

### L-BAND PA DRIVER AMPLIFIER

#### DESCRIPTION

The  $\mu$ PG173TA 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 :  $V_{DD} = 2.8$  V
- Low distortion :  $P_{adj1} = -60$  dBc typ. @  $V_{DD} = 2.8$  V,  $f_{RF} = 925$  to  $960$  MHz,  $P_{out} = +9$  dBm  
External output matching
- Low operation Current :  $I_{DD} = 25$  mA typ. @  $V_{DD} = 2.8$  V,  $f_{RF} = 925$  to  $960$  MHz,  $P_{out} = +9$  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                                             |
|------------------|-----------------|----------------------------------------------------------|
| $\mu$ PG173TA-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:  $\mu$ PG173TA)

#### 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 <sup>Note</sup> | mW               |
| Operating Temperature   | $T_A$     | -30 to +90          | $^\circ\text{C}$ |
| Storage Temperature     | $T_{stg}$ | -35 to +150         | $^\circ\text{C}$ |

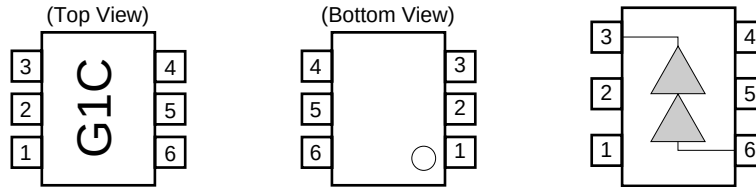
**Note** Mounted on a  $50 \times 50 \times 1.6$  mm double copper clad epoxy glass PWB,  $T_A = +85^\circ\text{C}$

**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 <sub>DD1</sub>       | 4       | Non Connection |
| 2       | GND                    | 5       | GND            |
| 3       | V <sub>DD2</sub> & OUT | 6       | IN             |

RECOMMENDED OPERATING CONDITIONS ( $T_A = 25^\circ\text{C}$ )

| PARAMETERS          | SYMBOL              | MIN. | TYP. | MAX. | UNIT |
|---------------------|---------------------|------|------|------|------|
| Supply Voltage 1, 2 | V <sub>DD1, 2</sub> | +2.7 | +2.8 | +3.0 | V    |
| Input Power         | P <sub>in</sub>     |      | -18  |      | dBm  |

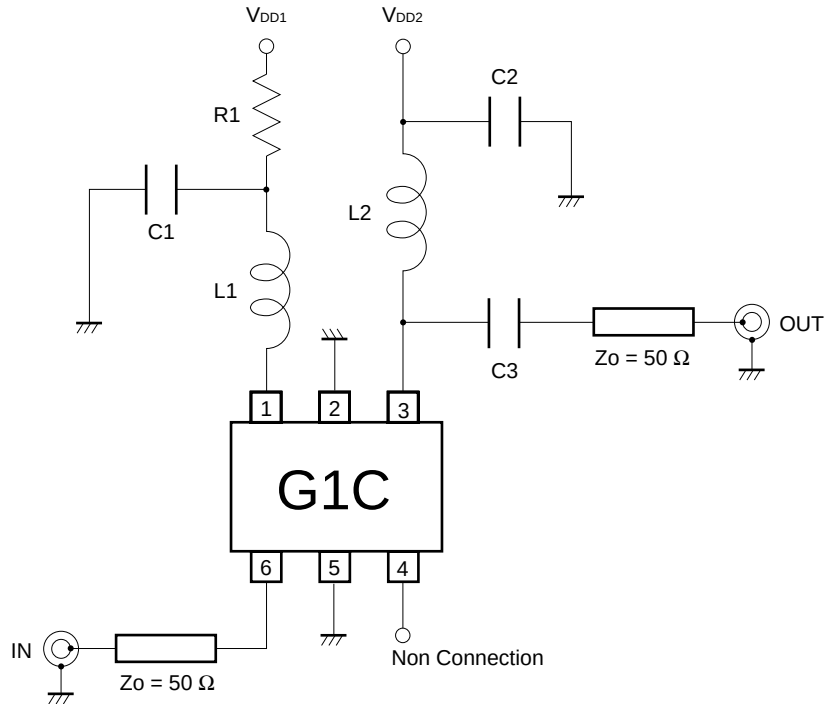
## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,  $T_A = 25^\circ\text{C}$ , V<sub>DD1</sub> = V<sub>DD2</sub> = +2.8 V,  $\pi$ 4DQPSK modulated signal input, External output matching)

