S29CD032G

CS 80053, 80054

Qualification of: S29CD032G, 32 Megabit (1M x 32 Bit), 2.5 Volt-only, Burst Mode, Dual Boot, Simultaneous Read/Write Flash Memory

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: S29CD032G

32 Megabit (1M x 32 Bit), 2.5 Volt-only, Burst Mode, Dual Boot, Simultaneous Read/Write Flash Memory

Package:	LAA080	**Qualification:**	80053
Description:	(13.0 x 11.0 x 1.4mm) 80 Ball, Fortified Ball Grid Array Package (FBGA)		
Theta Ja:	78 °C/W	**Psi Jt:**	°C/W
Assembly Location:	Spansion Thailand	**Molding Compound:**	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Laminate Substrate	**Die Attachment:**	Paste
Lead Finish:	63Sn37Pb Spheres	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	150 °C
Est. DC Field Current:	40 mA	**Life Test Dynamic Current:**	4 mA
Est. Field Voltage:	2.5 V	**Life Test Voltage:**	2.7 V
Est. Field Power Dissipation:	100 mWatts	**Est. Stress Power Dissipation:**	10.8 mWatts
Est. Field Tj:	62.8 °C	**Est. Stress Tj:**	150.8 °C

Die:	98N03A	**Die Size:**	7.33 x 5.85 mm
Process:	CS59LS (170nm)	**Fab:**	Spansion Takaku
Type:	Floating Gate	**Density:**	32M

I.B. Product Information

Product Description: S29CD032G
32 Megabit (1M x 32 Bit), 2.5 Volt-only, Burst Mode, Dual Boot, Simultaneous Read/Write Flash Memory

Package:	PQR080	**Qualification:**	80054
Description:	(14.0 x 20.0 x 3.35mm) 80 Lead, Plastic Quad Flat Package (PQR)		
Theta Ja:	50 °C/W	**Psi Jt:**	°C/W
Assembly Location:	Amkor Manila	**Molding Compound:**	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Laminate Substrate	**Die Attachment:**	Paste
Lead Finish:	SnPb Plating	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	150 °C
Est. DC Field Current:	40 mA	**Life Test Dynamic Current:**	4 mA
Est. Field Voltage:	2.5 V	**Life Test Voltage:**	2.7 V
Est. Field Power Dissipation:	100 mWatts	**Est. Stress Power Dissipation:**	10.8 mWatts
Est. Field Tj:	60.0 °C	**Est. Stress Tj:**	150.5 °C

Die:	98N03A	**Die Size:**	7.33 x 5.85 mm
Process:	CS59LS (170nm)	**Fab:**	Spansion Takaku
Type:	Floating Gate	**Density:**	32M

II. CS59S/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	18144	16147	2757	320							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	135	1	135		13	1
Totals	**0**	**0**	**0**	**0**					**114155**	**13**	**1**

* - Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	3708	0.00	No Failures
1000 hrs	0	3861	0.00	No Failures
2000 hrs	0	3208	0.00	No Failures
5000 hrs	0	1400	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 80053, 80054:							
HTOL (EL)	(2.7V, 150°C)	LAA080 [1]	152	2	0	0.00	168 hours
ESD CDM	N/A	LAA080 [1]	17	2	Passed 1.0kV		
	N/A	PQR080 [2]	30	2	Passed 1.0kV		
ESD HBM	(100pF, 1500 Ohms)	LAA080 [1]	204	2	Passed 2.0kV		
	(100pF, 1500 Ohms)	PQR080 [2]	148	2	Passed 2.0kV		
Latch Up	(125°C, +/- 200mA)	LAA080 [1]	10	2	Passed		
	(125°C, +/- 200mA)	PQR080 [2]	12	2	Passed		
Endurance (10k)	(130°C, 2.7V)	LAA080 [1]	119	2	0	0.00	10k cycles
Gate Leakage	(155°C, +/- 400V)	LAA080 [1]	12	1	Passed		
	(155°C, +/- 400V)	PQR080 [2]	12	1	Passed		
Preconditioning	(PC2/260°C, +0°C/-5°C)	LAA080 [1]	151	1	Passed Jedec L3		
	(PC2/260°C, +0°C/-5°C)	PQR080 [2]	154	1	Passed Jedec L3		
Precon+Temp Cycle	(PC2/260°C, -50°C/150°C)	LAA080 [1]	77	1	0	0.00	1000 cycles
	(PC2/260°C, -40°C/150°C)	PQR080 [2]	77	1	0	0.00	1000 cycles
Precon+Steam Pressure	(PC2/260°C, 121°C/100%RH/15PSIG)	LAA080 [1]	74	1	0	0.00	168 hours
	(PC2/260°C, 121°C/100%RH/15PSIG)	PQR080 [2]	77	1	0	0.00	168 hours
Generic Reference Data:							
Preconditioning	(PC2/260°C, +0°C/-5°C)	PQR080 [3]	924	3	Passed Jedec L3		
	(PC2/260°C, +0°C/-5°C)	LAA080 [4]	164	3	Passed Jedec L3		
	(PC2/260°C, +0°C/-5°C)	LAA064 [5]	142	3	Passed Jedec L3		
Precon+Temp Cycle	(PC2/260°C, -40°C/150°C)	PQR080 [3]	231	3	0	0.00	1000 cycles
	(PC2/260°C, -50°C/150°C)	PQR080 [3]	230	3	0	0.00	1000 cycles
	(PC2/260°C, -40°C/150°C)	LAA080 [4]	164	3	0	0.00	1000 cycles
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	PQR080 [3]	231	3	0	0.00	96 hours
	(PC2/260°C, Biased, 110°C/85% RH)	LAA064 [5]	142	3	0	0.00	264 hours
Precon+Steam Pressure	(PC2/260°C, 121°C/100%RH/15PSIG)	PQR080 [3]	231	3	0	0.00	168 hours
Steam Pressure Pot	(121°C/100%RH/15PSIG)	LAA080 [4]	164	3	0	0.00	168 hours

Notes / Justification:

1) Results from Qual 80053, S29CD032G, 32M CS59LS (170nm) Floating Gate in 80 Ball fFBGA (13 x 11 x 1.4mm) - BKK
2) Results from Qual 80054, S29CD032G, 32M CS59LS (170nm) Floating Gate in 80 Lead PQR (14 x 20 x 3.35mm) - Amkor
3) Results from Qual 80021, Am29BDD160G in 80 Lead PQR (14 x 20 x 3.35mm) - Amkor, Same Package, Technology, Similar Device
4) Results from Qual 4494, Am29BDD160G in 80 Ball fFBGA (13 x 11 x 1.4mm) - BKK, Same Package, Technology, Similar Device
5) Results from Qual 4588, in 64 Ball fFBGA (13 x 11 x 1.4mm) - BKK, Similar Package

Preconditioning Flows: PC2 (JEDEC L3): Bake 125°C, 24hr => Soak @ 30°C/60%RH, 192hr => 3x Reflow

IV. Revision History

Section	Description
Revision A - 1/26/2006	
	Initial Release.

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