



BTA06T-600CWRG

6 A Snubberless™ Triac

Features

- High static and dynamic commutation
- BTA series is UL1557 certified (File ref.: 81734)
- Package is RoHS (2002/95/EC) compliant
- $I_{GT} = 35 \text{ mA}$

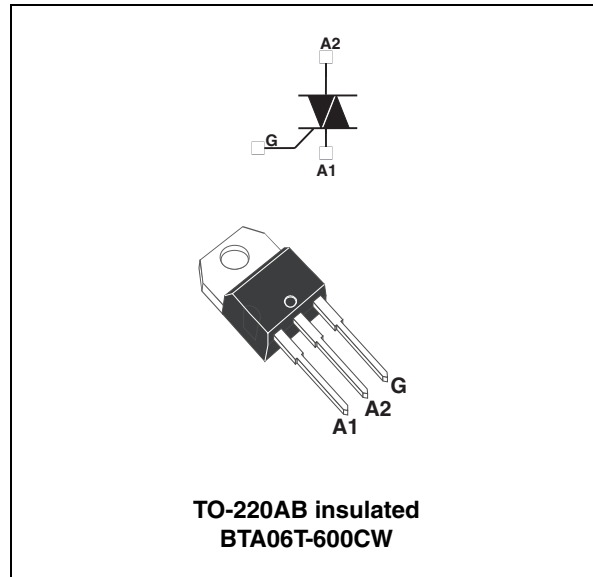
Applications

Specially designed for power tool applications, it can also be used to drive loads like motor speed controller, kitchen equipments such as electro valves, light dimmers and similar.

Description

Available in through-hole package, the Triac BTA06T-600CW is suitable for general purpose ac switching.

Being a fully insulated package, the BTA06T-600CW provides insulation rated at 2500 V rms.



TM: Snubberless is a trademark of STMicroelectronics

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|-------------------|--|-------------------------------|-----------------------------------|-------------------------|------------------|
| $I_{T(RMS)}$ | On-state rms current (full sine wave) | | $T_c = 100\text{ }^\circ\text{C}$ | 6 | A |
| I_{TSM} | Non repetitive surge peak on-state current (full cycle sine wave, T_j initial = $25\text{ }^\circ\text{C}$) | F = 60 Hz | t = 16.7 ms | 47 | A |
| | | F = 50 Hz | t = 20 ms | 45 | |
| I^2t | I^2t Value for fusing | $t_p = 10\text{ ms}$ | | 13 | 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 = 120 Hz | $T_j = 125\text{ }^\circ\text{C}$ | 50 | A/ μ s |
| V_{DSM}/V_{RSM} | Non repetitive surge peak off-state voitage | $t_p = 10\text{ ms}$ | $T_j = 25\text{ }^\circ\text{C}$ | $V_{DRM}/V_{RRM} + 100$ | V |
| I_{GM} | Peak gate current | $t_p = 20\text{ }\mu\text{s}$ | $T_j = 125\text{ }^\circ\text{C}$ | 4 | A |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j = 125\text{ }^\circ\text{C}$ | 1 | W |
| T_{stg} | Storage junction temperature range | | | -40 to +150 | $^\circ\text{C}$ |
| T_j | Operating junction temperature range | | | -40 to +125 | |

Table 2. Electrical characteristics, Snubberless (3 quadrants) ($T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified)

| Symbol | Test conditions | Quadrant | | Value | Unit |
|-------------------------------------|---|--------------|-----|-------|------------|
| $I_{GT}^{(1)}$ | $V_D = 12\text{ V}$ $R_L = 30\text{ }\Omega$ | I - II - III | MAX | 35 | mA |
| V_{GT} | $V_D = 12\text{ V}$ $R_L = 30\text{ }\Omega$ | I - II - III | MAX | 1.3 | V |
| V_{GD} | $V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ | I - II - III | MIN | 0.2 | V |
| $I_H^{(2)}$ | $I_T = 100\text{ mA}$ | | MAX | 35 | mA |
| I_L | $I_G = 1.2 \times I_{GT}$ | I - III | MAX | 50 | mA |
| | | II | | 80 | |
| dV/dt ⁽²⁾ | $V_D = 67\% V_{DRM}$, gate open, $T_j = 125\text{ }^\circ\text{C}$ | | MIN | 750 | V/ μ s |
| (dI/dt) _C ⁽²⁾ | Without snubber, $T_j = 125\text{ }^\circ\text{C}$ | | MIN | 8.0 | A/ms |

