

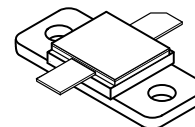
The RF Line Microwave Pulse Power Transistor

... designed for 1025–1150 MHz pulse common base amplifier applications such as TCAS, TACAN and Mode-S transmitters.

- Guaranteed Performance @ 1090 MHz
Output Power = 150 Watts Peak
Gain = 9.5 dB Min, 10.0 dB (Typ)
- 100% Tested for Load Mismatch at All Phase Angles with 10:1 VSWR
- Hermetically Sealed Package
- Silicon Nitride Passivated
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Internal Input and Output Matching
- Characterized with 10 μ s, 10% Duty Cycle Pulses
- Recommended Driver for a Pair of MRF10500 Transistors

MRF10150

**150 W (PEAK)
1025–1150 MHz
MICROWAVE POWER
TRANSISTOR
NPN SILICON**



CASE 376B-02, STYLE 1

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|-----------|-------------|------------------------------------|
| Collector–Emitter Voltage | V_{CES} | 65 | Vdc |
| Collector–Base Voltage | V_{CBO} | 65 | Vdc |
| Emitter–Base Voltage | V_{EBO} | 3.5 | Vdc |
| Collector Current — Peak (1) | I_C | 14 | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1), (2) Derate above 25°C | P_D | 700 4.0 | Watts $\text{W}/^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | –65 to +200 | $^\circ\text{C}$ |
| Junction Temperature | T_J | 200 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--|-----------------|------|---------------------------|
| Thermal Resistance, Junction to Case (3) | $R_{\theta JC}$ | 0.25 | $^\circ\text{C}/\text{W}$ |

NOTES:

1. Under pulse RF operating conditions.
2. These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as pulsed RF amplifiers.
3. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques. (Worst case θ_{JC} value measured @ 10 μ s, 10%.)

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---------------|-----|-----|-----|------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Breakdown Voltage ($I_C = 60 \text{ mAdc}$, $V_{BE} = 0$) | $V_{(BR)CES}$ | 65 | — | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 60 \text{ mAdc}$, $I_E = 0$) | $V_{(BR)CBO}$ | 65 | — | — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 10 \text{ mAdc}$, $I_C = 0$) | $V_{(BR)EBO}$ | 3.5 | — | — | Vdc |
| Collector Cutoff Current ($V_{CB} = 36 \text{ Vdc}$, $I_E = 0$) | I_{CBO} | — | — | 25 | mAdc |

ON CHARACTERISTICS

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

FUNCTIONAL TESTS

| | | | | | |
|---|----------|--------------------------------|----|---|----|
| Common–Base Amplifier Power Gain ($V_{CC} = 50 \text{ Vdc}$, $P_{Out} = 150 \text{ W Peak}$, $f = 1090 \text{ MHz}$) | G_{PB} | 9.5 | 10 | — | dB |
| Collector Efficiency ($V_{CC} = 50 \text{ Vdc}$, $P_{Out} = 150 \text{ W Peak}$, $f = 1090 \text{ MHz}$) | η | 40 | — | — | % |
| Load Mismatch ($V_{CC} = 50 \text{ Vdc}$, $P_{Out} = 150 \text{ W Peak}$, $f = 1090 \text{ MHz}$, $VSWR = 10:1$ All Phase Angles) | ψ | No Degradation in Output Power | | | |

