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PCI

Product/Process Change Information

Qualification of a new cover tape for selected Protection devices at subcontractor in China

Notification number:	ADG-DIS/20/12158	Issue Date	24/06/2020
Issued by	Aline AUGIS		
Product series affected by the change		HDMI, EMIF, ECMF, CLT, SPT, HSP selected devices	

Reason for change

The current supplier will stop production of cover tape part CP36 # 437150 (9.2+/-0.1MM-L500) at the end of June 2020 and transfer to the new cover tape CP38 # 445491 with similar characteristics.

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Effects of change

No effect, the new cover tape is better:

New cover tape tensile strength is better.

No impact for sealing and quality as per internal qualification.

The new cover tape was developed to meet the stringent requirements specified by customers such as ESD and product performance like peel force strength consistency and clarity.

Cover Tape Comparison			
	Current cover tape	New cover tape	Result
Vendor	C-PAK	C-PAK	Same
Surface Resistivity	10 ⁴ ~10 ¹¹	10 ⁴ ~10 ⁹	New cover tape is better, meet ESD requirement.
raw material	PET	PET	Same
Width	9.2+/-0.1mm	9.2+/-0.1mm	Same
Tape Thickness	0.052+/-0.005mm	0.046+/-0.005mm	New cover tape is thinner.
(Polyester	(0.016mm	(0.016mm	No quality risk as new cover tape tensile strength is better, so this won't impact mass production.
Inner layer	0.035mm	0.029mm	
Sealant hot melt layer)	0.010mm)	0.005mm)	
Roll thickness	500 meters/roll	500 meters/roll	The thickness of roll become thinner, because the thickness of tape become thinner but length of cover tape changed, then the roll will become thinner as well.
Temperature Storage requirements/Humidity	25+/-3°C 60% R.H. ± 20%	25+/-3°C 60% R.H. ± 20%	Meet ST SPEC (27±10 °C)
Clarity	35%	25%	New cover tape is better
Extensibility	0.75	0.75	Same
Tensile strength	5.1kg/mm ²	6.4kg/mm ²	New cover tape is better
Life time	2 years	2 years	Same
SGS report			All comply
MSDS report			All comply
Delivery time	3 months	3 months	Same

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Capacity	more than 3000km/month	more than 3000km/month	Same														
Product identification and traceability																	
The traceability is ensured by the trace code.																	
Qualification complete date		2019 NOV 06															
Forecasted sample availability: not applicable																	
Change implementation schedule																	
<table border="1"> <thead> <tr> <th>Sales types</th> <th>Estimated production start</th> <th>Estimated first shipments</th> </tr> </thead> <tbody> <tr> <td>HDMI2C1-6C1</td> <td rowspan="8" style="text-align: center;">Week 27-2020</td> <td rowspan="8" style="text-align: center;">Week 28-2020</td> </tr> <tr> <td>HDMI2C1-14HDS</td> </tr> <tr> <td>CLT03-2Q3</td> </tr> <tr> <td>SPT02-236DDB</td> </tr> <tr> <td>HSP061-8M16</td> </tr> <tr> <td>EMIF06-MSD02N16</td> </tr> <tr> <td>ECMF06-6AM16</td> </tr> <tr> <td>EMIF08-LCD04M16</td> </tr> <tr> <td>EMIF08-1005M16</td> </tr> </tbody> </table>				Sales types	Estimated production start	Estimated first shipments	HDMI2C1-6C1	Week 27-2020	Week 28-2020	HDMI2C1-14HDS	CLT03-2Q3	SPT02-236DDB	HSP061-8M16	EMIF06-MSD02N16	ECMF06-6AM16	EMIF08-LCD04M16	EMIF08-1005M16
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Reliability Evaluation Report

Qualification of new cover tape CP38 from supplier C-PAK in Subcontractor in China

General Information	
Product Description	<i>PROTECTION & FILTERS</i>
Part Numbers	<i>CLT03-2Q3 HSP061-8M16 ECMF6C-6AM16 SPT02-236DDB EMIF08-1005M16 HDMI2C1-14HDS EMIF08-LCD04BM16 HDMI2C1-6C1 EMIF06-MSD02N16</i>
Product Group	<i>ADG</i>
Product division	<i>DFD</i>
Package	<i>FPN 3.5x3.5 ; 4x4 ; 4x2 ; 3.3x1.5 ; 3.5x1.2 ; 3.3x1.35</i>
Maturity level step	<i>Qualified</i>

Locations	
Wafer fab	<i>ST TOURS / ST AGRATE / ST ANG MO KIO</i>
Assembly plant	<i>SUBCONTRACTOR – China</i>
Reliability Lab	<i>SUBCONTRACTOR – China</i>

Reliability Assessment
<i>Pass</i>

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1	05/06/2020	6	Timothée PINGAULT	Julien MICHELON	Initial release

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.
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1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD 22	Reliability test methods for packaged devices

2 RELIABILITY EVALUATION OVERVIEW

2.1 Objectives

The objective of this report is to qualify new cover tape CP-38 from supplier C-PAK in subcontractor plant in China. Production of previous cover tape CP-36 is planned to stop by June 2020 and supplier is proposing cover tape CP-38 with similar characteristics for mass production.

