The RF Line

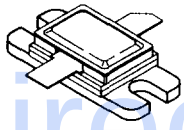
Microwave Pulse Power Transistor

MRF1375

375 W (PEAK), 1025–1150 MHz
MICROWAVE POWER
TRANSISTOR
NPN SILICON

Designed for 1025–1150 MHz pulse common base amplifier applications such as TACAN and DME.

- Guaranteed Performance @ 1090 MHz
  Output Power = 375 Watts Peak
  Gain = 6.7 dB Min 7.5 dB (Typ)
- 100% Tested for Load Mismatch at All Phase Angles with 3:1 VSWR
- Hermetically Sealed Package
- Silicon Nitride Passivated
- Gold Metallized, Emitter Ballasted for Long Life and Resistance to Metal Migration
- Internal Input Matching
- Characterized using 10 µs, 1% Duty Pulse Format



CASE 355G–01, STYLE 1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CES}	70	Vdc
Collector–Base Voltage	V_{CBO}	70	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Peak (1)	I_C	29	Adc
Total Device Dissipation @ T_C = 25°C (1) (2) Derate above 25°C	P_D	1458 8.33	Watts W/°C
Storage Temperature Range	T_{stg}	– 65 to +200	°C
Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Rating	Symbol	Max	Unit
Thermal Resistance, Junction to Case (3) (4)	$R_{\theta JC}$	0.12	°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.
4. Pulse Width = 10 µs, Duty Cycle = 1%.

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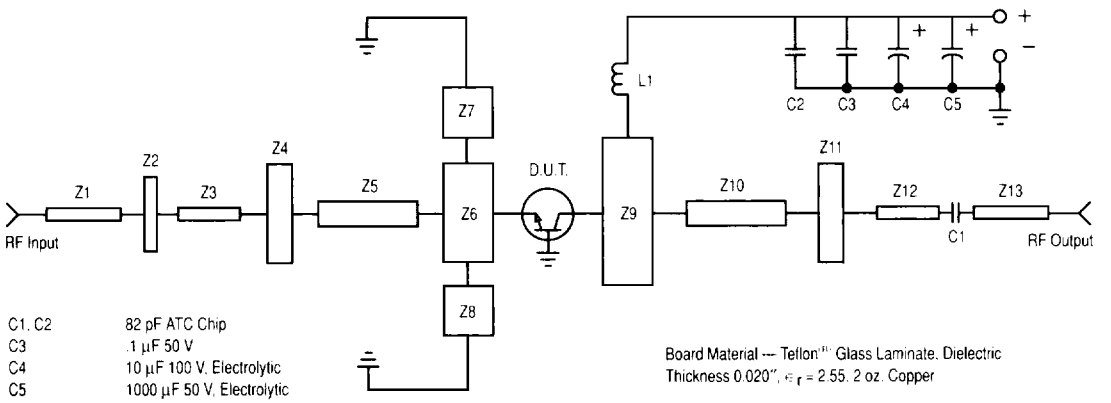
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 60 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	70	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 60 mAdc, I_E = 0)	$V_{(BR)CBO}$	70	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 50 Vdc, I_E = 0)	I_{CBO}	—	—	3.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	10	—	—	—
FUNCTIONAL TESTS					
Common–Base Amplifier Power Gain (V_{CC} = 50 Vdc, P_{out} = 375 W Peak, f = 1090 MHz)	G_{PB}	6.7	7.5	—	dB
Collector Efficiency (V_{CC} = 50 Vdc, P_{out} = 375 W Peak, f = 1090 MHz)	η_C	40	—	—	%
Load Mismatch (V_{CC} = 50 Vdc, P_{out} = 375 W Peak, f = 1090 MHz, Load VSWR = 3:1 All Phase Angles)	Ψ	No Degradation in Output Power			



C1, C2	82 pF ATC Chip
C3	.1 µF 50 V
C4	10 µF 100 V, Electrolytic
C5	1000 µF 50 V, Electrolytic
L1	3 Turns # 18AWG, 1/8″ ID, 0.18″ Long
Z1–Z13	Microstrip, See Details

