

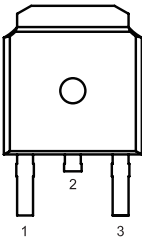
[illegible]

| Symbol    | Parameter                         | Conditions                                                                                                                                                                     |  | Min | Typ | Max | Unit       |
|-----------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----|-----|-----|------------|
| $dV_D/dt$ | rate of rise of off-state voltage | $V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; $R_{GK} = 100\text{ }\Omega$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; <a href="#">Fig. 13</a> |  | 50  | 100 | -   | V/ $\mu$ s |

[1] Operation above junction temperatures of 110 °C may require the use of a gate to cathode resistor of 1 kΩ

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description                       | Simplified outline                                                                 | Graphic symbol                                                                      |
|-----|--------|-----------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | K      | cathode                           |  |  |
| 2   | A      | anode                             |                                                                                    |                                                                                     |
| 3   | G      | gate                              |                                                                                    |                                                                                     |
| mb  | A      | mounting base; connected to anode |                                                                                    |                                                                                     |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package Name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|-------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| BT258S-800R | DPAK         | BT258S-800R,118       | Reel           | 2500                   | TO252N          | 07-Mar-2025        |
|             |              |                       |                |                        | TO252Q          | 05-Mar-2025        |

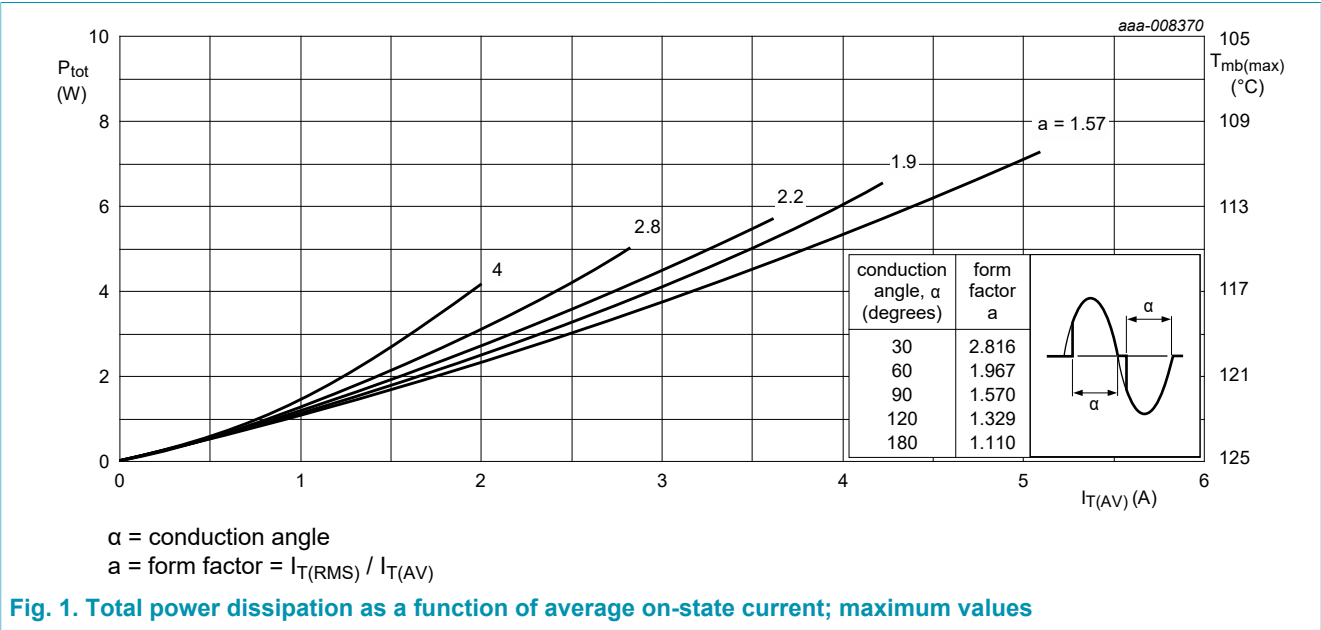
| Type number | Marking codes       |                     |
|-------------|---------------------|---------------------|
|             | Assembly factory: N | Assembly factory: Q |
| BT258S-800R | 258S8<br>PJNxxxx xx | 258S8<br>PJQxxxx xx |

