

# New Jersey Semi-Conductor Products, Inc.

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## 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%

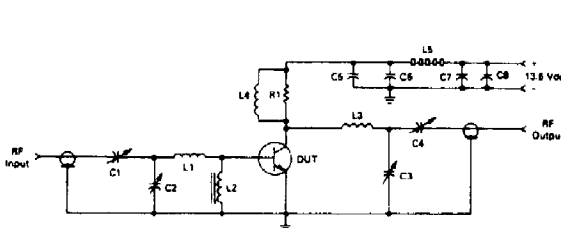
#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CE0}$	20	Vdc
Collector-Base Voltage	$V_{CB0}$	40	Vdc
Emitter-Base Voltage	$V_{EB0}$	4.0	- Vdc
Collector Current - Continuous	$I_C$	7.5	Adc
Total Device Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	115	Watts W/C
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ C$

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.53	$^\circ C/W$

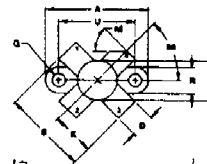
FIGURE 1 — 30 MHz TEST CIRCUIT SCHEMATIC



- C1 — 14-150 pF, ARCO 424
- C2, C3, C4 — 170-780 pF, ARCO 469
- C5, C8 — ERIE 0.1  $\mu F$  100 V RED CAPS
- C6 — 1000 pF UNELCO, 350 Vdc
- C7 — 10  $\mu F$ , 35 Vdc
- R1 — 100  $\Omega$ , 2.0 W Carbon
- L1 — 0.15  $\mu H$  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 #56-570-653B, 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

## MRF450 MRF450A

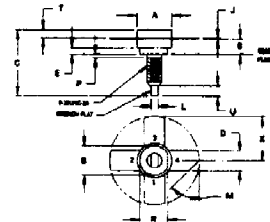
50 W — 30 MHz  
RF POWER  
TRANSISTORS  
NPN SILICON



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.29	25.13	0.956	0.989
B	1.60	1.90	0.063	0.075
C	1.60	1.12	0.063	0.044
D	1.02	1.06	0.040	0.042
E	1.78	1.78	0.070	0.070
F	2.81	2.51	0.110	0.099
G	0.71	0.71	0.028	0.028
H	15.88	15.88	0.625	0.625
M	0.7	0.7	0.028	0.028
N	2.68	2.68	0.105	0.105
P	1.0	1.0	0.039	0.039
Q	20.87	20.17	0.822	0.794
V	0.29	0.34	0.011	0.014

CASE 211-07  
MRF450



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.40	1.70	0.055	0.067
B	0.13	0.20	0.005	0.008
C	11.02	11.02	0.434	0.434
D	1.40	1.07	0.055	0.042
E	1.78	-	0.070	-
F	2.68	2.10	0.105	0.083
G	1.00	-	0.039	-
H	1.60	1.78	0.063	0.070
M	0.7	-	0.028	-
N	2.68	-	0.105	-
P	1.00	-	0.039	-
Q	20.87	20.17	0.822	0.794
V	1.00	0.30	0.039	0.012

CASE 145A-09  
MRF450A

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## MRF450, MRF450A

### 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 ( $I_C = 100\text{ mA dc}, I_B = 0$ )	$V_{(BR)CEO}$	20	—	—	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 20\text{ mA dc}, V_{BE} = 0$ )	$V_{(BR)CES}$	40	—	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = 20\text{ mA dc}, I_E = 0$ )	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10\text{ mA dc}, I_C = 0$ )	$V_{(BR)EB0}$	4.0	—	—	Vdc
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 1.0\text{ A dc}, V_{CE} = 5.0\text{ V dc}$ )	$h_{FE}$	10	—	—	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 15\text{ V dc}, I_E = 0, f = 1.0\text{ MHz}$ )	$C_{ob}$	—	—	200	pF
<b>FUNCTIONAL TESTS (Figure 1)</b>					
Common-Emitter Amplifier Power Gain ( $V_{CC} = 13.6\text{ V dc}, P_{out} = 50\text{ W}, I_C(\text{max}) = 6.13\text{ A dc}, f = 30\text{ MHz}$ )	$G_{PE}$	11	15	—	dB
Collector Efficiency ( $V_{CC} = 13.6\text{ V dc}, P_{out} = 50\text{ W}, I_C(\text{max}) = 6.13\text{ A dc}, f = 30\text{ MHz}$ )	$\eta$	50	—	—	%
Series Equivalent Input Impedance ( $V_{CC} = 13.6\text{ V dc}, P_{out} = 50\text{ W}, f = 30\text{ MHz}$ )	$Z_{in}$	—	$1.56 - j.89$	—	Ohms
Series Equivalent Output Impedance ( $V_{CC} = 13.6\text{ V dc}, P_{out} = 50\text{ W}, f = 30\text{ MHz}$ )	$Z_{out}$	—	$174 - j.50$	—	Ohms

FIGURE 2 — INPUT POWER versus OUTPUT POWER

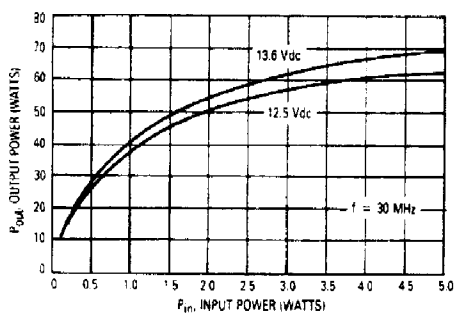


FIGURE 3 — OUTPUT POWER versus SUPPLY VOLTAGE

