DATA SHEET

NEC

GaAs INTEGRATED CIRCUIT

μPG100P, μPG101P

WIDE BAND AMPLIFIER CHIPS

DESCRIPTION

μPG100P and μPG101P are GaAs integrated circuits designed as wide band amplifiers. Both devices are available in chip form.

μPG100P is low noise amplifier from 50 MHz to 3 GHz and μPG101P 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 MHz to 3 GHz

ORDERING INFORMATION

PART NUMBER	FORM
μPG100P	chip
μPG101P	chip

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

		μPG100P	μPG101P	
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	°C
Storage Temperature	T_{stg}	−65 to +175	−65 to +175	°C

***1** Mounted with AuSn hard solder

***2** The temperature of base material baside the chip

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)[*3]

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

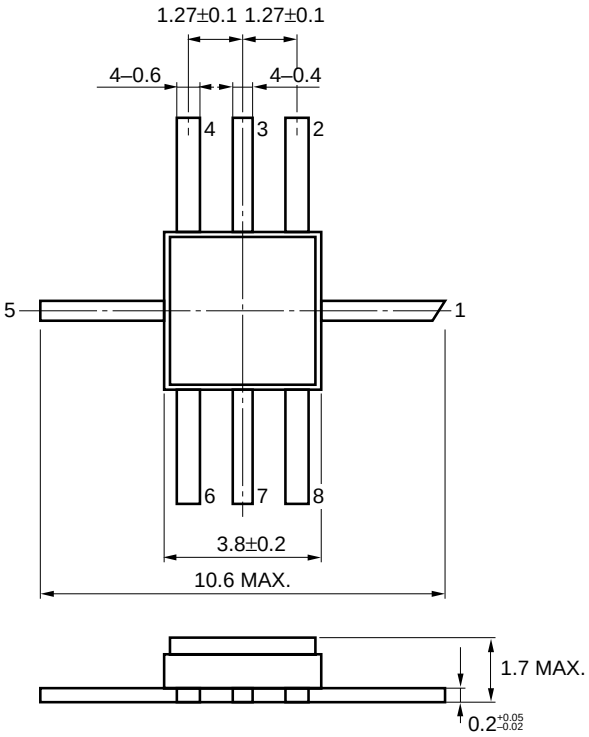
CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain Current	I_{DD}	30	45	60	mA	RF OFF
Gate Current	I_{GG}		0.7	1.5	mA	
Power Gain	Gp	14	16		dB	f = 0.05 to 3 GHz
Gain Flatness	ΔGp			±1.5	dB	
Noise Figure	NF		2.7	3.5	dB	
Input Return Loss	RL_{in}	7	10		dB	
Output Return Loss	RL_{out}	7	10		dB	
Isolation	I_{SOL}	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	Gp	12	14		dB	f = 0.05 to 3 GHz
Gain Flatness	ΔGp			±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	I_{SOL}	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.

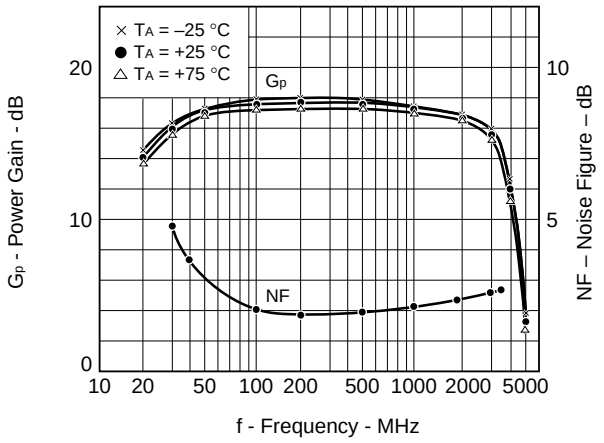
Fig. 1 8 Pin Ceramic Package



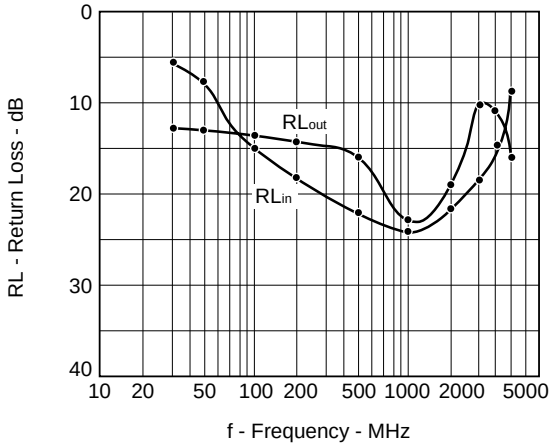
TYPICAL CHARACTERISTICS[*4]

