PRODUCT/PROCESS CHANGE NOTIFICATION

PCN IPD-IPC/12/7320
Dated 13 Aug 2012

Bipolar products changing wafer size from 5" to 6" in Ang Mo Kio fabs (Singapore)

Table 1. Change Implementation Schedule

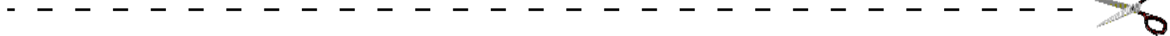
Forecasted implementation date for change	10-Aug-2012
Forecasted availability date of samples for customer	10-Sep-2012
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	06-Aug-2012
Estimated date of changed product first shipment	12-Nov-2012

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	see attached list
Type of change	Waferfab process change
Reason for change	Capacity increase
Description of the change	We are going to change the wafer size from 5" to 6" of the products in bipolar technology, in Ang Mo Kio fabs (Singapore).
Change Product Identification	VW or V6 digits on trace code
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN IPD-IPC/12/7320**
Please sign and return to STMicroelectronics Sales Office	**Dated 13 Aug 2012**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

....

....

....

....

....

....

....

....

DOCUMENT APPROVAL

Name	Function
Di Stefano, Giuseppe	Marketing Manager
Merisio, Massimiliano	Marketing Manager
Arrigo, Domenico Massimo	Product Manager
Merisio, Massimiliano	Product Manager
Motta, Antonino	Q.A. Manager

ATTACHMENT TO PCN IPD-IPC/12/7320

WHAT*:*
We are changing the wafer size from 5" to 6" of our products in bipolar technology, in Ang Mo Kio fabs (Singapore).

WHY*:*
To increase production capacity and to improve service.

HOW*:*
The test vehicles used to qualify the 6" are : 1708BA6, L693EA6, L740CA6, L843DA6 and L877EA6.

The package-oriented reliability evaluation and the electrical and parametric test result analysis on these five test vehicles have been positively completed, see the attached Reliability Report.

The change to 6" will be identified on the trace code by the digits "VW" or "V6".

WHEN*:*
The change from 5" to 6" will be made progressively from August onwards.
The first shipments could be from November 2012, depending on the orders volumes to allow phase-out and phase-in.

Samples can be delivered upon request in 6 weeks A.R.O.

Reliability Report

BIPOLAR TECHNOLOGY PRODUCTS WAFER SIZE CHANGE FROM 5" TO 6" in ANG MO KIO FABS, SINGAPORE

General Information	
Product Line TV1	*1708 BA6*
Product division	*IPD- I&PC*
Package	*VFDFPN8 4X4*
Silicon process technology	*BIP (111)*

Locations	
Wafer fab location	*ANG MO KIO 6"*
Assembly plant location	*CARSEM S*
Reliability assessment	*Pass*

General Information	
Product Line TV2	*L693 EA6*
Product division	*IPD- I&PC*
Package	*PwSO20*
Silicon process technology	*BIP (>6um)*

Locations	
Wafer fab location	*ANG MO KIO 6"*
Assembly plant location	*MUAR*
Reliability assessment	*Pass*

General Information	
Product Line TV3	*L740 CA6*
Product division	*IPD- I&PC*
Package	*HeptaWatt7*
Silicon process technology	*BIP (>6um)*

Locations	
Wafer fab location	*ANG MO KIO 6"*
Assembly plant location	*BOUSKOURA2*
Reliability assessment	*Pass*

General Information	
Product Line TV4	*L843 DA6*
Product division	*IPD- I&PC*
Package	*PDIP16*
Silicon process technology	*BIP (>6um)*

Locations	
Wafer fab location	*ANG MO KIO 6"*
Assembly plant location	*MUAR*
Reliability assessment	*Pass*

General Information	
Product Line TV5	*L877 EA6*
Product division	*IPD- I&PC*
Package	*SO20*
Silicon process technology	*BIP (>6um)*

Locations	
Wafer fab location	*ANG MO KIO 6"*
Assembly plant location	*MUAR*
Reliability assessment	*Pass*

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
1.0	1-April-2012		A.Contrafatto	Original document

