

## General Description

The AOZ8251BDI is a one-line bi-directional transient voltage suppressor diode designed to protect voltage sensitive electronics from high transient conditions and ESD.

This device incorporates bi-directional TVS diode in an ultra-small DFN 1006 package. It may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge).

The AOZ8251BDI comes in an RoHS compliant DFN 1.0 mm x 0.6 mm package and is rated over a  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  ambient temperature range.

The ultra-small 0.62 mm x 0.32 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

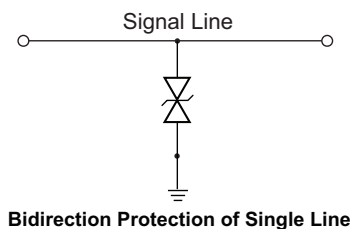
- ESD protection for high-speed data lines
  - AOZ8251BDI-05:
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 20\text{ kV}$  (air),  $\pm 20\text{ kV}$  (contact)
    - Human Body Model (HBM)  $\pm 30\text{ kV}$
    - IEC 61000-4-5 (Lightning) 4 A (8/20  $\mu\text{s}$ )
  - AOZ8251BDI-12:
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 20\text{ kV}$  (air),  $\pm 20\text{ kV}$  (contact)
    - Human Body Model (HBM)  $\pm 30\text{ kV}$
    - IEC 61000-4-5 (Lightning) 1.5 A (8/20  $\mu\text{s}$ )
- Pb-free device

## Applications

- Portable handheld devices
- Keypads, data lines, buttons
- Notebook computers
- Digital cameras
- Portable GPS



## Typical Application



## Pin Configuration



## Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8251BDI-05	-40°C to +125°C	DFN 0.62 x 0.32	Green Product
AOZ8251BDI-12			



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 for AOZ8251BDI	
	-05	-12
VP – VN	5 V	12 V
Peak Pulse Current, $t_p = 8/20 \mu s$	4 A	1.5 A
Storage Temperature ( $T_S$ )	-65°C to +150°C	
ESD Rating per IEC61000-4-2, Contact <sup>(1)</sup>	± 20 kV	± 20 kV
ESD Rating per IEC61000-4-2, Air <sup>(1)</sup>	± 20 kV	± 20 kV
ESD Rating per Human Body Model <sup>(2)</sup>	± 30 kV	± 30 kV

### Notes:

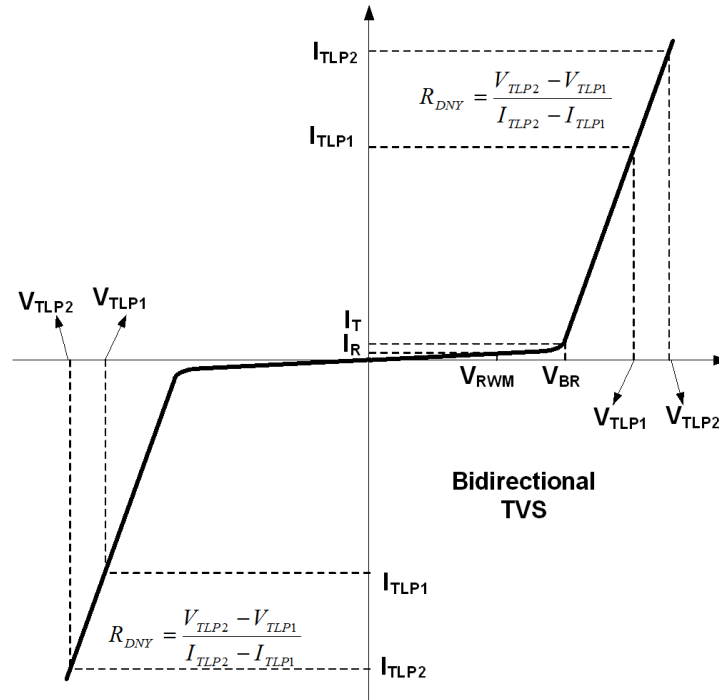
- IEC 61000-4-2 discharge with  $C_{Discharge} = 150 \text{ pF}$ ,  $R_{Discharge} = 330 \Omega$ .
- Human Body Discharge per MIL-STD-883, Method 3015  $C_{Discharge} = 100 \text{ pF}$ ,  $R_{Discharge} = 1.5 \text{ k}\Omega$ .

