

| DESCRIPTION | 16A TRIACs | | | | | | | | | | | | |
|---|------------------|--------|-------|------|--------------|----|---|-------------------|------------------|---|----------------|----------|----|
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| <p>MAIN FEATURES:</p> <table border="1"> <thead> <tr> <th>Symbol</th> <th>Value</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>$I_{T(RMS)}$</td> <td>16</td> <td>A</td> </tr> <tr> <td>V_{DRM}/V_{RRM}</td> <td>600, 700 and 800</td> <td>V</td> </tr> <tr> <td>$I_{GT} (Q_1)$</td> <td>10 to 50</td> <td>mA</td> </tr> </tbody> </table> | | Symbol | Value | Unit | $I_{T(RMS)}$ | 16 | A | V_{DRM}/V_{RRM} | 600, 700 and 800 | V | $I_{GT} (Q_1)$ | 10 to 50 | mA |
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| $I_{T(RMS)}$ | 16 | A | | | | | | | | | | | |
| V_{DRM}/V_{RRM} | 600, 700 and 800 | V | | | | | | | | | | | |
| $I_{GT} (Q_1)$ | 10 to 50 | mA | | | | | | | | | | | |
| <p>DESCRIPTION</p> <p>Available either in through-hole or surface-mount packages, the BTA/BTB16 and T16 triac series issuitable for general purpose AC switching. Theycan be used as an ON/OFF function in applicationssuch as static relays, heating regulation, inductionmotor starting circuits... or for phase control operation in light dimmers, motor speed controllers, ...</p> <p>The snubberless versions (BTA/BTB...W and T16 series) are specially recommended for use on inductive loads, thanks to their high commutation performances. By using an internal ceramic pad, the BTA series provides voltage insulated tab (rated at 2500V RMS) complying with UL standards</p> | | | | | | | | | | | | | |

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | | Value | Unit | |
|-------------------|--|---------------------|---------------------|-------------------------|---------------------|
| $I_{T(RMS)}$ | RMS on-state current (full sine wave) | D ² PAK | 16 | A | |
| | | TO-220AB | | | $T_c = 100^\circ C$ |
| | | TO-220AB Ins. | $T_c = 85^\circ C$ | | |
| I_{TSM} | Non repetitive surge peak on-state current (full cycle, T_j initial = 25°C) | F = 60 Hz | t = 16.7 ms | 168 | A |
| | | F = 50 Hz | t = 20 ms | 160 | |
| $I^2 t$ | $I^2 t$ Value for fusing | tp = 10 ms | | 144 | A ² s |
| dI/dt | Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, tr ≤ 100 ns | F = 120 Hz | $T_j = 125^\circ C$ | 50 | A/μs |
| V_{DSM}/V_{RSM} | Non repetitive surge peak off-state voltage | tp = 10 ms | $T_j = 25^\circ C$ | $V_{DRM}/V_{RRM} + 100$ | V |
| I_{GM} | Peak gate current | tp = 20 μs | $T_j = 125^\circ C$ | 4 | A |
| $P_{G(AV)}$ | Average gate power dissipation | $T_j = 125^\circ C$ | | 1 | W |
| T_{stg} | Storage junction temperature range | | | - 40 to + 150 | °C |
| T_j | Operating junction temperature range | | | - 40 to + 125 | |

ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$, unless otherwise specified)

■ SNUBBERLESS™ and LOGIC LEVEL (3 Quadrants)

