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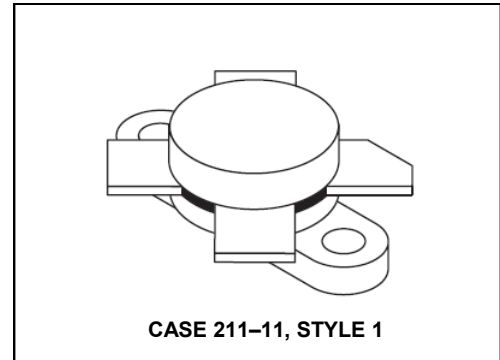


The RF Line NPN Silicon Power Transistor 150W(PEP), 30MHz, 28V

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

(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} | 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

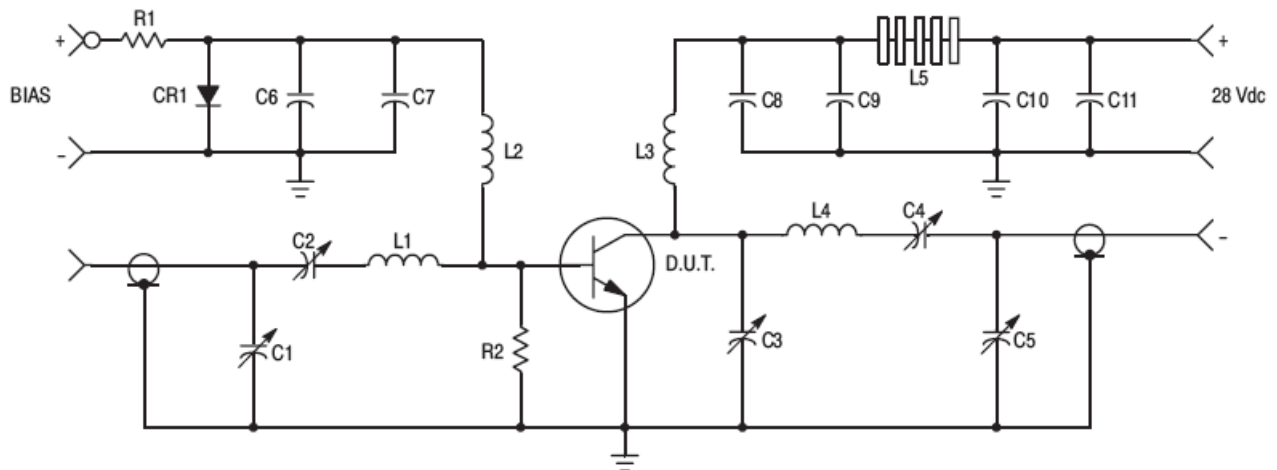
| | | | | | |
|---|-----------|-----|-----|-----|----------------|
| Common-Emitter Amplifier Power Gain ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$) | G_{PE} | 10 | 13 | — | dB |
| Collector Efficiency ($V_{CC} = 28 \text{ Vdc}$, $P_{out} = 150 \text{ W (PEP)}$, $I_{C(max)} = 6.7 \text{ Adc}$, $I_{CQ} = 150 \text{ mAdc}$, $f = 30, 30.001 \text{ MHz}$) | 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:

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

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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

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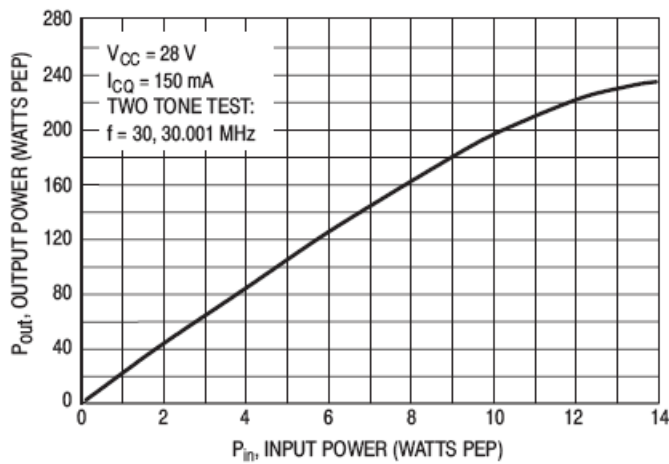


