### **MRF454**



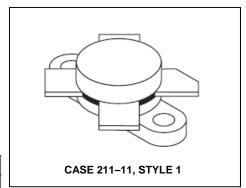
## The RF Line NPN Silicon Power Transistor 80W, 30MHz, 12.5V

M/A-COM Products Released - Rev. 07.07

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

- Specified 12.5 V, 30 MHz characteristics
- Output power = 80 W
- Minimum gain = 12 dB
- Efficiency = 50%

#### **Product Image**



#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V <sub>CEO</sub>	V <sub>CEO</sub> 25	
Collector-Base Voltage	V <sub>CBO</sub>	45	Vdc
Emitter–Base Voltage	V <sub>EBO</sub>	4.0	Vdc
Collector Current — Continuous	Ic	20	Adc
Total Device Dissipation @ T <sub>C</sub> = 25°C Derate above 25°C	P <sub>D</sub>	250 1.43	Watts 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>eJC</sub>	0.7	°C/W

#### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS	•	•	•		
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	18	_	_	Vdc
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 50 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	36	_	_	Vdc
Emitter-Base Breakdown Voltage (I <sub>E</sub> = 10 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	_	_	Vdc
ON CHARACTERISTICS					
DC Current Gain (I <sub>C</sub> = 5.0 Adc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	40	_	150	_
DYNAMIC CHARACTERISTICS	•				
Output Capacitance (V <sub>CB</sub> = 15 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	_	_	250	pF

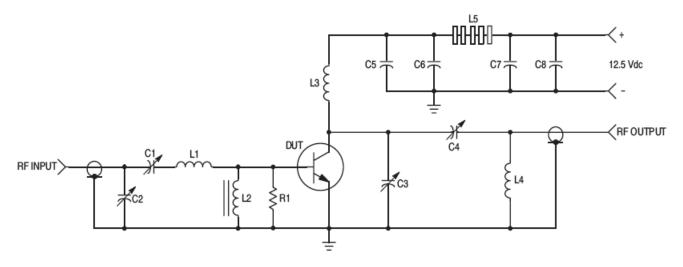


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#### FUNCTIONAL TESTS (Figure 1)

Common–Emitter Amplifier Power Gain (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 80 W, f = 30 MHz)	G <sub>pe</sub>	12	_	_	dB
Collector Efficiency (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 80 W, f = 30 MHz)	η	50	_	_	%
Series Equivalent Input Impedance (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 80 W, f = 30 MHz)	Z <sub>in</sub>	_	.938–j.341	_	Ohms
Series Equivalent Output Impedance (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 80 W, f = 30 MHz)	Z <sub>out</sub>	_	1.16-j.201	_	Ohms
Parallel Equivalent Input Impedance (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 80 W, f = 30 MHz)	_	_	1.06 Ω 1817 pF	_	_
Parallel Equivalent Output Impedance (V <sub>CC</sub> = 12.5 Vdc, P <sub>out</sub> = 80 W, f = 30 MHz)	_	_	1.19 Ω 777 pF	_	_



C1, C2, C4 - ARCO 469

C3 - ARCO 466

C5 - 1000 pF, UNELCO

C6, C7 - 0.1 µF Disc Ceramic

C8 — 1000 µF/15 V Electrolytic

R1 - 10 Ohm/1.0 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 1. 30 MHz Test Circuit Schematic

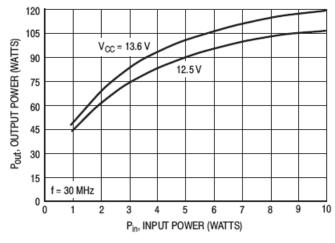
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120 105 Pout, OUTPUT POWER (WATTS)  $P_{in} = 5 V$ 90 3.5 W 75 1.75 W 60 45 30 15 f = 30 MHz 0 10 13 16 17 V<sub>CC</sub>, SUPPLY VOLTAGE (VOLTS)

Figure 2. Output Power versus Input Power

Figure 3. Output Power versus Supply Voltage

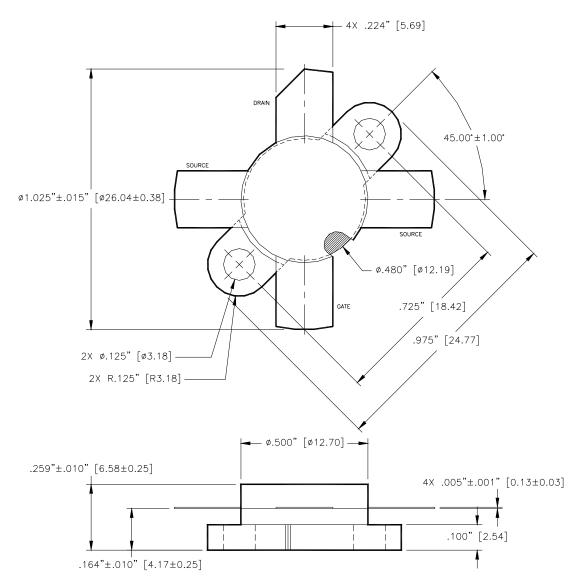
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Unless otherwise noted, tolerances are inches  $\pm .005$ " [millimeters  $\pm 0.13$ mm]

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