

1. General description

Silicon Carbide Schottky diode in a TO247-2L 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

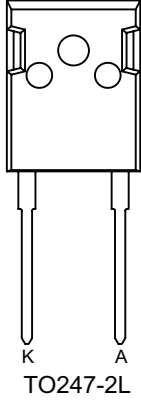

4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Values | | | Unit |
|--------------------------------|---------------------------------|---|--------|------|-----|------|
| Absolute maximum rating | | | | | | |
| V_{RRM} | repetitive peak reverse voltage | | 1200 | | | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; square-wave pulse; $T_{mb} \leq 138\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3 ; Fig. 4 | 10 | | | A |
| T_j | junction temperature | | 175 | | | °C |
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 10\text{ A}$; $T_j = 25\text{ °C}$; Fig. 6 | - | 1.4 | 1.6 | V |
| | | $I_F = 10\text{ A}$; $T_j = 150\text{ °C}$; Fig. 6 | - | 1.85 | 2.3 | V |
| | | $I_F = 10\text{ A}$; $T_j = 175\text{ °C}$; Fig. 6 | - | 2 | 2.6 | V |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 10\text{ A}$; $V_R = 400\text{ V}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $T_j = 25\text{ °C}$; Fig. 8 | - | 24 | - | nC |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------------------------|--|---|
| 1 | K | cathode |  |  |
| 2 | A | anode | | |
| mb | K | 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 |
|-------------|--------------|-----------------------|----------------|------------------------|-----------------|--------------------|
| WNSC101200W | TO247-2L | WNSC101200WQ | Tube | 30 | TO247L-2L | 28-Aug-2018 |

7. Marking

Table 4. Marking codes

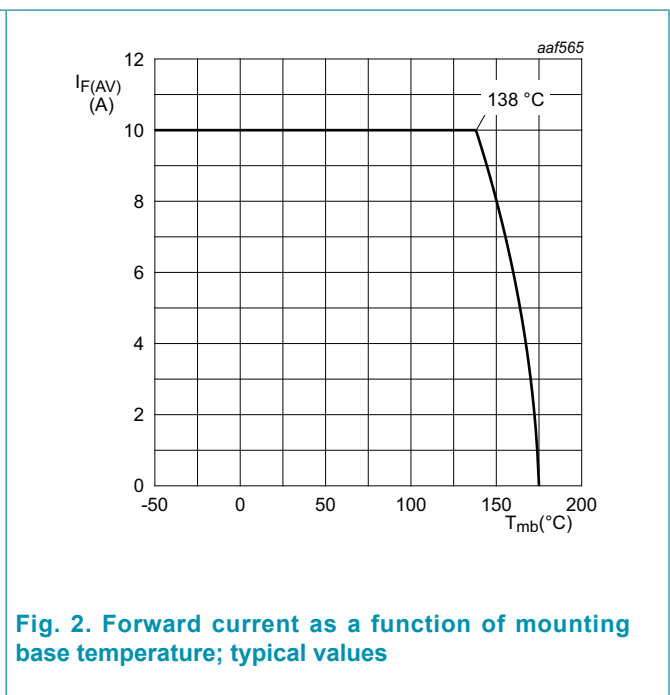
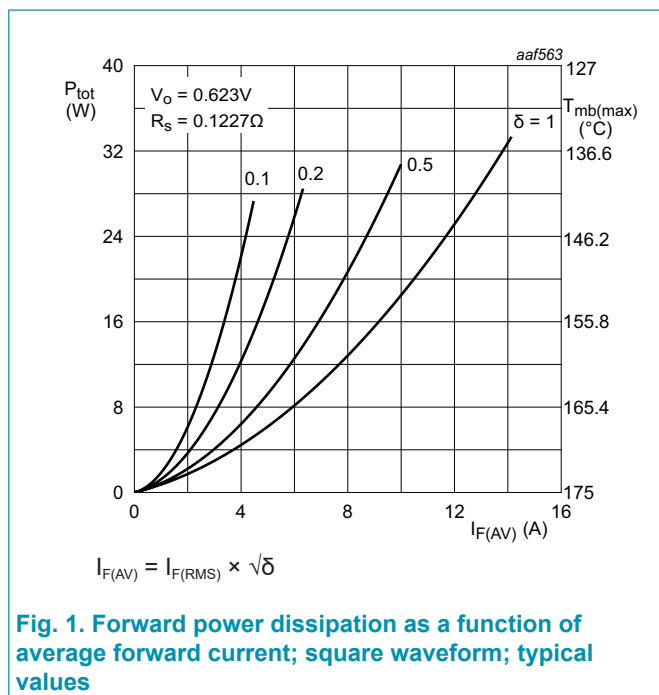
| Type number | Marking codes |
|-------------|---------------|
| WNSC101200W | WNSC101200W |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | 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; $T_{mb} \leq 138\text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3 ; Fig. 4 | 10 | A |
| I_{FRM} | repetitive peak forward current | $\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 138\text{ }^\circ\text{C}$; square-wave pulse | 20 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse | 110 | A |
| | | $t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse | 720 | A |
| T_{stg} | storage temperature | | -55 to 175 | $^\circ\text{C}$ |
| T_j | junction temperature | | 175 | $^\circ\text{C}$ |



