



PRODUCT/PROCESS CHANGE NOTIFICATION

PCN IPG-DIS/14/8398
Dated 26 Mar 2014

Selected Power Rectifiers

Additional Assembly and Test Location in China for D2PAK package

Table 1. Change Implementation Schedule

Forecasted implementation date for change	19-Mar-2014
Forecasted availability date of samples for customer	19-Mar-2014
Forecasted date for STMicroelectronics change Qualification Plan results availability	19-Mar-2014
Estimated date of changed product first shipment	25-Jun-2014

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	Selected Power Rectifiers
Type of change	Assembly additional location
Reason for change	to increase the manufacturing capacity
Description of the change	see attached
Change Product Identification	marking, internal codification, QA number
Manufacturing Location(s)	

DOCUMENT APPROVAL

Name	Function
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PCN

Product/Process Change Notification

Selected Power Rectifiers

Additional Assembly and Test Location in China for D2PAK package

Notification number:	IPG-DIS/14/8398	Issue Date	19/03/2014
Issued by	Aline AUGIS		
Product series affected by the change	STPS10150CG-TR STPS10170CG-TR STPS10H100CG-TR STPS10L25G-TR STPS10L40CG-TR STPS10LCD80CG-TR STPS10M80CG-TR STPS10SM80CG-TR STPS1545CG-TR STPS1545G STPS1545G-TR STPS15LCD80CG-TR STPS15M80CG-TR STPS15SM80CG-TR STPS16170CG-TR STPS16H100CG-TR STPS20150CG STPS20150CG-TR STPS20170CG-TR STPS2045CG-TR STPS20H100CG STPS20H100CG-TR STPS20L15G-TR STPS20L45CG-TR STPS20LCD80CG-TR STPS20M100SG-TR STPS20M80CG-TR STPS20SM100SG-TR STPS20SM60CG-TR STPS20SM60SG-TR STPS20SM80CG-TR STPS2545CG-TR STPS30150CG-TR STPS30170CG-TR STPS3045CG-TR STPS30LCD80CG-TR STPS30SM100SG-TR STPS30SM80CG-TR STPS40LCD80CG-TR STPS745G-TR STPS8H100G STPS8H100G-TR STTH1002CG-TR STTH10P04SG-TR STTH10R04G-TR STTH1302CG-TR STTH15P035SG-TR STTH1602CG-TR STTH16R04CG-TR STTH2002CG STTH2002CG-TR STTH2002G-TR STTH2003CG		

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

Type of change	Additional assembly and test location
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Description of the change

STMicroelectronics decided to expand the manufacturing capacity **Power Rectifiers** housed in **D2PAK** package with one **additional assembly** and **test plant** in China.

In order to cover both manufacturing locations D2PAK package outline dimensions, the package dimension table of the impacted products will be updated as below:

NEW D2PAK dimensions specified in datasheets				Original D2PAK dimensions specified in datasheets			
Ref.	Dimensions			Ref.	Dimensions		
	Millimeters		Millimeters		Millimeters		Millimeters
	Min.	Max.			Min.	Max.	
A	4.36	4.6		A	4.40	4.60	
A1	0	0.23		A1	2.49	2.69	
b	0.7	0.93		A2	0.03	0.23	
b2	1.14	1.7		B	0.70	0.93	
c	0.38	0.694		B2	1.14	1.70	
c2	1.19	1.36		C	0.45	0.60	
D	8.6	9.35		C2	1.23	1.36	
D1	6.9	-		D	8.95	9.35	
E	10	10.55		E	10.00	10.40	
E1	8.1	-		G	4.88	5.28	
e	2.54 typ.			L	15.00	15.85	
H	15	15.85		L2	1.27	1.40	
L	1.9	2.79		L3	1.40	1.75	
L1	-	1.65		M	2.40	3.20	
L2	-	1.78		R	0.40 typ.		
L3	0.25 typ.			V2	0°	8°	
L4	4.78	5.28		* FLAT ZONE NO LESS THAN 2mm			

Reason for change

This additional multi-sourcing will increase our **manufacturing capacity** for a better service on the considered **Power Rectifier** devices.

Former versus changed product:	<p>The changed products do not present modified electrical, parameters, leaving unchanged the current information published in the product datasheet, except for the POA.</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>
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Disposition of former products

As the purpose is to expand the manufacturing capacity, shipments of the products processed in the initial test and assembly site will continue.

