

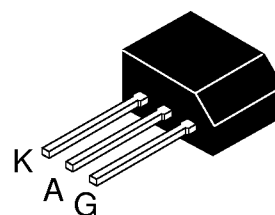
## SENSITIVE GATE SCR

### FEATURES

- $I_{T(RMS)} = 4A$
- $V_{DRM} = 400V$  to  $800V$
- Low  $I_{GT} < 200\mu A$

### DESCRIPTION

The X04xxxF 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, like small engine ignition, SMPS crowbar protection, food processor.



**TO202-3**  
(Plastic)

### ABSOLUTE RATINGS (limiting values)

| Symbol             | Parameter                                                                               |                    | Value                      | Unit       |
|--------------------|-----------------------------------------------------------------------------------------|--------------------|----------------------------|------------|
| $I_{T(RMS)}$       | RMS on-state current<br>(180° conduction angle)                                         | $T_c = 90^\circ C$ | 4                          | A          |
|                    |                                                                                         | $T_a = 25^\circ C$ | 1.35                       |            |
| $I_{T(AV)}$        | Mean on-state current<br>(180° conduction angle)                                        | $T_c = 90^\circ C$ | 2.5                        | A          |
|                    |                                                                                         | $T_a = 25^\circ C$ | 0.9                        |            |
| $I_{TSM}$          | Non repetitive surge peak on-state current<br>( $T_j$ 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<br>$I_G = 10$ mA $di_G/dt = 0.1$ A/ $\mu s$ . |                    | 50                         | A/ $\mu s$ |
| $T_{stg}$<br>$T_j$ | Storage and operating junction temperature range                                        |                    | - 40, + 150<br>- 40, + 125 | $^\circ C$ |
| TI                 | Maximum lead temperature for soldering during 10s at 4.5mm from case                    |                    | 260                        | $^\circ C$ |

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

## X04xxxF

### THERMAL RESISTANCES

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

### GATE CHARACTERISTICS

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

$V_{GD} = 0.1 \text{ Vmin. (V}_D = V_{DRM} \text{ } R_L = 3.3 \text{ k}\Omega \text{ } R_{GK} = 1 \text{ k}\Omega \text{ } T_j = 125^\circ\text{C)}$

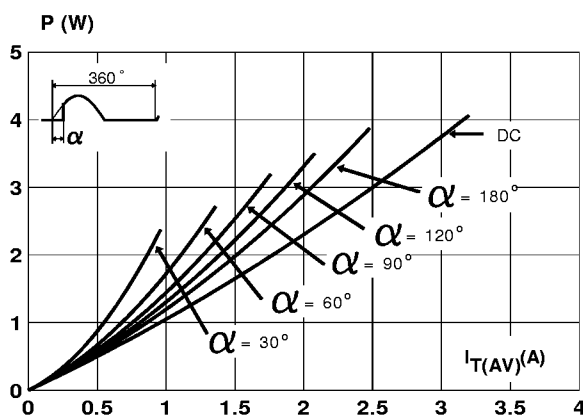
### ELECTRICAL CHARACTERISTICS

| 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>RGM</sub>                     | I <sub>RG</sub> =10μA                                                                         | T <sub>j</sub> = 25°C  | MIN | 8           |     |    | V    |
| 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 tp= 380μs                                                                | T <sub>j</sub> = 25°C  | MAX | 1.8         |     |    | V    |
| I <sub>DRM</sub><br>I <sub>RRM</sub> | V <sub>D</sub> = V <sub>DRM</sub> R <sub>GK</sub> = 1 KΩ<br>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          | 15  | 15 | V/μs |

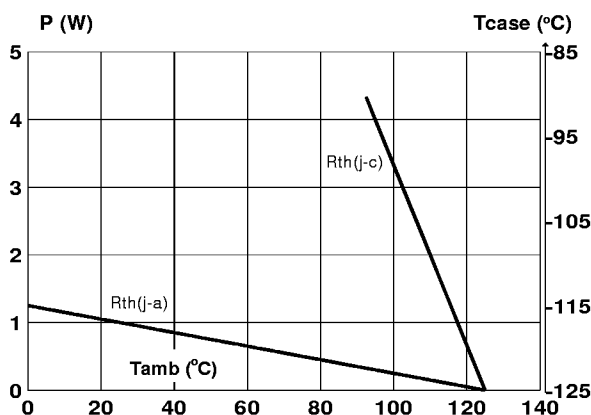
### ORDERING INFORMATION

|               |           |             |          |                        |
|---------------|-----------|-------------|----------|------------------------|
| <b>X</b>      | <b>04</b> | <b>03</b>   | <b>M</b> | <b>F</b>               |
| SCR TOP GLASS | CURRENT   | SENSITIVITY |          | PACKAGE :<br>F=TO202-3 |
|               |           |             | VOLTAGE  |                        |

