

## DESCRIPTION:

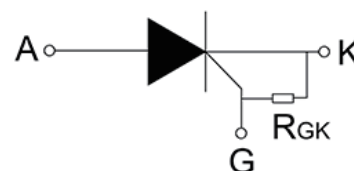
The chip triac is suitable for general purpose AC switching. It is more suitable for the switch functions of washing machines' water valve, positive inversion of motor, heat pump...The chip embeds a TVS structure to absorb the inductive turn-off energy such as those described in the IEC 61000-4-5 standards. By using an external plastic package, chip provides a rated insulation voltage of 2000 VRMS, complying with UL standards (File



TO-252

## MAIN FEATURES

| Symbol            | Value | Unit |
|-------------------|-------|------|
| $I_{T(RMS)}$      | 2     | A    |
| $V_{DRM}/V_{RRM}$ | 800   | V    |
| $I_{GT\ II/III}$  | 10/10 | mA   |



## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                                            | Symbol       | Value   | Unit             |
|------------------------------------------------------------------------------------------------------|--------------|---------|------------------|
| Storage junction temperature range                                                                   | $T_{stg}$    | -40-150 | °C               |
| Operating junction temperature range                                                                 | $T_j$        | -40-150 | °C               |
| Repetitive peak off-state voltage ( $T_j=25^{\circ}C$ )                                              | $V_{DRM}$    | 800     | V                |
| Repetitive peak reverse voltage ( $T_j=25^{\circ}C$ )                                                | $V_{RRM}$    | 800     | V                |
| RMS on-state current ( $T_C \leq 133^{\circ}C$ )                                                     | $I_{T(RMS)}$ | 2       | A                |
| Non repetitive surge peak on-state current (full cycle , $t_p=20ms$ , $T_j=25^{\circ}C$ )            | $I_{TSM}$    | 20      | A                |
| Non repetitive surge peak on-state current (full cycle , $t_p=16.6ms$ , $T_j=25^{\circ}C$ )          |              | 22      |                  |
| $I^2t$ value for fusing ( $t_p=10ms$ , $T_j=25^{\circ}C$ )                                           | $I^2t$       | 2       | A <sup>2</sup> s |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ , $f=100Hz$ , $T_j=150^{\circ}C$ ) | $di/dt$      | 50      | A/ $\mu$ s       |
| Peak gate current ( $t_p=20\mu s$ , $T_j=150^{\circ}C$ )                                             | $I_{GM}$     | 2       | A                |
| Average gate power dissipation ( $T_j=150^{\circ}C$ )                                                | $P_{G(AV)}$  | 0.5     | W                |
| Peak gate power                                                                                      | $P_{GM}$     | 10      | W                |

|                                                                                     |          |   |    |
|-------------------------------------------------------------------------------------|----------|---|----|
| Peak pulse voltage<br>( $T_j=25^{\circ}\text{C}$ ; non-repetitive, off-state; FIG ) | $V_{pp}$ | 3 | kV |
|-------------------------------------------------------------------------------------|----------|---|----|

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

| Symbol      | Test Condition                                                                     | Quadrant | Value |     | Unit             |
|-------------|------------------------------------------------------------------------------------|----------|-------|-----|------------------|
| $I_{GT}$    | $V_D=12\text{V}$ $R_L=33\Omega$                                                    | II -III  | MAX.  | 10  | mA               |
| $V_{GT}$    |                                                                                    | II -III  | MAX.  | 1   | V                |
| $V_{GD}$    | $V_D=V_{DRM}$ $T_j=150^{\circ}\text{C}$<br>$R_L=3.3\text{k}\Omega$                 | II -III  | MIN.  | 0.2 | V                |
| $I_L$       | $I_G=1.2I_{GT}$                                                                    | III      | MAX.  | 25  | mA               |
|             |                                                                                    | II       |       | 35  |                  |
| $I_H$       | $I_T=100\text{mA}$                                                                 |          | MAX.  | 10  | mA               |
| $dV/dt$     | $V_D=540\text{V}$ Gate Open $T_j=150^{\circ}\text{C}$                              |          | MIN.  | 500 | V/ $\mu\text{s}$ |
| $(dV/dt)_c$ | $(dI/dt)_c=1\text{A/ms}$ , $T_j=150^{\circ}\text{C}$                               |          | MIN.  | 20  | 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  |                  |

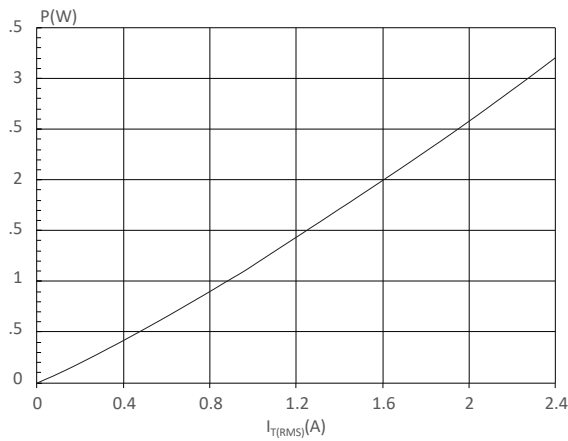
**STATIC CHARACTERISTICS**

| Symbol    | Parameter                               |                           | Value(MAX.) | Unit             |
|-----------|-----------------------------------------|---------------------------|-------------|------------------|
| $V_{TM}$  | $I_{TM}=3\text{A}$ $t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.4         | V                |
| $V_{TO}$  | Threshold voltage                       | $T_j=150^{\circ}\text{C}$ | 0.93        | V                |
| $R_D$     | Dynamic resistance                      | $T_j=150^{\circ}\text{C}$ | 85          | $\text{m}\Omega$ |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$             | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$    |
| $I_{RRM}$ |                                         | $T_j=150^{\circ}\text{C}$ | 1           | mA               |