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    |                                                                                                    | -   | 800 | V                      |
| $V_{RRM}$    | repetitive peak reverse voltage      |                                                                                                    | -   | 800 | V                      |
| $I_{T(AV)}$  | average on-state current             | half sine wave; $T_{mb} \leq 111\text{ }^{\circ}\text{C}$ ; Fig. 1                                 | -   | 5   | A                      |
| $I_{T(RMS)}$ | RMS on-state current                 | half sine wave; $T_{mb} \leq 111\text{ }^{\circ}\text{C}$ ; Fig. 2; Fig. 3                         | -   | 8   | A                      |
| $I_{TSM}$    | non-repetitive peak on-state current | half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 10\text{ ms}$ ; Fig. 4; Fig. 5 | -   | 75  | A                      |
|              |                                      | half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 8.3\text{ ms}$                 | -   | 82  | A                      |
| $I^2t$       | $I^2t$ for fusing                    | $t_p = 10\text{ ms}$ ; sine-wave pulse                                                             | -   | 28  | $\text{A}^2\text{s}$   |
| $di_T/dt$    | rate of rise of on-state current     | $I_G = 50\text{ mA}$                                                                               | -   | 50  | $\text{A}/\mu\text{s}$ |
| $I_{GM}$     | peak gate current                    |                                                                                                    | -   | 2   | A                      |
| $V_{RGM}$    | peak reverse gate voltage            |                                                                                                    | -   | 5   | V                      |
| $P_{GM}$     | 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                 | [1]                                                                                                | -   | 125 | $^{\circ}\text{C}$     |

[1] Operation above junction temperatures of 110 °C may require the use of a gate to cathode resistor of 1 kΩ



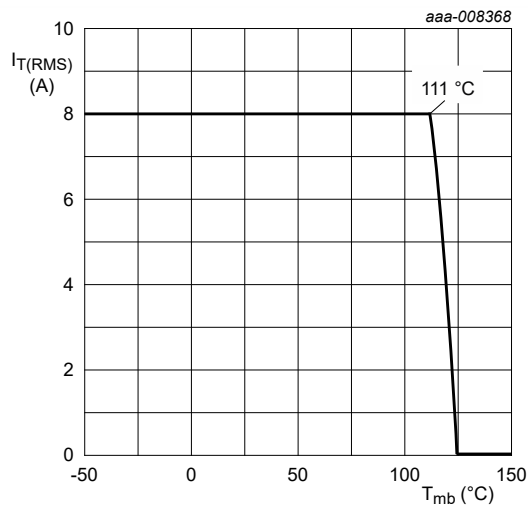
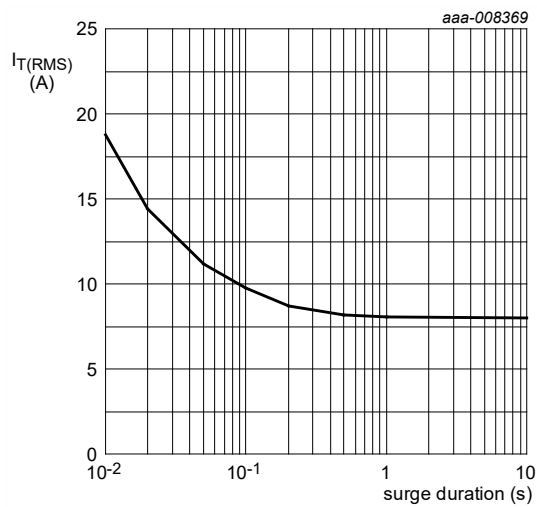
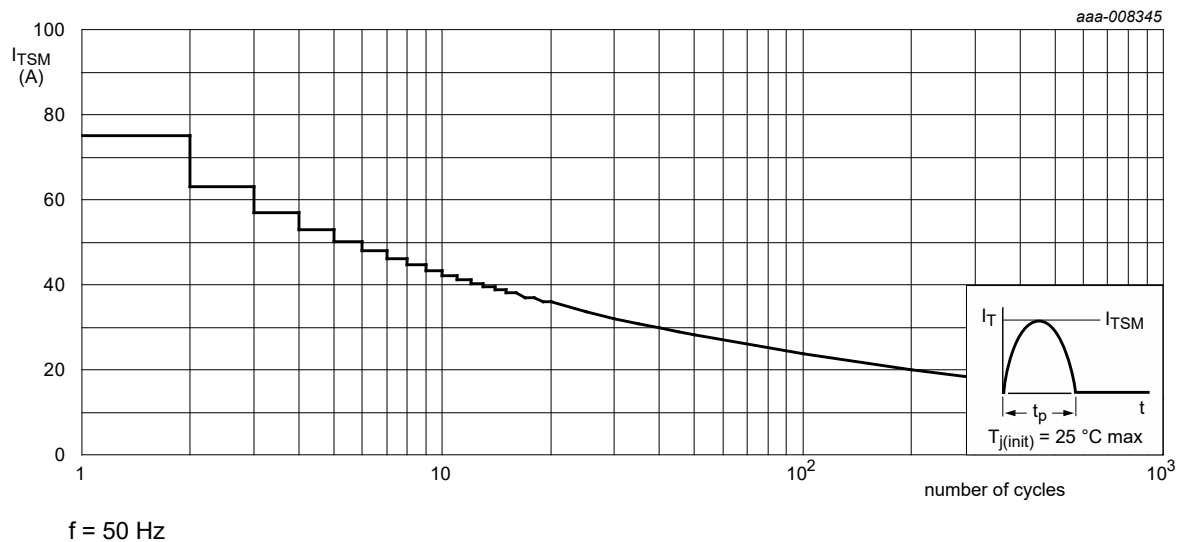


