

PolyZen Devices
Polymer Protected Zener Diode

Figure PZ1 – Typical Application Block Diagram

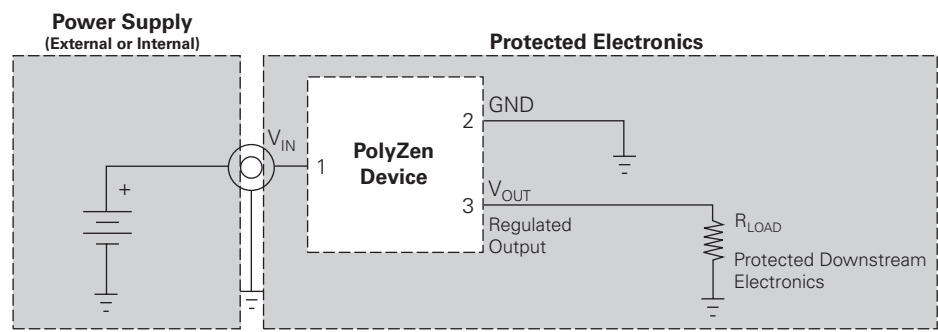


Table PZ1 – Electrical Characteristics

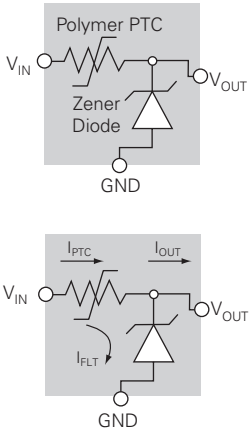
(Performance ratings @ 25°C unless otherwise specified)

Part Number	V _Z (V)			I _{ZT} (A)	I _{HOLD} @ 20°C (A)	R _{Typ} (Ω)	R _{1MAX} (Ω)	V _{INT MAX}		I _{FLT MAX}	
	Min	Typ	Max					V _{INT MAX} (V)	Test Current (A)	I _{FLT MAX} (A)	Test Voltage (V)
ZEN056V130A24LS	5.45	5.60	5.75	0.10	1.30	0.12	0.16	24	3	+10/-40	+24/-16
ZEN059V130A24LS†	5.80	5.90	6.00	0.10	1.30	0.12	0.15	24	3	+6/-40	+24/-16
ZEN065V130A24LS	6.35	6.50	6.65	0.10	1.30	0.12	0.16	24	3	+6/-40	+24/-16
ZEN098V130A24LS	9.60	9.80	10.00	0.10	1.30	0.12	0.16	24	3	+3.5/-40	+24/-16
ZEN132V130A24LS	13.20	13.40	13.60	0.10	1.30	0.12	0.16	24	3	+2/-40	+24/-16
ZEN164V130A24LS	16.10	16.40	16.60	0.10	1.30	0.12	0.16	24	3	+1.25/-40	+24/-16
ZEN056V230A16LS	5.45	5.60	5.75	0.10	2.30	0.04	0.06	16	5	+5/-40	+16/-12
ZEN065V230A16LS	6.35	6.50	6.65	0.10	2.30	0.04	0.06	16	5	+3.5/-40	+16/-12
ZEN098V230A16LS	9.60	9.80	10.00	0.10	2.30	0.04	0.06	16	5	+3.5/-40	+16/-12
ZEN132V230A16LS	13.20	13.40	13.60	0.10	2.30	0.04	0.06	16	5	+2/-40	+20/-12
ZEN056V075A48LS	5.45	5.60	5.75	0.10	0.75	0.28	0.45	48	3	+10/-40	+48/-16
ZEN132V075A48LS	13.20	13.40	13.60	0.10	0.75	0.28	0.45	48	3	+2/-40	+48/-16
ZEN056V115A24LS	5.45	5.60	5.75	0.10	1.15	0.15	0.18	24	3	+10/-40	+24/-16
NEW ZEN056V130A16YM	5.35	5.60	5.85	0.10	1.30	0.110	0.160	14	3	+3/-40	+16/-12
NEW ZEN056V175A12YM	5.35	5.60	5.85	0.10	1.75	0.050	0.095	12	4	+3/-40	+12/-12
NEW ZEN132V130A16YM	13.20	13.40	13.80	0.10	1.30	0.110	0.160	14	3	+1/-40	+20/-12
NEW ZEN132V175A12YM	13.20	13.40	13.80	0.10	1.75	0.050	0.095	12	4	+1/-40	+20/-12
NEW ZEN056V130A24YC	5.35	5.60	5.85	0.10	1.30	0.110	0.170	24	3	+4/-40	+24/-16
NEW ZEN056V230A16YC	5.35	5.60	5.85	0.10	2.30	0.040	0.070	16	5	+3/-40	+16/-12
NEW ZEN056V260A16YC	5.35	5.60	5.85	0.10	2.60	0.040	0.055	16	5	+3/-40	+16/-12
NEW ZEN132V130A24YC	13.20	13.40	13.80	0.10	1.30	0.110	0.170	24	3	+1/-40	+24/-16
NEW ZEN132V230A16YC	13.20	13.40	13.80	0.10	2.30	0.040	0.070	16	5	+1/-40	+20/-12
NEW ZEN132V260A16YC	13.20	13.40	13.80	0.10	2.60	0.040	0.055	16	5	+1/-40	+20/-12

LS module height is 1.7mm typical. YM module height is 1.2mm typical. YC module

Table PZ2 – Definition of Terms

V _Z	Zener clamping voltage measured at current I _{ZT} and 20°C.
I _{ZT}	Test current at which V _Z is measured.
I _{HOLD}	Maximum steady state current I _{PTC} that will not generate a trip event at the specified temperature. Ratings assume I _{FLT} = 0A.
R _{Typ}	Typical resistance between V _{IN} and V _{OUT} pins when the device is at room temperature.
R _{1MAX}	The maximum resistance between V _{IN} and V _{OUT} pins, 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 Zener diode component of the device can withstand and remain resettable; testing is conducted at rated voltage with no load connected to V _{OUT} .
V _{INT MAX}	The voltage (V _{IN} - V _{OUT} "post trip") at which typical qualification devices (98% devices, 95% confidence) survived at least 100 trip cycles and 24 hours trip endurance when "tripped" at the specified voltage and current (I _{PTC}).
I _{PTC}	Current flowing through the PPTC portion of the circuit.
I _{OUT}	Current flowing out the V _{OUT} pin of the device.
Trip Event	A condition where the PPTC transitions to a high resistance state, thereby limiting I _{PTC} , and significantly increasing the voltage drop between V _{IN} and V _{OUT} .



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Figures PZ2-PZ9 – Typical Performance Curves for PolyZen Devices - LS Series

