ALPHA & OMEGA SEMICONDUCTOR

AOS Semiconductor
Product Reliability Report

AOZ8001DI, rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

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This AOS product reliability report summarizes the qualification result for AOZ8001DI. Review of the electrical test results confirm that AOZ8001DI pass AOS quality and reliability requirements for product release. The continuous qualification testing and reliability monitoring program ensure that all outgoing products will continue to meet AOS quality and reliability standards.

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I. Product Description:

The AOZ8001DI is a transient voltage suppressor array designed to protect high speed data lines from ESD and lightning.

-ROHS compliant
-Halogen free

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Details please refer to the datasheet.

II. Package and Die Information:

Product ID	AOZ8001DI
Process	HV003A1/HV003B1
Package Type	DFN 1.6x1.6
Lead Frame	Cu, NiPbAu
Die attach material	8006NS
Die bond wire	Au, 1 mil
MSL level	Up to Level 1

III. Qualification Tests Requirements

- 4 lots of AOZ8001DI up to 168/500hrs of HTRB for New Product release.
- 3 lots of package qual testing (PCT, 500 cycles TC, HAST) for package release to manufacturing.

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IV. Qualification Tests Result

Test Item	Test Condition	Sample Size	Result
Pre-Conditioning	**Per JESD 22-A113 168hrs @85 ℃ /85%RH+3 cyc reflow@260℃**	**3 lots (Sum of TC,PCT and HAST)**	**Pass**
HTRB	**Per JESD 22-A108_B Vdd= 6v Temp = 150℃**	**4 lots (77 /lot)**	**Pass**
Temperature Cycle	**'-65 °C to +150 °C, air to air (2cyc/hr)**	**3 lots (77 /lot)**	**Pass**
Pressure Pot	**121°C, 29.7psi, RH= 100%**	**3 lots (77 /lot)**	**Pass**
HAST	**'130 +/- 2°C, 85%RH, 33.3 psi, at VCC min power dissipation.**	**3 lot (55 /lot)**	**Pass**

V. Reliability Evaluation

FIT rate (per billion): 34
MTTF = 3311 years

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

Failure Rate = $Chi^2 \times 10^9$ **/ [**2 (N) (H) (Af)**]**
= 1.83×10^9 **/ [**2x (2x77x168+2x77x500) x258**]** = 34
MTTF = 10^9 / FIT = 2.90 $x10^7$hrs= 3311 years

Chi² = Chi Squared Distribution, determined by the number of failures and confidence interval
N = Total Number of units from HTRB tests
H = Duration of HTRB testing
Af = Acceleration Factor from Test to Use Conditions (Ea = 0.7eV and Tuse = 55℃)
Acceleration Factor [**Af**] = **Exp** [Ea / **k** (1/Tj u – 1/Tj 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	**258**	**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, 8.617164×10^{-5}eV / K