Board Material — Teflon™ Glass Laminate, Dielectric Thickness 0.020″, ϵ_r = 2.55, 2 oz. Copper

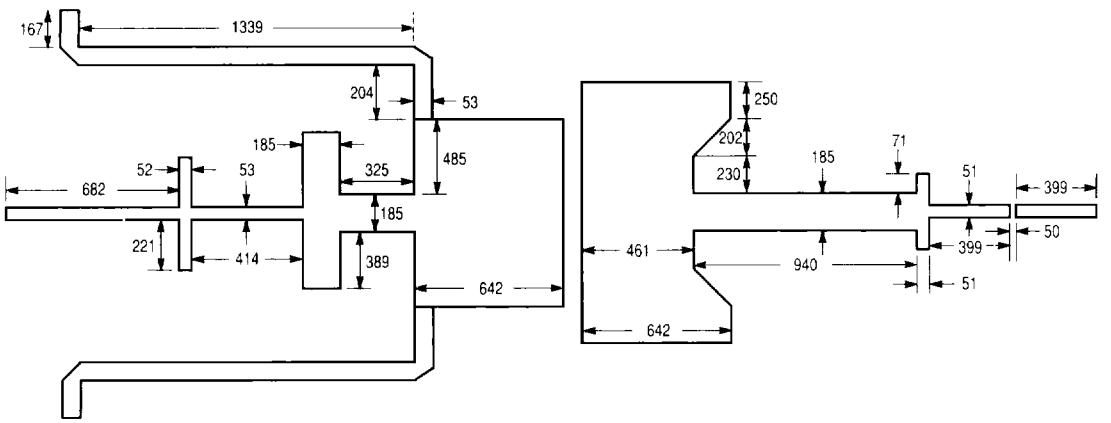


Figure 1. Test Circuit

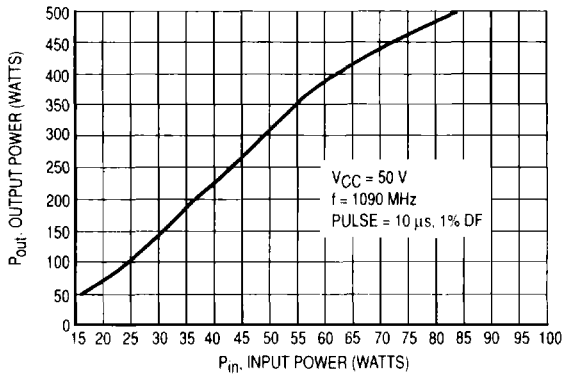


Figure 2. Output Power versus Input Power

P_{out} = 375 W, V_{CC} = 50 V
T_p = 10 μs, DF = 1%

Freq MHz	Z_{in} Ohms	Z_{OL}^* Ohms (1)
1025	2.4 + j1.7	1.1 + j1.3
1050	2.1 + j1.2	1.1 + j1.4
1090	1.8 + j1.1	1.1 + j1.3
1125	1.6 + j1.1	1.3 + j1.3
1150	1.4 + j1.0	1.2 + j1.6

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

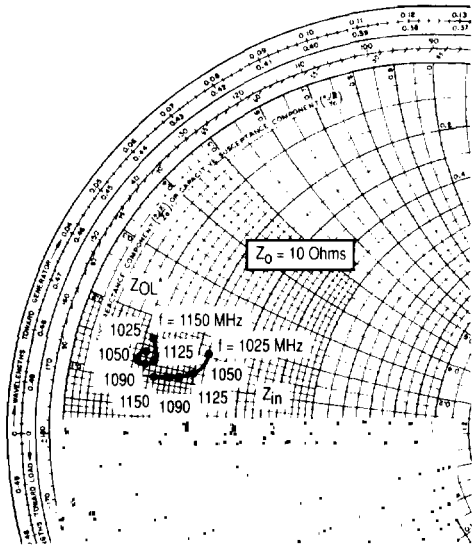


Figure 3. Series Equivalent Input/Output Impedances