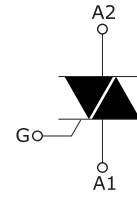


**Product features and main applications:**

NPNP five-layer structure of silicon bidirectional devices; with independent intellectual property rights of single-sided digging technology, table glass passivation process; multi-layer metallized electrodes on the back; with high blocking voltage and high temperature stability.



**Mainly used in:**

vacuum cleaners, power tools and other motor speed controllers; solid state relays; heating controllers (temperature regulation); other phase control circuits.

**Characteristics**

**Table 1. Absolute maximum ratings (Tj = 25 ° C unless otherwise stated)**

| Symbol       | Parameter name   |                   | value | Unit             |
|--------------|--|-------------------|-------|------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave)  | BTA<br>Tc=80°C    | 12    | A                |
| $I_{TSM}$    | Non repetitive surge peak on-state current (full cycle, Tj initial = 25 ° C) | F=50HZ<br>tp=20ms | 120   | A                |
| $I^2t$       | I <sup>2</sup> t value for fusing  | tp=10ms           | 72    | A <sup>2</sup> S |
| di/dt        | Critical rate of rise of on-state current IG = 2 x IGT, tr ≤ 100 ns          | Tj=125            | 50    | A/us             |

|                    |  |                          |                           |                          |                    |
|--------------------|--|--------------------------|---------------------------|--------------------------|--------------------|
| $V_{DRM}/V_{RRM}$  | Off state repetitive peak voltage<br>Reverse repetitive peak voltage       | $T_j=25^{\circ}\text{C}$ |                           | 600/800                  | V                  |
| $I_{GM}$           | Peak gate current  | $t_p=20\mu\text{s}$      | $T_j=150^{\circ}\text{C}$ | 4                        | A                  |
| $P_{G(AV)}$        | Average gate power dissipation   |                          | $T_j=150^{\circ}\text{C}$ | 1                        | W                  |
| $T_{stg}$<br>$T_j$ | Storage junction temperature range<br>Operating junction temperature range |                          |                           | -40 to+150<br>-40 to+125 | $^{\circ}\text{C}$ |

**Table 2. Electrical characteristics ( $T_j = 25^{\circ}\text{C}$ , unless otherwise specified) --3 quadrants**

| Symbol               | Name and test conditions   | Quadrant       | Range | value |     |     |     | Unit |
|----------------------|--|----------------|-------|-------|-----|-----|-----|------|
|                      |  |                |       | BW    | CW  | SW  | TW  |      |
| $I_{GT}$             | $V_D=12\text{V}$ $R_L=100\Omega$   | I<br>II<br>III | MAX   | 50    | 35  | 10  | 5   | mA   |
| $V_{GT}$             |  |                |       | 1.5   |     |     |     |      |
| $V_{GD}$             | $V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ , $T_j = 125^{\circ}\text{C}$ |                | MIN   | 0.2   |     |     |     | V    |
| $I_H$                | $I_T = 100\text{ mA}$  |                | MAX   | 60    | 40  | 20  | 15  | mA   |
| $I_L$                | $I_G = 1.2 \times I_{GT}$  |                | MAX   | 100   | 60  | 40  | 30  | mA   |
| dv/dt                | $V_D = 67\% V_{DRM}$ , gate open,<br>$T_j = 125^{\circ}\text{C}$         |                | MIN   | 500   | 500 | 200 | 100 | V/us |
| (dv/dt) <sub>c</sub> | Critical rise rate of commutation<br>voltage $T_J = 150^{\circ}\text{C}$ |                | MIN   | 8     |     |     |     | V/us |

**Table 3 Electrical characteristics (Tj = 25 °C unless otherwise specified) -Standard Triac (4 quadrants)**

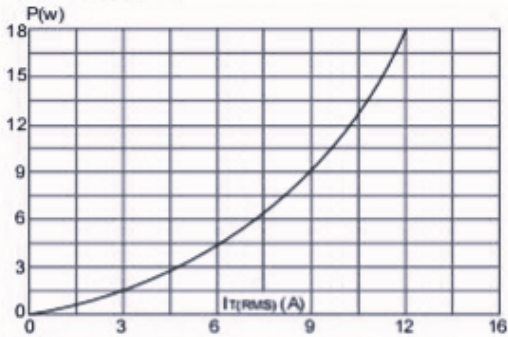
| Symbol               | Name and test conditions  | Quadrant    | Range | value |    | Unit |
|----------------------|---|-------------|-------|-------|----|------|
|                      |   |             |       | B     | C  |      |
| I <sub>GT</sub>      | V <sub>D</sub> =12V R <sub>L</sub> =100Ω  | I - II -III | MAX   | 50    | 20 | mA   |
|                      |   | IV          |       | 100   | 60 |      |
| V <sub>GT</sub>      |   | ALL         | MAX   | 1.5   |    | V    |
| V <sub>GD</sub>      | V <sub>D</sub> = V <sub>DRM</sub> , R <sub>L</sub> = 3.3 kΩ, T <sub>j</sub> = 125 ° C | ALL         | MIN   | 0.2   |    | V    |
| I <sub>H</sub>       | I <sub>T</sub> =500mA   |             | MAX   | 60    | 50 | mA   |
| I <sub>L</sub>       | I <sub>G</sub> = 1.2 x I <sub>GT</sub>  | I - II -III | MAX   | 60    | 50 | mA   |
|                      |   | IV          |       | 100   | 80 |      |
| dv/dt                | V <sub>D</sub> = 67% V <sub>DRM</sub> , gate open, T <sub>j</sub> = 125 ° C           |             | MIN   | 500   |    | V/us |
| (dv/dt) <sub>c</sub> | Critical rise rate of commutation voltage T <sub>J</sub> = 150 ° C                    |             | MIN   | 10    |    | V/us |

