK	t_{co}	3.033	3.033	4.250	4.605	5.103	4.984	5.175	4.605	5.103	4.984	5.175	ns
		GCLK PLL	t_{co}	3.367	3.341	4.677	5.095	5.574	5.430	5.728	5.095	5.574	5.430	5.728	ns
	16mA	GCLK	t_{co}	3.000	3.010	4.188	4.536	5.053	4.934	5.152	4.536	5.053	4.934	5.152	ns
		GCLK PLL	t_{co}	3.349	3.323	4.648	5.067	5.546	5.401	5.700	5.067	5.546	5.401	5.700	ns

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Table 1–103. EP3SE50 Column Pins Output Timing Parameters (Part 2 of 6)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.146	3.146	4.397	4.757	5.259	5.140	5.275	4.757	5.259	5.140	5.275	ns
		GCLK PLL	t_{co}	3.428	3.402	4.774	5.197	5.683	5.539	5.836	5.197	5.683	5.539	5.836	ns
	8mA	GCLK	t_{co}	3.009	3.010	4.202	4.558	5.077	4.958	5.165	4.558	5.077	4.958	5.165	ns
		GCLK PLL	t_{co}	3.349	3.323	4.651	5.068	5.548	5.404	5.701	5.068	5.548	5.404	5.701	ns
	12mA	GCLK	t_{co}	2.995	3.005	4.183	4.524	5.009	4.889	5.134	4.524	5.009	4.889	5.134	ns
		GCLK PLL	t_{co}	3.344	3.318	4.643	5.061	5.540	5.395	5.694	5.061	5.540	5.395	5.694	ns
	16mA	GCLK	t_{co}	2.986	2.996	4.169	4.509	5.007	4.888	5.139	4.509	5.007	4.888	5.139	ns
		GCLK PLL	t_{co}	3.335	3.309	4.629	5.046	5.525	5.380	5.679	5.046	5.525	5.380	5.679	ns
2.5 V	4mA	GCLK	t_{co}	3.293	3.293	4.651	5.036	5.541	5.422	5.483	5.036	5.541	5.422	5.483	ns
		GCLK PLL	t_{co}	3.550	3.524	4.981	5.424	5.930	5.786	6.084	5.424	5.930	5.786	6.084	ns
	8mA	GCLK	t_{co}	3.168	3.168	4.478	4.852	5.344	5.225	5.359	4.852	5.344	5.225	5.359	ns
		GCLK PLL	t_{co}	3.450	3.424	4.862	5.298	5.798	5.654	5.951	5.298	5.798	5.654	5.951	ns
	12mA	GCLK	t_{co}	3.068	3.068	4.349	4.716	5.204	5.085	5.281	4.716	5.204	5.085	5.281	ns
		GCLK PLL	t_{co}	3.406	3.380	4.775	5.208	5.703	5.558	5.857	5.208	5.703	5.558	5.857	ns
	16mA	GCLK	t_{co}	3.041	3.041	4.280	4.649	5.154	5.035	5.224	4.649	5.154	5.035	5.224	ns
		GCLK PLL	t_{co}	3.368	3.342	4.736	5.165	5.660	5.515	5.814	5.165	5.660	5.515	5.814	ns
1.8 V	2mA	GCLK	t_{co}	3.556	3.556	5.088	5.519	6.078	5.958	5.880	5.519	6.078	5.958	5.880	ns
		GCLK PLL	t_{co}	3.741	3.715	5.303	5.784	6.335	6.190	6.489	5.784	6.335	6.190	6.489	ns
	4mA	GCLK	t_{co}	3.315	3.315	4.728	5.113	5.617	5.498	5.549	5.113	5.617	5.498	5.549	ns
		GCLK PLL	t_{co}	3.560	3.534	5.024	5.475	5.987	5.843	6.140	5.475	5.987	5.843	6.140	ns
	6mA	GCLK	t_{co}	3.197	3.197	4.538	4.923	5.443	5.323	5.437	4.923	5.443	5.323	5.437	ns
		GCLK PLL	t_{co}	3.478	3.452	4.917	5.360	5.877	5.732	6.031	5.360	5.877	5.732	6.031	ns
	8mA	GCLK	t_{co}	3.143	3.143	4.438	4.825	5.331	5.211	5.360	4.825	5.331	5.211	5.360	ns
		GCLK PLL	t_{co}	3.458	3.432	4.858	5.307	5.811	5.666	5.965	5.307	5.811	5.666	5.965	ns
	10mA	GCLK	t_{co}	3.075	3.075	4.342	4.727	5.217	5.097	5.291	4.727	5.217	5.097	5.291	ns
		GCLK PLL	t_{co}	3.395	3.369	4.797	5.232	5.730	5.585	5.884	5.232	5.730	5.585	5.884	ns
	12mA	GCLK	t_{co}	3.051	3.051	4.317	4.680	5.179	5.059	5.258	4.680	5.179	5.059	5.258	ns
		GCLK PLL	t_{co}	3.377	3.351	4.777	5.210	5.707	5.562	5.861	5.210	5.707	5.562	5.861	ns

Table 1–103. EP3SE50 Column Pins Output Timing Parameters (Part 3 of 6)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.464	3.464	4.981	5.429	5.995	5.875	5.825	5.429	5.995	5.875	5.825	ns
		GCLK PLL	t_{co}	3.687	3.661	5.231	5.717	6.273	6.128	6.427	5.717	6.273	6.128	6.427	ns
	4mA	GCLK	t_{co}	3.181	3.181	4.527	4.916	5.439	5.319	5.439	4.916	5.439	5.319	5.439	ns
		GCLK PLL	t_{co}	3.475	3.449	4.912	5.360	5.881	5.736	6.035	5.360	5.881	5.736	6.035	ns
	6mA	GCLK	t_{co}	3.103	3.111	4.427	4.808	5.322	5.202	5.362	4.808	5.322	5.202	5.362	ns
		GCLK PLL	t_{co}	3.450	3.424	4.845	5.300	5.814	5.669	5.968	5.300	5.814	5.669	5.968	ns
	8mA	GCLK	t_{co}	3.093	3.100	4.409	4.787	5.290	5.170	5.345	4.787	5.290	5.170	5.345	ns
		GCLK PLL	t_{co}	3.439	3.413	4.828	5.275	5.794	5.649	5.948	5.275	5.794	5.649	5.948	ns
	10mA	GCLK	t_{co}	3.063	3.063	4.330	4.709	5.208	5.088	5.282	4.709	5.208	5.088	5.282	ns
		GCLK PLL	t_{co}	3.384	3.358	4.790	5.225	5.724	5.579	5.878	5.225	5.724	5.579	5.878	ns
	12mA	GCLK	t_{co}	3.030	3.040	4.314	4.676	5.168	5.047	5.261	4.676	5.168	5.047	5.261	ns
		GCLK PLL	t_{co}	3.379	3.353	4.774	5.213	5.713	5.568	5.867	5.213	5.713	5.568	5.867	ns
1.2 V	2mA	GCLK	t_{co}	3.354	3.354	4.868	5.328	5.915	5.795	5.765	5.328	5.915	5.795	5.765	ns
		GCLK PLL	t_{co}	3.603	3.577	5.157	5.652	6.217	6.072	6.371	5.652	6.217	6.072	6.371	ns
	4mA	GCLK	t_{co}	3.181	3.181	4.546	4.947	5.486	5.366	5.480	4.947	5.486	5.366	5.480	ns
		GCLK PLL	t_{co}	3.480	3.454	4.932	5.391	5.931	5.786	6.085	5.391	5.931	5.786	6.085	ns
	6mA	GCLK	t_{co}	3.094	3.103	4.419	4.806	5.331	5.211	5.366	4.806	5.331	5.211	5.366	ns
		GCLK PLL	t_{co}	3.442	3.416	4.839	5.301	5.818	5.673	5.972	5.301	5.818	5.673	5.972	ns
	8mA	GCLK	t_{co}	3.070	3.070	4.351	4.746	5.240	5.120	5.319	4.746	5.240	5.120	5.319	ns
		GCLK PLL	t_{co}	3.395	3.369	4.811	5.252	5.762	5.617	5.916	5.252	5.762	5.617	5.916	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.058	3.058	4.312	4.677	5.188	5.068	5.276	4.677	5.188	5.068	5.276	ns
		GCLK PLL	t_{co}	3.395	3.369	4.768	5.200	5.693	5.548	5.847	5.200	5.693	5.548	5.847	ns
	10mA	GCLK	t_{co}	3.055	3.055	4.305	4.670	5.193	5.074	5.271	4.670	5.193	5.074	5.271	ns
		GCLK PLL	t_{co}	3.392	3.366	4.765	5.196	5.689	5.544	5.843	5.196	5.689	5.544	5.843	ns
	12mA	GCLK	t_{co}	3.043	3.051	4.305	4.666	5.174	5.054	5.272	4.666	5.174	5.054	5.272	ns
		GCLK PLL	t_{co}	3.390	3.364	4.765	5.197	5.690	5.545	5.844	5.197	5.690	5.545	5.844	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.032	3.042	4.291	4.644	5.140	5.020	5.256	4.644	5.140	5.020	5.256	ns
		GCLK PLL	t_{co}	3.381	3.355	4.751	5.182	5.675	5.530	5.829	5.182	5.675	5.530	5.829	ns

Table 1–103. EP3SE50 Column Pins Output Timing Parameters (Part 4 of 6)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.074	3.074	4.324	4.692	5.215	5.096	5.295	4.692	5.215	5.096	5.295	ns
		GCLK PLL	t_{co}	3.402	3.376	4.780	5.214	5.709	5.564	5.863	5.214	5.709	5.564	5.863	ns
	6mA	GCLK	t_{co}	3.057	3.059	4.321	4.689	5.205	5.085	5.293	4.689	5.205	5.085	5.293	ns
		GCLK PLL	t_{co}	3.398	3.372	4.778	5.212	5.707	5.562	5.861	5.212	5.707	5.562	5.861	ns
	8mA	GCLK	t_{co}	3.045	3.048	4.308	4.669	5.197	5.078	5.291	4.669	5.197	5.078	5.291	ns
		GCLK PLL	t_{co}	3.387	3.361	4.768	5.202	5.698	5.553	5.852	5.202	5.698	5.553	5.852	ns
	10mA	GCLK	t_{co}	3.027	3.037	4.296	4.652	5.159	5.039	5.266	4.652	5.159	5.039	5.266	ns
		GCLK PLL	t_{co}	3.376	3.350	4.756	5.189	5.685	5.540	5.839	5.189	5.685	5.540	5.839	ns
	12mA	GCLK	t_{co}	3.027	3.037	4.295	4.652	5.159	5.039	5.265	4.652	5.159	5.039	5.265	ns
		GCLK PLL	t_{co}	3.376	3.350	4.755	5.189	5.685	5.540	5.839	5.189	5.685	5.540	5.839	ns
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.033	3.043	4.294	4.649	5.159	5.039	5.268	4.649	5.159	5.039	5.268	ns
		GCLK PLL	t_{co}	3.382	3.356	4.754	5.186	5.680	5.535	5.834	5.186	5.680	5.535	5.834	ns
	16mA	GCLK	t_{co}	3.036	3.046	4.302	4.658	5.164	5.044	5.291	4.658	5.164	5.044	5.291	ns
		GCLK PLL	t_{co}	3.385	3.359	4.762	5.196	5.692	5.547	5.846	5.196	5.692	5.547	5.846	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.068	3.068	4.338	4.709	5.230	5.110	5.310	4.709	5.230	5.110	5.310	ns
		GCLK PLL	t_{co}	3.406	3.380	4.790	5.225	5.722	5.577	5.876	5.225	5.722	5.577	5.876	ns
	6mA	GCLK	t_{co}	3.043	3.053	4.319	4.688	5.204	5.084	5.296	4.688	5.204	5.084	5.296	ns
		GCLK PLL	t_{co}	3.392	3.366	4.779	5.215	5.713	5.568	5.867	5.215	5.713	5.568	5.867	ns
	8mA	GCLK	t_{co}	3.032	3.042	4.306	4.667	5.180	5.060	5.281	4.667	5.180	5.060	5.281	ns
		GCLK PLL	t_{co}	3.381	3.355	4.766	5.201	5.699	5.554	5.853	5.201	5.699	5.554	5.853	ns
	10mA	GCLK	t_{co}	3.031	3.041	4.309	4.667	5.169	5.049	5.278	4.667	5.169	5.049	5.278	ns
		GCLK PLL	t_{co}	3.380	3.354	4.769	5.205	5.703	5.558	5.857	5.205	5.703	5.558	5.857	ns
	12mA	GCLK	t_{co}	3.028	3.038	4.303	4.662	5.159	5.039	5.272	4.662	5.159	5.039	5.272	ns
		GCLK PLL	t_{co}	3.377	3.351	4.763	5.199	5.697	5.552	5.851	5.199	5.697	5.552	5.851	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.030	3.040	4.292	4.648	5.159	5.039	5.269	4.648	5.159	5.039	5.269	ns
		GCLK PLL	t_{co}	3.379	3.353	4.752	5.185	5.680	5.535	5.834	5.185	5.680	5.535	5.834	ns
	16mA	GCLK	t_{co}	3.033	3.043	4.299	4.657	5.165	5.045	5.293	4.657	5.165	5.045	5.293	ns
		GCLK PLL	t_{co}	3.382	3.356	4.759	5.194	5.691	5.546	5.845	5.194	5.691	5.546	5.845	ns

Table 1–103. EP3SE50 Column Pins Output Timing Parameters (Part 5 of 6)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.042	3.050	4.294	4.654	5.173	5.053	5.270	4.654	5.173	5.053	5.270	ns
		GCLK PLL	t_{co}	3.389	3.363	4.754	5.185	5.678	5.533	5.832	5.185	5.678	5.533	5.832	ns
	6mA	GCLK	t_{co}	3.033	3.043	4.292	4.646	5.169	5.050	5.275	4.646	5.169	5.050	5.275	ns
		GCLK PLL	t_{co}	3.382	3.356	4.752	5.184	5.677	5.532	5.831	5.184	5.677	5.532	5.831	ns
	8mA	GCLK	t_{co}	3.025	3.035	4.285	4.639	5.142	5.023	5.257	4.639	5.142	5.023	5.257	ns
		GCLK PLL	t_{co}	3.374	3.348	4.745	5.176	5.670	5.525	5.824	5.176	5.670	5.525	5.824	ns
	10mA	GCLK	t_{co}	3.028	3.038	4.288	4.642	5.145	5.025	5.260	4.642	5.145	5.025	5.260	ns
		GCLK PLL	t_{co}	3.377	3.351	4.748	5.180	5.674	5.529	5.828	5.180	5.674	5.529	5.828	ns
	12mA	GCLK	t_{co}	3.025	3.035	4.290	4.646	5.144	5.025	5.267	4.646	5.144	5.025	5.267	ns
		GCLK PLL	t_{co}	3.374	3.348	4.750	5.183	5.678	5.533	5.832	5.183	5.678	5.533	5.832	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.033	3.043	4.289	4.643	5.141	5.021	5.271	4.643	5.141	5.021	5.271	ns
		GCLK PLL	t_{co}	3.382	3.356	4.749	5.181	5.674	5.529	5.828	5.181	5.674	5.529	5.828	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.048	3.055	4.303	4.667	5.189	5.069	5.283	4.667	5.189	5.069	5.283	ns
		GCLK PLL	t_{co}	3.394	3.368	4.763	5.195	5.689	5.544	5.843	5.195	5.689	5.544	5.843	ns
	6mA	GCLK	t_{co}	3.041	3.051	4.304	4.662	5.178	5.058	5.280	4.662	5.178	5.058	5.280	ns
		GCLK PLL	t_{co}	3.390	3.364	4.764	5.197	5.692	5.547	5.846	5.197	5.692	5.547	5.846	ns
	8mA	GCLK	t_{co}	3.037	3.047	4.299	4.655	5.172	5.052	5.275	4.655	5.172	5.052	5.275	ns
		GCLK PLL	t_{co}	3.386	3.360	4.759	5.192	5.687	5.542	5.841	5.192	5.687	5.542	5.841	ns
	10mA	GCLK	t_{co}	3.030	3.040	4.292	4.648	5.159	5.039	5.269	4.648	5.159	5.039	5.269	ns
		GCLK PLL	t_{co}	3.379	3.353	4.752	5.185	5.680	5.535	5.834	5.185	5.680	5.535	5.834	ns
	12mA	GCLK	t_{co}	3.031	3.041	4.299	4.656	5.155	5.035	5.272	4.656	5.155	5.035	5.272	ns
		GCLK PLL	t_{co}	3.380	3.354	4.759	5.193	5.690	5.545	5.844	5.193	5.690	5.545	5.844	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.029	3.039	4.280	4.634	5.134	5.014	5.257	4.634	5.134	5.014	5.257	ns
		GCLK PLL	t_{co}	3.378	3.352	4.740	5.171	5.664	5.519	5.818	5.171	5.664	5.519	5.818	ns

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Table 1–103. EP3SE50 Column Pins Output Timing Parameters (Part 6 of 6)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.048	3.058	4.317	4.683	5.208	5.088	5.302	4.683	5.208	5.088	5.302	ns
		GCLK PLL	t_{co}	3.397	3.371	4.777	5.212	5.710	5.565	5.864	5.212	5.710	5.565	5.864	ns
	6mA	GCLK	t_{co}	3.040	3.050	4.308	4.668	5.191	5.071	5.290	4.668	5.191	5.071	5.290	ns
		GCLK PLL	t_{co}	3.389	3.363	4.768	5.203	5.701	5.556	5.855	5.203	5.701	5.556	5.855	ns
	8mA	GCLK	t_{co}	3.041	3.051	4.315	4.674	5.187	5.067	5.293	4.674	5.187	5.067	5.293	ns
		GCLK PLL	t_{co}	3.390	3.364	4.775	5.212	5.710	5.565	5.864	5.212	5.710	5.565	5.864	ns
	10mA	GCLK	t_{co}	3.030	3.040	4.302	4.661	5.164	5.044	5.287	4.661	5.164	5.044	5.287	ns
		GCLK PLL	t_{co}	3.379	3.353	4.762	5.198	5.696	5.551	5.850	5.198	5.696	5.551	5.850	ns
	12mA	GCLK	t_{co}	3.030	3.040	4.302	4.661	5.165	5.045	5.279	4.661	5.165	5.045	5.279	ns
		GCLK PLL	t_{co}	3.379	3.353	4.762	5.198	5.697	5.552	5.851	5.198	5.697	5.552	5.851	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.061	3.061	4.318	4.685	5.243	5.123	5.316	4.685	5.243	5.123	5.316	ns
		GCLK PLL	t_{co}	3.400	3.374	4.778	5.213	5.710	5.565	5.864	5.213	5.710	5.565	5.864	ns
3.0-V PCI	—	GCLK	t_{co}	3.154	3.164	4.363	4.710	5.218	5.098	5.347	4.710	5.218	5.098	5.347	ns
		GCLK PLL	t_{co}	3.503	3.477	4.823	5.247	5.735	5.590	5.889	5.247	5.735	5.590	5.889	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.154	3.164	4.363	4.710	5.218	5.098	5.347	4.710	5.218	5.098	5.347	ns
		GCLK PLL	t_{co}	3.503	3.477	4.823	5.247	5.735	5.590	5.889	5.247	5.735	5.590	5.889	ns

Table 1–104 lists the EP3SE50 row pins output timing parameters for single-ended I/O standards.

Table 1–104. EP3SE50 Row Pins Output Timing Parameters (Part 1 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.161	3.395	4.722	5.117	5.622	5.486	5.755	5.247	5.754	5.618	5.832	ns
		GCLK PLL	t_{co}	1.488	1.692	2.101	2.185	2.381	2.400	2.349	2.304	2.505	2.523	2.344	ns
	8mA	GCLK	t_{co}	3.095	3.324	4.612	5.005	5.508	5.372	5.611	5.134	5.638	5.502	5.683	ns
		GCLK PLL	t_{co}	1.395	1.587	1.971	2.047	2.237	2.256	2.205	2.163	2.356	2.374	2.195	ns
	12mA	GCLK	t_{co}	3.016	3.235	4.506	4.905	5.412	5.276	5.483	5.035	5.539	5.403	5.551	ns
		GCLK PLL	t_{co}	1.314	1.493	1.852	1.924	2.109	2.128	2.077	2.036	2.224	2.242	2.063	ns

Table 1–104. EP3SE50 Row Pins Output Timing Parameters (Part 2 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.163	3.402	4.726	5.122	5.631	5.495	5.760	5.255	5.766	5.630	5.837	ns
		GCLK PLL	t_{co}	1.498	1.696	2.109	2.190	2.386	2.405	2.354	2.310	2.510	2.528	2.349	ns
	8mA	GCLK	t_{co}	3.020	3.239	4.517	4.920	5.422	5.286	5.489	5.047	5.548	5.412	5.558	ns
		GCLK PLL	t_{co}	1.318	1.497	1.858	1.930	2.115	2.134	2.083	2.042	2.231	2.249	2.070	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.122	3.356	4.689	5.085	5.588	5.452	5.712	5.215	5.720	5.584	5.790	ns
		GCLK PLL	t_{co}	1.442	1.638	2.053	2.138	2.338	2.357	2.306	2.261	2.463	2.481	2.302	ns
	8mA	GCLK	t_{co}	3.021	3.244	4.552	4.943	5.443	5.307	5.548	5.073	5.575	5.438	5.625	ns
		GCLK PLL	t_{co}	1.319	1.511	1.900	1.979	2.174	2.193	2.142	2.099	2.299	2.316	2.137	ns
	12mA	GCLK	t_{co}	2.984	3.206	4.492	4.878	5.373	5.237	5.460	5.005	5.501	5.365	5.532	ns
		GCLK PLL	t_{co}	1.282	1.464	1.818	1.896	2.086	2.105	2.054	2.013	2.206	2.223	2.044	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.043	3.268	4.587	4.978	5.479	5.343	5.601	5.107	5.611	5.474	5.678	ns
		GCLK PLL	t_{co}	1.356	1.557	1.947	2.031	2.227	2.246	2.195	2.153	2.352	2.369	2.190	ns
	8mA	GCLK	t_{co}	2.971	3.190	4.464	4.849	5.345	5.209	5.421	4.975	5.473	5.336	5.492	ns
		GCLK PLL	t_{co}	1.269	1.448	1.783	1.857	2.047	2.066	2.015	1.973	2.166	2.183	2.004	ns
2.5 V	4mA	GCLK	t_{co}	3.148	3.393	4.797	5.211	5.733	5.597	5.884	5.347	5.872	5.736	5.968	ns
		GCLK PLL	t_{co}	1.468	1.674	2.185	2.292	2.510	2.529	2.478	2.421	2.642	2.659	2.480	ns
	8mA	GCLK	t_{co}	3.063	3.290	4.673	5.076	5.591	5.455	5.714	5.210	5.728	5.591	5.794	ns
		GCLK PLL	t_{co}	1.361	1.575	2.030	2.129	2.340	2.359	2.308	2.254	2.468	2.485	2.306	ns
	12mA	GCLK	t_{co}	3.006	3.246	4.589	4.990	5.500	5.364	5.588	5.121	5.633	5.497	5.664	ns
		GCLK PLL	t_{co}	1.312	1.504	1.919	2.010	2.214	2.233	2.182	2.131	2.338	2.355	2.176	ns
1.8 V	2mA	GCLK	t_{co}	3.405	3.663	5.253	5.717	6.292	6.156	6.368	5.867	6.444	6.308	6.461	ns
		GCLK PLL	t_{co}	1.650	1.863	2.459	2.597	2.849	2.868	2.787	2.729	2.984	3.002	2.793	ns
	4mA	GCLK	t_{co}	3.180	3.461	4.926	5.349	5.887	5.751	5.963	5.502	6.038	5.901	6.054	ns
		GCLK PLL	t_{co}	1.477	1.677	2.168	2.271	2.489	2.508	2.427	2.403	2.623	2.640	2.431	ns
	6mA	GCLK	t_{co}	3.115	3.359	4.773	5.199	5.728	5.592	5.804	5.334	5.865	5.729	5.882	ns
		GCLK PLL	t_{co}	1.402	1.595	2.069	2.166	2.388	2.407	2.326	2.289	2.517	2.535	2.326	ns
	8mA	GCLK	t_{co}	3.055	3.285	4.696	5.106	5.632	5.496	5.708	5.239	5.771	5.635	5.788	ns
		GCLK PLL	t_{co}	1.384	1.575	2.012	2.113	2.323	2.342	2.261	2.233	2.445	2.463	2.254	ns

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Table 1–104. EP3SE50 Row Pins Output Timing Parameters (Part 3 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.316	3.581	5.163	5.631	6.220	6.084	6.296	5.774	6.368	6.232	6.385	ns
		GCLK PLL	t_{co}	1.592	1.806	2.387	2.524	2.786	2.805	2.724	2.650	2.919	2.937	2.728	ns
	4mA	GCLK	t_{co}	3.074	3.324	4.758	5.194	5.729	5.593	5.805	5.328	5.864	5.728	5.881	ns
		GCLK PLL	t_{co}	1.400	1.592	2.065	2.166	2.392	2.411	2.330	2.286	2.518	2.536	2.327	ns
	6mA	GCLK	t_{co}	3.047	3.276	4.685	5.098	5.623	5.487	5.699	5.230	5.759	5.623	5.776	ns
		GCLK PLL	t_{co}	1.373	1.566	1.996	2.105	2.323	2.342	2.261	2.226	2.445	2.463	2.254	ns
	8mA	GCLK	t_{co}	3.038	3.267	4.663	5.080	5.604	5.468	5.680	5.212	5.737	5.601	5.754	ns
		GCLK PLL	t_{co}	1.354	1.555	1.980	2.081	2.304	2.323	2.242	2.202	2.426	2.444	2.235	ns
1.2 V	2mA	GCLK	t_{co}	3.259	3.506	5.073	5.545	6.145	6.009	6.221	5.686	6.284	6.148	6.301	ns
		GCLK PLL	t_{co}	1.522	1.719	2.308	2.456	2.725	2.744	2.663	2.582	2.850	2.868	2.659	ns
	4mA	GCLK	t_{co}	3.079	3.317	4.780	5.222	5.770	5.634	5.846	5.353	5.906	5.770	5.923	ns
		GCLK PLL	t_{co}	1.405	1.596	2.082	2.194	2.440	2.459	2.378	2.315	2.562	2.580	2.371	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.010	3.234	4.582	4.981	5.490	5.354	5.556	5.108	5.619	5.483	5.627	ns
		GCLK PLL	t_{co}	1.308	1.492	1.899	1.984	2.183	2.202	2.150	2.100	2.301	2.318	2.139	ns
	12mA	GCLK	t_{co}	3.005	3.230	4.579	4.979	5.488	5.352	5.548	5.107	5.618	5.482	5.620	ns
		GCLK PLL	t_{co}	1.303	1.488	1.896	1.982	2.181	2.200	2.142	2.099	2.300	2.317	2.132	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	2.996	3.219	4.564	4.963	5.471	5.335	5.521	5.090	5.600	5.464	5.593	ns
		GCLK PLL	t_{co}	1.294	1.477	1.881	1.966	2.164	2.183	2.115	2.082	2.282	2.299	2.105	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.016	3.241	4.591	4.993	5.505	5.369	5.581	5.120	5.634	5.498	5.651	ns
		GCLK PLL	t_{co}	1.333	1.519	1.931	2.017	2.218	2.237	2.156	2.132	2.336	2.354	2.145	ns
	6mA	GCLK	t_{co}	3.001	3.227	4.588	4.991	5.503	5.367	5.579	5.118	5.632	5.496	5.649	ns
		GCLK PLL	t_{co}	1.328	1.514	1.929	2.016	2.217	2.236	2.155	2.130	2.334	2.352	2.143	ns
	8mA	GCLK	t_{co}	2.990	3.215	4.571	4.974	5.486	5.350	5.562	5.101	5.616	5.480	5.633	ns
		GCLK PLL	t_{co}	1.317	1.503	1.919	2.006	2.207	2.226	2.145	2.121	2.325	2.343	2.134	ns
	10mA	GCLK	t_{co}	2.966	3.192	4.555	4.958	5.471	5.335	5.547	5.086	5.601	5.465	5.618	ns
		GCLK PLL	t_{co}	1.306	1.492	1.906	1.993	2.194	2.213	2.132	2.109	2.313	2.331	2.122	ns
	12mA	GCLK	t_{co}	2.966	3.191	4.554	4.957	5.470	5.334	5.546	5.085	5.600	5.464	5.617	ns
		GCLK PLL	t_{co}	1.306	1.491	1.906	1.993	2.194	2.213	2.132	2.108	2.313	2.331	2.122	ns

Table 1–104. EP3SE50 Row Pins Output Timing Parameters (Part 4 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	2.976	3.200	4.552	4.953	5.464	5.328	5.540	5.080	5.593	5.457	5.610	ns
		GCLK PLL	t_{co}	1.314	1.498	1.905	1.990	2.189	2.208	2.127	2.104	2.307	2.325	2.116	ns
	16mA	GCLK	t_{co}	2.975	3.198	4.551	4.954	5.466	5.330	5.542	5.082	5.597	5.461	5.614	ns
		GCLK PLL	t_{co}	1.315	1.501	1.911	1.998	2.199	2.218	2.137	2.113	2.318	2.336	2.127	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.012	3.237	4.602	5.007	5.522	5.386	5.598	5.133	5.650	5.514	5.667	ns
		GCLK PLL	t_{co}	1.336	1.522	1.940	2.028	2.231	2.250	2.169	2.142	2.348	2.366	2.157	ns
	6mA	GCLK	t_{co}	2.989	3.215	4.584	4.990	5.505	5.369	5.581	5.117	5.634	5.498	5.651	ns
		GCLK PLL	t_{co}	1.322	1.508	1.929	2.018	2.221	2.240	2.159	2.133	2.339	2.357	2.148	ns
	8mA	GCLK	t_{co}	2.972	3.198	4.567	4.972	5.487	5.351	5.563	5.099	5.617	5.481	5.634	ns
		GCLK PLL	t_{co}	1.311	1.496	1.916	2.005	2.208	2.227	2.146	2.120	2.326	2.344	2.135	ns
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	2.991	3.213	4.558	4.958	5.467	5.331	5.543	5.084	5.596	5.460	5.613	ns
		GCLK PLL	t_{co}	1.321	1.504	1.904	1.988	2.187	2.206	2.125	2.103	2.304	2.322	2.113	ns
	6mA	GCLK	t_{co}	2.979	3.201	4.549	4.950	5.459	5.323	5.535	5.076	5.589	5.453	5.606	ns
		GCLK PLL	t_{co}	1.314	1.498	1.902	1.987	2.186	2.205	2.124	2.102	2.304	2.322	2.113	ns
	8mA	GCLK	t_{co}	2.966	3.189	4.541	4.941	5.451	5.315	5.527	5.068	5.581	5.445	5.598	ns
		GCLK PLL	t_{co}	1.305	1.490	1.895	1.980	2.179	2.198	2.117	2.095	2.297	2.315	2.106	ns
	10mA	GCLK	t_{co}	2.968	3.191	4.543	4.944	5.454	5.318	5.530	5.071	5.584	5.448	5.601	ns
		GCLK PLL	t_{co}	1.308	1.492	1.898	1.983	2.183	2.202	2.121	2.098	2.300	2.318	2.109	ns
	12mA	GCLK	t_{co}	2.964	3.186	4.541	4.943	5.454	5.318	5.530	5.071	5.585	5.449	5.602	ns
		GCLK PLL	t_{co}	1.304	1.489	1.900	1.986	2.186	2.205	2.124	2.101	2.305	2.323	2.114	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	2.972	3.194	4.536	4.935	5.445	5.309	5.521	5.062	5.574	5.438	5.591	ns
		GCLK PLL	t_{co}	1.312	1.497	1.898	1.983	2.182	2.201	2.120	2.097	2.299	2.317	2.108	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	2.998	3.220	4.569	4.971	5.482	5.346	5.558	5.096	5.610	5.474	5.627	ns
		GCLK PLL	t_{co}	1.327	1.510	1.913	1.998	2.198	2.217	2.136	2.112	2.315	2.333	2.124	ns
	6mA	GCLK	t_{co}	2.986	3.210	4.565	4.967	5.478	5.342	5.554	5.093	5.607	5.471	5.624	ns
		GCLK PLL	t_{co}	1.321	1.505	1.914	2.000	2.200	2.219	2.138	2.114	2.318	2.336	2.127	ns
	8mA	GCLK	t_{co}	2.982	3.205	4.559	4.961	5.472	5.336	5.548	5.087	5.601	5.465	5.618	ns
		GCLK PLL	t_{co}	1.317	1.501	1.909	1.995	2.195	2.214	2.133	2.109	2.312	2.330	2.121	ns

Table 1–104. EP3SE50 Row Pins Output Timing Parameters (Part 5 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	2.997	3.219	4.580	4.985	5.500	5.364	5.576	5.110	5.627	5.491	5.644	ns
		GCLK PLL	t_{co}	1.329	1.512	1.926	2.014	2.217	2.236	2.155	2.128	2.334	2.352	2.143	ns
	6mA	GCLK	t_{co}	2.985	3.207	4.569	4.973	5.488	5.352	5.564	5.099	5.616	5.480	5.633	ns
		GCLK PLL	t_{co}	1.320	1.504	1.917	2.005	2.208	2.227	2.146	2.119	2.325	2.343	2.134	ns
	8mA	GCLK	t_{co}	2.982	3.205	4.573	4.978	5.494	5.358	5.570	5.105	5.623	5.487	5.640	ns
		GCLK PLL	t_{co}	1.319	1.504	1.924	2.013	2.217	2.236	2.155	2.128	2.335	2.353	2.144	ns
3.0-V PCI	—	GCLK	t_{co}	3.116	3.340	4.634	5.027	5.530	5.394	5.578	5.156	5.661	5.525	5.651	ns
		GCLK PLL	t_{co}	1.414	1.598	1.951	2.030	2.223	2.242	2.160	2.148	2.343	2.360	2.151	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.116	3.340	4.634	5.027	5.530	5.394	5.578	5.156	5.661	5.525	5.651	ns
		GCLK PLL	t_{co}	1.414	1.598	1.951	2.030	2.223	2.242	2.160	2.148	2.343	2.360	2.151	ns

Table 1–115 through Table 1–108 list the maximum I/O timing parameters for EP3SE50 devices for differential I/O standards.

Table 1–105 lists the EP3SE50 column pins input timing parameters for differential I/O standards.

Table 1–105. EP3SE50 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.730	-0.751	-1.114	-1.228	-1.341	-1.284	-1.581	-1.230	-1.344	-1.290	-1.617	ns
		t_h	0.848	0.884	1.299	1.436	1.571	1.501	1.798	1.446	1.583	1.516	1.835	ns
	GCLK PLL	t_{su}	1.120	1.138	1.796	2.027	2.253	2.141	2.145	2.036	2.262	2.145	2.193	ns
		t_h	-0.867	-0.870	-1.397	-1.578	-1.752	-1.669	-1.666	-1.580	-1.754	-1.665	-1.710	ns
MINI-LVDS	GCLK	t_{su}	-0.730	-0.751	-1.114	-1.228	-1.341	-1.284	-1.581	-1.230	-1.344	-1.290	-1.617	ns
		t_h	0.848	0.884	1.299	1.436	1.571	1.501	1.798	1.446	1.583	1.516	1.835	ns
	GCLK PLL	t_{su}	1.120	1.138	1.796	2.027	2.253	2.141	2.145	2.036	2.262	2.145	2.193	ns
		t_h	-0.867	-0.870	-1.397	-1.578	-1.752	-1.669	-1.666	-1.580	-1.754	-1.665	-1.710	ns
RSDS	GCLK	t_{su}	-0.738	-0.763	-1.124	-1.239	-1.357	-1.300	-1.597	-1.241	-1.359	-1.305	-1.632	ns
		t_h	0.856	0.896	1.309	1.447	1.587	1.517	1.814	1.457	1.598	1.531	1.850	ns
	GCLK PLL	t_{su}	1.112	1.126	1.786	2.016	2.237	2.125	2.129	2.025	2.247	2.130	2.178	ns
		t_h	-0.859	-0.858	-1.387	-1.567	-1.736	-1.653	-1.650	-1.569	-1.739	-1.650	-1.695	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.738	-0.763	-1.124	-1.239	-1.357	-1.300	-1.597	-1.241	-1.359	-1.305	-1.632	ns
		t_h	0.856	0.896	1.309	1.447	1.587	1.517	1.814	1.457	1.598	1.531	1.850	ns
	GCLK PLL	t_{su}	1.112	1.126	1.786	2.016	2.237	2.125	2.129	2.025	2.247	2.130	2.178	ns
		t_h	-0.859	-0.858	-1.387	-1.567	-1.736	-1.653	-1.650	-1.569	-1.739	-1.650	-1.695	ns

Table 1–105. EP3SE50 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.750	-0.774	-1.133	-1.250	-1.376	-1.319	-1.616	-1.252	-1.377	-1.323	-1.650	ns
		t_h	0.868	0.907	1.319	1.458	1.606	1.536	1.833	1.468	1.616	1.549	1.868	ns
	GCLK PLL	t_{su}	1.100	1.115	1.777	2.005	2.218	2.106	2.110	2.014	2.229	2.112	2.160	ns
		t_h	-0.847	-0.847	-1.377	-1.556	-1.717	-1.634	-1.631	-1.558	-1.721	-1.632	-1.677	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.750	-0.774	-1.133	-1.250	-1.376	-1.319	-1.616	-1.252	-1.377	-1.323	-1.650	ns
		t_h	0.868	0.907	1.319	1.458	1.606	1.536	1.833	1.468	1.616	1.549	1.868	ns
	GCLK PLL	t_{su}	1.100	1.115	1.777	2.005	2.218	2.106	2.110	2.014	2.229	2.112	2.160	ns
		t_h	-0.847	-0.847	-1.377	-1.556	-1.717	-1.634	-1.631	-1.558	-1.721	-1.632	-1.677	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.738	-0.763	-1.124	-1.239	-1.357	-1.300	-1.597	-1.241	-1.359	-1.305	-1.632	ns
		t_h	0.856	0.896	1.309	1.447	1.587	1.517	1.814	1.457	1.598	1.531	1.850	ns
	GCLK PLL	t_{su}	1.112	1.126	1.786	2.016	2.237	2.125	2.129	2.025	2.247	2.130	2.178	ns
		t_h	-0.859	-0.858	-1.387	-1.567	-1.736	-1.653	-1.650	-1.569	-1.739	-1.650	-1.695	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.738	-0.763	-1.124	-1.239	-1.357	-1.300	-1.597	-1.241	-1.359	-1.305	-1.632	ns
		t_h	0.856	0.896	1.309	1.447	1.587	1.517	1.814	1.457	1.598	1.531	1.850	ns
	GCLK PLL	t_{su}	1.112	1.126	1.786	2.016	2.237	2.125	2.129	2.025	2.247	2.130	2.178	ns
		t_h	-0.859	-0.858	-1.387	-1.567	-1.736	-1.653	-1.650	-1.569	-1.739	-1.650	-1.695	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.750	-0.774	-1.133	-1.250	-1.376	-1.319	-1.616	-1.252	-1.377	-1.323	-1.650	ns
		t_h	0.868	0.907	1.319	1.458	1.606	1.536	1.833	1.468	1.616	1.549	1.868	ns
	GCLK PLL	t_{su}	1.100	1.115	1.777	2.005	2.218	2.106	2.110	2.014	2.229	2.112	2.160	ns
		t_h	-0.847	-0.847	-1.377	-1.556	-1.717	-1.634	-1.631	-1.558	-1.721	-1.632	-1.677	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.750	-0.774	-1.133	-1.250	-1.376	-1.319	-1.616	-1.252	-1.377	-1.323	-1.650	ns
		t_h	0.868	0.907	1.319	1.458	1.606	1.536	1.833	1.468	1.616	1.549	1.868	ns
	GCLK PLL	t_{su}	1.100	1.115	1.777	2.005	2.218	2.106	2.110	2.014	2.229	2.112	2.160	ns
		t_h	-0.847	-0.847	-1.377	-1.556	-1.717	-1.634	-1.631	-1.558	-1.721	-1.632	-1.677	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.757	-0.780	-1.145	-1.255	-1.376	-1.321	-1.615	-1.256	-1.372	-1.321	-1.646	ns
		t_h	0.875	0.913	1.332	1.466	1.609	1.539	1.837	1.475	1.616	1.548	1.869	ns
	GCLK PLL	t_{su}	1.093	1.109	1.765	2.000	2.218	2.104	2.111	2.010	2.234	2.114	2.164	ns
		t_h	-0.840	-0.841	-1.364	-1.548	-1.714	-1.631	-1.627	-1.551	-1.721	-1.633	-1.676	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.757	-0.780	-1.145	-1.255	-1.376	-1.321	-1.615	-1.256	-1.372	-1.321	-1.646	ns
		t_h	0.875	0.913	1.332	1.466	1.609	1.539	1.837	1.475	1.616	1.548	1.869	ns
	GCLK PLL	t_{su}	1.093	1.109	1.765	2.000	2.218	2.104	2.111	2.010	2.234	2.114	2.164	ns
		t_h	-0.840	-0.841	-1.364	-1.548	-1.714	-1.631	-1.627	-1.551	-1.721	-1.633	-1.676	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.730	-0.751	-1.114	-1.228	-1.341	-1.284	-1.581	-1.230	-1.344	-1.290	-1.617	ns
		t_h	0.848	0.884	1.299	1.436	1.571	1.501	1.798	1.446	1.583	1.516	1.835	ns
	GCLK PLL	t_{su}	1.120	1.138	1.796	2.027	2.253	2.141	2.145	2.036	2.262	2.145	2.193	ns
		t_h	-0.867	-0.870	-1.397	-1.578	-1.752	-1.669	-1.666	-1.580	-1.754	-1.665	-1.710	ns

Table 1–105. EP3SE50 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.730	-0.751	-1.114	-1.228	-1.341	-1.284	-1.581	-1.230	-1.344	-1.290	-1.617	ns
		t_h	0.848	0.884	1.299	1.436	1.571	1.501	1.798	1.446	1.583	1.516	1.835	ns
	GCLK PLL	t_{su}	1.120	1.138	1.796	2.027	2.253	2.141	2.145	2.036	2.262	2.145	2.193	ns
		t_h	-0.867	-0.870	-1.397	-1.578	-1.752	-1.669	-1.666	-1.580	-1.754	-1.665	-1.710	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.738	-0.763	-1.124	-1.239	-1.357	-1.300	-1.597	-1.241	-1.359	-1.305	-1.632	ns
		t_h	0.856	0.896	1.309	1.447	1.587	1.517	1.814	1.457	1.598	1.531	1.850	ns
	GCLK PLL	t_{su}	1.112	1.126	1.786	2.016	2.237	2.125	2.129	2.025	2.247	2.130	2.178	ns
		t_h	-0.859	-0.858	-1.387	-1.567	-1.736	-1.653	-1.650	-1.569	-1.739	-1.650	-1.695	ns

Table 1–106 lists the EP3SE50 row pins input timing parameters for differential I/O standards.

Table 1–106. EP3SE50 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.925	-0.948	-1.004	-0.967	-1.102	-1.057	-1.337	-0.933	-1.060	-1.017	-1.369	ns
		t_h	1.048	1.086	1.223	1.219	1.381	1.322	1.601	1.199	1.353	1.296	1.634	ns
	GCLK PLL	t_{su}	0.886	0.901	1.866	2.244	2.450	2.324	2.344	2.289	2.502	2.376	2.396	ns
		t_h	-0.626	-0.628	-1.432	-1.750	-1.897	-1.803	-1.817	-1.782	-1.937	-1.842	-1.867	ns
MINI-LVDS	GCLK	t_{su}	-0.925	-0.948	-1.004	-0.967	-1.102	-1.057	-1.337	-0.933	-1.060	-1.017	-1.369	ns
		t_h	1.048	1.086	1.223	1.219	1.381	1.322	1.601	1.199	1.353	1.296	1.634	ns
	GCLK PLL	t_{su}	0.886	0.901	1.866	2.244	2.450	2.324	2.344	2.289	2.502	2.376	2.396	ns
		t_h	-0.626	-0.628	-1.432	-1.750	-1.897	-1.803	-1.817	-1.782	-1.937	-1.842	-1.867	ns
RSDS	GCLK	t_{su}	-0.925	-0.948	-1.004	-0.967	-1.102	-1.057	-1.337	-0.933	-1.060	-1.017	-1.369	ns
		t_h	1.048	1.086	1.223	1.219	1.381	1.322	1.601	1.199	1.353	1.296	1.634	ns
	GCLK PLL	t_{su}	0.886	0.901	1.866	2.244	2.450	2.324	2.344	2.289	2.502	2.376	2.396	ns
		t_h	-0.626	-0.628	-1.432	-1.750	-1.897	-1.803	-1.817	-1.782	-1.937	-1.842	-1.867	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.740	-0.773	-1.101	-1.201	-1.301	-1.251	-1.526	-1.210	-1.307	-1.259	-1.563	ns
		t_h	0.856	0.902	1.288	1.408	1.531	1.467	1.741	1.427	1.548	1.486	1.779	ns
	GCLK PLL	t_{su}	1.081	1.086	1.779	2.020	2.261	2.140	2.165	2.022	2.265	2.144	2.212	ns
		t_h	-0.828	-0.822	-1.377	-1.571	-1.757	-1.668	-1.687	-1.564	-1.752	-1.662	-1.732	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.740	-0.773	-1.101	-1.201	-1.301	-1.251	-1.526	-1.210	-1.307	-1.259	-1.563	ns
		t_h	0.856	0.902	1.288	1.408	1.531	1.467	1.741	1.427	1.548	1.486	1.779	ns
	GCLK PLL	t_{su}	1.081	1.086	1.779	2.020	2.261	2.140	2.165	2.022	2.265	2.144	2.212	ns
		t_h	-0.828	-0.822	-1.377	-1.571	-1.757	-1.668	-1.687	-1.564	-1.752	-1.662	-1.732	ns

Table 1–106. EP3SE50 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.749	-0.785	-1.110	-1.211	-1.317	-1.267	-1.542	-1.219	-1.323	-1.275	-1.579	ns
		t_h	0.865	0.914	1.297	1.418	1.547	1.483	1.757	1.436	1.564	1.502	1.795	ns
	GCLK PLL	t_{su}	1.072	1.074	1.770	2.010	2.245	2.124	2.149	2.013	2.249	2.128	2.196	ns
		t_h	-0.819	-0.810	-1.368	-1.561	-1.741	-1.652	-1.671	-1.555	-1.736	-1.646	-1.716	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.749	-0.785	-1.110	-1.211	-1.317	-1.267	-1.542	-1.219	-1.323	-1.275	-1.579	ns
		t_h	0.865	0.914	1.297	1.418	1.547	1.483	1.757	1.436	1.564	1.502	1.795	ns
	GCLK PLL	t_{su}	1.072	1.074	1.770	2.010	2.245	2.124	2.149	2.013	2.249	2.128	2.196	ns
		t_h	-0.819	-0.810	-1.368	-1.561	-1.741	-1.652	-1.671	-1.555	-1.736	-1.646	-1.716	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.763	-0.797	-1.123	-1.221	-1.335	-1.285	-1.560	-1.230	-1.340	-1.292	-1.596	ns
		t_h	0.879	0.926	1.309	1.428	1.565	1.501	1.775	1.447	1.581	1.519	1.812	ns
	GCLK PLL	t_{su}	1.058	1.062	1.757	2.000	2.227	2.106	2.131	2.002	2.232	2.111	2.179	ns
		t_h	-0.805	-0.798	-1.356	-1.551	-1.723	-1.634	-1.653	-1.544	-1.719	-1.629	-1.699	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.763	-0.797	-1.123	-1.221	-1.335	-1.285	-1.560	-1.230	-1.340	-1.292	-1.596	ns
		t_h	0.879	0.926	1.309	1.428	1.565	1.501	1.775	1.447	1.581	1.519	1.812	ns
	GCLK PLL	t_{su}	1.058	1.062	1.757	2.000	2.227	2.106	2.131	2.002	2.232	2.111	2.179	ns
		t_h	-0.805	-0.798	-1.356	-1.551	-1.723	-1.634	-1.653	-1.544	-1.719	-1.629	-1.699	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.749	-0.785	-1.110	-1.211	-1.317	-1.267	-1.542	-1.219	-1.323	-1.275	-1.579	ns
		t_h	0.865	0.914	1.297	1.418	1.547	1.483	1.757	1.436	1.564	1.502	1.795	ns
	GCLK PLL	t_{su}	1.072	1.074	1.770	2.010	2.245	2.124	2.149	2.013	2.249	2.128	2.196	ns
		t_h	-0.819	-0.810	-1.368	-1.561	-1.741	-1.652	-1.671	-1.555	-1.736	-1.646	-1.716	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.749	-0.785	-1.110	-1.211	-1.317	-1.267	-1.542	-1.219	-1.323	-1.275	-1.579	ns
		t_h	0.865	0.914	1.297	1.418	1.547	1.483	1.757	1.436	1.564	1.502	1.795	ns
	GCLK PLL	t_{su}	1.072	1.074	1.770	2.010	2.245	2.124	2.149	2.013	2.249	2.128	2.196	ns
		t_h	-0.819	-0.810	-1.368	-1.561	-1.741	-1.652	-1.671	-1.555	-1.736	-1.646	-1.716	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.763	-0.797	-1.123	-1.221	-1.335	-1.285	-1.560	-1.230	-1.340	-1.292	-1.596	ns
		t_h	0.879	0.926	1.309	1.428	1.565	1.501	1.775	1.447	1.581	1.519	1.812	ns
	GCLK PLL	t_{su}	1.058	1.062	1.757	2.000	2.227	2.106	2.131	2.002	2.232	2.111	2.179	ns
		t_h	-0.805	-0.798	-1.356	-1.551	-1.723	-1.634	-1.653	-1.544	-1.719	-1.629	-1.699	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.763	-0.797	-1.123	-1.221	-1.335	-1.285	-1.560	-1.230	-1.340	-1.292	-1.596	ns
		t_h	0.879	0.926	1.309	1.428	1.565	1.501	1.775	1.447	1.581	1.519	1.812	ns
	GCLK PLL	t_{su}	1.058	1.062	1.757	2.000	2.227	2.106	2.131	2.002	2.232	2.111	2.179	ns
		t_h	-0.805	-0.798	-1.356	-1.551	-1.723	-1.634	-1.653	-1.544	-1.719	-1.629	-1.699	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.762	-0.796	-1.128	-1.227	-1.336	-1.287	-1.561	-1.231	-1.336	-1.290	-1.593	ns
		t_h	0.878	0.925	1.314	1.436	1.569	1.505	1.780	1.451	1.580	1.518	1.813	ns
	GCLK PLL	t_{su}	1.049	1.053	1.742	1.984	2.216	2.094	2.120	1.991	2.226	2.103	2.172	ns
		t_h	-0.796	-0.789	-1.341	-1.533	-1.709	-1.620	-1.638	-1.530	-1.710	-1.620	-1.688	ns

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Table 1–106. EP3SE50 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.762	-0.796	-1.128	-1.227	-1.336	-1.287	-1.561	-1.231	-1.336	-1.290	-1.593	ns
		t_h	0.878	0.925	1.314	1.436	1.569	1.505	1.780	1.451	1.580	1.518	1.813	ns
	GCLK PLL	t_{su}	1.049	1.053	1.742	1.984	2.216	2.094	2.120	1.991	2.226	2.103	2.172	ns
		t_h	-0.796	-0.789	-1.341	-1.533	-1.709	-1.620	-1.638	-1.530	-1.710	-1.620	-1.688	ns

Table 1–107 lists the EP3SE50 column pins output timing parameters for differential I/O standards.

