

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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**Phase-out/Discontinued**

## InGaP POWER AMPLIFIER FOR DUAL BAND W-LAN

### DESCRIPTION

The μPG2317T5J is a GaAs HBT MMIC power amplifier for Dual (2.4 GHz and 5.8 GHz) band wireless LAN. This device realizes high efficiency, high gain and high output power by using InGaP HBT and shut-down function. This device is housed in a 12-pin plastic TQFN (Thin Quad Flat Non-leaded) package. And this package is able to high-density surface mounting.

### FEATURES

- Operating frequency :  $f_{opt} = 2\ 400$  to  $2\ 500$  MHz (L-band)  
:  $f_{opt} = 4\ 900$  to  $5\ 850$  MHz (H-band)
- Supply voltage :  $V_{CC(H), (L)} = 3.0$  to  $3.6$  V (3.3 V TYP.)
- Control voltage :  $V_{enable(H), (L)} = 0$  to  $2.9$  V (2.8 V TYP.)
- Circuit current :  $I_{CC(L)} = 125$  mA TYP. @  $P_{out} = +18$  dBm, 11g OFDM 54 Mbps signal  
:  $I_{CC(H)} = 150$  mA TYP. @  $P_{out} = +18$  dBm, 11a OFDM 54 Mbps signal
- Power gain :  $G_P(L) = 29$  dB TYP. @  $P_{out} = +18$  dBm, 11g OFDM 54 Mbps signal  
:  $G_P(H) = 27$  dB TYP. @  $P_{out} = +18$  dBm, 11a OFDM 54 Mbps signal
- Error vector magnitude :  $EVM(L) = 3.0\%$  TYP. @  $P_{out} = +18$  dBm, 11g OFDM 54 Mbps signal  
:  $EVM(H) = 4.0\%$  TYP. @  $P_{out} = +18$  dBm, 11a OFDM 54 Mbps signal
- High-density surface mounting : 12-pin plastic TQFN package ( $2.5 \times 2.5 \times 0.37$  mm)

### APPLICATION

- Power Amplifier for 802.11a/b/g, etc.

### ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2317T5J-E2	μPG2317T5J-E2-A	12-pin plastic TQFN (Pb-Free)	2317	<ul style="list-style-type: none"> <li>• Embossed tape 8 mm wide</li> <li>• Pin 10, 11, 12 face the perforation side of the tape</li> <li>• Qty 3 kpcs/reel</li> </ul>

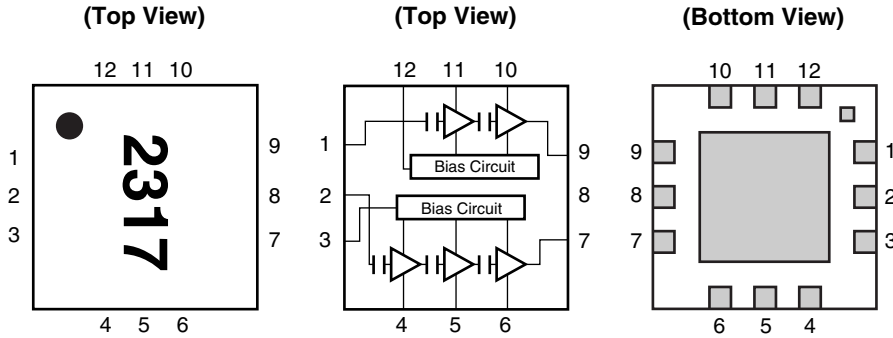
**Remark** To order evaluation samples, contact your nearby sales office.

Part number for sample order: μPG2317T5J

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

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**PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM**



Pin No.	Pin Name
1	P <sub>in</sub> (L)
2	P <sub>in</sub> (H)
3	V <sub>enable</sub> (H)
4	V <sub>cc1</sub> (H)
5	V <sub>cc2</sub> (H)
6	V <sub>cc3</sub> (H)
7	P <sub>out</sub> (H)
8	GND
9	P <sub>out</sub> (L)
10	V <sub>cc2</sub> (L)
11	V <sub>cc1</sub> (L)
12	V <sub>enable</sub> (L)

**Remark** Exposed pad : GND

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

Parameter	Symbol	Ratings	Unit
Supply Voltage	V <sub>CC</sub> (H), (L)	5.0	V
Control Voltage	V <sub>enable</sub> (H), (L)	3.2	V
Input Power	P <sub>in</sub>	+5	dBm
Power Dissipation	P <sub>D</sub>	500 <sup>Note</sup>	mW
Operating Ambient Temperature	T <sub>A</sub>	-45 to +85	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

**Note** Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T<sub>A</sub> = +85°C

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

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V <sub>CC</sub> (H), (L)	3.0	3.3	3.6	V
Control Voltage	V <sub>enable</sub> (H), (L)	0 <sup>Note</sup>	2.8	2.9	V

