

# MRF429



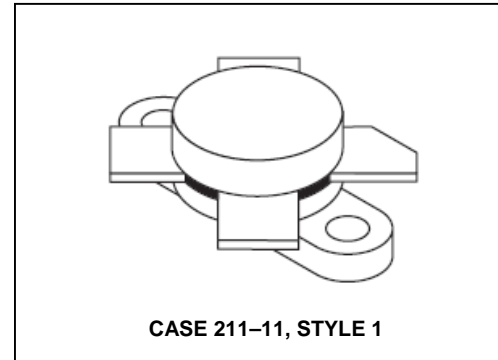
## The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

M/A-COM Products  
Released - Rev. 07.07

Designed primarily for high-voltage applications as a high-power linear amplifier from 2.0 to 30 MHz. Ideal for marine and base station equipment.

- Specified 50 V, 30 MHz Characteristics —  
Output power = 150 W (PEP)  
Minimum gain = 13 dB  
Efficiency = 45%
- Intermodulation distortion @ 150 W (PEP) —  
IMD = -32 dB (Max)
- Diffused emitter resistors for superior ruggedness
- 100% tested for load mismatch at all phase angles with 30:1 VSWR @ 150 W CW

### Product Image



### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	50	Vdc
Collector-Base Voltage	$V_{CBO}$	100	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous	$I_C$	16	Adc
Withstand Current — 10 s	—	20	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	233 1.33	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	$R_{\theta JC}$	0.75	$^\circ\text{C/W}$

### 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 ( $I_C = 200 \text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	50	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 100 \text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	100	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 100 \text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	100	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc

(continued)

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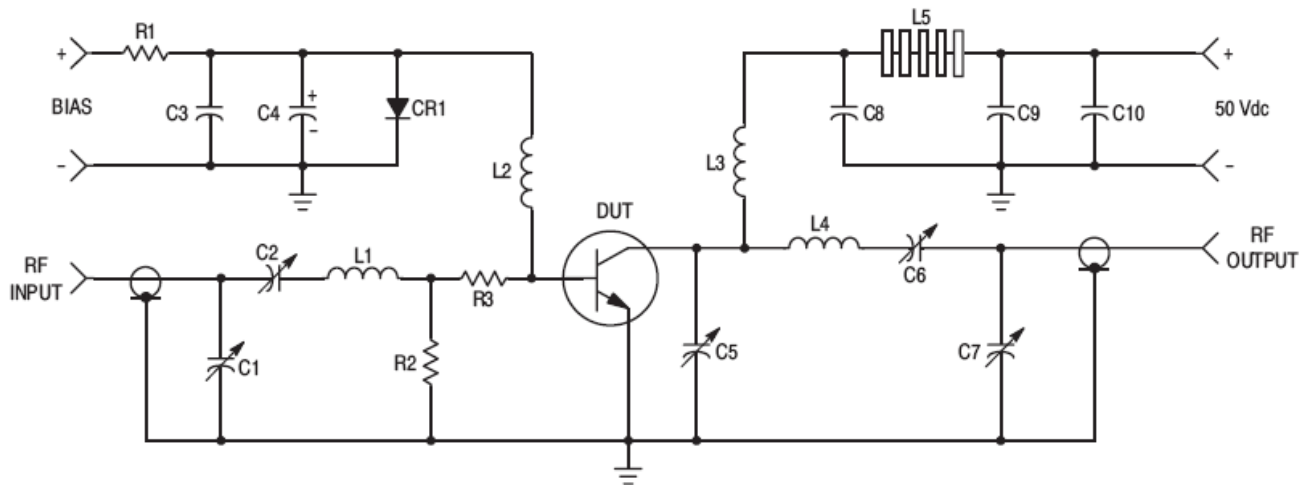
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### ELECTRICAL CHARACTERISTICS — continued ( $T_C = 25^\circ\text{C}$ unless otherwise noted.)

