



AOS Semiconductor Product Reliability Report

AOZ1380DI/AOZ1380DI-01

Rev A

Plastic Encapsulated Device

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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} = V _{CCmax}	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 = $\text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 15.26$

MTTF = $10^9 / \text{FIT} = 7480$ 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 (E_a = 0.7eV and T_{use} = 55°C)

Acceleration Factor [Af] = $\text{Exp} [E_a / k (1/T_{j u} - 1/T_{j s})]$

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), $K = C + 273.16$

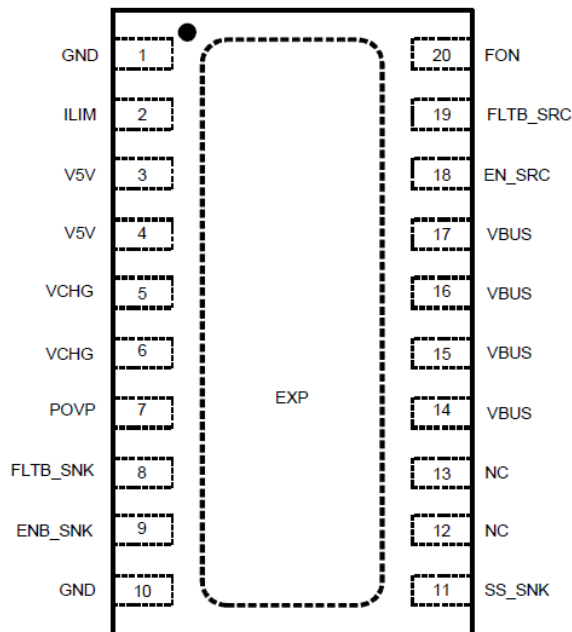
$T_{j u}$ = The use junction temperature in degree (Kelvin), $K = C + 273.16$

k = Boltzmann's constant, $8.617164 \times 10^{-5} \text{eV} / \text{K}$

III. ESD and Latch Up Test Results

Test	Test Conditions	Total Sample Size	Number of Failures	Reference Standard
Electrostatic Discharge Human Body Model	$T_A = 25^\circ\text{C}$, +/-2.5kV	3	0	JESD-A114
Electrostatic Discharge Charged Device Model	$T_A = 25^\circ\text{C}$, +/-1kV	3	0	JESD-C101
Latch Up	$T_A = 25^\circ\text{C}$, +/-100mA, 1.5x OV	6	0	JESD78
Latch Up	$T_A = 85^\circ\text{C}$, +/-100mA, 1.5x OV	6	0	JESD78
Electrostatic Discharge Immunity (only VOUT pin)	$T_A = 25^\circ\text{C}$, +/-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)