6.9V Precision Voltage Reference

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

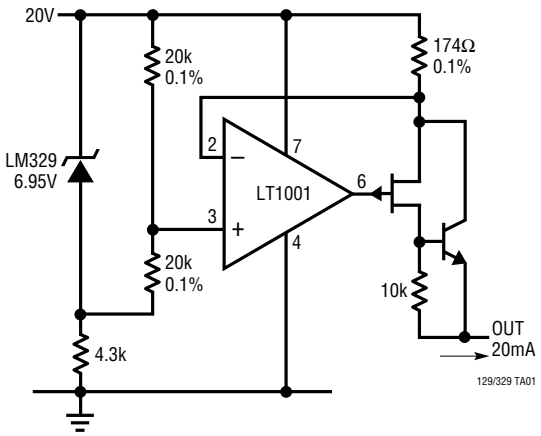
- Transducers
- A/D and D/A Converters
- Calibration Standards
- Instrumentation Reference

DESCRIPTION

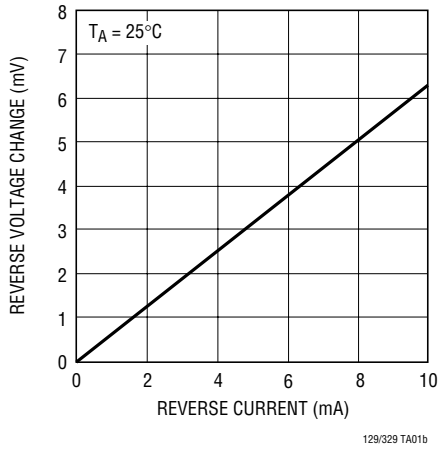
The LM129 temperature compensated 6.9V zener references provide excellent stability over time and temperature, very low dynamic impedance and a wide operating current range. The device achieves low dynamic impedance by incorporating a high gain shunt regulator around the zener. The excellent noise performance 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.

TYPICAL APPLICATION

20mA Positive Current Source



Reverse Voltage Change



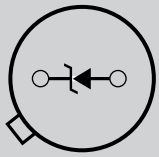
ABSOLUTE MAXIMUM RATINGS (Note 1)

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



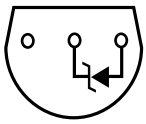
H PACKAGE
2-LEAD TO-46 METAL CAN
T_{JMAX} = 150°C,
θ_{JA} = 440°C/W, θ_{JC} = 80°C/W

ORDER PART NUMBER

LM129AH LM329AH
LM129BH LM329BH
LM129CH LM329CH
LM329DH

OBSOLETE PACKAGE
Consider the Z Package for Alternate Source

BOTTOM VIEW



Z PACKAGE
3-LEAD PLASTIC TO-92
T_{JMAX} = 150°C, θ_{JA} = 160°C/W

ORDER PART NUMBER

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°C. (Note 2)

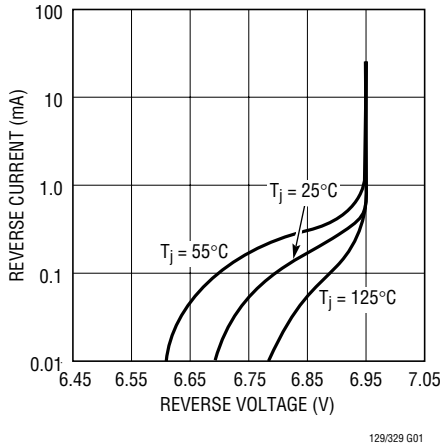
SYMBOL	PARAMETER	CONDITIONS		LM129A/ LM129B/LM129C MIN	LM129A/ LM129B/LM129C TYP	LM129A/ LM129B/LM129C MAX	LM329A/LM329B/ LM329C/LM329D MIN	LM329A/LM329B/ LM329C/LM329D TYP	LM329A/LM329B/ LM329C/LM329D MAX	UNITS
V_Z	Reverse Breakdown Voltage	T_A = 25°C, 0.6mA ≤ I_R ≤ 15mA		6.7	6.9	7.2	6.6	6.9	7.25	V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

