

6367254 MOTOROLA SC (XSTRS/R F)

89D 79021 DT-33-15

**MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA**

**MRF458
MRF458A**

The RF Line

NPN SILICON RF POWER TRANSISTOR

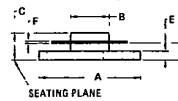
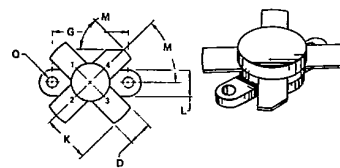
...designed for power amplifier applications in industrial, commercial and amateur radio equipment to 30 MHz.

- Specified 12.5 Volt, 30 MHz Characteristics -
 - Output Power = 80 Watts
 - Minimum Gain = 12 dB
 - Efficiency = 50%
- Capable of Withstanding 30:1 Load VSWR @ Rated P_{out} and V_{CC}

80 W-30 MHz

**RF POWER
TRANSISTOR**

NPN SILICON



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.64	24.89	0.970	0.980
B	11.81	12.95	0.465	0.510
C	5.82	6.38	0.233	0.255
D	5.46	5.97	0.216	0.235
E	2.13	2.79	0.084	0.110
F	0.09	0.18	0.003	0.007
G	18.28	18.64	0.720	0.730
H	11.05	-	0.435	-
I	6.22	6.49	0.246	0.255
J	45° NDM	45° NDM	-	-
K	3.65	4.52	0.144	0.178
L	2.92	3.30	0.115	0.130

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

CASE 211-11

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	18	Vdc
Collector-Base Voltage	V _{CBO}	36	Vdc
Emitter-Base Voltage	V _{EBO}	4.0	Vdc
Collector Current - Continuous	I _C	10	Adc
Total Device Dissipation @ T _C = 25°C Derate above 25°C	P _D	175 1.0	Watts W/°C
Storage Temperature Range	T _{stg}	-65 to +150	°C

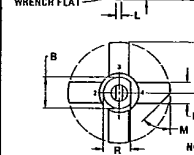
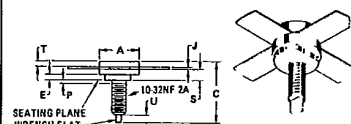
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	1.0	°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_{FE} at the data sheet conditions and color coding the device to predetermined h_{FE} ranges within the normal h_{FE} 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.



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.45	12.95	0.480	0.510
B	10.54	10.80	0.415	0.425
C	19.60	22.73	0.775	0.895
D	5.46	5.97	0.215	0.235
E	1.83	-	0.072	-
F	0.09	0.18	0.003	0.007
G	12.45	-	0.490	-
H	1.65	1.80	0.065	0.075
I	45° NDM	45° NDM	-	-
J	-	1.27	-	0.050
K	9.73	10.06	0.383	0.395
L	3.84	4.60	0.151	0.177
M	2.11	2.54	0.083	0.100
N	2.49	3.35	0.098	0.132

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

CASE 145A-10

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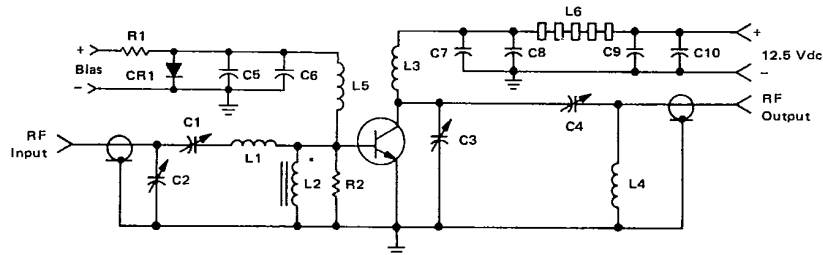
MRF458, MRF458A

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

Characteristics	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ($I_C = 100 \text{ mA dc}$, $I_B = 0$)	$V_{(BR)CEO}$	18	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 50 \text{ mA dc}$, $I_E = 0$)	$V_{(BR)CBO}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ mA dc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain ($I_C = 5.0 \text{ A dc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	10	—	150	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 15 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	—	300	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain ($V_{CC} = 12.5 \text{ Vdc}$, $P_{out} = 80 \text{ W}$, $f = 30 \text{ MHz}$)	G_{PE}	12	—	—	dB
Collector Efficiency ($V_{CC} = 12.5 \text{ Vdc}$, $P_{out} = 80 \text{ W}$, $f = 30 \text{ MHz}$)	η	50	—	—	%
Intermodulation Distortion ($V_{CC} = 12.5 \text{ Vdc}$, $P_{out} = 70 \text{ W PEP}$, $f = 30, 30.001 \text{ MHz}$)	IMD_3 IMD_5	—	-32 -35	—	dB

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FIGURE 1 — 30 MHz TEST CIRCUIT SCHEMATIC



C1, C2, C4 — ARCO 469
 C3 — ARCO 466
 C5 — ERIE 0.1 μF , 100 V
 C6 — 500 μF , 15 V Electrolytic
 C7 — 1000 pF, UNELCO
 C8, C9 — 0.1 μF Disk Ceramic
 C10 — 100 μF , 15 V Electrolytic
 CR1 — 1N4997
 R1 — 10 Ω , 25 Watt Wirewound
 R2 — 10 Ohm, 1 Watt, Carbon

L1 — 3 Turns #18 AWG, 5/16" I.D.,
 5/16" Long
 L2, L5 — VK200 — 20/4B, FERROXCUBE
 L3 — 12 Turns, #18 AWG Enamelled Wire,
 1/4" I.D., Close Wound
 L4 — 3 Turns 1/8" O.D. Copper Tubing,
 3/8" I.D., 3/4" Long
 L6 — 7 FERRITE Beads, FERROXCUBE
 #66-690-65/3B

*NOTE: For Class C operation bias network (R1, R2, CR1, C5, C6, L5) is not used.
 For Class AB operation L2 is not used.