Table 1–107. EP3SE50 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.058	3.277	4.610	5.014	5.527	5.385	5.614	5.140	5.654	5.514	5.680	ns
		GCLK PLL	t_{co}	3.054	3.280	4.657	5.069	5.589	5.447	5.676	5.199	5.720	5.580	5.746	ns
LVDS_E_3R	—	GCLK	t_{co}	3.058	3.277	4.610	5.014	5.527	5.385	5.614	5.140	5.654	5.514	5.680	ns
		GCLK PLL	t_{co}	3.054	3.280	4.657	5.069	5.589	5.447	5.676	5.199	5.720	5.580	5.746	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.058	3.277	4.610	5.014	5.527	5.385	5.614	5.140	5.654	5.514	5.680	ns
		GCLK PLL	t_{co}	3.054	3.280	4.657	5.069	5.589	5.447	5.676	5.199	5.720	5.580	5.746	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.085	3.310	4.681	5.092	5.611	5.469	5.698	5.220	5.740	5.600	5.766	ns
		GCLK PLL	t_{co}	3.075	3.300	4.671	5.081	5.601	5.459	5.688	5.209	5.730	5.590	5.756	ns
RSDS_E_1R	—	GCLK	t_{co}	3.075	3.300	4.674	5.085	5.605	5.463	5.692	5.214	5.735	5.595	5.761	ns
		GCLK PLL	t_{co}	3.068	3.294	4.667	5.079	5.599	5.457	5.686	5.207	5.729	5.589	5.755	ns
RSDS_E_3R	—	GCLK	t_{co}	3.067	3.292	4.664	5.076	5.596	5.454	5.683	5.204	5.725	5.585	5.751	ns
		GCLK PLL	t_{co}	3.089	3.314	4.685	5.096	5.615	5.473	5.702	5.224	5.745	5.605	5.771	ns

Table 1–107. EP3SE50 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.079	3.303	4.664	5.073	5.590	5.448	5.677	5.200	5.718	5.578	5.744	ns
		GCLK PLL	t_{co}	3.074	3.299	4.664	5.073	5.591	5.449	5.678	5.201	5.720	5.580	5.746	ns
	6mA	GCLK	t_{co}	3.072	3.297	4.663	5.072	5.589	5.447	5.676	5.200	5.719	5.579	5.745	ns
		GCLK PLL	t_{co}	3.064	3.288	4.653	5.062	5.580	5.438	5.667	5.190	5.709	5.569	5.735	ns
	8mA	GCLK	t_{co}	3.065	3.290	4.659	5.069	5.588	5.446	5.675	5.198	5.718	5.578	5.744	ns
		GCLK PLL	t_{co}	3.064	3.287	4.642	5.050	5.566	5.424	5.653	5.177	5.694	5.554	5.720	ns
	10mA	GCLK	t_{co}	3.076	3.300	4.660	5.068	5.584	5.442	5.671	5.196	5.713	5.573	5.739	ns
		GCLK PLL	t_{co}	3.072	3.297	4.661	5.070	5.588	5.446	5.675	5.198	5.717	5.577	5.743	ns
	12mA	GCLK	t_{co}	3.062	3.286	4.650	5.059	5.576	5.434	5.663	5.187	5.705	5.565	5.731	ns
		GCLK PLL	t_{co}	3.060	3.284	4.648	5.056	5.574	5.432	5.661	5.185	5.703	5.563	5.729	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.060	3.285	4.651	5.061	5.579	5.437	5.666	5.189	5.709	5.569	5.735	ns
		GCLK PLL	t_{co}	3.064	3.288	4.648	5.056	5.573	5.431	5.660	5.184	5.702	5.562	5.728	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.090	3.317	4.693	5.104	5.623	5.481	5.710	5.232	5.752	5.612	5.778	ns
		GCLK PLL	t_{co}	3.076	3.303	4.681	5.093	5.613	5.471	5.700	5.222	5.743	5.603	5.769	ns
	6mA	GCLK	t_{co}	3.064	3.290	4.664	5.075	5.595	5.453	5.682	5.204	5.725	5.585	5.751	ns
		GCLK PLL	t_{co}	3.064	3.290	4.667	5.079	5.599	5.457	5.686	5.208	5.730	5.590	5.756	ns
	8mA	GCLK	t_{co}	3.060	3.286	4.660	5.071	5.592	5.450	5.679	5.201	5.722	5.582	5.748	ns
		GCLK PLL	t_{co}	3.064	3.288	4.653	5.062	5.580	5.438	5.667	5.190	5.709	5.569	5.735	ns
	10mA	GCLK	t_{co}	3.065	3.290	4.661	5.072	5.591	5.449	5.678	5.200	5.721	5.581	5.747	ns
		GCLK PLL	t_{co}	3.093	3.320	4.692	5.102	5.621	5.479	5.708	5.231	5.750	5.610	5.776	ns
	12mA	GCLK	t_{co}	3.082	3.308	4.680	5.090	5.609	5.467	5.696	5.219	5.738	5.598	5.764	ns
		GCLK PLL	t_{co}	3.077	3.304	4.680	5.091	5.610	5.468	5.697	5.220	5.740	5.600	5.766	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.063	3.289	4.662	5.072	5.591	5.449	5.678	5.201	5.722	5.582	5.748	ns
		GCLK PLL	t_{co}	3.061	3.287	4.660	5.070	5.589	5.447	5.676	5.199	5.719	5.579	5.745	ns

Table 1–107. EP3SE50 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.065	3.289	4.652	5.060	5.577	5.435	5.664	5.188	5.706	5.566	5.732	ns
		GCLK PLL	t_{co}	3.065	3.290	4.660	5.070	5.589	5.447	5.676	5.199	5.719	5.579	5.745	ns
	6mA	GCLK	t_{co}	3.081	3.307	4.676	5.085	5.603	5.461	5.690	5.214	5.732	5.592	5.758	ns
		GCLK PLL	t_{co}	3.081	3.307	4.676	5.085	5.603	5.461	5.690	5.214	5.732	5.592	5.758	ns
	8mA	GCLK	t_{co}	3.071	3.297	4.666	5.075	5.593	5.451	5.680	5.204	5.723	5.583	5.749	ns
		GCLK PLL	t_{co}	3.064	3.289	4.652	5.060	5.577	5.435	5.664	5.188	5.706	5.566	5.732	ns
	10mA	GCLK	t_{co}	3.058	3.277	4.610	5.014	5.527	5.385	5.614	5.140	5.654	5.514	5.680	ns
		GCLK PLL	t_{co}	3.054	3.280	4.657	5.069	5.589	5.447	5.676	5.199	5.720	5.580	5.746	ns
	12mA	GCLK	t_{co}	3.058	3.277	4.610	5.014	5.527	5.385	5.614	5.140	5.654	5.514	5.680	ns
		GCLK PLL	t_{co}	3.054	3.280	4.657	5.069	5.589	5.447	5.676	5.199	5.720	5.580	5.746	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.058	3.277	4.610	5.014	5.527	5.385	5.614	5.140	5.654	5.514	5.680	ns
		GCLK PLL	t_{co}	3.054	3.280	4.657	5.069	5.589	5.447	5.676	5.199	5.720	5.580	5.746	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.085	3.310	4.681	5.092	5.611	5.469	5.698	5.220	5.740	5.600	5.766	ns
		GCLK PLL	t_{co}	3.075	3.300	4.671	5.081	5.601	5.459	5.688	5.209	5.730	5.590	5.756	ns
	6mA	GCLK	t_{co}	3.075	3.300	4.674	5.085	5.605	5.463	5.692	5.214	5.735	5.595	5.761	ns
		GCLK PLL	t_{co}	3.068	3.294	4.667	5.079	5.599	5.457	5.686	5.207	5.729	5.589	5.755	ns
	8mA	GCLK	t_{co}	3.067	3.292	4.664	5.076	5.596	5.454	5.683	5.204	5.725	5.585	5.751	ns
		GCLK PLL	t_{co}	3.089	3.314	4.685	5.096	5.615	5.473	5.702	5.224	5.745	5.605	5.771	ns
	10mA	GCLK	t_{co}	3.079	3.303	4.664	5.073	5.590	5.448	5.677	5.200	5.718	5.578	5.744	ns
		GCLK PLL	t_{co}	3.074	3.299	4.664	5.073	5.591	5.449	5.678	5.201	5.720	5.580	5.746	ns
	12mA	GCLK	t_{co}	3.072	3.297	4.663	5.072	5.589	5.447	5.676	5.200	5.719	5.579	5.745	ns
		GCLK PLL	t_{co}	3.064	3.288	4.653	5.062	5.580	5.438	5.667	5.190	5.709	5.569	5.735	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.065	3.290	4.659	5.069	5.588	5.446	5.675	5.198	5.718	5.578	5.744	ns
		GCLK PLL	t_{co}	3.064	3.287	4.642	5.050	5.566	5.424	5.653	5.177	5.694	5.554	5.720	ns
	16mA	GCLK	t_{co}	3.076	3.300	4.660	5.068	5.584	5.442	5.671	5.196	5.713	5.573	5.739	ns
		GCLK PLL	t_{co}	3.072	3.297	4.661	5.070	5.588	5.446	5.675	5.198	5.717	5.577	5.743	ns

Table 1–107. EP3SE50 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.062	3.286	4.650	5.059	5.576	5.434	5.663	5.187	5.705	5.565	5.731	ns
		GCLK PLL	t_{co}	3.060	3.284	4.648	5.056	5.574	5.432	5.661	5.185	5.703	5.563	5.729	ns
	6mA	GCLK	t_{co}	3.060	3.285	4.651	5.061	5.579	5.437	5.666	5.189	5.709	5.569	5.735	ns
		GCLK PLL	t_{co}	3.064	3.288	4.648	5.056	5.573	5.431	5.660	5.184	5.702	5.562	5.728	ns
	8mA	GCLK	t_{co}	3.090	3.317	4.693	5.104	5.623	5.481	5.710	5.232	5.752	5.612	5.778	ns
		GCLK PLL	t_{co}	3.076	3.303	4.681	5.093	5.613	5.471	5.700	5.222	5.743	5.603	5.769	ns
	10mA	GCLK	t_{co}	3.064	3.290	4.664	5.075	5.595	5.453	5.682	5.204	5.725	5.585	5.751	ns
		GCLK PLL	t_{co}	3.064	3.290	4.667	5.079	5.599	5.457	5.686	5.208	5.730	5.590	5.756	ns
	12mA	GCLK	t_{co}	3.060	3.286	4.660	5.071	5.592	5.450	5.679	5.201	5.722	5.582	5.748	ns
		GCLK PLL	t_{co}	3.064	3.288	4.653	5.062	5.580	5.438	5.667	5.190	5.709	5.569	5.735	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.065	3.290	4.661	5.072	5.591	5.449	5.678	5.200	5.721	5.581	5.747	ns
		GCLK PLL	t_{co}	3.093	3.320	4.692	5.102	5.621	5.479	5.708	5.231	5.750	5.610	5.776	ns
	16mA	GCLK	t_{co}	3.082	3.308	4.680	5.090	5.609	5.467	5.696	5.219	5.738	5.598	5.764	ns
		GCLK PLL	t_{co}	3.077	3.304	4.680	5.091	5.610	5.468	5.697	5.220	5.740	5.600	5.766	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.063	3.289	4.662	5.072	5.591	5.449	5.678	5.201	5.722	5.582	5.748	ns
		GCLK PLL	t_{co}	3.061	3.287	4.660	5.070	5.589	5.447	5.676	5.199	5.719	5.579	5.745	ns
	10mA	GCLK	t_{co}	3.065	3.289	4.652	5.060	5.577	5.435	5.664	5.188	5.706	5.566	5.732	ns
		GCLK PLL	t_{co}	3.065	3.290	4.660	5.070	5.589	5.447	5.676	5.199	5.719	5.579	5.745	ns
	12mA	GCLK	t_{co}	3.081	3.307	4.676	5.085	5.603	5.461	5.690	5.214	5.732	5.592	5.758	ns
		GCLK PLL	t_{co}	3.081	3.307	4.676	5.085	5.603	5.461	5.690	5.214	5.732	5.592	5.758	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.071	3.297	4.666	5.075	5.593	5.451	5.680	5.204	5.723	5.583	5.749	ns
		GCLK PLL	t_{co}	3.064	3.289	4.652	5.060	5.577	5.435	5.664	5.188	5.706	5.566	5.732	ns

Table 1–108 lists the EP3SE50 row pins output timing parameters for differential I/O standards.

Table 1–108. EP3SE50 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.674	2.849	3.990	4.359	4.834	4.699	4.910	4.467	4.945	4.809	4.961	ns
		GCLK PLL	t_{co}	3.068	3.295	4.657	5.068	5.588	5.445	5.648	5.200	5.724	5.579	5.715	ns
LVDS_E_1R	—	GCLK	t_{co}	3.050	3.285	4.695	5.114	5.642	5.499	5.702	5.251	5.785	5.640	5.776	ns
		GCLK PLL	t_{co}	2.674	2.849	3.990	4.359	4.834	4.699	4.910	4.467	4.945	4.809	4.961	ns
LVDS_E_3R	—	GCLK	t_{co}	3.068	3.295	4.657	5.068	5.588	5.445	5.648	5.200	5.724	5.579	5.715	ns
		GCLK PLL	t_{co}	3.050	3.285	4.695	5.114	5.642	5.499	5.702	5.251	5.785	5.640	5.776	ns
MINI-LVDS	—	GCLK	t_{co}	2.674	2.849	3.990	4.359	4.834	4.699	4.910	4.467	4.945	4.809	4.961	ns
		GCLK PLL	t_{co}	3.068	3.295	4.657	5.068	5.588	5.445	5.648	5.200	5.724	5.579	5.715	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.050	3.285	4.695	5.114	5.642	5.499	5.702	5.251	5.785	5.640	5.776	ns
		GCLK PLL	t_{co}	3.104	3.338	4.741	5.158	5.685	5.542	5.745	5.294	5.824	5.679	5.815	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.090	3.324	4.728	5.145	5.672	5.529	5.732	5.280	5.811	5.666	5.802	ns
		GCLK PLL	t_{co}	3.086	3.320	4.726	5.145	5.673	5.530	5.733	5.280	5.813	5.668	5.804	ns
RSDS	—	GCLK	t_{co}	3.102	3.335	4.727	5.142	5.667	5.524	5.727	5.277	5.806	5.661	5.797	ns
		GCLK PLL	t_{co}	3.091	3.325	4.723	5.138	5.664	5.521	5.724	5.274	5.803	5.658	5.794	ns
RSDS_E_1R	—	GCLK	t_{co}	3.088	3.322	4.721	5.136	5.662	5.519	5.722	5.272	5.802	5.657	5.793	ns
		GCLK PLL	t_{co}	3.099	3.332	4.722	5.137	5.661	5.518	5.721	5.271	5.800	5.655	5.791	ns
RSDS_E_3R	—	GCLK	t_{co}	3.089	3.323	4.720	5.135	5.660	5.517	5.720	5.271	5.800	5.655	5.791	ns
		GCLK PLL	t_{co}	3.075	3.309	4.705	5.120	5.646	5.503	5.706	5.256	5.785	5.640	5.776	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.072	3.305	4.701	5.116	5.642	5.499	5.702	5.252	5.781	5.636	5.772	ns
		GCLK PLL	t_{co}	3.069	3.303	4.702	5.119	5.645	5.502	5.705	5.255	5.785	5.640	5.776	ns
	6mA	GCLK	t_{co}	3.070	3.303	4.692	5.107	5.632	5.489	5.692	5.242	5.771	5.626	5.762	ns
		GCLK PLL	t_{co}	3.119	3.356	4.763	5.180	5.708	5.565	5.768	5.316	5.847	5.702	5.838	ns
	8mA	GCLK	t_{co}	3.095	3.332	4.745	5.163	5.691	5.548	5.751	5.299	5.832	5.687	5.823	ns
		GCLK PLL	t_{co}	3.077	3.313	4.723	5.141	5.669	5.526	5.729	5.277	5.810	5.665	5.801	ns

Table 1–108. EP3SE50 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.123	3.359	4.763	5.180	5.707	5.564	5.767	5.316	5.847	5.702	5.838	ns
		GCLK PLL	t_{co}	3.108	3.344	4.749	5.165	5.692	5.549	5.752	5.301	5.832	5.687	5.823	ns
	6mA	GCLK	t_{co}	3.097	3.333	4.744	5.162	5.689	5.546	5.749	5.298	5.830	5.685	5.821	ns
		GCLK PLL	t_{co}	3.077	3.313	4.721	5.138	5.666	5.523	5.726	5.275	5.806	5.661	5.797	ns
	8mA	GCLK	t_{co}	3.074	3.309	4.717	5.135	5.662	5.519	5.722	5.271	5.803	5.658	5.794	ns
		GCLK PLL	t_{co}	3.079	3.313	4.708	5.123	5.648	5.505	5.708	5.258	5.787	5.642	5.778	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.072	3.306	4.707	5.124	5.651	5.508	5.711	5.261	5.792	5.647	5.783	ns
		GCLK PLL	t_{co}	3.100	3.335	4.735	5.151	5.677	5.534	5.737	5.287	5.817	5.672	5.808	ns
	6mA	GCLK	t_{co}	3.082	3.318	4.720	5.136	5.662	5.519	5.722	5.272	5.802	5.657	5.793	ns
		GCLK PLL	t_{co}	3.068	3.302	4.697	5.112	5.637	5.494	5.697	5.248	5.777	5.632	5.768	ns
	8mA	GCLK	t_{co}	2.674	2.849	3.990	4.359	4.834	4.699	4.910	4.467	4.945	4.809	4.961	ns
		GCLK PLL	t_{co}	3.068	3.295	4.657	5.068	5.588	5.445	5.648	5.200	5.724	5.579	5.715	ns
	10mA	GCLK	t_{co}	3.050	3.285	4.695	5.114	5.642	5.499	5.702	5.251	5.785	5.640	5.776	ns
		GCLK PLL	t_{co}	2.674	2.849	3.990	4.359	4.834	4.699	4.910	4.467	4.945	4.809	4.961	ns
	12mA	GCLK	t_{co}	3.068	3.295	4.657	5.068	5.588	5.445	5.648	5.200	5.724	5.579	5.715	ns
		GCLK PLL	t_{co}	3.050	3.285	4.695	5.114	5.642	5.499	5.702	5.251	5.785	5.640	5.776	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	2.674	2.849	3.990	4.359	4.834	4.699	4.910	4.467	4.945	4.809	4.961	ns
		GCLK PLL	t_{co}	3.068	3.295	4.657	5.068	5.588	5.445	5.648	5.200	5.724	5.579	5.715	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.050	3.285	4.695	5.114	5.642	5.499	5.702	5.251	5.785	5.640	5.776	ns
		GCLK PLL	t_{co}	3.104	3.338	4.741	5.158	5.685	5.542	5.745	5.294	5.824	5.679	5.815	ns
	6mA	GCLK	t_{co}	3.090	3.324	4.728	5.145	5.672	5.529	5.732	5.280	5.811	5.666	5.802	ns
		GCLK PLL	t_{co}	3.086	3.320	4.726	5.145	5.673	5.530	5.733	5.280	5.813	5.668	5.804	ns
	8mA	GCLK	t_{co}	3.102	3.335	4.727	5.142	5.667	5.524	5.727	5.277	5.806	5.661	5.797	ns
		GCLK PLL	t_{co}	3.091	3.325	4.723	5.138	5.664	5.521	5.724	5.274	5.803	5.658	5.794	ns

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Table 1–108. EP3SE50 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.088	3.322	4.721	5.136	5.662	5.519	5.722	5.272	5.802	5.657	5.793	ns
		GCLK PLL	t_{co}	3.099	3.332	4.722	5.137	5.661	5.518	5.721	5.271	5.800	5.655	5.791	ns
	6mA	GCLK	t_{co}	3.089	3.323	4.720	5.135	5.660	5.517	5.720	5.271	5.800	5.655	5.791	ns
		GCLK PLL	t_{co}	3.075	3.309	4.705	5.120	5.646	5.503	5.706	5.256	5.785	5.640	5.776	ns
	8mA	GCLK	t_{co}	3.072	3.305	4.701	5.116	5.642	5.499	5.702	5.252	5.781	5.636	5.772	ns
		GCLK PLL	t_{co}	3.069	3.303	4.702	5.119	5.645	5.502	5.705	5.255	5.785	5.640	5.776	ns
	10mA	GCLK	t_{co}	3.070	3.303	4.692	5.107	5.632	5.489	5.692	5.242	5.771	5.626	5.762	ns
		GCLK PLL	t_{co}	3.119	3.356	4.763	5.180	5.708	5.565	5.768	5.316	5.847	5.702	5.838	ns
	12mA	GCLK	t_{co}	3.095	3.332	4.745	5.163	5.691	5.548	5.751	5.299	5.832	5.687	5.823	ns
		GCLK PLL	t_{co}	3.077	3.313	4.723	5.141	5.669	5.526	5.729	5.277	5.810	5.665	5.801	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.123	3.359	4.763	5.180	5.707	5.564	5.767	5.316	5.847	5.702	5.838	ns
		GCLK PLL	t_{co}	3.108	3.344	4.749	5.165	5.692	5.549	5.752	5.301	5.832	5.687	5.823	ns
	16mA	GCLK	t_{co}	3.097	3.333	4.744	5.162	5.689	5.546	5.749	5.298	5.830	5.685	5.821	ns
		GCLK PLL	t_{co}	3.077	3.313	4.721	5.138	5.666	5.523	5.726	5.275	5.806	5.661	5.797	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.074	3.309	4.717	5.135	5.662	5.519	5.722	5.271	5.803	5.658	5.794	ns
		GCLK PLL	t_{co}	3.079	3.313	4.708	5.123	5.648	5.505	5.708	5.258	5.787	5.642	5.778	ns
	12mA	GCLK	t_{co}	3.072	3.306	4.707	5.124	5.651	5.508	5.711	5.261	5.792	5.647	5.783	ns
		GCLK PLL	t_{co}	3.100	3.335	4.735	5.151	5.677	5.534	5.737	5.287	5.817	5.672	5.808	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.082	3.318	4.720	5.136	5.662	5.519	5.722	5.272	5.802	5.657	5.793	ns
		GCLK PLL	t_{co}	3.068	3.302	4.697	5.112	5.637	5.494	5.697	5.248	5.777	5.632	5.768	ns

Table 1–109 and Table 1–110 list the EP3SE50 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–109 lists the EP3SE50 column pin delay adders when using the regional clock in Stratix III devices.

Table 1–109. EP3SE50 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.152	0.164	0.22	0.237	0.25	0.244	0.31	0.24	0.254	0.246	0.312	ns
RCLK PLL input adder	-0.001	-0.001	-0.003	-0.004	-0.004	-0.004	-0.006	-0.003	-0.004	-0.004	-0.006	ns
RCLK output adder	-0.116	-0.119	-0.134	-0.136	-0.17	-0.171	-0.249	-0.131	-0.13	-0.13	-0.216	ns
RCLK PLL output adder	1.647	1.684	2.61	2.926	3.238	3.084	3.298	2.943	3.254	3.098	3.374	ns

Table 1–110 lists the EP3SE50 row pin delay adders when using the regional clock in Stratix III devices.

Table 1–110. EP3SE50 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.113	0.125	0.182	0.197	0.212	0.205	0.274	0.201	0.215	0.21	0.275	ns
RCLK PLL input adder	0.13	0.14	0.213	0.241	0.267	0.255	0.385	0.244	0.27	0.256	0.386	ns
RCLK output adder	-0.116	-0.129	-0.186	-0.202	-0.218	-0.209	-0.28	-0.206	-0.221	-0.214	-0.283	ns
RCLK PLL output adder	-0.137	-0.143	-0.193	-0.214	-0.236	-0.225	-0.295	-0.215	-0.237	-0.226	-0.297	ns

EP3SE80 I/O Timing Parameters

Table 1–111 through Table 1–114 list the maximum I/O timing parameters for EP3SE80 devices for single-ended I/O standards.

Table 1–111 lists the EP3SE80 column pins input timing parameters for single-ended I/O standards.

Table 1–111. EP3SE80 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.054	-1.054	-1.505	-1.636	-1.872	-1.819	-2.173	-1.636	-1.872	-1.819	-2.173	ns
		t_h	1.195	1.195	1.704	1.861	2.117	2.050	2.409	1.861	2.117	2.050	2.409	ns
	GCLK PLL	t_{su}	-1.307	-1.307	-1.870	-2.028	-2.321	-2.214	-2.661	-2.028	-2.321	-2.214	-2.661	ns
		t_h	1.605	1.605	2.302	2.513	2.858	2.721	3.186	2.513	2.858	2.721	3.186	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.054	-1.054	-1.505	-1.636	-1.872	-1.819	-2.173	-1.636	-1.872	-1.819	-2.173	ns
		t_h	1.195	1.195	1.704	1.861	2.117	2.050	2.409	1.861	2.117	2.050	2.409	ns
	GCLK PLL	t_{su}	-1.307	-1.307	-1.870	-2.028	-2.321	-2.214	-2.661	-2.028	-2.321	-2.214	-2.661	ns
		t_h	1.605	1.605	2.302	2.513	2.858	2.721	3.186	2.513	2.858	2.721	3.186	ns
3.0-V LVTTL	GCLK	t_{su}	-1.065	-1.065	-1.504	-1.638	-1.871	-1.818	-2.172	-1.638	-1.871	-1.818	-2.172	ns
		t_h	1.206	1.206	1.703	1.863	2.116	2.049	2.408	1.863	2.116	2.049	2.408	ns
	GCLK PLL	t_{su}	-1.318	-1.318	-1.869	-2.030	-2.320	-2.213	-2.660	-2.030	-2.320	-2.213	-2.660	ns
		t_h	1.616	1.616	2.301	2.515	2.857	2.720	3.185	2.515	2.857	2.720	3.185	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.065	-1.065	-1.504	-1.638	-1.871	-1.818	-2.172	-1.638	-1.871	-1.818	-2.172	ns
		t_h	1.206	1.206	1.703	1.863	2.116	2.049	2.408	1.863	2.116	2.049	2.408	ns
	GCLK PLL	t_{su}	-1.318	-1.318	-1.869	-2.030	-2.320	-2.213	-2.660	-2.030	-2.320	-2.213	-2.660	ns
		t_h	1.616	1.616	2.301	2.515	2.857	2.720	3.185	2.515	2.857	2.720	3.185	ns
2.5 V	GCLK	t_{su}	-1.060	-1.060	-1.513	-1.650	-1.890	-1.837	-2.191	-1.650	-1.890	-1.837	-2.191	ns
		t_h	1.201	1.201	1.712	1.875	2.135	2.068	2.427	1.875	2.135	2.068	2.427	ns
	GCLK PLL	t_{su}	-1.313	-1.313	-1.878	-2.042	-2.339	-2.232	-2.679	-2.042	-2.339	-2.232	-2.679	ns
		t_h	1.611	1.611	2.310	2.527	2.876	2.739	3.204	2.527	2.876	2.739	3.204	ns
1.8 V	GCLK	t_{su}	-1.082	-1.082	-1.553	-1.686	-1.888	-1.835	-2.189	-1.686	-1.888	-1.835	-2.189	ns
		t_h	1.225	1.225	1.752	1.911	2.133	2.066	2.425	1.911	2.133	2.066	2.425	ns
	GCLK PLL	t_{su}	-1.335	-1.335	-1.918	-2.078	-2.337	-2.230	-2.677	-2.078	-2.337	-2.230	-2.677	ns
		t_h	1.635	1.635	2.350	2.563	2.874	2.737	3.202	2.563	2.874	2.737	3.202	ns
1.5 V	GCLK	t_{su}	-1.072	-1.072	-1.530	-1.654	-1.818	-1.765	-2.119	-1.654	-1.818	-1.765	-2.119	ns
		t_h	1.215	1.215	1.729	1.879	2.063	1.996	2.355	1.879	2.063	1.996	2.355	ns
	GCLK PLL	t_{su}	-1.325	-1.325	-1.895	-2.046	-2.267	-2.160	-2.607	-2.046	-2.267	-2.160	-2.607	ns
		t_h	1.625	1.625	2.327	2.531	2.804	2.667	3.132	2.531	2.804	2.667	3.132	ns
1.2 V	GCLK	t_{su}	-1.020	-1.020	-1.453	-1.555	-1.662	-1.609	-1.963	-1.555	-1.662	-1.609	-1.963	ns
		t_h	1.163	1.163	1.652	1.780	1.907	1.840	2.199	1.780	1.907	1.840	2.199	ns
	GCLK PLL	t_{su}	-1.273	-1.273	-1.818	-1.947	-2.111	-2.004	-2.451	-1.947	-2.111	-2.004	-2.451	ns
		t_h	1.573	1.573	2.250	2.432	2.648	2.511	2.976	2.432	2.648	2.511	2.976	ns

Table 1–111. EP3SE80 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS I	GCLK	t_{su}	-0.991	-0.991	-1.425	-1.539	-1.664	-1.611	-1.965	-1.539	-1.664	-1.611	-1.965	ns
		t_h	1.134	1.134	1.624	1.764	1.909	1.842	2.201	1.764	1.909	1.842	2.201	ns
	GCLK PLL	t_{su}	-1.244	-1.244	-1.790	-1.931	-2.113	-2.006	-2.453	-1.931	-2.113	-2.006	-2.453	ns
		t_h	1.544	1.544	2.222	2.416	2.650	2.513	2.978	2.416	2.650	2.513	2.978	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.991	-0.991	-1.425	-1.539	-1.664	-1.611	-1.965	-1.539	-1.664	-1.611	-1.965	ns
		t_h	1.134	1.134	1.624	1.764	1.909	1.842	2.201	1.764	1.909	1.842	2.201	ns
	GCLK PLL	t_{su}	-1.244	-1.244	-1.790	-1.931	-2.113	-2.006	-2.453	-1.931	-2.113	-2.006	-2.453	ns
		t_h	1.544	1.544	2.222	2.416	2.650	2.513	2.978	2.416	2.650	2.513	2.978	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.985	-0.985	-1.412	-1.531	-1.661	-1.606	-1.963	-1.531	-1.661	-1.606	-1.963	ns
		t_h	1.128	1.128	1.611	1.753	1.903	1.836	2.194	1.753	1.903	1.836	2.194	ns
	GCLK PLL	t_{su}	-1.238	-1.238	-1.777	-1.923	-2.110	-2.001	-2.451	-1.923	-2.110	-2.001	-2.451	ns
		t_h	1.538	1.538	2.209	2.405	2.644	2.507	2.971	2.405	2.644	2.507	2.971	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.985	-0.985	-1.412	-1.531	-1.661	-1.606	-1.963	-1.531	-1.661	-1.606	-1.963	ns
		t_h	1.128	1.128	1.611	1.753	1.903	1.836	2.194	1.753	1.903	1.836	2.194	ns
	GCLK PLL	t_{su}	-1.238	-1.238	-1.777	-1.923	-2.110	-2.001	-2.451	-1.923	-2.110	-2.001	-2.451	ns
		t_h	1.538	1.538	2.209	2.405	2.644	2.507	2.971	2.405	2.644	2.507	2.971	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.974	-0.974	-1.401	-1.520	-1.642	-1.587	-1.944	-1.520	-1.642	-1.587	-1.944	ns
		t_h	1.117	1.117	1.599	1.742	1.884	1.817	2.175	1.742	1.884	1.817	2.175	ns
	GCLK PLL	t_{su}	-1.227	-1.227	-1.766	-1.912	-2.091	-1.982	-2.432	-1.912	-2.091	-1.982	-2.432	ns
		t_h	1.527	1.527	2.197	2.394	2.625	2.488	2.952	2.394	2.625	2.488	2.952	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.974	-0.974	-1.401	-1.520	-1.642	-1.587	-1.944	-1.520	-1.642	-1.587	-1.944	ns
		t_h	1.117	1.117	1.599	1.742	1.884	1.817	2.175	1.742	1.884	1.817	2.175	ns
	GCLK PLL	t_{su}	-1.227	-1.227	-1.766	-1.912	-2.091	-1.982	-2.432	-1.912	-2.091	-1.982	-2.432	ns
		t_h	1.527	1.527	2.197	2.394	2.625	2.488	2.952	2.394	2.625	2.488	2.952	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.985	-0.985	-1.412	-1.531	-1.661	-1.606	-1.963	-1.531	-1.661	-1.606	-1.963	ns
		t_h	1.128	1.128	1.611	1.753	1.903	1.836	2.194	1.753	1.903	1.836	2.194	ns
	GCLK PLL	t_{su}	-1.238	-1.238	-1.777	-1.923	-2.110	-2.001	-2.451	-1.923	-2.110	-2.001	-2.451	ns
		t_h	1.538	1.538	2.209	2.405	2.644	2.507	2.971	2.405	2.644	2.507	2.971	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.985	-0.985	-1.412	-1.531	-1.661	-1.606	-1.963	-1.531	-1.661	-1.606	-1.963	ns
		t_h	1.128	1.128	1.611	1.753	1.903	1.836	2.194	1.753	1.903	1.836	2.194	ns
	GCLK PLL	t_{su}	-1.238	-1.238	-1.777	-1.923	-2.110	-2.001	-2.451	-1.923	-2.110	-2.001	-2.451	ns
		t_h	1.538	1.538	2.209	2.405	2.644	2.507	2.971	2.405	2.644	2.507	2.971	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.974	-0.974	-1.401	-1.520	-1.642	-1.587	-1.944	-1.520	-1.642	-1.587	-1.944	ns
		t_h	1.117	1.117	1.599	1.742	1.884	1.817	2.175	1.742	1.884	1.817	2.175	ns
	GCLK PLL	t_{su}	-1.227	-1.227	-1.766	-1.912	-2.091	-1.982	-2.432	-1.912	-2.091	-1.982	-2.432	ns
		t_h	1.527	1.527	2.197	2.394	2.625	2.488	2.952	2.394	2.625	2.488	2.952	ns

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Table 1–111. EP3SE80 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.974	-0.974	-1.401	-1.520	-1.642	-1.587	-1.944	-1.520	-1.642	-1.587	-1.944	ns
		t_h	1.117	1.117	1.599	1.742	1.884	1.817	2.175	1.742	1.884	1.817	2.175	ns
	GCLK PLL	t_{su}	-1.227	-1.227	-1.766	-1.912	-2.091	-1.982	-2.432	-1.912	-2.091	-1.982	-2.432	ns
		t_h	1.527	1.527	2.197	2.394	2.625	2.488	2.952	2.394	2.625	2.488	2.952	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.962	-0.962	-1.391	-1.509	-1.626	-1.571	-1.928	-1.509	-1.626	-1.571	-1.928	ns
		t_h	1.105	1.105	1.589	1.731	1.868	1.801	2.159	1.731	1.868	1.801	2.159	ns
	GCLK PLL	t_{su}	-1.215	-1.215	-1.756	-1.901	-2.075	-1.966	-2.416	-1.901	-2.075	-1.966	-2.416	ns
		t_h	1.515	1.515	2.187	2.383	2.609	2.472	2.936	2.383	2.609	2.472	2.936	ns
3.0-V PCI	GCLK	t_{su}	-0.962	-0.962	-1.391	-1.509	-1.626	-1.571	-1.928	-1.509	-1.626	-1.571	-1.928	ns
		t_h	1.105	1.105	1.589	1.731	1.868	1.801	2.159	1.731	1.868	1.801	2.159	ns
	GCLK PLL	t_{su}	-1.215	-1.215	-1.756	-1.901	-2.075	-1.966	-2.416	-1.901	-2.075	-1.966	-2.416	ns
		t_h	1.515	1.515	2.187	2.383	2.609	2.472	2.936	2.383	2.609	2.472	2.936	ns
3.0-V PCI-X	GCLK	t_{su}	-1.065	-1.065	-1.504	-1.638	-1.871	-1.818	-2.172	-1.638	-1.871	-1.818	-2.172	ns
		t_h	1.206	1.206	1.703	1.863	2.116	2.049	2.408	1.863	2.116	2.049	2.408	ns
	GCLK PLL	t_{su}	-1.318	-1.318	-1.869	-2.030	-2.320	-2.213	-2.660	-2.030	-2.320	-2.213	-2.660	ns
		t_h	1.616	1.616	2.301	2.515	2.857	2.720	3.185	2.515	2.857	2.720	3.185	ns

Table 1–112 lists the EP3SE80 row pins input timing parameters for single-ended I/O standards.

Table 1–112. EP3SE80 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.922	-0.964	-1.369	-1.481	-1.595	-1.647	-1.890	-1.492	-1.697	-1.649	-1.929	ns
		t_h	1.045	1.103	1.566	1.703	1.842	1.878	2.128	1.725	1.950	1.890	2.168	ns
	GCLK PLL	t_{su}	1.087	1.110	1.770	2.000	1.985	2.004	1.799	2.012	2.003	2.024	1.850	ns
		t_h	-0.825	-0.830	-1.353	-1.532	-1.470	-1.513	-1.300	-1.533	-1.477	-1.523	-1.349	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.922	-0.964	-1.369	-1.481	-1.595	-1.647	-1.890	-1.492	-1.697	-1.649	-1.929	ns
		t_h	1.045	1.103	1.566	1.703	1.842	1.878	2.128	1.725	1.950	1.890	2.168	ns
	GCLK PLL	t_{su}	1.087	1.110	1.770	2.000	1.985	2.004	1.799	2.012	2.003	2.024	1.850	ns
		t_h	-0.825	-0.830	-1.353	-1.532	-1.470	-1.513	-1.300	-1.533	-1.477	-1.523	-1.349	ns
3.0-V LVTTL	GCLK	t_{su}	-0.928	-0.975	-1.366	-1.482	-1.598	-1.650	-1.893	-1.491	-1.702	-1.654	-1.934	ns
		t_h	1.051	1.114	1.563	1.704	1.845	1.881	2.131	1.724	1.955	1.895	2.173	ns
	GCLK PLL	t_{su}	1.081	1.099	1.773	1.999	1.982	2.001	1.796	2.013	1.998	2.019	1.845	ns
		t_h	-0.819	-0.819	-1.356	-1.531	-1.467	-1.510	-1.297	-1.534	-1.472	-1.518	-1.344	ns

Table 1–112. EP3SE80 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	GCLK	t_{su}	-0.928	-0.975	-1.366	-1.482	-1.598	-1.650	-1.893	-1.491	-1.702	-1.654	-1.934	ns
		t_h	1.051	1.114	1.563	1.704	1.845	1.881	2.131	1.724	1.955	1.895	2.173	ns
	GCLK PLL	t_{su}	1.081	1.099	1.773	1.999	1.982	2.001	1.796	2.013	1.998	2.019	1.845	ns
		t_h	-0.819	-0.819	-1.356	-1.531	-1.467	-1.510	-1.297	-1.534	-1.472	-1.518	-1.344	ns
2.5 V	GCLK	t_{su}	-0.916	-0.968	-1.375	-1.495	-1.613	-1.665	-1.908	-1.500	-1.712	-1.664	-1.944	ns
		t_h	1.039	1.107	1.572	1.717	1.860	1.896	2.146	1.733	1.965	1.905	2.183	ns
	GCLK PLL	t_{su}	1.093	1.106	1.764	1.986	1.967	1.986	1.781	2.004	1.988	2.009	1.835	ns
		t_h	-0.831	-0.826	-1.347	-1.518	-1.452	-1.495	-1.282	-1.525	-1.462	-1.508	-1.334	ns
1.8 V	GCLK	t_{su}	-0.973	-1.027	-1.441	-1.555	-1.741	-1.689	-1.906	-1.560	-1.739	-1.691	-1.945	ns
		t_h	1.097	1.167	1.638	1.777	1.984	1.920	2.144	1.792	1.992	1.931	2.184	ns
	GCLK PLL	t_{su}	0.974	0.984	1.606	1.824	1.969	1.854	1.783	1.837	1.987	1.870	1.834	ns
		t_h	-0.714	-0.705	-1.192	-1.359	-1.454	-1.366	-1.284	-1.362	-1.461	-1.373	-1.333	ns
1.5 V	GCLK	t_{su}	-0.963	-1.016	-1.417	-1.523	-1.673	-1.621	-1.838	-1.529	-1.674	-1.626	-1.880	ns
		t_h	1.087	1.156	1.614	1.745	1.916	1.852	2.076	1.761	1.927	1.866	2.119	ns
	GCLK PLL	t_{su}	0.984	0.995	1.630	1.856	2.037	1.922	1.851	1.868	2.052	1.935	1.899	ns
		t_h	-0.724	-0.716	-1.216	-1.391	-1.522	-1.434	-1.352	-1.393	-1.526	-1.438	-1.398	ns
1.2 V	GCLK	t_{su}	-0.903	-0.963	-1.338	-1.422	-1.514	-1.462	-1.679	-1.433	-1.519	-1.471	-1.725	ns
		t_h	1.027	1.103	1.535	1.644	1.757	1.693	1.917	1.665	1.772	1.711	1.964	ns
	GCLK PLL	t_{su}	1.044	1.048	1.709	1.957	2.196	2.081	2.010	1.964	2.207	2.090	2.054	ns
		t_h	-0.784	-0.769	-1.295	-1.492	-1.681	-1.593	-1.511	-1.489	-1.681	-1.593	-1.553	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.859	-0.910	-1.289	-1.386	-1.393	-1.445	-1.688	-1.388	-1.495	-1.447	-1.727	ns
		t_h	0.983	1.050	1.486	1.608	1.640	1.676	1.926	1.621	1.748	1.688	1.966	ns
	GCLK PLL	t_{su}	1.151	1.165	1.850	2.095	2.187	2.206	2.001	2.116	2.205	2.226	2.052	ns
		t_h	-0.888	-0.884	-1.433	-1.627	-1.672	-1.715	-1.502	-1.637	-1.679	-1.725	-1.551	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.859	-0.910	-1.289	-1.386	-1.393	-1.445	-1.688	-1.388	-1.495	-1.447	-1.727	ns
		t_h	0.983	1.050	1.486	1.608	1.640	1.676	1.926	1.621	1.748	1.688	1.966	ns
	GCLK PLL	t_{su}	1.151	1.165	1.850	2.095	2.187	2.206	2.001	2.116	2.205	2.226	2.052	ns
		t_h	-0.888	-0.884	-1.433	-1.627	-1.672	-1.715	-1.502	-1.637	-1.679	-1.725	-1.551	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.877	-0.928	-1.300	-1.395	-1.509	-1.456	-1.677	-1.401	-1.512	-1.463	-1.720	ns
		t_h	1.001	1.068	1.497	1.615	1.750	1.686	1.911	1.631	1.762	1.702	1.955	ns
	GCLK PLL	t_{su}	1.070	1.083	1.747	1.984	2.201	2.087	2.014	1.996	2.214	2.098	2.061	ns
		t_h	-0.810	-0.804	-1.333	-1.521	-1.688	-1.600	-1.519	-1.523	-1.691	-1.602	-1.564	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.877	-0.928	-1.300	-1.395	-1.509	-1.456	-1.677	-1.401	-1.512	-1.463	-1.720	ns
		t_h	1.001	1.068	1.497	1.615	1.750	1.686	1.911	1.631	1.762	1.702	1.955	ns
	GCLK PLL	t_{su}	1.070	1.083	1.747	1.984	2.201	2.087	2.014	1.996	2.214	2.098	2.061	ns
		t_h	-0.810	-0.804	-1.333	-1.521	-1.688	-1.600	-1.519	-1.523	-1.691	-1.602	-1.564	ns

Table 1–112. EP3SE80 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-15 CLASS I	GCLK	t_{su}	-0.863	-0.916	-1.285	-1.385	-1.491	-1.438	-1.659	-1.390	-1.495	-1.446	-1.703	ns
		t_h	0.987	1.056	1.483	1.605	1.732	1.668	1.893	1.620	1.745	1.685	1.938	ns
	GCLK PLL	t_{su}	1.084	1.095	1.762	1.994	2.219	2.105	2.032	2.007	2.231	2.115	2.078	ns
		t_h	-0.824	-0.816	-1.347	-1.531	-1.706	-1.618	-1.537	-1.534	-1.708	-1.619	-1.581	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.877	-0.928	-1.300	-1.395	-1.509	-1.456	-1.677	-1.401	-1.512	-1.463	-1.720	ns
		t_h	1.001	1.068	1.497	1.615	1.750	1.686	1.911	1.631	1.762	1.702	1.955	ns
	GCLK PLL	t_{su}	1.070	1.083	1.747	1.984	2.201	2.087	2.014	1.996	2.214	2.098	2.061	ns
		t_h	-0.810	-0.804	-1.333	-1.521	-1.688	-1.600	-1.519	-1.523	-1.691	-1.602	-1.564	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.877	-0.928	-1.300	-1.395	-1.509	-1.456	-1.677	-1.401	-1.512	-1.463	-1.720	ns
		t_h	1.001	1.068	1.497	1.615	1.750	1.686	1.911	1.631	1.762	1.702	1.955	ns
	GCLK PLL	t_{su}	1.070	1.083	1.747	1.984	2.201	2.087	2.014	1.996	2.214	2.098	2.061	ns
		t_h	-0.810	-0.804	-1.333	-1.521	-1.688	-1.600	-1.519	-1.523	-1.691	-1.602	-1.564	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.863	-0.916	-1.285	-1.385	-1.491	-1.438	-1.659	-1.390	-1.495	-1.446	-1.703	ns
		t_h	0.987	1.056	1.483	1.605	1.732	1.668	1.893	1.620	1.745	1.685	1.938	ns
	GCLK PLL	t_{su}	1.084	1.095	1.762	1.994	2.219	2.105	2.032	2.007	2.231	2.115	2.078	ns
		t_h	-0.824	-0.816	-1.347	-1.531	-1.706	-1.618	-1.537	-1.534	-1.708	-1.619	-1.581	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.863	-0.916	-1.285	-1.385	-1.491	-1.438	-1.659	-1.390	-1.495	-1.446	-1.703	ns
		t_h	0.987	1.056	1.483	1.605	1.732	1.668	1.893	1.620	1.745	1.685	1.938	ns
	GCLK PLL	t_{su}	1.084	1.095	1.762	1.994	2.219	2.105	2.032	2.007	2.231	2.115	2.078	ns
		t_h	-0.824	-0.816	-1.347	-1.531	-1.706	-1.618	-1.537	-1.534	-1.708	-1.619	-1.581	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.854	-0.904	-1.276	-1.375	-1.475	-1.422	-1.643	-1.381	-1.479	-1.430	-1.687	ns
		t_h	0.978	1.044	1.474	1.595	1.716	1.652	1.877	1.611	1.729	1.669	1.922	ns
	GCLK PLL	t_{su}	1.093	1.107	1.771	2.004	2.235	2.121	2.048	2.016	2.247	2.131	2.094	ns
		t_h	-0.833	-0.828	-1.356	-1.541	-1.722	-1.634	-1.553	-1.543	-1.724	-1.635	-1.597	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.854	-0.904	-1.276	-1.375	-1.475	-1.422	-1.643	-1.381	-1.479	-1.430	-1.687	ns
		t_h	0.978	1.044	1.474	1.595	1.716	1.652	1.877	1.611	1.729	1.669	1.922	ns
	GCLK PLL	t_{su}	1.093	1.107	1.771	2.004	2.235	2.121	2.048	2.016	2.247	2.131	2.094	ns
		t_h	-0.833	-0.828	-1.356	-1.541	-1.722	-1.634	-1.553	-1.543	-1.724	-1.635	-1.597	ns
3.0-V PCI	GCLK	t_{su}	-0.928	-0.975	-1.366	-1.482	-1.598	-1.650	-1.893	-1.491	-1.702	-1.654	-1.934	ns
		t_h	1.051	1.114	1.563	1.704	1.845	1.881	2.131	1.724	1.955	1.895	2.173	ns
	GCLK PLL	t_{su}	1.081	1.099	1.773	1.999	1.982	2.001	1.796	2.013	1.998	2.019	1.845	ns
		t_h	-0.819	-0.819	-1.356	-1.531	-1.467	-1.510	-1.297	-1.534	-1.472	-1.518	-1.344	ns
3.0-V PCI-X	GCLK	t_{su}	-0.928	-0.975	-1.366	-1.482	-1.598	-1.650	-1.893	-1.491	-1.702	-1.654	-1.934	ns
		t_h	1.051	1.114	1.563	1.704	1.845	1.881	2.131	1.724	1.955	1.895	2.173	ns
	GCLK PLL	t_{su}	1.081	1.099	1.773	1.999	1.982	2.001	1.796	2.013	1.998	2.019	1.845	ns
		t_h	-0.819	-0.819	-1.356	-1.531	-1.467	-1.510	-1.297	-1.534	-1.472	-1.518	-1.344	ns

Table 1–113 lists the EP3SE80 column pins output timing parameters for single-ended I/O standards.

