

AOS Semiconductor Product Reliability Report

AOZ13287DI-03 rev A

Plastic Encapsulated Device

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This AOS product reliability report summarizes the qualification results for AOZ13287DI-03 in DFN3.2 x 5.5 -17L package. AOZ13287DI-03 are qualified. 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 AOZ13287DI-03 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.

I. AOZ13287DI-03 Reliability Stress Test Summary and Results

Test Item	Test Condition	Time Point	Total Sample Size	Number of Failures	Reference Standard
HTOL	$T_J = 125^\circ\text{C}$, $V_{IN} = V_{CC\max}$	168 / 500 / 1000 hours	231 pcs	0	JESD22-A108
Preconditioning (Note A)	192hr 30°C, RH = 60% + 3 cycle reflow @ 260°C (MSL 3)	-	924 pcs	0	JESD22-A113
HAST	130°C, RH = 85%, 33.3psia, $V_{IN} = V_{CC\max}$	96 hours	231 pcs	0	JESD22-A110
Autoclave	121°C, 29.7 psia, PH = 100%	96 hours	231 pcs	0	JESD22-A102
Temperature Cycle	-65°C to 150°C, air to air	250 / 500 / 1000 cycles	231 pcs	0	JESD22-A104
High Temperature storage	150°C	168 / 500 / 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 3 (Moisture Sensitivity Level) based on J-STD-020

II. Reliability Evaluation

FIT rate (per billion): 12.012

MTTF = 9503.43 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 = $\text{Chi}^2 \times 10^9 / [2 (N) (H) (Af)] = 12.012$

MTTF = $10^9 / \text{FIT} = 9503$ 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 ($E_a = 0.7\text{eV}$ and $T_{use} = 55^\circ\text{C}$)

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. AOZ13287DI-03 ESD and Latch Up Test Results

Test	Test Conditions	Total Sample Size	Number of Failures	Reference Standard
Electrostatic Discharge Human Body Model	$T_A = 25^\circ\text{C}$, +/-2kV	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

Note: ATE results are used to determine PASS/FAIL. Parametric shift<10%.

