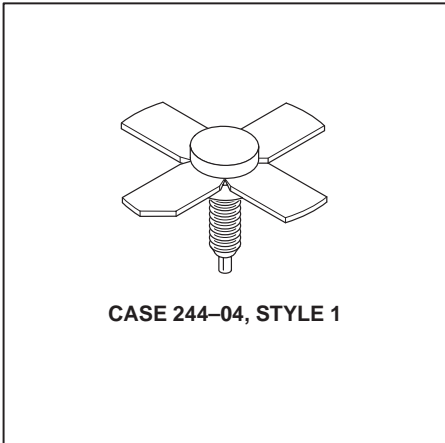


The RF Line  
**NPN Silicon**  
**RF Power Transistor**

Designed for 12.5 Volt UHF large-signal amplifier applications in industrial and commercial FM equipment operating to 512 MHz.

- Specified 12.5 Volt, 512 MHz Characteristics
  - Output Power = 10 W
  - Gain = 8.0 dB (Typ)
  - Efficiency = 65% (Typ)
- Gold Metallized, Emitter Ballasted for Long Life and Reliability
- Capable of 20:1 VSWR Load Mismatch at 16 V Supply Voltage
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.



**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	16.5	Vdc
Collector-Base Voltage	V <sub>CB0</sub>	38	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current — Continuous	I <sub>C</sub>	2.75	Adc
Total Device Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	44 0.25	Watts W/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Operating Junction Temperature	T <sub>J</sub>	200	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	4.0	°C/W

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

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

Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 20 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	16.5	—	—	Vdc
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 20 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	38	—	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 5.0 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	—	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 15 Vdc, V <sub>BE</sub> = 0)	I <sub>CES</sub>	—	—	5.0	mAdc

**ON CHARACTERISTICS**

DC Current Gain (I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	20	—	120	—
-----------------------------------------------------------------------	-----------------	----	---	-----	---

**DYNAMIC CHARACTERISTICS**

Output Capacitance (V <sub>CB</sub> = 12.5 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	—	22	28	pF
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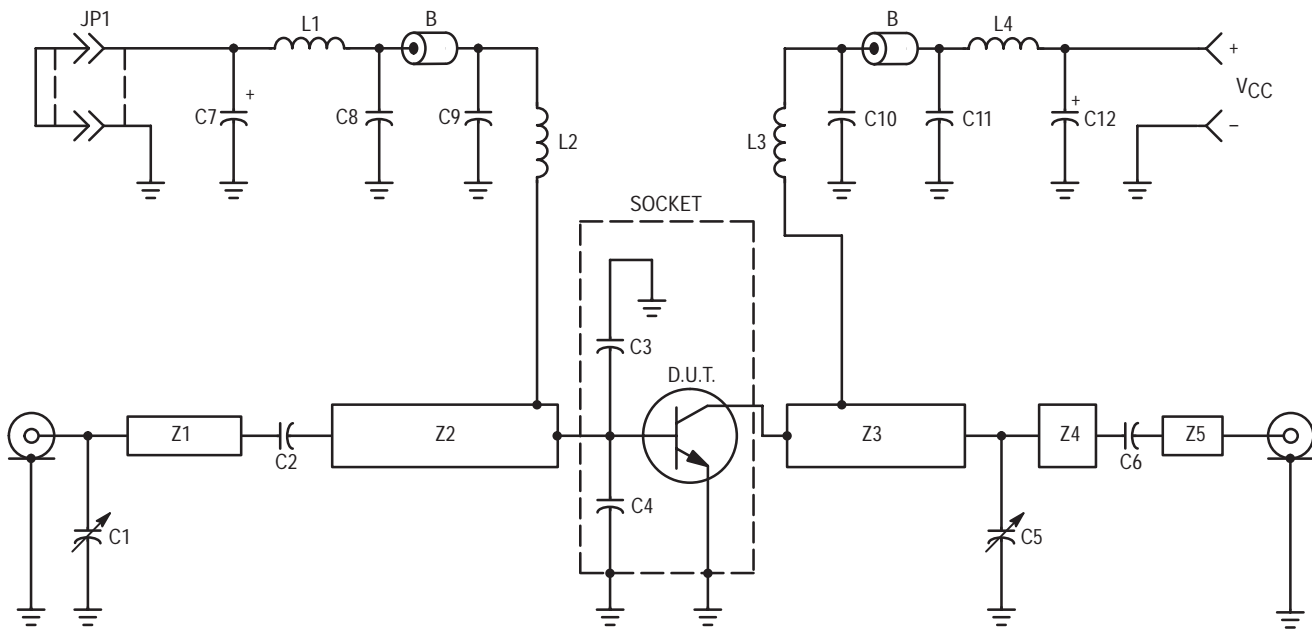
**FUNCTIONAL TESTS**

Common-Emitter Amplifier Power Gain (V <sub>CC</sub> = 12.5 Vdc, P <sub>Out</sub> = 10 W, f = 512 MHz)	G <sub>pe</sub>	7.0	8.0	—	dB
Collector Efficiency (V <sub>CC</sub> = 12.5 Vdc, P <sub>Out</sub> = 10 W, f = 512 MHz)	η <sub>c</sub>	55	65	—	%
Load Mismatch Stress (V <sub>CC</sub> = 16 Vdc, f = 512 MHz, P <sub>in</sub> (1) = 2.6 W, VSWR = 20:1, All Phase Angles)	ψ	No Degradation in Output Power			

NOTE:  
1. P<sub>in</sub> = 2.0 dB over the typical input power required for 10 W output power @ 12.5 Vdc.

