PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/22/12676
1.3 Title of PCN	ST Muar (Malaysia) Additional capacity through High Density Leadframe for STM8A AUTOMOTIVE listed products in LQFP32 & LQFP48 7x7 packages
1.4 Product Category	STM8AFx product family, STM8ALx product family
1.5 Issue date	2022-11-28

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	Ricardo Antonio DE SA EARP
2.1.2 Marketing Manager	Veronique BARLATIER
2.1.3 Quality Manager	Pascal NARCHE

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 finishing material / area (internal)	ST MUAR (MALAYSIA)

4. Description of change		
	Old	New
4.1 Description	Leadframe matrix size (57 x 215mm) Marking layout: No 2D marking	Leadframe high density size (70x 250mm) Marking layout: Add SS marking and 2D marking
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	Form: Yes, Marking change Fit: No change, Function: No change, No impact for customer	

5. Reason / motivation for change	
5.1 Motivation	To increase capacity and services for STM8Ax products.
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change	
6.1 Description	Traceability ensured by ST internal tools

7. Timing / schedule	
7.1 Date of qualification results	2022-11-22
7.2 Intended start of delivery	2023-03-20
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description	12676 MDG-GPM-RER2215 ST Muar (Malaysia) LQFP7x7 32-48L Auto.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2022-11-28

9. Attachments (additional documentations)
12676 Public product.pdf 12676 MDG-GPM-RER2215 ST Muar (Malaysia) LQFP7x7 32-48L Auto.pdf 12676 PCN12676_Additional information.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
	STM8AF5268TAY	
	STM8AF5268TCX	
	STM8AF5268TCY	
	STM8AF5268TDY	
	STM8AF5288TAY	
	STM8AF5288TCX	
	STM8AF5288TCY	
	STM8AF5288TDY	
	STM8AF52A8TAY	
	STM8AF52A8TCX	
	STM8AF52A8TDY	
	STM8AF6226TAY	
	STM8AF6226TCSSSY	
	STM8AF6226TCY	
	STM8AF6226TDY	
	STM8AF6246TASSSY	
	STM8AF6246TCSSSX	
	STM8AF6246TCSSSY	
	STM8AF6246TDSSSX	
	STM8AF6246TDSSSY	
	STM8AF6248TAY	
	STM8AF6248TCY	
	STM8AF6248TDY	
	STM8AF6266ITCX	
	STM8AF6266ITCY	
	STM8AF6266TAX	
	STM8AF6266TAY	
	STM8AF6266TCX	
	STM8AF6266TCY	
	STM8AF6266TDX	
	STM8AF6266TDY	
	STM8AF6268TAY	
	STM8AF6268TCX	
	STM8AF6268TCY	
	STM8AF6268TDY	
	STM8AF6286TAY	
	STM8AF6286TCY	
	STM8AF6288TCX	
	STM8AF6288TDX	
	STM8AF6288TDY	
	STM8AF62A8TCY	
	STM8AF62A8TDY	
	STM8AF6366TCY	
	STM8AF6388TCY	

	STM8AL3136TAY	
	STM8AL3136TCY	
	STM8AL3146TAY	
	STM8AL3146TCY	
	STM8AL3148TCY	
	STM8AL3166TAY	
	STM8AL3166TCY	
	STM8AL3168TAX	
	STM8AL3168TAY	
	STM8AL3168TCY	
	STM8AL3188TCY	
	STM8AL31E88TAY	
	STM8AL31E88TCX	
	STM8AL31E88TCY	
	STM8AL3L46TAY	
	STM8AL3L66TAY	
	STM8AL3L66TCY	
	STM8AL3L68TAY	
	STM8AL3L68TCY	
	STM8AL3LE88TCY	

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Reliability Evaluation Report

MDG-GPM- RER2215

ST Muar (Malaysia) LQFP7x7 32-48L Automotive MTX to HD conversion for STM8AFx/Lx products

(PCN 12676)

General Information	
Product Line	*79AX03, 79BX03, 79HX19 79JX19, 79KX19*
Product Description	*STM8AFx product family, STM8ALx product family*
Package	*LQFP 32-48 7x7x1.4*
Silicon Technology	*F9GO1/F9GO2*
Division	*: MDG-GPM*

