PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data		
1.1 Company		STMicroelectronics International N.V
1.2 PCN No.		CRP/15/9552
1.3 Title of PCN		PSSO12 and PSSO14 Lead Frames - Second source qualification. Bouskoura - Morocco.
1.4 Product Category		PSSO12 and PSSO14
1.5 Issue date		2015-12-17

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 Process Owner	Patrick LOW
2.1.2 Corporate Quality Manager	Veronique LIVACHE

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	Direct material: usage of material without any modification having same part number, and produced in a new plant of a qualified supplier	Back End Assembly Plant in BOUSKOURA - MOROCCO

4. Description of change		
	Old	New
4.1 Description	PSSO12 and PSSO14 "Stamped" Lead Frames are currently provided by our supplier DCI.	PSSO12 and PSSO14 "Stamped" Lead Frames will be provided by our suppliers MITSUI-MHT and SUMITOMO-SHAP.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Change	

5. Reason / motivation for change	
5.1 Motivation	Reason for this change is: • Our lead frame supplier DCI announced recently his “stamped” lead frame activity closure. • A second source qualification has been immediately activated to protect our customers and business. • Approach for selecting the second source supplier is same specifications, same materials, same finishing
5.2 Customer Benefit	DOUBLE SOURCING

6. Marking of parts / traceability of change	
6.1 Description	-

7. Timing / schedule	
7.1 Date of qualification results	2015-11-30
7.2 Intended start of delivery	2016-06-06
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description			
8.2 Qualification report and qualification results	In progress	Issue Date	

9. Attachments (additional documentations)
9552PpPrdtLst.pdf DCI_PSSO12_14 customer notification document.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
	L4995AJTR	
	L4995JTR	
	L4995RJTR	
	L5150CJTR	
	L5150GJTR	
	VN5050AJTR-E	
	VN5050J-E	
	VN5050JTR-E	
	VN5E050AJTR-E	
	VN5E050JTR-E	
	VN5E050MJTR-E	
	VND5160AJTR-E	
	VND5E160AJTR-E	
	VND5E160JTR-E	
	VND5E160MJTR-E	

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 TWO AUTHORIZED ST REPRESENTATIVES, 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

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

Public Products List

PCN Title : PSSO12 and PSSO14 Lead Frames - Second source qualification. Bouskoura - Morocco.

PCN Reference : CRP/15/9552

PCN Created on : 30-Nov-2015

Subject : Public Products List

Dear Customer,

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

VN5E050MJTR-E	VND5E160AJTR-E	RL5150CJTR
L9777A	VN5E050AJ-E	VN5E050AJTR-E
L9777B13TR	L9777B	L4995RJ
VN5E050JTR-E	VND5E160MJTR-E	L4995RJTR
VND5E160AJ-E	L9777C13TR	L5150CJTR
L5300GJ	VND5E160MJ-E	VN5050AJ-E
VND5160AJTR-E	VN5E050MJ-E	L5150GJ
L5150CJ	VND5160AJ-E	VN5050AJTR-E
VN5E050J-E	L5150GJTR	VND5E160JTR-E
VND5E160J-E	L9777C	VN5050JTR-E
L5300GJTR	L9777A13TR	VN5050J-E

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 TWO AUTHORIZED ST REPRESENTATIVES, 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

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

PSSO12 & 14 Lead frames - 2nde source qualification
BOUSKOURA - MOROCCO

WHAT is the change?

- This change is concerning the qualification of 2nd sources for PSSO12 and PSSO14 "stamped" lead frames currently provided by our supplier DCI and used at BOUSKOURA – MOROCCO manufacturing plant
- Identified second source suppliers are MITSUI-MHT and SUMITOMO-SHAP

WHY:

Reason for this change is:

- Our lead frame supplier DCI announced recently his "stamped" lead frame activity closure.
- A second source qualification has been immediately activated to protect our customers and business.
- Approach for selecting the second source supplier is same specifications, same materials, same finishing

WHEN will this change occur?

Target date to deploy this change is W23'2016.

HOW will the change be qualified?

