

FEATURES

- *Guaranteed* Temperature Stability
- Maximum 0.6Ω Dynamic Impedance
- Adjustable for Minimum Temperature Coefficient
- Wide Operating Current Range

APPLICATIONS

- Reference for 5V Systems
- 8 Bit A/D and D/A Reference
- Digital Voltmeters
- Current Loop Measurement and Control Systems
- Power Supply Monitor

DESCRIPTION

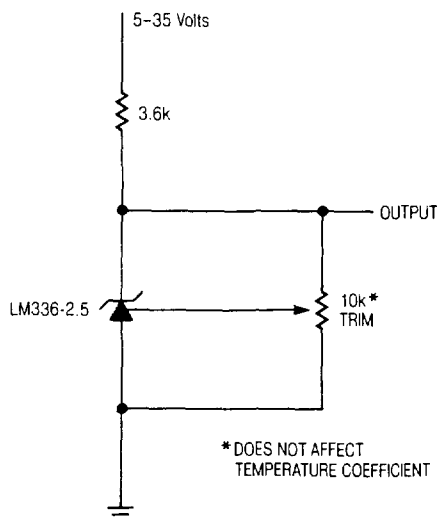
The LM136-2.5 is a general purpose shunt regulator diode designed to operate over a wide current range while maintaining good stability with time and temperature. The third terminal allows either the temperature coefficient to be minimized or the reference voltage to be adjusted without changing the temperature coefficient. Because it operates as a shunt regulator it can be used equally well as a positive or negative reference.

The LM136-2.5 is available with initial tolerances as low as 1% in either a TO-46 metal can for hermetic requirements or a low cost TO-92 plastic package.

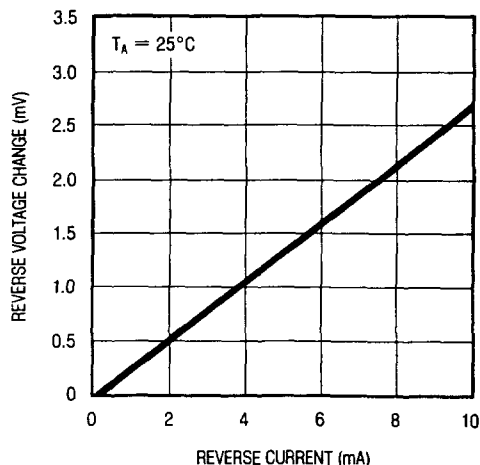
Linear's advanced design, test and process techniques have optimized the LM136-2.5 to achieve superior performance and reliability over previous designs. For more demanding precision reference applications requiring very low initial tolerance and temperature coefficients, consult the LT1009 data sheet. A typical 2.5 Volt reference with trim is shown below.

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2.5 Volt Reference



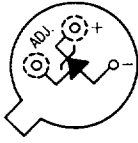
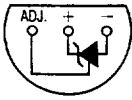
Reverse Voltage Change



ABSOLUTE MAXIMUM RATINGS

Reverse Current	15mA
Forward Current	10mA
Operating Temperature Range	
LM136-2.5	-55°C to 125°C
LM336-2.5	0°C to 70°C
Storage Temperature Range	
LM136-2.5	-65°C to 150°C
LM336-2.5	-65°C to 150°C
Lead Temperature (Soldering, 10 sec.)	300°C

PACKAGE/ORDER INFORMATION

 H PACKAGE TO-46 METAL CAN	LM136H-2.5 LM136AH-2.5 LM336H-2.5 LM336BH-2.5 *SEE NOTE 1
 Z PACKAGE TO-92 PLASTIC	LM336Z-2.5 LM336BZ-2.5 *SEE NOTE 1

ELECTRICAL CHARACTERISTICS (See Note 1)

