National Semiconductor

MICROCIRCUIT DATA SHEET

MNLM129A-X REV 0CL

Original Creation Date: 07/10/95
Last Update Date: 02/24/03
Last Major Revision Date: 07/10/95

PRECISION REFERENCE

General Description

The LM129 is a precision multi-current temperature-compensated 6.9V zener reference with dynamic impedances a factor of 10 to 100 less than discrete diodes. Constructed in a single silicon chip, the LM129 uses active circuitry to buffer the internal zener allowing the device to operate over a 0.5 mA to 15 mA range with virtually no change in performance. The LM129 is available with selected temperature coefficients of 0.001, 0.002, 0.005 and 0.01%/ C. These new references also have excellent long term stability and low noise.

A new subsurface breakdown zener used in the LM129 gives lower noise and better long-term stability than coventional IC zeners. Further the zener and temperature compensating transistor are made by a planar process so they are immune to problems that plague ordinary zeners. For example, there is virtually no voltage shift in zener voltage due to temperature cycling and the device is insenstive to stress on the leads.

The LM129 can be used in place of conventional zeners with improved performance. The low dynamic impedance simplifies biasing and the wide operating current allows the replacement of may zener types.

The LM129 is packaged in a 2-lead T0-46 package and is rated for operation over a -55 C to +125 C temperature range.

Industry Part Number

LM129

NS Part Numbers

LM129AH-SMD*
LM129AH/883

Prime Die

LM129

Controlling Document

5962-8992101XA*

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (^{o}C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

(Absolute Maximum Ratings)

Reverse Breakdown Current	mA
Forward Current	2 mA
Operating Temperature Range	
LM129	-55 C to +125 C
Storage Temperature Range	-55 C to +125 C
Soldering Information	
T0-92 Package 10 Sec.	260 C
T0-46 Package 10 Sec.	300 C
ESD Tolerance (Note 1)	3500V

Note 1: Human body model, 1.5k Ohms in series with 100pF

Electrical Characteristics

DC PARAMETERS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vr	Reverse Breakdown Voltage	0.6mA ≤ Ir ≤ 15 mA			6.7	7.2	V	1
Vr (I)	Reverse Breakdown Change w/Current	0.6mA ≤ Ir ≤ 15 mA				14	mV	1
Rr	Reverse Dynamic Impedance	Ir = 1mA	1			1	Ohm	1
Vn	RMS Noise	10Hz ≤ F ≤ 10KHz				20	uV	1
Iq	Quiescent Current					0.6	mA	1
Vnpk	Zener Peak Noise	10Hz < FREQ < 10KHz				80	uV	1
Vf	Forward Voltage	Ir = 1mA			-1	-0.2	V	1
Tc(1)	Temperature Coefficient	Ir = 1.9mA, -55 C < TA < 125 C	1, 2			10	ppm/C	1
Tc(2)	Temperature Coefficient	Ir = 1.9mA, -55 C < TA < 125 C	1, 2		-12.4	12.4	mV	1

Note 1: Parameter tested go-no-go only.
Note 2: Tested on the National Drift Oven, use program DRFT129XEE.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
0CL	M0004110	02/24/03	Rose Malone	Update MDS: MNLM129A-X, Rev. 0BL to MNLM129A-X, Rev. 0CL. Added ESD Level in Absolute Maximum Ratings Section.