Tyco Electronics

308 Constitution Drive
Menlo Park, CA 94025-1164
Phone: 800-227-4856
www.circuitprotection.com

PolyZen

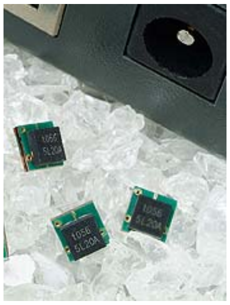
Polymer Enhanced Zener Diode
Micro-Assemblies

Raychem Circuit Protection Products

PRODUCT: ZEN132V130A24LS

DOCUMENT: SCD 26665
REV LETTER: D
REV DATE: FEBRUARY 28, 2008
PAGE NO.: 1 OF 5

Specification Status: Released



GENERAL DESCRIPTION

Raychem PolyZen devices are polymer enhanced, precision Zener diode micro-assemblies. They offer resettable protection against multi-Watt fault events without the need for multi-Watt heat sinking.

The Zener diode used for voltage clamping in a PolyZen micro-assembly was selected due to its relatively flat voltage vs current response. This helps improve output voltage clamping, even when input voltage is high and diode currents are large.

An advanced feature of the PolyZen micro-assembly is that the Zener diode is thermally coupled to a resistively non-linear, polymer PTC (positive temperature coefficient) layer. This PTC layer is fully integrated into the device, and is electrically in series between V_{IN} and the diode clamped V_{OUT}.

This advanced PTC layer responds to either extended diode heating or overcurrent events by transitioning from a low to high resistance state, also known as ”tripping”. A tripped PTC will limit current and generate voltage drop. It helps to protect both the Zener diode and the follow on electronics and effectively increases the diode’s power handling capability.

The polymer enhanced Zener diode helps protect sensitive portable electronics from damage caused by inductive voltage spikes, voltage transients, incorrect power supplies and reverse bias. These devices are particularly suitable for portable electronics and other low-power DC devices

BENEFITS

- Stable Zener diode helps shield downstream electronics from overvoltage and reverse bias
- Trip events shut out overvoltage and reverse bias sources
- Analog nature of trip events minimizes upstream inductive spikes
- Minimal power dissipation requirements
- Single component placement

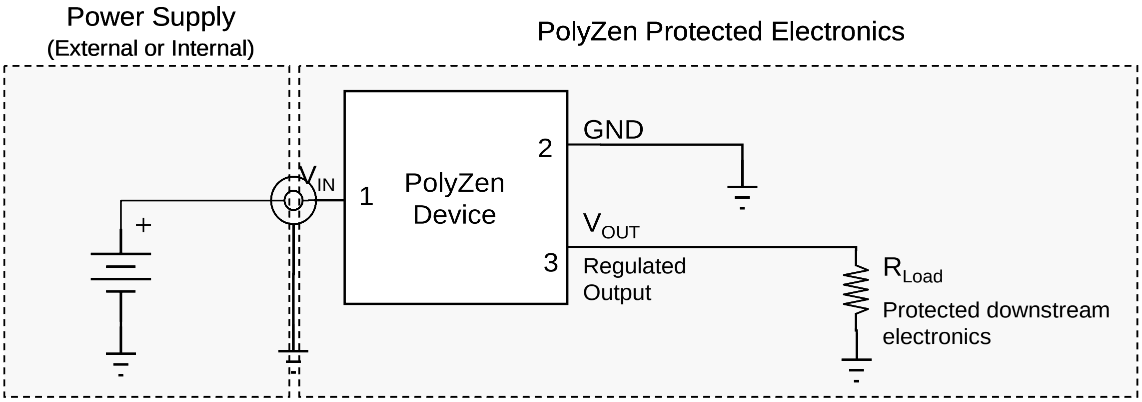
FEATURES

- Overvoltage transient suppression
- Stable V_Z vs fault current
- Time delayed, overvoltage trip
- Time delayed, reverse bias trip
- Multi-Watt power handling capability
- Integrated device construction
- RoHS Compliant

