ALPHA & OMEGA SEMICONDUCTOR

Alpha & Omega Semiconductor Product Reliability Report

SMBJ series, rev C

Plastic Encapsulated Device

ALPHA & OMEGA Semiconductor, Inc

www.aosmd.com

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

SMBJ series release parts list table:

SMBJ5.0A	SMBJ36A	SMBJ180A	SMBJ5.0CA	SMBJ33CA	SMBJ180CA
SMBJ6.0A	SMBJ40A	SMBJ200A	SMBJ6.0CA	SMBJ36CA	SMBJ200CA
SMBJ6.5A	SMBJ43A	SMBJ220A	SMBJ6.5CA	SMBJ40CA	SMBJ220CA
SMBJ7.0A	SMBJ45A	SMBJ250A	SMBJ7.0CA	SMBJ43CA	SMBJ250CA
SMBJ7.5A	SMBJ48A	SMBJ300A	SMBJ7.5CA	SMBJ45CA	SMBJ300CA
SMBJ8.0A	SMBJ51A	SMBJ350A	SMBJ8.0CA	SMBJ48CA	SMBJ350CA
SMBJ8.5A	SMBJ54A	SMBJ400A	SMBJ8.5CA	SMBJ51CA	SMBJ400CA
SMBJ9.0A	SMBJ58A	SMBJ440A	SMBJ9.0CA	SMBJ54CA	SMBJ440CA
SMBJ10A	SMBJ60A		SMBJ10CA	SMBJ58CA	
SMBJ11A	SMBJ64A		SMBJ11CA	SMBJ60CA	
SMBJ12A	SMBJ70A		SMBJ12CA	SMBJ64CA	
SMBJ14A	SMBJ75A		SMBJ13CA	SMBJ70CA	
SMBJ15A	SMBJ78A		SMBJ14CA	SMBJ75CA	
SMBJ16A	SMBJ85A		SMBJ15CA	SMBJ78CA	
SMBJ17A	SMBJ90A		SMBJ16CA	SMBJ85CA	
SMBJ18A	SMBJ100A		SMBJ17CA	SMBJ90CA	
SMBJ20A	SMBJ110A		SMBJ18CA	SMBJ100CA	
SMBJ22A	SMBJ120A		SMBJ20CA	SMBJ110CA	
SMBJ24A	SMBJ130A		SMBJ22CA	SMBJ120CA	
SMBJ26A	SMBJ150A		SMBJ24CA	SMBJ130CA	
SMBJ28A	SMBJ160A		SMBJ26CA	SMBJ150CA	
SMBJ30A	SMBJ170A		SMBJ28CA	SMBJ160CA	
SMBJ33A	SMBJ180A		SMBJ30CA	SMBJ170CA	