

<b>PCN</b>								
<b>Product/Process Change Notification</b>								
<b>Additional Assembly site in China for Rectifiers housed in TO 247 package</b>								
<b>Notification number:</b>	IPG-DIS/15/9111			<b>Issue Date</b>	20/02/2015			
<b>Issued by</b>	Aline AUGIS							
<b>Product series affected by the change</b>				STTH50W03CW STTH6003CW STTH60RL03CW STTH60W03CW				
<b>Type of change</b>				Multisourcing assembly site				
<b>Description of the change</b>								
New manufacturing location for TO247:								
	<b>Back-end</b>				<b>Back-end</b>			
	<b>Name</b>	<b>Type</b>	<b>Country</b>	<b>Marking</b>	<b>Name</b>	<b>Type</b>	<b>Country</b>	<b>Marking</b>
<b>TO247 Rectifier</b>	LGG	ST	China	G4	Subco	subco	China	GF
					STS	ST	China	GK
<b>Reason for change</b>								
Following the continuous improvement of our service and in order to increase our capacity this document is announcing that the products housed in TO247, listed in this PCN, will be manufactured in Subcontractor plant (China) and in ST assembly site in Shenzhen plant.								
<b>Former versus changed product:</b>				<p>The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the product datasheet</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>				
<b>Disposition of former products</b>								
Deliveries of former product we 'll continue as long as products stocks last								

(1) IPD: Industrial & Power Discretes - ASD: Application Specific Device – IPAD™: Integrated Passive and Active Devices

**Marking and traceability**

Traceability for the implemented change will be ensured by the marking, an internal codification and by the Q.A. number. "GF and GK" marked on the package and box label.

**Qualification complete date**

15-02-2015

**Forecasted sample availability**

Product family	Sub-family	Commercial part Number	Availability date
BIPOLAR RECTIFIER	TO247	STTH50W03CW	NOW
BIPOLAR RECTIFIER	TO247	STTH6003CW	NOW
BIPOLAR RECTIFIER	TO247	STTH60RL03CW	NOW
BIPOLAR RECTIFIER	TO247	STTH60W03CW	NOW

**Change implementation schedule**

Sales types	Estimated production start	Estimated first shipments
STTH50W03CW STTH6003CW STTH60RL03CW STTH60W03CW	<b>W15-2015</b>	<b>W21-2015</b>

**Comments:**

**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**

QRP15002 Attached

# Reliability Evaluation Report

*Additional Chinese subcontractor qualification  
TO247 and MAX247 packages for Rectifiers products*

General Information	
<b>Product Description</b>	<i>Rectifier</i>
<b>Product scope</b>	STTH50W03CW STTH6003CW STTH60RL03CW STTH60W03CW STPS80H100CY STPS80L60CY STTH8003CY
<b>Product Group</b>	<i>ASD&amp;IPAD</i>
<b>Product division</b>	<i>IPG</i>
<b>Package</b>	TO247 MAX TO247
<b>Maturity level step</b>	<i>QUALIFIED</i>

Locations	
<b>Wafer fab</b>	ST TOURS (France) ST ANG MO KIO (SINGAPORE)
<b>Assembly plant</b>	<i>SUBCONTRACTOR (CHINA)</i>
<b>Reliability Lab</b>	<i>ST TOURS (FRANCE)</i>

Reliability Assessment
<i>PASS</i>

## DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	02/02/2015		Aude DROMEL	Jean-Paul REBRASSE	

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 47	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
PC	Pre-conditioning
HTRB	High Temperature Reverse Bias
HTFB	High Temperature Forward Bias
TC	Temperature Cycling
PCT / AC	Pressure Pot 2 bars / Autoclave
THB / HTRB	Thermal Humidity Bias / High Temperature Reverse Bias
UHAST	Unbiased Highly Accelerated Stress Test
IOLT / TF	Intermittent Operational Life Test / Thermal Fatigue
DPA	Destructive Physical Analysis
RSH	Resistance to Solder Heat
SD	Solderability
GD	Generic Data

### **3 RELIABILITY EVALUATION OVERVIEW**

#### **3.1 Objectives**

The objective is to qualify new assembly subcontractor for TO247 and TO247 MAX packaging for Rectifiers in order to improve the quality of service.

Product perimeter is composed of:

- STTH50W03CW
- STTH6003CW
- STTH60RL03CW
- STTH60W03CW
- STPS80H100CY
- STPS80L60CY
- STTH8003CY

The reliability test methodology used follows the JESD47-H: « Stress Test Driven Qualification Methodology » and is package oriented.

