PRODUCT/PROCESS CHANGE NOTIFICATION

PCN MMS-MIC/14/8385
Dated 10 Jul 2014

UFBGA Transfer back-end site from Amkor ATK (Korea) to Amkor ATP (Philippines) & Features improvement for STM32F42xIxH & STM32F43xIxH products

Table 1. Change Implementation Schedule

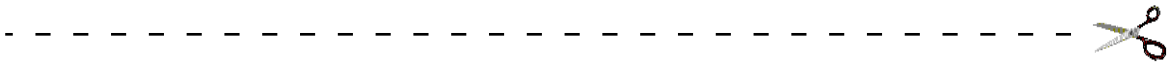
Forecasted implementation date for change	17-Oct-2014
Forecasted availability date of samples for customer	17-Sep-2014
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	17-Sep-2014
Estimated date of changed product first shipment	17-Oct-2014

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	UFBGA products listed below
Type of change	Package assembly location change
Reason for change	see indicated below
Description of the change	Transfer of back-end site from Amkor ATK (Korea) to Amkor ATP (Philippines) for UFBGA products listed below. Concurrently, introduction of a new die revision for the STM32F42xIxH & STM32F43xIxH products.
Change Product Identification	see indicated below
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN MMS-MIC/14/8385**
Please sign and return to STMicroelectronics Sales Office	**Dated 10 Jul 2014**
☐ 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	Marketing Manager
Buffa, Michel	Product Manager
Narche, Pascal	Q.A. Manager

PRODUCT/PROCESS CHANGE NOTIFICATION

UFBGA Transfer back-end site from Amkor ATK (Korea) to Amkor ATP (Philippines) & Features improvement for STM32F42xIxH & STM32F43xIxH products

MMS - Microcontrollers Division (MCD)

Dear Customer,

STMicroelectronics continuously acts and invests to optimize its manufacturing process in order to maintain high quality of service to all our customers. Consequently, ST MCD Division decided to transfer back-end site from Amkor ATK (Korea) to Amkor ATP (Philippines) for UFBGA packages.
In addition, ST MCD Division is pleased to announce that the features of the STM32F42xIxH & STM32F43xIxH products will be enhanced through the introduction of a new die revision that will be introduced concurrently with the transfer of back-end site indicated below.

What are the changes?
Changes are described in the following table:

Change 1: Transfer of assembly site from Amkor ATK (Korea) to Amkor ATP (Philippines) for UFBGA products, listed below, including STM32F42xIxH & STM32F43xIxH products.

The Bill Of Materials remains the same.

Change 2: Introduction of a new design revision only for the STM32F42xIxH & STM32F43xIxH products, listed below.

	Products		**Actual**	**New**
Change 1	All products	Assemby site	Amkor ATK4 (Korea)	Amkor ATP3 (Philippines)
Change 2	STM32F42xIxH & STM32F43xIxH	Revision code	Revision 1	Revision 3, described in STM23F42xx and STM32F43xx Errata sheet revision 8

Why?

Change 1: In order to better rationalize the supply chain, ST MCD Division transfers UFBGA package production from Amkor ATK (Korea) to Amkor ATP (Philippines).

Change 2: The strategy of ST MCD Division is to continuously improve performances, quality and functionality of our products. This can be achieved by introducing a new die revision for STM32F42xIxH & STM32F43xIxH products, listed below.

When?

Production for both changes will start from Week 42 2014.

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. You can find below Qualification Plans for change 1 and change 2.

What is the impact of the change?

- Form: no change

- Fit: no change

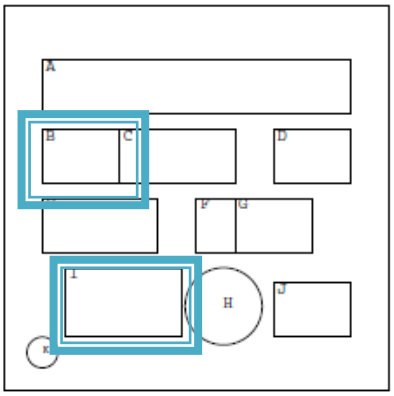
- Function:

- Change 1: no change
- Change 2: change of die revision on STM32F42xIxH & STM32F43xIxH products in reference to Errata sheet revision 8

How can the change be seen?

Traceability of the change is ensured by ST internal tools.

