

## DESCRIPTION:

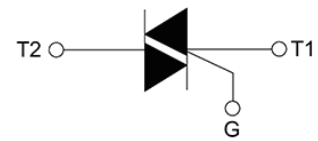
The chip triac is suitable for general purpose AC switching. It can be used as an ON/OFF function in applications such as heating regulation, induction motor starting circuits, for phase control operation in light dimmers, motor speed controllers.



SOT-223

## MAIN FEATURES

| Symbol                | Value   | Unit |
|-----------------------|---------|------|
| $I_{T(RMS)}$          | 0.8     | A    |
| $V_{DRM}/V_{RRM}$     | 600     | V    |
| $I_{GT\ I/II/III/IV}$ | 5/5/5/5 | mA   |



## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                                                         |        | Symbol              | Value   | Unit             |
|-------------------------------------------------------------------------------------------------------------------|--------|---------------------|---------|------------------|
| Storage junction temperature range                                                                                |        | T <sub>stg</sub>    | -40-150 | ℃                |
| Operating junction temperature range                                                                              |        | T <sub>j</sub>      | -40-125 | ℃                |
| Repetitive peak off-state voltage (T <sub>j</sub> =25℃)                                                           |        | V <sub>DRM</sub>    | 600     | V                |
| Repetitive peak reverse voltage (T <sub>j</sub> =25℃)                                                             |        | V <sub>RRM</sub>    | 600     | V                |
| RMS on-state current (T <sub>c</sub> ≤97℃)                                                                        |        | I <sub>T(RMS)</sub> | 0.8     | A                |
| Non repetitive surge peak on-state current<br>(full cycle , t <sub>p</sub> =20ms , T <sub>j</sub> =25℃)           |        | I <sub>TSM</sub>    | 10      | A                |
| Non repetitive surge peak on-state current<br>(full cycle , t <sub>p</sub> =16.6ms , T <sub>j</sub> =25℃)         |        |                     | 11      |                  |
| I <sup>2</sup> t value for fusing (t <sub>p</sub> =10ms , T <sub>j</sub> =25℃)                                    |        | I <sup>2</sup> t    | 0.5     | A <sup>2</sup> s |
| Critical rate of rise of on-state current<br>(I <sub>G</sub> =2×I <sub>GT</sub> , f=100Hz , T <sub>j</sub> =125℃) | I - II | di/dt               | 30      | A/μs             |
|                                                                                                                   | III-IV |                     | 20      |                  |
| Peak gate current (t <sub>p</sub> =20μs , T <sub>j</sub> =125℃)                                                   |        | I <sub>GM</sub>     | 1       | A                |
| Average gate power dissipation (T <sub>j</sub> =125℃)                                                             |        | P <sub>G(AV)</sub>  | 0.1     | W                |
| Peak gate power                                                                                                   |        | P <sub>GM</sub>     | 5       | W                |
| Peak pulse voltage<br>(T <sub>j</sub> =25℃; non-repetitive,off-state;FIG )                                        |        | V <sub>pp</sub>     | 2.5     | kV               |

**ELECTRICAL CHARACTERISTICS** ( $T_j=25^{\circ}\text{C}$  unless otherwise specified)

| Symbol      | Test Condition                                                                     | Quadrant  | Value |     | Unit             |
|-------------|------------------------------------------------------------------------------------|-----------|-------|-----|------------------|
| $I_{GT}$    | $V_D=12\text{V}$ $R_L=33\Omega$                                                    | ALL       | MAX.  | 5   | mA               |
| $V_{GT}$    |                                                                                    | ALL       | MAX.  | 1.3 | V                |
| $V_{GD}$    | $V_D=V_{DRM}$ $T_j=125^{\circ}\text{C}$<br>$R_L=3.3\text{k}\Omega$                 | ALL       | MIN.  | 0.2 | V                |
| $I_L$       | $I_G=1.2I_{GT}$                                                                    | I -III-IV | MAX.  | 5   | mA               |
|             |                                                                                    | II        |       | 15  |                  |
| $I_H$       | $I_T=50\text{mA}$                                                                  |           | MAX.  | 5   | mA               |
| $dV/dt$     | $V_D=400\text{V}$ Gate Open $T_j=110^{\circ}\text{C}$                              |           | MIN.  | 30  | V/ $\mu\text{s}$ |
| $(dV/dt)_c$ | $(dI/dt)_c=0.3\text{A/ms}$ , $T_j=110^{\circ}\text{C}$                             |           | MIN.  | 1   | V/ $\mu\text{s}$ |
| $t_{on}$    | $I_G=10\text{mA}$ $I_A=200\text{mA}$ $I_R=20\text{mA}$<br>$T_j=25^{\circ}\text{C}$ |           | TYP.  | 2   | $\mu\text{s}$    |
| $t_{off}$   |                                                                                    |           |       | 20  |                  |

