

## 1. General description

Planar passivated sensitive gate four quadrant triac in a SOT223 surface-mountable plastic package. This sensitive gate "series E" triac is intended for interfacing with low power drivers including microcontrollers.

## 2. Features and benefits

- Direct interfacing to logic level ICs
- Direct interfacing to low power gate drivers and microcontrollers
- High blocking voltage capability
- Planar passivated for voltage ruggedness and reliability
- Sensitive gate
- Surface-mountable package
- Triggering in all four quadrants

## 3. Applications

- General purpose low power motor control
- General purpose switching and phase control

## 4. Quick reference data

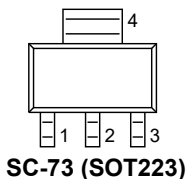
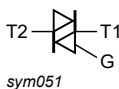
Table 1. Quick reference data

| Symbol                        | Parameter                            | Conditions   | Min | Typ | Max | Unit |
|-------------------------------|--------------------------------------|--|-----|-----|-----|------|
| $V_{DRM}$                     | repetitive peak off-state voltage    |  | -   | -   | 600 | V    |
| $I_{T(RMS)}$                  | RMS on-state current                 | full sine wave; $T_{sp} \leq 108\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>       | -   | -   | 1   | A    |
| $I_{TSM}$                     | non-repetitive peak on-state current | full sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a> | -   | -   | 10  | A    |
|                               |                                      | full sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 16.7\text{ ms}$   | -   | -   | 11  | A    |
| $T_j$                         | junction temperature                 |  | -   | -   | 125 | °C   |
| <b>Static characteristics</b> |                                      |  |     |     |     |      |
| $I_{GT}$                      | gate trigger current                 | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                           | -   | 2.5 | 10  | mA   |
|                               |                                      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                           | -   | 4   | 10  | mA   |
|                               |                                      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                           | -   | 5   | 10  | mA   |

| Symbol                         | Parameter                         | Conditions  | Min | Typ | Max | Unit       |
|--------------------------------|-----------------------------------|---|-----|-----|-----|------------|
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                       | -   | 11  | 25  | mA         |
| $I_H$                          | holding current                   | $V_D = 12\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 11</a>  | -   | 2.2 | 15  | mA         |
| $V_T$                          | on-state voltage                  | $I_T = 2\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 12</a>   | -   | 1.2 | 1.5 | V          |
| <b>Dynamic characteristics</b> |                                   |   |     |     |     |            |
| $dV_D/dt$                      | rate of rise of off-state voltage | $V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ °C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit | -   | 30  | -   | V/ $\mu$ s |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description     | Simplified outline   | Graphic symbol  |
|-----|--------|-----------------|--|---|
| 1   | T1     | main terminal 1 |  <p>SC-73 (SOT223)</p> |  <p>sym051</p> |
| 2   | T2     | main terminal 2 |  |   |
| 3   | G      | gate            |  |   |
| 4   | T2     | main terminal 2 |  |   |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description  | Version |
| BT134W-600E | SC-73   | plastic surface-mounted package with increased heatsink; 4 leads | SOT223  |

## 7. Marking

Table 4. Marking codes

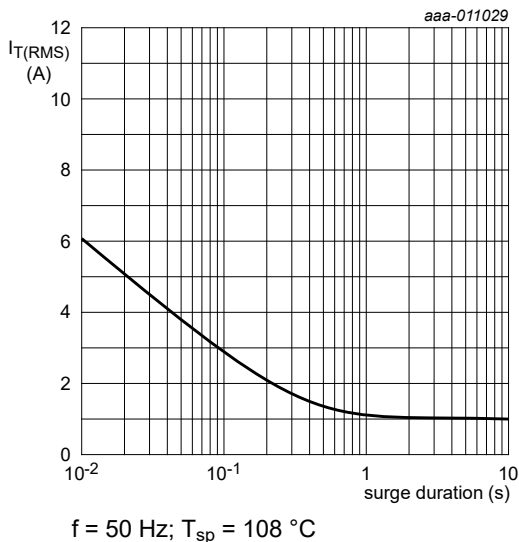
| Type number | Marking code |
|-------------|--------------|
| BT134W-600E | BT134W-6E    |

