

RF Line NPN Silicon Power Transistor

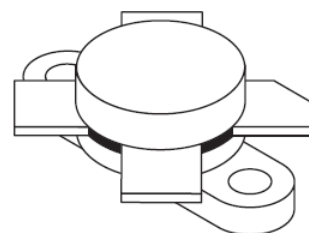
150 W (PEP), 30 MHz, 28 V

**MRF422**

Rev. V2

Features

- 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

**CASE 211-11, STYLE 1**

Description

Designed primarily for applications as a high power linear amplifier from 2 to 30 MHz.

Electrical Characteristics: $T_A = +25^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
OFF Characteristics					
Collector-Emitter Breakdown Voltage	$I_C = 200 \text{ mA}$, $I_B = 0$ $I_C = 100 \text{ mA}$, $V_{BE} = 0$	V	35 85	—	—
Collector-Base Breakdown Voltage	$I_C = 100 \text{ mA}$, $I_E = 0$	V	85	—	—
Emitter-Base Breakdown Voltage	$I_E = 10 \text{ mA}$, $I_C = 0$	V	3	—	—
Collector Cutoff Current	$V_{CE} = 28 \text{ V}$, $V_{BE} = 0$, $T_C = 25^\circ\text{C}$	mA	—	—	20
ON Characteristics					
DC Current Gain	$I_C = 5 \text{ A}$, $V_{CE} = 5 \text{ V}$	—	15	30	120
DYNAMIC Characteristics					
Output Capacitance	$V_{CB} = 28 \text{ V}$, $I_E = 0$, 1 MHz	pF	—	420	—

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Functional Tests: $V_{CC} = 28\text{ V}$, $P_{OUT} = 150\text{ W (PEP)}$, $I_{C(MAX)} = 6.7\text{ A}$, $I_{CQ} = 150\text{ mA}$, $f = 30, 30.001\text{ MHz}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Common-Emitter Amplifier Gain	—	dB	10	13	—
Collector Efficiency	—	%	—	45	—
Intermodulation Distortion ¹	—	dB	—	-33	-30
Output Power	30 MHz	Watts (PEP)	150	—	—

1. MIL-STD-1311 Version A, Test Method 2204, 2-Tone, Reference each tone.

Absolute Maximum Ratings^{2,3}

Parameter	Absolute Maximum
Collector-Emitter Voltage	40 V
Collector-Base Voltage	85 V
Emitter-Base Voltage	3 V
Collector Current - Continuous	20 A
Withstanding Current	30 A, 10 seconds
Total Device Dissipation @ $T_C = 25^\circ\text{C}$, Derate above 25°C	290 W 1.66 W/ $^\circ\text{C}$
Storage Temperature	-65°C to $+150^\circ\text{C}$

2. Exceeding any one or combination of these limits may cause permanent damage to this device.

3. MACOM does not recommend sustained operation near these survivability limits.

Thermal Characteristics

Parameter	Absolute Maximum
Thermal Resistance, Junction to Case ($R_{\theta JC}$)	0.6 $^\circ\text{C/W}$

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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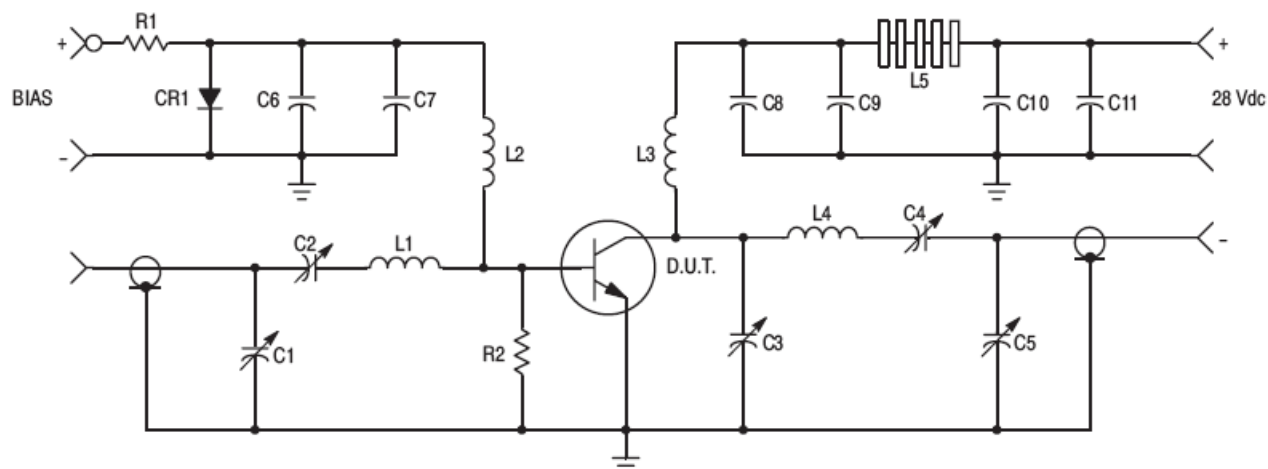
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Test Circuit Schematic, 30 MHz



