

To our customers,

Old Company Name in Catalogs and Other Documents

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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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Phase-out/Discontinued

1.9 GHz POWER AMPLIFIER FOR DECT

DESCRIPTION

The μPG2255T6N is a GaAs MMIC for power amplifier for 1.9 GHz DECT use.

This device originates from the μPG2250T5N for Bluetooth™ Class 1, and is guaranteed for the performance at 1.9 GHz. High efficiency, high gain and high output power of this device is suitable for DECT use.

This device is housed in a 6-pin plastic TSON (Thin Small Out-line Non-leaded) (T6N) package. And this package is able to high-density surface mounting.

FEATURES

- Operating frequency : $f_{opt} = 1\ 880\ \text{to}\ 1\ 930\ \text{MHz}$ (1 890 MHz TYP.)
- Supply voltage : $V_{DD1, 2, 3} = 1.5\ \text{to}\ 3.5\ \text{V}$ (3.3 V TYP.)
- Control voltage : $V_{cont} = 1.5\ \text{to}\ 2.1\ \text{V}$ (1.8 V TYP.)
- Circuit current : $I_{DD} = 200\ \text{mA TYP. @ } V_{DD1, 2, 3} = 3.3\ \text{V}, V_{cont} = 1.8\ \text{V}, P_{in} = -8\ \text{dBm}$
- Output power : $P_{out} = +25\ \text{dBm TYP. @ } V_{DD1, 2, 3} = 3.3\ \text{V}, V_{cont} = 1.8\ \text{V}, P_{in} = -8\ \text{dBm}$
- Gain control range : $GCR = 60\ \text{dB TYP. @ } V_{DD1, 2, 3} = 3.3\ \text{V}, V_{cont} = 0\ \text{to}\ 1.8\ \text{V}, P_{in} = -8\ \text{dBm}$
- High efficiency : $PAE = 50\% \text{ TYP. @ } V_{DD1, 2, 3} = 3.3\ \text{V}, V_{cont} = 1.8\ \text{V}, P_{in} = -8\ \text{dBm}$
- High-density surface mounting : 6-pin plastic TSON package (T6N) (1.5 × 1.5 × 0.37 mm)

APPLICATION

- Power Amplifier for 1.9 GHz DECT

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPG2255T6N-E2	μPG2255T6N-E2-A	6-pin plastic TSON (T6N) (Pb-Free)	G5W	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • Qty 3 kpcs/reel

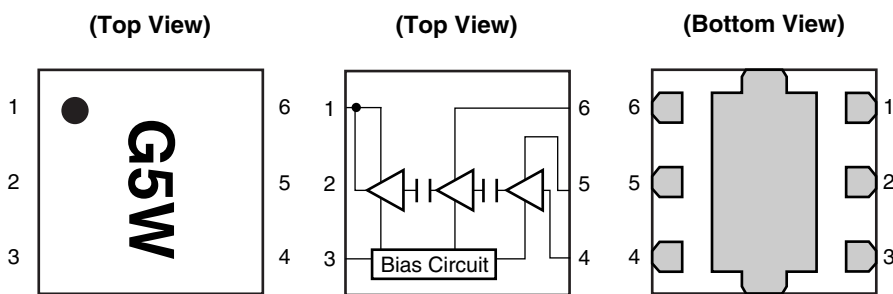
Remark To order evaluation samples, contact your nearby sales office.

Part number for sample order: μPG2255T6N

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	OUTPUT/V _{DD3}
2	N.C.
3	V _{cont}
4	INPUT
5	V _{DD1}
6	V _{DD2}

Remark Exposed pad : GND

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

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{DD1, 2, 3}	5.0	V
Control Voltage	V _{cont}	2.4	V
Circuit Current	I _{DD}	250	mA
Control Current	I _{cont}	5	mA
Input Power	P _{in}	+5	dBm
Power Dissipation	P _D	400 ^{Note}	mW
Operating Ambient Temperature	T _A	-40 to +85	°C
Storage Temperature	T _{stg}	-55 to +150	°C

Note Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C.
Power is continuously dissipated.

