

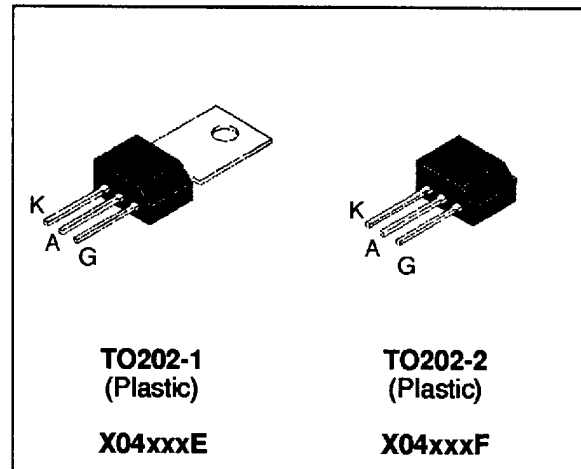
## SENSITIVE GATE SCR

### FEATURES

- $I_{T(RMS)} = 4A$
- $V_{DRM} = 200V$  to  $800V$
- Low  $I_{GT} < 200\mu A$

### DESCRIPTION

The X04xxxE/F series of SCRs uses a high performance TOP GLASS PNP technology. These parts are intended for general purpose applications where low gate sensitivity is required.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)	X04xxxE/F $T_c = 90^\circ C$	4	A
		X04xxxF $T_a = 25^\circ C$	1.35	
$I_{T(AV)}$	Mean on-state current (180° conduction angle)	X04xxxE/F $T_c = 90^\circ C$	2.5	A
		X04xxxF $T_a = 25^\circ C$	0.9	
$I_{TSM}$	Non repetitive surge peak on-state current ( $T_j$ initial = $25^\circ C$ )	$t_p = 8.3$ ms	33	A
		$t_p = 10$ ms	30	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10$ ms	4.5	$A^2s$
$di/dt$	Critical rate of rise of on-state current $I_G = 10$ mA $di_G/dt = 0.1$ A/ $\mu s$ .		50	A/ $\mu s$
$T_{sig}$ $T_j$	Storage and operating junction temperature range		- 40, + 150 - 40, + 125	$^\circ C$
$T_l$	Maximum lead temperature for soldering during 10s at 4.5mm from case		260	$^\circ C$

Symbol	Parameter	Voltage				Unit
		B	D	M	N	
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage $T_j = 125^\circ C$ $R_{GK} = 1K\Omega$	200	400	600	800	V

# X04xxxE/F

## THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
Rth(j-a)	Junction to ambient	X04xxxE	80	°C/W
		X04xxxF	100	
Rth(j-c)	Junction to case for DC		7.5	°C/W

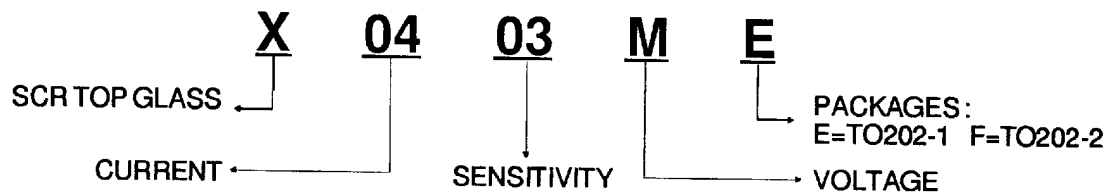
## GATE CHARACTERISTICS (maximum values)

$P_{G(AV)} = 0.2 \text{ W}$   $P_{GM} = 3 \text{ W}$  ( $t_p = 20 \mu\text{s}$ )  $I_{GM} = 1.2 \text{ A}$  ( $t_p = 20 \mu\text{s}$ )

