

## DESCRIPTION:

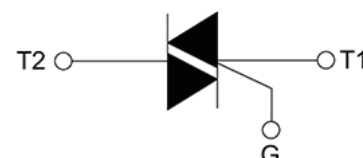
The chip triac is suitable for general purpose AC switching. It can be used as an ON/OFF function in applications such as heating regulation, induction motor starting circuits, for phase control operation in light dimmers, motor speed controllers.



TO-220A

## MAIN FEATURES

| Symbol                | Value       | Unit |
|-----------------------|-------------|------|
| $I_{T(RMS)}$          | 12          | A    |
| $V_{DRM}/V_{RRM}$     | 600         | V    |
| $I_{GT\ I/II/III/IV}$ | 50/50/50/70 | 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> ≤87℃)                                                                        |        | I <sub>T(RMS)</sub> | 12      | 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>    | 120     | A                |
| Non repetitive surge peak on-state current<br>(full cycle , t <sub>p</sub> =16.6ms , T <sub>j</sub> =25℃)         |        |                     | 132     |                  |
| I <sup>2</sup> t value for fusing (t <sub>p</sub> =10ms , T <sub>j</sub> =25℃)                                    |        | I <sup>2</sup> t    | 72      | 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               | 100     | A/μs             |
|                                                                                                                   | III-IV |                     | 50      |                  |
| Peak gate current (t <sub>p</sub> =20μs , T <sub>j</sub> =125℃)                                                   |        | I <sub>GM</sub>     | 4       | 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>     | 10      | W                |

|                                                                                      |          |   |    |
|--------------------------------------------------------------------------------------|----------|---|----|
| Peak pulse voltage<br>( $T_j=25^{\circ}\text{C}$ ; non-repetitive, off-state; FIG.7) | $V_{pp}$ | 2 | 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.  | 50   | mA               |
|             |                                                                                    | IV          |       | 70   |                  |
| $V_{GT}$    |                                                                                    | ALL         | MAX.  | 1    | 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.  | 50   | mA               |
|             |                                                                                    | II          |       | 100  |                  |
| $I_H$       | $I_T=500\text{mA}$                                                                 |             | MAX.  | 60   | mA               |
| $dV/dt$     | $V_D=400\text{V}$ Gate Open $T_j=125^{\circ}\text{C}$                              |             | MIN.  | 1200 | V/ $\mu\text{s}$ |
| $(dV/dt)_c$ | $(dI/dt)_c=5.3\text{A/ms}$ , $T_j=125^{\circ}\text{C}$                             |             | MIN.  | 12   | V/ $\mu\text{s}$ |
| $t_{on}$    | $I_G=80\text{mA}$ $I_A=400\text{mA}$ $I_R=40\text{mA}$<br>$T_j=25^{\circ}\text{C}$ |             | TYP.  | 5    | $\mu\text{s}$    |
| $t_{off}$   |                                                                                    |             |       | 30   |                  |

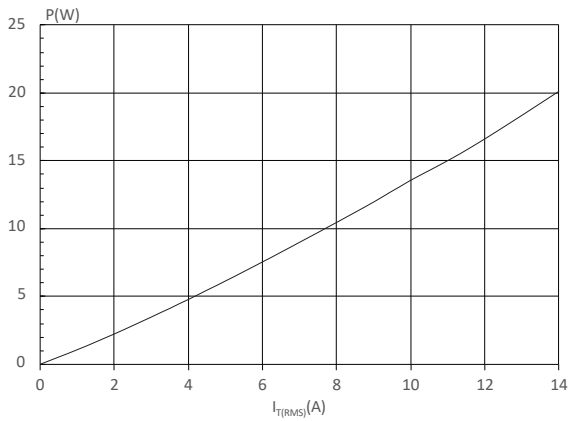
**STATIC CHARACTERISTICS**

| Symbol    | Parameter                                |                           | Value(MAX.) | Unit          |
|-----------|------------------------------------------|---------------------------|-------------|---------------|
| $V_{TM}$  | $I_{TM}=17\text{A}$ $t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.5         | V             |
| $V_{TO}$  | Threshold voltage                        | $T_j=125^{\circ}\text{C}$ | 0.77        | V             |
| $R_D$     | Dynamic resistance                       | $T_j=125^{\circ}\text{C}$ | 35          | m $\Omega$    |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$              | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$ |
| $I_{RRM}$ |                                          | $T_j=125^{\circ}\text{C}$ | 0.4         | mA            |

