

1. General description

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



2. Features and benefits

- Highly stable switching performance
- Extremely fast reverse recovery time
- Superior in efficiency to Silicon Diode alternatives
- Reduced losses in associated MOSFET
- Reduced EMI
- Reduced cooling requirements
- RoHS compliant

3. Applications

- Power factor correction
- Telecom / Server SMPS
- UPS
- PV inverter
- PC Silverbox
- LED / OLED TV
- Motor Drives

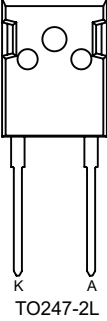
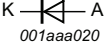
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V_{RRM}	repetitive peak reverse voltage			650			V
I_F	continuous forward current	$T_{mb} \leq 115\text{ }^\circ\text{C}$, DC; Fig. 2		30			A
T_j	junction temperature			-55 to 175			$^\circ\text{C}$
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V_F	forward voltage	$I_F = 30\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 5		-	1.45	1.70	V
		$I_F = 30\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; Fig. 5		-	1.80	2.20	V
Dynamic characteristics							
Q_r	recovered charge	$I_F = 30\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $V_R = 400\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7		-	48	-	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
WN5C5D30650W	TO247-2L	WN5C5D30650W6Q	Tube	30	TO247L-2L(L)	10-Nov-2020
					TO247P-2L(P)	31-Mar-2023

7. Marking

Table 4. Marking codes

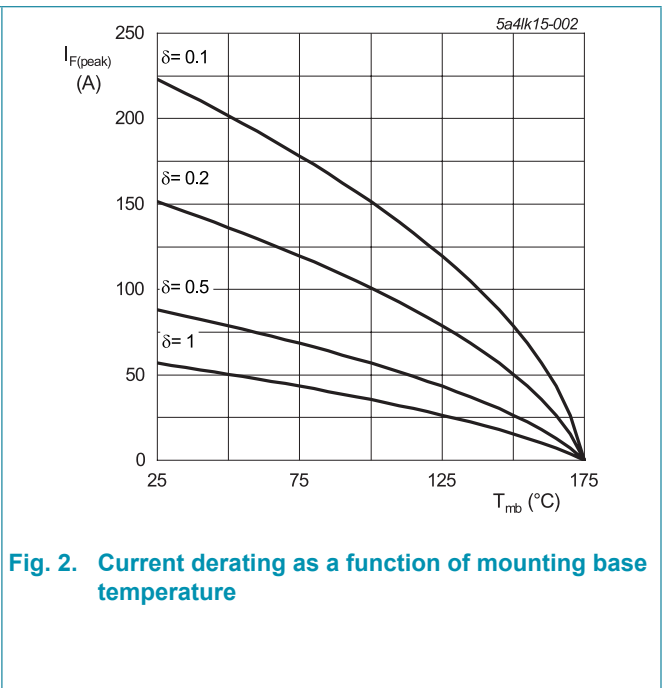
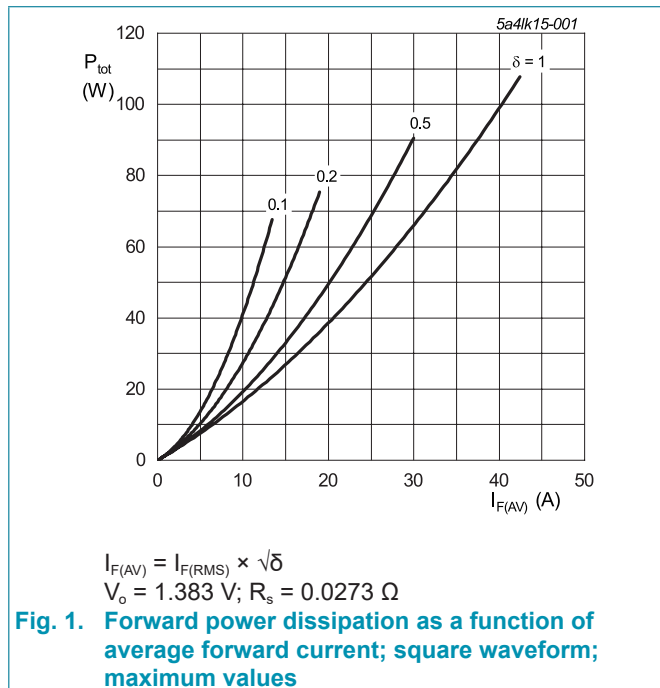
Type number	Marking codes
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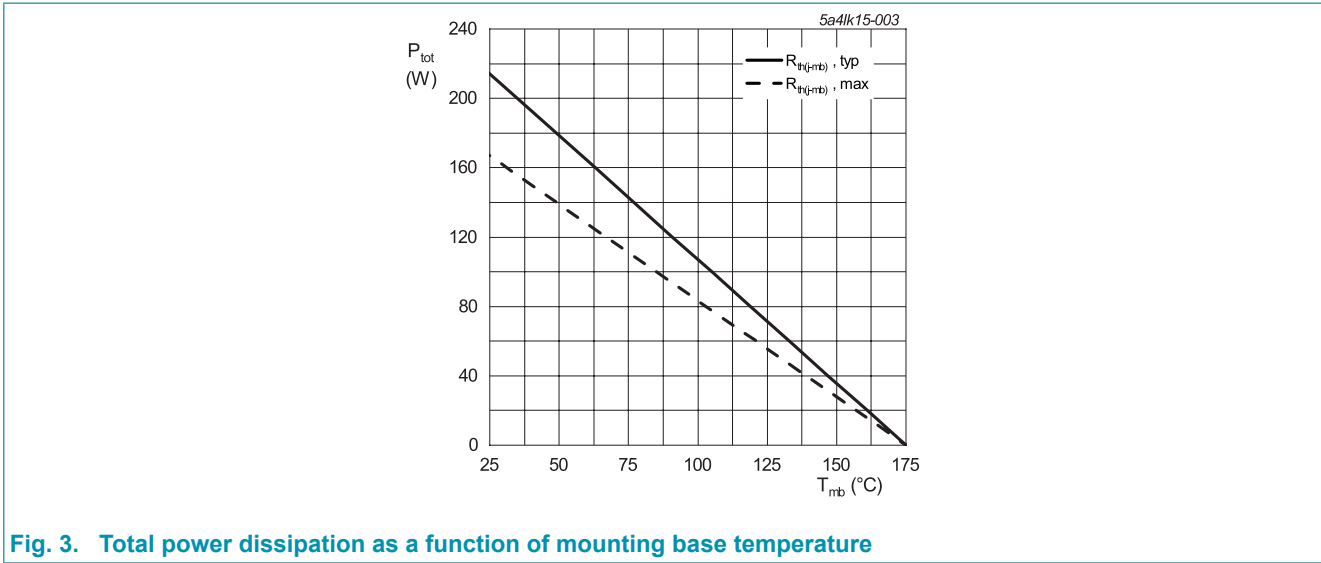
8. Limiting values