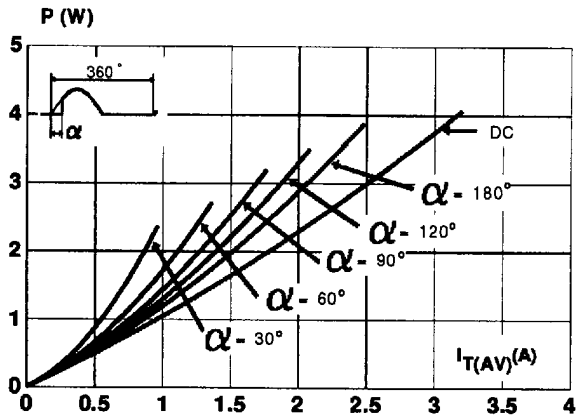
## ELECTRICAL CHARACTERISTICS

Symbol	Test Conditions				Sensitivity			Unit
					02	03	05	
I <sub>GT</sub>	V <sub>D</sub> =12V (DC) R <sub>L</sub> =140Ω	T <sub>j</sub> = 25°C	MIN		20	20	μA	
			MAX	200	200	50		
V <sub>GT</sub>	V <sub>D</sub> =12V (DC) R <sub>L</sub> =140Ω	T <sub>j</sub> = 25°C	MAX	0.8			V	
V <sub>GD</sub>	V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3kΩ R <sub>GK</sub> = 1 KΩ	T <sub>j</sub> = 125°C	MIN	0.1			V	
V <sub>FGM</sub>	I <sub>RG</sub> = 10μA	T <sub>j</sub> = 25°C	MIN	8			V	
t <sub>gd</sub>	V <sub>D</sub> =V <sub>DRM</sub> I <sub>TM</sub> = 3 x I <sub>T(AV)</sub> dI <sub>G</sub> /dt = 0.1A/μs I <sub>G</sub> = 10mA	T <sub>j</sub> = 25°C	MAX	2			μs	
I <sub>H</sub>	I <sub>T</sub> = 50mA R <sub>GK</sub> = 1 KΩ	T <sub>j</sub> = 25°C	MAX	5			mA	
I <sub>L</sub>	I <sub>G</sub> =1mA R <sub>GK</sub> = 1 KΩ	T <sub>j</sub> = 25°C	MAX	6			mA	
V <sub>TM</sub>	I <sub>TM</sub> = 8A t <sub>p</sub> = 380μs	T <sub>j</sub> = 25°C	MAX	1.8			V	
I <sub>DRM</sub> I <sub>RRM</sub>	V <sub>D</sub> = V <sub>DRM</sub> R <sub>GK</sub> = 1 KΩ V <sub>R</sub> = V <sub>RRM</sub>	T <sub>j</sub> = 25°C	MAX	5			μA	
			T <sub>j</sub> = 110°C	MAX	200			
dV/dt	V <sub>D</sub> =67%V <sub>DRM</sub> R <sub>GK</sub> = 1 KΩ	T <sub>j</sub> = 110°C	MIN			10	V/μs	
			TYP	15	20	15		
t <sub>q</sub>	I <sub>TM</sub> = 3 x I <sub>T(AV)</sub> V <sub>R</sub> =35V dI/dt=10A/μs t <sub>p</sub> =100μs dV/dt=2V/μs V <sub>D</sub> = 67%V <sub>DRM</sub> R <sub>GK</sub> = 1 KΩ	T <sub>j</sub> = 110°C	MAX	50			μs	

