

MTD2003B

Dual Full-bridge PWM Stepper Motor Driver

Features

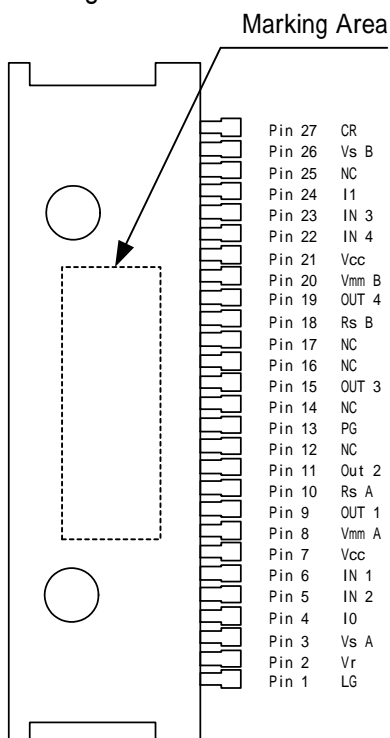
- Output current 1.2A , Output voltage 35V
- Constant current control(fixed frequency PWM control)
- 2-bit digital current selection
- Noise cancellation function
- Built-in flywheel and flyback diodes
- Cross conduction protection
- Low thermal resistance ZIP package(ZIP27)



Absolute maximum ratings / Ta=25

Parameter	Symbol	Rating	Unit
Output voltage	V _{mm}	35	V
Output current	I _{OUT}	1.2	A
Logic supply	V _{CC}	0 ~ 6	V
Logic input	V _{LOGIC}	0 ~ V _{CC}	V
Allowable power dissipation	P _D	5	W
Storage temperature range	T _{stg}	-40 ~ 150	
Maximum Junction temperature	T _j	150	

Pin Assignment



Truth table

IN 1 or 4	IN 2 or 3	OUT 1 or 4	OUT 2 or 3
L	L	OFF	OFF
L	H	L	H
H	L	H	L
H	H	OFF	OFF

I0	I1	Output current ratio[%]	Vref[V] (at Vr=5V)
L	L	100	0.50 ± 5%
H	L	70	0.35 ± 8%
L	H	33	0.17 ± 10%
H	H	0	-

Stepper Motor Driver IC

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Electrical Characteristics

 $V_{CC}=5V$, $T_a=25$ unless otherwise specified

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
Output stage						
Upper transistor saturation voltage	$V_{CE(sat)H}$	$I_C=1.0A$	-	1.2	1.4	V
Lower transistor saturation voltage	$V_{CE(sat)L}$	$I_C=1.0A$	-	0.7	1.0	V
Upper transistor leak current	I_{rH}	$V_{mm}=35V, V_{OUT}=0V$	-	-	10	μA
Lower transistor leak current	I_{rL}	$V_{OUT}=35V, V_{RS}=0V$	-	-	10	μA
Upper diode forward drop	V_{FH}	$I_F=1.0A$	-	1.4	1.6	V
Lower diode forward drop	V_{FL}	$I_F=1.0A$	-	1.3	1.5	V
Logic stage						
Logic supply current (2circuit ON)	$I_{CC(ON)}$		-	50	65	mA
Logic supply current (2circuit OFF)	$I_{CC(OFF)}$	$V_{IN}=\text{all } 0V \text{ or all } 5V$	-	15	25	mA
IN "H" input voltage	V_{INH}		2.3	-	V_{CC}	V
IN "L" input voltage	V_{INL}		GND	-	0.6	V
IN "H" input current	I_{INH}	$V_{IN}=3.3 \text{ or } 5V$	-	-	10	μA
IN "L" input current	I_{INL}	$V_{IN}=0V$	-	-3	-20	μA
I0,11 "H" input voltage	$V_{I0/11H}$		2.3	-	V_{CC}	V
I0,11 "L" input voltage	$V_{I0/11L}$		GND	-	0.6	V
I0,11 "H" input current	$I_{I0/11H}$	$V_{I0/11}=3.3 \text{ or } 5V$	-	-	10	μA
I0,11 "L" input current	$I_{I0/11L}$	$V_{I0/11}=0V$	-	-75	-100	μA
Vr input current	I_{ref}	$V_r=5V$	-	500	650	μA
Vs input current	I_s	$V_s=0V$	-	-1	-10	μA
Comparator threshold (100%)	V_{s1}	$V_r=5V, V_{I0}=0V, V_{I1}=0V$	0.475	0.5	0.525	V
Comparator threshold (70%)	V_{s2}	$V_r=5V, V_{I0}=5V, V_{I1}=0V$	0.322	0.35	0.378	V
Comparator threshold (33%)	V_{s3}	$V_r=5V, V_{I0}=0V, V_{I1}=5V$	0.153	0.17	0.187	V
Chopping frequency	f_{CHOP}		-	20	-	kHz
Blanking time	t_b	$C_t=3300pF$	-	1.55	-	μs
Vs maximum voltage	$V_{s(max)}$		-	-	1.5	V

