MOTOROLA

MRF237

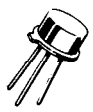
The RF Line

NPN SILICON RF POWER TRANSISTOR

. . . designed for 12.5 Volt large-signal power amplifier applications in communication equipment operating to 225 MHz.

- Specified 12.5 Volt, 175 MHz Characteristics —
  Output Power = 4.0 Watts
  Minimum Gain = 12 dB
  Efficiency = 50%
- Characterized With Series Equivalent Large-Signal Impedance Parameters
- Grounded Emitter TO-39 Package for High Gain and Excellent Heat Dissipation
- Replaces Medium Power Stud Mount Devices

4 W – 175 MHz
RF POWER TRANSISTOR
NPN SILICON



MAXIMUM RATINGS

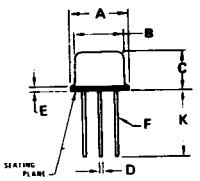
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Base Voltage	V_{CBO}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	640	mAdc
Total Power Dissipation @ $T_C = 25^oC$ Derate above 25^oC	P_D	8.0 45.7	Watts mW/^oC
Storage Temperature Range	T_{stg}	-65 to +200	^oC

THERMAL CHARACTERISTICS

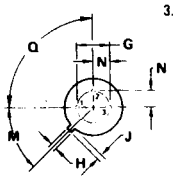
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	20	$^oC/W$

ELECTRICAL CHARACTERISTICS ($T_C = 25^oC$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	BV_{CEO}	18	–	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, V_{BE} = 0)	BV_{CES}	36	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 1.0 mAdc, I_C = 0)	BV_{EBO}	4.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 15 Vdc, I_E = 0)	I_{CBO}	–	–	0.25	mAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 250 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	5.0	–	–	–
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 15 Vdc, I_E = 0, f = 0.1 MHz)	C_{ob}	–	15	20	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (P_{out} = 4.0 W, V_{CC} = 12.5 Vdc, I_C (max) = 640 mAdc, f = 175 MHz)	G_{PE}	12	14	–	dB
Collector Efficiency (P_{out} = 4.0 W, V_{CC} = 12.5 Vdc, I_C (max) = 640 mAdc, f = 175 MHz)	η	50	62	–	%



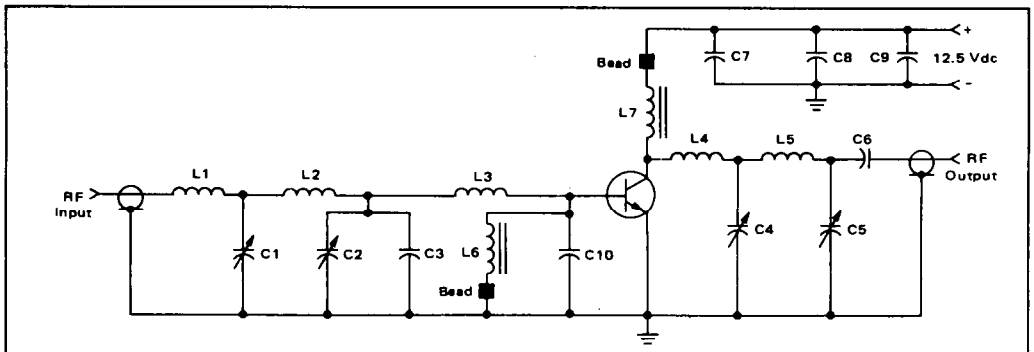
STYLE 5:
PIN 1. COLLECTOR
2. BASE
3. EMITTER



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.02	9.30	0.355	0.366
B	8.00	8.51	0.315	0.335
C	4.19	4.57	0.165	0.180
D	0.43	0.53	0.017	0.021
E	0.43	0.89	0.017	0.035
F	0.41	0.48	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.71	0.86	0.028	0.034
J	0.74	1.02	0.029	0.040
K	12.70	–	0.500	–
M	45° NOM		45° NOM	
N	2.54 TYP		0.100 TYP	
Q	90° NOM		90° NOM	

CASE 79-03

FIGURE 1 – 175 MHz TEST CIRCUIT SCHEMATIC



C1,C4,C5	3.0 - 180 pF, ARCO 463	L1	1/2 Turn, #16 AWG, 0.5" I.D.
C2	1.75 - 30 pF, ARCO 461	L2	1", #16 AWG
C3	40 pF, UNELCO	L3	0.75" #16 AWG
C6	0.01 μF, ERIE	L4,L5	1 Turn, #16 AWG, 0.5" I.D.
C7	0.1 μF, ERIE REDCAP	L6	0.15 μH Molded Choke
C8	1.0 μF, TANTALUM	L7	1.2 μH Molded Choke
C9	1000 pF, UNELCO	Beads	FERRITE Beads, FERROXCUBE
C10	100 pF UNELCO		#56-570-65/38

FIGURE 2 – OUTPUT POWER versus INPUT POWER

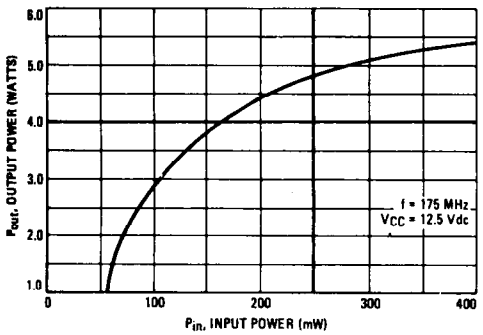


FIGURE 3 – OUTPUT POWER versus FREQUENCY

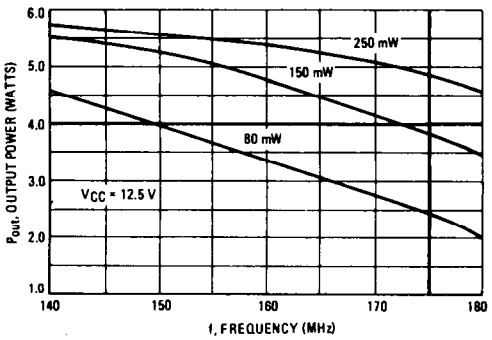


FIGURE 4 – OUTPUT POWER versus SUPPLY VOLTAGE

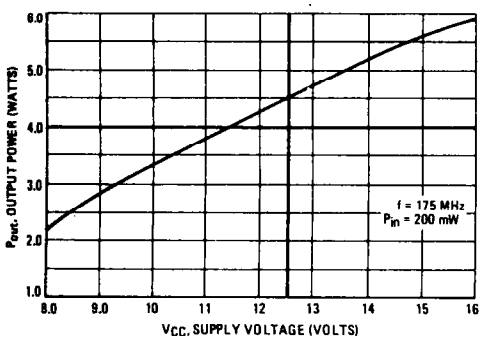
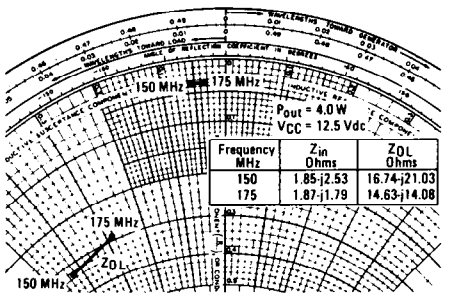


FIGURE 5 – SERIES EQUIVALENT IMPEDANCE



Frequency MHz	Z_{in} Ohms	Z_{OL} Ohms
150	1.85-j2.53	16.74-j21.03
175	1.87-j1.79	14.63-j14.08