Figure PZ2

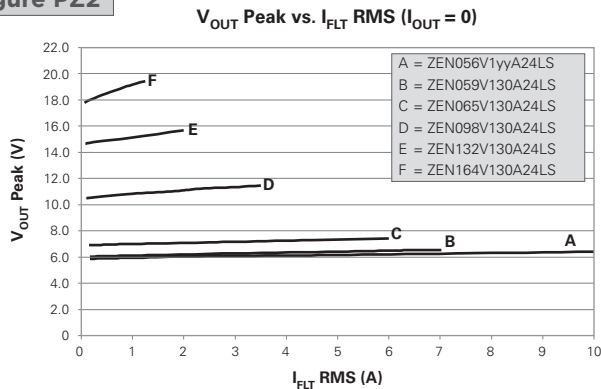


Figure PZ3

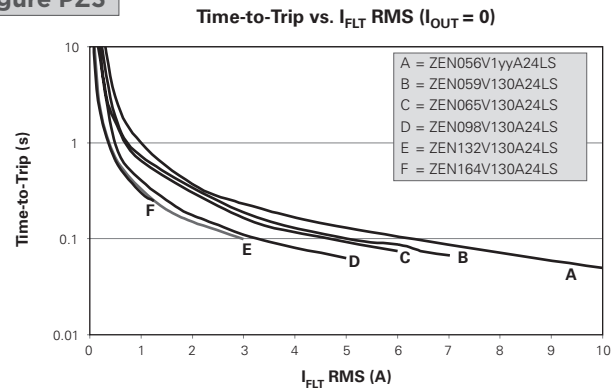


Figure PZ4

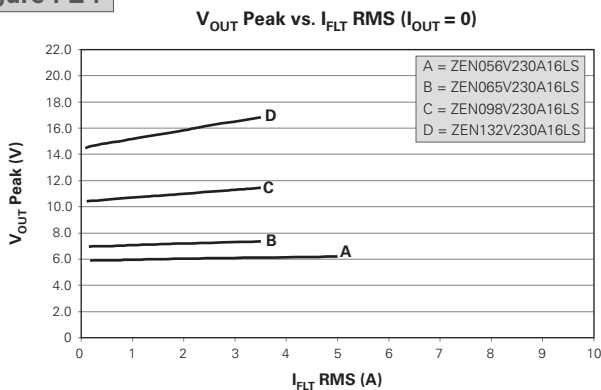


Figure PZ5

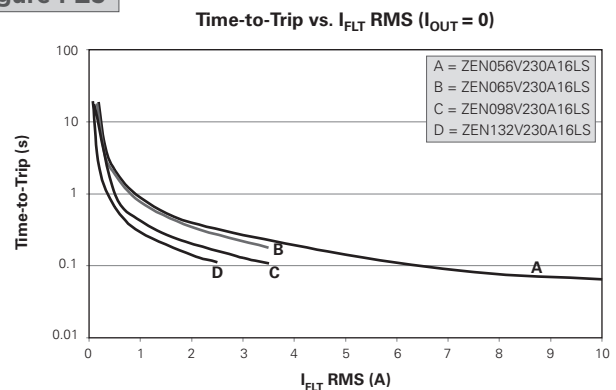


Figure PZ6

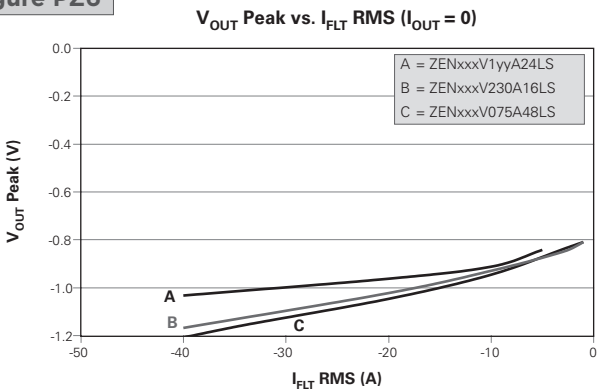


Figure PZ7

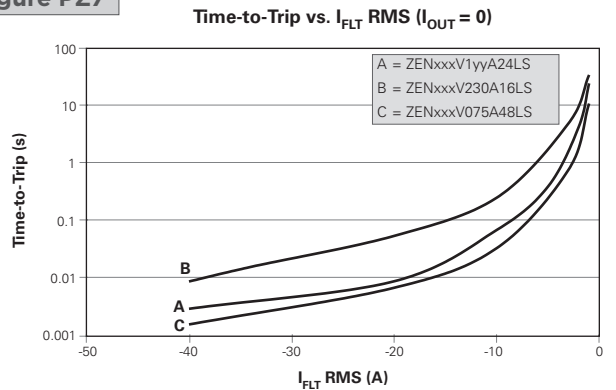


Figure PZ8

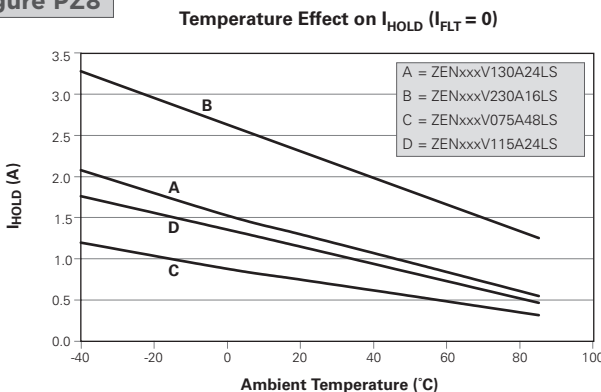
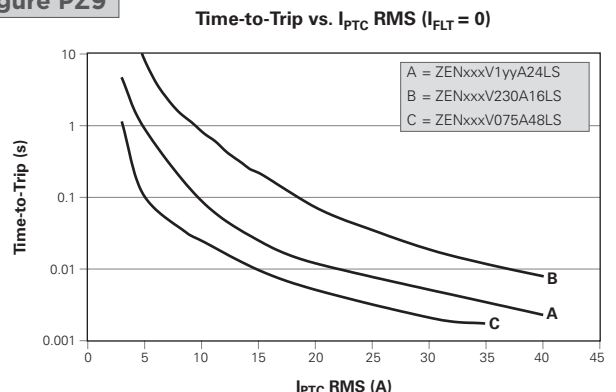


