

L-Band PA DRIVER AMPLIFIER

DESCRIPTION

μ PG175TA is a GaAs MMIC for PA driver amplifier with variable gain function which was developed for PDC (Personal Digital Cellular in Japan) and another L-band application. The device can operate with 3.0 V, having the high gain and low distortion.

FEATURES

- Low Operation Voltage: $V_{DD1} = V_{DD2} = 3.0$ V
- f_{RF} : 925 to 960 MHz @ $P_{out} = +9$ dBm
- Low distortion: $P_{adj1} = -60$ dBc typ. @ $V_{DD} = 3.0$ V, $P_{out} = +9$ dBm, $V_{AGC} = 2.5$ V
External input and output matching
- Low operation Current: $I_{DD} = 20$ mA typ. @ $V_{DD} = 3.0$ V, $P_{out} = +9$ dBm, $V_{AGC} = 2.5$ V
External input and output matching
- Variable gain control function: $\Delta G = 35$ dB typ. @ $V_{AGC} = 0.5$ to 2.5 V
- 6 pin mini-mold package

APPLICATION

- Digital Cellular: PDC800M, etc.

ORDERING INFORMATION (PLAN)

PART NUMBER	PACKAGE	PACKING FORM
μ PG175TA-E3	6 pin Mini-mold	Carrier tape width is 8 mm, Quantity is 3 kpcs per reel.

Remark For sample order, please contact your local NEC sales office. (Part number for sample order: μ PG175TA)

Caution The IC must be handled with care to prevent static discharge because its circuit composed of GaAs HJ-FET.

The information in this document is subject to change without notice.

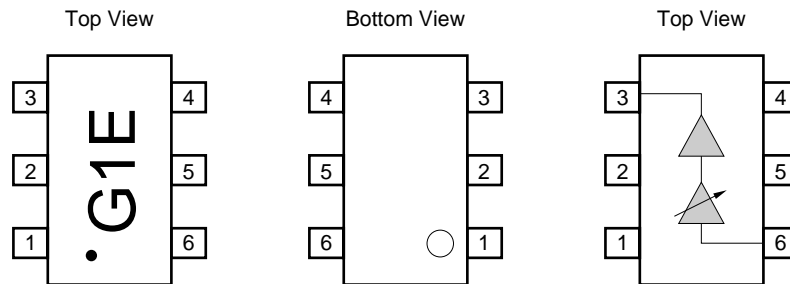
ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{DD1} , V _{DD2}	6.0	V
AGC Control Voltage	V _{AGC}	6.0	V
Input Power	P _{in}	-8	dBm
Total Power Dissipation	P _{tot}	200 ^{Note}	mW
Operating Temperature	T _A	-30 to +90	°C
Storage Temperature	T _{stg}	-35 to +150	°C

Note Mounted on a 50 × 50 × 1.6 mm double copper clad epoxy glass PWB, T_A = +85°C

PIN CONNECTION AND INTERNAL BLOCK DIAGRAM

PIN NO.	CONNECTION	PIN NO.	CONNECTION
1	V _{DD1}	4	V _{AGC}
2	GND	5	GND
3	V _{DD2} & OUT	6	IN



RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

PARAMETERS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{DD1} , V _{DD2}	+2.7	+3.0	+3.3	V
AGC Control Voltage	V _{AGC}	0.5		2.5	V
Input Power	P _{in}		-21	-17	dBm