Figure 2. Output Power versus Input Power

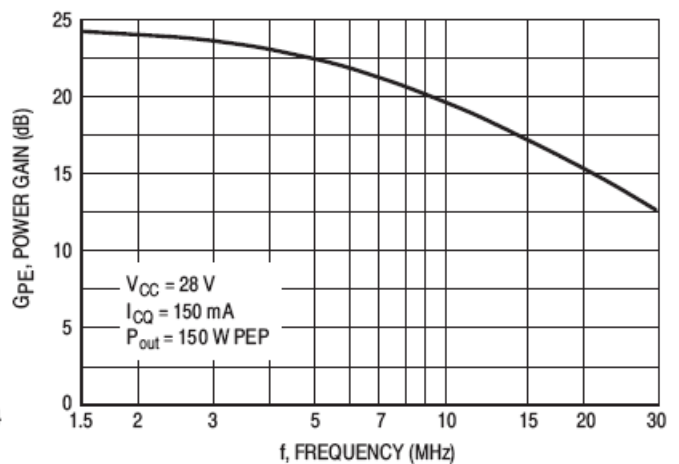


Figure 3. Power Gain versus Frequency

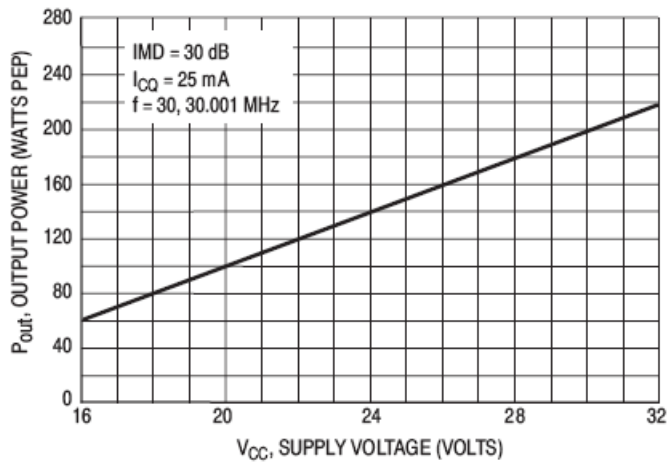


Figure 4. Linear Output Power versus Supply Voltage

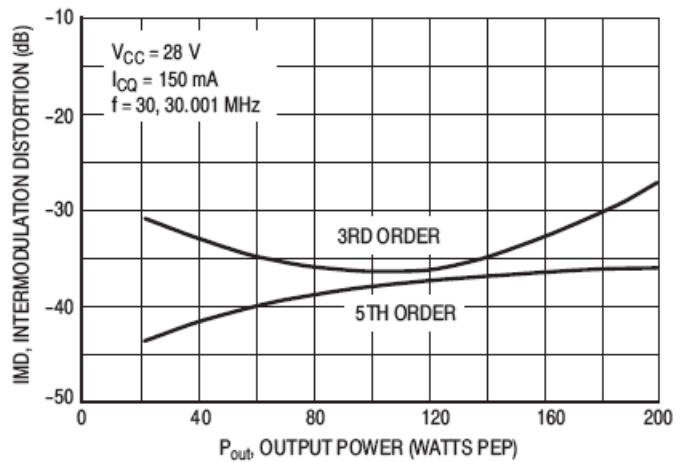


Figure 5. Intermodulation Distortion versus Output Power

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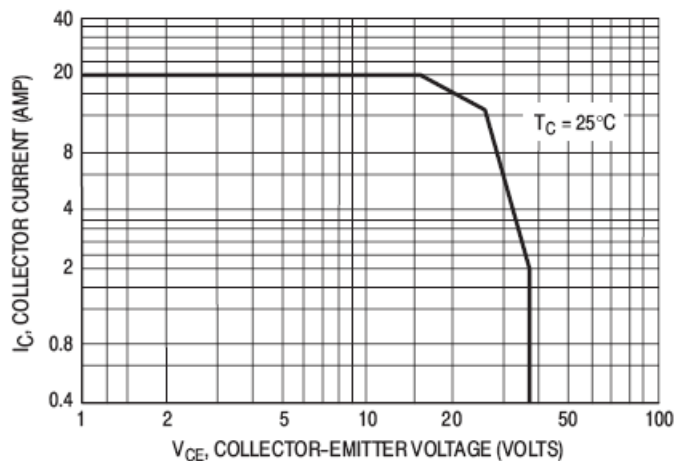


