

40 A standard TRIACs

Features

- High current TRIAC
- Low thermal resistance with clip bonding
- High commutation capability
- BTA series UL1557 certified (File ref: 81734)
- Packages are RoHS (2002/95/EC) compliant

Applications

- On/off function in static relays, heating regulation, induction motor starting circuits
- Phase control operations in light dimmers, motor speed controllers, and similar

Description

Available in high power packages, the BTA/BTB40-41 series is suitable for general purpose AC switching.

The BTA series provides an insulated tab (rated at 2500 V rms).

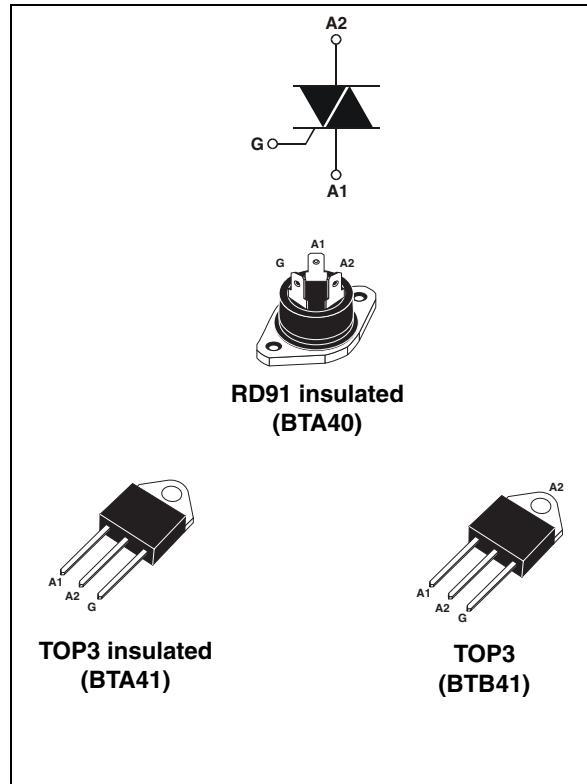


Table 1. Device summary

| Symbol | Parameter | BTA40 ⁽¹⁾ | BTA41 ⁽¹⁾ | BTB41 | Unit |
|----------------------------------|-----------------------------------|----------------------|----------------------|-------------|------|
| I _{T(RMS)} | On-state rms current | 40 | 41 | 41 | A |
| V _{DRM/V_{RRM}} | Repetitive peak off-state voltage | 600 and 800 | 600 and 800 | 600 and 800 | V |
| I _{GT} | Triggering gate current | 50 | 50 | 50 | mA |

1. Insulated package

1 Characteristics

Table 2. Absolute maximum ratings

| Symbol | Parameter | | | Value | Unit |
|--------------------|--|------------------------|---------------------|--------------------------------|------|
| $I_{T(RMS)}$ | On-state rms current (full sine wave) | TOP3 | $T_c = 95^\circ C$ | 40 | A |
| | | RD91 / TOP ins. | $T_c = 80^\circ C$ | | |
| I_{TSM} | Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C) | F = 50 Hz | t = 20 ms | 400 | A |
| | | F = 60 Hz | t = 16.7 ms | 420 | |
| I^2t | I^2t Value for fusing | $t_p = 10 \text{ ms}$ | | 1000 | A²s |
| 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 | $T_j = 125^\circ C$ | 50 | A/μs |
| V_{DSM}/V_{RSM} | Non repetitive surge peak off-state voltage | $t_p = 10 \text{ ms}$ | $T_j = 25^\circ C$ | $V_{DSM}/V_{RSM} + 100$ | V |
| I_{GM} | Peak gate current | $t_p = 20 \mu\text{s}$ | $T_j = 125^\circ C$ | 8 | A |
| $P_{G(AV)}$ | Average gate power dissipation | | $T_j = 125^\circ C$ | 1 | W |
| T_{stg} T_j | Storage junction temperature range Operating junction temperature range | | | - 40 to + 150 - 40 to + 125 | °C |

