NEC

GaAs INTEGRATED CIRCUIT
μPG174TA

L-BAND PA DRIVER AMPLIFIER

DESCRIPTION

The μPG174TA 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 35 mA low current operation. It is housed in a very small 6-pin minimold package available on tape-and-reel and easy to install and contributes to miniaturizing the systems.

FEATURES

- Low operation voltage : V_{DD} = 2.8 V
- Low distortion : P_{adj1} = –60 dBc TYP. @ V_{DD} = 2.8 V, f_{RF} = 1 429 to 1 453 MHz, P_{out} = +10 dBm
  Off-chip input and output matching
- Low operation current : I_{DD} = 35 mA TYP. @ V_{DD} = 2.8 V, f_{RF} = 1 429 to 1 453 MHz, P_{out} = +10 dBm
  Off-chip input and output matching
- 6-pin minimold package

APPLICATION

- Digital Cellular: PDC1.5G, DCS1800, PCS, etc.

ORDERING INFORMATION

Part Number	Package	Supplying Form
μPG174TA-E3	6-pin minimold	Carrier tape width is 8 mm. Qty 3kp/reel.

Remark To order evaluation samples, please contact your local NEC sales office. (Part number for sample order: μPG174TA)

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C)

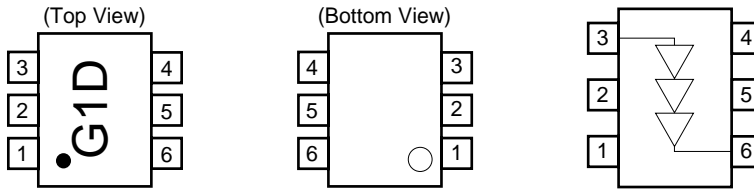| Parameters	Symbol	Ratings	Unit
Supply Voltage	V_{DD}	6.0	V
Input Power	P_{in}	–10	dBm
Total Power Dissipation	P_{tot}	170[Note]	mW
Operating Ambient Temperature	T_A	–30 to +90	°C
Storage Temperature	T_{stg}	–35 to +150	°C

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

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

The mark ★ shows major revised points.

PIN CONNECTION AND INTERNAL BLOCK DIAGRAM

Pin No.	Connection
1	GND
2	GND
3	IN
4	V_{DD1}
5	GND
6	V_{DD2} & OUT

(Top View)   (Bottom View)

★ 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}	–	−22	−20	dBm

★ ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, T$_A$ = +25°C, V$_{DD1}$ = V$_{DD2}$ = +2.8 V, *π*/4DQPSK modulated signal input, off-chip input and output matching)

| Parameters	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Operating Frequency	f		1 429	–	1 453	MHz
Power Gain	G_P	P_{in} = −22 dBm	32.0	34.0	–	dB
Total Current	I_{DD}	P_{in} = −22 dBm	–	35	40	mA
Adjacent Channel Power Leakage 1	P_{adj1}	P_{out} = +10 dBm, Δf = ±50 kHz	–	−60	−55	dBc
Adjacent Channel Power Leakage 2	P_{adj2}	P_{out} = +10 dBm, Δf = ±100 kHz	–	−65	−60	dBc

★ REFERENCE CHARACTERISTICS
(Unless otherwise specified, T$_A$ = +25°C, V$_{DD1}$ = V$_{DD2}$ = +2.8 V, f = 1 429 to 1 453 MHz, off-chip input and output matching)

Parameters	Symbol	MIN.	TYP.	MAX.	Unit
Input Return Loss	RL_{in}	–	10	–	dB
Output Return Loss	RL_{out}	–	10	–	dB

