

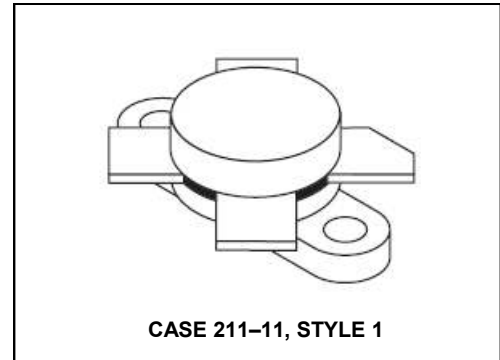
The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 50V

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 |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

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.)

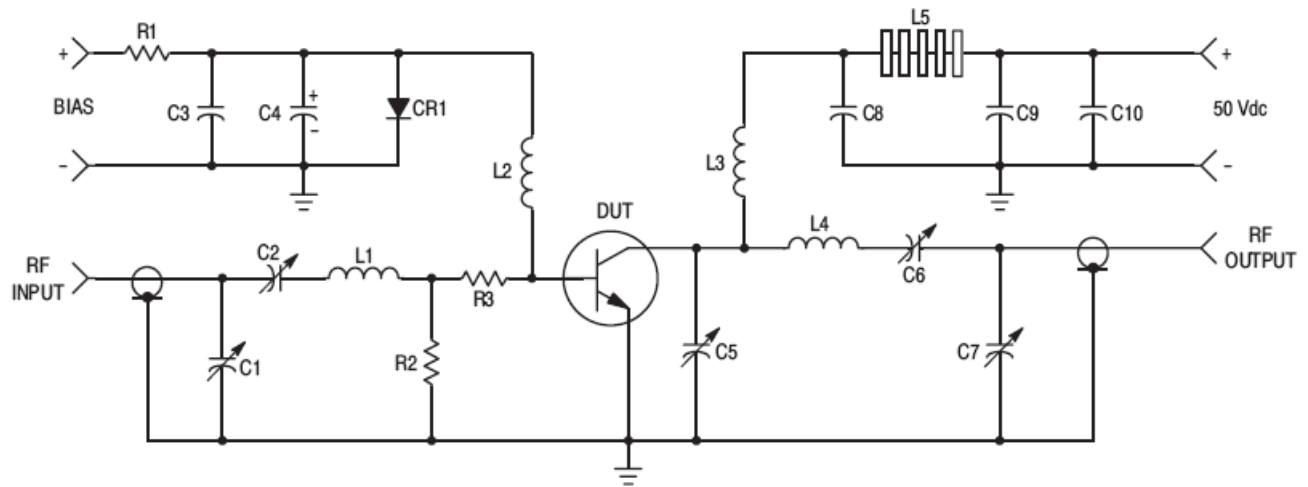
| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|-----------|--------------------------------|-----|-----|---------|
| ON CHARACTERISTICS | | | | | |
| DC Current Gain ($I_C = 5.0 \text{ Adc}$, $V_{CE} = 5.0 \text{ Vdc}$) | h_{FE} | 10 | 30 | 80 | — |
| DYNAMIC CHARACTERISTICS | | | | | |
| Output Capacitance ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$) | C_{ob} | — | 220 | 300 | pF |
| 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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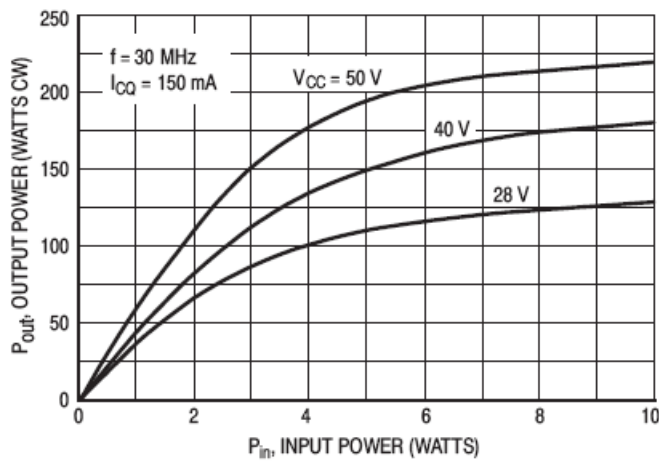


