

## DESCRIPTION:

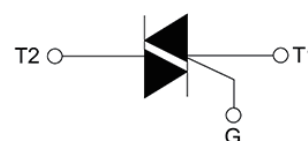
The chip triac is suitable for general purpose AC switching. It can be used as an ON/OFF function in applications such as heating regulation, induction motor starting circuits, for phase control operation in light dimmers, motor speed controllers.



SOT-223

## MAIN FEATURES

| Symbol                | Value    | Unit |
|-----------------------|----------|------|
| $I_{T(RMS)}$          | 1        | A    |
| $V_{DRM}/V_{RRM}$     | 800      | V    |
| $I_{GT\ I}/II/III/IV$ | 5/5/5/10 | 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>    | 800     | V                |
| Repetitive peak reverse voltage (T <sub>j</sub> =25℃)                                                             |             | V <sub>RRM</sub>    | 800     | V                |
| RMS on-state current (T <sub>C</sub> ≤98℃)                                                                        |             | I <sub>T(RMS)</sub> | 1       | 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>    | 14      | A                |
| Non repetitive surge peak on-state current<br>(full cycle , t <sub>p</sub> =16.6ms , T <sub>j</sub> =25℃)         |             |                     | 15      |                  |
| I <sup>2</sup> t value for fusing (t <sub>p</sub> =10ms , T <sub>j</sub> =25℃)                                    |             | I <sup>2</sup> t    | 0.98    | 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 -III | di/dt               | 50      | A/μs             |
|                                                                                                                   | IV          |                     | 30      |                  |
| Peak gate current (t <sub>p</sub> =20μs , T <sub>j</sub> =125℃)                                                   |             | I <sub>GM</sub>     | 2       | A                |
| Average gate power dissipation (T <sub>j</sub> =125℃)                                                             |             | P <sub>G(AV)</sub>  | 0.5     | 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>     | 3.5     | kV               |

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

| Symbol      | Test Condition                                                                     | Quadrant    | Value |     | Unit                   |
|-------------|------------------------------------------------------------------------------------|-------------|-------|-----|------------------------|
| $I_{GT}$    | $V_D=12\text{V}$ $R_L=33\Omega$                                                    | I - II -III | MAX.  | 5   | mA                     |
|             |                                                                                    | IV          |       | 10  |                        |
| $V_{GT}$    |                                                                                    | 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          |       | 20  |                        |
| $I_H$       | $I_T=50\text{mA}$                                                                  |             | MAX.  | 7   | mA                     |
| $dV/dt$     | $V_D=540\text{V}$ Gate Open $T_j=110^{\circ}\text{C}$                              |             | MIN.  | 100 | $\text{V}/\mu\text{s}$ |
| $(dV/dt)_c$ | $(dI/dt)_c=0.44\text{A/ms}$ , $T_j=110^{\circ}\text{C}$                            |             | MIN.  | 3   | $\text{V}/\mu\text{s}$ |
| $t_{on}$    | $I_G=20\text{mA}$ $I_A=200\text{mA}$ $I_R=20\text{mA}$<br>$T_j=25^{\circ}\text{C}$ |             | TYP.  | 2.5 | $\mu\text{s}$          |
| $t_{off}$   |                                                                                    |             |       | 25  |                        |

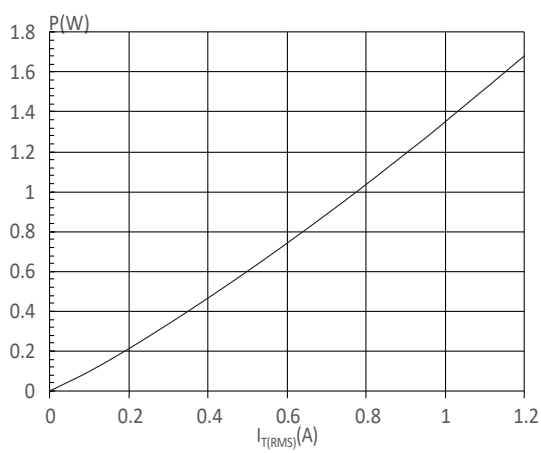
**STATIC CHARACTERISTICS**

| Symbol    | Parameter                                 |                           | Value(MAX.) | Unit             |
|-----------|-------------------------------------------|---------------------------|-------------|------------------|
| $V_{TM}$  | $I_{TM}=1.4\text{A}$ $t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.45        | V                |
| $V_{TO}$  | Threshold voltage                         | $T_j=125^{\circ}\text{C}$ | 0.96        | V                |
| $R_D$     | Dynamic resistance                        | $T_j=125^{\circ}\text{C}$ | 225         | $\text{m}\Omega$ |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$               | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$    |
| $I_{RRM}$ |                                           | $T_j=125^{\circ}\text{C}$ | 0.25        | mA               |