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	30	80	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 50 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	220	300	pF
<b>FUNCTIONAL TESTS</b>					
Common-Emitter Amplifier Gain ( $V_{CC} = 50 \text{ Vdc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_C(\text{max}) = 3.32 \text{ Adc}$ , $f = 30$ ; $30.001 \text{ MHz}$ )	$G_{PE}$	13	15	—	dB
Output Power ( $V_{CE} = 50 \text{ Vdc}$ , $f = 30$ ; $30.001 \text{ MHz}$ )	$P_{out}$	150	—	—	W (PEP)
Collector Efficiency ( $V_{CC} = 50 \text{ Vdc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_C(\text{max}) = 3.32 \text{ Adc}$ , $f = 30$ , $30.001 \text{ MHz}$ )	$\eta$	45	—	—	%
Intermodulation Distortion (1) ( $V_{CE} = 50 \text{ Vdc}$ , $P_{out} = 150 \text{ W (PEP)}$ , $I_C = 3.32 \text{ Adc}$ )	IMD	—	-35	-32	dB
Electrical Ruggedness ( $V_{CC} = 50 \text{ Vdc}$ , $P_{out} = 150 \text{ W CW}$ , $f = 30 \text{ MHz}$ , VSWR 30:1 at all Phase Angles)	$\Psi$	No Degradation in Output Power			

**NOTE:**

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



C1, C2, C7 — 170–780 pF, Arco 469  
C3, C8, C9 — 0.1  $\mu$ F, 100 V Erie  
C4 — 500  $\mu$ F @ 6.0 V  
C5 — 9.0–180 pF, Arco 463  
C6 — 80–480 pF, Arco 466  
C10 — 30  $\mu$ F, 100 V  
R1 — 10  $\Omega$ , 10 Watt

R2 — 10  $\Omega$ , 1.0 Watt  
R3 — 5.0 – 3.3  $\Omega$  1/2 Watt Carbon Resistors in Parallel  
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 Closewound, 1/4" I.D.  
L4 — 5 Turns, 1/8" Copper Tubing, 9/16" I.D., 3/4" Long  
L5 — 10 Ferrite Beads — Ferroxcube #56–590–65/3B

