

General Description

The AOZ8222DI-05 is a two-line transient voltage suppressor diode designed to protect voltage sensitive electronics from high transient conditions and ESD.

This device incorporates two TVS diodes in an ultra-small DFN 1.0 x 0.6 package. During transient conditions, the TVS diodes direct the transient to ground. The AOZ8222DI-05 may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (± 15 kV air, ± 8 kV contact discharge).

The AOZ8222DI-05 comes in an RoHS compliant 3-lead DFN package and is rated over a -40°C to $+85^{\circ}\text{C}$ 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.

Features

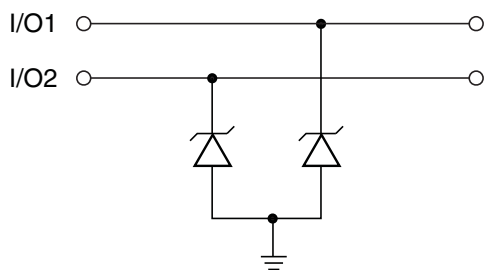
- ESD protection for high-speed data lines:
 - Exceeds IEC 61000-4-2 (ESD): ± 20 kV (air), ± 20 kV (contact)
 - Human Body Model (HBM) ± 30 kV
- Small package saves board space
- Low insertion loss
- Low clamping voltage
- Low operating voltage: 5 V

Applications

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

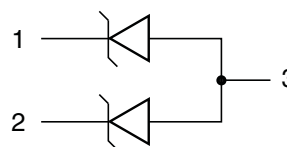


Typical Application



Unidirection Protection of Two Line

Pin Configuration



Ordering Information

| Part Number | Ambient Temperature Range | Package | Environmental |
|--------------|---------------------------|------------------|---------------|
| AOZ8222DI-05 | -40 °C to +85 °C | DFN 1.0 x 0.6-3L | 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.

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

| Parameter | AOZ8222DI-05DI-05 |
|---|-------------------|
| Peak Pulse Current, $t_P = 8/20 \mu s$ | 5.5 A |
| Peak Pulse Power, $t_P = 8/20 \mu s$ | 50 W |
| Storage Temperature (T_S) | -65 °C to +150 °C |
| ESD Rating per IEC61000-4-2, Contact ⁽¹⁾ | ± 20 kV |
| ESD Rating per IEC61000-4-2, Air ⁽¹⁾ | ± 20 kV |
| ESD Rating per Human Body Model ⁽²⁾ | ± 30 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.

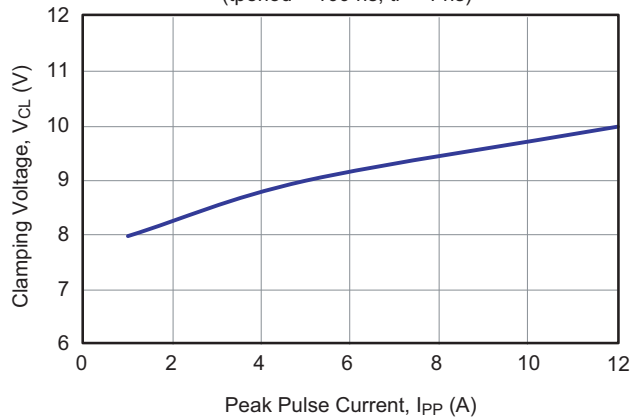
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Units |
|-----------|---|--|------|------|---------------|---------------|
| V_{RWM} | Reverse Working Voltage | Between I/O and $V_N^{(3)}$ | | | 5.0 | V |
| V_{BR} | Reverse Breakdown Voltage | $I_T = 1\text{ mA}$, between I/O and $V_N^{(4)}$ | 6.0 | | | V |
| I_R | Reverse Leakage Current | $V_{RWM} = 5\text{ V}$, between I/O and V_N | | | 1 | μA |
| V_F | Diode Forward Voltage | $I_F = 10\text{ mA}$ | 0.6 | 0.7 | 0.9 | V |
| V_{CL} | Channel Clamp Voltage Positive Transients Negative Transients | $I_{PP} = 1\text{ A}$, $t_p = 100\text{ ns}$, any I/O pin to Ground ⁽⁵⁾⁽⁶⁾ | | | 8.0 -2.0 | V V |
| | Channel Clamp Voltage Positive Transients Negative Transients | $I_{PP} = 5\text{ A}$, $t_p = 100\text{ ns}$, any I/O pin to Ground ⁽⁵⁾⁽⁶⁾ | | | 9.0 -5.0 | V V |
| | Channel Clamp Voltage Positive Transients Negative Transients | $I_{PP} = 12\text{ A}$, $t_p = 100\text{ ns}$, any I/O pin to Ground ⁽⁵⁾⁽⁶⁾ | | | 10.0 -10.0 | V V |
| C_J | Channel Input Capacitance | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, between I/O pins ⁽⁶⁾ | | 8 | 9 | pF |
| | | $V_R = 0\text{ V}$, $f = 1\text{ MHz}$, any I/O pin to Ground ⁽⁶⁾ | | 15 | 18 | pF |