## Maximum Operating Ratings

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

## Electrical Characteristics

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



AOZ8251BDI-05						
Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V <sub>RWM</sub>	Reverse Working Voltage	I/O Pin-to-Ground			5	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> =1mA, I/O Pin-to-Ground	5.5	6	8	V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> =5V, I/O Pin-to-Ground		1	100	nA
V <sub>CL</sub>	Clamping Voltage <sup>(3)</sup> (100ns Transmission Line Pulse, I/O Pin-to-Ground)	I <sub>TLP</sub> =1A		8	11	V
		I <sub>TLP</sub> =16A		16.5	24	V
	Clamping Voltage <sup>(3)</sup> (IEC61000-4-5, 8/20μs, I/O Pin-to-Ground)	I <sub>PP</sub> =4A		15	18	V
R <sub>DNY</sub>	Dynamic Resistance <sup>(3)</sup>	I <sub>TLP</sub> =1A to 12A		0.55		Ω
C <sub>J</sub>	Junction Capacitance	V <sub>I/O</sub> =0V, f=1MHz, I/O Pin-to-Ground		5	6.5	pF

**Electrical Characteristics (continued)**

AOZ8251BDI-12						
Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
$V_{RWM}$	Reverse Working Voltage	I/O Pin-to-Ground			12	V
$V_{BR}$	Reverse Breakdown Voltage	$I_T=1mA$ , I/O Pin-to-Ground	13	14.5	16	V
$I_R$	Reverse Leakage Current	$V_{RWM}=12V$ , I/O Pin-to-Ground		1	100	nA
$V_{CL}$	Clamping Voltage <sup>(3)</sup> (100ns Transmission Line Pulse, I/O Pin-to-Ground)	$I_{TLP}=1A$		18	20	V
		$I_{TLP}=16A$		25	33	V
	Clamping Voltage <sup>(3)</sup> (IEC61000-4-5, 8/20 $\mu$ s, I/O Pin-to-Ground)	$I_{PP}=1.5A$			25	V
$R_{DNY}$	Dynamic Resistance <sup>(3)</sup>	$I_{TLP}=10A$ to 20A		0.3		$\Omega$
$C_J$	Junction Capacitance	$V_{I/O}=0V$ , $f=1MHz$ , I/O Pin-to-Ground		4.5	6.5	pF

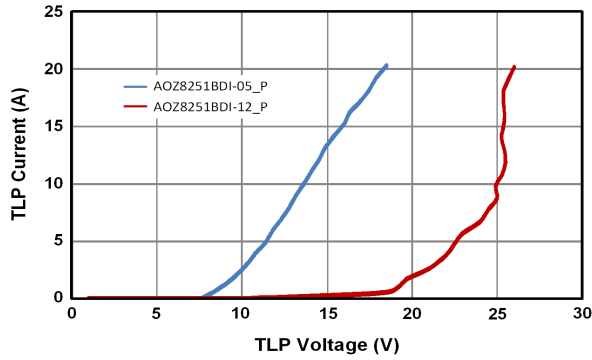
**Note:**

3. These specifications are guaranteed by design and characterization.

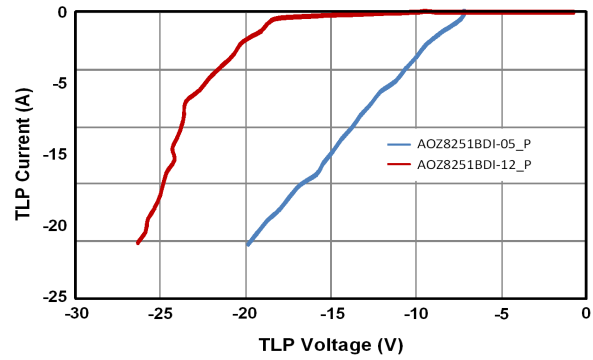
## Typical Performance Characteristics

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

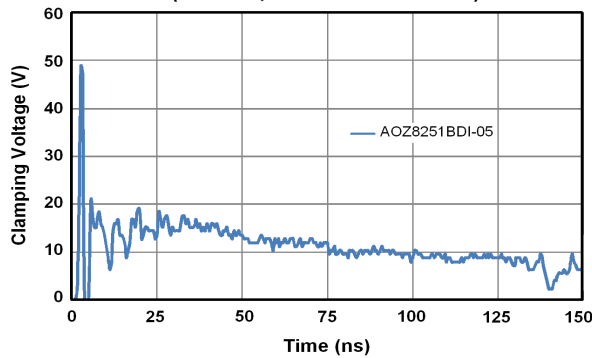
Positive TLP Clamping  
( $t_p=100\text{ns}$ ,  $t_r=1\text{ns}$ )