1. Minimum I_{GT} is guaranteed at 5% of I_{GT} max.
2. For both polarities of A2 pin referenced to A1 pin

Table 3. Static electrical characteristics

| Symbol | Test conditions | | Value | Unit | | |
|------------------------|--|-----------------------------------|-----------------------------------|------|---------------|------------|
| $V_{TM}^{(1)}$ | $I_{TM} = 8.5\text{ A}$, $t_p = 380\text{ }\mu\text{s}$ | $T_j = 25\text{ }^\circ\text{C}$ | MAX | 1.6 | V | |
| $V_{TO}^{(1)}$ | Threshold voltage | | $T_j = 125\text{ }^\circ\text{C}$ | MAX | 0.85 | V |
| $R_D^{(1)}$ | Dynamic resistance | | $T_j = 125\text{ }^\circ\text{C}$ | MAX | 80 | m Ω |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM}$ | $T_j = 25\text{ }^\circ\text{C}$ | MAX | 5 | μA | |
| | | $T_j = 125\text{ }^\circ\text{C}$ | | 1 | mA | |

1. For both polarities of A2 pin referenced to A1 pin

Table 4. Thermal resistances

| Symbol | Parameter | Value | Unit |
|---------------|-----------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case (ac) | 3.4 | °C/W |
| $R_{th(j-a)}$ | Junction to ambient | 60 | |

Figure 1. Maximum power dissipation versus rms on-state current (full cycle)

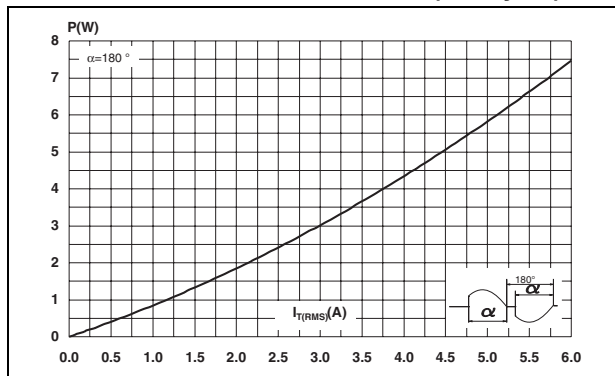


Figure 2. On-state current (rms) versus case temperature (full cycle)

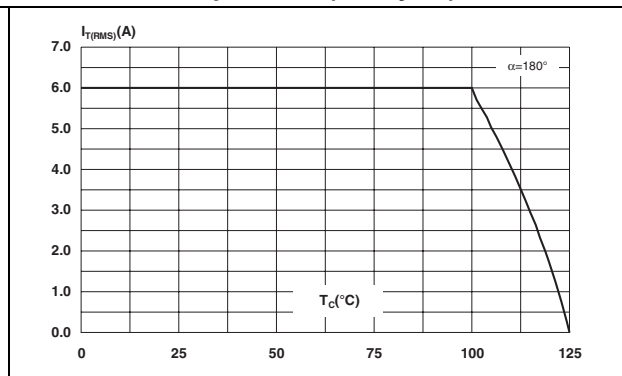


Figure 3. On-state current (rms) versus ambient temperature (free air convection)

