PRODUCT/PROCESS CHANGE NOTIFICATION

PCN HED-AUD/07/2733
Notification Date 07/16/2007

SMALL QFP ASSEMBLY TRANSFER FROM AMKOR (ATK3) TO MUAR

AUD - AUDIO

Table 1. Change Identification

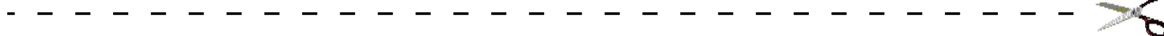
Product Identification (Product Family/Commercial Product)	V071 IN TQFP44 PACKAGE
Type of change	Package assembly location change
Reason for change	ASSY LINE CLOSURE IN AMKOR ATK3
Description of the change	Small QFP production transfer from Amkor ATK3 subcontractor plant (Korea) to Muar plant (Malaysia) with the introduction of new molding compound Sumitomo 7351 and Glue Hitachi, qualified in Muar since end of 2003. Production in Muar will be leadfree.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	"99" AS PRODUCTION AREA FOR MUAR
Manufacturing Location(s)	1]Sc Amkor Atk3 - Korea

Table 2. Change Implementation Schedule

Forecasted implementation date for change	15-Sep-2007
Forecasted availabillity date of samples for customer	15-Jul-2007
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	09-Jul-2007
Estimated date of changed product first shipment	15-Oct-2007

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	PCN HED-AUD/07/2733
Please sign and return to STMicroelectronics Sales Office	Notification Date 07/16/2007
☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

....

....

....

....

....

....

....

....

DOCUMENT APPROVAL

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

SMALL QFP TRANSFER FROM AMKOR (ATK3) TO MUAR

WHAT:

Following a Company package roadmap, we are on going to transfer the production of SMALL QFP package from Amkor (ATK3) subcontractor to Muar plant, already operative for this package.

STA013T$ (tray packing) and STA013T$013TR (tape&reel packing) belonging to V071 line is the only Audio product involved in this transfer.

Due to the changes introduced on SMALL QFP packages in Muar on 2003, production will be with new molding compound Sumitomo EME7351 and new Glue Hitachi EN4900.

WHY:

Company package roadmap for SMALL QFP package.

HOW:

T.R.55.03/1150 report covers all the new material involved in this PCN.
The V071 Audio product must be considered qualified by extension.

WHEN:

From October 07 deliveries onward.

GLUE HITACHI EN4900ST9 ON LQFP 10sq AND 14sq, MUAR

RELIABILITY EVALUATION REPORT

Abstract

The present reliability exercise has successfully investigated the new die-attach material HITACHI EN4900ST9 proposed for the LQFP 10x10 and 14x14 family (slug-down options included) in MUAR.

This material, previously qualified in the same plant for L/TQFP 10x10 with exposed pad, has been introduced to improve the MSL performance of the overall package family in front of the reflow temperature increase driven by the lead-free conversion. Therefore, the present assessment has been mainly based on MSL3 trials with lead-free-oriented reflow profiles (250°C and 260°C as peak temperature); humidity stress-tests (THB, PPT) and temperature cycling have been added on some test-vehicles to consolidate the general reliability judgment on the new material.

Reliability conclusion

On the basis of the results summarized in the present report, the new die-attach material HITACHI EN4900ST9 can be pre-qualified in MUAR on LQFP 10x10 and 14x14 (slug-down options included) as far as Reliability is concerned.

The MSL tests have anyway pointed out that full die-attach integrity is difficult to be achieved for devices with large die size by applying the standard "snap curing" solution available in the 10x10 and 14x14 assembly lines. Therefore, products having large die-size and severe application requirements in terms of power dissipation or substrate electrical contact must be assembled with oven-cured die attach instead of "snap".

In order to reach a full qualification maturity for the new die-attach material and process, the following actions are requested:

- hot die-shear test (target T=250°C) implementation in the assembly control plan, defining acceptance criteria in coherence with TPA target reflow performance (die-attach delamination after MSL3 Pb-free reflow <10% of the die area);

- clarification of safe die size criteria to authorize the use of standard "snap curing" on critical devices (as explained above).

The introduction of the new material on the current production will be monitored on sample basis through dedicated reliability tests. Representative devices will be selected for the two body sizes involved.

