



PRODUCT INFORMATION LETTER

PIL CRP/13/8135
Dated 04 Oct 2013

D2PAK Leads (Pins) Modification

Sales Type/product family label	See attached
Type of change	Product design change
Reason for change	The purpose of this change is to eradicate tin burr risks.
Description	This change concerns a modification of lead design of D2PAK packages at ST Shenzhen Back-End plant.
Forecasted date of implementation	31-Oct-2013
Forecasted date of samples for customer	27-Sep-2013
Forecasted date for STMicroelectronics change Qualification Plan results availability	27-Sep-2013
Involved ST facilities	ST Shenzhen Back-End plant

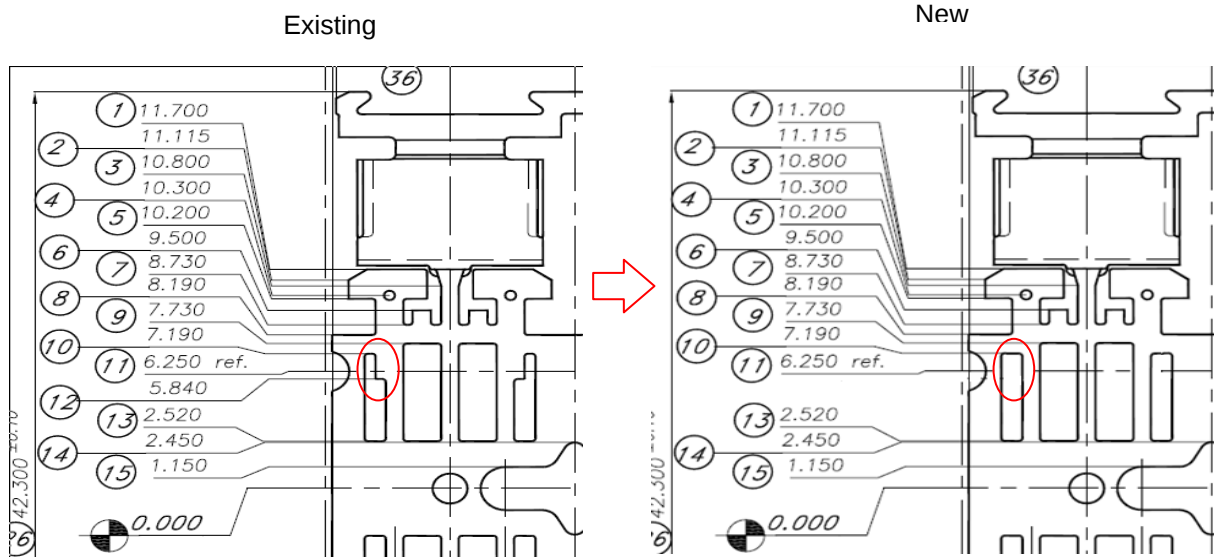
DOCUMENT APPROVAL

Name	Function
Livache, Veronique	Corporate Quality Manager
Low, Patrick	Process Owner

