

## General Description

The AOZ8822 is an ultra-low capacitance two-line transient voltage suppressor diode designed to protect very high-speed data lines and 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 ultra-low capacitance TVS diodes direct the transient to ground. The AOZ8822 may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ( $\pm 15$  kV air,  $\pm 15$  kV contact discharge).

The AOZ8822 comes in an RoHS compliant 3-lead DFN package and is rated over a  $-40$  °C to  $+85$  °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

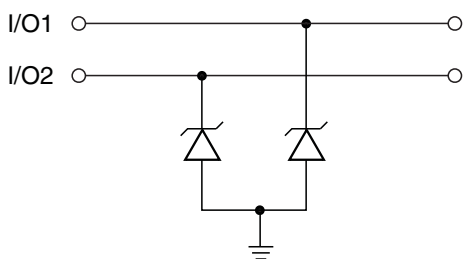
- ESD protection for high-speed data lines:
  - Exceeds: IEC 61000-4-2 (ESD)  $\pm 15$  kV (air),  $\pm 15$  kV (contact)
  - Human Body Model (HBM)  $\pm 15$  kV
- Ultra-low capacitance: 0.55 pF
- Low clamping voltage
- Low operating voltage: 5 V
- Green product

## Applications

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

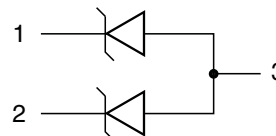


## Typical Application



Unidirection Protection of Two Line

## Pin Configuration



## Ordering Information

| Part Number  | Ambient Temperature Range | Package       | Environmental |
|--------------|---------------------------|---------------|---------------|
| AOZ8822DI-05 | -40 °C to +85 °C          | DFN 1.0 x 0.6 | Green Product |



AOS Green Products use reduced levels of Halogens, and are also RoHS compliant.

Please visit [www.aosmd.com/media/AOSGreenPolicy.pdf](http://www.aosmd.com/media/AOSGreenPolicy.pdf) for additional information.

## Absolute Maximum Ratings

*Exceeding the Absolute Maximum ratings may damage the device.*

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

### Notes:

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

## Maximum Operating Ratings

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

## Electrical Characteristics

$T_A = 25^\circ\text{C}$  unless otherwise specified. Specifications in **BOLD** indicate a temperature range of  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$ .

| 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                             |         |
| $I_T$     | Test Current                                  |         |
| $I_F$     | Forward Current                               |         |
| $V_F$     | Forward Voltage                               |         |
| $P_{PK}$  | Peak Power Dissipation                        |         |
| $C_J$     | Capacitance @ $V_R = 0$ and $f = 1\text{MHz}$ |         |

| Symbol    | Parameter                                | Conditions   | Min. | Typ. | Max. | Units         |
|-----------|--|--|------|------|------|---------------|
| $V_{RWM}$ | Reverse Working Voltage <sup>(3)</sup>   | I/O pin to ground  |      |      | 5.0  | V             |
| $V_{BR}$  | Reverse Breakdown Voltage <sup>(4)</sup> | $I_T = 1\text{ mA}$ , I/O pin to ground                                      | 6.0  |      | 10.0 | V             |
| $I_R$     | Reverse Leakage Current                  | $V_{RWM} = 5\text{ V}$ , between I/O pin to ground                           |      |      | 0.1  | $\mu\text{A}$ |
| $V_{CL}$  | Channel Clamp Voltage                    | $I_{PP} = 1\text{ A}$ , $t_P = 100\text{ ns}$ , I/O pin to ground            |      |      | 13   | V             |
|           |  | $I_{PP} = 2\text{ A}$ , $t_P = 100\text{ ns}$ , I/O pin to ground            |      |      | 14   | V             |
|           |  | $I_{PP} = 5\text{ A}$ , $t_P = 100\text{ ns}$ , I/O pin to ground            |      |      | 17   | V             |
|           |  | $I_{PP} = 1\text{ A}$ , IEC61000-4-5, 8/20 $\mu\text{s}$ , I/O pin to ground |      |      | 14.5 | V             |
|           |  | $I_{PP} = 2\text{ A}$ , IEC61000-4-5, 8/20 $\mu\text{s}$ , I/O pin to ground |      |      | 19   | V             |
| $C_J$     | Junction Capacitance                     | $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , I/O pin to ground                  |      | 0.55 | 0.75 | pF            |

