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

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

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>$V_{CEO}$</td>
<td>100</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Voltage</td>
<td>$V_{EB0}$</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</td>
<td>$P_D$</td>
<td>233</td>
<td>Watts</td>
</tr>
<tr>
<td>Derate above 25°C</td>
<td></td>
<td>1.33</td>
<td>W/°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>$T_{stg}$</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>$R_{AJC}$</td>
<td>0.75</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

ELECTRICAL CHARACTERISTICS (TC = 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, $I_B$ = 0)</td>
<td>$V_{BRICE0}$</td>
<td>50</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Emitter Breakdown Voltage ($I_C$ = 100 mA dc, $V_{BE}$ = 0)</td>
<td>$V_{BRICES}$</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>$V_{BRICBO}$</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>$V_{BRIBEO}$</td>
<td>4.0</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
</tbody>
</table>

(continued)
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ELECTRICAL CHARACTERISTICS — continued (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>DC Current Gain</td>
<td>h_FE</td>
<td>10</td>
<td>30</td>
<td>80</td>
<td>—</td>
</tr>
</tbody>
</table>

ON CHARACTERISTICS

| Output Capacitance | C_0b | 220 | 300 | pF |

DYNAMIC CHARACTERISTICS

<table>
<thead>
<tr>
<th>Functional Tests</th>
<th>G_FE</th>
<th>13</th>
<th>15</th>
<th>—</th>
<th>dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Power</td>
<td>P_OUT</td>
<td>150</td>
<td>—</td>
<td>—</td>
<td>W (PEP)</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>η</td>
<td>45</td>
<td>—</td>
<td>—</td>
<td>%</td>
</tr>
<tr>
<td>Intermodulation Distortion (1)</td>
<td>IMD</td>
<td>—</td>
<td>−35</td>
<td>−32</td>
<td>dB</td>
</tr>
<tr>
<td>Electrical Ruggedness</td>
<td>ψ</td>
<td>No Degradation in Output Power</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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Figure 1. 30 MHz Test Circuit Schematic

- **C1, C2, C7** — 170–780 pF, Arco 469
- **C3, C8, C9** — 0.1 μF, 100 V Erte
- **C4** — 500 μF @ 6.0 V
- **C5** — 9.0–180 pF, Arco 463
- **C6** — 80–480 pF, Arco 465
- **C10** — 30 μF, 100 V
- **R1** — 10 kΩ, 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 Enamelled Wire Clowowound, 1/4" I.D.
- **L4** — 5 Turns, 1/8” Copper Tubing, 9/16” I.D., 3/4” Long
- **L5** — 10 Ferrite Beads — Ferroxcube #56–590–85/38

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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 ±.005" [millimeters ±0.13mm]
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