

General Description

The AOZ8310DI is a series of one-line, high-power transient voltage suppressor designed to protect power rail/bus from surge and ESD events, with an operating voltage range from 2.5V to 36V.

This device incorporates one unidirectional TVS diode in an ultra-small 1.6mm x 1.0mm DFN package. It may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge).

The AOZ8310DI comes in an RoHS compliant package and is rated over a -40°C to $+125^{\circ}\text{C}$ ambient temperature range.

Features

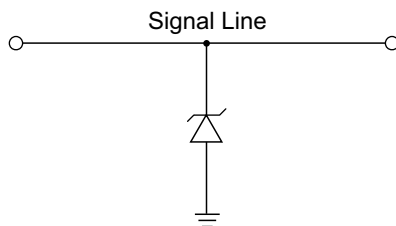
- Surge protection for power rail
- IEC 61000-4-5 8/20 μs 22-85A
- IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (air and contact)
- Human body model (HBM) $\pm 30\text{kV}$
- IEC 61000-4-4 (EFT) 80A (5/50ns)
- Peak pulse power 1100W to 1500W
- Operating voltage: 2.5V, 5V, 8V, 9V, 12V, 18V, 20V, 26V, 36V
- Green product

Applications

- USB voltage bus
- Battery protection
- Mobile devices
- Screen panels
- Other power rails

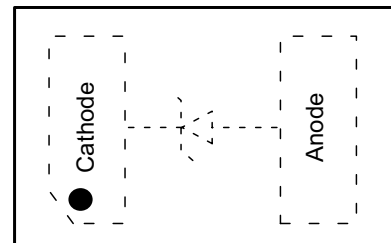


Typical Application



Unidirection Protection of Single Line

Pin Configuration



DFN1.6x1.0_2L

Ordering Information

| Part Number | Ambient Temperature Range | Package | Environmental |
|--------------|---------------------------|----------------------|---------------|
| AOZ8310DI-02 | -40°C to +125°C | 1.6mm x 1.0mm DFN-2L | Green Product |
| AOZ8310DI-05 | | | |
| AOZ8310DI-08 | | | |
| AOZ8310DI-09 | | | |
| AOZ8310DI-12 | | | |
| AOZ8310DI-18 | | | |
| AOZ8310DI-20 | | | |
| AOZ8310DI-26 | | | |
| AOZ8310DI-36 | | | |



AOS Green Products use reduced levels of Halogens, and are also RoHS compliant.

Please visit www.aosmd.com/media/AOSGreenPolicy.pdf for additional information.

Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage the device.

| Parameter | Rating |
|---|-----------------|
| VP-VN | 2.5V to 36V |
| Peak Pulse Current (I_{PP}), $t_P = 8/20\mu s$ | 22A to 85A |
| Peak Pulse Power (P_{PP}), $t_P = 8/20\mu s$ | 1100W to 1500W |
| 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:

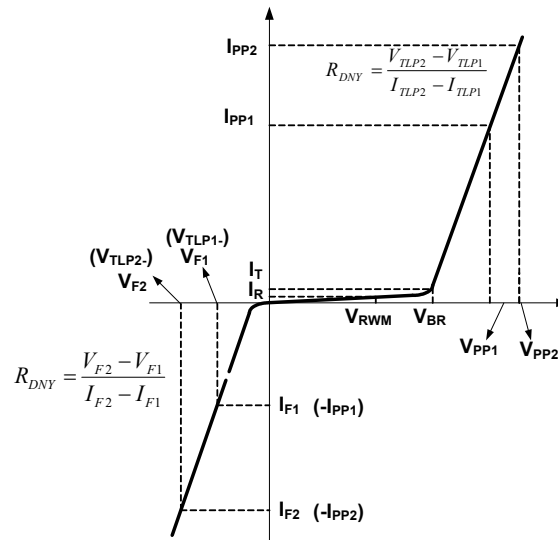
1. IEC 61000-4-2 discharge with $C_{Discharge} = 150pF$, $R_{Discharge} = 330\Omega$.

