S25FL004K

CS Q99971, Q99973

Qualification of: S25FL004K, 4-Mbit CMOS 3.0 Volt Flash Memory with 104-MHz SPI (Serial Peripheral Interface) Multi I/O Bus in SOA008 (4.9 x 6.0 x 1.75mm) and SOC008 (8.00 x 5.28 x 2.159mm)

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: S25FL004K
4-Mbit CMOS 3.0 Volt Flash Memory
with 104-MHz SPI (Serial Peripheral Interface) Multi I/O Bus

Package:	SOC008	**Qualification:**	Q99971
Description:	(8.00 x 5.28 x 2.159mm) 8 Lead, Small Outline Integrated Circuit (SOIC)		
Theta Ja:	75 °C/W	**Psi Jt:**	15 °C/W
Assembly Location:	ChipMOS Shanghai	**Molding Compound:**	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Copper Leadframe	**Die Attachment:**	Paste
Lead Finish:	100% Matte Sn Plating	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	25 mA	**Life Test Dynamic Current:**	12 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	75 mWatts	**Est. Stress Power Dissipation:**	43.2 mWatts
Est. Field Tj:	60.6 °C	**Est. Stress Tj:**	128.2 °C

Die:	KAG018D	**Die Size:**	1.59 x 1.61 mm
Process:	90nm	**Fab:**	Winbond
Type:	Floating Gate	**Density:**	4M

I.B. Product Information

Product Description: S25FL004K

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

Package:	SOA008	**Qualification:**	Q99973
Description:	(4.9 x 6.0 x 1.75mm) 8 Lead, Small Outline Integrated Circuit (SOIC)		
Theta Ja:	75 °C/W	**Psi Jt:**	15 °C/W
Assembly Location:	ChipMOS Shanghai	**Molding Compound:**	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Copper Leadframe	**Die Attachment:**	Paste
Lead Finish:	100% Matte Sn Plating	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	25 mA	**Life Test Dynamic Current:**	12 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	75 mWatts	**Est. Stress Power Dissipation:**	43.2 mWatts
Est. Field Tj:	60.6 °C	**Est. Stress Tj:**	128.2 °C

Die:	KAG018D	**Die Size:**	1.59 x 1.61 mm
Process:	90nm	**Fab:**	Winbond
Type:	Floating Gate	**Density:**	4M

II. 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 Q99971, Q99973:							
ESD CDM	N/A	SOC008 [1]	15	1	Passed 1.0kV		
	N/A	SOA008 [2]	15	1	Passed 1.0kV		
Generic Reference Data:							
HTOL (XL)	(3.6V, 125°C)	SOC008 [5]	231	3	0	0.00	1000 hours
Data Retention Bake	(150°C)	SOC008 [5]	231	3	0	0.00	1000 hours
ESD HBM	(100pF, 1500 Ohms)	SOC008 [5]	36	3	Passed 2.0kV		
Latch Up	(25°C, +/- 100mA)	SOC008 [5]	18	3	Passed		
Cycling + DRB	(25°C, 3.3V, 100kcyc, DRB@125C)	SOC008 [5]	114	3	0	0.00	500h DRB
	(85°C, 3.3V, 100kcyc, DRB@125C)	SOC008 [5]	117	3	0	0.00	500h DRB
Preconditioning	(PC9/260°C, +0°C/-5°C)	SOA008 [3]	154	1	Passed Jedec L3 / Jeita Rank E		
	(PC9/260°C, +0°C/-5°C)	SOC008 [4]	154	1	Passed Jedec L3 / Jeita Rank E		
	(PC2/260°C, +0°C/-5°C)	SOC008 [5]	1155	3	Passed Jedec L3		
Precon+Temp Cycle	(PC9/260°C, -40°C/150°C)	SOA008 [3]	77	1	0	0.00	1000 cycles
	(PC9/260°C, -40°C/150°C)	SOC008 [4]	77	1	0	0.00	1000 cycles
Temp Cycle	(-65°C/150°C)	SOC008 [5]	231	3	0	0.00	500 cycles
Precon+HAST	(PC9/260°C, Biased, 130°C/85% RH)	SOA008 [3]	77	1	0	0.00	96 hours
	(PC9/260°C, Biased, 130°C/85% RH)	SOC008 [4]	77	1	0	0.00	96 hours
HAST	(Biased, 130°C/85% RH)	SOC008 [5]	231	3	0	0.00	168 hours
Steam Pressure Pot	(121°C/100%RH / 15PSIG)	SOC008 [5]	231	3	0	0.00	168 hours

Notes / Justification:
1) Results from Qual Q99971, S25FL004K, 4M 90nm Floating Gate in 8 Lead SOIC (8 x 5.28 x 2.159mm)
2) Results from Qual Q99973, S25FL004K, 4M 90nm Floating Gate in 8 Lead SOIC (4.9 x 6 x 1.75mm)
3) Results from Qual Q99947, S25FL016K in 8 Lead SOIC (4.9 x 6 x 1.75mm) - Same Package, Same Material Set, Same Assembly Location, Same Technology in FL-K 16M
4) Results from Qual Q99948, S25FL016K in 8 Lead SOIC (8 x 5.28 x 2.159mm) - Same Package, Same Material Set, Same Assembly Location, Same Technology in FL-K 16M
5) Results from Qual 64M_Winbond_FL-K, S25FL064K in 8 Lead SOIC (8 x 5.28 x 2.159mm) - Winbond 90nm Qualification

Preconditioning Flows:
PC2 (JEDEC L3): Bake 125°C, 24hr => Soak @ 30°C/60%RH, 192hr => 3x Reflow
PC9 (Accelerated JEDEC L3 / JEITA Rank E): Bake 125°C, 24hr => Soak @ 60°C/70%RH, 72hr => 3x Reflow

III. Revision History

Section	Description
Revision A - 11/24/2010	
	Initial Release.

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