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

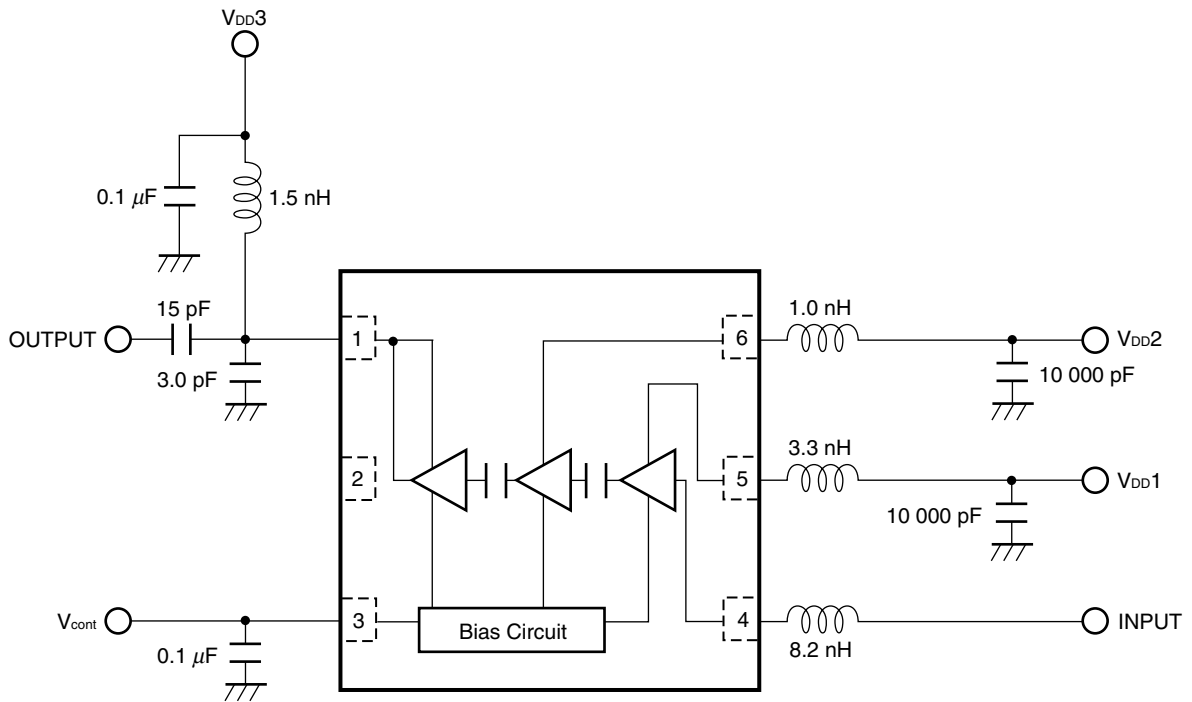
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f _{opt}	1 880	1 890	1 930	MHz
Supply Voltage	V _{DD1, 2, 3}	1.5	3.3	3.5 ^{Note}	V
Control Voltage	V _{cont}	1.5	1.8	2.1	V

Note Operation over the recommended voltage is permitted, unless circuit current and power dissipation are out of absolute maximum ratings.