Issued by

Antonino Contrafatto

Approved by

Antonino Motta

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS 3
2 QUALITY AND RELIABILITY EVALUATION OVERVIEW 4
2.1 Objectives 4
2.2 Conclusion 4
3 DEVICE CHARACTERISTICS 5
3.1 Traceability 5
3.1.1 TV1 – 1708BA6 5
3.1.2 TV2 – L693EA6 6
3.1.3 TV3 – L740CA6 7
3.1.4 TV4 – L843DA6 8
3.1.5 TV5 – L877EA6 9
4 RELIABILITY TESTS 10
4.1 Reliability test conditions and results 10
4.1.1 TV1 – 1708BA6 10
4.1.2 TV2 – L693EA6 10
4.1.3 TV3 – L740CA6 10
4.1.4 TV4 – L843DA6 11
4.1.5 TV5 – L877EA6 11
5 RELIABILITY TESTS DESCRIPTION & DETAILED RESULTS 12
5.1 Package oriented tests 12
5.1.1 Pre-Conditioning 12
5.1.2 Thermal Cycles 12
5.1.3 Autoclave 12
5.1.4 High Temperature Storage Life 12
5.1.5 Thermal Humidity Storage 12
6 PROCESS CHANGE CHARACTERIZATION 13
6.1 Parametric Test and EWS analysis 13

1. APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q100	: Stress test qualification for integrated circuits
8161393A	: General Specification For Product Development

2. QUALITY AND RELIABILITY EVALUATION OVERVIEW

2.1 Objectives

This report describes all the evaluation activities and the results achieved in order to convert IPC division products in BIPOLAR technology from 5” fab to 6” fabs in Ang Mo Kio – Singapore. BIPOLAR technology is already qualified in AMK 6” fabs, AMK6 and AMJ9.
The five test vehicles used for the qualification are:
- 1708BA6 assembled in VFDFPN 4x4 8L in CARSEM S.
- L693EA6 assembled in PowerSO20 in MUAR.
- L740CA6 assembled in HeptaWatt7 in BOUSKOURA 2.
- L843DA6 assembled in PDIP16 in MUAR.
- L877EA6 assembled in SO20 in MUAR.

The qualification activities include:

- Package-oriented reliability evaluation of 1708BA6, L693EA6, L740CA6, L843DA6 and L877EA6 devices diffused in AMK 6”.
- Electrical and parametric test result analysis on the five test vehicles.

According to Reliability Qualification Plan, below is the list of the trials performed:

Package Oriented Tests
- Preconditioning
- High Temperature Storage
- Autoclave
- Thermal Cycles
- Thermal Humidity Storage

2.2 Conclusion

Taking in account the results of the evaluations performed**, the wafer size of I&PC Division products in BIPOLAR technology can be changed from 5” to 6” in ANG MO KIO wafer fabs - Singapore.**

3. DEVICE CHARACTERISTICS

3.1 Traceability

3.1.1 TV1 – 1708BA6

Wafer fab information	
Wafer fab manufacturing location	*ANG MO KIO - SINGAPORE*
Wafer diameter	*6 inches*
Wafer thickness	*275 µm ±25*
Silicon process technology	*BIP (111)*
Die finishing back side	*LAPPED SILICON*
Die size	*2930x2130µm*
Bond pad metallization layers	*AlSiCu*
Die Finish Front	*P-VAPOX (Si glass)*
Metal levels	*1*

Assembly Information	
Assembly plant location	*CARSEM S - MALAYSIA*
Package description	*VFDFPN 4X4 8L*
Molding compound	*G77OH*
Wires bonding materials/diameters	*Au/1mils*
Die attach material	*QMI519*
Lead solder material	*NiPdAu*

3.1.2 TV2 – L693EA6

Wafer fab information	
Wafer fab manufacturing location	*ANG MO KIO - SINGAPORE*
Wafer diameter	*6 inches*
Wafer thickness	*280 µm ±25*
Silicon process technology	*BIP (>6um)*
Die finishing back side	*Cr/Ni/Au*
Die size	*3280x3080µm*
Bond pad metallization layers	*AlSi*
Die Finish Front	*SiN (nitride)*
Metal levels	*1*

Assembly Information	
Assembly plant location	*MUAR - MALAYSIA*
Package description	*Power*
Molding compound	*SUMITOMO 7307A*
Wires bonding materials/diameters	*Au/2 mils*
Die attach material	*PREFORM Pb/Ag/Sn 97.5/1.5/1*
Lead solder material	*Sn*

3.1.3 TV3 – L740CA6

Wafer fab information	
Wafer fab manufacturing location	*ANG MO KIO - SINGAPORE*
Wafer diameter	*6 inches*
Wafer thickness	*275 µm ±5*
Silicon process technology	*BIP (>6um)*
Die finishing back side	*Cr/Ni/Au*
Die size	*3160x3170µm*
Bond pad metallization layers	*AlSi*
Die Finish Front	*SiN (nitride)*
Metal levels	*1*