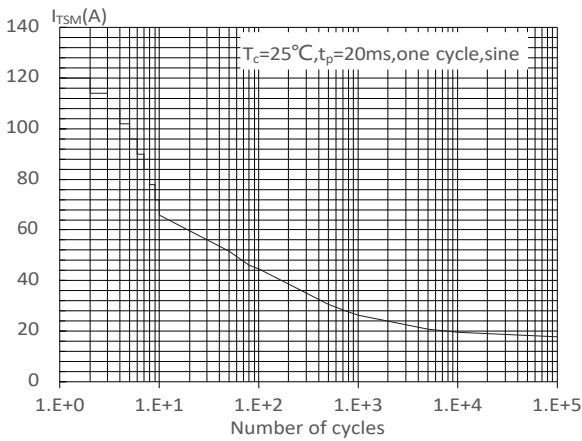
**THERMAL RESISTANCES**

| Symbol        | Parameter                | Value | Unit                 |
|---------------|--------------------------|-------|----------------------|
| $R_{th(j-c)}$ | junction to case (AC)    | 2.3   | $^{\circ}\text{C/W}$ |
| $R_{th(j-a)}$ | junction to ambient (AC) | 60    | $^{\circ}\text{C/W}$ |

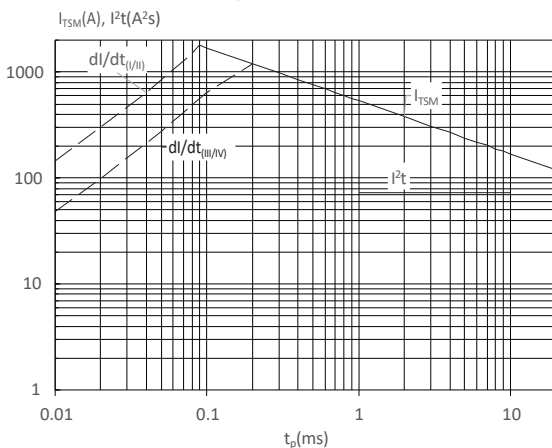
**FIG :** Maximum power dissipation versus RMS on-state current



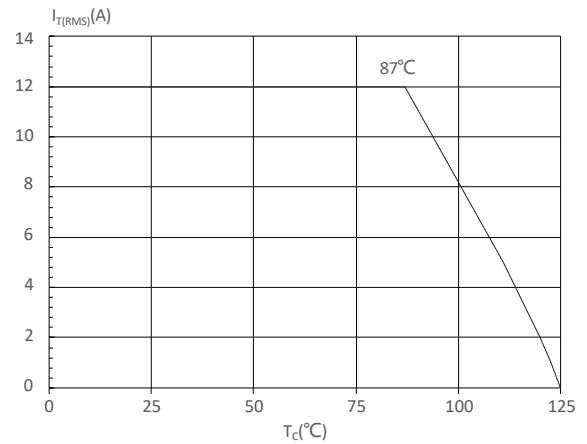
**FIG :** Surge peak on-state current versus number of cycles



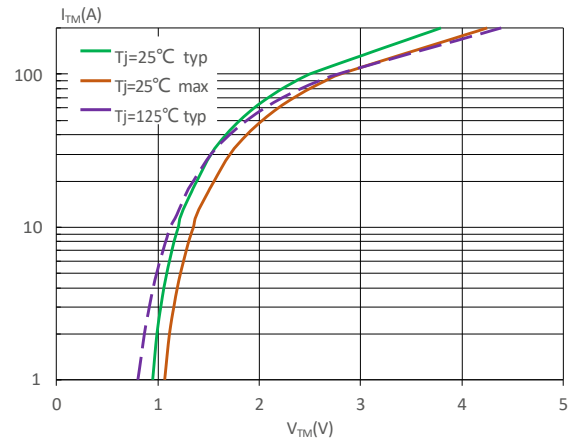
**FIG :** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20\text{ms}$ , and corresponding value of  $I^2t$  ( I - II :  $di/dt < 100\text{A}/\mu\text{s}$ ; III-IV :  $di/dt < 50\text{A}/\mu\text{s}$ )



