

# MRF422

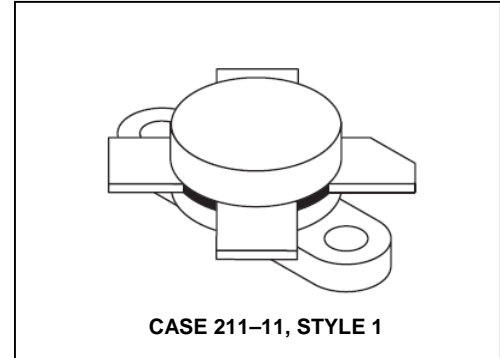


## The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

M/A-COM Products  
Released - Rev. 07.07

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

- Specified 28 V, 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	$V_{CEO}$	40	Vdc
Collector-Base Voltage	$V_{CBO}$	85	Vdc
Emitter-Base Voltage	$V_{EBO}$	3.0	Vdc
Collector Current — Continuous	$I_C$	20	Adc
Withstanding 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	$^\circ\text{C}/\text{W}$

### 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 ( $I_C = 200 \text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	35	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 100 \text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	85	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 100 \text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	85	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 28 \text{ Vdc}$ , $V_{BE} = 0$ , $T_C = 25^\circ\text{C}$ )	$I_{CES}$	—	—	20	mAdc

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
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#### ON CHARACTERISTICS

DC Current Gain ( $I_C = 5.0 \text{ A dc}$ , $V_{CE} = 5.0 \text{ V dc}$ )	$h_{FE}$	15	30	120	—
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#### DYNAMIC CHARACTERISTICS

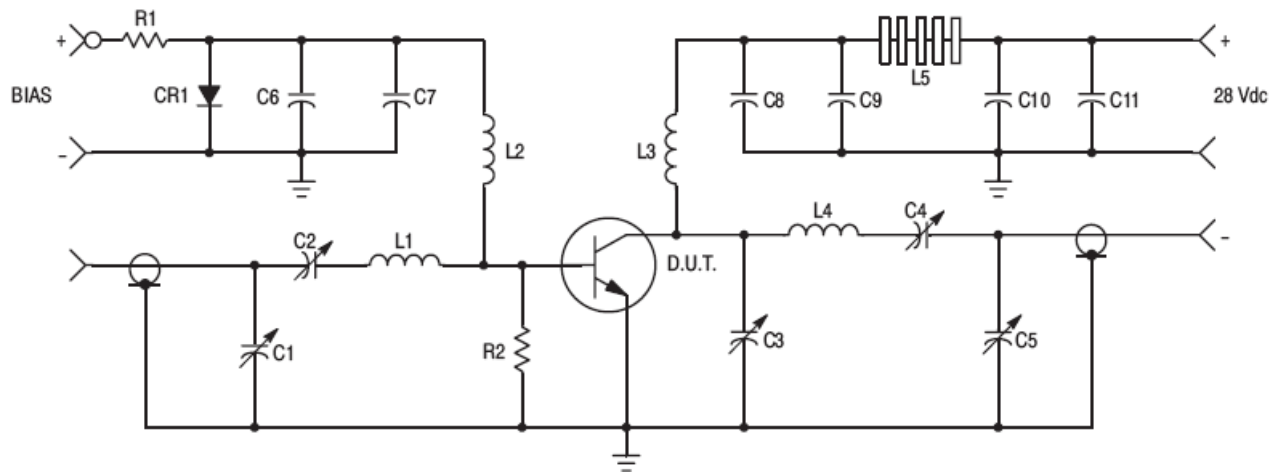
Output Capacitance ( $V_{CB} = 28 \text{ V dc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	420	—	pF
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#### FUNCTIONAL TESTS