Fig. 2. RMS on-state current as a function of mounting base temperature; maximum values



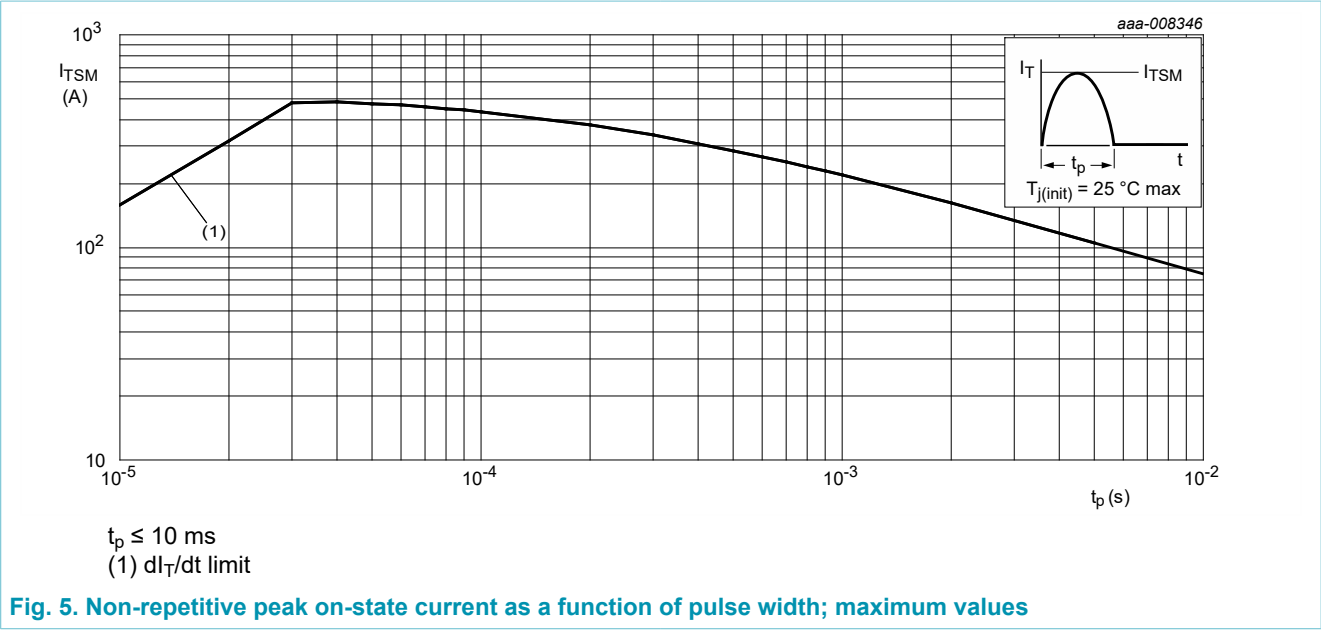
$f = 50 \text{ Hz}; T_{mb} = 111 \text{ °C}$

Fig. 3. RMS on-state current as a function of surge duration; maximum values



$f = 50 \text{ Hz}$

Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; 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    | Fig. 6                                                                                                         | -   | -   | 2   | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient free air | Device mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint; Fig. 7 | -   | 75  | -   | K/W  |

