

## 1. General description

Silicon Carbide Schottky diode in a TO263-2L (D2PAK) plastic package, designed for high frequency switched-mode power supplies.



**Lead-Free**

## 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

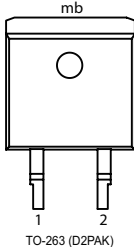
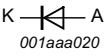
## 4. Quick reference data

Table 1. Quick reference data

| Symbol                  | Parameter                       | Conditions  | Notes | Values     |      |      | Unit |
|-------------------------|---------------------------------|---|-------|------------|------|------|------|
| Absolute maximum rating |                                 |   |       |            |      |      |      |
| V <sub>RRM</sub>        | repetitive peak reverse voltage |   |       | 1200       |      |      | V    |
| I <sub>F(AV)</sub>      | average forward current         | δ = 0.5 ; square-wave pulse; T <sub>mb</sub> ≤ 145 °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> |       | 10         |      |      | A    |
| T <sub>j</sub>          | junction temperature            |   |       | -55 to 175 |      |      | °C   |
| Symbol                  | Parameter                       | Conditions  | Notes | Min        | Typ  | Max  | Unit |
| Static characteristics  |                                 |   |       |            |      |      |      |
| V <sub>F</sub>          | forward voltage                 | I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 5</a>   |       | -          | 1.42 | 1.60 | V    |
|                         |                                 | I <sub>F</sub> = 10 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 5</a>  |       | -          | 1.90 | 2.30 | V    |
|                         |                                 | I <sub>F</sub> = 10 A; T <sub>j</sub> = 175 °C; <a href="#">Fig. 5</a>  |       | -          | 2.00 | 2.50 | V    |
| Dynamic characteristics |                                 |   |       |            |      |      |      |
| Q <sub>r</sub>          | recovered charge                | I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 500 A/μs; V <sub>R</sub> = 400 V; T <sub>i</sub> = 25 °C; <a href="#">Fig. 7</a>   |       | -          | 22   | -    | nC   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description                         | Simplified outline   | Graphic symbol  |
|-----|--------|-------------------------------------|--|---|
| 1   | K      | cathode                             |  |  |
| 2   | A      | 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 |
|-----------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| WNSC2D101200BT2 | TO263-2L     | WNSC2D101200BT26J     | Reel           | 800                    | TO263N-2L       | 14-Oct-2022        |

## 7. Marking

Table 4. Marking codes

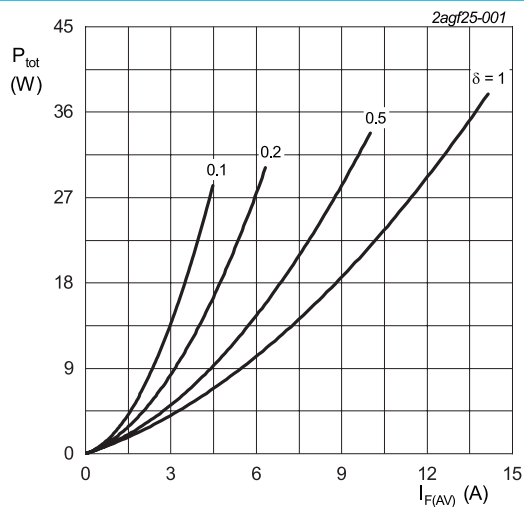
| Type number     | Marking codes       |
|-----------------|---------------------|
| WNSC2D101200BT2 | WNSC2D<br>101200BT2 |

