

## General Description

The AOZ8211 is a one-line transient voltage suppressor diode designed to protect voltage sensitive electronics from high transient conditions and ESD.

This device incorporates one TVS diode in an ultra-small DFN 1.0 mm x 0.6 mm package. During transient conditions, the one-line TVS diode directs the transient to ground. It may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ( $\pm 15$  kV air,  $\pm 8$  kV contact discharge).

The AOZ8211 comes in an RoHS compliant 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 the AOZ8211 ideal for applications where PCB space is at a premium. The small size and high ESD protection makes the AOZ8211 ideal for protecting voltage sensitive electronics from high transient conditions and ESD.

## Features

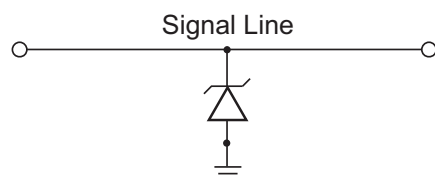
- ESD protection for high-speed data lines:
  - AOZ8211DI-02
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 30$  kV (air),  $\pm 30$  kV (contact)
    - Human Body Model (HBM)  $\pm 30$  kV
  - AOZ8211DI-03
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 30$  kV (air),  $\pm 30$  kV (contact)
    - Human Body Model (HBM)  $\pm 30$  kV
  - AOZ8211DI-05
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 28$  kV (air),  $\pm 28$  kV (contact)
    - Human Body Model (HBM)  $\pm 30$  kV
  - AOZ8211DI-12
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 28$  kV (air),  $\pm 28$  kV (contact)
    - Human Body Model (HBM)  $\pm 30$  kV
  - AOZ8211DI-24
    - Exceeds: IEC 61000-4-2 (ESD)  $\pm 15$  kV (air),  $\pm 18$  kV (contact)
    - Human Body Model (HBM)  $\pm 30$  kV
- Small package saves board space
- Low insertion loss
- Low clamping voltage
- Low operating voltage: 2.5 V, 3.3 V, 5 V, 12 V and 24 V

## Applications

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



## Typical Application



Unidirection Protection of Single Line

## Pin Configuration



## Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8211DI-02	-40 °C to +85 °C	DFN 1.0 x 0.6	Green Product RoHS Compliant
AOZ8211DI-03			
AOZ8211DI-05			
AOZ8211DI-12			
AOZ8211DI-24			



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	AOZ8211DI-02	AOZ8211DI-03	AOZ8211DI-05	AOZ8211DI-12	AOZ8211DI-24
Peak Pulse Current, $t_p = 8/20 \mu s$	6 A	6 A	5.5 A	5 A	2.5 A
Peak Pulse Power, $t_p = 8/20 \mu s$	50 W	55 W	50 W	100 W	110 W
Storage Temperature ( $T_S$ )	-65 °C to +150 °C	-65 °C to +150 °C	-65 °C to +150 °C	-65 °C to +150 °C	-65 °C to +150 °C
ESD Rating per IEC61000-4-2, Contact <sup>(1)</sup>	±30 kV	±30 kV	±28 kV	±28 kV	±18 kV
ESD Rating per IEC61000-4-2, Air <sup>(1)</sup>	±30 kV	±30 kV	±28 kV	±28 kV	±15 kV
ESD Rating per Human Body Model <sup>(2)</sup>	±30 kV	±30 kV	±30 kV	±30 kV	±30 kV

### Notes:

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

## Maximum Operating Ratings

Parameter	Rating
Junction Temperature ( $T_J$ )	-40 °C to +85 °C

### Electrical Characteristics

$T_A = 25\text{ }^\circ\text{C}$  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 @ $I_T$	
$I_F$	Forward Current	
$V_F$	Forward Voltage	
$P_{PK}$	Peak Power Dissipation	
$C_J$	Capacitance @ $V_R = 0$ and $f = 1\text{ MHz}$	

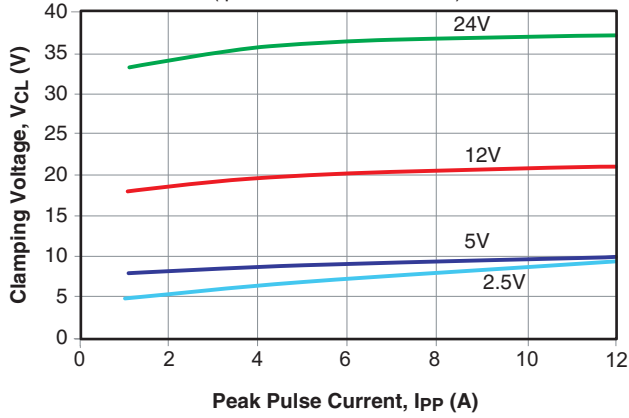
### Electrical Characteristics

$T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted,  $V_F = 0.9\text{ V Max.}$  @  $I_F = 10\text{ mA}$  for all types.

