

**MRF4070**

**The RF Line**

**NPN SILICON RF POWER TRANSISTOR**

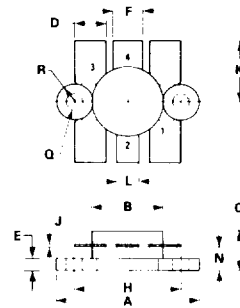
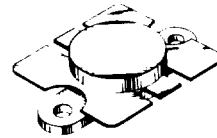
... designed for 12.5 Volt VHF large-signal amplifier applications in industrial and commercial FM equipment operating to 175 MHz.

- Specified 12.5 Volt, 175 MHz Characteristics —
  - Output Power = 70 Watts
  - Minimum Gain = 5.0 dB
  - Efficiency = 55%
- Characterized With Series Equivalent Large-Signal Impedance Parameters
- Built-In Matching Network for Broadband Operation
- Capable of Withstanding VSWR of 20:1 at Rated P<sub>out</sub> and 15.5 V

70 W 175 MHz

**CONTROLLED Q  
 RF POWER  
 TRANSISTOR**

NPN SILICON



STYLE 1  
 PIN 1 EMITTER  
 2 COLLECTOR  
 3 EMITTER  
 4 BASE

NOTE  
 FLANGE IS ISOLATED IN ALL STYLES

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.38	25.14	0.960	0.990
B	12.45	12.95	0.490	0.510
C	5.97	7.62	0.235	0.300
D	5.33	5.58	0.210	0.220
E	2.16	3.04	0.085	0.120
F	5.08	5.33	0.200	0.210
H	18.29	18.54	0.720	0.730
J	0.10	0.15	0.004	0.006
K	10.29	11.17	0.405	0.440
L	3.81	4.06	0.150	0.160
N	3.81	4.31	0.150	0.170
Q	2.92	3.30	0.115	0.130
R	3.05	3.30	0.120	0.130
U	11.94	12.57	0.470	0.495

CASE 316-01

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	16	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	36	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current — Peak	I <sub>C</sub>	20	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate Above 25°C	P <sub>D</sub>	250 1.43	Watts W/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	0.7	°C/W

# MRF4070

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 50 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	16	—	—	Vdc
Collector-Emittor Breakdown Voltage (I <sub>C</sub> = 50 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CBO</sub>	36	—	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	—	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 12.5 Vdc, V <sub>BE</sub> = 0, T <sub>C</sub> = 25°C)	I <sub>CES</sub>	—	—	10	mAdc
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	5.0	—	—	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance (V <sub>CB</sub> = 15 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	—	—	275	pF
<b>FUNCTIONAL TESTS (Figure 1)</b>					
Common-Emitter Amplifier Power Gain (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 70 Watts, f = 175 MHz)	G <sub>PE</sub>	5.0	—	—	dB
Input Power (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 70 Watts, f = 175 MHz)	P <sub>in</sub>	—	—	20	Watts
Collector Efficiency (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 70 Watts, f = 175 MHz)	η	55	—	—	%

