



# BTA20 Series

SNUBBERLESSTM

20A TRIACs

**Table 1: Main Features**

| Symbol             | Value       | Unit |
|--------------------|-------------|------|
| $I_{T(RMS)}$       | 20          | A    |
| $V_{DRM}/V_{RRM}$  | 600 and 700 | V    |
| $I_{GT(Q_1)}(max)$ | 35 and 50   | mA   |

## DESCRIPTION

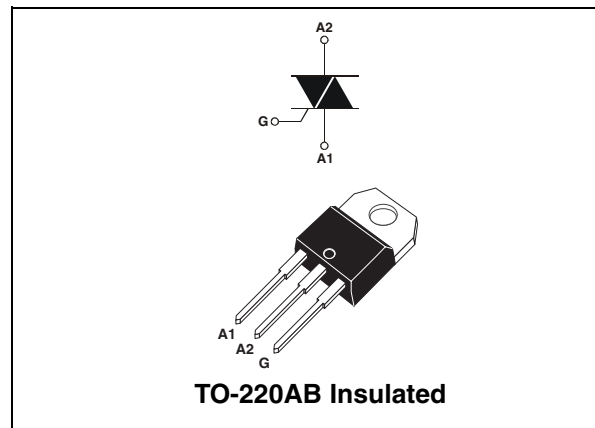
The **BTA20 BW/CW** triac family are high performance glass passivated chips technology. The snubberless concept offer suppression of RC network and it is suitable for application such as phase control and static switching on inductive or resistive load.

Thanks to their clip assembly technique, they provide a superior performance in surge current handling capabilities.

By using an internal ceramic pad, the BTA series provides voltage insulated tab (rated at  $2500V_{RMS}$ ) complying with UL standards (File ref.: E81734).

**Table 3: Absolute Maximum Ratings**

| Symbol             | Parameter  |                         | Value                    | Unit                           |            |
|--------------------|--|-------------------------|--------------------------|--------------------------------|------------|
| $I_{T(RMS)}$       | RMS on-state current (full sine wave)  |                         | $T_c = 70^\circ C$<br>20 | A                              |            |
| $I_{TSM}$          | Non repetitive surge peak on-state current (full cycle, $T_j$ initial = $25^\circ C$ ) | F = 50 Hz    t = 10 ms  | 210                      | A                              |            |
|                    |  | F = 60 Hz    t = 8.3 ms | 200                      |                                |            |
| $I^2t$             | $I^2t$ Value for fusing  | $t_p = 10$ ms           | 200                      | $A^2s$                         |            |
| di/dt              | Critical rate of rise of on-state current<br>$I_G = 500$ mA $dI_G/dt = 1$ A/ $\mu s$   | Repetitive<br>F = 50 Hz | $T_j = 125^\circ C$      | 20                             | A/ $\mu s$ |
|                    |  | Non repetitive          |                          | 100                            |            |
| $V_{DSM}/V_{RSM}$  | Non repetitive peak off-state voltage  | $t_p = 10$ ms           | $T_j = 25^\circ C$       | $V_{DSM}/V_{RSM} + 100$        | V          |
| $I_{GM}$           | Peak gate current  | $t_p = 20$ $\mu s$      | $T_j = 125^\circ C$      | 4                              | A          |
| $V_{GM}$           | Peak positive gate voltage   | $t_p = 20$ $\mu s$      |                          | 16                             | V          |
| $P_{G(AV)}$        | Average gate power dissipation   |                         | $T_j = 125^\circ C$      | 1                              | W          |
| $T_{stg}$<br>$T_j$ | Storage junction temperature range<br>Operating junction temperature range             |                         |                          | - 40 to + 150<br>- 40 to + 125 | $^\circ C$ |



**Table 2: Order Codes**

| Part Numbers  | Marking     |
|---------------|-------------|
| BTA20-600BWRG | BTA20-600BW |
| BTA20-600CWRG | BTA20-600CW |
| BTA20-700BWRG | BTA20-700BW |
| BTA20-700CWRG | BTA20-700CW |

