

General Description

The AOZ8S204BL2 is a dual channel transient voltage suppressor designed to protect high speed data lines and voltage sensitive electronics from high transient conditions and ESD.

The AOZ8S204BL2 comes in an RoHS compliant package and is rated over a -40°C to +125°C ambient temperature range.

The ultra-small 0.63 mm x 0.33 mm 0201 footprint package makes the AOZ8S204BL2 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

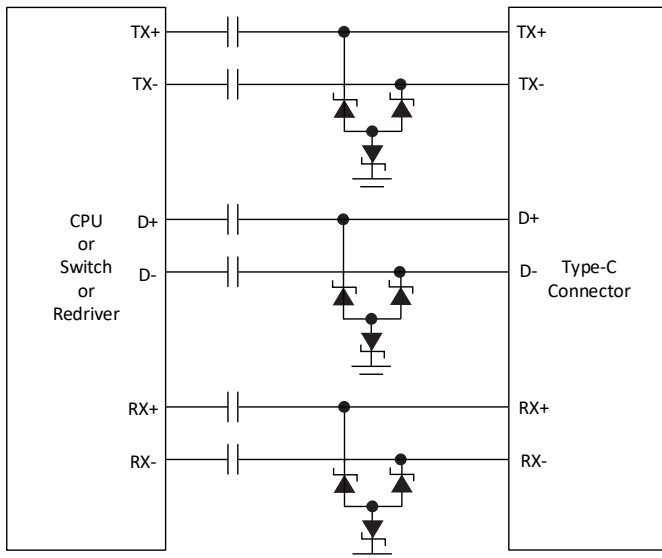
- ESD protection for high-speed data lines:
 - IEC 61000 4-2, ESD immunity:
 - Air discharge: ±20 kV
 - Contact discharge: ±20 kV
 - IEC 61000-4-5 (Lightning 8/20 μs): 8.5 A
 - IEC 61000-4-4 EFT (5/50 ns): 40 A
 - Human Body Mode: ±8 kV
- Bidirectional TVS
- Low capacitance: 0.15 pF
- Low clamping voltage
- Low operating voltage: 3.3 V, 5 V

Applications

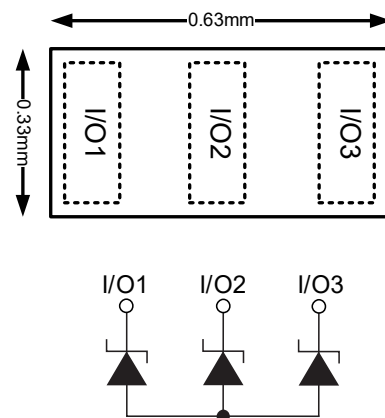
- USB4, Thunderbolt 4, PCI Express
- Mobile phones
- Notebook computers



Typical Applications



Pin Configuration



Ordering Information

| Part Number | Ambient Temperature Range | Package | Environmental |
|----------------|---------------------------|-------------------|---------------|
| AOZ8S204BL2-03 | -40°C to +125°C | WLCSP 0.63x0.33-3 | Green Product |
| AOZ8S204BL2-05 | -40°C to +125°C | WLCSP 0.63x0.33-3 | Green Product |



AOS products are offered in packages with Pb-free plating and compliant to RoHS standards. Please visit www.aosmd.com/media/AOSGreenPolicy.pdf for additional information.

Absolute Maximum Ratings

(T_A = 25°C, unless otherwise noted) Exceeding the Absolute Maximum Ratings may damage the device.

| Parameter | Rating |
|---|-----------------|
| AOZ8S204BL2-03 Any Pin to Pin AOZ8S204BL2-05 Any Pin to Pin | 3.3 V 5 V |
| Peak Pulse Current (I _{PP}), t _P = 8/20 μs | 8.5 A |
| Peak Pulse Power (P _{PP}), t _P = 8/20 μs | 50 W |
| Storage Temperature (T _S) | -65°C to +150°C |
| ESD Rating per IEC61000-4-2, Contact ⁽¹⁾ | ±20 kV |
| ESD Rating per IEC61000-4-2, Air ⁽¹⁾ | ±20 kV |
| ESD Rating per Human Body Mode ⁽²⁾ | ±8 kV |