Figure 1. 30 MHz Test Circuit Schematic

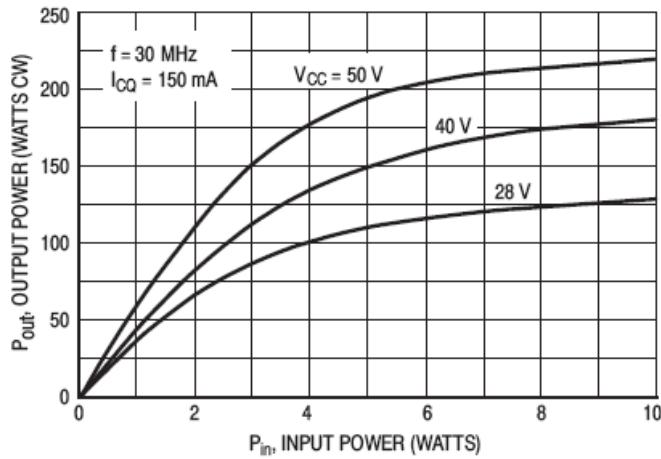


Figure 2. Output Power versus Input Power

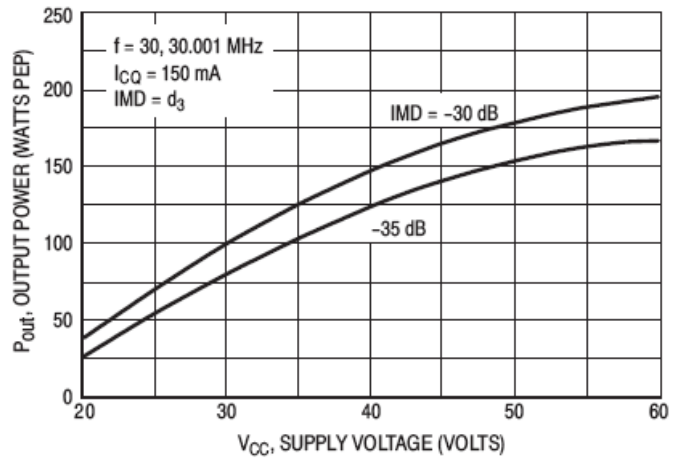


Figure 3. Output Power versus Supply Voltage

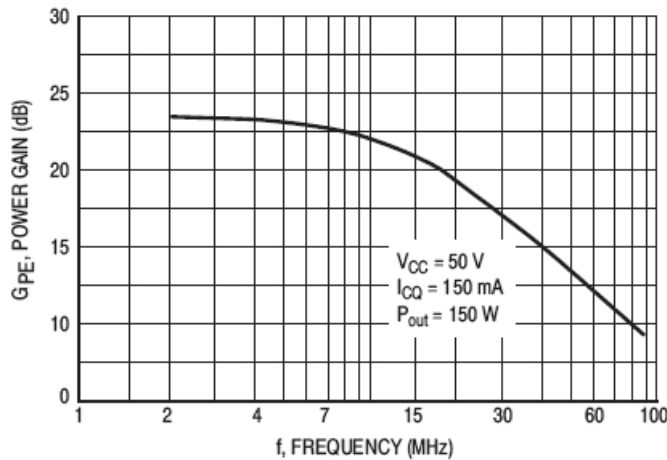


Figure 4. Power Gain versus Frequency

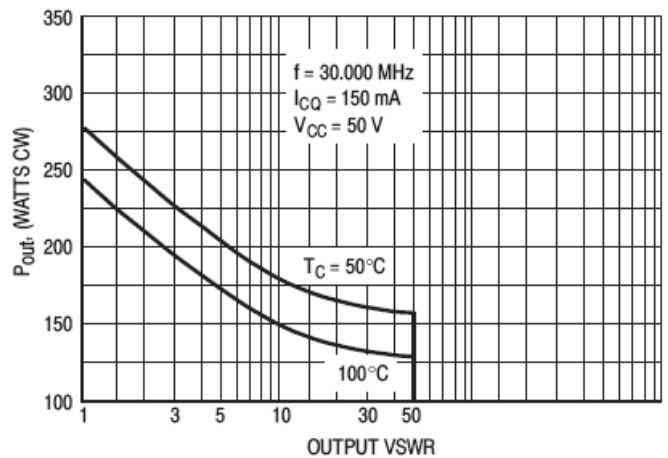


Figure 5. RF Safe Operating Area (SOAR)

