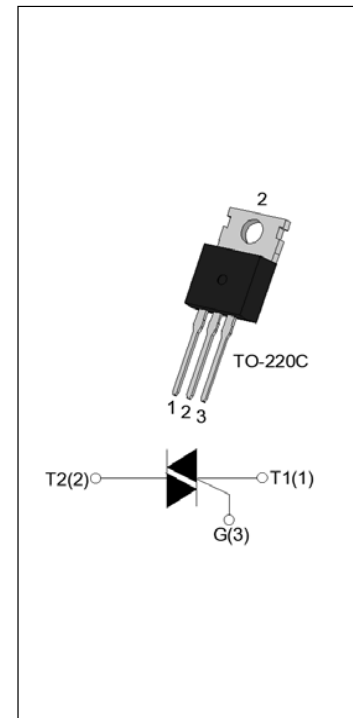


## DESCRIPTION:

The BTB16-800SW 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. BTB16-800SW snubberless triac is especially recommended for use on inductive loads. It can be driven directly through the MCU I/O port. From T2 terminals to external heatsink. Package TO-220C is RoHS compliant.

## MAIN FEATURES

| Symbol             | Value    | Unit |
|--------------------|----------|------|
| $I_{T(RMS)}$       | 16       | A    |
| $V_{DRM}/V_{RRM}$  | 800      | V    |
| $I_{GT\ I/II/III}$ | 10/10/10 | mA   |



## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                                            | Symbol       | Value   | Unit      |
|------------------------------------------------------------------------------------------------------|--------------|---------|-----------|
| Storage junction temperature range                                                                   | $T_{stg}$    | -40-150 | °C        |
| Operating junction temperature range                                                                 | $T_j$        | -40-125 | °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 ( $T_c \leq 100^{\circ}C$ )                                                     | $I_{T(RMS)}$ | 16      | A         |
| Non repetitive surge peak on-state current (full cycle , $t_p=20ms$ , $T_j=25^{\circ}C$ )            | $I_{TSM}$    | 160     | A         |
| Non repetitive surge peak on-state current (full cycle , $t_p=16.6ms$ , $T_j=25^{\circ}C$ )          |              | 176     |           |
| $I^2t$ value for fusing ( $t_p=10ms$ , $T_j=25^{\circ}C$ )                                           | $I^2t$       | 128     | $A^2s$    |
| Critical rate of rise of on-state current ( $I_G=2 \times I_{GT}$ , $f=100Hz$ , $T_j=125^{\circ}C$ ) | $di/dt$      | 50      | $A/\mu s$ |
| Peak gate current ( $t_p=20\mu s$ , $T_j=125^{\circ}C$ )                                             | $I_{GM}$     | 4       | A         |
| Average gate power dissipation ( $T_j=125^{\circ}C$ )                                                | $P_{G(AV)}$  | 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. 7) | $V_{pp}$ | 4 | 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.  | 10  | 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.  | 25  | mA               |
|             |                                                                                    | II           |       | 30  |                  |
| $I_H$       | $I_T=500\text{mA}$                                                                 |              | MAX.  | 15  | mA               |
| $dV/dt$     | $V_D=540\text{V}$ Gate Open $T_j=125^{\circ}\text{C}$                              |              | MIN.  | 400 | V/ $\mu\text{s}$ |
| $(dI/dt)_c$ | $(dV/dt)_c=10\text{V}/\mu\text{s}$ $T_j=125^{\circ}\text{C}$                       |              | MIN.  | 5   | A/ms             |
| $t_{on}$    | $I_G=20\text{mA}$ $I_A=200\text{mA}$ $I_R=20\text{mA}$<br>$T_j=25^{\circ}\text{C}$ |              | TYP.  | 5   | $\mu\text{s}$    |
| $t_{off}$   |                                                                                    |              |       | 30  |                  |

