

1. General description

Silicon Carbide Schottky diode in a TO247-3L plastic package, designed for high frequency switched-mode power supplies.



2. Features and benefits

- New 6th Generation Technology
- Low Forward Voltage Drop
- Low Reverse Leakage Current
- High Forward Surge Capability I_{FSM}
- 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

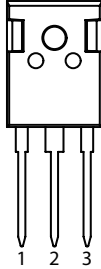
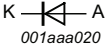
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		650			V
I_F	continuous forward current	$T_{mb} \leq 151\text{ °C}$; DC; Fig. 2	16			A
T_j	junction temperature		175			°C
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 16\text{ A}$; $T_j = 25\text{ °C}$; Fig. 5	-	1.29	1.45	V
		$I_F = 16\text{ A}$; $T_j = 150\text{ °C}$; Fig. 5	-	1.45	1.65	V
Dynamic characteristics						
Q_r	recovered charge	$I_F = 16\text{ A}$; $di_F/dt = 500\text{ A}/\mu\text{s}$; $V_R = 400\text{ V}$; $T_j = 25\text{ °C}$; Fig. 7	-	36	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		 001aaa020
2	K	cathode		
3	A	anode		
mb	K	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
WN6D16650CW	TO247	WN6D16650CW6Q	Tube	30	SOT429 (L)	25-Mar-2013
					TO247P (P)	09-Mar-2023

7. Marking

Table 4. Marking codes

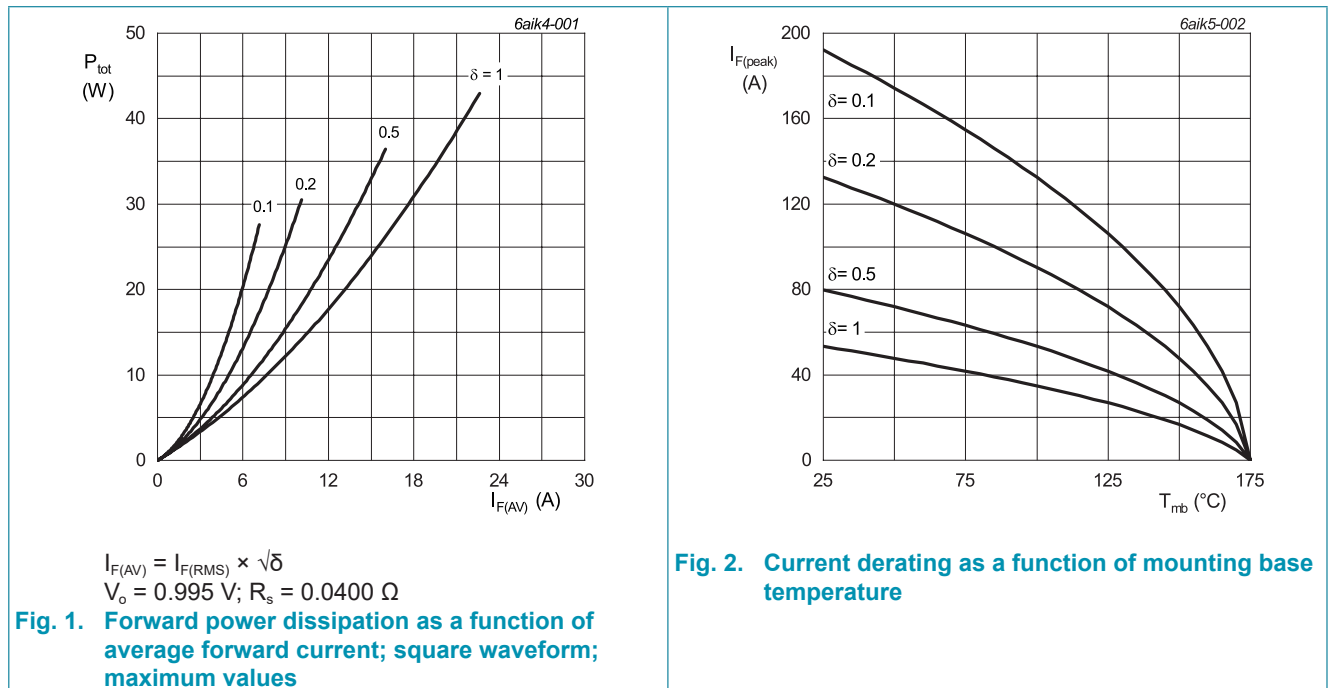
Type number	Marking codes
WN6D16650CW	WN6D 16650CW

