PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM-AAM/09/4614
Notification Date 05/22/2009

HCMOS4TZ OPTION PROCESS DIFFUSION TRANSFER FROM CARROLLTON 6" TO ANG MO KIO 6"

Table 1. Change Implementation Schedule

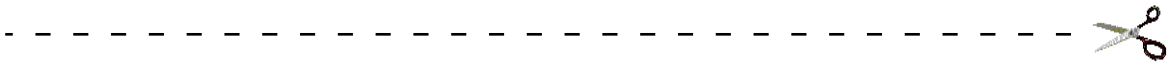
Forecasted implementation date for change	15-May-2009
Forecasted availabillity date of samples for customer	15-May-2009
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	15-May-2009
Estimated date of changed product first shipment	03-Aug-2009

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	See Attached
Type of change	Waferfab location change
Reason for change	Restructuring Plan
Description of the change	Progressing along the Restructuring Plan already communicated by Corporate Information Letter (C.I.L.) CRP/07/2900 dated October 2, 2007 and APCN APM/07/3317 dated December 28, 2007, please be informed that the products currently manufactured in Carrollton 6" Plant (Texas, USA) by using HCMOS4TZ Option Technology, will be moved to our facilities located in Singapore Ang Mo Kio 6" (AMK6) Plant. The relocation of the HCMOS4 Baseline Technology has been successfully qualified in the new plant and the full production ramp-up in the new site, began at the end of October 2008 as communicated by PCN APM/08/3892 dated July 31, 2008. The HCMOS4TZ Option follow-on Techno sub family has now been successfully qualified in the new plant. The full production ramp-up in the new site, has begun.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	See Attached
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APM-AAM/09/4614**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 05/22/2009**

☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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DOCUMENT APPROVAL

Name	Function
Mcdonagh, Gary	Division Marketing Manager
Sonnino, Ruben	Division Product Manager
Winn, Robert E	Division Q.A. Manager

HCMOS4TZ OPTION PROCESS DIFFUSION TRANSFER FROM CARROLLTON 6” TO ANG MO KIO 6"

WHAT:
Progressing along the Restructuring Plan already communicated by Corporate Information Letter (C.I.L.) CRP/07/2900 dated October 2, 2007 and APCN APM/07/3317 dated December 28, 2007, please be informed that the products currently manufactured in Carrollton 6” Plant (Texas, USA) by using HCMOS4TZ Option Technology, will be moved to our facilities located in Singapore Ang Mo Kio 6” (AMK6) Plant.

The relocation of the HCMOS4 Baseline Technology has been successfully qualified in the new plant and the full production ramp-up in the new site, began at the end of October 2008 as communicated by PCN APM/08/3892 dated July 31, 2008.

The HCMOS4TZ Option follow-on Techno sub family has now been successfully qualified in the new plant. The full production ramp-up in the new site, has begun.

The affected products are listed in the table attached. All the products manufactured by ST using the HCMOS4TZ Option Technology, even if not expressly included in the above mentioned table, are affected by this change.

WHY:
In order to optimize ST asset utilization and enhance performance for shareholders and customers.

HOW:
By transferring and re-qualifying the mentioned front-end technology in the receiving plant; this technology has been qualified through a full set of evaluations on the selected test vehicle (TV for technology qualification): T84, EWS, electrical characterization, die and package oriented stress tests; other products diffused in the same Technology will be qualified mainly by similarity (generic data) if assembled in the same package family.

Techno family	Techno sub family	TV Product	Line	Package	Product Group	Qualification Plan
HCMOS4 baseline	HCMOS4TZ Option	M41T83	B6LA61	QFN	APM	TV for technology and FE/BE compatibility

This transfer will not modify the electrical, dimensional and thermal parameters for the product affected, maintaining unchanged current information published on the relevant datasheets. There are no changes in the packing modes or in the standard delivery quantities either. The table here in appendix 1, is providing you the detailed qualification plan that has been used in the new location to qualify the affected test vehicle.

ST will focus on customer satisfaction and ensure a seamless transition in the supply of products from different sites.

WHEN:
The transfer of all product lines and the ramp up in the new location will be finalized within Q2 2009.

