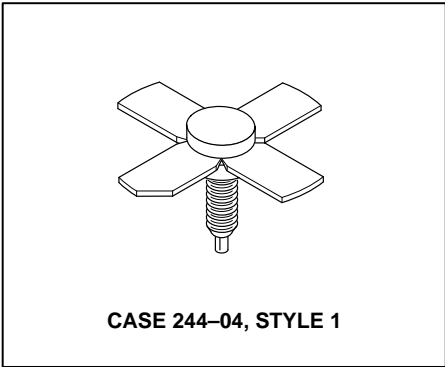


The RF Line
NPN Silicon
RF Power Transistor

... 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



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	18	Vdc
Collector-Base Voltage	V _{CB0}	36	Vdc
Emitter-Base Voltage	V _{EBO}	4.0	Vdc
Collector Current — Continuous	I _C	2.5	Adc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	40 0.23	Watts W/°C
Storage Temperature Range	T _{stg}	-65 to +150	°C
Junction Temperature	T _J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	4.0	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
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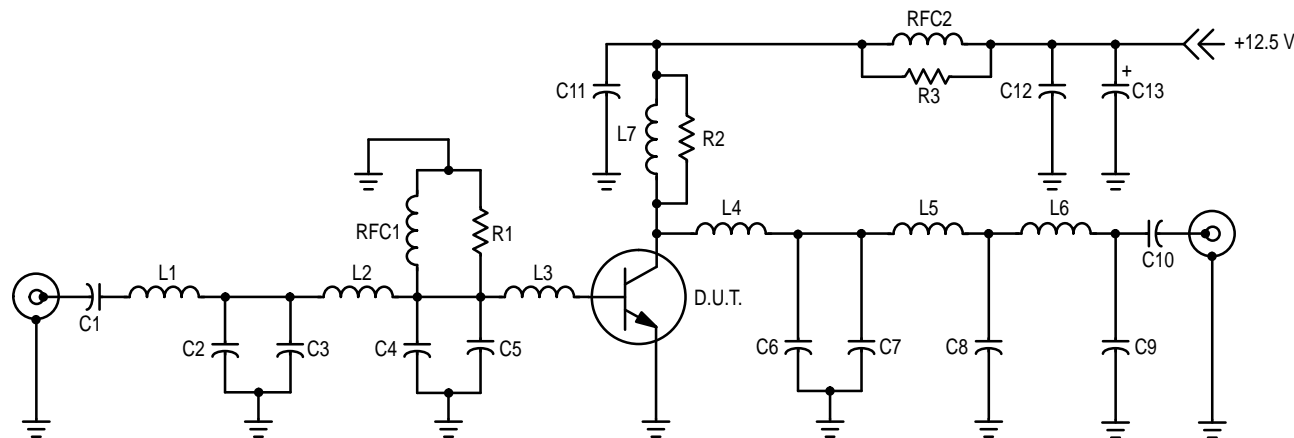
OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (I _C = 25 mA, I _B = 0)	V _{(BR)CEO}	18	—	—	Vdc
Collector-Emitter Breakdown Voltage (I _C = 25 mA, V _{BE} = 0)	V _{(BR)CES}	36	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 5.0 mA, I _C = 0)	V _{(BR)EBO}	4.0	—	—	Vdc
Collector Cutoff Current (V _{CB} = 15 Vdc, I _E = 0)	I _{CB0}	—	—	1.0	mA

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ($I_C = 500 \text{ mA}_{dc}$, $V_{CE} = 5.0 \text{ V}_{dc}$)	h_{FE}	10	70	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 15 \text{ V}_{dc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	33	60	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 12.5 \text{ V}_{dc}$, $P_{out} = 15 \text{ W}$, $f = 175 \text{ MHz}$)	G_{pe}	12	13	—	dB
Collector Efficiency ($V_{CC} = 12.5 \text{ V}_{dc}$, $P_{out} = 15 \text{ W}$, $f = 175 \text{ MHz}$)	η	60	68	—	%
Load Mismatch ($V_{CC} = 15.5 \text{ V}_{dc}$, $P_{in} = 2.0 \text{ dB Overdrive}$, 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

