MOTOROLA

MRF427A

The RF Line

25 W (PEP) – 30 MHz

RF POWER TRANSISTOR

NPN SILICON

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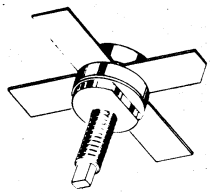
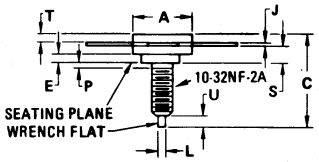
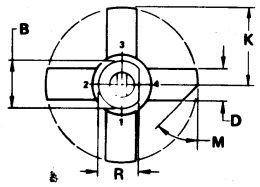
NPN SILICON RF POWER TRANSISTOR

. . . 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 = 25 W(PEP)
  Minimum Gain = 18 dB
- Intermodulation Distortion @ 25 W(PEP) –
  IMD = -34 dB (Max)
- 100% Tested for Load Mismatch at all Phase Angles with 30:1 VSWR







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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	65	Vdc
Collector-Base Voltage	V_{CBO}	110	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current – Continuous	I_C	6.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	80 0.457	Watts W/°C
Storage Temperature Range	T_{stg}	−65° to +200°	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.19	°C/W

DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	12.45	12.95	0.490	0.510
B	10.54	10.80	0.415	0.425
C	19.68	22.73	0.775	0.895
D	5.46	5.97	0.215	0.235
E	1.83	–	0.072	–
J	0.08	0.18	0.003	0.007
K	12.45	–	0.490	–
L	1.65	1.90	0.065	0.075
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
R	9.73	10.06	0.383	0.396
S	3.84	4.50	0.151	0.177
T	2.11	2.54	0.083	0.100
U	2.49	3.35	0.098	0.132

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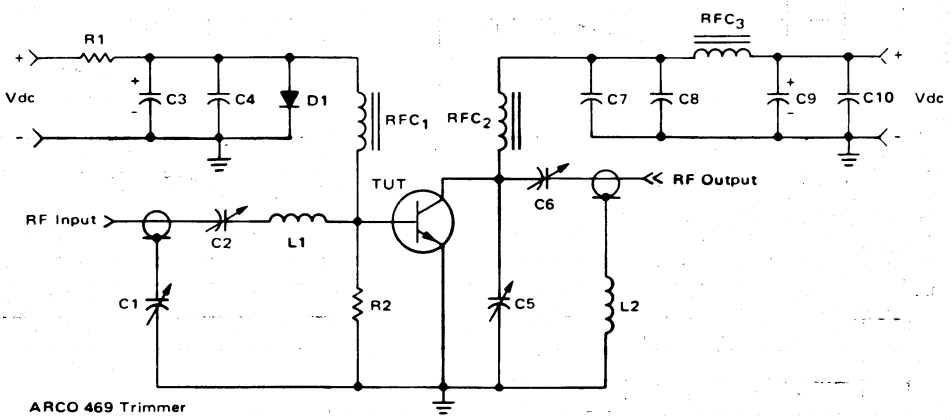
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 200 mAdc, I_B = 0)	BV_{CEO}	65	–	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, V_{BE} = 0)	BV_{CES}	110	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 100 mAdc, I_E = 0)	BV_{CBO}	110	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	BV_{EBO}	4.0	–	–	Vdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 500 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	15	–	90	–
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 50 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	–	–	60	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V_{CC} = 50 Vdc, P_{out} = 25 W(PEP), f = 30 MHz)	G_{pe}	18	20	–	dB
Intermodulation Distortion (V_{CC} = 50 Vdc, P_{out} = 25 W(PEP))	IMD	–	-37	-34	dB
Electrical Ruggedness (V_{CC} = 50 Vdc, P_{out} = 25 W(PEP), f = 30 MHz, VSWR 30:1) All Phase Angles	–	No Degradation in Output Power			

FIGURE 1 – 30 MHz TEST CIRCUIT SCHEMATIC



C1,C2,C6	ARCO 469 Trimmer		
C3	500 µF, 3 Vdc Capacitor		
C4,C7,C10	0.1 µF ERIE REDCAP	RFC1	1 µH Molded Choke
C5	ARCO 463 Trimmer	RFC2	20 Turns, #20 AWG, Enameled Wire
C8	1000 pF, UNELCO Capacitor		on 390 Ω, 1 Watt Resistor
C9	47 µF, 50 Vdc Capacitor	RFC3	VK 200-4B FERROXCUBE Choke
R1	20 Ω, 5 Watt Resistor		
R2	10 Ω, ½ Watt Resistor		
L1	0.15 µH Inductor		
L2	0.3 µH Inductor		
D1	1N4997		