2. Human Body Discharge per MIL-STD-883, Method 3015 $C_{Discharge} = 100pF$, $R_{Discharge} = 1.5k\Omega$.

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.

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---------------------|--|--|------|-------------|-----------|----------|
| AOZ8310DI-02 | | | | | | |
| V_{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 2.5 | V |
| V_{BR} | Reverse Breakdown Voltage | $I_T = 1\text{mA}$, I/O Pin-to-Ground | 2.8 | 3.3 | 5 | V |
| I_R | Reverse Leakage Current | Max. V_{RWM} , I/O Pin-to-Ground | | 100 | 1000 | nA |
| I_{PP} | Peak Pulse Current | IEC61000-4-5, 8/20 μs , I/O Pin-to-Ground | | | 75 | A |
| V_{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | $I_{TLP} = 1\text{A}$ $I_{TLP} = -1\text{A}$ | | 4.5 -1 | 6 -2 | V |
| | | $I_{TLP} = 30\text{A}$ $I_{TLP} = -30\text{A}$ | | 5.5 -3.5 | 7.5 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20 μs , I/O Pin-to-Ground) | $I_{PP} = 10\text{A}$ $I_{PP} = -10\text{A}$ | | 5.5 -2.5 | 7.5 -4 | V |
| | | $I_{PP} = 75\text{A}$ $I_{PP} = -75\text{A}$ | | 13 -10 | 15 -12 | V |
| R_{DNY} | Dynamic Resistance ⁽³⁾ | $I_{TLP} = 1\text{A to } 30\text{A}$ $I_{TLP} = -1\text{A to } -30\text{A}$ | | 0.05 0.1 | | Ω |
| P_{PP} | Peak Pulse Power | IEC61000-4-5, 8/20 μs , I/O Pin-to-Ground | | | 1100 | W |
| C_J | Junction Capacitance | $V_{I/O} = 0\text{V}$, $f = 1\text{MHz}$, I/O Pin-to-Ground | | 100 | | pF |

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---------------------|--|--|------|--------------|------------|-------|
| AOZ8310DI-05 | | | | | | |
| V _{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 5 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 1mA, I/O Pin-to-Ground | 6 | 7.5 | 8.5 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} , I/O Pin-to-Ground | | 100 | 1000 | nA |
| I _{PP} | Peak Pulse Current | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 85 | A |
| V _{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | I _{TLP} = 1A I _{TLP} = -1A | | 8 -1 | 9.5 -2 | V |
| | | I _{TLP} = 30A I _{TLP} = -30A | | 9.5 -3.5 | 11 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20μs, I/O Pin-to- Ground) | I _{PP} = 20A I _{PP} = -20A | | 9.5 -2.5 | 11 -4 | V |
| | | I _{PP} = 85A I _{PP} = -85A | | 14.3 -6 | 16 -8 | V |
| R _{DNY} | Dynamic Resistance ⁽³⁾ | I _{TLP} = 1A to 30A I _{TLP} = -1A to -30A | | 0.05 0.09 | | Ω |
| P _{PP} | Peak Pulse Power | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 1500 | W |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz, I/O Pin-to-Ground | | 675 | | pF |
| AOZ8310DI-08 | | | | | | |
| V _{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 8 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 1mA, I/O Pin-to-Ground | 9 | 10 | 12 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} , I/O Pin-to-Ground | | 10 | 100 | nA |
| I _{PP} | Peak Pulse Current | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 70 | A |
| V _{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | I _{TLP} = 1A I _{TLP} = -1A | | 10.5 -0.9 | 12 -1.5 | V |
| | | I _{TLP} = 30A I _{TLP} = -30A | | 12 -3.7 | 13.5 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20μs, I/O Pin-to- Ground) | I _{PP} = 10A I _{PP} = -10A | | 12 -2.4 | 14 -4 | V |
| | | I _{PP} = 70A I _{PP} = -70A | | 21 -9 | 24 -11 | V |
| R _{DNY} | Dynamic Resistance ⁽³⁾ | I _{TLP} = 1A to 30A I _{TLP} = -1A to -30A | | 0.05 0.1 | | Ω |
| P _{PP} | Peak Pulse Power | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 1500 | W |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz, I/O Pin-to-Ground | | 425 | | pF |

