

2.5 Volt Reference

Description

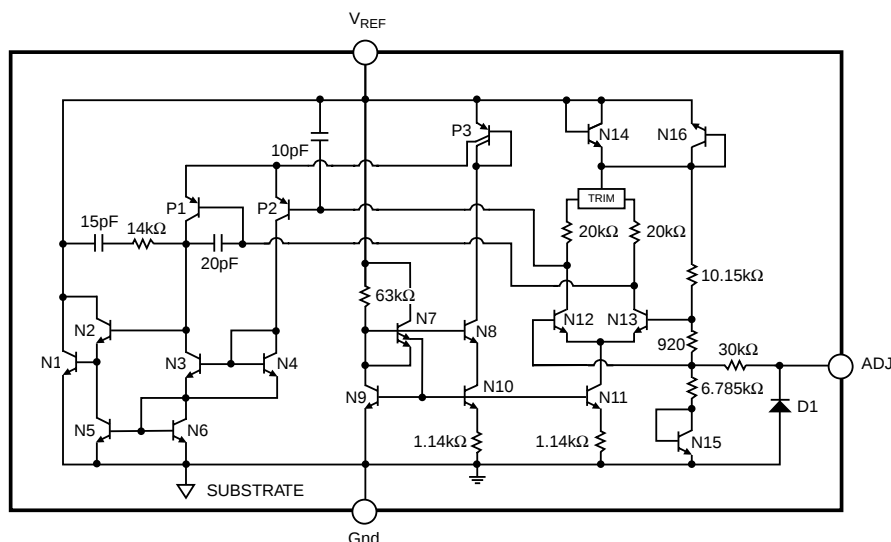
The CS1009 is a precision trimmed 2.500V $\pm 5\text{mV}$ shunt regulator diode. The low dynamic impedance and wide operating current range enhances its versatility. The tight reference tolerance is achieved by on-chip trimming which minimizes voltage tolerance and temperature drift.

A third terminal allows the reference voltage to be adjusted $\pm 5\%$ to calibrate out system errors. In many applications, the CS1009GZ can be used as a pin-to-pin replacement of the LT1009CZ and the LM136Z-2.5 with the external trim network eliminated.

Absolute Maximum Ratings

Reverse Current	20mA
Forward	10mA
Operating Temperature Range.....	-40°C to 105°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature Soldering	
Wave Solder(through hole styles only).....	10 sec. max, 260°C peak
Reflow (SMD styles only).....	60 sec. max above 183°C, 230°C peak

Block Diagram

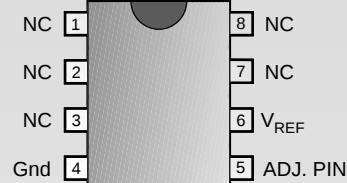


Features

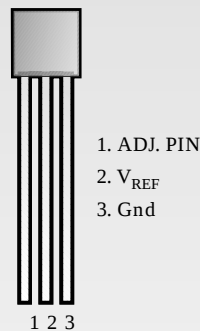
- **0.2% initial tolerance max.**
- **Guaranteed temperature stability**
- **Maximum 0.6Ω dynamic impedance**
- **Wide operating current range**
- **Directly interchangeable with LT1009 and LM136 for improved performance**
- **No adjustments needed for minimum temperature coefficient**
- **Meets Mil Std 883C ESD requirements**

Package Options

8 Lead SO



TO-92



ON Semiconductor

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Electrical Characteristics: $T_A = 25^\circ\text{C}$ unless otherwise specified

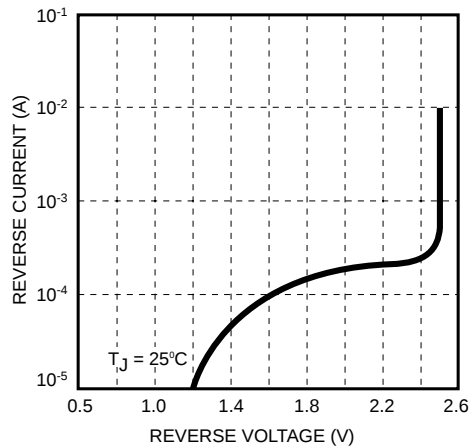
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Reverse Breakdown Voltage	$I_R = 1\text{mA}$	2.492	2.500	2.508	V
Reverse Breakdown Voltage	$0^\circ\text{C} \leq T_A \leq 105^\circ\text{C}$	2.492	2.500	2.508	V
Reverse Breakdown Voltage	$-40^\circ\text{C} \leq T_A \leq 0^\circ\text{C}$	2.480	2.500	2.508	V
Reverse Breakdown Change with Current	$400\mu\text{A} \leq I_R \leq 10\text{mA}$		2.6 3	10 12	mV mV
Reverse Dynamic Impedance	$I_R = 1\text{mA}$		0.2 0.4	1.0 1.4	Ω Ω
Temperature Stability	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (Note 1)				mV
Avg. Temp. Coefficient	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (Note 1)				ppm/ $^\circ\text{C}$
Long Term Stability	$T_A = 25^\circ\text{C} \pm 0.1\text{C}$, $I_R = 1\text{mA}$		20		ppm/kHr

The • denotes the specifications which apply over full operating temperature range.

