

GaAs INTEGRATED CIRCUIT

μ PG100P, μ PG101P

WIDE BAND AMPLIFIER CHIPS

DESCRIPTION

μ PG100P and μ PG101P are GaAs integrated circuits designed as wide band amplifiers. Both devices are available in chip form.

μ PG100P is low noise amplifier from 50 MHz to 3 GHz and μ PG101P is a medium power amplifier in the same frequency band. These devices are most suitable for the IF stage of microwave communication system and the measurement equipment.

FEATURES

- Wide band : $f = 50 \text{ MHz to } 3 \text{ GHz}$

ORDERING INFORMATION

PART NUMBER	FORM
μ PG100P	chip
μ PG101P	chip

ABSOLUTE MAXIMUM RATINGS ($T_A = 25 \text{ }^\circ\text{C}$)

		μ PG100P	μ PG101P	
Drain Voltage	V_{DD}	+8	+10	V
Gate Voltage	V_{GG}	-8	-8	V
Input Voltage	V_{in}	-3 to +0.6	-5 to +0.6	V
Input Power	P_{in}	+15	+15	dBm
Total Power Dissipation	P_{tot}^{*1}	1.5	1.5	W
Operating Temperature	T_{opr}^{*2}	-65 to +125	-65 to +125	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +175	-65 to +175	$^\circ\text{C}$

*1 Mounted with AuSn hard solder

*2 The temperature of base material beside the chip

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)^{*3}

μPG100P (V_{DD} = +5 V, V_{GG} = -5 V)

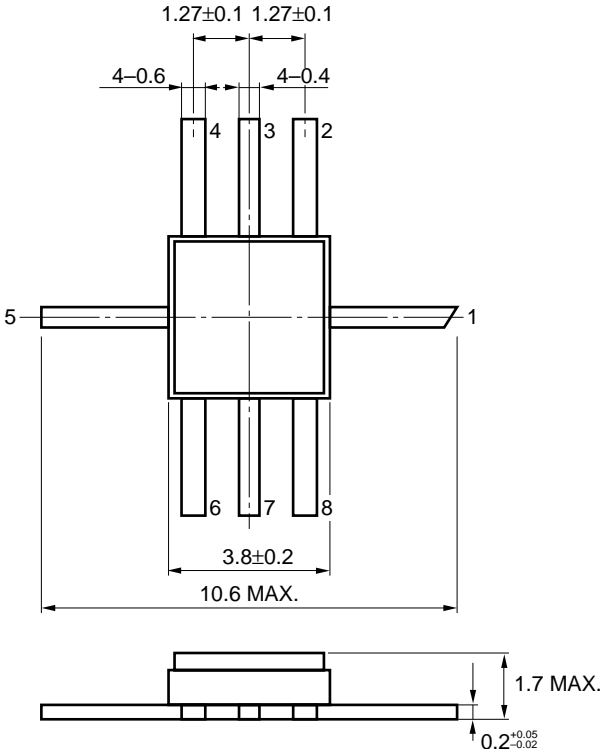
CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Current	I _{DD}	30	45	60	mA	RF OFF
Gate Current	I _{GG}		0.7	1.5	mA	
Power Gain	G _p	14	16		dB	f = 0.05 to 3 GHz
Gain Flatness	ΔG _p			±1.5	dB	
Noise Figure	NF		2.7	3.5	dB	
Input Return Loss	RL _{in}	7	10		dB	
Output Return Loss	RL _{out}	7	10		dB	
Isolation	ISOL	30	40		dB	
Output Power at 1 dB Gain Compression Point	P _{O(1 dB)}	+3	+6		dBm	

μPG101P (V_{DD} = +8 V, V_{GG} = -5 V)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Current	I _{DD}	70	100	140	mA	RF OFF
Gate Current	I _{GG}		1.0	3.0	mA	
Power Gain	G _p	12	14		dB	f = 0.05 to 3 GHz
Gain Flatness	ΔG _p			±1.5	dB	
Noise Figure	NF		5	7	dB	
Input Return Loss	RL _{in}	6	8		dB	
Output Return Loss	RL _{out}	6	8		dB	
Isolation	ISOL	30	40		dB	
Output Power at 1 dB Gain Compression Point	P _{O(1 dB)}	+16	+18		dBm	

*3 These characteristics are based on performance of devices mounted in the standard package shown in Fig. 1.

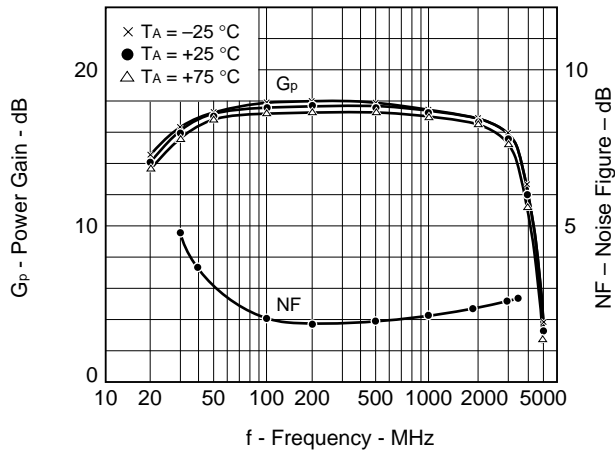
Fig. 1 8 Pin Ceramic Package



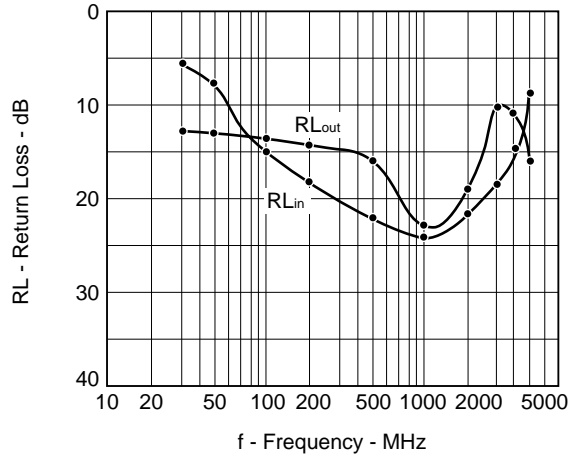
TYPICAL CHARACTERISTICS⁴

μ PG100P ($V_{DD} = +5$ V, $V_{GG} = -5$ V)

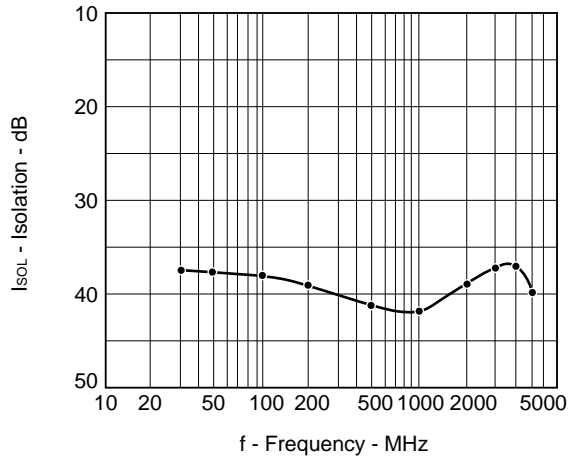
POWER GAIN AND NOISE FIGURE vs. FREQUENCY



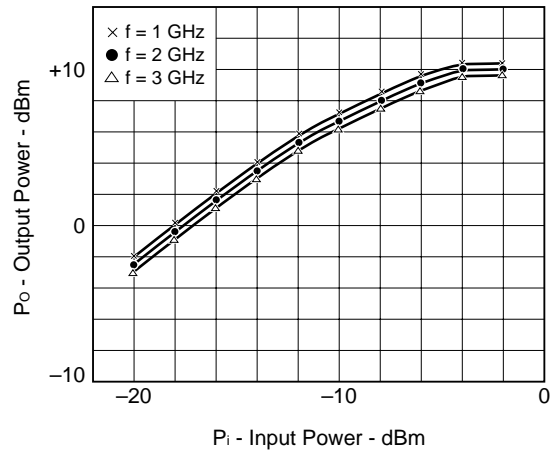
INPUT AND OUTPUT RETURN LOSS vs. FREQUENCY



