

The RF Line

NPN Silicon

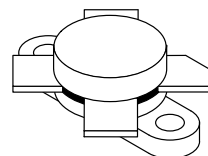
RF Power Transistor

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 Volt, 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

MRF429

**150 W (LINEAR), 30 MHz
RF POWER
TRANSISTOR
NPN SILICON**



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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	233 1.33	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	$R_{\theta JC}$	0.75	$^\circ\text{C/W}$

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 ($I_C = 200$ 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)

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}	10	30	80	—

DYNAMIC CHARACTERISTICS

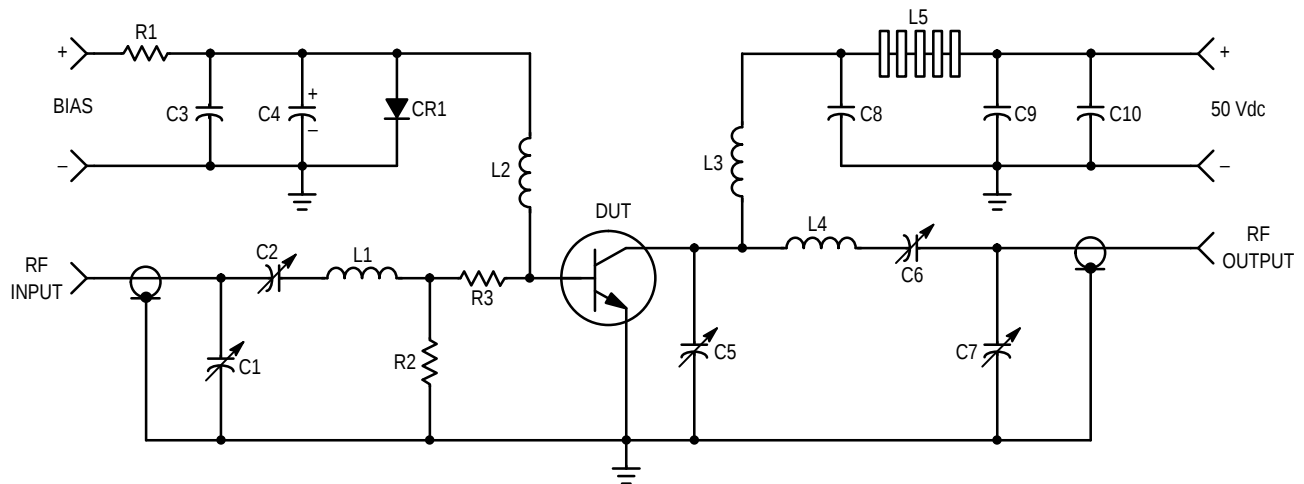
Output Capacitance ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	220	300	pF
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FUNCTIONAL TESTS

Common-Emitter Amplifier Gain ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C(\text{max}) = 3.32 \text{ Adc}$, $f = 30$; 30.001 MHz)	G_{PE}	13	15	—	dB
Output Power ($V_{CE} = 50 \text{ Vdc}$, $f = 30$; 30.001 MHz)	P_{out}	150	—	—	W (PEP)
Collector Efficiency ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C(\text{max}) = 3.32 \text{ Adc}$, $f = 30$, 30.001 MHz)	η	45	—	—	%
Intermodulation Distortion (1) ($V_{CE} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C = 3.32 \text{ Adc}$)	IMD	—	-35	-32	dB
Electrical Ruggedness ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W CW}$, $f = 30 \text{ MHz}$, 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.



