# AOZ8937DI

## 7-Channel Combo TVS

## General Description

The AOZ8937DI is a 7-channel combo transient voltage suppressor array designed to protect high-speed data lines such as USB3.1, Thunderbolt, Displayport, and VBUS from damaging ESD events.

This device incorporates 6 channels for high speed data lines and 1 channel for VBUS.

The AOZ8937DI comes in a RoHS compliant and Halogen Free DFN4.1x2.0 package and is rated for -40°C to +125°C junction temperature range.

## Features

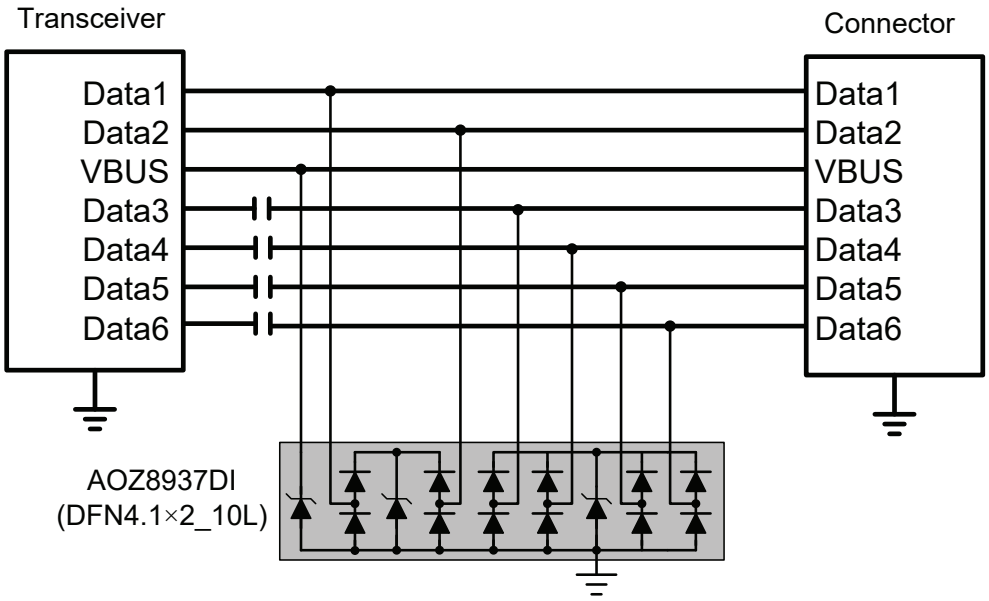
- IEC61000-4-2, ESD immunity (Contact/Air)
  - ± 12/15 kV (High Speed Data lines)
  - ± 30/30 kV (VBUS)
- IEC61000-4-5, Surge Immunity (8/20μs)
  - ± 3 A (High Speed Data lines)
  - ± 5 A (VBUS).
- Capacitance between I/O to GND
  - 0.3 pF (High Speed Data lines)
  - 16 pF (VBUS)

