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**256K & 512K bit CMOS-E5 OTP ROM in TSOP28**

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**INTRODUCTION**

The concerned products to this Qualification Report are:

M27C256B-XXNY, M27C512-XXNY, M27V512-XXNY

where "XX" is for access time class and "Y" for temperature range.

The M27C256B is a 256K bit OTP ROM, organized as 32K x 8 bits. The M27C512 (and the corresponding low voltage version M27V512) is a 512K bit OTP ROM, organized as 64K x 8 bits. They are manufactured in the SGS-THOMSON advanced CMOS E5-U10 (256K) and E5-U20 (512K) process. U20 stands for 20% upgrade of the standard 0.8 micron E5 process: which means the E5 process has been improved to such an extent as to allow a 20% shrinkage in linear dimensions. Assembly in TSOP28 and Testing are presently done outside SGS-THOMSON facilities, by a qualified Japanese Subcontractor.

Both 256K and 512K memories feature an access time down to 70ns, at 5V +/-10% V<sub>CC</sub>. Even more outstanding, the low voltage 512K bit (3V to 5.5V V<sub>CC</sub> range) can be delivered according to the 120ns speed class. The active power consumption is less than 150mW at V<sub>CC</sub> = 5V, less than 30mW at V<sub>CC</sub> = 3V for the low voltage product.

The characteristics above, together with the small outline of the TSOP28, 8mm x 13.4mm, make these products ideals for very compact surface mounting applications.

**PRODUCTS QUALIFICATION**

Reliability is a must for all our products. In the specific case, in order to ensure a true built-in endurance to humidity tests, a dedicated task force of process and device Engineers worked over a 2 years period to develop and standardize a proper final passivation for the plastic TSOP: the outcome has been an excellent three layers protection, capable to give full guarantee to our Customers.

Product Qualification always is a very severe and rigorous procedure in SGS-THOMSON. Even more extensive tests were performed on these OTP ROMs because they represented our first approach to the TSOP.

The results of the tests for the M27C256B, M27C512, M27V512 OTP ROMs in TSOP28 are on the attached page.

Let us recall that Product Qualification is made on all new products. It is also remade on existing products when there are major changes in design and manufacturing.

Shown here below are the current Lot Acceptance conditions for the above quoted products.

# QR101 Qualification Report

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## Lot Acceptance Criteria 256K & 512K OTP ROM - 28 Lead TSOP

Outgoing Specification	Subcontractor Reference	AQL Level	Note
Electrical	Testing Flow Programs 311/411	0.1 %	1
Mechanical & Visual	Subcontractor External Inspection Criteria for TSOP	0.1% critical defective 1.0% major defect 2.5% minor defect	2
Solderability	Subcontractor Manufacturing Flow	Monitoring	3
Marking Permanency	Subcontractor Manufacturing Flow	Monitoring	4

- Notes:**
1. Test Programs according to SGS-THOMSON specification.
  2. Critical defects include Coplanarity > 0.1mm.
  3. In-process Quality Specification: Plating thickness 5 to 20µm, composition Sn/Pb = 90/10; Solderability test, frequency 6 pcs/day.
  4. In-process Quality Specification: Marking Permanency IPA solution, frequency 10 pcs/day.

Director of  
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Quality Control & Reliability



Attilio PANCHIERI

**Table 1. Product Qualification, Plastic Package Related Tests  
M27C256B, M27C512 and M27V512, TSOP28, CMOS E5-U20**

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Conditions	Results		Note
				Samp.	Fail	
1	Physical Dimensions	2016	Published Data	10	0	1
	Coplanarity Package			15	0	
2	Solderability Package	CECC 90,000	215°C, 3 sec, Precondition Dry Air, 150°C, 16 hrs	15	0	1
3	Resistance to Solvents	2015	4 Solvent Solutions	15	0	1
4	Package External Visual Inspection	2009		80	0	1

**Note:** 1. Sample is coming from 3 different lots minimum.

**Table 2. Product Qualification, Plastic Package - Die Related Tests  
M27C256B, M27C512 and M27V512, TSOP28, CMOS E5-U20**

Sub-group	Test Procedure	MIL-STD-883 Procedure	Test Conditions	Results		Note
				Samp.	Fail	
1	Operating Life Test	1005	140°C, V <sub>CC</sub> = 7V, – 168 hrs – 500 hrs – 1000 hrs	360	0	1, 2
				360	0	
				360	0	
2	Retention Bake	1008	150°C, – 168 hrs – 500 hrs – 1000 hrs	360	0	1
				360	0	
				360	0	
3	Temperature, Humidity, Bias	CECC 90,000	85°C, RH = 85%, V <sub>CC</sub> = 5V, – 168 hrs – 500 hrs – 1000 hrs	580	0	1, 2
				580	0	
				580	0	
4	Temperature Cycling	1010	–40 to 150°C, – 500 cycles – 1000 cycles	500	0	1, 2
				500	0	
5	Pressure Pot		121°C, 2 Atm, – 96 hrs – 168 hrs	360	0	1
				360	0	

**Notes:** 1. Sample is coming from 3 different lots minimum.  
2. Surface Mounting preconditioned sample, according to SGS-THOMSON specificaton.

# QR101 Qualification Report

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