

## PRODUCT / PROCESS CHANGE NOTIFICATION

### 1. PCN basic data

1.1 Company		STMicroelectronics International N.V
1.2 PCN No.		ADG/19/11623
1.3 Title of PCN		LQFP-64 (10x10x1.4): High Density Lead Frame Introduction
1.4 Product Category		see list
1.5 Issue date		2019-07-09

### 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,Vito GRAZIANO
2.2.2 Marketing Manager	Giovanni Luca TORRISI
2.2.3 Quality Manager	Francesco MINERVA

### 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	ST Muar (Malaysia)

### 4. Description of change

	Old	New
4.1 Description	Standard Lead Frame (30 units x Matrix) Corner Gate Mold	High Density Lead Frame (60 units x Matrix) Top Gate Mold
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No Impact	

### 5. Reason / motivation for change

5.1 Motivation	Capacity Increase
5.2 Customer Benefit	CAPACITY INCREASE

### 6. Marking of parts / traceability of change

6.1 Description	Dedicated Finished Good Codes
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### 7. Timing / schedule

7.1 Date of qualification results	2019-06-12
7.2 Intended start of delivery	2019-09-12
7.3 Qualification sample available?	Upon Request

### 8. Qualification / Validation

8.1 Description	11623 Validation.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2019-07-09

### 9. Attachments (additional documentations)

11623 Public product.pdf  
11623 Validation.pdf  
11623 Details.pdf

<b>10. Affected parts</b>		
<b>10.1 Current</b>		<b>10.2 New (if applicable)</b>
<b>10.1.1 Customer Part No</b>	<b>10.1.2 Supplier Part No</b>	<b>10.1.2 Supplier Part No</b>
	L99DZ100G PTR	
	L99DZ100GTR	
	L99DZ120TR	

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## PRODUCT/PROCESS CHANGE NOTIFICATION

**SUBJECT** LQFP-64 (10x10x1.4): High Density Lead Frame Introduction

<b>IMPACTED PRODUCTS</b>	Products housed in LQFP-64 (see list for details)
<b>MANUFACTURING STEP</b>	Assembly
<b>INVOLVED PLANT</b>	ST Muar Plant (Malaysia)
<b>CHANGE REASON</b>	Capacity increase
<b>CHANGE DESCRIPTION</b>	<p>Introduction of High Density Lead Frame and New Molding Equipment</p> <ul style="list-style-type: none"> <li>- High Density consists in 60 units x matrix instead of the current standard version with 30 units x matrix</li> <li>- New Molding Equipment (Top Gate) is needed to allow the higher leadframe density</li> </ul> <p>No change in frame drawing, dimension, surface...</p> <p>No change in materials used (Wires, Molding Compound, Glue..)</p> <p>See attached details</p>
<b>TRACEABILITY</b>	<p>L99PCU3F-TR, L99PCU2R-TR, L99PCU2F-TR from wk35-2019.</p> <p>Remaining already available on demand</p>
<b>VALIDATION</b>	<p>Validation result and new lead frame details included</p> <p>11623 Validation.pdf</p>
<b>SAMPLES</b>	Available on demand
<b>IMPLEMENTATION</b>	We are ready to implement the change upon Customer agreement