The following reliability tests are:

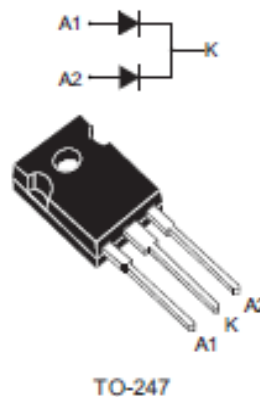
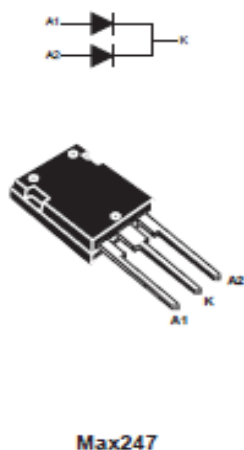
- TC to ensure the mechanical robustness of the products.
- THB and Autoclave to check the robustness to corrosion and the good package hermeticity.
- RSH and Solderability test to check package robustness against customer assembly on board.

#### **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



### 4.2 Construction note

**STTH50W03CW, STTH6003CW, STTH60RL03CW, STTH60W03CW**

<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	ST TOURS FRANCE
Technology / Process family	BIPOLAR RECTIFIER
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	ST TOURS FRANCE
<b>Assembly information</b>	
Assembly site	SUBCONTRACTOR – CHINA
Package description	TO 247
Molding compound	ECOPACK®2 (“Halogen-free”) molding compound
Lead finishing material	Leadfree (100% pure Tin)
<b>Final testing information</b>	
Testing location	SUBCONTRACTOR – CHINA

**STPS80H100CY, STPS80L60CY, STTH8003CY**

<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	ST ANG MO KIO (SINGAPORE)
Technology / Process family	POWER SCHOTTKY
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	ST ANG MO KIO (SINGAPORE)
<b>Assembly information</b>	
Assembly site	SUBCONTRACTOR – CHINA
Package description	TO 247 MAX
Molding compound	ECOPACK®2 (“Halogen-free”) molding compound
Lead finishing material	Leadfree (100% pure Tin)
<b>Final testing information</b>	
Testing location	SUBCONTRACTOR – CHINA



## 5 TESTS RESULTS SUMMARY

### 5.1 Test vehicles

Lot #	Part Number	Package	Comments
Lot 1	STTH50W03CW	TO247	
Lot 2	STTH6003CW	TO247	
Lot 3	STPS80L60CY	TO247 MAX	
Lot 4	STPS80H100CY	TO247 MAX	
GD1	STPS80170CW	TO247	Similar package
GD2	STTH3002CW	TO247	Similar package

Detailed results in below chapter will refer to P/N and Lot #.

### 5.2 Test plan and results summary

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS					
						Lot 1	Lot 2	Lot 3	Lot 4	GD1	GD2
HTRB	N	JESD22 A-108	V = 80% VRRM Tj = 150°C	154	1000h					0/77	0/77
<b>Package Oriented Tests</b>											
TC	N	JESD22 A-104	Frequency (cy/h)=2cy/h Temperature (high)=150°C Temperature (low)=-65°C	75	500cy	0/25	0/25	0/25			
RSH	N	JESD22 B-106-A	Dippings=2 Temperature=260°C Time (off)=15s Time (on)=10s	60	MESURE		0/30	0/30			
THB	N	JESD22 A-101	Humidity (HR)=85% Temperature=85°C Tension=80% VRRRM, max 100V	75	1000h	0/25	0/25		0/25		
PCT	N	JESD22 A-102	Pressure=2.05bar Temperature=121°C	75	96h	0/25	0/25		0/25		
SD	N	ST internal 0018688	Wet ageing SnPn bath bath 245°C SnAgCu bath 245°C	30	N/A				0/30		



## 6 ANNEXES

### 6.1 Tests Description

Test name	Standard Reference	Description	Purpose
<b>Die Oriented</b>			
<b>HTRB</b> High Temperature Reverse Bias		The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: low power dissipation; max. supply voltage compatible with diffusion process and internal circuitry limitations	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices operating condition in an accelerated way. To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects.
<b>Package Oriented</b>			
<b>RSH</b> Resistance to solder heat	JESD22 B-106-A	Device is submitted to a dipping in a solder bath at 260°C with a dwell time of 10s. Only for through hole mounted devices.	This test is used to determine whether solid state devices can withstand the effects of the temperature to which they will be subjected during soldering of their leads. The heat is conducted through the leads into the device package from solder heat at the reverse side of the board. This procedure does not simulate wave soldering or reflow heat exposure on the same side of the board as the package body.
<b>TC</b> Temperature Cycling	JESD22 A-104	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>THB</b> Temperature Humidity Bias	JESD22 A-101	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.
<b>PCT</b> Pressure Cooker Test	JESD22 A-102	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.