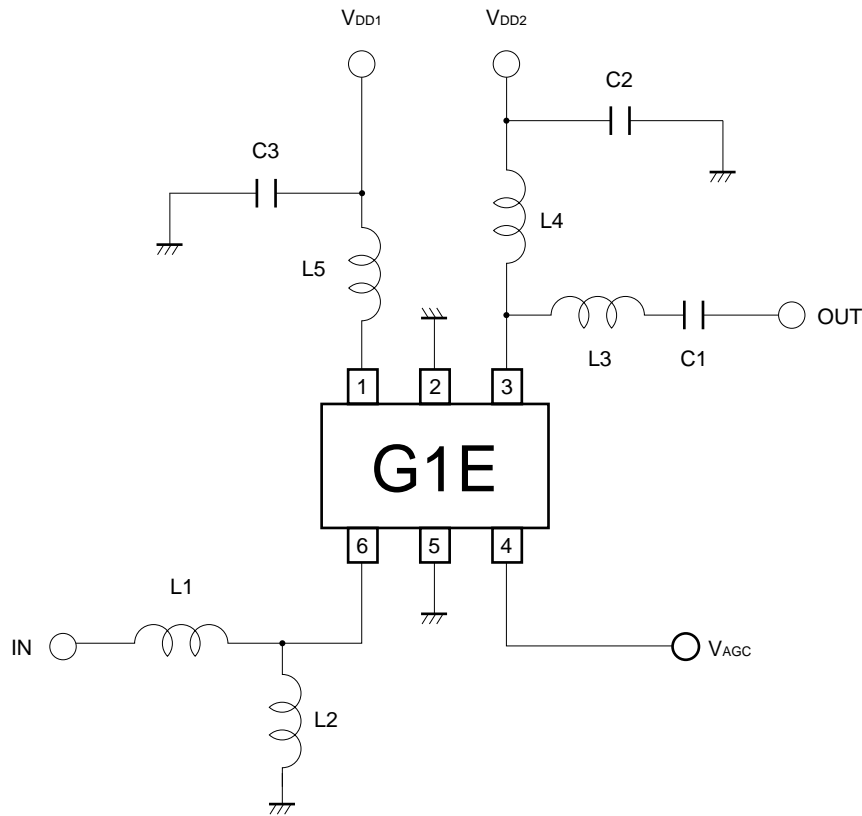
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $T_A = 25^\circ\text{C}$, $V_{DD1} = V_{DD2} = +3.0\text{ V}$, $\pi/4$ DQPSK modulated signal input, External input and output matching)

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Frequency	f		925		960	MHz
Total Current	I _{DD}	P _{in} = -21 dBm, V _{AGC} = 2.5 V		20	30	mA
AGC Control Current	I _{AGC}	V _{AGC} = 0.5 to 2.5 V		200	500	μA
Power Gain	G _p	P _{in} = -21 dBm, V _{AGC} = 2.5 V	27	30		dB
Variable Gain Range	ΔG	P _{in} = -21 dBm, V _{AGC} = 0.5 to 2.5 V	30	35		dB
Adjacent Channel Power Leakage 1	P _{adj1}	P _{out} = +9 dBm, V _{AGC} = 2.5 V Δf = ±50 kHz, 21 kHz Band Width		-60	-55	dBc
Adjacent Channel Power Leakage 2	P _{adj2}	P _{out} = +9 dBm, V _{AGC} = 2.5 V Δf = ±100 kHz, 21 kHz Band Width		-70	-65	dBc
Input Return Loss	RL _{in}	External matching		10		dB
Output Return Loss	RL _{out}	External matching		10		dB

EVALUATION CIRCUIT (Preliminary)

