

6367254 MOTOROLA SC (XSTRS/R F)

89D 79009 D

T-33-11

**MOTOROLA**  
**SEMICONDUCTOR**  
TECHNICAL DATA

**MRF449**  
**MRF449A**

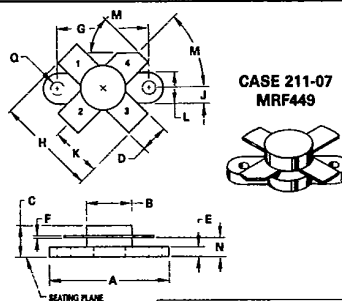
**The RF Line**

**NPN SILICON RF POWER TRANSISTORS**

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

- Specified 12.5 Volt, 30 MHz Characteristics —  
Output Power = 30 Watts  
Minimum Gain = 12 dB  
Efficiency = 50%

30 W — 30 MHz  
RF POWER TRANSISTORS  
NPN SILICON



CASE 211-07  
MRF449

| DIM | MILLIMETERS |       | INCHES |       |
|-----|-------------|-------|--------|-------|
|     | MIN         | MAX   | MIN    | MAX   |
| A   | 24.58       | 25.15 | 0.960  | 0.990 |
| B   | 9.40        | 9.91  | 0.370  | 0.390 |
| C   | 5.82        | 7.14  | 0.229  | 0.281 |
| D   | 5.46        | 5.97  | 0.215  | 0.235 |
| E   | 2.15        | 2.67  | 0.085  | 0.105 |
| F   | 0.10        | 0.15  | 0.004  | 0.006 |
| G   | 18.29       | 18.54 | 0.720  | 0.730 |
| H   | 20.07       | 20.57 | 0.790  | 0.810 |
| K   | 10.03       | 10.29 | 0.395  | 0.405 |
| L   | 6.22        | 6.48  | 0.245  | 0.255 |
| M   | 42°         | 59°   | 42°    | 59°   |
| N   | 3.81        | 4.57  | 0.150  | 0.180 |
| Q   | 2.87        | 3.30  | 0.113  | 0.130 |

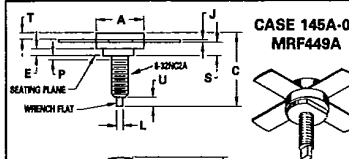
- STYLE 1.  
PIN 1. EMITTER  
2. BASE  
3. EMITTER  
4. COLLECTOR

**MAXIMUM RATINGS**

| Rating  | Symbol           | Value       | Unit           |
|---|------------------|-------------|----------------|
| Collector-Emitter Voltage   | V <sub>CEO</sub> | 20          | Vdc            |
| Collector-Base Voltage  | V <sub>CBO</sub> | 40          | Vdc            |
| Emitter-Base Voltage  | V <sub>EBO</sub> | 4.0         | Vdc            |
| Total Device Dissipation @ T <sub>C</sub> = 25°C<br>Derate above 25°C | P <sub>D</sub>   | 60<br>343   | Watts<br>mW/°C |
| Storage Temperature Range   | T <sub>stg</sub> | -65 to +150 | °C             |

**THERMAL CHARACTERISTICS**

| Characteristic                       | Symbol           | Max | Unit |
|--------------------------------------|------------------|-----|------|
| Thermal Resistance, Junction to Case | R <sub>θJC</sub> | 2.9 | °C/W |



CASE 145A-09  
MRF449A

| DIM | MILLIMETERS |         | INCHES |       |
|-----|-------------|---------|--------|-------|
|     | MIN         | MAX     | MIN    | MAX   |
| A   | 8.40        | 8.78    | 0.370  | 0.365 |
| B   | 8.13        | 8.38    | 0.320  | 0.330 |
| 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   | 12.45       | —       | 0.490  | —     |
| L   | 1.40        | 1.78    | 0.055  | 0.070 |
| M   | 45° NOM     | 45° NOM | —      | —     |
| P   | —           | 1.27    | —      | 0.050 |
| R   | 7.58        | 7.80    | 0.299  | 0.307 |
| S   | 4.01        | 4.52    | 0.158  | 0.178 |
| T   | 2.11        | 2.54    | 0.083  | 0.100 |
| U   | 2.43        | 3.35    | 0.098  | 0.132 |

