



# BT134-600G

4Q Triac

21 November 2013

Product data sheet

## 1. General description

Planar passivated four quadrant triac in a SOT82 plastic package intended for use in general purpose bidirectional switching and phase control applications.

## 2. Features and benefits

- Compact package
- High blocking voltage capability
- Least sensitive gate for highest noise immunity
- Planar passivated for voltage ruggedness and reliability
- Triggering in all four quadrants

## 3. Applications

- General purpose low power motor control
- Home appliances
- Industrial process 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    |
| $I_{TSM}$                     | 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> | -   | -   | 25  | A    |
| $I_{T(RMS)}$                  | RMS on-state current                 | full sine wave; $T_{mb} \leq 107\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>       | -   | -   | 4   | A    |
| <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. 7</a>                           | -   | 5   | 50  | mA   |
|                               |                                      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>                           | -   | 8   | 50  | mA   |
|                               |                                      | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>                           | -   | 11  | 50  | mA   |



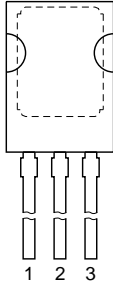
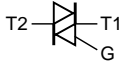
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| Symbol | Parameter | Conditions  | Min | Typ | Max | Unit |
|--------|-----------|---|-----|-----|-----|------|
|        |           | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+;<br>$T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a> | -   | 30  | 100 | mA   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description                    | Simplified outline  | Graphic symbol  |
|-----|--------|--------------------------------|---|---|
| 1   | T1     | main terminal 1                |  <p>SIP3 (SOT82)</p> |  <p>sym051</p> |
| 2   | T2     | main terminal 2                |   |   |
| 3   | G      | gate                           |   |   |
| mb  | T2     | mounting base; main terminal 2 |   |   |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |   |         |
|-------------|---------|---|---------|
|             | Name    | Description                                     | Version |
| BT134-600G  | SIP3    | plastic single-ended package; 3 leads (in-line) | SOT82   |

## 7. Limiting values

**Table 4. 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; $T_{mb} \leq 107\text{ °C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> | -   | 4   | 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>  | -   | 25  | A           |
|              |                                      | full sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 16.7\text{ ms}$  | -   | 27  | A           |
| $I^2t$       | $I^2t$ for fusing                    | $t_p = 10\text{ ms}$ ; SIN   | -   | 3.1 | $A^2s$      |
| $di_T/dt$    | rate of rise of on-state current     | $I_T = 6\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dI_G/dt = 0.2\text{ A}/\mu s$ ; T2+ G+                                    | -   | 50  | $A/\mu s$   |
|              |                                      | $I_T = 6\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dI_G/dt = 0.2\text{ A}/\mu s$ ; T2+ G-                                    | -   | 50  | $A/\mu s$   |
|              |                                      | $I_T = 6\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dI_G/dt = 0.2\text{ A}/\mu s$ ; T2- G-                                    | -   | 50  | $A/\mu s$   |
|              |                                      | $I_T = 6\text{ A}$ ; $I_G = 0.2\text{ A}$ ; $dI_G/dt = 0.2\text{ A}/\mu s$ ; T2- G+                                    | -   | 10  | $A/\mu s$   |
| $I_{GM}$     | 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 | $^{\circ}C$ |
| $T_j$        | junction temperature                 |  | -   | 125 | $^{\circ}C$ |

