ALPHA & OMEGA SEMICONDUCTOR

# AOZ8211

## One-line TVS Diode

## General Description

The AOZ8211 is a one-line transient voltage suppressor diode designed to protect voltage sensitive electronics from high transient conditions and ESD. This state-of-the-art device utilizes AOS leading edge Trench Vertical Structure [TVS]$^2$ ™ technology for superior clamping performance.

This device incorporates one TVS diode in an ultra-small SOD923 package. During transient conditions, the one-line TVS diode directs the transient to ground. It may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

The AOZ8211 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

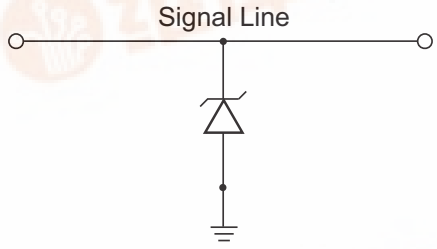
- ESD protection for high-speed data lines:
  - Exceeds: IEC 61000-4-2 (ESD) ±28kV (air), ±28kV (contact)
  - Human Body Model (HBM) ±30kV
- Trench Vertical Structure [TVS]$^2$ ™ based technology used to achieve excellent ESD clamping performance
- Small package saves board space
- Low insertion loss
- Low clamping voltage
- Low operating voltage
- Green product

## Applications

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

Green Product

## Typical Application




**Unidirection Protection of Single Line**

## Pin Configuration

## Ordering Information

| Part Number | Ambient Temperature Range | Package | Environmental |
|---|---|---|---|
| AOZ8211NI-05L | -40°C to +85°C | SOD923 | RoHS Compliant<br>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) | ±28kV |
| ESD Rating per IEC61000-4-2, Air(1) | ±28kV |
| 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 |

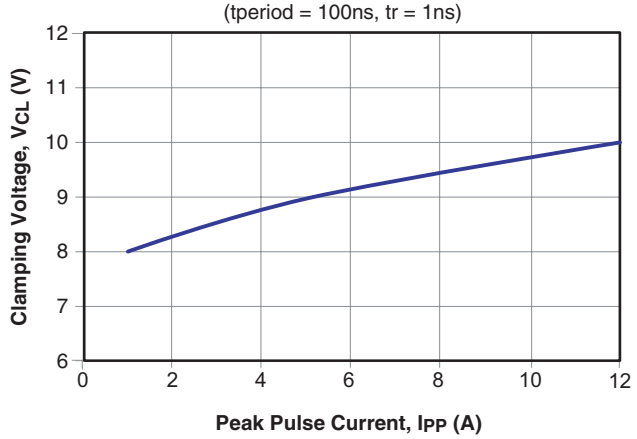
## Electrical Characteristics

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

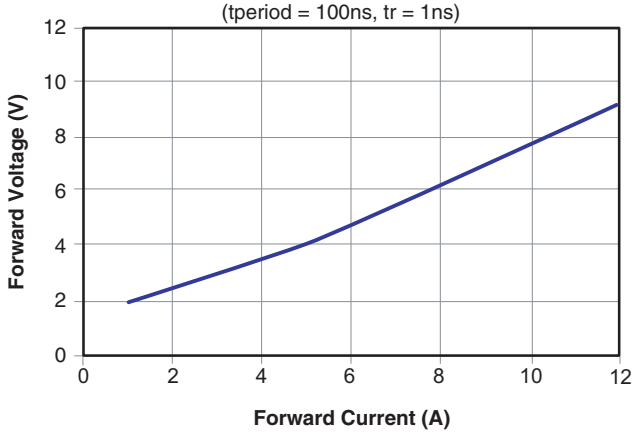
| Device | Device Marking | $V_{RWM}$ (V) Max. | $V_{BR}$ (V) Max. | $I_R$ (µA) Max. | $V_F$ (V) Typ. | $V_{CL}$ Max. | | | $C_J$ (pF) Max. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | $I_{PP}$ = 1A | $I_{PP}$ = 5A | $I_{PP}$ = 12A | |
| AOZ8211NI-05L | CM | 5.0 | 6.0 | 0.1 | 0.75 | 8.00 | 9.00 | 10.00 | 16 |