## Applications

- USB3.1/3.2&USB2.0
- Thunderbolt
- Displayport
- Notebook computers

Green Product

## Typical Application

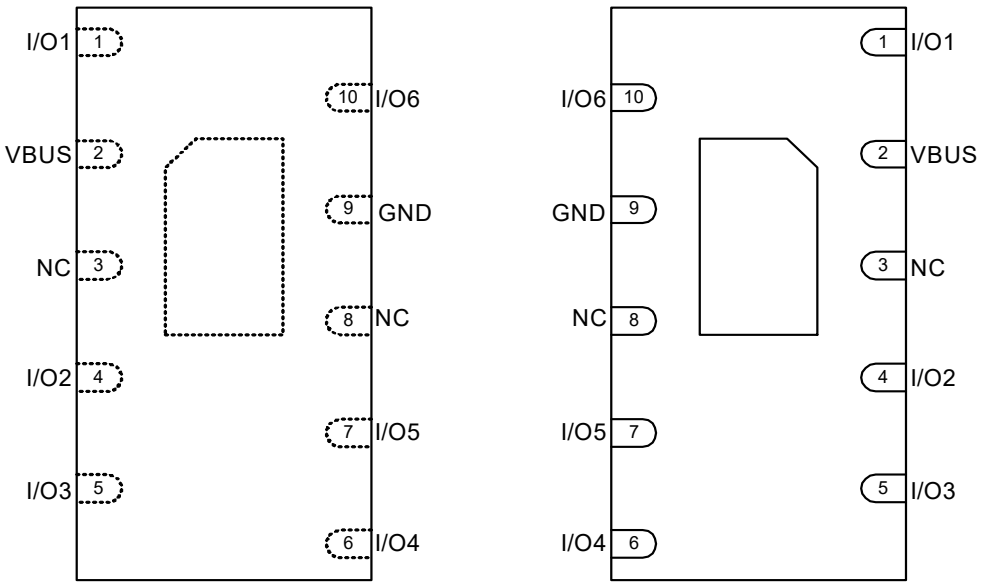


## Ordering Information

| Part Number | Ambient Temperature Range | Package | Environmental |
|---|---|---|---|
| AOZ8937DI | -40°C to +125°C | DFN4.1X2_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




Top View Bottom View

## Absolute Maximum Ratings

*Exceeding the Absolute Maximum ratings may damage the device.*

| Parameter | Rating | |
|---|---|---|
| | **I/O1 to I/O6 (Pin 1, 4, 5, 6, 7,10)** | **VBUS (Pin2)** |
| Storage Temperature ($T_S$) | -65°C to +150°C | -65 °C to +150°C |
| ESD Rating per IEC61000-4-2, contact[1] | ±12kV | ±30kV |
| ESD Rating per IEC61000-4-2, air[1] | ±15kV | ±30kV |
| 8/20µs Surge IEC61000-4-5 | ±3 A | ±5 A |

**Notes:**

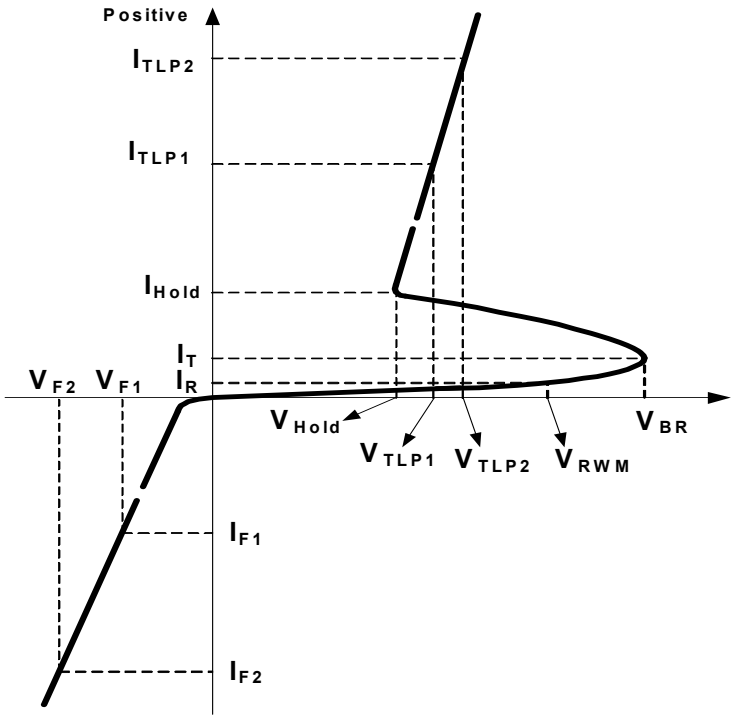
1. IEC 61000-4-2 discharge with $C_{Discharge}$ = 150pF, $R_{Discharge}$ = 330Ω.
2. Human Body Discharge per MIL-STD-883, Method 3015 $C_{Discharge}$ = 100pF, $R_{Discharge}$ = 1.5kΩ.

