PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	MDG/20/12208
1.3 Title of PCN	ST25R3911B, NFC Reader IC backend update
1.4 Product Category	ST25R3911B-AQFT
1.5 Issue date	2020-06-18

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	Benoit RODRIGUES
2.1.2 Marketing Manager	Sylvain FIDELIS
2.1.3 Quality Manager	Rita PAVANO

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), Bond wire material, diameter	TSMC -Taiwan UTAC - Thailand

4. Description of change

	Old	**New**
4.1 Description	The ST25R3911B-AQFT, currently assembled with Copper bonding wire in a standard punched QFN package at ASE (Korea) and tested at KYEC (Taiwan)...	...will be assembled and tested at UTAC (Thailand) with Gold bonding wire in the sawn wettable flank QFN package with a new product name ST25R3911B-AQWT.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	- Form: Marking change: - “Assembly Country & Plant” digits change from HA to FN - “Country of origin” digits change from KOR to THA - Fit: Package dimensions: Length of solder pin “L” changes (see Table 102. QFN32 5 mm x 5 mm dimensions in datasheet) - Function: No change PRODUCT / PROCESS CHANGE NOTIFICATION	

5. Reason / motivation for change

5.1 Motivation	The strategy of STMicroelectronics Memory Division is to offer customers shortest possible lead times and secure production bandwidth even if customer demand is increasing. Additionally, ST is committed to follow highest quality standards for long-term reliability and to always optimize quality level wherever possible.
5.2 Customer Benefit	QUALITY IMPROVEMENT

6. Marking of parts / traceability of change

6.1 Description	N/A

7. Timing / schedule

7.1 Date of qualification results	2020-06-11
7.2 Intended start of delivery	2020-09-07
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description			
8.2 Qualification report and qualification results	In progress	**Issue Date**	

9. Attachments (additional documentations)
12208 Public product.pdf 12208 PCN ST25R3911B wettable flanck.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**
	ST25R3911B-AQFT	

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PRODUCT / PROCESS CHANGE NOTIFICATION

ST25R3911B, NFC Reader IC backend update

What is the change?

The **ST25R3911B-AQFT**, currently assembled with Copper bonding wire in a standard punched QFN package at ASE (Korea) and tested at KYEC (Taiwan) **will be assembled and tested at UTAC (Thailand)** with **Gold bonding wire** in the sawn **wettable flank** QFN package with a new product name **ST25R3911B-AQWT**.

The ST25R3911B-AQWT is compatible with ST25R3911B-AQFT with same functionalities and electrical features. New wettable flank QFN package physical dimensions are compatible with current QFN package. It is still recommended to check soldering process compatibility at customer (No change on plating (mat Tin)).

The new product has a new ordering code and replaces the current product. While the old ST25R3911B-AQFT will be still available (last order June 2021, last delivery November 2021), ST recommends the new ST25R3911B-AQWT for faster availability and to secure demand.

Why?

The strategy of STMicroelectronics Memory Division is to offer customers shortest possible lead times and secure production bandwidth even if customer demand is increasing.
Additionally, ST is committed to follow highest quality standards for long-term reliability and to always optimize quality level wherever possible.

When?

The shipments of the new product with new backend and new package will start from **September 2020**.

How will the change be qualified?

The new product has been qualified using the standard STMicroelectronics Corporate and MMY (Memory) division Procedures for Quality and Reliability. The Qualification Report **QRMMY1701** is available and included inside this document.

What is the impact of the change?

- **Form:** Marking change: - “Assembly Country & Plant” digits change from HA to **FN**
  - “Country of origin” digits change from KOR to **THA**