Table 3. Electrical characteristics ($T_j = 25^\circ C$, unless otherwise specified)

| Symbol | Parameter | | | Value | Unit |
|------------------|---|---------------------|------|-------|------|
| $I_{GT}^{(1)}$ | $V_D = 12 \text{ V}$ $R_L = 33 \Omega$ | I - II - III | MAX. | 50 | mA |
| | | IV | | 100 | |
| V_{GT} | | ALL | MAX. | 1.3 | V |
| V_{GD} | $V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $T_j = 125^\circ C$ | ALL | MIN. | 0.2 | V |
| $I_H^{(2)}$ | $I_T = 500 \text{ mA}$ | | MAX. | 80 | mA |
| I_L | $I_G = 1.2 I_{GT}$ | I - III - IV | MAX. | 70 | mA |
| | | II | | 160 | |
| $dV/dt^{(2)}$ | $V_D = 67\% V_{DRM}$ gate open | $T_j = 125^\circ C$ | MIN. | 500 | V/μs |
| $(dV/dt)c^{(2)}$ | $(dI/dt)c = 20 \text{ A/ms}$ | $T_j = 125^\circ C$ | MIN. | 10 | V/μs |

1. Minimum I_{GT} is guaranteed at 5% of I_{GT} max.

2. for both polarities of A2 referenced to A1

Table 4. Static characteristics

| Symbol | Test conditions | | | Value | Unit |
|------------------------|-------------------------|-------------------------|---------------------------|-------|--------|
| $V_T^{(1)}$ | $I_{TM} = 60 \text{ A}$ | $t_p = 380 \mu\text{s}$ | $T_j = 25^\circ\text{C}$ | MAX. | 1.55 V |
| $V_{t0}^{(2)}$ | Threshold voltage | | $T_j = 125^\circ\text{C}$ | MAX. | 0.85 V |
| $R_d^{(2)}$ | Dynamic resistance | | $T_j = 125^\circ\text{C}$ | MAX. | 10 mΩ |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM}$ | | $T_j = 25^\circ\text{C}$ | MAX. | 5 μA |
| | | | $T_j = 125^\circ\text{C}$ | | 5 mA |

1. Minimum I_{GT} is guaranteed at 5% of I_{GT} max.

2. for both polarities of A2 referenced to A1

Table 5. Thermal resistance

| Symbol | Test conditions | | Value | Unit |
|---------------|-----------------------|-----------------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case (AC) | RD91 (insulated) / TOP3 insulated | 0.9 | °C/W |
| | | TOP3 | 0.6 | |
| $R_{th(j-a)}$ | Junction to ambient | TOP3 / TOP3 insulated | 50 | °C/W |

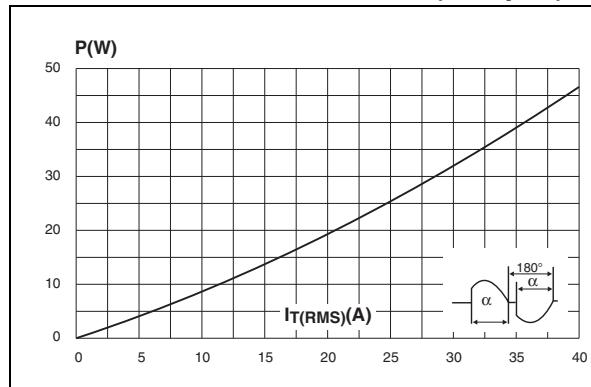
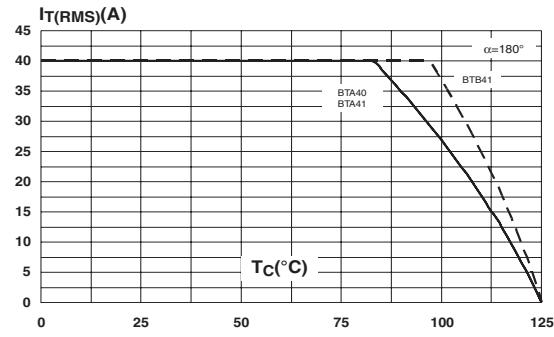
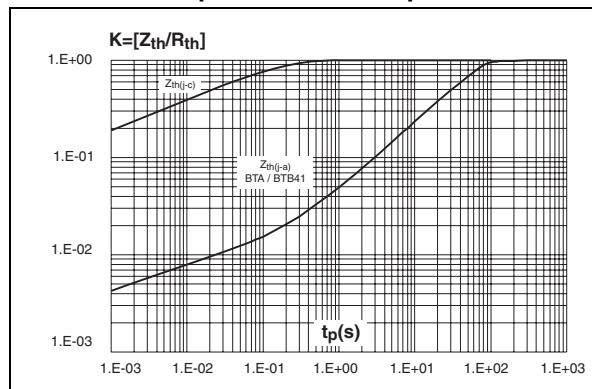
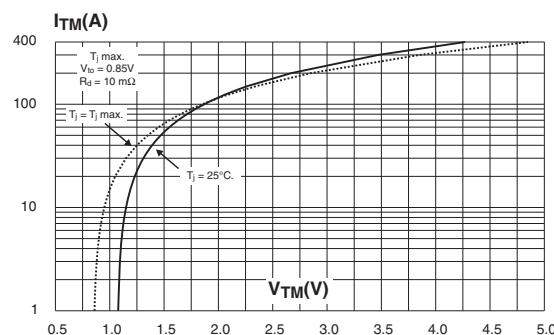
Figure 1. Maximum power dissipation versus on-state rms current (full cycle)**Figure 2. On-state rms current versus case temperature (full cycle)****Figure 3. Relative variation of thermal impedance versus pulse duration****Figure 4. On-state characteristics (maximum values)**

