

1. General description

Planar passivated sensitive gate four quadrant triac in a SOT223 surface-mountable plastic package intended for applications requiring direct interfacing to logic level ICs and low power gate drivers.

2. Features and benefits

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

3. Applications

- General purpose low power motor control
- Home appliances
- Industrial process control
- Low power AC Fan controllers

4. Quick reference data

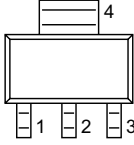
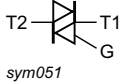
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|--------------------------------------|--|-----|-----|------|------|
| Absolute maximum rating | | | | | | |
| V_{DRM} | repetitive peak off-state voltage | | - | - | 800 | V |
| $I_{T(RMS)}$ | RMS on-state current | full sine wave; $T_{sp} \leq 88\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3 | - | - | 2 | A |
| I_{TSM} | non-repetitive peak on-state current | full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5 | - | - | 25 | A |
| | | full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$ | - | - | 27.5 | A |
| T_j | junction temperature | | - | - | 125 | °C |
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
| Static characteristics | | | | | | |
| I_{GT} | gate trigger current | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ °C}$; Fig. 9 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_j = 25\text{ °C}$; Fig. 9 | - | - | 10 | mA |

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-----------------------------------|---|-----|-----|-----|------------------|
| Static characteristics | | | | | | |
| | | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_j = 25\text{ °C}$; Fig. 9 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G+; $T_j = 25\text{ °C}$; Fig. 9 | - | - | 10 | mA |
| I_H | holding current | $V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; Fig. 11 | - | - | 8 | mA |
| V_T | on-state voltage | $I_T = 2\text{ A}$; $T_j = 25\text{ °C}$; Fig. 12 | - | 1.2 | 1.5 | V |
| Dynamic characteristics | | | | | | |
| dV_D/dt | rate of rise of off-state voltage | $V_{DM} = 536\text{ V}$; $T_j = 125\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit | 50 | - | - | V/ μs |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-----------------|---|--|
| 1 | T1 | main terminal 1 |  |  sym051 |
| 2 | T2 | main terminal 2 | | |
| 3 | G | gate | | |
| 4 | mb | main terminal 2 | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package Name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|-------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| BT134W-800E | SOT223 | BT134W-800EF | Reel | 4000 | SOT223 | 16-Mar-2006 |

7. Marking

Table 4. Marking codes

| Type number | Marking codes |
|-------------|---------------|
| BT134W-800E | 134W8E |

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 | | - | 800 | V |
| $I_{T(RMS)}$ | RMS on-state current | full sine wave; $T_{sp} \leq 88\text{ }^{\circ}\text{C}$; Fig 1 ; Fig 2 ; Fig 3 | - | 2 | A |
| I_{TSM} | non-repetitive peak on-state current | full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig 4 ; Fig 5 | - | 25 | A |
| | | full sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 16.7\text{ ms}$ | - | 27.5 | A |
| I^2t | I^2t for fusing | $t_p = 10\text{ ms}$; SIN | - | 3.125 | A^2s |
| di_T/dt | rate of rise of on-state current | $I_G = 20\text{ mA}$; T2+ G+ | - | 50 | $\text{A}/\mu\text{s}$ |
| | | $I_G = 20\text{ mA}$; T2- G+ | - | 50 | $\text{A}/\mu\text{s}$ |
| | | $I_G = 20\text{ mA}$; T2- G- | - | 50 | $\text{A}/\mu\text{s}$ |
| | | $I_G = 20\text{ mA}$; T2- G+ | - | 20 | $\text{A}/\mu\text{s}$ |
| 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 | $^{\circ}\text{C}$ |
| T_j | junction temperature | | -40 | 125 | $^{\circ}\text{C}$ |

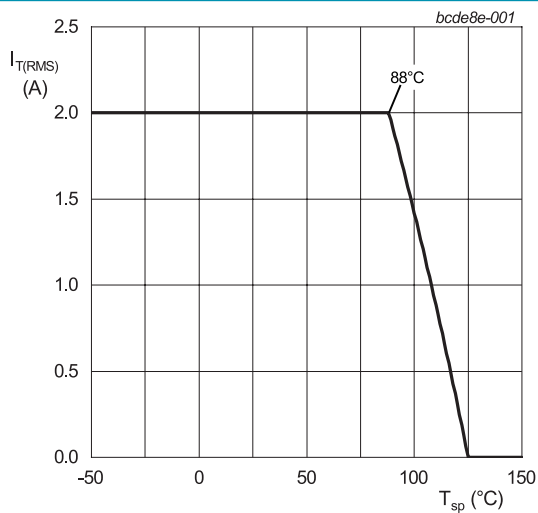


Fig. 1. RMS on-state current as a function of solder point temperature; maximum values

