

## TURBO 2 ULTRAFast HIGH VOLTAGE RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	1 A
$V_{RRM}$	600 V
$I_R (max)$	75 $\mu$ A
$T_j (max)$	175 °C
$V_F (max)$	1.05 V
$t_{rr} (max)$	80 ns

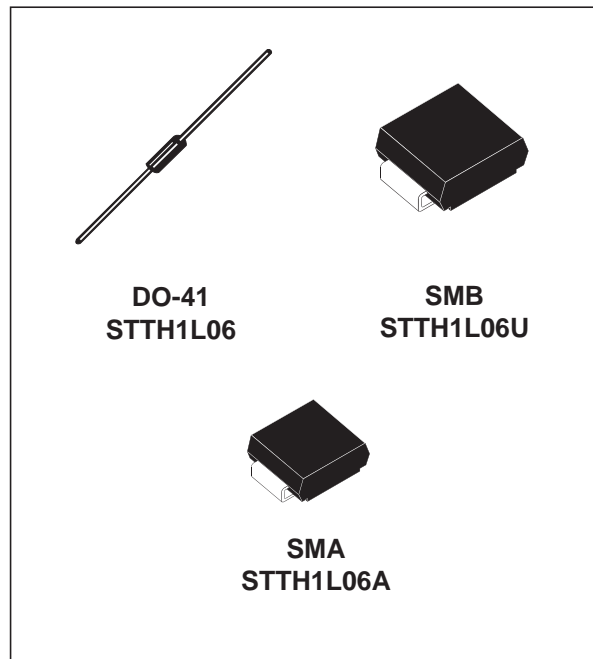
### FEATURES AND BENEFITS

- Ultrafast switching
- Low reverse recovery current
- Reduces switching & conduction losses
- Low thermal resistance

### DESCRIPTION

The STTH1L06/U/A, which is using ST Turbo 2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

The device is also intended for use as a free wheeling diode in power supplies and other power switching applications.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	RMS forward current	DO-41 SMA / SMB	10 7	A
$I_{F(AV)}$	Average forward current	TI = 120°C $\delta = 0.5$ DO-41 TI = 135°C $\delta = 0.5$ SMA TI = 145°C $\delta = 0.5$ SMB	1 1 1	A
$I_{FSM}$	Surge non repetitive forward current	tp = 10 ms Sinusoidal DO-41 tp = 10 ms Sinusoidal SMA / SMB	30 20	A
$T_{stg}$	Storage temperature range		- 65 + 175	°C
$T_j$	Maximum operating junction temperature		+ 175	°C

**THERMAL PARAMETERS**

Symbol	Parameter			Maximum	Unit
R <sub>th(j-l)</sub>	Junction to lead	L = 10 mm	DO-41	45	°C/W
			SMA	30	
			SMB	25	
R <sub>th(j-a)</sub>	Junction to ambient (note 1)	L = 10 mm	DO-41	70	

Note 1: R<sub>th(j-a)</sub> is measured with a copper area S = 5cm<sup>2</sup> (see Fig 12)

**STATIC ELECTRICAL CHARACTERISTICS**

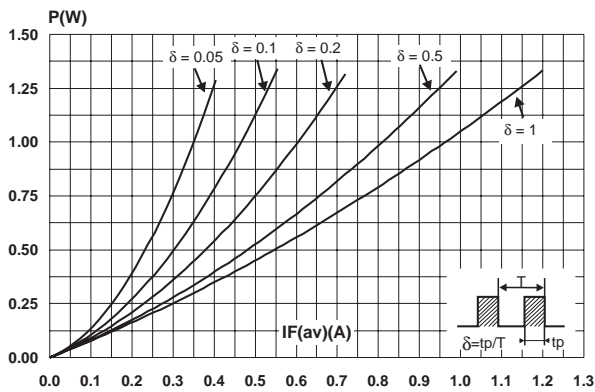
Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub>	Reverse leakage current	V <sub>R</sub> = 600V	T <sub>j</sub> = 25°C			1	µA
			T <sub>j</sub> = 150°C		10	75	
V <sub>F</sub>	Forward voltage drop	I <sub>F</sub> = 1 A	T <sub>j</sub> = 25°C			1.3	V
			T <sub>j</sub> = 150°C		0.85	1.05	