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.559	3.559	4.935	5.323	5.638	5.693	5.865	5.323	5.638	5.693	5.865	ns
		GCLK PLL	t_{co}	3.859	3.865	5.394	5.826	6.396	6.210	6.631	5.826	6.396	6.210	6.631	ns
	8mA	GCLK	t_{co}	3.442	3.442	4.781	5.161	5.525	5.523	5.752	5.161	5.525	5.523	5.752	ns
		GCLK PLL	t_{co}	3.792	3.798	5.285	5.715	6.283	6.097	6.518	5.715	6.283	6.097	6.518	ns
	12mA	GCLK	t_{co}	3.347	3.347	4.644	5.018	5.433	5.371	5.660	5.018	5.433	5.371	5.660	ns
		GCLK PLL	t_{co}	3.706	3.712	5.181	5.616	6.191	6.005	6.426	5.616	6.191	6.005	6.426	ns
	16mA	GCLK	t_{co}	3.302	3.302	4.619	4.994	5.392	5.346	5.619	4.994	5.392	5.346	5.619	ns
		GCLK PLL	t_{co}	3.699	3.705	5.164	5.588	6.150	5.964	6.385	5.588	6.150	5.964	6.385	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.562	3.562	4.939	5.335	5.645	5.707	5.872	5.335	5.645	5.707	5.872	ns
		GCLK PLL	t_{co}	3.865	3.871	5.398	5.831	6.403	6.217	6.638	5.831	6.403	6.217	6.638	ns
	8mA	GCLK	t_{co}	3.362	3.362	4.649	5.023	5.444	5.377	5.671	5.023	5.444	5.377	5.671	ns
		GCLK PLL	t_{co}	3.710	3.716	5.191	5.633	6.202	6.016	6.437	5.633	6.202	6.016	6.437	ns
	12mA	GCLK	t_{co}	3.305	3.305	4.612	4.992	5.418	5.346	5.645	4.992	5.418	5.346	5.645	ns
		GCLK PLL	t_{co}	3.717	3.723	5.185	5.612	6.176	5.990	6.411	5.612	6.176	5.990	6.411	ns
	16mA	GCLK	t_{co}	3.285	3.285	4.558	4.934	5.389	5.289	5.616	4.934	5.389	5.289	5.616	ns
		GCLK PLL	t_{co}	3.701	3.707	5.163	5.587	6.147	5.961	6.382	5.587	6.147	5.961	6.382	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.504	3.504	4.884	5.274	5.605	5.658	5.832	5.274	5.605	5.658	5.832	ns
		GCLK PLL	t_{co}	3.823	3.829	5.361	5.794	6.363	6.177	6.598	5.794	6.363	6.177	6.598	ns
	8mA	GCLK	t_{co}	3.374	3.374	4.715	5.102	5.468	5.497	5.693	5.102	5.468	5.497	5.693	ns
		GCLK PLL	t_{co}	3.712	3.718	5.231	5.660	6.225	6.041	6.459	5.660	6.225	6.041	6.459	ns
	12mA	GCLK	t_{co}	3.299	3.299	4.626	5.003	5.394	5.395	5.620	5.003	5.394	5.395	5.620	ns
		GCLK PLL	t_{co}	3.676	3.682	5.168	5.591	6.151	5.967	6.386	5.591	6.151	5.967	6.386	ns
	16mA	GCLK	t_{co}	3.262	3.262	4.561	4.934	5.365	5.345	5.592	4.934	5.365	5.345	5.592	ns
		GCLK PLL	t_{co}	3.658	3.664	5.139	5.563	6.123	5.937	6.358	5.563	6.123	5.937	6.358	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.412	3.412	4.773	5.155	5.503	5.551	5.728	5.155	5.503	5.551	5.728	ns
		GCLK PLL	t_{co}	3.737	3.743	5.265	5.694	6.260	6.076	6.494	5.694	6.260	6.076	6.494	ns
	8mA	GCLK	t_{co}	3.275	3.275	4.578	4.956	5.368	5.369	5.593	4.956	5.368	5.369	5.593	ns
		GCLK PLL	t_{co}	3.658	3.664	5.141	5.565	6.125	5.941	6.359	5.565	6.125	5.941	6.359	ns
	12mA	GCLK	t_{co}	3.245	3.245	4.532	4.904	5.359	5.300	5.586	4.904	5.359	5.300	5.586	ns
		GCLK PLL	t_{co}	3.653	3.659	5.134	5.558	6.117	5.931	6.352	5.558	6.117	5.931	6.352	ns
	16mA	GCLK	t_{co}	3.223	3.224	4.510	4.883	5.344	5.299	5.571	4.883	5.344	5.299	5.571	ns
		GCLK PLL	t_{co}	3.644	3.650	5.120	5.543	6.102	5.916	6.337	5.543	6.102	5.916	6.337	ns
2.5 V	4mA	GCLK	t_{co}	3.559	3.559	5.027	5.434	5.750	5.833	5.976	5.434	5.750	5.833	5.976	ns
		GCLK PLL	t_{co}	3.859	3.865	5.472	5.921	6.507	6.323	6.742	5.921	6.507	6.323	6.742	ns
	8mA	GCLK	t_{co}	3.434	3.434	4.854	5.250	5.618	5.636	5.843	5.250	5.618	5.636	5.843	ns
		GCLK PLL	t_{co}	3.759	3.765	5.353	5.795	6.375	6.191	6.609	5.795	6.375	6.191	6.609	ns
	12mA	GCLK	t_{co}	3.334	3.334	4.725	5.114	5.522	5.496	5.749	5.114	5.522	5.496	5.749	ns
		GCLK PLL	t_{co}	3.715	3.721	5.266	5.704	6.280	6.094	6.515	5.704	6.280	6.094	6.515	ns
	16mA	GCLK	t_{co}	3.307	3.307	4.656	5.047	5.479	5.446	5.706	5.047	5.479	5.446	5.706	ns
		GCLK PLL	t_{co}	3.677	3.683	5.227	5.662	6.237	6.051	6.472	5.662	6.237	6.051	6.472	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.822	3.822	5.464	5.917	6.154	6.369	6.381	5.917	6.154	6.369	6.381	ns
		GCLK PLL	t_{co}	4.050	4.056	5.793	6.281	6.912	6.726	7.147	6.281	6.912	6.726	7.147	ns
	4mA	GCLK	t_{co}	3.581	3.581	5.104	5.511	5.807	5.909	6.032	5.511	5.807	5.909	6.032	ns
		GCLK PLL	t_{co}	3.869	3.875	5.514	5.972	6.564	6.380	6.798	5.972	6.564	6.380	6.798	ns
	6mA	GCLK	t_{co}	3.463	3.463	4.914	5.321	5.696	5.734	5.923	5.321	5.696	5.734	5.923	ns
		GCLK PLL	t_{co}	3.787	3.793	5.407	5.857	6.454	6.268	6.689	5.857	6.454	6.268	6.689	ns
	8mA	GCLK	t_{co}	3.409	3.409	4.814	5.223	5.630	5.622	5.857	5.223	5.630	5.622	5.857	ns
		GCLK PLL	t_{co}	3.767	3.773	5.349	5.803	6.388	6.202	6.623	5.803	6.388	6.202	6.623	ns
	10mA	GCLK	t_{co}	3.341	3.341	4.718	5.125	5.549	5.508	5.776	5.125	5.549	5.508	5.776	ns
		GCLK PLL	t_{co}	3.704	3.710	5.288	5.728	6.307	6.121	6.542	5.728	6.307	6.121	6.542	ns
	12mA	GCLK	t_{co}	3.317	3.317	4.685	5.078	5.526	5.470	5.753	5.078	5.526	5.470	5.753	ns
		GCLK PLL	t_{co}	3.686	3.692	5.267	5.707	6.284	6.098	6.519	5.707	6.284	6.098	6.519	ns
1.5 V	2mA	GCLK	t_{co}	3.730	3.730	5.357	5.827	6.092	6.286	6.319	5.827	6.092	6.286	6.319	ns
		GCLK PLL	t_{co}	3.996	4.002	5.722	6.213	6.850	6.664	7.085	6.213	6.850	6.664	7.085	ns
	4mA	GCLK	t_{co}	3.447	3.447	4.903	5.314	5.700	5.730	5.927	5.314	5.700	5.730	5.927	ns
		GCLK PLL	t_{co}	3.784	3.790	5.403	5.857	6.458	6.272	6.693	5.857	6.458	6.272	6.693	ns
	6mA	GCLK	t_{co}	3.369	3.369	4.803	5.206	5.633	5.613	5.860	5.206	5.633	5.613	5.860	ns
		GCLK PLL	t_{co}	3.759	3.765	5.336	5.797	6.391	6.205	6.626	5.797	6.391	6.205	6.626	ns
	8mA	GCLK	t_{co}	3.359	3.359	4.785	5.185	5.613	5.581	5.840	5.185	5.613	5.581	5.840	ns
		GCLK PLL	t_{co}	3.748	3.754	5.319	5.772	6.371	6.185	6.606	5.772	6.371	6.185	6.606	ns
	10mA	GCLK	t_{co}	3.329	3.329	4.701	5.107	5.543	5.499	5.770	5.107	5.543	5.499	5.770	ns
		GCLK PLL	t_{co}	3.693	3.699	5.281	5.721	6.301	6.115	6.536	5.721	6.301	6.115	6.536	ns
	12mA	GCLK	t_{co}	3.280	3.280	4.679	5.072	5.532	5.457	5.759	5.072	5.532	5.457	5.759	ns
		GCLK PLL	t_{co}	3.688	3.694	5.264	5.710	6.290	6.104	6.525	5.710	6.290	6.104	6.525	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.620	3.620	5.244	5.726	6.036	6.206	6.263	5.726	6.036	6.206	6.263	ns
		GCLK PLL	t_{co}	3.912	3.918	5.648	6.149	6.794	6.608	7.029	6.149	6.794	6.608	7.029	ns
	4mA	GCLK	t_{co}	3.447	3.447	4.922	5.345	5.750	5.777	5.977	5.345	5.750	5.777	5.977	ns
		GCLK PLL	t_{co}	3.789	3.795	5.422	5.887	6.508	6.322	6.743	5.887	6.508	6.322	6.743	ns
	6mA	GCLK	t_{co}	3.360	3.360	4.795	5.204	5.637	5.622	5.864	5.204	5.637	5.622	5.864	ns
		GCLK PLL	t_{co}	3.751	3.757	5.330	5.798	6.395	6.209	6.630	5.798	6.395	6.209	6.630	ns
	8mA	GCLK	t_{co}	3.336	3.336	4.726	5.144	5.581	5.531	5.808	5.144	5.581	5.531	5.808	ns
		GCLK PLL	t_{co}	3.704	3.710	5.302	5.749	6.339	6.153	6.574	5.749	6.339	6.153	6.574	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.324	3.324	4.688	5.075	5.512	5.479	5.739	5.075	5.512	5.479	5.739	ns
		GCLK PLL	t_{co}	3.704	3.710	5.259	5.696	6.270	6.084	6.505	5.696	6.270	6.084	6.505	ns
	10mA	GCLK	t_{co}	3.321	3.321	4.681	5.068	5.508	5.485	5.735	5.068	5.508	5.485	5.735	ns
		GCLK PLL	t_{co}	3.701	3.707	5.256	5.693	6.266	6.080	6.501	5.693	6.266	6.080	6.501	ns
	12mA	GCLK	t_{co}	3.309	3.309	4.677	5.064	5.509	5.465	5.736	5.064	5.509	5.465	5.736	ns
		GCLK PLL	t_{co}	3.699	3.705	5.256	5.694	6.267	6.081	6.502	5.694	6.267	6.081	6.502	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.286	3.286	4.647	5.033	5.494	5.431	5.721	5.033	5.494	5.431	5.721	ns
		GCLK PLL	t_{co}	3.690	3.696	5.241	5.678	6.252	6.066	6.487	5.678	6.252	6.066	6.487	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.340	3.340	4.700	5.090	5.528	5.507	5.755	5.090	5.528	5.507	5.755	ns
		GCLK PLL	t_{co}	3.711	3.717	5.271	5.710	6.286	6.100	6.521	5.710	6.286	6.100	6.521	ns
	6mA	GCLK	t_{co}	3.323	3.323	4.697	5.087	5.526	5.496	5.753	5.087	5.526	5.496	5.753	ns
		GCLK PLL	t_{co}	3.707	3.713	5.269	5.708	6.284	6.098	6.519	5.708	6.284	6.098	6.519	ns
	8mA	GCLK	t_{co}	3.311	3.311	4.677	5.067	5.517	5.489	5.744	5.067	5.517	5.489	5.744	ns
		GCLK PLL	t_{co}	3.696	3.702	5.259	5.699	6.275	6.089	6.510	5.699	6.275	6.089	6.510	ns
	10mA	GCLK	t_{co}	3.282	3.282	4.659	5.049	5.504	5.450	5.731	5.049	5.504	5.450	5.731	ns
		GCLK PLL	t_{co}	3.685	3.691	5.246	5.686	6.262	6.076	6.497	5.686	6.262	6.076	6.497	ns
	12mA	GCLK	t_{co}	3.281	3.281	4.659	5.049	5.504	5.450	5.731	5.049	5.504	5.450	5.731	ns
		GCLK PLL	t_{co}	3.685	3.691	5.246	5.686	6.262	6.076	6.497	5.686	6.262	6.076	6.497	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.290	3.290	4.656	5.044	5.499	5.450	5.726	5.044	5.499	5.450	5.726	ns
		GCLK PLL	t_{co}	3.691	3.697	5.245	5.683	6.257	6.071	6.492	5.683	6.257	6.071	6.492	ns
	16mA	GCLK	t_{co}	3.279	3.279	4.649	5.039	5.511	5.455	5.738	5.039	5.511	5.455	5.738	ns
		GCLK PLL	t_{co}	3.694	3.700	5.253	5.692	6.269	6.083	6.504	5.692	6.269	6.083	6.504	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.334	3.334	4.714	5.107	5.541	5.521	5.768	5.107	5.541	5.521	5.768	ns
		GCLK PLL	t_{co}	3.715	3.721	5.280	5.722	6.299	6.113	6.534	5.722	6.299	6.113	6.534	ns
	6mA	GCLK	t_{co}	3.309	3.309	4.693	5.086	5.532	5.495	5.759	5.086	5.532	5.495	5.759	ns
		GCLK PLL	t_{co}	3.701	3.707	5.270	5.712	6.290	6.104	6.525	5.712	6.290	6.104	6.525	ns
	8mA	GCLK	t_{co}	3.289	3.289	4.672	5.065	5.518	5.471	5.745	5.065	5.518	5.471	5.745	ns
		GCLK PLL	t_{co}	3.690	3.696	5.256	5.698	6.276	6.090	6.511	5.698	6.276	6.090	6.511	ns
	10mA	GCLK	t_{co}	3.280	3.280	4.666	5.059	5.522	5.460	5.749	5.059	5.522	5.460	5.749	ns
		GCLK PLL	t_{co}	3.689	3.695	5.259	5.701	6.280	6.094	6.515	5.701	6.280	6.094	6.515	ns
	12mA	GCLK	t_{co}	3.275	3.275	4.659	5.051	5.516	5.450	5.743	5.051	5.516	5.450	5.743	ns
		GCLK PLL	t_{co}	3.686	3.692	5.254	5.696	6.274	6.088	6.509	5.696	6.274	6.088	6.509	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.284	3.284	4.652	5.042	5.499	5.450	5.726	5.042	5.499	5.450	5.726	ns
		GCLK PLL	t_{co}	3.688	3.694	5.243	5.682	6.257	6.071	6.492	5.682	6.257	6.071	6.492	ns
	16mA	GCLK	t_{co}	3.274	3.274	4.646	5.036	5.510	5.456	5.737	5.036	5.510	5.456	5.737	ns
		GCLK PLL	t_{co}	3.691	3.697	5.250	5.691	6.268	6.082	6.503	5.691	6.268	6.082	6.503	ns

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Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.308	3.308	4.665	5.052	5.497	5.464	5.724	5.052	5.497	5.464	5.724	ns
		GCLK PLL	t_{co}	3.698	3.704	5.245	5.682	6.255	6.069	6.490	5.682	6.255	6.069	6.490	ns
	6mA	GCLK	t_{co}	3.294	3.294	4.652	5.040	5.496	5.461	5.723	5.040	5.496	5.461	5.723	ns
		GCLK PLL	t_{co}	3.691	3.697	5.243	5.680	6.254	6.068	6.489	5.680	6.254	6.068	6.489	ns
	8mA	GCLK	t_{co}	3.278	3.278	4.642	5.029	5.489	5.434	5.716	5.029	5.489	5.434	5.716	ns
		GCLK PLL	t_{co}	3.683	3.689	5.235	5.673	6.247	6.061	6.482	5.673	6.247	6.061	6.482	ns
	10mA	GCLK	t_{co}	3.279	3.279	4.644	5.032	5.493	5.436	5.720	5.032	5.493	5.436	5.720	ns
		GCLK PLL	t_{co}	3.686	3.692	5.238	5.676	6.251	6.065	6.486	5.676	6.251	6.065	6.486	ns
	12mA	GCLK	t_{co}	3.271	3.271	4.640	5.028	5.497	5.436	5.724	5.028	5.497	5.436	5.724	ns
		GCLK PLL	t_{co}	3.683	3.689	5.241	5.680	6.255	6.069	6.490	5.680	6.255	6.069	6.490	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.274	3.274	4.631	5.018	5.493	5.432	5.720	5.018	5.493	5.432	5.720	ns
		GCLK PLL	t_{co}	3.691	3.697	5.240	5.677	6.251	6.065	6.486	5.677	6.251	6.065	6.486	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.314	3.314	4.676	5.065	5.508	5.480	5.735	5.065	5.508	5.480	5.735	ns
		GCLK PLL	t_{co}	3.703	3.709	5.253	5.692	6.266	6.080	6.501	5.692	6.266	6.080	6.501	ns
	6mA	GCLK	t_{co}	3.302	3.302	4.670	5.060	5.511	5.469	5.738	5.060	5.511	5.469	5.738	ns
		GCLK PLL	t_{co}	3.699	3.705	5.254	5.693	6.269	6.083	6.504	5.693	6.269	6.083	6.504	ns
	8mA	GCLK	t_{co}	3.296	3.296	4.664	5.053	5.506	5.463	5.733	5.053	5.506	5.463	5.733	ns
		GCLK PLL	t_{co}	3.695	3.701	5.250	5.689	6.264	6.078	6.499	5.689	6.264	6.078	6.499	ns
	10mA	GCLK	t_{co}	3.284	3.284	4.652	5.042	5.499	5.450	5.726	5.042	5.499	5.450	5.726	ns
		GCLK PLL	t_{co}	3.688	3.694	5.243	5.682	6.257	6.071	6.492	5.682	6.257	6.071	6.492	ns
	12mA	GCLK	t_{co}	3.279	3.279	4.653	5.043	5.509	5.446	5.736	5.043	5.509	5.446	5.736	ns
		GCLK PLL	t_{co}	3.689	3.695	5.250	5.690	6.267	6.081	6.502	5.690	6.267	6.081	6.502	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.275	3.275	4.629	5.015	5.483	5.425	5.710	5.015	5.483	5.425	5.710	ns
		GCLK PLL	t_{co}	3.687	3.693	5.231	5.668	6.241	6.055	6.476	5.668	6.241	6.055	6.476	ns

Table 1–113. EP3SE80 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.312	3.312	4.688	5.081	5.529	5.499	5.756	5.081	5.529	5.499	5.756	ns
		GCLK PLL	t_{co}	3.706	3.712	5.267	5.709	6.287	6.101	6.522	5.709	6.287	6.101	6.522	ns
	6mA	GCLK	t_{co}	3.298	3.298	4.674	5.066	5.520	5.482	5.747	5.066	5.520	5.482	5.747	ns
		GCLK PLL	t_{co}	3.698	3.704	5.258	5.700	6.278	6.092	6.513	5.700	6.278	6.092	6.513	ns
	8mA	GCLK	t_{co}	3.292	3.292	4.675	5.068	5.529	5.478	5.756	5.068	5.529	5.478	5.756	ns
		GCLK PLL	t_{co}	3.699	3.705	5.266	5.708	6.287	6.101	6.522	5.708	6.287	6.101	6.522	ns
	10mA	GCLK	t_{co}	3.277	3.277	4.657	5.049	5.515	5.455	5.742	5.049	5.515	5.455	5.742	ns
		GCLK PLL	t_{co}	3.688	3.694	5.253	5.695	6.273	6.087	6.508	5.695	6.273	6.087	6.508	ns
	12mA	GCLK	t_{co}	3.277	3.277	4.657	5.049	5.516	5.456	5.743	5.049	5.516	5.456	5.743	ns
		GCLK PLL	t_{co}	3.688	3.694	5.253	5.695	6.274	6.088	6.509	5.695	6.274	6.088	6.509	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.327	3.327	4.692	5.083	5.529	5.534	5.756	5.083	5.529	5.534	5.756	ns
		GCLK PLL	t_{co}	3.709	3.715	5.269	5.710	6.287	6.101	6.522	5.710	6.287	6.101	6.522	ns
3.0-V PCI	—	GCLK	t_{co}	3.395	3.395	4.701	5.080	5.554	5.509	5.781	5.080	5.554	5.509	5.781	ns
		GCLK PLL	t_{co}	3.812	3.818	5.314	5.744	6.312	6.126	6.547	5.744	6.312	6.126	6.547	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.395	3.395	4.701	5.080	5.554	5.509	5.781	5.080	5.554	5.509	5.781	ns
		GCLK PLL	t_{co}	3.812	3.818	5.314	5.744	6.312	6.126	6.547	5.744	6.312	6.126	6.547	ns

Table 1–114 lists the EP3SE80 row pins output timing parameters for single-ended I/O standards.

Table 1–114. EP3SE80 Row Pins Output Timing Parameters (Part 1 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.238	3.493	4.856	5.245	5.757	5.609	5.907	5.368	5.891	5.735	5.990	ns
		GCLK PLL	t_{co}	1.439	1.634	2.039	2.121	2.343	2.334	2.309	2.226	2.430	2.441	2.301	ns
	8mA	GCLK	t_{co}	3.156	3.399	4.726	5.107	5.612	5.464	5.762	5.227	5.742	5.586	5.841	ns
		GCLK PLL	t_{co}	1.346	1.529	1.909	1.983	2.198	2.189	2.195	2.085	2.281	2.292	2.186	ns
	12mA	GCLK	t_{co}	3.077	3.310	4.607	4.984	5.484	5.348	5.634	5.107	5.610	5.468	5.709	ns
		GCLK PLL	t_{co}	1.247	1.423	1.790	1.860	2.070	2.061	2.099	1.958	2.149	2.160	2.086	ns

Table 1–114. EP3SE80 Row Pins Output Timing Parameters (Part 2 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.248	3.497	4.864	5.250	5.761	5.613	5.911	5.374	5.895	5.739	5.994	ns
		GCLK PLL	t_{co}	1.449	1.638	2.047	2.126	2.347	2.338	2.318	2.232	2.434	2.445	2.313	ns
	8mA	GCLK	t_{co}	3.081	3.314	4.613	4.999	5.490	5.358	5.640	5.119	5.617	5.477	5.716	ns
		GCLK PLL	t_{co}	1.251	1.429	1.796	1.866	2.076	2.067	2.109	1.964	2.156	2.167	2.095	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.192	3.439	4.808	5.198	5.713	5.565	5.863	5.325	5.849	5.693	5.948	ns
		GCLK PLL	t_{co}	1.393	1.580	1.991	2.074	2.299	2.290	2.275	2.183	2.388	2.399	2.267	ns
	8mA	GCLK	t_{co}	3.082	3.319	4.655	5.039	5.549	5.401	5.699	5.163	5.685	5.528	5.783	ns
		GCLK PLL	t_{co}	1.268	1.453	1.838	1.915	2.135	2.126	2.130	2.021	2.224	2.234	2.121	ns
	12mA	GCLK	t_{co}	3.045	3.281	4.582	4.957	5.461	5.313	5.611	5.077	5.592	5.435	5.690	ns
		GCLK PLL	t_{co}	1.229	1.402	1.756	1.832	2.047	2.038	2.060	1.935	2.131	2.141	2.048	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.106	3.358	4.702	5.091	5.603	5.455	5.753	5.217	5.738	5.581	5.836	ns
		GCLK PLL	t_{co}	1.307	1.499	1.885	1.967	2.189	2.180	2.166	2.075	2.277	2.287	2.157	ns
	8mA	GCLK	t_{co}	3.032	3.265	4.554	4.928	5.422	5.281	5.572	5.047	5.552	5.401	5.650	ns
		GCLK PLL	t_{co}	1.207	1.380	1.721	1.793	2.008	1.999	2.032	1.895	2.091	2.101	2.019	ns
2.5 V	4mA	GCLK	t_{co}	3.218	3.475	4.940	5.352	5.885	5.737	6.035	5.485	6.028	5.871	6.126	ns
		GCLK PLL	t_{co}	1.419	1.616	2.123	2.228	2.471	2.462	2.420	2.343	2.567	2.577	2.419	ns
	8mA	GCLK	t_{co}	3.124	3.377	4.785	5.189	5.715	5.567	5.865	5.318	5.854	5.697	5.952	ns
		GCLK PLL	t_{co}	1.309	1.518	1.968	2.065	2.301	2.292	2.278	2.176	2.393	2.403	2.274	ns
	12mA	GCLK	t_{co}	3.067	3.321	4.679	5.070	5.589	5.441	5.739	5.195	5.724	5.567	5.822	ns
		GCLK PLL	t_{co}	1.263	1.441	1.857	1.946	2.175	2.166	2.187	2.053	2.263	2.273	2.180	ns
1.8 V	2mA	GCLK	t_{co}	3.451	3.722	5.326	5.781	6.360	6.212	6.510	5.922	6.504	6.356	6.611	ns
		GCLK PLL	t_{co}	1.652	1.862	2.507	2.657	2.761	2.937	2.944	2.780	2.883	3.062	2.957	ns
	4mA	GCLK	t_{co}	3.229	3.520	4.999	5.412	5.955	5.807	6.105	5.557	6.098	5.949	6.204	ns
		GCLK PLL	t_{co}	1.427	1.660	2.180	2.288	2.401	2.532	2.539	2.415	2.522	2.655	2.550	ns
	6mA	GCLK	t_{co}	3.161	3.418	4.846	5.262	5.796	5.648	5.946	5.389	5.925	5.777	6.032	ns
		GCLK PLL	t_{co}	1.362	1.558	2.027	2.138	2.301	2.373	2.380	2.247	2.416	2.483	2.378	ns
	8mA	GCLK	t_{co}	3.136	3.379	4.770	5.176	5.699	5.552	5.849	5.300	5.831	5.683	5.938	ns
		GCLK PLL	t_{co}	1.315	1.497	1.950	2.044	2.235	2.276	2.297	2.152	2.344	2.389	2.290	ns

Table 1–114. EP3SE80 Row Pins Output Timing Parameters (Part 3 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.362	3.640	5.236	5.694	6.288	6.140	6.438	5.829	6.428	6.280	6.535	ns
		GCLK PLL	t_{co}	1.563	1.780	2.417	2.570	2.698	2.865	2.872	2.687	2.818	2.986	2.881	ns
	4mA	GCLK	t_{co}	3.152	3.396	4.831	5.257	5.797	5.649	5.947	5.383	5.924	5.776	6.031	ns
		GCLK PLL	t_{co}	1.331	1.522	2.012	2.133	2.304	2.374	2.381	2.241	2.417	2.482	2.377	ns
	6mA	GCLK	t_{co}	3.125	3.370	4.758	5.168	5.691	5.552	5.841	5.293	5.819	5.677	5.926	ns
		GCLK PLL	t_{co}	1.304	1.488	1.939	2.037	2.235	2.268	2.297	2.143	2.344	2.377	2.290	ns
	8mA	GCLK	t_{co}	3.106	3.359	4.738	5.143	5.672	5.533	5.822	5.269	5.797	5.658	5.904	ns
		GCLK PLL	t_{co}	1.285	1.477	1.917	2.019	2.216	2.249	2.278	2.125	2.325	2.355	2.271	ns
1.2 V	2mA	GCLK	t_{co}	3.305	3.565	5.146	5.608	6.213	6.065	6.363	5.741	6.344	6.196	6.451	ns
		GCLK PLL	t_{co}	1.506	1.705	2.327	2.484	2.637	2.790	2.797	2.599	2.749	2.902	2.797	ns
	4mA	GCLK	t_{co}	3.157	3.400	4.853	5.285	5.838	5.690	5.988	5.408	5.966	5.818	6.073	ns
		GCLK PLL	t_{co}	1.336	1.518	2.034	2.161	2.352	2.415	2.422	2.266	2.461	2.524	2.419	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.071	3.309	4.672	5.060	5.557	5.426	5.707	5.180	5.686	5.548	5.785	ns
		GCLK PLL	t_{co}	1.248	1.427	1.835	1.918	2.143	2.134	2.177	2.020	2.225	2.236	2.166	ns
	12mA	GCLK	t_{co}	3.066	3.305	4.669	5.058	5.549	5.424	5.699	5.179	5.679	5.547	5.778	ns
		GCLK PLL	t_{co}	1.236	1.415	1.827	1.910	2.135	2.126	2.175	2.012	2.218	2.229	2.165	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.057	3.294	4.654	5.042	5.522	5.407	5.672	5.162	5.652	5.529	5.751	ns
		GCLK PLL	t_{co}	1.220	1.397	1.802	1.885	2.108	2.099	2.158	1.986	2.191	2.202	2.147	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.085	3.323	4.689	5.080	5.578	5.447	5.724	5.199	5.698	5.568	5.802	ns
		GCLK PLL	t_{co}	1.264	1.441	1.849	1.934	2.130	2.151	2.192	2.035	2.235	2.254	2.181	ns
	6mA	GCLK	t_{co}	3.080	3.318	4.687	5.079	5.577	5.446	5.723	5.197	5.696	5.566	5.800	ns
		GCLK PLL	t_{co}	1.259	1.436	1.847	1.933	2.129	2.150	2.191	2.033	2.233	2.252	2.179	ns
	8mA	GCLK	t_{co}	3.069	3.307	4.677	5.069	5.567	5.436	5.713	5.188	5.687	5.557	5.791	ns
		GCLK PLL	t_{co}	1.248	1.425	1.837	1.923	2.119	2.140	2.181	2.024	2.224	2.243	2.170	ns
	10mA	GCLK	t_{co}	3.058	3.296	4.664	5.056	5.554	5.423	5.700	5.176	5.675	5.545	5.779	ns
		GCLK PLL	t_{co}	1.237	1.414	1.824	1.910	2.106	2.127	2.168	2.012	2.212	2.231	2.158	ns
	12mA	GCLK	t_{co}	3.058	3.295	4.664	5.056	5.554	5.423	5.700	5.175	5.675	5.545	5.779	ns
		GCLK PLL	t_{co}	1.237	1.413	1.824	1.910	2.106	2.127	2.168	2.011	2.212	2.231	2.158	ns

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Table 1–114. EP3SE80 Row Pins Output Timing Parameters (Part 4 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.066	3.302	4.663	5.053	5.549	5.418	5.695	5.171	5.669	5.539	5.773	ns
		GCLK PLL	t_{co}	1.245	1.420	1.823	1.907	2.101	2.122	2.163	2.007	2.206	2.225	2.152	ns
	16mA	GCLK	t_{co}	3.067	3.305	4.669	5.061	5.559	5.428	5.705	5.180	5.680	5.550	5.784	ns
		GCLK PLL	t_{co}	1.246	1.423	1.829	1.915	2.111	2.132	2.173	2.016	2.217	2.236	2.163	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.088	3.326	4.698	5.091	5.591	5.460	5.740	5.209	5.710	5.580	5.817	ns
		GCLK PLL	t_{co}	1.267	1.444	1.858	1.946	2.143	2.167	2.205	2.046	2.247	2.268	2.193	ns
	6mA	GCLK	t_{co}	3.074	3.312	4.687	5.081	5.581	5.450	5.727	5.200	5.701	5.571	5.805	ns
		GCLK PLL	t_{co}	1.253	1.430	1.847	1.935	2.133	2.154	2.195	2.036	2.238	2.257	2.184	ns
	8mA	GCLK	t_{co}	3.063	3.300	4.674	5.068	5.568	5.437	5.714	5.187	5.688	5.558	5.792	ns
		GCLK PLL	t_{co}	1.242	1.418	1.834	1.922	2.120	2.141	2.182	2.023	2.225	2.244	2.171	ns
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.073	3.308	4.662	5.051	5.547	5.416	5.693	5.170	5.666	5.536	5.770	ns
		GCLK PLL	t_{co}	1.252	1.426	1.822	1.905	2.099	2.120	2.161	2.006	2.203	2.222	2.149	ns
	6mA	GCLK	t_{co}	3.066	3.302	4.660	5.050	5.546	5.415	5.692	5.169	5.666	5.536	5.770	ns
		GCLK PLL	t_{co}	1.245	1.420	1.820	1.904	2.098	2.119	2.160	2.005	2.203	2.222	2.149	ns
	8mA	GCLK	t_{co}	3.057	3.294	4.653	5.043	5.539	5.408	5.685	5.162	5.659	5.529	5.763	ns
		GCLK PLL	t_{co}	1.236	1.412	1.813	1.897	2.091	2.112	2.153	1.998	2.196	2.215	2.142	ns
	10mA	GCLK	t_{co}	3.060	3.296	4.656	5.046	5.543	5.412	5.689	5.165	5.662	5.532	5.766	ns
		GCLK PLL	t_{co}	1.239	1.414	1.816	1.900	2.095	2.116	2.157	2.001	2.199	2.218	2.145	ns
	12mA	GCLK	t_{co}	3.056	3.293	4.658	5.049	5.546	5.415	5.692	5.168	5.667	5.537	5.771	ns
		GCLK PLL	t_{co}	1.235	1.411	1.818	1.903	2.098	2.119	2.160	2.004	2.204	2.223	2.150	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.064	3.301	4.656	5.046	5.542	5.411	5.688	5.164	5.661	5.531	5.765	ns
		GCLK PLL	t_{co}	1.243	1.419	1.816	1.900	2.094	2.115	2.156	2.000	2.198	2.217	2.144	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.079	3.314	4.671	5.061	5.558	5.427	5.704	5.179	5.677	5.547	5.781	ns
		GCLK PLL	t_{co}	1.258	1.432	1.831	1.915	2.110	2.131	2.172	2.015	2.214	2.233	2.160	ns
	6mA	GCLK	t_{co}	3.073	3.309	4.672	5.063	5.560	5.429	5.706	5.181	5.680	5.550	5.784	ns
		GCLK PLL	t_{co}	1.252	1.427	1.832	1.917	2.112	2.133	2.174	2.017	2.217	2.236	2.163	ns
	8mA	GCLK	t_{co}	3.069	3.305	4.667	5.058	5.555	5.424	5.701	5.176	5.674	5.544	5.778	ns
		GCLK PLL	t_{co}	1.248	1.423	1.827	1.912	2.107	2.128	2.169	2.012	2.211	2.230	2.157	ns

Table 1–114. EP3SE80 Row Pins Output Timing Parameters (Part 5 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.081	3.316	4.684	5.077	5.577	5.446	5.723	5.195	5.696	5.566	5.800	ns
		GCLK PLL	t_{co}	1.260	1.434	1.844	1.931	2.129	2.150	2.191	2.031	2.233	2.252	2.179	ns
	6mA	GCLK	t_{co}	3.072	3.308	4.675	5.068	5.568	5.437	5.714	5.186	5.687	5.557	5.791	ns
		GCLK PLL	t_{co}	1.251	1.426	1.835	1.922	2.120	2.141	2.182	2.022	2.224	2.243	2.170	ns
	8mA	GCLK	t_{co}	3.071	3.308	4.682	5.076	5.577	5.446	5.723	5.195	5.697	5.567	5.801	ns
		GCLK PLL	t_{co}	1.250	1.426	1.842	1.930	2.129	2.150	2.191	2.031	2.234	2.253	2.180	ns
3.0-V PCI	—	GCLK	t_{co}	3.177	3.415	4.724	5.106	5.581	5.466	5.731	5.228	5.698	5.590	5.810	ns
		GCLK PLL	t_{co}	1.333	1.510	1.860	1.936	2.152	2.143	2.217	2.038	2.252	2.248	2.208	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.177	3.415	4.724	5.106	5.581	5.466	5.731	5.228	5.698	5.590	5.810	ns
		GCLK PLL	t_{co}	1.333	1.510	1.860	1.936	2.152	2.143	2.217	2.038	2.252	2.248	2.208	ns

Table 1–115 through Table 1–118 list the maximum I/O timing parameters for EP3SE80 devices for differential I/O standards.

Table 1–115 lists the EP3SE80 column pins input timing parameters for differential I/O standards.

Table 1–115. EP3SE80 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.997	-1.029	-1.181	-1.169	-1.324	-1.269	-1.645	-1.133	-1.542	-1.230	-1.683	ns
		t_h	1.133	1.184	1.415	1.436	1.618	1.551	1.927	1.411	1.858	1.524	1.966	ns
	GCLK PLL	t_{su}	0.960	0.994	1.879	2.224	2.401	2.288	2.194	2.277	2.567	2.345	2.245	ns
		t_h	-0.691	-0.701	-1.428	-1.714	-1.834	-1.749	-1.648	-1.756	-1.968	-1.795	-1.697	ns
MINI-LVDS		t_{su}	-0.997	-1.029	-1.181	-1.169	-1.324	-1.269	-1.645	-1.133	-1.542	-1.230	-1.683	ns
	GCLK	t_h	1.133	1.184	1.415	1.436	1.618	1.551	1.927	1.411	1.858	1.524	1.966	ns
		t_{su}	0.960	0.994	1.879	2.224	2.401	2.288	2.194	2.277	2.567	2.345	2.245	ns
	GCLK PLL	t_h	-0.691	-0.701	-1.428	-1.714	-1.834	-1.749	-1.648	-1.756	-1.968	-1.795	-1.697	ns
RSDS		t_{su}	-0.997	-1.029	-1.181	-1.169	-1.324	-1.269	-1.645	-1.133	-1.542	-1.230	-1.683	ns
		t_h	1.133	1.184	1.415	1.436	1.618	1.551	1.927	1.411	1.858	1.524	1.966	ns
	GCLK	t_{su}	0.960	0.994	1.879	2.224	2.401	2.288	2.194	2.277	2.567	2.345	2.245	ns
		t_h	-0.691	-0.701	-1.428	-1.714	-1.834	-1.749	-1.648	-1.756	-1.968	-1.795	-1.697	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.813	-0.852	-1.258	-1.368	-1.483	-1.423	-1.794	-1.368	-1.482	-1.428	-1.837	ns
		t_h	0.942	0.999	1.460	1.595	1.731	1.659	2.031	1.604	1.739	1.674	2.075	ns
	GCLK PLL	t_{su}	1.144	1.171	1.802	2.025	2.242	2.134	2.045	2.042	2.260	2.147	2.091	ns
		t_h	-0.882	-0.886	-1.383	-1.555	-1.721	-1.641	-1.544	-1.563	-1.729	-1.645	-1.588	ns

Table 1–115. EP3SE80 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.813	-0.852	-1.258	-1.368	-1.483	-1.423	-1.794	-1.368	-1.482	-1.428	-1.837	ns
		t_h	0.942	0.999	1.460	1.595	1.731	1.659	2.031	1.604	1.739	1.674	2.075	ns
	GCLK PLL	t_{su}	1.144	1.171	1.802	2.025	2.242	2.134	2.045	2.042	2.260	2.147	2.091	ns
		t_h	-0.882	-0.886	-1.383	-1.555	-1.721	-1.641	-1.544	-1.563	-1.729	-1.645	-1.588	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns

Table 1–115. EP3SE80 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.840	-0.881	-1.289	-1.395	-1.518	-1.460	-1.828	-1.394	-1.510	-1.459	-1.866	ns
		t_h	0.969	1.028	1.493	1.625	1.769	1.697	2.070	1.633	1.772	1.706	2.109	ns
	GCLK PLL	t_{su}	1.117	1.142	1.771	1.998	2.207	2.097	2.011	2.016	2.232	2.116	2.062	ns
		t_h	-0.855	-0.857	-1.350	-1.525	-1.683	-1.603	-1.505	-1.534	-1.696	-1.613	-1.554	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.840	-0.881	-1.289	-1.395	-1.518	-1.460	-1.828	-1.394	-1.510	-1.459	-1.866	ns
		t_h	0.969	1.028	1.493	1.625	1.769	1.697	2.070	1.633	1.772	1.706	2.109	ns
	GCLK PLL	t_{su}	1.117	1.142	1.771	1.998	2.207	2.097	2.011	2.016	2.232	2.116	2.062	ns
		t_h	-0.855	-0.857	-1.350	-1.525	-1.683	-1.603	-1.505	-1.534	-1.696	-1.613	-1.554	ns

Table 1–116 lists the EP3SE80 row pins input timing parameters for differential I/O standards.

Table 1–116. EP3SE80 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.944	-0.979	-1.054	-1.015	-1.154	-1.107	-1.454	-0.975	-1.107	-1.061	-1.493	ns
		t_h	1.077	1.130	1.288	1.285	1.447	1.389	1.737	1.257	1.412	1.355	1.777	ns
	GCLK PLL	t_{su}	0.961	0.989	1.951	2.328	2.533	2.408	2.342	2.387	2.599	2.472	2.394	ns
		t_h	-0.691	-0.700	-1.502	-1.818	-1.968	-1.871	-1.796	-1.862	-2.019	-1.921	-1.844	ns
MINI-LVDS	GCLK	t_{su}	-0.944	-0.979	-1.054	-1.015	-1.154	-1.107	-1.454	-0.975	-1.107	-1.061	-1.493	ns
		t_h	1.077	1.130	1.288	1.285	1.447	1.389	1.737	1.257	1.412	1.355	1.777	ns
	GCLK PLL	t_{su}	0.961	0.989	1.951	2.328	2.533	2.408	2.342	2.387	2.599	2.472	2.394	ns
		t_h	-0.691	-0.700	-1.502	-1.818	-1.968	-1.871	-1.796	-1.862	-2.019	-1.921	-1.844	ns
RSDS	GCLK	t_{su}	-0.944	-0.979	-1.054	-1.015	-1.154	-1.107	-1.454	-0.975	-1.107	-1.061	-1.493	ns
		t_h	1.077	1.130	1.288	1.285	1.447	1.389	1.737	1.257	1.412	1.355	1.777	ns
	GCLK PLL	t_{su}	0.961	0.989	1.951	2.328	2.533	2.408	2.342	2.387	2.599	2.472	2.394	ns
		t_h	-0.691	-0.700	-1.502	-1.818	-1.968	-1.871	-1.796	-1.862	-2.019	-1.921	-1.844	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.749	-0.794	-1.145	-1.244	-1.343	-1.291	-1.633	-1.246	-1.344	-1.293	-1.677	ns
		t_h	0.875	0.936	1.345	1.468	1.587	1.524	1.867	1.479	1.597	1.535	1.912	ns
	GCLK PLL	t_{su}	1.156	1.174	1.864	2.104	2.344	2.224	2.163	2.120	2.362	2.240	2.210	ns
		t_h	-0.893	-0.894	-1.447	-1.639	-1.828	-1.736	-1.666	-1.644	-1.834	-1.741	-1.709	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.749	-0.794	-1.145	-1.244	-1.343	-1.291	-1.633	-1.246	-1.344	-1.293	-1.677	ns
		t_h	0.875	0.936	1.345	1.468	1.587	1.524	1.867	1.479	1.597	1.535	1.912	ns
	GCLK PLL	t_{su}	1.156	1.174	1.864	2.104	2.344	2.224	2.163	2.120	2.362	2.240	2.210	ns
		t_h	-0.893	-0.894	-1.447	-1.639	-1.828	-1.736	-1.666	-1.644	-1.834	-1.741	-1.709	ns

Table 1–116. EP3SE80 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.781	-0.827	-1.178	-1.275	-1.384	-1.333	-1.673	-1.273	-1.378	-1.329	-1.712	ns
		t_h	0.907	0.969	1.379	1.502	1.631	1.568	1.912	1.509	1.636	1.573	1.952	ns
	GCLK PLL	t_{su}	1.124	1.141	1.827	2.068	2.299	2.178	2.118	2.089	2.323	2.199	2.170	ns
		t_h	-0.861	-0.861	-1.411	-1.601	-1.780	-1.688	-1.617	-1.610	-1.792	-1.699	-1.665	ns

Table 1–116. EP3SE80 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.781	-0.827	-1.178	-1.275	-1.384	-1.333	-1.673	-1.273	-1.378	-1.329	-1.712	ns
		t_h	0.907	0.969	1.379	1.502	1.631	1.568	1.912	1.509	1.636	1.573	1.952	ns
	GCLK PLL	t_{su}	1.124	1.141	1.827	2.068	2.299	2.178	2.118	2.089	2.323	2.199	2.170	ns
		t_h	-0.861	-0.861	-1.411	-1.601	-1.780	-1.688	-1.617	-1.610	-1.792	-1.699	-1.665	ns

Table 1–117 lists the EP3SE80 column pins output timing parameters for differential I/O standards.

Table 1–117. EP3SE80 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
LVDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns
RSDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
RSDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns

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Table 1–117. EP3SE80 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.179	3.420	4.828	5.233	5.750	5.610	5.910	5.358	5.875	5.736	5.985	ns
		GCLK PLL	t_{co}	1.355	1.535	1.984	2.084	2.298	2.309	2.335	2.190	2.407	2.417	2.323	ns
	6mA	GCLK	t_{co}	3.169	3.410	4.818	5.222	5.740	5.600	5.900	5.347	5.865	5.726	5.975	ns
		GCLK PLL	t_{co}	1.345	1.525	1.974	2.073	2.288	2.299	2.325	2.179	2.397	2.407	2.313	ns
	8mA	GCLK	t_{co}	3.169	3.410	4.821	5.226	5.744	5.604	5.904	5.352	5.870	5.731	5.980	ns
		GCLK PLL	t_{co}	1.345	1.525	1.977	2.077	2.292	2.303	2.329	2.184	2.402	2.412	2.318	ns
	10mA	GCLK	t_{co}	3.162	3.404	4.814	5.220	5.738	5.598	5.898	5.345	5.864	5.725	5.974	ns
		GCLK PLL	t_{co}	1.338	1.519	1.970	2.071	2.286	2.297	2.323	2.177	2.396	2.406	2.312	ns
	12mA	GCLK	t_{co}	3.161	3.402	4.811	5.217	5.735	5.595	5.895	5.342	5.860	5.721	5.970	ns
		GCLK PLL	t_{co}	1.337	1.517	1.967	2.068	2.283	2.294	2.320	2.174	2.392	2.402	2.308	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.183	3.424	4.832	5.237	5.754	5.614	5.914	5.362	5.880	5.741	5.990	ns
		GCLK PLL	t_{co}	1.359	1.539	1.988	2.088	2.302	2.313	2.339	2.194	2.412	2.422	2.328	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.173	3.413	4.811	5.214	5.729	5.589	5.889	5.338	5.853	5.714	5.963	ns
		GCLK PLL	t_{co}	1.349	1.528	1.967	2.065	2.277	2.288	2.314	2.170	2.385	2.395	2.301	ns
	6mA	GCLK	t_{co}	3.168	3.409	4.811	5.214	5.730	5.590	5.890	5.339	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.344	1.524	1.967	2.065	2.278	2.289	2.315	2.171	2.387	2.397	2.303	ns
	8mA	GCLK	t_{co}	3.166	3.407	4.810	5.213	5.728	5.588	5.888	5.338	5.854	5.715	5.964	ns
		GCLK PLL	t_{co}	1.342	1.522	1.966	2.064	2.276	2.287	2.313	2.170	2.386	2.396	2.302	ns
	10mA	GCLK	t_{co}	3.158	3.398	4.800	5.203	5.719	5.579	5.879	5.328	5.844	5.705	5.954	ns
		GCLK PLL	t_{co}	1.334	1.513	1.956	2.054	2.267	2.278	2.304	2.160	2.376	2.386	2.292	ns
	12mA	GCLK	t_{co}	3.159	3.400	4.806	5.210	5.727	5.587	5.887	5.336	5.853	5.714	5.963	ns
		GCLK PLL	t_{co}	1.335	1.515	1.962	2.061	2.275	2.286	2.312	2.168	2.385	2.395	2.301	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.158	3.397	4.789	5.191	5.705	5.565	5.865	5.315	5.829	5.690	5.939	ns
		GCLK PLL	t_{co}	1.334	1.512	1.945	2.042	2.253	2.264	2.290	2.147	2.361	2.371	2.277	ns

Table 1–117. EP3SE80 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.170	3.410	4.807	5.209	5.723	5.583	5.883	5.334	5.848	5.709	5.958	ns
		GCLK PLL	t_{co}	1.346	1.525	1.963	2.060	2.271	2.282	2.308	2.166	2.380	2.390	2.296	ns
	6mA	GCLK	t_{co}	3.166	3.407	4.808	5.211	5.727	5.587	5.887	5.336	5.852	5.713	5.962	ns
		GCLK PLL	t_{co}	1.342	1.522	1.964	2.062	2.275	2.286	2.312	2.168	2.384	2.394	2.300	ns
	8mA	GCLK	t_{co}	3.156	3.396	4.797	5.200	5.715	5.575	5.875	5.325	5.840	5.701	5.950	ns
		GCLK PLL	t_{co}	1.332	1.511	1.953	2.051	2.263	2.274	2.300	2.157	2.372	2.382	2.288	ns
	10mA	GCLK	t_{co}	3.154	3.394	4.795	5.197	5.713	5.573	5.873	5.323	5.838	5.699	5.948	ns
		GCLK PLL	t_{co}	1.330	1.509	1.951	2.048	2.261	2.272	2.298	2.155	2.370	2.380	2.286	ns
	12mA	GCLK	t_{co}	3.154	3.395	4.798	5.202	5.718	5.578	5.878	5.327	5.844	5.705	5.954	ns
		GCLK PLL	t_{co}	1.330	1.510	1.954	2.053	2.266	2.277	2.303	2.159	2.376	2.386	2.292	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.158	3.398	4.795	5.197	5.712	5.572	5.872	5.322	5.837	5.698	5.947	ns
		GCLK PLL	t_{co}	1.334	1.513	1.951	2.048	2.260	2.271	2.297	2.154	2.369	2.379	2.285	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.184	3.427	4.840	5.245	5.762	5.622	5.922	5.370	5.887	5.748	5.997	ns
		GCLK PLL	t_{co}	1.360	1.542	1.996	2.096	2.310	2.321	2.347	2.202	2.419	2.429	2.335	ns
	6mA	GCLK	t_{co}	3.170	3.413	4.828	5.234	5.752	5.612	5.912	5.360	5.878	5.739	5.988	ns
		GCLK PLL	t_{co}	1.346	1.528	1.984	2.085	2.300	2.311	2.337	2.192	2.410	2.420	2.326	ns
	8mA	GCLK	t_{co}	3.158	3.400	4.811	5.216	5.734	5.594	5.894	5.342	5.860	5.721	5.970	ns
		GCLK PLL	t_{co}	1.334	1.515	1.967	2.067	2.282	2.293	2.319	2.174	2.392	2.402	2.308	ns
	10mA	GCLK	t_{co}	3.158	3.400	4.814	5.220	5.738	5.598	5.898	5.346	5.865	5.726	5.975	ns
		GCLK PLL	t_{co}	1.334	1.515	1.970	2.071	2.286	2.297	2.323	2.178	2.397	2.407	2.313	ns
	12mA	GCLK	t_{co}	3.154	3.396	4.807	5.212	5.731	5.591	5.891	5.339	5.857	5.718	5.967	ns
		GCLK PLL	t_{co}	1.330	1.511	1.963	2.063	2.279	2.290	2.316	2.171	2.389	2.399	2.305	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.158	3.398	4.800	5.203	5.719	5.579	5.879	5.328	5.844	5.705	5.954	ns
		GCLK PLL	t_{co}	1.334	1.513	1.956	2.054	2.267	2.278	2.304	2.160	2.376	2.386	2.292	ns
	16mA	GCLK	t_{co}	3.159	3.400	4.808	5.213	5.730	5.590	5.890	5.338	5.856	5.717	5.966	ns
		GCLK PLL	t_{co}	1.335	1.515	1.964	2.064	2.278	2.289	2.315	2.170	2.388	2.398	2.304	ns

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Table 1–117. EP3SE80 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.187	3.430	4.839	5.243	5.760	5.620	5.920	5.369	5.885	5.746	5.995	ns
		GCLK PLL	t_{co}	1.363	1.545	1.995	2.094	2.308	2.319	2.345	2.201	2.417	2.427	2.333	ns
	6mA	GCLK	t_{co}	3.176	3.418	4.827	5.231	5.748	5.608	5.908	5.357	5.873	5.734	5.983	ns
		GCLK PLL	t_{co}	1.352	1.533	1.983	2.082	2.296	2.307	2.333	2.189	2.405	2.415	2.321	ns
	8mA	GCLK	t_{co}	3.171	3.414	4.827	5.232	5.749	5.609	5.909	5.358	5.875	5.736	5.985	ns
		GCLK PLL	t_{co}	1.347	1.529	1.983	2.083	2.297	2.308	2.334	2.190	2.407	2.417	2.323	ns
	10mA	GCLK	t_{co}	3.157	3.399	4.809	5.213	5.730	5.590	5.890	5.339	5.857	5.718	5.967	ns
		GCLK PLL	t_{co}	1.333	1.514	1.965	2.064	2.278	2.289	2.315	2.171	2.389	2.399	2.305	ns
	12mA	GCLK	t_{co}	3.155	3.397	4.807	5.211	5.728	5.588	5.888	5.337	5.854	5.715	5.964	ns
		GCLK PLL	t_{co}	1.331	1.512	1.963	2.062	2.276	2.287	2.313	2.169	2.386	2.396	2.302	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.159	3.399	4.799	5.201	5.716	5.576	5.876	5.326	5.841	5.702	5.951	ns
		GCLK PLL	t_{co}	1.335	1.514	1.955	2.052	2.264	2.275	2.301	2.158	2.373	2.383	2.289	ns
	16mA	GCLK	t_{co}	3.159	3.400	4.807	5.211	5.728	5.588	5.888	5.337	5.854	5.715	5.964	ns
		GCLK PLL	t_{co}	1.335	1.515	1.963	2.062	2.276	2.287	2.313	2.169	2.386	2.396	2.302	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.175	3.417	4.823	5.226	5.742	5.602	5.902	5.352	5.867	5.728	5.977	ns
		GCLK PLL	t_{co}	1.351	1.532	1.979	2.077	2.290	2.301	2.327	2.184	2.399	2.409	2.315	ns
	10mA	GCLK	t_{co}	3.175	3.417	4.823	5.226	5.742	5.602	5.902	5.352	5.867	5.728	5.977	ns
		GCLK PLL	t_{co}	1.351	1.532	1.979	2.077	2.290	2.301	2.327	2.184	2.399	2.409	2.315	ns
	12mA	GCLK	t_{co}	3.165	3.407	4.813	5.216	5.732	5.592	5.892	5.342	5.858	5.719	5.968	ns
		GCLK PLL	t_{co}	1.341	1.522	1.969	2.067	2.280	2.291	2.317	2.174	2.390	2.400	2.306	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.158	3.399	4.799	5.201	5.716	5.576	5.876	5.326	5.841	5.702	5.951	ns
		GCLK PLL	t_{co}	1.334	1.514	1.955	2.052	2.264	2.275	2.301	2.158	2.373	2.383	2.289	ns

Table 1–118 lists the EP3SE80 row pins output timing parameters for differential I/O standards.

