

The RF Line Microwave Pulse Power Transistors

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

- Guaranteed Performance @ 1090 MHz, 50 Vdc
 Output Power = 15 Watts Peak
 Minimum Gain = 10 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
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	60	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	17.5 100	Watts mW/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (2)	$R_{\theta JC}$	10	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 10 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	60	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 10 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 1.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	1.0	mAdc

ON CHARACTERISTICS

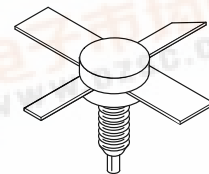
DC Current Gain ($I_C = 250 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	10	40	100	—
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NOTES:

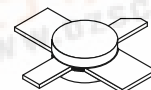
1. These devices are designed for RF operation. The total device dissipation rating applies only when the device is operated as RF amplifiers.
2. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.

**MRF1015MA
 MRF1015MB**

**15 W (PEAK), 960–1215 MHz
 MICROWAVE POWER
 TRANSISTORS
 NPN SILICON**



**CASE 332-04, STYLE 1
 MRF1015MA**

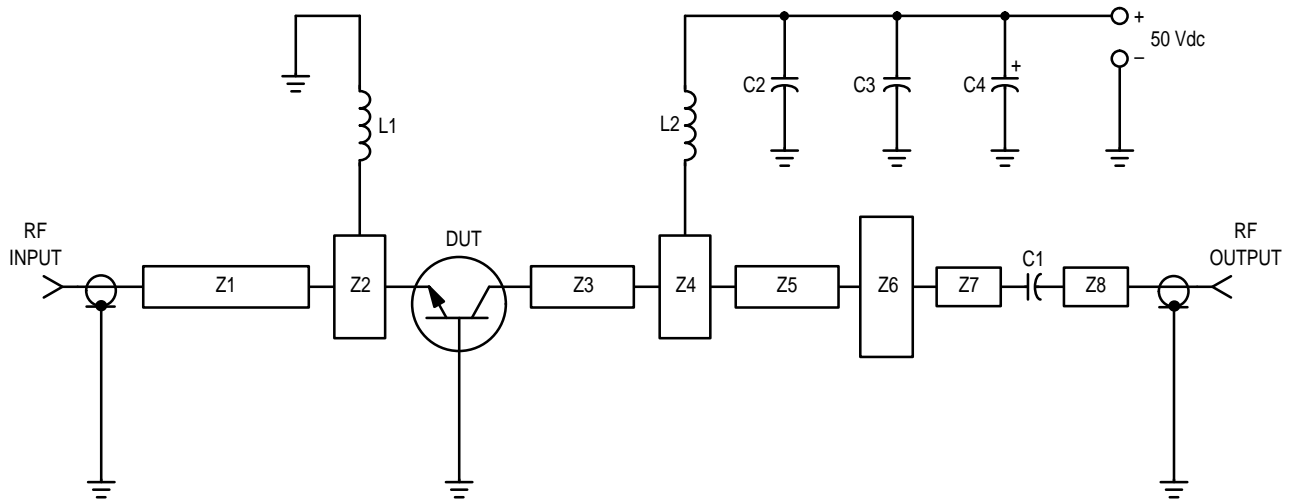


**CASE 332A-03, STYLE 1
 MRF1015MB**

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 50\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	5.0	7.5	pF
FUNCTIONAL TESTS (Pulse Width = $10\ \mu\text{s}$, Duty Cycle = 1.0%)					
Common-Base Amplifier Power Gain ($V_{CC} = 50\text{ Vdc}$, $P_{out} = 15\text{ W Peak}$, $f = 1090\text{ MHz}$)	G_{PB}	10	12.5	—	dB
Collector Efficiency ($V_{CC} = 50\text{ Vdc}$, $P_{out} = 15\text{ W Peak}$, $f = 1090\text{ MHz}$)	η	30	35	—	%
Load Mismatch ($V_{CC} = 50\text{ Vdc}$, $P_{out} = 15\text{ W Peak}$, $f = 1090\text{ MHz}$, $VSWR = 10:1$ All Phase Angles)	ψ	No Degradation in Power Output			



