

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

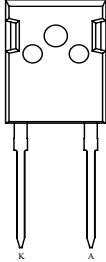
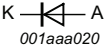
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage			1200			V
I_F	continuous forward current	$T_{mb} \leq 132\text{ °C}$, DC; Fig. 2		20			A
T_j	junction temperature			-55 to 175			°C
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 20\text{ A}$; $T_j = 25\text{ °C}$; Fig. 5		-	1.45	1.65	V
		$I_F = 20\text{ A}$; $T_j = 150\text{ °C}$; Fig. 5		-	1.95	2.30	V
Dynamic characteristics							
Q_r	recovered charge	$I_F = 20\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $V_R = 400\text{ V}$; $T_j = 25\text{ °C}$; Fig. 7		-	45	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>TO247-2L</p>	
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

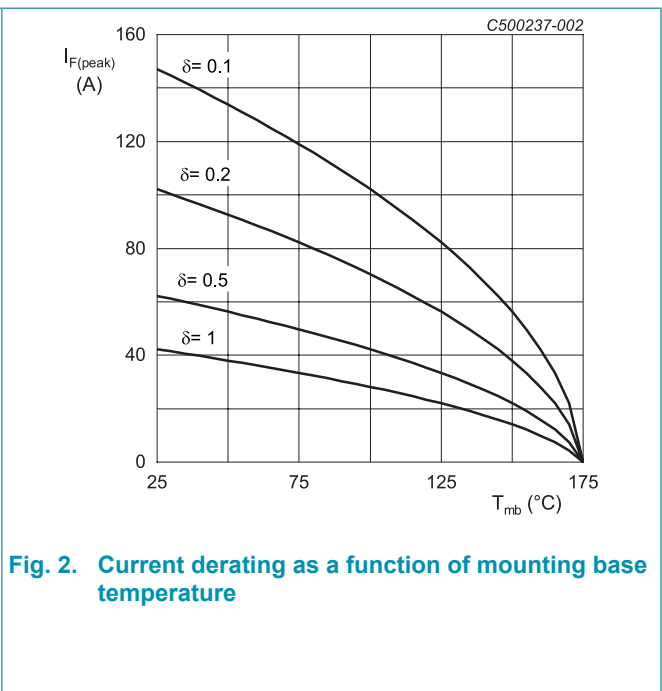
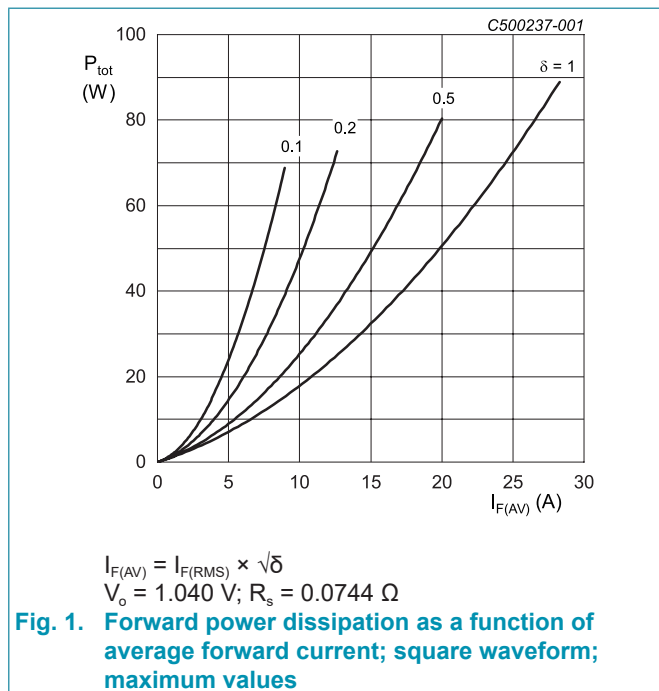
Type number	Marking codes
WNSC2D201200W-A	WNSC2D 201200W-A

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{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	$T_{mb} \leq 132\text{ }^\circ\text{C}$, DC; Fig. 2		20	A
		$T_{mb} \leq 125\text{ }^\circ\text{C}$, DC; Fig. 2		22	A
		$T_{mb} \leq 25\text{ }^\circ\text{C}$, DC; Fig. 2		42	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 125\text{ }^\circ\text{C}$; square-wave pulse		33	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		190	A
		$t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; square-wave pulse		1170	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; $t_p = 10\text{ ms}$		181	A^2s
T_{stg}	storage temperature			-55 to 175	$^\circ\text{C}$
T_j	junction temperature			-55 to 175	$^\circ\text{C}$



