

Features

- PCB area: 0.09 mm²
- Bidirectional device
- Low capacitance: 8 pF max.
- Minimum breakdown voltage $V_{BR} = 6$ V
- Low leakage current: lower than 50 nA at 3 V
- RoHS compliant

Applications

Where transient over voltage protection in ESD sensitive equipment is required, such as:

- Portable multimedia devices and accessories
- MID, netbooks and notebooks
- Digital cameras and camcorders
- Communication systems
- Smart phones and accessories

Description

The ESDAVLC6-1BV2 is a single line bidirectional transil diode designed specially for the protection of integrated circuits into portable equipment and miniaturized electronics devices subject to ESD transient overvoltage.

The device is ideal for applications where both reduced printed circuit board space and high ESD protection level are required.

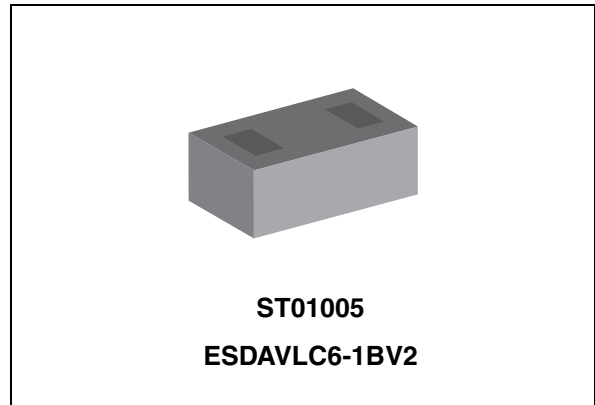
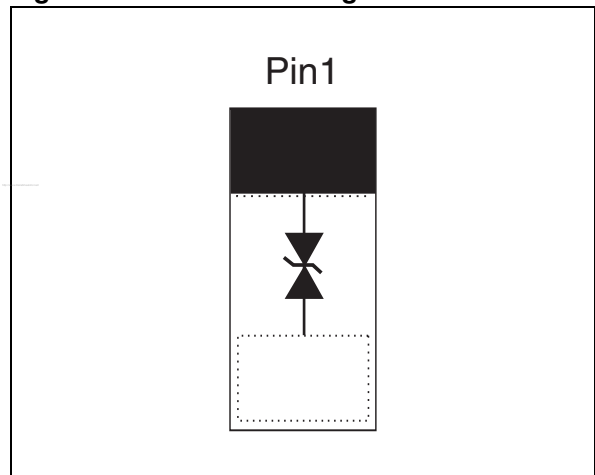


Figure 1. Functional diagram



1 Characteristics

Table 1. Absolute maximum ratings ($T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter		Value	Unit
V_{PP}	Peak pulse voltage	IEC 61000-4-2 contact discharge	12	kV
		IEC 61000-4-2 air discharge	15	
I_{PP}	Peak pulse current (8/20 μs) ⁽¹⁾		2.5	A
P_{PP}	Peak pulse power (8/20 μs) ⁽¹⁾		45	W
T_j	Operating temperature range		-55 to +150	$^{\circ}\text{C}$
T_{stg}	Storage temperature range		- 65 to +150	$^{\circ}\text{C}$
T_L	Maximum lead temperature for soldering during 10 s		260	$^{\circ}\text{C}$

1. For a surge greater than the maximum values, the diode will fail in short-circuit.

Figure 2. Electrical characteristics (definitions)

