

1. General description

Silicon Carbide Schottky diode in a TO247-2L plastic package, designed for high frequency, high efficiency systems.



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

- Switching mode power supplies
- UPS & energy storage systems
- PV inverter and MPPT circuit
- Battery formation systems
- EV chargers
- Motor Drives

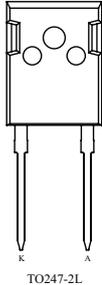
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage			1200			V
I_F	continuous forward current	$T_{mb} \leq 121\text{ °C}$; DC; Fig. 2		80			A
T_j	junction temperature			-55 to 175			°C
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 80\text{ A}$; $T_j = 25\text{ °C}$; Fig. 5		-	1.42	1.60	V
		$I_F = 80\text{ A}$; $T_j = 150\text{ °C}$; Fig. 5		-	1.90	2.30	V
Dynamic characteristics							
Q_r	recovered charge	$I_F = 50\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $V_R = 400\text{ V}$; $T_j = 25\text{ °C}$; Fig. 7		-	193	-	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
WNSC2D801200W	TO247-2L	WNSC2D801200W6Q	Tube	30	TO247P-2L	09-Mar-2023

7. Marking

Table 4. Marking codes

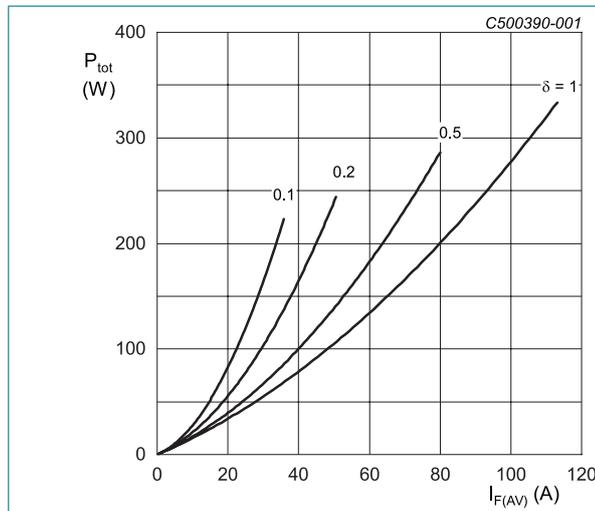
Type number	Marking codes
WNSC2D801200W	WNSC2D 801200W

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	continuous forward current	$T_{mb} \leq 121\text{ °C}$; DC; Fig. 2		80	A
		$T_{mb} \leq 125\text{ °C}$; DC; Fig. 2		76	A
		$T_{mb} \leq 25\text{ °C}$; DC; Fig. 2		157	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\ \mu\text{s}$; $T_{mb} \leq 125\text{ °C}$; square-wave pulse		121	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; sine-wave pulse		690	A
		$t_p = 10\ \mu\text{s}$; $T_{j(\text{init})} = 25\text{ °C}$; square-wave pulse		4000	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN		2380	A^2s
T_{stg}	storage temperature			-55 to 175	$^{\circ}\text{C}$
T_j	junction temperature			-55 to 175	$^{\circ}\text{C}$



