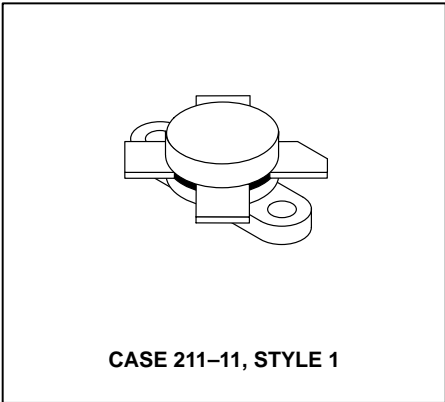
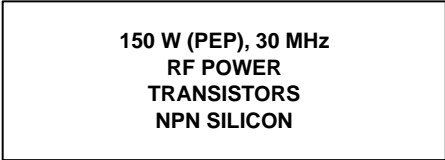


The RF Line  
**NPN Silicon**  
**RF Power Transistor**

Designed primarily for applications as a high-power linear amplifier from 2.0 to 30 MHz.

- Specified 28 Volt, 30 MHz Characteristics —  
Output Power = 150 W (PEP)  
Minimum Gain = 10 dB  
Efficiency = 40%
- Intermodulation Distortion @ 150 W (PEP) —  
IMD = -30 dB (Min)
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR



**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	40	Vdc
Collector-Base Voltage	V <sub>CBO</sub>	85	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	3.0	Vdc
Collector Current — Continuous	I <sub>C</sub>	20	Adc
Withstanding Current — 10 s	—	30	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	290 1.66	Watts W/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	0.6	°C/W

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 200 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	35	—	—	Vdc
Collector-Emitter Breakdown Voltage (I <sub>C</sub> = 100 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	85	—	—	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 mAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	85	—	—	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	3.0	—	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 28 Vdc, V <sub>BE</sub> = 0, T <sub>C</sub> = 25°C)	I <sub>CES</sub>	—	—	20	mAdc

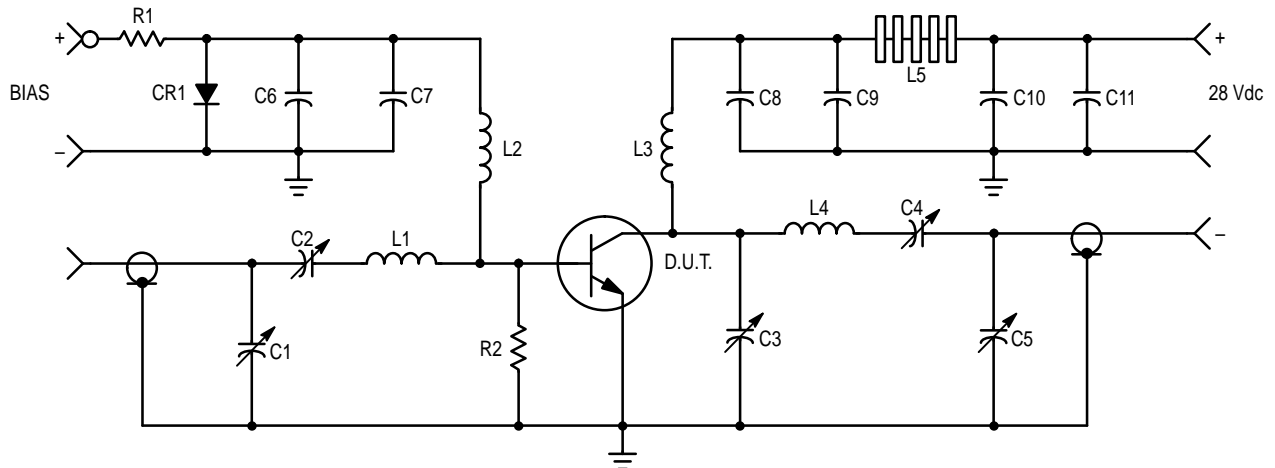
(continued)

**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 ( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	$h_{FE}$	15	30	120	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 28 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	420	—	pF
<b>FUNCTIONAL TESTS</b>					
Common-Emitter Amplifier Power Gain ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_{C(max)} = 6.7 \text{ Adc}$ , $I_{CQ} = 150 \text{ mA dc}$ , $f = 30, 30.001 \text{ MHz}$ )	$G_{PE}$	10	13	—	dB
Collector Efficiency ( $V_{CC} = 28 \text{ Vdc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_{C(max)} = 6.7 \text{ Adc}$ , $I_{CQ} = 150 \text{ mA dc}$ , $f = 30, 30.001 \text{ MHz}$ )	$\eta$	—	45	—	%
Intermodulation Distortion (1) ( $V_{CE} = 28 \text{ Vdc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_C = 6.7 \text{ Adc}$ , $I_{CQ} = 150 \text{ mA dc}$ , $f = 30, 30.001 \text{ MHz}$ )	IMD	—	-33	-30	dB
Output Power ( $V_{CE} = 28 \text{ Vdc}$ , $f = 30 \text{ MHz}$ )	$P_{out}$	150	—	—	Watts (PEP)