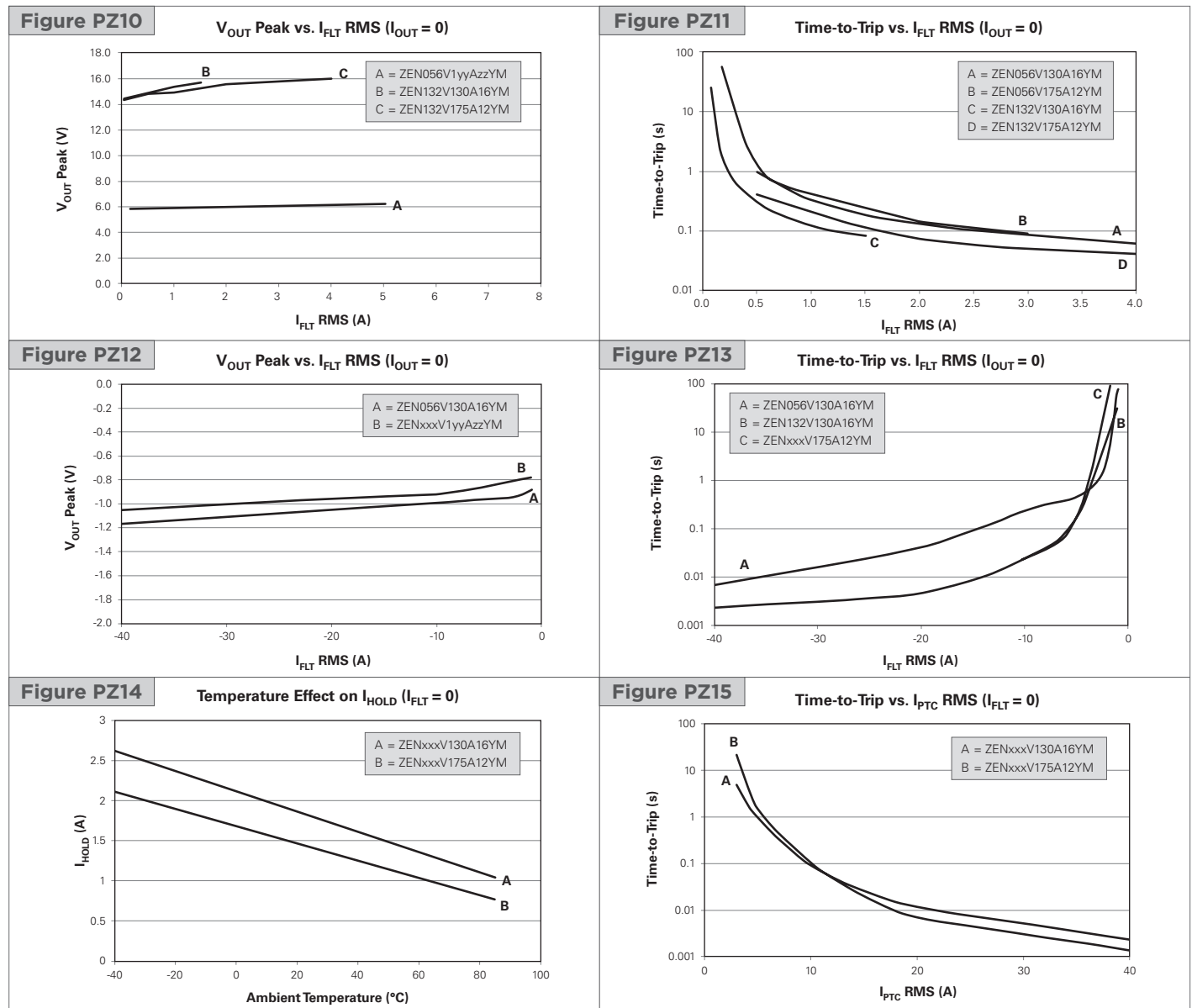
Figure PZ9



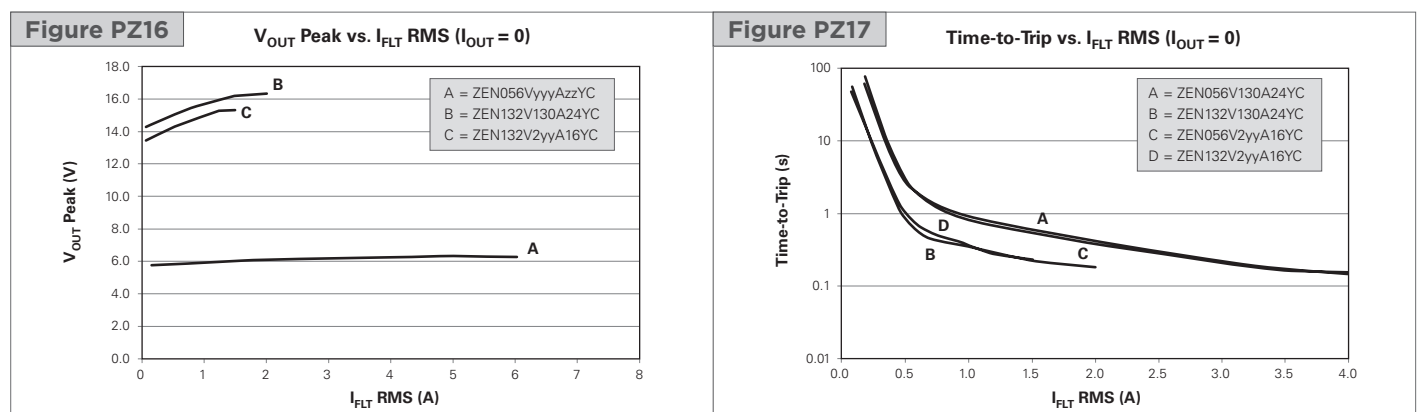
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Figures PZ10-PZ15 – Typical Performance Curves for PolyZen Devices -YM Series



Figures PZ16-PZ21 – Typical Performance Curves for PolyZen Devices -YC Series



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Figures PZ16-PZ21 — Typical Performance Curves for PolyZen Devices -YC Series

(Cont'd)

