MRF429
MRF429MP

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The RF Line

150 W (LINEAR) 30 MHz

RF POWER TRANSISTORS

NPN SILICON

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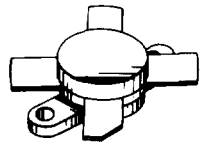
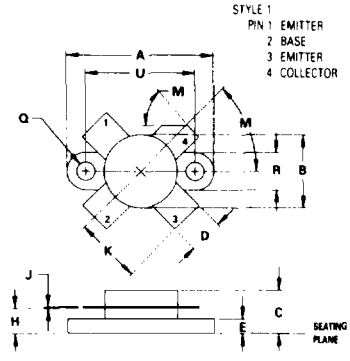
. . . designed primarily for high-voltage applications as a high-power linear amplifier from 2.0 to 30 MHz. Ideal for marine and base station equipment.

- 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





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

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

CASE 211-11

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

MRF429MP is for ordering an h_{FE} matched pair.

THERMAL CHARACTERISTICS

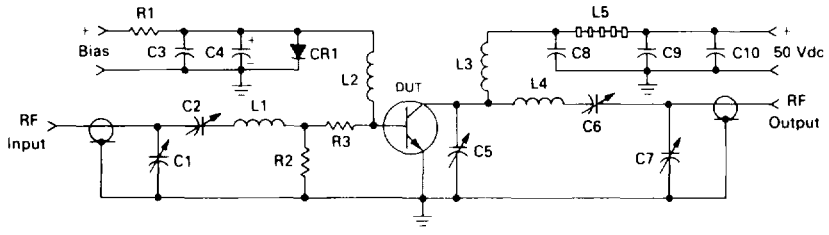
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.75	°C/W

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
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)	No Degradation in Output Power				

(1) To Mil Std 1311 Version A, Test Method 2204B, Two Tone, Reference Each Tone.

FIGURE 1 — 30 MHz TEST CIRCUIT SCHEMATIC



C1,C2,C7	170-780 pF, Arco 469	R2	10 Ω, 1 Watt
C3,C8,C9	0.1 μF, 100 V Erie	R3	5-3.3 Ω 1/2 Watt Carbon Resistors in Parallel
C4	500 μF @ 6 V	CR1	1N4997
C5	9.0-180 pF, Arco 463	L1	3 Turns, #16 Wire, 5/16" I.D., 5/16" Long
C6	80-480 pF, Arco 466	L2	10 μH Molded Choke
C10	30 μF, 100 V	L3	12 Turns, #16 Enameled Wire Closewound, 1/4" I.D.
R1	10 Ω, 10 Watt	L4	5 Turns, 1/8" Copper Tubing, 9/16" I.D., 3/4" Long
		L5	10 Ferrite Beads — Ferroxcube #56-590-65/3B

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FIGURE 2 — OUTPUT POWER versus INPUT POWER

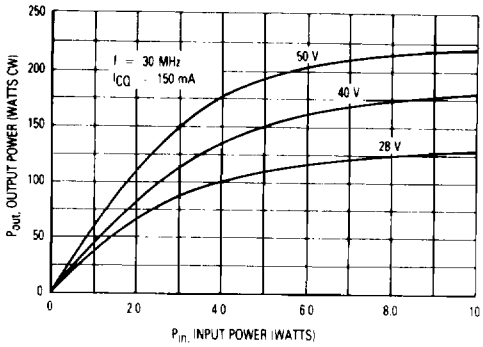


FIGURE 3 — OUTPUT POWER versus SUPPLY VOLTAGE

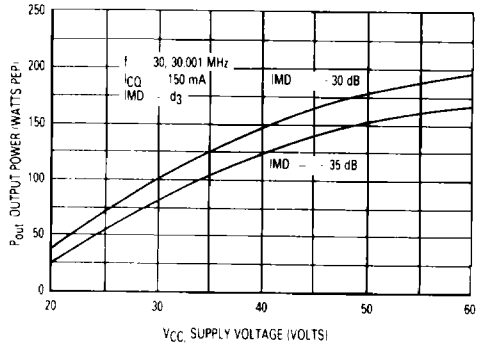


FIGURE 4 — POWER GAIN versus FREQUENCY

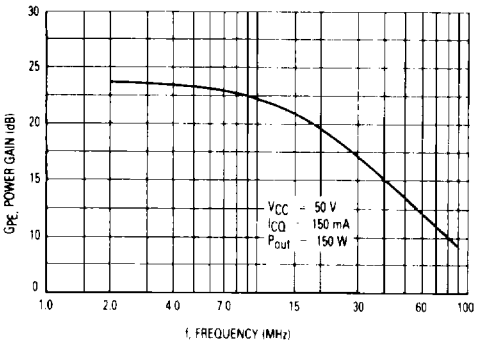


FIGURE 5 — RF SAFE OPERATING AREA (SOAR)

