

**NPN Silicon RF power transistor**

**MRF477**

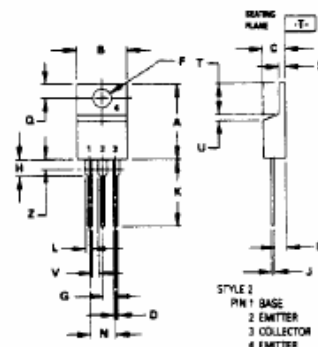
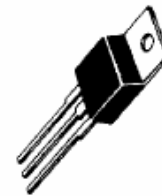
**NPN SILICON RF POWER TRANSISTOR**

designed primarily for application as a high-power linear amplifier from 1.5 to 30 MHz, in single sideband mobile, marine and base station equipment.

- Low-Cost, Common-Emitter TO-220AB Package
- Specified 12.5 Volt, 30 MHz Performance —  
Output Power = 40 W CW or PEP  
Power Gain = 15 dB Min  
Efficiency = 40% Min (PEP)
- Intermodulation Distortion @ 40 W (PEP) —  
IMD = -30 dB (Max)
- 30:1 VSWR Load Mismatch Capability at Rated Output Power and Supply Voltage

40 W (PEP) – 30 MHz

**RF POWER TRANSISTOR**  
NPN SILICON



NOTES  
1 DIMENSIONING AND TOLERANCING PER ANSI Y14.5M 1982  
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	9.88	10.29	0.390	0.405
C	4.37	4.82	0.170	0.190
D	3.44	3.88	0.135	0.152
F	3.81	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.03	0.110	0.120
J	0.36	0.56	0.014	0.022
R	12.70	14.27	0.500	0.562
S	1.15	1.29	0.045	0.051
U	4.83	5.33	0.190	0.210
V	2.54	3.04	0.100	0.120
W	2.34	2.75	0.090	0.110
X	1.15	1.38	0.045	0.055
T	5.97	6.47	0.235	0.255
U	2.90	3.27	0.115	0.129
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

CASE 221A-04  
TO-220AB

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CE0}$	18	Vdc
Collector Base Voltage	$V_{CB0}$	36	Vdc
Emitter-Base Voltage	$V_{EB0}$	4.0	Vdc
Collector Current – Continuous	$I_C$	5.0	Adc
Withstand Current ( $t = 5.0$ s)	—	8.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (1) Derate above $25^\circ\text{C}$	$P_D$	87.5 0.5	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	$^\circ\text{C}/\text{W}$

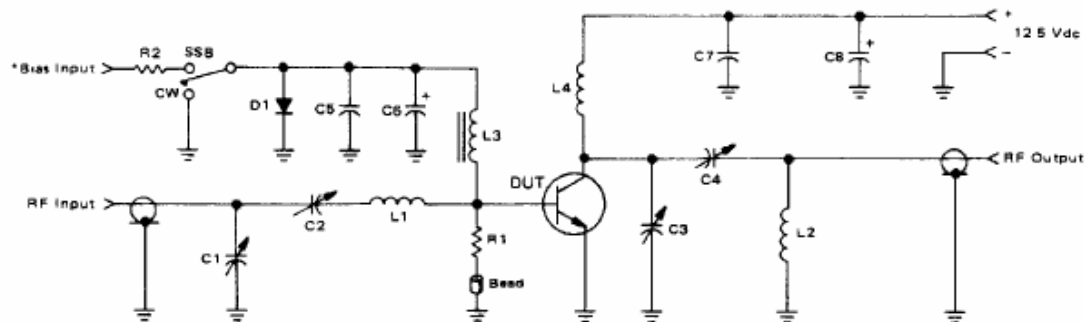
(1) This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage ( $I_C = 100\text{ mA dc}, I_B = 0$ )	$V_{(BR)CEO}$	18	—	—	Vdc
Collector Base Breakdown Voltage ( $I_C = 100\text{ mA dc}, I_E = 0$ )	$V_{(BR)CBO}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 5.0\text{ mA dc}, I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 12.5\text{ Vdc}, V_{BE} = 0, T_C = 25^\circ\text{C}$ )	$I_{CES}$	—	—	10	mA dc
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 2.0\text{ A dc}, V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	20	70	—	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 12.5\text{ Vdc}, I_E = 0, f = 1.0\text{ MHz}$ )	$C_{ob}$	—	175	250	pF
<b>FUNCTIONAL TESTS</b>					
Common-Emitter Amplifier Power Gain ( $V_{CC} = 12.5\text{ Vdc}, P_{out} = 40\text{ W (PEP)}, f_1 = 30\text{ MHz},$ $f_2 = 30.001\text{ MHz}, I_{CQ} = 40\text{ mA dc}$ )	$G_{PE}$	15	17	—	dB
Collector Efficiency ( $V_{CC} = 12.5\text{ Vdc}, P_{out} = 40\text{ W (PEP)}, f_1 = 30\text{ MHz},$ $f_2 = 30.001\text{ MHz}, I_{CQ} = 40\text{ mA dc}$ )	$\eta$	40	45	—	%
Intermodulation Distortion (1) ( $V_{CC} = 12.5\text{ Vdc}, P_{out} = 40\text{ W (PEP)}, f_1 = 30\text{ MHz},$ $f_2 = 30.001\text{ MHz}, I_{CQ} = 40\text{ mA dc}$ )	IMD (d3)	—	-35	-30	dB

(1) To Proposed EIA Method of Measurement Reference Peak Envelope Power

**FIGURE 1 – 30 MHz TEST CIRCUIT**



C1, C2, C4 – Arco 469, 190-780 pF  
 C3 – Arco 429, 90-400 pF  
 C5, C7 – 0.001  $\mu\text{F}$  Disk Ceramics  
 C6 – 500  $\mu\text{F}$  3.0 Vdc Electrolytic  
 C8 – 100  $\mu\text{F}$  16 Vdc Electrolytic  
 R1 – 10  $\Omega$  1.0 Watt Resistor  
 R2 – 5  $\Omega$  5.0 Watt Resistor

L1 – 4 Turns #16 AWG 1/3" ID, 1/3" Long  
 L2 – 3 Turns #16 AWG 1/3" ID, 1/2" Long  
 L3 – 10  $\mu\text{H}$  Molded Choke  
 L4 – 12 Turns #18 AWG 1/4" ID  
 Bead – Ferroxcube #56 590.65/38  
 D1 – 1N4719