

# GaAs MULTI-CHIP INTEGRATED CIRCUIT

**MC-5952**

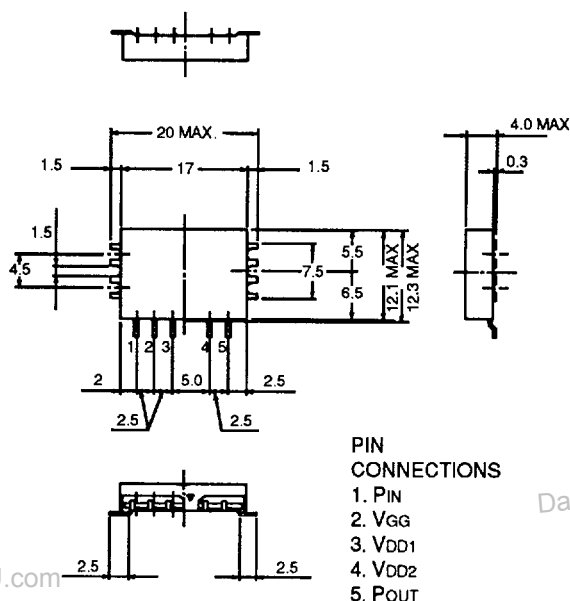
## FEATURES

- **LOW DISSIPATIVE CURRENT:**  
Total Current  $I_{DD} = 330 \text{ mA}$  (Typ.) at  $P_{OUT} = 30.5 \text{ dBm Min.}$
- **HIGH EFFICIENCY:**  
Total Efficiency,  $\eta_T = 63\%$  (Typ.) at  $P_{OUT}$  Maximum
- **SMALL SIZE**

## DESCRIPTION

The MC-5952 is a two stage GaAs Multi-Chip Integrated Circuit (MCIC), designed to be used as the Power Amplifier in a cellular portable or handheld application. Its optimum frequency range of 872-905 MHz makes it ideal for cellular analog phones for use in Europe (E-TACS). With separate access provided to both drain supplies, the output power can be effectively controlled. With over 1 Watt output power, excellent efficiency and small size, this MCIC has advantages for a variety of portable wireless applications.

### OUTLINE DIMENSIONS (Units in mm)



**Note:**

1. Lead dimensions 0.25 x 0.5
2. Tolerance of lead pitch  $\pm 0.3$

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C)

| PARTNUMBER<br>PACKAGE OUTLINE |                                                                                                                                                                                                                                      |                                                                                                            | MC-5952 |     |     |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------|-----|-----|
| SYMBOLS                       | PARAMETERS AND CONDITIONS <sup>1</sup>                                                                                                                                                                                               | UNITS                                                                                                      | MIN     | TYP | MAX |
| f                             | Frequency                                                                                                                                                                                                                            | MHz                                                                                                        | 872     |     | 905 |
| POUT1                         | Output Power 1, P <sub>IN</sub> = 7 dBm, V <sub>DD1</sub> = V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                                                       | dBm                                                                                                        | 30.5    |     |     |
| POUT2                         | Output Power 2, P <sub>IN</sub> = 8 dBm, V <sub>DD1</sub> = 0 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                                                  | dBm                                                                                                        |         | 3.0 | 6.0 |
| I <sub>DD2</sub>              | Total Current, P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> = +30.0 dBm, V <sub>DD1</sub> = 5.8 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                   | mA                                                                                                         |         | 330 | 370 |
| 2f <sub>o</sub>               | Harmonics, P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> = 30.0 dBm, V <sub>DD1</sub> = ≤5.8 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                       | dBc                                                                                                        |         | -40 | -30 |
| 3f <sub>o</sub>               | Harmonics, P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> = 30.0 dBm, V <sub>DD1</sub> = ≤5.8 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                       | dBc                                                                                                        |         | -40 | -30 |
| 4f <sub>o</sub>               | Harmonics, P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> = 30.0 dBm, V <sub>DD1</sub> = ≤5.8 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                       | dBc                                                                                                        |         | -40 | -30 |
| I <sub>GG</sub>               | Gate Current, P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> = 30.0 dBm, V <sub>DD1</sub> = ≤5.8 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                    | mA                                                                                                         |         | 1.0 | 3.0 |
| V <sub>SWR</sub>              | Input VSWR P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> = 30.0 dBm, V <sub>DD1</sub> = ≤5.8 V, V <sub>DD2</sub> = 5.8 V, V <sub>GG</sub> = -3.5 V                                                                                       |                                                                                                            |         | 2:1 |     |
|                               | Stability Against Load Fluctuation, P <sub>IN</sub> = 7 dBm, P <sub>OUT</sub> ≥30.0 dBm, V <sub>GG</sub> = -3.5 V, Z <sub>s</sub> = 50 Ω, ALL PHASE, Load time = 30 s, V <sub>DD1</sub> = V <sub>DD2</sub> = 8.0 V, LOAD VSWR = 20:1 | No characteristic change. Frequency, Output Power 1, 2, Total Current, Harmonics, Gate Current, Input VSWR |         |     |     |

