

1. General description

Silicon Carbide Schottky diode in a ITO220-2L 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
- Insulated package rated at 2500V RMS

3. Applications

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

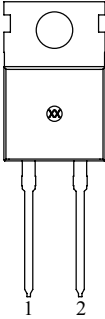

4. Quick reference data

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} ≤ 146 °C, DC; Fig. 2		6			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 = 6 A; T _j = 25 °C; Fig. 5		-	1.26	1.40	V
		I _F = 6 A; T _j = 150 °C; Fig. 5		-	1.35	1.55	V
Dynamic characteristics							
Q _r	recovered charge	I _F = 6 A; dI _F /dt = 500 A/μs; V _R = 400 V; T _j = 25 °C; Fig. 7		-	13.5	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
WNSC6D06650Y	IITO220-2L	WNSC6D06650Y6Q	Tube	50	IITO220P-2L	13-Mar-2023

7. Marking

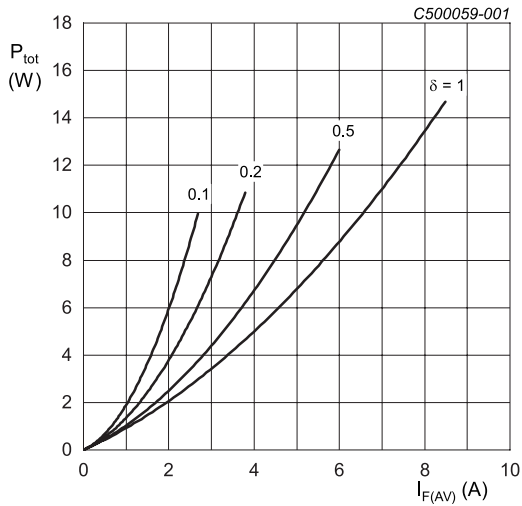
Table 4. Marking codes

Type number	Marking codes
WNSC6D06650Y	WNSC6D 06650Y

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} ≤ 146 °C, DC; Fig. 2		6	A
		T _{mb} ≤ 125 °C, DC; Fig. 2		8	A
		T _{mb} ≤ 25 °C, DC; Fig. 2		17	A
I _{FRM}	repetitive peak forward current	δ = 0.5; t _p = 25 μs; T _{mb} ≤ 125 °C; square-wave pulse		13	A
I _{FSM}	non-repetitive peak forward current	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse		50	A
		t _p = 10 μs; T _{j(init)} = 25 °C; square-wave pulse		610	A
I ² t	I ² t for fusing	t _p = 10 ms; T _{j(init)} = 25 °C; sine-wave pulse		12.5	A ² s
T _{stg}	storage temperature			-55 to 175	°C
T _j	junction temperature			-55 to 175	°C



$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$
 $V_o = 0.817 \text{ V}; R_s = 0.1079 \text{ }\Omega$