**Note** Shut down

**ELECTRICAL CHARACTERISTICS 1**

( $T_A = +25^{\circ}\text{C}$ ,  $V_{CC(L)} = 3.3\text{ V}$ ,  $V_{enable(L)} = 2.8\text{ V}$ , external input and output matching, RF signal: 11g OFDM 54 Mbps at L-band, unless otherwise specified)

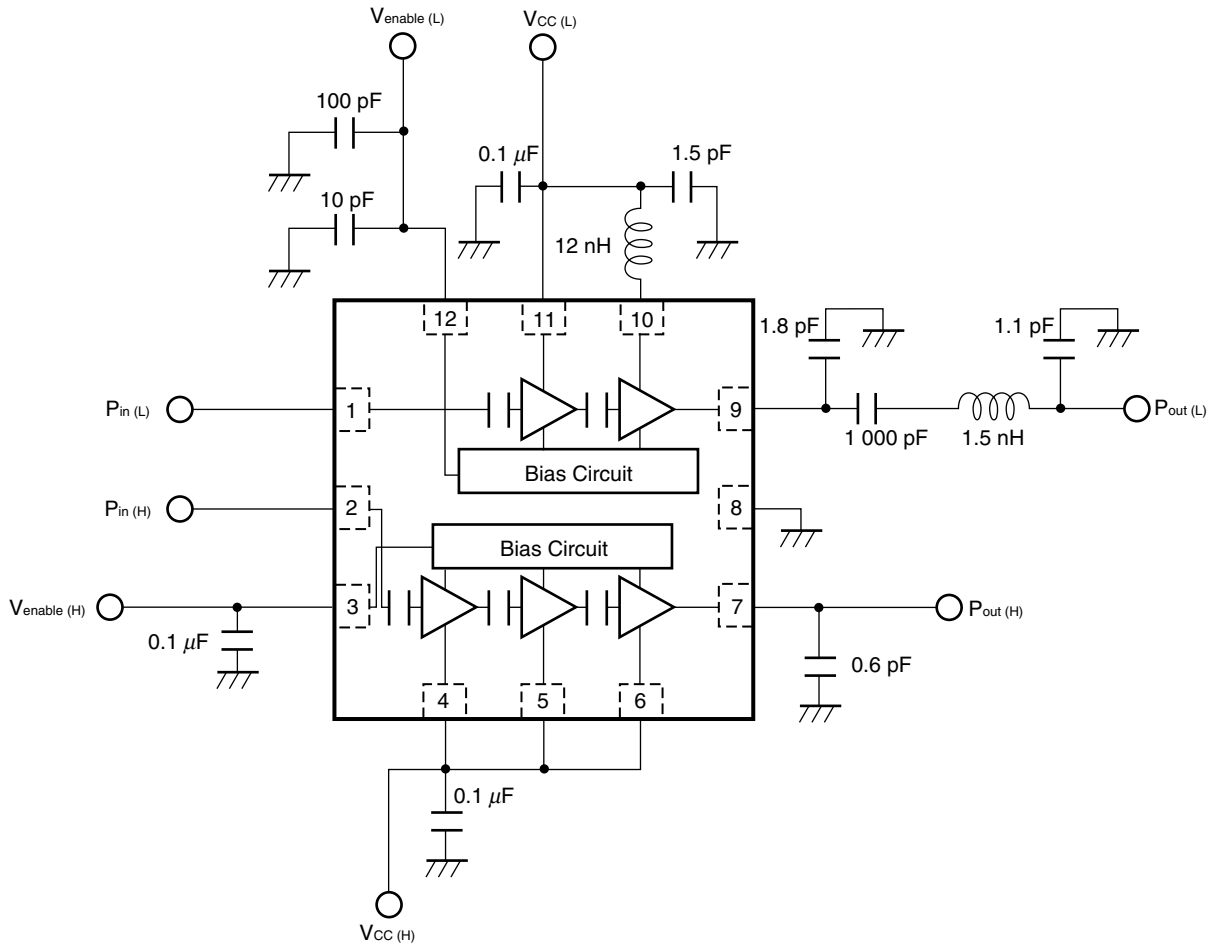
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Frequency Range	$f_{opt}$		2 400	2 450	2 500	MHz
Circuit Current	$I_{CC(L)}$	$P_{out} = +18\text{ dBm}$	–	125	140	mA
Power Gain	$G_P(L)$	$P_{out} = +18\text{ dBm}$	26	29	–	dB
Shut down Current	$I_{shut\ down(L)}$	$V_{enable(L)} = 0\text{ V}$	–	–	0.1	μA
Error Vector Magnitude	$EVM(L)$	$P_{out} = +18\text{ dBm}$	–	3.0	–	%
2nd Harmonics	$2f_0(L)$	$P_{out} = +18\text{ dBm}$	–	–35	–	dBc
3rd Harmonics	$3f_0(L)$	$P_{out} = +18\text{ dBm}$	–	–55	–	dBc
Enable Current	$I_{enable(L)}$	$P_{out} = +18\text{ dBm}$	–	2.5	5.0	mA
Idle Current	$I_q(L)$	No RF input	–	65	–	mA
Output Load Mismatch	–	VSWR 1: 5 all phase	No destruction			–

