PRODUCT/PROCESS CHANGE NOTIFICATION

PCN IPG-IPC/14/8676
Dated 04 Sep 2014

TD310ID: New glue and MSL3 (Moisture Sensitive Level) introduction

Table 1. Change Implementation Schedule

Forecasted implementation date for change	28-Aug-2014
Forecasted availability date of samples for customer	28-Aug-2014
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	28-Aug-2014
Estimated date of changed product first shipment	04-Dec-2014

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	see attached list
Type of change	Package assembly material change, Packing
Reason for change	to harmonize Bill of Material as used on SO16 package
Description of the change	Following our plan to harmonize Bill of Material, we are now introducing for this specific product, a new glue already in use on same package by other different products. Moreover, we are also introducing the process and the packing relative to the JEDEC MSL3
Change Product Identification	Dedicated FG's
Manufacturing Location(s)	

DOCUMENT APPROVAL

Name	Function
Chelli, Fabio	Marketing Manager
Arrigo, Domenico Massimo	Product Manager
Barbieri, Danilo	Product Manager
Moretti, Paolo	Q.A. Manager

RELIABILITY EVALUATION

MSL_ (MOISTURE SENSITIVITY LEVEL) ASSESSMENT

IPC-JEDEC J-STD-020D

CHANGE FROM MSL_1 TO MSL_3

***D310SA2-TD310ID-2LF/**

SOIC16L SHD ST-SHENZHEN (CHINA)

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	25-JUN-2014	27	F.VENTURA I&PC QA&R / B/E	A.PLATINI I&PC QA&R MNG.	

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 of STMicroelectronics.

General Information	
Product Line	KKQ7*D310SA2
P/N	**TD310ID-2LF**
Product Group	*IPG*
Product division	*Industrial & Power Group*
Package	*SOIC 16L*
Silicon Process technology	*CMOS DM-CMOS*
Maturity level step	*29*

Document reference	Short description
AEC-Q100	Stress test qualification for automotive grade integrated circuits
JESD47	Stress-Test-Driven Qualification of Integrated Circuits
ADCS:8161393	General specification for product development

1 GLOSSARY

DUT	Device Under Test
SS	Sample Size

2 RELIABILITY EVALUATION OVERVIEW

2.1 Objectives

MSL_ (MOISTURE SENSITIVITY LEVEL) ASSESSMENT IPC-JEDEC J-STD-020D

CHANGE FROM MSL_1 TO MSL_3

2.2 Conclusion

Qualification Plan requirements (WORKABILITY/ TESTING) 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.

2.3 Construction note

	*D310_ P/N: **TD310ID-2LF**
Wafer/Die fab. information	*AMKF-AMJ9 5"*
Wafer fab manufacturing location	*ANG MO KIO S'PORE*
Technology	CMOS
Process family	DM-CMOS
Die finishing back side	RAW SILICON
Die size	4430 x 1980 mm
Bond pad metallization layers	Al/Si
Passivation type	P-VAPOX (SiO2) NITRIDE (SiN)
Wafer Testing (EWS) information	*AMJ9 5"*
Electrical testing manufacturing location	STS
Assembly information	
Assembly site	ST-SHENZHEN (CHINA)
Package description	SOIC16L SHDLF .15
Molding compound	ECOPAK 2 COMPLIANCE
Frame material	SHDLF 16L Ni/Thin/Pd/Ag/Au OPT.B
Die attach process	EPOXY
Die attach material	GLUE ABLEBOND 8601S-25
Die pad size	94 X 200MILS
Wire bonding process	THERMOSONIC
Wires bonding materials/diameters	1mils Cu
Lead finishing process	Pre- plated
Package code	Q7
Final testing information	
Testing location	ST-SHENZHEN (CHINA)

3 TESTS RESULTS SUMMARY

3.1 Test vehicle *U324

Lot #	Diffusion Lot	Assy Lot	Trace Code	Process/ Package	Product Line	Comments
1	VW3108L6	GK4170H6RR	GK4170H6	SOIC 16L SHDL	KKQ7*D310SA2	

