

### InGaP POWER AMPLIFIER FOR DUAL BAND W-LAN

#### DESCRIPTION

The  $\mu$ PG2317T5J 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
$\mu$ PG2317T5J-E2	$\mu$ PG2317T5J-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>

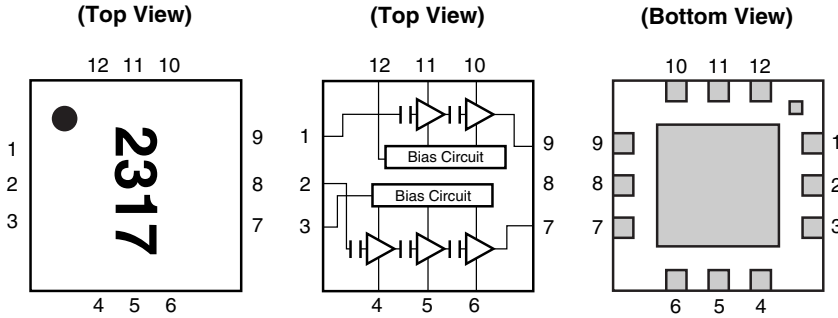
**Remark** To order evaluation samples, contact your nearby sales office.

Part number for sample order:  $\mu$ PG2317T5J

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

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Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

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<sub>A</sub> = +25°C, V<sub>CC (L)</sub> = 3.3 V, V<sub>enable (L)</sub> = 2.8 V, external input and output matching, RF signal: 11g OFDM 54 Mbps at L-band, unless otherwise specified**)

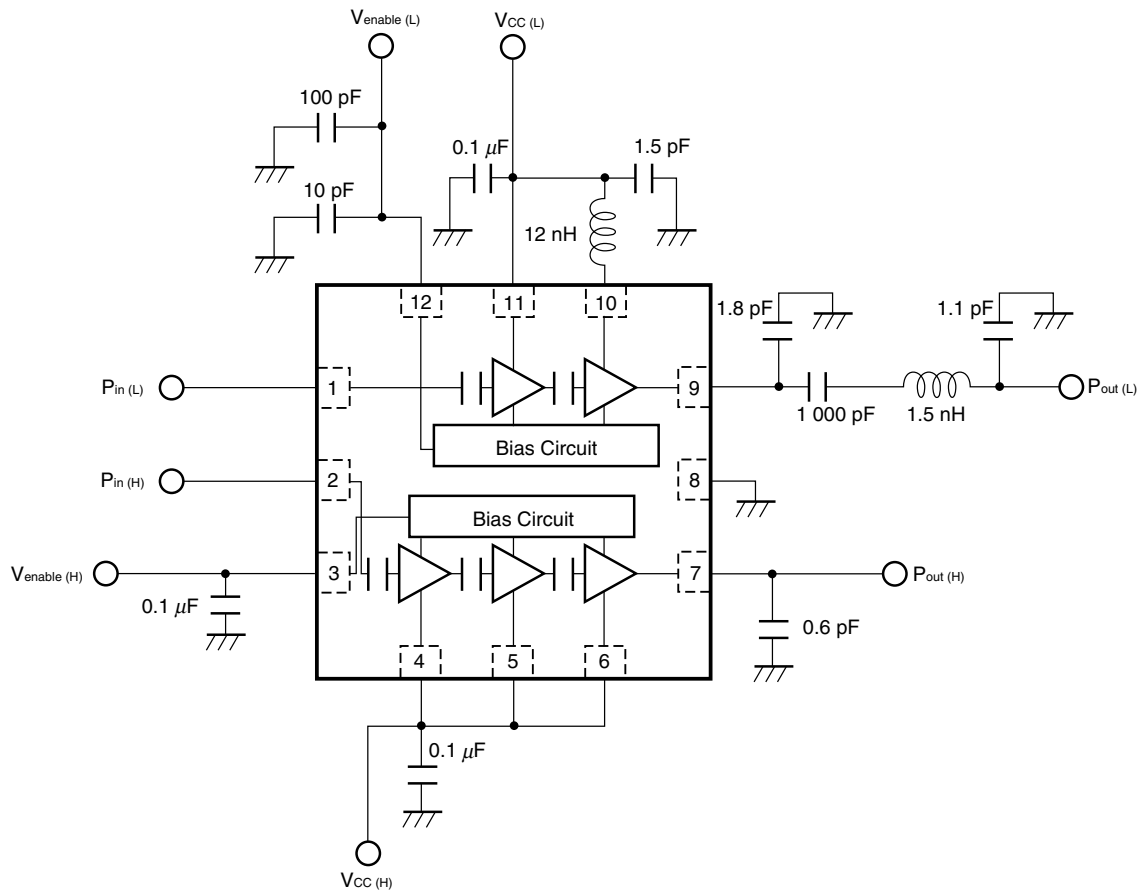
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Frequency Range	f <sub>opt</sub>		2 400	2 450	2 500	MHz
Circuit Current	I <sub>CC (L)</sub>	P <sub>out</sub> = +18 dBm	–	125	140	mA
Power Gain	G <sub>P (L)</sub>	P <sub>out</sub> = +18 dBm	26	29	–	dB
Shut down Current	I <sub>shut down (L)</sub>	V <sub>enable (L)</sub> = 0 V	–	–	0.1	μA
Error Vector Magnitude	EVM (L)	P <sub>out</sub> = +18 dBm	–	3.0	–	%
2nd Harmonics	2f <sub>0 (L)</sub>	P <sub>out</sub> = +18 dBm	–	–35	–	dBc
3rd Harmonics	3f <sub>0 (L)</sub>	P <sub>out</sub> = +18 dBm	–	–55	–	dBc
Enable Current	I <sub>enable (L)</sub>	P <sub>out</sub> = +18 dBm	–	2.5	5.0	mA
Idle Current	I <sub>q (L)</sub>	No RF input	–	65	–	mA
Output Load Mismatch	–	VSWR 1: 5 all phase	No destruction			–