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

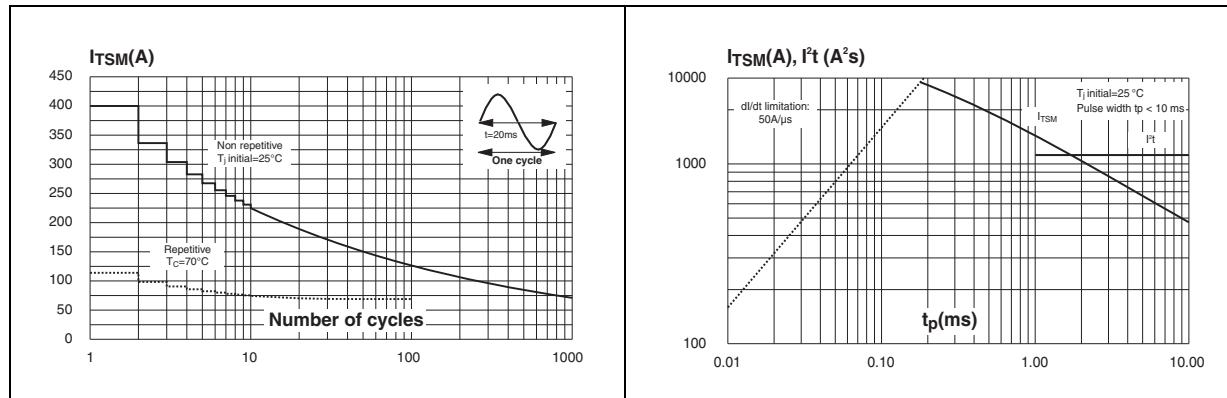


Figure 7. Relative variation of gate trigger, holding and latching current versus junction temperature

