Alpha & Omega Semiconductor Product Reliability qualification Report

AONS66814, rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

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This AOS product reliability report summarizes the qualification result for AONS66814. 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 AONS66814 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
HTGB	Temp = 175°C , Vgs=100% of Vgsmax	1000 hrs	231 pcs	0	JESD22-A108
HTRB	Temp = 175°C , Vds=100% of Vdsmax	1000 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, Vds = 80% of Vdsmax up to 42V	96 hrs		0	JESD22-A110
H3TRB	168hr 85°C / 85%RH + 3 cycle reflow@260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	85°C , 85%RH, Vds = 80% of Vdsmax	1000 hrs		0	JESD22-A101
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	1000 cycles		0	JESD22-A104
HTSL	168hr 85°C / 85%RH + 3 cycle reflow@260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	Temp = 175°C	1000 hrs		0	JESD22-A103
IOL	168hr 85°C / 85%RH + 3 cycle reflow@260°C (MSL 1)*	-	231 pcs	0	JESD22-A113
	∆ Tj = 100°C	15000 cycles		0	MIL-STD-750 Method 1037

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

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II. Reliability Evaluation

FIT rate (per billion): 2.61
MTTF = 43670 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 = $Chi^2 \times 10^9$ **/ [**2 (N) (H) (Af)**] =** 2.61
MTTF = 10^9 / FIT =43670 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**] = **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	125 deg C	150 deg C	175 deg C
Af	**758**	**256**	**95**	**38**	**9.7**	**2.9**	**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 X 10^{-5}eV / K