| Symbol | Test Conditions | Quadrant | | T16 | BTA/BTB16 | | | Unit |
|-----------------|---|--------------|------|-------|-----------|-----|------|------------------|
| | | | | T1635 | SW | CW | BW | |
| $I_{GT} (1)$ | $V_D = 12\text{ V}$ $R_L = 33\ \Omega$ | I - II - III | MAX. | 35 | 10 | 35 | 50 | mA |
| V_{GT} | | I - II - III | MAX. | 1.3 | | | | V |
| V_{GD} | $V_D = V_{DRM}$ $R_L = 3.3\ \text{k}\Omega$ $T_j = 125^\circ\text{C}$ | I - II - III | MIN. | 0.2 | | | | V |
| $I_H (2)$ | $I_T = 500\ \text{mA}$ | | MAX. | 35 | 15 | 35 | 50 | mA |
| I_L | $I_G = 1.2 I_{GT}$ | I - III | MAX. | 50 | 25 | 50 | 70 | mA |
| | | II | | 60 | 30 | 60 | 80 | |
| $dV/dt (2)$ | $V_D = 67\% V_{DRM}$ gate open $T_j = 125^\circ\text{C}$ | | MIN. | 500 | 40 | 500 | 1000 | V/ μs |
| $(dI/dt)_c (2)$ | $(dV/dt)_c = 0.1\ \text{V}/\mu\text{s}$ $T_j = 125^\circ\text{C}$ | | MIN. | - | 8.5 | - | - | A/ms |
| | $(dV/dt)_c = 10\ \text{V}/\mu\text{s}$ $T_j = 125^\circ\text{C}$ | | | - | 3.0 | - | - | |
| | Without snubber $T_j = 125^\circ\text{C}$ | | | 8.5 | - | 8.5 | 14 | |

■ STANDARD (4 Quadrants)

| Symbol | Test Conditions | Quadrant | | BTA/BTB16 | | Unit |
|-----------------|---|--------------------|------|-----------|-----------|------------------|
| | | | | C | B | |
| $I_{GT} (1)$ | $V_D = 12\text{ V}$ $R_L = 33\ \Omega$ | I - II - III IV | MAX. | 25 50 | 50 100 | mA |
| V_{GT} | | ALL | MAX. | 1.3 | | V |
| V_{GD} | $V_D = V_{DRM}$ $R_L = 3.3\ \text{k}\Omega$ $T_j = 125^\circ\text{C}$ | ALL | MIN. | 0.2 | | V |
| $I_H (2)$ | $I_T = 500\ \text{mA}$ | | MAX. | 25 | 50 | mA |
| I_L | $I_G = 1.2 I_{GT}$ | I - III - IV | MAX. | 40 | 60 | mA |
| | | II | | 80 | 120 | |
| $dV/dt (2)$ | $V_D = 67\% V_{DRM}$ gate open $T_j = 125^\circ\text{C}$ | | MIN. | 200 | 400 | V/ μs |
| $(dV/dt)_c (2)$ | $(dI/dt)_c = 7\ \text{A}/\text{ms}$ $T_j = 125^\circ\text{C}$ | | MIN. | 5 | 10 | V/ μs |

STATIC CHARACTERISTICS

| Symbol | Test Conditions | | Value | Unit | |
|------------------------|--|---------------------------|-------|------|------------------|
| $V_{TM} (2)$ | $I_{TM} = 22.5\ \text{A}$ $t_p = 380\ \mu\text{s}$ | $T_j = 25^\circ\text{C}$ | MAX. | 1.55 | V |
| $V_{to} (2)$ | Threshold voltage | $T_j = 125^\circ\text{C}$ | MAX. | 0.85 | V |
| $R_d (2)$ | Dynamic resistance | $T_j = 125^\circ\text{C}$ | MAX. | 25 | $\text{m}\Omega$ |
| I_{DRM} I_{RRM} | $V_{DRM} = V_{RRM}$ | $T_j = 25^\circ\text{C}$ | MAX. | 5 | μA |
| | | $T_j = 125^\circ\text{C}$ | | 2 | mA |

Note 1: minimum IGT is guaranteed at 5% of IGT max.

Note 2: for both polarities of A2 referenced to A1

Fig. 1: Maximum power dissipation versus RMS on-state current (full cycle).