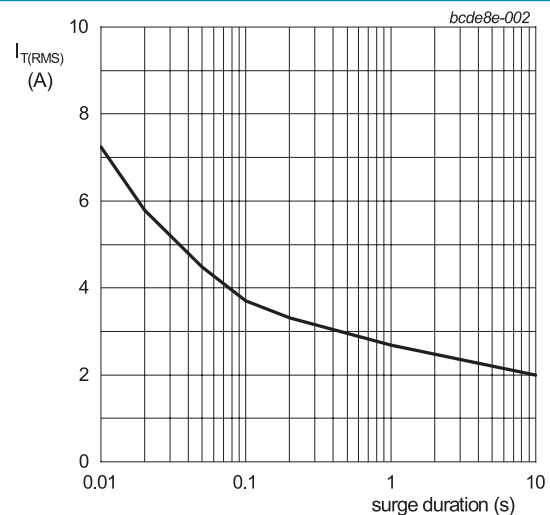


Fig. 2. RMS on-state current as a function of surge duration; maximum values
f = 50 Hz; $T_{sp} = 88\text{ }^{\circ}\text{C}$

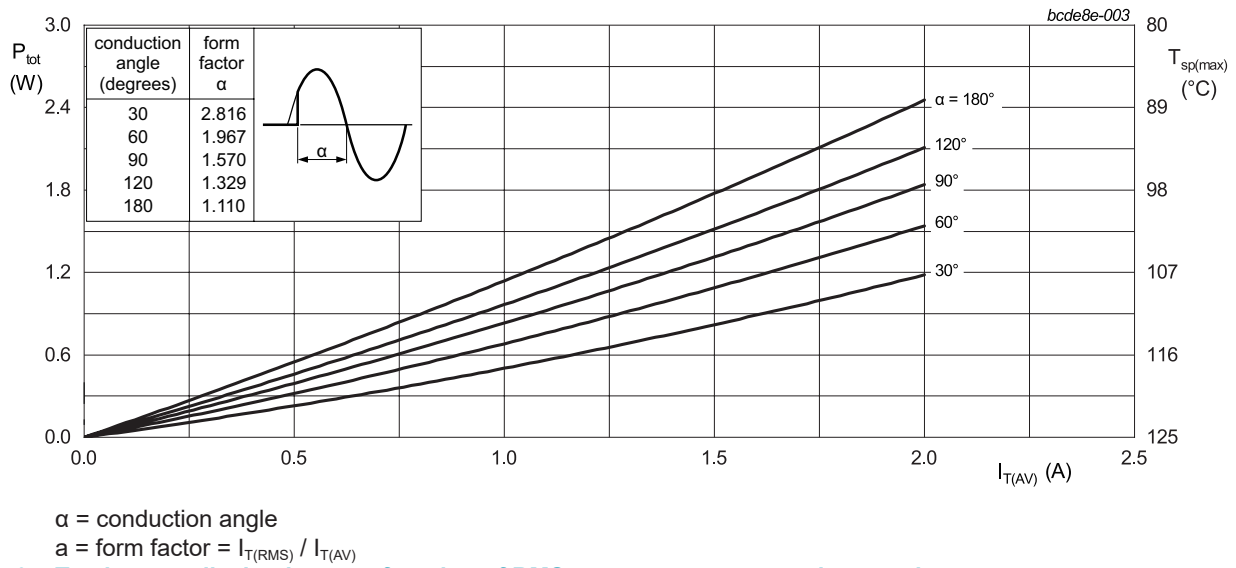


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

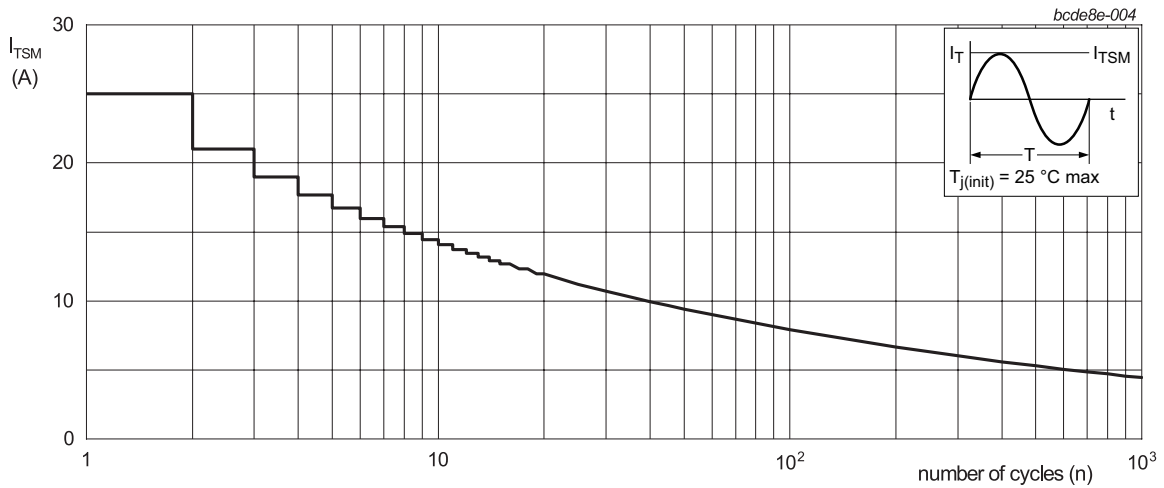


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