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FIGURE 2 – OUTPUT POWER versus INPUT POWER

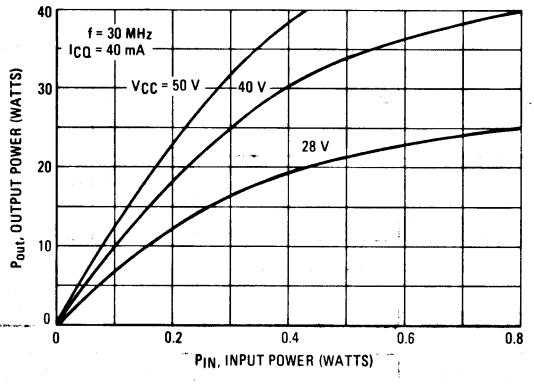


FIGURE 3 – POWER GAIN versus FREQUENCY

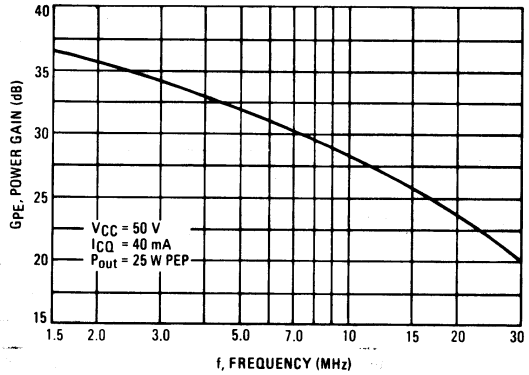


FIGURE 4 – INTERMODULATION DISTORTION versus OUTPUT POWER
VCC = 50 Vdc

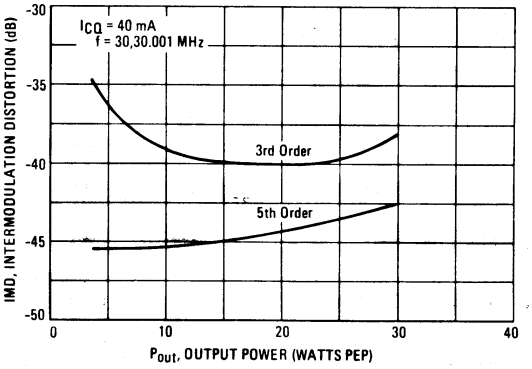


FIGURE 5 – INTERMODULATION DISTORTION versus OUTPUT POWER
VCC = 40 Vdc

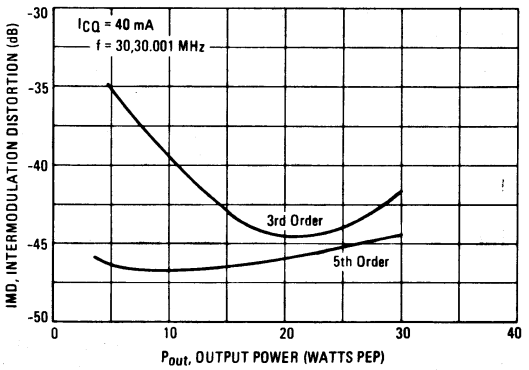


FIGURE 6 – OUTPUT RESISTANCE versus FREQUENCY