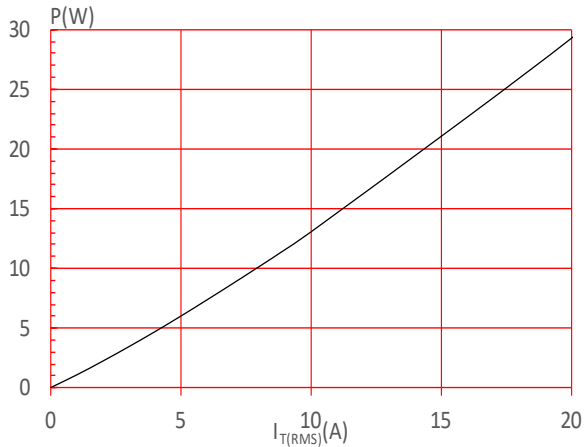
**STATIC CHARACTERISTICS**

| 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          | m $\Omega$    |
| $I_{DRM}$ | $V_D=V_{DRM}$ $V_R=V_{RRM}$                | $T_j=25^{\circ}\text{C}$  | 5           | $\mu\text{A}$ |
| $I_{RRM}$ |                                            | $T_j=125^{\circ}\text{C}$ | 0.5         | mA            |

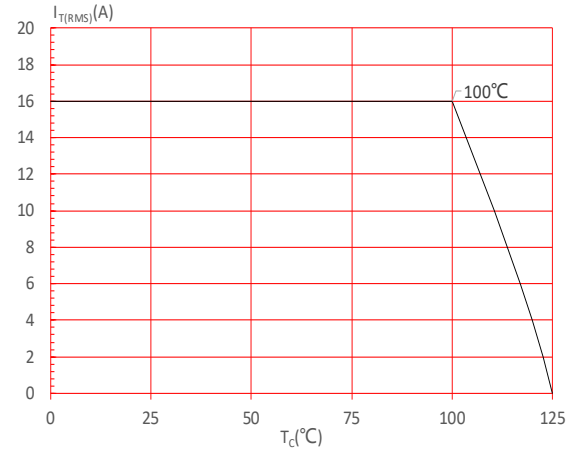
**THERMAL RESISTANCES**

| Symbol        | Parameter                | Value | Unit                        |
|---------------|--------------------------|-------|-----------------------------|
| $R_{th(j-c)}$ | junction to case (AC)    | 1.1   | $^{\circ}\text{C}/\text{W}$ |
| $R_{th(j-a)}$ | junction to ambient (AC) | 60    | $^{\circ}\text{C}/\text{W}$ |

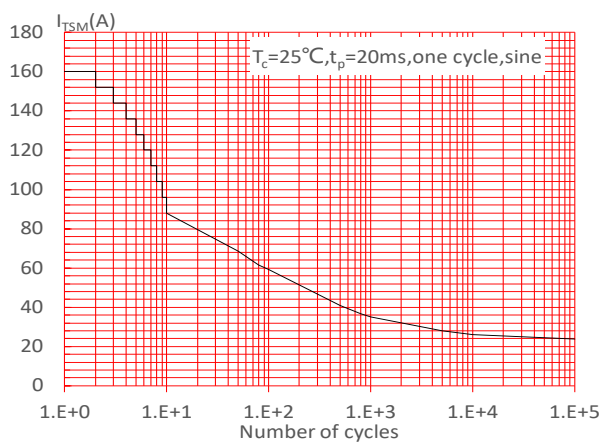
**FIG.1:** Maximum power dissipation versus RMS on-state current



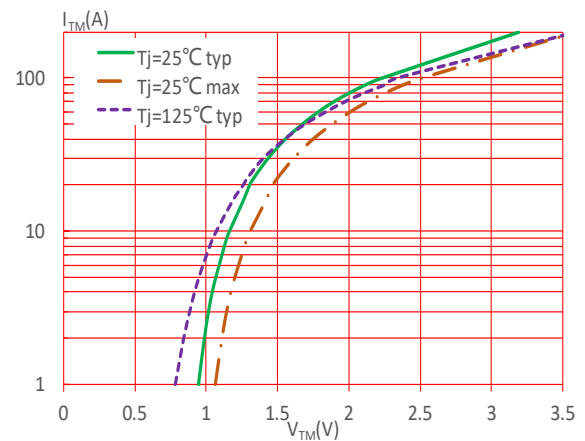
**FIG.2:** RMS on-state current versus case temperature