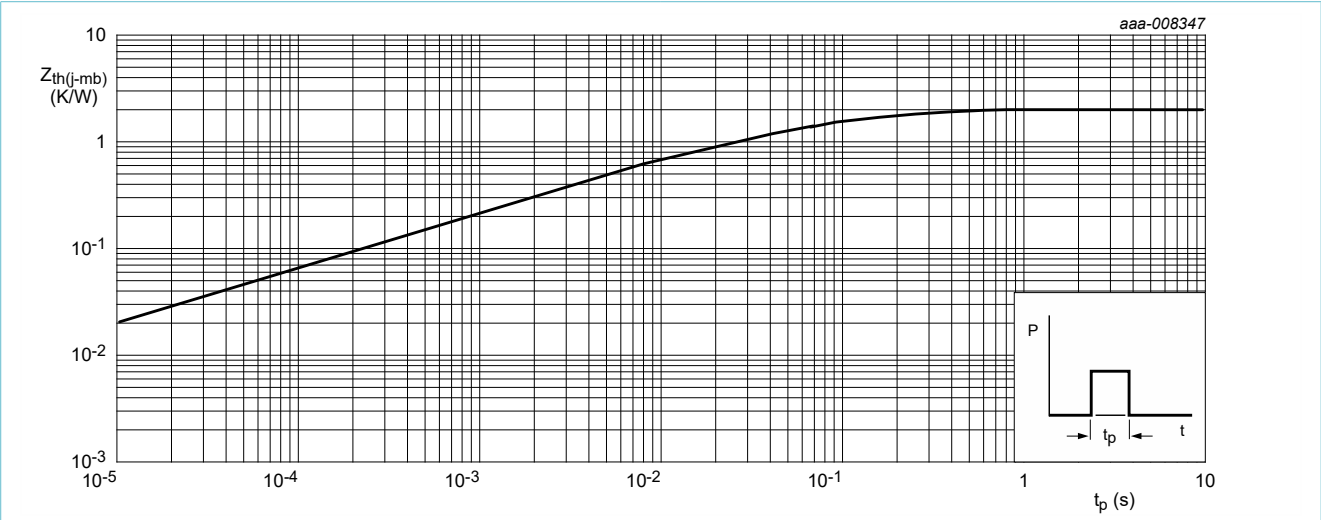
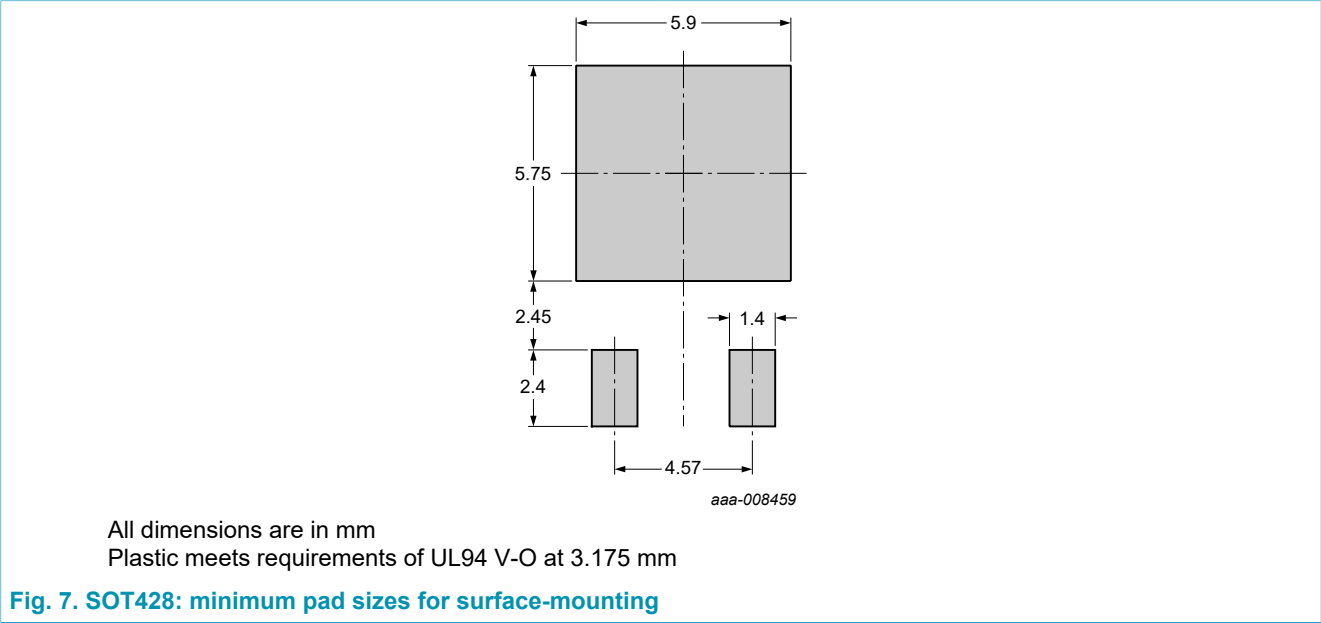


