

## General Description

The AOZ8251BDI-16 is a single channel bi-directional transient voltage suppressor diode designed to protect data transmission lines from ESD.

This device incorporates two unidirectional TVS diodes in a single package. During transient conditions, the TVS diodes direct the transient energy to either the positive side of the data line or to ground.

The AOZ8251BDI-16 comes in a RoHS compliant and Halogen Free 0.62 mm x 0.32 mm x 0.3 mm package and is rated for -40°C to +125°C junction temperature range.

## Features

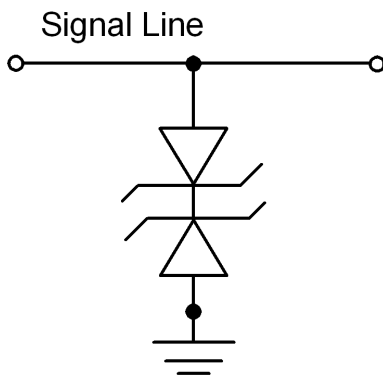
- ESD protection for high-speed data lines:
  - IEC 61000-4-2 (ESD) ±15 kV (air), ±15 kV (contact)
  - Human Body Model (HBM) ±8 kV
  - IEC 61000-4-5 (Lightning) 1.2 A (8/20 μs)
- Protects four I/O lines
- Capacitance between I/O to GND: 3 pF
- Max. reverse working voltage: 16 V

## Applications

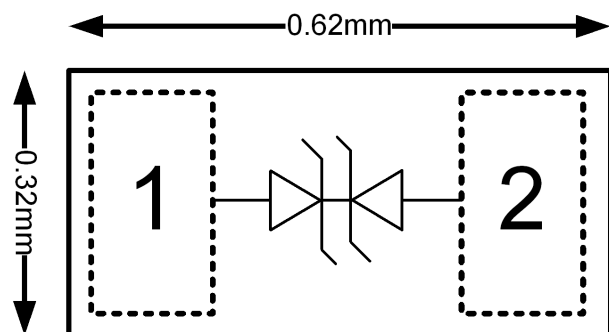
- USB2.0 (Type-A, Type-B, Type-C)
- Mobile Phones
- Notebook Computers



## Typical Application



## Pin Configuration



## Ordering Information

| Part Number   | Ambient Temperature Range | Package         | Environmental |
|---------------|---------------------------|-----------------|---------------|
| AOZ8251BDI-16 | -40°C to +125°C           | DFN 0.62 x 0.32 | Green Product |



AOS Green Products use reduced levels of Halogens, and are also RoHS compliant.  
Please visit [www.aosmd.com/web/quality/rohs\\_compliant.jsp](http://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          |
|---|-----------------|
| Storage Temperature (T <sub>S</sub> )               | -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>      | ±8 kV           |

### Notes:

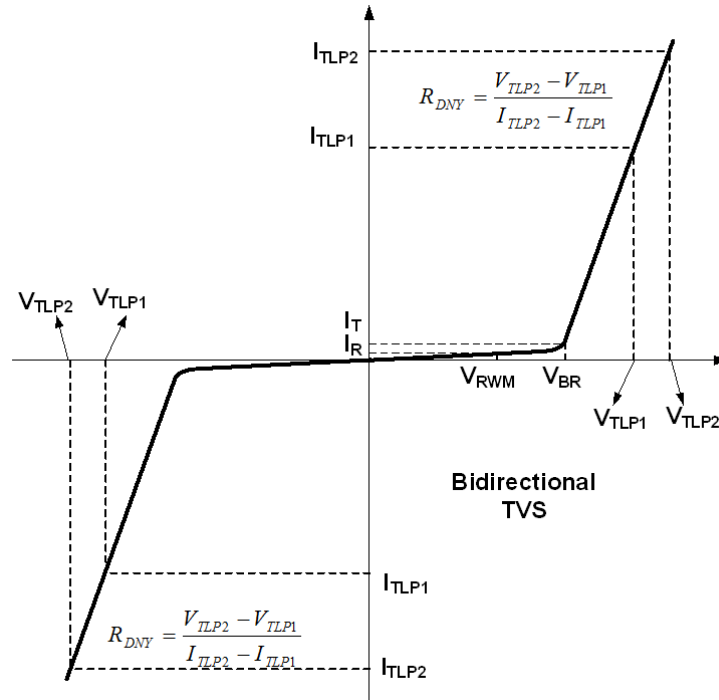
- IEC 61000-4-2 discharge with C<sub>Discharge</sub> = 150 pF, R<sub>Discharge</sub> = 330 Ω.
- Human Body Discharge per MIL-STD-883, Method 3015 C<sub>Discharge</sub> = 100 pF, R<sub>Discharge</sub> = 1.5 kΩ.