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

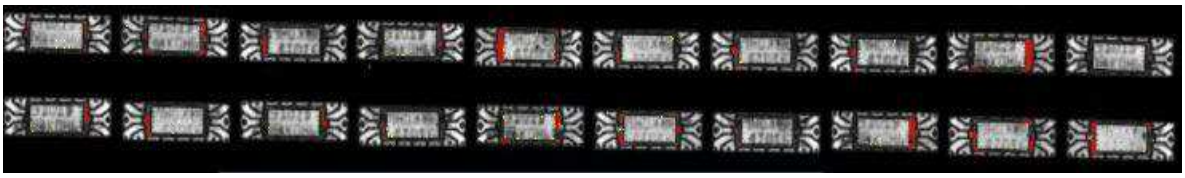
3.2 Test plan and results summary

P/N : TD310ID-2LF

Test	PC	Std ref.	Conditions	Steps	Note
PC	Y	JESD22 A020-D	MSL_3 (192H 30°C/60%H.R)	0/200	NO DELAMINATION TOP/BOTTOM
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	100Cy	0/80
					NO DELAMINATION AFTER TC.

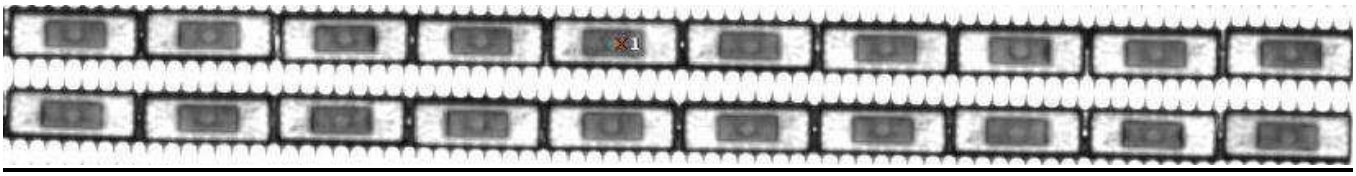
3.4.1 SAM AFTER MSL3(NO DELAMINATION FOUND)

