MRF429

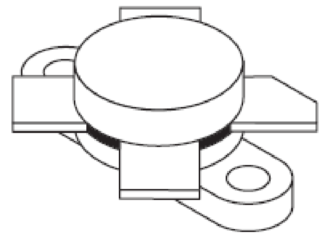
The RF Line NPN Silicon Power Transistor
150W(PEP), 30MHz, 50V

Rev. V1

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



CASE 211–11, STYLE 1

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°C Derate above 25°C	P_D	233 1.33	Watts W/°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.75	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I_C = 200 mAdc, I_B = 0)	$V_{(BR)CEO}$	50	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 100 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	100	—	—	Vdc
Collector–Base Breakdown Voltage (I_C = 100 mAdc, I_E = 0)	$V_{(BR)CBO}$	100	—	—	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	—	—	Vdc

(continued)

MACOM

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ELECTRICAL CHARACTERISTICS — continued (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	10	30	80	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 50 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	—	220	300	pF
FUNCTIONAL TESTS					
Common–Emitter Amplifier Gain (V_{CC} = 50 Vdc, P_{out} = 150 W (PEP), I_C(max) = 3.32 Adc, f = 30; 30.001 MHz)	G_{PE}	13	15	—	dB
Output Power (V_{CE} = 50 Vdc, f = 30; 30.001 MHz)	P_{out}	150	—	—	W (PEP)
Collector Efficiency (V_{CC} = 50 Vdc, P_{out} = 150 W (PEP), I_C(max) = 3.32 Adc, f = 30, 30.001 MHz)	η	45	—	—	%
Intermodulation Distortion (1) (V_{CE} = 50 Vdc, P_{out} = 150 W (PEP), I_C = 3.32 Adc)	IMD	—	–35	–32	dB
Electrical Ruggedness (V_{CC} = 50 Vdc, P_{out} = 150 W CW, f = 30 MHz, VSWR 30:1 at all Phase Angles)	ψ	No Degradation in Output Power			

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

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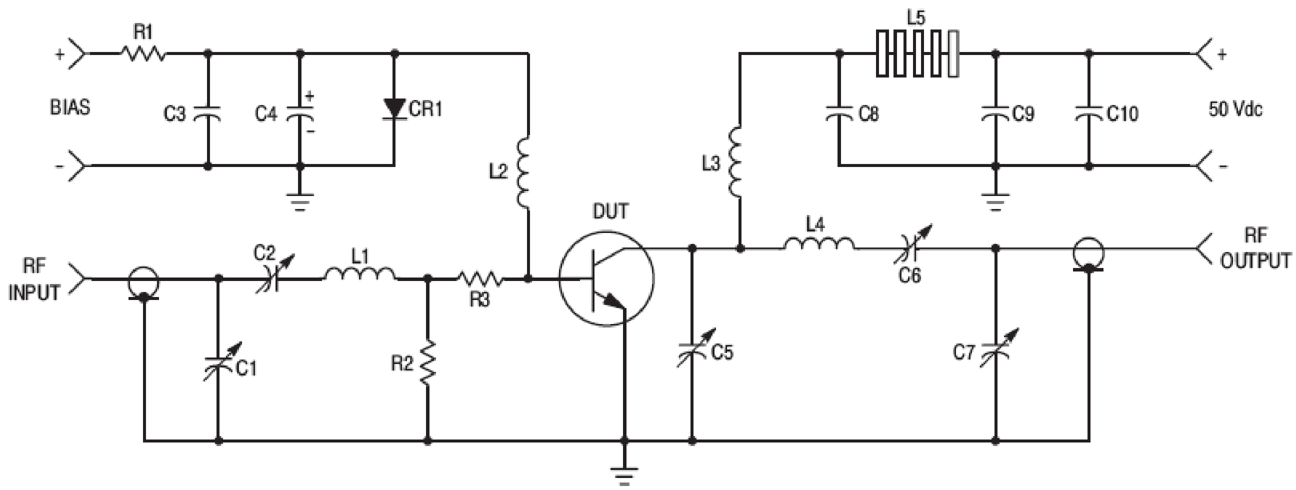