## Maximum Operating Ratings

| Parameter                              | Rating          |
|--|-----------------|
| Junction Temperature (T <sub>J</sub> ) | -40°C to +125°C |

## Electrical Characteristics

T<sub>A</sub> = 25°C unless otherwise specified.



| Symbol           | Parameter   | Condition  | Min. | Typ. | Max. | Units |
|------------------|---|--|------|------|------|-------|
| V <sub>RWM</sub> | Reverse Working Voltage   | I/O Pin-to-Ground                                  |      |      | 16   | V     |
| V <sub>BR</sub>  | Reverse Breakdown Voltage   | I <sub>T</sub> =100μA, I/O Pin-to-Ground           | 17   | 20   | 23   | V     |
| I <sub>R</sub>   | Reverse Leakage Current   | Max. V <sub>RWM</sub> , I/O Pin-to-Ground          |      | 1    | 100  | nA    |
| V <sub>CL</sub>  | Clamping Voltage <sup>(3)(4)</sup><br>(100ns Transmission Line Pulse,<br>I/O Pin-to-Ground) | I <sub>TLP</sub> =1A                               |      | 21   | 25   | V     |
|                  |   | I <sub>TLP</sub> =16A                              |      | 28   | 32   | V     |
| R <sub>DNY</sub> | Dynamic Resistance <sup>(3)(4)</sup>  | I <sub>TLP</sub> =8A to 16A                        |      | 0.4  |      | Ω     |
| I <sub>PP</sub>  | Peak Pulse Current <sup>(3)</sup><br>(IE61000-4-5 Surge 8/20μs)                             |  |      |      | 1.2  | A     |
| V <sub>CL</sub>  | Clamping Voltage <sup>(3)</sup><br>(IE61000-4-5 Surge 8/20μs)                               | I <sub>PP</sub> = 1A                               |      | 26   | 31   | V     |
|                  |   | I <sub>PP</sub> = 1.2A                             |      | 27   | 32   |       |
| C <sub>J</sub>   | Junction Capacitance  | V <sub>I/O</sub> = 0V, f = 1MHz, I/O Pin-to-Ground |      | 3    | 4.5  | pF    |

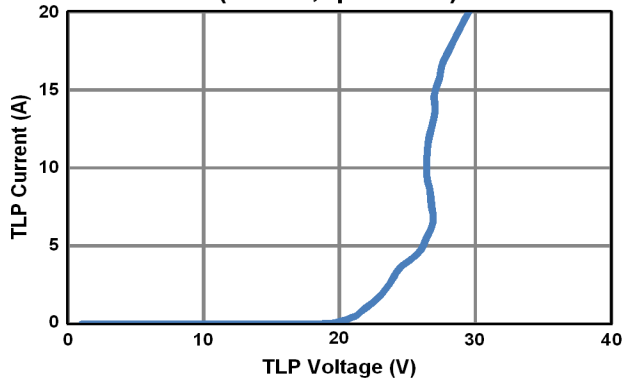
**Note:**

- 3. These specifications are guaranteed by design and characterization.
- 4. Measurements performed using 100ns Transmission Line Pulse (TLP) system.