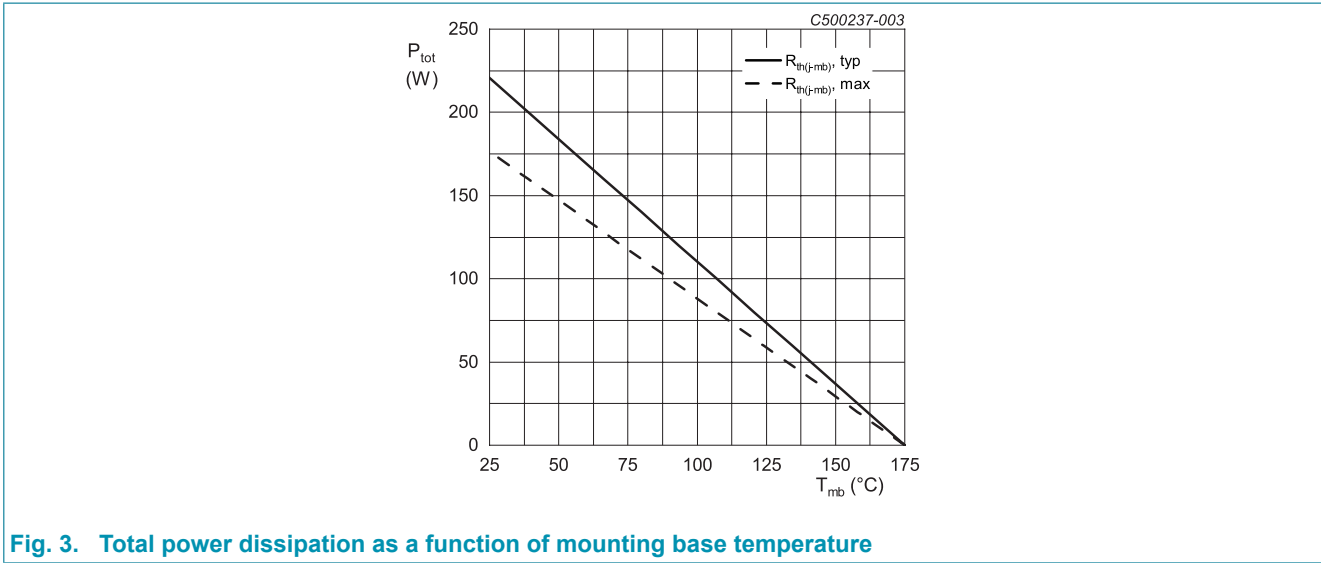


Fig. 3. Total power dissipation as a function of mounting base temperature

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	Fig. 4		-	0.68	0.85	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	40	-	K/W