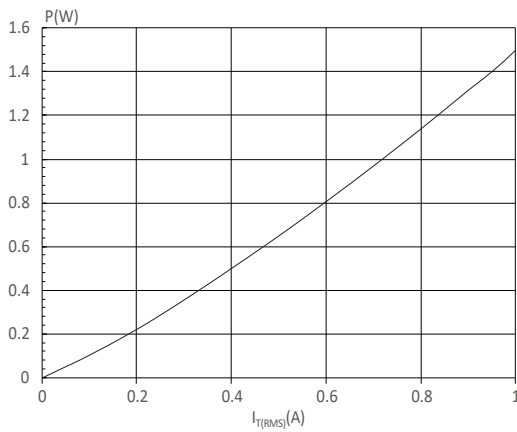
**STATIC CHARACTERISTICS**

| Symbol    | Parameter                               |                           | Value(MAX.) | Unit             |
|-----------|-----------------------------------------|---------------------------|-------------|------------------|
| $V_{TM}$  | $I_{TM}=1\text{A}$ $t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.5         | V                |
| $V_{TO}$  | Threshold voltage                       | $T_j=125^{\circ}\text{C}$ | 1.01        | V                |
| $R_D$     | Dynamic resistance                      | $T_j=125^{\circ}\text{C}$ | 316         | $\text{m}\Omega$ |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$             | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$    |
| $I_{RRM}$ |                                         | $T_j=125^{\circ}\text{C}$ | 0.2         | mA               |

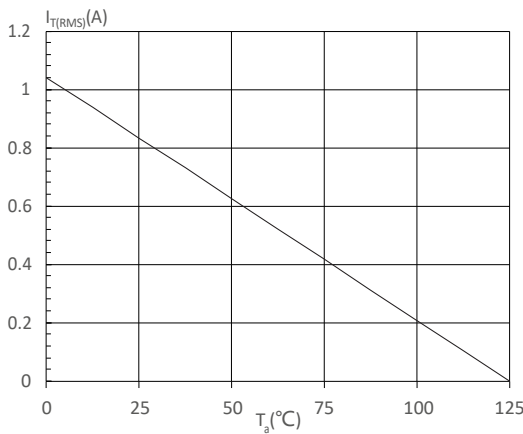
**THERMAL RESISTANCES**

| Symbol        | Parameter                | Value | Unit                 |
|---------------|--------------------------|-------|----------------------|
| $R_{th(j-c)}$ | junction to case (AC)    | 25    | $^{\circ}\text{C/W}$ |
| $R_{th(j-a)}$ | junction to ambient (AC) | 120   | $^{\circ}\text{C/W}$ |

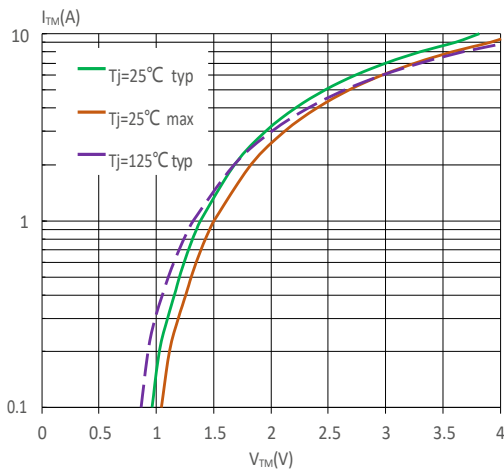
**FIG :** Maximum power dissipation versus RMS on-state current