## 8. Limiting values

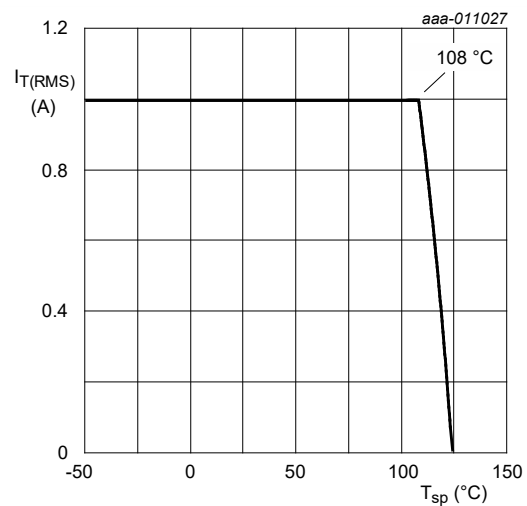
**Table 5. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol       | Parameter                            | Conditions   | Min | Max | Unit             |
|--------------|--------------------------------------|--|-----|-----|------------------|
| $V_{DRM}$    | repetitive peak off-state voltage    |  | -   | 600 | V                |
| $I_{T(RMS)}$ | RMS on-state current                 | full sine wave; $T_{sp} \leq 108\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | -   | 1   | A                |
| $I_{TSM}$    | non-repetitive peak on-state current | full sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 20\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>  | -   | 10  | A                |
|              |                                      | full sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 16.7\text{ ms}$  | -   | 11  | A                |
| $I^2t$       | $I^2t$ for fusing                    | $t_p = 10\text{ ms}$ ; SIN   | -   | 0.5 | A <sup>2</sup> s |
| $di_T/dt$    | rate of rise of on-state current     | $I_G = 20\text{ mA}$   | -   | 50  | A/ $\mu$ s       |
|              |                                      | $I_G = 50\text{ mA}$   | -   | 10  | A/ $\mu$ s       |
|              |                                      | $I_G = 20\text{ mA}$   | -   | 50  | A/ $\mu$ s       |
|              |                                      | $I_G = 20\text{ mA}$   | -   | 50  | A/ $\mu$ s       |
| $I_{GM}$     | peak gate current                    |  | -   | 2   | A                |
| $P_{GM}$     | peak gate power                      |  | -   | 5   | W                |
| $P_{G(AV)}$  | average gate power                   | over any 20 ms period  | -   | 0.5 | W                |
| $T_{stg}$    | storage temperature                  |  | -40 | 150 | °C               |
| $T_j$        | junction temperature                 |  | -   | 125 | °C               |



