PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	ADG/23/14438
1.3 Title of PCN	STLxx (PFLAT 5x6 in TFME): Stamped leadframe Implementation
1.4 Product Category	see list
1.5 Issue date	2023-11-27

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	Mario ASTUTI
2.1.2 Marketing Manager	Anna RANIOLO,Martina GIUFFRIDA
2.1.3 Quality Manager	Diego Maria FERRARI

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Materials	New direct material part number (same supplier, different supplier or new supplier), Lead frame base material	Subcon TFME (former NANTONG FUJITSU) - China

4. Description of change		
	Old	New
4.1 Description	Etched leadframe version	Stamped leadframe version
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Impact	

5. Reason / motivation for change	
5.1 Motivation	Service Continuity
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change	
6.1 Description	Dedicated Finished Good Codes

7. Timing / schedule	
7.1 Date of qualification results	2023-11-20
7.2 Intended start of delivery	2024-03-01
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	14438 Validation.zip		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-11-27

9. Attachments (additional documentations)
14438 Public product.pdf 14438 Details.pdf 14438 Validation.zip

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
	STL120N10F8	
	STL120N8F7	
	STL130N6F7	
	STL140N6F7	
	STL160N4F7	
	STL210N4F7	
	STL320N4LF8	
	STL90N6F7	

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Etched to Stamped LF conversion for PFLAT 5x6 in TFME

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Agenda

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Change description

- Aim of this document is to describe the qualification activity to use the new Stamped LF from current Etched LF in TFME
- The TV identified have been :
  - OD4FA1 (Automotive)
  - OD6E01 (Industrial)
  - 8L4G01 (Industrial)
- No any change from Assy & Testing point of view in TFME
- Reliability reports related each TV are attached to show the positive results. The new Stamped LF is ensuring the same quality and electrical characteristics as the current products.
- All reliability tests have been completed with positive results.

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ZVEI Guidelines

- According to ZVEI recommendations, the notification is not required.

		Assessment of impact on Supply Chain regarding following aspects - contractual agreements - technical interface of processability/manufacturability of customer - form, fit, function, quality performance, reliability	Remaining risks within Supply Chain?		Understanding of semiconductors experts	Examples to explain
	ID	Type of change	No	Yes		
x	SEM-PA-14	Change in process technology (e.g. trim and form, leadframe preparation …)	--	P	**(--):** If the change in process technology does not influence the integrity of the final product. **(P):** If the change in process technology can influence the integrity of the final product.	**(P):** e.g. change from punched to sawn QFN

