

## General Description

The AOZ8S205BLS-24 is a single channel transient voltage suppressor designed to protect high speed data lines such as USB4.0, TBT4 from damaging ESD events.

The AOZ8S205BLS-24 provides a ultra low capacitance of high allowable reverse working voltage up to 24V 0.075pF and low insertion loss providing greater signal integrity making it ideally suited for super speed data transmission applications in mobile and computing Type-C applications.

The AOZ8S205BLS-24 comes in a RoHS compliant and Halogen Free 0.6 mm x 0.3 mm x 0.3 mm package and is rated for -40°C to +125°C junction temperature range.

## Features

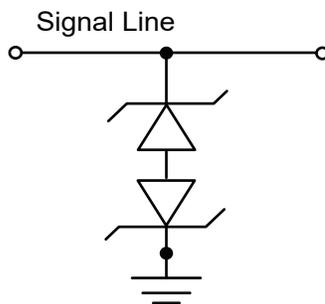
- ESD protection for high-speed data lines:
  - IEC 61000 4-2, ESD immunity:
    - Air discharge:  $\pm 8$  kV
    - Contact Discharge:  $\pm 8$  kV
  - IEC 61000-4-5 (Lightning) 3.5 A (8/20  $\mu$ s)
  - Human Body Mode:  $\pm 8$  kV
- Bidirectional TVS
- Low capacitance: 0.075 pF
- Low clamping voltage
- Operating voltage: 24 V

## Applications

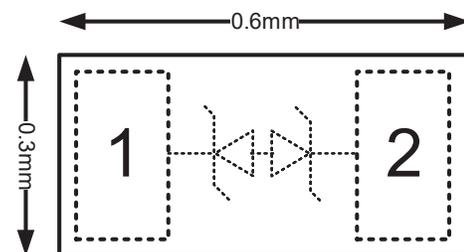
- USB 4, Thunderbolt 4, PCI Express
- Mobile Phone
- Notebook computers



## Typical Application



## Pin Configuration



## Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8S205BLS-24	-40°C to +125°C	WLCSP0.6x0.3-2	Green Product



AOS products are offered in packages with Pb-free plating and compliant to RoHS standards. Please visit <https://aosmd.com/sites/default/files/media/AOSGreenPolicy.pdf> for additional information.

## Absolute Maximum Ratings

Exceeding the Absolute Maximum Ratings may damage the device.

Parameter	Rating
Any Pin to Pin	24 V
Peak Pulse Current ( $I_{PP}$ ), $t_P = 8/20 \mu s$	3.5 A
Peak Pulse Power ( $P_{PP}$ ), $t_P = 8/20 \mu s$	20 W
Storage Temperature ( $T_S$ )	-65°C to +150°C
ESD Rating per IEC61000-4-2, Contact <sup>(1)</sup>	±8 kV
ESD Rating per IEC61000-4-2, Air <sup>(1)</sup>	±8 kV
ESD Rating per Human Body Mode <sup>(2)</sup>	±8 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  $C_{Discharge} = 100 \text{ pF}$ ,  $R_{Discharge} = 1.5 \text{ k}\Omega$

