

Features

- On-state rms current: 30 A
- Blocking voltage: up to 1200 V
- Gate current: 50 mA
- UL 2500 V insulation (file ref E81734)

Description

Available in a high power insulated package, the BTW68 series is suitable for applications where power handling and power dissipation are critical such as solid state relays, welding equipment and high power motor control.

Based on a clip assembly technology, this device offers a superior performance in surge current handling capabilities.

Thanks to the internal ceramic pad, the device provides high voltage insulation (2500 V_{RMS}) and complies with UL standards (file ref: E81734).

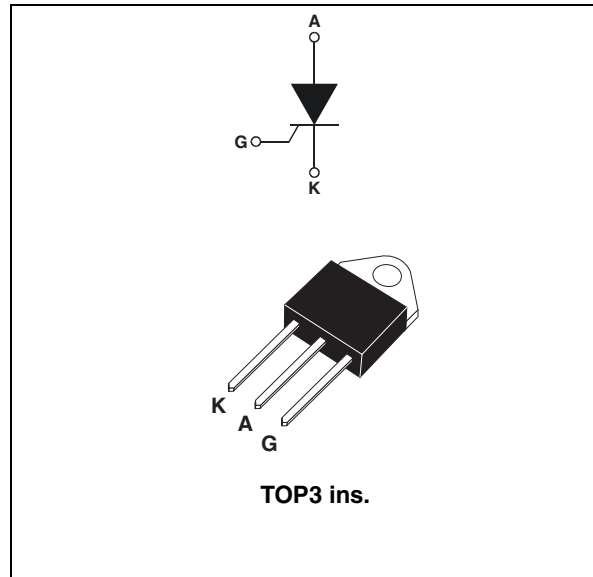


Table 1. Device summary

| Symbol | Value |
|-------------------|---------------|
| $I_{T(RMS)}$ | 30 A |
| V_{DRM}/V_{RRM} | 600 to 1200 V |
| I_{GT} | 50 mA |

1 Characteristics

Table 2. Absolute maximum ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|--------------------|---|-------------------------|-----------------------|--------------------------------|-------------|
| $I_{T(RMS)}$ | On-state current rms (180° conduction angle) | | $T_c = 80\text{ °C}$ | 30 | A |
| $I_{T(AV)}$ | Average on-state current (180° conduction angle) | | $T_c = 80\text{ °C}$ | 19 | A |
| I_{TSM} | Non repetitive surge peak on-state current | $t_p = 8.3\text{ ms}$ | $T_j = 25\text{ °C}$ | 420 | A |
| | | $t_p = 10\text{ ms}$ | | 400 | |
| I^2t | I^2t Value for fusing | | $T_j = 25\text{ °C}$ | 800 | A^2s |
| di/dt | Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$ | $F = 60\text{ Hz}$ | $T_j = 125\text{ °C}$ | 100 | $A/\mu s$ |
| I_{GM} | Peak gate current | $t_p = 20\text{ }\mu s$ | $T_j = 125\text{ °C}$ | 8 | A |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j = 125\text{ °C}$ | 1 | W |
| T_{stg} T_j | Storage junction temperature range Operating junction temperature range | | | - 40 to + 150 - 40 to + 125 | $^{\circ}C$ |
| V_{RGM} | Maximum peak reverse gate voltage | | | 5 | V |

Table 3. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Test conditions | | Value | Unit | | |
|------------------------|---|---------------------------|-----------------------|------|---------|-----------|
| I_{GT} | $V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$ | MIN. | 50 | mA | | |
| V_{GT} | | MAX. | 1.5 | V | | |
| V_{GD} | $V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$ | $T_j = 125\text{ °C}$ | MIN. | 0.2 | V | |
| t_{gt} | $V_D = V_{DRM}$, $I_G = 200\text{ mA}$, $di_G/dt = 1.5\text{ A}/\mu s$ | | TYP. | 2 | μs | |
| I_H | $I_T = 500\text{ mA}$, gate open | | MAX. | 75 | mA | |
| I_L | $I_G = 1.2 \times I_{GT}$ | | TYP. | 40 | mA | |
| dV/dt | $V_D = 67\% V_{DRM}$ gate open | $V_{DRM} = 800\text{ V}$ | $T_j = 125\text{ °C}$ | MIN. | 500 | $V/\mu s$ |
| | | $V_{DRM} = 1000\text{ V}$ | | 250 | | |
| V_{TM} | $I_{TM} = 60\text{ A}$, $t_p = 380\text{ }\mu s$ | | MAX. | 2.1 | V | |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM}$ | | $T_j = 25\text{ °C}$ | MAX. | 20 | μA |
| | | | $T_j = 125\text{ °C}$ | | 6 | mA |
| t_q | $V_D = 67\% V_{DRM}$, $I_{TM} = 60\text{ A}$, $V_R = 75\text{ V}$ $di_{TM}/dt = 30\text{ A}/\mu s$, $dV_D/dt = 20\text{ V}/\mu s$ | | $T_j = 125\text{ °C}$ | TYP. | 100 | μs |

