

General Description

The AOZ8208 is a transient voltage suppressor diode array designed to protect data lines 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 eight TVS diodes in a single package. During transient conditions, the TVS diodes direct the transient to ground. They may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

The AOZ8208 is RoHS compliant. The DFN-8 package is rated over a -40°C to +85°C ambient temperature range.

The very small DFN-8 1.8 x 1.2 x 0.55mm package makes it ideal for applications where PCB space is a premium. The small size and high ESD protection makes it ideal for protecting high speed video and data communication interfaces.

Features

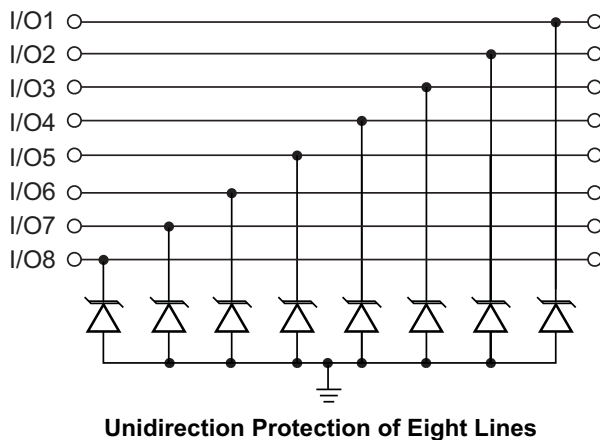
- ESD protection for high-speed data lines:
 - Exceeds: IEC 61000-4-2 (ESD) ±15kV (air), ±15kV (contact)
 - IEC61000-4-5 (Lightning) 5A (8/20µS)
 - Human Body Model (HBM) ±20kV
- Trench Vertical Structure [TVS]²™ based technology used to achieve excellent ESD clamping performance
- Small package saves board space
- Low insertion loss
- Protects eight unidirectional I/O lines
- Low clamping voltage
- Low operating voltage: 5.0V
- Green product, Pb-free

Applications

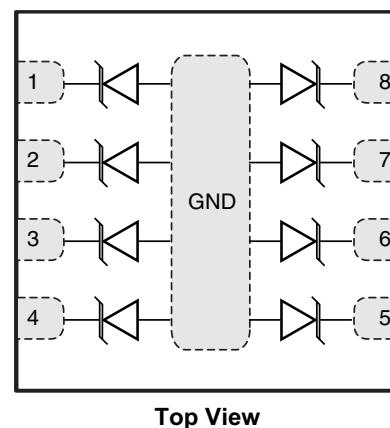
- Portable handheld devices
- Keypads, data lines
- Notebook computers
- Digital Cameras
- Portable GPS
- MP3 players



Typical Applications



Pin Configuration



Ordering Information

| Part Number | Ambient Temperature Range | Package | Environmental |
|--------------|---------------------------|---------|---------------------------------|
| AOZ8208DI-05 | -40°C to +85°C | DFN-8 | Green Product RoHS Compliant |



AOS Green Products 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 |
|---|-----------------|
| Peak Pulse Current (I_{PP}), $t_P = 8/20\mu s$ | 5A |
| Storage Temperature (T_S) | -65°C to +150°C |
| ESD Rating per IEC61000-4-2, Contact ⁽¹⁾ | ±15kV |
| ESD Rating per IEC61000-4-2, Air ⁽¹⁾ | ±15kV |
| ESD Rating per Human Body Model ⁽²⁾ | ±20kV |

Notes:

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

Maximum Operating Ratings

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

Electrical Characteristics

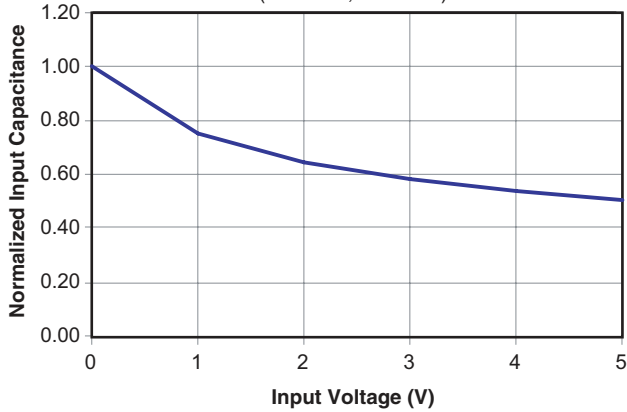
$T_A = 25^\circ C$ unless otherwise specified.