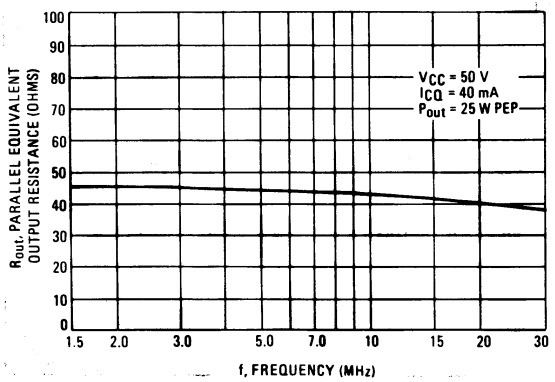


FIGURE 7 – OUTPUT CAPACITANCE versus FREQUENCY

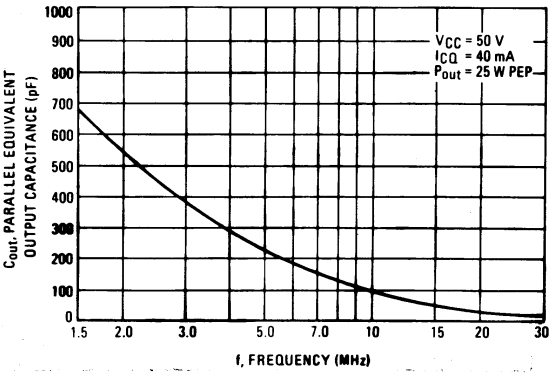


FIGURE 8 – OUTPUT POWER versus SUPPLY VOLTAGE

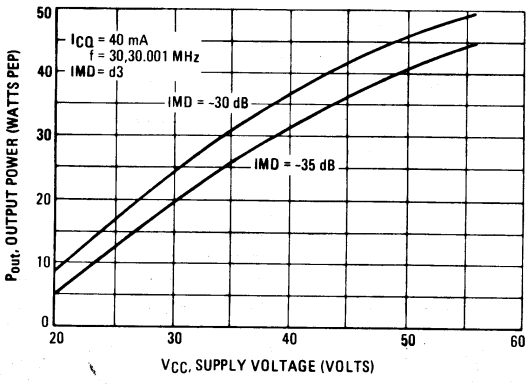


FIGURE 9 – DC SAFE OPERATING AREA

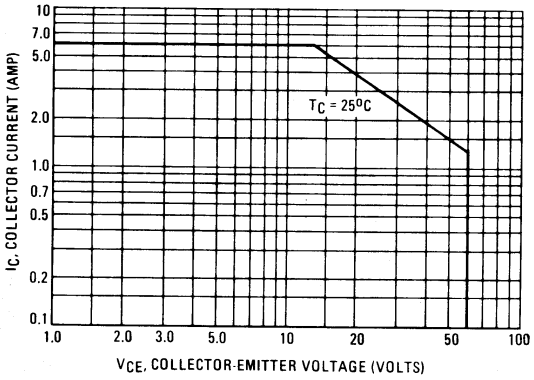
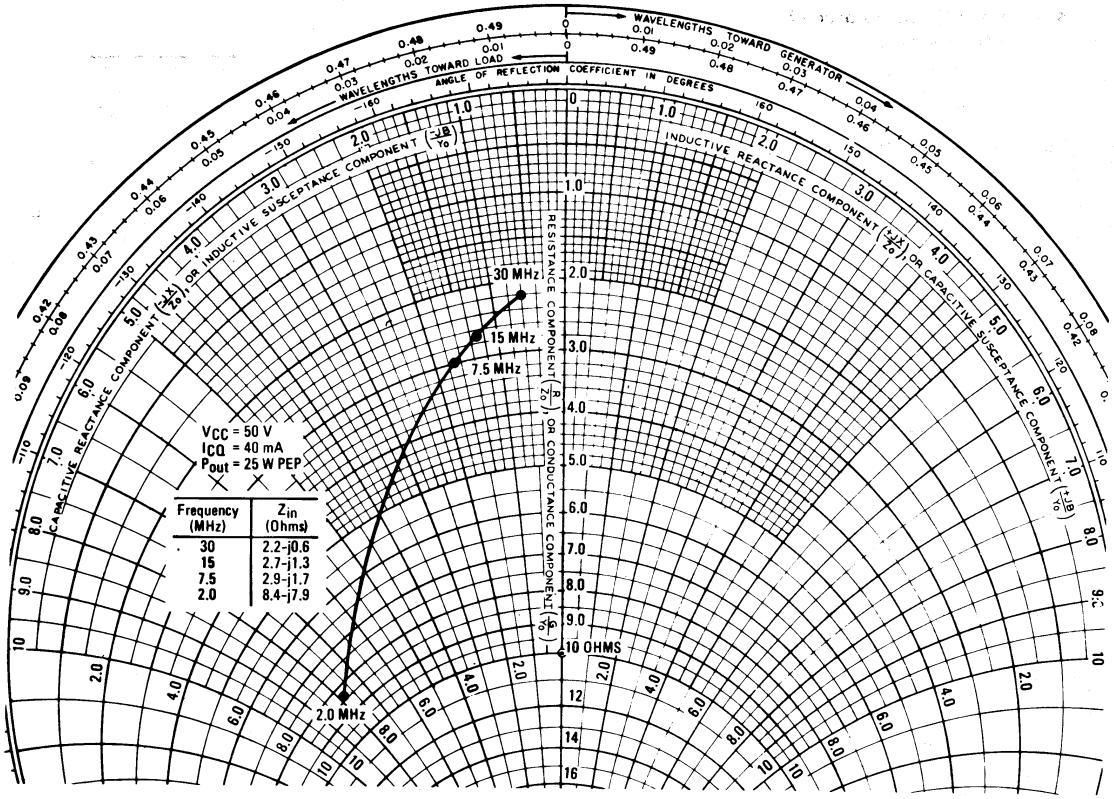


FIGURE 10 – SERIES EQUIVALENT IMPEDANCE



Frequency (MHz)	Z_{in} (Ohms)
30	2.2-j0.6
15	2.7-j1.3
7.5	2.9-j1.7
2.0	8.4-j7.9