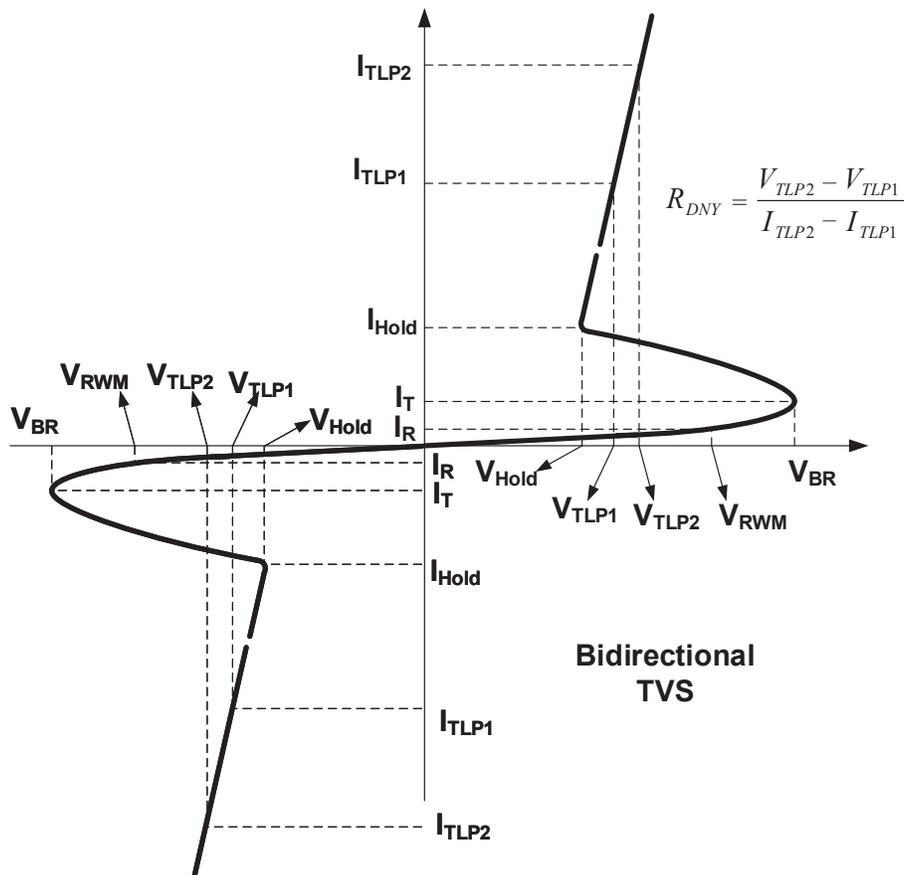
## Maximum Operating Ratings

The device is not guaranteed to operate beyond the Maximum Operating Conditions.

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

## Electrical Characteristics

T<sub>A</sub> = 25°C, unless otherwise noted. Any Pin to Pin.



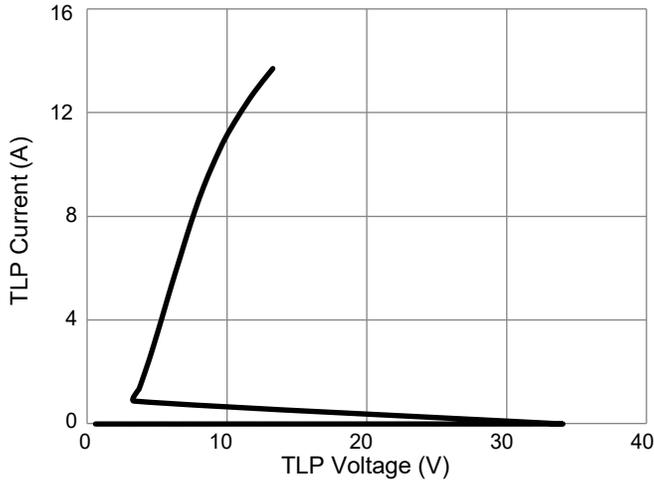
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V <sub>RWM</sub>	Reverse Working Voltage				24	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 100 μA	27	29	33	V
I <sub>R</sub>	Reverse Leakage Current	Max. V <sub>RWM</sub>		1	100	nA
V <sub>CL</sub>	Clamping Voltage <sup>(3)(4)</sup> (100 ns Transmission Line Pulse)	I <sub>TLP</sub> = 1 A		3.4		V
		I <sub>TLP</sub> = 12 A		11.5		
R <sub>DNY</sub>	Dynamic Resistance <sup>(3)(4)</sup>	I <sub>TLP</sub> = 1 A to 12 A		0.73		Ω
V <sub>CL</sub>	Clamping Voltage <sup>(3)</sup> (IEC61000-4-5, 8/20 μs)	I <sub>PP</sub> = 2 A		4.5		V
		I <sub>PP</sub> = 3.5 A		7		
C <sub>J</sub>	Junction Capacitance	V <sub>I/O</sub> = 0 V, f = 1MHz		0.075	0.095	pF

