

MRF10350



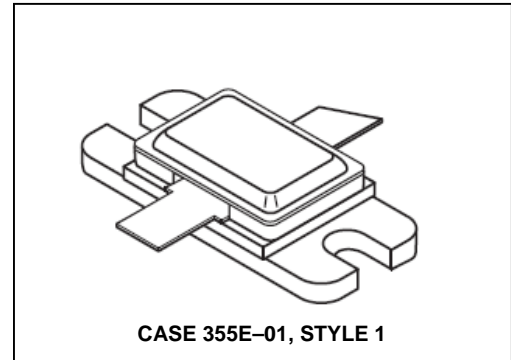
Microwave Pulse Power Silicon NPN Transistor
350W (peak), 1025–1150MHz

M/A-COM Products
 Released - Rev. 07.07

Product Image

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

- Guaranteed performance @ 1090 MHz
 Output power = 350 W Peak
 Gain = 8.5 dB min, 9.0 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 using Mode-S pulse format



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 | 31 | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1), (2) Derate above 25°C | P_D | 1590 9.1 | Watts W°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) | $R_{\theta JC}$ | 0.11 | $^\circ\text{C}/\text{W}$ |

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} measured using Mode-S pulse train, 128 μs burst 0.5 μs on, 0.5 μs off repeating at 6.4 ms interval.)

Microwave Pulse Power Silicon NPN Transistor 350W (peak), 1025–1150MHz

M/A-COM Products
Released - Rev. 07.07

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

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

OFF CHARACTERISTICS

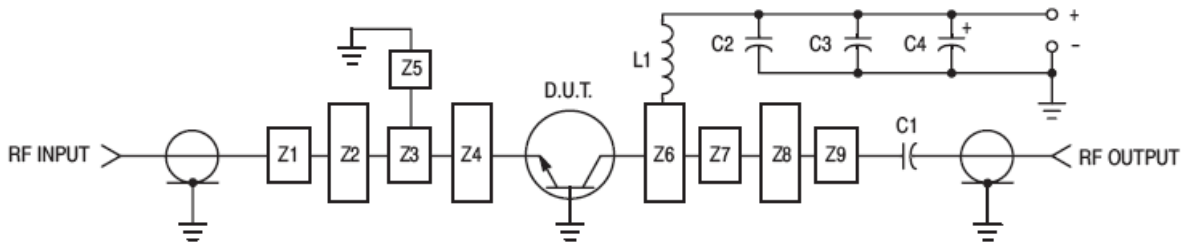
| | | | | | |
|--|---------------|-----|---|----|------|
| Collector–Emitter Breakdown Voltage ($I_C = 60 \text{ mAdc}$, $V_{BE} = 0$) | $V_{(BR)CES}$ | 65 | — | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 60 \text{ mAdc}$, $I_E = 0$) | $V_{(BR)CBO}$ | 65 | — | — | Vdc |
| Emitter–Base Breakdown 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 ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 350 \text{ W Peak}$, $f = 1090 \text{ MHz}$) | G_{PB} | 8.5 | 9.0 | — | dB |
| Collector Efficiency ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 350 \text{ W Peak}$, $f = 1090 \text{ MHz}$) | η | 40 | — | — | % |
| Load Mismatch ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 350 \text{ W Peak}$, $f = 1090 \text{ MHz}$, $VSWR = 10:1$ All Phase Angles) | ψ | No Degradation in Output Power | | | |



C1 — 75 pF 100 Mil Chip Capacitor
 C2 — 39 pF 100 Mil Chip Capacitor
 C3 — 0.1 μ F
 C4 — 100 μ F, 100 Vdc, Electrolytic
 L1 — 3 Turns #18 AWG, 1/8" ID, 0.18 Long

Z1–Z9 — Microstrip, See Details
 Board Material — Teflon, Glass Laminate
 Dielectric Thickness = 0.030"
 $\epsilon_r = 2.55$, 2 Oz. Copper