Figure 6. DC Safe Operating Area

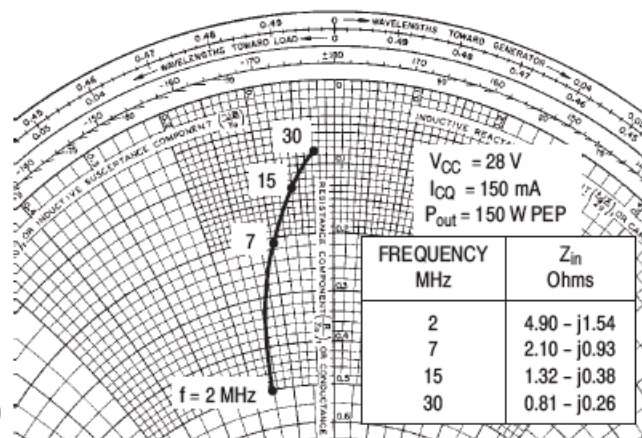


Figure 7. Series Input Impedance

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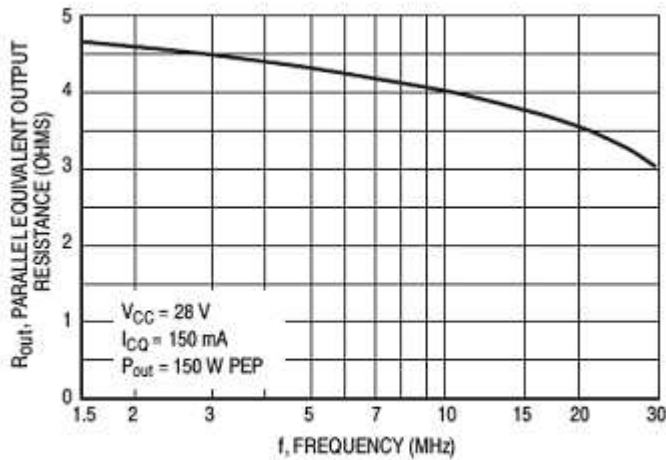


Figure 8. Output Resistance versus Frequency

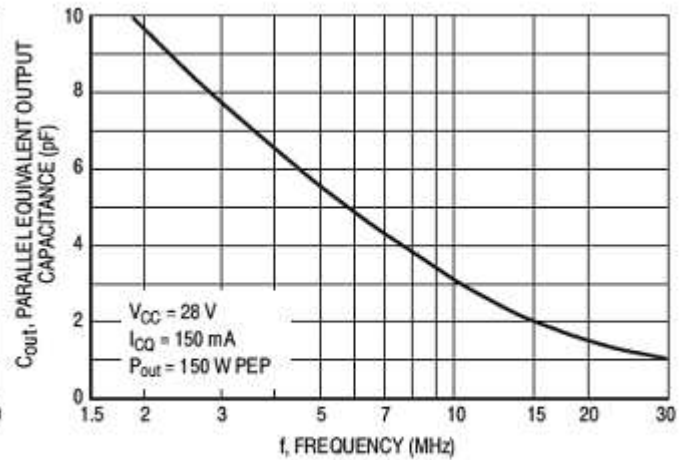
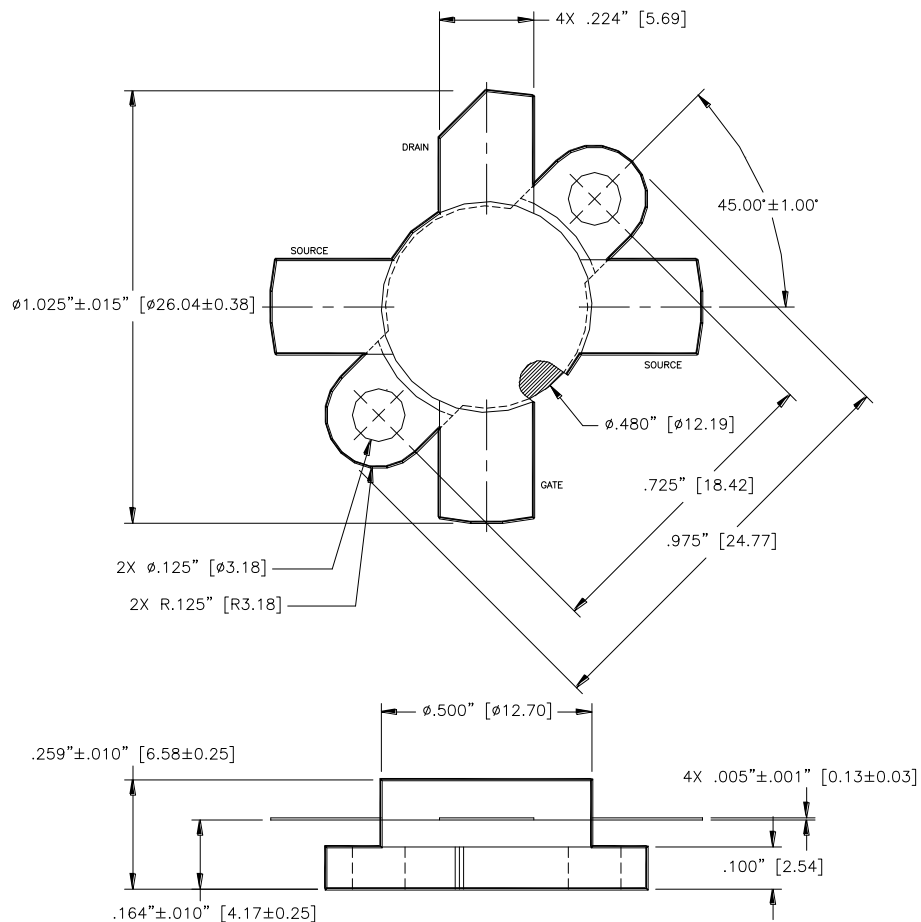


Figure 9. Output Capacitance versus Frequency



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

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