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



**FIG :** On-state characteristics



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

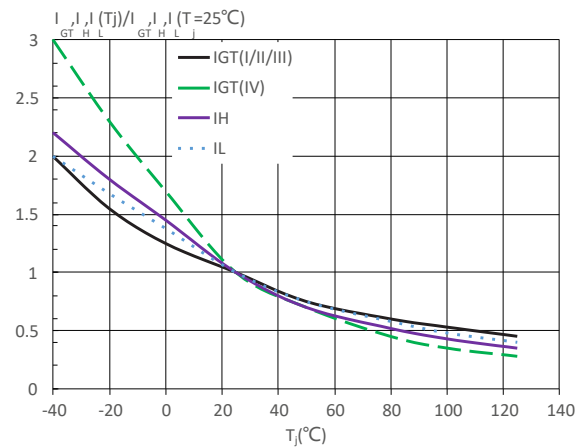
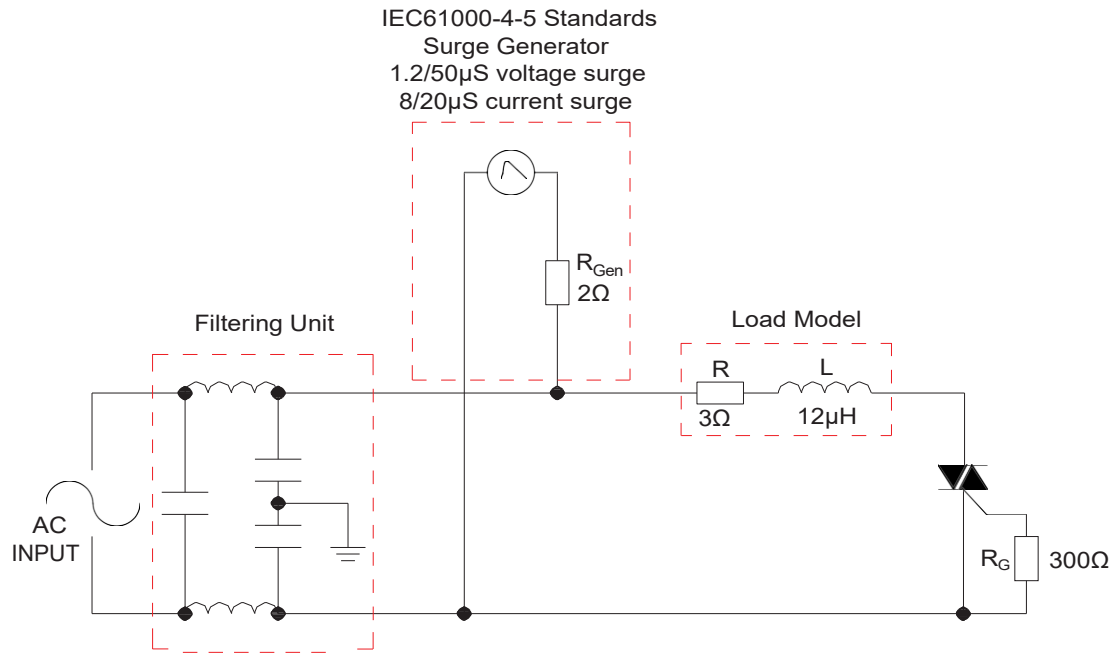


FIG : Test circuit for inductive and resistive loads to IEC-61000-4-5 standards



## LEAD FORMING AND SOLDERING

Refer to the application note “Assembly Instructions for Thyristors in Through-hole Package” released by JieJie Microelectronics