

## 1. General description

Silicon Carbide Schottky diode in a SOD59A (TO220-2L) plastic package, designed for high frequency switched-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

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

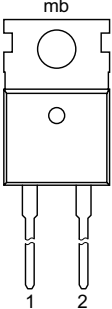
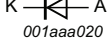
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values				Unit
Absolute maximum rating							
V <sub>RRM</sub>	repetitive peak reverse voltage		1200				V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; square-wave pulse; T <sub>mb</sub> ≤ 152 °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> ; <a href="#">Fig. 4</a>	5				A
T <sub>j</sub>	junction temperature		175				°C
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 5 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.4	1.6	V
		I <sub>F</sub> = 5 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1.85	2.3	V
		I <sub>F</sub> = 5 A; T <sub>j</sub> = 175 °C; <a href="#">Fig. 6</a>		-	2	2.6	V
Dynamic characteristics							
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 5 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 8</a>		-	13	-	nC

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	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
WNSC051200	TO220-2L	WNSC051200Q	Tube	50	SOD59A	30-Mar-2015

7. Marking

Table 4. Marking codes

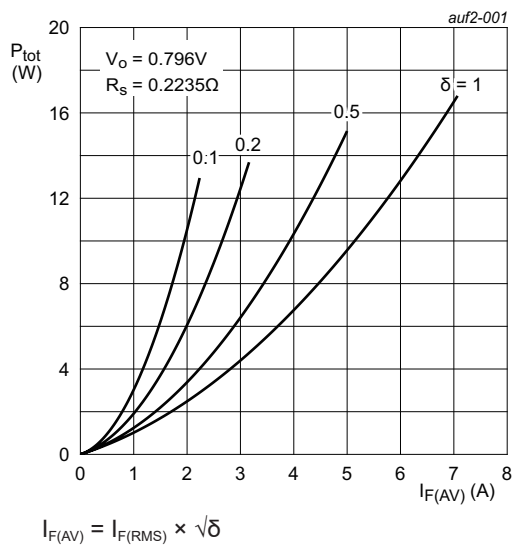
Type number	Marking codes
WNSC051200	WNSC051200

## 8. Limiting values

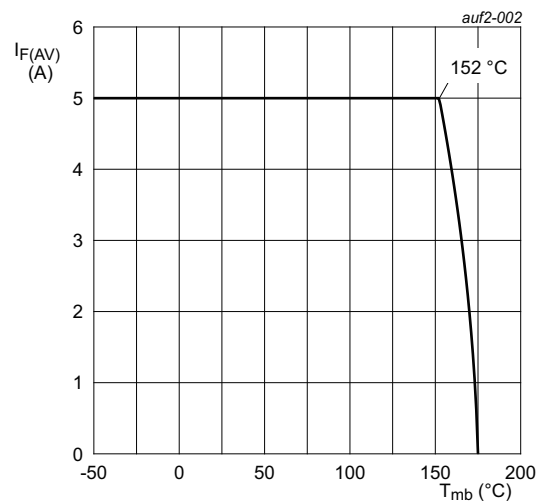
**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		1200	V
$V_{RWM}$	crest working reverse voltage		1200	V
$V_R$	reverse voltage	DC	1200	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 152\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a> ; <a href="#">Fig. 4</a>	5	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 152\text{ }^{\circ}\text{C}$ ; square-wave pulse	10	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	65	A
		$t_p = 10\text{ }\mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; sine-wave pulse	525	A
$T_{stg}$	storage temperature		-55 to 175	$^{\circ}\text{C}$
$T_j$	junction temperature		175	$^{\circ}\text{C}$



