

General Description

The AOZ8231A is a one-line bi-directional transient voltage suppressor diode designed to protect voltage sensitive electronics from high transient conditions and ESD.

This device incorporates one TVS diode in an ultra-small DFN 1006 package. It may be used to meet the ESD immunity requirements of EC 61000-4-2, Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge).

The AOZ8231A comes in an RoHS compliant DFN 1.0 mm x 0.6 mm package and is rated over a $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ ambient temperature range.

The ultra-small 1.0 mm x 0.6 mm x 0.5 mm DFN package makes it ideal for applications where PCB space is a premium. The small size and high ESD protection makes it ideal for protecting voltage sensitive electronics from high transient conditions and ESD.

Applications

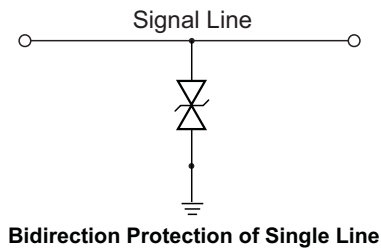
- Portable handheld devices
- Keypads, data lines, buttons
- Notebook computers
- Digital Cameras
- Portable GPS
- MP3 players

Features

- ESD protection for high-speed data lines
- AOZ8231ADI-02:
- Exceeds: IEC 61000-4-2 (ESD) $\pm 30\text{ kV}$ (air), $\pm 30\text{ kV}$ (contact)
 - Human Body Model (HBM) $\pm 30\text{ kV}$
 - IEC 61000-4-5 (Lightning) 6 A (8/20 μS)
 - IEC 61000-4-4 (EFT) 40 A
- AOZ8231ADI-03:
- Exceeds: IEC 61000-4-2 (ESD) $\pm 30\text{ kV}$ (air), $\pm 30\text{ kV}$ (contact)
 - Human Body Model (HBM) $\pm 30\text{ kV}$
 - IEC 61000-4-5 (Lightning) 6 A (8/20 μS)
 - IEC 61000-4-4 (EFT) 40 A
- AOZ8231ADI-05:
- Exceeds: IEC 61000-4-2 (ESD) $\pm 30\text{ kV}$ (air), $\pm 30\text{ kV}$ (contact)
 - Human Body Model (HBM) $\pm 30\text{ kV}$
 - IEC 61000-4-5 (Lightning) 5 A (8/20 μS)
 - IEC 61000-4-4 (EFT) 40 A
- AOZ8231ADI-08:
- Exceeds: IEC 61000-4-2 (ESD) $\pm 30\text{ kV}$ (air), $\pm 30\text{ kV}$ (contact)
 - Human Body Model (HBM) $\pm 30\text{ kV}$
 - IEC 61000-4-5 (Lightning) 5 A (8/20 μS)
 - IEC 61000-4-4 (EFT) 40 A
- AOZ8231ADI-12:
- Exceeds: IEC 61000-4-2 (ESD) $\pm 30\text{ kV}$ (air), $\pm 30\text{ kV}$ (contact)
 - Human Body Model (HBM) $\pm 30\text{ kV}$
 - IEC 61000-4-5 (Lightning) 4 A (8/20 μS)
 - IEC 61000-4-4 (EFT) 40 A
- AOZ8231ADI-24:
- Exceeds: IEC 61000-4-2 (ESD) $\pm 18\text{ kV}$ (air), $\pm 15\text{ kV}$ (contact)
 - Human Body Model (HBM) $\pm 15\text{ kV}$
 - IEC 61000-4-5 (Lightning) 2.5 A (8/20 μS)
 - IEC 61000-4-4 (EFT) 40 A
- Small package saves board space
 - Low insertion loss
 - Low clamping voltage
 - Low operating voltage
 - Pb-free device



Typical Application



Pin Configuration



Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8231ADI-02	-40 °C to +85 °C	DFN 1.0 x 0.6	Green Product
AOZ8231ADI-03			
AOZ8231ADI-05			
AOZ8231ADI-08			
AOZ8231ADI-12			
AOZ8231ADI-24			



