AOZ8205

Five-line TVS Diode Array

General Description

The AOZ8205 is a transient voltage suppressor diode array designed to protect data lines from high transient conditions and ESD. This state-of-the-art device utilizes AOS leading edge Trench Vertical Structure [TVS]^2 ™ technology for superior clamping performance.

This device incorporates five TVS diodes in a single package. Due to the flexibility of the design, the package can be configured as a four channel bidirectional TVS array. During transient conditions, the TVS diodes direct the transient to ground. They may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

The AOZ8205 comes in an RoHS compliant SC-89 package and is rated over a -40°C to +85°C ambient temperature range.

The very small 1.7 x 1.7 x 0.6mm SC-89 package makes it ideal for applications where PCB space is a premium. The small size and high ESD protection makes it ideal for protecting high speed video and data communication interfaces.

Features

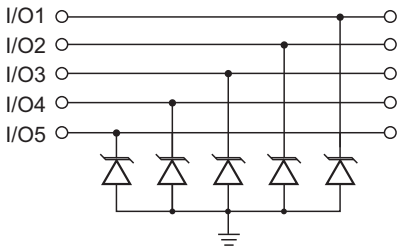
- ESD protection for high-speed data lines:
  - Exceeds: IEC 61000-4-2 (ESD) ±30kV (air), ±30kV (contact)
  - Human Body Model (HBM) ±30kV
- Trench Vertical Structure [TVS]^2 ™ based technology used to achieve excellent ESD clamping performance
- Small package saves board space
- Low insertion loss
- Protects five unidirectional or four bidirectional I/O lines
- Low clamping voltage
- Low operating voltage: 5.0V
- Green product, Pb-free

Applications

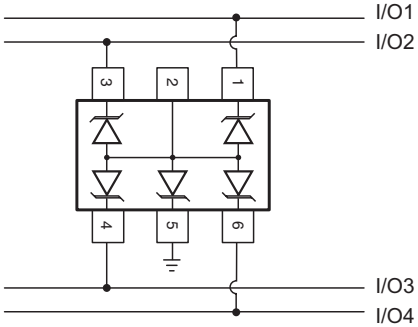
- Portable handheld devices
- Keypads, data lines
- Notebook computers
- Digital Cameras
- Portable GPS
- MP3 players

Green Product

Typical Applications

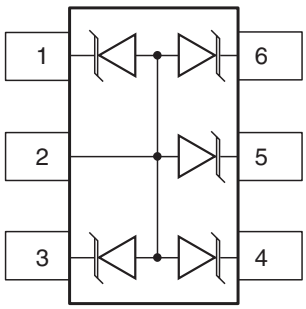


Unidirection Protection of Five Lines



Bidirection Protection of Four Lines

Pin Configuration



Top View

Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8205KIL	-40°C to +85°C	SC-89	Green Product RoHS Compliant

- All AOS products are offered in packages with Pb-free plating and compliant to RoHS standards.
- Parts marked as Green Products (with "L" suffix) use reduced levels of Halogens, and are also RoHS compliant.

Please visit 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
VP – VN	5V
Peak Pulse Current (I_{PP}), t_P = 8/20µs	5A
Storage Temperature (T_S)	-65°C to +150°C
ESD Rating per IEC61000-4-2, Contact(1)	±30kV
ESD Rating per IEC61000-4-2, Air(1)	±30kV
ESD Rating per Human Body Model(2)	±30kV

Notes:

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

Maximum Operating Ratings

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

Electrical Characteristics

T_A = 25°C unless otherwise specified. Specifications in **BOLD** indicate a temperature range of -40°C to +85°C.