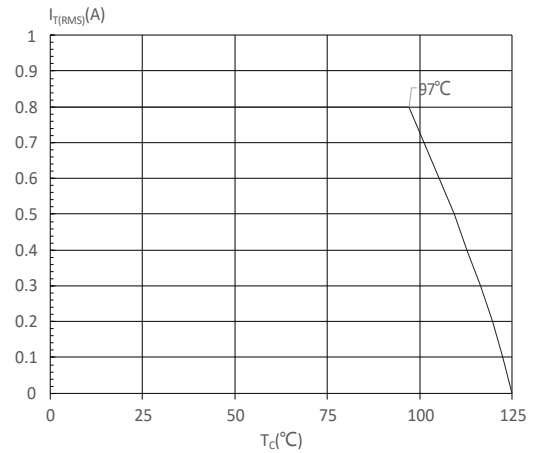
**FIG :** RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 $\mu$ m) (full cycle)



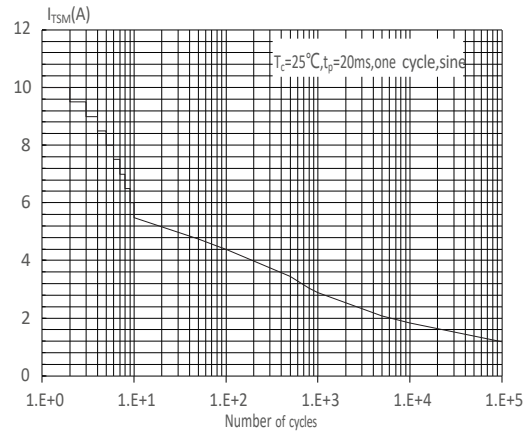
**FIG :** On-state characteristics



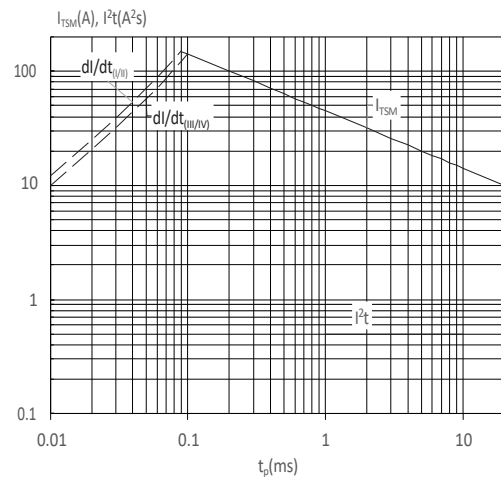
**FIG :** RMS on-state current versus case temperature



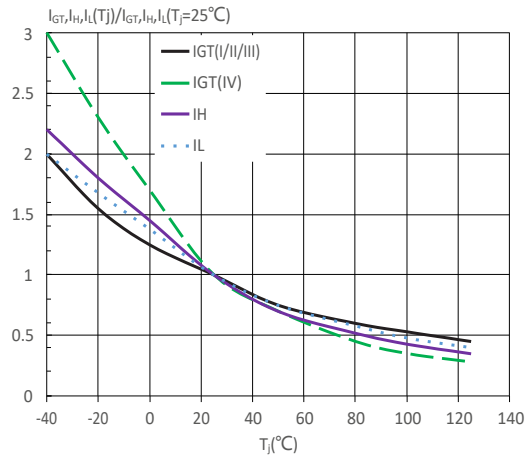
**FIG :** Surge peak on-state current versus number of cycles

