



AOS Semiconductor Product Reliability Report

AOZ8312DI, rev C

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for AOZ8312DI . 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 AOZ8312DI 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.

Table of Contents:

- I. Product Description
- II. Package and Die information
- III. Reliability Stress Test Summary and Results
- IV. Reliability Evaluation

I. Product Description:

The AOZ8312 is a transient voltage suppressor array designed to protect high speed data lines from ESD and lightning.

This AOZ8312 incorporates twelve 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 AOZ8312 may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 and IEC 61000-4-5.

The AOZ8312 comes in a Halogen Free and RoHS compliant 3.5 mm x 2.5 mm x 0.55 mm DFN-12 package.

The AOZ8312 is compatible with both lead free and SnPb assembly techniques. The small size, low capacitance and high ESD protection makes the AOZ8312 ideal for protecting high speed video and data communication interfaces

Details refer to the datasheet.

II. Die / Package Information:

	AOZ8312DI
Process	Standard sub-micron Low Capacitance TVS Diode
Package Type	DFN3.5x2.5 12 Leads
Lead Frame	Bare Cu
Die Attach	Ag Epoxy
Bond	Au Wire
Mold Material	Epoxy resin with silica filler
Moisture Level	Level 1

III. Reliability Stress Test Summary and Results

Test Item	Test Condition	Time Point	Total Sample Size	Number of Failures	Reference Standard
HTRB	Temp = 150°C , Vds=80% of Vbrmax	168 / 500 / 1000 hours	924 pcs	0	JESD22-A108
MSL Precondition	168hr 85°C / 85%RH + 3 cycle reflow @260°C (MSL 1)	-	1386 pcs	0	JESD22-A113
HAST	130°C , 85%RH, 33.3 psia, Vds = 80% of Vbrmax	96 hours	462 pcs	0	JESD22-A110
Autoclave	121°C , 29.7psia, RH=100%	96 hours	462 pcs	0	JESD22-A102
Temperature Cycle	-65°C to 150°C , air to air	250 / 500 cycles	462 pcs	0	JESD22-A104

Note: The reliability data presents total of available generic data up to the published date.

IV. Reliability Evaluation

FIT rate (per billion): 6.10

MTTF = 18700 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 = $\text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 6.10$

MTTF = $10^9 / \text{FIT} = 18700$ 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**] = $\text{Exp} [Ea / k (1/Tj u - 1/Tj s)]$

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	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, $8.617164 \times 10^{-5} \text{eV} / \text{K}$