Figure 2. Output Power versus Input Power

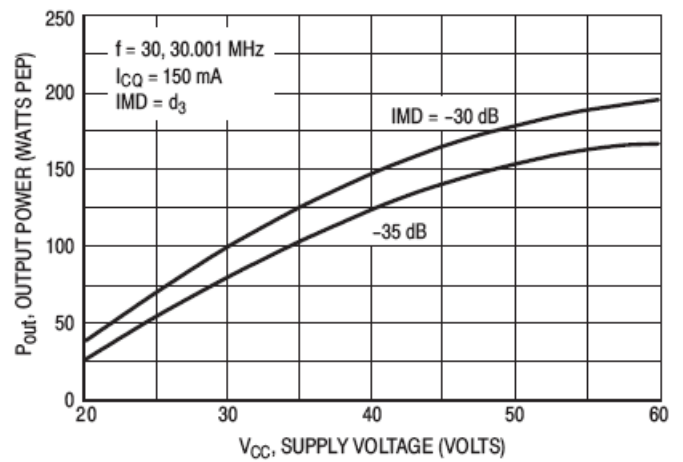


Figure 3. Output Power versus Supply Voltage

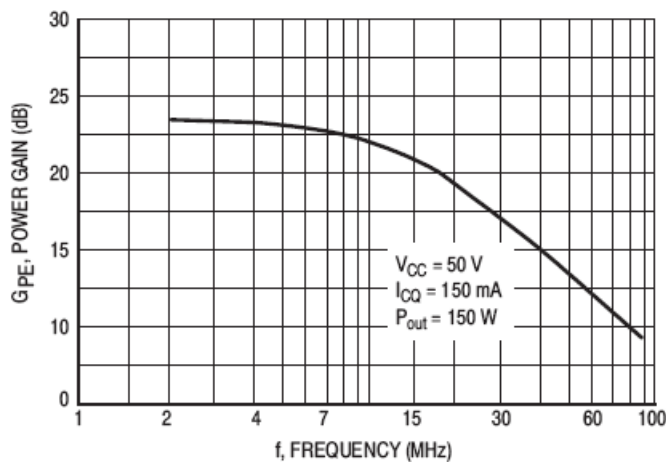


Figure 4. Power Gain versus Frequency

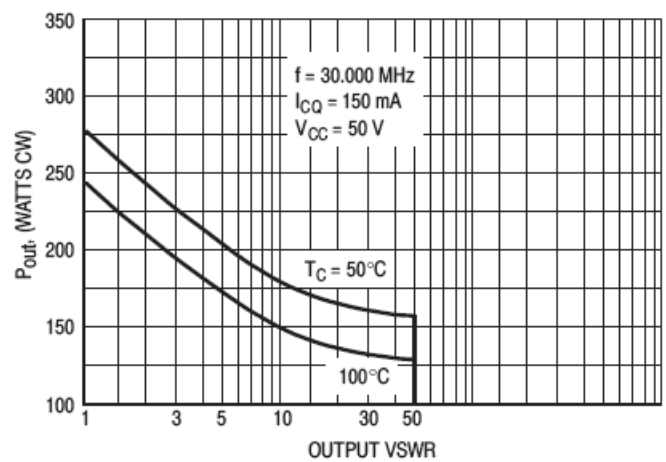


Figure 5. RF Safe Operating Area (SOAR)

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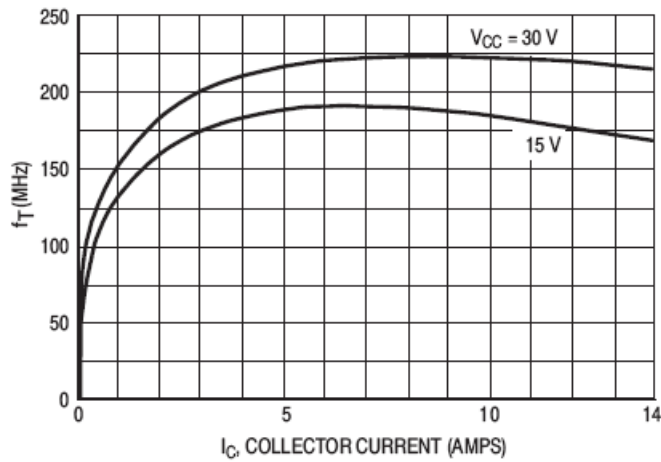