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

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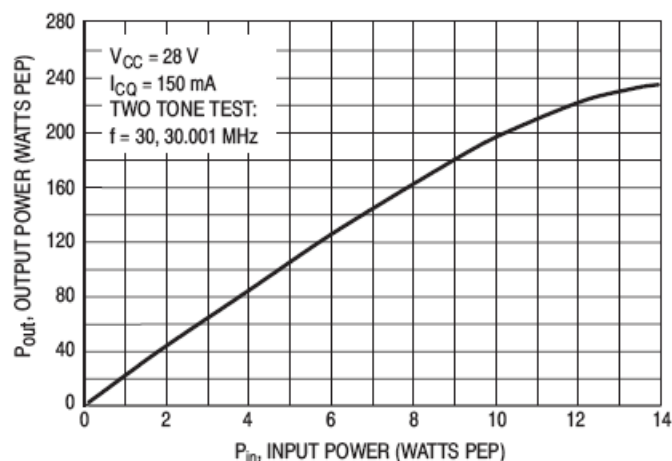


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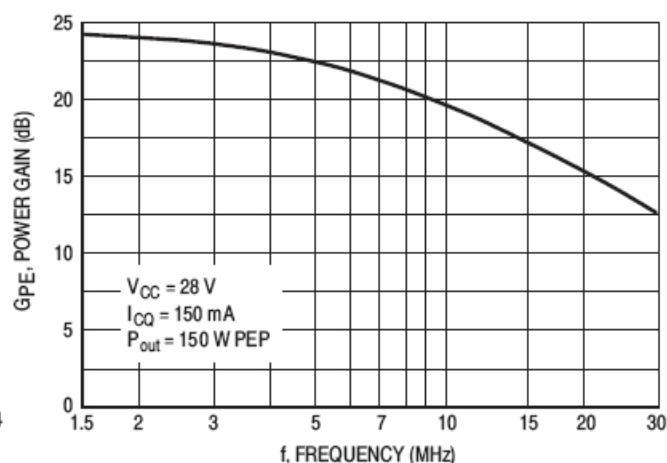
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Typical Performance Curves

