

1. General description

Dual Silicon Carbide Schottky diode in a TO247-3L plastic package, designed for high frequency switching 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

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

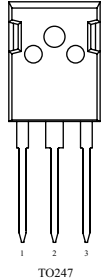
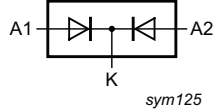
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage			1200			V
I_O	limiting average forward current	$T_{mb} \leq 141\text{ °C}$; DC; both diodes		30			A
T_j	junction temperature			-55 to 175			°C
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 15\text{ A}$; $T_j = 25\text{ °C}$; per diode; Fig. 5		-	1.42	1.60	V
		$I_F = 15\text{ A}$; $T_j = 150\text{ °C}$; per diode; Fig. 5		-	1.90	2.30	V
Dynamic characteristics							
Q_r	recovered charge	$I_F = 15\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $V_R = 400\text{ V}$; $T_j = 25\text{ °C}$; per diode; Fig. 7		-	36	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode	 <p>TO247</p>	 <p>sym125</p>
2	K	cathode		
3	A2	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
WNSC2D301200CW	TO247	WNSC2D301200CW6Q	Tube	30	TO247P	09-Mar-2023

7. Marking

Table 4. Marking codes

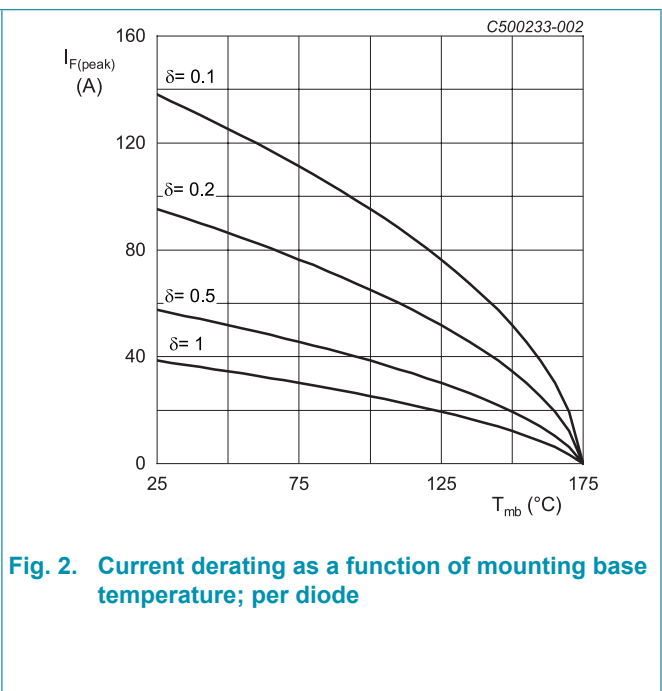
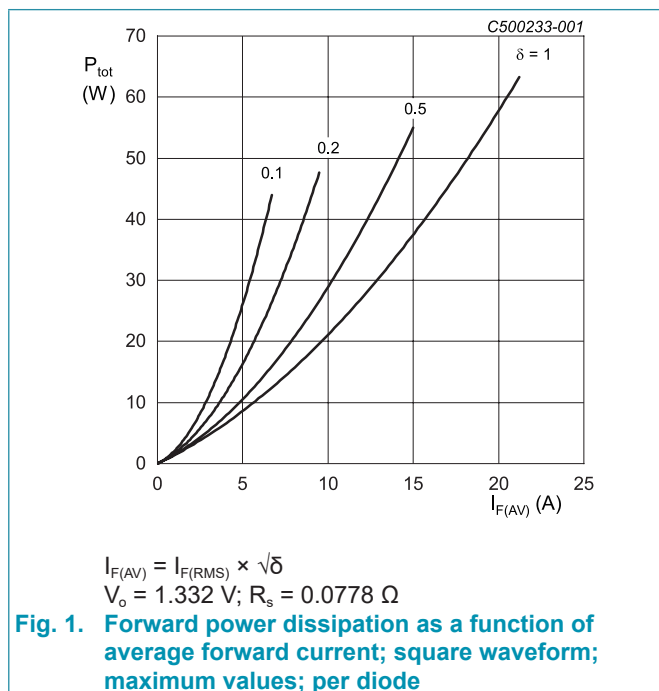
Type number	Marking codes
WNSC2D301200CW	WNSC2D 301200CW