Figure 6. f_T versus Collector Current

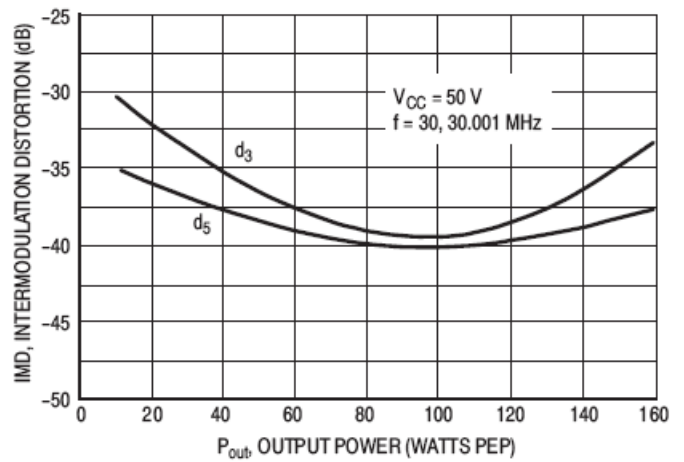


Figure 7. IMD versus P_{out}

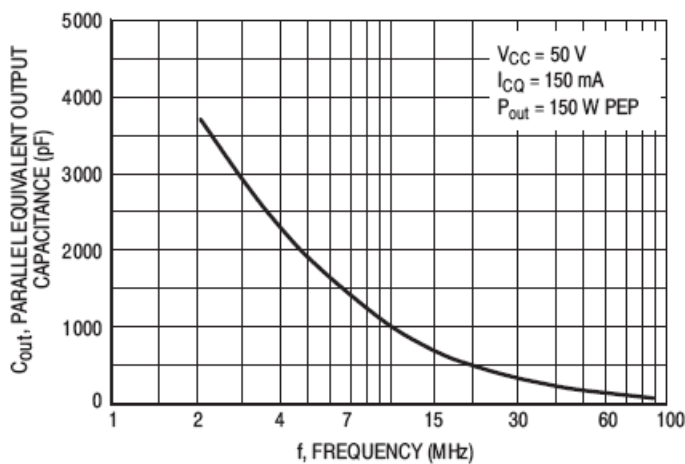


Figure 8. Output Capacitance versus Frequency

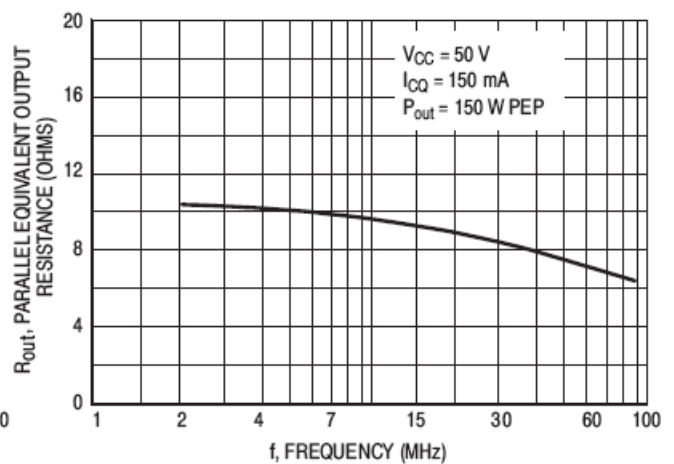


