

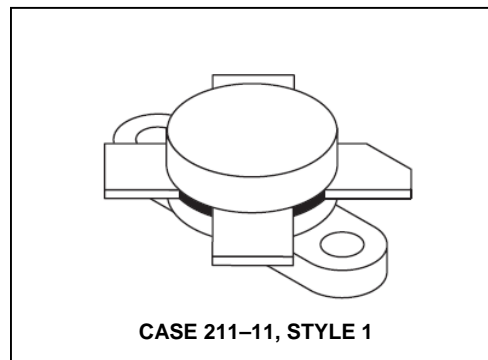
## The RF Line NPN Silicon Power Transistor

### 100W(PEP), 30MHz, 28V

M/A-COM Products  
Released - Rev. 07.07

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

### Product Image



- Specified 12.5 V, 30 MHz characteristics —  
Output power = 100 W (PEP)  
Minimum gain = 10 dB  
Efficiency = 40%
- Intermodulation distortion @ 100 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	$V_{CEO}$	20	Vdc
Collector-Base Voltage	$V_{CBO}$	45	Vdc
Emitter-Base Voltage	$V_{EBO}$	3.0	Vdc
Collector Current — Continuous	$I_C$	20	Adc
Withstand Current — 10 s	—	30	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	290 1.66	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.6	$^\circ\text{C/W}$

### 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 ( $I_C = 50$ mAdc, $I_B = 0$ )	$V_{(BR)CEO}$	20	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 200$ mAdc, $V_{BE} = 0$ )	$V_{(BR)CES}$	45	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 200$ mAdc, $I_E = 0$ )	$V_{(BR)CBO}$	45	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10$ mAdc, $I_C = 0$ )	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 16$ Vdc, $V_{BE} = 0$ , $T_C = 25^\circ\text{C}$ )	$I_{CES}$	—	—	10	mAdc

(continued)

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### 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 ( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	$h_{FE}$	10	70	—	—

### DYNAMIC CHARACTERISTICS

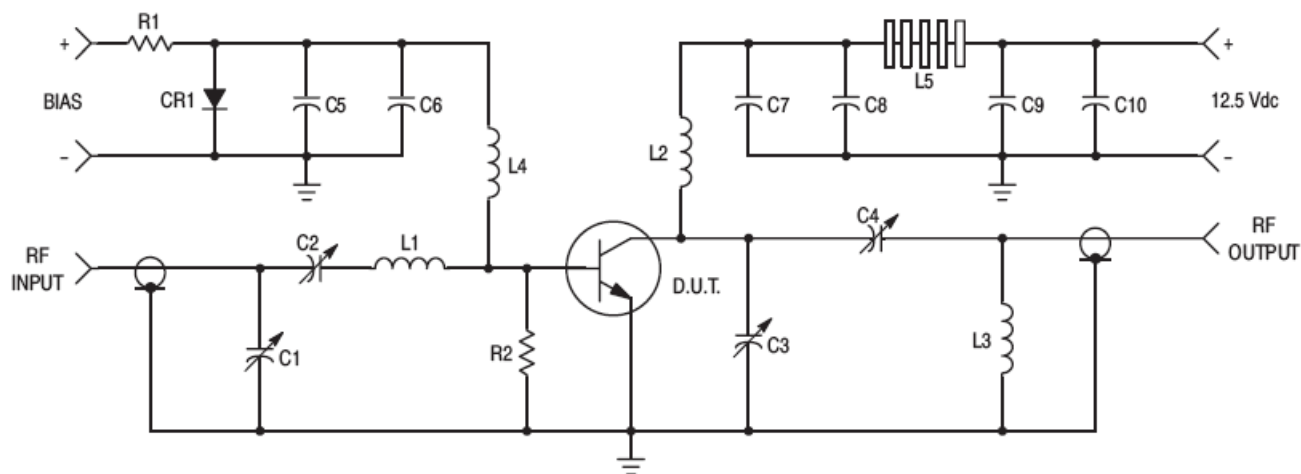
Output Capacitance ( $V_{CB} = 12.5 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	550	800	pF
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### FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain ( $V_{CC} = 12.5 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $I_{C(max)} = 10 \text{ Adc}$ , $I_{CQ} = 150 \text{ mA}$ , $f = 30, 30.001 \text{ MHz}$ )	$G_{PE}$	10	12	—	dB
Collector Efficiency ( $V_{CC} = 12.5 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $I_{C(max)} = 10 \text{ Adc}$ , $I_{CQ} = 150 \text{ mA}$ , $f = 30, 30.001 \text{ MHz}$ )	$\eta$	40	—	—	%
Intermodulation Distortion (1) ( $V_{CE} = 12.5 \text{ Vdc}$ , $P_{out} = 100 \text{ W}$ , $I_C = 10 \text{ Adc}$ , $I_{CQ} = 150 \text{ mA}$ , $f = 30, 30.001 \text{ MHz}$ )	IMD	—	-33	-30	dB

