

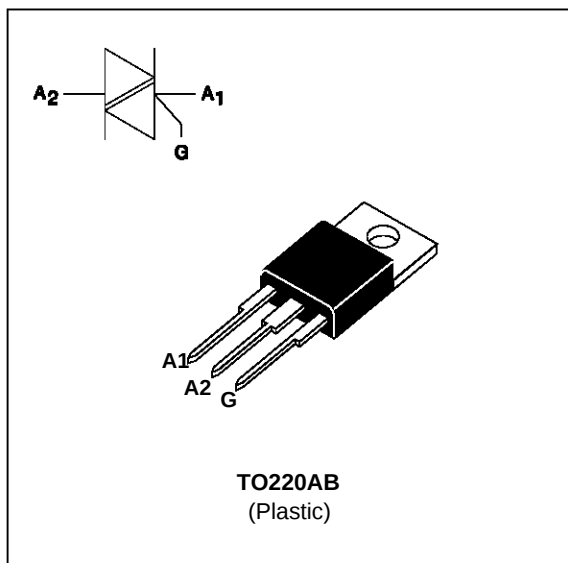
## SNUBBERLESS TRIACS

### FEATURES

- HIGH COMMUTATION :  $(di/dt)_c > 18A/ms$  without snubber
- HIGH SURGE CURRENT :  $I_{TSM} = 200A$
- $V_{DRM}$  UP TO 800V
- BTA Family :  
INSULATING VOLTAGE = 2500V(RMS)  
(UL RECOGNIZED : E81734)

### DESCRIPTION

The BTA/BTB20 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.



### ABSOLUTE RATINGS (limiting values)

| Symbol                             | Parameter                                                                                                       |     |                         | Value                          | Unit             |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----|-------------------------|--------------------------------|------------------|
| I <sub>T(RMS)</sub>                | RMS on-state current<br>(360° conduction angle)                                                                 | BTA | T <sub>c</sub> = 70 °C  | 20                             | A                |
|                                    |                                                                                                                 | BTB | T <sub>c</sub> = 90 °C  |                                |                  |
| I <sub>TSM</sub>                   | Non repetitive surge peak on-state current<br>( T <sub>j</sub> initial = 25°C )                                 |     | tp = 8.3 ms             | 210                            | A                |
|                                    |                                                                                                                 |     | tp = 10 ms              | 200                            |                  |
| I <sup>2</sup> t                   | I <sup>2</sup> t value                                                                                          |     | tp = 10 ms              | 200                            | A <sup>2</sup> s |
| di/dt                              | Critical rate of rise of on-state current<br>Gate supply : I <sub>G</sub> = 500mA   di <sub>G</sub> /dt = 1A/μs |     | Repetitive<br>F = 50 Hz | 20                             | A/μs             |
|                                    |                                                                                                                 |     | Non<br>Repetitive       | 100                            |                  |
| T <sub>stg</sub><br>T <sub>j</sub> | Storage and operating junction temperature range                                                                |     |                         | - 40 to + 150<br>- 40 to + 125 | °C<br>°C         |
| T <sub>l</sub>                     | Maximum lead temperature for soldering during 10 s at 4.5 mm from case                                          |     |                         | 260                            | °C               |

| Symbol                 | Parameter                                                                | BTA / BTB20-... BW/CW |     |     |     | Unit |
|------------------------|--------------------------------------------------------------------------|-----------------------|-----|-----|-----|------|
|                        |                                                                          | 400                   | 600 | 700 | 800 |      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>$T_j = 125\text{ }^{\circ}\text{C}$ | 400                   | 600 | 700 | 800 | V    |

**THERMAL RESISTANCES**

| Symbol       | Parameter                                                 |     | Value | Unit |
|--------------|-----------------------------------------------------------|-----|-------|------|
| Rth (j-a)    | Junction to ambient                                       |     | 60    | °C/W |
| Rth (j-c) DC | Junction to case for DC                                   | BTA | 2.8   | °C/W |
|              |                                                           | BTB | 1.7   |      |
| Rth (j-c) AC | Junction to case for 360° conduction angle<br>(F = 50 Hz) | BTA | 2.1   | °C/W |
|              |                                                           | BTB | 1.3   |      |

**GATE CHARACTERISTICS** (maximum values)

$P_G$  (AV) = 1W     $P_{GM}$  = 10W (tp = 20 μs)     $I_{GM}$  = 4A (tp = 20 μs)     $V_{GM}$  = 16V (tp = 20 μs).

