AOS Semiconductor
Product Reliability Report

AOD409, rev D

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

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This AOS product reliability report summarizes the qualification result for AOD409. 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 AOD409 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.

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I. Product Description:

The AOD409 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and low gate resistance. With the excellent thermal resistance of the DPAK package, this device is well suited for high current load applications.

Details refer to the datasheet.

II. Die / Package Information:

	AOD409
Process	Standard sub-micron P-Channel MOSFET
Package Type	TO252
Lead Frame	Bare Cu
Die Attach	Soft solder
Bond	Al wire
Mold Material	Epoxy resin with silica filler
Moisture Level	Up to Level 1

III. Reliability Stress Test Summary and Results

Test Item	Test Condition	Time Point	Total Sample Size*	Number of Failures	Reference Standard
MSL Precondition	168hr 85°C / 85%RH + 3 cycle reflow@260°C (MSL 1)	-	3234pcs	0	JESD22-A113
HTGB	Temp = 150°C , Vgs=100% of Vgsmax	168 / 500 / 1000 hrs	924pcs	0	JESD22-A108
HTRB	Temp = 150°C , Vds=80% of Vdsmax	168 / 500 / 1000 hrs	924pcs	0	JESD22-A108
HAST	130°C , 85%RH, 33.3 psi, Vds = 80% of Vdsmax up to 42V	96 hrs	693 pcs	0	JESD22-A110
H3TRB	85°C , 85%RH, Vds = 80% of Vdsmax	1000 hrs	462 pcs	0	JESD22-A101
Autoclave	121°C , 29.7psi, RH=100%	96 hrs	924 pcs	0	JESD22-A102
Temperature Cycle	-65°C to 150°C , air to air,	250 / 500 / 1000 cycles	462 pcs	0	JESD22-A104
Power Cycling	Δ Tj = 100°C	15000 cycles	693 pcs	0	AEC Q101

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

IV. Reliability Evaluation

FIT rate (per billion): 3.27
MTTF = 34926 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)**] =** 3.27
MTTF = 10^9 / FIT = 34926 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	130 deg C	150 deg C
Af	**259**	**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