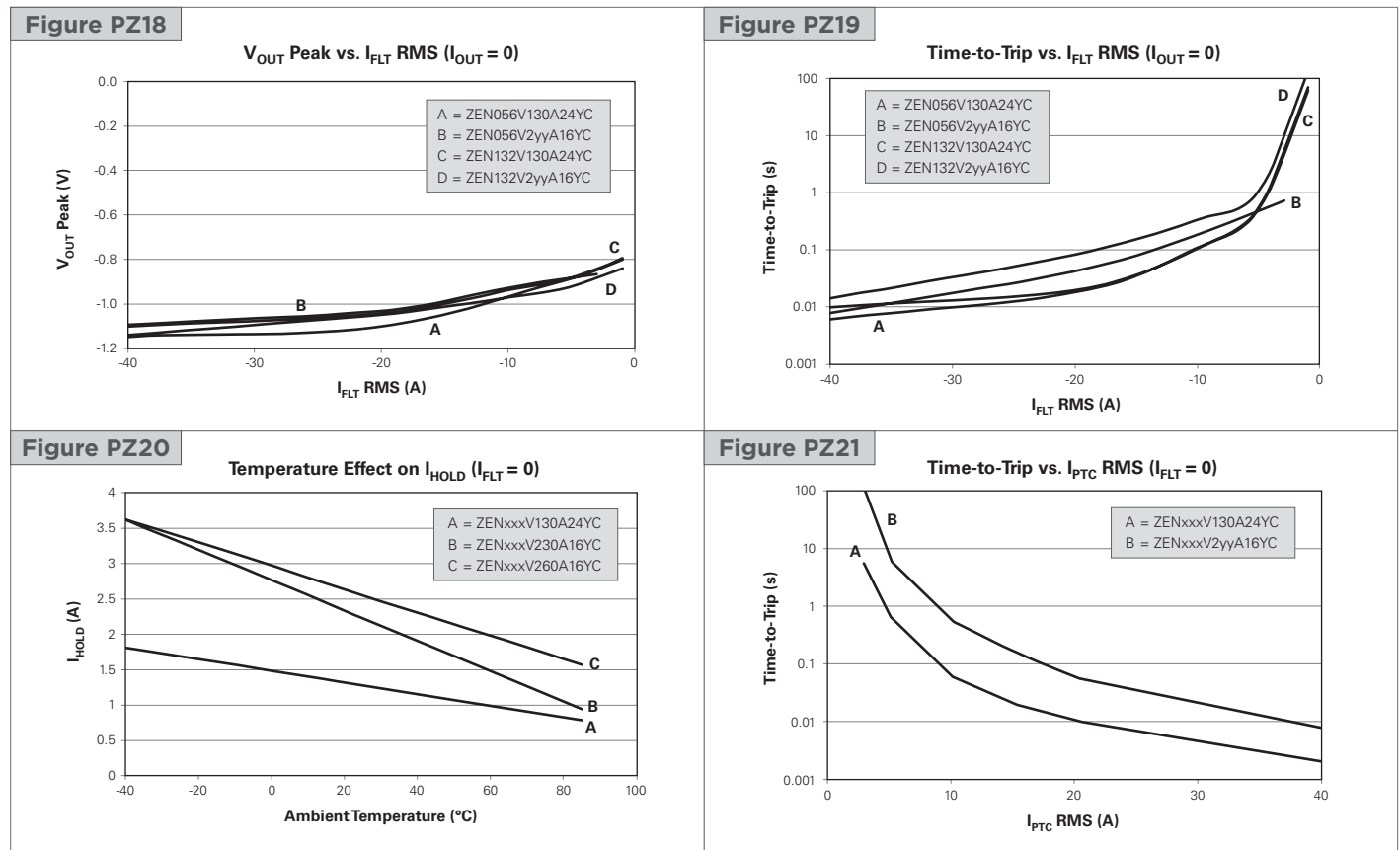


Table PZ3 — General Characteristics for PolyZen Devices

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	

Figures PZ22-PZ34 — Basic Operation Examples for PolyZen Devices - LS Series

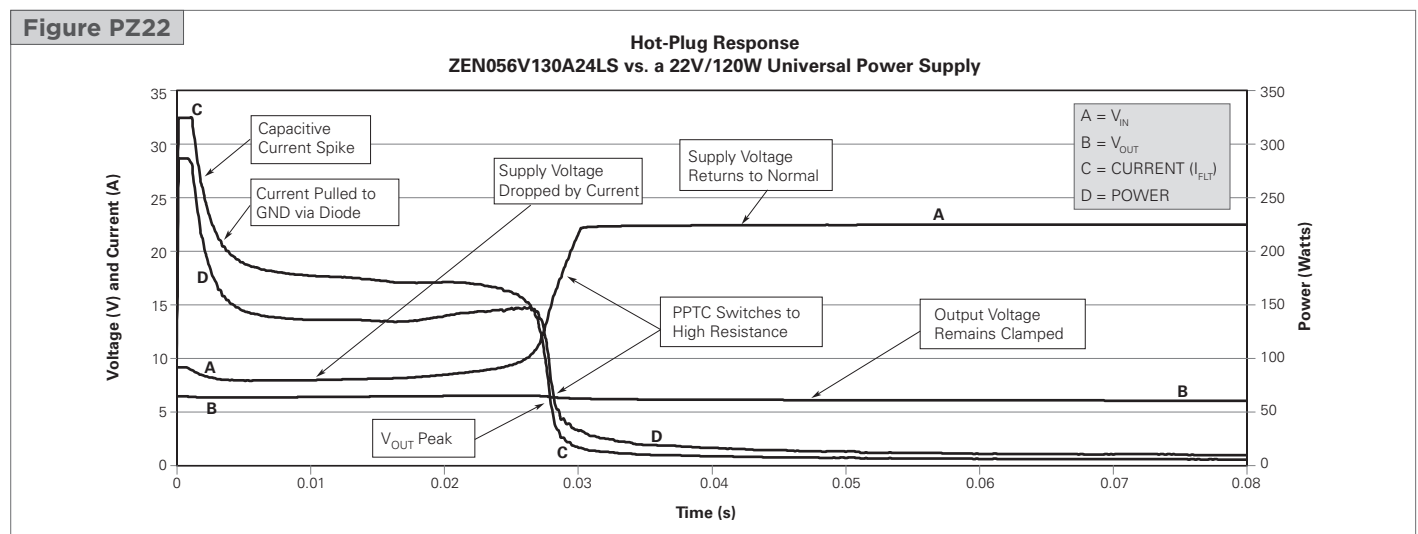


Figure PZ23

Typical Fault Response: ZEN056V1xxA24LS
20V, 3.5A Current Limited Source ($I_{OUT}=0$)

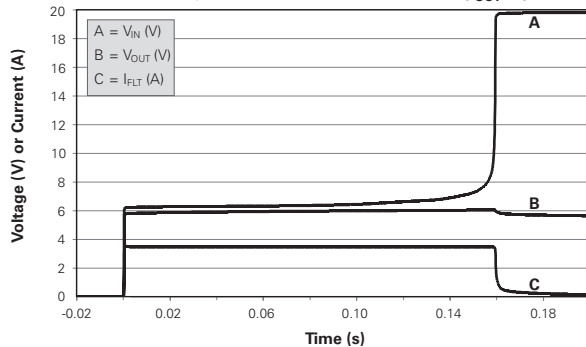


Figure PZ24

Typical Fault Response: ZEN059V130A24LS
24V, 6A Current Limited Source ($I_{OUT}=0$)

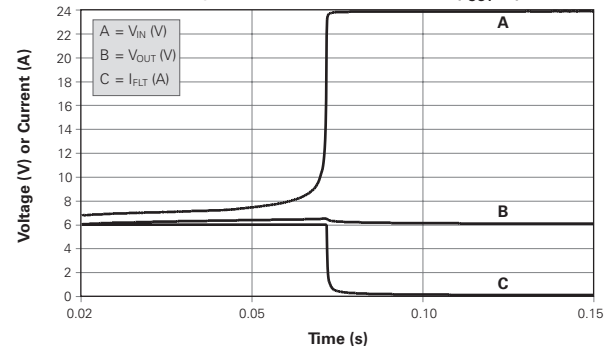


Figure PZ25

Typical Fault Response: ZEN065V130A24LS
24V, 5.0A Current Limited Source ($I_{OUT}=0$)

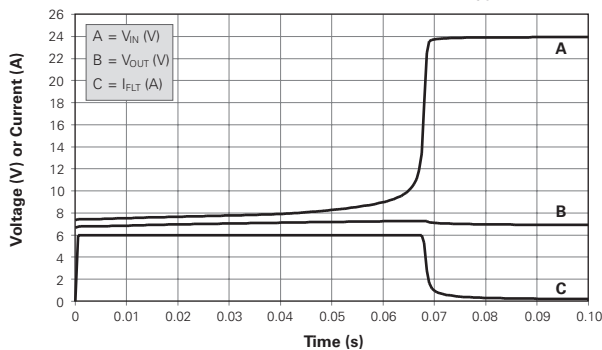


Figure PZ26

Typical Fault Response: ZEN098V130A24LS
24V, 3.5A Current Limited Source ($I_{OUT}=0$)

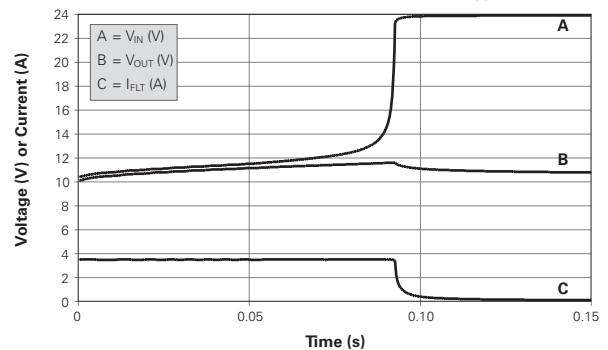


Figure PZ27

Typical Fault Response: ZEN132V130A24LS
24V, 2.0A Current Limited Source ($I_{OUT}=0$)

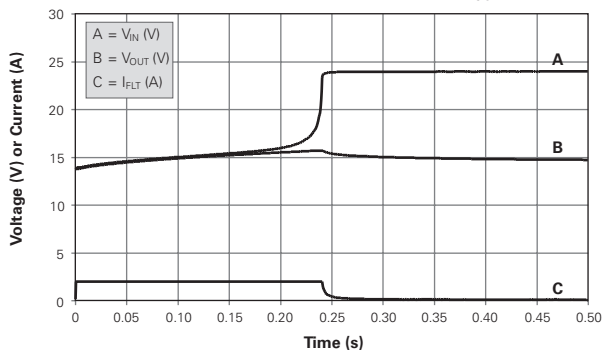


Figure PZ28

Typical Fault Response: ZEN164V130A24LS
24V, 1.0A Current Limited Source ($I_{OUT}=0$)

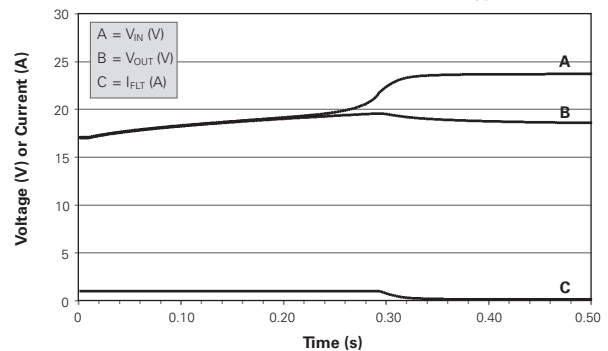


Figure PZ29

Typical Fault Response: ZEN056V230A16LS
16V, 5.0A Current Limited Source ($I_{OUT}=0$)