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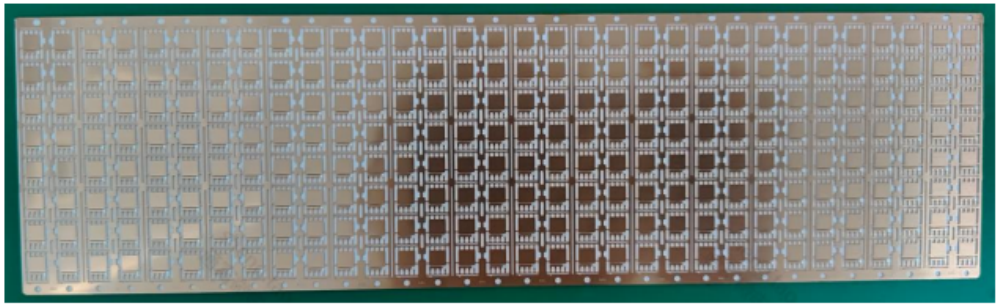
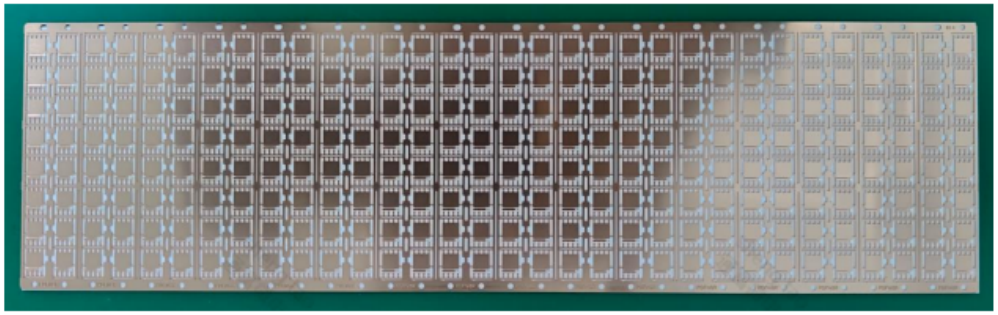
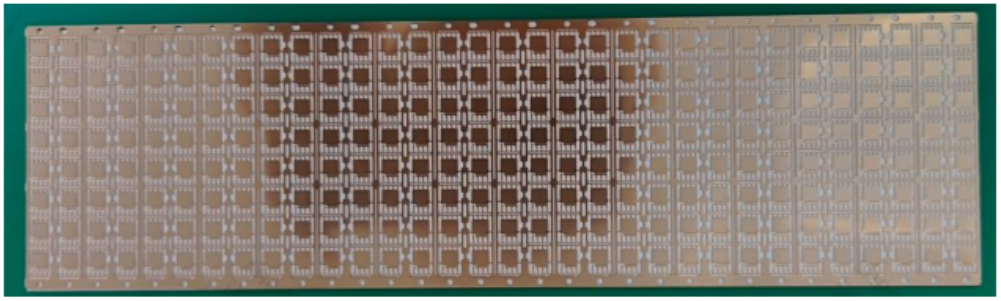
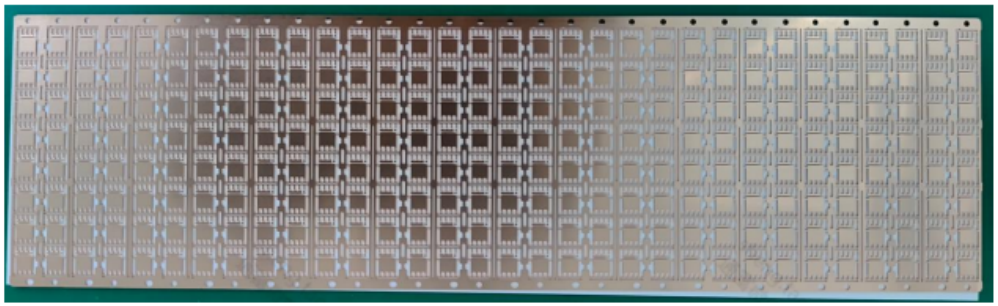
Stamped Vs Etched Leadframe Comparison - 1/5







LF Stamped photo



LF Etched photo

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Stamped Vs Etched Leadframe Comparison - 2/5

