

## 1. General description

Dual Silicon Carbide Schottky diode in a TO247-3L plastic package, designed for high frequency switched-mode power supplies.



## 2. Features and benefits

- Highly stable switching performance
- High forward surge capability  $I_{FSM}$
- Extremely fast reverse recovery time
- Superior in efficiency to Silicon Diode alternatives
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant
- High junction operating temperature capability ( $T_{j(max)} = 175\text{ °C}$ )

## 3. Applications

- Power factor correction
- Telecom / Server SMPS
- UPS
- PV inverter
- PC Silverbox
- LED / OLED TV
- Motor Drives

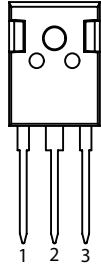
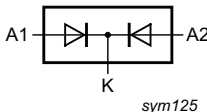
## 4. Quick reference data

Table 1. Quick reference data

| Symbol                         | Parameter                        | Conditions   | Notes | Values     |      |      | Unit |
|--------------------------------|----------------------------------|--|-------|------------|------|------|------|
| <b>Absolute maximum rating</b> |                                  |  |       |            |      |      |      |
| $V_{RRM}$                      | repetitive peak reverse voltage  |  |       | 1200       |      |      | V    |
| $I_{O(AV)}$                    | limiting average forward current | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 126\text{ °C}$ ; both diodes conducting; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> |       | 30         |      |      | A    |
| $T_j$                          | junction temperature             |  |       | -55 to 175 |      |      | °C   |
| Symbol                         | Parameter                        | Conditions   | Notes | Min        | Typ  | Max  | Unit |
| <b>Static characteristics</b>  |                                  |  |       |            |      |      |      |
| $V_F$                          | forward voltage                  | $I_F = 15\text{ A}$ ; $T_j = 25\text{ °C}$ ; per diode; <a href="#">Fig. 5</a>   |       | -          | 1.42 | 1.60 | V    |
|                                |                                  | $I_F = 15\text{ A}$ ; $T_j = 150\text{ °C}$ ; per diode; <a href="#">Fig. 5</a>  |       | -          | 1.90 | 2.30 | V    |
|                                |                                  | $I_F = 15\text{ A}$ ; $T_j = 175\text{ °C}$ ; per diode; <a href="#">Fig. 5</a>  |       | -          | 2.00 | 2.50 | V    |
| <b>Dynamic characteristics</b> |                                  |  |       |            |      |      |      |
| $Q_r$                          | recovered charge                 | $I_F = 15\text{ A}$ ; $di_F/dt = 500\text{ A}/\mu\text{s}$ ; $V_R = 400\text{ V}$ ; $T_j = 25\text{ °C}$ ; per diode; <a href="#">Fig. 7</a>                       |       | -          | 36   | -    | nC   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description                         | Simplified outline  | Graphic symbol  |
|-----|--------|-------------------------------------|---|---|
| 1   | A1     | anode                               |  | <br>sym125 |
| 2   | K      | cathode                             |   |   |
| 3   | A2     | anode                               |   |   |
| mb  | mb     | mounting base; connected to cathode |   |   |

## 6. Ordering information

Table 3. Ordering information

| Type number    | Package name | Orderable part number | Packing method | Small packing quantity | Package version | Package issue date |
|----------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| WNSC2D301200CW | TO247        | WNSC2D301200CW6Q      | Tube           | 30                     | SOT429 (L)      | 25-Mar-2013        |
|                |              |                       |                |                        | TO247P (P)      | 31-Mar-2023        |

## 7. Marking

Table 4. Marking codes

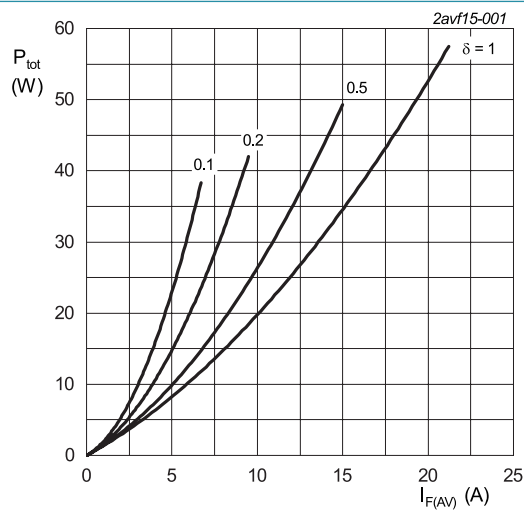
| Type number    | Marking codes      |
|----------------|--------------------|
| WNSC2D301200CW | WNSC2D<br>301200CW |

