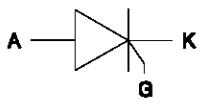
SGS-THOMSON MICROELECTRONICS

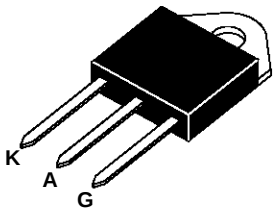
# BTW 68 (N)

## SCR

### FEATURES

- HIGH SURGE CAPABILITY
- HIGH ON-STATE CURRENT
- HIGH STABILITY AND RELIABILITY
- BTW 68 Serie :
  INSULATED VOLTAGE = 2500V(RMS)
  (UL RECOGNIZED : E81734)




TOP 3
(Plastic)

### DESCRIPTION

The BTW 68 (N) Family of Silicon Controlled Rectifiers uses a high performance glass passivated technology.
This general purpose Family of Silicon Controlled Rectifiers is designed for power supplies up to 400Hz on resistive or inductive load.

### ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $I_{T(RMS)}$ | RMS on-state current (180° conduction angle) | BTW 68<br>BTW 68 N | Tc=80°C<br>Tc=85°C | 30<br>35 | A |
| $I_{T(AV)}$ | Average on-state current (180° conduction angle,single phase circuit) | BTW 68<br>BTW 68 N | Tc=80°C<br>Tc=85°C | 19<br>22 | A |
| $I_{TSM}$ | Non repetitive surge peak on-state current ( Tj initial = 25°C ) | | tp=8.3 ms<br>tp=10 ms | 420<br>400 | A |
| $I^2t$ | $I^2t$ value | | tp=10 ms | 800 | $A^2s$ |
| dI/dt | Critical rate of rise of on-state current<br>Gate supply : $I_G$ = 100 mA $di_G/dt$ = 1 A/µs | | | 100 | A/µs |
| Tstg<br>Tj | Storage and operating junction temperature range | | | - 40 to + 150<br>- 40 to + 125 | °C<br>°C |
| Tl | Maximum lead temperature for soldering during 10 s at 4.5 mm from case | | | 230 | °C |

| Symbol | Parameter | BTW 68 | | BTW 68 / BTW 68 N | | | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | 200 | 400 | 600 | 800 | 1000 | 1200 | |
| $V_{DRM}$<br>$V_{RRM}$ | Repetitive peak off-state voltage<br>Tj = 125 °C | 200 | 400 | 600 | 800 | 1000 | 1200 | V |

## THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| Rth (j-a) | Junction to ambient | | 50 | °C/W |
| Rth (j-c) DC | Junction to case for DC | BTW 68 | 1.1 | °C/W |
| | | BTW 68 N | 0.8 | |

## GATE CHARACTERISTICS (maximum values)

$P_{G\ (AV)}$ = 1W $P_{GM}$ = 40W (tp = 20 µs) $I_{FGM}$ = 8A (tp = 20 µs) $V_{RGM}$ = 5 V.

## ELECTRICAL CHARACTERISTICS

| Symbol | Test Conditions | | | | Value | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | | BTW 68 | BTW 68 N | |
| $I_{GT}$ | $V_D$=12V (DC) $R_L$=33Ω | | Tj=25°C | MAX | 50 | | mA |
| $V_{GT}$ | $V_D$=12V (DC) $R_L$=33Ω | | Tj=25°C | MAX | 1.5 | | V |
| $V_{GD}$ | $V_D$=$V_{DRM}$ $R_L$=3.3kΩ | | Tj= 125°C | MIN | 0.2 | | V |
| tgt | $V_D$=$V_{DRM}$ $I_G$ = 200mA<br>$dI_G/dt$ = 1.5A/µs | | Tj=25°C | TYP | 2 | | µs |
| $I_L$ | $I_G$= 1.2 $I_{GT}$ | | Tj=25°C | TYP | 40 | | mA |
| $I_H$ | $I_T$= 500mA gate open | | Tj=25°C | MAX | 75 | | mA |
| $V_{TM}$ | BTW 68 ITM= 60A<br>BTW 68 N $I_{TM}$= 70A tp= 380µs | | Tj=25°C | MAX | 2.1 | 2.2 | V |
| $I_{DRM}$<br>$I_{RRM}$ | $V_{DRM}$ Rated<br>$V_{RRM}$ Rated | | Tj=25°C | MAX | 0.02 | | mA |
| | | | Tj= 125°C | | 6 | | |
| dV/dt | Linear slope up to<br>$V_D$=67%$V_{DRM}$<br>gate open | $V_{DRM}$≤ 800V<br>$V_{DRM}$ ≥ 1000V | Tj= 125°C | MIN | 500<br>250 | | V/µs |
| tq | $V_D$=67%$V_{DRM}$ $I_{TM}$= 60A $V_R$= 75V<br>$dI_{TM}/dt$=30 A/µs $dV_D/dt$= 20V/µs | | Tj= 125°C | TYP | 100 | | µs |