C1, C2, C7 — 170–780 pF, Arco 469
C3, C8, C9 — 0.1 µF, 100 V Erie
C4 — 500 µF @ 6.0 V
C5 — 9.0–180 pF, Arco 463
C6 — 80–480 pF, Arco 466
C10 — 30 µF, 100 V
R1 — 10 Ω, 10 Watt
R2 — 10 Ω, 1.0 Watt
R3 — 5.0 – 3.3 Ω 1/2 Watt Carbon Resistors in Parallel
CR1 — 1N4997
L1 — 3 Turns, #16 Wire, 5/16″ I.D., 5/16″ Long
L2 — 10 µH Molded Choke
L3 — 12 Turns, #16 Enameled Wire 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

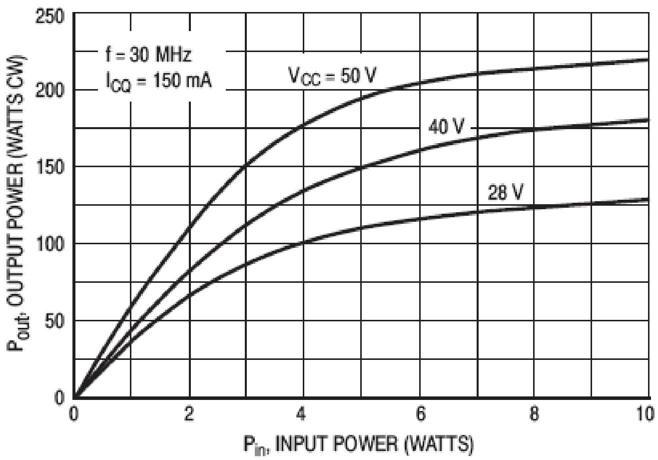

Figure 2. Output Power versus Input Power

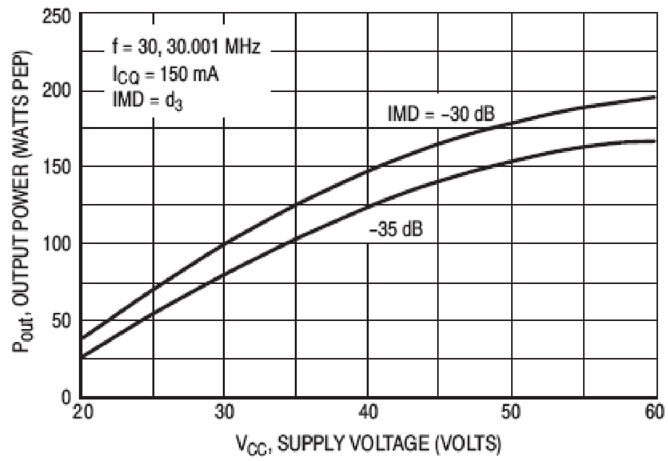

Figure 3. Output Power versus Supply Voltage

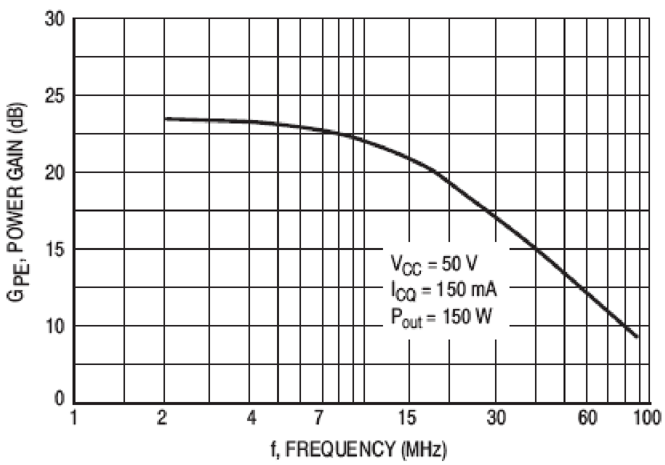

Figure 4. Power Gain versus Frequency

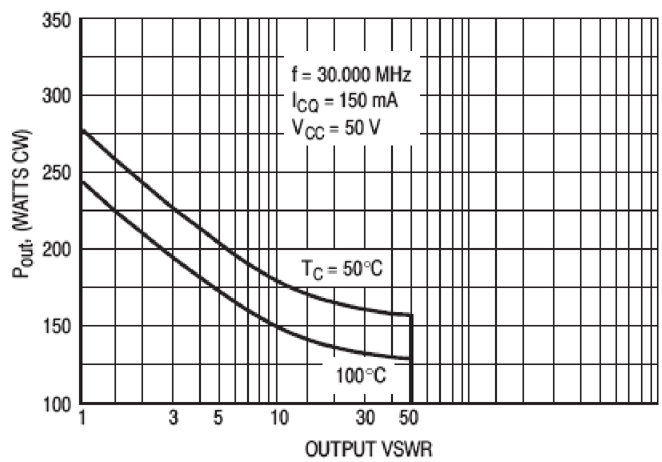

Figure 5. RF Safe Operating Area (SOAR)

