AOS Semiconductor
Product Reliability Report

AO3404, rev D

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for AO3404. 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 AO3404 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 AO3404 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device may be used as a load switch or in PWM applications.

-RoHS Compliant
-Halogen Free

Detailed information refers to datasheet.

II. Die / Package Information:

	AO3404
Process	Standard sub-micron
	30V N-Channel MOSFET
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

III. Result of Reliability Stress for AO3404

Test Item	Test Condition	Time Point	Lot Attribution	Total Sample size	Number of Failures	Standard
MSL Precondition	168hr 85°c /85%RH +3 cycle reflow@260°c	-	39 lots	6402 pcs	0	JESD22-A113
HTGB	Temp = 150 °c, Vgs=100% of Vgsmax	168hrs 500 hrs 1000 hrs	4 lots 6 lots (Note A*)	770pcs 77pcs / lot	0	JESD22-A108
HTRB	Temp = 150 °c, Vds=80% of Vdsmax	168hrs 500 hrs 1000 hrs	4 lots 6 lots (Note A*)	770pcs 77pcs / lot	0	JESD22-A108
HAST	130 +/- 2°c, 85%RH, 33.3 psi, Vgs = 100% of Vgs max	100 hrs	24 lots (Note A*)	1320 pcs 55 pcs / lot	0	JESD22-A110
Pressure Pot	121°c, 29.7psi, RH=100%	96 hrs	27 lots (Note A*)	2079 pcs 77 pcs / lot	0	JESD22-A102
Temperature Cycle	-65°c to 150°c, air to air	250 / 500 cycles	39 lots (Note A*)	3003 pcs 77 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): 3
MTTF = 39656 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AO3404). 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)**]**

$= 1.83$ x 10^9 / **[**2x (2x77x500+6x77x1000) x258**] =** 3

MTTF = 10^9 / FIT = 3.47 x 10^8hrs = 39656 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°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	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 X 10^{-5}eV / K