SYMBOL	PARAMETER	CONDITIONS	LM136A/LM136			LM336B/LM336			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
V_Z	Reverse Breakdown Voltage	$T_A = 25^\circ\text{C}$, $I_R = 1\text{mA}$ LM136/LM336 LM136A/LM336B	2.440	2.490	2.540	2.390	2.490	2.590	V
			2.465	2.490	2.515	2.440	2.490	2.540	V
$\frac{\Delta V_Z}{\Delta I_R}$	Reverse Breakdown Change with Current	$400\mu\text{A} \leq I_R \leq 10\text{mA}$ $T_A = 25^\circ\text{C}$ $T_{\min} \leq T_A \leq T_{\max}$	●	2.6	6		2.6	10	mV
				3	10		3	12	mV
r_Z	Reverse Dynamic Impedance	$I_R = 1\text{mA}$ $T_A = 25^\circ\text{C}$ $T_{\min} \leq T_A \leq T_{\max}$	●	0.2	0.6		0.2	1.0	Ω
				0.4	1		0.4	1.4	Ω
$\frac{\Delta V_Z}{\Delta \text{Temp}}$	Temperature Stability	V_R adjusted to 2.490V, $I_R = 1\text{mA}$ $T_{\min} \leq T_A \leq T_{\max}$ LM136A/LM136 LM336B/LM336 (See Figure 1.)	●	12	18				mV
			●				1.8	6	mV
$\frac{\Delta V_Z}{\Delta \text{Time}}$	Long Term Stability	$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$, $I_R = 1\text{mA}$		20			20		ppm/kHr

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

Note 1: The LT1009 is an improved, low cost, pin for pin replacement for the "A" and "B" versions. For further information consult the LT1009 data sheet.

Adjusting the LM336 for minimum temperature coefficient

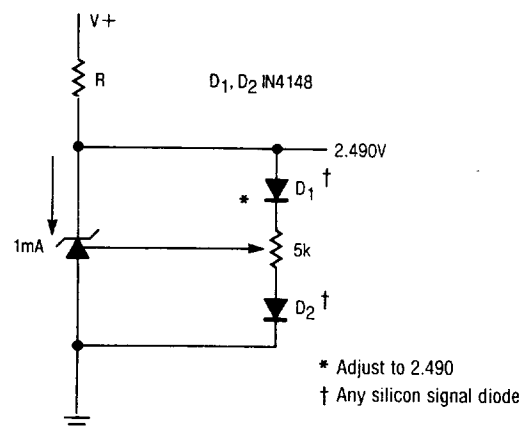
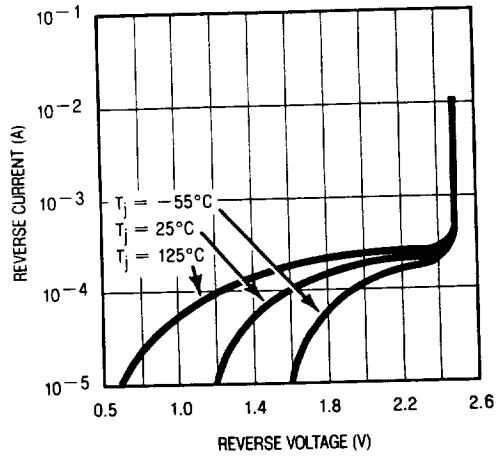