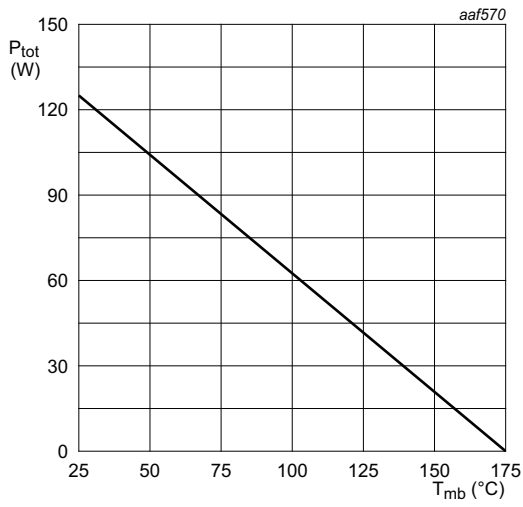


Fig. 3. Total power dissipation as a function of mounting base temperature

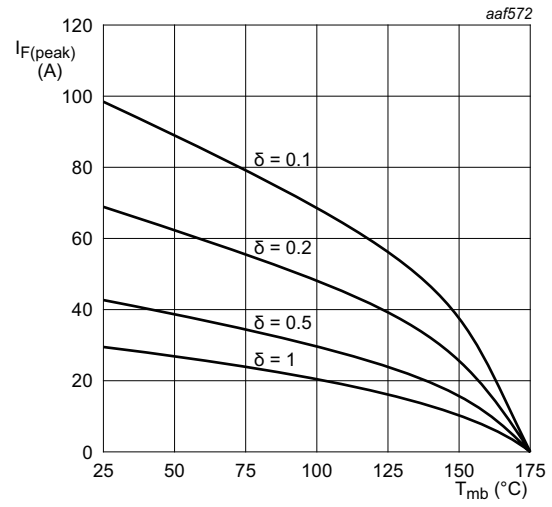


Fig. 4. Current derating as a function of mounting base temperature

9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|--|------------------------|-----|-----|-----|------|
| $R_{th(j-mb)}$ | thermal resistance from junction to mounting base | Fig. 5 | - | - | 1.2 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient free air | in free air | - | 40 | - | K/W |

