SGS-THOMSON MICROELECTRONICS

QUALIFICATION REPORT

M28F102
1 Megabit (64K x 16) CMOS T5 FLASH MEMORY in TSOP40

INTRODUCTION

The M28F102 is a 1 Megabit FLASH MEMORY organised as 64K x 16 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 120ns 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.

The qualification tests of this program have been perfomed on devices assembled in surface mounting TSOP40 (10 x 14mm) package.

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 M28F102 FLASH MEMORY are on the attached pages of this qualification report.

Director of
Memory Products Group
Quality Control & Reliability

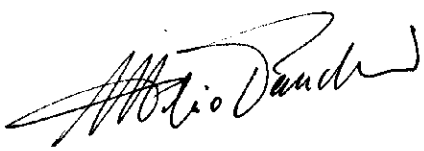

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Table 1. Product Qualification, Plastic Package Related Tests M28F102, TSOP40 (10 x 14mm), CMOS T5

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Conditions	Result			Note
				Lots	Samp.	Fail	
1	Physical Dimensions	2016	Published Data	2	10	0	
	Coplanarity TSOP40 Package		Published Data	2	10	0	
2	Bond Strength	2011		2	10	0	
3	Die Attach	2019 or 2027		2	2	0	
4	Radiography	2012		2	90	0	
5	Internal Visual and Mechanical	2014		2	10	0	
6	Solderability TSOP40 Package	CECC 90,000 2003	215°C, 3 sec, Precondition Dry Air, 150°C, 16 hrs	2	5	0	
7	Resistance to Solvents	2015	4 Solvent Solutions	2	20	0	
8	Solder Coating Thickness and Compositions	(Note 1)	5µm min Sn/Pb 85/15	2	10	0	
9	Resistance to Surface Mounting TSOP40 Package:	(Note 1)					
	1. Temperature Humidity		85°C, RH = 30%, 48 hrs				
	2. Solder IR Reflow		3 x T_{PEAK} = 235°C				
	3. Visual Inspection		Body Cracks	2	30	0	
	4. Electrical Test			2	30	0	
	5. Pressure Pot		121°C, 2 Atm	2	30	0	

Note: 1. According to SGS-THOMSON specification

Table 2. Product Qualification, Plastic Packages - Die Related Tests M28F102, TSOP40 (10 x 14mm), 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} = 7V, – 168 hrs – 500 hrs – 1000 hrs		 228 228 228	 0 0 0	1, 2
2	Retention Bake	1008	150°C, – 168 hrs – 500 hrs – 1000 hrs		180 180 180	0 0 0	1
3	Write/Erase Cycling		10,000 cycles 20,000 cycles		61 61	0 0	
4	Temperature, Humidity, Bias	CECC 90,000	85°C, RH = 85%, V_{CC} = 5V, – 168 hrs – 500 hrs – 1000 hrs		 180 180 180	 0 0 0	1, 2
5	Temperature Cycling	1010	–65 to 150°C, – 100 cycles – 500 cycles – 1000 cycles		 180 180 180	 0 0 0	1, 2
6	Thermal Shock	1011	–55 to 125°C, – 100 cycles – 500 cycles		 75 75	 0 0	1, 2
7	Pressure Pot		121°C, 2 Atm, – 96 hrs – 168 hrs – 240 hrs		 210 210 210	 0 0 0	1
8	Pressure Pot		121°C, 2 Atm, – 96 hrs – 168 hrs – 240 hrs		 234 234 234	 0 0 0	1, 2
9	HAST	CECC 90,000	130°C, RH = 85%, 5,5V – 48 hrs – 96hrs – 168 hrs		 75 75 75	 0 0 0	1, 2

Notes: 1. Sample is coming from 3 different lots minimum.
2. Samples previously submitted to preconditioning flow for Surface Mounting devices according to SGS-THOMSON specification.