Table 1–118. EP3SE80 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.744	2.932	4.083	4.440	4.901	4.771	5.049	4.540	5.002	4.873	5.107	ns
		GCLK PLL	t_{co}	0.931	1.057	1.249	1.300	1.458	1.480	1.486	1.382	1.545	1.563	1.456	ns
LVDS_E_1R	—	GCLK	t_{co}	3.136	3.376	4.754	5.156	5.664	5.526	5.797	5.281	5.790	5.652	5.871	ns
		GCLK PLL	t_{co}	1.333	1.511	1.930	2.026	2.231	2.245	2.243	2.133	2.343	2.352	2.229	ns
LVDS_E_3R	—	GCLK	t_{co}	3.118	3.366	4.792	5.202	5.718	5.580	5.851	5.332	5.851	5.713	5.932	ns
		GCLK PLL	t_{co}	1.315	1.501	1.968	2.072	2.285	2.299	2.297	2.184	2.404	2.413	2.290	ns
MINI-LVDS	—	GCLK	t_{co}	2.744	2.932	4.083	4.440	4.901	4.771	5.049	4.540	5.002	4.873	5.107	ns
		GCLK PLL	t_{co}	0.931	1.057	1.249	1.300	1.458	1.480	1.486	1.382	1.545	1.563	1.456	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.136	3.376	4.754	5.156	5.664	5.526	5.797	5.281	5.790	5.652	5.871	ns
		GCLK PLL	t_{co}	1.333	1.511	1.930	2.026	2.231	2.245	2.243	2.133	2.343	2.352	2.229	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.118	3.366	4.792	5.202	5.718	5.580	5.851	5.332	5.851	5.713	5.932	ns
		GCLK PLL	t_{co}	1.315	1.501	1.968	2.072	2.285	2.299	2.297	2.184	2.404	2.413	2.290	ns
RSDS	—	GCLK	t_{co}	2.744	2.932	4.083	4.440	4.901	4.771	5.049	4.540	5.002	4.873	5.107	ns
		GCLK PLL	t_{co}	0.931	1.057	1.249	1.300	1.458	1.480	1.486	1.382	1.545	1.563	1.456	ns
RSDS_E_1R	—	GCLK	t_{co}	3.136	3.376	4.754	5.156	5.664	5.526	5.797	5.281	5.790	5.652	5.871	ns
		GCLK PLL	t_{co}	1.333	1.511	1.930	2.026	2.231	2.245	2.243	2.133	2.343	2.352	2.229	ns
RSDS_E_3R	—	GCLK	t_{co}	3.118	3.366	4.792	5.202	5.718	5.580	5.851	5.332	5.851	5.713	5.932	ns
		GCLK PLL	t_{co}	1.315	1.501	1.968	2.072	2.285	2.299	2.297	2.184	2.404	2.413	2.290	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.162	3.409	4.828	5.236	5.751	5.613	5.884	5.365	5.880	5.742	5.961	ns
		GCLK PLL	t_{co}	1.359	1.544	2.004	2.106	2.318	2.332	2.330	2.217	2.433	2.442	2.319	ns
	6mA	GCLK	t_{co}	3.148	3.395	4.815	5.223	5.738	5.600	5.871	5.351	5.867	5.729	5.948	ns
		GCLK PLL	t_{co}	1.345	1.530	1.991	2.093	2.305	2.319	2.317	2.203	2.420	2.429	2.306	ns
	8mA	GCLK	t_{co}	3.144	3.391	4.813	5.223	5.739	5.601	5.872	5.351	5.869	5.731	5.950	ns
		GCLK PLL	t_{co}	1.341	1.526	1.989	2.093	2.306	2.320	2.318	2.203	2.422	2.431	2.308	ns

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Table 1–118. EP3SE80 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.160	3.406	4.814	5.220	5.733	5.595	5.866	5.348	5.862	5.724	5.943	ns
		GCLK PLL	t_{co}	1.357	1.541	1.990	2.090	2.300	2.314	2.312	2.200	2.415	2.424	2.301	ns
	6mA	GCLK	t_{co}	3.149	3.396	4.810	5.216	5.730	5.592	5.863	5.345	5.859	5.721	5.940	ns
		GCLK PLL	t_{co}	1.346	1.531	1.986	2.086	2.297	2.311	2.309	2.197	2.412	2.421	2.298	ns
	8mA	GCLK	t_{co}	3.146	3.393	4.808	5.214	5.728	5.590	5.861	5.343	5.858	5.720	5.939	ns
		GCLK PLL	t_{co}	1.343	1.528	1.984	2.084	2.295	2.309	2.307	2.195	2.411	2.420	2.297	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.157	3.403	4.809	5.215	5.727	5.589	5.860	5.343	5.856	5.718	5.937	ns
		GCLK PLL	t_{co}	1.354	1.538	1.985	2.085	2.294	2.308	2.306	2.195	2.409	2.418	2.295	ns
	6mA	GCLK	t_{co}	3.147	3.394	4.807	5.213	5.726	5.588	5.859	5.342	5.856	5.718	5.937	ns
		GCLK PLL	t_{co}	1.344	1.529	1.983	2.083	2.293	2.307	2.305	2.194	2.409	2.418	2.295	ns
	8mA	GCLK	t_{co}	3.133	3.380	4.792	5.198	5.712	5.574	5.845	5.327	5.841	5.703	5.922	ns
		GCLK PLL	t_{co}	1.330	1.515	1.968	2.068	2.279	2.293	2.291	2.179	2.394	2.403	2.280	ns
	10mA	GCLK	t_{co}	3.130	3.376	4.788	5.194	5.708	5.570	5.841	5.323	5.837	5.699	5.918	ns
		GCLK PLL	t_{co}	1.327	1.511	1.964	2.064	2.275	2.289	2.287	2.175	2.390	2.399	2.276	ns
	12mA	GCLK	t_{co}	3.127	3.374	4.789	5.197	5.711	5.573	5.844	5.326	5.841	5.703	5.922	ns
		GCLK PLL	t_{co}	1.324	1.509	1.965	2.067	2.278	2.292	2.290	2.178	2.394	2.403	2.280	ns
	16mA	GCLK	t_{co}	3.128	3.374	4.779	5.185	5.698	5.560	5.831	5.313	5.827	5.689	5.908	ns
		GCLK PLL	t_{co}	1.325	1.509	1.955	2.055	2.265	2.279	2.277	2.165	2.380	2.389	2.266	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.177	3.427	4.850	5.258	5.774	5.636	5.907	5.387	5.903	5.765	5.984	ns
		GCLK PLL	t_{co}	1.374	1.562	2.026	2.128	2.341	2.355	2.353	2.239	2.456	2.465	2.342	ns
	6mA	GCLK	t_{co}	3.153	3.403	4.832	5.241	5.757	5.619	5.890	5.370	5.888	5.750	5.969	ns
		GCLK PLL	t_{co}	1.350	1.538	2.008	2.111	2.324	2.338	2.336	2.222	2.441	2.450	2.327	ns
	8mA	GCLK	t_{co}	3.136	3.384	4.810	5.219	5.735	5.597	5.868	5.348	5.866	5.728	5.947	ns
		GCLK PLL	t_{co}	1.333	1.519	1.986	2.089	2.302	2.316	2.314	2.200	2.419	2.428	2.305	ns

Table 1–118. EP3SE80 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.181	3.430	4.850	5.258	5.773	5.635	5.906	5.387	5.903	5.765	5.984	ns
		GCLK PLL	t_{co}	1.378	1.565	2.026	2.128	2.340	2.354	2.352	2.239	2.456	2.465	2.342	ns
	6mA	GCLK	t_{co}	3.166	3.415	4.836	5.243	5.758	5.620	5.891	5.372	5.888	5.750	5.969	ns
		GCLK PLL	t_{co}	1.363	1.550	2.012	2.113	2.325	2.339	2.337	2.224	2.441	2.450	2.327	ns
	8mA	GCLK	t_{co}	3.155	3.404	4.831	5.240	5.755	5.617	5.888	5.369	5.886	5.748	5.967	ns
		GCLK PLL	t_{co}	1.352	1.539	2.007	2.110	2.322	2.336	2.334	2.221	2.439	2.448	2.325	ns
	10mA	GCLK	t_{co}	3.135	3.384	4.808	5.216	5.732	5.594	5.865	5.346	5.862	5.724	5.943	ns
		GCLK PLL	t_{co}	1.332	1.519	1.984	2.086	2.299	2.313	2.311	2.198	2.415	2.424	2.301	ns
	12mA	GCLK	t_{co}	3.132	3.380	4.804	5.213	5.728	5.590	5.861	5.342	5.859	5.721	5.940	ns
		GCLK PLL	t_{co}	1.329	1.515	1.980	2.083	2.295	2.309	2.307	2.194	2.412	2.421	2.298	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.137	3.384	4.795	5.201	5.714	5.576	5.847	5.329	5.843	5.705	5.924	ns
		GCLK PLL	t_{co}	1.334	1.519	1.971	2.071	2.281	2.295	2.293	2.181	2.396	2.405	2.282	ns
	16mA	GCLK	t_{co}	3.130	3.377	4.794	5.202	5.717	5.579	5.850	5.332	5.848	5.710	5.929	ns
		GCLK PLL	t_{co}	1.327	1.512	1.970	2.072	2.284	2.298	2.296	2.184	2.401	2.410	2.287	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.168	3.416	4.832	5.239	5.753	5.615	5.886	5.368	5.883	5.745	5.964	ns
		GCLK PLL	t_{co}	1.365	1.551	2.008	2.109	2.320	2.334	2.332	2.220	2.436	2.445	2.322	ns
	12mA	GCLK	t_{co}	3.150	3.399	4.817	5.224	5.738	5.600	5.871	5.353	5.868	5.730	5.949	ns
		GCLK PLL	t_{co}	1.347	1.534	1.993	2.094	2.305	2.319	2.317	2.205	2.421	2.430	2.307	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.136	3.383	4.794	5.200	5.713	5.575	5.846	5.329	5.843	5.705	5.924	ns
		GCLK PLL	t_{co}	1.333	1.518	1.970	2.070	2.280	2.294	2.292	2.181	2.396	2.405	2.282	ns

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Table 1–119 and Table 1–120 list the EP3SE80 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–119 lists the EP3SE80 column pin delay adders when using the regional clock.

Table 1–119. EP3SE80 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.251	0.187	0.308	0.239	0.389	0.103	0.176	0.199	0.102	0.099	0.172	ns
RCLK PLL input adder	1.895	1.982	2.923	3.16	3.601	4.28	4.913	3.261	4.491	4.295	4.833	ns
RCLK output adder	-0.069	0.253	0.551	0.865	0.693	-0.059	-0.119	1.06	0.135	0.066	-0.046	ns
RCLK PLL output adder	-1.545	-1.367	-1.715	-1.587	-1.976	-3.145	-3.116	-1.541	-3.343	-3.027	-3.123	ns

Table 1–120 lists the EP3SE80 row pin delay adders when using the regional clock.

Table 1–120. EP3SE80 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.014	0.014	0.018	0.005	-0.022	0.0	0.052	-0.004	-0.014	-0.008	0.056	ns
RCLK PLL input adder	0.116	0.122	0.192	0.206	0.231	0.217	0.367	0.198	0.223	0.21	0.371	ns
RCLK output adder	0.004	0.003	0.029	0.042	0.056	0.039	-0.021	0.047	0.061	0.049	-0.025	ns
RCLK PLL output adder	-0.089	-0.089	-0.145	-0.161	-0.197	-0.169	-0.332	-0.151	-0.186	-0.157	-0.333	ns

EP3SE110 I/O Timing Parameters

Table 1–121 through Table 1–124 list the maximum I/O timing parameters for EP3SE110 for single-ended I/O standards.

Table 1–121 lists the EP3SE110 column pins input timing parameters for single-ended I/O standards.

Table 1–121. EP3SE110 Column Pins Input Timing Parameters (Part 1 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.030	-1.006	-1.454	-1.613	-1.847	-1.786	-2.148	-1.613	-1.847	-1.786	-2.148	ns
		t_h	1.172	1.144	1.648	1.838	2.093	2.017	2.385	1.838	2.093	2.017	2.385	ns
	GCLK PLL	t_{su}	-1.297	-1.267	-1.831	-2.023	-2.261	-2.187	-2.655	-2.023	-2.261	-2.187	-2.655	ns
		t_h	1.600	1.565	2.262	2.514	2.793	2.689	3.180	2.514	2.793	2.689	3.180	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.030	-1.006	-1.454	-1.613	-1.847	-1.786	-2.148	-1.613	-1.847	-1.786	-2.148	ns
		t_h	1.172	1.144	1.648	1.838	2.093	2.017	2.385	1.838	2.093	2.017	2.385	ns
	GCLK PLL	t_{su}	-1.297	-1.267	-1.831	-2.023	-2.261	-2.187	-2.655	-2.023	-2.261	-2.187	-2.655	ns
		t_h	1.600	1.565	2.262	2.514	2.793	2.689	3.180	2.514	2.793	2.689	3.180	ns

Table 1–121. EP3SE110 Column Pins Input Timing Parameters (Part 2 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVTTL	GCLK	t_{su}	-1.041	-1.017	-1.453	-1.615	-1.846	-1.785	-2.147	-1.615	-1.846	-1.785	-2.147	ns
		t_h	1.183	1.155	1.647	1.840	2.092	2.016	2.384	1.840	2.092	2.016	2.384	ns
	GCLK PLL	t_{su}	-1.308	-1.278	-1.830	-2.025	-2.260	-2.186	-2.654	-2.025	-2.260	-2.186	-2.654	ns
		t_h	1.611	1.576	2.261	2.516	2.792	2.688	3.179	2.516	2.792	2.688	3.179	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.041	-1.017	-1.453	-1.615	-1.846	-1.785	-2.147	-1.615	-1.846	-1.785	-2.147	ns
		t_h	1.183	1.155	1.647	1.840	2.092	2.016	2.384	1.840	2.092	2.016	2.384	ns
	GCLK PLL	t_{su}	-1.308	-1.278	-1.830	-2.025	-2.260	-2.186	-2.654	-2.025	-2.260	-2.186	-2.654	ns
		t_h	1.611	1.576	2.261	2.516	2.792	2.688	3.179	2.516	2.792	2.688	3.179	ns
2.5 V	GCLK	t_{su}	-1.036	-1.012	-1.462	-1.627	-1.865	-1.804	-2.166	-1.627	-1.865	-1.804	-2.166	ns
		t_h	1.178	1.150	1.656	1.852	2.111	2.035	2.403	1.852	2.111	2.035	2.403	ns
	GCLK PLL	t_{su}	-1.303	-1.273	-1.839	-2.037	-2.279	-2.205	-2.673	-2.037	-2.279	-2.205	-2.673	ns
		t_h	1.606	1.571	2.270	2.528	2.811	2.707	3.198	2.528	2.811	2.707	3.198	ns
1.8 V	GCLK	t_{su}	-1.058	-1.034	-1.502	-1.663	-1.863	-1.802	-2.164	-1.663	-1.863	-1.802	-2.164	ns
		t_h	1.202	1.174	1.696	1.888	2.109	2.033	2.401	1.888	2.109	2.033	2.401	ns
	GCLK PLL	t_{su}	-1.325	-1.295	-1.879	-2.073	-2.277	-2.203	-2.671	-2.073	-2.277	-2.203	-2.671	ns
		t_h	1.630	1.595	2.310	2.564	2.809	2.705	3.196	2.564	2.809	2.705	3.196	ns
1.5 V	GCLK	t_{su}	-1.048	-1.024	-1.479	-1.631	-1.793	-1.732	-2.094	-1.631	-1.793	-1.732	-2.094	ns
		t_h	1.192	1.164	1.673	1.856	2.039	1.963	2.331	1.856	2.039	1.963	2.331	ns
	GCLK PLL	t_{su}	-1.315	-1.285	-1.856	-2.041	-2.207	-2.133	-2.601	-2.041	-2.207	-2.133	-2.601	ns
		t_h	1.620	1.585	2.287	2.532	2.739	2.635	3.126	2.532	2.739	2.635	3.126	ns
1.2 V	GCLK	t_{su}	-0.996	-0.972	-1.402	-1.532	-1.637	-1.576	-1.938	-1.532	-1.637	-1.576	-1.938	ns
		t_h	1.140	1.112	1.596	1.757	1.883	1.807	2.175	1.757	1.883	1.807	2.175	ns
	GCLK PLL	t_{su}	-1.263	-1.233	-1.779	-1.942	-2.051	-1.977	-2.445	-1.942	-2.051	-1.977	-2.445	ns
		t_h	1.568	1.533	2.210	2.433	2.583	2.479	2.970	2.433	2.583	2.479	2.970	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.967	-0.943	-1.374	-1.516	-1.639	-1.578	-1.940	-1.516	-1.639	-1.578	-1.940	ns
		t_h	1.111	1.083	1.568	1.741	1.885	1.809	2.177	1.741	1.885	1.809	2.177	ns
	GCLK PLL	t_{su}	-1.234	-1.204	-1.751	-1.926	-2.053	-1.979	-2.447	-1.926	-2.053	-1.979	-2.447	ns
		t_h	1.539	1.504	2.182	2.417	2.585	2.481	2.972	2.417	2.585	2.481	2.972	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.967	-0.943	-1.374	-1.516	-1.639	-1.578	-1.940	-1.516	-1.639	-1.578	-1.940	ns
		t_h	1.111	1.083	1.568	1.741	1.885	1.809	2.177	1.741	1.885	1.809	2.177	ns
	GCLK PLL	t_{su}	-1.234	-1.204	-1.751	-1.926	-2.053	-1.979	-2.447	-1.926	-2.053	-1.979	-2.447	ns
		t_h	1.539	1.504	2.182	2.417	2.585	2.481	2.972	2.417	2.585	2.481	2.972	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.961	-0.937	-1.361	-1.508	-1.636	-1.573	-1.938	-1.508	-1.636	-1.573	-1.938	ns
		t_h	1.105	1.077	1.555	1.730	1.879	1.803	2.170	1.730	1.879	1.803	2.170	ns
	GCLK PLL	t_{su}	-1.228	-1.198	-1.738	-1.918	-2.050	-1.974	-2.445	-1.918	-2.050	-1.974	-2.445	ns
		t_h	1.533	1.498	2.169	2.406	2.579	2.475	2.965	2.406	2.579	2.475	2.965	ns

Table 1–121. EP3SE110 Column Pins Input Timing Parameters (Part 3 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	GCLK	t_{su}	-0.961	-0.937	-1.361	-1.508	-1.636	-1.573	-1.938	-1.508	-1.636	-1.573	-1.938	ns
		t_h	1.105	1.077	1.555	1.730	1.879	1.803	2.170	1.730	1.879	1.803	2.170	ns
	GCLK PLL	t_{su}	-1.228	-1.198	-1.738	-1.918	-2.050	-1.974	-2.445	-1.918	-2.050	-1.974	-2.445	ns
		t_h	1.533	1.498	2.169	2.406	2.579	2.475	2.965	2.406	2.579	2.475	2.965	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.950	-0.926	-1.350	-1.497	-1.617	-1.554	-1.919	-1.497	-1.617	-1.554	-1.919	ns
		t_h	1.094	1.066	1.543	1.719	1.860	1.784	2.151	1.719	1.860	1.784	2.151	ns
	GCLK PLL	t_{su}	-1.217	-1.187	-1.727	-1.907	-2.031	-1.955	-2.426	-1.907	-2.031	-1.955	-2.426	ns
		t_h	1.522	1.487	2.157	2.395	2.560	2.456	2.946	2.395	2.560	2.456	2.946	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.950	-0.926	-1.350	-1.497	-1.617	-1.554	-1.919	-1.497	-1.617	-1.554	-1.919	ns
		t_h	1.094	1.066	1.543	1.719	1.860	1.784	2.151	1.719	1.860	1.784	2.151	ns
	GCLK PLL	t_{su}	-1.217	-1.187	-1.727	-1.907	-2.031	-1.955	-2.426	-1.907	-2.031	-1.955	-2.426	ns
		t_h	1.522	1.487	2.157	2.395	2.560	2.456	2.946	2.395	2.560	2.456	2.946	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.961	-0.937	-1.361	-1.508	-1.636	-1.573	-1.938	-1.508	-1.636	-1.573	-1.938	ns
		t_h	1.105	1.077	1.555	1.730	1.879	1.803	2.170	1.730	1.879	1.803	2.170	ns
	GCLK PLL	t_{su}	-1.228	-1.198	-1.738	-1.918	-2.050	-1.974	-2.445	-1.918	-2.050	-1.974	-2.445	ns
		t_h	1.533	1.498	2.169	2.406	2.579	2.475	2.965	2.406	2.579	2.475	2.965	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.961	-0.937	-1.361	-1.508	-1.636	-1.573	-1.938	-1.508	-1.636	-1.573	-1.938	ns
		t_h	1.105	1.077	1.555	1.730	1.879	1.803	2.170	1.730	1.879	1.803	2.170	ns
	GCLK PLL	t_{su}	-1.228	-1.198	-1.738	-1.918	-2.050	-1.974	-2.445	-1.918	-2.050	-1.974	-2.445	ns
		t_h	1.533	1.498	2.169	2.406	2.579	2.475	2.965	2.406	2.579	2.475	2.965	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.950	-0.926	-1.350	-1.497	-1.617	-1.554	-1.919	-1.497	-1.617	-1.554	-1.919	ns
		t_h	1.094	1.066	1.543	1.719	1.860	1.784	2.151	1.719	1.860	1.784	2.151	ns
	GCLK PLL	t_{su}	-1.217	-1.187	-1.727	-1.907	-2.031	-1.955	-2.426	-1.907	-2.031	-1.955	-2.426	ns
		t_h	1.522	1.487	2.157	2.395	2.560	2.456	2.946	2.395	2.560	2.456	2.946	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.950	-0.926	-1.350	-1.497	-1.617	-1.554	-1.919	-1.497	-1.617	-1.554	-1.919	ns
		t_h	1.094	1.066	1.543	1.719	1.860	1.784	2.151	1.719	1.860	1.784	2.151	ns
	GCLK PLL	t_{su}	-1.217	-1.187	-1.727	-1.907	-2.031	-1.955	-2.426	-1.907	-2.031	-1.955	-2.426	ns
		t_h	1.522	1.487	2.157	2.395	2.560	2.456	2.946	2.395	2.560	2.456	2.946	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.938	-0.914	-1.340	-1.486	-1.601	-1.538	-1.903	-1.486	-1.601	-1.538	-1.903	ns
		t_h	1.082	1.054	1.533	1.708	1.844	1.768	2.135	1.708	1.844	1.768	2.135	ns
	GCLK PLL	t_{su}	-1.205	-1.175	-1.717	-1.896	-2.015	-1.939	-2.410	-1.896	-2.015	-1.939	-2.410	ns
		t_h	1.510	1.475	2.147	2.384	2.544	2.440	2.930	2.384	2.544	2.440	2.930	ns
3.0-V PCI	GCLK	t_{su}	-0.938	-0.914	-1.340	-1.486	-1.601	-1.538	-1.903	-1.486	-1.601	-1.538	-1.903	ns
		t_h	1.082	1.054	1.533	1.708	1.844	1.768	2.135	1.708	1.844	1.768	2.135	ns
	GCLK PLL	t_{su}	-1.205	-1.175	-1.717	-1.896	-2.015	-1.939	-2.410	-1.896	-2.015	-1.939	-2.410	ns
		t_h	1.510	1.475	2.147	2.384	2.544	2.440	2.930	2.384	2.544	2.440	2.930	ns

Table 1–121. EP3SE110 Column Pins Input Timing Parameters (Part 4 of 4)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V PCI-X	GCLK	t_{su}	-1.041	-1.017	-1.453	-1.615	-1.846	-1.785	-2.147	-1.615	-1.846	-1.785	-2.147	ns
		t_h	1.183	1.155	1.647	1.840	2.092	2.016	2.384	1.840	2.092	2.016	2.384	ns
	GCLK PLL	t_{su}	-1.308	-1.278	-1.830	-2.025	-2.260	-2.186	-2.654	-2.025	-2.260	-2.186	-2.654	ns
		t_h	1.611	1.576	2.261	2.516	2.792	2.688	3.179	2.516	2.792	2.688	3.179	ns

Table 1–122 lists the EP3SE110 row pins input timing parameters for single-ended I/O standards.

Table 1–122. EP3SE110 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-0.917	-0.960	-1.364	-1.476	-1.736	-1.642	-2.026	-1.488	-1.737	-1.683	-2.064	ns
		t_h	1.041	1.099	1.561	1.698	1.978	1.873	2.261	1.720	1.989	1.922	2.300	ns
	GCLK PLL	t_{su}	1.022	1.000	1.632	1.851	1.964	1.893	1.808	1.901	1.982	1.864	1.859	ns
		t_h	-0.762	-0.722	-1.218	-1.386	-1.449	-1.406	-1.309	-1.426	-1.456	-1.368	-1.357	ns
3.3-V LVCMOS	GCLK	t_{su}	-0.917	-0.960	-1.364	-1.476	-1.736	-1.642	-2.026	-1.488	-1.737	-1.683	-2.064	ns
		t_h	1.041	1.099	1.561	1.698	1.978	1.873	2.261	1.720	1.989	1.922	2.300	ns
	GCLK PLL	t_{su}	1.022	1.000	1.632	1.851	1.964	1.893	1.808	1.901	1.982	1.864	1.859	ns
		t_h	-0.762	-0.722	-1.218	-1.386	-1.449	-1.406	-1.309	-1.426	-1.456	-1.368	-1.357	ns
3.0-V LVTTL	GCLK	t_{su}	-0.923	-0.971	-1.361	-1.477	-1.739	-1.645	-2.029	-1.487	-1.742	-1.688	-2.069	ns
		t_h	1.047	1.110	1.558	1.699	1.981	1.876	2.264	1.719	1.994	1.927	2.305	ns
	GCLK PLL	t_{su}	1.016	0.989	1.635	1.850	1.961	1.890	1.805	1.902	1.977	1.859	1.854	ns
		t_h	-0.756	-0.711	-1.221	-1.385	-1.446	-1.403	-1.306	-1.427	-1.451	-1.363	-1.352	ns
3.0-V LVCMOS	GCLK	t_{su}	-0.923	-0.971	-1.361	-1.477	-1.739	-1.645	-2.029	-1.487	-1.742	-1.688	-2.069	ns
		t_h	1.047	1.110	1.558	1.699	1.981	1.876	2.264	1.719	1.994	1.927	2.305	ns
	GCLK PLL	t_{su}	1.016	0.989	1.635	1.850	1.961	1.890	1.805	1.902	1.977	1.859	1.854	ns
		t_h	-0.756	-0.711	-1.221	-1.385	-1.446	-1.403	-1.306	-1.427	-1.451	-1.363	-1.352	ns
2.5 V	GCLK	t_{su}	-0.911	-0.964	-1.370	-1.490	-1.754	-1.660	-2.044	-1.496	-1.752	-1.698	-2.079	ns
		t_h	1.035	1.103	1.567	1.712	1.996	1.891	2.279	1.728	2.004	1.937	2.315	ns
	GCLK PLL	t_{su}	1.028	0.996	1.626	1.837	1.946	1.875	1.790	1.893	1.967	1.849	1.844	ns
		t_h	-0.768	-0.718	-1.212	-1.372	-1.431	-1.388	-1.291	-1.418	-1.441	-1.353	-1.342	ns
1.8 V	GCLK	t_{su}	-0.987	-1.042	-1.456	-1.570	-1.756	-1.705	-2.042	-1.576	-1.754	-1.707	-2.080	ns
		t_h	1.112	1.182	1.653	1.793	1.999	1.936	2.277	1.808	2.007	1.948	2.316	ns
	GCLK PLL	t_{su}	1.040	1.054	1.703	1.929	1.948	1.963	1.900	1.946	1.966	1.848	1.952	ns
		t_h	-0.777	-0.773	-1.286	-1.461	-1.433	-1.472	-1.399	-1.468	-1.440	-1.352	-1.447	ns

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Table 1–122. EP3SE110 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	GCLK	t_{su}	-0.977	-1.031	-1.432	-1.538	-1.688	-1.637	-1.974	-1.545	-1.689	-1.642	-2.015	ns
		t_h	1.102	1.171	1.629	1.761	1.931	1.868	2.209	1.777	1.942	1.883	2.251	ns
	GCLK PLL	t_{su}	1.050	1.065	1.727	1.961	2.016	2.031	1.968	1.977	2.031	1.913	2.017	ns
		t_h	-0.787	-0.784	-1.310	-1.493	-1.501	-1.540	-1.467	-1.499	-1.505	-1.417	-1.512	ns
1.2 V	GCLK	t_{su}	-0.917	-0.978	-1.353	-1.437	-1.529	-1.478	-1.815	-1.449	-1.534	-1.487	-1.860	ns
		t_h	1.042	1.118	1.550	1.660	1.772	1.709	2.050	1.681	1.787	1.728	2.096	ns
	GCLK PLL	t_{su}	1.110	1.118	1.806	2.062	2.175	2.190	2.127	2.073	2.186	2.068	2.172	ns
		t_h	-0.847	-0.837	-1.389	-1.594	-1.660	-1.699	-1.626	-1.595	-1.660	-1.572	-1.667	ns
SSTL-2 CLASS I	GCLK	t_{su}	-0.854	-0.906	-1.284	-1.381	-1.534	-1.440	-1.824	-1.384	-1.535	-1.481	-1.862	ns
		t_h	0.979	1.046	1.481	1.603	1.776	1.671	2.059	1.616	1.787	1.720	2.098	ns
	GCLK PLL	t_{su}	1.085	1.054	1.712	1.946	2.166	2.095	2.010	2.005	2.184	2.066	2.061	ns
		t_h	-0.824	-0.775	-1.298	-1.481	-1.651	-1.608	-1.511	-1.530	-1.658	-1.570	-1.559	ns
SSTL-2 CLASS II	GCLK	t_{su}	-0.854	-0.906	-1.284	-1.381	-1.534	-1.440	-1.824	-1.384	-1.535	-1.481	-1.862	ns
		t_h	0.979	1.046	1.481	1.603	1.776	1.671	2.059	1.616	1.787	1.720	2.098	ns
	GCLK PLL	t_{su}	1.085	1.054	1.712	1.946	2.166	2.095	2.010	2.005	2.184	2.066	2.061	ns
		t_h	-0.824	-0.775	-1.298	-1.481	-1.651	-1.608	-1.511	-1.530	-1.658	-1.570	-1.559	ns
SSTL-18 CLASS I	GCLK	t_{su}	-0.891	-0.943	-1.315	-1.410	-1.524	-1.472	-1.811	-1.417	-1.530	-1.479	-1.853	ns
		t_h	1.016	1.083	1.512	1.631	1.765	1.702	2.042	1.647	1.778	1.719	2.085	ns
	GCLK PLL	t_{su}	1.136	1.153	1.844	2.087	2.180	2.193	2.129	2.102	2.193	2.076	2.177	ns
		t_h	-0.873	-0.872	-1.427	-1.621	-1.667	-1.704	-1.632	-1.627	-1.670	-1.581	-1.676	ns
SSTL-18 CLASS II	GCLK	t_{su}	-0.891	-0.943	-1.315	-1.410	-1.524	-1.472	-1.811	-1.417	-1.530	-1.479	-1.853	ns
		t_h	1.016	1.083	1.512	1.631	1.765	1.702	2.042	1.647	1.778	1.719	2.085	ns
	GCLK PLL	t_{su}	1.136	1.153	1.844	2.087	2.180	2.193	2.129	2.102	2.193	2.076	2.177	ns
		t_h	-0.873	-0.872	-1.427	-1.621	-1.667	-1.704	-1.632	-1.627	-1.670	-1.581	-1.676	ns
SSTL-15 CLASS I	GCLK	t_{su}	-0.877	-0.931	-1.300	-1.400	-1.506	-1.454	-1.793	-1.406	-1.513	-1.462	-1.836	ns
		t_h	1.002	1.071	1.498	1.621	1.747	1.684	2.024	1.636	1.761	1.702	2.068	ns
	GCLK PLL	t_{su}	1.150	1.165	1.857	2.097	2.198	2.211	2.147	2.113	2.210	2.093	2.194	ns
		t_h	-0.887	-0.884	-1.439	-1.631	-1.685	-1.722	-1.650	-1.638	-1.687	-1.598	-1.693	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-0.891	-0.943	-1.315	-1.410	-1.524	-1.472	-1.811	-1.417	-1.530	-1.479	-1.853	ns
		t_h	1.016	1.083	1.512	1.631	1.765	1.702	2.042	1.647	1.778	1.719	2.085	ns
	GCLK PLL	t_{su}	1.136	1.153	1.844	2.087	2.180	2.193	2.129	2.102	2.193	2.076	2.177	ns
		t_h	-0.873	-0.872	-1.427	-1.621	-1.667	-1.704	-1.632	-1.627	-1.670	-1.581	-1.676	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-0.891	-0.943	-1.315	-1.410	-1.524	-1.472	-1.811	-1.417	-1.530	-1.479	-1.853	ns
		t_h	1.016	1.083	1.512	1.631	1.765	1.702	2.042	1.647	1.778	1.719	2.085	ns
	GCLK PLL	t_{su}	1.136	1.153	1.844	2.087	2.180	2.193	2.129	2.102	2.193	2.076	2.177	ns
		t_h	-0.873	-0.872	-1.427	-1.621	-1.667	-1.704	-1.632	-1.627	-1.670	-1.581	-1.676	ns

Table 1–122. EP3SE110 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5-V HSTL CLASS I	GCLK	t_{su}	-0.877	-0.931	-1.300	-1.400	-1.506	-1.454	-1.793	-1.406	-1.513	-1.462	-1.836	ns
		t_h	1.002	1.071	1.498	1.621	1.747	1.684	2.024	1.636	1.761	1.702	2.068	ns
	GCLK PLL	t_{su}	1.150	1.165	1.857	2.097	2.198	2.211	2.147	2.113	2.210	2.093	2.194	ns
		t_h	-0.887	-0.884	-1.439	-1.631	-1.685	-1.722	-1.650	-1.638	-1.687	-1.598	-1.693	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-0.877	-0.931	-1.300	-1.400	-1.506	-1.454	-1.793	-1.406	-1.513	-1.462	-1.836	ns
		t_h	1.002	1.071	1.498	1.621	1.747	1.684	2.024	1.636	1.761	1.702	2.068	ns
	GCLK PLL	t_{su}	1.150	1.165	1.857	2.097	2.198	2.211	2.147	2.113	2.210	2.093	2.194	ns
		t_h	-0.887	-0.884	-1.439	-1.631	-1.685	-1.722	-1.650	-1.638	-1.687	-1.598	-1.693	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	-0.868	-0.919	-1.291	-1.390	-1.490	-1.438	-1.777	-1.397	-1.497	-1.446	-1.820	ns
		t_h	0.993	1.059	1.489	1.611	1.731	1.668	2.008	1.627	1.745	1.686	2.052	ns
	GCLK PLL	t_{su}	1.159	1.177	1.866	2.107	2.214	2.227	2.163	2.122	2.226	2.109	2.210	ns
		t_h	-0.896	-0.896	-1.448	-1.641	-1.701	-1.738	-1.666	-1.647	-1.703	-1.614	-1.709	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-0.868	-0.919	-1.291	-1.390	-1.490	-1.438	-1.777	-1.397	-1.497	-1.446	-1.820	ns
		t_h	0.993	1.059	1.489	1.611	1.731	1.668	2.008	1.627	1.745	1.686	2.052	ns
	GCLK PLL	t_{su}	1.159	1.177	1.866	2.107	2.214	2.227	2.163	2.122	2.226	2.109	2.210	ns
		t_h	-0.896	-0.896	-1.448	-1.641	-1.701	-1.738	-1.666	-1.647	-1.703	-1.614	-1.709	ns
3.0-V PCI	GCLK	t_{su}	-0.923	-0.971	-1.361	-1.477	-1.739	-1.645	-2.029	-1.487	-1.742	-1.688	-2.069	ns
		t_h	1.047	1.110	1.558	1.699	1.981	1.876	2.264	1.719	1.994	1.927	2.305	ns
	GCLK PLL	t_{su}	1.016	0.989	1.635	1.850	1.961	1.890	1.805	1.902	1.977	1.859	1.854	ns
		t_h	-0.756	-0.711	-1.221	-1.385	-1.446	-1.403	-1.306	-1.427	-1.451	-1.363	-1.352	ns
3.0-V PCI-X	GCLK	t_{su}	-0.923	-0.971	-1.361	-1.477	-1.739	-1.645	-2.029	-1.487	-1.742	-1.688	-2.069	ns
		t_h	1.047	1.110	1.558	1.699	1.981	1.876	2.264	1.719	1.994	1.927	2.305	ns
	GCLK PLL	t_{su}	1.016	0.989	1.635	1.850	1.961	1.890	1.805	1.902	1.977	1.859	1.854	ns
		t_h	-0.756	-0.711	-1.221	-1.385	-1.446	-1.403	-1.306	-1.427	-1.451	-1.363	-1.352	ns

Table 1–123 lists the EP3SE110 column pins output timing parameters for single-ended I/O standards.

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.489	3.489	4.830	5.213	5.686	5.551	5.863	5.213	5.686	5.551	5.863	ns
		GCLK PLL	t_{co}	3.868	3.881	5.415	5.837	6.442	6.278	6.680	5.837	6.442	6.278	6.680	ns
	8mA	GCLK	t_{co}	3.422	3.422	4.721	5.102	5.573	5.438	5.750	5.102	5.573	5.438	5.750	ns
		GCLK PLL	t_{co}	3.801	3.814	5.306	5.726	6.329	6.165	6.567	5.726	6.329	6.165	6.567	ns
	12mA	GCLK	t_{co}	3.336	3.336	4.617	5.003	5.481	5.346	5.658	5.003	5.481	5.346	5.658	ns
		GCLK PLL	t_{co}	3.715	3.728	5.203	5.628	6.237	6.073	6.475	5.628	6.237	6.073	6.475	ns
	16mA	GCLK	t_{co}	3.329	3.329	4.600	4.975	5.440	5.305	5.617	4.975	5.440	5.305	5.617	ns
		GCLK PLL	t_{co}	3.709	3.721	5.186	5.600	6.196	6.032	6.434	5.600	6.196	6.032	6.434	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.495	3.495	4.834	5.218	5.693	5.558	5.870	5.218	5.693	5.558	5.870	ns
		GCLK PLL	t_{co}	3.874	3.887	5.420	5.842	6.449	6.285	6.687	5.842	6.449	6.285	6.687	ns
	8mA	GCLK	t_{co}	3.340	3.340	4.627	5.020	5.492	5.357	5.669	5.020	5.492	5.357	5.669	ns
		GCLK PLL	t_{co}	3.719	3.732	5.213	5.645	6.248	6.084	6.486	5.645	6.248	6.084	6.486	ns
	12mA	GCLK	t_{co}	3.347	3.347	4.621	4.999	5.466	5.331	5.643	4.999	5.466	5.331	5.643	ns
		GCLK PLL	t_{co}	3.726	3.739	5.207	5.624	6.222	6.058	6.460	5.624	6.222	6.058	6.460	ns
	16mA	GCLK	t_{co}	3.331	3.331	4.599	4.974	5.437	5.302	5.614	4.974	5.437	5.302	5.614	ns
		GCLK PLL	t_{co}	3.710	3.723	5.184	5.599	6.193	6.029	6.431	5.599	6.193	6.029	6.431	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.453	3.453	4.797	5.181	5.653	5.518	5.830	5.181	5.653	5.518	5.830	ns
		GCLK PLL	t_{co}	3.831	3.845	5.382	5.805	6.409	6.245	6.647	5.805	6.409	6.245	6.647	ns
	8mA	GCLK	t_{co}	3.342	3.342	4.667	5.047	5.515	5.381	5.691	5.047	5.515	5.381	5.691	ns
		GCLK PLL	t_{co}	3.724	3.734	5.252	5.674	6.272	6.109	6.509	5.674	6.272	6.109	6.509	ns
	12mA	GCLK	t_{co}	3.306	3.306	4.604	4.978	5.441	5.307	5.618	4.978	5.441	5.307	5.618	ns
		GCLK PLL	t_{co}	3.686	3.698	5.189	5.602	6.198	6.035	6.435	5.602	6.198	6.035	6.435	ns
	16mA	GCLK	t_{co}	3.288	3.288	4.575	4.950	5.413	5.278	5.590	4.950	5.413	5.278	5.590	ns
		GCLK PLL	t_{co}	3.667	3.680	5.160	5.575	6.169	6.005	6.407	5.575	6.169	6.005	6.407	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.367	3.367	4.701	5.081	5.550	5.416	5.726	5.081	5.550	5.416	5.726	ns
		GCLK PLL	t_{co}	3.748	3.759	5.286	5.707	6.307	6.144	6.544	5.707	6.307	6.144	6.544	ns
	8mA	GCLK	t_{co}	3.288	3.288	4.577	4.952	5.415	5.281	5.591	4.952	5.415	5.281	5.591	ns
		GCLK PLL	t_{co}	3.669	3.680	5.163	5.577	6.172	6.009	6.413	5.577	6.172	6.009	6.413	ns
	12mA	GCLK	t_{co}	3.283	3.283	4.570	4.945	5.407	5.272	5.584	4.945	5.407	5.272	5.584	ns
		GCLK PLL	t_{co}	3.662	3.675	5.155	5.570	6.163	5.999	6.401	5.570	6.163	5.999	6.401	ns
	16mA	GCLK	t_{co}	3.274	3.274	4.556	4.930	5.392	5.257	5.569	4.930	5.392	5.257	5.569	ns
		GCLK PLL	t_{co}	3.653	3.666	5.141	5.554	6.148	5.984	6.387	5.554	6.148	5.984	6.387	ns
2.5 V	4mA	GCLK	t_{co}	3.489	3.489	4.908	5.308	5.797	5.663	5.974	5.308	5.797	5.663	5.974	ns
		GCLK PLL	t_{co}	3.868	3.881	5.493	5.932	6.554	6.391	6.791	5.932	6.554	6.391	6.791	ns
	8mA	GCLK	t_{co}	3.389	3.389	4.789	5.182	5.665	5.531	5.841	5.182	5.665	5.531	5.841	ns
		GCLK PLL	t_{co}	3.771	3.781	5.374	5.807	6.422	6.259	6.659	5.807	6.422	6.259	6.659	ns
	12mA	GCLK	t_{co}	3.345	3.345	4.702	5.091	5.570	5.435	5.747	5.091	5.570	5.435	5.747	ns
		GCLK PLL	t_{co}	3.726	3.737	5.287	5.716	6.326	6.162	6.564	5.716	6.326	6.162	6.564	ns
	16mA	GCLK	t_{co}	3.307	3.307	4.663	5.049	5.527	5.392	5.704	5.049	5.527	5.392	5.704	ns
		GCLK PLL	t_{co}	3.687	3.699	5.248	5.674	6.283	6.119	6.521	5.674	6.283	6.119	6.521	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.680	3.680	5.229	5.668	6.202	6.067	6.379	5.668	6.202	6.067	6.379	ns
		GCLK PLL	t_{co}	4.059	4.072	5.815	6.291	6.958	6.794	7.196	6.291	6.958	6.794	7.196	ns
	4mA	GCLK	t_{co}	3.499	3.499	4.950	5.359	5.854	5.720	6.030	5.359	5.854	5.720	6.030	ns
		GCLK PLL	t_{co}	3.881	3.891	5.536	5.984	6.611	6.448	6.848	5.984	6.611	6.448	6.848	ns
	6mA	GCLK	t_{co}	3.417	3.417	4.843	5.244	5.744	5.609	5.921	5.244	5.744	5.609	5.921	ns
		GCLK PLL	t_{co}	3.796	3.809	5.429	5.868	6.500	6.336	6.738	5.868	6.500	6.336	6.738	ns
	8mA	GCLK	t_{co}	3.397	3.397	4.785	5.190	5.678	5.543	5.855	5.190	5.678	5.543	5.855	ns
		GCLK PLL	t_{co}	3.776	3.789	5.370	5.814	6.434	6.270	6.672	5.814	6.434	6.270	6.672	ns
	10mA	GCLK	t_{co}	3.334	3.334	4.724	5.115	5.597	5.462	5.774	5.115	5.597	5.462	5.774	ns
		GCLK PLL	t_{co}	3.713	3.726	5.309	5.740	6.353	6.189	6.591	5.740	6.353	6.189	6.591	ns
	12mA	GCLK	t_{co}	3.316	3.316	4.703	5.094	5.574	5.439	5.751	5.094	5.574	5.439	5.751	ns
		GCLK PLL	t_{co}	3.696	3.708	5.289	5.719	6.330	6.166	6.568	5.719	6.330	6.166	6.568	ns
1.5 V	2mA	GCLK	t_{co}	3.626	3.626	5.158	5.600	6.140	6.005	6.317	5.600	6.140	6.005	6.317	ns
		GCLK PLL	t_{co}	4.005	4.018	5.743	6.224	6.896	6.732	7.134	6.224	6.896	6.732	7.134	ns
	4mA	GCLK	t_{co}	3.414	3.414	4.839	5.244	5.748	5.613	5.925	5.244	5.748	5.613	5.925	ns
		GCLK PLL	t_{co}	3.793	3.806	5.424	5.867	6.504	6.340	6.742	5.867	6.504	6.340	6.742	ns
	6mA	GCLK	t_{co}	3.389	3.389	4.772	5.184	5.681	5.546	5.858	5.184	5.681	5.546	5.858	ns
		GCLK PLL	t_{co}	3.769	3.781	5.357	5.809	6.437	6.273	6.675	5.809	6.437	6.273	6.675	ns
	8mA	GCLK	t_{co}	3.378	3.378	4.755	5.159	5.661	5.526	5.838	5.159	5.661	5.526	5.838	ns
		GCLK PLL	t_{co}	3.757	3.770	5.340	5.784	6.417	6.253	6.655	5.784	6.417	6.253	6.655	ns
	10mA	GCLK	t_{co}	3.323	3.323	4.717	5.108	5.591	5.456	5.768	5.108	5.591	5.456	5.768	ns
		GCLK PLL	t_{co}	3.702	3.715	5.302	5.733	6.347	6.183	6.585	5.733	6.347	6.183	6.585	ns
	12mA	GCLK	t_{co}	3.318	3.318	4.700	5.097	5.580	5.445	5.757	5.097	5.580	5.445	5.757	ns
		GCLK PLL	t_{co}	3.696	3.710	5.286	5.720	6.336	6.172	6.574	5.720	6.336	6.172	6.574	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.542	3.542	5.084	5.536	6.084	5.949	6.261	5.536	6.084	5.949	6.261	ns
		GCLK PLL	t_{co}	3.921	3.934	5.669	6.159	6.840	6.676	7.078	6.159	6.840	6.676	7.078	ns
	4mA	GCLK	t_{co}	3.419	3.419	4.858	5.274	5.798	5.663	5.975	5.274	5.798	5.663	5.975	ns
		GCLK PLL	t_{co}	3.799	3.811	5.444	5.899	6.554	6.390	6.792	5.899	6.554	6.390	6.792	ns
	6mA	GCLK	t_{co}	3.381	3.381	4.766	5.185	5.685	5.550	5.862	5.185	5.685	5.550	5.862	ns
		GCLK PLL	t_{co}	3.761	3.773	5.351	5.809	6.441	6.277	6.679	5.809	6.441	6.277	6.679	ns
	8mA	GCLK	t_{co}	3.334	3.334	4.738	5.136	5.629	5.494	5.806	5.136	5.629	5.494	5.806	ns
		GCLK PLL	t_{co}	3.712	3.726	5.323	5.759	6.385	6.221	6.623	5.759	6.385	6.221	6.623	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.334	3.334	4.695	5.083	5.560	5.425	5.737	5.083	5.560	5.425	5.737	ns
		GCLK PLL	t_{co}	3.713	3.726	5.280	5.706	6.316	6.152	6.554	5.706	6.316	6.152	6.554	ns
	10mA	GCLK	t_{co}	3.331	3.331	4.692	5.080	5.556	5.421	5.733	5.080	5.556	5.421	5.733	ns
		GCLK PLL	t_{co}	3.710	3.723	5.277	5.702	6.312	6.148	6.550	5.702	6.312	6.148	6.550	ns
	12mA	GCLK	t_{co}	3.329	3.329	4.692	5.081	5.557	5.422	5.734	5.081	5.557	5.422	5.734	ns
		GCLK PLL	t_{co}	3.709	3.721	5.277	5.703	6.313	6.149	6.551	5.703	6.313	6.149	6.551	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.320	3.320	4.677	5.065	5.542	5.407	5.719	5.065	5.542	5.407	5.719	ns
		GCLK PLL	t_{co}	3.700	3.712	5.263	5.689	6.298	6.134	6.536	5.689	6.298	6.134	6.536	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.341	3.341	4.707	5.097	5.576	5.441	5.753	5.097	5.576	5.441	5.753	ns
		GCLK PLL	t_{co}	3.720	3.733	5.292	5.720	6.332	6.168	6.570	5.720	6.332	6.168	6.570	ns
	6mA	GCLK	t_{co}	3.337	3.337	4.705	5.095	5.574	5.439	5.751	5.095	5.574	5.439	5.751	ns
		GCLK PLL	t_{co}	3.716	3.729	5.290	5.718	6.330	6.166	6.568	5.718	6.330	6.166	6.568	ns
	8mA	GCLK	t_{co}	3.326	3.326	4.695	5.086	5.565	5.430	5.742	5.086	5.565	5.430	5.742	ns
		GCLK PLL	t_{co}	3.706	3.718	5.280	5.709	6.321	6.157	6.559	5.709	6.321	6.157	6.559	ns
	10mA	GCLK	t_{co}	3.315	3.315	4.682	5.073	5.552	5.417	5.729	5.073	5.552	5.417	5.729	ns
		GCLK PLL	t_{co}	3.694	3.707	5.268	5.696	6.308	6.144	6.546	5.696	6.308	6.144	6.546	ns
	12mA	GCLK	t_{co}	3.315	3.315	4.682	5.073	5.552	5.417	5.729	5.073	5.552	5.417	5.729	ns
		GCLK PLL	t_{co}	3.694	3.707	5.267	5.696	6.308	6.144	6.546	5.696	6.308	6.144	6.546	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.321	3.321	4.681	5.070	5.547	5.412	5.724	5.070	5.547	5.412	5.724	ns
		GCLK PLL	t_{co}	3.701	3.713	5.266	5.693	6.303	6.139	6.541	5.693	6.303	6.139	6.541	ns
	16mA	GCLK	t_{co}	3.324	3.324	4.689	5.079	5.559	5.424	5.736	5.079	5.559	5.424	5.736	ns
		GCLK PLL	t_{co}	3.703	3.716	5.274	5.702	6.315	6.151	6.553	5.702	6.315	6.151	6.553	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.345	3.345	4.716	5.109	5.589	5.454	5.766	5.109	5.589	5.454	5.766	ns
		GCLK PLL	t_{co}	3.723	3.737	5.302	5.731	6.345	6.181	6.583	5.731	6.345	6.181	6.583	ns
	6mA	GCLK	t_{co}	3.331	3.331	4.706	5.099	5.580	5.445	5.757	5.099	5.580	5.445	5.757	ns
		GCLK PLL	t_{co}	3.711	3.723	5.291	5.722	6.336	6.172	6.574	5.722	6.336	6.172	6.574	ns
	8mA	GCLK	t_{co}	3.320	3.320	4.692	5.085	5.566	5.431	5.743	5.085	5.566	5.431	5.743	ns
		GCLK PLL	t_{co}	3.699	3.712	5.278	5.708	6.322	6.158	6.560	5.708	6.322	6.158	6.560	ns
	10mA	GCLK	t_{co}	3.319	3.319	4.695	5.088	5.570	5.435	5.747	5.088	5.570	5.435	5.747	ns
		GCLK PLL	t_{co}	3.698	3.711	5.281	5.711	6.326	6.162	6.564	5.711	6.326	6.162	6.564	ns
	12mA	GCLK	t_{co}	3.316	3.316	4.690	5.083	5.564	5.429	5.741	5.083	5.564	5.429	5.741	ns
		GCLK PLL	t_{co}	3.695	3.708	5.275	5.705	6.320	6.156	6.558	5.705	6.320	6.156	6.558	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.318	3.318	4.679	5.069	5.547	5.412	5.724	5.069	5.547	5.412	5.724	ns
		GCLK PLL	t_{co}	3.697	3.710	5.264	5.692	6.303	6.139	6.541	5.692	6.303	6.139	6.541	ns
	16mA	GCLK	t_{co}	3.321	3.321	4.686	5.078	5.558	5.423	5.735	5.078	5.558	5.423	5.735	ns
		GCLK PLL	t_{co}	3.700	3.713	5.271	5.700	6.314	6.150	6.552	5.700	6.314	6.150	6.552	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.328	3.328	4.681	5.069	5.545	5.410	5.722	5.069	5.545	5.410	5.722	ns
		GCLK PLL	t_{co}	3.707	3.720	5.266	5.691	6.301	6.137	6.539	5.691	6.301	6.137	6.539	ns
	6mA	GCLK	t_{co}	3.321	3.321	4.679	5.067	5.544	5.409	5.721	5.067	5.544	5.409	5.721	ns
		GCLK PLL	t_{co}	3.701	3.713	5.264	5.691	6.300	6.136	6.538	5.691	6.300	6.136	6.538	ns
	8mA	GCLK	t_{co}	3.313	3.313	4.671	5.060	5.537	5.402	5.714	5.060	5.537	5.402	5.714	ns
		GCLK PLL	t_{co}	3.693	3.705	5.257	5.683	6.293	6.129	6.531	5.683	6.293	6.129	6.531	ns
	10mA	GCLK	t_{co}	3.316	3.316	4.674	5.063	5.541	5.406	5.718	5.063	5.541	5.406	5.718	ns
		GCLK PLL	t_{co}	3.695	3.708	5.260	5.686	6.297	6.133	6.535	5.686	6.297	6.133	6.535	ns
	12mA	GCLK	t_{co}	3.313	3.313	4.677	5.067	5.545	5.410	5.722	5.067	5.545	5.410	5.722	ns
		GCLK PLL	t_{co}	3.692	3.705	5.262	5.689	6.301	6.137	6.539	5.689	6.301	6.137	6.539	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.321	3.321	4.676	5.064	5.541	5.406	5.718	5.064	5.541	5.406	5.718	ns
		GCLK PLL	t_{co}	3.700	3.713	5.261	5.687	6.297	6.133	6.535	5.687	6.297	6.133	6.535	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.333	3.333	4.689	5.079	5.556	5.421	5.733	5.079	5.556	5.421	5.733	ns
		GCLK PLL	t_{co}	3.712	3.725	5.275	5.701	6.312	6.148	6.550	5.701	6.312	6.148	6.550	ns
	6mA	GCLK	t_{co}	3.329	3.329	4.690	5.080	5.559	5.424	5.736	5.080	5.559	5.424	5.736	ns
		GCLK PLL	t_{co}	3.708	3.721	5.276	5.704	6.315	6.151	6.553	5.704	6.315	6.151	6.553	ns
	8mA	GCLK	t_{co}	3.325	3.325	4.686	5.076	5.554	5.419	5.731	5.076	5.554	5.419	5.731	ns
		GCLK PLL	t_{co}	3.704	3.717	5.271	5.699	6.310	6.146	6.548	5.699	6.310	6.146	6.548	ns
	10mA	GCLK	t_{co}	3.318	3.318	4.679	5.069	5.547	5.412	5.724	5.069	5.547	5.412	5.724	ns
		GCLK PLL	t_{co}	3.697	3.710	5.264	5.692	6.303	6.139	6.541	5.692	6.303	6.139	6.541	ns
	12mA	GCLK	t_{co}	3.319	3.319	4.686	5.077	5.557	5.422	5.734	5.077	5.557	5.422	5.734	ns
		GCLK PLL	t_{co}	3.697	3.711	5.271	5.699	6.313	6.149	6.551	5.699	6.313	6.149	6.551	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.317	3.317	4.667	5.055	5.531	5.396	5.708	5.055	5.531	5.396	5.708	ns
		GCLK PLL	t_{co}	3.695	3.709	5.252	5.677	6.287	6.123	6.525	5.677	6.287	6.123	6.525	ns