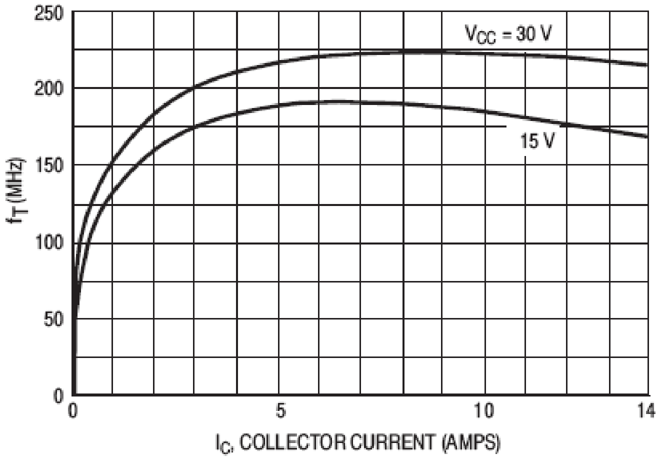

Figure 6. f_T versus Collector Current

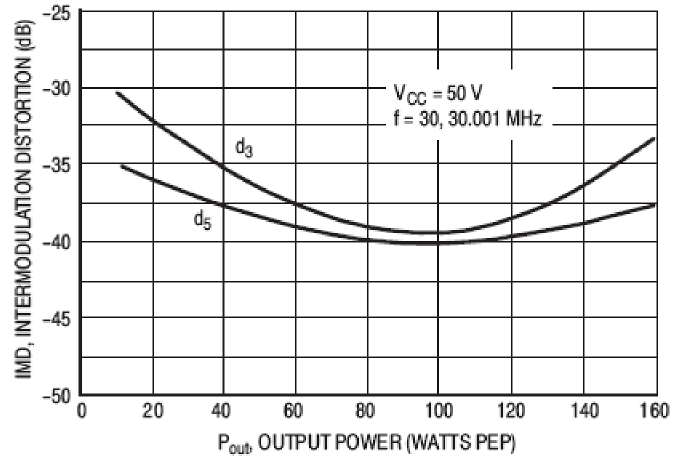

Figure 7. IMD versus P_{out}

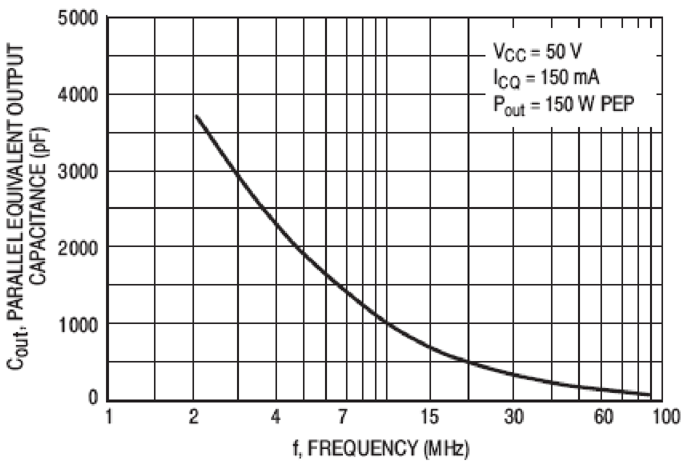

Figure 8. Output Capacitance versus Frequency

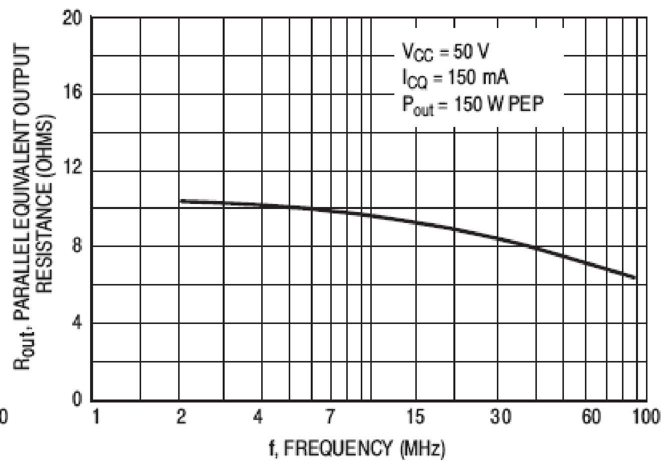

