



ALPHA & OMEGA
SEMICONDUCTOR

AOS Semiconductor Product Reliability Report

AON6974, rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for AON6974. 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 AON6974 passes AOS quality and reliability requirements.

Table of Contents:

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

I. Product Description:

General Description:

- Latest Trench Power AlphaMOS (α MOS LV) technology
- Integrated Schottky Diode (SRFET) on Low-Side
- Very Low $R_{DS(on)}$ at 4.5VGS
- Low Gate Charge
- High Current Capability
- RoHS and Halogen-Free Compliant

Application:

- DC/DC Converters in Computing, Servers, and POL
- Isolated DC/DC Converters in Telecom and Industrial

Detailed information refers to datasheet.

II. Die / Package Information:

	AON6974
Process	Standard sub-micron Low voltage N channel
Package Type	DFN 5x6B
Lead Frame	Cu
Die Attach	Ag epoxy
Bonding	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 AON6974

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	-	11 lots	1815pcs	0	JESD22-A113
HTGB	Temp = 150 °c, Vgs=100% of Vgsmax	168hrs 500 hrs 1000 hrs	1 lot 3 lots (Note A*)	308pcs 77pcs / lot	0	JESD22-A108
HTRB	Temp = 150 °c, Vds=80% of Vdsmax	168hrs 500 hrs 1000 hrs	1 lot 3 lots (Note A*)	308pcs 77pcs / lot	0	JESD22-A108
HAST	130 °c, 85%RH, 33.3 psi, Vgs = 100% of Vgs max	100 hrs	11 lots (Note A*)	605pcs 55pcs / lot	0	JESD22-A110
Pressure Pot	121°C, 29.7psi, RH=100%	96 hrs	11 lots (Note A*)	605pcs 55pcs / lot	0	JESD22-A102
Temperature Cycle	-65°C to 150°C, air to air	250 / 500 cycles	11 lots (Note A*)	605pcs 55pcs / 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): 7

MTTF = 15704 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AON6974). Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

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

$$= 1.83 \times 10^9 / [2 \times (2 \times 77 \times 168 + 6 \times 77 \times 1000) \times 258] = 7$$

$$\text{MTTF} = 10^9 / \text{FIT} = 1.38 \times 10^8 \text{hrs} = 15704 \text{ years}$$

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 10⁻⁵eV / K