PRODUCT/PROCESS CHANGE NOTIFICATION

PCN IPG-IPC/14/8450
Dated 25 Apr 2014

VIMIT10, VIPER12AS, VIPER22AS and VN751S :

Introduction of MSL3 (Moisture Sensitive Level)

Table 1. Change Implementation Schedule

Forecasted implementation date for change	01-Jul-2014
Forecasted availability date of samples for customer	15-May-2014
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	18-Apr-2014
Estimated date of changed product first shipment	25-Jul-2014

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	See attached list
Type of change	Logistics material (label & box)
Reason for change	Process standardization
Description of the change	As a consequence of PCN IPD-IPC/12/7348 dated 31 July 2012, the products VIMIT10, VIPER12AS, VIPER22AS and VN751S in SO 8 package, manufactured in ST Shenzhen (China) will be JEDEC- MSL3 compliant.
Change Product Identification	New Finished Goods code and MSL3 shown on box labels
Manufacturing Location(s)	

DOCUMENT APPROVAL

Name	**Function**
Chelli, Fabio	Marketing Manager
Sandrini, Francesca Marta	Marketing Manager
Di Stefano, Giuseppe	Product Manager
Salanitri, Fabio Rosario	Product Manager
Moretti, Paolo	Q.A. Manager

ATTACHMENT TO PCN IPG-IPC/14/8450

WHAT*:*

Reference is made to PCN IPD-IPC/12/7348 dated 31 July 2012 about "SO 08/14/16 Narrow BACK-END plant optimization in ST Shenzhen (China)".

As a consequence of this PCN, the products VIMIT10, VIPER12AS, VIPER22AS and VN751S assembled in SO 8 package with SHD frame and green resin, will be JEDEC-MSL3 compliant starting July, 2014.

WHY*:*

Process standardization in accordance with JEDEC MSL 3 dry packing requirements.

HOW*:*

See the attached report.

The change to MSL 3 will be identified by a new Finished Goods code and the MSL 3 classification stated on the box labels.

WHEN*:*

The MSL 3 will be introduced at the beginning of July, 2104.
Samples of the new products can be delivered upon request.

Preliminary Reliability Evaluation Report
Assembly change

General Information	
Product Line	*VNA4*
Product Description	*SMPS PRIMARY I.C, VIPER*
Finished Good Code	*VIPER12AS$8-E* *VIPER12AS$7-E*
Product division	*IND.& POWER CONV.*
Package	*SO 8*
Silicon process technology	*VIPOWER*
Raw Line Code :	*UCO7*VNA4XCB* *UCO7*VNA4X3B*

Locations	
Wafer fab location	*AMK6 6*
Assembly plant location	SHENZHEN CHINA
Reliability plant location	CATANIA
Reliability assessment	*POSITIVE*

DOCUMENT HISTORY

Version	Date	Pages	Author	Comment
1.0	10/04/2014	11	A. Vilardo	-

Issued by **Antonio Vilardo**
IPG Rel Dept.– APG Support

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q100	Stress test qualification for integrated circuits
SOP 2.6.11	Project management for product development
SOP 2.6.19	Front-end technology platform development & qualification
SOP 2.6.2	Internal change management
SOP 2.6.7	Product maturity level
SOP 2.6.9	Package and process maturity management in Back End
SOP 2.7.5	Automotive products definition and status
0061692	Reliability tests and criteria for product qualification
8160601	Internal reliability evaluation report template
8161393	General specification for product development

2 TEST GLOSSARY

TEST NAME	DESCRIPTION	NOTE
PC (JL3):	Preconditioning (solder simulation)	1
AC:	Autoclave at 2atm	
HTSL:	High Temperature Storage Life	
TC:	Temperature Cycling	
HTRB:	High Temperature Reverse Bias Test	

NOTE:

1) To be done before AC, TC, HTRB

3 RELIABILITY REPORT OVERVIEW

3.1 Objectives

Aim of this report is to present the preliminary results of the reliability evaluation performed on VNA4 device (VIPER12)
due to assembly change with frame SHD and green resin.

It was also evaluated the change from MSL1 to MSL3.

