

The RF Line

NPN Silicon

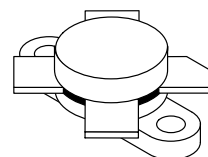
RF Power Transistor

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

- Specified 28 Volt, 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

MRF422

150 W (PEP), 30 MHz
RF POWER
TRANSISTORS
NPN SILICON



CASE 211-11, STYLE 1

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	$^\circ\text{C}/\text{W}$

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

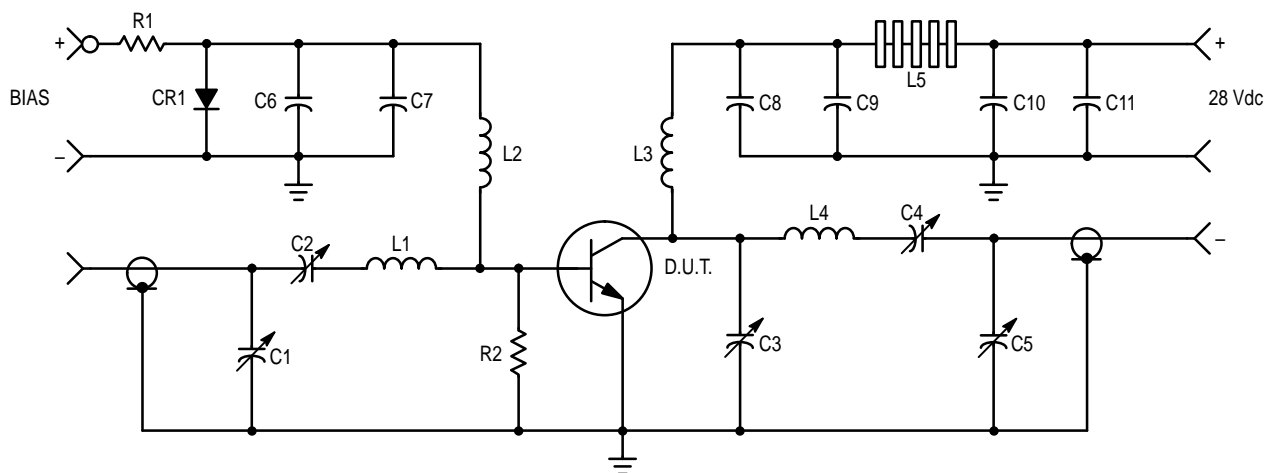
(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	15	30	120	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 28 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	420	—	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mA dc}$, $f = 30, 30.001 \text{ MHz}$)	G_{PE}	10	13	—	dB
Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mA dc}$, $f = 30, 30.001 \text{ MHz}$)	η	—	45	—	%
Intermodulation Distortion (1) ($V_{CE} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mA dc}$, $f = 30, 30.001 \text{ MHz}$)	IMD	—	-33	-30	dB
Output Power ($V_{CE} = 28 \text{ Vdc}$, $f = 30 \text{ MHz}$)	P_{out}	150	—	—	Watts (PEP)

NOTE:

- 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 μF , 100 V
- C7 — MALLORY 500 μF , 15 V Electrolytic
- C9 — UNDERWOOD 1000 pF, 350 V
- C10 — 10 μF , 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 μH 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