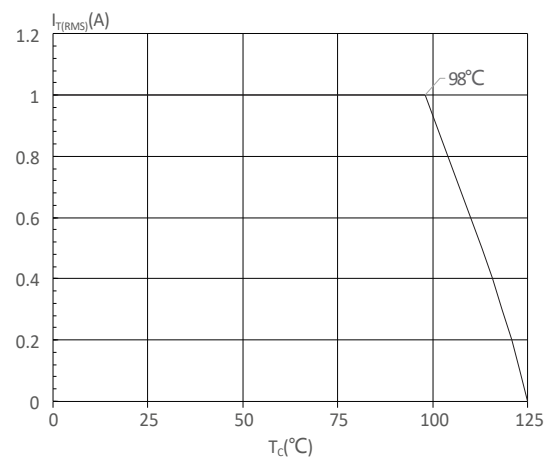
**THERMAL RESISTANCES**

| Symbol        | Parameter                | Value | Unit                        |
|---------------|--------------------------|-------|-----------------------------|
| $R_{th(j-c)}$ | junction to case (AC)    | 20    | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | junction to ambient (AC) | 130   | $^{\circ}\text{C}/\text{W}$ |

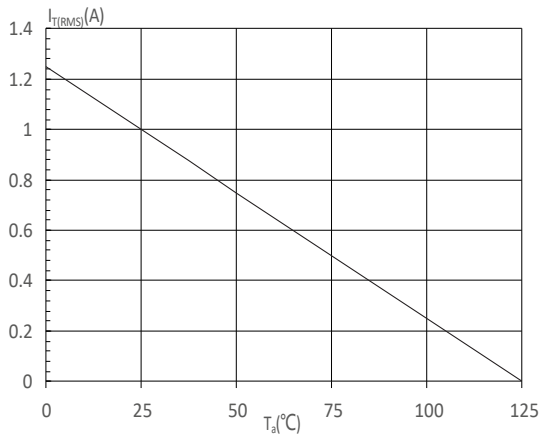
**FIG :** Maximum power dissipation versus RMS on-state current



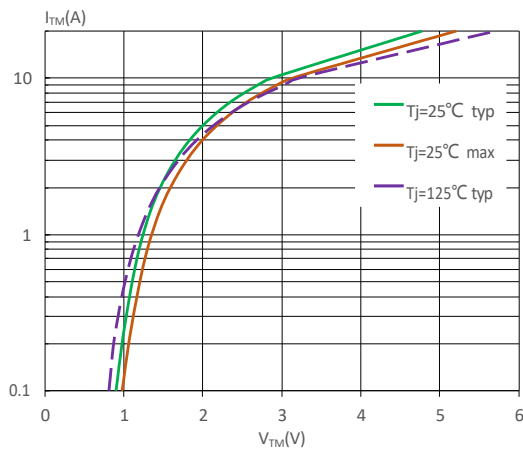
**FIG :** RMS on-state current versus case temperature



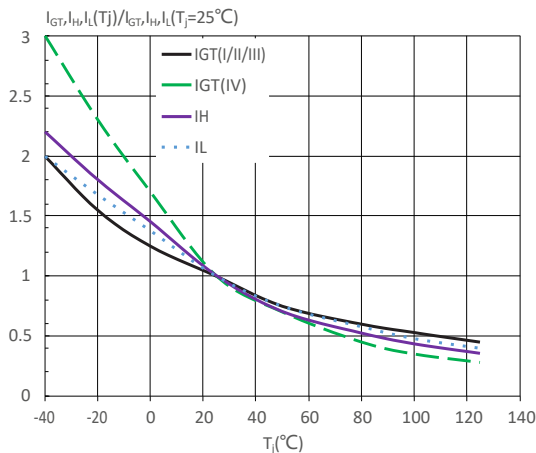
**FIG :** RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 $\mu$ m) (full cycle)



