

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

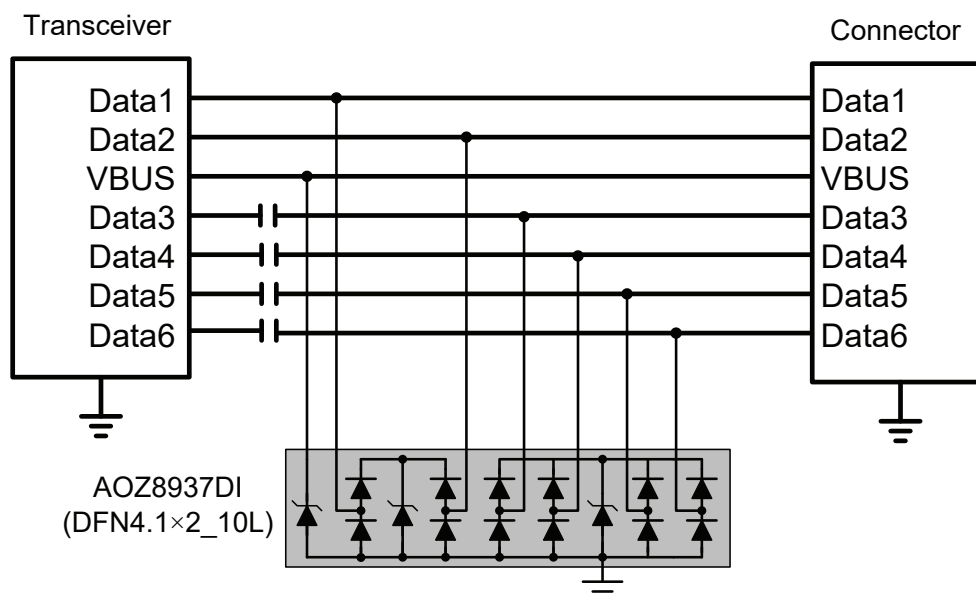
- IEC61000-4-2, ESD immunity (Contact/Air)
 - $\pm 12/15$ kV (High Speed Data lines)
 - $\pm 30/30$ kV (VBUS)
- IEC61000-4-5, Surge Immunity (8/20 μ s)
 - ± 3 A (High Speed Data lines)
 - ± 5 A (VBUS).
- Capacitance between I/O to GND
 - 0.3 pF (High Speed Data lines)
 - 16 pF (VBUS)

Applications

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



Typical Application



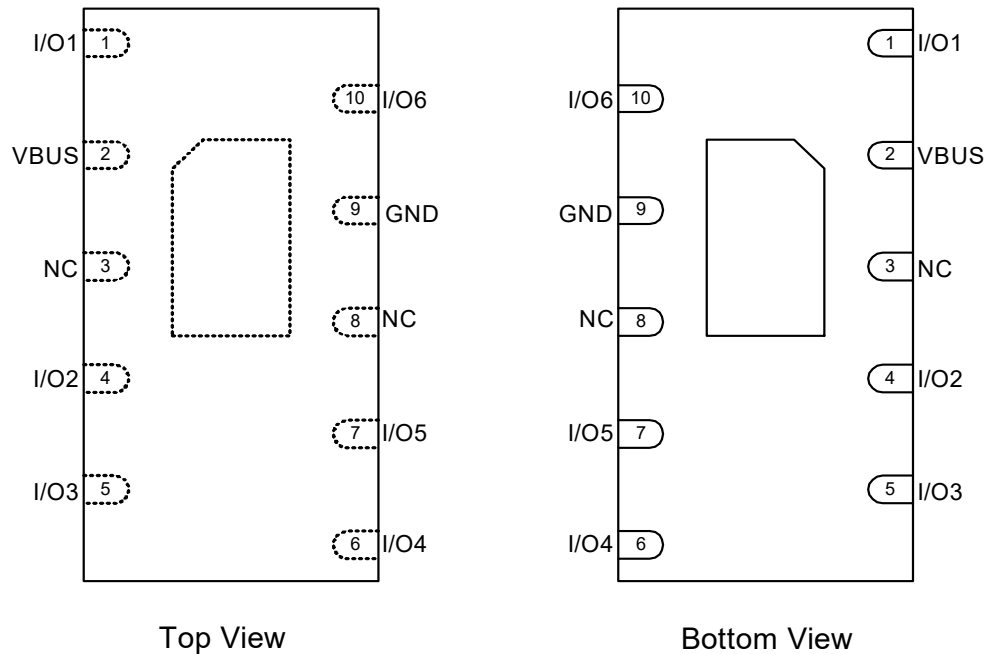
Ordering Information

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



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:

