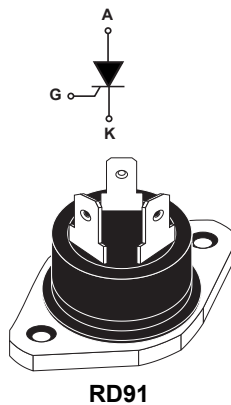


50 A, 1000 V SCR thyristor in RD91



Features

- High current SCR
- High commutation capability
- Low thermal resistance with clip bonding
- Insulated package RD91 high power:
 - Low thermal resistance with clip bonding
 - Insulated voltage: 2500 V_{RMS}
 - Complies with UL 1557 (File ref : E81734)
- RoHS (2002/95/EC) compliant

Applications

- Solid state relays
- Welding equipment
- High power motor control

Description

Available in 2500 V insulated high power package, the 50 A and 1000 V SCR BTW67 is suitable in 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, they offer a superior performance in surge current handling capabilities.

Product status link

[BTW67](#)

Product summary

| | |
|-------------------|--------|
| $I_{T(RMS)}$ | 50 A |
| V_{DRM}/V_{RRM} | 1000 V |
| I_{GT} | 80 mA |

1 Characteristics

Table 1. Absolute maximum ratings

| Symbol | Parameters | | Value | Unit | |
|--------------|---|-------------------------|-----------------------|-------------|------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave) | | $T_c = 70\text{ °C}$ | 50 | A |
| $I_{T(AV)}$ | Average on-state current (180° conduction angle) | | $T_c = 70\text{ °C}$ | 32 | A |
| I_{TSM} | Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C) | | $t_p = 8.3\text{ ms}$ | 610 | A |
| I^2t | I^2t value for fusing | $t_p = 10\text{ ms}$ | | 1680 | A ² s |
| di/dt | Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$ | F = 60 Hz | $T_j = 125\text{ °C}$ | 50 | A/ μ 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} | Storage junction temperature range | | | -40 to +150 | °C |
| T_j | Operating junction temperature range | | | -40 to +125 | °C |
| V_{GRM} | Maximum peak reverse gate voltage | | | 5 | V |
| V_{ins} | Insulation RMS voltage, 1 minute | | | 2500 | V |

Table 2. Electrical characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Test conditions | T_j | | Value | Unit |
|-------------------|--|--------|------|-------|------------|
| I_{GT} | $V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$ | 25 °C | Min. | 8 | mA |
| | | | Max | 80 | |
| V_{GT} | | | Max | 1.3 | V |
| V_{GD} | $V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$ | 125 °C | Min. | 0.2 | V |
| I_H | $I_T = 500\text{ mA}$, gate open | | Max. | 150 | mA |
| I_L | $I_G = 1.2 \times I_{GT}$ | | Max. | 200 | mA |
| dV/dt | $V_D = 67\%$, V_{DRM} gate open | 125 °C | Min. | 1000 | V/ μ s |
| V_{TM} | $I_{TM} = 100\text{ A}$, $t_p = 380\text{ }\mu$ s | 25 °C | Max. | 1.9 | V |
| V_{TO} | threshold on-state voltage | 125 °C | Max. | 1.0 | V |
| R_D | Dynamic resistance | 125 °C | Max. | 8.5 | m Ω |
| I_{DRM}/I_{RRM} | $V_D = V_{DRM}$, $V_R = V_{RRM}$ | 25 °C | Max. | 10 | μ A |
| | | 125 °C | | 5 | mA |

Table 3. Thermal resistance

| Symbol | Parameters | Value | Unit |
|---------------|------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case (D.C) | 1.0 | °C/W |

