

S29AS016J

CS Q99815, Q99815a

Qualification of: S29AS016J, 16 Megabit (2M x 8-Bit/1M x 16-Bit) CMOS
1.8 Volt-only Boot Sector Flash Memory in TS048 (18.4 x 12.0 x
1.0mm) and VBK048 (8.15 x 6.15 x 1.0mm) 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: S29AS016J

16 Megabit (2M x 8-Bit/1M x 16-Bit) CMOS 1.8 Volt-only Boot Sector Flash Memory

Package: TS048

Qualification: Q99815

Description: (18.4 x 12.0 x 1.0mm) 48 Lead, Thin Small Outline Package (TSOP)

Theta Ja: 40 °C/W

Psi Jt: 17 °C/W

Assembly Location: Spansion Kuala Lumpur

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: 30 mA

Life Test Dynamic Current: 12 mA

Est. Field Voltage: 1.8 V

Life Test Voltage: 1.95 V

Est. Field Power Dissipation: 54 mWatts

Est. Stress Power Dissipation: 23.4 mWatts

Est. Field Tj: 57.1 °C

Est. Stress Tj: 150.9 °C

Die: 98K36B

Die Size: 4.30 x 2.55 mm

Process: CS69LSS (110nm)

Fab: Spansion Fab25

Type: Floating Gate

Density: 16M

I.B. Product Information

Product Description: S29AS016J
16 Megabit (2M x 8-Bit/1M x 16-Bit) CMOS 1.8 Volt-only Boot Sector Flash Memory

Package:	VBK048	Qualification:	Q99815a
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:	30 mA	Life Test Dynamic Current:	12 mA
Est. Field Voltage:	1.8 V	Life Test Voltage:	1.95 V
Est. Field Power Dissipation:	54 mWatts	Est. Stress Power Dissipation:	23.4 mWatts
Est. Field Tj:	57.1 °C	Est. Stress Tj:	150.9 °C

Die:	98K36B	Die Size:	4.30 x 2.55 mm
Process:	CS69LSS (110nm)	Fab:	Spansion Fab25
Type:	Floating Gate	Density:	16M

II. CS69SS/LSS 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	5600	6416	1200	80							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	166	1	166		39	3
Totals	0	0	0	0					38052	39	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	1577	0.00	No Failures
1000 hrs	0	1750	0.00	No Failures
2000 hrs	0	1750	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 Q99815:							
HTOL (EL)	(1.95V, 150°C)	TS048 ¹	77	1		168 hours	
HTOL (IL)	(1.95V, 150°C)	TS048 ¹	77	1		408 hours	
ESD CDM	N/A	TS048 ¹	15	1		Passed 1.0kV	
ESD HBM	(100pF, 1500 Ohms)	TS048 ¹	60	1		Passed 2.0kV	
Latch Up	(125°C, +/- 100mA)	TS048 ¹	6	1		Passed	
Endurance (10k)	(-40°C, 1.95V)	TS048 ¹	64	1	0	0.00	10k cycles
	(90°C, 1.95V)	TS048 ¹	64	1	0	0.00	10k cycles
Endurance (100k)	(90°C, 1.95V)	TS048 ¹	64	1	0	0.00	100k cycles
Preconditioning	(PC2/260°C, +0°C/-5°C)	TS048 ¹	231	1		Passed Jedec L3 / Jeita Rank E	

Generic Reference Data:

Data Retention Bake	(150°C)	TS048 ⁴	300	3	0	0.00	48 hours
	(25°C)	TS048 ⁴	3926	3	0	0.00	24 hours
Preconditioning	(PC2/260°C, +0°C/-5°C)	TS048 ²	231	1		Passed Jedec L3 / Jeita Rank E	
	(PC2/260°C, +0°C/-5°C)	VBK048 ³	231	1		Passed Jedec L3 / Jeita Rank E	
	(PC1/260°C, +0°C/-5°C)	TS048 ⁴	693	3		Passed Jedec L3 / Jeita Rank E	
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	TS048 ²	77	1	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	VBK048 ³	77	1	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	TS048 ⁴	231	3	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	TS048 ²	77	1	0	0.00	96 hours
	(PC1/260°C, Biased, 110°C/85% RH)	VBK048 ³	77	1	0	0.00	264 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	TS048 ²	77	1	0	0.00	168 hours
	(PC1/260°C, 121°C/100%RH/15PSIG)	VBK048 ³	77	1	0	0.00	168 hours

- Notes / Justification:
- 1) Results from Qual Q99815, S29AS016J, 16M CS69LSS (110nm) Floating Gate in 48 Lead TSOP (18.4 x 12 x 1mm) - Same Package, Flash Technology and Fab Location
 - 2) Results from Qual 81281, S29AS016J in 48 Lead TSOP (18.4 x 12 x 1.1mm) - Same Package and Flash Technology but in different Fab location
 - 3) Results from Qual 81282, S29AS016J in 48 Ball vFBGA (8.15 x 6.15 x 1mm) - Same Package and Flash Technology but in different Fab location
 - 4) Results from Qual Q99801, S29AL016J in 48 Lead TSOP (18.4 x 12 x 1mm) - Same Package, Similar Technology and same Fab location

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 - 3/22/2010	Initial Release.

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