Table 1–123. EP3SE110 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		UnitS
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.336	3.336	4.703	5.096	5.577	5.442	5.754	5.096	5.577	5.442	5.754	ns
		GCLK PLL	t_{co}	3.716	3.728	5.289	5.719	6.333	6.169	6.571	5.719	6.333	6.169	6.571	ns
	6mA	GCLK	t_{co}	3.328	3.328	4.694	5.087	5.568	5.433	5.745	5.087	5.568	5.433	5.745	ns
		GCLK PLL	t_{co}	3.707	3.720	5.280	5.710	6.324	6.160	6.562	5.710	6.324	6.160	6.562	ns
	8mA	GCLK	t_{co}	3.329	3.329	4.702	5.095	5.577	5.442	5.754	5.095	5.577	5.442	5.754	ns
		GCLK PLL	t_{co}	3.707	3.721	5.287	5.718	6.333	6.169	6.571	5.718	6.333	6.169	6.571	ns
	10mA	GCLK	t_{co}	3.318	3.318	4.689	5.082	5.563	5.428	5.740	5.082	5.563	5.428	5.740	ns
		GCLK PLL	t_{co}	3.697	3.710	5.274	5.704	6.319	6.155	6.557	5.704	6.319	6.155	6.557	ns
	12mA	GCLK	t_{co}	3.318	3.318	4.689	5.082	5.564	5.429	5.741	5.082	5.564	5.429	5.741	ns
		GCLK PLL	t_{co}	3.697	3.710	5.274	5.705	6.320	6.156	6.558	5.705	6.320	6.156	6.558	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.339	3.339	4.705	5.097	5.577	5.442	5.754	5.097	5.577	5.442	5.754	ns
		GCLK PLL	t_{co}	3.718	3.731	5.290	5.720	6.333	6.169	6.571	5.720	6.333	6.169	6.571	ns
3.0-V PCI	—	GCLK	t_{co}	3.442	3.442	4.750	5.131	5.602	5.467	5.779	5.131	5.602	5.467	5.779	ns
		GCLK PLL	t_{co}	3.821	3.834	5.335	5.756	6.358	6.194	6.596	5.756	6.358	6.194	6.596	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.442	3.442	4.750	5.131	5.602	5.467	5.779	5.131	5.602	5.467	5.779	ns
		GCLK PLL	t_{co}	3.821	3.834	5.335	5.756	6.358	6.194	6.596	5.756	6.358	6.194	6.596	ns

Table 1–124 lists the EP3SE110 row pins output timing parameters for single-ended I/O standards.

Table 1–124. EP3SE110 Row Pins Output Timing Parameters (Part 1 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.208	3.456	4.797	5.180	5.703	5.543	5.850	5.304	5.827	5.696	5.930	ns
		GCLK PLL	t_{co}	1.452	1.625	2.008	2.086	2.326	2.346	2.347	2.239	2.435	2.455	2.342	ns
	8mA	GCLK	t_{co}	3.142	3.385	4.687	5.069	5.589	5.429	5.736	5.191	5.712	5.581	5.815	ns
		GCLK PLL	t_{co}	1.359	1.554	1.898	1.975	2.181	2.201	2.202	2.098	2.286	2.306	2.193	ns
	12mA	GCLK	t_{co}	3.063	3.296	4.581	4.969	5.493	5.333	5.640	5.092	5.612	5.481	5.715	ns
		GCLK PLL	t_{co}	1.260	1.465	1.792	1.875	2.053	2.073	2.074	1.971	2.154	2.174	2.061	ns

Table 1–124. EP3SE110 Row Pins Output Timing Parameters (Part 2 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.210	3.463	4.801	5.186	5.712	5.552	5.859	5.312	5.839	5.708	5.942	ns
		GCLK PLL	t_{co}	1.462	1.632	2.012	2.092	2.330	2.350	2.351	2.245	2.439	2.459	2.346	ns
	8mA	GCLK	t_{co}	3.067	3.300	4.592	4.984	5.503	5.343	5.650	5.104	5.621	5.490	5.724	ns
		GCLK PLL	t_{co}	1.264	1.469	1.803	1.890	2.059	2.079	2.080	1.977	2.161	2.181	2.068	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.169	3.417	4.764	5.149	5.669	5.509	5.816	5.272	5.793	5.662	5.896	ns
		GCLK PLL	t_{co}	1.406	1.586	1.975	2.055	2.282	2.302	2.303	2.196	2.393	2.413	2.300	ns
	8mA	GCLK	t_{co}	3.068	3.305	4.627	5.007	5.524	5.364	5.671	5.130	5.648	5.516	5.750	ns
		GCLK PLL	t_{co}	1.281	1.474	1.838	1.913	2.118	2.138	2.139	2.034	2.229	2.248	2.135	ns
	12mA	GCLK	t_{co}	3.031	3.267	4.567	4.942	5.454	5.294	5.601	5.062	5.574	5.443	5.677	ns
		GCLK PLL	t_{co}	1.242	1.436	1.778	1.848	2.030	2.050	2.051	1.948	2.136	2.155	2.042	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.090	3.329	4.662	5.042	5.560	5.400	5.707	5.163	5.684	5.552	5.786	ns
		GCLK PLL	t_{co}	1.320	1.498	1.873	1.948	2.172	2.192	2.193	2.088	2.282	2.301	2.188	ns
	8mA	GCLK	t_{co}	3.018	3.251	4.539	4.913	5.426	5.266	5.573	5.032	5.546	5.414	5.648	ns
		GCLK PLL	t_{co}	1.220	1.420	1.750	1.819	1.991	2.011	2.012	1.908	2.096	2.115	2.002	ns
2.5 V	4mA	GCLK	t_{co}	3.195	3.454	4.872	5.275	5.814	5.654	5.961	5.404	5.945	5.814	6.048	ns
		GCLK PLL	t_{co}	1.432	1.623	2.083	2.181	2.454	2.474	2.475	2.356	2.572	2.591	2.478	ns
	8mA	GCLK	t_{co}	3.110	3.351	4.748	5.140	5.672	5.512	5.819	5.267	5.801	5.669	5.903	ns
		GCLK PLL	t_{co}	1.322	1.520	1.959	2.046	2.284	2.304	2.305	2.189	2.398	2.417	2.304	ns
	12mA	GCLK	t_{co}	3.053	3.307	4.664	5.054	5.581	5.421	5.728	5.178	5.706	5.575	5.809	ns
		GCLK PLL	t_{co}	1.276	1.476	1.875	1.960	2.158	2.178	2.179	2.066	2.268	2.287	2.174	ns
1.8 V	2mA	GCLK	t_{co}	3.458	3.730	5.334	5.790	6.350	6.220	6.500	5.931	6.493	6.365	6.600	ns
		GCLK PLL	t_{co}	1.663	1.874	2.520	2.669	2.929	2.949	2.954	2.792	3.056	3.075	2.967	ns
	4mA	GCLK	t_{co}	3.233	3.528	5.007	5.421	5.945	5.815	6.095	5.566	6.087	5.958	6.193	ns
		GCLK PLL	t_{co}	1.438	1.672	2.193	2.300	2.524	2.544	2.549	2.427	2.650	2.668	2.560	ns
	6mA	GCLK	t_{co}	3.168	3.426	4.854	5.271	5.786	5.656	5.936	5.398	5.914	5.786	6.021	ns
		GCLK PLL	t_{co}	1.373	1.570	2.040	2.150	2.365	2.385	2.390	2.259	2.477	2.496	2.388	ns
	8mA	GCLK	t_{co}	3.108	3.352	4.777	5.177	5.691	5.559	5.839	5.303	5.820	5.692	5.927	ns
		GCLK PLL	t_{co}	1.313	1.496	1.963	2.056	2.268	2.288	2.293	2.164	2.383	2.402	2.294	ns

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Table 1–124. EP3SE110 Row Pins Output Timing Parameters (Part 3 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.369	3.648	5.244	5.703	6.278	6.148	6.428	5.838	6.417	6.289	6.524	ns
		GCLK PLL	t_{co}	1.574	1.792	2.430	2.582	2.857	2.877	2.882	2.699	2.980	2.999	2.891	ns
	4mA	GCLK	t_{co}	3.127	3.390	4.839	5.266	5.787	5.657	5.937	5.392	5.913	5.785	6.020	ns
		GCLK PLL	t_{co}	1.332	1.534	2.025	2.145	2.366	2.386	2.391	2.253	2.476	2.495	2.387	ns
	6mA	GCLK	t_{co}	3.100	3.343	4.766	5.170	5.691	5.551	5.834	5.294	5.816	5.685	5.916	ns
		GCLK PLL	t_{co}	1.305	1.487	1.952	2.049	2.260	2.280	2.285	2.155	2.371	2.390	2.282	ns
	8mA	GCLK	t_{co}	3.091	3.334	4.744	5.152	5.672	5.532	5.815	5.276	5.797	5.666	5.897	ns
		GCLK PLL	t_{co}	1.296	1.478	1.930	2.031	2.241	2.261	2.266	2.137	2.349	2.368	2.260	ns
1.2 V	2mA	GCLK	t_{co}	3.312	3.573	5.154	5.617	6.203	6.073	6.353	5.750	6.333	6.205	6.440	ns
		GCLK PLL	t_{co}	1.517	1.717	2.340	2.496	2.782	2.802	2.807	2.611	2.896	2.915	2.807	ns
	4mA	GCLK	t_{co}	3.132	3.384	4.861	5.294	5.828	5.698	5.978	5.417	5.955	5.827	6.062	ns
		GCLK PLL	t_{co}	1.337	1.528	2.047	2.173	2.407	2.427	2.432	2.278	2.518	2.537	2.429	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.057	3.295	4.657	5.045	5.571	5.411	5.718	5.165	5.692	5.561	5.795	ns
		GCLK PLL	t_{co}	1.261	1.464	1.868	1.951	2.126	2.146	2.147	2.033	2.230	2.250	2.137	ns
	12mA	GCLK	t_{co}	3.052	3.291	4.654	5.043	5.569	5.409	5.716	5.164	5.691	5.560	5.794	ns
		GCLK PLL	t_{co}	1.249	1.460	1.865	1.949	2.118	2.138	2.139	2.025	2.223	2.243	2.130	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.043	3.280	4.639	5.027	5.552	5.392	5.699	5.147	5.673	5.542	5.776	ns
		GCLK PLL	t_{co}	1.234	1.449	1.850	1.933	2.097	2.111	2.112	1.999	2.202	2.221	2.103	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.069	3.308	4.672	5.065	5.586	5.433	5.729	5.184	5.707	5.576	5.807	ns
		GCLK PLL	t_{co}	1.274	1.452	1.858	1.944	2.142	2.162	2.167	2.045	2.246	2.265	2.157	ns
	6mA	GCLK	t_{co}	3.054	3.294	4.669	5.063	5.585	5.431	5.728	5.182	5.705	5.574	5.805	ns
		GCLK PLL	t_{co}	1.259	1.438	1.855	1.942	2.140	2.160	2.165	2.043	2.244	2.263	2.155	ns
	8mA	GCLK	t_{co}	3.043	3.282	4.652	5.046	5.575	5.414	5.718	5.165	5.696	5.565	5.796	ns
		GCLK PLL	t_{co}	1.248	1.426	1.838	1.925	2.123	2.143	2.148	2.026	2.228	2.247	2.139	ns
	10mA	GCLK	t_{co}	3.030	3.267	4.636	5.030	5.562	5.399	5.705	5.150	5.684	5.553	5.784	ns
		GCLK PLL	t_{co}	1.228	1.404	1.822	1.909	2.108	2.128	2.133	2.011	2.213	2.232	2.124	ns
	12mA	GCLK	t_{co}	3.030	3.266	4.635	5.029	5.562	5.398	5.705	5.149	5.684	5.553	5.784	ns
		GCLK PLL	t_{co}	1.228	1.403	1.821	1.908	2.107	2.127	2.132	2.010	2.213	2.232	2.123	ns

Table 1–124. EP3SE110 Row Pins Output Timing Parameters (Part 4 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.038	3.273	4.633	5.025	5.557	5.392	5.700	5.144	5.678	5.547	5.778	ns
		GCLK PLL	t_{co}	1.236	1.411	1.819	1.904	2.102	2.121	2.126	2.005	2.207	2.226	2.116	ns
	16mA	GCLK	t_{co}	3.039	3.276	4.639	5.031	5.567	5.400	5.710	5.150	5.689	5.558	5.789	ns
		GCLK PLL	t_{co}	1.237	1.413	1.818	1.905	2.112	2.123	2.128	2.007	2.218	2.237	2.120	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.065	3.304	4.683	5.079	5.599	5.450	5.742	5.197	5.719	5.588	5.819	ns
		GCLK PLL	t_{co}	1.270	1.448	1.869	1.958	2.159	2.179	2.184	2.058	2.262	2.281	2.173	ns
	6mA	GCLK	t_{co}	3.046	3.283	4.665	5.062	5.589	5.433	5.732	5.181	5.710	5.579	5.810	ns
		GCLK PLL	t_{co}	1.247	1.426	1.851	1.941	2.142	2.162	2.167	2.042	2.246	2.265	2.157	ns
	8mA	GCLK	t_{co}	3.035	3.271	4.648	5.044	5.576	5.415	5.719	5.163	5.697	5.566	5.797	ns
		GCLK PLL	t_{co}	1.233	1.409	1.834	1.923	2.124	2.144	2.149	2.024	2.229	2.248	2.140	ns
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.045	3.280	4.639	5.030	5.555	5.395	5.698	5.148	5.675	5.544	5.775	ns
		GCLK PLL	t_{co}	1.249	1.424	1.825	1.909	2.104	2.124	2.129	2.009	2.208	2.227	2.119	ns
	6mA	GCLK	t_{co}	3.038	3.273	4.630	5.022	5.554	5.387	5.697	5.140	5.675	5.544	5.775	ns
		GCLK PLL	t_{co}	1.237	1.412	1.816	1.901	2.099	2.116	2.121	2.001	2.204	2.223	2.112	ns
	8mA	GCLK	t_{co}	3.029	3.265	4.623	5.013	5.547	5.380	5.690	5.132	5.668	5.537	5.768	ns
		GCLK PLL	t_{co}	1.227	1.402	1.807	1.892	2.092	2.108	2.113	1.993	2.197	2.216	2.104	ns
	10mA	GCLK	t_{co}	3.032	3.267	4.626	5.016	5.551	5.384	5.694	5.135	5.671	5.540	5.771	ns
		GCLK PLL	t_{co}	1.230	1.404	1.810	1.895	2.096	2.111	2.116	1.996	2.200	2.219	2.107	ns
	12mA	GCLK	t_{co}	3.028	3.264	4.628	5.019	5.554	5.387	5.697	5.138	5.676	5.545	5.776	ns
		GCLK PLL	t_{co}	1.226	1.401	1.808	1.894	2.099	2.111	2.116	1.996	2.205	2.224	2.108	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.036	3.272	4.626	5.016	5.550	5.383	5.693	5.134	5.670	5.539	5.770	ns
		GCLK PLL	t_{co}	1.234	1.409	1.805	1.890	2.095	2.106	2.107	1.991	2.199	2.218	2.097	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.051	3.287	4.650	5.043	5.566	5.410	5.709	5.160	5.686	5.555	5.786	ns
		GCLK PLL	t_{co}	1.256	1.431	1.836	1.922	2.119	2.139	2.144	2.021	2.222	2.241	2.133	ns
	6mA	GCLK	t_{co}	3.045	3.280	4.646	5.039	5.568	5.406	5.711	5.157	5.689	5.558	5.789	ns
		GCLK PLL	t_{co}	1.244	1.421	1.832	1.918	2.115	2.135	2.140	2.018	2.219	2.238	2.130	ns
	8mA	GCLK	t_{co}	3.041	3.276	4.640	5.033	5.563	5.400	5.706	5.151	5.683	5.552	5.783	ns
		GCLK PLL	t_{co}	1.240	1.416	1.826	1.912	2.109	2.129	2.134	2.012	2.213	2.232	2.124	ns

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Table 1–124. EP3SE110 Row Pins Output Timing Parameters (Part 5 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.053	3.287	4.661	5.057	5.585	5.428	5.728	5.174	5.705	5.574	5.805	ns
		GCLK PLL	t_{co}	1.255	1.430	1.847	1.936	2.137	2.157	2.162	2.035	2.239	2.258	2.150	ns
	6mA	GCLK	t_{co}	3.044	3.279	4.650	5.045	5.576	5.416	5.719	5.163	5.696	5.565	5.796	ns
		GCLK PLL	t_{co}	1.243	1.418	1.836	1.924	2.125	2.145	2.150	2.024	2.228	2.247	2.139	ns
	8mA	GCLK	t_{co}	3.043	3.279	4.654	5.050	5.585	5.422	5.728	5.169	5.706	5.575	5.806	ns
		GCLK PLL	t_{co}	1.241	1.416	1.840	1.929	2.131	2.151	2.156	2.030	2.235	2.254	2.146	ns
3.0-V PCI	—	GCLK	t_{co}	3.163	3.401	4.709	5.091	5.611	5.451	5.758	5.213	5.734	5.603	5.837	ns
		GCLK PLL	t_{co}	1.354	1.570	1.920	1.997	2.156	2.167	2.156	2.061	2.263	2.282	2.149	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.163	3.401	4.709	5.091	5.611	5.451	5.758	5.213	5.734	5.603	5.837	ns
		GCLK PLL	t_{co}	1.354	1.570	1.920	1.997	2.156	2.167	2.156	2.061	2.263	2.282	2.149	ns

Table 1–125 through Table 1–128 list the maximum I/O timing parameters for EP3SE110 devices for differential I/O standards.

Table 1–125 lists the EP3SE110 column pins input timing parameters for differential I/O standards.

Table 1–125. EP3SE110 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.997	-1.029	-1.181	-1.169	-1.324	-1.269	-1.645	-1.133	-1.542	-1.230	-1.683	ns
		t_h	1.133	1.184	1.415	1.436	1.618	1.551	1.927	1.411	1.858	1.524	1.966	ns
	GCLK PLL	t_{su}	0.960	0.994	1.879	2.224	2.401	2.288	2.194	2.277	2.567	2.345	2.245	ns
		t_h	-0.691	-0.701	-1.428	-1.714	-1.834	-1.749	-1.648	-1.756	-1.968	-1.795	-1.697	ns
MINI-LVDS		t_{su}	-0.997	-1.029	-1.181	-1.169	-1.324	-1.269	-1.645	-1.133	-1.542	-1.230	-1.683	ns
	GCLK	t_h	1.133	1.184	1.415	1.436	1.618	1.551	1.927	1.411	1.858	1.524	1.966	ns
		t_{su}	0.960	0.994	1.879	2.224	2.401	2.288	2.194	2.277	2.567	2.345	2.245	ns
	GCLK PLL	t_h	-0.691	-0.701	-1.428	-1.714	-1.834	-1.749	-1.648	-1.756	-1.968	-1.795	-1.697	ns
RSDS		t_{su}	-0.997	-1.029	-1.181	-1.169	-1.324	-1.269	-1.645	-1.133	-1.542	-1.230	-1.683	ns
		t_h	1.133	1.184	1.415	1.436	1.618	1.551	1.927	1.411	1.858	1.524	1.966	ns
	GCLK	t_{su}	0.960	0.994	1.879	2.224	2.401	2.288	2.194	2.277	2.567	2.345	2.245	ns
		t_h	-0.691	-0.701	-1.428	-1.714	-1.834	-1.749	-1.648	-1.756	-1.968	-1.795	-1.697	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.813	-0.852	-1.258	-1.368	-1.483	-1.423	-1.794	-1.368	-1.482	-1.428	-1.837	ns
		t_h	0.942	0.999	1.460	1.595	1.731	1.659	2.031	1.604	1.739	1.674	2.075	ns
	GCLK PLL	t_{su}	1.144	1.171	1.802	2.025	2.242	2.134	2.045	2.042	2.260	2.147	2.091	ns
		t_h	-0.882	-0.886	-1.383	-1.555	-1.721	-1.641	-1.544	-1.563	-1.729	-1.645	-1.588	ns

Table 1–125. EP3SE110 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.813	-0.852	-1.258	-1.368	-1.483	-1.423	-1.794	-1.368	-1.482	-1.428	-1.837	ns
		t_h	0.942	0.999	1.460	1.595	1.731	1.659	2.031	1.604	1.739	1.674	2.075	ns
	GCLK PLL	t_{su}	1.144	1.171	1.802	2.025	2.242	2.134	2.045	2.042	2.260	2.147	2.091	ns
		t_h	-0.882	-0.886	-1.383	-1.555	-1.721	-1.641	-1.544	-1.563	-1.729	-1.645	-1.588	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.821	-0.864	-1.268	-1.379	-1.499	-1.439	-1.810	-1.379	-1.497	-1.443	-1.852	ns
		t_h	0.950	1.011	1.470	1.606	1.747	1.675	2.047	1.615	1.754	1.689	2.090	ns
	GCLK PLL	t_{su}	1.136	1.159	1.792	2.014	2.226	2.118	2.029	2.031	2.245	2.132	2.076	ns
		t_h	-0.874	-0.874	-1.373	-1.544	-1.705	-1.625	-1.528	-1.552	-1.714	-1.630	-1.573	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.833	-0.875	-1.277	-1.390	-1.518	-1.458	-1.829	-1.390	-1.515	-1.461	-1.870	ns
		t_h	0.962	1.022	1.480	1.617	1.766	1.694	2.066	1.626	1.772	1.707	2.108	ns
	GCLK PLL	t_{su}	1.124	1.148	1.783	2.003	2.207	2.099	2.010	2.020	2.227	2.114	2.058	ns
		t_h	-0.862	-0.863	-1.363	-1.533	-1.686	-1.606	-1.509	-1.541	-1.696	-1.612	-1.555	ns

Table 1–125. EP3SE110 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.840	-0.881	-1.289	-1.395	-1.518	-1.460	-1.828	-1.394	-1.510	-1.459	-1.866	ns
		t_h	0.969	1.028	1.493	1.625	1.769	1.697	2.070	1.633	1.772	1.706	2.109	ns
	GCLK PLL	t_{su}	1.117	1.142	1.771	1.998	2.207	2.097	2.011	2.016	2.232	2.116	2.062	ns
		t_h	-0.855	-0.857	-1.350	-1.525	-1.683	-1.603	-1.505	-1.534	-1.696	-1.613	-1.554	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.840	-0.881	-1.289	-1.395	-1.518	-1.460	-1.828	-1.394	-1.510	-1.459	-1.866	ns
		t_h	0.969	1.028	1.493	1.625	1.769	1.697	2.070	1.633	1.772	1.706	2.109	ns
	GCLK PLL	t_{su}	1.117	1.142	1.771	1.998	2.207	2.097	2.011	2.016	2.232	2.116	2.062	ns
		t_h	-0.855	-0.857	-1.350	-1.525	-1.683	-1.603	-1.505	-1.534	-1.696	-1.613	-1.554	ns

Table 1–126 lists the EP3SE110 row pins input timing parameters for differential I/O standards

Table 1–126. EP3SE110 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-0.944	-0.979	-1.054	-1.015	-1.154	-1.107	-1.454	-0.975	-1.107	-1.061	-1.493	ns
		t_h	1.077	1.130	1.288	1.285	1.447	1.389	1.737	1.257	1.412	1.355	1.777	ns
	GCLK PLL	t_{su}	0.961	0.989	1.951	2.328	2.533	2.408	2.342	2.387	2.599	2.472	2.394	ns
		t_h	-0.691	-0.700	-1.502	-1.818	-1.968	-1.871	-1.796	-1.862	-2.019	-1.921	-1.844	ns
MINI-LVDS	GCLK	t_{su}	-0.944	-0.979	-1.054	-1.015	-1.154	-1.107	-1.454	-0.975	-1.107	-1.061	-1.493	ns
		t_h	1.077	1.130	1.288	1.285	1.447	1.389	1.737	1.257	1.412	1.355	1.777	ns
	GCLK PLL	t_{su}	0.961	0.989	1.951	2.328	2.533	2.408	2.342	2.387	2.599	2.472	2.394	ns
		t_h	-0.691	-0.700	-1.502	-1.818	-1.968	-1.871	-1.796	-1.862	-2.019	-1.921	-1.844	ns
RSDS	GCLK	t_{su}	-0.944	-0.979	-1.054	-1.015	-1.154	-1.107	-1.454	-0.975	-1.107	-1.061	-1.493	ns
		t_h	1.077	1.130	1.288	1.285	1.447	1.389	1.737	1.257	1.412	1.355	1.777	ns
	GCLK PLL	t_{su}	0.961	0.989	1.951	2.328	2.533	2.408	2.342	2.387	2.599	2.472	2.394	ns
		t_h	-0.691	-0.700	-1.502	-1.818	-1.968	-1.871	-1.796	-1.862	-2.019	-1.921	-1.844	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-0.749	-0.794	-1.145	-1.244	-1.343	-1.291	-1.633	-1.246	-1.344	-1.293	-1.677	ns
		t_h	0.875	0.936	1.345	1.468	1.587	1.524	1.867	1.479	1.597	1.535	1.912	ns
	GCLK PLL	t_{su}	1.156	1.174	1.864	2.104	2.344	2.224	2.163	2.120	2.362	2.240	2.210	ns
		t_h	-0.893	-0.894	-1.447	-1.639	-1.828	-1.736	-1.666	-1.644	-1.834	-1.741	-1.709	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-0.749	-0.794	-1.145	-1.244	-1.343	-1.291	-1.633	-1.246	-1.344	-1.293	-1.677	ns
		t_h	0.875	0.936	1.345	1.468	1.587	1.524	1.867	1.479	1.597	1.535	1.912	ns
	GCLK PLL	t_{su}	1.156	1.174	1.864	2.104	2.344	2.224	2.163	2.120	2.362	2.240	2.210	ns
		t_h	-0.893	-0.894	-1.447	-1.639	-1.828	-1.736	-1.666	-1.644	-1.834	-1.741	-1.709	ns

Table 1–126. EP3SE110 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-0.758	-0.806	-1.154	-1.254	-1.359	-1.307	-1.649	-1.255	-1.360	-1.309	-1.693	ns
		t_h	0.884	0.948	1.354	1.478	1.603	1.540	1.883	1.488	1.613	1.551	1.928	ns
	GCLK PLL	t_{su}	1.147	1.162	1.855	2.094	2.328	2.208	2.147	2.111	2.346	2.224	2.194	ns
		t_h	-0.884	-0.882	-1.438	-1.629	-1.812	-1.720	-1.650	-1.635	-1.818	-1.725	-1.693	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-0.772	-0.818	-1.163	-1.264	-1.377	-1.325	-1.667	-1.266	-1.377	-1.326	-1.710	ns
		t_h	0.898	0.960	1.364	1.488	1.621	1.558	1.901	1.499	1.630	1.568	1.945	ns
	GCLK PLL	t_{su}	1.133	1.150	1.842	2.084	2.310	2.190	2.129	2.100	2.329	2.207	2.177	ns
		t_h	-0.870	-0.870	-1.426	-1.619	-1.794	-1.702	-1.632	-1.624	-1.801	-1.708	-1.676	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-0.781	-0.827	-1.178	-1.275	-1.384	-1.333	-1.673	-1.273	-1.378	-1.329	-1.712	ns
		t_h	0.907	0.969	1.379	1.502	1.631	1.568	1.912	1.509	1.636	1.573	1.952	ns
	GCLK PLL	t_{su}	1.124	1.141	1.827	2.068	2.299	2.178	2.118	2.089	2.323	2.199	2.170	ns
		t_h	-0.861	-0.861	-1.411	-1.601	-1.780	-1.688	-1.617	-1.610	-1.792	-1.699	-1.665	ns

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Table 1–126. EP3SE110 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-0.781	-0.827	-1.178	-1.275	-1.384	-1.333	-1.673	-1.273	-1.378	-1.329	-1.712	ns
		t_h	0.907	0.969	1.379	1.502	1.631	1.568	1.912	1.509	1.636	1.573	1.952	ns
	GCLK PLL	t_{su}	1.124	1.141	1.827	2.068	2.299	2.178	2.118	2.089	2.323	2.199	2.170	ns
		t_h	-0.861	-0.861	-1.411	-1.601	-1.780	-1.688	-1.617	-1.610	-1.792	-1.699	-1.665	ns

Table 1–127 lists the EP3SE110 column pins output timing parameters for differential I/O standards.

Table 1–127. EP3SE110 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	
LVDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
LVDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns
RSDS_E_1R	—	GCLK	t_{co}	3.152	3.387	4.757	5.155	5.666	5.526	5.826	5.278	5.789	5.650	5.899	ns
		GCLK PLL	t_{co}	1.328	1.502	1.913	2.006	2.214	2.225	2.251	2.110	2.321	2.331	2.237	ns
RSDS_E_3R	—	GCLK	t_{co}	3.148	3.390	4.804	5.210	5.728	5.588	5.888	5.337	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.324	1.505	1.960	2.061	2.276	2.287	2.313	2.169	2.387	2.397	2.303	ns

Table 1–127. EP3SE110 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.179	3.420	4.828	5.233	5.750	5.610	5.910	5.358	5.875	5.736	5.985	ns
		GCLK PLL	t_{co}	1.355	1.535	1.984	2.084	2.298	2.309	2.335	2.190	2.407	2.417	2.323	ns
	6mA	GCLK	t_{co}	3.169	3.410	4.818	5.222	5.740	5.600	5.900	5.347	5.865	5.726	5.975	ns
		GCLK PLL	t_{co}	1.345	1.525	1.974	2.073	2.288	2.299	2.325	2.179	2.397	2.407	2.313	ns
	8mA	GCLK	t_{co}	3.169	3.410	4.821	5.226	5.744	5.604	5.904	5.352	5.870	5.731	5.980	ns
		GCLK PLL	t_{co}	1.345	1.525	1.977	2.077	2.292	2.303	2.329	2.184	2.402	2.412	2.318	ns
	10mA	GCLK	t_{co}	3.162	3.404	4.814	5.220	5.738	5.598	5.898	5.345	5.864	5.725	5.974	ns
		GCLK PLL	t_{co}	1.338	1.519	1.970	2.071	2.286	2.297	2.323	2.177	2.396	2.406	2.312	ns
	12mA	GCLK	t_{co}	3.161	3.402	4.811	5.217	5.735	5.595	5.895	5.342	5.860	5.721	5.970	ns
		GCLK PLL	t_{co}	1.337	1.517	1.967	2.068	2.283	2.294	2.320	2.174	2.392	2.402	2.308	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.183	3.424	4.832	5.237	5.754	5.614	5.914	5.362	5.880	5.741	5.990	ns
		GCLK PLL	t_{co}	1.359	1.539	1.988	2.088	2.302	2.313	2.339	2.194	2.412	2.422	2.328	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.173	3.413	4.811	5.214	5.729	5.589	5.889	5.338	5.853	5.714	5.963	ns
		GCLK PLL	t_{co}	1.349	1.528	1.967	2.065	2.277	2.288	2.314	2.170	2.385	2.395	2.301	ns
	6mA	GCLK	t_{co}	3.168	3.409	4.811	5.214	5.730	5.590	5.890	5.339	5.855	5.716	5.965	ns
		GCLK PLL	t_{co}	1.344	1.524	1.967	2.065	2.278	2.289	2.315	2.171	2.387	2.397	2.303	ns
	8mA	GCLK	t_{co}	3.166	3.407	4.810	5.213	5.728	5.588	5.888	5.338	5.854	5.715	5.964	ns
		GCLK PLL	t_{co}	1.342	1.522	1.966	2.064	2.276	2.287	2.313	2.170	2.386	2.396	2.302	ns
	10mA	GCLK	t_{co}	3.158	3.398	4.800	5.203	5.719	5.579	5.879	5.328	5.844	5.705	5.954	ns
		GCLK PLL	t_{co}	1.334	1.513	1.956	2.054	2.267	2.278	2.304	2.160	2.376	2.386	2.292	ns
	12mA	GCLK	t_{co}	3.159	3.400	4.806	5.210	5.727	5.587	5.887	5.336	5.853	5.714	5.963	ns
		GCLK PLL	t_{co}	1.335	1.515	1.962	2.061	2.275	2.286	2.312	2.168	2.385	2.395	2.301	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.158	3.397	4.789	5.191	5.705	5.565	5.865	5.315	5.829	5.690	5.939	ns
		GCLK PLL	t_{co}	1.334	1.512	1.945	2.042	2.253	2.264	2.290	2.147	2.361	2.371	2.277	ns

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Table 1–127. EP3SE110 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.170	3.410	4.807	5.209	5.723	5.583	5.883	5.334	5.848	5.709	5.958	ns
		GCLK PLL	t_{co}	1.346	1.525	1.963	2.060	2.271	2.282	2.308	2.166	2.380	2.390	2.296	ns
	6mA	GCLK	t_{co}	3.166	3.407	4.808	5.211	5.727	5.587	5.887	5.336	5.852	5.713	5.962	ns
		GCLK PLL	t_{co}	1.342	1.522	1.964	2.062	2.275	2.286	2.312	2.168	2.384	2.394	2.300	ns
	8mA	GCLK	t_{co}	3.156	3.396	4.797	5.200	5.715	5.575	5.875	5.325	5.840	5.701	5.950	ns
		GCLK PLL	t_{co}	1.332	1.511	1.953	2.051	2.263	2.274	2.300	2.157	2.372	2.382	2.288	ns
	10mA	GCLK	t_{co}	3.154	3.394	4.795	5.197	5.713	5.573	5.873	5.323	5.838	5.699	5.948	ns
		GCLK PLL	t_{co}	1.330	1.509	1.951	2.048	2.261	2.272	2.298	2.155	2.370	2.380	2.286	ns
	12mA	GCLK	t_{co}	3.154	3.395	4.798	5.202	5.718	5.578	5.878	5.327	5.844	5.705	5.954	ns
		GCLK PLL	t_{co}	1.330	1.510	1.954	2.053	2.266	2.277	2.303	2.159	2.376	2.386	2.292	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.158	3.398	4.795	5.197	5.712	5.572	5.872	5.322	5.837	5.698	5.947	ns
		GCLK PLL	t_{co}	1.334	1.513	1.951	2.048	2.260	2.271	2.297	2.154	2.369	2.379	2.285	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.184	3.427	4.840	5.245	5.762	5.622	5.922	5.370	5.887	5.748	5.997	ns
		GCLK PLL	t_{co}	1.360	1.542	1.996	2.096	2.310	2.321	2.347	2.202	2.419	2.429	2.335	ns
	6mA	GCLK	t_{co}	3.170	3.413	4.828	5.234	5.752	5.612	5.912	5.360	5.878	5.739	5.988	ns
		GCLK PLL	t_{co}	1.346	1.528	1.984	2.085	2.300	2.311	2.337	2.192	2.410	2.420	2.326	ns
	8mA	GCLK	t_{co}	3.158	3.400	4.811	5.216	5.734	5.594	5.894	5.342	5.860	5.721	5.970	ns
		GCLK PLL	t_{co}	1.334	1.515	1.967	2.067	2.282	2.293	2.319	2.174	2.392	2.402	2.308	ns
	10mA	GCLK	t_{co}	3.158	3.400	4.814	5.220	5.738	5.598	5.898	5.346	5.865	5.726	5.975	ns
		GCLK PLL	t_{co}	1.334	1.515	1.970	2.071	2.286	2.297	2.323	2.178	2.397	2.407	2.313	ns
	12mA	GCLK	t_{co}	3.154	3.396	4.807	5.212	5.731	5.591	5.891	5.339	5.857	5.718	5.967	ns
		GCLK PLL	t_{co}	1.330	1.511	1.963	2.063	2.279	2.290	2.316	2.171	2.389	2.399	2.305	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.158	3.398	4.800	5.203	5.719	5.579	5.879	5.328	5.844	5.705	5.954	ns
		GCLK PLL	t_{co}	1.334	1.513	1.956	2.054	2.267	2.278	2.304	2.160	2.376	2.386	2.292	ns
	16mA	GCLK	t_{co}	3.159	3.400	4.808	5.213	5.730	5.590	5.890	5.338	5.856	5.717	5.966	ns
		GCLK PLL	t_{co}	1.335	1.515	1.964	2.064	2.278	2.289	2.315	2.170	2.388	2.398	2.304	ns

Table 1–127. EP3SE110 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 1.1V	V_{CCL}= 0.9V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.187	3.430	4.839	5.243	5.760	5.620	5.920	5.369	5.885	5.746	5.995	ns
		GCLK PLL	t_{co}	1.363	1.545	1.995	2.094	2.308	2.319	2.345	2.201	2.417	2.427	2.333	ns
	6mA	GCLK	t_{co}	3.176	3.418	4.827	5.231	5.748	5.608	5.908	5.357	5.873	5.734	5.983	ns
		GCLK PLL	t_{co}	1.352	1.533	1.983	2.082	2.296	2.307	2.333	2.189	2.405	2.415	2.321	ns
	8mA	GCLK	t_{co}	3.171	3.414	4.827	5.232	5.749	5.609	5.909	5.358	5.875	5.736	5.985	ns
		GCLK PLL	t_{co}	1.347	1.529	1.983	2.083	2.297	2.308	2.334	2.190	2.407	2.417	2.323	ns
	10mA	GCLK	t_{co}	3.157	3.399	4.809	5.213	5.730	5.590	5.890	5.339	5.857	5.718	5.967	ns
		GCLK PLL	t_{co}	1.333	1.514	1.965	2.064	2.278	2.289	2.315	2.171	2.389	2.399	2.305	ns
	12mA	GCLK	t_{co}	3.155	3.397	4.807	5.211	5.728	5.588	5.888	5.337	5.854	5.715	5.964	ns
		GCLK PLL	t_{co}	1.331	1.512	1.963	2.062	2.276	2.287	2.313	2.169	2.386	2.396	2.302	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.159	3.399	4.799	5.201	5.716	5.576	5.876	5.326	5.841	5.702	5.951	ns
		GCLK PLL	t_{co}	1.335	1.514	1.955	2.052	2.264	2.275	2.301	2.158	2.373	2.383	2.289	ns
	16mA	GCLK	t_{co}	3.159	3.400	4.807	5.211	5.728	5.588	5.888	5.337	5.854	5.715	5.964	ns
		GCLK PLL	t_{co}	1.335	1.515	1.963	2.062	2.276	2.287	2.313	2.169	2.386	2.396	2.302	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.175	3.417	4.823	5.226	5.742	5.602	5.902	5.352	5.867	5.728	5.977	ns
		GCLK PLL	t_{co}	1.351	1.532	1.979	2.077	2.290	2.301	2.327	2.184	2.399	2.409	2.315	ns
	10mA	GCLK	t_{co}	3.175	3.417	4.823	5.226	5.742	5.602	5.902	5.352	5.867	5.728	5.977	ns
		GCLK PLL	t_{co}	1.351	1.532	1.979	2.077	2.290	2.301	2.327	2.184	2.399	2.409	2.315	ns
	12mA	GCLK	t_{co}	3.165	3.407	4.813	5.216	5.732	5.592	5.892	5.342	5.858	5.719	5.968	ns
		GCLK PLL	t_{co}	1.341	1.522	1.969	2.067	2.280	2.291	2.317	2.174	2.390	2.400	2.306	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.158	3.399	4.799	5.201	5.716	5.576	5.876	5.326	5.841	5.702	5.951	ns
		GCLK PLL	t_{co}	1.334	1.514	1.955	2.052	2.264	2.275	2.301	2.158	2.373	2.383	2.289	ns

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Table 1–128 lists the EP3SE110 row pins output timing parameters for differential I/O standards.