Table 4. Thermal resistance

| Symbol | Parameter | Value | Unit |
|---------------|-------------------------|-------|---------------|
| $R_{th(j-c)}$ | Junction to case (D.C.) | 1.1 | $^{\circ}C/W$ |
| $R_{th(j-a)}$ | Junction to ambient | 50 | $^{\circ}C/W$ |

Figure 1. Maximum average power dissipation versus average on-state current

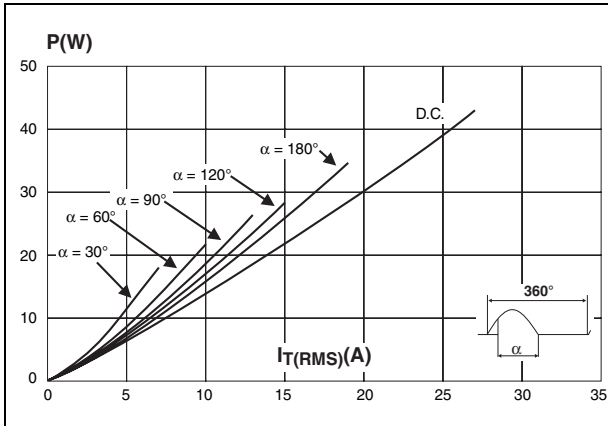


Figure 2. Correlation between maximum average power dissipation and maximum allowable temperature

