

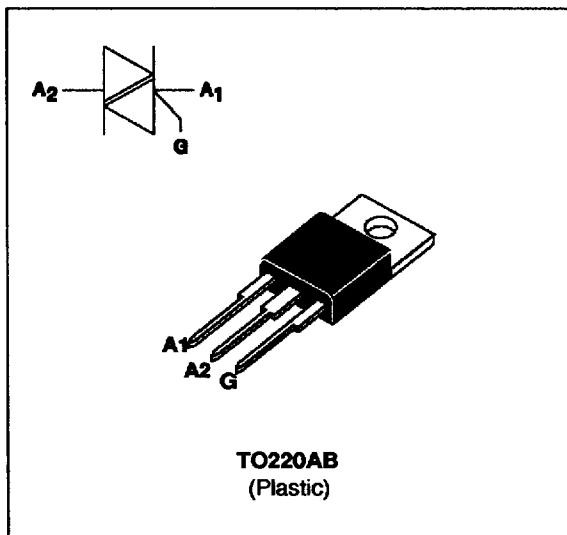
## LOGIC LEVEL TRIACS

### FEATURES

- LOW  $I_{GT} = 10\text{mA max}$
- HIGH EFFICIENCY SWITCHING ON COMMUTATION
- BTA Family :  
INSULATING VOLTAGE = 2500V(RMS)  
(UL RECOGNIZED : E81734)

### DESCRIPTION

The BTA/BTB12 SW Triac family are high performance products glass passivated PNP devices. These parts are suited for low power trigger circuit (integrated circuits, microcontroller, microprocessors).



### ABSOLUTE RATINGS (limiting values)

| Symbol                             | Parameter                                                                                                      |                         |                        | Value                          | Unit             |
|------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------|------------------------|--------------------------------|------------------|
| I <sub>T</sub> (RMS)               | RMS on-state current<br>(360° conduction angle)                                                                | BTA                     | T <sub>c</sub> = 70 °C | 12                             | A                |
|                                    |                                                                                                                | BTB                     | T <sub>c</sub> = 75 °C |                                |                  |
| I <sub>TSM</sub>                   | Non repetitive surge peak on-state current<br>( T <sub>J</sub> initial = 25°C )                                | t <sub>p</sub> = 8.3 ms |                        | 126                            | A                |
|                                    |                                                                                                                | t <sub>p</sub> = 10 ms  |                        | 120                            |                  |
| I <sup>2</sup> <sub>t</sub>        | I <sup>2</sup> <sub>t</sub> value                                                                              | t <sub>p</sub> = 10 ms  |                        | 72                             | A <sup>2</sup> s |
| di/dt                              | Critical rate of rise of on-state current<br>Gate supply : I <sub>G</sub> = 50mA di <sub>G</sub> /dt = 0.1A/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 + 110 | °C<br>°C         |
| T <sub>I</sub>                     | Maximum lead temperature for soldering during 10 s at 4.5 mm from case                                         |                         |                        | 260                            | °C               |

| Symbol                 | Parameter                                                      | BTA / BTB12- |        |        | Unit |
|------------------------|----------------------------------------------------------------|--------------|--------|--------|------|
|                        |                                                                | 400 SW       | 600 SW | 700 SW |      |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>$T_J = 110^\circ\text{C}$ | 400          | 600    | 700    | 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 | 3.3   | °C/W |
|              |                                                           | BTB | 2.7   |      |
| Rth (j-c) AC | Junction to case for 360° conduction angle<br>(F = 50 Hz) | BTA | 2.5   | °C/W |
|              |                                                           | BTB | 2     |      |

## GATE CHARACTERISTICS (maximum values)

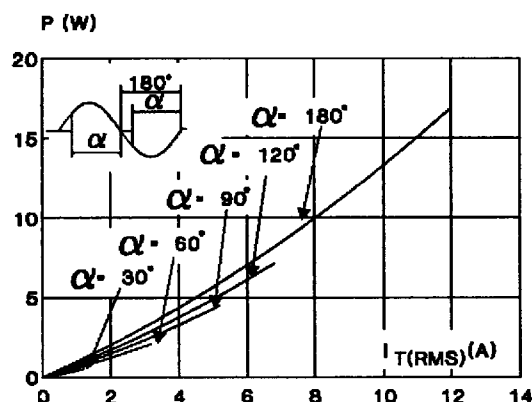
$P_G$  (AV) = 1W     $P_{GM}$  = 10W ( $t_p$  = 20  $\mu$ s)     $I_{GM}$  = 4A ( $t_p$  = 20  $\mu$ s)     $V_{GM}$  = 16V ( $t_p$  = 20  $\mu$ s).