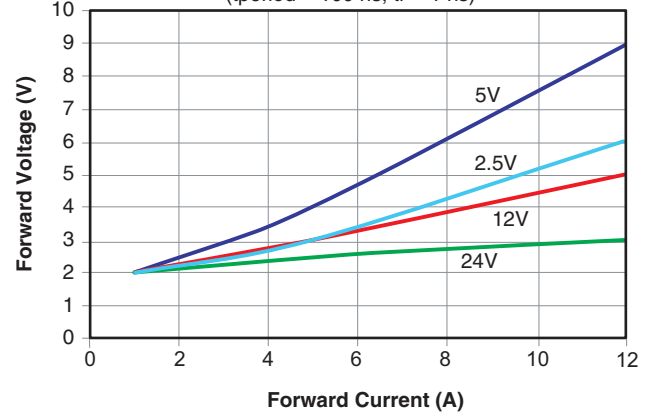
Device	Device Marking	$V_{RWM}$ (V) Max.	$I_R$ ( $\mu\text{A}$ ) Max.	$V_{BR}$ (V) Min.	$I_T$	$V_F$ (V) Typ.	$V_{CL}$ Max.			$C_J$ (pF) Typ.
							$I_{PP} = 1\text{ A}$	$I_{PP} = 5\text{ A}$	$I_{PP} = 12\text{ A}$	
AOZ8211DI-02	Q	2.5	0.1	2.8	$2\text{ }\mu\text{A}$	0.75	5.00	7.00	9.50	11
AOZ8211DI-03	G	3.3	0.1	3.7	$2\text{ }\mu\text{A}$	0.75	5.50	7.50	9.50	11
AOZ8211DI-05	J	5.0	0.1	6.0	1 mA	0.75	8.00	9.00	10.00	16
AOZ8211DI-12	K	12.0	0.1	14.0	1 mA	0.75	18.00	20.00	21.00	30
AOZ8211DI-24	M	24.0	0.1	27.0	1 mA	0.75	33.00	36.00	37.00	20

## Typical Performance Characteristics

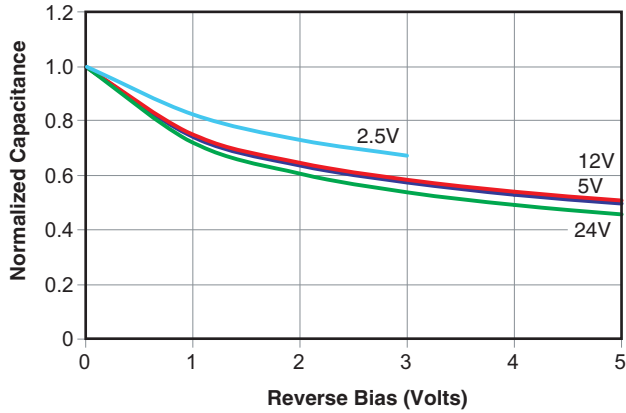
**Clamping Voltage vs. Peak Pulse Current**  
(tperiod = 100 ns, tr = 1 ns)



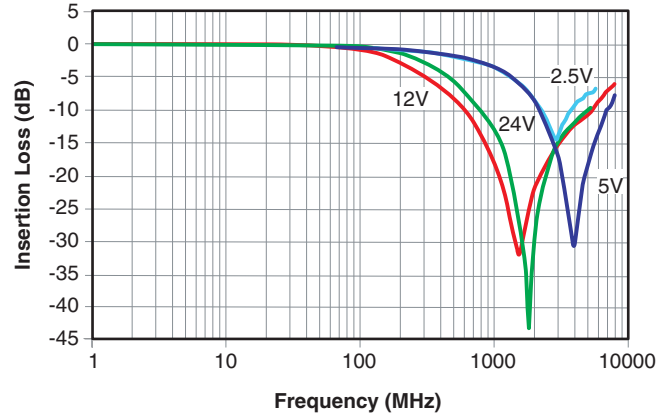
**Forward Voltage vs. Forward Current**  
(tperiod = 100 ns, tr = 1 ns)