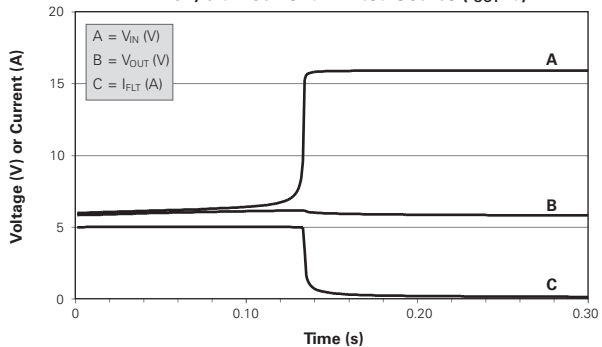
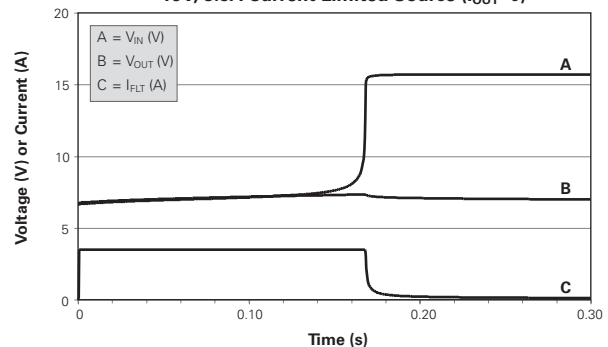


Figure PZ30

Typical Fault Response: ZEN065V230A16LS
16V, 3.5A Current Limited Source ($I_{OUT}=0$)



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Figures PZ22-PZ34 — Basic Operation Examples for PolyZen Devices - LS Series

(Cont'd)

Figure PZ31

Typical Fault Response: ZEN098V230A16LS
16V, 3.5A Current Limited Source ($I_{OUT}=0$)

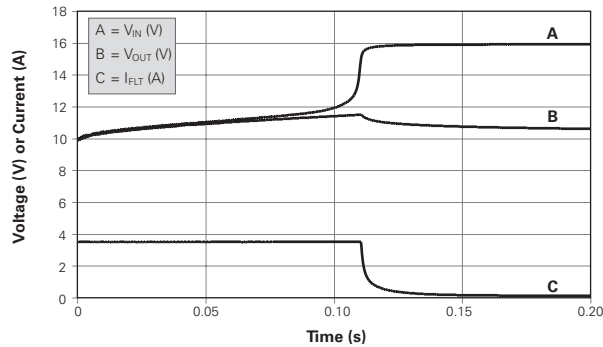


Figure PZ32

Typical Fault Response: ZEN132V230A16LS
20V, 2.0A Current Limited Source ($I_{OUT}=0$)

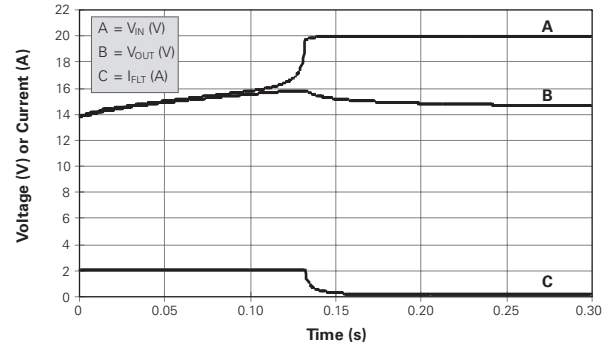


Figure PZ33

Typical Fault Response: ZEN056V075A48LS
48V, 10.0A Current Limited Source ($I_{OUT}=0$)

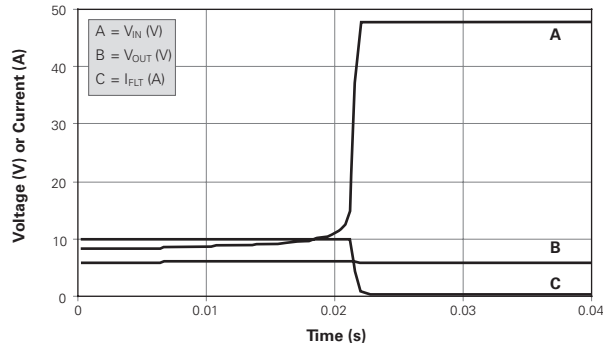


Figure PZ34

Typical Fault Response: ZEN132V075A48LS
48V, 2.0A Current Limited Source ($I_{OUT}=0$)

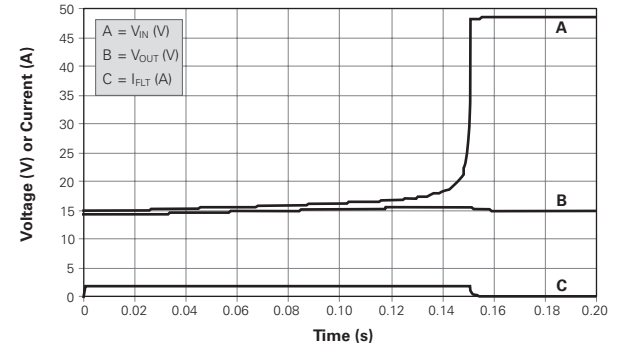


Figure PZ35

Typical Fault Response: ZEN056V130A16YM
20V/3A Current Limited Source ($I_{OUT} = 0$)

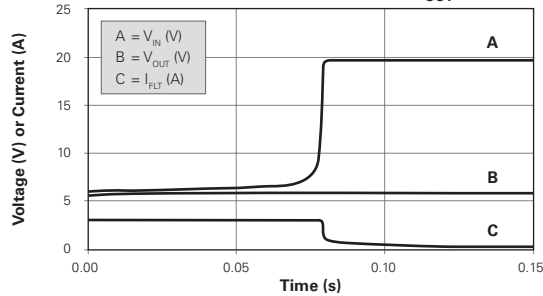


Figure PZ36

Typical Fault Response: ZEN056V175A12YM
12V/3A Current Limited Source ($I_{OUT} = 0$)

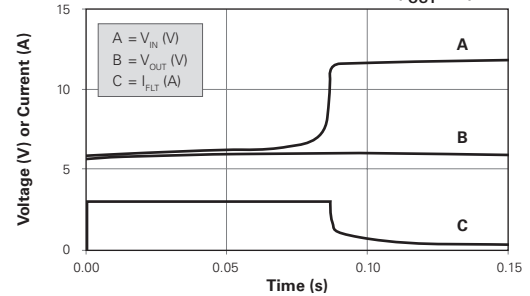


Figure PZ37

Typical Fault Response: ZEN132V130A16YM
20V/1A Current Limited Source ($I_{OUT} = 0$)

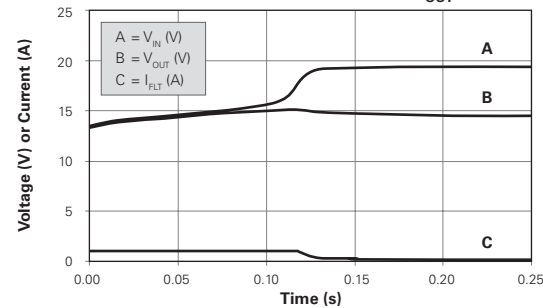
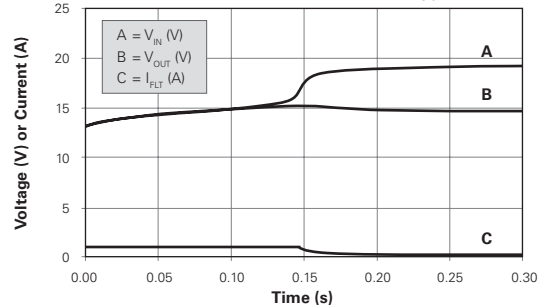


Figure PZ38

Typical Fault Response: ZEN132V175A12YM
20V/1A Current Limited Source ($I_{OUT} = 0$)



