X006

0.8 A sensitive gate SCRs

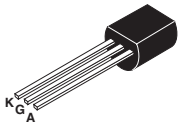
Features

- $I_{T(RMS)}$ = 0.8 A
- V_{DRM}/V_{RRM} = 600 V
- I_{GT} = 200 µA

Description

Thanks to highly sensitive triggering levels, the X006 SCR series is suitable for all applications where the available gate current is limited, such as ground fault circuit interrupters, overvoltage crowbar protection in low power supplies, capacitive ignition circuits, etc.

Available in though-hole or surface-mount packages, these devices are optimized in forward voltage drop and inrush current capabilities, for reduced power losses and high reliability in harsh environments.



TO-92
(X00602A)

SOT-223
(X00602N)

1 Characteristics

Table 1. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (180 °Conduction angle)	TO-92	T_l = 85 °C	0.8	A
		SOT-223	T_{tab} = 100 °C		
$IT_{(AV)}$	Average on-state current (180 °Conduction angle)	TO-92	T_l = 85 °C	0.5	A
		SOT-223	T_{tab} = 100 °C		
I_{TSM}	Non repetitive surge peak on-state current	t_p = 8.3 ms	T_j = 25 °C	10	A
		t_p = 10 ms		9	
I^2t	I^2t Value for fusing	t_p = 10 ms	T_j = 25 °C	0.4	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 60 Hz	T_j = 125 °C	50	A/µs
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	1	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	0.1	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C

Table 2. Electrical characteristics

Symbol	Test Conditions			Value	Unit
I_{GT}	V_D = 12 V, R_L = 140 Ω		MIN.	15	µA
			MAX.	200	
V_{GT}			MAX.	0.8	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ , R_{GK} = 1 kΩ	T_j = 125 °C	MIN.	0.2	V
V_{RG}	I_{RG} = 10 µA		MIN.	5	V
I_H	I_T = 50 mA, R_{GK} = 1 kΩ		MAX.	5	mA
I_L	I_G = 1 mA, R_{GK} = 1 kΩ		MAX.	6	mA
dV/dt	V_D = 67% V_{DRM}, R_{GK} = 1 kΩ	T_j = 125 °C	MIN.	25	V/µs
V_{TM}	I_{TM} = 1 A, tp = 380 µs	T_j = 25 °C	MAX.	1.35	V
V_{t0}	Threshold voltage	T_j = 125 °C	MAX.	0.85	V
R_d	Dynamic resistance	T_j = 125 °C	MAX.	245	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM} , R_{GK} = 1 kΩ	T_j = 25 °C	MAX.	1	µA
		T_j = 125 °C	MAX.	100	

Table 3. Thermal resistances

Symbol	Parameter			Value	Unit
$R_{th(j-a)}$	Junction to ambient (DC)		TO-92	150	°C/W
		S = 5 cm²	SOT-223	60	
$R_{th(j-l)}$	Junction to lead (DC)		TO-92	70	
$R_{th(j-t)}$	Junction to tab (DC)		SOT-223	30	

Figure 1. Maximum average power dissipation versus average on-state current

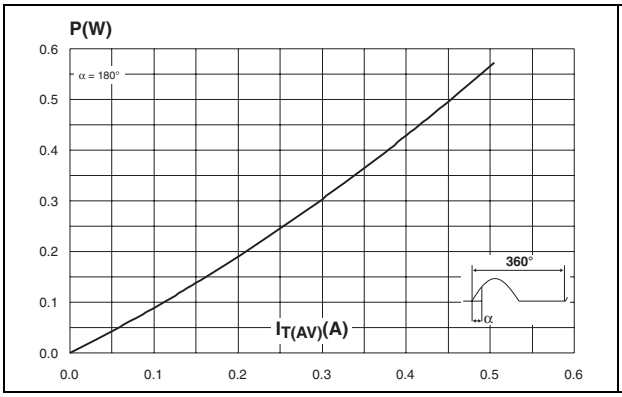


Figure 2. Average and DC on-state current versus case temperature (TO-92)