**Fig. 1. RMS on-state current as a function of surge duration; maximum values**



**Fig. 2. RMS on-state current as a function of solder point temperature; maximum values**

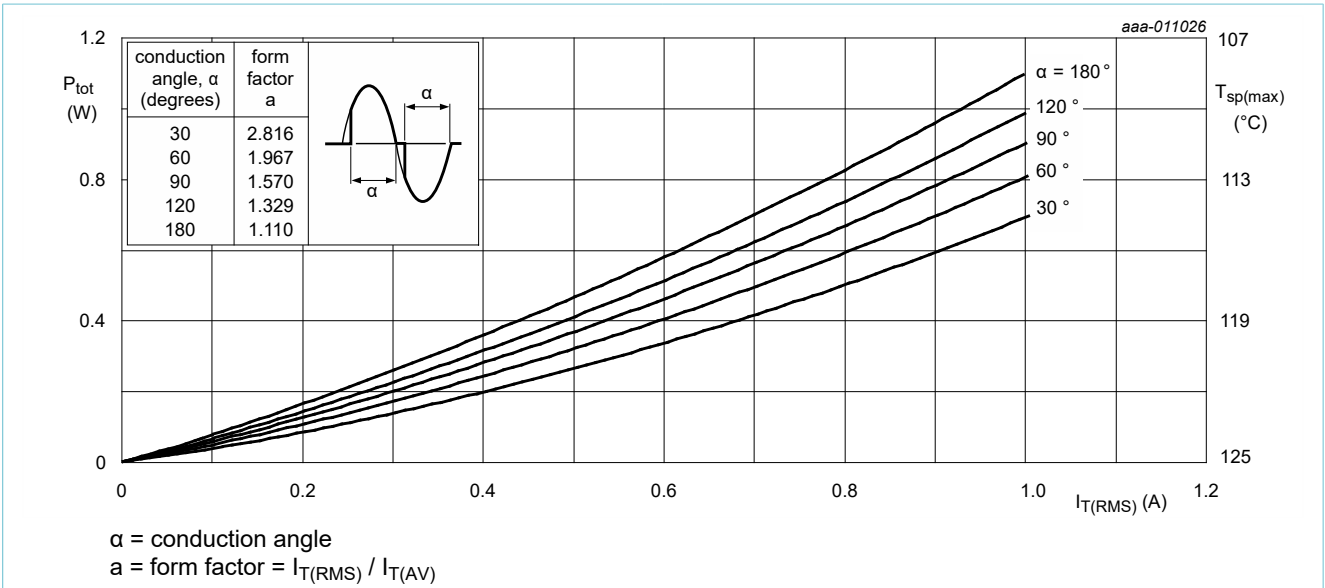


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

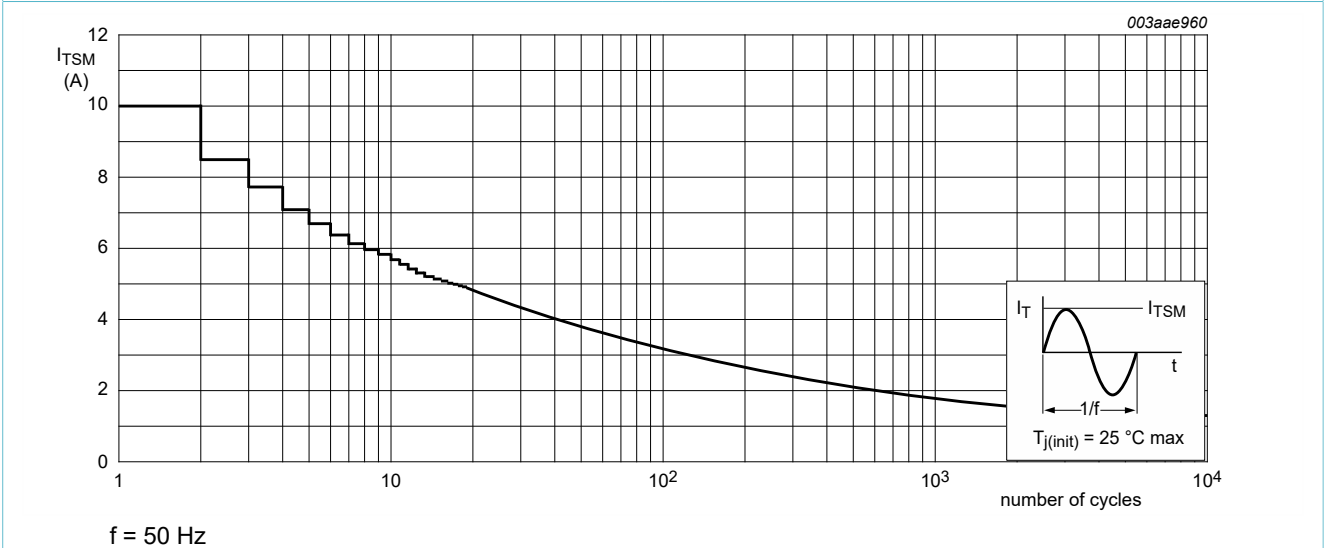
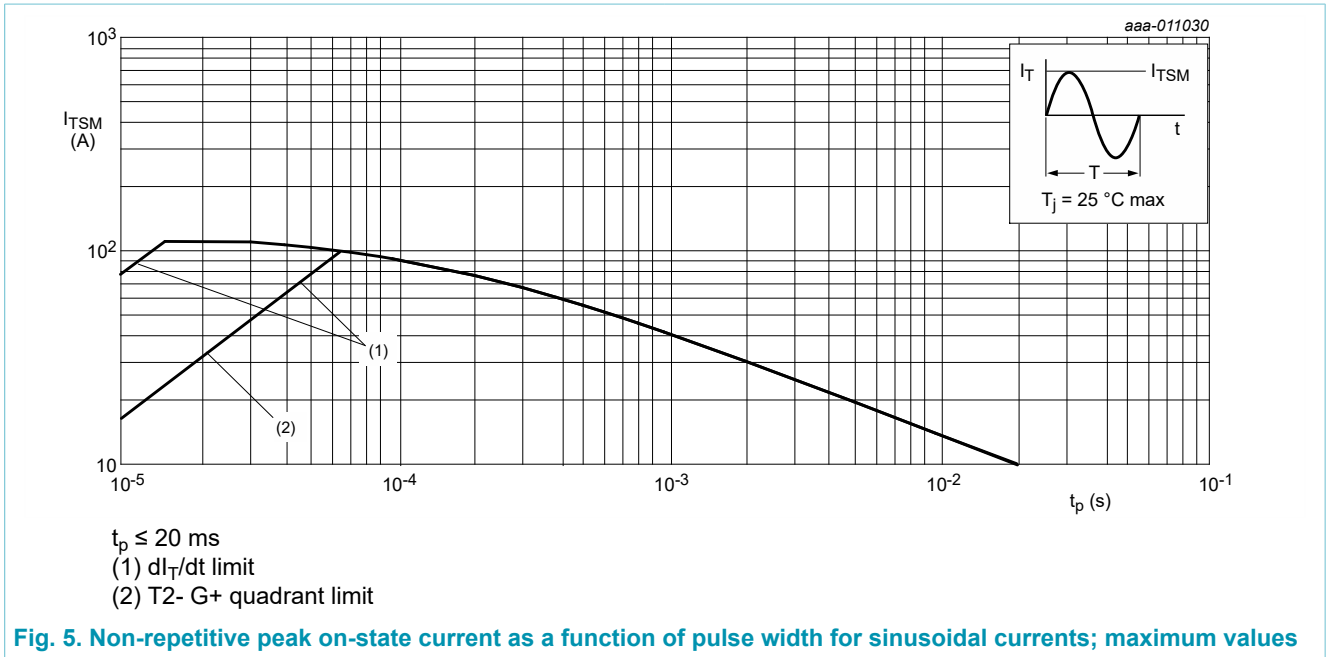


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol         | Parameter  | Conditions   | Min | Typ | Max | Unit |
|----------------|--|--|-----|-----|-----|------|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point     | full cycle; <a href="#">Fig. 6</a>   | -   | -   | 15  | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient free air | full cycle; printed circuit board mounted; minimum footprint; <a href="#">Fig. 7</a> | -   | 156 | -   | K/W  |
|                |  | full cycle; printed circuit board mounted; pad area; <a href="#">Fig. 8</a>          | -   | 70  | -   | K/W  |