Assembly Information	
Assembly plant location	*BOUSKOURA - MOROCCO*
Package description	*HW 7L*
Molding compound	*SUMITOMO 6300HR1LD*
Wires bonding materials/diameters	*Cu/2 mils*
Die attach material	*PREFORM Pb/Ag/Sn 97.5/1.5/1*
Lead solder material	*Sn*

3.1.4 TV4 – L843DA6

Wafer fab information	
Wafer fab manufacturing location	*ANG MO KIO - SINGAPORE*
Wafer diameter	*6 inches*
Wafer thickness	*275 µm ±25*
Silicon process technology	*BIP (>6um)*
Die finishing back side	*Cr/Ni/Au*
Die size	*2814x2795µm*
Bond pad metallization layers	*AlSi*
Die Finish Front	*SiN (nitride)*
Metal levels	*1*

Assembly Information	
Assembly plant location	*MUAR - MALAYSIA*
Package description	*PDIP16L*
Molding compound	*PLASKON S-7PG*
Wires bonding materials/diameters	*Au/2 mils*
Die attach material	*PREFORM Pb/Ag/Sn 97.5/1.5/1*
Lead solder material	*Sn*

3.1.5 TV5 – L877EA6

Wafer fab information	
Wafer fab manufacturing location	*ANG MO KIO - SINGAPORE*
Wafer diameter	*6 inches*
Wafer thickness	*275 µm ±25*
Silicon process technology	*BIP (>6um)*
Die finishing back side	*Cr/Ni/Au*
Die size	*3910x3660µm*
Bond pad metallization layers	*AlSi*
Die Finish Front	*SiN (nitride)*
Metal levels	*1*

Assembly Information	
Assembly plant location	*MUAR - MALAYSIA*
Package description	*SO 20L*
Molding compound	*SUMITOMO EME7026*
Wires bonding materials/diameters	*Au/1.5 mils*
Die attach material	*HITACHI EN4900*
Lead solder material	*NiPdAu*

4. RELIABILITY TESTS

4.1 Reliability test conditions and results

4.1.1 TV1 – 1708BA6

Package Oriented Tests						
Test	**Method**	**Conditions**	**Sample/Lots**	**Number of lots**	**Duration**	**Results Fail/SS**
PC	Pre-Conditioning: Moisture sensitivity level 3					
		24h bake@125 ℃,192h@30 ℃/60%R.H.	**154**	1		**0/154**
TC	Temperature Cycling					
	PC before	**Temp. range: -65℃/+150℃**	**77**	1	**500cy**	**0/77**
AC	Autoclave					
	PC before	**121℃ 2atm**	**77**	1	**168h**	**0/77**
HTS	High Temperature Storage					
	No bias	**Tamb=150℃**	**77**	1	**1000h**	**0/77**
THS	Temperature Humidity Storage					
	No bias	**Ta=85 ℃/85%, R.H.**	**77**	1	**1000h**	**0/77**

4.1.2 TV2 – L693EA6

Package Oriented Tests						
Test	**Method**	**Conditions**	**Sample/Lots**	**Number of lots**	**Duration**	**Results Fail/SS**
PC	Pre-Conditioning: Moisture sensitivity level 3					
		24h bake@125 ℃,192h@30 ℃/60%R.H.	**154**	1		**0/154**
TC	Temperature Cycling					
	PC before	**Temp. range: -65℃/+150℃**	**77**	1	**500cy**	**0/77**
AC	Autoclave					
	PC before	**121℃ 2atm**	**77**	1	**168h**	**0/77**
HTS	High Temperature Storage					
	No bias	**Tamb=150℃**	**77**	1	**1000h**	**0/77**
THS	Temperature Humidity Storage					
	No bias	**Ta=85 ℃/85%, R.H.**	**77**	1	**1000h**	**0/77**

4.1.3 TV3 – L740CA6

Package Oriented Tests						
Test	**Method**	**Conditions**	**Sample/Lots**	**Number of lots**	**Duration**	**Results Fail/SS**
TC	Temperature Cycling					
		Temp. range: -65℃/+150℃	**77**	1	**500cy**	**0/77**
AC	Autoclave					
		121℃ 2atm	**77**	1	**96h**	**0/77**
HTS	High Temperature Storage					
	No bias	**Tamb=150℃**	**77**	1	**1000h**	**0/77**
THS	Temperature Humidity Storage					
	No bias	**Ta=85 ℃/85%, R.H.**	**77**	1	**1000h**	**0/77**

