

# S29VS064R

## CS Q99914, Q99913

Qualification of: S29VS064R, 64 Megabit (4M x 16-bit), CMOS 1.8 Volt-only Simultaneous Read/Write, Burst-mode MirrorBit Flash Memory in VBH084 and VDL044 Packages.



### 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.

#### Table of Contents

- I. Product Information
- II. Life Test Failure Rate Calculation
- III. Summary of Stress Test Results
- IV. Revision History

## I.A. Product Information

Product Description: S29VS064R  
 64 Megabit (4M x 16-bit), CMOS 1.8 Volt-only  
 Simultaneous Read/Write, Burst-mode MirrorBit Flash Memory

Package:	VBH084	Qualification:	Q99914
Description:	(11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin Fine Pitch Ball Grid Array Package (FBGA)		
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:	40 °C	Life Test Temperature:	125 °C
Est. DC Field Current:	40 mA	Life Test Dynamic Current:	19 mA
Est. Field Voltage:	1.8 V	Life Test Voltage:	1.95 V
Est. Field Power Dissipation:	72 mWatts	Est. Stress Power Dissipation:	37 mWatts
Est. Field Tj:	42.8 °C	Est. Stress Tj:	126.4 °C

Die:	98533B	Die Size:	3.30 x 4.77 mm
Process:	CS239L (65nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	64M

## I.B. Product Information

---

Product Description: S29VS064R  
 64 Megabit (4M x 16-bit), CMOS 1.8 Volt-only  
 Simultaneous Read/Write, Burst-mode MirrorBit Flash Memory

---

Package:	VDL044	Qualification:	Q99913
Description:	(5 x 7.5 x 1mm) 44 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:	40 °C	Life Test Temperature:	125 °C
Est. DC Field Current:	40 mA	Life Test Dynamic Current:	19 mA
Est. Field Voltage:	1.8 V	Life Test Voltage:	1.95 V
Est. Field Power Dissipation:	72 mWatts	Est. Stress Power Dissipation:	37 mWatts
Est. Field Tj:	42.8 °C	Est. Stress Tj:	126.4 °C

---

Die:	98533B	Die Size:	3.30 x 4.77 mm
Process:	CS239L (65nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	64M

## II. CS239/L Life Test Failure Rate Calculation

HTOL Stress Temperature - 125 °C

Failure Mechanism	Read Points / Test Results				Modeling Parameters @ 40°C					Avg. Failure Rate FITS @ 40°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	3880	9664	1548	1085							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	150	1	150		50	2
Totals	0	0	0	0					57078	50	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	308	0.00	No Failures
1000 hrs	0	844	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
<b>Data From Qualification Q99914, Q99913:</b>							
HTOL (EL)	(1.95V, 125°C)	VBH084 <sup>1</sup>	391	2	0	0.00	168 hours
ESD CDM	N/A	VBH084 <sup>1</sup>	15	1		Passed 1.0kV	
	N/A	VDL044 <sup>2</sup>	15	1		Passed 1.0kV	
ESD HBM	(100pF, 1500 Ohms)	VBH084 <sup>1</sup>	84	1		Passed 2.0kV	
Latch Up	( +/- 100mA)	VBH084 <sup>1</sup>	6	1		Passed	
Endurance Cycling	(-25°C, 1.95V)	VBH084 <sup>1</sup>	128	2	0	0.00	10K cycles
	(-40°C, 1.95V)	VBH084 <sup>1</sup>	128	2	0	0.00	10K cycles
	(90°C, 1.95V)	VBH084 <sup>1</sup>	63	1	0	0.00	10K cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	VBH084 <sup>1</sup>	77	1		Passed Jedec L3 / Jeita Rank E	
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	VBH084 <sup>1</sup>	71	1	0	0.00	500 cycles
<b>Generic Reference Data:</b>							
Preconditioning	(PC1/260°C, +0°C/-5°C)	VDJ044 <sup>3</sup>	228	1		Passed Jedec L3 / Jeita Rank E	
	(PC1/260°C, +0°C/-5°C)	VDG048 <sup>4</sup>	77	1		Passed Jedec L3 / Jeita Rank E	
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	VDJ044 <sup>3</sup>	73	1	0	0.00	500 cycles
	(PC1/260°C, -40°C/150°C)	VDG048 <sup>4</sup>	73	1	0	0.00	1000 cycles
Precon+uHAST	(PC1/260°C, Unbiased, 130°C/85% RH)	VDJ044 <sup>3</sup>	61	1	0	0.00	96 hours

- Notes / Justification:
- 1) Results from Qual Q99914, S29VS064R, 64M CS239L (65nm) MirrorBit in 84 Ball vFBGA (11.6 x 8 x 1mm)
  - 2) Results from Qual Q99913, S29VS064R, 64M CS239L (65nm) MirrorBit in 44 Ball vFBGA (5 x 7.5 x 1mm)
  - 3) Results from Qual Q99904, S29VS128R in 44 Ball vFBGA (7.7 x 6.2 x 1mm) - Same Flash Technology in similar package type
  - 4) Results from Qual 80615, Am29SL800D in 48 Ball vFBGA (6 x 5 x 1mm) - 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 - 12/7/2010	Initial Release.

### Trademarks and Notice

The contents of this document are subject to change without notice. This document may contain information on a Spansion product under development by Spansion. Spansion reserves the right to change or discontinue work on any product without notice. The information in this document is provided as is without warranty or guarantee of any kind as to its accuracy, completeness, operability, fitness for particular purpose, merchantability, non-infringement of third-party rights, or any other warranty, express, implied, or statutory. Spansion assumes no liability for any damages of any kind arising out of the use of the information in this document.

Copyright © 2012 Spansion Inc. All rights reserved. Spansion®, the Spansion logo, MirrorBit®, MirrorBit® Eclipse™, ORNAND™, and combinations thereof, are trademarks and registered trademarks of Spansion LLC in the United States and other countries. Other names used are for informational purposes only and may be trademarks of their respective owners.