

General Description

The AOZ8S212UD4 is a transient voltage suppressor array designed to protect high speed data lines such as HDMI 2.0/2.1, USB 3.2, LVDS, and V-by-one from damaging ESD events.

This device incorporates a numbers of surge rated, low capacitance steering diodes and a TVS in a single package. During transient conditions, the steering diodes direct the transient to either the positive side of the power supply line or to ground.

The AOZ8S212UD4 provides a typical line-to-line capacitance of 0.20 pF and low insertion loss providing greater signal integrity making it ideally suited for HDMI 2.0/2.1 or USB 3.2 applications, such as Digital TVs, DVD players, computing, set-top boxes and MDDI applications in mobile computing devices.

The AOZ8S212UD4 comes in a RoHS compliant and Halogen Free 2.5 mm x 1.0 mm x 0.55 mm DFN-10L package and is rated for -40°C to +125°C junction temperature range.

Features

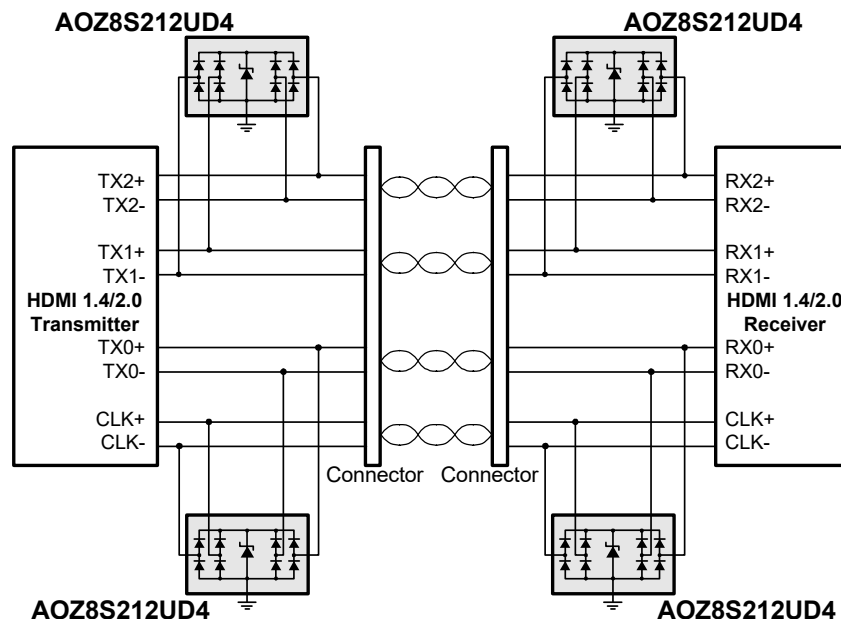
- IEC 61000-4-2 (ESD):
 - Air discharge: ±10 kV
 - Contact discharge: ±8 kV
- IEC 61000-4-5 (Lightning, 8/20 μs) 3 A
- Human Body Model (HBM) ±8 kV
- Protects four I/O lines
- Low capacitance between I/O to GND: 0.2 pF
- Low clamping voltage
- Low operating voltage: 3.3 V, 5 V

Applications

- HDMI 2.0/2.1, USB 3.2, Thunderbolt, V-by-One
- Monitors and flat panel displays
- Set-top box
- Video graphics cards
- Notebook computers



Typical Applications



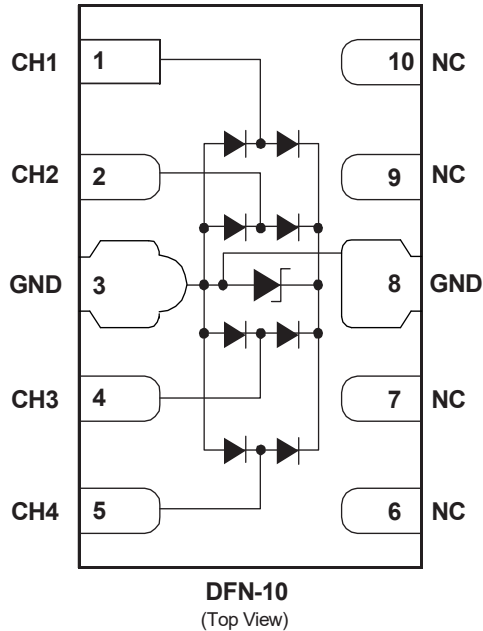
Ordering Information

Part Number	Ambient Temperature Range	Package	Environmental
AOZ8S212UD4-03	-40°C to +125°C	2.5 mm x 1.0 mm DFN-10L	Green Product
AOZ8S212UD4-05	-40°C to +125°C	2.5 mm x 1.0 mm DFN-10L	Green Product



AOS Green Products use reduced levels of Halogens, and are also RoHS compliant. Please visit www.aosmd.com/media/AOSGreenPolicy.pdf for additional information.

