

# S29CD016J

## CS 80596, 80980

Qualification of: S29CD016J, 16 Megabit 2.5 Volt-only Simultaneous Read/Write, Dual Boot, Burst Mode Flash Memory, with Versatile/O™ in LAA080 and PQR080 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.

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## I.A. Product Information

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Product Description: S29CD016J  
16 Megabit 2.5 Volt-only Simultaneous Read/Write, Dual Boot, Burst Mode Flash Memory,  
with Versatile/O™

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Package:	LAA080	Qualification:	80596
Description:	(13.0 x 11.0 x 1.4mm) 80 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:			

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Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	40 mA	Life Test Dynamic Current:	10 mA
Est. Field Voltage:	2.5 V	Life Test Voltage:	2.7 V
Est. Field Power Dissipation:	100 mWatts	Est. Stress Power Dissipation:	27 mWatts
Est. Field Tj:	58.9 °C	Est. Stress Tj:	151.0 °C

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Die:	98P05A	Die Size:	4.77 x 2.83 mm
Process:	CS69S (110nm)	Fab:	Spansion Fab25
Type:	Floating Gate	Density:	16M

## I.B. Product Information

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Product Description: S29CD016J  
 16 Megabit 2.5 Volt-only Simultaneous Read/Write, Dual Boot, Burst Mode Flash Memory,  
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Package:	PQR080	Qualification:	80980
Description:	(14.0 x 20.0 x 3.35mm) 80 Lead, Plastic Quad Flat Package (PQR)		
Theta Ja:	50 °C/W	Psi Jt:	19 °C/W
Assembly Location:	Stats ChipPAC Shanghai	Molding Compound:	RoHS Compliant Epoxy Resin
Substrate/Leadframe:	Copper Leadframe	Die Attachment:	Paste
Lead Finish:	100% Matte Sn Plating	Bond Wire:	Gold
Comments:			

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Est. Field Temperature:	55 °C	Life Test Temperature:	150 °C
Est. DC Field Current:	40 mA	Life Test Dynamic Current:	10 mA
Est. Field Voltage:	2.5 V	Life Test Voltage:	2.7 V
Est. Field Power Dissipation:	100 mWatts	Est. Stress Power Dissipation:	27 mWatts
Est. Field Tj:	60.0 °C	Est. Stress Tj:	151.3 °C

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Die:	98P05A	Die Size:	4.77 x 2.83 mm
Process:	CS69S (110nm)	Fab:	Spansion Fab25
Type:	Floating Gate	Density:	16M

## II. CS69S/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	2000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life	Inherent Life
PLASTIC											
Sample Size	8790	9791	2280	210							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	140	1	140		25	2
Totals	0	0	0	0					57078	25	2

\* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	3837	0.00	No Failures
1000 hrs	0	4084	0.00	No Failures
2000 hrs	0	4531	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 80596, 80980:							
HTOL (EL)	(2.7V, 150°C)	PQR080 <sup>2</sup>	224	3	0	0.00	168 hours
ESD CDM	N/A	LAA080 <sup>1</sup>	15	1	Passed 1.0kV		
	N/A	PQR080 <sup>2</sup>	45	3	Passed 1.0kV		
ESD HBM	(100pF, 1500 Ohms)	LAA080 <sup>1</sup>	84	1	Passed 2.0kV		
Latch Up	(125°C, +/- 200mA)	LAA080 <sup>1</sup>	6	1	Passed		
Endurance (10k)	(130°C, 2.5V)	LAA080 <sup>1</sup>	64	1	0	0.00	10k cycles
Preconditioning	(PC2/260°C, +0°C/-5°C)	LAA080 <sup>1</sup>	462	3	Passed Jedec L3 / Jeita Rank E		
	(PC2/260°C, +0°C/-5°C)	PQR080 <sup>2</sup>	668	3	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	LAA080 <sup>1</sup>	231	3	0	0.00	1000 cycles
	(PC1/260°C, -40°C/150°C)	PQR080 <sup>2</sup>	220	3	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	PQR080 <sup>2</sup>	224	3	0	0.00	96 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	LAA080 <sup>1</sup>	231	3	0	0.00	168 hours
	(PC1/260°C, 121°C/100%RH/15PSIG)	PQR080 <sup>2</sup>	224	3	0	0.00	168 hours
Solderability	N/A	PQR080 <sup>2</sup>	60	3	Passed		

## Generic Reference Data:

HTOL (EL)	(2.7V, 150°C)	PQR080 <sup>4</sup>	77	1	0	0.00	168 hours
ESD CDM	N/A	LAA080 <sup>3</sup>	15	1	Passed 1.0kV		
	N/A	PQR080 <sup>4</sup>	15	1	Passed 1.0kV		
Endurance (10k)	(130°C, 2.5V)	LAA080 <sup>3</sup>	128	2	0	0.00	10k cycles
Preconditioning	(PC2/260°C, +0°C/-5°C)	PQR080 <sup>4</sup>	231	1	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC1/260°C, -50°C/150°C)	PQR080 <sup>4</sup>	77	1	0	0.00	500 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	PQR080 <sup>4</sup>	77	1	0	0.00	96 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	PQR080 <sup>4</sup>	77	1	0	0.00	96 hours

- Notes / Justification:
- 1) Results from Qual 80596, S29CD016J, 16M CS69S (110nm) Floating Gate in 80 Ball fBGA (13 x 11 x 1.4mm)
  - 2) Results from Qual 80980, S29CD016J, 16M CS69S (110nm) Floating Gate in 80 Lead PQR (14 x 20 x 3.35mm)
  - 3) Results from Qual Q06766, S29CD016J in 80 Ball fBGA (13 x 11 x 1.4mm) - Same technology device in LAA080.
  - 4) Results from Qual Q06780, S29CD016J in 80 Lead PQR (14 x 20 x 3.35mm) - Same technology device in PQR080

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

## IV. Revision History

Section	Description
Revision A - 12/20/2010	Initial Release.

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