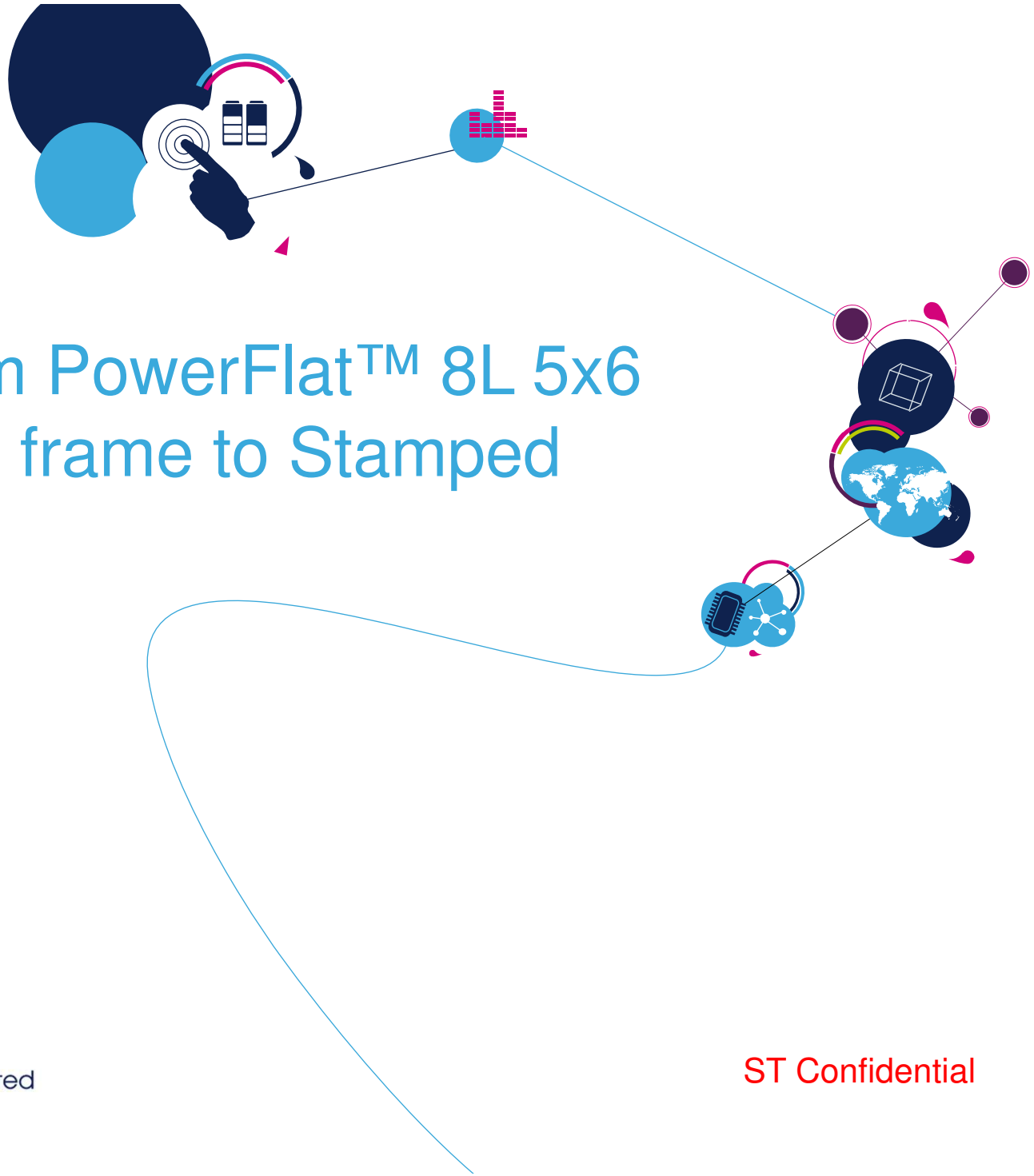
PRODUCT/PROCESS CHANGE NOTIFICATION

SUBJECT **PowerFlat™ 8L 5x6: LeadFrame Migration from Etched to Stamped (Auto and Industrial products - replace previous PCN 10736)**