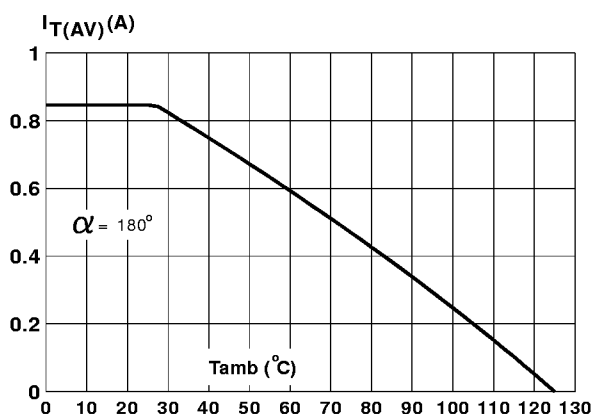
**Fig.1** : Maximum average power dissipation versus average on-state current.



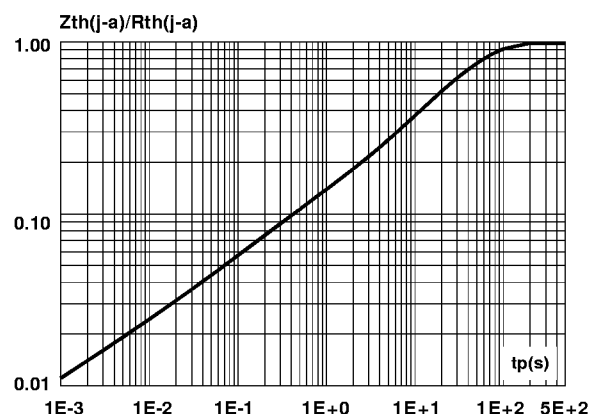
**Fig.2** : Correlation between maximum average power dissipation and maximum allowable temperature ( $T_{amb}$  and  $T_{case}$ ).



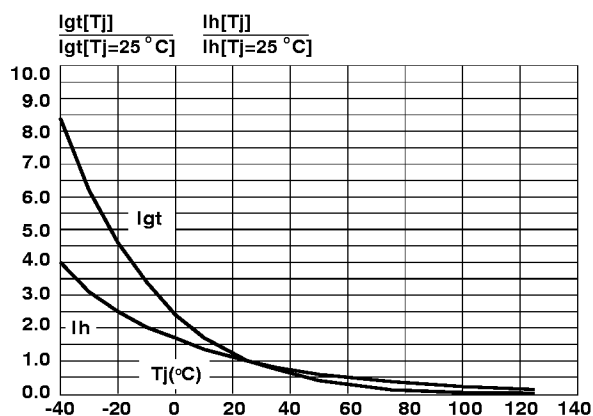
**Fig.3** : Average on-state current versus case temperature.



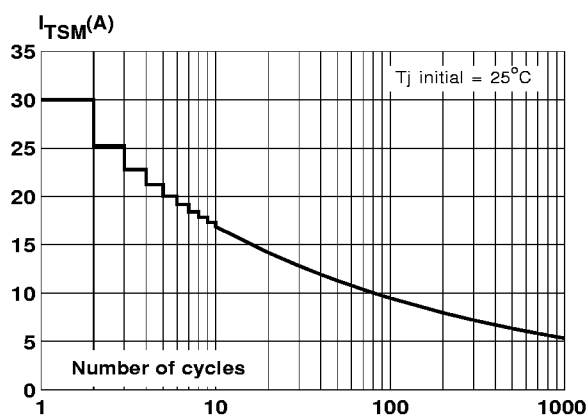
**Fig.4** : Relative variation of thermal impedance junction to ambient versus pulse duration.



**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.



X04xxxF

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  $I^2t$ .