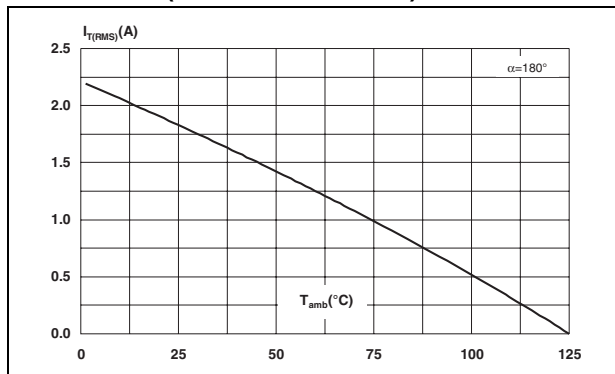


Figure 4. Relative variation of thermal impedance versus pulse duration

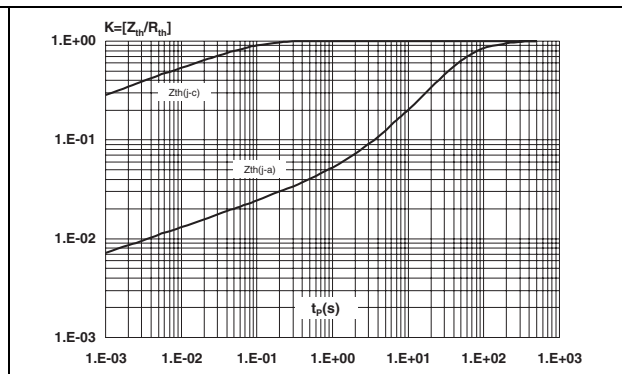


Figure 5. Relative variation of gate trigger current, and gate trigger voltage versus junction temperature

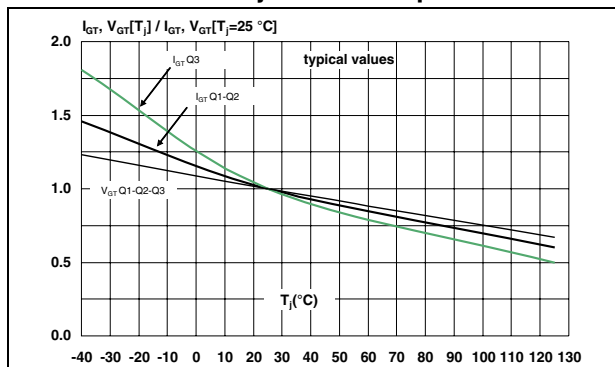


Figure 6. Relative variation of holding current and latching current versus junction temperature

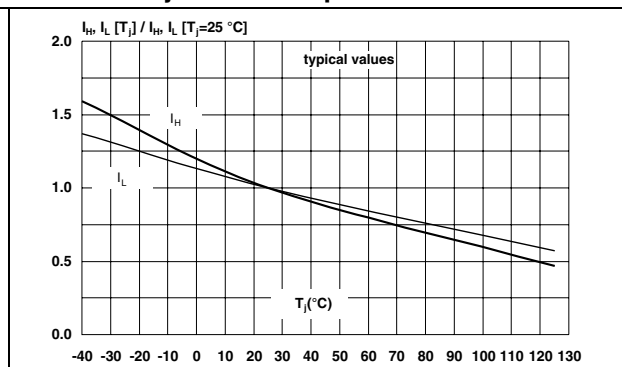


Figure 7. Surge peak on-state current versus number of cycles

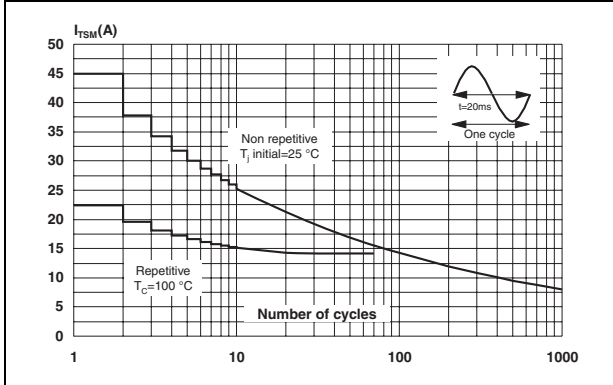


Figure 8. Non-repetitive surge peak on-state current for sinusoidal

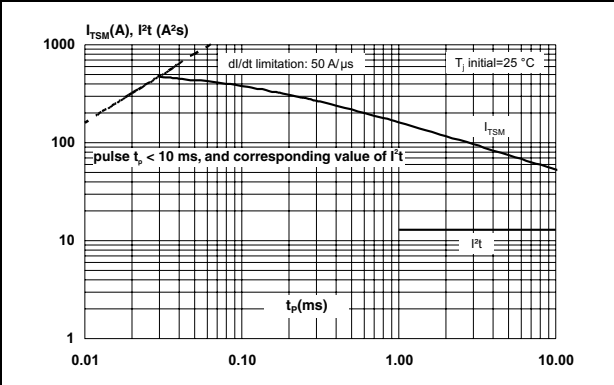


Figure 9. On-state characteristics (maximum values)

