Alpha & Omega Semiconductor Product Reliability Qualification Report

ALD8S series, rev A

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for ALD8S series. 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 ALD8S series 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	BIAS @ (VR MAX) / T 175℃	1000 hrs	77 pcs	0	AEC-Q101
pre-conditioning	per JESD22-A113 spec.	/	231 pcs	0	JESD22-A113
PCT	Presure Cooker@121℃ / P=15PSIG	96 hrs	77 pcs	0	AEC-Q101
TC	Temp.:-55℃~150℃ ; time:15 min	1000 cycle	77 pcs	0	AEC-Q101
H3TRB	BIAS @ (VR MAX) / 85℃/85%RH	1000 hrs	77 pcs	0	AEC-Q101
Parametric verification	Electrical Initial Test@-55/25/175℃	/	25 pcs	0	AEC-Q101
DPA	per spec. 2 pcs from H3TRB and TC only	/	2 pcs	0	AEC-Q101
physical dimension	per datasheet spec.	/	30 pcs	0	AEC-Q101
terminal strength	MIL-STD-750 Method 2036	/	30 pcs	0	MIL-STD-750 Method 2036
RSH	Resistance to Soldering heat@ 260℃ /10 sec.	/	30 pcs	0	AEC-Q101
Solderability Test	Solderability test @ 245℃ / 5 sec. 95% solder coverage min.	/	10 pcs	0	AEC-Q101
Die shear	per MIL-STD-750 Method 2017 spec.	/	5 pcs	0	MIL-STD-750 Method 2017
lead free	2 plating house per AEC-Q005 & JESD201 spec. Temp. cycle @ -55℃ ~85℃ / 1000 cycle; Storage @ 55℃/85RH / 1000 hrs; Storage @ 30℃/60RH / 1000 hrs	/	≧3	0	AEC-Q005 & JESD201

Note: All parts were random selected from prod. Line and only lot.1 run all # test.

II. Reliability Evaluation

FIT rate (per billion): 15.68
MTTF = 7278 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)**] =** 15.68
MTTF = 10^9 / FIT = 7278 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

ALD8S series Part No. can refer to below table

SD8S22CA	**SD8S43A**	**SD8S16A**