C1, C2 — 220 pF 100 mil Chip Capacitor
 C3 — 0.1 μF
 C4 — 47 $\mu\text{F}/75\text{ V}$ Electrolytic Capacitor
 L1, L2 — 3 Turns #18 AWG, 1/8" ID
 Z1–Z8 — Microstrip, See Photomaster
 Board Material — 0.032" Glass Teflon
 $\epsilon_r = 2.5$

Figure 1. 1090 MHz Test Circuit

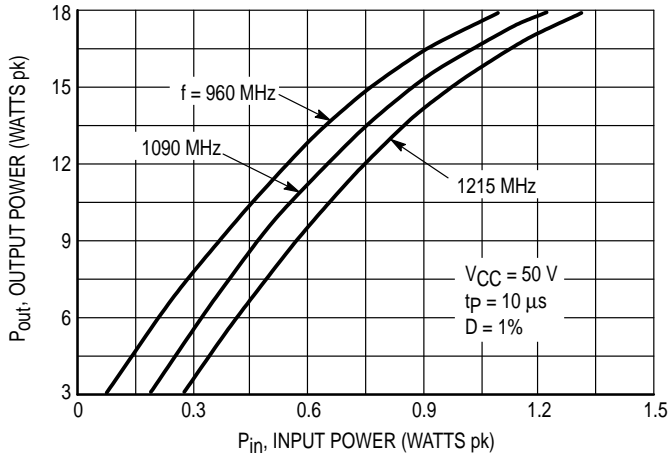


Figure 2. Output Power versus Input Power

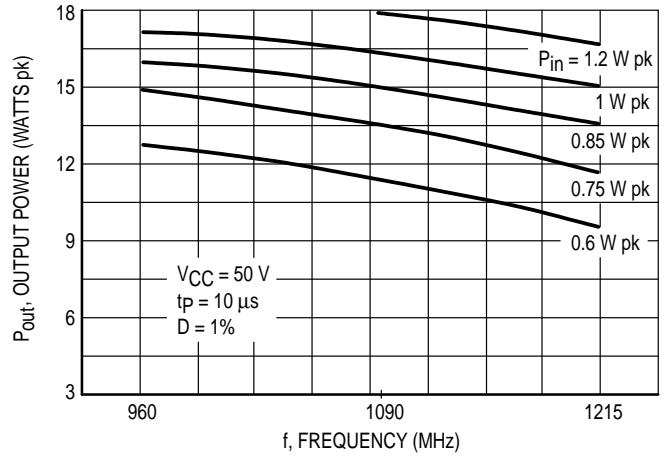


