

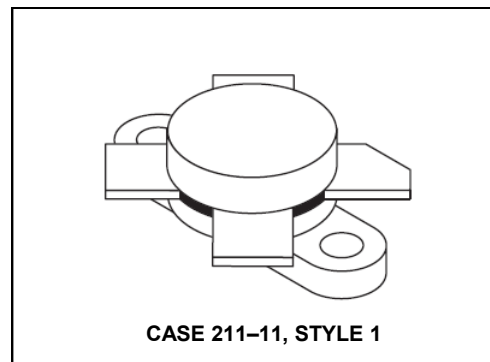
MRF422

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

Rev. V1

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°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 ($I_C = 200\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	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 ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	15	30	120	—
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DYNAMIC CHARACTERISTICS

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

Common-Emitter Amplifier Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$)	G_{PE}	10	13	—	dB
Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$)	η	—	45	—	%
Intermodulation Distortion (1) ($V_{CE} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$)	IMD	—	-33	-30	dB
Output Power ($V_{CE} = 28 \text{ Vdc}$, $f = 30 \text{ MHz}$)	P_{out}	150	—	—	Watts (PEP)

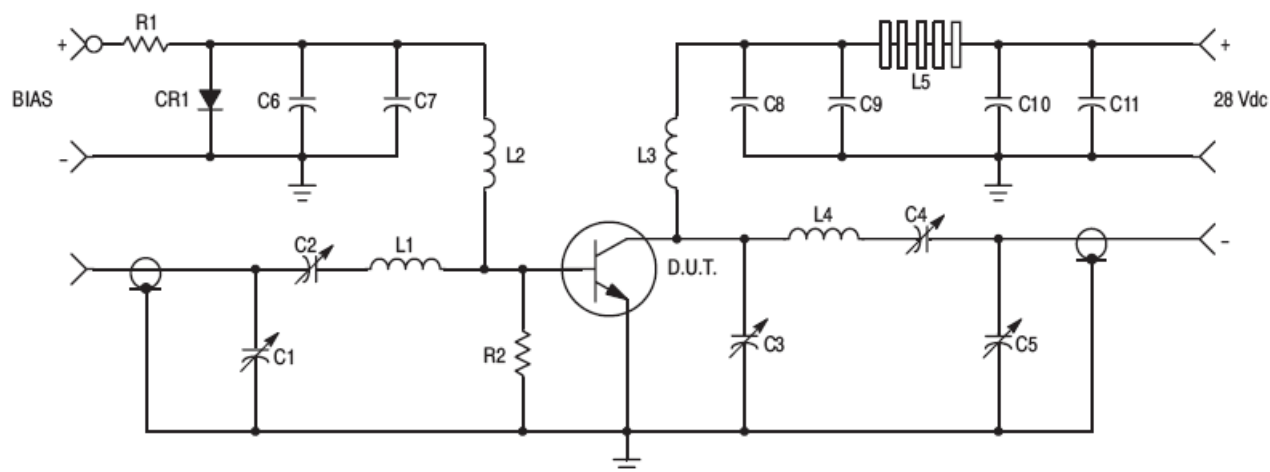
NOTE:

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

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

L1 — 3 Turns, #16 Wire, 5/16" I.D., 5/16" Long
L2 — 10 μ 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

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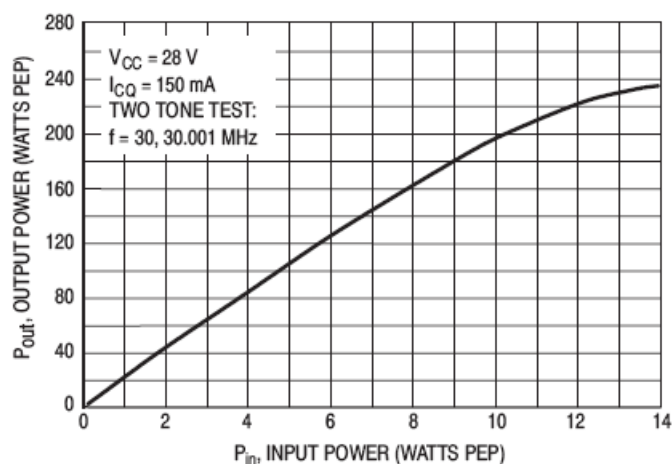