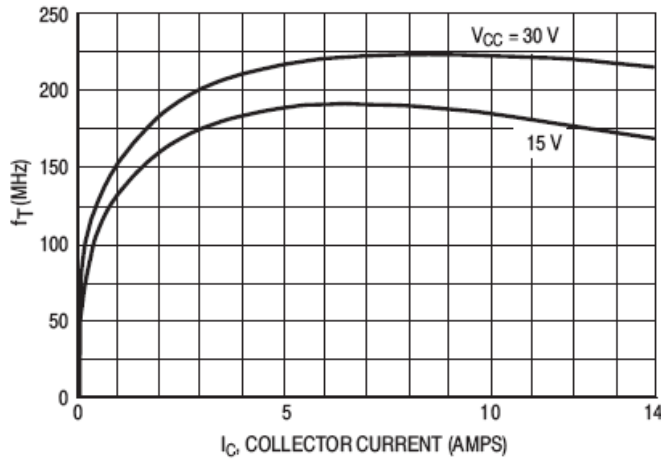


Figure 6.  $f_T$  versus Collector Current

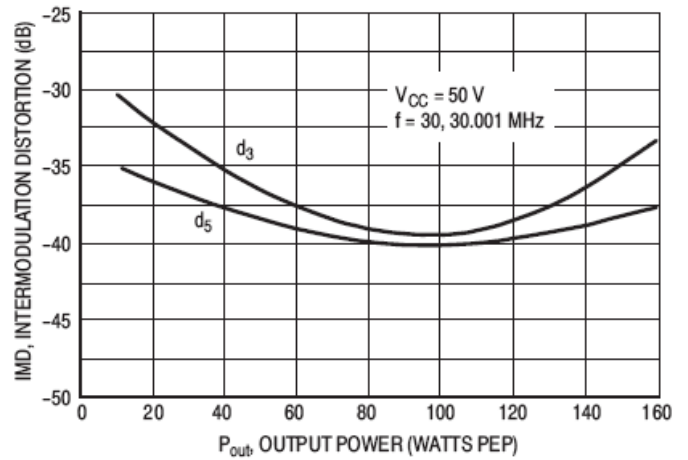


Figure 7. IMD versus  $P_{out}$

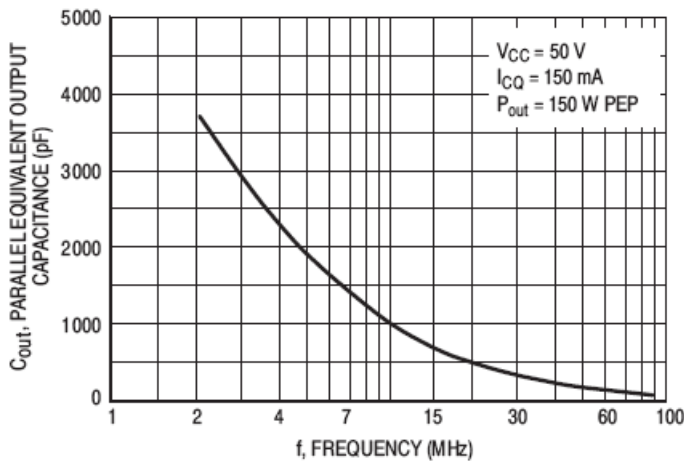


Figure 8. Output Capacitance versus Frequency

