

MRF476

The RF Line

3.0 W (PEP)–3.0 W (CW) – 30 MHz

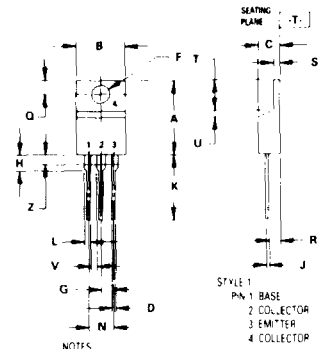
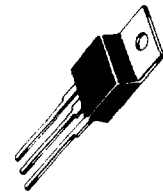
**RF POWER
TRANSISTOR**

NPN SILICON

NPN SILICON RF POWER TRANSISTOR

... designed primarily for use in single sideband linear amplifier output applications in citizens band and other communications equipment operating to 50 MHz.

- Characterized for Single Sideband and Large-Signal Amplifier Applications Utilizing Low-Level Modulation
- Specified 12.5 V, 30 MHz Characteristics —
Output Power = 3.0 W (PEP)
Minimum Efficiency = 40% (SSB)
Output Power = 3.0 W (CW)
Minimum Power Gain = 15 dB (PEP)
- Common-Collector Configuration



NOTES
1 DIMENSIONING AND TOLERANCING PER ANSI Y14.5M 1987
2 CONTROLLING DIMENSION: INCH
3 DIM Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.48	15.75	0.570	0.620
B	9.66	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.88	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.93	0.110	0.155
J	0.36	0.55	0.014	0.022
K	12.70	14.27	0.500	0.562
L	1.15	1.39	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	3.54	3.94	0.100	0.120
R	2.04	2.79	0.080	0.110
S	1.15	1.39	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.90	1.27	0.000	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

CASE 221A-04
TO-220AB

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	18	Vdc
Collector-Base Voltage	V _{CBO}	36	Vdc
Emitter-Base Voltage	V _{EBO}	4.0	Vdc
Collector Current – Continuous	I _C	1.0	Adc
Total Device Dissipation @ T _A = 25°C (1) Derate above 25°C	P _D	10 57.2	Watts mW/°C
Storage Temperature Range	T _{stg}	-65 to + 150	°C

(1) This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	17.5	°C/W

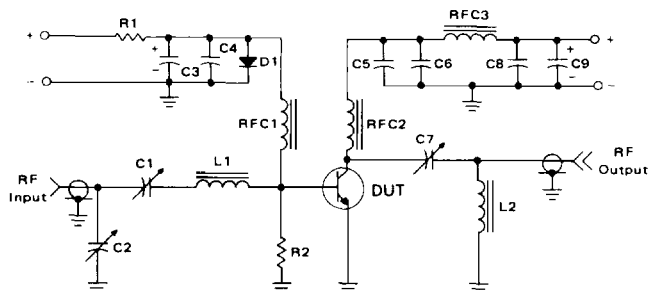
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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ($I_C = 10 \text{ mA dc}, I_B = 0$)	$V_{(BR)CEO}$	18	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 25 \text{ mA dc}, V_{BE} = 0$)	$V_{(BR)CES}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 1.0 \text{ mA dc}, I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 15 \text{ V dc}, I_E = 0$)	I_{CBO}	—	—	0.5	mA dc
ON CHARACTERISTICS					
DC Current Gain ($I_C = 250 \text{ mA dc}, V_{CE} = 5.0 \text{ V dc}$)	h_{FE}	10	50	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 12.5 \text{ V dc}, I_E = 0, f = 1.0 \text{ MHz}$)	C_{ob}	—	25	35	pF
FUNCTIONAL TESTS (SSB)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 12.5 \text{ V dc}, P_{out} = 3.0 \text{ W (PEP)}, f_1 = 30 \text{ MHz}, f_2 = 30.001 \text{ MHz}, I_{CQ} = 20 \text{ mA}$)	G_{PE}	15	18	—	dB
Collector Efficiency ($V_{CC} = 12.5 \text{ V dc}, P_{out} = 3.0 \text{ W (PEP)}, f_1 = 30 \text{ MHz}, f_2 = 30.001 \text{ MHz}, I_{CQ} = 20 \text{ mA}$)	η	40	—	—	%
Intermodulation Distortion (1) ($V_{CC} = 12.5 \text{ V dc}, P_{out} = 3.0 \text{ W (PEP)}, f_1 = 30 \text{ MHz}, f_2 = 30.001 \text{ MHz}, I_{CQ} = 20 \text{ mA}$)	IMD	—	35	30	dB
50 MHz PERFORMANCE					
Common-Emitter Amplifier Power Gain ($V_{CC} = 12.5 \text{ V dc}, P_{out} = 3.0 \text{ W}, f = 50 \text{ MHz}$)	G_{PE}	—	15	—	dB

(1) To proposed EIA method of measurement. Reference peak envelope power.