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_O	limiting average forward current	$T_{mb} \leq 141\text{ °C}$; DC; both diodes		30	A
		$T_{mb} \leq 125\text{ °C}$; DC; both diodes		38	A
		$T_{mb} \leq 25\text{ °C}$; DC; both diodes		77	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 125\text{ °C}$; square-wave pulse; per diode		30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; sine-wave pulse; per diode		140	A
		$t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ °C}$; square-wave pulse; per diode		900	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 10\text{ ms}$		98	A ² s
T_{stg}	storage temperature			-55 to 175	°C
T_j	junction temperature			-55 to 175	°C



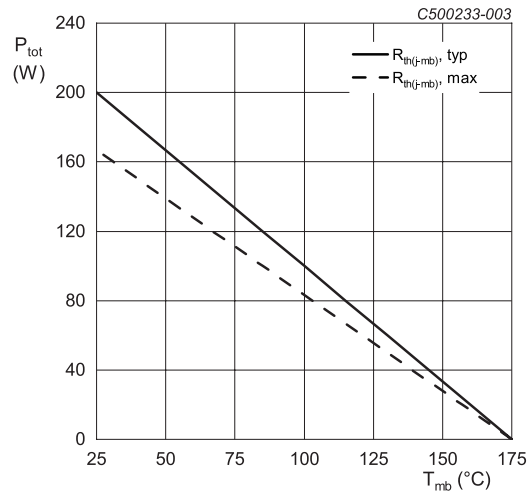


Fig. 3. Total power dissipation as a function of mounting base temperature; per diode

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	per diode; Fig. 4		-	0.75	0.9	K/W
		both diodes conducting		-	0.38	0.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	40	-	K/W

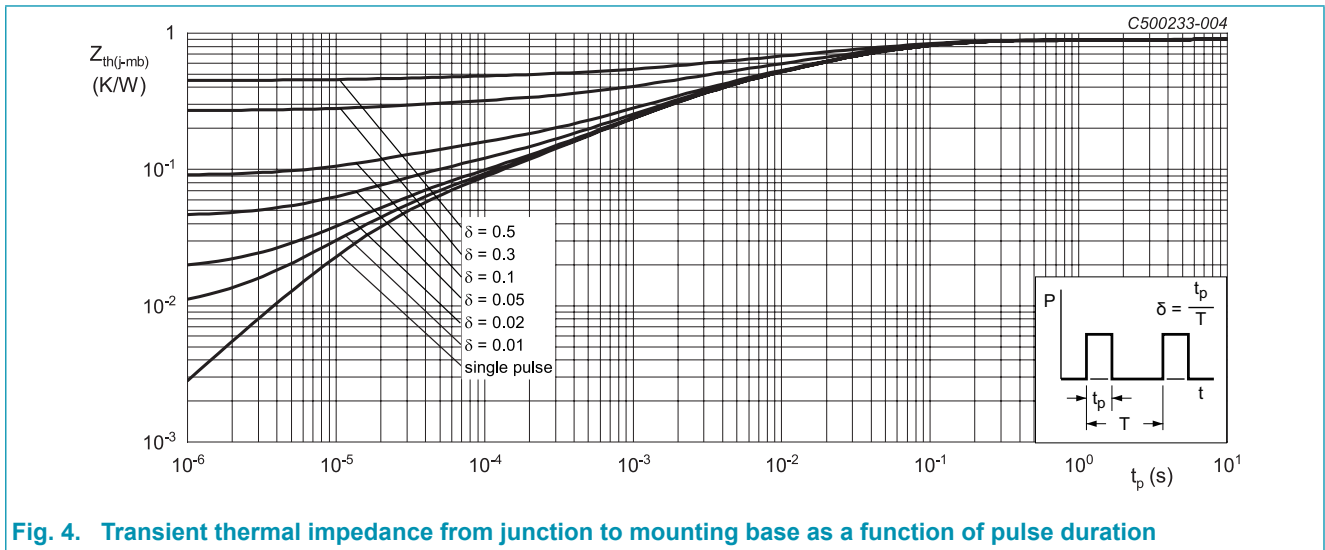
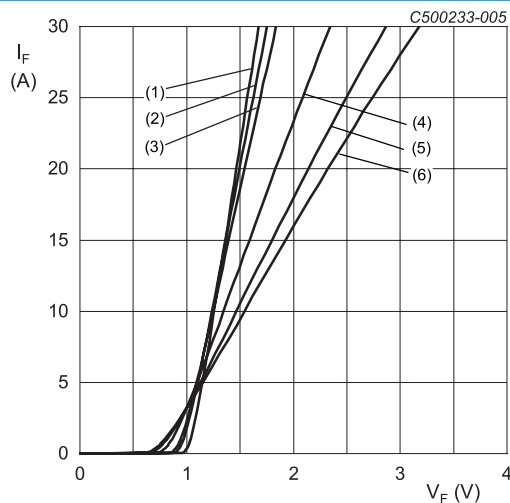


