



# BTA/BTB08 and T8 Series

SNUBBERLESS™, LOGIC LEVEL & STANDARD

8A TRIACs

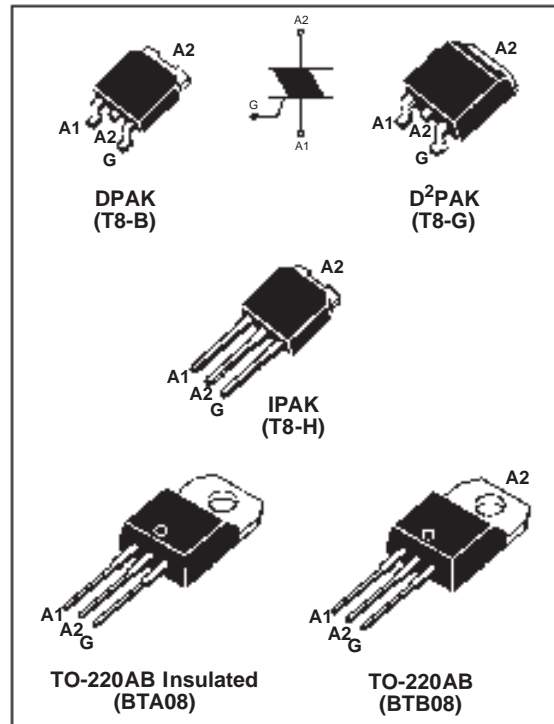
## MAIN FEATURES:

| Symbol            | Value       | Unit |
|-------------------|-------------|------|
| $I_{T(RMS)}$      | 8           | A    |
| $V_{DRM}/V_{RRM}$ | 600 and 800 | V    |
| $I_{GT}(Q_1)$     | 5 to 50     | mA   |

## DESCRIPTION

Available either in through-hole or surface-mount packages, the BTA/BTB08 and T8 triac series is suitable for general purpose AC switching. They can be used as an ON/OFF function in applications such as static relays, heating regulation, induction motor starting circuits... or for phase control operation in light dimmers, motor speed controllers,...

The snubberless versions (BTA/BTB...W and T8 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 (File ref.: E81734)



## ABSOLUTE MAXIMUM RATINGS

| Symbol          | Parameter  |   | Value                          | Unit |
|-----------------|--|---|--------------------------------|------|
| $I_{T(RMS)}$    | RMS on-state current (full sine wave)  | DPAK / D PAK<br>IPAK / TO-220AB<br>Tc = 110°C | 8                              | A    |
|                 |  | TO-220AB Ins.<br>Tc = 100°C                   |                                |      |
| $I_{TSM}$       | Non repetitive surge peak on-state current (full cycle, Tj initial = 25°C)         | F = 50 Hz<br>t = 20 ms                        | 80                             | A    |
|                 |  | F = 60 Hz<br>t = 16.7 ms                      | 84                             |      |
| I t             | I t Value for fusing   | tp = 10 ms                                    | 45                             | A s  |
| di/dt           | Critical rate of rise of on-state current<br>$I_G = 2 \times I_{GT}$ , tr ≤ 100 ns | F = 120 Hz<br>Tj = 125°C                      | 50                             | A/μs |
| $I_{GM}$        | Peak gate current  | tp = 20 μs<br>Tj = 125°C                      | 4                              | A    |
| $P_{G(AV)}$     | Average gate power dissipation   |   | 1                              | W    |
| $T_{stg}$<br>Tj | Storage junction temperature range<br>Operating junction temperature range         |   | - 40 to + 150<br>- 40 to + 125 | °C   |