LF Stamped

- Front Side Photo

- Back Side Photo

- Die Pad Edge Photo

- Lead Photo

LF Etched

- Front Side Photo

- Back Side Photo

- Die Pad Edge Photo

- Lead Photo

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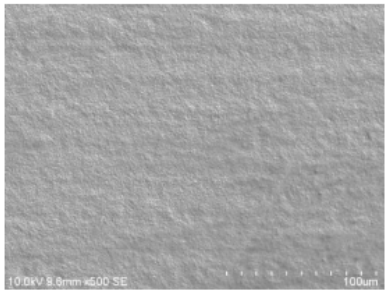
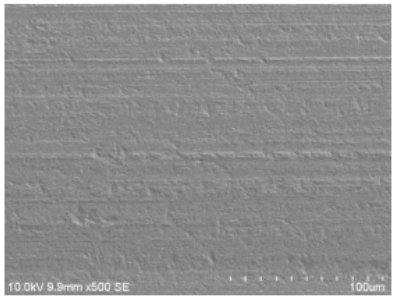
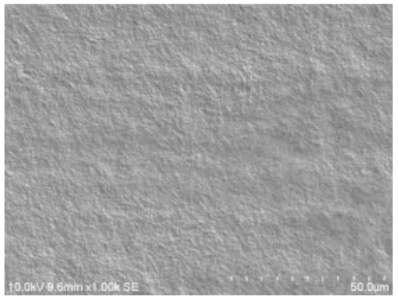
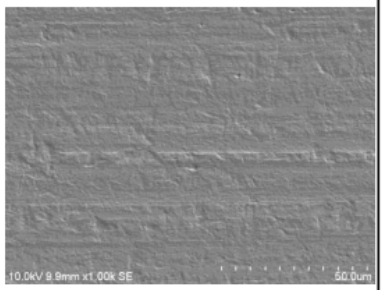
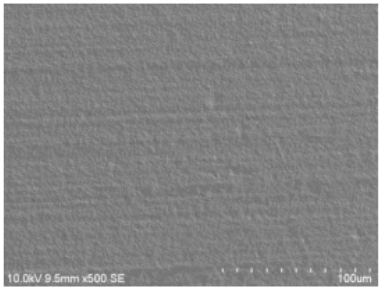
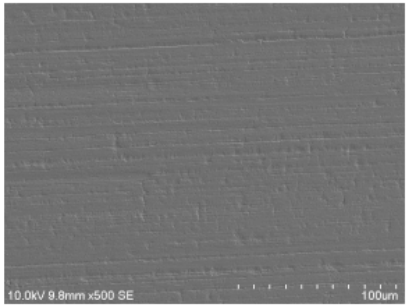
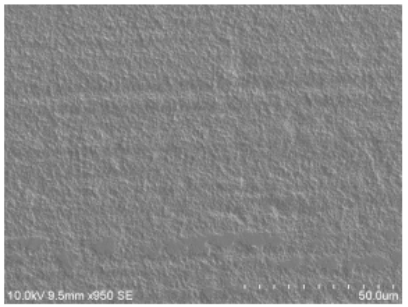
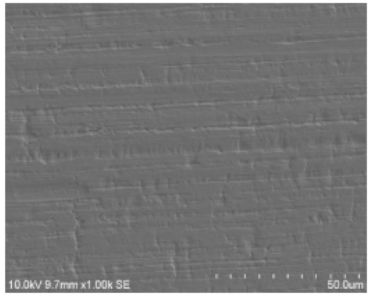
Stamped Vs Etched Leadframe Comparison - 3/5

Lead Frame Comparison (from S.E.M. point of view)				
LF	**Lead tip 500x**	**On die pad 500x**	**Lead tip 1000x**	**On die pad 1000x**
Stamped				
Etched				

Stamped Vs Etched Leadframe Comparison - 4/5

LF Stamped

- Front Side Photo

- Back Side Photo

LF Etched

- Front Side Photo

- Back Side Photo

Stamped Vs Etched Leadframe Comparison - 5/5

	Existing Frame (etched)	New Frame (stamped)	Note (Same or New or Smaler, etc..)
Leadframe Supplier	AAMI	AAMI	Same
Location	ShenZhen, China	ShenZhen, China	Same
Lead frame material	C194	C194	Same
Lead frame type	PDFN8R	PDFN8AG	Different L/F type
Plating type	Silver plating on Pin 4	Silver plating on Pin 4	Same
Lead frame thickness	0.254mm	0.254mm	Same
Die Pad size	4.4*4.0076mm	4.33*3.815mm	Smaller due to the different manufacture method

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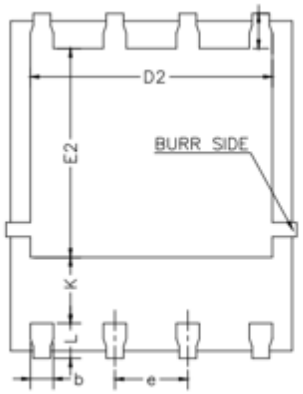
Note: Die pad size will change inside the package only. No change in the exposed pad dimensions.