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

$$V_o = 1.429\text{ V}; R_s = 0.0134\ \Omega$$

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

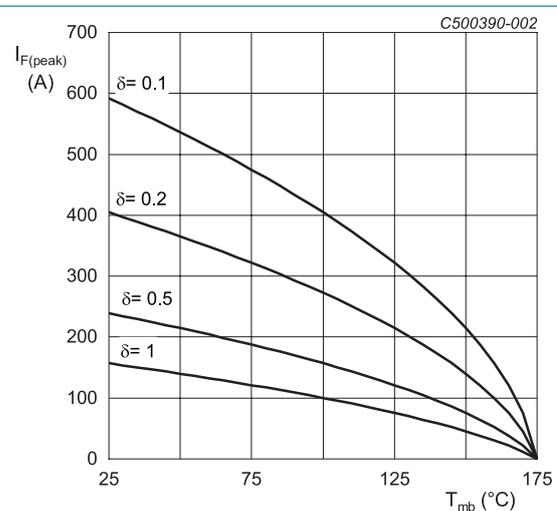
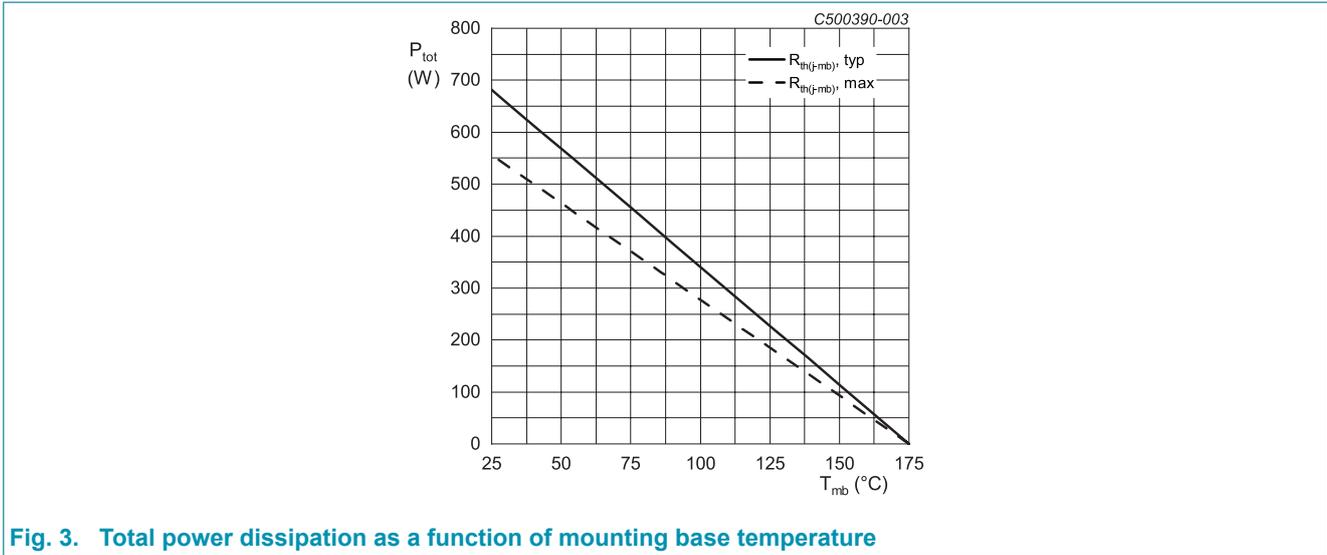


Fig. 2. Current derating as a function of mounting base temperature



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	Fig. 4		-	0.22	0.27	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	40	-	K/W