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

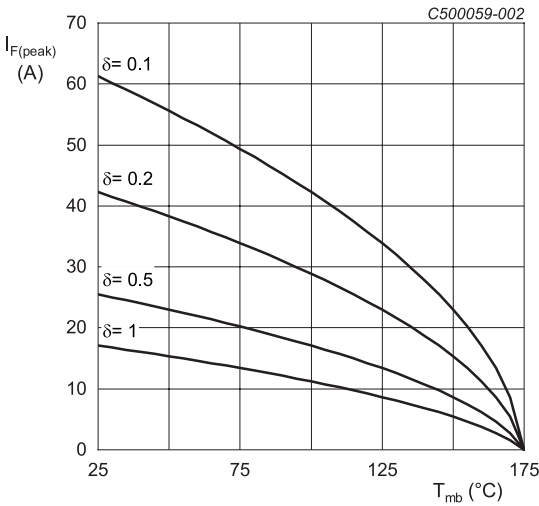


Fig. 2. Current derating as a function of mounting base temperature

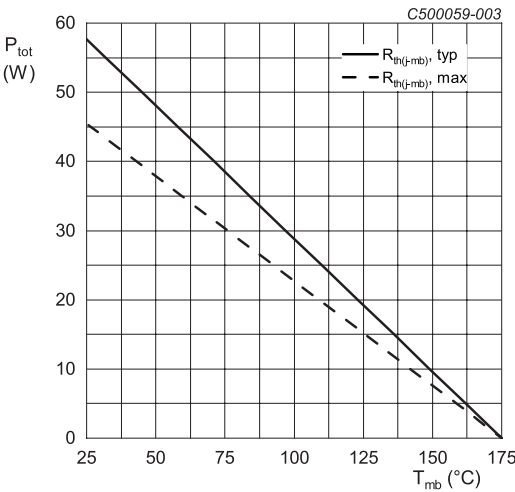


Fig. 3. Total power dissipation as a function of mounting base temperature

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	Fig. 4		-	2.6	3.3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

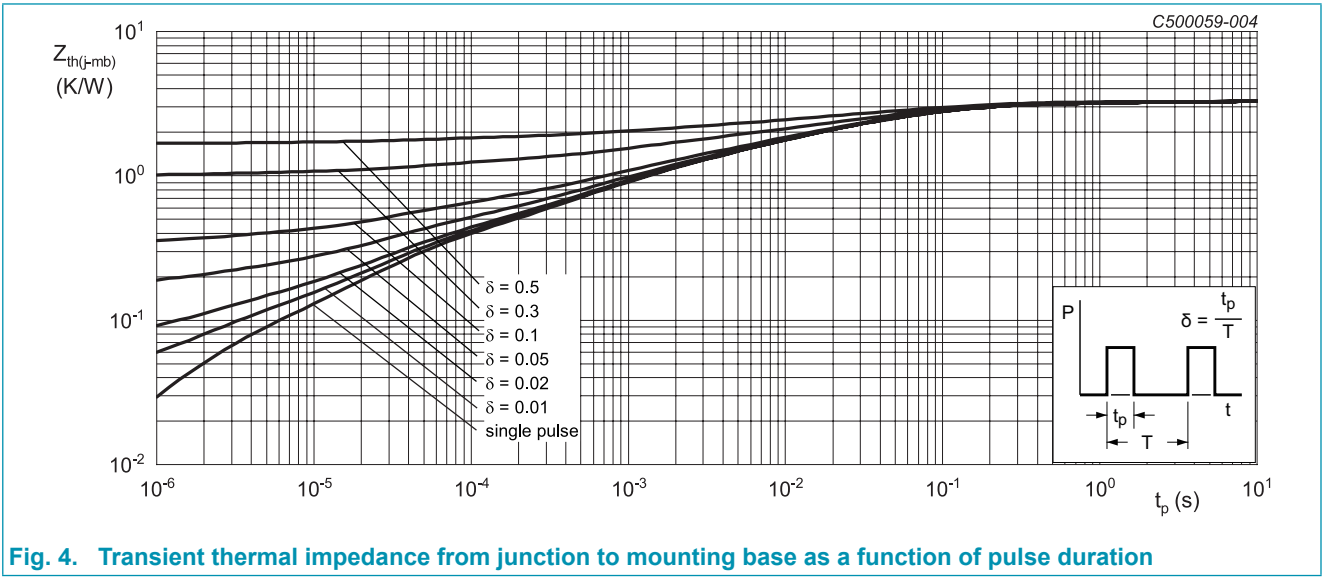


Fig. 4. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Isolation characteristics

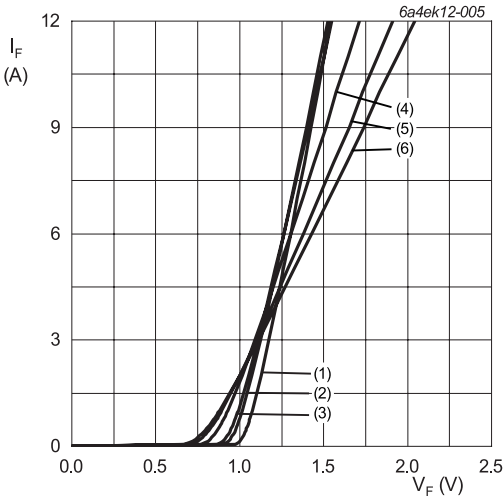
Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; sinusoidal waveform; clean and dust free; 50 Hz $\leq f \leq$ 60 Hz; $T_h = 25\text{ }^{\circ}\text{C}$; RH $\leq 65\%$		-	-	2500	V

