PRODUCT/PROCESS CHANGE NOTIFICATION

PCN HED-AUD/08/3870
Notification Date 07/23/2008

New Molding Compound introduction for MULTIWATT and PENTAWATT packages in Bouskoura assembly plant

Table 1. Change Implementation Schedule

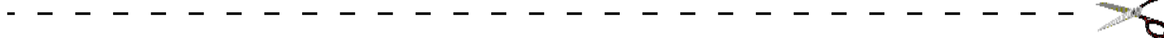
Forecasted implementation date for change	13-Oct-2008
Forecasted availabillity date of samples for customer	04-Aug-2008
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	16-Jul-2008
Estimated date of changed product first shipment	22-Oct-2008

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	Audio products in MULTIWATT, PENTAWATT package
Type of change	Package assembly material change
Reason for change	Molding compound material change
Description of the change	Following a Company package roadmap, Audio Division is going to introduce molding compound SAMSUNG 7200 DXC on Multiwatt and Pentawatt packages assembled in Bouskoura.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	Internal sales type change only
Manufacturing Location(s)	1]St Bouskoura - Morocco

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN HED-AUD/08/3870**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 07/23/2008**
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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DOCUMENT APPROVAL

Name	Function
Angelici, Marco	Division Marketing Manager
Onetti, Andrea Mario	Division Product Manager
Piccoli, Massimo	Division Q.A. Manager

Reliability Evaluation Report

HED Back-end qualification Rel-08-08-B
Bouskoura SW New Samsung resin

General Information	
Package	*SW*
Package description	*HW Monocomp. 7LDS SPLIT VERT*
Product division	*Audio, Display*
Silicon process technology	*C1 BIP PROJ & DE*
Affected products	*L559* *L440*

Locations	
Assembly plant location	*Bouskoura*
Wafer fab location	*Ang Mo Kio 5"*
Reliability test location	*Bouskoura*

DISTRIBUTION LIST

NAME	FUNCTION	LOCATION		NAME	FUNCTION	LOCATION
Corinne TRIOMPHE	HED BE QA Engineer	Grenoble		Alberto MANCALEONI	APG BE Reliability Engineer	Agrate
Massimo PICCOLI	HED QA Manager	Grenoble		Livio GOBBATO	CPG BE Reliability Engineer	Agrate
Jean-Luc DIOT	HED BE Operation Manager	Grenoble		Saverio DRAGONETTI	MMC reliability lab Manager	Grenoble
Donato PERRICA	HED/Audio BE Operation Engineer	Grenoble				
Carole DEL-PUPPO	HED/Display BE Operation Engineer	Grenoble				
Massimo PICCOLI	HED/Audio Product QA Manager	Grenoble				
Fabio FIABANE	HED/Audio Reliability Engineer	Castelletto				

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
1.0	June 17, 2008		C. TRIOMPHE	Document creation

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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
HED/0012/07 – ADCS 8072295	Qualification request
ADCS 7939807	Assembly Flowchart
ADCS 8077982	Related BSK Reliability reports
ADCS 8119114	Qualification certificate
ADCS 0061050	Back-End Qualification Procedure
ADCS 0061692	Reliability tests and criteria for product qualification
JESD22-A102-C	Accelerated Moisture Resistance - Unbiased Autoclave
JESD22-A104C	Temperature Cycling
JESD-22a118	Temperature Humidity Storage
SOP 2.6.2	Process qualification and transfer management
SOP 2.6.9	Package and process maturity management in Back End

2 GLOSSARY

SW	Smallwatt package (HW, Heptawatt + PW, Pentawatt)
TC	Thermal cycling
AC	Autoclave
THS	Temperature Humidity Storage

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this reliability report is to validate the introduction of Samsung SI 7200 DXC resin in Smallwatt assy line from ST Bouskoura plant. This qualification will come in complement of the qualification of this resin on MW package (QR HED/0016/07, HED-Rel-08-08, QC-31-08).

3.2 Conclusion

Based on the results of reliability tests, all SW devices with Samsung SI 7200 DXC resin from ST Bouskoura plant can be considered as qualified.