TARGET APPLICATIONS

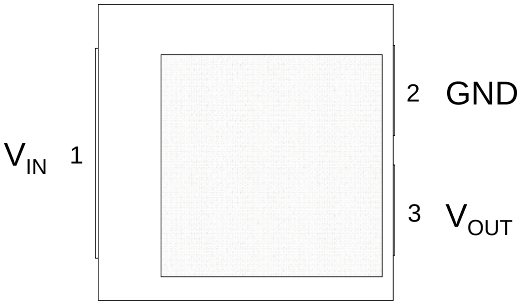
- DC power port protection in portable electronics
- DC power port protection for systems using barrel jacks for power input
- Internal overvoltage & transient suppression
- DC output voltage regulation

TYPICAL APPLICATION BLOCK DIAGRAM

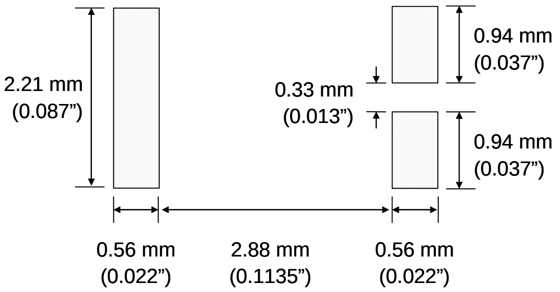


CONFIGURATION INFORMATION

Pin Configuration (Top View)



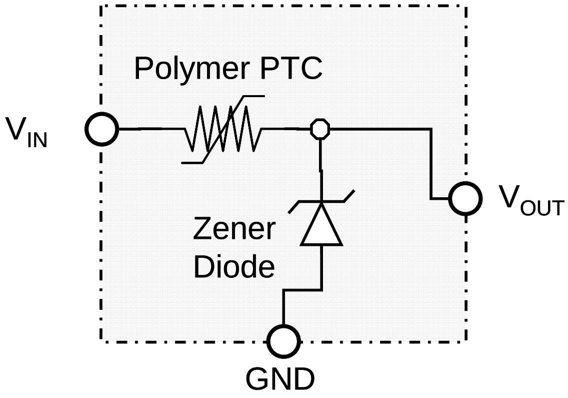
Recommended Pad Dimensions



PIN DESCRIPTION

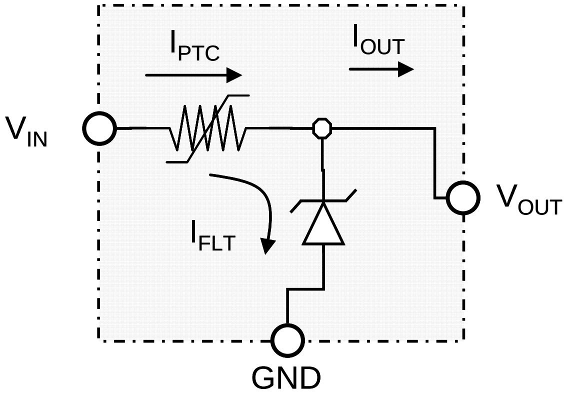
Pin Number	Pin Name	Pin Function
1	V_{IN}	**V_{IN}.** Protected input to Zener diode.
2	GND	**GND**
3	V_{OUT}	**V_{OUT}.** Zener regulated voltage output

BLOCK DIAGRAM



DEFINITION of TERMS

I_{PTC}	Current flowing through the PTC portion of the circuit
I_{FLT}	RMS fault current flowing through the diode
I_{OUT}	Current flowing out the V_{OUT} pin of the device
Trip Event	A condition where the PTC transitions to a high resistance state, thereby significantly limiting I_{PTC} and related currents, and significantly increasing the voltage drop between V_{IN} and V_{OUT}.
Trip Endurance	Time the PTC portion of the device remains both powered and in a tripped state.



GENERAL SPECIFICATIONS

Operating Temperature	-40º to +85ºC
Storage Temperature	-40º to +85ºC

ELECTRICAL CHARACTERISTICS[1-3, 11] (Typical unless otherwise specified)

Part Number	V_Z[4] (V)		I_{zt}[4] (A)	I_{HOLD}[5] @ 20ºC (A)	R Typ[6] (Ohms)	R_{1Max}[7] (Ohms)	V_{INT} Max[8] @ 2A (V)	I_{FLT} Max[9] (A)	Power Dissipation[10] (W)
	Min	Max							
ZEN132V130A24LS	13.2	13.6	0.1	1.3	0.12	0.16	24	+2 / -40	0.7

Note 1: Electrical characteristics determined at 25ºC unless otherwise specified.