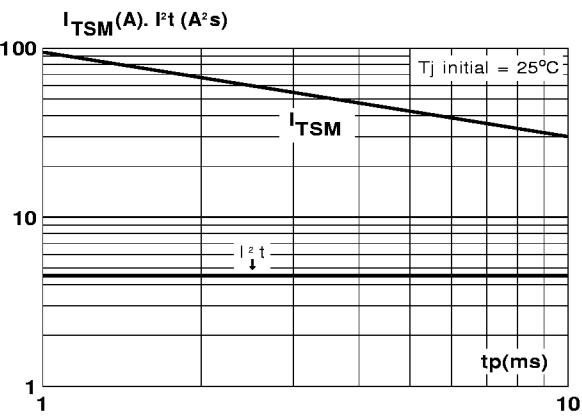
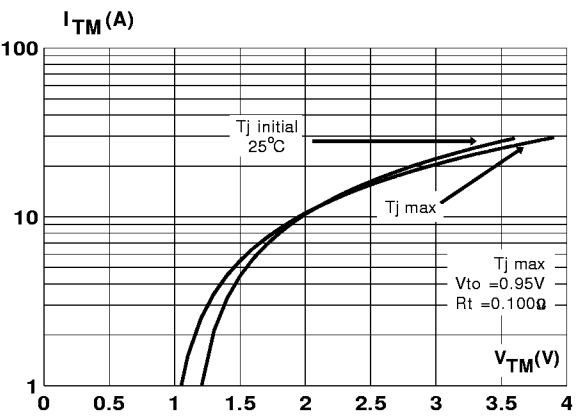
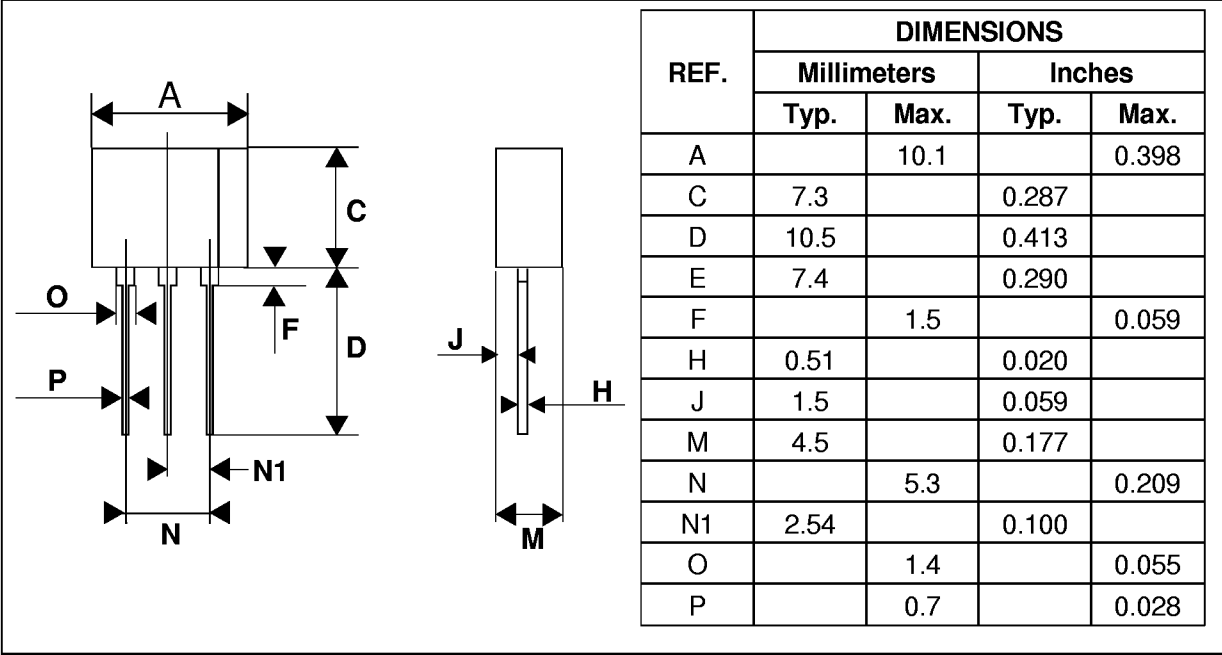


Fig.8 : On-state characteristics (maximum values).



PACKAGE MECHANICAL DATA  
TO202-3 (Plastic)



Marking : type number  
Weight : 1 g

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