Pin Configuration



Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

Parameter	Rating
Storage Temperature (T_S)	-65 °C to +150 °C
ESD Rating per IEC 61000-4-2, contact ⁽¹⁾	±8 kV
ESD Rating per IEC 61000-4-2, air ⁽¹⁾	±10 kV
ESD Rating per Human Body Model ⁽²⁾	±8 kV

Notes:

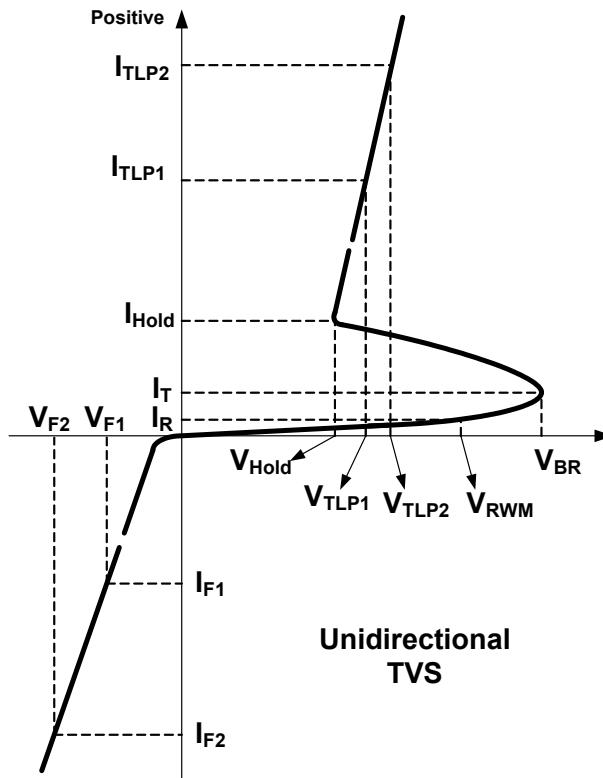
- IEC 61000-4-2 discharge with $C_{Discharge} = 150\text{pF}$, $R_{Discharge} = 330\ \Omega$.
- Human Body Discharge per MIL-STD-883, Method 3015 $C_{Discharge} = 100\ \text{pF}$, $R_{Discharge} = 1.5\ \text{k}\Omega$.

Maximum Operating Ratings

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

Electrical Characteristics

$T_A = 25^\circ\text{C}$ unless otherwise specified. Any I/O Pin-to-Ground.



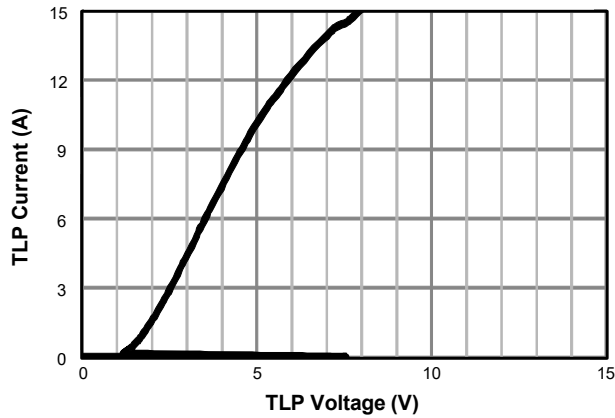
Symbol	Parameter	Conditions	Min.	Typ.	Max	Units
V_{RWM}	Reverse Working Voltage	AOZ8S212UD4-03			3.3	V
		AOZ8S212UD4-05			5	V
V_{BR}	Reverse Breakdown Voltage	$I_T = 100 \mu\text{A}$	6		9	V
I_R	Reverse Leakage Current	Max. V_{RWM}		1	50	nA
V_{CL}	Clamping Voltage ⁽³⁾⁽⁴⁾ (100 ns Transmission Line Pulse, I/O Pin to GND)	$I_{TLP} = 1 \text{ A}$ $I_{TLP} = -1 \text{ A}$		1.5 -1.5	2 -2	V V
		$I_{TLP} = 15 \text{ A}$ $I_{TLP} = -15 \text{ A}$		8 -9	10 -11	V V
R_{DNY}	Dynamic Resistance ⁽³⁾	$I_{TLP} = 1 \text{ A to } 15 \text{ A}$		0.45		Ω
C_J	Junction Capacitance	$V_{PIN\ 3,8} = 0 \text{ V}, V_{I/O} = 1.65 \text{ V}, f = 1 \text{ MHz}$		0.20	0.25	pF
		$V_{PIN\ 3,8} = 0 \text{ V}, V_{I/O} = 1.65 \text{ V}, f = 1 \text{ MHz},$ I/O Pin-to-I/O Pin		0.10		pF

