S25FL032P

CS Q99772, Q99765

Qualification of: S25FL032P, 32-Mbit CMOS 3.0 Volt Flash Memory with 104-MHz SPI (Serial Peripheral Interface) Multi I/O Bus in FAC024 and FAB024, 24 Ball, Fine Pitch Ball Grid Array Package (FBGA)

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:	S25FL032P
	32-Mbit CMOS 3.0 Volt Flash Memory with 104-MHz SPI (Serial Peripheral Interface) Multi I/O Bus

Package:	FAC024	Qualification:	Q99772
Description:	(8 x 6 x 1.2mm) 24 Ball, 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:	96.5Sn3.0Ag0.5Cu Spheres	Bond Wire:	Gold
Comments:			

Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	26 mA	Life Test Dynamic Current:	12 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	78 mWatts	Est. Stress Power Dissipation:	43.2 mWatts
Est. Field Tj:	58.0 °C	Est. Stress Tj:	151.6 °C

Die:	98LZ2A	Die Size:	3.96 x 2.92 mm
Process:	CS129 (90nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	32M

I.B. Product Information

Product Description:	S25FL032P
	32-Mbit CMOS 3.0 Volt Flash Memory with 104-MHz SPI (Serial Peripheral Interface) Multi I/O Bus

Package:	FAB024	Qualification:	Q99765
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Substrate/Leadframe:	BT Resin Substrate	Die Attachment:	Paste
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Die:	98LZ2A	Die Size:	3.96 x 2.92 mm
Process:	CS129 (90nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	32M

II. CS129/AL 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	10451	9843	2239	50							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	158	1	158		21	1
Totals	0	0	0	0					114155	21	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	2349	0.00	No Failures
1000 hrs	0	2395	0.00	No Failures
2000 hrs	0	2645	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 Q99772, Q99765:							
ESD CDM	N/A	FAC024 [1]	15	1	Passed 1.0kV		
	N/A	FAB024 [2]	15	1	Passed 1.0kV		
Generic Reference Data:							
HTOL (EL)	(3.6V, 150°C)	SO3016 [6]	400	2	0	0.00	168 hours
HTOL (IL)	(3.6V, 150°C)	SO3016 [6]	400	2	0	0.00	504 hours
ESD HBM	(100pF, 1500 Ohms)	SO3016 [6]	120	2	Passed 2.0kV		
Latch Up	(125°C, +/- 100mA)	SO3016 [6]	12	2	Passed		
Endurance (10k)	(25°C, 3.6V)	SO3016 [6]	128	2	0	0.00	10k cycles
	(90°C, 3.6V)	SO3016 [6]	128	2	0	0.00	10k cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	FAC024 [3]	77	1	Passed Jedec L3 / Jeita Rank E		
	(PC1/260°C, +0°C/-5°C)	FAB024 [4]	77	1	Passed Jedec L3 / Jeita Rank E		
	(PC1/260°C, +0°C/-5°C)	LAA064 [5]	229	1	Passed Jedec L3 / Jeita Rank E		
	(PC1/260°C, +0°C/-5°C)	FAA064 [7]	77	1	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	LAA064 [5]	75	1	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	FAA064 [7]	77	1	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 110°C/85% RH)	LAA064 [5]	77	1	0	0.00	264 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	LAA064 [5]	77	1	0	0.00	168 hours

Notes / Justification:
1) Results from Qual Q99772, S25FL032P, 32M CS129 (90nm) MirrorBit in 24 Ball FBGA (8 x 6 x 1.2mm)
2) Results from Qual Q99765, S25FL032P, 32M CS129 (90nm) MirrorBit in 24 Ball FBGA (8 x 6 x 1.2mm)
3) Results from Qual Q99768, S25FL129P in 24 Ball FBGA (8 x 6 x 1.2mm) - Same Package and Flash Technology
4) Results from Qual Q99745, S25FL129P in 24 Ball FBGA (8 x 6 x 1.2mm) - Same Package and Flash Technology
5) Results from Qual 81292, S29GL01GP in 64 Ball fFBGA (13 x 11 x 1.4mm) - Same Material Set and Similar Package
6) Results from Qual Q99569, S25FL032P in 16 Lead SOIC (10.3 x 10.3 x 2.65mm) - Same Flash
7) Results from Qual 80731, S29GL256N in 64 Ball FBGA (13 x 10 x 1.2mm) - Same Material Set and 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 - 12/3/2009	
	Initial Release.