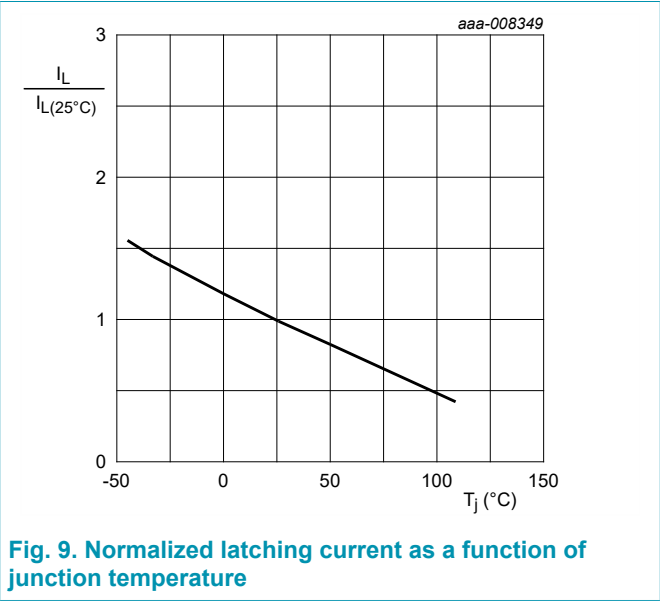
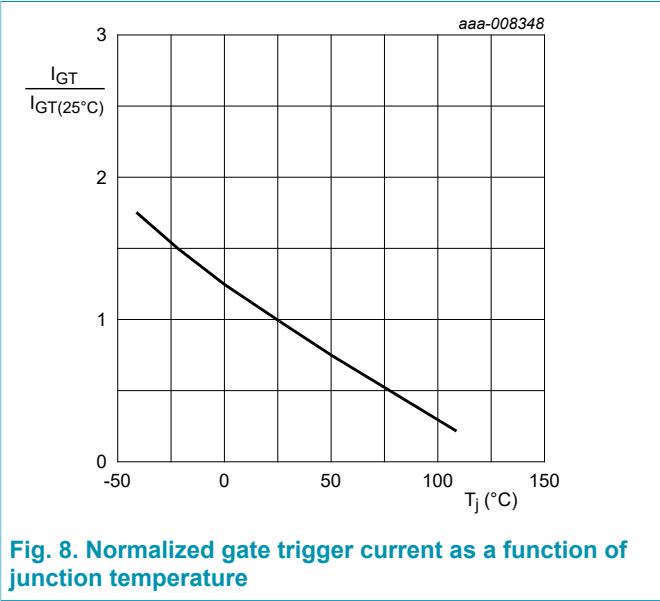
Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

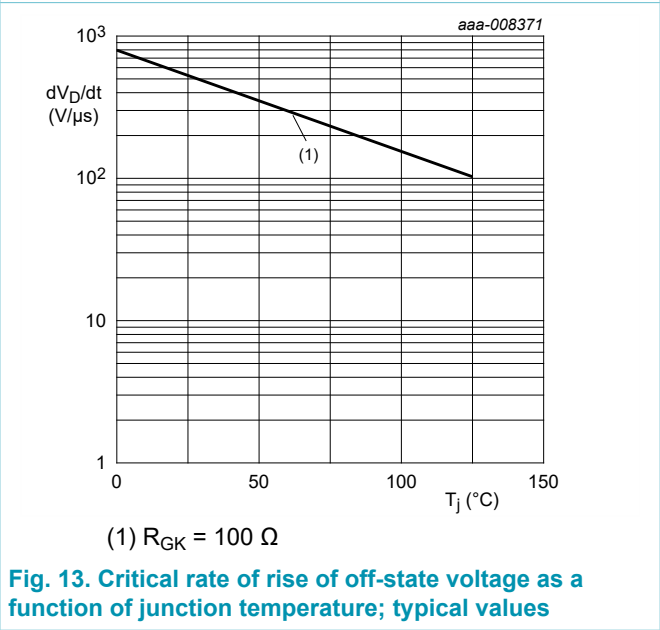
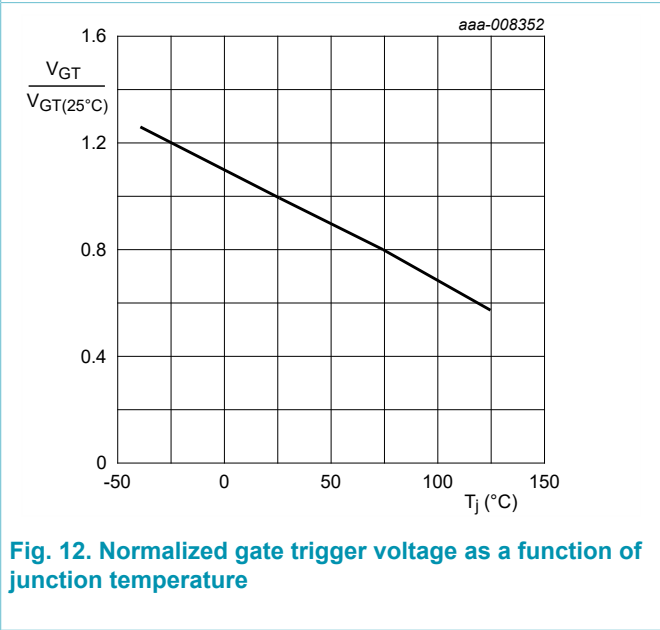
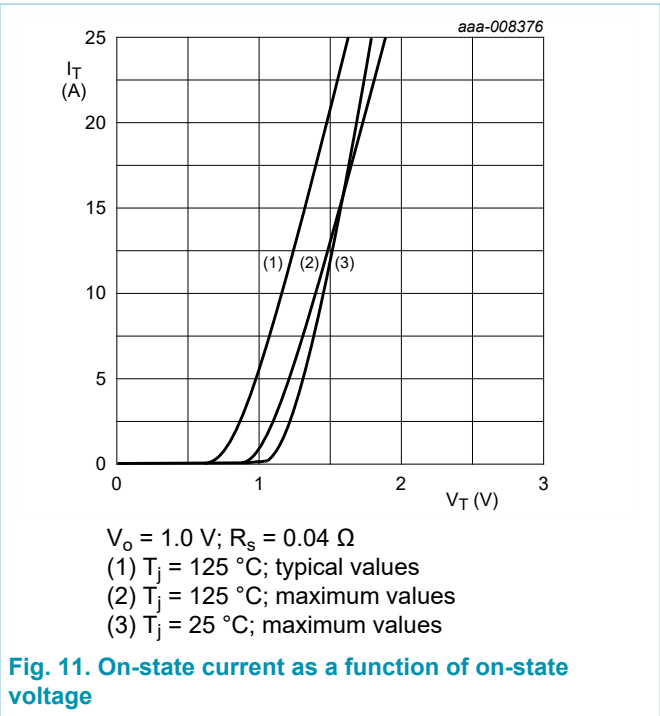
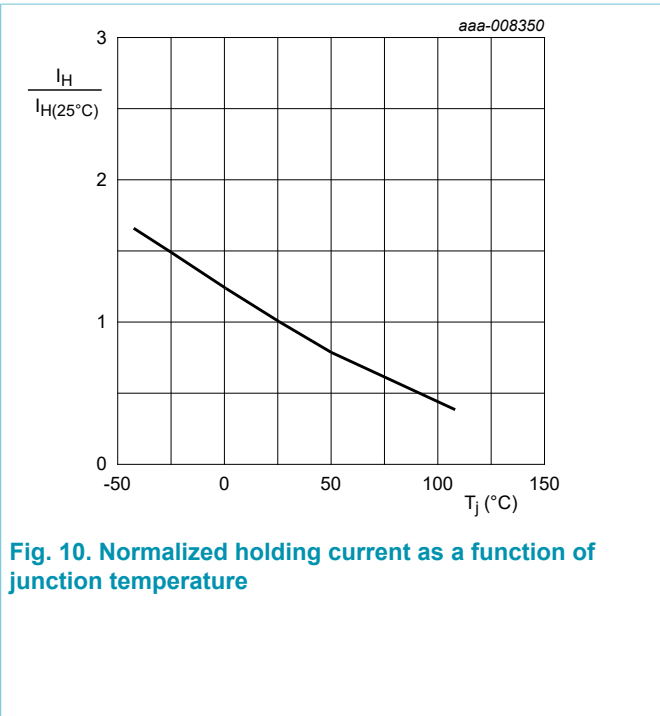


