

## Triacs

## BT134W series

## GENERAL DESCRIPTION

Glass passivated triacs in a plastic envelope suitable for surface mounting, intended for use in applications requiring high bidirectional transient and blocking voltage capability and high thermal cycling performance. Typical applications include motor control, industrial and domestic lighting, heating and static switching.

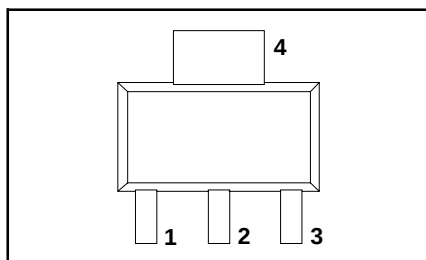
## QUICK REFERENCE DATA

| SYMBOL              | PARAMETER                            | MAX.                | MAX.                | MAX.                | UNIT |
|---------------------|--------------------------------------|---------------------|---------------------|---------------------|------|
| $V_{\text{DRM}}$    | Repetitive peak off-state voltages   | 500<br>500F<br>500G | 600<br>600F<br>600G | 800<br>800F<br>800G | V    |
| $I_{\text{T(RMS)}}$ | RMS on-state current                 | 1                   | 1                   | 1                   | A    |
| $I_{\text{TSM}}$    | Non-repetitive peak on-state current | 10                  | 10                  | 10                  | A    |

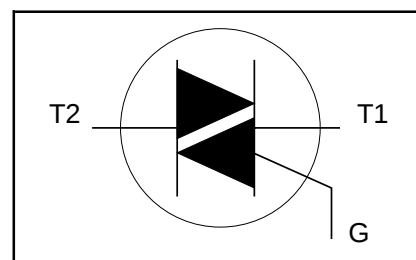
## PINNING - SOT223

| 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             |
|---------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------|-------------|------------------|
| $V_{\text{DRM}}$    | Repetitive peak off-state voltages                           |                                                                                                                   | -    | -500<br>500 <sup>1</sup> | -600<br>600 <sup>1</sup> | -800<br>800 | V                |
| $I_{\text{T(RMS)}}$ | RMS on-state current                                         | full sine wave; $T_{\text{sp}} \leq 108^\circ\text{C}$                                                            | -    | 1                        |                          |             | A                |
| $I_{\text{TSM}}$    | Non-repetitive peak on-state current                         | full sine wave; $T_{\text{j}} = 25^\circ\text{C}$ prior to surge                                                  | -    | 10                       |                          |             | A                |
|                     |                                                              | $t = 20\text{ ms}$                                                                                                | -    | 11                       |                          |             | A                |
|                     |                                                              | $t = 16.7\text{ ms}$                                                                                              | -    | 0.5                      |                          |             | A <sup>2</sup> s |
| $I^2t$              | $I^2t$ for fusing                                            | $t = 10\text{ ms}$                                                                                                | -    | 50                       |                          |             | A/μs             |
| $di_{\text{T}}/dt$  | Repetitive rate of rise of on-state current after triggering | $I_{\text{TM}} = 1.5\text{ A}$ ; $I_{\text{G}} = 0.2\text{ A}$ ;<br>$di_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$ | -    | 50                       |                          |             | A/μs             |
|                     |                                                              | T2+ G+                                                                                                            | -    | 50                       |                          |             | A/μs             |
|                     |                                                              | T2+ G-                                                                                                            | -    | 50                       |                          |             | A/μs             |
|                     |                                                              | T2- G-                                                                                                            | -    | 10                       |                          |             | A/μs             |
|                     |                                                              | T2- G+                                                                                                            | -    | 2                        |                          |             | A                |
| $I_{\text{GM}}$     | Peak gate current                                            |                                                                                                                   | -    | 5                        |                          |             | V                |
| $V_{\text{GM}}$     | Peak gate voltage                                            |                                                                                                                   | -    | 5                        |                          |             | W                |
| $P_{\text{GM}}$     | Peak gate power                                              |                                                                                                                   | -    | 0.5                      |                          |             | W                |
| $P_{\text{G(AV)}}$  | Average gate power                                           | over any 20 ms period                                                                                             | -    | 150                      |                          |             | °C               |
| $T_{\text{stg}}$    | Storage temperature                                          |                                                                                                                   | -40  | 125                      |                          |             | °C               |
| $T_{\text{j}}$      | Operating junction temperature                               |                                                                                                                   | -    |                          |                          |             | °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 3 A/μs.

