Advanced Monolithic Systems

AMS236/AMS336

VOLTAGE REFERENCE DIODE

RoHS compliant

FEATURES

- **Low Temperature Coefficient**
- **Wide Operating Current Range**
- **Guaranteed Temperature Stability**
- **Max. 0.6Ω Dynamic Impedance (A grade)**
- **±1% Initial Tolerance Available**

APPLICATIONS

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

GENERAL DESCRIPTION

The AMS236/AMS336 are precision band-gap voltage reference diodes. These 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 trimmed ±5%.

The AMS236/AMS336 are 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.

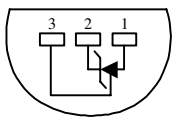
The AMS236 is rated for operation over -25°C to +85°C while the AMS336 is rated over a 0°C to 70°C temperature range. The AMS236/AMS336 are available in TO-92 and SO-8 packages.

ORDERING INFORMATION:

TOL.	PACKAGE TYPE		OPERATING TEMPERATURE RANGE
	TO-92	8 LEAD SOIC	
±25mV	AMS236AN	AMS236AS	-25°C to +85°C
±50mV	AMS236BN	AMS236BS	-25°C to +85°C
±50mV	AMS336AN	AMS336AS	0°C to 70°C
±100mV	AMS336BN	AMS336BS	0°C to 70°C

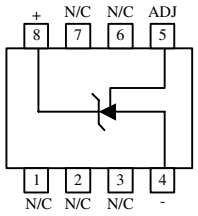
PIN CONNECTIONS

TO-92
Plastic Package (N)



Bottom View

8L SOIC
SO Package (S)



Top View

ABSOLUTE MAXIMUM RATINGS (Note 1)

Reverse Current	15mA	Storage temperature	-55°C to +150°C
Forward Current	10mA	Soldering information (25 sec)	265°C
Operating Temperature Range			
AMS236	-25°C to +85°C		
AMS336	0°C to +70°C		

ELECTRICAL CHARACTERISTICS

Electrical Characteristics at I_R = 1 mA, and T_A = +25°C unless otherwise specified.

Parameter	Conditions	AMS236A Min	AMS236A Typ	AMS236A Max	AMS236B Min	AMS236B Typ	AMS236B Max	Units
Reverse Breakdown Voltage		2.475	2.500	2.525	2.450	2.500	2.550	V
Reverse Dynamic Impedance	f = 100Hz		0.2 **0.4**	0.6 **1**		0.2 **0.4**	0.6 **1**	Ω
Reverse Breakdown Voltage Change with current	400μA ≤I_R ≤10mA		2.6 **3**	6 **10**		2.6 **3**	6 **10**	mV
Temperature Stability	-25°C ≤ T_A ≤ +85°C		3.5	9		3.5	9	mV
Long Term Stability (Note 4)	T_A=25°C±0.1°C T = 1000 Hr		20			20		ppm

ELECTRICAL CHARACTERISTICS

Electrical Characteristics at I_R = 1 mA, and T_A = +25°C unless otherwise specified.

Parameter	Conditions	AMS336A Min	AMS336A Typ	AMS336A Max	AMS336B Min	AMS336B Typ	AMS336B Max	Units
Reverse Breakdown Voltage		2.450	2.500	2.550	2.400	2.500	2.600	V
Reverse Dynamic Impedance	f = 100Hz		0.2 **0.4**	1.0 **1.4**		0.2 **0.4**	1.0 **1.4**	Ω
Reverse Breakdown Voltage Change with current	400μA ≤I_R ≤10mA		2.6 **3**	10 **12**		2.6 **3**	10 **12**	mV
Temperature Stability	0°C ≤ T_A ≤ 70°C		1.8	6		1.8	6	mV
Long Term Stability (Note 4)	T_A=25°C±0.1°C T = 1000 Hr		20			20		ppm

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:

AMS236 +125°C
AMS336 +100°C

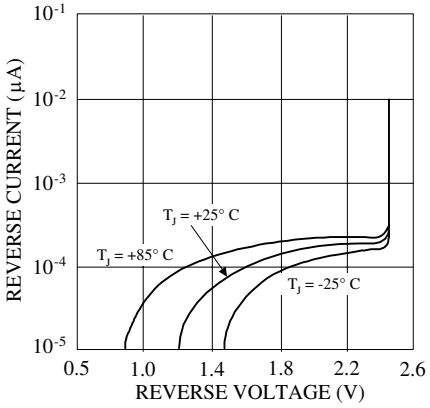
Thermal Resistance	TO-92	SO-8
φ_{JA} (junction to ambient)	170°C/W (0.125" leads)	165°C/W

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

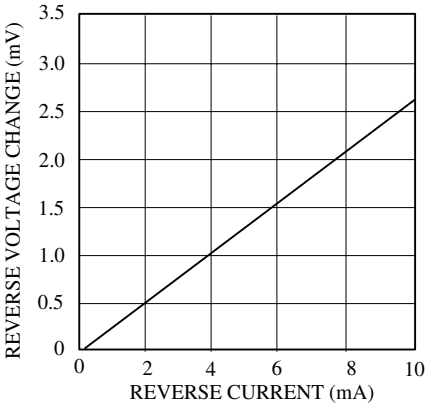
Note 4: Temperature stability for the AMS236/336 family is guaranteed by design. Design limits are guaranteed (but not 100% production tested) over the specified temperature and supply voltage ranges. These limits are not used to calculate outgoing quality levels. The average temperature coefficient 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}.

