

## DESCRIPTION

The RH129 precision reference features excellent stability over a wide range of voltage, temperature and operating current conditions. 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 usually associated with ordinary Zeners.

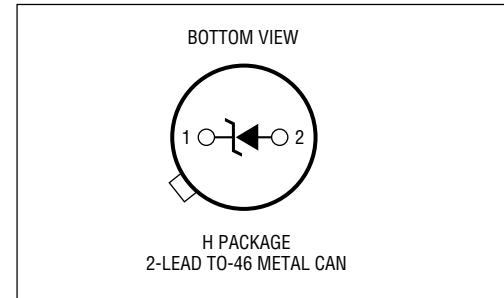
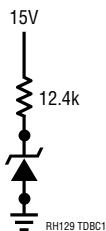
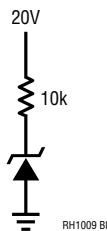
The wafer lots are processed to LTC's in-house Class S flow to yield circuits usable in stringent military applications.

## ABSOLUTE MAXIMUM RATINGS

Reverse Breakdown Current .....	30mA
Forward Current .....	2mA
Operating Temperature Range .....	-55°C to 125°C
Storage Temperature Range .....	-65°C to 150°C
Lead Temperature (Soldering, 10 sec) .....	300°C

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## BURN-IN CIRCUIT   TOTAL DOSE BIAS CIRCUIT   PACKAGE INFORMATION



**TABLE 1: ELECTRICAL CHARACTERISTICS** (Preirradiation)

SYMBOL	PARAMETER	CONDITIONS	NOTES	T <sub>A</sub> = 25°C			SUB-GROUP	-55°C			SUB-GROUP	UNITS
				MIN	TYP	MAX		MIN	TYP	MAX		
V <sub>Z</sub>	Reverse Breakdown Voltage	0.6mA I <sub>R</sub> 15mA		6.7	7.2	1						V
V <sub>Z</sub> I <sub>R</sub>	Reverse Breakdown Voltage Change with Current	0.6mA I <sub>R</sub> 15mA 1mA I <sub>R</sub> 15mA			14					12		mV mV
V <sub>Z</sub> Temp	Temperature Coefficient	I <sub>R</sub> = 1mA, RH129A RH129B RH129C								10 20 50	2, 3 2, 3 2, 3	ppm/°C ppm/°C ppm/°C
	Change in TC	1mA I <sub>R</sub> 15mA							1			ppm/°C
r <sub>Z</sub>	Dynamic Impedance	I <sub>R</sub> = 1mA 1mA I <sub>R</sub> 15mA	1		2					0.8		
en	RMS Noise	10Hz f 10kHz	2		20	1						µV
V <sub>Z</sub> Time	Long Term Stability	T <sub>A</sub> = 25°C ± 0.1°C, I <sub>R</sub> = 1mA ± 0.3%			20							ppm/kHr

**TABLE 1A: ELECTRICAL CHARACTERISTICS** (Postirradiation) (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	10KRAD(Si)		20KRAD(Si)		50KRAD(Si)		100KRAD(Si)		200KRAD(Si)		UNITS
				MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$V_Z$	Reverse Breakdown Voltage	0.6mV $I_R \leq 15\text{mA}$		6.7	7.2	6.7	7.2	6.7	7.2	6.7	7.2	6.7	7.2	V
$\frac{V_Z}{I_Z}$	Reverse Breakdown Voltage Change with Current	0.6mV $I_R \leq 15\text{mA}$			14		14		20		30		50	mV
$V_Z$	Temperature Coefficient	$I_R = 1\text{mA}$ , RH129A		10		10		10		15		20		ppm/ $^{\circ}\text{C}$
Temp		RH129B		20		20		20		25		30		ppm/ $^{\circ}\text{C}$
		RH129C		50		50		50		55		60		ppm/ $^{\circ}\text{C}$

**Note 1:** Guaranteed by design, characterization or correlation to other tested parameters.

**Note 2:** Guaranteed by correlation testing including enhancements for popcorn noise detection.

**Note 3:**  $T_A = 25^{\circ}\text{C}$  unless otherwise noted.

**TABLE 2: ELECTRICAL TEST REQUIREMENTS**

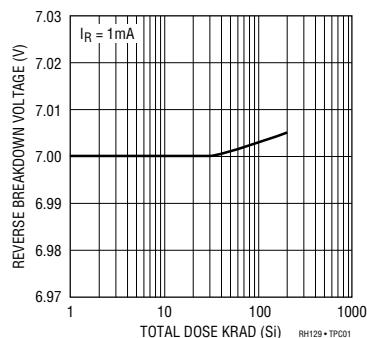
MIL-STD-883 TEST REQUIREMENTS	SUBGROUP
Final Electrical Test Requirements (Method 5004)	1*, 2, 3
Group A Test Requirements (Method 5005)	1, 2, 3
Group B and D for Class S and Group C and D for Class B	1
End Point Electrical Parameters (Method 5005)	

\* PDA Applies to subgroup 1. See PDA Test Notes.

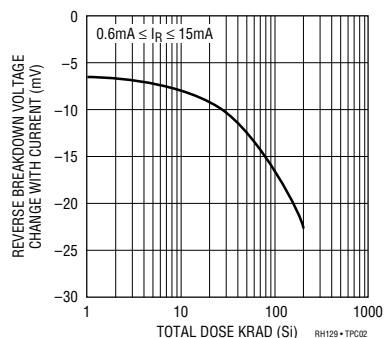
**PDA Test Notes:** The PDA is specified as 5% based on failures from group A, subgroup 1, tests after cooldown as the final electrical test in accordance with method 5004 of MIL-STD-883. The verified failures of group A, subgroup 1, after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent for the lot. Linear Technology Corporation reserves the right to test to tighter limits than those given.

## TYPICAL PERFORMANCE CHARACTERISTICS

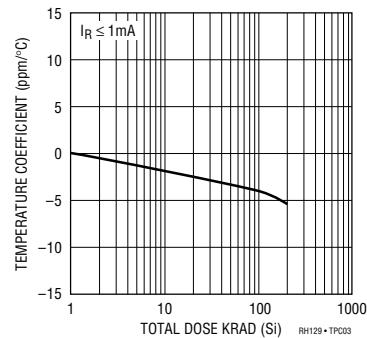
Reverse Breakdown Voltage



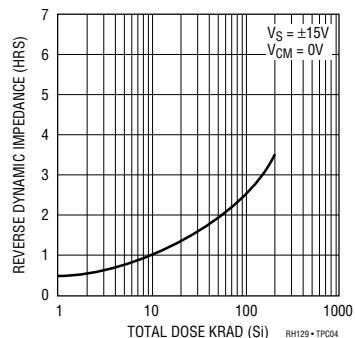
Reverse Breakdown Voltage Change with Current



Temperature Coefficient



Reverse Dynamic Impedance



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