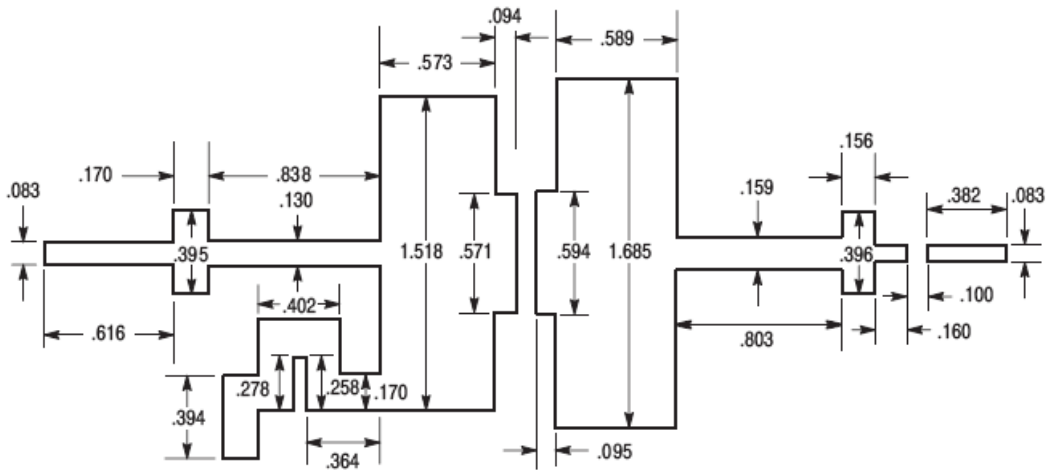
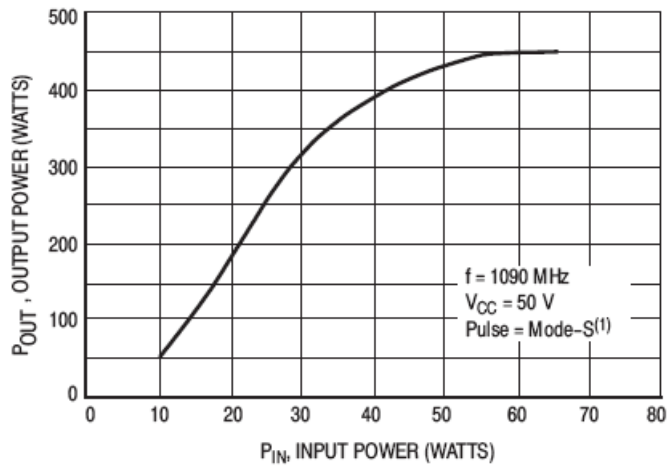
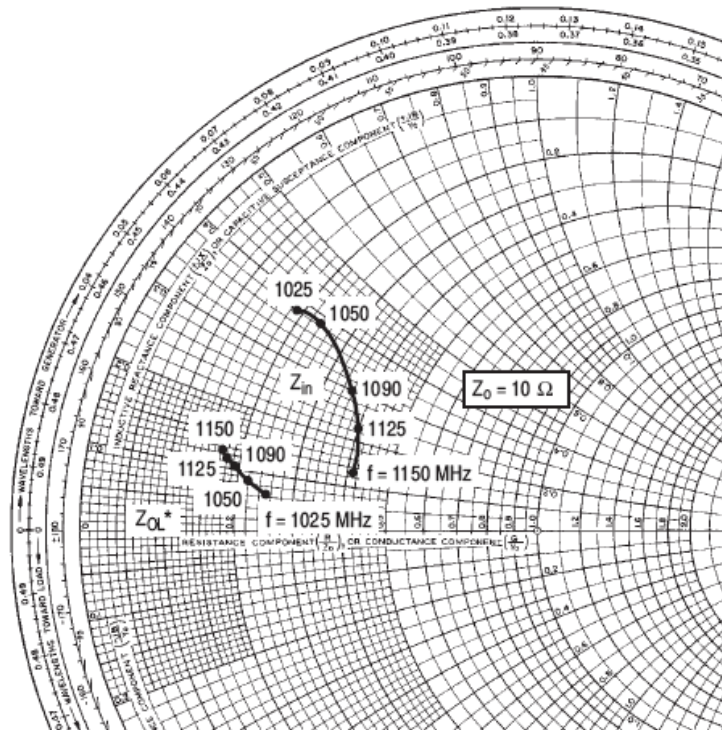


Figure 1. Test Circuit



(1) 128 μ s burst 0.5 μ s on, 0.5 μ s off
repeating at 6.4 ms interval.