9. Characteristics

Table 6. Characteristics

| Symbol                  | Parameter                         | Conditions                                                                                                                                                                                                                                                        |  | Min | Typ | Max | Unit                   |
|-------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----|-----|-----|------------------------|
| Static characteristics  |                                   |                                                                                                                                                                                                                                                                   |  |     |     |     |                        |
| $I_{GT}$                | gate trigger current              | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 8</a>                                                                                                                                                          |  | -   | 50  | 200 | $\mu\text{A}$          |
| $I_L$                   | latching current                  | $V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 9</a>                                                                                                                                                          |  | -   | 0.4 | 10  | $\text{mA}$            |
| $I_H$                   | holding current                   | $V_D = 12\text{ V}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 10</a>                                                                                                                                                                                |  | -   | 0.3 | 6   | $\text{mA}$            |
| $V_T$                   | on-state voltage                  | $I_T = 16\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 11</a>                                                                                                                                                                                |  | -   | 1.3 | 1.6 | $\text{V}$             |
| $V_{GT}$                | gate trigger voltage              | $V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 12</a>                                                                                                                                                         |  | -   | 0.4 | 1   | $\text{V}$             |
|                         |                                   | $V_D = 800\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 110\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 12</a>                                                                                                                                                       |  | 0.1 | 0.2 | -   | $\text{V}$             |
| $I_D$                   | off-state current                 | $V_D = 800\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$                                                                                                                                                                                                        |  | -   | 0.1 | 0.5 | $\text{mA}$            |
| $I_R$                   | reverse current                   | $V_R = 800\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$                                                                                                                                                                                                        |  | -   | 0.1 | 0.5 | $\text{mA}$            |
| Dynamic characteristics |                                   |                                                                                                                                                                                                                                                                   |  |     |     |     |                        |
| $dV_D/dt$               | rate of rise of off-state voltage | $V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; $R_{GK} = 100\text{ }\Omega$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; <a href="#">Fig. 13</a>                                                                                    |  | 50  | 100 | -   | $\text{V}/\mu\text{s}$ |
| $t_{gt}$                | gate-controlled turn-on time      | $I_{TM} = 10\text{ A}$ ; $V_D = 800\text{ V}$ ; $I_G = 5\text{ mA}$ ; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^{\circ}\text{C}$                                                                                                                   |  | -   | 2   | -   | $\mu\text{s}$          |
| $t_q$                   | commutated turn-off time          | $V_{DM} = 536\text{ V}$ ; $T_j = 125\text{ }^{\circ}\text{C}$ ; $I_{TM} = 12\text{ A}$ ; $V_R = 24\text{ V}$ ; $(dI_T/dt)_M = 10\text{ A}/\mu\text{s}$ ; $dV_D/dt = 2\text{ V}/\mu\text{s}$ ; $R_{GK(ext)} = 1\text{ k}\Omega$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ) |  | -   | 100 | -   | $\mu\text{s}$          |

