



# ***Alpha & Omega Semiconductor Product Reliability Report***

**AOZ8S311UD4-03**, rev A

**Plastic Encapsulated Device**

**ALPHA & OMEGA Semiconductor, Inc**

**[www.aosmd.com](http://www.aosmd.com)**

This AOS product reliability report summarizes the qualification result for AOZ8S311UD4-03. 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 AOZ8S311UD4-03 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 ,<br>Vdd=100% of VRWMmax                | 168 / 500 /<br>1000 hours | 462 pcs           | 0                  | JESD22-A108        |
| Precondition<br>(Note A) | 168hr 85°C / 85%RH +<br>3 cycle reflow@260°C         | -                         | 1386 pcs          | 0                  | JESD22-A113        |
| HAST                     | 130°C , 85%RH,<br>33.3 psia,<br>Vdd = 80% of VRWMmax | 96 hours                  | 462 pcs           | 0                  | JESD22-A110        |
| Autoclave                | 121°C , 29.7psia,<br>RH=100%                         | 96 hours                  | 462 pcs           | 0                  | JESD22-A102        |
| Temperature<br>Cycle     | -65°C to 150°C ,<br>air to air                       | 250 / 500<br>cycles       | 462 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): 7.63**

**MTTF = 14960 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** =  $\text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 7.63$

**MTTF** =  $10^9 / \text{FIT} = 14960$  years

**Chi<sup>2</sup>** = 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 |
|-----------|------------|-----------|-----------|-----------|-------------|-------------|-----------|
| <b>Af</b> | <b>259</b> | <b>87</b> | <b>32</b> | <b>13</b> | <b>5.64</b> | <b>2.59</b> | <b>1</b>  |

**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<sup>-5</sup>eV / K