

6367254 MOTOROLA SC (XSTRS/R F)

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T-33-15

**MOTOROLA SEMICONDUCTOR TECHNICAL DATA**

**MRF453  
MRF453A**

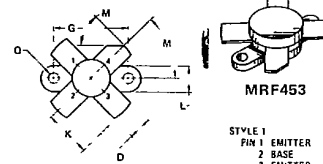
**The RF Line**

**NPN SILICON RF POWER TRANSISTORS**

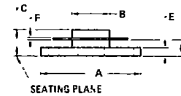
... designed for power amplifier applications in industrial, commercial and amateur radio equipment to 30 MHz.

- Specified 12.5 Volt, 30 MHz Characteristics -  
Output Power = 60 Watts  
Minimum Gain = 13 dB  
Efficiency = 55%

60 W - 30 MHz  
RF POWER TRANSISTORS  
NPN SILICON



STYLE 1  
PIN 1 EMITTER  
2 BASE  
3 EMITTER  
4 COLLECTOR



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.64	12.25	0.301	0.486
B	11.81	12.25	0.465	0.510
C	5.82	6.38	0.229	0.251
D	5.46	5.97	0.215	0.235
E	2.13	2.29	0.084	0.090
F	0.08	0.18	0.003	0.007
G	18.28	18.54	0.720	0.730
H	11.06	-	0.435	-
I	4.92	6.48	0.246	0.255
J	45° NCM	-	45° NCM	-
K	3.65	4.52	0.144	0.178
L	2.92	3.30	0.115	0.130

CASE 211 11

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	18	Vdc
Collector-Emitter Voltage	V <sub>CES</sub>	36	Vdc
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current - Continuous	I <sub>C</sub>	15	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C	P <sub>D</sub>	175	Watts
Derate above 25°C		1.0	W/°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

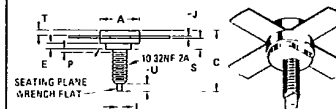
**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	1.0	°C/W

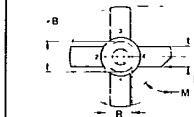
**MATCHING PROCEDURE**

In the push-pull circuit configuration, it is preferred that the transistors are used as matched pairs to obtain optimum performance.

The matching procedure used by Motorola consists of measuring h<sub>FE</sub> at the data sheet conditions and color coding the device to predetermined h<sub>FE</sub> ranges within the normal h<sub>FE</sub> limits. A color dot is added to the marking on top of the cap. Any two devices with the same color dot can be paired together to form a matched set of units.



STYLE 1  
PIN 1 EMITTER  
2 BASE  
3 EMITTER  
4 COLLECTOR



NOTE  
1 145A 10 USE 1032NF 2A STGD

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.45	12.95	0.490	0.510
B	10.54	10.63	0.415	0.425
C	19.29	22.73	0.775	0.895
D	5.45	5.97	0.215	0.235
E	1.83	-	0.072	-
F	0.08	0.18	0.003	0.007
G	12.45	-	0.490	-
H	1.85	1.90	0.073	0.075
I	45° NCM	-	45° NCM	-
J	1.27	-	0.050	-
K	0.73	1.075	0.333	0.385
L	3.84	4.50	0.151	0.177
M	2.11	2.54	0.083	0.100
N	2.49	3.35	0.098	0.132

CASE 145A 10

MRF453, MRF453A

ELECTRICAL CHARACTERISTICS (TC = 25°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-Emitter Breakdown Voltage ( $I_C = 50 \text{ mA dc}, V_{BE} = 0$ )	$V_{(BR)CES}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \text{ mA dc}, I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 5.0 \text{ A dc}, V_{CE} = 5.0 \text{ V dc}$ )	$h_{FE}$	10	—	150	—
<b>DYNAMIC CHARACTERISTICS</b>					
Output Capacitance ( $V_{CB} = 12.5 \text{ V dc}, I_E = 0, f = 1.0 \text{ MHz}$ )	$C_{ob}$	—	—	250	pF
<b>FUNCTIONAL TESTS (Figure 1)</b>					
Common-Emitter Amplifier Power Gain ( $V_{CC} = 12.5 \text{ V dc}, P_{out} = 60 \text{ W}, f = 30 \text{ MHz}$ )	$G_{pe}$	13	—	—	dB
Collector Efficiency ( $V_{CC} = 12.5 \text{ V dc}, P_{out} = 60 \text{ W}, f = 30 \text{ MHz}$ )	$\eta$	55	—	—	%
Series Equivalent Input Impedance ( $V_{CC} = 12.5 \text{ V dc}, P_{out} = 60 \text{ W}, f = 30 \text{ MHz}$ )	$Z_{in}$	—	1.66-j.844	—	Ohms
Series Equivalent Output Impedance ( $V_{CC} = 12.5 \text{ V dc}, P_{out} = 60 \text{ W}, f = 30 \text{ MHz}$ )	$Z_{out}$	—	1.73-j.188	—	Ohms
Parallel Equivalent Input Impedance ( $V_{CC} = 12.5 \text{ V dc}, P_{out} = 60 \text{ W}, f = 30 \text{ MHz}$ )	$Z_{in}$	—	2.09/1030	—	$\Omega/pF$
Parallel Equivalent Output Impedance ( $V_{CC} = 12.5 \text{ V dc}, P_{out} = 60 \text{ W}, f = 30 \text{ MHz}$ )	$Z_{out}$	—	1.75/330	—	$\Omega/pF$

3

FIGURE 1 — 30 MHz TEST CIRCUIT SCHEMATIC

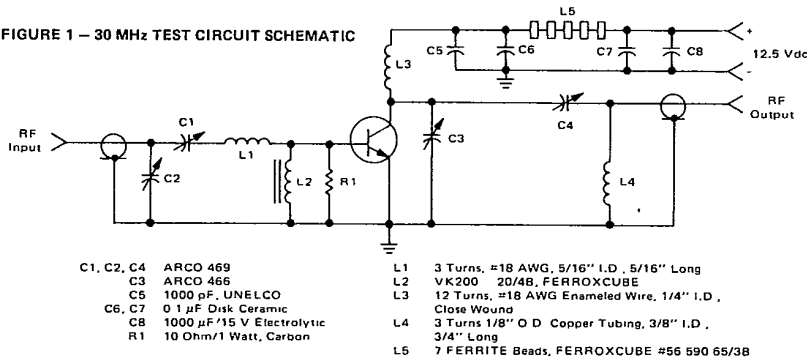


FIGURE 2 — OUTPUT POWER versus INPUT POWER

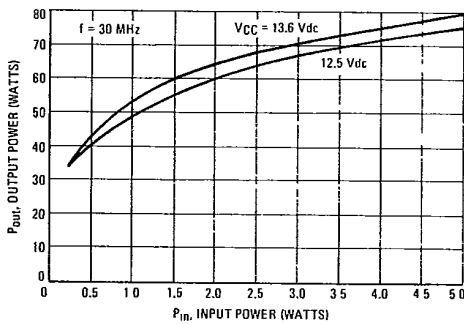


FIGURE 3 — OUTPUT POWER versus SUPPLY VOLTAGE