Figures PZ39-PZ44 — Basic Operation Examples for PolyZen Devices -YC Series

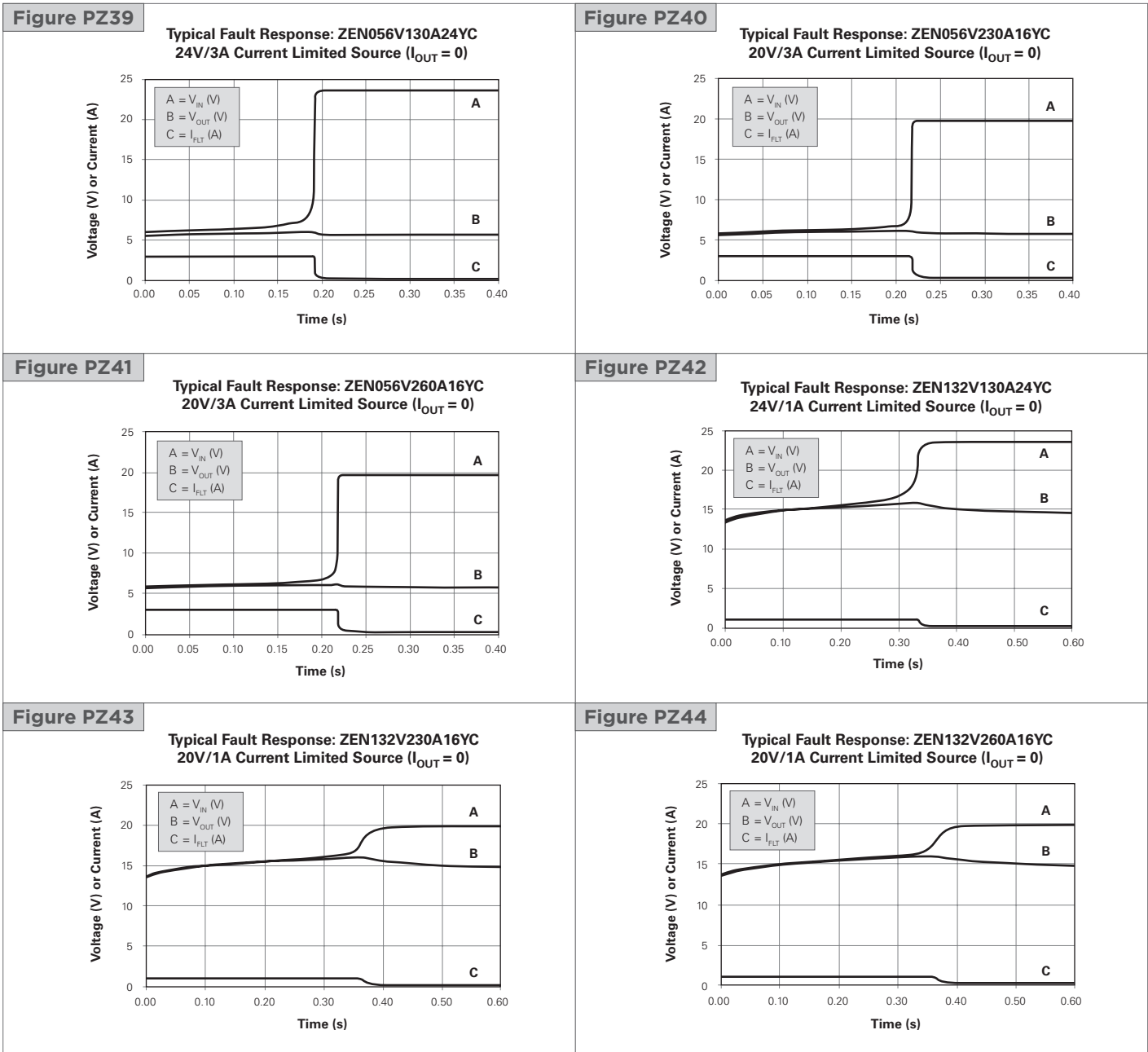


Table PZ4 - Packaging and Marking Information for PolyZen Devices

Part Number	Bag Quantity	Tape & Reel Quantity	Standard Package
ZENxxxVyyyAzzLS	—	3,000	15,000
ZENxxxVyyyAzzYM	—	3,000	30,000
ZENxxxVyyyAzzYC	—	4,000	20,000

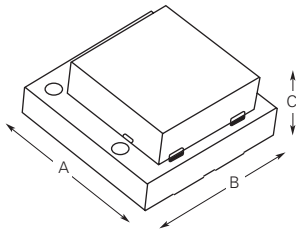
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Table PZ5 — Dimensions in Millimeters and (Inches)

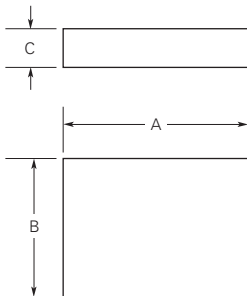
ZENxxxVyyyAzzLS Devices

	A		B		C	
	Min	Max	Min	Max	Min	Max
mm	3.85	4.15	3.85	4.15	1.40	2.00
in	(0.152)	(0.163)	(0.152)	(0.163)	(0.055)	(0.081)



ZENxxxVyyyAzzYM Devices

	A		B		C	
	Min	Max	Min	Max	Min	Max
mm	3.00	3.40	2.30	2.70	1.10	1.30
in	(0.118)	(0.134)	(0.091)	(0.106)	(0.043)	(0.051)

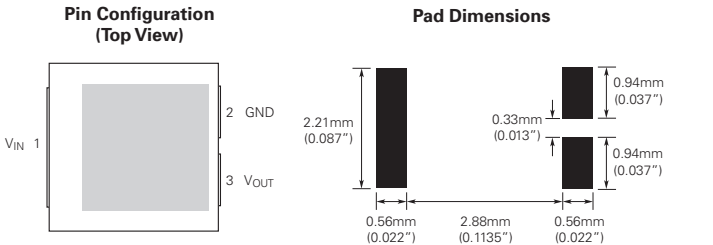


ZENxxxVyyyAzzYC Devices

	A		B		C	
	Min	Max	Min	Max	Min	Max
mm	4.80	5.20	3.80	4.20	1.20	1.40
in	(0.190)	(0.206)	(0.150)	(0.166)	(0.047)	(0.055)

