

L-BAND PA DRIVER AMPLIFIER

DESCRIPTION

The μPG173TA is L-Band PA driver amplifier developed for digital cellular telephone and PCS applications. This device feature high output power and low distortion with 2.8 V low voltage and 25 mA low current operation. It is housed in a very small 6 pin mini-mold package available on tape-and-reel and easy to install and contributes to miniaturizing the systems.

FEATURES

- Low Operation Voltage : $V_{DD} = 2.8\text{ V}$
- Low distortion : $P_{adj1} = -60\text{ dBc typ. @ } V_{DD} = 2.8\text{ V, } f_{RF} = 925\text{ to } 960\text{ MHz, } P_{out} = +9\text{ dBm}$
External output matching
- Low operation Current : $I_{DD} = 25\text{ mA typ. @ } V_{DD} = 2.8\text{ V, } f_{RF} = 925\text{ to } 960\text{ MHz, } P_{out} = +9\text{ dBm}$
External output matching
- 6 pin mini-mold package

APPLICATION

- Digital Cellular: PDC, GSM, IS-95, IS-136, PCS etc.

ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING FORM
μPG173TA-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: μPG173TA)

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

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	6.0	V
Input Power	P_{in}	-8	dBm
Total Power Dissipation	P_{tot}	170 ^{Note}	mW
Operating Temperature	T_A	-30 to +90	°C
Storage Temperature	T_{stg}	-35 to +150	°C

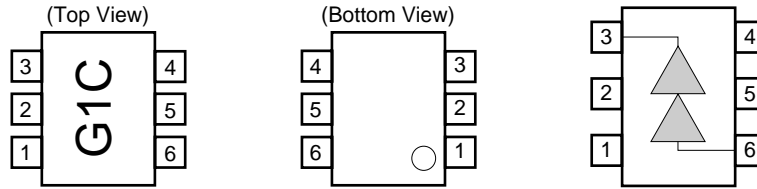
Note Mounted on a $50 \times 50 \times 1.6\text{ mm}$ double copper clad epoxy glass PWB, $T_A = +85^\circ\text{C}$

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.

PIN CONNECTION AND INTERNAL BLOCK DIAGRAM

Pin No.	Connection	Pin No.	Connection
1	V _{DD1}	4	Non Connection
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 1, 2	V _{DD1, 2}	+2.7	+2.8	+3.0	V
Input Power	P _{in}		-18		dBm

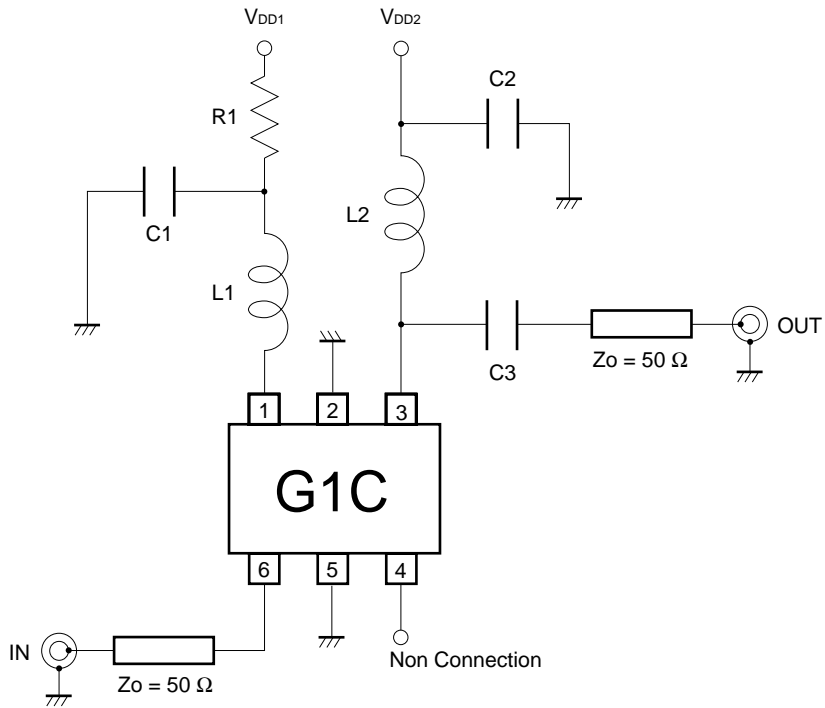
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, T_A = 25°C, V_{DD1} = V_{DD2} = +2.8 V, π/4QPSK modulated signal input, External output matching)

