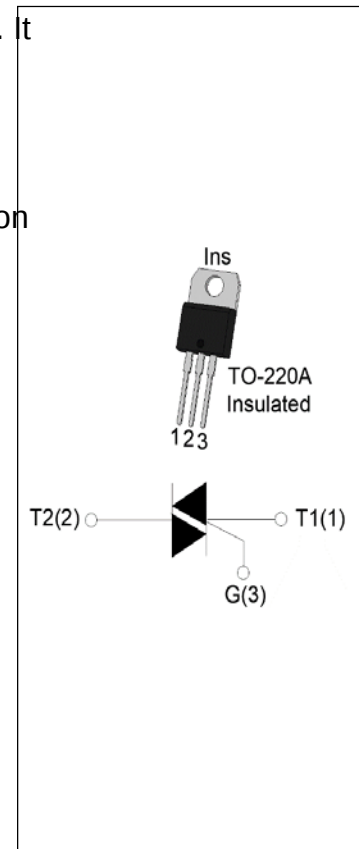


## DESCRIPTION:

The T1605G-6I 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. T1605G-6I snubberless triac is especially recommended for use on inductive loads. It can be driven directly through the MCU I/O port. By using an internal ceramic pad, T1605G-6I provides a rated insulation voltage of 2500 VRMS, complying with UL standards (File ref: E252906). Package TO-220A is RoHS compliant.

## MAIN FEATURES

| Symbol             | Value | Unit |
|--------------------|-------|------|
| $I_{T(RMS)}$       | 16    | A    |
| $V_{DRM}/V_{RRM}$  | 600   | V    |
| $I_{GT\ I/II/III}$ | 5/5/5 | mA   |



## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                                                        | Symbol       | Value   | Unit                   |
|------------------------------------------------------------------------------------------------------------------|--------------|---------|------------------------|
| Storage junction temperature range                                                                               | $T_{stg}$    | -40-150 | °C                     |
| Operating junction temperature range                                                                             | $T_j$        | -40-125 | °C                     |
| Repetitive peak off-state voltage ( $T_j=25^\circ\text{C}$ )                                                     | $V_{DRM}$    | 600     | V                      |
| Repetitive peak reverse voltage ( $T_j=25^\circ\text{C}$ )                                                       | $V_{RRM}$    | 600     | V                      |
| RMS on-state current ( $T_c \leq 102^\circ\text{C}$ )                                                            | $I_{T(RMS)}$ | 16      | A                      |
| Non repetitive surge peak on-state current (full cycle , $t_p=20\text{ms}$ , $T_j=25^\circ\text{C}$ )            | $I_{TSM}$    | 160     | A                      |
| Non repetitive surge peak on-state current (full cycle , $t_p=16.6\text{ms}$ , $T_j=25^\circ\text{C}$ )          |              | 176     |                        |
| $I^2t$ value for fusing ( $t_p=10\text{ms}$ , $T_j=25^\circ\text{C}$ )                                           | $I^2t$       | 128     | $\text{A}^2\text{s}$   |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ , $f=100\text{Hz}$ , $T_j=125^\circ\text{C}$ ) | $di/dt$      | 50      | $\text{A}/\mu\text{s}$ |
| Peak gate current ( $t_p=20\mu\text{s}$ , $T_j=125^\circ\text{C}$ )                                              | $I_{GM}$     | 4       | A                      |

|                                                                                      |             |     |    |
|--------------------------------------------------------------------------------------|-------------|-----|----|
| Average gate power dissipation ( $T_j=125^{\circ}\text{C}$ )                         | $P_{G(AV)}$ | 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.7) | $V_{pp}$    | 3   | kV |

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

| Symbol      | Test Condition                                                                     | Quadrant    | Value |     | Unit             |
|-------------|------------------------------------------------------------------------------------|-------------|-------|-----|------------------|
| $I_{GT}$    | $V_D=12\text{V}$ $R_L=33\Omega$                                                    | I - II -III | MAX.  | 5   | mA               |
| $V_{GT}$    |                                                                                    | I - II -III | MAX.  | 1   | V                |
| $V_{GD}$    | $V_D=V_{DRM}$ $T_j=125^{\circ}\text{C}$<br>$R_L=3.3\text{k}\Omega$                 | I - II -III | MIN.  | 0.2 | V                |
| $I_L$       | $I_G=1.2I_{GT}$                                                                    | I -III      | MAX.  | 15  | mA               |
|             |                                                                                    | II          |       | 20  |                  |
| $I_H$       | $I_T=500\text{mA}$                                                                 |             | MAX.  | 15  | mA               |
| $dV/dt$     | $V_D=400\text{V}$ Gate Open $T_j=125^{\circ}\text{C}$                              |             | MIN.  | 100 | V/ $\mu\text{s}$ |
| $(dI/dt)_c$ | $(dV/dt)_c=10\text{V}/\mu\text{s}$ $T_j=125^{\circ}\text{C}$                       |             | MIN.  | 1.5 | A/ms             |
| $t_{on}$    | $I_G=10\text{mA}$ $I_A=200\text{mA}$ $I_R=20\text{mA}$<br>$T_j=25^{\circ}\text{C}$ |             | TYP.  | 3   | $\mu\text{s}$    |
| $t_{off}$   |                                                                                    |             |       | 25  |                  |