Qualification program and results availability:

The qualification program mainly consists of comparative electrical characterizations and reliability tests. The relevant reliability report is provided in appendix 1 of this document.

Samples availability:

Samples of the test vehicle used to qualify the HCMOS4TZ Option Technology in our AMK6 facility are already available, while for all the concerned products, samples will be available upon request to the relevant product Business Unit.

Change implementation schedule:

The production start and first shipments will be implemented according to our work in progress and materials availability as indicated in the schedule below:

Product Family Code	Product Family Description	PCN date	1st Shipments
61	Advanced Analog	Week 20-2009	From Week 32-2009

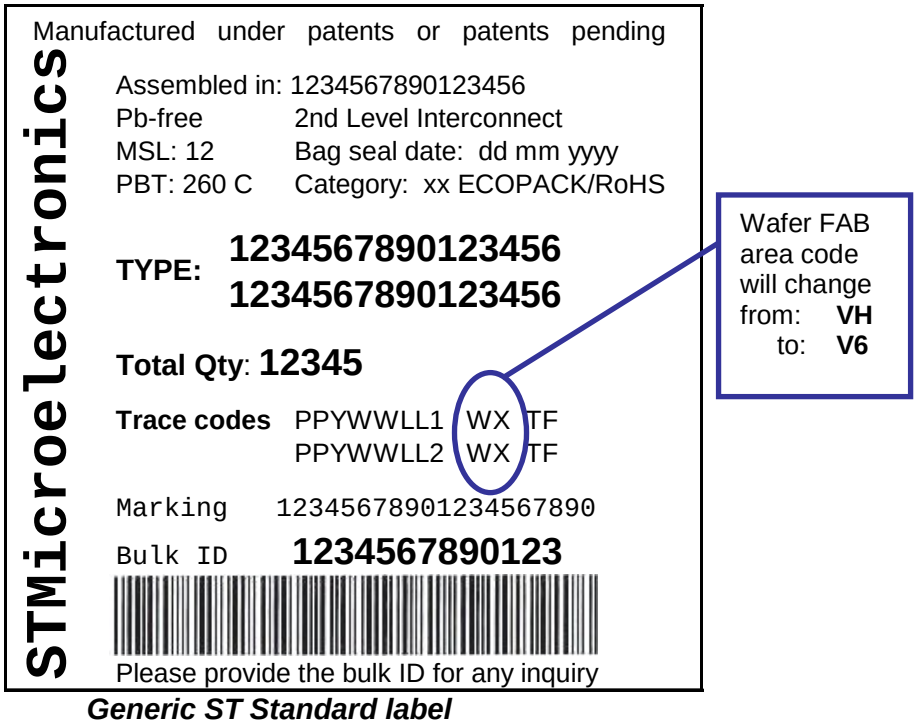
Lack of acknowledgement of the PCN within 30 days will constitute acceptance of the change. After acknowledgement, lack of additional response within the 90 day period will constitute acceptance of the change (Jedec Standard No. 46-C). In any case, first shipments may start earlier with customer's written agreement.

Product's traceability:

Unless otherwise stated by customer specific requirement, new parts produced in AMK6 will be differentiated as indicated below:

Diffusion plant	ID	Country of origin
Carrollton (current)	**VH**	USA
AMK6 (new)	**V6**	Singapore

Shipments from new Wafer FAB location will be tracked on the ST Standard Label as showed below:



Generic ST Standard label

Please note that ST Team is doing all the best for providing you full visibility about the announced restructuring Plan and to minimize any negative impact it may occurs. While our Marketing and Sales teams are available for additional information when required, we are looking forward to your renewed confidence in STMicroelectronics as the strategic partner of your choice.

Reliability Report

On HCMOS4TZ Option Technology
Test Vehicle: M41T83

General Information	
Product Line	***CB6LA83Z***
Product Description	***Serial I²C Bus RTC***
Commercial Product	***M41T83***
Product Group	***APM GROUP***
Product Division	***Advanced Analog and Mixed Signal***
Package Description	***QFN- 16L***
Silicon Process Technology	***HCMOS4TZ Option***

Locations	
Wafer fabrication location	***AMK6***
Assembly plant location	***Carsem, Malaysia***
Final test plant location	***Carsem Malaysia***

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
0.1	May-15-2009		R. Winn / J. Peck	Original document

Reliability is the attitude of element to satisfy required function in fixed conditions during established time.

