Cypress Semiconductor
Reliability Qualification Report

QTP# Q100648 Version *A

S70FL01GSAGBH

Qualification of: S70FL01GSAGBH, 512 Megabit (64 Megabyte) MirrorBit® Flash Non-Volatile Memory CMOS 3.0 Volt Core with Versatile I/O in ZSA024 (8.0 x 6.0 x 1.2mm) 24 Ball, Multi-Chip Fine Pitch Ball Grid Array Package (MCP)

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
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I. Product and Package Information

Product Description: S70FL01GSAGBH **Cypress Division:** Memory Product Division

512 Megabit (64 Megabyte) MirrorBit® Flash Non-Volatile Memory CMOS 3.0 Volt Core with Versatile I/O

Package:	ZSA024	**QTP:**	Q100648		
Description:	(8.0 x 6.0 x 1.2mm) 24 Ball, Multi-Chip Fine Pitch Ball Grid Array Package (MCP)			**Flammability:**	**O2 Index:**
Assembly:	Cypress Thailand	**Molding Compound:**	ShinEtsu KMC 3580LVA	UL-V0	>28
Electrical Test:	Cypress Thailand	**Theta Ja / Psi Jt:**	35 °C/W / 9.5 °C/W		
Substrate/Leadframe:	BT Resin Substrate	**Die Attachment:**	FH 900 (Die 1), FH 4026 (Die 2)		
Lead Finish:	96.5Sn3.0Ag0.5Cu Spheres	**Bond Wire:**	Copper		
Comments:					

Est. Field Temperature:	55 °C	**Life Test Temperature:**	125 °C
Est. DC Field Current:	33 mA	**Life Test Dynamic Current:**	16 mA
Est. Field Voltage:	3.0 V	**Life Test Voltage:**	3.6 V
Est. Field Power Dissipation:	99 mWatts	**Est. Stress Power Dissipation:**	57.6 mWatts
Est. Field Tj:	58.4 °C	**Est. Stress Tj:**	127.0 °C

Die #1:	**Die:**	98289A	**Die Size:**	6.58 x 4.90 mm	**Number of Dies:**
(Bottom)	**Process:**	CS239LS (65nm)	**Fab:**	Cypress Fab25	2
	Type:	MirrorBit Eclipse	**Density:**	512M	
Die #2:	**Die:**	98289A	**Die Size:**	6.58 x 4.90 mm	
	Process:	CS239LS (65nm)	**Fab:**	Cypress Fab25	
	Type:	MirrorBit Eclipse	**Density:**	512M	

II. CS239LS Life Test Failure Rate Calculation

HTOL Stress Temperature - 125 °C

Failure Mechanism	Read Points / Test Results					Modeling Parameters @ 55°C					Avg. Failure Rate FITS @ 55°C, 60% Conf.	
	24 hrs	48 hrs	168 hrs	1000 hrs	2000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	PPM	FIT
PLASTIC												
Sample Size	4640	3000	6342	1530	135							
Zero fails, Process ave. Ea	0	0	0	0	0	0.7	69	1	69			
Totals	**0**	**0**	**0**	**0**	**0**					**19026**	**0**	**6**

* Contributes to early life FITS

Data Retention Bake - 150 °C

Reliability Stress	Number of Rejects	Sample Size	Failure Rate %	Failure Mechanism
500 hrs	0	4146	0.00	No Failures
1000 hrs	0	4132	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 Q100648:							
High Temp Bake (200°C)	(200°C)	ZSA024 [1]	86	2	0	0.00	350 hours
ESD CDM	N/A	ZSA024 [1]	30	2	Passed 1.0kV		
Preconditioning	(PC9/260°C, +0°C/-5°C)	ZSA024 [1]	1001	7	Passed Jedec L3 / Jeita Rank E		
Precon+Temp Cycle	(PC9/260°C, -55°C/125°C)	ZSA024 [1]	536	7	0	0.00	1000 cycles
Precon+HAST	(PC3/260°C, Biased, 110°C/85% RH)	ZSA024 [1]	154	2	0	0.00	264 hours
Precon+uHAST	(PC9/260°C, Unbiased, 130°C/85% RH)	ZSA024 [1]	153	2	0	0.00	96 hours
Construction Analysis	N/A	ZSA024 [1]	30	1	Passed		
Generic Reference Data:							
HTOL (EL)	(3.6V, 125°C)	FAB024 [2]	77	1	0	0.00	168 hours
HTOL (IL)	(3.6V, 125°C)	FAB024 [2]	77	1	0	0.00	504 hours
ESD HBM	(100pF, 1500 Ohms)	FAB024 [2]	84	1	Passed 2.0kV		
Latch Up	(+/- 100mA)	FAB024 [2]	6	1	Passed		
Endurance Cycling	(105°C, 3.6V)	FAB024 [2]	64	1	0	0.00	10K cycles
	(-40°C, 3.6V)	FAB024 [2]	62	1	0	0.00	10K cycles

Notes / Justification: 1) Results from Qual Q100648, S70FL01GSAGBH, CS239LS (65nm) MirrorBit Eclipse + CS239LS (65nm) MirrorBit Eclipse in 24 Ball MCP (8 x 6 x 1.2mm)

2) Results from Qual Q100334, S25FL512S in 24 Ball FBGA (8 x 6 x 1.2mm) - Same Product but in single die package

Preconditioning Flows: PC9 (Accelerated JEDEC L3 / JEITA Rank E): Bake 125°C, 24hr => Soak @ 60°C/70%RH, 72hr => 3x Reflow

Reliability Tests Performed per Specification Requirements

Stress	Condition	Specification Reference
Construction Analysis	N/A	Internal Specifications
Endurance Cycling	(105°C, 3.6V)	JESD47 / JESD22-A117 / AEC-Q100 /AEC-Q100-005
Endurance Cycling	(-40°C, 3.6V)	JESD47 / JESD22-A117 / AEC-Q100 /AEC-Q100-005
ESD CDM	N/A	JS002 / AEC-Q100-011
ESD HBM	(100pF, 1500 Ohms)	JS001 / AEC-Q100-002
High Temp Bake (200°C)	(200°C)	JESD22-A103
HTOL (EL)	(3.6V, 125°C)	JESD22-A108
HTOL (IL)	(3.6V, 125°C)	JESD22-A108
Latch Up	(+/- 100mA)	JESD78 / AEC Q100-004
Precon+HAST	(PC3/260°C, Biased, 110°C/85% RH)	JESD22-A110
Precon+Temp Cycle	(PC9/260°C, -55°C/125°C)	JESD22-A104
Precon+uHAST	(PC9/260°C, Unbiased, 130°C/85% RH)	JESD22-A118
Preconditioning	(PC9/260°C, +0°C/-5°C)	J-STD-020 / EIAJ ED-4701-100 Method 104

IV. Revision History

Document Number: 002-21614

Document Title: QTP#Q100648: Qualification of S70FL01GSAGBH in ZSA024 Package

Rev.	Issue Date	ECN#	Originator	Description
**	10/4/2017	5908313	BAKC	Initial Release.
*A	6/1/2018	6193097	BAKC	Added Generic Reference Data

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