PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/23/14206
1.3 Title of PCN	ASE Kaohsiung (Taiwan) additional source for STM32H74x/75x products in UFBGA 10x10 package
1.4 Product Category	STM32H74x, STM32H75x
1.5 Issue date	2023-10-19

2. PCN Team	
2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Ricardo Antonio DE SA EARP
2.1.2 Marketing Manager	Veronique BARLATIER
2.1.3 Quality Manager	Pascal NARCHE

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Transfer	Line transfer for a full process or process brick (process step, control plan, recipes) from one site to another site: Assembly site (SOP 2617)	ASE Kaohsiung Taiwan

4. Description of change		
	Old	New
4.1 Description	Back-end source: - Amkor ATP Philippines	Back-end sources: - Amkor ATP Philippines - ASE Kaohsiung Taiwan - Additional source For more information, please refer to PCN14206 – Additional information attached document.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Impact on product Form, Fit, Function Visual aspect (color) might change depending on substrate material. Package darkness might change depending on molding compound. Marking position and size could be different upon assembly site, without any loss of information.	

5. Reason / motivation for change	
5.1 Motivation	Due to the success on the market of STM32 devices, ST Microcontrollers Division decided to qualify an additional back-end site to maintain state of the art service level to our customers thanks to extra capacity.
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	Change is visible through assembly traceability plant, in the marking: - “7B” for Amkor ATP Philippines - “AA” for ASE Kaohsiung Taiwan Please refer to PCN 14206 – Additional information attached document.

7. Timing / schedule	
7.1 Date of qualification results	2023-09-22
7.2 Intended start of delivery	2024-01-10
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	14206 MDG-MCD-RER2021 V2.0 - PCN12916 - PCN14206 - ASE KH(Taiwan) xFBGA package Bonding Wire - Reliab Rprt.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	**Issue Date**	2023-10-19

9. Attachments (additional documentations)
14206 Public product.pdf 14206 MDG-MCD-RER2021 V2.0 - PCN12916 - PCN14206 - ASE KH(Taiwan) xFBGA package Bonding Wire - Reliab Rprt.pdf 14206 PCN14206_Additional information.pdf

10. Affected parts		
10. 1 Current		**10.2 New (if applicable)**
10.1.1 Customer Part No	**10.1.2 Supplier Part No**	**10.1.2 Supplier Part No**
	STM32H743IIK6	
	STM32H750IBK6	
	STM32H753IIK6	

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Reliability Evaluation Report

MDG-MCD-RER2021

ASE Kaohsiung (Taiwan) xFBGA package Bonding Wire procurement flexibility

(PCN12916 – PCN14206)

General Information	
Commercial Product	*STM32H743IIK6* *STM32F417IGH6* *STM32L433VCI6*
Product Line	*450X66* *413X66* *435X66*
Die revision	*X450XXXU* *X413XXX4* *X435XXXZ*
Package	*UFBGA 10x10 176+25L* *UFBGA 7x7 100L*
Silicon Technology	*CROLLES CMOS040_LP* *TSMC CMOSM10* *TSMC 90nm eFlash Generic*
Division	*MDG-MCD*

Traceability	
Diffusion Plant	*CROLLES 300 / FRANCE* *TMSC FAB 14 / TAIWAN*
Assembly Plant	*ASE KH, TAIWAN*

Reliability Assessment	
Pass	☒
Fail	☐

Note: *this report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the electronic device conformance to its specific mission profile. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics or under the approval of the author (see below).*

Version	Date	Author	Function
1.0	29th March 2022	Celine NAVARRO	MDG-MCD-QA Back end
2.0	11th September 2023	Celine NAVARRO	MDG-GPM-Q&R Back end

APPROVED BY:

Function	Location	Name	Date
Division Quality Manager	Rousset	Pascal NARCHE	29th March 2022
Subgroup Quality Manager	Rousset	Pascal NARCHE	13th September 2023

TABLE OF CONTENTS

1 RELIABILITY EVALUATION OVERVIEW

1.1 Objective

The aim of this report is to present results of the reliability evaluation performed on STM32H die 450, 413 for UFBGA 10X10 and die 435 for UFBGA 7x7 ASE Kaohsiung (Taiwan) with CuPd wires.