#### NOTE:

1. To proposed EIA method of measurement. Reference peak envelope power.



C1, C2, C4 — 170–780 pF, ARCO 469  
C3 — 80–480 pF, ARCO 466  
C5, C7, C10 — ERIE 0.1  $\mu\text{F}$ , 100 V  
C6 — MALLORY 500  $\mu\text{F}$  @ 15 V Electrolytic  
C9 — 100  $\mu\text{F}$ , 15 V Electrolytic  
C8 — 1000 pF, 350 V UNDERWOOD  
R1 — 10  $\Omega$ , 25 Watt Wirewound

R2 — 10  $\Omega$ , 1.0 Watt Carbon  
CR1 — 1N4997  
L1 — 3 Turns, #16 Wire, 5/16" I.D., 5/16" Long  
L2 — 12 Turns, #16 Enameled Wire Closewound, 1/4" I.D.  
L3 — 1-3/4 Turns, 1/8" Tubing, 3/8" I.D., 3/8" Long  
L4 — 10  $\mu\text{H}$  Molded Choke  
L5 — 10 Ferrite Beads — FERROXCUBE #56–590–65/3B

Figure 1. 30 MHz Test Circuit Schematic

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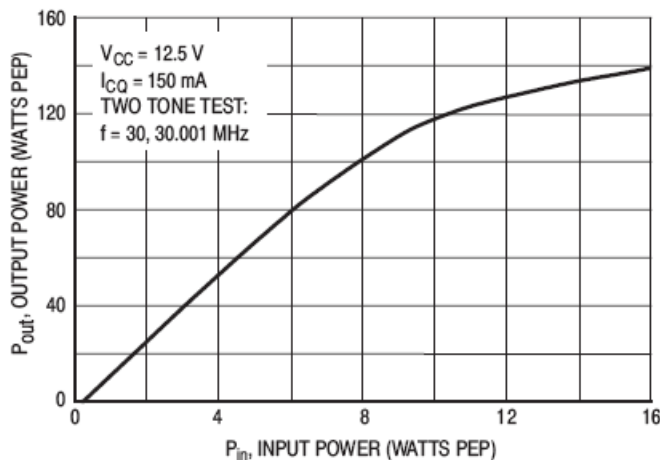