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## THERMAL RESISTANCES

| SYMBOL         | PARAMETER                                      | CONDITIONS                                                           | MIN.   | TYP.      | MAX.   | UNIT       |
|----------------|------------------------------------------------|----------------------------------------------------------------------|--------|-----------|--------|------------|
| $R_{th\ j-sp}$ | Thermal resistance<br>junction to solder point | full or half cycle                                                   | -      | -         | 15     | K/W        |
| $R_{th\ j-a}$  | Thermal resistance<br>junction to ambient      | pcb mounted; minimum footprint<br>pcb mounted; pad area as in fig:14 | -<br>- | 156<br>70 | -<br>- | K/W<br>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      | <b>BT134W-</b><br>$V_D = 12\text{ V}; I_T = 0.1\text{ A}$                |      |      | ...  | ...F | ...G |      |
|          |                           | T2+ G+                                                                   | -    | 5    | 35   | 25   | 50   | mA   |
|          |                           | T2+ G-                                                                   | -    | 8    | 35   | 25   | 50   | mA   |
|          |                           | T2- G-                                                                   | -    | 11   | 35   | 25   | 50   | mA   |
| $I_L$    | Latching current          | $V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$                               |      |      |      |      |      |      |
|          |                           | T2- G+                                                                   | -    | 30   | 70   | 70   | 100  | mA   |
|          |                           | T2+ G+                                                                   | -    | 7    | 20   | 20   | 30   | mA   |
|          |                           | T2+ G-                                                                   | -    | 16   | 30   | 30   | 45   | mA   |
| $I_H$    | Holding current           | $V_D = 12\text{ V}; I_{GT} = 0.1\text{ A}$                               |      |      |      |      |      |      |
|          |                           | T2- G-                                                                   | -    | 5    | 20   | 20   | 30   | mA   |
|          |                           | T2- G+                                                                   | -    | 7    | 30   | 30   | 45   | mA   |
|          |                           |                                                                          | -    | 5    | 15   | 15   | 30   | mA   |
| $V_T$    | On-state voltage          | $I_T = 2\text{ A}$                                                       | -    | 1.2  | 1.50 |      |      | V    |
| $V_{GT}$ | Gate trigger voltage      | $V_D = 12\text{ V}; I_T = 0.1\text{ A}$                                  | -    | 0.7  | 1.5  |      |      | V    |
|          |                           | $V_D = 400\text{ V}; I_T = 0.1\text{ A};$<br>$T_j = 125\ ^\circ\text{C}$ | 0.25 | 0.4  | -    |      |      | V    |
| $I_D$    | Off-state leakage current | $V_D = V_{DRM(max)};$<br>$T_j = 125\ ^\circ\text{C}$                     | -    | 0.1  | 0.5  |      |      | mA   |