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

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Parameter	Rating for AOZ8231ADI					
	-02	-03	-05	-08	-12	-24
VP – VN	2.5 V	3.3 V	5 V	8 V	12 V	24 V
Peak Pulse Current, $t_p = 8/20 \mu s$	6 A	6 A	5 A	5 A	4 A	2.5 A
Storage Temperature (T_S)	-65 °C to +150 °C					
ESD Rating per IEC61000-4-2, Contact ⁽¹⁾	± 30 kV	± 30 kV	± 30 kV	± 30 kV	± 30 kV	± 15 kV
ESD Rating per IEC61000-4-2, Air ⁽¹⁾	± 30 kV	± 30 kV	± 30 kV	± 30 kV	± 30 kV	± 18 kV
ESD Rating per Human Body Model ⁽²⁾	± 30 kV	± 30 kV	± 30 kV	± 30 kV	± 30 kV	± 15 kV

Notes:

- IEC 61000-4-2 discharge with $C_{Discharge} = 150 \text{ pF}$, $R_{Discharge} = 330 \Omega$.
- Human Body Discharge per MIL-STD-883, Method 3015 $C_{Discharge} = 100 \text{ pF}$, $R_{Discharge} = 1.5 \text{ k}\Omega$.

Maximum Operating Ratings

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

Electrical Characteristics

$T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified. $V_F = 0.9\text{ V Max. @ } I_F = 10\text{ mA}$ for all types

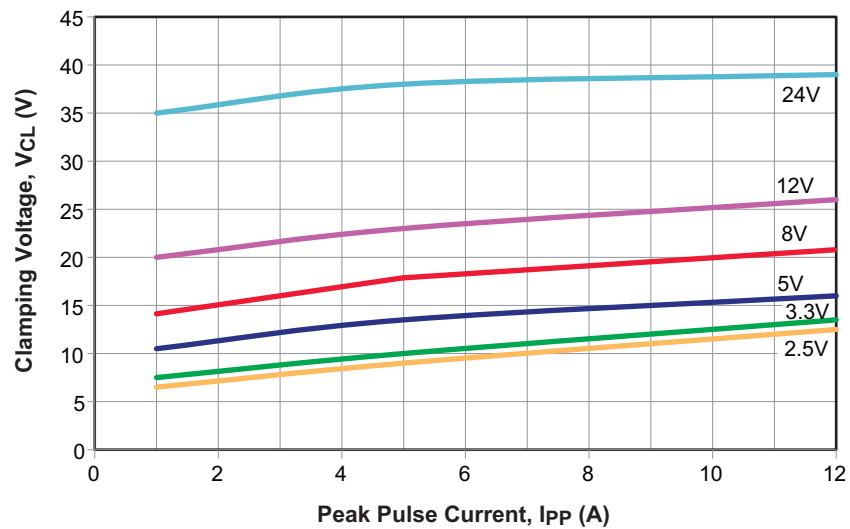
Symbol	Parameter	Diagram
I_{PP}	Reverse Peak Pulse Current, ($t_{\text{period}} = 100\text{ ns}$, $t_r = 1\text{ ns}$)	
V_{CL}	Clamping Voltage @ I_{PP}	
V_{RWM}	Working Peak Reverse Voltage	
I_R	Maximum Reverse Leakage Current	
V_{BR}	Breakdown Voltage	
I_F	Forward Current	
V_F	Forward Voltage	
P_{PK}	Peak Power Dissipation	
C_J	Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$	

