

# DATA SHEET

## **BTA225 series B** Three quadrant triacs high commutation

Product specification

September 1997



## Three quadrant triacs high commutation

## BTA225 series B

### GENERAL DESCRIPTION

Glass passivated high commutation triacs in a plastic envelope intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur loads. These devices will commutate the full rated rms current at the maximum rated junction temperature, without the aid of a snubber.

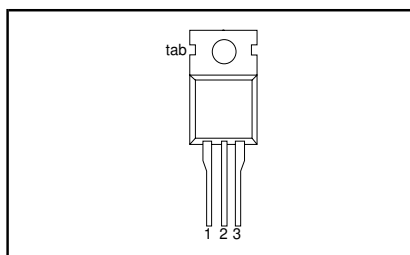
### QUICK REFERENCE DATA

| SYMBOL              | PARAMETER                                            | MAX.               | MAX.               | MAX.               | UNIT |
|---------------------|------------------------------------------------------|--------------------|--------------------|--------------------|------|
| $V_{\text{DRM}}$    | <b>BTA225-</b><br>Repetitive peak off-state voltages | <b>500B</b><br>500 | <b>600B</b><br>600 | <b>800B</b><br>800 | V    |
| $I_{\text{T(RMS)}}$ | RMS on-state current                                 | 25                 | 25                 | 25                 | A    |
| $I_{\text{TSM}}$    | Non-repetitive peak on-state current                 | 190                | 190                | 190                | A    |

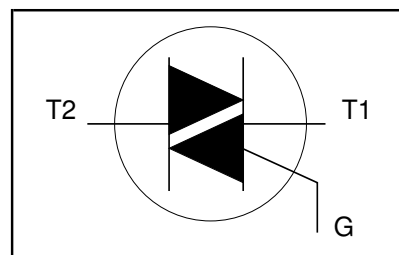
### PINNING - TO220AB

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | main terminal 1 |
| 2   | main terminal 2 |
| 3   | gate            |
| tab | main terminal 2 |

### PIN CONFIGURATION



### SYMBOL



### LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

| SYMBOL              | PARAMETER                                                    | CONDITIONS                                                                                              | MIN. | MAX.             |                  |      | UNIT             |
|---------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------|------------------|------------------|------|------------------|
|                     |                                                              |                                                                                                         |      | -500             | -600             | -800 |                  |
| $V_{\text{DRM}}$    | Repetitive peak off-state voltages                           |                                                                                                         | -    | 600 <sup>1</sup> | 600 <sup>1</sup> | 800  | V                |
| $I_{\text{T(RMS)}}$ | RMS on-state current                                         | full sine wave;<br>$T_{\text{mb}} \leq 91^\circ\text{C}$                                                | -    | 25               |                  |      | A                |
| $I_{\text{TSM}}$    | Non-repetitive peak on-state current                         | full sine wave;<br>$T_j = 25^\circ\text{C}$ prior to surge                                              | -    | 190              |                  |      | A                |
| $I^2t$              | $I^2t$ for fusing                                            | $t = 20\text{ ms}$                                                                                      | -    | 209              |                  |      | A                |
| $dI_T/dt$           | Repetitive rate of rise of on-state current after triggering | $t = 16.7\text{ ms}$                                                                                    | -    | 180              |                  |      | A <sup>2</sup> s |
| $I_{\text{GM}}$     | Peak gate current                                            | $t = 10\text{ ms}$                                                                                      | -    | 100              |                  |      | A/μs             |
| $V_{\text{GM}}$     | Peak gate voltage                                            | $I_{\text{TM}} = 30\text{ A}; I_{\text{G}} = 0.2\text{ A}; dI_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$ | -    | 2                |                  |      | A                |
| $P_{\text{GM}}$     | Peak gate power                                              |                                                                                                         | -    | 5                |                  |      | W                |
| $P_{\text{G(AV)}}$  | Average gate power                                           | over any 20 ms period                                                                                   | -    | 0.5              |                  |      | W                |
| $T_{\text{stg}}$    | Storage temperature                                          |                                                                                                         | -40  | 150              |                  |      | °C               |
| $T_j$               | Operating junction temperature                               |                                                                                                         | -    | 125              |                  |      | °C               |

<sup>1</sup> Although not recommended, off-state voltages up to 800V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 15 A/μs.

