AOZ8231

One-line Bi-directional TVS Diode

General Description

The AOZ8231 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 SOD923 package. It may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

The AOZ8231 comes in an RoHS compliant SOD923 package and is rated over a -40°C to +85°C ambient temperature range.

The ultra-small 1.0 x 0.6 x 0.4mm SOD923 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.

Features

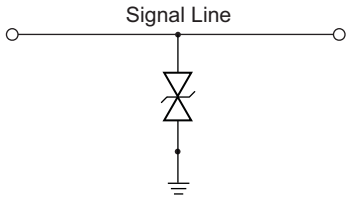
- ESD protection for high-speed data lines:
  - Exceeds: IEC 61000-4-2 (ESD) ±24kV (air), ±24kV (contact)
  - Human Body Model (HBM) ±30kV
  - IEC 61000-4-5 (Lightning) ±5A (8/20µS)
  - IEC 61000-4-4 (EFT) ±40A
- Small package saves board space
- Low insertion loss
- Low clamping voltage
- Low operating voltage: 5.0V
- Pb-free device

Applications

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

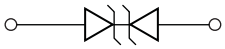
Green Product

Typical Application



Bidirection Protection of Single Line

Pin Configuration



Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8231NI-05L	-40°C to +85°C	SOD923	RoHS Compliant Green Product

• All AOS products are offered in packages with Pb-free plating and compliant to RoHS standards.

• Parts marked as Green Products (with "L" suffix) use reduced levels of Halogens, and are also RoHS compliant.

Please visit www.aosmd.com/web/quality/rohs_compliant.jsp for additional information.

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Parameter	Rating
VP – VN	5V
Peak Pulse Current (I_{PP}), t_P = 8/20µs	5A
Storage Temperature (T_S)	-65°C to +150°C
ESD Rating per IEC61000-4-2, Contact(1)	±24kV
ESD Rating per IEC61000-4-2, Air(1)	±24kV
ESD Rating per Human Body Model(2)	±30kV

Notes:

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

Maximum Operating Ratings

Parameter	Rating
Junction Temperature (T_J)	-40°C to +85°C

Electrical Characteristics

T_A = 25°C unless otherwise specified.

Symbol	Parameter		Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current		I_T	Test Current
V_{CL}	Clamping Voltage @ I_{PP}		I_F	Forward Current
V_{RWM}	Working Peak Reverse Voltage		V_F	Forward Voltage @ I_F
I_R	Maximum Reverse Leakage Current @ V_{RWM}		P_{pk}	Peak Power Dissipation
V_{BR}	Breakdown Voltage @ I_T		C_J	Max. Capacitance @ V_R = 0 and f = 1MHz

