

# Thyristors

## logic level

## BT258 series

### GENERAL DESCRIPTION

Passivated, sensitive gate thyristors in a plastic envelope, intended for use in general purpose switching and phase control applications. These devices are intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

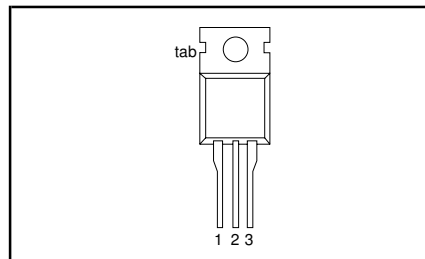
### QUICK REFERENCE DATA

| SYMBOL                | PARAMETER   | MAX.               | MAX.               | MAX.               | UNIT |
|-----------------------|---|--------------------|--------------------|--------------------|------|
| $V_{DRM}$ , $V_{RRM}$ | <b>BT258-</b><br>Repetitive peak off-state voltages | <b>500R</b><br>500 | <b>600R</b><br>600 | <b>800R</b><br>800 | V    |
| $I_{T(AV)}$           | Average on-state current                            | 5                  | 5                  | 5                  | A    |
| $I_{T(RMS)}$          | RMS on-state current                                | 8                  | 8                  | 8                  | A    |
| $I_{TSM}$             | Non-repetitive peak on-state current                | 75                 | 75                 | 75                 | A    |

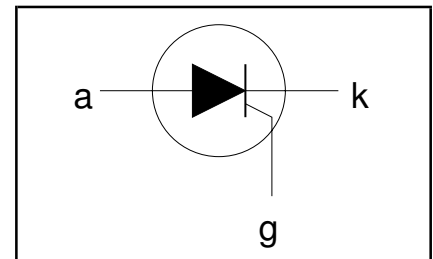
### PINNING - TO220AB

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | cathode     |
| 2   | anode       |
| 3   | gate        |
| tab | anode       |

### PIN CONFIGURATION



### SYMBOL



### LIMITING VALUES

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

| SYMBOL                | PARAMETER  | CONDITIONS  | MIN. | MAX.                             |                                  |                     | UNIT             |
|-----------------------|--|---|------|----------------------------------|----------------------------------|---------------------|------------------|
| $V_{DRM}$ , $V_{RRM}$ | Repetitive peak off-state voltages                           |   | -    | <b>-500R</b><br>500 <sup>1</sup> | <b>-600R</b><br>600 <sup>1</sup> | <b>-800R</b><br>800 | V                |
| $I_{T(AV)}$           | Average on-state current                                     | half sine wave; $T_{mb} \leq 111\text{ °C}$   | -    | 5                                |                                  |                     | A                |
| $I_{T(RMS)}$          | RMS on-state current   | all conduction angles   | -    | 8                                |                                  |                     | A                |
| $I_{TSM}$             | Non-repetitive peak on-state current                         | half sine wave; $T_j = 25\text{ °C}$ prior to surge<br>$t = 10\text{ ms}$                                     | -    | 75                               |                                  |                     | A                |
| $I^2t$                | $I^2t$ for fusing  | $t = 8.3\text{ ms}$   | -    | 82                               |                                  |                     | A                |
| $di_T/dt$             | Repetitive rate of rise of on-state current after triggering | $t = 10\text{ ms}$<br>$I_{TM} = 10\text{ A}$ ; $I_G = 50\text{ mA}$ ;<br>$di_G/dt = 50\text{ mA}/\mu\text{s}$ | -    | 28                               |                                  |                     | A <sup>2</sup> s |
| $I_{GM}$              | Peak gate current  |   | -    | 50                               |                                  |                     | A/ $\mu\text{s}$ |
| $V_{RGM}$             | Peak reverse gate voltage                                    |   | -    | 2                                |                                  |                     | A                |
| $P_{GM}$              | Peak gate power  |   | -    | 5                                |                                  |                     | V                |
| $P_{G(AV)}$           | Average gate power   | over any 20 ms period   | -    | 5                                |                                  |                     | W                |
| $T_{stg}$             | Storage temperature  |   | -40  | 0.5                              |                                  |                     | W                |
| $T_j$                 | Operating junction temperature                               |   | -    | 150                              |                                  |                     | °C               |
|                       |  |   |      | 125 <sup>2</sup>                 |                                  |                     | °C               |

1 Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed 15 A/ $\mu\text{s}$ .

