

T-33-11

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

MRF450 MRF450A

The RF Line

NPN SILICON RF POWER TRANSISTORS

... designed for power amplifier applications in industrial, commercial and amateur radio equipment to 30 MHz.

- Specified 12.5 Volt, 30 MHz Characteristics -
 Output Power = 50 Watts
 Minimum Gain = 11 dB
 Efficiency = 50%

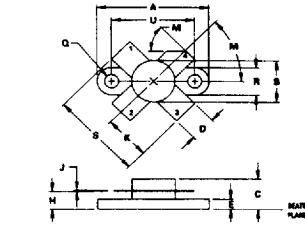
50 W - 30 MHz
RF POWER TRANSISTORS
 NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	20	Vdc
Collector-Base Voltage	V _{CBO}	40	Vdc
Emitter-Base Voltage	V _{EBO}	4.0	- Vdc
Collector Current - Continuous	I _C	7.5	Adc
Total Device Dissipation @ T _C = 25°C	P _D	115	Watts
Derate above 25°C		0.66	W/°C
Storage Temperature Range	T _{stg}	-65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	1.53	°C/W



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

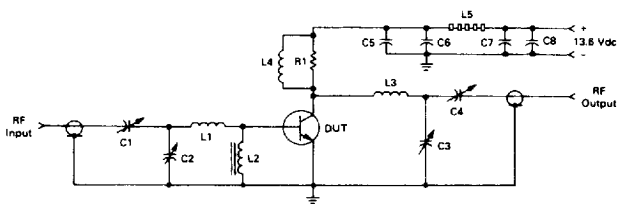


STYLE 1
 PIN 1: EMITTER
 2: BASE
 3: EMITTER
 4: COLLECTOR

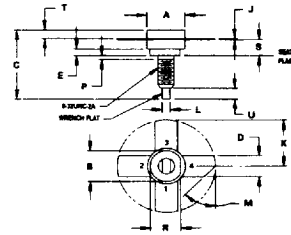
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.29	25.14	0.956	0.990
B	9.40	9.90	0.370	0.390
C	5.42	5.73	0.213	0.225
D	5.47	5.96	0.215	0.235
E	2.18	2.86	0.086	0.113
H	3.81	4.57	0.150	0.180
J	0.11	0.25	0.004	0.010
K	10.04	10.28	0.395	0.405
M	40°	50°	40°	50°
Q	2.86	3.30	0.113	0.130
R	6.23	6.40	0.245	0.252
S	20.07	20.57	0.790	0.810
U	18.29	18.54	0.720	0.730

CASE 211-07
 MRF450

FIGURE 1 - 30 MHz TEST CIRCUIT SCHEMATIC



- C1 - 14-150 pF, ARCO 424
- C2, C3, C4 - 170-780 pF, ARCO 469
- C5, C8 - ERIE 0.1 μF @ 100 V RED CAPS
- C6 - 1000 pF UNELCO, 350 Vdc
- C7 - 10 μF, 35 Vdc
- R1 - 100 Ω, 2.0 W Carbon
- L1 - 0.15 μH Molded Choke MILLER
- L2 - FERROXCUBE, VK200-20-4B
- L3 - 3 Turns, #14 Bare Tinned Wire, 0.3" (0.79) I.D. x 0.38" (0.97) Long
- L4 - 9 Turns, #20 Enamel Wire, Close Wound on R1
- L5 - FERROXCUBE #56-570-65/3B, 5 Ferrite Beads, on 1" Long #20 Wire
- Input/Output Connectors - Type N
- Board - Glass Teflon Mounted on a 4" x 4" x 2" SEEZAK Box



NOTES:
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 2 CONTROLLING DIMENSION: INCH



STYLE 1
 PIN 1: EMITTER
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DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	9.76	0.370	0.386
B	6.13	6.36	0.241	0.250
C	17.02	20.07	0.670	0.790
D	5.46	5.97	0.215	0.235
E	1.78	---	0.070	---
J	0.08	0.18	0.003	0.007
K	12.86	---	0.506	---
L	1.40	1.78	0.055	0.070
M	40° NOM	50° NOM	---	---
P	---	1.27	---	0.050
R	1.58	1.60	0.062	0.063
S	4.01	4.52	0.158	0.178
T	2.11	2.54	0.083	0.100
U	7.62	8.26	0.300	0.325

CASE 145A-09
 MRF450A

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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 ($I_C = 100 \text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	20	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 20 \text{ mAdc}, V_{BE} = 0$)	$V_{(BR)CES}$	40	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 20 \text{ mAdc}, I_E = 0$)	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ mAdc}, I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain ($I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	10	—	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 15 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$)	C_{ob}	—	—	200	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 13.6 \text{ Vdc}, P_{out} = 50 \text{ W}, I_C(\text{max}) = 6.13 \text{ Adc}, f = 30 \text{ MHz}$)	G_{PE}	11	15	—	dB
Collector Efficiency ($V_{CC} = 13.6 \text{ Vdc}, P_{out} = 50 \text{ W}, I_C(\text{max}) = 6.13 \text{ Adc}, f = 30 \text{ MHz}$)	η	50	—	—	%
Series Equivalent Input Impedance ($V_{CC} = 13.6 \text{ Vdc}, P_{out} = 50 \text{ W}, f = 30 \text{ MHz}$)	Z_{in}	—	1.56-j.89	—	Ohms
Series Equivalent Output Impedance ($V_{CC} = 13.6 \text{ Vdc}, P_{out} = 50 \text{ W}, f = 30 \text{ MHz}$)	Z_{out}	—	174-j.50	—	Ohms

FIGURE 2 - INPUT POWER versus OUTPUT POWER

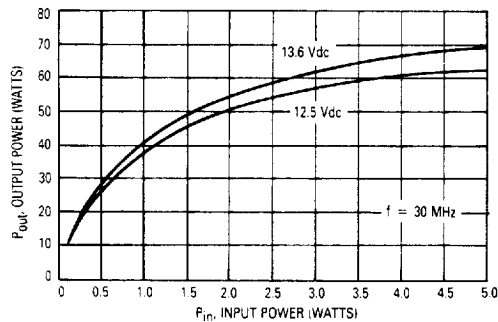


FIGURE 3 - OUTPUT POWER versus SUPPLY VOLTAGE