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			650	V
V_{RWM}	crest working reverse voltage			650	V
V_R	reverse voltage	DC		650	V
I_F	continuous forward current	$T_{mb} \leq 115\text{ }^\circ\text{C}$, DC; Fig. 2		30	A
		$T_{mb} \leq 125\text{ }^\circ\text{C}$, DC; Fig. 2		26	A
		$T_{mb} \leq 25\text{ }^\circ\text{C}$, DC; Fig. 2		57	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		43	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		170	A
		$t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; square-wave pulse		1000	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; $t_p = 10\text{ ms}$		144.5	A^2s
T_{stg}	storage temperature			-55 to 175	$^\circ\text{C}$
T_j	junction temperature			-55 to 175	$^\circ\text{C}$





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		-	0.7	0.9	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

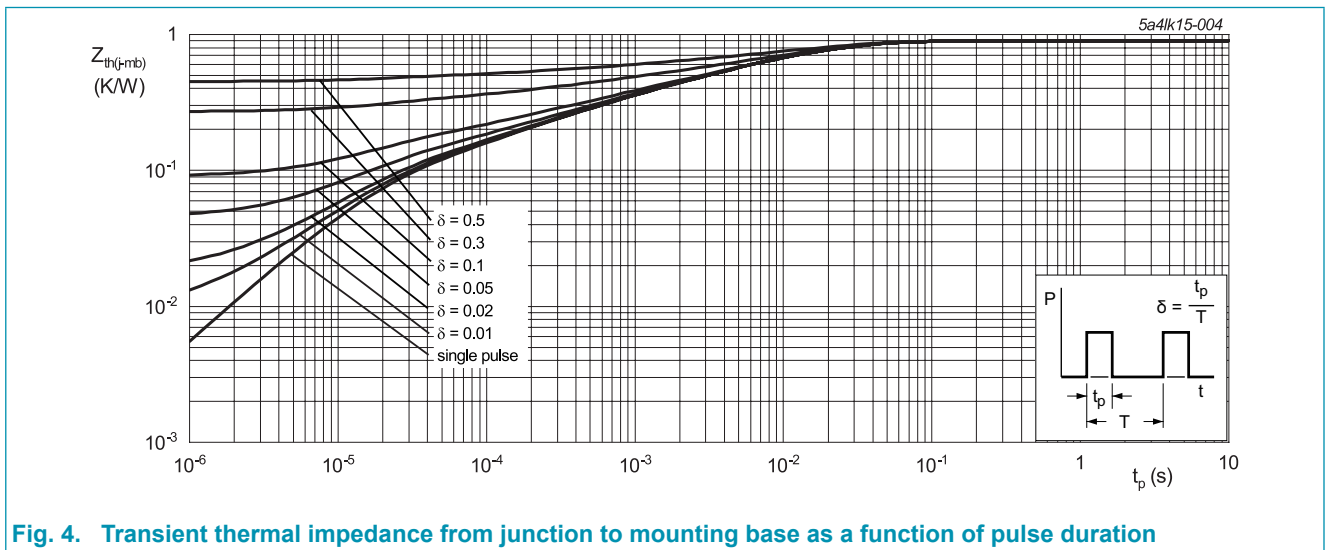
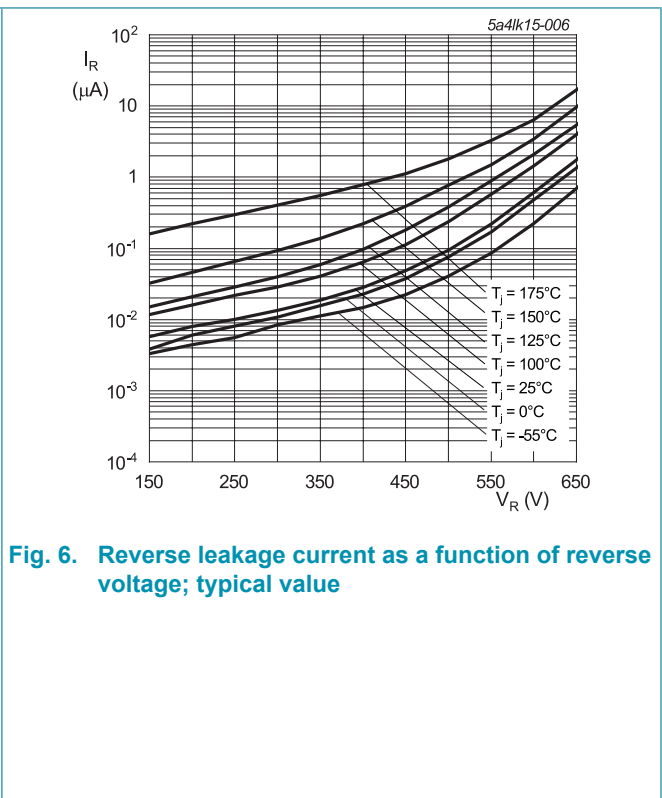
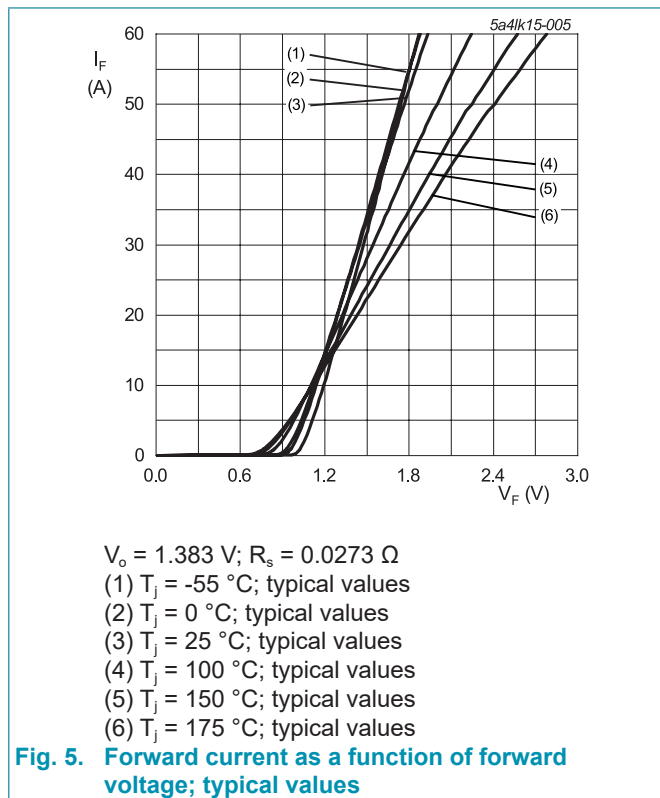