2 Note: Operation above 110°C may require the use of a gate to cathode resistor of 1k $\Omega$  or less.

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### THERMAL RESISTANCES

| SYMBOL         | PARAMETER                                       | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|----------------|---|-------------|------|------|------|------|
| $R_{th\ j-mb}$ | Thermal resistance<br>junction to mounting base | in free air | -    | -    | 2.0  | K/W  |
| $R_{th\ j-a}$  | Thermal resistance<br>junction to ambient       |             | -    | 60   | -    | K/W  |

### STATIC CHARACTERISTICS

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

| SYMBOL     | PARAMETER                 | CONDITIONS  | MIN. | TYP. | MAX. | UNIT          |
|------------|---------------------------|---|------|------|------|---------------|
| $I_{GT}$   | Gate trigger current      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$                          | -    | 50   | 200  | $\mu\text{A}$ |
| $I_L$      | Latching current          | $V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$                       | -    | 0.4  | 10   | mA            |
| $I_H$      | Holding current           | $V_D = 12\text{ V}$ ; $I_{GT} = 0.1\text{ A}$                       | -    | 0.3  | 6    | mA            |
| $V_T$      | On-state voltage          | $I_T = 16\text{ A}$   | -    | 1.3  | 1.6  | V             |
| $V_{GT}$   | Gate trigger voltage      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$                          | -    | 0.4  | 1.5  | V             |
| $I_D, I_R$ | Off-state leakage current | $V_D = V_{DRM(max)}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 110\text{ °C}$ | 0.1  | 0.2  | -    | V             |
|            |                           | $V_D = V_{DRM(max)}$ ; $V_R = V_{RRM(max)}$ ; $T_j = 125\text{ °C}$ | -    | 0.1  | 0.5  | mA            |