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

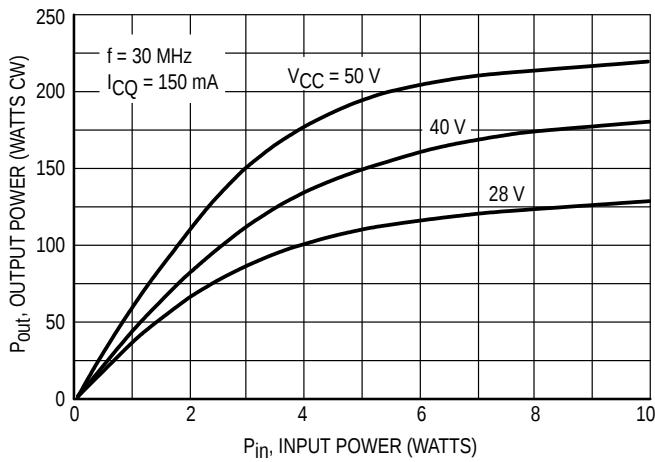


Figure 2. Output Power versus Input Power

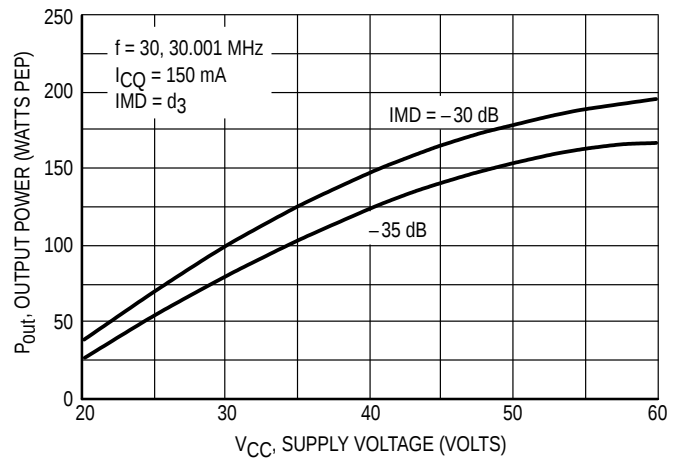


Figure 3. Output Power versus Supply Voltage

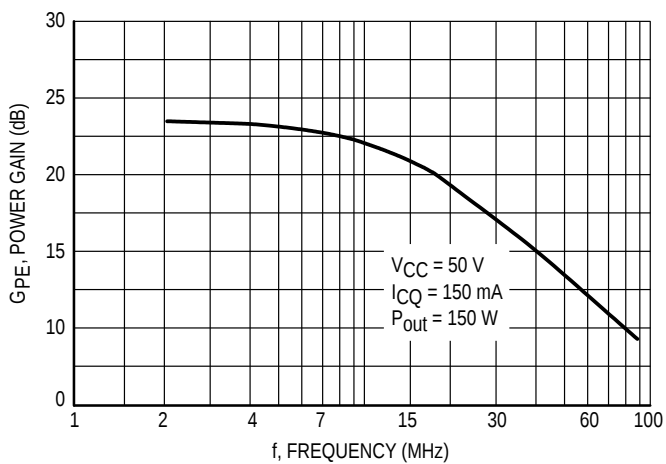


Figure 4. Power Gain versus Frequency

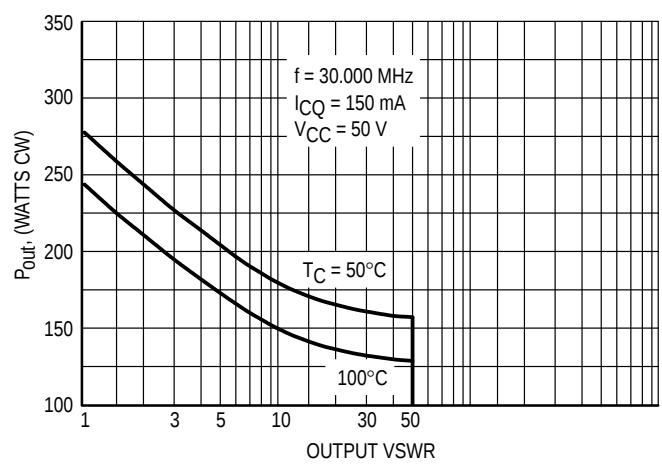


Figure 5. RF Safe Operating Area (SOAR)