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

Marking and traceability

Parts produced in the new China location are differentiated by their **marking** as indicated below

Assembly location	Date code marking		
	Assy plant code	Assy year	Assy week
China 1 (ST)	GK		
New location : China 2 (subco)	GE	Y (1 digit indicating the year)	WW (2 digits indicating the week number)

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

Qualification complete date	August 2011
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Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
Diodes & Rectifiers	All	All	Upon request with from 4 to 8 weeks of delay

Change implementation schedule

Sales types	Estimated production start	Estimated first shipments
All	Week 15-2014	Week 25-2014

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	11143QRP-Rev 1.0
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*Qualification of
New ECOPACK®2 resin for Rectifiers products
in D²PAK package at Subcontractor in China*

General Information		Locations
Product Line	Power Schottky & Ultrafast Bipolar up to 400V (BU78)	Wafer fab
Product Description	Rectifiers in D ² PAK package: New ECOPACK®2 resin	Assembly plant
Product Group	APM	Subcontractor (China)
Product division	ASD & IPAD	
Package	D ² PAK	
Maturity level step	Qualified	Reliability Lab
		STM Tours (France)

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Comment
1.0	29-Jul-2011	8	I. BALLON	<p>First issue</p> <p>Qualification of Power Schottky & Bipolar up to 400V (BU78) in D²PAK package: New ECOPACK®2 resin</p> <p>(Reference document: Product Information Letter PIL APM-DIS/11/6705, APM-DIS/11/6706, APM-DIS/11/6707, APM-DIS/11/6708)</p>

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
FMEA	8343019
RER	1051002

2 GLOSSARY

DUT	Device Under Test
PCB	Printed Circuit Board
SS	Sample Size
HTRB	High Temperature Reverse Bias
TC	Temperature Cycling
PCT	Pressure Cooker Test (Pressure Pot)
THB	Temperature Humidity Bias
SD	Solderability

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify new “Halogen-Free” encapsulation molding compound for Rectifiers housed in D²PAK package at Subcontractor in China.

The encapsulation molding compound chosen for the qualification is the same, which have been qualified at ST Shenzhen plant (China).

The reliability methodology used in this qualification follows the JESD47-G: «Stress Test Driven Qualification Methodology».

3.2 Conclusion

The perimeter addressed in this campaign qualifies the production of Rectifiers housed in D²PAK package with the new “Halogen-Free” encapsulation molding compound.

Reliability tests are positive.

Qualification Plan requirements have been fulfilled without exception. It is stressed that 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 ruggedness of the products and safe operation, which is consequently expected during their lifetime.

4 DEVICE CHARACTERISTICS

4.1 Device description

- Rectifiers (Power Schottky & Ultrafast Bipolar up to 400V) in D²PAK package with new ECOPACK®2 Molding compound assembled at subcontractor in China.

4.2 Construction note

Power Schottky & Ultrafast Bipolar up to 400V in D²PAK package with new ECOPACK®2 Molding compound	
Wafer/Die fab. information	
Wafer fab manufacturing location	STM Ang Mo Kio (Singapore) STM Tours (France)
Wafer Testing (EWS) information	
Electrical testing manufacturing location	STM Ang Mo Kio (Singapore) STM Tours (France)
Assembly information	
Assembly site	Subcontractor in China
Package description	D ² PAK
Molding compound	ECOPACK®2 ("Halogen-free") molding compound
Frame material	Copper
Die attach process	Soft solder
Die attach material	Preform Pb/Sn/Ag
Wire bonding process	Ultra Sonic wire bonding
Wires bonding materials	Aluminium
Lead finishing process	Plating
Lead finishing material	Tin (Sn 100%)
Final testing information	
Testing location	Subcontractor in China

5 TESTS RESULTS SUMMARY

5.1 Test vehicles

Lot #	Process/ Package	Product Family	Product
1	D ² PAK	Power Schottky	STPS3045CG-TR
2			STPS30170CG-TR
3		Ultrafast Bipolar	STTH2004SG-TR

5.2 Test plan and results summary

Die Oriented Tests

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS			Note
						Lot 2	Lot 3		
HTRB	N	JESD22 A-108	T _j , V _r = 0.8xV _{rrm}	154	168 H 500 H 1000 H	0/77 0/77 0/77	0/77 0/77 0/77	0/77 0/77 0/77	

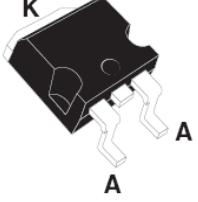
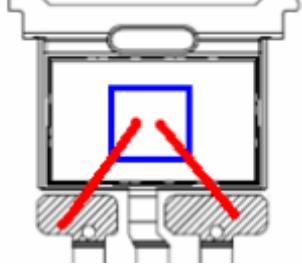
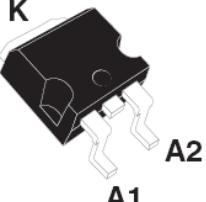
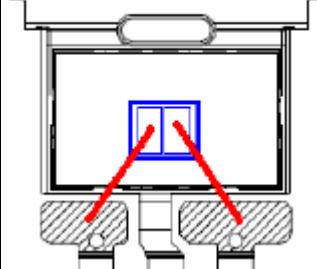
Package Oriented Tests