## BTA/BTB08 and T8 Series

### ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25°C, unless otherwise specified)

#### ■ SNUBBERLESS™ and LOGIC LEVEL (3 Quadrants)

| Symbol                   | Test Conditions   | Quadrant     |      | T8   |      | BTA/BTB08 |     |     |      | Unit |
|--------------------------|---|--------------|------|------|------|-----------|-----|-----|------|------|
|                          |   |              |      | T810 | T835 | TW        | SW  | CW  | BW   |      |
| I <sub>GT</sub> (1)      | V <sub>D</sub> = 12 V R <sub>L</sub> = 30 Ω   | I - II - III | MAX. | 10   | 35   | 5         | 10  | 35  | 50   | mA   |
| V <sub>GT</sub>          |   | I - II - III | MAX. | 1.3  |      |           |     |     |      | V    |
| V <sub>GD</sub>          | V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3 kΩ<br>T <sub>j</sub> = 125°C | I - II - III | MIN. | 0.2  |      |           |     |     |      | V    |
| I <sub>H</sub> (2)       | I <sub>T</sub> = 100 mA   | I - III      | MAX. | 15   | 35   | 10        | 15  | 35  | 50   | mA   |
| I <sub>L</sub>           | I <sub>G</sub> = 1.2 I <sub>GT</sub>  |              | MAX. | 25   | 50   | 10        | 25  | 50  | 70   | mA   |
|                          |   | II           |      | 30   | 60   | 15        | 30  | 60  | 80   |      |
| dV/dt (2)                | V <sub>D</sub> = 67 %V <sub>DRM</sub> gate open<br>T <sub>j</sub> = 125°C           |              | MIN. | 40   | 400  | 20        | 40  | 400 | 1000 | V/μs |
| (dl/dt) <sub>c</sub> (2) | (dV/dt) <sub>c</sub> = 0.1 V/μs T <sub>j</sub> = 125°C                              |              | MIN. | 5.4  | -    | 3.5       | 5.4 | -   | -    | A/ms |
|                          | (dV/dt) <sub>c</sub> = 10 V/μs T <sub>j</sub> = 125°C                               |              |      | 2.8  | -    | 1.5       | 2.8 | -   | -    |      |
|                          | Without snubber T <sub>j</sub> = 125°C  |              |      | -    | 4.5  | -         | -   | 4.5 | 7    |      |

#### ■ STANDARD (4 Quadrants)

| Symbol                   | Test Conditions  | Quadrant           |      | BTA/BTB08 |           | Unit |
|--------------------------|--|--------------------|------|-----------|-----------|------|
|                          |  |                    |      | C         | B         |      |
| I <sub>GT</sub> (1)      | V <sub>D</sub> = 12 V R <sub>L</sub> = 30 Ω                                      | I - II - III<br>IV | MAX. | 25<br>50  | 50<br>100 | mA   |
| V <sub>GT</sub>          |  | ALL                | MAX. | 1.3       |           | V    |
| V <sub>GD</sub>          | V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3 kΩ T <sub>j</sub> = 125°C | ALL                | MIN. | 0.2       |           | V    |
| I <sub>H</sub> (2)       | I <sub>T</sub> = 500 mA  |                    | MAX. | 25        | 50        | mA   |
| I <sub>L</sub>           | I <sub>G</sub> = 1.2 I <sub>GT</sub>   | I - III - IV       | MAX. | 40        | 50        | mA   |
|                          |  | II                 |      | 80        | 100       |      |
| dV/dt (2)                | V <sub>D</sub> = 67 %V <sub>DRM</sub> gate open T <sub>j</sub> = 125°C           |                    | MIN. | 200       | 400       | V/μs |
| (dV/dt) <sub>c</sub> (2) | (dl/dt) <sub>c</sub> = 3.5 A/ms T <sub>j</sub> = 125°C                           |                    | MIN. | 5         | 10        | V/μs |

### STATIC CHARACTERISTICS

| Symbol              | Test Conditions                     |                        | Value | Unit |    |
|---------------------|-------------------------------------|------------------------|-------|------|----|
| V <sub>TM</sub> (2) | I <sub>TM</sub> = 11 A tp = 380 μs  | T <sub>j</sub> = 25°C  | MAX.  | 1.55 | V  |
| V <sub>to</sub> (2) | Threshold voltage                   | T <sub>j</sub> = 125°C | MAX.  | 0.85 | V  |
| R <sub>d</sub> (2)  | Dynamic resistance                  | T <sub>j</sub> = 125°C | MAX.  | 50   | mΩ |
| I <sub>DRM</sub>    | V <sub>DRM</sub> = V <sub>RDM</sub> | T <sub>j</sub> = 25°C  | MAX.  | 5    | μA |
| I <sub>RDM</sub>    |                                     | T <sub>j</sub> = 125°C |       | 1    | mA |