| Package | $I_{T(RMS)}$ | $V_{DRM}$ / $V_{RRM}$ | Sensitivity Specification |
|---|---|---|---|
| | A | V | BTW |
| BTW 68 (Insulated) | 30 | 200 | X |
| | | 400 | X |
| | | 600 | X |
| | | 800 | X |
| | | 1000 | X |
| | | 1200 | X |
| BTW 68 N (Uninsulated) | 35 | 600 | X |
| | | 800 | X |
| | | 1000 | X |
| | | 1200 | X |

**Fig.1 :** Maximum average power dissipation versus average on-state current (BTW 68).

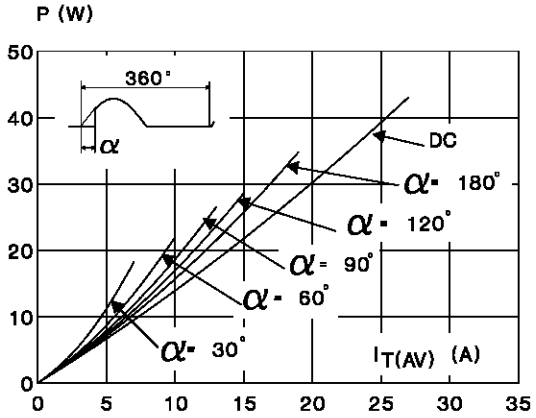



**Fig.2 :** Correlation between maximum average power dissipation and maximum allowable temperatures ($T_{amb}$ and $T_{case}$) for different thermal resistances heatsink + contact (BTW 68).

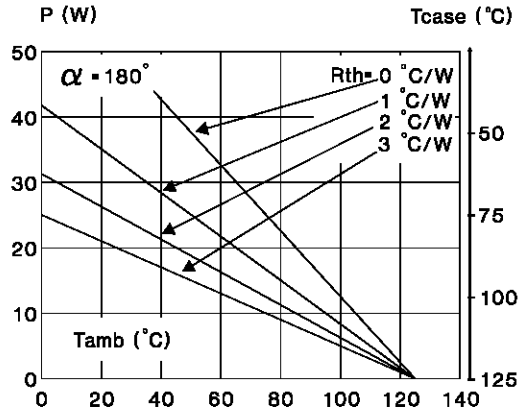



**Fig.3 :** Maximum average power dissipation versus average on-state current (BTW 68 N).

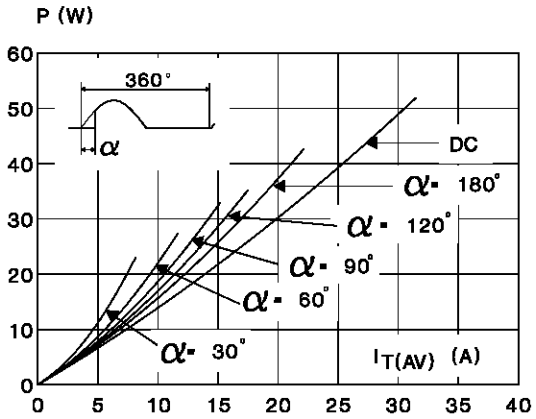



**Fig.4 :** Correlation between maximum average power dissipation and maximum allowable temperatures ($T_{amb}$ and $T_{case}$) for different thermal resistances heatsink + contact (BTW 68 N).

