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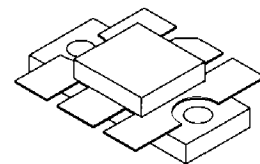
## The RF Line **NPN Silicon RF Power Transistor**

... designed primarily for wideband large-signal output and driver amplifier stages in the 100 to 500 MHz frequency range.

- Specified 28 Volt, 400 MHz Characteristics —  
 Output Power = 100 Watts  
 Minimum Gain = 7.0 dB  
 Efficiency = 50% (Min)
- Built-In Matching Network for Broadband Operation Using Double Match Technique
- 100% Tested for Load Mismatch at all Phase Angles with 3:1 VSWR
- Gold Metallization System for High Reliability

**MRF329**

**100 W, 100 to 500 MHz  
 CONTROLLED "Q"  
 BROADBAND RF POWER  
 TRANSISTOR  
 NPN SILICON**



**CASE 333-04, STYLE 1**

### MAXIMUM RATINGS

| Rating   | Symbol    | Value       | Unit                         |
|--|-----------|-------------|------------------------------|
| Collector-Emitter Voltage  | $V_{CE0}$ | 30          | Vdc                          |
| Collector-Base Voltage   | $V_{CBO}$ | 60          | Vdc                          |
| Emitter-Base Voltage   | $V_{EBO}$ | 4.0         | Vdc                          |
| Collector Current — Continuous<br>— Peak   | $I_C$     | 9.0<br>12   | Adc                          |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1)<br>Derate above $25^\circ\text{C}$ | $P_D$     | 270<br>1.54 | Watts<br>W/ $^\circ\text{C}$ |
| Storage Temperature Range  | $T_{stg}$ | -65 to +150 | $^\circ\text{C}$             |

### THERMAL CHARACTERISTICS

| Characteristic                           | Symbol          | Max  | Unit                      |
|--|-----------------|------|---------------------------|
| Thermal Resistance, Junction to Case (2) | $R_{\theta JC}$ | 0.65 | $^\circ\text{C}/\text{W}$ |

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|   |               |     |   |   |     |
|---|---------------|-----|---|---|-----|
| Collector-Emitter Breakdown Voltage<br>( $I_C = 80 \text{ mAdc}$ , $I_B = 0$ )    | $V_{(BR)CEO}$ | 30  | — | — | Vdc |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 80 \text{ mAdc}$ , $V_{BE} = 0$ ) | $V_{(BR)CES}$ | 60  | — | — | Vdc |
| Emitter-Base Breakdown Voltage<br>( $I_E = 8.0 \text{ mAdc}$ , $I_C = 0$ )        | $V_{(BR)EBO}$ | 4.0 | — | — | Vdc |

NOTES:

(continued)

1. This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.
2. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.



**ELECTRICAL CHARACTERISTICS — continued** ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

**OFF CHARACTERISTICS (continued)**

|   |               |    |   |     |      |
|---|---------------|----|---|-----|------|
| Collector-Base Breakdown Voltage<br>( $I_C = 80 \text{ mAdc}$ , $I_E = 0$ ) | $V_{(BR)CBO}$ | 60 | — | —   | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ )       | $I_{CBO}$     | —  | — | 5.0 | mAdc |

**ON CHARACTERISTICS**

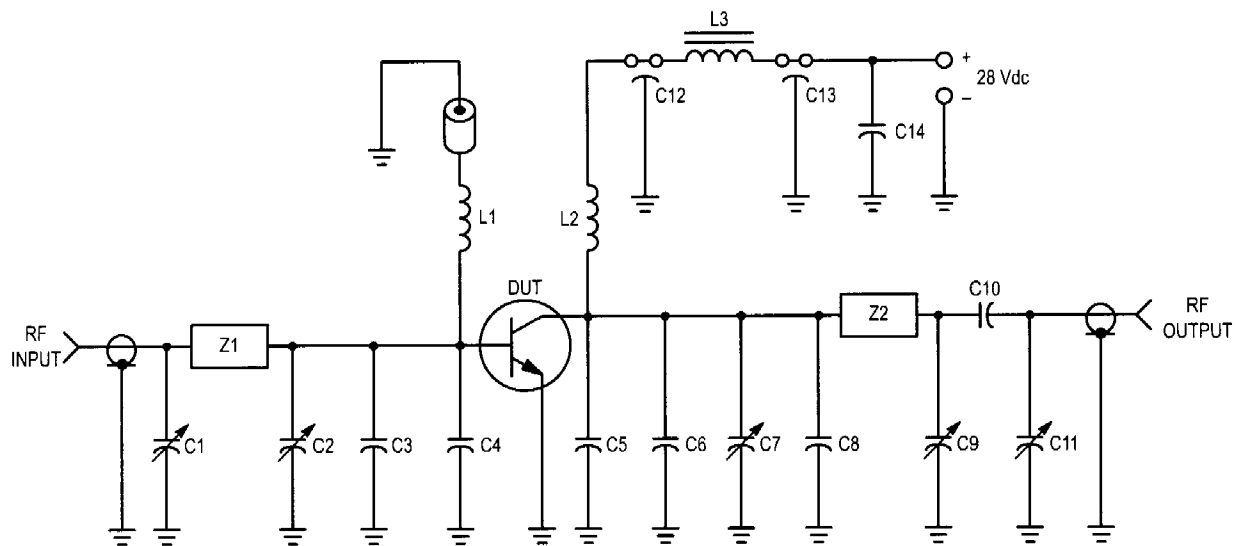
|   |          |    |   |    |   |
|---|----------|----|---|----|---|
| DC Current Gain<br>( $I_C = 4.0 \text{ Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ ) | $h_{FE}$ | 20 | — | 80 | — |
|---|----------|----|---|----|---|

**DYNAMIC CHARACTERISTICS**

|   |          |   |    |     |    |
|---|----------|---|----|-----|----|
| Output Capacitance<br>( $V_{CB} = 28 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ ) | $C_{ob}$ | — | 95 | 125 | pF |
|---|----------|---|----|-----|----|

**FUNCTIONAL TESTS (Figure 1)**

|  |          |                                |     |   |    |
|--|----------|--------------------------------|-----|---|----|
| Common-Emitter Amplifier Power Gain<br>( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $f = 400 \text{ MHz}$ )       | $G_{PE}$ | 7.0                            | 9.7 | — | dB |
| Collector Efficiency<br>( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $f = 400 \text{ MHz}$ )                      | $\eta$   | 50                             | 60  | — | %  |
| Load Mismatch<br>( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $f = 400 \text{ MHz}$ ,<br>$VSWR = 3:1$ all angles) | $\psi$   | No Degradation in Output Power |     |   |    |



- C1, C2, C7, C9 — 1.0–20 pF Johanson (JMC 5501)
- C3, C4 — 36 pF 100 mil Chip Cap (ATC)
- C5, C6 — 50 pF 100 mil Chip Cap (ATC)
- C8 — 30 pF 100 mil Chip Cap (ATC)
- C10 — 2.0–150 pF 100 mil Chip Caps in Parallel (ATC)
- C11 — 1.0–10 pF Johanson (JMC 5201)
- C12, C13 — 1000 pF UNELCO Feedthru
- C14 — 0.1  $\mu\text{F}$  Erie Redcap

- L1 — 0.15  $\mu\text{H}$  Molded Choke with Ferrite Bead (Ferroxcube #56–590–65/4B) on Ground End
- L2 — 4 Turns #18 AWG, 1/4" ID
- L3 — Ferroxcube VK200–19/4B
- Z1 — Microstrip Line 2300 mils L x 210 mils W
- Z2 — Microstrip Line 2300 mils L x 280 mils W
- Board — Glass Teflon,  $t = 0.062"$ ,  $\epsilon_r = 2.56$

**Figure 1. 400 MHz Test Circuit**