

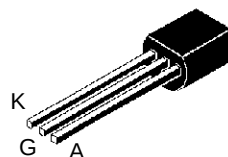
## SENSITIVE GATE SCR

### FEATURES

- $I_{T(RMS)} = 1.25A$
- $V_{DRM} = 200V$  to  $800V$
- Low  $I_{GT} < 200 \mu A$

### DESCRIPTION

The X02xxxA 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.



**TO92**  
(Plastic)

### ABSOLUTE RATINGS (limiting values)

| Symbol             | Parameter                                                                                            |                        | Value                      | Unit       |
|--------------------|------------------------------------------------------------------------------------------------------|------------------------|----------------------------|------------|
| $I_{T(RMS)}$       | RMS on-state current<br>(180° conduction angle)                                                      | $T_I = 60^\circ C$     | 1.25                       | A          |
| $I_{T(AV)}$        | Mean on-state current<br>(180° conduction angle)                                                     | $T_I = 60^\circ C$     | 0.8                        | A          |
| $I_{TSM}$          | Non repetitive surge peak on-state current<br>( $T_j$ initial = $25^\circ C$ )                       | $t_p = 8.3 \text{ ms}$ | 25                         | A          |
|                    |                                                                                                      | $t_p = 10 \text{ ms}$  | 22.5                       |            |
| $I^2_t$            | $I^2_t$ Value for fusing                                                                             | $t_p = 10 \text{ ms}$  | 2.5                        | $A^2s$     |
| $di/dt$            | Critical rate of rise of on-state current<br>$I_G = 10 \text{ mA}$ $di_G/dt = 0.1 \text{ A}/\mu s$ . |                        | 30                         | $A/\mu s$  |
| $T_{stg}$<br>$T_j$ | Storage and operating junction temperature range                                                     |                        | - 40, + 150<br>- 40, + 125 | $^\circ C$ |
| $T_I$              | Maximum lead temperature for soldering during 10s at<br>2mm from case                                |                        | 260                        | $^\circ C$ |

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

## X02xxxA

### THERMAL RESISTANCES

| Symbol   | Parameter                | Value | Unit |
|----------|--------------------------|-------|------|
| Rth(j-a) | Junction to ambient      | 150   | °C/W |
| Rth(j-l) | Junction to leads for DC | 60    | °C/W |

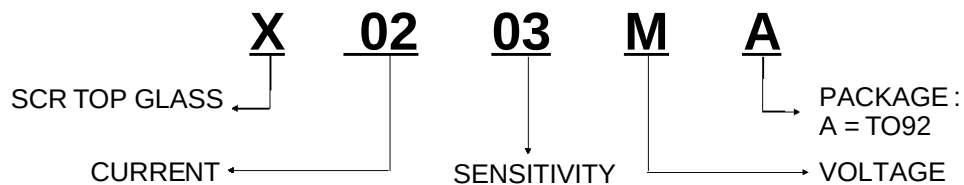
### GATE CHARACTERISTICS (maximum values)

$P_G$  (AV) = 0.2 W    $P_{GM}$  = 3 W (tp = 20 μs)    $I_{GM}$  = 1.2 A (tp = 20 μs)

