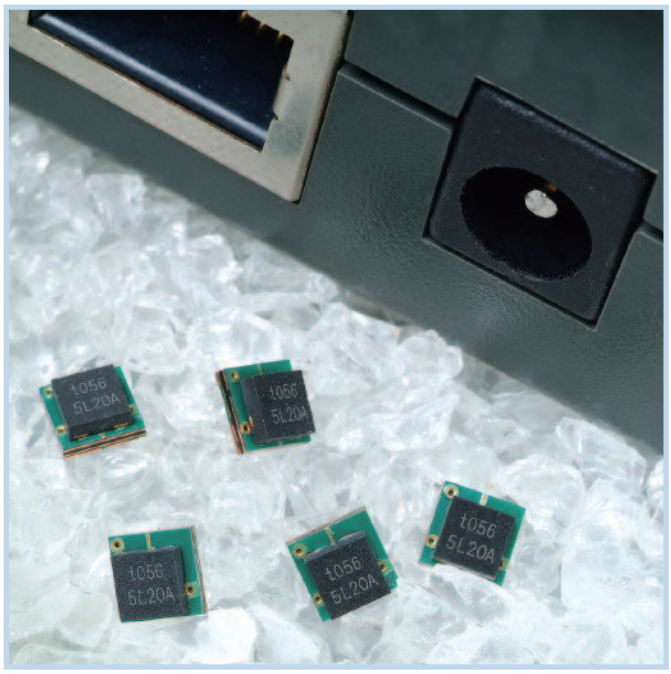
PolyZen Devices

Polymer Protected Zener Diode

PolyZen devices are polymer enhanced precision Zener diode micro-assemblies that help protect sensitive electronics from damage caused by inductive voltage spikes, voltage transients, incorrect power supplies and reverse bias.

The PolyZen micro-assembly incorporates a stable Zener diode for precise voltage clamping and a resistively non-linear, polymeric positive temperature coefficient (PPTC) layer that responds to either diode heating or overcurrent events by transitioning from a low to high resistance state.

PolyZen devices help provide resettable protection against multi-watt fault events and require only 0.7W power dissipation. In the event of sustained high power conditions, the PPTC element of the device "trips" to limit current and generate voltage drop. This functionality helps protect both the Zener and the follow-on electronics, effectively increasing the diode's power handling capacity.



Benefits

- Helps shield downstream electronics from overvoltage and reverse bias
- Trip events shut out overvoltage and reverse bias sources
- Analog nature of trip events minimize upstream inductive spikes
- Helps reduce design costs with single component placement and minimal heat sinking requirements

Features

- Overvoltage transient suppression
- Stable Vz vs. fault current
- Time delayed, overvoltage trip
- Time delayed, reverse bias trip
- Power handling on the order of 100 watts
- Integrated device construction
- RoHS compliant

Applications

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

Figure PZ1 Typical Application Block Diagram for PolyZen Devices

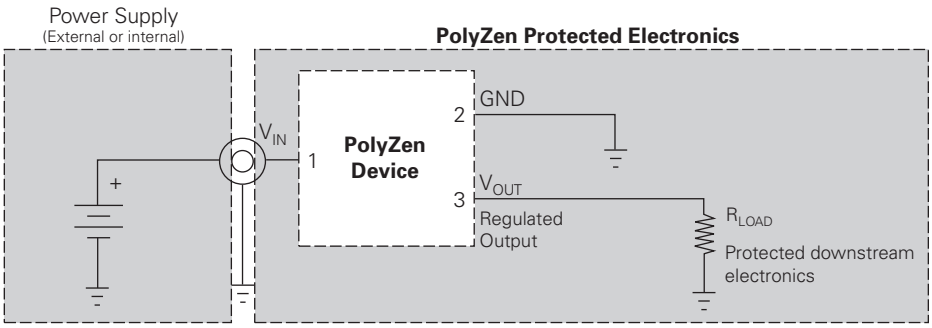


Table PZ1 Electrical Characteristics for PolyZen Devices

(Performance ratings @ 25°C unless otherwise specified)