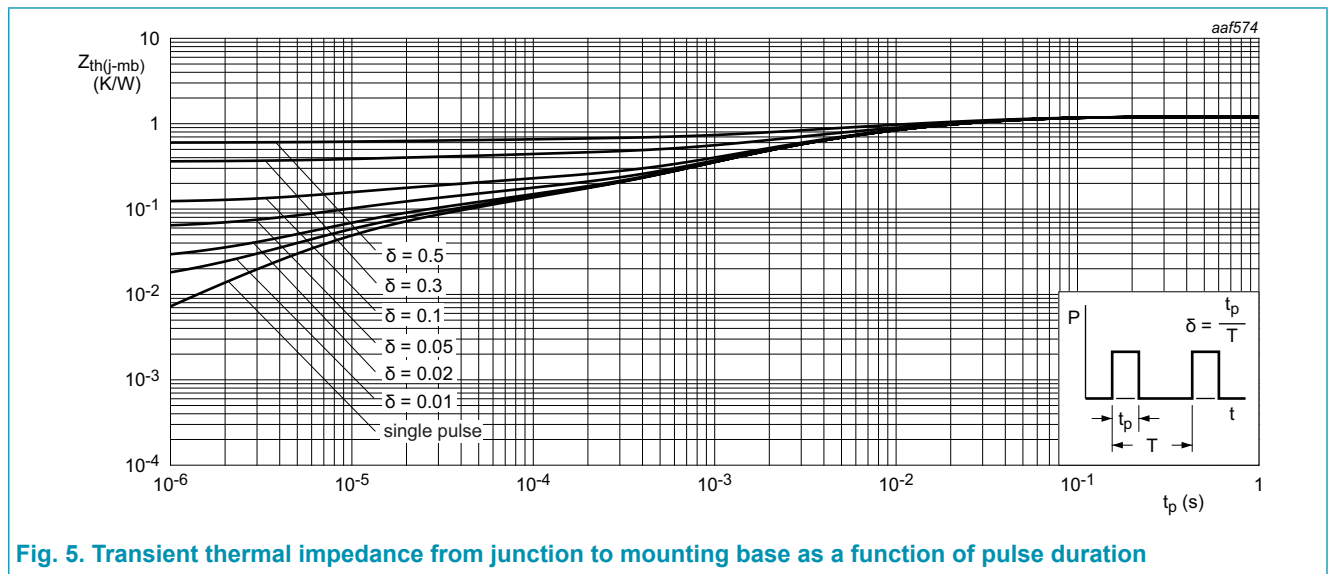
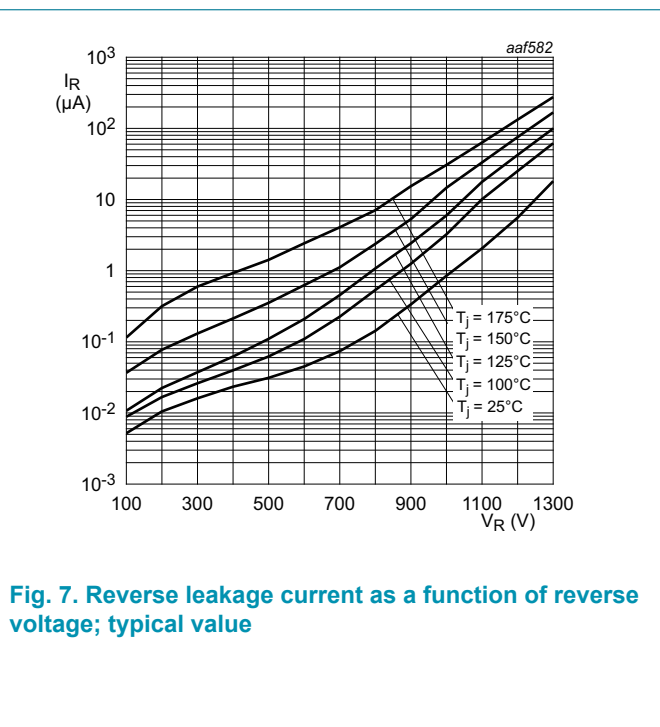
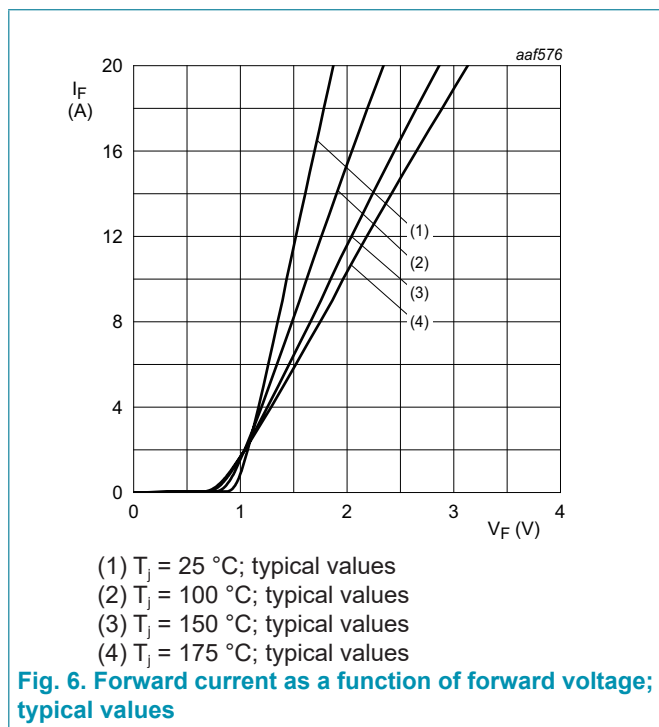