### Notes:

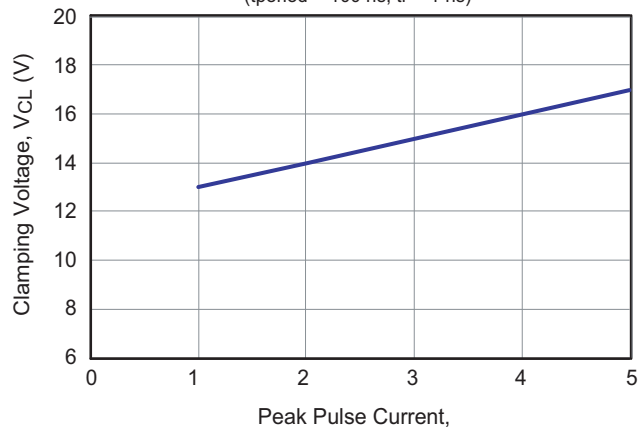
3. The working peak reverse voltage ( $V_{RWM}$ ) should be equal to or greater than the DC or continuous peak operating voltage level.

4.  $V_{BR}$  is measured at the pulse test current  $I_T$ .

## Typical Performance Characteristics

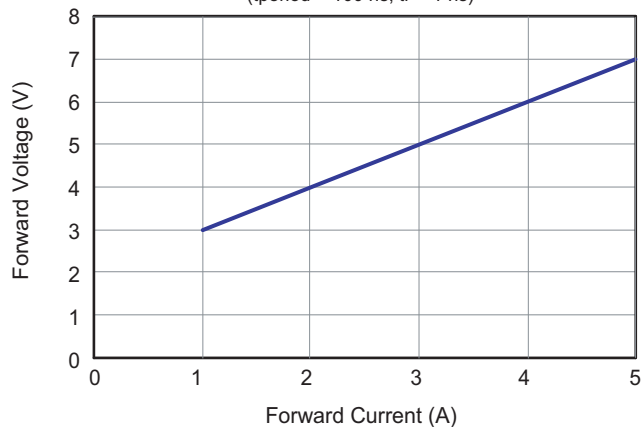
**Clamping Voltage vs. Peak Pulse Current**

(tperiod = 100 ns, tr = 1 ns)

