MRF10350

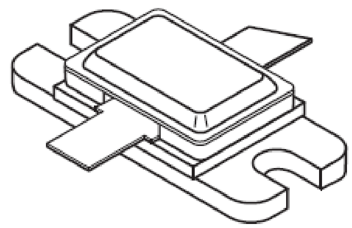
Microwave Pulse Power Silicon NPN Transistor
350W (peak), 1025–1150MHz

Rev. V1

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

Product Image



CASE 355E–01, 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	31	Adc
Total Device Dissipation @ T_C = 25°C (1), (2) Derate above 25°C	P_D	1590 9.1	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +200	°C
Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (3)	$R_{\theta JC}$	0.11	°C/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.)

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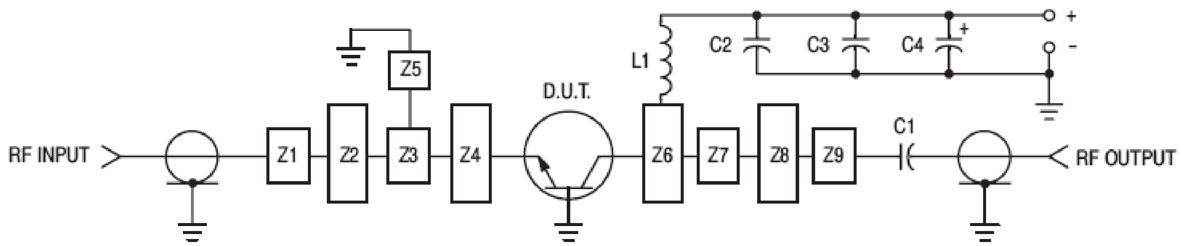
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 60 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	65	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 60 mAdc, I_E = 0)	$V_{(BR)CBO}$	65	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Cutoff Current (V_{CB} = 36 Vdc, I_E = 0)	I_{CBO}	—	—	25	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	20	—	—	—
FUNCTIONAL TESTS					
Common–Base Amplifier Power Gain (V_{CC} = 50 Vdc, P_{out} = 350 W Peak, f = 1090 MHz)	G_{PB}	8.5	9.0	—	dB
Collector Efficiency (V_{CC} = 50 Vdc, P_{out} = 350 W Peak, f = 1090 MHz)	η	40	—	—	%
Load Mismatch (V_{CC} = 50 Vdc, P_{out} = 350 W Peak, f = 1090 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 µF
C4 — 100 µF, 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″
ε_r = 2.55, 2 Oz. Copper

