Avionics Pulsed Power Transistor
350 W, 960 - 1215 MHz, 10 µs 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 @ +25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Voltage</td>
<td>$V_{CES}$</td>
<td>65 V</td>
</tr>
<tr>
<td>Emitter-Base Voltage</td>
<td>$V_{EBO}$</td>
<td>3 V</td>
</tr>
<tr>
<td>Collector Current (Peak)</td>
<td>$I_C$</td>
<td>32.5 A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>$P_{TOT}$</td>
<td>1.34 kW</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>$T_{STG}$</td>
<td>-65°C to +200°C</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>$T_J$</td>
<td>+200°C</td>
</tr>
</tbody>
</table>

Electrical Specifications: $V_{CC} = 50$ V, $P_{IN} = 40$ W, $T_A = 25 \pm 5$°C (unless otherwise noted)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector-Emitter Breakdown Voltage</td>
<td>$BV_{CES}$</td>
<td>$I_C = 50$ mA</td>
<td>V</td>
<td>65</td>
<td>-</td>
</tr>
<tr>
<td>Collector-Emitter Leakage Current</td>
<td>$I_{CES}$</td>
<td>$V_{CE} = 50$ V</td>
<td>mA</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>$R_{THUC}$</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>°C/W</td>
<td>-</td>
<td>0.13</td>
</tr>
<tr>
<td>Output Power</td>
<td>$P_O$</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>W</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>Power Gain</td>
<td>$G_P$</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>dB</td>
<td>9.4</td>
<td>-</td>
</tr>
<tr>
<td>Collector Efficiency</td>
<td>$h_C$</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>%</td>
<td>45</td>
<td>-</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>$RL$</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>dB</td>
<td>-</td>
<td>-9</td>
</tr>
<tr>
<td>Load Mismatch Stability</td>
<td>VSWR-T</td>
<td>$F = 960$ MHz</td>
<td>-</td>
<td>-</td>
<td>10:1</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>VSWR-S</td>
<td>$F = 960, 1090, 1215$ MHz</td>
<td>-</td>
<td>-</td>
<td>1.5:1</td>
</tr>
</tbody>
</table>

Typical RF Performance

<table>
<thead>
<tr>
<th>Freq. (MHz)</th>
<th>P_{IN} (W)</th>
<th>P_{OUT} (W)</th>
<th>Gain (dB)</th>
<th>\Delta \text{Gain (dB)}</th>
<th>I_C (A)</th>
<th>Eff (%)</th>
<th>RL (dB)</th>
<th>VSWR-S (1.5:1)</th>
<th>VSWR-T (10:1)</th>
<th>P_{1dB Overdrive}</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>40</td>
<td>421</td>
<td>10.22</td>
<td>—</td>
<td>15.7</td>
<td>53.4</td>
<td>-19.9</td>
<td>S</td>
<td>P</td>
<td>496</td>
</tr>
<tr>
<td>1090</td>
<td>40</td>
<td>401</td>
<td>10.01</td>
<td>—</td>
<td>15.0</td>
<td>53.4</td>
<td>-18.5</td>
<td>S</td>
<td>—</td>
<td>469</td>
</tr>
<tr>
<td>1215</td>
<td>40</td>
<td>399</td>
<td>9.99</td>
<td>0.23</td>
<td>15.0</td>
<td>53.2</td>
<td>-21.5</td>
<td>S</td>
<td>—</td>
<td>421</td>
</tr>
</tbody>
</table>

Note: \( \Delta P_{O (dB)} \) is the difference between \( P_{OUT} \) at 1dB overdrive and \( P_{OUT} \) at \( P_{IN} = 40W \).

Gain vs. Frequency

Collector Efficiency vs. Frequency
RF Power Transfer Curve
(Output Power Vs. Input Power)

Broadband Test Fixture Impedance

<table>
<thead>
<tr>
<th>F (MHz)</th>
<th>Z_F (Ω)</th>
<th>Z_OF (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>1.8 - j1.7</td>
<td>1.7 - j1.7</td>
</tr>
<tr>
<td>1030</td>
<td>1.7 - j1.4</td>
<td>1.8 - j1.2</td>
</tr>
<tr>
<td>1090</td>
<td>1.6 - j1.2</td>
<td>1.9 - j0.8</td>
</tr>
<tr>
<td>1150</td>
<td>1.4 - j1.0</td>
<td>1.9 - j0.6</td>
</tr>
<tr>
<td>1215</td>
<td>1.2 - j0.8</td>
<td>2.0 - j0.2</td>
</tr>
</tbody>
</table>

MAPRST0912-350
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Rev. V1

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Test Fixture Circuit Dimensions

Test Fixture Assembly

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