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

**Note 2:** for both polarities of A2 referenced to A1

**THERMAL RESISTANCES**

| Symbol               | Parameter             |            | Value                           | Unit |      |
|----------------------|-----------------------|------------|---------------------------------|------|------|
| R <sub>th(j-c)</sub> | Junction to case (AC) |            | DPAK / D PAK<br>IPAK / TO-220AB | 1.6  | °C/W |
|                      |                       |            | TO-220AB Insulated              | 2.5  |      |
| R <sub>th(j-a)</sub> | Junction to ambient   | S = 1 cm   | D PAK                           | 45   | °C/W |
|                      |                       | S = 0.5 cm | DPAK                            | 70   |      |
|                      |                       |            | TO-220AB<br>TO-220AB Insulated  | 60   |      |
|                      |                       |            | IPAK                            | 100  |      |

S = Copper surface under tab

**PRODUCT SELECTOR**

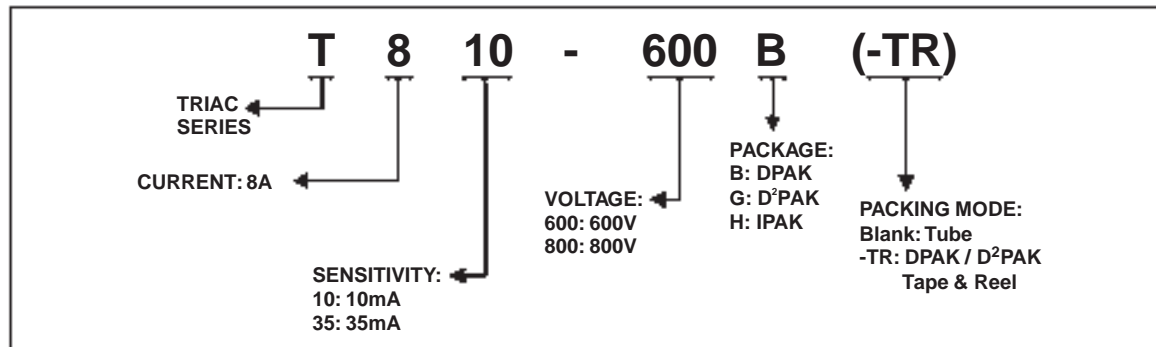
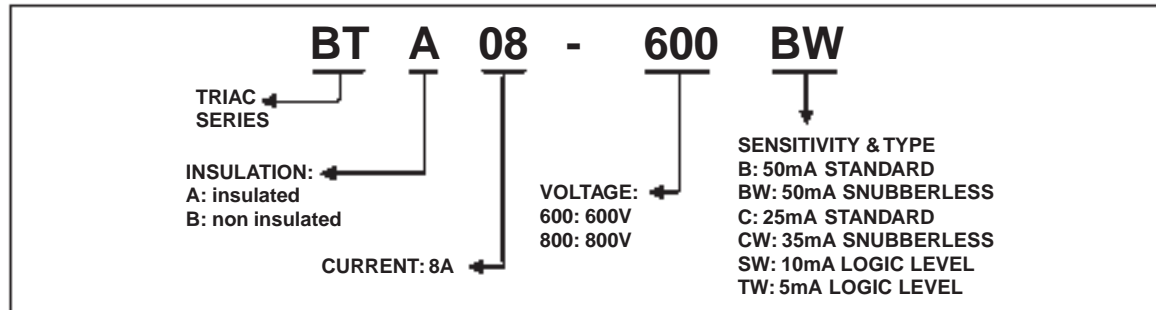
| Part Number      | Voltage (xxx) |       | Sensitivity | Type        | Package  |
|------------------|---------------|-------|-------------|-------------|----------|
|                  | 600 V         | 800 V |             |             |          |
| BTA/BTB08-xxxB   | X             | X     | 50 mA       | Standard    | TO-220AB |
| BTA/BTB108-xxxBW | X             | X     | 50 mA       | Snubberless | TO-220AB |
| BTA/BTB08-xxxC   | X             | X     | 25 mA       | Standard    | TO-220AB |
| BTA/BTB08-xxxCW  | X             | X     | 35 mA       | Snubberless | TO-220AB |
| BTA/BTB08-xxxSW  | X             | X     | 10 mA       | Logic level | TO-220AB |
| BTA/BTB08-xxxTW  | X             | X     | 5 mA        | Logic level | TO-220AB |
| T810-xxxB        | X             | X     | 10 mA       | Logic level | DPAK     |
| T810-xxxH        | X             | X     | 10 mA       | Logic level | IPAK     |
| T835-xxxB        | X             | X     | 35mA        | Snubberless | DPAK     |
| T835-xxxG        | X             | X     | 35 mA       | Snubberless | D PAK    |
| T835-xxxH        | X             | X     | 35 mA       | Snubberless | IPAK     |