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



**Fig. 2. Forward current as a function of mounting base temperature; typical values**

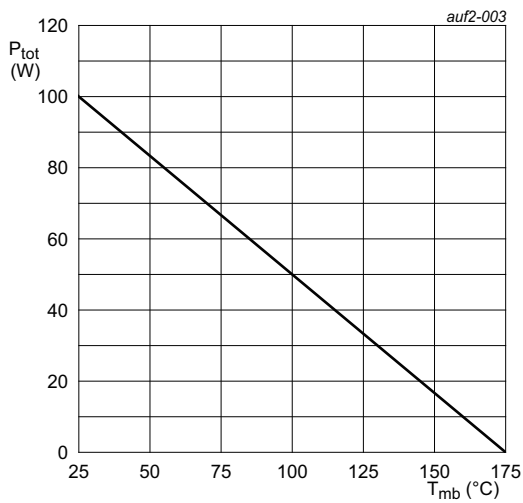


Fig. 3. Total power dissipation as a function of mounting base temperature

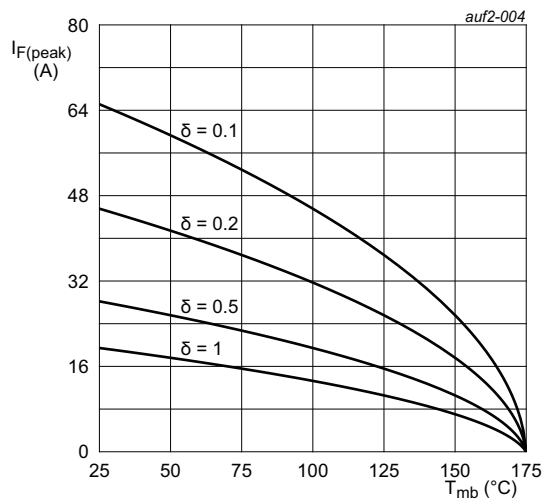


Fig. 4. Current derating as a function of mounting base temperature

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	<a href="#">Fig. 5</a>		-	-	1.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

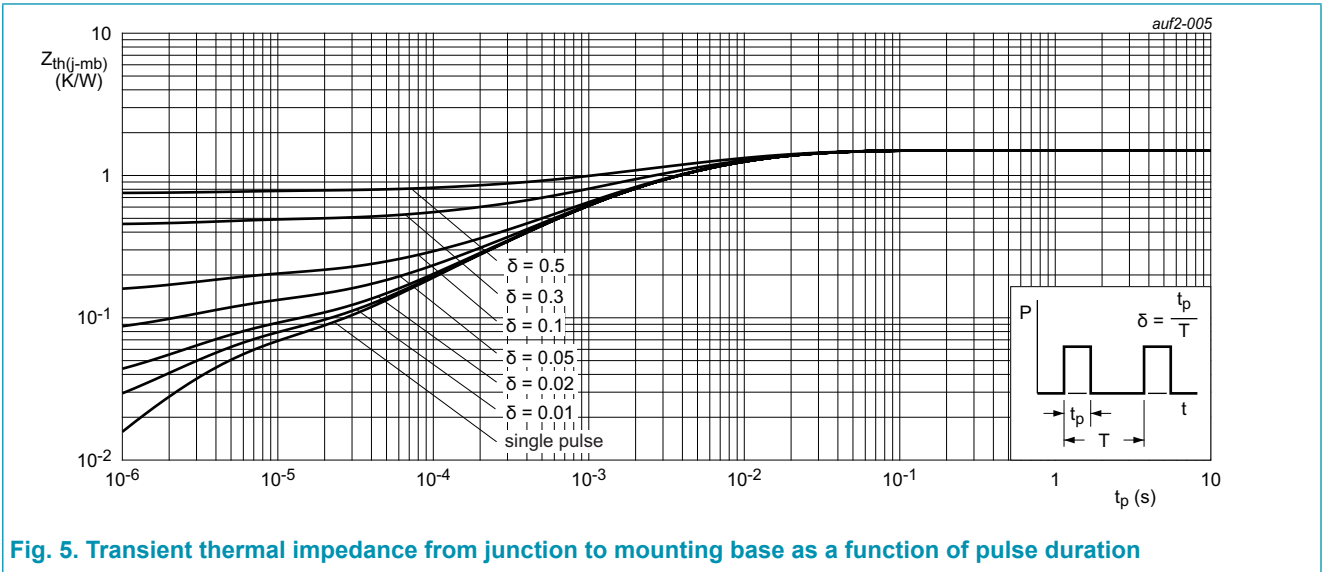
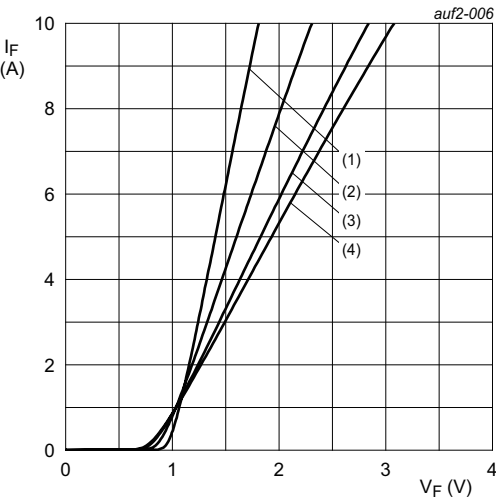