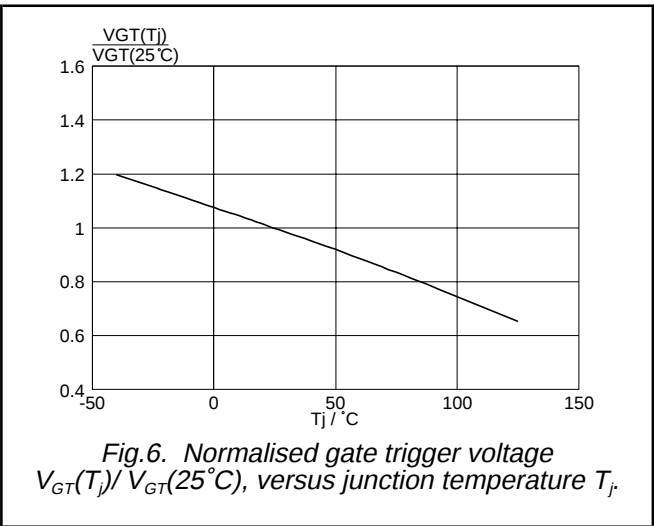
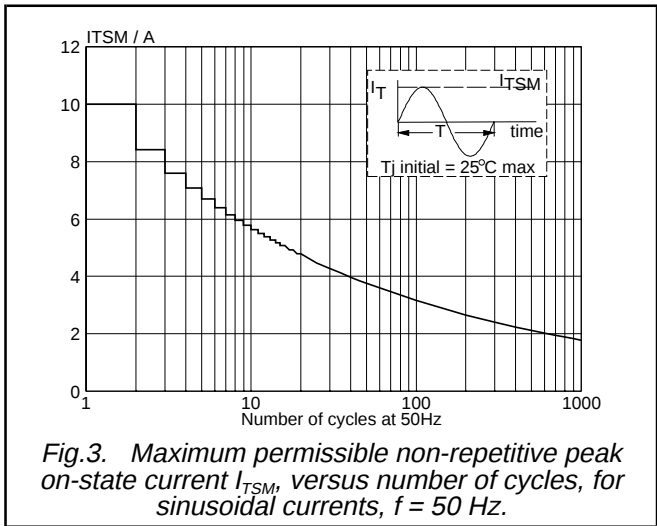
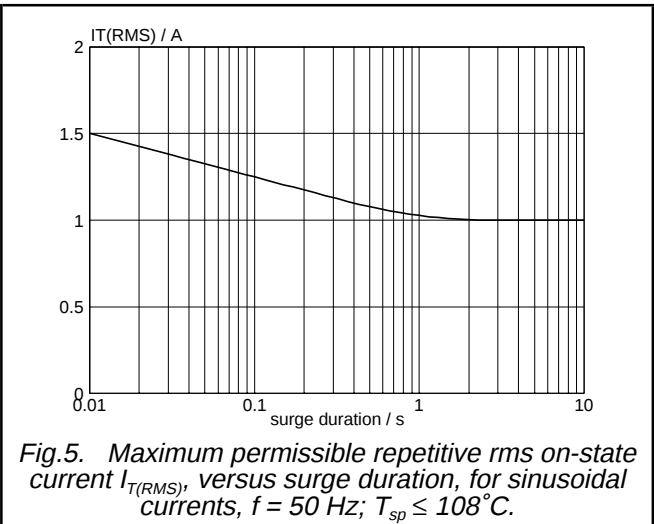
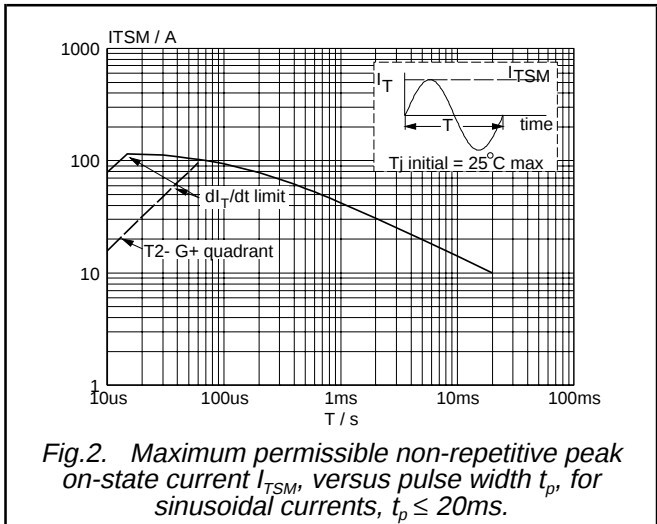
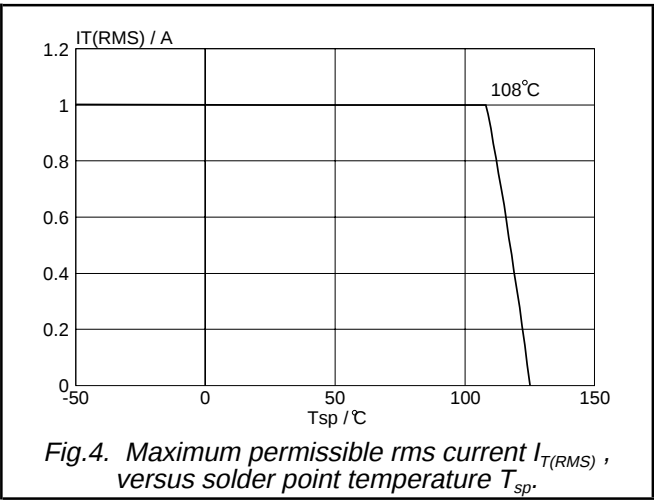
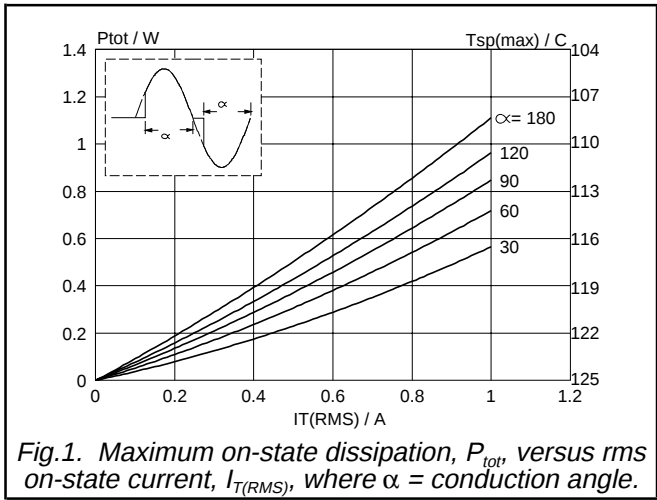
## DYNAMIC CHARACTERISTICS

