

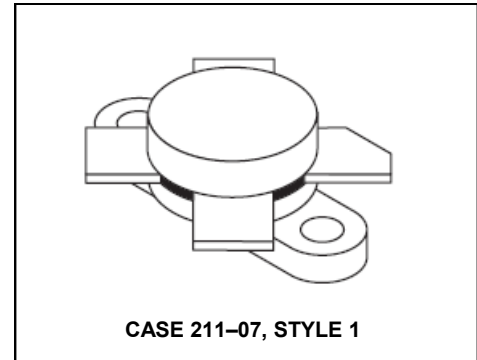
## The RF Line NPN Silicon Power Transistor 60W, 30MHz, 12.5V

Rev. V1

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

- Specified 12.5 V, 30 MHz characteristics —  
Output power = 60 W  
Minimum gain = 13 dB  
Efficiency = 55%

### Product Image



### 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 @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	175 1.0	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	$R_{\theta JC}$	1.0	$^\circ\text{C/W}$

### 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 ( $I_C = 5.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	10	—	150	—
---	----------	----	---	-----	---

### DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CB} = 12.5\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	—	250	pF
---	----------	---	---	-----	----

(continued)

## The RF Line NPN Silicon Power Transistor 60W, 30MHz, 12.5V

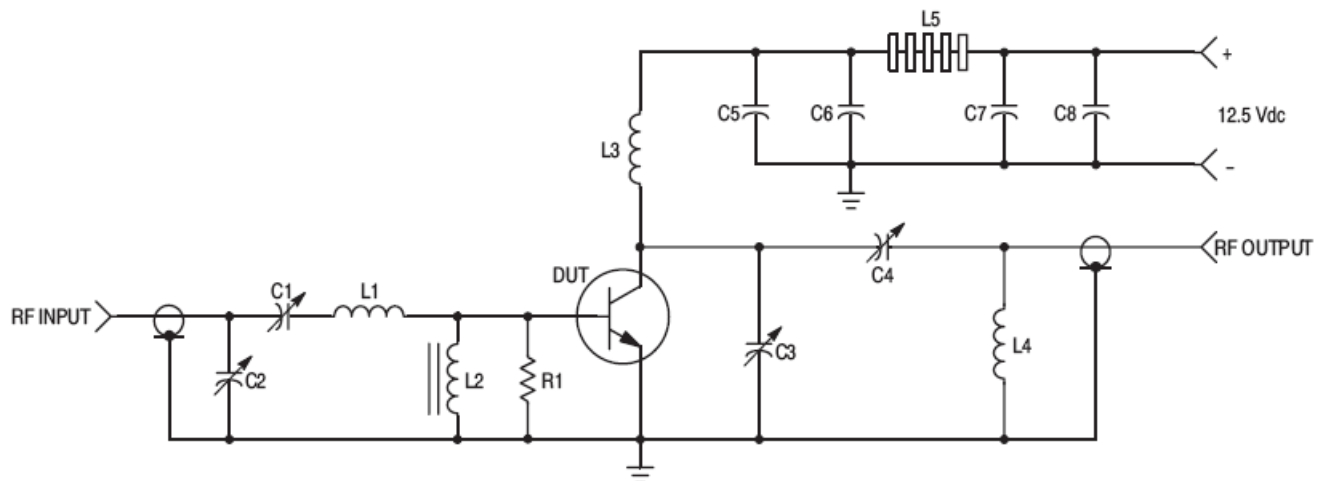
Rev. V1

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

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

### FUNCTIONAL TESTS (Figure 1)

Common-Emitter Amplifier Power Gain ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 30\text{ MHz}$ )	$G_{pe}$	13	—	—	dB
Collector Efficiency ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 30\text{ MHz}$ )	$\eta$	55	—	—	%
Series Equivalent Input Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 30\text{ MHz}$ )	$Z_{in}$	—	$1.66-j.844$	—	Ohms
Series Equivalent Output Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 30\text{ MHz}$ )	$Z_{out}$	—	$1.73-j.188$	—	Ohms
Parallel Equivalent Input Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 30\text{ MHz}$ )	$Z_{in}$	—	$2.09/1030$	—	$\Omega/\text{pF}$
Parallel Equivalent Output Impedance ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 60\text{ W}$ , $f = 30\text{ MHz}$ )	$Z_{out}$	—	$1.75/330$	—	$\Omega/\text{pF}$



C1, C2, C4 — ARCO 469

C3 — ARCO 466

C5 — 1000 pF, UNELCO

C6, C7 — 0.1  $\mu\text{F}$  Disc Ceramic

C8 — 1000  $\mu\text{F}/15\text{ V}$  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

