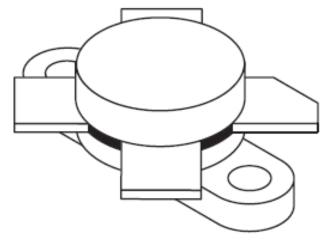
RF Line NPN Silicon Power Transistor
150 W (PEP), 30 MHz, 28 V

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°C

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

Functional Tests:

V_{CC} = 28 V, P_{OUT} = 150 W (PEP), $I_{C(MAX)}$ = 6.7 A, I_{CQ} = 150 mA, f = 30, 30.001 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°C, Derate above 25°C	290 W 1.66 W/°C
Storage Temperature	-65°C to +150°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°C/W

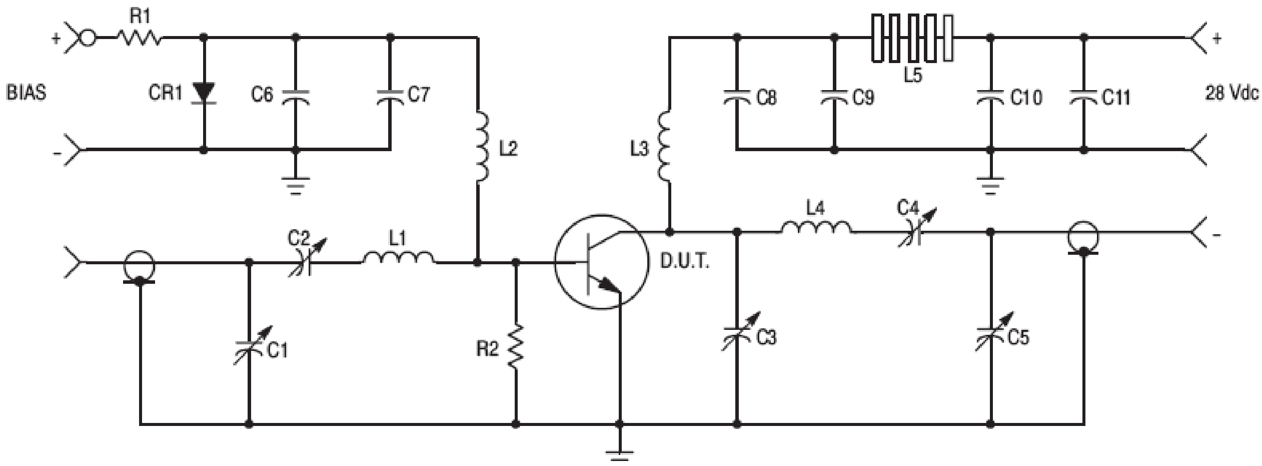
Handling Procedures

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.

Test Circuit Schematic, 30 MHz

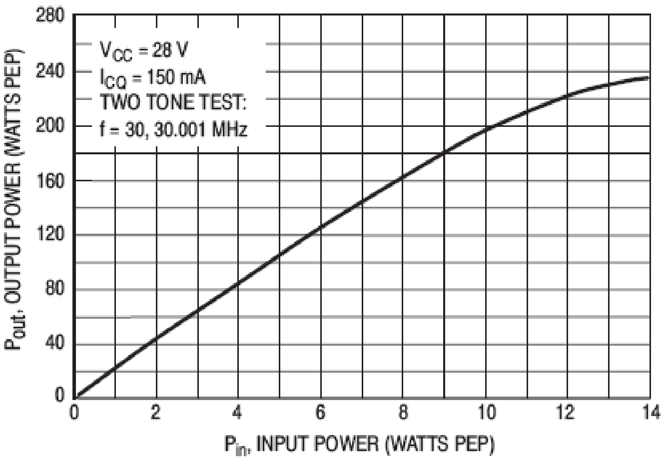


C1, C2, C3, C5 — 170–680 pF, ARCO 469
C4 — 80–480 pF, ARCO 466
C6, C8, C11 — ERIE 0.1 µF, 100 V
C7 — MALLORY 500 µF, 15 V Electrolytic
C9 — UNDERWOOD 1000 pF, 350 V
C10 — 10 µF, 50 V Electrolytic
R1 — 10 Ω, 25 Watt Wire Wound
R2 — 10 Ω, 1.0 Watt Carbon
CR1 — 1N4997