Traceability	
Diffusion Plant	*: RS8F-Rousset*
Assembly Plant	*: ST Muar MALAYSIA*

Reliability Assessment	
Pass	☒
Fail	☐
Investigation required	☐

Note: *this report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the electronic device conformance to its specific mission profile. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics or under the approval of the author (see below).*

Version	Date	Author	Function
1.0	21st November 2022	Lionel NEVORET	MDG-GPM-Q&R Engineer

APPROVED BY:

Function	Location	Name	Date
Division Quality Manager	Rousset	Pascal NARCHE	21st November 2022

TABLE OF CONTENTS

1 RELIABILITY EVALUATION OVERVIEW

1.1 Objective

The aim of this report is to present results of the reliability evaluation performed on STM8AFx/Lx in package LQFP 7x7 48L High Density leadframe at ST Muar.

Changes are described here below:

	Current back-end lines	New back-end line
Assembly site	ST Muar (Malaysia)	
Leadframe	Matrix	High Density
Leadframe pad size	No change (1)	
Enhanced Traceability in marking	No digit	2 digits SS marking 2D marking

(1) Only exception for STM8AL3x 32K in LQFP 32L 7x7 package, leadframe pad size changes from 5x5mm to 3.6x3.6mm

1.2 Reliability Strategy

Test vehicles are described here below:

Product	Die	Process, Package	Assembly plant
ZZ8AF6248TAY	79B (X79BX14W)	F9GO1, LQFP 48 7x7x1.4	ST Muar (Malaysia)
ZZ8AL3168TAY	79H (X79HX21Z)	F9GO2, LQFP 48 7x7x1.4	ST Muar (Malaysia)

Qualification is based on standard STMicroelectronics Corporate Procedures for Quality and Reliability, in full compliancy with the JESD-47 international standard.

Reliability will be performed on test vehicle STM8 in CMOS F9 GO1 and CMOS F9 GO2 diffusion process.

Similarity is applicable on STM8 devices in LQFP 7x7 32L High Density leadframe.

1.3 Conclusion

All reliability tests have been completed with positive results. Neither functional nor parametric rejects were detected at final electrical testing.

According to good reliability tests results in line with reliability strategy, the qualification is granted for the STM8AFx/Lx in LQFP 7x7 32/48L High Density leadframe at ST Muar.

Refer to Section 3.0 for reliability test results.

2 PRODUCT OR TEST VEHICLE CHARACTERISTICS

2.1 Generalities

2.1.1 Package Test vehicles

Package line	Assembly Line	Package	Device (RawLine Code)	Diffusion Plants & Process	Number of Reliability Lots
LQFP	ST Muar	LQFP 7*7 48L	STM8 (JI5B*79BZZ4W)	RSST CMOS F9 GO1	3
			STM8 (J95B*79HZZ1Z)	RSST CMOS F9 GO2	1

2.2 Traceability

2.2.1 Wafer fab information

Table 1

FAB	Die 79B (X79BX14W)	Die 79H (X79HX21Z)
Wafer fab name / location	RS8F-Rousset	RS8F-Rousset
Wafer diameter (inches)	8”	8”
Wafer thickness (µm)	375	375
Silicon process technology	CMOS F9 GO1	CMOS F9 GO2
Number of masks	29	38
Die finishing front side (passivation) materials	HFP USG+UV Nitride	HFP USG+UV Nitride
Die finishing back side Materials	Raw Silicon	
Die area (Stepping die size) (µm)	2118,2358	1738,2876
Die pad size (µm)	65,108	65,108
Sawing street width (X,Y) (µm)	80, 80	80, 80
Metal levels/Materials/ Thicknesses	Metal 1 TaN/Ta/Cu 0.280 UM Metal 2 TaN/Ta/Cu 0.350 UM Metal 3 TaN/Ta/Cu 0.350 UM Metal 4 Ti/AlCu/TxTN 0.900 UM	Metal 1 TaN/Ta/Cu 0.280 UM Metal 2 TaN/Ta/Cu 0.350 UM Metal 3 TaN/Ta/Cu 0.350 UM Metal 4 TaN/Ta/Cu 0.350 UM Metal 5 Ti/AlCu/TxTN 0.900 UM