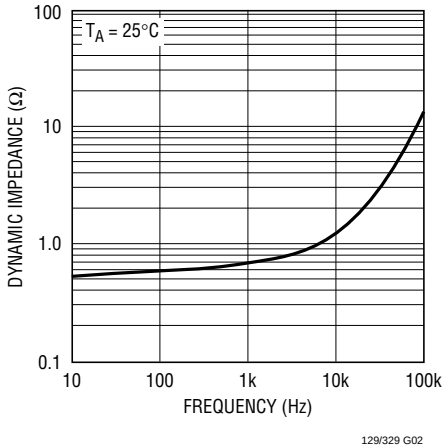
TYPICAL PERFORMANCE CHARACTERISTICS

Reverse Characteristics



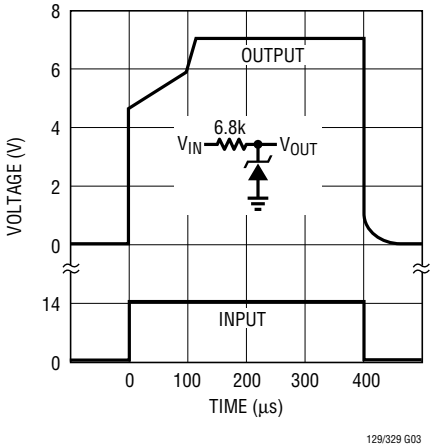
129/329 G01

Dynamic Impedance



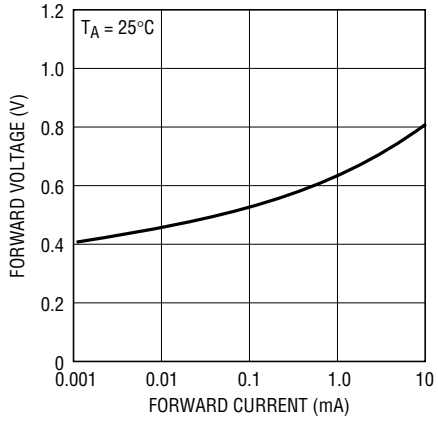
129/329 G02

Response Time



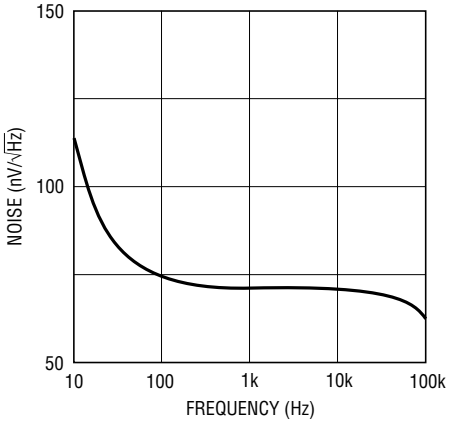
129/329 G03

Forward Characteristics



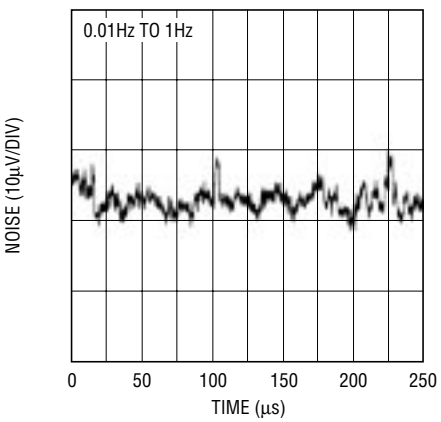
129/329 G04

Noise Voltage



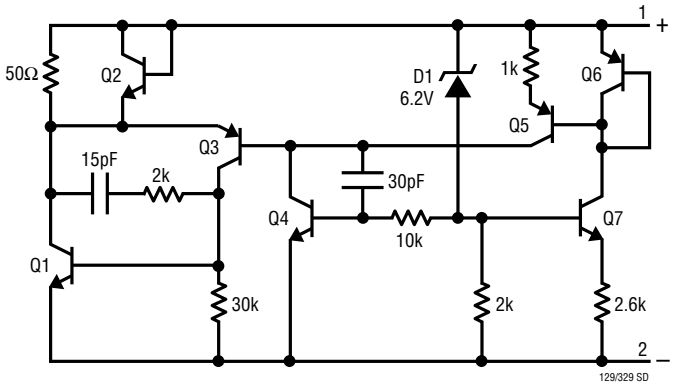
129/329 G05

Low Frequency Noise Voltage



129/329 G06

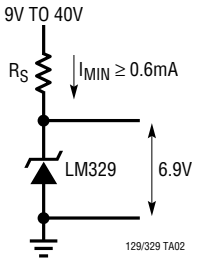
SCHEMATIC DIAGRAM