Table 1–128. EP3SE110 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	2.744	2.932	4.083	4.440	4.901	4.771	5.049	4.540	5.002	4.873	5.107	ns
		GCLK PLL	t_{co}	0.931	1.057	1.249	1.300	1.458	1.480	1.486	1.382	1.545	1.563	1.456	ns
LVDS_E_1R	—	GCLK	t_{co}	3.136	3.376	4.754	5.156	5.664	5.526	5.797	5.281	5.790	5.652	5.871	ns
		GCLK PLL	t_{co}	1.333	1.511	1.930	2.026	2.231	2.245	2.243	2.133	2.343	2.352	2.229	ns
LVDS_E_3R	—	GCLK	t_{co}	3.118	3.366	4.792	5.202	5.718	5.580	5.851	5.332	5.851	5.713	5.932	ns
		GCLK PLL	t_{co}	1.315	1.501	1.968	2.072	2.285	2.299	2.297	2.184	2.404	2.413	2.290	ns
MINI-LVDS	—	GCLK	t_{co}	2.744	2.932	4.083	4.440	4.901	4.771	5.049	4.540	5.002	4.873	5.107	ns
		GCLK PLL	t_{co}	0.931	1.057	1.249	1.300	1.458	1.480	1.486	1.382	1.545	1.563	1.456	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.136	3.376	4.754	5.156	5.664	5.526	5.797	5.281	5.790	5.652	5.871	ns
		GCLK PLL	t_{co}	1.333	1.511	1.930	2.026	2.231	2.245	2.243	2.133	2.343	2.352	2.229	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.118	3.366	4.792	5.202	5.718	5.580	5.851	5.332	5.851	5.713	5.932	ns
		GCLK PLL	t_{co}	1.315	1.501	1.968	2.072	2.285	2.299	2.297	2.184	2.404	2.413	2.290	ns
RSDS	—	GCLK	t_{co}	2.744	2.932	4.083	4.440	4.901	4.771	5.049	4.540	5.002	4.873	5.107	ns
		GCLK PLL	t_{co}	0.931	1.057	1.249	1.300	1.458	1.480	1.486	1.382	1.545	1.563	1.456	ns
RSDS_E_1R	—	GCLK	t_{co}	3.136	3.376	4.754	5.156	5.664	5.526	5.797	5.281	5.790	5.652	5.871	ns
		GCLK PLL	t_{co}	1.333	1.511	1.930	2.026	2.231	2.245	2.243	2.133	2.343	2.352	2.229	ns
RSDS_E_3R	—	GCLK	t_{co}	3.118	3.366	4.792	5.202	5.718	5.580	5.851	5.332	5.851	5.713	5.932	ns
		GCLK PLL	t_{co}	1.315	1.501	1.968	2.072	2.285	2.299	2.297	2.184	2.404	2.413	2.290	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.162	3.409	4.828	5.236	5.751	5.613	5.884	5.365	5.880	5.742	5.961	ns
		GCLK PLL	t_{co}	1.359	1.544	2.004	2.106	2.318	2.332	2.330	2.217	2.433	2.442	2.319	ns
	6mA	GCLK	t_{co}	3.148	3.395	4.815	5.223	5.738	5.600	5.871	5.351	5.867	5.729	5.948	ns
		GCLK PLL	t_{co}	1.345	1.530	1.991	2.093	2.305	2.319	2.317	2.203	2.420	2.429	2.306	ns
	8mA	GCLK	t_{co}	3.144	3.391	4.813	5.223	5.739	5.601	5.872	5.351	5.869	5.731	5.950	ns
		GCLK PLL	t_{co}	1.341	1.526	1.989	2.093	2.306	2.320	2.318	2.203	2.422	2.431	2.308	ns

Table 1–128. EP3SE110 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.160	3.406	4.814	5.220	5.733	5.595	5.866	5.348	5.862	5.724	5.943	ns
		GCLK PLL	t_{co}	1.357	1.541	1.990	2.090	2.300	2.314	2.312	2.200	2.415	2.424	2.301	ns
	6mA	GCLK	t_{co}	3.149	3.396	4.810	5.216	5.730	5.592	5.863	5.345	5.859	5.721	5.940	ns
		GCLK PLL	t_{co}	1.346	1.531	1.986	2.086	2.297	2.311	2.309	2.197	2.412	2.421	2.298	ns
	8mA	GCLK	t_{co}	3.146	3.393	4.808	5.214	5.728	5.590	5.861	5.343	5.858	5.720	5.939	ns
		GCLK PLL	t_{co}	1.343	1.528	1.984	2.084	2.295	2.309	2.307	2.195	2.411	2.420	2.297	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.157	3.403	4.809	5.215	5.727	5.589	5.860	5.343	5.856	5.718	5.937	ns
		GCLK PLL	t_{co}	1.354	1.538	1.985	2.085	2.294	2.308	2.306	2.195	2.409	2.418	2.295	ns
	6mA	GCLK	t_{co}	3.147	3.394	4.807	5.213	5.726	5.588	5.859	5.342	5.856	5.718	5.937	ns
		GCLK PLL	t_{co}	1.344	1.529	1.983	2.083	2.293	2.307	2.305	2.194	2.409	2.418	2.295	ns
	8mA	GCLK	t_{co}	3.133	3.380	4.792	5.198	5.712	5.574	5.845	5.327	5.841	5.703	5.922	ns
		GCLK PLL	t_{co}	1.330	1.515	1.968	2.068	2.279	2.293	2.291	2.179	2.394	2.403	2.280	ns
	10mA	GCLK	t_{co}	3.130	3.376	4.788	5.194	5.708	5.570	5.841	5.323	5.837	5.699	5.918	ns
		GCLK PLL	t_{co}	1.327	1.511	1.964	2.064	2.275	2.289	2.287	2.175	2.390	2.399	2.276	ns
	12mA	GCLK	t_{co}	3.127	3.374	4.789	5.197	5.711	5.573	5.844	5.326	5.841	5.703	5.922	ns
		GCLK PLL	t_{co}	1.324	1.509	1.965	2.067	2.278	2.292	2.290	2.178	2.394	2.403	2.280	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.128	3.374	4.779	5.185	5.698	5.560	5.831	5.313	5.827	5.689	5.908	ns
		GCLK PLL	t_{co}	1.325	1.509	1.955	2.055	2.265	2.279	2.277	2.165	2.380	2.389	2.266	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.177	3.427	4.850	5.258	5.774	5.636	5.907	5.387	5.903	5.765	5.984	ns
		GCLK PLL	t_{co}	1.374	1.562	2.026	2.128	2.341	2.355	2.353	2.239	2.456	2.465	2.342	ns
	6mA	GCLK	t_{co}	3.153	3.403	4.832	5.241	5.757	5.619	5.890	5.370	5.888	5.750	5.969	ns
		GCLK PLL	t_{co}	1.350	1.538	2.008	2.111	2.324	2.338	2.336	2.222	2.441	2.450	2.327	ns
	8mA	GCLK	t_{co}	3.136	3.384	4.810	5.219	5.735	5.597	5.868	5.348	5.866	5.728	5.947	ns
		GCLK PLL	t_{co}	1.333	1.519	1.986	2.089	2.302	2.316	2.314	2.200	2.419	2.428	2.305	ns

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Table 1–128. EP3SE110 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.181	3.430	4.850	5.258	5.773	5.635	5.906	5.387	5.903	5.765	5.984	ns
		GCLK PLL	t_{co}	1.378	1.565	2.026	2.128	2.340	2.354	2.352	2.239	2.456	2.465	2.342	ns
	6mA	GCLK	t_{co}	3.166	3.415	4.836	5.243	5.758	5.620	5.891	5.372	5.888	5.750	5.969	ns
		GCLK PLL	t_{co}	1.363	1.550	2.012	2.113	2.325	2.339	2.337	2.224	2.441	2.450	2.327	ns
	8mA	GCLK	t_{co}	3.155	3.404	4.831	5.240	5.755	5.617	5.888	5.369	5.886	5.748	5.967	ns
		GCLK PLL	t_{co}	1.352	1.539	2.007	2.110	2.322	2.336	2.334	2.221	2.439	2.448	2.325	ns
	10mA	GCLK	t_{co}	3.135	3.384	4.808	5.216	5.732	5.594	5.865	5.346	5.862	5.724	5.943	ns
		GCLK PLL	t_{co}	1.332	1.519	1.984	2.086	2.299	2.313	2.311	2.198	2.415	2.424	2.301	ns
	12mA	GCLK	t_{co}	3.132	3.380	4.804	5.213	5.728	5.590	5.861	5.342	5.859	5.721	5.940	ns
		GCLK PLL	t_{co}	1.329	1.515	1.980	2.083	2.295	2.309	2.307	2.194	2.412	2.421	2.298	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.137	3.384	4.795	5.201	5.714	5.576	5.847	5.329	5.843	5.705	5.924	ns
		GCLK PLL	t_{co}	1.334	1.519	1.971	2.071	2.281	2.295	2.293	2.181	2.396	2.405	2.282	ns
	16mA	GCLK	t_{co}	3.130	3.377	4.794	5.202	5.717	5.579	5.850	5.332	5.848	5.710	5.929	ns
		GCLK PLL	t_{co}	1.327	1.512	1.970	2.072	2.284	2.298	2.296	2.184	2.401	2.410	2.287	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.168	3.416	4.832	5.239	5.753	5.615	5.886	5.368	5.883	5.745	5.964	ns
		GCLK PLL	t_{co}	1.365	1.551	2.008	2.109	2.320	2.334	2.332	2.220	2.436	2.445	2.322	ns
	12mA	GCLK	t_{co}	3.150	3.399	4.817	5.224	5.738	5.600	5.871	5.353	5.868	5.730	5.949	ns
		GCLK PLL	t_{co}	1.347	1.534	1.993	2.094	2.305	2.319	2.317	2.205	2.421	2.430	2.307	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.136	3.383	4.794	5.200	5.713	5.575	5.846	5.329	5.843	5.705	5.924	ns
		GCLK PLL	t_{co}	1.333	1.518	1.970	2.070	2.280	2.294	2.292	2.181	2.396	2.405	2.282	ns

Table 1–129 and Table 1–130 list the EP3SE110 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–129 lists the EP3SE110 column pin delay adders when using the regional clock.

Table 1–129. EP3SE110 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.111	0.14	0.19	0.103	0.105	0.103	0.177	0.085	0.101	0.098	0.146	ns
RCLK PLL input adder	2.506	2.513	3.782	4.081	4.579	4.381	4.923	4.222	4.603	4.401	4.984	ns
RCLK output adder	-0.281	-0.062	-0.079	-0.074	-0.074	-0.072	-0.128	0.056	0.051	0.054	-0.055	ns
RCLK PLL output adder	-2.121	-1.833	-2.75	-2.908	-3.127	-3.057	-3.165	-2.959	-3.157	-2.903	-3.172	ns

Table 1–130 lists the EP3SE110 row pin delay adders when using the regional clock.

Table 1–130. EP3SE110 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	-0.003	-0.002	0.001	-0.012	-0.01	-0.017	0.078	-0.02	-0.02	-0.016	0.08	ns
RCLK PLL input adder	0.116	0.122	0.192	0.212	0.227	0.217	0.375	0.198	0.219	0.209	0.379	ns
RCLK output adder	0.02	0.019	0.027	0.041	0.044	0.048	-0.038	0.051	0.057	0.051	-0.04	ns
RCLK PLL output adder	-0.103	-0.105	-0.162	-0.179	-0.194	-0.185	-0.322	-0.167	-0.183	-0.175	-0.324	ns

EP3SE260 I/O Timing Parameters

Table 1–131 through Table 1–135 list the maximum I/O timing parameters for EP3SE260 devices for single-ended I/O standards.

Table 1–131 lists the EP3SE260 column pins input timing parameters for single-ended I/O standards.

Table 1–131. EP3SE260 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.242	-1.186	-1.822	-1.915	-2.184	-2.050	-2.482	-1.915	-2.184	-2.050	-2.482	ns
		t_h	1.388	1.332	2.045	2.146	2.437	2.285	2.724	2.146	2.437	2.285	2.724	ns
	GCLK PLL	t_{su}	-1.417	-1.465	-2.238	-2.189	-2.558	-2.477	-3.038	-2.189	-2.558	-2.477	-3.038	ns
		t_h	1.732	1.778	2.727	2.697	3.113	3.000	3.584	2.697	3.113	3.000	3.584	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.242	-1.186	-1.822	-1.915	-2.184	-2.050	-2.482	-1.915	-2.184	-2.050	-2.482	ns
		t_h	1.388	1.332	2.045	2.146	2.437	2.285	2.724	2.146	2.437	2.285	2.724	ns
	GCLK PLL	t_{su}	-1.417	-1.465	-2.238	-2.189	-2.558	-2.477	-3.038	-2.189	-2.558	-2.477	-3.038	ns
		t_h	1.732	1.778	2.727	2.697	3.113	3.000	3.584	2.697	3.113	3.000	3.584	ns
3.0-V LVTTL	GCLK	t_{su}	-1.253	-1.197	-1.821	-1.917	-2.183	-2.049	-2.481	-1.917	-2.183	-2.049	-2.481	ns
		t_h	1.399	1.343	2.044	2.148	2.436	2.284	2.723	2.148	2.436	2.284	2.723	ns
	GCLK PLL	t_{su}	-1.428	-1.476	-2.237	-2.191	-2.557	-2.476	-3.037	-2.191	-2.557	-2.476	-3.037	ns
		t_h	1.743	1.789	2.726	2.699	3.112	2.999	3.583	2.699	3.112	2.999	3.583	ns
3.0-V LVCMOS	GCLK	t_{su}	-1.253	-1.197	-1.821	-1.917	-2.183	-2.049	-2.481	-1.917	-2.183	-2.049	-2.481	ns
		t_h	1.399	1.343	2.044	2.148	2.436	2.284	2.723	2.148	2.436	2.284	2.723	ns
	GCLK PLL	t_{su}	-1.428	-1.476	-2.237	-2.191	-2.557	-2.476	-3.037	-2.191	-2.557	-2.476	-3.037	ns
		t_h	1.743	1.789	2.726	2.699	3.112	2.999	3.583	2.699	3.112	2.999	3.583	ns
2.5 V	GCLK	t_{su}	-1.248	-1.192	-1.830	-1.929	-2.202	-2.068	-2.500	-1.929	-2.202	-2.068	-2.500	ns
		t_h	1.394	1.338	2.053	2.160	2.455	2.303	2.742	2.160	2.455	2.303	2.742	ns
	GCLK PLL	t_{su}	-1.423	-1.471	-2.246	-2.203	-2.576	-2.495	-3.056	-2.203	-2.576	-2.495	-3.056	ns
		t_h	1.738	1.784	2.735	2.711	3.131	3.018	3.602	2.711	3.131	3.018	3.602	ns
1.8 V	GCLK	t_{su}	-1.270	-1.214	-1.870	-1.965	-2.200	-2.066	-2.498	-1.965	-2.200	-2.066	-2.498	ns
		t_h	1.418	1.362	2.093	2.196	2.453	2.301	2.740	2.196	2.453	2.301	2.740	ns
	GCLK PLL	t_{su}	-1.443	-1.493	-2.286	-2.239	-2.574	-2.493	-3.054	-2.239	-2.574	-2.493	-3.054	ns
		t_h	1.760	1.808	2.775	2.747	3.129	3.016	3.600	2.747	3.129	3.016	3.600	ns
1.5 V	GCLK	t_{su}	-1.260	-1.204	-1.847	-1.933	-2.130	-1.996	-2.428	-1.933	-2.130	-1.996	-2.428	ns
		t_h	1.408	1.352	2.070	2.164	2.383	2.231	2.670	2.164	2.383	2.231	2.670	ns
	GCLK PLL	t_{su}	-1.433	-1.483	-2.263	-2.207	-2.504	-2.423	-2.984	-2.207	-2.504	-2.423	-2.984	ns
		t_h	1.750	1.798	2.752	2.715	3.059	2.946	3.530	2.715	3.059	2.946	3.530	ns
1.2 V	GCLK	t_{su}	-1.208	-1.152	-1.770	-1.834	-1.974	-1.840	-2.272	-1.834	-1.974	-1.840	-2.272	ns
		t_h	1.356	1.300	1.993	2.065	2.227	2.075	2.514	2.065	2.227	2.075	2.514	ns
	GCLK PLL	t_{su}	-1.381	-1.431	-2.186	-2.108	-2.348	-2.267	-2.828	-2.108	-2.348	-2.267	-2.828	ns
		t_h	1.698	1.746	2.675	2.616	2.903	2.790	3.374	2.616	2.903	2.790	3.374	ns

Table 1–131. EP3SE260 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-2 CLASS I	GCLK	t_{su}	-1.179	-1.123	-1.742	-1.818	-1.976	-1.842	-2.274	-1.818	-1.976	-1.842	-2.274	ns
		t_h	1.327	1.271	1.965	2.049	2.229	2.077	2.516	2.049	2.229	2.077	2.516	ns
	GCLK PLL	t_{su}	-1.352	-1.402	-2.158	-2.092	-2.350	-2.269	-2.830	-2.092	-2.350	-2.269	-2.830	ns
		t_h	1.669	1.717	2.647	2.600	2.905	2.792	3.376	2.600	2.905	2.792	3.376	ns
SSTL-2 CLASS II	GCLK	t_{su}	-1.179	-1.123	-1.742	-1.818	-1.976	-1.842	-2.274	-1.818	-1.976	-1.842	-2.274	ns
		t_h	1.327	1.271	1.965	2.049	2.229	2.077	2.516	2.049	2.229	2.077	2.516	ns
	GCLK PLL	t_{su}	-1.352	-1.402	-2.158	-2.092	-2.350	-2.269	-2.830	-2.092	-2.350	-2.269	-2.830	ns
		t_h	1.669	1.717	2.647	2.600	2.905	2.792	3.376	2.600	2.905	2.792	3.376	ns
SSTL-18 CLASS I	GCLK	t_{su}	-1.173	-1.117	-1.729	-1.810	-1.973	-1.837	-2.272	-1.810	-1.973	-1.837	-2.272	ns
		t_h	1.321	1.265	1.952	2.038	2.223	2.071	2.509	2.038	2.223	2.071	2.509	ns
	GCLK PLL	t_{su}	-1.346	-1.396	-2.145	-2.087	-2.347	-2.264	-2.828	-2.087	-2.347	-2.264	-2.828	ns
		t_h	1.663	1.711	2.634	2.592	2.899	2.786	3.369	2.592	2.899	2.786	3.369	ns
SSTL-18 CLASS II	GCLK	t_{su}	-1.173	-1.117	-1.729	-1.810	-1.973	-1.837	-2.272	-1.810	-1.973	-1.837	-2.272	ns
		t_h	1.321	1.265	1.952	2.038	2.223	2.071	2.509	2.038	2.223	2.071	2.509	ns
	GCLK PLL	t_{su}	-1.346	-1.396	-2.145	-2.087	-2.347	-2.264	-2.828	-2.087	-2.347	-2.264	-2.828	ns
		t_h	1.663	1.711	2.634	2.592	2.899	2.786	3.369	2.592	2.899	2.786	3.369	ns
SSTL-15 CLASS I	GCLK	t_{su}	-1.162	-1.106	-1.718	-1.799	-1.954	-1.818	-2.253	-1.799	-1.954	-1.818	-2.253	ns
		t_h	1.310	1.254	1.940	2.027	2.204	2.052	2.490	2.027	2.204	2.052	2.490	ns
	GCLK PLL	t_{su}	-1.335	-1.385	-2.134	-2.076	-2.328	-2.245	-2.809	-2.076	-2.328	-2.245	-2.809	ns
		t_h	1.652	1.700	2.622	2.581	2.880	2.767	3.350	2.581	2.880	2.767	3.350	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	-1.162	-1.106	-1.718	-1.799	-1.954	-1.818	-2.253	-1.799	-1.954	-1.818	-2.253	ns
		t_h	1.310	1.254	1.940	2.027	2.204	2.052	2.490	2.027	2.204	2.052	2.490	ns
	GCLK PLL	t_{su}	-1.335	-1.385	-2.134	-2.076	-2.328	-2.245	-2.809	-2.076	-2.328	-2.245	-2.809	ns
		t_h	1.652	1.700	2.622	2.581	2.880	2.767	3.350	2.581	2.880	2.767	3.350	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-1.173	-1.117	-1.729	-1.810	-1.973	-1.837	-2.272	-1.810	-1.973	-1.837	-2.272	ns
		t_h	1.321	1.265	1.952	2.038	2.223	2.071	2.509	2.038	2.223	2.071	2.509	ns
	GCLK PLL	t_{su}	-1.346	-1.396	-2.145	-2.087	-2.347	-2.264	-2.828	-2.087	-2.347	-2.264	-2.828	ns
		t_h	1.663	1.711	2.634	2.592	2.899	2.786	3.369	2.592	2.899	2.786	3.369	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	-1.173	-1.117	-1.729	-1.810	-1.973	-1.837	-2.272	-1.810	-1.973	-1.837	-2.272	ns
		t_h	1.321	1.265	1.952	2.038	2.223	2.071	2.509	2.038	2.223	2.071	2.509	ns
	GCLK PLL	t_{su}	-1.346	-1.396	-2.145	-2.087	-2.347	-2.264	-2.828	-2.087	-2.347	-2.264	-2.828	ns
		t_h	1.663	1.711	2.634	2.592	2.899	2.786	3.369	2.592	2.899	2.786	3.369	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	-1.162	-1.106	-1.718	-1.799	-1.954	-1.818	-2.253	-1.799	-1.954	-1.818	-2.253	ns
		t_h	1.310	1.254	1.940	2.027	2.204	2.052	2.490	2.027	2.204	2.052	2.490	ns
	GCLK PLL	t_{su}	-1.335	-1.385	-2.134	-2.076	-2.328	-2.245	-2.809	-2.076	-2.328	-2.245	-2.809	ns
		t_h	1.652	1.700	2.622	2.581	2.880	2.767	3.350	2.581	2.880	2.767	3.350	ns

Table 1–131. EP3SE260 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	GCLK	t_{su}	-1.162	-1.106	-1.718	-1.799	-1.954	-1.818	-2.253	-1.799	-1.954	-1.818	-2.253	ns
		t_h	1.310	1.254	1.940	2.027	2.204	2.052	2.490	2.027	2.204	2.052	2.490	ns
	GCLK PLL	t_{su}	-1.335	-1.385	-2.134	-2.076	-2.328	-2.245	-2.809	-2.076	-2.328	-2.245	-2.809	ns
		t_h	1.652	1.700	2.622	2.581	2.880	2.767	3.350	2.581	2.880	2.767	3.350	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	-1.150	-1.094	-1.708	-1.788	-1.938	-1.802	-2.237	-1.788	-1.938	-1.802	-2.237	ns
		t_h	1.298	1.242	1.930	2.016	2.188	2.036	2.474	2.016	2.188	2.036	2.474	ns
	GCLK PLL	t_{su}	-1.323	-1.373	-2.124	-2.065	-2.312	-2.229	-2.793	-2.065	-2.312	-2.229	-2.793	ns
		t_h	1.640	1.688	2.612	2.570	2.864	2.751	3.334	2.570	2.864	2.751	3.334	ns
3.0-V PCI	GCLK	t_{su}	-1.150	-1.094	-1.708	-1.788	-1.938	-1.802	-2.237	-1.788	-1.938	-1.802	-2.237	ns
		t_h	1.298	1.242	1.930	2.016	2.188	2.036	2.474	2.016	2.188	2.036	2.474	ns
	GCLK PLL	t_{su}	-1.323	-1.373	-2.124	-2.065	-2.312	-2.229	-2.793	-2.065	-2.312	-2.229	-2.793	ns
		t_h	1.640	1.688	2.612	2.570	2.864	2.751	3.334	2.570	2.864	2.751	3.334	ns
3.0-V PCI-X	GCLK	t_{su}	-1.253	-1.197	-1.821	-1.917	-2.183	-2.049	-2.481	-1.917	-2.183	-2.049	-2.481	ns
		t_h	1.399	1.343	2.044	2.148	2.436	2.284	2.723	2.148	2.436	2.284	2.723	ns
	GCLK PLL	t_{su}	-1.428	-1.476	-2.237	-2.191	-2.557	-2.476	-3.037	-2.191	-2.557	-2.476	-3.037	ns
		t_h	1.743	1.789	2.726	2.699	3.112	2.999	3.583	2.699	3.112	2.999	3.583	ns

Table 1–132 lists the EP3SE260 row pins input timing parameters for single-ended I/O standards.

Table 1–132. EP3SE260 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	GCLK	t_{su}	-1.219	-1.374	-2.059	-1.988	-2.283	-2.177	-2.643	-2.003	-2.382	-2.177	-2.643	ns
		t_h	1.355	1.524	1.749	1.864	1.862	1.767	1.884	1.864	1.883	1.767	1.884	ns
	GCLK PLL	t_{su}	0.983	0.983	2.293	2.233	2.553	2.431	2.902	2.260	2.659	2.431	2.902	ns
		t_h	-0.704	-0.685	-2.059	-1.988	-2.283	-2.177	-2.643	-2.003	-2.382	-2.177	-2.643	ns
3.3-V LVCMOS	GCLK	t_{su}	-1.219	-1.374	-2.059	-1.988	-2.283	-2.177	-2.643	-2.003	-2.382	-2.177	-2.643	ns
		t_h	1.355	1.524	1.749	1.864	1.862	1.767	1.884	1.864	1.883	1.767	1.884	ns
	GCLK PLL	t_{su}	0.983	0.983	2.293	2.233	2.553	2.431	2.902	2.260	2.659	2.431	2.902	ns
		t_h	-0.704	-0.685	-2.056	-1.989	-2.286	-2.180	-2.646	-2.002	-2.387	-2.180	-2.646	ns
3.0-V LVTTL	GCLK	t_{su}	-1.225	-1.385	2.290	2.234	2.556	2.434	2.905	2.259	2.664	2.434	2.905	ns
		t_h	1.361	1.535	-2.056	-1.989	-2.286	-2.180	-2.646	-2.002	-2.387	-2.180	-2.646	ns
	GCLK PLL	t_{su}	0.977	0.972	1.752	1.863	1.859	1.764	1.881	1.865	1.878	1.764	1.881	ns
		t_h	-0.698	-0.674	2.290	2.234	2.556	2.434	2.905	2.259	2.664	2.434	2.905	ns

Table 1–132. EP3SE260 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	GCLK	t_{su}	-1.225	-1.385	2.299	2.247	2.571	2.449	2.920	2.268	2.674	2.449	2.920	ns
		t_h	1.361	1.535	-2.065	-2.002	-2.301	-2.195	-2.661	-2.011	-2.397	-2.195	-2.661	ns
	GCLK PLL	t_{su}	0.977	0.972	1.743	1.850	1.844	1.749	1.866	1.856	1.868	1.749	1.866	ns
		t_h	-0.698	-0.674	2.299	2.247	2.571	2.449	2.920	2.268	2.674	2.449	2.920	ns
2.5 V	GCLK	t_{su}	-1.213	-1.378	1.617	1.714	1.860	1.741	1.759	1.830	1.861	1.741	1.759	ns
		t_h	1.349	1.528	2.364	2.410	2.627	2.565	3.018	2.344	2.687	2.565	3.018	ns
	GCLK PLL	t_{su}	0.989	0.979	-2.130	-2.167	-2.360	-2.314	-2.765	-2.088	-2.409	-2.314	-2.765	ns
		t_h	-0.710	-0.681	1.617	1.714	1.860	1.741	1.759	1.830	1.861	1.741	1.759	ns
1.8 V	GCLK	t_{su}	-1.283	-1.435	1.641	1.746	1.928	1.809	1.827	1.861	1.926	1.809	1.827	ns
		t_h	0.968	0.896	2.340	2.378	2.559	2.497	2.950	2.313	2.622	2.497	2.950	ns
	GCLK PLL	t_{su}	1.421	1.586	-2.106	-2.135	-2.292	-2.246	-2.697	-2.057	-2.344	-2.246	-2.697	ns
		t_h	-1.273	-1.424	1.720	1.847	2.087	1.968	1.986	1.957	2.081	1.968	1.986	ns
1.5 V	GCLK	t_{su}	0.978	0.907	2.261	2.277	2.400	2.338	2.791	2.217	2.467	2.338	2.791	ns
		t_h	1.411	1.575	-2.027	-2.034	-2.133	-2.087	-2.538	-1.961	-2.189	-2.087	-2.538	ns
	GCLK PLL	t_{su}	-1.213	-1.371	1.829	1.959	2.064	1.969	2.086	1.968	2.085	1.969	2.086	ns
		t_h	1.038	0.960	2.213	2.138	2.351	2.229	2.700	2.156	2.457	2.229	2.700	ns
1.2 V	GCLK	t_{su}	1.351	1.522	-1.989	-2.007	-2.128	-2.081	-2.534	-1.932	-2.182	-2.081	-2.534	ns
		t_h	-1.155	-1.320	1.758	-2.007	-2.128	-2.081	-2.534	-1.932	-2.182	-2.081	-2.534	ns
	GCLK PLL	t_{su}	1.047	1.038	2.223	2.248	2.393	2.331	2.783	2.185	2.457	2.331	2.783	ns
		t_h	1.292	1.471	-1.989	1.874	2.092	1.974	1.990	1.986	2.088	1.974	1.990	ns
SSTL-2 CLASS I	GCLK	t_{su}	-1.155	-1.320	1.758	1.874	2.092	1.974	1.990	1.986	2.088	1.974	1.990	ns
		t_h	1.047	1.038	2.223	-1.378	-1.541	-1.455	-1.458	-1.477	-1.526	-1.455	-1.458	ns
	GCLK PLL	t_{su}	1.292	1.471	-1.989	-2.007	-2.128	-2.081	-2.534	-1.932	-2.182	-2.081	-2.534	ns
		t_h	-1.187	-1.336	1.758	2.248	2.393	2.331	2.783	2.185	2.457	2.331	2.783	ns
SSTL-2 CLASS II	GCLK	t_{su}	1.064	0.995	2.223	1.874	2.092	1.974	1.990	1.986	2.088	1.974	1.990	ns
		t_h	1.325	1.487	-1.989	-1.378	-1.541	-1.455	-1.458	-1.477	-1.526	-1.455	-1.458	ns
	GCLK PLL	t_{su}	-1.187	-1.336	-1.294	-1.997	-2.110	-2.063	-2.516	-1.921	-2.165	-2.063	-2.516	ns
		t_h	1.064	0.995	-1.974	2.238	2.375	2.313	2.765	2.174	2.440	2.313	2.765	ns
SSTL-18 CLASS I	GCLK	t_{su}	1.325	1.487	2.209	1.884	2.110	1.992	2.008	1.997	2.105	1.992	2.008	ns
		t_h	-1.173	-1.324	1.758	1.884	2.110	1.992	2.008	1.997	2.105	1.992	2.008	ns
	GCLK PLL	t_{su}	1.078	1.007	2.223	-1.388	-1.559	-1.473	-1.476	-1.488	-1.543	-1.473	-1.476	ns
		t_h	1.311	1.475	-1.989	-1.997	-2.110	-2.063	-2.516	-1.921	-2.165	-2.063	-2.516	ns
SSTL-18 CLASS II	GCLK	t_{su}	-1.187	-1.336	1.758	-1.378	-1.541	-1.455	-1.458	-1.477	-1.526	-1.455	-1.458	ns
		t_h	1.064	0.995	2.223	-2.007	-2.128	-2.081	-2.534	-1.932	-2.182	-2.081	-2.534	ns
	GCLK PLL	t_{su}	1.325	1.487	-1.989	2.248	2.393	2.331	2.783	2.185	2.457	2.331	2.783	ns
		t_h	-1.187	-1.336	-1.294	1.874	2.092	1.974	1.990	1.986	2.088	1.974	1.990	ns

Table 1–132. EP3SE260 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-15 CLASS I	GCLK	t_{su}	1.064	0.995	-1.974	-1.378	-1.541	-1.455	-1.458	-1.477	-1.526	-1.455	-1.458	ns
		t_h	1.325	1.487	2.209	-2.007	-2.128	-2.081	-2.534	-1.932	-2.182	-2.081	-2.534	ns
	GCLK PLL	t_{su}	-1.173	-1.324	1.773	2.248	2.393	2.331	2.783	2.185	2.457	2.331	2.783	ns
		t_h	1.078	1.007	-1.294	1.874	2.092	1.974	1.990	1.986	2.088	1.974	1.990	ns
1.8-V HSTL CLASS I	GCLK	t_{su}	1.311	1.475	-1.974	-1.378	-1.541	-1.455	-1.458	-1.477	-1.526	-1.455	-1.458	ns
		t_h	-1.173	-1.324	-1.303	1.884	2.110	1.992	2.008	1.997	2.105	1.992	2.008	ns
	GCLK PLL	t_{su}	1.078	1.007	-1.965	-1.388	-1.559	-1.473	-1.476	-1.488	-1.543	-1.473	-1.476	ns
		t_h	1.311	1.475	2.200	-1.997	-2.110	-2.063	-2.516	-1.921	-2.165	-2.063	-2.516	ns
1.8-V HSTL CLASS II	GCLK	t_{su}	-1.164	-1.312	1.782	2.238	2.375	2.313	2.765	2.174	2.440	2.313	2.765	ns
		t_h	1.087	1.019	-1.303	1.884	2.110	1.992	2.008	1.997	2.105	1.992	2.008	ns
	GCLK PLL	t_{su}	1.302	1.463	-1.965	-1.388	-1.559	-1.473	-1.476	-1.488	-1.543	-1.473	-1.476	ns
		t_h	-1.164	-1.312	-1.303	1.894	2.126	2.008	2.024	2.006	2.121	2.008	2.024	ns
1.5-V HSTL CLASS I	GCLK	t_{su}	1.087	1.019	-2.056	-1.398	-1.575	-1.489	-1.492	-1.497	-1.559	-1.489	-1.492	ns
		t_h	1.302	1.463	1.752	-1.987	-2.094	-2.047	-2.500	-1.912	-2.149	-2.047	-2.500	ns
	GCLK PLL	t_{su}	-1.225	-1.385	2.290	2.228	2.359	2.297	2.749	2.165	2.424	2.297	2.749	ns
		t_h	1.361	1.535	-2.056	1.894	2.126	2.008	2.024	2.006	2.121	2.008	2.024	ns
1.5-V HSTL CLASS II	GCLK	t_{su}	0.977	0.972	1.752	-1.398	-1.575	-1.489	-1.492	-1.497	-1.559	-1.489	-1.492	ns
		t_h	-0.698	-0.674	2.290	-1.987	-2.094	-2.047	-2.500	-1.912	-2.149	-2.047	-2.500	ns
	GCLK PLL	t_{su}	-1.225	-1.385	2.290	2.228	2.359	2.297	2.749	2.165	2.424	2.297	2.749	ns
		t_h	1.361	1.535	2.290	1.894	2.126	2.008	2.024	2.006	2.121	2.008	2.024	ns
1.2-V HSTL CLASS I	GCLK	t_{su}	0.977	0.972	2.290	-1.398	-1.575	-1.489	-1.492	-1.497	-1.559	-1.489	-1.492	ns
		t_h	-0.698	-0.674	2.290	-1.987	-2.094	-2.047	-2.500	-1.912	-2.149	-2.047	-2.500	ns
	GCLK PLL	t_{su}	-1.219	-1.374	-2.059	-1.988	-2.283	-2.177	-2.643	-2.003	-2.382	-2.177	-2.643	ns
		t_h	1.355	1.524	1.749	1.864	1.862	1.767	1.884	1.864	1.883	1.767	1.884	ns
1.2-V HSTL CLASS II	GCLK	t_{su}	0.983	0.983	2.293	2.233	2.553	2.431	2.902	2.260	2.659	2.431	2.902	ns
		t_h	-0.704	-0.685	-2.059	-1.988	-2.283	-2.177	-2.643	-2.003	-2.382	-2.177	-2.643	ns
	GCLK PLL	t_{su}	-1.219	-1.374	-2.059	-1.988	-2.283	-2.177	-2.643	-2.003	-2.382	-2.177	-2.643	ns
		t_h	1.355	1.524	1.749	1.864	1.862	1.767	1.884	1.864	1.883	1.767	1.884	ns
3.0-V PCI	GCLK	t_{su}	0.983	0.983	2.293	2.233	2.553	2.431	2.902	2.260	2.659	2.431	2.902	ns
		t_h	-0.704	-0.685	-2.056	-1.989	-2.286	-2.180	-2.646	-2.002	-2.387	-2.180	-2.646	ns
	GCLK PLL	t_{su}	-1.225	-1.385	2.290	2.234	2.556	2.434	2.905	2.259	2.664	2.434	2.905	ns
		t_h	1.361	1.535	-2.056	-1.989	-2.286	-2.180	-2.646	-2.002	-2.387	-2.180	-2.646	ns
3.0-V PCI-X	GCLK	t_{su}	0.977	0.972	1.752	1.863	1.859	1.764	1.881	1.865	1.878	1.764	1.881	ns
		t_h	-0.698	-0.674	2.290	2.234	2.556	2.434	2.905	2.259	2.664	2.434	2.905	ns
	GCLK PLL	t_{su}	-1.225	-1.385	2.299	2.247	2.571	2.449	2.920	2.268	2.674	2.449	2.920	ns
		t_h	1.361	1.535	-2.065	-2.002	-2.301	-2.195	-2.661	-2.011	-2.397	-2.195	-2.661	ns

Table 1–133 lists the EP3SE260 column pins output timing parameters for single-ended I/O standards.

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 1 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.644	3.677	5.302	5.460	6.139	5.837	6.259	5.460	6.139	5.837	6.259	ns
		GCLK PLL	t_{co}	4.087	4.076	5.937	6.144	6.701	6.529	7.188	6.144	6.701	6.529	7.188	ns
	8mA	GCLK	t_{co}	3.577	3.610	5.193	5.349	5.969	5.724	6.146	5.349	5.969	5.724	6.146	ns
		GCLK PLL	t_{co}	4.020	4.009	5.828	6.033	6.588	6.416	7.018	6.033	6.588	6.416	7.018	ns
	12mA	GCLK	t_{co}	3.491	3.524	5.089	5.250	5.817	5.632	6.054	5.250	5.817	5.632	6.054	ns
		GCLK PLL	t_{co}	3.934	3.923	5.724	5.934	6.496	6.324	6.866	5.934	6.496	6.324	6.866	ns
	16mA	GCLK	t_{co}	3.484	3.517	5.072	5.222	5.792	5.591	6.013	5.222	5.792	5.591	6.013	ns
		GCLK PLL	t_{co}	3.927	3.916	5.707	5.906	6.455	6.283	6.841	5.906	6.455	6.283	6.841	ns
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.650	3.683	5.306	5.465	6.153	5.844	6.266	5.465	6.153	5.844	6.266	ns
		GCLK PLL	t_{co}	4.093	4.082	5.941	6.149	6.708	6.536	7.202	6.149	6.708	6.536	7.202	ns
	8mA	GCLK	t_{co}	3.495	3.528	5.099	5.267	5.823	5.643	6.065	5.267	5.823	5.643	6.065	ns
		GCLK PLL	t_{co}	3.938	3.927	5.734	5.951	6.507	6.335	6.872	5.951	6.507	6.335	6.872	ns
	12mA	GCLK	t_{co}	3.502	3.535	5.093	5.246	5.792	5.617	6.039	5.246	5.792	5.617	6.039	ns
		GCLK PLL	t_{co}	3.945	3.934	5.728	5.930	6.481	6.309	6.841	5.930	6.481	6.309	6.841	ns
	16mA	GCLK	t_{co}	3.486	3.519	5.071	5.221	5.735	5.588	6.010	5.221	5.735	5.588	6.010	ns
		GCLK PLL	t_{co}	3.929	3.918	5.706	5.905	6.452	6.280	6.784	5.905	6.452	6.280	6.784	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.608	3.641	5.269	5.428	6.104	5.804	6.226	5.428	6.104	5.804	6.226	ns
		GCLK PLL	t_{co}	4.051	4.040	5.904	6.112	6.668	6.496	7.153	6.112	6.668	6.496	7.153	ns
	8mA	GCLK	t_{co}	3.497	3.530	5.139	5.294	5.942	5.668	6.088	5.294	5.942	5.668	6.088	ns
		GCLK PLL	t_{co}	3.940	3.929	5.774	5.978	6.531	6.360	6.990	5.978	6.531	6.360	6.990	ns
	12mA	GCLK	t_{co}	3.461	3.494	5.076	5.225	5.840	5.594	6.014	5.225	5.840	5.594	6.014	ns
		GCLK PLL	t_{co}	3.904	3.893	5.711	5.909	6.457	6.286	6.888	5.909	6.457	6.286	6.888	ns
	16mA	GCLK	t_{co}	3.443	3.476	5.047	5.197	5.790	5.564	5.986	5.197	5.790	5.564	5.986	ns
		GCLK PLL	t_{co}	3.886	3.875	5.682	5.881	6.428	6.256	6.838	5.881	6.428	6.256	6.838	ns

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 2 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.522	3.555	5.173	5.328	5.996	5.703	6.123	5.328	5.996	5.703	6.123	ns
		GCLK PLL	t_{co}	3.965	3.954	5.808	6.012	6.566	6.395	7.044	6.012	6.566	6.395	7.044	ns
	8mA	GCLK	t_{co}	3.443	3.476	5.049	5.199	5.814	5.568	5.988	5.199	5.814	5.568	5.988	ns
		GCLK PLL	t_{co}	3.886	3.875	5.684	5.883	6.431	6.260	6.862	5.883	6.431	6.260	6.862	ns
	12mA	GCLK	t_{co}	3.438	3.471	5.042	5.192	5.746	5.558	5.980	5.192	5.746	5.558	5.980	ns
		GCLK PLL	t_{co}	3.881	3.870	5.677	5.876	6.422	6.250	6.795	5.876	6.422	6.250	6.795	ns
	16mA	GCLK	t_{co}	3.429	3.462	5.028	5.177	5.744	5.543	5.965	5.177	5.744	5.543	5.965	ns
		GCLK PLL	t_{co}	3.872	3.861	5.663	5.861	6.407	6.235	6.792	5.861	6.407	6.235	6.792	ns
2.5 V	4mA	GCLK	t_{co}	3.644	3.677	5.380	5.555	6.278	5.950	6.370	5.555	6.278	5.950	6.370	ns
		GCLK PLL	t_{co}	4.087	4.076	6.015	6.239	6.813	6.642	7.326	6.239	6.813	6.642	7.326	ns
	8mA	GCLK	t_{co}	3.544	3.577	5.261	5.429	6.081	5.818	6.238	5.429	6.081	5.818	6.238	ns
		GCLK PLL	t_{co}	3.987	3.976	5.896	6.113	6.681	6.510	7.129	6.113	6.681	6.510	7.129	ns
	12mA	GCLK	t_{co}	3.500	3.533	5.174	5.338	5.941	5.721	6.143	5.338	5.941	5.721	6.143	ns
		GCLK PLL	t_{co}	3.943	3.932	5.809	6.022	6.585	6.413	6.989	6.022	6.585	6.413	6.989	ns
	16mA	GCLK	t_{co}	3.462	3.495	5.135	5.296	5.891	5.678	6.100	5.296	5.891	5.678	6.100	ns
		GCLK PLL	t_{co}	3.905	3.894	5.770	5.980	6.542	6.370	6.939	5.980	6.542	6.370	6.939	ns

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 3 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8 V	2mA	GCLK	t_{co}	3.835	3.868	5.701	5.915	6.815	6.353	6.775	5.915	6.815	6.353	6.775	ns
		GCLK PLL	t_{co}	4.278	4.267	6.336	6.599	7.217	7.045	7.864	6.599	7.217	7.045	7.864	ns
	4mA	GCLK	t_{co}	3.654	3.687	5.422	5.606	6.354	6.007	6.427	5.606	6.354	6.007	6.427	ns
		GCLK PLL	t_{co}	4.097	4.086	6.057	6.290	6.870	6.699	7.402	6.290	6.870	6.699	7.402	ns
	6mA	GCLK	t_{co}	3.572	3.605	5.315	5.491	6.180	5.895	6.317	5.491	6.180	5.895	6.317	ns
		GCLK PLL	t_{co}	4.015	4.004	5.950	6.175	6.759	6.587	7.229	6.175	6.759	6.587	7.229	ns
	8mA	GCLK	t_{co}	3.552	3.585	5.257	5.437	6.068	5.829	6.251	5.437	6.068	5.829	6.251	ns
		GCLK PLL	t_{co}	3.995	3.984	5.892	6.121	6.693	6.521	7.117	6.121	6.693	6.521	7.117	ns
	10mA	GCLK	t_{co}	3.489	3.522	5.196	5.362	5.954	5.748	6.170	5.362	5.954	5.748	6.170	ns
		GCLK PLL	t_{co}	3.932	3.921	5.831	6.046	6.612	6.440	7.003	6.046	6.612	6.440	7.003	ns
	12mA	GCLK	t_{co}	3.471	3.504	5.175	5.341	5.916	5.725	6.147	5.341	5.916	5.725	6.147	ns
		GCLK PLL	t_{co}	3.914	3.903	5.810	6.025	6.589	6.417	6.965	6.025	6.589	6.417	6.965	ns
1.5 V	2mA	GCLK	t_{co}	3.781	3.814	5.630	5.847	6.732	6.291	6.713	5.847	6.732	6.291	6.713	ns
		GCLK PLL	t_{co}	4.224	4.213	6.265	6.531	7.155	6.983	7.781	6.531	7.155	6.983	7.781	ns
	4mA	GCLK	t_{co}	3.569	3.602	5.311	5.491	6.176	5.899	6.321	5.491	6.176	5.899	6.321	ns
		GCLK PLL	t_{co}	4.012	4.001	5.946	6.175	6.763	6.591	7.225	6.175	6.763	6.591	7.225	ns
	6mA	GCLK	t_{co}	3.544	3.577	5.244	5.431	6.059	5.832	6.254	5.431	6.059	5.832	6.254	ns
		GCLK PLL	t_{co}	3.987	3.976	5.879	6.115	6.696	6.524	7.108	6.115	6.696	6.524	7.108	ns
	8mA	GCLK	t_{co}	3.533	3.566	5.227	5.406	6.027	5.812	6.234	5.406	6.027	5.812	6.234	ns
		GCLK PLL	t_{co}	3.976	3.965	5.862	6.090	6.676	6.504	7.076	6.090	6.676	6.504	7.076	ns
	10mA	GCLK	t_{co}	3.478	3.511	5.189	5.355	5.945	5.742	6.164	5.355	5.945	5.742	6.164	ns
		GCLK PLL	t_{co}	3.921	3.910	5.824	6.039	6.606	6.434	6.994	6.039	6.606	6.434	6.994	ns
	12mA	GCLK	t_{co}	3.473	3.506	5.172	5.344	5.903	5.731	6.153	5.344	5.903	5.731	6.153	ns
		GCLK PLL	t_{co}	3.916	3.905	5.807	6.028	6.595	6.423	6.952	6.028	6.595	6.423	6.952	ns

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 4 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2 V	2mA	GCLK	t_{co}	3.697	3.730	5.556	5.783	6.652	6.235	6.657	5.783	6.652	6.235	6.657	ns
		GCLK PLL	t_{co}	4.140	4.129	6.191	6.467	7.099	6.927	7.701	6.467	7.099	6.927	7.701	ns
	4mA	GCLK	t_{co}	3.574	3.607	5.330	5.521	6.223	5.949	6.371	5.521	6.223	5.949	6.371	ns
		GCLK PLL	t_{co}	4.017	4.006	5.965	6.205	6.813	6.641	7.272	6.205	6.813	6.641	7.272	ns
	6mA	GCLK	t_{co}	3.536	3.569	5.238	5.432	6.068	5.836	6.258	5.432	6.068	5.836	6.258	ns
		GCLK PLL	t_{co}	3.979	3.968	5.873	6.116	6.700	6.528	7.117	6.116	6.700	6.528	7.117	ns
	8mA	GCLK	t_{co}	3.489	3.522	5.210	5.383	5.977	5.780	6.202	5.383	5.977	5.780	6.202	ns
		GCLK PLL	t_{co}	3.932	3.921	5.845	6.067	6.644	6.472	7.026	6.067	6.644	6.472	7.026	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.489	3.522	5.167	5.330	5.925	5.711	6.133	5.330	5.925	5.711	6.133	ns
		GCLK PLL	t_{co}	3.932	3.921	5.802	6.014	6.575	6.403	6.974	6.014	6.575	6.403	6.974	ns
	10mA	GCLK	t_{co}	3.486	3.519	5.164	5.327	5.930	5.707	6.129	5.327	5.930	5.707	6.129	ns
		GCLK PLL	t_{co}	3.929	3.918	5.799	6.011	6.571	6.399	6.978	6.011	6.571	6.399	6.978	ns
	12mA	GCLK	t_{co}	3.484	3.517	5.164	5.328	5.911	5.708	6.130	5.328	5.911	5.708	6.130	ns
		GCLK PLL	t_{co}	3.927	3.916	5.799	6.012	6.572	6.400	6.960	6.012	6.572	6.400	6.960	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.475	3.508	5.149	5.312	5.877	5.693	6.115	5.312	5.877	5.693	6.115	ns
		GCLK PLL	t_{co}	3.918	3.907	5.784	5.996	6.557	6.385	6.926	5.996	6.557	6.385	6.926	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.496	3.529	5.179	5.344	5.952	5.727	6.149	5.344	5.952	5.727	6.149	ns
		GCLK PLL	t_{co}	3.939	3.928	5.814	6.028	6.591	6.419	7.000	6.028	6.591	6.419	7.000	ns
	6mA	GCLK	t_{co}	3.492	3.525	5.177	5.342	5.942	5.725	6.147	5.342	5.942	5.725	6.147	ns
		GCLK PLL	t_{co}	3.935	3.924	5.812	6.026	6.589	6.417	6.991	6.026	6.589	6.417	6.991	ns
	8mA	GCLK	t_{co}	3.481	3.514	5.167	5.333	5.934	5.716	6.138	5.333	5.934	5.716	6.138	ns
		GCLK PLL	t_{co}	3.924	3.913	5.802	6.017	6.580	6.408	6.982	6.017	6.580	6.408	6.982	ns
	10mA	GCLK	t_{co}	3.470	3.503	5.154	5.320	5.896	5.703	6.125	5.320	5.896	5.703	6.125	ns
		GCLK PLL	t_{co}	3.913	3.902	5.789	6.004	6.567	6.395	6.945	6.004	6.567	6.395	6.945	ns
	12mA	GCLK	t_{co}	3.470	3.503	5.154	5.320	5.896	5.703	6.125	5.320	5.896	5.703	6.125	ns
		GCLK PLL	t_{co}	3.913	3.902	5.789	6.004	6.567	6.395	6.945	6.004	6.567	6.395	6.945	ns

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 5 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.476	3.509	5.153	5.317	5.896	5.698	6.120	5.317	5.896	5.698	6.120	ns
		GCLK PLL	t_{co}	3.919	3.908	5.788	6.001	6.562	6.390	6.945	6.001	6.562	6.390	6.945	ns
	16mA	GCLK	t_{co}	3.479	3.512	5.161	5.326	5.901	5.710	6.132	5.326	5.901	5.710	6.132	ns
		GCLK PLL	t_{co}	3.922	3.911	5.796	6.010	6.574	6.402	6.950	6.010	6.574	6.402	6.950	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.500	3.533	5.188	5.356	5.967	5.740	6.162	5.356	5.967	5.740	6.162	ns
		GCLK PLL	t_{co}	3.943	3.932	5.823	6.040	6.604	6.432	7.016	6.040	6.604	6.432	7.016	ns
	6mA	GCLK	t_{co}	3.486	3.519	5.178	5.346	5.941	5.731	6.153	5.346	5.941	5.731	6.153	ns
		GCLK PLL	t_{co}	3.929	3.918	5.813	6.030	6.595	6.423	6.990	6.030	6.595	6.423	6.990	ns
	8mA	GCLK	t_{co}	3.475	3.508	5.164	5.332	5.917	5.717	6.139	5.332	5.917	5.717	6.139	ns
		GCLK PLL	t_{co}	3.918	3.907	5.799	6.016	6.581	6.409	6.966	6.016	6.581	6.409	6.966	ns
	10mA	GCLK	t_{co}	3.474	3.507	5.167	5.335	5.906	5.721	6.143	5.335	5.906	5.721	6.143	ns
		GCLK PLL	t_{co}	3.917	3.906	5.802	6.019	6.585	6.413	6.955	6.019	6.585	6.413	6.955	ns
	12mA	GCLK	t_{co}	3.471	3.504	5.162	5.330	5.896	5.715	6.137	5.330	5.896	5.715	6.137	ns
		GCLK PLL	t_{co}	3.914	3.903	5.797	6.014	6.579	6.407	6.945	6.014	6.579	6.407	6.945	ns
SSTL-15 CLASS II	8mA	GCLK	t_{co}	3.473	3.506	5.151	5.316	5.896	5.698	6.120	5.316	5.896	5.698	6.120	ns
		GCLK PLL	t_{co}	3.916	3.905	5.786	6.000	6.562	6.390	6.945	6.000	6.562	6.390	6.945	ns
	16mA	GCLK	t_{co}	3.476	3.509	5.158	5.325	5.902	5.709	6.131	5.325	5.902	5.709	6.131	ns
		GCLK PLL	t_{co}	3.919	3.908	5.793	6.009	6.573	6.401	6.951	6.009	6.573	6.401	6.951	ns

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Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 6 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.483	3.516	5.153	5.316	5.910	5.696	6.118	5.316	5.910	5.696	6.118	ns
		GCLK PLL	t_{co}	3.926	3.915	5.788	6.000	6.560	6.388	6.959	6.000	6.560	6.388	6.959	ns
	6mA	GCLK	t_{co}	3.476	3.509	5.151	5.314	5.906	5.695	6.117	5.314	5.906	5.695	6.117	ns
		GCLK PLL	t_{co}	3.919	3.908	5.786	5.998	6.559	6.387	6.954	5.998	6.559	6.387	6.954	ns
	8mA	GCLK	t_{co}	3.468	3.501	5.143	5.307	5.879	5.688	6.110	5.307	5.879	5.688	6.110	ns
		GCLK PLL	t_{co}	3.911	3.900	5.778	5.991	6.552	6.380	6.928	5.991	6.552	6.380	6.928	ns
	10mA	GCLK	t_{co}	3.471	3.504	5.146	5.310	5.882	5.692	6.114	5.310	5.882	5.692	6.114	ns
		GCLK PLL	t_{co}	3.914	3.903	5.781	5.994	6.556	6.384	6.931	5.994	6.556	6.384	6.931	ns
	12mA	GCLK	t_{co}	3.468	3.501	5.149	5.314	5.881	5.696	6.118	5.314	5.881	5.696	6.118	ns
		GCLK PLL	t_{co}	3.911	3.900	5.784	5.998	6.560	6.388	6.929	5.998	6.560	6.388	6.929	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.476	3.509	5.148	5.311	5.878	5.692	6.114	5.311	5.878	5.692	6.114	ns
		GCLK PLL	t_{co}	3.919	3.908	5.783	5.995	6.556	6.384	6.927	5.995	6.556	6.384	6.927	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.488	3.521	5.161	5.326	5.926	5.707	6.129	5.326	5.926	5.707	6.129	ns
		GCLK PLL	t_{co}	3.931	3.920	5.796	6.010	6.571	6.399	6.975	6.010	6.571	6.399	6.975	ns
	6mA	GCLK	t_{co}	3.484	3.517	5.162	5.327	5.915	5.710	6.132	5.327	5.915	5.710	6.132	ns
		GCLK PLL	t_{co}	3.927	3.916	5.797	6.011	6.574	6.402	6.964	6.011	6.574	6.402	6.964	ns
	8mA	GCLK	t_{co}	3.480	3.513	5.158	5.323	5.909	5.705	6.127	5.323	5.909	5.705	6.127	ns
		GCLK PLL	t_{co}	3.923	3.912	5.793	6.007	6.569	6.397	6.958	6.007	6.569	6.397	6.958	ns
	10mA	GCLK	t_{co}	3.473	3.506	5.151	5.316	5.896	5.698	6.120	5.316	5.896	5.698	6.120	ns
		GCLK PLL	t_{co}	3.916	3.905	5.786	6.000	6.562	6.390	6.945	6.000	6.562	6.390	6.945	ns
	12mA	GCLK	t_{co}	3.474	3.507	5.158	5.324	5.892	5.708	6.130	5.324	5.892	5.708	6.130	ns
		GCLK PLL	t_{co}	3.917	3.906	5.793	6.008	6.572	6.400	6.941	6.008	6.572	6.400	6.941	ns
1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.472	3.505	5.139	5.302	5.871	5.682	6.104	5.302	5.871	5.682	6.104	ns
		GCLK PLL	t_{co}	3.915	3.904	5.774	5.986	6.546	6.374	6.920	5.986	6.546	6.374	6.920	ns

Table 1–133. EP3SE260 Column Pins Output Timing Parameters (Part 7 of 7)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.491	3.524	5.175	5.343	5.945	5.728	6.150	5.343	5.945	5.728	6.150	ns
		GCLK PLL	t_{co}	3.934	3.923	5.810	6.027	6.592	6.420	6.994	6.027	6.592	6.420	6.994	ns
	6mA	GCLK	t_{co}	3.483	3.516	5.166	5.334	5.928	5.719	6.141	5.334	5.928	5.719	6.141	ns
		GCLK PLL	t_{co}	3.926	3.915	5.801	6.018	6.583	6.411	6.977	6.018	6.583	6.411	6.977	ns
	8mA	GCLK	t_{co}	3.484	3.517	5.174	5.342	5.924	5.728	6.150	5.342	5.924	5.728	6.150	ns
		GCLK PLL	t_{co}	3.927	3.916	5.809	6.026	6.592	6.420	6.973	6.026	6.592	6.420	6.973	ns
	10mA	GCLK	t_{co}	3.473	3.506	5.161	5.329	5.901	5.714	6.136	5.329	5.901	5.714	6.136	ns
		GCLK PLL	t_{co}	3.916	3.905	5.796	6.013	6.578	6.406	6.950	6.013	6.578	6.406	6.950	ns
	12mA	GCLK	t_{co}	3.473	3.506	5.161	5.329	5.902	5.715	6.137	5.329	5.902	5.715	6.137	ns
		GCLK PLL	t_{co}	3.916	3.905	5.796	6.013	6.579	6.407	6.951	6.013	6.579	6.407	6.951	ns
1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.494	3.527	5.177	5.344	5.980	5.728	6.150	5.344	5.980	5.728	6.150	ns
		GCLK PLL	t_{co}	3.937	3.926	5.812	6.028	6.592	6.420	7.029	6.028	6.592	6.420	7.029	ns
3.0-V PCI	—	GCLK	t_{co}	3.597	3.630	5.222	5.378	5.955	5.753	6.175	5.378	5.955	5.753	6.175	ns
		GCLK PLL	t_{co}	4.040	4.029	5.857	6.062	6.617	6.445	7.004	6.062	6.617	6.445	7.004	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.597	3.630	5.222	5.378	5.955	5.753	6.175	5.378	5.955	5.753	6.175	ns
		GCLK PLL	t_{co}	4.040	4.029	5.857	6.062	6.617	6.445	7.004	6.062	6.617	6.445	7.004	ns

Table 1–134 lists the EP3SE260 row pins output timing parameters for single-ended I/O standards.