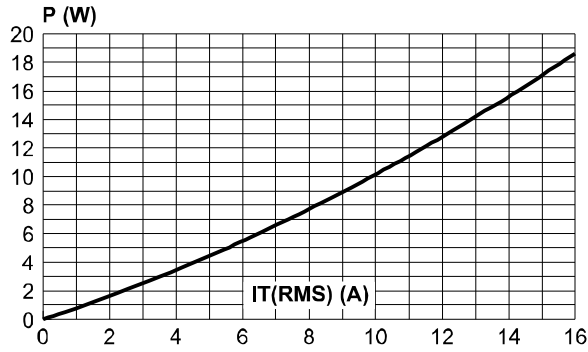


Fig. 2-1: RMS on-state current versus case temperature (full cycle).

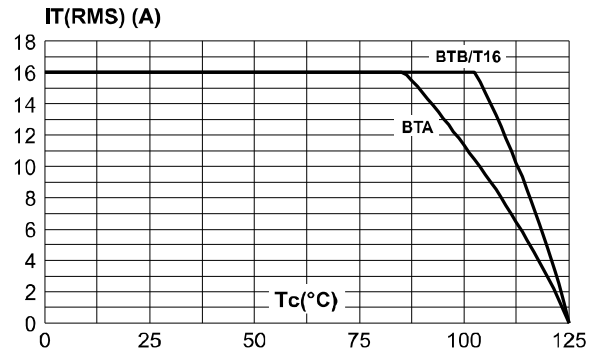


Fig. 2-2: D²PAK RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35 μm), full cycle.

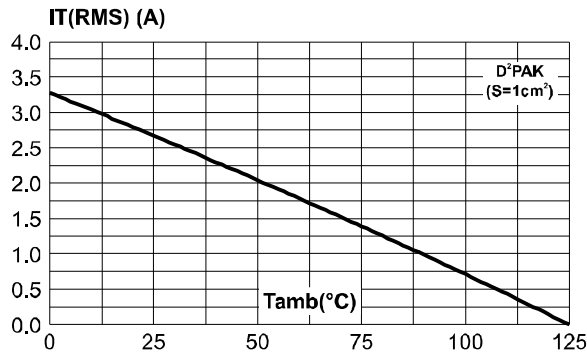
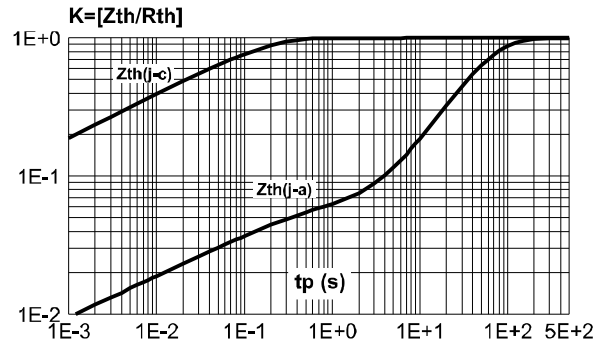


Fig. 3: Relative variation of thermal impedance versus pulse duration.



THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit | |
|----------------------|-----------------------|-----------------------------|--------------------|------|----|
| R _{th(j-c)} | Junction to case (AC) | D ² PAK TO-220AB | 1.2 | °C/W | |
| | | TO-220AB Insulated | 2.1 | | |
| R _{th(j-a)} | Junction to ambient | S = 1 cm ² | D ² PAK | °C/W | |
| | | | TO-220AB | | 45 |
| | | | TO-220AB Insulated | | 60 |

S: Copper surface under tab

PRODUCT SELECTOR

| Part Number | Voltage(XXX) | | | Sensitivity | Type | Package |
|-----------------|--------------|-------|-------|-------------|-------------|--------------------|
| | 600 V | 700 V | 800 V | | | |
| BTA/BTB16-xxxB | X | X | X | 50 mA | Standard | TO-220AB |
| BTA/BTB16-xxxBW | X | X | X | 50 mA | Snubberless | TO-220AB |
| BTA/BTB16-xxxC | X | X | X | 25 mA | Standard | TO-220AB |
| BTA/BTB16-xxxCW | X | X | X | 35 mA | Snubberless | TO-220AB |
| BTA/BTB16-xxxSW | X | X | X | 10 mA | Logic level | TO-220AB |
| T1635-xxxG | X | | X | 35 mA | Snubberless | D ² PAK |