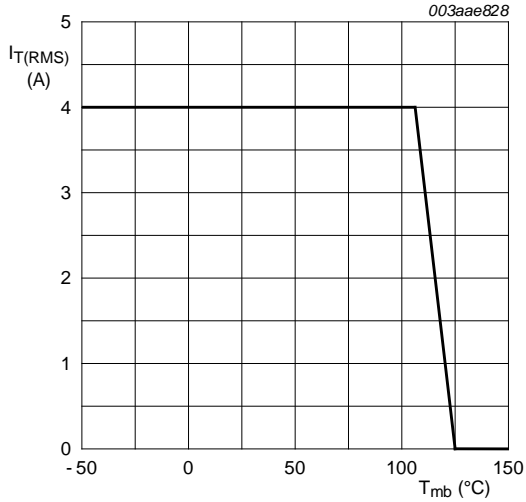
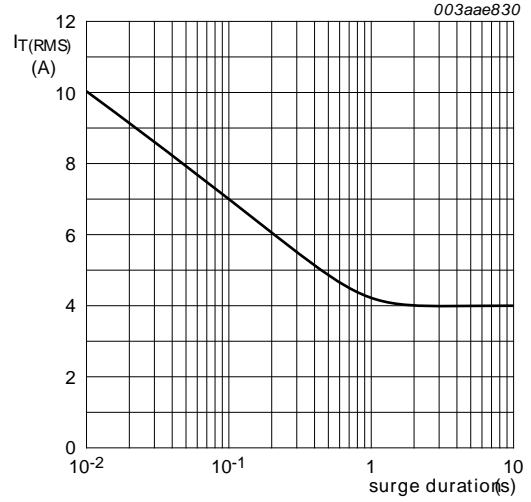
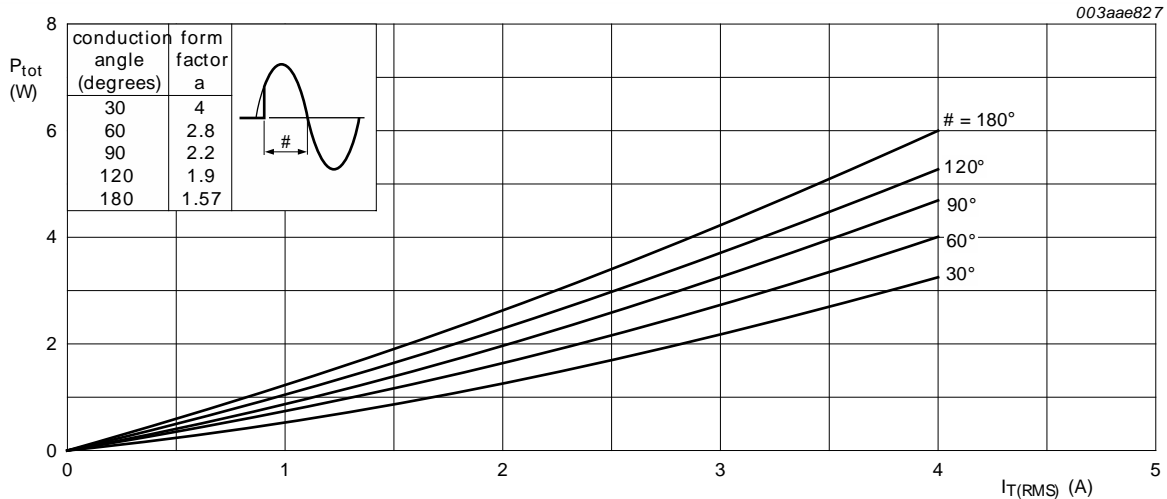


