

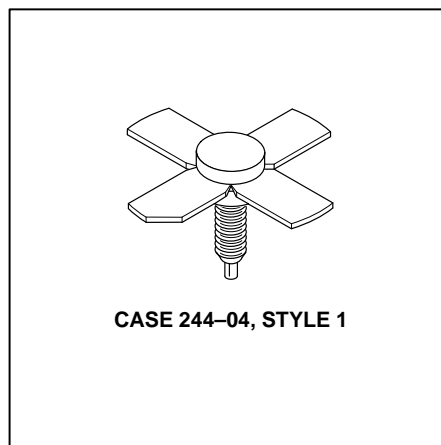
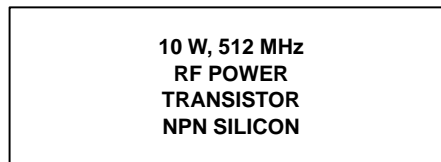
The RF Line

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 _{CEO}	16.5	Vdc
Collector-Base Voltage	V _{CB0}	38	Vdc
Emitter-Base Voltage	V _{EBO}	4.0	Vdc
Collector Current — Continuous	I _C	2.75	Adc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	44 0.25	Watts W/°C
Storage Temperature Range	T _{stg}	-65 to +150	°C
Operating 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
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (I _C = 20 mA _{dc} , I _B = 0)	V _{(BR)CEO}	16.5	—	—	Vdc
Collector-Emitter Breakdown Voltage (I _C = 20 mA _{dc} , V _{BE} = 0)	V _{(BR)CES}	38	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 5.0 mA _{dc} , I _C = 0)	V _{(BR)EBO}	4.0	—	—	Vdc
Collector Cutoff Current (V _{CE} = 15 Vdc, V _{BE} = 0)	I _{CES}	—	—	5.0	mA _{dc}

ON CHARACTERISTICS

DC Current Gain (I _C = 1.0 Adc, V _{CE} = 5.0 Vdc)	h _{FE}	20	—	120	—
---	-----------------	----	---	-----	---

DYNAMIC CHARACTERISTICS

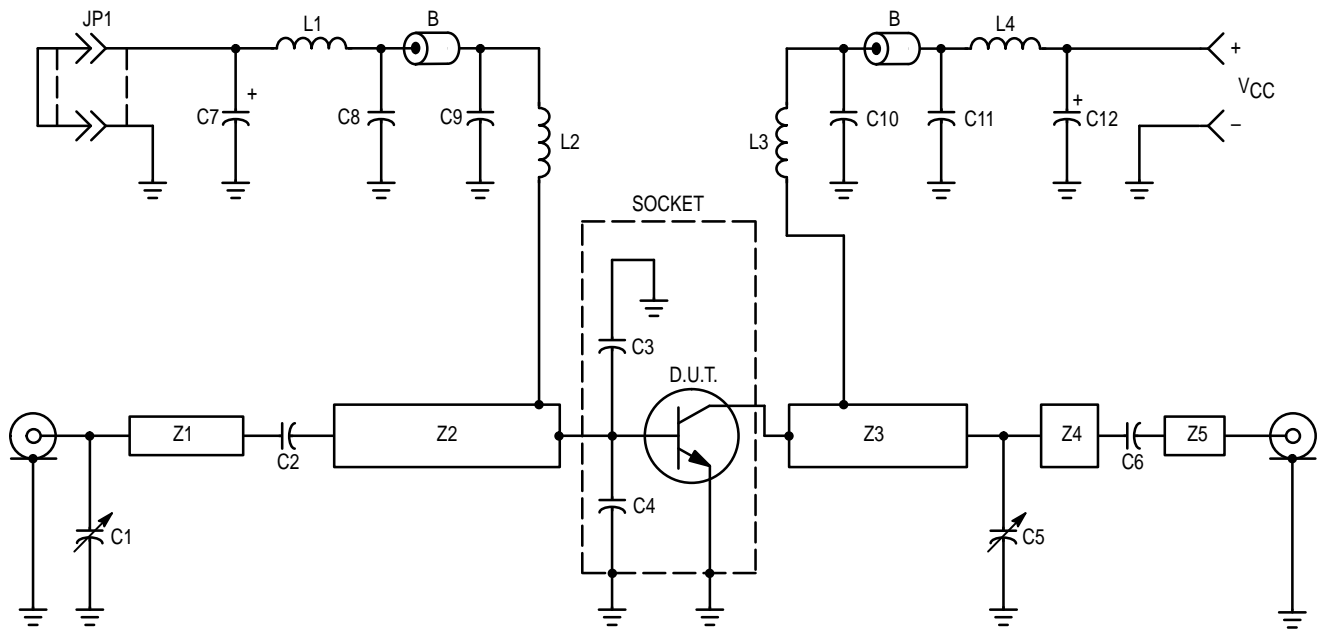
Output Capacitance (V _{CB} = 12.5 Vdc, I _E = 0, f = 1.0 MHz)	C _{ob}	—	22	28	pF
--	-----------------	---	----	----	----

FUNCTIONAL TESTS

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

NOTE:

- P_{in} = 2.0 dB over the typical input power required for 10 W output power @ 12.5 Vdc.