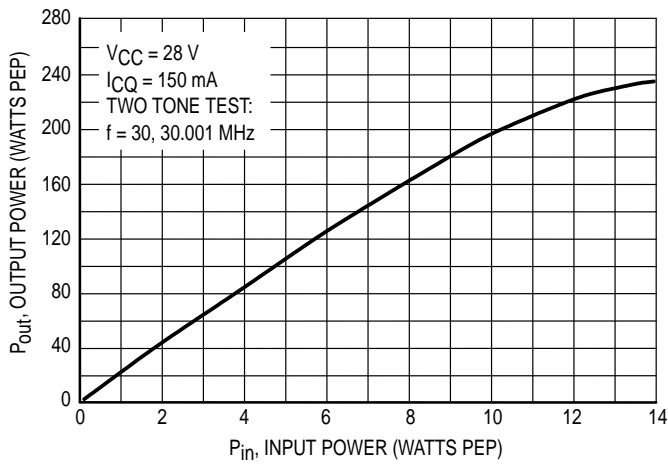


Figure 2. Output Power versus Input Power

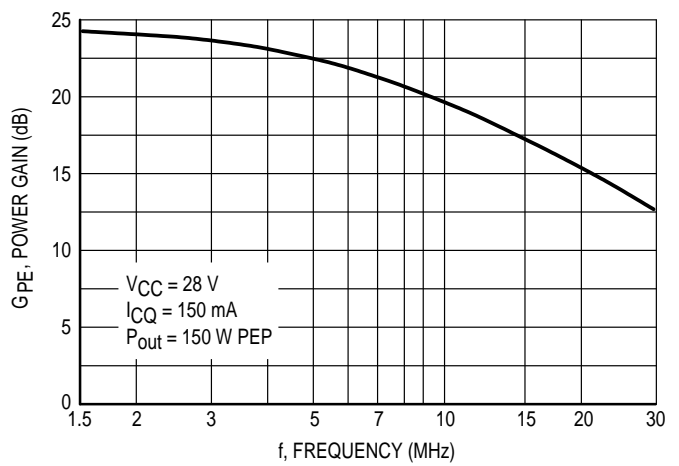


Figure 3. Power Gain versus Frequency

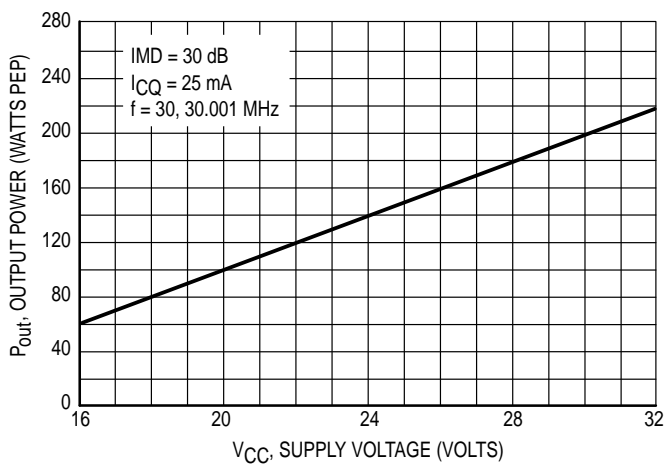


Figure 4. Linear Output Power versus Supply Voltage

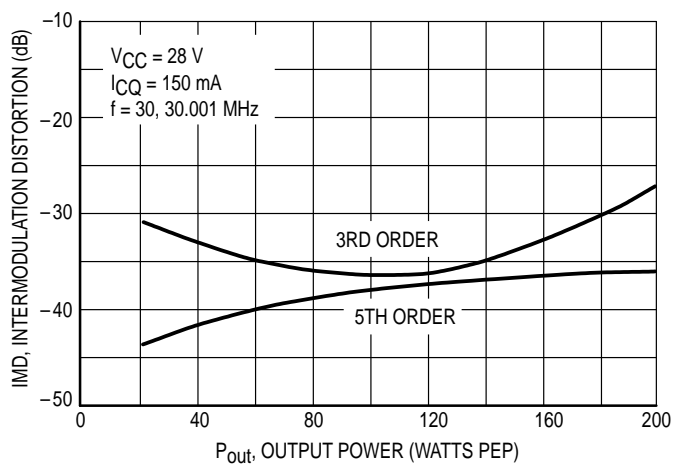


Figure 5. Intermodulation Distortion versus Output Power

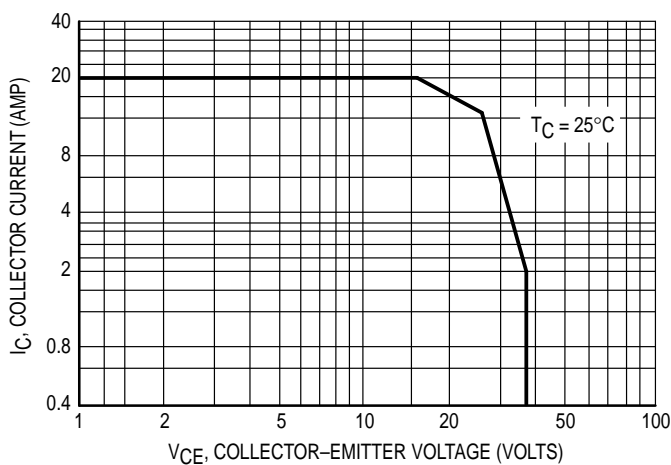


