

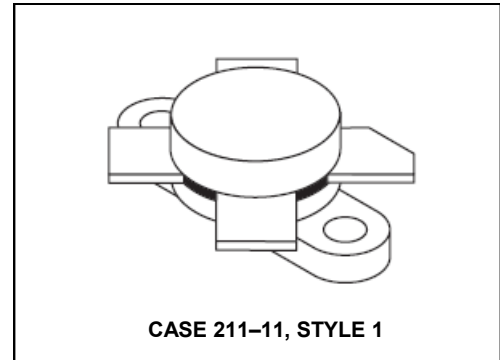
The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 50V

Rev. V1

Designed primarily for high-voltage applications as a high-power linear amplifier from 2.0 to 30 MHz. Ideal for marine and base station equipment.

- Specified 50 V, 30 MHz Characteristics —
 - Output power = 150 W (PEP)
 - Minimum gain = 13 dB
 - Efficiency = 45%
- Intermodulation distortion @ 150 W (PEP) —
 - IMD = -32 dB (Max)
- Diffused emitter resistors for superior ruggedness
- 100% tested for load mismatch at all phase angles with 30:1 VSWR @ 150 W CW

Product Image



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	16	Adc
Withstand Current — 10 s	—	20	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	233 1.33	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	$R_{\theta JC}$	0.75	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ($I_C = 200 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	50	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 100 \text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	100	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	100	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc

(continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
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ON CHARACTERISTICS

DC Current Gain ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$)	h_{FE}	10	30	80	—
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DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)	C_{ob}	—	220	300	pF
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FUNCTIONAL TESTS

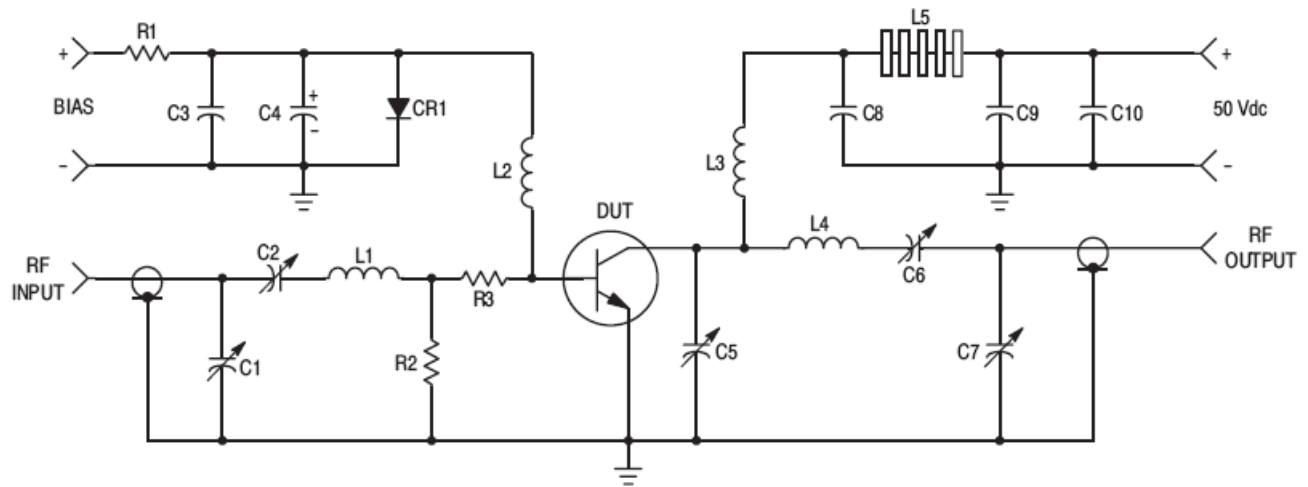
Common-Emitter Amplifier Gain ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C(\text{max}) = 3.32 \text{ Adc}$, $f = 30; 30.001 \text{ MHz}$)	G_{PE}	13	15	—	dB
Output Power ($V_{CE} = 50 \text{ Vdc}$, $f = 30; 30.001 \text{ MHz}$)	P_{out}	150	—	—	W (PEP)
Collector Efficiency ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C(\text{max}) = 3.32 \text{ Adc}$, $f = 30, 30.001 \text{ MHz}$)	η	45	—	—	%
Intermodulation Distortion (1) ($V_{CE} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_C = 3.32 \text{ Adc}$)	IMD	—	-35	-32	dB
Electrical Ruggedness ($V_{CC} = 50 \text{ Vdc}$, $P_{out} = 150 \text{ W CW}$, $f = 30 \text{ MHz}$, VSWR 30:1 at all Phase Angles)	ψ	No Degradation in Output Power			