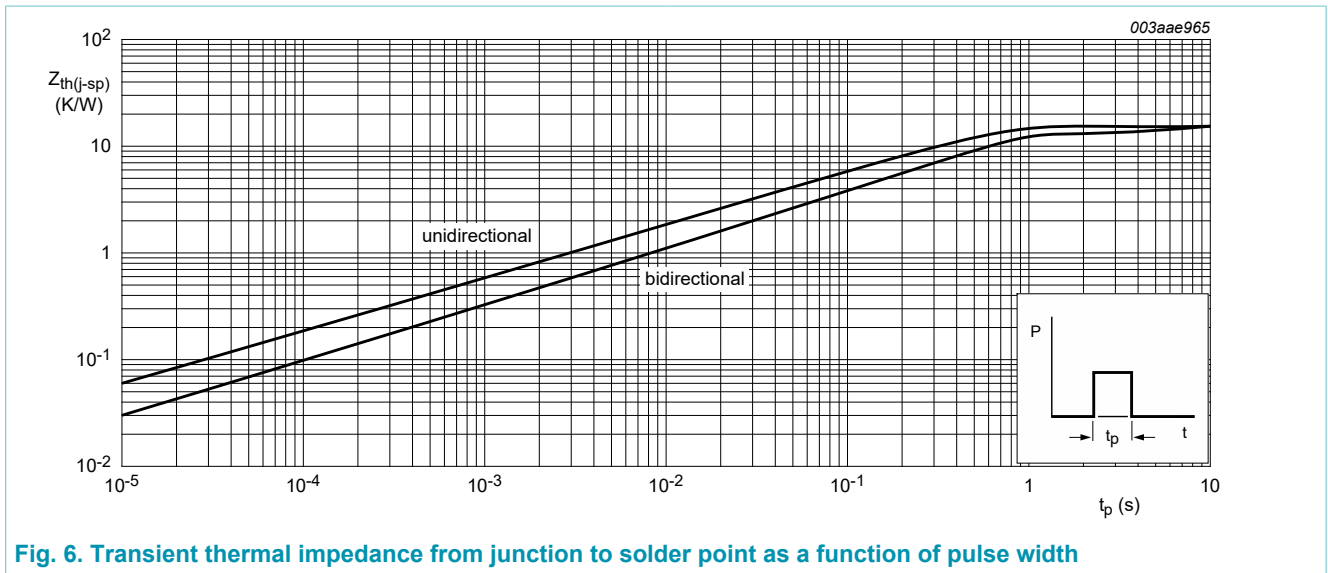
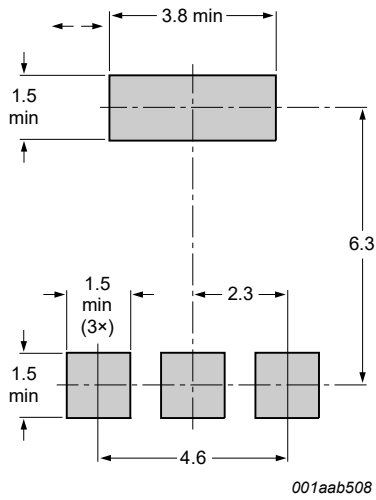
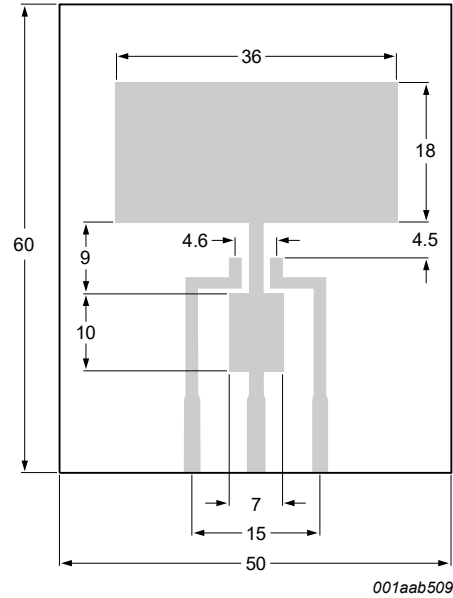


Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width



All dimensions are in mm

Fig. 7. Minimum footprint SOT223



All dimensions are in mm

Printed circuit board:

FR4 epoxy glass (1.6 mm thick), copper laminate (35 um thick)

