Microwave Long Pulse Power Silicon NPN Transistor
120W (peak), 960–1215MHz

Designed for 960–1215 MHz long pulse common base amplifier applications such as JTIDS and Mode S transmitters.

- Guaranteed performance @ 1.215 GHz, 36 Vdc
  Output power = 120 W Peak
  Gain = 7.6 dB min., 8.5 dB (typ.)
- 100% tested for load mismatch at all phase angles with 3:1 VSWR
- Hermetically sealed industry standard package
- Silicon nitride passivated
- Gold metalized, emitter ballasted for long life and resistance to metal migration
- Internal input and output matching for broadband operation

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_CES</td>
<td>55</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Voltage</td>
<td>V_CBO</td>
<td>55</td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Voltage</td>
<td>V_EBO</td>
<td>3.5</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Current — Peak (1)</td>
<td>I_C</td>
<td>15</td>
<td>A(dc)</td>
</tr>
<tr>
<td>Total Device Dissipation @ T_C = 25°C (1), (2)</td>
<td>P_D</td>
<td>380</td>
<td>Watts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.17</td>
<td>W/°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>T_Stq</td>
<td>-65 to +200</td>
<td>°C</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>T_J</td>
<td>200</td>
<td></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 (3)</td>
<td>R_AJC</td>
<td>0.46</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 = 60 mA, V_BE = 0)</td>
<td>V_BRcedes</td>
<td>55</td>
<td></td>
<td></td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Base Breakdown Voltage (I_C = 60 mA, I_E = 0)</td>
<td>V_BRcedes</td>
<td>55</td>
<td></td>
<td></td>
<td>Vdc</td>
</tr>
<tr>
<td>Emitter–Base Breakdown Voltage (I_E = 10 mA, I_C = 0)</td>
<td>V_IBRcedes</td>
<td>3.5</td>
<td></td>
<td></td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Cutoff Current (V_CE = 36 Vdc, I_E = 0)</td>
<td>I_CBO</td>
<td></td>
<td></td>
<td>25</td>
<td>mAdc</td>
</tr>
</tbody>
</table>

NOTES:
1. Under pulse RF operating conditions.
2. These devices are designed for RF operation. The total device dissipation rating applies only when the device is operated as RF amplifiers.
3. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.

For further information and support please visit: https://www.macom.com/support
### Electrical Characteristics — continued (T<sub>C</sub> = 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 (I&lt;sub&gt;C&lt;/sub&gt; = 5.0 A, V&lt;sub&gt;CBE&lt;/sub&gt; = 5.0 V)</td>
<td>h&lt;sub&gt;FE&lt;/sub&gt;</td>
<td>20</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

### Functional Tests (7.0 μs Pulses @ 54% duty cycle for 3.4 ms, then off for 4.5 ms; overall duty cycle = 23%)

| Common–Base Amplifier Power Gain  
(V<sub>CC</sub> = 36 Vdc, P<sub>out</sub> = 120 W Peak, f = 1215 MHz) | G<sub>PE</sub> | 7.6 | 8.5 | —   | dB   |
| Collector Efficiency  
(V<sub>CC</sub> = 36 Vdc, P<sub>out</sub> = 120 W Peak, f = 1215 MHz) | η | 50  | 55  | —   | %    |
| Load Mismatch  
(V<sub>CC</sub> = 36 Vdc, P<sub>out</sub> = 120 W Peak, f = 1215 MHz,  
VSWR = 3.1 All Phase Angles) | γ | No Degradation in Output Power |
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Figure 1. Test Circuit
Microwave Long Pulse Power Silicon NPN Transistor
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**Rev. V1**

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**Figure 2. Output Power versus Input Power**

**Figure 3. Output Power versus Input Power**

**Figure 4. Series Equivalent Input Impedances**

**Figure 5. Series Equivalent Output Impedance**

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Z_{0L}^* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

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