Changes are described here below for PCN12916:

	Existing Back-End Line	Added back-end line
Assembly site	ASE Kaohsiung (Taiwan)	
Wire	Gold 0.8mil	Copper Palladium 0.8mil

Changes are described here below for PCN14206:

	Existing back-end sites	Added back-end site
Assembly site	Amkor ATP Philippines	ASE Kaohsiung Taiwan
Die Attach	DAF NITTO EM-760L2-P	DAF ABLESTIK ATB-125
Resin (1)	NITTO GE100LFCS	KYOCERA G1250AAS
Solder balls	SN96.5 AG3.5%	SN96.5 AG3.5%
Enhanced traceability in marking	No digit	2 digits
Wire bonding	Gold 0.8Mils	CuPd 0.8Mils

(1) Package darkness might change depending on molding compound.
Visual aspect (color) might change depending on substrate material.
Marking position and size could be different upon assembly site, without any loss of information.

1.2 Reliability Strategy

Test vehicles for reliability trials are described here below:

Package	Body	Pitch	Package Code	Wire	Assy	Trial
UFBGA 176+25L	10x10	0.65	A0E7	CuPd	ASE KH	3 assembly lots.
UFBGA 176+25L	10x10	0.65	A0E7	CuPd	ASE KH	1 assembly lot.
UFBGA 100L	7x7	0.5	A0C2	CuPd	ASE KH	1 assembly lot.

Qualification is based on standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy with the JESD-47 international standard.

1.3 Conclusion

All reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.

According to good reliability tests results in line with validated product mission profile and reliability strategy, the qualification is granted for all products with same silicon technology as Test Vehicle in xFBGA package in ASE Kaohsiung.

Refer to Section 3.0 for reliability test results.

2 TEST VEHICLE CHARACTERISTICS

2.1 Generalities

Package line	Assembly Line Package	Device (Partial RawLine Code)	Diffusion Process	Number of Lots
UFBGA	UFBGA10x10x0.6 176+25L	E0MR*450CSXU	CMOS040 Crolles	3
UFBGA	UFBGA10x10x0.6 176+25L	E2MR*413CSX4	CMOSM10 TSCM	1
UFBGA	UFBGA 7x7x0.60 100L	E0MJ*435CSXZ	90nm eFlash Generic TSMC	1

2.2 Traceability

2.2.1 Wafer fab information

Table 1

Wafer fab information	
FAB1 die 450 UFBGA 10x10	
Wafer fab name / location	CROLLES 300 / FRANCE
Wafer diameter (inches)	12
Wafer thickness (µm)	775 +/-25
Silicon process technology	CMOS040
Number of masks	51
Die finishing front side (passivation) materials	PSG + NITRIDE
Die area (Stepping die size) (µm)	4983 x 4662
Die pad size (X,Y) (µm)	54.9 x 54.4
Sawing street width (X,Y) (µm)	72 x 72
Metal levels/Materials/Thicknesses (µm)	Metal 1 Cu 0.130 Metal 2 Cu 0.140 Metal 3 Cu 0.140 Metal 4 Cu 0.140 Metal 5 Cu 0.140 Metal 6 Cu 1.000 Metal 7 Cu 1.000 Metal 8 Ta/TaN/AlCu 1.450
FAB2 die 413 UFBGA 10x10	
Wafer fab name / location	Fab 14 TSMC / TAIWAN
Wafer diameter (inches)	12
Wafer thickness (µm)	775 +/-25
Silicon process technology	CMOS010
Number of masks	42
Die finishing front side (passivation) materials/	USG + NITRIDE
Die area (Stepping die size) (µm)	4004 x 4258
Die pad size (X,Y) (µm)	59 x 123 and 63 x 73
Sawing street width (X,Y) (µm)	80 x 80
Metal levels/Materials/Thicknesses (µm)	Metal 1 TaN/Ta/CuSeed/Cu 0.220 µm Metal 2 TaN/Ta/CuSeed/Cu 0.280 µm Metal 3 TaN/Ta/CuSeed/Cu 0.280 µm Metal 4 TaN/Ta/CuSeed/Cu 0.280 µm Metal 5 TaN/Ta/CuSeed/Cu 0.280 µm Metal 6 Ta/TaN/AlCu 0.730 µm Metal 7 AlCu 1.200 µm