4.1.4 TV4 – L843DA6

Package Oriented Tests						
Test	**Method**	**Conditions**	**Sample/Lots**	**Number of lots**	**Duration**	**Results Fail/SS**
TC	Temperature Cycling					
		Temp. range: -65℃/+150℃	**77**	1	**500cy**	**0/77**
AC	Autoclave					
		121℃ 2atm	**77**	1	**240h**	**0/77**
HTS	High Temperature Storage					
	No bias	**Tamb=150℃**	**77**	1	**1000h**	**0/77**
THS	Temperature Humidity Storage					
	No bias	**Ta=85 ℃/85%, R.H.**	**77**	1	**1000h**	**0/77**

4.1.5 TV5 – L877EA6

Package Oriented Tests						
Test	**Method**	**Conditions**	**Sample/Lots**	**Number of lots**	**Duration**	**Results Fail/SS**
PC	Pre-Conditioning: Moisture sensitivity level 3					
		24h bake@125 ℃,192h@30 ℃/60%R.H.	**154**	1		**0/154**
TC	Temperature Cycling					
	PC before	**Temp. range: -65℃/+150℃**	**77**	1	**500cy**	**0/77**
AC	Autoclave					
	PC before	**121℃ 2atm**	**77**	1	**168h**	**0/77**
HTS	High Temperature Storage					
	No bias	**Tamb=150℃**	**77**	1	**1000h**	**0/77**
THS	Temperature Humidity Storage					
	No bias	**Ta=85 ℃/85%, R.H.**	**77**	1	**1000h**	**0/77**

5. RELIABILITY TESTS DESCRIPTION & DETAILED RESULTS

5.1 Package oriented tests

5.1.1 Pre-Conditioning

The device is submitted to a typical temperature profile used for surface mounting, after controlled moisture absorption.
The scope is to verify that the surface mounting stress does not impact on the subsequent reliability performance.
The typical failure modes are "pop corn" effect and delamination.

5.1.2 Thermal Cycles

The purpose of this test is to evaluate the thermo mechanical behavior under moderate thermal gradient stress.
Test flow chart is the following:

- Initial testing @ Ta=25°C.
- Readout @ 200 cycles.
- Final Testing @ 500 cycles @ Ta=25°C.

5.1.3 Autoclave

The purpose of this test is to point out critical water entry path with consequent corrosion phenomena related to chemical contamination and package hermeticity.
Test flow chart is the following:

- Initial testing @ Ta=25°C.
- Final Testing (168hrs) @ Ta=25°C.

TEST CONDITIONS:

- P=2.08 atm
- Ta=121°C
- test time= 168 hrs

5.1.4 High Temperature Storage Life

The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.
The scope is to investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding

5.1.5 Thermal Humidity Storage

The Temperature Humidity Storage follows the same method than Unbiased HAST at lower temperature.

TEST CONDITIONS: 85°C/85% RH.

6. PROCESS CHANGE CHARACTERIZATION

6.1 Parametric Test and EWS analysis

Parametric test distributions have been analyzed: no significant difference has been observed on any T84 critical parameter between BIPOLAR products diffused on 6" and 5" wafer size in AMK fabs.
EWS yield results and parametric distributions have also been analyzed comparing 6" and 5 " wafer size.
All the results are conforming to the expectations: no significant difference in EWS yield % and in the parametric distributions is highlighted.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries(''ST'') reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND / OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS ''AUTOMOTIVE GRADE'' MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners

ⓒ2012 STMicroelectronics - All rights reserved.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morroco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

Public Products List

PCN Title : Bipolar products changing wafer size from 5" to 6" in Ang Mo Kio fabs (Singapore)
PCN Reference : IPD-IPC/12/7320
PCN Created on : 29-AUG-2012

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change:

ST COMMERCIAL PRODUCT

L200CV	L2293Q	L2293QTR
L293B	L293D	L293DD
L293DD013TR	L293E	L296
L296HT	L296P	L297/1
L297D	L297D013TR	L298HN
L298N	L298P	L298P013TR
L4960	L4960H	L4962/A
L4962E/A	L4962EH/A	L4963D
L4963D013TR	L4963W	L4964
L4964HT	L6506	L6506D
L6506D013TR	SG2525AN	SG2525AP
SG2525AP013TR	SG3524N	SG3524P
SG3524P013TR	SG3525AN	SG3525AP
SG3525AP013TR	TDE1707BFP	TDE1707BFPT
TDE1708DFT	TDE1737DP	TDE1747FP
TDE1747FPT	TDE1767DP	TDE1787ADP
TDE1798DP	TDE3247FP	TDE3247FPT

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries(“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND / OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS ‘‘AUTOMOTIVE GRADE’’ MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners

ⓒ2012 STMicroelectronics - All rights reserved.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morroco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com