To evaluate the maximum conduction losses use the following equation :  
 $P = 0.89 \times I_{F(AV)} + 0.165 I_{F(RMS)}^2$

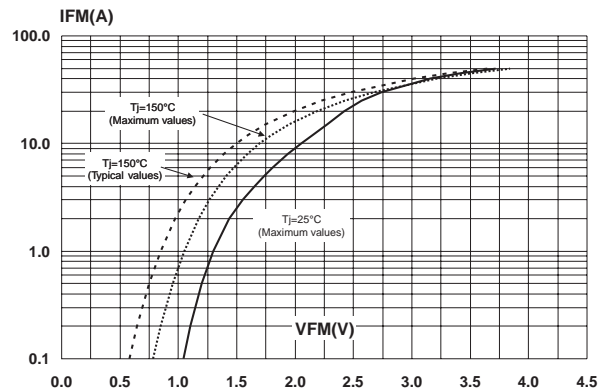
**DYNAMIC ELECTRICAL CHARACTERISTICS**

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t <sub>rr</sub>	Reverse recovery time	I <sub>F</sub> = 1 A dI <sub>F</sub> /dt = - 50 A/µs V <sub>R</sub> = 30V	T <sub>j</sub> = 25°C		55	80	ns
t <sub>fr</sub>	Forward recovery time	I <sub>F</sub> = 1 A dI <sub>F</sub> /dt = 100 A/µs V <sub>FR</sub> = 3.5V	T <sub>j</sub> = 25°C			50	ns
V <sub>FP</sub>	Forward recovery voltage	I <sub>F</sub> = 1A dI <sub>F</sub> /dt = 100 A/µs	T <sub>j</sub> = 25°C			10	V

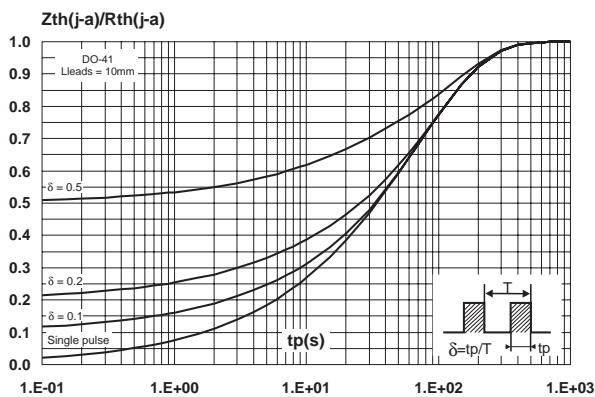
**Fig. 1:** Conduction losses versus average current.



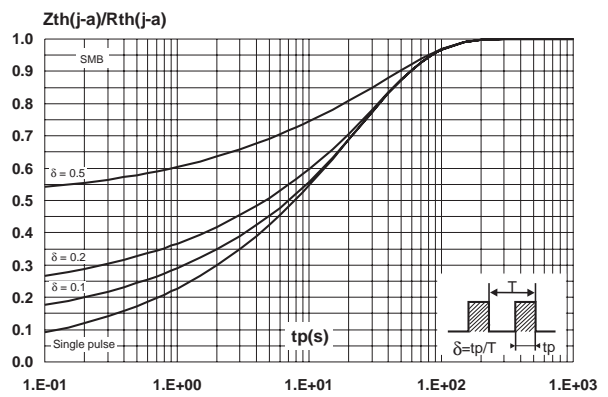
**Fig. 2:** Forward voltage drop versus forward current.