Notes:

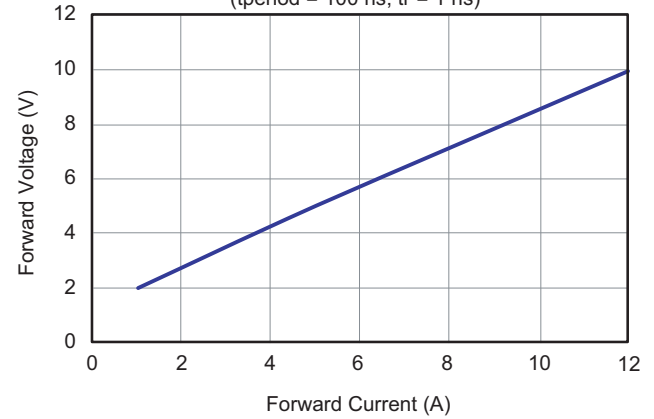
- The working peak reverse voltage, V_{RWM} , should be equal to or greater than the DC or continuous peak operating voltage level.
- V_{BR} is measured at the pulse test current I_T .
- Measurements performed using a 100ns Transmission Line Pulse (TLP) system.
- Guaranteed by design and characterization.

Typical Performance Characteristics

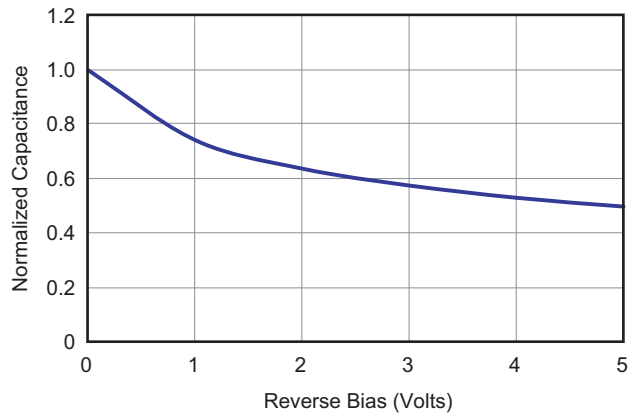
Clamping Voltage vs. Peak Pulse Current
(tperiod = 100 ns, tr = 1 ns)



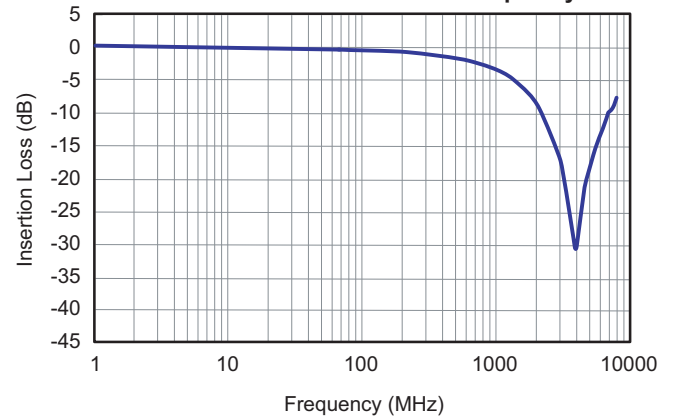
Forward Voltage vs. Forward Current
(tperiod = 100 ns, tr = 1 ns)