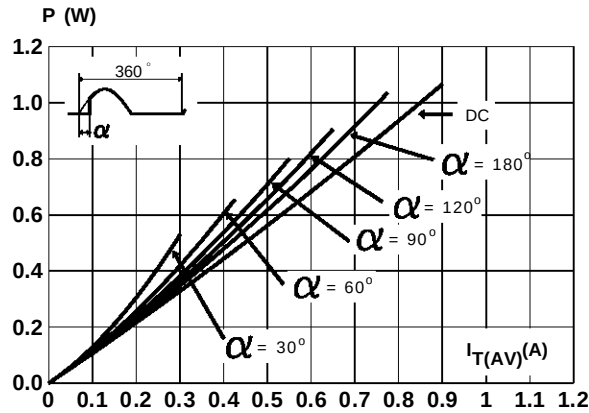
### ELECTRICAL CHARACTERISTICS

| Symbol                 | Test Conditions                                                                                                                   |                   |     | Sensitivity |     |    | Unit    |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------|-----|-------------|-----|----|---------|
|                        |                                                                                                                                   |                   |     | 02          | 03  | 05 |         |
| $I_{GT}$               | $V_D=12V$ (DC) $R_L=140\Omega$                                                                                                    | $T_j=25^\circ C$  | MIN |             | 20  | 20 | $\mu A$ |
|                        |                                                                                                                                   |                   | MAX | 200         | 200 | 50 |         |
| $V_{GT}$               | $V_D=12V$ (DC) $R_L=140\Omega$                                                                                                    | $T_j=25^\circ C$  | MAX | 0.8         |     |    | V       |
| $V_{GD}$               | $V_D=V_{DRM}$ $R_L=3.3k\Omega$<br>$R_{GK}=1K\Omega$                                                                               | $T_j=125^\circ C$ | MIN | 0.1         |     |    | V       |
| $V_{RGM}$              | $I_{RG}=10\mu A$                                                                                                                  | $T_j=25^\circ C$  | MIN | 8           |     |    | V       |
| tg d                   | $V_D=V_{DRM}$ $I_{TM}=3 \times I_{T(AV)}$<br>$dI_G/dt=0.1A/\mu s$ $I_G=10mA$                                                      | $T_j=25^\circ C$  | TYP | 0.5         |     |    | $\mu s$ |
| $I_H$                  | $I_T=50mA$ $R_{GK}=1K\Omega$                                                                                                      | $T_j=25^\circ C$  | MAX | 5           |     |    | mA      |
| $I_L$                  | $I_G=1mA$ $R_{GK}=1K\Omega$                                                                                                       | $T_j=25^\circ C$  | MAX | 6           |     |    | mA      |
| $V_{TM}$               | $I_{TM}=2.5A$ tp = 380 μs                                                                                                         | $T_j=25^\circ C$  | MAX | 1.45        |     |    | V       |
| $I_{DRM}$<br>$I_{RRM}$ | $V_D=V_{DRM}$ $R_{GK}=1K\Omega$<br>$V_R=V_{RRM}$                                                                                  | $T_j=25^\circ C$  | MAX | 5           |     |    | $\mu A$ |
|                        |                                                                                                                                   | $T_j=110^\circ C$ | MAX | 200         |     |    | $\mu A$ |
| dV/dt                  | $V_D=67\%V_{DRM}$ $R_{GK}=1K\Omega$                                                                                               | $T_j=110^\circ C$ | TYP | 15          | 20  | 15 | V/μs    |
| tq                     | $I_{TM}=3 \times I_{T(AV)}$ $V_R=35V$<br>$dI/dt=10A/\mu s$ tp = 100 μs<br>$dV/dt=2V/\mu s$<br>$V_D=67\%V_{DRM}$ $R_{GK}=1K\Omega$ | $T_j=110^\circ C$ | MAX | 100         |     |    | $\mu s$ |

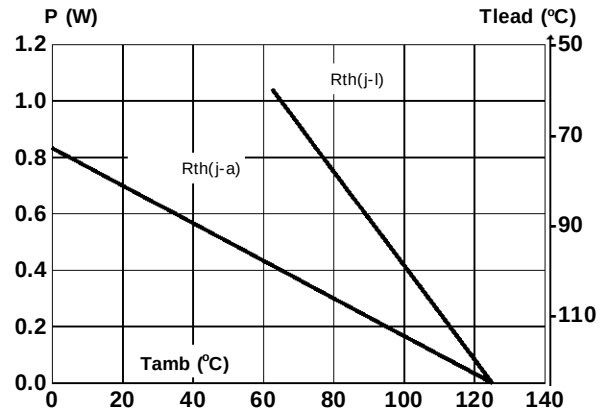
### ORDERING INFORMATION



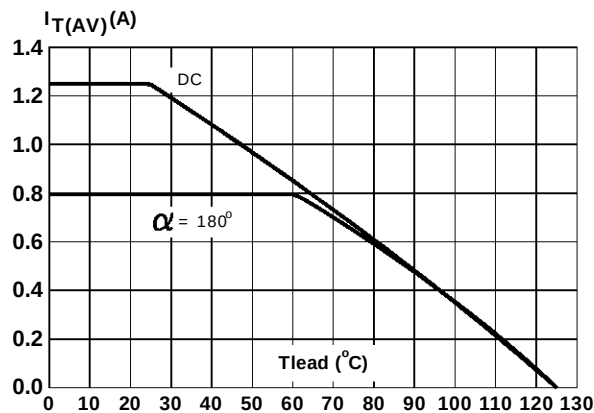
**Fig.1 :** Maximum average power dissipation versus average on-state current.



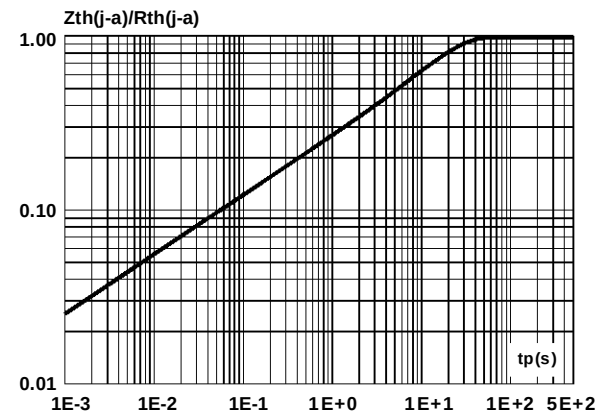
**Fig.2 :** Correlation between maximum average power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{lead}$ ).