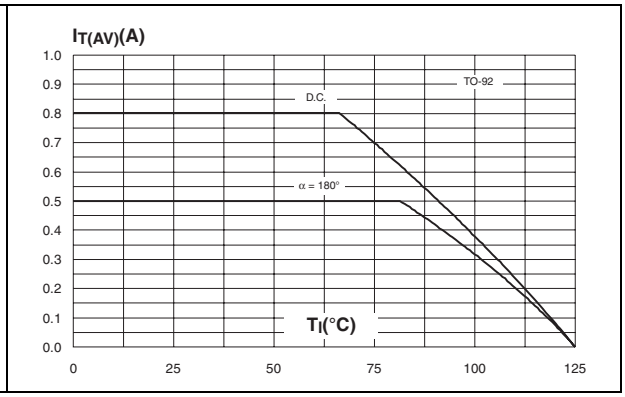


Figure 3. Average and D.C. on-state current versus ambient temperature (epoxy printed circuit board FR4, copper thickness = 35 µm, S_{CU} = 0.5 cm²) (TO-92)

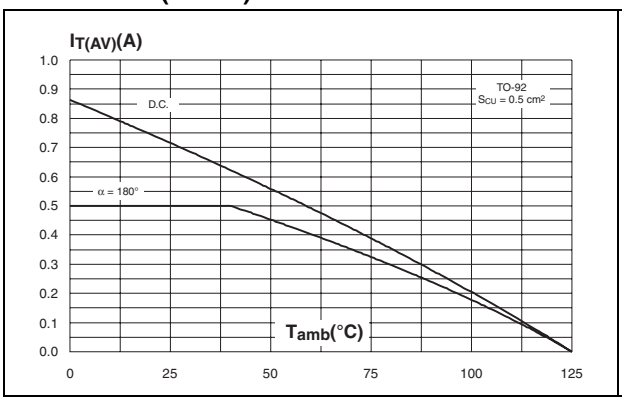


Figure 4. Average and DC on-state current versus case temperature (SOT-223)

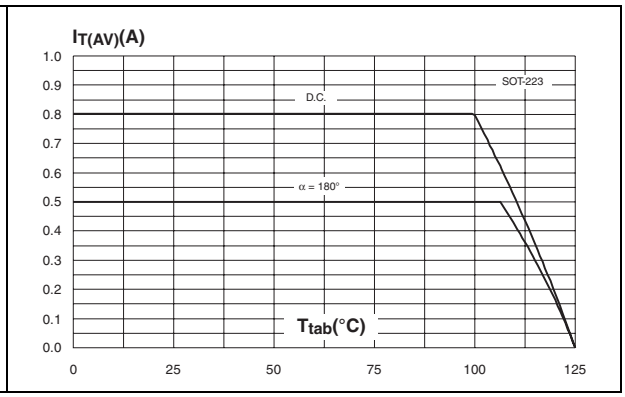


Figure 5. Average and DC on-state current versus ambient temperature (epoxy PCB FR4, copper thickness = 35 µm, S_{CU} = 5 cm^2) (SOT-223)

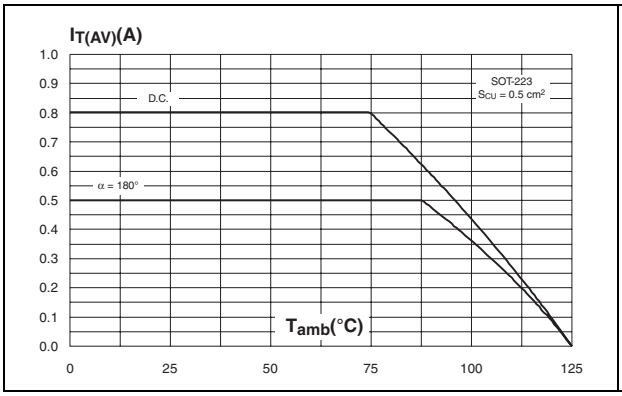


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration (PCB FR4, copper thickness = 35 µm, S_{CU} = 0.5 cm^2) (TO-92)

