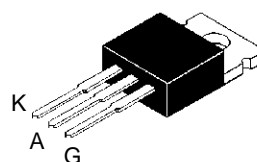


### FEATURES

- $I_{T(RMS)} = 12A$
- $V_{DRM} = 200V$  to  $800V$
- High surge current capability

### DESCRIPTION

The S12xxxH series of SCRs uses a high performance MESA GLASS PNP technology. These parts are intended for general purpose applications.



**TO220**  
non-insulated  
(Plastic)

### ABSOLUTE RATINGS (limiting values)

| Symbol             | Parameter  |                    | Value                      | Unit       |
|--------------------|--|--------------------|----------------------------|------------|
| $I_{T(RMS)}$       | RMS on-state current<br>(180° conduction angle)  | $T_c = 90^\circ C$ | 12                         | A          |
| $I_{T(AV)}$        | Average on-state current<br>(180° conduction angle)                                    | $T_c = 90^\circ C$ | 7.6                        | A          |
| $I_{TSM}$          | Non repetitive surge peak on-state current<br>( $T_j$ initial = $25^\circ C$ )         | $t_p = 8.3$ ms     | 132                        | A          |
|                    |  | $t_p = 10$ ms      | 120                        |            |
| $I_t^2$            | $I_t^2$ Value for fusing   | $t_p = 10$ ms      | 72                         | $A^2s$     |
| $di/dt$            | Critical rate of rise of on-state current<br>$I_G = 100$ mA $di_G/dt = 1$ A/ $\mu s$ . |                    | 100                        | 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 |
|------------------------|--|---------|-----|-----|-----|------|
|                        |  | B       | D   | M   | N   |      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>$T_j = 125^\circ C$ | 200     | 400 | 600 | 800 | V    |

## S12xxxH

### THERMAL RESISTANCES

| Symbol   | Parameter               | Value | Unit |
|----------|-------------------------|-------|------|
| Rth(j-a) | Junction to ambient     | 60    | °C/W |
| Rth(j-c) | Junction to case for DC | 3     | °C/W |

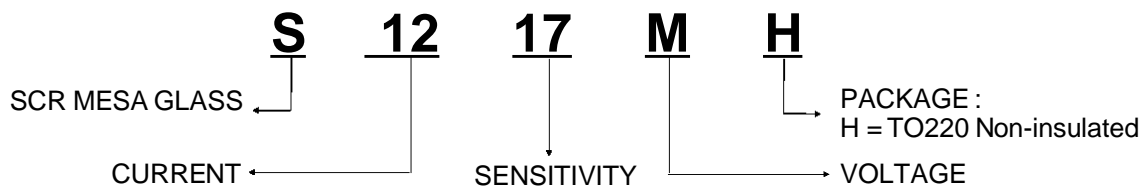
### GATE CHARACTERISTICS (maximum values)

$P_{G(AV)} = 1 \text{ W}$   $P_{GM} = 10 \text{ W}$  ( $t_p = 20 \mu\text{s}$ )  $I_{GM} = 4 \text{ A}$  ( $t_p = 20 \mu\text{s}$ )