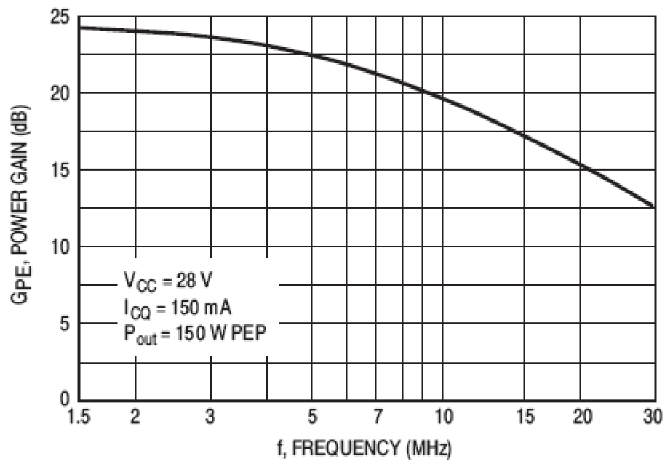
L1 — 3 Turns, #16 Wire, 5/16″ I.D., 5/16″ Long
L2 — 10 µH Molded Choke
L3 — 12 Turns, #16 Enameled Wire, Close Wound, 1/4″ Dia.
L4 — 5 Turns, 1/8″ Copper Tubing
L5 — 10 Ferrite Beads — FERROXCUBE #56–590–65/3B

