S29PL256N

CS 7739, 80931, 81106

Qualification of: S29PL256N, 256 Megabit (16 M x 16-Bit) Vcc=3.0v, Vio=3.0v, Simultaneous Read/Write Page Mode Flash Memory in VBH084 (11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin 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: S29PL256N

256 Megabit (16 M x 16-Bit) Vcc=3.0v, Vio=3.0v, Simultaneous Read/Write Page Mode Flash Memory

Package:	VBH084	**Qualification:**	7739
Description:	(11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin Fine Pitch Ball Grid Array Package (FBGA)		
Theta Ja:	78 °C/W	**Psi Jt:**	°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:	60 mA	**Life Test Dynamic Current:**	8 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	180 mWatts	**Est. Stress Power Dissipation:**	28.8 mWatts
Est. Field Tj:	69.0 °C	**Est. Stress Tj:**	152.2 °C

Die:	98454A	**Die Size:**	5.38 x 9.35 mm
Process:	CS119S (110nm)	**Fab:**	Spansion Takaku
Type:	MirrorBit	**Density:**	256M

I.B. Product Information

Product Description: S29PL256N

256 Megabit (16 M x 16-Bit) Vcc=3.0v, Vio=3.0v, Simultaneous Read/Write Page Mode Flash Memory

Package:	VBH084	**Qualification:**	80931
Description:	(11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin 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:**	Paste
Lead Finish:	63Sn37Pb Spheres	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	150 °C
Est. DC Field Current:	60 mA	**Life Test Dynamic Current:**	8 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	180 mWatts	**Est. Stress Power Dissipation:**	28.8 mWatts
Est. Field Tj:	62.0 °C	**Est. Stress Tj:**	151.1 °C

Die:	98454A	**Die Size:**	5.38 x 9.35 mm
Process:	CS119S (110nm)	**Fab:**	Spansion Takaku
Type:	MirrorBit	**Density:**	256M

I.C. Product Information

Product Description: S29PL256N

256 Megabit (16 M x 16-Bit) Vcc=3.0v, Vio=3.0v, Simultaneous Read/Write Page Mode Flash Memory

Package:	VBH084	**Qualification:**	81106
Description:	(11.6 x 8.0 x 1.0mm) 84 Ball, Very Thin 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:**	Paste
Lead Finish:	63Sn37Pb Spheres	**Bond Wire:**	Gold
Comments:			

Est. Field Temperature:	55 °C	**Life Test Temperature:**	150 °C
Est. DC Field Current:	60 mA	**Life Test Dynamic Current:**	8 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	180 mWatts	**Est. Stress Power Dissipation:**	28.8 mWatts
Est. Field Tj:	62.0 °C	**Est. Stress Tj:**	151.1 °C

Die:	98454A	**Die Size:**	5.38 x 9.35 mm
Process:	CS119S (110nm)	**Fab:**	Spansion Takaku
Type:	MirrorBit	**Density:**	256M

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	4920	4639	800							
Zero fails, Process ave. Ea	0 *	0	0	0.66	135	1	135		47	5
Totals	**0**	**0**	**0**					**22831**	**47**	**5**

* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	2886	0.00	No Failures
1000 hrs	0	2732	0.00	No Failures
2000 hrs	0	2251	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 7739, 80931, 81106:							
HTOL (EL)	(3.6V, 150°C)	VBH084 [1]	77	1	0	0.00	168 hours
	(3.6V, 150°C)	VBH084 [2]	77	1	0	0.00	168 hours
	(3.6V, 150°C)	VBH084 [3]	77	1	0	0.00	168 hours
ESD CDM	N/A	VBH084 [1]	15	1	Passed 1.0kV		
ESD HBM	(100pF, 1500 Ohms)	VBH084 [1]	42	1	Passed 2.0kV		
Latch Up	(125°C, +/- 100mA)	VBH084 [1]	6	1	Passed		
Endurance (10k)	(90°C, 3.6V)	VBH084 [1]	64	1	0	0.00	10k cycles
	(90°C, 2.7V)	VBH084 [2]	64	1	0	0.00	10k cycles
	(-25°C, 2.7V)	VBH084 [3]	64	1	0	0.00	10k cycles
	(-25°C, 3.1V)	VBH084 [3]	64	1	0	0.00	10k cycles
	(90°C, 2.7V)	VBH084 [3]	64	1	0	0.00	10k cycles
	(90°C, 3.1V)	VBH084 [3]	64	1	0	0.00	10k cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	VBH084 [1]	77	1	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	VBH084 [1]	77	1	0	0.00	1000 cycles
Generic Reference Data:							
Preconditioning	(PC1/260°C, +0°C/-5°C)	LAA064 [4]	230	1	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	LAA064 [4]	77	1	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 110°C/85% RH)	LAA064 [4]	77	1	0	0.00	264 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	LAA064 [4]	76	1	0	0.00	168 hours

Notes / Justification:
1) Results from Qual 7739, S29PL256N, 256M CS119S (110nm) MirrorBit in 84 Ball vFBGA (11.6 x 8 x 1mm)
2) Results from Qual 80931, S29PL256N, 256M CS119S (110nm) MirrorBit in 84 Ball vFBGA (11.6 x 8 x 1mm)
3) Results from Qual 81106, S29PL256N, 256M CS119S (110nm) MirrorBit in 84 Ball vFBGA (11.6 x 8 x 1mm)
4) Results from Qual 80209, S29GL512N in 64 Ball fFBGA (13 x 11 x 1.4mm) - Same Technology, Fab, Similar Product and 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 - 2/22/2006	
	Initial Release.

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