ELECTRICAL CHARACTERISTICS (T_A = +25°C, V_{DD1, 2, 3} = 3.3 V, f = 1 880 to 1 930 MHz, external input and output matching, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Circuit Current	I _{DD}	V _{cont} = 1.8 V, P _{in} = -8 dBm	-	200	240	mA
Control Current	I _{cont}	V _{cont} = 1.8 V, P _{in} = -8 dBm	-	-	3	mA
Shut Down Current	I _{shut down}	V _{cont} = 0 V, RF None	-	-	5	μA
Output Power 1	P _{out1}	V _{cont} = 1.8 V, P _{in} = -8 dBm	+23	+25	-	dBm
Output Power 2	P _{out2}	V _{cont} = 0 V, P _{in} = -8 dBm	-	-35	-	dBm
Gain Control Range	GCR	V _{cont} = 0 to 1.8 V, P _{in} = -8 dBm	-	60	-	dB
Efficiency	PAE	V _{cont} = 1.8 V, P _{in} = -8 dBm	-	50	-	%
2nd Harmonics	2f ₀	V _{cont} = 1.8 V, P _{in} = -8 dBm	-	40	-	dBc

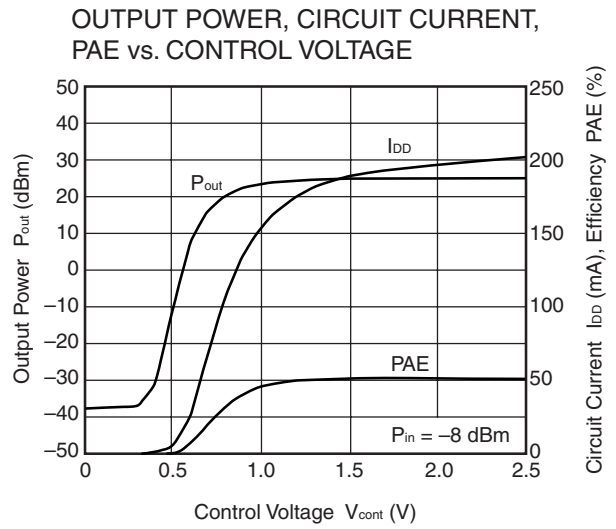
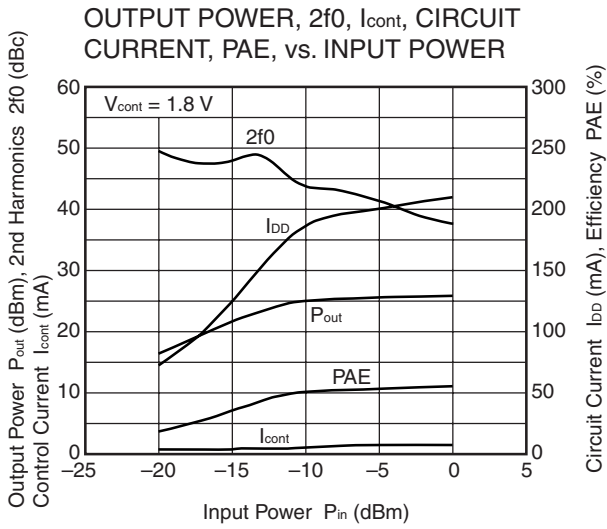
EVALUATION CIRCUIT



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

TYPICAL CHARACTERISTICS

($T_A = +25^\circ\text{C}$, $V_{DD1, 2, 3} = 3.3\text{ V}$, $f = 1.9\text{ GHz}$, with external input and output matching circuits, unless otherwise specified)

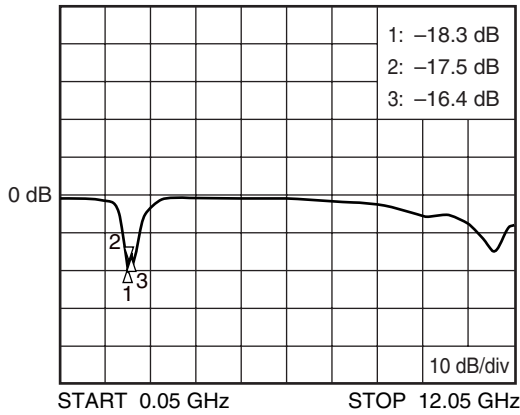


Remark The graphs indicate nominal characteristics.

