

# 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%

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	25	Vdc
Collector–Base Voltage	$V_{CB0}$	45	Vdc
Emitter–Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous	$I_C$	20	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	250 1.43	Watts W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.7	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

#### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = 100\text{ mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	18	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 50\text{ mAdc}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	36	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ mAdc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc

#### ON CHARACTERISTICS

DC Current Gain ( $I_C = 5.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	40	—	150	—
--	----------	----	---	-----	---

#### DYNAMIC CHARACTERISTICS

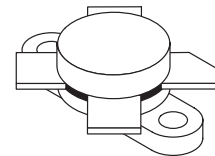
Output Capacitance ( $V_{CB} = 15\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	—	250	pF
--	----------	---	---	-----	----

#### FUNCTIONAL TESTS (Figure 1)

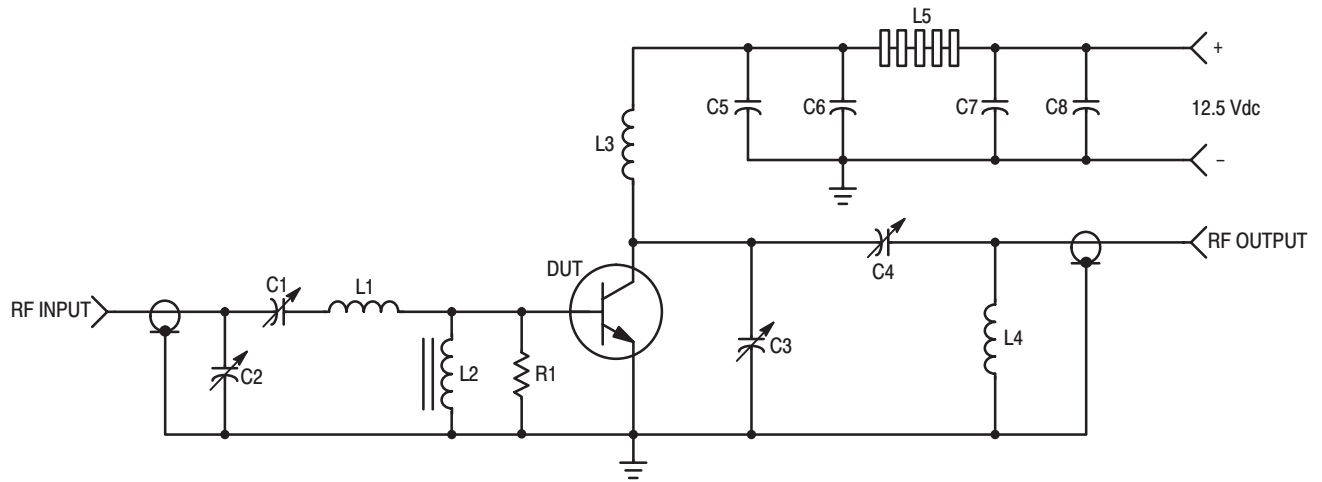
Common–Emitter Amplifier Power Gain ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 80\text{ W}$ , $f = 30\text{ MHz}$ )	$G_{pe}$	12	—	—	dB
Collector Efficiency ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 80\text{ W}$ , $f = 30\text{ MHz}$ )	$\eta$	50	—	—	%
Series Equivalent Input Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 80\text{ W}$ , $f = 30\text{ MHz}$ )	$Z_{in}$	—	.938-j.341	—	Ohms
Series Equivalent Output Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 80\text{ W}$ , $f = 30\text{ MHz}$ )	$Z_{out}$	—	1.16-j.201	—	Ohms
Parallel Equivalent Input Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 80\text{ W}$ , $f = 30\text{ MHz}$ )	—	—	1.06 $\Omega$ 1817 pF	—	—
Parallel Equivalent Output Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 80\text{ W}$ , $f = 30\text{ MHz}$ )	—	—	1.19 $\Omega$ 777 pF	—	—

**MRF454**

**80 W, 30 MHz  
RF POWER  
TRANSISTOR  
NPN SILICON**



**CASE 211-11, STYLE 1**



C1, C2, C4 — ARCO 469  
 C3 — ARCO 466  
 C5 — 1000 pF, UNELCO  
 C6, C7 — 0.1  $\mu$ F Disc Ceramic  
 C8 — 1000  $\mu$ F/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

