Voltage Variable Absorptive Attenuator, 800 - 1000 MHz

Features

- Input IP3: +35 dBm Min (Full Attenuation Range)
- Input IP3 is 15 - 20 dB Better than GaAs
- Linear Operation: +20 dBm Typ.
- Plastic, 28 Lead, 6 mm CSP, SMT Package
- 35 dB Dynamic Range (With 30 mA Bias Current)
- Single Control Voltage
- 50 ohm Impedance
- Linear Driver, MADR-007098-000100, Available
- Test Boards are Available
- Tape and Reel Packaging Available
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of MAAVCC0001

Description

M/A-COM's MAAV-007092-000100 is a PIN diode based voltage variable attenuator. This device is in a 6mm square, 28 lead, plastic CSP Package, suitable for surface mounting on PCBs. These attenuators have linear operating power and input intercept point levels 15 - 20 dB better than GaAs FET MMIC voltage variable attenuators. They are ideally suited for use where low distortion, high linear operating power and high dynamic range are required. These devices are optimized for the GSM frequency band, but exhibit excellent performance and repeatability over the entire specified frequency band. The MAAV-007092-000100 is ideally suited for wireless communications systems.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAAV-007092-000100</td>
<td>Bulk Packaging</td>
</tr>
<tr>
<td>MAAV-007092-0001TR</td>
<td>1000 piece reel</td>
</tr>
<tr>
<td>MAAV-007092-0001TB</td>
<td>Sample Test Board</td>
</tr>
</tbody>
</table>

Note: Reference Application Note M513 for reel size information.


1. Bias current may be applied to Pin 9 or 23. However, the unused Pin must be isolated.
2. The exposed pad centered on the package bottom must be connected to RF and DC ground. (For PQFN Packages)
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Electrical Specifications:  \( T_A = 25^\circ C \)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Frequency</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>0 volts</td>
<td>800-1000 MHz</td>
<td>dB</td>
<td>—</td>
<td>3.6</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>925 - 960 MHz</td>
<td>dB</td>
<td>—</td>
<td>3.5</td>
<td>3.9</td>
</tr>
<tr>
<td>Attenuation (Above Loss)</td>
<td>10 mA bias current</td>
<td>800-1000 MHz</td>
<td>dB</td>
<td>30</td>
<td>34</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>925 - 960 MHz</td>
<td>dB</td>
<td>30</td>
<td>34</td>
<td>—</td>
</tr>
<tr>
<td>Attenuation Flatness</td>
<td>0 to 30 dB attenuation</td>
<td>800-1000 MHz</td>
<td>dB</td>
<td>—</td>
<td>2.3</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>925 - 960 MHz</td>
<td>dB</td>
<td>—</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>VSWR</td>
<td>0 to 30 dB attenuation</td>
<td>800-1000 MHz</td>
<td>Ratio</td>
<td>—</td>
<td>1.5:1</td>
<td>1.9:1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>925 - 960 MHz</td>
<td>Ratio</td>
<td>—</td>
<td>1.3:1</td>
<td>1.8:1</td>
</tr>
<tr>
<td>Switching Speed</td>
<td>50% Control to 90%/10% RF</td>
<td>800-1000 MHz</td>
<td>( \mu s )</td>
<td>—</td>
<td>—</td>
<td>10.0</td>
</tr>
<tr>
<td>Linear Operation</td>
<td>—</td>
<td>800-1000 MHz</td>
<td>dBm</td>
<td>—</td>
<td>+20</td>
<td>—</td>
</tr>
<tr>
<td>Input IP1</td>
<td>Two-tone inputs up to +10 dBm</td>
<td>800-1000 MHz</td>
<td>dBm</td>
<td>+35</td>
<td>+40</td>
<td>—</td>
</tr>
<tr>
<td>I Control</td>
<td>—</td>
<td>800-1000 MHz</td>
<td>mA</td>
<td>—</td>
<td>—</td>
<td>30</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings \(^{3,4}\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Input Power</td>
<td>+27 dBm</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +125°C</td>
</tr>
</tbody>
</table>

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

Handling Procedures
Please observe the following precautions to avoid damage:

Static Sensitivity
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Recommended PCB Layout

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Typical Performance Curves

*Insertion Loss*

![Typical Insertion Loss Graph](image)

*Typical VSWR @ +25°C*

![Typical VSWR Graph](image)

*Attenuation Flatness @ +25°C*

![Attenuation Flatness Graph](image)

*Attenuation vs. Bias Current, Frequency = 1000 MHz*

![Attenuation vs. Bias Current Graph](image)
CSP-8, 28 Lead, 6mm

Package outline conforms to JEDEC standard MO-220B.

NOTES:
1. REFERENCE JEDEC MO-220-A For Additional Dimensional and Tolerance Information.
2. All Dimensions Shown As Millimeter.
3. Reference S2005 Application Note For PCB Footprint Information.