

FEATURES

- *Guaranteed* 10ppm/°C Temperature Coefficient
- *Guaranteed* 1Ω Maximum Dynamic Impedance
- *Guaranteed* 20μV Maximum Wideband Noise
- Wide Operating Current Range 0.6mA to 15mA

APPLICATIONS

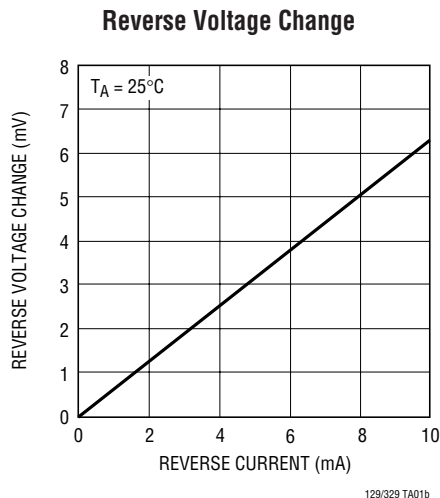
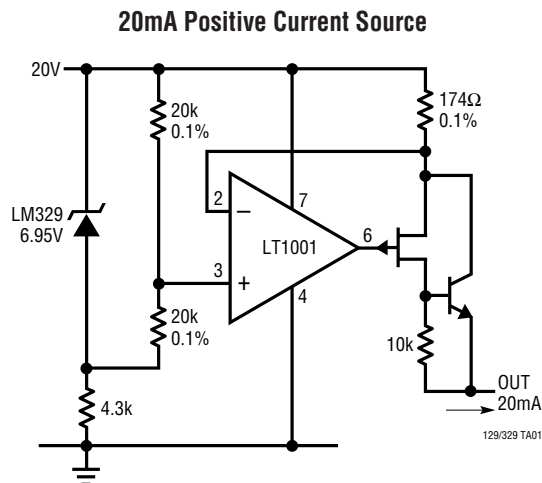
- Transducers
- A/D and D/A Converters
- Calibration Standards
- Instrumentation Reference

DESCRIPTION

The LM129 temperature compensated 6.9V zener references provide excellent stability over time and temperature, very low dynamic impedance and a wide operating current range. The device achieves low dynamic impedance by incorporating a high gain shunt regulator around the zener. The excellent noise performance of the device is achieved by using a “buried zener” design which eliminates surface noise phenomenon associated with ordinary zeners. To serve a wide variety of applications, the LM129 is available in several temperature coefficient grades and two package styles. A 20mA positive current source application is shown below.

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TYPICAL APPLICATION



LM129/LM329

ABSOLUTE MAXIMUM RATINGS (Note 1)

Operating Temperature Range

LM129 (OBSOLETE) -55°C to 125°C

LM329 0°C to 70°C

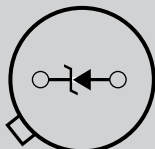
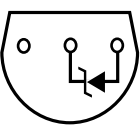
Storage Temperature Range -65°C to 150°C

Lead Temperature (Soldering, 10 sec) 300°C

Reverse Breakdown Current 30mA

Forward Current 2mA

PACKAGE/ORDER INFORMATION

 BOTTOM VIEW H PACKAGE 2-LEAD TO-46 METAL CAN $T_{JMAX} = 150^{\circ}\text{C}$, $\theta_{JA} = 440^{\circ}\text{C/W}$, $\theta_{JC} = 80^{\circ}\text{C/W}$ OBSOLETE PACKAGE Consider the Z Package for Alternate Source	ORDER PART NUMBER	 BOTTOM VIEW Z PACKAGE 3-LEAD PLASTIC TO-92 $T_{JMAX} = 150^{\circ}\text{C}$, $\theta_{JA} = 160^{\circ}\text{C/W}$	ORDER PART NUMBER
	LM129AH LM329AH LM129BH LM329BH LM129CH LM329CH LM329DH		LM329AZ LM329BZ LM329CZ LM329DZ