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### THERMAL RESISTANCES

| SYMBOL         | PARAMETER                                       | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|----------------|-------------------------------------------------|-------------|------|------|------|------|
| $R_{th\ j-mb}$ | Thermal resistance<br>junction to mounting base | full cycle  | -    | -    | 1.0  | K/W  |
| $R_{th\ j-a}$  | Thermal resistance<br>junction to ambient       | half cycle  | -    | -    | 1.4  | K/W  |
|                |                                                 | in free air | -    | 60   | -    | K/W  |

### STATIC CHARACTERISTICS

$T_j = 25\ ^\circ\text{C}$  unless otherwise stated

| SYMBOL   | PARAMETER                         | CONDITIONS                                                                  | MIN. | TYP. | MAX. | UNIT |
|----------|-----------------------------------|-----------------------------------------------------------------------------|------|------|------|------|
| $I_{GT}$ | Gate trigger current <sup>2</sup> | $V_D = 12\ \text{V}$ ; $I_T = 0.1\ \text{A}$                                |      |      |      |      |
|          |                                   | T2+ G+                                                                      | 2    | 18   | 50   | mA   |
|          |                                   | T2+ G-                                                                      | 2    | 21   | 50   | mA   |
|          |                                   | T2- G-                                                                      | 2    | 34   | 50   | mA   |
| $I_L$    | Latching current                  | $V_D = 12\ \text{V}$ ; $I_{GT} = 0.1\ \text{A}$                             |      |      |      |      |
|          |                                   | T2+ G+                                                                      | -    | 31   | 60   | mA   |
|          |                                   | T2+ G-                                                                      | -    | 34   | 90   | mA   |
|          |                                   | T2- G-                                                                      | -    | 30   | 60   | mA   |
| $I_H$    | Holding current                   | $V_D = 12\ \text{V}$ ; $I_{GT} = 0.1\ \text{A}$                             | -    | 31   | 60   | mA   |
| $V_T$    | On-state voltage                  | $I_T = 30\ \text{A}$                                                        | -    | 1.3  | 1.55 | V    |
| $V_{GT}$ | Gate trigger voltage              | $V_D = 12\ \text{V}$ ; $I_T = 0.1\ \text{A}$                                | -    | 0.7  | 1.5  | V    |
|          |                                   | $V_D = 400\ \text{V}$ ; $I_T = 0.1\ \text{A}$ ; $T_j = 125\ ^\circ\text{C}$ | 0.25 | 0.4  | -    | V    |
| $I_D$    | Off-state leakage current         | $V_D = V_{DRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$                          | -    | 0.1  | 0.5  | mA   |