VNA4 is processed in VIPOWER diffused in AMK6 and assembled in SO8 - in ST SHENZHEN -CHINA.

For the reliability evaluation the following tests were carried out:

AC, TC, HTSL, HTRB

In particular two different lots were used, one for AC, TC and HTSL tests (R.L. UCO7*VNA4XCB) and one for HTHB test (R.L. UCO7*VNA4X3B)

Regarding HTRB test, samples of first lot were submitted only to 12h bake @ 125°C and IR reflow (1 times) 260°C; for second lot instead, half samples were submitted to standard ML3 flow and half samples only to 12h bake @ 125°C and IR reflow (1 times), without humidity treatment.

This choice has been taken to verify the behavior of the device with or without humidity insertion.

3.2 Conclusion

All reliability tests have been completed with positive at final electrical.

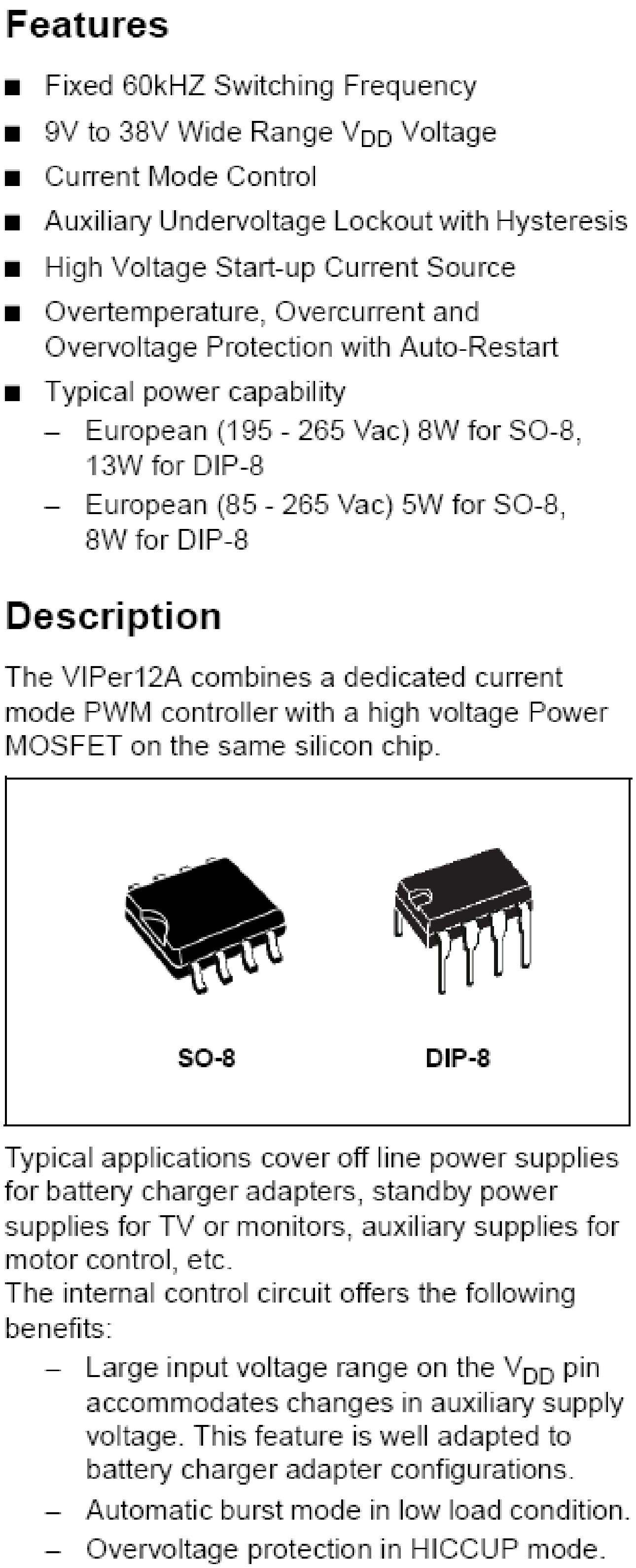
In particular, for HTRB, no differences to underline between samples for submitted to standard ML3 flow and the others not submitted to humidity treatment.

