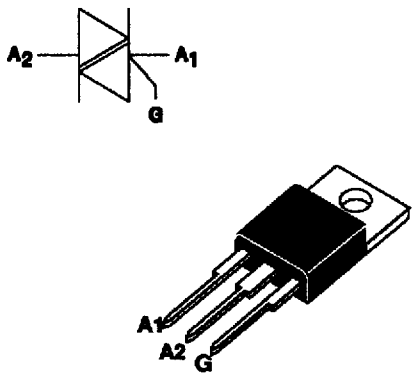
SGS-THOMSON MICROELECTRONICS

# BTA12 SW
# BTB12 SW

## LOGIC LEVEL TRIACS

### FEATURES

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




**TO220AB**
(Plastic)

### DESCRIPTION

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

### ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $I_{T(RMS)}$ | RMS on-state current (360° conduction angle) | BTA | Tc = 70 °C | 12 | A |
| | | BTB | Tc = 75 °C | | |
| $I_{TSM}$ | Non repetitive surge peak on-state current ( Tj initial = 25°C ) | | tp = 8.3 ms | 126 | A |
| | | | tp = 10 ms | 120 | |
| $I^2t$ | $I^2t$ value | | tp = 10 ms | 72 | $A^2s$ |
| dI/dt | Critical rate of rise of on-state current Gate supply : $I_G$ = 50mA $di_G/dt$ = 0.1A/µs | | Repetitive F = 50 Hz | 20 | A/µs |
| | | | Non Repetitive | 100 | |
| Tstg<br>Tj | Storage and operating junction temperature range | | | - 40 to + 150<br>- 40 to + 110 | °C<br>°C |
| Tl | 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 Tj = 110 °C | 400 | 600 | 700 | V |



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## 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 (F= 50 Hz) | BTA | 2.5 | °C/W |
| | | BTB | 2 | |

## 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 |
|---|---|---|---|---|---|---|
| | | | | | SW | |
| $I_{GT}$ | $V_D$=12V (DC) $R_L$=33Ω | Tj=25°C | I-II-III | MAX | 10 | mA |
| $V_{GT}$ | $V_D$=12V (DC) $R_L$=33Ω | Tj=25°C | I-II-III | MAX | 1.5 | V |
| $V_{GD}$ | $V_D$=$V_{DRM}$ $R_L$=3.3kΩ | Tj=110°C | I-II-III | MIN | 0.2 | V |
| tgt | $V_D$=$V_{DRM}$ $I_G$ = 40mA $dI_G/dt$ = 0.5A/µs | Tj=25°C | I-II-III | TYP | 2 | µs |
| $I_L$ | $I_G$=1.2 $I_{GT}$ | Tj=25°C | I-III | TYP | 15 | mA |
| | | | II | | 25 | |
| $I_H$ * | $I_T$= 100mA gate open | Tj=25°C | | MAX | 25 | mA |
| $V_{TM}$ * | $I_{TM}$= 17A tp= 380µs | Tj=25°C | | MAX | 1.75 | V |
| $I_{DRM}$ $I_{RRM}$ | $V_{DRM}$ Rated $V_{RRM}$ Rated | Tj=25°C | | MAX | 0.01 | mA |
| | | Tj=110°C | | MAX | 1 | |
| dV/dt * | Linear slope up to $V_D$=67%$V_{DRM}$ gate open | Tj=110°C | | MIN | 50 | V/µs |
| (dI/dt)c * | dV/dt= 0.1V/µs | Tj=110°C | | MIN | 5.3 | A/ms |
| | dV/dt= 20V/µs | | | MIN | 3.5 | |

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



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**Fig.1** : Maximum RMS power dissipation versus RMS on-state current (F=50Hz).
(Curves are cut off by (dI/dt)c limitation)

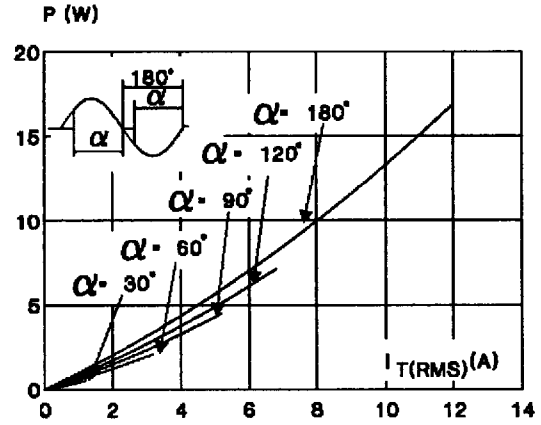



**Fig.2** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ($T_{amb}$ and $T_{case}$) for different thermal resistances heatsink + contact (BTA).