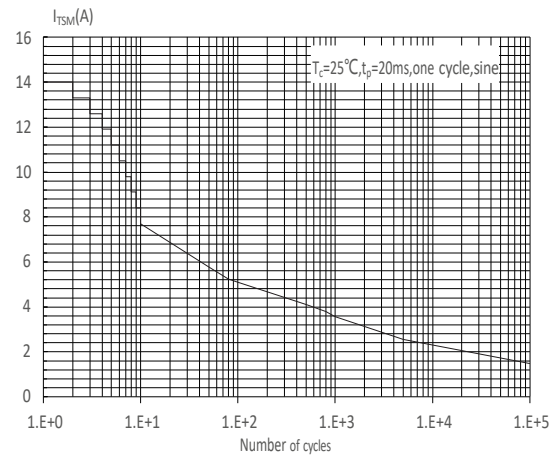
**FIG :** On-state characteristics



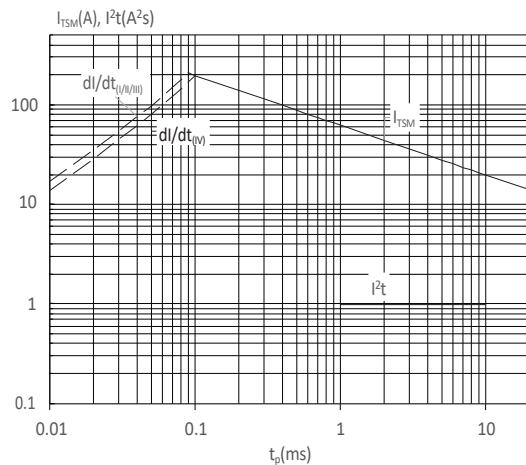
**FIG :** Relative variations of gate trigger current, holding current and latching current versus junction temperature

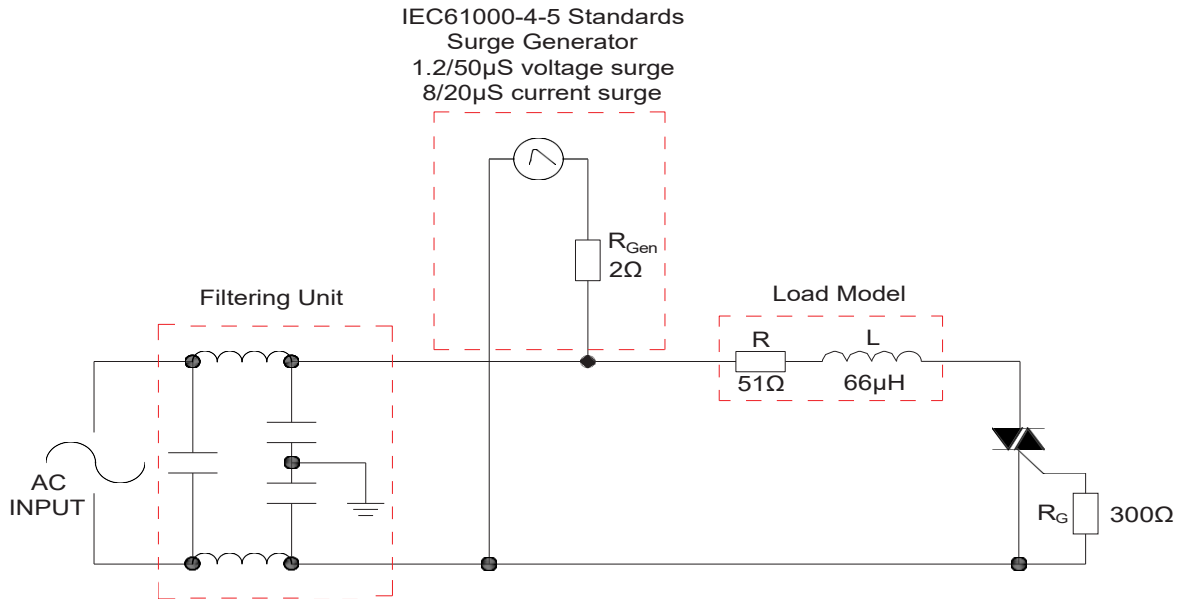


**FIG :** Surge peak on-state current versus number of cycles



**FIG :** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2t$  ( I - II -III:  $di/dt < 50\text{A}/\mu\text{s}$ ; IV:  $di/dt < 30\text{A}/\mu\text{s}$ )



**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 <sub>s(min)</sub> )  | +150°C                                    |
|                                                                   | -Temperature<br>Max(T <sub>s(max)</sub> )   | +200°C                                    |
|                                                                   | -Time (Min to Max) (ts)                     | 60-180 secs.                              |
| Average ramp up rate<br>(Liquidus Temp (T <sub>L</sub> ) to peak) |                                             | 3°C/sec. Max                              |
| T <sub>s(max)</sub> to T <sub>L</sub> - Ramp-up Rate              |                                             | 3°C/sec. Max                              |
| Reflow                                                            | -Temperature(T <sub>L</sub> )<br>(Liquidus) | +217°C                                    |
|                                                                   | -Temperature(t <sub>L</sub> )               | 60-150 secs.                              |
| Peak Temp (T <sub>p</sub> )                                       |                                             | +260(+0/-5)°C                             |
| Time within 5°C of actual<br>Peak Temp (t <sub>p</sub> )          |                                             | 20-40secs.                                |
| Ramp-down Rate                                                    |                                             | 6°C/sec. Max                              |
| Time 25°C to Peak Temp (T <sub>p</sub> )                          |                                             | 8 min. Max                                |
| Do not exceed                                                     |                                             | +260°C                                    |

