

1. General description

Ultrafast power diode in a SOD59 (2-lead TO-220AC) plastic package.

2. Features and benefits

- Fast switching
- Guaranteed ESD capability
- High thermal cycling performance
- Low on-state loss
- Low thermal resistance
- Rugged: reverse voltage surge capability
- Soft recovery minimizes power-consuming oscillations

3. Applications

- Output rectifiers in high-frequency switched-mode power supplies

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
Absolute maximum rating						
V_{RRM}	repetitive peak reverse voltage		150			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 128$ °C; square-wave pulse; Fig. 1 ; Fig. 2	8			A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; $T_{mb} \leq 128$ °C; square-wave pulse	16			A
I_{FSM}	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	80			A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	88			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 8$ A; $T_j = 25$ °C; Fig. 4	-	0.92	1.05	V
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $di_F/dt = 100$ A/ μ s; $T_j = 25$ °C; ramp recovery; Fig. 5 ; Fig. 7	-	20	25	ns
Electrostatic discharge						
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 k Ω	-	-	8	kV

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYW29E-150	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

7. Marking

Table 4. Marking codes

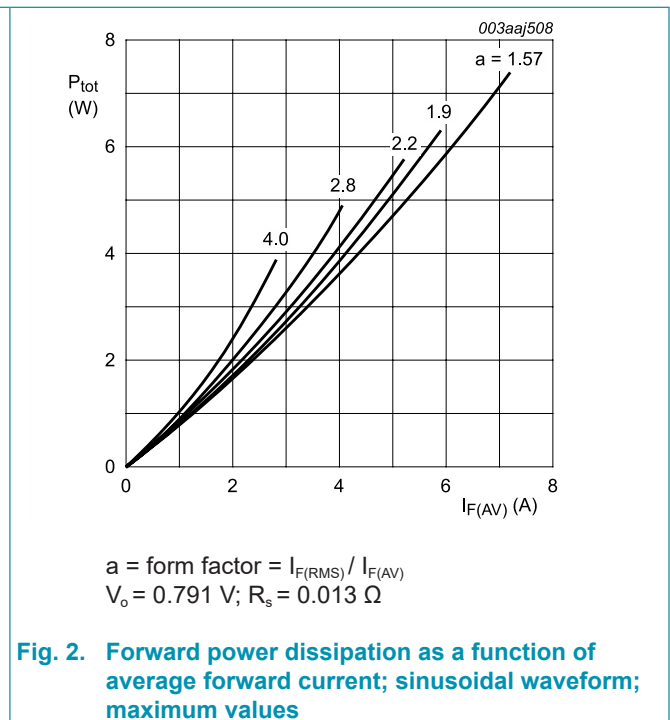
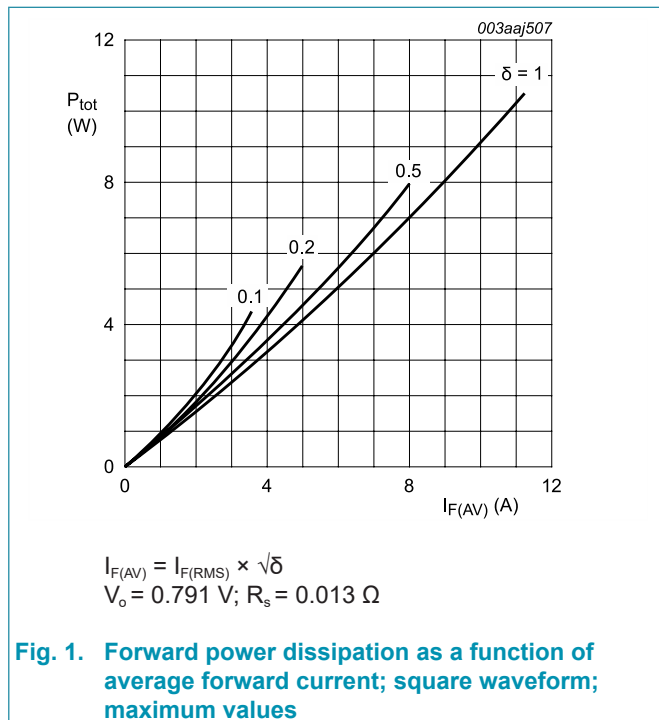
Type number	Marking codes
BYW29E-150	BYW29E-150