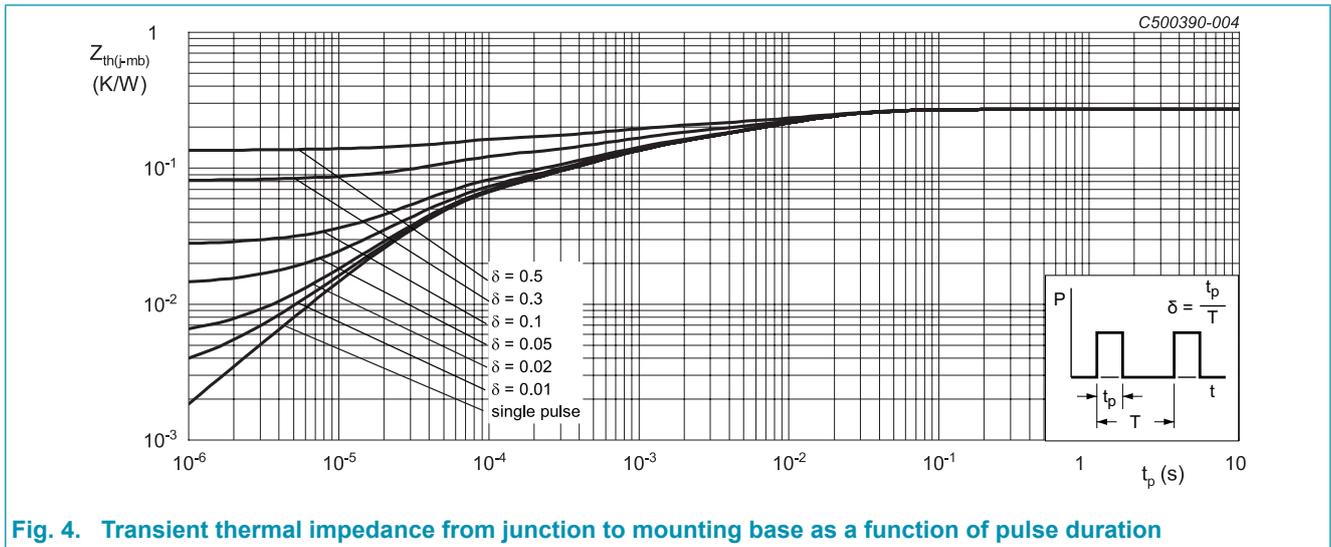
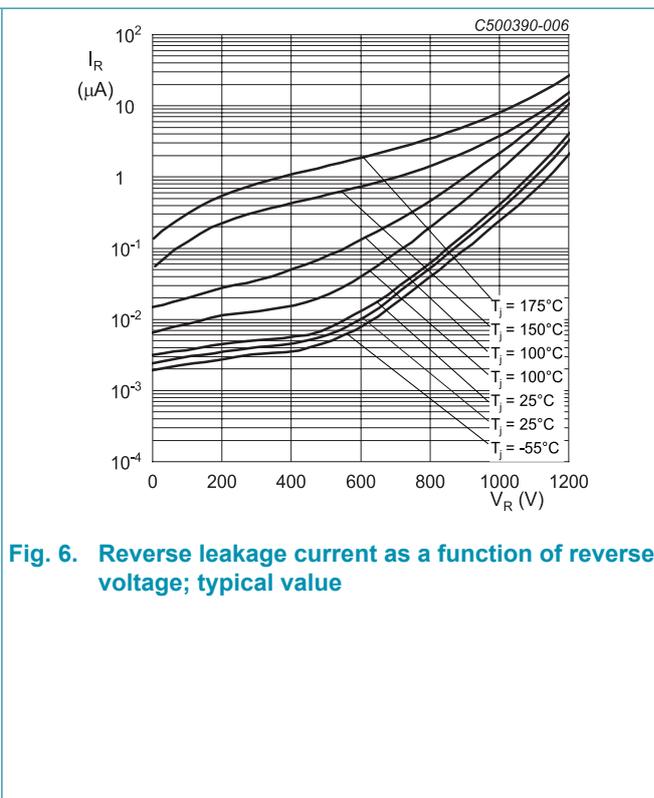
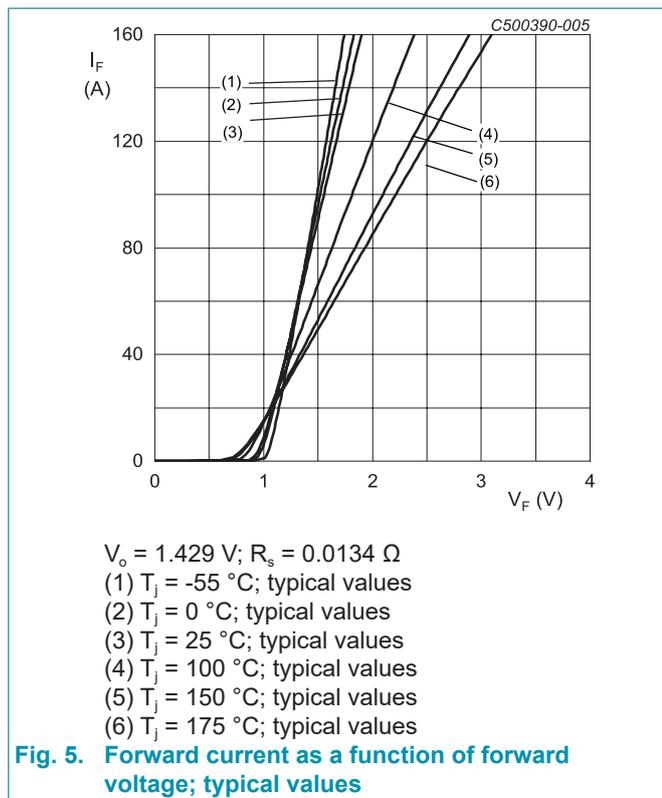


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_F	forward current	$I_F = 80 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$		-	1.42	1.60	V
		$I_F = 80 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 5}$		-	1.90	2.30	V
		$I_F = 80 \text{ A}; T_j = 175 \text{ }^\circ\text{C}; \text{ Fig. 5}$		-	2.00	2.50	V
I_R	reverse current	$V_R = 1200 \text{ V}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 6}$		-	1	400	μA
		$V_R = 1200 \text{ V}; T_j = 175 \text{ }^\circ\text{C}; \text{ Fig. 6}$		-	50	-	μA
Dynamic characteristics							
Q_r	recovered charge	$I_F = 50 \text{ A}; V_R = 400 \text{ V}; dI_F/dt = 500 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 7}$		-	193	-	nC
C_d	diode capacitance	$f = 1 \text{ MHz}; V_R = 1 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	4074	-	pF
		$f = 1 \text{ MHz}; V_R = 400 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	359	-	pF
		$f = 1 \text{ MHz}; V_R = 800 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$		-	255	-	pF
E_{as}	non-repetitive avalanche energy	$I_R = 12.2 \text{ A}; L = 10 \text{ mH}; T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$		744	-	-	mJ