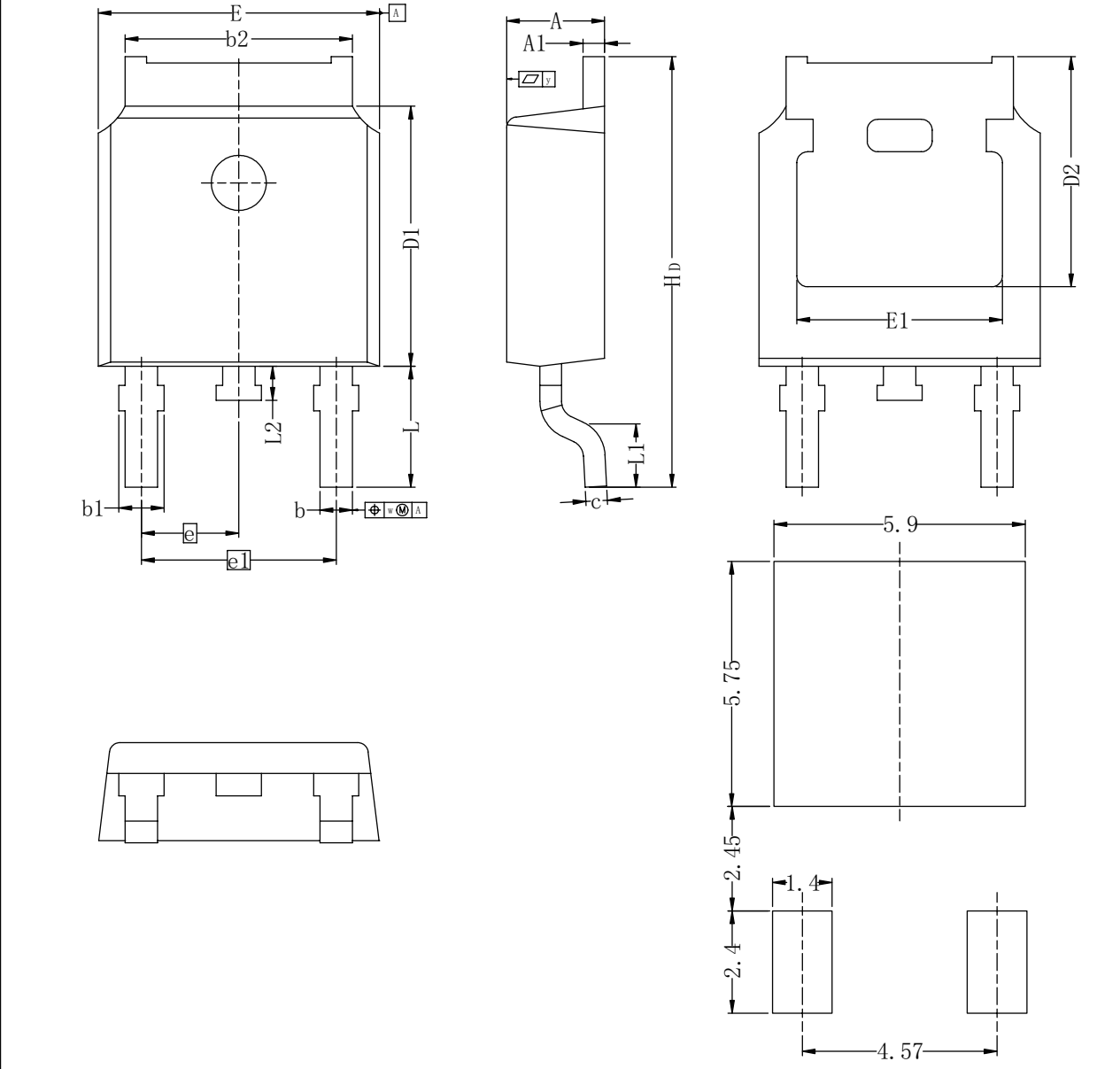




10. Package outline

Assembly factory: N

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)



