

Alpha & Omega Semiconductor Product Reliability Qualification Report

AOGT68801 rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com



This report delineates the product's quality and reliability test outcomes. Specific sample sizes undergo accelerated environmental tests, with corresponding electrical testing before and after each interval. Analysis of the conclusive electrical test results affirms the product's adherence to AOS quality and reliability standards in accordance with **JEDEC**. Reference to the existing qualification outcomes for similar products is warranted due to structural similarities. The released product will be classified by its process family and undergo regular monitoring to ensure continual enhancements in product quality.

Test Item	Test Condition	Duration	Lots/SS	Number of Failures	Reference Standard
HTGB High Temperature Gate Bias	175°C Vgs=100% of Vgsmax	1000 hrs	3 * 77	0/231	JESD22-A108
HTRB High Temperature Reverse Bias	175°C Vds=100% of Vdsmax	1000 hrs	3 * 77	0/231	JESD22-A108
PC Precondition	168 hrs, 85°C, 85%RH, 3 cycles reflow @ 260°C <u>(MSL 1)</u>	-	12 * 77	0/924	JESD22-A113 J-STD-020
HAST* Highly Accelerated Stress Test	130°C, 85%RH, Vds = 80% of Vdsmax up to 42V	96 hrs	3 * 77	0/231	JESD22-A110
AC* Autoclave	121°C, 100%RH, 15psig	96 hrs	3 * 77	0/231	JESD22-A102
TC* Temperature Cycling	-65°C to 150°C, air to air	1000 cycles	3 * 77	0/231	JESD22-A104
IOL* Intermittent Operational Life	∆Tj = 100°C t _{on} = 2 minutes t _{off} = 2 minutes	15000 cycles	3 * 77	0/231	MIL-STD-750 Method 1037
ESD_HBM	Class 3A (4000V to <8000V)	-	3 pcs	-	JS-001
ESD_CDM	Class C2b (750 to <1000V)	-	3 pcs	-	JS-002

I. Reliability Stress Test Summary and Results

Notes:

* For SMD devices reliability stress tests performed after PC (precondition).



FIT rate (per billion): 2.61 MTTF = 43670 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.

At 60% Confidence Level **Failure Rate** = $Chi^2 \times 10^9 / [2 (N) (H) (Af)] = 2.61$ **MTTF** = $10^9 / FIT = 43670$ 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_J u = 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	125 deg C	150 deg C	175 deg C
Af	758	256	95	38	9.7	2.9	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