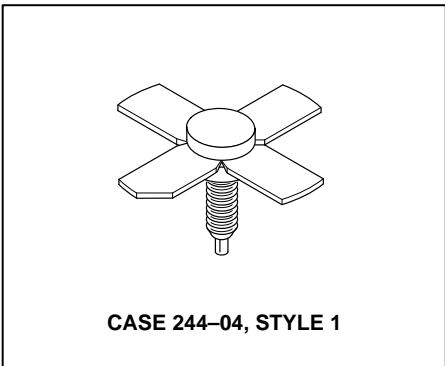
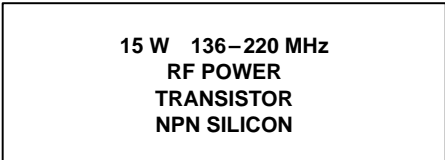


The RF Line  
**NPN Silicon**  
**RF Power Transistor**

... 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	$V_{CBO}$	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 $25^\circ\text{C}$	$P_D$	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	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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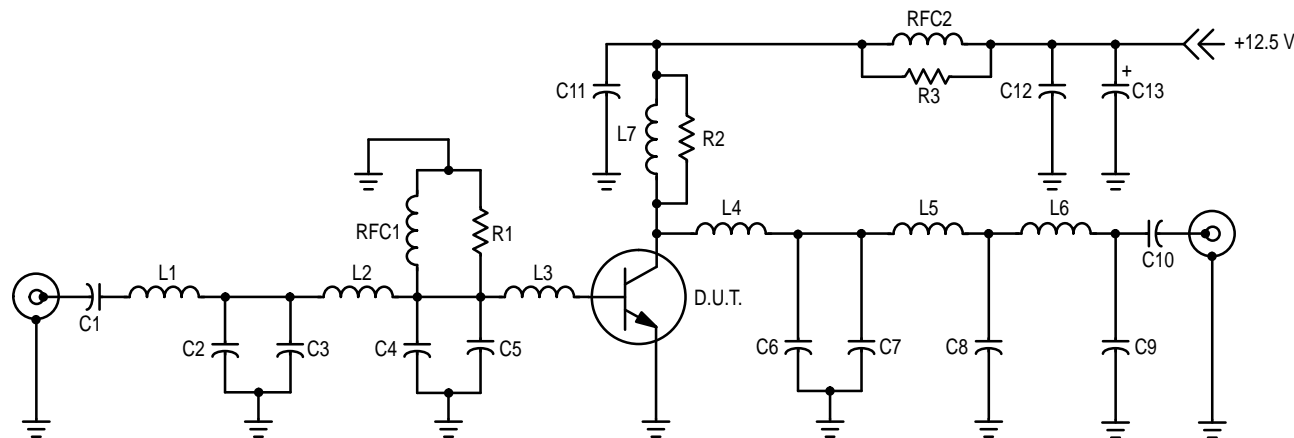
**OFF CHARACTERISTICS**

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
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 500 \text{ mA}_{dc}$ , $V_{CE} = 5.0 \text{ V}_{dc}$ )	$h_{FE}$	10	70	150	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 15 \text{ V}_{dc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	33	60	pF
<b>FUNCTIONAL TESTS (Figure 1)</b>					
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 ( $V_{CC} = 12.5 \text{ V}_{dc}$ , $P_{out} = 15 \text{ W}$ , $f = 175 \text{ MHz}$ )	$\eta$	60	68	—	%
Load Mismatch ( $V_{CC} = 15.5 \text{ V}_{dc}$ , $P_{in} = 2.0 \text{ dB Overdrive}$ , Load VSWR = 30:1)	$\psi$	No Degradation in Output Power			



- |   |   |
|---|---|
| C1, C10, C11 — 1000 pF Ceramic Chip Capacitor | L3 — Copper Pad, 0.200 x 0.400 x 0.060  |
| C2 — 27 pF Mini Unelco Capacitor              | L4 — 1/4" #18 AWG into 1/8" High Loop   |
| C3 — 33 pF Mini Unelco Capacitor              | L5 — 3 Turns #24 AWG Enameled, 3/32" ID |
| C4, C5 — 270 pF Unelco J101 Capacitor         | L6 — 6 Turns #24 AWG Enameled, 3/32" ID |
| C6, C9 — 18 pF Mini Unelco Capacitor          | L7 — 1-3/4" #16 AWG into 3/4" High Loop |
| C7 — 91 pF Mini Unelco Capacitor              | R1 — 12 $\Omega$ , 1/2 W Carbon         |
| C8 — 68 pF Mini Unelco Capacitor              | R2 — 100 $\Omega$ , 1.0 W Carbon        |
| C12 — 0.1 $\mu\text{F}$ Monolythic Capacitor  | R3 — 10 $\Omega$ , 1.0 W Carbon         |
| C13 — 100 $\mu\text{F}$ , 15 V Electrolytic   | RFC1 — 0.15 $\mu\text{H}$ Molded Choke  |
| L1 — 3 Turns #18 AWG, 3/16" ID                | RFC2 — Ferroxcube Choke, VK200-4B       |
| L2 — 1-1/8" #18 AWG into 1/2" High Loop       |   |