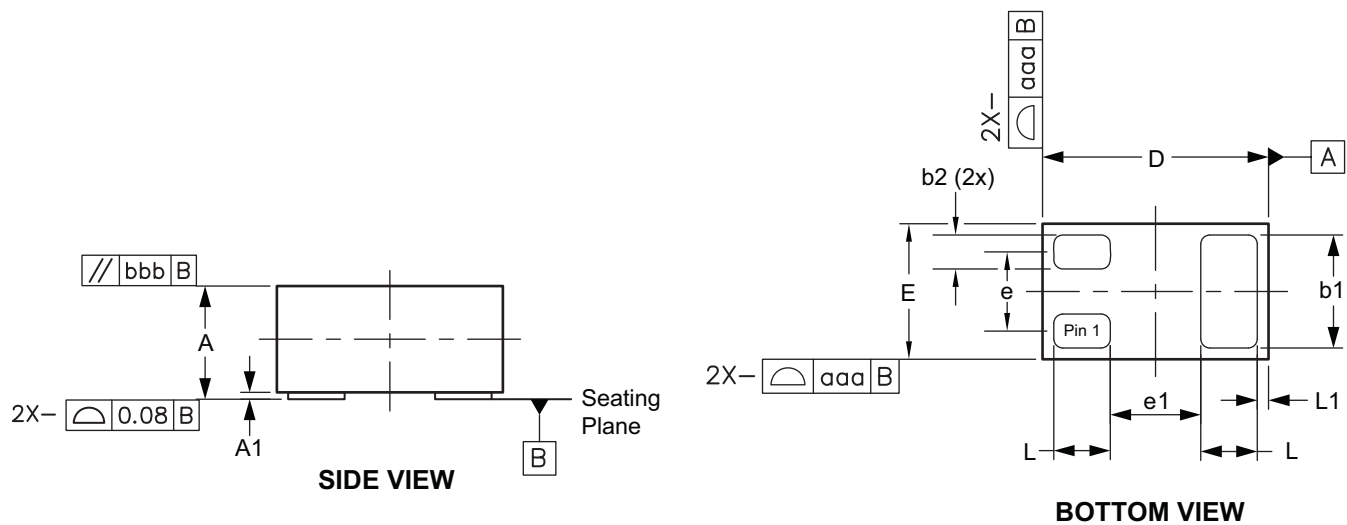
Capacitance vs. Reverse Bias



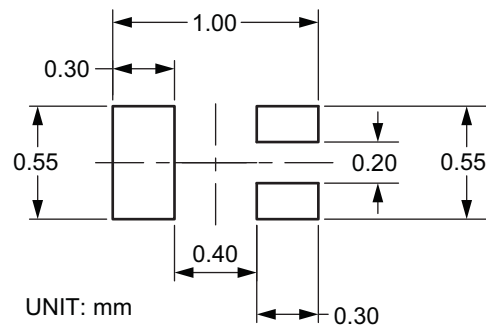
I/O – Gnd Insertion Loss vs. Frequency



Package Dimensions, DFN 1.0 x 0.6, 3L



RECOMMENDED LAND PATTERN



Dimensions in millimeters

| Symbols | Min. | Nom. | Max. |
|---------|------|------|-------|
| A | 0.50 | 0.52 | 0.55 |
| A1 | 0.00 | 0.03 | 0.05 |
| b1 | 0.45 | 0.50 | 0.55 |
| b2 | 0.10 | 0.15 | 0.20 |
| D | 0.95 | 1.00 | 1.075 |
| E | 0.55 | 0.60 | 0.675 |
| e | — | 0.35 | — |
| e1 | — | 0.40 | — |
| L | 0.20 | 0.25 | 0.30 |
| L1 | — | 0.05 | — |
| aaa | 0.15 | | |
| bbb | 0.05 | | |