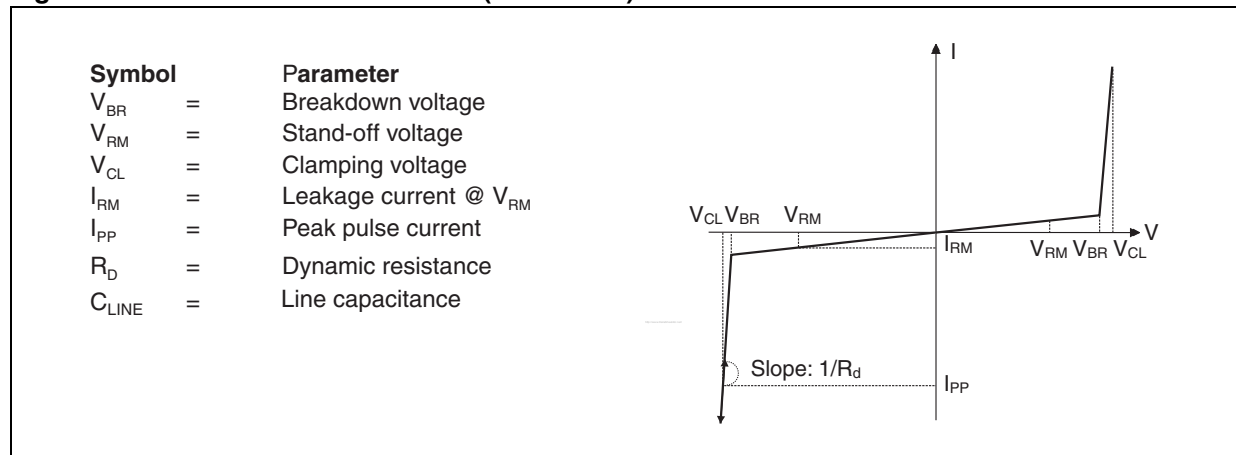


Table 2. Electrical characteristics (values, $T_{amb} = 25\text{ }^{\circ}\text{C}$)

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ.	Max.	
V_{BR}	Breakdown voltage	$I_R = 1\text{ mA}$	6			V
I_{RM}	Leakage current	$V_{RM} = 3\text{ V}$			50	nA
V_{CL}	Clamping voltage	$I_{PP} = 1\text{ A}, 8/20\text{ }\mu\text{s}$			12	V
		$I_{PP} = 2.5\text{ A maximum}, 8/20\text{ }\mu\text{s}$			18	
C_{line}	Line capacitance, I/O to GND	$V_R = 0\text{ V}, F = 1\text{ MHz}, V_{osc} = 30\text{ mV}$		7.5	8	pF

Figure 3. ESD response to IEC 61000-4-2 (typical values, +8 kV contact discharge)

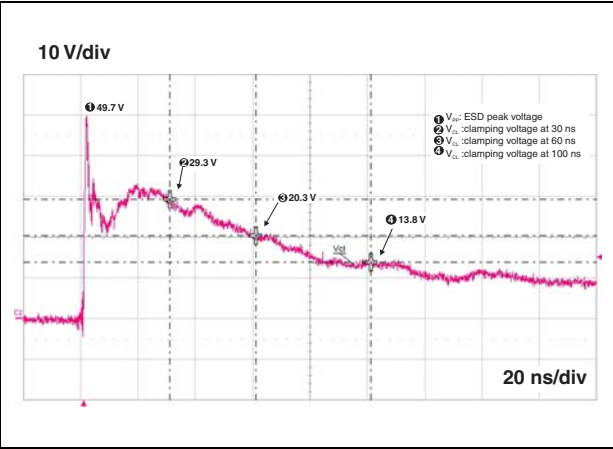


Figure 4. ESD response to IEC 61000-4-2 (typical values, -8 kV contact discharge)