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



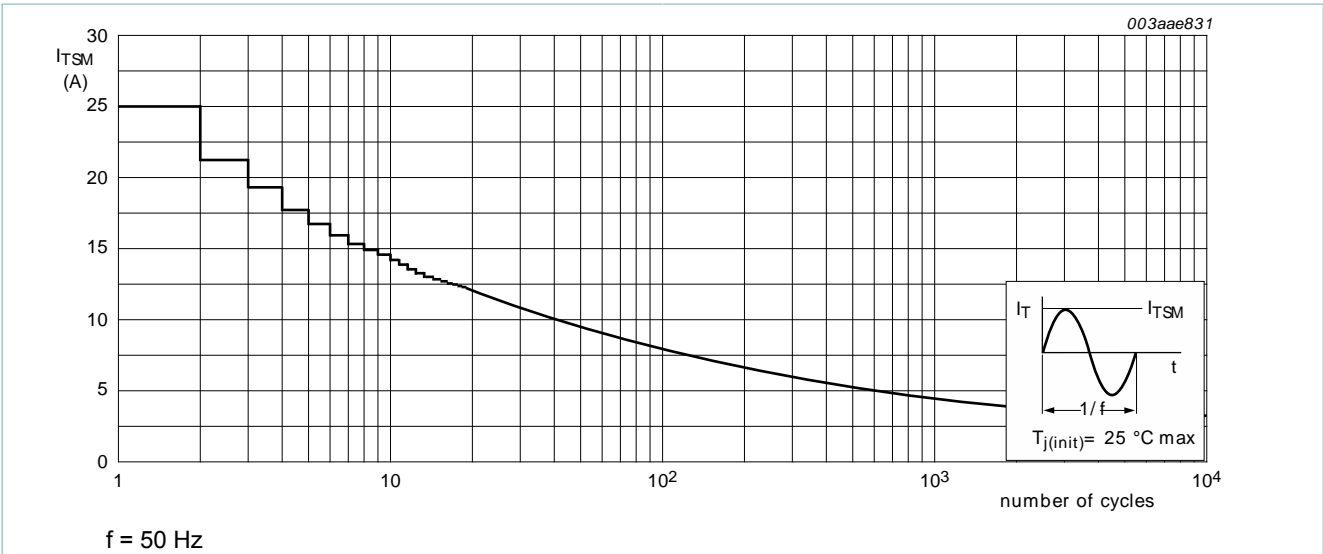
f = 50 Hz  
 $T_{mb} \leq 107\text{ }^{\circ}\text{C}$