FIGURE 1 — 175 MHz TEST CIRCUIT SCHEMATIC

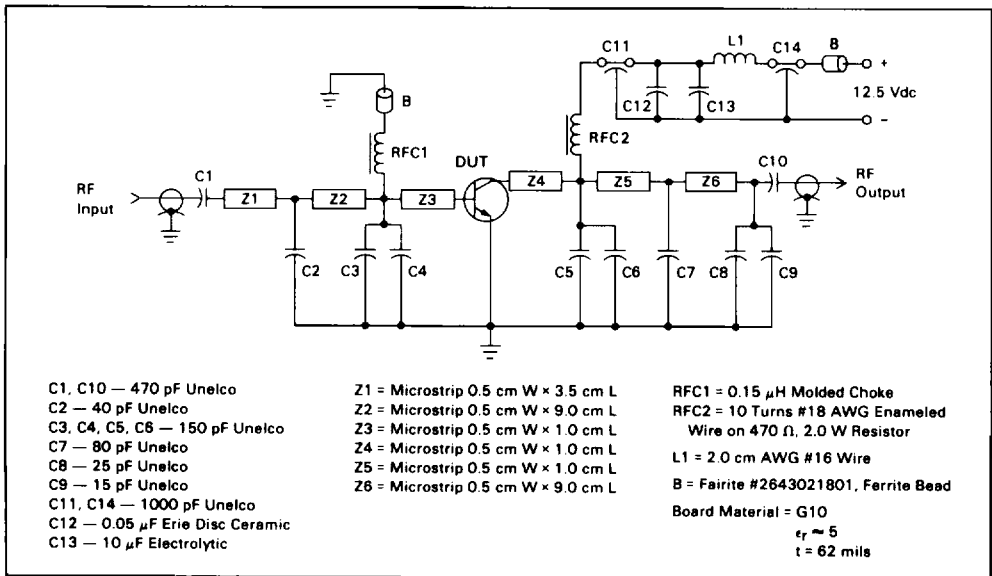


FIGURE 2 — OUTPUT POWER versus INPUT POWER

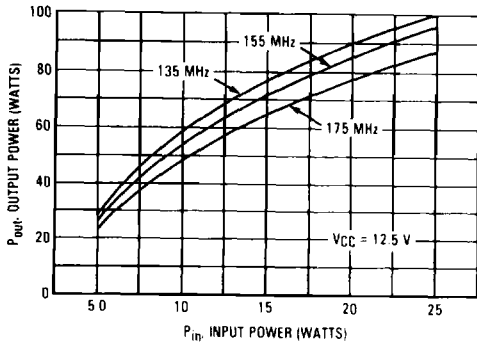


FIGURE 3 — OUTPUT POWER versus INPUT POWER

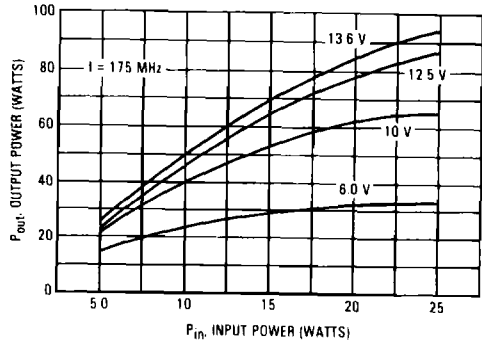


FIGURE 4 — OUTPUT POWER versus FREQUENCY

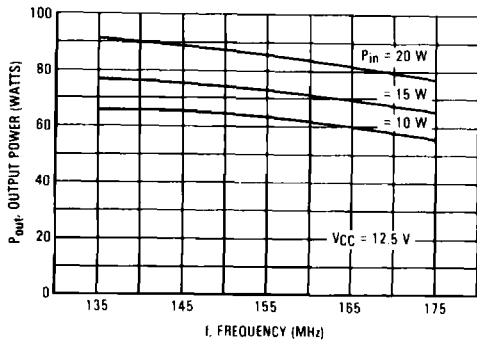
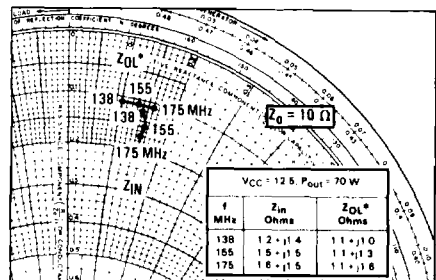


FIGURE 5 — SERIES EQUIVALENT IMPEDANCE



Z<sub>0L</sub><sup>\*</sup> = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage, and frequency.

FIGURE 6 — OUTPUT POWER versus SUPPLY VOLTAGE

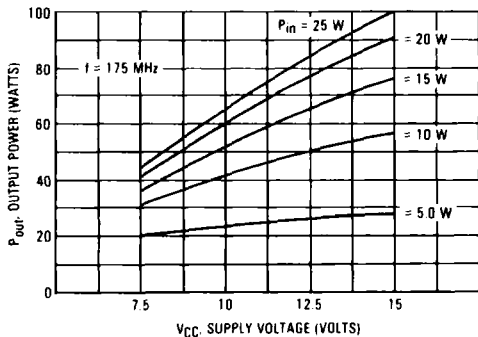


FIGURE 7 — OUTPUT POWER versus VOLTAGE

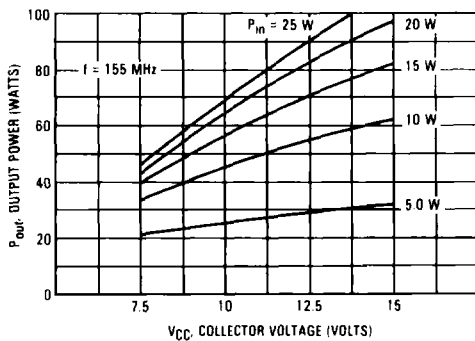


FIGURE 8 — OUTPUT POWER versus VOLTAGE

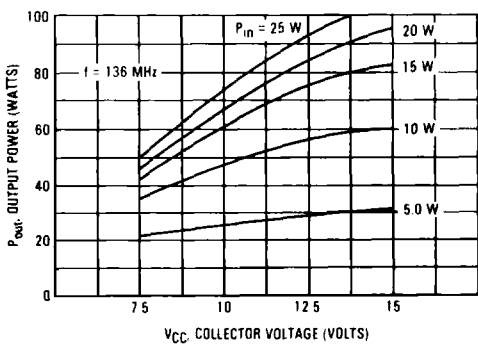


FIGURE 9 — BROADBAND PERFORMANCE GAIN, RETURN LOSS, EFFICIENCY versus FREQUENCY