**Figure 1. Broadband Circuit**

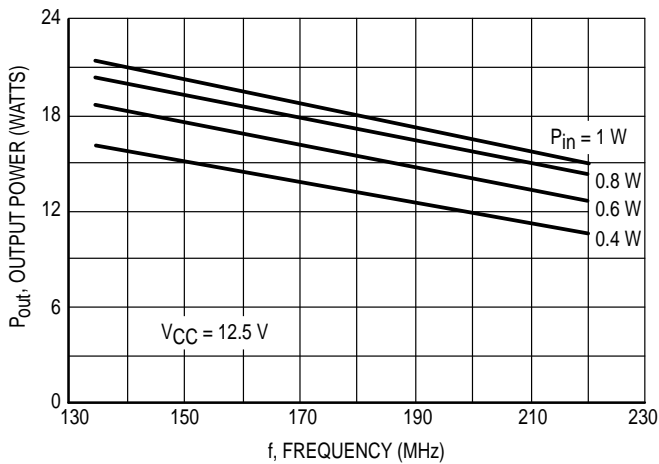


Figure 2. Output Power versus Frequency

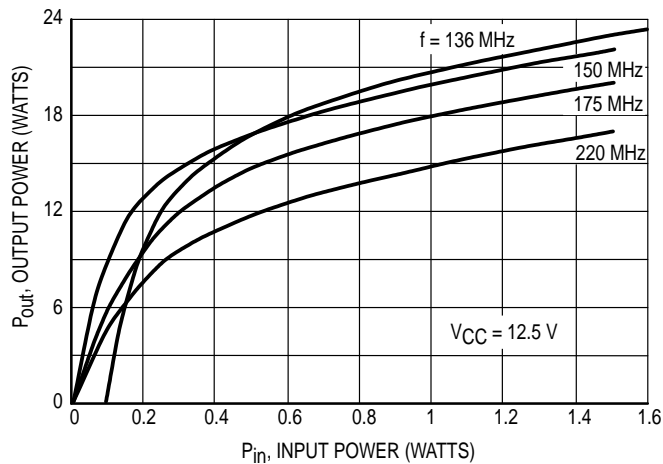


Figure 3. Output Power versus Input Power

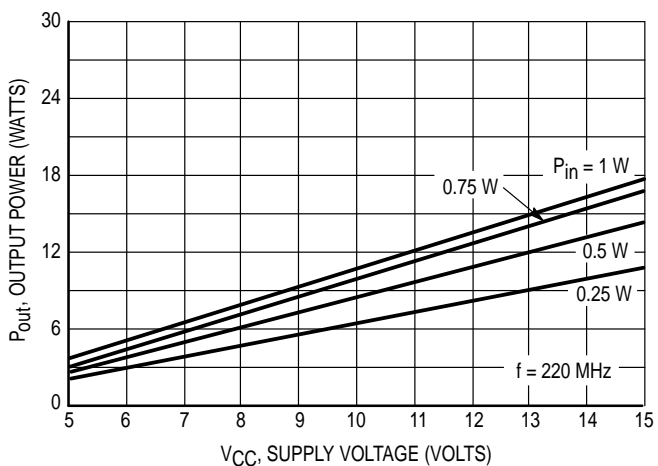


Figure 4. Output Power versus Supply Voltage

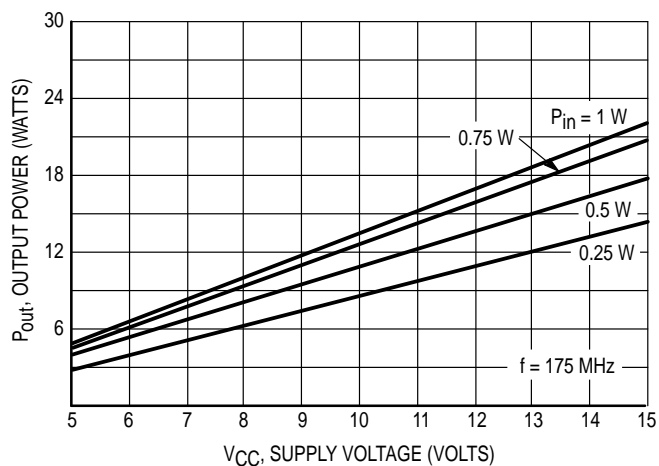


Figure 5. Output Power versus Supply Voltage

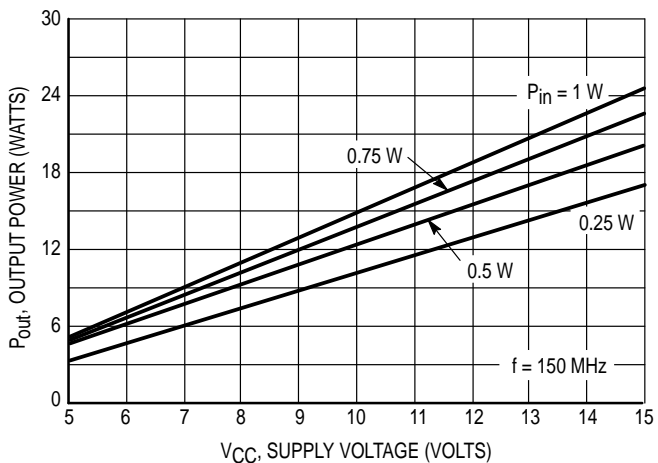


Figure 6. Output Power versus Supply Voltage

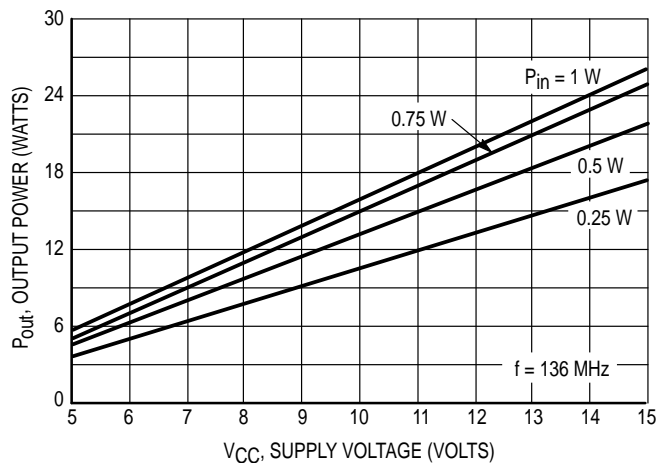


Figure 7. Output Power versus Supply Voltage