	Part Number	V_z (V) Typical	I_{Zt} (A)	I_{HOLD} @ 20°C (A)	R Typ (Ω)	R_{1Max} (Ω)	V_{INT} Max @ 3A (V)	I_{FLT} Max (A)	Power Dissipation (W)
coming soon	ZEN056V240A16LS	5.6	0.1	2.4	0.12	0.16	16	+10 / -40	0.7
	ZEN056V130A24LS	5.6	0.1	1.3	0.12	0.16	24	+10 / -40	0.7
coming soon	ZEN065V130A24LS	6.5	0.1	1.3	0.12	0.16	24	TBD / -40	0.7
coming soon	ZEN098V130A24LS	9.8	0.1	1.3	0.12	0.16	24	TBD / -40	0.7
coming soon	ZEN128V130A24LS	12.8	0.1	1.3	0.12	0.16	24	TBD / -40	0.7
	ZEN132V130A24LS	13.4	0.1	1.3	0.12	0.16	24	+3 / -40	0.7
coming soon	ZEN164V130A24LS	16.4	0.1	1.3	0.12	0.16	24	TBD / -40	0.7
	ZEN132V075A48LS	13.4	0.1	0.75	0.28	0.45	48	+3 / -40	0.7

Table PZ2 Definition of Terms for PolyZen Devices

V_z	Voltage out
I_{zt}	Current at which V_z is measured
I_{HOLD}	Maximum steady state I_{PTC} that will not generate a trip event at the specified temperature. Specification assumes I_{FLT} is sufficiently low so as to prevent the diode from acting as a heat source.
R Typ	Resistance between V_{IN} and V_{OUT} pins during normal operation at room temperature
R_{1MAX}	The maximum resistance between V_{IN} and V_{OUT} pins during normal operation at room temperature, one hour after first trip or after reflow soldering
I_{FLT}	Current flowing through the Zener diode
I_{FLT} Max	Maximum RMS fault current the diode portion of the device can withstand and remain resettable; testing is conducted at ±24V, or ±48V with no load connected to V_{OUT}.
V_{INT} Max	The voltage at which typical qualification devices (98% devices, 95% confidence) survived at least 100 trip cycles and 24 hours trip endurance at the specific voltage and current Iptc

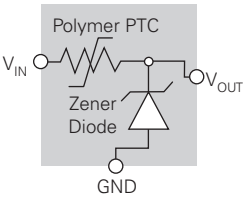


Figure PZ2-PZ7 Typical Performance Curves for PolyZen Devices

Figure PZ2

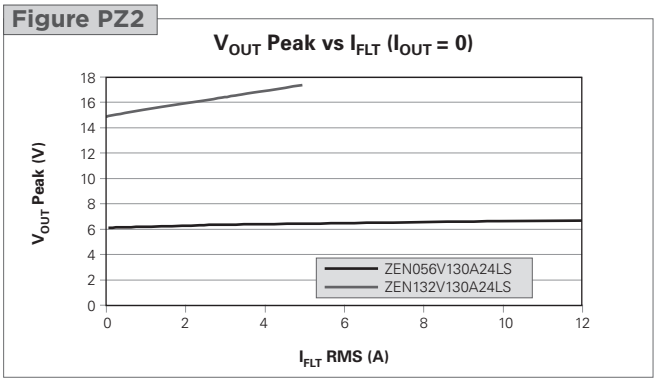
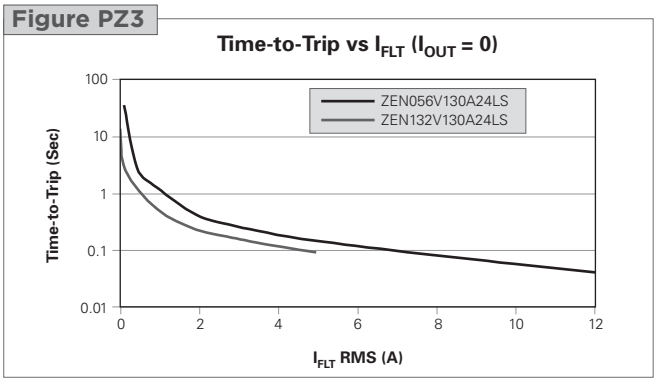