NOTE:

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

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C1, C2, C7 — 170–780 pF, Arco 469
 C3, C8, C9 — 0.1 μ F, 100 V Erie
 C4 — 500 μ F @ 6.0 V
 C5 — 9.0–180 pF, Arco 463
 C6 — 80–480 pF, Arco 466
 C10 — 30 μ F, 100 V
 R1 — 10 Ω , 10 Watt

R2 — 10 Ω , 1.0 Watt
 R3 — 5.0 – 3.3 Ω 1/2 Watt Carbon Resistors in Parallel
 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 Closewound, 1/4" I.D.
 L4 — 5 Turns, 1/8" Copper Tubing, 9/16" I.D., 3/4" Long
 L5 — 10 Ferrite Beads — Ferroxcube #56–590–65/3B

Figure 1. 30 MHz Test Circuit Schematic

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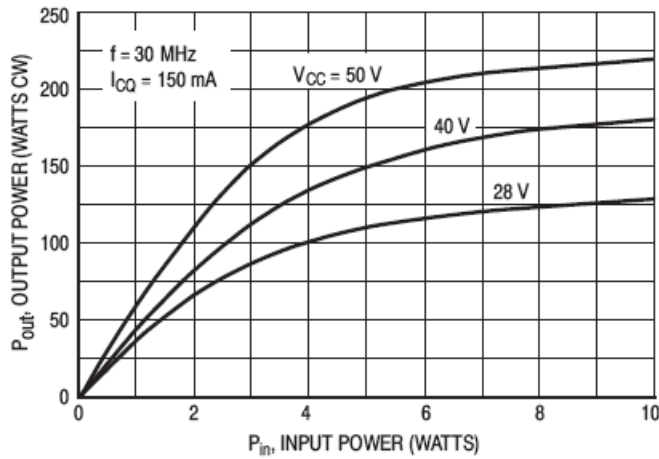