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---------------------|--|--|------|--------------|-------------|-------|
| AOZ8310DI-09 | | | | | | |
| V _{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 9 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 1mA, I/O Pin-to-Ground | 10 | 11 | 13 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} , I/O Pin-to-Ground | | 10 | 100 | nA |
| I _{PP} | Peak Pulse Current | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 65 | A |
| V _{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | I _{TLP} = 1A I _{TLP} = -1A | | 11.5 -0.9 | 13 -1.5 | V |
| | | I _{TLP} = 30A I _{TLP} = -30A | | 13.3 -3.7 | 15 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20μs, I/O Pin-to- Ground) | I _{PP} = 10A I _{PP} = -10A | | 13.5 -2.4 | 15 -4.5 | V |
| | | I _{PP} = 65A I _{PP} = -65A | | 21.5 -8.5 | 24 -10.5 | V |
| R _{DNY} | Dynamic Resistance ⁽³⁾ | I _{TLP} = 1A to 30A I _{TLP} = -1A to -30A | | 0.05 0.1 | | Ω |
| P _{PP} | Peak Pulse Power | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 1500 | W |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz, I/O Pin-to-Ground | | 385 | | pF |
| AOZ8310DI-12 | | | | | | |
| V _{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 12 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 1mA, I/O Pin-to-Ground | 13.2 | 15 | 17 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} , I/O Pin-to-Ground | | 5 | 100 | nA |
| I _{PP} | Peak Pulse Current | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 45 | A |
| V _{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | I _{TLP} = 1A I _{TLP} = -1A | | 15.5 -0.9 | 18 -1.5 | V |
| | | I _{TLP} = 30A I _{TLP} = -30A | | 17 -3.5 | 19 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20μs, I/O Pin-to- Ground) | I _{PP} = 10A I _{PP} = -10A | | 18 -2.4 | 21 -4.5 | V |
| | | I _{PP} = 45A I _{PP} = -45A | | 26 -6.8 | 30 -8.5 | V |
| R _{DNY} | Dynamic Resistance ⁽³⁾ | I _{TLP} = 1A to 30A I _{TLP} = -1A to -30A | | 0.05 0.1 | | Ω |
| P _{PP} | Peak Pulse Power | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 1500 | W |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz, I/O Pin-to-Ground | | 275 | | pF |