IMPACTED PRODUCTS	PowerFlat™ 8L 5x6 see list
MANUFACTURING STEP	Assembly
INVOLVED PLANT	ST Shenzhen - China
CHANGE REASON	Malesian Supplier SH Electronics (MSHE) has released a PTN about PowerFlat™ 8L 5x6 matrix frame in order to armonize their production flow
CHANGE DESCRIPTION	Migration of PowerFlat™ 8L 5x6 production from MSHE (Japan) etched matrix frame to MSHE (Malaysia) Stamped one
VALIDATION	Enclosed to this communication
REPORTS	12290 Validation.pdf



Migration from PowerFlat™ 8L 5x6 matrix etched frame to Stamped

life.augmented

Outline

Change description

Malesian SH Electronics (MSHE) has released a PTN about PowerFlat™ 8L 5x6 matrix frame in order to armonize their production flow. Here below are reported the introduced changes :

	CURRENT		NEW	
Supplier	MSHE		MSHE	
Manufacturing process	Plating + Etching	L/F cutting	Plating + Stamping	L/F cutting
Manufacturing location	Japan	Malaysia	Malaysia	Malaysia
Raw material	C194		C194	

- ST assembly production plant : Shenzhen, China

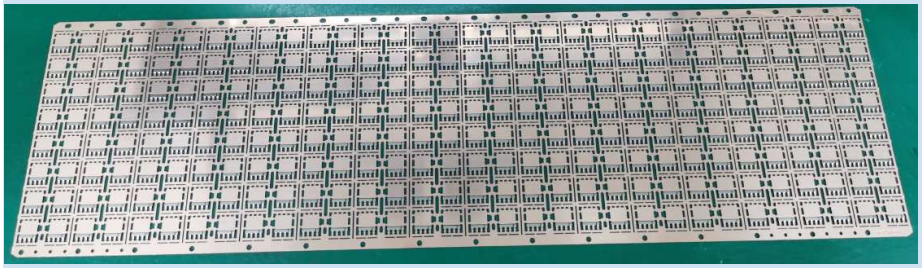
Change description

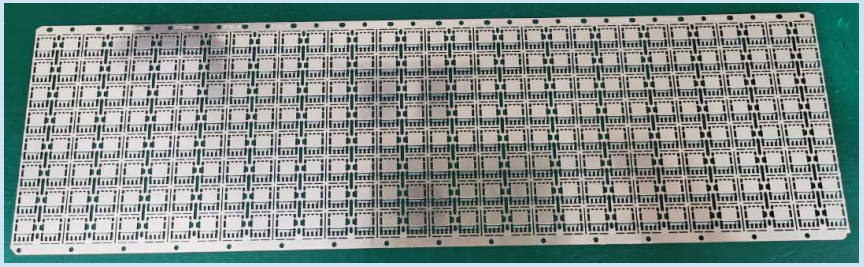
Impacted products:

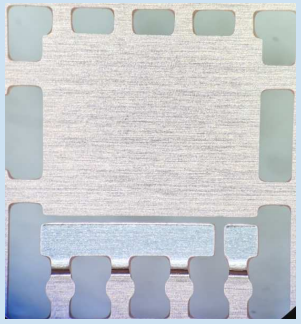
Commercial products :	ST silicon line
- STL8N6LF6AG	7L62A1
- STL58N3LLH5	5H3OA1
- STL19N3LLH6AG	6L30A1
- STL7N6LF3	4L62A1
- STL8N10LF3	4L0CA1
- STL45N10F7AG	OD0BA1
- STL92N10F7AG	OD0EA1
- STL86N3LLH6AG	6L3CA1
- STL20NF06LAG	EL6PA1
- STL100N10F7	OD0F01
- STL100N10F7	D0F001
- STL12P6F6	6P6A01
- STL30N10F7	OD0201
- STL40N75LF3	4L7401
- STL45P3LLH6	6B3P01
- STL60N10F7	OD0C01