## Maximum Operating Ratings

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

## Electrical Characteristics

$T_A$ = 25°C unless otherwise specified. Any I/O Pin to GND.



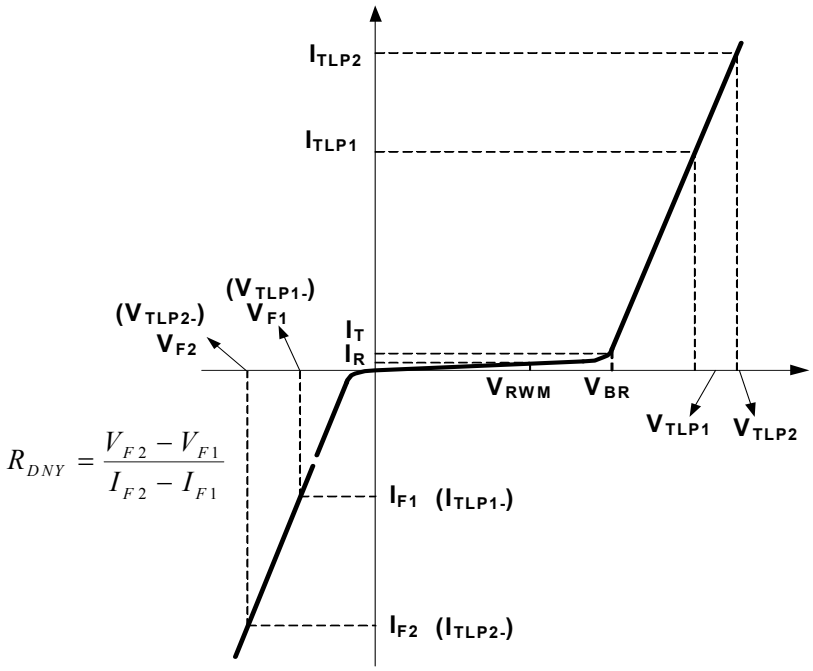

| I/O1 to I/O6 (Pin 1, 4, 5, 6, 7, 10) | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Parameter** | **Conditions** | **Min.** | **Typ.** | **Max.** | **Units** |
| $V_{RWM}$ | Reverse Working Voltage | | | | 5.5 | V |
| $V_{BR}$ | Reverse Breakdown Voltage | $I_T$ = 100µA | 6.5 | | | V |
| $I_R$ | Reverse Leakage Current | $V_T$ = Max. $V_{RWM}$ | | | 100 | µA |
| $V_F$ | Forward Voltage | | 0.7 | 0.85 | 0.95 | V |
| $V_{CL}$ | Clamping Voltage[3][4] (100ns Transmission Line Pulse) | $I_{TLP}$ = 1A<br>$I_{TLP}$ = -1A | | 3<br>-1 | 4<br>-2 | V |
| | | $I_{TLP}$ = 16A<br>$I_{TLP}$ = -16A | | 12<br>-8 | 15<br>-10 | |
| $R_{DYN}$ | Dynamic Resistance[3][4] | $I_{TLP}$ = 8A to 16A<br>$I_{TLP}$ = -8A to -16A | | 0.35<br>0.40 | | Ω |
| $I_{PP}$ | Peak Pulse Current[3] IEC61000-4-5 Surge 8/20µs | | | | ±3 | A |
| $V_{CL}$ | Clamping Voltage[3] IEC61000-4-5 Surge 8/20µs | $I_{PP}$ = 1A<br>$I_{PP}$ = -1A | | 2<br>-1.8 | | V |
| | | $I_{PP}$ = 3A<br>$I_{PP}$ = -3A | | 3.7<br>-3 | | |
| $C_j$ | Junction Capacitance | $V_{I/O}$ = 0V, f = 1MHz | | 0.3 | 0.45 | pF |

**Notes:**

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

## Electrical Characteristics

$T_A$ = 25°C unless otherwise specified. Any I/O Pin to GND.