Notes:

- IEC 61000-4-2 discharge with CDischarge = 150 pF, RDischarge = 330 Ω.
- Human Body Discharge per MIL-STD-883, Method 3015 CDischarge = 100 pF, RDischarge = 1.5 kΩ

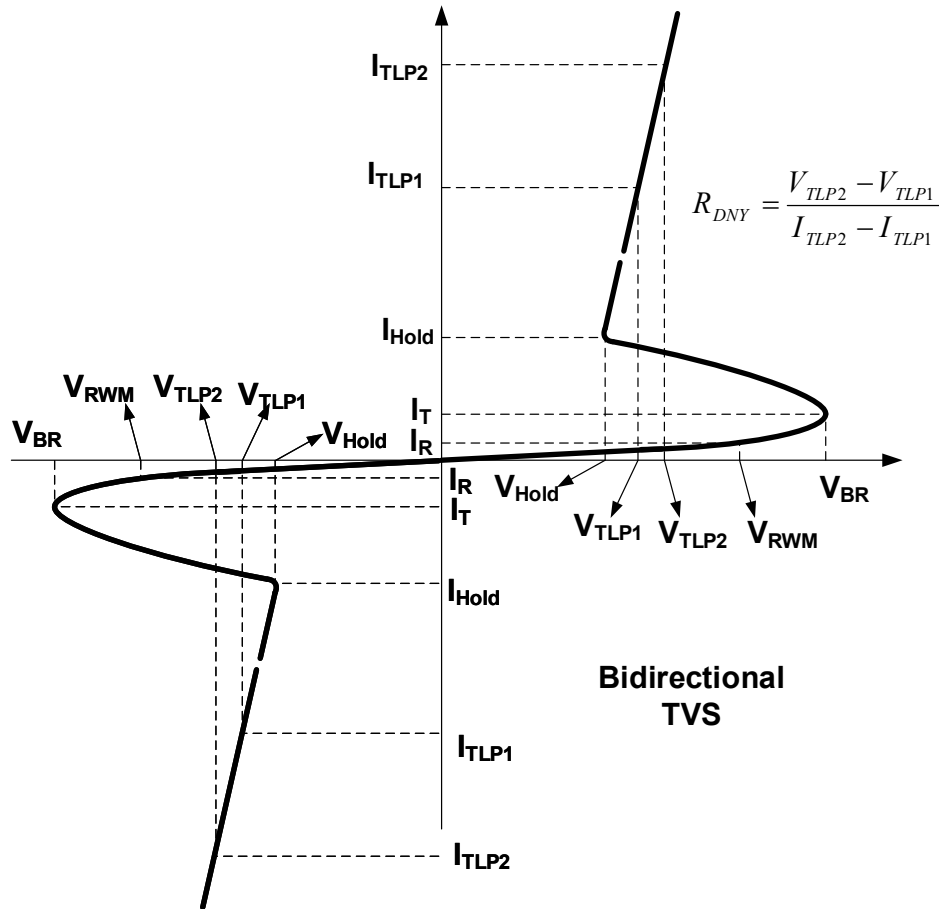
Maximum Operating Ratings

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_A = 25°C, unless otherwise noted. Pin 2 as GND.