Fig. 2. RMS on-state current as a function of surge duration; maximum values

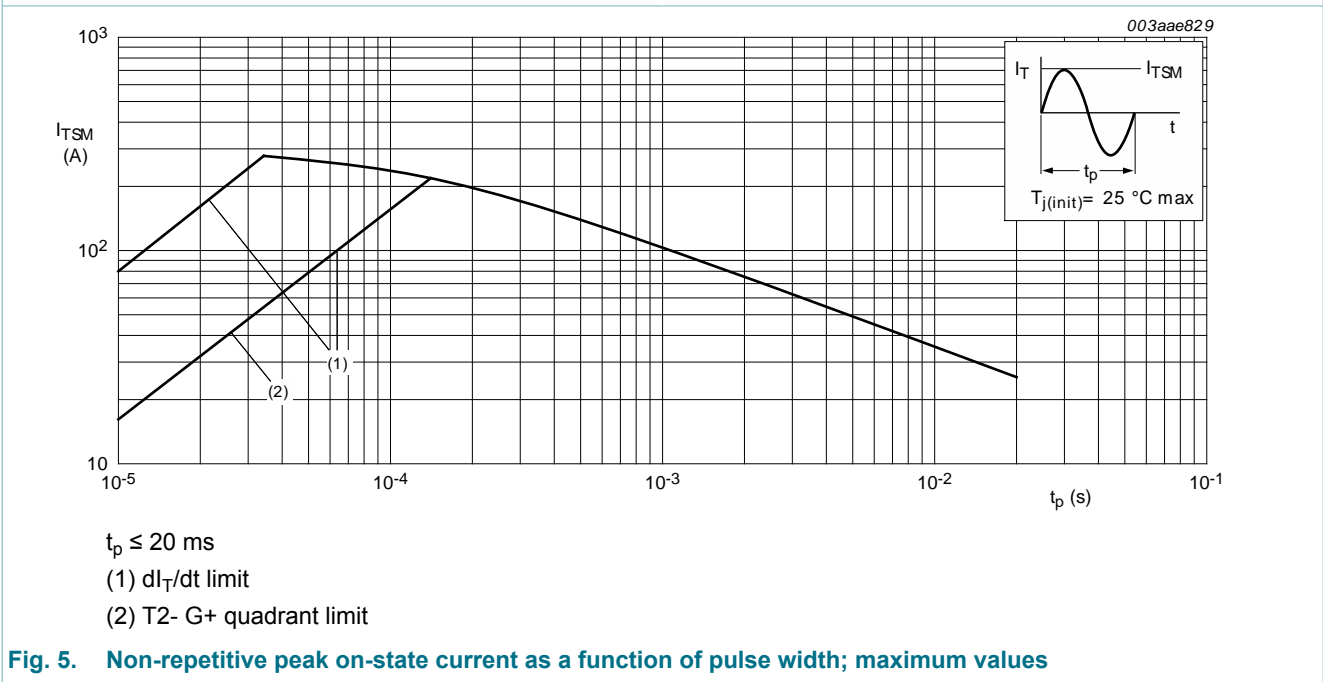


$\alpha$  = conduction angle  
 $a$  = form factor =  $I_{T(RMS)} / I_{T(AV)}$

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**



**Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values**

## 8. Thermal characteristics

Table 5. Thermal characteristics

| Symbol         | Parameter   | Conditions                         | Min | Typ | Max | Unit |
|----------------|---|------------------------------------|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | half cycle; <a href="#">Fig. 6</a> | -   | -   | 3.7 | K/W  |
|                |   | full cycle; <a href="#">Fig. 6</a> | -   | -   | 3   | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient       | in free air                        | -   | 100 | -   | K/W  |

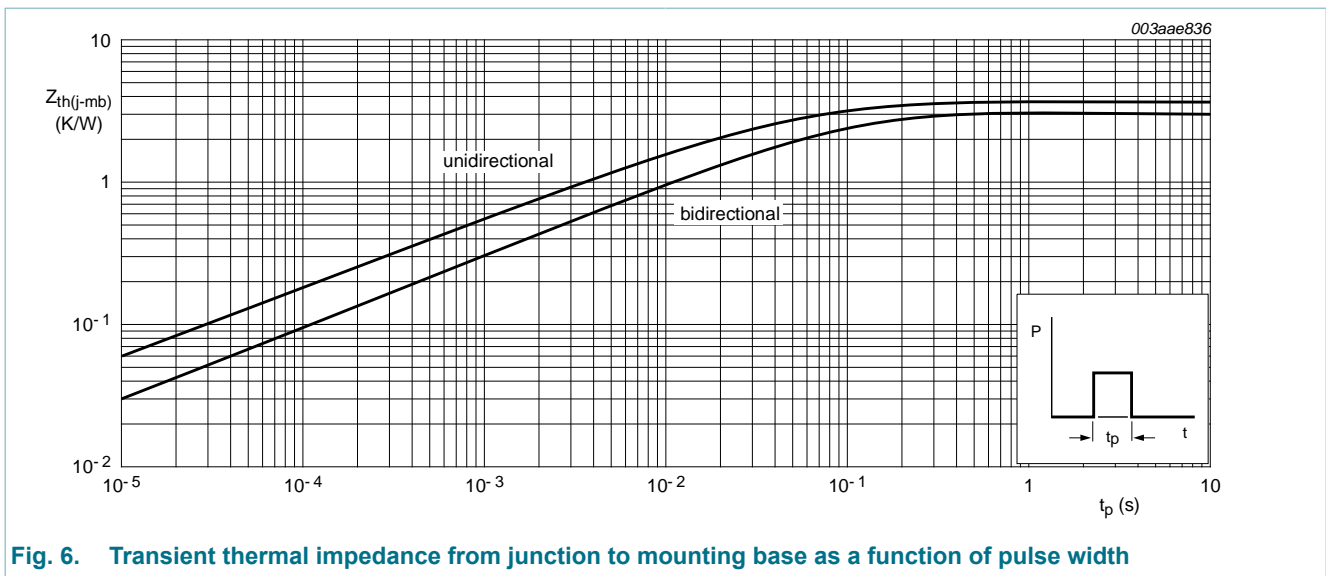
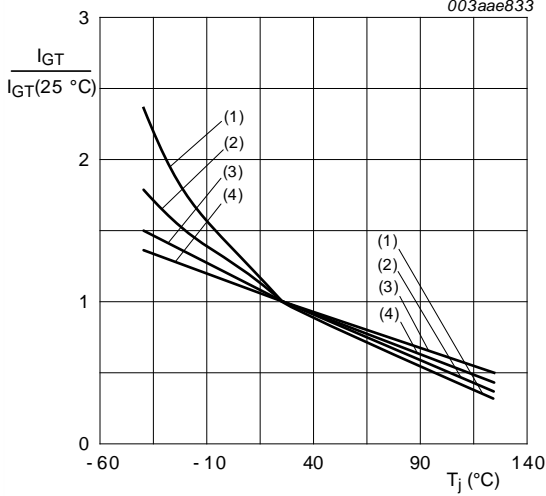