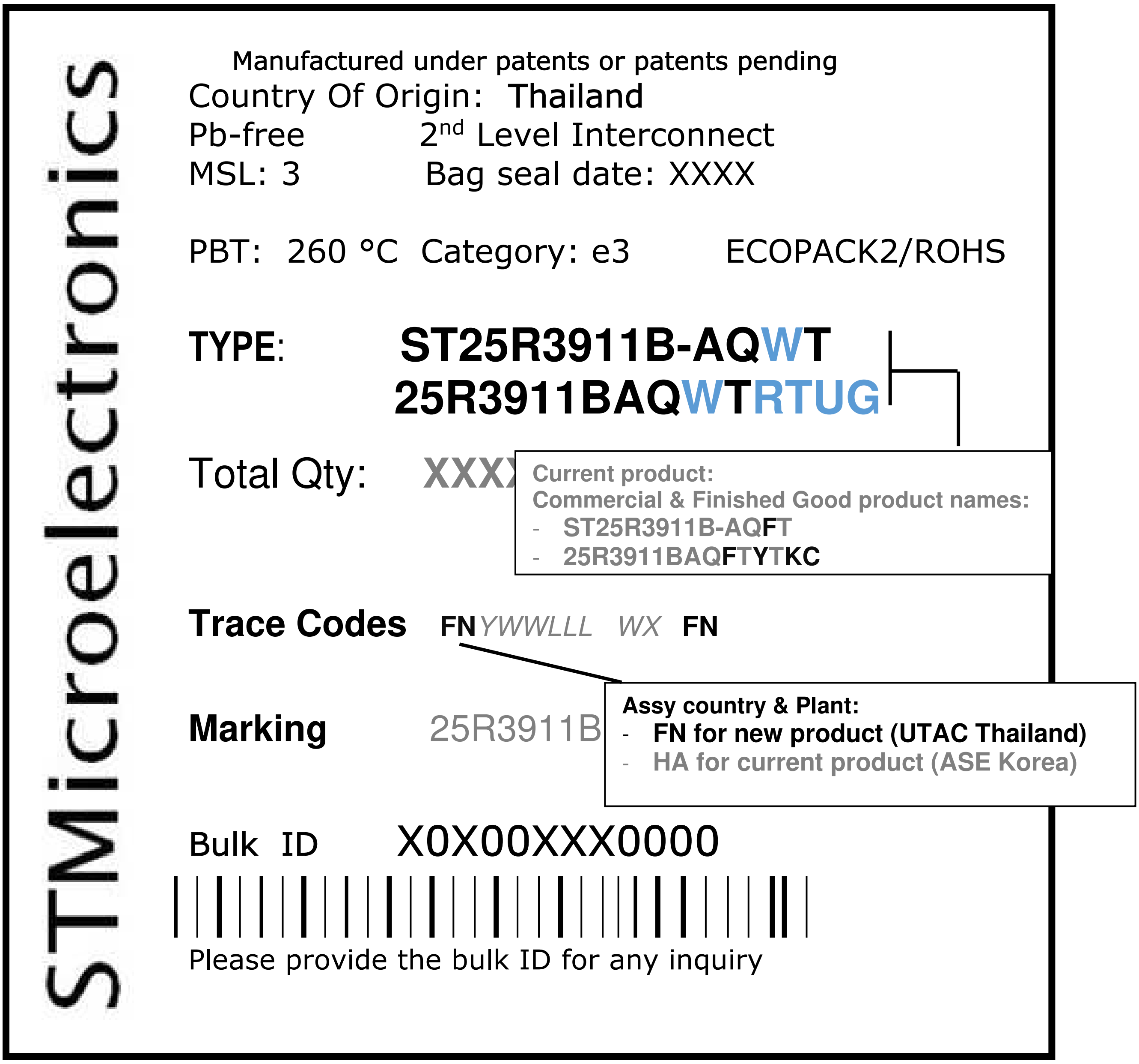
- **Fit:** Package dimensions: Length of solder pin “L” changes
  (see **Table 102. QFN32 5 mm x 5 mm dimensions** in datasheet)

- **Function:** No change

How can the change be identified?

- ***BOX LABEL MARKING***

On the BOX LABEL MARKING, the difference is visible on the Commercial Part Number and the Finished Good part Number. Also, the change is visible inside the Trace code where the “Assembly Country & Plant” digits are reflecting the new plant as FN for UTAC Thailand instead of HA for ASE Korea:



STMicroelectronics

Manufactured under patents or patents pending
Country Of Origin: Thailand
Pb-free 2nd Level Interconnect
MSL: 3 Bag seal date: XXXX

PBT: 260 °C Category: e3 ECOPACK2/ROHS

TYPE: **ST25R3911B-AQWT**
25R3911BAQWTRTUG

Total Qty: XXXX

Current product:
Commercial & Finished Good product names:
- **ST25R3911B-AQFT**
- **25R3911BAQFTYTKC**

Trace Codes **FN***YWWLLL* *WX* **FN**

Assy country & Plant:
- **FN for new product (UTAC Thailand)**
- **HA for current product (ASE Korea)**

Marking 25R3911B

Bulk ID X0X00XXX0000

Please provide the bulk ID for any inquiry

How can the change be identified?