Figure 9. Output Resistance versus Frequency

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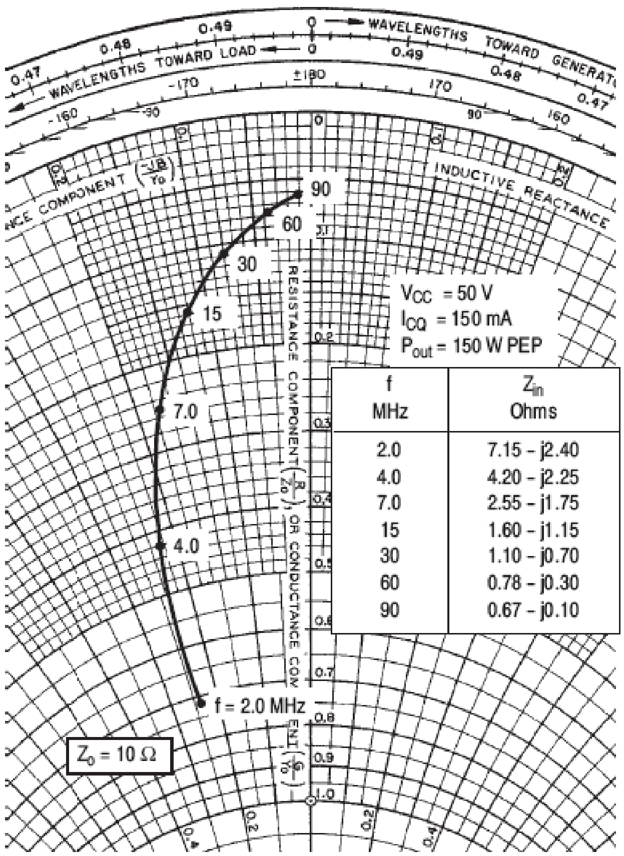

f MHz	Z_{in} Ohms
2.0	7.15 – j2.40
4.0	4.20 – j2.25
7.0	2.55 – j1.75
15	1.60 – j1.15
30	1.10 – j0.70
60	0.78 – j0.30
90	0.67 – j0.10