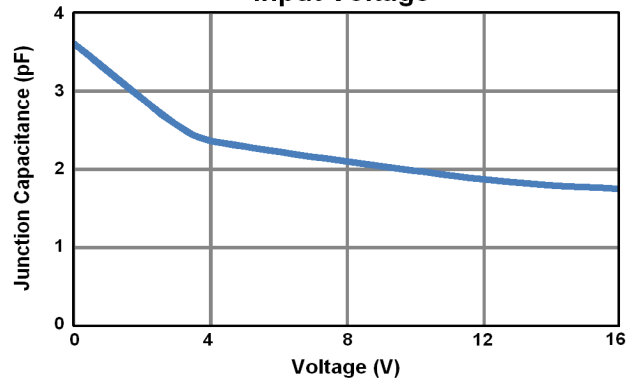
## Typical Performance Characteristics

$T_A = 25^\circ\text{C}$ , unless otherwise specified.

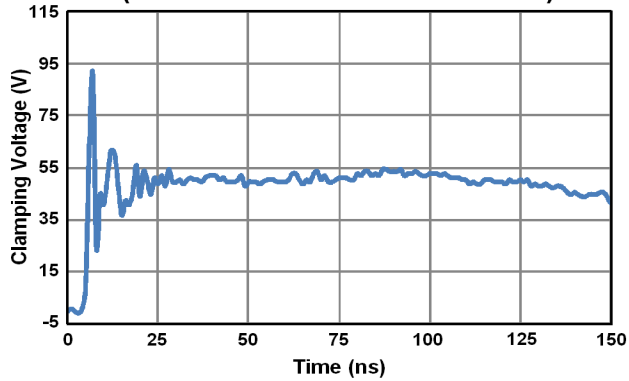
**TLP Clamping Curve**  
( $t_r=1\text{ns}$ ,  $t_p=100\text{ns}$ )



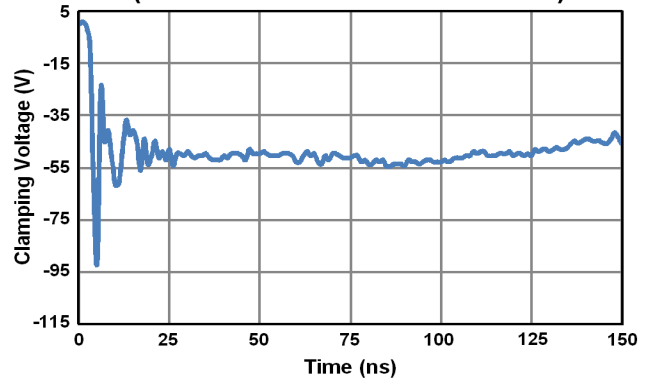
**Typical Variations of CJ vs. Input Voltage**



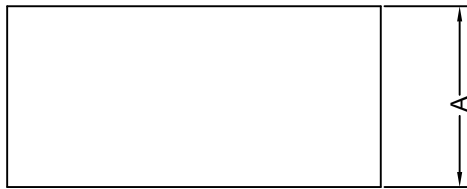
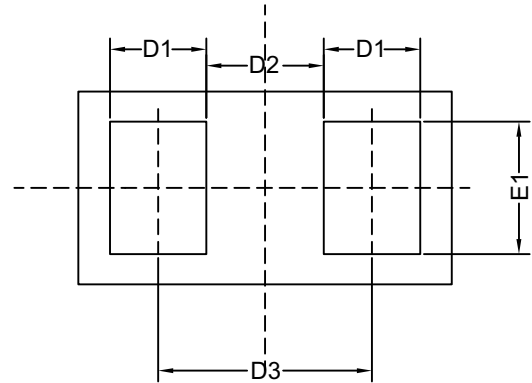
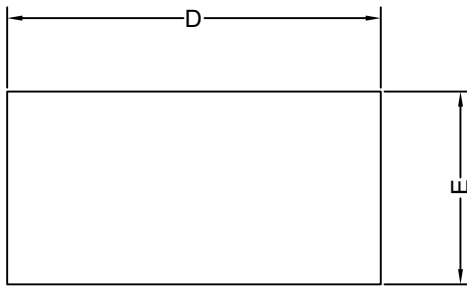
**+8kV ESD Clamping per IEC 61000-4-2**  
(Connection between IO to GND)