The marking composition indicated on the products is changing:



B : Assy plant
changes from HP to 7B

I : Country Of Origin
changes from KOR to PHL

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

Commercial products impacted by change 1 and change 2 :

Commercial products	Change 1	Change 2
STM32F427IGH6	x	x
STM32F427IIH6	x	x
STM32F427IIH6TR	x	x
STM32F427IIH6U	x	x
STM32F427IIH7	x	x
STM32F429IEH6	x	x
STM32F429IGH6	x	x
STM32F429IIH6	x	x
STM32F429IIH6TR	x	x
STM32F429IIH6U	x	x
STM32F437IGH6	x	x
STM32F437IIH6	x	x
STM32F437IIH6TR	x	x
STM32F437IIH6U	x	x
STM32F439IGH6	x	x
STM32F439IIH6	x	x
STM32F439IIH6TR	x	x
STM32F439IIH6U	x	x
STM32F071V8H6	x	
STM32F071VBH6	x	
STM32F072V8H6	x	
STM32F072VBH6	x	
STM32F072VBH6TR	x	
STM32F078VBH6	x	
STM32F103VBI6	x	
STM32F207ICH6	x	
STM32F207IEH6	x	
STM32F207IEH6TR	x	
STM32F207IFH6	x	
STM32F207IFH6TR	x	
STM32F207IGH6	x	
STM32F207IGH6J	x	
STM32F207IGH6TR	x	
STM32F207IGH6U	x	
STM32F207IGH7	x	
STM32F217IEH6	x	
STM32F217IGH6	x	
STM32F217IGH6U	x	
STM32F373V8H6	x	
STM32F373VBH6	x	
STM32F373VCH6	x	
STM32F401VBH6	x	
STM32F401VCH6	x	
STM32F401VCH6U	x	
STM32F401VDH6	x	
STM32F401VEH6	x	
STM32F407IEH6	x	
STM32F407IGH6	x	
STM32F407IGH6J	x	
STM32F407IGH6TR	x	

STM32F407IGH6U	x	
STM32F407IGH7	x	
STM32F417IEH6	x	
STM32F417IGH6	x	
STM32F417IGH6U	x	
STM32F417IGH6W	x	
STM32L151QCH6	x	
STM32L151QDH6	x	
STM32L151QDH6TR	x	
STM32L151QEH6	x	
STM32L151V8H6	x	
STM32L151V8H6A	x	
STM32L151VBH6	x	
STM32L151VBH6A	x	
STM32L151VCH6	x	
STM32L151VCH6TR	x	
STM32L151VCHCOP	x	
STM32L152QCH6	x	
STM32L152QDH6	x	
STM32L152QEH6	x	
STM32L152V8H6	x	
STM32L152V8H6A	x	
STM32L152V8H6TR	x	
STM32L152VBH6	x	
STM32L152VBH6A	x	
STM32L152VCH6	x	
STM32L152VCH6D	x	
STM32L162QCH6	x	
STM32L162QDH6	x	
STM32L162QDH6DTR	x	
STM32L162VCH6	x	
STM32P207IGH6QC1	x	
STM32P207IGQC1TR	x	
STM32TS60ZH6	x	

RERMCD1402 RELIABILITY PLAN

Qualification of :

UFBGA transfer from AMKOR Korea to AMKOR Philippines for Microcontrollers devices

Qualification Reference:	**RERMCD1402**
Issued on:	**March 6, 2014**
Assembly Plant:	**AMKOR Philippines ATP3**
Assembly Line:	**UFBGA 7x7 / 10x10**
Devices:	**MCD Standard products**
Package / Process:	**7x7 (100/132/169 Leads)** **10x10 (176 Leads)**
MSL:	**MSL3**

Purpose

Qualification of new assembly lines for UFBGA 7x7 and UFBGA 10x10 packages assembled at ATP3 (Amkor Philippines).

Test Vehicles :

Package line	Assembly Line	Package	Device (Partial RawLine Code)	Diffusion Process	Number of Lots
1	UFBGA 7x7x0.6	100L	STM32F (*410)	TSMC 0.18	**1**
		132L	STM32L (*436)	ST R8 F9GO2	**1**
		169L	STM32F (*419)	ST Cr300 M10	**1**
2	UFBGA 10x10 x0.6	176L	STM32F (*419)	ST Cr300 M10	**2**

Package Reliability Trials :