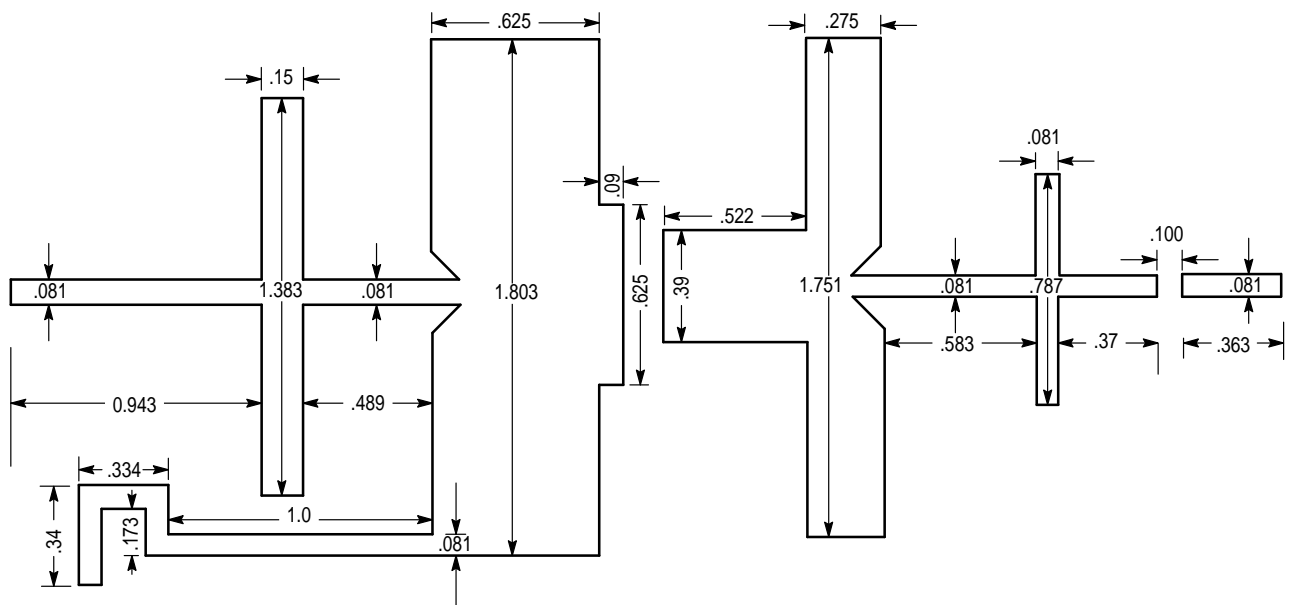
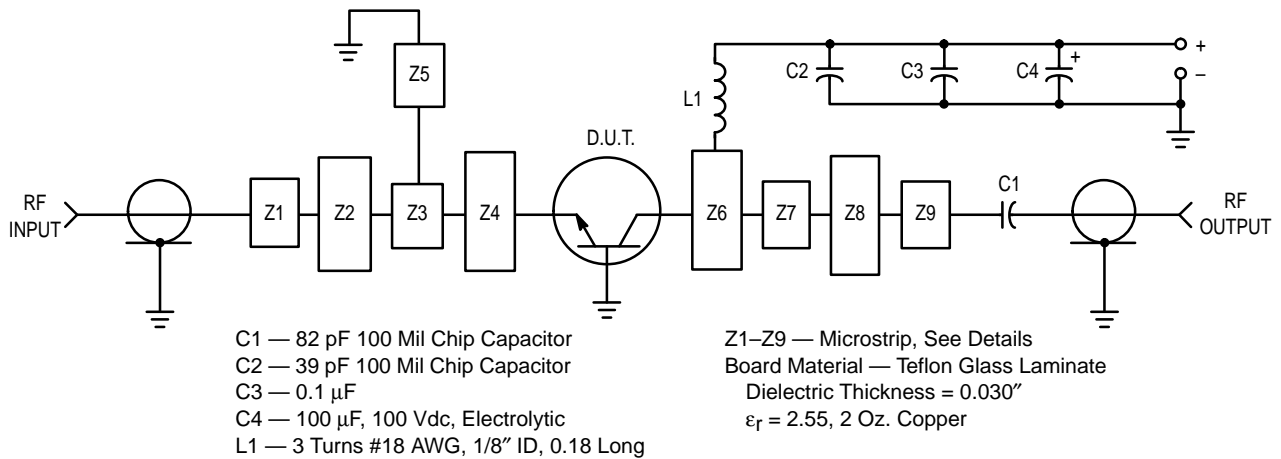


