MEST2G-100-20-CM33

Pin Diode Switch Element  

Rev. V1

Features

- Low Insertion Loss:
  - 0.10 dB @ 1.0 GHz
  - 0.15 dB @ 2.6 GHz
- Medium Isolation: 16 dB @ 1 GHz
- RoHS* Compliant

Description

The MEST2G-100-20-CM33 is a Thermal To Ground Series diode Switch Element in an Aluminum Nitride package. This part is designed for reliable high power switch applications up to 100 watts and with a frequency range to 2.6 GHz.

Electrical Specifications:  \( T_C = +25\degree \text{C} \) (unless otherwise specified)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown Voltage ( (V_{BR}) )</td>
<td>( I_R = 10 \mu\text{A} )</td>
<td>V</td>
<td>500</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Leakage Current ( (I_R) )</td>
<td>( V_R = 100 \text{V} )</td>
<td>nA</td>
<td>—</td>
<td>—</td>
<td>100</td>
</tr>
<tr>
<td>Forward Voltage ( (V_F) )</td>
<td>( I_F = 100 \text{mA} )</td>
<td>V</td>
<td>—</td>
<td>900</td>
<td>950</td>
</tr>
<tr>
<td>Lifetime ( (t) )</td>
<td>( I_F = 10 \text{mA}, I_R = 6 \text{mA, 50%} )</td>
<td>ns</td>
<td>—</td>
<td>2000</td>
<td>—</td>
</tr>
<tr>
<td>Input / Output Return Loss ( (I/OR_{L}) )</td>
<td>( I_F = 100 \text{mA, 1.0 GHz} )</td>
<td>dB</td>
<td>25</td>
<td>38</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>( I_F = 100 \text{mA, 2.6 GHz} )</td>
<td></td>
<td>21</td>
<td>34</td>
<td>—</td>
</tr>
<tr>
<td>Insertion Loss ( (I_L) )</td>
<td>( I_F = 100 \text{mA, 1.0 GHz} )</td>
<td>dB</td>
<td>—</td>
<td>0.10</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>( I_F = 100 \text{mA, 2.6 GHz} )</td>
<td></td>
<td></td>
<td>0.15</td>
<td>0.25</td>
</tr>
<tr>
<td>Isolation ( (I_{SO}) )</td>
<td>( V_R = 10 \text{V, 0.5 GHz} )</td>
<td>dB</td>
<td>14</td>
<td>16.5</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>( V_R = 10 \text{V, &lt;1.0 GHz} )</td>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>


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MEST2G-100-20-CM33

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Absolute Maximum Ratings$^{1,2}$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown Voltage ($V_R$)</td>
<td>500 V</td>
</tr>
<tr>
<td>Forward Current ($I_{FDC}$)</td>
<td>500 mA</td>
</tr>
<tr>
<td>Thermal Resistance ($\theta_{JC}$)</td>
<td>18°C/W</td>
</tr>
<tr>
<td>Junction Temperature ($T_J$)</td>
<td>-40°C to 175°C</td>
</tr>
<tr>
<td>Storage Temperature ($T_{STG}$)</td>
<td>-55°C to +150°C</td>
</tr>
<tr>
<td>Mounting Temperature ($T_{MTG}$)</td>
<td>+260°C per JEDEC STD-J-20C</td>
</tr>
</tbody>
</table>

1. Exceeding any one or combination of these limits may cause permanent damage to this device.
2. MACOM does not recommend sustained operation near these survivability limits.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 0 (HBM) devices.

Typical Performance Curves: $T_A = 25°C$, $Z_O = 50 \Omega$, -10 dBm Small Signal

**Insertion Loss**

**Isolation**

**Input / Output Return Loss**

**Series Resistance vs. Current, 500 MHz**
MEST2G-100-20-CM33

Pin Diode Switch Element

Insertion Loss

Isolation

Input Return Loss

Output Return Loss

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Junction Temperature vs Input Power PCB[1] Mounted on Heat Sink, 25 °C Ambient, 1.3 GHz and 50 mA Bias

Notes:
1. 16.6 mils Rogers RO4350B with ½ oz. copper clad and copper filled and plated over 10 mil diameter vias under package thermal ground.

PCB Layout

Copper filled and plated over 10 mil diameter vias on 17 mil centers.

Solder mask (in green) should provide 60 um clearance between copper pad and solder mask. Rounded pkg pads should have matching rounded solder mask openings. On the outer edges of package, use 100 um clearance.

For the solder paste stencil design, use circles or squares such that only get 60 to 80% solder paste coverage.
Outline (CM33)

Pin function for Silicon PIN diode.
1. Anode
2. Cathode