2.2.2 Assembly information

Table 2

Assembly Information – Die 767	
Package – 5B LQFP 48 7x7x1.4	
Assembly plant name / location	ST MUAR MALAYSIA
Die thickness after back-grinding (µm)	375
Die sawing method	Mechanical
Bill of Material elements	
Lead frame/Substrate material/reference	FRAME LQFP 48L 7x7 3.6sq HD
Lead frame finishing (material)	Rough Ni Pd AgAU (e4)
Die attach material/type(glue/film)/supplier	GLUE EN4900
Wire bonding material/diameter	WIRE Au 2N D0.8
Molding compound material/supplier/reference	RESIN SUMITOMO EME-G700LS
Package Moisture Sensitivity Level (JEDEC J-STD020D)	MSL3

2.2.3 Reliability testing information

Table 3

Reliability Testing Information	
Reliability laboratory name / location	ST Muar & ST Grenoble

Note: ST is ISO 9001 certified. This induces certification of all internal and subcontractor labs.
ST certification document can be downloaded under the following link:
http://www.st.com/content/st_com/en/support/quality-and-reliability/certifications.html

3 TESTS RESULTS SUMMARY

3.1 Lot Information

Table 4

Lot #	Diffusion Lot / Wafer ID	Assy Lot / Trace Code	Raw Line	Package	Note
1	VG148850	992080N601/ 992080N6	JI5B*79BZZ4W	LQFP 7x7 48L	Package Reliability assessment
2	VG148850	992080N6RR / 992080N6	JI5B*79BZZ4W		Package Reliability assessment
3	VG148850	992080N6RQ / 992080N6	JI5B*79BZZ4W		Package Reliability assessment
4	VG140739	992100VA01/ 992100VA	J95B*79HZZ1Z		Package Reliability assessment

3.2 Test plan and results summary

Table 6 – ACCELERATED ENVIRONMENT STRESS TESTS

79B:

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
PC	J-STD-020	24h bake@125°C, MSL3 (192h@30°C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	3	194	582	Lot1: 0/194 Lot2: 0/194 Lot3: 0/194	T0 test @ Room
TC	JESD22-A104	Ta=-55/+150°C Duration= 2000cyc ☒ After PC	3	90	270	Lot 1: 0/85(1) Lot 2: 0/85(1) Lot 3: 0/85(1)	Read out after PC @ Room + Hot Read out 1000cy/2000cy @ Hot
Wire Bond Pull after TC	Mil Std 883 Method 2011	Minimum pull strength after TC=3 grams	3	30 bonds from a minimum of 5 devices		PASS	5 devices @ 0cy/ 5 devices @ 1000cy/ 5 devices @ 2000cy
Wire Bond Shear after TC	AEC Q100-001	Min bond shear 15g	3			PASS	5 devices @ 0cy/ 5 devices @ 1000cy/ 5 devices @ 2000cy

UHAST	JESD22-A118	Ta=130°C ,85% RH 2.3 atm Duration= 96hrs ☒ After PC	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	Read out after PC @ Room Read out 96h @ Room
HTSL	JESD 22-A103	Ta=150°C, Duration= 2000hrs	3	77	231	Lot 1: 0/77 Lot 2: 0/77 Lot 3: 0/77	T0 test @ Room + Hot Read out 1000h/2000h @ Room + Hot
THB	JESD 22-A101	Ta=85°C/85%RH VDD=5v6 Duration= 1000hrs ☒ After PC	3	27	81	Lot 1: 0/27 Lot 2: 0/27 Lot 3: 0/27	Read out after PC @ Room + Hot Read out 500h/1000h @ Room + Hot

(1): 85 parts at TC2000cy due to 5 parts used for Wire bond pull and wire bond shear at readout TC1000cy

79H :