Consult LTC Marketing for availability of LM329AZ, LM329CZ and LM329DZ

ELECTRICAL CHARACTERISTICS The ● denotes the specifications which apply over the full operating temperature range, otherwise specifications are at $T_A = 25^{\circ}\text{C}$. (Note 2)

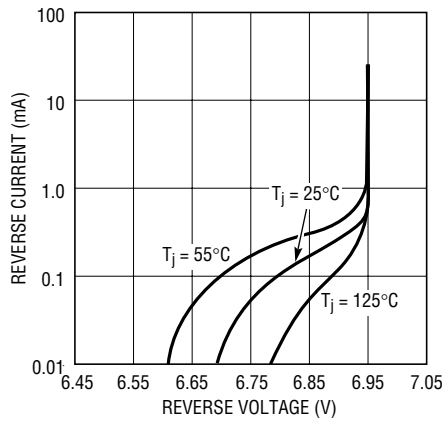
SYMBOL	PARAMETER	CONDITIONS		LM129A/ LM129B/LM129C			LM329A/LM329B/ LM329C/LM329D			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	
V_Z	Reverse Breakdown Voltage	$T_A = 25^{\circ}\text{C}$, $0.6\text{mA} \leq I_R \leq 15\text{mA}$		6.7	6.9	7.2	6.6	6.9	7.25	V
$\frac{\Delta V_Z}{\Delta I_R}$	Reverse Breakdown Voltage Change with Current	$T_A = 25^{\circ}\text{C}$, $0.6\text{mA} \leq I_R \leq 15\text{mA}$ $1\text{mA} \leq I_R \leq 15\text{mA}$	●		9 12	14		9 12	20	mV mV
$\frac{\Delta V_Z}{\Delta T_{\text{Temp}}}$	Temperature Coefficient	$I_R = 1\text{mA}$, LM129A/LM329A LM129A/LM329B LM129A/LM329C LM329D	● ● ● ●		6 15 30	10 20 50		6 15 30 50	10 20 50 100	ppm/ $^{\circ}\text{C}$ ppm/ $^{\circ}\text{C}$ ppm/ $^{\circ}\text{C}$ ppm/ $^{\circ}\text{C}$
	Change in Temperature Coefficient	$1\text{mA} \leq I_R \leq 15\text{mA}$	●		1			1		ppm/ $^{\circ}\text{C}$
r_Z	Dynamic Impedance	$T_A = 25^{\circ}\text{C}$, $I_R = 1\text{mA}$ $1\text{mA} \leq I_R \leq 15\text{mA}$	●		0.6 0.8	1		0.8 1	2	Ω Ω
e_n	RMS Noise	$T_A = 25^{\circ}\text{C}$, $10\text{Hz} \leq f \leq 10\text{kHz}$			7	20		7	100	μV
$\frac{\Delta V_Z}{\Delta \text{Time}}$	Long Term Stability	$T_A = 45^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_R = 1\text{mA} \pm 0.3\%$			20			20		ppm/kHr

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: To determine the junction temperature as a function of the ambient temperature, see θ_{JA} for each package.