### DYNAMIC CHARACTERISTICS

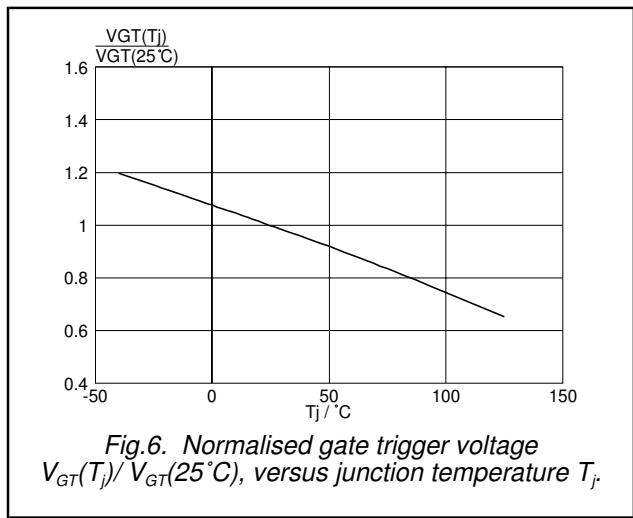
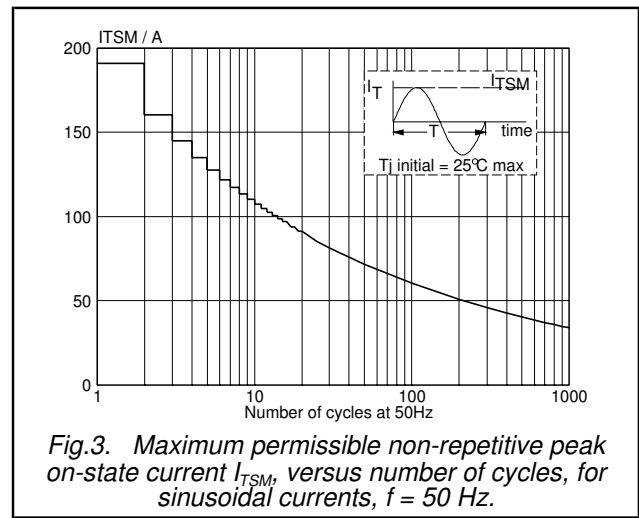
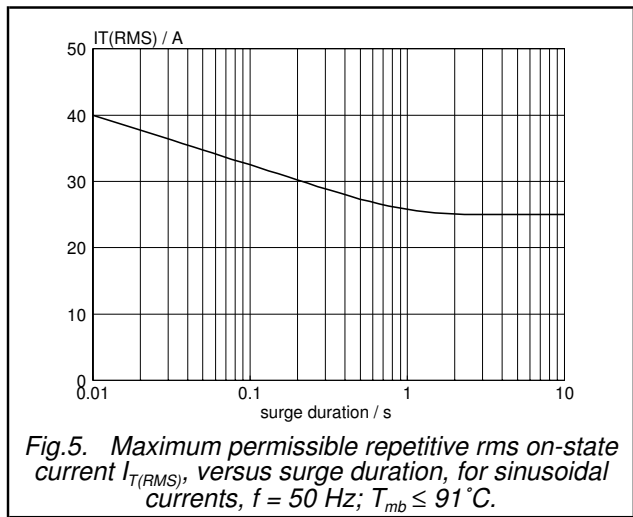
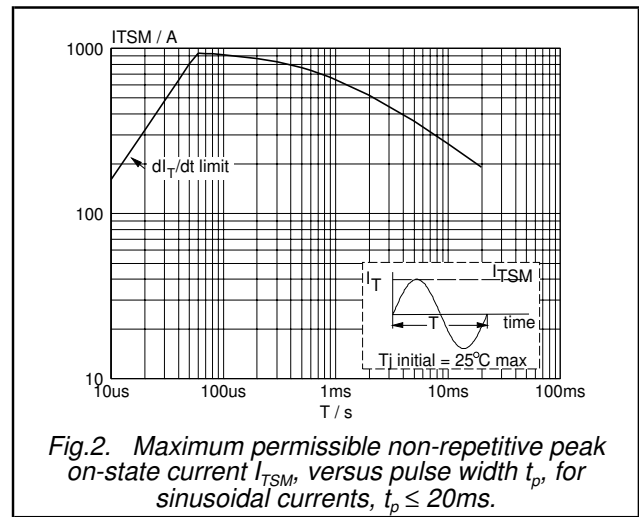
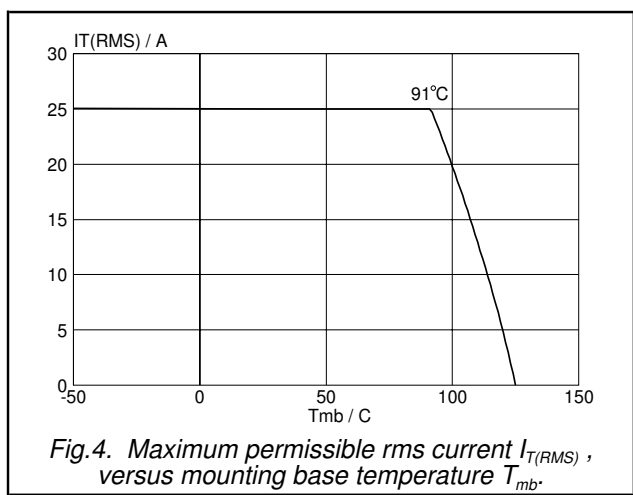
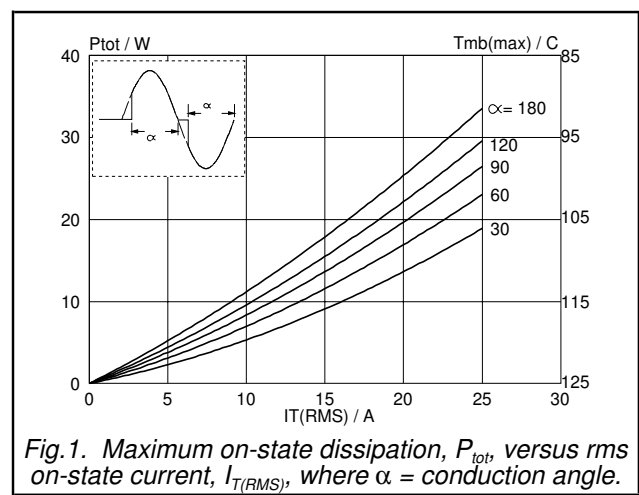
$T_j = 25\ ^\circ\text{C}$  unless otherwise stated