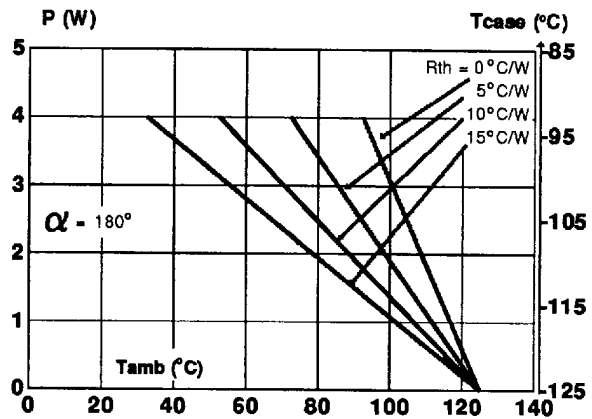
## ORDERING INFORMATION



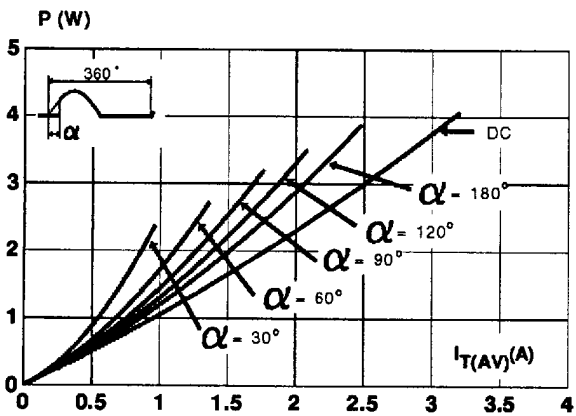
**Fig.1 :** Maximum average power dissipation versus average on-state current (TO202-1).



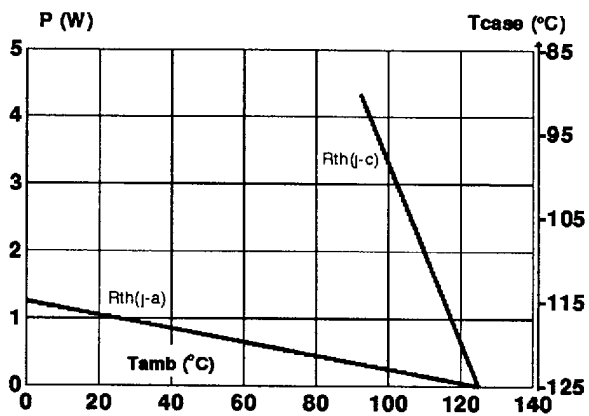
**Fig.2 :** Correlation between maximum average power dissipation and maximum allowable temperature (Tamb and Tcase) for different thermal resistances heatsink + contact (TO202-1).



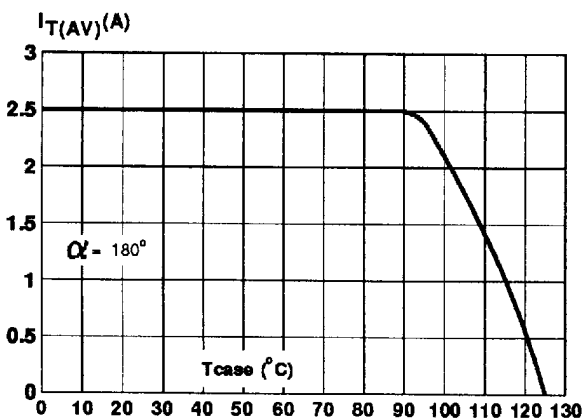
**Fig.3 :** Maximum average power dissipation versus average on-state current (TO202-2).



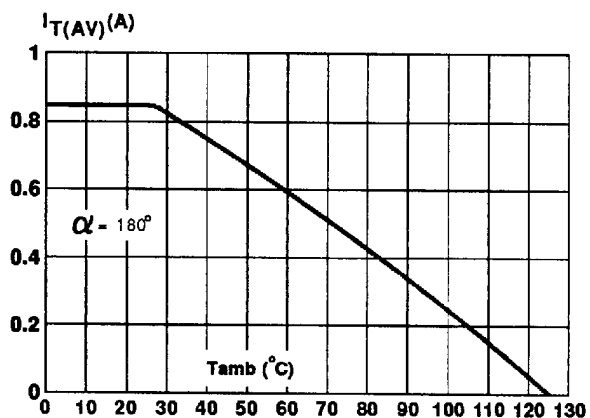
**Fig.4 :** Correlation between maximum average power dissipation and maximum allowable temperature (Tamb and Tcase) (TO202-2).