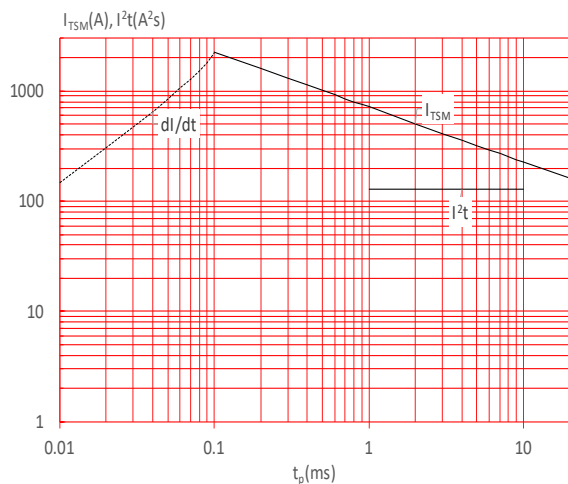
**FIG.3:** Surge peak on-state current versus number of cycles



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



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

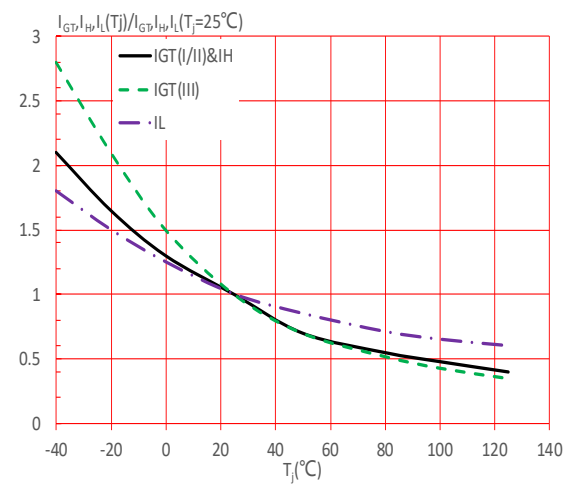
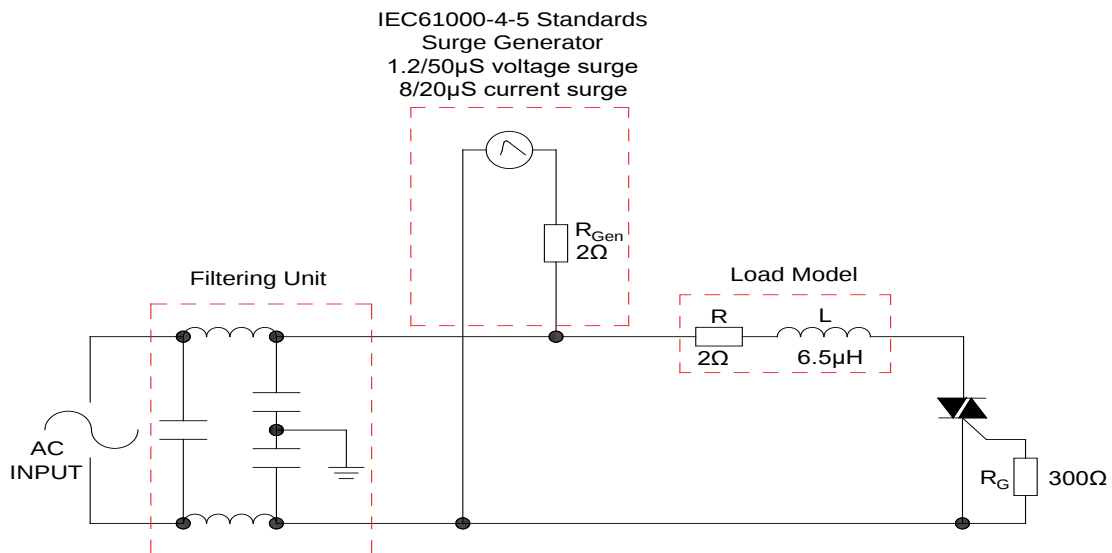
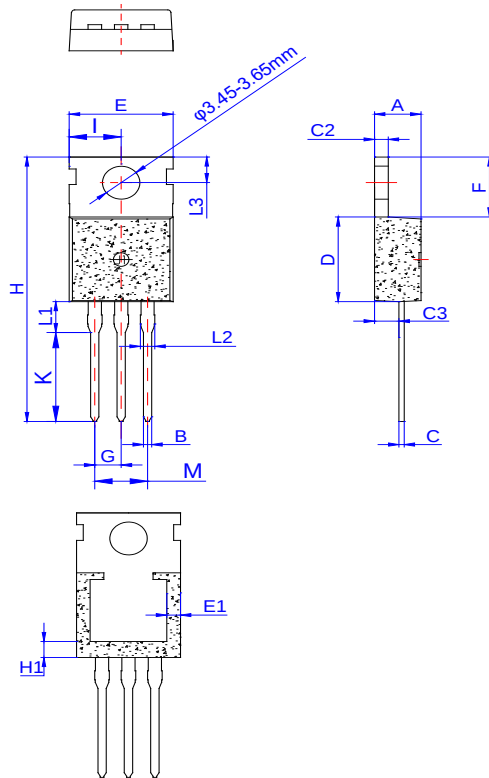


