# Alpha & Omega Semiconductor Product Reliability Report

## AOZ2151LQI-30, rev A

**Plastic Encapsulated Device**

**ALPHA & OMEGA Semiconductor, Inc**

**www.aosmd.com**

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This AOS product reliability report summarizes the qualification results for AOZ2151LQI-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 AOZ2151LQI-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.

## 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 (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 |
| THB | $T_A$ = 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 |

**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 |

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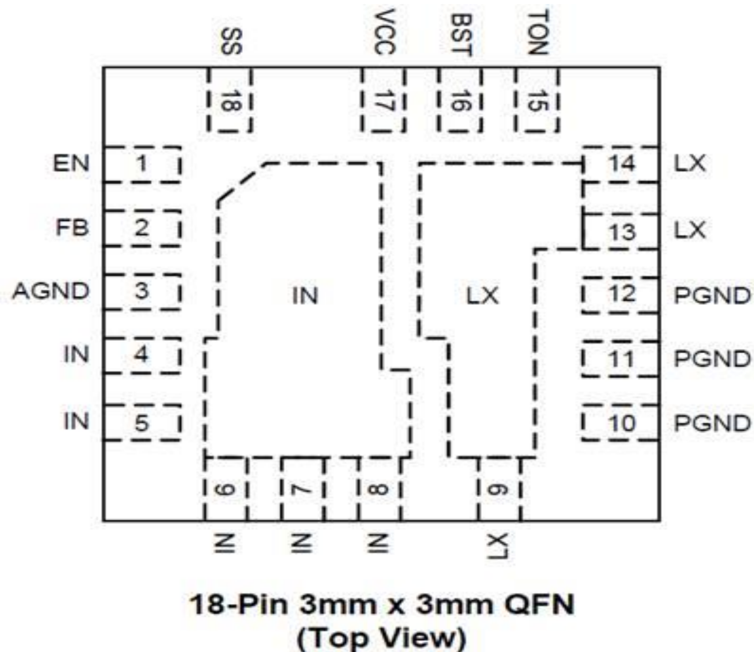
**$T_J$ s** = Stressed junction temperature in degree (Kelvin), K = C + 273.16
**$T_J$ u** =The use junction temperature in degree (Kelvin), K = C + 273.16
**k** = Boltzmann's constant, 8.617164 X $10^{-5}$eV / K

## 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** | **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** |

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




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