Alpha & Omega Semiconductor Product Reliability Report

SMDJ series, rev B

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for SMDJ series. 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 SMDJ series passes AOS quality and reliability requirements. The released product will be categorized by the process family and be routine monitored for continuously improving the product quality.

I. Reliability Stress Test Summary and Results

Test Item	Test Condition	Time Point	Total Sample Size	Number of Failures	Reference Standard
HTRB	Temp = 150°C , VR=80% of VRmax	1000 hours	22 pcs	0	JESD22-A108
MSL	168hr 85°C / 85%RH + 3 cycle reflow@260°C (MSL 1)	-	30 pcs	0	J-STD-020
Autoclave	121°C , 29.7psia, RH=100%	48 hours	22 pcs	0	JESD22-A102
Temperature Cycle	-55°C to 150°C , air to air,	500 cycles	22 pcs	0	JESD22-A104
HTSL	Temp = 175°C	1000 hours	22 pcs	0	JESD22-A103
Solderability Test	Temp = 245°C	5 seconds	5 pcs	0	JESD22-B102
RSH	Temp = 260°C	10 seconds	5 pcs	0	JESD22-B106

Note: The reliability data presents total of available generic data up to the published date.

II. Reliability Evaluation

FIT rate (per billion): 160.25
MTTF = 712 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)**] =** 160.25
MTTF = 10^9 / FIT = 712 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 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^{-5}eV / K

SMDJ series release parts list table:

SMDJ5.0A	SMDJ30A	SMDJ170A	SMDJ5.0CA	SMDJ30CA	SMDJ170CA
SMDJ6.0A	SMDJ33A	SMDJ180A	SMDJ6.0CA	SMDJ33CA	SMDJ180CA
SMDJ6.5A	SMDJ36A	SMDJ200A	SMDJ6.5CA	SMDJ36CA	SMDJ200CA
SMDJ7.0A	SMDJ40A	SMDJ220A	SMDJ7.0CA	SMDJ40CA	SMDJ220CA
SMDJ7.5A	SMDJ43A	SMDJ250A	SMDJ7.5CA	SMDJ43CA	SMDJ250CA
SMDJ8.0A	SMDJ45A		SMDJ8.0CA	SMDJ45CA	
SMDJ8.5A	SMDJ48A		SMDJ8.5CA	SMDJ48CA	
SMDJ9.0A	SMDJ51A		SMDJ9.0CA	SMDJ51CA	
SMDJ10A	SMDJ54A		SMDJ10CA	SMDJ54CA	
SMDJ11A	SMDJ58A		SMDJ11CA	SMDJ58CA	
SMDJ12A	SMDJ60A		SMDJ12CA	SMDJ60CA	
SMDJ13A	SMDJ64A		SMDJ13CA	SMDJ64CA	
SMDJ14A	SMDJ70A		SMDJ14CA	SMDJ70CA	
SMDJ15A	SMDJ75A		SMDJ15CA	SMDJ75CA	
SMDJ16A	SMDJ78A		SMDJ16CA	SMDJ78CA	
SMDJ17A	SMDJ85A		SMDJ17CA	SMDJ85CA	
SMDJ18A	SMDJ90A		SMDJ18CA	SMDJ90CA	
SMDJ20A	SMDJ100A		SMDJ20CA	SMDJ100CA	
SMDJ21A	SMDJ110A		SMDJ21CA	SMDJ110CA	
SMDJ22A	SMDJ120A		SMDJ22CA	SMDJ120CA	
SMDJ24A	SMDJ130A		SMDJ24CA	SMDJ130CA	
SMDJ26A	SMDJ150A		SMDJ26CA	SMDJ150CA	