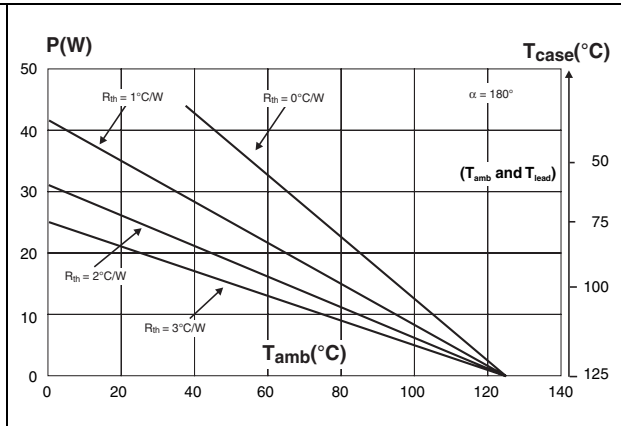


Figure 3. Average on-state current versus case temperature

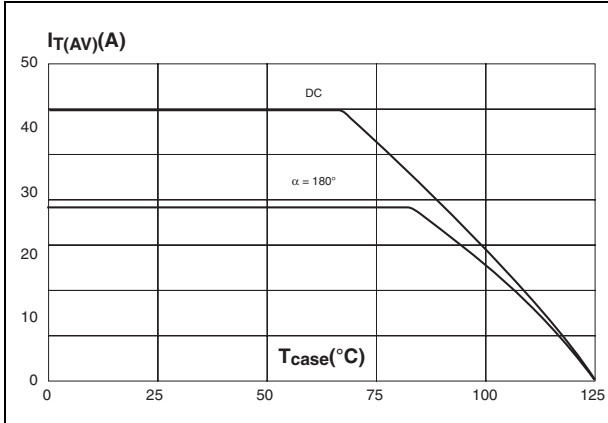


Figure 4. Relative variation of thermal impedance versus pulse duration

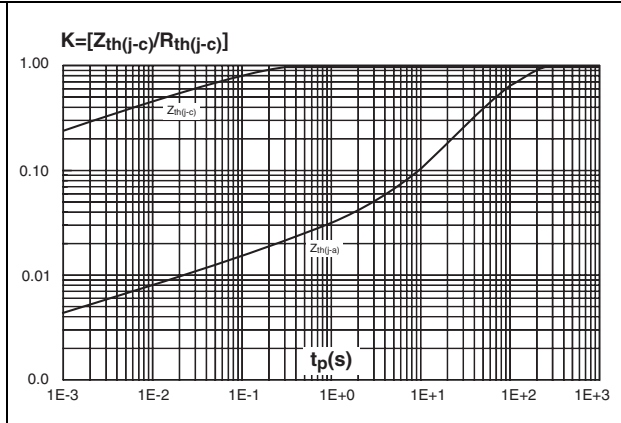


Figure 5. Relative variation of gate trigger current versus junction temperature

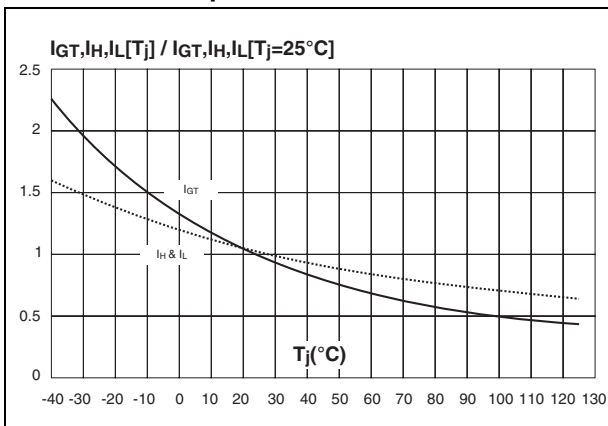


Figure 6. Surge peak on-state current versus number of cycles

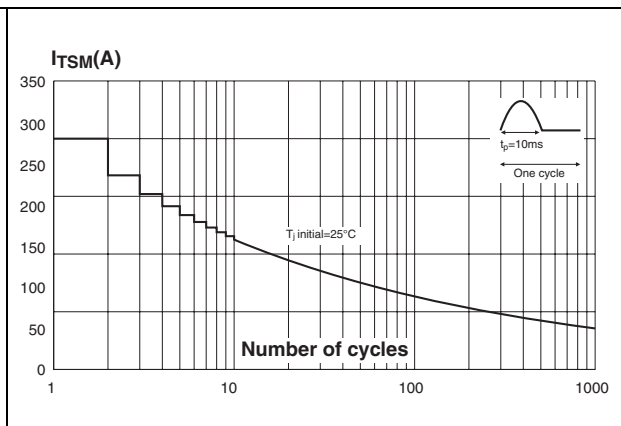


Figure 7. Non repetitive surge peak on-state current and corresponding value of I^2t versus sinusoidal pulse width

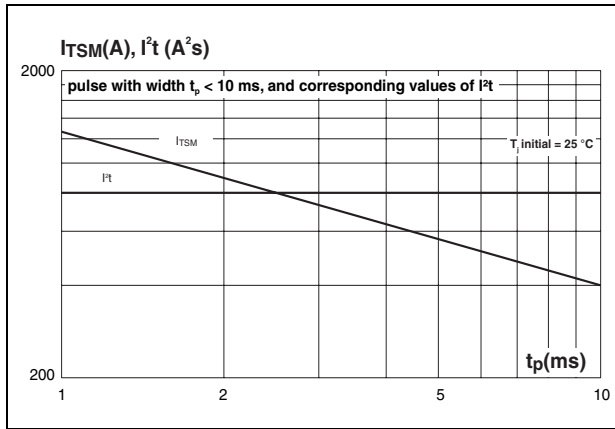
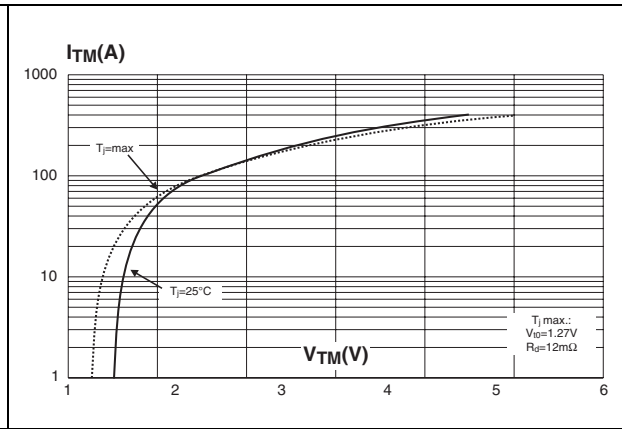


Figure 8. On-state characteristics (maximum values)