Figure 2. Output Power versus Input Power

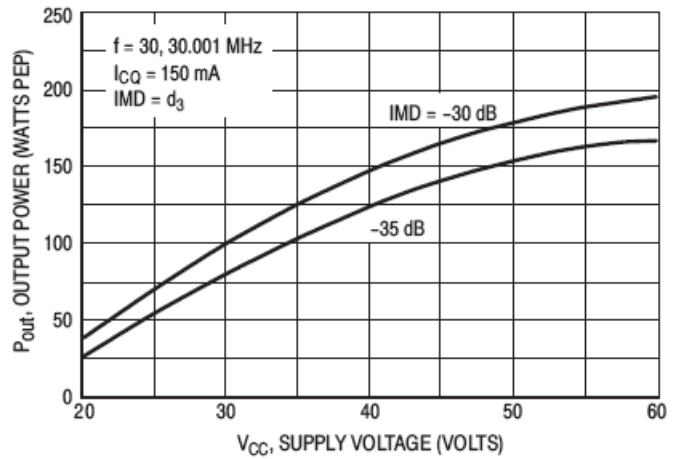


Figure 3. Output Power versus Supply Voltage

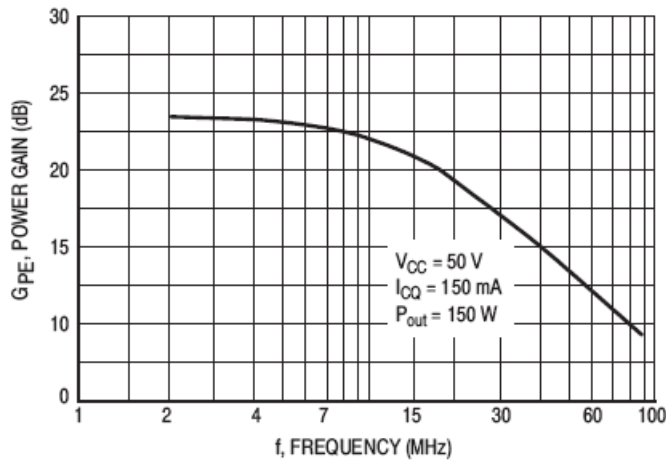


Figure 4. Power Gain versus Frequency

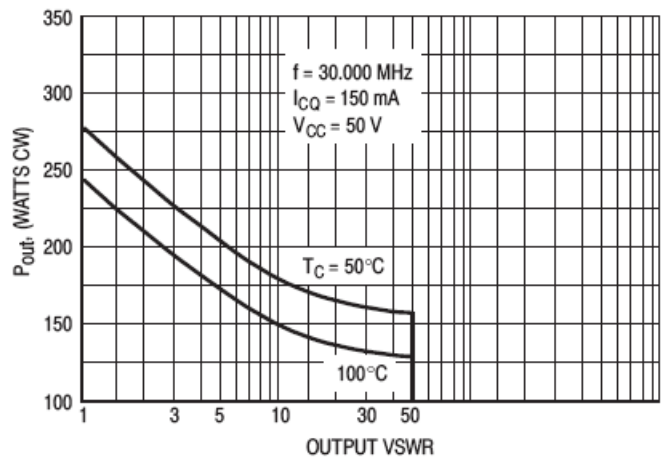


Figure 5. RF Safe Operating Area (SOAR)

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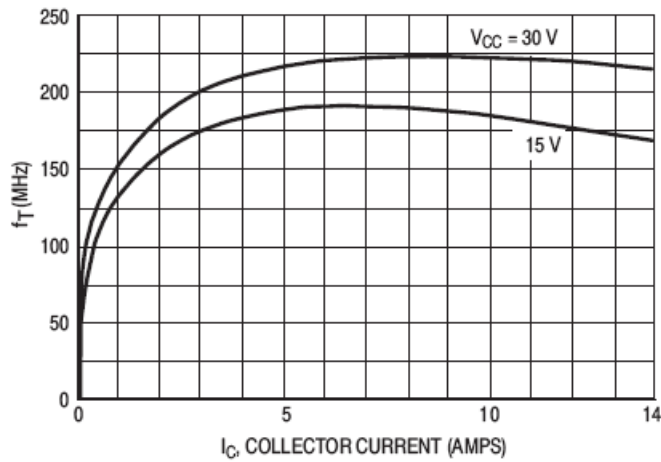