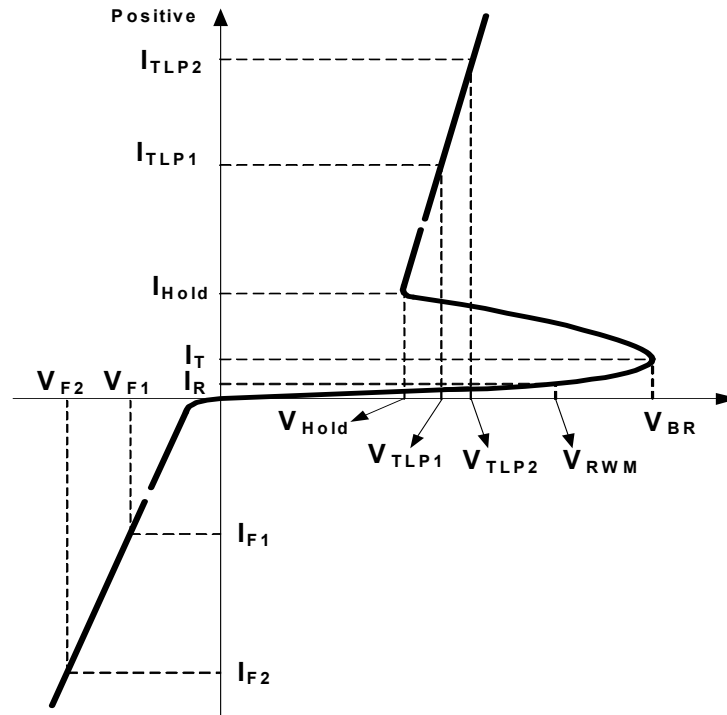
- IEC 61000-4-2 discharge with C_{Discharge} = 150pF, R_{Discharge} = 330Ω.
- Human Body Discharge per MIL-STD-883, Method 3015 C_{Discharge} = 100pF, R_{Discharge} = 1.5kΩ.

Maximum Operating Ratings

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

Electrical Characteristics

$T_A = 25^\circ\text{C}$ 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	$I_T = 100\mu\text{A}$	6.5			V
I_R	Reverse Leakage Current	$V_T = \text{Max. } V_{RWM}$			100	μA
V_F	Forward Voltage		0.7	0.85	0.95	V
V_{CL}	Clamping Voltage ⁽³⁾⁽⁴⁾ (100ns Transmission Line Pulse)	$I_{TLP} = 1\text{A}$ $I_{TLP} = -1\text{A}$		3 -1	4 -2	V
		$I_{TLP} = 16\text{A}$ $I_{TLP} = -16\text{A}$		12 -8	15 -10	
R_{DYN}	Dynamic Resistance ⁽³⁾⁽⁴⁾	$I_{TLP} = 8\text{A to } 16\text{A}$ $I_{TLP} = -8\text{A to } -16\text{A}$		0.35 0.40		Ω
I_{PP}	Peak Pulse Current ⁽³⁾ IEC61000-4-5 Surge 8/20 μs				± 3	A
V_{CL}	Clamping Voltage ⁽³⁾ IEC61000-4-5 Surge 8/20 μs	$I_{PP} = 1\text{A}$ $I_{PP} = -1\text{A}$		2 -1.8		V
		$I_{PP} = 3\text{A}$ $I_{PP} = -3\text{A}$		3.7 -3		
C_j	Junction Capacitance	$V_{I/O} = 0\text{V}, f = 1\text{MHz}$		0.3	0.45	pF