Common-Emitter Amplifier Power Gain ( $V_{CC} = 28 \text{ V dc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_{C(max)} = 6.7 \text{ A dc}$ , $I_{CQ} = 150 \text{ mA dc}$ , $f = 30, 30.001 \text{ MHz}$ )	$G_{PE}$	10	13	—	dB
Collector Efficiency ( $V_{CC} = 28 \text{ V dc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_{C(max)} = 6.7 \text{ A dc}$ , $I_{CQ} = 150 \text{ mA dc}$ , $f = 30, 30.001 \text{ MHz}$ )	$\eta$	—	45	—	%
Intermodulation Distortion (1) ( $V_{CE} = 28 \text{ V dc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_C = 6.7 \text{ A dc}$ , $I_{CQ} = 150 \text{ mA dc}$ , $f = 30, 30.001 \text{ MHz}$ )	IMD	—	-33	-30	dB
Output Power ( $V_{CE} = 28 \text{ V dc}$ , $f = 30 \text{ MHz}$ )	$P_{out}$	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  $\mu$ F, 100 V  
 C7 — MALLORY 500  $\mu$ F, 15 V Electrolytic  
 C9 — UNDERWOOD 1000 pF, 350 V  
 C10 — 10  $\mu$ 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  $\mu$ 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

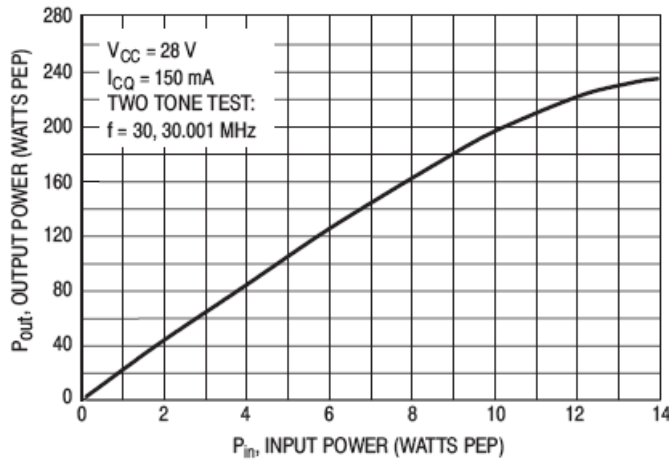


Figure 2. Output Power versus Input Power

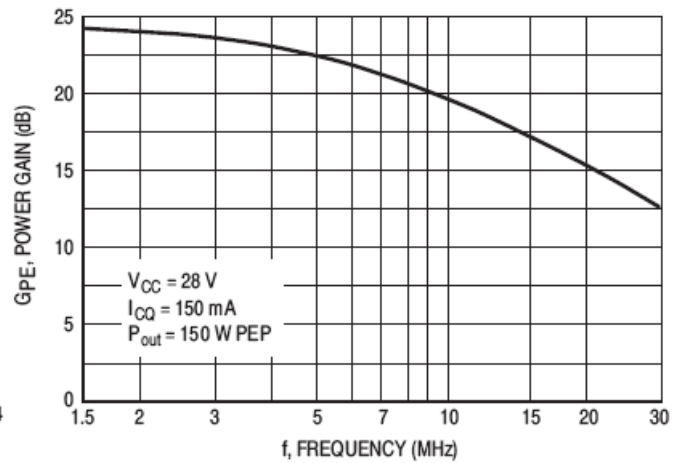


Figure 3. Power Gain versus Frequency

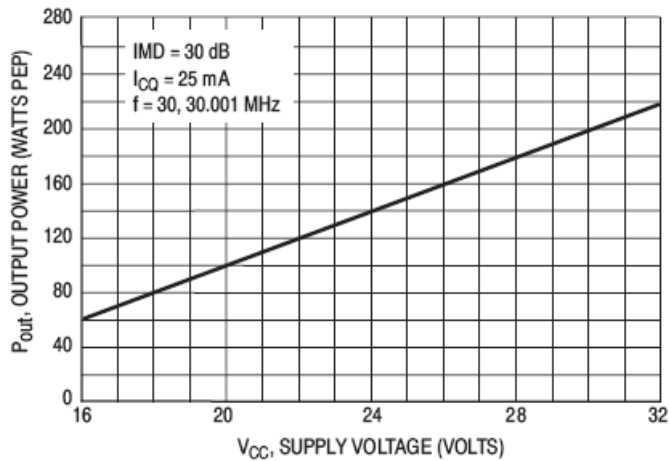