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

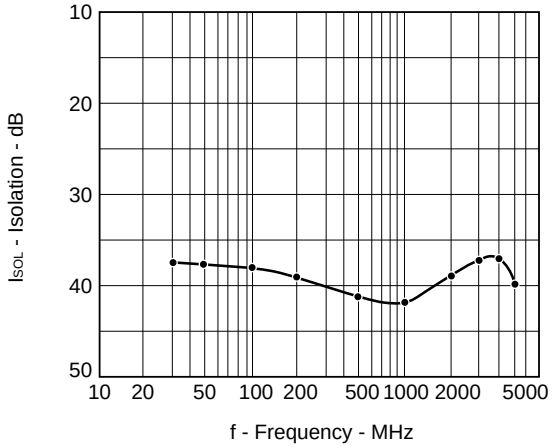
POWER GAIN AND NOISE FIGURE vs. FREQUENCY



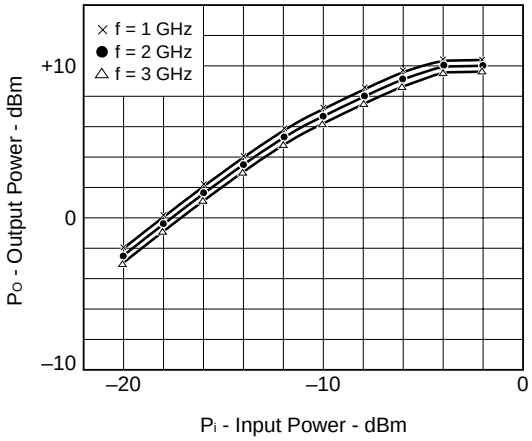
INPUT AND OUTPUT RETURN LOSS vs. FREQUENCY



ISOLATION vs. FREQUENCY

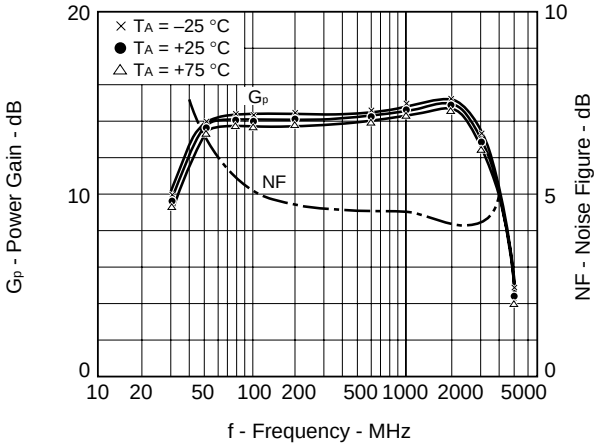


OUTPUT POWER vs. INPUT POWER

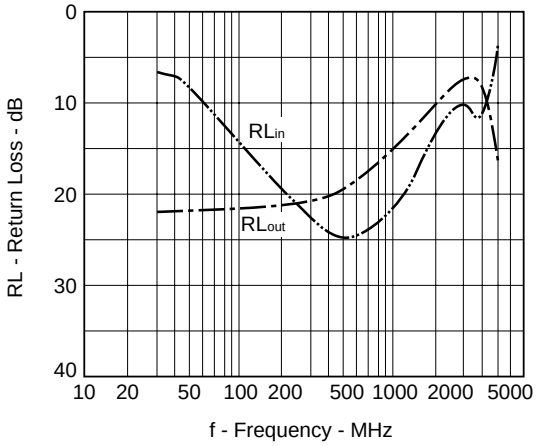


μPG101P (V_{DD} = +8 V, V_{GG} = –5 V)

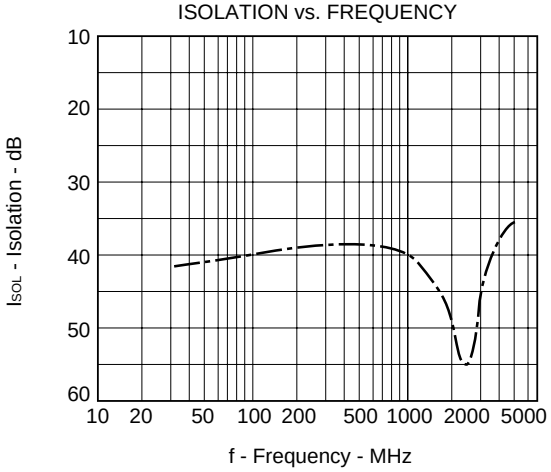
POWER GAIN AND NOISE FIGURE vs. FREQUENCY