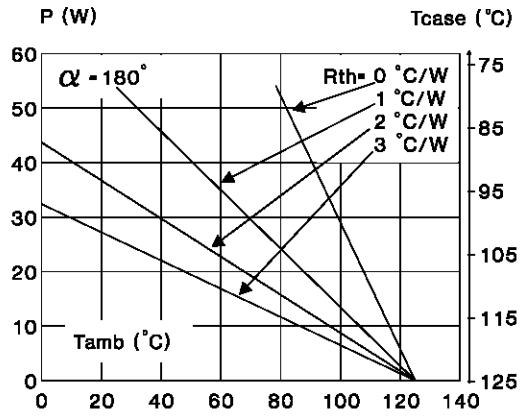


**Fig.5 :** Average on-state current versus case temperature (BTW 68).

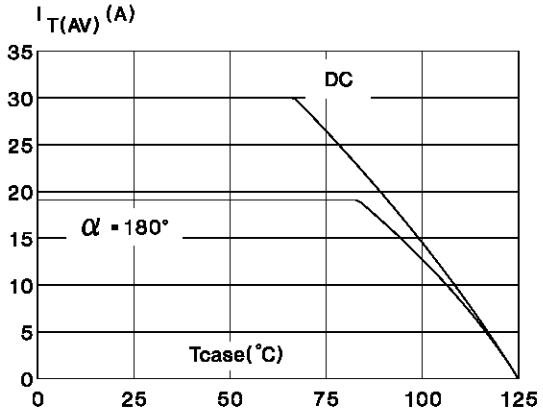



**Fig.6 :** Average on-state current versus case temperature (BTW 68 N).

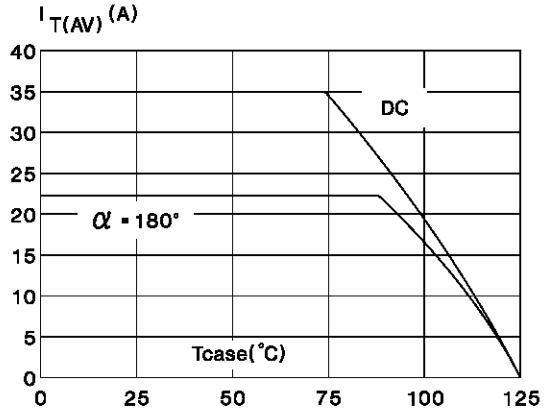



**Fig.7 :** Relative variation of thermal impedance versus pulse duration.

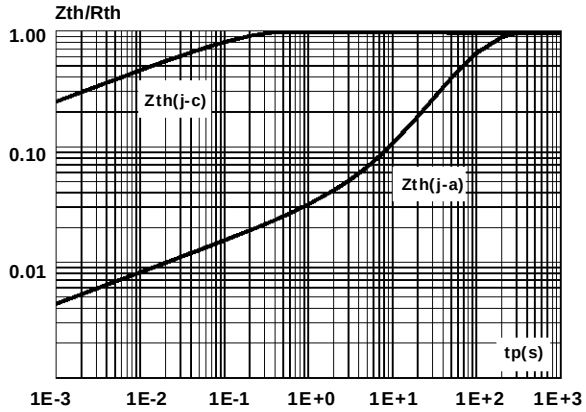



**Fig.8 :** Relative variation of gate trigger current versus junction temperature.

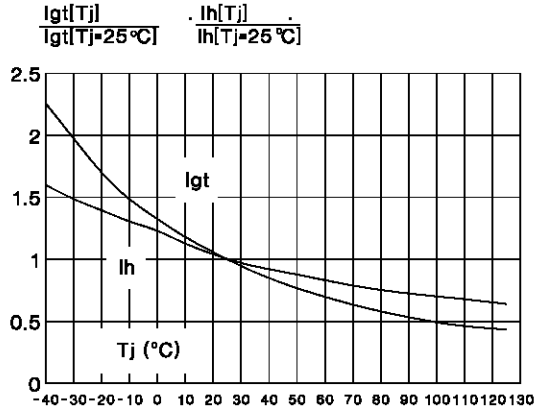



**Fig.9 :** Non repetitive surge peak on-state current versus number of cycles.

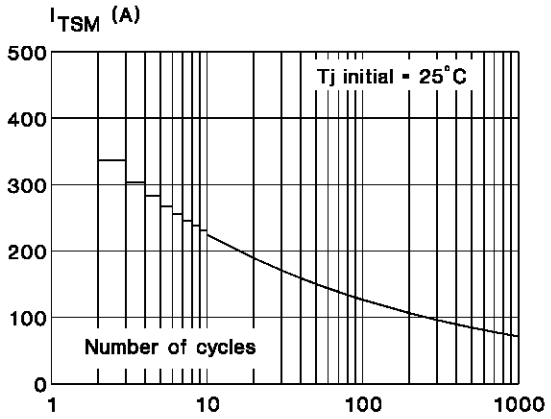



**Fig.10 :** Non repetitive surge peak on-state current for a sinusoidal pulse with width : t ≤ 10 ms, and corresponding value of $I^2t$.

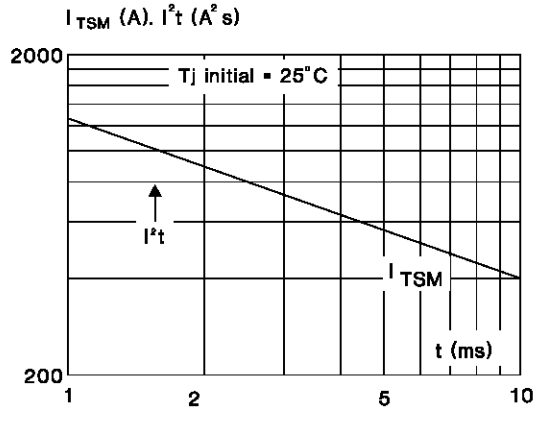