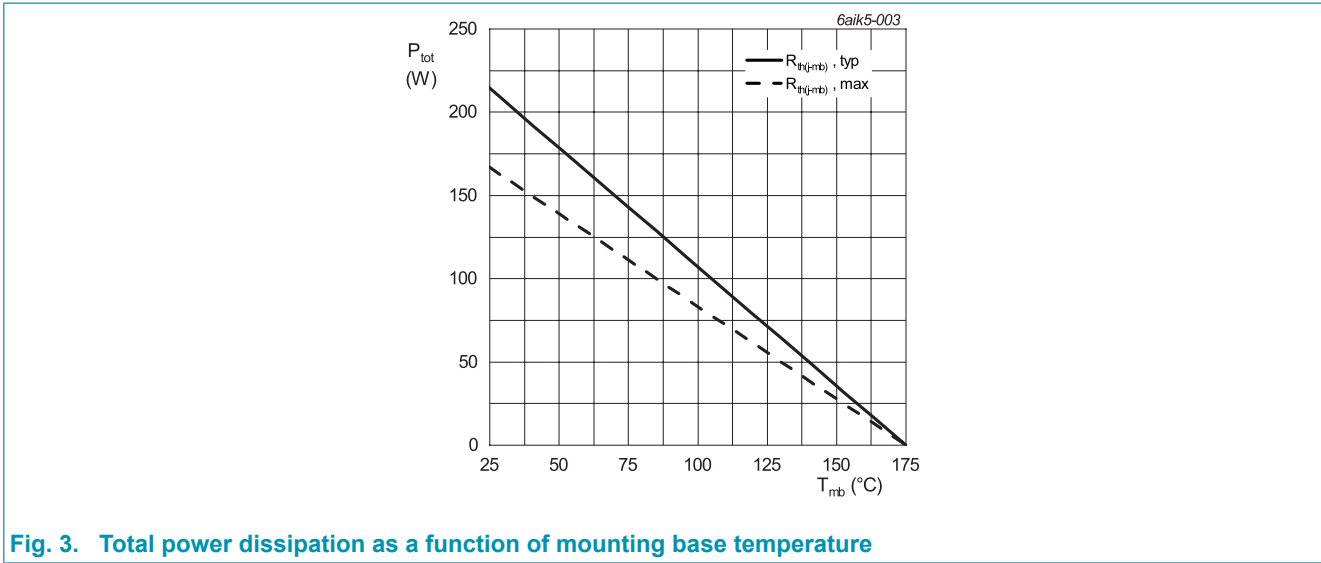
8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	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	$T_{mb} \leq 151\text{ }^\circ\text{C}$; DC; Fig. 2	16	A
		$T_{mb} \leq 125\text{ }^\circ\text{C}$; DC; Fig. 2	27	A
		$T_{mb} \leq 25\text{ }^\circ\text{C}$; DC; Fig. 2	53	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	42	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	110	A
		$t_p = 10\text{ }\mu\text{s}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; square-wave pulse	900	A
I^2t	I^2t for fusing	sine-wave pulse; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; $t_p = 10\text{ ms}$	61	A^2s
T_{stg}	storage temperature		-55 to 175	$^\circ\text{C}$
T_j	junction temperature		175	$^\circ\text{C}$





9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	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	-	40	-	K/W