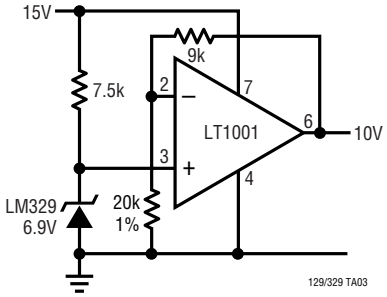
129/329 SD

TYPICAL APPLICATIONS

Common Reference

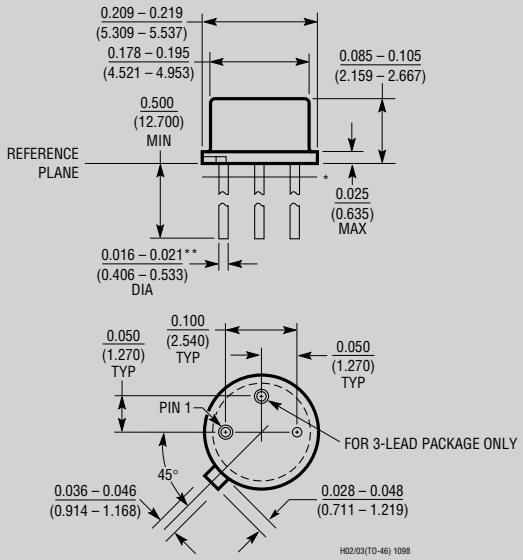


Buffered Reference Using a Single Supply



PACKAGE DESCRIPTION

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

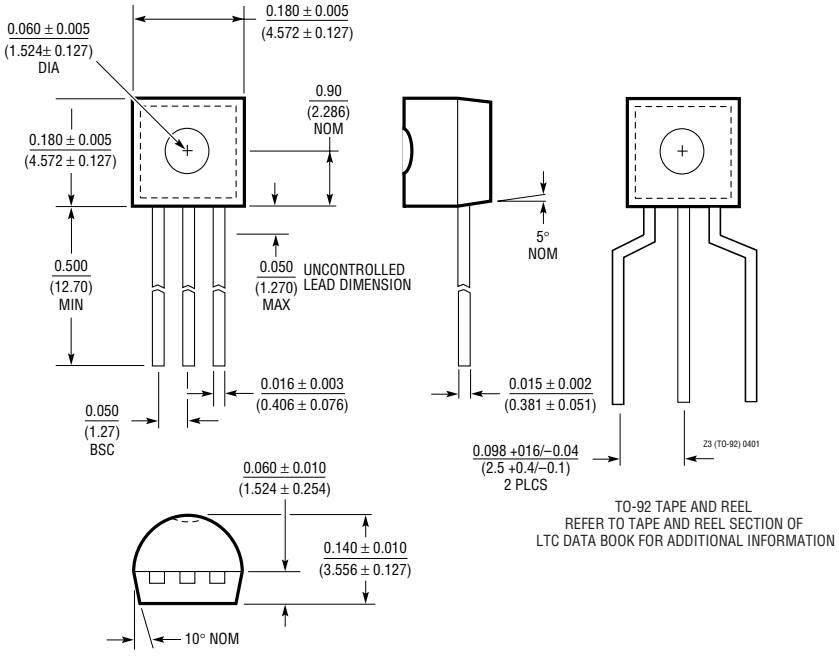


*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND 0.045" BELOW THE REFERENCE PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{0.016 - 0.024}{(0.406 - 0.610)}$

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

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