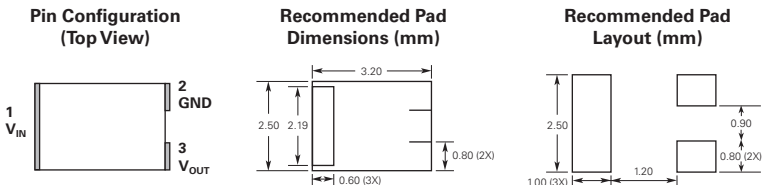
ZENxxxVyyyAzzLS Devices

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



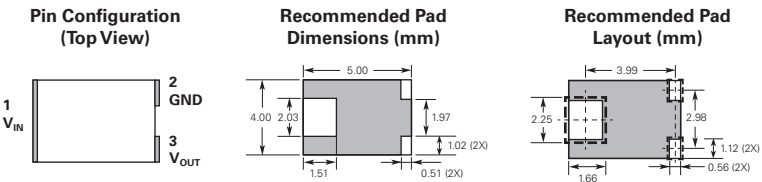
ZENxxxVyyyAzzYM Devices

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



ZENxxxVyyyAzzYC Devices

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

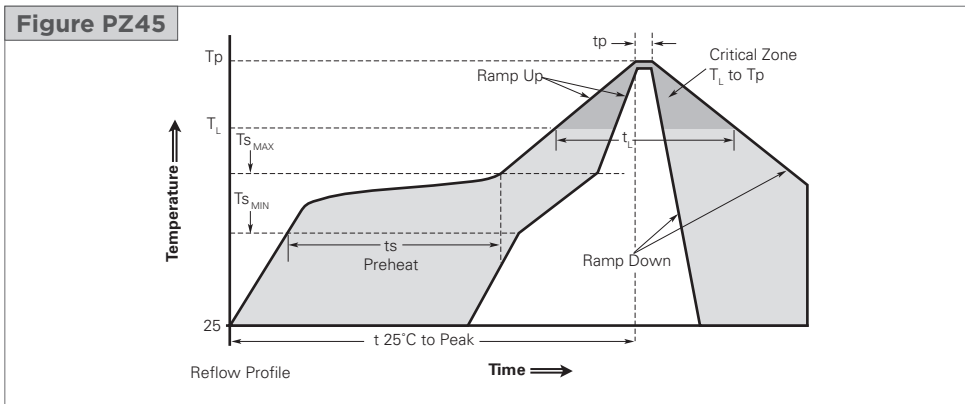


Solder Reflow and Rework Recommendation

Classification Reflow Profiles

Profile Feature	ZENxxxVyyyAzzLS Devices	ZENxxxVyyyAzzYM Devices	ZENxxxVyyyAzzYC Devices
	Pb-Free Assembly	Pb-Free Assembly	Pb-Free Assembly
Average Ramp Up Rate (Ts _{MAX} to Tp) Preheat	3°C/ s Max		3°C/ s Max
• Temperature Min (Ts _{MIN})	150°C		150°C
• Temperature Max (Ts _{MAX})	200°C		200°C
• Time (ts Preheat)	60-180 s		60-180 s
Time Maintained Above:			
• Temperature (T _L)	217°C		217°C
• Time (t _L)	60-150 s		60-150 s
Peak/Classification Temperature (Tp) Time within 5°C of Actual Peak Temperature	260°C		250°C
Time (tp)	20-40 s		20-40 s
Average Ramp Down Rate (Tp to T _L)	6°C/ s Max		3°C/ s Max
Time 25°C to Peak Temperature	8 Minutes Max		8 Minutes Max

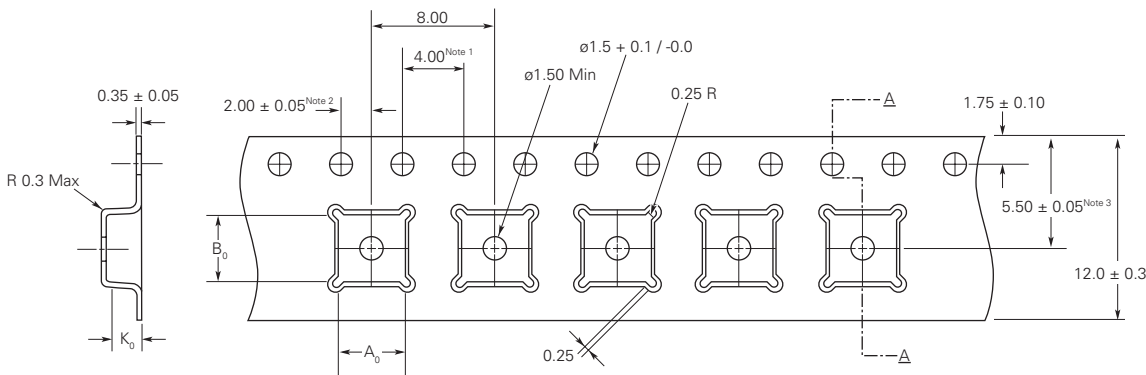
Note: All temperatures refer to top side of the package, measured on the package



Tape and Reel Specifications for PolyZen Devices in Millimeters

Figure PZ46 — EIA Referenced Taped Component Dimensions for ZENxxxVyyyAzzLS Devices in Millimeters (mm)

Description	ZENxxxVyyyAzzLS Devices
A ₀	4.35
B ₀	4.35
K ₀	2.30

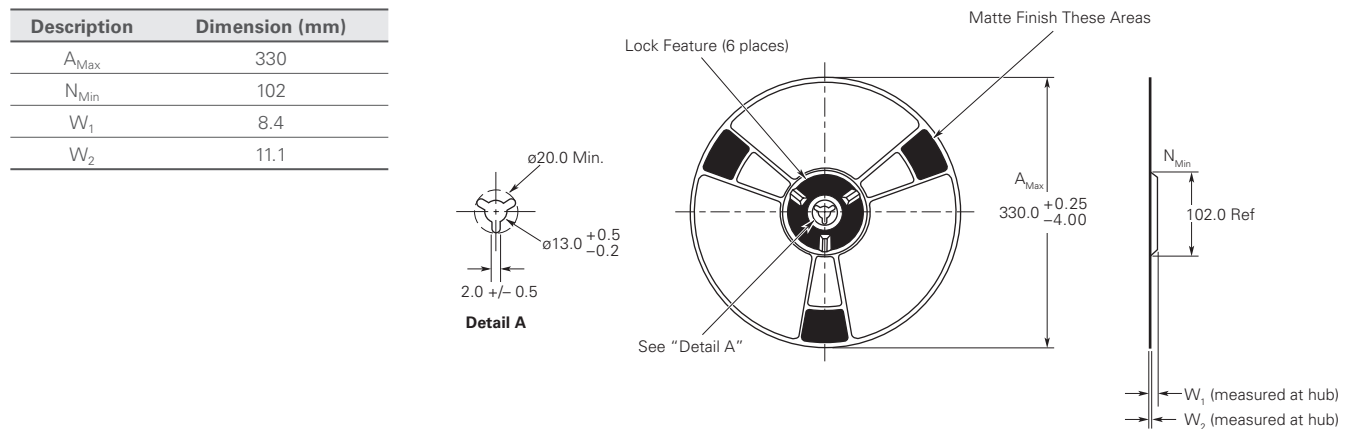


Notes: 1. 10 sprocket hole pitch cumulative tolerance ± 0.2
2. Camber in compliance with EIA 481

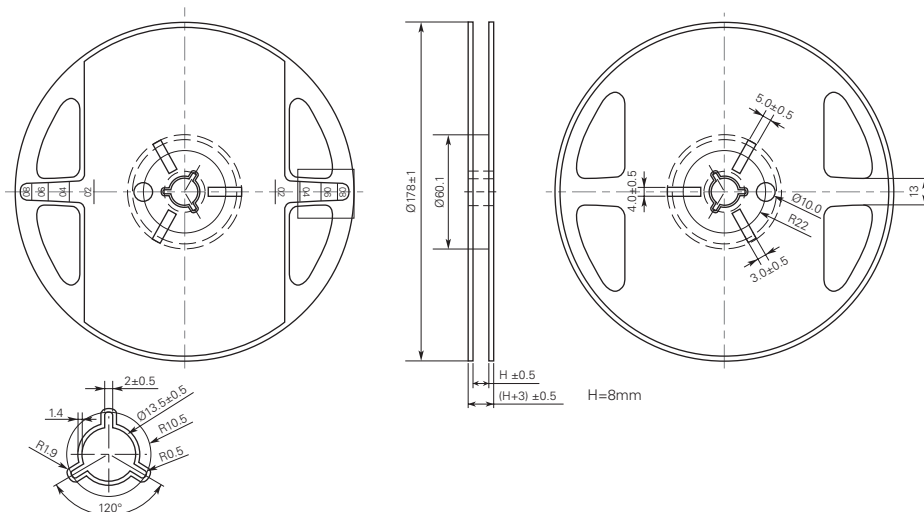
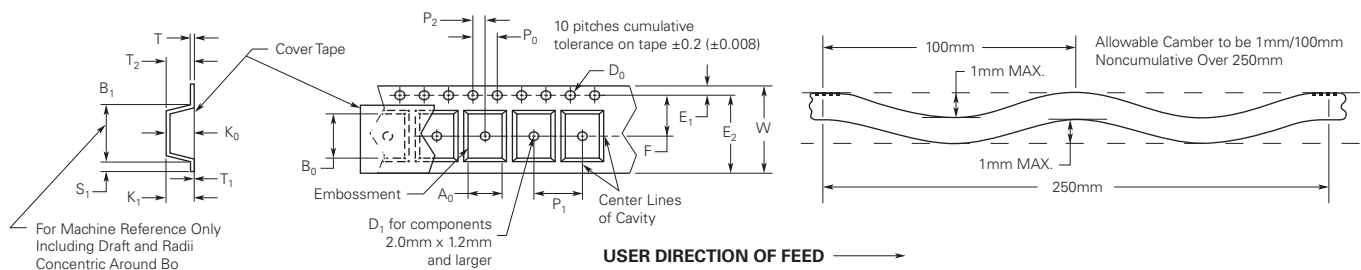
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Figure PZ47 — Reel Dimensions for ZENxxxVyyyAzzLS Devices in Millimeters (mm)



