AOZ8312

Low Capacitance 2.5 V TVS Diode

General Description

The AOZ8312 is a transient voltage suppressor array designed to protect high speed data lines from ESD and lightning.

This AOZ8312 incorporates twelve low capacitance steering diodes and a TVS in a single package. During transient conditions, the steering diodes direct the transient to either the positive side of the power supply line or to ground. The AOZ8312 may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 and IEC 61000-4-5. The TVS diodes provide effective suppression of ESD voltages: ±30 kV (air discharge) and ±30 kV (contact discharge).

The AOZ8312 comes in a Halogen Free and RoHS compliant 3.5 mm x 2.5 mm x 0.55 mm DFN-12 package and is rated over a -40 °C to +85 °C ambient temperature range. The AOZ8312 is compatible with both lead free and SnPb assembly techniques. The small size, low capacitance and high ESD protection makes the AOZ8312 ideal for protecting high speed video and data communication interfaces.

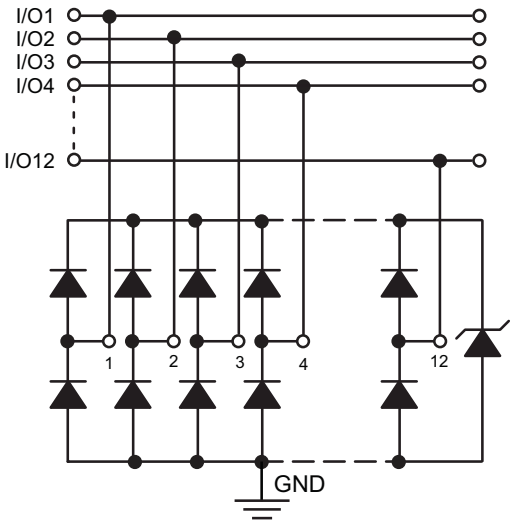
Features

- ESD protection for high-speed data lines:
  - IEC 61000-4-2, level 4 (ESD) immunity test
  - ±30 kV (air discharge) and ±30 kV (contact discharge)
  - IEC 61000-4-4 (EFT) 40 A (5/50 ns)
  - IEC 61000-4-5 (Lightning) 18 A
  - Human Body Model (HBM) ±30 kV
- Small package saves board space
- Low insertion loss
- Protects twelve I/O lines
- Low clamping voltage
- Low operating voltage: 2.5 V
- Green product
- Pb-free device

Applications

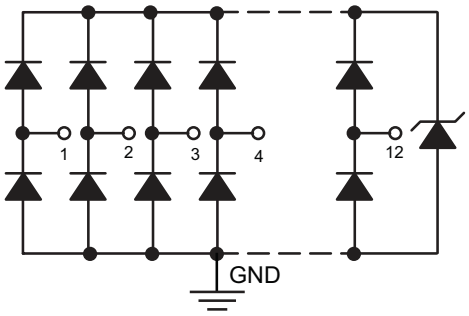
- Video graphics cards
- Monitors and flat panel displays
- Digital Video Interface (DVI)
- T1/E1 telecom ports

Typical Application



Protection of Twelve Lines

Circuit Diagram

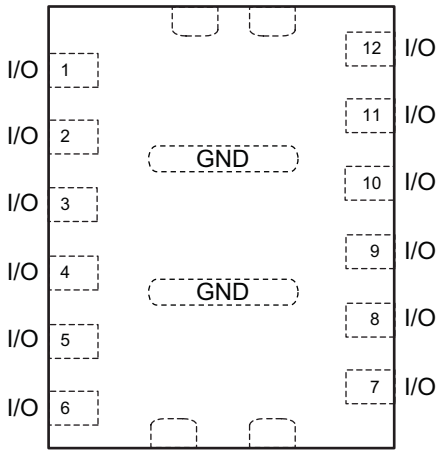


Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8312DI	-40 °C to +85 °C	3.5 mm x 2.5 mm DFN-12	Green Product

AOS Green Products use reduced levels of Halogens, and are also RoHS compliant.
Please visit www.aosmd.com/media/AOSGreenPolicy.pdf for additional information.

