

## 1. General description

Silicon Carbide Schottky diode in a TO247-2L plastic package, designed for high frequency switching mode power supplies.



AEC - Q101 Qualified



## 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 ( $T_{j(max)} = 175\text{ °C}$ )
- AEC-Q101 qualified

## 3. Applications

- EV On Board Chargers
- EV DC-DC converters
- Other EV HV systems

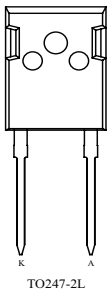
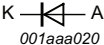
## 4. Quick reference data

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</sub>	continuous forward current	T <sub>mb</sub> ≤ 132 °C, DC; <a href="#">Fig. 2</a>		20			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> = 20 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 5</a>		-	1.45	1.65	V
		I <sub>F</sub> = 20 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 5</a>		-	1.95	2.30	V
Dynamic characteristics							
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 20 A; dI <sub>F</sub> /dt = 500 A/μs; V <sub>R</sub> = 400 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	45	-	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
WNSC2D201200W-A	TO247-2L	WNSC2D201200W-A6Q	Tube	30	TO247P-2L	09-Mar-2023

7. Marking

Table 4. Marking codes

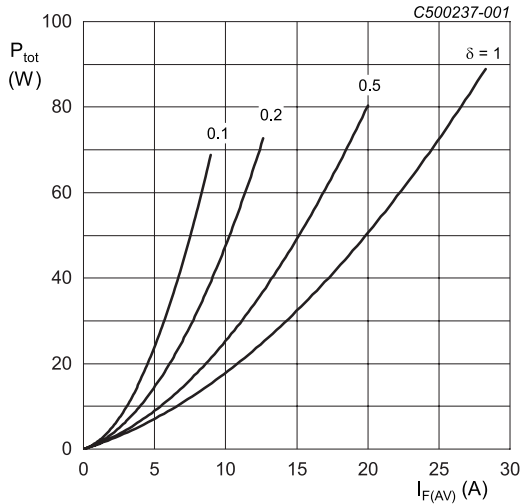
Type number	Marking codes
WNSC2D201200W-A	WNSC2D 201200W-A

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Notes	Values	Unit
V <sub>RRM</sub>	repetitive peak reverse voltage			1200	V
V <sub>RWM</sub>	crest working reverse voltage			1200	V
V <sub>R</sub>	reverse voltage	DC		1200	V
I <sub>F</sub>	continuous forward current	T <sub>mb</sub> ≤ 132 °C, DC; Fig. 2		20	A
		T <sub>mb</sub> ≤ 125 °C, DC; Fig. 2		22	A
		T <sub>mb</sub> ≤ 25 °C, DC; Fig. 2		42	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 125 °C; square-wave pulse		33	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse		190	A
		t <sub>p</sub> = 10 μs; T <sub>j(init)</sub> = 25 °C; square-wave pulse		1170	A
I <sup>2</sup> t	I <sup>2</sup> t for fusing	sine-wave pulse; T <sub>j(init)</sub> = 25 °C; t <sub>p</sub> = 10 ms		181	A <sup>2</sup> s
T <sub>stg</sub>	storage temperature			-55 to 175	°C
T <sub>j</sub>	junction temperature			-55 to 175	°C



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$
$$V_o = 1.040 \text{ V}; R_s = 0.0744 \text{ }\Omega$$