8. Limiting values

Table 5. Limiting values

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

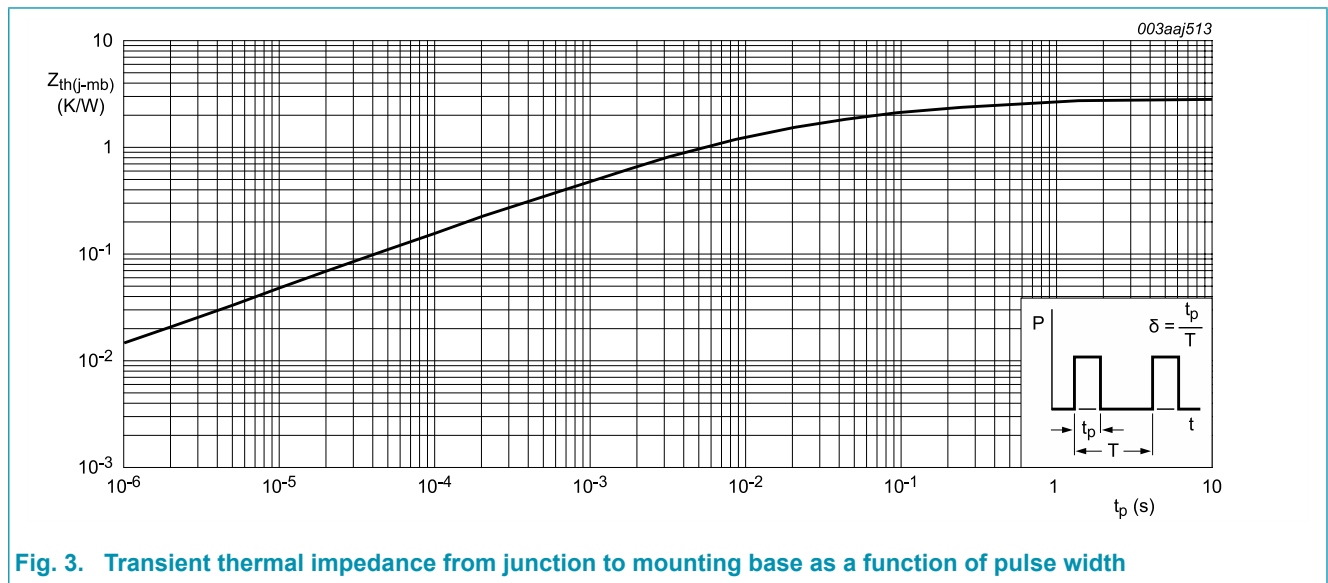
Symbol	Parameter	Conditions	Values	Unit
V_{RRM}	repetitive peak reverse voltage		150	V
V_{RWM}	crest working reverse voltage		150	V
V_R	reverse voltage		150	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_{mb} \leq 128\text{ }^\circ\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2	8	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 128\text{ }^\circ\text{C}$; square-wave pulse	16	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	80	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sine-wave pulse	88	A
I_{RRM}	repetitive peak reverse current	$\delta = 0.001$; $t_p = 2\text{ }\mu\text{s}$	0.2	A
I_{RSM}	non-repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$	0.2	A
T_{stg}	storage temperature		-40 to 150	$^\circ\text{C}$
T_j	junction temperature		150	$^\circ\text{C}$
Electrostatic discharge				
V_{ESD}	electrostatic discharge voltage	HBM; C = 250 pF; R = 1.5 k Ω	8	kV