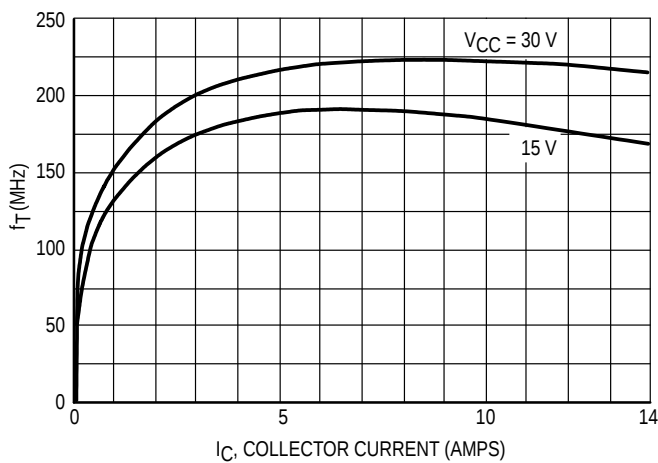


Figure 6. f_T versus Collector Current

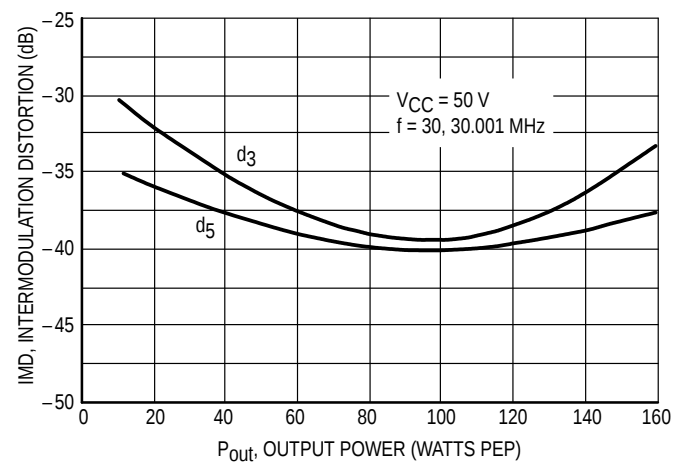


Figure 7. IMD versus P_{out}

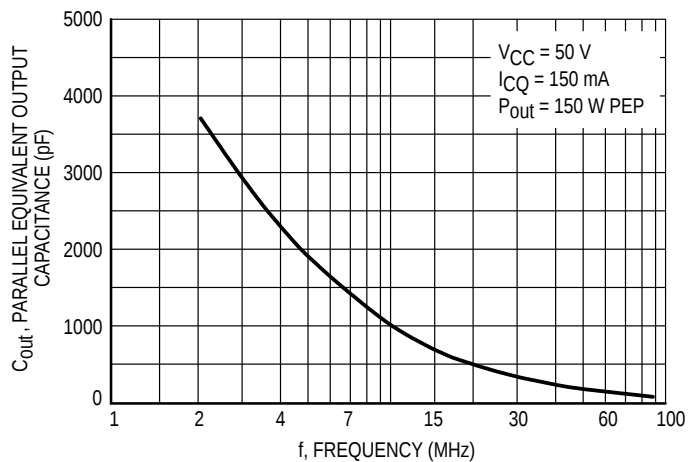


Figure 8. Output Capacitance versus Frequency

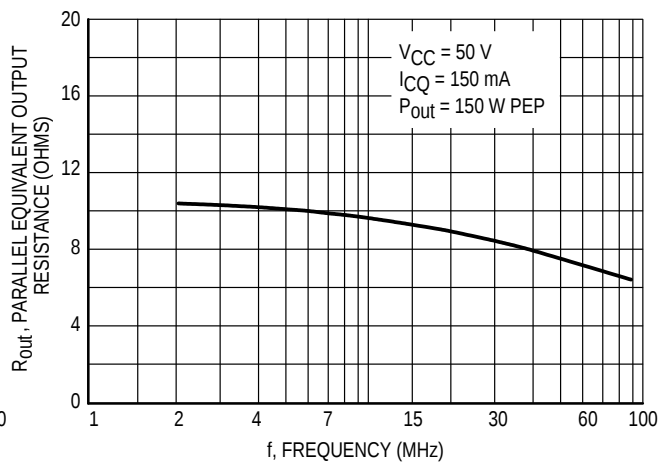


Figure 9. Output Resistance versus Frequency

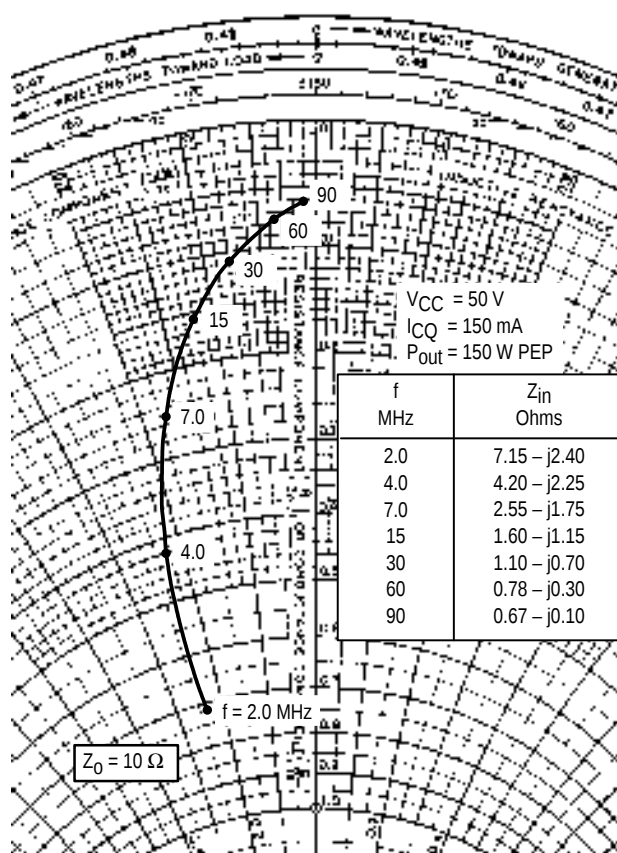
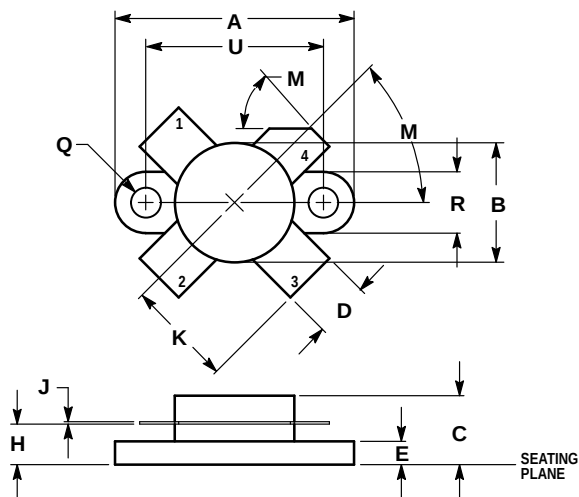


Figure 10. Series Equivalent Impedance

PACKAGE DIMENSIONS



- NOTES:
- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 - 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.960	0.990	24.39	25.14
B	0.465	0.510	11.82	12.95
C	0.229	0.275	5.82	6.98
D	0.216	0.235	5.49	5.96
E	0.084	0.110	2.14	2.79
H	0.144	0.178	3.66	4.52
J	0.003	0.007	0.08	0.17
K	0.435	—	11.05	—
M	45°NOM		45°NOM	
Q	0.115	0.130	2.93	3.30
R	0.246	0.255	6.25	6.47
U	0.720	0.730	18.29	18.54

STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

CASE 211-11
ISSUE N

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