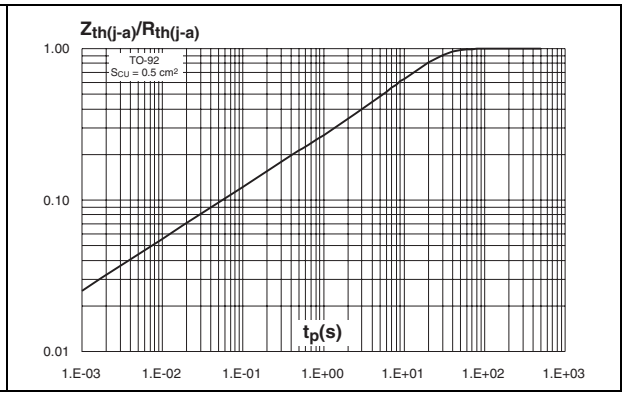


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (PCB FR4, copper thickness = 35 µm, S_{CU} = 0.5 cm^2) (SOT-223)

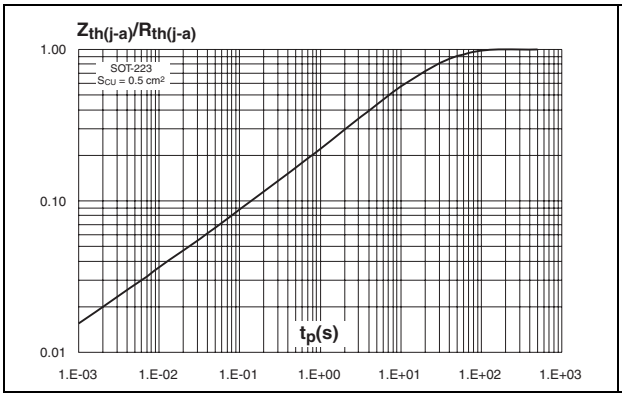


Figure 8. Thermal resistance junction to ambient versus copper surface under tab (PCB FR4, copper thickness = 35 µm) (SOT-223)

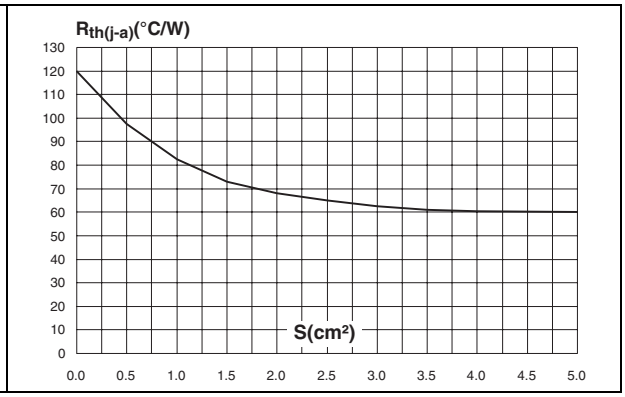


Figure 9. Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

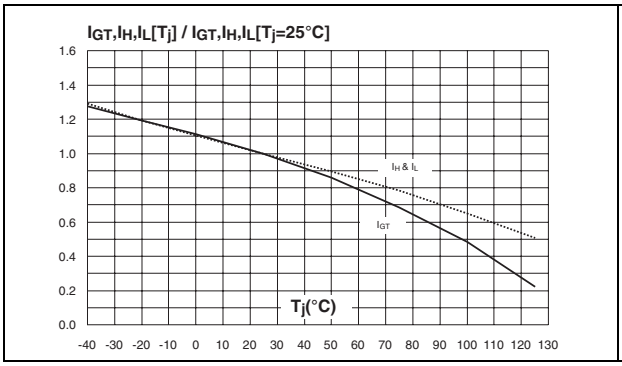


Figure 10. Relative variation of holding current versus gate-cathode resistance (typical values)