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.
This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics general terms and conditions of Sale. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics.

1 RELIABILITY EVALUATION OVERVIEW

1.1 Objectives

The purpose of this report is to present the results of the reliability evaluations performed on the M41T83 device used as a test vehicle in order to qualify the transfer of HCMOS4TZ Option technology in AMK6.

This product used the QFN-16L for qualification tests and was assembled in Carsem, Malaysia.

1.2 Conclusion

The final reliability results are positive for all stressed lots.

2 DEVICE CHARACTERISTICS

2.1 Device description

The test vehicle is a ***Serial I²C Bus RTC*** product.

2.2 Traceability

2.2.1 Wafer fabrication information

- Wafer fabrication manufacturing location: Ang Mo Kio 6” in Singapore
- Technology: HCMOS4TZ Option
- Die size: 2190µm x 2620µm
- Passivation type: PSG, SiN

2.2.2 Assembly information

Assembly site	Carsem, Malaysia
Package description	QFN-16L
Frame	Copper
Wire	GLD Au 1 mil

3 RELIABILITY TESTS RESULTS

3.1 Reliability test plan and results summary

Die oriented test

Test	Test short description				
	Method	**Conditions**	**Sample size**	**Duration**	**Fail/ tested**
T.H.B.	Temperature Humidity Bias				
		85℃ / 85%RH Vcc = 5.5V	3 Lots / 73	959 H	0/73
HTB	High Temperature Bias (SOIC-18L)				
		125℃ Vcc = 6.0V	3 Lots / 531	168 H 168-1K H	1/531 (n1) 0/230

n1 – A random gate oxide defect was found in the month register logic producing elevated Icc2 and Ibat currents while remaining functional. Samples of 3171 devices (9 lots) were tested after 168 hours of op. life, from the Baseline Hcmos4 and other sub techno transfer processes, with no failures. We are applying full wafer level gate oxide integrity testing at parametric test for the next 10 lots as required by planning. Ongoing product monitoring testing will continue on these processes in the future.

Package oriented test

Test	Test short description				
	Method	**Conditions**	**Sample size**	**Duration**	**Fail/ tested**
TC	Temperature Cycle				
		-65℃ / 150℃	3 Lots / 89	1000 C	0/89
HTS	High Temperature Storage				
		150℃	3 Lots / 231	1000 H	0/231
P.C.	Pre Condition				
		85℃ / 85%RH Level1;260°C	3 Lots/ 480	168 H	0/480

ESD tests

ESD Model	Stress voltage (V)	Fail / tested
HBM	2000	0 / 18
RCDM	1000	0 / 9

All tests above are compliant with below standards:

- MIL883C
- JEDEC JESD22

Latch-Up tests

L/U	Stress Condition	Fail / tested
Positive Current Injection	+ 200ma; 11.0v	0 / 15
NegativeCurrent Injection	- 200ma; 0.6v	0 / 15
Over Voltage	+ 500ma; 11.0v	0 / 15

All tests above are compliant with below standards:

- EIA/JESD 78A

3.2 Die oriented tests

These tests are performed in order to demonstrate the quality and reliability of devices subjected to an elevated temperature and reverse biased. The purpose of this test is to detect surface defects such as poor passivation, presence of contaminants, metal corrosion, etc

3.3 Package oriented tests

These tests are performed in order to check device life in various environmental conditions in an accelerated way. Detectable failure mechanisms are metal corrosion and molding defect, cracking of die, breaking of wire bonding, and mechanical damage to the device case.

4 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q100	Stress test qualification for integrated circuits
SOP 2610	General product qualification procedure
Internal ST specification	Reliability Tests and criteria for qualifications (Corporate Q&R rules)

5 GLOSSARY

ESD	Electro Static Discharge
LU	Latch Up
HTB	High Temperature Bias
T.H.B.	Temperature Humidity Bias
HTS	High Temperature Storage
T.C.	Thermal Cycle
P.C.	Preconditioning

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