ALPHA & OMEGA SEMICONDUCTOR

Alpha & Omega Semiconductor Product Reliability Qualification Report

AOZ23567QI rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

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This AOS product reliability report summarizes the qualification results for AOZ23567QI in QFN5x5-36L package. 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 confirm that AOZ23567QI pass the AOS quality and reliability requirements. The released products 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
HTOL	T_J = 125°C, V_{IN} = Vccmax	168 / 500 / 1000 hours	231 pcs	0	JESD22-A108
Preconditioning	T_A = 30°C, RH = 60% + 3 cycle reflow @ 260°C (MSL 3)	192 hours	231*4 pcs	0	JESD22-A113 J-STD-020
HAST	T_A = 130°C, RH = 85%, P = 33.3psia, V_{IN} = Vccmax	96 hours	231 pcs	0	JESD22-A110
Autoclave	T_A = 121°C, RH = 100%, P = 29.7psia	96 hours	231 pcs	0	JESD22-A102
Temperature Cycle	T_A = -65°C to 150°C, air to air	250 / 500 / 1000 cycles	231 pcs	0	JESD22-A104
HTSL	Temp = 150°C	500 / 1000 / hours	231 pcs	0	JESD22-A103

II. Reliability Evaluation

FIT rate (per billion): 50.97
MTTF = 2240 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)**] =** 50.97
MTTF = 10^9 / FIT = 2240 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	125 deg C
Af	77	26	9.8	3.9	1.7	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 X 10^{-5}eV / K

III. ESD and Latch Up Test Results

Test	Test Conditions	Total Sample Size	Number of Failures	Reference Standard
Electrostatic Discharge Human Body Model	**T_A = 25°C, +/-2kV**	**3**	**0**	**JS-001-2017**
Electrostatic Discharge Charged Device Model	**T_A = 25°C, +/-1kV**	**3**	**0**	**JS-002-2022**
Latch Up	**T_A = 25°C, +/-100mA,1.5xOV**	**6**	**0**	**JESD78**
Latch Up	**T_A = 125°C, +/-100mA,1.5xOV**	**6**	**0**	**JESD78**

(1) ATE results are used to determine PASS/FAIL. Parametric shift <10%.