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TYPICAL PERFORMANCE CURVES

FIGURE 2 - POWER GAIN versus FREQUENCY

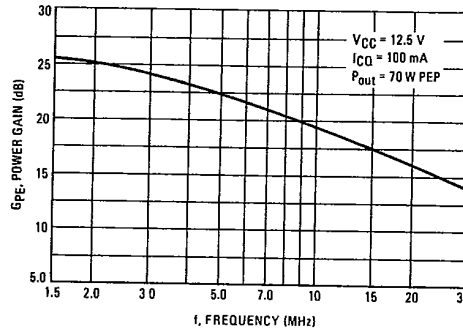


FIGURE 3 - OUTPUT RESISTANCE versus FREQUENCY

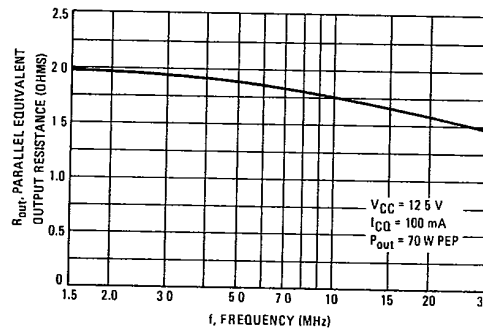
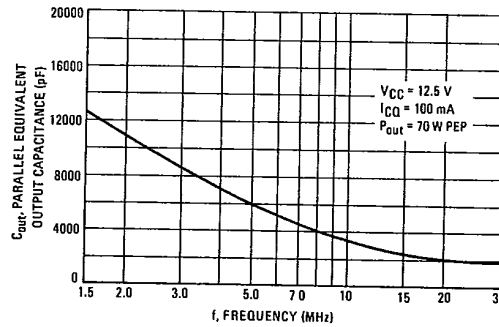


FIGURE 4 - OUTPUT CAPACITANCE versus FREQUENCY

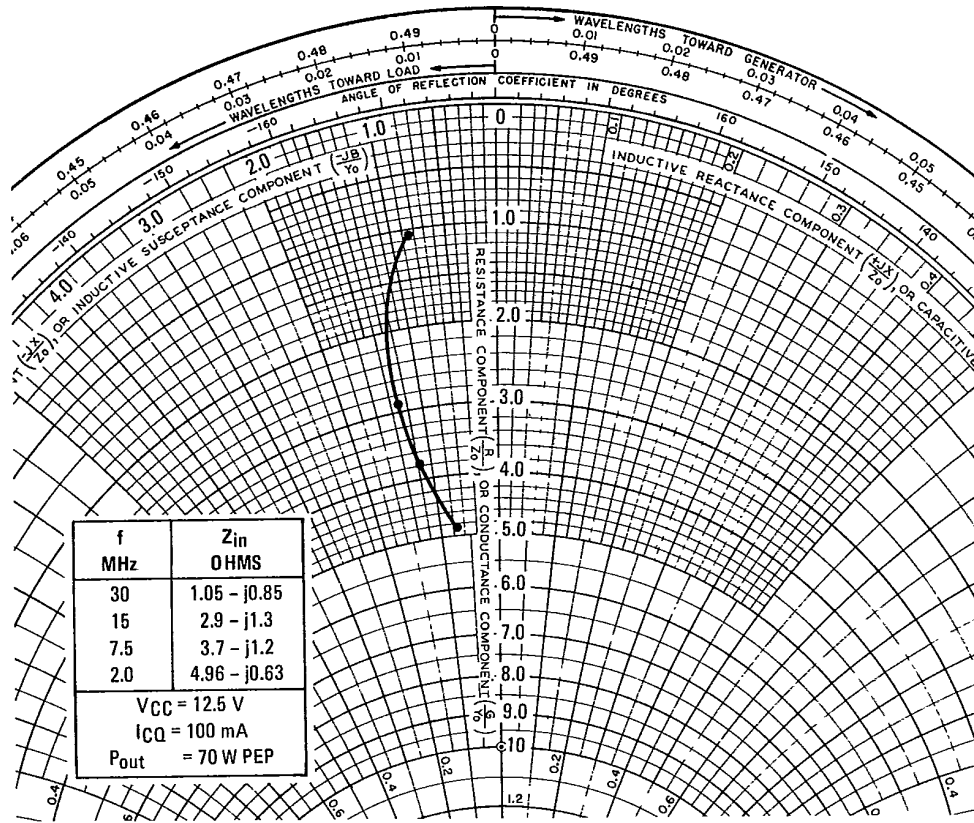


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FIGURE 5 - SERIES EQUIVALENT INPUT-OUTPUT IMPEDANCE



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