AOS Semiconductor
Product Reliability Report

AO3416, rev C

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

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This AOS product reliability report summarizes the qualification result for AO3416. 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 AO3416 passes AOS quality and reliability requirements. The released product will be categorized by the process family and be monitored on a quarterly basis for continuously improving the product quality.

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I. Product Description:

The AO3416 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

-RoHS Compliant
-Halogen Free

Detailed information refers to datasheet.

II. Die / Package Information:

	AO3416
Process	Standard sub-micron Low voltage N channel
Package Type	SOT23
Lead Frame	Cu
Die Attach	Ag Epoxy
Bonding Wire	Cu & Au wire
Mold Material	Epoxy resin with silica filler
MSL (moisture sensitive level)	Level 1 based on J-STD-020

Note * based on information provided by assembler and mold compound supplier

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III. Result of Reliability Stress for AO3416

Test Item	Test Condition	Time Point	Lot Attribution	Total Sample size	Number of Failures	Standard
MSL Precondition	**168hr 85℃ /85%RH +3 cycle reflow@260℃**	**-**	**39 lots**	**5775 pcs**	**0**	**JESD22-A113**
HTGB	**Temp = 150 °c, Vgs=100% of Vgsmax**	**168hrs 500 hrs 1000 hrs**	** 2 lots 3 lots (Note A*)**	**385pcs 77pcs / lot**	**0**	**JESD22-A108**
HTRB	**Temp = 150 °c, Vds=80% of Vdsmax**	**168hrs 500 hrs 1000 hrs**	** 2 lots 3 lots (Note A*)**	**385pcs 77pcs / lot**	**0**	**JESD22-A108**
HAST	**130°c, 85%RH, 33.3 psi, Vgs = 100% of Vgs max**	**100 hrs**	**38 lots (Note A*)**	**2090 pcs 55 pcs / lot**	**0**	**JESD22-A110**
Pressure Pot	**121°c, 29.7psi, RH=100%**	**96 hrs**	**28 lots (Note A*)**	**1540 pcs 55 pcs / lot**	**0**	**JESD22-A102**
Temperature Cycle	**-65°c to 150°c, air to air**	**250 / 500 cycles**	**39 lots (Note A*)**	**2145 pcs 55 pcs / lot**	**0**	**JESD22-A104**

Note A: The reliability data presents total of available generic data up to the published date.

IV. Reliability Evaluation

FIT rate (per billion): 6
MTTF = 19828 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AO3416). 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)**]**
= 1.83×10^9 **/ [**2x (4x77x500+6x77x1000) x258**] =** 6
MTTF = 10^9 / FIT = 1.74×10^8hrs = 19828 years

Chi² = Chi Squared Distribution, determined by the number of failures and confidence interval
N = Total Number of units from HTRB and HTGB tests
H = Duration of HTRB/HTGB testing
Af = Acceleration Factor from Test to Use Conditions (Ea = 0.7eV and Tuse = 55℃)
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	130 deg C	150 deg C
Af	**258**	**87**	**32**	**13**	**5.64**	**2.59**	**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, 8.617164×10^{-5}eV / K