## 8. Limiting values

**Table 5. Limiting values**

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

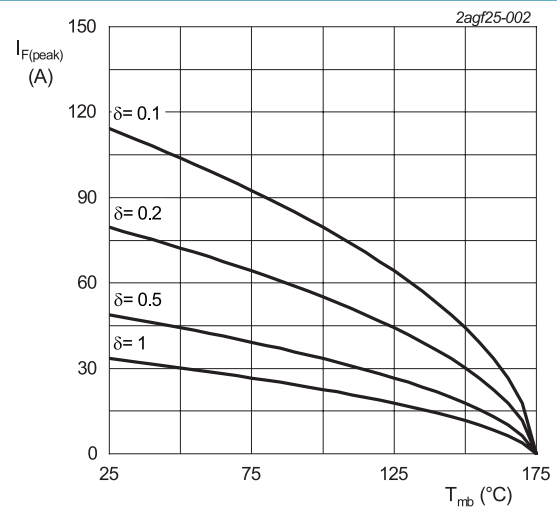
| Symbol      | Parameter                           | Conditions   | Notes | Values     | Unit                 |
|-------------|-------------------------------------|--|-------|------------|----------------------|
| $V_{RRM}$   | repetitive peak reverse voltage     |  |       | 1200       | V                    |
| $V_{RWM}$   | crest working reverse voltage       |  |       | 1200       | V                    |
| $V_R$       | reverse voltage                     | DC   |       | 1200       | V                    |
| $I_{F(AV)}$ | average forward current             | $\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 145^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> |       | 10         | A                    |
| $I_{FRM}$   | repetitive peak forward current     | $\delta = 0.5$ ; $t_p = 25\ \mu\text{s}$ ; $T_{mb} \leq 145^\circ\text{C}$ ; square-wave pulse   |       | 20         | A                    |
| $I_{FSM}$   | non-repetitive peak forward current | $t_p = 10\ \text{ms}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ ; sine-wave pulse  |       | 80         | A                    |
|             |                                     | $t_p = 10\ \mu\text{s}$ ; $T_{j(\text{init})} = 25^\circ\text{C}$ ; square-wave pulse  |       | 700        | A                    |
| $I^2t$      | $I^2t$ for fusing                   | sine-wave pulse; $T_{j(\text{init})} = 25^\circ\text{C}$ ; $t_p = 10\ \text{ms}$   |       | 32         | $\text{A}^2\text{s}$ |
| $T_{stg}$   | storage temperature                 |  |       | -55 to 175 | $^\circ\text{C}$     |
| $T_j$       | junction temperature                |  |       | -55 to 175 | $^\circ\text{C}$     |



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

$$V_o = 0.997\ \text{V}; R_s = 0.1192\ \Omega$$

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



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

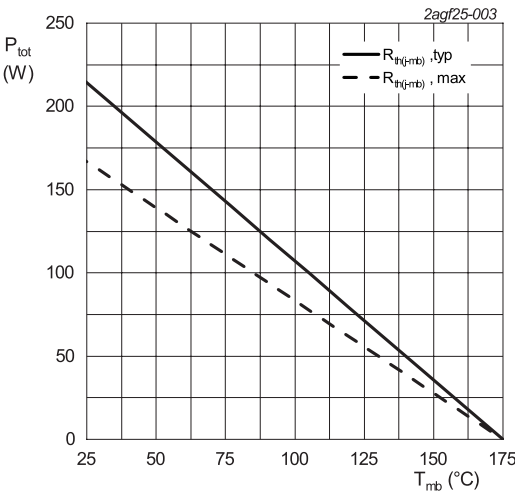


Fig. 3. Total power dissipation as a function of mounting base temperature

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    | <a href="#">Fig. 4</a> |       | -   | 0.7 | 0.9 | K/W  |
| $R_{th(j-a)}$  | thermal resistance from junction to ambient free air | in free air            |       | -   | 40  | -   | K/W  |

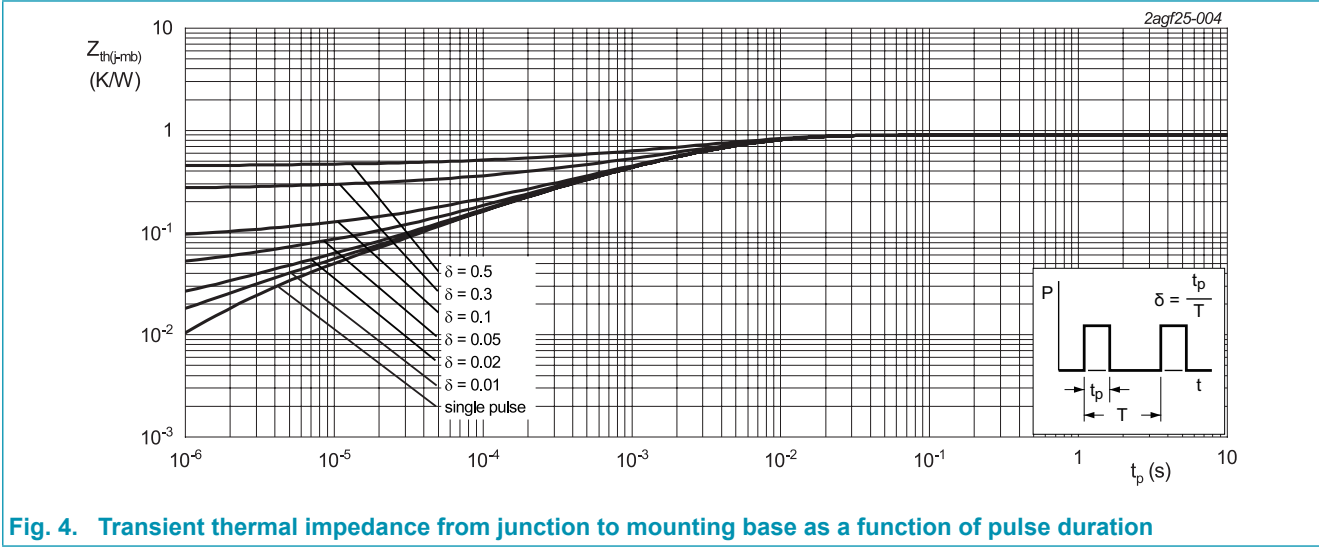
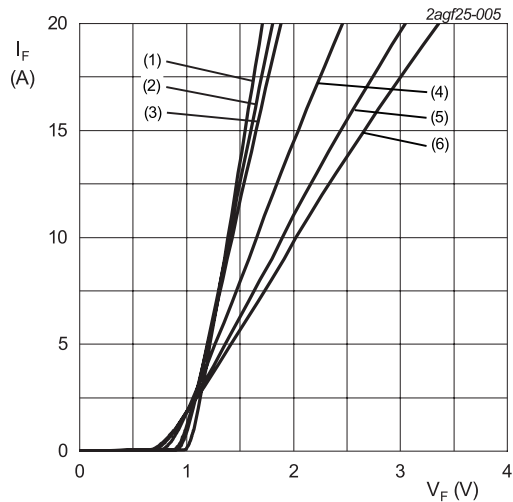


