

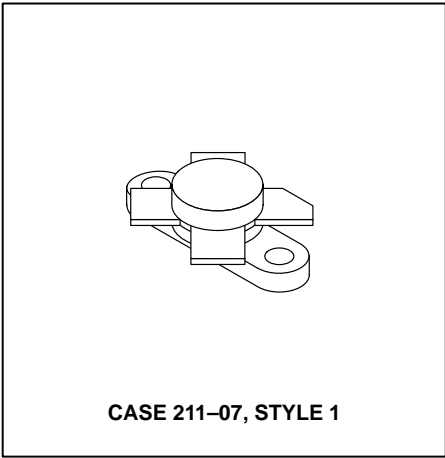
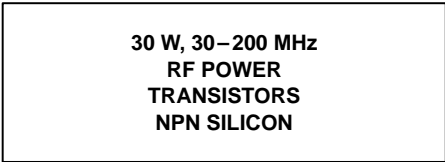
# The RF Line

## NPN Silicon

### RF Power Transistors

... designed primarily for wideband large-signal driver and output amplifier stages in the 30–200 MHz frequency range.

- Guaranteed Performance at 150 MHz, 28 Vdc  
Output Power = 30 Watts  
Minimum Gain = 10 dB
- 100% Tested for Load Mismatch at All Phase Angles with 30:1 VSWR
- Gold Metallization System for High Reliability Applications



#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	35	Vdc
Collector–Base Voltage	V <sub>CBO</sub>	65	Vdc
Emitter–Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current — Continuous	I <sub>C</sub>	3.4	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C (1) Derate above 25°C	P <sub>D</sub>	82 0.47	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>	2.13	°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> = 30 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	35	—	—	Vdc
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 30 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	65	—	—	Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = 30 mAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	65	—	—	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 3.0 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	—	—	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	—	3.0	mAdc

#### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 1.5 Adc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	20	—	80	—
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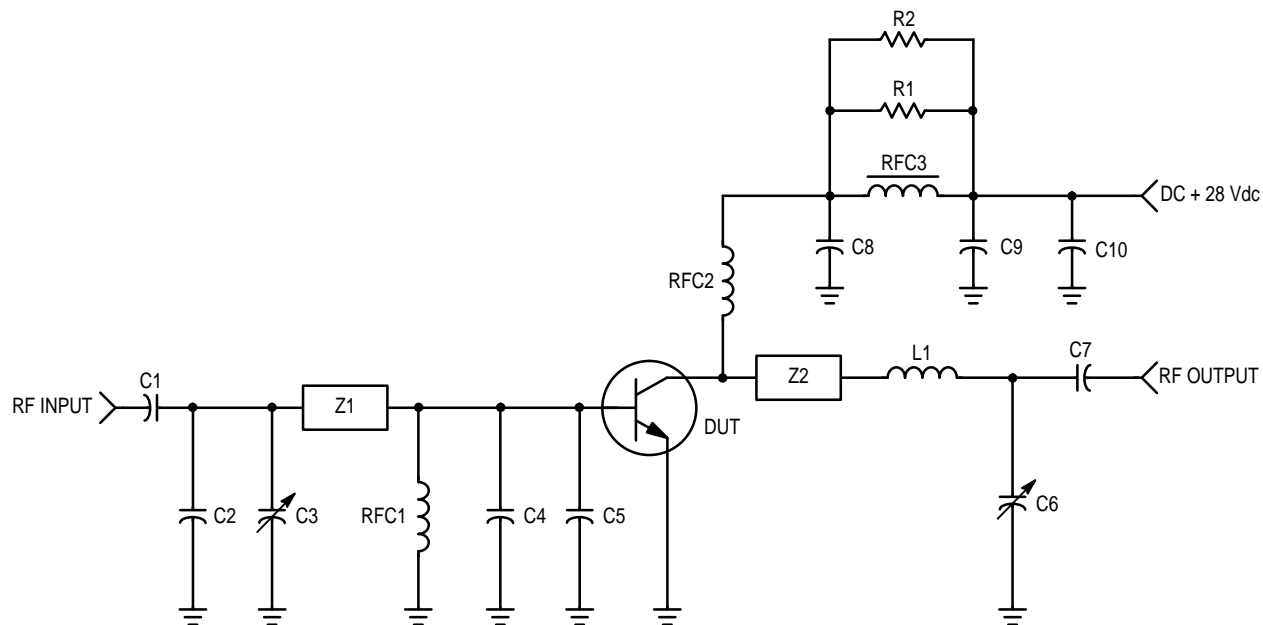
NOTE:

1. These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	30	40	pF
<b>FUNCTIONAL TESTS</b> (Figure 1)					
Common-Emitter Amplifier Power Gain ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ W}$ , $f = 150\text{ MHz}$ )	$G_{PE}$	10	13.5	—	dB
Collector Efficiency ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ W}$ , $f = 150\text{ MHz}$ )	$\eta$	50	—	—	%
Load Mismatch ( $V_{CC} = 28\text{ Vdc}$ , $P_{out} = 30\text{ W}$ , $f = 150\text{ MHz}$ , $VSWR = 30:1$ all phase angles)	$\psi$	No Degradation in Power Output			

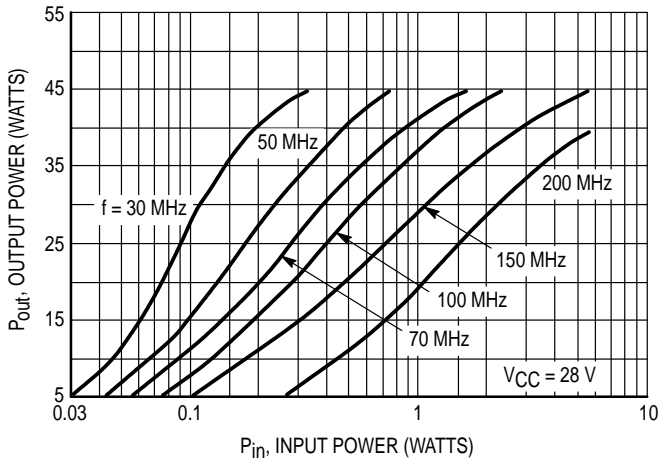


C1, C7 — 18 pF, 100 mil ATC  
 C2 — 68 pF, 100 mil ATC  
 C3, C6 — Johanson #JMC 5501  
 C4 — 270 pF, 100 mil ATC  
 C5 — 240 pF, 100 mil ATC  
 C8, C9 — 100 pF Underwood  
 C10 — 1.0  $\mu\text{F}$  Tantalum  
 L1 — 2 Turns, 2.5" #20 Wire, ID = 0.275"

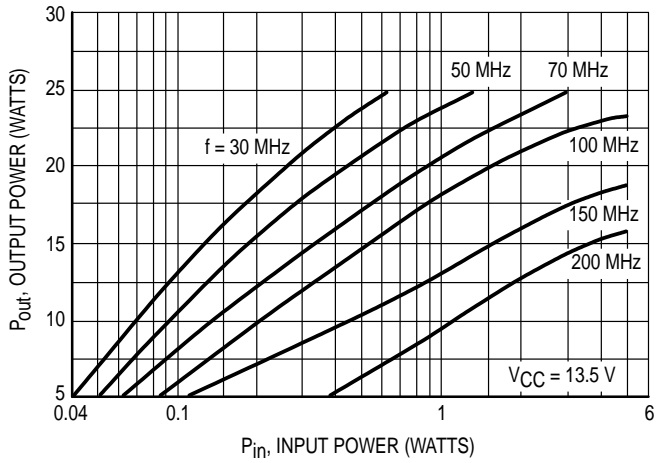
R1, R2 — 10  $\Omega$ , 1.0 W  
 RFC1 — 15  $\mu\text{H}$  Molded Coil  
 RFC2 — 2 Turns, 2.5" #20 Wire, ID = 0.2"  
 RFC3 — Ferroxcube VK200-19/4B  
 Z1 — Microstrip, 0.168" W x 1.6" L  
 Z2 — Microstrip, 0.168" W x 1.2" L  
 Board — Glass Teflon  $\epsilon_r = 2.55$