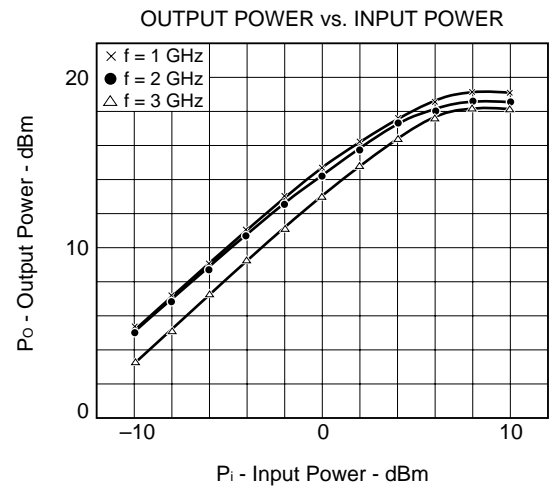
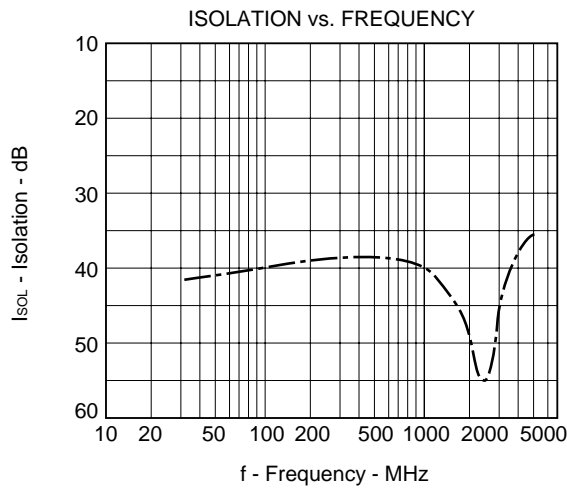
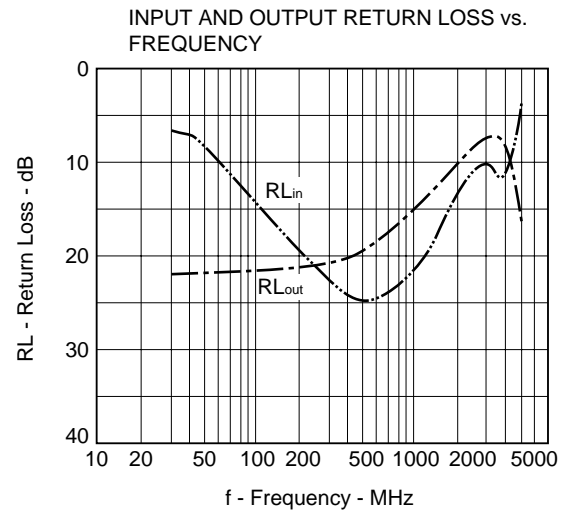
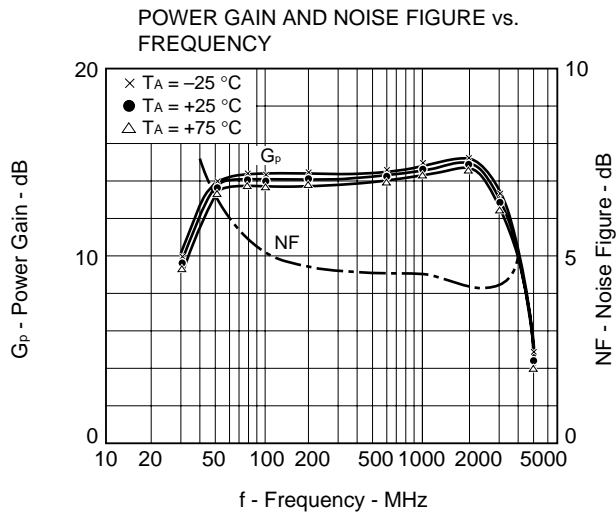
ISOLATION vs. FREQUENCY



OUTPUT POWER vs. INPUT POWER



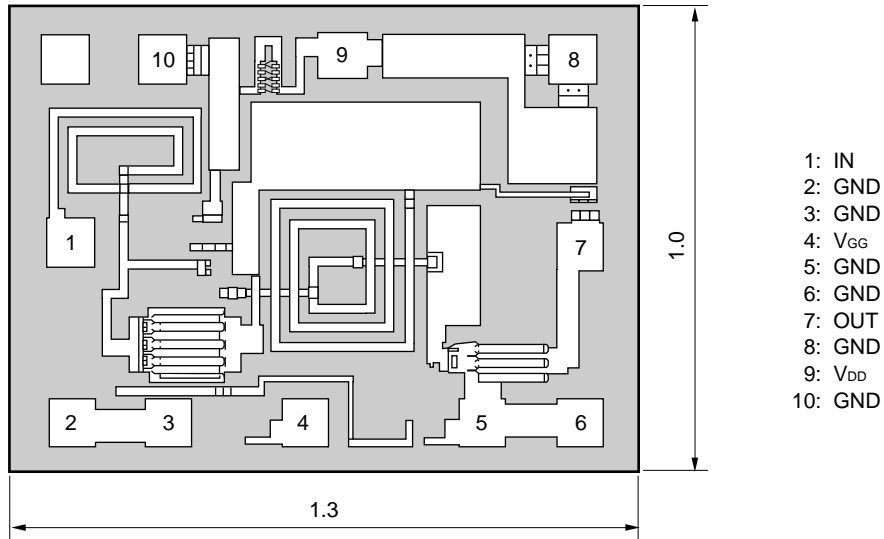
μ PG101P ($V_{DD} = +8\text{ V}$, $V_{GG} = -5\text{ V}$)



*4 These characteristics are measured for device mounted in the standard package shown in Fig. 1.