Figure 6. f_T versus Collector Current

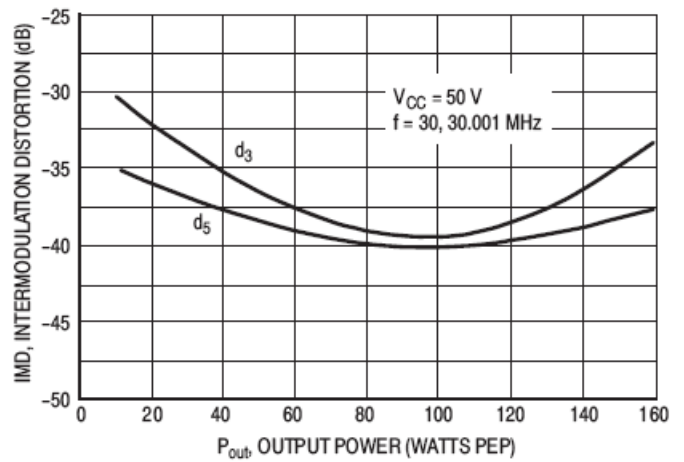


Figure 7. IMD versus P_{out}

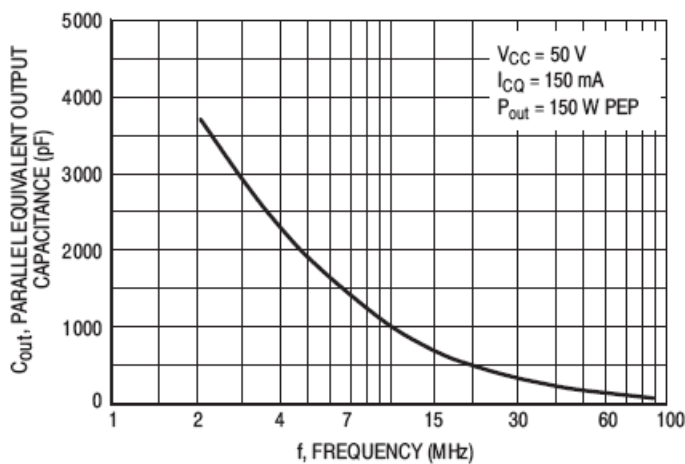


Figure 8. Output Capacitance versus Frequency

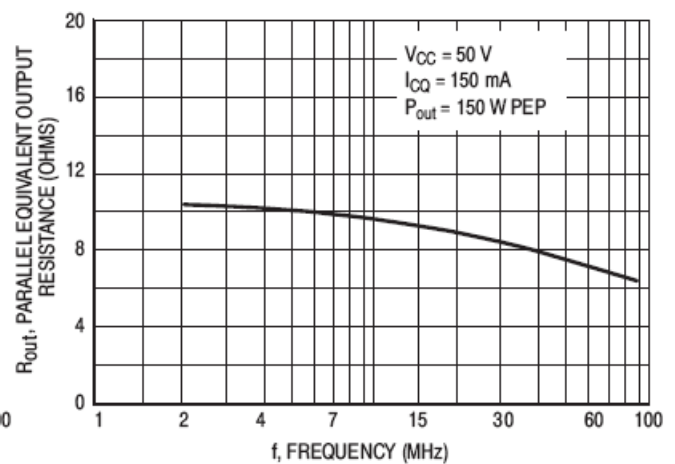


