

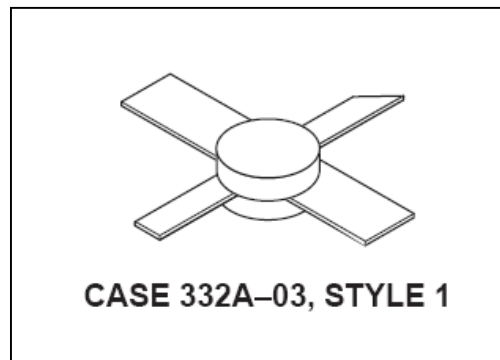
Microwave Pulse Power Silicon NPN Transistor 150W (peak), 960–1215MHz

M/A-COM Products
Released - Rev. 07.07

Product Image

Designed for Class B and C common base amplifier applications in short pulse TACAN, IFF, and DME transmitters.

- Guaranteed performance @ 1090 MHz, 50 Vdc
Output power = 150 W peak
Minimum gain = 7.8 dB
- 100% tested for load mismatch at all phase angles with 10:1 VSWR
- Industry standard package
- Nitride passivated
- Gold metallized, emitter ballasted for long life and resistance to metal migration
- Internal input matching for broadband operation



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Base Voltage	V_{CBO}	70	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Peak (1)	I_C	12	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) (2) Derate above 25°C	P_D	583 3.33	Watts W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	–65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (3)	$R_{\theta JC}$	0.3	$^\circ\text{C/W}$

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

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

OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 50 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	70	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 50 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	70	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 5.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	10	mAdc

ON CHARACTERISTICS

DC Current Gain (4) ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	10	30	—	—
---	----------	----	----	---	---

NOTES:

- Pulse Width = 10 μs , Duty Cycle = 1%.
- This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.
- Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.
- 80 μs Pulse on Tektronix 576 or equivalent.

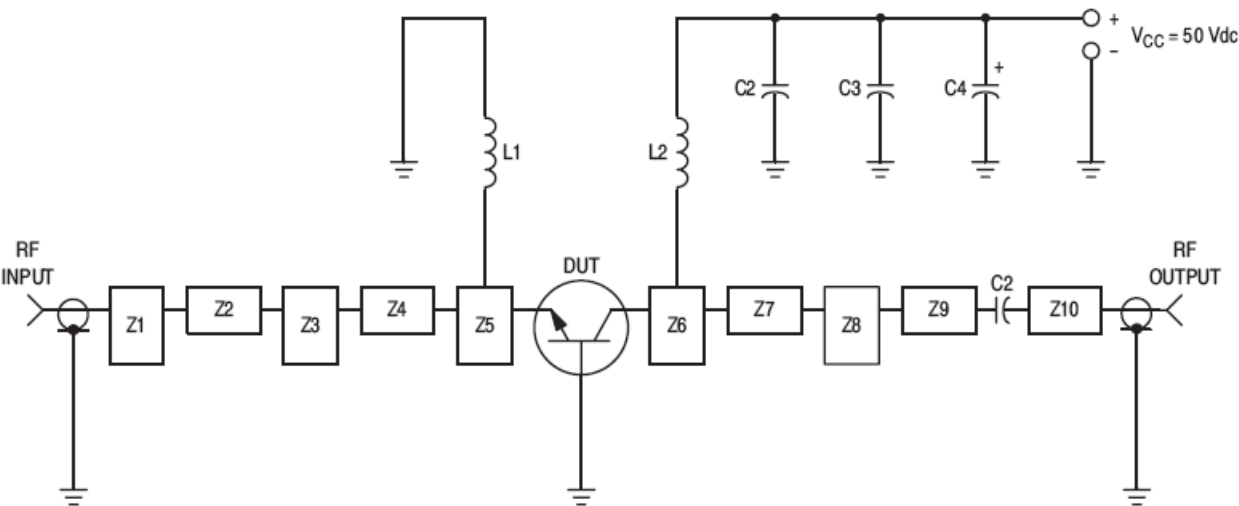
(continued)

Microwave Pulse Power Silicon NPN Transistor
150W (peak), 960–1215MHz

M/A-COM Products
Released - Rev. 07.07

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance (V _{CB} = 50 Vdc, I _E = 0, f = 1.0 MHz)	C _{ob}	—	25	32	pF
FUNCTIONAL TESTS (Pulse Width = 10 μs, Duty Cycle = 1.0%)					
Common–Base Amplifier Power Gain (V _{CC} = 50 Vdc, P _{out} = 150 W pk, f = 1090 MHz)	G _{PB}	7.8	9.8	—	dB
Collector Efficiency (V _{CC} = 50 Vdc, P _{out} = 150 W pk, f = 1090 MHz)	η	35	40	—	%
Load Mismatch (V _{CC} = 50 Vdc, P _{out} = 150 W pk, f = 1090 MHz, VSWR = 10:1 All Phase Angles)	ψ	No Degradation in Power Output			