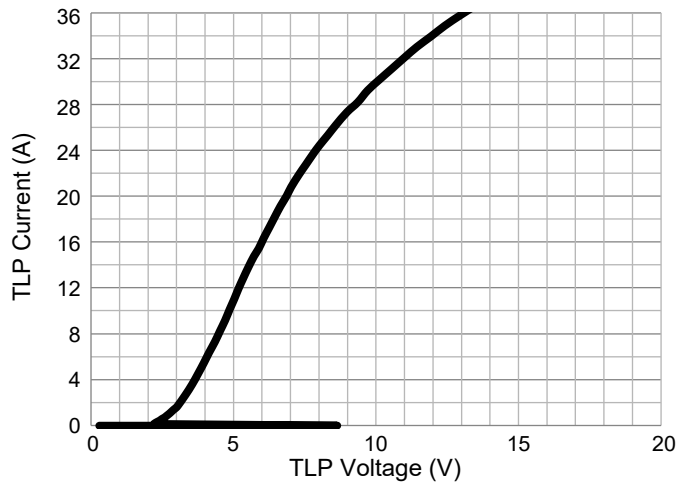
| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|------------------|--|----------------------------------|-----|------|----------|-------|
| V _{RWM} | Reverse Working Voltage | AOZ8S204BL2-03 AOZ8S204BL2-05 | | | 3.3 5 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 100 μA | 6 | 7.5 | 9 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} | | 1 | 50 | nA |
| V _{CL} | Clamping Voltage ⁽³⁾⁽⁴⁾ (100 ns Transmission Line Pulse) | I _{TLP} = 1 A | | 2.5 | | V |
| | | I _{TLP} = 16 A | | 6 | | |
| V _{CL} | Clamping Voltage ⁽³⁾ (IEC61000-4-5, 8/20 μs) | I _{PP} = 1 A | | 3 | | |
| | | I _{PP} = 8.5 A | | 5.8 | | |
| R _{DNY} | Dynamic Resistance ⁽³⁾⁽⁴⁾ | I _{TLP} = 1A to 16 A | | 0.2 | | Ω |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz | | 0.15 | 0.19 | pF |

Notes:

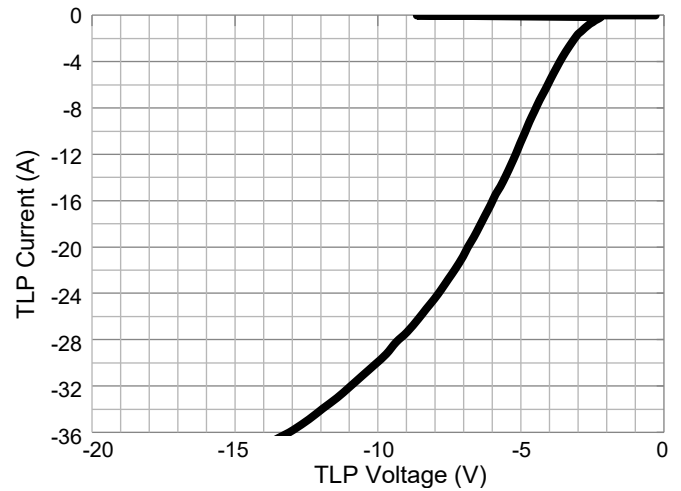
3. These specifications are guaranteed by design and characterization.
4. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.

Typical Performance Characteristics

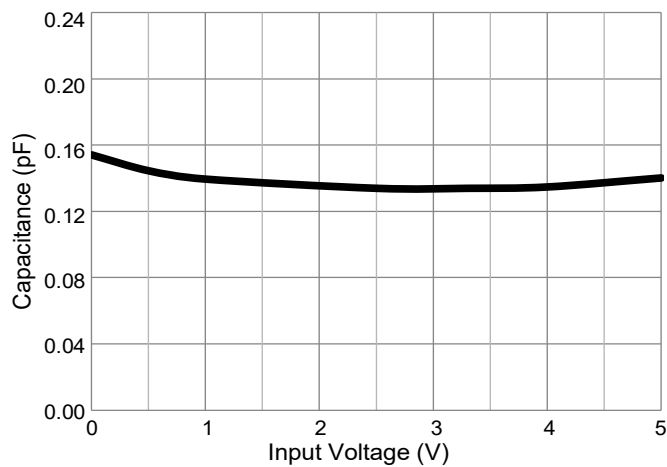
Positive Transmission Line Pulse
($t_p=100\text{ns}$, $t_r=0.2\text{ns}$)



