PRODUCT INFORMATION LETTER

PIL CRP/14/8529
Dated 12 Jun 2014

Etched Lead frame 2nde source qualification

Sales Type/product family label	NA
Type of change	Package assembly material change
Reason for change	Second source qualification to protect our customers and
Description	This change is concerning the qualification of a 2nd source for "etched" lead frames currently provided by our supplier DCI. Manufacturing location is Muar Assembly Back end Plant.
Forecasted date of implementation	06-Dec-2014
Forecasted date of samples for customer	27-Sep-2014
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	27-Sep-2014
Involved ST facilities	Muar Assembly Back End Plant

DOCUMENT APPROVAL

Name	Function
Livache, Veronique	Corporate Quality Manager
Low, Patrick	Process Owner

Lead frame 2nd source qualification

1- WHAT is the change?

This change is concerning the qualification of a 2nd source for “etched” lead frames currently provided by our supplier DCI.
Packages and manufacturing plant concerned by this change are listed in the table below:

Plant	Package
Muar	SO16
Muar	SO20
Muar	SO24
Muar	SO28
Muar	SO34
Muar	PSS024
Muar	PSSO36
Muar	QFP 7x7 (48 leads)

Note: Only the products assembled in the above packages list with DCI lead frame are concerned. List of products is given with this document.

2- WHY:

Reason for this change is:

- Our lead frame supplier DCI announced recently his “stamped” lead frame activity closure, inducing important problems for our company
- To avoid re-occurrence of such event, second source qualifications has been started for “etched” lead frames to protect our customers and business.

3- WHEN will this change occur?

Target to deploy this change is W49’2014.

4- HOW will the change be qualified?

- Second source suppliers are already identified :

Plant	Package	Identified second source suppliers
Muar	SO16	MSHE
Muar	SO20	MSHE
Muar	SO24	MSHE
Muar	SO28	MSHE
Muar	SO34	MSHE
Muar	PSS024	MSHE
Muar	PSSO36	MSHE, SHINKO
Muar	QFP 7x7 (48 leads)	SHINKO

- Approach for selecting the second source supplier is: same specifications, same materials, same finishing

- Risk have been evaluated (APPENDIX 1)

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

5- **IMPACTS OF THE CHANGE**:

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

6 - APPENDICES:

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
Decapsulation	5
SAM	10
X RAY	20
Pull test	30 bonds / 3 lots

APPENDIX 3: Qualification execution & results summary

Plant	Packages	Workability	Construction analysis	Reliability	Line stressing	Qualification completion	Production (ramp up)
Muar	SO16	W10'2014 done & passed	W22'2014	W22'2014	W27'2014	W28'2014	Target is W49'2014
Muar	SO20	W07'2014 done & passed	W22'2014	W18'2014 done & passed	W22'2014	W24'2014	Target is W49'2014
Muar	SO24	W10'2014 done & passed	W12'2014 done & passed	W14'2014 done & passed	W18'2014 Done & passed	W28'2014	Target is W49'2014
Muar	SO28	W8'2014 done & passed	W10'2014 done & passed	W12'2014 done & passed	W24'2014	W28'2014	Target is W49'2014
Muar	SO34	W8'2014 done & passed	W14'2014 done & passed	W15'2014 done & passed	W22'2014	W23'2014	Target is W49'2014
Muar	PSS024	W8'2014 done & passed	W19'2014 done	W21'2014 done	W26'2014	W30'2014	Target is W49'2014
Muar	PSSO36	W8'2014 done & passed	W24'2014	W25'2014	W27'2014	W30'2014	Target is W49'2014
Muar	QFP 7x7 (48 leads)	W27'2014	W30'2014	W34'2014	W35'2014	W39'2014	Target is W49'2014

Note: Qualification reports will be available at end of qualifications

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