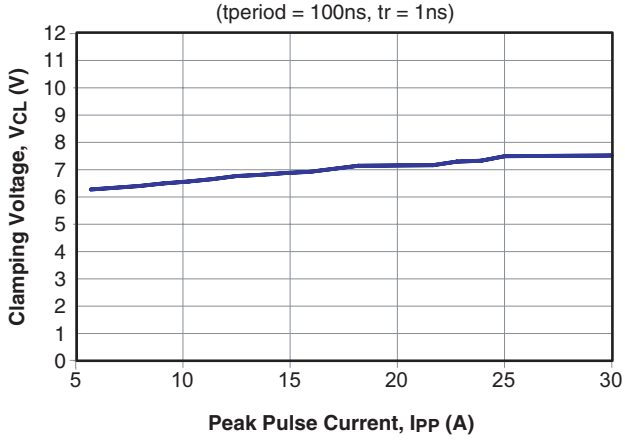
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{RWM}	Reverse Working Voltage	Between pin 5 and 2(3)			5.0	V
V_{BR}	Reverse Breakdown Voltage	I_T = 1mA, between pins 5 and 2(4)	**6.0**			V
I_R	Reverse Leakage Current	V_{RWM} = 5V, between pins 5 and 2			**0.1**	µA
V_F	Diode Forward Voltage	I_F = 15mA	**0.70**	**0.85**	**1**	V
V_{CL}	Channel Clamp Voltage Positive Transients Negative Transient	I_{PP} = 15A, tp = 100ns, any I/O pin to Ground			 7.0 -6.75	 V V
	Channel Clamp Voltage Positive Transients Negative Transient	I_{PP} = 25A, tp = 100ns, any I/O pin to Ground			 7.50 -10.25	 V V
C_j	Junction Capacitance	V_R = 0V, f = 1MHz, any I/O pin to Ground		15	17	pF

Notes:

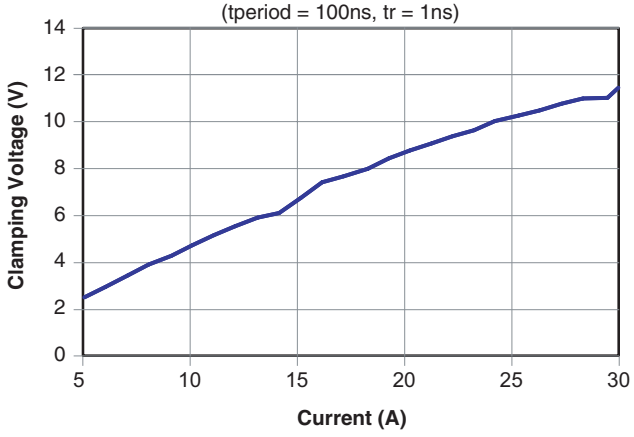
3. The working peak reverse voltage, V_{RWM}, should be equal to or greater than the DC or continuous peak operating voltage level.
4. V_{BR} is measured at the pulse test current I_T.

Typical Performance Characteristics

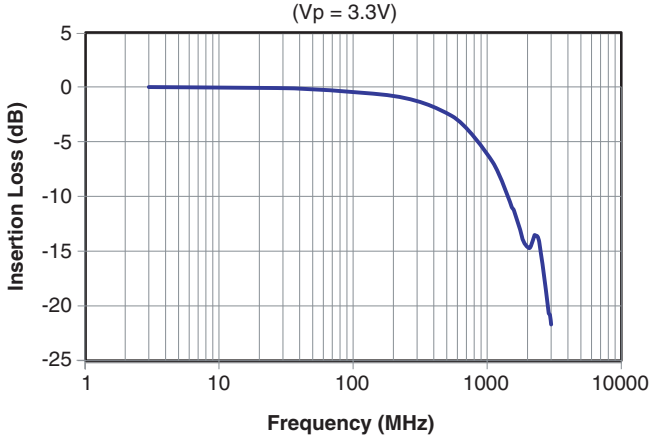
Clamping Voltage vs. Peak Pulse Current
(tperiod = 100ns, tr = 1ns)