## BTA20 Series

**Tables 4: Electrical Characteristics** ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

| Symbol          | Test Conditions  | Quadrant                  |      | BTA20 |     | Unit             |
|-----------------|--|---------------------------|------|-------|-----|------------------|
|                 |  |                           |      | BW    | CW  |                  |
| $I_{GT}$ (1)    | $V_D = 12\text{ V}$ $R_L = 33\ \Omega$                               | ALL                       | MIN. | 2     | 1   | mA               |
|                 |  |                           | MAX. | 50    | 35  |                  |
| $V_{GT}$        |  | ALL                       | MAX. | 1.5   |     | V                |
| $V_{GD}$        | $V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ $T_j = 125^\circ\text{C}$ | ALL                       | MIN. | 0.2   |     | V                |
| $I_H$ (2)       | $I_T = 500\text{ mA}$ gate open                                      |                           | MAX. | 75    | 50  | mA               |
| $I_L$           | $I_G = 1.2\ I_{GT}$  | I - III                   | TYP. | 50    | -   | mA               |
|                 |  | II                        |      | 90    | -   |                  |
|                 |  | I - II - III              | MAX. | -     | 80  |                  |
| $dV/dt$ (2)     | $V_D = 67\ \%V_{DRM}$ gate open                                      | $T_j = 125^\circ\text{C}$ | TYP. | 750   | 500 | V/ $\mu\text{s}$ |
|                 |  |                           | MIN. | 500   | 250 |                  |
| $(dV/dt)_c$ (2) | $(dI/dt)_c = 20\text{ A/ms}$   | $T_j = 125^\circ\text{C}$ | TYP. | 36    | 22  | V/ $\mu\text{s}$ |
|                 |  |                           | MIN. | 18    | 11  |                  |

**Table 5: Static Characteristics**

| Symbol                 | Test Conditions        |                          |                           | Value | Unit |               |
|------------------------|------------------------|--------------------------|---------------------------|-------|------|---------------|
| $V_{TM}$ (2)           | $I_{TM} = 28\text{ A}$ | $t_p = 380\ \mu\text{s}$ | $T_j = 25^\circ\text{C}$  | MAX.  | 1.70 | V             |
| $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM} = V_{RRM}$    |                          | $T_j = 25^\circ\text{C}$  | MAX.  | 10   | $\mu\text{A}$ |
|                        |                        |                          | $T_j = 125^\circ\text{C}$ |       | 3    | mA            |

**Note 1:** minimum  $I_{GT}$  is guaranteed at 5% of  $I_{GT}$  max.

**Note 2:** for both polarities of A2 referenced to A1.

**Table 6: Thermal resistance**

| Symbol        | Parameter             | Value | Unit               |
|---------------|-----------------------|-------|--------------------|
| $R_{th(j-c)}$ | Junction to case (AC) | 2.1   | $^\circ\text{C/W}$ |
| $R_{th(j-c)}$ | Junction to case (DC) | 2.8   |                    |
| $R_{th(j-a)}$ | Junction to ambient   | 60    | $^\circ\text{C/W}$ |

Figure 1: Maximum power dissipation versus RMS on-state current (full cycle)

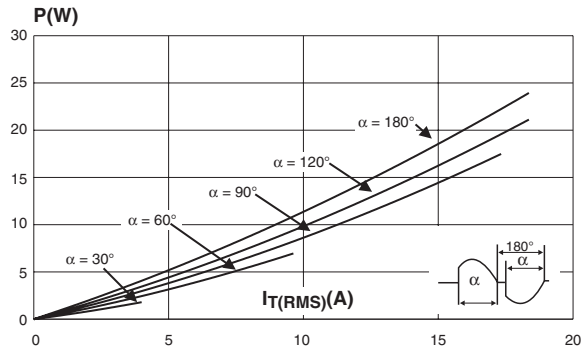


Figure 2: Correlation between maximum RMS power dissipation and maximum allowable temperatures (Tamb and Tcase) for different thermal resistances heatsink + contact