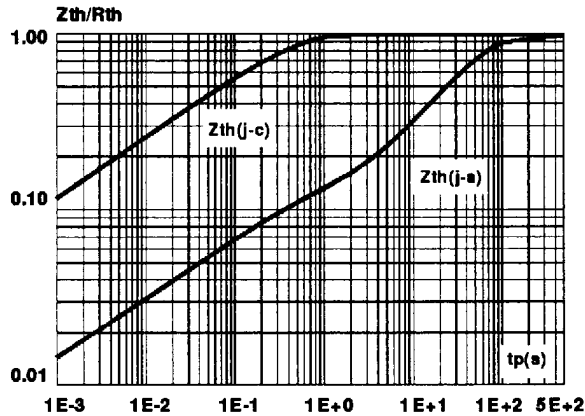
**Fig.5 :** Average on-state current versus case temperature (TO202-1).



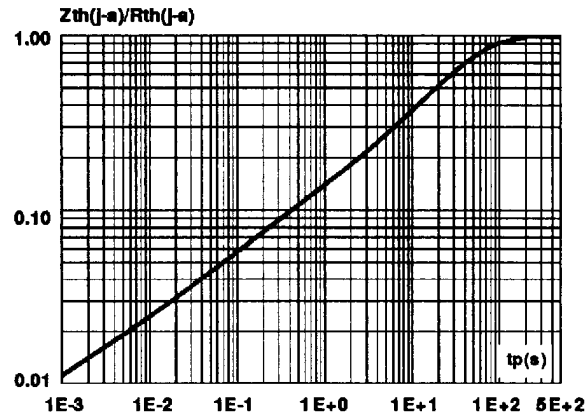
**Fig.6 :** Average on-state current versus case temperature (TO202-2).



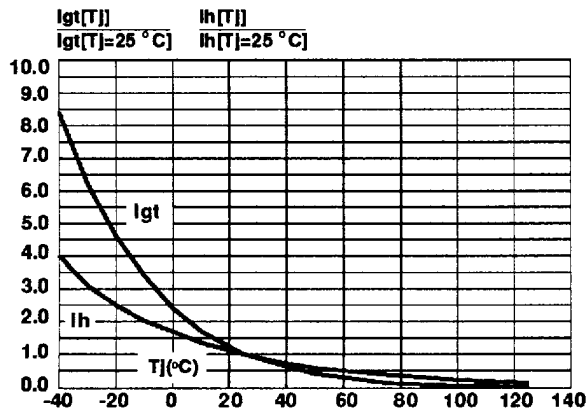
**Fig.7 :** Relative variation of thermal impedance versus pulse duration (TO202-1).



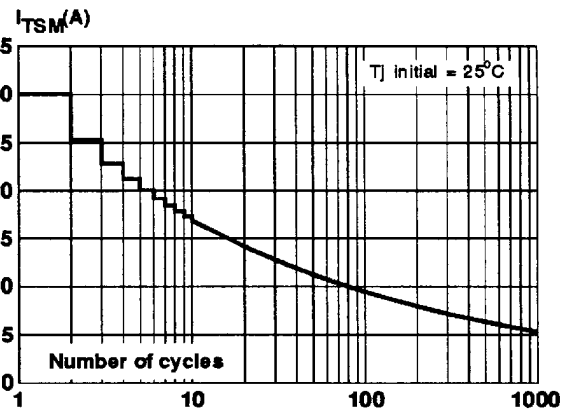
**Fig.8 :** Relative variation of thermal impedance junction to ambient versus pulse duration (TO202-2).



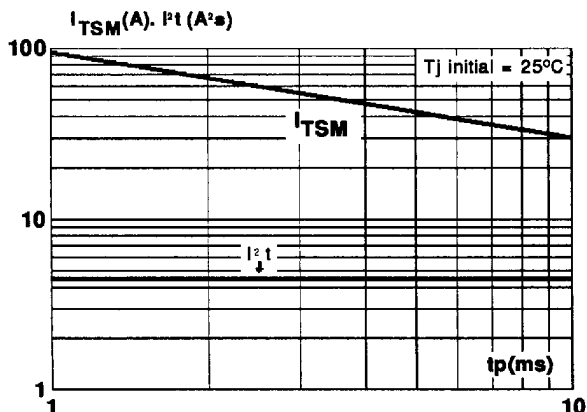
**Fig.9 :** Relative variation of gate trigger current and holding current versus junction temperature.