## ELECTRICAL CHARACTERISTICS

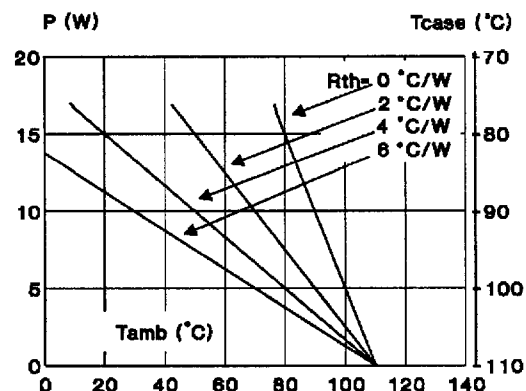
| Symbol                 | Test Conditions                                      |                   | Quadrant |     | Suffix | Unit       |
|------------------------|------------------------------------------------------|-------------------|----------|-----|--------|------------|
|                        |                                                      |                   |          |     | SW     |            |
| $I_{GT}$               | $V_D=12V$ (DC) $R_L=33\Omega$                        | $T_J=25^\circ C$  | I-II-III | MAX | 10     | mA         |
| $V_{GT}$               | $V_D=12V$ (DC) $R_L=33\Omega$                        | $T_J=25^\circ C$  | I-II-III | MAX | 1.5    | V          |
| $V_{GD}$               | $V_D=V_{DRM}$ $R_L=3.3k\Omega$                       | $T_J=110^\circ C$ | I-II-III | MIN | 0.2    | V          |
| $t_{gt}$               | $V_D=V_{DRM}$ $I_G = 40mA$<br>$di_G/dt = 0.5A/\mu s$ | $T_J=25^\circ C$  | I-II-III | TYP | 2      | $\mu s$    |
| $I_L$                  | $I_G=1.2 I_{GT}$                                     | $T_J=25^\circ C$  | I-III    | TYP | 15     | mA         |
|                        |                                                      |                   | II       |     | 25     |            |
| $I_H$ *                | $I_T=100mA$ gate open                                | $T_J=25^\circ C$  |          | MAX | 25     | mA         |
| $V_{TM}$ *             | $I_{TM}=17A$ $t_p=380\mu s$                          | $T_J=25^\circ C$  |          | MAX | 1.75   | V          |
| $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM}$ Rated<br>$V_{RRM}$ Rated                   | $T_J=25^\circ C$  |          | MAX | 0.01   | mA         |
|                        |                                                      | $T_J=110^\circ C$ |          | MAX | 1      |            |
| $dV/dt$ *              | Linear slope up to $V_D=67\%V_{DRM}$<br>gate open    | $T_J=110^\circ C$ |          | MIN | 50     | V/ $\mu s$ |
| $(di/dt)_c$ *          | $dV/dt=0.1V/\mu s$                                   | $T_J=110^\circ C$ |          | MIN | 5.3    | A/ms       |
|                        | $dV/dt=20V/\mu s$                                    |                   |          | MIN | 3.5    |            |

\* For either polarity of electrode  $A_2$  voltage with reference to electrode  $A_1$ .