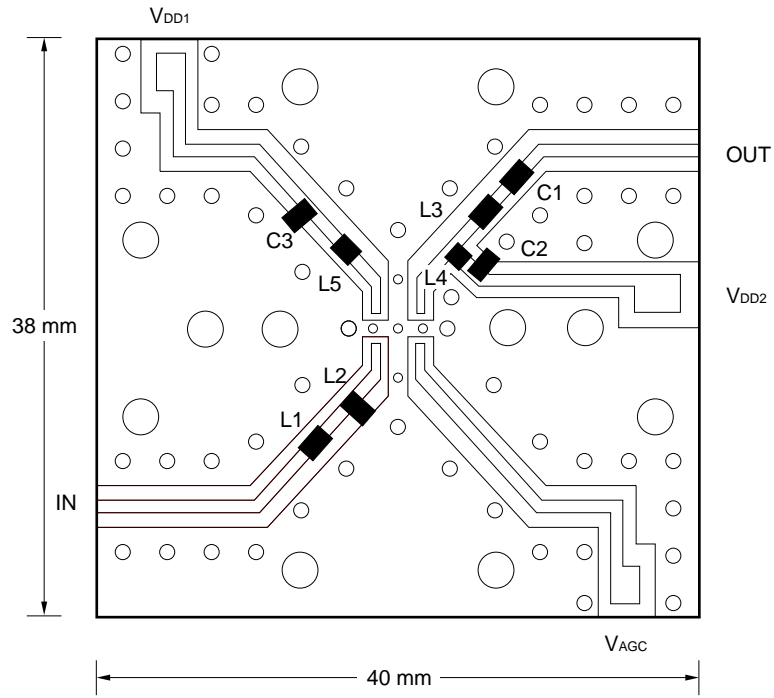
$V_{DD1} = V_{DD2} = +3.0\text{ V}$, $f = 950\text{ MHz}$



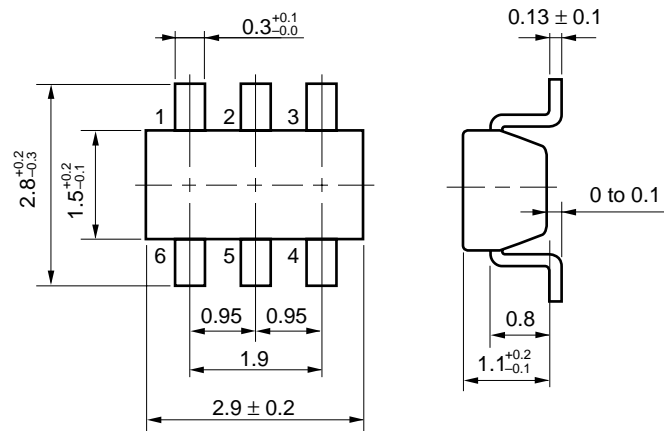
Using the NEC Evaluation board

C1	2.0 pF
C2, C3	1000 pF
L1	22 nH
L2	27 nH
L3	12 nH
L4	47 nH
L5	10 nH

EVALUATION BOARD (Epoxy Glass, $\epsilon = 4.6$, 0.4 mm thickness)



6 PIN MINI-MOLD PACKAGE DIMENSIONS (UNIT: mm)



RECOMMENDED SOLDERING CONDITIONS

This Product should be soldered in the following recommended conditions. Other soldering methods and conditions than the recommended conditions are to be consulted with our sales representatives.

Soldering process	Soldering conditions	Recommended condition symbol
Infrared ray reflow	Package peak temperature: 235°C Hour: within 30 s. (more than 210°C) Time: 3 times, Limited days: no. ^{Note}	IR35-00-3
VPS	Package peak temperature: 215°C Hour: within 40 s. (more than 200°C) Time: 3 times, Limited days: no. ^{Note}	VP15-00-3
Wave Soldering	Soldering tub temperature: less than 260°C, Hour: within 10 s. Time: 1 time, Limited days: no. ^{Note}	WS60-00-1
Pin part heating	Pin area temperature: less than 300°C, Hour: within 3 s. Limited days: no. ^{Note}	

Note It is the storage days after opening a dry pack, the storage conditions are 25°C, less than 65%, RH.

Caution The combined use of soldering method is to be avoided (However, except the pin area heating method).

For details of recommended soldering conditions for surface mounting, refer to information document **SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535E)**.

[MEMO]

Caution

**The Great Care must be taken in dealing with the devices in this guide.
The reason is that the material of the devices is GaAs (Gallium Arsenide), which is
designated as harmful substance according to the law concerned.
Keep the law concerned and so on, especially in case of removal.**

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

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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

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.