



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
Paris, Eric	Marketing Manager
Duclos, Franck	Product Manager
Cazaubon, Guy	Q.A. Manager

PCN

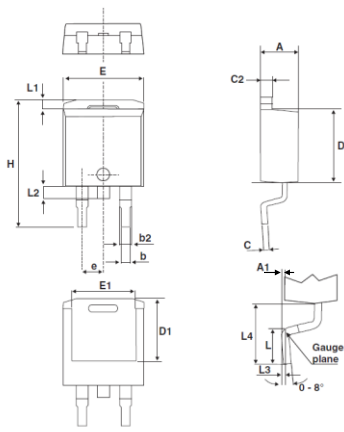
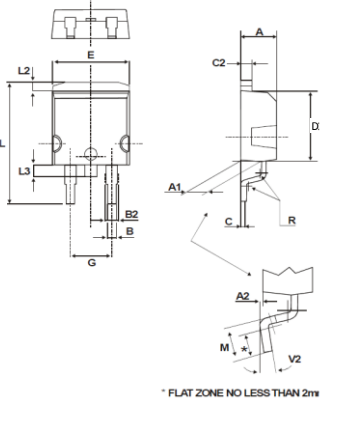
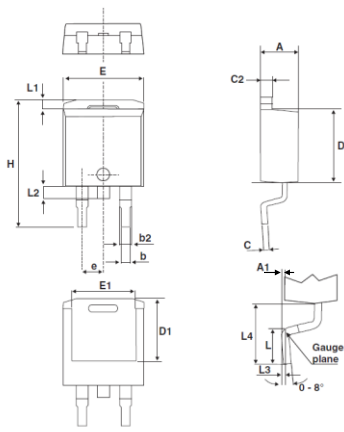
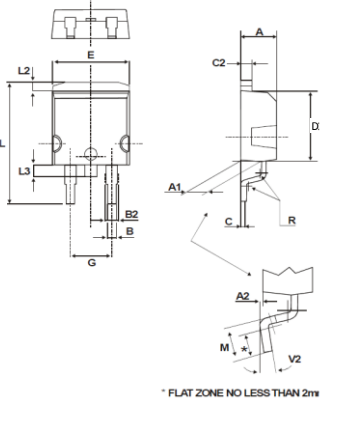
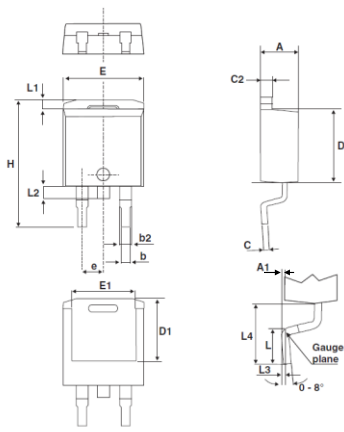
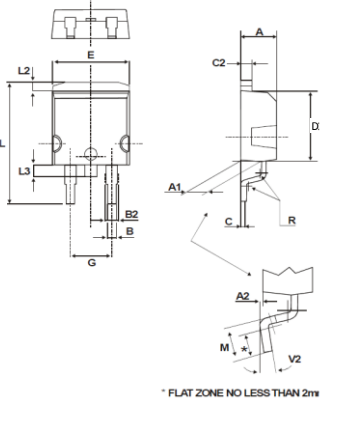
Product/Process Change Notification

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	STTH2003CG-TR STTH2004SG-TR STTH20L03CG-TR STTH20P035SGTR STTH20R04G-TR STTH802G STTH802G-TR STTH803G-TR STTH8R04G-TR