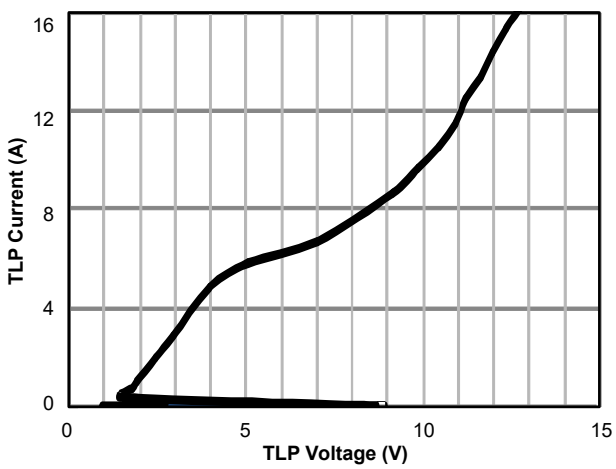

| VBUS (Pin 2) | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | **Parameter** | **Conditions** | **Min.** | **Typ.** | **Max.** | **Units** |
| $V_{RWM}$ | Reverse Working Voltage | | | | 5.5 | V |
| $V_{BR}$ | Reverse Breakdown Voltage | $I_T$ = 1mA | 6 | | | V |
| $I_R$ | Reverse Leakage Current | $V_T$ = Max, $V_{RWM}$ | | | 1 | µA |
| $V_F$ | Forward Voltage | | 0.65 | 0.85 | 0.95 | V |
| $V_{CL}$ | Clamping Voltage(3)(4)<br>(100ns Transmission Line Pulse) | $I_{TLP}$ = 1A<br>$I_{TLP}$ = -1A | | 8<br>-1 | 10<br>-2 | V |
| | | $I_{TLP}$ = 16A<br>$I_{TLP}$ = -16A | | 10<br>-10 | 12<br>-15 | |
| $I_{PP}$ | Peak Pulse Current(3)<br>IEC61000-4-5 Surge 8/20µs | | | | ±5 | A |

**Notes:**

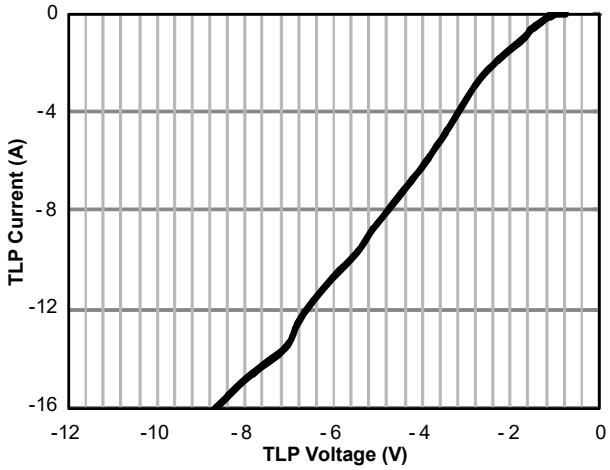
3. These specifications are guaranteed by design and characterization.
4. Measurements performed using a 100ns Transmission Line Pulse (TLP) system.