FAB3 die 435 UFBGA 7x7	
Wafer fab name / location	Fab 14 TSMC / TAIWAN
Wafer diameter (inches)	12
Wafer thickness (µm)	775 +/-25
Silicon process technology	90nm eFlash Generic
Number of masks	44
Die finishing front side (passivation) materials/	USG + NITRIDE
Die area (Stepping die size) (µm)	3176.4 x 3162.4
Die pad size (X,Y) (µm)	59 x 123
Sawing street width (X,Y) (µm)	80 x 80
Metal levels/Materials/Thicknesses (µm)	Metal 1 TaN/Ta/CuSeed/Cu 0.240 µm Metal 2 TaN/Ta/CuSeed/Cu 0.310 µm Metal 3 TaN/Ta/CuSeed/Cu 0.310 µm Metal 4 TaN/Ta/CuSeed/Cu 0.310 µm Metal 5 TaN/Ta/CuSeed/Cu 0.310 µm Metal 6 TaN/Ta/CuSeed/Cu 0.850 µm Metal 7 AlCu 1.450 µm

2.2.2 Assembly information

Table 2

Assembly Information	
Package 1 – UFBGA 10x10 176 + 25L	
Assembly plant name / location	ASE KH TAIWAN
Pitch (mm)	0.65
Die thickness after back-grinding (µm)	75 +/- 10
Die sawing method	Laser Grooving + Mechanical sawing
Bill of Material elements	
Substrate material/supplier/reference	UFBGA 10x10 176p25 P0.65 ASE A25621
Die attach material/type(glue/film)/supplier	ABLESTICK ATB-125
Wire bonding material/diameter	Wire CuPd 51000251D1 4N 0.8mil
Balls metallurgy/diameter	BALLS WITH 200 DIAM SN96.5 AG3.5%
Molding compound material/supplier	KYOCERA G1250AAS ULA
Package Moisture Sensitivity Level (JEDEC J-STD020D)	MSL 3
Package 2 – UFBGA 10x10 176 + 25L	
Assembly plant name / location	ASE KH TAIWAN
Pitch (mm)	0.65
Die thickness after back-grinding (µm)	75 +/- 10
Die sawing method	Laser Grooving + Mechanical sawing
Bill of Material elements	
Substrate material/supplier/reference	UFBGA 10x10 176p25 P0.65 ASE A25623
Die attach material/type(glue/film)/supplier	ABLESTICK ATB-125
Wire bonding material/diameter	Wire CuPd 51000251D1 4N 0.8mil
Balls metallurgy/diameter	BALLS WITH 200 DIAM SN96.5 AG3.5%
Molding compound material/supplier	KYOCERA G1250AAS ULA
Package Moisture Sensitivity Level (JEDEC J-STD020D)	MSL 3
Package 3 – UFBGA 7x7 100L	
Assembly plant name / location	ASE KH TAIWAN
Pitch (mm)	0.5
Die thickness after back-grinding (µm)	75 +/- 10
Die sawing method	Laser Grooving + Mechanical sawing
Bill of Material elements	
Substrate material/supplier/reference	UFBGA 7x7 100L P0.5 ASE A25620
Die attach material/type(glue/film)/supplier	ABLESTICK ATB-125
Wire bonding material/diameter	Wire CuPd 51000251D1 4N 0.8mil
Balls metallurgy/diameter	BALLS WITH 200 DIAM SN96.5 AG3.5%

Molding compound material/supplier	KYOCERA G1250AAS ULA
Package Moisture Sensitivity Level (JEDEC J-STD020D)	MSL 3

Reliability testing information

Table 3

Reliability Testing Information	
Reliability laboratory name / location	GRAL in Grenoble

Note: ST is ISO 9001 certified. This induces certification of all internal and subcontractor labs.
ST certification document can be downloaded under the following link:
http://www.st.com/content/st_com/en/support/quality-and-reliability/certifications.html

3 TESTS RESULTS SUMMARY

3.1 Lot Information

Table 4

Lot #	Diffusion Lot / Wafer ID	Die Revision (Cut)	Assy Lot / Trace Code	Raw Line	Package	Note
1	VQ950566	2.2	AA035013	E0MR*450CSXU	UFBGA 10x10 176+25L	
2	VQ004370	2.2	AA035014	E0MR*450CSXU	UFBGA 10x10 176+25L	
3	VQ934755	2.2	AA020197	E0MR*450CSXU	UFBGA 10x10 176+25L	
4	9R934182	1.1	AA028084	E2MR*413CSX4	UFBGA 10x10 176+25L	
5	9R013195	1.1	AA037094	E0MJ*435CSXZ	UFBGA 7x7 100L	