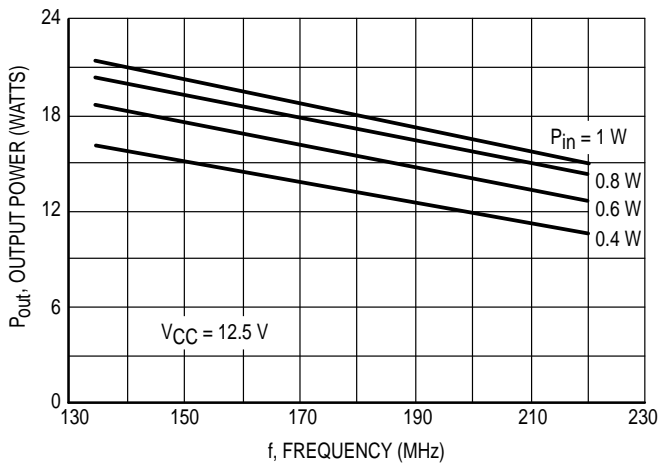


Figure 2. Output Power versus Frequency

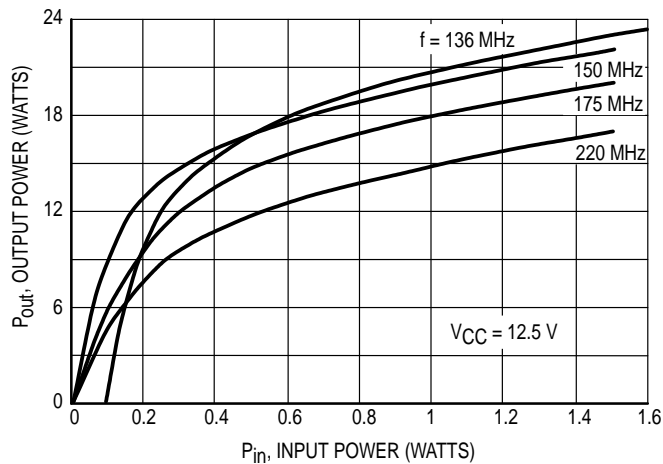


Figure 3. Output Power versus Input Power

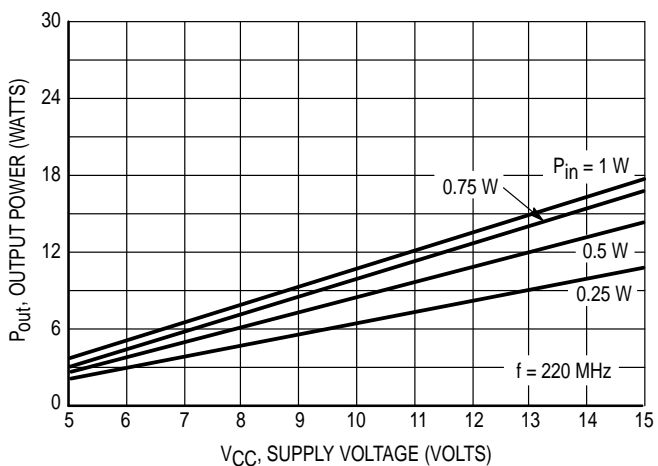


Figure 4. Output Power versus Supply Voltage

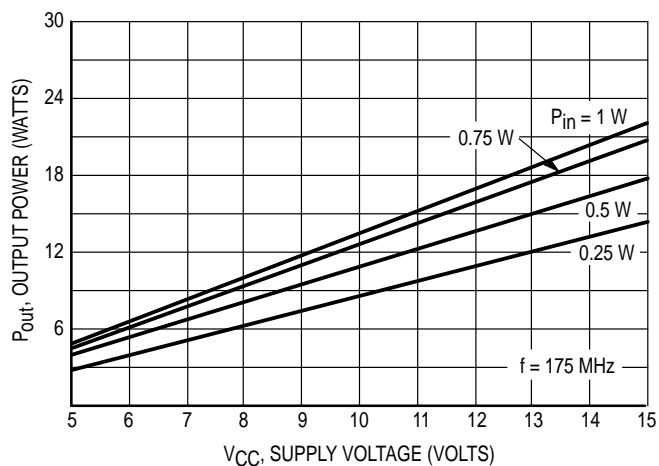


Figure 5. Output Power versus Supply Voltage

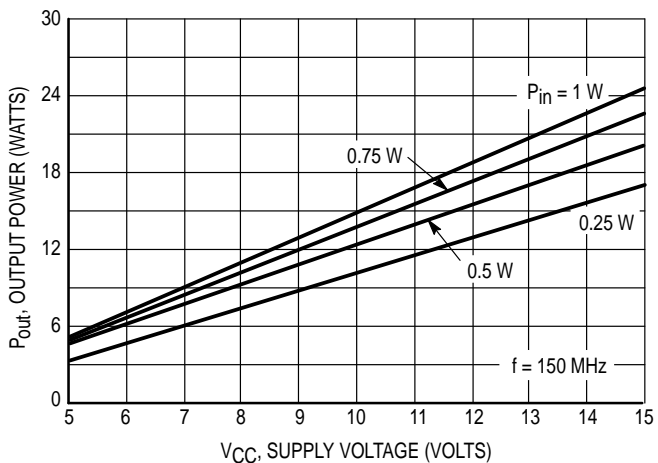


Figure 6. Output Power versus Supply Voltage

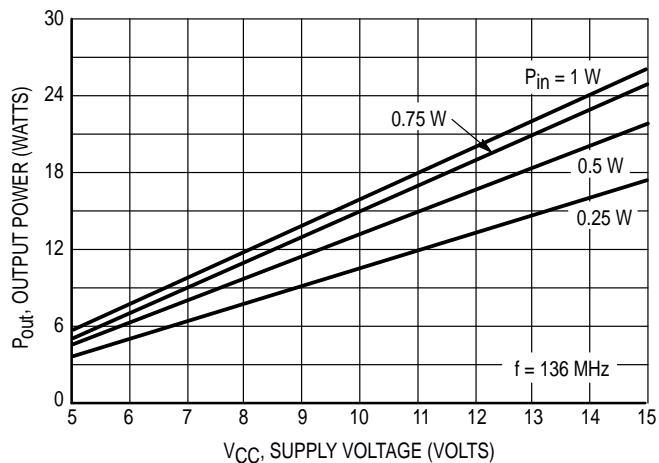


Figure 7. Output Power versus Supply Voltage