C1, C2 — 220 pF Chip Capacitor, 100–mil ATC
C3 — 0.1 μF/100 V
C4 — 47 μF/75 V Electrolytic
L1, L2 — 3 Turns #18 AWG, 1/8" ID
Z1–Z10 — Distributed Microstrip Elements — See Photomaster
Board Material — 0.031" Thick Teflon–Fiberglass, ε_r = 2.5

Figure 1. 1090 MHz Test Circuit

Microwave Pulse Power Silicon NPN Transistor 150W (peak), 960–1215MHz

M/A-COM Products
Released - Rev. 07.07

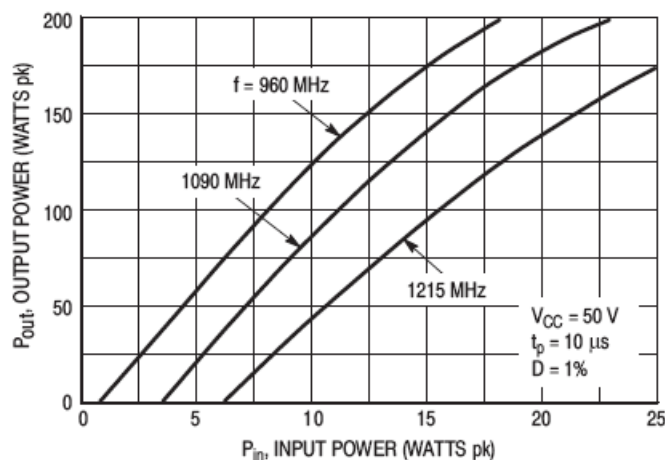


Figure 2. Output Power versus Input Power

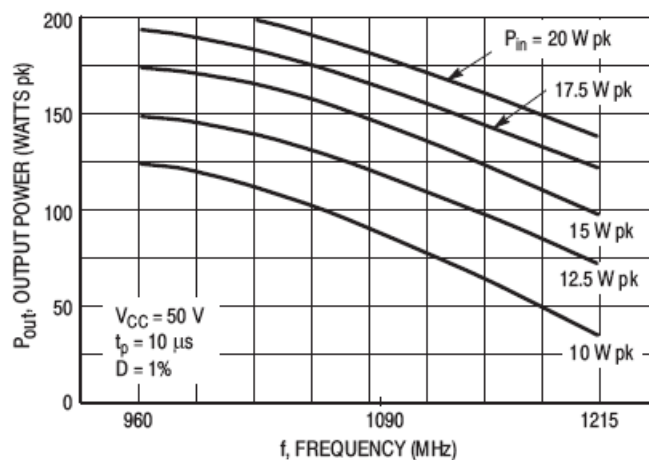


Figure 3. Output Power versus Frequency

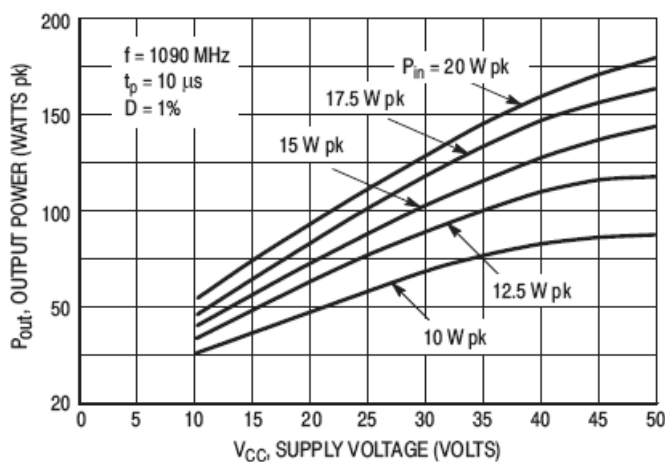


Figure 4. Output Power versus Supply Voltage

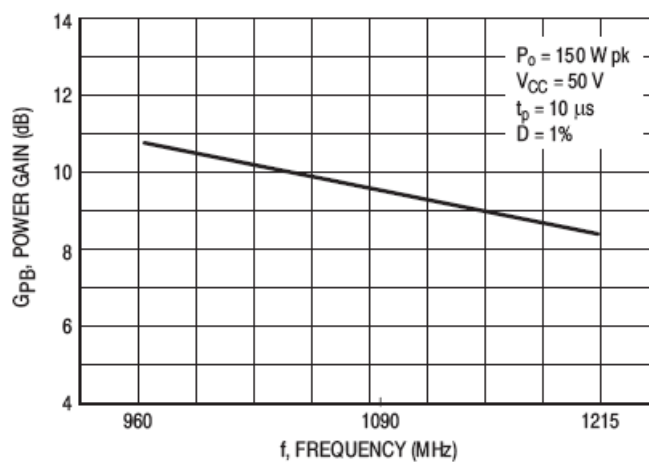
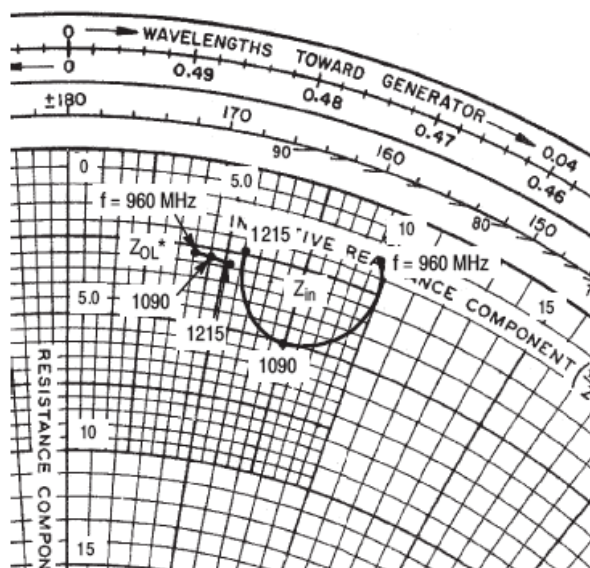


Figure 5. Power Gain versus Frequency

Microwave Pulse Power Silicon NPN Transistor
150W (peak), 960–1215MHz

M/A-COM Products
Released - Rev. 07.07