BTB: non insulated TO-220AB package



## BTA/BTB08 and T8 Series

### ORDERING INFORMATION

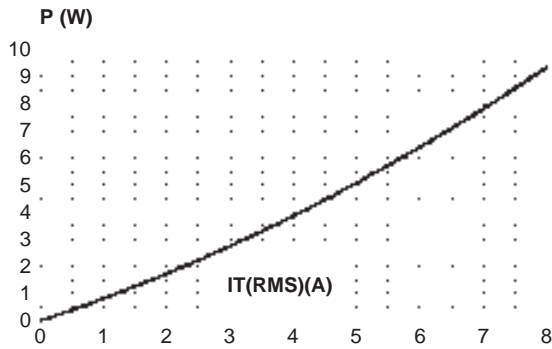


### OTHER INFORMATION

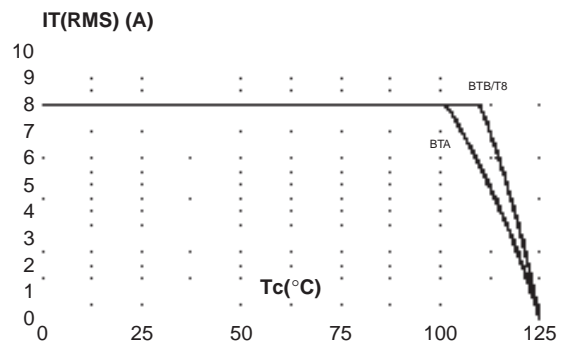
| Part Number      | Marking         | Weight | Base quantity | Packing mode |
|------------------|-----------------|--------|---------------|--------------|
| BTA/BTB08-xxxxyz | BTA/BTB08xxxxyz | 2.3 g  | 250           | Bulk         |
| T8yy-xxxB        | T8yyxxx         | 0.3 g  | 75            | Tube         |
| T8yy-xxxB-TR     | T8yyxxx         | 0.3 g  | 2500          | Tape & reel  |
| T8yy-xxxH        | T8yyxxx         | 0.4 g  | 75            | Tube         |
| T8yy-xxxG        | T8yyxxx         | 1.5 g  | 50            | Tube         |
| T8yy-xxxG-TR     | T8yyxxx         | 1.5 g  | 1000          | Tape & reel  |

**Note:** xxx = voltage, yy = sensitivity, z = type

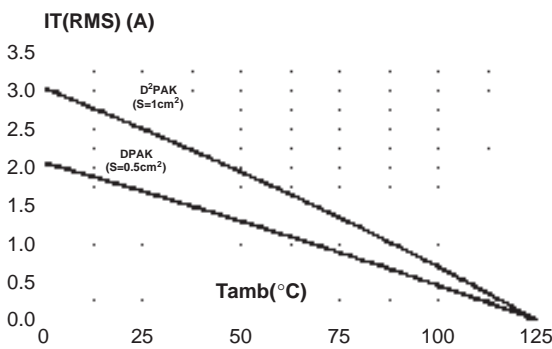
**Fig. 1:** Maximum power dissipation versus RMS on-state current (full cycle).