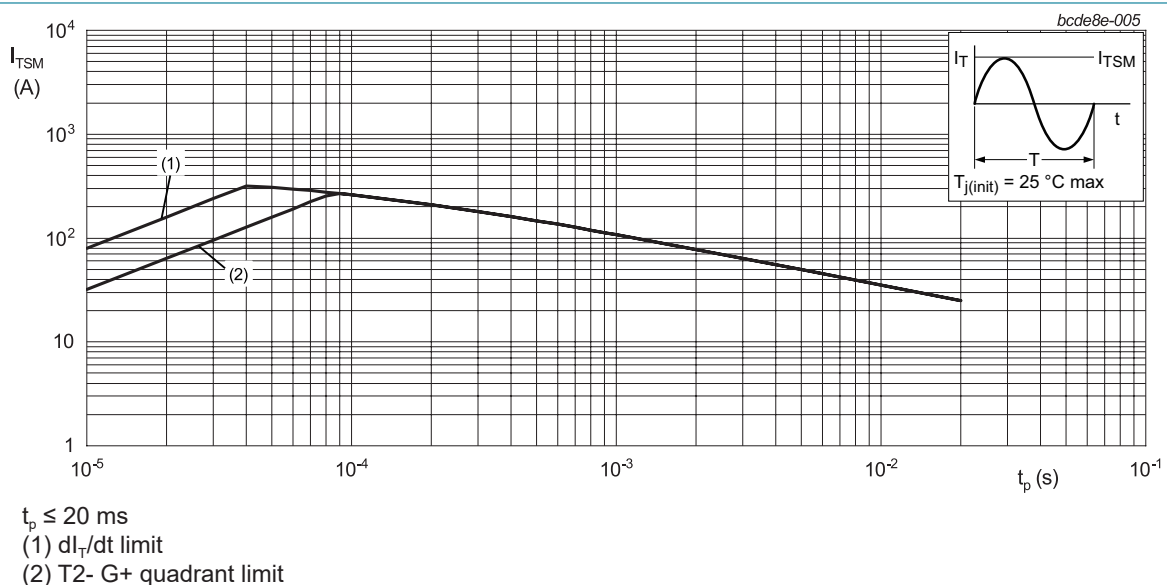


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

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; Fig 6 | - | - | 15 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | full cycle; printed circuit board mounted; minimum footprint; Fig 7 | - | 156 | - | K/W |
| | | full cycle; printed circuit board mounted; pad area; Fig 8 | - | 70 | - | K/W |