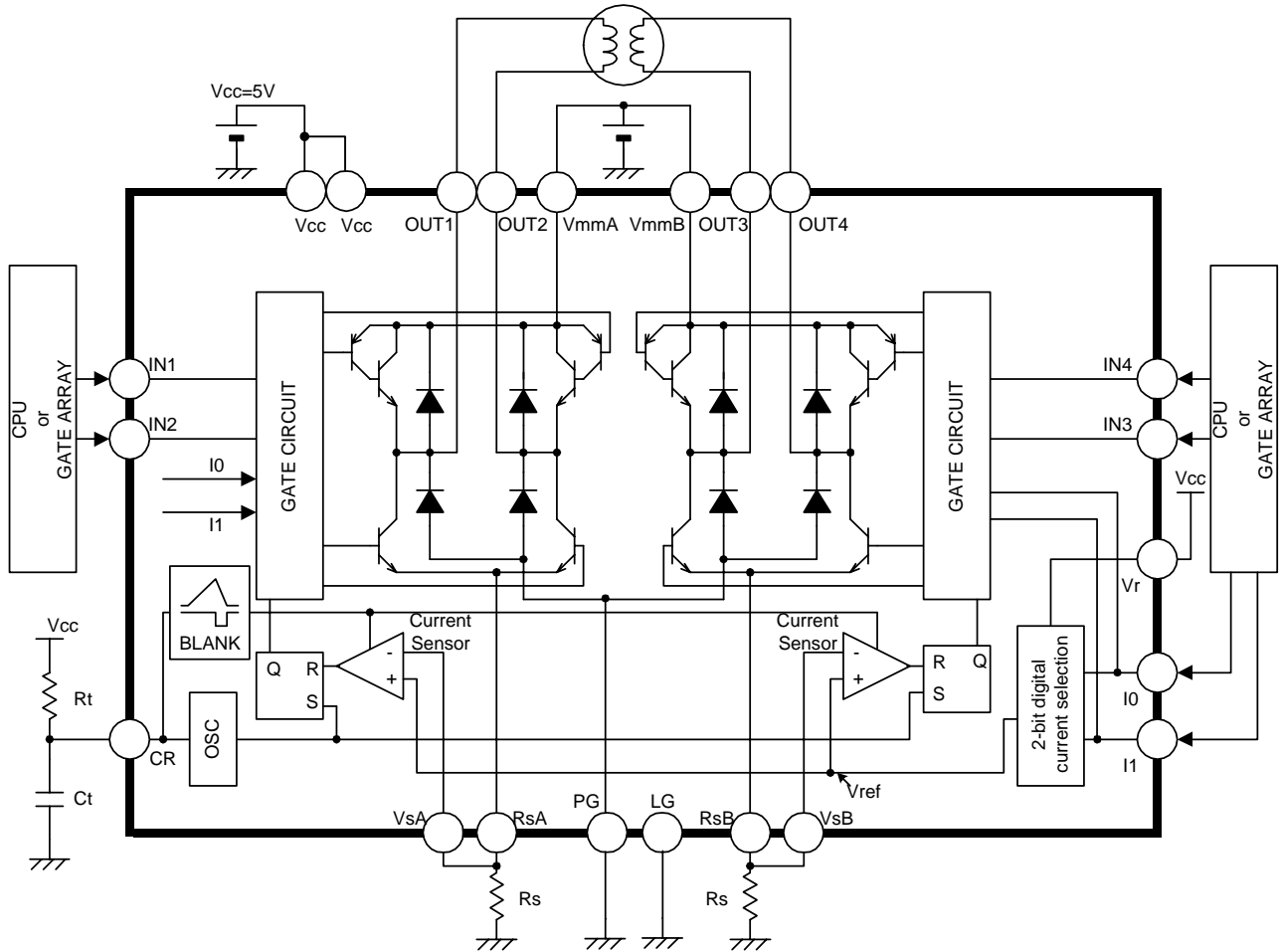
Recommended operation conditions

Parameter	Symbol	Recommendation	Unit
Junction temperature	T_j	-25 ~ 120	
Logic supply	V_{CC}	4.75 ~ 5.25	V
Load supply	V_{mm}	5 ~ 31	V