**ELECTRICAL CHARACTERISTICS**

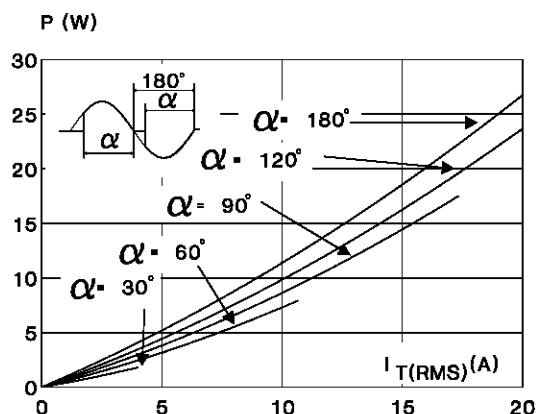
| Symbol                               | Test Conditions                                                                        |                       | Quadrant |     | Suffix |     | Unit |
|--------------------------------------|----------------------------------------------------------------------------------------|-----------------------|----------|-----|--------|-----|------|
|                                      |                                                                                        |                       |          |     | BW     | CW  |      |
| I <sub>GT</sub>                      | V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω                                           | T <sub>j</sub> =25°C  | I-II-III | MIN | 2      | 1   | mA   |
|                                      |                                                                                        |                       |          | MAX | 50     | 35  |      |
| V <sub>GT</sub>                      | V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω                                           | T <sub>j</sub> =25°C  | I-II-III | MAX | 1.5    |     | V    |
| V <sub>GD</sub>                      | V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3kΩ                                 | T <sub>j</sub> =125°C | I-II-III | MIN | 0.2    |     | V    |
| tgt                                  | V <sub>D</sub> =V <sub>DRM</sub> I <sub>G</sub> = 500mA<br>dI <sub>G</sub> /dt = 3A/μs | T <sub>j</sub> =25°C  | I-II-III | TYP | 2      |     | μs   |
| I <sub>L</sub>                       | I <sub>G</sub> =1.2 I <sub>GT</sub>                                                    | T <sub>j</sub> =25°C  | I-III    | TYP | 50     | -   | mA   |
|                                      |                                                                                        |                       | II       | TYP | 90     | -   |      |
|                                      |                                                                                        |                       | I-II-III | MAX | -      | 80  |      |
| I <sub>H</sub> *                     | I <sub>T</sub> = 500mA gate open                                                       | T <sub>j</sub> =25°C  |          | MAX | 75     | 50  | mA   |
| V <sub>TM</sub> *                    | I <sub>TM</sub> = 28A tp= 380μs                                                        | T <sub>j</sub> =25°C  |          | MAX | 1.70   |     | V    |
| I <sub>DRM</sub><br>I <sub>RRM</sub> | V <sub>DRM</sub> Rated<br>V <sub>RRM</sub> Rated                                       | T <sub>j</sub> =25°C  |          | MAX | 0.01   |     | mA   |
|                                      |                                                                                        | T <sub>j</sub> =125°C |          | MAX | 3      |     |      |
| dV/dt *                              | Linear slope up to V <sub>D</sub> =67%V <sub>DRM</sub><br>gate open                    | T <sub>j</sub> =125°C |          | MIN | 500    | 250 | V/μs |
|                                      |                                                                                        |                       |          | TYP | 750    | 500 |      |
| (dI/dt) <sub>c</sub> *               | Without snubber                                                                        | T <sub>j</sub> =125°C |          | MIN | 18     | 11  | A/ms |
|                                      |                                                                                        |                       |          | TYP | 36     | 22  |      |

\* For either polarity of electrode A2 voltage with reference to electrode A1.

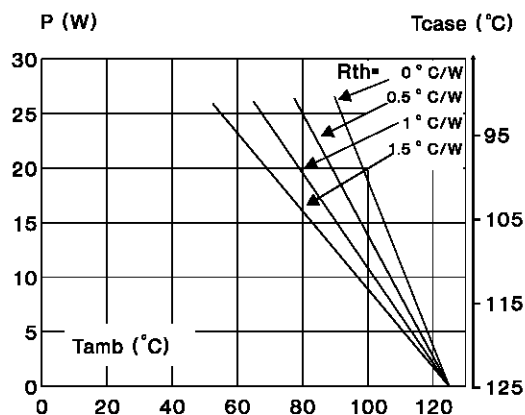
## ORDERING INFORMATION

| Package              | $I_{T(RMS)}$ | $V_{DRM} / V_{RRM}$ | Sensitivity Specification |    |
|----------------------|--------------|---------------------|---------------------------|----|
|                      | A            | V                   | BW                        | CW |
| BTA<br>(Insulated)   | 20           | 400                 | X                         | X  |
|                      |              | 600                 | X                         | X  |
|                      |              | 700                 | X                         | X  |
|                      |              | 800                 | X                         | X  |
| BTB<br>(Uninsulated) |              | 400                 | X                         | X  |
|                      |              | 600                 | X                         | X  |
|                      |              | 700                 | X                         | X  |
|                      |              | 800                 | X                         | X  |