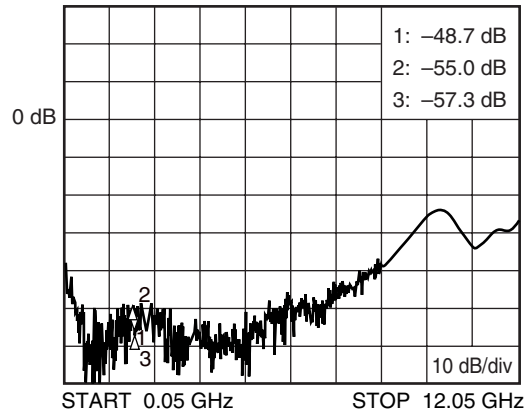
S-PARAMETERS (Reference Data) –This data is included external matching components–

Condition : $T_A = +25^\circ\text{C}$, $P_{in} = -30\text{ dBm}$, $V_{DD1, 2, 3} = 3.3\text{ V}$, $V_{cont} = 1.8\text{ V}$

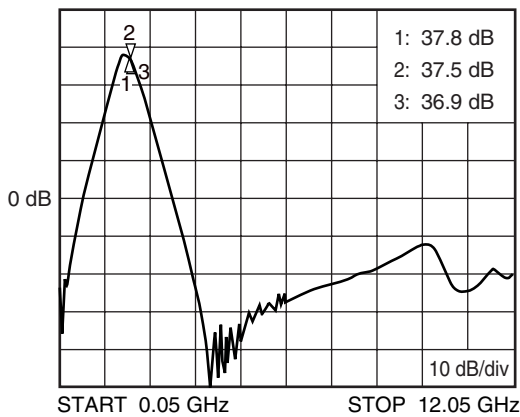
S₁₁-FREQUENCY



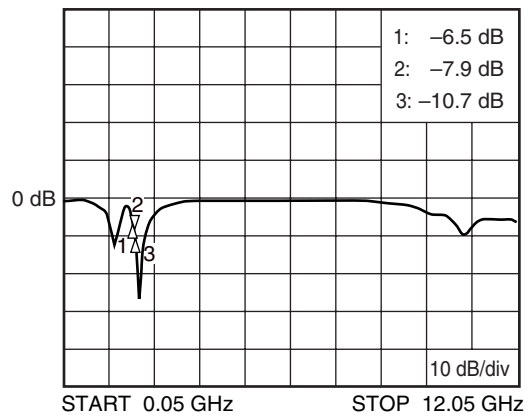
S₁₂-FREQUENCY



S₂₁-FREQUENCY



S₂₂-FREQUENCY



Remark 1. The graphs indicate nominal characteristics.