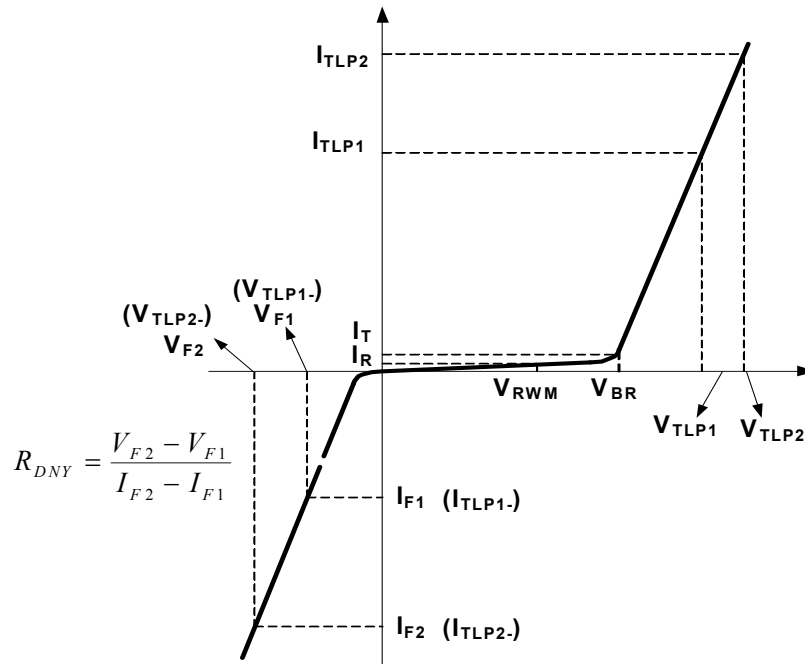
Notes:

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.



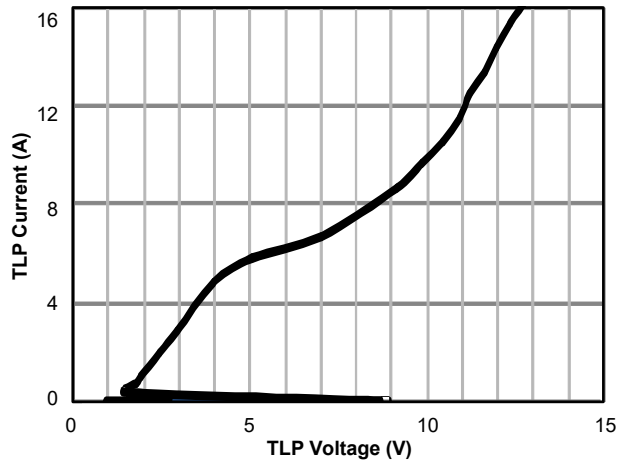
VBUS (Pin 2)						
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{RWM}	Reverse Working Voltage				5.5	V
V_{BR}	Reverse Breakdown Voltage	$I_T = 1\text{mA}$	6			V
I_R	Reverse Leakage Current	$V_T = \text{Max}, V_{RWM}$			1	μA
V_F	Forward Voltage		0.65	0.85	0.95	V
V_{CL}	Clamping Voltage ⁽³⁾⁽⁴⁾ (100ns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

Notes:

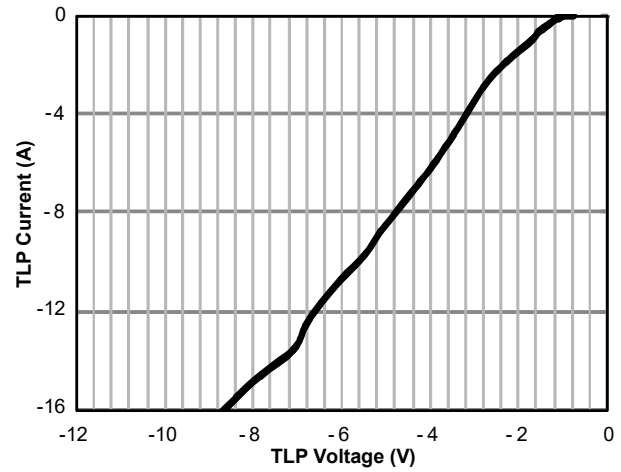
- These specifications are guaranteed by design and characterization.
- Measurements performed using a 100ns Transmission Line Pulse (TLP) system.