On the ground of the overall positive results, from a reliability point of view, the new assembly with SHD frame and green resin with ML3 flow can be judged positively.

4 DEVICE CHARACTERISTICS

4.1 Device description

4.1.1 Generalities



Features

- Fixed 60kHZ Switching Frequency
- 9V to 38V Wide Range V_{DD} Voltage
- Current Mode Control
- Auxiliary Undervoltage Lockout with Hysteresis
- High Voltage Start-up Current Source
- Overtemperature, Overcurrent and Overvoltage Protection with Auto-Restart
- Typical power capability
  - European (195 - 265 Vac) 8W for SO-8, 13W for DIP-8
  - European (85 - 265 Vac) 5W for SO-8, 8W for DIP-8

Description

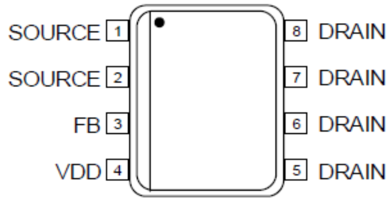
The VIPer12A combines a dedicated current mode PWM controller with a high voltage Power MOSFET on the same silicon chip.

SO-8 DIP-8

Typical applications cover off line power supplies for battery charger adapters, standby power supplies for TV or monitors, auxiliary supplies for motor control, etc.
The internal control circuit offers the following benefits:

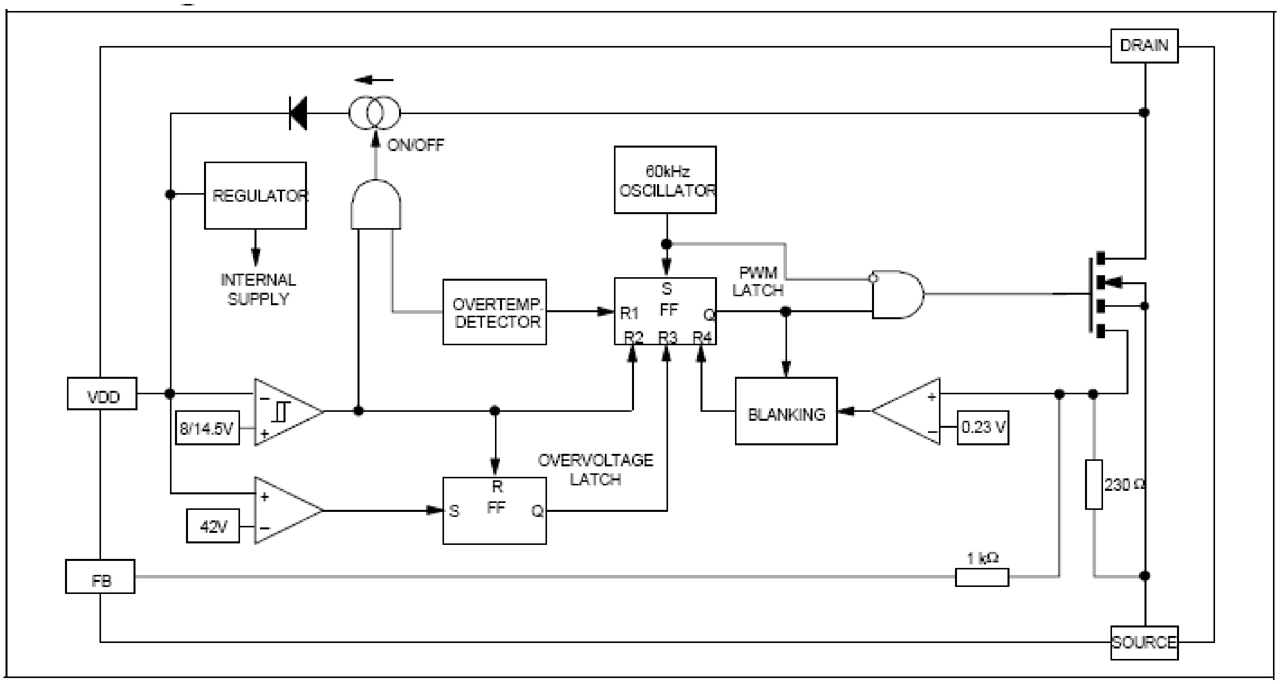
- Large input voltage range on the V_{DD} pin accommodates changes in auxiliary supply voltage. This feature is well adapted to battery charger adapter configurations.
- Automatic burst mode in low load condition.
- Overvoltage protection in HICCUP mode.