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 15\text{ A}; T_j = 25\text{ °C};$ per diode; Fig. 5		-	1.42	1.60	V
		$I_F = 15\text{ A}; T_j = 150\text{ °C};$ per diode; Fig. 5		-	1.90	2.30	V
		$I_F = 15\text{ A}; T_j = 175\text{ °C};$ per diode; Fig. 5		-	2.00	2.50	V
I_R	reverse current	$V_R = 1200\text{ V}; T_j = 25\text{ °C};$ per diode; Fig. 6		-	1	75	μA
		$V_R = 1200\text{ V}; T_j = 175\text{ °C};$ per diode; Fig. 6		-	25	750	μA
Dynamic characteristics							
Q_r	recovered charge	$I_F = 15\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ per diode; Fig. 7		-	36	-	nC
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 1\text{ V}; T_j = 25\text{ °C}$		-	800	-	pF
		$f = 1\text{ MHz}; V_R = 400\text{ V}; T_j = 25\text{ °C}$		-	66	-	pF
		$f = 1\text{ MHz}; V_R = 800\text{ V}; T_j = 25\text{ °C}$		-	48	-	pF
E_{as}	non-repetitive avalanche energy	$I_R = 4.7\text{ A}; L = 10\text{ mH}; T_{j(\text{init})} = 25\text{ °C};$ per diode		110	-	-	mJ