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

| SYMBOL        | PARAMETER                                         | CONDITIONS                                                                                                                                | MIN. |      |      | TYP. | MAX. | UNIT             |
|---------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------------------|
| $dV_D/dt$     | Critical rate of rise of<br>off-state voltage     | <b>BT134W-</b><br>$V_{DM} = 67\% V_{DRM(max)};$<br>$T_j = 125\ ^\circ\text{C};$ exponential<br>waveform; gate open<br>circuit             | ...  | ...F | ...G | 250  | -    | V/ $\mu\text{s}$ |
| $dV_{com}/dt$ | Critical rate of change of<br>commutating voltage | $V_{DM} = 400\text{ V}; T_j = 95\ ^\circ\text{C};$<br>$I_{T(RMS)} = 1\text{ A};$<br>$di_{com}/dt = 1.8\text{ A/ms};$ gate<br>open circuit | -    | -    | 10   | 50   | -    | V/ $\mu\text{s}$ |
| $t_{gt}$      | Gate controlled turn-on<br>time                   | $I_{TM} = 1.5\text{ A};$<br>$V_D = V_{DRM(max)}; I_G = 0.1\text{ A};$<br>$di_G/dt = 5\text{ A}/\mu\text{s};$                              | -    | -    | -    | 2    | -    | $\mu\text{s}$    |