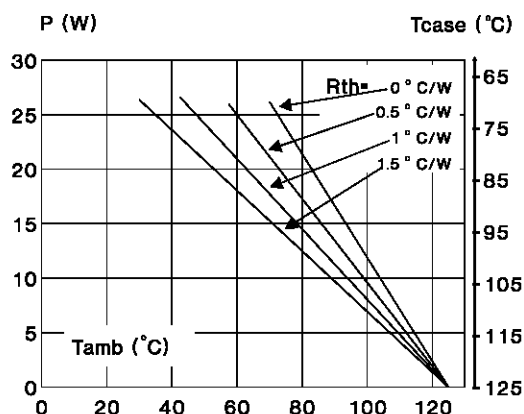
**Fig.1** : Maximum RMS power dissipation versus RMS on-state current ( $F=50\text{Hz}$ ).  
(Curves are cut off by  $(di/dt)_c$  limitation)



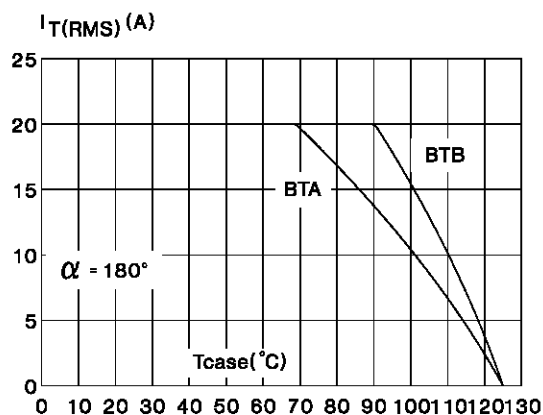
**Fig.3** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ( $T_{\text{amb}}$  and  $T_{\text{case}}$ ) for different thermal resistances heatsink + contact (BTB).



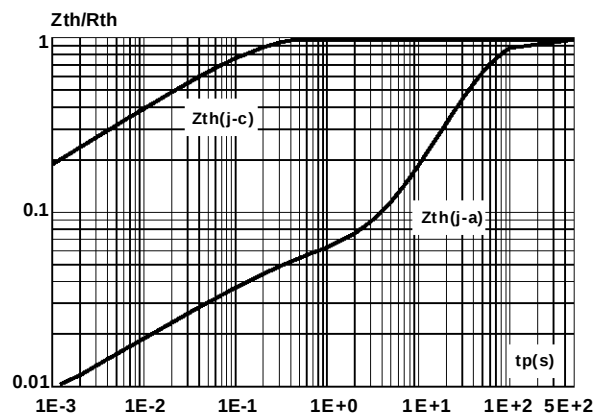
**Fig.2** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ( $T_{\text{amb}}$  and  $T_{\text{case}}$ ) for different thermal resistances heatsink + contact (BTA).



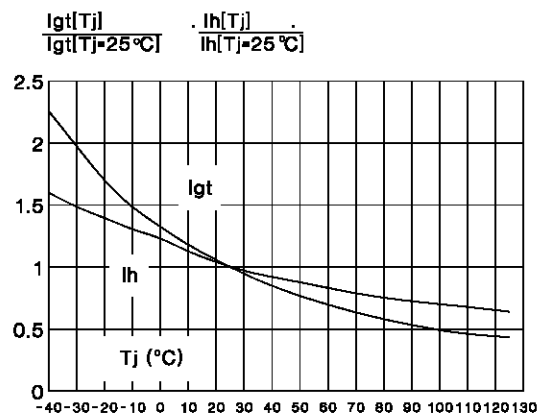
**Fig.4** : RMS on-state current versus case temperature.



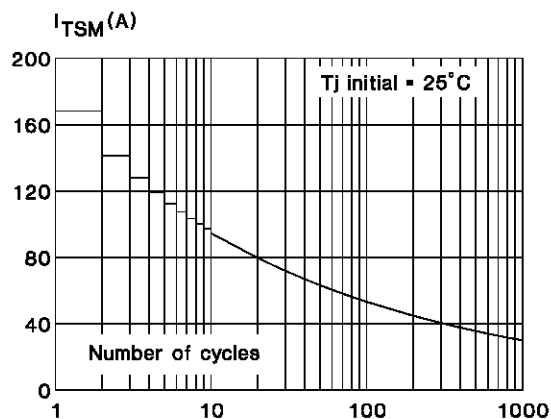
**Fig.5 :** Relative variation of thermal impedance versus pulse duration.