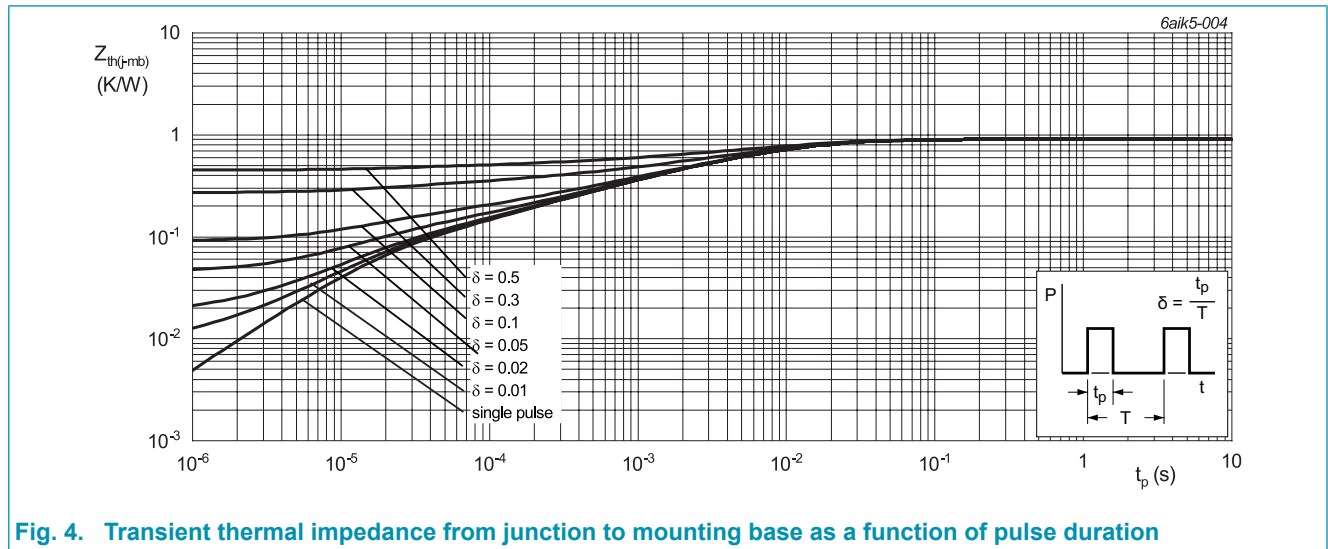
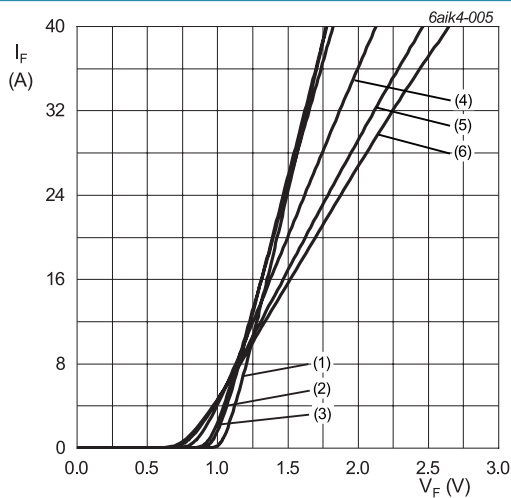


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward current	$I_F = 16\text{ A}; T_J = 25\text{ }^\circ\text{C}; \text{Fig. 5}$	-	1.29	1.45	V
		$I_F = 16\text{ A}; T_J = 150\text{ }^\circ\text{C}; \text{Fig. 5}$	-	1.45	1.65	V
		$I_F = 16\text{ A}; T_J = 175\text{ }^\circ\text{C}; \text{Fig. 5}$	-	1.50	1.7	V
I_R	reverse current	$V_R = 650\text{ V}; T_J = 25\text{ }^\circ\text{C}; \text{Fig. 6}$	-	1	80	μA
		$V_R = 650\text{ V}; T_J = 175\text{ }^\circ\text{C}; \text{Fig. 6}$	-	25	320	μA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 16\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_J = 25\text{ }^\circ\text{C}; \text{Fig. 7}$	-	36	-	nC
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 1\text{ V}; T_J = 25\text{ }^\circ\text{C}$	-	780	-	pF
		$f = 1\text{ MHz}; V_R = 300\text{ V}; T_J = 25\text{ }^\circ\text{C}$	-	86	-	pF
		$f = 1\text{ MHz}; V_R = 600\text{ V}; T_J = 25\text{ }^\circ\text{C}$	-	79	-	pF
E_{as}	non-repetitive avalanche energy	$I_R = 7\text{ A}; L = 5\text{ mH}; T_{J(\text{init})} = 25\text{ }^\circ\text{C}$	120	-	-	mJ



