


PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data

1.1 Company	 STMicroelectronics International N.V
1.2 PCN No.	MDG/23/14099
1.3 Title of PCN	Implementation of a PBO (Polybenzoxazole) protective layer over product passivation for STM8A (AUTOMOTIVE) listed products
1.4 Product Category	STM8A
1.5 Issue date	2023-06-22

2. PCN Team

2.1 Contact supplier	
2.1.1 Name	NEMETH KRISZTINA
2.1.2 Phone	+49 89460062210
2.1.3 Email	krisztina.nemeth@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
Wafer Fab (Process)	Change of top layer on die	ST Singapore

4. Description of change

	Old	New
4.1 Description	The wafer passivation layer has no protective layer.	Implementation of a PBO (Polybenzoxazole) protective layer on top of the wafer passivation layer is proposed to customer.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	Reliability will be improved - PBO is a stress relief coating used as a protective layer for passivation layer.	

5. Reason / motivation for change

5.1 Motivation	Part of the strategy is to eradicate passivation damage on dice. A protective layer (PBO) on top of product passivation to be implemented to further reduce the baseline defectiveness level, and to protect versus possible quality excursions.
5.2 Customer Benefit	QUALITY IMPROVEMENT

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	2023-09-07
7.2 Intended start of delivery	2023-09-07
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation

8.1 Description	14099 MDG-MCD_PBO_Implementation_Plan and context.pdf		
8.2 Qualification report and qualification results	Available (see attachment)	Issue Date	2023-06-22

9. Attachments (additional documentations)

14099 Public product.pdf
14099 MDG-MCD_PBO_Implementation_Plan and context.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
	STM8AF6266ITCY	
	STM8AF6266UCY	

IMPORTANT NOTICE – PLEASE READ CAREFULLY

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2022 STMicroelectronics – All rights reserved

PCN14099 : Implementation of a PBO (Polybenzoxazole) protective layer over product passivation for STM8A (AUTOMOTIVE) listed products

PBO implementation context and reliability plan



Passivation Damage Eradication Plan

The continuous improvement plan for eradication of passivation damage applied in these years on 8bit MCUs was focusing of 3 key areas of the manufacturing flow:

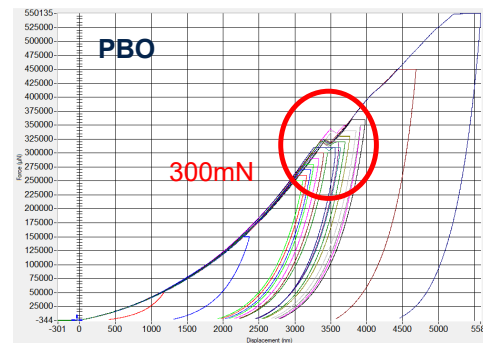
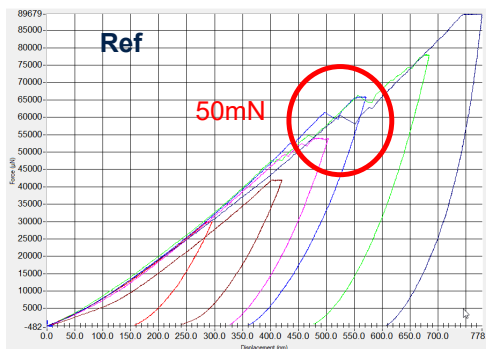
- Wafer transportation
- Automatic Visual Inspection (AVI)
- Removal of manual wafer handling steps during assembly

The various identified and implemented improvement actions were able to **significantly reduce** the ppm level of this failure mode **but not to eradicate** it.

A **breakthrough** to further reduce the baseline defectiveness level, and to protect versus possible quality excursions, **must** therefore go through an **intrinsic product robustness** improvement action: the implementation of a polyimide protection layer (**PBO**) over product passivation.

Polyimide (PBO) benefits

- The use of polyimide, as robustness improvement vs mechanical damages on die surface, is well known in semiconductor industry.
- ST has a large experience in polyimide on smart power products and on sensitive digital technologies, with very positive results for protection against passivation scratches/squashes failure modes, without any drawback
- Dedicated characterization by Nano-indentation results on M10 wafer are showing 6x gain (from 50mN to 300mN) on the force needed to break passivation.



