PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MMS-MIC/12/7215
Notification Date 04/12/2012

AMKOR (ATP3) - New BOM for UFQFPN3x3 Package

Table 1. Change Implementation Schedule

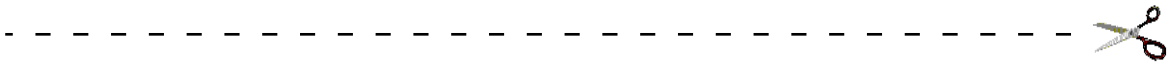
Forecasted implementation date for change	06-Jul-2012
Forecasted availabillity date of samples for customer	15-Jun-2012
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	30-Jun-2012
Estimated date of changed product first shipment	12-Jul-2012

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	UFQFPN 3x3 package products
Type of change	Package assembly material change
Reason for change	Pre-plated Frame (PPF) lead-frame disruption
Description of the change	Change of lead frame / molding compound / gold wire diameter
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	See below
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN MMS-MIC/12/7215**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 04/12/2012**

☐ 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

PRODUCT/PROCESS CHANGE NOTIFICATION

AMKOR (ATP3) - New BOM for UFQFPN 3x3 Package

MMS - Microcontrollers Division (MCD)

Dear Customer,

In order to sustain the strong demand for our UFQFPN 3x3 products and to continue to provide best-in-class service to our customers, ST MCD Division is standardizing the Bill Of Materials. The new BOM will also improve package robustness.

What is the change?

UFQFPN 3x3 products assembled at Amkor ATP3 (Philippines) will switch to the new Bill Of Materials for all microcontroller products.

This change will involve:

- a change of lead-frame: from Pre-Plated Frame to rough Pre-Plated Frame

Concurrent to this change, there will be:

- a change of molding compound : from Hitachi to Sumitomo G700
- a decrease in the diameter of the gold wire from 1.0 mil to 0.8 mil

Why?

Our strategy is to protect our customers against any disruption of materials availability, such as in this case, the termination in the supply of the lead frames by our supplier. That is why, MCD has selected a new lead frame supplier for all UFQFPN packages. In the meantime, we have taken the opportunity to implement the changes described above, in order to improve the BOM through the introduction of new raw materials which will improve package robustness.

When?

The production with the new BOM will start **week 27 2012.**

How will the change be qualified?

This change will be qualified using the standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy with the JESD-47 international standard.

Qualification plan

See Qualification plan file.

What is the impact of the change?

- **Form:** no change
- **Fit:** no change
- **Function:** no change

How can the change be seen?

Traceability of the change is ensured by ST internal tools.

We remain available to discuss any concern that you may have regarding this Product Change Notification.

With our sincere regards.

Michel Buffa
Microcontroller Division General Manager

MCDRER1205
New BOM for UQFN3x3 with µPPF Samsung lead frame- G700L resin- 0.8 mil wire
QUALIFICATION PLAN

Qualification of : **New Bill Of Material for UQFN3x3**

Qualification Reference :	**MCD RER1205**
Issued on :	**Mar 19, 2012**
Assembly Plant :	**AMKOR ATP3**
Assembly Line :	**QFN**
Package / Process :	**QFN3x3 20L**
MSL:	**MSL1**

Test Vehicles :

Device	RL Code	Package	Number of Lots
STM8L	761	UQFN3x3	3

Package Reliability Trials :

Reliability Trial (1)		Test Conditions	Pass Crite-ria	Unit per Lot
Preconditioning JL1+ uHAST	JL1+ uHAST	130°C, 85%RH, Unbiased	96h	77
Preconditioning JL1+ HTSL	JL1+ High Temperature Storage	150°C, Unbiased	1000h	77
Preconditioning JL1+ TC	JL1+ Thermal Cycling Cond C	-65°C, +150°C	500Cy	77
Preconditioning JL1+THB	JL1+ Temperature Humidity Bias	85°C, 85% RH, Bias	1000h	77

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. Un biased UHAST

The Unbiased HAST is performed for the purpose of evaluating 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 is used to identify failure mechanisms internal to the package and is destructive.

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 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.

5. 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.