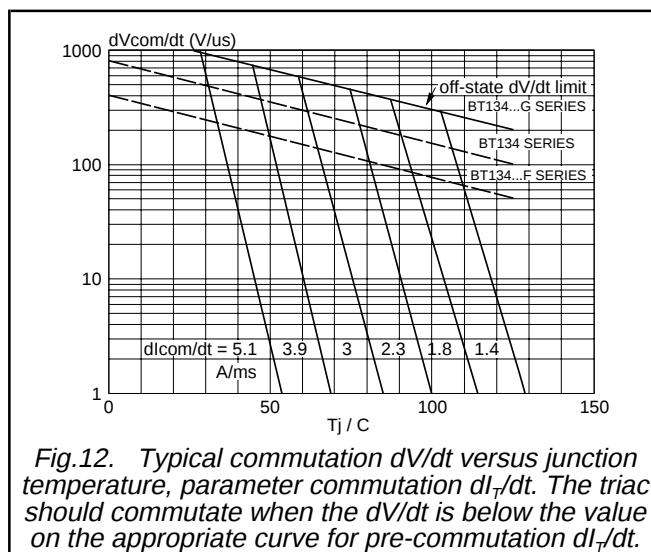
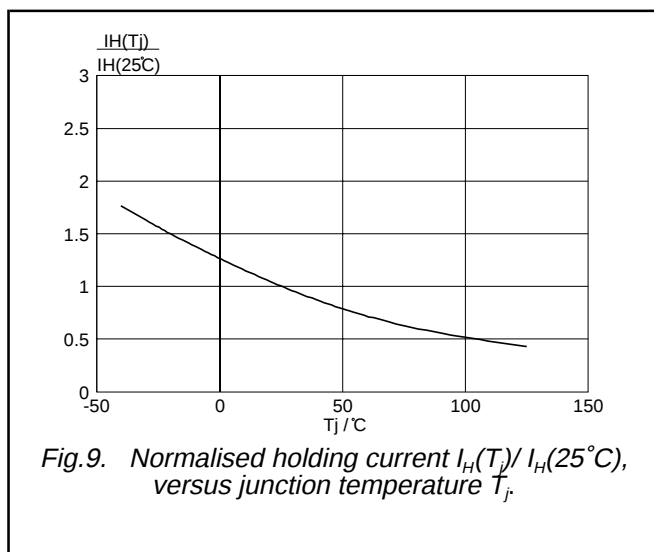
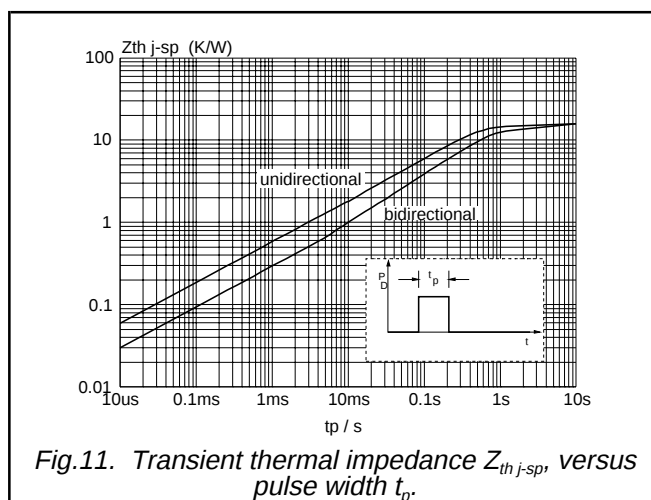
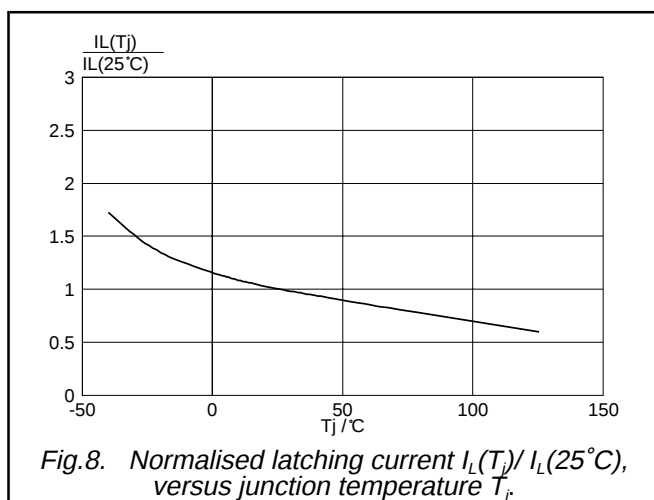