SYMBOL	A_0	B_0	K_0	P_0	P_1	P_2	B_{1Max}
SPEC	2.90±0.10	3.55±0.10	1.27±0.10	4.00±0.10	4.00±0.10	2.00±0.05	4.35
SYMBOL	T	E1	F	D_0	D_1	W	D_{1Max}
SPEC	0.25±0.02	1.75±0.10	3.50±0.05	1.55±0.05	1.00±0.10	8.00±0.30	1.0



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Figure PZ50 — EIA Referenced Taped Component Dimensions for ZENxxxVyyyAzzYC Devices in Millimeters (mm)

Item	Dimension	Tolerance
W	12.00	±0.10
P	8.00	±0.10
E	1.75	±0.10
F	5.50	±0.10
P ₂	2.00	±0.10
D	1.50	+0.10 -0.00
D ₁	1.50	±0.10
P ₀	4.00	±0.10
10P ₀	40.00	±0.20
A ₀	4.20	±0.10
B ₀	5.25	±0.10
K ₀	1.40	±0.10
t	0.24	±0.05

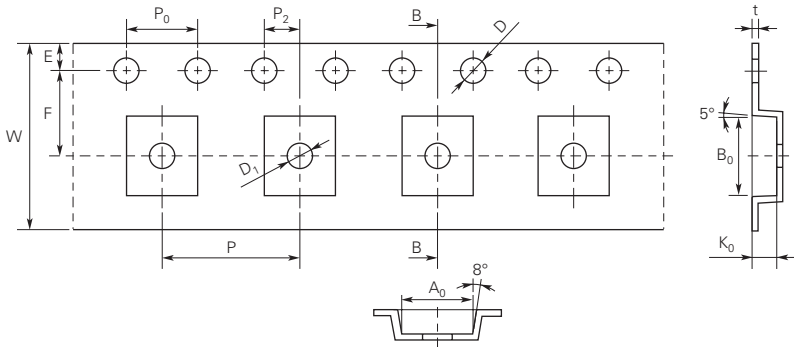
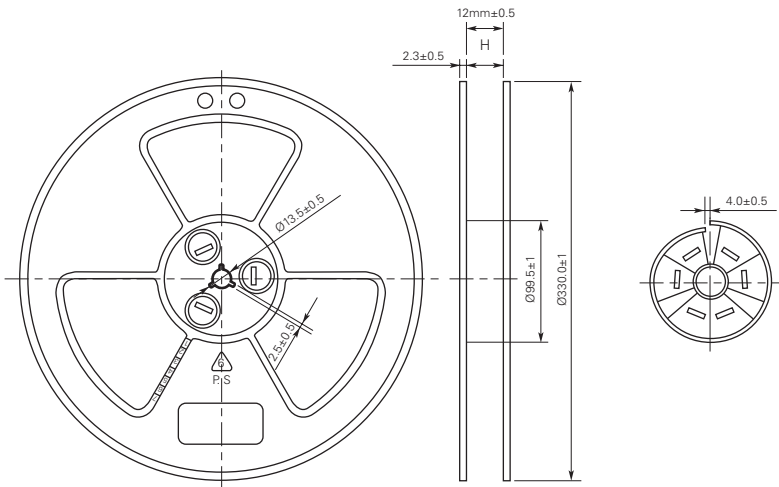
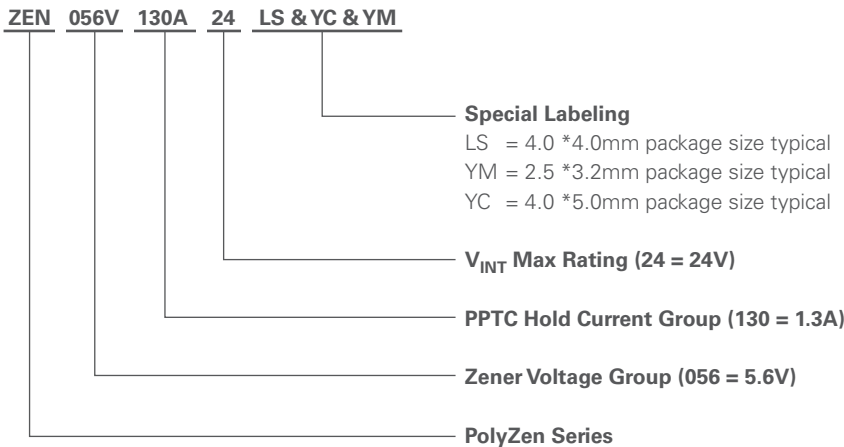


Figure PZ51 — Reel Dimensions for ZENxxxVyyyAzzYC Devices in Millimeters (mm)



Part Numbering System

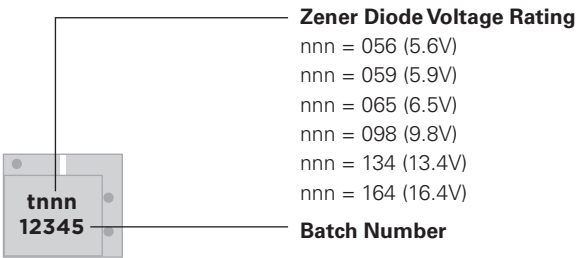


PolyZen Devices

Polymer Protected Zener Diode

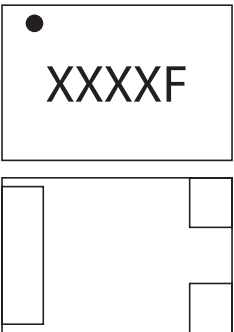
Part Marking System

ZENxxxVyyyAzzLS Devices



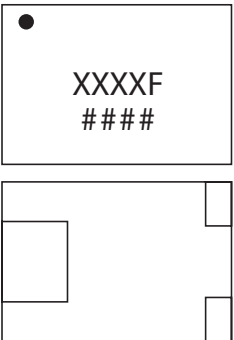
ZENxxxVyyyAzzYM Devices

Markings	V _z	Hold Current	Special Code	Part Description
0513F	5.6V	1.3A	F	ZEN056V130A16YM
0517F	5.6V	1.75A	F	ZEN056V175A12YM
1313F	13.2V	1.3A	F	ZEN132V130A16YM
1317F	13.2V	1.75A	F	ZEN132V175A12YM



ZENxxxVyyyAzzYC Devices

Markings	V _z	Hold Current	Special Code	Part Description
0513F	5.6V	1.3A	F	ZEN056V130A24YC
052XF	5.6V	2.3A	F	ZEN056V230A16YC
052XF	5.6V	2.6A	F	ZEN056V230A16YC
1313F	13.2V	1.3A	F	ZEN132V130A24YC
132XF	13.2V	2.3A	F	ZEN132V230A16YC
132XF	13.2V	2.6A	F	ZEN132V230A16YC
####	Last 4 digits of batch number			



PolyZen Devices

Polymer Protected Zener Diode

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