FIG.7: Test circuit for inductive and resistive loads to IEC-61000-4-5 standards

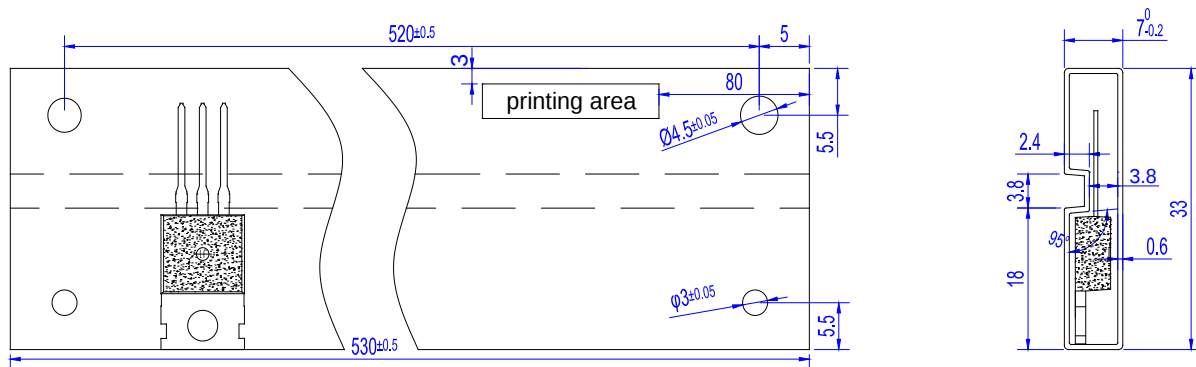


## PACKAGE MECHANICAL DATA



| Ref. | Dimensions  |      |       |        |      |       |
|------|-------------|------|-------|--------|------|-------|
|      | Millimeters |      |       | Inches |      |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ. | Max.  |
| A    | 4.40        |      | 4.60  | 0.173  |      | 0.181 |
| B    | 0.70        |      | 0.90  | 0.028  |      | 0.035 |
| C    | 0.45        |      | 0.60  | 0.018  |      | 0.024 |
| C2   | 1.25        |      | 1.35  | 0.049  |      | 0.053 |
| C3   | 2.20        |      | 2.60  | 0.087  |      | 0.102 |
| D    | 8.90        |      | 9.90  | 0.350  |      | 0.390 |
| E    | 9.90        |      | 10.30 | 0.390  |      | 0.406 |
| E1   | 0.80        |      | 1.20  | 0.031  |      | 0.047 |
| F    | 6.30        |      | 6.90  | 0.248  |      | 0.272 |
| G    | 2.40        |      | 2.70  | 0.094  |      | 0.106 |
| H    | 28.00       |      | 29.80 | 1.102  |      | 1.173 |
| H1   | 2.15        |      | 2.55  | 0.085  |      | 0.100 |
| I    | 4.70        |      | 5.10  | 0.185  |      | 0.201 |
| K    | 9.90        |      | 10.30 | 0.390  |      | 0.406 |
| L1   | 2.70        |      | 3.30  | 0.106  |      | 0.130 |
| L2   | 1.14        |      | 1.70  | 0.045  |      | 0.067 |
| L3   | 2.65        |      | 2.95  | 0.104  |      | 0.116 |
| M    | 4.80        |      | 5.20  | 0.189  |      | 0.205 |

## DELIVERY MODE



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