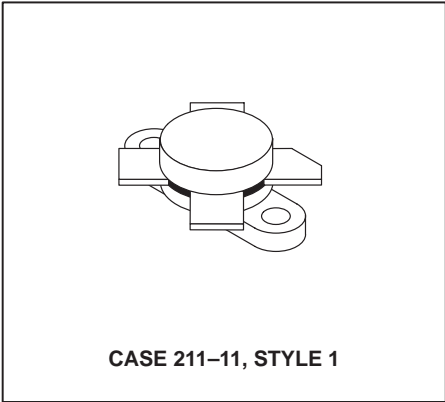


The RF Line NPN Silicon RF Power Transistor

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 Volt, 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



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 | $^\circ\text{C}/\text{W}$ |

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 |

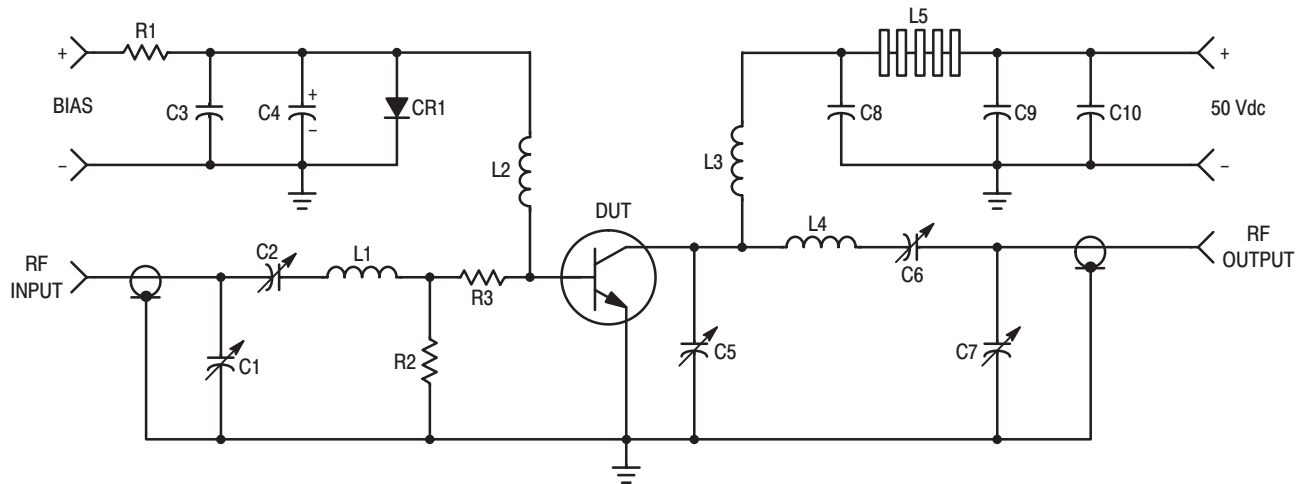
(continued)

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 MHz) | G_{PE} | 13 | 15 | — | dB |
| Output Power ($V_{CE} = 50 \text{ Vdc}$, $f = 30$; 30.001 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 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.