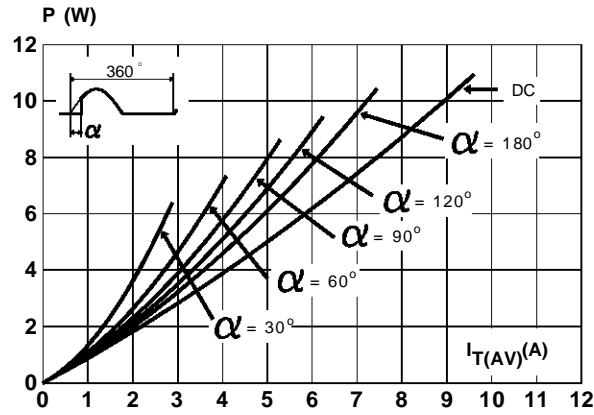
### ELECTRICAL CHARACTERISTICS

| Symbol                 | Test Conditions   |                           |     |     | Sensitivity |     |                  | Unit |
|------------------------|---|---------------------------|-----|-----|-------------|-----|------------------|------|
|                        |   |                           |     |     | 06          | 10  | 17               |      |
| $I_{GT}$               | $V_D = 12 \text{ V (DC)}$ $R_L = 33 \Omega$   | $T_j = 25^\circ\text{C}$  | MIN | 0.5 | 10          | 4   | mA               |      |
|                        |   |                           | MAX | 5   | 25          | 15  |                  |      |
| $V_{GT}$               | $V_D = 12 \text{ V (DC)}$ $R_L = 33 \Omega$   | $T_j = 25^\circ\text{C}$  | MAX | 1.5 |             |     | V                |      |
| $V_{GD}$               | $V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$   | $T_j = 125^\circ\text{C}$ | MIN | 0.2 |             |     | V                |      |
| tgt                    | $V_D = V_{DRM}$ $I_{TM} = 3 \times I_{T(AV)}$<br>$di/dt = 0.5 \text{ A}/\mu\text{s}$ $I_G = 40 \text{ mA}$  | $T_j = 25^\circ\text{C}$  | TYP | 2   |             |     | $\mu\text{s}$    |      |
| $I_H$                  | $I_T = 250 \text{ mA}$ Gate open  | $T_j = 25^\circ\text{C}$  | MAX | 15  | 50          | 30  | mA               |      |
| $I_L$                  | $I_G = 1.2 I_{GT}$  | $T_j = 25^\circ\text{C}$  | MAX | 30  | 100         | 60  | mA               |      |
| $V_{TM}$               | $I_{TM} = 24 \text{ A}$ $t_p = 380 \mu\text{s}$   | $T_j = 25^\circ\text{C}$  | MAX | 1.6 |             |     | V                |      |
| $I_{DRM}$<br>$I_{RRM}$ | $V_D = V_{DRM}$<br>$V_R = V_{RRM}$  | $T_j = 25^\circ\text{C}$  | MAX | 5   |             |     | $\mu\text{A}$    |      |
|                        |   | $T_j = 110^\circ\text{C}$ | MAX | 1.5 |             |     | mA               |      |
| dV/dt                  | $V_D = 67\% V_{DRM}$<br>Gate open   | $T_j = 110^\circ\text{C}$ | MIN |     | 200         | 100 | V/ $\mu\text{s}$ |      |
|                        |   | $T_j = 110^\circ\text{C}$ | TYP | 10  |             |     |                  |      |
| tq                     | $I_{TM} = 3 \times I_{T(AV)}$ $V_R = 35 \text{ V}$<br>$di/dt = 10 \text{ A}/\mu\text{s}$ $t_p = 100 \mu\text{s}$<br>$dV/dt = 5 \text{ V}/\mu\text{s}$<br>$V_D = 67\% V_{DRM}$ | $T_j = 110^\circ\text{C}$ | MAX | 100 |             |     | $\mu\text{s}$    |      |

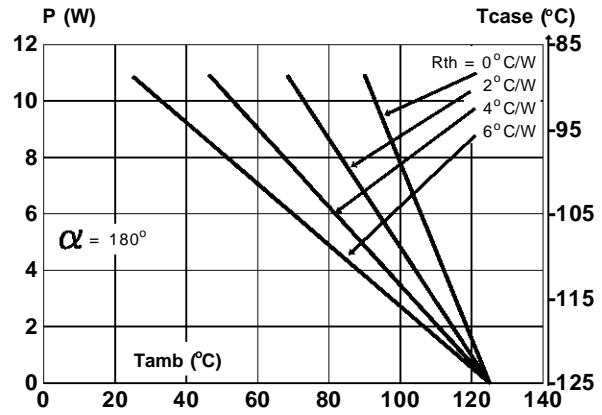
### ORDERING INFORMATION



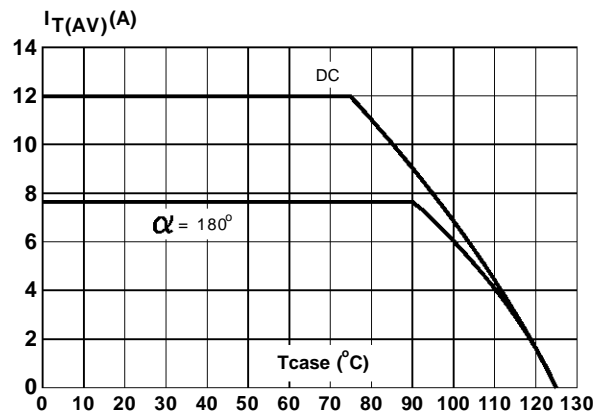
**Fig.1 :** Maximum average power dissipation versus average on-state current.



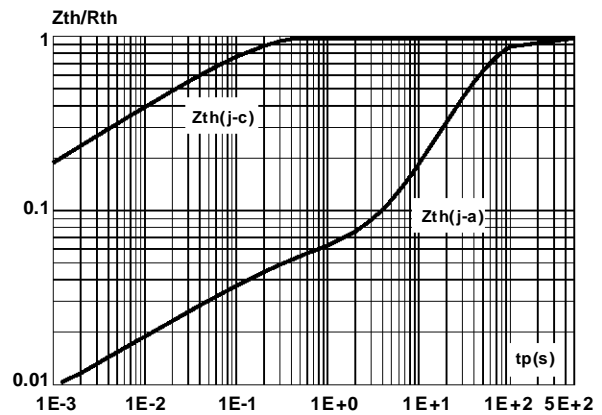
**Fig.2 :** Correlation between maximum average power dissipation and maximum allowable temperature (Tamb and Tcase) for different thermal resistances heatsink + contact.