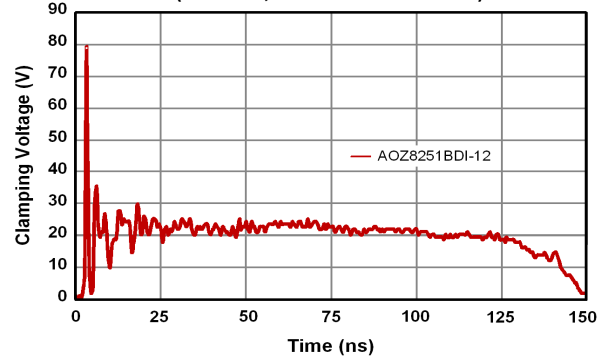
Negative TLP Clamping  
( $t_p=100\text{ns}$ ,  $t_r=1\text{ns}$ )



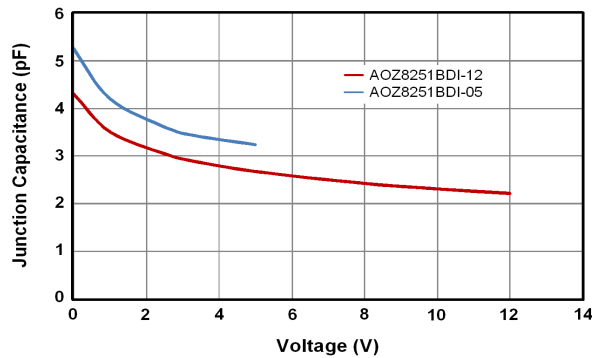
$\pm 8\text{kV}$  ESD Clamping per IEC 61000-4-2  
(Contact, Between IO to GND)



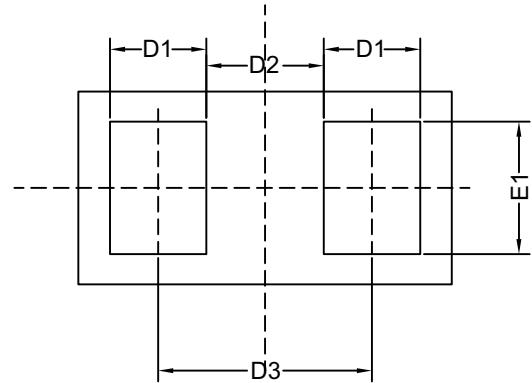
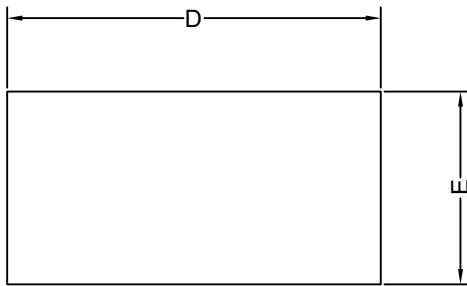
$\pm 8\text{kV}$  ESD Clamping per IEC 61000-4-2  
(Contact, Between IO to GND)



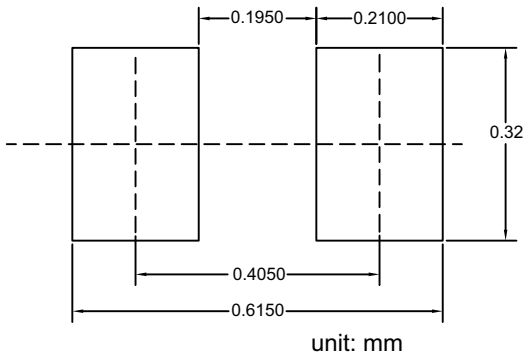
Typical Variations of  $C_j$  vs. Input Voltage



