



AOS Semiconductor Product Reliability Report

AO4406A/AO4406AL, rev A

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for AO4406A. 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 AO4406A 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 AO4406A/L uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for high side switch in SMPS and general purpose applications.

- RoHS Compliant
- AO4406AL Halogen Free

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted			
Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	12
		$T_C=70^\circ\text{C}$	10
Pulsed Drain Current ^c	I_{DM}	100	A
Avalanche Current ^c	I_{AR}	22	A
Repetitive avalanche energy $L=0.1\text{mH}$ ^c	E_{AR}	24	mJ
Power Dissipation ^b	P_D	$T_C=25^\circ\text{C}$	3.1
		$T_C=70^\circ\text{C}$	2
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 ^A	$t \leq 10\text{s}$	$R_{\theta JA}$	31	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{A,D}	Steady-State		59	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	16	24	$^\circ\text{C/W}$

II. Die / Package Information:

	AO4406A	AO4406AL (Green Compound)
Process	Standard sub-micron Low voltage N channel process	Standard sub-micron Low voltage N channel process
Package Type	8 leads SOIC	8 leads SOIC
Lead Frame	Cu, S/pad, Ag spot	Cu, S/pad, Ag spot
Die Attach	Ag epoxy	Ag epoxy
Bond wire	G: Au 1.3 mils; S: Cu 2mils	G: Au 1.3 mils; S: Cu 2mils
Mold Material	Epoxy resin with silica filler	Epoxy resin with silica filler
Flammability Rating	UL-94 V-0	UL-94 V-0
Backside Metallization	Ti / Ni / Ag	Ti / Ni / Ag
Moisture Level	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 AO4406A (Standard) & AO4406AL (Green)

Test Item	Test Condition	Time Point	Lot Attribution	Total Sample size	Number of Failures
Solder Reflow Precondition	Standard: 1hr PCT+3 cycle reflow@260°C Green: 168hr 85°C /85%RH +3 cycle reflow@260°C	0hr	Standard: 83 lots Green: 29 lots	17380 pcs	0
HTGB	Temp = 150°C , Vgs=100% of Vgsmax	168 / 500 hrs 1000 hrs	1 lot (Note A*)	82 pcs 77+5 pcs / lot	0
HTRB	Temp = 150°C , Vds=80% of Vdsmax	168 / 500 hrs 1000 hrs	1 lot (Note A*)	82 pcs 77+5 pcs / lot	0
HAST	130 +/- 2°C , 85%RH, 33.3 psi, Vgs = 80% of Vgs max	100 hrs	Standard: 81 lots Green: 16 lots (Note B**)	5335 pcs 50+5 pcs / lot	0
Pressure Pot	121°C , 29.7psi, RH=100%	96 hrs	Standard: 83 lots Green: 20 lots (Note B**)	5665 pcs 50+5 pcs / lot	0
Temperature Cycle	-65°C to 150°C , air to air	250 / 500 cycles	Standard: 87 lots Green: 29 lots (Note B**)	6380 pcs 50+5 pcs / lot	0

III. Result of Reliability Stress for AO4406A (Standard) & AO4406AL (Green) 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 AO4406A and AO4406AL burn-in data up to the published date.

Note B: The pressure pot, temperature cycle and HAST reliability data for AO4406A and AO4406AL comes from the AOS generic package qualification data.

IV. Reliability Evaluation

FIT rate (per billion): 128
MTTF = 887 years