PRODUCT INFORMATION LETTER

PIL IPD-DIS/13/8059
Dated 19 Aug 2013

SO8 Super High Density leadframe qualification in ST in-house China plant

Sales Type/product family label	SO8 package
Type of change	Package assembly material change
Reason for change	to optimize the industrial process
Description	Implementation of Super High Density frame with die Attach pad optimization on products housed in SO8 package
Forecasted date of implementation	12-Aug-2013
Forecasted date of samples for customer	12-Aug-2013
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	12-Aug-2013
Involved ST facilities	ST in-house China plant

DOCUMENT APPROVAL

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STMicroelectronics
IPD - ASD & IPAD™ Division[1]
BU Protection

(1) IPG: Industrial & Power Group - ASD: Application Specific Device – IPAD™: Integrated Passive and Active Devices

PIL
Product/Process Information Letter

SO8 Super High Density leadframe qualification in ST in-house China plant

Notification number:	IPG-DIS/13/8059	**Issue Date**	12/08/2013
Issued by	Aline AUGIS		
Product series affected by the change		CLP190ERL CLP30-200B1RL ETP01-1621RL ETP01-2821RL LCDP1521RL LCDP1521SRL LCP1521S LCP1521SRL LCP1531RL PEP01-5841 QPS200BRL THBT15011DRL THBT20011D/DRL TPI12011N/NRL TPI8011N/NRL TPN3021/RL TPP25011RL	

Reason for change

ST upgrades its products housed in SO8 package with a new Super High Density frame in order to optimize its industrial process.

Effects of change

Implementation of Super High Density frame with die Attach pad optimization on products housed in SO8 package

- The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the product datasheet
- The Moisture Sensitivity Level of the part (according to the IPC/JEDEC JSTD-020D standard) remains unchanged.
- The footprint recommended by ST remains the same.
- There is no change neither in the packing modes nor the standard delivery quantities.

Product identification and traceability

Traceability and identification is ensured by:

- Specific **internal product codification** for devices with Super High Density leadframe. This code is mentioned on the inner and outer packing box.
- **QA lot number** .

Qualification complete date	8th of April, 2013

Forecasted sample availability

Product family	Package	Commercial part Number	Availability date
Protection	SO8	LCP1521S	Now
Protection	SO8	TPN3021	Now
Protection	SO8	LCP1531	Now
Protection	SO8	TPI12011NRL	Now
Protection	SO8	TPI8011NRL	Now
Protection	SO8	PEP01-5841	Now

Change implementation schedule

Sales types	Estimated production start	Estimated first shipments
All SO8	**Week 30-2013**	**Week 36-2013**

External Reliability Evaluation Report

SO8 Super High Density leadframe qualification in ST China plant

General Information	
Product Line	*P&L58 anP&L80*
P/N	*ACS102-6T1-TR* *CLP190ERL* *CLP30-200B1RL* *ETP01-1621RL* *ETP01-2821RL* *LCDP1521RL* *LCDP1521SRL* *LCP1521S* *LCP1521SRL* *LCP1531RL* *PEP01-5841* *QPS200BRL* *THBT15011DRL* *THBT20011D/DRL* *TPI12011N/NRL* *TPI8011N/NRL* *TPN3021/RL* *TPP25011RL*
Product Group	*IPD*
Product division	*ASD & IPAD*
Package	*SO8*
Maturity level step	*30*

Locations	
Wafer fab	*ST Tours (France)*
Assembly plant	*ST Shenzhen (China)*
Reliability Lab	*STM Tours(France)*
Reliability assessment	*Pass*

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	25/07/2013	12	J.Michelon	JP.Rebrasse	Report supporting PIL 7970

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.
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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
SOP 2614	Reliability requirements for product qualification
0061692	Reliability tests and criteria for qualifications

2 GLOSSARY

DUT	Device Under Test
PCB	Printed Circuit Board
SS	Sample Size
TC	Temperature Cycling
THB	Temperature Humidity Bias
HTOL	High Temperature Operational Life
DT	Drop Test

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

ST upgrades its products housed in SO8 package with a new Super High Density frame in order to optimize its industrial process.

3.2 Conclusion

Qualification Plan requirements have been fulfilled without exception. Reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the robustness of the products and safe operation, which is consequently expected during their lifetime.