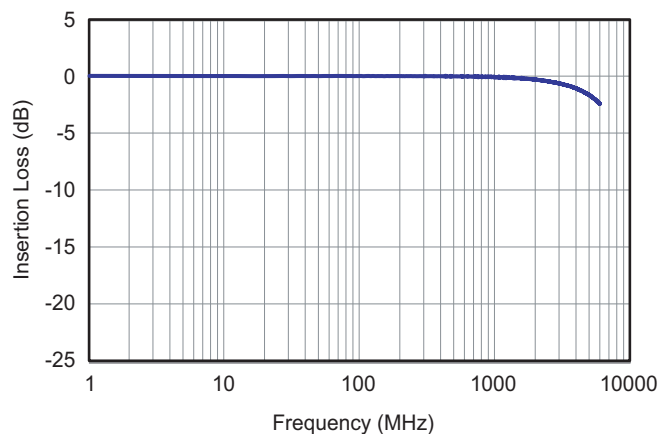


**Forward Voltage vs. Forward Current**

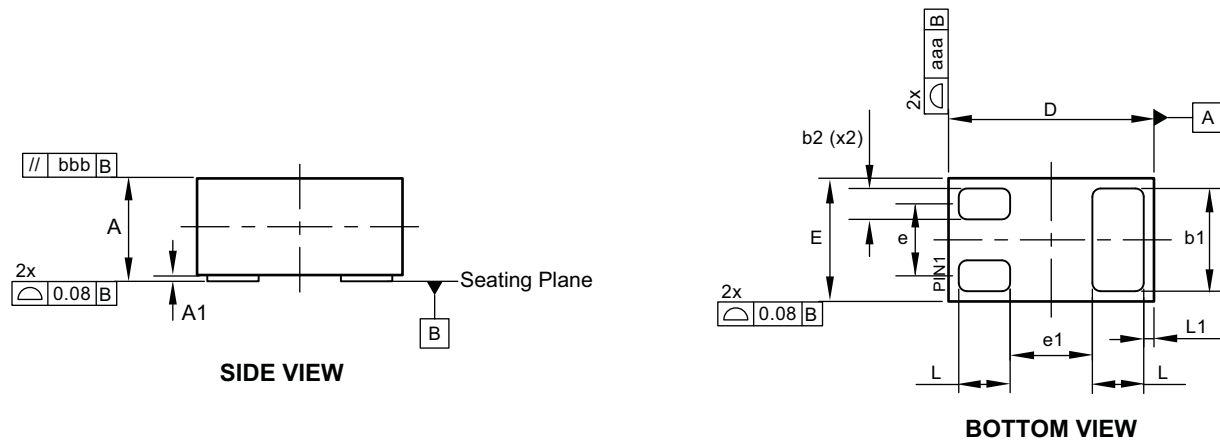
(tperiod = 100 ns, tr = 1 ns)



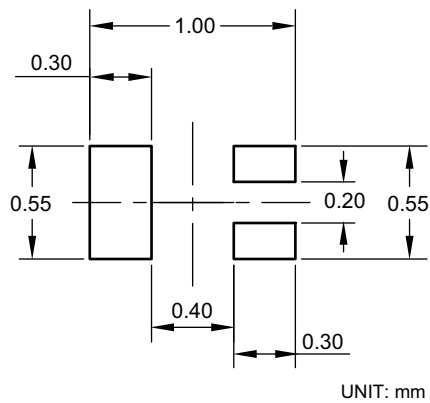
**I/O – Gnd Insertion Loss (S<sub>21</sub>) vs. Frequency**



## Package Dimensions, DFN 1.0 x 0.6



### RECOMMENDED LAND PATTERN



UNIT: mm

### 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

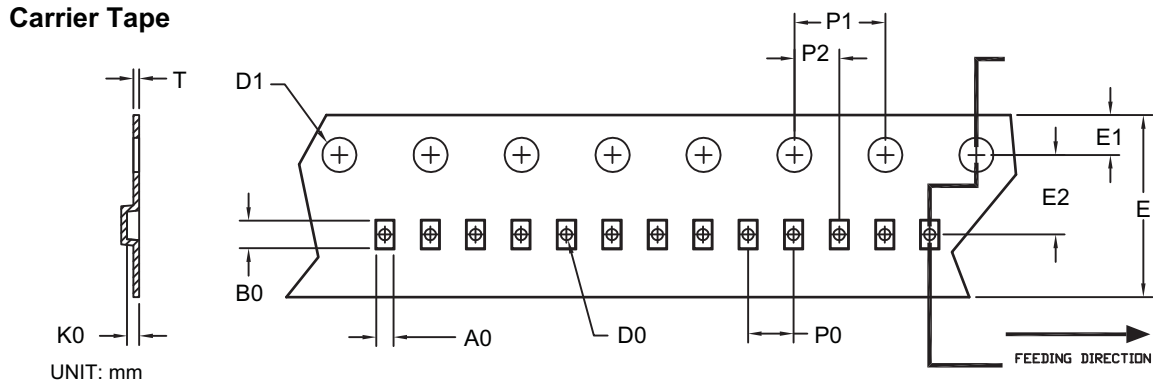
| Symbols | Min.  | Nom.  | Max.  |
|---------|-------|-------|-------|
| A       | 0.019 | 0.020 | 0.022 |
| A1      | 0.000 | 0.001 | 0.002 |
| b       | 0.018 | 0.020 | 0.022 |
| b2      | 0.004 | 0.006 | 0.008 |
| D       | 0.037 | 0.039 | 0.042 |
| E       | 0.022 | 0.024 | 0.027 |
| e       | ---   | 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.

