CEL

GaAs INTEGRATED CIRCUIT

μPG2164T5N

DPDT SWITCH FOR 2.4 GHz AND 6 GHz DUAL-BAND WIRELESS LAN

DESCRIPTION

The μPG2164T5N is a GaAs MMIC DPDT (Double Pole Double Throw) switch which was developed for 2.4 GHz and 6 GHz dual-band wireless LAN. This device can operate frequency from 2.4 GHz band and 6 GHz band, having the low insertion loss and high isolation.

This device is housed in a 6-pin plastic TSON (Thin Small Out-line Non-leaded) package. And this package is able to high-density surface mounting.

FEATURES

- Operating frequency : f = 2.4 to 2.5 GHz and 4.9 to 6.0 GHz
- Switch control voltage : $V_{cont\ (H)}$ = 2.8 to 5.0 V (3.0 V TYP.)
  : $V_{cont\ (L)}$ = −0.3 to 0.3 V (0 V TYP.)
- Low insertion loss : $L_{ins}1$ = 0.50 dB TYP. @ f = 2.4 to 2.5 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : $L_{ins}2$ = 0.70 dB TYP. @ f = 4.9 to 6.0 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
- High isolation : ISL1 = 25 dB TYP. @ f = 2.4 to 2.5 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : ISL2 = 17 dB TYP. @ f = 4.9 to 6.0 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
- Handling power : $P_{in\ (1\ dB)}$ = +31.0 dBm TYP. @ f = 2.5 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : $P_{in\ (1\ dB)}$ = +29.0 dBm TYP. @ f = 6.0 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
- High-density surface mounting : 6-pin plastic TSON package (1.5 × 1.5 × 0.37 mm)

APPLICATION

- Dual-band wireless LAN (IEEE802.11a + b/g)

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2164T5N-E2	μPG2164T5N-E2-A	6-pin plastic TSON (Pb-Free)	G5B	• Embossed tape 8 mm wide • Pin 1, 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: μPG2164T5N-A

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

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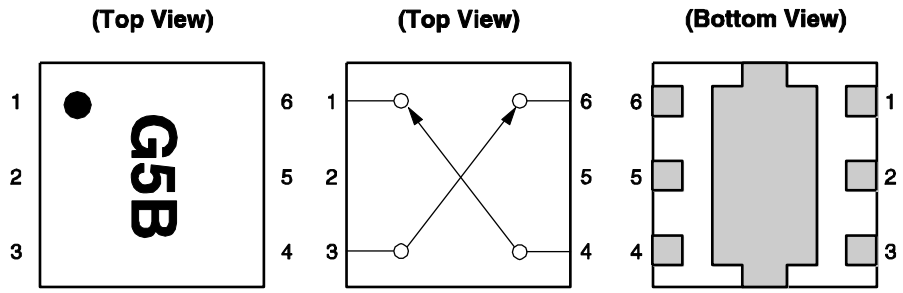
The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



Pin No.	Pin Name
1	ANT2
2	$V_{cont}2$
3	OUT2 (RX)
4	OUT1 (TX)
5	$V_{cont}1$
6	ANT1

Remark Exposed pad : GND

TRUTH TABLE

$V_{cont}1$	$V_{cont}2$	ANT1–OUT1 (TX)	ANT1– OUT2 (RX)	ANT2– OUT1 (TX)	ANT2–OUT2 (RX)
High	Low	OFF	ON	ON	OFF
Low	High	ON	OFF	OFF	ON

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

Parameter	Symbol	Ratings	Unit
Switch Control Voltage	V_{cont}	–6.0 to +6.0	V
Input Power	P_{in}	+32	dBm
Operating Ambient Temperature	T_A	–45 to +85	°C
Storage Temperature	T_{stg}	–55 to +135	°C

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

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Switch Control Voltage (H)	$V_{cont\ (H)}$	2.8	3.0	5.0	V
Switch Control Voltage (L)	$V_{cont\ (L)}$	–0.3	0	0.3	V
Operating Frequency 1	f1	2.4	–	2.5	GHz
Operating Frequency 2	f2	4.9	–	6.0	GHz