4 PACKAGE CHARACTERISTICS

4.1 Package construction note

PACKAGE FEATURES	
Package name	Small watt
Body sizes (mm^3)	10,18 x 9,17 x 4,5
Assembly site	Bouskoura
Lead frame material	Mono-component bare Copper
Lead finish	Pure tin
Die attach	PREFORM Pb/Ag/Sn 97.5/1.5/1
Molding compound	Samsung SI 7200 DXC
Wire material / diameter	Cu / 2 mil

4.2 Test vehicles definition

DIE & PRODUCT FEATURES		
Technical code/ Line	L559	L440
Package description	HW Monocomp. 7LDS SPLIT VERT	
Ground wires	1	1
Diffusion process	C1 BIP PROJ & DE	C1 BIP PROJ & DE
Diffusion plant	Ang Mo Kio 5”	Ang Mo Kio 5”
Die front finishing	SiN	SiN
Die back finishing	CHROMIUM/NICKEL/GOLD	

5 TESTS RESULTS SUMMARY

5.1 LOT Information

Lot Nb	Source lot	Lot number	Raw line code	Reliability location
1	VW604001B	CZ7320FMZZ	ED7X*L559TCW	Bouskoura
2	W649217	CZ70909M03	EB7X*L440ADW	Bouskoura

Detailed results in below chapter will refer to Lot #.

5.2 Test plan and results summary

Include here the tests plan and the results summary.

Test	Test short description					
	Method	**Conditions**	**SS/Lot**	**Lot n#**	**Duration**	**Results Fail/SS**
TC	Temperature cycling					
	JESD22-A104C Condition M, Soak Mode 3, 2cph	**Ta= -60/+150°C** **Steps: 0, 100, 500, 1000 cycles** **SAM (T-SCAN + C-SAM) after 1000 cycles**	**77** **100**	1 2	**1000 hrs**	**0/77** **0/100**
AC	Autoclave					
	JESD22-A102C	**P=2atm, Ta=121°C, 100%RH** **Steps: 0, 168, 240h** **SAM (T-SCAN + C-SAM) after 240h**	**77** **50**	1 2	**240 hrs**	**0/77** **0/50**
THS	Temperature humidity storage					
	JESD-22a118	**Ta=85°C/85%Rh** **Steps: 0, 500, 1000 hours** **SAM (T-SCAN + C-SAM) after 1000 hours**	**77**	1	**1000 hrs**	**0/77**

6 TESTS DESCRIPTION

6.1 Package oriented tests

TEST NAME	DESCRIPTION	PURPOSE
TC: Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere (thermal gradient typical 10 C/min).	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, and die attach layer degradation.
AC: Autoclave	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity. To point out critical water entry paths with consequent electrochemical and galvanic corrosion.
THS: Temperature Humidy Storage	It is a highly accelerated test which employs temperature and humidity under non-condensing conditions to accelerate the penetration of moisture through the external protective material (encapsulant or seal) or along the interface between the external protective material and the metallic conductors which pass through. Bias is not applied in this test to ensure the failure mechanisms potentially overshadowed by bias can be uncovered (e.g. galvanic corrosion).	To evaluate the reliability of non-hermetic packaged solid-state devices in humid environments This test is used to identify failure mechanisms internal to the package and is destructive.

Reliability Evaluation Report

HED Back-end qualification Rel-08-08
Bouskoura MW New Samsung resin

General Information	
Package	*MW*
Package description	*MULTIWATT 11L SPLIT VERT.* *MULTIWATT 15L SPLIT VERT.*
Product division	*Audio*
Silicon process technology	*C1 BIP PROJ & DE* *A3 BCD1*
Affected products	*L145* *U115*

Locations	
Assembly plant location	*Bouskoura*
Wafer fab location	*Ang Mo Kio 6"*
Reliability test location	*Castelletto*

DISTRIBUTION LIST

NAME	FUNCTION	LOCATION		NAME	FUNCTION	LOCATION
Corinne TRIOMPHE	HED BE QA Engineer	Grenoble		Alberto MANCALEONI	APG BE Reliability Engineer	Agrate
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Donato PERRICA	HED/Audio BE Operation Engineer	Grenoble				
Carole DEL-PUPPO	HED/Display BE Operation Engineer	Grenoble				
Massimo PICCOLI	HED/Audio Product QA Manager	Grenoble				
Fabio FIABANE	HED/Audio Reliability Engineer	Castelletto				

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
1.0	June 12, 2008		C. TRIOMPHE	Document creation