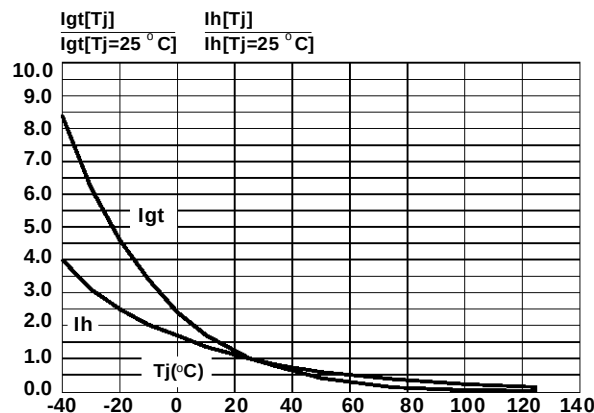
**Fig.3 :** Average on-state current versus lead temperature.



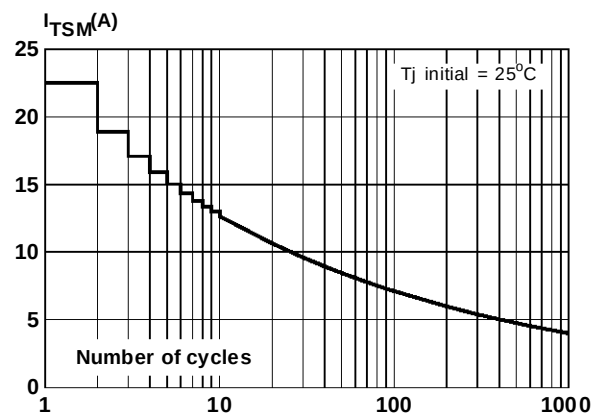
**Fig.4 :** Relative variation of thermal impedance junction to ambient versus pulse duration.



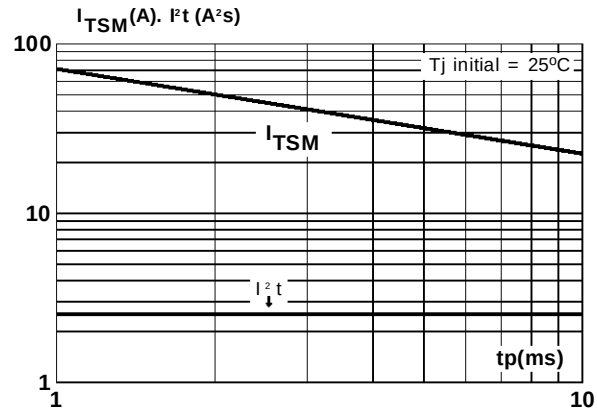
**Fig.5 :** Relative variation of gate trigger current and holding current versus junction temperature.



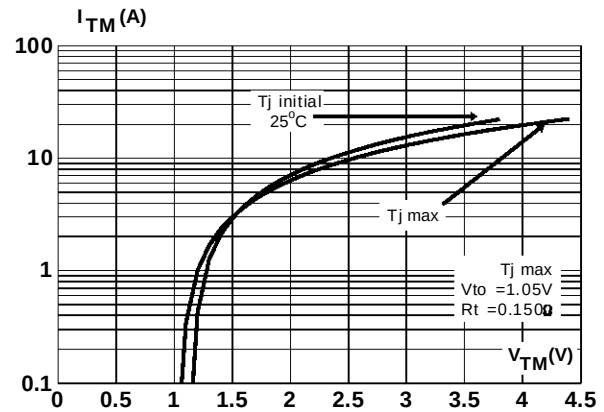
**Fig.6 :** Non repetitive surge peak on-state current versus number of cycles.



**Fig.7 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t_p \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



**Fig.8 :** On-state characteristics (maximum values).



**PACKAGE MECHANICAL DATA**  
 TO92 (Plastic)

| REF. | DIMENSIONS  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Typ.        | Min. | Max. | Typ.   | Min.  | Max.  |
| A    | 1.35        |      |      | 0.053  |       |       |
| B    |             |      | 4.7  |        |       | 0.185 |
| C    | 2.54        |      |      | 0.100  |       |       |
| D    |             | 4.4  | 4.8  |        | 0.173 | 0.189 |
| E    |             | 12.7 |      |        | 0.500 |       |
| F    |             |      | 3.7  |        |       | 0.146 |
| a    |             |      | 0.45 |        |       | 0.017 |

Marking : Type number  
 Weight : 0.2 g

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