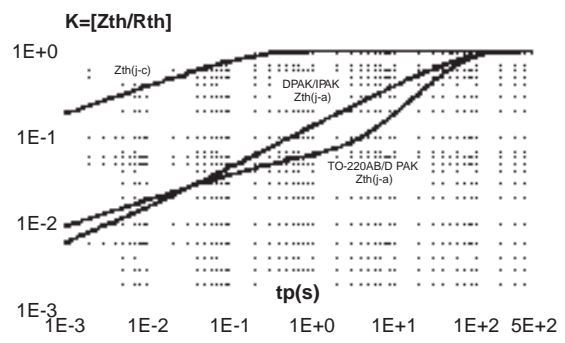
**Fig. 2-1:** RMS on-state current versus case temperature (full cycle).



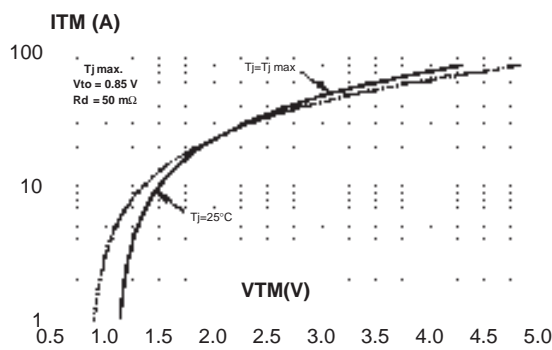
**Fig. 2-2:** RMS on-state current versus ambient temperature (printed circuit board FR4, copper thickness: 35µm), full cycle.



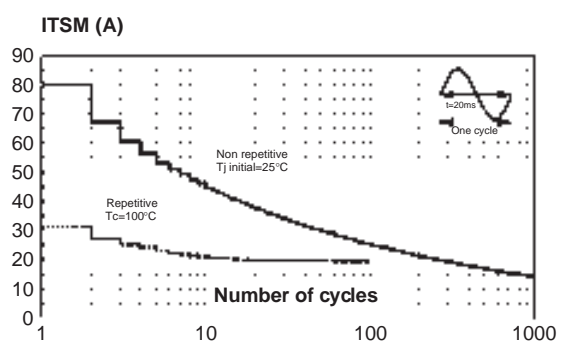
**Fig. 3:** Relative variation of thermal impedance versus pulse duration.



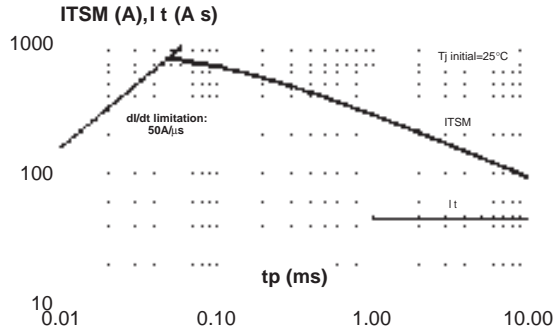
**Fig. 4:** On-state characteristics (maximum values).



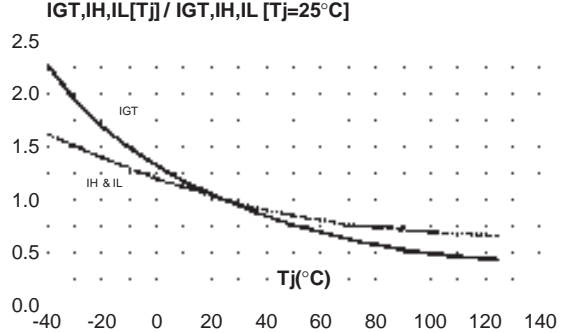
**Fig. 5:** Surge peak on-state current versus number of cycles.



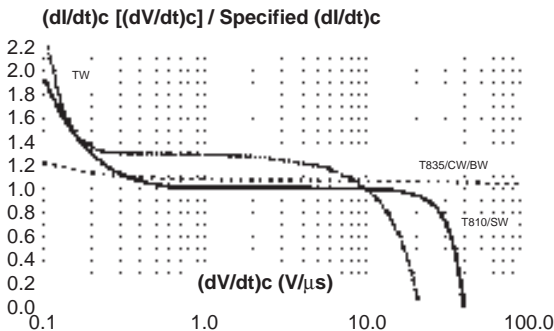
**Fig. 6:** Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10\text{ms}$ , and corresponding value of  $I_t$ .