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6 TESTS DESCRIPTION 6
6.1 PACKAGE ORIENTED TESTS 6

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
HED/0016/07 – ADCS 8073107	Qualification request
ADCS 7848413	Assembly Flowchart
ADCS 8077981	Related BSK Reliability reports
ADCS 8137101	Qualification certificate
ADCS 0061050	Back-End Qualification Procedure
ADCS 0061692	Reliability tests and criteria for product qualification
JESD22-A102-C	Accelerated Moisture Resistance - Unbiased Autoclave
JESD22-A104C	Temperature Cycling
JESD-22a118	Temperature Humidity Storage
SOP 2.6.2	Process qualification and transfer management
SOP 2.6.9	Package and process maturity management in Back End

2 GLOSSARY

MW	Multiwatt package
TC	Thermal cycling
AC	Autoclave
THS	Temperature Humidity Storage

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this reliability report is to validate the introduction of Samsung SI 7200 DXC resin in Multiwatt assy line from ST Bouskoura plant.

3.2 Conclusion

Based on the results of reliability tests, all MW devices with Samsung SI 7200 DXC resin from ST Bouskoura plant can be considered as qualified.

4 PACKAGE CHARACTERISTICS

4.1 Package construction note

PACKAGE FEATURES	
Package name	MULTIWATT
Assembly site	Bouskoura
Lead frame material	Copper frame
Lead finish	Pure tin
Die attach	PREFORM Pb/Ag/Sn 97.5/1.5/1
Molding compound	Resin Samsung SI 7200 DXC
Wire material / diameter	Copper 2 mil

4.2 Test vehicles definition

DIE & PRODUCT FEATURES		
Technical code/ Line	L145	U115
RL Code	K8V1*L145CA6	K8V2*U115FB6
Package description	MULTIWATT 11L SPLIT VERT.	MULTIWATT 15L SPLIT VERT.
Ground wires	No	No
Diffusion process	C1 BIP PROJ & DE	A3 BCD1
Diffusion plant	Ang Mo Kio	Ang Mo Kio
Die front finishing	SiN	SiN
Die back finishing	CHROMIUM/NICKEL/GOLD	

5 TESTS RESULTS SUMMARY

5.1 LOT Information

Lot Nb	Wafer lot number	Marking	Lot number	Raw line code	Reliability location
1	66485N1	ST e3 DXC TDA7265 CZ069 733 V6 CZ MAR	CZ733069ZZ	K8V1*L145CA6	CASTELLETTO
2	V67265J8	ST e3 DXC TDA7294 CZ068 733 V6 CZ MAR	CZ733068ZZ	K8V2*U115FB6	CASTELLETTO

Detailed results in below chapter will refer to Lot #.

5.2 Test plan and results summary

Include here the tests plan and the results summary.

Test	Test short description					
	Method	**Conditions**	**SS/Lot**	**Lot n#**	**Duration**	**Results Fail/SS**
TC	Temperature cycling					
	JESD22-A104C Condition M, Soak Mode 3, 2cph	**Ta= -50/+150°C** **Steps: 0, 100, 500, 1000 cycles** **SAM (T-SCAN + C-SAM) after 1000 cycles**	**77** **77**	1 2	**1000 hrs**	**0/77** **0/77**
AC	Autoclave					
	JESD22-A102C	**P=2atm, Ta=121°C, 100%RH** **Steps: 0, 168, 240h** **SAM (T-SCAN + C-SAM) after 240h**	**77** **77**	1 2	**158 hrs**	**0/77** **0/77**
			77 **77**	1 2	**240 hrs**	**0/77** **0/77**
THS	Temperature humidity storage					
	JESD-22a118	**Ta=85°C/85%Rh** **Steps: 0, 500, 1000 hours** **SAM (T-SCAN + C-SAM) after 1000 hours**	**77** **77**	1 2	**1000 hrs**	**0/77** **0/77**

6 TESTS DESCRIPTION

6.1 Package oriented tests

TEST NAME	DESCRIPTION	PURPOSE
TC: Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere (thermal gradient typical 10 C/min).	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, and die attach layer degradation.
AC: Autoclave	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity. To point out critical water entry paths with consequent electrochemical and galvanic corrosion.
THS: Temperature Humidy Storage	It is a highly accelerated test which employs temperature and humidity under non-condensing conditions to accelerate the penetration of moisture through the external protective material (encapsulant or seal) or along the interface between the external protective material and the metallic conductors which pass through. Bias is not applied in this test to ensure the failure mechanisms potentially overshadowed by bias can be uncovered (e.g. galvanic corrosion).	To evaluate the reliability of non-hermetic packaged solid-state devices in humid environments This test is used to identify failure mechanisms internal to the package and is destructive.

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