- ***Form: DEVICE MARKING***

On the device marking, the change is visible inside the trace code where the Assembly Country & Plant “PP” is changing from HA to **FN**. Also, the Country Of origin “HHH” is changing from KOR to **THA**.

Legend:
25R3911B = Product name
PP = **Assembly Country & plant: - FN for new product (UTAC Thailand)**
- **HA for current product (ASE Korea)**

LLL = Sequence
WX = Wafer plant
HHH = **Country of origin: - THA for new product, KOR for current product**
Y = Assembly year
WW = Assembly week

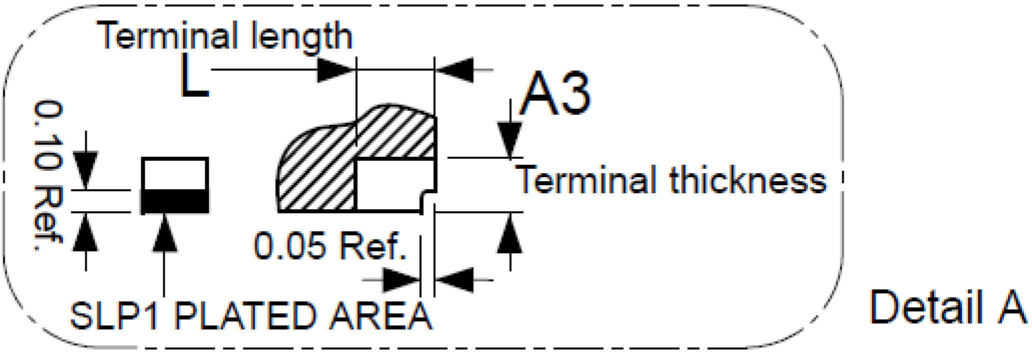
How can the change be identified?

- Fit: Package dimensions & tolerances

Similar QFN-32 5x5mm package is used. For detailed drawing please investigate the package section of the ST25R3911B datasheet.

Symbol	Min.	Typ.	Max.	Comment
A	0,8	0,9	1	No change
A1	0	0,02	0,05	No change
A2	-	0,65	1	No change
A3	-	0,2	-	No change
L	0,35	0,4	0,45	AQFT only – length of solder pin
L	0,3	0,4	0,5	AQWT only – length of solder pin
q	0º	-	14º	AQFT only – Angle of package side
b	0,18	0,25	0,3	No change
D		5 (with BSC)		No change
E		5 (with BSC)		No change
e		0,5 (with BSC)		No change
D2	3,4	3,5	3,6	No change
E2	3,4	3,5	3,6	No change
D1		4,75 (with BSC)		No change
E1		4,75 (with BSC)		No change
aaa	-	0,15	-	No change
bbb	-	0,1	-	No change
ccc	-	0,1	-	No change
ddd	-	0,05	-	No change
eee	-	0,08	-	No change
fff	-	0,1	-	No change
N		32		No change

Additionally, the new package offers a wettable flank to make optical solder checks possible.



Appendix A- Product Change Information

Product family / Commercial products:	ST25R3911B-AQFT
Customer(s):	All
Type of change:	Back End plant change
Reason for the change:	STMicroelectronics believe that customers deserves fastest possible leadtimes and security of delivery during demand peaks.
Description of the change:	Change backend from ASE (Korea) for standard punched QFN-32 5x5mm to **UTAC (Thailand) wettable flank QFN-32 5x5mm package with Gold bonding wire.**
Forecast date of the change: **(Notification to customer)**	Week 24 / 2020
Forecast date of Qualification samples availability for customer(s):	Available
Qualification Report availability:	Qualification Report **QRMMY1701** available and included inside this document.
Marking to identify the changed product:	Not Applicable
Description of the qualification program:	Standard ST Microelectronics Corporate Procedures for Quality and Reliability
Estimated date of first shipment:	Week 37 / 2020

Appendix B- Qualification Report:

See next page

life.augmented

QRMMY1701
Qualification report

New design / ST25R3911B using the C35 technology at subcontractor TSMC Fab10

Table 1. Product information

General information	
Commercial product	ST25R3911B-AQFT ST25R3911B-AQWT
Product description	High performance HF reader / NFC initiator with 1.4 W supporting VHBR and AAT
Product group	MDG
Product division	MMY - Memory
Silicon process technology	C35
Wafer fabrication location	Subcontractor TSMC Fab10, Shanghai

Table 2. Package description

Package description	Assembly plant location	Final test plant location
32-pin QFN (5 mm x 5 mm)	Subcontractor ASE, Korea	Subcontractor KYEC, Taiwan
32-pin VFQFPN (5 x 5 mm) with wettable flanks	Subcontractor UTAC, Thailand	Subcontractor UTAC, Thailand

Reliability / Qualification assessment: PASS

1 Reliability evaluation overview

1.1 Objectives

This qualification report summarizes the results of the reliability trials that were performed to qualify the new design ST25R3911B using the C35 silicon process technology manufactured at subcontractor TSMC Fab10 diffusion fab.

The C35 silicon process technology is already qualified and in production at subcontractor TSMC Fab10, Shanghai.

This document serves for the qualification of the named product using the named silicon process technology in the named diffusion fab.

The supply voltage and temperature ranges covered by this document are :

- 2.4 V to 5.5 V at - 40 to 125 °C

1.2 Conclusion

The new design ST35R3911B using the C35 silicon process technology manufactured at subcontractor TSMC Fab10 diffusion fab has passed the reliability requirements, and all products described in *Table 1* are qualified.

Refer to *Section 3: Reliability test results* for details on the reliability test results.

2 Device characteristics

Device description

The ST25R3911B is a highly integrated NFC Initiator / HF Reader IC, including the analog front end (AFE) and a highly integrated data framing system for ISO 18092 (NFCIP-1) initiator, ISO 18092 (NFCIP-1) active target, ISO 14443A and B reader (including high bit rates), ISO 15693 reader and FeliCa,Ñ¢ reader. Implementation of other standard and custom protocols like MIFARE,Ñ¢ Classic is possible using the AFE and implementing framing in the external microcontroller (Stream and Transparent modes).

The ST25R3911B is positioned perfectly for the infrastructure side of the NFC system, where users need optimal RF performance and flexibility combined with low power.

Thanks to automatic antenna tuning (AAT) technology, the device is optimized for applications with directly driven antennas. The ST25R3911B is alone in the domain of HF reader ICs as it contains two differential low impedance (1 Ohm) antenna drivers.

The ST25R3911B includes several features that make it very suited for low power applications. It contains a low power capacitive sensor that can be used to detect the presence of a card without switching on the reader field. The presence of a card can also be detected by performing a measurement of amplitude or phase of signal on antenna LC tank, and comparing it to the stored reference. It also contains a low power RC oscillator and wake-up timer that can be used to wake up the system after a defined time period, and to check for the presence of a tag using one or more low power detection techniques (capacitive, phase or amplitude).

The ST25R3911B is designed to operate from a wide (2.4 V to 5.5 V) power supply range; peripheral interface IO pins support power supply range from 1.65 V to 5.5 V.

For more details refer to the product datasheet.

3 Reliability test results

This section contains a general description of the reliability evaluation strategy. The named products are qualified using the standard STMicroelectronics corporate procedures for quality and reliability.

The product vehicle used for die qualification is presented in *Table 3*.

Table 3. Product vehicle used for die qualification

Product	Silicon process technology	Wafer fabrication location	Package description	Assembly plant location
ST25R3911B	C35	subcontractor TSMC Fab10, Shanghai	32-pin QFN (5 mm x 5 mm)	subcontractor ASE, Korea

The product vehicles used for the package qualification are presented in *Table 4*.

Table 4. Product vehicle used for package qualification

Product	Silicon process technology	Wafer fabrication location	Package description	Assembly plant location
ST25R3911B	C35	subcontractor TSMC Fab10, Shanghai	32-pin QFN (5 mm x 5 mm)	subcontractor ASE, Korea
ST25R3916 (1)	C35	subcontractor TSMC Fab10, Shanghai	32-pin VFQFPN (5 x 5 mm) with wettable flanks	Subcontractor UTAC, Thailand

1. Qualification by similarity rules applies. Package qualification data obtained on ST25R3916 are applicable to ST25R3911B (same silicon process technology, same package with gold wire bonding).