FRAME PFLAT 8L 5x6 Ve1 OpAW SelNi/NiP

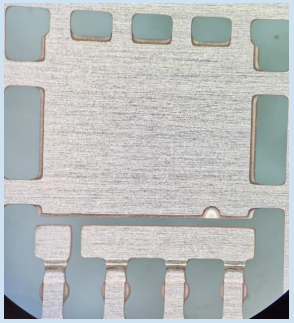
5FT40060 (etched)	5FT80146 (stamped)



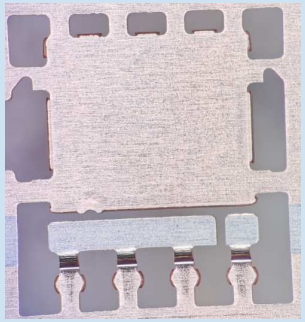




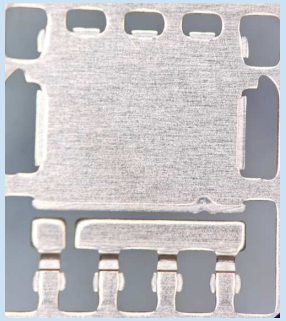
Front side



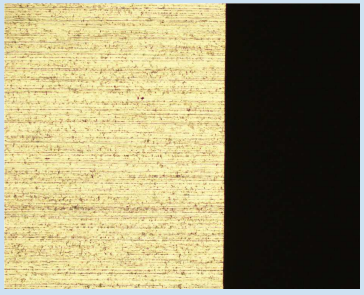
Back side



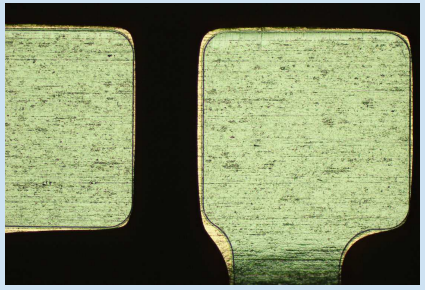
Front side



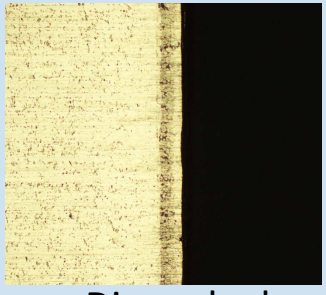
Back side



Die pad edge



Lead

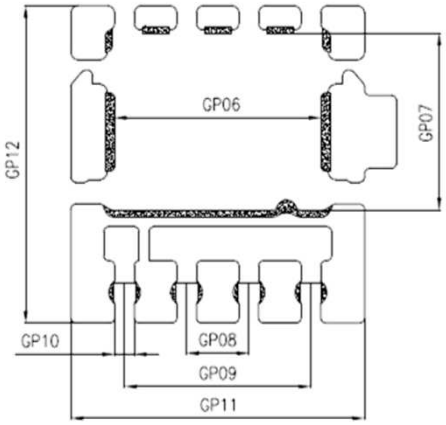


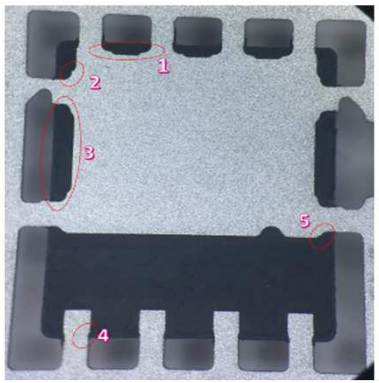
Die pad edge

Lead

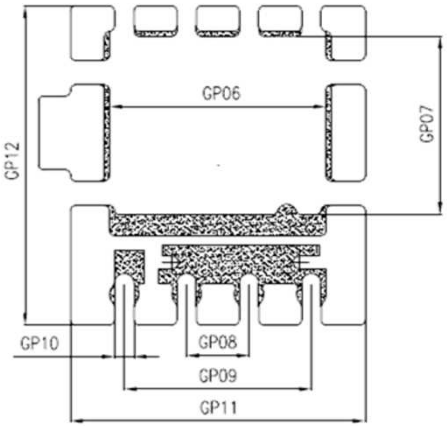
Stamped vs Etched Leadframe Comparison

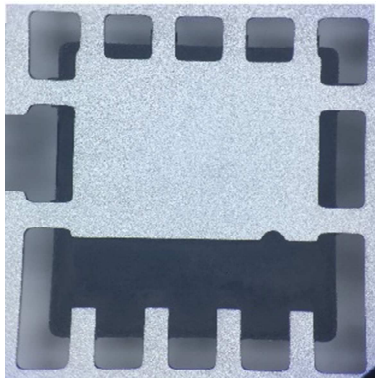
Stamped (5FT80146)