Device	Device Marking	$V_{RWM}\text{ (V) Max.}$	$V_{BR}\text{ (V) Min. @ 1mA}$	$I_R\text{ (}\mu\text{A) Max.}$	$V_{CL}\text{ Max.}$			$C_J\text{ (pF)}$		
					$I_{PP} = 1\text{ A}$	$I_{PP} = 5\text{ A}$	$I_{PP} = 12\text{ A}$	Min.	Typ.	Max.
AOZ8231ADI-02	P	2.5	3.0	0.1	6.5	9.0	12.5	4.4	5.5	7.0
AOZ8231ADI-03	D	3.3	3.7	0.1	7.5	10.0	13.5	4.4	5.5	7.0
AOZ8231ADI-05	E	5.0	5.5	0.1	10.5	13.5	15.5	10.4	13.0	14.0
AOZ8231ADI-08	Y	8.0	9.5	0.1	15.0	18.0	22.5	19.0	23.0	27.0
AOZ8231ADI-12	F	12.0	13.0	0.1	20.0	23.0	26.0	10.4	13.0	14.0
AOZ8231ADI-24	R	24.0	29.0	0.1	35.0	38.0	39.0	9.6	12.0	15.0

Typical Performance Characteristics

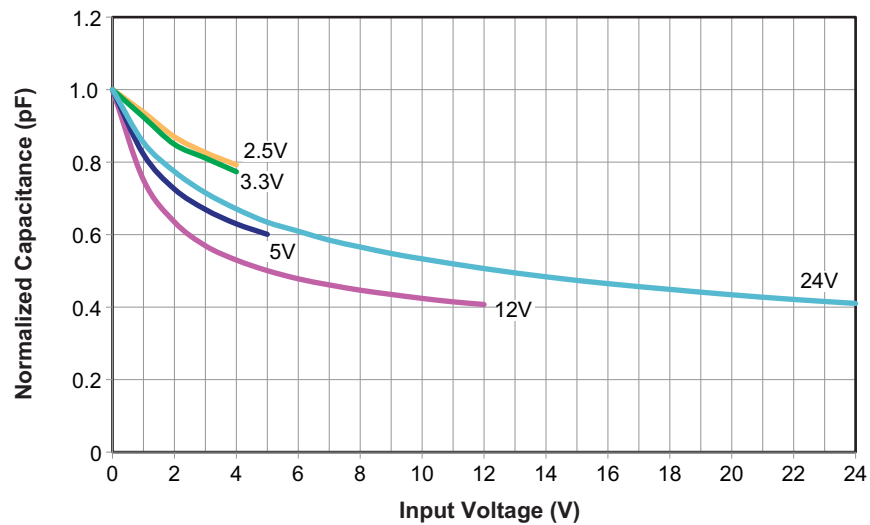
Clamping Voltage vs. Peak Pulse Current

($t_{\text{period}} = 100 \text{ ns}$, $t_r = 1 \text{ ns}$)