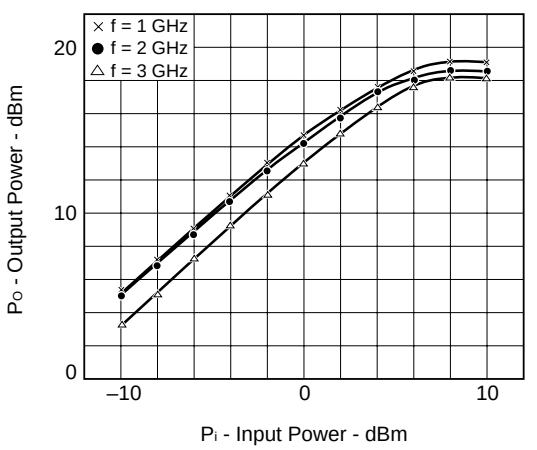
INPUT AND OUTPUT RETURN LOSS vs. FREQUENCY



ISOLATION vs. FREQUENCY



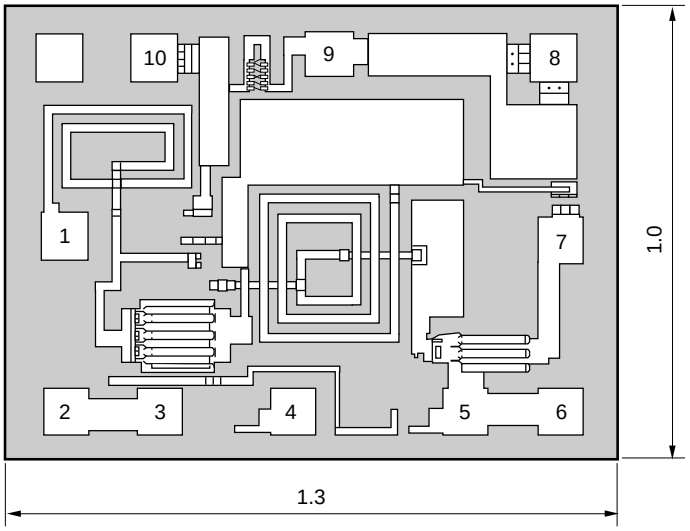
OUTPUT POWER vs. INPUT POWER



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

CHIP DIMENSIONS (Unit : mm)

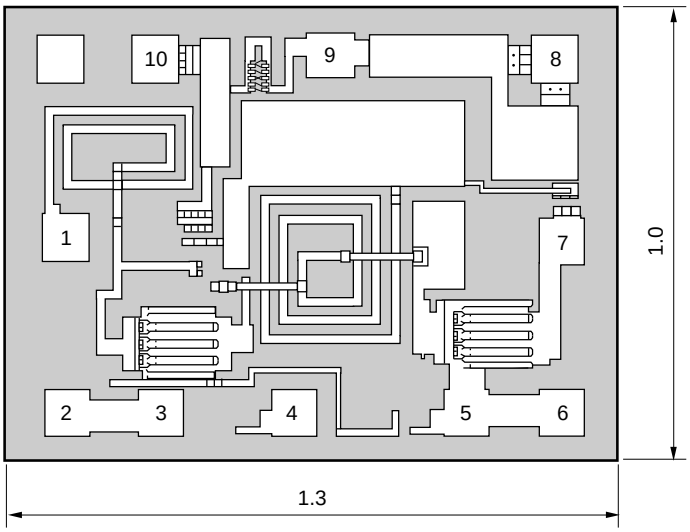
μPG100P



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 μm × 100 μm

μPG101P



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 μm ∞ 100 μm

RECOMMENDED CHIP ASSEMBLY CONDITIONS

Die Attachment

Atmosphere	:	N_2 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	:	N_2 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. WARRANTEE

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 desicater with the flow of dry N_2 gas.

4. CAUTION

4-1 Take great care to prevent static electricity.

4-2 Be sure that Die Attach is performed in N_2 atmosphere.

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