EVALUATION CIRCUIT

V$_{DD1}$ = V$_{DD2}$ = +2.8 V, f = 1 429 to 1 453 MHz
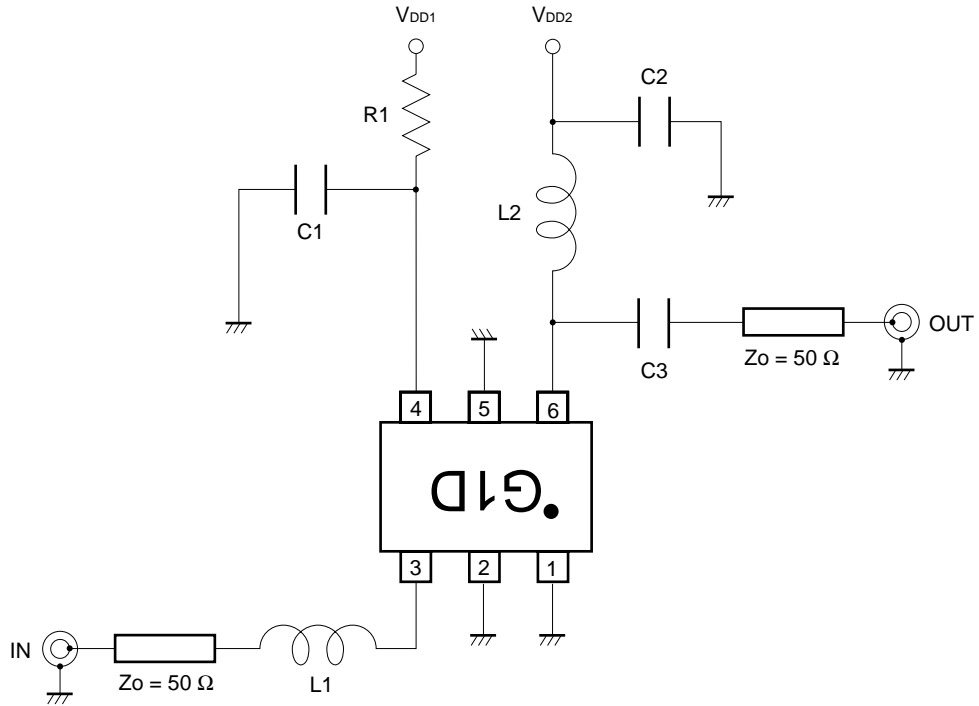
Using the NEC Evaluation board

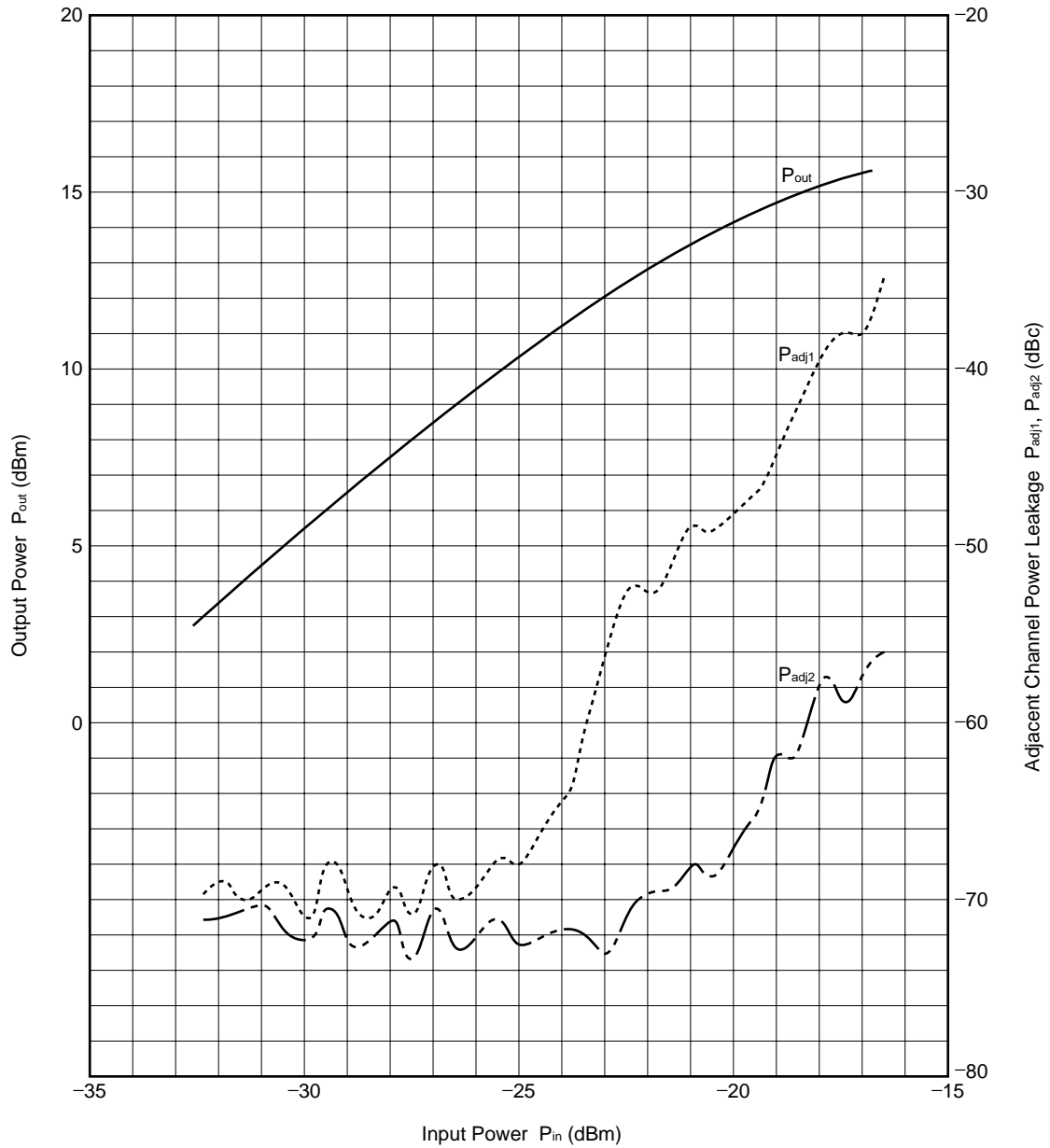| Parts List	Value
C1, C2	1 000 pF
C3	2.0 pF
R1	10 Ω
L1	6.8 nH
L2	3.3 nH