## 8. Limiting values

**Table 5. Limiting values**

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

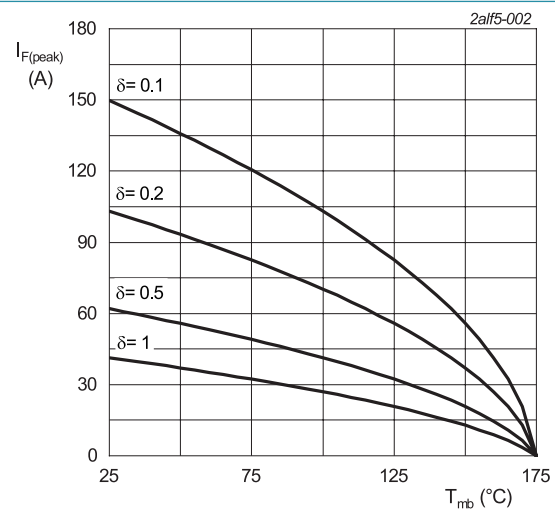
| Symbol      | Parameter                           | Conditions   | Notes | Values     | Unit                 |
|-------------|-------------------------------------|--|-------|------------|----------------------|
| $V_{RRM}$   | repetitive peak reverse voltage     |  |       | 1200       | V                    |
| $V_{RWM}$   | crest working reverse voltage       |  |       | 1200       | V                    |
| $V_R$       | reverse voltage                     | DC   |       | 1200       | V                    |
| $I_{O(AV)}$ | limiting average forward current    | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 126\text{ }^\circ\text{C}$ ; both diodes conducting; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> |       | 30         | A                    |
| $I_{FRM}$   | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 131\text{ }^\circ\text{C}$ ; square-wave pulse; per diode  |       | 30         | A                    |
| $I_{FSM}$   | non-repetitive peak forward current | $t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse; per diode  |       | 140        | A                    |
|             |                                     | $t_p = 10\text{ }\mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; square-wave pulse; per diode   |       | 900        | A                    |
| $I^2t$      | $I^2t$ for fusing                   | sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; $t_p = 10\text{ ms}$  |       | 98         | $\text{A}^2\text{s}$ |
| $T_{stg}$   | storage temperature                 |  |       | -55 to 175 | $^\circ\text{C}$     |
| $T_j$       | junction temperature                |  |       | -55 to 175 | $^\circ\text{C}$     |



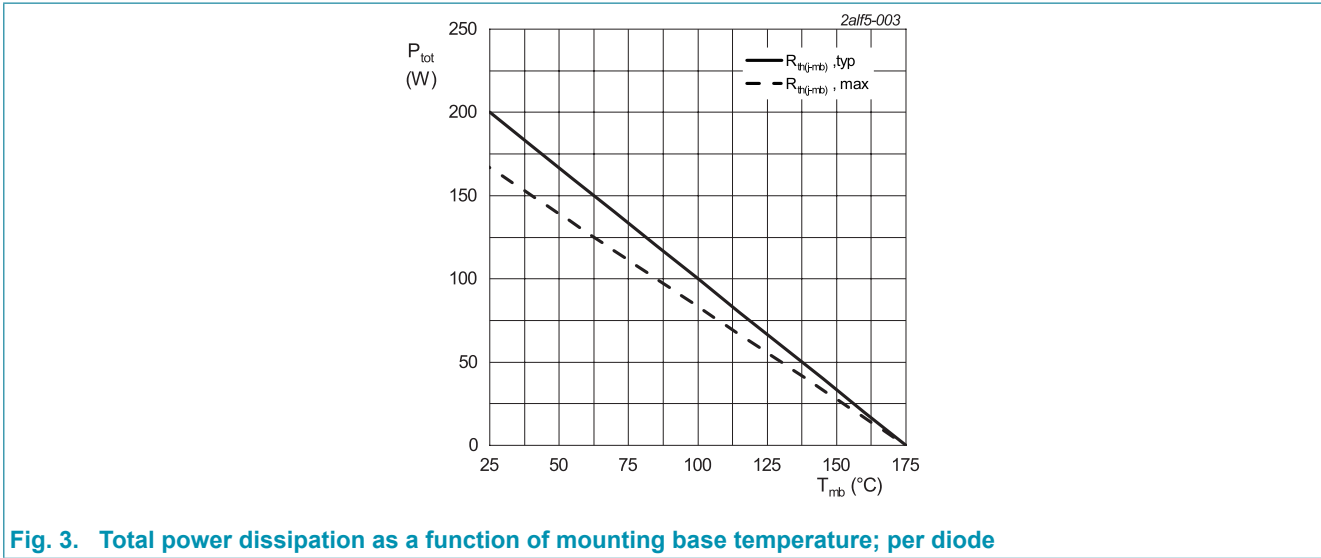
$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 1.321\text{ V}; R_s = 0.0655\text{ }\Omega$$

**Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values; per diode**



**Fig. 2. Current derating as a function of mounting base temperature; per diode**



## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol         | Parameter  | Conditions                        | Notes | Min | Typ  | Max | Unit |
|----------------|--|-----------------------------------|-------|-----|------|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base    | per diode; <a href="#">Fig. 4</a> |       | -   | 0.75 | 0.9 | K/W  |
|                |  | both diodes conducting            |       | -   | 0.38 | 0.5 | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient free air | in free air                       |       | -   | 40   | -   | K/W  |

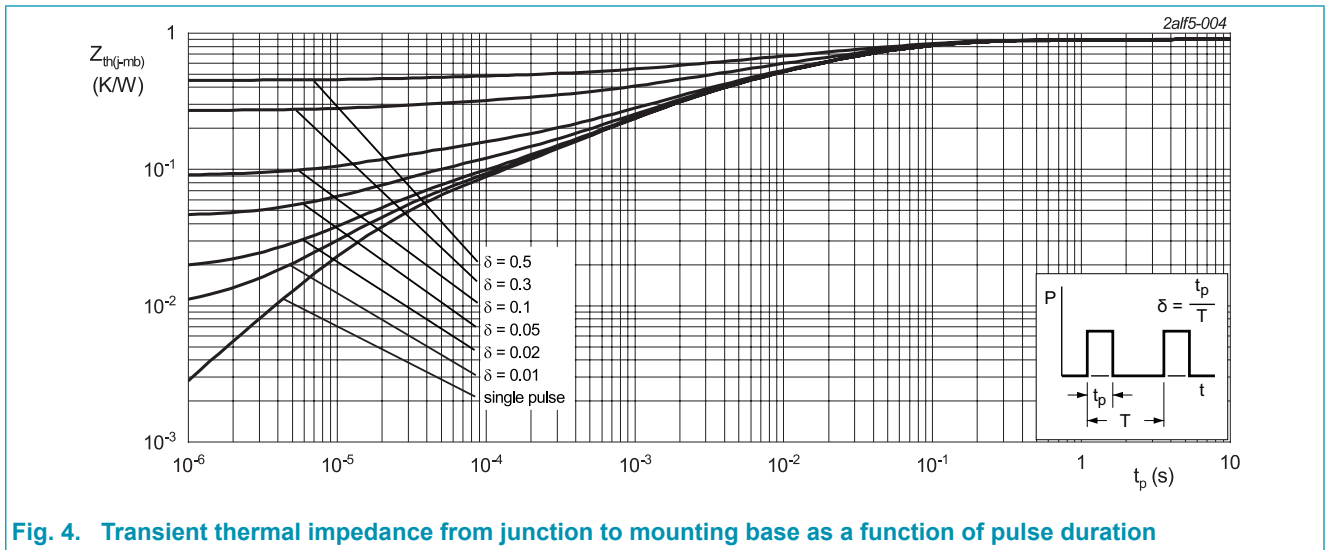
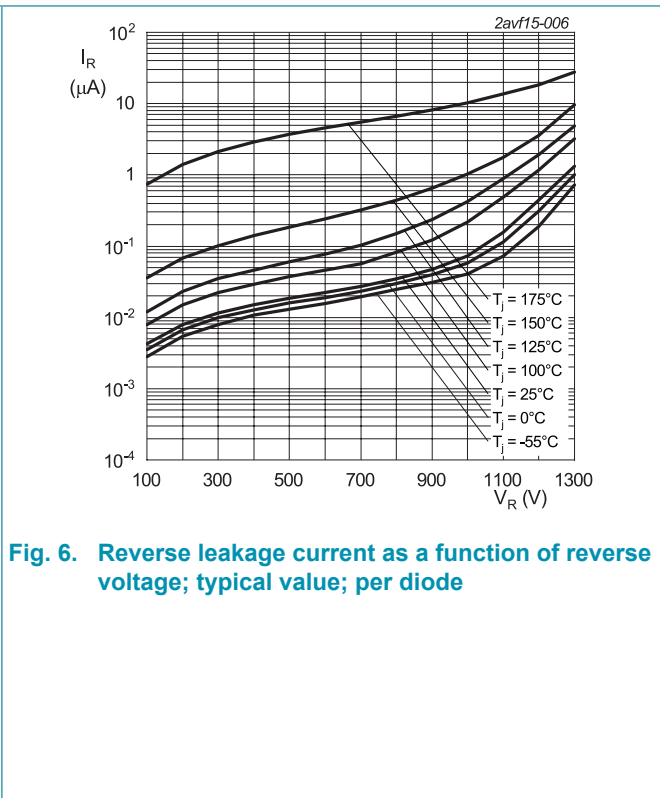
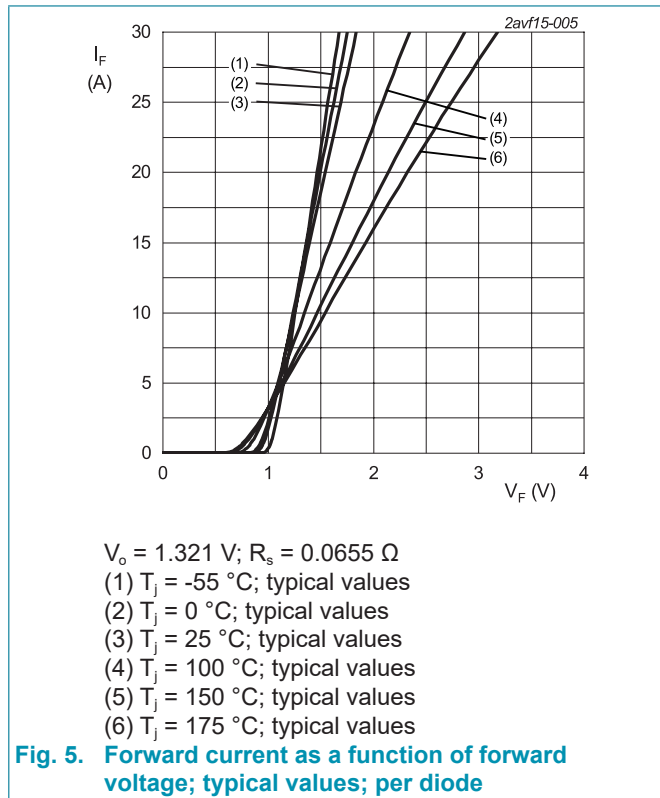


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

### 10. Characteristics

Table 7. Characteristics

| Symbol                         | Parameter                       | Conditions  | Notes | Min | Typ  | Max  | Unit          |
|--------------------------------|---------------------------------|---|-------|-----|------|------|---------------|
| <b>Static characteristics</b>  |                                 |   |       |     |      |      |               |
| $V_F$                          | forward current                 | $I_F = 15\text{ A}; T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 5</a>  |       | -   | 1.42 | 1.60 | V             |
|                                |                                 | $I_F = 15\text{ A}; T_j = 150\text{ °C};$ per diode; <a href="#">Fig. 5</a>   |       | -   | 1.90 | 2.30 | V             |