$P_{out} = 150 \text{ W pk}$ $V_{CC} = 50 \text{ V}$
 $t_p = 10 \mu\text{s}$ $D = 1\%$

f MHz	Z_{in} Ohms	Z_{OL}^* Ohms
960	$1.5 + j9.6$	$2.6 + j4.1$
1090	$5.0 + j7.5$	$2.7 + j4.6$
1215	$2.4 + j5.6$	$2.8 + j5.3$

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

Figure 6. Series Equivalent Input/Output Impedance

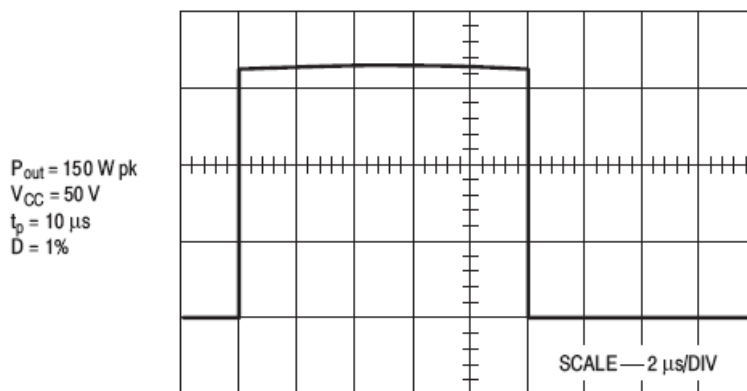


Figure 7. Typical Pulse Performance

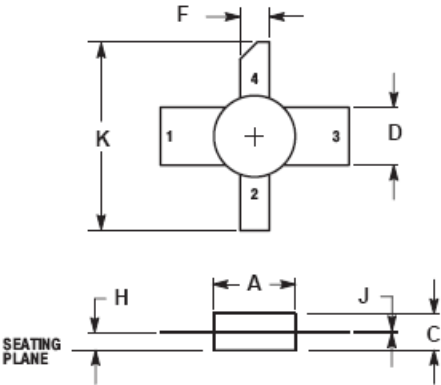
MRF1150MB



Microwave Pulse Power Silicon NPN Transistor
150W (peak), 960–1215MHz

M/A-COM Products
Released - Rev. 07.07

PACKAGE DIMENSIONS



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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.270	0.290	6.86	7.36
C	0.115	0.135	2.93	3.42
D	0.195	0.205	4.96	5.20
F	0.095	0.105	2.42	2.66
H	0.050	0.070	1.27	1.77
J	0.003	0.007	0.08	0.17
K	0.600	---	15.24	---

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

CASE 332A-03
ISSUE D