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Fig. 4: On-state characteristics (maximum values)

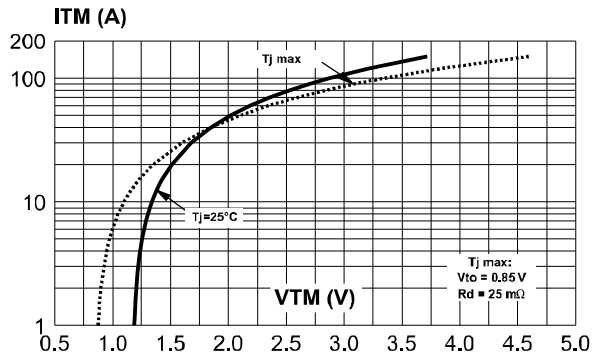


Fig. 5: Surge peak on-state current versus number of cycles.

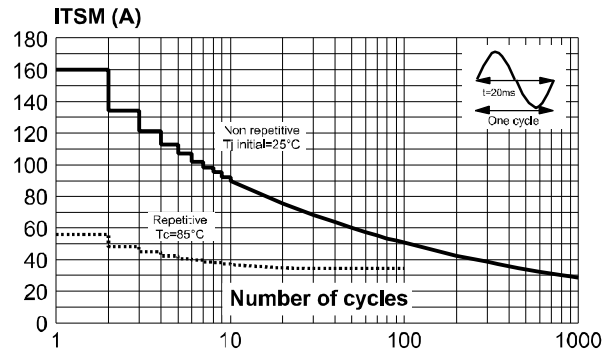


Fig. 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10\text{ms}$, and corresponding value of I^2t .

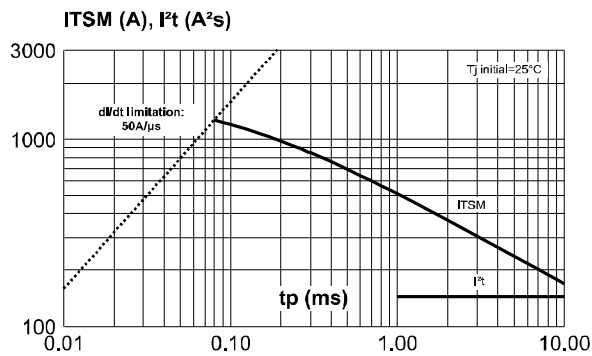


Fig. 7: Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).

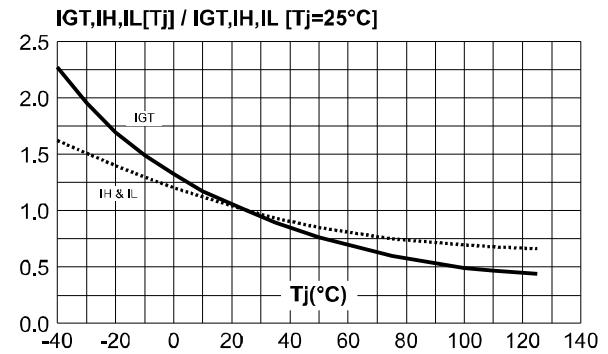


Fig. 8: Relative variation of critical rate of decrease of main current versus $(dV/dt)_c$ (typical values).

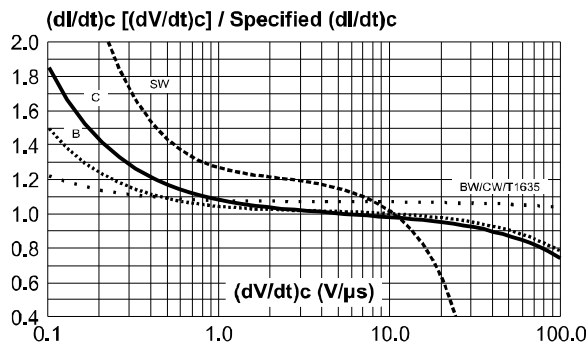


Fig. 9: Relative variation of critical rate of decrease of main current versus junction temperature.