| PARAMETERS                       | SYMBOL            | TEST CONDITIONS                                     | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|-------------------|-----------------------------------------------------|------|------|------|------|
| Operating Frequency              | f                 |                                                     | 925  |      | 960  | MHz  |
| Linear Gain                      | G <sub>L</sub>    | P <sub>in</sub> = -18 dBm                           | 27   | 28.5 |      | dB   |
| Total Current                    | I <sub>DD</sub>   | P <sub>in</sub> = -18 dBm                           |      | 25   | 30   | mA   |
| Adjacent Channel Power Leakage 1 | P <sub>adj1</sub> | P <sub>out</sub> = +9 dBm, $\Delta f = \pm 50$ kHz  |      | -60  | -55  | dBc  |
| Adjacent Channel Power Leakage 2 | P <sub>adj2</sub> | P <sub>out</sub> = +9 dBm, $\Delta f = \pm 100$ kHz |      | -65  | -60  | dBc  |
| Input Return Loss                | RL <sub>in</sub>  |                                                     |      | 10   |      | dB   |
| Output Return Loss               | RL <sub>out</sub> | External matching                                   |      | 10   |      | dB   |

**EVALUATION CIRCUIT (Preliminary)**

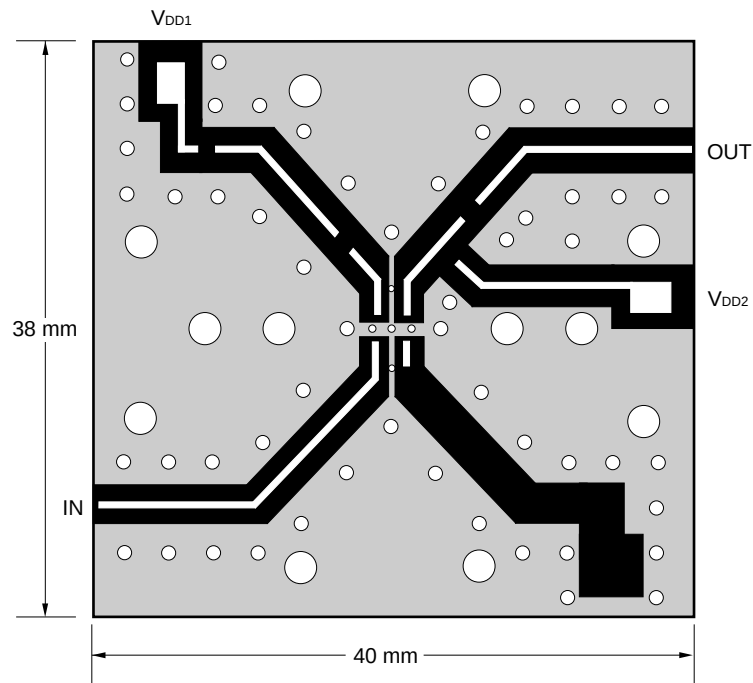
$V_{DD1} = V_{DD2} = +2.8 \text{ V}$ ,  $f = 925 \text{ to } 960 \text{ MHz}$



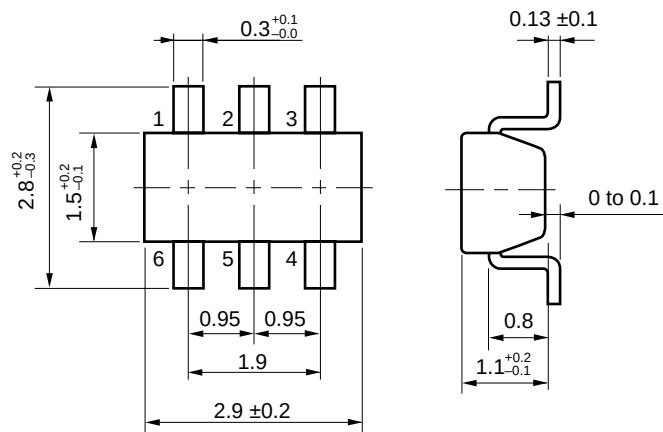
Using the NEC Evaluation board

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

EVALUATION BOARD (Epoxy Glass,  $\varepsilon = 4.6$ , 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<br>Hour: within 30 s. (more than 210°C)<br>Time: 3 times, Limited days: no. <sup>Note</sup> | IR35-00-3                    |
| VPS                 | Package peak temperature: 215°C<br>Hour: within 40 s. (more than 200°C)<br>Time: 3 times, Limited days: no. <sup>Note</sup> | VP15-00-3                    |
| Wave Soldering      | Soldering tub temperature: less than 260°C, Hour: within 10 s.<br>Time: 1 time, Limited days: no. <sup>Note</sup>           | WS60-00-1                    |
| Pin part heating    | Pin area temperature: less than 300°C, Hour: within 3 s.<br>Limited days: no. <sup>Note</sup>                               |                              |

**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)**.

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## 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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Anti-radioactive design is not implemented in this product.