Package Dimension, DFN 0.62 x 0.32



RECOMMEND LAND PATTERN



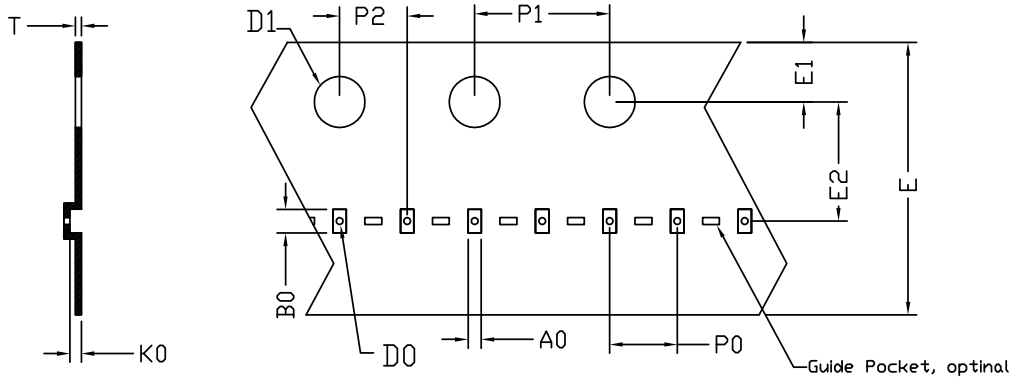
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.27	0.30	0.33	0.0106	0.0118	0.0130
D	0.57	0.62	0.67	0.0224	0.0244	0.0264
D1	0.11	0.16	0.21	0.0043	0.0063	0.0083
D2	0.145	0.195	0.245	0.0057	0.0077	0.0097
D3	0.305	0.355	0.405	0.0120	0.0140	0.0160
E	0.27	0.32	0.37	0.0106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

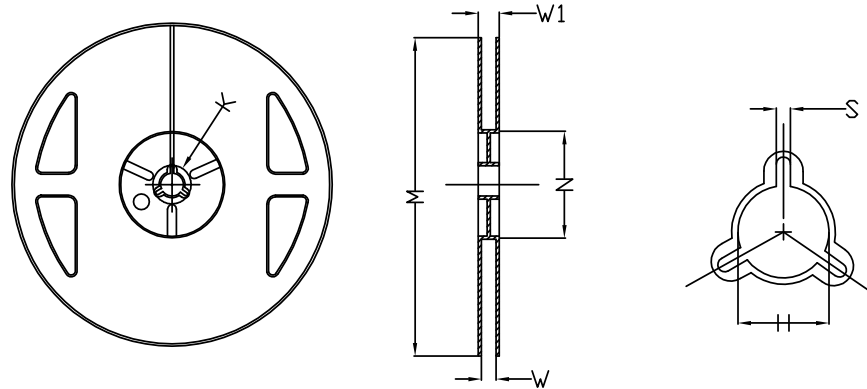
Carrier Tape



UNIT: MM

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

Reel

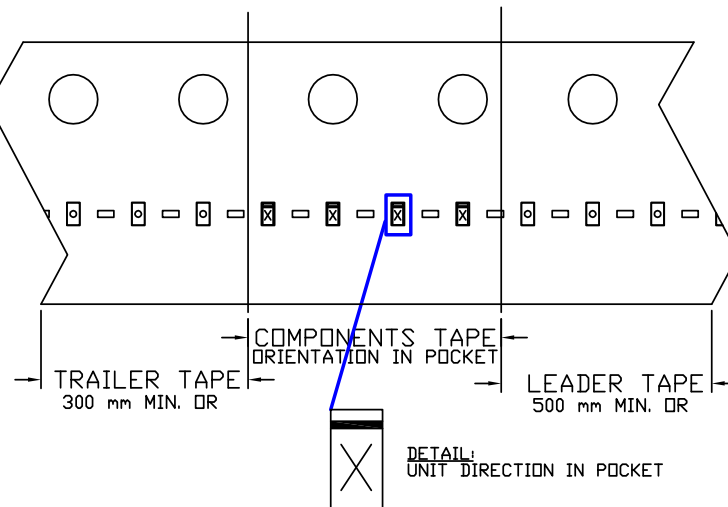


UNIT: MM

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

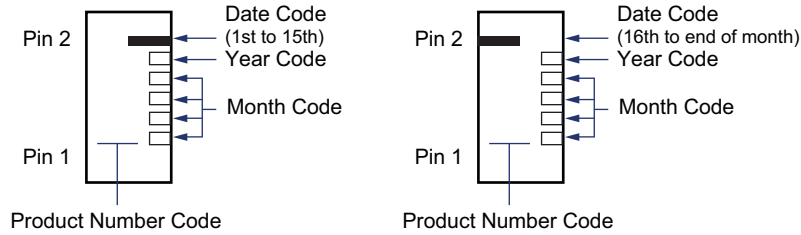
Leader / Trailer & Orientation

Unit Per Reel: 10000pcs



## Part Marking

### AOZ8251BDI-05 (DFN0.62x0.32)



Part Number	Product Code
AOZ8251BDI-05	J
AOZ8251BDI-12	K

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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.