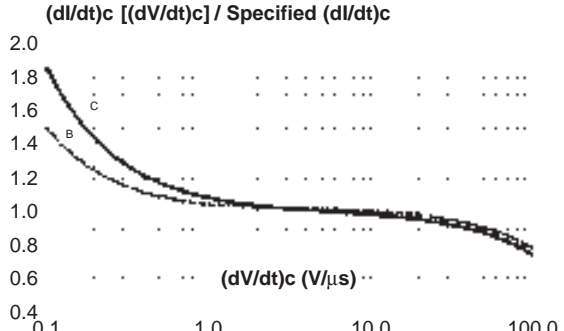
**Fig. 7:** Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values).



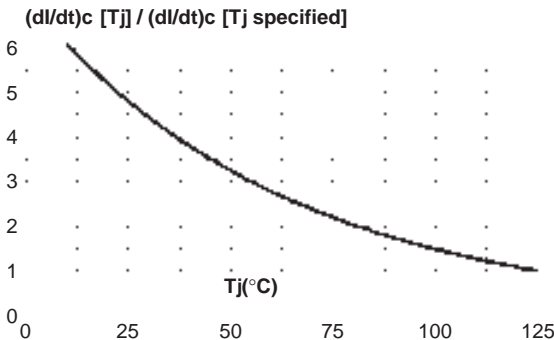
**Fig. 8-1:** Relative variation of critical rate of decrease of main current versus  $(dV/dt)_c$  (typical values). Snubberless & Logic Level Types



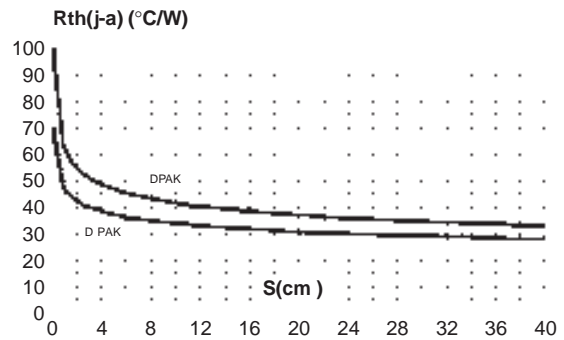
**Fig. 8-2:** Relative variation of critical rate of decrease of main current versus  $(dV/dt)_c$  (typical values). Standard Types



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

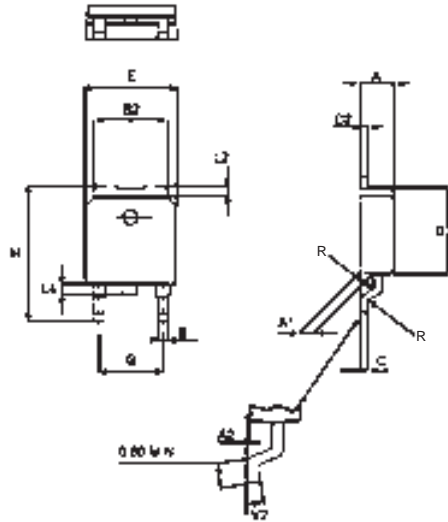


**Fig. 10:** DPAK and D<sup>2</sup>PAK Thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 μm).



**PACKAGE MECHANICAL DATA**

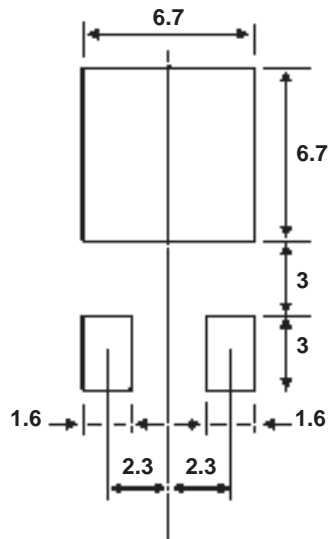
DPAK (Plastic)