|                                |                                 | $I_F = 15\text{ A}; T_j = 175\text{ °C};$ per diode; <a href="#">Fig. 5</a>   |       | -   | 2.00 | 2.50 | V             |
| $I_R$                          | reverse current                 | $V_R = 1200\text{ V}; T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 6</a>  |       | -   | 1    | 75   | $\mu\text{A}$ |
|                                |                                 | $V_R = 1200\text{ V}; T_j = 175\text{ °C};$ per diode; <a href="#">Fig. 6</a>   |       | -   | 25   | 750  | $\mu\text{A}$ |
| <b>Dynamic characteristics</b> |                                 |   |       |     |      |      |               |
| $Q_r$                          | recovered charge                | $I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s};$<br>$T_j = 25\text{ °C};$ per diode; <a href="#">Fig. 7</a> |       | -   | 36   | -    | nC            |
| $C_d$                          | diode capacitance               | $f = 1\text{ MHz}; V_R = 1\text{ V}; T_j = 25\text{ °C};$ per diode   |       | -   | 800  | -    | pF            |
|                                |                                 | $f = 1\text{ MHz}; V_R = 400\text{ V}; T_j = 25\text{ °C};$ per diode   |       | -   | 66   | -    | pF            |
|                                |                                 | $f = 1\text{ MHz}; V_R = 800\text{ V}; T_j = 25\text{ °C};$ per diode   |       | -   | 48   | -    | pF            |
| $E_{as}$                       | non-repetitive avalanche energy | $I_R = 4.7\text{ A}; L = 10\text{ mH}; T_{j(\text{init})} = 25\text{ °C};$<br>per diode   |       | 110 | -    | -    | mJ            |