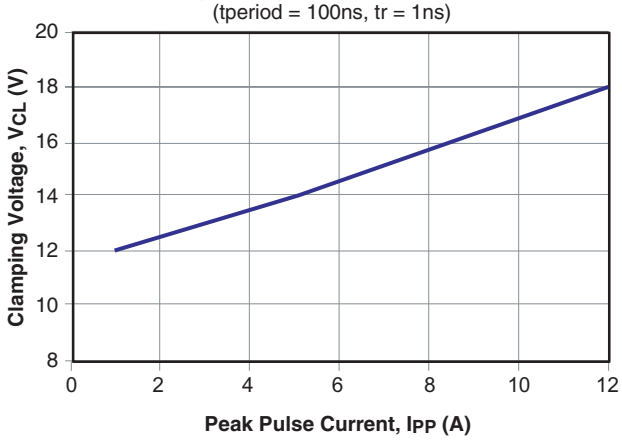
Electrical Characteristics

T_A = 25°C unless otherwise noted, V_F = 0.9V Max. @ I_F = 10mA for all types

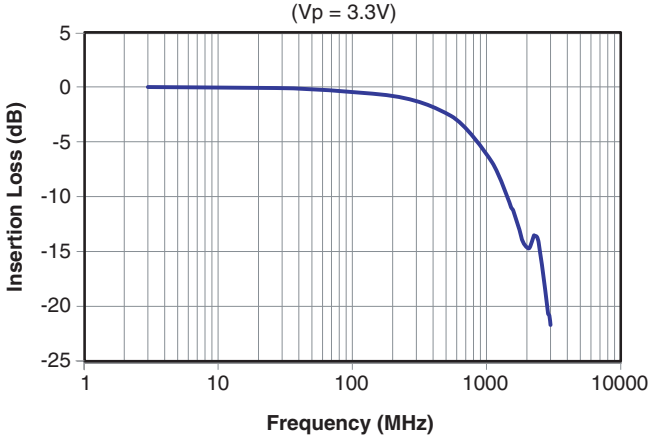
Device	Device Marking	V_{RWM} (V) Max.	V_{BR} (V) Min.	I_R (µA) Max.	V_F (V) Typ.	V_{CL} Max.			C_J (pF) Typ.
						I_{PP} = 1A	I_{PP} = 5A	I_{PP} = 12A	
AOZ8231NI-05L	HG	5.0	6.0	0.1	1.0	12.00	14.00	18.00	12

Typical Performance Characteristics

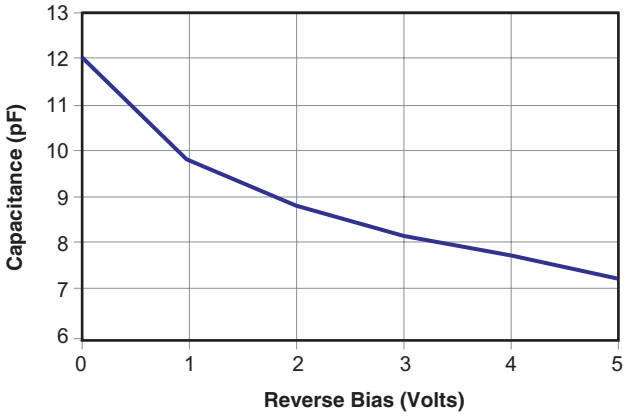
Clamping Voltage vs. Peak Pulse Current
(tperiod = 100ns, tr = 1ns)



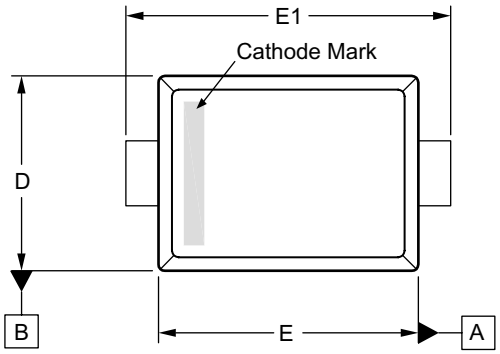
I/O – Gnd Insertion Loss (S21) vs. Frequency
(Vp = 3.3V)



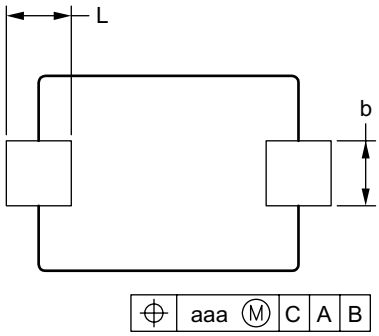
Capacitance vs. Reverse Bias



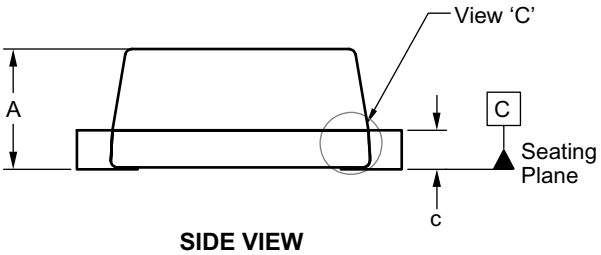
Package Dimensions, SOD923



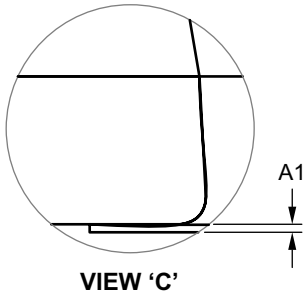
TOP VIEW



BOTTOM VIEW

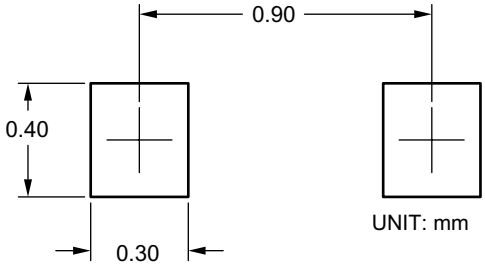


SIDE VIEW



VIEW 'C'

RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	—	—	0.41
A1	0.00	—	0.05
b	0.15	0.20	0.25
c	0.07	0.12	0.14
D	0.55	0.60	0.65
E	0.75	0.80	0.85
E1	0.95	1.00	1.05
L	0.15	0.20	0.25
aaa		0.08	

Dimensions in inches

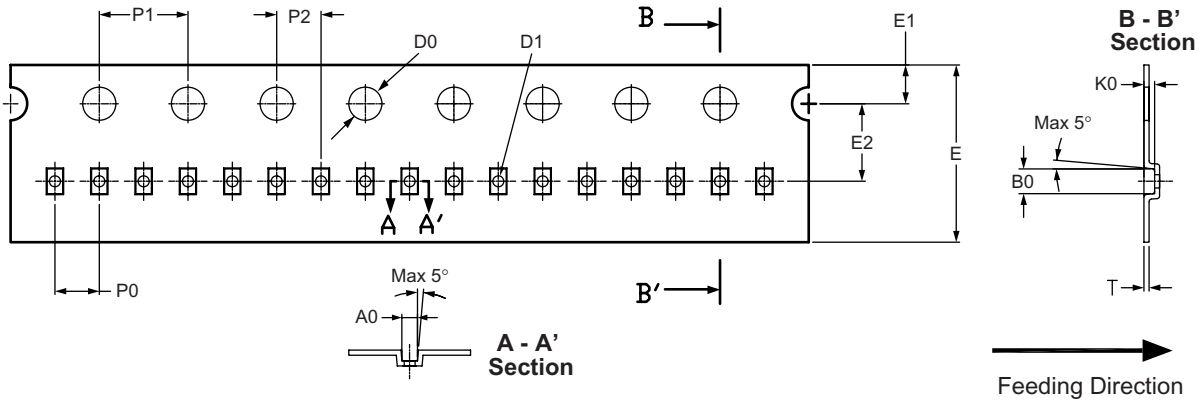
Symbols	Min.	Nom.	Max.
A	—	—	0.016
A1	0.00	—	0.002
b	0.006	0.008	0.010
c	0.003	0.005	0.006
D	0.022	0.024	0.026
E	0.030	0.031	0.033
E1	0.037	0.039	0.041
L	0.006	0.008	0.010
aaa		0.003	

Notes:

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating.
3. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.
4. The cathode mark is optional.
5. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 3 mils each.

