

The RF Line

NPN Silicon

RF Power Transistor

... designed for 12.5 Volt VHF large-signal power amplifier applications required in commercial and industrial equipment operating to VHF frequencies.

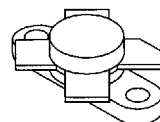
- Specified 12.5 Volt, 175 MHz Characteristics —
Output Power = 40 W
Power Gain = 4.5 dB Min
Efficiency = 70% Min

MRF224

**40 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	7.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (2) Derate above 25°C	P_D	80 0.46	Watts W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$
Stud Torque (1)	—	6.5	in. lb.



CASE 211-07, STYLE 1

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 ($I_C = 100\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CEO}$	18	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 20\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 15\text{ Vdc}$, $V_{BE} = 0$, $T_C = +55^\circ\text{C}$)	I_{CES}	—	—	10	mAdc
Collector Cutoff Current ($V_{CB} = 15\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	2.5	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 1.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	5.0	—	—	—
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DYNAMIC CHARACTERISTICS

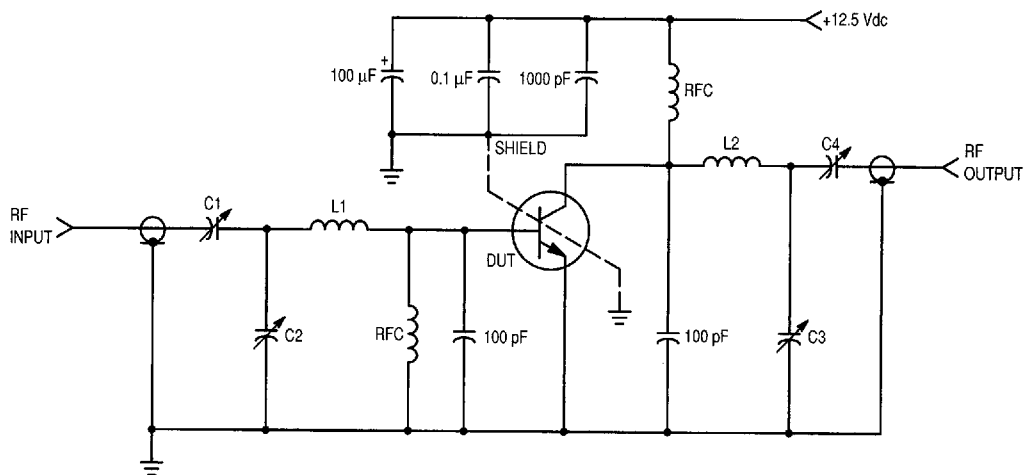
Output Capacitance ($V_{CB} = 15\text{ Vdc}$, $I_E = 0$, $f = 0.1\text{ MHz}$)	C_{ob}	—	170	200	pF
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FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain ($P_{out} = 40\text{ W}$, $V_{CC} = 12.5\text{ Vdc}$, $f = 175\text{ MHz}$)	G_{PE}	4.5	—	—	dB
Collector Efficiency ($P_{out} = 40\text{ W}$, $V_{CC} = 12.5\text{ Vdc}$, $f = 175\text{ MHz}$)	η	70	—	—	%

NOTES:

- For repeated assembly use 5 in. lb.
- These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.



C1, C2, C3, C4 — 5.0–80 pF ARCO 462
 L1 — Straight Wire, #14 AWG, 1–3/8" Long
 L2 — 1 Turn, #14 AWG, 3/8" ID, Length Plus Leads = 1"
 RFC — VK200–20/4B, FERROXCUBE

Figure 1. 175 MHz Test Circuit

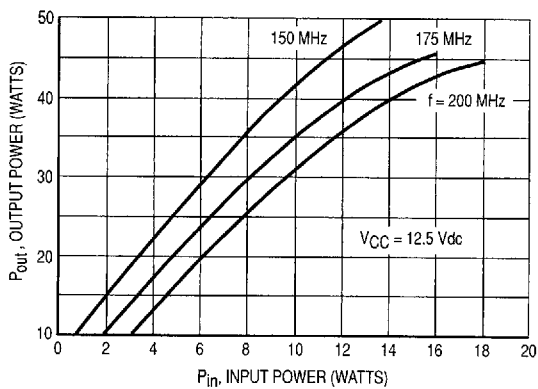


Figure 2. Output Power versus Input Power

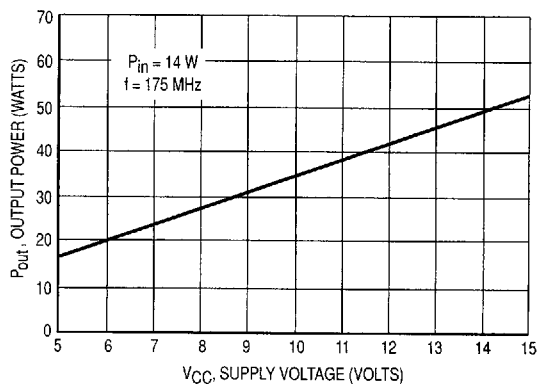
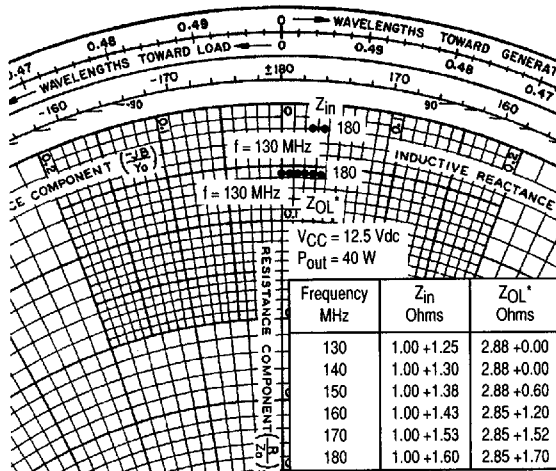


Figure 3. Output Power versus Supply Voltage



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

Figure 4. Series Equivalent Impedance