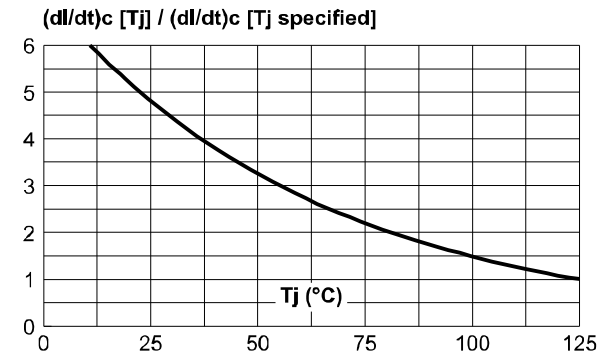
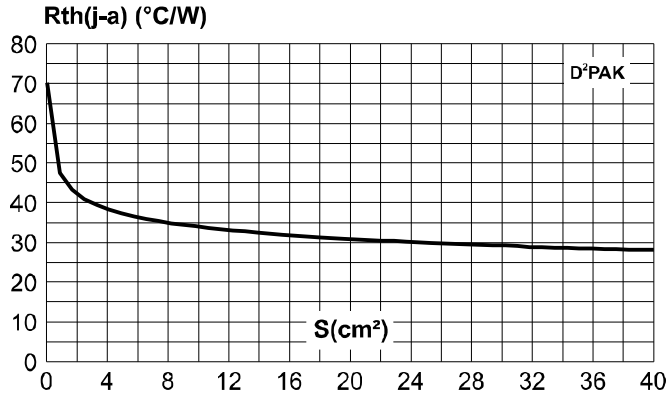
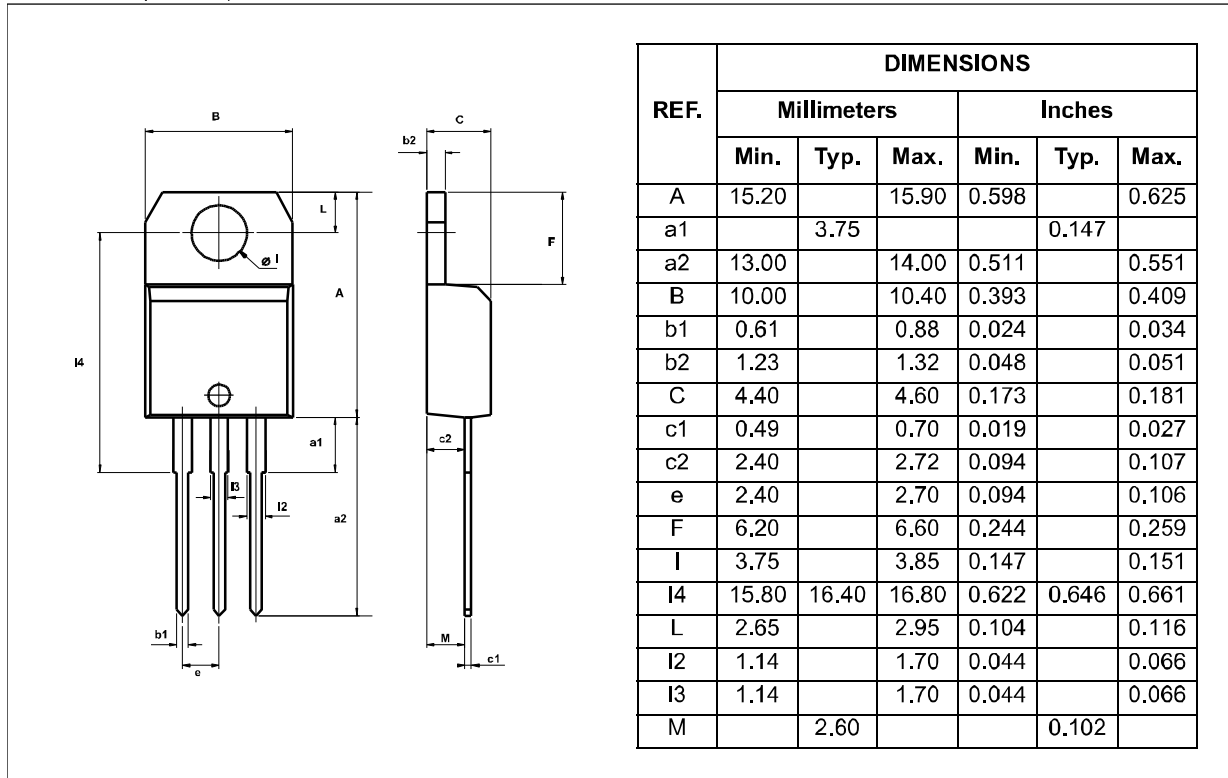


