MRF428

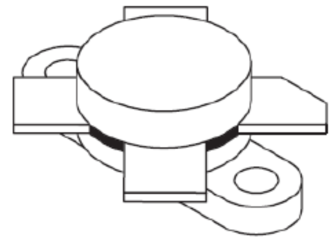
The RF Line NPN Silicon Power Transistor
150W(PEP), 30MHz, 50V

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 = -30 db (max.)
- 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}	55	Vdc
Collector-Base Voltage	V_{CBO}	110	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	20	Adc
Withstand Current — 10 s	—	30	Adc
Total Device Dissipation @ T_C = 25 °C Derate above 25 °C	P_D	320 1.83	Watts W/°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.5	°C/W

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

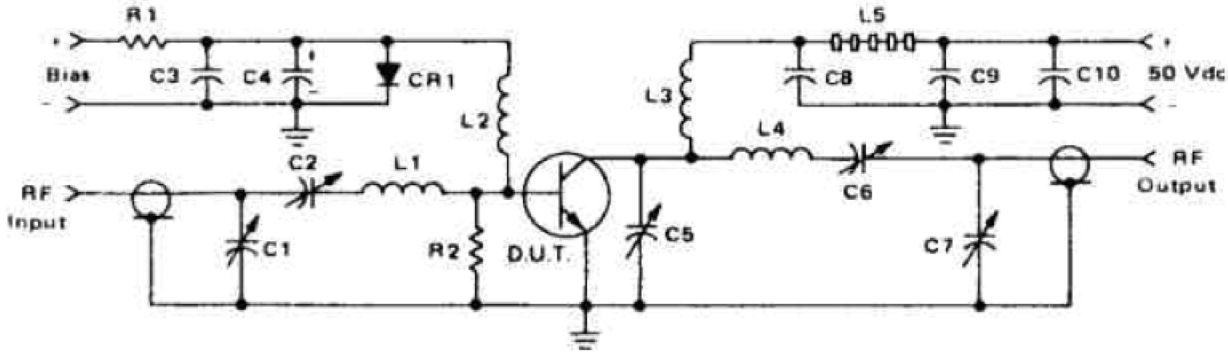
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, I_B = 0)	$V_{(BR)CEO}$	55	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	110	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 100 mAdc, I_E = 0)	$V_{(BR)CBO}$	110	—	—	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 °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	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 50 Vdc, I_E = 0, f = 1.0 MHz)	C_{OB}	—	220	250	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Gain (V_{CC} = 50 Vdc, P_{OUT} = 150 W (PEP), I_C(max) = 3.32 Adc, f = 30 MHz)	G_{PE}	13	15	—	dB
Output Power (V_{CE} = 50 Vdc, f = 30 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 MHz)	η	45	—	—	%
Intermodulation Distortion (1) (V_{CE} = 50 Vdc, P_{OUT} = 150 W (PEP), I_C = 3.32 Adc)	IMD	—	-33	-30	dB
Electrical Ruggedness (V_{CC} = 50 Vdc, P_{OUT} = 150 W (PEP), I_C(max) = 3.32 Adc, VSWR 30:1 at all Phase Angles)	Ψ	No Degradation in Output Power			

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



C1,C2,C7 — 170-780 pF, Arco 469
C3,C8,C9 — 0.1µF, 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
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

