S29WS256R

CS Q99048

Qualification of: S29WS256R, 256 Mb (16M x 16 bit) Simultaneous Read/Write, Burst Mode, 1.8 Volt-only Flash Memory in 65 nm MirrorBit® Technology in VBH084 (11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin Fine Pitch Ball Grid Array Package (FBGA)

Reliability Qualification Summary

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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. Product Information

Product Description: S29WS256R
256 Mb (16M x 16 bit) Simultaneous Read/Write, Burst Mode,
1.8 Volt-only Flash Memory in 65 nm MirrorBit® Technology

Package:	VBH084	**Qualification:**	Q99048
Description:	(11.6 x 8 x 1mm) 84 Ball, Very Thin Fine Pitch Ball Grid Array Package (vFBGA)		
Theta Ja:	39 °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:	98.5Sn1.0Ag0.5Cu Spheres	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	150 °C
Est. DC Field Current:	50 mA	**Life Test Dynamic Current:**	10 mA
Est. Field Voltage:	1.8 V	**Life Test Voltage:**	1.95 V
Est. Field Power Dissipation:	90 mWatts	**Est. Stress Power Dissipation:**	19.5 mWatts
Est. Field Tj:	58.5 °C	**Est. Stress Tj:**	150.7 °C

Die:	98252A	**Die Size:**	5.10 x 5.65 mm
Process:	CS239L (65nm)	**Fab:**	Spansion SP1
Type:	MirrorBit	**Density:**	256M

II. CS239/L 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	504 hrs	1000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC											
Sample Size	5909	5892	977	306							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	159	1	159		39	4
Totals	**0**	**0**	**0**	**0**					**28539**	**39**	**4**

* - Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
168 hrs	0	231	0.00	No Failures
500 hrs	0	231	0.00	No Failures
1000 hrs	0	231	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 Q99048:							
HTOL (EL)	(1.95V, 150°C)	VBH084 [1]	77	1	0	0.00	168 hours
ESD CDM	N/A	VBH084 [1]	15	1	Passed 1.0kV		
ESD HBM	(100pF, 1500 Ohms)	VBH084 [1]	156	1	Passed 2.0kV		
Latch Up	(125°C, +/- 100mA)	VBH084 [1]	6	1	Passed		
	(25°C, +/- 100mA)	VBH084 [1]	6	1	Passed		
Endurance (10k)	(90°C, 1.95V)	VBH084 [1]	64	1	0	0.00	10k cycles
Generic Reference Data:							
Preconditioning	(PC1/260°C, +0°C/-5°C)	VDH064 [2]	231	2	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	VDH064 [2]	77	1	0	0.00	500 cycles
Precon+HAST	(PC1/260°C, Biased, 110°C/85% RH)	VDH064 [2]	77	2	0	0.00	96 hours
Precon+uHAST	(PC1/260°C, Unbiased, 130°C/85% RH)	VDH064 [2]	77	2	0	0.00	96 hours

Notes / Justification:
1) Results from Qual Q99048, S29WS256R, 256M CS239L (65nm) MirrorBit in 84 Ball vFBGA (11.6 x 8 x 1mm)
2) Results from Qual Q99023, S29NS512R in 64 Ball vFBGA (8 x 9.2 x 1mm) - same flash technology from same fab location in similar package

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

IV. Revision History

Section	Description
Revision A - 9/23/2008	
	Initial Release.

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