Fig. 8. Printed circuit board pad area: SOT223

## 10. Characteristics

Table 7. Characteristics

| Symbol                         | Parameter                         | Conditions  | Min  | Typ | Max | Unit       |
|--------------------------------|-----------------------------------|---|------|-----|-----|------------|
| <b>Static characteristics</b>  |                                   |   |      |     |     |            |
| $I_{GT}$                       | gate trigger current              | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                       | -    | 2.5 | 10  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                       | -    | 4   | 10  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                       | -    | 5   | 10  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>                       | -    | 11  | 25  | mA         |
| $I_L$                          | latching current                  | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2+ G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>                      | -    | 3   | 15  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2+ G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>                      | -    | 10  | 20  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>                      | -    | 2.5 | 15  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>                      | -    | 4   | 20  | mA         |
| $I_H$                          | holding current                   | $V_D = 12\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 11</a>  | -    | 2.2 | 15  | mA         |
| $V_T$                          | on-state voltage                  | $I_T = 2\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 12</a>   | -    | 1.2 | 1.5 | V          |
| $V_{GT}$                       | gate trigger voltage              | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ °C}$ ;<br><a href="#">Fig. 13</a>                              | -    | 0.7 | 1   | V          |
|                                |                                   | $V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ °C}$ ;<br><a href="#">Fig. 13</a>                            | 0.25 | 0.4 | -   | V          |
| $I_D$                          | off-state current                 | $V_D = 600\text{ V}$ ; $T_j = 125\text{ °C}$  | -    | 0.1 | 0.5 | mA         |
| <b>Dynamic characteristics</b> |                                   |   |      |     |     |            |
| $dV_D/dt$                      | rate of rise of off-state voltage | $V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ °C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit | -    | 30  | -   | V/ $\mu$ s |
| $t_{gt}$                       | gate-controlled turn-on time      | $I_{TM} = 1.5\text{ A}$ ; $V_D = 600\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $dI_G/dt = 5\text{ A}/\mu\text{s}$                  | -    | 2   | -   | $\mu$ s    |