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

Table 7. Characteristics

| Symbol                  | Parameter                       | Conditions  | Notes | Min | Typ  | Max  | Unit |
|-------------------------|---------------------------------|---|-------|-----|------|------|------|
| Static characteristics  |                                 |   |       |     |      |      |      |
| V <sub>F</sub>          | forward current                 | I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 5</a>   |       | -   | 1.42 | 1.60 | V    |
|                         |                                 | I <sub>F</sub> = 10 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 5</a>  |       | -   | 1.90 | 2.30 | V    |
|                         |                                 | I <sub>F</sub> = 10 A; T <sub>j</sub> = 175 °C; <a href="#">Fig. 5</a>  |       | -   | 2.00 | 2.50 | V    |
| I <sub>R</sub>          | reverse current                 | V <sub>R</sub> = 1200 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>   |       | -   | 1    | 50   | μA   |
|                         |                                 | V <sub>R</sub> = 1200 V; T <sub>j</sub> = 175 °C; <a href="#">Fig. 6</a>  |       | -   | 25   | -    | μA   |
| Dynamic characteristics |                                 |   |       |     |      |      |      |
| Q <sub>r</sub>          | recovered charge                | I <sub>F</sub> = 10 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a> |       | -   | 22   | -    | nC   |
| C <sub>d</sub>          | diode capacitance               | f = 1 MHz; V <sub>R</sub> = 1 V; T <sub>j</sub> = 25 °C   |       | -   | 481  | -    | pF   |
|                         |                                 | f = 1 MHz; V <sub>R</sub> = 400 V; T <sub>j</sub> = 25 °C   |       | -   | 42   | -    | pF   |
|                         |                                 | f = 1 MHz; V <sub>R</sub> = 800 V; T <sub>j</sub> = 25 °C   |       | -   | 31   | -    | pF   |
| E <sub>as</sub>         | non-repetitive avalanche energy | I <sub>R</sub> = 4.2 A; L = 10 mH; T <sub>j</sub> (init) = 25 °C  |       | 88  | -    | -    | mJ   |



$V_o = 0.997\text{ V}$ ;  $R_s = 0.1192\text{ }\Omega$

- (1)  $T_j = -55\text{ }^\circ\text{C}$ ; typical values
- (2)  $T_j = 0\text{ }^\circ\text{C}$ ; typical values
- (3)  $T_j = 25\text{ }^\circ\text{C}$ ; typical values
- (4)  $T_j = 100\text{ }^\circ\text{C}$ ; typical values
- (5)  $T_j = 150\text{ }^\circ\text{C}$ ; typical values
- (6)  $T_j = 175\text{ }^\circ\text{C}$ ; typical values