1.1 Characteristics curves

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

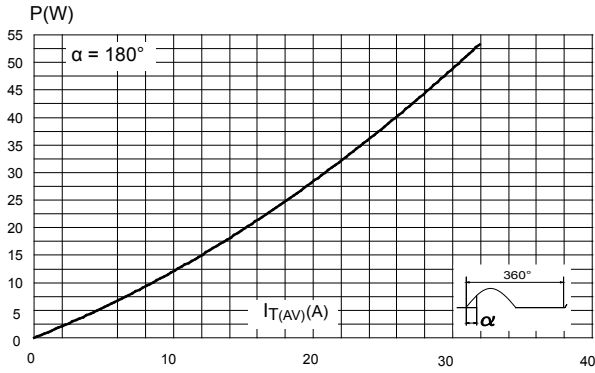


Figure 2. Average on-state current versus case temperature

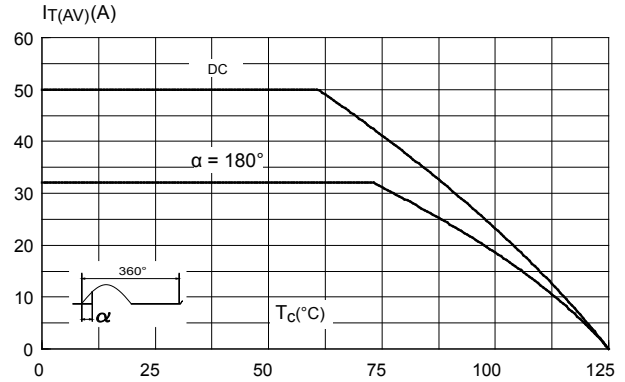


Figure 3. Relative variation of thermal impedance versus pulse duration

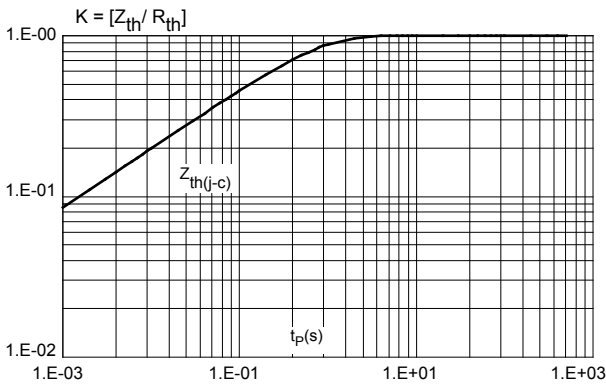


Figure 4. Relative variation of gate trigger current, holding current and latching current versus junction temperature

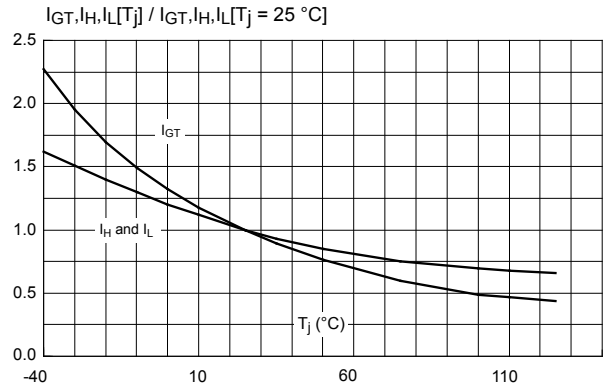


Figure 5. Surge peak on-state current versus number of cycles

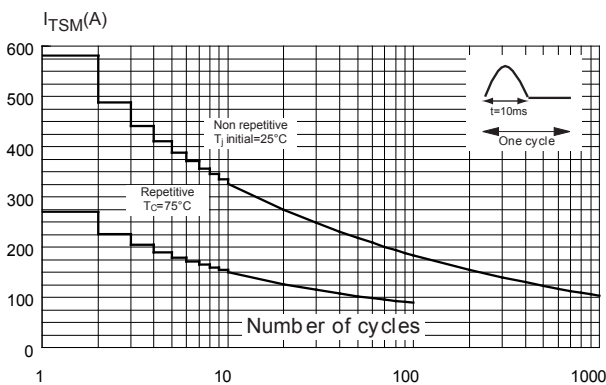


Figure 6. Non repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10ms$, and corresponding value of I^2t