Figure 4. Linear Output Power versus Supply Voltage

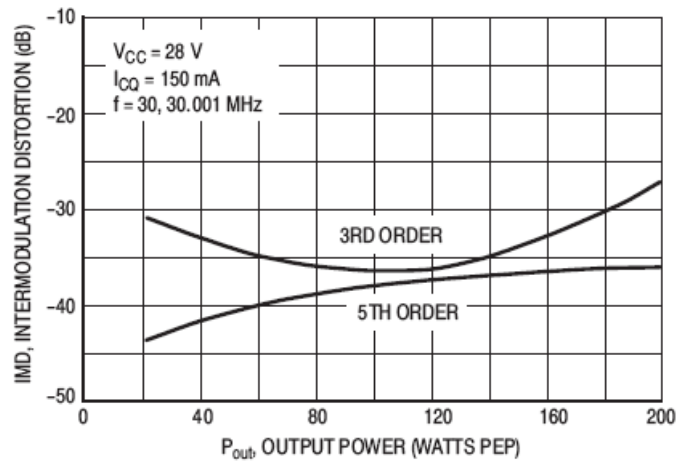


Figure 5. Intermodulation Distortion versus Output Power

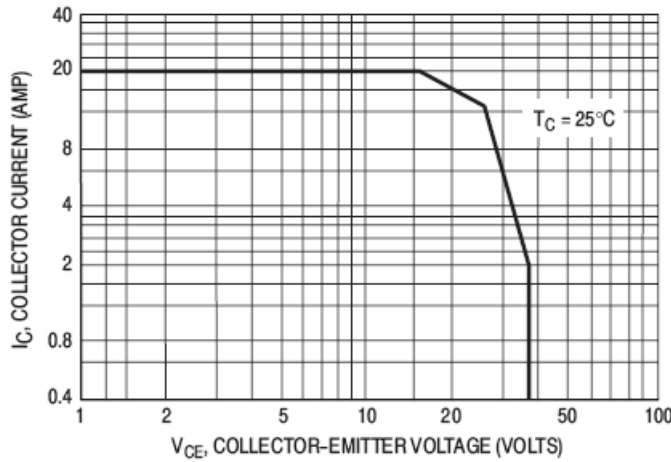


Figure 6. DC Safe Operating Area

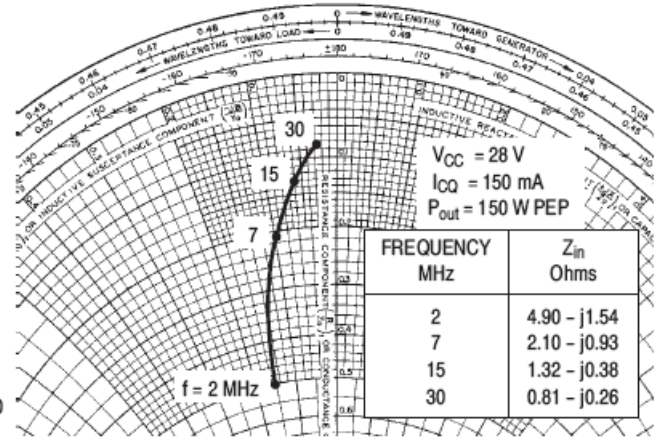


Figure 7. Series Input Impedance

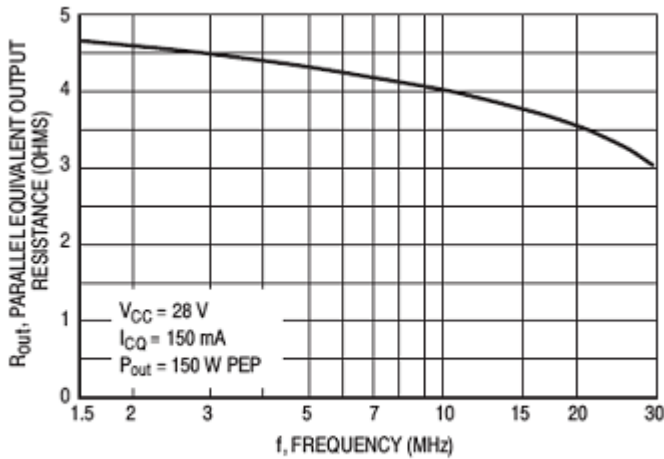


Figure 8. Output Resistance versus Frequency

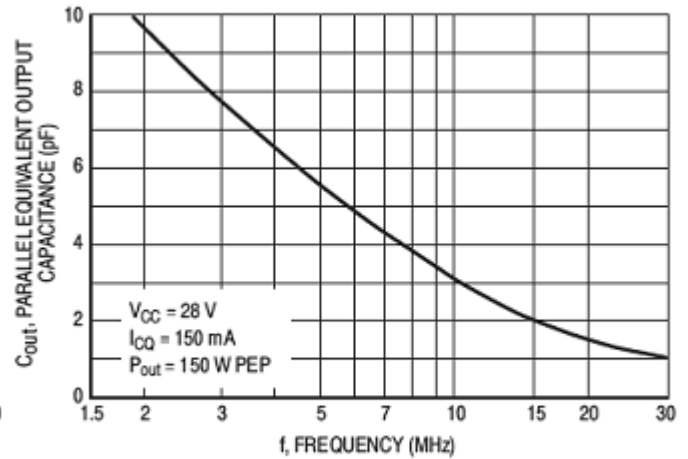
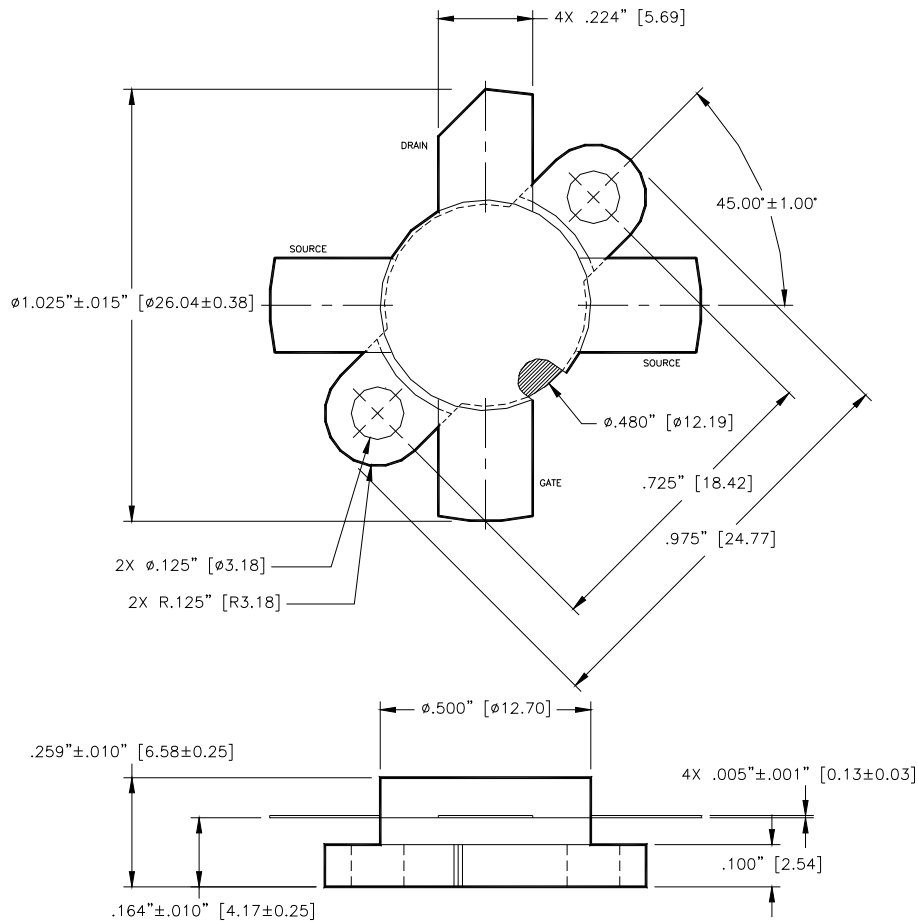


Figure 9. Output Capacitance versus Frequency



Unless otherwise noted, tolerances are inches  $\pm 0.005$  [millimeters  $\pm 0.13$ mm]