MAPRST0912-50

Avionics Pulsed Power Transistor
50 W, 960 - 1215 MHz, 10 µs Pulse, 10% Duty

Rev. V2

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

Description
The MAPRST0912-50 is a RF power transistor. These high power transistors are ideal for avionics, communications, radar, and industrial, scientific, and medical applications.

Electrical Specifications: $T_A = +25^\circ C \pm 5^\circ C$, $V_{CC} = 50$ V, $P_{IN} = 6.2$ W (unless otherwise noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Symbol</th>
<th>Min.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Breakdown Voltage</td>
<td>$I_C = 15$ mA</td>
<td>$BV_{CES}$</td>
<td>65</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Collector-Emitter Leakage Current</td>
<td>$V_{CE} = 40$ V</td>
<td>$I_{CES}$</td>
<td>-</td>
<td>2.0</td>
<td>mA</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>$R_{TH(JC)}$</td>
<td>-</td>
<td>0.80</td>
<td>°C/W</td>
</tr>
<tr>
<td>Output Power</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>$P_O$</td>
<td>50</td>
<td>-</td>
<td>W</td>
</tr>
<tr>
<td>Power Gain</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>$G_p$</td>
<td>9.1</td>
<td>-</td>
<td>dB</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>$RL$</td>
<td>40</td>
<td>-</td>
<td>dB</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>$\eta_C$</td>
<td>-</td>
<td>-9</td>
<td>%</td>
</tr>
<tr>
<td>Load Mismatch Stability</td>
<td>$F = 960$ MHz</td>
<td>$VSWR-S$</td>
<td>-</td>
<td>10:1</td>
<td>-</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>$VSWR-T$</td>
<td>-</td>
<td>1.5:1</td>
<td>-</td>
</tr>
</tbody>
</table>

Typical RF Performance

<table>
<thead>
<tr>
<th>Freq. (MHz)</th>
<th>Pin (W)</th>
<th>Pout (W)</th>
<th>Gain (dB)</th>
<th>ΔGain (dB)</th>
<th>Ic (A)</th>
<th>Eff (%)</th>
<th>RL (dB)</th>
<th>VSWR-S (1.5:1)</th>
<th>VSWR-T (10:1)</th>
<th>P1dB Overdrive</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>6.2</td>
<td>65.9</td>
<td>10.25</td>
<td>-</td>
<td>2.66</td>
<td>49.6</td>
<td>-22.2</td>
<td>S</td>
<td>P</td>
<td>73.4</td>
</tr>
<tr>
<td>1090</td>
<td>6.2</td>
<td>61.9</td>
<td>9.98</td>
<td>-</td>
<td>2.58</td>
<td>48.0</td>
<td>-15.2</td>
<td>S</td>
<td>-</td>
<td>68.7</td>
</tr>
<tr>
<td>1215</td>
<td>6.2</td>
<td>64.6</td>
<td>10.16</td>
<td>0.35</td>
<td>2.50</td>
<td>51.6</td>
<td>-15.9</td>
<td>S</td>
<td>-</td>
<td>74.8</td>
</tr>
</tbody>
</table>

Note: ΔPo(dB) is the difference between Pout at 1dB overdrive and Pout at Pin = 6.2 W.

Absolute Maximum Ratings @ +25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Voltage (VCES)</td>
<td>65 V</td>
</tr>
<tr>
<td>Emitter-Base Voltage (VEBO)</td>
<td>3.0 V</td>
</tr>
<tr>
<td>Collector Current (Peak) (IC)</td>
<td>5.3 A</td>
</tr>
<tr>
<td>Power Dissipation @ +25°C (PTOT)</td>
<td>220 kW</td>
</tr>
<tr>
<td>Storage Temperature (TSTG)</td>
<td>-65°C to +200°C</td>
</tr>
<tr>
<td>Junction Temperature (TJ)</td>
<td>200°C</td>
</tr>
</tbody>
</table>

Output Power vs. Input Power

Gain vs. Frequency

Collector Efficiency vs. Frequency

Visit www.macom.com for additional data sheets and product information.
Broadband Test Fixture Impedance

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>$Z_{IF}$ (Ω)</th>
<th>$Z_{OF}$ (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>3.5 - j7.5</td>
<td>12.0 - j7.8</td>
</tr>
<tr>
<td>1030</td>
<td>3.8 - j7.0</td>
<td>11.1 - j6.4</td>
</tr>
<tr>
<td>1090</td>
<td>3.9 - j6.8</td>
<td>10.6 - j5.1</td>
</tr>
<tr>
<td>1150</td>
<td>3.9 - j6.8</td>
<td>10.8 - j3.8</td>
</tr>
<tr>
<td>1215</td>
<td>3.6 - j7.0</td>
<td>11.1 - j3.2</td>
</tr>
</tbody>
</table>

Test Fixture Assembly
Test Fixture Circuit Dimensions
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50 W, 960 - 1215 MHz, 10 µs Pulse, 10% Duty

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