

S29GL512N

CS Q99790, Q99790a

Qualification of: S29GL512N, 512 Megabit, 3.0 Volt-only Page Mode
Flash Memory featuring 110nm MirrorBit Process Technology



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: S29GL512N

512 Megabit, 3.0 Volt-only Page Mode Flash Memory featuring 110nm MirrorBit Process Technology

Package:	TS056	Qualification:	Q99790
Description:	(18.4 x 14.0 x 1.0mm) 56 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:	Copper Leadframe	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:	25 mA	Life Test Dynamic Current:	10 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	75 mWatts	Est. Stress Power Dissipation:	36 mWatts
Est. Field Tj:	58.0 °C	Est. Stress Tj:	151.4 °C

Die:	98883C	Die Size:	9.74 x 7.70 mm
Process:	CS119S (110nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	512M

I.B. Product Information

Product Description: S29GL512N
 512 Megabit, 3.0 Volt-only Page Mode Flash Memory featuring 110nm MirrorBit Process Technology

Package:	LAA064	Qualification:	Q99790a
Description:	(13.0 x 11.0 x 1.4mm) 64 Ball, Fortified 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:	25 mA	Life Test Dynamic Current:	10 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	75 mWatts	Est. Stress Power Dissipation:	36 mWatts
Est. Field Tj:	57.9 °C	Est. Stress Tj:	151.4 °C

Die:	98883C	Die Size:	9.74 x 7.70 mm
Process:	CS119S (110nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	512M

II. CS119S/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	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC										
Sample Size	6110	4390	1150							
Zero fails, Process ave. Ea	0 *	0	0	0.66	135	1	135		39	4
Totals	0	0	0					28539	39	4

* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	2790	0.00	No Failures
1000 hrs	0	2790	0.00	No Failures
2000 hrs	0	2809	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 Q99790:							
HTOL (EL)	(3.6V, 150°C)	TS056 ¹	77	1	0	0.00	168 hours
ESD CDM	N/A	TS056 ¹	15	1	Passed	1.0kV	
ESD HBM	(100pF, 1500 Ohms)	TS056 ¹	84	1	Passed	2.0kV	
Latch Up	(+/- 100mA)	TS056 ¹	6	1	Passed		
Endurance (10k)	(-40°C, 3.6V)	TS056 ¹	64	1	0	0.00	10k cycles
Generic Reference Data:							
HTOL (EL)	(3.6V, 150°C)	TS056 ³	2630	6	0	0.00	168 hours
HTOL (IL)	(3.6V, 150°C)	TS056 ³	231	3	0	0.00	500 hours
ESD CDM	N/A	LAA064 ²	15	1	Passed	1.0kV	
Preconditioning	(PC1/260°C, +0°C/-5°C)	LAA064 ²	230	1	Passed	Jedec L3 / Jeita Rank E	
		TS056 ³	692	3	Passed	Jedec L3 / Jeita Rank E	
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	LAA064 ²	77	1	0	0.00	1000 cycles
		TS056 ³	230	3	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 110°C/85% RH)	LAA064 ²	77	1	0	0.00	264 hours
		TS056 ³	231	3	0	0.00	96 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	LAA064 ²	76	1	0	0.00	168 hours
Precon+uHAST	(PC1/260°C, Unbiased, 130°C/85% RH)	TS056 ³	231	3	0	0.00	96 hours

Notes / Justification: 1) Results from Qual Q99790, S29GL512N, 512M CS119S (110nm) MirrorBit in 56 Lead TSOP (18.4 x 14 x 1mm)
 2) Results from Qual 80209, S29GL512N in 64 Ball fBGA (13 x 11 x 1.4mm) - Same product on same technology in same BGA package
 3) Results from Qual Q99760, S29GL128N in 56 Lead TSOP (18.4 x 14 x 1mm) - Similar product (128M) on same technology built in same fab location in same TSOP 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 - 12/2/2009	Initial Release.

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