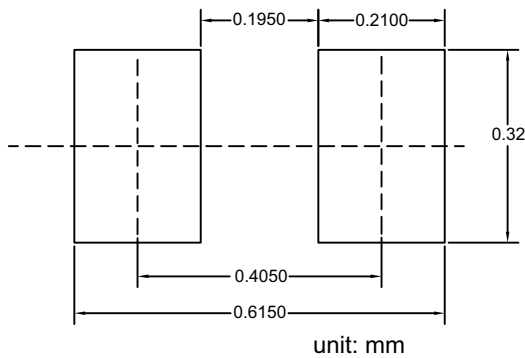
**-8kV ESD Clamping per IEC 61000-4-2**  
(Connection between IO to GND)



**Package Dimension, DFN 0.62 x 0.32**



**RECOMMEND LAND PATTERN**



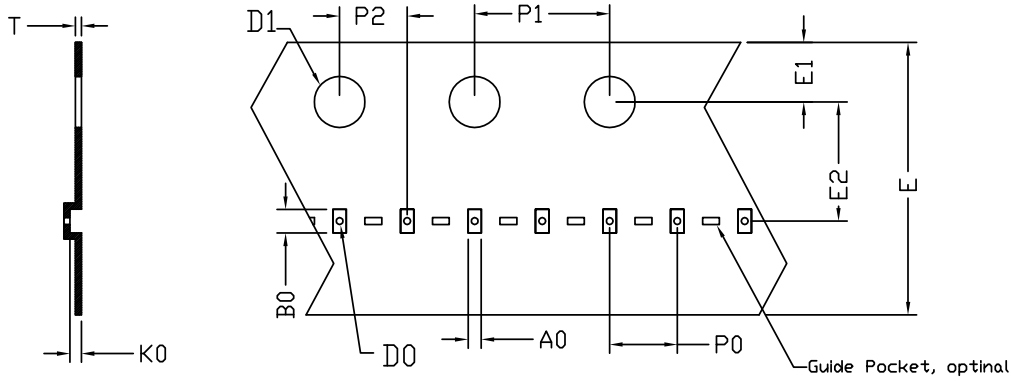
| SYMBOLS | DIMENSIONS IN MILLIMETERS |       |       | DIMENSIONS IN INCHES |        |        |
|---------|---------------------------|-------|-------|----------------------|--------|--------|
|         | MIN                       | NOM   | MAX   | MIN                  | NOM    | MAX    |
| A       | 0.27                      | 0.30  | 0.33  | 0.0106               | 0.0118 | 0.0130 |
| D       | 0.57                      | 0.62  | 0.67  | 0.0224               | 0.0244 | 0.0264 |
| D1      | 0.11                      | 0.16  | 0.21  | 0.0043               | 0.0063 | 0.0083 |
| D2      | 0.145                     | 0.195 | 0.245 | 0.0057               | 0.0077 | 0.0097 |
| D3      | 0.305                     | 0.355 | 0.405 | 0.0120               | 0.0140 | 0.0160 |
| E       | 0.27                      | 0.32  | 0.37  | 0.0106               | 0.0126 | 0.0146 |
| E1      | 0.17                      | 0.22  | 0.27  | 0.0067               | 0.0087 | 0.0107 |

**NOTE**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.  
MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6MIL EACH.
4. CONTROLLING DIMENSIONS IN MILLIMETER.  
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
5. PADDLE EXPOSED ON BOTTOM.