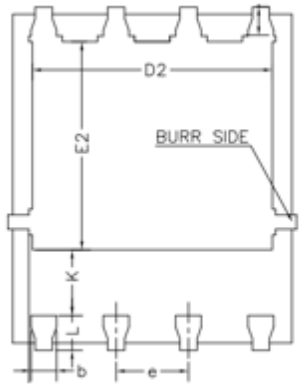
Package Dimension Comparison

Current PDFN8R

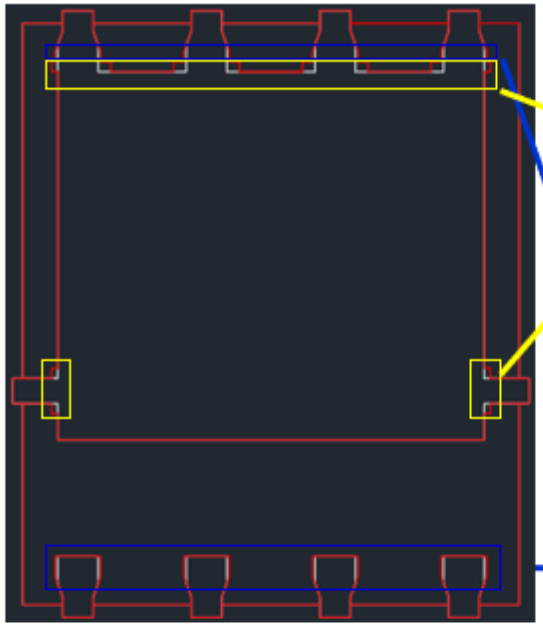


SYMBOL	MIN	NOM	MAX
A	0.90	0.95	1.00
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	–	–	5.10
D1	4.80	4.90	5.00
D2	4.01	4.21	4.31
e	1.17	1.27	1.37
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.54	3.64	3.74
H	0.51	0.61	0.71
K	0.95	–	–
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	–	–	0.10
P	1.00	1.10	1.20
θ	8°	10°	12°

New PDFN8AG



SYMBOL	MIN	NOM	MAX
A	0.90	0.95	1.00
b	0.35	0.40	0.45
c	0.21	0.25	0.34
D	–	–	5.10
D1	4.80	4.90	5.00
D2	4.01	4.21	4.31
e	1.17	1.27	1.37
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.54	3.64	3.74
H	0.51	0.61	0.71
K	0.95	–	–
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	–	–	0.10
P	1.00	1.10	1.20
θ	8°	10°	12°



Overlap picture

PDFN8AG POA

The yellow part of POA overlap will has the visual appearance difference due to the manufacture method difference.

The blue part of POA overlap is only design difference. The physical unit of PDFN8AG will have similar dimension as the original one. So the width of lead(b) will no change.

The new POA for PDFN8AG will have some visual appearance difference, but the dimension in POA will not change.

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Test Vehicles selected

Commercial products		ST silicon line
• STL210N4F7	→	OD4FA1
• STL140N6F7	→	OD6E01
• STL320N4LF8	→	8L4G01

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Product list impacted

Maturity	Line	CP
30	OD6C	STL90N6F7
30	OD6D	STL130N6F7
30	OD4F	STL210N4F7
30	OD6E	STL14060
30	OD6E	STL140N6F7
30	OD44	STL160N4F7
30	8D0F	STL120N10F8
30	8L4G	STL320N4LF8
30	OD8F	STL120N8F7

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Qualification program for each TV

Test Name	Condition/ Method	Steps	Steps	Perform this trials for each lot
TC Thermal Cycle	Ambient Temp Range = -55°C / +150°C	1000 cycles	SAM pre stress MSL1 SAM post stress TEST TC1000 SAM post stress TEST	77 units
ES (TC100+PCT96h)	ES (100TC @ Ta= -55°C / +150°C + 96hAC)	TC100+ PCT96h	SAM pre stress MSL1 SAM post stress TEST ES SAM post stress TEST	77 units
HTS	150°C	1000H	SAM pre stress HTS 1000H SAM post stress TEST	77 units

For the details to see the Qual report

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Conclusions

- Qualification activity has been performed to qualify the new Stamped lead frame from current Etched LF in TFME .
- All reliability tests (AEC-Q101 requirement) have been completed with positive results.
- Neither functional or parametric rejects were detected at final electrical test.
- These reports shows the positive results achieved. The new Stamped LF are ensuring the same quality and electrical characteristics as the current products.

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PCN Title : STLxx (PFLAT 5x6 in TFME): Stamped leadframe Implementation

PCN Reference : ADG/23/14438

Subject : Public Products List

Dear Customer,

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

STL120N8F7	STL160N4F7	STL140N6F7
STL210N4F7	STL320N4LF8	STL130N6F7
STL90N6F7	STL120N10F8	

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