Fig. 5. Forward current as a function of forward voltage; typical values

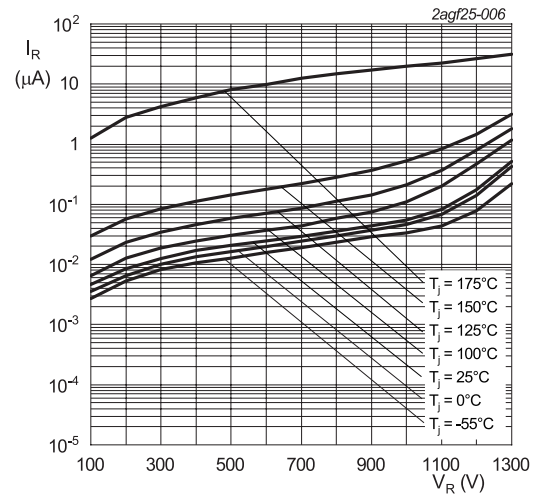


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

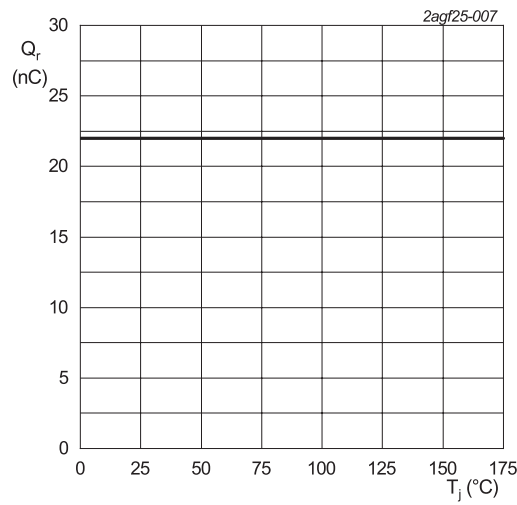
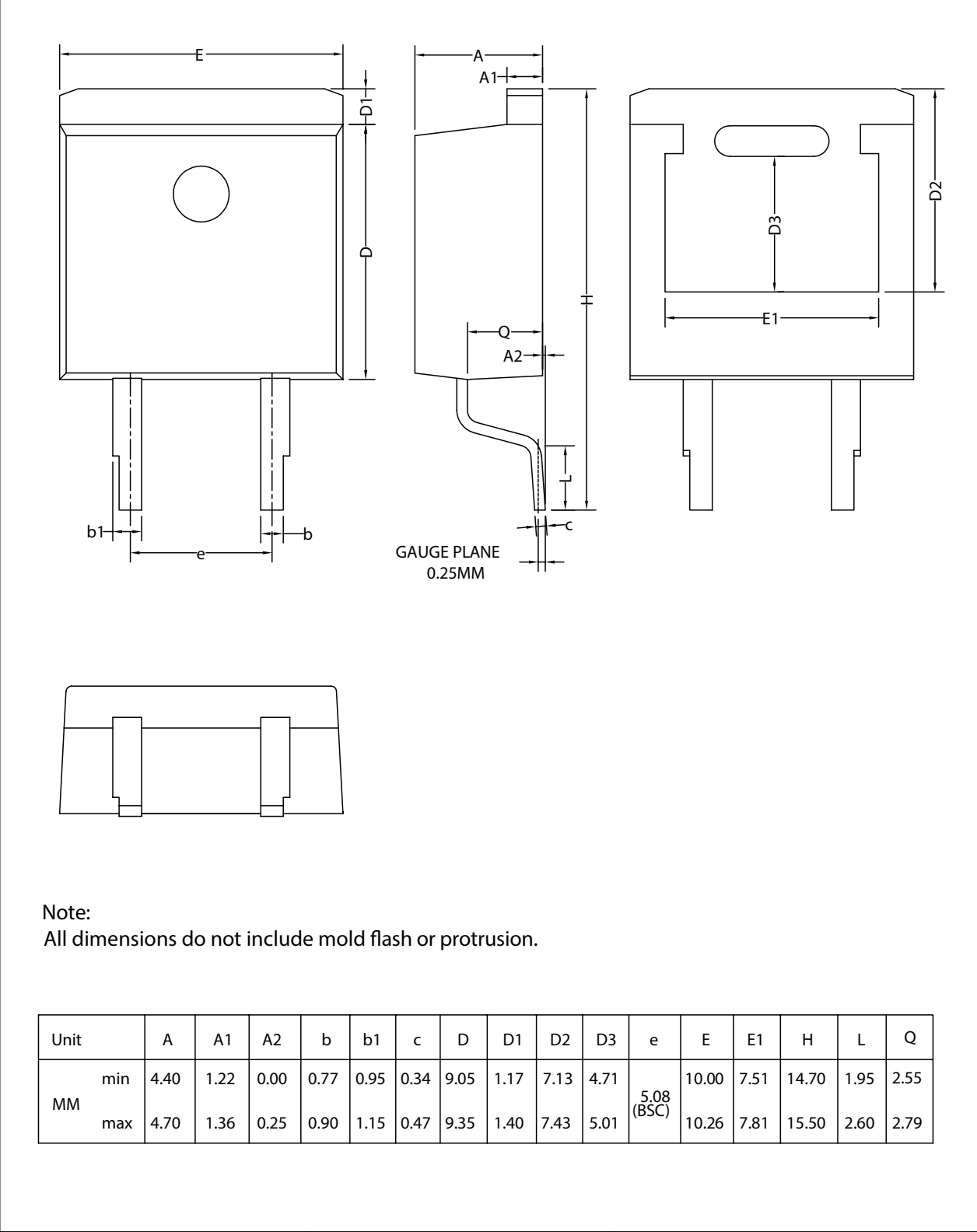


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline

Plastic single-ended surface-mounted package (D2PAK); 2 leads

TO263-2L





## 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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