Thermal resistance

Symbol	Rating	Unit
j_a	25	/W

Block diagram / Typical application



Constant chopping current level

$$I_{chop} = \frac{V_r}{10 \times R_s} - 0.015$$

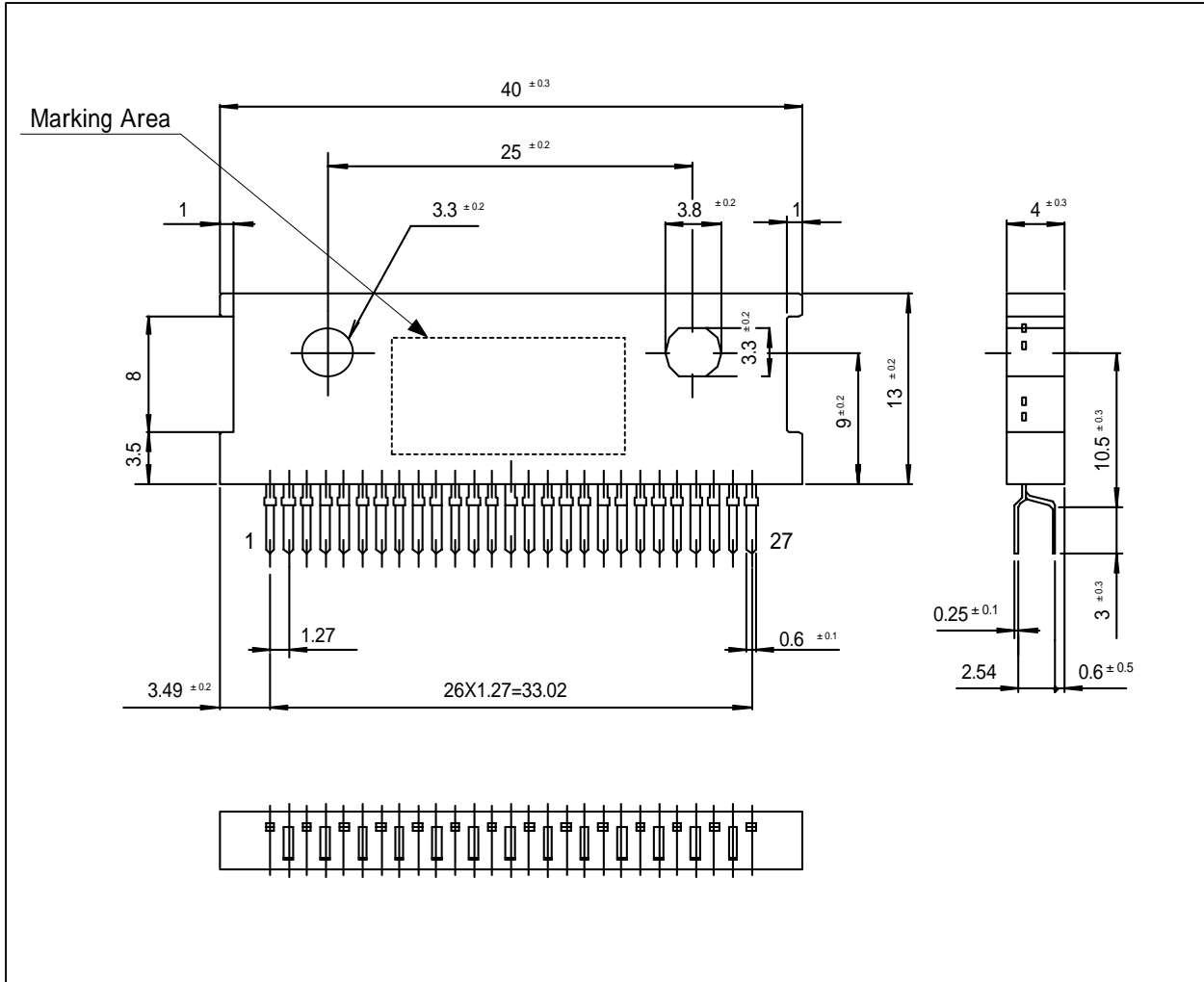
Recommended component values

Symbol	Recommended component values	Unit
Rt	18	k
Ct	3300	pF
Vr	Vcc	V


ONE SHOT OFF TIME


$$f = \frac{1}{0.72 \times C_t \times R_t}$$

Outline Drawing



(Unit : mm)

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