## Typical Performance Characteristics (I/O1 to I/O6)

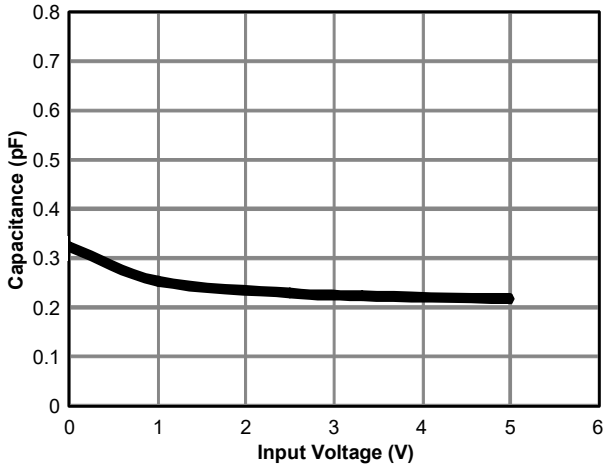
**Positive Transmission Line Pulse**
(tp=100ns, tr=0.2ns)



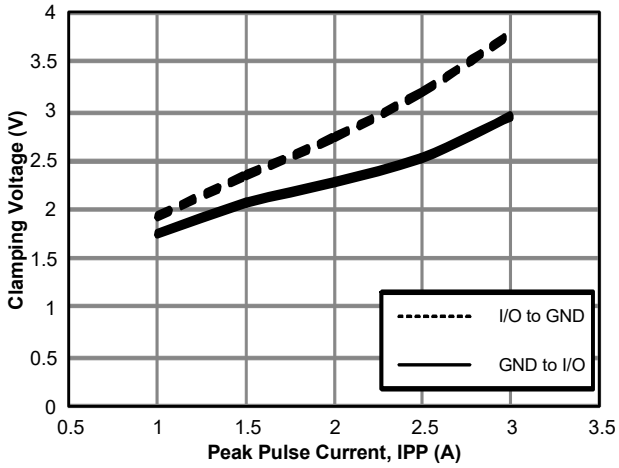

**Negative Transmission Line Pulse**
(tp=100ns, tr=0.2ns)



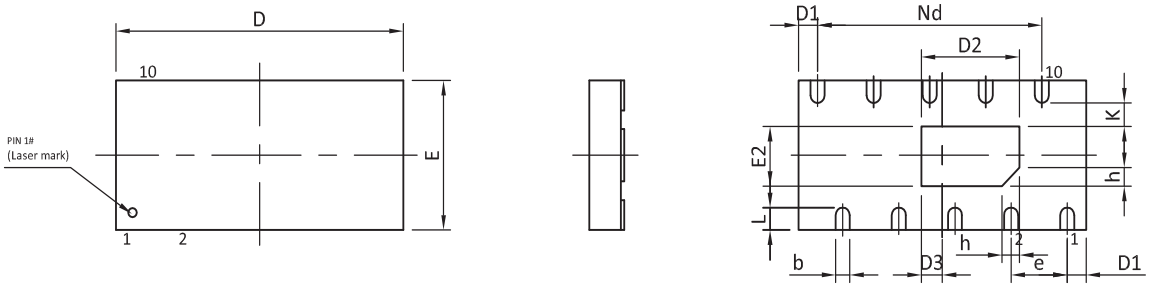

**Typical Variations of CJ vs. Input Voltage**



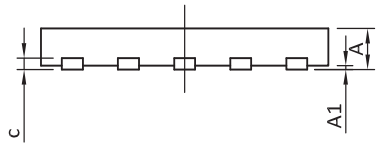

**IEC61000-4-5 Surge 8/20µs**



## Package Dimensions, DFN4.1x2.0-10L, EP1_S



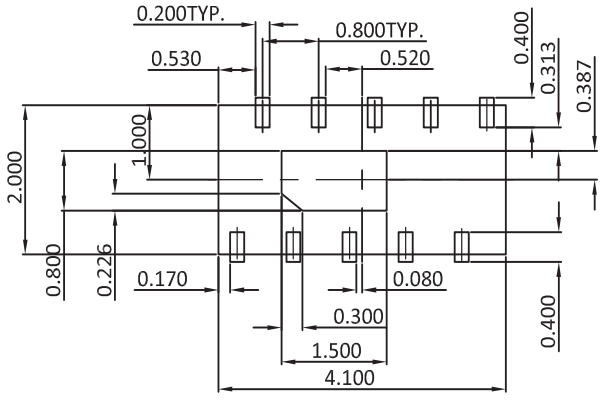

TOP VIEW SIDE VIEW BOTTOM VIEW




SIDE VIEW

| SYMBOLS | DIMENSION IN MILLIMETRES | | | DIMENSION IN INCHS | | |
|---|---|---|---|---|---|---|
| | 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 | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| c | 0.10 | 0.15 | 0.20 | 0.004 | 0.006 | 0.008 |
| D | 4.00 | 4.10 | 4.20 | 0.157 | 0.161 | 0.165 |
| D1 | 0.20 | 0.25 | 0.30 | 0.008 | 0.010 | 0.012 |
| D2 | 1.30 | 1.40 | 1.50 | 0.051 | 0.055 | 0.059 |
| D3 | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| e | 0.80 BSC | | | 0.031 BSC | | |
| Nd | 3.20 BSC | | | 0.126 BSC | | |
| E | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| E2 | 0.70 | 0.80 | 0.90 | 0.028 | 0.031 | 0.035 |
| K | 0.20 | --- | --- | 0.008 | ---- | ---- |
| L | 0.25 | 0.30 | 0.35 | 0.010 | 0.012 | 0.014 |
| h | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |

### LAND PATTERN RECOMMENDATIONS



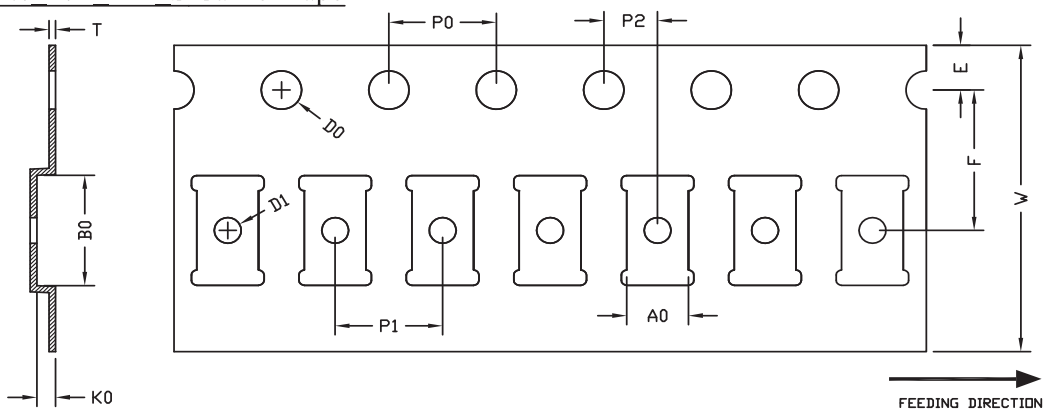

UNIT: mm

NOTES

1. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

## Tape and Reel Dimensions, DFN4.1x2.0-10L, EP1_S

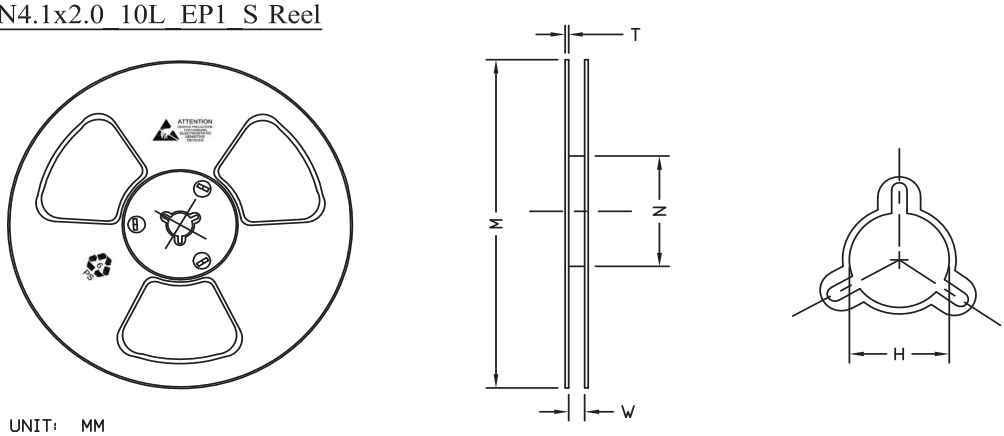
DFN4.1x2.0_10L_EP1_S Carrier Tape




UNIT: MM

| PACKAGE | A0 | B0 | K0 | D0 | D1 | W | E | F | P0 | P1 | P2 | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DFN4.1x2.0 | 2.30 ±0.05 | 4.30 ±0.05 | 0.70 ±0.05 | 1.50 +0.1 −0.0 | 1.00 Min. | 12.00 +0.30 −0.10 | 1.75 ±0.10 | 5.50 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 0.25 ±0.03 |