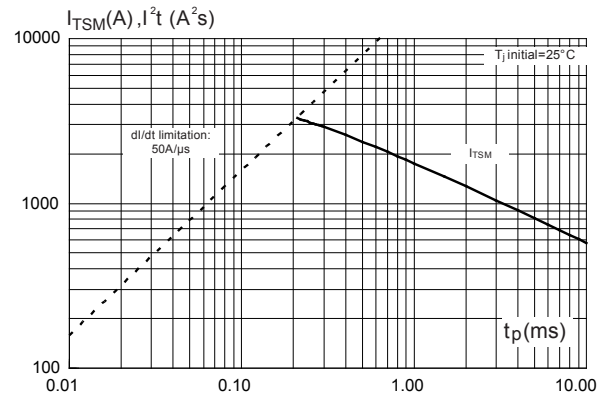
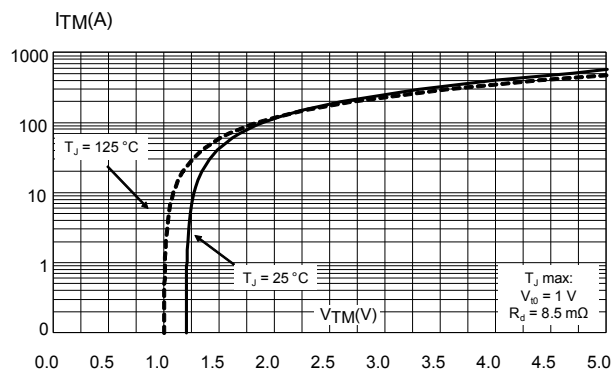


Figure 7. On-state characteristics (maximum values)



2 Package information

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.

2.1 RD91 package information

- Epoxy meets UL94, V0
- Cooling method: Conduction
- Recommended torque: 0.9 to 1.2 N·m