C-SCAN



4

T-scan

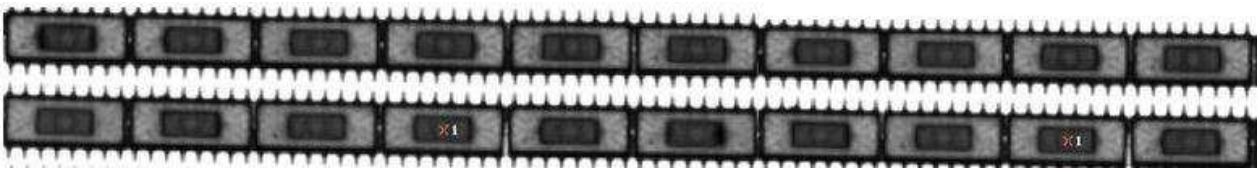


5

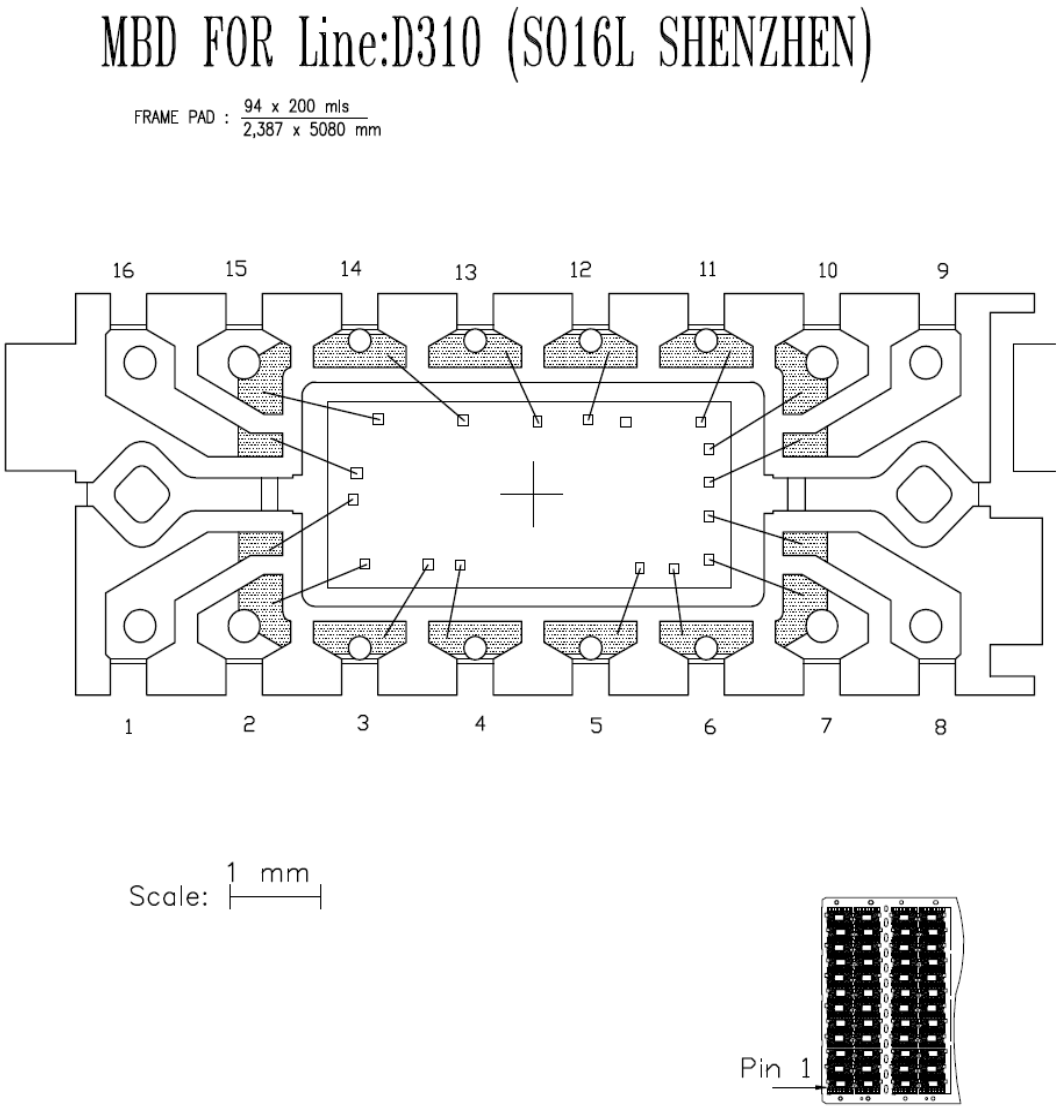
SAM after MSL3+100TC(No delamination found)

C-SCAN

T-scan



3.4.1 ANNEX 2 : MOUNT & BOND DIAGRAM:



3.5.0 ANNEX 3 : POA PACKAGE OUTLINE ASSEMBLY

PACKAGE OUTLINE ASSEMBLY

TITLE: PLASTIC SMALL OUTLINE PACKAGE 16L NARROW

PACKAGE CODE: Q7

JEDEC/EIAJ REFERENCE NUMBER: JEDEC MS-012-AC

	DIMENSIONS						
	DATABOOK (mm)			DRAWING (mm)			
REF.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	NOTES
A			1.75	1.43	1.55	1.68	
A1	0.10		0.25	0.12	0.15	0.18	
A2	1.25			1.48	1.52	1.56	
b	0.31		0.51	0.375	0.40	0.425	
c	0.17		0.25			0.238	
D	9.80	9.90	10.00	9.82	9.85	9.88	(1) (3)
E	5.80	6.00	6.20	5.90	6.00	6.10	
E1	3.80	3.90	4.00	3.87	3.90	3.93	(2) (3)
e		1.27			1.27		
h	0.25		0.50	0.425		0.50	
L	0.40		1.27	0.585	0.635	0.685	
k	0		8	2	4	8	DEGREES
ccc			0.10			0.04	