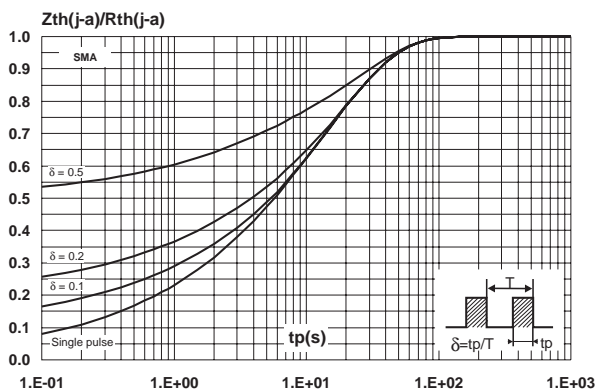
**Fig. 3-1:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, Leads = 10mm)



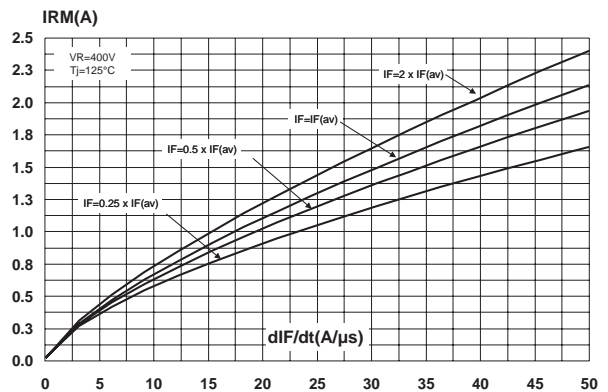
**Fig. 3-2:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4, S = 1cm²)



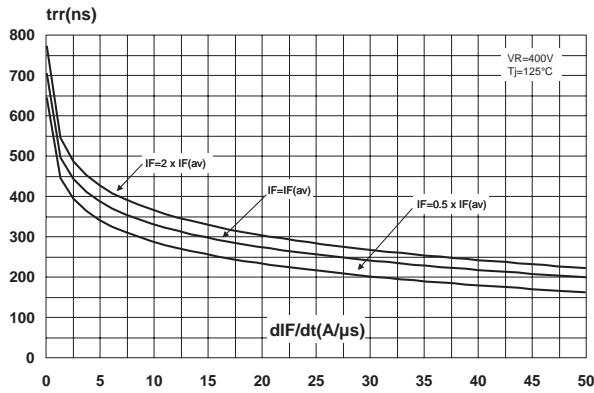
**Fig. 3-3:** Relative variation of thermal impedance junction ambient versus pulse duration (epoxy FR4)



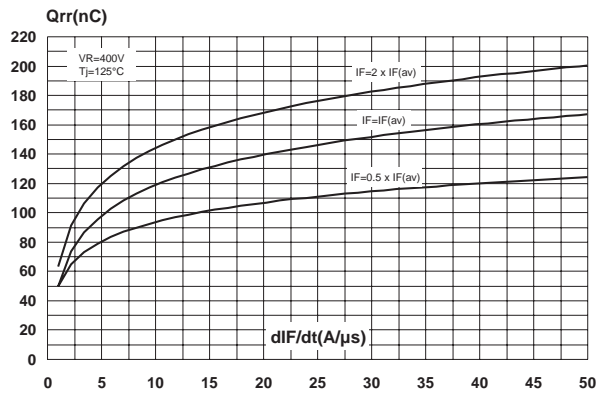
**Fig. 4:** Peak reverse recovery current versus dIF/dt (90% confidence).



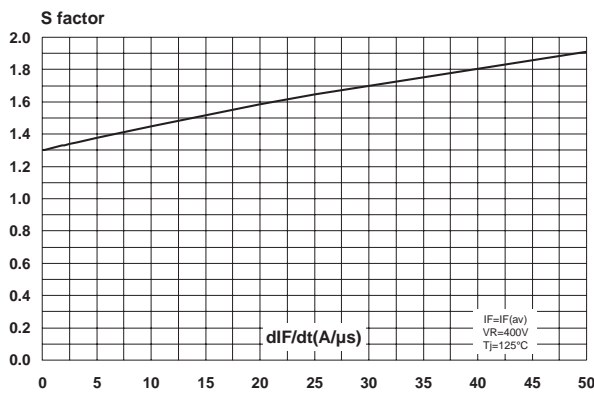
**Fig. 5:** Reverse recovery time versus  $di_F/dt$  (90% confidence).