ELECTRICAL CHARACTERISTICS

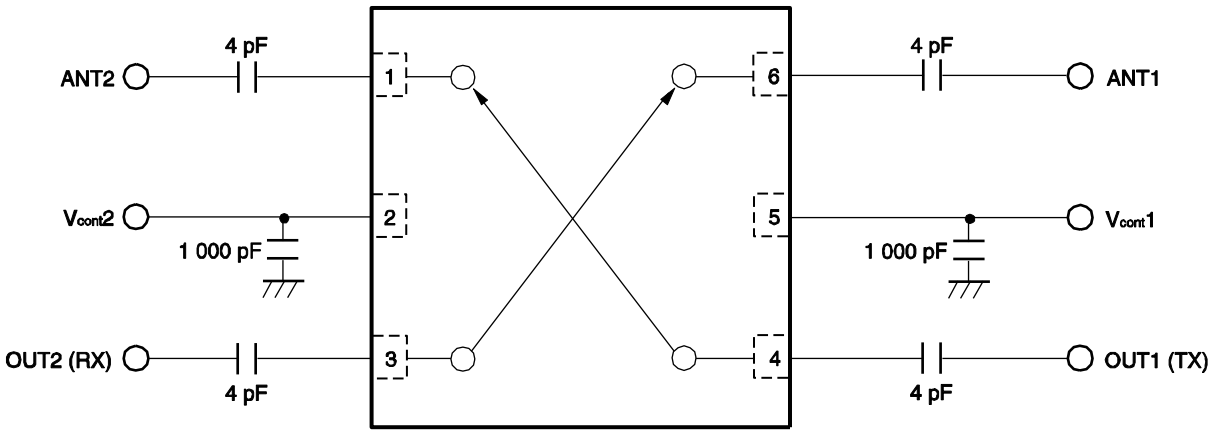
(T_A = +25°C, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V, Z_0 = 50 Ω, DC blocking capacitors = 4 pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss 1	$L_{ins}1$	f = 2.4 to 2.5 GHz	–	0.50	0.75	dB
Insertion Loss 2	$L_{ins}2$	f = 4.9 to 6.0 GHz	–	0.70	1.00	dB
Isolation 1 (ANT to OUT)	ISL1	f = 2.4 to 2.5 GHz	22	25	–	dB
Isolation 2 (ANT to OUT)	ISL2	f = 4.9 to 6.0 GHz	14	17	–	dB
Isolation 3 (ANT1 to ANT2, TX to RX)	ISL3	f = 2.4 to 2.5 GHz	22	25	–	dB
Isolation 4 (ANT1 to ANT2, TX to RX)	ISL4	f = 4.9 to 6.0 GHz	15	17	–	dB
Input Return Loss 1	$RL_{in}1$	f = 2.4 to 2.5 GHz	–	15	–	dB
Input Return Loss 2	$RL_{in}2$	f = 4.9 to 6.0 GHz	–	15	–	dB
Output Return Loss 1	$RL_{out}1$	f = 2.4 to 2.5 GHz	–	15	–	dB
Output Return Loss 2	$RL_{out}2$	f = 4.9 to 6.0 GHz	–	15	–	dB
1 dB Loss Compression Input Power 1 **Note**	$P_{in\ (1\ dB)}$ 1	f = 2.4 to 2.5 GHz	–	+31.0	–	dBm
1 dB Loss Compression Input Power 2 **Note**	$P_{in\ (1\ dB)}$ 2	f = 4.9 to 6.0 GHz	–	+29.0	–	dBm
Input 3rd Order Intercept Point	IIP_3	f1 = 2 500 MHz, f2 = 2 501 MHz, $P_{in\ (1\ tone)}$ = +20 dBm	–	+50	–	dBm
Switch Control Current	I_{cont}		–	0.1	1.0	μA
Switch Control Speed	tsw	50% CTL to 90/10%	–	50	–	ns

Note $P_{in\ (1\ dB)}$ is measured the input power level when the insertion loss increases more 1 dB than that of linear range.

Caution This device is used it is necessary to use DC blocking capacitors.