| Symbol | Parameter | Diagram |
|-----------|--|---------|
| I_{PP} | Maximum Reverse Peak Pulse Current | |
| 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 $f = 1MHz$ | |

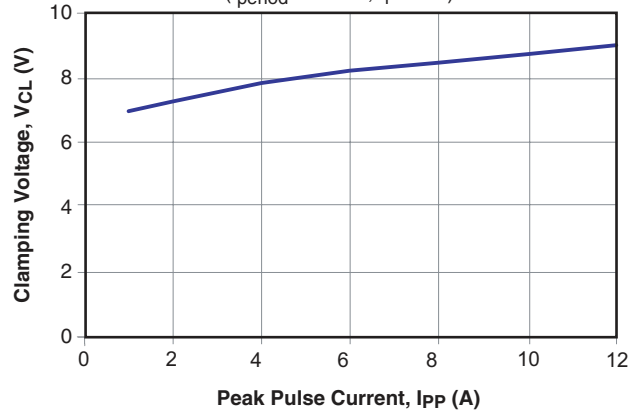
| Device | Device Marking | V_{RWM} (V) Max. | V_{BR} (V) Min. | I_R (μA) Max. | V_F (V) Typ. | V_{CL} Max. | | | C_J (pF) Typ. | C_J (pF) Max. |
|--------------|----------------|--------------------|-------------------|------------------------|----------------|---------------|---------------|----------------|-----------------|-----------------|
| | | | | | | $I_{PP} = 1A$ | $I_{PP} = 5A$ | $I_{PP} = 12A$ | | |
| AOZ8208DI-05 | D | 5 | 6.0 | 0.1 | 0.85 | 7.0 | 8.0 | 9.0 | 10 | 12 |

Typical Performance Characteristics

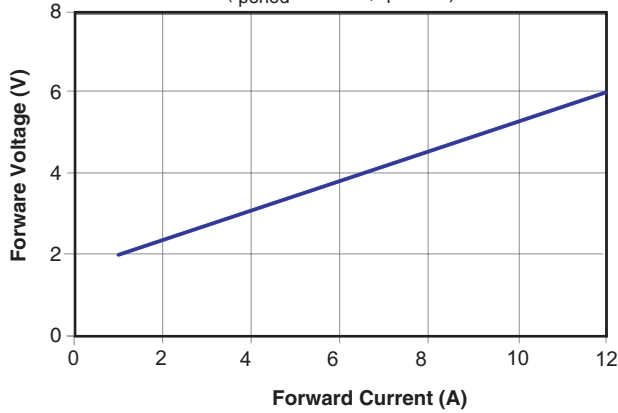
Typical Variation of C_{IN} vs. V_R
($f = 1\text{MHz}$, $T = 25^\circ\text{C}$)



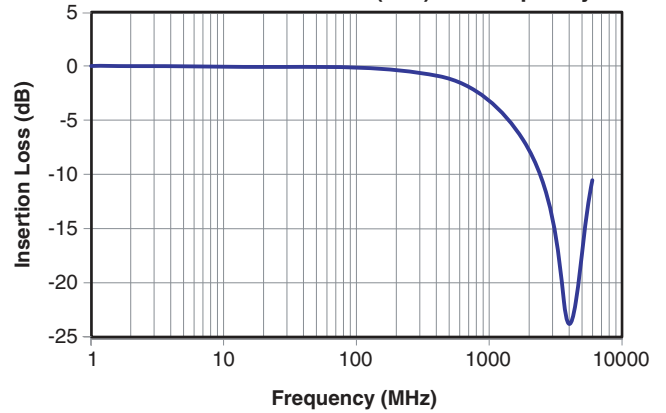
Clamping Voltage vs. Peak Pulse Current
($t_{\text{period}} = 100\text{ns}$, $t_r = 1\text{ns}$)