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward current	I <sub>F</sub> = 5 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.4	1.6	V
		I <sub>F</sub> = 5 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1.85	2.3	V
		I <sub>F</sub> = 5 A; T <sub>j</sub> = 175 °C; <a href="#">Fig. 6</a>		-	2	2.6	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 1200 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	-	100	μA
		V <sub>R</sub> = 1200 V; T <sub>j</sub> = 175 °C; <a href="#">Fig. 7</a>		-	-	240	μA
Dynamic characteristics							
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 5 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 8</a>		-	13	-	nC
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 1 V; T <sub>j</sub> = 25 °C		-	250	-	pF
		f = 1 MHz; V <sub>R</sub> = 400 V; T <sub>j</sub> = 25 °C		-	24.5	-	pF
		f = 1 MHz; V <sub>R</sub> = 800 V; T <sub>j</sub> = 25 °C		-	22	-	pF



- (1)  $T_J = 25\text{ }^{\circ}\text{C}$ ; typical values
- (2)  $T_J = 100\text{ }^{\circ}\text{C}$ ; typical values
- (3)  $T_J = 150\text{ }^{\circ}\text{C}$ ; typical values
- (4)  $T_J = 175\text{ }^{\circ}\text{C}$ ; typical values

Fig. 6. Forward current as a function of forward voltage; typical values

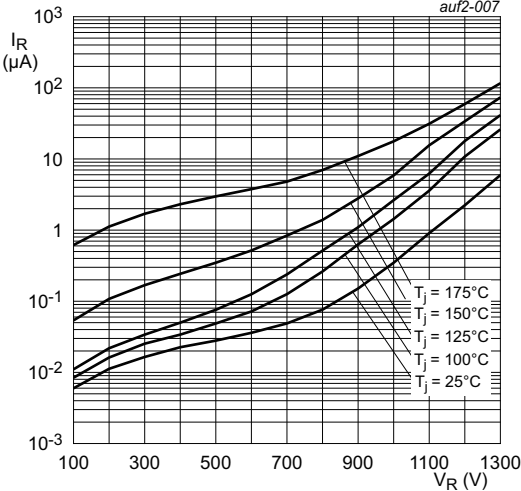


Fig. 7. Reverse leakage current as a function of reverse voltage; typical value

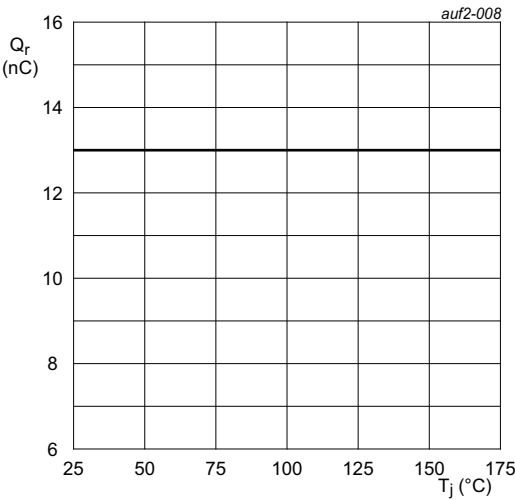
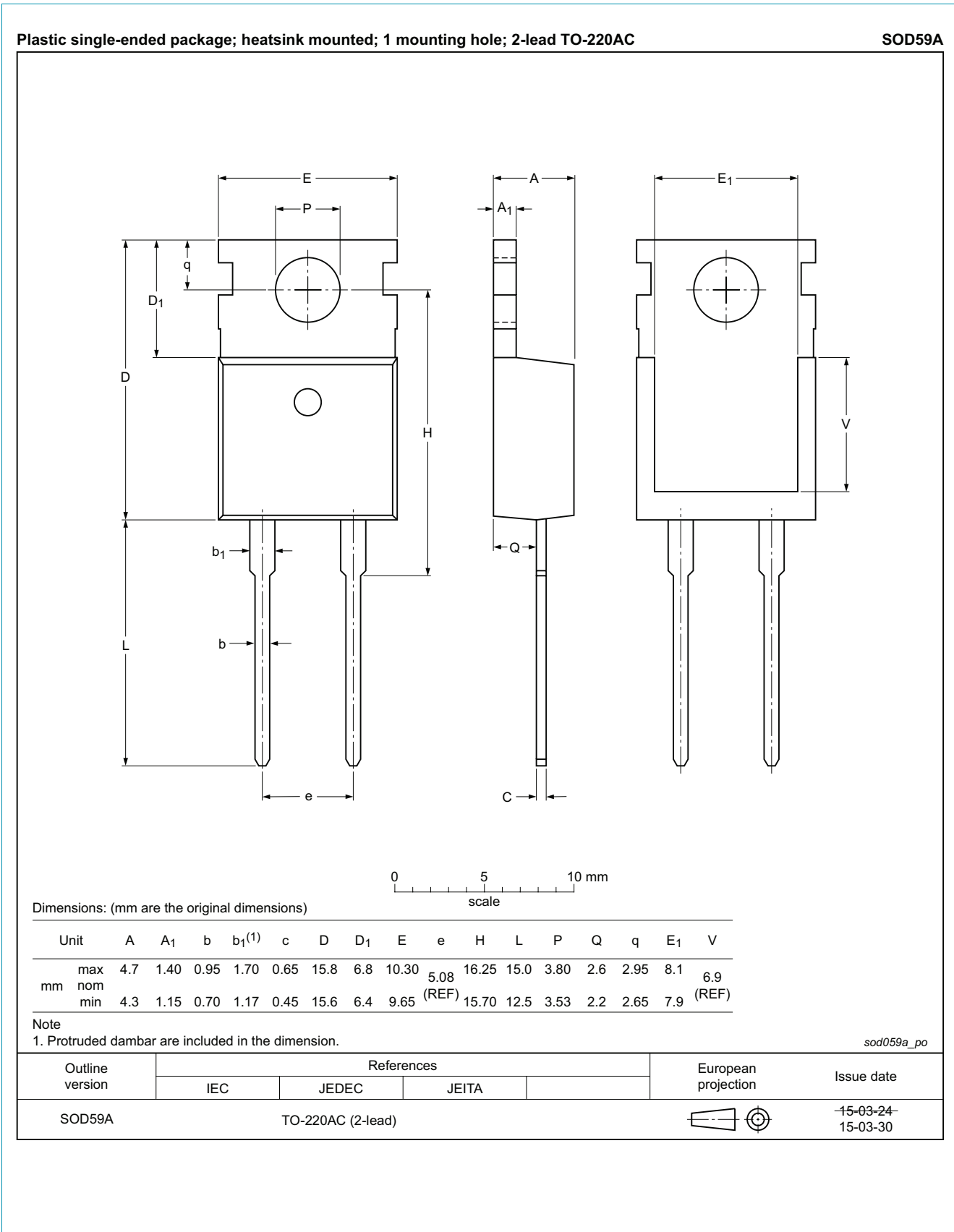


Fig. 8. Recovered charge as a function of junction temperature

11. Package outline



## 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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