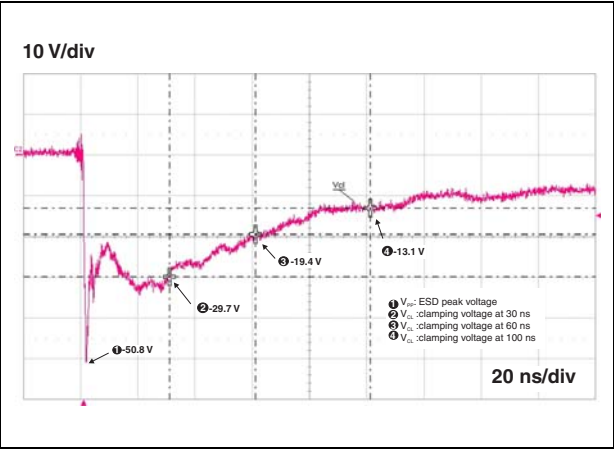


Figure 5. S21 attenuation measurement

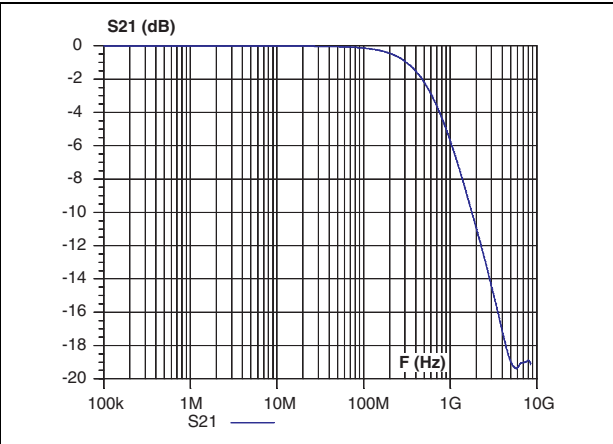
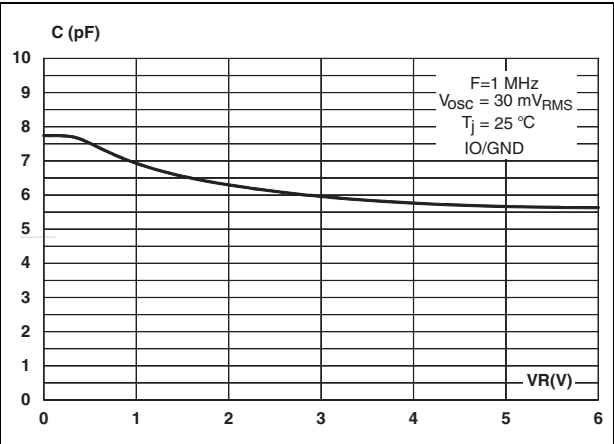
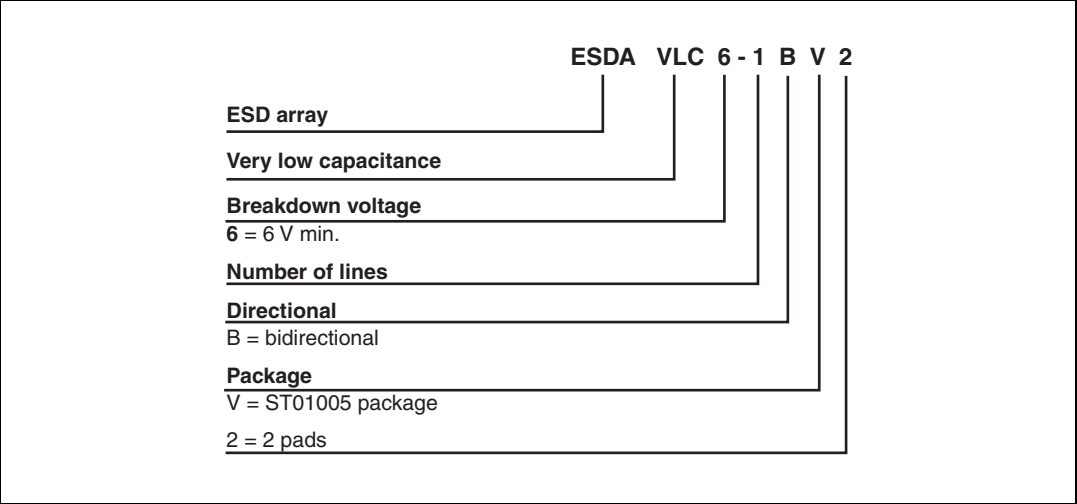


Figure 6. Junction capacitance versus reverse applied voltage (typical values)



2 Ordering information scheme

Figure 7. Ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Figure 8. Package dimensions