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- C1, C5 — 1.0–20 pF, Johanson
- C2, C6 — 330 pF, 100 Mil ATC
- C3, C4 — 36 pF, Mini–Unelco
- C7, C12 — 10  $\mu$ F, 35 V, Tantalum
- C8, C11 — 0.1  $\mu$ F, Ceramic
- C9, C10 — 91 pF, Mini–Unelco

- L1, L4 — 4–1/2 Turns, #18 AWG, 0.16" ID
- L2, L3 — 2 Turns, #18 AWG, 0.16" ID
- B — Ferrite Bead, Ferroxcube 56–590–65–3B
- Z1 — 51 x 630 mils
- Z2 — 162 x 1300 mils
- Z3 — 210 x 1350 mils
- Z4 — 210 x 280 mils
- Z5 — 51 x 300 mils
- Board Material — 0.032" epoxy glass G10, 1 oz., copper clad, double sided,  $\epsilon_r = 5$
- JP1 — Jumper, #14 AWG w/Banana Plugs

Figure 1. Broadband Test Circuit Schematic

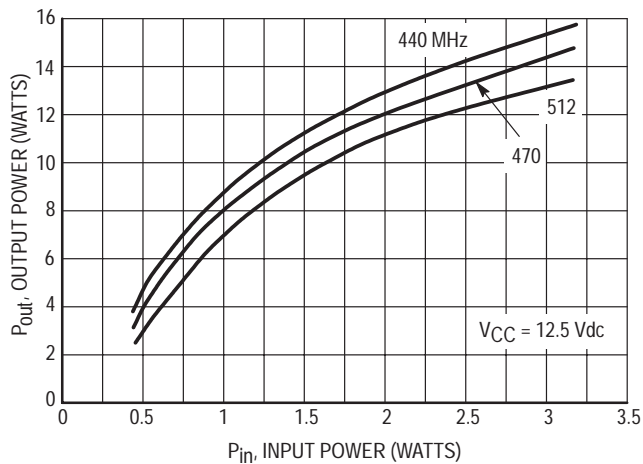


Figure 2. Output Power versus Input Power

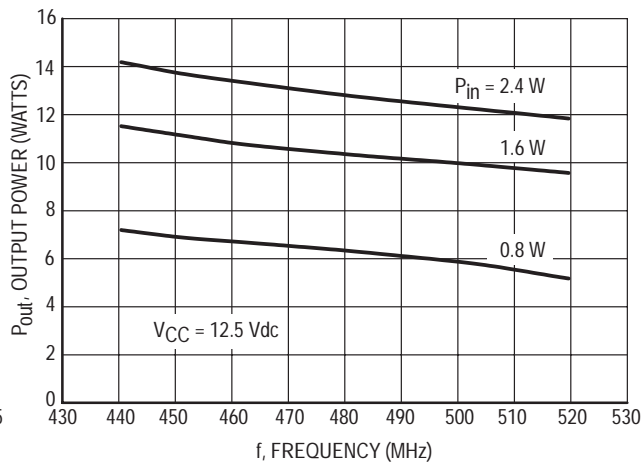


Figure 3. Output Power versus Frequency

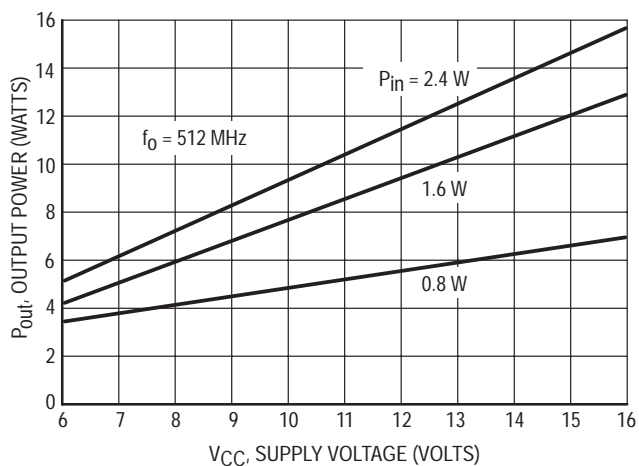


Figure 4. Output Power versus Supply Voltage

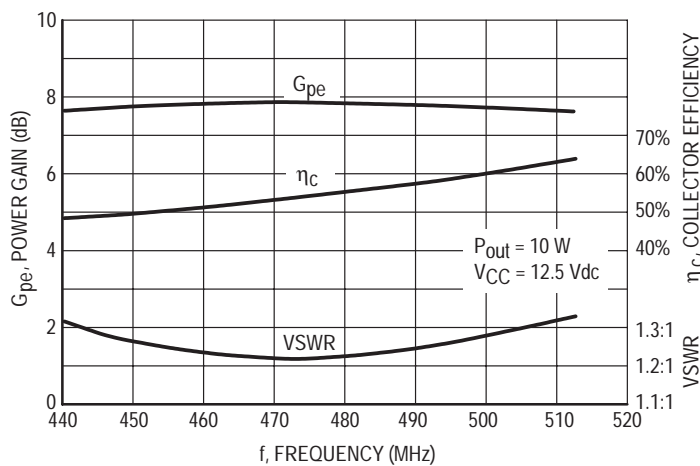


Figure 5. Typical Broadband Circuit Performance

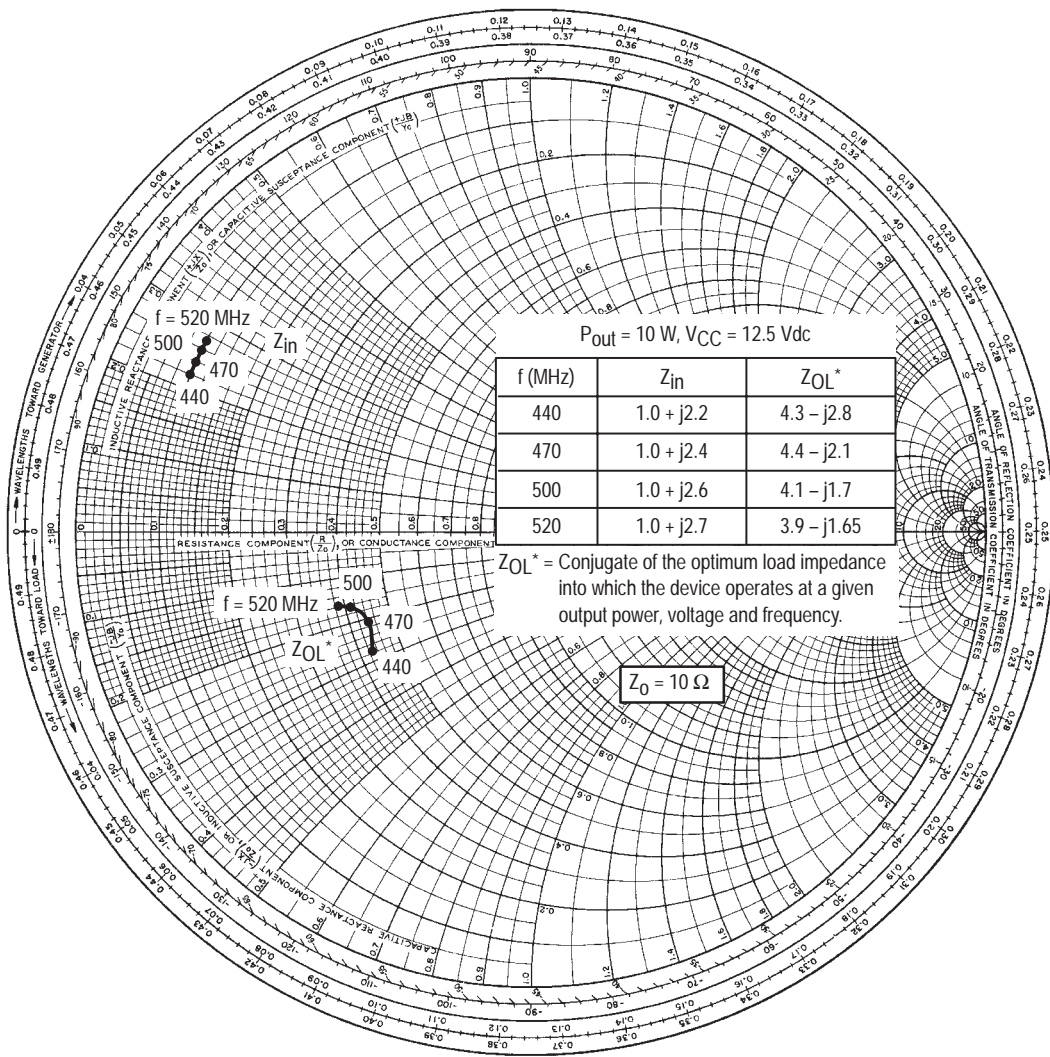
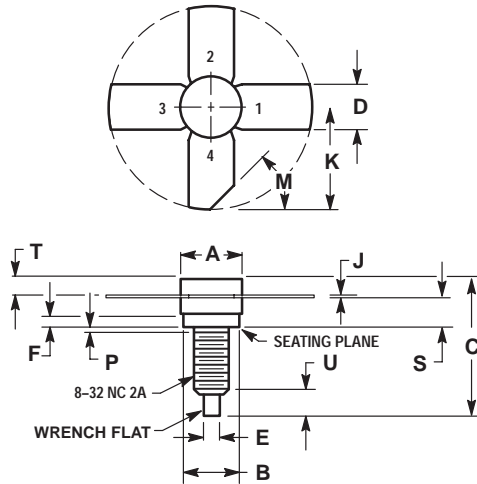


Figure 6. Series Equivalent Input and Output Impedance

## 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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# NOTES


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