Radar Pulsed Power Transistor
12W, 1.2-1.4 GHz, 150µs Pulse, 10% 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>70</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>1.3</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation @ +25°C</td>
<td>$P_{TOT}$</td>
<td>47</td>
<td>W</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{STG}$</td>
<td>-65 to +200</td>
<td>°C</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>200</td>
<td>°C</td>
</tr>
</tbody>
</table>

Electrical Specifications: $T_C = 25 ± 5°C$ (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>$I_C = 12.5mA$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$B_{V_{CES}}$</td>
<td>60</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Collector-Emitter Leakage Current</td>
<td>$V_{CE} = 40V$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$I_{CES}$</td>
<td>-</td>
<td>1.25</td>
<td>mA</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$R_{TH(JC)}$</td>
<td>-</td>
<td>3.7</td>
<td>°C/W</td>
</tr>
<tr>
<td>Output Power</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$P_{IN}$</td>
<td>-</td>
<td>1.7</td>
<td>W</td>
</tr>
<tr>
<td>Power Gain</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$G_P$</td>
<td>8.5</td>
<td>-</td>
<td>dB</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$\eta_C$</td>
<td>45</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$RL$</td>
<td>-</td>
<td>-9</td>
<td>dB</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$V_{SWR-T}$</td>
<td>-</td>
<td>3:1</td>
<td>-</td>
</tr>
<tr>
<td>Load Mismatch Stability</td>
<td>$V_{cc} = 28V$, $P_{out} = 12W$</td>
<td>$F = 1.2, 1.3, 1.4 GHz$</td>
<td>$V_{SWR-S}$</td>
<td>-</td>
<td>1.5:1</td>
<td>-</td>
</tr>
</tbody>
</table>
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>1.31</td>
<td>12.0</td>
<td>9.64</td>
<td>0.77</td>
<td>56.0</td>
<td>-11.9</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>1.3</td>
<td>1.28</td>
<td>12.0</td>
<td>9.72</td>
<td>0.79</td>
<td>54.4</td>
<td>-17.4</td>
<td>S</td>
<td>P</td>
</tr>
<tr>
<td>1.4</td>
<td>1.49</td>
<td>12.0</td>
<td>9.04</td>
<td>0.88</td>
<td>48.8</td>
<td>-17.2</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>3.7 - j5.3</td>
<td>5.0 + j6.0</td>
</tr>
<tr>
<td>1.3</td>
<td>3.5 - j4.4</td>
<td>7.1 + j5.1</td>
</tr>
<tr>
<td>1.4</td>
<td>3.4 - j3.8</td>
<td>7.7 + j3.6</td>
</tr>
</tbody>
</table>
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