AOS Semiconductor
Product Reliability Report

AON4803 rev A

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for AON4803. 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 AON4803 passes AOS quality and reliability requirements. The released product will be categorized by the process family and be monitored on a quarterly basis for continuously improving the product quality.

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I. Product Description:

The AON4803 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltage as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

-RoHs Compliant
-Halogen Free

Absolute Maximum Ratings T_A=25°C unless otherwise noted				
Parameter		**Symbol**	**MOSFET**	**Units**
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±8	V
Continuous Drain Current [A]	T_A=25°C	I_D	-3.4	A
	T_A=70°C		-2.7	
Pulsed Drain Current [B]		I_{DM}	-15	
Power Dissipation	T_A=25°C	P_D	1.7	W
	T_A=70°C		1.1	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Parameter: Thermal Characteristics MOSFET		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	51	75	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		88	110	
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	28	35	

II. Die / Package Information:

	AON4803
Process	Standard sub-micron Low voltage P channel process
Package Type	DFN 3x2A_8L
Lead Frame	Cu ,D/pad, Ag spot
Die Attach	Ag epoxy
Bond wire	Au 2mils
Mold Material	Epoxy resin with silica filler
Flammability Rating	UL-94 V-0
Moisture Level	Up to Level 1 *

Note * based on info provided by assembler and mold compound supplier

III. Result of Reliability Stress for AON4803

Test Item	Test Condition	Time Point	Lot Attribution	Total Sample size	Number of Failures
Solder Reflow Precondition	168hr 85°c /85%RH +3 cycle reflow @260°c	-	8 lots	1155 pcs	0
HTGB	Temp = 150°c , Vgs=100% of Vgsmax	168hrs 500 hrs 1000 hrs	7 lots 2 lots 1 lot (Note A*)	770 pcs 77pcs / lot	0
HTRB	Temp = 150°c , Vds=80% of Vdsmax	168hrs 500 hrs 1000 hrs	7 lots 2 lots 1 lot (Note A*)	770 pcs 77pcs / lot	0
HAST	130 +/- 2°c , 85%RH, 33.3 psi, Vgs = 80% of Vgs max	100 hrs	6 lots (Note B**)	330 pcs 55 pcs / lot	0
Pressure Pot	121°c , 29.7psi, RH=100%	96 hrs	7 lots (Note B**)	385 pcs 55 pcs / lot	0
Temperature Cycle	-65°c to 150°c , air to air	250 / 500 cycles	8 lot (Note B**)	440 pcs 55 pcs / lot	0

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III. Result of Reliability Stress for AON4803

Continues

DPA	**Internal Vision** **Cross-section** **X-ray**	**NA**	**5** **5** **5**	**5** **5** **5**	**0**
CSAM		**NA**	**5**	**5**	**0**
Bond Integrity	**Room Temp** **150°c bake** **150°c bake**	**0hr** **250hr** **500hr**	**40** **40** **40**	**40 wires** **40 wires** **40 wires**	**0**
Solderability	**245°c**	**5 sec**	**15**	**15 leads**	**0**

Note A: The HTGB and HTRB reliability data presents total of available AON4803 burn-in data up to the published date.
Note B: The pressure pot, temperature cycle and HAST reliability data for AON4803 comes from the AOS generic package qualification data.

IV. Reliability Evaluation

FIT rate (per billion): 7
MTTF = 15743 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AON4803). Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

Failure Rate = $Chi^2 \times 10^9$ **/ [**2 (N) (H) (Af)**]**
= 1.83×10^9 / **[**2x (2x7x77x168+2x2x77x500+2x77x1000) x258**]** = 7
MTTF = 10^9 / FIT = 1.38×10^8hrs = 15743 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℃)
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

Tjs = Stressed junction temperature in degree (Kelvin), K = C+273.16
Tju =The use junction temperature in degree (Kelvin), K = C+273.16
k = Boltzmann's constant, 8.617164×10^{-5}eV/K