9. Thermal characteristics

Table 6. Thermal characteristics

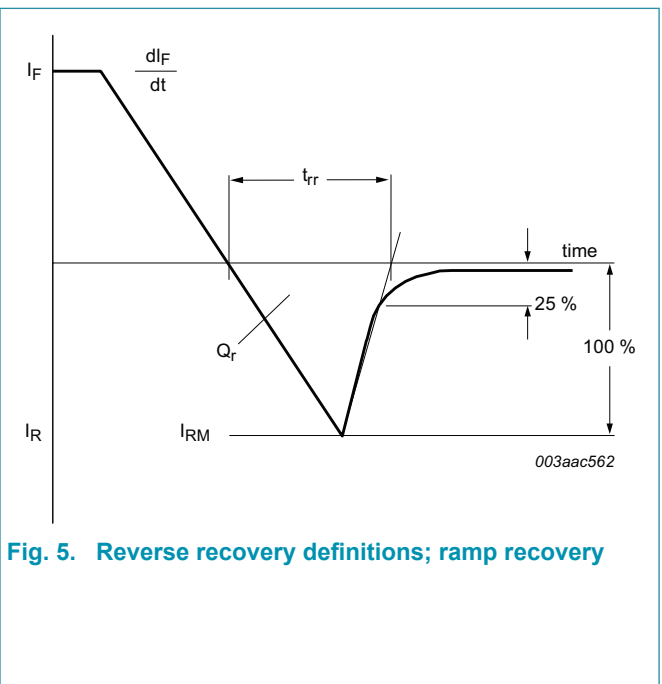
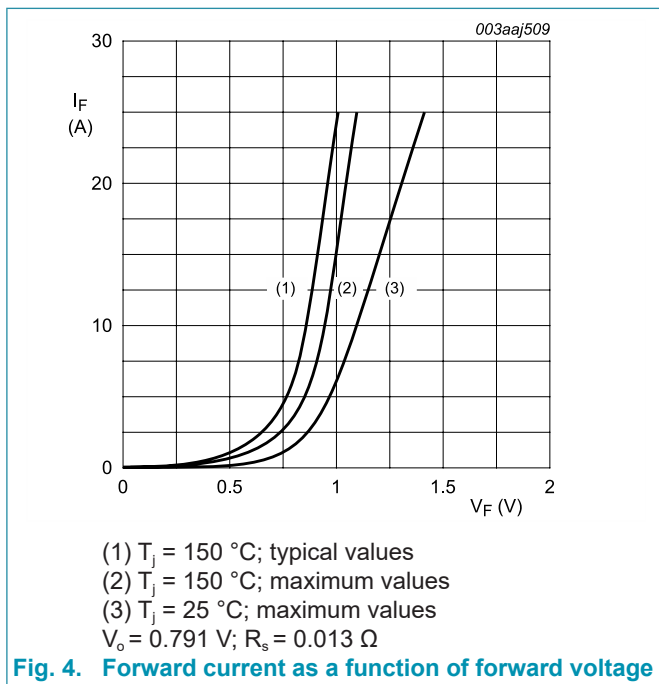
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 3	-	-	2.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

