



# **Alpha & Omega Semiconductor Product Reliability Report**

**AO4830/AO4830L, rev B**

**Plastic Encapsulated Device**

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This AOS product reliability report summarizes the qualification result for AO4830. 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 AO4830 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 AO4830 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. This device is suitable for use as a load switch or in PWM applications. Standard Product AO4830 is Pb-free (meets ROHS & Sony 259 specifications). AO4830L is a Green Product ordering option. AO4830 and AO4830L are electrically identical.

Absolute Maximum Ratings $T_A=25^{\circ}\text{C}$ unless otherwise noted			
Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	80	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	$T_C=25^{\circ}\text{C}$	5
		$T_C=70^{\circ}\text{C}$	4
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	21	A
Avalanche Current <sup>C</sup>	$I_{AR}$	16	A
Repetitive avalanche energy $L=0.1\text{mH}$ <sup>C</sup>	$E_{AR}$	12.8	mJ
Power Dissipation <sup>B</sup>	$P_D$	$T_C=25^{\circ}\text{C}$	2
		$T_C=70^{\circ}\text{C}$	1.3
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics					
Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$t \leq 10\text{s}$	$R_{\theta JA}$	48	62.5	$^{\circ}\text{C/W}$
Maximum Junction-to-Ambient <sup>A,D</sup>	Steady-State		74	90	$^{\circ}\text{C/W}$
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	32	40	$^{\circ}\text{C/W}$

## II. Die / Package Information:

	<b>AO4830</b>	<b>AO4830L (Green Compound)</b>
<b>Process</b>	Standard sub-micron Low voltage N channel process	Standard sub-micron Low voltage N channel process
<b>Package Type</b>	8 leads SOIC	8 leads SOIC
<b>Lead Frame</b>	Cu, D/pad, Ag spot	Cu, D/pad, Ag spot
<b>Die Attach</b>	Ag epoxy	Ag epoxy
<b>Bond wire</b>	S: Cu 2 misl, G: Au 1.3mils	S: Cu 2 misl, G: Au 1.3mils
<b>Mold Material</b>	Epoxy resin with silica filler	Epoxy resin with silica filler
<b>Flammability Rating</b>	UL-94 V-0	UL-94 V-0
<b>Backside Metallization</b>	Ti / Ni / Ag	Ti / Ni / Ag
<b>Moisture Level</b>	Up to Level 1 *	Up to Level 1 *

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

## III. Result of Reliability Stress for AO4830 (Standard) & AO4830L (Green)

Test Item	Test Condition	Time Point	Lot Attribution	Total Sample size	Number of Failures
<b>Solder Reflow Precondition</b>	Standard: 1hr PCT+3 cycle reflow@260°c Green: 168hr 85°c /85RH +3 cycle reflow@260°c	-	Standard: 49 lots Green: 16 lots	9625 pcs	0
<b>HTGB</b>	Temp = 150°c , Vgs=100% of Vgsmax	168 / 500 hrs 1000 hrs	1lot  (note A*)	82 pcs 77+5 pcs / lot	0
<b>HTRB</b>	Temp = 150°c , Vds=80% of Vdsmax	168 / 500 hrs 1000 hrs	1lot  (note A*)	82 pcs 77+5 pcs / lot	0
<b>HAST</b>	130 +/- 2°c , 85%RH, 33.3 psi, Vgs = 80% of Vgs max	100 hrs	Standard: 33 lots Green: 13 lots  (note B**)	2530 pcs 50+5 pcs / lot	0
<b>Pressure Pot</b>	121°c , 29.7 psi, RH=100%	96 hrs	Standard: 49 lots Green: 16 lots  (note B**)	3575 pcs 50+5 pcs / lot	0
<b>Temperature Cycle</b>	-65°c to 150°c , air to air,	250 / 500 cycles	Standard: 49 lots Green: 15 lots  (note B**)	3520 pcs 50+5 pcs / lot	0

### III. Result of Reliability Stress for AO4830 (Standard) & AO4830L (Green)

Continues

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

**Note A:** The HTGB and HTRB reliability data presents total of available AO4830 and AO4830L burn-in data up to the published date.

**Note B:** The pressure pot, temperature cycle and HAST reliability data for AO4830 and AO4830L comes from the AOS generic package qualification data.

### IV. Reliability Evaluation

**FIT rate (per billion):43**

**MTTF =2639years**