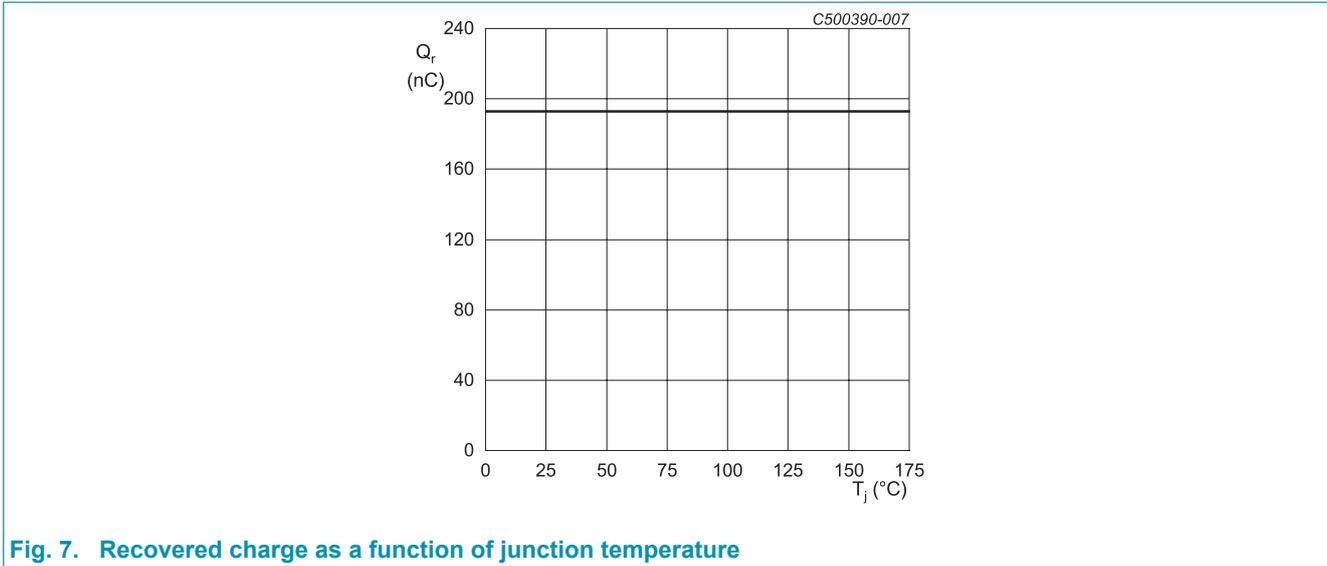
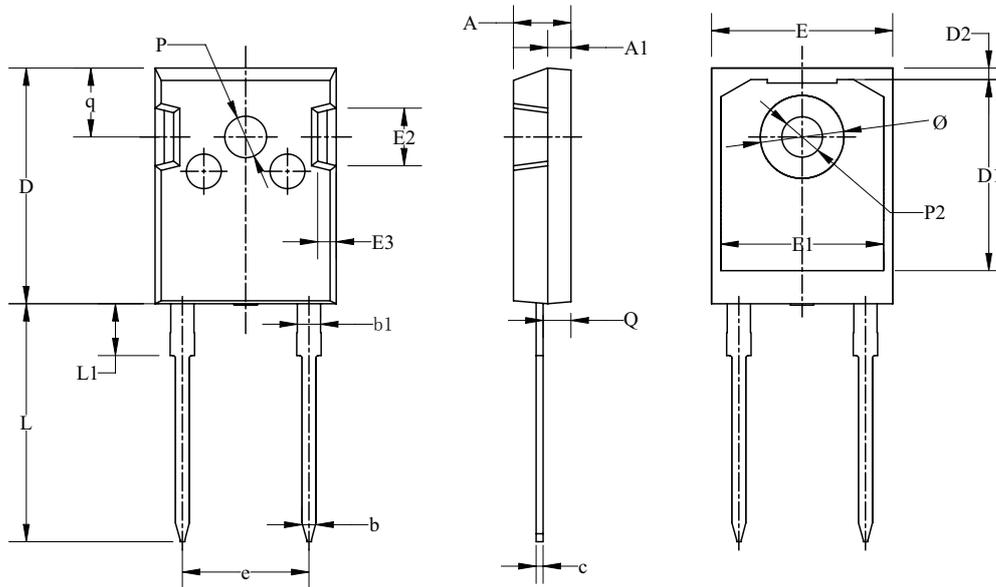


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline

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

TO247-2L



Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.70	4.95	5.20
A1	1.90	2.00	2.10
b	1.00	1.20	1.40
b1	1.80	2.00	2.20
c	0.50	0.60	0.70
D	20.30	20.45	20.60
D1	16.20	16.58	16.87
D2	0.80	1.00	1.20
E	15.45	15.60	15.75
E1	13.82	14.02	14.22
E2	4.80	5.00	5.20
E3	1.40	1.60	1.80
e	10.90 BSC		
L	20.40	20.65	20.90
L1	4.25	4.50	4.75
P2	3.40	3.50	3.60
P	3.50	3.60	3.70
Q	2.20	2.40	2.60
q	5.78	5.98	6.18
Ø	7.10	7.19	7.30

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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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- [2] The term 'short data sheet' is explained in section "Definitions".
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