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

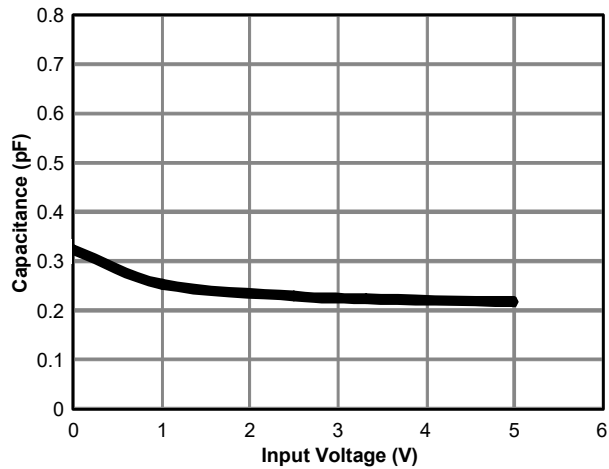
Positive Transmission Line Pulse
($t_p=100\text{ns}$, $t_r=0.2\text{ns}$)



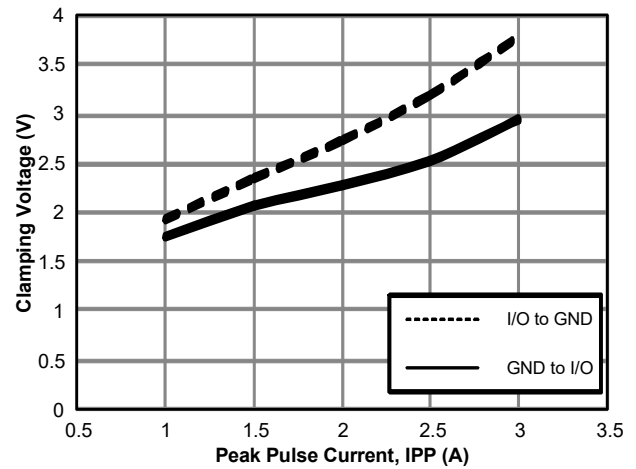
Negative Transmission Line Pulse
($t_p=100\text{ns}$, $t_r=0.2\text{ns}$)



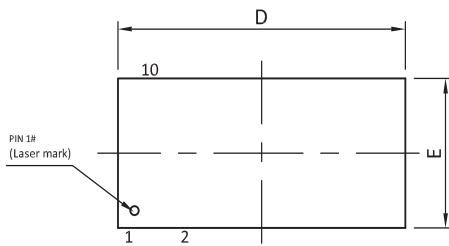
Typical Variations of CJ vs. Input Voltage



IEC61000-4-5 Surge 8/20 μ s



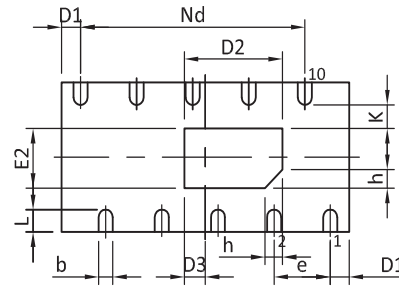
Package Dimensions, DFN4.1x2.0-10L, EP1_S



