



AOS Semiconductor Product Reliability Report

AON7520, rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for AON7520. 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 AON7520 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:

- Latest Trench Power AlphaMOS (α MOS LV) technology
- Very Low RDS(ON) at 2.5V VGS
- Low Gate Charge
- ESD protection

Application

- Load switch, battery switch in portable devices

-RoHS Compliant

-Halogen-Free

Detailed information refers to datasheet.

II. Die / Package Information:

	AON7520
Process	Standard sub-micron Low voltage N channel
Package Type	DFN 3.3x3.3 EP
Lead Frame	Bare Cu
Die Attach	Solder paste
Bonding	Cu Clip
Mold Material	Epoxy resin with silica filler
MSL (moisture sensitive level)	Level 1 based on J-STD-020

III. Result of Reliability Stress for AON7520

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	-	12 lots	2618pcs	0	JESD22-A113
HTGB	Temp = 150 °c, Vgs=100% of Vgsmax	168hrs 500 hrs 1000 hrs	3 lots 4 lots 3 lots	770pcs 77pcs / lot	0	JESD22-A108
HTRB	Temp = 150 °c, Vds=80% of Vdsmax	168hrs 500 hrs 1000 hrs	3 lots 4 lots 3 lots	770pcs 77pcs / lot	0	JESD22-A108
HAST	130 °c, 85%RH, 33.3 psi, Vds = 80% of Vdsmax	96 hrs	11 lots (Note A*)	847pcs 77 pcs / lot	0	JESD22-A110
Pressure Pot	121°C, 29.7psi, RH=100%	96 hrs	11 lots (Note A*)	847pcs 77 pcs / lot	0	JESD22-A102
Temperature Cycle	-65°C to 150°C, air to air	250 / 500 cycles	12 lots (Note A*)	924pcs 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): 4.16

MTTF = 27446 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AON7520). Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

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

$$= 1.83 \times 10^9 / [2 \times (6 \times 77 \times 168 + 8 \times 77 \times 500 + 6 \times 77 \times 1000) \times 259] = 4.16$$

$$\text{MTTF} = 10^9 / \text{FIT} = 2.40 \times 10^8 \text{hrs} = 27446 \text{ years}$$

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

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	88	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