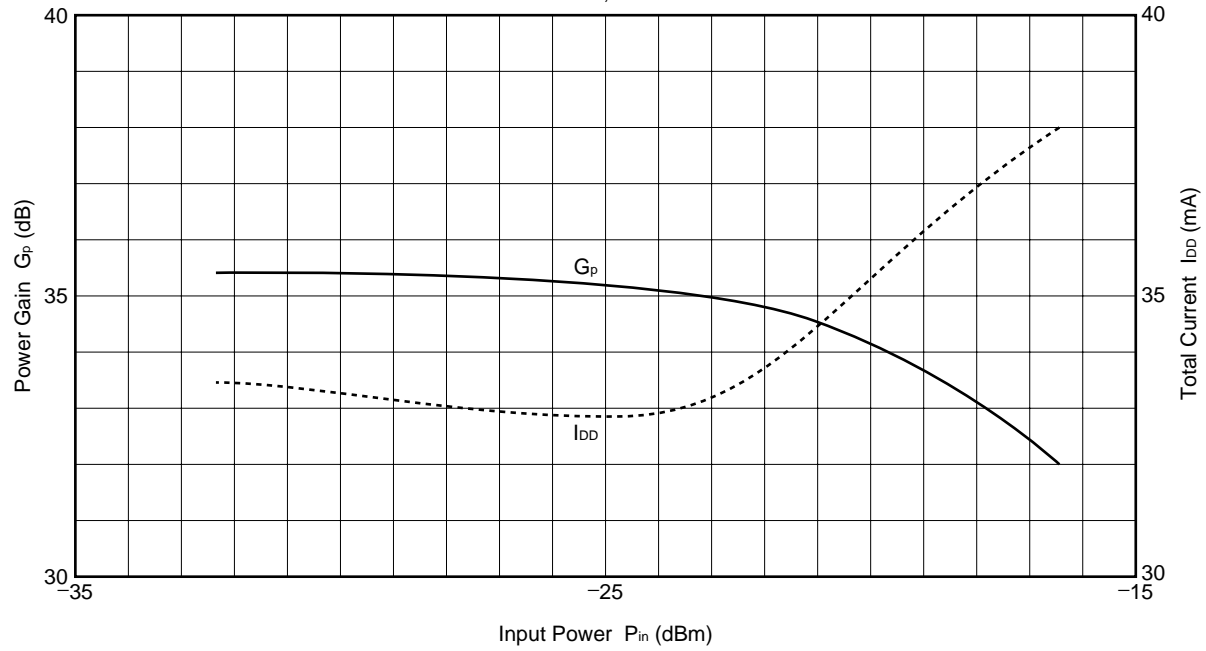**EVALUATION BOARD (Epoxy Glass, ε = 4.6, 0.4 mm thickness)**
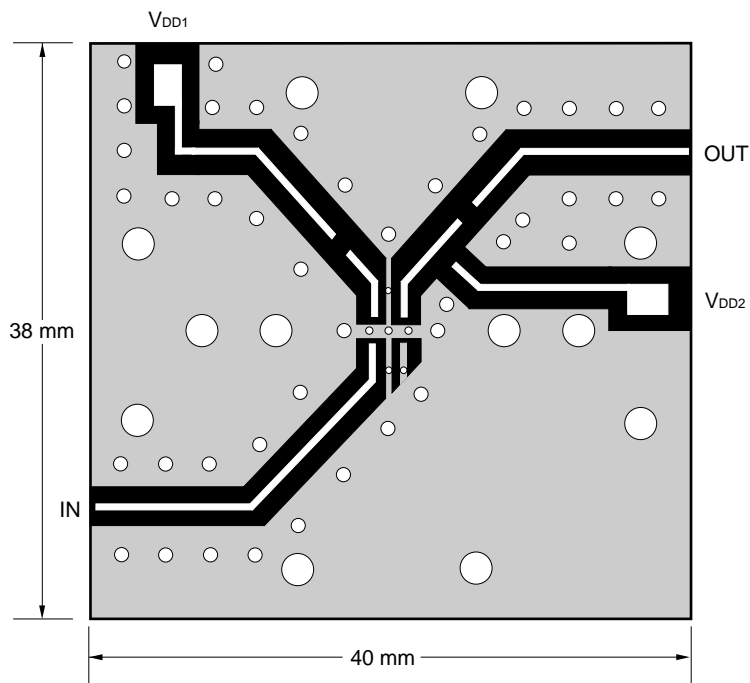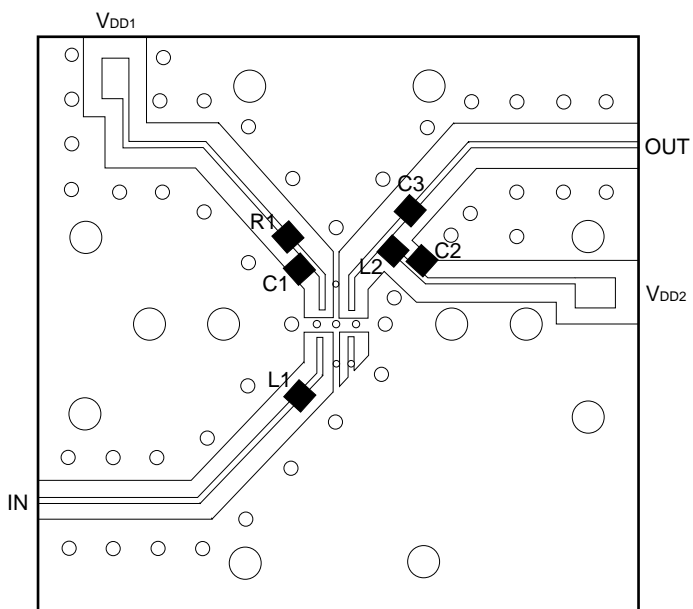
★   **TYPICAL CHARACTERISTICS**