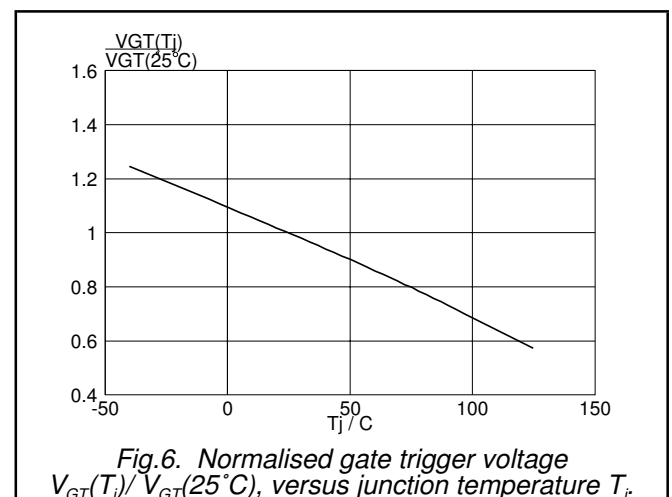
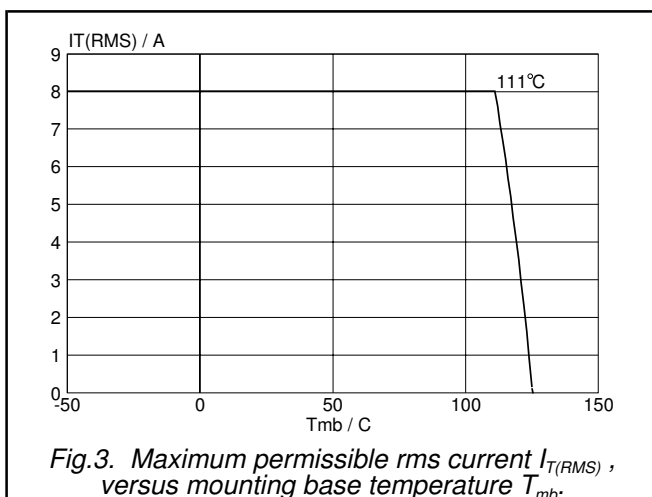
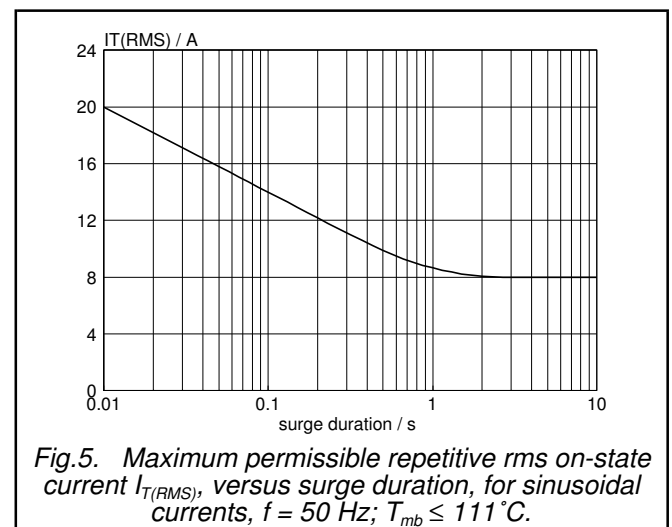
