MRF234 (SILICON)

The RF Line

NPN SILICON RF POWER TRANSISTORS

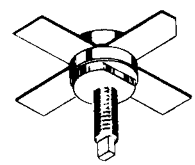
. . . designed for 12.5 Volt, mid-band large-signal amplifier applications in industrial and commercial FM equipment operating in the 40 to 100 MHz range.

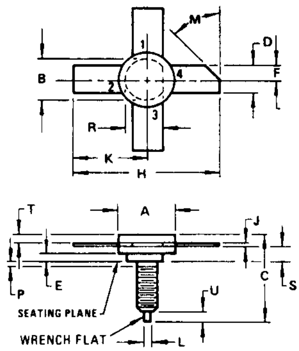
- Specified 12.5 Volt, 90 MHz Characteristics —
  Output Power = 25 Watts
  Minimum Gain = 9.5 dB
  Efficiency = 55%
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR.
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- Characterized with Parallel Equivalent Large-Signal Impedance Parameters

25 W — 90 MHz

RF POWER TRANSISTOR

NPN SILICON





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

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	18.03	19.05	0.710	0.750
D	5.59	5.84	0.220	0.230
E	1.78	2.03	0.070	0.080
F	2.79	2.92	0.110	0.115
H	26.42	28.70	1.040	1.130
J	0.10	0.15	0.004	0.006
K	13.21	14.35	0.520	0.565
L	1.40	1.65	0.055	0.065
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130

NOTE:
CASE 145A-01 USE 8-32NC2A STUD

CASE 145A-01

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Base Voltage	V_{CBO}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	4.0	Adc
Total Device Dissipation @ T_C = 25°C (1) Derate above 25°C	P_D	70 400	Watts mW/°C
Storage Temperature Range	T_{stg}	-65 to +200	°C
Stud Torque (2)	—	6.5	In. Lb.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	°C/W

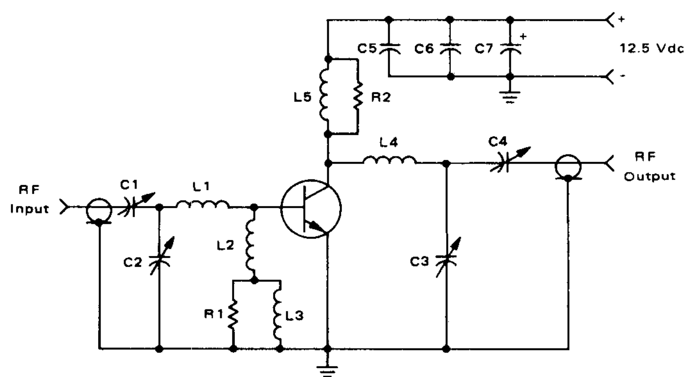
(1) These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as Class C RF Amplifiers.

(2) For repeated assembly use 5 In. Lb.

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, I_B = 0)	BV_{CEO}	18	–	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, V_{BE} = 0)	BV_{CES}	36	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 5.0 mAdc, I_C = 0)	BV_{EBO}	4.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 15 Vdc, I_E = 0)	I_{CBO}	–	–	1.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 1.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	5.0	–	–	–
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	–	100	120	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 25 W, f = 90 MHz)	G_{PE}	9.5	–	–	dB
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 25 W, f = 90 MHz)	η	55	–	–	%
Load Mismatch (V_{CC} = 12.5 Vdc, P_{out} = 25 W, f = 90 MHz, $T_C \leqslant 25°C$)	–	VSWR > 30:1 Through All Phase Angles in a 3 Second Interval After Which Devices Will Meet G_{PE} Test Limits.			

FIGURE 1 – 90 MHz TEST CIRCUIT SCHEMATIC



C1,C4	5.0-80 pF, ARCO 462
C2,C3	25-280 pF, ARCO 464
C5	1000 pF UNELCO
C6	0.047 μF, ERIE disc ceramic
C7	10 μF, 15 Vdc TANTALUM
L1	1 Turn, #16 AWG, 3/8" I.D., 1/8" Long
L2	0.22 μH, 9230-04 MILLER Molded Choke
L3	22 μH, 9230-52 MILLER Molded Choke
L4	2 Turns, #14 AWG, 3/8" I.D., 1/4" Long
L5	10 Turns, #18 AWG, 1/4" I.D., wound on R2
R1	15 Ohms, 1/2 W, 10%
R2	47 Ohm, 1 W Carbon