## Typical Performance Characteristics

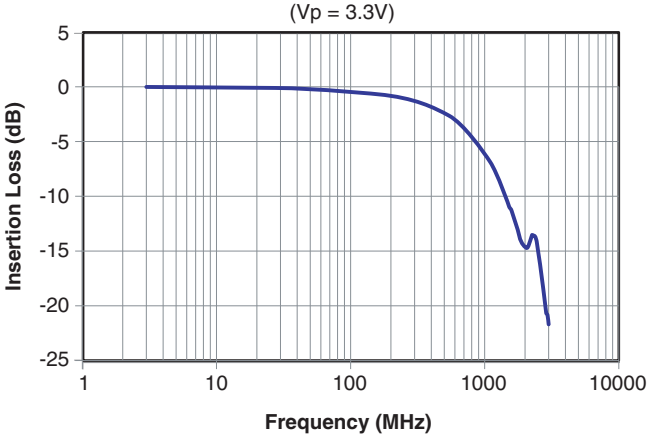
**Clamping Voltage vs. Peak Pulse Current**
(tperiod = 100ns, tr = 1ns)



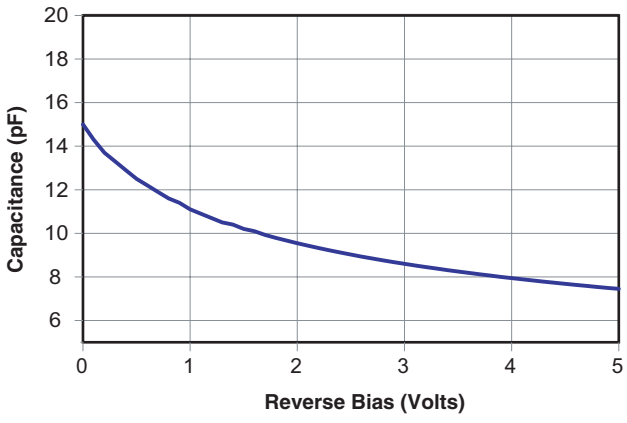

**Forward Voltage vs. Forward Current**
(tperiod = 100ns, tr = 1ns)



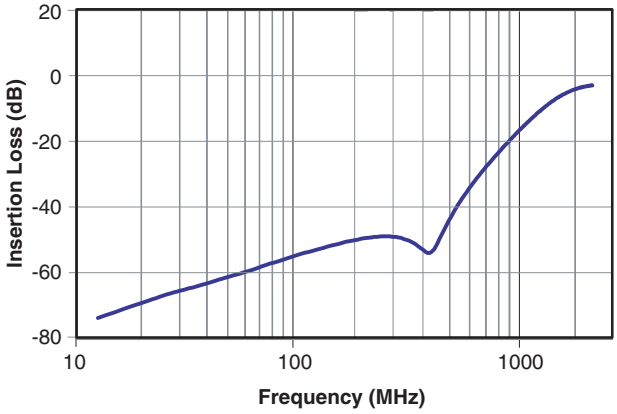

**I/O – Gnd Insertion Loss (S21) vs. Frequency**
(Vp = 3.3V)



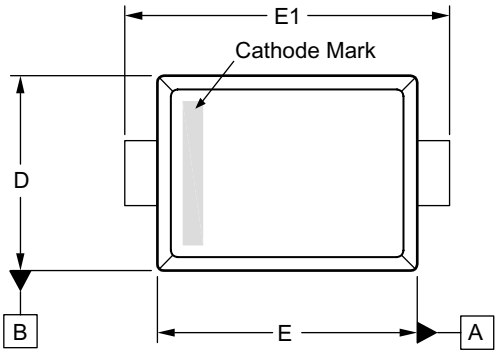

**Capacitance vs. Reverse Bias**



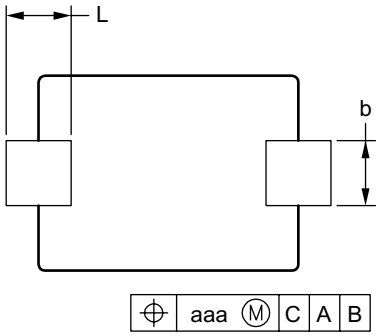

**Analog Crosstalk (I/O–I/O) vs. Frequency**



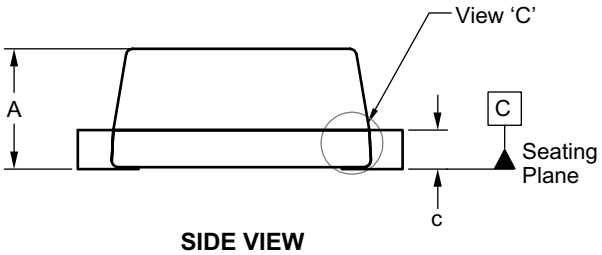
