S25FL256S

CS Q100083, Q100087, Q100088, Q100191

Qualification of: S25FL256S, 256-Mbit CMOS 3.0 Volt Flash Memory with 104-MHz SPI (Serial Peripheral Interface) with Multi I/O Bus

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: S25FL256S

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

Package:	SO3016	**Qualification:**	Q100083
Description:	(10.3 x 10.3 x 2.65mm) 16 Lead, Small Outline Integrated Circuit (SOIC)		
Theta Ja:	38 °C/W	**Psi Jt:**	7.8 °C/W
Assembly Location:	UTL Thailand	**Molding Compound:**	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Copper Leadframe	**Die Attachment:**	Paste
Lead Finish:	100% Matte Sn Plating	**Bond Wire:**	Copper
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	25 mA	**Life Test Dynamic Current:**	14 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	75 mWatts	**Est. Stress Power Dissipation:**	50.4 mWatts
Est. Field Tj:	57.8 °C	**Est. Stress Tj:**	126.9 °C

Die:	98222A	**Die Size:**	4.93 x 5.30 mm
Process:	CS239LS (65nm)	**Fab:**	Spansion Fab25
Type:	MirrorBit	**Density:**	256M

I.B. Product Information

Product Description: S25FL256S

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

Package:	FAB024	**Qualification:**	Q100087
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:	Laminate Substrate	**Die Attachment:**	Film
Lead Finish:	96.5Sn3.0Ag0.5Cu Spheres	**Bond Wire:**	Copper
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	25 mA	**Life Test Dynamic Current:**	14 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	75 mWatts	**Est. Stress Power Dissipation:**	50.4 mWatts
Est. Field Tj:	57.9 °C	**Est. Stress Tj:**	126.9 °C

Die:	98222A	**Die Size:**	4.93 x 5.30 mm
Process:	CS239LS (65nm)	**Fab:**	Spansion Fab25
Type:	MirrorBit	**Density:**	256M

I.C. Product Information

Product Description: S25FL256S

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

Package:	FAC024	**Qualification:**	Q100088
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:	Laminate Substrate	**Die Attachment:**	Film
Lead Finish:	96.5Sn3.0Ag0.5Cu Spheres	**Bond Wire:**	Copper
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	25 mA	**Life Test Dynamic Current:**	14 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	75 mWatts	**Est. Stress Power Dissipation:**	50.4 mWatts
Est. Field Tj:	57.9 °C	**Est. Stress Tj:**	126.9 °C

Die:	98222A	**Die Size:**	4.93 x 5.30 mm
Process:	CS239LS (65nm)	**Fab:**	Spansion Fab25
Type:	MirrorBit	**Density:**	256M

I.D. Product Information

Product Description: S25FL256S
256-Mbit CMOS 3.0 Volt Flash Memory with 104-MHz SPI (Serial Peripheral Interface) with Multi I/O Bus

Package:	WNG008	**Qualification:**	Q100191
Description:	(6 x 8 x 0.8mm) 8 Contact, Small Outline No Lead Package (WSON)		
Theta Ja:	18 °C/W	**Psi Jt:**	8.8 °C/W
Assembly Location:	UTL Thailand	**Molding Compound:**	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Copper Leadframe	**Die Attachment:**	Paste
Lead Finish:	100% Matte Sn Plating	**Bond Wire:**	Copper
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	25 mA	**Life Test Dynamic Current:**	14 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	75 mWatts	**Est. Stress Power Dissipation:**	50.4 mWatts
Est. Field Tj:	56.3 °C	**Est. Stress Tj:**	125.8 °C

Die:	98222A	**Die Size:**	4.93 x 5.30 mm
Process:	CS239LS (65nm)	**Fab:**	Spansion Fab25
Type:	MirrorBit	**Density:**	256M

II. CS239LS Life Test Failure Rate Calculation

HTOL Stress Temperature - 125 °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	4950	4615	842	50							
Zero fails, Process ave. Ea	0	0 *	0	0	0.66	53	1	53		48	11
Totals	**0**	**0**	**0**	**0**					**10378**	**48**	**11**

* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	1735	0.00	No Failures
1000 hrs	0	1208	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 Q100083, Q100087, Q100088, Q100191:							
HTOL (EL)	(3.6V, 125°C)	SO3016 [1]	447	4	0	0.00	48 hours
	(3.6V, 125°C)	SO3016 [1]	447	4	0	0.00	168 hours
HTOL (IL)	(3.6V, 125°C)	SO3016 [1]	231	4	0	0.00	504 hours
ESD CDM	N/A	SO3016 [1]	30	2	Passed 1.0kV		
	N/A	FAB024 [2]	15	1	Passed 1.0kV		
	N/A	FAC024 [3]	15	1	Passed 1.0kV		
	N/A	WNG008 [4]	15	1	Passed 1.0kV		
ESD HBM	(100pF, 1500 Ohms)	SO3016 [1]	252	3	Passed 2.0kV		
Latch Up	(+/- 100mA)	SO3016 [1]	18	3	Passed		
Endurance Cycling	(-40°C, 3.6V)	SO3016 [1]	64	1	0	0.00	10K cycles
	(90°C, 3.6V)	SO3016 [1]	128	2	0	0.00	100K cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	FAB024 [2]	154	1	Passed Jedec L3 / Jeita Rank E		
	(PC9/260°C, +0°C/-5°C)	WNG008 [4]	154	2	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	FAB024 [2]	77	1	0	0.00	1000 cycles
	(PC9/260°C, -40°C/150°C)	WNG008 [4]	77	1	0	0.00	1000 cycles
Precon+HAST	(PC9/260°C, Biased, 130°C/85% RH)	WNG008 [4]	77	1	0	0.00	96 hours
Precon+uHAST	(PC1/260°C, Unbiased, 130°C/85% RH)	FAB024 [2]	77	1	0	0.00	96 hours

Notes / Justification:
1) Results from Qual Q100083, S25FL256S, 256M CS239LS (65nm) MirrorBit in 16 Lead SOIC (10.3 x 10.3 x 2.65mm)
2) Results from Qual Q100087, S25FL256S, 256M CS239LS (65nm) MirrorBit in 24 Ball FBGA (8 x 6 x 1.2mm)
3) Results from Qual Q100088, S25FL256S, 256M CS239LS (65nm) MirrorBit in 24 Ball FBGA (8 x 6 x 1.2mm)
4) Results from Qual Q100191, S25FL256S, 256M CS239LS (65nm) MirrorBit in 8 Contact WSON (6 x 8 x 0.8mm)

Preconditioning Flows:
PC1 (Exceeds JEDEC L3 and JEITA Rank E): Bake 125°C, 24hr => Soak @ 30°C/70%RH, 216hr => 3x Reflow
PC9 (Accelerated JEDEC L3 / JEITA Rank E): Bake 125°C, 24hr => Soak @ 60°C/70%RH, 72hr => 3x Reflow

IV. Revision History

Section	Description
Revision A - 8/6/2012	
	Initial Release.

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