4.1.2 Pin connection



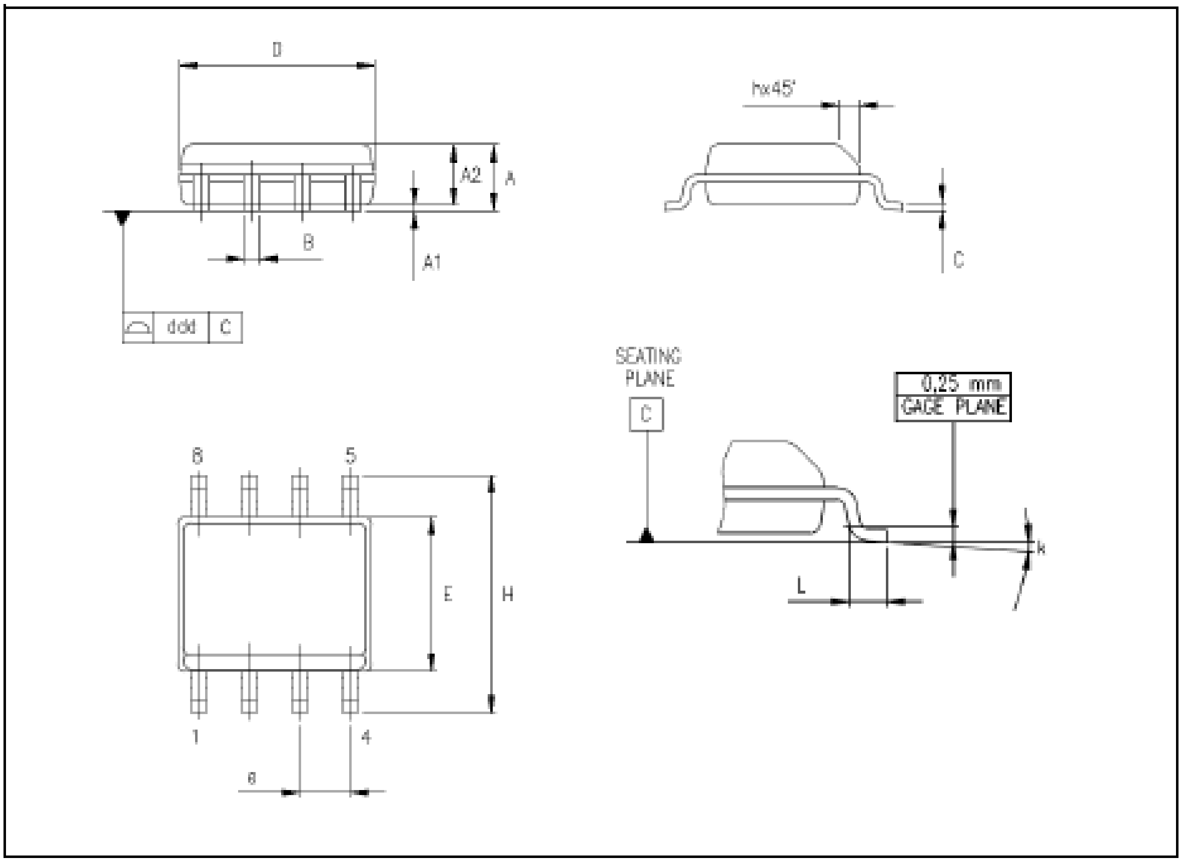
SO-8

4.1.3 Block diagram



4.1.4 Package outline/Mechanical data

Dimensions			
Ref.	**Databook (mm)**		
	Nom.	**Min**	**Max**
A	1.35		1.75
A1	0.10		0.25
A2	1.10		1.65
B	0.33		0.51
C	0.19		0.25
D	4.80		5.00
E	3.80		4.00
e		1.27	
H	5.80		6.20
h	0.25		0.50
L	0.40		1.27
k	8° (max.)		
ddd			0.1