Table 1–134. EP3SE260 Row Pins Output Timing Parameters (Part 1 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVTTL	4mA	GCLK	t_{co}	3.648	3.902	5.663	5.865	6.484	6.256	6.709	6.063	6.530	6.256	6.709	ns
		GCLK PLL	t_{co}	1.582	1.785	2.228	2.322	2.505	2.489	2.454	2.441	2.632	2.489	2.454	ns
	8mA	GCLK	t_{co}	3.555	3.797	5.533	5.727	6.340	6.112	6.565	5.922	6.414	6.112	6.565	ns
		GCLK PLL	t_{co}	1.489	1.680	2.098	2.184	2.361	2.346	2.310	2.300	2.483	2.346	2.310	ns
	12mA	GCLK	t_{co}	3.456	3.707	5.414	5.604	6.212	5.995	6.446	5.795	6.315	5.995	6.446	ns
		GCLK PLL	t_{co}	1.390	1.574	1.979	2.061	2.233	2.250	2.182	2.173	2.354	2.250	2.182	ns

Table 1–134. EP3SE260 Row Pins Output Timing Parameters (Part 2 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
3.3-V LVCMOS	4mA	GCLK	t_{co}	3.658	3.906	5.671	5.870	6.489	6.261	6.714	6.069	6.542	6.261	6.714	ns
		GCLK PLL	t_{co}	1.592	1.789	2.236	2.327	2.510	2.494	2.459	2.447	2.637	2.494	2.459	ns
	8mA	GCLK	t_{co}	3.460	3.711	5.420	5.616	6.218	6.005	6.456	5.801	6.324	6.005	6.456	ns
		GCLK PLL	t_{co}	1.394	1.580	1.985	2.067	2.239	2.260	2.188	2.179	2.363	2.260	2.188	ns
3.0-V LVTTL	4mA	GCLK	t_{co}	3.602	3.848	5.615	5.818	6.441	6.213	6.666	6.020	6.496	6.213	6.666	ns
		GCLK PLL	t_{co}	1.536	1.731	2.180	2.275	2.462	2.446	2.411	2.398	2.590	2.446	2.411	ns
	8mA	GCLK	t_{co}	3.477	3.721	5.463	5.659	6.277	6.049	6.502	5.858	6.351	6.049	6.502	ns
		GCLK PLL	t_{co}	1.411	1.604	2.028	2.116	2.298	2.282	2.247	2.236	2.426	2.282	2.247	ns
	12mA	GCLK	t_{co}	3.438	3.678	5.381	5.576	6.189	5.961	6.414	5.772	6.277	5.961	6.414	ns
		GCLK PLL	t_{co}	1.372	1.553	1.946	2.033	2.210	2.211	2.159	2.150	2.333	2.211	2.159	ns
3.0-V LVCMOS	4mA	GCLK	t_{co}	3.516	3.767	5.510	5.711	6.330	6.102	6.555	5.912	6.387	6.102	6.555	ns
		GCLK PLL	t_{co}	1.450	1.650	2.075	2.168	2.351	2.335	2.300	2.290	2.479	2.335	2.300	ns
	8mA	GCLK	t_{co}	3.416	3.662	5.351	5.545	6.150	5.928	6.379	5.732	6.249	5.928	6.379	ns
		GCLK PLL	t_{co}	1.350	1.531	1.911	1.994	2.171	2.183	2.120	2.110	2.293	2.183	2.120	ns
2.5 V	4mA	GCLK	t_{co}	3.628	3.884	5.748	5.972	6.613	6.385	6.838	6.180	6.648	6.385	6.838	ns
		GCLK PLL	t_{co}	1.562	1.767	2.313	2.429	2.634	2.618	2.583	2.558	2.769	2.618	2.583	ns
	8mA	GCLK	t_{co}	3.518	3.785	5.593	5.809	6.443	6.215	6.668	6.013	6.504	6.215	6.668	ns
		GCLK PLL	t_{co}	1.452	1.668	2.158	2.266	2.464	2.448	2.413	2.391	2.595	2.448	2.413	ns
	12mA	GCLK	t_{co}	3.472	3.718	5.482	5.690	6.317	6.089	6.542	5.890	6.409	6.089	6.542	ns
		GCLK PLL	t_{co}	1.406	1.592	2.047	2.147	2.338	2.338	2.287	2.268	2.465	2.338	2.287	ns
1.8 V	2mA	GCLK	t_{co}	3.886	4.170	6.174	6.450	7.088	6.750	7.260	6.640	7.070	6.750	7.260	ns
		GCLK PLL	t_{co}	1.787	2.014	2.698	2.822	3.109	3.100	3.058	2.988	3.253	3.100	3.058	ns
	4mA	GCLK	t_{co}	3.661	3.968	5.848	6.082	6.683	6.390	6.855	6.275	6.709	6.390	6.855	ns
		GCLK PLL	t_{co}	1.562	1.812	2.372	2.454	2.704	2.695	2.653	2.623	2.847	2.695	2.653	ns
	6mA	GCLK	t_{co}	3.596	3.866	5.694	5.932	6.524	6.289	6.709	6.107	6.603	6.289	6.709	ns
		GCLK PLL	t_{co}	1.497	1.710	2.218	2.304	2.545	2.536	2.494	2.455	2.674	2.536	2.494	ns
	8mA	GCLK	t_{co}	3.536	3.792	5.617	5.839	6.428	6.224	6.644	6.012	6.531	6.224	6.644	ns
		GCLK PLL	t_{co}	1.437	1.649	2.141	2.227	2.449	2.440	2.398	2.360	2.580	2.440	2.398	ns

Table 1–134. EP3SE260 Row Pins Output Timing Parameters (Part 3 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.5 V	2mA	GCLK	t_{co}	3.797	4.088	6.084	6.364	7.016	6.687	7.188	6.547	7.005	6.687	7.188	ns
		GCLK PLL	t_{co}	1.698	1.932	2.608	2.736	3.037	3.028	2.986	2.895	3.177	3.028	2.986	ns
	4mA	GCLK	t_{co}	3.555	3.831	5.679	5.927	6.525	6.293	6.713	6.101	6.604	6.293	6.713	ns
		GCLK PLL	t_{co}	1.456	1.675	2.203	2.299	2.546	2.537	2.495	2.449	2.673	2.537	2.495	ns
	6mA	GCLK	t_{co}	3.528	3.783	5.606	5.831	6.419	6.224	6.644	6.003	6.531	6.224	6.644	ns
		GCLK PLL	t_{co}	1.429	1.640	2.130	2.219	2.440	2.431	2.389	2.351	2.568	2.431	2.389	ns
	8mA	GCLK	t_{co}	3.519	3.774	5.584	5.813	6.400	6.205	6.625	5.985	6.512	6.205	6.625	ns
		GCLK PLL	t_{co}	1.420	1.629	2.108	2.195	2.421	2.412	2.370	2.333	2.549	2.412	2.370	ns
1.2 V	2mA	GCLK	t_{co}	3.740	4.013	5.994	6.278	6.941	6.626	7.113	6.459	6.936	6.626	7.113	ns
		GCLK PLL	t_{co}	1.641	1.857	2.518	2.650	2.962	2.953	2.911	2.807	3.093	2.953	2.911	ns
	4mA	GCLK	t_{co}	3.560	3.824	5.701	5.955	6.566	6.341	6.761	6.126	6.648	6.341	6.761	ns
		GCLK PLL	t_{co}	1.461	1.670	2.225	2.327	2.587	2.578	2.536	2.474	2.715	2.578	2.536	ns
SSTL-2 CLASS I	8mA	GCLK	t_{co}	3.457	3.706	5.468	5.677	6.285	6.073	6.524	5.857	6.395	6.073	6.524	ns
		GCLK PLL	t_{co}	1.391	1.578	2.024	2.119	2.306	2.328	2.255	2.235	2.434	2.328	2.255	ns
	12mA	GCLK	t_{co}	3.445	3.702	5.465	5.675	6.277	6.071	6.522	5.849	6.394	6.071	6.522	ns
		GCLK PLL	t_{co}	1.379	1.566	2.016	2.111	2.301	2.326	2.247	2.227	2.433	2.326	2.247	ns
SSTL-2 CLASS II	16mA	GCLK	t_{co}	3.429	3.691	5.450	5.659	6.250	6.054	6.505	5.823	6.376	6.054	6.505	ns
		GCLK PLL	t_{co}	1.363	1.548	1.991	2.086	2.284	2.309	2.220	2.201	2.415	2.309	2.220	ns
SSTL-18 CLASS I	4mA	GCLK	t_{co}	3.497	3.748	5.512	5.726	6.301	6.119	6.539	5.893	6.422	6.119	6.539	ns
		GCLK PLL	t_{co}	1.398	1.593	2.041	2.131	2.324	2.313	2.271	2.241	2.459	2.313	2.271	ns
	6mA	GCLK	t_{co}	3.482	3.734	5.509	5.724	6.299	6.118	6.538	5.891	6.420	6.118	6.538	ns
		GCLK PLL	t_{co}	1.383	1.588	2.039	2.130	2.323	2.311	2.269	2.239	2.457	2.311	2.269	ns
	8mA	GCLK	t_{co}	3.471	3.722	5.492	5.707	6.282	6.108	6.528	5.874	6.411	6.108	6.528	ns
		GCLK PLL	t_{co}	1.372	1.577	2.029	2.120	2.313	2.294	2.252	2.222	2.448	2.294	2.252	ns
	10mA	GCLK	t_{co}	3.447	3.699	5.476	5.691	6.267	6.095	6.515	5.859	6.399	6.095	6.515	ns
		GCLK PLL	t_{co}	1.348	1.566	2.016	2.107	2.300	2.279	2.237	2.207	2.436	2.279	2.237	ns
	12mA	GCLK	t_{co}	3.447	3.698	5.475	5.690	6.266	6.095	6.515	5.858	6.399	6.095	6.515	ns
		GCLK PLL	t_{co}	1.348	1.565	2.016	2.107	2.300	2.278	2.236	2.206	2.436	2.278	2.236	ns

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Table 1–134. EP3SE260 Row Pins Output Timing Parameters (Part 4 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
SSTL-18 CLASS II	8mA	GCLK	t_{co}	3.457	3.707	5.473	5.686	6.260	6.090	6.510	5.853	6.393	6.090	6.510	ns
		GCLK PLL	t_{co}	1.358	1.572	2.015	2.104	2.295	2.272	2.230	2.201	2.430	2.272	2.230	ns
	16mA	GCLK	t_{co}	3.451	3.702	5.472	5.687	6.262	6.100	6.520	5.855	6.404	6.100	6.520	ns
		GCLK PLL	t_{co}	1.352	1.575	2.021	2.112	2.305	2.274	2.233	2.203	2.441	2.274	2.233	ns
SSTL-15 CLASS I	4mA	GCLK	t_{co}	3.493	3.744	5.523	5.740	6.318	6.132	6.552	5.906	6.434	6.132	6.552	ns
		GCLK PLL	t_{co}	1.394	1.596	2.050	2.142	2.339	2.330	2.288	2.254	2.471	2.330	2.288	ns
	6mA	GCLK	t_{co}	3.470	3.722	5.505	5.723	6.301	6.122	6.542	5.890	6.425	6.122	6.542	ns
		GCLK PLL	t_{co}	1.371	1.582	2.039	2.132	2.327	2.313	2.271	2.238	2.462	2.313	2.271	ns
	8mA	GCLK	t_{co}	3.453	3.705	5.488	5.705	6.283	6.109	6.529	5.872	6.412	6.109	6.529	ns
		GCLK PLL	t_{co}	1.354	1.570	2.026	2.119	2.314	2.295	2.253	2.220	2.449	2.295	2.253	ns
1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.472	3.720	5.479	5.691	6.263	6.088	6.508	5.857	6.390	6.088	6.508	ns
		GCLK PLL	t_{co}	1.373	1.578	2.014	2.102	2.293	2.275	2.233	2.205	2.427	2.275	2.233	ns
	6mA	GCLK	t_{co}	3.460	3.708	5.470	5.683	6.255	6.087	6.507	5.849	6.390	6.087	6.507	ns
		GCLK PLL	t_{co}	1.361	1.572	2.012	2.101	2.292	2.267	2.225	2.197	2.427	2.267	2.225	ns
	8mA	GCLK	t_{co}	3.447	3.696	5.462	5.674	6.247	6.080	6.500	5.841	6.383	6.080	6.500	ns
		GCLK PLL	t_{co}	1.348	1.564	2.005	2.094	2.285	2.259	2.217	2.189	2.420	2.259	2.217	ns
	10mA	GCLK	t_{co}	3.449	3.698	5.464	5.677	6.250	6.084	6.504	5.844	6.386	6.084	6.504	ns
		GCLK PLL	t_{co}	1.350	1.566	2.008	2.097	2.289	2.262	2.220	2.192	2.423	2.262	2.220	ns
	12mA	GCLK	t_{co}	3.442	3.693	5.462	5.676	6.250	6.087	6.507	5.844	6.391	6.087	6.507	ns
		GCLK PLL	t_{co}	1.343	1.563	2.010	2.100	2.292	2.262	2.220	2.192	2.428	2.262	2.220	ns
1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.448	3.697	5.457	5.668	6.241	6.083	6.503	5.835	6.385	6.083	6.503	ns
		GCLK PLL	t_{co}	1.349	1.571	2.008	2.097	2.288	2.253	2.216	2.183	2.422	2.253	2.216	ns
1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.479	3.727	5.490	5.704	6.278	6.099	6.519	5.869	6.401	6.099	6.519	ns
		GCLK PLL	t_{co}	1.380	1.584	2.023	2.112	2.304	2.290	2.248	2.217	2.438	2.290	2.248	ns
	6mA	GCLK	t_{co}	3.467	3.717	5.486	5.700	6.274	6.101	6.521	5.866	6.404	6.101	6.521	ns
		GCLK PLL	t_{co}	1.368	1.579	2.024	2.114	2.306	2.286	2.244	2.214	2.441	2.286	2.244	ns
	8mA	GCLK	t_{co}	3.463	3.712	5.480	5.694	6.268	6.096	6.516	5.860	6.398	6.096	6.516	ns
		GCLK PLL	t_{co}	1.364	1.575	2.019	2.109	2.301	2.280	2.238	2.208	2.435	2.280	2.238	ns

Table 1–134. EP3SE260 Row Pins Output Timing Parameters (Part 5 of 5)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.478	3.726	5.501	5.718	6.296	6.118	6.538	5.883	6.420	6.118	6.538	ns
		GCLK PLL	t_{co}	1.379	1.586	2.036	2.128	2.323	2.308	2.266	2.231	2.457	2.308	2.266	ns
	6mA	GCLK	t_{co}	3.466	3.714	5.490	5.706	6.284	6.109	6.529	5.872	6.411	6.109	6.529	ns
		GCLK PLL	t_{co}	1.367	1.578	2.027	2.119	2.314	2.296	2.254	2.220	2.448	2.296	2.254	ns
	8mA	GCLK	t_{co}	3.463	3.712	5.494	5.711	6.290	6.118	6.538	5.878	6.421	6.118	6.538	ns
		GCLK PLL	t_{co}	1.364	1.578	2.034	2.127	2.323	2.302	2.260	2.226	2.458	2.302	2.260	ns
3.0-V PCI	—	GCLK	t_{co}	3.542	3.812	5.520	5.723	6.294	6.113	6.564	5.875	6.437	6.113	6.564	ns
		GCLK PLL	t_{co}	1.476	1.661	2.049	2.137	2.343	2.368	2.264	2.253	2.476	2.368	2.264	ns
3.0-V PCI-X	—	GCLK	t_{co}	3.542	3.812	5.520	5.723	6.294	6.113	6.564	5.875	6.437	6.113	6.564	ns
		GCLK PLL	t_{co}	1.476	1.661	2.049	2.137	2.343	2.368	2.264	2.253	2.476	2.368	2.264	ns

Table 1–135 through Table 1–138 list the maximum I/O timing parameters for EP3SE260 devices for differential I/O standards.

Table 1–135 lists the EP3SE260 column pins input timing parameters for differential I/O standards.

Table 1–135. EP3SE260 Column Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
MINI-LVDS	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
RSDS	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns

Table 1–135. EP3SE260 Column Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.173	-1.244	-1.898	-1.933	-2.102	-2.022	-2.494	-1.950	-2.117	-2.022	-2.494	ns
		t_h	1.309	1.399	2.133	2.172	2.365	2.272	2.746	2.199	2.388	2.272	2.746	ns
	GCLK PLL	t_{su}	1.083	1.099	1.863	1.964	2.172	2.064	2.061	1.976	2.184	2.064	2.061	ns
		t_h	-0.804	-0.798	-1.384	-1.471	-1.624	-1.545	-1.527	-1.471	-1.626	-1.545	-1.527	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-1.180	-1.250	-1.910	-1.938	-2.102	-2.024	-2.493	-1.954	-2.112	-2.024	-2.493	ns
		t_h	1.316	1.405	2.146	2.180	2.368	2.275	2.750	2.206	2.388	2.275	2.750	ns
	GCLK PLL	t_{su}	1.076	1.093	1.851	1.959	2.172	2.062	2.062	1.972	2.189	2.062	2.062	ns
		t_h	-0.797	-0.792	-1.371	-1.463	-1.621	-1.542	-1.523	-1.464	-1.626	-1.542	-1.523	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.180	-1.250	-1.910	-1.938	-2.102	-2.024	-2.493	-1.954	-2.112	-2.024	-2.493	ns
		t_h	1.316	1.405	2.146	2.180	2.368	2.275	2.750	2.206	2.388	2.275	2.750	ns
	GCLK PLL	t_{su}	1.076	1.093	1.851	1.959	2.172	2.062	2.062	1.972	2.189	2.062	2.062	ns
		t_h	-0.797	-0.792	-1.371	-1.463	-1.621	-1.542	-1.523	-1.464	-1.626	-1.542	-1.523	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns

Table 1–135. EP3SE260 Column Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.153	-1.221	-1.879	-1.911	-2.067	-1.987	-2.459	-1.928	-2.084	-1.987	-2.459	ns
		t_h	1.289	1.376	2.114	2.150	2.330	2.237	2.711	2.177	2.355	2.237	2.711	ns
	GCLK PLL	t_{su}	1.103	1.122	1.882	1.986	2.207	2.099	2.096	1.998	2.217	2.099	2.096	ns
		t_h	-0.824	-0.821	-1.403	-1.493	-1.659	-1.580	-1.562	-1.493	-1.659	-1.580	-1.562	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-1.161	-1.233	-1.889	-1.922	-2.083	-2.003	-2.475	-1.939	-2.099	-2.003	-2.475	ns
		t_h	1.297	1.388	2.124	2.161	2.346	2.253	2.727	2.188	2.370	2.253	2.727	ns
	GCLK PLL	t_{su}	1.095	1.110	1.872	1.975	2.191	2.083	2.080	1.987	2.202	2.083	2.080	ns
		t_h	-0.816	-0.809	-1.393	-1.482	-1.643	-1.564	-1.546	-1.482	-1.644	-1.564	-1.546	ns

Table 1–136 lists the EP3SE260 row pins input timing parameters for differential I/O standards.

Table 1–136. EP3SE260 Row Pins Input Timing Parameters (Part 1 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	GCLK	t_{su}	-1.332	-1.401	-1.719	-1.648	-1.841	-1.769	-2.221	-1.630	-1.815	-1.769	-2.221	ns
		t_h	1.476	1.563	1.994	1.939	2.157	2.071	2.526	1.934	2.145	2.071	2.526	ns
	GCLK PLL	t_{su}	0.869	0.886	1.991	2.205	2.405	2.282	2.297	2.252	2.458	2.282	2.297	ns
		t_h	-0.581	-0.578	-1.475	-1.662	-1.803	-1.711	-1.711	-1.692	-1.839	-1.711	-1.711	ns
MINI-LVDS	GCLK	t_{su}	-1.332	-1.401	-1.719	-1.648	-1.841	-1.769	-2.221	-1.630	-1.815	-1.769	-2.221	ns
		t_h	1.476	1.563	1.994	1.939	2.157	2.071	2.526	1.934	2.145	2.071	2.526	ns
	GCLK PLL	t_{su}	0.869	0.886	1.991	2.205	2.405	2.282	2.297	2.252	2.458	2.282	2.297	ns
		t_h	-0.581	-0.578	-1.475	-1.662	-1.803	-1.711	-1.711	-1.692	-1.839	-1.711	-1.711	ns
RSDS	GCLK	t_{su}	-1.332	-1.401	-1.719	-1.648	-1.841	-1.769	-2.221	-1.630	-1.815	-1.769	-2.221	ns
		t_h	1.476	1.563	1.994	1.939	2.157	2.071	2.526	1.934	2.145	2.071	2.526	ns
	GCLK PLL	t_{su}	0.869	0.886	1.991	2.205	2.405	2.282	2.297	2.252	2.458	2.282	2.297	ns
		t_h	-0.581	-0.578	-1.475	-1.662	-1.803	-1.711	-1.711	-1.692	-1.839	-1.711	-1.711	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	GCLK	t_{su}	-1.137	-1.216	-1.849	-1.877	-2.030	-1.953	-2.400	-1.901	-2.052	-1.953	-2.400	ns
		t_h	1.274	1.369	2.088	2.122	2.297	2.206	2.656	2.156	2.330	2.206	2.656	ns
	GCLK PLL	t_{su}	1.064	1.071	1.866	1.981	2.216	2.098	2.118	1.985	2.221	2.098	2.118	ns
		t_h	-0.783	-0.772	-1.384	-1.483	-1.663	-1.576	-1.581	-1.474	-1.654	-1.576	-1.581	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	GCLK	t_{su}	-1.137	-1.216	-1.849	-1.877	-2.030	-1.953	-2.400	-1.901	-2.052	-1.953	-2.400	ns
		t_h	1.274	1.369	2.088	2.122	2.297	2.206	2.656	2.156	2.330	2.206	2.656	ns
	GCLK PLL	t_{su}	1.064	1.071	1.866	1.981	2.216	2.098	2.118	1.985	2.221	2.098	2.118	ns
		t_h	-0.783	-0.772	-1.384	-1.483	-1.663	-1.576	-1.581	-1.474	-1.654	-1.576	-1.581	ns

Table 1–136. EP3SE260 Row Pins Input Timing Parameters (Part 2 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	GCLK	t_{su}	-1.146	-1.228	-1.858	-1.887	-2.046	-1.969	-2.416	-1.910	-2.068	-1.969	-2.416	ns
		t_h	1.283	1.381	2.097	2.132	2.313	2.222	2.672	2.165	2.346	2.222	2.672	ns
	GCLK PLL	t_{su}	1.055	1.059	1.857	1.971	2.200	2.082	2.102	1.976	2.205	2.082	2.102	ns
		t_h	-0.774	-0.760	-1.375	-1.473	-1.647	-1.560	-1.565	-1.465	-1.638	-1.560	-1.565	ns
DIFFERENTIAL 1.8-V SSTL CLASS I	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	GCLK	t_{su}	-1.160	-1.240	-1.867	-1.897	-2.064	-1.987	-2.434	-1.921	-2.085	-1.987	-2.434	ns
		t_h	1.297	1.393	2.106	2.142	2.331	2.240	2.690	2.176	2.363	2.240	2.690	ns
	GCLK PLL	t_{su}	1.041	1.047	1.844	1.961	2.182	2.064	2.084	1.965	2.188	2.064	2.084	ns
		t_h	-0.760	-0.748	-1.363	-1.463	-1.629	-1.542	-1.547	-1.454	-1.621	-1.542	-1.547	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	GCLK	t_{su}	-1.169	-1.249	-1.881	-1.908	-2.071	-1.995	-2.440	-1.928	-2.086	-1.995	-2.440	ns
		t_h	1.306	1.402	2.121	2.156	2.341	2.250	2.701	2.186	2.369	2.250	2.701	ns
	GCLK PLL	t_{su}	1.032	1.038	1.829	1.945	2.171	2.052	2.073	1.954	2.182	2.052	2.073	ns
		t_h	-0.751	-0.739	-1.348	-1.445	-1.615	-1.528	-1.532	-1.440	-1.612	-1.528	-1.532	ns

Table 1–136. EP3SE260 Row Pins Input Timing Parameters (Part 3 of 3)

I/O Standard	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
			Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 2.5-V SSTL CLASS II	GCLK	t_{su}	-1.169	-1.249	-1.881	-1.908	-2.071	-1.995	-2.440	-1.928	-2.086	-1.995	-2.440	ns
		t_h	1.306	1.402	2.121	2.156	2.341	2.250	2.701	2.186	2.369	2.250	2.701	ns
	GCLK PLL	t_{su}	1.032	1.038	1.829	1.945	2.171	2.052	2.073	1.954	2.182	2.052	2.073	ns
		t_h	-0.751	-0.739	-1.348	-1.445	-1.615	-1.528	-1.532	-1.440	-1.612	-1.528	-1.532	ns

Table 1–137 lists the EP3SE260 column pins output timing parameters for differential I/O standards.

Table 1–137. EP3SE260 Column Pins Output Timing Parameters (Part 1 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS_E_1R	—	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
LVDS_E_3R	—	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.506	3.783	5.577	5.790	6.354	6.190	6.597	5.934	6.497	6.190	6.597	ns
		GCLK PLL	t_{co}	3.496	3.773	5.567	5.779	6.344	6.180	6.587	5.923	6.487	6.180	6.587	ns
RSDS_E_1R	—	GCLK	t_{co}	3.496	3.773	5.570	5.783	6.348	6.184	6.591	5.928	6.492	6.184	6.591	ns
		GCLK PLL	t_{co}	3.489	3.767	5.563	5.777	6.342	6.178	6.585	5.921	6.486	6.178	6.585	ns
RSDS_E_3R	—	GCLK	t_{co}	3.488	3.765	5.560	5.774	6.339	6.175	6.582	5.918	6.482	6.175	6.582	ns
		GCLK PLL	t_{co}	3.510	3.787	5.581	5.794	6.358	6.194	6.601	5.938	6.502	6.194	6.601	ns

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Table 1–137. EP3SE260 Column Pins Output Timing Parameters (Part 2 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.500	3.776	5.560	5.771	6.333	6.169	6.576	5.914	6.475	6.169	6.576	ns
		GCLK PLL	t_{co}	3.495	3.772	5.560	5.771	6.334	6.170	6.577	5.915	6.477	6.170	6.577	ns
	6mA	GCLK	t_{co}	3.493	3.770	5.559	5.770	6.332	6.168	6.575	5.914	6.476	6.168	6.575	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
	8mA	GCLK	t_{co}	3.486	3.763	5.555	5.767	6.331	6.167	6.574	5.912	6.475	6.167	6.574	ns
		GCLK PLL	t_{co}	3.485	3.760	5.538	5.748	6.309	6.145	6.552	5.891	6.451	6.145	6.552	ns
	10mA	GCLK	t_{co}	3.497	3.773	5.556	5.766	6.327	6.163	6.570	5.910	6.470	6.163	6.570	ns
		GCLK PLL	t_{co}	3.493	3.770	5.557	5.768	6.331	6.167	6.574	5.912	6.474	6.167	6.574	ns
	12mA	GCLK	t_{co}	3.483	3.759	5.546	5.757	6.319	6.155	6.562	5.901	6.462	6.155	6.562	ns
		GCLK PLL	t_{co}	3.481	3.757	5.544	5.754	6.317	6.153	6.560	5.899	6.460	6.153	6.560	ns
DIFFERENTIAL 1.2-V HSTL CLASS II	16mA	GCLK	t_{co}	3.481	3.758	5.547	5.759	6.322	6.158	6.565	5.903	6.466	6.158	6.565	ns
		GCLK PLL	t_{co}	3.485	3.761	5.544	5.754	6.316	6.152	6.559	5.898	6.459	6.152	6.559	ns
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.511	3.790	5.589	5.802	6.366	6.202	6.609	5.946	6.509	6.202	6.609	ns
		GCLK PLL	t_{co}	3.497	3.776	5.577	5.791	6.356	6.192	6.599	5.936	6.500	6.192	6.599	ns
	6mA	GCLK	t_{co}	3.485	3.763	5.560	5.773	6.338	6.174	6.581	5.918	6.482	6.174	6.581	ns
		GCLK PLL	t_{co}	3.485	3.763	5.563	5.777	6.342	6.178	6.585	5.922	6.487	6.178	6.585	ns
	8mA	GCLK	t_{co}	3.481	3.759	5.556	5.769	6.335	6.171	6.578	5.915	6.479	6.171	6.578	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
	10mA	GCLK	t_{co}	3.486	3.763	5.557	5.770	6.334	6.170	6.577	5.914	6.478	6.170	6.577	ns
		GCLK PLL	t_{co}	3.514	3.793	5.588	5.800	6.364	6.200	6.607	5.945	6.507	6.200	6.607	ns
	12mA	GCLK	t_{co}	3.503	3.781	5.576	5.788	6.352	6.188	6.595	5.933	6.495	6.188	6.595	ns
		GCLK PLL	t_{co}	3.498	3.777	5.576	5.789	6.353	6.189	6.596	5.934	6.497	6.189	6.596	ns
DIFFERENTIAL 1.5-V HSTL CLASS II	16mA	GCLK	t_{co}	3.484	3.762	5.558	5.770	6.334	6.170	6.577	5.915	6.479	6.170	6.577	ns
		GCLK PLL	t_{co}	3.482	3.760	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns

Table 1–137. EP3SE260 Column Pins Output Timing Parameters (Part 3 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.486	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
		GCLK PLL	t_{co}	3.486	3.763	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	6mA	GCLK	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
		GCLK PLL	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
	8mA	GCLK	t_{co}	3.492	3.770	5.562	5.773	6.336	6.172	6.579	5.918	6.480	6.172	6.579	ns
		GCLK PLL	t_{co}	3.485	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
	10mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
	12mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.479	3.750	5.506	5.712	6.270	6.106	6.513	5.854	6.411	6.106	6.513	ns
		GCLK PLL	t_{co}	3.475	3.753	5.553	5.767	6.332	6.168	6.575	5.913	6.477	6.168	6.575	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.506	3.783	5.577	5.790	6.354	6.190	6.597	5.934	6.497	6.190	6.597	ns
		GCLK PLL	t_{co}	3.496	3.773	5.567	5.779	6.344	6.180	6.587	5.923	6.487	6.180	6.587	ns
	6mA	GCLK	t_{co}	3.496	3.773	5.570	5.783	6.348	6.184	6.591	5.928	6.492	6.184	6.591	ns
		GCLK PLL	t_{co}	3.489	3.767	5.563	5.777	6.342	6.178	6.585	5.921	6.486	6.178	6.585	ns
	8mA	GCLK	t_{co}	3.488	3.765	5.560	5.774	6.339	6.175	6.582	5.918	6.482	6.175	6.582	ns
		GCLK PLL	t_{co}	3.510	3.787	5.581	5.794	6.358	6.194	6.601	5.938	6.502	6.194	6.601	ns
	10mA	GCLK	t_{co}	3.500	3.776	5.560	5.771	6.333	6.169	6.576	5.914	6.475	6.169	6.576	ns
		GCLK PLL	t_{co}	3.495	3.772	5.560	5.771	6.334	6.170	6.577	5.915	6.477	6.170	6.577	ns
	12mA	GCLK	t_{co}	3.493	3.770	5.559	5.770	6.332	6.168	6.575	5.914	6.476	6.168	6.575	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
DIFFERENTIAL 1.5-V SSTL CLASS II	8mA	GCLK	t_{co}	3.486	3.763	5.555	5.767	6.331	6.167	6.574	5.912	6.475	6.167	6.574	ns
		GCLK PLL	t_{co}	3.485	3.760	5.538	5.748	6.309	6.145	6.552	5.891	6.451	6.145	6.552	ns
	16mA	GCLK	t_{co}	3.497	3.773	5.556	5.766	6.327	6.163	6.570	5.910	6.470	6.163	6.570	ns
		GCLK PLL	t_{co}	3.493	3.770	5.557	5.768	6.331	6.167	6.574	5.912	6.474	6.167	6.574	ns

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Table 1–137. EP3SE260 Column Pins Output Timing Parameters (Part 4 of 4)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.483	3.759	5.546	5.757	6.319	6.155	6.562	5.901	6.462	6.155	6.562	ns
		GCLK PLL	t_{co}	3.481	3.757	5.544	5.754	6.317	6.153	6.560	5.899	6.460	6.153	6.560	ns
	6mA	GCLK	t_{co}	3.481	3.758	5.547	5.759	6.322	6.158	6.565	5.903	6.466	6.158	6.565	ns
		GCLK PLL	t_{co}	3.485	3.761	5.544	5.754	6.316	6.152	6.559	5.898	6.459	6.152	6.559	ns
	8mA	GCLK	t_{co}	3.511	3.790	5.589	5.802	6.366	6.202	6.609	5.946	6.509	6.202	6.609	ns
		GCLK PLL	t_{co}	3.497	3.776	5.577	5.791	6.356	6.192	6.599	5.936	6.500	6.192	6.599	ns
	10mA	GCLK	t_{co}	3.485	3.763	5.560	5.773	6.338	6.174	6.581	5.918	6.482	6.174	6.581	ns
		GCLK PLL	t_{co}	3.485	3.763	5.563	5.777	6.342	6.178	6.585	5.922	6.487	6.178	6.585	ns
	12mA	GCLK	t_{co}	3.481	3.759	5.556	5.769	6.335	6.171	6.578	5.915	6.479	6.171	6.578	ns
		GCLK PLL	t_{co}	3.485	3.761	5.549	5.760	6.323	6.159	6.566	5.904	6.466	6.159	6.566	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.486	3.763	5.557	5.770	6.334	6.170	6.577	5.914	6.478	6.170	6.577	ns
		GCLK PLL	t_{co}	3.514	3.793	5.588	5.800	6.364	6.200	6.607	5.945	6.507	6.200	6.607	ns
	16mA	GCLK	t_{co}	3.503	3.781	5.576	5.788	6.352	6.188	6.595	5.933	6.495	6.188	6.595	ns
		GCLK PLL	t_{co}	3.498	3.777	5.576	5.789	6.353	6.189	6.596	5.934	6.497	6.189	6.596	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.484	3.762	5.558	5.770	6.334	6.170	6.577	5.915	6.479	6.170	6.577	ns
		GCLK PLL	t_{co}	3.482	3.760	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	10mA	GCLK	t_{co}	3.486	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns
		GCLK PLL	t_{co}	3.486	3.763	5.556	5.768	6.332	6.168	6.575	5.913	6.476	6.168	6.575	ns
	12mA	GCLK	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
		GCLK PLL	t_{co}	3.502	3.780	5.572	5.783	6.346	6.182	6.589	5.928	6.489	6.182	6.589	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.492	3.770	5.562	5.773	6.336	6.172	6.579	5.918	6.480	6.172	6.579	ns
		GCLK PLL	t_{co}	3.485	3.762	5.548	5.758	6.320	6.156	6.563	5.902	6.463	6.156	6.563	ns

Table 1–138 lists the EP3SE260 row pins output timing parameters for differential I/O standards.

Table 1–138. EP3SE260 Row Pins Output Timing Parameters (Part 1 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
LVDS	—	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
LVDS_E_1R	—	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
LVDS_E_3R	—	GCLK	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
		GCLK PLL	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
MINI-LVDS	—	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
MINI-LVDS_E_1R	—	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.562	3.845	5.678	5.894	6.468	6.301	6.680	6.046	6.621	6.301	6.680	ns
MINI-LVDS_E_3R	—	GCLK	t_{co}	3.548	3.831	5.665	5.881	6.455	6.288	6.667	6.032	6.608	6.288	6.667	ns
		GCLK PLL	t_{co}	3.544	3.827	5.663	5.881	6.456	6.289	6.668	6.032	6.610	6.289	6.668	ns
RSDS	—	GCLK	t_{co}	3.560	3.842	5.664	5.878	6.450	6.283	6.662	6.029	6.603	6.283	6.662	ns
		GCLK PLL	t_{co}	3.549	3.832	5.660	5.874	6.447	6.280	6.659	6.026	6.600	6.280	6.659	ns
RSDS_E_1R	—	GCLK	t_{co}	3.546	3.829	5.658	5.872	6.445	6.278	6.657	6.024	6.599	6.278	6.657	ns
		GCLK PLL	t_{co}	3.557	3.839	5.659	5.873	6.444	6.277	6.656	6.023	6.597	6.277	6.656	ns
RSDS_E_3R	—	GCLK	t_{co}	3.547	3.830	5.657	5.871	6.443	6.276	6.655	6.023	6.597	6.276	6.655	ns
		GCLK PLL	t_{co}	3.533	3.816	5.642	5.856	6.429	6.262	6.641	6.008	6.582	6.262	6.641	ns
DIFFERENTIAL 1.2-V HSTL CLASS I	4mA	GCLK	t_{co}	3.530	3.812	5.638	5.852	6.425	6.258	6.637	6.004	6.578	6.258	6.637	ns
		GCLK PLL	t_{co}	3.527	3.810	5.639	5.855	6.428	6.261	6.640	6.007	6.582	6.261	6.640	ns
	6mA	GCLK	t_{co}	3.528	3.810	5.629	5.843	6.415	6.248	6.627	5.994	6.568	6.248	6.627	ns
		GCLK PLL	t_{co}	3.577	3.863	5.700	5.916	6.491	6.324	6.703	6.068	6.644	6.324	6.703	ns
	8mA	GCLK	t_{co}	3.553	3.839	5.682	5.899	6.474	6.307	6.686	6.051	6.629	6.307	6.686	ns
		GCLK PLL	t_{co}	3.535	3.820	5.660	5.877	6.452	6.285	6.664	6.029	6.607	6.285	6.664	ns

Table 1–138. EP3SE260 Row Pins Output Timing Parameters (Part 2 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.5-V HSTL CLASS I	4mA	GCLK	t_{co}	3.581	3.866	5.700	5.916	6.490	6.323	6.702	6.068	6.644	6.323	6.702	ns
		GCLK PLL	t_{co}	3.566	3.851	5.686	5.901	6.475	6.308	6.687	6.053	6.629	6.308	6.687	ns
	6mA	GCLK	t_{co}	3.555	3.840	5.681	5.898	6.472	6.305	6.684	6.050	6.627	6.305	6.684	ns
		GCLK PLL	t_{co}	3.535	3.820	5.658	5.874	6.449	6.282	6.661	6.027	6.603	6.282	6.661	ns
	8mA	GCLK	t_{co}	3.532	3.816	5.654	5.871	6.445	6.278	6.657	6.023	6.600	6.278	6.657	ns
		GCLK PLL	t_{co}	3.537	3.820	5.645	5.859	6.431	6.264	6.643	6.010	6.584	6.264	6.643	ns
DIFFERENTIAL 1.8-V HSTL CLASS I	4mA	GCLK	t_{co}	3.530	3.813	5.644	5.860	6.434	6.267	6.646	6.013	6.589	6.267	6.646	ns
		GCLK PLL	t_{co}	3.568	3.852	5.682	5.897	6.470	6.303	6.682	6.049	6.624	6.303	6.682	ns
	6mA	GCLK	t_{co}	3.550	3.835	5.667	5.882	6.455	6.288	6.667	6.034	6.609	6.288	6.667	ns
		GCLK PLL	t_{co}	3.536	3.819	5.644	5.858	6.430	6.263	6.642	6.010	6.584	6.263	6.642	ns
	8mA	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
	10mA	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
	12mA	GCLK	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
		GCLK PLL	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
DIFFERENTIAL 1.8-V HSTL CLASS II	16mA	GCLK	t_{co}	3.152	3.376	4.936	5.115	5.637	5.478	5.865	5.239	5.762	5.478	5.865	ns
		GCLK PLL	t_{co}	3.536	3.812	5.604	5.814	6.381	6.214	6.593	5.962	6.531	6.214	6.593	ns
DIFFERENTIAL 1.5-V SSTL CLASS I	4mA	GCLK	t_{co}	3.518	3.802	5.642	5.860	6.435	6.268	6.647	6.013	6.592	6.268	6.647	ns
		GCLK PLL	t_{co}	3.562	3.845	5.678	5.894	6.468	6.301	6.680	6.046	6.621	6.301	6.680	ns
	6mA	GCLK	t_{co}	3.548	3.831	5.665	5.881	6.455	6.288	6.667	6.032	6.608	6.288	6.667	ns
		GCLK PLL	t_{co}	3.544	3.827	5.663	5.881	6.456	6.289	6.668	6.032	6.610	6.289	6.668	ns
	8mA	GCLK	t_{co}	3.560	3.842	5.664	5.878	6.450	6.283	6.662	6.029	6.603	6.283	6.662	ns
		GCLK PLL	t_{co}	3.549	3.832	5.660	5.874	6.447	6.280	6.659	6.026	6.600	6.280	6.659	ns

Table 1–138. EP3SE260 Row Pins Output Timing Parameters (Part 3 of 3)

I/O Standard	Current Strength	Clock	Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
				Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
DIFFERENTIAL 1.8-V SSTL CLASS I	4mA	GCLK	t_{co}	3.546	3.829	5.658	5.872	6.445	6.278	6.657	6.024	6.599	6.278	6.657	ns
		GCLK PLL	t_{co}	3.557	3.839	5.659	5.873	6.444	6.277	6.656	6.023	6.597	6.277	6.656	ns
	6mA	GCLK	t_{co}	3.547	3.830	5.657	5.871	6.443	6.276	6.655	6.023	6.597	6.276	6.655	ns
		GCLK PLL	t_{co}	3.533	3.816	5.642	5.856	6.429	6.262	6.641	6.008	6.582	6.262	6.641	ns
	8mA	GCLK	t_{co}	3.530	3.812	5.638	5.852	6.425	6.258	6.637	6.004	6.578	6.258	6.637	ns
		GCLK PLL	t_{co}	3.527	3.810	5.639	5.855	6.428	6.261	6.640	6.007	6.582	6.261	6.640	ns
	10mA	GCLK	t_{co}	3.528	3.810	5.629	5.843	6.415	6.248	6.627	5.994	6.568	6.248	6.627	ns
		GCLK PLL	t_{co}	3.577	3.863	5.700	5.916	6.491	6.324	6.703	6.068	6.644	6.324	6.703	ns
	12mA	GCLK	t_{co}	3.553	3.839	5.682	5.899	6.474	6.307	6.686	6.051	6.629	6.307	6.686	ns
		GCLK PLL	t_{co}	3.535	3.820	5.660	5.877	6.452	6.285	6.664	6.029	6.607	6.285	6.664	ns
DIFFERENTIAL 1.8-V SSTL CLASS II	8mA	GCLK	t_{co}	3.581	3.866	5.700	5.916	6.490	6.323	6.702	6.068	6.644	6.323	6.702	ns
		GCLK PLL	t_{co}	3.566	3.851	5.686	5.901	6.475	6.308	6.687	6.053	6.629	6.308	6.687	ns
	16mA	GCLK	t_{co}	3.555	3.840	5.681	5.898	6.472	6.305	6.684	6.050	6.627	6.305	6.684	ns
		GCLK PLL	t_{co}	3.535	3.820	5.658	5.874	6.449	6.282	6.661	6.027	6.603	6.282	6.661	ns
DIFFERENTIAL 2.5-V SSTL CLASS I	8mA	GCLK	t_{co}	3.532	3.816	5.654	5.871	6.445	6.278	6.657	6.023	6.600	6.278	6.657	ns
		GCLK PLL	t_{co}	3.537	3.820	5.645	5.859	6.431	6.264	6.643	6.010	6.584	6.264	6.643	ns
	12mA	GCLK	t_{co}	3.530	3.813	5.644	5.860	6.434	6.267	6.646	6.013	6.589	6.267	6.646	ns
		GCLK PLL	t_{co}	3.568	3.852	5.682	5.897	6.470	6.303	6.682	6.049	6.624	6.303	6.682	ns
DIFFERENTIAL 2.5-V SSTL CLASS II	16mA	GCLK	t_{co}	3.550	3.835	5.667	5.882	6.455	6.288	6.667	6.034	6.609	6.288	6.667	ns
		GCLK PLL	t_{co}	3.536	3.819	5.644	5.858	6.430	6.263	6.642	6.010	6.584	6.263	6.642	ns

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Table 1–139 and Table 1–140 list the EP3SE260 regional clock (RCLK) adder values that must be added to the GCLK values. Use these adder values to determine I/O timing when the I/O pin is driven using the regional clock. This applies to all I/O standards supported by Stratix III devices.

Table 1–139 lists the EP3SE260 column pin delay adders when using the regional clock.

Table 1–139. EP3SE260 Column Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.233	0.311	0.488	0.489	0.45	0.439	0.515	0.416	0.458	0.439	0.515	ns
RCLK PLL input adder	-0.036	0.028	0.059	0.06	0.113	0.11	-0.005	-0.038	0.121	0.11	-0.005	ns
RCLK output adder	-0.204	-0.237	-0.334	-0.331	-0.413	-0.405	-0.44	-0.32	-0.371	-0.405	-0.44	ns
RCLK PLL output adder	1.899	1.965	3.193	3.323	3.677	3.512	3.802	3.346	3.705	3.512	3.802	ns

Table 1–140 lists the EP3SE260 row pin delay adders when using the regional clock in Stratix III devices.

Table 1–140. EP3SE260 Row Pin Delay Adders for Regional Clock

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
RCLK input adder	0.244	0.293	0.438	0.412	0.471	0.427	0.577	0.421	0.452	0.427	0.577	ns
RCLK PLL input adder	0.124	0.134	0.21	0.215	0.234	0.228	0.297	0.217	0.239	0.228	0.297	ns
RCLK output adder	-0.256	-0.289	-0.418	-0.424	-0.484	-0.438	-0.591	-0.443	-0.464	-0.438	-0.591	ns
RCLK PLL output adder	-0.134	-0.147	-0.228	-0.233	-0.254	-0.261	-0.322	-0.236	-0.262	-0.261	-0.322	ns

Dedicated Clock Pin Timing

Table 1–141 to Table 1–201 list clock pin timing for Stratix III devices when the clock is driven by the global clock, regional clock, periphery clock, and a PLL.

Table 1–141 lists the Stratix III clock timing parameters.

Table 1–141. Clock Timing Parameters for Stratix III Devices

Symbol	Parameter
t_{CIN}	Delay from the clock pad to the I/O input register
t_{COUT}	Delay from the clock pad to the I/O output register
t_{PLLCIN}	Delay from the PLL `inclk` pad to the I/O input register
$t_{PLLCOUT}$	Delay from the PLL `inclk` pad to the I/O output register

EP3SL50 Clock Timing Parameters

Table 1–142 and Table 1–143 list the global clock timing parameters for EP3SL50 devices.

Table 1–142. EP3SL50 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.736	1.737	2.436	2.691	3.056	2.925	3.433	2.691	3.056	2.925	3.433	ns
t_{COUT}	1.736	1.737	2.436	2.691	3.056	2.925	3.433	2.691	3.056	2.925	3.433	ns
t_{PLLCIN}	-0.018	-0.026	-0.261	-0.312	-0.251	-0.230	-0.011	-0.312	0.161	-0.230	-0.011	ns
$t_{PLLCOUT}$	-0.018	-0.026	-0.261	-0.312	-0.251	-0.230	-0.011	-0.312	0.161	-0.230	-0.011	ns

Table 1–143. EP3SL50 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.732	1.843	2.527	2.758	3.099	2.997	3.227	2.811	3.146	3.055	3.260	ns
t_{COUT}	1.650	1.752	2.385	2.595	2.918	2.826	3.068	2.641	2.957	2.876	3.101	ns
t_{PLLCIN}	0.048	0.116	-0.142	-0.216	-0.181	-0.136	-0.188	-0.173	0.265	-0.087	-0.230	ns
$t_{PLLCOUT}$	-0.034	0.025	-0.284	-0.379	-0.362	-0.307	-0.347	-0.343	0.076	-0.266	-0.389	ns

Table 1–144 and Table 1–145 list the regional clock timing parameters for EP3SL50 devices.