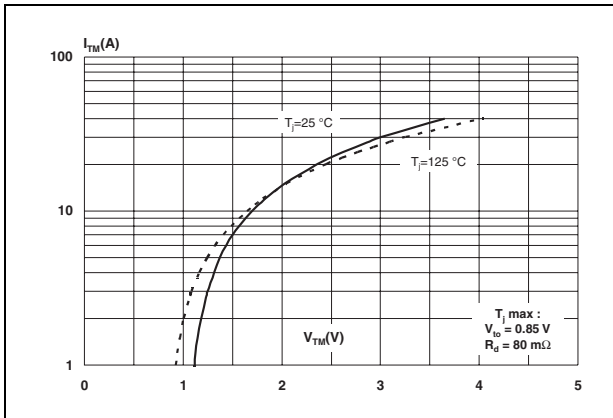


Figure 10. Relative variation of critical rate of decrease of main current (di/dt)_c versus junction temperature

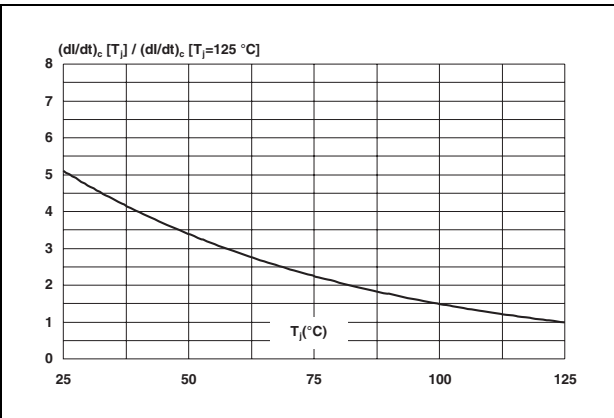


Figure 11. Relative variation of critical rate of decrease of main current (di/dt)_c versus reapplied (dV/dt)_c

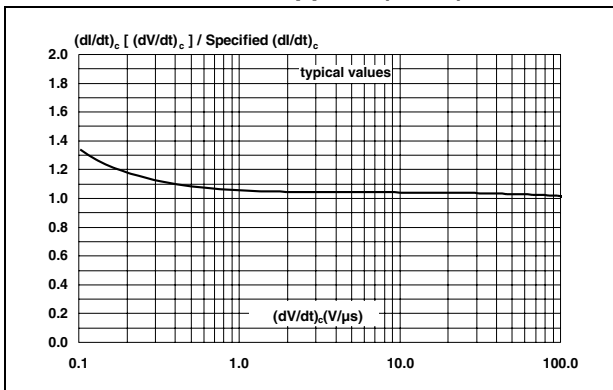
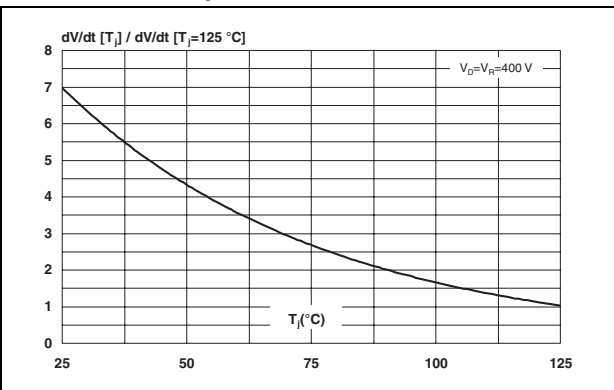
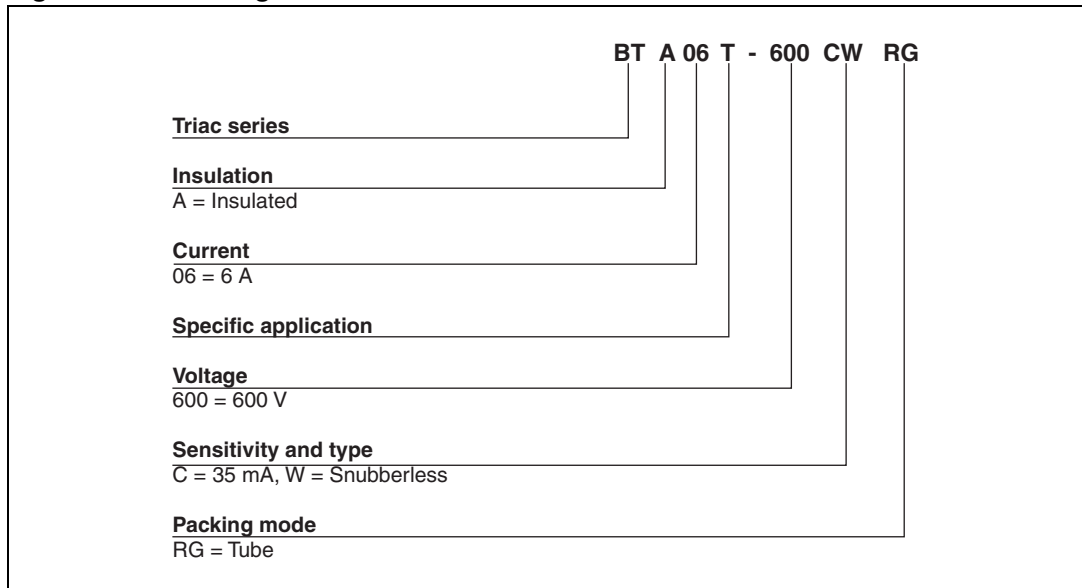


