

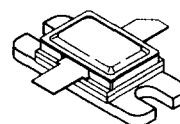
The RF Line Microwave Pulse Power Transistor

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 μ s, 1% Duty Pulse Format

MRF1375

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



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 @ $T_C = 25^\circ\text{C}$ (1) (2) Derate above 25°C	P_D	1458 8.33	Watts 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

Rating	Symbol	Max	Unit
Thermal Resistance, Junction to Case (3) (4)	$R_{\theta JC}$	0.12	$^\circ\text{C/W}$

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 μ s, Duty Cycle = 1%.

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage ($I_C = 60\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	70	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 60\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	70	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 50\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	3.0	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 5.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	10	—	—	—
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FUNCTIONAL TESTS

Common–Base Amplifier Power Gain ($V_{CC} = 50\text{ Vdc}$, $P_{out} = 375\text{ W Peak}$, $f = 1090\text{ MHz}$)	G_{PB}	6.7	7.5	—	dB
Collector Efficiency ($V_{CC} = 50\text{ Vdc}$, $P_{out} = 375\text{ W Peak}$, $f = 1090\text{ MHz}$)	η_C	40	—	—	%
Load Mismatch ($V_{CC} = 50\text{ Vdc}$, $P_{out} = 375\text{ W Peak}$, $f = 1090\text{ MHz}$, Load VSWR = 3:1 All Phase Angles)	Ψ	No Degradation in Output Power			

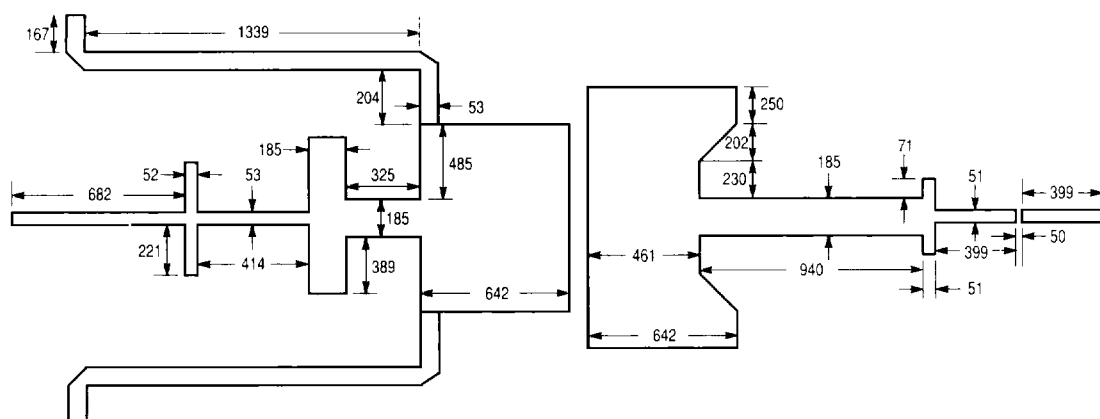
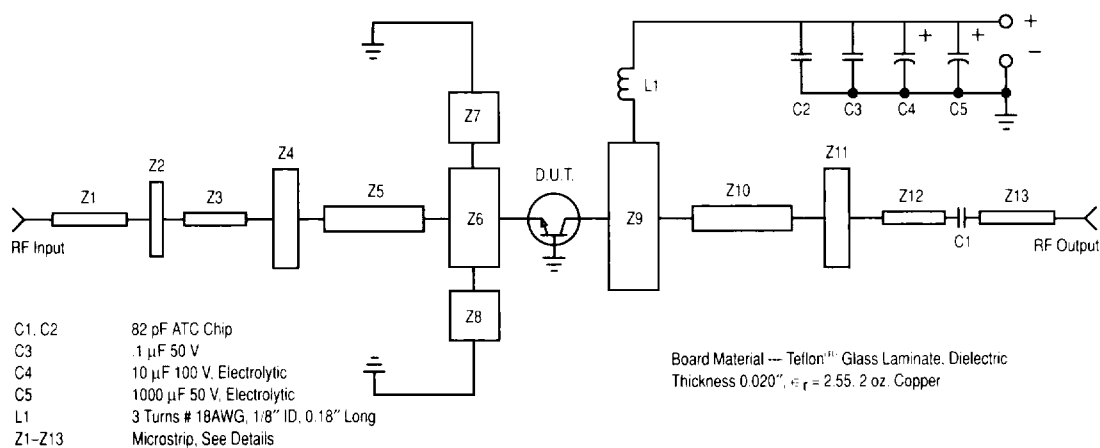


Figure 1. Test Circuit

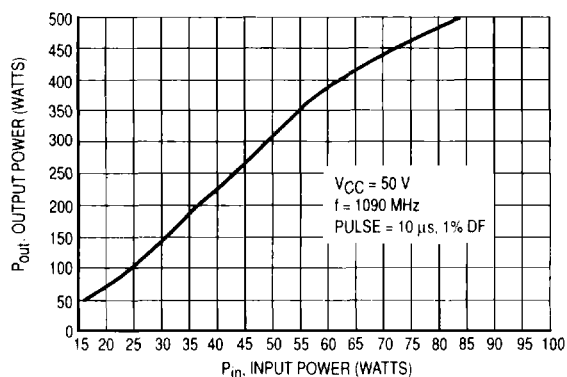


Figure 2. Output Power versus Input Power

$P_{out} = 375 \text{ W}$, $V_{CC} = 50 \text{ V}$
 $T_p = 10 \mu\text{s}$, $DF = 1\%$

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.

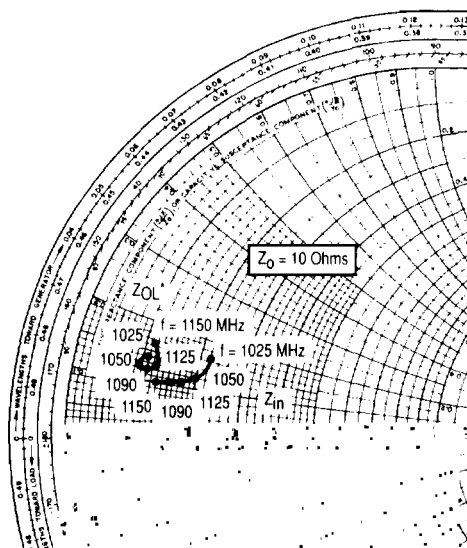


Figure 3. Series Equivalent Input/Output Impedances