| SYMBOL        | PARAMETER                                         | CONDITIONS                                                                                                                   | MIN. | TYP. | MAX. | UNIT             |
|---------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------|------|------|------------------|
| $dV_D/dt$     | Critical rate of rise of<br>off-state voltage     | $V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$ ;<br>exponential waveform; gate open circuit                      | 1000 | 4000 | -    | V/ $\mu\text{s}$ |
| $di_{com}/dt$ | Critical rate of change of<br>commutating current | $V_{DM} = 400\ \text{V}$ ; $T_j = 125\ ^\circ\text{C}$ ; $I_{T(RMS)} = 25\ \text{A}$ ;<br>without snubber; gate open circuit | -    | 44   | -    | A/ms             |
| $t_{gt}$      | Gate controlled turn-on<br>time                   | $I_{TM} = 30\ \text{A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 0.1\ \text{A}$ ;<br>$di_G/dt = 5\ \text{A}/\mu\text{s}$              | -    | 2    | -    | $\mu\text{s}$    |

<sup>2</sup> Device does not trigger in the T2-, G+ quadrant.

Three quadrant triacs  
high commutation

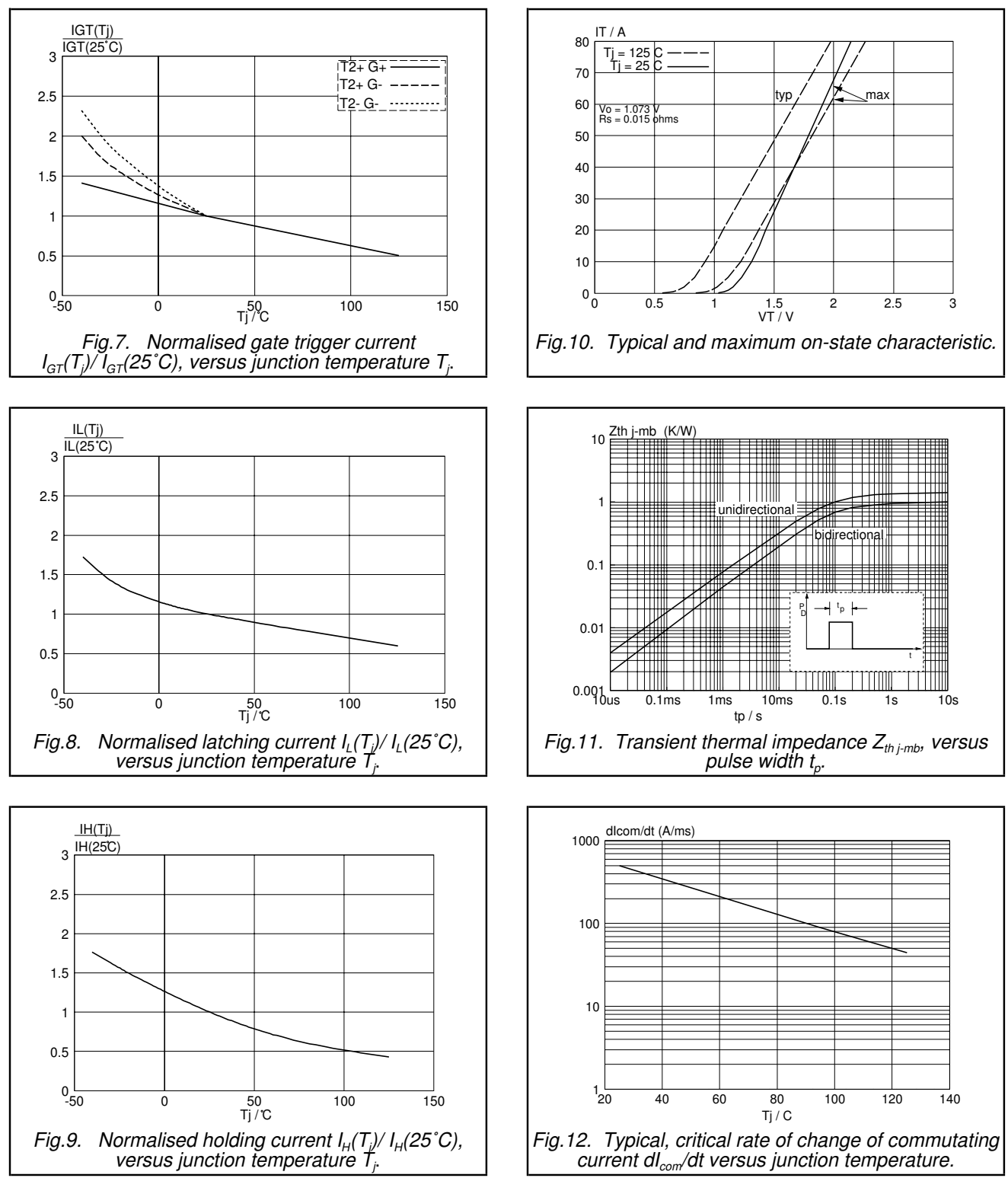
BTA225 series B



Three quadrant triacs

high commutation

BTA225 series B



## Three quadrant triacs high commutation

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## MECHANICAL DATA

*Dimensions in mm*

*Net Mass: 2 g*

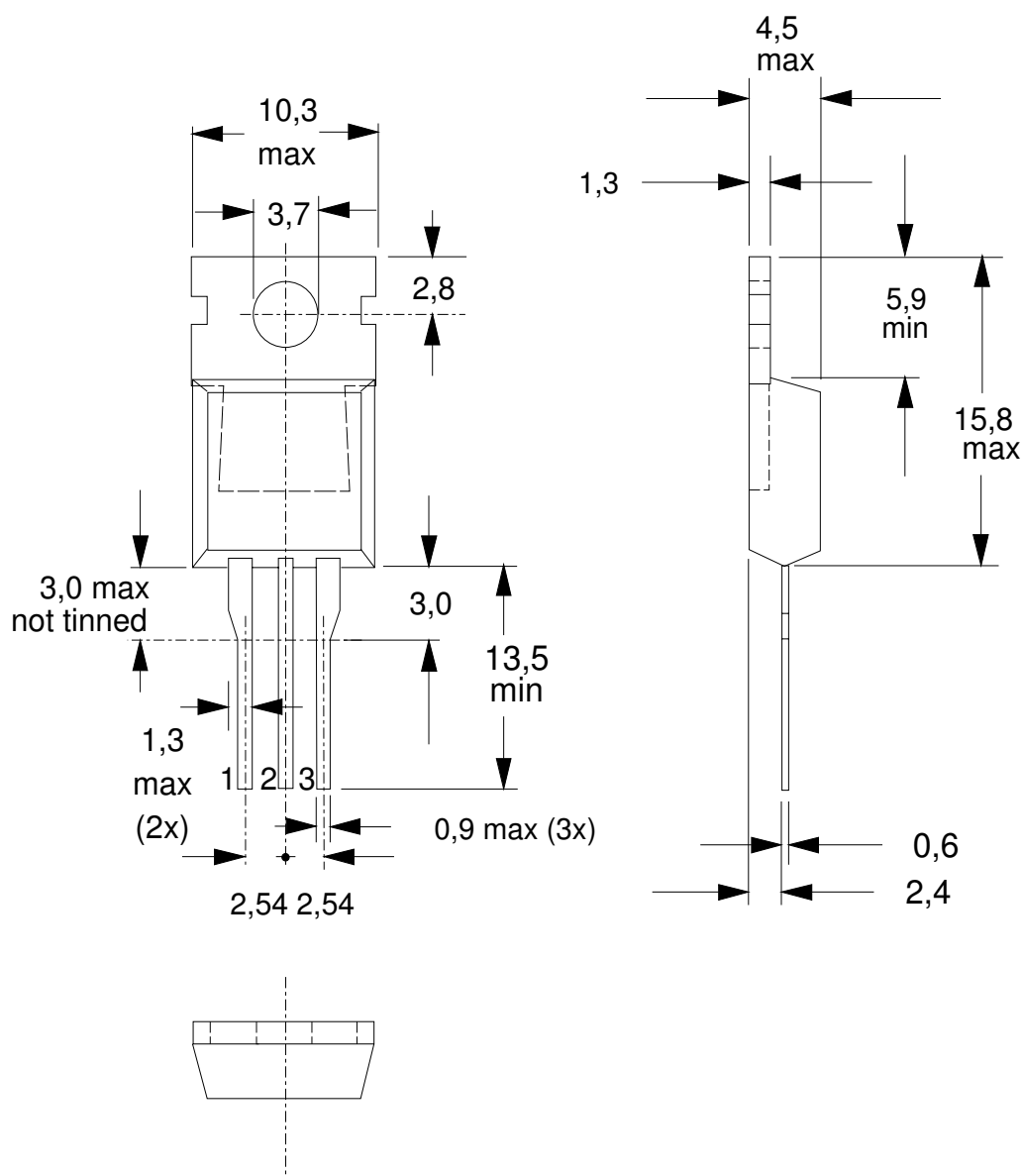


Fig.13. TO220AB; pin 2 connected to mounting base.

## Notes

- Notes**
1. Refer to mounting instructions for TO220 envelopes.
  2. Epoxy meets UL94 V0 at 1/8".

## Legal information

### DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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