C1, C5 — 1.0–20 pF, Johanson
 C2, C6 — 330 pF, 100 Mil ATC
 C3, C4 — 36 pF, Mini-Unelco
 C7, C12 — 10 μ F, 35 V, Tantalum
 C8, C11 — 0.1 μ 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

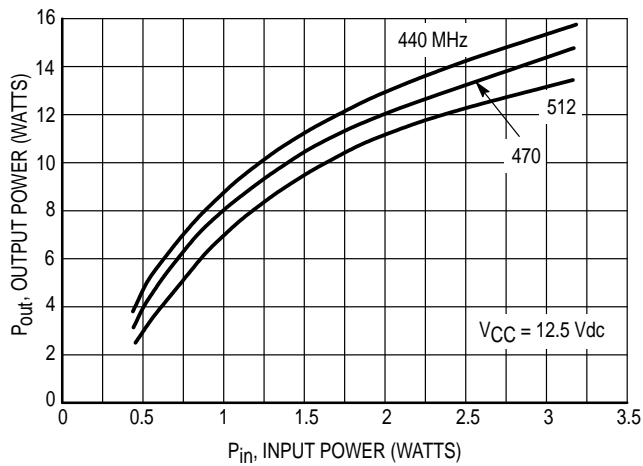


Figure 2. Output Power versus Input Power

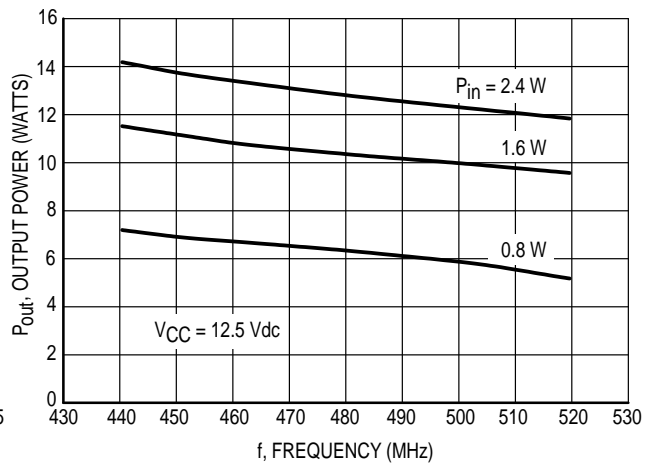


Figure 3. Output Power versus Frequency

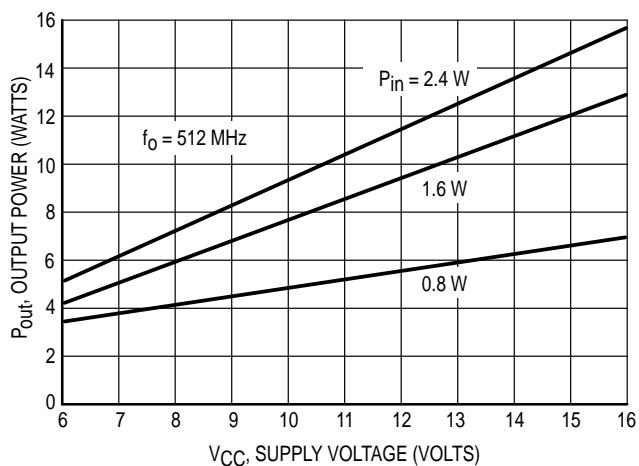


Figure 4. Output Power versus Supply Voltage

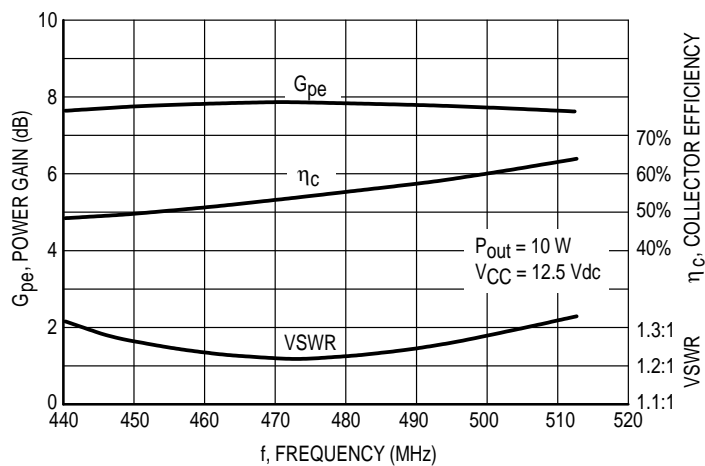


Figure 5. Typical Broadband Circuit Performance

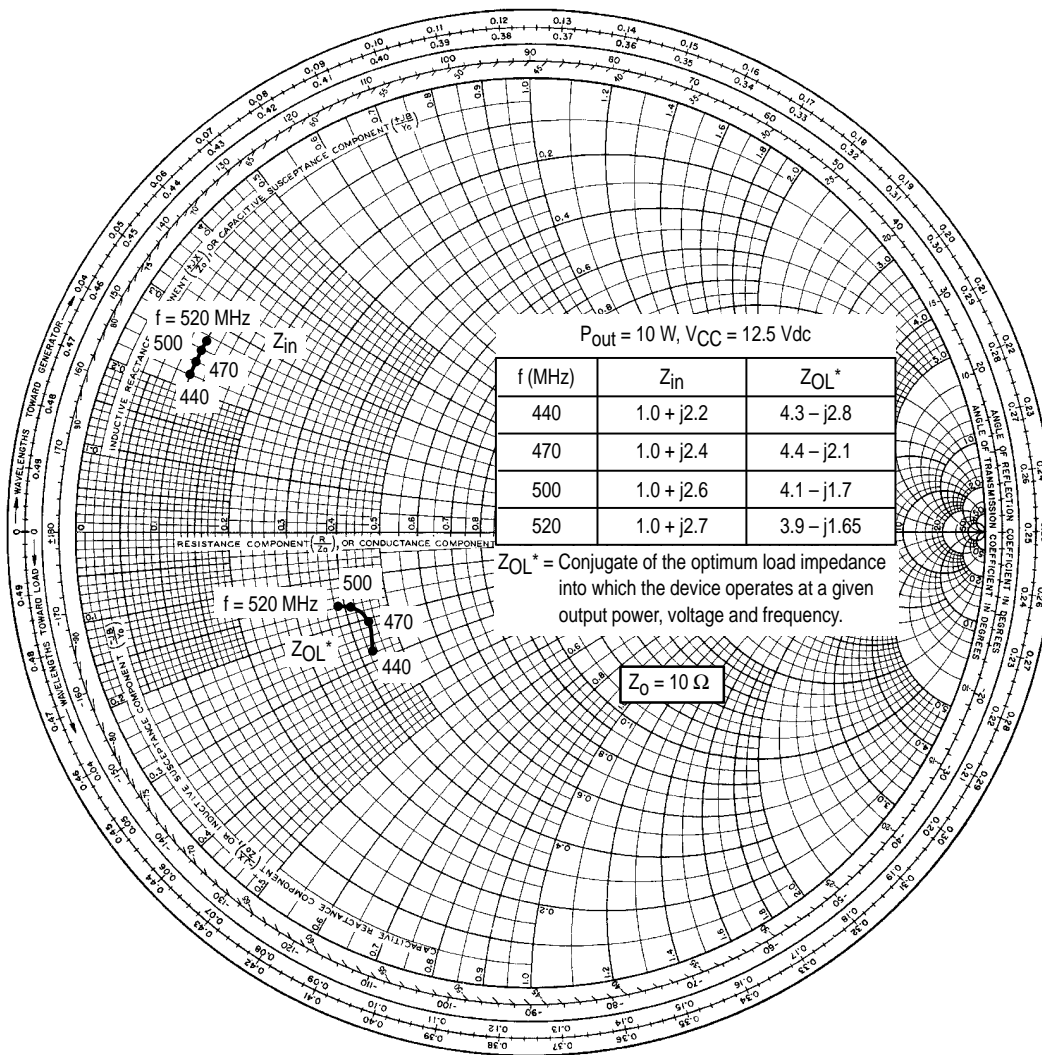
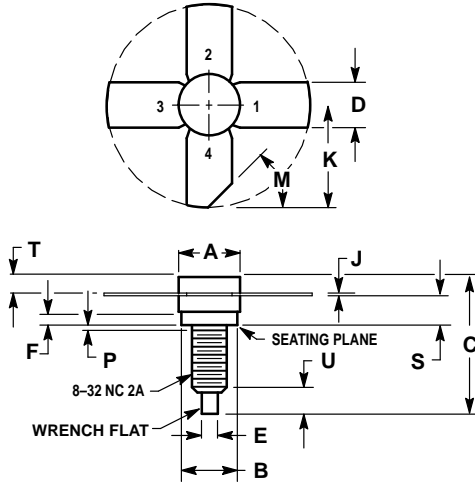


Figure 6. Series Equivalent Input and Output Impedance


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**

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303-675-2140 or 1-800-441-2447

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 4-32-1,
Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan. 81-3-5487-8488

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602-244-6609
– US & Canada ONLY 1-800-774-1848

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

INTERNET: <http://motorola.com/sps>