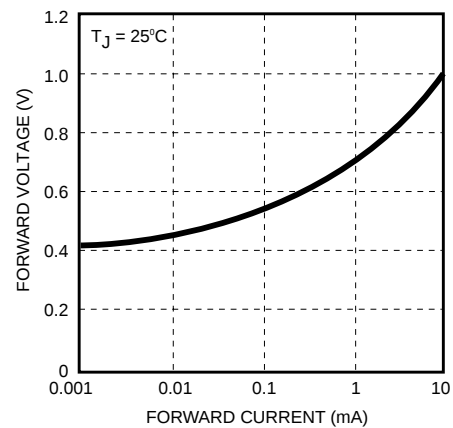
Note 1: Average temperature coefficient is defined as the total voltage change divided by the specified temperature range.

Typical Performance Characteristics

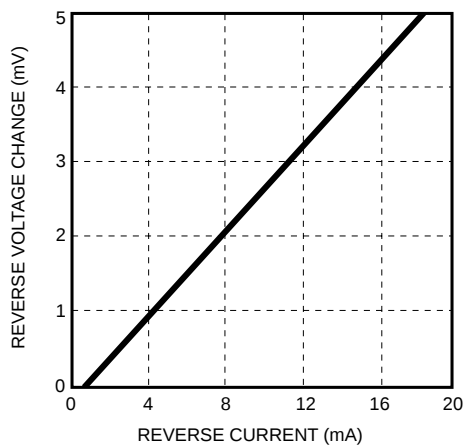
Reverse Current vs. Reverse Voltage



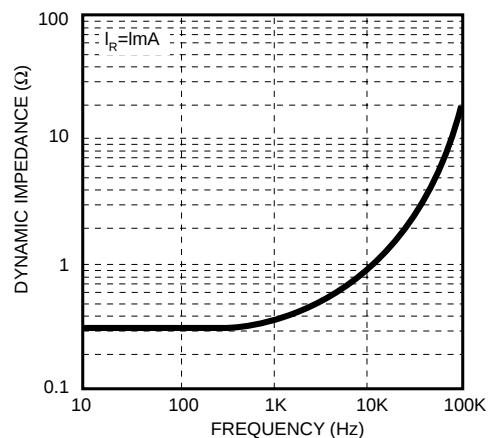
Forward Voltage vs. Forward Current



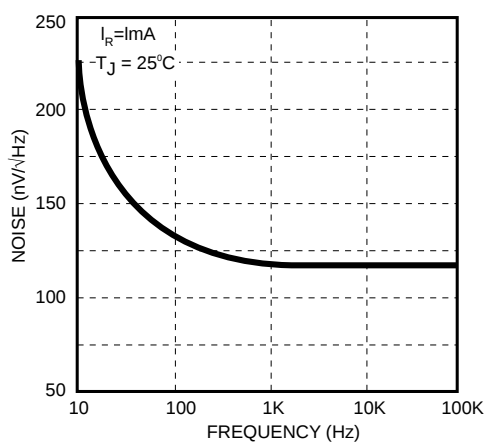
Change in Reverse Voltage vs. Reverse Current