Figure 8. RD91 package outline

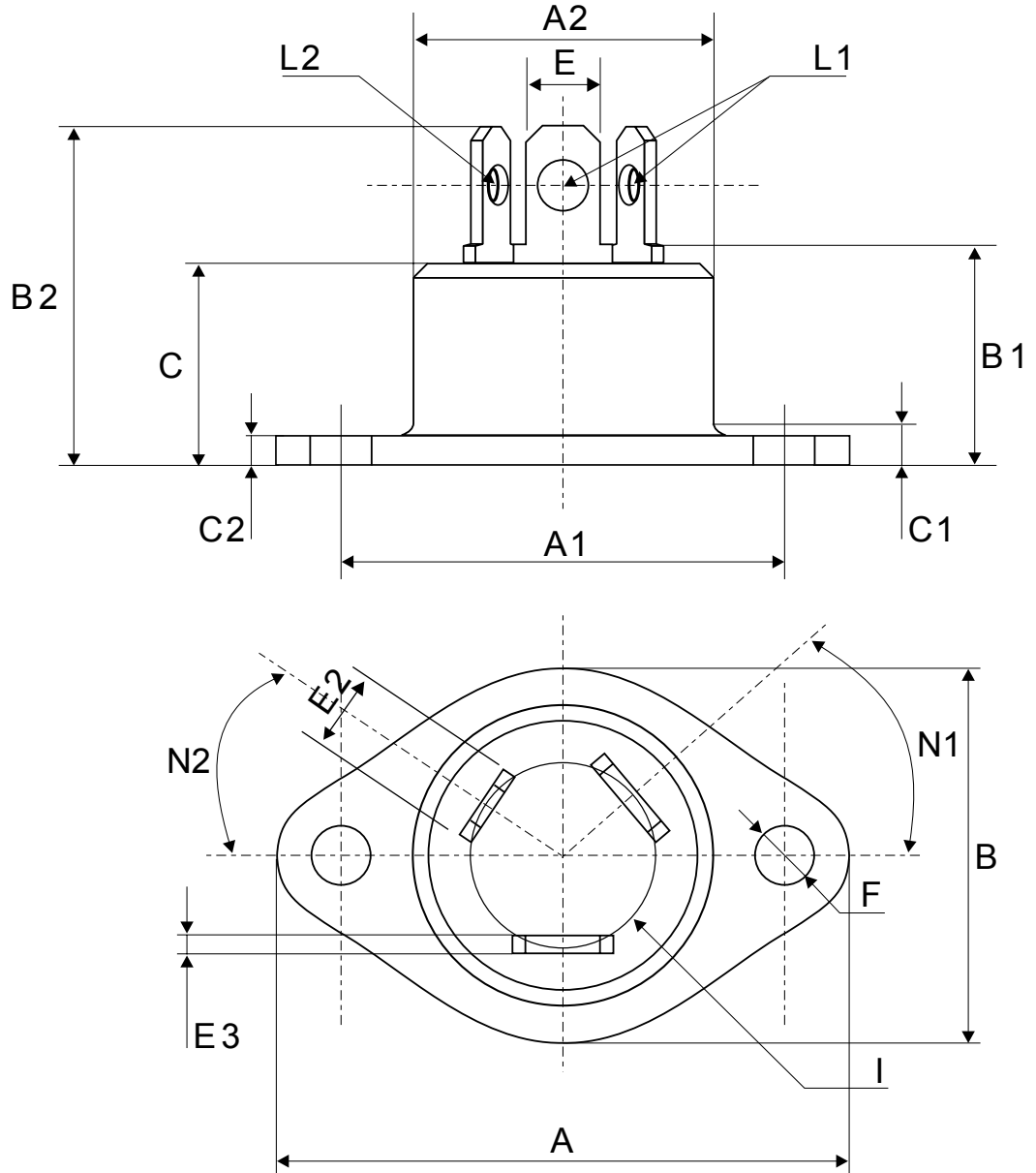


Table 4. RD91 mechanical data

| Ref. | Dimensions | | | | | |
|------|------------|------|-------|-----------------------|------|-------|
| | mm | | | Inches ⁽¹⁾ | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 40.00 | | | 1.575 |
| A1 | 30.10 | | 30.30 | 1.185 | | 1.193 |
| A2 | | | 22.00 | | | 0.867 |
| B | | | 27.00 | | | 1.063 |
| B1 | 13.50 | | 16.50 | 0.531 | | 0.650 |
| B2 | | | 24.00 | | | 0.945 |
| C | | | 14.00 | | | 0.552 |
| C1 | | | 3.50 | | | 0.138 |
| C2 | 1.90 | | 2.10 | 0.074 | | 0.083 |
| E | 6.10 | | 6.50 | 0.240 | | 0.256 |
| E2 | 4.80 | | 5.20 | 0.188 | | 0.205 |
| E3 | 0.70 | | 0.90 | 0.027 | | 0.036 |
| F | 4.00 | | 4.30 | 0.157 | | 0.170 |
| I | 11.20 | | 11.60 | 0.440 | | 0.536 |
| L1 | 3.10 | | 3.50 | 0.122 | | 0.138 |
| L2 | 1.70 | | 1.90 | 0.066 | | 0.075 |
| N1 | 33° | | 43° | 33° | | 43° |
| N2 | 28° | | 38° | 28° | | 38° |

1. Inches given for reference only

3 Ordering information

Figure 9. Ordering information scheme

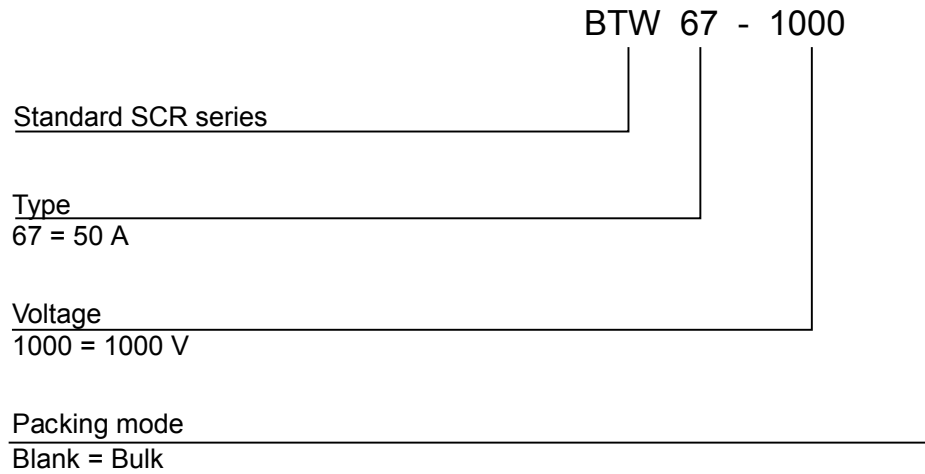


Table 5. Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|------------|-----------|---------|--------|-----------|---------------|
| BTW67-1000 | BTW671000 | RD91 | 20 g | 25 | Bulk |

Revision history

Table 6. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| Apr-2001 | 4A | Last update. |
| 13-Feb-2006 | 5 | TOP3 Insulated delivery mode changed from bulk to tube. ECOPACK statement added. |
| 26-Jun-2019 | 6 | Removed TOP3 Ins. package information. Minor text changed. |

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