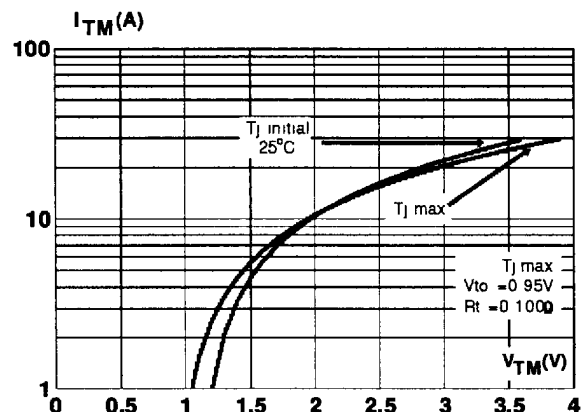
**Fig.10 :** Non repetitive surge peak on-state current versus number of cycles.



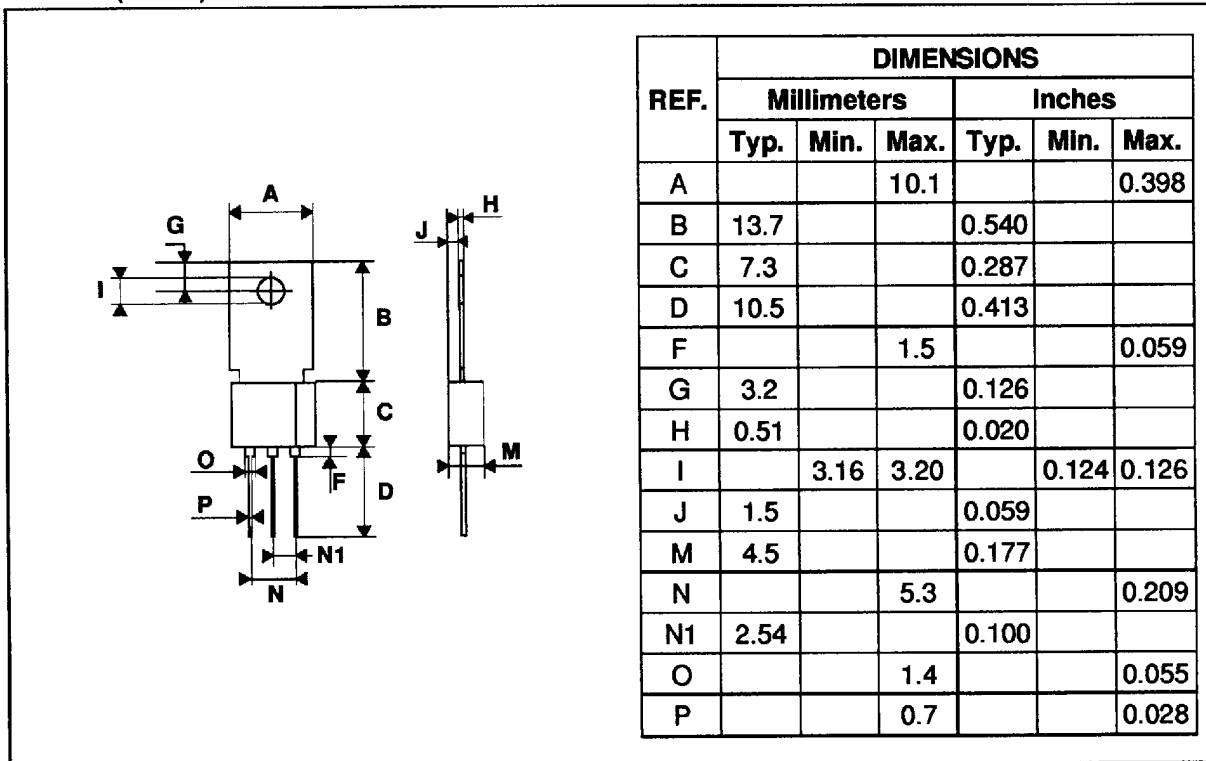
**Fig.11 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $tp \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