**NOTE:**

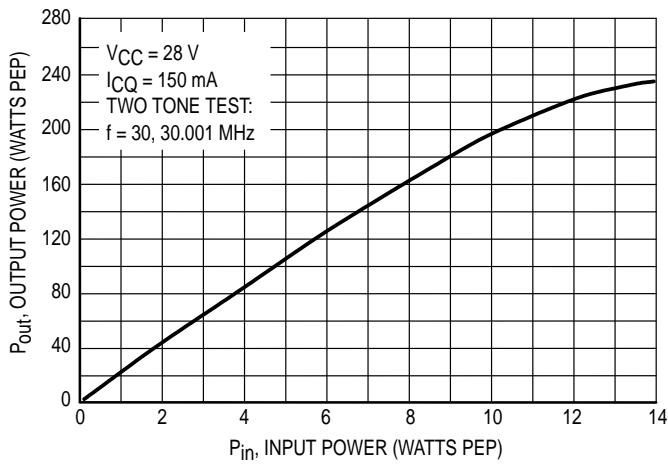
1. To Mil-Std-1311 Version A, Test Method 2204, Two Tone, Reference each Tone.



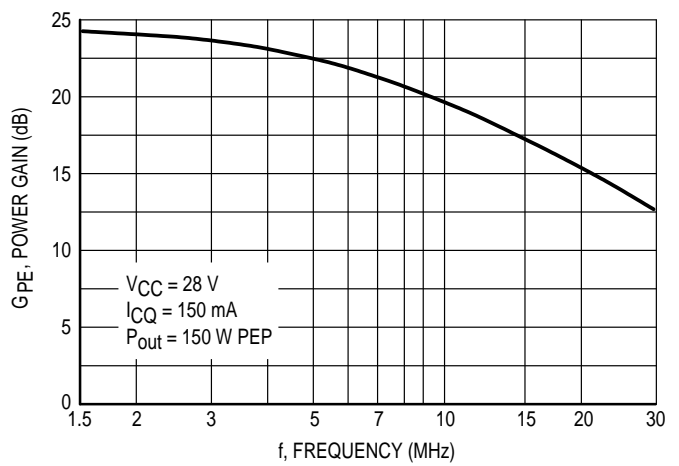
C1, C2, C3, C5 — 170–680 pF, ARCO 469  
 C4 — 80–480 pF, ARCO 466  
 C6, C8, C11 — ERIE 0.1  $\mu\text{F}$ , 100 V  
 C7 — MALLORY 500  $\mu\text{F}$ , 15 V Electrolytic  
 C9 — UNDERWOOD 1000 pF, 350 V  
 C10 — 10  $\mu\text{F}$ , 50 V Electrolytic  
 R1 — 10  $\Omega$ , 25 Watt Wire Wound  
 R2 — 10  $\Omega$ , 1.0 Watt Carbon  
 CR1 — 1N4997

L1 — 3 Turns, #16 Wire, 5/16" I.D., 5/16" Long  
 L2 — 10  $\mu\text{H}$  Molded Choke  
 L3 — 12 Turns, #16 Enameled Wire, Close Wound, 1/4" Dia.  
 L4 — 5 Turns, 1/8" Copper Tubing  
 L5 — 10 Ferrite Beads — FERROXCUBE #56-590-65/3B

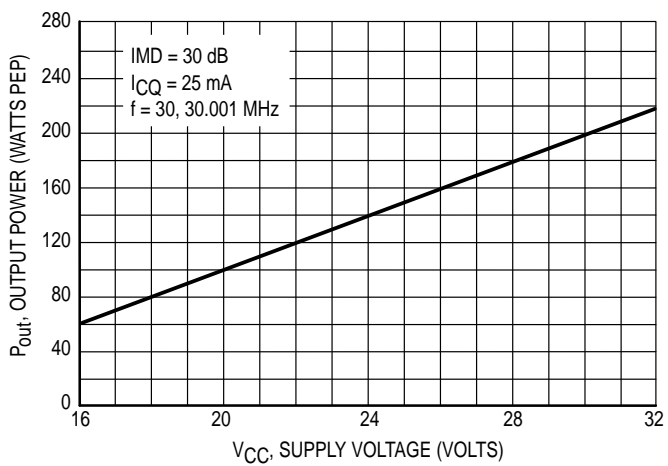
**Figure 1. 30 MHz Test Circuit Schematic**



