



QRFL0003 QUALIFICATION REPORT

M29F102B T6X-U35: 1 Mbit (x16) Single Supply Flash Memory

INTRODUCTION

The M29F102B is a 1 Mbit Single Supply (5V) Flash memory with Boot Block partitioning and organized as 64 KWord of 16 bits each. It can be programmed and erased in-system or in standard EPROM programmers.

The M29F102B is manufactured with the STMicroelectronics advanced CMOS 0.35 micron T6X-U35 process, especially developed for Flash memory products. The memory features a fast access time, low power consumption in all operations (Standby, Read, Erase and Program) and an endurance of 100,000 Program/Erase cycles per block.

Qualification Report History

- July 1999: Catania M5 Diffusion Line, PLCC44 package
- July 1999: Catania M5 Diffusion Line, TSOP40 (10 x 14mm) package
- January 2000: Catania M5 Diffusion Line, TSOP40 (10 x 14mm) package, EEMS Assembly Line

ST recognises that the quality of a product must be built-in during the design, material procurement, manufacturing and testing. Also that the reliability must be demonstrated before the product is released to full mass production. The qualification of new products and the certification of new processes is a rigorous task undertaken by Quality and Reliability professionals, to ensure stable products and processes capable of fully meeting customer requirements.

A key step of this activity is the Design Review where we assure that,

- adequate and realistic product specifications have been developed;
- design and layout rules, as documented in the Design Rules Manual, have been respected;
- critical performance parameters and process variables have been identified;
- previously untested design techniques or manufacturing processes are recognised;
- manufacturability concerns are identified;
- comprehensive and efficient qualification programs are defined.

Product Qualification is made on all new products and on new packages. Qualification is also remade on existing products when there are major changes to the design or manufacturing. The tests performed are tailored to the parameters affected by the major change or the combinations of new die or new package to be evaluated.

The results of the tests for this Flash memory are on the attached pages of this qualification report.

Director of
Memory Products Group
Quality Control & Reliability

Attilio PANCHIERI

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Table 1. Revision History

Date	Revision Details
July 1999	First Issue
03/10/00	Added results of tests performed on lots from EEMS assembly line
06/16/00	PLCC package related tests conditions change to be compliant to JEDEC 020A TSOP package related tests conditions change to be compliant to JEDEC 020A

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Table 2. PLCC44 Plastic Package Related Tests, Catania M5 Diffusion Line

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Condition s	Result			Note
				Lots	Samp.	Fail	
1	Physical Dimensions	2016	Published Data				2
	Coplanarity PLCC44 Package		Published Data				2
2	Bond Strength	2011					2
3	Die Attach Strength	2019 or 2027					2
4	Radiography	2012		1	45	0	
5	Internal Visual and Mechanical	2014		1	5	0	
6	Solderability PLCC44 Package	2003	215°C, 3 sec, Precondition, 8 hrs, Steam aging				2
7	Resistance to Solvents	2015	4 Solvent Solutions				2
8	Solder Coating Thickness and Compositions	(Note 1)	5 µm min Sn/Pb 85/15				2
9	Resistance to Surface Mounting PLCC44 Package	JEDEC 020A	MSL 3	1	15	0	

Note: 1. According to ST specification.

2. Results for similarity, from standard production monitor.

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Table 3. PLCC44 Plastic Package - Die Related Tests, Catania M5 Diffusion Line