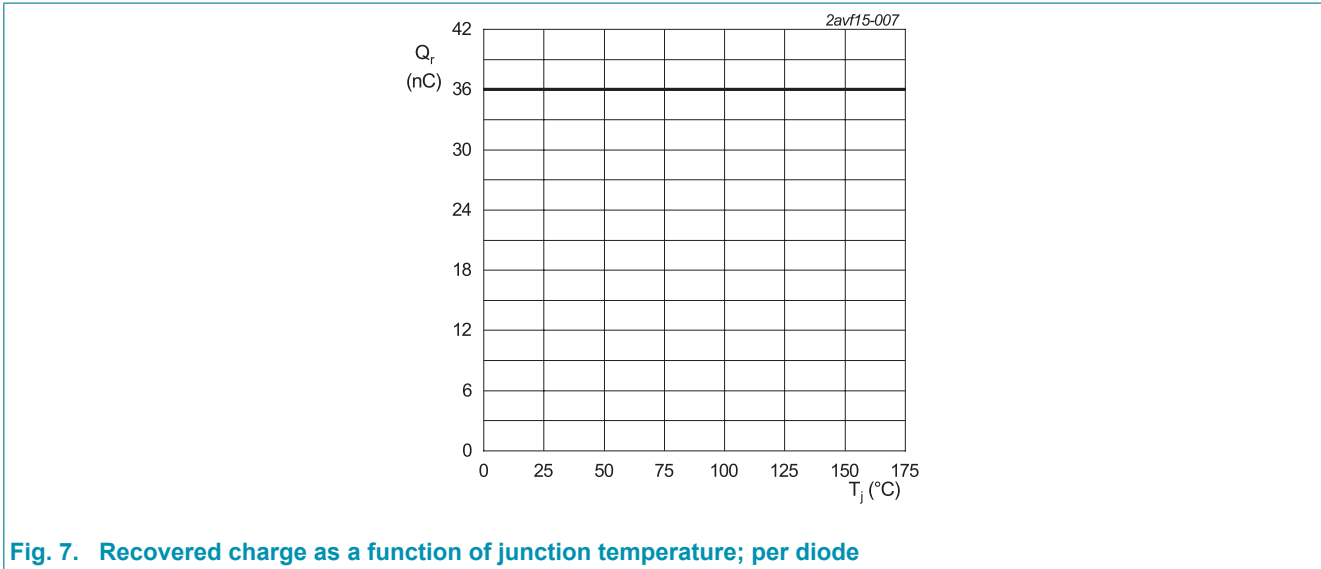
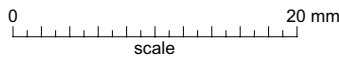
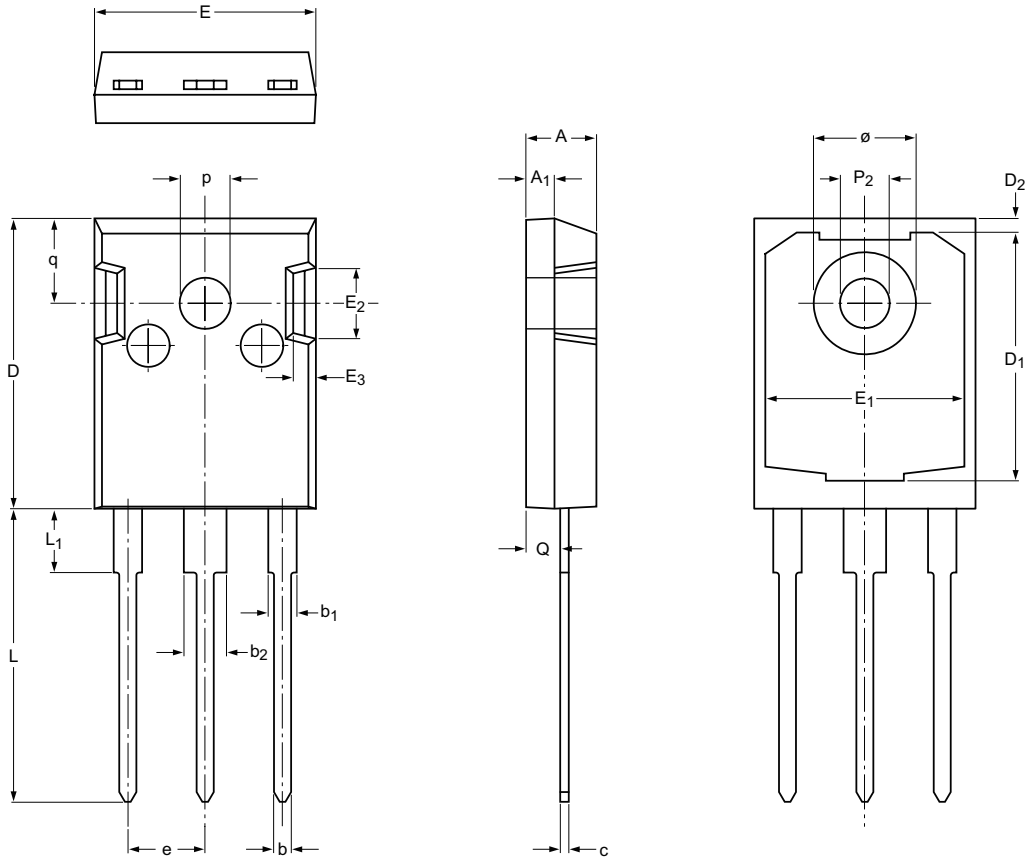