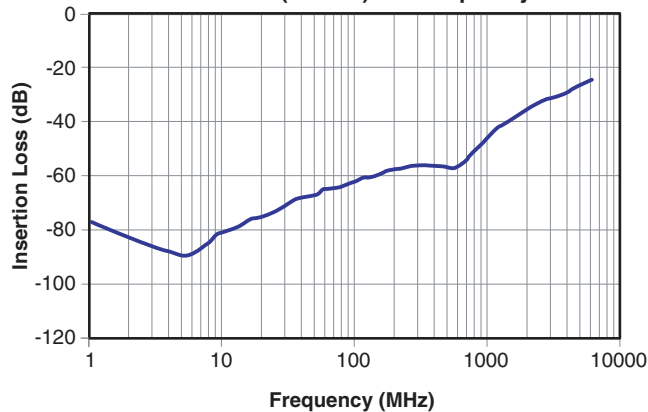
Forward Voltage vs. Forward Current
($t_{\text{period}} = 100\text{ns}$, $t_r = 1\text{ns}$)



I/O – Gnd Insertion Loss (S21) vs. Frequency



Crosstalk (I/O–I/O) vs. Frequency



Applications Information

Device Connection for Protection of Eight Unidirectional Data Lines

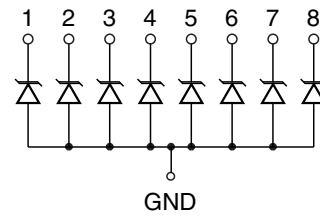
These devices are designed to protect up to eight unidirectional data lines. The device is connected as follows.

- Unidirectional protection of eight I/O lines is achieved by connecting pins 1 through 8 to the data lines. The ground connection should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.

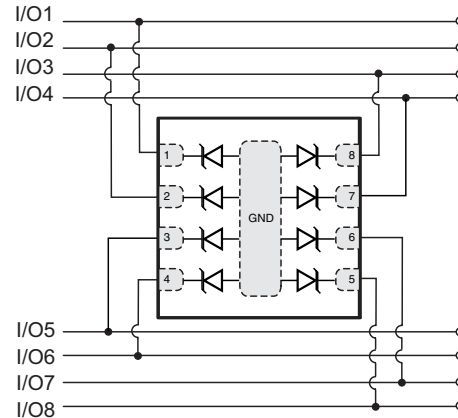
Circuit Board Layout Recommendations for Suppression of ESD

Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- Minimize all conductive loops including power and ground loops.
- The ESD transient return path to ground should be kept as short as possible.
- Never run critical signals near board edges.
- Use ground planes whenever possible.

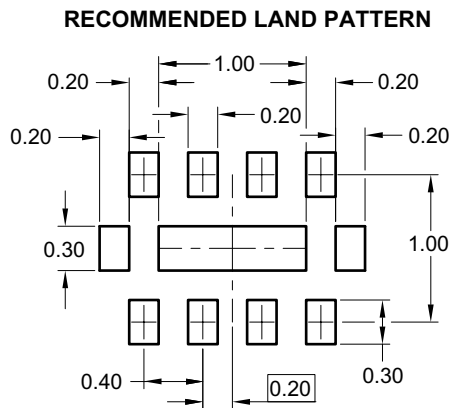
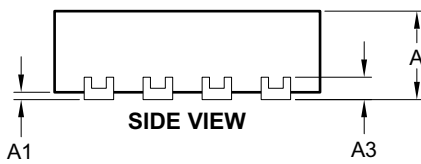
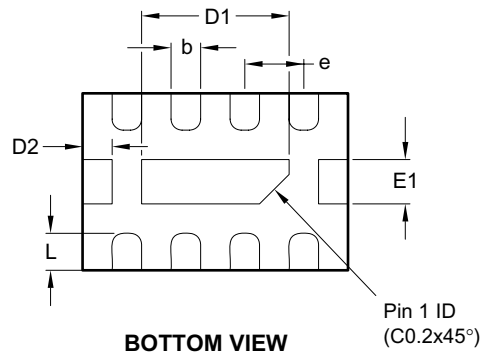
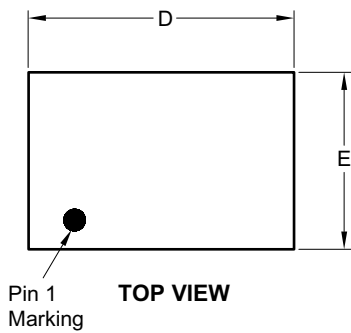