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

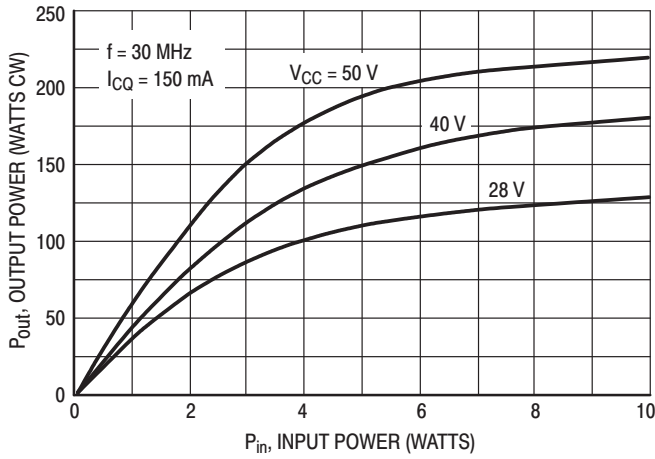


Figure 2. Output Power versus Input Power

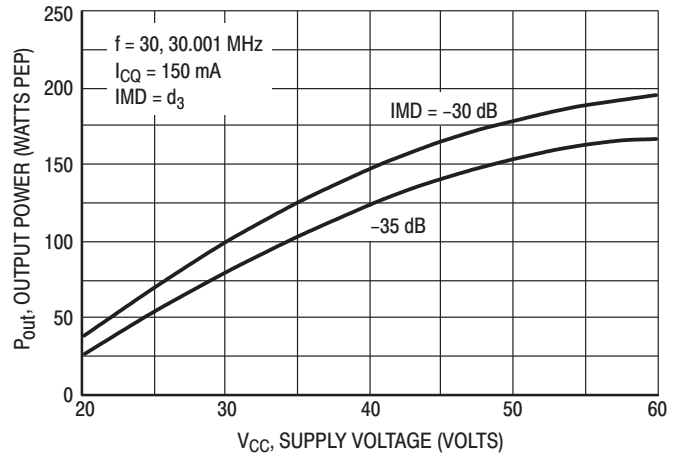


Figure 3. Output Power versus Supply Voltage

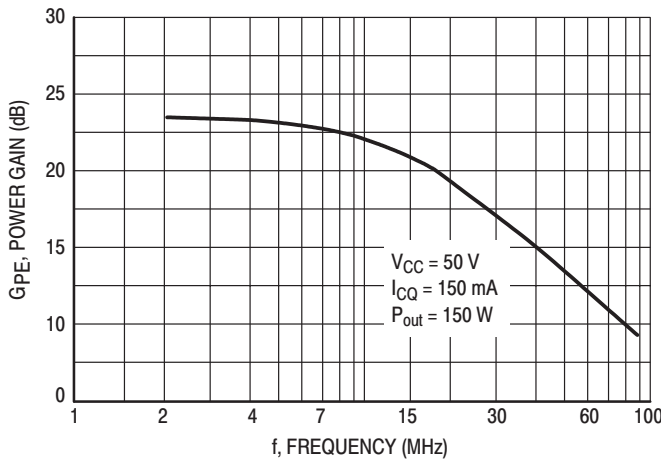


Figure 4. Power Gain versus Frequency

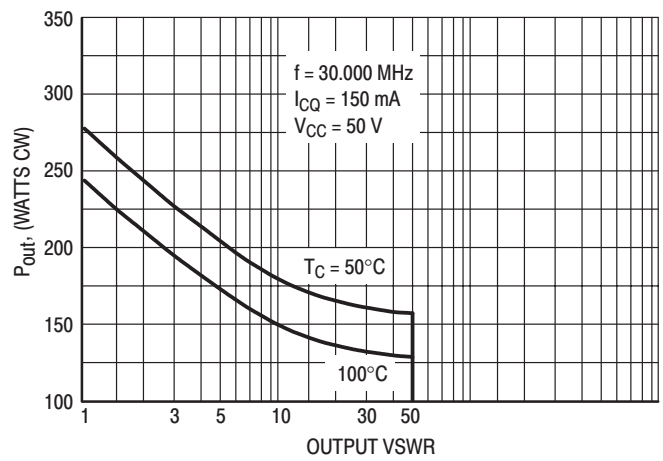


Figure 5. RF Safe Operating Area (SOAR)