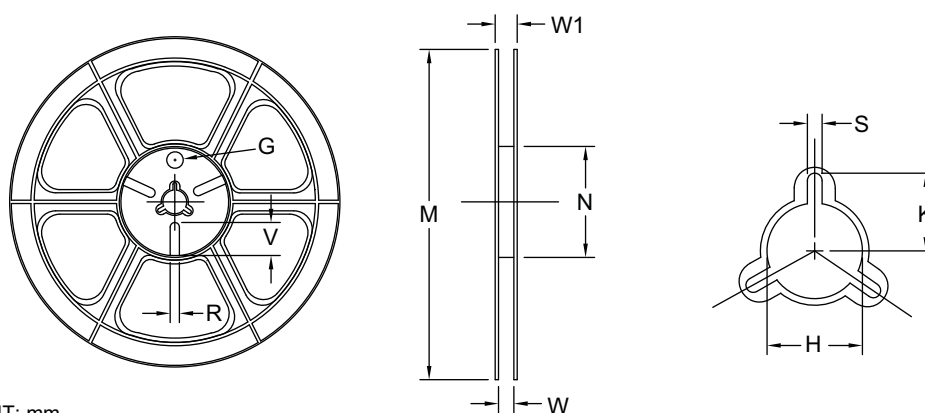
## Tape and Reel Dimensions, DFN 1.0 x 0.6

### Carrier Tape



| Option | Package                                | A0            | B0            | K0            | D0            | D1            | E                 | E1            | E2            | P0            | P1            | P2            | T             |
|--------|--|---------------|---------------|---------------|---------------|---------------|-------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| A      | DFN 1.0x0.6/<br>DFN 1.0x0.6A<br>(8 mm) | 0.69<br>±0.05 | 1.19<br>±0.05 | 0.66<br>±0.05 | 0.40<br>±0.05 | 1.50<br>±0.10 | 8.00<br>+0.3/-0.1 | 1.75<br>±0.10 | 3.50<br>±0.05 | 2.00<br>±0.05 | 4.00<br>±0.10 | 2.00<br>±0.05 | 0.23<br>±0.02 |
| B      | DFN 1.0x0.6/<br>DFN 1.0x0.6A<br>(8 mm) | 0.65<br>±0.04 | 1.05<br>±0.04 | 0.61<br>±0.04 | 0.40<br>±0.05 | 1.50<br>±0.10 | 8.00<br>+0.3/-0.1 | 1.75<br>±0.10 | 3.50<br>±0.05 | 2.00<br>±0.10 | 4.00<br>±0.10 | 2.00<br>±0.05 | 0.20<br>±0.05 |

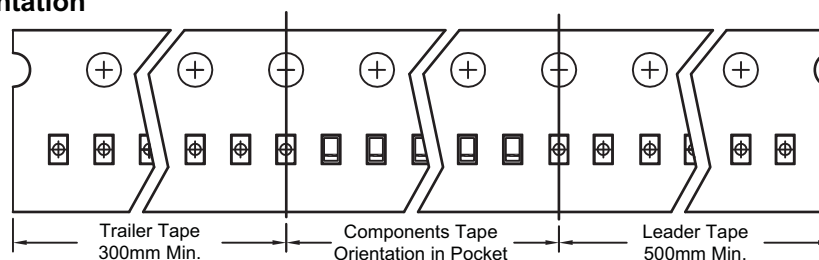
### Reel



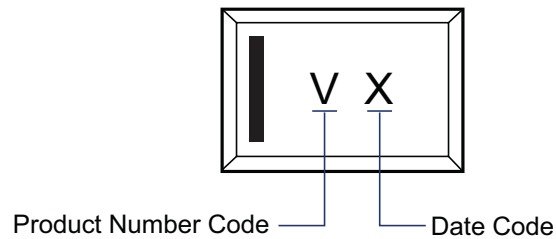
| Tape Size | Reel Size | M            | N         | W              | W1           | H             | K            | S           | G   | R   | V   |
|-----------|-----------|--------------|-----------|----------------|--------------|---------------|--------------|-------------|-----|-----|-----|
| 8mm       | ø178      | ø178<br>±0.5 | ø55<br>±1 | 8.4<br>+1.5/-0 | Max.<br>14.4 | ø13.0<br>±0.5 | Max.<br>10.1 | 2.0<br>±0.5 | N/A | N/A | N/A |

### Leader / Trailer & Orientation

TVS  
Unit Per Reel:  
10000pcs



## Part Marking



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