Figure 2. Output Power versus Input Power

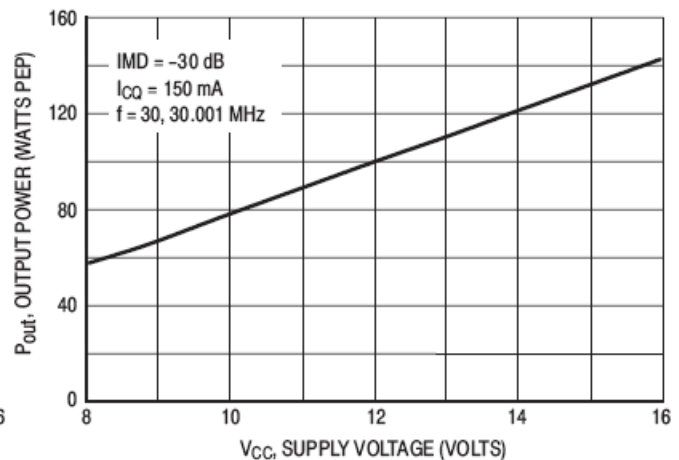


Figure 3. Output Power versus Supply Voltage

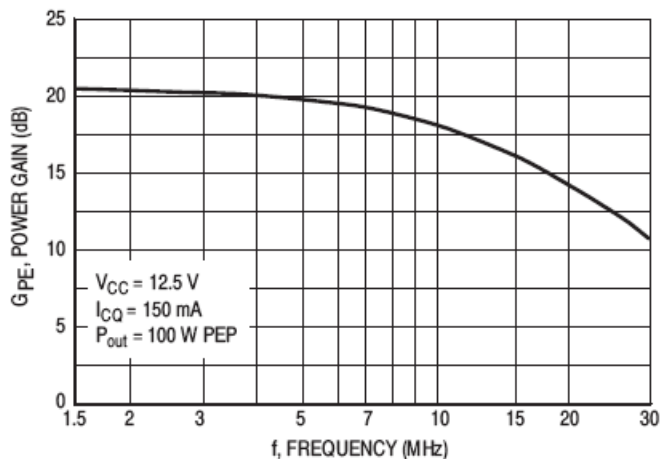


Figure 4. Power Gain versus Frequency

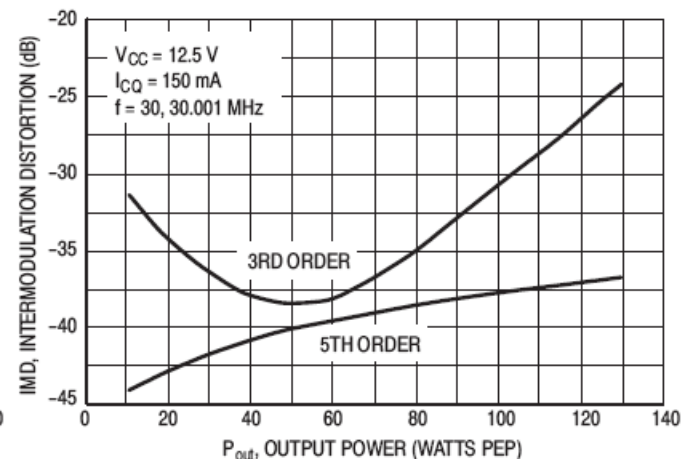


Figure 5. Intermodulation Distortion versus Output Power

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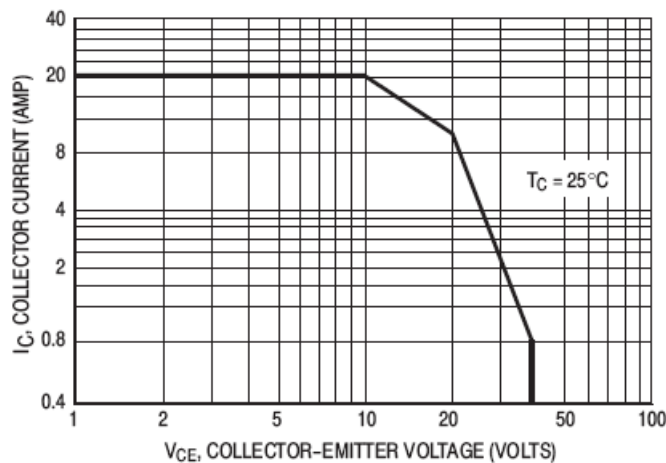


Figure 6. DC Safe Operating Area

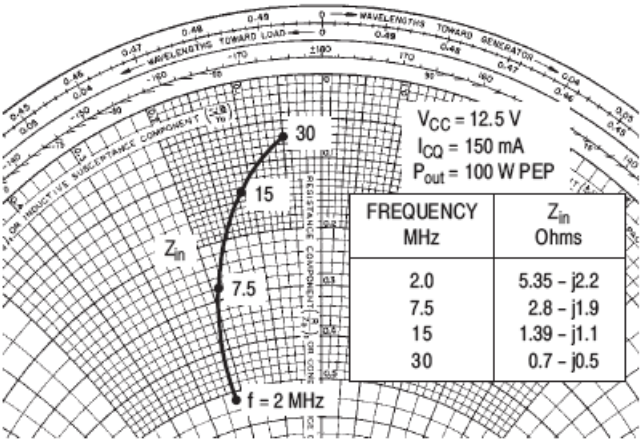


Figure 7. Series Equivalent Impedance

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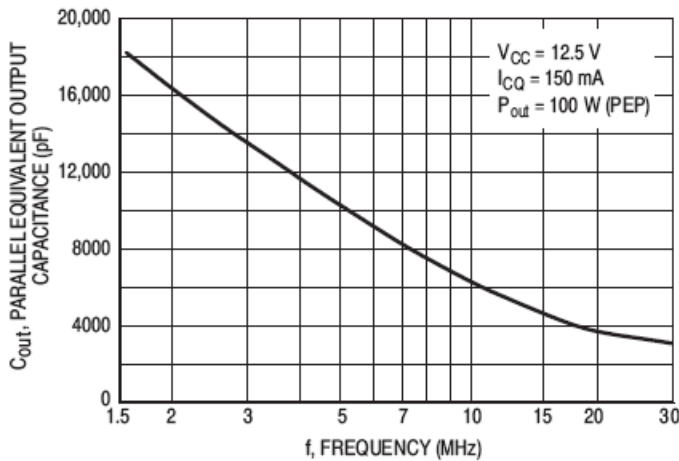