Figure 2. Output Power versus Input Power

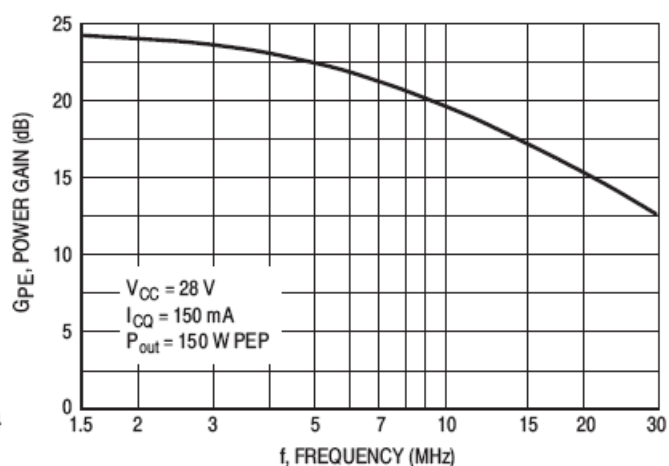


Figure 3. Power Gain versus Frequency

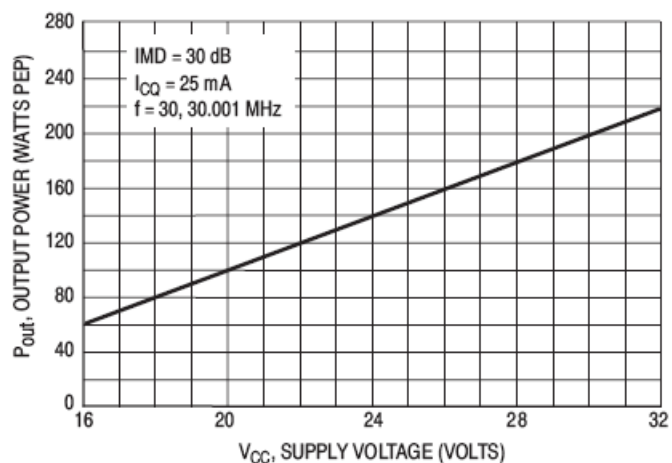


Figure 4. Linear Output Power versus Supply Voltage

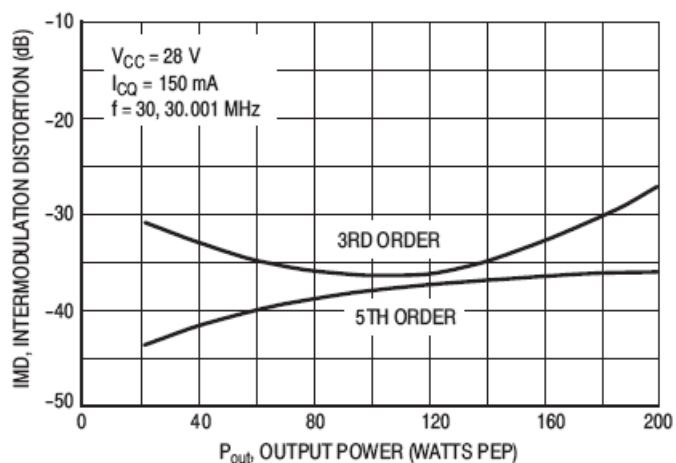


Figure 5. Intermodulation Distortion versus Output Power

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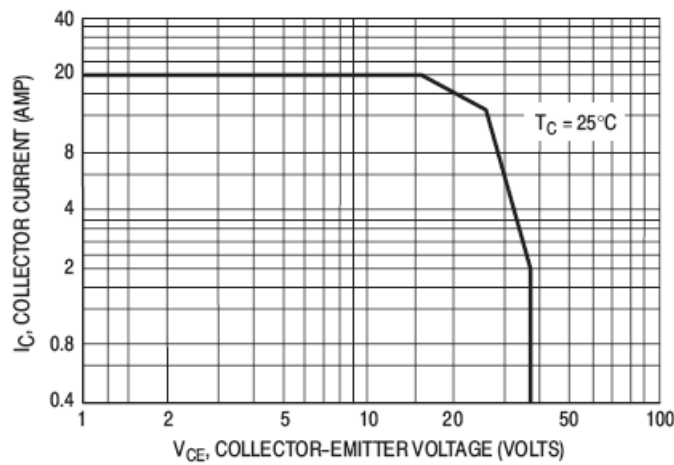