Notes:

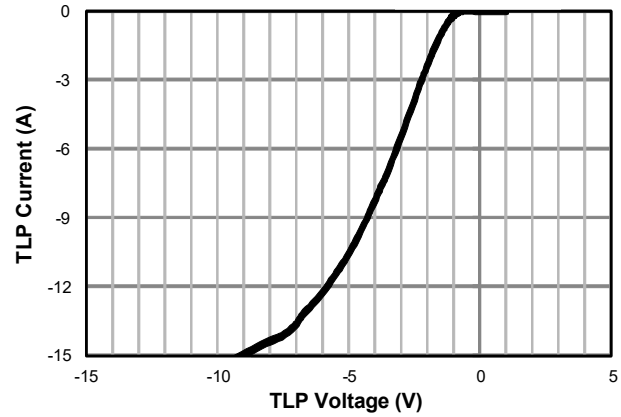
- 3. These specifications are guaranteed by design and characterization.
- 4. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.

Typical Characteristics

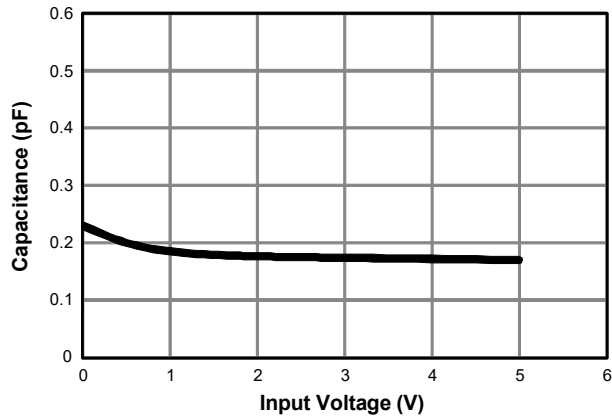
Positive Transmission Line Pulse
($T_P=100\text{ns}$, $T_R=0.2\text{ns}$)



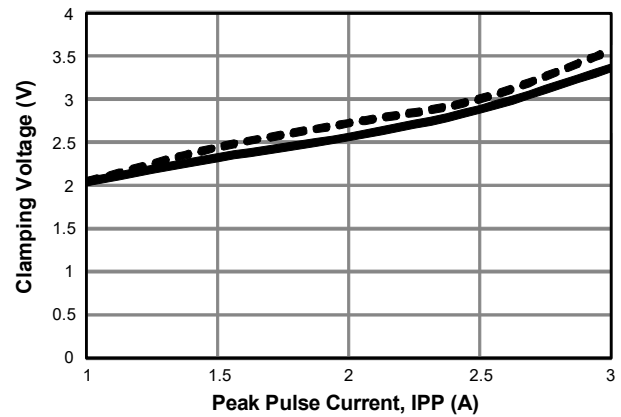
Negative Transmission Line Pulse
($T_P=100\text{ns}$, $T_R=0.2\text{ns}$)



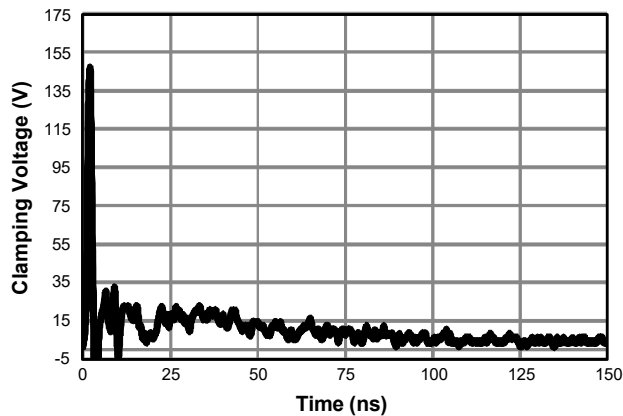
Typical Variations of C_J vs. Input Voltage