Figure PZ3



RoHS compliant, ELV compliant

Figure PZ2-PZ7 Typical Performance Curves for PolyZen Devices ... Cont'd

Figure PZ4

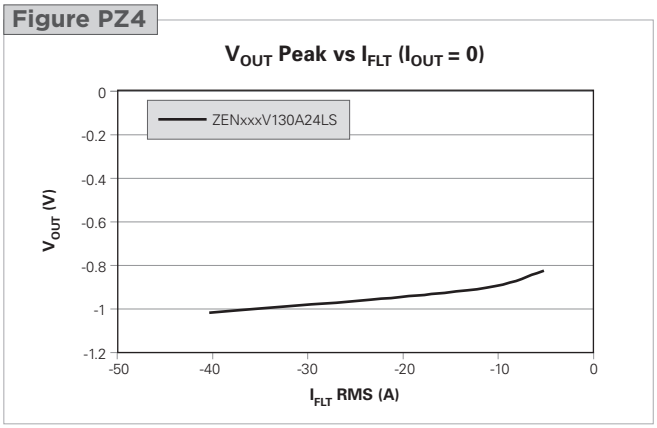


Figure PZ5

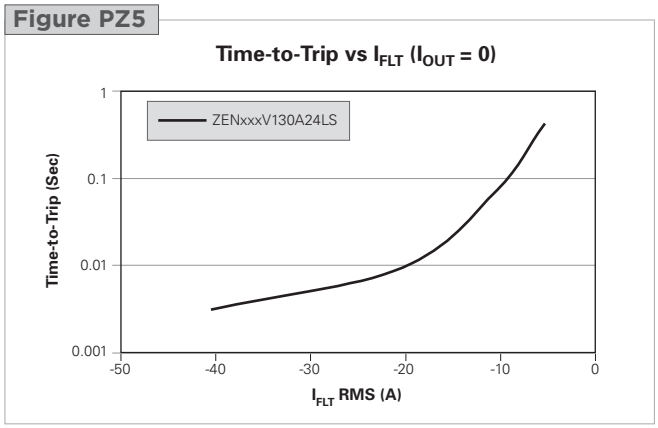


Figure PZ6

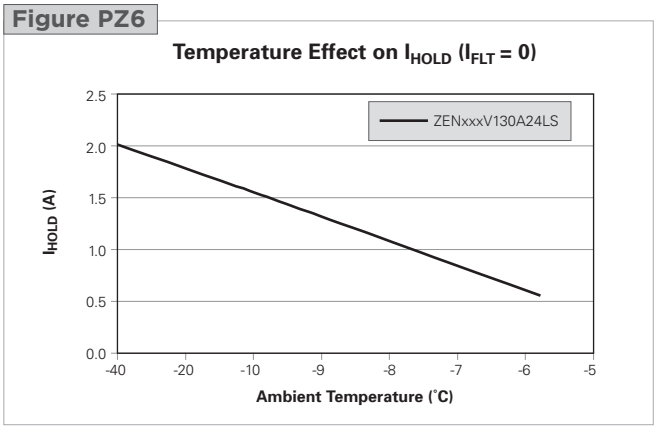


Figure PZ7

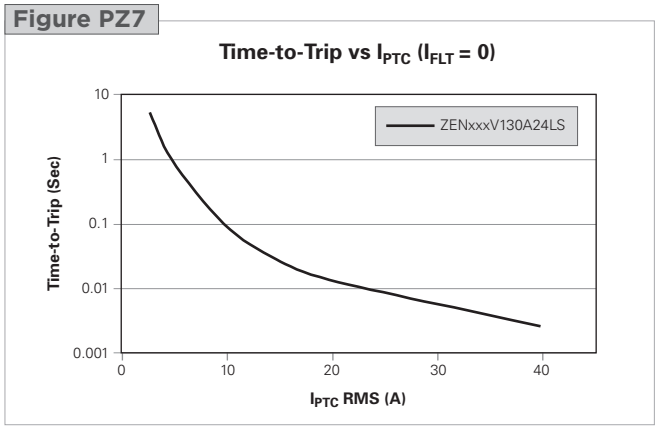


Table PZ3 General Characteristics for PolyZen Devices

Operating Temperature Range	-40° to +85°C	
Storage Temperature	-40° to +85°C	
ESD Withstand	15KV	Human Body Model
Diode Capacitance	4200pF	Typical @ 1MHz, 1V RMS
Construction	RoHS compliant	