Note 2: This device is intended for limited fault protection. Repeated trip events or extended trip endurance can degrade the device and may affect performance to specifications. Performance impact will depend on multiple factors including, but not limited to, voltage, trip current, trip duration, trip cycles, and circuit design. For details or ratings specific to your application contact Raychem Circuit Protection directly.

Note 3: Specifications developed using 1.0 ounce 0.045" wide copper traces on dedicated FR4 test boards. Performance in your application may vary.

Note 4: I_{zt} is the current at which V_z is measured ($V_Z = V_{OUT}$). Additional V_Z values are available on request.

Note 5: I_{HOLD} : Maximum steady state I_{PTC} (current entering or exiting the V_{IN} pin of the device) that will not generate a trip event at the specified temperature. Specification assumes I_{FLT} (current flowing through the Zener diode) is sufficiently low so as to prevent the diode from acting as a heat source. Testing is conducted with an "open" Zener.

Note 6: R Typ: Resistance between V_{IN} and V_{OUT} pins during normal operation at room temperature.

Note 7: R_{1Max}: The maximum resistance between V_{IN} and V_{OUT} pins at room temperature, one hour after 1st trip or after reflow soldering.

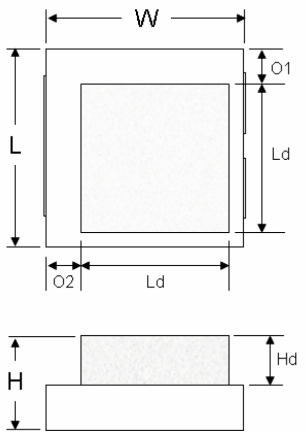
Note 8: V_{INT} Max: V_{INT} Max is defined as the voltage at which typical qualification devices (98% devices, 95% confidence) survived at least 100 trip cycles and 24hours trip endurance at the specified voltage and current (I_{PTC}). V_{INT} Max testing is conducted using a "shorted" load (V_{OUT} = 0V). V_{INT} Max is a survivability rating, not a performance rating. For performance ratings, see Note 2.

Note 9: I_{FLT} Max: Maximum RMS fault current the diode portion of the device can withstand and remain resettable. Specification is dependent on the direction of current flow through the diode. RMS fault currents above I_{FLT} Max may permanently damage the PolyZen device. Specification assumes I_{OUT} = 0. Testing conducted at ±24V and -16V, with no load connected to V_{OUT}

Note 10: The power dissipated by the device when in the "tripped" state.

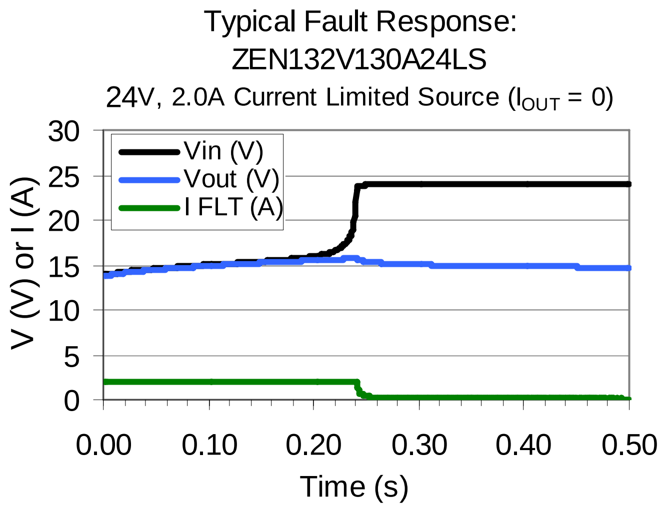
Note 11: Specifications based on limited qualification data and subject to change.