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS			Note	
						Lot 1	Lot 2	Lot 3		
THB	N	JESD22 A-101	T _a = 85°C, RH = 85%, V _r = 0.8xV _{rrm} or 100V max	73	168 H 500 H 1000 H	0/24 0/24 0/24	0/24 0/24 0/24	0/25 0/25 0/25		
TC	N	JESD22 A-104	T _a = -65°C to 150°C	75	SS 100 cy 500 cy 1Kcy	100 cy 0/25 0/25 0/25	0/25 0/25 0/25	0/25 0/25 0/25		
PCT	N	JESD22 A-102	121°C, 100% RH, 2bars	75	SS 96hrs	96hrs	0/25	0/25	0/25	
Solderability	N	J-STD-002		SS	Steps	Failure/SS			Note	
						Lot 1	Lot 2	Lot 3		
			245°C SnAgCu bath Dry aging	30		0/10	0/10	0/10		
			245°C SnAgCu bath Wet aging	30		0/10	0/10	0/10		
				SS	Steps	Failure/SS			Note	
						Lot 1	Lot 2	Lot 3		
			220°C SnPb bath Dry aging	30		0/10	0/10	0/10		
			220°C SnPb bath Wet aging	30		0/10	0/10	0/10		

6 ANNEXES

6.1 Device details

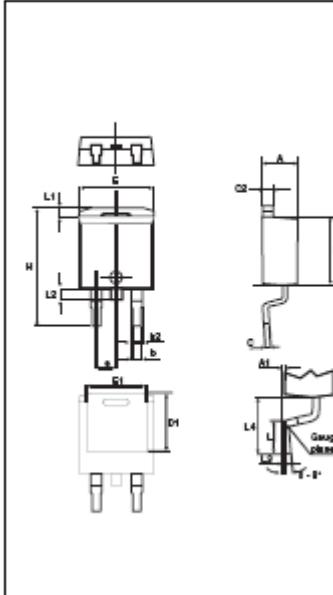
6.1.1 Pin connection

Package	Pin connection	
	For Single diode configuration STPSxxxxSG STTHxxxxSG	For Double diodes configuration STPSxxxxCG STTHxxxxCG
D ² PAK	  	  

6.1.2 Package outline/Mechanical data

- D²PAK

D²PAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.26	4.66	0.168	0.183
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.694	0.015	0.027
c2	1.19	1.36	0.047	0.059
D	8.60	9.35	0.339	0.388
D1	6.90	-	0.272	-
E	10.00	10.55	0.394	0.415
E1	8.10	-	0.319	-
e	2.54 typ.		0.100	
H	15.00	15.85	0.591	0.624
L	1.90	2.79	0.075	0.110
L1	-	1.65	-	0.065
L2	-	1.79	-	0.070
L3	0.25 typ.		0.010	
L4	4.78	5.28	0.188	0.208

6.2 Tests description

Test name	Description	Purpose
Die Oriented		
HTRB 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.
HTFB / HTGB High Temperature Forward (Gate) Bias		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.
Package Oriented		
TC 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.
THB Temperature Humidity Bias	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.
AC/PCT Auto Clave (Pressure Pot)	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.



Public Products List

PCN Title : Selected Power Rectifiers//Additional Assembly and Test Location in China for D2PAK package

PCN Reference : IPG-DIS/14/8398

PCN Created on : 20-MAR-2014

Subject : Public Products List

Dear Customer,

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

ST COMMERCIAL PRODUCT

STPS10150CG-TR	STPS10170CG-TR	STPS10H100CG-TR
STPS10L25G-TR	STPS10L40CG-TR	STPS10M80CG-TR
STPS10SM80CG-TR	STPS1545CG-TR	STPS1545G
STPS1545G-TR	STPS15M80CG-TR	STPS15SM80CG-TR
STPS16170CG-TR	STPS16H100CG-TR	STPS20150CG
STPS20150CG-TR	STPS20170CG-TR	STPS2045CG-TR
STPS20H100CG	STPS20H100CG-TR	STPS20L15G-TR
STPS20L45CG-TR	STPS20M100SG-TR	STPS20M80CG-TR
STPS20SM100SG-TR	STPS20SM60CG-TR	STPS20SM60SG-TR
STPS20SM80CG-TR	STPS2545CG-TR	STPS30150CG-TR
STPS30170CG-TR	STPS3045CG-TR	STPS30SM100SG-TR
STPS30SM80CG-TR	STPS745G-TR	STPS8H100G
STPS8H100G-TR	STTH1002CG-TR	STTH10R04G-TR
STTH1302CG-TR	STTH1602CG-TR	STTH16R04CG-TR
STTH2002CG	STTH2002CG-TR	STTH2002G-TR
STTH2003CG	STTH2003CG-TR	STTH20L03CG-TR
STTH20R04G-TR	STTH802G	STTH802G-TR
STTH803G-TR	STTH8R04G-TR	

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