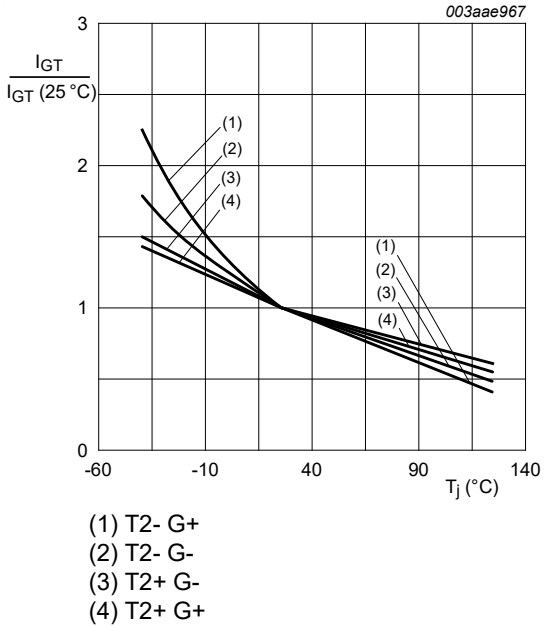


Fig. 9. Normalized gate trigger current as a function of junction temperature

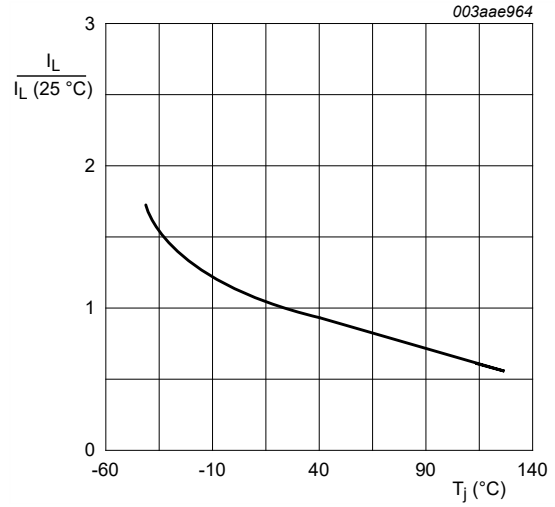


Fig. 10. Normalized latching current as a function of junction temperature

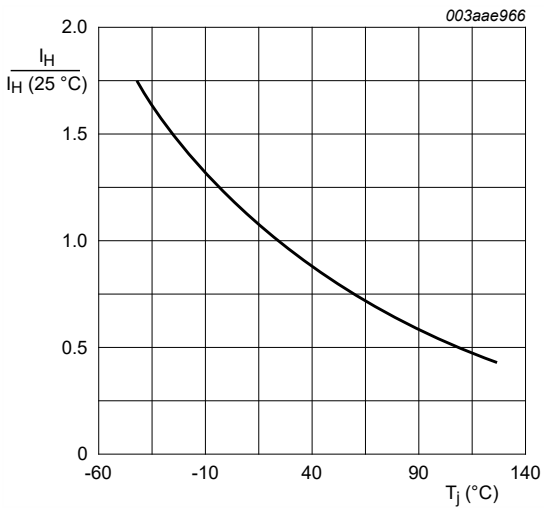


Fig. 11. Normalized holding current as a function of junction temperature

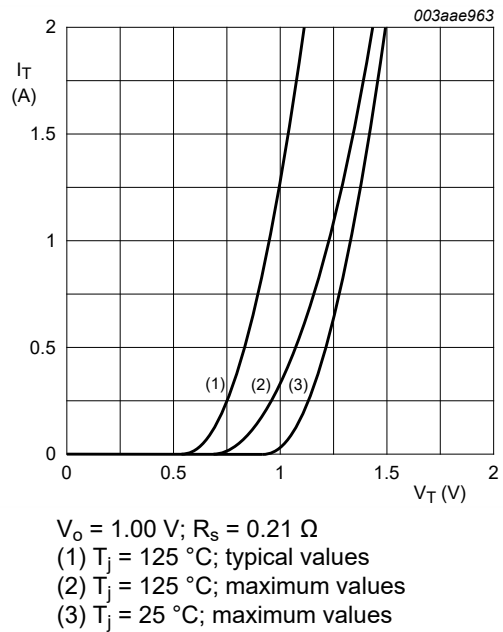


Fig. 12. On-state current as a function of on-state voltage

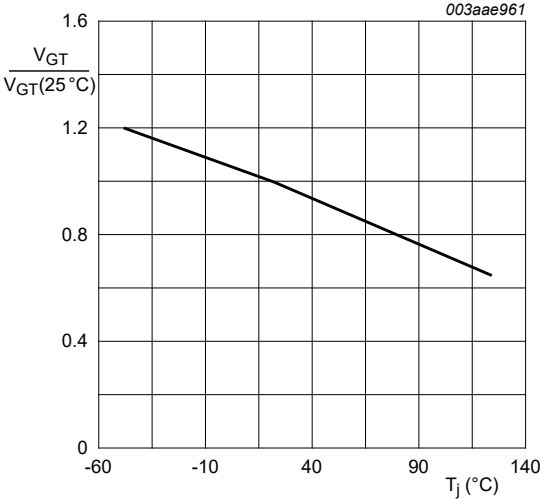


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

### 11. Package outline

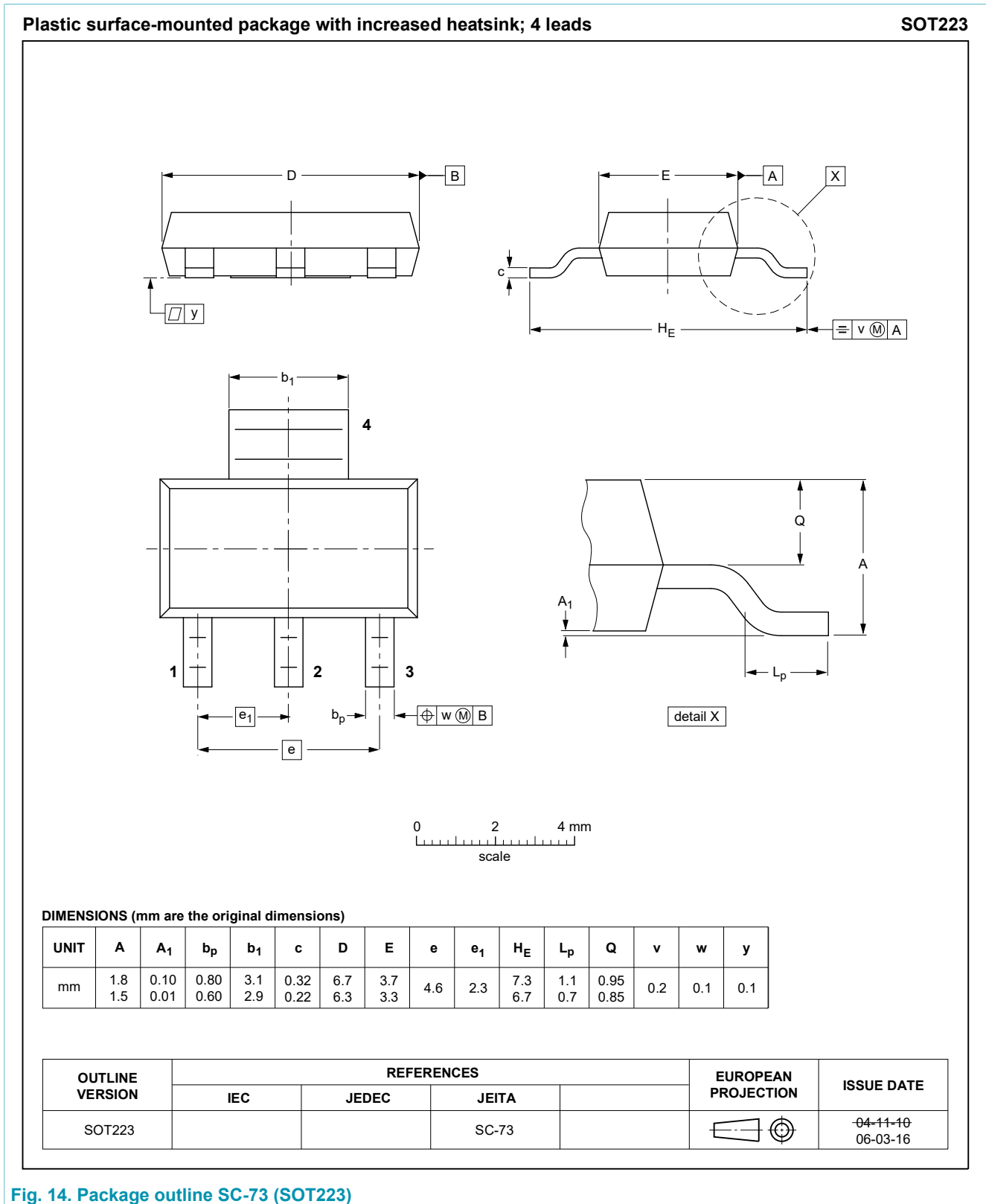


Fig. 14. Package outline SC-73 (SOT223)