2. Marker1 : 1.88 GHz

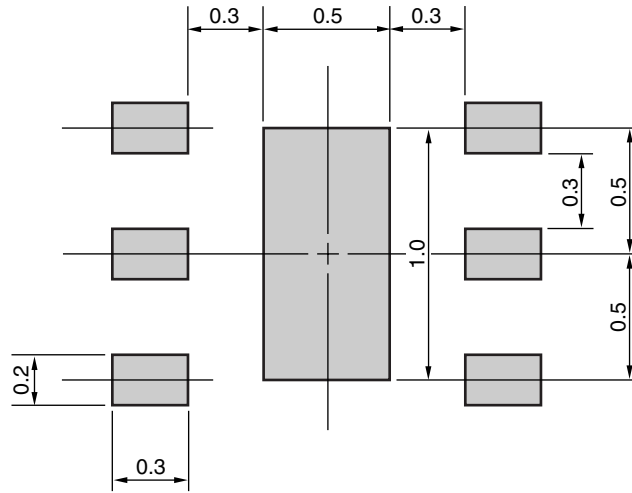
Marker2 : 1.90 GHz

Marker3 : 1.93 GHz

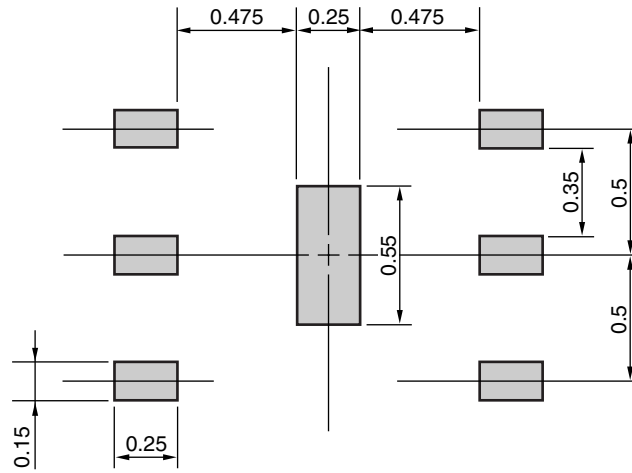
MOUNTING PAD AND SOLDER MASK LAYOUT DIMENSIONS

6-PIN PLASTIC TSON (UNIT: mm)

MOUNTING PAD



SOLDER MASK

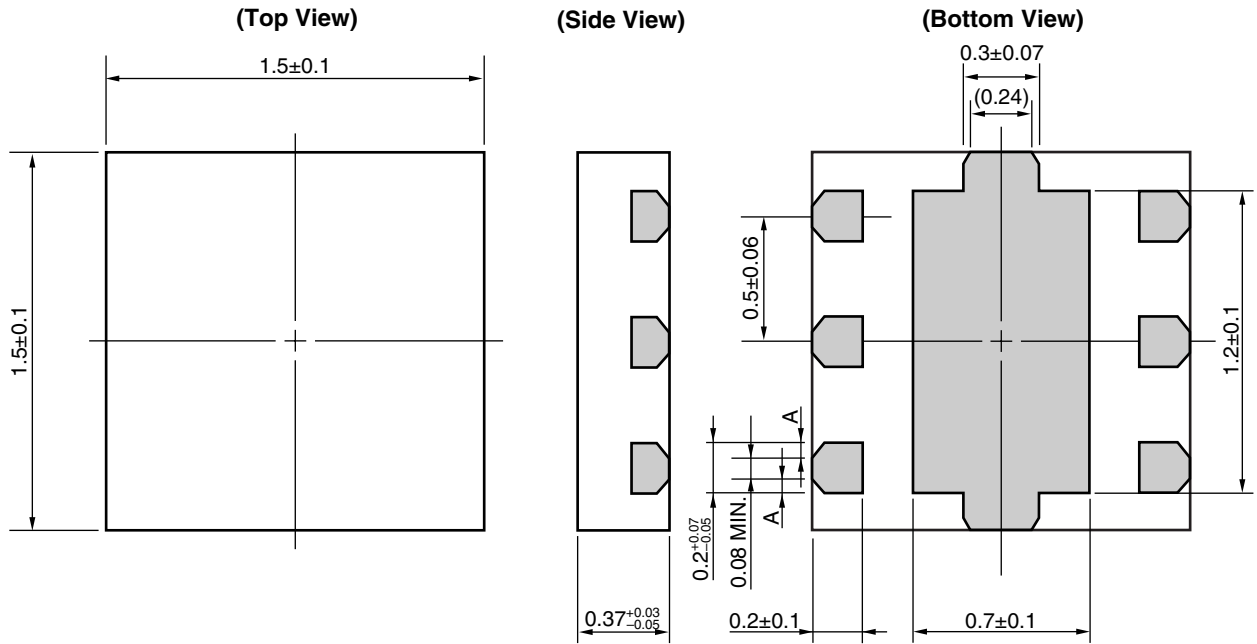


Solder thickness : 0.08 mm

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

PACKAGE DIMENSIONS

6-PIN PLASTIC TSON (T6N) (UNIT: mm)



Remark A>0
 () : Reference value

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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