

## 2W Self-Bias and Prematched GaAs Power PHEMTs using SMT package

### FEATURES

- Prematched for 5~8 GHz
- 2W Typical Output Power at 5~8GHz
- 7.5dB Typical Linear Power Gain at 8GHz
- High Linearity: IP3 = 43 dBm Typical at 5~8GHz
- High Power Added Efficiency: Nominal PAE of 35% at 5~8GHz
- Breakdown Voltage:  $BV_{DGO} \geq 18V$
- $W_g = 5.0$  mm
- 100 % DC Tested
- Suitable for High Reliability Application
- Lost Cost SMT Ceramic Package

### DESCRIPTION

The TC3963 is a self-bias and prematched GaAs PHEMT. It is designed for use in low cost, high volume, and 5~8 GHz 2W amplifiers. It provides a typical gain of 7.5dB and P1dB of 33dBm at 8GHz. The single positive drain bias is 10V and the typical drain-source current is 600mA. The device is packaged in copper based ceramic 10 pins SMT packages. The copper based carrier of the package allows direct soldering of the device to the PCB.

### ELECTRICAL SPECIFICATIONS ( $T_A=25$ )

| Symbol     | CONDITIONS   | MIN | TYP | MAX | UNIT  |
|------------|--|-----|-----|-----|-------|
| $P_{1dB}$  | Output Power at 1dB Gain Compression Point, $f = 8GHz$ , $V_{DS} = 10V$  | 32  | 33  |     | dBm   |
| $G_L$      | Linear Power Gain, $f = 8GHz$ , $V_{DS} = 10V$   | 6.5 | 7.5 |     | dB    |
| IP3        | Intercept Point of the 3 <sup>rd</sup> -order Intermodulation, $f = 8GHz$ , $V_{DS} = 10V$ , $*P_{SCL} = 20$ dBm |     | 43  |     | dBm   |
| PAE        | Power Added Efficiency at 1dB Compression Power, $f = 8GHz$  |     | 35  |     | %     |
| $I_{DS}$   | Drain-Source Current at $V_{DS} = 10V$   |     | 600 |     | mA    |
| $BV_{DGO}$ | Drain-Gate Breakdown Voltage at $I_{DGO} = 1.2mA$  | 18  | 20  |     | Volts |

**Note:  $*P_{SCL}$ : Output Power of Single Carrier Level.**

# TC3963

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25 °C)

| Symbol           | Parameter              | Rating             |
|------------------|------------------------|--------------------|
| V <sub>DS</sub>  | Drain-Source Voltage   | 12 V               |
| P <sub>in</sub>  | RF Input Power, CW     | 29 dBm             |
| P <sub>T</sub>   | Continuous Dissipation | 7.7 W              |
| T <sub>CH</sub>  | Channel Temperature    | 175 °C             |
| T <sub>STG</sub> | Storage Temperature    | - 65 °C to +175 °C |

## RECOMMENDED OPERATING CONDITION

| Symbol          | Parameter               | Rating |
|-----------------|-------------------------|--------|
| V <sub>DS</sub> | Drain to Source Voltage | 10V    |

## HANDLING PRECAUTIONS:

The user must operate in a clean, dry environment. Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. The static discharge must be less than 300V.

## EVALUATION BOARD

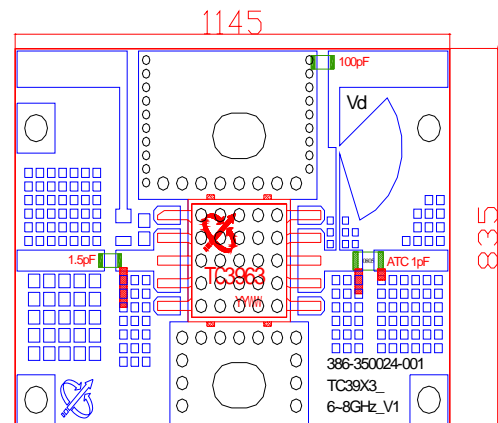
DXF file of the PCB can be downloaded from our web-site at [www.transcominc.com.tw](http://www.transcominc.com.tw)

PCB Material: RO4003

ER = 3.38

Thickness = 20 mil

Unit: mil



## EVALUATION BOARD PARTS LIST

| Qt'y | Description                      | Reference Designator | Manufacturer | Inventory ID                         |
|------|----------------------------------|----------------------|--------------|--------------------------------------|
| 1    | Chip CAP (0603) 1.5 PF ± 0.25 PF |                      | Murata       | GRM39COG1R5C50V                      |
| 1    | Chip CAP (0603) 100 PF ± 5%      |                      | Murata       | GRM39X7R101K50V                      |
| 1    | Chip CAP (0805) 1 PF ± 0.1 PF    |                      | ATC          | ATC 600F 1R0BT (1pF ± 0.1pF 250WVDC) |