Features
- RF & Microwave Medium Barrier Silicon 20 V Schottky Diode
- Available as Single Diode, Series Pair or Unconnected Pair Configurations.
- Low Profile Surface Mount Plastic Package
- Lead Free
- RoHS* Compliant with 260°C Reflow Capability

Description and Applications
The MA4E1339 series is a silicon medium barrier Schottky diode suitable for use in mixer, detector and limiter circuits. These diodes are also suitable for usage in anti-parallel, shunt power surge protection circuits for 50 Ω and 75 Ω systems.

The MA4E1339 Series of Schottky diodes is available in the SOT-23 (case style 287), SOT-323 (case style 1146), SC-79 (case style 1279) and the SOD 323, (case style 1141) plastic package. These packages are supplied on tape and reel for automatic pick and place assembly and for surface mount placement to circuit boards, as indicated by a “T” to the P/N suffix.

These Silicon Medium Barrier, 20 V Schottky Diodes are useful in detector, limiter, mixer, and surge protection applications for operating frequency bands from DC through 6 GHz.

Part Numbers

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA4E1339A1-287T</td>
<td>SOT-23</td>
</tr>
<tr>
<td>MA4E1339A1-1146T</td>
<td>SOT-323</td>
</tr>
<tr>
<td>MA4E1339B1-287T</td>
<td>SOT-23</td>
</tr>
<tr>
<td>MA4E1339B1-1146T</td>
<td>SOT-323</td>
</tr>
<tr>
<td>MA4E1339A1-1141T</td>
<td>SOD-323</td>
</tr>
<tr>
<td>MADS-001339-12790T</td>
<td>SC-79</td>
</tr>
</tbody>
</table>

## Electrical Specifications @ +25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Voltage ($V_F$)</td>
<td>$I_F = 1 \text{ mA}$</td>
<td>410 mV max.</td>
</tr>
<tr>
<td></td>
<td>$I_F = 10 \text{ mA}$</td>
<td>1 V max.</td>
</tr>
<tr>
<td>Delta Forward Voltage ($\Delta V_F$)</td>
<td>$I_F = 1 \text{ mA}$</td>
<td>20 mV max. (for series pair and unconnected pair configurations)</td>
</tr>
<tr>
<td>Total Capacitance ($C_T$)</td>
<td>$V_R = 0 \text{ V}$, $F = 1 \text{ MHz}$</td>
<td>1.2 pF max.</td>
</tr>
<tr>
<td>Reverse Leakage Current ($I_R$)</td>
<td>$V_R = 15 \text{ V}$</td>
<td>200 nA max.</td>
</tr>
<tr>
<td>Reverse Voltage Breakdown ($V_B$)</td>
<td>$I_R = 10 \mu\text{A}$</td>
<td>20 V min.</td>
</tr>
</tbody>
</table>

## Maximum Ratings @ 25°C (unless otherwise specified)\(^1,2\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-55°C to +125°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55 to +125</td>
</tr>
<tr>
<td>Total Power Dissipation (RF and DC)</td>
<td>250 mW</td>
</tr>
<tr>
<td>Continuous Forward Current</td>
<td>30 mA</td>
</tr>
<tr>
<td>Surge Forward Current, @ $t &lt; 10 \text{ ms}$</td>
<td>100 mA</td>
</tr>
<tr>
<td>Reverse Voltage</td>
<td>20 V</td>
</tr>
<tr>
<td>Soldering Temperature (Standard Part #)</td>
<td>+235°C for 5 sec.</td>
</tr>
<tr>
<td>Soldering Temperature (RoHS Compliant Part #)</td>
<td>+260°C for 5 sec.</td>
</tr>
<tr>
<td>Electrostatic Discharge (ESD) Classification</td>
<td>1A, HBM</td>
</tr>
</tbody>
</table>

1. Operation of this device above any one of the Maximum Rated parameters may cause permanent damage.
2. Please refer to Application Note M538 for surface mounting instructions.
## MA4E1339 Series

### Silicon Medium Barrier Schottky Diodes

**Circuit Models**

#### SOT-23

<table>
<thead>
<tr>
<th>1</th>
<th>0.13 pF</th>
<th>0.65 nH</th>
<th>0.01 pF</th>
<th>0.05 pF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.13 pF</td>
<td>0.65 nH</td>
<td>0.01 pF</td>
<td>0.05 pF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>0.65 nH</th>
<th>0.05 pF</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.7 nH</td>
<td>0.13 pF</td>
</tr>
</tbody>
</table>