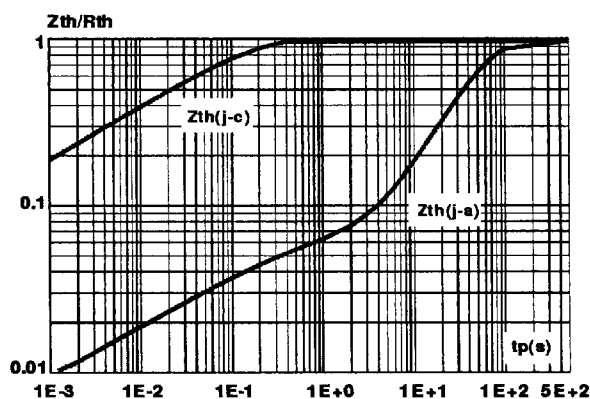
**Fig.1** : Maximum RMS power dissipation versus RMS on-state current ( $F=50\text{Hz}$ ).  
(Curves are cut off by  $(di/dt)_c$  limitation)



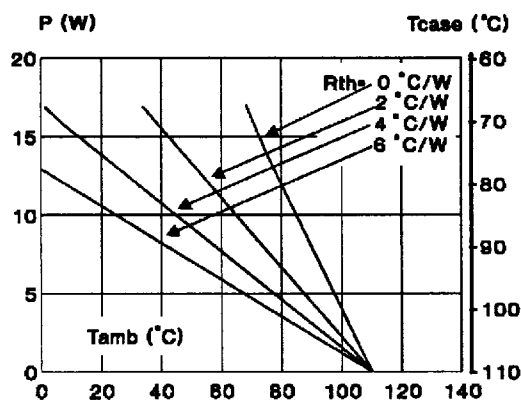
**Fig.3** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (BTB).



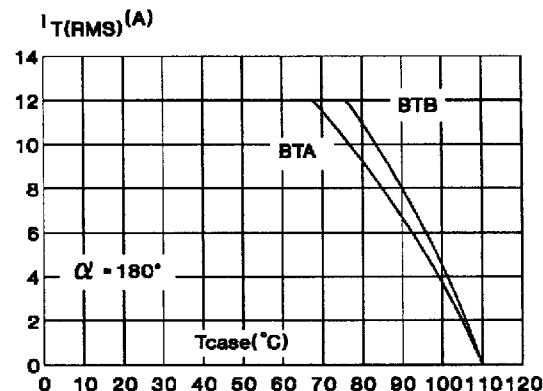
**Fig.5** : Relative variation of thermal impedance versus pulse duration.



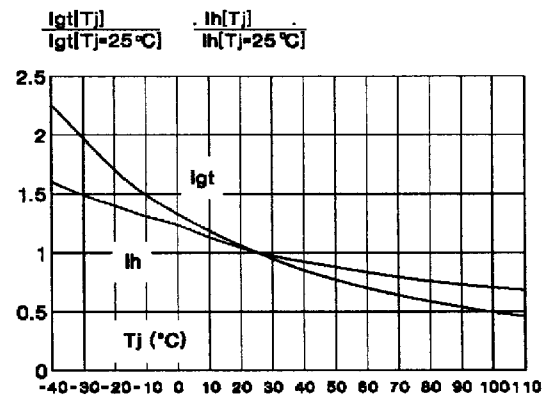
**Fig.2** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for different thermal resistances heatsink + contact (BTA).



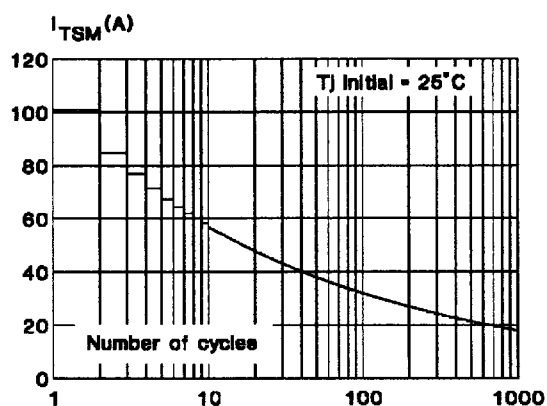
**Fig.4** : RMS on-state current versus case temperature.