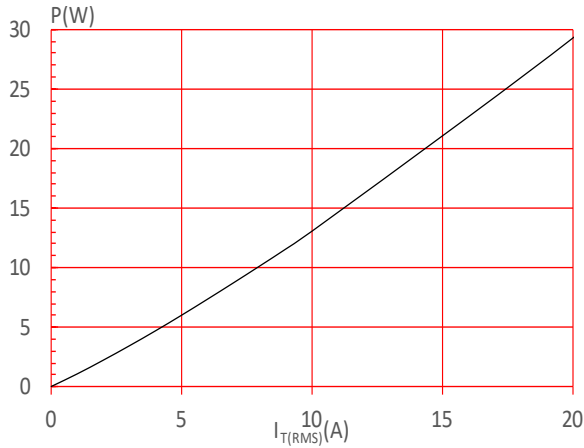
**STATIC CHARACTERISTICS**

| Symbol    | Parameter                                  |                           | Value(MAX.) | Unit             |
|-----------|--------------------------------------------|---------------------------|-------------|------------------|
| $V_{TM}$  | $I_{TM}=22.5\text{A}$ $t_p=380\mu\text{s}$ | $T_j=25^{\circ}\text{C}$  | 1.5         | V                |
| $V_{TO}$  | Threshold voltage                          | $T_j=125^{\circ}\text{C}$ | 0.77        | V                |
| $R_D$     | Dynamic resistance                         | $T_j=125^{\circ}\text{C}$ | 30          | $\text{m}\Omega$ |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$                | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$    |
| $I_{RRM}$ |                                            | $T_j=125^{\circ}\text{C}$ | 0.4         | mA               |

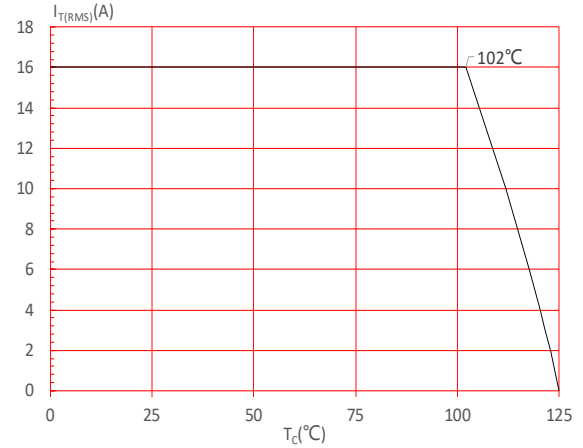
**THERMAL RESISTANCES**

| Symbol        | Parameter                | Value | Unit                        |
|---------------|--------------------------|-------|-----------------------------|
| $R_{th(j-c)}$ | junction to case (AC)    | 1     | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | junction to ambient (AC) | 60    | $^{\circ}\text{C}/\text{W}$ |

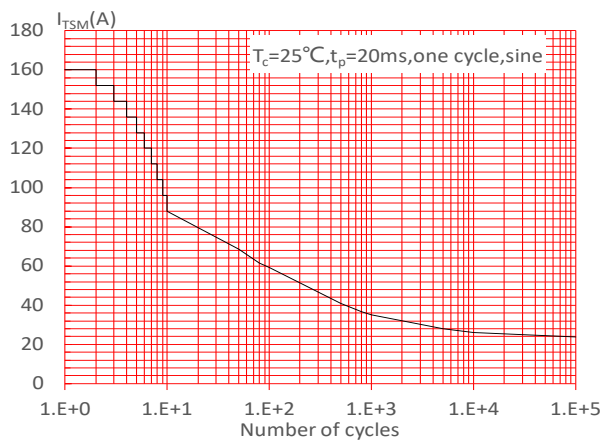
**FIG.1:** Maximum power dissipation versus RMS on-state current