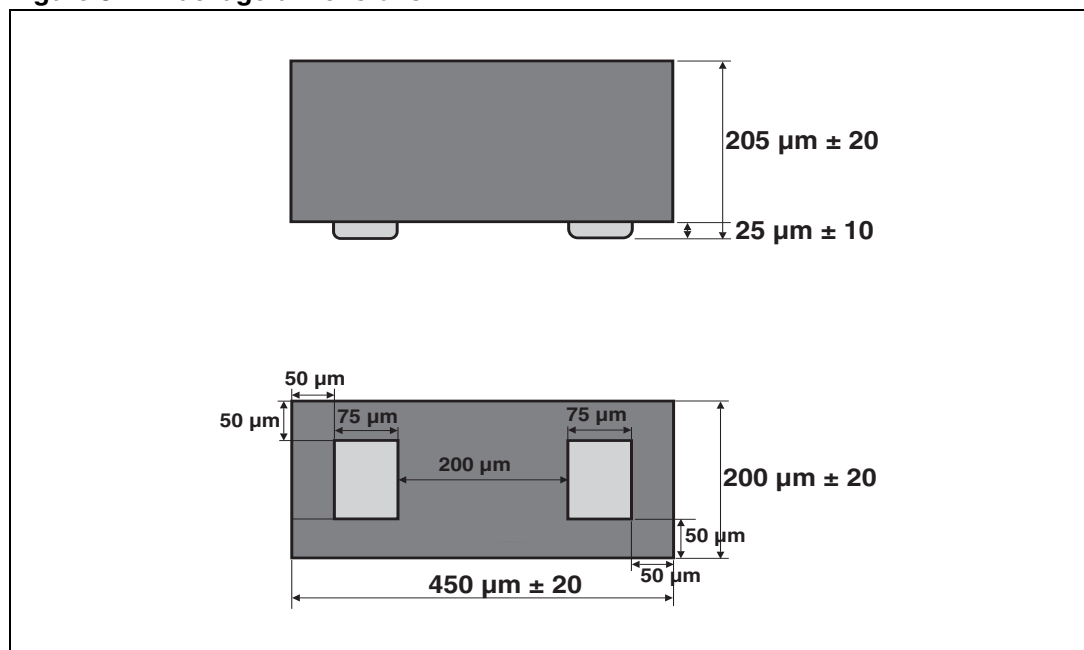
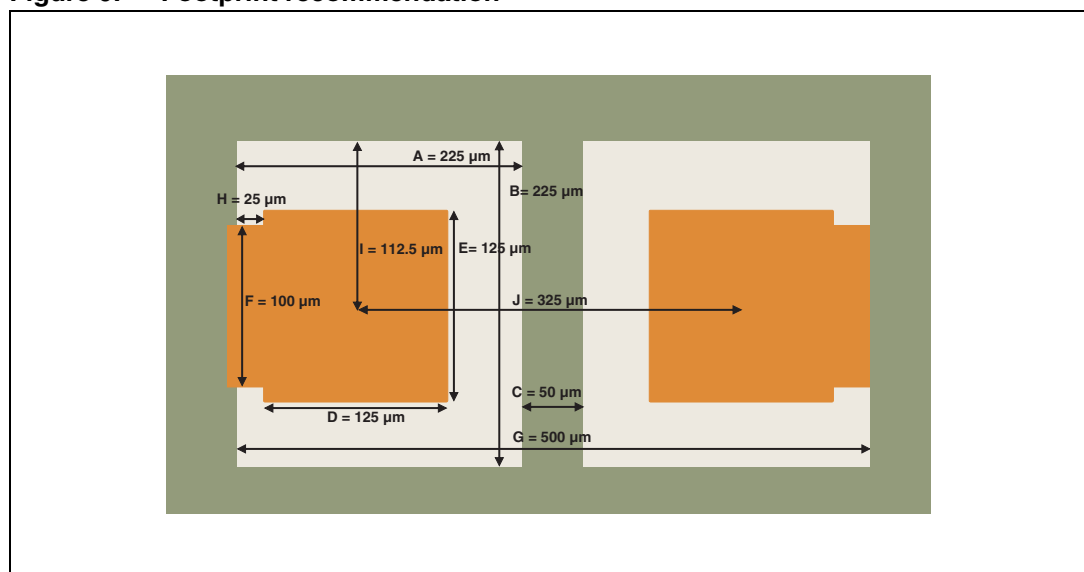