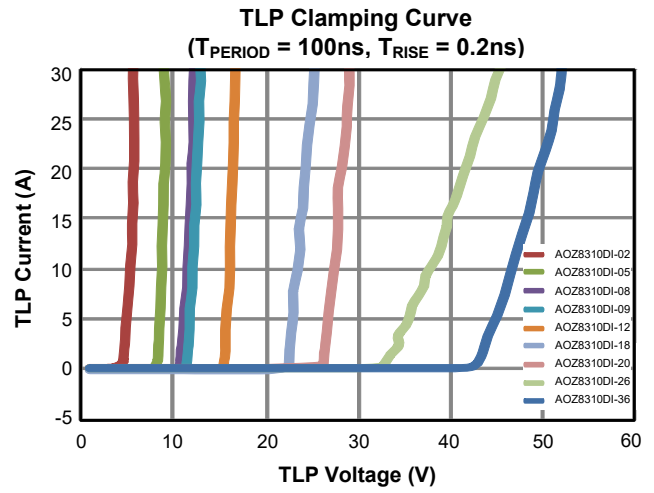
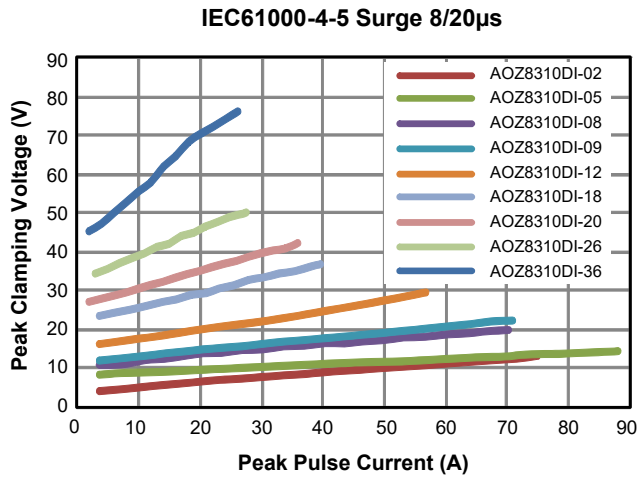
| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---------------------|--|--|------|--------------|------------|-------|
| AOZ8310DI-18 | | | | | | |
| V _{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 18 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 1mA, I/O Pin-to-Ground | 19 | 21.5 | 24 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} , I/O Pin-to-Ground | | 10 | 100 | nA |
| I _{PP} | Peak Pulse Current | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 35 | A |
| V _{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | I _{TLP} = 1A I _{TLP} = -1A | | 22 -1 | 24 -2 | V |
| | | I _{TLP} = 30A I _{TLP} = -30A | | 26 -4 | 29 -6 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20μs, I/O Pin-to- Ground) | I _{PP} = 10A I _{PP} = -10A | | 25 -2.5 | 29 -4.5 | V |
| | | I _{PP} = 35A I _{PP} = -35A | | 35 -6 | 39 -8 | V |
| R _{DNY} | Dynamic Resistance ⁽³⁾ | I _{TLP} = 1A to 30A I _{TLP} = -1A to -30A | | 0.1 0.1 | | Ω |
| P _{PP} | Peak Pulse Power | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 1200 | W |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz, I/O Pin-to-Ground | | 200 | | pF |
| AOZ8310DI-20 | | | | | | |
| V _{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 20 | V |
| V _{BR} | Reverse Breakdown Voltage | I _T = 1mA, I/O Pin-to-Ground | 22 | 25 | 28 | V |
| I _R | Reverse Leakage Current | Max. V _{RWM} , I/O Pin-to-Ground | | 2 | 100 | nA |
| I _{PP} | Peak Pulse Current | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 32 | A |
| V _{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | I _{TLP} = 1A I _{TLP} = -1A | | 25.5 -0.9 | 28 -1.5 | V |
| | | I _{TLP} = 30A I _{TLP} = -30A | | 29 -3.5 | 32 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20μs, I/O Pin-to- Ground) | I _{PP} = 5A I _{PP} = -5A | | 28 -2 | 31 -4 | V |
| | | I _{PP} = 32A I _{PP} = -32A | | 40 -5.5 | 44 -7.5 | V |
| R _{DNY} | Dynamic Resistance ⁽³⁾ | I _{TLP} = 1A to 30A I _{TLP} = -1A to -30A | | 0.12 0.1 | | Ω |
| P _{PP} | Peak Pulse Power | IEC61000-4-5, 8/20μs, I/O Pin-to-Ground | | | 1200 | W |
| C _J | Junction Capacitance | V _{I/O} = 0V, f = 1MHz, I/O Pin-to-Ground | | 165 | | pF |

