

## 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.

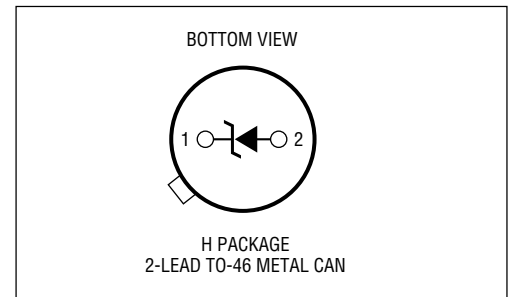
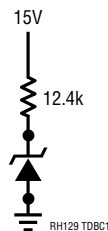
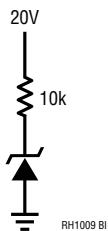
The wafer lots are processed to LTC's in-house Class S flow to yield circuits usable in stringent military applications.

## 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	$T_A = 25^\circ\text{C}$			SUB-GROUP	$-55^\circ\text{C}$ $T_A$ $125^\circ\text{C}$			SUB-GROUP	UNITS
				MIN	TYP	MAX		MIN	TYP	MAX		
$V_Z$	Reverse Breakdown Voltage	0.6mA $I_R$ 15mA		6.7		7.2	1					V
$\frac{V_Z}{I_R}$	Reverse Breakdown Voltage Change with Current	0.6mA $I_R$ 15mA 1mA $I_R$ 15mA				14			12			mV mV
$\frac{V_Z}{\text{Temp}}$	Temperature Coefficient	$I_R = 1\text{mA}$ , RH129A RH129B RH129C							10 20 50	2, 3 2, 3 2, 3		ppm/°C ppm/°C ppm/°C
	Change in TC	1mA $I_R$ 15mA							1			ppm/°C
$r_Z$	Dynamic Impedance	$I_R = 1\text{mA}$ 1mA $I_R$ 15mA	1			2			0.8			
$e_n$	RMS Noise	10Hz $f$ 10kHz	2			20	1					$\mu\text{V}$
$\frac{V_Z}{\text{Time}}$	Long Term Stability	$T_A = 25^\circ\text{C} \pm 0.1^\circ\text{C}$ , $I_R = 1\text{mA} \pm 0.3\%$				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 $I_R$ 15mA		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 $I_R$ 15mA			14		14		20		30		50	mV
$\frac{V_Z}{Temp}$	Temperature Coefficient	$I_R = 1mA$ , RH129A -55°C $T_A$ 125°C RH129B RH129C			10		10		10		15		20	ppm/°C
					20		20		20		25		30	ppm/°C
					50		50		50		55		60	ppm/°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.

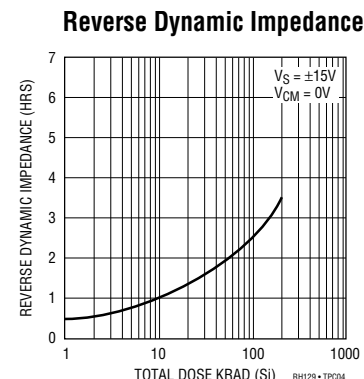
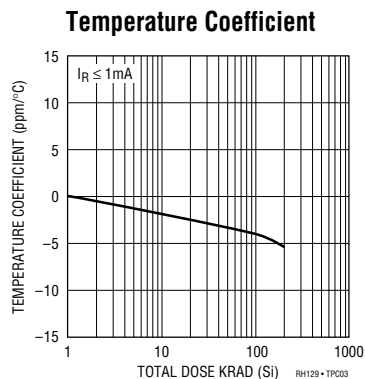
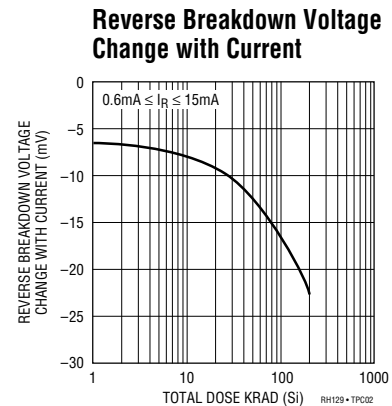
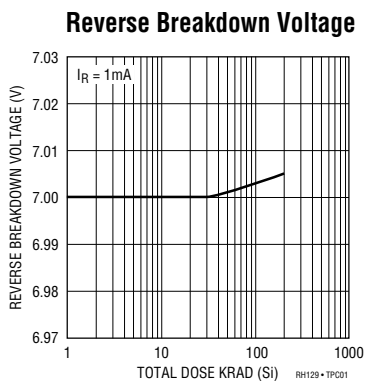
**TABLE 2: ELECTRICAL TEST REQUIREMENTS**

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 End Point Electrical Parameters (Method 5005)	1

\* 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**



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