ALPHA & OMEGA SEMICONDUCTOR

AOS Semiconductor
Product Reliability Report

AOTF7T60, rev A

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for AOTF7T60. 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 AOTF7T60 passes AOS quality and reliability requirements.

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I. Product Description:

The AOTF7T60 is fabricated using an advanced high voltage MOSFET process that is designed to deliver high levels of performance and robustness in popular AC-DC applications. By providing low RDS(on), Ciss and Crss along with guaranteed avalanche capability this parts can be adopted quickly into new and existing offline power supply designs.

For Halogen Free add "L" suffix to part number:
AOTF7T60L

Details refer to the datasheet.

II. Die / Package Information:

	AOTF7T60
Process	Standard sub-micron 600V N-Channel MOSFET
Package Type	TO220F
Lead Frame	Bare Cu
Die Attach	Soft solder
Bonding	Al wire
Mold Material	Epoxy resin with silica filler
Moisture Level	Up to Level 1 *

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

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III. Result of Reliability Stress for AOTF7T60

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@250°c	-	21 lots	4158pcs	0	JESD22-A113
HTGB	Temp = 150°c , Vgs=100% of Vgsmax	168hrs 500 hrs 1000 hrs	2 lots 3 lots 6 lots	847pcs 77 pcs / lot	0	JESD22-A108
HTRB	Temp = 150°c , Vds=80% of Vdsmax	168hrs 500 hrs 1000 hrs	2 lots 3 lots 6 lots	847pcs 77 pcs / lot	0	JESD22-A108
HAST	130°c , 85%RH, 33.3 psi, Vgs = 100% of Vgs max	96 hrs	15 lots (Note A*)	1155pcs 77 pcs / lot	0	JESD22-A110
Pressure Pot	121°c , 29.7psi, RH=100%	96 hrs	18 lots (Note A*)	1386pcs 77 pcs / lot	0	JESD22-A102
Temperature Cycle	-65°c to 150°c , air to air,	250 / 500 cycles	21 lots (Note A*)	1617pcs 77 pcs / lot	0	JESD22-A104

IV. Reliability Evaluation

FIT rate (per billion): 2.92
MTTF = 39075 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size of the selected product (AOTF7T60). Failure Rate Determination is based on JEDEC Standard JESD 85. FIT means one failure per billion hours.

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

= 1.83×10^9 **/ [**2x (4x77x168 +6x77x500 +12x77x1000) x259**]** = 2.92

MTTF = 10^9 / FIT = 3.42×10^8hrs = 39075 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, 8.617164×10^{-5}eV / K