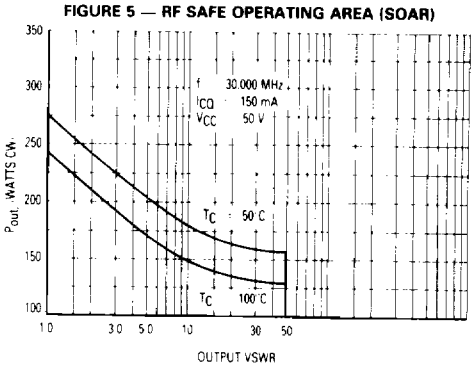


FIGURE 6 — f_T versus COLLECTOR CURRENT

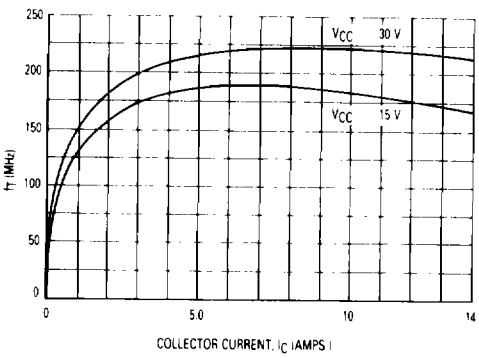


FIGURE 7 — IMD versus P_{out}

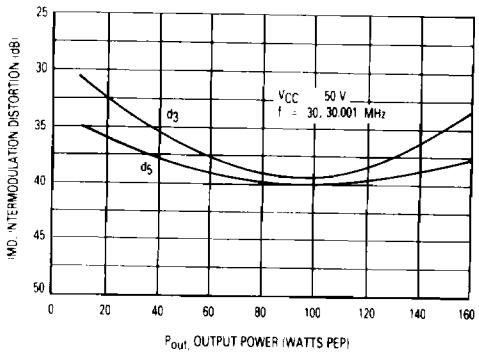


FIGURE 8 — OUTPUT CAPACITANCE versus FREQUENCY

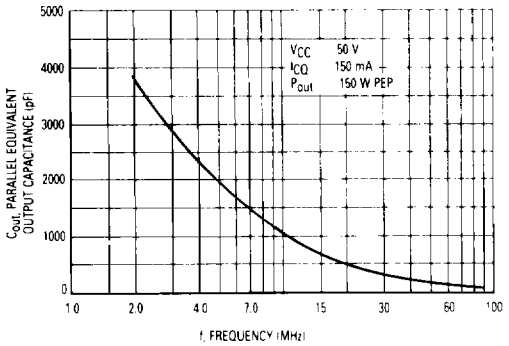


FIGURE 9 — OUTPUT RESISTANCE versus FREQUENCY

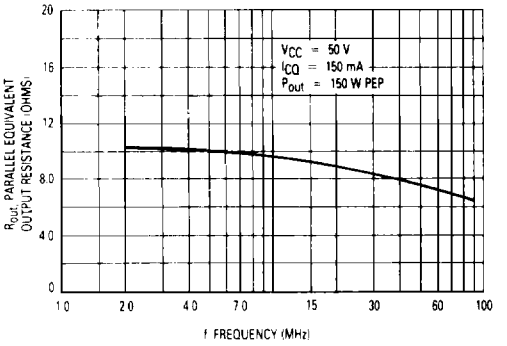
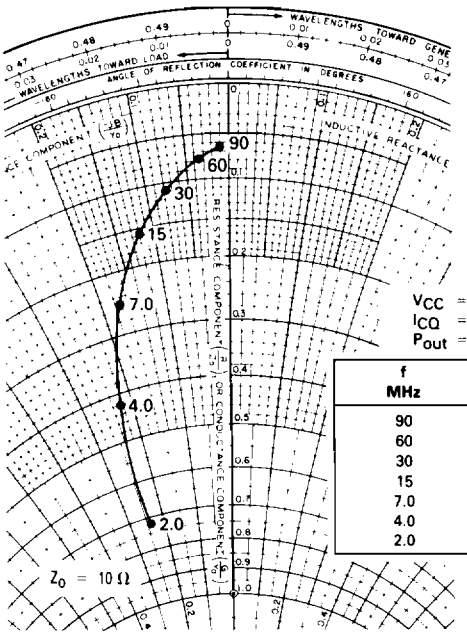


FIGURE 10 — SERIES EQUIVALENT IMPEDANCE



V_{CC} = 50 V
I_{CQ} = 150 mA
P_{out} = 150 W PEP

f MHz	Z_{in} Ohms
90	0.67 – J0.10
60	0.78 – J0.30
30	1.10 – J0.70
15	1.60 – J1.15
7.0	2.55 – J1.75
4.0	4.20 – J2.25
2.0	7.15 – J2.40