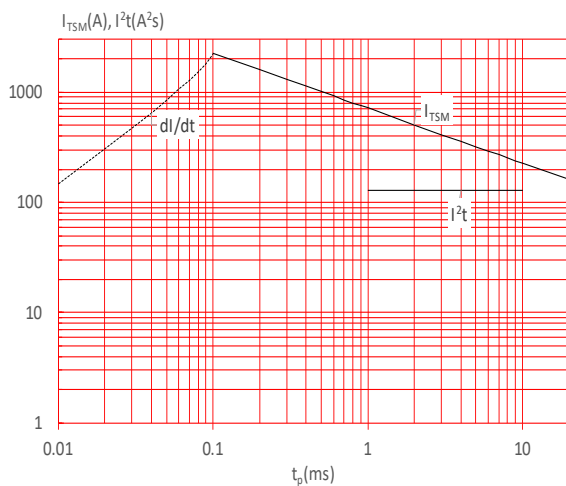
**FIG.2:** RMS on-state current versus case temperature



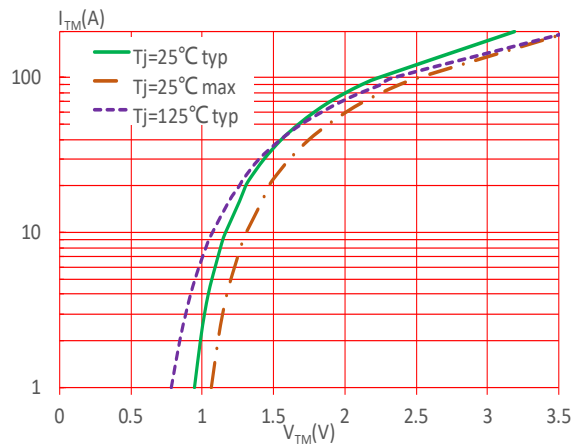
**FIG.3:** Surge peak on-state current versus number of cycles



**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 20ms$ , and corresponding value of  $I^2t$  ( $di/dt < 50A/\mu s$ )



**FIG.4:** On-state characteristics



**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature

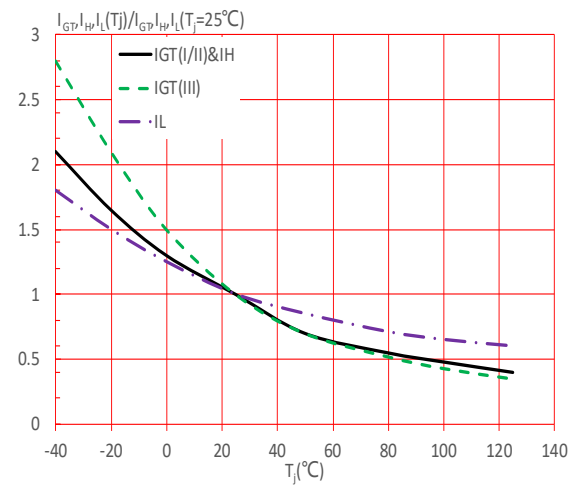
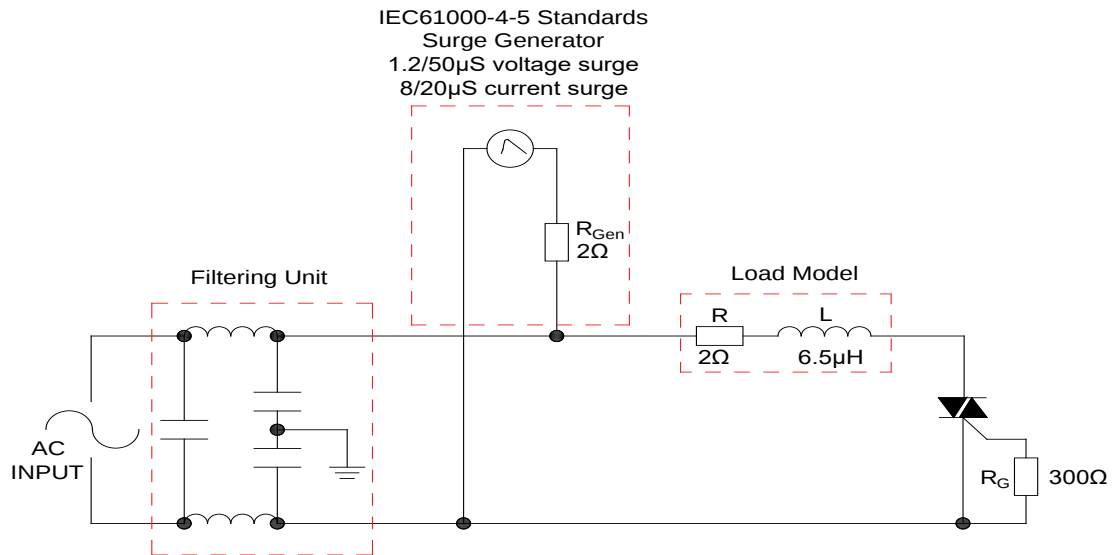
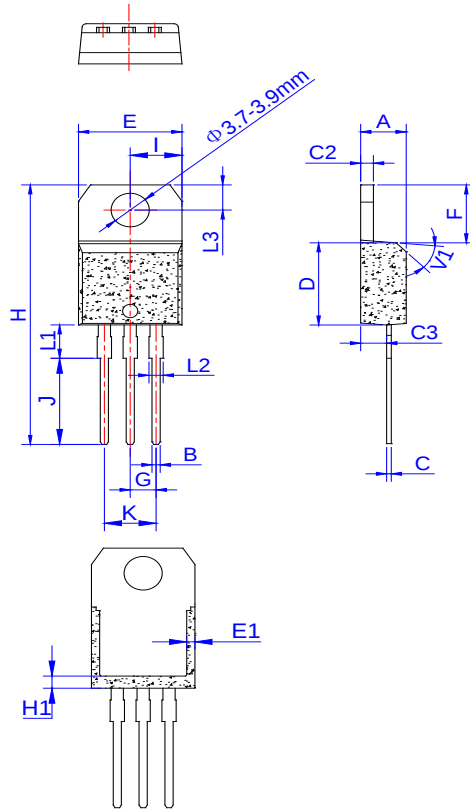