**ELECTRICAL CHARACTERISTICS 2**

(**T<sub>A</sub> = +25°C, V<sub>CC (H)</sub> = 3.3 V, V<sub>enable (H)</sub> = 2.8 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 <sub>opt</sub>		4 900	5 200	5 850	MHz
Circuit Current	I <sub>CC (H)</sub>	P <sub>out</sub> = +18 dBm	–	150	180	mA
Power Gain	G <sub>P (H)</sub>	P <sub>out</sub> = +18 dBm	23	27	–	dB
Shut down Current	I <sub>shut down (H)</sub>	V <sub>enable (H)</sub> = 0 V	–	–	0.1	μA
Error Vector Magnitude	EVM (H)	P <sub>out</sub> = +18 dBm	–	4.0	–	%
2nd Harmonics	2f <sub>0 (H)</sub>	P <sub>out</sub> = +18 dBm	–	–40	–	dBc
3rd Harmonics	3f <sub>0 (H)</sub>	P <sub>out</sub> = +18 dBm	–	–45	–	dBc
Enable Current	I <sub>enable (H)</sub>	P <sub>out</sub> = +18 dBm	–	4.0	6.0	mA
Idle Current	I <sub>q (H)</sub>	No RF input	–	80	–	mA
Output Load Mismatch	–	VSWR 1: 5 all phase	No destruction			–

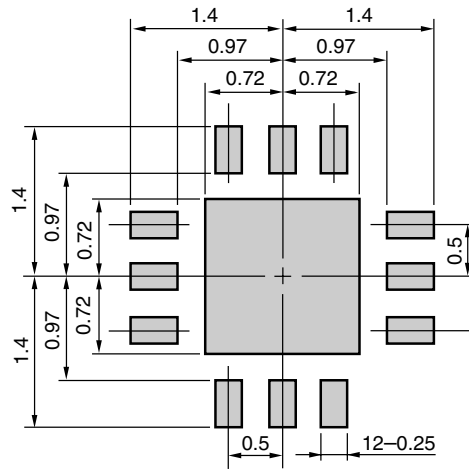
EVALUATION CIRCUIT



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

MOUNTING PAD LAYOUT DIMENSIONS

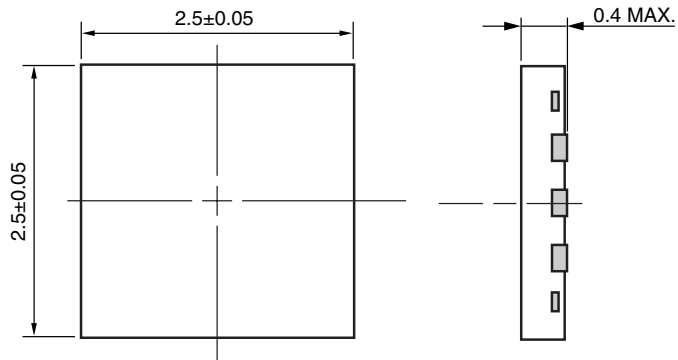
12-PIN PLASTIC TQFN (UNIT: mm)



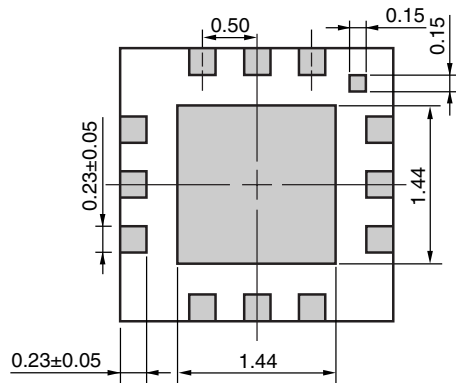
**Remark** The mounting pad layout in this document is for reference only.

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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M8E 02.11-1



<b>Caution</b>	GaAs Products	<p>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.</p> <ul style="list-style-type: none"><li>• 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.<ol style="list-style-type: none"><li>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.</li><li>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.</li></ol></li><li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li><li>• Do not lick the product or in any way allow it to enter the mouth.</li></ul>
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