

Alpha & Omega Semiconductor Product Reliability Report



Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification results for AOZ2152LQI-30 in QFN3x3-18L 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 AOZ2152LQI-30 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.

Test Item	Test Condition	Time Point	Total Sample Size	Number of Failures	Reference Standard
HTOL	T」= 125°C, V _{IN} = Vccmax	168 / 500 / 1000 hours	231 pcs	0	JESD22-A108
Preconditioning (Note A)	T _A = 30°C, RH = 60% + 3 cycle reflow @ 260°C (MSL 3)	192 hours	1155 pcs	0	JESD22-A113
HAST	T _A = 130°C, RH = 85%, P = 33.3psia, V _{IN} = Vccmax	96 hours	231 pcs	0	JESD22-A110
ТНВ	T _A = 85°C, RH = 85%, V _{IN} = Vccmax	168 / 500 / 1000 hours	231 pcs	0	JESD22-A101
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	168 / 500 / 1000 hours	231 pcs	0	JESD22-A103

I. Reliability Stress Test Summary and Results

Note: The reliability data presents total of available generic data up to the published date. Note A: MSL (Moisture Sensitivity Level) 3 based on J-STD-020

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

 Chi^2 = Chi Squared Distribution, determined by the number of failures and confidence interval N = Total Number of units from burn-in tests

 \mathbf{H} = Duration of burn-in testing

Af = Acceleration Factor from Test to Use Conditions (Ea = 0.7eV and $T_{use} = 55^{\circ}C$) 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

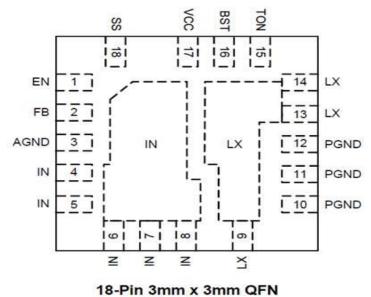
 $T_J u$ =The use junction temperature in degree (Kelvin), K = C + 273.16

 \mathbf{k} = Boltzmann's constant, 8.617164 X 10⁻⁵eV / K

Test	Test Conditions	Total Sample Size	Number of Failures	Reference Standard				
Electrostatic Discharge Human Body Model	T _A = 25°C, +/-2kV	3	0	JESD-A114				
Electrostatic Discharge Charged Device Model	T _A = 25°C, +/-1kV	3	0	JESD-C101				
Latch Up	T _A = 25°C, +/-200mA,30V	6	0	JESD78				
Latch Up	T _A = 85°C, +/-200mA,30V	6	0	JESD78				

III. ESD and Latch Up Test Results

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



(Top View)