Dimensions in inches

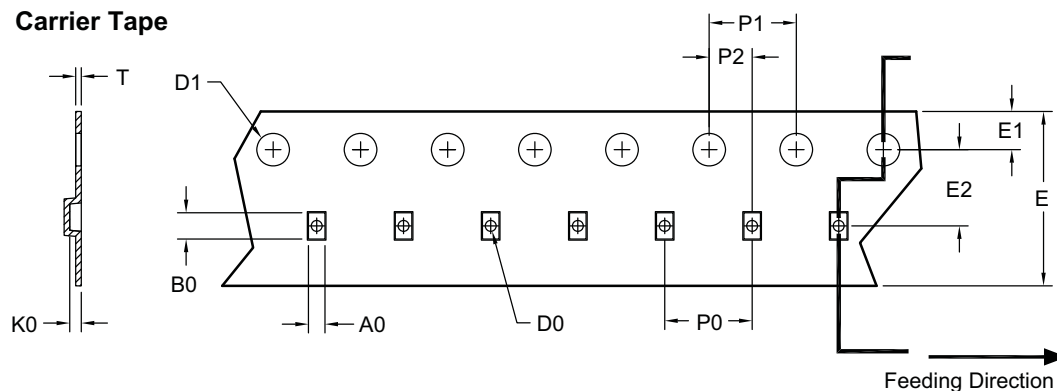
| Symbols | Min. | Nom. | Max. |
|---------|-------|-------|-------|
| A | 0.019 | 0.020 | 0.022 |
| A1 | 0.000 | 0.001 | 0.002 |
| b1 | 0.018 | 0.020 | 0.022 |
| b2 | 0.004 | 0.006 | 0.008 |
| D | 0.037 | 0.039 | 0.042 |
| E | 0.022 | 0.024 | 0.027 |
| e | — | 0.014 | — |
| e1 | — | 0.016 | — |
| L | 0.008 | 0.010 | 0.012 |
| L1 | — | 0.002 | — |
| aaa | 0.006 | | |
| bbb | 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, 3L

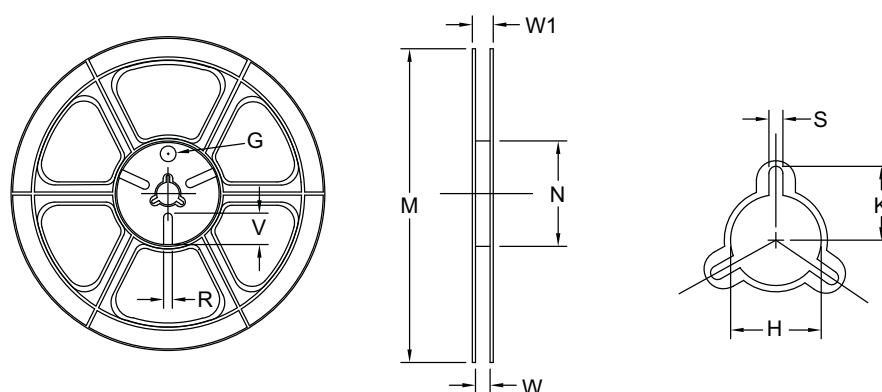
Carrier Tape



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 |

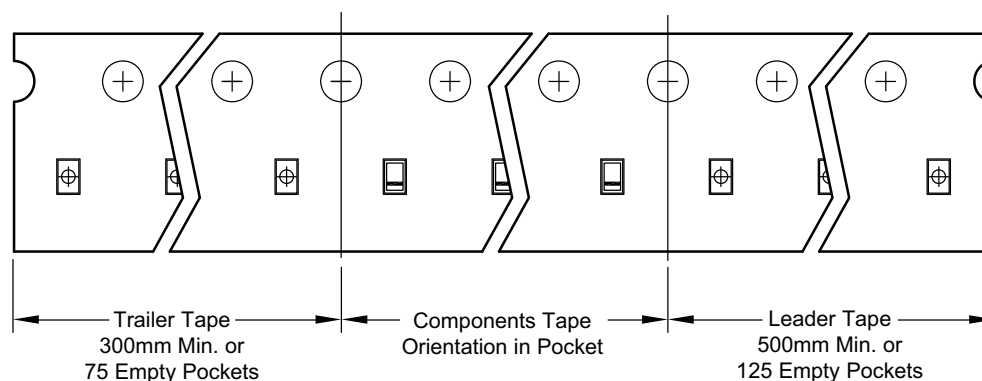
Reel



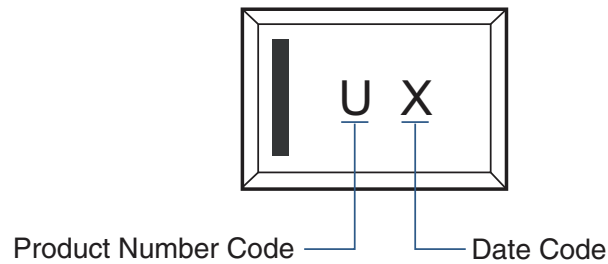
UNIT: mm

| 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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