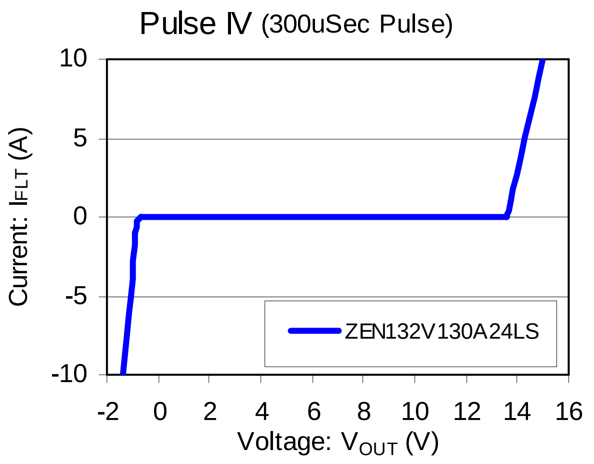
MECHANICAL DIMENSIONS

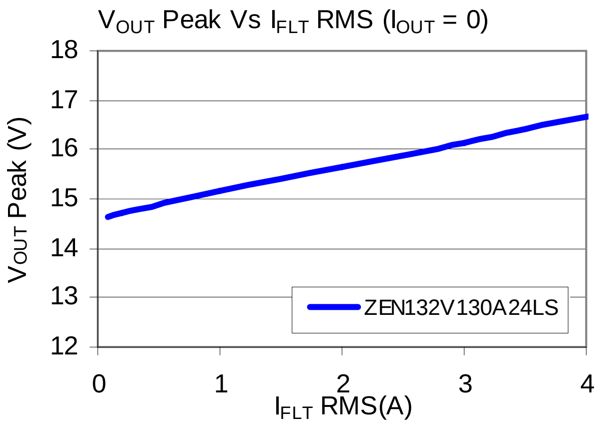


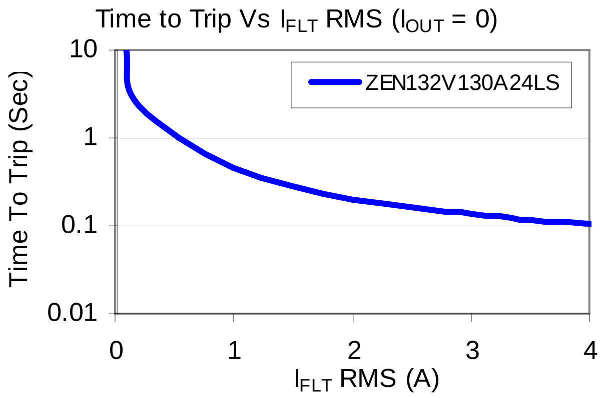
		Min	Typical	Max
Length	L	3.85 mm (0.152")	4 mm (0.16")	4.15 mm (0.163")
Width	W	3.85 mm (0.152")	4 mm (0.16")	4.15 mm (0.163")
Height	H	1.7mm (0.067")	1.9 mm (0.075")	2.1 mm (0.083")
Length Diode	Ld	-	3.0 mm (0.118")	-
Height Diode	Hd	-	1.0 mm (0.039")	-
Offset	O1	-	0.6 mm (0.024")	-
Offset	O2	-	0.7 mm (0.028")	-

