MELF PIN Diode
1 - 4000 MHz

Features
- High Power Handling
- Low Loss / Low Distortion
- Low Thermal Resistance
- Surface Mountable
- Lead-Free MELF Package (1072)
- Halogen-Free "green" Mold Compound
- RoHS* Compliant and 260°C Re-flow Compatible

Description
The MA4P504-1072 is a PIN diode assembled in a surface mount metal electrode leadless faced (MELF) ceramic package. This package is full face bonded to refractory metal plugs on both the anode and cathode. The result is a low loss PIN diode with low thermal resistance due to its symmetrical thermal paths. MELF PIN diodes are designed specifically for high volume tape and reel assembly. Their user friendly design provides for extremely easy automatic pick and place indexing and assembly. All solderable surfaces are tin plated and are compatible with all industry standard reflow and vapor phase solder processes.

The MA4P504 is ideally suited for use in a series or shunt configuration where there is a high incident power present. Typical applications include switches as well as attenuators from HF through UHF frequencies.

The MA4P504 is manufactured using a unique passivation process which provides for a hard glass encapsulation that protects and hermetically seals the active area of the chip.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA4P504-1072T</td>
<td>1500 pc. reel</td>
</tr>
</tbody>
</table>

1. Reference Application Note M513 for reel size information.

Package Dimensions ODS 1072

<table>
<thead>
<tr>
<th></th>
<th>Inches</th>
<th>Millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>A</td>
<td>0.115</td>
<td>0.125</td>
</tr>
<tr>
<td>B</td>
<td>0.008</td>
<td>0.023</td>
</tr>
<tr>
<td>C</td>
<td>0.080</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Diode Cross Section

Circuit Pad Layout
MELF PIN Diode
1 - 4000 MHz

Electrical Specifications:  \(T_A = 25^\circ\text{C}\)

<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>Forward Voltage</td>
<td>+ 50 mA</td>
<td>V</td>
<td>—</td>
<td>—</td>
<td>1.0</td>
</tr>
<tr>
<td>Reverse Leakage Current</td>
<td>-500 V</td>
<td>nA</td>
<td>—</td>
<td>—</td>
<td>-100</td>
</tr>
<tr>
<td>Total Capacitance (^2)</td>
<td>-100 V @ 1 MHz</td>
<td>pF</td>
<td>—</td>
<td>—</td>
<td>0.50</td>
</tr>
<tr>
<td>Package Capacitance</td>
<td></td>
<td>pF</td>
<td>—</td>
<td>0.16</td>
<td>—</td>
</tr>
<tr>
<td>Input IP3</td>
<td>(P_{IN} = +10,\text{dBm},) Spacing = 1 MHz @ 1000 MHz</td>
<td>dBm</td>
<td>—</td>
<td>&gt;54</td>
<td>—</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>Diode attached to infinite Heatsink</td>
<td>°CW</td>
<td>—</td>
<td>16</td>
<td>51</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>Diode attached to infinite Heatsink (^3)</td>
<td>W</td>
<td>—</td>
<td>—</td>
<td>7.5</td>
</tr>
<tr>
<td>Minority Carrier Lifetime</td>
<td>(I_F = +10,\text{mA}, I_{R} = -6,\text{mA})</td>
<td>µs</td>
<td>—</td>
<td>1.0</td>
<td>—</td>
</tr>
<tr>
<td>Series Resistance</td>
<td>+100 mA, 100 MHz</td>
<td>Ω</td>
<td>—</td>
<td>—</td>
<td>0.60</td>
</tr>
</tbody>
</table>

2. Chip junction capacitance + parasitic package capacitance.
3. De-rate linearly by -50.0 mW/°C to 0 W @ +125°C.
4. De-rate linearly by -19.3 mW/°C to 0 W @ +125°C.

Absolute Maximum Ratings \(^5,6\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Voltage</td>
<td>1.0 V</td>
</tr>
<tr>
<td>Reverse Voltage</td>
<td>500 V</td>
</tr>
<tr>
<td>Operating Temp.</td>
<td>-65°C to +175°C</td>
</tr>
<tr>
<td>Storage Temp.</td>
<td>-65°C to +200°C</td>
</tr>
</tbody>
</table>

5. Exceeding any one or combination of these limits may cause permanent damage to this device.
6. MACOM does not recommend sustained operation near these survivability limits.
7. Values will de-rate linearly over temperature.

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 1C devices.
Typical RF Performance Curves (50 – 4000 MHz)

MOUNTED IN A SERIES CONFIGURATION

**Input Return Loss**

![Input Return Loss Graph]

**Output Return Loss**

![Output Return Loss Graph]

**Insertion Loss**

![Insertion Loss Graph]

**Isolation**

![Isolation Graph]
Typical RF Performance Curves (50 – 4000 MHz)

MOUNTED IN A SHUNT CONFIGURATION

**Input Return Loss**

![](image1)

**Output Return Loss**

![](image2)

**Insertion Loss**

![](image3)

**Isolation**

![](image4)
Cleanliness and Storage
MELF devices should be handled and stored in a clean environment. The metalized ends of the device are tin plated for greater solderability and any continuous exposure to high humidity (>80%) for extended periods of time may cause the surface to oxidize. Caution should be taken when storing devices for extended intervals.

Mounting Techniques - Solder Attach
Typical wave soldering or reflow techniques may be used to mount MELF packages to circuit boards using Sn63/Pb37 alloy or any RoHS compliant solder. For more information visit the MACOM website and read application note M538.

Note:
Click links below to view datasheets of other MELF packaged PIN diodes and to compare them to the MA4P504-1072.

PACKAGED_PIN_DIODES
and/or
MA4P MELF & HIPAX Series