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
PC	J-STD-020	24h bake@125°C, MSL3 (192h@30°C/60%RH) 3x Reflow simulation Peak Reflow Temp= 260°C	1	244	244	Lot 4: 0/244	T0 test @ Room
TC	JESD22-A104	Ta=-55/+150°C Duration= 2000cyc ☒ After PC	1	90	90	Lot 4: 0/85(1)	Read out after PC @ Room + Hot Read out 1000cy/2000cy @ Hot
Wire Bond Pull after TC	Mil Std 883 Method 2011	Minimum pull strength after TC=3 grams	1	30 bonds from a minimum of 5 devices		PASS	5 devices @ 0cy/ 5 devices @ 1000cy/ 5 devices @ 2000cy
Wire Bond Shear after TC	AEC Q100-001	Min bond shear 15g	1			PASS	5 devices @ 0cy/ 5 devices @ 1000cy/ 5 devices @ 2000cy
UHAST	JESD22-A118	Ta=130°C ,85% RH 2.3 atm Duration= 96hrs ☒ After PC	1	77	77	Lot 4: 0/77	Read out after PC @ Room Read out 96h @ Room
HTSL	JESD22-A103	Ta=150°C, Duration= 2000hrs	1	77	77	Lot 4: 0/77	T0 test @ Room + Hot Read out 1000h/2000h @ Room + Hot

THS	JESD22-A118	Ta=85°C/85%RH Duration= 1000hrs ☒ After PC	1	77	77	Lot 4: 0/77	Read out after PC @ Room + Hot Read out 500h/1000h @ Room + Hot

(1): 85 parts at TC2000c due to 5 parts used for Wire bond pull and wire bond shear at readout TC1000c

Table 7 – ELECTRICAL VERIFICATION TESTS

79B:

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ESD Charge Device Model AEC-Q100-011 – ANSI/ESD STM5.3.1	750V corner pins / 500V others	3	3	9	Lot 1: 0/3 Lot 2: 0/3 Lot 3: 0/3	T0 test @ Room + Hot Read out after ESD @ Room + Hot

79H:

Test code	Stress method	Stress Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
ESD CDM	ESD Charge Device Model AEC-Q100-011 – ANSI/ESD STM5.3.1	750V corner pins / 500V others	1	3	3	Lot 1: 0/3	T0 test @ Room + Hot Read out after ESD @ Room + Hot

Table 8 – PACKAGE ASSEMBLY INTEGRITY TESTS

79B:

Test code	Method	Tests Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
CA	Construction Analysis including including Solderability, Physical dimensions, wire bond shear	JESD 22B102 JESDB100/B108 ST internal spec	1	50	50	Lot 1: 0/50	PASS MDG Muar_22_00010 – 79B

79H:

Test code	Method	Tests Conditions	Lots	S.S.	Total	Results/Lot Fail/S.S.	Comments: (N/A =Not Applicable)
CA	Construction Analysis including including Solderability, Physical dimensions, wire bond shear	JESD 22B102 JESDB100/B108 ST internal spec	1	50	50	Lot 1: 0/50	PASS MDG Muar_21_00013_79HZ

4 APPLICABLE AND REFERENCE DOCUMENTS

Reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
SOP2.4.4	Record Management Procedure
SOP2.6.2	Internal Change Management
SOP2.6.7	Finished Good Maturity Management
SOP2.6.9	Package & Process Maturity Management in BE
SOP2.6.11	Program Management for Product Development
SOP2.6.17	Management of Manufacturing Transfers
SOP2.6.19	Front-End Technology Platform Development and Qualification
DMS 0061692	Reliability Tests and Criteria for Product Qualification
JESD22-A103:	High Temperature Storage Life
J-STD-020:	Moisture/reflow sensitivity classification for non-hermetic solid state surface mount devices
JESD22-A113:	Preconditioning of non-hermetic surface mount devices prior to reliability testing
JESD22-A118:	Unbiased Temperature/Humidity
JESD22-A104:	Temperature cycling
JESD22-A110:	Temperature Humidity Bake
JESD 22B102:	Solderability test
JESD22B100/B108:	Physical dimension

5 GLOSSARY

Reference	Short description
PC	Preconditioning (solder simulation)
THB	Temperature Humidity Bias
TC	Temperature cycling
UHAST	Unbiased Temperature/Humidity
HTSL	High temperature storage life
THS	Temperature Humidity Storage
DMS	ST Advanced Documentation Controlled system/ Documentation Management system
ESD CDM	Electrostatic discharge (charge device model)
CA	Construction Analysis

