



AOS Semiconductor Product Reliability Report

AOT2500L, rev A

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification result for AOT2500L. 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 AOT2500L passes AOS quality and reliability requirements.

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I. Product Description:

The AOT2500L uses Trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$, C_{iss} and C_{oss} . This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

- RoHS Compliant
- Halogen-Free

Details refer to the datasheet.

II. Die / Package Information:

	AOT2500L
Process	Standard sub-micron 150V N-Channel MOSFET
Package Type	TO220
Lead Frame	Bare Cu
Die Attach	Soft solder
Bonding	Al wire
Mold Material	Epoxy resin with silica filler
Moisture Level	Up to Level 1

III. Result of Reliability Stress for AOT2500L

Test Item	Test Condition	Time Point	Lot Attribution	Total Sample size	Number of Failures	Reference Standard
MSL Precondition	168hr 85°C /85%RH +3 cycle reflow @260°C	-	12 lots	2541pcs	0	JESD22-A113
HTGB	Temp = 150°C , Vgs=100% of Vgsmax	168hrs 500 hrs 1000 hrs	2 lots 6 lots	616pcs 77 pcs / lot	0	JESD22-A108
HTRB	Temp = 150°C , Vds=80% of Vdsmax	168hrs 500 hrs 1000 hrs	2 lots 6 lots	616pcs 77 pcs / lot	0	JESD22-A108
HAST	130°C , 85%RH, 33.3 psi, Vds = 80% of Vdsmax	96 hrs	9 lots (Note A*)	693pcs 77 pcs / lot	0	JESD22-A110
Pressure Pot	121°C , 29.7psi, RH=100%	96 hrs	12 lots (Note A*)	924pcs 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): 3.27

MTTF = 34906 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AOT2500L). Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

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

$$= 1.83 \times 10^9 / [2 \times (4 \times 77 \times 500 + 12 \times 77 \times 1000) \times 259] = 3.27$$

$$\text{MTTF} = 10^9 / \text{FIT} = 3.06 \times 10^8 \text{hrs} = 34906 \text{ years}$$

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**] = **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	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 10⁻⁵eV / K