PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM-SLI/08/3990
Notification Date 08/28/2008

HF2CMOS S Baseline 350A gate DIFFUSION TRANSFER FROM CARROLLTON 6" TO ANG MO KIO 6"

Table 1. Change Implementation Schedule

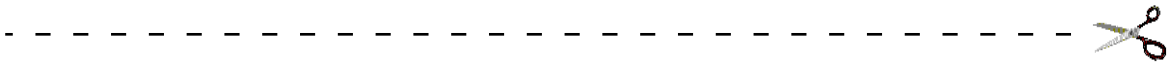
Forecasted implementation date for change	17-Nov-2008
Forecasted availabillity date of samples for customer	28-Aug-2008
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	28-Aug-2008
Estimated date of changed product first shipment	17-Nov-2008

Table 2. Change Identification

Related APCN	3289
Product Identification (Product Family/Commercial Product)	ALL PRODUCTS IN THIS TECHNOLOGY
Type of change	Waferfab location change
Reason for change	FAB CLOSURE AS PER CORPORATE CIL CRP/07/2900
Description of the change	Following Corporate CIL CRP/07/2900 we are transferring the process HF2CMOS S Baseline 350A gate and related products from Carrollton to Ang Mo Kio.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	Plant marking identification "V6" for Ang Mo Kio plant
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APM-SLI/08/3990**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 08/28/2008**

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

Remark

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DOCUMENT APPROVAL

Name	Function
Sibille, Marie-Helene	Corporate Quality Manager
Buiguez, Francois	Process Owner

HF2CMOS S S 350A gate 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/07/2927 dated September 25, 2007 and APCN CRP/07/3289 dated December 25, 2007, please be informed that the products currently manufactured in Carrollton 6" Plant (Texas) by using HF2CMOS S 350A gate subfamily, will be moved to our facilities located in Ang Mo Kio 6" Plant (Singapore).

The affected products are listed in the table here attached.
All the products manufactured by ST using HF2CMOS S Baseline 350A gate subfamily, 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; others products diffused in the same Technology will be qualified mainly by similarity (generic data) if assembled in the same package family. In case of different package families, stress test package oriented will be carried on a "package test vehicle" (FE/BE compatibility) as listed in the annexed table.

Techno family	Techno sub family	Product	Package	Product Group	Qualification Plan
HF2CMOS S Baseline 475A gate	HF2CMOS S 350A gate	0922	SO	APM	TV for technology
		0922	TSSOP	APM	TV for technology

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 is as well neither change in the packing modes nor 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 Q1 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 HF2CMOS Baseline 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
71	Standard Linear	Week 34-2008	From Week 47-2008

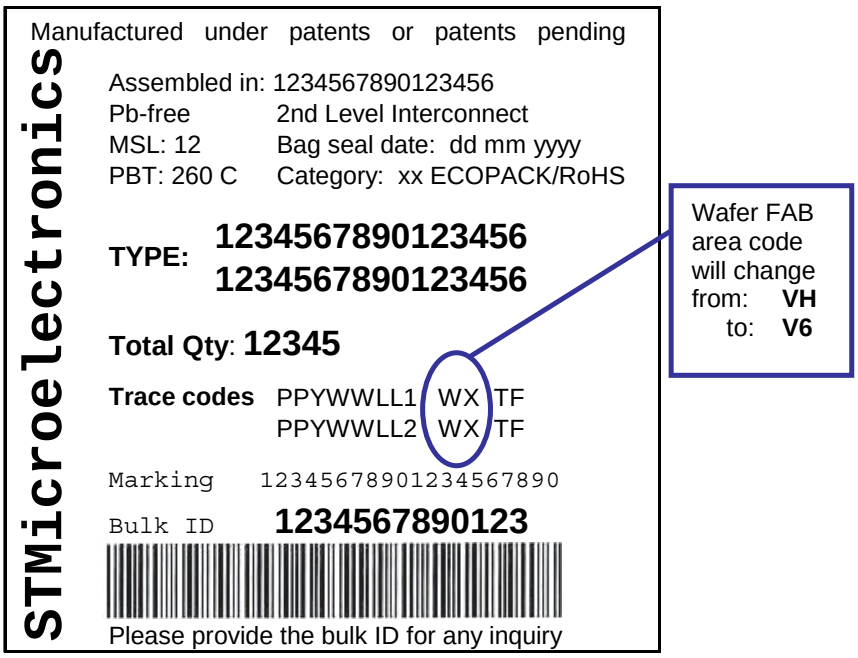
Lack of acknowledgement of the PCN within 30 days will constitute acceptance of the change. After acknowledgement, lack of additional response within the 90 day period will constitute acceptance of the change (Jedec Standard No. 46-C).
In any case, first shipments may start earlier with customer's written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

Product's traceability:

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

Diffusion plant	ID	Country of origin
Carrollton (current)	**VH**	Texas
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.