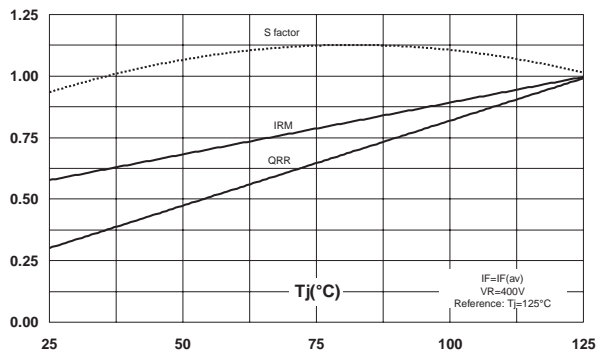
**Fig. 6:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



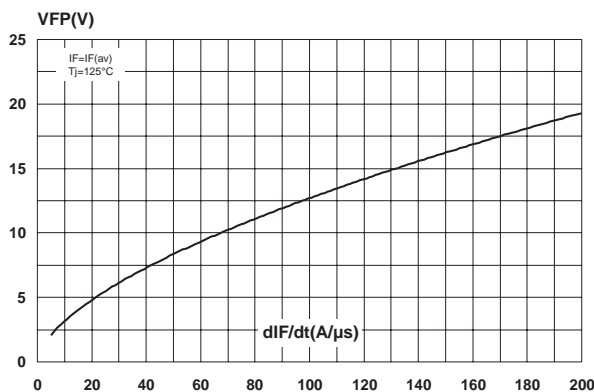
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



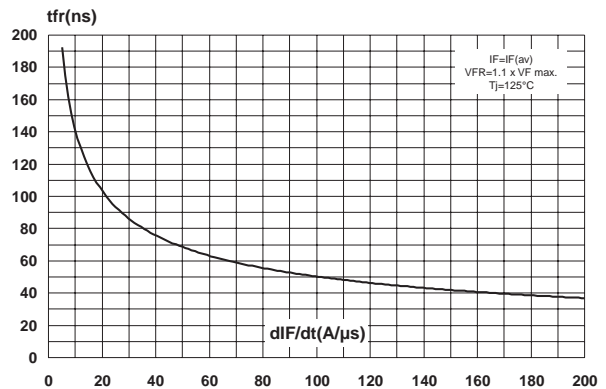
**Fig. 8:** Relative variations of dynamic parameters versus junction temperature.



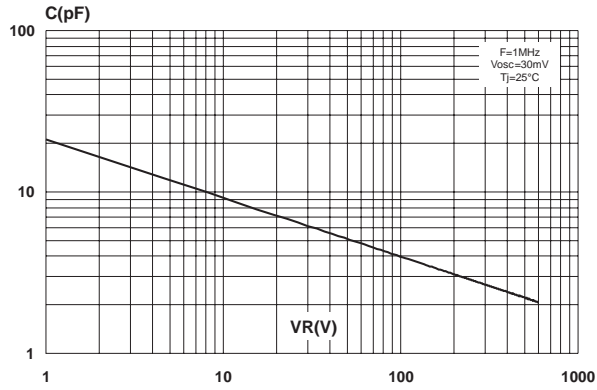
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).