FIGURE 1 – 30 MHz TEST CIRCUIT SCHEMATIC



C2 – Arco 466 Trimmer

C1, C7 – Arco 469 Trimmer

C3 – 500 μF , 3.0 V Electrolytic

C4, C5, C8 – 0.1 μF Erie Redcap

C6 – 1000 pF UNELCO

C9 – 100 μF , 15 V Electrolytic

R1 – 33 Ω 5 W Wire Wound

R2 – 50 Ω 1/2 W Carbon

L1 – 0.22 μH Molded Choke

L2 – 5 Turns #18 Enameled Wire, 1/4" ID

RFC1 – 10 μH Molded Choke

RFC2 – 1.9 μH Molded Choke (Ohmite Z.144)

RFC3 – 6 Ferroxcube Beads on #18 AWG Wire

D1 – MR751

Board – G10, 2-sided 2 oz. Copper Clad

Connectors – Type N

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FIGURE 2 – POWER GAIN versus FREQUENCY

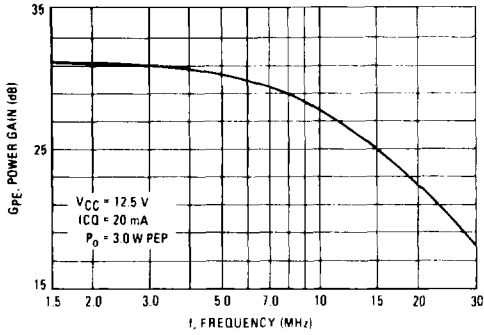


FIGURE 3 – OUTPUT POWER versus INPUT POWER

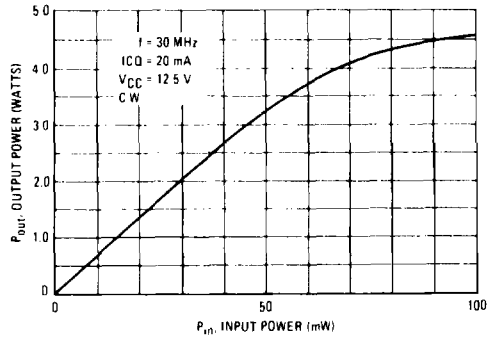


FIGURE 4 – OUTPUT POWER versus INPUT POWER

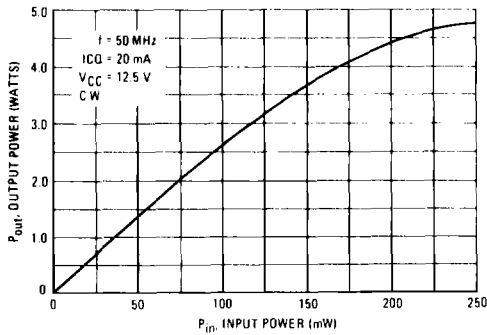


FIGURE 5 – OUTPUT POWER versus SUPPLY VOLTAGE

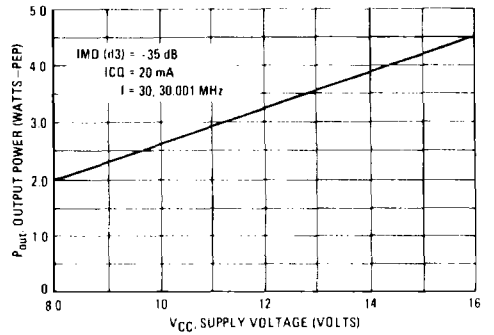


FIGURE 6 – INTERMODULATION DISTORTION versus OUTPUT POWER

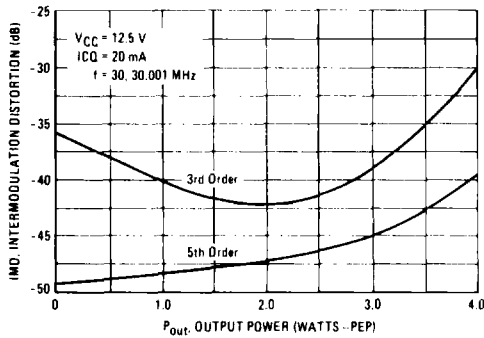
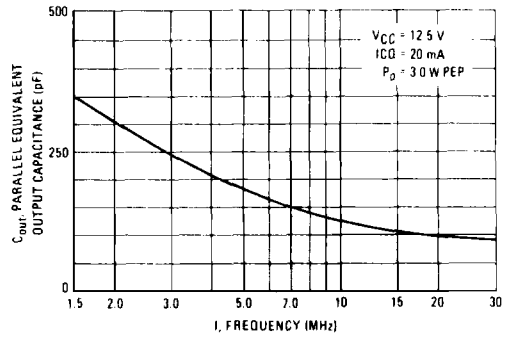
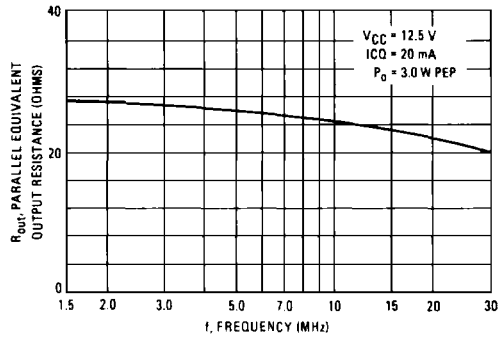


FIGURE 7 – OUTPUT CAPACITANCE versus FREQUENCY



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FIGURE 8 – OUTPUT RESISTANCE versus FREQUENCY



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FIGURE 9 – SERIES EQUIVALENT INPUT IMPEDANCE