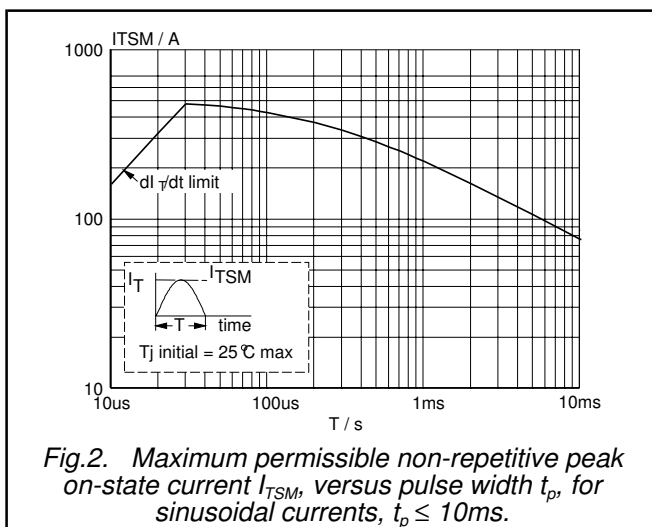
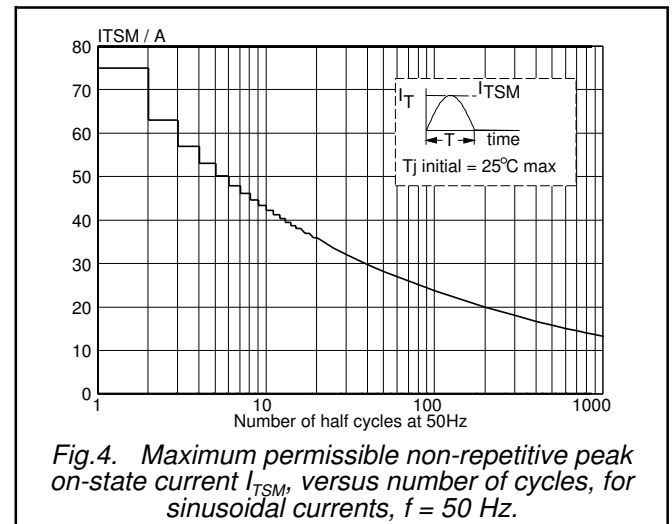
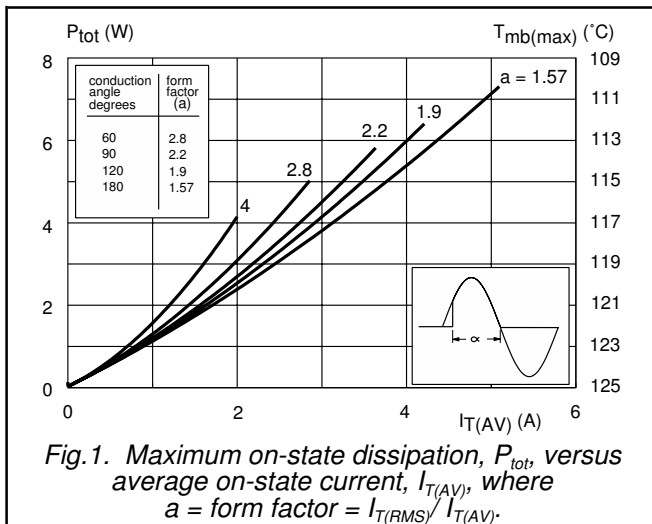
### DYNAMIC CHARACTERISTICS

