The RF Line NPN Silicon Power Transistor
250W, 30MHz, 50V

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

- Specified 50 V, 30 MHz characteristics
  - Output power = 250 W
  - Minimum gain = 12 dB
  - Efficiency = 45%
- Intermodulation distortion @ 250 W (PEP) —
  - IMD = –30 dB (max)
- 100% tested for load mismatch at all phase angles with 3:1 VSWR

MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Emitter Voltage</td>
<td>V_CEO</td>
<td>50</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Voltage</td>
<td>V_CBO</td>
<td>100</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Voltage</td>
<td>V_EBO</td>
<td>4.0</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Current — Continuous</td>
<td>I_C</td>
<td>16</td>
<td>Adc</td>
</tr>
<tr>
<td>Withstand Current — 10 s</td>
<td>—</td>
<td>20</td>
<td>Adc</td>
</tr>
<tr>
<td>Total Device Dissipation @ T_C = 25°C (1)</td>
<td>P_D</td>
<td>250</td>
<td>Watts</td>
</tr>
<tr>
<td>(Derate above 25°C)</td>
<td></td>
<td>1.67</td>
<td>W/°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>T_stb</td>
<td>–65 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance, Junction to Case</td>
<td>R_EJC</td>
<td>0.6</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Emitter Breakdown Voltage (I_C = 200 mA dc, I_E = 0)</td>
<td>V_BR/CEO</td>
<td>50</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Emitter Breakdown Voltage (I_C = 100 mA dc, V_BB = 0)</td>
<td>V_BR/CES</td>
<td>100</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Breakdown Voltage (I_C = 100 mA dc, I_E = 0)</td>
<td>V_BR/CBO</td>
<td>100</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Breakdown Voltage (I_E = 10 mA dc, I_C = 0)</td>
<td>V_BR/EBO</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
</tbody>
</table>

NOTE:
1. P_D is a measurement reflecting short term maximum condition. See SOAR curve for operating conditions.

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# MRF448

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### ELECTRICAL CHARACTERISTICS — continued  

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Current Gain</td>
<td>$h_{FE}$</td>
<td>10</td>
<td>30</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>$C_{ob}$</td>
<td>—</td>
<td>350</td>
<td>450</td>
<td>pF</td>
</tr>
</tbody>
</table>

### ON CHARACTERISTICS

- DC Current Gain: $I_C = 5.0\, \text{A}, V_{CE} = 10\, \text{Vdc}$
- Output Capacitance: $V_{CB} = 50\, \text{Vdc}, I_C = 0, f = 1.0\, \text{MHz}$

### DYNAMIC CHARACTERISTICS

### FUNCTIONAL TESTS

- Common-Emitter Amplifier Power Gain: $V_{CC} = 50\, \text{Vdc}, P_{out} = 250\, \text{W CW}, f = 30\, \text{MHz}, I_{CO} = 250\, \text{mA}$
- Collector Efficiency: $V_{CC} = 50\, \text{Vdc}, P_{out} = 250\, \text{W}, f = 30\, \text{MHz}, I_{CO} = 250\, \text{mA}$
- Intermodulation Distortion (2): $V_{CE} = 50\, \text{Vdc}, P_{out} = 250\, \text{W (PEP)}, I_{CO} = 250\, \text{mA}, f = 30\, \text{MHz}$
- Electrical Ruggedness: $V_{CC} = 50\, \text{Vdc}, P_{out} = 250\, \text{W CW}, f = 30\, \text{MHz}, VSWR 3:1 at all Phase Angles$

### NOTE:

2. To Mil–Std–1311 Version A, Test Method 2204, Two Tone, Reference each Tone.
C1, C2, C5, C7 — 170–780 pF, Arco 459
C3, C8, C9 — 0.1 μF, 100 V Ene
C4 — 500 μF @ 6.0 V
C6 — 360 pF, 3 x 120 pF 3.0 kV in parallel
C10 — 10 μF, 100 V
R1 — 10 Ω, 10 Watt
R2 — 10 Ω, 1.0 Watt

CR1 — 1N4997 or equivalent
L1 — 3 Turns, #16 Wire, 0.4" I.D., 0.3" Long
L2 — 0.6 μH, Ohmite Z-235 or equivalent
L3 — 12 Turns, #16 Enamelled Wire Closewound 0.25" I.D.
L4 — 4 Turns, 1/8" Copper Tubing, 0.6" I.D., 1.0" Long
L5, L6 — 2.0 μH, Fair-Rite 2643021801 Ferrite bead each or equivalent

Figure 1. 30 MHz Test Circuit Schematic
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Figure 6. $f_t$ versus Collector Current

Figure 7. IMD versus $P_{out}$

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![Figure 8. Output Resistance and Capacitance versus Frequency](image)

![Figure 9. Series Equivalent Impedance](image)
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Rev. V1

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Unless otherwise noted, tolerances are inches ±0.005 [millimeters ±0.013mm]
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