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

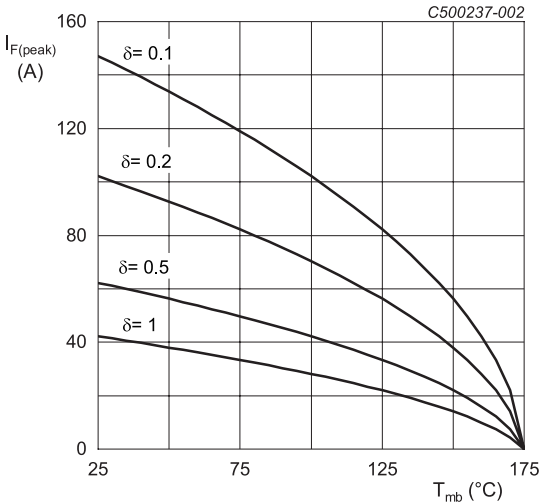


Fig. 2. Current derating as a function of mounting base temperature

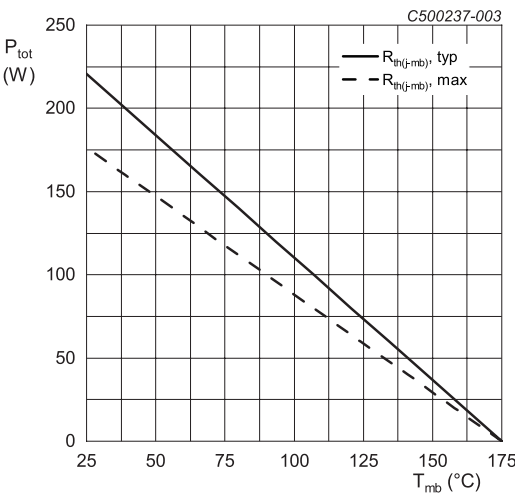


Fig. 3. Total power dissipation as a function of mounting base temperature

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>		-	0.68	0.85	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	40	-	K/W

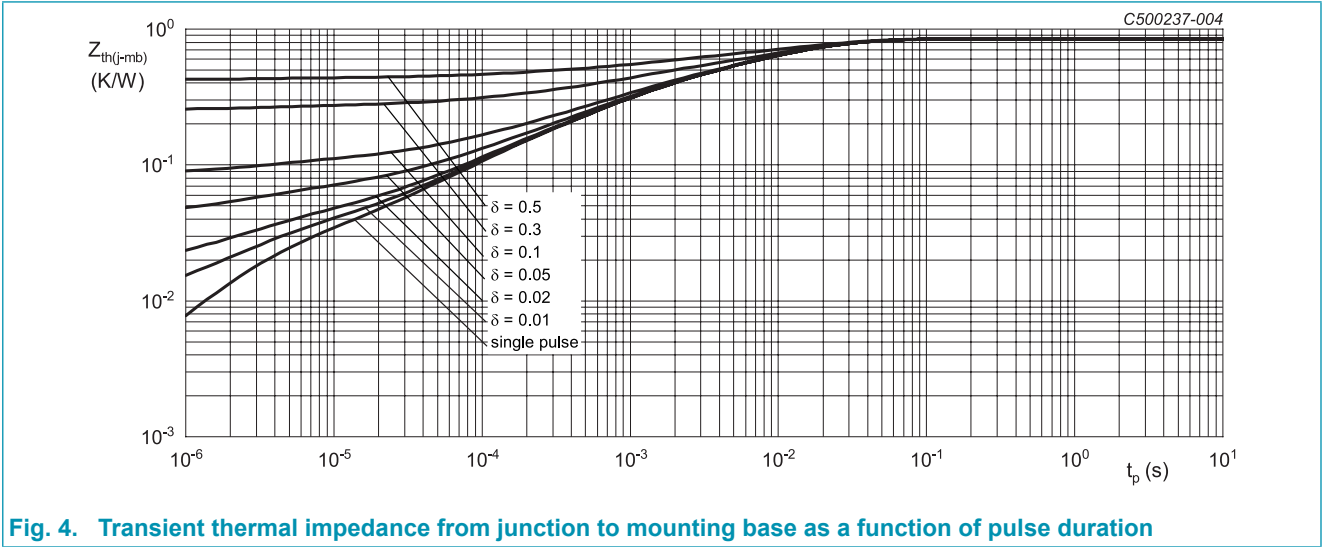
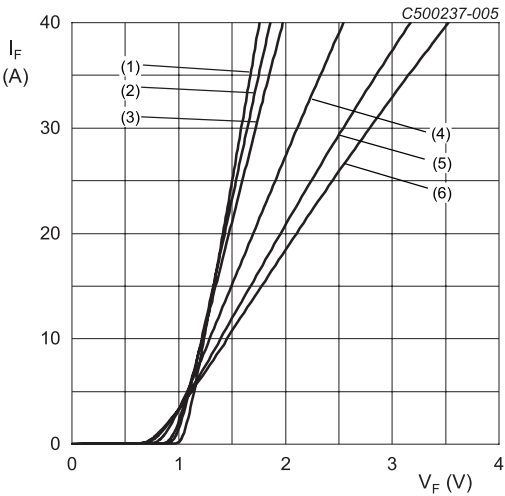


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 20 A; T <sub>J</sub> = 25 °C; <a href="#">Fig. 5</a>		-	1.45	1.65	V
		I <sub>F</sub> = 20 A; T <sub>J</sub> = 150 °C; <a href="#">Fig. 5</a>		-	1.95	2.30	V
		I <sub>F</sub> = 20 A; T <sub>J</sub> = 175 °C; <a href="#">Fig. 5</a>		-	2.10	2.60	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	100	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> = 20 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>		-	45	-	nC
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 1 V; T <sub>J</sub> = 25 °C		-	950	-	pF
		f = 1 MHz; V <sub>R</sub> = 400 V; T <sub>J</sub> = 25 °C		-	86	-	pF
		f = 1 MHz; V <sub>R</sub> = 800 V; T <sub>J</sub> = 25 °C		-	64	-	pF
E <sub>as</sub>	non-repetitive avalanche energy	I <sub>R</sub> = 5.3 A; L = 10 mH; T <sub>j(init)</sub> = 25 °C		140	-	-	mJ