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_F	forward current	$I_F = 30\text{ A}; T_J = 25\text{ °C}; \text{Fig. 5}$		-	1.45	1.70	V
		$I_F = 30\text{ A}; T_J = 150\text{ °C}; \text{Fig. 5}$		-	1.80	2.20	V
		$I_F = 30\text{ A}; T_J = 175\text{ °C}; \text{Fig. 5}$		-	2.00	2.30	V
I_R	reverse current	$V_R = 650\text{ V}; T_J = 25\text{ °C}; \text{Fig. 6}$		-	2	100	μA
		$V_R = 650\text{ V}; T_J = 175\text{ °C}; \text{Fig. 6}$		-	25	400	μA
Dynamic characteristics							
Q_r	recovered charge	$I_F = 30\text{ A}; V_R = 400\text{ V}; di_F/dt = 500\text{ A}/\mu\text{s}; T_J = 25\text{ °C}; \text{Fig. 7}$		-	48	-	nC
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 1\text{ V}; T_J = 25\text{ °C}$		-	1005	-	pF
		$f = 1\text{ MHz}; V_R = 300\text{ V}; T_J = 25\text{ °C}$		-	110	-	pF
		$f = 1\text{ MHz}; V_R = 600\text{ V}; T_J = 25\text{ °C}$		-	102	-	pF
E_{as}	non-repetitive avalanche energy	$I_R = 7.8\text{ A}; L = 5\text{ mH}; T_{j(\text{init})} = 25\text{ °C}$		150	-	-	mJ



