Pin Diode Switch Element

Features
- Supports up to 10 W Power
- Low Insertion Loss: 0.5 dB up to 2.7 GHz
- High Isolation: 23 dB up to 2.7 GHz
- RoHS* Compliant

Description
A broadband medium power switch element in a 1.9 x 1.1 mm DFN package. This device is electrical series and thermal direct to ground (EST2G). This device is designed for wireless infrastructure applications and test instruments. It is also suited for other applications from 100 MHz up to 10 GHz.

Electrical Specifications: $T_C = +25^\circ C$ (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>$I_R = 10 \mu A$</td>
<td>V</td>
<td>100</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Lifetime (t)</td>
<td>$I_F = 10 mA, I_{IR} = 6 mA, 10% / 90%$</td>
<td>ns</td>
<td>—</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>I-Region (w)</td>
<td>I-Layer</td>
<td>µm</td>
<td>—</td>
<td>8</td>
<td>—</td>
</tr>
<tr>
<td>Series Resistance ($R_S$)</td>
<td>$I_F = 100 mA$</td>
<td>Ω</td>
<td>—</td>
<td>2</td>
<td>—</td>
</tr>
<tr>
<td>Junction Capacitance ($C_J$)</td>
<td>$V_R = -10 V, 1 MHz$</td>
<td>pF</td>
<td>—</td>
<td>0.04</td>
<td>—</td>
</tr>
<tr>
<td>Insertion Loss ($I_L$)</td>
<td>$I_F = 50 mA, 2.3 \sim 2.7 GHz$</td>
<td>dB</td>
<td>—</td>
<td>0.40</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>$I_F = 50 mA, &lt;8 GHz$</td>
<td></td>
<td></td>
<td>0.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Input Return Loss ($I_{RL}$)</td>
<td>$I_F = 50 mA, 2.3 \sim 2.7 GHz$</td>
<td>dB</td>
<td>20</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>$I_F = 50 mA, &lt;8 GHz$</td>
<td></td>
<td>12</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td>Isolation ($I_{SO}$)</td>
<td>$V_R = -10 mA, 2.3 \sim 2.7 GHz$</td>
<td>dB</td>
<td>20</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>$V_R = -10 mA, &lt;8 GHz$</td>
<td></td>
<td>11</td>
<td>15</td>
<td>—</td>
</tr>
</tbody>
</table>

MEST2G-010-20

Pin Diode Switch Element

Absolute Maximum Ratings\textsuperscript{1,2}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown Voltage ($V_{BR}$)</td>
<td>100 V</td>
</tr>
<tr>
<td>Forward Current ($I_F$)</td>
<td>100 mA</td>
</tr>
<tr>
<td>Thermal Resistance ($\theta_{JC}$)</td>
<td>130°C/W</td>
</tr>
<tr>
<td>Junction Temperature ($T_J$)</td>
<td>175°C</td>
</tr>
<tr>
<td>Storage Temperature ($T_{STG}$)</td>
<td>-65°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: $T_A = 25^\circ\text{C}$, $Z_O = 50 \Omega$, Small Signal

**Insertion Loss**

![Insertion Loss Graph]

**Isolation**

![Isolation Graph]

**Input Return Loss**

![Input Return Loss Graph]
3. Unless otherwise specified: Tolerance ±0.10 mm
4. If possible, use copper filled vias underneath pin 3 for better thermals; otherwise, use vias that are plated through, filled and plated over.
5. Solder mask should provide a 60 µm clearance between copper pad and soldermask. Rounded package pads should have matching rounded solder mask openings.
6. Use circles or squares for thermal land stencil such that there is only 50% to 80% solder paste coverage
2012-0 Package Outline Before DC: 1528:

Dimensions in inches [mm]

Finish: 300 micro inches matte tin 1 hour 150 °C anneal

PART NUMBER
FDR NENSYMETRICAL DESIGN CATHODE LINE OR INPUT MARK

0.0310±0.0040
(0.79±0.10)

0.0230±0.0050
(0.58±0.13)

0.0100
(0.26) TYP.

0.0150
(0.38) TYP.

0.0080
(0.20) TYP.

0.0010
(0.03) TYP.

0.0470±0.0050
(1.19±0.13)

0.0160
(0.41) TYP.

0.0140±0.0040
(0.35±0.10)

0.0145±0.0040
(0.37±0.10)

0.0770±0.0050
(1.96±0.13)
2012-1 Package Outline After DC: 1528:

Dimensions in inches [mm]

Notes:
1. LEAD FRAME MATERIAL: 8 MIL COPPER.
2. BOTH TERMINAL SOLDERING Ni/Au (3.0μm Ni, 1.0μm Au)
3. MINIMUM LEAD WIDTH 0.002" (0.05 mm)

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