6 REVISION HISTORY

Revision	Author	Content description	Approval List			
			Function	Location	Name	Date
1.0	L. Nevoret	Initial release	Div. Quality Manager	Rousset	Pascal NARCHE	21st November 2022

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PRODUCT/PROCESS CHANGE NOTIFICATION PCN12676– Additional information

ST Muar (Malaysia) Additional capacity through High Density Leadframe for STM8A AUTOMOTIVE listed products in LQFP 32 and LQFP 48 7x7 package

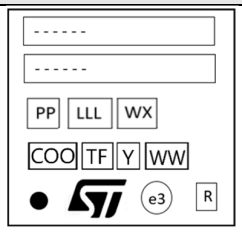
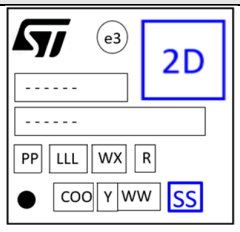
MDG - Microcontrollers Division (MCD)

What is the change?

	Current back-end lines	New back-end line
Assembly site	ST Muar (Malaysia)	
Leadframe	Matrix	High Density
Leadframe pad size	No change (1)	
Enhanced Traceability in marking	No digit	2 digits SS marking 2D marking

(1) Only exception for STM8AL3x 32K in LQFP 32L 7x7 package, leadframe pad size changes from 5x5mm to 3.6x3.6mm

How can the change be seen? See marking example

	No Digit	With Enhanced Tracability (2D & SS) marking
Marking example		

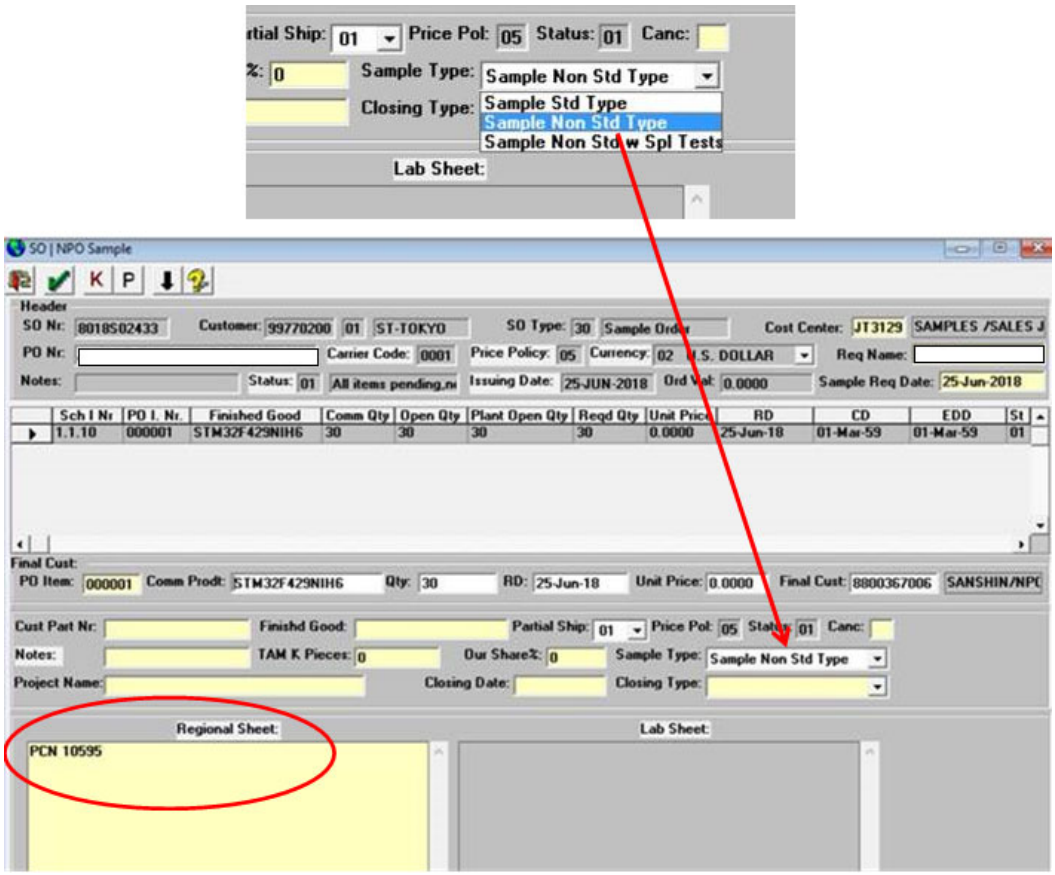
No change in Assembly traceability plant code (PP).