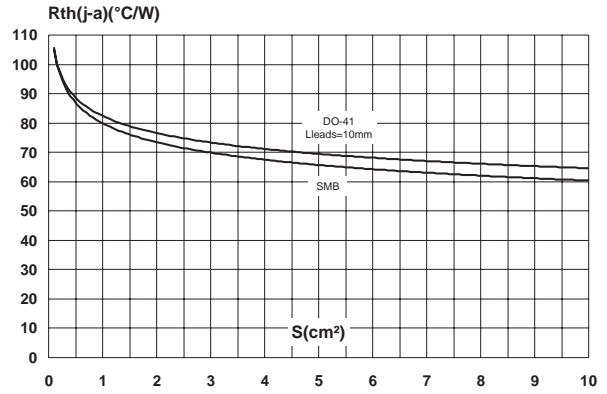
**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



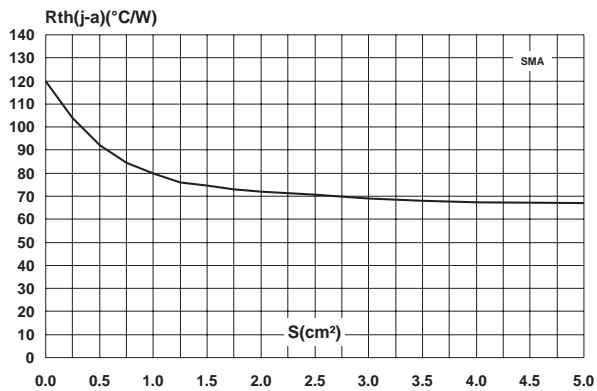
**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



**Fig. 12-1:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ ).



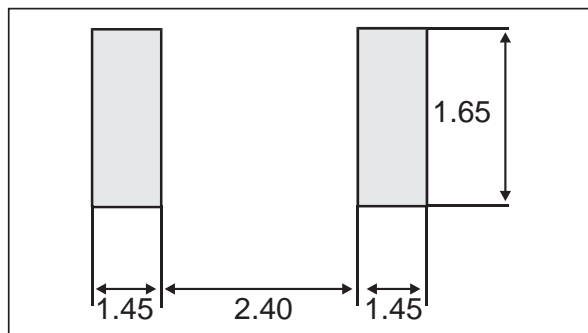
**Fig. 12-2:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ ).



