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Alpha & Omega Semiconductor Product Reliability Qualification Report

AONS36337, rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

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The report summarizes the AOS product reliability qualification results. Accelerated environmental tests are performed on a specific sample size and samples are electrically tested before and after each time point. Review of final electrical test results confirms that the product passes the AOS quality and reliability requirements based on **JEDEC** and may reference existing qualification results of similar products, which is justified by the structural similarity of the products. The released product will be categorized by its process family and routinely monitored for continuous improvement of 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 = 150°C Vgs=100% of Vgsmax	1000 hrs	231 pcs	0	JESD22-A108
HTRB	Temp = 150°C Vds=100% of Vdsmax	1000 hrs	231 pcs	0	JESD22-A108
Precondition	168hr, 85°C, 85%RH, 3 cycle reflow @ 260°C (MSL 1)	-	231*3 pcs	0	JESD22-A113 J-STD-020
HAST	130°C, 85%RH, 33.3 psia, Vds = 80% of Vdsmax up to 42V	96 hrs	231 pcs	0	JESD22-A110
Autoclave	121°C, 100%RH, 29.7psia	96 hrs	231 pcs	0	JESD22-A102
Temperature Cycle	-65°C to 150°C, air to air	1000 cycles	231 pcs	0	JESD22-A104

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

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.

At 60% Confidence Level
Failure Rate = $Chi^2 \times 10^9$ **/** **[**2 (N) (H) (Af)**] =** 7.63
MTTF = 10^9 / FIT = 14960 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 T_{use} = 55°C)
Acceleration Factor [**Af**] = **Exp** [Ea / **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
Af	259	87	32	13	5.64	2.59	1

T_J s = Stressed junction temperature in degree (Kelvin), K = C + 273.16
T_J u =The use junction temperature in degree (Kelvin), K = C + 273.16
k = Boltzmann's constant, 8.617164×10^{-5}eV / K