AMS1009

VOLTAGE REFERENCE DIODE

RoHS compliant

FEATURES
• ±5 mV (±0.2%) Max. Initial Tolerance (A grade)
• Wide Operating Current Range
• Low Voltage Reference 2.5V
• Max. 0.6Ω Dynamic Impedance (A grade)
• Low Temperature Coefficient

APPLICATIONS
• Power Supplies
• Instrumentation
• 8 Bit A/D, D/A Reference
• Current Loop Measurement and Control Systems
• Reference for 5V Systems

GENERAL DESCRIPTION
The AMS1009 is a precision band-gap voltage reference diode. This voltage reference features a very low dynamic impedance and good temperature coefficient, operating over a wide current range of 400µA to 10mA. On-chip trimming is used to provide tight tolerance and minimize temperature drift. A third terminal allows the reference voltage to be adjusted to ±5% to calibrate out system errors.

The AMS1009 is used as a precision 2.5V low voltage reference for digital voltmeters, power supplies or op amp circuitry, and the 2.5V make it easy to obtain a stable reference from 5V logic supplies.

The AMS1009 is available in TO-92 and SO-8 packages operating over a 0°C to 70°C temperature range.

ORDERING INFORMATION:

<table>
<thead>
<tr>
<th>TOL.</th>
<th>PACKAGE TYPE</th>
<th>OPERATING TEMPERATURE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TO-92</td>
<td>8 LEAD SOIC</td>
</tr>
<tr>
<td>±5mV</td>
<td>AMS1009AN</td>
<td>AMS1009AS 0 to 70°C C</td>
</tr>
<tr>
<td>±10mV</td>
<td>AMS1009BN</td>
<td>AMS1009BS 0 to 70°C C</td>
</tr>
</tbody>
</table>

PIN CONNECTIONS

TO-92
Plastic Package (N)

8L SOIC
SO Package (S)

Bottom View

Top View
ABSOLUTE MAXIMUM RATINGS (Note 1)
Reverse Current                20mA  Soldering information (25 sec.) 265°C
Forward Current                10mA
Operating Temperature Range    0°C to 70°C
Storage temperature            -55°C to +150°C

ELECTRICAL CHARACTERISTICS
Electrical Characteristics at \( I_R = 1 \text{ mA} \), and \( T_A = +25°C \) unless otherwise specified.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>AMS1009A</th>
<th></th>
<th>AMS1009B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Typ</td>
<td>Max</td>
<td>Min</td>
<td>Typ</td>
</tr>
<tr>
<td>Reverse Breakdown Voltage</td>
<td>2.495</td>
<td>2.500</td>
<td>2.505</td>
<td>2.490</td>
<td>2.500</td>
</tr>
<tr>
<td>Reverse Dynamic Impedance</td>
<td>0.2</td>
<td>0.6</td>
<td>1.4</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Reverse Breakdown Voltage Change with current</td>
<td>2.6</td>
<td>10</td>
<td></td>
<td>2.6</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12</td>
<td></td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Temperature Stability</td>
<td>1.8</td>
<td>4</td>
<td></td>
<td>1.8</td>
<td>4</td>
</tr>
<tr>
<td>Average Temperature Coeff.</td>
<td>15</td>
<td>25</td>
<td></td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Long Term Stability (Note 4)</td>
<td>20</td>
<td></td>
<td></td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed.

Note 2: For elevated temperature operation, \( T_{J\max} \) is +125°C

<table>
<thead>
<tr>
<th>Thermal Resistance</th>
<th>TO-92</th>
<th>SO-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \phi_{JA} ) (junction to ambient)</td>
<td>170°C/W (0.125” leads)</td>
<td>165°C/W</td>
</tr>
</tbody>
</table>

Note 3: Parameters identified with **boldface type** apply at temperature extremes. All other numbers apply at \( T_A = T_J = 25°C \).

Note 4: The average temperature coefficient is defined as the maximum deviation of reference voltage at all measured temperatures between the operating \( T_{MAX} \) and \( T_{MIN} \), divided by \( T_{MAX} - T_{MIN} \). The measured temperatures are 0°C, 25°C and 70°C.

TYPICAL PERFORMANCE CHARACTERISTICS
TYPICAL APPLICATIONS

2.5V Reference

Wide Supply Range, Adjustable Reference

*Does not affect Temperature Coefficient

Low Temperature Coefficient Power Regulator

PACKAGE DIMENSIONS inches (millimeters) unless otherwise noted.

3 LEAD TO-92 PLASTIC PACKAGE (N)
PACKAGE DIMENSIONS inches (millimeters) unless otherwise noted (Continued).

8 LEAD SOIC PLASTIC PACKAGE (S)

*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE