

<h2 style="text-align: center;">PCN</h2> <h3 style="text-align: center;">Product/Process Change Notification</h3>			
<h4 style="text-align: center;">Diodes housed in PowerFLAT™ 3.3 x 3.3 Assembly Line Transfer</h4>			
Notification number:	AGD-DIS/17/10358	Issue Date	30/06/2017
Issued by	Aline AUGIS		
Product series affected by the change		STPSxxxxDEE-TR STTHxxxxDEE-TR	
Type of change		Assembly and test line transfer to new location	
<p><b>Description of the change</b></p> <p>Transfer of the diodes housed in PowerFLAT™ 3.3x3.3 package production line from location A to location B, at same subcontractor, in the same country (Philippines). Equipment, material (BOM), and processes remain unchanged.</p> <p>This PowerFLAT™ 3.3 x 3.3 package line will be set-up at the same subcontractor, in location B (vs location A), both A &amp; B are in the Philippines</p> <ul style="list-style-type: none"> <li>- Location B is already a major production site for ST</li> <li>- Additional capacity to support the increased WW demand is considered in location B to resume the high lead-times seen on this package</li> <li>- This change will not impact the products performances</li> <li>- The dice of each product remain unchanged</li> <li>- Package have exactly the same BOM (Bill Of Material)</li> <li>- To ensure accurate traceability, internal codification has been created. Traceability will be visible             <ul style="list-style-type: none"> <li>o On labels with specific product internal codification and plant code,</li> <li>o On body package with plant traceability code,</li> <li>o On the top of this, change will be tracked through date code, on both labels and body package.</li> </ul> </li> </ul>			
<p><b>Reason for change</b></p> <p>As you may have seen in our regular communicated lead-times information, the PowerFLAT™ 3.3x3.3 package assembly line is saturated. This is the result of a WW increased demand seen over the last months. The current back-end production line is planned to be transferred and capacity will be increased.</p>			
Former versus changed product:		<p>The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the products datasheets.</p> <p>The Moisture Sensitivity Level of the part (according to the IPC/JEDEC JSTD-020D standard) remains unchanged.</p> <p>The footprint recommended by ST remains the same.</p> <p>There is no change in the packing modes and the standard delivery quantities either.</p> <p>The products remain in full compliance with the ST ECOPACK®2 grade ("halogen-free").</p>	

(1) ADG: Automotive and Discretes Group - ASD: Application Specific Device – IPAD™: Integrated Passive and Active Devices

## Disposition of former products

Shipments will last as long as stocks will be fully depleted.

## Marking and traceability



Traceability for the implemented change will be ensured by the **date code**, an **internal codification** and by **Q.A. number**.

	Location A	Location B
Commercial Product	Internal codification	Internal codification
STPS6M100DEE-TR	STPS6M100DEETR%R	STPS6M100DEETR%S

## Qualification complete date

Week 26-2017

## Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
Power Schottky	PowerFLAT™3.3x3.3	STPS6M100DEE-TR STPS8L30DEE-TR	Available

Other products are available on demand.

## Change implementation schedule

Sales types	Estimated production start	Estimated first shipments
All	Week 28-2017	Week 40-2017

With early PCN acceptance, possible shipment starting week 30-2017

## Customer's feedback

Please contact your local ST sales representative or quality contact for requests concerning this change notification.

Absence of acknowledgement of this PCN within 30 days of receipt will constitute acceptance of the change

Absence of additional response within 90 days of receipt of this PCN will constitute acceptance of the change

## Qualification program and results

QRP17008 Attached

# Reliability Evaluation Report Qualification of PowerFLAT™ 3.3x3.3 transfer from Philippines location A to Philippines location B for same subcontractor

General Information		Locations	
Product Line	<i>Rectifiers</i>	Wafer fab	<i>ST SINGAPORE ST TOURS – FRANCE</i>
Product Description	<i>Power Schottky diodes Ultrafast recovery diodes</i>	Assembly plant	<i>SUBCONTRACTOR – PHILIPPINES (9945)</i>
Product perimeter	<i>STPSxxxxDEE-TR STPSxxxxDEETR STTHxxxxDEE-TR</i>	Reliability Lab	<i>ST TOURS - FRANCE</i>
Product Group	<i>ADG</i>		
Product division	<i>ASD &amp; IPAD</i>		
Package	<i>PowerFLAT™ 3.3x3.3</i>		
Maturity level step	<i>Qualified</i>	Reliability assessment	Pass

## DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	27-Jun-2017	8	Isabelle BALLON	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
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge based test methodology
JESD 22	Reliability test methods for packaged devices

## **2 GLOSSARY**

SS	Sample Size
TC	Temperature Cycling
PCT	Pressure Cooker Test (Autoclave)
SD	Solderability
GD	Generic Data
PC	Pre-conditioning (before test)

### **3 RELIABILITY EVALUATION OVERVIEW**

#### **3.1 Objectives**

The objective of this report is to qualify PowerFLAT™ 3.3x3.3 transfer from Philippines location A to Philippines location B for same subcontractor.

The involved products are listed in table here below:

Commercial Product
STPS6M100DEE-TR
STPS8L30DEE-TR
STPS8L30DEETR
STPS1045DEE-TR
STPS8170DEE-TR
STPS8H100DEE-TR
STPS8H100DEER
STTH4R06DEE-TR

The reliability test methodology used follows the JESD47-H: « Stress Test Driven Qualification Methodology ». The following reliability tests ensuing are:

- TC to ensure the mechanical robustness of the products.
- PCT to check the robustness to corrosion and the good package hermeticity
- Solderability to check that package can be soldered on board

#### **3.2 Conclusion**

Qualification Plan requirements have been fulfilled without exception. Reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the robustness of the products and safe operation, which is consequently expected during their lifetime.



## 4 DEVICE CHARACTERISTICS

### 4.1 Device description

Refer to products datasheets.

### 4.2 Construction Note

STPSxxDEE-TR / STPSxxDEETR	
<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	ST SINGAPORE
Technology / Process family	Power Schottky
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	ST SINGAPORE
<b>Assembly information</b>	
Assembly site	Subcontractor in PHILIPPINES (9945)
Package description	PowerFLAT™ 3.3x3.3
Molding compound	ECOPACK®2 compliant component
Lead finishing/bump solder material	Pure Tin
<b>Final testing information</b>	
Testing location	Subcontractor in PHILIPPINES (9945)

STTHxxDEE-TR	
<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	ST Tours (France)
Technology / Process family	Ultrafast Recovery diodes
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	ST Tours (France)
<b>Assembly information</b>	
Assembly site	Subcontractor in PHILIPPINES (9945)
Package description	PowerFLAT™ 3.3x3.3
Molding compound	ECOPACK®2 compliant component
Lead finishing/bump solder material	Pure Tin
<b>Final testing information</b>	
Testing location	Subcontractor in PHILIPPINES (9945)



## **5 TESTS RESULTS SUMMARY**

### **5.1 Test vehicle**

Lot #	Commercial Product	Package	Comments
Lot 1	STPS6M100DEE-TR	PowerFLAT™ 3.3x3.3	Qualification lots
Lot 2	STPS8L30DEE-TR		
Lot 3	STTH4R06DEE-TR		

Detailed results in below chapter will refer to these references.



## 5.2 Test plan and results summary

Test	PC	Std ref.	Conditions	Steps	SS	Failure/SS		
						Lot 1	Lot 2	Lot 3
TC	Y	JESD22 A-104	-65/+150°C 2cy/h	500cy	75	0/25	0/25	0/25
PCT	Y	JESD22 A-102	121°C 2bars 100% RH	96hrs	75	0/25	0/25	0/25
SD	N	JESD22 B-102	Dry ageing SnPb 220°C	-	10		0/10	
			Wet ageing SnPb 220°C		10		0/10	
			Dry ageing SnAgCu 245°C		10		0/10	
			Wet ageing SnAgC 245°C		10		0/10	

## 6 ANNEXES

### 6.1 Tests description

Test name	Description	Purpose
<b>Package-oriented</b>		
<b>TC</b> Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
<b>PCT</b> Pressure Cooker Test (Autoclave)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
<b>SD</b> Solderability	Wet ageing + dipping in a solder bath. Assessment by visual inspection of the leads.	To ensure good wettability of the leads