Circuit Diagram



Protection of Eight Unidirection Lines

Package Dimensions, DFN 1.8 x 1.2, 8L



Dimensions in millimeters

| Symbols | Min. | Nom. | Max. |
|---------|------------|------|------|
| A | 0.50 | 0.55 | 0.60 |
| A1 | 0.00 | — | 0.05 |
| A3 | 0.152 Ref. | | |
| b | 0.15 | 0.20 | 0.25 |
| D | 1.75 | 1.80 | 1.85 |
| D1 | 0.95 | 1.00 | 1.05 |
| D2 | 0.200 Ref. | | |
| E | 1.15 | 1.20 | 1.25 |
| E1 | 0.25 | 0.30 | 0.35 |
| e | 0.40 BSC | | |
| L | 0.20 | 0.25 | 0.30 |

Dimensions in inches

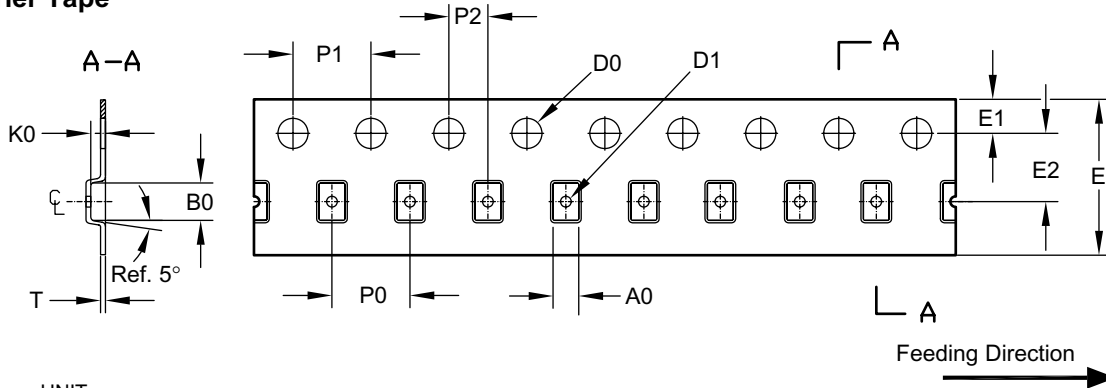
| Symbols | Min. | Nom. | Max. |
|---------|------------|-------|-------|
| A | 0.020 | 0.022 | 0.024 |
| A1 | 0.000 | — | 0.002 |
| A3 | 0.006 Ref. | | |
| b | 0.006 | 0.008 | 0.010 |
| D | 0.069 | 0.071 | 0.073 |
| D1 | 0.037 | 0.039 | 0.041 |
| D2 | 0.008 Ref. | | |
| E | 0.045 | 0.047 | 0.049 |
| E1 | 0.010 | 0.012 | 0.014 |
| e | 0.016 BSC | | |
| L | 0.008 | 0.010 | 0.012 |

Notes:

1. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.
2. Warpage shall not exceed 0.10mm.
3. Marking is for package orientation reference only.

