ALPHA & OMEGA SEMICONDUCTOR

Alpha & Omega Semiconductor Product Reliability Report

SMAJ 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 SMAJ 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 SMAJ 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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SMAJ series release parts list table:

SMAJ5.0A	SMAJ33A	SMAJ180A	SMAJ5.0CA	SMAJ33CA	SMAJ180CA
SMAJ6.0A	SMAJ36A	SMAJ200A	SMAJ6.0CA	SMAJ36CA	SMAJ200CA
SMAJ6.5A	SMAJ40A	SMAJ220A	SMAJ6.5CA	SMAJ40CA	SMAJ220CA
SMAJ7.0A	SMAJ43A	SMAJ250A	SMAJ7.0CA	SMAJ43CA	SMAJ250CA
SMAJ7.5A	SMAJ45A	SMAJ300A	SMAJ7.5CA	SMAJ45CA	SMAJ300CA
SMAJ8.0A	SMAJ48A	SMAJ350A	SMAJ8.0CA	SMAJ48CA	SMAJ350CA
SMAJ8.5A	SMAJ51A	SMAJ400A	SMAJ8.5CA	SMAJ51CA	SMAJ400CA
SMAJ9.0A	SMAJ54A	SMAJ440A	SMAJ9.0CA	SMAJ54CA	SMAJ440CA
SMAJ10A	SMAJ58A		SMAJ10CA	SMAJ58CA	
SMAJ11A	SMAJ60A		SMAJ11CA	SMAJ60CA	
SMAJ12A	SMAJ64A		SMAJ12CA	SMAJ64CA	
SMAJ13A	SMAJ70A		SMAJ13CA	SMAJ70CA	
SMAJ14A	SMAJ75A		SMAJ14CA	SMAJ75CA	
SMAJ15A	SMAJ78A		SMAJ15CA	SMAJ78CA	
SMAJ16A	SMAJ85A		SMAJ16CA	SMAJ85CA	
SMAJ17A	SMAJ90A		SMAJ17CA	SMAJ90CA	
SMAJ18A	SMAJ100A		SMAJ18CA	SMAJ100CA	
SMAJ20A	SMAJ110A		SMAJ20CA	SMAJ110CA	
SMAJ22A	SMAJ120A		SMAJ22CA	SMAJ120CA	
SMAJ24A	SMAJ130A		SMAJ24CA	SMAJ130CA	
SMAJ26A	SMAJ150A		SMAJ26CA	SMAJ150CA	
SMAJ28A	SMAJ160A		SMAJ28CA	SMAJ160CA	
SMAJ30A	SMAJ170A		SMAJ30CA	SMAJ170CA	