Tape and Reel Dimensions, SOD923

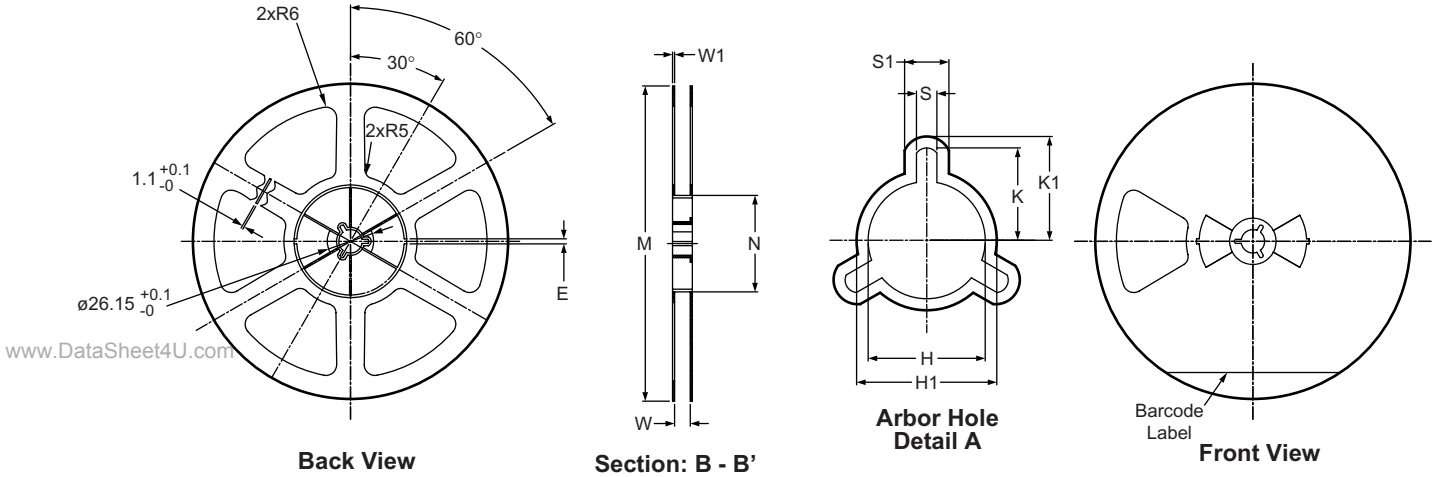
Tape



UNIT: mm

Package	A0	B0	K0	D0	D1	E	E1	E2	P0	P1	P2	T
SOD923	0.70 ±0.05	1.12 ±0.05	0.48 ±0.05	ø1.50 ±0.1	ø0.5 ±0.05	8.0 ±0.2	1.75 ±0.1	3.5 ±0.05	2.0 ±0.05	4.0 ±0.1	2.0 ±0.05	0.229 ±0.02

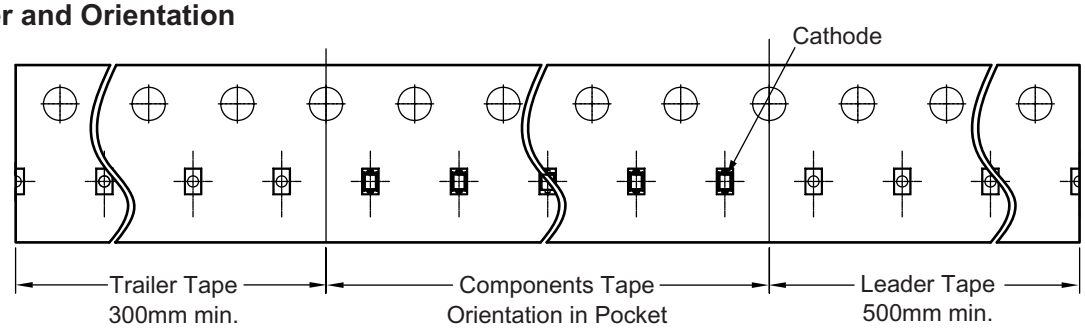
Reel



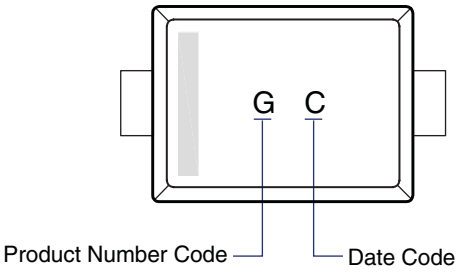
UNIT: mm

Tape Size	Reel Size	M	N	W	W1	H	H1	K	K1	S	S1	E
8mm	ø180	ø177.7 ±0.5	ø54.4 ±0.5	8.8 ±0.5	1.15 +0.2 / -0.0	ø13.2 ±0.3	ø15.8	10.4	11.7	2.3 ±0.1	4.9 ±0.1	2.8 ±0.1

Leader/Trailer and Orientation



Part Marking



Alpha & Omega Semiconductor reserves the right to make changes at any time without notice.

LIFE SUPPORT POLICY

ALPHA & OMEGA SEMICONDUCTOR PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.

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.