Figure 9. Output Resistance versus Frequency

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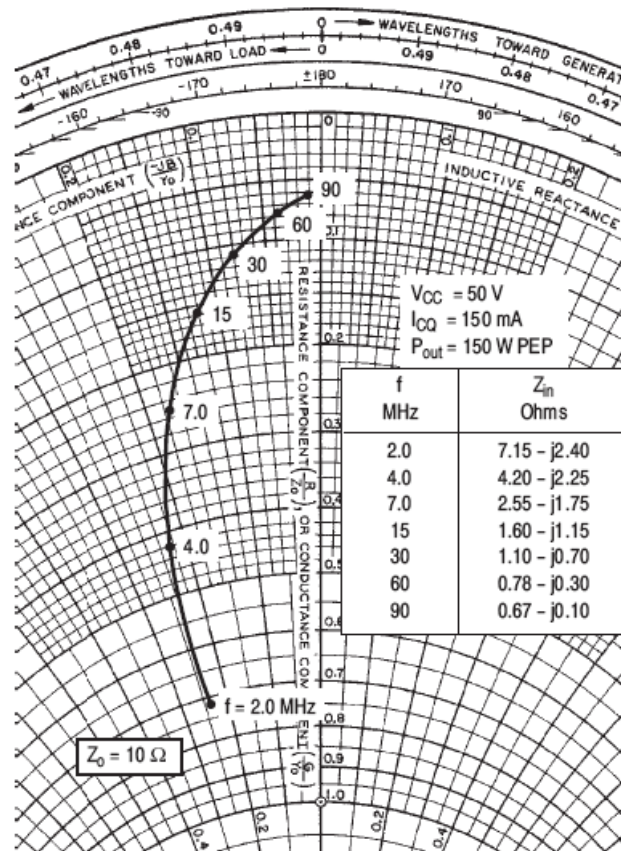
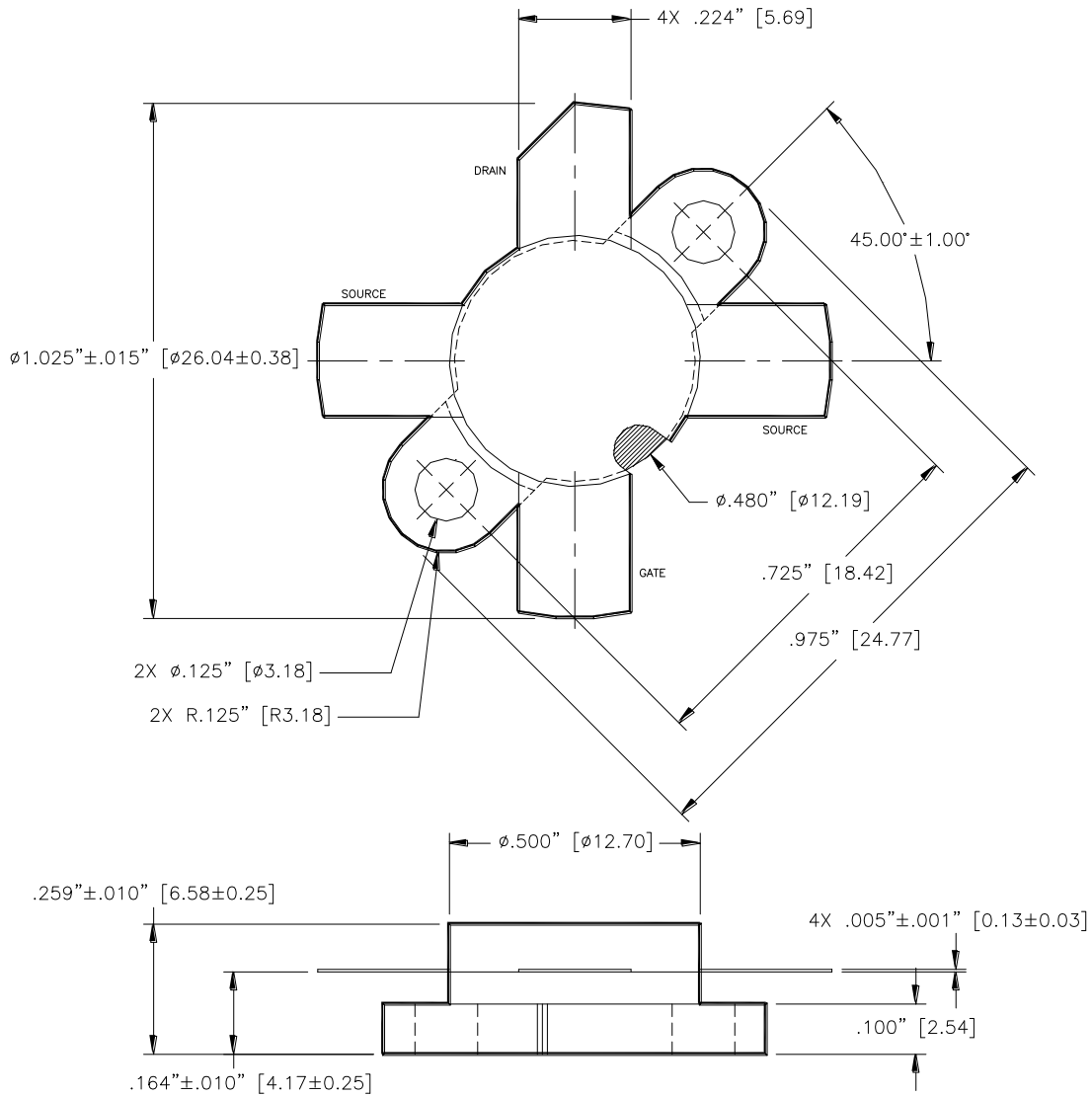


Figure 10. Series Equivalent Impedance

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