



AOS Semiconductor Product Reliability Report

AO3435, rev B

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for AO3435. 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 AO3435 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.

Table of Contents:

- I. Product Description
- II. Package and Die information
- III. Reliability Stress Test Summary and Results
- IV. Reliability Evaluation

I. Product Description:

The AO3435 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.5V. This device is suitable for use in buck convertor applications.

Details refer to the datasheet.

II. Die / Package Information:

Process	AO3435 Standard sub-micron 20V P-Channel MOSFET
Package Type	SOT23
Lead Frame	Bare Cu
Die Attach	Ag Epoxy
Bond	Au wire & Cu 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)	-	3927 pcs	0	JESD22-A113
HTGB	Temp = 150°C , Vgs=100% of Vgsmax	168 / 500 / 1000 hours	1155 pcs	0	JESD22-A108
HTRB	Temp = 150°C , Vds=80% of Vdsmax	168 / 500 / 1000 hours	1155 pcs	0	JESD22-A108
HAST	130°C , 85%RH, 33.3 psi, Vds = 80% of Vdsmax	96 hours	924 pcs	0	JESD22-A110
H3TRB	85°C , 85%RH, Vds = 80% of Vdsmax	1000 hours	693 pcs	0	JESD22-A101
Autoclave	121°C , 29.7psi, RH=100%	96 hours	1155 pcs	0	JESD22-A102
Temperature Cycle	-65°C to 150°C , air to air,	250 / 500 / 1000 cycles	693 pcs	0	JESD22-A104
Power Cycling	Δ Tj = 100°C	15000 cycles	462 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): 2.69

MTTF = 42426 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.

$$\text{Failure Rate} = \text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 2.69$$

$$\text{MTTF} = 10^9 / \text{FIT} = 42426 \text{ years}$$

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