Pin Configuration



DFN-12
(Top View)

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Parameter	Rating
Peak Pulse Current (I_{PP}), t_P = 8/20 µs	18 A
Peak Power Dissipation (8 x 20 µs@ 25 °C)	160 W
Storage Temperature (T_S)	-65 °C to +150 °C
ESD Rating per IEC61000-4-2, Contact(1)	±30 kV
ESD Rating per IEC61000-4-2, Air(1)	±30 kV
ESD Rating per Human Body Model(2)	±30 kV

Notes:
1. IEC 61000-4-2 discharge with $C_{Discharge}$ = 150 pF, $R_{Discharge}$ = 330 Ω.
2. Human Body Discharge per MIL-STD-883, Method 3015 $C_{Discharge}$ = 100 pF, $R_{Discharge}$ = 1.5 kΩ.

Maximum Operating Ratings

Parameter	Rating
Junction Temperature (T_J)	-40 °C to +125 °C

Electrical Characteristics

T_A = 25°C unless otherwise specified.

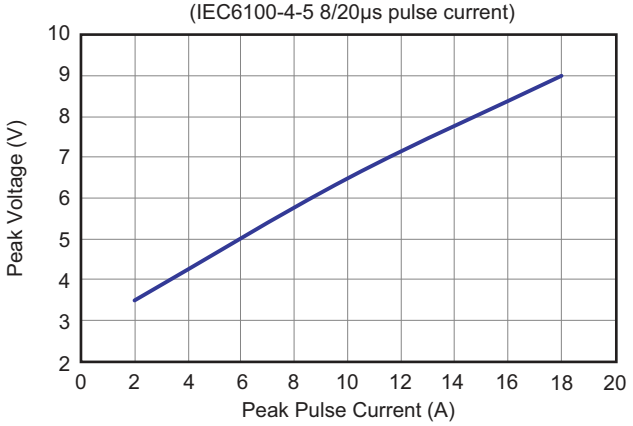
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{RWM}	Reverse Working Voltage	Between any I/O pin 5 and GND[4]			2.5	V
I_R	Reverse Leakage Current	V_{RWM} = 2.5 V, between any I/O pin 5 and GND			1	µA
V_{BR}	Reverse Breakdown Voltage	I_T = 100 µA	2.8			V
V_{CL}	Channel Clamp Voltage Positive Transients	I_{PP} = 2 A, tp = 8/20 µs, any I/O pin to GND[3]			3.5	V
	Channel Clamp Voltage Positive Transients	I_{PP} = 10 A, tp = 8/20 µs, any I/O pin to GND[3]			6.5	V
	Channel Clamp Voltage Positive Transients	I_{PP} = 18 A, tp = 8/20 µs, any I/O pin to GND[3]			9	V
C_j	Junction Capacitance	V_R = 0 V, f = 1 MHz, any I/O pin to Ground		2.3	3.5	pF
		V_R = 0 V, f = 1 MHz, between I/O pins[3]		1.2		pF

Notes:

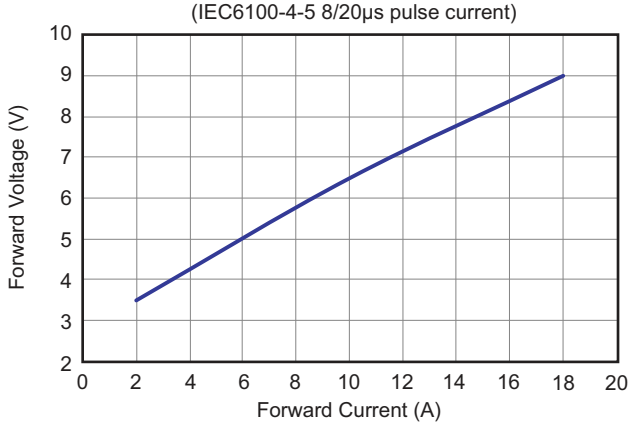
3. These specifications are guaranteed by design.
4. The working peak reverse voltage, V_{RWM}, should be equal to or greater than the DC or continuous peak operating voltage level.
5. V_{BR} is measured at the pulse test current I_T.