## Public Products List

Public Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

**PCN Title :** LQFP-64 (10x10x1.4): High Density Lead Frame Introduction

**PCN Reference :** ADG/19/11623

**Subject :** Public Products List

Dear Customer,

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

L99DZ120TR	L99DZ120	L99DZ100G
L99DZ100GTR	L99DZ100G PTR	L99DZ100GP



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# LQFP 10x10 64Leads

- Frame HD qualification

May, 2019

# Change Description

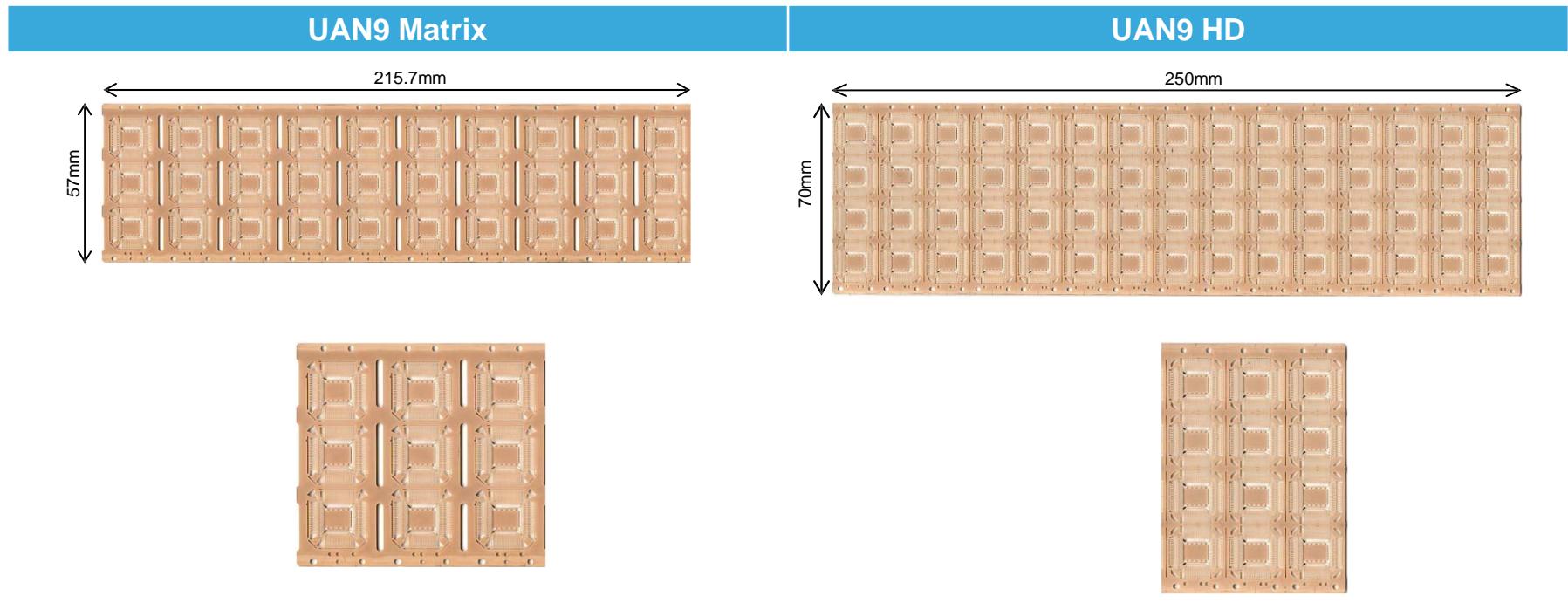
## Assembly Plant Muar

- LQFP 10x10 64leads frame migration from Matrix to High Density
- New Mold Equipment Introduction (Top Gate)
  - The Top Gate mold equipment is needed to allow the higher leadframe density

# Additional Information

- Reason for the change: Company Roadmap
- Test Vehicle L99PCU2F-TR (silicon line UAN903)
- No change in the single unit frame drawing
- No change in datasheet, nor on electrical and mechanical parameters
- Dedicated Finished Good will be available. No change in either the commercial product or the marking
- Samples are available on demand

# LQFP10x10 Leadframe comparison

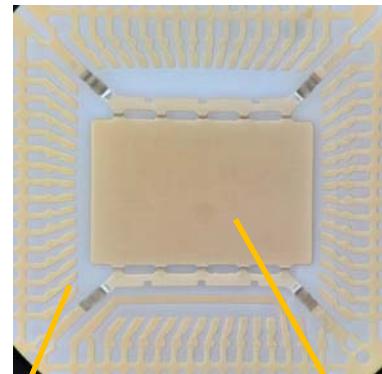


Matrix Leadframe  
3row x 10columns  
**30units**

HD Leadframe  
4row x 15columns  
**60units**

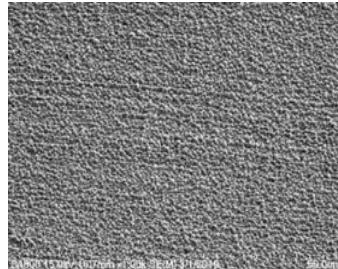
# LQFP10x10 Leadframe Surface analysis

UAN9 Matrix

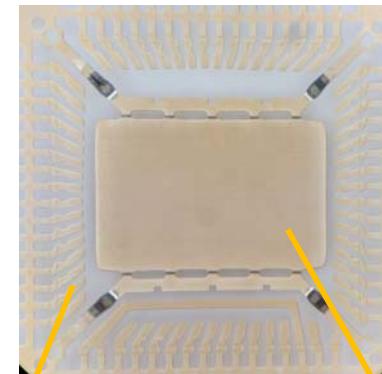


Lead tip

On die pad

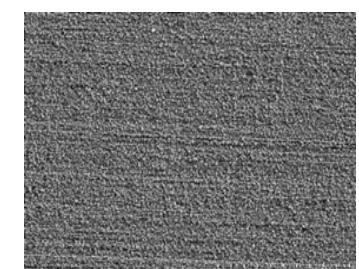
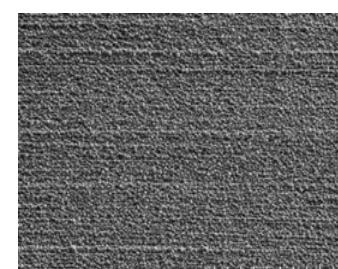