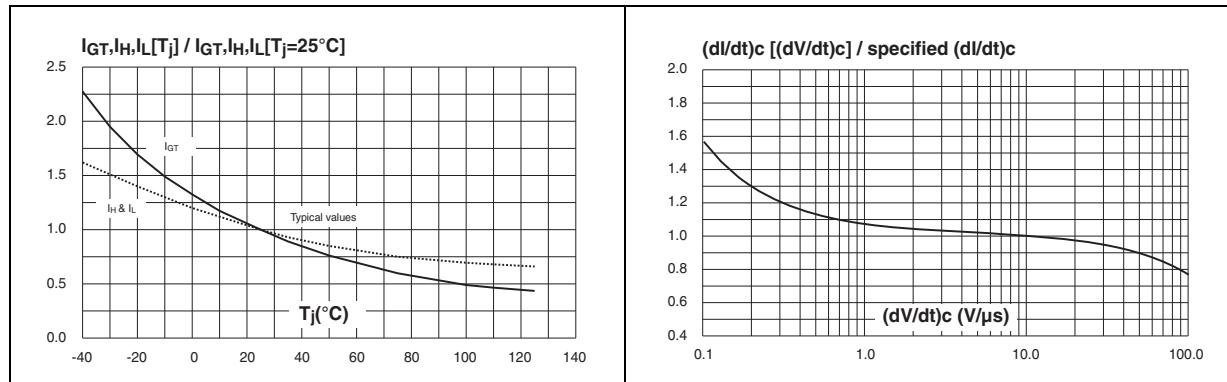


Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding value of I^2t

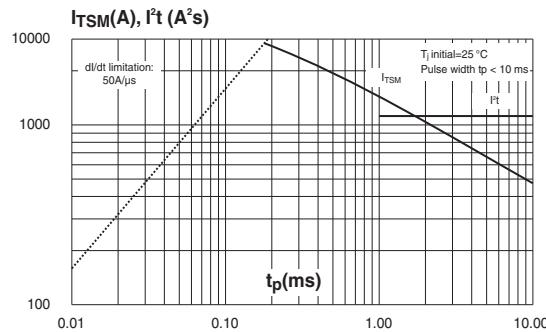
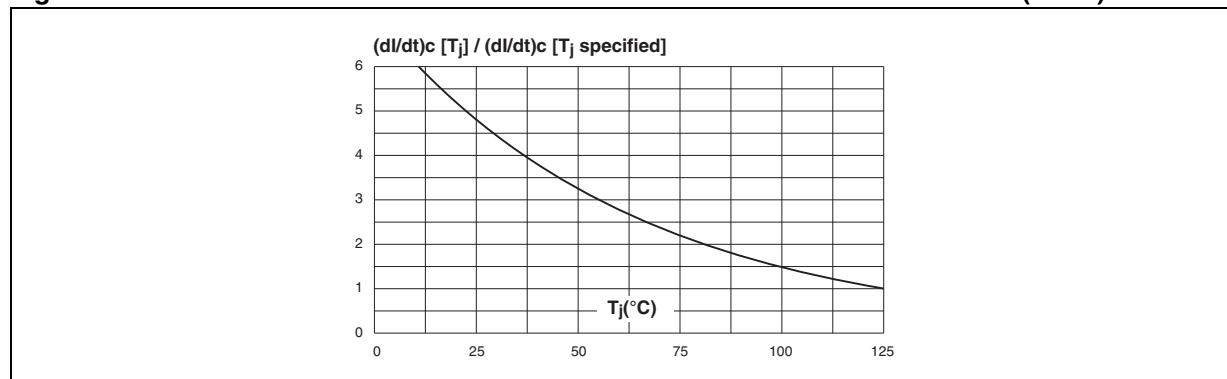
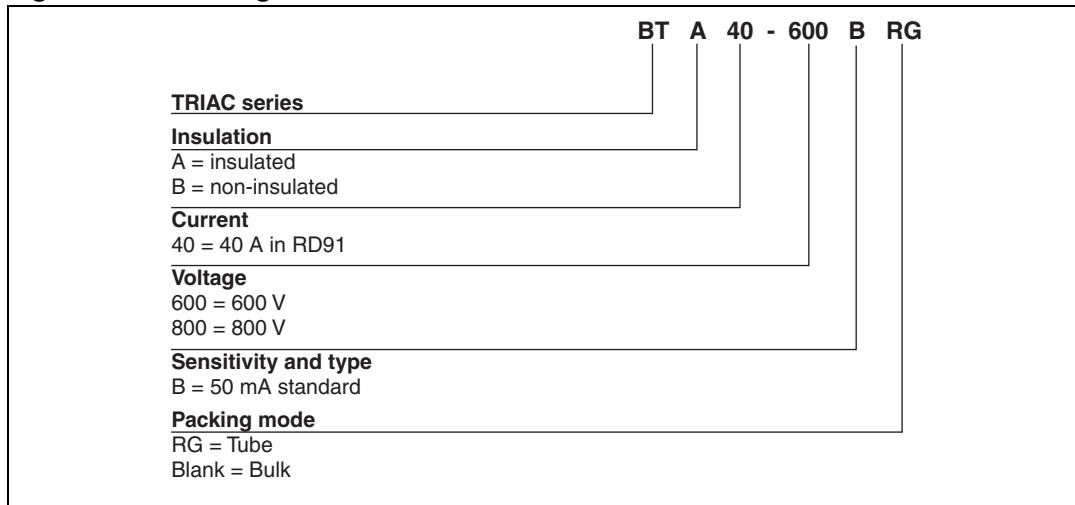