2 Ordering information scheme

Figure 9. Ordering information scheme

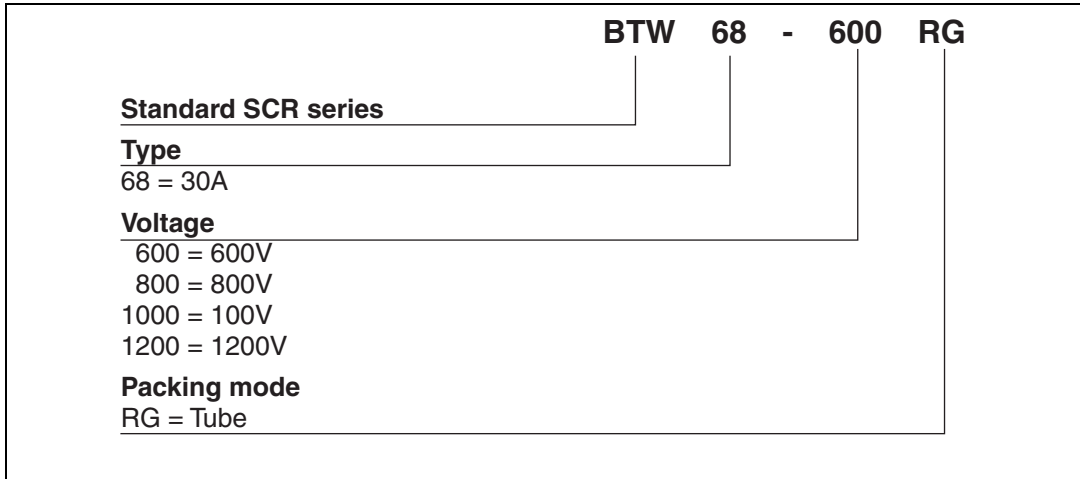


Table 5. Product Selector

| Part numbers | Voltage (xxx) | | | | Sensitivity | Package |
|--------------|---------------|-------|--------|--------|-------------|-----------|
| | 600 V | 800 V | 1000 V | 1200 V | | |
| BTW68-600RG | X | | | | 50 mA | TOP3 Ins. |
| BTW68-800RG | | X | | | | |
| BTW68-1000RG | | | X | | | |
| BTW68-1200RG | | | | X | | |

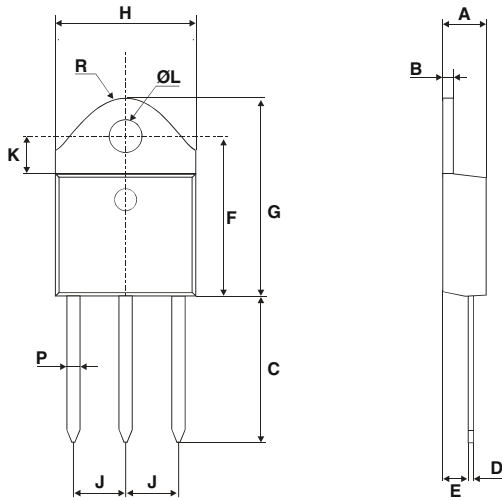
3 Package information

- Epoxy meets UL94,V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 6. TOP3 ins. dimensions

| Ref. | Dimensions | | | |
|------|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.4 | 4.6 | 0.173 | 0.181 |
| B | 1.45 | 1.55 | 0.057 | 0.061 |
| C | 14.35 | 15.60 | 0.565 | 0.614 |
| D | 0.5 | 0.7 | 0.020 | 0.028 |
| E | 2.7 | 2.9 | 0.106 | 0.114 |
| F | 15.8 | 16.5 | 0.622 | 0.650 |
| G | 20.4 | 21.1 | 0.815 | 0.831 |
| H | 15.1 | 15.5 | 0.594 | 0.610 |
| J | 5.4 | 5.65 | 0.213 | 0.222 |
| K | 3.4 | 3.65 | 0.134 | 0.144 |
| ØL | 4.08 | 4.17 | 0.161 | 0.164 |
| P | 1.20 | 1.40 | 0.047 | 0.055 |
| R | 4.60 typ. | | 0.181 typ. | |



4 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|--------------|------------|-----------|--------|----------|---------------|
| BTW68-600RG | BTW68-600 | TOP3 ins. | 4.5 g | 30 | Tube |
| BTW68-800RG | BTW68-800 | | | | |
| BTW68-1000RG | BTW68-1000 | | | | |
| BTW68-1200RG | BTW68-1200 | | | | |

5 Revision history

Table 8. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| Mar-1995 | 1 | Initial release. |
| 13-Feb-2006 | 2 | TOP3 Insulated delivery mode changed from bulk to tube. ECOPACK statement added. |
| 29-Jul-2010 | 3 | Deleted part number BTW68-200RG. Updated Table 2 , Figure 7 and alpha angle in Figure 1 . |

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