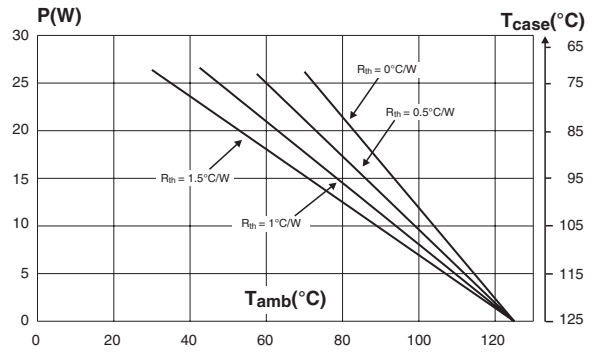


Figure 3: RMS on-state current versus case temperature (full cycle)

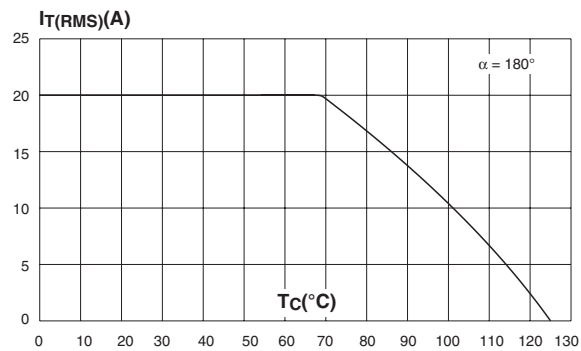


Figure 4: Relative variation of thermal impedance versus pulse duration

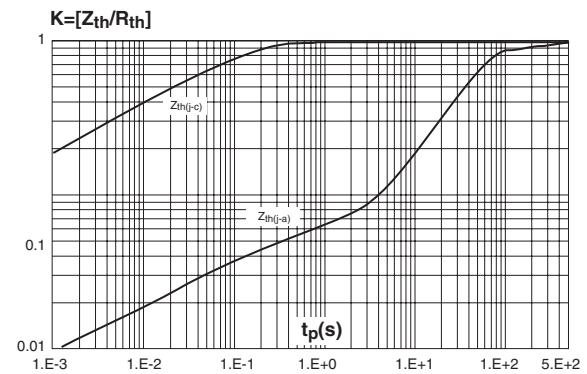


Figure 5: On-state characteristics (maximum values)

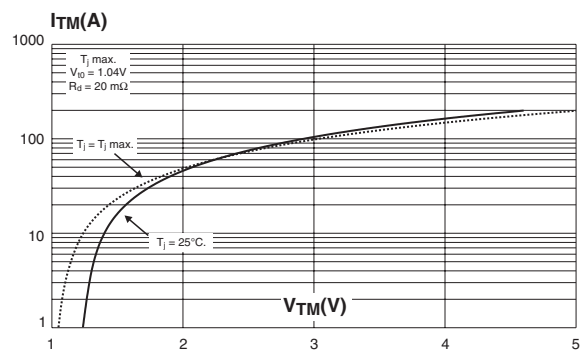
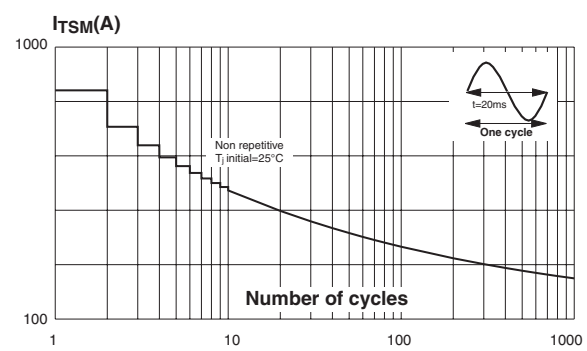
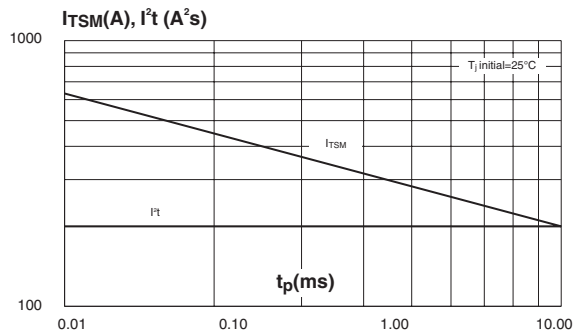