3.1 Reliability test plan and result summary

The reliability test plan and the result summary are presented as follows:

- in *Table 5* for die-oriented tests
- in *Table 6* for 32-pin QFN (5 mm x 5 mm) subcontractor ASE, Korea package-oriented tests
- in *Table 7* for 32-pin VFQFPN (5 x 5 mm) with wettable flanks subcontractor UTAC, Thailand package-oriented tests

Table 5. Die-oriented reliability test plan and result summary (CDIP8 / Engineering package)(1)

Test	Test short description					
	Method	**Conditions**	**Sample size / lots**	**No. of lots**	**Duration**	**Results fail / sample size**
						ST25R3911B
						Lot 1
HTOL	High temperature operating life					
	JESD22-A108	HTOL at +125 °C, 6 V	77	1	504 hrs	0/77
					1008 hrs	0/77
ESD HBM	Electrostatic discharge (human body model)					
	ANSI/ESDA/JEDEC JS-001-2014	C = 100 pF, R= 1500 Ohms	12	1	N/A	Pass 2000 V
LU	Latch-up (current injection and overvoltage stress)					
	JESD78E	At maximum junction temperature (125 °C)	6	1	N/A	Class II Level A

1. See *Table 8: List of terms* for a definition of abbreviations.

Table 6. Package-oriented reliability test plan and result summary (32-pin QFN 5 mm x 5 mm / subcontractor ASE)[1]

Test	**Test short description**					
	Method	**Conditions**	**Sample size / lots**	**No. of lots**	**Duration**	**Results fail / sample size**
						ST25R3911B
						Lot 1
PC	Preconditioning: moisture sensitivity level 3					
	JESD22-A113 J-STD-020E	MSL3, peak temperature at 260 °C, 3 IReflow	410	1	N/A	0/410
TC[2]	Temperature cycling					
	JESD22-A104	- 65 °C / +150 °C	77	1	1000 cycles	0/77
TMSK[2]	Thermal shocks					
	JESD22-A106	-55 °C / +125 °C	25	1	200 shocks	0/25
uHAST[2]	Unbiased highly accelerated stress test					
	JESD22-A118	130 °C, 85% RH, 230 kPa, no bias	77	1	96 hrs	0/77
HAST[2]	highly accelerated stress test					
	JESD22-A110	130 °C, 85% RH, 230 kPa, bias 5.6 V	77	1	96 hrs	0/77
HTSL[2]	High temperature storage life					
	JESD22-A103	High temperature storage at 150 °C	77	1	1008 hrs	0/77
ESD CDM	Electrostatic discharge (charge device model)					
	AEC-Q100-011 ANSI-ESDSTM5 3 1-2009	Field induced charging method	15	1	N/A	Pass 1000 V

[1] See *Table 8: List of terms* for a definition of abbreviations.

[2] TC-, TMSK-, uHAST-, HAST-, and HTSL- dedicated parts are first subject to preconditioning flow.

Table 7. Package-oriented reliability test plan and result summary (32-pin VFQFPN 5 x 5 mm with wettable flanks / subcontractor UTAC)(1)

Test	Test short description							
	Method	**Conditions**	**Sample size / lots**	**No. of lots**	**Duration**	**Results fail / sample size**		
						ST25R3916 (2)		
						Lot 1	**Lot 2**	**Lot 3**
PC	Preconditioning: moisture sensitivity level 3							
	JESD22-A113 J-STD-020	MSL3, peak temperature at 260 °C, 3 IReflow	539	3	N/A	0/539	0/539	0/539
	JESD22-A104	+ TC -65°C / +150°C, 100 cycles						
THB (3)	Temperature humidity bias							
	JESD22-A101	85 °C, 85% RH, bias 5.6V	77	3	1008 hrs	0/77	0/77	0/77
TC (3)	Temperature cycling							
	JESD22-A104	- 65 °C / +150 °C	77	3	1000 cycles	0/77	0/77	0/77
TMSK (3)	Thermal shocks							
	JESD22-A106	-55 °C / +125 °C	77	3	1000 shocks	0/77	0/77	0/77
AC (3)	Autoclave (pressure pot)							
	JESD22-A102	121 °C, 100% RH at 2 ATM	77	3	96 hrs	0/77	0/77	0/77
uHAST (3)	Unbiased highly accelerated stress test							
	JESD22-A118	130 °C, 85% RH, 230 kPa, no bias	77	3	96 hrs	0/77	0/77	0/77
HAST (3)	highly accelerated stress test							
	JESD22-A110	130 °C, 85% RH, 230 kPa, bias 5.6 V	77	3	96 hrs	0/77	0/77	0/77
HTSL (3)	High temperature storage life							
	JESD22-A103	High temperature storage at 150 °C	77	3	1008 hrs	0/77	0/77	0/77
ESD CDM	Electrostatic discharge (charge device model)							
	ANSI/ESDA/ JEDEC JS-002	Field induced charging method	15	3	N/A	Pass 1000 V	Pass 1000 V	Pass 1000 V