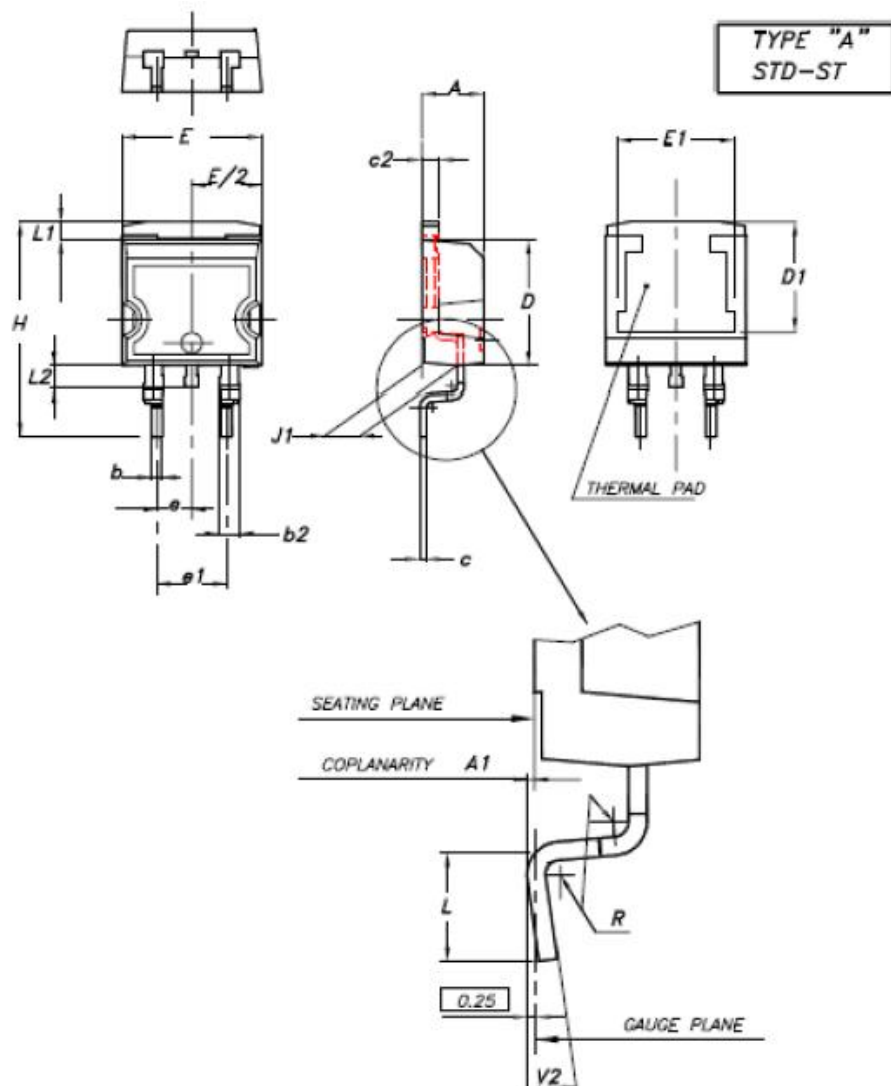
SHENZHEN –D2PAK Lead (Pins) Modification

WHAT:

This change concerns a modification of lead design of D2PAK packages at ST Shenzhen Back-End plant, without changing materials, people, method, facilities, process flow, and controls. Below is the comparison between new frame design and existing one.

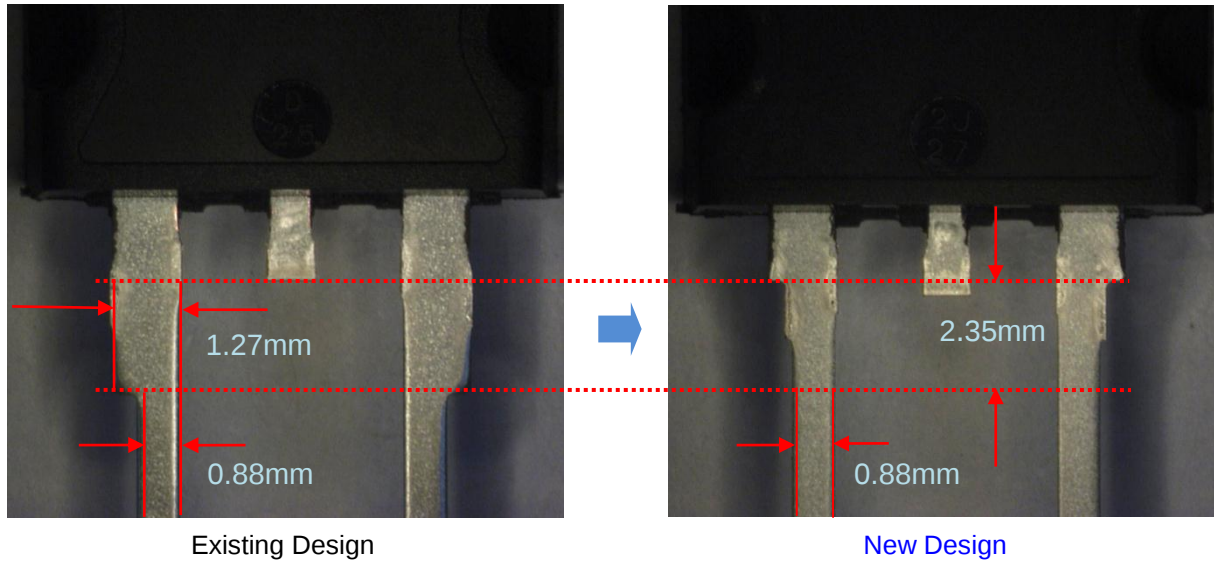


POA is not affected. Dimensions concerned by the proposed change are not specified in the POA

