S29GL512P

CS 80967, 81175

Qualification of: S29GL512P, 512 Megabit, 3.0 Volt-only Page Mode Flash Memory featuring 90 nm MirrorBit® Process Technology in TS056 and LAA064 Packages

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.

Table of Contents

I.A. Product Information

Product Description: S29GL512P

512 Megabit, 3.0 Volt-only Page Mode Flash Memory featuring 90 nm MirrorBit® Process Technology

Package:	TS056	Qualification:	80967
Description:	(18.4 x 14.0 x 1.1mm) 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:	SnPb Plating	Bond Wire:	Gold
Comments:			

Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	50 mA	Life Test Dynamic Current:	6 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	150 mWatts	Est. Stress Power Dissipation:	21.6 mWatts
Est. Field Tj:	61.0 °C	Est. Stress Tj:	150.8 °C

Die:	98884A	Die Size:	6.55 x 7.38 mm
Process:	CS129 (90nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	512M

I.B. Product Information

Product Description: S29GL512P

512 Megabit, 3.0 Volt-only Page Mode Flash Memory featuring 90 nm MirrorBit® Process Technology

Package:	LAA064	Qualification:	81175
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:	63Sn37Pb Spheres	Bond Wire:	Gold
Comments:			

Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	50 mA	Life Test Dynamic Current:	6 mA
Est. Field Voltage:	3.0 V	Life Test Voltage:	3.6 V
Est. Field Power Dissipation:	150 mWatts	Est. Stress Power Dissipation:	21.6 mWatts
Est. Field Tj:	60.8 °C	Est. Stress Tj:	150.8 °C

Die:	98884A	Die Size:	6.55 x 7.38 mm
Process:	CS129 (90nm)	Fab:	Spansion Fab25
Type:	MirrorBit	Density:	512M

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	504 hrs	1000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC											
Sample Size	7640	7876	960	164							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	145	1	145		29	3
Totals	0	0	0	0					38052	29	3

* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	2310	0.00	No Failures
1000 hrs	0	2171	0.00	No Failures
2000 hrs	0	1402	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 80967, 81175:							
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		
	N/A	LAA064 [2]	15	1	Passed 1.0kV		
ESD HBM	(100pF, 1500 Ohms)	TS056 [1]	84	1	Passed 2.0kV		
	(100pF, 1500 Ohms)	LAA064 [2]	84	1	Passed 2.0kV		
Latch Up	(125°C, +/- 100mA)	TS056 [1]	6	1	Passed		
	(125°C, +/- 100mA)	LAA064 [2]	6	1	Passed		
Endurance (10k)	(90°C, 3.6V)	TS056 [1]	64	1	0	0.00	10k cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	TS056 [1]	77	1	Passed Jedec L3 / Jeita Rank E		
	(PC1/260°C, +0°C/-5°C)	LAA064 [2]	77	1	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	TS056 [1]	77	1	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	LAA064 [2]	77	1	0	0.00	1000 cycles
Generic Reference Data:							
Preconditioning	(PC1/260°C, +0°C/-5°C)	TS056 [3]	692	3	Passed Jedec L3 / Jeita Rank E		
	(PC2/260°C, +0°C/-5°C)	LAA064 [4]	379	3	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	TS056 [3]	231	3	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	LAA064 [4]	146	3	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	TS056 [3]	231	3	0	0.00	96 hours
	(PC1/260°C, Biased, 110°C/85% RH)	LAA064 [4]	117	3	0	0.00	264 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	TS056 [3]	230	3	0	0.00	168 hours
	(PC1/260°C, 121°C/100%RH/15PSIG)	LAA064 [4]	116	3	0	0.00	168 hours

Notes / Justification:
1) Results from Qual 80967, S29GL512P, 512M CS129 (90nm) MirrorBit in 56 Lead TSOP (18.4 x 14 x 1.1mm)
2) Results from Qual 81175, S29GL512P, 512M CS129 (90nm) MirrorBit in 64 Ball fFBGA (13 x 11 x 1.4mm)
3) Results from Qual 80719, S29GL01GP in 56 Lead TSOP (18.4 x 14 x 1.1mm) - Same Flash technology and TS056 Package
4) Results from Qual 80732, S29GL01GP in 64 Ball fFBGA (13 x 11 x 1.4mm) - ame Flash technology and LAA064 Package. Similar to LAE064

Preconditioning Flows: PC1 (Exceeds JEDEC L3 and JEITA Rank E): Bake 125°C, 24hr => Soak @ 30°C/70%RH, 216hr => 3x Reflow
PC2 (JEDEC L3): Bake 125°C, 24hr => Soak @ 30°C/60%RH, 192hr => 3x Reflow

IV. Revision History

Section	Description
Revision A - 11/30/2010	
	Initial Release.