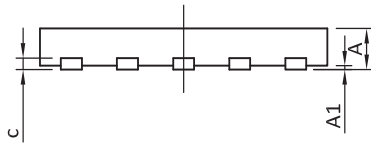
TOP VIEW



SIDE VIEW



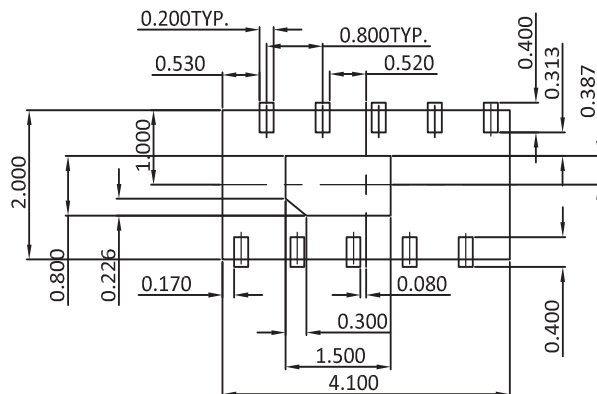
BOTTOM VIEW



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



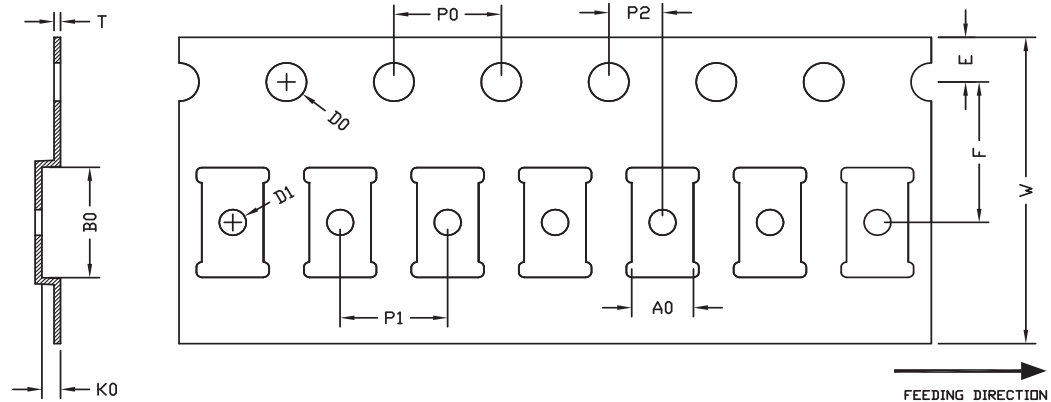
UNIT: mm

NOTES

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

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

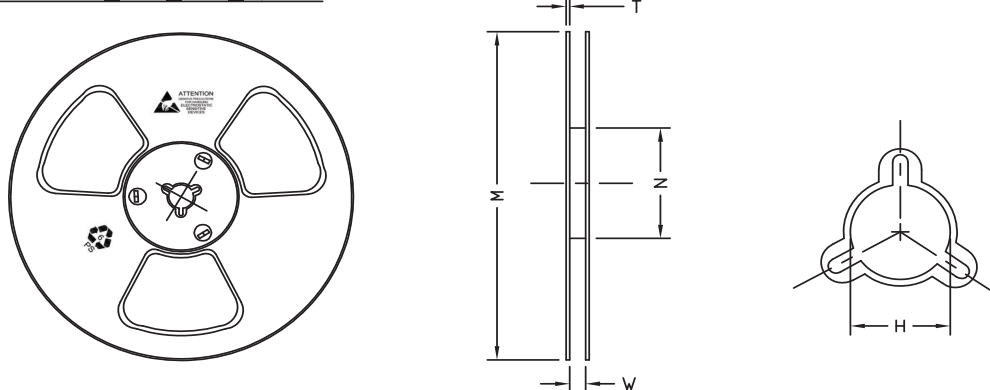
DFN4.1x2.0 10L EP1 S Carrier Tape



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



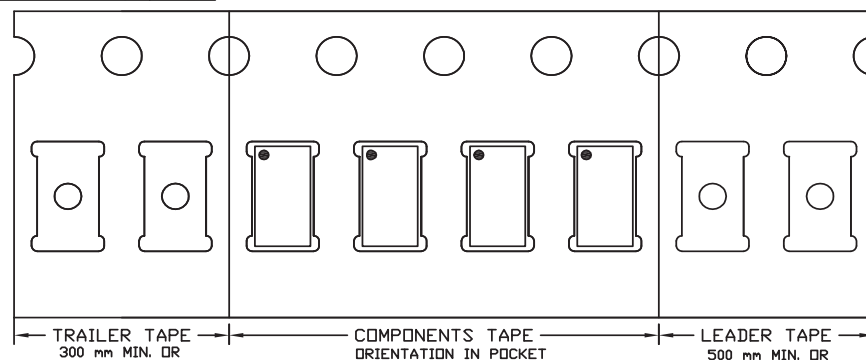
UNIT: MM

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

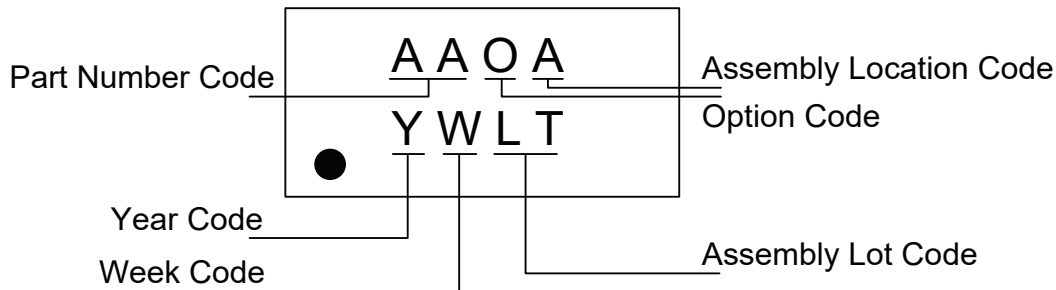
Leader / Trailer
& Orientation

Unit Per Reel:
6000pcs



Part Marking

AOZ8937DI
(DFN4.1x2.0_10L)



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.

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:

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.