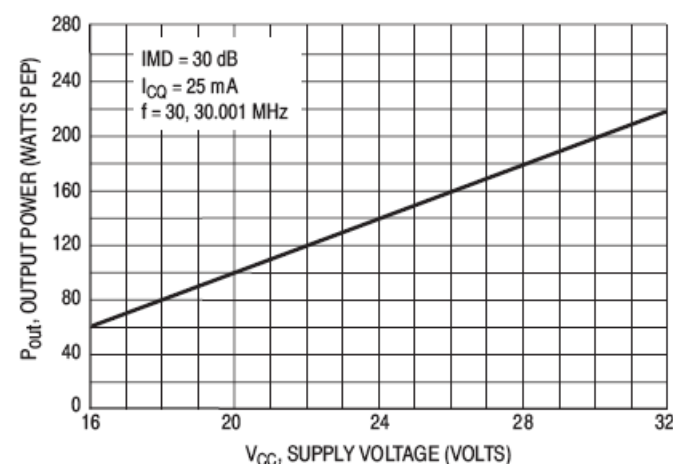
Output Power vs Input Power



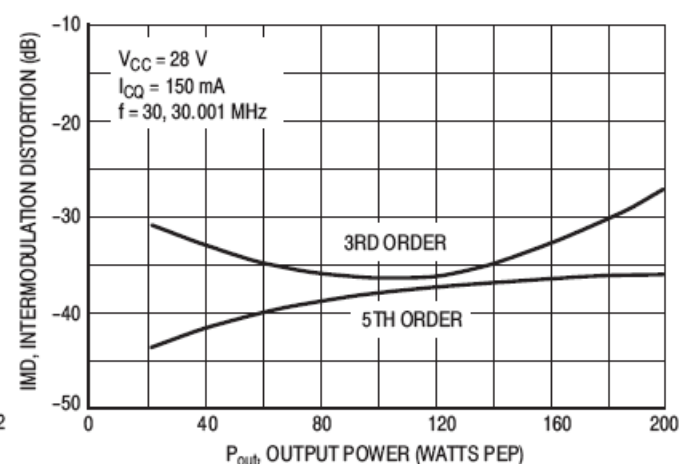
Power Gain vs Frequency



Linear Output Power vs Supply Voltage



Intermodulation Distortion vs Output Power



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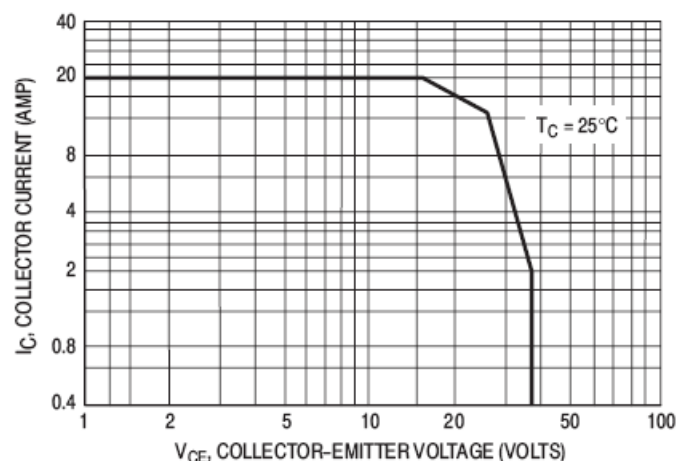
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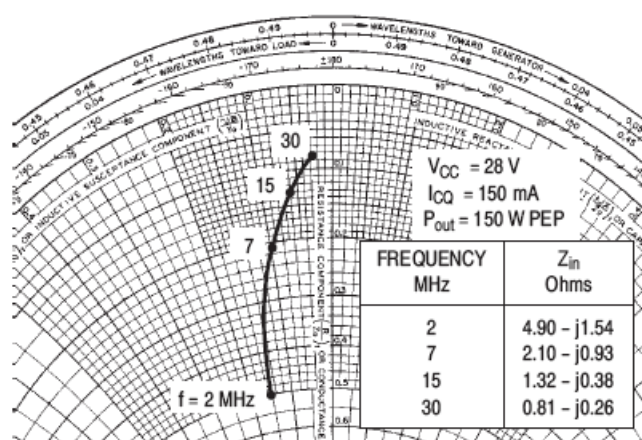
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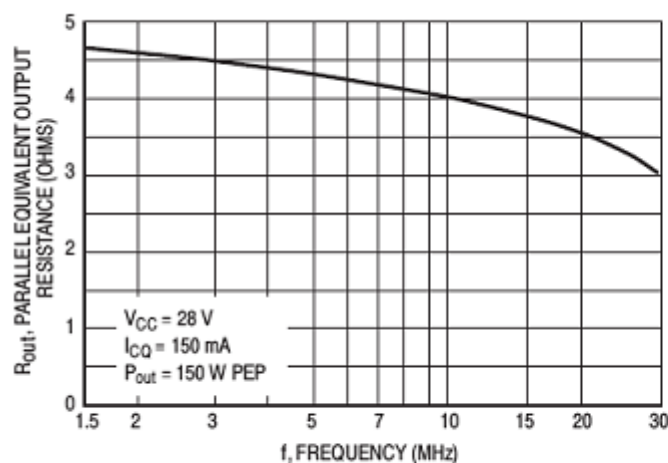
DC Safe Operating Area