4 TESTS RESULTS SUMMARY

4.1 Test vehicle

Lot #	Part Number	Die manufacturing site	Assembly Site	Package	Comments
Lot 1	PEP01-5841	ST Tours (France)	ST Shenzhen (China)	SO8	Qualification Lot
Lot 2	TPN3021RL	ST Tours (France)	ST Shenzhen (China)	SO8	Qualification Lot
Lot 3	LCP1521S	ST Tours (France)	ST Shenzhen (China)	SO8	Qualification Lot
Lot 4	ACS102-6T1-TR	ST Tours (France)	ST Shenzhen (China)	SO8	Qualification Lot
Lot 5	TPP25011RL	ST Tours (France)	ST Shenzhen (China)	SO8	Qualification Lot

4.2 Test plan and results summary

PEP01-5841

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS Lot 1	Note
Die Oriented Tests							
HTRB	N	JESD22 A-108	Tj = 150°C; VR = 58V	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
Package Oriented Tests							
MSL 1	N	JESD 22 A-113	Ta = 85°C / RH = 85% 3 IR Reflows: Tp = 260°C	25	168h	0/25	MSL1 validated
THB	Y	JESD22 A-101	Ta = 85°C / RH = 85% VR = 58V	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
TC	Y	JESD22 A-104	-65°C / +150°C 2 cycles / hour	77	500C	0/77	
UHAST	Y	JESD22 A-118	Ta =130°C / RH=85% 3 BARS	77	96h	0/77	
Solderability	N	JESD22 B-102	Steam Ageing 8h SnAgCu 245°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Steam Ageing 8h SnPb 220°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Dry Ageing 16h SnAgCu 245°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Dry Ageing 16h SnPb 220°C	15	Visual Inspection	0/15	

TPN3021RL

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS Lot 2	Note
Die Oriented Tests							
HTS	N	JESD22 A-103	Ta = 150°C	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
					2000h	0/77	
Package Oriented Tests							
THB	Y	JESD22 A-101	Ta = 85°C / RH = 85% VR = 28V	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
					2000h	0/77	

LCP1521S

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS Lot 3	Note
Die Oriented Tests							
HTRB	N	JESD22 A-108	Tj = 150°C / VR = 175V	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
Package Oriented Tests							
MSL 1	N	JESD 22 A-113	Ta = 85°C / RH = 85% 3 IR Reflows : Tp = 260°C	25	168h	0/25	MSL1 validated
THB	Y	JESD22 A-101	Ta = 85°C / RH = 85% VR = 100V	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
TC	Y	JESD22 A-104	-65°C / +150°C 2 cycles / hour	77	500C	0/77	
AC	Y	JESD22 A-102	Ta = 121°C / RH = 100% 2 BAR	25	96h	0/25	
UHAST	Y	JESD22 A-118	Ta =130°C / RH=85% 3 BARS	25	96h	0/25	
Solderability	N	JESD22 B-102	Steam Ageing 8h SnAgCu 245°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Steam Ageing 8h SnPb 220°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Dry Ageing 16h SnAgCu 245°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Dry Ageing 16h SnPb 220°C	15	Visual Inspection	0/15	

ACS102-6T1-TR

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS Lot 4	Note
Die Oriented Tests							
HTRB	N	JESD22 A-108	Tj = 125°C / 600VAC Peak	77	168h	0/77	
					500h	0/77	
					1000h	0/77	
Package Oriented Tests							
MSL 1	N	JESD 22 A-113	Ta = 85°C / RH = 85% 3 IR Reflows: Tp = 260°C	25	168h	0/25	MSL1 validated
TC	Y	JESD22 A-104	-65°C / +150°C 2 cycles / hour	77	500C	0/77	
RSH	Y	JESD22 B-106	260°C; 10s ON; 15s OFF 2 cycles	77	2 Dipping	0/12	
Solderability	N	JESD22 B-102	Steam Ageing 8h SnAgCu 245°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Steam Ageing 8h SnPb 220°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Dry Ageing 16h SnAgCu 245°C	15	Visual Inspection	0/15	
Solderability	N	JESD22 B-102	Dry Ageing 16h SnPb 220°C	15	Visual Inspection	0/15	

TPP2501RL

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS	Note
						Lot 6	
Package Oriented Tests							
MSL 1	N	JESD 22 A-113	Ta = 85°C / RH = 85% 3 IR Reflows: Tp = 260°C	30	168h	0/30	
THS	N	JESD22 A-118	Ta = 85°C / RH = 85%	30	1000h	0/30	

5 ANNEXES

Tests Description

Test name	Description	Purpose
Die Oriented		
HTRB High Temperature Reverse Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: low power dissipation; max. supply voltage compatible with diffusion process and internal circuitry limitations;	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices operating condition in an accelerated way. To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects.
Package Oriented		
RSH Resistance to Solder Heat	device is submitted to a dipping in a solder bath at 260°C with a dwell time of 10s. Only for through hole mounted devices.	This test is used to determine whether solid state devices can withstand the effects of the temperature to which they will be subjected during soldering of their leads. The heat is conducted through the leads into the device package from solder heat at the reverse side of the board. This procedure does not simulate wave soldering or reflow heat exposure on the same side of the board as the package body.
u-HAST unbiased High Accelerated Stress Test	The device is un-biased under 130°C 85% RH during 96 hours	The Highly-Accelerated Temperature and Humidity Stress Test is performed for the purpose of evaluating the reliability of non-hermetic packaged solid-state devices in humid environments. It employs severe conditions of temperature, humidity, and bias which 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 it. The stress usually activates the same failure mechanisms as the "85/85" Steady-State Humidity Life Test (THB).
PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: 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.
THB Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.

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.	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, die-attach layer degradation.

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