#### SOT-323

<table>
<thead>
<tr>
<th>1</th>
<th>0.04 pF</th>
<th>0.6 nH</th>
<th>0.06 pF</th>
<th>0.05 pF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.04 pF</td>
<td>0.6 nH</td>
<td>0.06 pF</td>
<td>0.05 pF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>0.04 pF</th>
<th>0.06 pF</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.6 nH</td>
<td>0.06 pF</td>
</tr>
</tbody>
</table>

#### SOD-323

<table>
<thead>
<tr>
<th>1</th>
<th>0.47 nH</th>
<th>0.05 pF</th>
<th>0.47 nH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.02 pF</td>
<td>0.2 pF</td>
<td>0.2 pF</td>
</tr>
</tbody>
</table>

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MA4E1339 Series

Silicon Medium Barrier Schottky Diodes

Case Styles

SOT-23

SOT-23 (Case Style 287)

<table>
<thead>
<tr>
<th>DIM.</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>—</td>
<td>0.048</td>
</tr>
<tr>
<td>B</td>
<td>—</td>
<td>0.008</td>
</tr>
<tr>
<td>C</td>
<td>—</td>
<td>0.040</td>
</tr>
<tr>
<td>D</td>
<td>0.013</td>
<td>0.020</td>
</tr>
<tr>
<td>E</td>
<td>0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>F</td>
<td>0.110</td>
<td>0.119</td>
</tr>
<tr>
<td>G</td>
<td>0.047</td>
<td>0.056</td>
</tr>
<tr>
<td>H</td>
<td>0.037 typical</td>
<td>0.95 typical</td>
</tr>
<tr>
<td>J</td>
<td>0.075 typical</td>
<td>1.90 typical</td>
</tr>
<tr>
<td>K</td>
<td>—</td>
<td>0.103</td>
</tr>
<tr>
<td>L</td>
<td>—</td>
<td>0.024</td>
</tr>
<tr>
<td>M</td>
<td></td>
<td>10° max.</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>2°...30°</td>
</tr>
</tbody>
</table>

Package Parasitics

Ls = 1.4 nH
Cp = 0.12 pF

SOT-323

SOT-323 (Case Style 1146)

<table>
<thead>
<tr>
<th>DIM.</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>0.063</td>
<td>0.087</td>
</tr>
<tr>
<td>B</td>
<td>0.045</td>
<td>0.053</td>
</tr>
<tr>
<td>C</td>
<td>0.079</td>
<td>0.087</td>
</tr>
<tr>
<td>D</td>
<td>0.047</td>
<td>0.055</td>
</tr>
<tr>
<td>E</td>
<td>0.008</td>
<td>0.016</td>
</tr>
<tr>
<td>F</td>
<td>0.031</td>
<td>0.039</td>
</tr>
<tr>
<td>G</td>
<td>—</td>
<td>0.004</td>
</tr>
<tr>
<td>H</td>
<td>0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>J</td>
<td>0.004</td>
<td>0.010</td>
</tr>
</tbody>
</table>

Package Parasitics

Ls = 1.2 nH
Cp = 0.11 pF

3. Applicable on all sides
Case Styles (Cont’d)

**SOD-323**

![SOD-323 Diagram]

**Package Parasitics**

\[ L_s = 1.2 \text{ nH} \]
\[ C_p = 0.11 \text{ pF} \]

**SOD-323 (Case Style 1141)**

<table>
<thead>
<tr>
<th>DIM.</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>—</td>
<td>0.043</td>
</tr>
<tr>
<td>B</td>
<td>—</td>
<td>0.004</td>
</tr>
<tr>
<td>C</td>
<td>—</td>
<td>0.008</td>
</tr>
<tr>
<td>D</td>
<td>0.010</td>
<td>0.016</td>
</tr>
<tr>
<td>E</td>
<td>0.003</td>
<td>0.006</td>
</tr>
<tr>
<td>F</td>
<td>0.063</td>
<td>0.075</td>
</tr>
<tr>
<td>G</td>
<td>0.045</td>
<td>0.057</td>
</tr>
<tr>
<td>H</td>
<td>0.091</td>
<td>0.106</td>
</tr>
</tbody>
</table>

**SC-79**

![SC-79 Diagram]

**Package Parasitics**

\[ L_s = 0.6 \text{ nH} \]
\[ C_p = 0.10 \text{ pF} \]

**SC-79 (Case Style 1279)**

![SC-79 Diagram](1279)

**Package Parasitics**

\[ L_s = 0.6 \text{ nH} \]
\[ C_p = 0.10 \text{ pF} \]
Silicon Medium Barrier Schottky Diodes

MA4E1339 Series

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