## 12. Package outline (minimized)

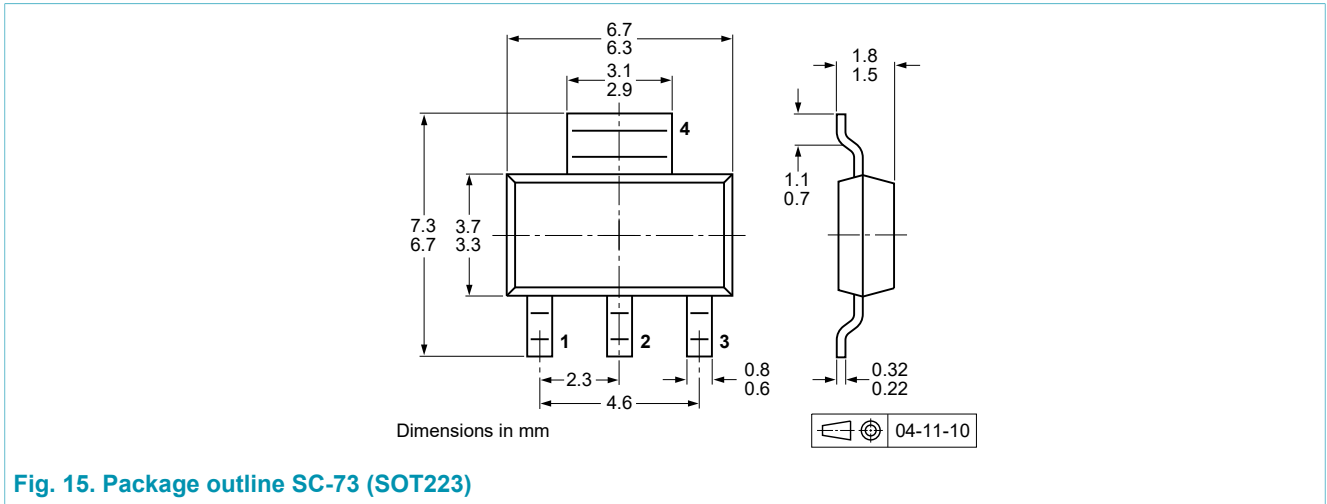


Fig. 15. Package outline SC-73 (SOT223)

