

The RF Line

NPN Silicon

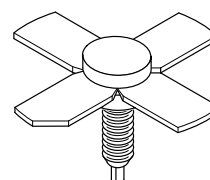
RF Power Transistor

... designed for 12.5 volt VHF large-signal power amplifiers in commercial and industrial FM equipment.

- Compact .280 Stud Package
- Specified 12.5 V, 175 MHz Performance
 - Output Power = 15 Watts
 - Power Gain = 12 dB Min
 - Efficiency = 60% Min
- Characterized to 220 MHz
- Load Mismatch Capability at High Line and Overdrive

MRF2628

15 W 136–220 MHz
RF POWER
TRANSISTOR
NPN SILICON



CASE 244-04, STYLE 1

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	2.5	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.23	Watts W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	–65 to +150	$^\circ\text{C}$
Junction Temperature	T_J	200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.0	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

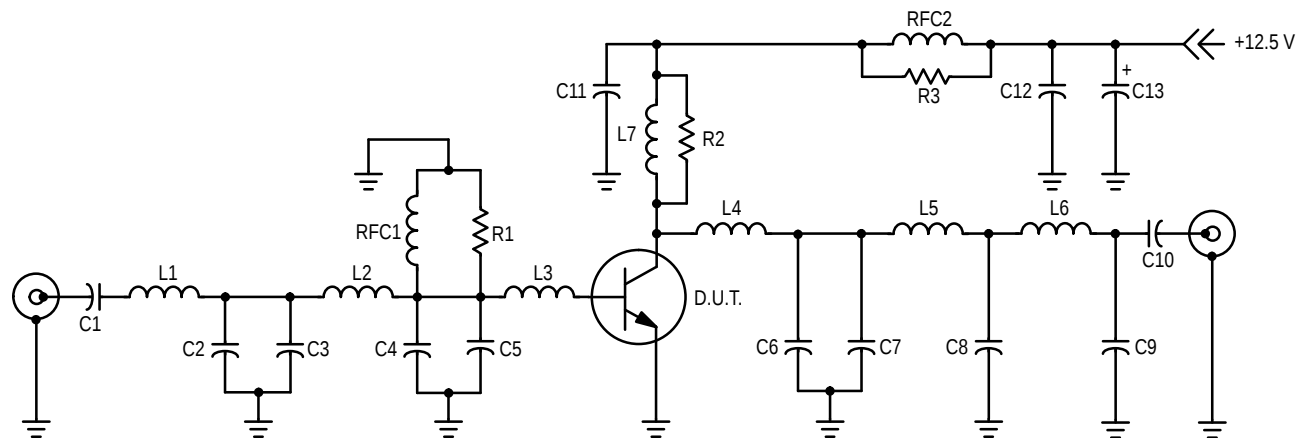
Collector–Emitter Breakdown Voltage ($I_C = 25 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	18	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 25 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	36	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 5.0 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 15 \text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	1.0	mAdc

(continued)



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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ($I_C = 500\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	10	70	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 15\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	33	60	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 15\text{ W}$, $f = 175\text{ MHz}$)	G_{pe}	12	13	—	dB
Collector Efficiency ($V_{CC} = 12.5\text{ Vdc}$, $P_{out} = 15\text{ W}$, $f = 175\text{ MHz}$)	η	60	68	—	%
Load Mismatch ($V_{CC} = 15.5\text{ Vdc}$, $P_{in} = 2.0\text{ dB}$ Overdrive, Load VSWR = 30:1)	ψ	No Degradation in Output Power			



C1, C10, C11 — 1000 pF Ceramic Chip Capacitor
 C2 — 27 pF Mini Unelco Capacitor
 C3 — 33 pF Mini Unelco Capacitor
 C4, C5 — 270 pF Unelco J101 Capacitor
 C6, C9 — 18 pF Mini Unelco Capacitor
 C7 — 91 pF Mini Unelco Capacitor
 C8 — 68 pF Mini Unelco Capacitor
 C12 — 0.1 μF Monolithic Capacitor
 C13 — 100 μF , 15 V Electrolytic
 L1 — 3 Turns #18 AWG, 3/16" ID
 L2 — 1-1/8" #18 AWG into 1/2" High Loop

L3 — Copper Pad, 0.200 x 0.400 x 0.060
 L4 — 1/4" #18 AWG into 1/8" High Loop
 L5 — 3 Turns #24 AWG Enameled, 3/32" ID
 L6 — 6 Turns #24 AWG Enameled, 3/32" ID
 L7 — 1-3/4" #16 AWG into 3/4" High Loop
 R1 — 12 Ω , 1/2 W Carbon
 R2 — 100 Ω , 1.0 W Carbon
 R3 — 10 Ω , 1.0 W Carbon
 RFC1 — 0.15 μH Molded Choke
 RFC2 — Ferroxcube Choke, VK200-4B