1. See *Table 8: List of terms* for a definition of abbreviations.
2. Qualification by similarity rules applies. Package qualification data obtained on ST25R3916 are applicable to ST25R3911B (same silicon process technology, same package with gold wire bonding).
3. THB-, TC-, TMSK-, AC-, uHAST-, HAST-, and HTSL- dedicated parts are first subject to preconditioning flow PC + TC -65°C/+150°C 100 cycles.

4 Applicable and reference documents

- AEC-Q100: Stress test qualification for integrated circuits
- SOP 2.6.10: General product qualification procedure
- SOP 2.6.11: Program management for product qualification
- SOP 2.6.12: Design criteria for product qualification
- SOP 2.6.14: Reliability requirements for product qualification
- SOP 2.6.19: Process maturity level
- SOP 2.6.2: Process qualification and transfer management
- SOP 2.6.20: New process / New product qualification
- SOP 2.6.7: Product maturity level
- SOP 2.6.9: Package and process maturity management in Back End
- SOP 2.7.5: Automotive products definition and status
- JESD22-A101: Steady state temperature humidity bias life test
- JESD22-A102: Accelerated moisture resistance - unbiased autoclave
- JESD22-A103: High temperature storage life
- JESD22-A104: Temperature cycling
- JESD22-A106: Thermal shock
- JESD22-A108: Temperature, bias, and operating life
- JESD22-A110: Highly accelerated stress test
- JESD22-A113: Preconditioning of nonhermetic surface mount devices prior to reliability testing
- JESD22-A118: Unbiased highly accelerated stress test
- ANSI-ESDSTM5 3 1-2009: Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
- ANSI/ESDA/JEDEC JS-002: Electrostatic discharge (ESD) sensitivity testing charge device model (CDM)
- ANSI/ESDA/JEDEC JS-001: Electrostatic discharge (ESD) sensitivity testing human body model (HBM)
- JESD78: IC Latch-up test
- J-STD-020: Moisture/reflow sensitivity classification for nonhermetic solid state surface mount devices

5 Glossary

Table 8. List of terms

Terms	Description
HTOL	High temperature operating life
ESD HBM	Electrostatic discharge (human body model)
LU	Latch-up
PC	Preconditioning (solder simulation)
THB	Temperature humidity bias
TC	Temperature cycling
TMSK	Thermal shocks
uHAST	Unbiased highly accelerated stress test
HAST	Highly accelerated stress test
HTSL	High temperature storage life
ESD CDM	Electrostatic discharge (charge device model)

6 Revision history

Table 9. Document revision history

Date	Revision	Changes
07-Aug-2017	1	Initial release.
17-Nov-2017	2	*Table 5* updated with latest reliability results.
04-Jun-2020	3	List of qualified commercial products updated in *Table 1*. Added reference to 32-pin VFQFPN (5 x 5 mm) with wettable flanks package. Added *Table 7: Package-oriented reliability test plan and result summary (32-pin VFQFPN 5 x 5 mm with wettable flanks / subcontractor UTAC)*

Document Revision History

Date	Rev.	Description of the Revision
June 02, 2020	1.00	First draft creation

Source Documents & Reference Documents

Source document Title	**Rev.:**	**Date:**

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 : ST25R3911B, NFC Reader IC backend update
PCN Reference : MDG/20/12208

Subject : Public Products List

Dear Customer,

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

ST25R3911B-AQFT		

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