DFN4.1x2.0_10L_EP1_S Reel



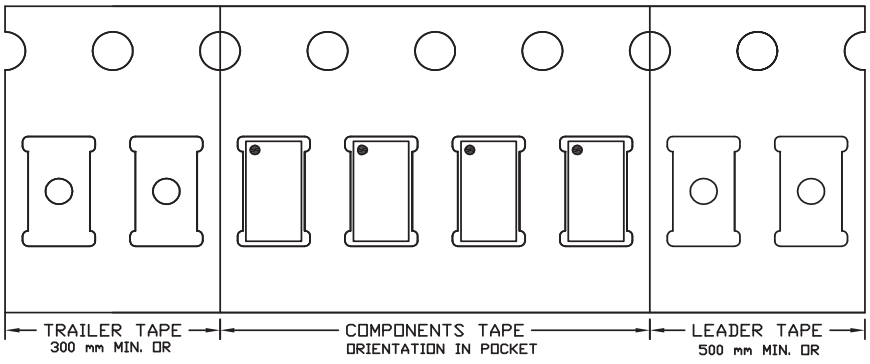

UNIT: MM

| TAPE SIZE | REEL SIZE | M | N | W | T | H | K | S | G | R | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 mm | ø329 | ø329.00 ±1.00 | ø100.00 ±1.00 | 12.80 ±1.00 | 2.00 ±0.30 | ø13.30 ±0.30 | --- | --- | --- | --- | --- |

DFN4.1x2.0_10L_EP1_S Package Tape

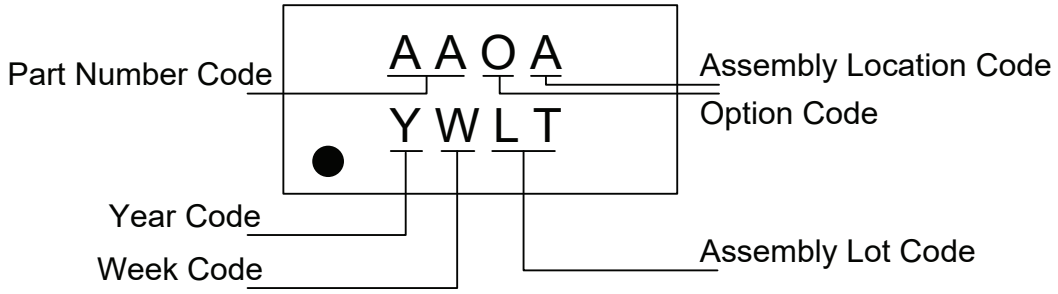
Leader / Trailer & Orientation

Unit Per Reel: 6000pcs



## Part Marking

**AOZ8937DI**
**(DFN4.1x2.0_10L)**



单击下面可查看定价，库存，交付和生命周期等信息

>>AOS(万代)