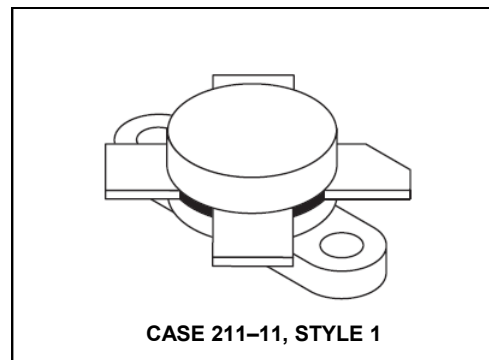


The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1

Designed primarily for applications as a high-power linear amplifier from 2.0 to 30 MHz. **Product Image**

- Specified 28 V, 30 MHz characteristics —
Output power = 150 W (PEP)
Minimum gain = 10 dB
Efficiency = 40%
- Intermodulation distortion @ 150 W (PEP) —IMD = -30 dB (min.)
- 100% tested for load mismatch at all phase angles with 30:1 VSWR



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Collector-Base Voltage	V_{CBO}	85	Vdc
Emitter-Base Voltage	V_{EBO}	3.0	Vdc
Collector Current — Continuous	I_C	20	Adc
Withstanding Current — 10 s	—	30	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	290 1.66	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	$R_{\theta JC}$	0.6	$^\circ\text{C/W}$

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

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

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 200\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	35	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 100\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	85	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 100\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	85	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	3.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 28\text{ Vdc}$, $V_{BE} = 0$, $T_C = 25^\circ\text{C}$)	I_{CES}	—	—	20	mAdc

(continued)

The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1

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

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

ON CHARACTERISTICS

DC Current Gain ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	15	30	120	—
---	----------	----	----	-----	---

DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 28 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	420	—	pF
---	----------	---	-----	---	----

FUNCTIONAL TESTS

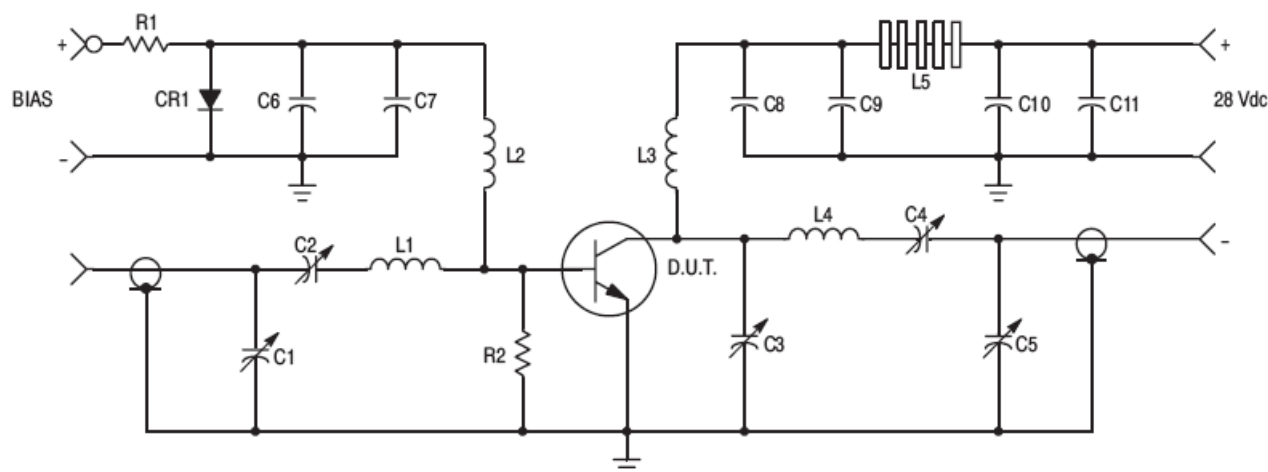
Common-Emitter Amplifier Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$)	G_{PE}	10	13	—	dB
Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$)	η	—	45	—	%
Intermodulation Distortion (1) ($V_{CE} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$)	IMD	—	-33	-30	dB
Output Power ($V_{CE} = 28 \text{ Vdc}$, $f = 30 \text{ MHz}$)	P_{out}	150	—	—	Watts (PEP)

NOTE:

1. To Mil-Std-1311 Version A, Test Method 2204, Two Tone, Reference each Tone.

The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1



C1, C2, C3, C5 — 170–680 pF, ARCO 469
C4 — 80–480 pF, ARCO 466
C6, C8, C11 — ERIE 0.1 μ F, 100 V
C7 — MALLORY 500 μ F, 15 V Electrolytic
C9 — UNDERWOOD 1000 pF, 350 V
C10 — 10 μ F, 50 V Electrolytic
R1 — 10 Ω , 25 Watt Wire Wound
R2 — 10 Ω , 1.0 Watt Carbon
CR1 — 1N4997

L1 — 3 Turns, #16 Wire, 5/16" I.D., 5/16" Long
L2 — 10 μ H Molded Choke
L3 — 12 Turns, #16 Enameled Wire, Close Wound, 1/4" Dia.
L4 — 5 Turns, 1/8" Copper Tubing
L5 — 10 Ferrite Beads — FERROXCUBE #56–590–65/3B

Figure 1. 30 MHz Test Circuit Schematic

The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1

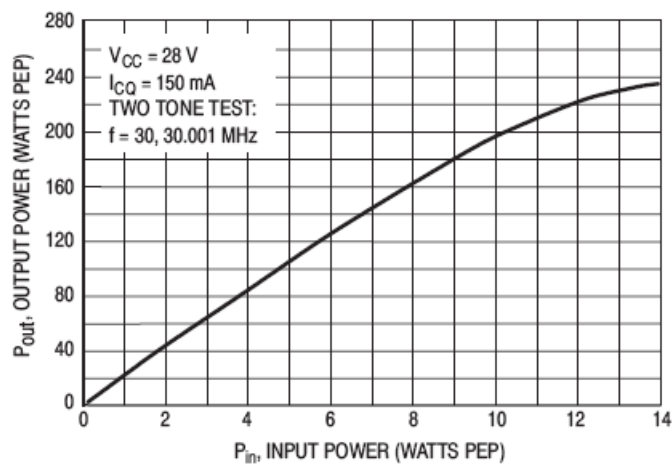


Figure 2. Output Power versus Input Power

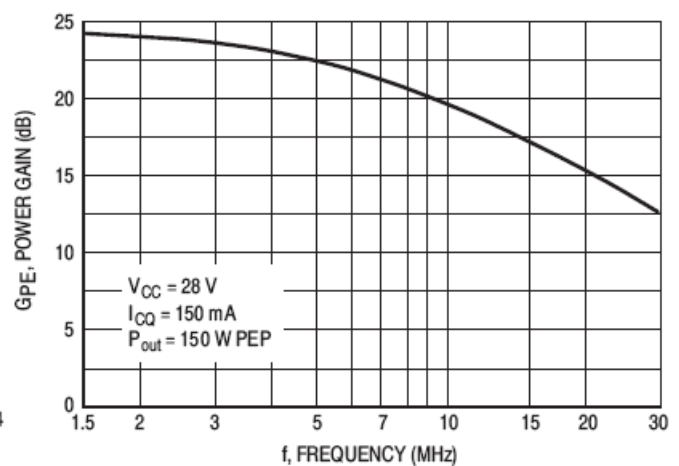


Figure 3. Power Gain versus Frequency

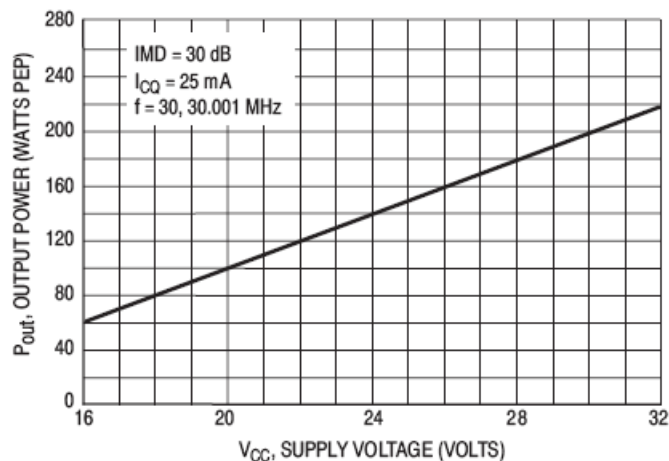


Figure 4. Linear Output Power versus Supply Voltage

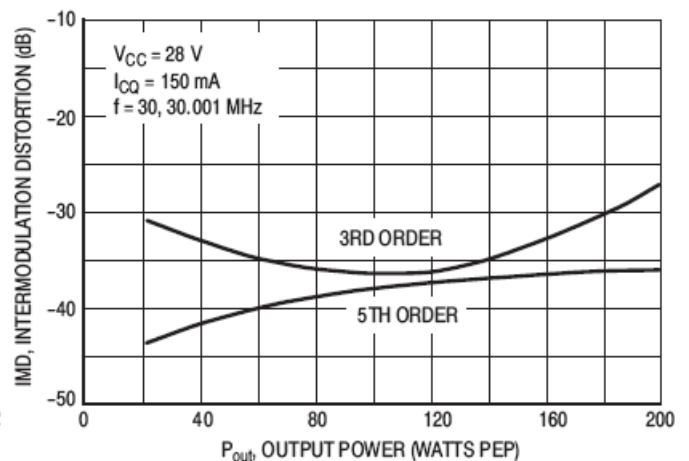


Figure 5. Intermodulation Distortion versus Output Power

The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1

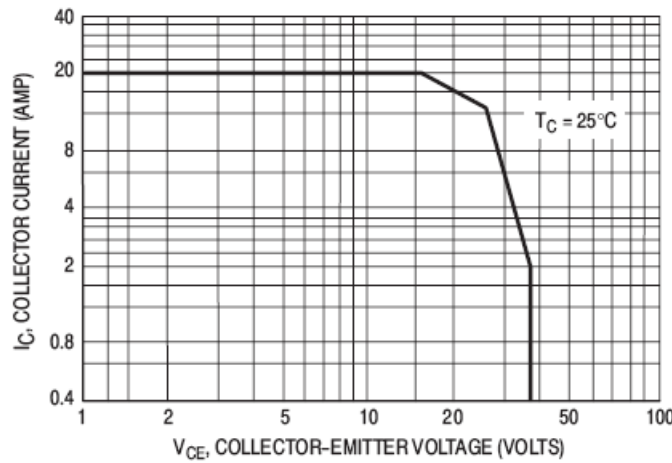