$V_o = 1.332\text{ V}; R_s = 0.0778\ \Omega$

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

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

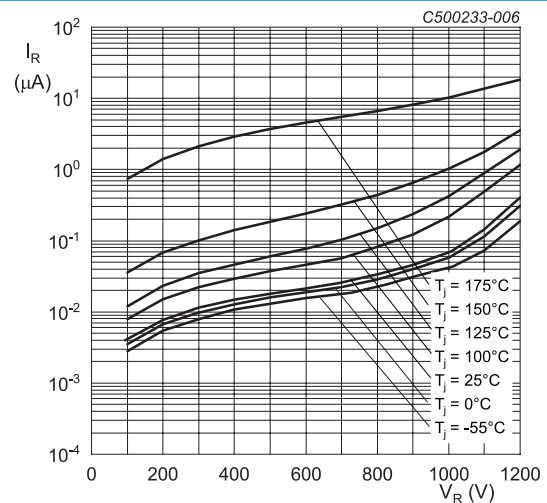


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value; per diode

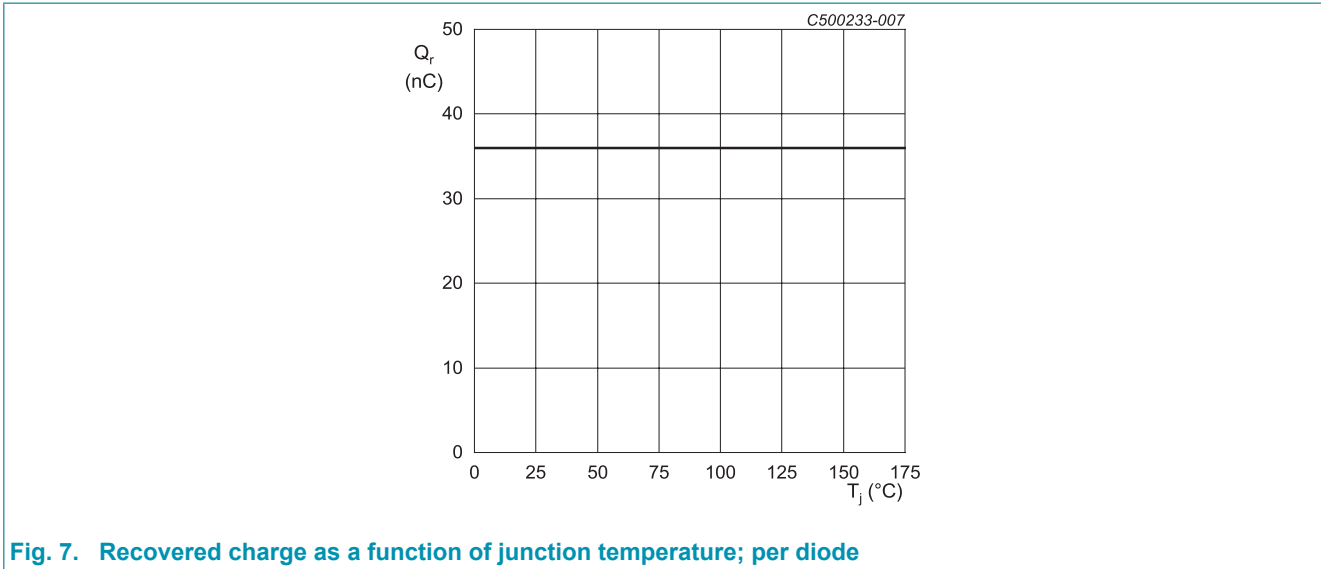
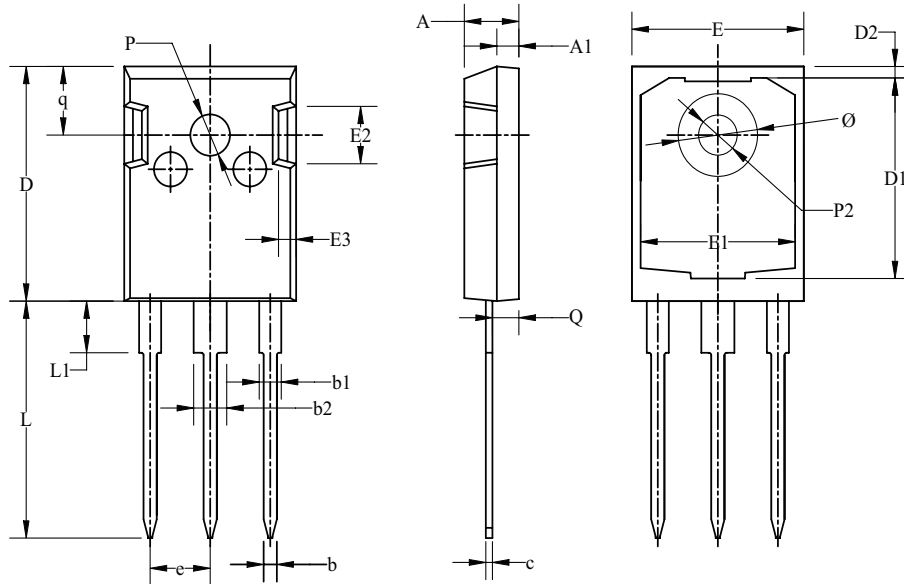


Fig. 7. Recovered charge as a function of junction temperature; per diode

11. Package outline

Plastic single-ended through-hole package; headsink mounted; 1 mounting hole; 3 leads TO-247

TO247



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
b2	2.80	3.00	3.20
c	0.50	0.60	0.70
D	20.30	20.45	20.60
D1	17.28	17.48	17.68
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	5.45 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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