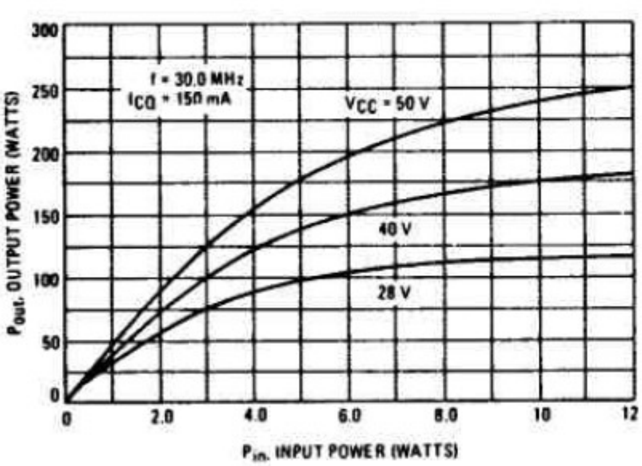


FIGURE 3 – OUTPUT POWER versus SUPPLY VOLTAGE

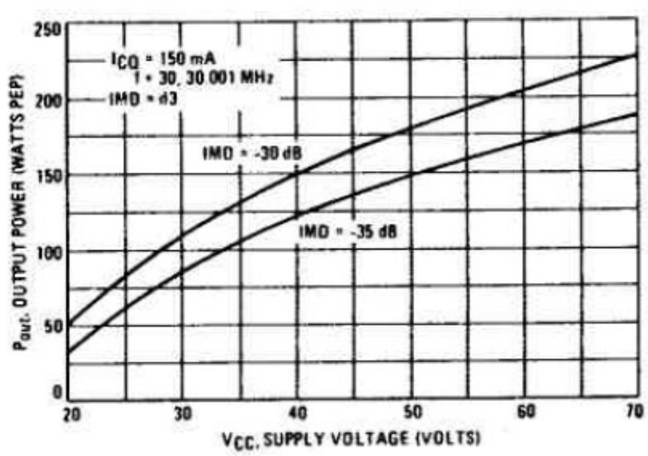


FIGURE 4 – POWER GAIN versus FREQUENCY

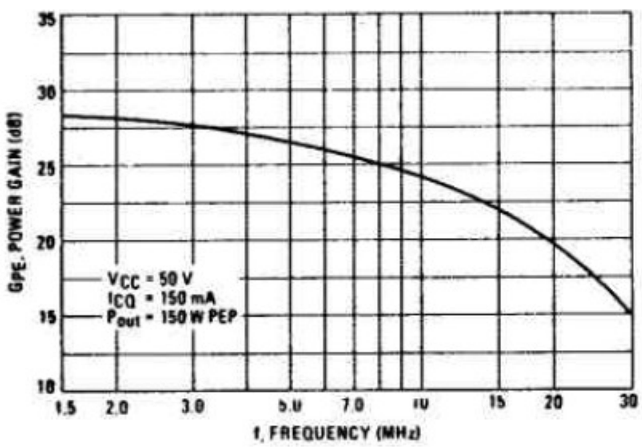
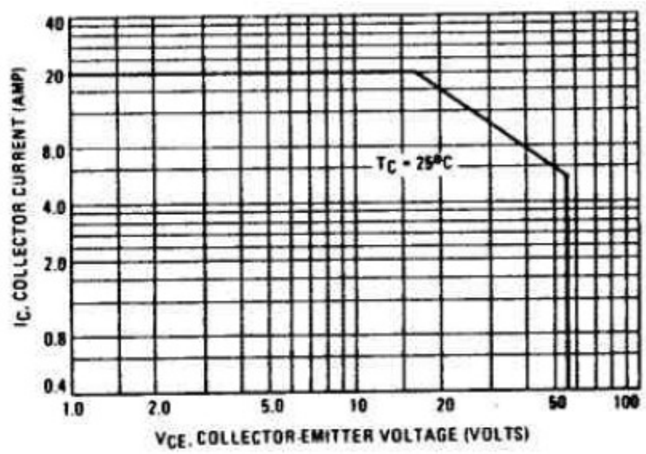


