

## Alpha & Omega Semiconductor Product Reliability Report

**AOZ2151EQI-31, rev A** 

**Plastic Encapsulated Device** 

**ALPHA & OMEGA Semiconductor, Inc** 

www.aosmd.com



This AOS product reliability report summarizes the qualification results for AOZ2151EQI-31 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 AOZ2151EQI-31 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 <sub>J</sub> = 125°C, V <sub>IN</sub> = Vccmax	168 / 500 / 1000 hours	231 pcs	0	JESD22-A108
Preconditioning (Note A)	T <sub>A</sub> = 30°C, RH = 60% + 3 cycle reflow @ 260°C (MSL 3)	192 hours	924 pcs	0	JESD22-A113
HAST	T <sub>A</sub> = 130°C, RH = 85%, P = 33.3psia, V <sub>IN</sub> = Vccmax	96 hours	231 pcs	0	JESD22-A110
Autoclave	T <sub>A</sub> = 121°C, RH = 100%, P = 29.7psia	96 hours	231 pcs	0	JESD22-A102
Temperature Cycle	T <sub>A</sub> = -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

**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

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<sub>J</sub> 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

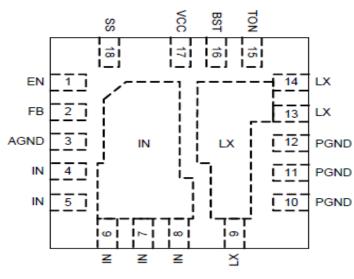
 $\mathbf{k}$  = Boltzmann's constant, 8.617164 X 10<sup>-5</sup>eV / K



III. ESD and Latch Up Test Results

Test	Test Conditions	Total Sample Size	Number of Failures	Reference Standard
Electrostatic Discharge Human Body Model	T <sub>A</sub> = 25°C, +/-2kV	3	0	JESD-A114
Electrostatic Discharge Charged Device Model	T <sub>A</sub> = 25°C, +/-1kV	3	0	JESD-C101
Latch Up	T <sub>A</sub> = 25°C, +/-200mA/28V	6	0	JESD78
Latch Up	T <sub>A</sub> = 85°C, +/-200mA/28V	6	0	JESD78

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



18-Pin 3mm x 3mm QFN (Top View)