## The RF Line NPN Silicon Power Transistor 60W, 30MHz, 12.5V

Rev. V1

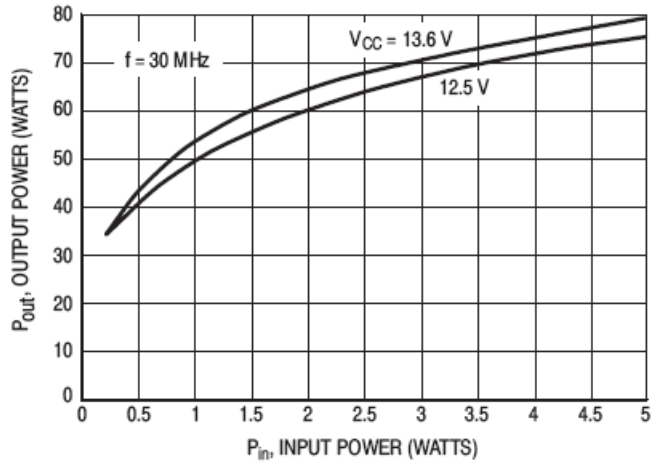


Figure 2. Output Power versus Input Power

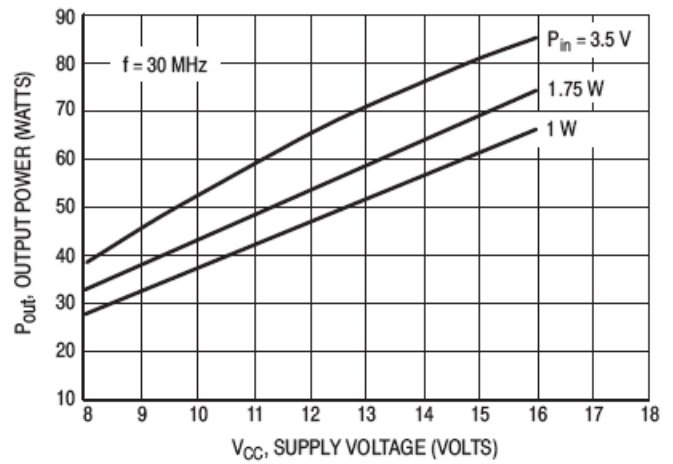
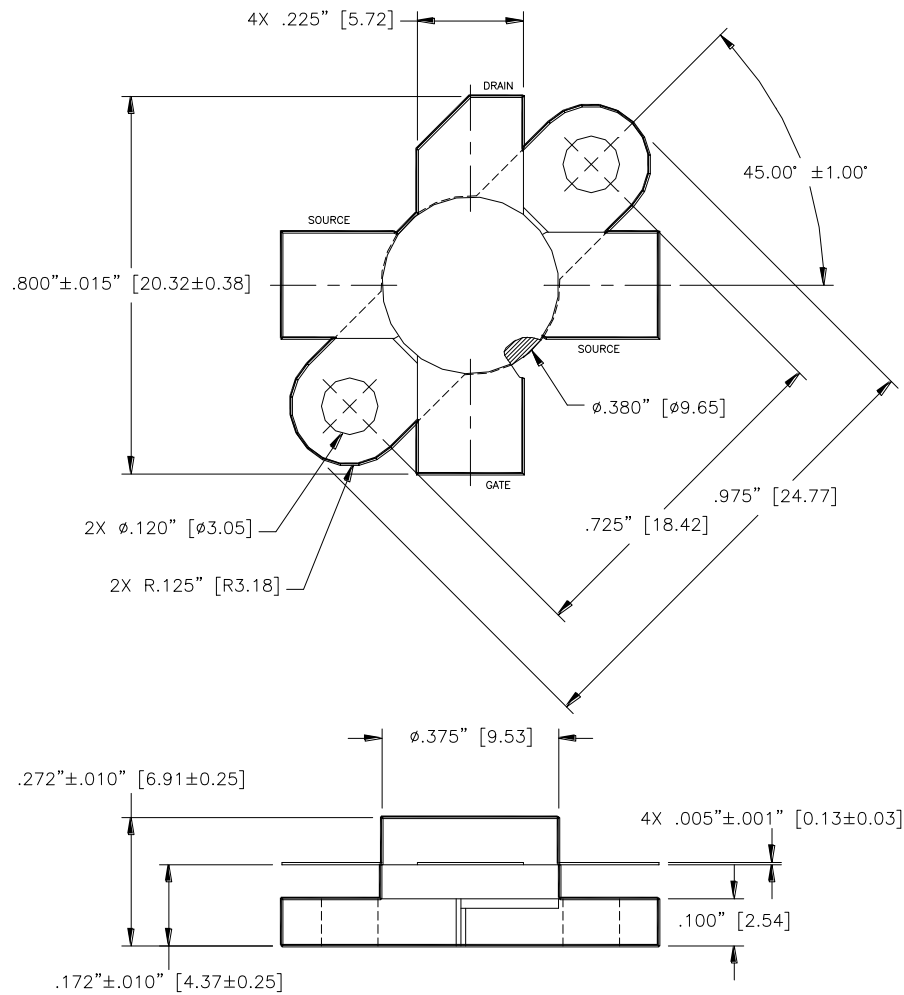


Figure 3. Output Power versus Supply Voltage

## The RF Line NPN Silicon Power Transistor 60W, 30MHz, 12.5V

Rev. V1



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

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.