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Frequency	f		925		960	MHz
Linear Gain	G _L	P _{in} = -18 dBm	27	28.5		dB
Total Current	I _{DD}	P _{in} = -18 dBm		25	30	mA
Adjacent Channel Power Leakage 1	P _{adj1}	P _{out} = +9 dBm, Δf = ±50 kHz		-60	-55	dBc
Adjacent Channel Power Leakage 2	P _{adj2}	P _{out} = +9 dBm, Δf = ±100 kHz		-65	-60	dBc
Input Return Loss	RL _{in}			10		dB
Output Return Loss	RL _{out}	External matching		10		dB

EVALUATION CIRCUIT (Preliminary)

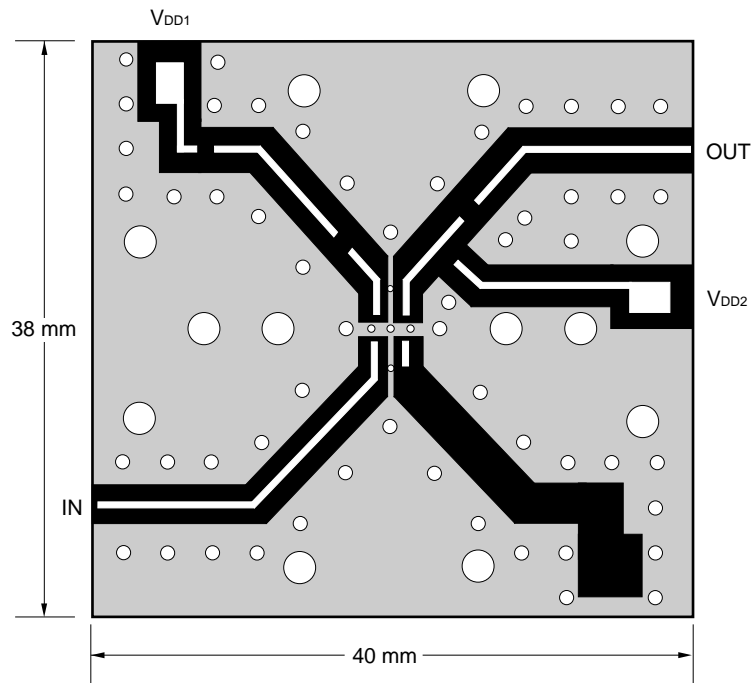
$V_{DD1} = V_{DD2} = +2.8\text{ V}$, $f = 925\text{ to }960\text{ MHz}$



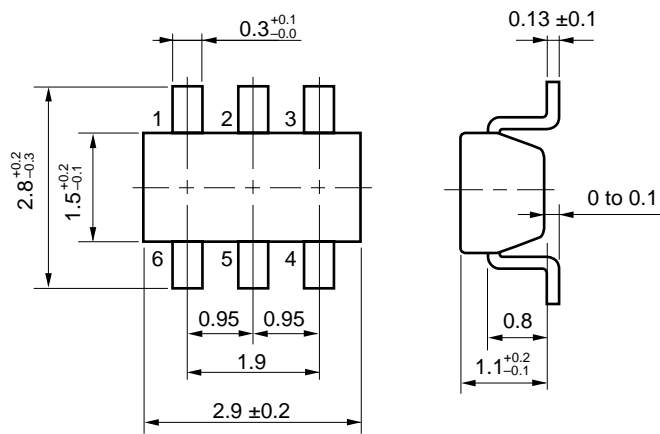
Using the NEC Evaluation board

C1, C2	1000 pF
C3	2.0 pF
R1	10 Ω
L1	8.2 nH
L2	10 nH

EVALUATION BOARD (Epoxy Glass, ε = 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]

[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.

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.

NEC devices are classified into the following three quality grades:

"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

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.

The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

Anti-radioactive design is not implemented in this product.