3.2 Test plan and results summary

Table 5 – ACCELERATED ENVIRONMENT STRESS TESTS

For UFBGA 10x10 die 450

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ANSI/ESDA/ JEDEC JS-002	250V class C1	1	3	3	Lot1: 0/3	
PC	J-STD-020	24h bake@125°C, MSL3 (192h@30C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	3	308	924	Lot1: 0/308 Lot2: 0/308 Lot3: 0/308	
TC	JESD22-A104	Ta=-65/150°C Duration= 500cyc ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	
UHAST	JESD22-A118	Ta=130°C ,85% RH Duration= 96hrs ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	
HTSL	JESD 22-A103	Ta=150°C, Duration= 1000hrs ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	
THB	JESD 22-A101	Ta=85°C/85%RH VDD=3v6 Duration= 1000hrs ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	

Note: Test method revision reference is the one active at the date of reliability trial execution

For UFBGA 10x10 die 413

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ANSI/ESD/ STM 5.3.1	500V class II	1	3	3	Lot4: 0/3	
PC	J-STD-020	24h bake@125°C, MSL3 (192h@30C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	1	308	308	Lot4: 0/308	
TC	JESD22-A104	Ta=-65/150°C Duration= 500cyc ☒ After PC	1	77	77	Lot4: 0/77	
UHAST	JESD22-A118	Ta=130°C ,85% RH Duration= 96hrs ☒ After PC	1	77	77	Lot4: 0/77	
HTSL	JESD 22-A103	Ta=150°C, Duration= 1000hrs ☒ After PC	1	77	77	Lot4: 0/77	
THB	JESD 22-A101	Ta=85°C/85%RH VDD=3v6 Duration= 1000hrs ☒ After PC	1	77	77	Lot4: 0/77	

Note: Test method revision reference is the one active at the date of reliability trial execution

For UFBGA 7x7 die 435

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ANSI/ESD/ STM 5.3.1	250V class C3	1	3	3	Lot5: 0/3	
PC	J-STD-020	24h bake@125°C, MSL3 (192h@30C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	1	308	308	Lot5: 0/308	
TC	JESD22-A104	Ta=-65/150°C Duration= 500cyc ☒ After PC	1	77	77	Lot5: 0/77	
UHAST	JESD22-A118	Ta=130°C ,85% RH Duration= 96hrs ☒ After PC	1	77	77	Lot5: 0/77	
HTSL	JESD 22-A103	Ta=150°C, Duration= 1000hrs ☒ After PC	1	77	77	Lot5: 0/77	
THB	JESD 22-A101	Ta=85°C/85%RH VDD=3v6 Duration= 1000hrs ☒ After PC	1	77	77	Lot5: 0/77	

Note: Test method revision reference is the one active at the date of reliability trial execution

Table 8 – PACKAGE ASSEMBLY INTEGRITY TESTS

Test code	Method	Tests Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
CA	Construction Analysis including POA	Internal ST specifications	3	10	30	Lot3: 0/10 Lot4: 0/10 Lot5: 0/10	SHZ_CA_20-00046 (450) CA-48-1020_UFBGA 10x10 176+25_413 (413) SHZ_CA_20-00060 (435)

4 APPLICABLE AND REFERENCE DOCUMENTS

Reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
SOP2.4.4	Record Management Procedure
SOP2.6.2	Internal Change Management
SOP2.6.7	Finished Good Maturity Management
SOP2.6.9	Package & Process Maturity Management in BE
SOP2.6.11	Program Management for Product Development
SOP2.6.17	Management of Manufacturing Transfers
SOP2.6.19	Front-End Technology Platform Development and Qualification
DMS 0061692	Reliability Tests and Criteria for Product Qualification
ANSI/ESDA JEDEC JS-002	Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
JESD 22-A103	High Temperature Storage Life
J-STD-020	Moisture/reflow sensitivity classification for non-hermetic solid state surface mount devices
JESD22-A113	Preconditioning of non-hermetic surface mount devices prior to reliability testing
JESD22-A118	Unbiased Highly Accelerated temperature & humidity Stress Test
JESD22-A104	Temperature cycling
JESD22-A101	Temperature Humidity Bias