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

6367254 MOTOROLA SC (XSTRS/R F)  
MRF449, MRF449A

89D 79010 DT-33-11

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

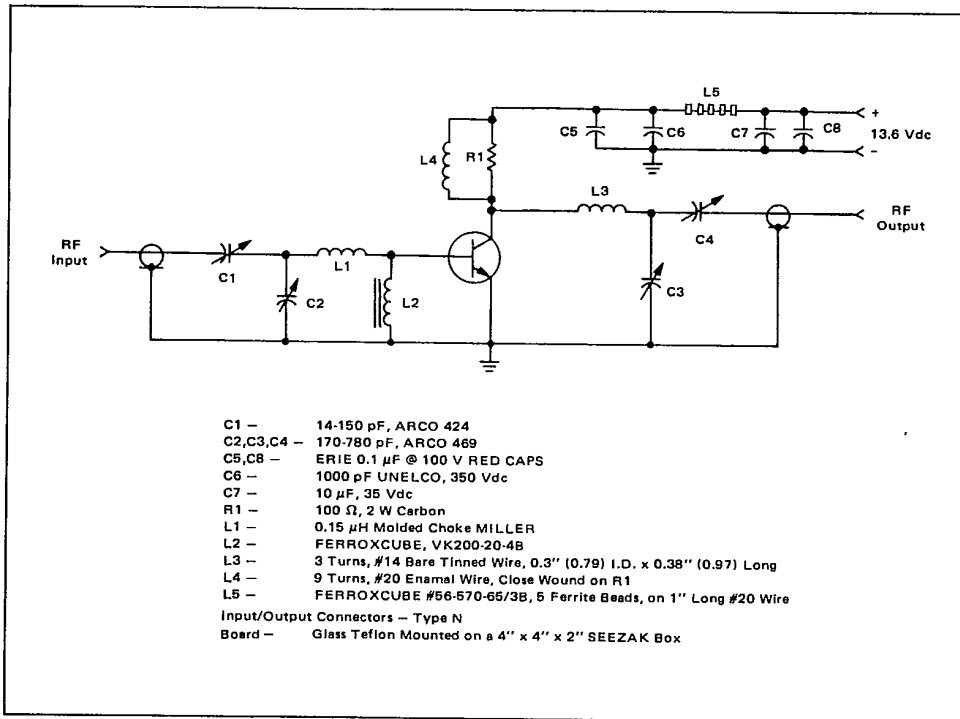
| Characteristic  | Symbol        | Min | Typ          | Max | Unit |
|---|---------------|-----|--------------|-----|------|
| <b>OFF CHARACTERISTICS</b>  |               |     |              |     |      |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 100 \text{ mA dc}$ , $I_B = 0$ )  | $V_{(BR)CEO}$ | 20  | —            | —   | Vdc  |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 50 \text{ mA dc}$ , $V_{BE} = 0$ )  | $V_{(BR)CES}$ | 40  | 50           | —   | Vdc  |
| Collector-Base Breakdown Voltage<br>( $I_C = 20 \text{ mA dc}$ , $I_E = 0$ )  | $V_{(BR)CBO}$ | 40  | —            | —   | Vdc  |
| Emitter-Base Breakdown Voltage<br>( $I_E = 5.0 \text{ mA dc}$ , $I_C = 0$ )   | $V_{(BR)EBO}$ | 4.0 | —            | —   | Vdc  |
| <b>ON CHARACTERISTICS</b>   |               |     |              |     |      |
| DC Current Gain<br>( $I_C = 1.0 \text{ A dc}$ , $V_{CE} = 5.0 \text{ V dc}$ )   | $h_{FE}$      | 10  | —            | —   | —    |
| <b>DYNAMIC CHARACTERISTICS</b>  |               |     |              |     |      |
| Output Capacitance<br>( $V_{CB} = 12.5 \text{ V dc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )  | $C_{ob}$      | —   | —            | 140 | pF   |
| <b>FUNCTIONAL TESTS (Figure 1)</b>  |               |     |              |     |      |
| Common-Emitter Amplifier Power Gain<br>( $V_{CC} = 13.6 \text{ V dc}$ , $P_{out} = 30 \text{ W}$ , $I_C(\text{max}) = 4.0 \text{ A dc}$ ,<br>$f = 30 \text{ MHz}$ ) | $G_{pE}$      | 12  | 14           | —   | dB   |
| Collector Efficiency<br>( $V_{CC} = 13.6 \text{ V dc}$ , $P_{out} = 30 \text{ W}$ , $I_C(\text{max}) = 4.0 \text{ A dc}$ ,<br>$f = 30 \text{ MHz}$ )                | $\eta$        | 50  | —            | —   | %    |
| Series Equivalent Input Impedance<br>( $V_{CC} = 12.5 \text{ V dc}$ , $P_{out} = 30 \text{ W}$ , $f = 30 \text{ MHz}$ )   | $Z_{in}$      | —   | $2.13-j1.15$ | —   | Ohms |
| Series Equivalent Output Impedance<br>( $V_{CC} = 12.5 \text{ V dc}$ , $P_{out} = 30 \text{ W}$ , $f = 30 \text{ MHz}$ )  | $Z_{out}$     | —   | $2.47-j0.37$ | —   | Ohms |

3

6367254 MOTOROLA SC (XSTRS/R F)  
MRF449, MRF449A

89D 79011 DT-33-11

FIGURE 1 -- 30 MHz TEST CIRCUIT SCHEMATIC



3

FIGURE 2 -- POWER OUTPUT versus POWER INPUT

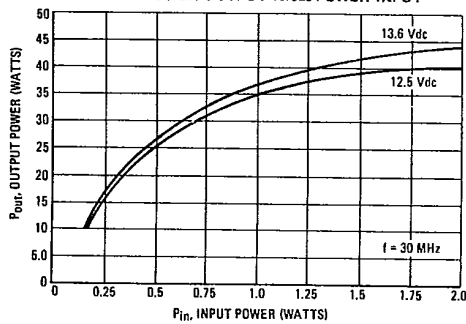


FIGURE 3 -- OUTPUT POWER versus SUPPLY VOLTAGE