**Fig.12 :** On-state characteristics (maximum values).



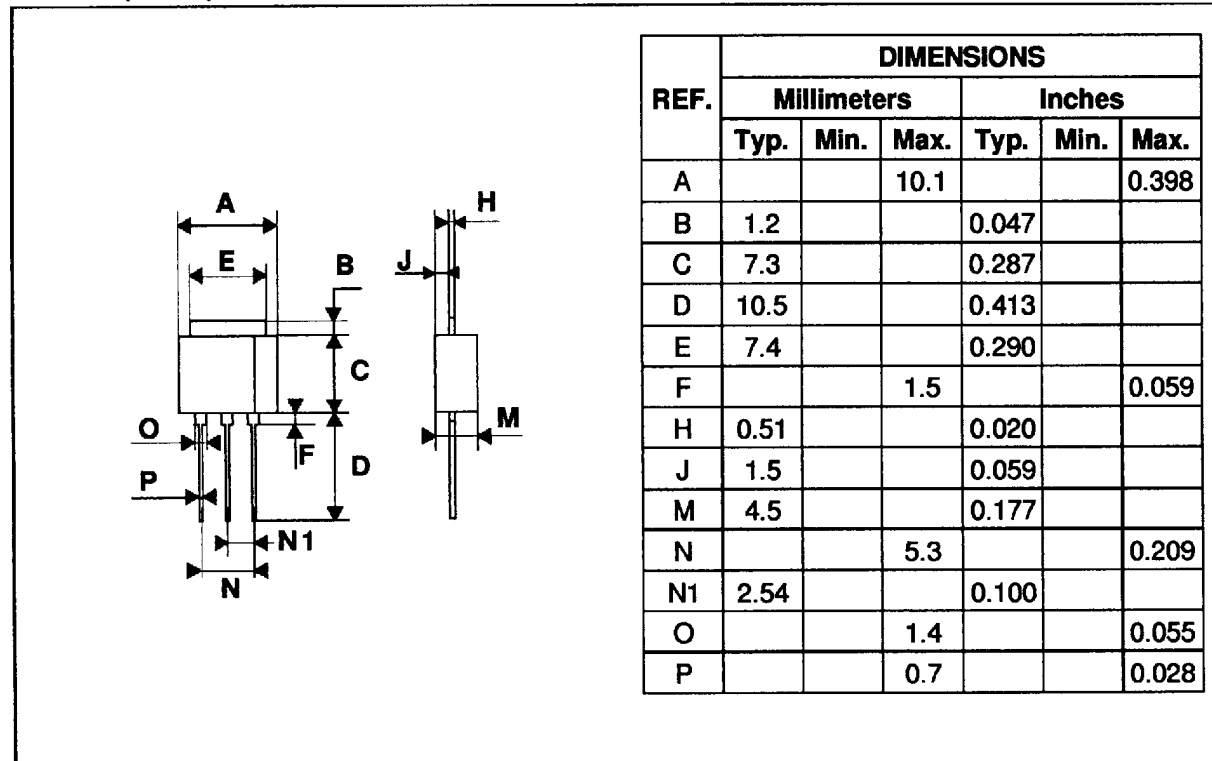
**PACKAGE MECHANICAL DATA**  
TO202-1 (Plastic)



Marking : type number  
Weight : 1.4 g

X04xxxE/F

**PACKAGE MECHANICAL DATA**  
TO202-2 (Plastic)



Marking : type number  
Weight : 1.0 g

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