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

Type of change	Additional assembly and test location																																																																																																																																																																																				
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:																																																																																																																																																																																					
<table><tr><th colspan="4">NEW D2PAK dimensions specified in datasheets</th><th colspan="4">Original D2PAK dimensions specified in datasheets</th></tr><tr><td rowspan="2"></td><td rowspan="2">Ref.</td><td colspan="2">Dimensions</td><td rowspan="2"></td><td rowspan="2">Ref.</td><td colspan="2">Dimensions</td></tr><tr><td colspan="2">Millimeters</td><td colspan="2">Millimeters</td></tr><tr><td></td><td></td><td>Min.</td><td>Max.</td><td></td><td></td><td>Min.</td><td>Max.</td></tr><tr><td></td><td>A</td><td>4.36</td><td>4.6</td><td></td><td>A</td><td>4.40</td><td>4.60</td></tr><tr><td></td><td>A1</td><td>0</td><td>0.23</td><td></td><td>A1</td><td>2.49</td><td>2.69</td></tr><tr><td></td><td>b</td><td>0.7</td><td>0.93</td><td></td><td>A2</td><td>0.03</td><td>0.23</td></tr><tr><td></td><td>b2</td><td>1.14</td><td>1.7</td><td></td><td>B</td><td>0.70</td><td>0.93</td></tr><tr><td></td><td>c</td><td>0.38</td><td>0.694</td><td></td><td>B2</td><td>1.14</td><td>1.70</td></tr><tr><td></td><td>c2</td><td>1.19</td><td>1.36</td><td></td><td>C</td><td>0.45</td><td>0.60</td></tr><tr><td></td><td>D</td><td>8.6</td><td>9.35</td><td></td><td>C2</td><td>1.23</td><td>1.36</td></tr><tr><td></td><td>D1</td><td>6.9</td><td>-</td><td></td><td>D</td><td>8.95</td><td>9.35</td></tr><tr><td></td><td>E</td><td>10</td><td>10.55</td><td></td><td>E</td><td>10.00</td><td>10.40</td></tr><tr><td></td><td>E1</td><td>8.1</td><td>-</td><td></td><td>G</td><td>4.88</td><td>5.28</td></tr><tr><td></td><td>e</td><td colspan="2">2.54 typ.</td><td></td><td>L</td><td>15.00</td><td>15.85</td></tr><tr><td></td><td>H</td><td>15</td><td>15.85</td><td></td><td>L2</td><td>1.27</td><td>1.40</td></tr><tr><td></td><td>L</td><td>1.9</td><td>2.79</td><td></td><td>L3</td><td>1.40</td><td>1.75</td></tr><tr><td></td><td>L1</td><td>-</td><td>1.65</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>L2</td><td>-</td><td>1.78</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>L3</td><td colspan="2">0.25 typ.</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>L4</td><td>4.78</td><td>5.28</td><td></td><td>M</td><td>2.40</td><td>3.20</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>R</td><td colspan="2">0.40 typ.</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>V2</td><td>0°</td><td>8°</td></tr></table>		NEW D2PAK dimensions specified in datasheets				Original D2PAK dimensions specified in datasheets					Ref.	Dimensions			Ref.	Dimensions		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						L2	-	1.78						L3	0.25 typ.							L4	4.78	5.28		M	2.40	3.20						R	0.40 typ.							V2	0°	8°
NEW D2PAK dimensions specified in datasheets				Original D2PAK dimensions specified in datasheets																																																																																																																																																																																	
	Ref.	Dimensions			Ref.	Dimensions																																																																																																																																																																															
		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																																																																																																																																																																																		
	L2	-	1.78																																																																																																																																																																																		
	L3	0.25 typ.																																																																																																																																																																																			
	L4	4.78	5.28		M	2.40	3.20																																																																																																																																																																														
					R	0.40 typ.																																																																																																																																																																															
					V2	0°	8°																																																																																																																																																																														
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>																																																																																																																																																																																				
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.																																																																																																																																																																																					

Marking and traceability

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

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

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

Qualification complete date

August 2011

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

Qualification of
New ECOPACK®2 resin for Rectifiers products
in D²PAK package at Subcontractor in China

General Information

Product Line	Power Schottky & Ultrafast Bipolar up to 400V (BU78)
Product Description	Rectifiers in D ² PAK package: New ECOPACK®2 resin
Product Group	APM
Product division	ASD & IPAD
Package	D ² PAK
Maturity level step	Qualified

Locations

Wafer fab	STM Tours (France) STM Ang Mo Kio (Singapore)
Assembly plant	Subcontractor (China)
Reliability Lab	STM Tours (France)

DOCUMENT INFORMATION

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

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.

This report does not imply for STMicroelectronics expressly or implicitly any contractual obligations other than as set forth in STMicroelectronics general terms and conditions of Sale. This report and its contents shall not be disclosed to a third party without previous written agreement from STMicroelectronics.