| REF. | DIMENSIONS  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max.  | Min.       | Max.  |
| A    | 2.20        | 2.40  | 0.086      | 0.094 |
| A1   | 0.90        | 1.10  | 0.035      | 0.043 |
| A2   | 0.03        | 0.23  | 0.001      | 0.009 |
| B    | 0.64        | 0.90  | 0.025      | 0.035 |
| B2   | 5.20        | 5.40  | 0.204      | 0.212 |
| C    | 0.45        | 0.60  | 0.017      | 0.023 |
| C2   | 0.48        | 0.60  | 0.018      | 0.023 |
| D    | 6.00        | 6.20  | 0.236      | 0.244 |
| E    | 6.40        | 6.60  | 0.251      | 0.259 |
| G    | 4.40        | 4.60  | 0.173      | 0.181 |
| H    | 9.35        | 10.10 | 0.368      | 0.397 |
| L2   | 0.80 typ.   |       | 0.031 typ. |       |
| L4   | 0.60        | 1.00  | 0.023      | 0.039 |
| R    | 0.2 typ.    |       | 0.007 typ. |       |
| V2   | 0°          | 8°    | 0°         | 8°    |

**FOOTPRINT DIMENSIONS (in millimeters)**

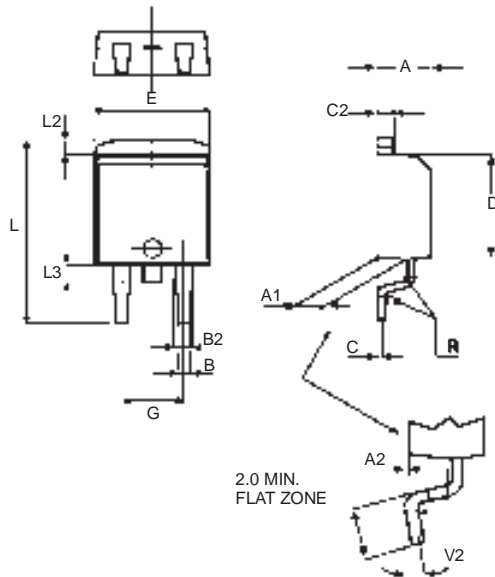
DPAK (Plastic)



## BTA/BTB08 and T8 Series

### PACKAGE MECHANICAL DATA

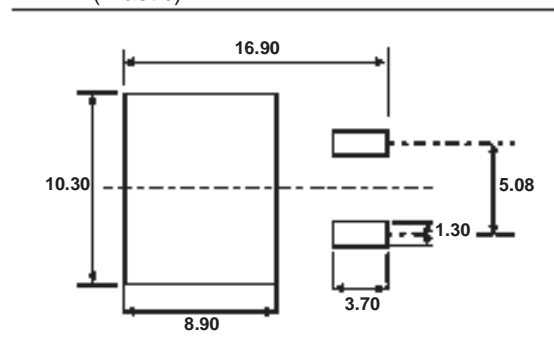
D PAK (Plastic)



| REF. | DIMENSIONS  |      |       |        |       |       |
|------|-------------|------|-------|--------|-------|-------|
|      | Millimeters |      |       | Inches |       |       |
|      | Min.        | Typ. | Max.  | Min.   | Typ.  | Max.  |
| A    | 4.30        |      | 4.60  | 0.169  |       | 0.181 |
| A1   | 2.49        |      | 2.69  | 0.098  |       | 0.106 |
| A2   | 0.03        |      | 0.23  | 0.001  |       | 0.009 |
| B    | 0.70        |      | 0.93  | 0.027  |       | 0.037 |
| B2   | 1.25        | 1.40 |       | 0.048  | 0.055 |       |
| C    | 0.45        |      | 0.60  | 0.017  |       | 0.024 |
| C2   | 1.21        |      | 1.36  | 0.047  |       | 0.054 |
| D    | 8.95        |      | 9.35  | 0.352  |       | 0.368 |
| E    | 10.00       |      | 10.28 | 0.393  |       | 0.405 |
| G    | 4.88        |      | 5.28  | 0.192  |       | 0.208 |
| L    | 15.00       |      | 15.85 | 0.590  |       | 0.624 |
| L2   | 1.27        |      | 1.40  | 0.050  |       | 0.055 |
| L3   | 1.40        |      | 1.75  | 0.055  |       | 0.069 |
| R    |             | 0.40 |       |        | 0.016 |       |
| V2   | 0°          |      | 8°    | 0°     |       | 8°    |