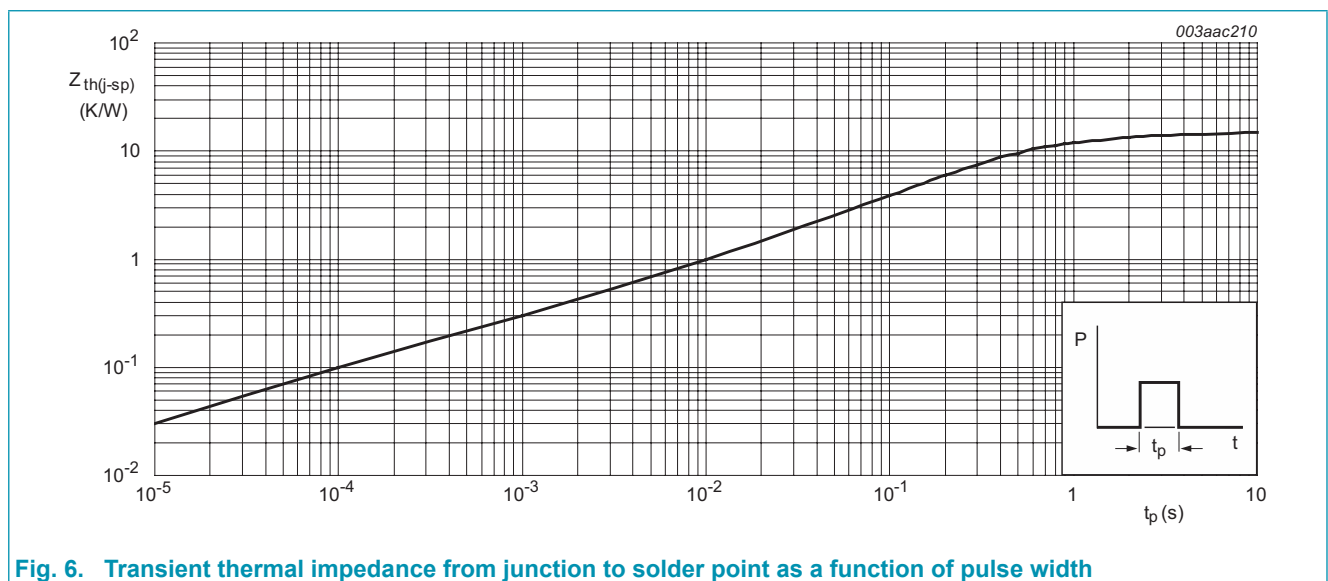
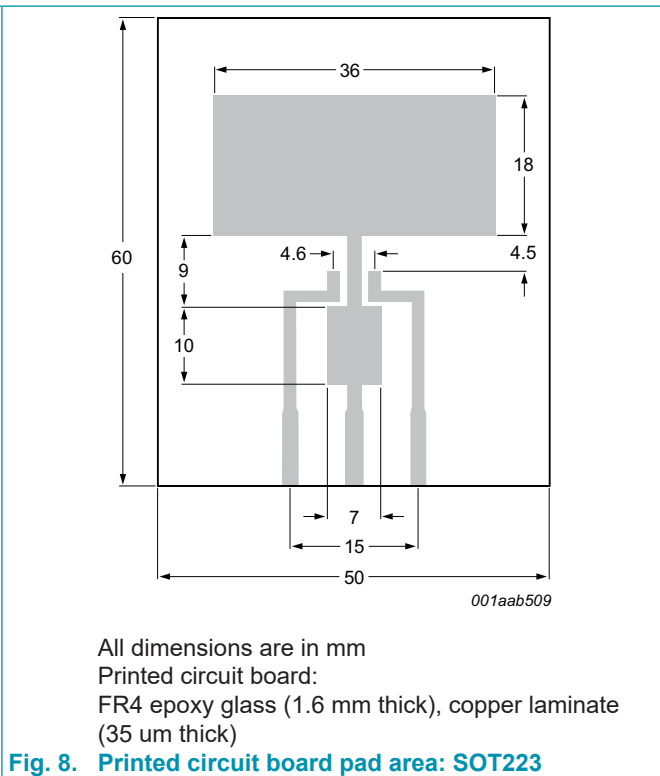
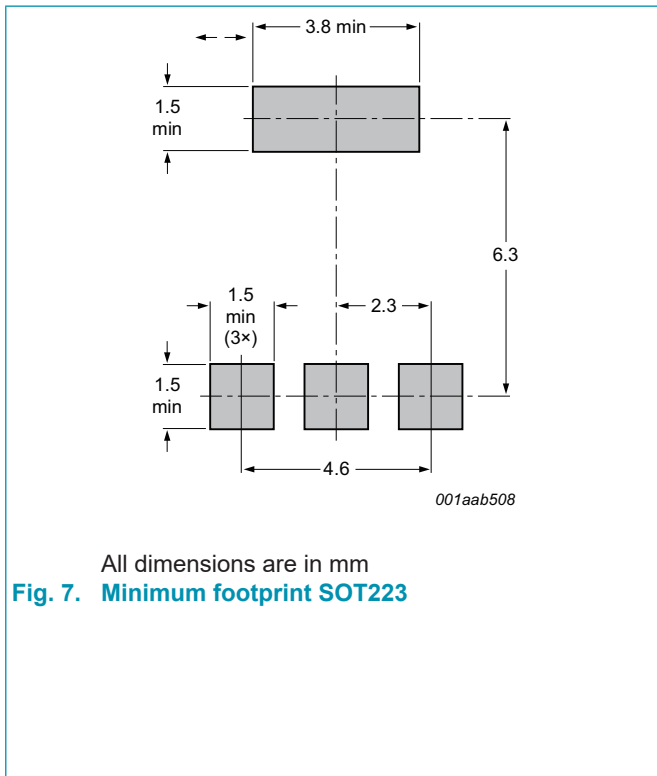