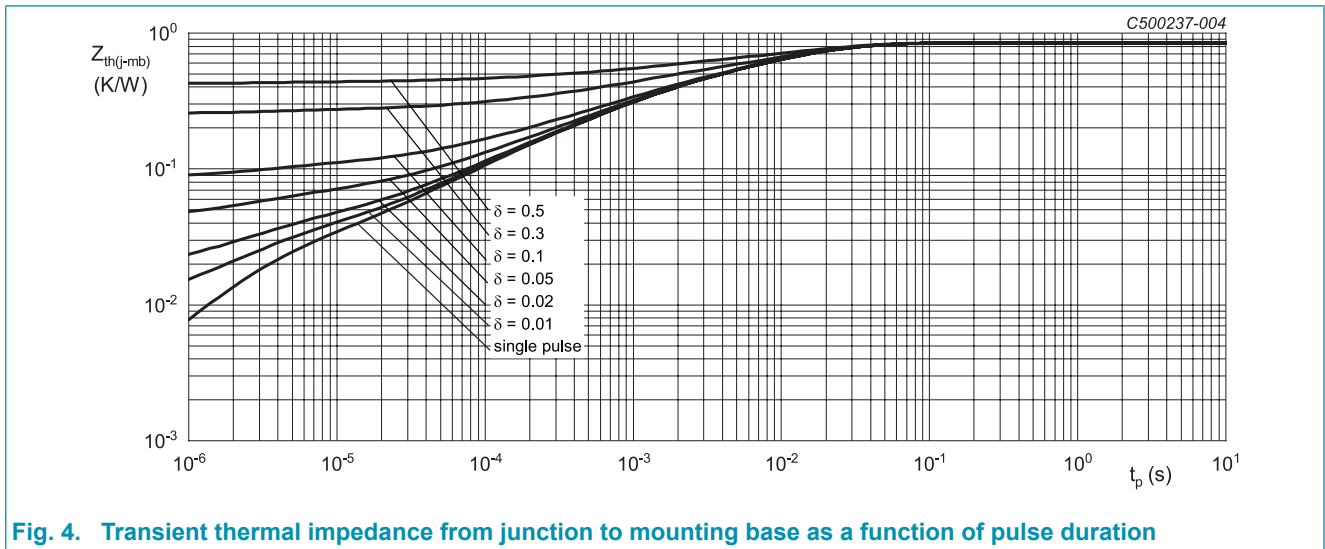
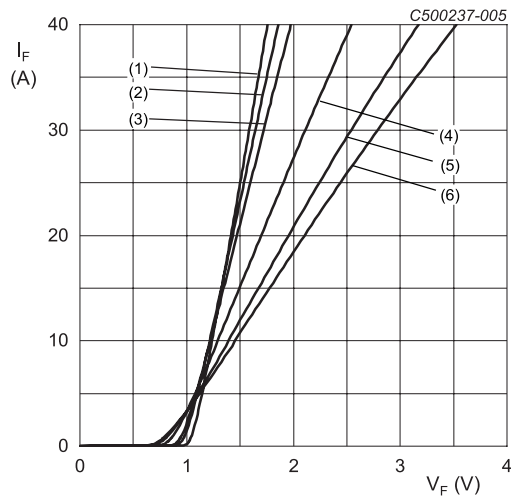


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 20 A; T _J = 25 °C; Fig. 5		-	1.45	1.65	V
		I _F = 20 A; T _J = 150 °C; Fig. 5		-	1.95	2.30	V
		I _F = 20 A; T _J = 175 °C; Fig. 5		-	2.10	2.60	V
I _R	reverse current	V _R = 1200 V; T _J = 25 °C; Fig. 6		-	1	100	μA
		V _R = 1200 V; T _J = 175 °C; Fig. 6		-	25	-	μA
Dynamic characteristics							
Q _r	recovered charge	I _F = 20 A; V _R = 400 V; di _F /dt = 500 A/μs; T _J = 25 °C; Fig. 7		-	45	-	nC
C _d	diode capacitance	f = 1 MHz; V _R = 1 V; T _J = 25 °C		-	950	-	pF
		f = 1 MHz; V _R = 400 V; T _J = 25 °C		-	86	-	pF
		f = 1 MHz; V _R = 800 V; T _J = 25 °C		-	64	-	pF
E _{as}	non-repetitive avalanche energy	I _R = 5.3 A; L = 10 mH; T _{J(initial)} = 25 °C		140	-	-	mJ



V₀ = 1.040 V; R_s = 0.0744 Ω
 (1) T_J = -55 °C; typical values
 (2) T_J = 0 °C; typical values
 (3) T_J = 25 °C; typical values
 (4) T_J = 100 °C; typical values
 (5) T_J = 150 °C; typical values
 (6) T_J = 175 °C; typical values

