To our customers,

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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GaAs INTEGRATED CIRCUIT

Phase-out/Discontinued

μPG2022TB

GaAs MMIC SPDT HIGH POWER SWITCH FROM 4.8 TO 5.85 GHz

DESCRIPTION

The μPG2022TB is a GaAs FET MMIC SPDT (Single Pole Double Throw) high power switch. The device can operate from 4.8 to 5.85 GHz, having the low insertion loss. It housed in an original 6-pin super minimold package and contributes to miniaturizing the system.

FEATURES

- Operating frequency : f = 4.8 to 5.85 GHz
- Low insertion loss : L_{INS} = 0.8 dB TYP. @ f = 4.9 to 5.2 GHz
  L_{INS} = 0.9 dB TYP. @ f = 5.8 GHz
- Handling power : $P_{in\ (0.1dB)}$ = +30 dBm TYP. @ f = 4.9 to 5.2 GHz
  $P_{in\ (0.1dB)}$ = +31 dBm TYP. @ f = 5.2 to 5.85 GHz
- Control voltage : V_{cont} = +2.8 V/0 V
- High isolation : ISL1 (between OUTPUT1 and OUTPUT2) = 18 dB TYP. @ f = 5.8 GHz
  : ISL2 (between INPUT and OUTPUT) = 29 dB TYP. @ f = 5.8 GHz
- Input/output return loss : RL_{in}/RL_{out} = 10 dB MIN. @ f = 4.8 to 5.85 GHz
- Switching speed : 20 ns @ t_{RISE}/t_{FALL} (10/90% RF)
- 6-pin super minimold package (2.0 × 1.25 × 0.9 mm)

APPLICATIONS

- 5 GHz band wireless LAN

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
μPG2022TB-E4	6-pin super minimold	G3L	• Embossed tape 8 mm wide • Pin 4, 5, 6 face the perforation side of the tape • Qty 3 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: μPG2022TB

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

Document No. PG10473EJ01V0DS (1st edition)
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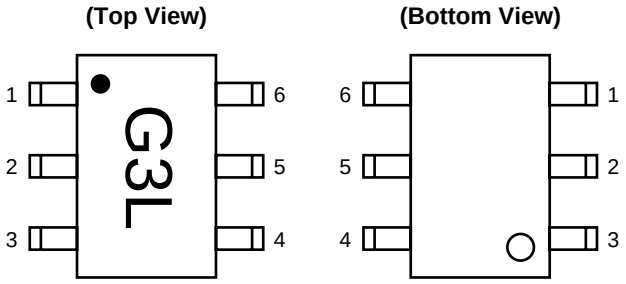
PIN CONNECTIONS



Pin No.	Pin Name
1	OUTPUT2
2	GND
3	OUTPUT1
4	V_{cont1}
5	INPUT
6	V_{cont2}

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Switch Control Voltage	$V_{cont1, 2}$	–6.0 to +6.0 Note1	V
Input Power	P_{in}	+36	dBm
Total Power Dissipation	P_{tot}	0.15 Note2	W
Operating Ambient Temperature	T_A	–45 to +85	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Notes 1. $|V_{cont1} - V_{cont2}| \leq 6.0$ V

2. Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C

RECOMMENDED OPERATING RANGE (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Switch Control Voltage (H)	$V_{cont\ (H)}$	2.7	2.8	3.3	V
Switch Control Voltage (L)	$V_{cont\ (L)}$	–0.2	0	0.2	V
Operating Frequency	f	4.8		5.85	GHz
Operating Ambient Temperature	T_A	–40	+25	+85	°C

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{cont} = 2.8 V/0 V, Z_O = 50 Ω, DC block capacitor = 3 pF, Each port, unless otherwise specified)

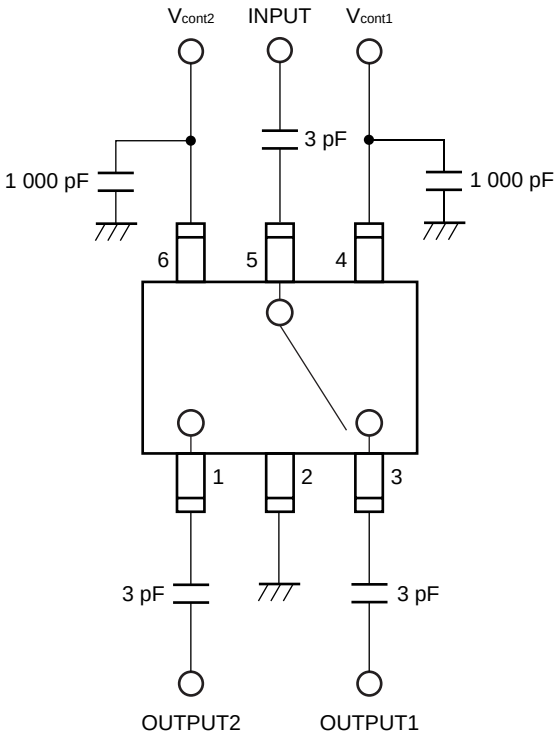
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	L_{INS}	f = 4.9 GHz	–	0.8	1.1	dB
		f = 5.2 GHz	–	0.8	1.1	dB
		f = 5.8 GHz	–	0.9	1.1	dB
Isolation 1 (between OUTPUT1 and OUTPUT2)	ISL1	f = 4.9 GHz	12	15	–	dB
		f = 5.2 GHz	13	16	–	dB
		f = 5.8 GHz	15	18	–	dB
Input Return Loss	RL_{in}	f = 4.9 GHz	10	17	–	dB
		f = 5.2 GHz	10	18	–	dB
		f = 5.8 GHz	10	15	–	dB
Output Return Loss	RL_{out}	f = 4.9 GHz	10	19	–	dB
		f = 5.2 GHz	10	21	–	dB
		f = 5.8 GHz	10	19	–	dB
0.1 dB Gain Compression Input Power	$P_{in\ (0.1\ dB)}$	f = 4.9 to 5.2 GHz	28	30	–	dBm
		f = 5.2 to 5.85 GHz	30	31	–	
Switching Control Speed	t_{SW}	t_{RISE}/t_{FALL} (10/90% RF)	–	20	–	ns
Switching Control Current	I_{cont}		–	0.5	1	μA