Figure 6: Non repetitive surge peak on-state current versus number of cycles

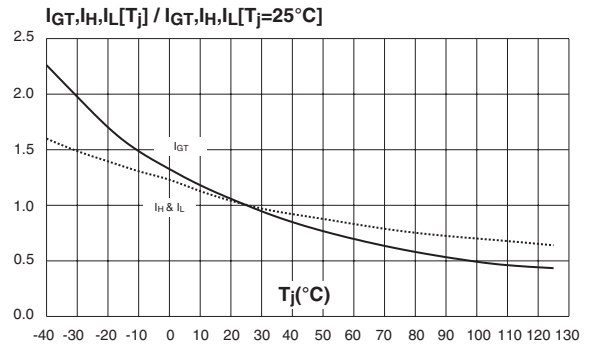


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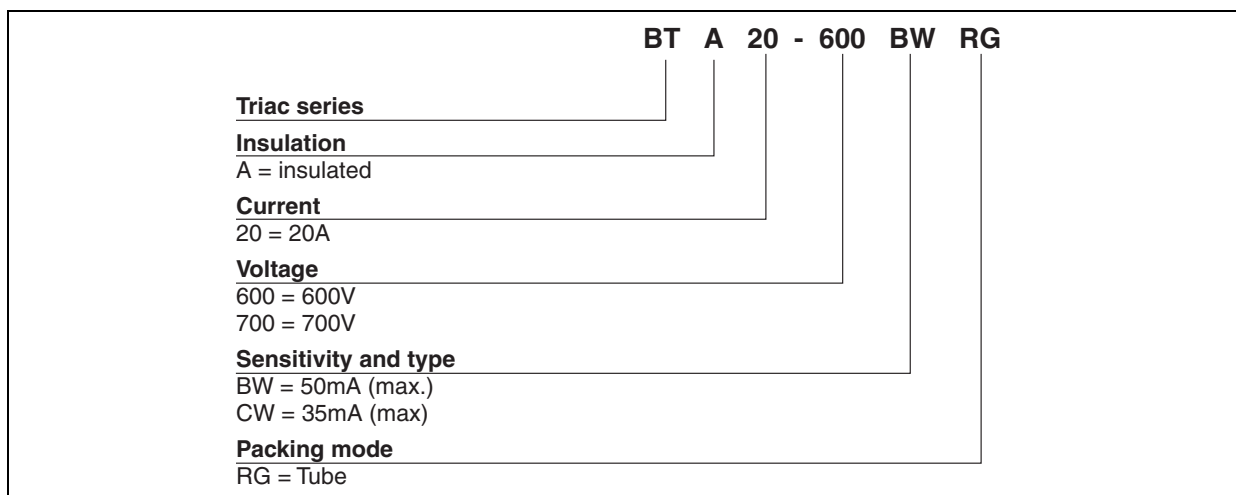
**Figure 7: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms and corresponding value of  $I^2t$**



**Figure 8: Relative variation of gate trigger current and holding current versus junction temperature**



**Figure 9: Ordering Information Scheme**



**Table 7: Product Selector**

| Part Numbers  | Voltage (xxx) |       | Sensitivity | Type        | Package       |
|---------------|---------------|-------|-------------|-------------|---------------|
|               | 600 V         | 700 V |             |             |               |
| BTA20-xxxBWRG | X             | X     | 50 mA       | Snubberless | TO-220AB Ins. |
| BTA20-xxxCWRG | X             | X     | 35 mA       |             |               |