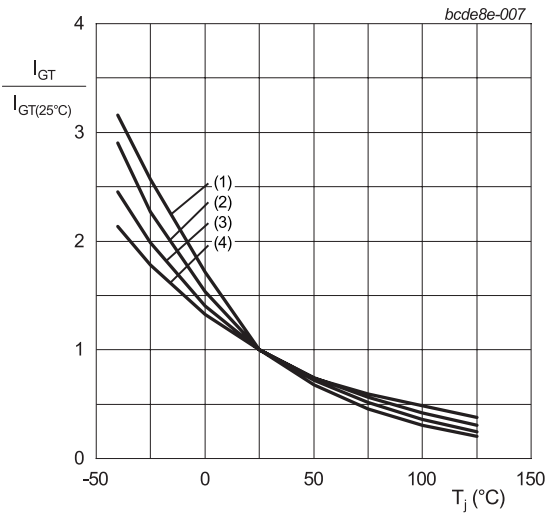
Fig. 6. Transient thermal impedance from junction to solder point as a function of pulse width



10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|---------------------------------------|--|-----|-----|-----|------------------------|
| Static characteristics | | | | | | |
| I_{GT} | gate trigger current | $V_D = 12\text{ V}; I_T = 0.1\text{ A}; T2+ G+;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 9 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}; I_T = 0.1\text{ A}; T2+ G-;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 9 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}; I_T = 0.1\text{ A}; T2- G-;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 9 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}; I_T = 0.1\text{ A}; T2- G+;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 9 | - | - | 10 | mA |
| I_L | latching current | $V_D = 12\text{ V}; I_G = 0.1\text{ A}; T2+ G+;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 10 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}; I_G = 0.1\text{ A}; T2+ G-;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 10 | - | - | 15 | mA |
| | | $V_D = 12\text{ V}; I_G = 0.1\text{ A}; T2- G-;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 10 | - | - | 10 | mA |
| | | $V_D = 12\text{ V}; I_G = 0.1\text{ A}; T2- G+;$ $T_J = 25\text{ }^\circ\text{C};$ Fig. 10 | - | - | 10 | mA |
| I_H | holding current | $V_D = 12\text{ V}; T_J = 25\text{ }^\circ\text{C};$ Fig. 11 | - | - | 8 | mA |
| V_T | on-state voltage | $I_T = 2\text{ A}; T_J = 25\text{ }^\circ\text{C};$ Fig. 12 | - | 1.2 | 1.5 | V |
| V_{GT} | gate trigger voltage | $V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_J = 25\text{ }^\circ\text{C};$ Fig. 13 | - | - | 1 | V |
| | | $V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_J = 125\text{ }^\circ\text{C}$ | 0.2 | 0.5 | - | V |
| I_D | off-state current | $V_D = 800\text{ V}; T_J = 25\text{ }^\circ\text{C}$ | - | - | 5 | μA |
| | | $V_D = 800\text{ V}; T_J = 125\text{ }^\circ\text{C}$ | - | - | 0.5 | mA |
| Dynamic characteristics | | | | | | |
| dV_D/dt | rate of rise of off-state voltage | $V_{DM} = 536\text{ V}; T_J = 125\text{ }^\circ\text{C}; (V_{DM} = 67\% \text{ of } V_{DRM});$ exponential waveform; gate open circuit | 50 | - | - | $\text{V}/\mu\text{s}$ |
| dV_{com}/dt | rate of change of commutating voltage | $V_D = 400\text{ V}; T_J = 125\text{ }^\circ\text{C}; dI_{com}/dt = 0.44\text{ A/ms};$ gate open circuit | 2 | - | - | $\text{V}/\mu\text{s}$ |