Figure 10. Series Equivalent Impedance

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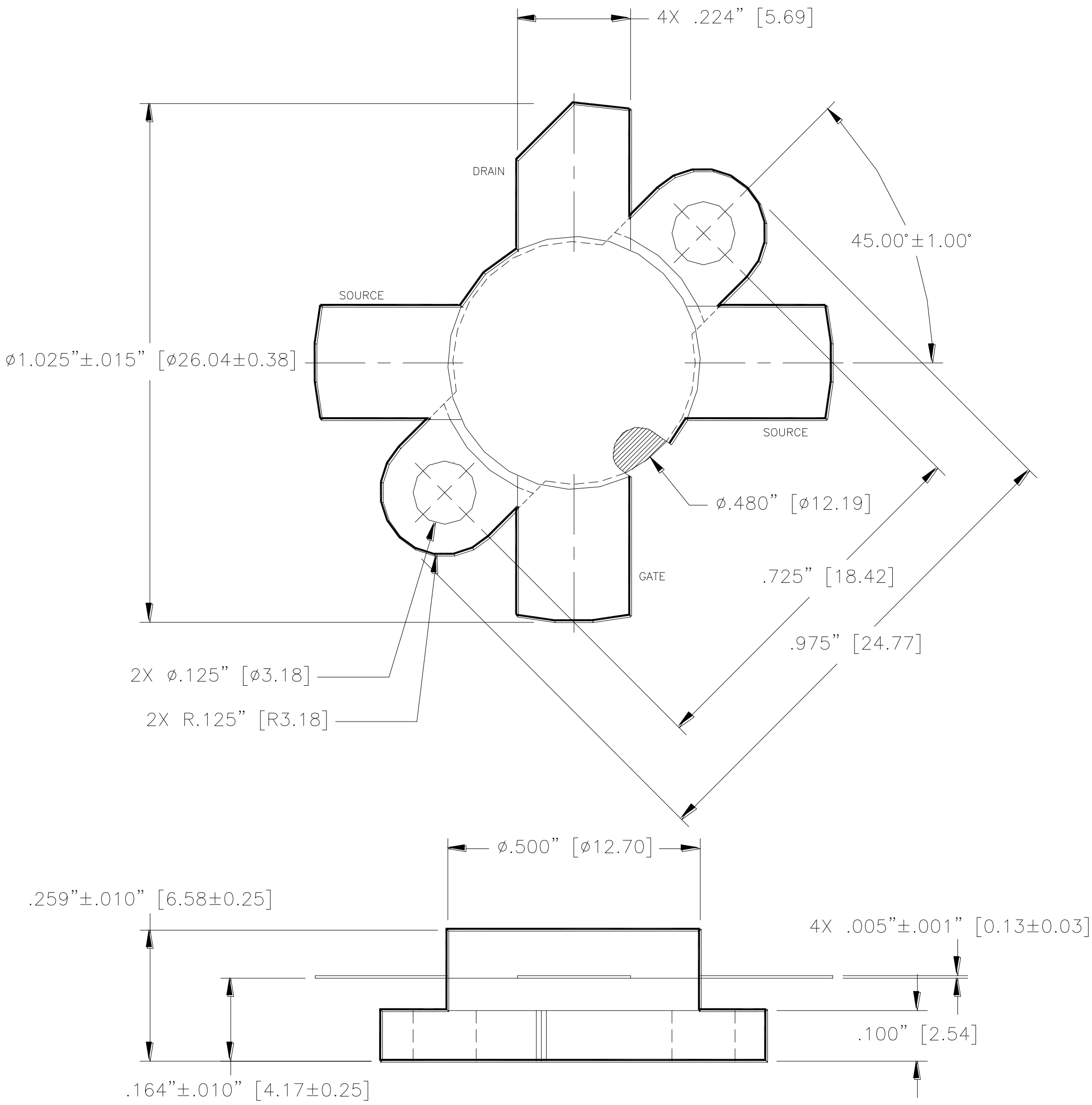

Unless otherwise noted, tolerances are inches ±.005" [millimeters ±0.13mm]