Typical Performance Curves

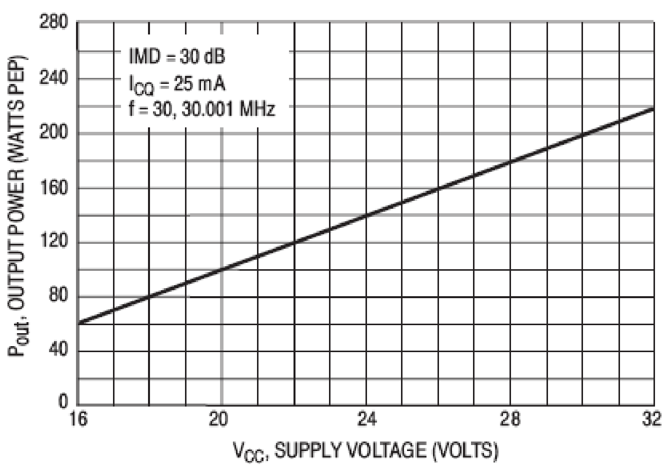
Output Power vs Input Power



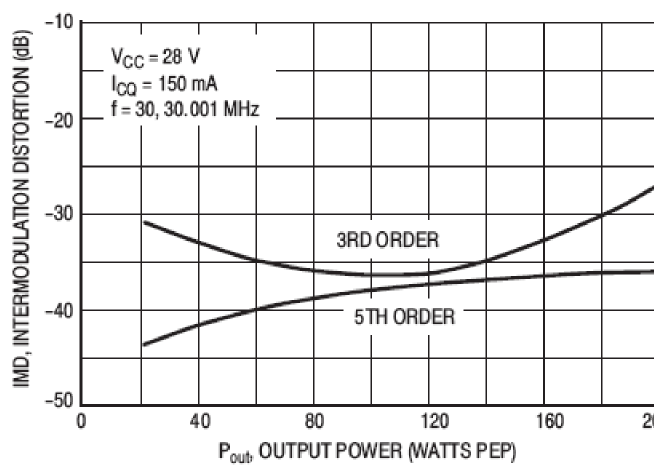
Power Gain vs Frequency



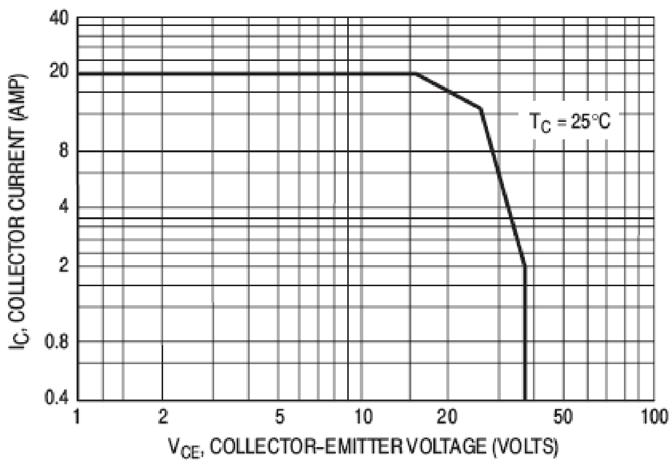
Linear Output Power vs Supply Voltage



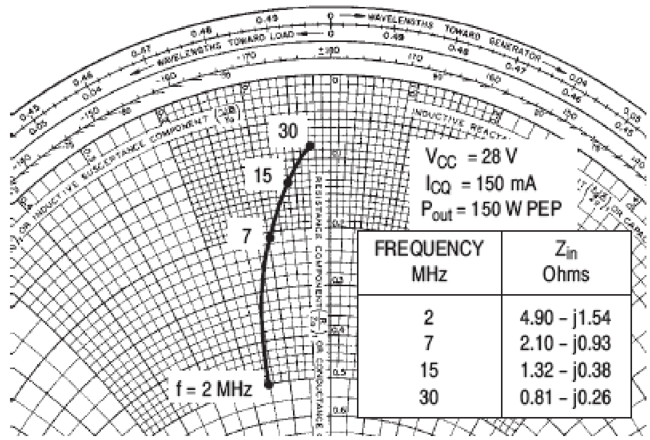
Intermodulation Distortion vs Output Power



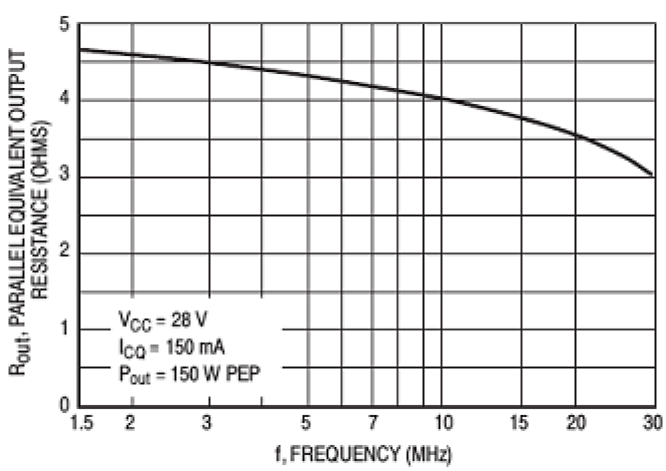
DC Safe Operating Area



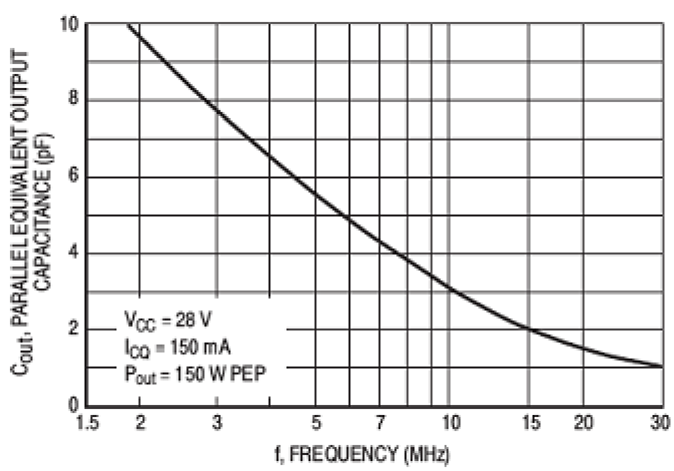
Series Input Impedance



Output Resistance vs. Frequency



Output Capacitance vs Frequency



Outline: Case 211-11, Style 1