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

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

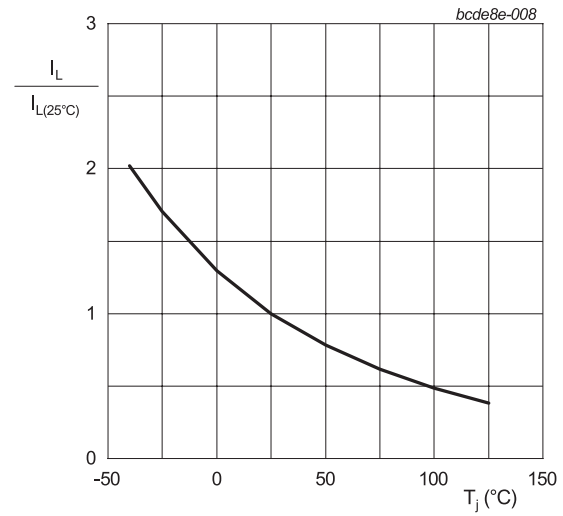


Fig. 10. Normalized latching current as a function of junction temperature

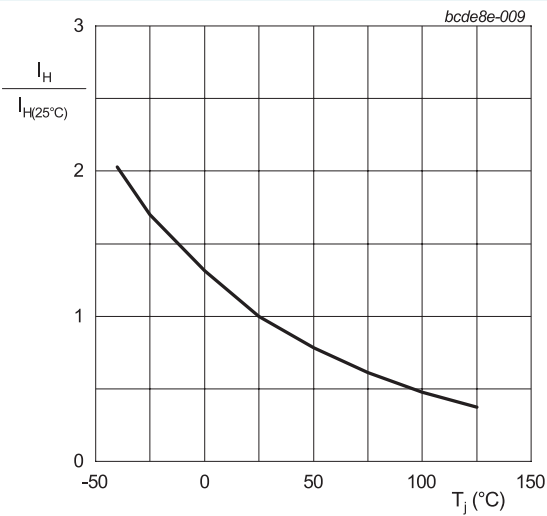
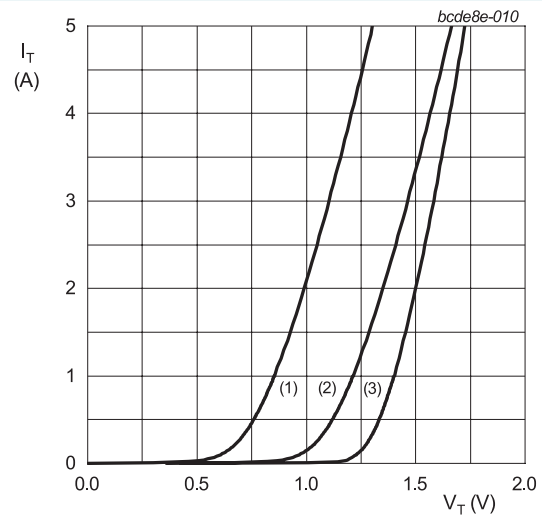


Fig. 11. Normalized holding current as a function of junction temperature



- $V_o = 1.166 \text{ V}; R_s = 0.0884 \Omega$
- (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. 12. On-state current as a function of on-state voltage

