MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

T-33-11

MRF455
MRF455A

The RF Line

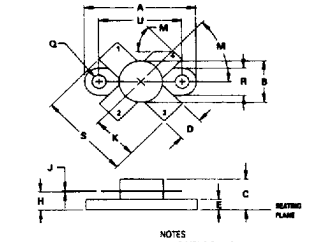
2

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

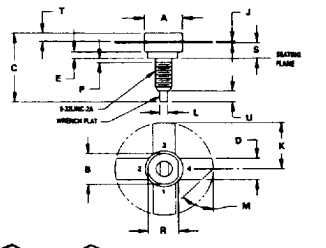


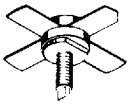
STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

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

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	24.28	25.14	0.980	0.990
B	9.40	9.90	0.370	0.390
C	5.82	7.13	0.229	0.281
D	5.47	5.98	0.215	0.235
E	2.16	2.66	0.085	0.105
H	3.81	4.57	0.150	0.180
J	0.11	0.15	0.004	0.006
K	10.04	10.28	0.395	0.405
M	40°	50°	40°	50°
Q	2.89	3.30	0.113	0.130
R	6.23	6.47	0.245	0.255
S	20.07	20.57	0.790	0.810
U	18.29	18.54	0.720	0.730

CASE 211-07
MRF455





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

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	17.02	20.07	0.670	0.790
D	5.48	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	0.298	0.307
S	4.01	4.52	0.158	0.178
T	2.11	2.54	0.083	0.100
U	2.49	3.35	0.098	0.132

CASE 145A-09

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Emitter Voltage	V_{CES}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	15	Adc
Total Device Dissipation @ $T_C = 25^oC$ Derate above 25^oC	P_D	175 1.0	Watts $W/^oC$
Storage Temperature Range	T_{stg}	−65 to +150	^oC

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.0	$^oC/W$

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.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, I_B = 0)	$V_{(BR)CEO}$	18	–	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 50 mAdc, V_{BE} = 0)	$V_{(BR)CES}$	36	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 mAdc, I_C = 0)	$V_{(BR)EBO}$	4.0	–	–	Vdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 5.0 Adc, V_{CE} = 5.0 Vdc)	h_{FE}	10	–	150	–
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)	C_{ob}	–	–	250	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain (V_{CC} = 12.5 Vdc, P_{out} = 60 W, f = 30 MHz)	G_{pe}	13	–	–	dB
Collector Efficiency (V_{CC} = 12.5 Vdc, P_{out} = 60 W, f = 30 MHz)	η	55	–	–	%
Series Equivalent Input Impedance (V_{CC} = 12.5 Vdc, P_{out} = 60 W, f = 30 MHz)	Z_{in}	–	1.66-j.844	–	Ohms
Series Equivalent Output Impedance (V_{CC} = 12.5 Vdc, P_{out} = 60 W, f = 30 MHz)	Z_{out}	–	1.73-j.188	–	Ohms
Parallel Equivalent Input Impedance (V_{CC} = 12.5 Vdc, P_{out} = 60 W, f = 30 MHz)	Z_{in}	–	2.09/1030	–	Ω/pF
Parallel Equivalent Output Impedance (V_{CC} = 12.5 Vdc, P_{out} = 60 W, f = 30 MHz)	Z_{out}	–	1.75/330	–	Ω/pF

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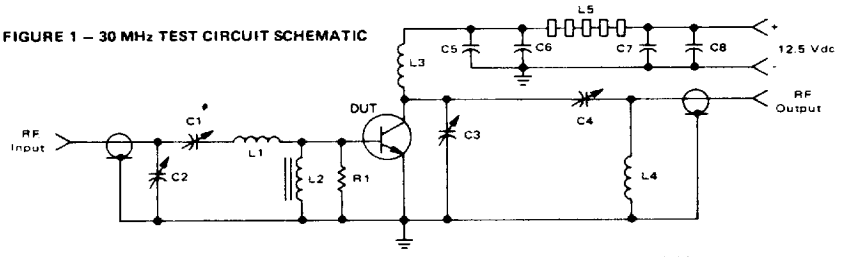
FIGURE 1 – 30 MHz TEST CIRCUIT SCHEMATIC



C1, C2, C4 ARCO 469
C3 ARCO 466
C5 1000 pF, UNELCO
C6, C7 0.1 μF Disk Ceramic
C8 1000 μF/15 V Electrolytic
R1 10 Ohm/1 Watt, Carbon

L1 3 Turns, #18 AWG, 5/16" I.D., 5/16" Long
L2 VK200 - 20/4B, FERROXCUBE
L3 12 Turns, #18 AWG Enameled Wire, 1/4" I.D., Close Wound
L4 3 Turns 1/8" O.D. Copper Tubing, 3/8" I.D., 3/4" Long
L5 7 FERRITE Beads, FERROXCUBE #56-590-65/3B

FIGURE 2 – OUTPUT POWER versus INPUT POWER

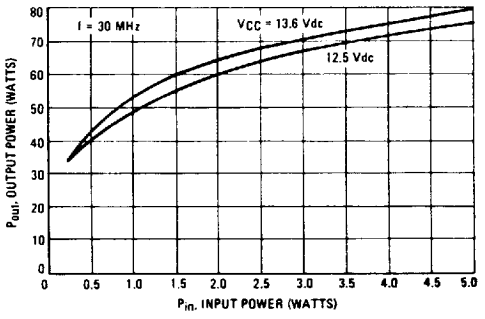


FIGURE 3 – OUTPUT POWER versus SUPPLY VOLTAGE