CHIP DIMENSIONS (Unit : mm)

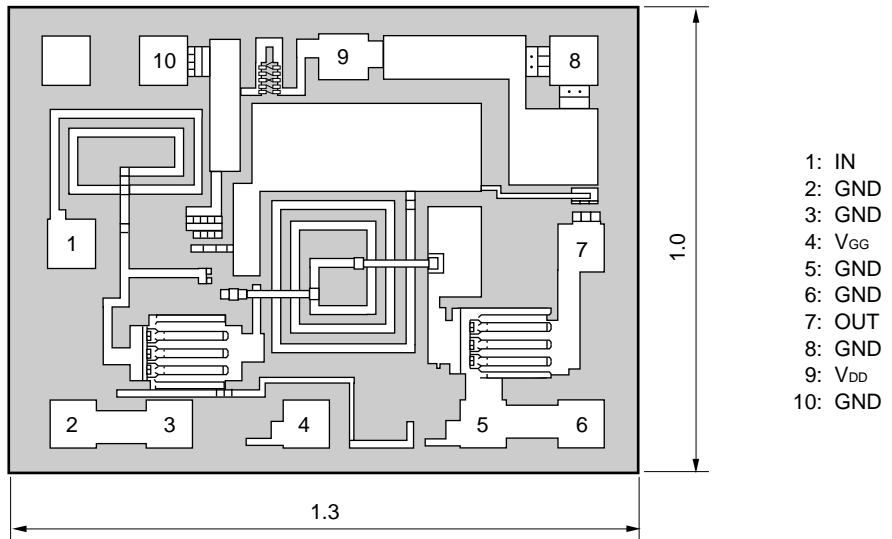
μ PG100P



- 1: IN
- 2: GND
- 3: GND
- 4: V_{GG}
- 5: GND
- 6: GND
- 7: OUT
- 8: GND
- 9: V_{DD}
- 10: GND

Bonding Pad Size: 100 μ m \times 100 μ m

μ PG101P



- 1: IN
- 2: GND
- 3: GND
- 4: V_{GG}
- 5: GND
- 6: GND
- 7: OUT
- 8: GND
- 9: V_{DD}
- 10: GND

Bonding Pad Size: 100 μ m \times 100 μ m

RECOMMENDED CHIP ASSEMBLY CONDITIONS

Die Attachment

- Atmosphere : N₂ gas
 - Temperature : 320 ±5 °C
 - AuSn Preform : 0.5 × 0.5 × 0.05^t (mm), 2 pcs.
 - * The hard solder such as AuSi or AuGe which has higher melting point than AuSn should not be used.
 - Base Material : CuW, Cu, KV
 - * Other material should not be used.
- Epoxy Die Attach is not recommended.

Bonding

- Machine : TCB
 - * USB is not recommended
- Wire : 30 μm diameter Au wire
- Temperature : 260 ±5 °C
- Strength : 31 ±3 g
- Atmosphere : N₂ gas

QUALITY ASSURANCE (Refer to GET-30116)

1. 100 % Tests

- 1-1 100 % DC and RF Probe
- 1-2 Visual Inspection
 - MIL-STD-883/Method 2010 Condition B

2. Tests on Sampling Basis

- 2-1 Bond Pull Tests (In case of recommended chip handling)
 - MIL-STD-883 Method 2011
 - 5 samples/wafer and 20 points tested
 - Accept 0/Reject 1
- 2-2 Tests in Standard Package
 - Test the electrical characteristics of chips assembled into the standard package used for μPG100B and μPG101B.
 - 5 samples/wafer tested
 - DC and RF measurement Accept 1/Reject 2

3. WARRANTY

NEC has a responsibility of quality assurance for the products within 180 days after delivered to customers where these are handled properly and stored in the desiccator with the flow of dry N₂ gas.

4. CAUTION

- 4-1 Take great care to prevent static electricity.
- 4-2 Be sure that Die Attach is performed in N₂ atmosphere.

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Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.