TABLE OF CONTENTS

1	APPLICABLE AND REFERENCE DOCUMENTS	3
2	GLOSSARY.....	3
3	RELIABILITY EVALUATION OVERVIEW.....	3
3.1	OBJECTIVES	3
3.2	CONCLUSION.....	3
4	DEVICE CHARACTERISTICS.....	4
4.1	DEVICE DESCRIPTION.....	4
4.2	CONSTRUCTION NOTE	4
5	TESTS RESULTS SUMMARY.....	5
5.1	TEST VEHICLES.....	5
5.2	TEST PLAN AND RESULTS SUMMARY.....	5
6	ANNEXES	6
6.1	DEVICE DETAILS	6
6.2	TESTS DESCRIPTION	8

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 D ² PAK 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	0/77	0/77	
					500 H	0/77	0/77	
					1000 H	0/77	0/77	

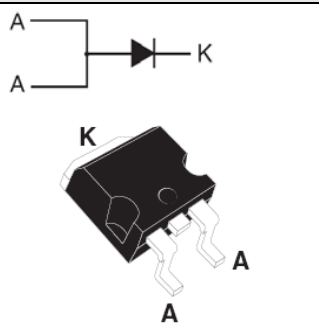
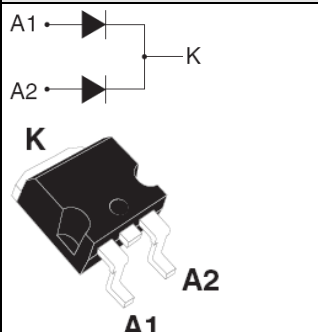
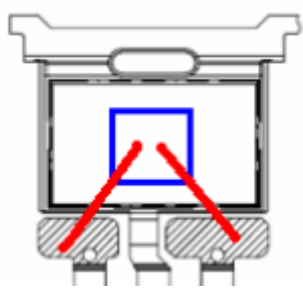
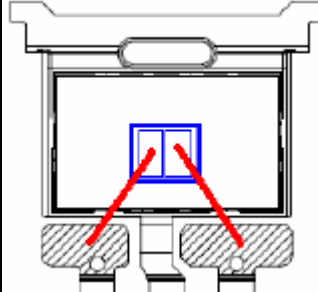
Package Oriented Tests

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS			Note
						Lot 1	Lot 2	Lot 3	
THB	N	JESD22 A-101	Ta = 85°C, RH = 85%, V _r = 0.8xV _{rrm} or 100V max	73	168 H	0/24	0/24	0/25	
					500 H	0/24	0/24	0/25	
					1000 H	0/24	0/24	0/25	
TC	N	JESD22 A-104	Ta = -65°C to 150°C	SS	Steps	Failure/SS			Note
						Lot 1	Lot 2	Lot 3	
				75	100 cy	0/25	0/25	0/25	
					500 cy	0/25	0/25	0/25	
PCT	N	JESD22 A-102	121°C, 100% RH, 2bars	75	96hrs	Failure/SS			Note
						Lot 1	Lot 2	Lot 3	
						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	0.053
D	8.60	9.35	0.339	0.368
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	-	1.78	-	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 HTFB / HTGB High Temperature Forward (Gate) 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.
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	

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

RESTRICTIONS OF USE AND CONFIDENTIALITY OBLIGATIONS:

THIS DOCUMENT AND ITS ANNEXES CONTAIN ST PROPRIETARY AND CONFIDENTIAL INFORMATION. THE DISCLOSURE, DISTRIBUTION, PUBLICATION OF WHATSOEVER NATURE OR USE FOR ANY OTHER PURPOSE THAN PROVIDED IN THIS DOCUMENT OF ANY INFORMATION CONTAINED IN THIS DOCUMENT AND ITS ANNEXES IS SUBMITTED TO ST PRIOR EXPRESS AUTHORIZATION. ANY UNAUTHORIZED REVIEW, USE, DISCLOSURE OR DISTRIBUTION OF SUCH INFORMATION IS EXPRESSLY PROHIBITED.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners

© 2014 STMicroelectronics - All rights reserved.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -
Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com