## 13. Soldering

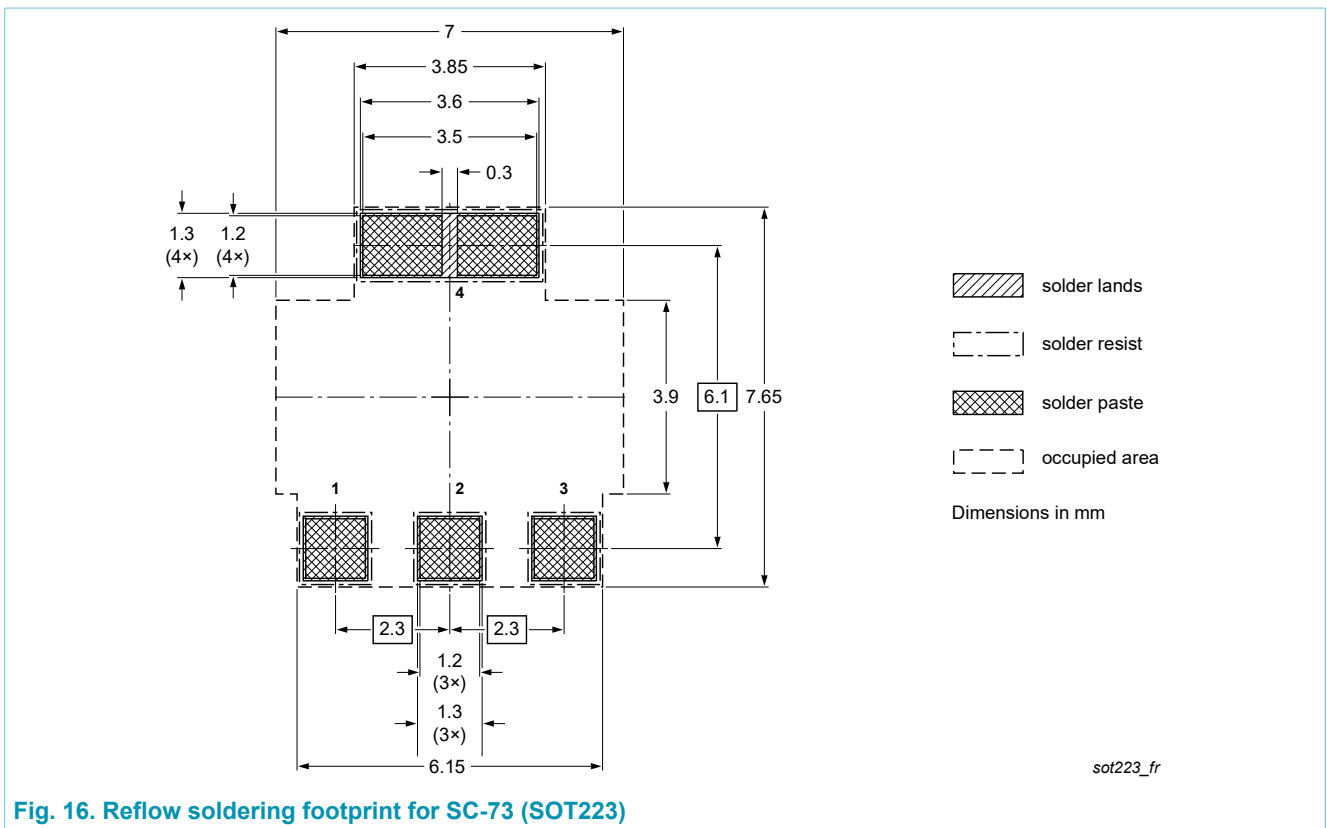


Fig. 16. Reflow soldering footprint for SC-73 (SOT223)

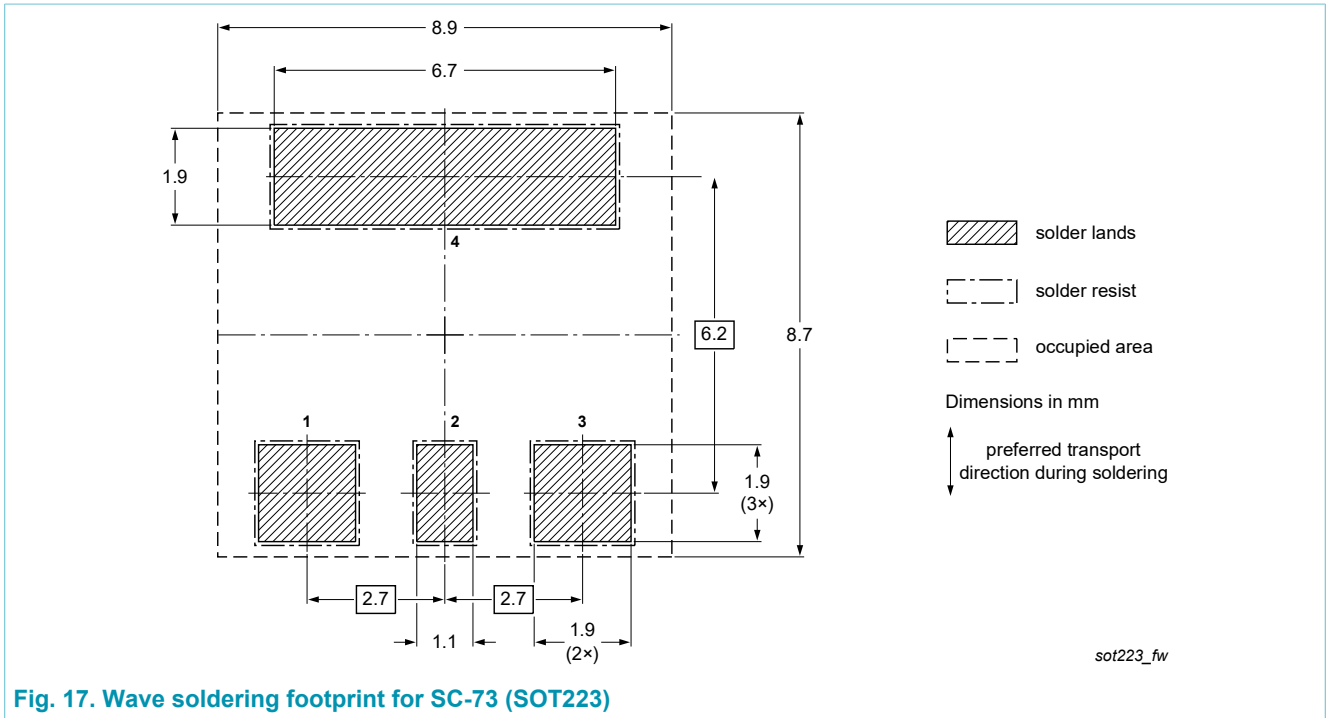


Fig. 17. Wave soldering footprint for SC-73 (SOT223)

## 14. Legal information

### Data sheet status

| Document status [1][2]         | Product status [3] | Definition  |
|--------------------------------|--------------------|---|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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For sales office addresses, please send an email to: [salesaddresses@ween-semi.com](mailto:salesaddresses@ween-semi.com)  
Date of release: 14 June 2016

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