## Package Dimensions, SOD923



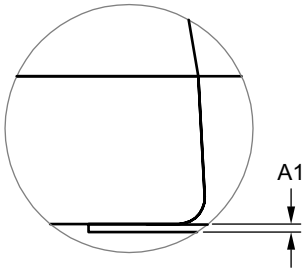

**TOP VIEW**




**BOTTOM VIEW**

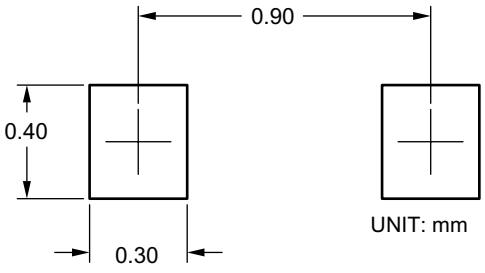



**SIDE VIEW**




**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**

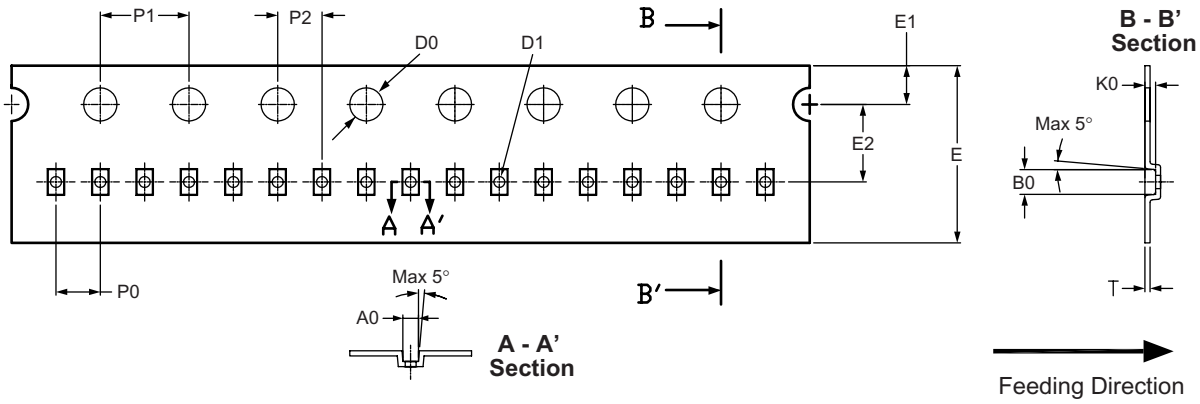
| Symbols | Min. | Nom. | Max. |
|---|---|---|---|
| A | — | — | 0.016 |
| A1 | 0.00 | — | 0.002 |
| b | 0.006 | 0.008 | 0.010 |
| c | 0.003 | 0.005 | 0.006 |
| D | 0.022 | 0.024 | 0.026 |
| E | 0.030 | 0.031 | 0.033 |
| E1 | 0.037 | 0.039 | 0.041 |
| L | 0.006 | 0.008 | 0.010 |
| aaa | | 0.003 | |