### Static parameters

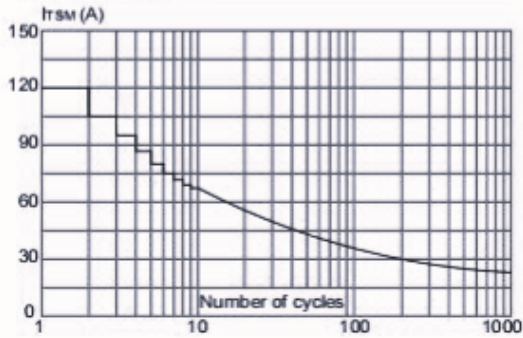
| Symbol                 | Parameter name             |                           |     | value  | Unit          |
|------------------------|----------------------------|---------------------------|-----|--------|---------------|
| $V_{TM}$               | $I_{TM} = 24A$             | $T_j = 25^{\circ}C$       | MAX | 1.50   | V             |
| $V_{TO}$               | threshold on-state voltage | $T_j = 150^{\circ}C$      | MAX | 0.86   | V             |
| Rd                     | Dynamic resistance         | $T_j = 150^{\circ}C$      | MAX | 36.6   | mΩ            |
| $I_{DRM}$<br>$I_{RRM}$ | VDRM = VRRM                | $T_j = 25$<br>$T_j = 150$ | MAX | 5<br>1 | uA<br>mA      |
| $R_{th(j-c)}$          | Junction to ambient        | BTA                       | MAX | 2.05   | $^{\circ}C W$ |

### BTA12 characteristic curve

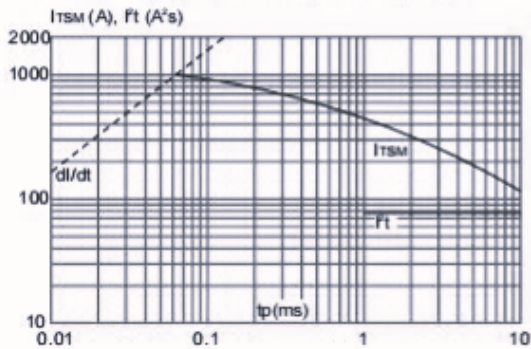
**FIG.1** Maximum power dissipation versus RMS on-state current



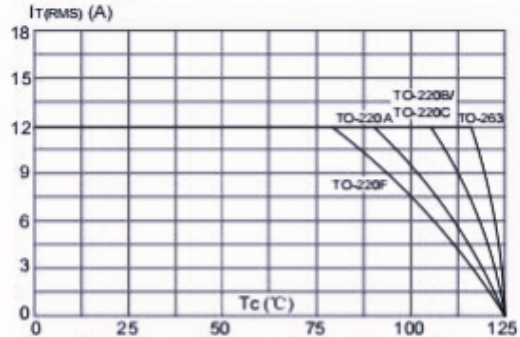
**FIG.3:** Surge peak on-state current versus number of cycles



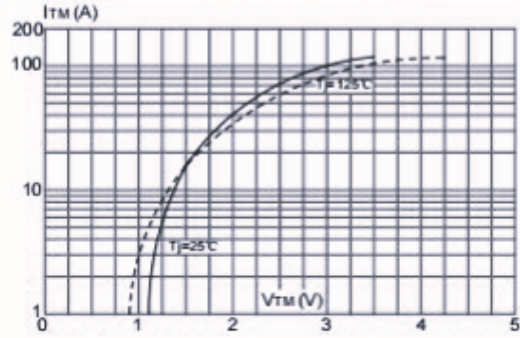
**FIG.5:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I^2 t$  ( $di/dt < 50\text{A}/\mu\text{s}$ )



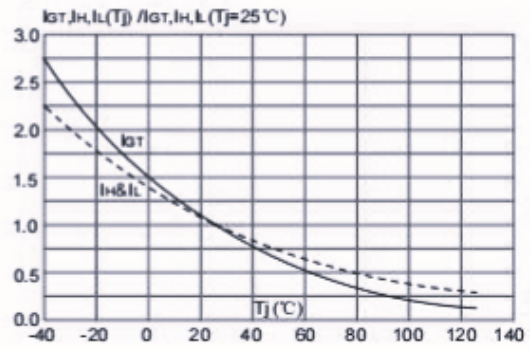
**FIG.2:** RMS on-state current versus case temperature