Figure 9. Footprint recommendation

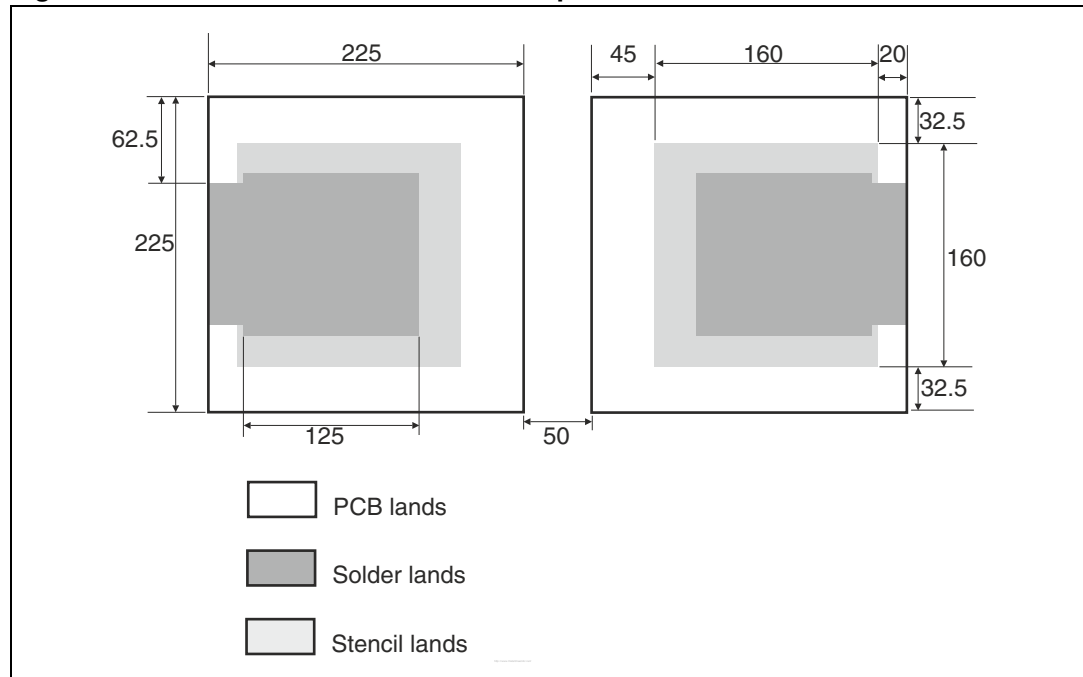


4 Recommendation on PCB assembly

4.1 Stencil opening design

Stencil opening thickness: 80 μm

Figure 10. Recommended stencil window position



4.2 Solder paste

1. Use halide-free flux, qualification ROL0 according to ANSI/J-STD-004.
2. "No clean" solder paste recommended.
3. Offers a high tack force to resist component displacement during PCB movement.
4. Solder paste with fine particles: type 4 (powder particle size 20-38 μm per IPC J-STD-005).

4.3 Placement

1. Manual positioning is not recommended.
2. It is recommended to use the lead recognition capabilities of the placement system, not the outline centering.
3. Tolerance of $\pm 0.02 \text{ mm}$ is recommended.

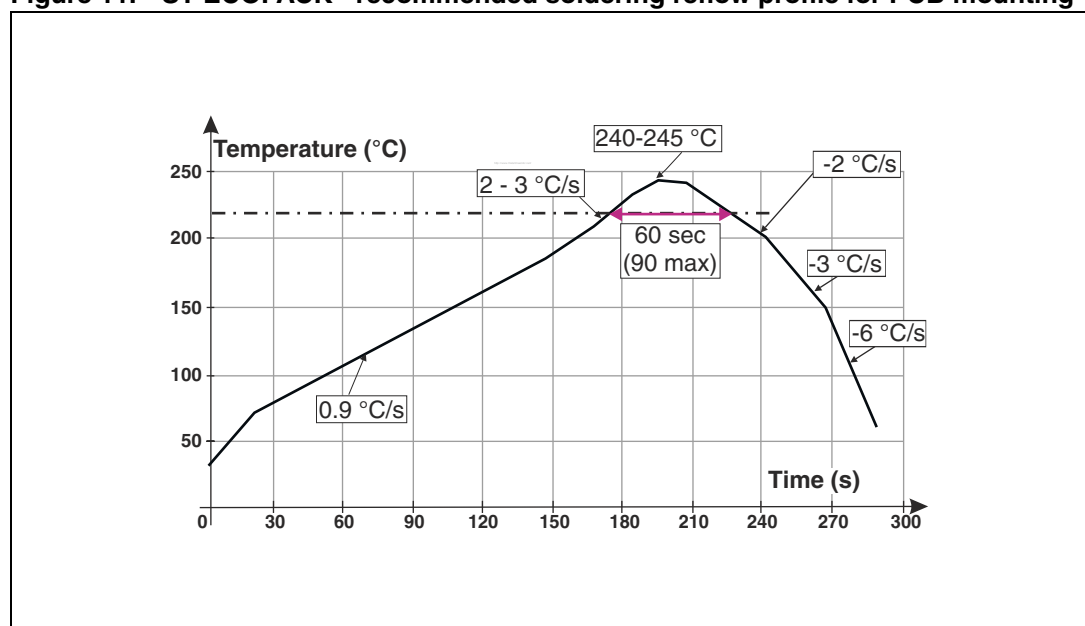
4. 1.0 N placement force is recommended. Too much placement force can lead to squeezed out solder paste and cause solder joints to short. Too low placement force can lead to insufficient contact between package and solder paste that could cause open solder joints or badly centered packages.
5. To improve the package placement accuracy, a bottom side optical control should be performed with a high resolution tool.
6. For assembly, a perfect supporting of the PCB (all the more on flexible PCB) is recommended during solder paste printing, pick and place and reflow soldering by using optimized tools.

4.4 PCB design preference

1. To control the solder paste amount, the closed via is recommended instead of open vias.
2. The position of tracks and open vias in the solder area should be well balanced. The symmetrical layout is recommended, in case any tilt phenomena caused by asymmetrical solder paste amount due to the solder flow away.

4.5 Reflow profile

Figure 11. ST ECOPACK® recommended soldering reflow profile for PCB mounting



Note: Minimize air convection currents in the reflow oven to avoid component movement.

5 Ordering information

Table 3. Ordering information

Order code	Marking	Weight	Base qty	Delivery mode
ESDAVLC6-1BV2	No marking	0.041 mg	20 000	Tape and reel

6 Revision history

Table 4. Document revision history

Date	Revision	Changes
05-Dec-2012	1	First issue

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.

© 2012 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