Figure 10: TO-220AB Insulated Package Mechanical Data

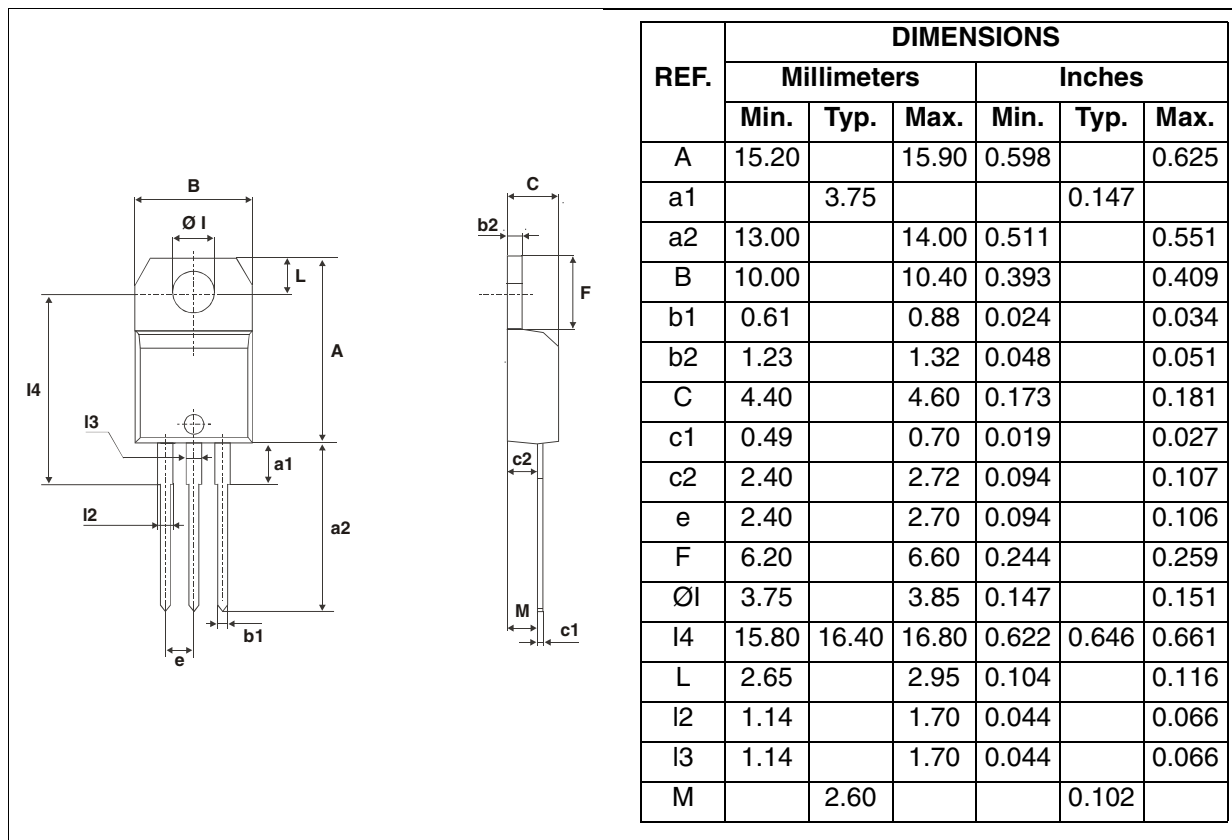


Table 8: Ordering Information

| Ordering type | Marking     | Package       | Weight | Base qty | Delivery mode |
|---------------|-------------|---------------|--------|----------|---------------|
| BTA20-600BWRG | BTA20-600BW | TO-220AB Ins. | 2.3 g  | 50       | Tube          |
| BTA20-600CWRG | BTA20-600CW |               |        |          |               |
| BTA20-700BWRG | BTA20-700BW |               |        |          |               |
| BTA20-700CWRG | BTA20-700CW |               |        |          |               |

Table 9: Revision History

| Date        | Revision | Description of Changes                                 |
|-------------|----------|--|
| Sep-2001    | 1A       | First issue.   |
| 08-Feb-2006 | 2        | TO-220AB Ins. delivery mode changed from bulk to tube. |

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