**Notes:**

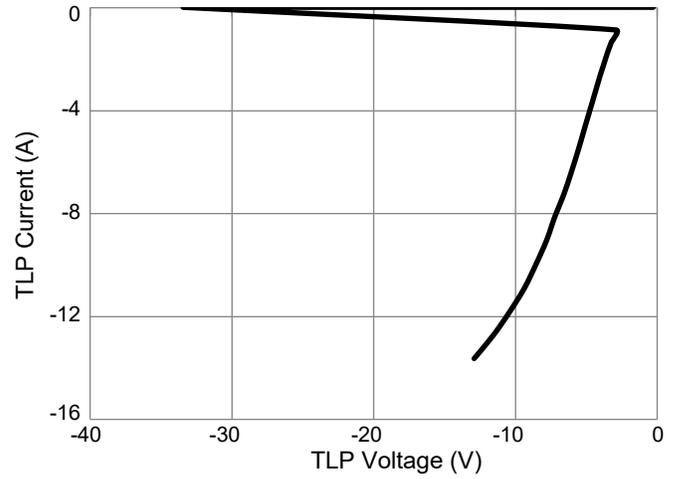
- 3. These specifications are guaranteed by design and characterization.
- 4. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.

## Typical Performance Characteristics

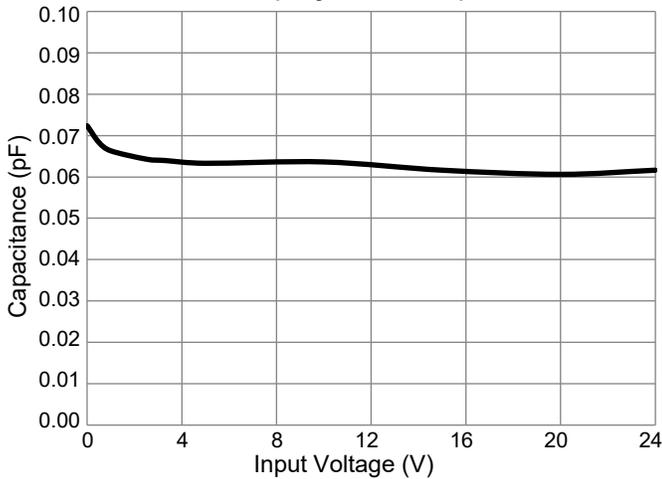
Positive Transmission Line Pulse  
( $t_p=100\text{ns}$ ,  $t_r=0.2\text{ns}$ )



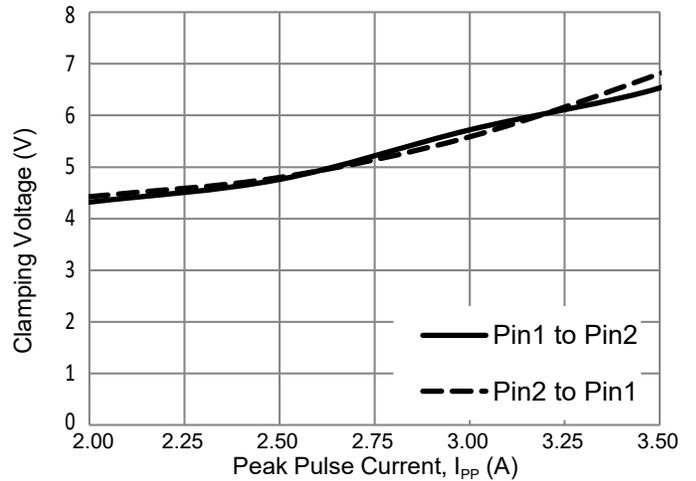
Negative Transmission Line Pulse  
( $t_p=100\text{ns}$ ,  $t_r=0.2\text{ns}$ )