STANDARD CHARACTERISTICS FOR REFERENCE

(T_A = +25°C, V_{cont} = 2.8 V/0 V, Z_O = 50 Ω, DC block capacitor = 3 pF, Each port, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Isolation 2 (between INPUT and OUTPUT)	ISL2	f = 4.9 GHz	–	17	–	dB
		f = 5.2 GHz	–	20	–	dB
		f = 5.8 GHz	–	29	–	dB

EVALUATION CIRCUIT



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

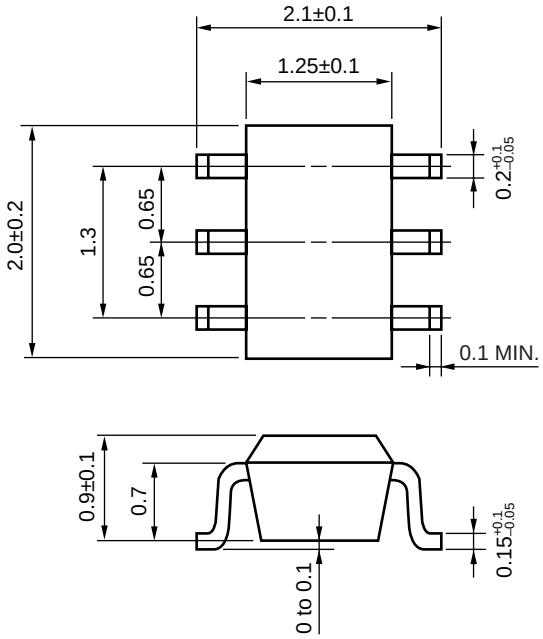
TRUTH TABLE OF SWITCHING BY CONDITION OF CONTROL VOLTAGE

		V_{CONT1}	
		$V_{CONT\ (H)}$	$V_{CONT\ (L)}$
V_{CONT2}	$V_{CONT\ (H)}$	**Note** INPUT — OUTPUT1, OUTPUT2	INPUT — OUTPUT2; OUTPUT1
	$V_{CONT\ (L)}$	INPUT — OUTPUT1; OUTPUT2	**Note** INPUT — OUTPUT1, OUTPUT2

Note In case of $V_{CONT1} = V_{CONT2}$ = High or $V_{CONT1} = V_{CONT2}$ = Low, (that is same control voltage for both pins), input signal of INPUT (Pin 5) is output from OUTPUT1 (Pin 3) and OUTPUT2 (Pin 1).

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) Time at peak temperature Time at temperature of 220°C or higher Preheating time at 120 to 180°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 60 seconds or less : 120±30 seconds : 3 times : 0.2%(Wt.) or below	IR260
VPS	Peak temperature (package surface temperature) Time at temperature of 200°C or higher Preheating time at 120 to 150°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 215°C or below : 25 to 40 seconds : 30 to 60 seconds : 3 times : 0.2%(Wt.) or below	VP215
Wave Soldering	Peak temperature (molten solder temperature) Time at peak temperature Preheating temperature (package surface temperature) Maximum number of flow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 120°C or below : 1 time : 0.2%(Wt.) or below	WS260
Partial Heating	Peak temperature (pin temperature) Soldering time (per side of device) Maximum chlorine content of rosin flux (% mass)	: 350°C or below : 3 seconds or less : 0.2%(Wt.) or below	HS350

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

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M8E 00.4-0110

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▶**For further information, please contact**

NEC Compound Semiconductor Devices, Ltd. **http://www.ncsd.necel.com/**
E-mail: salesinfo@ml.ncsd.necel.com (sales and general)
techinfo@ml.ncsd.necel.com (technical)
5th Sales Group, Sales Division TEL: +81-44-435-1588 FAX: +81-44-435-1579

NEC Compound Semiconductor Devices Hong Kong Limited
E-mail: ncsd-hk@elhk.nec.com.hk (sales, technical and general)
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309
Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859
Korea Branch Office TEL: +82-2-558-2120 FAX: +82-2-558-5209

NEC Electronics (Europe) GmbH **http://www.ee.nec.de/**
TEL: +49-211-6503-0 FAX: +49-211-6503-1327

California Eastern Laboratories, Inc. **http://www.cel.com/**
TEL: +1-408-988-3500 FAX: +1-408-988-0279

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