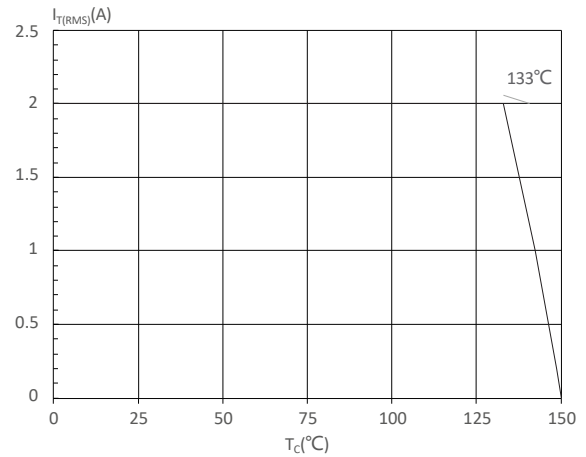
**THERMAL RESISTANCES**

| Symbol        | Parameter                | Value | Unit                 |
|---------------|--------------------------|-------|----------------------|
| $R_{th(j-c)}$ | junction to case (AC)    | 6.5   | $^{\circ}\text{C/W}$ |
| $R_{th(j-a)}$ | junction to ambient (AC) | 180   | $^{\circ}\text{C/W}$ |

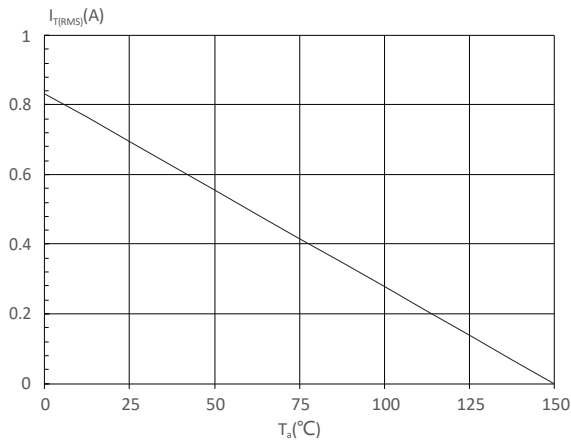
**FIG :** Maximum power dissipation versus RMS on-state current



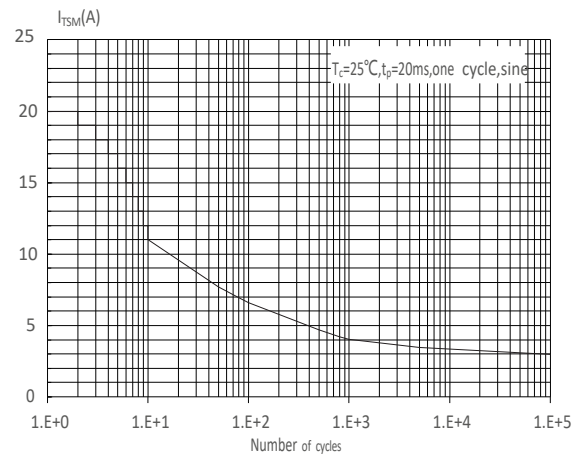
**FIG :** RMS on-state current versus case temperature



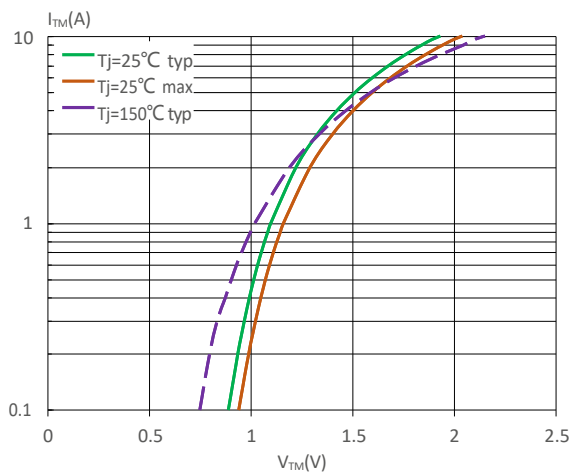
**FIG :** RMS on-state current versus ambient temperature (printed circuit board FR4,copper thickness:35μm)(full cycle)