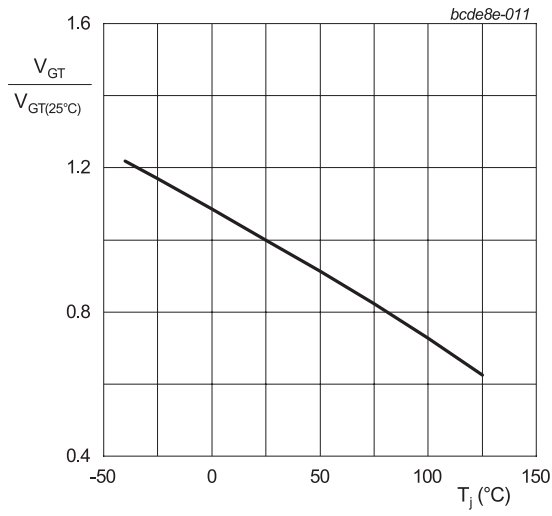
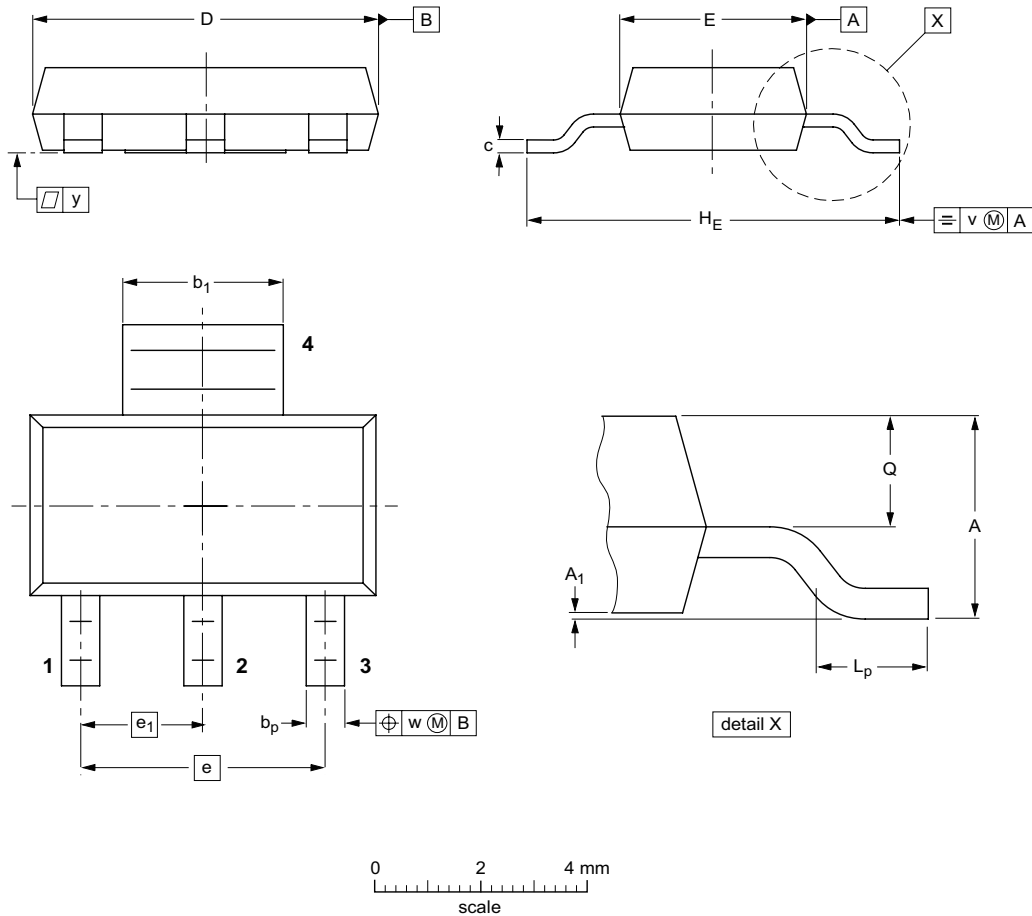


Fig. 13. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Plastic surface-mounted package with increased heatsink; 4 leads

SOT223



DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ | b _p | b ₁ | c | D | E | e | e ₁ | H _E | L _p | Q | v | w | y |
|------|------------|----------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|-----|
| mm | 1.8 1.5 | 0.10 0.01 | 0.80 0.60 | 3.1 2.9 | 0.32 0.22 | 6.7 6.3 | 3.7 3.3 | 4.6 | 2.3 | 7.3 6.7 | 1.1 0.7 | 0.95 0.85 | 0.2 | 0.1 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|-------|--|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT223 | | | SC-73 | | | 04-11-10 06-03-16 |

PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.

12. Legal information

Data sheet status

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

- [1] Please consult the most recently issued document before initiating or completing a design.
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