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

## 9. Characteristics

Table 6. 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. 7</a>                       | -    | 5   | 50  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2+ G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>                       | -    | 8   | 50  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>                       | -    | 11  | 50  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; T2- G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>                       | -    | 30  | 100 | 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. 8</a>                       | -    | 7   | 30  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2+ G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 8</a>                       | -    | 16  | 45  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G-;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 8</a>                       | -    | 5   | 30  | mA         |
|                                |                                   | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; T2- G+;<br>$T_j = 25\text{ °C}$ ; <a href="#">Fig. 8</a>                       | -    | 7   | 45  | mA         |
| $I_H$                          | holding current                   | $V_D = 12\text{ V}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 9</a>   | -    | 5   | 30  | mA         |
| $V_T$                          | on-state voltage                  | $I_T = 5\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 10</a>   | -    | 1.4 | 1.7 | 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. 11</a>                              | -    | 0.7 | 1.5 | V          |
|                                |                                   | $V_D = 400\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 125\text{ °C}$ ;<br><a href="#">Fig. 11</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 | 200  | 250 | -   | V/ $\mu$ s |
| $t_{gt}$                       | gate-controlled turn-on time      | $I_{TM} = 6\text{ A}$ ; $V_D = 600\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $dI_G/dt = 5\text{ A}/\mu\text{s}$                    | -    | 2   | -   | $\mu$ s    |