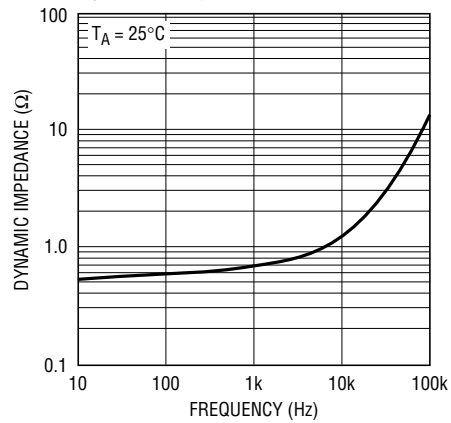
TYPICAL PERFORMANCE CHARACTERISTICS

Reverse Characteristics



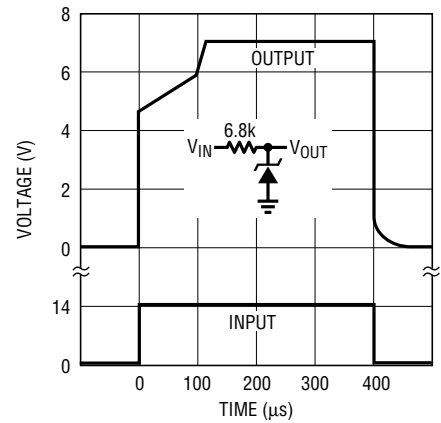
129/329 G01

Dynamic Impedance



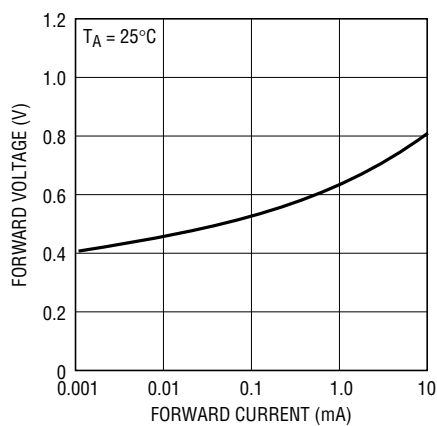
129/329 G02

Response Time



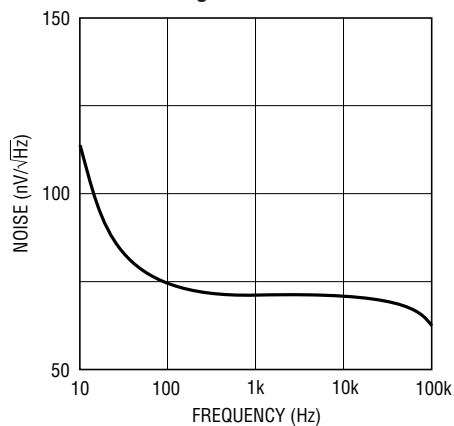
129/329 G03

Forward Characteristics



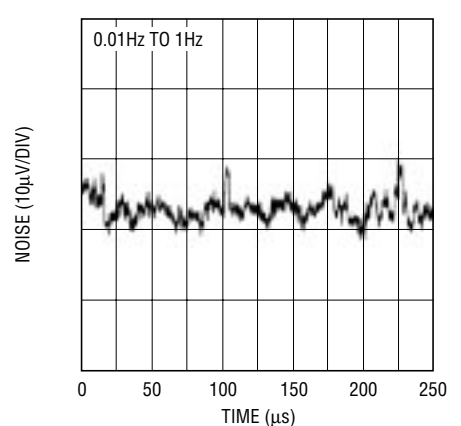
129/329 G04

Noise Voltage



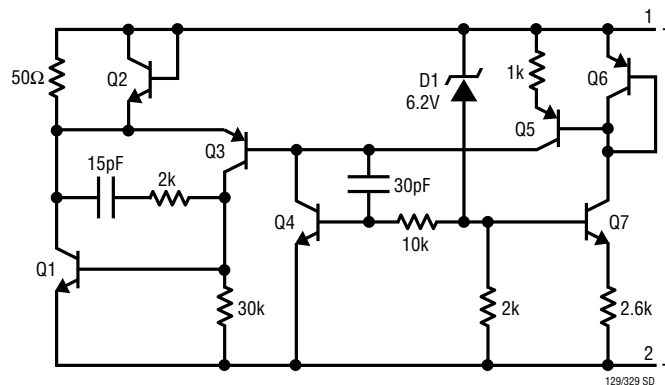
129/329 G05

Low Frequency Noise Voltage



129/329 G06

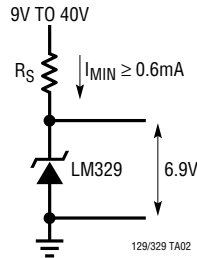
SCHEMATIC DIAGRAM



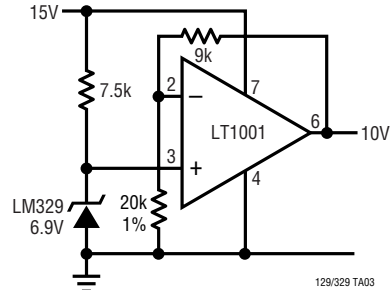
129/329 SD

TYPICAL APPLICATIONS

Common Reference

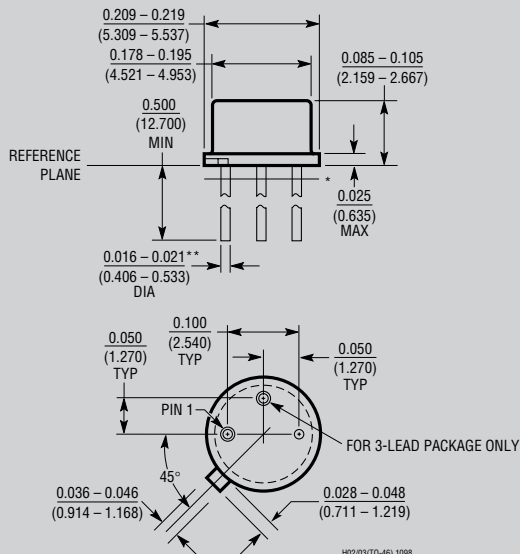


Buffered Reference Using a Single Supply