Figure 3. Output Power versus Frequency

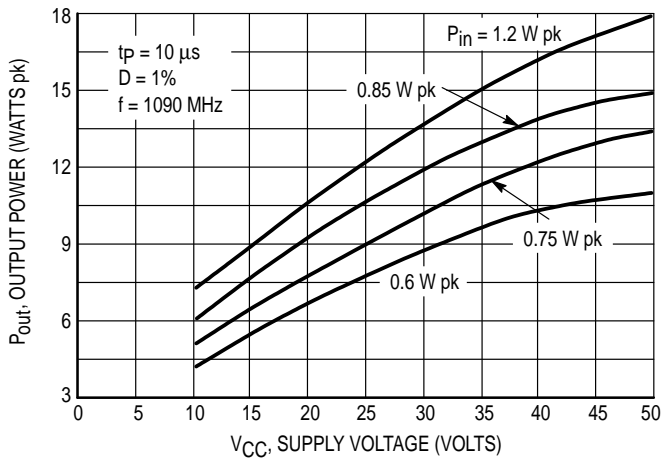


Figure 4. Output Power versus Supply Voltage

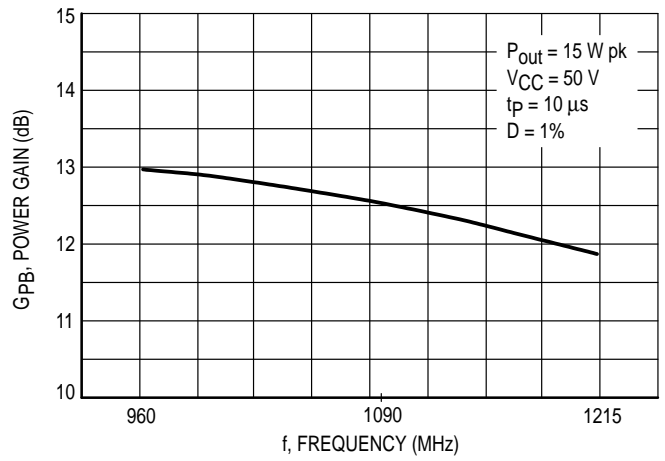
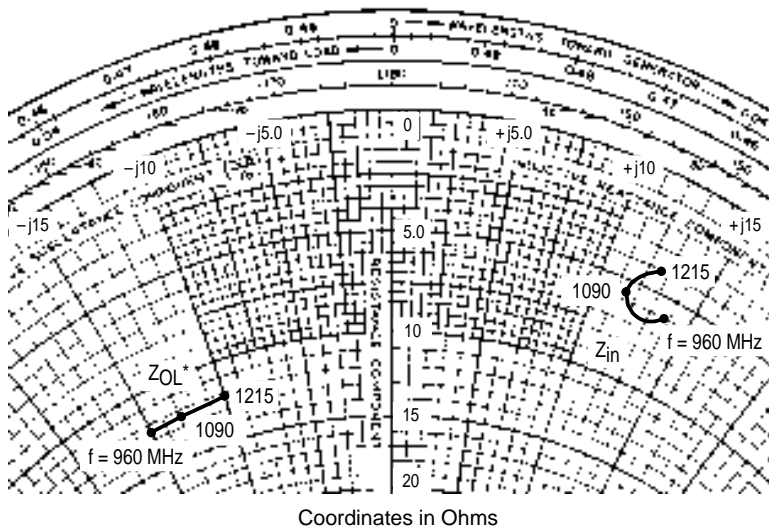


Figure 5. Power Gain versus Frequency



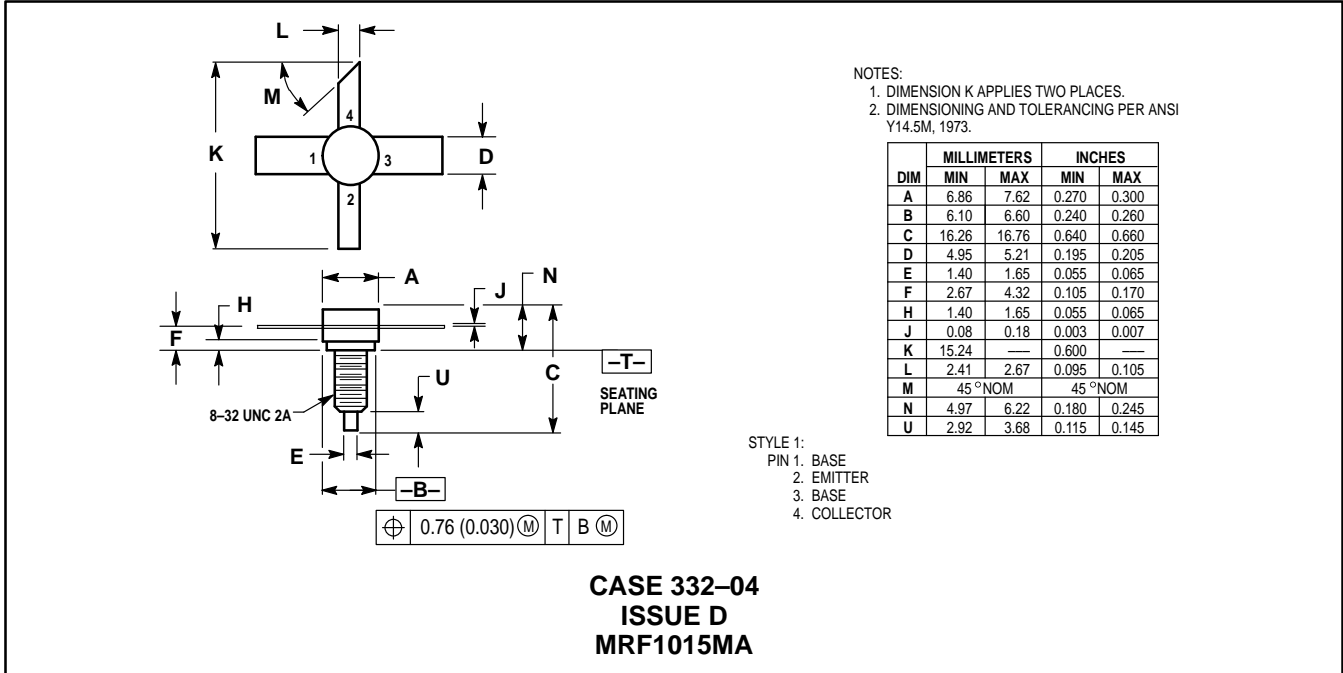
$P_{out} = 15 \text{ W pk}$ $V_{CC} = 50 \text{ V}$
 $t_p = 10 \mu\text{s}$ $D = 1\%$

