Features
- All EPI Mesa Construction
- High Reliability
- High Quality Factor
- Glass Passivation
- RoHS* Compliant

Description
The MHV5xx-11 series of silicon hyperabrupt tuning varactor diodes offer a large change in junction capacitance over a small tuning voltage range. It is a mesa device with an epitaxially-deposited cathode layer for low series resistance and high quality factor. The die is passivated with a high-reliability glass passivation for very fast settling time. This unpackaged die, is nominally 0.010 in (L) x 0.010 in (W) x 0.005 in (H). This rugged device is capable of reliable operation in all military, commercial and industrial applications. Contact the factory for other package styles.

The MHV5xx-11 is ideally suited for voltage controlled filters, analog voltage controlled phase shifters and voltage controlled oscillators.

Environmental Capabilities
The MHV5xx-11 silicon hyperabrupt junction varactor diodes are capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-883.

ESD & Moisture Sensitivity Level Rating
As are all semiconductors, silicon hyperabrupt tuning varactor diode are susceptible to damage from ESD events. Proper ESD prevention procedures should be followed. The ESD rating for these devices is Class 0 (HBM).

Electrical Specifications: \( T_A = +25^\circ C \)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Junction Capacitance ( C_J ) (pF)</th>
<th>Ratio ( C_{40} / C_{20} )</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 V, 1 MHZ</td>
<td>4 V, 1 MHz</td>
<td>20 V, 1 MHz</td>
</tr>
<tr>
<td>MHV500-11</td>
<td>2.25</td>
<td>2.5</td>
<td>2.75</td>
</tr>
<tr>
<td>MHV501-11</td>
<td>2.8</td>
<td>3.1</td>
<td>3.4</td>
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<td>3.7</td>
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<td>4.2</td>
<td>4.7</td>
<td>5.2</td>
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<td>5.0</td>
<td>5.6</td>
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<td>8.4</td>
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<td>10.0</td>
<td>11.0</td>
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<td>17.4</td>
<td>19.1</td>
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<td>21.0</td>
<td>23.1</td>
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<td>22.9</td>
<td>25.4</td>
<td>28.0</td>
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<td>MHV513-11</td>
<td>27.9</td>
<td>31.0</td>
<td>34.1</td>
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MHV5xx-11 Series

Silicon Hyperabrupt Tuning Varactor Diodes

Absolute Maximum Ratings\(^1,2\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Voltage Breakdown</td>
<td>22 V</td>
</tr>
<tr>
<td>Maximum Leakage Current</td>
<td>50 nA</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-55°C to +150°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +200°C</td>
</tr>
</tbody>
</table>

Assembly Instructions

Die attach of MHV5xx-11 silicon hyperabrupt tuning varactor diode chips may be accomplished with conductive epoxy or a eutectic solder such as Au(80%)/Sn(20%) or Au(88%)/Ge(12%). Electrical connection to the cathode may be made with a Au wire or ribbon, utilizing thermo compression or thermosonic bonding. Care should be exercised to not employ excessive pressure or ultrasonic energy while wire/ribbon bonding to avoid physical damage to the die.

Outline Drawing - CS11

Dimensions (inches)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Min.</th>
<th>Nom.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.016</td>
<td>0.018</td>
<td>0.020</td>
</tr>
<tr>
<td>B</td>
<td>0.016</td>
<td>0.018</td>
<td>0.020</td>
</tr>
<tr>
<td>C</td>
<td>0.006</td>
<td>0.010</td>
<td>0.012</td>
</tr>
<tr>
<td>D</td>
<td>—</td>
<td>0.010</td>
<td>—</td>
</tr>
</tbody>
</table>