Typical Performance Characteristics

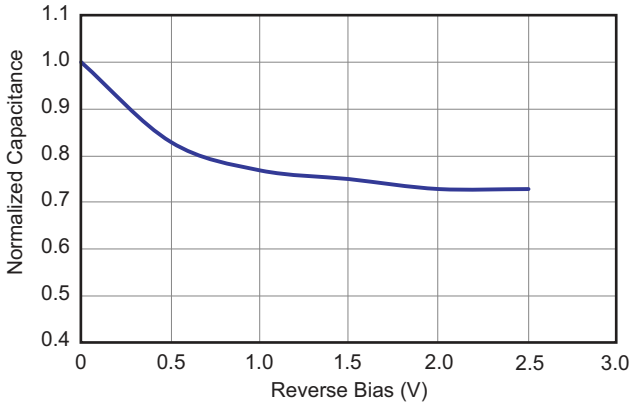
Clampling Voltage vs. Peak Pulse Current
(IEC6100-4-5 8/20μs pulse current)



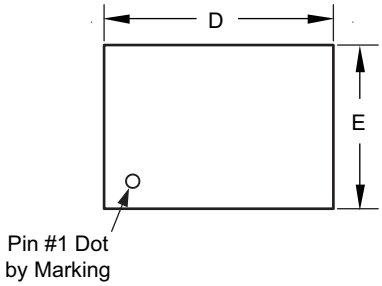
Forward Voltage vs. Forward Current
(IEC6100-4-5 8/20μs pulse current)



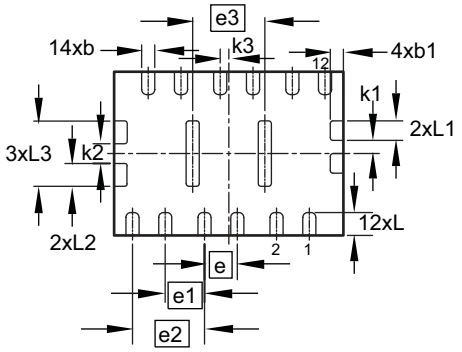
Capacitance vs. Reverse Bias



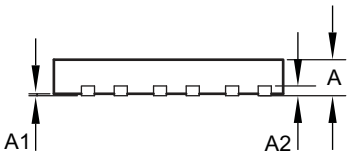
Package Dimensions, DFN 3.5mm x 2.5mm x 0.55mm, 12L, EP2



TOP VIEW

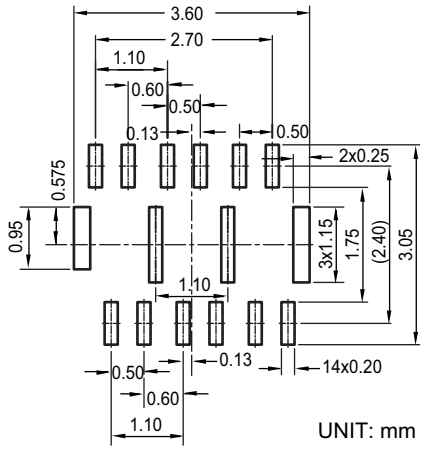


BOTTOM VIEW



SIDE VIEW

RECOMMENDED LAND PATTERN



Dimensions in Millimeters

Symbols	Min.	Nom.	Max.
A	0.50	0.55	0.60
A1	0.00	—	0.05
A2		(0.15)	
b	0.15	0.20	0.25
b1	0.10	0.20	0.30
D	3.40	3.50	3.60
E	2.40	2.50	2.60
e		0.50 BSC	
e1		0.60 BSC	
e2		1.10 BSC	
e3		1.10 BSC	
k1		(0.20)	
k2		(0.30)	
k3		(0.13)	
L	0.30	0.35	0.40
L1	0.25	0.30	0.35
L2	0.30	0.35	0.40
L3	0.90	1.00	1.10