Sincerely Yours.

Appendix 1: Reliability tests for qualification program.

Reliability Report

On HF2CMOS S 350A gate
Test Vehicle: 092271

General Information	
Product Line	***092271***
Product Description	***Rail-to-rail high output current dual operational amplifier***
Commercial Product	***TS922D / TS922P***
Product Group	***LINEAR & INTERFACE***
Product Division	***IMS - APM GROUP***
Package Description	***SO8 / TSSOP8***
Silicon Process Technology	***HF2CMOS S 350A Gate***

Locations	
Wafer fabrication location	***AMK6***
Assembly plant location (SO8 and TSSOP8)	***Bouskoura Morocco***
Final test plant location (SO8 and TSSOP8)	***Bouskoura Morocco***

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
0.1	August-14	4	O. Girard F. Paccard	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 aim of this report is to present the results of the reliability evaluations performed on 0922 device used as test vehicle in order to qualify HF2CMOS S 350A Gate subfamily diffused in AMK6.

This product is assembled in SO8 and TSSOP8 in Bouskoura (Morocco).

1.2 Conclusion

The final reliability results are positive for all stressed lots.

2 DEVICE CHARACTERISTICS

2.1 Device description

The TS922 is a rail-to-rail dual BiCMOS operational amplifier optimized and fully specified for 3V and 5V operation.
The device's high output current allows low-load impedances to be driven.
Very low noise, low distortion, low offset and a high output current capability make this device an excellent choice for high quality, low voltage or battery operated audio systems.
The device is stable for capacitive loads up to 500pF.

2.2 Traceability

2.2.1 Wafer fabrication information

- Wafer fabrication manufacturing location: Ang Mo Kio 6" in Singapore
- Technology: HF2CMOS S 350A Gate
- Die size: 1.87mm x 1.41mm
- Passivation type: PSG / SiN

2.2.2 Assembly information

Assembly site	Bouskoura Morocco	Bouskoura Morocco
Package description	SO8	TSSOP8
Frame	Cu 2.4 x 3.2 mm 8leads	Cu 2.2 x 3.2 mm 8leads
Wire	Au 1 mils	Au 1 mils

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
HTB	High Temperature Bias				
		Tj=150C Vs=absolute max rating	78 x 3 Lots (2 in SO8, 1 in TSSOP8)	1000 H	0/234

Package oriented test

Test	Test short description				
	Method	Conditions	Sample size	Duration	Fail/ tested
Env. Seq.	Environment sequence (Thermal Cycle followed by Pressure Pot)				
		TC: Ta =-65°C to 150°C thermal cycle PPT: Ta=121°C – Pa=2 atm	78 x 2 Lots (1 in SO8, 1 in TSSOP8)	TC 100 cy PPT 96 H	0/156
G. L.	Gate Leakage stress				
		3 units/lot @ Ta = 155°C +400 Volt 3 units/lot @ Ta = 155°C -400 Volt	6 x 2 Lots (1 in SO8, 1 in TSSOP8)	As per AECQ100	0/12

ESD tests

ESD Model	Date	Batch #	Stress voltage (V)	Fail / tested
HBM	April 15th, 2008	6803V86	2000	0 / 3
	April 17th, 2008	680425H	2000	0 / 3
	June 24th, 2008	6806F46	2000	0 / 3
MM	April 15th, 2008	6803V86	120	0 / 3
	April 17th, 2008	680425H	120	0 / 3
	June 24th, 2008	6806F46	120	0 / 3
CDM	April 15th, 2008	6803V86	1500	0 / 3
	April 17th, 2008	680425H	1500	0 / 3
	June 24th, 2008	6806F46	1500	0 / 3

All tests above are compliant with below standards:

- MIL883C
- JEDEC JESD22
- ANSI ESD STM 5.1

ESD results on samples from receiving plant are aligned with results obtained on sending plant samples.

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
ELFR	Early Life Failure Rate
GL	Gate Leakage
HTB	High Temperature Bias
HTS	High Temperature Storage
T.H.B.	Temperature Humidity Bias
T.C.	Thermal Cycle
P.P.	Pressure Pot
P.C.	Preconditioning
S.M.D.	Surface Mount Device moisture induced stress

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