(*) tests performed after preconditioning

Reliability Trial		Test Conditions	Pass Criteria	Unit per Lot	Qual Lot nb
PC	Pre Conditioning: Moisture Sensitivity Jedec Level 3 J-STD-020/ JESD22-A113	Bake (125°C / 24 hrs) Soak (30°C / 60% RH / 192 hrs) for level 3 Convection reflow: 3 passes with Jedec level 3	3 passes MSL3	**308**	**5**
UHAST(*)	UnBiased Highly Accelerated Temperature and Humidity Stress JESD22 A118	130°C, 85%RH, 2 atm	96h	**77**	**5**
TC(*)	Thermal Cycling JESD22 A104	-65°C, +150°C	500Cy	**77**	**5**
THB(*)	Temperature Humidity Bias JESD22 A101	85°C, 85% RH, bias	1000h	**77**	**5**
HTSL	High Temperature Storage Life JESD22 A103	150°C- no bias	1000h	**77**	**5**
ESD	ESD Charge Device Model ANSI/ESDSTM5.3.1	6 discharges on each pin (3 positive + 3 negative) +/-500V	500V	**3**	**All devices**
CA	Construction Analysis including : • package dimensions • Solderability	ADCS#8046024	No major concern	**50**	**5**

	• Solder ball shear • Total ball shear •Wire bond pull • Wire bond shear				

Attachment : Reliability tests description

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. Unbiased Highly Accelerated Temperature and Humidity Stress (UHAST)

The Unbiased HAST is performed for the purpose of evaluating the reliability of non-hermetic packaged solidstate 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:

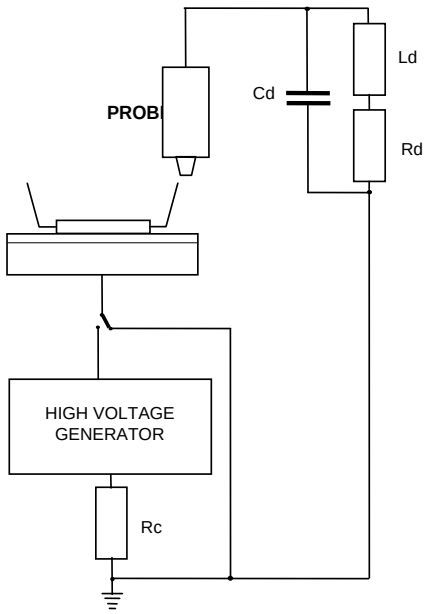
- Ta=85°C; R.H.=85%;
- Power supply voltage less or equal to max operative voltage to not exceed Tj = 95 °C.

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.

1. ESD Charge Device Model (CDM)

This ESD failure model is associated with the device and package itself. The CDM is intended to simulate charging/discharging events that occur in production equipment and processes. The Field induced CDM equivalent circuit used to describe this phenomenon is illustrated in Figure 1.



Possible (but not exhaustive) values of impedance:

Rc ≥ 100 MΩ
Rd = 1 - 10 Ω
Ld = 5 nH
Cd = 10 pF

Fig.1 : Field induced CDM equivalent circuit

STM32F4xx - BIG MANTA – 2M

New design revision introduction

Reliability Evaluation Plan

June, 16th 2014

MMS MCD Quality & Reliability Department

life.augmented

STM32F4xx - Big Manta - 2M - M10 - CR300

- Context :

Introduction of new design revision to improve product features.

Reliability Evaluation Plan

- Die oriented trials

Trial	Test	Method	Criteria	Conditions	Package	Sample x lot
STM32F4xx - BIG MANTA – 2M - M10HS – CR300 - TFBGA216 MU1T						
DIE	LU	0018695 JESD78	N.A	125°C	TFBGA216	6 x 1
	ESD HBM	ANSI/ESDA/JEDEC JS-001	1500Ω , 100pF	25°C 2kV (class 2)	TFBGA216	3 x 1
	HTOL	MIL-STD-883 Method 1005 JESD22-A108	125°C, 3.6V 1176h	125°C	TFBGA216	77 x 1
	EDR	JESD-22A117	10 kcyc Prog + 500h/150°C	Cycling @ 125°C Bake @ 150°C	TFBGA216	77 x 1
	EDR	JESD-22A117	10 kcyc Prog + 168h/150°C	Cycling @ 25°C Bake @ 150°C	TFBGA216	77 x 1
	EDR	JESD-22A117	10 kcyc Prog + 168h/150°C	Cycling @ -40°C Bake @ 150°C	TFBGA216	77 x 1
STM32F4xx - BIG MANTA – 2M - M10HS – CR300 – UFBGA176 ATP3						
DIE	ESD CDM	ANSI/ESDSTM5.3.1	25°C Min 250V (Class C3)	N.A.	UFBGA176	3 x 1

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