Item	Previous	New
Supplier	C-PAK	C-PAK
Type	CP36 Cover tape	CP38 Cover tape
Surface resistivity	$< 10^{11}$	$< 10^9$
Thickness	0.052 \pm 0.005 mm	0.046 \pm 0.005 mm

Feasibility study has been performed to ensure full workability of the cover tape, see results below.

2.2 Conclusion

Qualification Plan requirements have been fulfilled without exception. Feasibility tests have shown that the cover tape behaves correctly against environmental tests (no failure). Feasibility tests results performed are fully compliant.



3 DEVICE CHARACTERISTICS

3.1 Device description

Refer to products datasheets. No change on device characteristics.

3.2 Construction note

	FPN 3.5x3.5 ; 4x4 ; 4x2 ; 3.3x1.5 ; 3.5x1.2 ; 3.3x1.35
Wafer/Die fab. information	
Wafer fab manufacturing location	ST TOURS / ST AGRATE / ST ANG MO KIO
Technology / Process family	N/A
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST TOURS / ST AGRATE / ST ANG MO KIO
Assembly information	
Assembly site	SUBCONTRACTOR- CHINA
Package description	Micro QFN / DFN / FPN
Final testing information	
Testing location	SUBCONTRACTOR - CHINA



4 TESTS RESULTS SUMMARY

4.1 Test plan and results summary

One roll of cover tape CP38 was used on different handlers for all different applicable packages. After tape sealing, all following parameters were checked:

- Seal line
- Machine Jam
- Peel force
- Drop test
- Twist test
- Peel test
- Visual Mechanical damage on units.

Refer to results in below table.

MacroPackage	Cover tape	Sample Size	Handler	Seal line	Machine Jam	Peel force(25-80g)	Drop test	Twist test	Peel test	Unit defect in VM
FPN 3.5x3.5	CP38	500M(One roll)	SRM	Normal	No Jam	Pass	Pass	Pass	Pass	Pass
FPN 4X4	CP38	500M(One roll)	SRM/HON	Normal	No Jam	Pass	Pass	Pass	Pass	Pass
FPN 4X2	CP38	500M(One roll)	SRM	Normal	No Jam	Pass	Pass	Pass	Pass	Pass
FPN 3.3x1.5	CP38	500M(One roll)	SRM	Normal	No Jam	Pass	Pass	Pass	Pass	Pass
FPN 3.5x1.2	CP38	500M(One roll)	SRM	Normal	No Jam	Pass	Pass	Pass	Pass	Pass
FPN 3.3x1.35	CP38	500M(One roll)	SRM	Normal	No Jam	Pass	Pass	Pass	Pass	Pass

All performed tests are detailed below.

1. Peel test

Peel test was performed on sealed tape & reel under 3 different conditions :

- One month under standard production conditions
- 72 hours under 55°C, 60%RH
- 2 hours at 40°C, 60°C, 80°C

After each condition, 3000 units are detaped and cover tape is observed for glue residue and sticky units.

Results as below table:

Storage conditions	Lot number	Results
One month under standard production conditions	1	Pass
	2	Pass
	3	Pass
72 hours under 55°C, 60%RH	4	Pass
	5	Pass
	6	Pass
2 hours under 40°C, 60°C, 80°C	7	Pass
	8	Pass
	9	Pass

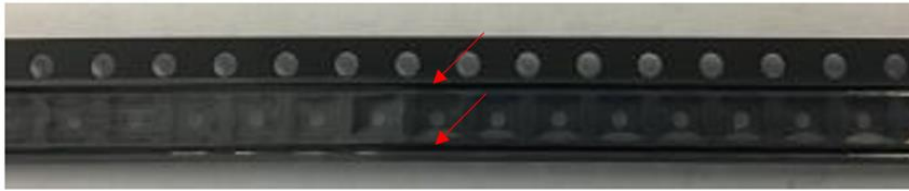
2. Outgas material test

10 units are placed in the carrier tape then stored for 24 hours under 30°C, 60%RH. Discoloration and outgas is then checked. If no discoloration nor outgas, test is passed. Results as below table:

Lot	Discoloration	Outgas
1	Pass	Pass
2	Pass	Pass
3	Pass	Pass

3. Seal line & machine jam

500m of tape is sealed. Seal line smoothness is observed – refer to below pictures - and machine jam is checked.



Both tests are pass.

4. Peel force

Peel force is measured and Cpk is calculated. Test is pass.

5. Aging test

Reels are aged in 55°C, 80%RH oven for various times, then peel force is measured. Refer to results below.

Duration	Results
0 days	Pass
1 days	Pass
7 days	Pass
14 days	Pass
21 days	Pass
28 days	Pass
35 days	Pass
42 days	Pass

6. Drop test

A reel is inserted in its inner box, then drop test is performed. Reel damage and unit reject is checked. If no damage and no reject, test is pass.

Lot	Reel damage	Unit reject
1	Pass	Pass

7. Twist test

Reel is sealed, then cut in 10 inches long portions. Portions are twisted and bent, then visual inspection is performed to check cover tape integrity.

Lot	Cover tape damage	Twist test
1	No damage	Pass

8. Unit defect in VM

Reel is passed through automatic visual inspection tool, and check if defects are detected as standard.

Defect	Detection	Test
Chip	Yes	Pass
Foreign material	Yes	Pass
Illegible marking	Yes	Pass
Crack	Yes	Pass
Sealing issue	Yes	Pass