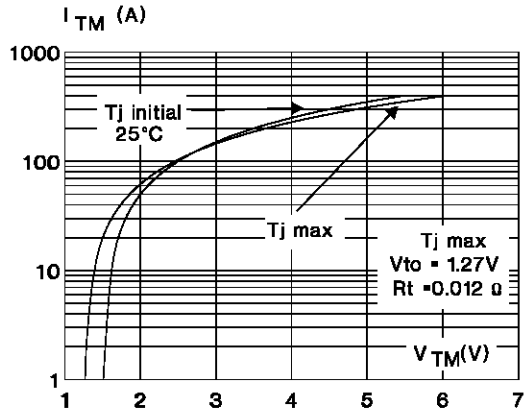
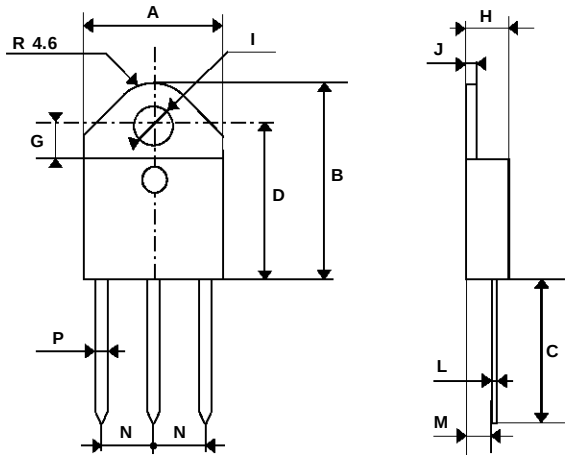


**Fig11 :** On-state characteristics (maximum values).




## PACKAGE MECHANICAL DATA

TOP 3 Plastic




| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 15.10 | 15.50 | 0.594 | 0.611 |
| B | 20.70 | 21.10 | 0.814 | 0.831 |
| C | 14.30 | 15.60 | 0.561 | 0.615 |
| D | 16.10 | 16.50 | 0.632 | 0.650 |
| G | 3.40 | - | 0.133 | - |
| H | 4.40 | 4.60 | 0.173 | 0.182 |
| I | 4.08 | 4.17 | 0.161 | 0.164 |
| J | 1.45 | 1.55 | 0.057 | 0.062 |
| L | 0.50 | 0.70 | 0.019 | 0.028 |
| M | 2.70 | 2.90 | 0.106 | 0.115 |
| N | 5.40 | 5.65 | 0.212 | 0.223 |
| P | 1.20 | 1.40 | 0.047 | 0.056 |

Cooling method : C
Marking : type number
Weight : 4.7 g

Recommended torque value : 0.8 m.N.
Maximum torque value : 1 m.N.