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|---------------------|--|--|------|---------------|------------|----------|
| AOZ8310DI-26 | | | | | | |
| V_{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 26 | V |
| V_{BR} | Reverse Breakdown Voltage | $I_T = 1\text{mA}$, I/O Pin-to-Ground | 28 | 31 | 35 | V |
| I_R | Reverse Leakage Current | Max. V_{RWM} , I/O Pin-to-Ground | | 1 | 100 | nA |
| I_{PP} | Peak Pulse Current | IEC61000-4-5, 8/20 μs , I/O Pin-to-Ground | | | 25 | A |
| V_{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | $I_{TLP} = 1\text{A}$ $I_{TLP} = -1\text{A}$ | | 32 -0.9 | 35 -1.5 | V |
| | | $I_{TLP} = 30\text{A}$ $I_{TLP} = -30\text{A}$ | | 45 -4.5 | 50 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20 μs , I/O Pin-to-Ground) | $I_{PP} = 5\text{A}$ $I_{PP} = -5\text{A}$ | | 36 -2 | 40 -4 | V |
| | | $I_{PP} = 25\text{A}$ $I_{PP} = -25\text{A}$ | | 50 -5.5 | 55 -7.5 | V |
| R_{DNY} | Dynamic Resistance ⁽³⁾ | $I_{TLP} = 1\text{A to } 25\text{A}$ $I_{TLP} = -1\text{A to } -25\text{A}$ | | 0.45 -0.12 | | Ω |
| P_{PP} | Peak Pulse Power | IEC61000-4-5, 8/20 μs , I/O Pin-to-Ground | | | 1200 | W |
| C_J | Junction Capacitance | $V_{I/O} = 0\text{V}$, $f = 1\text{MHz}$, I/O Pin-to-Ground | | 150 | | pF |
| AOZ8310DI-36 | | | | | | |
| V_{RWM} | Reverse Working Voltage | I/O Pin-to-Ground | | | 36 | V |
| V_{BR} | Reverse Breakdown Voltage | $I_T = 1\text{mA}$, I/O Pin-to-Ground | 37 | 39 | 44 | V |
| I_R | Reverse Leakage Current | Max. V_{RWM} , I/O Pin-to-Ground | | 10 | 100 | nA |
| I_{PP} | Peak Pulse Current | IEC61000-4-5, 8/20 μs , I/O Pin-to-Ground | | | 22 | A |
| V_{CL} | Clamping Voltage ⁽³⁾ (100ns Transmission Line Pulse, I/O Pin-to-Ground) | $I_{TLP} = 1\text{A}$ $I_{TLP} = -1\text{A}$ | | 43 -1 | 47 -2 | V |
| | | $I_{TLP} = 30\text{A}$ $I_{TLP} = -30\text{A}$ | | 52 -3.5 | 56 -5 | V |
| | Clamping Voltage ⁽³⁾ (IEC61000-4-5 8/20 μs , I/O Pin-to-Ground) | $I_{PP} = 2\text{A}$ $I_{PP} = -2\text{A}$ | | 45 -1.3 | 48 -2 | V |
| | | $I_{PP} = 22\text{A}$ $I_{PP} = -22\text{A}$ | | 72 -4.3 | 77 -7 | V |
| R_{DNY} | Dynamic Resistance ⁽³⁾ | $I_{TLP} = 1\text{A to } 30\text{A}$ $I_{TLP} = -1\text{A to } -30\text{A}$ | | 0.28 0.1 | | Ω |
| P_{PP} | Peak Pulse Power | IEC61000-4-5, 8/20 μs , I/O Pin-to-Ground | | | 1500 | W |
| C_J | Junction Capacitance | $V_{I/O} = 0\text{V}$, $f = 1\text{MHz}$, I/O Pin-to-Ground | | 130 | | pF |

Note:

3. These specifications are guaranteed by design and characterization.

Typical Characteristics



LEGAL DISCLAIMER

Applications or uses as critical components in life support devices or systems are not authorized. AOS does not assume any liability arising out of such applications or uses of its products. AOS reserves the right to make changes to product specifications without notice. It is the responsibility of the customer to evaluate suitability of the product for their intended application. Customer shall comply with applicable legal requirements, including all applicable export control rules, regulations and limitations.