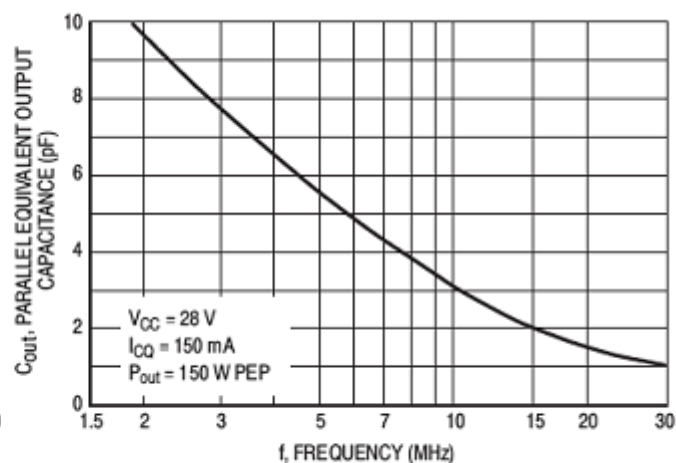
Series Input Impedance



Output Resistance vs. Frequency



Output Capacitance vs Frequency



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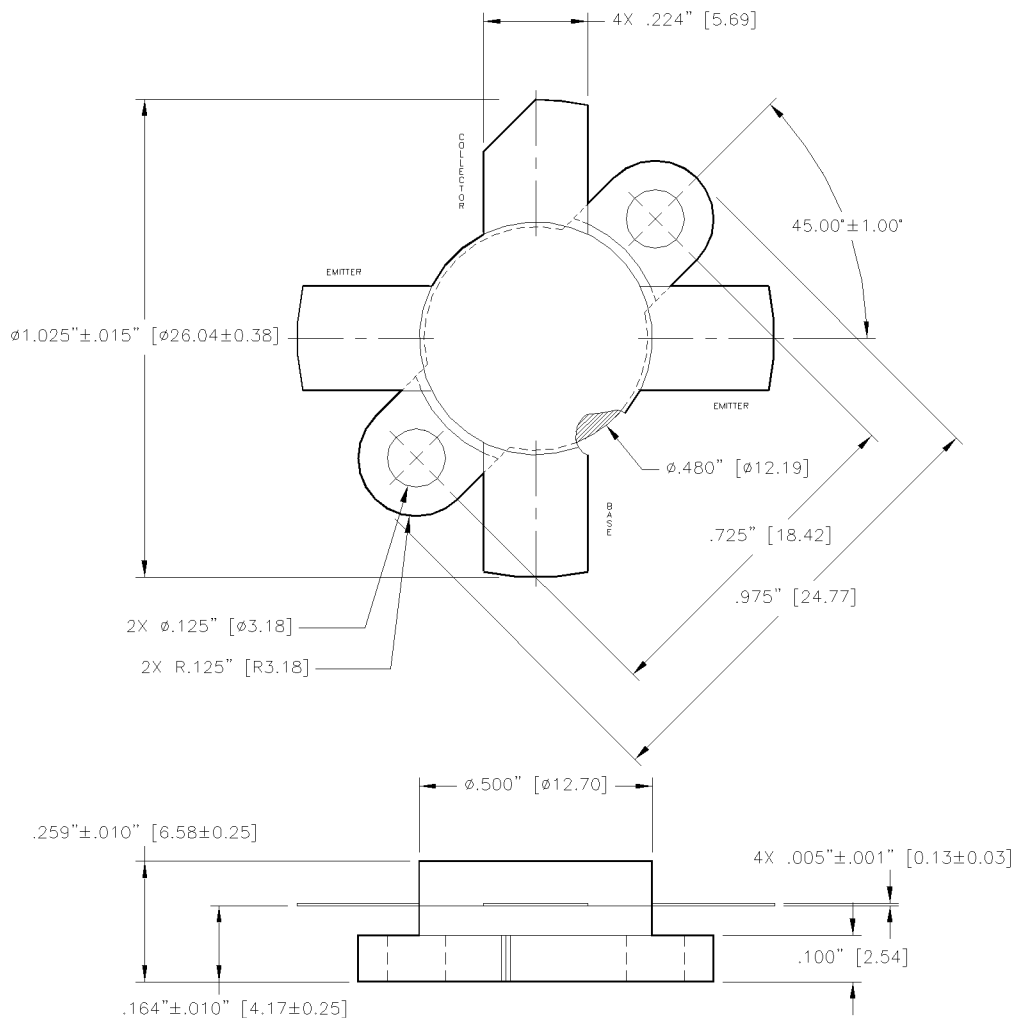
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Outline: Case 211-11, Style 1



UNLESS OTHERWISE NOTED, TOLERANCES ARE INCHES $\pm .005''$ [MILLIMETERS $\pm 0.13\text{MM}$]

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