**FIG.4:** On-state characteristics (maximum values)

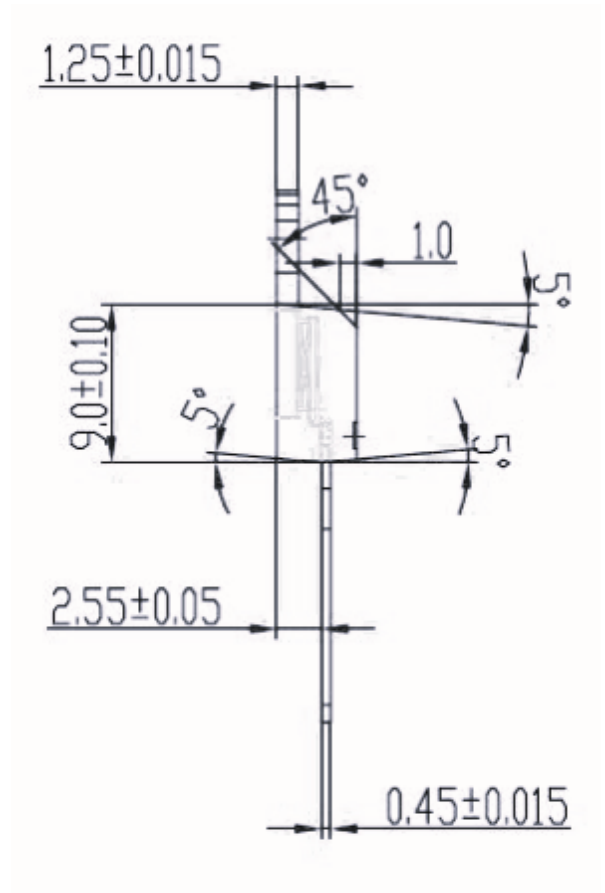
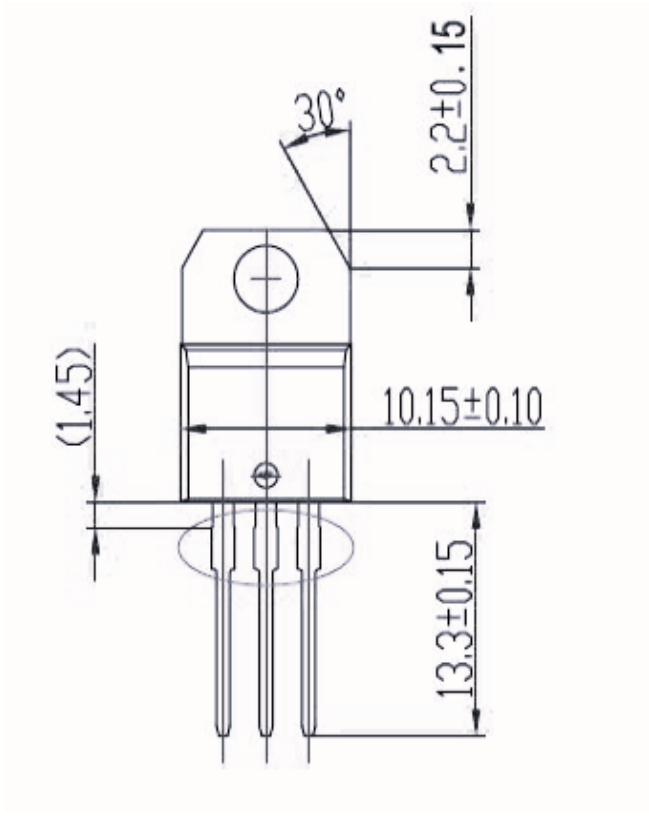


**FIG.6:** Relative variations of gate trigger current, holding current and latching current versus junction temperature



**TO-220 Dimensional drawing:**

Unit: mm ( $\pm 0.1$ )



### Ordering information

| Order code        | Package | Baseqty | Deliverymode |
|-------------------|---------|---------|--------------|
| UMW BTA12-600BRG  | TO-220A | 1000    | Tube and box |
| UMW BTA12-600CRG  | TO-220A | 1000    | Tube and box |
| UMW BTA12-800BRG  | TO-220A | 1000    | Tube and box |
| UMW BTA12-800CRG  | TO-220A | 1000    | Tube and box |
| UMW BTA12-600BWRG | TO-220A | 1000    | Tube and box |
| UMW BTA12-600CWRG | TO-220A | 1000    | Tube and box |
| UMW BTA12-800BWRG | TO-220A | 1000    | Tube and box |
| UMW BTA12-800CWRG | TO-220A | 1000    | Tube and box |
| UMW BTA12-600SWRG | TO-220A | 1000    | Tube and box |
| UMW BTA12-600TWRG | TO-220A | 1000    | Tube and box |
| UMW BTA12-800SWRG | TO-220A | 1000    | Tube and box |

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