Input/Output Connector – Type BNC

FIGURE 2 – OUTPUT POWER versus INPUT POWER

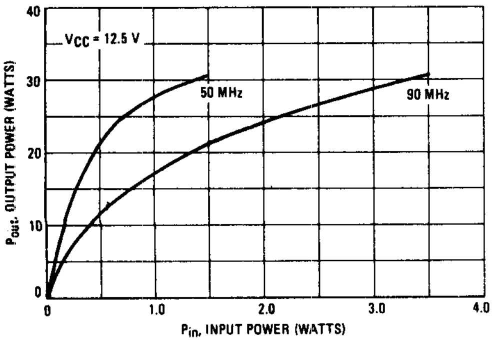


FIGURE 3 – OUTPUT POWER versus FREQUENCY

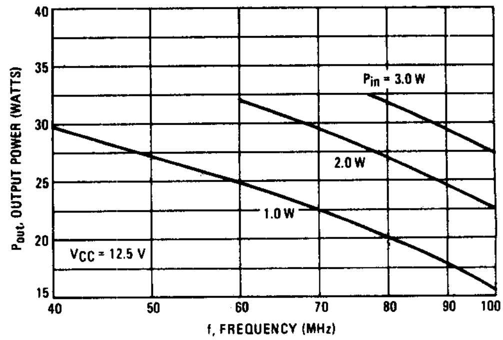


FIGURE 4 – OUTPUT POWER versus SUPPLY VOLTAGE

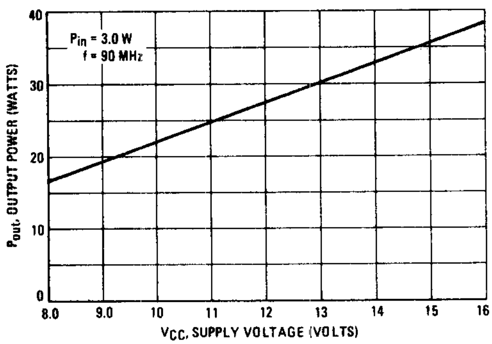
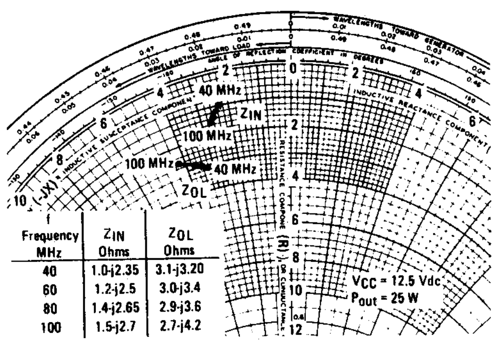


FIGURE 5 – SERIES EQUIVALENT IMPEDANCE



f Frequency MHz	ZIN Ohms	ZOL Ohms
40	1.0-j2.35	3.1-j3.20
60	1.2-j2.5	3.0-j3.4
80	1.4-j2.65	2.9-j3.6
100	1.5-j2.7	2.7-j4.2

FIGURE 6 – PARALLEL EQUIVALENT INPUT RESISTANCE versus FREQUENCY

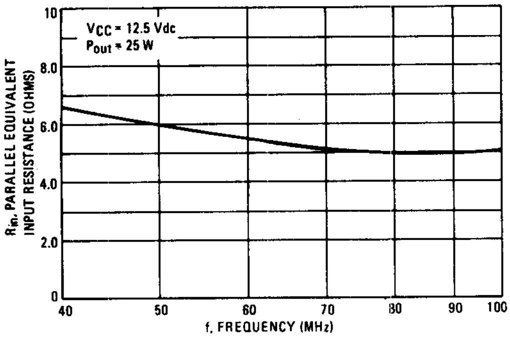


FIGURE 7 – PARALLEL EQUIVALENT INPUT CAPACITANCE versus FREQUENCY

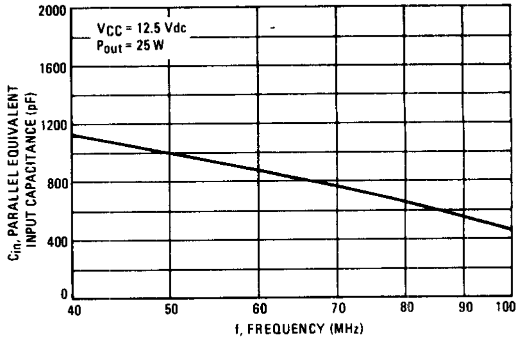


FIGURE 8 – PARALLEL EQUIVALENT OUTPUT RESISTANCE versus FREQUENCY

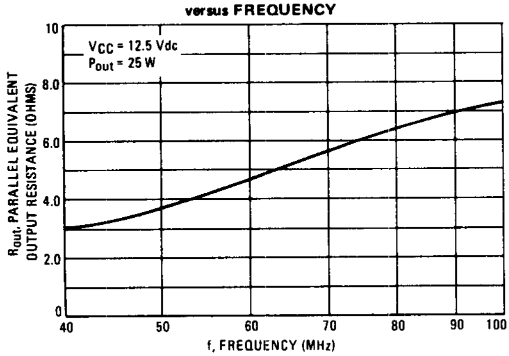


FIGURE 9 – PARALLEL EQUIVALENT OUTPUT CAPACITANCE versus FREQUENCY