

## FEATURES

- 15 $\mu$ A to 20mA Operating Range—1.2V Version
- 20 $\mu$ A to 20mA Operating Range—2.5V Version
- *Guaranteed* 1 $\Omega$  Dynamic Impedance
- Very Low Power Consumption

## APPLICATIONS

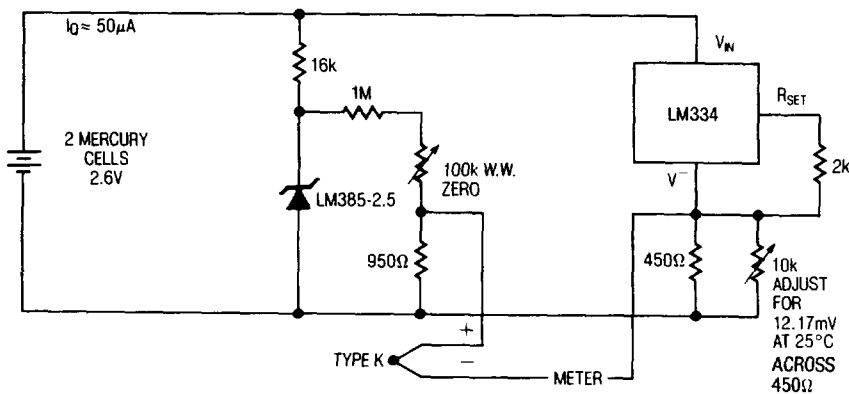
- Portable Meter References
- Portable Test Instruments
- Battery Operated Systems
- Panel Meters
- Current Loop Instrumentation

## DESCRIPTION

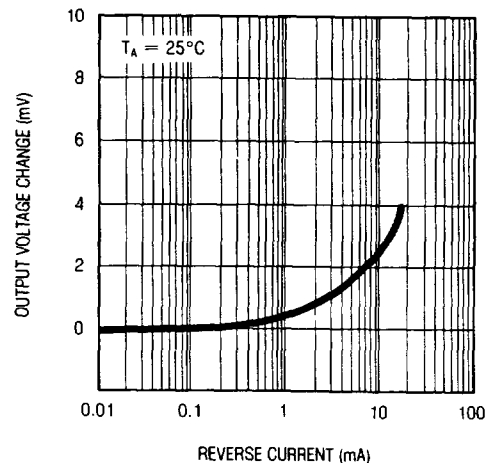
The LM385 series are two terminal band gap reference diodes that have been designed for applications which require precision performance with micropower operation. The devices provide guaranteed operating specifications at currents as low as 15 $\mu$ A. Some additional features are: maximum dynamic impedance of 1 $\Omega$ , low noise and excellent stability over time and temperature. The advanced design, processing and testing techniques make Linear's LM385 series a superior choice over previous designs. A circuit for cold junction compensation of a thermocouple is shown below.

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Thermocouple Cold Junction Compensator



Reverse Voltage Change with Current (LM385-1.2)



# LM385S8-1.2/LM385S8-2.5

## ABSOLUTE MAXIMUM RATINGS

Reverse Breakdown Current	30mA
Forward Current	10mA
Operating Temperature Range	0°C to 70°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 sec.)	300°C

## PACKAGE/ORDER INFORMATION

<p>S8 PACKAGE PLASTIC SO</p>	ORDER PART NUMBER
	LM385S8-1.2 LM385S8-2.5
	PART MARKING
	3851 (1.2V VERSION) 3852 (2.5V VERSION)

## ELECTRICAL CHARACTERISTICS (See Note 1)

SYMBOL	PARAMETER	CONDITIONS	LM385-1.2			LM385-2.5			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
$V_Z$	Reverse Breakdown Voltage	$T_A = 25^\circ\text{C}$ , $20\mu\text{A} \leq I_R \leq 20\text{mA}$	1.205	1.235	1.260	2.425	2.5	2.575	V
$\frac{\Delta V_Z}{\Delta \text{Temp}}$	Average Temperature Coefficient	$I_{\text{MIN}} \leq I_R \leq 20\text{mA}$ (Note 2)	20			20			ppm/°C
$I_{\text{min}}$	Minimum Operating Current	$T_{\text{min}} \leq T_A \leq T_{\text{max}}$	● 8 15			8 20			μA
$\frac{\Delta V_Z}{\Delta I_R}$	Reverse Breakdown Voltage Change with Current	$I_{\text{min}} \leq I_R \leq 1\text{mA}$ $T_A = 25^\circ\text{C}$ $T_{\text{min}} \leq T_A \leq T_{\text{max}}$	● 1 1.5			2 2.5			mV mV
		$1\text{mA} \leq I_R \leq 20\text{mA}$ $T_A = 25^\circ\text{C}$ $T_{\text{min}} \leq T_A \leq T_{\text{max}}$	● 20 25			20 25			mV mV
			● 0.4 1 1.5			0.4 1 1.5			Ω Ω
$r_z$	Reverse Dynamic Impedance	$I_R = 100\mu\text{A}$ $T_A = 25^\circ\text{C}$ $T_{\text{min}} \leq T_A \leq T_{\text{max}}$	● 0.4 1 1.5			0.4 1 1.5			Ω Ω
$e_n$	Wide Band Noise (RMS)	$10\text{Hz} \leq f \leq 10\text{kHz}$ , $I_R = 100\mu\text{A}$	60			120			μV
$\frac{\Delta V_Z}{\Delta \text{Time}}$	Long Term Stability	$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ , $I_R = 100\mu\text{A}$	20			20			ppm/kHr

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

**Note 1:** All specifications are for  $T_A = 25^\circ\text{C}$  unless otherwise noted.  
 $T_{\text{min}} = 0^\circ\text{C}$  and  $T_{\text{max}} = +70^\circ\text{C}$ .

**Note 2:** For guaranteed TC and very low initial tolerance, consult LT1034CS8 data sheet. The LT1034CS8 is a low cost, pin for pin substitution device.