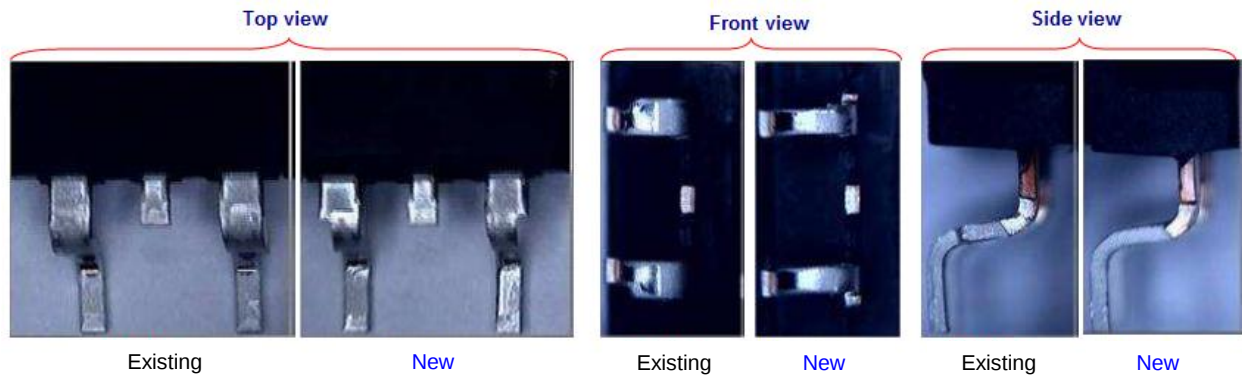


Visual aids to illustrate the change:

Units after dam bar cutting, before forming



Units after forming

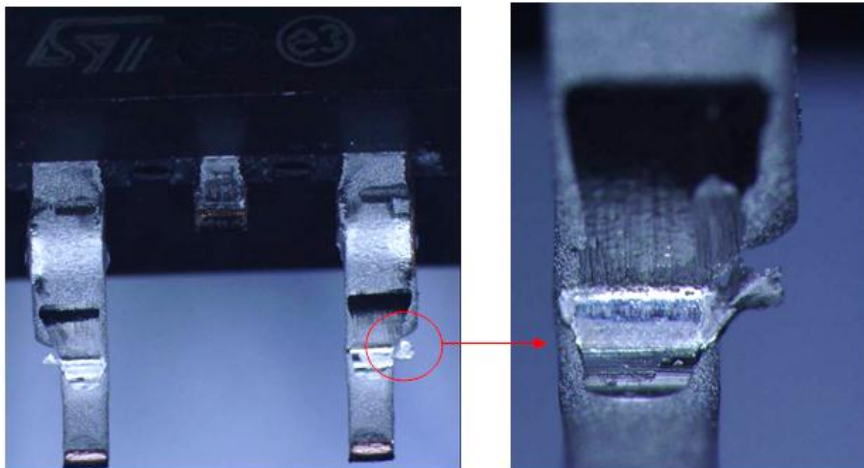


WHY:

The purpose of this change is to eradicate tin burr risks.

Few tin burrs were observed on pin1 and pin3 on 3 units occasionally, due to actual lead frame design (see below pictures).

New lead frame design will prevent this risk. It is already implemented on the devices STB85NF55T4\$Z & STB85NF55T4\$Z1 since 2011, so far burrs problems are removed.



WHEN:

Proposed plan:

- | | |
|---|--|
| • Phase 1 – Preparation, Risk assessment | Done (see Appendix 1) |
| • Phase 2 – Workability and Qualification | Done (see Appendix 2) |
| • Phase 3 – Lead frame Conversion | Schedule depend on Customer feedback & Supplier Existing Stock |

HOW:

This Lead (Pins) modification is following a **working plan**, divided in 3 major phases detailed below.

Phase 1 – Preparation and risk assessment

- Risk assessment (See appendix 1)

Phase 2 – Qualification Execute

- Qualification & Workability validation (see Qualification result in appendix 2)

Phase 3 – Lead Frame Conversion

- To start production with new lead frame design, under following conditions:
 - Ramp up with re-enforced control plan linked to identified risk
(See Appendix 1 - risk assessment)

IMPACT OF THE CHANGE:

No impacts on **Fit, Function** of the parts with new lead frame design.