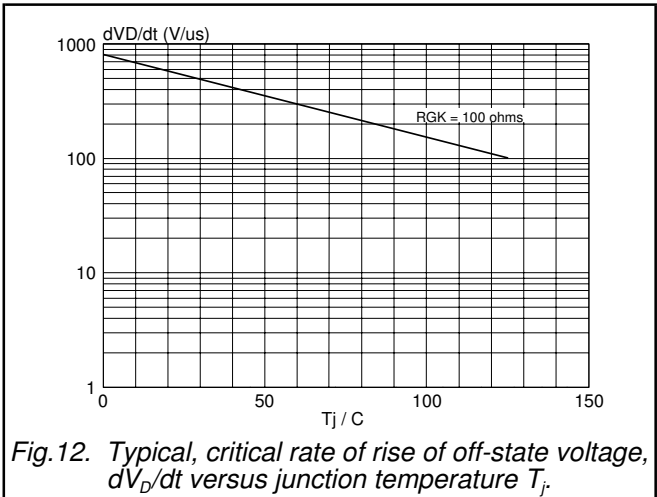
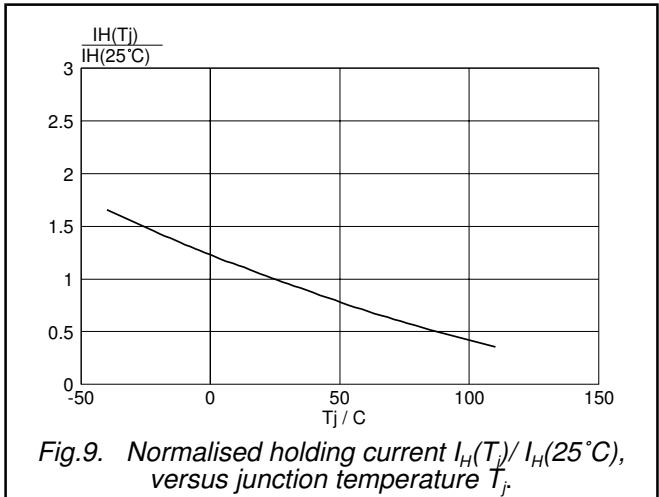
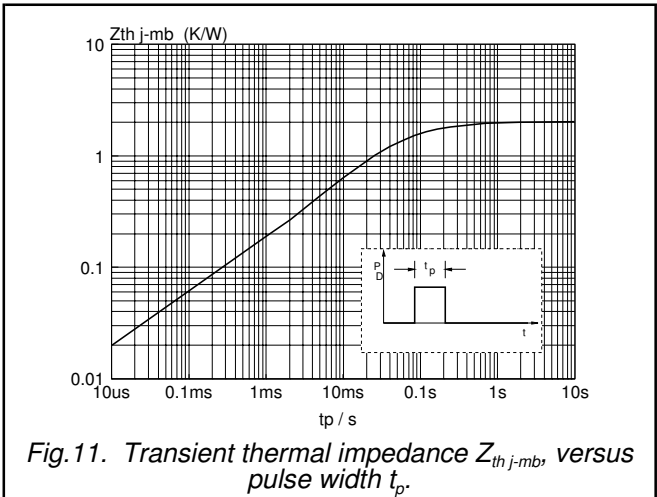
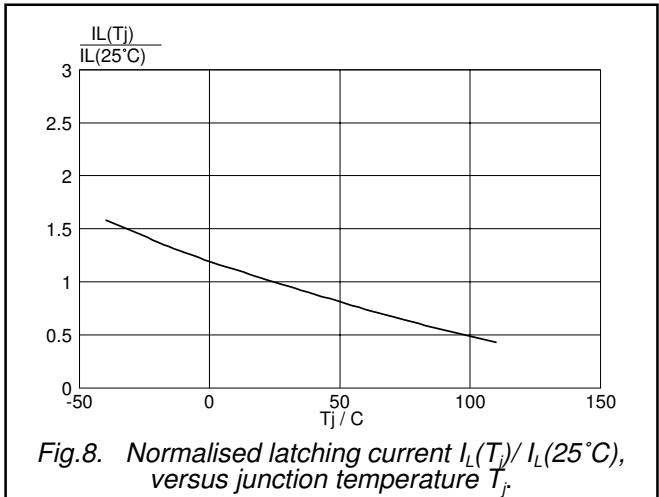
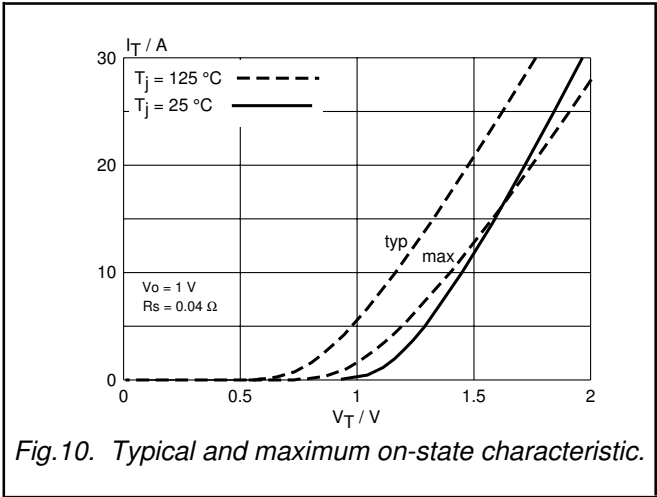
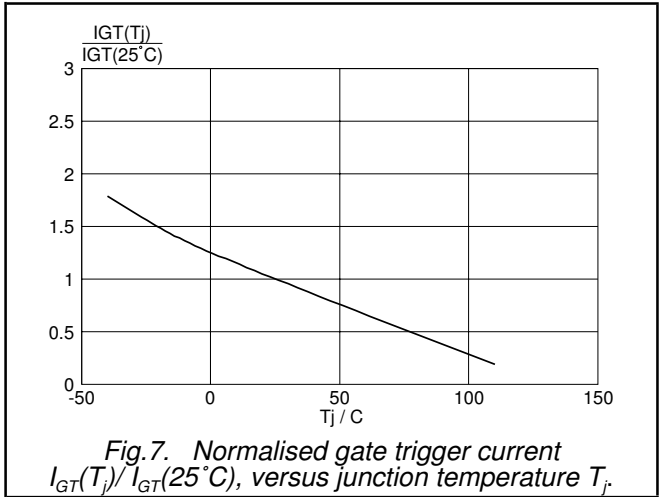
$T_j = 25\text{ °C}$  unless otherwise stated