V<sub>o</sub> = 1.040 V; R<sub>s</sub> = 0.0744 Ω  
(1) T<sub>J</sub> = -55 °C; typical values  
(2) T<sub>J</sub> = 0 °C; typical values  
(3) T<sub>J</sub> = 25 °C; typical values  
(4) T<sub>J</sub> = 100 °C; typical values  
(5) T<sub>J</sub> = 150 °C; typical values  
(6) T<sub>J</sub> = 175 °C; typical values

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

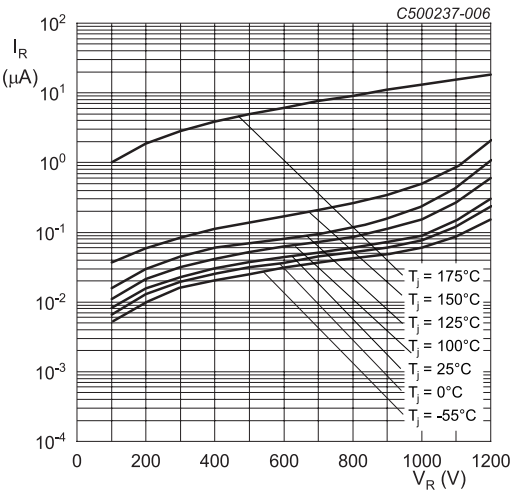


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

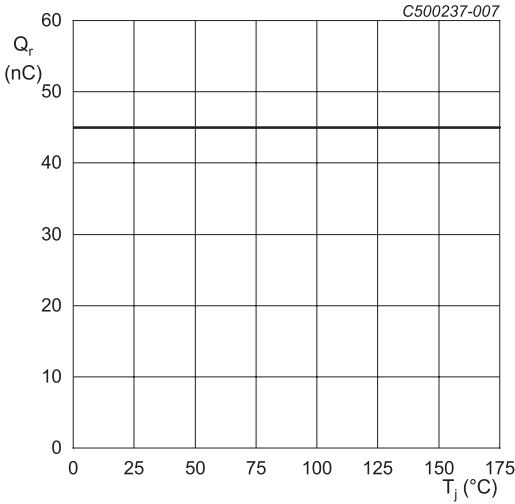
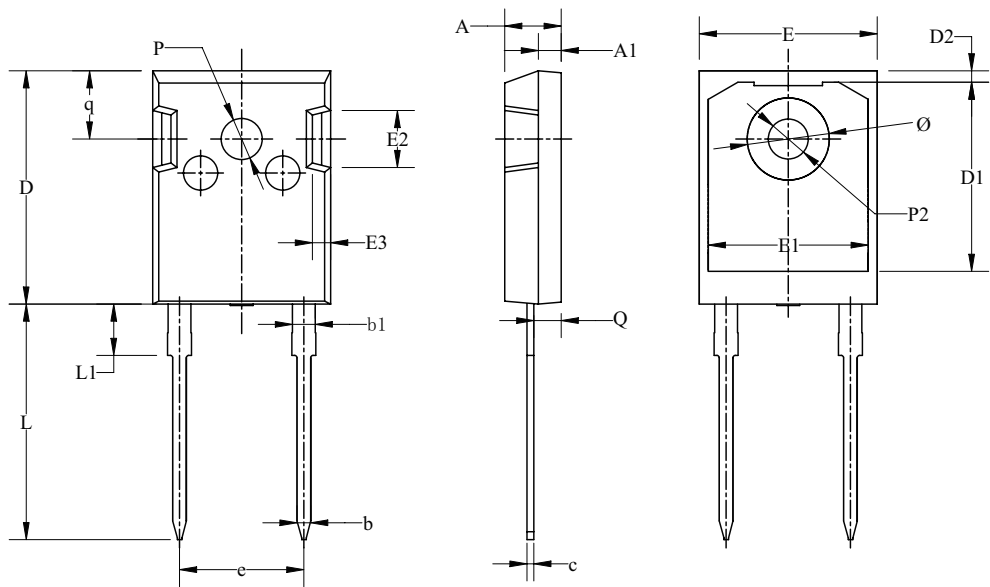


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline

Plastic single-ended 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

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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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