MAVR-0003 Series
Varactor Diodes, Si Hyperabrupt
Low-Voltage / Wide Band

Features
- Lead-Free Surface Mount Package (SOD-323)
- High Capacitance Ratio at Low Voltages
- High Q at Low Voltages
- SPC Process for Superior C-V Repeatability
- Tape and Reel Packaging
- Designed for Commercial Wireless Applications
- RoHS* Compliant with 260°C. Reflow Capability

Description
The MAVR-0003 series are ion-implanted, hyperabrupt junction, silicon tuning varactors offered in a SOD-323 surface mount packages. This series of varactors is designed for high capacitance ratio and low voltage operation. Each varactor type has a better than 3:1 capacitance ratio between 0.5 V and 3.0 V.

The MAVR-0003 series tuning varactors are useful for wide band tuning and low phase noise applications where the supply voltage is limited to 5 volts or less. These varactors have been specifically designed to cover wireless application bands up to the 2.4 GHz WLAN band. Applications include VCOs and voltage tuned filters.

Typical Device Selection by Frequency

<table>
<thead>
<tr>
<th>FREQUENCY (GHz)</th>
<th>0.25</th>
<th>0.5</th>
<th>0.75</th>
<th>1.0</th>
<th>2.0</th>
<th>3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>JCT</td>
<td>NMT</td>
<td>NMT</td>
<td>NMT</td>
<td></td>
<td></td>
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<tr>
<td>NMT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT2</td>
<td>SMR</td>
<td>PDC</td>
<td>IS-136/95</td>
<td>GSM</td>
<td>PCS</td>
<td>GPS</td>
</tr>
<tr>
<td>TACS</td>
<td>AMPs</td>
<td>DCS1800</td>
<td></td>
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<td>TACS</td>
<td>AMPs</td>
<td>DCS1800</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1. Reference Application Note M513 for reel size information.
2. The prefix defines package style, configuration and packaging information. Contact representative for complete part identification.

(Ordering Information)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAVR-000320-11410T</td>
<td>SOD-323</td>
</tr>
<tr>
<td>MAVR-000340-11410T</td>
<td>SOD-323</td>
</tr>
<tr>
<td>MAVR-000350-11410T</td>
<td>SOD-323</td>
</tr>
</tbody>
</table>


For further information and support please visit:
https://www.macom.com/support
MAVR-0003 Series

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Electrical Specifications: \( T_A = +25 \ ^\circ C \)
Breakdown Voltage @ \( I_R = 10 \ mA, V_b = 12 \ V \) Minimum
Reverse Leakage Current @ \( V_R = 10 \ V, I_R = 100 \ nA \) Maximum

<table>
<thead>
<tr>
<th>Part Number</th>
<th>( C_T @ 1 \ MHz ) VR = 0.5 V (pF)</th>
<th>Capacitance Ratio CT 0.5 / CT 3.0</th>
<th>Q Factor @ 50 MHz VR = 2.0 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAVR-000320</td>
<td>Min. 48.0</td>
<td>Nom. 58.0</td>
<td>Max. 63.0</td>
</tr>
<tr>
<td>MAVR-000340</td>
<td>Min. 15.0</td>
<td>Nom. 18.5</td>
<td>Max. 21.0</td>
</tr>
<tr>
<td>MAVR-000350</td>
<td>Min. 9.5</td>
<td>Nom. 11.8</td>
<td>Max. 13.5</td>
</tr>
</tbody>
</table>

Spice Model

Intrinsic Diode Model:
- \( N = 1.1 \)
- \( CJ0 = \) (see table below)
- \( V_J = \) (see table below)
- \( FC = 0.5 \)
- \( BV = 12.0 \ V \)
- \( M = \) (see table below)

Parasitics:
- \( Cp = 0.15 \ pF \)
- \( Ls = 1.4 \ nH \)

Absolute Maximum Ratings\(^3,4\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse Voltage</td>
<td>12 V</td>
</tr>
<tr>
<td>Forward Current</td>
<td>50 mA</td>
</tr>
<tr>
<td>Total Power Dissipation</td>
<td>250 mW</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-65°C to +125°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +150°C</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>( CJ0 ) (pF)</th>
<th>( V_J ) (V)</th>
<th>( M )</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAVR-000320</td>
<td>77.4</td>
<td>11.71</td>
<td>6.51</td>
</tr>
<tr>
<td>MAVR-000340</td>
<td>25.3</td>
<td>14.25</td>
<td>7.41</td>
</tr>
<tr>
<td>MAVR-000350</td>
<td>15.7</td>
<td>14.55</td>
<td>7.26</td>
</tr>
</tbody>
</table>
Typical Performance Curves

**Total Capacitance vs. Reverse Voltage at 1 MHz**

- MAVR-000320
- MAVR-000340
- MAVR-000350

**Nominal Q at 50 MHz vs. Reverse Voltage**

**Nominal Change in Capacitance with temperature**
Mounting Information

The illustration indicates the recommended mounting pad configuration for the SOD-323 package. Solder paste containing flux should be screened onto the pads to a thickness of 0.005 - 0.007 inches. The plastic package is placed in position, firmly adhering to the solder paste.

Please refer to Application Note M538 for surface mounting instructions.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

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

SOD-323 (Case Style 1141)

Dimensions: inches mm

<table>
<thead>
<tr>
<th>DIM.</th>
<th>INCHES</th>
<th>MILLIMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0 043</td>
<td>1 1</td>
</tr>
<tr>
<td>B</td>
<td>0 008</td>
<td>0 2</td>
</tr>
<tr>
<td>C</td>
<td>0 016</td>
<td>0 41</td>
</tr>
<tr>
<td>D</td>
<td>0 006</td>
<td>0 15</td>
</tr>
<tr>
<td>E</td>
<td>0 075</td>
<td>1 9</td>
</tr>
<tr>
<td>F</td>
<td>1 14</td>
<td>2 7</td>
</tr>
<tr>
<td>G</td>
<td>1 14</td>
<td>2 7</td>
</tr>
<tr>
<td>H</td>
<td>0 091</td>
<td>2 3</td>
</tr>
</tbody>
</table>
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