PBO characteristics

The PBO selected for MDG/MCD 8bit MCUs is the one already in volume production in the manufacturing plant (AMK)

	Thickness on product	CTE ppm/DegC	Tg (DegC)	Elongation %	Tensile Strength Mpa	Modulus Gpa	Current Production Status
Hitachi Dupont HD8820	6 um	60	280	100	140	2.1	In AMK on BCD1,2,3,4,5,6; PowerMOS, ViPower, HCMOS4, BICMOS4 technologies

F9G01 PBO introduction – STM8A-32K

Qualification plan

- Qualification plan for STM8A-32K
 - Package oriented trials planned on 3 lots and die oriented trials on 1 lot

Muar Assy site					
Trial	Trial step 1	Conditions	Trial step 2	Conditions Q100	LQFP48 7x7
AC	Precond.	MSL3, 3xReflow	Pressure Pot	96hrs @ 121C, 2.08 atm	77x3
TC	Precond.	MSL3, 3xReflow	Thermal Cycles	2000cyc @ -50/150C	77x3
THB	Precond.	MSL3, 3xReflow	Biased Humid chamber	1000hrs @ 85C, 85% RH	77x3
HTSL	High Temperature Storage Life	150°C	--	2000hrs @ 150°C	77x3
HTOL	High Temperature Operating Life	1000h, Tamb 150°C Vdd 2.2V	--	--	77x1
HTDR	Flash W/E	100kcyc @150°C	Bake	1000hrs@150°C	77x1
ELFR	Early Life Failure Rate	48h, Tamb 150°C Vdd 2.2V	--	--	800x1
ESD	HBM CDM LU	4000V 500V-750V 150°C	--	--	3x1 3x1 6x1
ED/Char	ED at 3T	--	--	--	30x1

Thank you

© STMicroelectronics - All rights reserved.
ST logo is a trademark or a registered
trademark of STMicroelectronics
International NV or its affiliates in the EU
and/or other countries. For additional
information about ST trademarks, please
refer to www.st.com/trademarks.
All other product or service names are the
property of their respective owners..



IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics International NV and its affiliates (“ST”) reserve the right to make changes corrections, enhancements, modifications, and improvements to ST products and/or to this document any time without notice.

This document is provided solely for the purpose of obtaining general information relating to an ST product. Accordingly, you hereby agree to make use of this document solely for the purpose of obtaining general information relating to the ST product. You further acknowledge and agree that this document may not be used in or in connection with any legal or administrative proceeding in any court, arbitration, agency, commission or other tribunal or in connection with any action, cause of action, litigation, claim, allegation, demand or dispute of any kind. You further acknowledge and agree that this document shall not be construed as an admission, acknowledgement or evidence of any kind, including, without limitation, as to the liability, fault or responsibility whatsoever of ST or any of its affiliates, or as to the accuracy or validity of the information contained herein, or concerning any alleged product issue, failure, or defect. ST does not promise that this document is accurate or error free and specifically disclaims all warranties, express or implied, as to the accuracy of the information contained herein. Accordingly, you agree that in no event will ST or its affiliates be liable to you for any direct, indirect, consequential, exemplary, incidental, punitive, or other damages, including lost profits, arising from or relating to your reliance upon or use of this document.

Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement, including, without limitation, the warranty provisions thereunder.

In that respect please note that ST products are not designed for use in some specific applications or environments described in above mentioned terms and conditions.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

Information furnished is believed to be accurate and reliable. However, ST assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously in any prior version of this document.

© 2023 STMicroelectronics - All rights reserved



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 : Implementation of a PBO (Polybenzoxazole) protective layer over product passivation for STM8A (AUTOMOTIVE) listed products

PCN Reference : MDG/23/14099

Subject : Public Products List

Dear Customer,

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

STM8AF6266ITCX	STM8AF6268TAX	STM8AF6246ITDY
STM8AF6246UAX	STM8AF6268TCY	STM8AF6246UCY
STM8AF6266TCY	STM8AF6266TCX	STM8AF6246ITDX
STM8AF6266TAX	STM8AF6248TCX	STM8AF6248TDX
STM8AF6226TASSSX	STM8AF6246UDY	STM8AF6268TDY
STM8AF6246TCSSSY	STM8AF6268TAY	STM8AF6266TAY
STM8AF6266TDY	STM8AF6226TASSSY	STM8AF6266UCX
STM8AF6266TDX	STM8AF6248TCY	STM8AF6246UDX
STM8AF6246TCSSSX	STM8AF6246ITCY	STM8AF6246UAY
STM8AF6366TCY	STM8AF6268TCX	STM8AF6366TCX
STM8AF6266ITCY	STM8AF6268TDX	STM8AF6246TASSSX
STM8AF6246TDSSSX	STM8AF6248TDY	STM8AF6246ITCX
STM8AF6248TAY	STM8AF6246TDSSSY	STM8AF6246UCX
STM8AF6246TASSSY		

IMPORTANT NOTICE – PLEASE READ CAREFULLY

Subject to any contractual arrangement in force with you or to any industry standard implemented by us, STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST’s terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers’ products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.