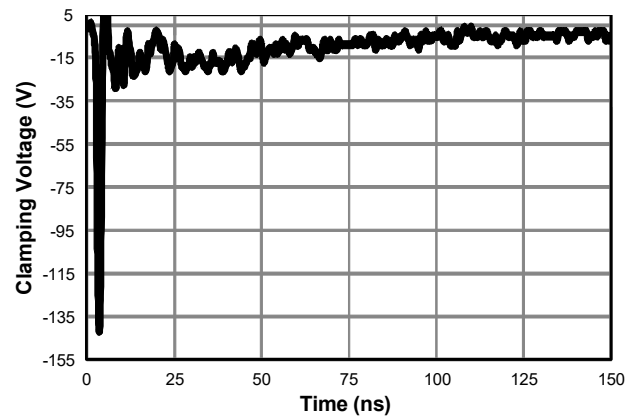
IEC61000-4-5 Surge 8/20us



+8kV ESD Clamping Per IEC 61000-4-2
(Contact, Any I/O to GND Pin)

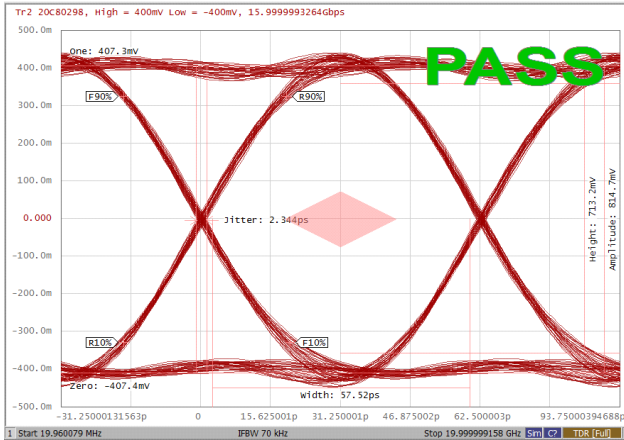


-8kV ESD Clamping Per IEC 61000-4-2
(Contact, Any I/O to GND Pin)

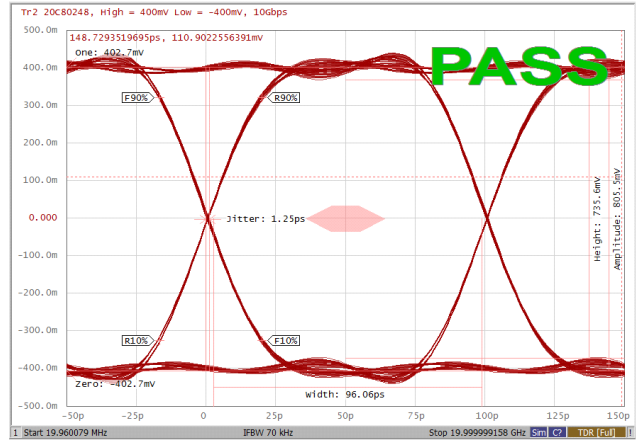


Typical Characteristics (Continued)

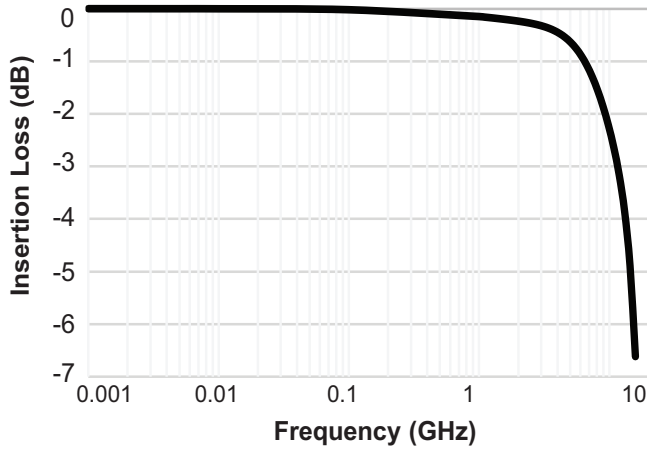
HDMI 2.1 Eye-Diagram (16 Gbps)



USB 3.1 Gen2 Eye-Diagram (10 Gbps)



Insertion Loss (S21, I/O to GND)



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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.