Figure PZ8-PZ10 Basic Operation Examples for PolyZen Devices

Figure PZ8

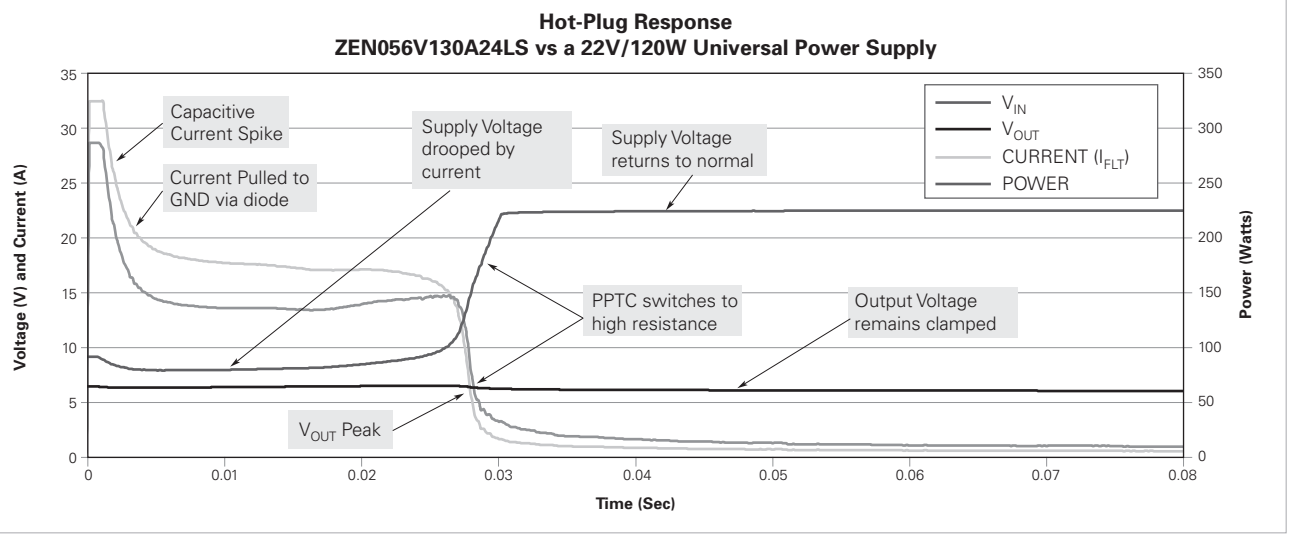


Figure PZ9

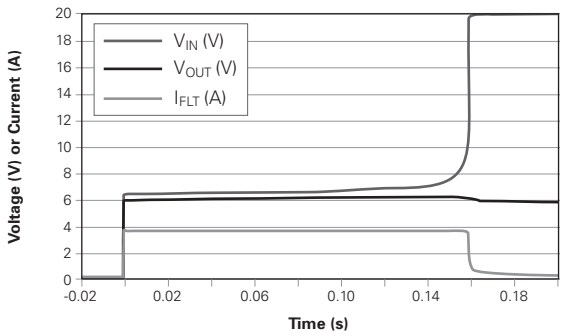


Figure PZ10

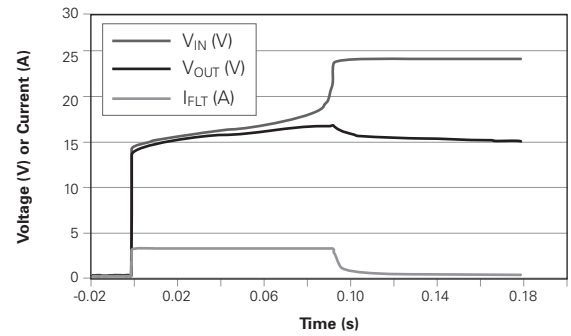
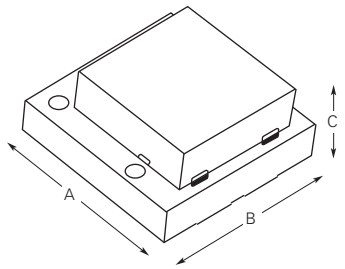


Table PZ4 Packaging and Marking Information for PolyZen Devices

Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package
ZENxxxVyyyAzzLS	-	3,000	15,000

Table PZ5 Mechanical Dimensions for PolyZen Devices

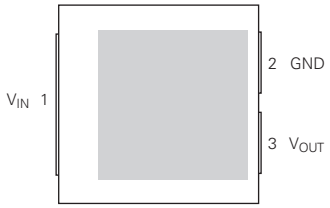
	A		B		C	
	Min	Max	Min	Max	Min	Max
mm	3.85	4.15	3.85	4.15	1.7	2.1
inch	(0.150)	(0.163)	(0.152)	(0.163)	(0.067)	(0.083)



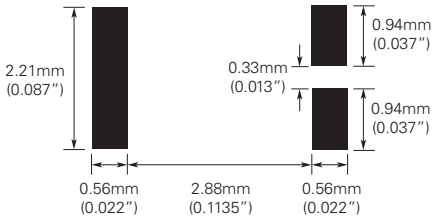
RoHS compliant, ELV compliant

Table PZ6 Configuration Information for PolyZen Devices

Pin Configuration (Top View)



Pad Dimensions



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

Part Numbering System for PolyZen Devices

ZEN 056V 130A 24 LS

- **Special Labeling**
  LS = Standard Part
- **V_{INT} Max Rating (24 = 24V)**
- **PPTC Hold Current Group (130 = 1.3A)**
- **Zener Voltage Group (056 = 5.6V)**
- **PolyZen Series**