$V_o = 0.995\text{ V}; R_s = 0.0400\ \Omega$
 (1) $T_J = -55\text{ }^\circ\text{C}$; typical values
 (2) $T_J = 0\text{ }^\circ\text{C}$; typical values
 (3) $T_J = 25\text{ }^\circ\text{C}$; typical values
 (4) $T_J = 100\text{ }^\circ\text{C}$; typical values
 (5) $T_J = 150\text{ }^\circ\text{C}$; typical values
 (6) $T_J = 175\text{ }^\circ\text{C}$; typical values

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

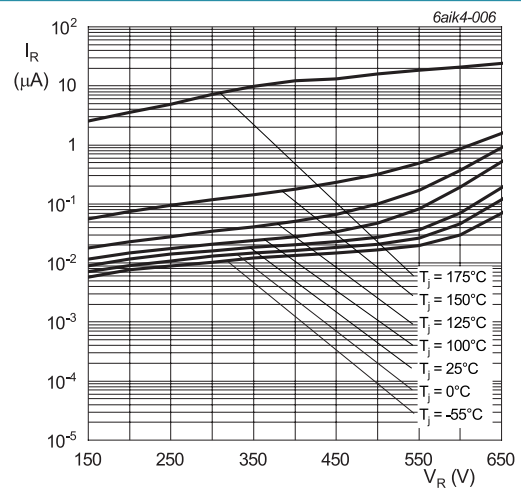


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

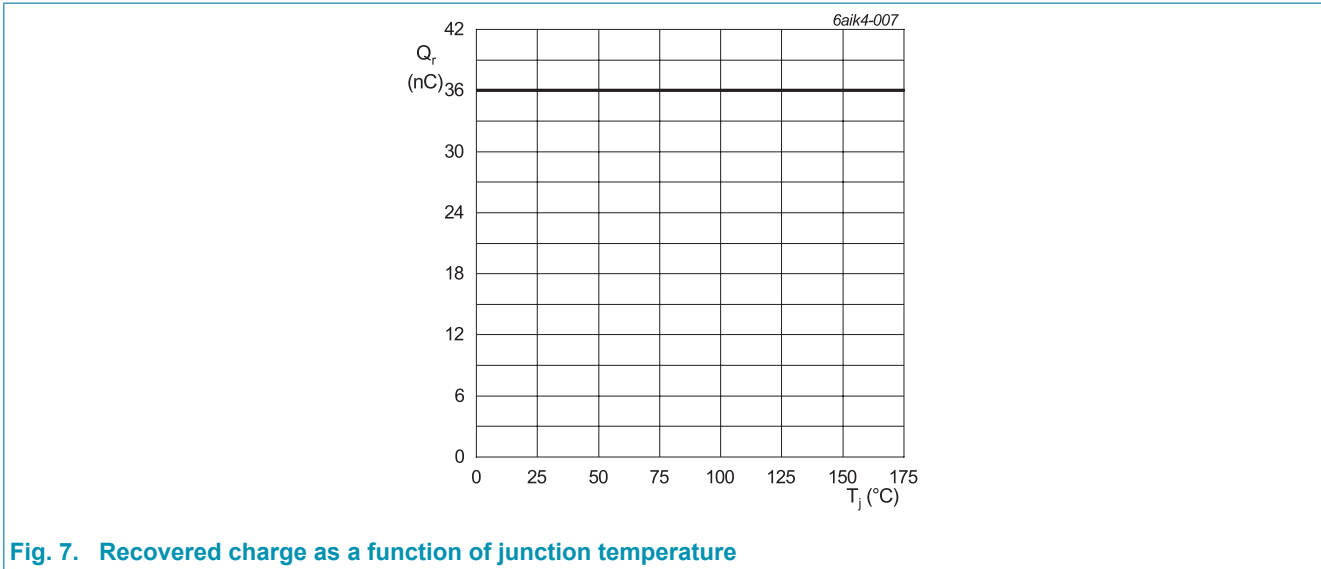
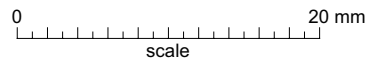
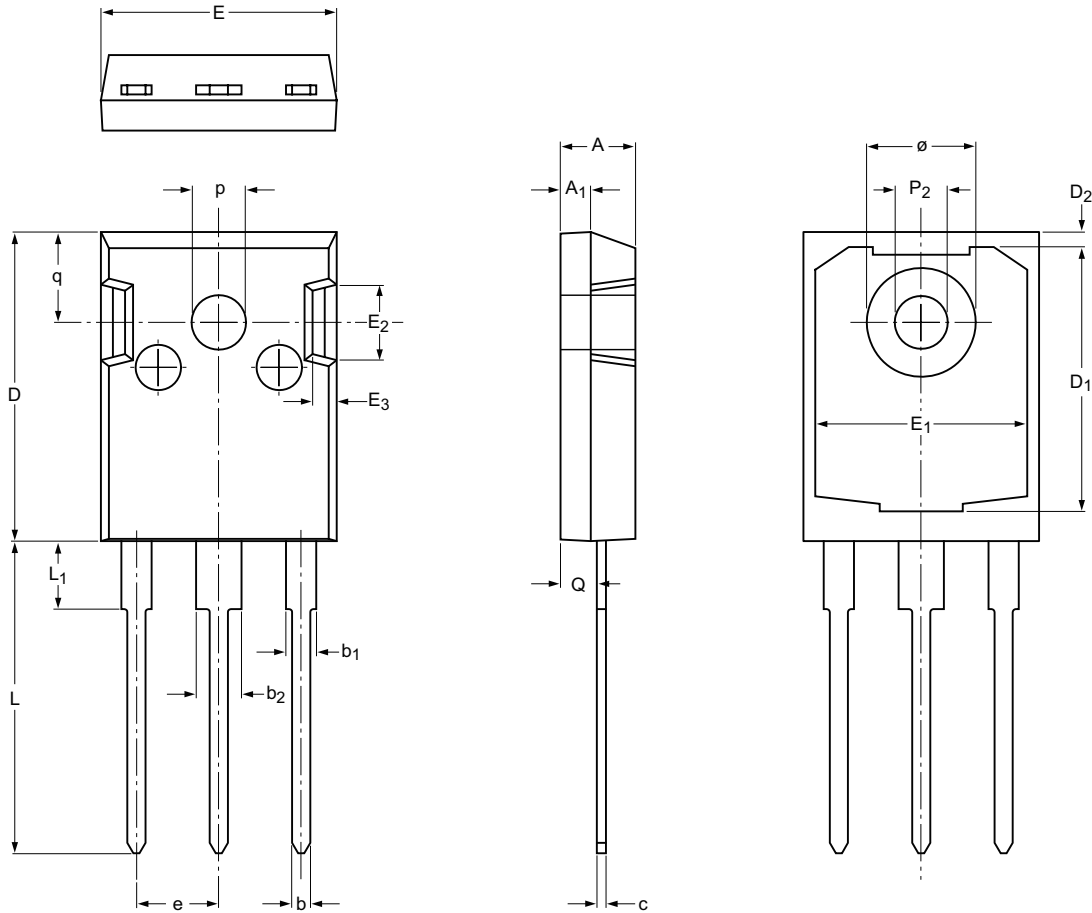


Fig. 7. Recovered charge as a function of junction temperature

11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247

SOT429



Dimensions (mm are the original dimensions)

Unit ⁽¹⁾	A	A ₁	b	b ₁	b ₂	c	D	D ₁	D ₂	E	E ₁	E ₂	E ₃	e ⁽¹⁾	L	L ₁	P ₂	p	Q	q	ø	
max	5.20	2.10	1.40	2.20	3.20	0.70	20.6	17.68	1.20	15.75	14.22	5.20	1.80		20.90	4.75	3.60	3.70	2.60	6.18	7.30	
nom														5.45								
min	4.70	1.90	1.00	1.80	2.80	0.50	20.3	17.28	0.80	15.45	13.82	4.80	1.40		20.40	4.25	3.40	3.50	2.20	5.78	7.10	

Note

1. Basic spacing between centers.

sot429_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT429		TO-247			04-09-14 13-03-25

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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