OUTPUT POWER AND ADJACENT CHANNEL POWER LEAKAGE vs. INPUT POWER
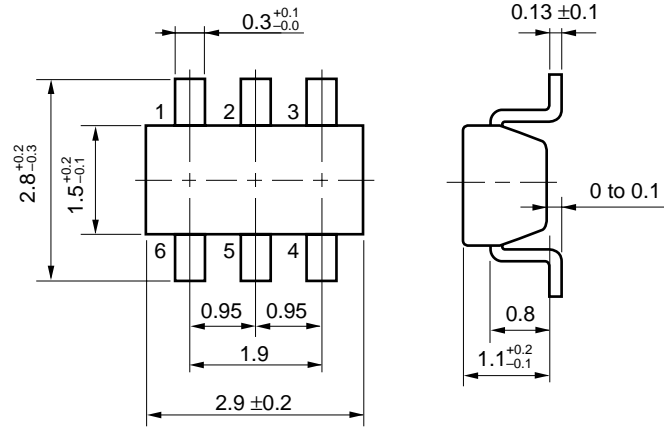@V_{DD} = +2.8 V, f = 1 450 MHz

★

POWER GAIN AND TOTAL CURRENT vs. INPUT POWER
@V$_{DD}$ = −2.8 V, f = 1 450 MHz

PACKAGE DIMENSIONS

6 PIN MINIMOLD PACKAGE (UNIT: mm)

$0.3^{+0.1}_{-0.0}$

0.13 ± 0.1

1   2   3

$2.8^{+0.2}_{-0.3}$

$1.5^{+0.2}_{-0.1}$

6   5   4

0 to 0.1

0.95   0.95

1.9

0.8

$1.1^{+0.2}_{-0.1}$

2.9 ±0.2

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your NEC sales representative.

Soldering Method	Soldering Conditions	Recommended Condition Symbol
Infrared Reflow	Package peak temperature: 235°C or below Time: 30 seconds or less (at 210°C) Count: 3, Exposure limit: None[Note]	IR35-00-3
VPS	Package peak temperature: 215°C or below Time: 40 seconds or less (at 200°C) Count: 3, Exposure limit: None[Note]	VP15-00-3
Wave Soldering	Soldering bath temperature: 260°C or below Time: 10 seconds or less Count: 1, Exposure limit: None[Note]	WS60-00-1
Partial Heating	Pin temperature: 300°C Time: 3 seconds or less (per side of device) Exposure limit: None[Note]	–

Note After opening the dry pack, keep it in a place below 25°C and 65% RH for the allowable storage period.

Caution   Do not use different soldering methods together (except for partial heating).

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

[MEMO]

[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.