5 GLOSSARY

Reference	Short description
PC	Preconditioning (solder simulation)
THB	Temperature Humidity Bias
TC	Temperature cycling
uHAST	Unbiased Highly Accelerated Stress Test
HTSL	High temperature storage life
DMS	ST Advanced Documentation Controlled system/ Documentation Management system
ESD CDM	Electrostatic discharge (charge device model)
CA	Construction Analysis

6 REVISION HISTORY

Revision	Author	Content description	Approval List			
			Function	Location	Name	Date
1.0	Celine NAVARRO	Initial Release	Division Q&R Responsible	RSST	Pascal NARCHE	29th March 2022
2.0	Celine NAVARRO	Added PCN14206	Subgroup Q&R Responsible	RSST	Pascal NARCHE	13th September 2023

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Public Products List

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PCN Title : ASE Kaohsiung (Taiwan) additional source for STM32H74x/75x products in UFBGA 10x10 package

PCN Reference : MDG/23/14206

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

STM32H742IIK6	STM32H743IIK6TR	STM32H742IGK6
STM32H743IGK6	STM32H753IIK6	STM32H743IIK6
STM32H750IBK6		

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PRODUCT/PROCESS CHANGE NOTIFICATION
PCN14206 – Additional information

ASE Kaohsiung (Taiwan) additional source for STM32H74x/75x products in UFBGA 10x10 package

MDG – General Purpose Microcontrollers Division (GPM)

What are the changes?

Introduction of an additional assembly plant for STM32H7x in BGA10x10 initially assembled in AMKOR ATP (Philippines) now transferring to ASE KaoHsiung (Taiwan) assembly site.
Changes are described in the table below.

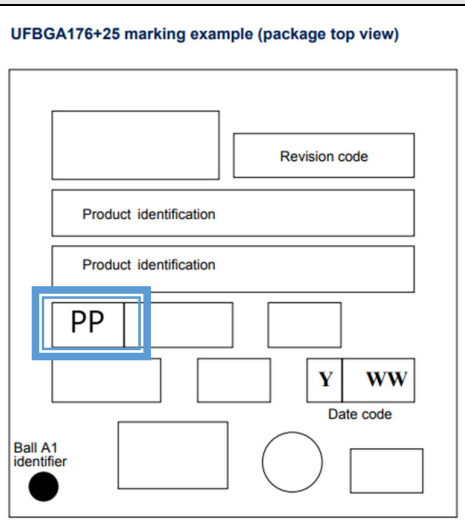
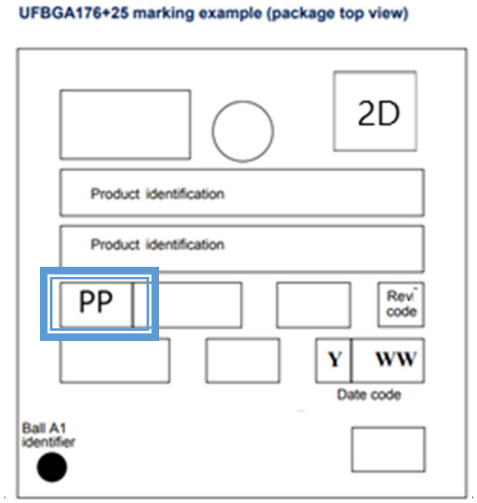
Changes described in table below:

	Existing back-end sites	Added back-end site
Assembly site	Amkor ATP Philippines	ASE Kaohsiung Taiwan
Die Attach	DAF NITTO EM-760L2-P	DAF ABLESTIK ATB-125
Resin (1)	NITTO GE100LFCS	KYOCERA G1250AAS
Solder balls	SN96.5 AG3.5%	SN96.5 AG3.5%
Marking composition	Without 2D	With 2D Marking
Wire bonding	Gold 0.8Mils	CuPd 0.8Mils

(1) Package darkness might change depending on molding compound.
Visual aspect (color) might change depending on substrate material.
Marking position and size could be different upon assembly site, without any loss of information.

How can the change be seen?

