AOS Semiconductor
Product Reliability Report

AOZ1380DI/AOZ1380DI-01

Rev A

Plastic Encapsulated Device

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February, 2020

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This AOS product reliability report summarizes the qualification results for AOZ1380DI and AOZ1380DI-01 in DFN3x5.2-20L package. Accelerated environmental tests are performed on a specific sample size and samples are electrically tested before and after each time point. Review of final electrical test results confirm that AOZ1380DI and AOZ1380DI-01 pass the AOS quality and reliability requirements. The released products will be categorized by its process family and routinely monitored for continuous improvement of product quality.

Qualification Tests Requirements

- AOZ1380DI and AOZ1380DI-01 a platform product
- AOZ1380DI/AOZ1380DI-01 3 lots 1000hrs HTOL
- 3 lots preconditioning, 96hrs PCT, 96hrs HAST, 1000 cycles TC, 1000hrs HTS
- 1 lot HBM, CDM ESD, Latch-up

I. Reliability Stress Test Summary and Results

Test Item	Test Condition	Time Point	Total Sample Size	Number of Failures	Reference Standard
HTOL	T_J = 125°C, V_{IN} = Vccmax	168 / 500 / 1000 hours	231 pcs	0	JESD22-A108
Preconditioning (Note A)	T_A = 85°C, RH = 85% + 3 cycle reflow @ 260°C (MSL 1)	168hours	693 pcs	0	JESD22-A113
HAST	T_A = 130°C, RH = 85%, P = 33.3psia	96 hours	231 pcs	0	JESD22-A110
Autoclave	T_A = 121°C, RH = 100%, P = 29.7psia	96 hours	231 pcs	0	JESD22-A102
Temperature Cycle	T_A = -65°C to 150°C, air to air	250 / 500 / 1000 cycles	231 pcs	0	JESD22-A104
High Temperature Storage	T_A = 150°C	1000 hours	231 pcs	0	JESD22-A103

Note: The reliability data presents total of available generic data up to the published date.
Note A: MSL (Moisture Sensitivity Level) 1 based on J-STD-020

II. Reliability Evaluation

FIT rate (per billion): 15.26
MTTF = 8778 years

The presentation of FIT rate for the individual product reliability is restricted by the actual burn-in sample size. 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)**] =** 15.26
MTTF = 10^9 / FIT = 7480 years
Chi² = Chi Squared Distribution, determined by the number of failures and confidence interval
N = Total Number of units from burn-in tests
H = Duration of burn-in testing
Af = Acceleration Factor from Test to Use Conditions (Ea = 0.7eV and T_{use} = 55°C)

Acceleration Factor [**Af**] = **Exp** [Ea / **k** (1/T_J u – 1/T_J s)]

Acceleration Factor ratio list:

	55 deg C	70 deg C	85 deg C	100 deg C	115 deg C	125 deg C
Af	**77**	**26**	**9.8**	**3.9**	**1.7**	**1**

T_J s = Stressed junction temperature in degree (Kelvin), K = C + 273.16

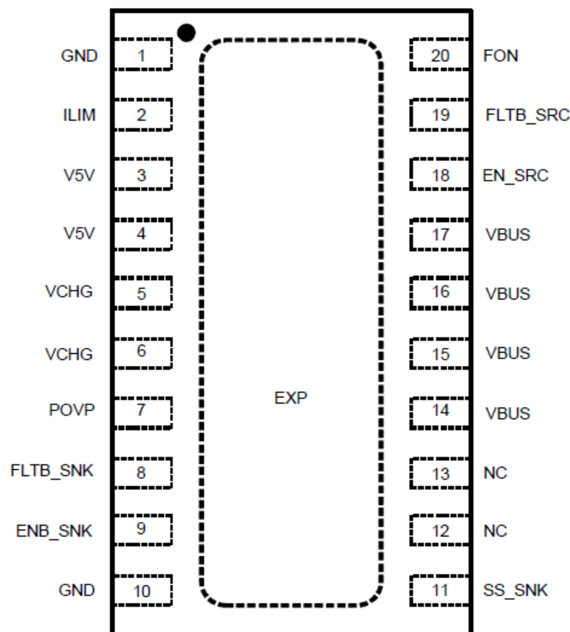
T_J u =The use junction temperature in degree (Kelvin), K = C + 273.16

k = Boltzmann's constant, 8.617164 X 10^{-5}eV / K

III. ESD and Latch Up Test Results

Test	Test Conditions	Total Sample Size	Number of Failures	Reference Standard
Electrostatic Discharge Human Body Model	**T_A = 25°C, +/-2.5kV**	**3**	**0**	**JESD-A114**
Electrostatic Discharge Charged Device Model	**T_A = 25°C, +/-1kV**	**3**	**0**	**JESD-C101**
Latch Up	**T_A = 25°C, +/-100mA, 1.5x OV**	**6**	**0**	**JESD78**
Latch Up	**T_A = 85°C, +/-100mA, 1.5x OV**	**6**	**0**	**JESD78**
Electrostatic Discharge Immunity (only VOUT pin)	**T_A = 25°C, +/-8kV**	**3**	**0**	**IEC61000-4-2**

(1) ATE results are used to determine PASS/FAIL. Parametric shift <10%.



DFN 3mm x 5.2mm-20L
(Top Transparent View)