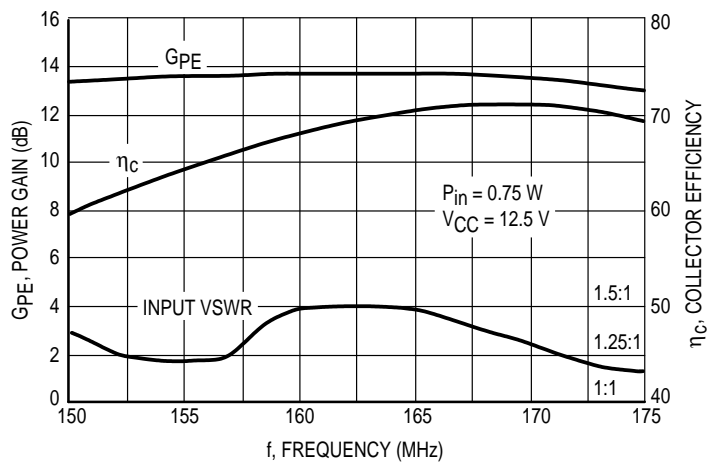
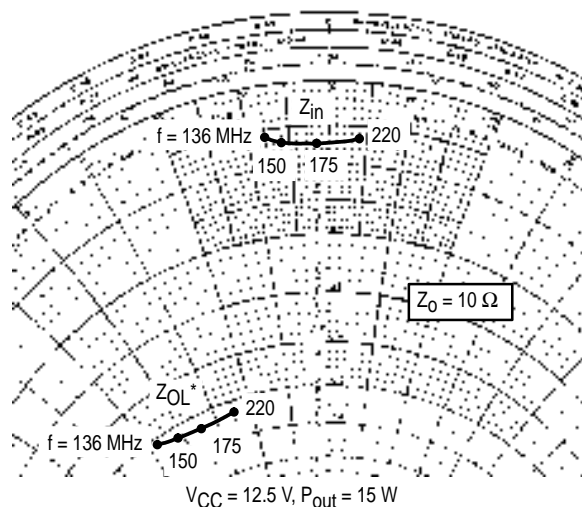


Figure 8. Typical Performance in a Broadband Circuit

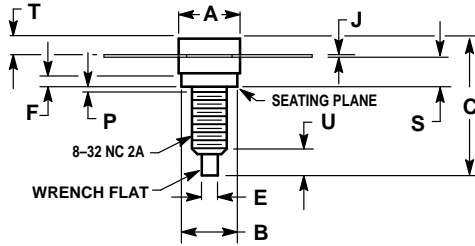
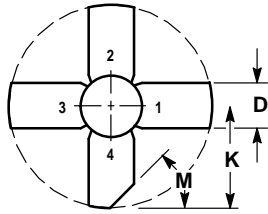


f MHz	Z _{in} Ohms	Z _{OL} * Ohms
136	0.59 - j0.80	5.07 - j4.76
150	0.68 - j0.61	5.23 - j4.14
175	0.69 - j0.17	5.26 - j3.46
220	0.62 + j0.39	5.25 - j2.46

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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