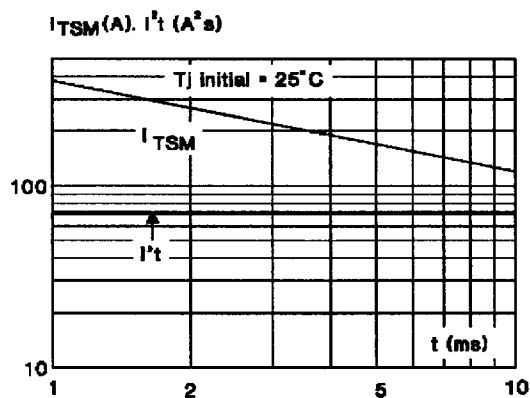
**Fig.6** : Relative variation of gate trigger current and holding current versus junction temperature.



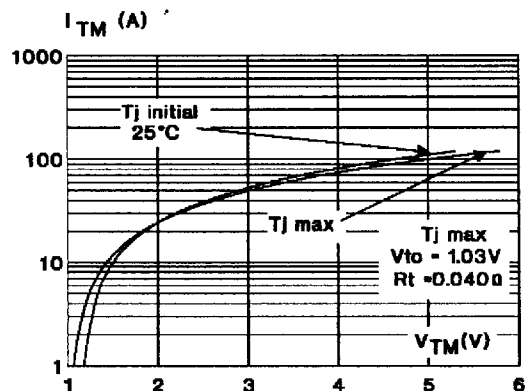
**Fig.7** : Non Repetitive surge peak on-state current versus number of cycles.



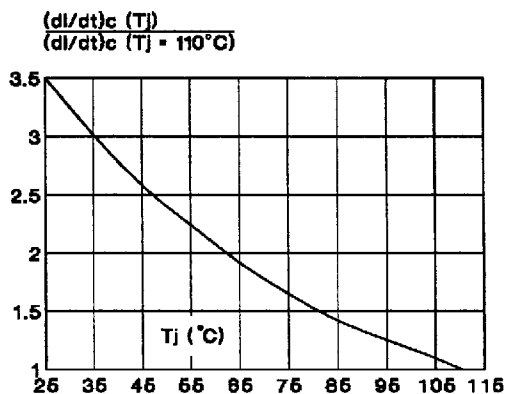
**Fig.8** : Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



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

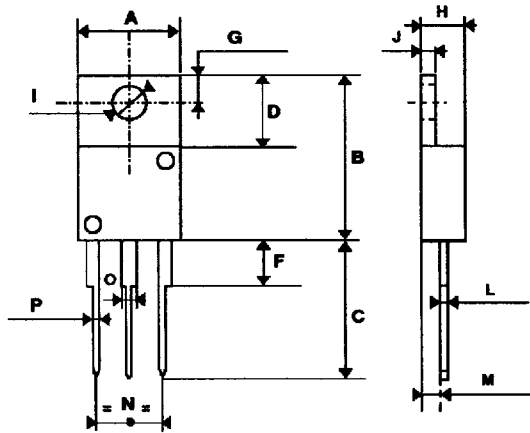


**Fig.10** : Relative variation of  $(di/dt)_c$  versus junction temperature.



**PACKAGE MECHANICAL DATA**

TO220AB Plastic



| REF. | DIMENSIONS  |       |        |       |
|------|-------------|-------|--------|-------|
|      | Millimeters |       | Inches |       |
|      | Min.        | Max.  | Min.   | Max.  |
| A    | 10.20       | 10.50 | 0.401  | 0.413 |
| B    | 14.23       | 15.87 | 0.560  | 0.625 |
| C    | 12.70       | 14.70 | 0.500  | 0.579 |
| D    | 5.85        | 6.85  | 0.230  | 0.270 |
| F    |             | 4.50  |        | 0.178 |
| G    | 2.54        | 3.00  | 0.100  | 0.119 |
| H    | 4.48        | 4.82  | 0.176  | 0.190 |
| I    | 3.55        | 4.00  | 0.140  | 0.158 |
| J    | 1.15        | 1.39  | 0.045  | 0.055 |
| L    | 0.35        | 0.65  | 0.013  | 0.026 |
| M    | 2.10        | 2.70  | 0.082  | 0.107 |
| N    | 4.58        | 5.58  | 0.18   | 0.22  |
| O    | 0.80        | 1.20  | 0.031  | 0.048 |
| P    | 0.64        | 0.96  | 0.025  | 0.038 |

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.