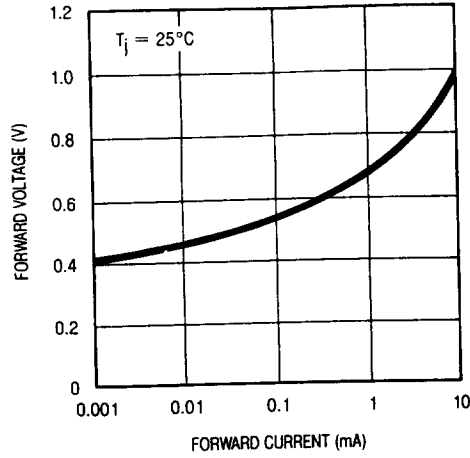
Figure 1

TYPICAL PERFORMANCE CHARACTERISTICS

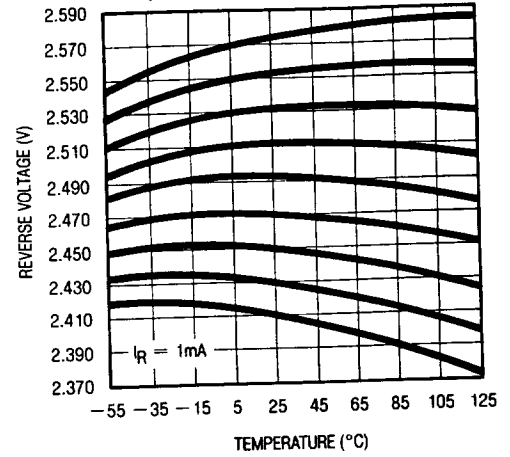
Reverse Characteristics



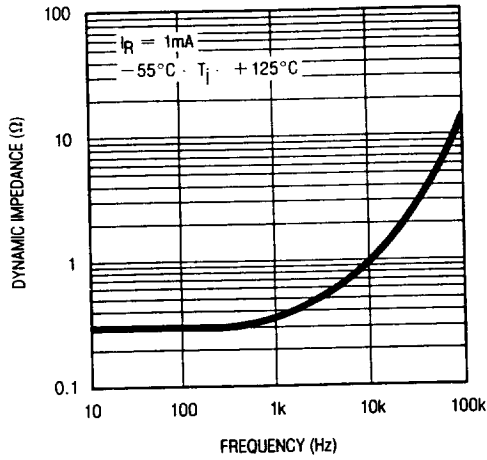
Forward Characteristics



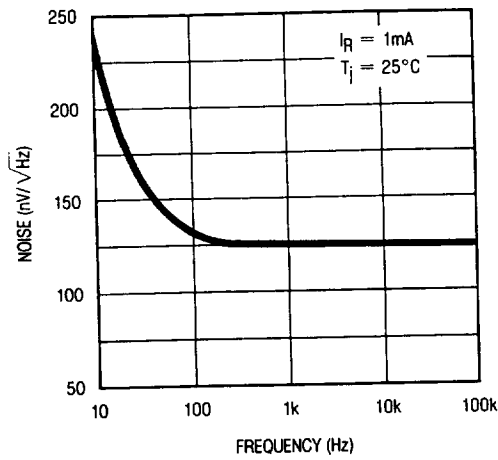
Temperature Drift



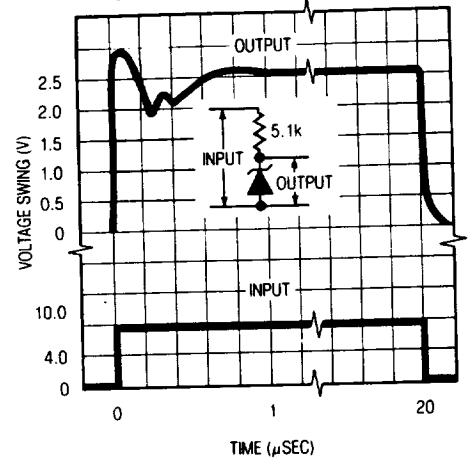
Dynamic Impedance



Zener Noise Voltage

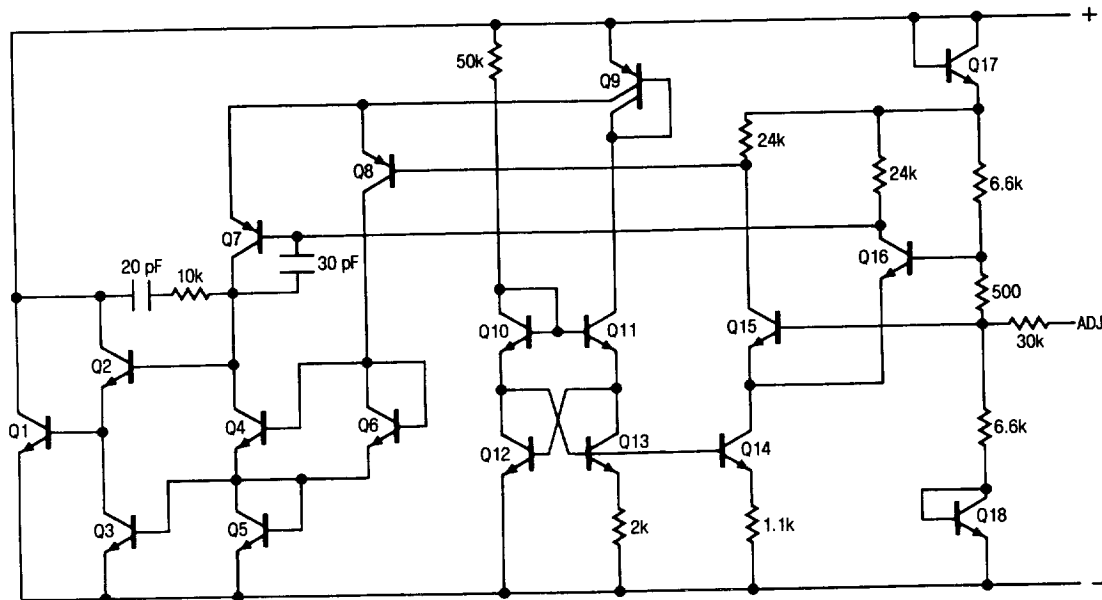


Response Time



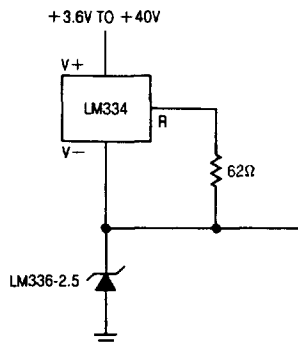