Figure 6. DC Safe Operating Area

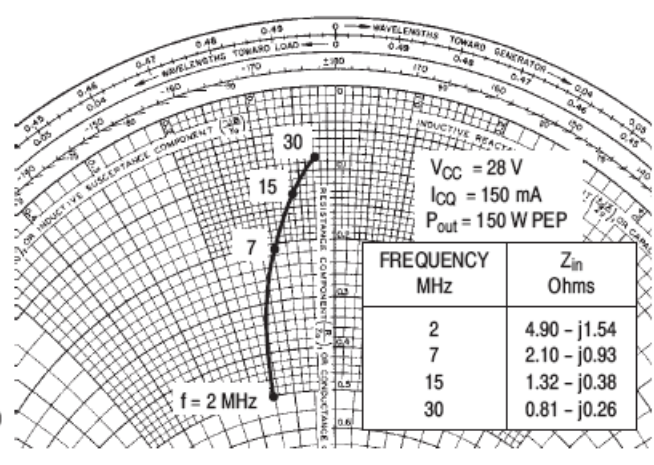


Figure 7. Series Input Impedance

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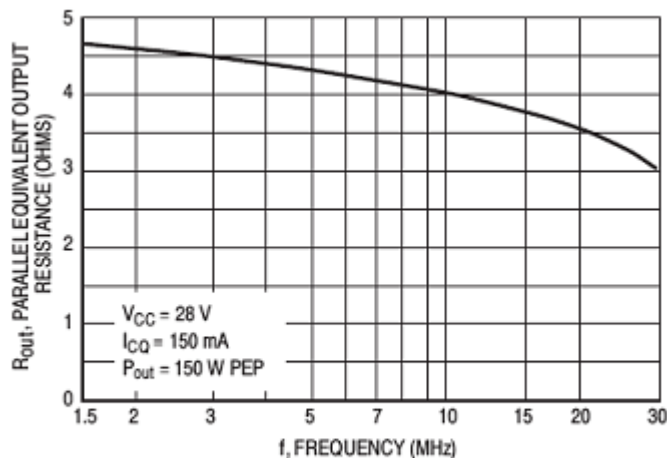


Figure 8. Output Resistance versus Frequency

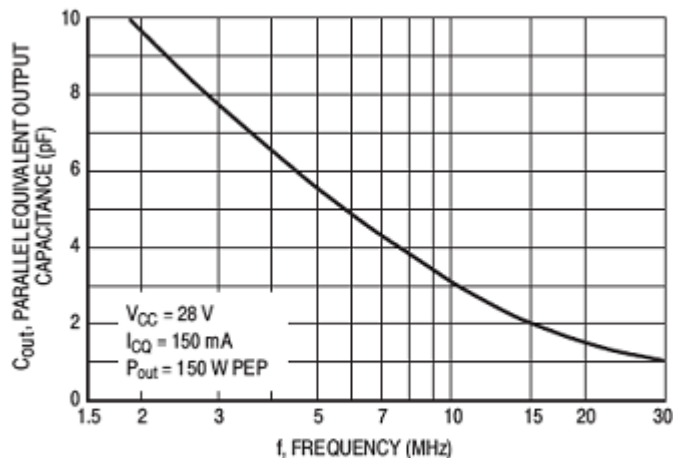
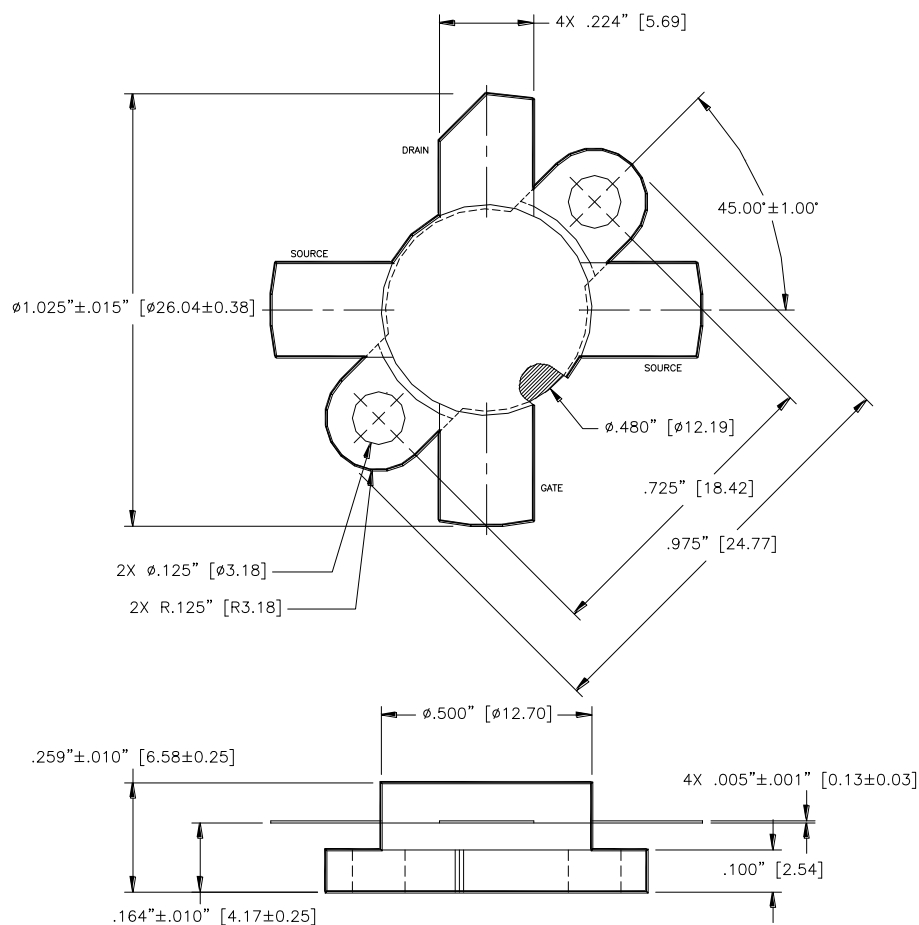


Figure 9. Output Capacitance versus Frequency



Unless otherwise noted, tolerances are inches ± 0.005 [millimeters ± 0.13 mm]