FIG.7: Test circuit for inductive and resistive loads to IEC-61000-4-5 standards

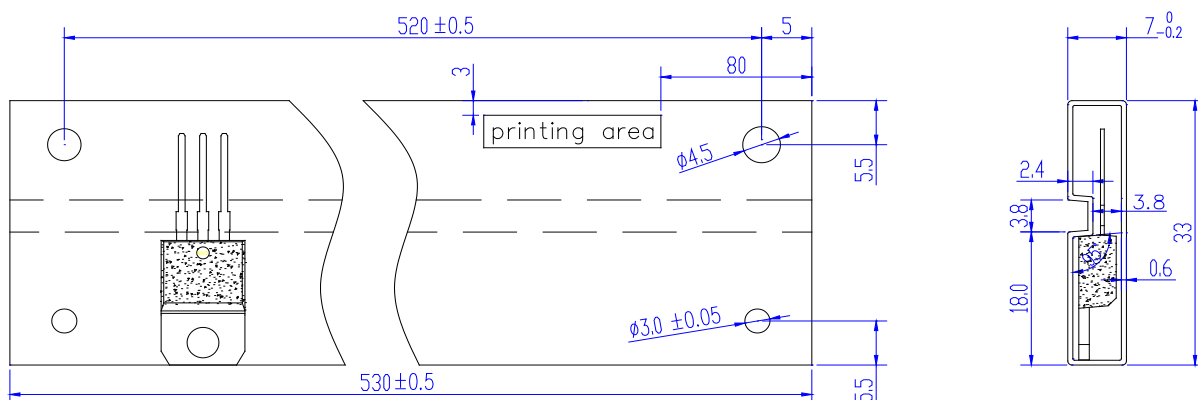


## PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 4.40        |      | 4.60  | 0.173  |      | 0.181 |
| B    | 0.61        |      | 0.88  | 0.024  |      | 0.035 |
| C    | 0.46        |      | 0.70  | 0.018  |      | 0.028 |
| C2   | 1.21        |      | 1.32  | 0.048  |      | 0.052 |
| C3   | 2.40        |      | 2.72  | 0.094  |      | 0.107 |
| D    | 8.60        |      | 9.70  | 0.339  |      | 0.382 |
| E    | 9.80        |      | 10.40 | 0.386  |      | 0.409 |
| E1   | 1.00        |      | 1.40  | 0.039  |      | 0.055 |
| F    | 6.25        |      | 6.85  | 0.246  |      | 0.270 |
| G    | 2.40        |      | 2.70  | 0.094  |      | 0.106 |
| H    | 28.00       |      | 29.80 | 1.102  |      | 1.173 |
| H1   | 1.80        |      | 2.20  | 0.071  |      | 0.087 |
| I    | 4.80        |      | 5.20  | 0.189  |      | 0.205 |
| J    | 9.55        |      | 9.95  | 0.376  |      | 0.392 |
| K    | 4.80        |      | 5.20  | 0.189  |      | 0.205 |
| L1   | 3.45        |      | 4.05  | 0.136  |      | 0.159 |
| L2   | 1.14        |      | 1.70  | 0.045  |      | 0.067 |
| L3   | 2.65        |      | 2.95  | 0.104  |      | 0.116 |
| V1   |             | 45°  |       |        | 45°  |       |

## DELIVERY MODE



| PACKAGE | OUTLINE | TUBE (PCS) | INNER BOX (PCS) | PER CARTON |
|---------|---------|------------|-----------------|------------|
| TO-220A | TUBE    | 50         | 1,000           | 5,000      |