Figure 8. Output Capacitance versus Frequency

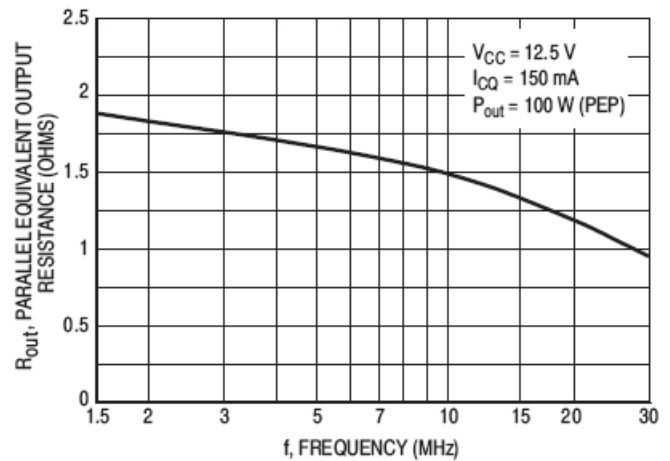
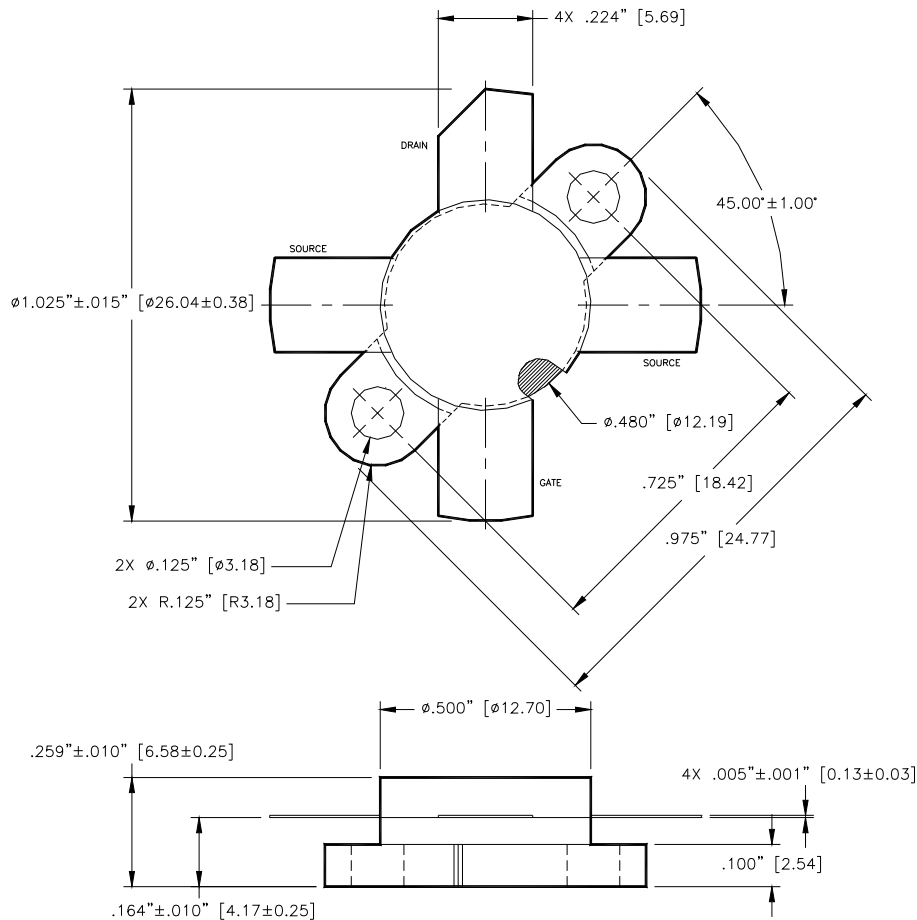


Figure 9. Output Resistance versus Frequency



Unless otherwise noted, tolerances are inches  $\pm .005$  [millimeters  $\pm 0.13$ mm]

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