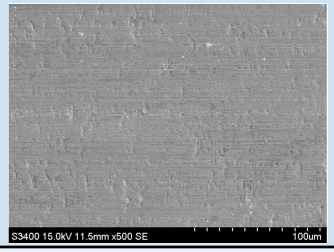
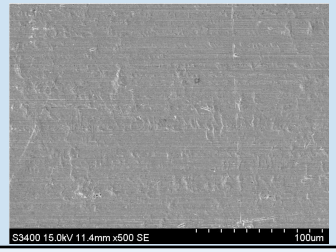
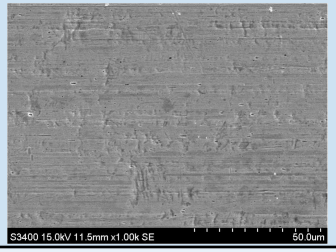
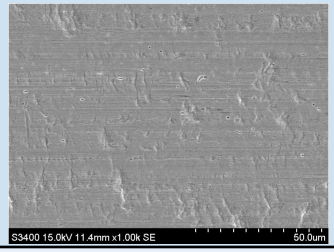
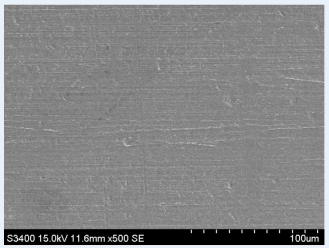
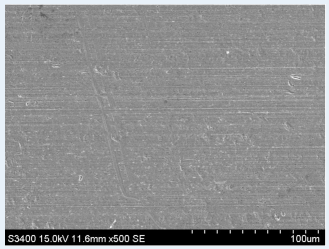
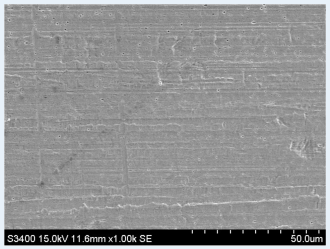
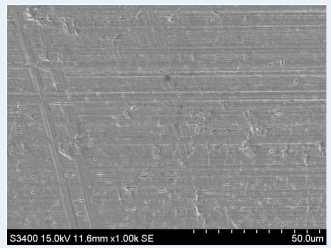
Etched (5FT40060)



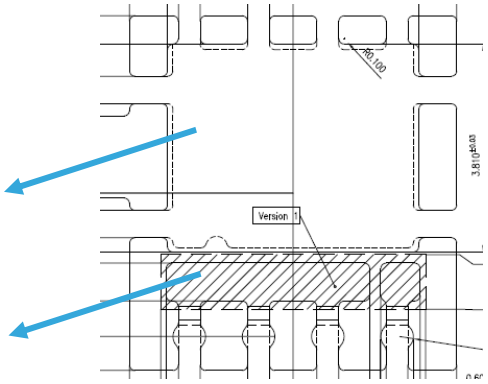


Existing frame vs New one

SEM Image

LF	Lead tip 500X	On die pad 500X	Lead tip 1000X	On die pad 1000X
5FT40060 etched				
5FT80146 stamped				

Note:
Plating Type = Sel Ni/NiP



Existing frame vs New one

Lead Frame Comparison			
	Existing Frame	**New Frame**	**Comparison**
LEADFRAME SUPPLIER	MSHE	MSHE	Same
LOCATION	JAPAN	MALAYSIA	New
LEADFRAME MATERIAL	Hitachi C194	Hitachi C194	Same
LEADFRAME TYPE	Etched	Stamped	New
PLATING TYPE	Sel Ni/NiP	Sel Ni/NiP	Same
LEADFRAME THICKNESS	0.254 mm	0.254 mm	Same
DIE PAD SIZE	4.41 x 3.63 mm	4.22 X 3.625 mm	**Smaller**