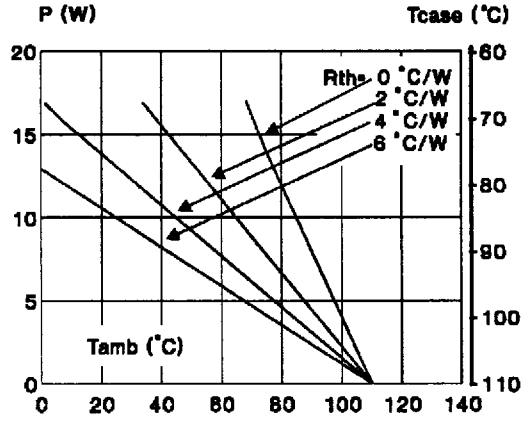



**Fig.3** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ($T_{amb}$ and $T_{case}$) for different thermal resistances heatsink + contact (BTB).

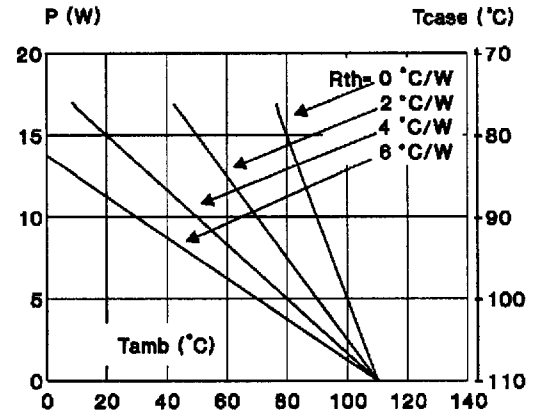



**Fig.4** : RMS on-state current versus case temperature.

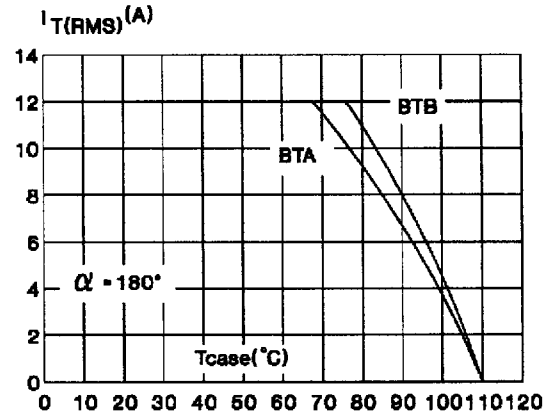



**Fig.5** : Relative variation of thermal impedance versus pulse duration.

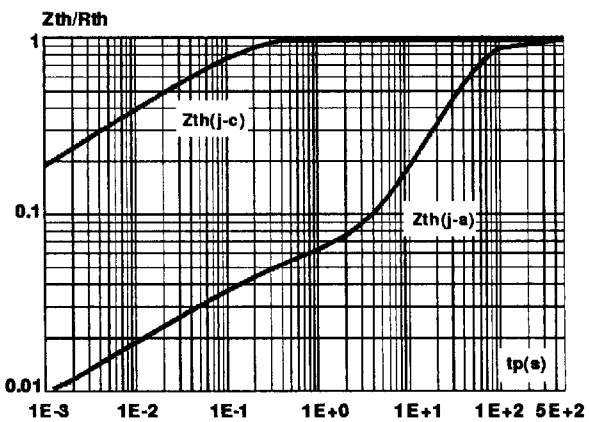
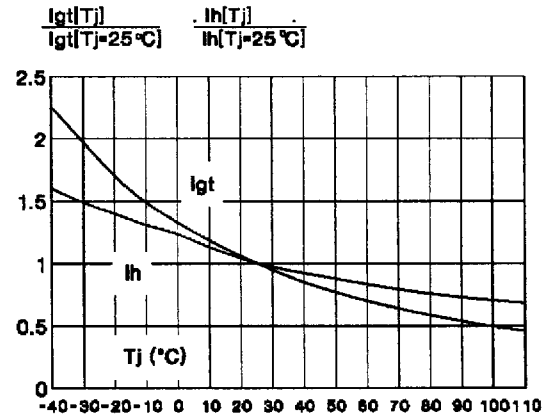