PP code	Assembly Line - Fab
99	ST Muar (Malaysia)

How to order samples?

For all samples request linked to this PCN, please:

- place a **Non-standard** sample order (choose Sample Non Std Type from pull down menu)
- insert the PCN number "**PCN12676**" into the NPO Electronic Sheet/**Regional Sheet**
- request sample(s) through Notice tool, indicating a single Commercial Product for each request



Public Products List

Publict 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 : ST Muar (Malaysia) Additional capacity through High Density Leadframe for STM8A AUTOMOTIVE listed products in LQFP32 & LQFP48 7x7 packages

PCN Reference : MDG/22/12676

Subject : Public Products List

Dear Customer,

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

STM8AF6288TAY	STM8AF6268TAX	STM8AF6266TDX
STM8AF6288TAX	STM8AF6266TCX	STM8AF6388TCY
STM8AF6388TDX	STM8AF6246TASSSY	STM8AF5268TAY
STM8AL3148TCX	STM8AF5288TCX	STM8AF6388TCX
STM8AF6226TASSSX	STM8AL3166TAY	STM8AF6266TCY
STM8AL3188TCY	STM8AF6226TAY	STM8AF6268TAY
STM8AF6266TDY	STM8AF6246TCSSSX	STM8AL31E88TAY
STM8AL3138TAY	STM8AF6226TASSSY	STM8AF5268TAX
STM8AL3L48TCY	STM8AF6248TCY	STM8AL3L68TAX
STM8AF6246TCSSSY	STM8AF52A8TCY	STM8AF6268TDX
STM8AF52A8TCX	STM8AL3168TCX	STM8AF5288TAY
STM8AF6266ITCY	STM8AF6246ITCX	STM8AL3146TAY
STM8AL3LE88TCY	STM8AL3168TCY	STM8AF6246ITDY
STM8AL3L66TCY	STM8AL3148TAY	STM8AF5288TAX
STM8AF5268TCX	STM8AF52A8TAY	STM8AF5268TCY
STM8AF6246ITDX	STM8AL31E88TCX	STM8AL3L88TAY
STM8AF6246TDSSSX	STM8AF6268TDY	STM8AF6286TAX
STM8AF6248TDX	STM8AF6366TCX	STM8AF5288TDX
STM8AL3168TAY	STM8AF6286TCY	STM8AF6248TCX
STM8AF5288TCY	STM8AF6266ITCX	STM8AL3LE88TAY
STM8AF62A8TDX	STM8AF52A8TDX	STM8AL3148TCY
STM8AF6288TCY	STM8AF6288TDX	STM8AL3166TAX
STM8AF6248TAY	STM8AL3L68TAY	STM8AF6366TCY
STM8AF6248TDY	STM8AL3188TCX	STM8AF6246TASSSX
STM8AF52A8TAX	STM8AL3188TAY	STM8AL3136TCY
STM8AF6226TCY	STM8AF6268TCX	STM8AL3L88TCX
STM8AL3L48TAY	STM8AF6266TAY	STM8AL3LE88TCX
STM8AF6268TCY	STM8AF5268TDY	STM8AF6246TDSSSY
STM8AF5288TDY	STM8AL3188TAX	STM8AL3146TCY
STM8AF6266TAX	STM8AF6286TCX	STM8AF52A8TDY
STM8AL3138TCX	STM8AF62A8TDY	STM8AF6226TDY
STM8AF6286TAY	STM8AF62A8TCY	STM8AL3136TAY
STM8AL3166TCY	STM8AF62A8TCX	STM8AF6288TDY
STM8AF6288TCX	STM8AL3L68TCY	STM8AL3L46TAY
STM8AL3L66TAY	STM8AL3L46TCY	STM8AL31E88TCY

STM8AL3L88TCY	STM8AF6246ITCY	STM8AL3168TAX
STM8AL3138TCY		

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