### Tape and Reel Dimensions, DFN 0.62 x 0.32

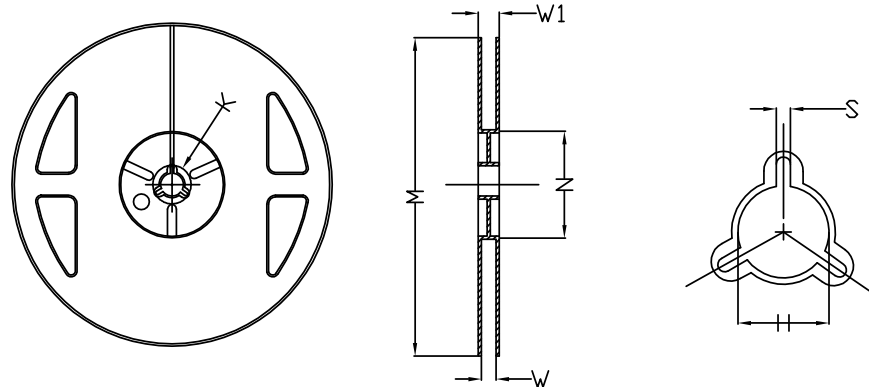
#### Carrier Tape



UNIT: MM

| PACKAGE                | A0            | B0            | K0                     | D0            | D1                   | E             | E1            | E2            | P0            | P1            | P2            | T             |
|------------------------|---------------|---------------|------------------------|---------------|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DFN0.62x0.32<br>(8 mm) | 0.39<br>±0.03 | 0.69<br>±0.03 | 0.34<br>+0.03<br>-0.01 | 0.20<br>±0.05 | 1.50<br>+0.1<br>-0.0 | 8.00<br>±0.10 | 1.75<br>±0.10 | 3.50<br>±0.03 | 2.00<br>±0.05 | 4.00<br>±0.05 | 2.00<br>±0.05 | 0.20<br>±0.05 |

#### Reel

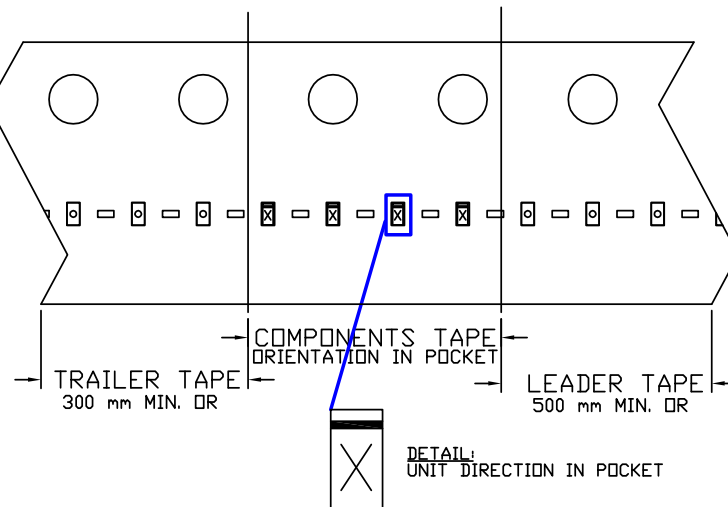


UNIT: MM

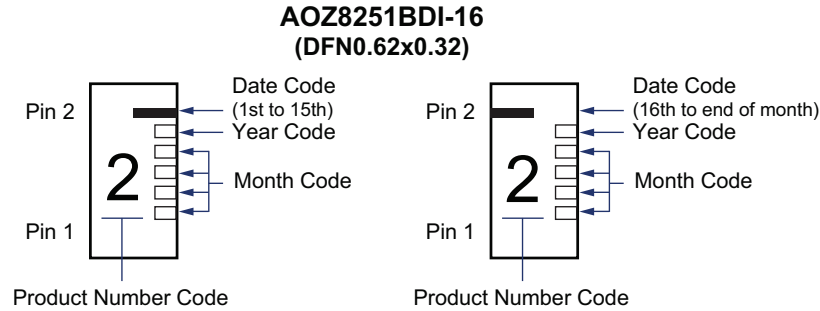
| TAPE SIZE | REEL SIZE | M                | N               | W           | W1           | H             | K             | S           |
|-----------|-----------|------------------|-----------------|-------------|--------------|---------------|---------------|-------------|
| 8 mm      | Ø180      | Ø180<br>+0<br>-3 | Ø60<br>+1<br>-0 | 9.0<br>±0.3 | 11.4<br>±1.0 | Ø13.0<br>±0.2 | Ø21.0<br>±0.5 | 2.0<br>±0.5 |

#### Leader / Trailer & Orientation

Unit Per Reel: 10000pcs



## Part Marking



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

### LIFE SUPPORT POLICY

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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.