**Figure 1. 150 MHz Test Circuit**

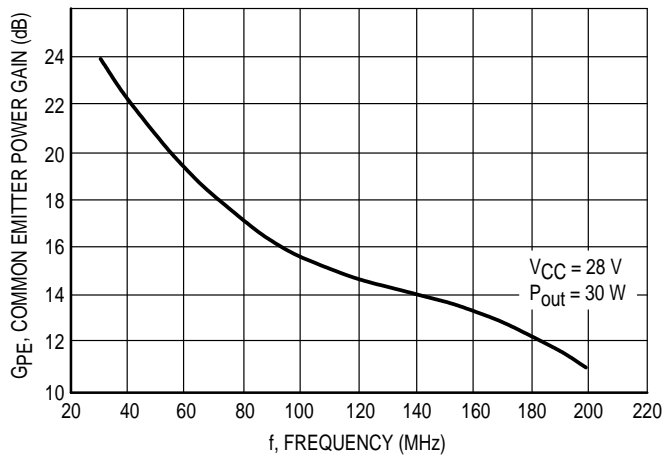
## TYPICAL PERFORMANCE CURVES



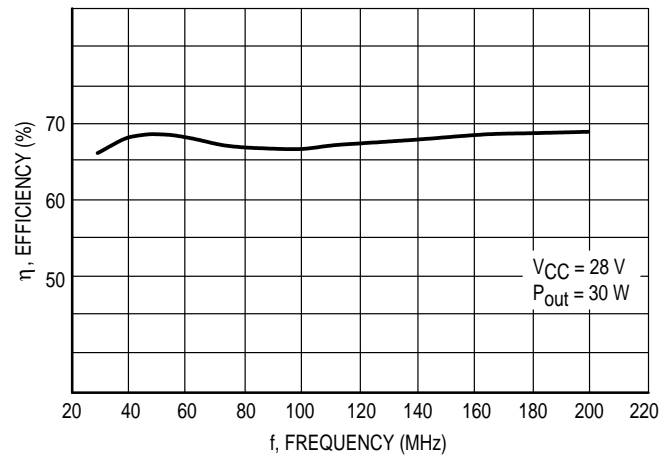
**Figure 2. Output Power versus Input Power**



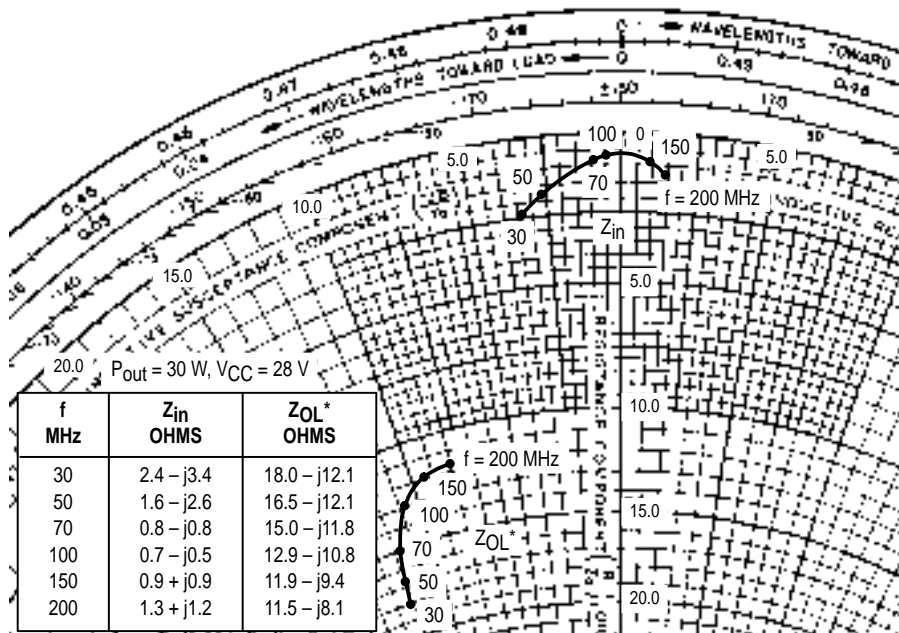
**Figure 3. Output Power versus Input Power**



**Figure 4. Power Gain versus Frequency**



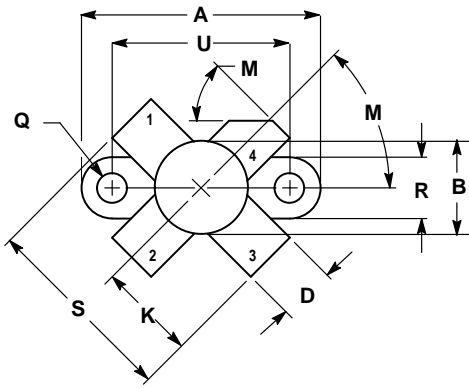
**Figure 5. Efficiency versus Frequency**



Z<sub>OL</sub>\* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

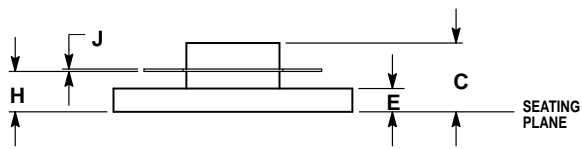
Figure 6. Series Equivalent Input/Output Impedance

# PACKAGE DIMENSIONS




- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.960	0.990	24.39	25.14
B	0.370	0.390	9.40	9.90
C	0.229	0.281	5.82	7.13
D	0.215	0.235	5.47	5.96
E	0.085	0.105	2.16	2.66
H	0.150	0.108	3.81	4.57
J	0.004	0.006	0.11	0.15
K	0.395	0.405	10.04	10.28
M	40°	50°	40°	50°
Q	0.113	0.130	2.88	3.30
R	0.245	0.255	6.23	6.47
S	0.790	0.810	20.07	20.57
U	0.720	0.730	18.29	18.54



- STYLE 1:  
 PIN 1. EMITTER  
 2. BASE  
 3. EMITTER  
 4. COLLECTOR

**CASE 211-07  
 ISSUE N**

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