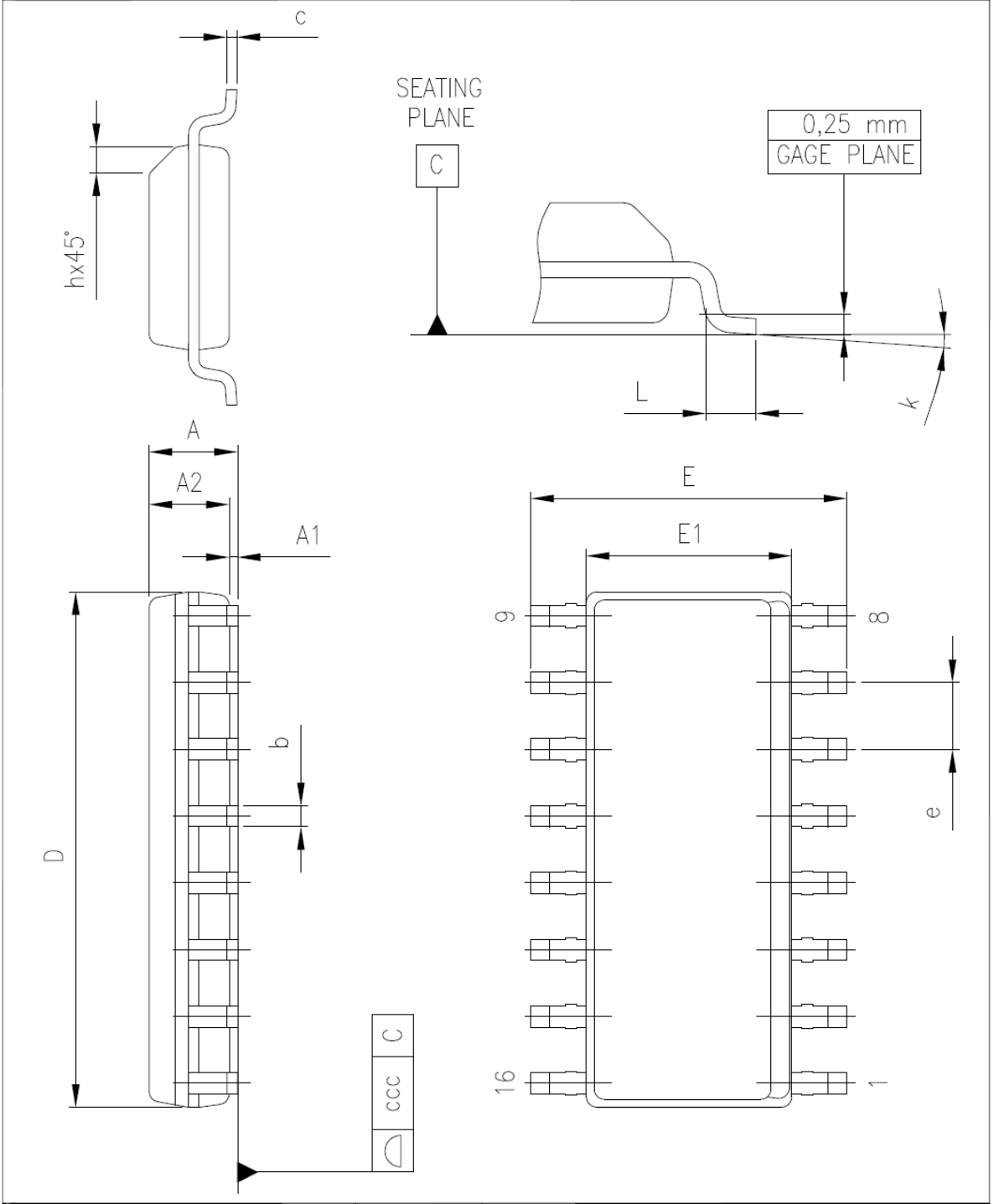
NOTES:

(1) – Dimension “D” does not include mold flash, protrusions or gate burrs.
Mold flash, protrusions or gate burrs shall not exceed 0.15mm in total (both side).

(2) – Dimension “E1” does not include interlead flash or protrusions.
Interlead flash or protrusions shall not exceed 0.25mm per side.