### FOOTPRINT DIMENSIONS (in millimeters)

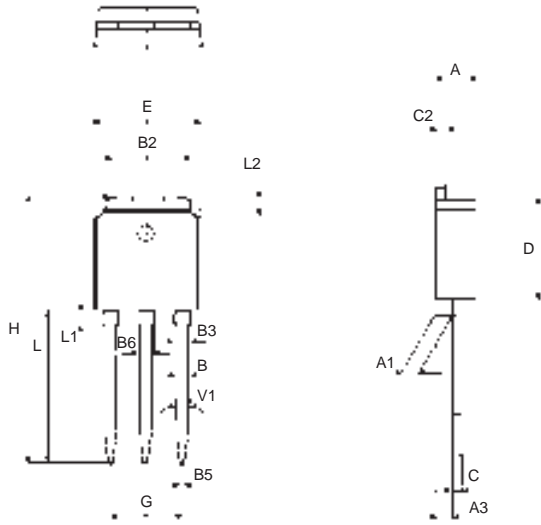
D PAK (Plastic)





**PACKAGE MECHANICAL DATA**

IPAK (Plastic)

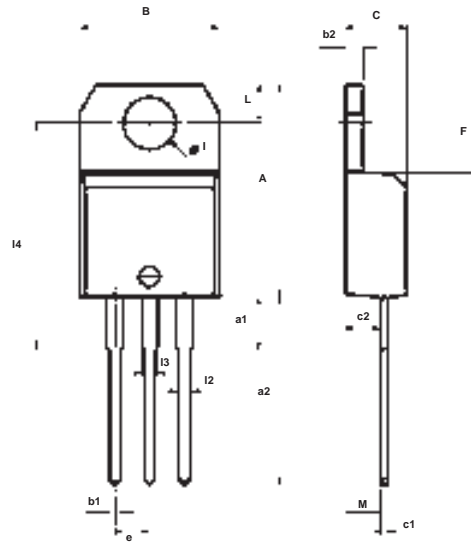


| REF. | DIMENSIONS  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 2.2         |      | 2.4  | 0.086  |       | 0.094 |
| A1   | 0.9         |      | 1.1  | 0.035  |       | 0.043 |
| A3   | 0.7         |      | 1.3  | 0.027  |       | 0.051 |
| B    | 0.64        |      | 0.9  | 0.025  |       | 0.035 |
| B2   | 5.2         |      | 5.4  | 0.204  |       | 0.212 |
| B3   |             |      | 0.85 |        |       | 0.033 |
| B5   |             | 0.3  |      |        | 0.035 |       |
| B6   |             |      | 0.95 |        |       | 0.037 |
| C    | 0.45        |      | 0.6  | 0.017  |       | 0.023 |
| C2   | 0.48        |      | 0.6  | 0.019  |       | 0.023 |
| D    | 6           |      | 6.2  | 0.236  |       | 0.244 |
| E    | 6.4         |      | 6.6  | 0.252  |       | 0.260 |
| G    | 4.4         |      | 4.6  | 0.173  |       | 0.181 |
| H    | 15.9        |      | 16.3 | 0.626  |       | 0.641 |
| L    | 9           |      | 9.4  | 0.354  |       | 0.370 |
| L1   | 0.8         |      | 1.2  | 0.031  |       | 0.047 |
| L2   |             | 0.8  | 1    |        | 0.031 | 0.039 |
| V1   |             | 10°  |      |        | 10°   |       |

## BTA/BTB08 and T8 Series

### PACKAGE MECHANICAL DATA

TO-220AB Ins.



| 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 |
| I    | 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 |       |

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2000 STMicroelectronics - Printed in Italy - All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom

<http://www.st.com>