- (1) T2- G+
- (2) T2- G-
- (3) T2+ G-
- (4) T2+ G+

Fig. 7. Normalized gate trigger current as a function of junction temperature

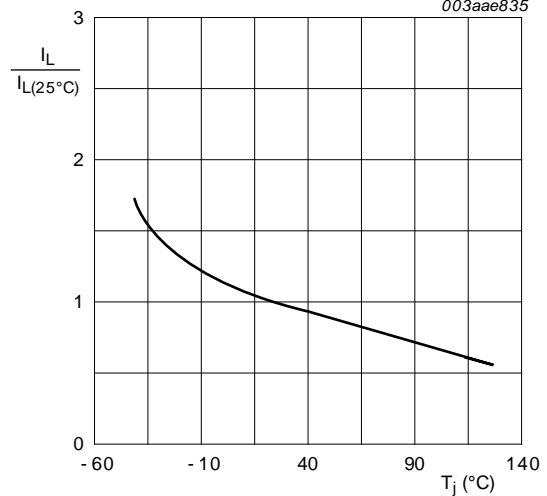


Fig. 8. Normalized latching current as a function of junction temperature

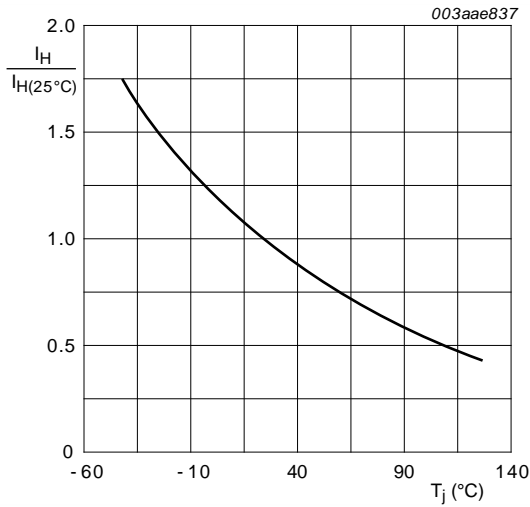
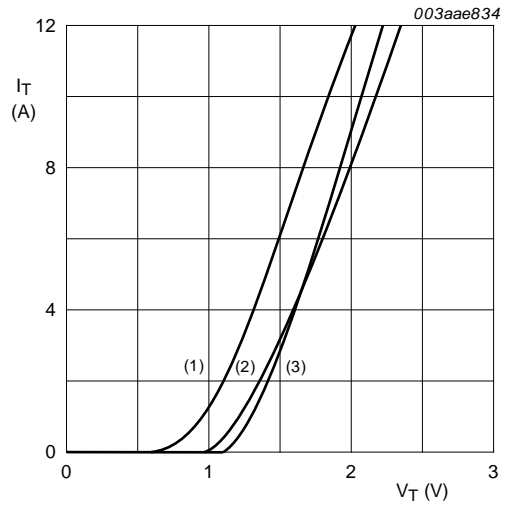


Fig. 9. Normalized holding current as a function of junction temperature



- $V_o = 1.27\text{ V}$
- $R_s = 0.091\ \Omega$
- (1)  $T_j = 125^\circ\text{C}$ ; typical values
- (2)  $T_j = 125^\circ\text{C}$ ; maximum values
- (3)  $T_j = 25^\circ\text{C}$ ; maximum values