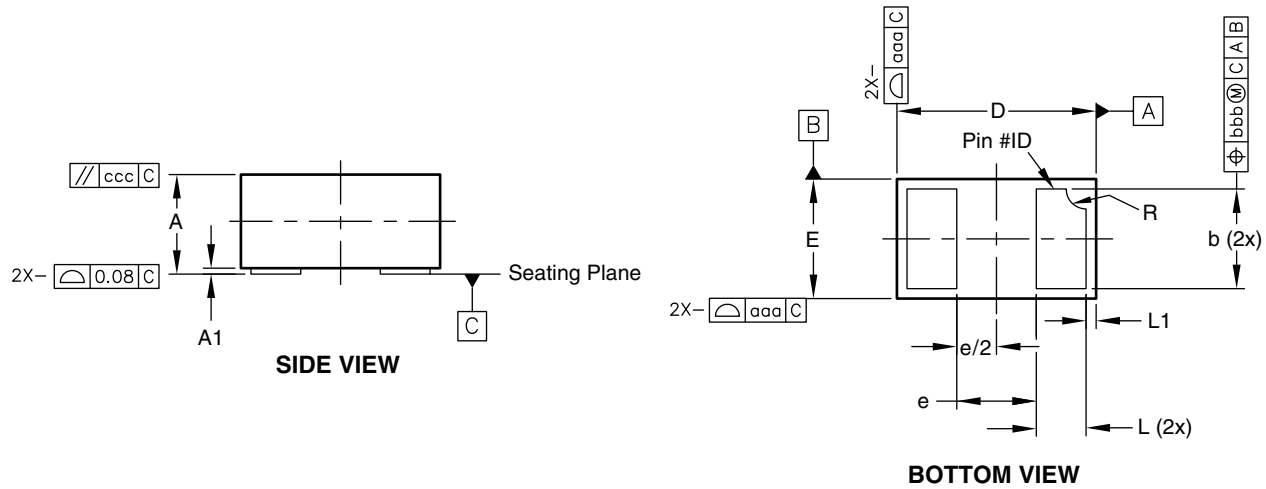


Typical Variation of C_{IN} vs. V_R

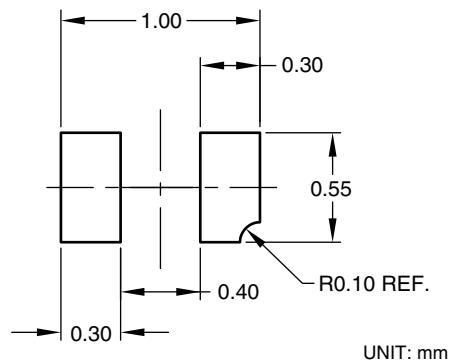
($f = 1 \text{ MHz}$, $T = 25^\circ \text{C}$)



Package Dimensions, DFN 1.0 x 0.6



RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.47	0.52	0.55
A1	0.00	0.03	0.05
b	0.45	0.50	0.55
D	0.95	1.00	1.075
E	0.55	0.60	0.675
e	—	0.40	—
L	0.20	0.25	0.30
L1	0.050.03 REF.		
R	0.05	0.10	0.15
aaa	0.15		
bbb	0.05		
ccc	0.05		

Dimensions in inches

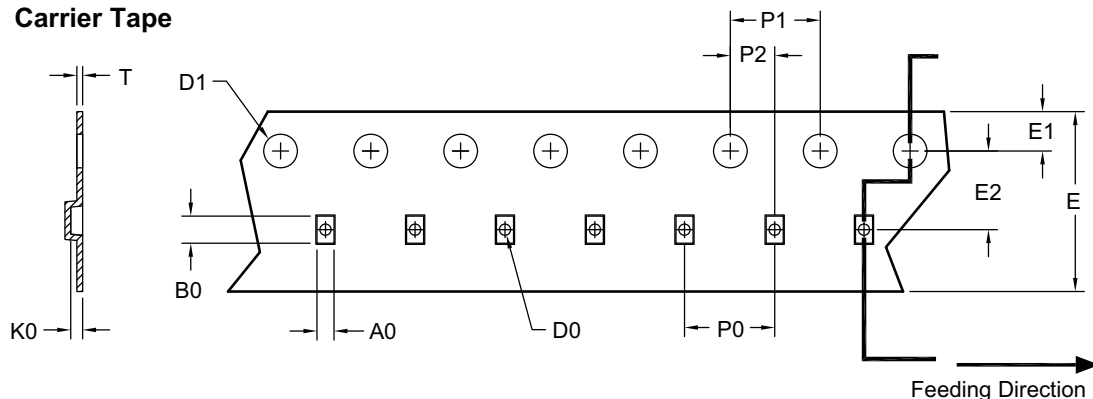
Symbols	Min.	Nom.	Max.
A	0.019	0.020	0.022
A1	0.000	0.001	0.002
b	0.018	0.020	0.022
D	0.037	0.039	0.042
E	0.022	0.024	0.027
e	—	0.016	—
L	0.008	0.010	0.012
L1	0.0020.001 REF.		
R	0.002	0.004	0.006
aaa	0.006		
bbb	0.002		
ccc	0.002		

Notes:

1. All dimensions are in millimeters, angles are in degrees.
2. Coplanarity applies to the exposed heat sink slug as well as the terminals.