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http://www.aosmd.com/terms_and_conditions_of_sale

LIFE SUPPORT POLICY

ALPHA AND OMEGA SEMICONDUCTOR PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
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.



| | |
|--------------|----------------------------------|
| Document No. | PD-02811 |
| Version | A |
| Title | AOZ8310DI-18 Marking Description |

DFN1.6x1.0 Power IC PACKAGE MARKING DESCRIPTION



Green product

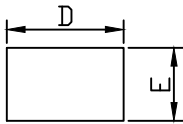
NOTE:
P - Part number code
W - Week code
L - Assembly lot code

| PART NO. | DESCRIPTION | CODE |
|--------------|---------------|------|
| AOZ8310DI-18 | Green product | H |



| | |
|--------------|----------|
| Document No. | PO-00269 |
| Version | B |

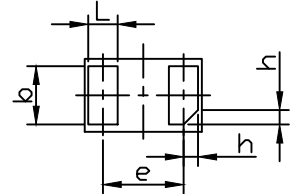
DFN1.6x1.0_2L_EP2_S PACKAGE OUTLINE



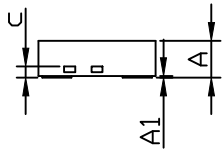
TOP VIEW



SIDE VIEW

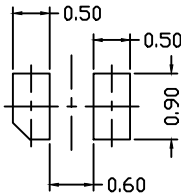


BOTTOM VIEW



SIDE VIEW

RECOMMENDED LAND PATTERN



| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---------|---------------------------|------|------|----------------------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.45 | 0.50 | 0.55 | 0.018 | 0.020 | 0.022 |
| A1 | --- | 0.02 | 0.05 | ---- | 0.001 | 0.002 |
| b | 0.75 | 0.80 | 0.85 | 0.030 | 0.031 | 0.033 |
| c | 0.10 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| D | 1.55 | 1.60 | 1.65 | 0.061 | 0.063 | 0.065 |
| e | 1.10 BSC | | | 0.043 BSC | | |
| E | 0.95 | 1.00 | 1.05 | 0.037 | 0.039 | 0.041 |
| L | 0.35 | 0.40 | 0.45 | 0.014 | 0.016 | 0.018 |
| h | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |

UNIT: mm

NOTE

1. CONTROLLING DIMENSION IS MILLIMETER.
CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.
2. TOLERANCE ± 0.05 UNLESS OTHERWISE SPECIFIED.
3. RADIUS ON ALL CORNER ARE 0.152 MAX., UNLESS OTHERWISE SPECIFIED.
4. PACKAGE WARPAGE: 0.012 MAX.
5. NO ANY PLASTIC FLASH ALLOWED ON THE TOP AND BOTTOM LEAD SURFACE.
6. PAD PLANARITY: ± 0.102
7. CRACK BETWEEN PLASTIC BODY AND LEAD IS NOT ALLOWED.



Alpha & Omega Semiconductor Product Reliability Report

AOZ8310DI-18, rev B

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for AOZ8310DI-18. Accelerated environmental tests are performed on a specific sample size, and then followed by electrical test at end point. Review of final electrical test result confirms that AOZ8310DI-18 passes AOS quality and reliability requirements. The released product will be categorized by the process family and be routine monitored for continuously improving the product quality.

I. Reliability Stress Test Summary and Results

| Test Item | Test Condition | Time Point | Total Sample Size | Number of Failures | Reference Standard |
|-----------------------|--|-------------|-------------------|--------------------|--------------------|
| HTRB | Temp = 150°C , Vdd=100% of VRWMmax | 1000 hours | 693 pcs | 0 | JESD22-A108 |
| Precondition (Note A) | 168hr 85°C / 85%RH + 3 cycle reflow@260°C | - | 1617 pcs | 0 | JESD22-A113 |
| HAST | 130°C , 85%RH, 33.3 psia, Vdd = 80% of VRWMmax | 96 hours | 693 pcs | 0 | JESD22-A110 |
| Autoclave | 121°C , 29.7psia, RH=100% | 96 hours | 693 pcs | 0 | JESD22-A102 |
| Temperature Cycle | -65°C to 150°C , air to air | 1000 cycles | 231 pcs | 0 | JESD22-A104 |