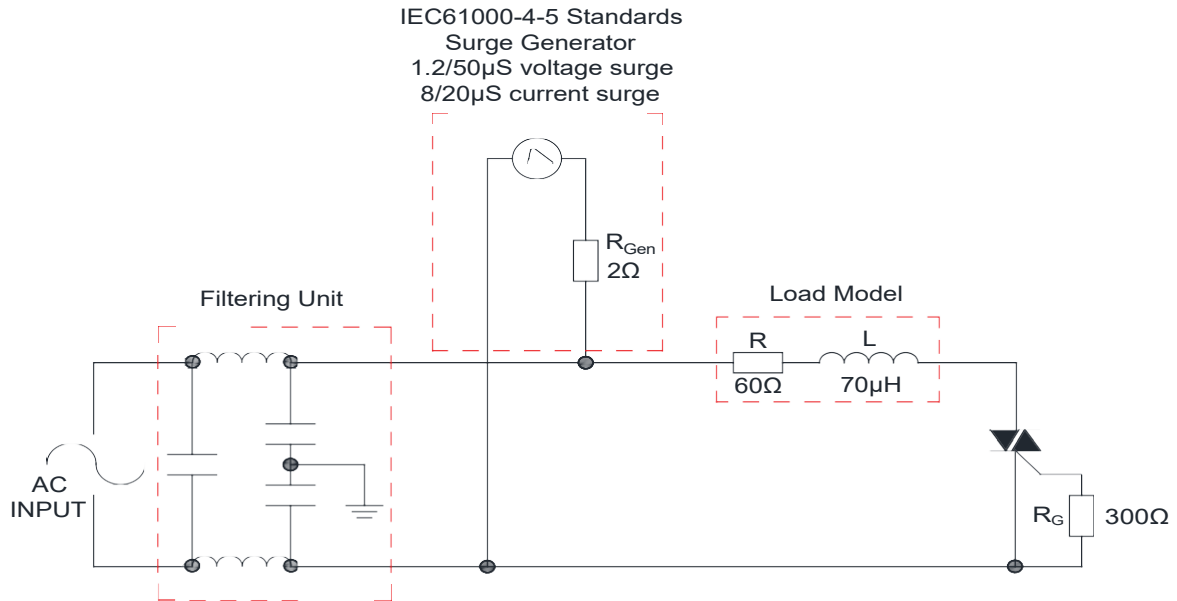


**FIG :** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20ms$ , and corresponding value of  $I^2t$  (I - II:  $di/dt < 30A/\mu s$ ; III-IV:  $di/dt < 20A/\mu s$ )



**FIG :** Relative variations of gate trigger current, holding current and latching current versus junction temperature



**FIG : Test circuit for inductive and resistive loads to IEC-61000-4-5 standards**


## SOLDERING PARAMETERS

| Reflow Condition                                            |                                      | Pb-Free assembly<br>(see figure at right) |
|-------------------------------------------------------------|--------------------------------------|-------------------------------------------|
| Pre Heat                                                    | -Temperature Min<br>( $T_{s(min)}$ ) | +150 $^{\circ}$ C                         |
|                                                             | -Temperature<br>Max( $T_{s(max)}$ )  | +200 $^{\circ}$ C                         |
|                                                             | -Time (Min to Max) (ts)              | 60-180 secs.                              |
| Average ramp up rate<br>(Liquidus Temp ( $T_L$ ) to peak)   |                                      | 3 $^{\circ}$ C/sec. Max                   |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                        |                                      | 3 $^{\circ}$ C/sec. Max                   |
| Reflow                                                      | -Temperature( $T_L$ )<br>(Liquidus)  | +217 $^{\circ}$ C                         |
|                                                             | -Temperature( $t_L$ )                | 60-150 secs.                              |
| Peak Temp ( $T_P$ )                                         |                                      | +260(+0/-5) $^{\circ}$ C                  |
| Time within 5 $^{\circ}$ C of actual<br>Peak Temp ( $t_p$ ) |                                      | 20-40secs.                                |
| Ramp-down Rate                                              |                                      | 6 $^{\circ}$ C/sec. Max                   |
| Time 25 $^{\circ}$ C to Peak Temp ( $T_P$ )                 |                                      | 8 min. Max                                |
| Do not exceed                                               |                                      | +260 $^{\circ}$ C                         |