Tape and Reel Dimensions, DFN 1.0 x 0.6

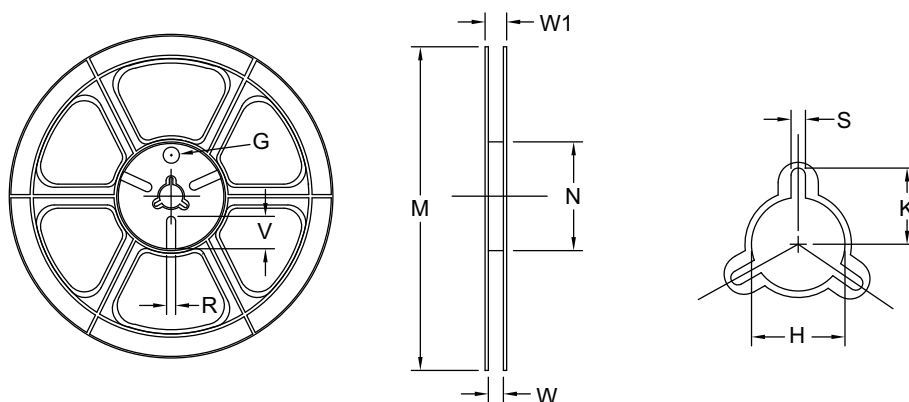
Carrier Tape



UNIT: mm

Package	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
DFN 1.0x0.6 (8 mm)	0.76 ±0.05	1.21 ±0.05	0.53 ±0.05	ø0.50 ±0.05	ø1.50 ±0.10	8.00 +0.30/-0.10	1.75 ±0.1	3.50 ±0.05	4.00 ±0.10	4.0 ±0.10	2.0 ±0.05	0.254 ±0.02

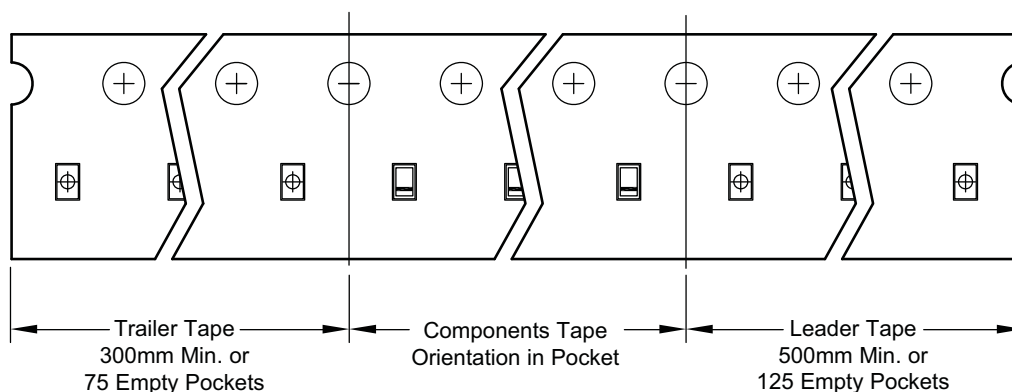
Reel



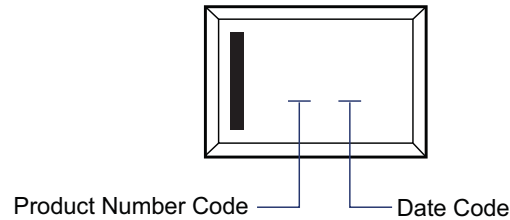
UNIT: mm

Tape Size	Reel Size	M	N	W	W1	H	K	S	G	R	V
8mm	ø178	ø178 ±0.5	ø55 ±1	8.4 +1.5/-0	14.4. Max.	ø13.0 ±0.5	2.0 ±0.5	2.0 ±0.5	N/A	N/A	N/A

Leader / Trailer & Orientation



Part Marking



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2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.