Note: The reliability data presents total of available generic data up to the published date.
Note A: MSL (Moisture Sensitivity Level) 1 based on J-STD-020

II. Reliability Evaluation

FIT rate (per billion): 5.09
MTTF = 22440 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size. Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

Failure Rate = $\text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 5.09$
MTTF = $10^9 / \text{FIT} = 22440$ years

Chi² = Chi Squared Distribution, determined by the number of failures and confidence interval

N = Total Number of units from burn-in tests

H = Duration of burn-in testing

Af = Acceleration Factor from Test to Use Conditions (Ea = 0.7eV and Tuse = 55°C)

Acceleration Factor [**Af**] = **Exp** $[E_a / k (1/T_j u - 1/T_j s)]$

Acceleration Factor ratio list:

| | 55 deg C | 70 deg C | 85 deg C | 100 deg C | 115 deg C | 130 deg C | 150 deg C |
|-----------|------------|-----------|-----------|-----------|-------------|-------------|-----------|
| Af | 259 | 87 | 32 | 13 | 5.64 | 2.59 | 1 |

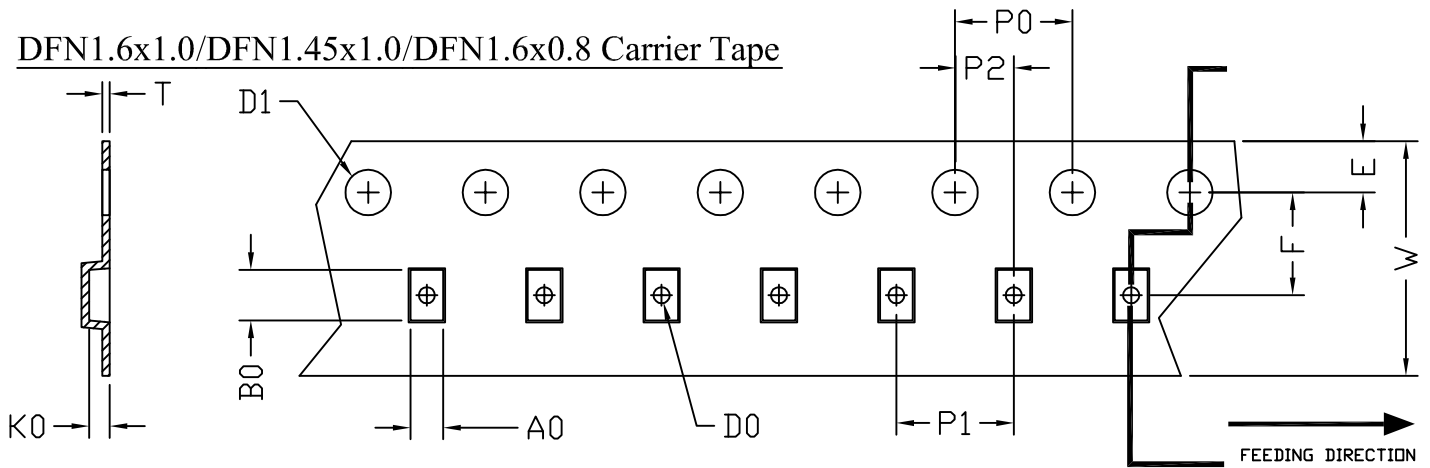
Tj s = Stressed junction temperature in degree (Kelvin), K = C+273.16