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 6 A; T _j = 25 °C; Fig. 5		-	1.26	1.40	V
		I _F = 6 A; T _j = 150 °C; Fig. 5		-	1.35	1.55	V
		I _F = 6 A; T _j = 175 °C; Fig. 5		-	1.40	1.60	V
I _R	reverse current	V _R = 650 V; T _j = 25 °C; Fig. 6		-	0.6	30	μA
		V _R = 650 V; T _j = 175 °C; Fig. 6		-	9	120	μA
Dynamic characteristics							
Q _r	recovered charge	I _F = 6 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _j = 25 °C; Fig. 7		-	13.5	-	nC
C _d	diode capacitance	f = 1 MHz; V _R = 1 V; T _j = 25 °C		-	313	-	pF
		f = 1 MHz; V _R = 300 V; T _j = 25 °C		-	35	-	pF
		f = 1 MHz; V _R = 600 V; T _j = 25 °C		-	32	-	pF
E _{as}	non-repetitive avalanche energy	I _R = 4 A; T _{j(initial)} = 25 °C; L = 5 mH		40	-	-	mJ



V_o = 0.817 V; R_s = 0.1079 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

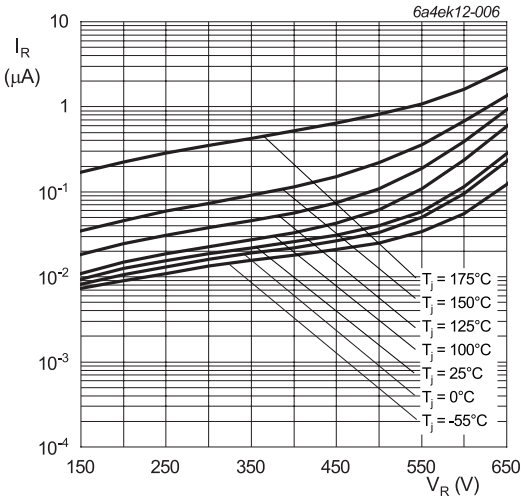


Fig. 6. Reverse leakage current as a function of reverse voltage; typical value

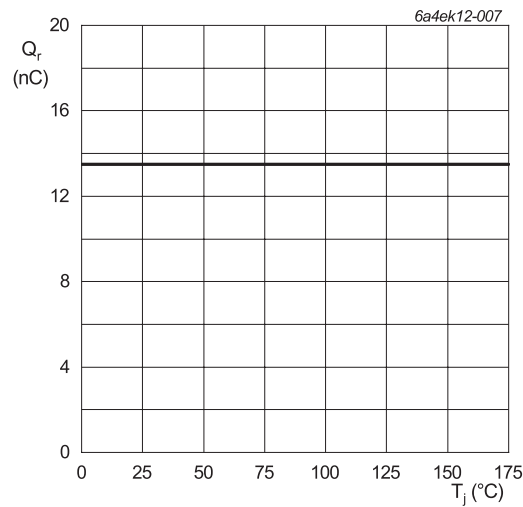


Fig. 7. Recovered charge as a function of junction temperature

12. Package outline

Plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2 leads TO-220 ITO220-2L

Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.30	4.45	4.70
A1	1.25	1.30	1.40
b	0.60	0.80	0.90
b1	1.10	1.27	1.40
b2	1.32	1.37	1.72
c	0.40	0.50	0.60
D	15.20	15.70	16.00
D1	6.20	6.40	6.60
D2	2.70	2.80	3.00
D3	12.98	13.28	13.58
E	9.70	10.00	10.30
E1	7.50	8.00	8.50
e	5.08(BSC)		
L	12.80	13.40	14.00
L1	2.80	3.00	3.20
P	3.50	3.60	3.70
Q	2.20	2.40	2.60

13. 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.

- [1] Please consult the most recently issued document before initiating or completing a design.
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