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 = -30 dB (max.)
- 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>55</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector-Base Voltage</td>
<td>( V_{CBO} )</td>
<td>110</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>20</td>
<td>A dc</td>
</tr>
<tr>
<td>Withstand Current — 10 s</td>
<td>—</td>
<td>30</td>
<td>A dc</td>
</tr>
<tr>
<td>Total Device Dissipation @ ( T_C = 25 ) °C</td>
<td>( P_D )</td>
<td>320</td>
<td>Watts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.83</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>0.5</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_B = 0 ))</td>
<td>( V_{BRCEO} )</td>
<td>55</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_{BRCES} )</td>
<td>110</td>
<td>—</td>
<td>—</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector-Base Breakdown Voltage (( I_C = 100 ) mA dc, ( I_B = 0 ))</td>
<td>( V_{BRCEO} )</td>
<td>110</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_{BRHBO} )</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>
</table>

ON CHARACTERISTICS

| DC Current Gain (I_C = 5.0 Adc, V_CE = 5.0 Vdc) | h_FE   | 10  | 30  | —   | —    |

DYNAMIC CHARACTERISTICS

| Output Capacitance (V_OC = 50 Vdc, I_E = 0, f = 1.0 MHz) | C_OE   | —   | 220 | 250 | pF    |

FUNCTIONAL TESTS

| Common-Emitter Amplifier Gain (V_CE = 50 Vdc, P_OUT = 150 W (PEP), I_C(max) = 3.32 Adc, f = 30 MHz) | G_FE   | 13  | 15  | —   | dB    |
| Output Power (V_CE = 50 Vdc, f = 30 MHz) | P_OUT  | 150 | —   | —   | W (PEP) |
| Collector Efficiency (V_CE = 50 Vdc, P_OUT = 150 W (PEP), I_C(max) = 3.32 Adc, f = 30 MHz) | η      | 45  | —   | —   | %     |
| Intermodulation Distortion (1) (V_CE = 50 Vdc, P_OUT = 150 W (PEP), I_C = 3.32 Adc) | IMD    | —   | -33 | -30 | dB    |
| Electrical Ruggedness (V_CE = 50 Vdc, P_OUT = 150 W (PEP), I_C(max) = 3.32 Adc, VSWR 30:1 at all Phase Angles) | V      | No Degradation in Output Power |

NOTE:
1. To Mil-Std-1311 Version A, Test Method 2204B, Two Tone, Reference each Tone.
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Rev. V1

MRF428

Figure 1. 30 MHz Test Circuit Schematic

C1,C2,C7 — 170-780 pF, Arco 469
C3,C8,C9 — 0.1µF, 100 V Ely
C4 — 500 µF @ 5.0 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
CR1 — 1N4997
L1 — 3 Tuns, #16 Wire, 5/16" I.D., 5/16" Long
L2 — 10 µH Molded Choke
L3 — 12 Tuns, #16 Enamelled Wire Closewound, 1/4" I.D.
L4 — 5 Tuns, 1/8" Copper Tubing, 9/16" I.D., 3/4" Long
L5 — 10 Ferrite Beads — Ferroxclube #56-590-55/3B

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Figure 8 - Output Capacitance versus Frequency

Figure 9 - Output Resistance versus Frequency

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