Fig. 10. On-state current as a function of on-state voltage



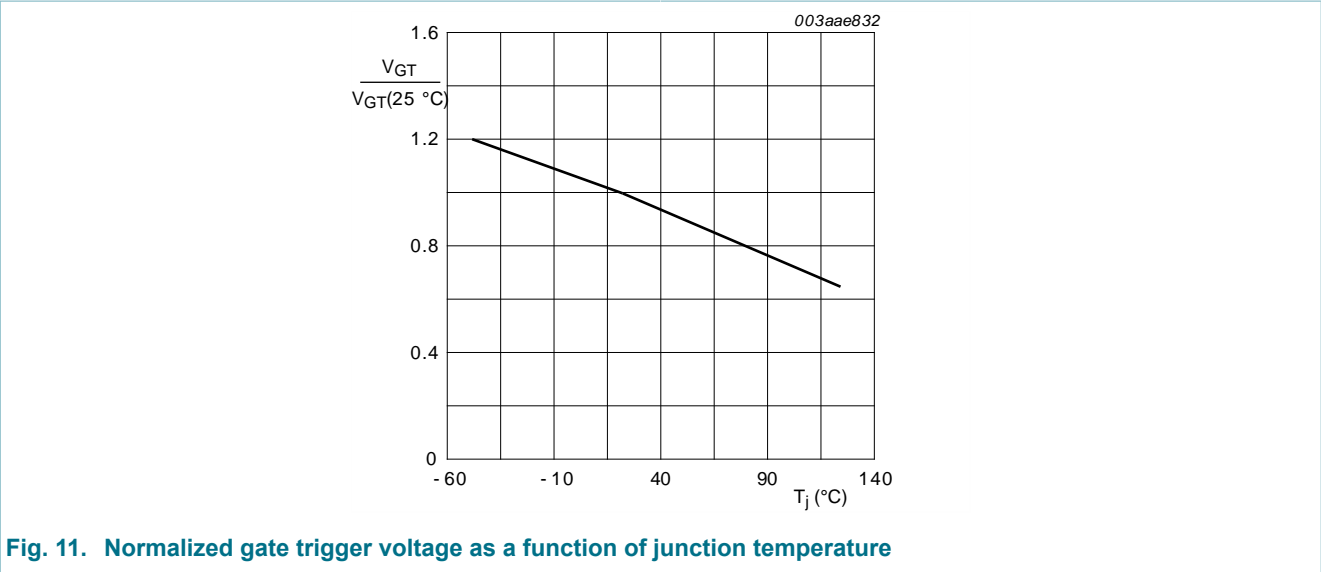


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

### 10. Package outline

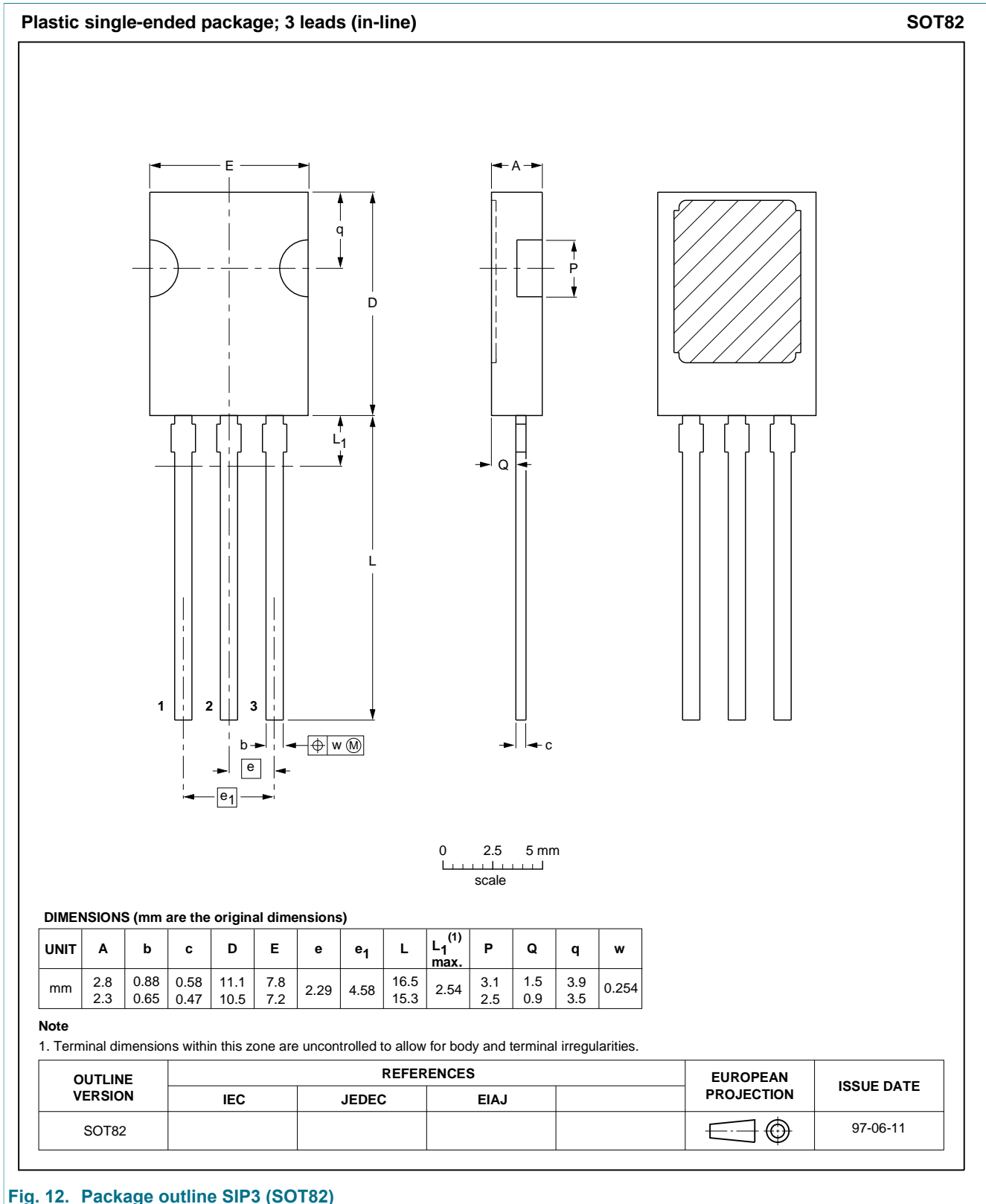


Fig. 12. Package outline SIP3 (SOT82)

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|--------------------------------|--------------------|---|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
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