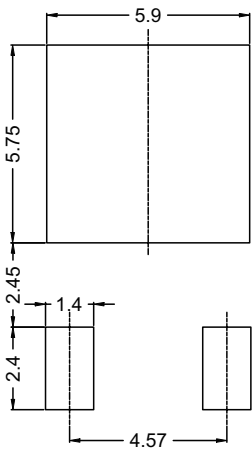
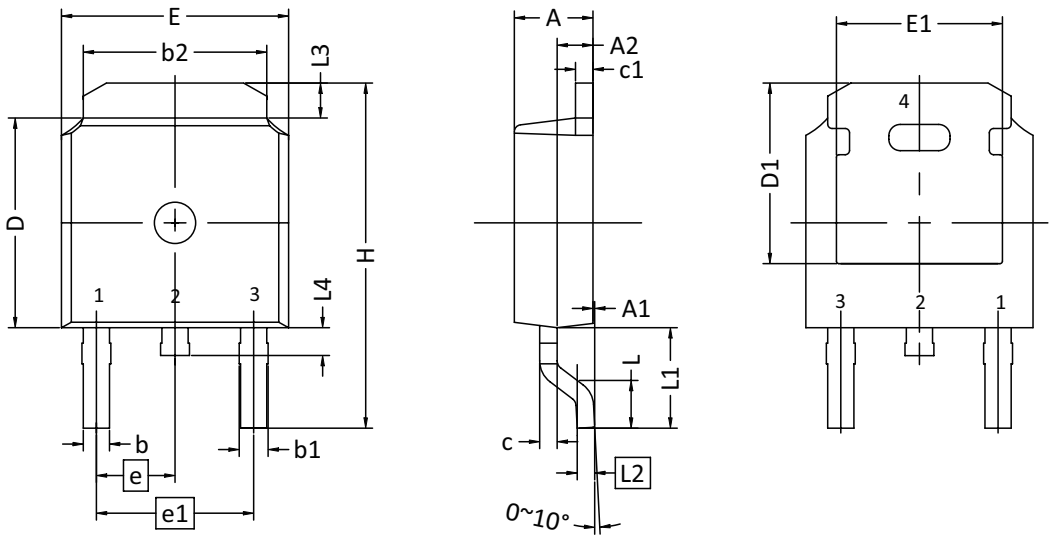
Recommended Footprint

| Unit | A    | A1   | b    | b1   | b2   | c    | D1   | D2   | E    | E1   | e     | e1   | H <sub>D</sub> | L              | L1   | L2   | w    | y    |
|------|------|------|------|------|------|------|------|------|------|------|-------|------|----------------|----------------|------|------|------|------|
| min  | 2.22 | 0.46 | 0.71 | 0.72 | 5.00 | 0.20 | 5.98 | 4.00 | 6.47 | 4.45 | 2.285 | 4.57 | 9.60           | 2.90<br>(Ref.) | 0.50 | 0.50 | 0.20 |      |
| nom  |      |      |      |      |      |      |      |      |      |      |       |      |                |                |      |      |      |      |
| max  | 2.38 | 0.93 | 0.89 | 1.10 | 5.46 | 0.56 | 6.22 | ---  | 6.73 | ---  |       |      | 10.40          |                | ---  | 0.90 |      | 0.20 |

Assembly factory: Q

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)

TO252



Recommended Footprint

| SYMBOLS | DIMENSION IN MM |        |        |
|---------|-----------------|--------|--------|
|         | MIN             | NOM    | MAX    |
| A       | 2.184           | 2.286  | 2.400  |
| A1      | 0.000           | ---    | 0.200  |
| A2      | 0.889           | 1.041  | 1.170  |
| b       | 0.635           | 0.762  | 0.889  |
| b1      | 0.680           | 0.840  | 1.143  |
| b2      | 4.953           | 5.340  | 5.500  |
| c       | 0.450           | 0.508  | 0.610  |
| c1      | 0.450           | 0.508  | 0.630  |
| D       | 5.969           | 6.096  | 6.223  |
| D1      | 5.210           | 5.249  | 5.380  |
| E       | 6.350           | 6.604  | 6.800  |
| E1      | 4.318           | 4.826  | 4.920  |
| e       | 2.286BSC        |        |        |
| e1      | 4.572BSC        |        |        |
| H       | 9.398           | 10.033 | 10.500 |
| L       | 1.270           | 1.520  | 2.032  |
| L1      | 2.921REF        |        |        |
| L2      | 0.408           | 0.508  | 0.608  |
| L3      | 0.889           | 1.016  | 1.270  |
| L4      | 0.600           | ---    | 1.016  |

## 11. 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. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| 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.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.ween-semi.com>.

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