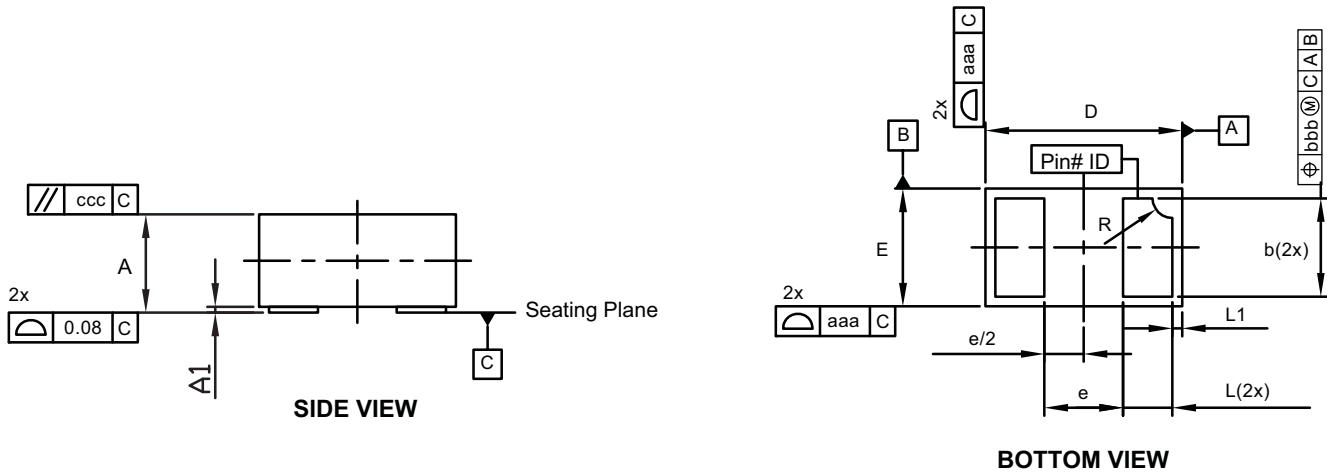
**Capacitance vs. Reverse Bias**



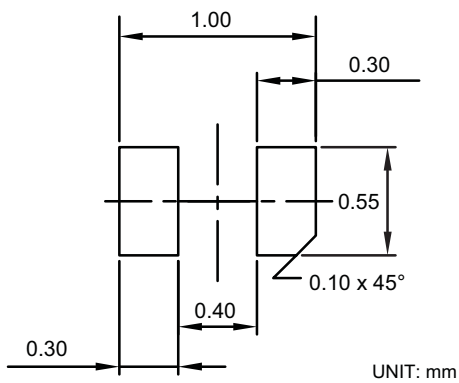
**I/O - Gnd Insertion Loss vs. Frequency**



Package Dimensions, DFN 1.0 x 0.6, 2L



RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.47	0.50	0.53
A1	0.00	0.03	0.05
b	0.45	0.50	0.55
D	0.95	1.00	1.05
E	0.55	0.60	0.65
e	---	0.40	---
L	0.20	0.25	0.30
L1	0.05±0.03 Ref.		
R	0.05	0.10	0.15
aaa	0.15		
bbb	0.05		
ccc	0.05		