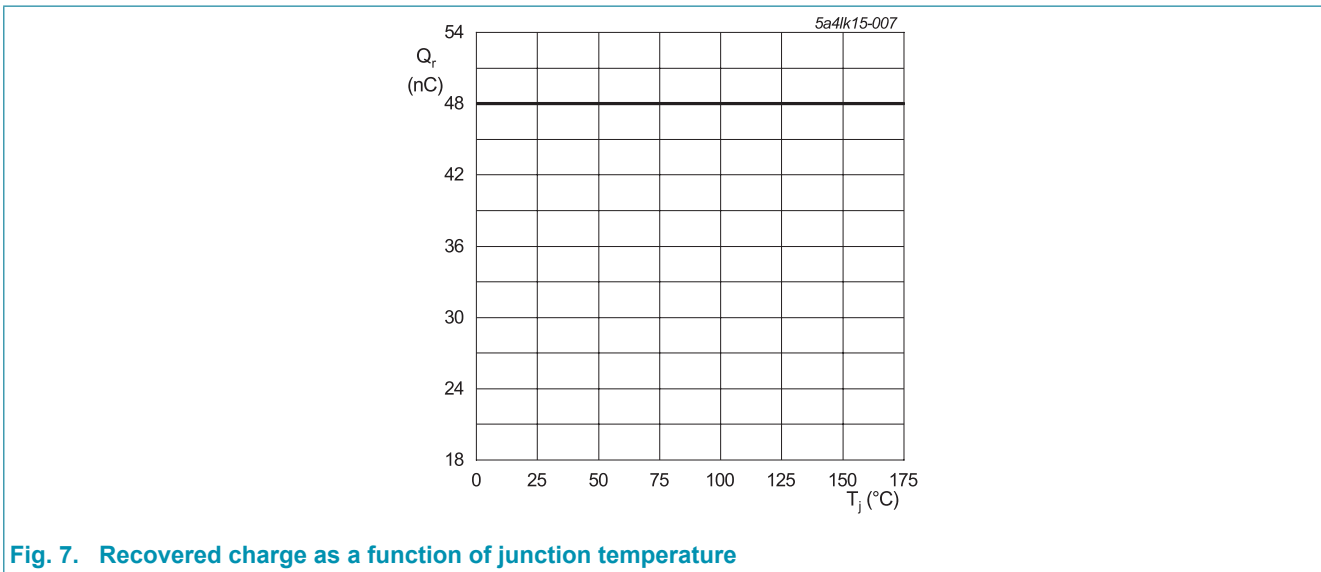
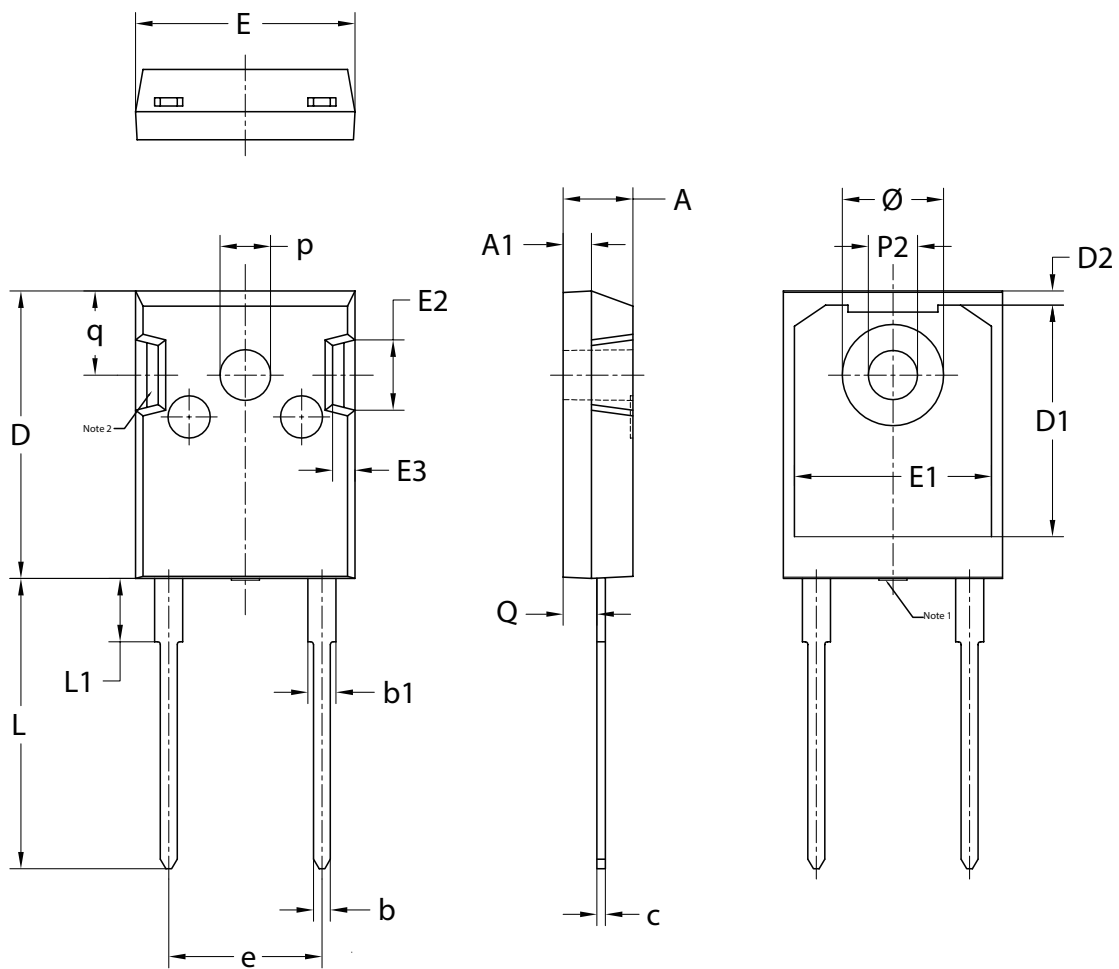


Fig. 7. Recovered charge as a function of junction temperature

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	16.20	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	16.87	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

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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Date of release: 20 March 2024