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SCHEMATIC DIAGRAM

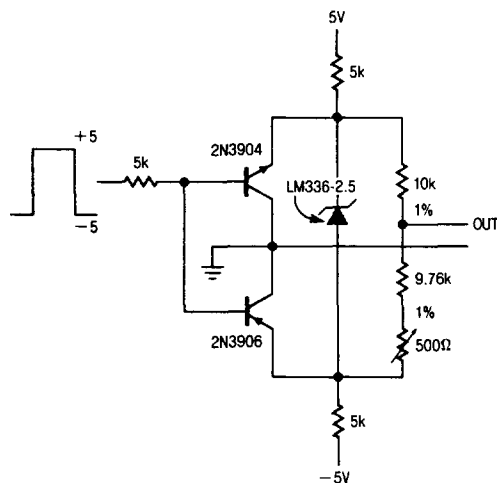


TYPICAL APPLICATIONS

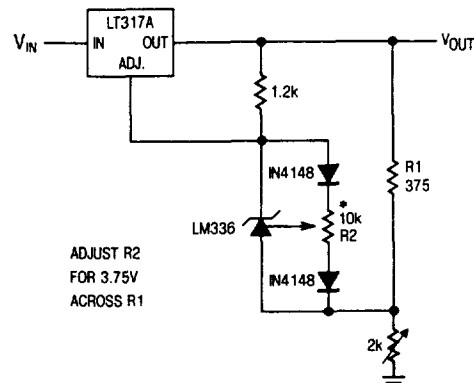
Wide Supply Range, Reference



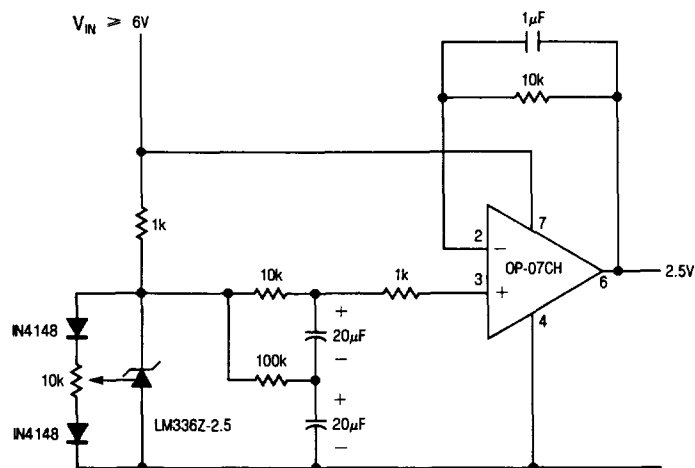
Switchable $\pm 1.25V$ Bipolar Reference



Low Temperature Coefficient Power Regulator

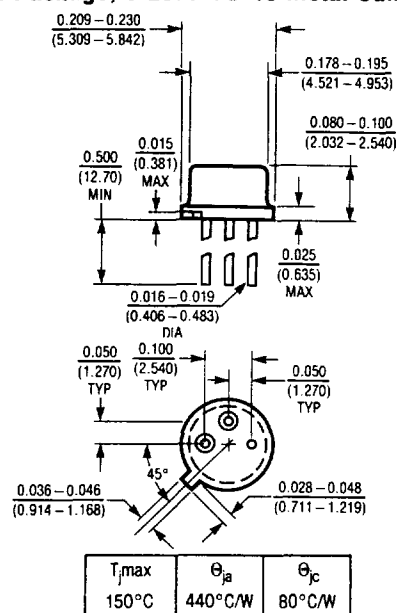


Low Noise 2.5V Buffered Reference



PACKAGE DESCRIPTION

H Package, 3 Lead TO-46 Metal Can



Z Package, 3 Lead TO-92 Plastic