**Notes:**

1.  $V_{GG} = \pm 0.2 \text{ V}$ ,  $Z_S = Z_L = 50 \Omega$
2.  $I_{DD} = I_{DD1} + I_{DD2}$

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** ( $T_A = 25^\circ\text{C}$ )

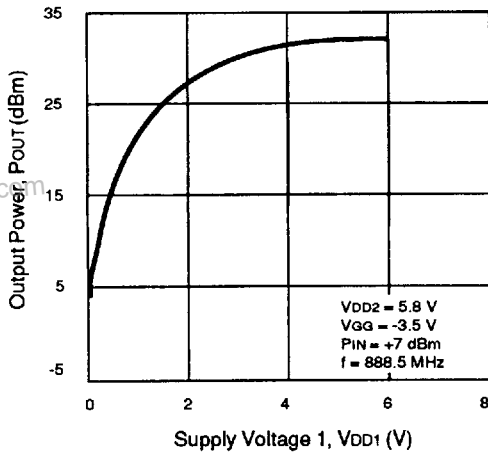
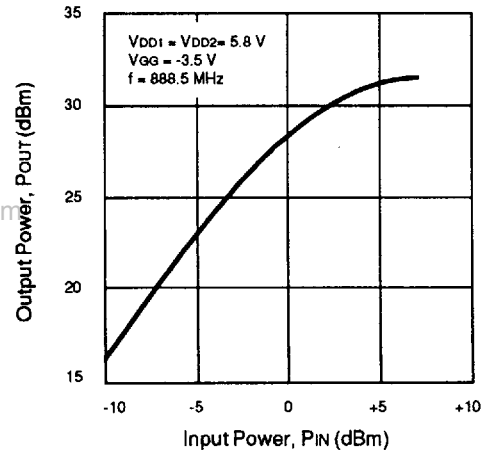
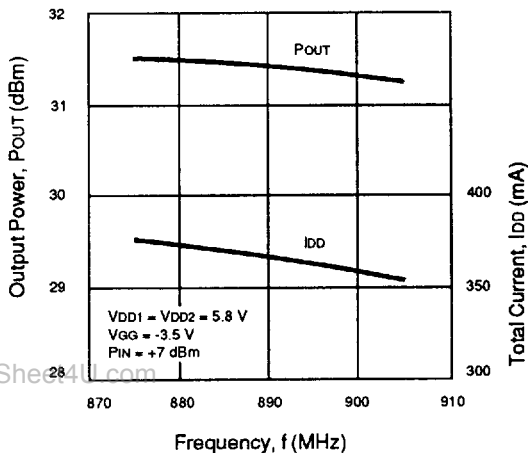
| SYMBOLS              | PARAMETERS                 | UNITS | RATINGS     |
|----------------------|----------------------------|-------|-------------|
| VDD1, 2 <sup>2</sup> | Supply Voltage 1, 2        | V     | 10          |
| VGG                  | Supply Voltage 3           | V     | -6          |
| PIN                  | Input Power                | dBm   | 12          |
| Tc(OP)               | Operating Case Temperature | °C    | -30 to +90  |
| Tstg                 | Storage Temperature        | °C    | -35 to +120 |

**Notes:**

1. Operation in excess of any one of these parameters may result in permanent damage.
2. VGG = -4 V.

**RECOMMENDED OPERATING CONDITIONS**

| SYMBOL | PARAMETERS       | UNITS | MIN  | TYP  | MAX  |
|--------|------------------|-------|------|------|------|
| VDD1   | Supply Voltage 1 | V     |      |      | 5.8  |
| VDD2   | Supply Voltage 2 | V     | 5.0  | 5.8  | 7.0  |
| VGG    | Supply Voltage 3 | V     | -3.3 | -3.5 | -3.7 |
| PIN    | Input Power      | dBm   |      | 7    | 8    |

**TYPICAL PERFORMANCE CURVES** ( $T_A = 25^\circ\text{C}$ )**OUTPUT POWER vs. SUPPLY VOLTAGE****OUTPUT POWER vs. INPUT POWER****OUTPUT POWER AND TOTAL CURRENT vs. FREQUENCY****EQUIVALENT CIRCUIT**