**Fig.6** : Relative variation of gate trigger current and holding current versus junction temperature.






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

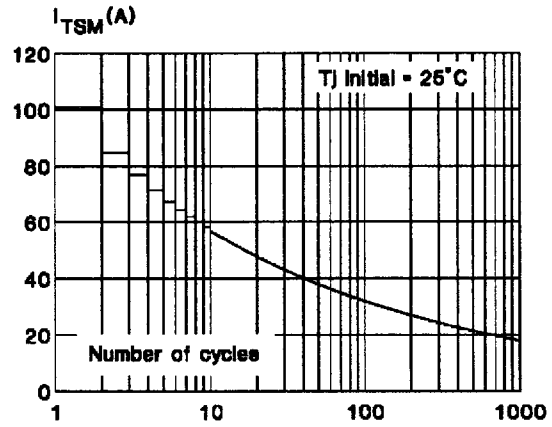



**Fig.8 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width : t ≤ 10ms, and corresponding value of $I^2t$.

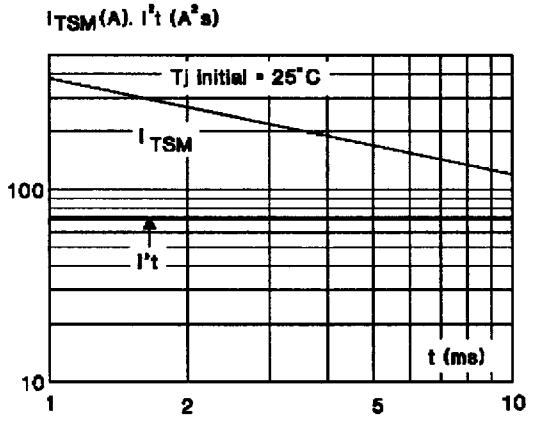



**Fig.9 :** On-state characteristics (maximum values).

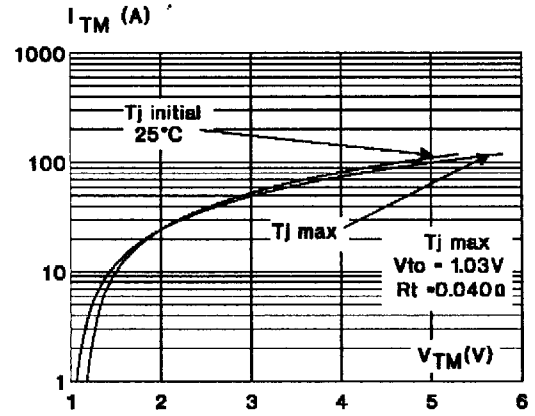
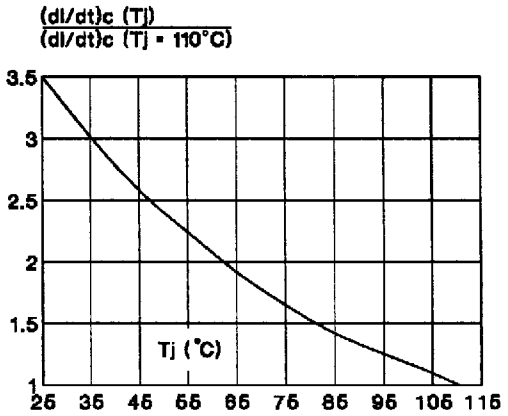



**Fig.10 :** Relative variation of (dI/dt)c versus junction temperature.



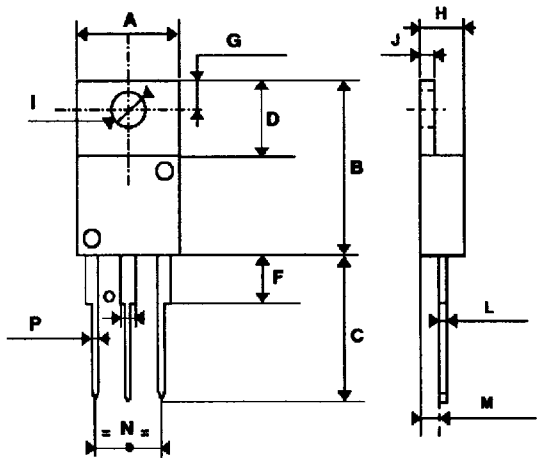





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## PACKAGE MECHANICAL DATA

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.

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