f MHz	Z_{in} Ohms	Z_{OL}^* Ohms
960	$5.9 + j13.6$	$12.5 - j15$
1090	$5.5 + j11.5$	$12.4 - j12.8$
1215	$4.0 + j12.5$	$12.1 - j10$

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 Impedances

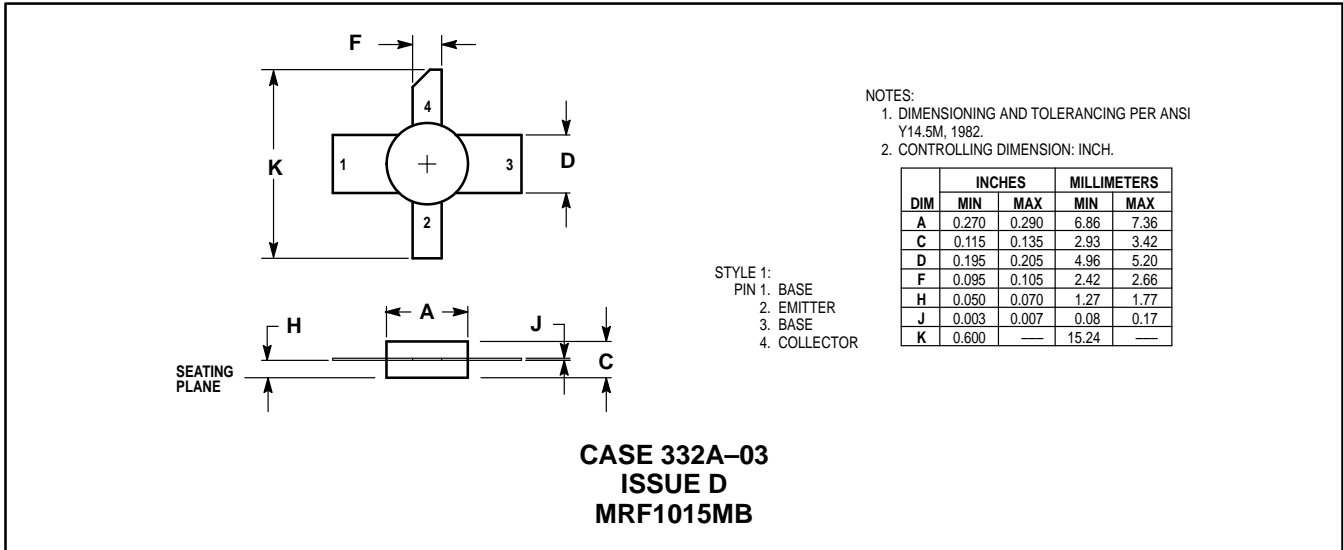
PACKAGE DIMENSIONS



NOTES:
1. DIMENSION K APPLIES TWO PLACES.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1973.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.86	7.62	0.270	0.300
B	6.10	6.60	0.240	0.260
C	16.26	16.76	0.640	0.660
D	4.95	5.21	0.195	0.205
E	1.40	1.65	0.055	0.065
F	2.67	4.32	0.105	0.170
H	1.40	1.65	0.055	0.065
J	0.08	0.18	0.003	0.007
K	15.24	—	0.600	—
L	2.41	2.67	0.095	0.105
M	45°NOM	—	45°NOM	—
N	4.97	6.22	0.180	0.245
U	2.92	3.68	0.115	0.145

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



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

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