TYPICAL PERFORMANCE CHARACTERISTICS

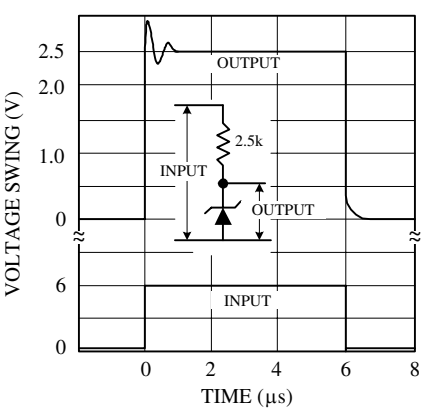
Reverse Characteristics



Reverse Voltage Change

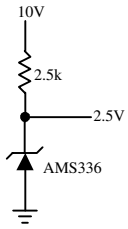


Response Time

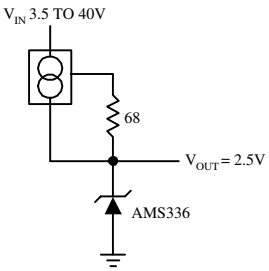


TYPICAL APPLICATIONS

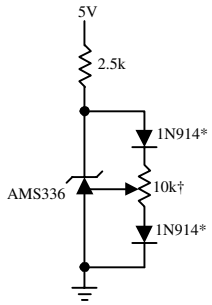
2.5V Reference



Wide Input Range Reference

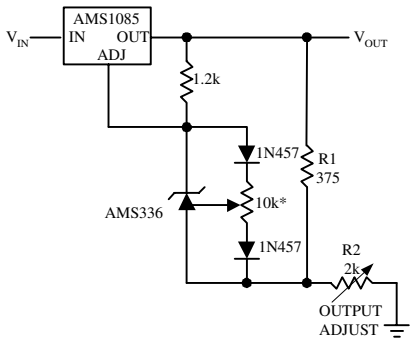


2.5V Reference with Minimum Temperature Coefficient

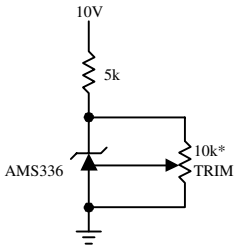


† Adjust to 2.50V
* Any silicon signal diode

Precision Power Regulator with Low Temperature Coefficient



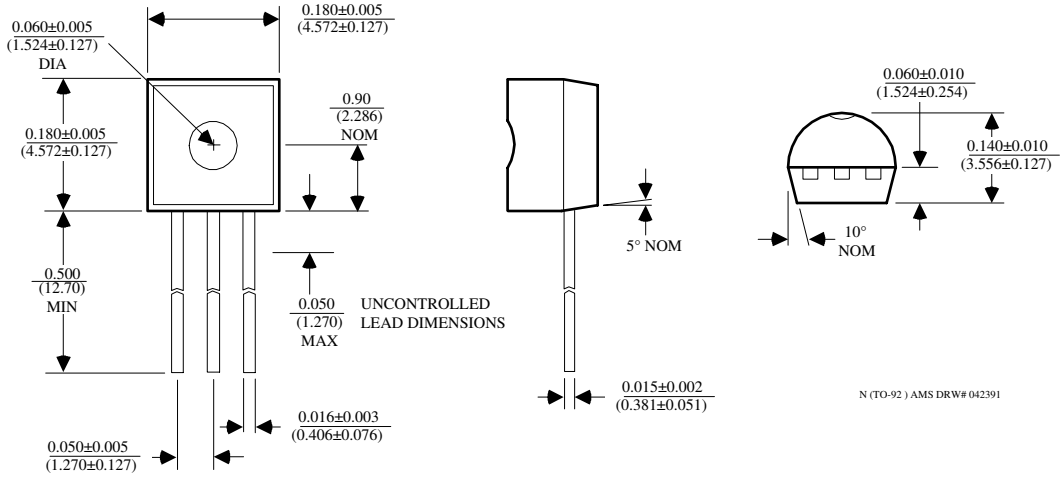
Trimmed 2.5V Reference with Temperature Coefficient Independent of Breakdown Voltage



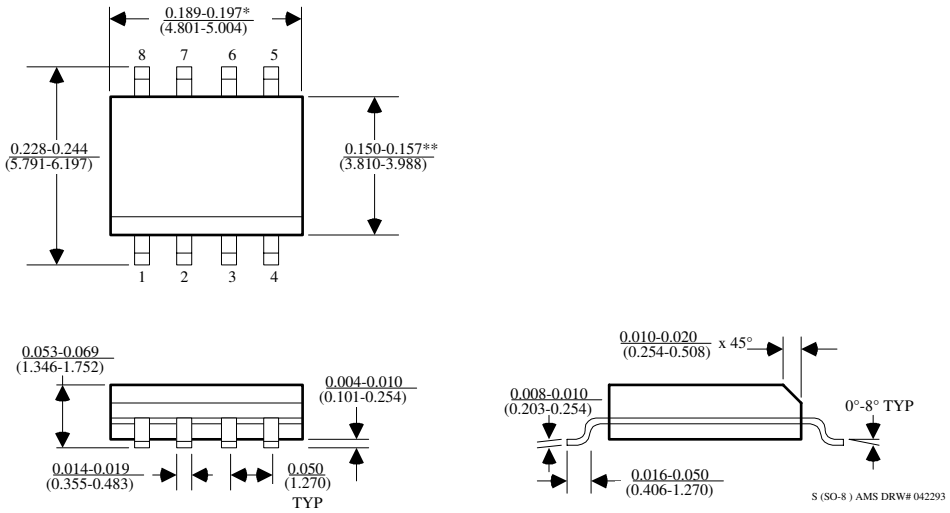
*Does not affect Temperature Coefficient

PACKAGE DIMENSIONS inches (millimeters) unless otherwise noted.

3 LEAD TO-92 PLASTIC PACKAGE (N)



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