Figure 1. Test Circuit

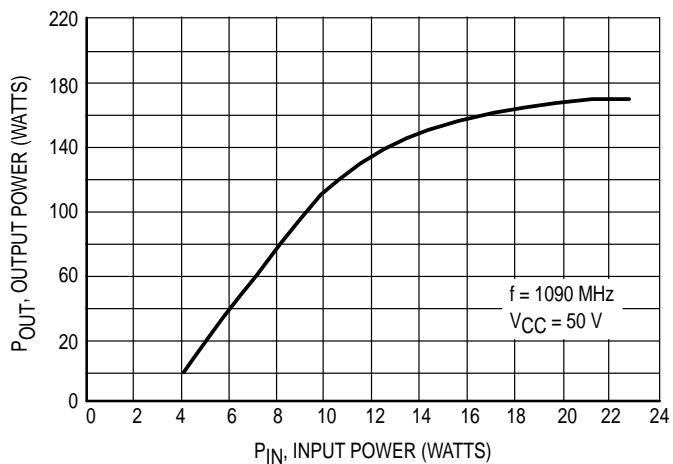
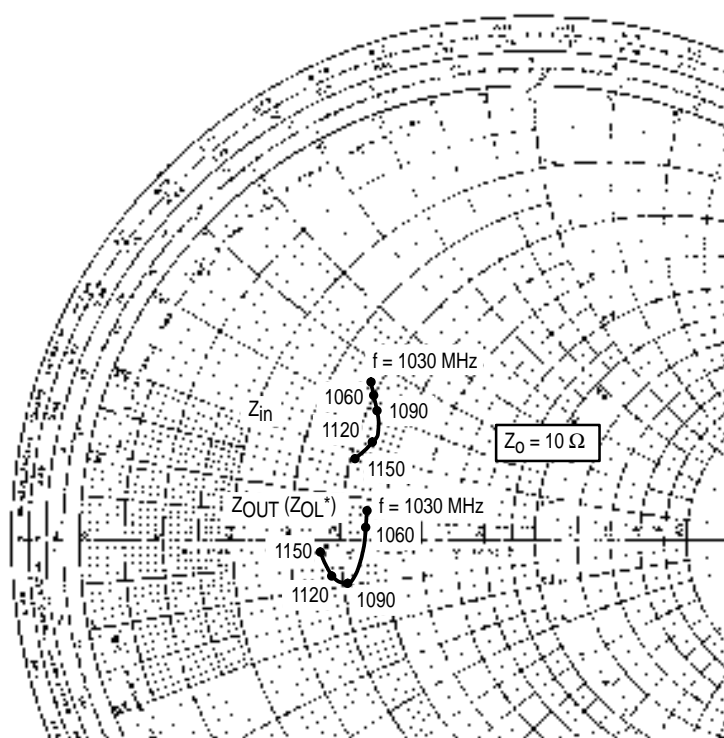


Figure 2. Output Power versus Input Power



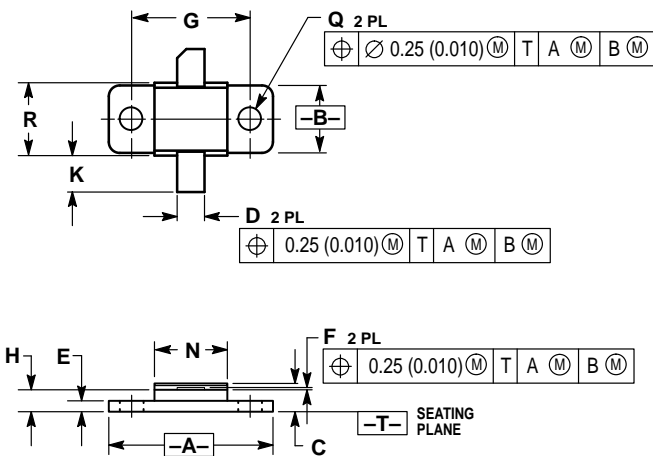
$P_{OUT} = 150 \text{ W Pk}$ $V_{CC} = 50 \text{ V}$

| f MHz | Z_{in} OHMS | Z_{OL}^* (Z_{OUT}) OHMS |
|----------|------------------|----------------------------------|
| 1030 | $3.8 + j3.5$ | $4.6 + j0.7$ |
| 1060 | $4.0 + j3.3$ | $4.6 + j0.3$ |
| 1090 | $4.2 + j3.0$ | $4.1 - j1.0$ |
| 1120 | $4.4 + j2.3$ | $3.8 - j0.8$ |
| 1150 | $4.1 + j1.8$ | $3.6 - j0.3$ |

Z_{OL}^* is the conjugate of the optimum load impedance into which the device operates at a given output power voltage and frequency.

Figure 3. Series Equivalent Input/Output Impedances

PACKAGE DIMENSIONS



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.890 | 0.910 | 22.61 | 23.11 |
| B | 0.370 | 0.400 | 9.40 | 10.16 |
| C | 0.145 | 0.160 | 3.69 | 4.06 |
| D | 0.140 | 0.160 | 3.56 | 4.06 |
| E | 0.055 | 0.065 | 1.40 | 1.65 |
| F | 0.003 | 0.006 | 0.08 | 0.15 |
| G | 0.650 BSC | | 16.51 BSC | |
| H | 0.110 | 0.130 | 2.80 | 3.30 |
| K | 0.180 | 0.220 | 4.57 | 5.59 |
| N | 0.390 | 0.410 | 9.91 | 10.41 |
| Q | 0.115 | 0.135 | 2.93 | 3.42 |
| R | 0.390 | 0.140 | 9.91 | 10.41 |

- STYLE 1:
 PIN 1. COLLECTOR
 2. EMITTER
 3. BASE

CASE 376B-02 ISSUE B

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