



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

**AOZ8S322US2-05**, 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 AOZ8S322US2-05. 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 AOZ8S322US2-05 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 , Vdd=100% of VRWMmax	500 hrs	231 pcs	0	JESD22-A108
HAST	168hr 85°C / 85%RH + 3 cycle reflow @260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	130°C , 85%RH, 33.3 psia, Vdd = 80% of VRWMmax	96 hrs		0	ESD22-A110
Autoclave	168hr 85°C / 85%RH + 3 cycle reflow @260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	121°C , 29.7psia, RH=100%	96 hrs		0	JESD22-A102
Temperature Cycle	168hr 85°C / 85%RH + 3 cycle reflow @260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	-65°C to 150°C , air to air	500 cycles		0	JESD22-A104
HTSL	168hr 85°C / 85%RH + 3 cycle reflow @260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	Temp = 150°C	1000 hrs		0	JESD22-A103

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

\*: MSL (Moisture Sensitivity Level) 1 based on J-STD-020

## II. Reliability Evaluation

**FIT rate (per billion): 30.52**

**MTTF = 3740 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** =  $\text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 30.52$

**MTTF** =  $10^9 / \text{FIT} = 3740 \text{ years}$

**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**] = **Exp**  $[E_a / k (1/T_j u - 1/T_j s)]$

**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