Appendix 1: Risk Assessment

#	Risks identified	Potential risk resulting from	Class	Considered Action
Process & Quality	Lead pitch too big	Forming force is not balanced	Medium	To modify the punching tool to shorten the lead protrusion. Specific control to put in place during ramp up phase
	Burr/metal filter/ flash on lead	Cutting tool worn-out and frame residue damage leads or stick on leads.	Low	
	Chip package	Jam between Turntable and track	Low	
	Delamination	Punch dimension is out of spec	Low	
	Incomplete cropping	Cutting tool worn-out	Low	
	Scratch on slug	Resin residue or broken lead in track	Low	
	Shift cutting	Mis-pitch in track	Low	
	Mechanical failures	At forming neck, mechanical stress can degrade the rigidity and performances of the leads	Low	Only cosmetic changes, no impact on product, which has already been verified by experience on other device
Supply Chain	Tin burr issue re-occurrence	Part numbers forgotten during the change and still assembled with same old design lead frame	Medium	Reviewed all D2PAK frame part numbers
	Delivery issue, parts delinquency, customer line down	Not enough lead frame in stock to satisfy the delivery plans	Low	As per division plans, order sufficient lead frames in advance to prepare the WIP

Workability validation: all results are within spec.

1. Burr visual result of 1st batch 6k sample

Group name	Sample size	Lead burr	Failure rate
Dummy group1 (New design)	3000	0	0%
Dummy group2 (New design)	3000	0	0%

* From the result, zero burr was found on the 6k new designed lead frame

2. POA measurement result of these 2 group new design samples in Smart scope

			Lead standoff	Lead width	Lead pitch
Dummy1 (New design)	Sample size	Average	0.15	0.83	5.14
	30pcs	3S	0.015	0.014	0.014
		CPK	5.69	7.1	9.79
Dummy2 (New design)	Sample size	Average	0.14	0.84	5.14
	30pcs	3S	0.015	0.023	0.03
		CPK	5.6	4.06	4.54

3. Burr visual result of 2nd batch 15k samples

Group name	Sample size	Lead burr	Failure rate
Dummy group1 (New design)	5000	0	0%
Dummy group2 (New design)	5000	0	0%
Dummy group3 (New design)	5000	0	0%

4. POA measurement result of these 3 group samples in Smart scope

			Lead standoff	Lead width	Lead pitch
Dummy1 (New design)	sample size	AVG	0.14	0.81	5.15
	30 pcs	3S	0.015	0.017	0.015
		CPK	6.28	6.74	8.81
Dummy2 (New design)	sample size	AVG	0.14	0.81	5.15
	30 pcs	3S	0.015	0.016	0.017
		CPK	5.87	6.98	7.58
Dummy3 (New design)	sample size	AVG	0.13	0.81	5.15
	30 pcs	3S	0.015	0.017	0.014
		CPK	6.55	6.27	9.26

15K dummy units were performed inspection on vision machine focused on ST,WI,PI, zero defect was found.