The standard marking is:

Marking	Amkor ATP Philippines	ASE Kaohsiung Taiwan
UFBGA 10X10		
PP code	**7B**	**AA**

Y WW code indicates Year Week (manufacturing date)

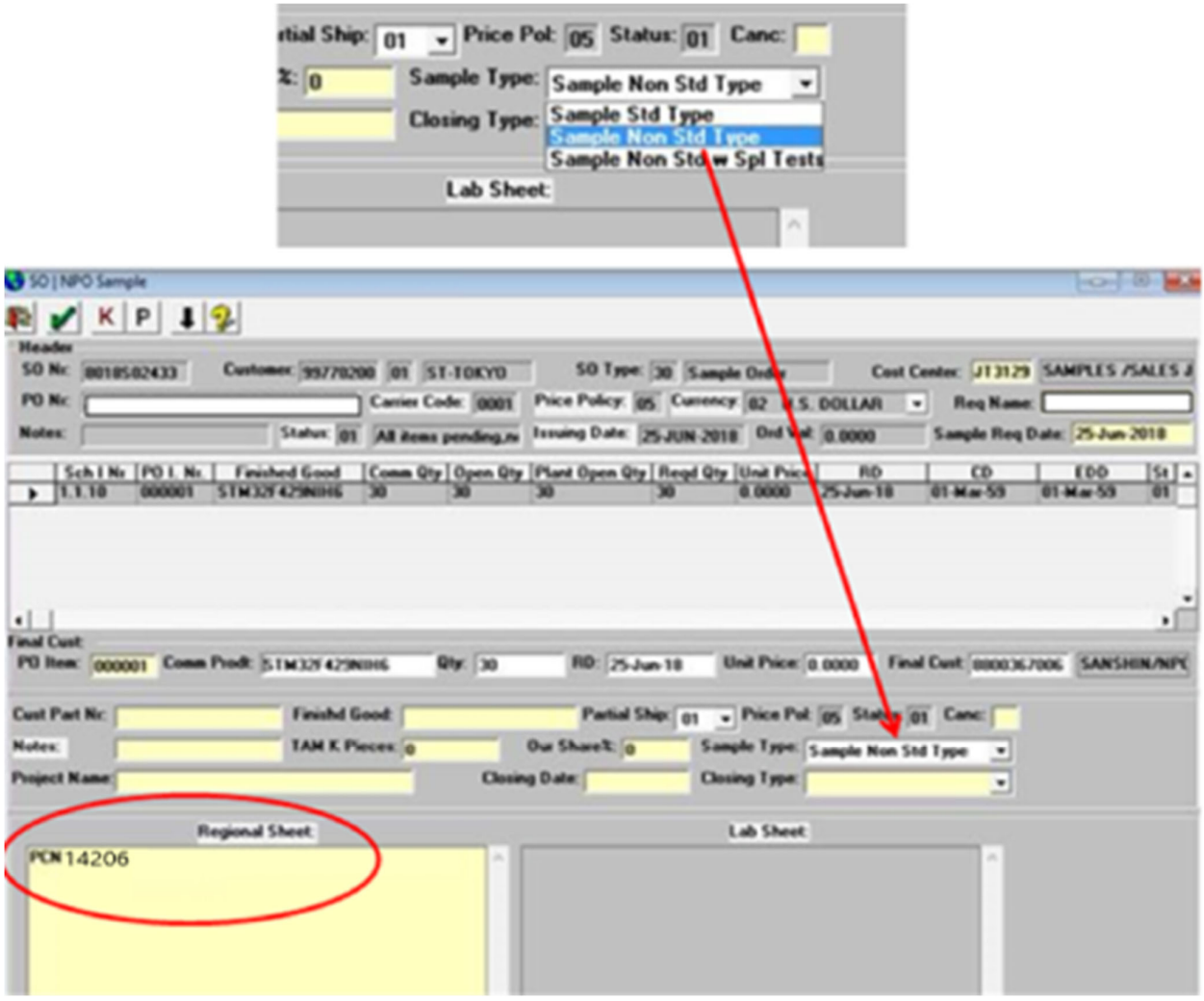
PP code indicates assembly traceability plant code.

Please refer to product **DataSheet** or Technical Note **TN1433** for package marking details.

How to order samples?

For all samples request linked to this PCN, please:

- place a **Non-standard** sample order (choose Sample Non Std Type from pull down menu)
- insert the PCN number "**PCN14206**" into the NPO Electronic Sheet/**Regional Sheet**
- request sample(s) through Notice tool, indicating a single Commercial Product for each request



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