Figure 12. Relative variation of static dV/dt immunity versus junction temperature



2 Ordering information

Figure 13. Ordering information scheme



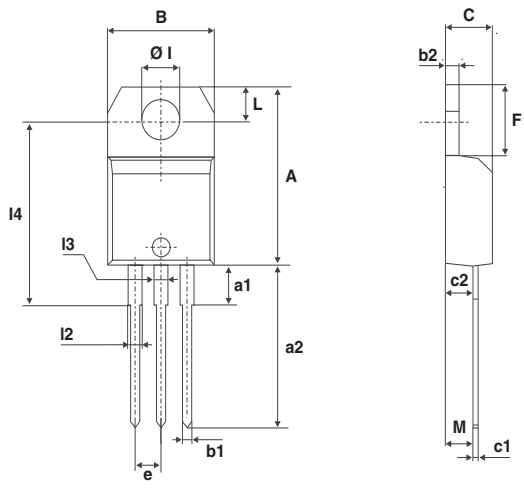
3 Package information

- 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 5. TO-220AB insulated dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|-------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 15.20 | | 15.90 | 0.598 | | 0.625 |
| a1 | | 3.75 | | | 0.147 | |
| a2 | 13.00 | | 14.00 | 0.511 | | 0.551 |
| B | 10.00 | | 10.40 | 0.393 | | 0.409 |
| b1 | 0.61 | | 0.88 | 0.024 | | 0.034 |
| b2 | 1.23 | | 1.32 | 0.048 | | 0.051 |
| C | 4.40 | | 4.60 | 0.173 | | 0.181 |
| c1 | 0.49 | | 0.70 | 0.019 | | 0.027 |
| c2 | 2.40 | | 2.72 | 0.094 | | 0.107 |
| e | 2.40 | | 2.70 | 0.094 | | 0.106 |
| F | 6.20 | | 6.60 | 0.244 | | 0.259 |
| ØI | 3.75 | | 3.85 | 0.147 | | 0.151 |
| I4 | 15.80 | 16.40 | 16.80 | 0.622 | 0.646 | 0.661 |
| L | 2.65 | | 2.95 | 0.104 | | 0.116 |
| I2 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| I3 | 1.14 | | 1.70 | 0.044 | | 0.066 |
| M | | 2.60 | | | 0.102 | |



4 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Packing mode |
|----------------|--------------|--------------|--------|----------|--------------|
| BTA06T-600CWRG | BTA06T-600CW | TO-220AB ins | 2.3 g | 50 | Tube |

5 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 15-Nov-2007 | 1 | Initial release. |
| 17-Jun-2010 | 2 | Updated title on page 1 . Updated ECOPACK statement. |

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