Figure 8. Relative variation of critical rate of decrease of main current versus $(dV/dt)c$ (typical values)



2 Ordering information scheme

Figure 10. Ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Lead-free packages

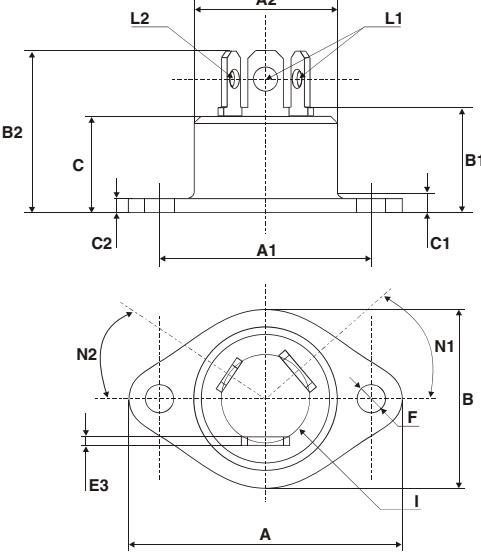
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Table 6. TOP3 insulated and non-insulated dimensions

| 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. | |

Table 7. RD91 dimensions

| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | - | 40.00 | - | 1.575 |
| A1 | 29.90 | 30.30 | 1.177 | 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 | - | 0.551 |
| C1 | - | 3.50 | - | 0.138 |
| C2 | 1.95 | 3.00 | 0.077 | 0.118 |
| E3 | 0.70 | 0.90 | 0.027 | 0.035 |
| F | 4.00 | 4.50 | 0.157 | 0.177 |
| I | 11.20 | 13.60 | 0.441 | 0.535 |
| L1 | 3.10 | 3.50 | 0.122 | 0.138 |
| L2 | 1.70 | 1.90 | 0.067 | 0.075 |
| N1 | 33° | 43° | 33° | 43° |
| N2 | 28° | 38° | 28° | 38° |



The technical drawing illustrates the RD91 package in two views: a top view showing the lead frame and bond wires, and a bottom view showing the chip and bond pads. Key dimensions labeled include: A (total width), A1 (width of the chip area), A2 (width of the bond pads), B (total height), B1 (height of the chip area), B2 (height of the bond pads), C (width of the lead frame), C1 (width of the lead frame at the base), C2 (width of the lead frame at the top), E3 (width of the lead frame at the base), F (width of the lead frame at the top), I (length of the lead frame), L1 (width of the lead frame at the top), L2 (width of the lead frame at the base), N1 (angle of the lead frame at the top), and N2 (angle of the lead frame at the base). The top view also shows bond wires labeled L1 and L2 extending from the bond pads.

4 Ordering information

Table 8. Ordering information

| Order code ⁽¹⁾ | Marking | Package | Weight | Base qty | Delivery mode |
|---------------------------|-----------|-----------|--------|----------|---------------|
| BTA40-xxxB | BTA40xxxB | RD91 | 20 g | 25 | Bulk |
| BTA41-xxxBRG | BTA41xxxB | TOP3 Ins. | 4.5 g | 30 | Tube |
| BTB41-xxxBRG | BTB41xxxB | TOP3 | 4.5 g | 30 | Tube |

1. xxx = voltage

5 Revision history

Table 9. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| Sep-2003 | 5 | Last update. |
| 25-Mar-2005 | 6 | TOP3 delivery mode changed from bulk to tube. |
| 14-Oct-2005 | 7 | T _c values for I _T changed in Table 3. ECOPACK statement added. |
| 10-Aug-2009 | 8 | Updated Table 2 to correctly place packages. Updated Figure 2 . Table 5 changed to correctly place TOP3. Updated ECOPACK statement. |

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