EVALUATION CIRCUIT

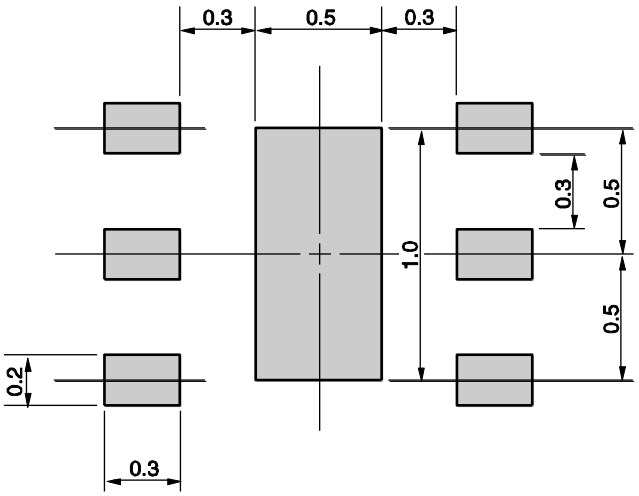


The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

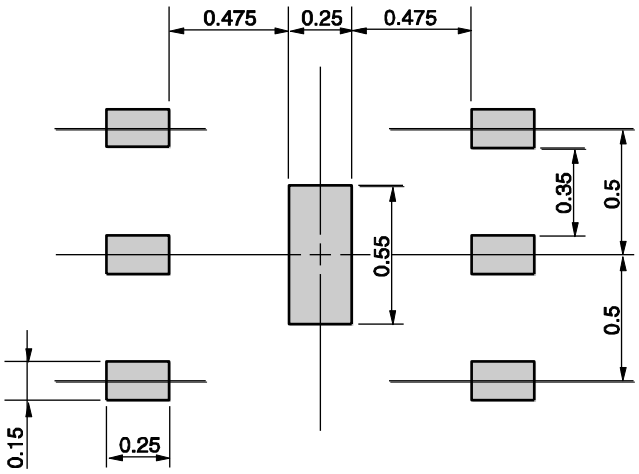
MOUNTING PAD AND SOLDER MASK LAYOUT DIMENSIONS

6-PIN PLASTIC TSON (UNIT: mm)

MOUNTING PAD



SOLDER MASK

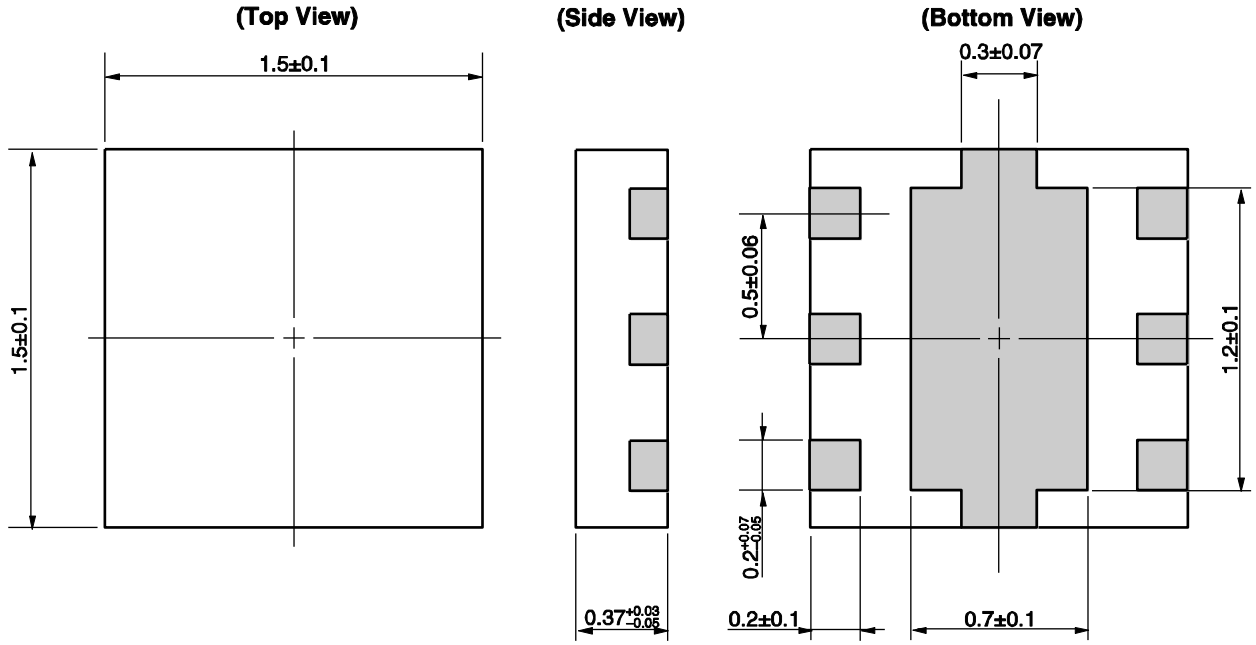


Solder thickness : 0.08 mm

Remark The mounting pad and solder mask layouts in this document are for reference only.

<R> **PACKAGE DIMENSIONS**

6-PIN PLASTIC TSON (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
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 (terminal 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).

Caution GaAs Products	This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points. • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.

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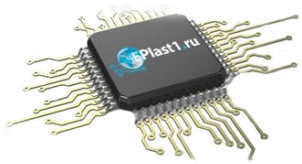
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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