Public Products List

PIL Title : D2PAK Leads (Pins) Modification

PIL Reference : CRP/13/8135

PIL Created on : 30-SEP-2013

Subject : Public Products List

Dear Customer,

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

ST COMMERCIAL PRODUCT

2STBN15D100T4	ACST1210-7G	ACST1210-7GTR
ACST1235-7G	ACST1235-7GTR	ACST610-8G
ACST610-8GTR	ACST830-8GTR	BUB941ZTT4
BULB49DT4	BULB7216T4	FERD30M45CG-TR
L4940D2T12-TR	L4940D2T5-TR	L7805ABD2T-TR
L7805ACD2T-TR	L7805CD2T-TR	L7806ABD2T-TR
L7806CD2T-TR	L7808ABD2T-TR	L7808CD2T-TR
L7809ABD2T-TR	L7809CD2T-TR	L7812ABD2T-TR
L7812ACD2T-TR	L7812CD2T-TR	L7815ABD2T-TR
L7815ACD2T-TR	L7815CD2T-TR	L7824CD2T-TR
L7905ACD2T-TR	L7905CD2T-TR	L7912CD2T-TR
LD1085D2M-R	LD1085D2M18R	LD1085D2M25R
LD1085D2M33R	LD1085D2T-R	LD1085D2T33R
LD1086D2M33TR	LD1086D2MTR	LD1086D2T12TR
LD1086D2T18TR	LD1086D2T33TR	LD1086D2T50TR
LD1086D2TTR	LM217D2T-TR	LM317D2T-TR
MJB44H11T4	STB100NF03L-03T4	STB100NF04T4
STB10N65K3	STB10NK60ZT4	STB11N52K3
STB11N65M5	STB11NK50ZT4	STB11NM60FDT4
STB11NM60T4	STB11NM80T4	STB120N4F6
STB120N4LF6	STB120NF10T4	STB12NK80ZT4
STB12NM50ND	STB12NM50T4	STB13007DT4
STB13N60M2	STB13N80K5	STB13NK60ZT4
STB13NM60N	STB140NF55T4	STB140NF75T4
STB14NK50ZT4	STB14NK60ZT4	STB14NM50N
STB150N3LH6	STB150NF55T4	STB155N3H6
STB155N3LH6	STB15N65M5	STB15N80K5
STB15NM60ND	STB160N75F3	STB16N65M5
STB16NF06LT4	STB170NF04	STB185N55F3
STB18N55M5	STB18N60M2	STB18N65M5
STB18NF25	STB18NF30	STB18NM60ND
STB18NM80	STB19NF20	STB200NF03T4
STB20N65M5	STB20N95K5	STB20NM50FDT4
STB20NM50T4	STB20NM60D	STB20NM60T4
STB21N65M5	STB21N90K5	STB21NK50Z



Public Products List

PIL Title : D2PAK Leads (Pins) Modification

PIL Reference : CRP/13/8135

PIL Created on : 30-SEP-2013

Subject : Public Products List (Contd.)

ST COMMERCIAL PRODUCT

STB21NM60ND	STB22NM60N	STB23NM50N
STB23NM60ND	STB24N60M2	STB24NM60N
STB24NM65N	STB25N80K5	STB25NM60ND
STB26NM60N	STB270N4F3	STB27NM60ND
STB28N60M2	STB28NM50N	STB28NM60ND
STB2N62K3	STB30N65M5	STB30NF10T4
STB30NF20	STB30NF20L	STB31N65M5
STB32N65M5	STB32NM50N	STB33N60M2
STB34N65M5	STB34NM60N	STB34NM60ND
STB35N65M5	STB35NF10T4	STB36NM60N
STB36NM60ND	STB38N65M5	STB3NK60ZT4
STB40N60M2	STB40NF10LT4	STB40NF10T4
STB40NF20	STB42N65M5	STB45N65M5
STB45NF06T4	STB46NF30	STB4N62K3
STB4NK60ZT4	STB55NF03LT4	STB55NF06LT4
STB55NF06T4	STB57N65M5	STB5N52K3
STB5N62K3	STB5NK50ZT4	STB60NF06LT4
STB60NF06T4	STB60NF10T4	STB6N52K3
STB6N60M2	STB6N62K3	STB6NK60ZT4
STB6NK90ZT4	STB70NF03LT4	STB70NF3LLT4
STB75NF20	STB75NF75LT4	STB75NF75T4
STB76NF75	STB7ANM60N	STB7NK80ZT4
STB80N20M5	STB80NF03L-04T4	STB80NF10T4
STB80NF55-06T	STB80NF55-08T4	STB80NF55L-06T4
STB85NF55T4	STB8N65M5	STB8NM60D
STB8NM60T4	STB95N4F3	STB9NK60ZDT4
STB9NK60ZT4	STB9NK80Z	STB9NK90Z
STGB10H60DF	STGB10NB37LZ	STGB10NB37LZT4
STGB10NB40LZT4	STGB10NC60HDT4	STGB10NC60KDT4
STGB14NC60KDT4	STGB15H60DF	STGB18N40LZT4
STGB19NC60HDT4	STGB19NC60HT4	STGB19NC60KDT4
STGB20H60DF	STGB20N40LZ	STGB20NB37LZT4
STGB20NB41LZT4	STGB20NC60V	STGB20V60DF
STGB20V60F	STGB30H60DF	STGB30V60DF
STGB30V60F	STGB35N35LZT4	



Public Products List

PIL Title : D2PAK Leads (Pins) Modification

PIL Reference : CRP/13/8135

PIL Created on : 30-SEP-2013

Subject : Public Products List (Contd.)