Fig. 10:D²PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 μm).

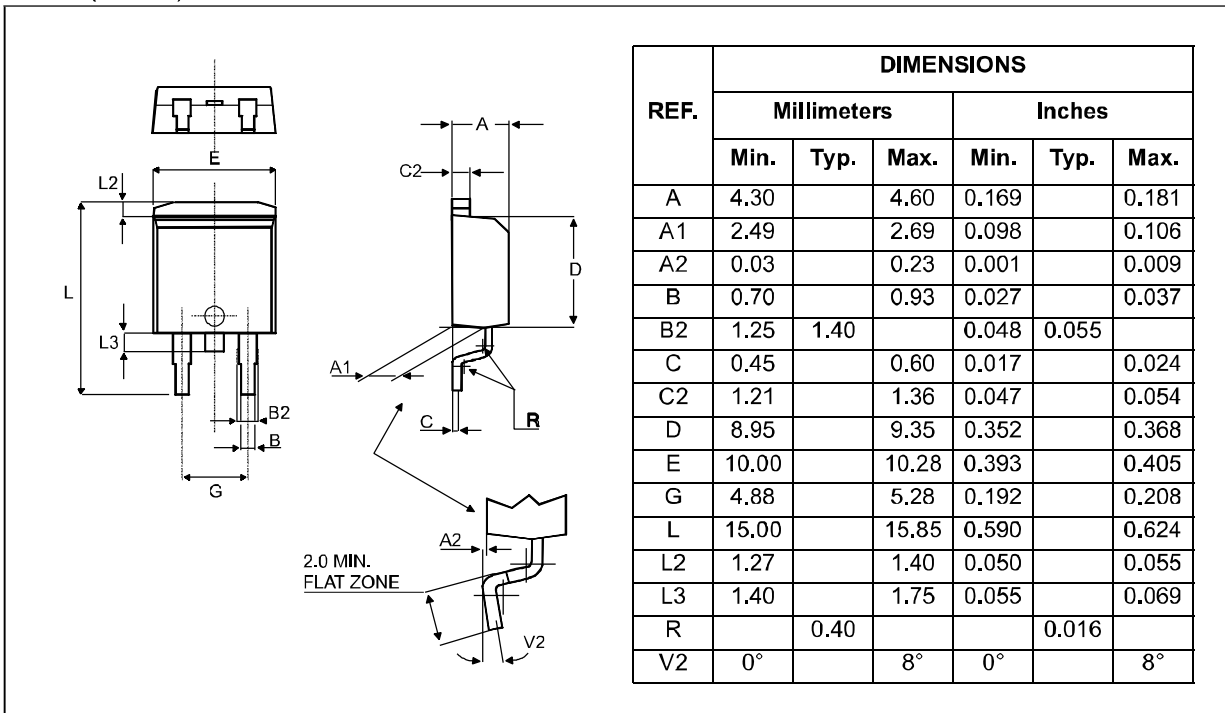


PACKAGE MECHANICAL DATA

TO-220AB (Plastic)



PACKAGE MECHANICAL DATA

 D²PAK (Plastic)


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