



# ***AOS Semiconductor Product Reliability Report***

**AON6554,** rev A

**Plastic Encapsulated Device**

**ALPHA & OMEGA Semiconductor, Inc**

**[www.aosmd.com](http://www.aosmd.com)**



This AOS product reliability report summarizes the qualification result for AON6554. 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 AON6554 passes AOS quality and reliability requirements.

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## I. Product Description:

### General Description:

- Latest Trench Power AlphaMOS ( $\alpha$ MOS LV) technology
- Very Low RDS(ON) at 4.5V VGS
- 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:

	<b>AON6554</b>
<b>Process</b>	Standard sub-micron 30V N-Channel AlphaMOS
<b>Package Type</b>	DFN 5x6
<b>Lead Frame</b>	Cu
<b>Die Attach</b>	Solder Paste
<b>Bonding</b>	Clip
<b>Mold Material</b>	Epoxy resin with silica filler
<b>MSL (moisture sensitive level)</b>	Level 1 based on J-STD-020

**Note** \* based on information provided by assembler and mold compound supplier

### III. Result of Reliability Stress for AON6554

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	2299pcs	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*)	847pcs 77pcs / lot	0	JESD22-A102
Temperature Cycle	-65°C to 150°C, air to air	250 / 500 cycles	11 lots (Note A*)	847pcs 77pcs / 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 (AON6554). Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

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

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

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

**Chi<sup>2</sup>** = 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**  $^{[E_a / k (1/T_j u - 1/T_j s)]}$

**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<sup>-5</sup>eV / K