

# S29WS128J

## CS 80150, 80302

Qualification of: S29WS128J, 128 Megabit (8 M x 16-Bit) 1.8 Volt-only Simultaneous Read/Write Burst Mode Flash Memory in VBL088 (11.0 x 8.0 x 1.0mm) 88 Ball, Very Thin Fine Pitch Ball Grid Array Package (FBGA)



### Reliability Qualification Summary

CONFIDENTIAL

NOTICE: The material in this report is confidential. It is prepared to assist in the qualification of our product. It is declassified for the internal use of our customers only, and may be modified to meet the needs of specific customers. It also serves as a record of full qualification according to JESD47 and AEC-Q100 Grade 1 requirements.

Additionally, the package details (material set, assembly location, etc.) are specific to the qual vehicle used for the qualification. Alternate material sets and assembly locations may be qualified for the product. Production material can be assembled with any qualified material set and at any qualified assembly location. Tests are performed in accordance with AEC-Q100 and relevant JEDEC specifications.

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## I.A. Product Information

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Product Description: S29WS128J  
128 Megabit (8 M x 16-Bit) 1.8 Volt-only Simultaneous Read/Write Burst Mode Flash Memory

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Package:	VBL088	Qualification:	80150
Description:	(11.0 x 8.0 x 1.0mm) 88 Ball, Very Thin Fine Pitch Ball Grid Array Package (FBGA)		
Theta Ja:	78 °C/W	Psi Jt:	11 °C/W
Assembly Location:	Spansion Thailand	Molding Compound:	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	BT Resin Substrate	Die Attachment:	Film
Lead Finish:	96.5Sn3.0Ag0.5Cu Spheres	Bond Wire:	Gold
Comments:			

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Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	30 mA	Life Test Dynamic Current:	4 mA
Est. Field Voltage:	1.8 V	Life Test Voltage:	1.95 V
Est. Field Power Dissipation:	54 mWatts	Est. Stress Power Dissipation:	7.8 mWatts
Est. Field Tj:	59.2 °C	Est. Stress Tj:	150.6 °C

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Die:	98U03A	Die Size:	4.32 x 9.76 mm
Process:	CS69LS (110nm)	Fab:	Spansion Fab25
Type:	Floating Gate	Density:	128M



## I.B. Product Information

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Product Description: S29WS128J  
128 Megabit (8 M x 16-Bit) 1.8 Volt-only Simultaneous Read/Write Burst Mode Flash Memory

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Package:	VBH084	Qualification:	80302
Description:	(11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin Fine Pitch Ball Grid Array Package (FBGA)		
Theta Ja:	78 °C/W	Psi Jt:	11 °C/W
Assembly Location:	Spansion Thailand	Molding Compound:	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	BT Resin Substrate	Die Attachment:	Paste
Lead Finish:	96.5Sn3.0Ag0.5Cu Spheres	Bond Wire:	Gold
Comments:			

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Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	30 mA	Life Test Dynamic Current:	4 mA
Est. Field Voltage:	1.8 V	Life Test Voltage:	1.95 V
Est. Field Power Dissipation:	54 mWatts	Est. Stress Power Dissipation:	7.8 mWatts
Est. Field Tj:	59.2 °C	Est. Stress Tj:	150.6 °C

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Die:	98U03A	Die Size:	4.32 x 9.76 mm
Process:	CS69LS (110nm)	Fab:	Spansion Fab25
Type:	Floating Gate	Density:	128M

## II. CS69S/LS Life Test Failure Rate Calculation

HTOL Stress Temperature - 150 °C

Failure Mechanism	Read Points / Test Results				Modeling Parameters @ 55°C					Avg. Failure Rate FITS @ 55°C, 60% Conf.	
	24 hrs	168 hrs	1000 hrs	2000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC											
Sample Size	16740	18199	1320	120							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	135	1	135		13	2
Totals	0	0	0	0					57078	13	2

\* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	7244	0.00	No Failures
1000 hrs	0	7491	0.00	No Failures
2000 hrs	0	7999	0.00	No Failures

## III. Summary of Stress Test Results

Stress Test	Stress Condition	Package Type	Sample Size	Num. of Lots	Num. of Fails	Failure Rate %	Comments
Data From Qualification 80150, 80302:							
HTOL (EL)	(1.95V, 150°C)	VBL088 <sup>1</sup>	77	1	0	0.00	168 hours
ESD CDM	N/A	VBL088 <sup>1</sup>	21	1	Passed	700V	
ESD HBM	(100pF, 1500 Ohms)	VBL088 <sup>1</sup>	70	1	Passed	2.0kV	
Latch Up	(125°C, +/- 100mA)	VBL088 <sup>1</sup>	6	1	Passed		
Endurance (10k)	(90°C, 1.95V)	VBL088 <sup>1</sup>	58	1	0	0.00	10k cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	VBL088 <sup>1</sup>	231	1	Passed	JeDEC L3 / Jeita Rank E	
	(PC1/260°C, +0°C/-5°C)	VBH084 <sup>2</sup>	154	1	Passed	JeDEC L3 / Jeita Rank E	
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	VBL088 <sup>1</sup>	77	1	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	VBH084 <sup>2</sup>	77	1	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 110°C/85% RH)	VBL088 <sup>1</sup>	77	1	0	0.00	264 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	VBL088 <sup>1</sup>	77	1	0	0.00	168 hours
	(PC1/260°C, 121°C/100%RH/15PSIG)	VBH084 <sup>2</sup>	77	1	0	0.00	168 hours

## Generic Reference Data:

Preconditioning	(PC2/260°C, +0°C/-5°C)	VBB080 <sup>3</sup>	154	3	Passed	JeDEC L3	
	(PC2/260°C, +0°C/-5°C)	VBG080 <sup>4</sup>	230	3	Passed	JeDEC L3	
Precon+Temp Cycle	(PC2/260°C, -40°C/150°C)	VBG080 <sup>4</sup>	230	3	0	0.00	1000 cycles
Precon+HAST	(PC2/260°C, Biased, 110°C/85% RH)	VBB080 <sup>3</sup>	154	3	0	0.00	264 hours
Steam Pressure Pot	(121°C/100%RH/15PSIG)	VBB080 <sup>3</sup>	154	3	0	0.00	168 hours

Notes / Justification: 1) Results from Qual 80150, S29WS128J, 128M CS69LS (110nm) Floating Gate in 88 Ball vFBGA (11 x 8 x 1mm)  
 2) Results from Qual 80302, S29WS128J, 128M CS69LS (110nm) Floating Gate in 84 Ball vFBGA (11.6 x 8 x 1mm)  
 3) Results from Qual 80038, S29PL129J in 80 Ball vFBGA (11.5 x 9 x 1mm) - Similar Technology and Package  
 4) Results from Qual 80127, S29PL127J in 80 Ball vFBGA (11 x 8 x 1mm) - Similar Technology and Package

Preconditioning Flows: PC1 (Exceeds JEDEC L3 and JEITA Rank E): Bake 125°C, 24hr => Soak @ 30°C/70%RH, 216hr => 3x Reflow  
 PC2 (JEDEC L3): Bake 125°C, 24hr => Soak @ 30°C/60%RH, 192hr => 3x Reflow

## IV. Revision History

Section	Description
Revision A - 3/3/2006	Initial Release.

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