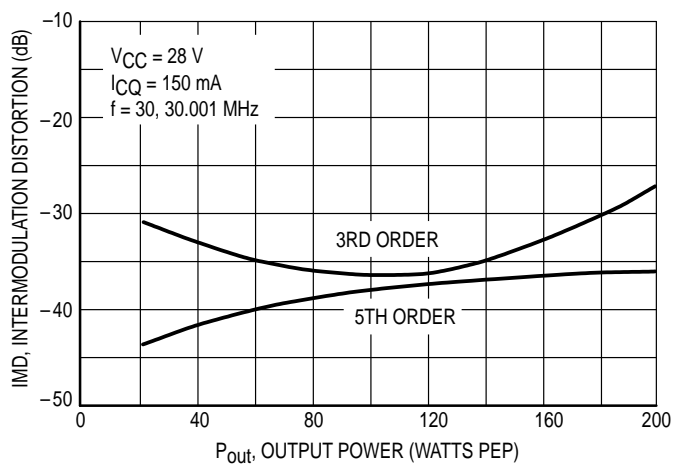
**Figure 2. Output Power versus Input Power**



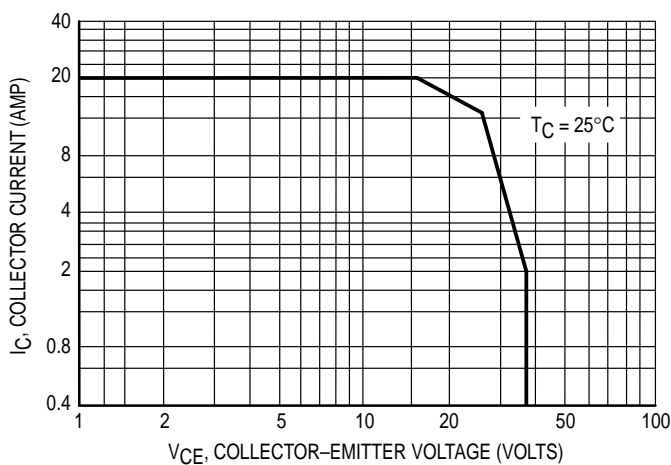
**Figure 3. Power Gain versus Frequency**



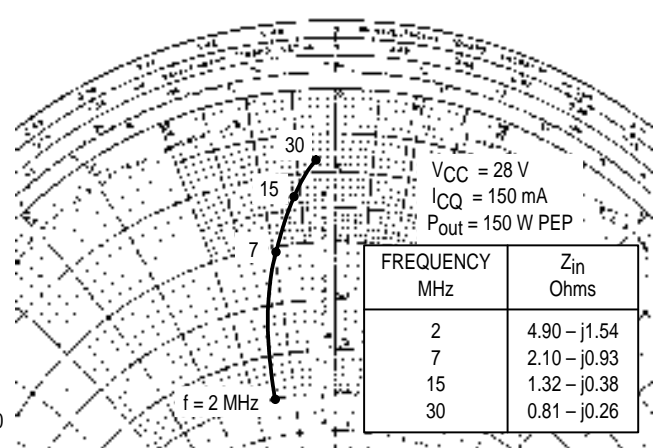
**Figure 4. Linear Output Power versus Supply Voltage**