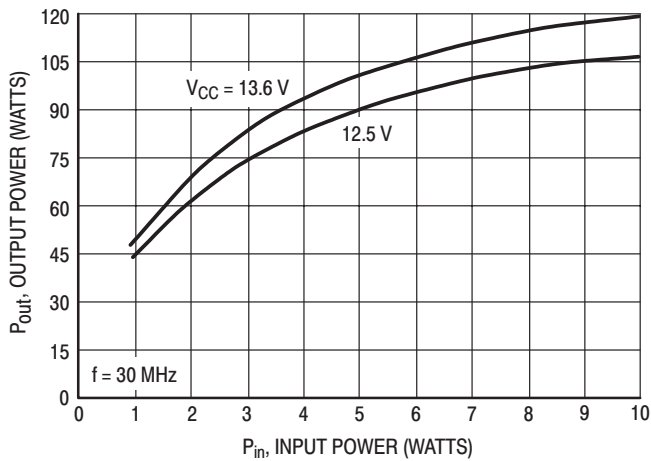


Figure 2. Output Power versus Input Power

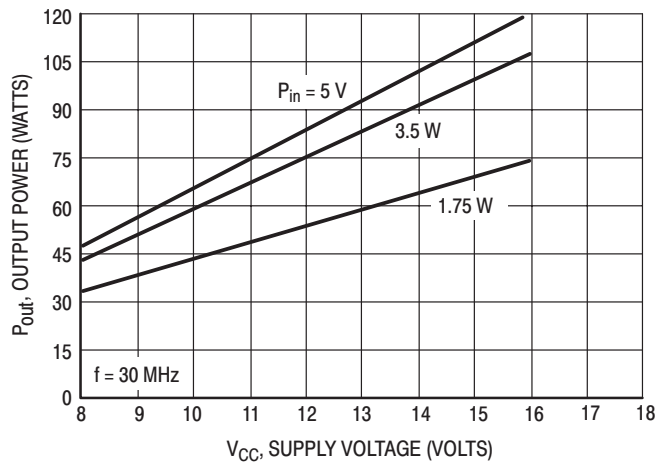
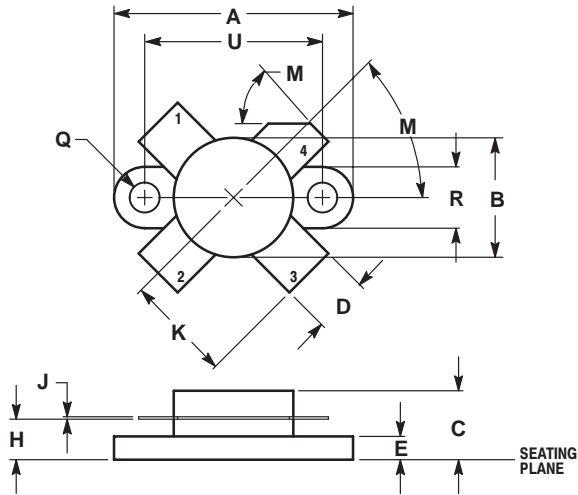


Figure 3. Output Power versus Supply Voltage

## PACKAGE DIMENSIONS



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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.960	0.990	24.39	25.14
B	0.465	0.510	11.82	12.95
C	0.229	0.275	5.82	6.98
D	0.216	0.235	5.49	5.96
E	0.084	0.110	2.14	2.79
H	0.144	0.178	3.66	4.52
J	0.003	0.007	0.08	0.17
K	0.435	---	11.05	---
M	45°NOM		45°NOM	
Q	0.115	0.130	2.93	3.30
R	0.246	0.255	6.25	6.47
U	0.720	0.730	18.29	18.54

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

**CASE 211-11  
 ISSUE N**

*Specifications subject to change without notice.*

- **North America:** Tel. (800) 366-2266, Fax (800) 618-8883
- **Asia/Pacific:** Tel.+81-44-844-8296, Fax +81-44-844-8298
- **Europe:** Tel. +44 (1344) 869 595, Fax+44 (1344) 300 020

Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

REV 1

**tyco** / Electronics

**MACOM**