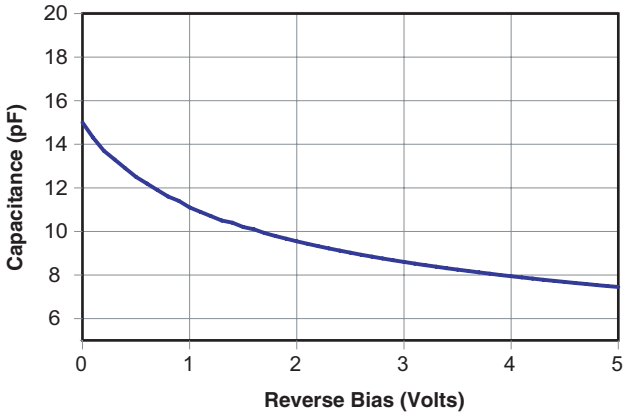
Clamping Voltage vs. Current
(tperiod = 100ns, tr = 1ns)



I/O – Gnd Insertion Loss (S21) vs. Frequency
(Vp = 3.3V)



Capacitance vs. Reverse Bias

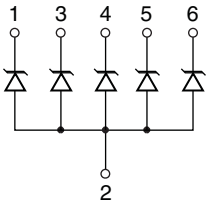


Applications Information

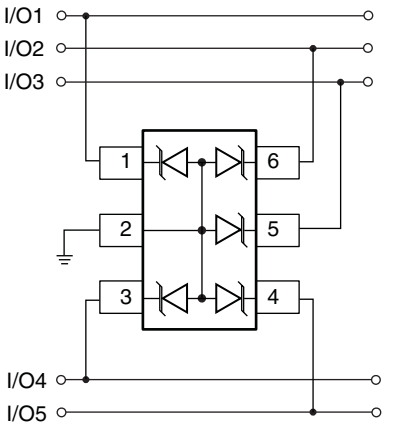
Device Connection for Protection of Five Unidirectional Data Lines

These devices are designed to protect up to five unidirectional data lines. The device is connected as follows.

1. Unidirectional protection of five I/O lines is achieved by connecting pins 1, 3, 4, 5 and 6 to the data lines. Connect pin 2 to ground. The ground connection should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.



Circuit Diagram

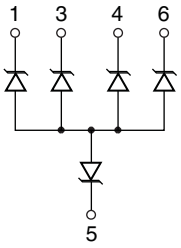


Protection of Five Unidirectional Lines

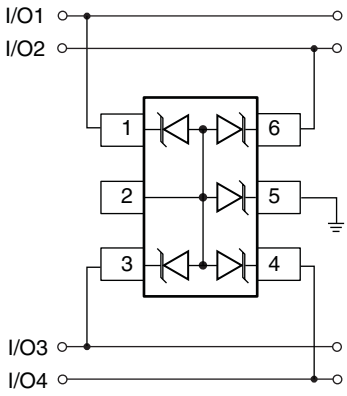
Device Connection for Protection of Four Bidirectional Data Lines

These devices are designed to protect up to four bidirectional data lines. The device is connected as follows.

1. Bidirectional protection of four I/O lines is achieved by connecting pins 1, 3, 4, and 6 to the data lines. Connect pin 5 to ground. The ground connection should be made directly to the ground plane for best results. The path length is kept as short as possible to reduce the effects of parasitic inductance in the board traces.