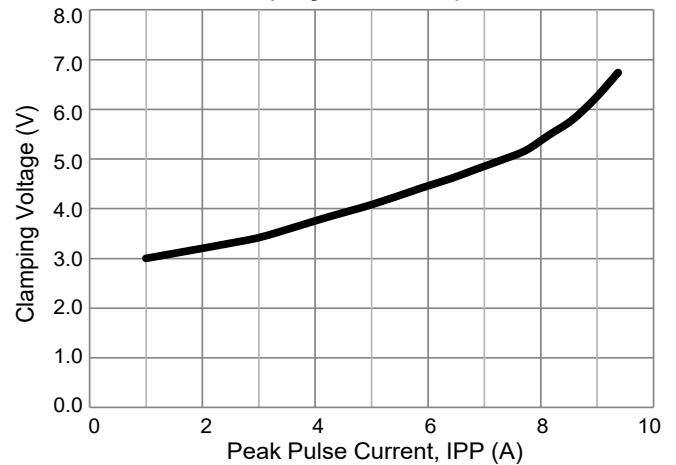
Negative Transmission Line Pulse
($t_p=100\text{ns}$, $t_r=0.2\text{ns}$)



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

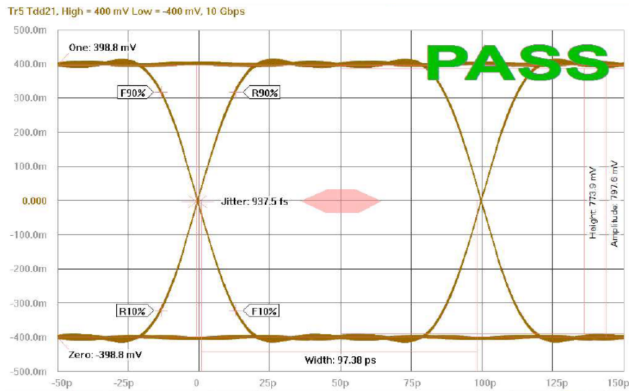


IEC61000-4-5 Surge 8/20 μs
(Any Pin to Pin)

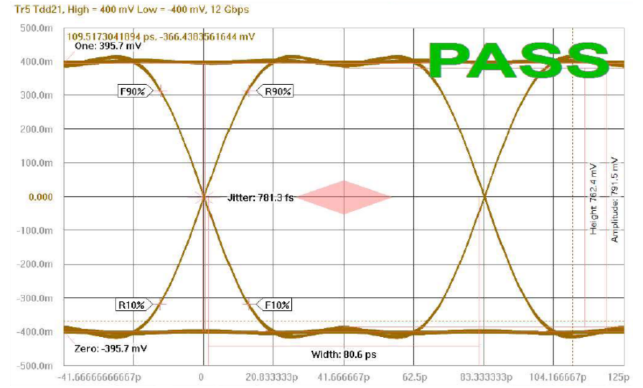


Typical Performance Characteristics (Continued)

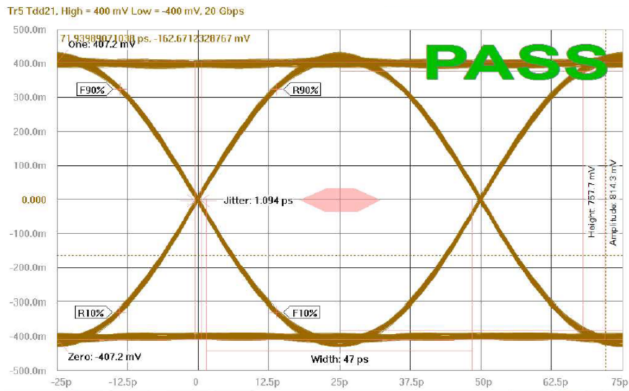
USB3.2 Gen2 Eye Diagram (10 Gbps)



HDMI2.1 Eye Diagram (12 Gbps)



Thunderbolt 3.0 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.