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

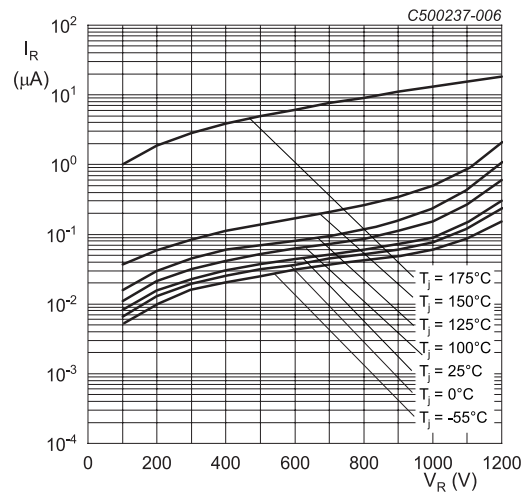


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

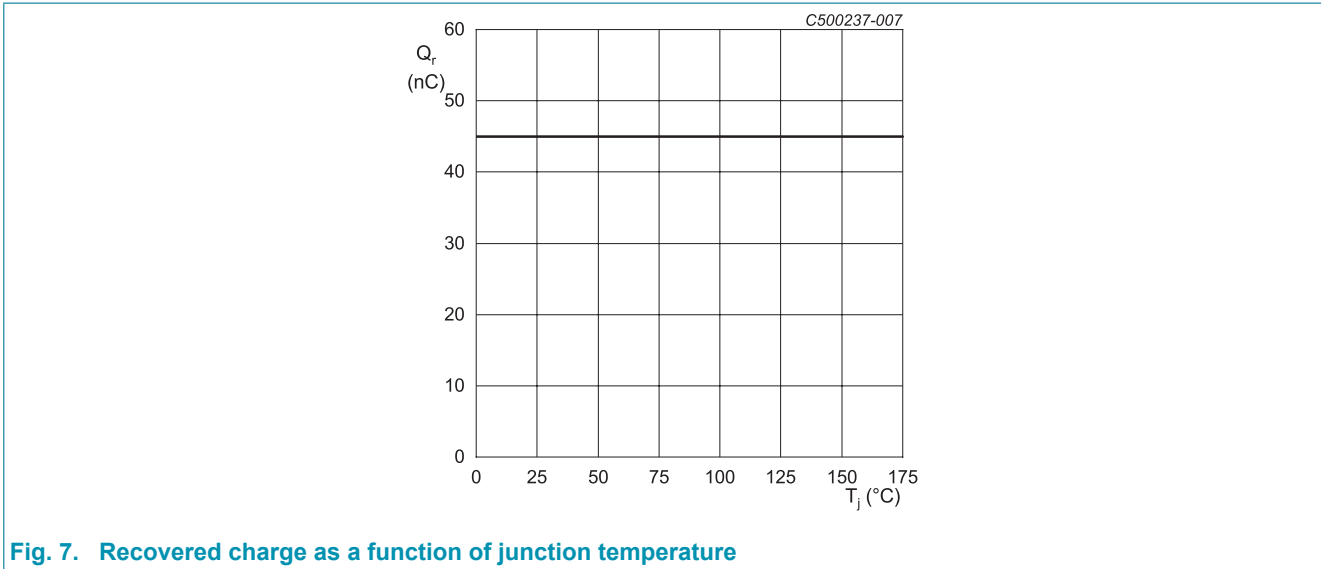
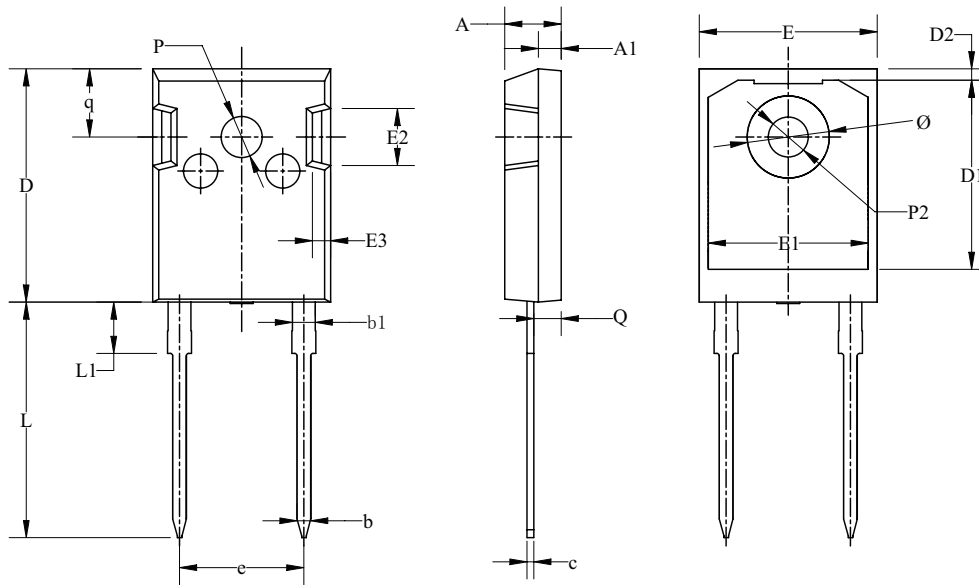


Fig. 7. Recovered charge as a function of junction temperature

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

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

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- [2] The term 'short data sheet' is explained in section "Definitions".
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