

# Am29F400B

## CS 80969a, 80969c

Qualification of: Am29F400B, 4 Megabit (512 K x 8-Bit/256 K x 16-Bit),  
5.0 Volt-only Boot Sector Flash Memory in SO044 and TS048 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. Product Information
- II. Life Test Failure Rate Calculation
- III. Summary of Stress Test Results
- IV. Revision History

## I.A. Product Information

---

Product Description: Am29F400B  
4 Megabit (512 K x 8-Bit/256 K x 16-Bit), 5.0 Volt-only Boot Sector Flash Memory

---

Package:	SO044	Qualification:	80969a
Description:	(28.2 x 13.3 x 2.8mm) 44 Lead, Small Outline Integrated Circuit (SOIC)		
Theta Ja:	88 °C/W	Psi Jt:	16 °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:	30 mA	Life Test Dynamic Current:	10 mA
Est. Field Voltage:	5.0 V	Life Test Voltage:	5.5 V
Est. Field Power Dissipation:	150 mWatts	Est. Stress Power Dissipation:	55 mWatts
Est. Field Tj:	68.2 °C	Est. Stress Tj:	154.8 °C

---

Die:	98F02A	Die Size:	3.42 x 5.02 mm
Process:	CS39S (320nm)	Fab:	Spansion Monden
Type:	Floating Gate	Density:	4M

## I.B. Product Information

---

Product Description: Am29F400B

4 Megabit (512 K x 8-Bit/256 K x 16-Bit), 5.0 Volt-only Boot Sector Flash Memory

---

Package: TS048

Qualification: 80969c

Description: (18.4 x 12.0 x 1.0mm) 48 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: 30 mA

Life Test Dynamic Current: 10 mA

Est. Field Voltage: 5.0 V

Life Test Voltage: 5.5 V

Est. Field Power Dissipation: 150 mWatts

Est. Stress Power Dissipation: 55 mWatts

Est. Field Tj: 61.0 °C

Est. Stress Tj: 152.2 °C

---

Die: 98F02A

Die Size: 3.42 x 5.02 mm

Process: CS39S (320nm)

Fab: Spansion Monden

Type: Floating Gate

Density: 4M

## II. CS39S/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	7376	7256	2160							
Zero fails, Process ave. Ea	0 *	0	0	0.66	150	1	150		31	2
Totals	0	0	0					57078	31	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	2105	0.00	No Failures
1000 hrs	0	2405	0.00	No Failures
2000 hrs	0	1971	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 80969a:							
HTOL (EL)	(5.5V, 150°C)	SO044 <sup>1</sup>	154	2	0	0.00	168 hours
ESD CDM	N/A	SO044 <sup>1</sup>	30	2	0	0.00	Passed 1.0kV
Preconditioning	(PC1/260°C, +0°C/-5°C)	SO044 <sup>1</sup>	616	2	0	0.00	Passed Jedec L3 / Jeita Rank E
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	SO044 <sup>1</sup>	154	2	0	0.00	1000 cycles
	(PC1/260°C, -50°C/150°C)	SO044 <sup>1</sup>	154	2	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	SO044 <sup>1</sup>	154	2	0	0.00	96 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	SO044 <sup>1</sup>	154	2	0	0.00	168 hours
Lead Integrity	N/A	SO044 <sup>1</sup>	6	1	0	0.00	Passed
Solderability	N/A	SO044 <sup>1</sup>	40	2	0	0.00	Passed

#### Generic Reference Data:

ESD HBM	(100pF, 1500 Ohms)	TS048 <sup>3</sup>	60	1	0	0.00	Passed 2.0kV
Endurance (10k)	(90°C, 5.5V)	TS048 <sup>3</sup>	64	1	0	0.00	10k cycles
Preconditioning	(PC1/260°C, +0°C/-5°C)	TS048 <sup>2</sup>	693	3	0	0.00	Passed Jedec L3 / Jeita Rank E
Precon+Temp Cycle	(PC1/260°C, -40°C/150°C)	TS048 <sup>2</sup>	231	3	0	0.00	1000 cycles
Precon+HAST	(PC1/260°C, Biased, 130°C/85% RH)	TS048 <sup>2</sup>	231	3	0	0.00	96 hours
Precon+Steam Pressure	(PC1/260°C, 121°C/100%RH/15PSIG)	TS048 <sup>2</sup>	231	3	0	0.00	168 hours
Solderability	N/A	TS048 <sup>2</sup>	40	1	0	0.00	Passed

Notes / Justification: 1) Results from Qual 80969a, Am29F400B, 4M CS39S (320nm) Floating Gate in 44 Lead SOIC (28.2 x 13.3 x 2.8mm)  
 2) Results from Qual Q06686a, Am29F800B in 48 Lead TSOP (18.4 x 12 x 1.1mm) - Same Flash Technology in TS048 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 - 12/2/2010	Initial Release.

### Trademarks and Notice

The contents of this document are subject to change without notice. This document may contain information on a Spansion product under development by Spansion. Spansion reserves the right to change or discontinue work on any product without notice. The information in this document is provided as is without warranty or guarantee of any kind as to its accuracy, completeness, operability, fitness for particular purpose, merchantability, non-infringement of third-party rights, or any other warranty, express, implied, or statutory. Spansion assumes no liability for any damages of any kind arising out of the use of the information in this document.

Copyright © 2012 Spansion Inc. All rights reserved. Spansion®, the Spansion logo, MirrorBit®, MirrorBit® Eclipse™, ORNAND™, and combinations thereof, are trademarks and registered trademarks of Spansion LLC in the United States and other countries. Other names used are for informational purposes only and may be trademarks of their respective owners.