(3) – Dimensions referred to the bottom side of the package

	FIGURE : 1	DOC. NUMBER : 0016020
TITLE : PLASTIC SMALL OUTLINE PACKAGE 16L NARROW		



NATIVE SCALE

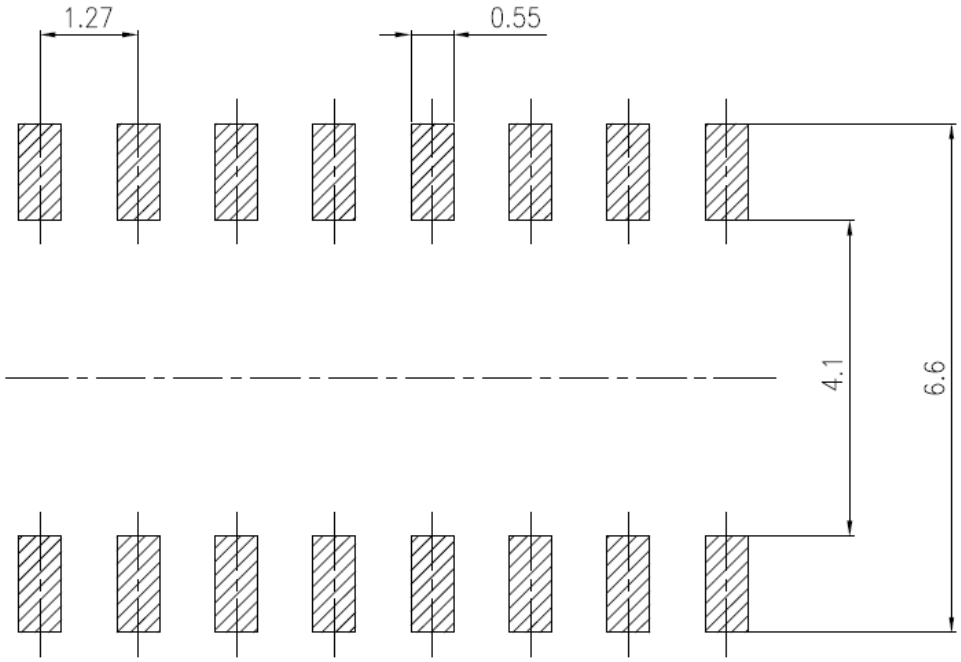
PROJECTION

MATERIAL

DIM are in mm – Unspecified tolerance

Precision rate	0 mm 6 mm	6,01 mm 30 mm	30,01mm 120 mm	120,01mm 315 mm	over 315 mm	Angular
Coarse	±0.2	±0.5	±0.8	±1.2	±2	±1°
Medium	±0.1	±0.2	±0.3	±0.5	±0.8	±0°30'
Fine	±0.05	±0.1	±0.15	±0.2	±0.3	±0°20'

RECOMMENDED FOOTPRINT



MATERIAL _____

NATIVE SCALE

PROJECTION

DIM are in mm – Unspecified tolerance						
Precision rate	0 mm 6 mm	6,01 mm 30 mm	30,01mm 120 mm	120,01mm 315 mm	over 315 mm	Angular
Coarse	±0.2	±0.5	±0.8	±1.2	±2	±1°
Medium	±0.1	±0.2	±0.3	±0.5	±0.8	±0°30'
Fine	±0.05	±0.1	±0.15	±0.2	±0.3	±0°20'

PC Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. 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 "pop corn" effect and delamination.
AC 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.
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.
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.
THSL Thermal Humidity Storage Life	The THS is performed for the purpose of evaluating the reliability of non-hermetic packaged solid state devices in humidity environments. Test employs temperature and humidity under non –condensed conditions to accelerate the penetration of moisture trough the external protective material and the metallic conductor which pass through it.	This test is used to identify failure mechanism internal to the package and is desctructive.
Die Oriented		
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.
HTRB **High Temperature Reverse Bias**	The device is biased in dynamic configuration maximizing its internal reverse power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	This test is performed to evaluate die problems related with chip stability, layout structure, surface contamination and oxide faults.

Public Products List

PCN Title : TD310ID: New glue and MSL3 (Moisture Sensitive Level) introduction
PCN Reference : IPG-IPC/14/8676
PCN Created on : 05-SEP-2014

Subject : Public Products List

Dear Customer,

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

ST COMMERCIAL PRODUCT

TD310ID TD310IDT

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

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