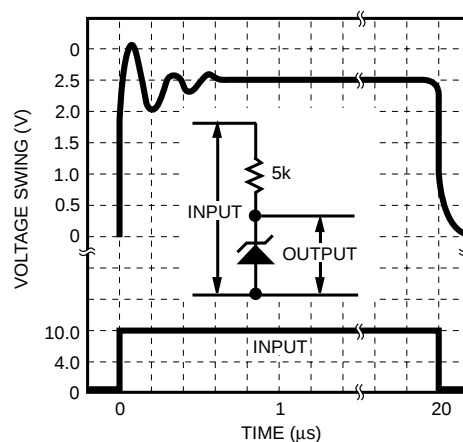
Dynamic Impedance vs. Frequency



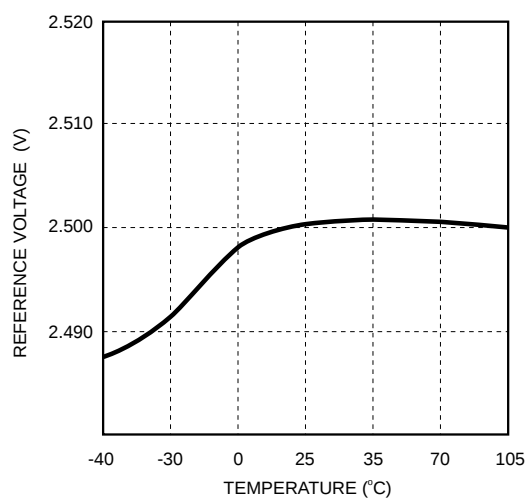
Zener Noise Voltage vs. Frequency



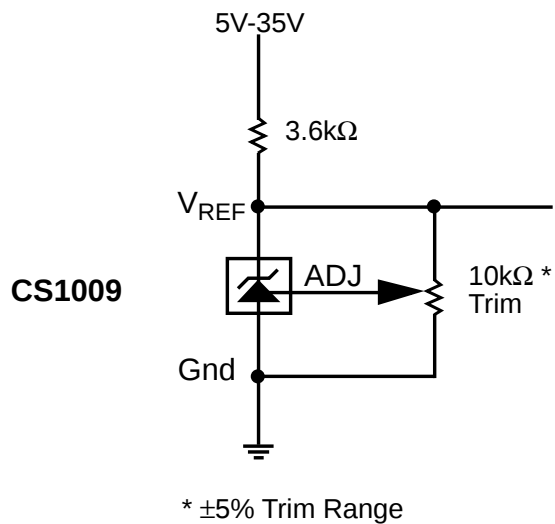
Response Time



Reference Voltage vs. Temperature



Application Diagram



Package Specification

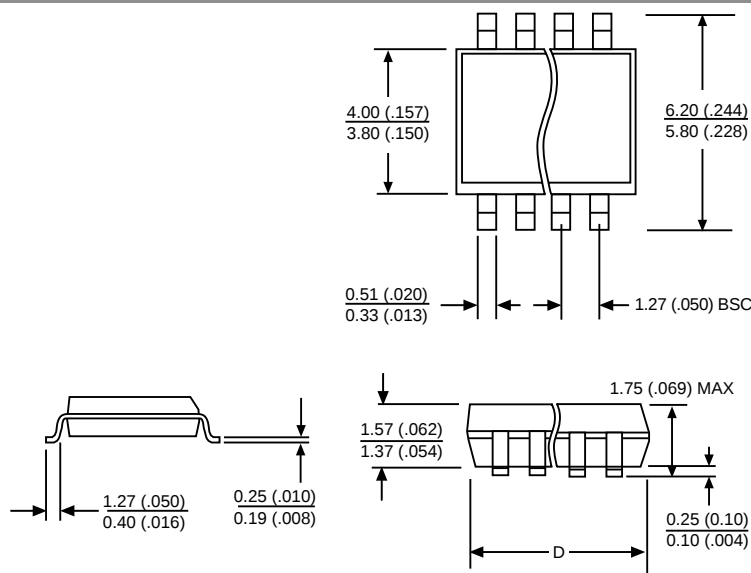
PACKAGE DIMENSIONS IN mm (INCHES)

Lead Count	D			
	Metric		English	
	Max	Min	Max	Min
8L SO Narrow	5.00	4.80	.197	.189

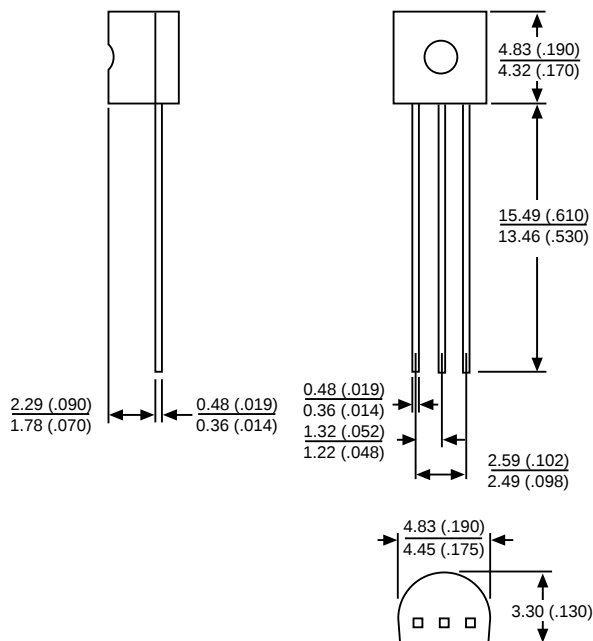
PACKAGE THERMAL DATA

Thermal Data		8L SO	TO-92	
R _{θJC}	typ	45	—	°C / W
R _{θJA}	typ	165	170	°C / W

Surface Mount Narrow Body (D); 150 mil wide



3 Lead TO-92 (Z)



Ordering Information

Part Number	Description
CS1009GD8	8 Lead SO Narrow
CS1009GDR8	8 Lead SO Narrow (tape & reel)
CS1009GZ3	3 Lead TO-92
CS1009GZR3	3 Lead TO-92 (tape & reel)

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