SGS-THOMSON MICROELECTRONICS

QUALIFICATION REPORT

M28F101
1 Megabit CMOS/T5 FLASH MEMORY in PLCC32

INTRODUCTION

The M28F101 is a 1 Megabit FLASH MEMORY organised as 128K x 8 bits. It is manufactured in the SGS-THOMSON Advanced CMOS 0.8 micron T5 process which has been especially developed for flash memory products. The memory features a fast 100ns access time, very low standby power consumption of 100µA at 5V, an endurance of 10,000 Erase/Program cycles and an integrated Erase/Program Stop timer.

SGS-THOMSON 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.

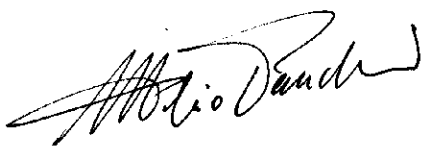
A key step of this activity is the Design Review where we assure that,

- 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 to the combinations of new die or new package to be evaluated.

The results of the tests for the M28F101 FLASH MEMORY are on the attached pages of this qualification report.

Director of
Memory Products Group
Quality Control & Reliability



Attilio PANCHIERI

Table 1. Product Qualification, Plastic Package Related Tests M28F101, PLCC32, CMOS/T5

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Conditions	Result			Note
				Lots	Samp.	Fail	
1	Physical Dimensions	2016	Published Data				1
	Coplanarity PLCC32, Package		Published Data				1
2	Bond Strength	2011					1
3	Die Attach	2019 or 2027					1
4	Solderability PLCC32 Package	CECC 90,000	215°C, 3 sec, Precondition Dry Air, 150°C, 16 hrs	3	15	0	
5	Resistance to Solvents	2015	4 Solvent Solutions	3	15	0	
7	Lead Integrity	2004	Test Condition B2	3	15	0	
8	Resistance to Soldering Heat PLCC32 Package		215°C, 40 sec	3	15	0	
9	Resistance to Surface Mounting PLCC32 Package:						
	1. Temperature Humidity		85°C, RH = 85%, 168 hrs				
	2. Solder Dipping		215°C, 120 sec				
	3. Visual Inspection		Body Cracks	3	45	0	
	4. Electrical Test			3	45	0	
	5. Pressure Pot		121°C, 2 Atm, 168 hrs	3	45	0	

Note: 1. Results for similarity, from standard production monitor.

Table 2. Product Qualification, Plastic Packages - Die Related Tests M28F101, PLCC32, CMOS/T5

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Conditions	Results			Note
				Lots	Samp.	Fail	
1	Operating Life Test	1005	140°C, V_{CC} = 6V, – 24 hrs – 168 hrs – 500 hrs – 1000 hrs		 1082 449 328 328	 0 0 0 0	1
2	Operating Life Test	1005	–10°C, V_{CC} = 7V, – 168 hrs – 500 hrs – 1000 hrs		 49 49 49	 0 0 0	
3	Retention Bake	1008	250°C, – 168 hrs – 500 hrs		242 242	0 0	2
4	Retention Bake	1008	150°C, – 168 hrs – 500 hrs – 1000 hrs		297 297 297	0 0 0	1
5	Retention Bake (after 10k cycles)	1008	250°C, – 168 hrs		120	0	
6	Write/Erase Cycling		10,000 cycles 20,000 cycles		443 130	0 0	1, 3
7	Temperature, Humidity, Bias	CECC 90,000	85°C, RH = 85%, V_{CC} = 5V, – 168 hrs – 500 hrs – 1000 hrs		 226 226 226	 0 0 0	1
8	Temperature Cycling	1010	–65 to 150°C, – 500 cycles – 1000 cycles		 228 228	 0 0	1
9	Thermal Shock	1011	–55 to 125°C, – 100 cycles – 500 cycles		 95 95	 0 0	1
10	Pressure Pot		121°C, 2 Atm, – 96 hrs – 168 hrs		 135 135	 0 0	
11	HAST	CECC 90,000	130°C, RH = 85%, 5,5V – 48 hrs – 96hrs		 64 64	 0 0	
12	Electrostatic Discharge	3015	1500Ω, 100pF, 1750V		36	0	
13	Electrostatic Discharge	EIAJ IC-121	0Ω, 200pF, 200V (min)				4
14	Latch-up	JEDEC STD-17	Current Injection 200mA (min), Overvoltage 14V/500mA (min)		45	0	

Notes: 1. Sample is coming from 3 different lots minimum.
2. Test performed on FDIP32W package.
3. Data collection in progress.
4. Test not performed.