**Figure 5. Intermodulation Distortion versus Output Power**



**Figure 6. DC Safe Operating Area**



**Figure 7. Series Input Impedance**

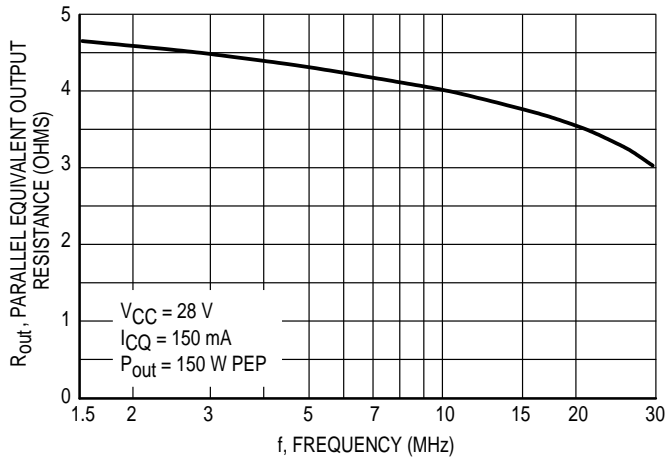


Figure 8. Output Resistance versus Frequency

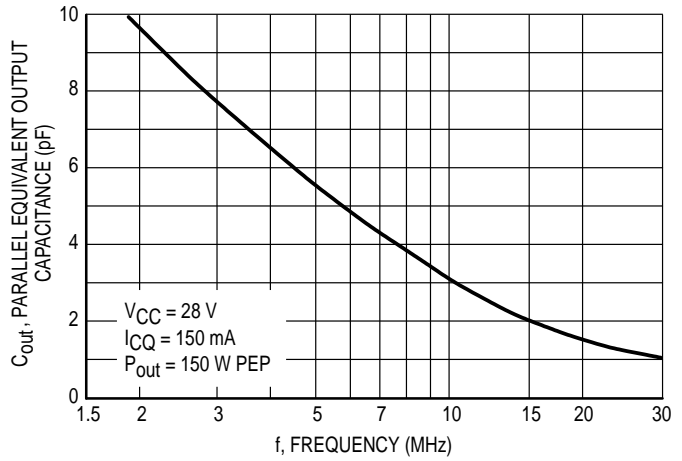
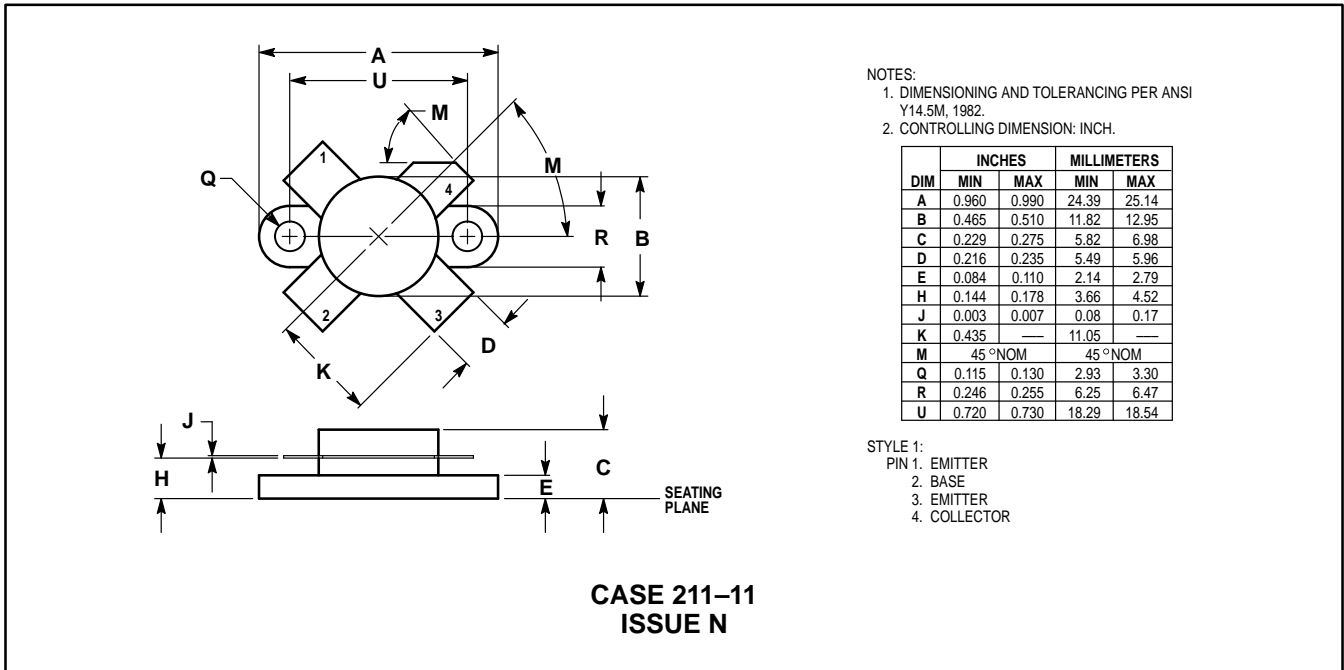


Figure 9. Output Capacitance versus Frequency

PACKAGE DIMENSIONS



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 can and do vary in different applications. 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.

How to reach us:  
 USA/EUROPE: Motorola Literature Distribution;  
 P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,  
 6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE (602) 244-6609  
 INTERNET: http://Design-NET.com

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