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------|--|-----|------|-----|---------------|
| Static characteristics | | | | | | |
| V_F | forward current | $I_F = 10\text{ A}; T_j = 25\text{ °C}; \text{Fig. 6}$ | - | 1.4 | 1.6 | V |
| | | $I_F = 10\text{ A}; T_j = 150\text{ °C}; \text{Fig. 6}$ | - | 1.85 | 2.3 | V |
| | | $I_F = 10\text{ A}; T_j = 175\text{ °C}; \text{Fig. 6}$ | - | 2 | 2.6 | V |
| I_R | reverse current | $V_R = 1200\text{ V}; T_j = 25\text{ °C}; \text{Fig. 7}$ | - | - | 200 | μA |
| | | $V_R = 1200\text{ V}; T_j = 175\text{ °C}; \text{Fig. 7}$ | - | - | 1 | mA |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 10\text{ A}; V_R = 400\text{ V}; di_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C}; \text{Fig. 8}$ | - | 24 | - | nC |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 1\text{ V}; T_j = 25\text{ °C}$ | - | 510 | - | pF |
| | | $f = 1\text{ MHz}; V_R = 400\text{ V}; T_j = 25\text{ °C}$ | - | 48 | - | pF |
| | | $f = 1\text{ MHz}; V_R = 800\text{ V}; T_j = 25\text{ °C}$ | - | 41 | - | pF |