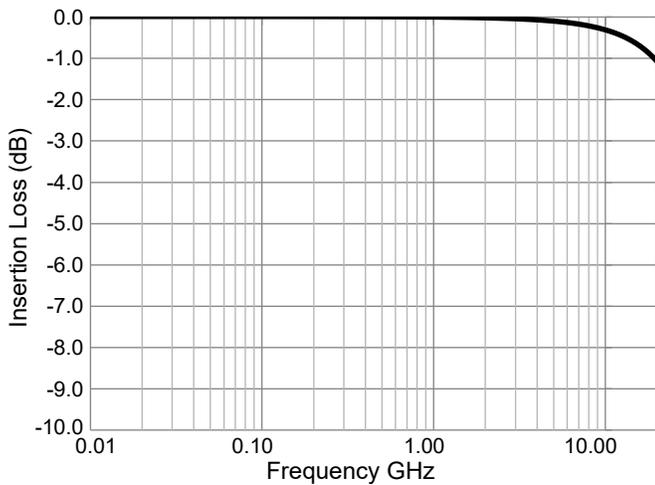
Typical Variations of  $C_J$  vs. Input Voltage  
(Any Pin to Pin)



IEC61000-4-5 Surge 8/20 $\mu\text{s}$   
(Any Pin to Pin)

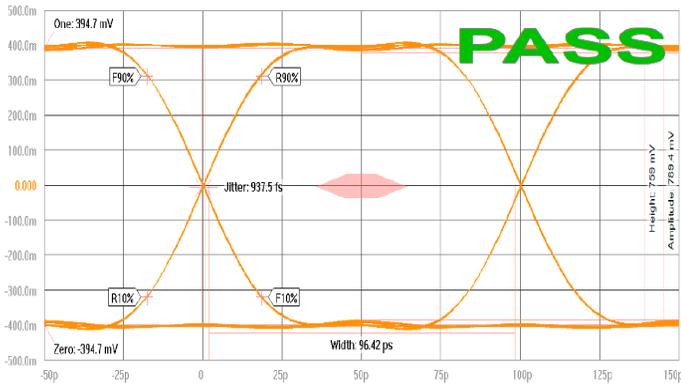


Insertion Loss SDD21

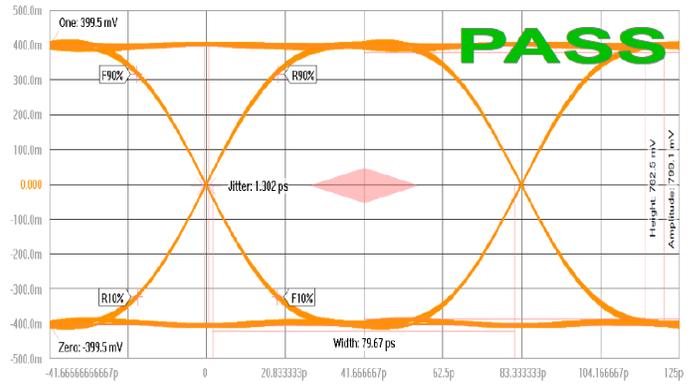


Typical Characteristics (continued)

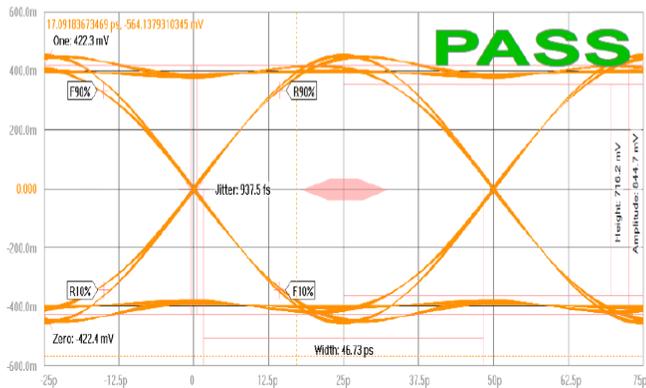
USB3.1 Gen2 Eye Diagram (10 Gbps)



HDMI2.0 Eye Diagram (12 Gbps)



Thunderbolt 4.0 Eye Diagram (20 Gbps)



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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.