Figure 6. DC Safe Operating Area

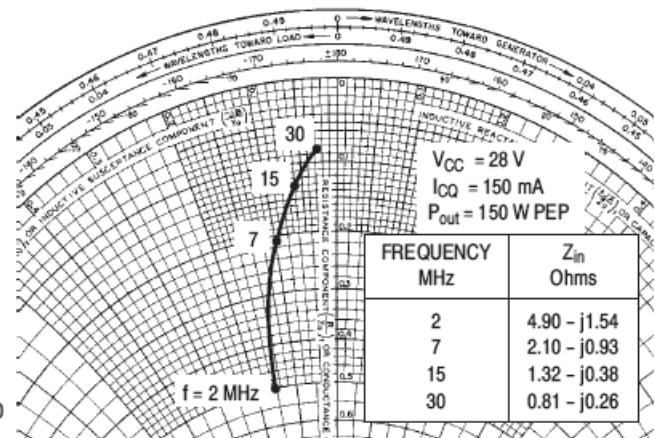


Figure 7. Series Input Impedance

The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1

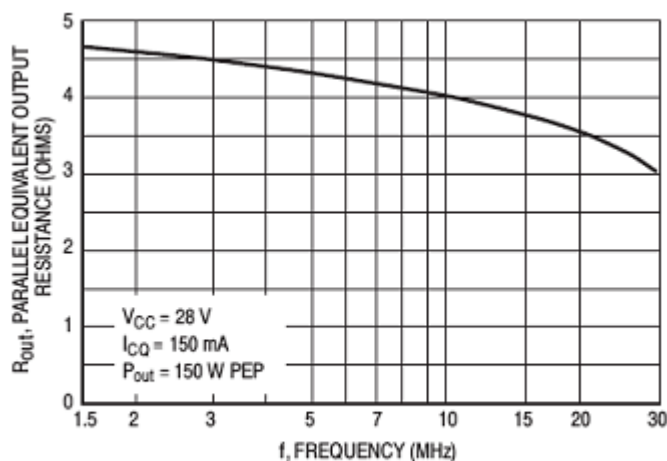


Figure 8. Output Resistance versus Frequency

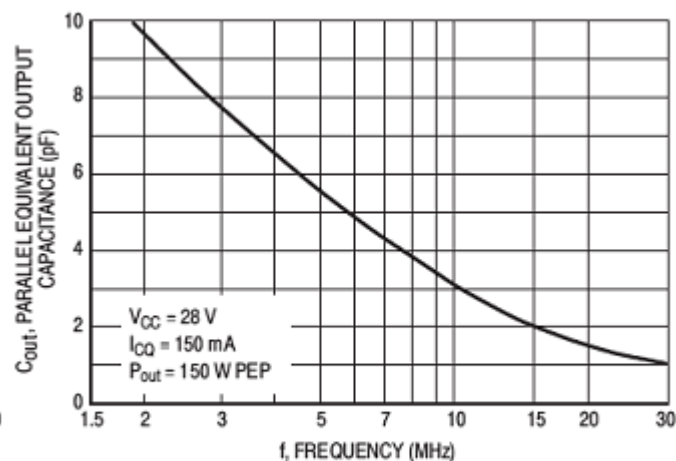
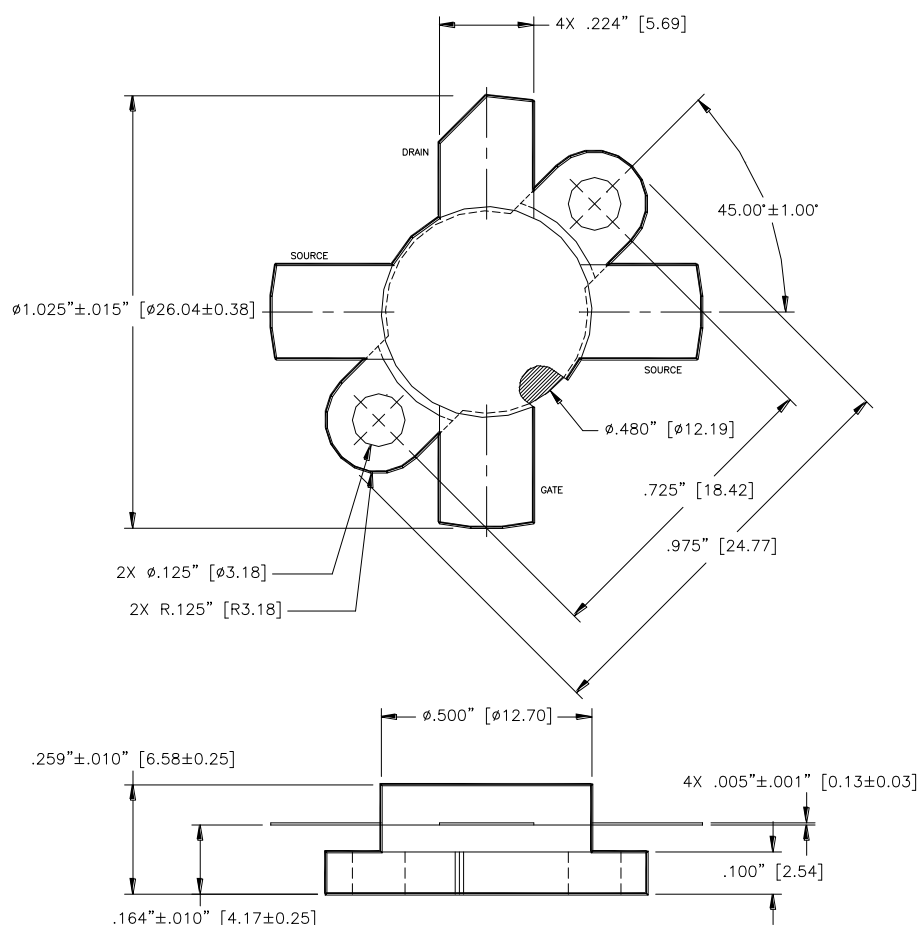


Figure 9. Output Capacitance versus Frequency



Unless otherwise noted, tolerances are inches ± 0.005 " [millimeters ± 0.13 mm]

The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

Rev. V1

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.