Tape and Reel Dimensions, DFN 1.8 x 1.2, 8L

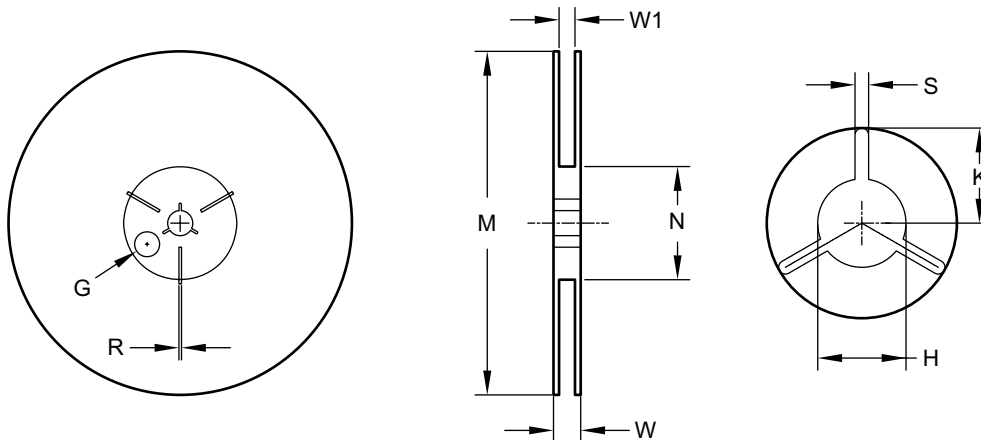
Carrier Tape



UNIT: mm

| Package | A0 | B0 | K0 | D0 | D1 | E | E1 | E2 | P0 | P1 | P2 | T |
|-------------|---------------|---------------|---------------|----------------|----------------|-------------------|--------------|---------------|--------------|-------------|--------------|---------------|
| DFN 1.8x1.2 | 1.32 ±0.05 | 1.92 ±0.05 | 0.75 ±0.05 | ∅1.55 ±0.05 | ∅0.55 ±0.05 | 8.00 +0.3/-0.1 | 1.75 ±0.1 | 3.50 ±0.05 | 4.00 ±0.1 | 4.0 ±0.1 | 2.0 ±0.05 | 0.25 ±0.05 |

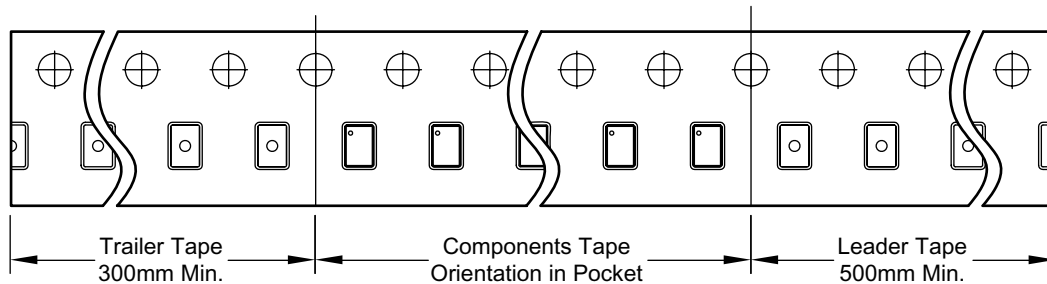
Reel



UNIT: mm

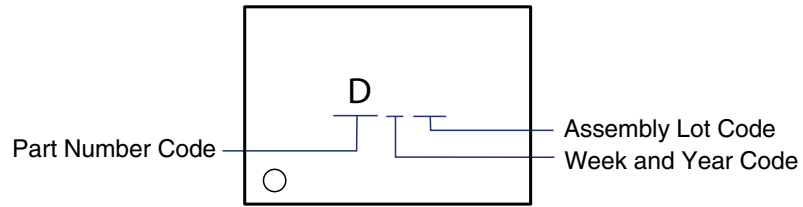
| Tape Size | Reel Size | M | N | W | W1 | H | S | K | G | R |
|-----------|-----------|----------------|---------------|---------------|-------------|--------------------|---------------|---------------|------|---|
| 8mm | ∅178 | ∅178.0 ±1.0 | ∅60.0 ±1.0 | 11.80 ±0.5 | 9.0 ±0.5 | ∅13.0 +0.5/-0.2 | 2.40 ±0.10 | 10.25 ±0.2 | ∅9.8 | — |

Leader / Trailer & Orientation



Package Marking

AOZ8208DI-05
(DFN 1.8 x 1.2, 8L)



Revision History

| Revision | Revised Item |
|----------|-----------------|
| Rev. 1.0 | Initial release |

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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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.