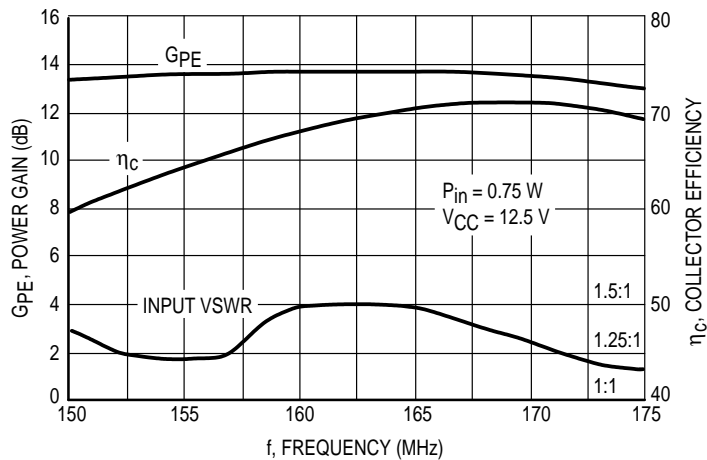
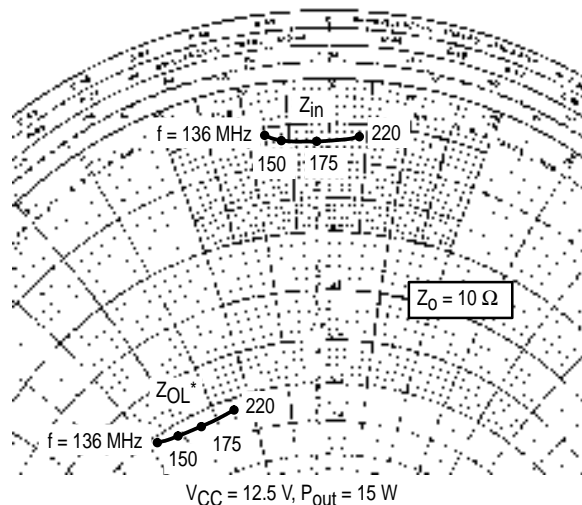


Figure 8. Typical Performance in a Broadband Circuit

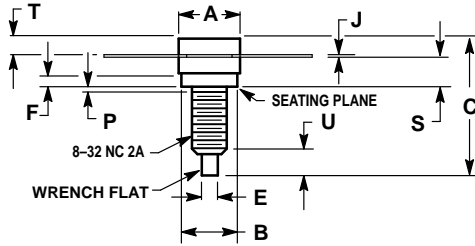
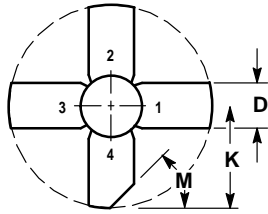


f MHz	Z <sub>in</sub> Ohms	Z <sub>OL</sub> * Ohms
136	0.59 - j0.80	5.07 - j4.76
150	0.68 - j0.61	5.23 - j4.14
175	0.69 - j0.17	5.26 - j3.46
220	0.62 + j0.39	5.25 - j2.46

Z<sub>OL</sub>\* = 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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