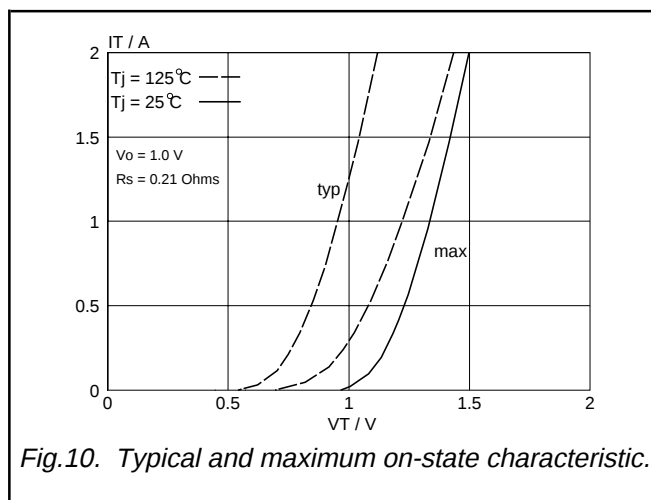
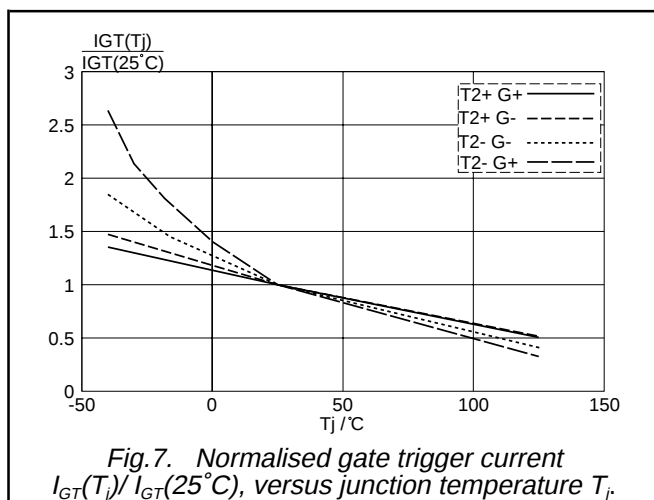
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## MOUNTING INSTRUCTIONS