Table 1–144. EP3SL50 Column Pin Regional Clock Timing Specifications (Part 1 of 2)

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.689	1.669	2.371	2.645	3.004	2.719	3.136	2.645	3.009	2.719	3.136	ns
t_{COUT}	1.689	1.669	2.371	2.645	3.004	2.719	3.136	2.645	3.009	2.719	3.136	ns

Table 1–144. EP3SL50 Column Pin Regional Clock Timing Specifications (Part 2 of 2)

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{PLLCIN}	-0.019	-0.025	-0.264	-0.315	-0.256	-0.236	-0.017	-0.315	0.224	-0.236	-0.017	ns
$t_{PLLCOUT}$	-0.019	-0.025	-0.264	-0.315	-0.256	-0.236	-0.017	-0.315	0.224	-0.236	-0.017	ns

Table 1–145. EP3SL50 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.636	1.729	2.356	2.567	2.894	2.800	2.964	2.622	2.941	2.853	2.997	ns
t_{COUT}	1.554	1.638	2.214	2.404	2.713	2.629	2.805	2.452	2.752	2.674	2.838	ns
t_{PLLCIN}	0.018	0.084	-0.178	-0.255	-0.222	-0.169	-0.226	-0.203	0.298	-0.123	-0.272	ns
$t_{PLLCOUT}$	-0.064	-0.007	-0.320	-0.418	-0.403	-0.340	-0.385	-0.373	0.109	-0.302	-0.431	ns

Table 1–146 and Table 1–147 list the periphery clock timing parameters for EP3SL50 devices.

Table 1–146. EP3SL50 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.468	1.469	2.143	2.418	2.797	2.668	3.219	2.418	2.801	2.668	3.219	ns
t_{COUT}	1.468	1.469	2.143	2.418	2.797	2.668	3.219	2.418	2.801	2.668	3.219	ns
t_{PLLCIN}	-0.081	-0.081	-0.327	-0.383	-0.334	-0.310	-0.105	-0.383	0.273	-0.310	-0.105	ns
$t_{PLLCOUT}$	-0.081	-0.081	-0.327	-0.383	-0.334	-0.310	-0.105	-0.383	0.273	-0.310	-0.105	ns

Table 1–147. EP3SL50 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.482	1.556	2.223	2.488	2.859	2.740	3.034	2.539	2.897	2.785	3.056	ns
t_{COUT}	1.400	1.465	2.078	2.325	2.678	2.569	2.875	2.369	2.708	2.606	2.897	ns
t_{PLLCIN}	-0.014	0.042	-0.222	-0.299	-0.278	-0.224	-0.295	-0.256	0.368	-0.177	-0.257	ns
$t_{PLLCOUT}$	-0.096	-0.049	-0.364	-0.462	-0.459	-0.395	-0.454	-0.426	0.179	-0.356	-0.416	ns

EP3SL70 Clock Timing Parameters

Table 1–148 and Table 1–149 list the global clock timing specifications for EP3SL70 devices.

Table 1–148. EP3SL70 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.749	1.735	2.434	2.702	3.056	2.950	3.403	2.702	3.056	2.950	3.403	ns
t_{COUT}	1.749	1.735	2.434	2.702	3.056	2.950	3.403	2.702	3.056	2.950	3.403	ns
t_{PLLCIN}	-0.012	-0.021	-0.255	-0.306	-0.251	-0.203	-0.044	-0.306	0.161	-0.203	-0.044	ns
$t_{PLLCOUT}$	-0.012	-0.021	-0.255	-0.306	-0.251	-0.203	-0.044	-0.306	0.161	-0.203	-0.044	ns

Table 1–149. EP3SL70 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.732	1.840	2.524	2.758	3.083	2.986	3.227	2.811	3.157	3.042	3.260	ns
t_{COUT}	1.650	1.749	2.382	2.595	2.902	2.815	3.068	2.641	2.968	2.863	3.101	ns
t_{PLLCIN}	0.051	0.115	-0.144	-0.219	-0.193	-0.144	-0.188	-0.170	0.275	-0.097	-0.234	ns
$t_{PLLCOUT}$	-0.031	0.024	-0.286	-0.382	-0.374	-0.315	-0.347	-0.340	0.086	-0.276	-0.393	ns

Table 1–150 and Table 1–151 list the regional clock timing parameters for EP3SL70 devices.

Table 1–150. EP3SL70 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.689	1.689	2.388	2.649	3.004	2.723	3.132	2.649	3.014	2.723	3.132	ns
t_{COUT}	1.689	1.689	2.388	2.649	3.004	2.723	3.132	2.649	3.014	2.723	3.132	ns
t_{PLLCIN}	-0.011	-0.022	-0.261	-0.308	-0.256	-0.207	-0.054	-0.308	0.224	-0.207	-0.054	ns
$t_{PLLCOUT}$	-0.011	-0.022	-0.261	-0.308	-0.256	-0.207	-0.054	-0.308	0.224	-0.207	-0.054	ns

Table 1–151. EP3SL70 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.637	1.726	2.353	2.566	2.885	2.786	2.964	2.625	2.948	2.839	3.001	ns
t_{COUT}	1.555	1.635	2.211	2.403	2.704	2.615	2.805	2.455	2.759	2.660	2.842	ns
t_{PLLCIN}	0.018	0.085	-0.176	-0.252	-0.230	-0.180	-0.226	-0.203	0.307	-0.139	-0.272	ns
$t_{PLLCOUT}$	-0.064	-0.006	-0.318	-0.415	-0.411	-0.351	-0.385	-0.373	0.118	-0.318	-0.431	ns

Table 1–152 and Table 1–153 list the periphery clock timing parameters for EP3SL70 devices.

Table 1–152. EP3SL70 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.465	1.468	2.142	2.410	2.792	2.673	3.220	2.410	2.802	2.673	3.220	ns
t_{COUT}	1.465	1.468	2.142	2.410	2.792	2.673	3.220	2.410	2.802	2.673	3.220	ns
t_{PLLCIN}	-0.068	-0.083	-0.330	-0.370	-0.334	-0.288	-0.133	-0.370	0.273	-0.288	-0.133	ns
$t_{PLLCOUT}$	-0.068	-0.083	-0.330	-0.370	-0.334	-0.288	-0.133	-0.370	0.273	-0.288	-0.133	ns

Table 1–153. EP3SL70 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.482	1.558	2.227	2.488	2.851	2.727	3.031	2.539	2.905	2.777	3.056	ns
t_{COUT}	1.400	1.467	2.082	2.325	2.670	2.556	2.872	2.369	2.716	2.598	2.897	ns
t_{PLLCIN}	-0.019	0.039	-0.225	-0.302	-0.291	-0.235	-0.295	-0.261	0.376	-0.188	-0.257	ns
$t_{PLLCOUT}$	-0.101	-0.052	-0.367	-0.465	-0.472	-0.406	-0.454	-0.431	0.187	-0.367	-0.416	ns

EP3SL110 Clock Timing Parameters

Table 1–154 and Table 1–155 list the global clock timing parameters for EP3SL110 devices.

Table 1–154. EP3SL110 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.909	1.907	2.674	2.936	3.285	3.182	3.700	2.936	3.285	3.182	3.700	ns
t_{COUT}	1.909	1.907	2.674	2.936	3.285	3.182	3.700	2.936	3.285	3.182	3.700	ns
t_{PLLCIN}	-0.048	-0.050	-0.274	-0.330	-0.290	-0.251	-0.032	-0.330	-0.290	-0.251	-0.032	ns
$t_{PLLCOUT}$	-0.048	-0.050	-0.274	-0.330	-0.290	-0.251	-0.032	-0.330	-0.290	-0.251	-0.032	ns

Table 1–155. EP3SL110 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Unit
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.882	2.014	2.754	2.975	3.344	3.221	3.511	3.062	3.413	3.287	3.551	ns
t_{COUT}	1.800	1.923	2.612	2.812	3.163	3.050	3.352	2.892	3.224	3.108	3.392	ns
t_{PLLCIN}	-0.002	0.059	-0.202	-0.271	-0.231	-0.184	-0.212	-0.219	-0.184	-0.138	-0.260	ns
$t_{PLLCOUT}$	-0.084	-0.032	-0.347	-0.434	-0.412	-0.355	-0.371	-0.389	-0.373	-0.317	-0.419	ns

Table 1–156 and Table 1–157 list the regional clock timing parameters for EP3SL110 devices.

Table 1–156. EP3SL110 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.689	1.687	2.360	2.600	2.924	2.836	3.241	2.600	2.924	2.836	3.241	ns
t_{COUT}	1.689	1.687	2.360	2.600	2.924	2.836	3.241	2.600	2.924	2.836	3.241	ns
t_{PLLCIN}	-0.036	-0.038	-0.262	-0.317	-0.278	-0.239	-0.020	-0.317	-0.278	-0.239	-0.020	ns
$t_{PLLCOUT}$	-0.036	-0.038	-0.262	-0.317	-0.278	-0.239	-0.020	-0.317	-0.278	-0.239	-0.020	ns

Table 1–157. EP3SL110 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.684	1.792	2.440	2.644	2.985	2.879	3.044	2.720	3.044	2.938	3.083	ns
t_{COUT}	1.602	1.701	2.298	2.481	2.804	2.708	2.885	2.550	2.855	2.759	2.924	ns
t_{PLLCIN}	0.008	0.071	-0.189	-0.276	-0.218	-0.188	-0.214	-0.209	-0.174	-0.141	-0.263	ns
$t_{PLLCOUT}$	-0.074	-0.020	-0.334	-0.439	-0.399	-0.359	-0.373	-0.379	-0.363	-0.320	-0.422	ns

Table 1–158 and Table 1–159 list the periphery clock timing parameters for EP3SL110 devices.

Table 1–158. EP3SL110 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.541	1.538	2.257	2.539	2.931	2.810	3.345	2.539	2.931	2.810	3.345	ns
t_{COUT}	1.541	1.538	2.257	2.539	2.931	2.810	3.345	2.539	2.931	2.810	3.345	ns
t_{PLLCIN}	-0.029	-0.031	-0.253	-0.310	-0.276	-0.222	-0.020	-0.310	-0.276	-0.222	-0.020	ns
$t_{PLLCOUT}$	-0.029	-0.031	-0.253	-0.310	-0.276	-0.222	-0.020	-0.310	-0.276	-0.222	-0.020	ns

Table 1–159. EP3SL110 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.430	1.503	2.156	2.416	2.783	2.665	2.926	2.465	2.828	2.711	2.951	ns
t_{COUT}	1.348	1.412	2.011	2.253	2.602	2.494	2.767	2.295	2.639	2.532	2.792	ns
t_{PLLCIN}	0.015	0.072	-0.188	-0.267	-0.219	-0.180	-0.214	-0.206	-0.170	-0.133	-0.263	ns
$t_{PLLCOUT}$	-0.067	-0.019	-0.333	-0.430	-0.400	-0.351	-0.373	-0.376	-0.359	-0.312	-0.422	ns

EP3SL150 Clock Timing Parameters

Table 1–160 and Table 1–161 list the global clock timing parameters for EP3SL150 devices.

Table 1–160. EP3SL150 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Unit
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.898	1.926	2.692	2.920	3.294	3.170	3.719	2.920	3.294	3.170	3.719	ns
t_{COUT}	1.898	1.926	2.692	2.920	3.294	3.170	3.719	2.920	3.294	3.170	3.719	ns
t_{PLLCIN}	-0.054	-0.028	-0.252	-0.342	-0.296	-0.239	-0.018	-0.342	-0.296	-0.239	-0.018	ns
$t_{PLLCOUT}$	-0.054	-0.028	-0.252	-0.342	-0.296	-0.239	-0.018	-0.342	-0.296	-0.239	-0.018	ns

Table 1–161. EP3SL150 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.868	2.010	2.750	2.982	3.347	3.224	3.506	3.048	3.400	3.293	3.549	ns
t_{COUT}	1.786	1.919	2.608	2.819	3.166	3.053	3.347	2.878	3.211	3.114	3.390	ns
t_{PLLCIN}	0.007	0.059	-0.202	-0.255	-0.231	-0.184	-0.214	-0.210	-0.173	-0.122	-0.249	ns
$t_{PLLCOUT}$	-0.075	-0.032	-0.347	-0.418	-0.412	-0.355	-0.373	-0.380	-0.362	-0.301	-0.408	ns

Table 1–162 and Table 1–163 list the regional clock timing parameters for EP3SL150 devices.

Table 1–162. EP3SL150 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.683	1.701	2.375	2.595	2.936	2.833	3.255	2.595	2.936	2.833	3.255	ns
t_{COUT}	1.683	1.701	2.375	2.595	2.936	2.833	3.255	2.595	2.936	2.833	3.255	ns
t_{PLLCIN}	-0.043	-0.016	-0.240	-0.329	-0.284	-0.227	-0.005	-0.329	-0.284	-0.227	-0.005	ns
$t_{PLLCOUT}$	-0.043	-0.016	-0.240	-0.329	-0.284	-0.227	-0.005	-0.329	-0.284	-0.227	-0.005	ns

Table 1–163. EP3SL150 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.683	1.793	2.441	2.659	2.987	2.875	3.042	2.719	3.047	2.951	3.096	ns
t_{COUT}	1.601	1.702	2.299	2.496	2.806	2.704	2.883	2.549	2.858	2.772	2.937	ns
t_{PLLCIN}	-0.007	0.068	-0.192	-0.269	-0.221	-0.188	-0.211	-0.226	-0.186	-0.135	-0.260	ns
$t_{PLLCOUT}$	-0.089	-0.023	-0.337	-0.432	-0.402	-0.359	-0.370	-0.396	-0.375	-0.314	-0.419	ns

Table 1–164 and Table 1–165 list the periphery clock timing parameters for EP3SL150 devices.

Table 1–164. EP3SL150 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.537	1.550	2.268	2.535	2.929	2.812	3.354	2.535	2.929	2.812	3.354	ns
t_{COUT}	1.537	1.550	2.268	2.535	2.929	2.812	3.354	2.535	2.929	2.812	3.354	ns
t_{PLLCIN}	-0.040	-0.012	-0.235	-0.326	-0.267	-0.234	0.002	-0.326	-0.267	-0.234	0.002	ns
$t_{PLLCOUT}$	-0.040	-0.012	-0.235	-0.326	-0.267	-0.234	0.002	-0.326	-0.267	-0.234	0.002	ns

Table 1–165. EP3SL150 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.438	1.505	2.159	2.429	2.783	2.657	2.934	2.475	2.838	2.725	2.972	ns
t_{COUT}	1.356	1.414	2.014	2.266	2.602	2.486	2.775	2.305	2.649	2.546	2.813	ns
t_{PLLCIN}	0.002	0.076	-0.183	-0.266	-0.217	-0.185	-0.206	-0.220	-0.182	-0.132	-0.260	ns
$t_{PLLCOUT}$	-0.080	-0.015	-0.328	-0.429	-0.398	-0.356	-0.365	-0.390	-0.371	-0.311	-0.419	ns

EP3SL200 Clock Timing Parameters

Table 1–166 and Table 1–167 list the global clock timing parameters for EP3SL200 devices.

Table 1–166. EP3SL200 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Unit
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.237	2.264	3.331	3.416	3.842	3.686	4.345	3.416	3.834	3.686	4.345	ns
t_{COUT}	2.237	2.264	3.331	3.416	3.842	3.686	4.345	3.416	3.834	3.686	4.345	ns
t_{PLLCIN}	0.032	0.060	-0.177	-0.219	-0.137	-0.122	0.088	-0.219	0.287	-0.122	0.088	ns
$t_{PLLCOUT}$	0.032	0.060	-0.177	-0.219	-0.137	-0.122	0.088	-0.219	0.287	-0.122	0.088	ns

Table 1–167. EP3SL200 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.208	2.371	3.453	3.526	3.900	3.747	4.190	3.601	3.977	3.747	4.190	ns
t_{COUT}	2.126	2.280	3.301	3.366	3.719	3.576	4.031	3.433	3.788	3.576	4.031	ns
t_{PLLCIN}	0.102	0.174	-0.085	-0.115	-0.076	-0.043	-0.063	-0.067	0.409	-0.043	-0.063	ns
$t_{PLLCOUT}$	0.020	0.083	-0.237	-0.278	-0.257	-0.214	-0.222	-0.237	0.220	-0.214	-0.222	ns

Table 1–168 and Table 1–169 list the regional clock timing parameters for EP3SL200.

Table 1–168. EP3SL200 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.006	2.035	3.020	3.113	3.494	3.213	3.743	3.113	3.531	3.213	3.743	ns
t_{COUT}	2.006	2.035	3.020	3.113	3.494	3.213	3.743	3.113	3.531	3.213	3.743	ns
t_{PLLCIN}	0.059	0.086	-0.150	-0.191	-0.109	-0.094	0.116	-0.191	0.291	-0.094	0.116	ns
$t_{PLLCOUT}$	0.059	0.086	-0.150	-0.191	-0.109	-0.094	0.116	-0.191	0.291	-0.094	0.116	ns

Table 1–169. EP3SL200 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.937	2.065	3.000	3.070	3.414	3.275	3.597	3.139	3.479	3.275	3.597	ns
t_{COUT}	1.855	1.974	2.848	2.910	3.233	3.104	3.438	2.971	3.290	3.104	3.438	ns
t_{PLLCIN}	0.126	0.197	-0.059	-0.091	-0.051	-0.036	-0.041	-0.043	0.410	-0.036	-0.041	ns
$t_{PLLCOUT}$	0.044	0.106	-0.211	-0.254	-0.232	-0.207	-0.200	-0.213	0.221	-0.207	-0.200	ns

Table 1–170 and Table 1–171 list the periphery clock timing parameters for EP3SL200 devices.

Table 1–170. EP3SL200 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.720	1.712	2.615	2.776	3.177	3.044	3.660	2.776	3.177	3.044	3.660	ns
t_{COUT}	1.720	1.712	2.615	2.776	3.177	3.044	3.660	2.776	3.177	3.044	3.660	ns
t_{PLLCIN}	0.037	0.064	-0.173	-0.213	-0.135	-0.118	0.090	-0.213	0.292	-0.118	0.090	ns
$t_{PLLCOUT}$	0.037	0.064	-0.173	-0.213	-0.135	-0.118	0.090	-0.213	0.292	-0.118	0.090	ns

Table 1–171. EP3SL200 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.501	1.575	2.380	2.518	2.892	2.761	3.077	2.567	2.938	2.761	3.077	ns
t_{COUT}	1.419	1.484	2.225	2.355	2.711	2.590	2.918	2.397	2.749	2.590	2.918	ns
t_{PLLCIN}	0.105	0.174	-0.081	-0.118	-0.077	-0.061	-0.063	-0.067	0.411	-0.061	-0.063	ns
$t_{PLLCOUT}$	0.023	0.083	-0.233	-0.281	-0.258	-0.232	-0.222	-0.237	0.222	-0.232	-0.222	ns

EP3SL340 Clock Timing Parameters

Table 1–172 and Table 1–173 list the global clock timing parameters for EP3S340 devices.

Table 1–172. EP3SL340 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.357	2.331	3.440	3.566	3.938	3.807	4.482	3.566	3.938	3.807	4.482	ns
t_{COUT}	2.357	2.331	3.440	3.566	3.938	3.807	4.482	3.566	3.938	3.807	4.482	ns
t_{PLLCIN}	0.091	0.058	-0.165	-0.152	-0.140	-0.096	0.111	-0.152	-0.140	-0.096	0.111	ns
$t_{PLLCOUT}$	0.091	0.058	-0.165	-0.152	-0.140	-0.096	0.111	-0.152	-0.140	-0.096	0.111	ns

Table 1–173. EP3SL340 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.293	2.479	3.608	3.630	4.020	3.880	4.324	3.746	4.099	3.977	4.369	ns
t_{COUT}	2.211	2.388	3.456	3.470	3.839	3.709	4.165	3.578	3.910	3.798	4.210	ns
t_{PLLCIN}	0.121	0.210	-0.034	-0.098	-0.045	-0.001	-0.042	-0.031	0.005	0.051	-0.083	ns
$t_{PLLCOUT}$	0.039	0.119	-0.186	-0.261	-0.226	-0.172	-0.201	-0.201	-0.184	-0.128	-0.242	ns

Table 1–174 and Table 1–175 list the regional clock timing parameters for EP3SL340 devices.

Table 1–174. EP3SL340 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.031	2.013	2.958	3.073	3.435	3.308	3.803	3.073	3.435	3.308	3.803	ns
t_{COUT}	2.031	2.013	2.958	3.073	3.435	3.308	3.803	3.073	3.435	3.308	3.803	ns
t_{PLLCIN}	0.127	0.094	-0.128	-0.116	-0.104	-0.061	0.148	-0.116	-0.104	-0.061	0.148	ns
$t_{PLLCOUT}$	0.127	0.094	-0.128	-0.116	-0.104	-0.061	0.148	-0.116	-0.104	-0.061	0.148	ns

Table 1–175. EP3SL340 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.998	2.161	3.129	3.149	3.501	3.376	3.648	3.242	3.570	3.463	3.707	ns
t_{COUT}	1.916	2.070	2.977	2.989	3.320	3.205	3.492	3.074	3.381	3.284	3.551	ns
t_{PLLCIN}	0.157	0.248	0.006	-0.069	-0.009	0.017	-0.011	0.003	0.039	0.093	-0.057	ns
$t_{PLLCOUT}$	0.075	0.157	-0.146	-0.232	-0.190	-0.154	-0.170	-0.167	-0.150	-0.086	-0.216	ns

Table 1–176 and Table 1–177 list the periphery clock timing parameters for EP3SL340 devices.

Table 1–176. EP3SL340 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.778	1.760	2.687	2.847	3.240	3.099	3.718	2.847	3.240	3.099	3.718	ns
t_{COUT}	1.778	1.760	2.687	2.847	3.240	3.099	3.718	2.847	3.240	3.099	3.718	ns
t_{PLLCIN}	0.086	0.061	-0.164	-0.161	-0.140	-0.097	0.101	-0.161	-0.140	-0.097	0.101	ns
$t_{PLLCOUT}$	0.086	0.061	-0.164	-0.161	-0.140	-0.097	0.101	-0.161	-0.140	-0.097	0.101	ns

Table 1–177. EP3SL340 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.524	1.616	2.435	2.567	2.958	2.823	3.141	2.605	3.002	2.861	3.165	ns
t_{COUT}	1.442	1.525	2.280	2.404	2.777	2.652	2.982	2.435	2.813	2.682	3.006	ns
t_{PLLCIN}	0.116	0.211	-0.039	-0.116	-0.055	-0.030	-0.051	-0.040	-0.006	0.050	-0.098	ns
$t_{PLLCOUT}$	0.034	0.120	-0.191	-0.279	-0.236	-0.201	-0.210	-0.210	-0.195	-0.129	-0.257	ns

EP3SE50 Clock Timing Parameters

Table 1–178 and Table 1–179 list the global clock timing parameters for EP3SE50 devices.

Table 1–178. EP3SE50 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.786	1.789	2.495	2.748	3.111	2.993	3.489	2.748	3.105	2.993	3.489	ns
t_{COUT}	1.786	1.789	2.495	2.748	3.111	2.993	3.489	2.748	3.105	2.993	3.489	ns
t_{PLLCIN}	0.023	0.027	-0.204	-0.268	-0.226	-0.180	0.025	-0.268	0.249	-0.180	0.025	ns
$t_{PLLCOUT}$	0.083	0.103	-0.068	-0.131	-0.226	-0.010	0.025	-0.131	0.249	-0.010	0.025	ns

Table 1–179. EP3SE50 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.739	1.849	2.536	2.769	3.112	3.010	3.250	2.830	3.171	3.069	3.276	ns
t_{COUT}	1.657	1.758	2.394	2.606	2.931	2.839	3.091	2.660	2.982	2.890	3.117	ns
t_{PLLCIN}	0.044	0.117	-0.143	-0.220	-0.183	-0.135	-0.189	-0.171	0.345	-0.088	-0.242	ns
$t_{PLLCOUT}$	-0.038	0.026	-0.285	-0.383	-0.364	-0.306	-0.348	-0.341	0.156	-0.267	-0.401	ns

Table 1–180 and Table 1–181 list the regional clock timing parameters for EP3SE50 devices.

Table 1–180. EP3SE50 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.711	1.721	2.429	2.679	3.053	2.767	3.191	2.679	3.053	2.767	3.191	ns
t_{COUT}	1.711	1.721	2.429	2.679	3.053	2.767	3.191	2.679	3.053	2.767	3.191	ns
t_{PLLCIN}	0.034	0.038	-0.193	-0.255	-0.212	-0.168	0.040	-0.255	0.263	-0.168	0.040	ns
$t_{PLLCOUT}$	0.106	0.102	-0.074	-0.101	-0.212	-0.168	0.040	-0.101	0.263	-0.168	0.040	ns

Table 1–181. EP3SE50 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.640	1.732	2.361	2.580	2.905	2.810	2.977	2.636	2.960	2.868	3.003	ns
t_{COUT}	1.558	1.641	2.219	2.417	2.724	2.639	2.818	2.466	2.771	2.689	2.844	ns
t_{PLLCIN}	0.020	0.091	-0.168	-0.241	-0.208	-0.155	-0.210	-0.191	0.321	-0.108	-0.264	ns
$t_{PLLCOUT}$	-0.062	0.000	-0.310	-0.404	-0.389	-0.326	-0.369	-0.361	0.132	-0.287	-0.423	ns

Table 1–182 and Table 1–183 list the periphery clock timing parameters for EP3SE50 devices.

Table 1–182. EP3SE50 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.472	1.481	2.155	2.417	2.825	2.681	3.247	2.417	2.819	2.681	3.247	ns
t_{COUT}	1.472	1.481	2.155	2.417	2.825	2.681	3.247	2.417	2.819	2.681	3.247	ns
t_{PLLCIN}	-0.047	-0.044	-0.288	-0.347	-0.302	-0.266	-0.079	-0.347	0.300	-0.266	-0.079	ns
$t_{PLLCOUT}$	-0.047	-0.044	-0.288	-0.347	-0.302	-0.266	-0.079	-0.347	0.300	-0.266	-0.079	ns

Table 1–183. EP3SE50 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.467	1.543	2.208	2.472	2.843	2.729	3.012	2.521	2.891	2.771	3.028	ns
t_{COUT}	1.385	1.452	2.063	2.309	2.662	2.558	2.853	2.351	2.702	2.592	2.869	ns
t_{PLLCIN}	-0.021	0.036	-0.231	-0.307	-0.282	-0.230	-0.301	-0.262	0.372	-0.184	-0.361	ns
$t_{PLLCOUT}$	-0.103	-0.055	-0.373	-0.470	-0.463	-0.401	-0.460	-0.432	0.183	-0.363	-0.520	ns

EP3SE80 Clock Timing Parameters

Table 1–184 and Table 1–185 list the global clock timing parameters for EP3SE80 devices.

Table 1–184. EP3SE80 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.037	2.059	2.879	3.127	3.524	3.430	3.989	3.127	3.524	3.430	3.989	ns
t_{COUT}	2.037	2.059	2.879	3.127	3.524	3.430	3.989	3.127	3.524	3.430	3.989	ns
t_{PLLCIN}	-0.024	-0.007	-0.235	-0.315	-0.292	-0.199	-0.042	-0.315	-0.292	-0.199	-0.042	ns
$t_{PLLCOUT}$	-0.024	-0.007	-0.235	-0.315	-0.292	-0.199	-0.042	-0.315	-0.292	-0.199	-0.042	ns

Table 1–185. EP3SE80 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.994	2.143	2.942	3.188	3.552	3.446	3.769	3.258	3.633	3.515	3.813	ns
t_{COUT}	1.912	2.052	2.800	3.025	3.371	3.275	3.610	3.089	3.444	3.336	3.654	ns
t_{PLLCIN}	0.020	0.086	-0.177	-0.249	-0.221	-0.171	-0.221	-0.199	-0.173	-0.121	-0.266	ns
$t_{PLLCOUT}$	-0.062	-0.005	-0.319	-0.412	-0.402	-0.342	-0.380	-0.369	-0.362	-0.300	-0.425	ns

Table 1–186 and Table 1–187 list the regional clock timing parameters for EP3SE80 devices.

Table 1–186. EP3SE80 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.828	1.849	2.578	2.811	3.171	3.087	3.547	2.811	3.171	3.087	3.547	ns
t_{COUT}	1.828	1.849	2.578	2.811	3.171	3.087	3.547	2.811	3.171	3.087	3.547	ns
t_{PLLCIN}	-0.013	0.004	-0.224	-0.303	-0.280	-0.187	-0.030	-0.303	-0.280	-0.187	-0.030	ns
$t_{PLLCOUT}$	-0.013	0.004	-0.224	-0.303	-0.280	-0.187	-0.030	-0.303	-0.280	-0.187	-0.030	ns

Table 1–187. EP3SE80 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.812	1.928	2.638	2.874	3.205	3.107	3.332	2.938	3.277	3.169	3.373	ns
t_{COUT}	1.730	1.837	2.496	2.711	3.024	2.936	3.173	2.768	3.088	2.990	3.214	ns
t_{PLLCIN}	0.010	0.087	-0.176	-0.259	-0.231	-0.167	-0.229	-0.210	-0.169	-0.118	-0.275	ns
$t_{PLLCOUT}$	-0.072	-0.004	-0.318	-0.422	-0.412	-0.338	-0.388	-0.380	-0.358	-0.297	-0.434	ns

Table 1–188 and Table 1–189 list the periphery clock timing parameters for EP3SE80 devices.

Table 1–188. EP3SE80 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.564	1.585	2.309	2.566	2.962	2.838	3.377	2.566	2.962	2.838	3.377	ns
t_{COUT}	1.564	1.584	2.308	2.566	2.962	2.844	3.377	2.566	2.962	2.844	3.377	ns
t_{PLLCIN}	-0.028	-0.006	-0.234	-0.327	-0.270	-0.193	-0.018	-0.327	-0.270	-0.193	-0.018	ns
$t_{PLLCOUT}$	-0.028	-0.006	-0.234	-0.327	-0.270	-0.193	-0.018	-0.327	-0.270	-0.193	-0.018	ns

Table 1–189. EP3SE80 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.441	1.503	2.156	2.429	2.776	2.665	2.934	2.477	2.828	2.711	2.959	ns
t_{COUT}	1.359	1.412	2.011	2.266	2.595	2.494	2.775	2.307	2.639	2.532	2.800	ns
t_{PLLCIN}	0.004	0.077	-0.186	-0.268	-0.243	-0.177	-0.238	-0.219	-0.177	-0.128	-0.287	ns
$t_{PLLCOUT}$	-0.078	-0.014	-0.328	-0.431	-0.424	-0.348	-0.397	-0.389	-0.366	-0.307	-0.446	ns

EP3SE110 Clock Timing Parameters

Table 1–190 and Table 1–191 list the global clock timing parameters for EP3SE110 devices.

Table 1–190. EP3SE110 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.046	2.046	2.868	3.144	3.524	3.429	3.989	3.144	3.524	3.429	3.989	ns
t_{COUT}	2.046	2.046	2.868	3.144	3.524	3.429	3.989	3.144	3.524	3.429	3.989	ns
t_{PLLCIN}	-0.020	-0.034	-0.265	-0.311	-0.267	-0.198	-0.034	-0.311	-0.267	-0.198	-0.034	ns
$t_{PLLCOUT}$	-0.020	-0.034	-0.265	-0.311	-0.267	-0.198	-0.034	-0.311	-0.267	-0.198	-0.034	ns

Table 1–191. EP3SE110 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.985	2.130	2.928	3.183	3.546	3.437	3.772	3.250	3.615	3.507	3.815	ns
t_{COUT}	1.903	2.039	2.786	3.020	3.365	3.266	3.613	3.082	3.426	3.328	3.656	ns
t_{PLLCIN}	0.012	0.084	-0.180	-0.253	-0.223	-0.173	-0.223	-0.207	-0.173	-0.123	-0.267	ns
$t_{PLLCOUT}$	-0.070	-0.007	-0.322	-0.416	-0.404	-0.344	-0.382	-0.377	-0.362	-0.302	-0.426	ns

Table 1–192 and Table 1–193 list the regional clock timing parameters for EP3SE110 devices.

Table 1–192. EP3SE110 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.828	1.849	2.578	2.811	3.155	3.082	3.560	2.811	3.155	3.082	3.560	ns
t_{COUT}	1.828	1.849	2.578	2.811	3.155	3.082	3.560	2.811	3.155	3.082	3.560	ns
t_{PLLCIN}	-0.008	-0.022	-0.254	-0.299	-0.255	-0.186	-0.021	-0.299	-0.255	-0.186	-0.021	ns
$t_{PLLCOUT}$	-0.008	-0.022	-0.254	-0.299	-0.255	-0.186	-0.021	-0.299	-0.255	-0.186	-0.021	ns

Table 1–193. EP3SE110 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.798	1.924	2.631	2.860	3.204	3.101	3.332	2.920	3.268	3.163	3.373	ns
t_{COUT}	1.716	1.833	2.489	2.697	3.023	2.930	3.173	2.750	3.079	2.984	3.214	ns
t_{PLLCIN}	0.001	0.076	-0.188	-0.262	-0.231	-0.184	-0.229	-0.218	-0.180	-0.134	-0.277	ns
$t_{PLLCOUT}$	-0.081	-0.015	-0.330	-0.425	-0.412	-0.355	-0.388	-0.388	-0.369	-0.313	-0.436	ns

Table 1–194 and Table 1–195 list the periphery clock timing parameters for EP3SE110 devices.

Table 1–194. EP3SE110 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.564	1.585	2.309	2.566	2.951	2.843	3.398	2.566	2.951	2.843	3.398	ns
t_{COUT}	1.564	1.584	2.308	2.566	2.951	2.843	3.398	2.566	2.951	2.843	3.398	ns
t_{PLLCIN}	-0.019	-0.019	-0.245	-0.310	-0.267	-0.194	-0.018	-0.310	-0.267	-0.194	-0.018	ns
$t_{PLLCOUT}$	-0.019	-0.019	-0.245	-0.310	-0.267	-0.194	-0.018	-0.310	-0.267	-0.194	-0.018	ns

Table 1–195. EP3SE110 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.423	1.502	2.156	2.411	2.781	2.659	2.934	2.455	2.826	2.704	2.949	ns
t_{COUT}	1.341	1.411	2.011	2.248	2.600	2.488	2.775	2.285	2.637	2.525	2.790	ns
t_{PLLCIN}	0.001	0.069	-0.195	-0.271	-0.241	-0.188	-0.238	-0.222	-0.190	-0.139	-0.288	ns
$t_{PLLCOUT}$	-0.081	-0.022	-0.337	-0.434	-0.422	-0.359	-0.397	-0.392	-0.379	-0.318	-0.447	ns

EP3SE260 Clock Timing Parameters

Table 1–196 and Table 1–197 list the global clock timing parameters for EP3SE260 devices.

Table 1–196. EP3SE260 Column Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.237	2.237	3.302	3.416	3.837	3.683	4.331	3.416	3.837	3.683	4.331	ns
t_{COUT}	2.237	2.237	3.302	3.416	3.837	3.683	4.331	3.416	3.837	3.683	4.331	ns
t_{PLLCIN}	0.040	0.040	-0.199	-0.211	-0.135	-0.127	0.074	-0.211	0.296	-0.127	0.074	ns
$t_{PLLCOUT}$	0.040	0.040	-0.199	-0.211	-0.135	-0.127	0.074	-0.211	0.296	-0.127	0.074	ns

Table 1–197. EP3SE260 Row Pin Global Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	2.171	2.374	3.458	3.526	3.868	3.768	4.184	3.564	3.943	3.768	4.184	ns
t_{COUT}	2.089	2.283	3.306	3.366	3.687	3.597	4.025	3.396	3.754	3.597	4.025	ns
t_{PLLCIN}	0.091	0.172	-0.087	-0.116	-0.085	-0.031	-0.071	-0.077	0.399	-0.031	-0.071	ns
$t_{PLLCOUT}$	0.009	0.081	-0.239	-0.279	-0.266	-0.202	-0.230	-0.247	0.210	-0.202	-0.230	ns

Table 1–198 and Table 1–199 list the regional clock timing parameters for EP3SE260 devices.

Table 1–198. EP3SE260 Column Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.930	2.003	2.983	2.955	3.531	3.209	3.736	2.955	3.531	3.209	3.736	ns
t_{COUT}	1.930	2.003	2.983	2.955	3.531	3.209	3.736	2.955	3.531	3.209	3.736	ns
t_{PLLCIN}	0.061	0.066	-0.172	-0.191	-0.109	-0.091	0.102	-0.191	0.302	-0.091	0.102	ns
$t_{PLLCOUT}$	0.061	0.066	-0.172	-0.191	-0.109	-0.091	0.102	-0.191	0.302	-0.091	0.102	ns

Table 1–199. EP3SE260 Row Pin Regional Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.903	2.065	3.000	3.070	3.388	3.294	3.593	3.103	3.457	3.294	3.593	ns
t_{COUT}	1.821	1.974	2.848	2.910	3.207	3.123	3.434	2.935	3.268	3.123	3.434	ns
t_{PLLCIN}	0.088	0.199	-0.056	-0.091	-0.081	-0.009	-0.049	-0.078	0.379	-0.009	-0.049	ns
$t_{PLLCOUT}$	0.006	0.108	-0.208	-0.254	-0.262	-0.180	-0.208	-0.248	0.190	-0.180	-0.208	ns

Table 1–200 and Table 1–201 list the periphery clock timing parameters for EP3SE260 devices.

Table 1–200. EP3SE260 Column Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.709	1.716	2.620	2.765	3.177	3.039	3.668	2.765	3.177	3.039	3.668	ns
t_{COUT}	1.709	1.716	2.620	2.765	3.177	3.039	3.668	2.765	3.177	3.039	3.668	ns
t_{PLLCIN}	0.037	0.037	-0.202	-0.213	-0.140	-0.119	0.075	-0.213	0.293	-0.119	0.075	ns
$t_{PLLCOUT}$	0.037	0.037	-0.202	-0.213	-0.140	-0.119	0.075	-0.213	0.293	-0.119	0.075	ns

Table 1–201. EP3SE260 Row Pin Periphery Clock Timing Specifications

Parameter	Fast Model		C2	C3	C4	C4L		I3	I4	I4L		Units
	Industrial	Commercial	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 1.1 V	V_{CCL}= 0.9 V	
t_{CIN}	1.495	1.574	2.378	2.518	2.878	2.776	3.072	2.555	2.926	2.776	3.072	ns
t_{COUT}	1.413	1.483	2.223	2.355	2.697	2.605	2.913	2.385	2.737	2.605	2.913	ns
t_{PLLCIN}	0.065	0.172	-0.084	-0.118	-0.103	-0.033	-0.071	-0.103	0.384	-0.033	-0.071	ns
$t_{PLLCOUT}$	-0.017	0.081	-0.236	-0.281	-0.284	-0.204	-0.230	-0.273	0.195	-0.204	-0.230	ns

Glossary

The following table lists the glossary for this chapter.

Table 1.

Glossary Table (Part 1 of 4)

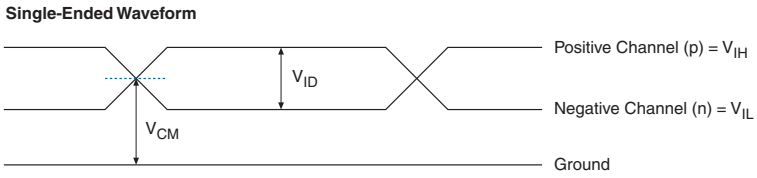
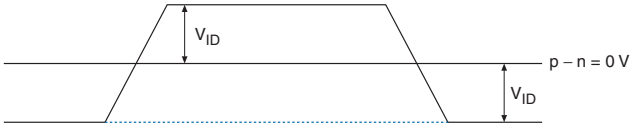
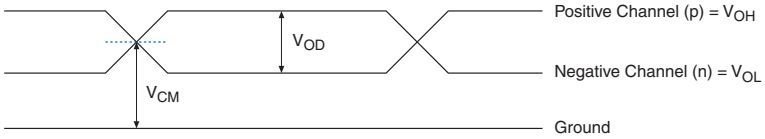
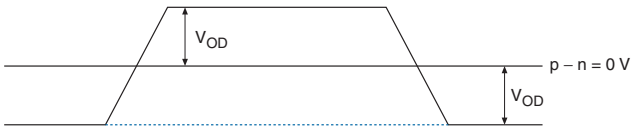
Letter	Subject	Definitions
A	—	—
B	—	—
C	—	—
D	Differential I/O Standards	Receiver Input Waveforms **Single-Ended Waveform**  **Differential Waveform**  Transmitter Output Waveforms **Single-Ended Waveform**  **Differential Waveform** 
E	—	—
F	f_{HSCLK}	High-Speed I/O Block: High-speed receiver/transmitter input and output clock frequency.
	f_{HSDR}	High-Speed I/O Block: Maximum/minimum LVDS data transfer rate (f_{HSDR} = 1/TUI), non-DPA.
	$f_{HSDRDPA}$	High-Speed I/O Block: Maximum/minimum LVDS data transfer rate ($f_{HSDRDPA}$ = 1/TUI), DPA.
G	—	—
H	—	—
I	—	—

Table 1.

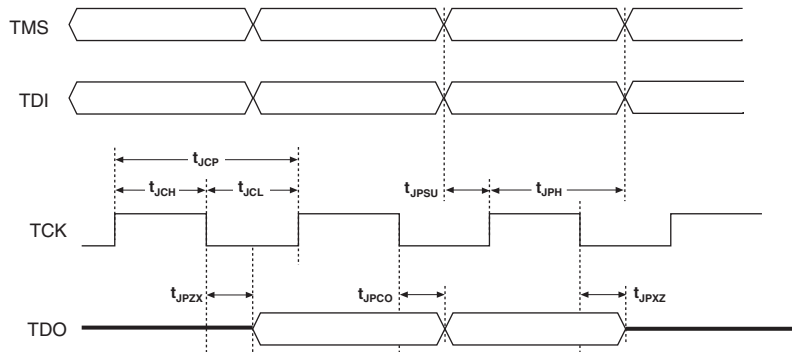
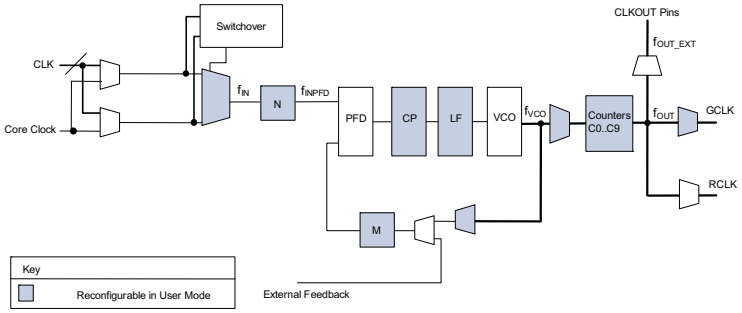
Glossary Table (Part 2 of 4)		
Letter	**Subject**	**Definitions**
J	J	High-Speed I/O Block: Deserialization factor (width of parallel data bus).
	JTAG Timing Specifications	JTAG Timing Specifications are in the following figure: 
K	—	—
L	—	—
M	—	—
N	—	—
O	—	—
P	PLL Specifications	The block diagram shown in the following figure highlights the PLL Specification parameters: Diagram of PLL Specifications (1)  **Note:** (1) CoreClock can only be fed by dedicated clock input pins or PLL outputs.
Q	—	—
R	R_L	Receiver differential input discrete resistor (external to Stratix III device).

Table 1.

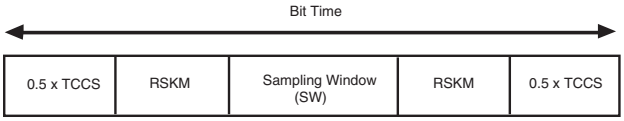
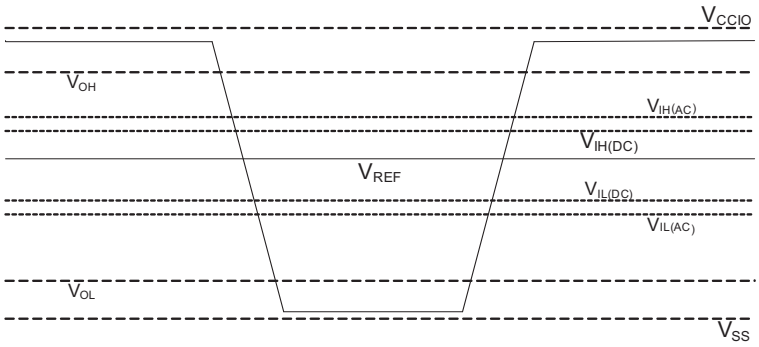
Glossary Table (Part 3 of 4)		
Letter	**Subject**	**Definitions**
S	SW (sampling window)	The period of time during which the data must be valid in order to capture it correctly. The setup and hold times determine the ideal strobe position within the sampling window (the following figure): Timing Diagram 
	Single-ended Voltage Referenced I/O Standard	The JEDEC standard for SSTI and HSTL I/O standards defines both the AC and DC input signal values. The AC values indicate the voltage levels at which the receiver must meet its timing specifications. The DC values indicate the voltage levels at which the final logic state of the receiver is unambiguously defined. After the receiver input has crossed the AC value, the receiver changes to the new logic state. The new logic state is maintained as long as the input stays beyond the DC threshold. This approach is intended to provide predictable receiver timing in the presence of input waveform ringing (The following figure): Single-Ended Voltage Referenced I/O Standard 
T	t_C	High-Speed receiver/transmitter input and output clock period.
	TCCS (channel-to-channel-skew)	The timing difference between the fastest and slowest output edges, including t_{co} variation and clock skew, across channels driven by the same PLL. The clock is included in the TCCS measurement (refer to the *Timing Diagram* figure under **S** in this table)
	t_{DUTY}	High-Speed I/O Block: Duty cycle on high-speed transmitter output clock. Timing Unit Interval (TUI) The timing budget allowed for skew, propagation delays, and data sampling window. (TUI = 1/(Receiver Input Clock Frequency Multiplication Factor) = t_C/w)
	t_{FALL}	Signal high-to-low transition time (80-20%)
	t_{INCCJ}	Cycle-to-cycle jitter tolerance on PLL clock input
	t_{OUTPJ_IO}	Period jitter on general purpose I/O driven by a PLL
	t_{OUTPJ_DC}	Period jitter on dedicated clock output driven by a PLL
	t_{RISE}	Signal low-to-high transition time (20-80%)
U	—	—

Table 1.

Glossary Table (Part 4 of 4)		
Letter	**Subject**	**Definitions**
V	$V_{CM(DC)}$	DC Common Mode Input Voltage.
	V_{ICM}	Input Common Mode Voltage: The common mode of the differential signal at the receiver.
	V_{ID}	Input Differential Voltage Swing: The difference in voltage between the positive and complementary conductors of a differential transmission at the receiver.
	$V_{DIF(AC)}$	AC Differential Input Voltage: Minimum AC input differential voltage required for switching.
	$V_{DIF(DC)}$	DC Differential Input Voltage: Minimum DC input differential voltage required for switching.
	V_{IH}	Voltage Input High: The minimum positive voltage applied to the input that is accepted by the device as a logic high.
	$V_{IH(AC)}$	High-level AC input voltage
	$V_{IH(DC)}$	High-level DC input voltage
	V_{IL}	Voltage Input Low: The maximum positive voltage applied to the input that is accepted by the device as a logic low.
	$V_{IL(AC)}$	Low-level AC input voltage
	$V_{IL(DC)}$	Low-level DC input voltage
	V_{OCM}	Output Common Mode Voltage: The common mode of the differential signal at the transmitter.
	V_{OD}	Output differential Voltage Swing: The difference in voltage between the positive and complementary conductors of a differential transmission at the transmitter.
W	W	High-Speed I/O Block: Clock Boost Factor
X	—	—
Y	—	—
Z	—	—

Chapter Revision History

Table 1–202 lists the revision history for this chapter.

Table 1–202. Chapter Revision History (Part 1 of 2)

Date	Version	Changes Made
July 2010	2.3	Updated Table 1–11, Table 1–20, Table 1–25, and Table 1–33.
March 2010	2.2	Updated for the Quartus II software version 9.1 SP2 release: ■ Updated Table 1–7, Table 1–8, Table 1–11, Table 1–19, Table 1–23, Table 1–25, Table 1–28, Table 1–29, and Table 1–33. ■ Updated the "Sinusoidal Maximum Allowed Overshoot/Undershoot Voltage" and "External Memory Interface Specifications" sections. ■ Minor text edits.
July 2009	2.1	Minor text edits.
May 2009	2.0	■ Updated Table 1–1, Table 1–7, Table 1–9, Table 1–18, Table 1–21, Table 1–22, Table 1–23, Table 1–25, Table 1–26, Table 1–28, Table 1–29, Table 1–30, Table 1–33, Table 1–35, Table 1–41, Table 1–43, Table 1–51, Table 1–53, Table 1–61, Table 1–63, Table 1–71, Table 1–73, Table 1–81, Table 1–83, Table 1–91, Table 1–93, Table 1–101, Table 1–103, Table 1–111, Table 1–113, Table 1–121, Table 1–123, Table 1–131, and Table 1–133. ■ Updated Equation 1–1.
February 2009	1.9	■ Updated "Programmable IOE Delay", "PLL Specifications", "DSP Block Specifications", "TriMatrix Memory Block Specifications", "External Memory Interface Specifications", and "High-Speed I/O Specifications" sections. ■ Updated all Timing Information Tables in "User I/O Pin Timing" and "Dedicated Clock Pin Timing" sections. ■ Removed "Referenced Documents" and "Maximum Input and Output Toggle Rate" sections.
October 2008	1.8	■ Updated "Operating Conditions". ■ Added "Bus Hold Specifications". ■ Updated Table 1–3, Table 1–6, Table 1–7, Table 1–11, and Table 1–14. ■ Updated Table 1–17 to Table 1–25. ■ Updated Table 1–39 to Table 1–47. ■ Updated Table 1–50 to Table 1–210. ■ Added (Note 3) to Table 1–11. ■ Added (Note 1) to Table 1–14. ■ Added (Note 6) to Table 1–17. ■ Added (Note 1) to Table 1–47. ■ Added Table 1–26. ■ Added Figure 1–2.

Table 1–202. Chapter Revision History (Part 2 of 2)

Date	Version	Changes Made
July 2008	1.7	■ Updated "Operating Conditions" introduction section. ■ Updated Table 1–3, Table 1–7, Table 1–8, Table 1–19, Table 1–21, Table 1–22, Table 1–25, Table 1–26,Table 1–28, Table 1–29, Table 1–30, Table 1–31, Table 1–32, Table 1–33, Table 1–35, and Table 1–48. ■ Updated "PLL Specifications" introduction section. ■ Updated "I/O Timing Measurement Methodology" section. ■ Updated Figure 1–5, Figure 1–6, and Figure 1–7.
May 2008	1.6	■ Updated all tables for timing section. ■ Added "Internal Weak Pull-Up Resistor" section. ■ Removed "Stratix III Temperature Sensing Diode Specifications" section. ■ Added Figure 1–6 and Figure 1–7. ■ Added derating factors Table 1–45 and Table 1–46.
November 2007	1.5	■ Updated Table 1–90 to Table 1–109. ■ Updated Table 1–140 to Table 1–149. ■ Updated Table 1–175 to Table 1–180. ■ Updated Table 1–181 to Table 1–186. ■ Updated Table 1–205 to Table 1–210.
October 2007	1.4	■ Updated I/O Timing ■ Added new device packages for EP3SL50, EP3SL110, EP3SE80.
May 2007	1.3	Added new contact information table to the About this Handbook section.
May 2007	1.2	Updated Table 1–44 through Table 1–205.
March 2007	1.1	Added I/O Timing section.
November 2006	1.0	Initial Release.