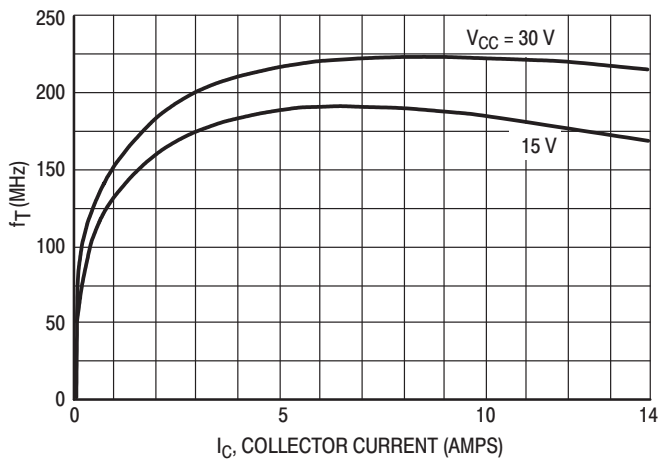


Figure 6. f_T versus Collector Current

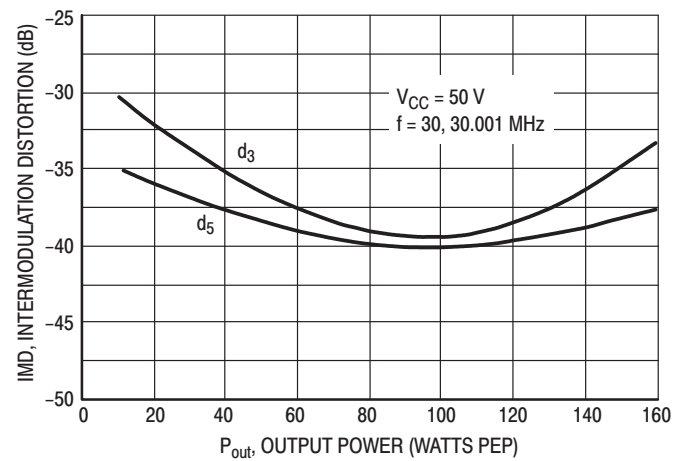


Figure 7. IMD versus P_{out}

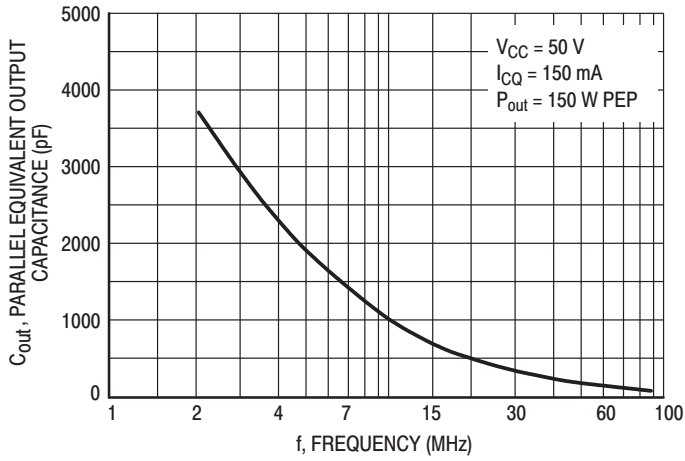


Figure 8. Output Capacitance versus Frequency

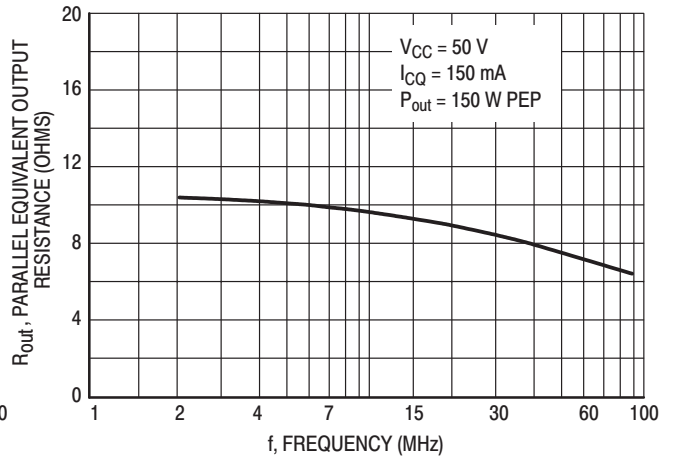


Figure 9. Output Resistance versus Frequency

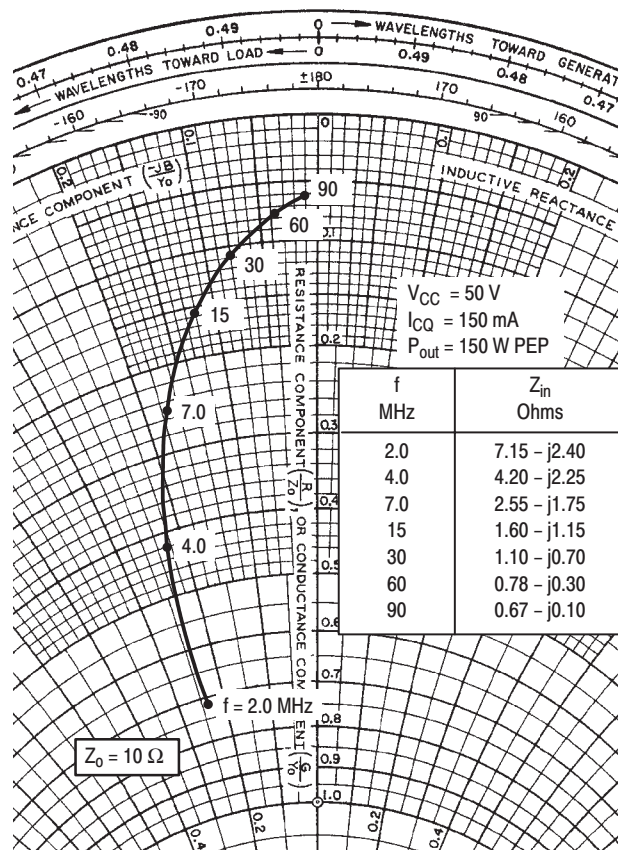
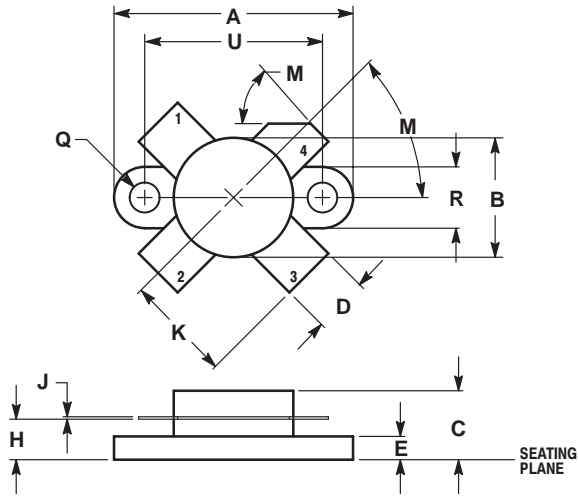


Figure 10. Series Equivalent Impedance

PACKAGE DIMENSIONS



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.960 | 0.990 | 24.39 | 25.14 |
| B | 0.465 | 0.510 | 11.82 | 12.95 |
| C | 0.229 | 0.275 | 5.82 | 6.98 |
| D | 0.216 | 0.235 | 5.49 | 5.96 |
| E | 0.084 | 0.110 | 2.14 | 2.79 |
| H | 0.144 | 0.178 | 3.66 | 4.52 |
| J | 0.003 | 0.007 | 0.08 | 0.17 |
| K | 0.435 | --- | 11.05 | --- |
| M | 45°NOM | | 45°NOM | |
| Q | 0.115 | 0.130 | 2.93 | 3.30 |
| R | 0.246 | 0.255 | 6.25 | 6.47 |
| U | 0.720 | 0.730 | 18.29 | 18.54 |

- STYLE 1:
 PIN 1. EMITTER
 2. BASE
 3. EMITTER
 4. COLLECTOR

**CASE 211-11
 ISSUE N**

Specifications subject to change without notice.

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