BOM comparison

Product Line: 6L3C

Current Bill of Material	
ITEM	**MATERIAL**
WIRE	Al D3 Mils
RIBBON	Al 30x4mils
RESIN	SUMITOMO EME-E670CA
PREFORM	Pb/Ag/Sn 95.5/2.5/2
FRAME	PFLAT 8L 5x6 Ve1 SelNi/NiP **Etch**

New Bill of Material	
ITEM	**MATERIAL**
WIRE	Al D3 Mils
RIBBON	Al 30x4mils
RESIN	SUMITOMO EME-E670CA
PREFORM	Pb/Ag/Sn 95.5/2.5/2
FRAME	PFLAT 8L 5x6 Ve1 SelNi/NiP **Stamp**

Stamped frame on P-FLAT 8L 5x6
ZVEI Guidelines (AEC-Q101 Rev D)

- According to ZVEI recommendations, the notification is 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 on Supply Chain?	
ID	Type of change	No	Yes
SBM-PA-03	Change in leadframe dimensions	P	P
SBM-PA-14	Change in process technology (e.g. sawing, die attach, bonding, molding, plating, trim and form, lead frame preparation)	--	P

Extract from ZVEI

Selected Test Vehicles

Lot #	Commercial product	Product line	Wafer fab
1	STL120N4F6AG	6D4F	Catania 8”
2	STL120N4F6AG	6D4F	Catania 8”
3	STL86N3LLH6AG	6L3C	HHGrace

Qualification program and Reliability results

Stress (Abrv)	Std ref.	Conditions	Sample Size (S.S)	Steps	Failure/SS		
					Lot 1	Lot 2	Lot 3
TEST	User specification	All qualification parts tested per the requirements of the appropriate device specification.			462	462	462
External visual	JESD22 B-101	All devices submitted for testing			462	462	462
Package oriented tests							
Pre-conditioning	JESD22 A-113	Dryng 24H @ 125°C Store 168H @ TA=85°C,RH=85% IR Reflow @ 260°C 3 times	All devices to be subjected to H3TRB, TC, AC, IOL	FINAL	Pass	Pass	Pass
TC	JESD22 A-104	TA=-55°C TO 150°C	231	1000cy	0/77	0/77	0/77
TCHT	JESD22 A-104 Appendix 6	125°C TEST after TC	231		0/77	0/77	0/77
TCDT		decap and wire pull for parts with internal bond wire sizes 5 mil diameter and less	15		0/5	0/5	0/5
		100% C-SAM inspection after TC	231		pass	pass	pass
AC	JESD22 A-102	TA=121°C ; PA=2ATM	231	96H	0/77	0/77	0/77
H3TRB	JESD22 A-101	TA=85°C ; RH=85% BIAS= 32V	154	1000H	0/77	0/77	
		TA=85°C ; RH=85% BIAS= 24V	77				0/77
IOL	MIL-STD-750 Method 1037	ΔTj≥100°C	231	15Kcy	0/77	0/77	0/77
D.P.A.	AEC-Q101-004 Section 4	Devices after H3TRB - TC	8		0/2 0/2		0/2 0/2
Solderability	JESD22B-102		20		0/10		0/10
Physical Dimension	JESD22 B-100		60		0/30		0/30
Thermal Resistance	JESD24-3, 24-4, 24-6 as appropriate		20		0/10		0/10
Die Shear	MIL-STD-750 Method 2017		10		0/5		0/5

Conclusions

- The whole Qualification program was completed and all reliability stress tests shown positive results. Neither functional nor parametric rejects were detected at final electrical testing.

- Parameter drift analysis, performed on samples submitted to die and package oriented test showed a good stability on the main electrical monitored parameters. Package oriented tests have not put in evidence any critical area.

The migration of PowerFlat™ 8L 5x6 production from MSHE (Japan) etched matrix frame to MSHE (Malaysia) Stamped one will assure :

- The same previous package performances, as demonstrated by the qualification data provided in the previous pages.