UAN9 HD



Lead tip

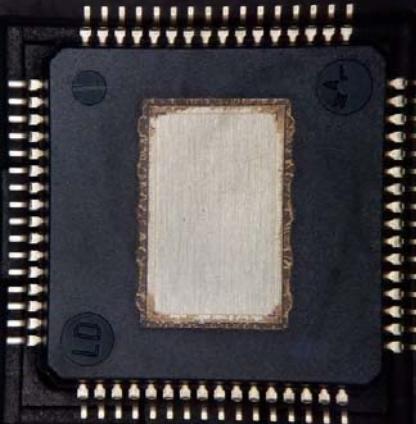
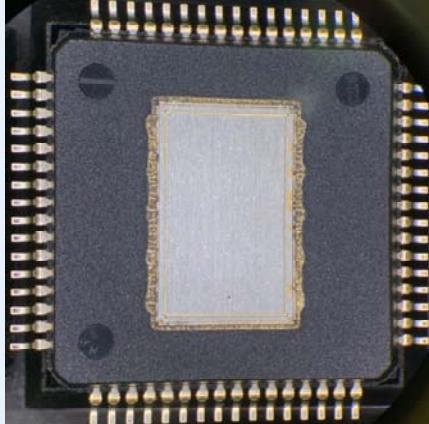
On die pad



## SEM images

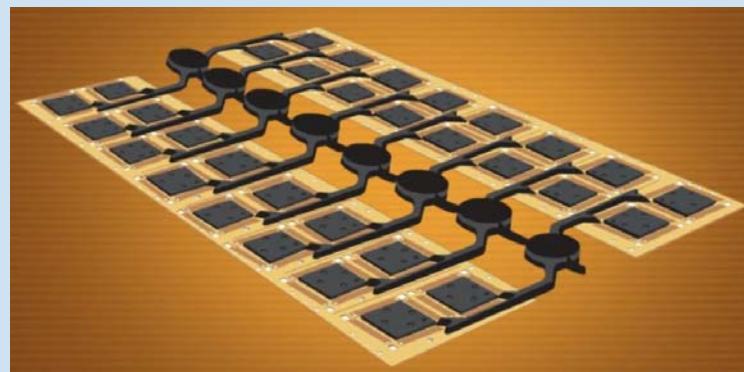
[ Note: SEM Mag  
1000X]

# Physical unit comparison

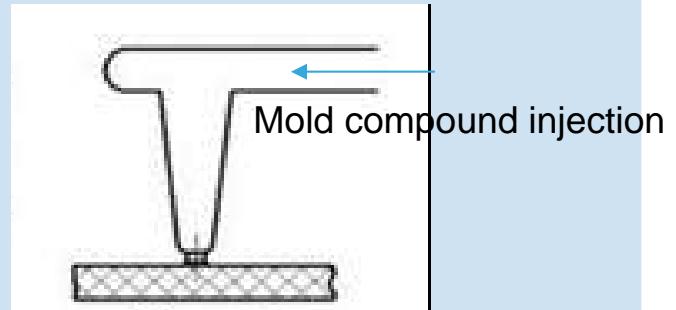
View	LQ10 MTX EP (UAN9)	LQ10 HD EP (UAN9)
Top		
Bottom		