Dimensions in inches

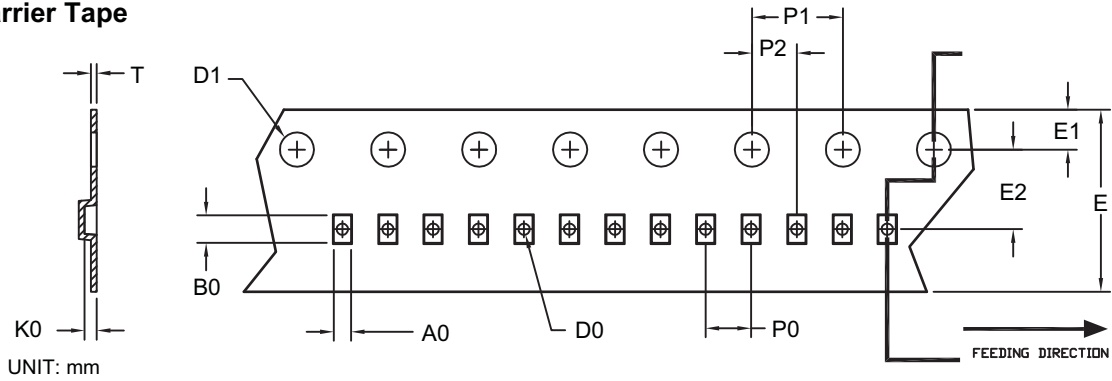
Symbols	Min.	Nom.	Max.
A	0.019	0.020	0.021
A1	0.000	0.001	0.002
b	0.018	0.020	0.022
D	0.037	0.039	0.041
E	0.022	0.024	0.026
e	---	0.016	---
L	0.008	0.010	0.012
L1	0.002±0.001 Ref.		
R	0.002	0.004	0.006
aaa	0.006		
bbb	0.002		
ccc	0.002		

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, 2L

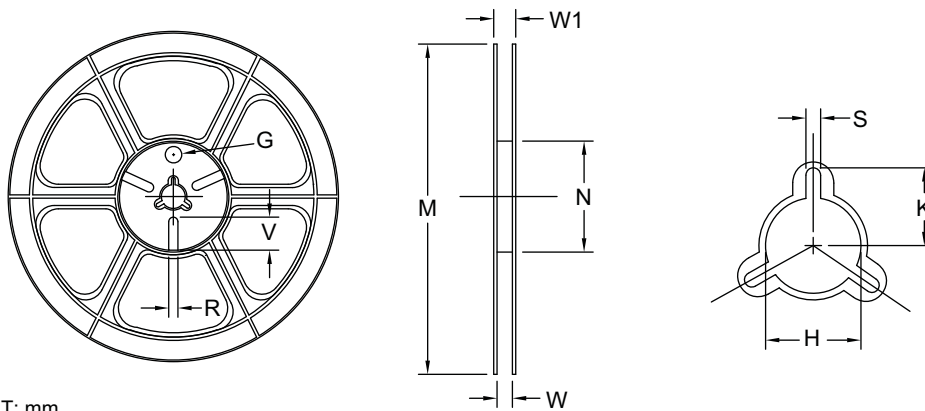
Carrier Tape



UNIT: mm

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

Reel

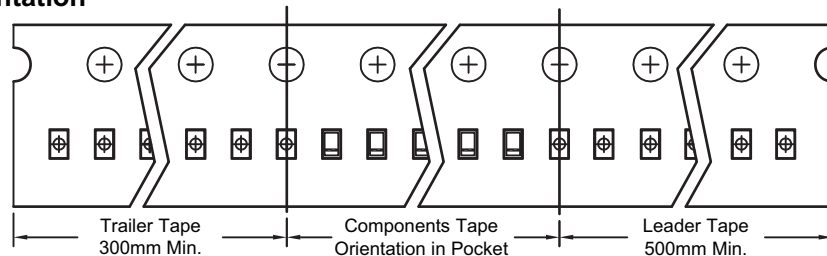


UNIT: mm

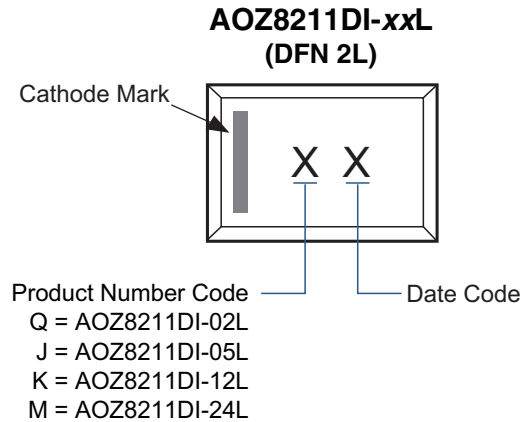
Tape Size	Reel Size	M	N	W	W1	H	K	S	G	R	V
8mm	ø178	ø178 ±0.5	ø55 ±1	8.4 +1.5/-0	Max. 14.4	ø13.0 ±0.5	Max. 10.1	2.0 ±0.5	N/A	N/A	N/A

Leader / Trailer & Orientation

TVS  
Unit Per Reel:  
10000pcs



## Part Marking



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