- This change will be qualified using the standard STMicroelectronics procedures for quality and reliability. Major steps of the qualification are:
  - Process capability assessment
  - Workability
  - Reliability
  - Line stressing

IMPACTS OF THE CHANGE:

Form:	No change
Fit:	No change
Function:	No change

APPENDIX:

APPENDIX 1	Risk assessment
APPENDIX 2	Qualification plan
APPENDIX 3	Qualification results

APPENDIX 1: RISK ASSESSMENT

#	Risks identified	Potential risk resulting from	Class	Considered action
1	Workability issues on machines at different process step (Die attach, wire bonding, molding, plating, cropping)	Indexing holes with different positions Frame dimension(X, Y, thickness) different from actual ones	Low	Drawings check Samples verifications validation during workability exercise
2	Transport problems in magazines (D/Attach, wire bonding, molding)	Frame dimension(X, Y, thickness) different from actual sizes	Low	Drawings check Samples verifications validation during workability exercise
3	D/A Quality problem	Results not in accordance with ST requirements on following: - void - coverage - Bond line thickness - Die shear	Medium	Reinforced checks to be done during execution of Quality plan and line stressing
4	Wire bonding quality problems	Results not in accordance with ST requirements on following: - Non-stick on Leads (NSOL) . Poor bondability of 2nd bond - Pull test	Medium	Reinforced checks to be done during execution of Quality plan and line stressing
5	Molding quality problems	Results not in accordance with ST requirements on following: - Excessive resin flash - molding voids	Medium	Reinforced checks to be done during execution of Quality plan and line stressing
6	Deflash / Plating quality issues	Results not in accordance with ST requirements on following: - plating thickness - plating quality	Medium	Reinforced checks to be done during execution of Quality plan and line stressing
7	Cropping quality problems	Results not in accordance with ST requirements on following: - crack package - package mismatch (dimension) - Metal burrs	Medium	Reinforced checks to be done during execution of Quality plan and line stressing
8	Product Performance	Electrical performances or characteristics change due to frame new material (resistivity…)	Low	Datalog on critical parameters (test) during qualification
9	Reliability Risks	- Delamination Frame/ Die - Delamination frame / Molding compound - Plating quality - contamination	Medium	Checks to be done during qualification, reliability, line stressing
10	Manufacturing issues	Yield degradation	Low	Yield variation between the existing material and new one to monitor during ramp up phase and line stressing after change

		Productivity issue	Low	Production and down time parameters to monitor carefully during ramp up phase and line stressing after deployment
11	Supply Chain: To guarantee parts delivery to our customers and avoid business disruption	No sufficient Buffer stock	Medium	Buffer stock of existing material to be secured by DCI to cover ST needs including the qualification period
		Unscheduled problems during deployment reducing the production throughput or degrading the yield or stopping the assembly activity	Medium	- Deployment plan to be carefully prepared - All opened points highlighted during qualification must be solved before moving to production
12	Supply Chain: Quality issues (ECC)	Quality or reliability problems in the field	Low	- Quality and reliability plans to be carefully verified to address potential product vulnerabilities - Extension of qual and reliability exercise until failure to know the margins available if needed

APPENDIX 2: Qualification plan

1) Reliability plan

Test Name	Conditions	Lots #	Sample Size	Notes
JLn	24 h bake @ 125C + MSLn TH soak + reflow simulation (3 times JEDEC J-STD -020C)	1 per L/F Option	160 pcs /lot	1, 2
JLn + TCT	Ta = - 50/150C, 500 cycles	1 per L/F Option	77 pcs / lot	1,2,3
JLn + ES	ES = 100 TC (-50/150C) + 96 h PP (2 atm, 121C)	1 per L/F Option	45 pcs / lot	1, 4

Note	Description	Sample size
1	Electrical test	100%
2	SAM analysis in C and T mode to check delamination resin-die, resin-lead, resin-die pad , DA integrity	20pcs /lot min
3	Automotive products only: Wire pull test after de-capsulation (to collect pull strength and failure mode and to inspect by SEM all abnormal failure mode)	30 wire from 5 units min
4	VI inspection after de-capsulation to detect pad / metal corrosion	3 units/lot as min

2) Construction analysis

item	Sample size
Visual inspection	50
POA	10 x 3 lots
Tin thickness	30
Tin composition	30
Wetting balance	10
Cross section	1
Silver spot thickness	1
De-capsulation	5
SAM	10
X RAY	20
Pull test	30 bonds / 3 lots

APPENDIX 3: Qualification execution & results

ITEMS		PSSO12		PSSO14	
		WHEN	RESULTS	WHEN	RESULTS
1	Workability	W30’2015	Passed	W38’2015	Passed
2	Construction analysis	W40’2015	Passed	W45’2015	Passed
3	Reliability	W40’2015	Passed	W47’ 2015	Passed
4	Line Stressing	W40’2015	Passed	W47 ’2015	Passed