



AOS Semiconductor Product Reliability Report

AOC4810, rev B

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for AOC4810. 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 AOC4810 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 AOC4810 uses advanced trench technology to provide excellent $R_{SS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V while retaining a 20V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a unidirectional or bi-directional load switch, facilitated by its common-drain configuration.

Details refer to the datasheet.

II. Die / Package Information:

	AOC4810
Process	Standard sub-micron 30V Common-Drain Dual N-Channel MOSFET
Package Type	AlphaDFN 3.2x2_8
Lead Frame	N/A
Die Attach	N/A
Bonding	Solder ball
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)	-	2079 pcs	0	JESD22-A113
HTGB	Temp = 150°C , Vgs=100% of Vgsmax	168 / 500 / 1000 hours	693 pcs	0	JESD22-A108
HTRB	Temp = 150°C , Vds=80% of Vdsmax	168 / 500 / 1000 hours	693 pcs	0	JESD22-A108
HAST	130°C , 85%RH, 33.3 psi, Vds = 80% of Vdsmax	96 hours	693 pcs	0	JESD22-A110
Autoclave	121°C , 29.7psi, RH=100%	96 hours	693 pcs	0	JESD22-A102
Temperature Cycle	-65°C to 150°C , air to air,	250 / 500 cycles	693 pcs	0	JESD22-A104

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

IV. Reliability Evaluation

FIT rate (per billion): 3.05

MTTF = 37399 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.

$$\text{Failure Rate} = \text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 3.05$$

$$\text{MTTF} = 10^9 / \text{FIT} = 37399 \text{ years}$$

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)

$$\text{Acceleration Factor [Af]} = \text{Exp} [Ea / k (1/Tj u - 1/Tj s)]$$

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 10⁻⁵eV / K