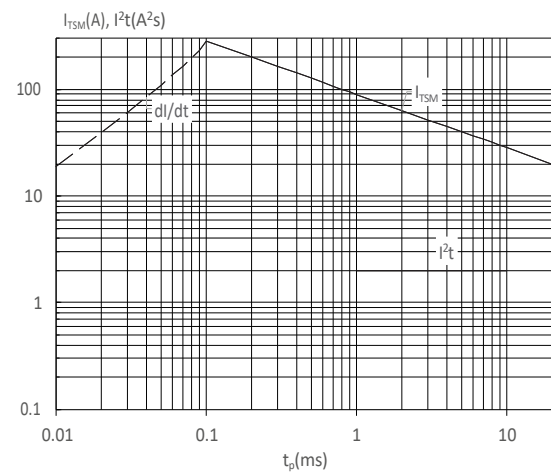
**FIG :** Surge peak on-state current versus number of cycles



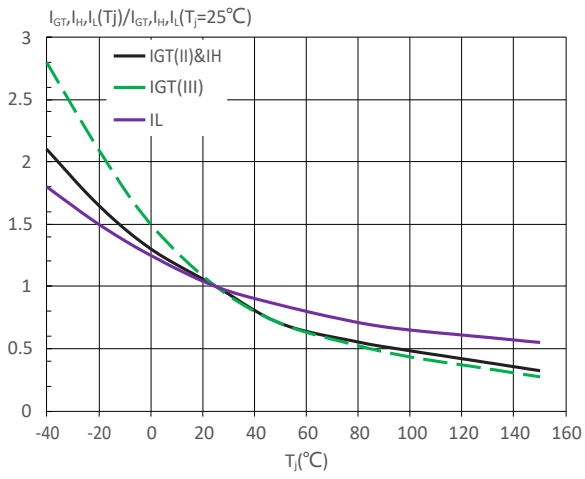
**FIG :** On-state characteristics

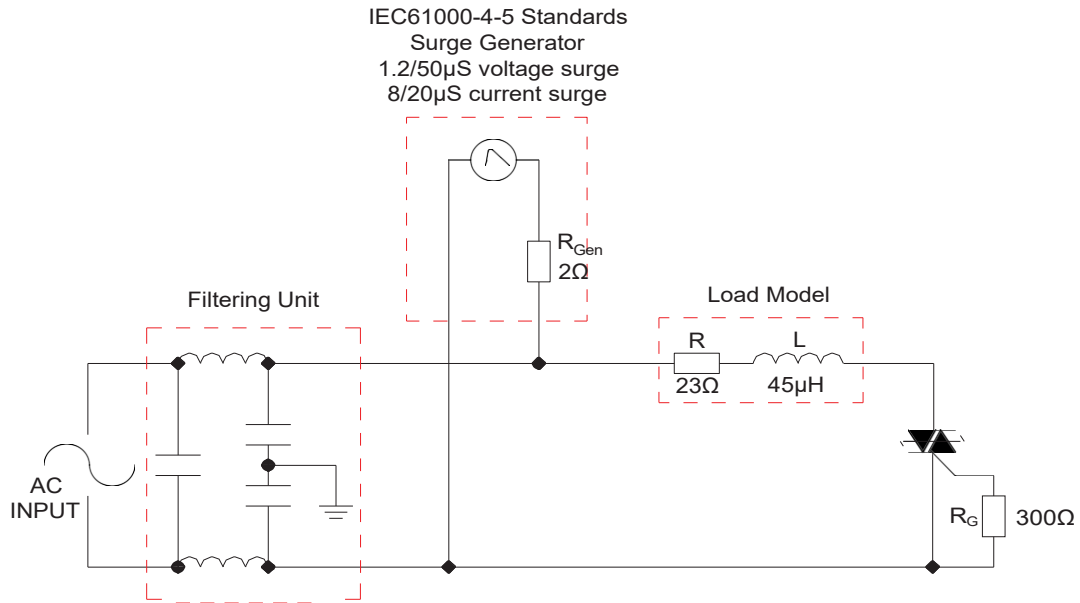


**FIG :** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20ms$ , and corresponding value of  $I^2t$  ( $di/dt < 50A/μs$ )



**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 ( $T_{s(min)}$ ) | +150°C                                    |
|                                                           | -Temperature Max( $T_{s(max)}$ )  | +200°C                                    |
|                                                           | -Time (Min to Max) ( $t_s$ )      | 60-180 secs.                              |
| Average ramp up rate<br>(Liquidus Temp ( $T_L$ ) to peak) |                                   | 3°C/sec. Max                              |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                      |                                   | 3°C/sec. Max                              |
| Reflow                                                    | -Temperature( $T_L$ )(Liquidus)   | +217°C                                    |
|                                                           | -Temperature( $t_L$ )             | 60-150 secs.                              |
| Peak Temp ( $T_p$ )                                       |                                   | +260(+0/-5)°C                             |
| Time within 5°C of actual<br>Peak Temp ( $t_p$ )          |                                   | 20-40secs.                                |
| Ramp-down Rate                                            |                                   | 6°C/sec. Max                              |
| Time 25°C to Peak Temp ( $T_p$ )                          |                                   | 8 min. Max                                |
| Do not exceed                                             |                                   | +260°C                                    |