Reliability test conditions and results

N	TEST NAME	CONDITIONS [SPEC]	TV1 Rej. / S/S	TV2 Rej. / S/S	TV3 Rej. / S/S	TV4 Rej. / S/S	NOTES
1	JL3@250°C	24h bake @ 125°C 192h @ 30°C / 60% RH reflow simulation (3 times) Tmax=250°C	Snap: 17/20	Snap: 2/10 Oven: 0/20	Snap: 0/20	Snap: 0/10 Oven: 0/10	1
2	JL3@260°C	24h bake @ 125°C 192h @ 30°C / 60% RH reflow simulation (3 times) Tmax=260°C	Snap: 20/20	Snap: 5/10 Oven: 0/20	Snap: 0/20	Snap: 2/10 Oven: 0/10	1
3	JL3@250°C+TCT	Ta=-40/+150°C (air to air) 1000 cycles	-	Snap:0/50	-	Snap: 0/10 Oven: 0/10	2
4	JL3@260°C+TCT	Ta=-40/+150°C (air to air) 1000 cycles	-	Snap: 0/50	-	Snap: 2/10 Oven: 0/10	2
5	JL3@250°C+PPT	Ta=121°C, P=2atm 168h	Snap: 0/27	-	-	-	3
6	JL3@260+THB	Ta=85°, RH=85% 1000hrs	Snap: 0/28	Snap: 0/30	-	-	3

NOTES:

[1] The defectiveness ratio reported for all the test-vehicles is referred to the delamination rejects at acoustic inspection (T-scan), according to the criteria defined in ADCS n. 7512807. No electrical rejects have been found over the samples pre-conditioned before the subsequent reliability tests, with both the reflow peak temperatures.

[2] The defectiveness ratio reported for TV2 is referred to electrical testing results. Acoustic inspection (T-scan) has been repeated on the same sub-samples analyzed after JL3 preconditioning: no remarkable delamination change has been detected.
The defectiveness ratio reported for TV4 is referred to the delamination rejects at acoustic inspection (T-scan), according to the criteria defined in ADCS n. 7512807 (no electrical testing has been performed).

[3] The defectiveness ratio reported for all the test-vehicles is referred to electrical testing results.

Test-vehicles construction note

		TV1	TV2	TV3	TV4
Technical code	:	AA1S*UR25AAB	A51S*V329FAG	AD1L*UF20AEH	BB4Y*A633ABH
Diffusion process	:	BCD5	HCMOS7	BCD3S	HF2CMOS
Wafer diameter	:	6"	8"	6"	6"
Diffusion site	:	Agrate AG1	Rousset	Carrollton	Carrollton
Die size (mm^2)	:	9.13x7.97	8.10x8.15	5.00x4.76	6.66x6.15
Metal levels (type)	:	3, Al/Si/Cu	6, Ti/Al/TiN	3, Al/Si/Cu	2, Al/Si/Cu
Passivation	:	Si-glass+SiON+PIX	Si-glass+SiN	Si-glass+SiON+PIX	Si-glass+SiN
Back finishing	:	Bare Si	Bare Si	Cr/Ni	Bare Si
Package family	:	LQFP			
Body size / Pin count	:	14x14x1.4mm / 80	14x14x1.4mm / 80	14x14x1.4mm / 100	10x10x1.4mm / 44
Slug-down option	:	NO	NO	NO	NO
Assembly site	:	Muar			
Leadframe	:	10x10, Ag spot	10x10, Ag spot	7.2x7.2, Ag spot	7.2x7.2, Ag spot
Die attach	:	Hitachi EN4900ST9			
Wire bonding	:	Au, 1.2mil			
Moulding compound	:	Sumitomo EME 7351LS			
Solder plating	:	Sn/Pb	Pure Sn	Sn/Pb	Sn/Pb
D/a curing vs assembly lot	:	Snap: B91030307	Oven: G995A0340 Snap: G992R0309	Snap: H99TF0340	Oven: 993380W101 Snap: 993380W1ZY

Attachments

1) Reliability tests description

ATTACHMENT 1: RELIABILITY TEST DESCRIPTION

TEST NAME	DESCRIPTION	PURPOSE
JLn: Jedec Level n surface mounting simulation	The device is submitted to a typical temperature profile used for surface mounting, after a controlled moisture absorption.	As stand-alone test: to investigate the level of moisture sensitivity. 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.
TCT: Temperature Cycles Test	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, moulding compound delamination, wire-bonds failure, die-attach layer degradation.
PPT: Pressure Pot Test	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.
THB: Temperature Humidity Bias Test	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To investigate failure mechanisms activated in the die-package environment by electrical field and wet conditions. Typical failure mechanisms are electro-chemical corrosion and surface effects related to the moulding compound.

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

ⓒ 2007 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