PACKAGE DESCRIPTION

H Package 2-Lead and 3-Lead TO-46 Metal Can (Reference LTC DWG # 05-08-1340)

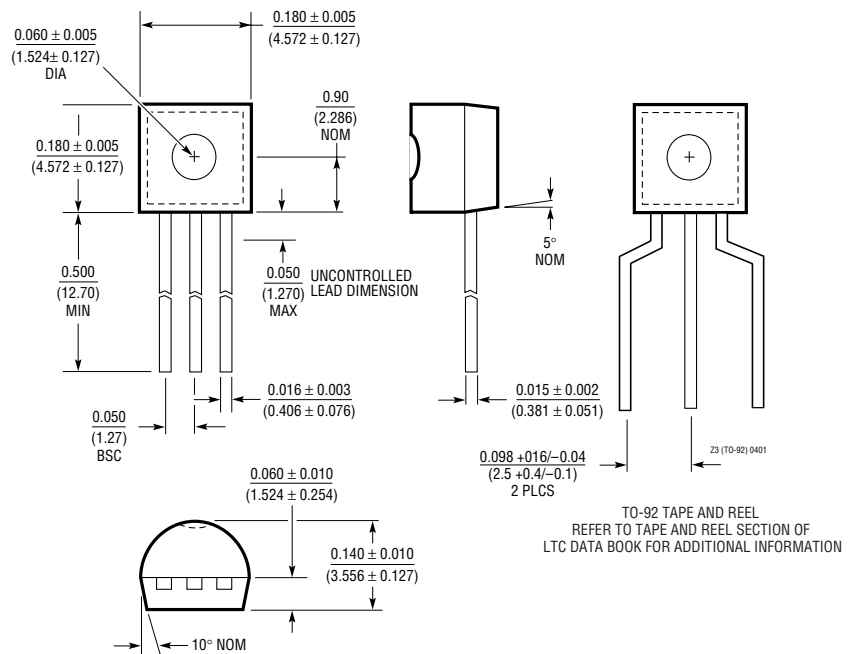


* LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND 0.045" BELOW THE REFERENCE PLANE

** FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS 0.016 - 0.024 (0.406 - 0.610)

OBSOLETE PACKAGE

Z Package 3-Lead Plastic TO-92 (Similar to TO-226) (Reference LTC DWG # 05-08-1410)



TO-92 TAPE AND REEL
REFER TO TAPE AND REEL SECTION OF
LTC DATA BOOK FOR ADDITIONAL INFORMATION

RELATED PARTS

PART NUMBER	DESCRIPTION	COMMENTS
LT1460	Micropower, Precise Series Reference	10ppm/°C, Output Voltages: 2.5V, 3V, 3.3V, 5V, 10V
LT1634	0.05% Accurate, 10ppm/°C, Shunt Reference	Output Voltages: 1.25V, 2.5V, 4.096V, 5V