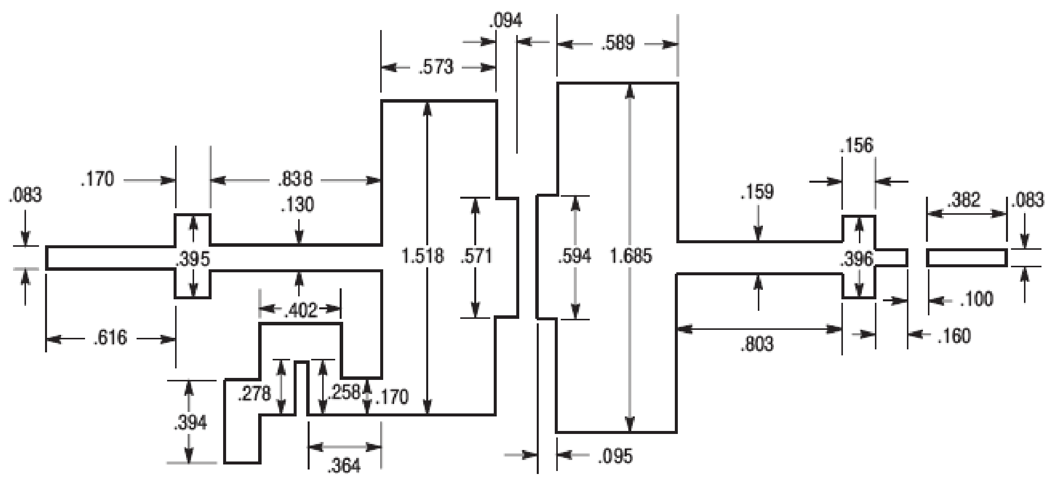
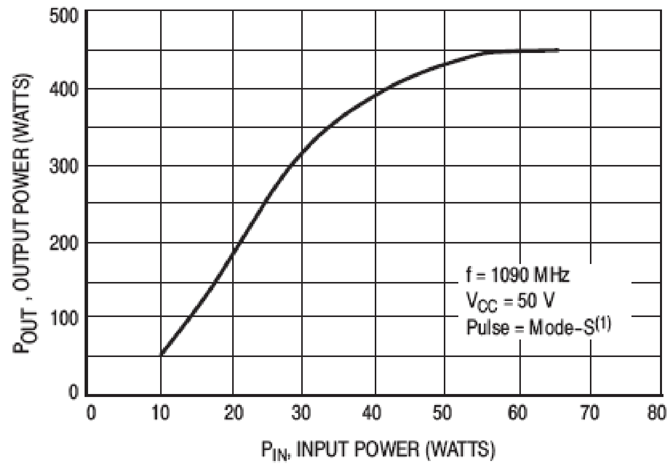
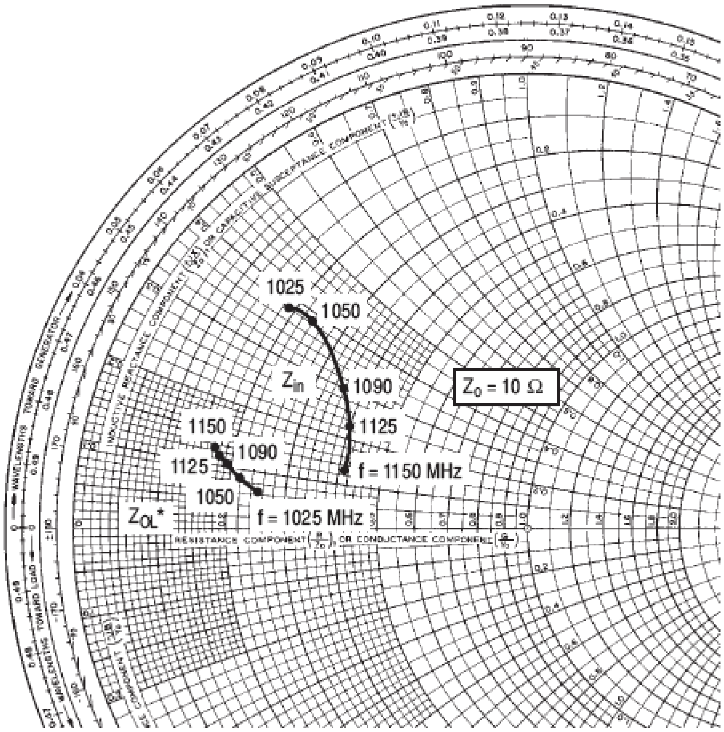


Figure 1. Test Circuit



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

Figure 2. Output Power versus Input Power



P_{OUT} = 350 W Pk V_{CC} = 50 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

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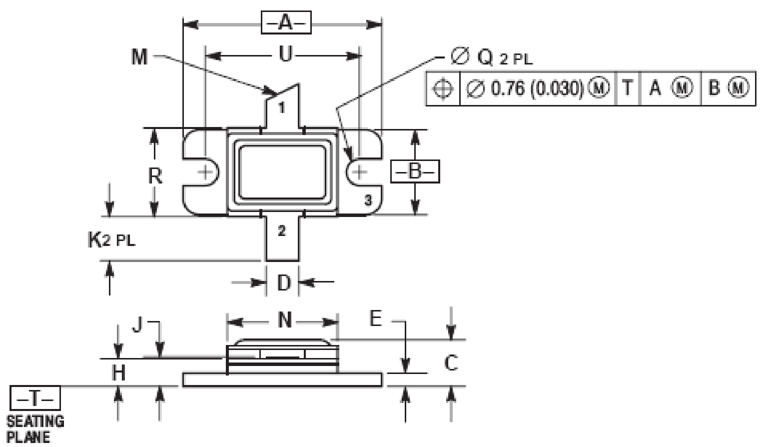
PACKAGE DIMENSIONS



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

DIM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	0.890	0.910	22.61	23.11
B	0.375	0.395	9.53	10.03
C	0.190	0.210	4.83	5.33
D	0.145	0.155	3.69	3.93
E	0.055	0.065	1.40	1.65
H	0.120	0.130	3.05	3.30
J	0.003	0.006	0.08	0.15
K	0.185	0.215	4.70	5.46
M	45° REF		45° REF	
N	0.490	0.510	12.45	12.95
Q	0.115	0.125	2.93	3.17
R	0.395	0.405	10.04	10.28
U	0.700 BSC		17.78 BSC	

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

CASE 355E–01
ISSUE B