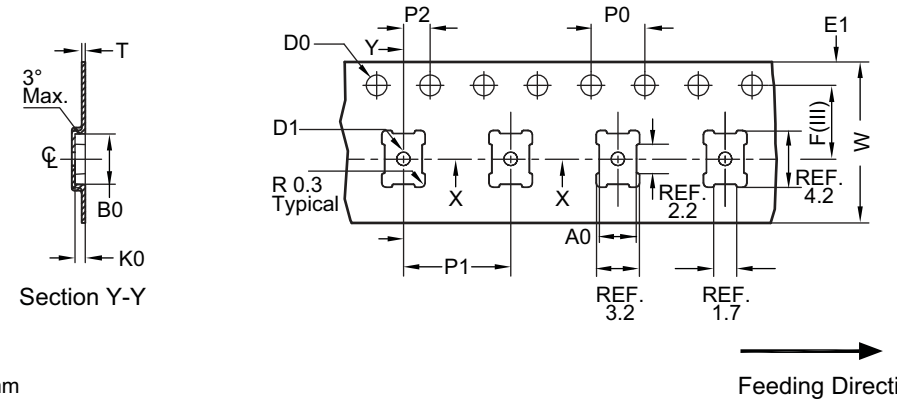
Dimensions in Millimeters

Symbols	Min.	Nom.	Max.
A	0.020	0.022	0.024
A1	0.000	—	0.002
A2		(0.006)	
b	0.006	0.008	0.010
b1	0.004	0.008	0.012
D	0.134	0.138	0.142
E	0.094	0.098	0.102
e		0.020 BSC	
e1		0.024 BSC	
e2		0.043 BSC	
e3		0.043 BSC	
k1		(0.008)	
k2		(0.012)	
k3		(0.005)	
L	0.012	0.014	0.016
L1	0.010	0.012	0.014
L2	0.012	0.014	0.016
L3	0.035	0.039	0.043

Notes:
1. Controlling dimension is millimeter. Converted inch dimensions are not necessarily exact.
2. Tolerance: ±0.05 unless otherwise specified.
3. Radius on all corners is 0.152 max., unless otherwise specified.
4. Package warpage: 0.012 max.
5. No any plastic flash allowed on the top and bottom lead surface.
6. Pad planarity: ±0.102.
7. Crack between plastic body and lead is not allowed.

Tape and Reel Dimensions, DFN 3.5mm x 2.5mm x 0.55mm, 12L, EP2

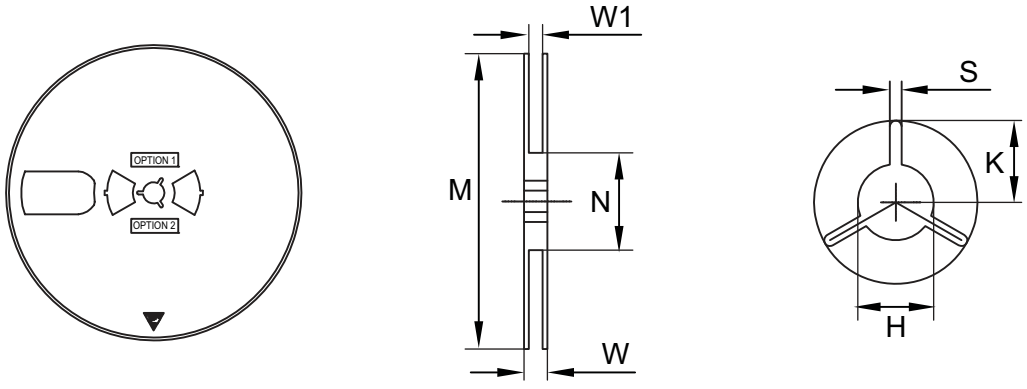
Carrier Tape



UNIT: mm

Package	A0	B0	K0	D0	D1	W	E1	F	P0	P1	P2	T
DFN 3.5x2.5	2.75 ±0.05	3.75 ±0.05	0.75 ±0.10	1.50 +0.1/-0.0	1.00 +0.1/-0.0	12.00 ±0.30	1.75 ±0.10	5.50 ±0.05	4.00 ±0.10	8.00 ±0.10	2.00 ±0.05	0.25 ±0.05

Reel

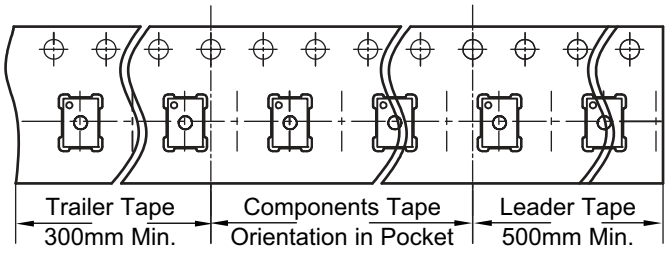


UNIT: mm

Tape Size	Reel Size	M	N	W	W1	H	S	K
12mm	ø178	ø178 ±1.0	ø54 ±0.5	17 ±2.0	13.5 ±0.5	ø13 +0.5/-0.2	2.2 ±0.3	10.25 ±0.2

Leader / Trailer & Orientation

Unit Per Reel:
2000 pcs



Part Marking

AOZ8312DI
(DFN-12)