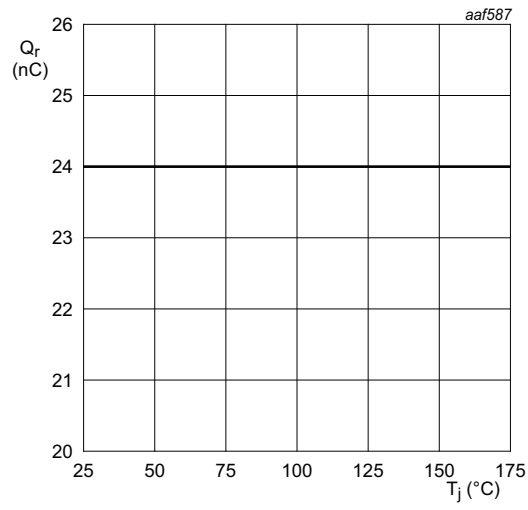
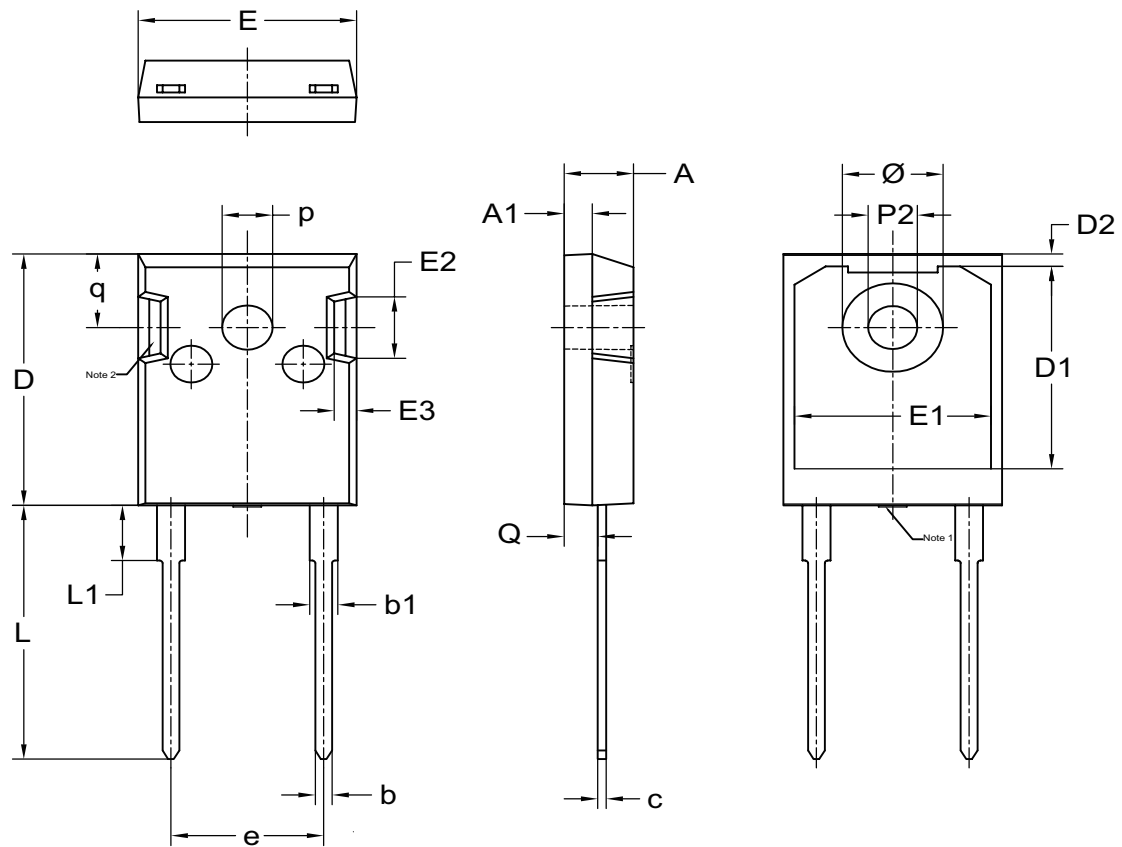


Fig. 8. Recovered charge as a function of junction temperature

11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 2 leads TO-247

TO247-2L



| UNIT | A | A ₁ | b | b ₁ | c | D | D ₁ | D ₂ | E | E ₁ | E ₂ | E ₃ | e | L | L ₁ | P ₂ | p | Q | q | Ø |
|------|------|----------------|------|----------------|------|-------|----------------|----------------|-------|----------------|----------------|----------------|-------|-------|----------------|----------------|------|------|------|------|
| mm | 5.20 | 2.10 | 1.40 | 2.20 | 0.70 | 20.60 | 17.78 | 1.20 | 15.75 | 14.22 | 5.20 | 1.80 | 10.90 | 20.72 | 4.75 | 3.60 | 3.70 | 2.60 | 6.18 | 7.30 |
| | 4.70 | 1.90 | 1.00 | 1.80 | 0.50 | 20.30 | 17.28 | 0.80 | 15.45 | 13.82 | 4.80 | 1.40 | BSC | 20.22 | 4.25 | 3.40 | 3.50 | 2.20 | 5.78 | 7.10 |

Note:

1. Mold resin protrusion max 0.127mm.
2. Metal exposed with Sn plating.

12. Legal information

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|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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