ST COMMERCIAL PRODUCT

STGB3NC120HDT4	STGB40V60F	STGB6NC60HDT4
STGB7NC60HDT4	STGB8NC60KDT4	STPS10150CG-TR
STPS10170CG-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
STPS20200CG-TR	STPS2045CG-TR	STPS2045CGY-TR
STPS20H100CG	STPS20H100CG-TR	STPS20L15G-TR
STPS20L25CG	STPS20L45CG-TR	STPS20L60CG-TR
STPS20L60CGY-TR	STPS20M100SG-TR	STPS20M60CG-TR
STPS20M60SG-TR	STPS20M80CG-TR	STPS20SM100SG-TR
STPS20SM60CG-TR	STPS20SM60SG-TR	STPS20SM80CG-TR
STPS2545CG-TR	STPS2545CGY-TR	STPS30150CG-TR
STPS30170CG-TR	STPS3030CG	STPS3030CG-TR
STPS3045CG	STPS3045CG-TR	STPS3045CGY-TR
STPS30H60CG-TR	STPS30H60CGY-TR	STPS30L30CG-TR
STPS30L45CG-TR	STPS30L60CG-TR	STPS30M60CG-TR
STPS30M60SG-TR	STPS30M80CG-TR	STPS30SM100SG-TR
STPS30SM60CG-TR	STPS30SM60SG-TR	STPS30SM80CG-TR
STPS40150CG	STPS40150CG-TR	STPS40170CG-TR
STPS40L45CG	STPS40L45CG-TR	STPS40L45CGY-TR
STPS40M60CG-TR	STPS40M80CG-TR	STPS40SM100CG
STPS40SM100CG-TR	STPS40SM60CG-TR	STPS40SM80CG-TR
STPS41H100CG	STPS41H100CG-TR	STPS41H100CGY-TR
STPS41L30CG-TR	STPS41L45CG-TR	STPS41L60CG-TR
STPS5045SG-TR	STPS745G-TR	STPS8H100G
STPS8H100G-TR	STPSC1006G-TR	STPSC10H065G-TR
STPSC606G-TR	STPSC6H065G-TR	STPSC806G-TR
STPSC8H065G-TR	STTH1002CG-TR	STTH1002CGY-TR
STTH10R04G-TR	STTH1212G-TR	STTH12R06G
STTH12R06G-TR	STTH1302CG-TR	STTH1512G
STTH1512GY-TR	STTH15L06G-TR	STTH1602CG-TR
STTH16L06CG-TR	STTH16R04CG-TR	STTH2002CG
STTH2002CG-TR	STTH2002G-TR	



Public Products List

PIL Title : D2PAK Leads (Pins) Modification

PIL Reference : CRP/13/8135

PIL Created on : 30-SEP-2013

Subject : Public Products List (Contd.)

ST COMMERCIAL PRODUCT

STTH2003CG	STTH2003CG-TR	STTH2003CGY-TR
STTH20L03CG-TR	STTH20LCD06CG-TR	STTH20R04G-TR
STTH3002CG	STTH3002CG-TR	STTH3002G-TR
STTH3010GY-TR	STTH30L06CG-TR	STTH30L06G-TR
STTH30L06GY-TR	STTH30R03CG	STTH30R03CG-TR
STTH30R04G	STTH30R04G-TR	STTH5R06G-TR
STTH5R06GY-TR	STTH802G	STTH802G-TR
STTH803G-TR	STTH806G-TR	STTH810G-TR
STTH810GY-TR	STTH812G	STTH812G-TR
STTH8L06G	STTH8L06G-TR	STTH8R04G-TR
STTH8R06G-TR	STTH8R06GY-TR	VNB10N07-E
VNB10N07TR-E	VNB14N04-E	VNB14N04TR-E
VNB14NV04-E	VNB14NV04TR-E	VNB20N07-E
VNB20N07TR-E	VNB28N04-E	VNB28N04TR-E
VNB35NV04-E	VNB35NV04TR-E	VNB49N04-E
VNB49N04TR-E		

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.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

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

© 2013 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