FIGURE 5 – DC SAFE OPERATING AREA



INTERMODULATION DISTORTION versus OUTPUT POWER

FIGURE 6 – V_{CC} = 40 Vdc

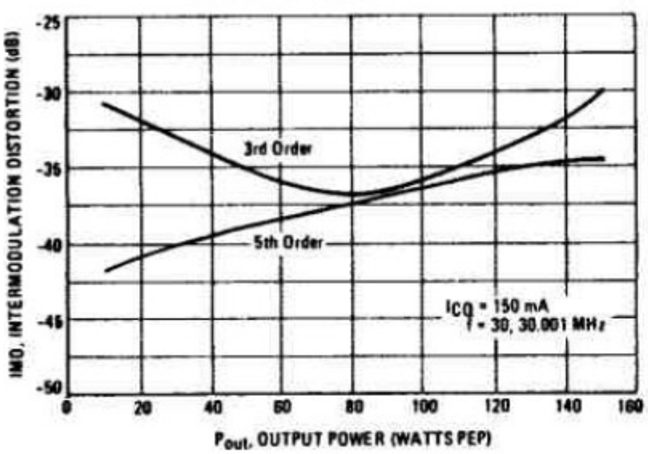


FIGURE 7 – V_{CC} = 50 Vdc

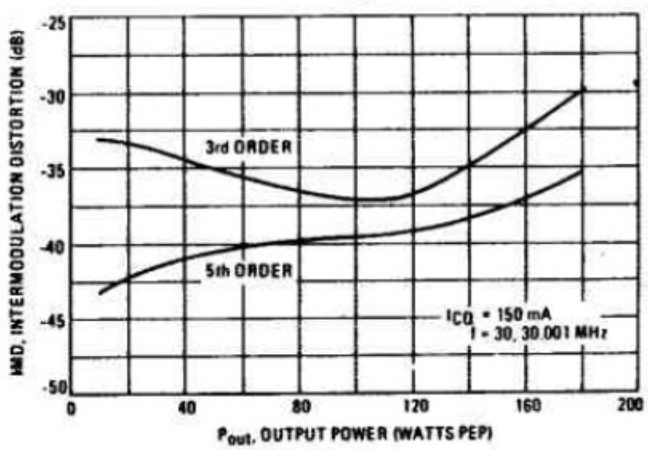


FIGURE 8 – OUTPUT CAPACITANCE versus FREQUENCY

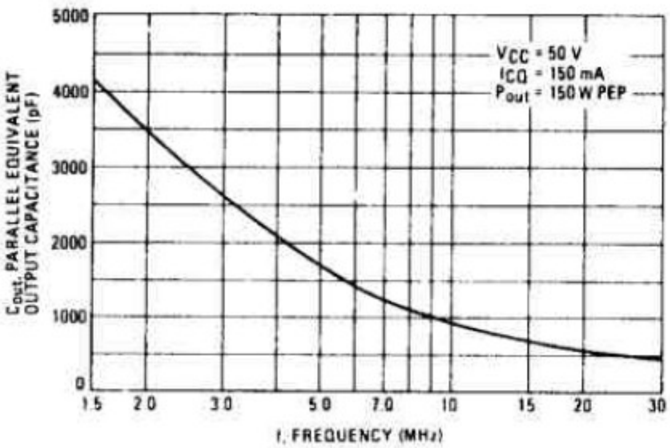