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Condition s	Results			Note
				Lots	Samp.	Fail	
1	Operating Life Test	1005	140°C, V _{CC} = 6V, – 168 hrs – 500 hrs	1	76 76	0 0	
2	Operating Life Test	1005	–40°C, V _{CC} = 6V, – 168 hrs – 500 hrs – 1000 hrs	2	80 80 80	0 0 0	2
3	Retention Bake	1008	150°C – 168 hrs – 500 hrs – 1000 hrs	1	60 60 60	0 0 0	2
4	Retention Bake	1008	250°C – 168 hrs – 500 hrs – 1000 hrs	1	60 60 60	0 0 0	3
5	Write/Erase Cycling		10,000 cycles 50,000 cycles 100,000 cycles	1	64 64 64	0 0 0	
6	Temperature Cycling	1010C	–65 to 150°C, – 100 cycles – 500 cycles – 1000 cycles	1	60 60 60	0 0 0	1
7	Pressure Pot		121°C, 2 Atm, RH = 100%, – 96 hrs – 168 hrs – 240 hrs	1	60 60 60	0 0 0	1

Note: 1. Samples previously submitted to preconditioning flow for Surface Mounting devices according to ST specification.
2. Test performed on TSOP40 package.
3. Test performed on CDIP40 package.

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Table 4. TSOP40 (10 x 14mm) Plastic Package Related Tests, Catania M5 Diffusion Line

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Condition s	Result			Note
				Lots	Samp.	Fail	
1	Physical Dimensions	2016	Published Data				2
	Coplanarity TSOP40 Package		Published Data				2
2	Bond Strength	2011					2
3	Die Attach Strength	2019 or 2027					2
4	Radiography	2012		4	180	0	3
5	Internal Visual and Mechanical	2014		4	20	0	3
6	Solderability TSOP40 Package	2003	215°C, 3 sec, Precondition, 8 hrs, Steam aging				2
7	Resistance to Solvents	2015	4 Solvent Solutions				2
8	Solder Coating Thickness and Compositions	(Note 1)	5 µm min Sn/Pb 85/15				2
9	Resistance to Surface Mounting TSOP40 Package	JEDEC 020A	MSL 3	4	60	0	3

Note: 1. According to ST specification.

2. Results for similarity, from standard production monitor.

3. Results reported as a total of previous tests (see QRFL9903) and current results on the EEMS assembly line.

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Table 5. TSOP40 (10 x 14mm) Plastic Package - Die Related Tests, Catania M5 Diffusion Line

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Condition s	Results			Note
				Lots	Samp.	Fail	
1	Operating Life Test	1005	140°C, V _{CC} = 6V, – 168 hrs – 500 hrs	1	76 76	0 0	2
2	Operating Life Test	1005	–40°C, V _{CC} = 6V, – 168 hrs – 500 hrs – 1000 hrs	2	80 80 80	0 0 0	
3	Retention Bake	1008	150°C – 168 hrs – 500 hrs – 1000 hrs	4 1	240 240 60	0 0 0	4
4	Retention Bake	1008	250°C – 168 hrs – 500 hrs – 1000 hrs	1	60 60 60	0 0 0	3
5	Write/Erase Cycling		10,000 cycles	1	48	0	
			50,000 cycles		48	0	
			100,000 cycles		48	0	
			monitoring				
			10,000 cycles	3	192	0	
			50,000 cycles	2	128	0	
6	Temperature, Humidity, Bias	CECC 90,000	85°C, RH = 85°C, V _{CC} = 5.5V – 168 hrs – 500 hrs – 1000 hrs	4	240 240 240	0 0 0	1,4
7	Temperature Cycling	1010C	–65 to 150°C, – 100 cycles – 500 cycles – 1000 cycles	4 2	236 236 116	0 0 0	1,4
8	Pressure Pot		121°C, 2 Atm, RH = 100%, – 96 hrs – 168 hrs – 240 hrs	4	240 240 240	0 0 0	1,4

Note: 1. Samples previously submitted to preconditioning flow for Surface Mounting devices according to ST specification.

2. Test performed on PLCC44 package.

3. Test performed on CDIP40 package.

4. Results reported as a total of previous tests (see QRFL9903) and current results on the EEMS assembly line.

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If you have any questions or suggestion concerning the matters raised in this document please send them to the following electronic mail address:

ask.memory@st.com

(for general enquiries)

Please remember to include your name, company, location, telephone number and fax number.

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