Fig. 7. Recovered charge as a function of junction temperature; per diode

### 11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247

SOT429



Dimensions (mm are the original dimensions)

| Unit <sup>(1)</sup> | A    | A <sub>1</sub> | b    | b <sub>1</sub> | b <sub>2</sub> | c    | D    | D <sub>1</sub> | D <sub>2</sub> | E     | E <sub>1</sub> | E <sub>2</sub> | E <sub>3</sub> | e <sup>(1)</sup> | L     | L <sub>1</sub> | P <sub>2</sub> | p    | Q    | q    | ø    |      |  |
|---------------------|------|----------------|------|----------------|----------------|------|------|----------------|----------------|-------|----------------|----------------|----------------|------------------|-------|----------------|----------------|------|------|------|------|------|--|
| max                 | 5.20 | 2.10           | 1.40 | 2.20           | 3.20           | 0.70 | 20.6 | 17.68          | 1.20           | 15.75 | 14.22          | 5.20           | 1.80           | 5,45             | 20.90 | 4.75           | 3.60           | 3.70 | 2.60 | 6.18 | 7.30 |      |  |
| nom                 |      |                |      |                |                |      |      |                |                |       |                |                |                |                  |       |                |                |      |      |      |      |      |  |
| min                 | 4.70 | 1.90           | 1.00 | 1.80           | 2.80           | 0.50 | 20.3 | 17.28          | 0.80           | 15.45 | 13.82          | 4.80           | 1.40           |                  |       | 20.40          | 4.25           | 3.40 | 3.50 | 2.20 | 5.78 | 7.10 |  |

Note

1. Basic spacing between centers.

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|                 |            |       |       |                     |                       |
|-----------------|------------|-------|-------|---------------------|-----------------------|
| Outline version | References |       |       | European projection | Issue date            |
|                 | IEC        | JEDEC | JEITA |                     |                       |
| SOT429          | TO-247     |       |       |                     | 04-09-14-<br>13-03-25 |



## 12. 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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| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

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