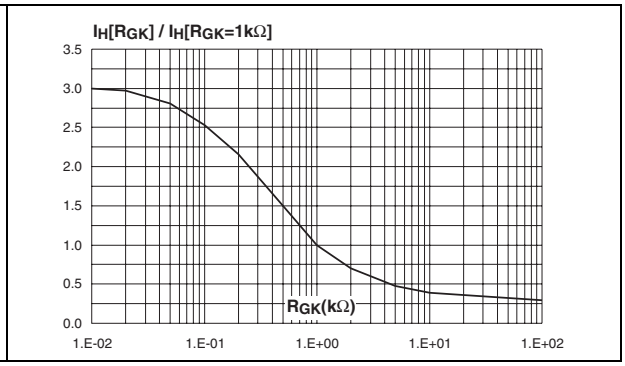


Figure 11. Relative variation of dV/dt immunity versus gate-cathode resistance (typical values)

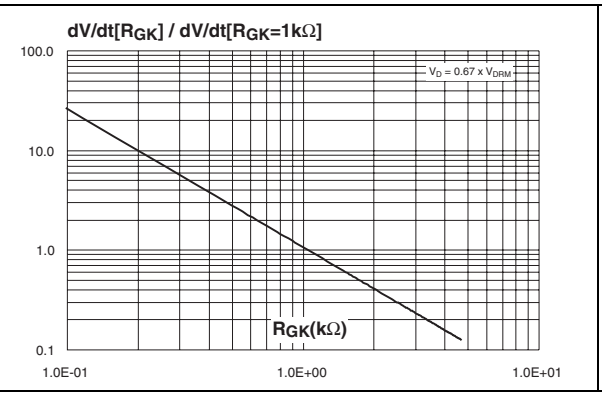


Figure 12. Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values)

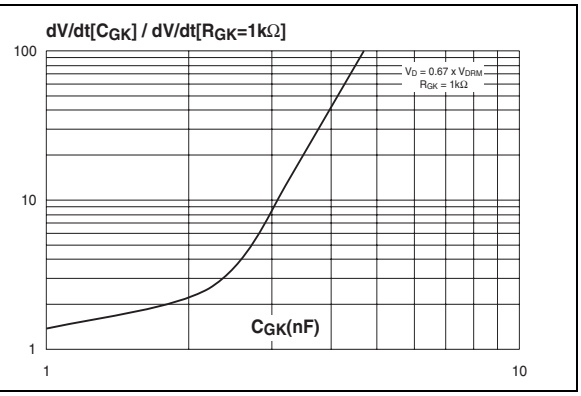


Figure 13. Surge peak on-state current versus number of cycles

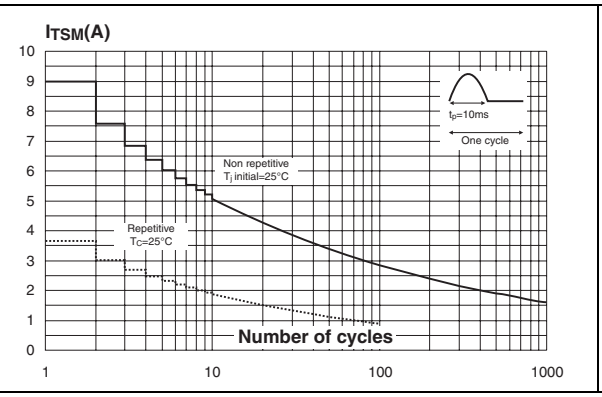


Figure 14. Non repetitive surge peak on-state current for a sinusoidal pulse with width t_P < 10ms, and corresponding value of I^2t