Figure 9. Output Resistance versus Frequency

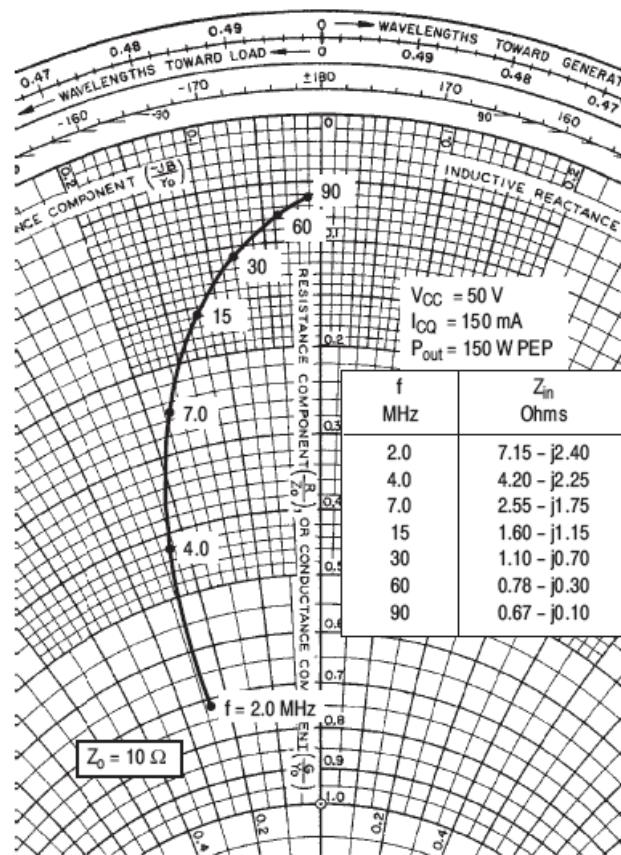
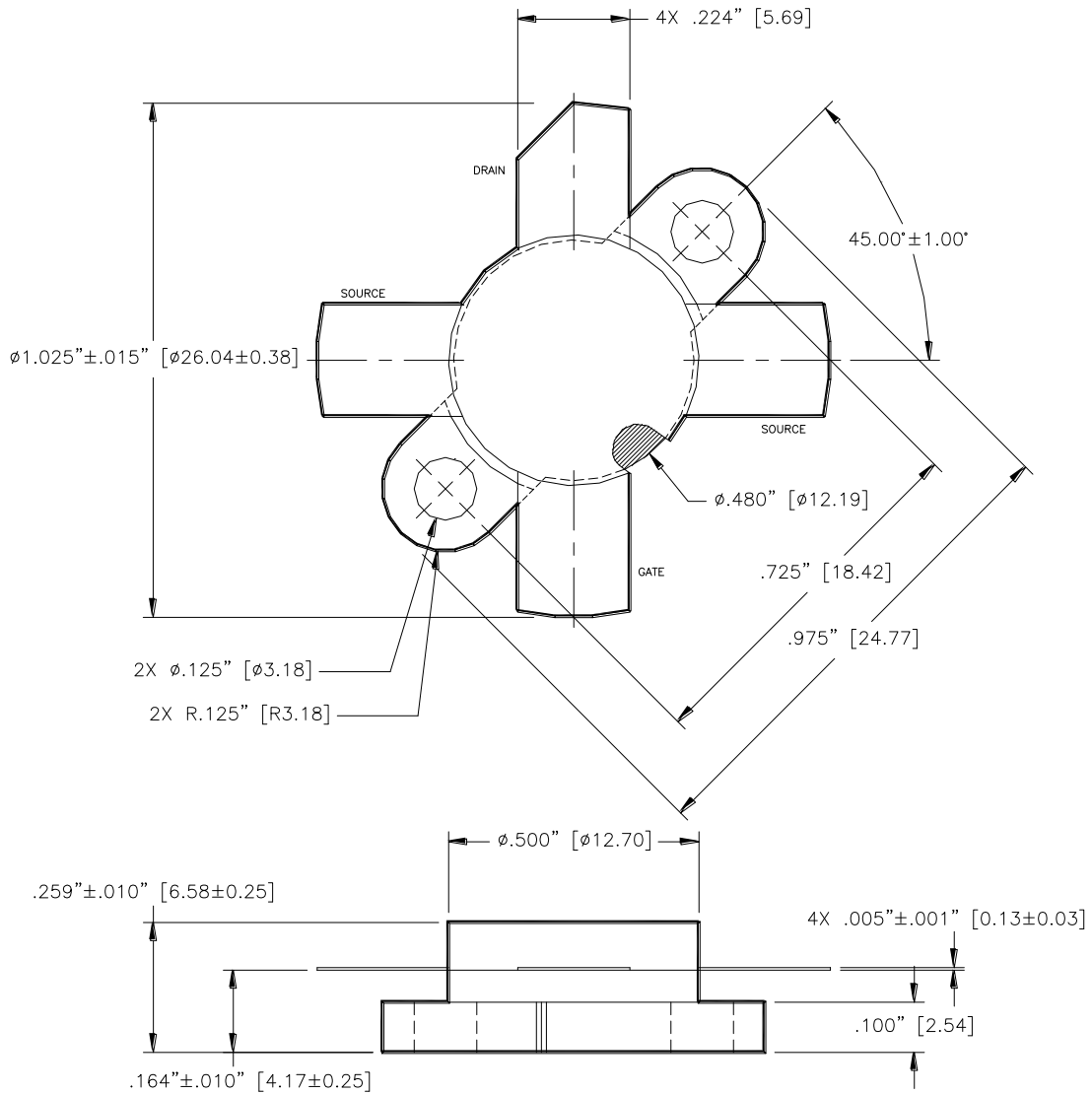


Figure 10. Series Equivalent Impedance

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

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