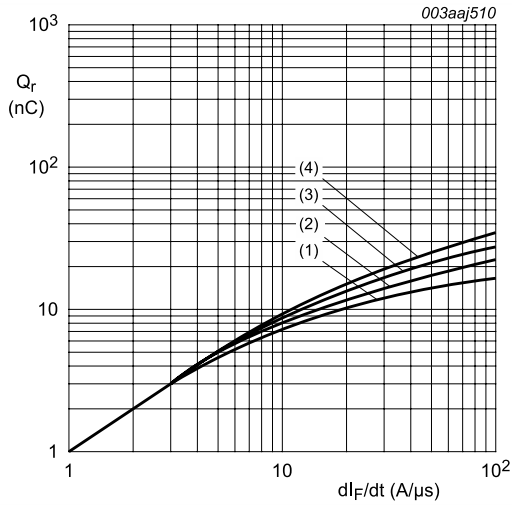


10. Characteristics

Table 7. Characteristics

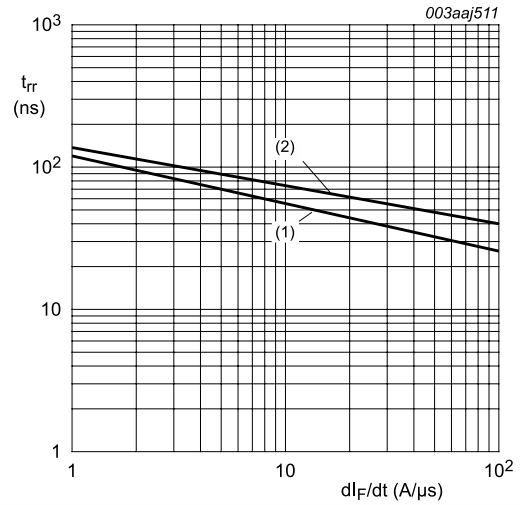
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 8 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 4}$	-	0.92	1.05	V
		$I_F = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 4}$	-	1.1	1.3	V
		$I_F = 8 \text{ A}; T_j = 150 \text{ }^\circ\text{C}; \text{ Fig. 4}$	-	0.8	0.895	V
I_R	reverse current	$V_R = 150 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	2	10	μA
		$V_R = 150 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.2	0.6	mA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 2 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}; \text{ Fig. 6}$	-	4	11	nC
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ ramp recovery}; \text{ Fig. 5}; \text{ Fig. 7}$	-	20	25	ns
		$I_F = 0.5 \text{ A}; I_R = 1 \text{ A}; I_{R(\text{meas})} = 0.25 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ step recovery}; \text{ Fig. 8}$	-	15	20	ns
V_{FRM}	forward recovery voltage	$I_F = 1 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 9}$	-	1	-	V





- (1) $I_F = 1$ A; $T_j = 25$ °C
- (2) $I_F = 2$ A; $T_j = 25$ °C
- (3) $I_F = 5$ A; $T_j = 25$ °C
- (4) $I_F = 10$ A; $T_j = 25$ °C

Fig. 6. Recovered charge as a function of rate of change of forward current; maximum values



- (1) $I_F = 1$ A; $T_j = 25$ °C
- (2) $I_F = 10$ A; $T_j = 25$ °C

Fig. 7. Reverse recovery time as a function of rate of change of forward current; maximum values

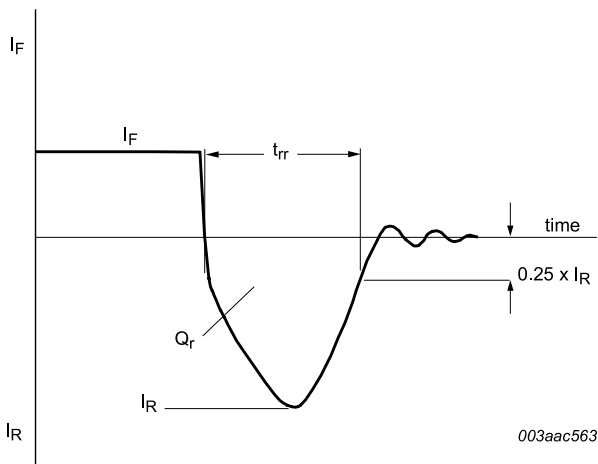


Fig. 8. Reverse recovery definitions; step recovery

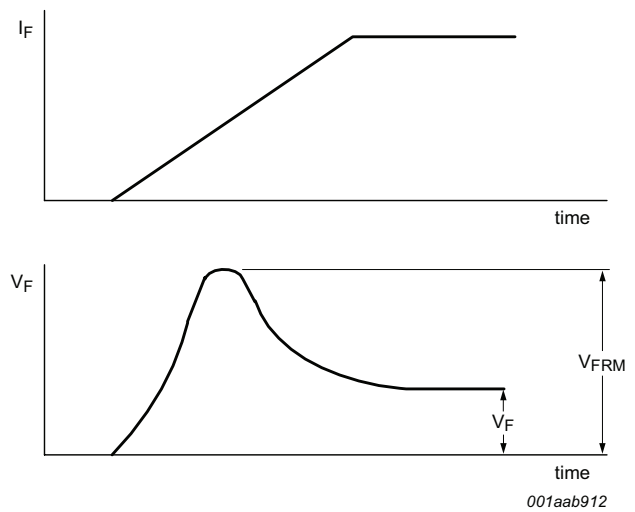


Fig. 9. Forward recovery definitions

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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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 4 June 2018

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