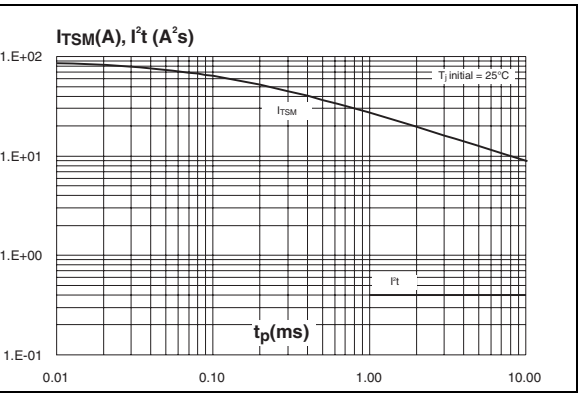
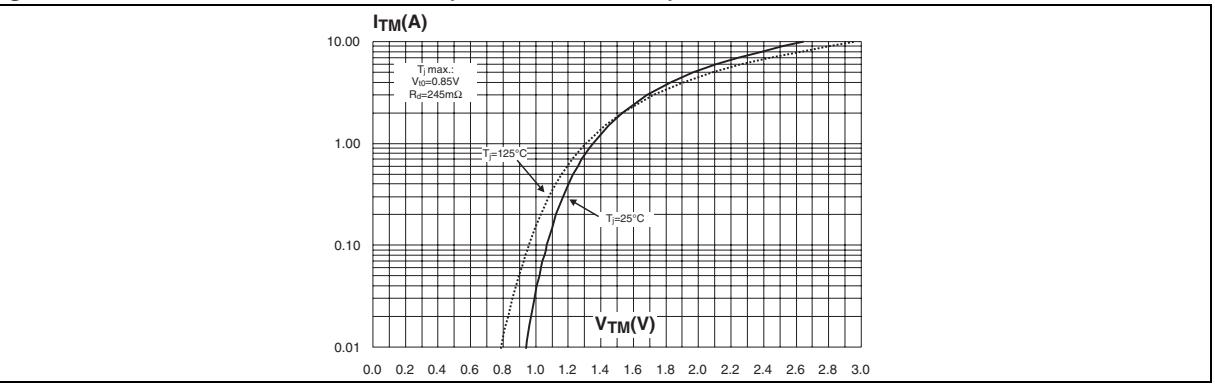
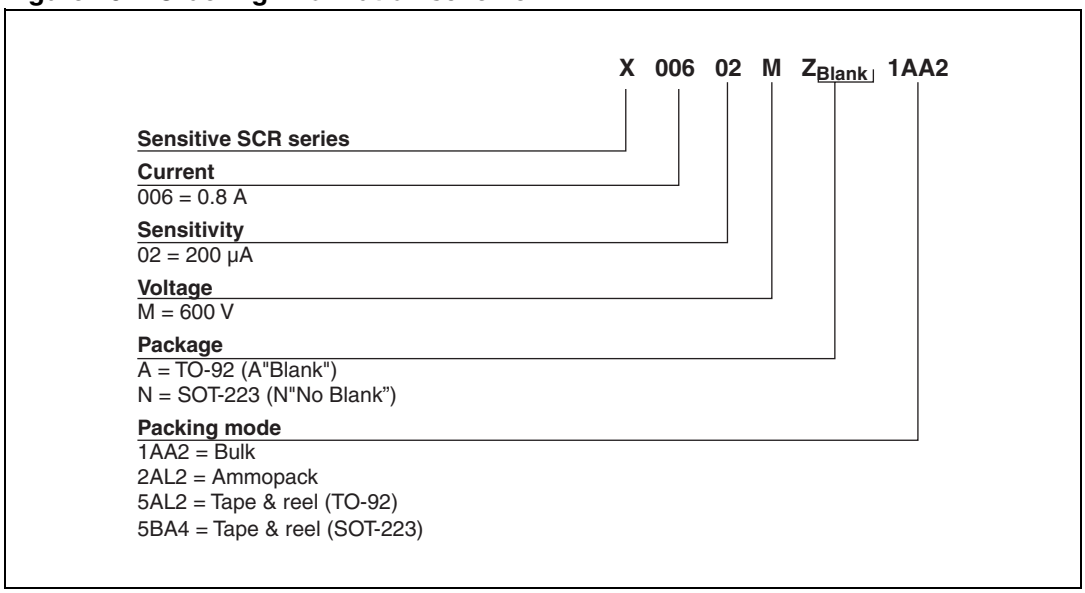


Figure 15. On-state characteristics (maximum values)