Circuit Diagram



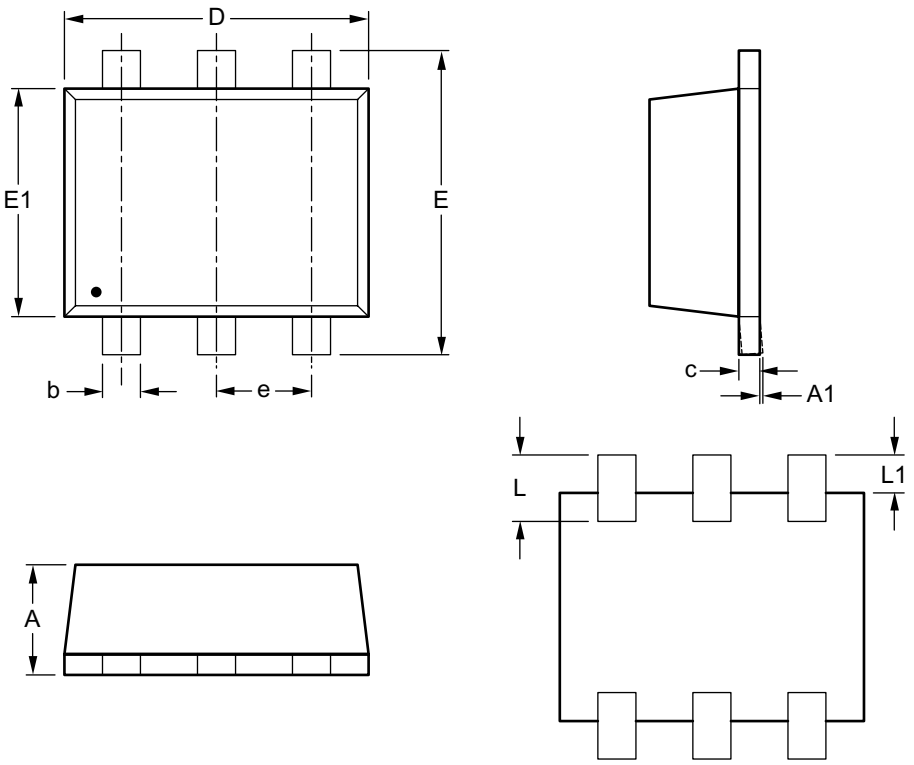
Protection of Four Bidirectional Lines

Circuit Board Layout Recommendations for Suppression of ESD

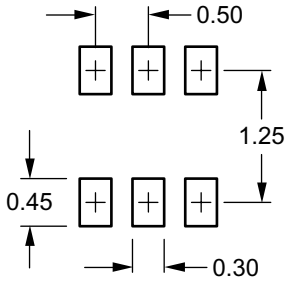
Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

- Place the TVS near the input terminals or connectors to restrict transient coupling.
- Minimize the path length between the TVS and the protected line.
- Minimize all conductive loops including power and ground loops.
- The ESD transient return path to ground should be kept as short as possible.
- Never run critical signals near board edges.
- Use ground planes whenever possible.

Package Dimensions, SC-89



RECOMMENDED LAND PATTERN



UNIT: mm

Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	0.53	0.58	0.62
A1	0.00	—	0.10
b	0.15	0.20	0.30
c	0.10	0.11	0.18
D	1.50	1.60	1.70
E	1.50	1.60	1.70
E1	1.10	1.20	1.30
e	0.50 BSC		
L	0.25	0.35	0.45
L1	0.13	0.20	0.27

Dimensions in inches

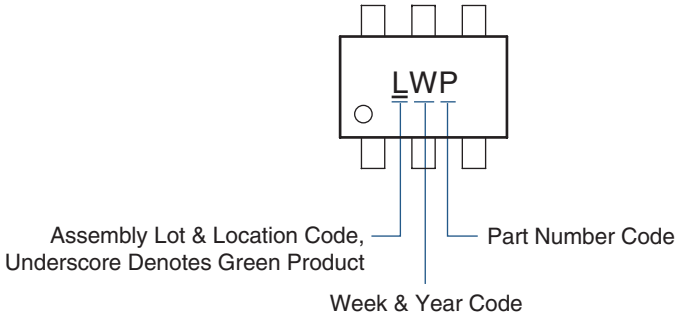
Symbols	Min.	Nom.	Max.
A	0.021	0.023	0.024
A1	0.000	—	0.004
b	0.006	0.008	0.012
c	0.004	0.004	0.007
D	0.059	0.063	0.067
E	0.059	0.063	0.067
E1	0.043	0.047	0.051
e	0.020 BSC		
L	0.010	0.014	0.018
L1	0.005	0.008	0.011

Notes:

1. Dimension D does not include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15mm per end. Dimension E1 does not include interlead flash or protrusion.
2. Dimensions D and E1 are determinded at the outmost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs and interlead flash, but including any mismatch between the top and bottom of the plastic body.
3. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.
4. All dimensions are in millimeters.

Package Marking

AOZ8205KIL
(SC-89)



This data sheet contains preliminary data; supplementary data may be published at a later date.
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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.