PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MMS-MIC/10/5433
Notification Date 07/12/2010

Qualification of Amkor (Korea) as an additional assembly site for TQFP 14x14 package with Ni/Pd/Au lead finishing

Table 1. Change Implementation Schedule

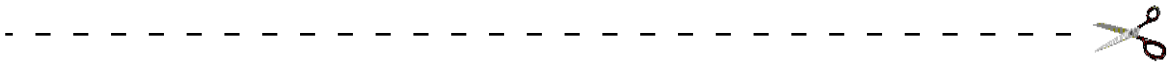
Forecasted implementation date for change	01-Sep-2010
Forecasted availabillity date of samples for customer	01-Sep-2010
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	01-Sep-2010
Estimated date of changed product first shipment	06-Oct-2010

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	STM32x, STM8Lx & STM8Sx in TQFP14x14
Type of change	Package assembly material change
Reason for change	Increase capacity
Description of the change	Microcontrollers Division intends to qualify Amkor (Korea) as an additional assembly site for our STM32, STM8L and STM8S devices in TQFP 14x14 (64L, 80L & 100L) with Ni/Pd/Au lead finishing. Successful completion of the qualification plan as shown page 5 will allow for production of the affected devices. There are no changes to the devices design or part number as a result of this change.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	Country of Origin : Korea
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN MMS-MIC/10/5433**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 07/12/2010**

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

Remark

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DOCUMENT APPROVAL

Name	Function
Colonna, Daniel	Division Marketing Manager
Buffa, Michel	Division Product Manager
Narche, Pascal	Division Q.A. Manager

MCD Pkg10 02 QUALIFICATION PLAN

Qualification of : LQFP14*14/ PPF frame at AMKOR

Qualification Reference :	**MCD Pkg10 02**
Issued on :	**Feb 17, 2010**
Assembly Plant :	**AMKOR ATK1 Korea**
Assembly Line :	**QFP**
Package / Process :	**LQFP 14*14/ PPF**
Lead termination:	**Ni-Pd-Au**

Test Vehicles :

Device	RL Code	Package	Number of Lots
STM32	1L*414XXXZ	LQFP100	2
STM8	1S*765XXXX	LQFP80	1

Test Vehicle Features:

Die information

Test Vehicle	STM32F10X	STM8S20X
Rawline	**1L*414XXXZ**	**1S*765XXXX**

Assembly information

Test Vehicle	STM32F10X	STM8S20X
Assembly Plant	**AMKOR ATK1**	
Packaging	**LQFP 100 14x14x1.4**	**LQFP 80 14x14x1.4**
POA	**ADCS 0086901**	**ADCS 0062342**
BOM	**1F026593**	**1F026594**
B/D	**ADCS 8246234**	**ADCS 8129103**
Materials	**FRAME LQFP 100L 14x14 5x5mm PPF 100L**	**FRAME LQFP 100L 14x14 5x5mm PPF 80L**
	GLUE ABLESTICK 8200C	
	RESIN NITTO GC7470LQ	
	WIRE Au D 0.8 mils	
Ecopack	**G (Ecopack2)**	
E Mark	**e4**	
2nd Level Interco	**Precious metal (Ag, Au, NiPdAu)**	
MSL	**3**	
Peak Body Temp (C)	**260°C**	

Package Reliability Trials :

Reliability Trial		Test Conditions	Pass Criteria	Unit per Lot
Preconditioning JL3+ AC	JL3+ Pressure Pot	121°C, 100% RH, 2 Atm	240h	80
Preconditioning JL3+ HTSL	JL3+ High Temperature Storage	150°C, Unbiased	500h,1000h	80
Preconditioning JL3+ TC	JL3+ Thermal Cycling MIL Std 883, Method 1010	-40°C, +150°C	500Cy,1000Cy	80
Preconditioning JL3+ THB/ THS	JL3+ Temperature Humidity Bias / Storage	85°C, 85% RH, biased/ No bias	500h,1000h	80

Package oriented tests/ Trials description

1. **Preconditioning**

According to ST spec 0098044.
Preconditioning test sequence simulates storage and soldering of SMD (surface mount devices) before submitting them to the reliability tests. It aims to validate the moisture sensitivity level of the package, and prepare it to the stress of additional reliability tests, thus enabling a good modelization of the life of the packaged product.
Out-of-bag floor life storage and soldering are modeled by the following test sequence:

- Bake to completely remove moisture from the package;
- Moisture soak according to the package moisture level;
- IR reflow.

The aim is to check that the chip and plastic package withstand the stress due to report on card. Depending on their technology, packages may absorb moisture during their transportation and/or storage, moisture that is released during the soldering operation. At this step, the moisture absorbed is vaporized due to high temperature of solder report process. This phenomenon can create plastic swelling, "pop corn" effect, and cracks which eventually results in wire breakage, passivation cracks, and delamination.

2. **Autoclave (AC)**

The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.

Purpose: 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.

3. **Temperature Cycling (TC)**

The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere (thermal gradient typical 10 C/min).

Purpose: 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.

4. Temperature Humidity Storage (THS)

The Temperature Humidity Storage is stored at controlled conditions of high temperature and relative humidity.

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

Purpose: to evaluate the reliability of non-hermetic packaged solid-state devices in humid environments. 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 it.
Bias is not applied in this test to ensure the failure mechanisms potentially overshadowed by bias can be uncovered (e.g. galvanic corrosion). This test is used to identify failure mechanisms internal to the package.

- Test conditions: 85°C / 85% RH.
- No power supply

5. Temperature Humidity Bias (THB)

The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.

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

Purpose: 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 molding compound.
The package moisture resistance with electrical field applied is verified, both electrolytic and galvanic corrosion are put in evidence.

Conditions:

- Ta=85°C; R.H.=85%;
- Power supply voltage less or equal to max operative voltage to not exceed Tj = 95 °C.

6. High Temperature Storage Life (HTSL)

The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.

Purpose: to investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.

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