Tj u = The use junction temperature in degree (Kelvin), K = C+273.16

k = Boltzmann's constant, 8.617164 X 10⁻⁵eV / K



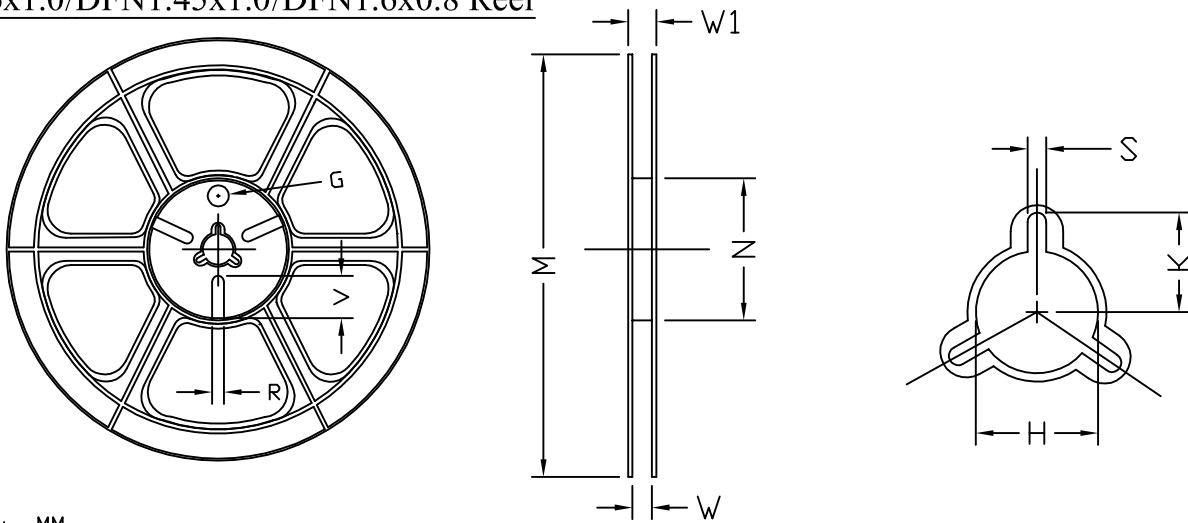
DFN1.6x1.0/DFN1.45x1.0/DFN1.6x0.8 Carrier Tape



UNIT: MM

| PACKAGE | | A0 | B0 | K0 | D0 | D1 | W | E | F | P0 | P1 | P2 | T |
|-------------|---------|---------------|---------------|---------------|------------------------|---------------|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| DFN1.6x1.0 | OPTION1 | 1.07 | 1.67 | 0.65 | 0.40 | 1.45 | 7.80 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 0.18 |
| DFN1.6x0.8 | | ~1.35 | ~1.90 | ~0.90 | ~0.60 | ~1.65 | ~8.30 | ±0.10 | ±0.05 | ±0.10 | ±0.10 | ±0.05 | ~0.30 |
| DFN1.45x1.0 | | | | | | | | | | | | | |
| DFN1.6x1.0 | OPTION2 | 1.15 ±0.05 | 1.75 ±0.05 | 0.63 ±0.05 | 0.60 +0.10 -0.00 | 1.55 ±0.10 | 8.00 +0.20 -0.10 | 1.75 ±0.10 | 3.50 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 0.20 ±0.03 |

DFN1.6x1.0/DFN1.45x1.0/DFN1.6x0.8 Reel



UNIT: MM

| TAPE SIZE | REEL SIZE | M | N | W | W1 | H | K | S | G | R | V |
|-----------|-----------|--------------|---------------|-------------|-----|-----------------------|---------------|---------------|------|-----|-----|
| 8 mm | ∅178 | ∅178 ±1.0 | ∅52.0 ±1.0 | 9.0 ±0.5 | N/A | ∅13.0 +0.5 -0.2 | 10.25 ±0.2 | 2.40 ±0.10 | ∅9.8 | N/A | N/A |

DFN1.6x1.0/DFN1.45x1.0/DFN1.6x0.8 Tape

Leader / Trailer
& Orientation

Unit Per Reel:
3000pcs