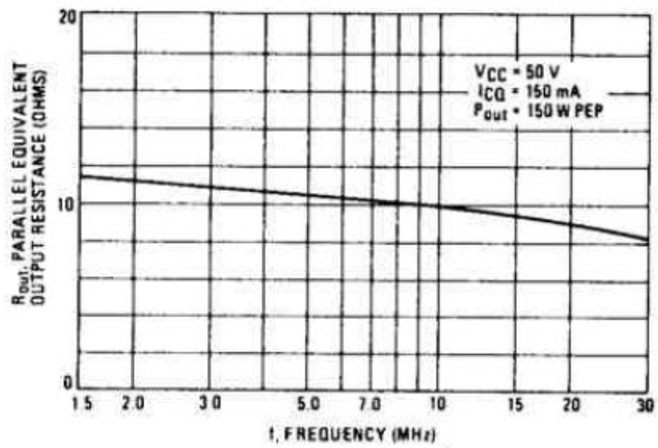
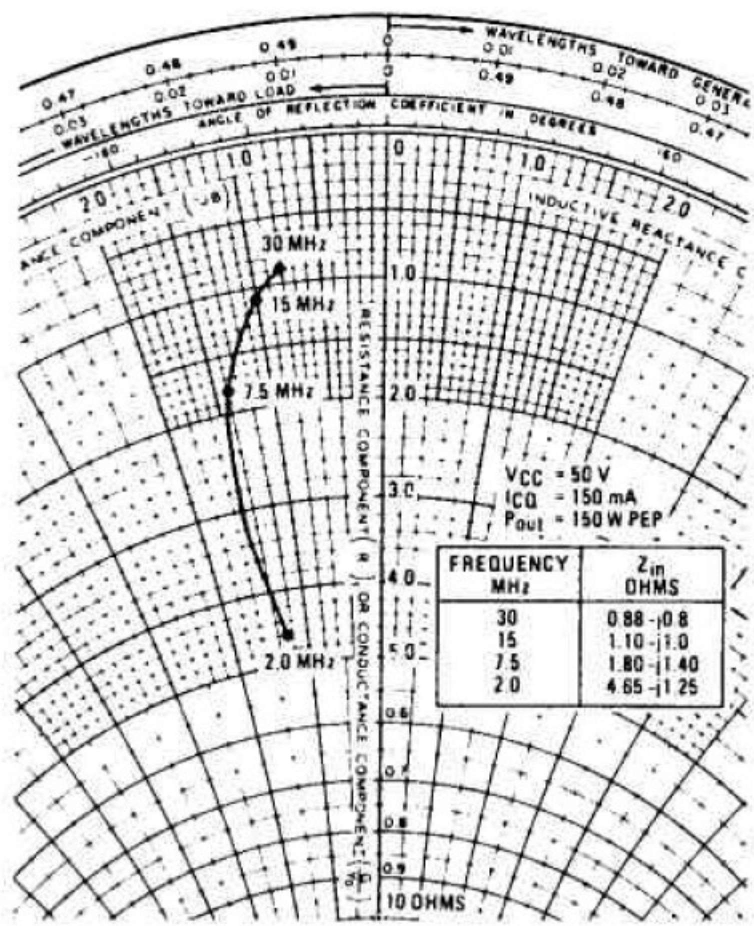
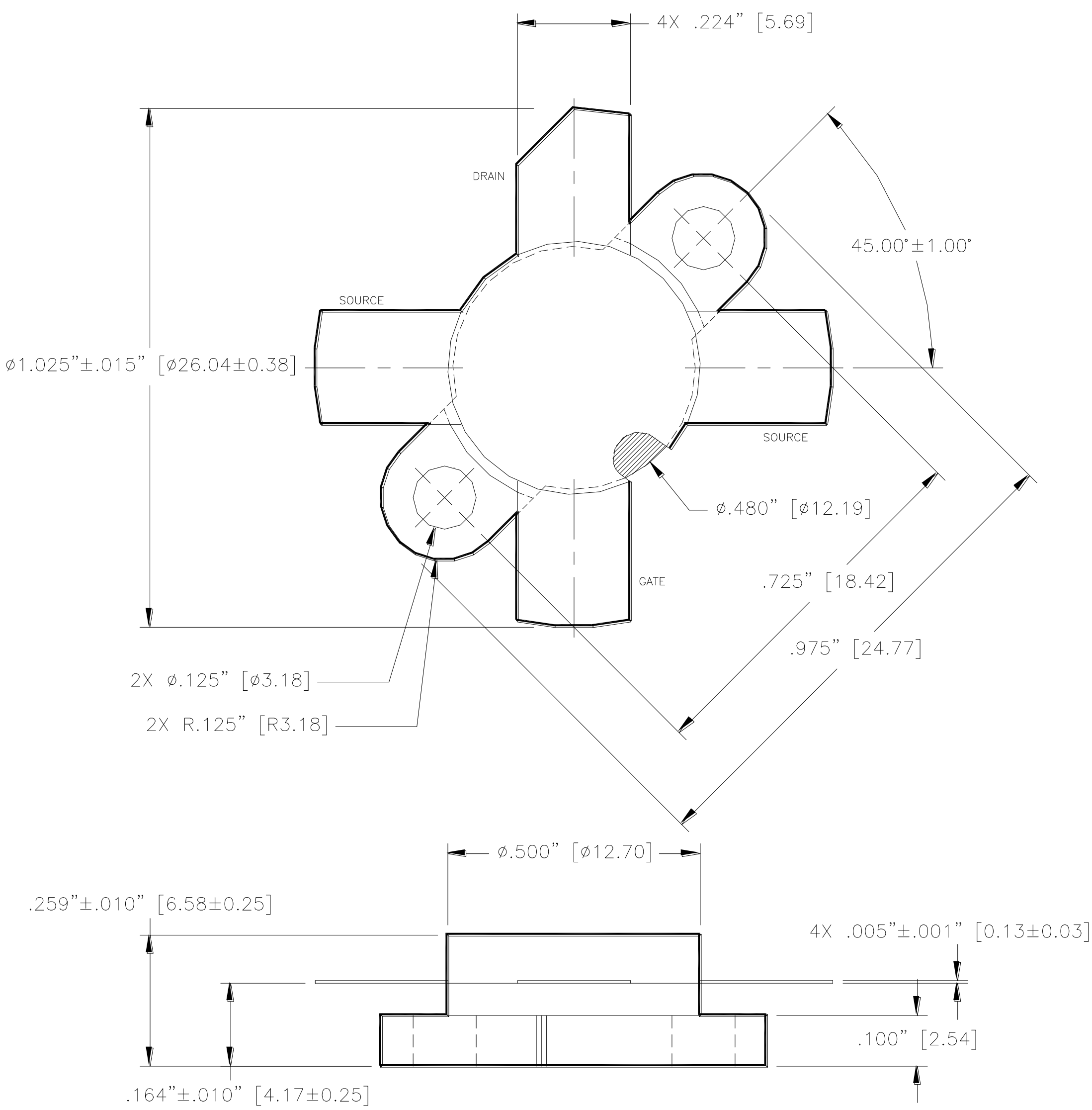


FIGURE 9 – OUTPUT RESISTANCE versus FREQUENCY







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

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