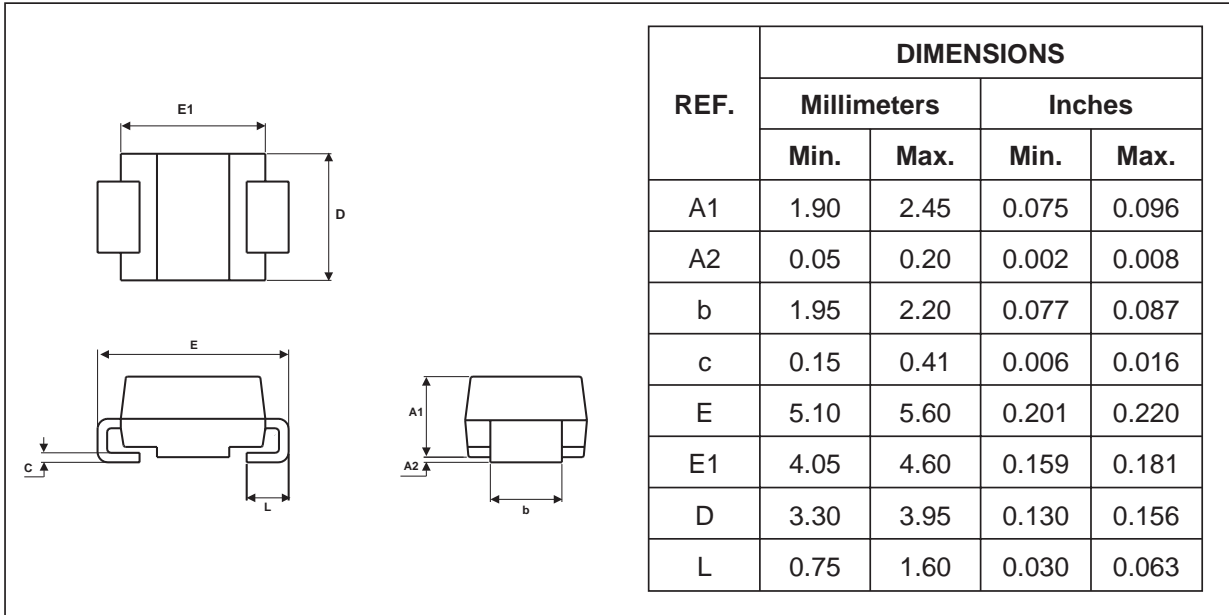
**PACKAGE MECHANICAL DATA**  
SMA

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.70	0.075	0.106
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.41	0.006	0.016
E	4.80	5.60	0.189	0.220
E1	3.95	4.60	0.156	0.181
D	2.25	2.95	0.089	0.116
L	0.75	1.60	0.030	0.063

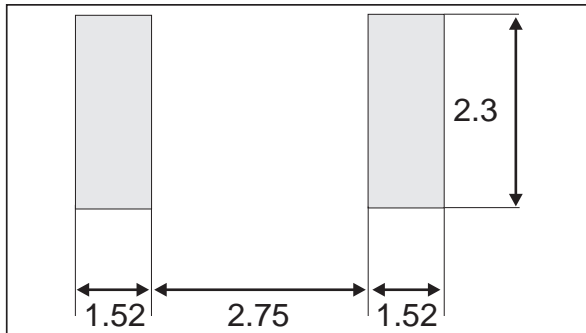
**FOOTPRINT**



**PACKAGE MECHANICAL DATA**  
SMB

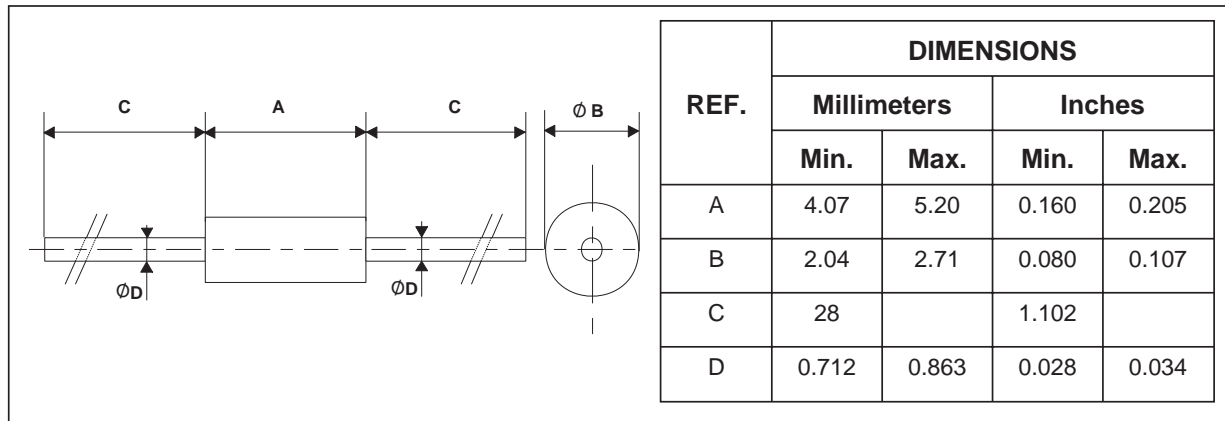


**FOOTPRINT**



# STTH1L06/U/A

## PACKAGE MECHANICAL DATA DO-41



Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1L06	STTH1L06	DO-41	0.34 g	2000	Ammopack
STTH1L06RL	STTH1L06	DO-41	0.34 g	5000	Tape & reel
STTH1L06U	BL6	SMB	0.11 g	2500	Tape & reel
STTH1L06A	HL6	SMA	0.068 g	5000	Tape & reel

- Epoxy meets UL 94,V0
- Band indicated cathode
- Bending method: Application note AN1471

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics  
 © 2002 STMicroelectronics - Printed in Italy - All rights reserved.  
 STMicroelectronics GROUP OF COMPANIES  
 Australia - Brazil - Canada - China - Finland - France - Germany  
 Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore  
 Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>