



# GaAs INTEGRATED CIRCUIT

# UPG2155TB

## NEC's L-BAND 4 W HIGH POWER SPDT SWITCH

### DESCRIPTION

The  $\mu$ PG2155TB is an L-band SPDT GaAs FET switch developed for digital cellular or cordless telephone applications. The device can operate from 500 MHz to 2.5 GHz, with low insertion loss and high linearity.

### FEATURES

- Low insertion loss
  - : L<sub>INS</sub> = 0.35 dB TYP. @ V<sub>cont</sub> = +2.6 V/0 V, f = 1.0 GHz
  - : L<sub>INS</sub> = 0.40 dB TYP. @ V<sub>cont</sub> = +2.6 V/0 V, f = 2.0 GHz
  - : L<sub>INS</sub> = 0.45 dB TYP. @ V<sub>cont</sub> = +2.6 V/0 V, f = 2.5 GHz
- High linearity
  - : 2f<sub>0</sub> = 70 dBc TYP. @ V<sub>cont</sub> = +2.6 V/0 V, f = 0.9 GHz, P<sub>in</sub> = +34.5 dBm
  - : 3f<sub>0</sub> = 75 dBc TYP. @ V<sub>cont</sub> = +2.6 V/0 V, f = 0.9 GHz, P<sub>in</sub> = +34.5 dBm
- 6-pin super minimold package (2.1 × 2.0 × 0.9 mm)

### APPLICATION

- GSM Triple/Quad band digital cellular

### ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
$\mu$ PG2155TB-E4	$\mu$ PG2155TB-E4-A	6-pin super minimold (Pb-Free)	G4R	<ul style="list-style-type: none"><li>• Embossed tape 8 mm wide</li><li>• Pin 4, 5, 6 face the perforation side of the tape</li><li>• Qty 3 kpcs/reel</li></ul>

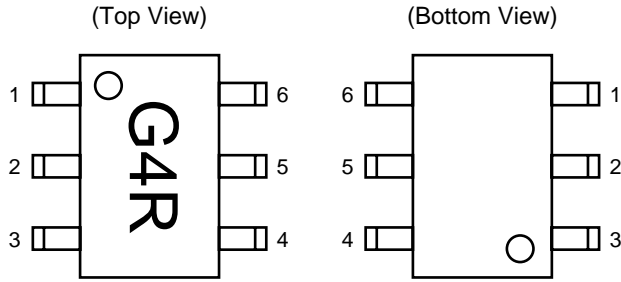
**Remark** To order evaluation samples, contact your nearby sales office.

Part number for sample order:  $\mu$ PG2155TB-A

**Caution** Observe precautions when handling because these devices are sensitive to electrostatic discharge.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.

**PIN CONNECTIONS**



Pin No.	Pin Name
1	OUT1
2	GND
3	OUT2
4	V <sub>cont2</sub>
5	IN
6	V <sub>cont1</sub>

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25°C)**

Parameter	Symbol	Ratings	Unit
Control Voltage	V <sub>cont</sub>	+6.0	V
Input Power	P <sub>in</sub>	+38	dBm
Operating Ambient Temperature	T <sub>A</sub>	-45 to +85	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

**RECOMMENDED OPERATING RANGE (T<sub>A</sub> = +25°C)**

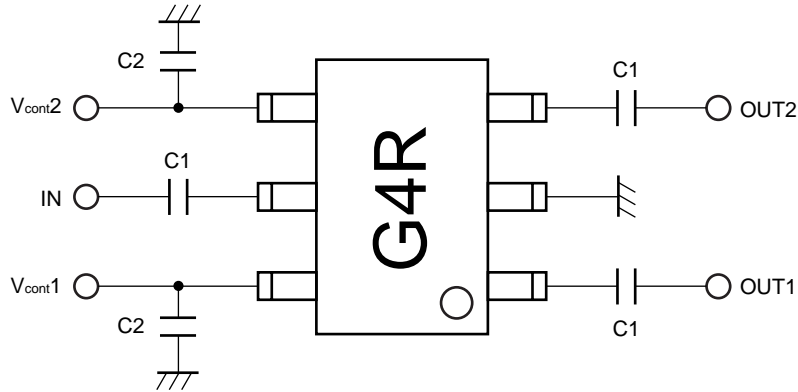
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Control Voltage (High)	V <sub>cont (H)</sub>	+2.4	+2.6	+5.0	V
Control Voltage (Low)	V <sub>cont (L)</sub>	-0.2	0	+0.2	V

**ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ\text{C}$ ,  $V_{\text{cont}} = +2.6 \text{ V/0 V}$ ,  $Z_o = 50 \Omega$ , off chip DC blocking capacitors value: 56 pF, unless otherwise specified)**

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	$L_{\text{INS}}$	f = 0.5 to 1.0 GHz	–	0.35	0.45	dB
		f = 1.0 to 2.0 GHz	–	0.40	0.50	dB
		f = 2.0 to 2.5 GHz	–	0.45	0.55	dB
Isolation	$ISL$	f = 0.5 to 1.0 GHz	22	24	–	dB
		f = 1.0 to 2.0 GHz	17	19	–	dB
		f = 2.0 to 2.5 GHz	15	17	–	dB
Input Return Loss	$RL_{\text{in}}$	f = 0.5 to 2.5 GHz	15	20	–	dB
Output Return Loss	$RL_{\text{out}}$	f = 0.5 to 2.5 GHz	15	20	–	dB
0.1 dB Loss Compression	$P_{\text{in (0.1 dB)}}$	f = 0.9 GHz	–	37.5<	–	dBm
Input Power		f = 1.8 GHz	–	37.5<	–	dBm
2nd Harmonics	$2f_0$	f = 0.9 GHz, $P_{\text{in}} = +34.5 \text{ dBm}$	67	70	–	dBc
		f = 1.8 GHz, $P_{\text{in}} = +31.5 \text{ dBm}$	64	70	–	dBc
3rd Harmonics	$3f_0$	f = 0.9 GHz, $P_{\text{in}} = +34.5 \text{ dBm}$	67	75	–	dBc
		f = 1.8 GHz, $P_{\text{in}} = +31.5 \text{ dBm}$	64	75	–	dBc
Switching Speed	$t_{\text{sw}}$		–	1	5	$\mu\text{s}$
Control Current	$I_{\text{cont}}$	RF Non	–	0.5	5.0	$\mu\text{A}$

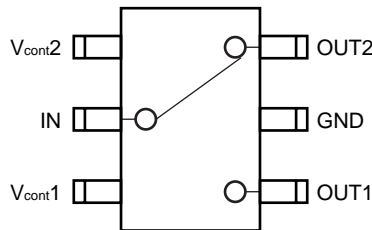
**EVALUATION CIRCUIT**

Off chip DC blocking capacitors value C1 = 56 pF, C2 = 1 000 pF (Bypass), using NEC standard evaluation board.



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

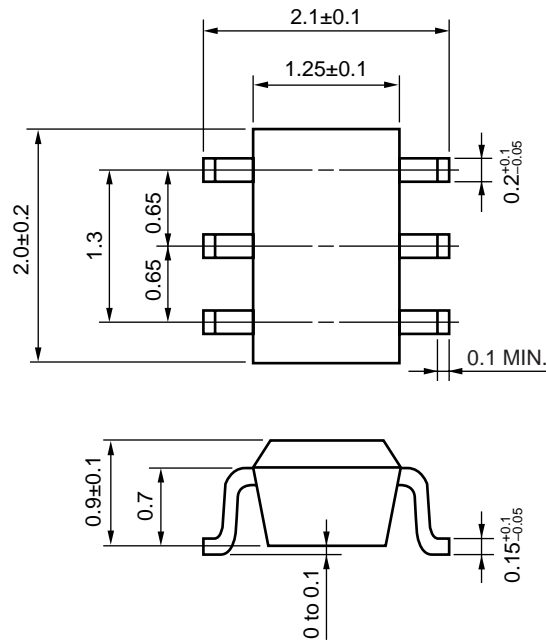
**TRUTH TABLE**



V <sub>cont1</sub>	V <sub>cont2</sub>	IN-OUT1	IN-OUT2
High	Low	ON	OFF
Low	High	OFF	ON

PACKAGE DIMENSIONS

6-PIN SUPER MINIMOLD (UNIT: mm)



**RECOMMENDED SOLDERING CONDITIONS**

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions	Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature) : 260°C or below Time at peak temperature : 10 seconds or less Time at temperature of 220°C or higher : 60 seconds or less Preheating time at 120 to 180°C : 120±30 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	IR260
Wave Soldering	Peak temperature (molten solder temperature) : 260°C or below Time at peak temperature : 10 seconds or less Preheating temperature (package surface temperature) : 120°C or below Maximum number of flow processes : 1 time Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	WS260
Partial Heating	Peak temperature (terminal temperature) : 350°C or below Soldering time (per side of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	HS350

**Caution Do not use different soldering methods together (except for partial heating).**

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

**Important Information and Disclaimer:** Information provided by CEL on its website or in other communications concerning the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL’s liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.