# Alpha & Omega Semiconductor Product Reliability Report

## AIM703S60C1, rev A

### Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for AIM703S60C1. 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 AIM703S60C1 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 | Duration | # Lots / SS per lot | Accept on # Failed | Reference |
|---|---|---|---|---|---|
| HTRB | Temp = 125°C, Vce =480V | 1000 hours | 3 lots / 45 units | 0 | JESD22-A108 |
| Precondition (Note A) | 192hrs 30°C / 60%RH + 3 cycle reflow@260°C (MSL 3) | - | 675 units | 0 | JESD22-A113 |
| THB | 85°C, 85%RH, Vce =100V | 1000 hours | 3 lots / 45 units | 0 | JESD22-A101 |
| Autoclave | 121°C, 29.7psia, RH=100% | 96 hours | 3 lots / 45 units | 0 | JESD22-A102 |
| Temperature Cycle | -55°C  to 150°C, air to air | 500 cycles | 3 lots / 45 units | 0 | JESD22-A104 |
| HTSL | Temp = 150°C | 1000 hours | 3 lots / 45 units | 0 | JESD22-A103 |
| IOL | $\Delta$ Tj = 100°C | 6000 cycles | 3 lots / 45 units | 0 | AEC-Q101 (MIL-STD-750 Method 1037) |

**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):  87.2
## MTTF = 1309 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$^2$ x $10^9$ **/ [**2 (N) (H) (Af)**] =** 87.2
**MTTF =** $10^9$ / FIT = 1390 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 | 115 deg C | 125 deg C |
|---|---|---|---|---|---|---|
| Af | 77.8 | 26.4 | 9.8 | 3.9 | 1.7 | 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