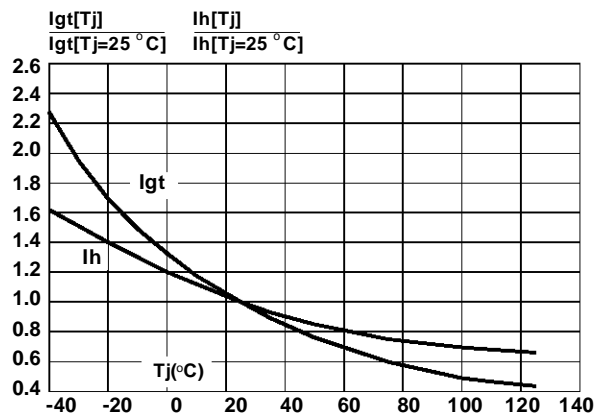
**Fig.3 :** Average on-state current versus case temperature.



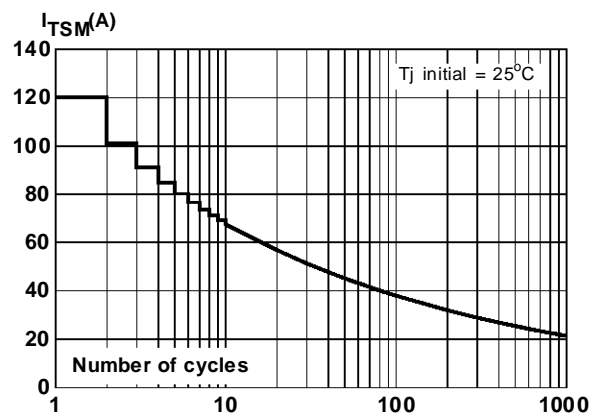
**Fig.4 :** Relative variation of thermal impedance versus pulse duration.



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

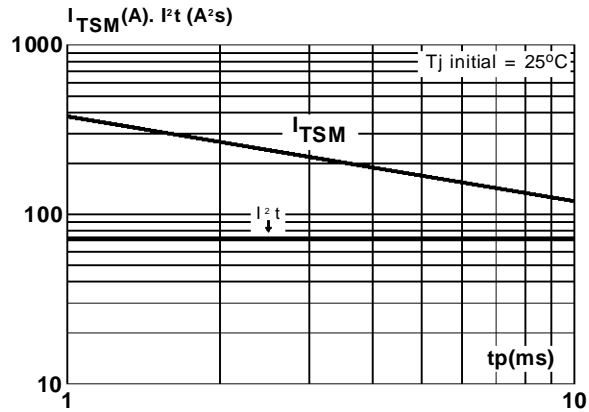


**Fig.6 :** Non repetitive surge peak on-state current versus number of cycles.

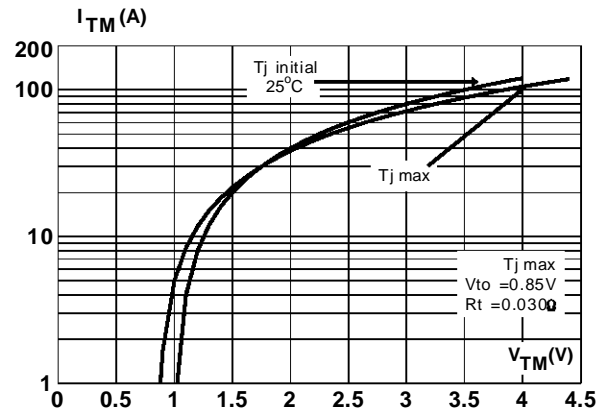


## S12xxxH

**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**  
TO220 Non-insulated (Plastic)

| REF. | DIMENSIONS  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Typ.        | Min. | Max. | Typ.   | Min.  | Max.  |
| A    |             |      | 10.3 |        |       | 0.406 |
| B    |             | 6.3  | 6.5  | 0.248  | 0.256 |       |
| C    |             |      | 9.1  |        |       | 0.358 |
| D    |             | 12.7 |      |        | 0.500 |       |
| F    |             |      | 4.2  |        |       | 0.165 |
| G    |             |      | 3.0  |        |       | 0.118 |
| H    |             | 4.5  | 4.7  |        | 0.177 | 0.185 |
| I    |             | 3.53 | 3.66 |        | 0.139 | 0.144 |
| J    |             | 1.2  | 1.3  |        | 0.047 | 0.051 |
| L    |             |      | 0.9  |        |       | 0.035 |
| M    | 2.7         |      |      | 0.106  |       |       |
| N    |             |      | 5.3  |        |       | 0.209 |
| N1   | 2.54        |      |      | 0.100  |       |       |
| O    |             | 1.2  | 1.4  |        | 0.047 | 0.055 |
| P    |             |      | 1.15 |        |       | 0.045 |

Marking : type number  
Weight : 1.8 g

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