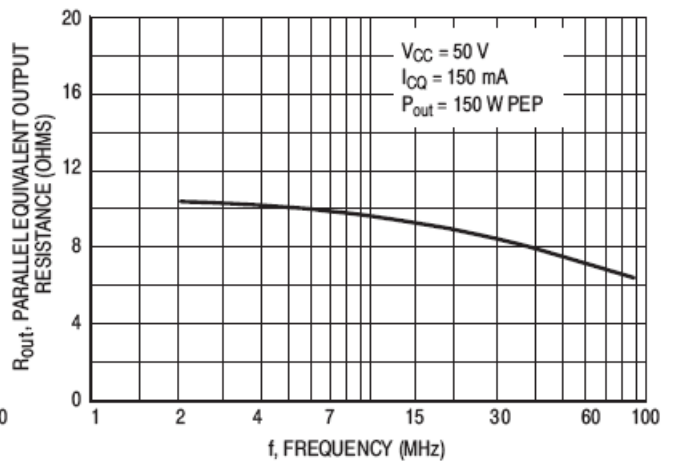


Figure 9. Output Resistance versus Frequency

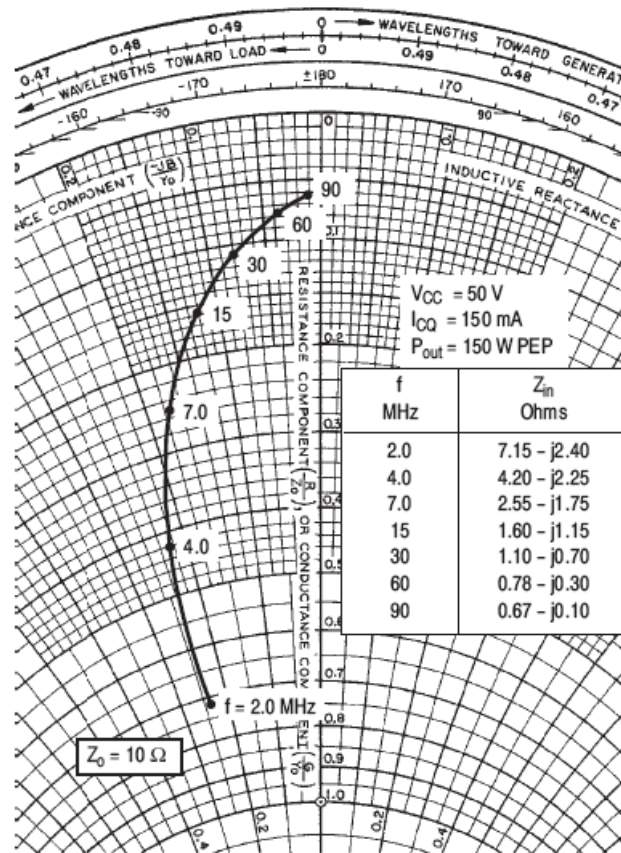
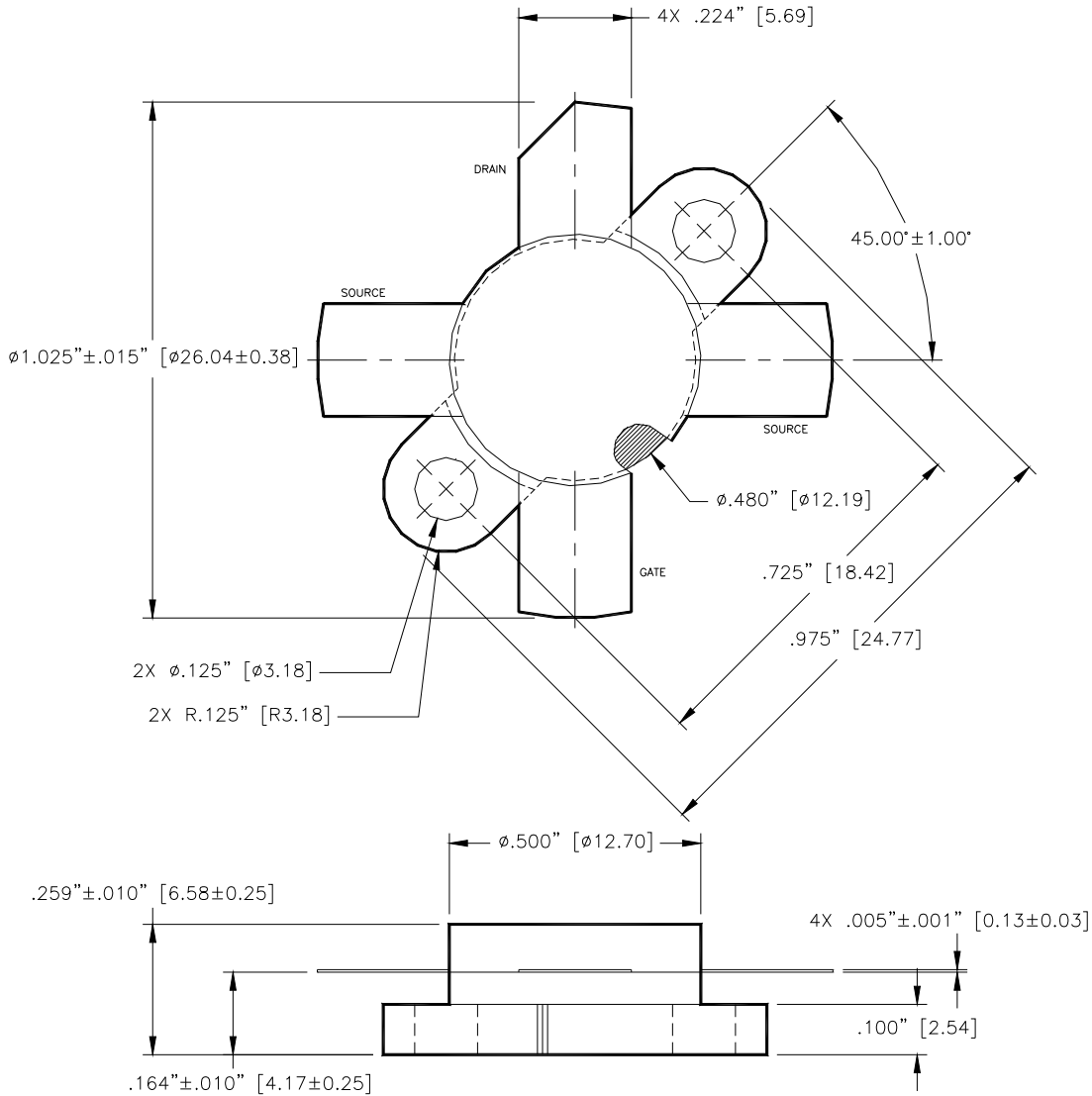


Figure 10. Series Equivalent Impedance

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