**ELECTRICAL CHARACTERISTICS 2**

( $T_A = +25^{\circ}\text{C}$ ,  $V_{CC(H)} = 3.3\text{ V}$ ,  $V_{enable(H)} = 2.8\text{ V}$ , external input and output matching, RF signal: 11a OFDM 54 Mbps at H-band, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Frequency Range	$f_{opt}$		4 900	5 200	5 850	MHz
Circuit Current	$I_{CC(H)}$	$P_{out} = +18\text{ dBm}$	–	150	180	mA
Power Gain	$G_P(H)$	$P_{out} = +18\text{ dBm}$	23	27	–	dB
Shut down Current	$I_{shut\ down(H)}$	$V_{enable(H)} = 0\text{ V}$	–	–	0.1	μA
Error Vector Magnitude	$EVM(H)$	$P_{out} = +18\text{ dBm}$	–	4.0	–	%
2nd Harmonics	$2f_0(H)$	$P_{out} = +18\text{ dBm}$	–	–40	–	dBc
3rd Harmonics	$3f_0(H)$	$P_{out} = +18\text{ dBm}$	–	–45	–	dBc
Enable Current	$I_{enable(H)}$	$P_{out} = +18\text{ dBm}$	–	4.0	6.0	mA
Idle Current	$I_q(H)$	No RF input	–	80	–	mA
Output Load Mismatch	–	VSWR 1: 5 all phase	No destruction			–

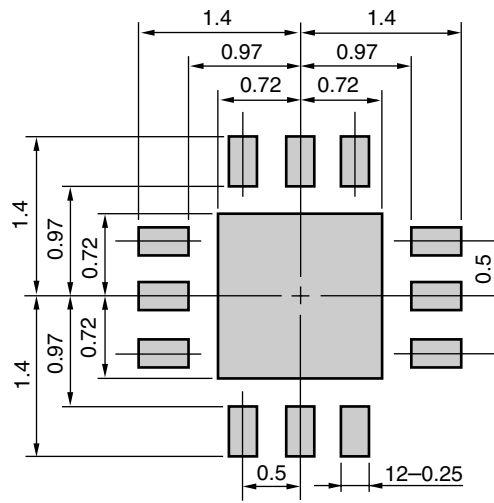
EVALUATION CIRCUIT



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

MOUNTING PAD LAYOUT DIMENSIONS

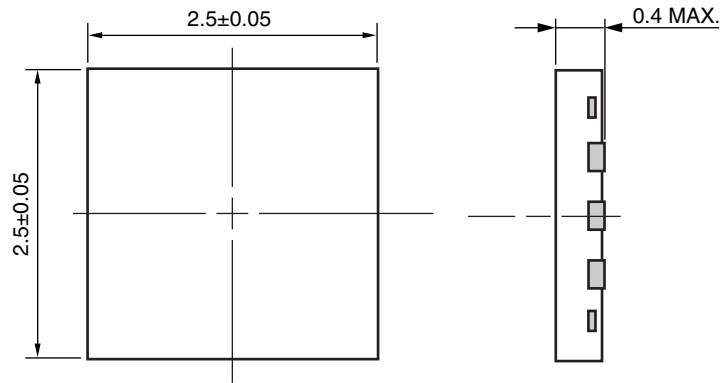
12-PIN PLASTIC TQFN (UNIT: mm)



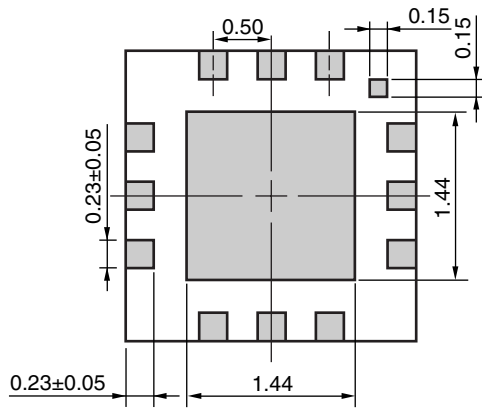
**Remark** The mounting pad layout in this document is for reference only.

PACKAGE DIMENSIONS

12-PIN PLASTIC TQFN (UNIT: mm)



(Bottom View)





**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).**

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