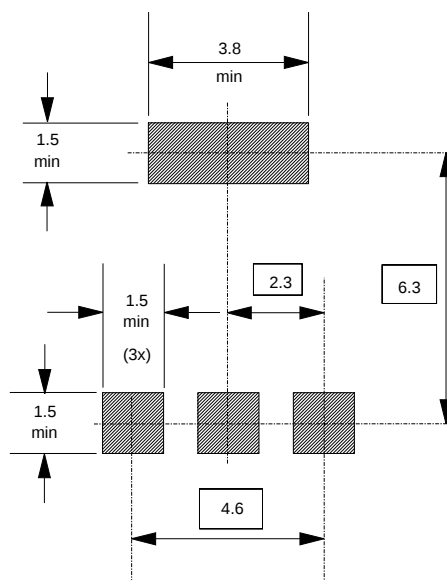
*Dimensions in mm.*

Fig.13. soldering pattern for surface mounting SOT223.

## PRINTED CIRCUIT BOARD

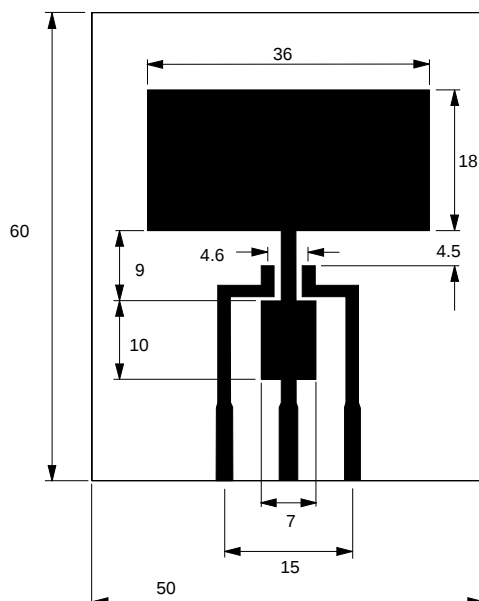
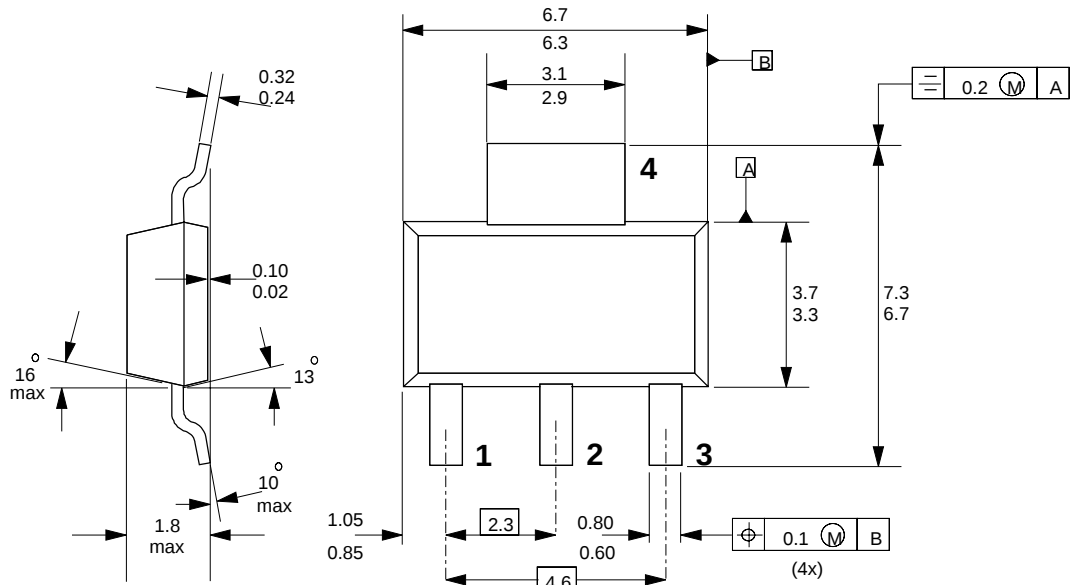
*Dimensions in mm.*

Fig.14. PCB for thermal resistance and power rating for SOT223.  
 PCB: FR4 epoxy glass (1.6 mm thick), copper laminate (35  $\mu$ m thick).

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## MECHANICAL DATA

*Dimensions in mm**Net Mass: 0.11 g**Fig.15. SOT223 surface mounting package.***Notes**

1. For further information, refer to Philips publication SC18 "SMD Footprint Design and Soldering Guidelines".  
Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".

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**DEFINITIONS**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Data sheet status</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                       |
| Objective specification                                                                                                                                                                                                                                                                                                                                                                                                                                    | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification                                                                                                                                                                                                                                                                                                                                                                                                                                  | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification                                                                                                                                                                                                                                                                                                                                                                                                                                      | This data sheet contains final product specifications.                                |
| <b>Limiting values</b>                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                       |
| Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability. |                                                                                       |
| <b>Application information</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                       |
| Where application information is given, it is advisory and does not form part of the specification.                                                                                                                                                                                                                                                                                                                                                        |                                                                                       |
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