**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

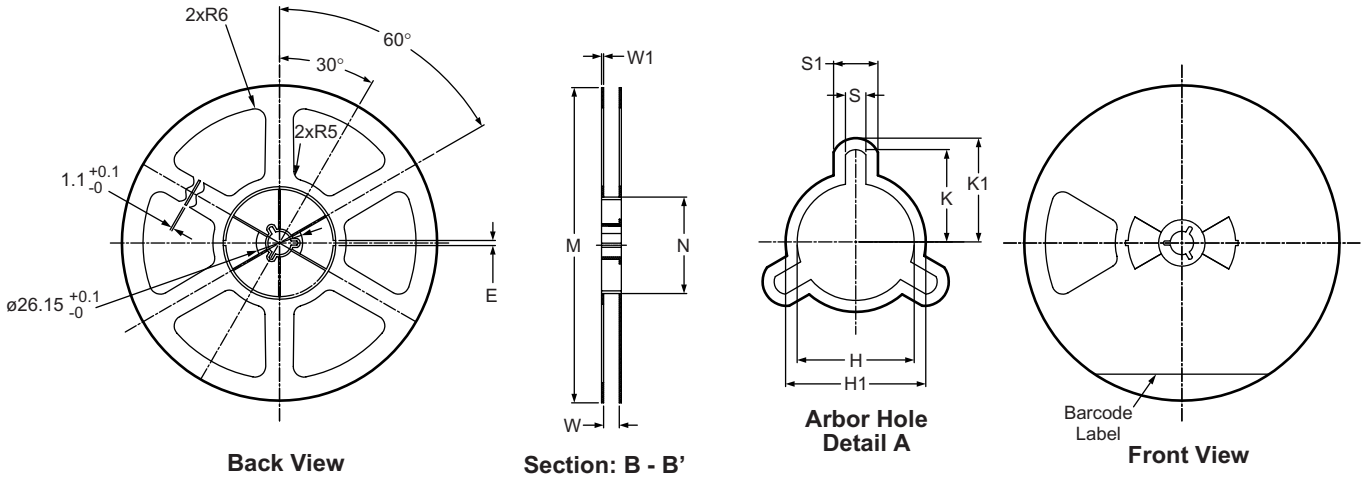
### Tape




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 |

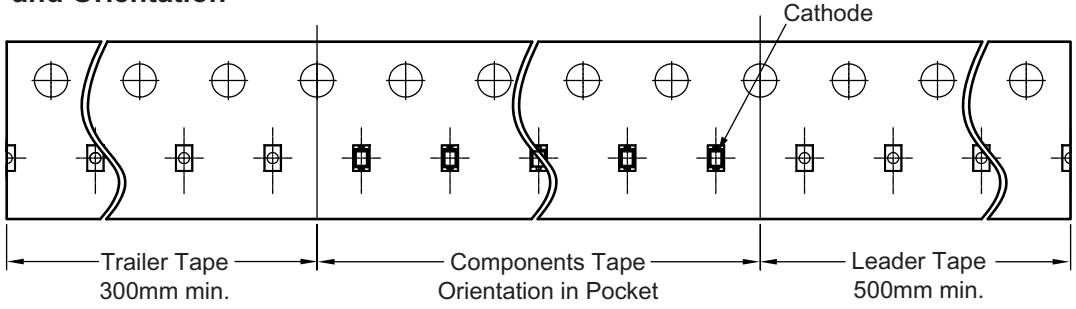
### Reel



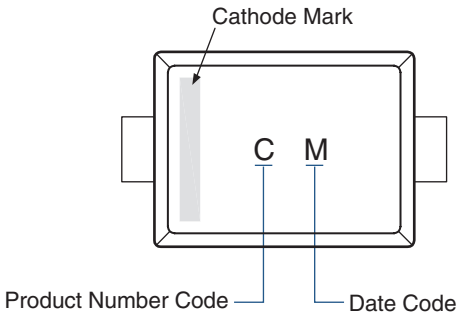

UNIT: mm

| 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




**This data sheet contains preliminary data; supplementary data may be published at a later date.**
**Alpha & Omega Semiconductor reserves the right to make changes at any time without notice.**

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