2 Ordering information scheme

Figure 16. Ordering information scheme

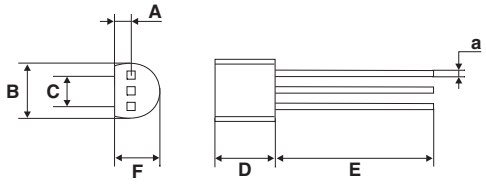


3 Package information

- Epoxy meets UL94, V0

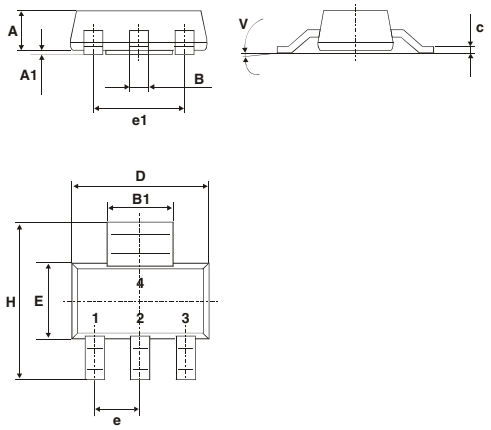
In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*.

Table 4. TO-92 (plastic) dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.35			0.053	
B			4.70			0.185
C		2.54			0.100	
D	4.40			0.173		
E	12.70			0.500		
F			3.70			0.146
a			0.50			0.019

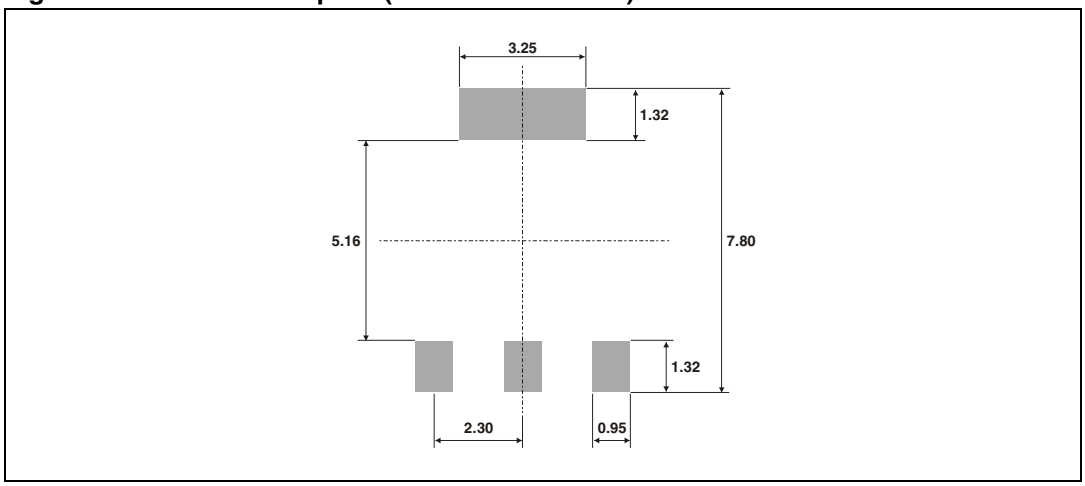
Table 5. SOT-223 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.80			0.071
A1		0.02	0.10		0.001	0.004
B	0.60	0.70	0.85	0.024	0.027	0.033
B1	2.90	3.00	3.15	0.114	0.118	0.124
c	0.24	0.26	0.35	0.009	0.010	0.014
D(1)	6.30	6.50	6.70	0.248	0.256	0.264
e		2.3			0.090	
e1		4.6			0.181	
E(1)	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V	10° max					

1. Do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm (0.006inches)

Figure 17. SOT-223 footprint (dimensions in mm)t



4 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
X00602MA 1AA2	X0602 MA	TO-92	0.2 g	2500	Bulk
X00602MA 2AL2				2000	Ammopack
X00602MA 5AL2				2000	Tape and reel
X00602MN5BA4	X06 2M	SOT-223	0.12 g	1000	

5 Revision history

Table 7. Document revision history

Date	Revision	Changes
Jan-2002	3	Last update.
08-Aug-2006	4	SOT-223 package added.
1-Apr-2008	5	Reformatted to current standards. Device X00605 removed. Updated dimensions in *Table 5*.

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 AN AUTHORIZED ST REPRESENTATIVE, 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.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9