

S29AL016D

CS 80285, 80347

16 Megabit (2M x 8 / 1M x 16) 3V-only, Standard Boot Sector Flash in
TS 048 and VBK048 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.

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I.A. Product Information

Product Description: S29AL016D
16 Megabit (2 M x 8-Bit/1 M x 16-Bit) 3.0 Volt-only Boot Sector Flash Memory

Package:	TS048	Qualification:	80285
Description:	(18.4 x 12.0 x 1.1mm) 48 Lead, Thin Small Outline Package (TSOP)		
Theta Ja:	40 °C/W	Psi Jt:	17 °C/W
Assembly Location:	Spansion Thailand	Molding Compound:	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Laminate Substrate	Die Attachment:	Paste
Lead Finish:	100% Matte Sn Plating	Bond Wire:	Gold
Comments:			

Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	21 mA	Life Test Dynamic Current:	4 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	63 mWatts	Est. Stress Power Dissipation:	14.4 mWatts
Est. Field Tj:	57.5 °C	Est. Stress Tj:	150.5 °C

Die:	98K33A	Die Size:	3.90 x 4.70 mm
Process:	CS49SS (200nm)	Fab:	Spansion Monden
Type:	Floating Gate	Density:	16M

I.B. Product Information

Product Description: S29AL016D
 16 Megabit (2 M x 8-Bit/1 M x 16-Bit) 3.0 Volt-only Boot Sector Flash Memory

Package:	VBK048	Qualification:	80347
Description:	(8.15 x 6.15 x 1.0mm) 48 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:	Laminate Substrate	Die Attachment:	Paste
Lead Finish:	96.5Sn3.0Ag0.5Cu Spheres	Bond Wire:	Gold
Comments:			

Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	21 mA	Life Test Dynamic Current:	4 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	63 mWatts	Est. Stress Power Dissipation:	14.4 mWatts
Est. Field Tj:	57.4 °C	Est. Stress Tj:	150.5 °C

Die:	98K33A	Die Size:	3.90 x 4.70 mm
Process:	CS49SS (200nm)	Fab:	Spansion Monden
Type:	Floating Gate	Density:	16M

II. CS49SS 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	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC										
Sample Size	7087	7101	1561							
Zero fails, Process ave. Ea	0 *	0	0	0.66	137	1	137		31	3
Totals	0	0	0					38052	31	3

* - Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	2943	0.00	No Failures
1000 hrs	0	2847	0.00	No Failures
2000 hrs	0	2116	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 80285, 80347:							
HTOL (EL)	(3.6V, 150°C)	TS048 ¹	1054	5	0	0.00	168 hours
ESD CDM	N/A	TS048 ¹	75	3	Passed	1.0kV	
ESD HBM	(100pF, 1500 Ohms)	TS048 ¹	195	3	Passed	2.0kV	
Latch Up	(125°C, +/- 200mA)	TS048 ¹	18	3	Passed		
Endurance (10k)	(90°C, 3.6V)	TS048 ¹	768	6	0	0.00	10k cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	TS048 ¹	693	3	Passed	Jedec L3 / Jeita Rank E	
	(PC1/260°C, +0°C/-5°C)	VBK048 ²	231	1	Passed	Jedec L3 / Jeita Rank E	
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	TS048 ¹	231	3	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	VBK048 ²	77	1	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	TS048 ¹	231	3	0	0.00	96 hours
	(PC1/260°C, Biased, 110°C/85% RH)	VBK048 ²	77	1	0	0.00	264 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	TS048 ¹	231	3	0	0.00	168 hours
	(PC1/260°C, 121°C/100%RH/15PSIG)	VBK048 ²	77	1	0	0.00	168 hours

Notes / Justification: 1) Results from Qual 80285, S29AL016D, 16M CS49SS (200nm) Floating Gate in 48 Lead TSOP (18.4 x 12 x 1.1mm)
 2) Results from Qual 80347, S29AL016D, 16M CS49SS (200nm) Floating Gate in 48 Ball vFBGA (8.15 x 6.15 x 1mm)

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 - 2/21/2006	
	Initial Release.
Revision B - 4/23/2007	
Section IV: Summary of Stress Test Results	Added new ESD/HBM data to show a passing level of 2kV.

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