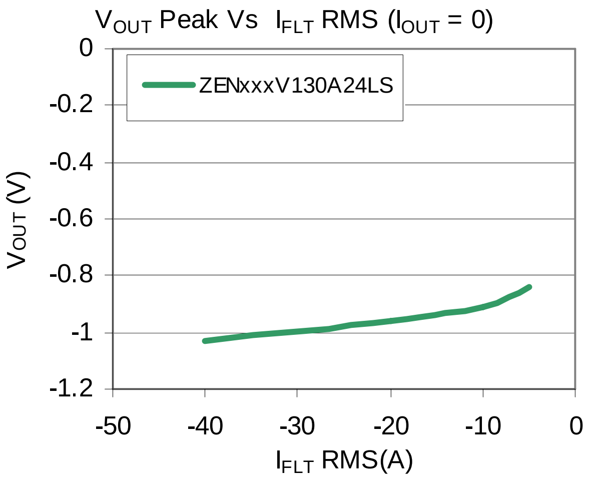
TYPICAL CHARACTERISTICS

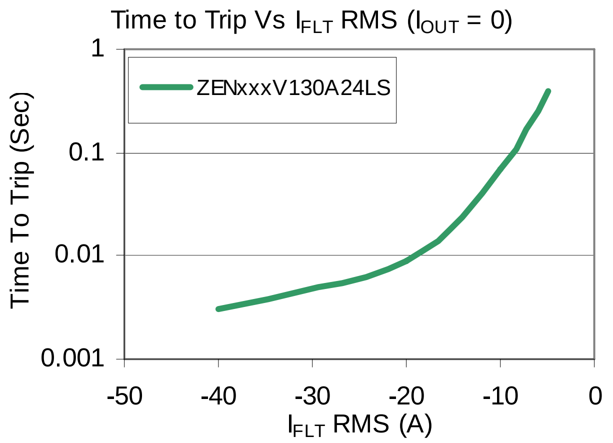


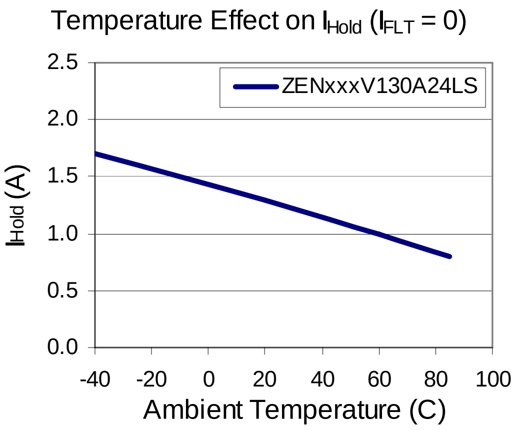


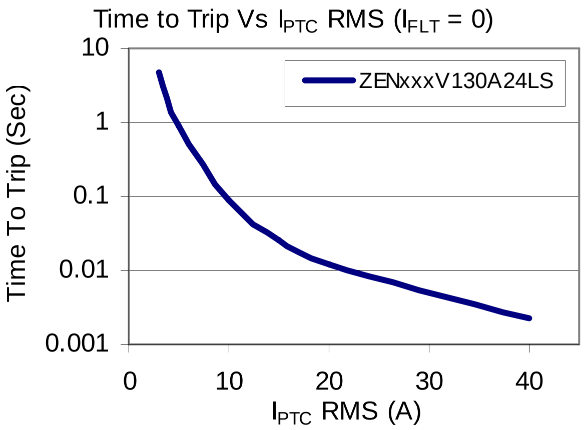


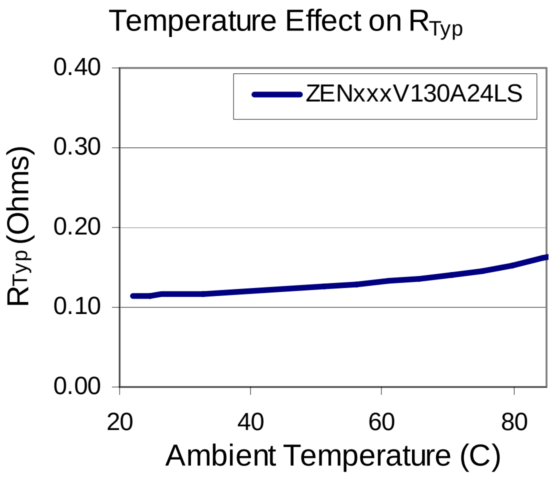












Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of each product for their applications. Tyco Electronics Corporation assumes no responsibility for the use of its product or for any infringement of patents or other rights of third parties resulting from the use of its product. No license is granted by implication or otherwise under any patent or proprietary right of Tyco Electronics except the right to use such product for the purpose for which it is sold. Tyco Electronics reserves the right to change or update, without notice, any information contained in this publication; to change, without notice, the design, construction, processing, or specification of any product; and to discontinue or limit production or distribution of any product. This publication supersedes and replaces all information previously supplied. Without expressed or written consent by an officer of Tyco Electronics, Tyco Electronics does not authorize the use of any of its products as components in nuclear facility applications, aerospace, or in critical life support devices or systems. Tyco Electronics' only obligations are those in the Tyco Electronics Standard Terms and Conditions of Sale and in no case will Tyco Electronics be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of its products.