Figure 1. Broadband Circuit

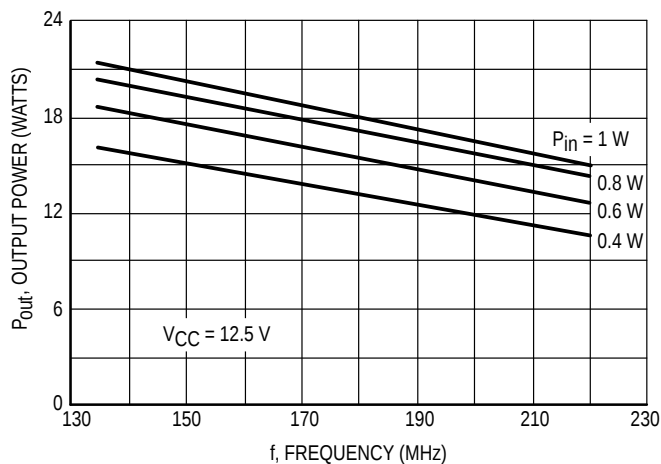


Figure 2. Output Power versus Frequency

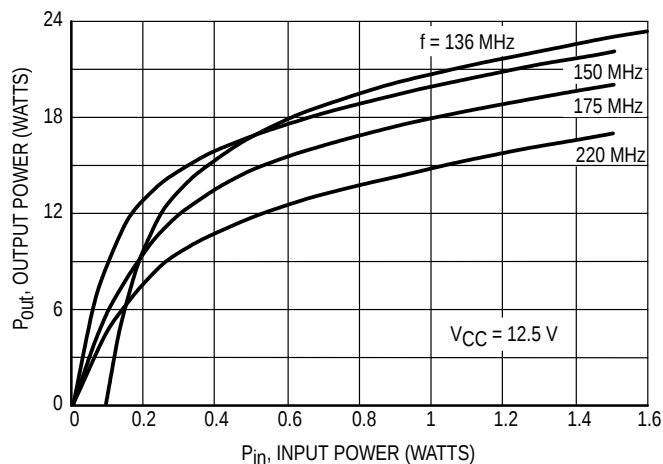


Figure 3. Output Power versus Input Power

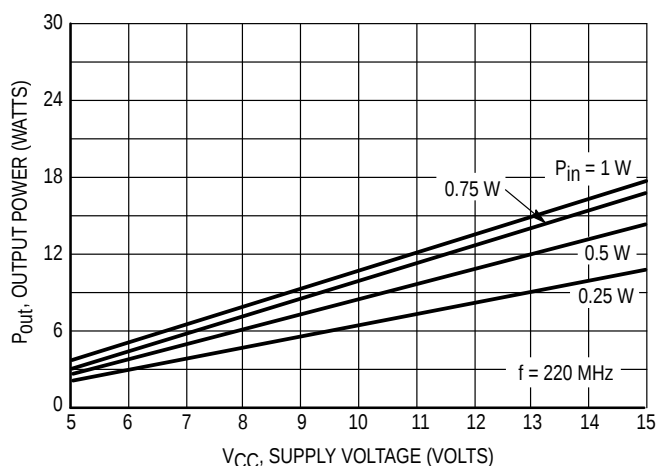


Figure 4. Output Power versus Supply Voltage

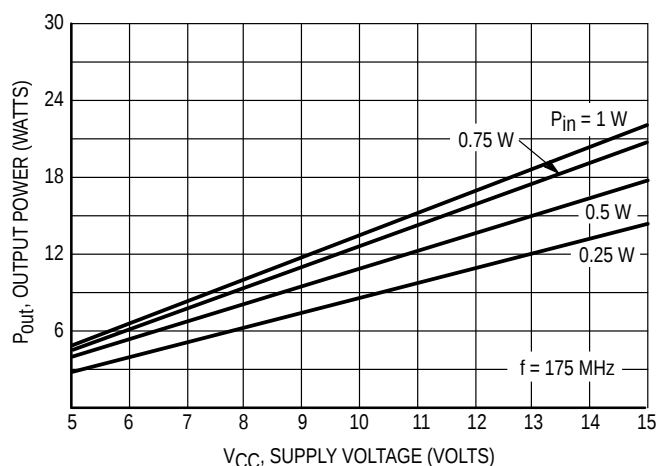


Figure 5. Output Power versus Supply Voltage

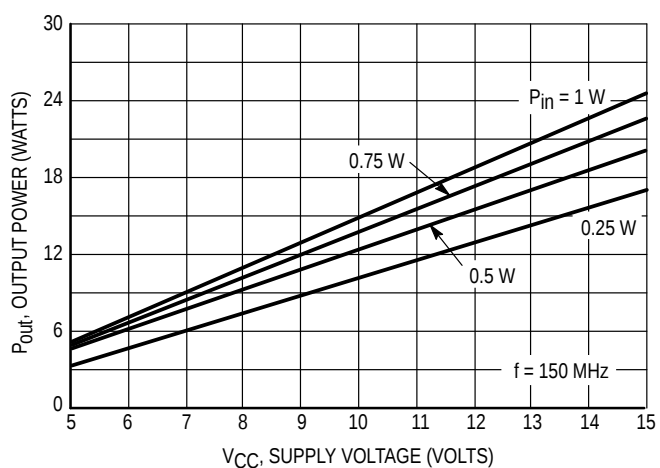


Figure 6. Output Power versus Supply Voltage

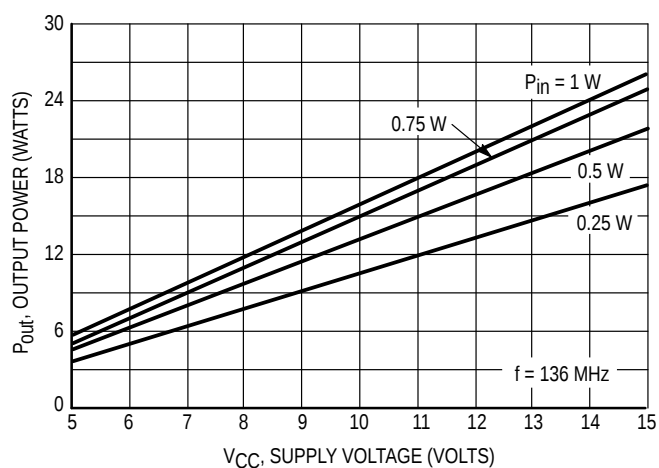


Figure 7. Output Power versus Supply Voltage

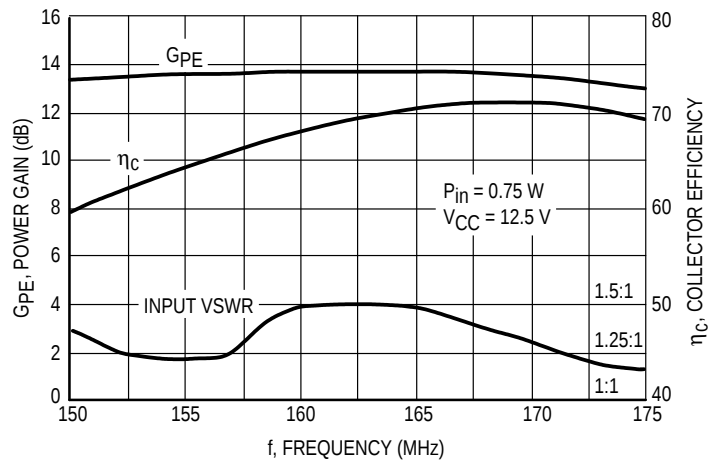
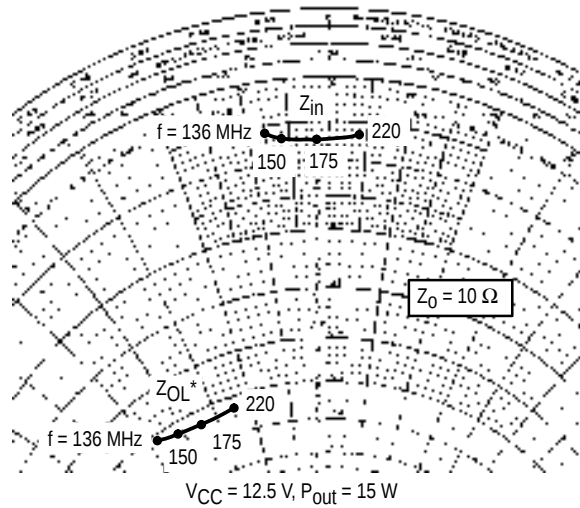


Figure 8. Typical Performance in a Broadband Circuit

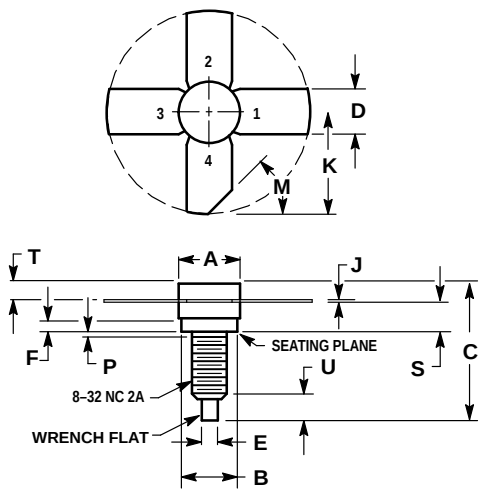


f MHz	Z_{in} Ohms	Z_{OL}^* Ohms
136	$0.59 - j0.80$	$5.07 - j4.76$
150	$0.68 - j0.61$	$5.23 - j4.14$
175	$0.69 - j0.17$	$5.26 - j3.46$
220	$0.62 + j0.39$	$5.25 - j2.46$

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

Figure 9. Series Equivalent Impedance

PACKAGE DIMENSIONS



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.06	7.26	0.278	0.286
B	6.20	6.50	0.244	0.256
C	14.99	16.51	0.590	0.650
D	5.46	5.96	0.215	0.235
E	1.40	1.65	0.055	0.065
G	1.52	—	0.060	—
J	0.08	0.17	0.003	0.007
K	11.05	—	0.435	—
M	45° NOM		45° NOM	
P	—	1.27	—	0.050
S	3.00	3.25	0.118	0.128
T	1.40	1.77	0.055	0.070
U	2.92	3.68	0.115	0.145

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

CASE 244-04
ISSUE J

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