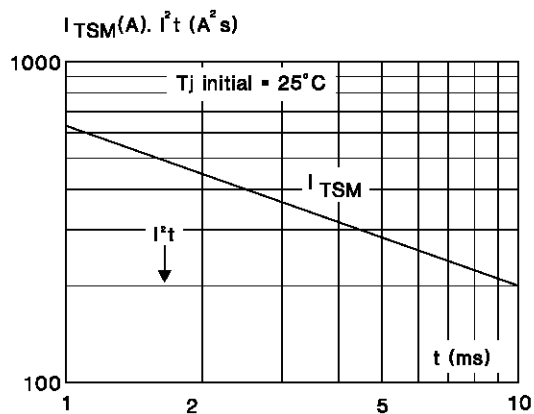
**Fig.6 :** Relative variation of gate trigger current and holding current versus junction temperature.



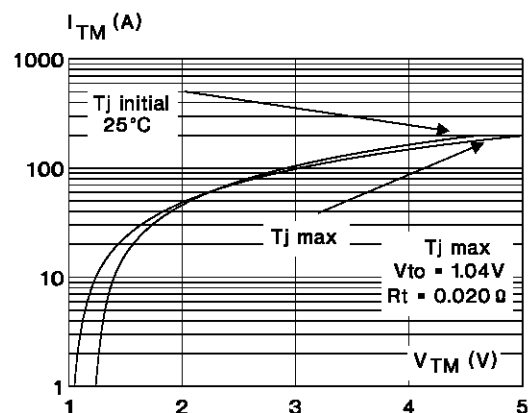
**Fig.7 :** Non Repetitive surge peak on-state current versus number of cycles.



**Fig.8 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .

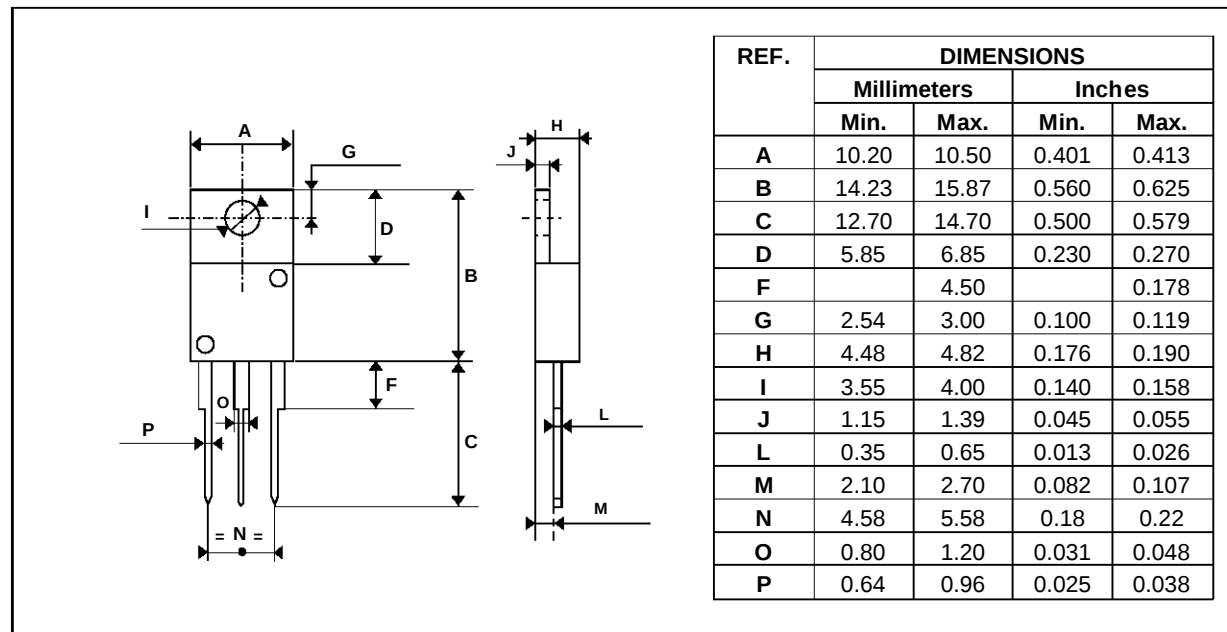


**Fig.9 :** On-state characteristics (maximum values).



**PACKAGE MECHANICAL DATA**

TO220AB Plastic



Cooling method : C

Marking : type number

Weight : 2.3 g

Recommended torque value : 0.8 m.N.

Maximum torque value : 1 m.N.

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied.

SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - Printed in Italy - All rights reserved.

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.