Figure 6. DC Safe Operating Area

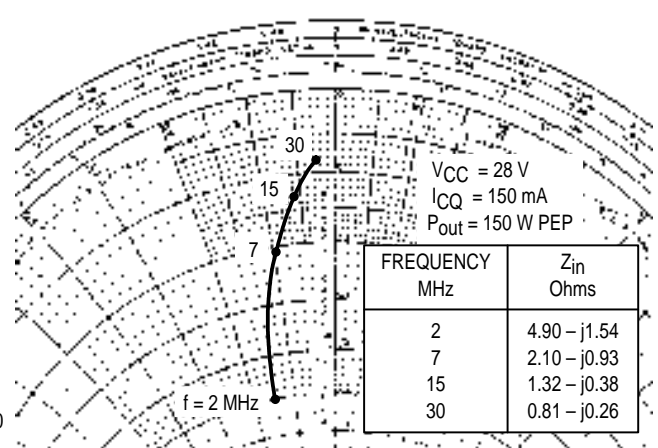


Figure 7. Series Input Impedance

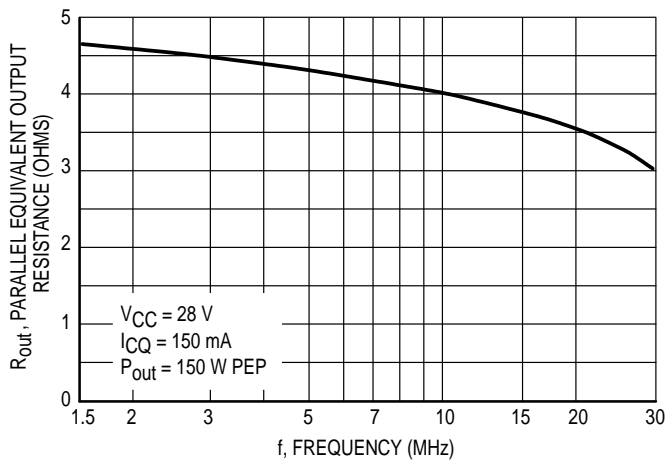


Figure 8. Output Resistance versus Frequency

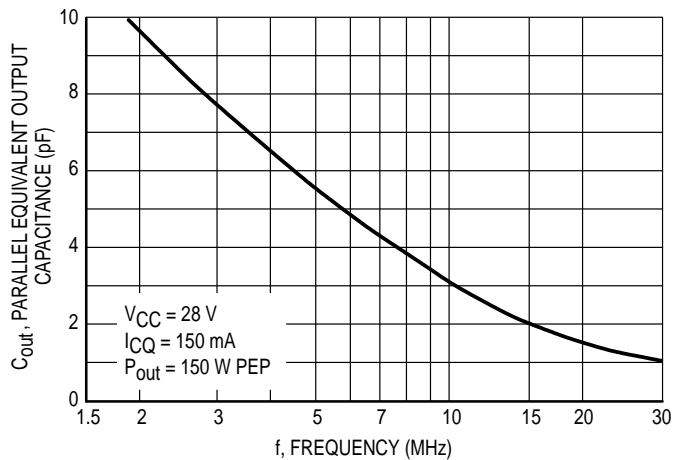
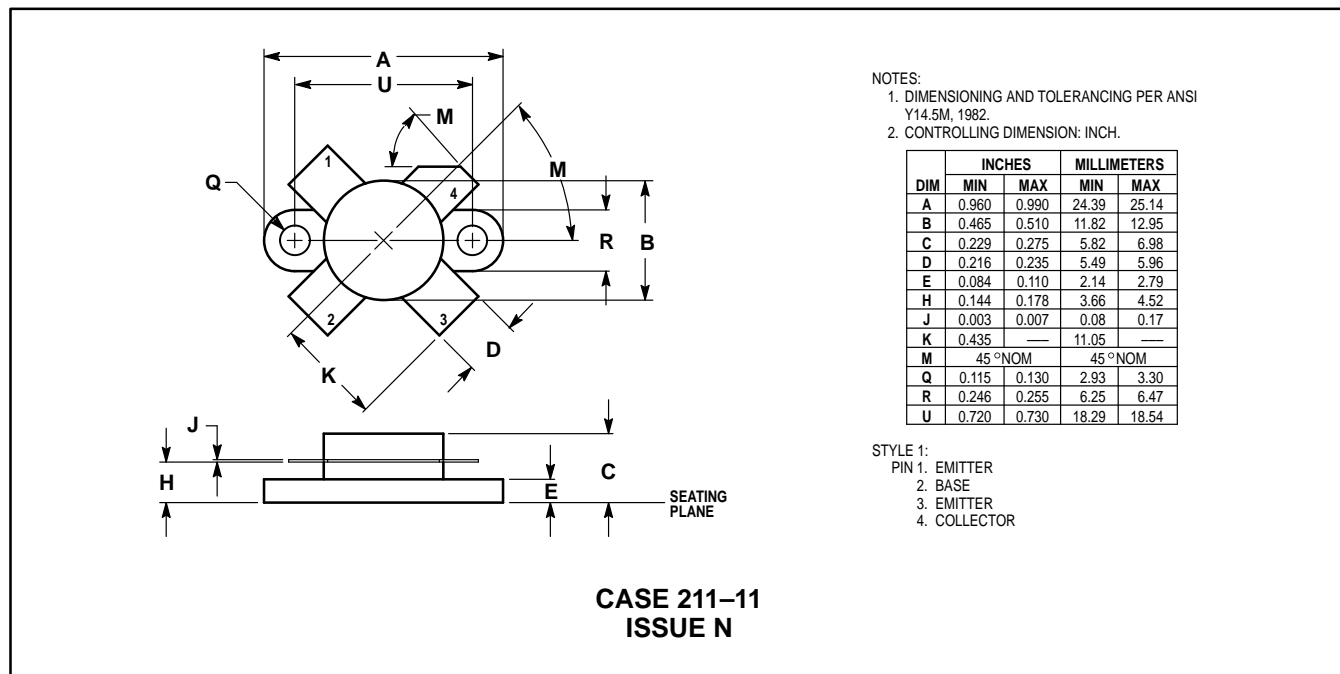


Figure 9. Output Capacitance versus Frequency

PACKAGE DIMENSIONS



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