| SYMBOL    | PARAMETER                                     | CONDITIONS   | MIN. | TYP. | MAX. | UNIT             |
|-----------|---|--|------|------|------|------------------|
| $dV_D/dt$ | Critical rate of rise of<br>off-state voltage | $V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125\text{ °C}$ ;<br>exponential waveform; $R_{GK} = 100\ \Omega$   | 50   | 100  | -    | V/ $\mu\text{s}$ |
| $t_{gt}$  | Gate controlled turn-on<br>time               | $I_{TM} = 10\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 5\text{ mA}$ ;<br>$dI_G/dt = 0.2\text{ A}/\mu\text{s}$  | -    | 2    | -    | $\mu\text{s}$    |
| $t_q$     | Circuit commutated<br>turn-off time           | $V_D = 67\% V_{DRM(max)}$ ; $T_j = 125\text{ °C}$ ;<br>$I_{TM} = 12\text{ A}$ ; $V_R = 24\text{ V}$ ; $dI_{TM}/dt = 10\text{ A}/\mu\text{s}$ ;<br>$dV_D/dt = 2\text{ V}/\mu\text{s}$ ; $R_{GK} = 1\text{ k}\Omega$ | -    | 100  | -    | $\mu\text{s}$    |

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## MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

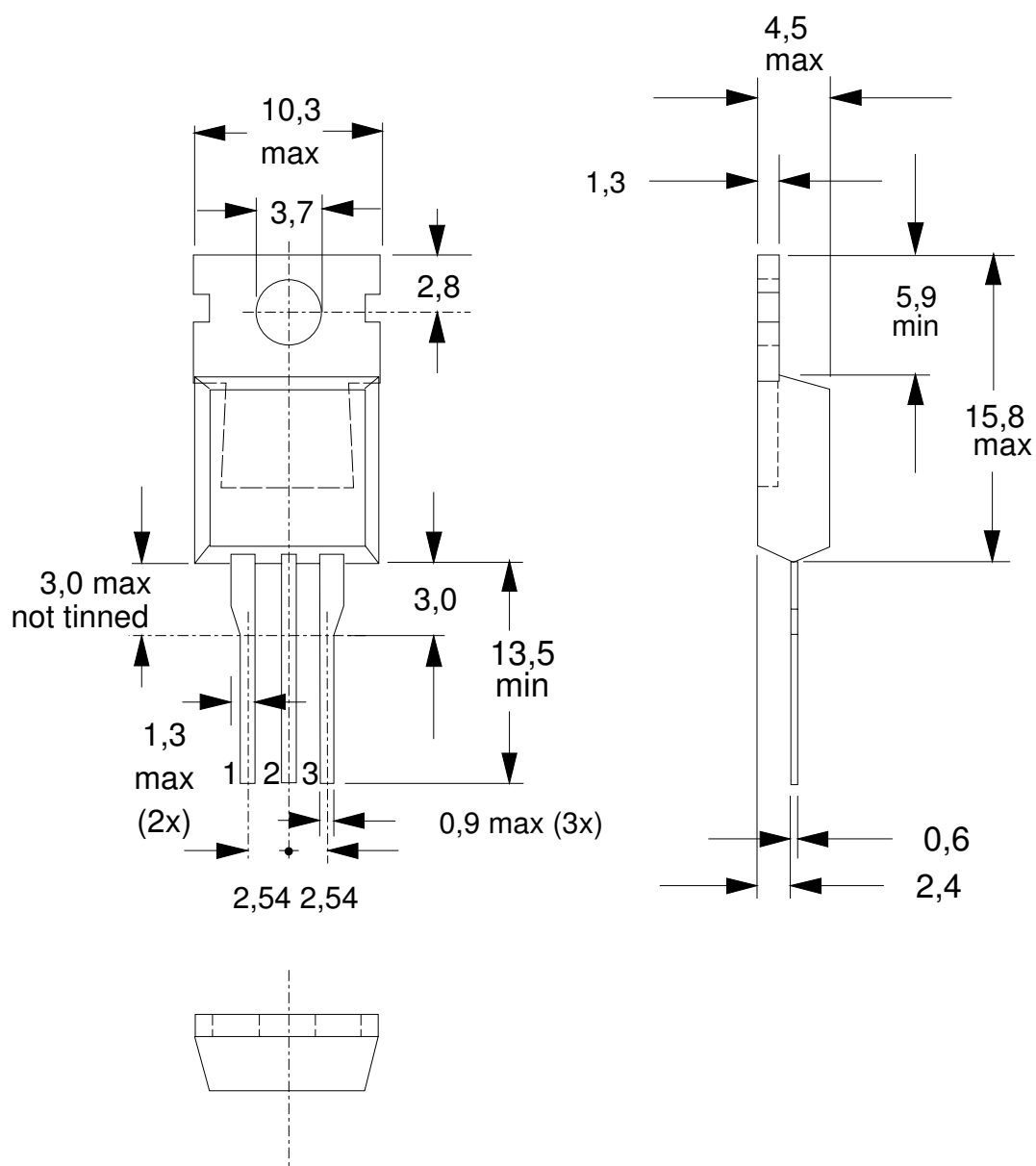


Fig.13. SOT78 (TO220AB). pin 2 connected to mounting base.

## Notes

1. Refer to mounting instructions for SOT78 (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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