4.2. Traceability

Wafer fab information	
Wafer fab manufacturing location	*AMK6 6*
Wafer diameter	*6*
Silicon process technology	*VIPOWER*
Die finishing back side	*Ti/Ni/Au*
Die size	*2800 x 2070 micron*
Passivation	*SiN*
Metal levels	*1*

Assembly Information	
Assembly plant location	*ST SHENZHEN -CHINA*
Frame description	*SO 8L 98x160 SHD*
Molding compound	*SUMITOMO G700KC*
Wires bonding materials/diameters	*Au (1.3 mils)*
Die attach material	*GLUE ABLEBOND 8601S*

Final Testing Information	
Electrical testing manufacturing location	*ST SHENZHEN -CHINA*

5 TESTS RESULTS SUMMARY

5.1 LOT Information

Lot Nb	Diffusion Lot	Assy Lot	Die Code
1	*62307E8*	*GK2451LE01*	*CVNA4XCB*
2	*3050231W*	*GK4050RP01*	*CVNA4X3B*

5.2 Test Plan and Results Summary

	Test						
N	**TEST NAME**	**PREC**	**CONDITION/METHOD**	**STEPS**	**1 LOT FAILS/SS**	**2 LOT FAILS/SS**	**NOTES**
1	PC (JL3)	-	JEDEC MSL = 3 24h bake @ 125°C 192hrs @ 30°C / 60% RH IR reflow (3 times) 260°C REFLOW PROFILE = Ecopack (Tmax=260°C) LF Reference specification = JEDEC J-STD-020	FINAL	0/238	0/56	*
2	AC	Y	JEDEC MSL = 3 REFLOW PROFILE = Ecopack (Tmax=260°C) LF Ta = 121 Pressure (Atm) = 2 Reference specification = JESD22-A102	0 H	0/77		
				96 H	0/77		
3	TC	Y	JEDEC MSL = 3 REFLOW PROFILE = Ecopack (Tmax=260°C) LF Low Ta = -65 High Ta = 150 Reference specification = JESD22-A104	0 CY	0/77		
				100 CY	0/77		
				200 CY	0/77		
				500 CY	0/77		

* 28 samples for each lot submitted only to 12h bake @ 125°C and IR reflow (1 times) 260°C

	Test						
N	**TEST NAME**	**PREC**	**CONDITION/METHOD**	**STEPS**	**1 LOT FAILS/SS**	**2 LOT FAILS/SS**	**NOTES**
4	HTSL	N	Ta = 150 Reference specification = JESD22-A103	0 H	0/77		
				168 H	0/77		
				500 H	0/77		
				1000 H	0/77		
5	HTRB	Y	Tj = 150°C Reference specification = JESD22-A108	0 H	0/28	0/56	**
				168 H	0/28	0/56	
				500 H	0/28		
				1000 H	0/28		

** samples of first lot and 28 samples of second lot submitted only to 12h bake @ 125°C and IR reflow (1 times) 260°C

6 TESTS DESCRIPTION

6.1 Die and Package tests description

TEST NAME	DESCRIPTION	PURPOSE
PC (JL3): Preconditioning (solder simulation)	The device is submitted to a typical temperature profile used for surface mounting, after a controlled moisture absorption.	As stand-alone test: to investigate the level of moisture sensitivity. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "popcorn" effect and delamination.
AC: Autoclave at 2atm	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.
HTSL: High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
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, moulding compound delamination, wire-bonds failure, die
HTRB: High Temperature Reverse Bias Test	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 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.

Public Products List

PCN Title : VIMIT10, VIPER12AS, VIPER22AS and VN751S : Introduction of MSL3 (Moisture Sensitive Level)
PCN Reference : IPG-IPC/14/8450
PCN Created on : 28-APR-2014

Subject : Public Products List

Dear Customer,

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

ST COMMERCIAL PRODUCT

VIPER12AS-E
VIPER12ASTR-E
VIPER22AS-E
VIPER22ASTR-E
VN751S
VN751STR

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