ALPHA & OMEGA SEMICONDUCTOR

Alpha & Omega Semiconductor Product Reliability Report

SMCJ series, rev C

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

This AOS product reliability report summarizes the qualification result for SMCJ 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 SMCJ 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

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SMCJ series release parts list table:

SMCJ5.0A	SMCJ36A	SMCJ180A	SMCJ5.0CA	SMCJ33CA	SMCJ180CA
SMCJ6.0A	SMCJ40A	SMCJ200A	SMCJ6.0CA	SMCJ36CA	SMCJ200CA
SMCJ6.5A	SMCJ43A	SMCJ220A	SMCJ6.5CA	SMCJ40CA	SMCJ220CA
SMCJ7.0A	SMCJ45A	SMCJ250A	SMCJ7.0CA	SMCJ43CA	SMCJ250CA
SMCJ7.5A	SMCJ48A	SMCJ300A	SMCJ7.5CA	SMCJ45CA	SMCJ300CA
SMCJ8.0A	SMCJ51A	SMCJ350A	SMCJ8.0CA	SMCJ48CA	SMCJ350CA
SMCJ8.5A	SMCJ54A	SMCJ400A	SMCJ8.5CA	SMCJ51CA	SMCJ400CA
SMCJ9.0A	SMCJ58A	SMCJ440A	SMCJ9.0CA	SMCJ54CA	SMCJ440CA
SMCJ10A	SMCJ60A		SMCJ10CA	SMCJ58CA	
SMCJ11A	SMCJ64A		SMCJ11CA	SMCJ60CA	
SMCJ12A	SMCJ70A		SMCJ12CA	SMCJ64CA	
SMCJ13A	SMCJ75A		SMCJ13CA	SMCJ70CA	
SMCJ15A	SMCJ78A		SMCJ14CA	SMCJ75CA	
SMCJ16A	SMCJ85A		SMCJ15CA	SMCJ78CA	
SMCJ17A	SMCJ90A		SMCJ16CA	SMCJ85CA	
SMCJ18A	SMCJ100A		SMCJ17CA	SMCJ90CA	
SMCJ20A	SMCJ110A		SMCJ18CA	SMCJ100CA	
SMCJ22A	SMCJ120A		SMCJ20CA	SMCJ110CA	
SMCJ24A	SMCJ130A		SMCJ22CA	SMCJ120CA	
SMCJ26A	SMCJ150A		SMCJ24CA	SMCJ130CA	
SMCJ28A	SMCJ160A		SMCJ26CA	SMCJ150CA	
SMCJ30A	SMCJ170A		SMCJ28CA	SMCJ160CA	
SMCJ33A	SMCJ180A		SMCJ30CA	SMCJ170CA	