Radar Pulsed Power Transistor
100W, 1.2-1.4 GHz, 2ms Pulse, 20% Duty

Features
- NPN silicon microwave power transistors
- Common base configuration
- Broadband Class C operation
- High efficiency inter-digitized geometry
- Diffused emitter ballasting resistors
- Gold metallization system
- Internal input and output impedance matching
- Hermetic metal/ceramic package
- RoHS compliant

Absolute Maximum Ratings at 25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Voltage</td>
<td>V_{CES}</td>
<td>75</td>
<td>V</td>
</tr>
<tr>
<td>Emitter-Base Voltage</td>
<td>V_{EBO}</td>
<td>3.0</td>
<td>V</td>
</tr>
<tr>
<td>Collector Current (Peak)</td>
<td>I_{C}</td>
<td>14.1</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation @$+25°C</td>
<td>P_{TOT}</td>
<td>250</td>
<td>W</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>T_{STG}</td>
<td>-65 to +200</td>
<td>ºC</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>T_{J}</td>
<td>200</td>
<td>ºC</td>
</tr>
</tbody>
</table>

Electrical Specifications: \( T_{C} = 25 \pm 5^ºC \) (Room Ambient)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Frequency</th>
<th>Symbol</th>
<th>Min</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Breakdown Voltage</td>
<td>I_{C} = 50mA</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>B_{V_{CES}}</td>
<td>70</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Collector-Emitter Leakage Current</td>
<td>V_{CE} = 28V</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>I_{CES}</td>
<td>-</td>
<td>10</td>
<td>mA</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>R_{TH(JC)}</td>
<td>-</td>
<td>0.7</td>
<td>ºC/W</td>
</tr>
<tr>
<td>Output Power</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>P_{OUT}</td>
<td>100</td>
<td>-</td>
<td>W</td>
</tr>
<tr>
<td>Power Gain</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>G_{P}</td>
<td>6.0</td>
<td>-</td>
<td>dB</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>( \eta_{C} )</td>
<td>52</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>RL</td>
<td>-</td>
<td>-8</td>
<td>dB</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>VSWR-T</td>
<td>-</td>
<td>3:1</td>
<td>-</td>
</tr>
<tr>
<td>Load Mismatch Stability</td>
<td>V_{cc} = 28V, Pin = 25W</td>
<td>( F = 1.2, 1.3, 1.4 ) GHz</td>
<td>VSWR-S</td>
<td>-</td>
<td>1.5:1</td>
<td>-</td>
</tr>
</tbody>
</table>
PH1214-100EL

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Typical RF Performance

<table>
<thead>
<tr>
<th>Freq. (GHz)</th>
<th>Pin (W)</th>
<th>Pout (W)</th>
<th>Gain (dB)</th>
<th>Ic (A)</th>
<th>Eff (%)</th>
<th>RL (dB)</th>
<th>VSWR-S (1.5:1)</th>
<th>VSWR-T (3:1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>25</td>
<td>140</td>
<td>7.48</td>
<td>16.3</td>
<td>61.4</td>
<td>-14.9</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>1.3</td>
<td>25</td>
<td>136</td>
<td>7.35</td>
<td>15.8</td>
<td>61.3</td>
<td>-13.5</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>1.4</td>
<td>25</td>
<td>127</td>
<td>7.07</td>
<td>14.7</td>
<td>61.8</td>
<td>-13.9</td>
<td>S</td>
<td>P</td>
</tr>
</tbody>
</table>

Gain vs. Frequency

Collector Efficiency vs. Frequency

RF Test Fixture Impedance

<table>
<thead>
<tr>
<th>F (GHz)</th>
<th>Z_{IF} (Ω)</th>
<th>Z_{DF} (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>2.6 - j3.8</td>
<td>3.0 - j2.7</td>
</tr>
<tr>
<td>1.3</td>
<td>3.0 - j3.4</td>
<td>2.4 - j2.6</td>
</tr>
<tr>
<td>1.4</td>
<td>3.4 - j3.1</td>
<td>1.9 - j2.5</td>
</tr>
</tbody>
</table>
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Test Fixture Circuit Dimensions

Test Fixture Assembly

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