# Mold Injection styles

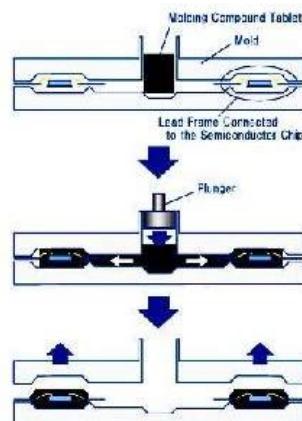
LQ10 MTX EP CORNER GATE



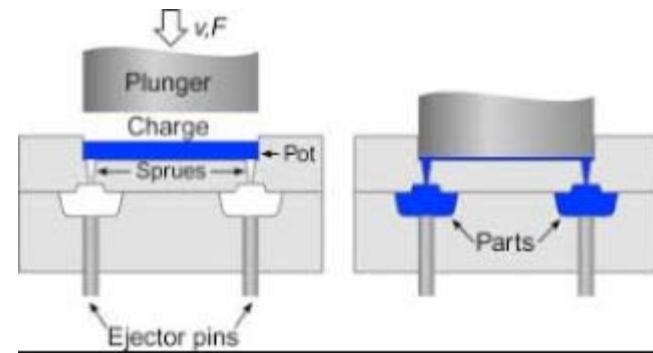
LQ10 HD EP TOP GATE



Package view by side



Example of corner gate injection process



Example of top gate injection process

# BOM comparison

## Product Line: UAN903

Current Bill of Material	
ITEM	MATERIAL
WIRE	Copper D1.2 Mils
WIRE	Copper D2 Mils
RESIN	SUMITOMO EME G700LS
GLUE	LOCTITE ABLESTIK QMI9507 – 2C2
FRAME	MATRIX FRAME PPF plating



New Bill of Material	
ITEM	MATERIAL
WIRE	Copper D1.2 Mils
WIRE	Copper D2 Mils
RESIN	SUMITOMO EME-G700LS
GLUE	LOCTITE ABLESTIK QMI9507 – 2C2
FRAME	HD FRAME PPF plating

# Leadframes Comparison

ITEM	EXISTING	NEW
Frame size	215.7 x 57 mm	250.0 x 70 mm
Units/Strip	30	60
Pad size	6.9 x 4.5	6.9 x 4.5
Inner Lead Plating	RT UPG3uPPF	RT UPG3uPPF
Frame base material	Copper	Copper
Frame process	Stamped	Stamped
Plating	RT UPG3uPPF	RT UPG3uPPF
Leadframe Supplier	HDS	HDS



# L99PCU2F-TR

## Matrix to HD conversion qual

UAN9 – LQFP 10x10

Updated : 22<sup>nd</sup> May 2019

Prepared By: Muar BEM&T QA Reliability Laboratory



**L99PCU2F-TR**  
**Matrix to HD conversion**

**Note: Sampling 241 pcs/lot – taken from tested good units after FT.**

Reliability Test Status									
No	Test Name	Prec	Condition/ Method	Steps	Steps	Fails/SS			
						998440GD01	998440GDRR	998440GDRQ	
1	PC (JL3 STD)		Bake 24 hrs @ 125°C Soak 192 hrs @ 30°C / 60% RH Reflow Profile = J-STD-020D (Tmax = 260°C)	Final	TSAM (0hr)	0 delam / 60 pcs	0 delam / 60 pcs	0 delam / 60 pcs	
					CSAM TOP (0hr)	0 delam / 60 pcs	0 delam / 60 pcs	0 delam / 60 pcs	
					ATE	0 def / 159 pcs	0 def / 159 pcs	0 def / 159 pcs	
					TSAM	0 delam / 40 pcs	0 delam / 40 pcs	0 delam / 40 pcs	
					CSAM TOP	0 delam / 40 pcs	0 delam / 40 pcs	0 delam / 40 pcs	
2	TC	Yes	TA = -55°C / +150°C	1000 Cycle	ATE	0 def / 82 pcs	0 def / 82 pcs	0 def / 82 pcs	
					TSAM	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					CSAM TOP	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					WPT & BS	Pass	Pass	Pass	
				2000 cycle	ATE	0 def/ 77 pcs	0 def/ 77 pcs	0 def/ 77 pcs	
					TSAM	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					CSAM TOP	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					WPT & BS	Pass	Pass	Pass	
3	PPT	Yes	TA = PPT 121°C/ 2Atm	96 hrs	ATE	0 def / 77 pcs	0 def / 77 pcs	0 def / 77 pcs	
					TSAM	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					CSAM TOP	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	

- Sample size at Preconditioning step are split for TC and PPT tests
- Parts used for the CSAM during preconditioning are split for TC, PPT and HTS tests

**L99PCU2F-TR**  
**Matrix to HD conversion**

**Note: Sampling 241 pcs/lot – taken from tested good units after FT.**

Reliability Test Status									
No	Test Name	Prec	Condition/ Method	Steps	Steps	Fails/SS			
						998440GD01	998440GDRR	998440GDRQ	
4	HTS	No	TA = 150°C	1000 hrs	ATE	0 def / 82 pcs	0 def / 82 pcs	0 def / 82 pcs	
					TSAM	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					CSAM TOP	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					WPT & BS	Pass	Pass	Pass	
				2000 hrs	ATE	0 def / 77 pcs	0 def / 77 pcs	0 def / 77 pcs	
					TSAM	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					CSAM TOP	0 delam / 20 pcs	0 delam / 20 pcs	0 delam / 20 pcs	
					WPT & BS	Pass	Pass	Pass	