Figure 2. Output Power versus Input Power



$P_{OUT} = 350 \text{ W Pk}$ $V_{CC} = 50 \text{ V}$

| f MHz | Z_{in} OHMS | $Z_{OL}^* (1)$ OHMS |
|----------|------------------|------------------------|
| 1025 | $1.92 + j3.80$ | $2.52 + j0.70$ |
| 1050 | $2.44 + j3.92$ | $2.18 + j0.85$ |
| 1090 | $3.55 + j3.02$ | $1.94 + j1.13$ |
| 1125 | $4.11 + j2.27$ | $1.80 + j1.22$ |
| 1150 | $4.13 + j1.35$ | $1.71 + j1.31$ |

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

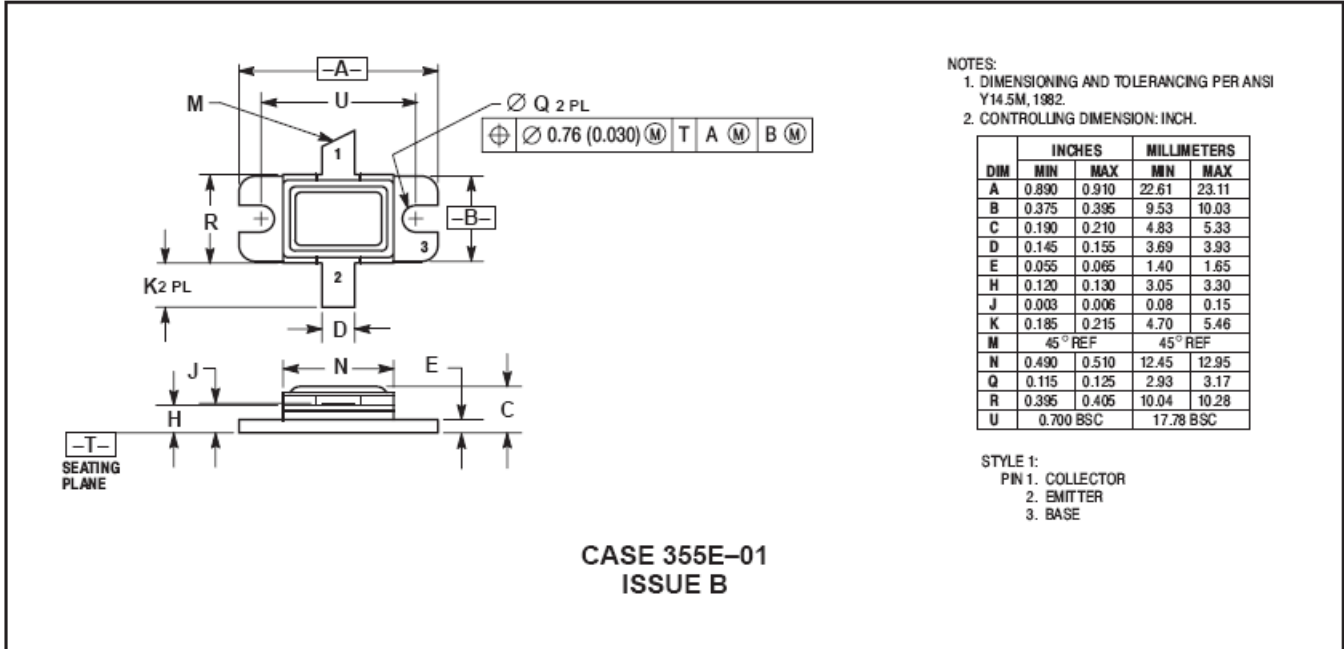
MRF10350



Microwave Pulse Power Silicon NPN Transistor
350W (peak), 1025–1150MHz

M/A-COM Products
Released - Rev. 07.07

PACKAGE DIMENSIONS



ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macomtech.com for additional data sheets and product information.

M/A-COM Technology Solutions Inc. and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.