

## 1. General description

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

## 2. Features and benefits

- Fast switching
- Low reverse recovery current
- Low leakage current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

## 3. Applications

- Half-bridge/full-bridge switched-mode power supplies
- Continuous Current Mode (CCM) Power Factor Correction (PFC)

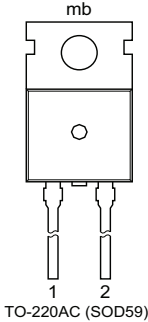
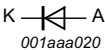
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit	
Absolute maximum rating							
V <sub>RRM</sub>	repetitive peak reverse voltage		600			V	
I <sub>F(AV)</sub>	average forward current	δ = 0.5; T <sub>mb</sub> ≤ 130 °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	8			A	
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 130 °C; square-wave pulse	16			A	
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; <a href="#">Fig. 4</a>	91			A	
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse	100			A	
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>j</sub> = 125 °C; <a href="#">Fig. 6</a>		-	1.5	1.9	V
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	12	18	ns

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	Description	Version
BYC8-600P	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

7. Marking

Table 4. Marking codes

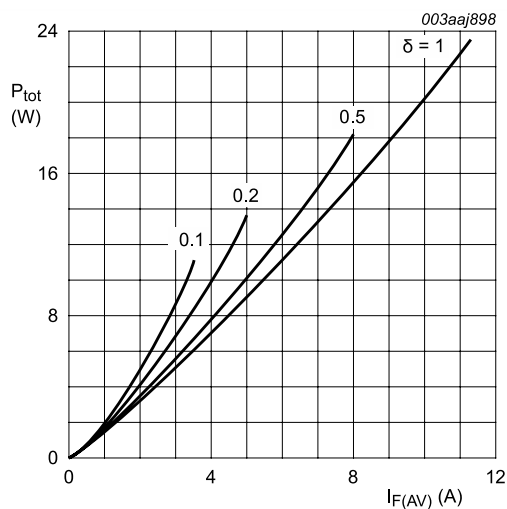
Type number	Marking codes
BYC8-600P	BYC8-600P

## 8. Limiting values

**Table 5. Limiting values**

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

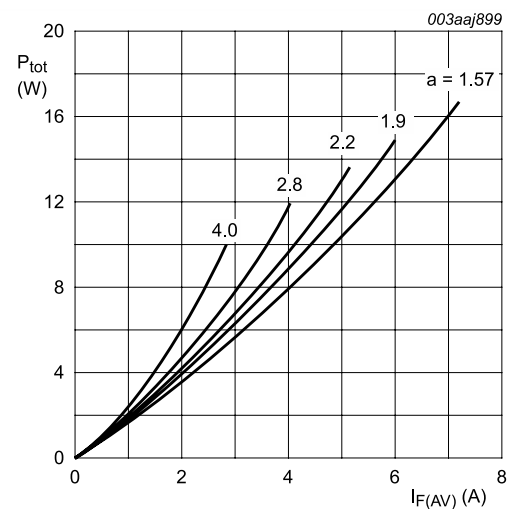
Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		600	V
$V_{RWM}$	crest working reverse voltage		600	V
$V_R$	reverse voltage	DC	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 130\text{ }^{\circ}\text{C}$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	8	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 130\text{ }^{\circ}\text{C}$ ; 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; <a href="#">Fig. 4</a>	91	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; sine-wave pulse	100	A
$T_{stg}$	storage temperature		-65 to 175	$^{\circ}\text{C}$
$T_j$	junction temperature		175	$^{\circ}\text{C}$



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$$V_o = 1.581\text{ V}; R_s = 0.043\text{ }\Omega$$

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



$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

$$V_o = 1.581\text{ V}; R_s = 0.043\text{ }\Omega$$

**Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values**

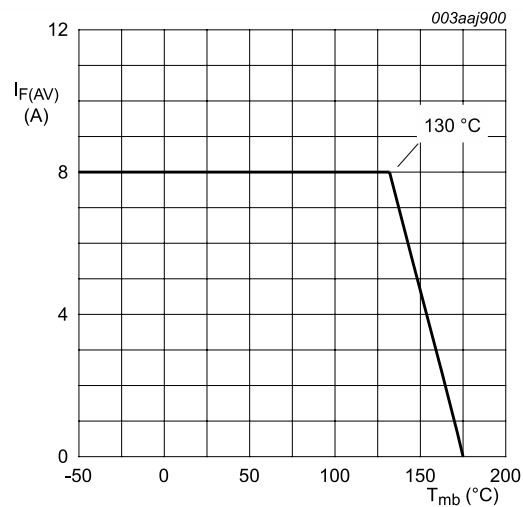


Fig. 3. Average forward current as a function of mounting base temperature; maximum values

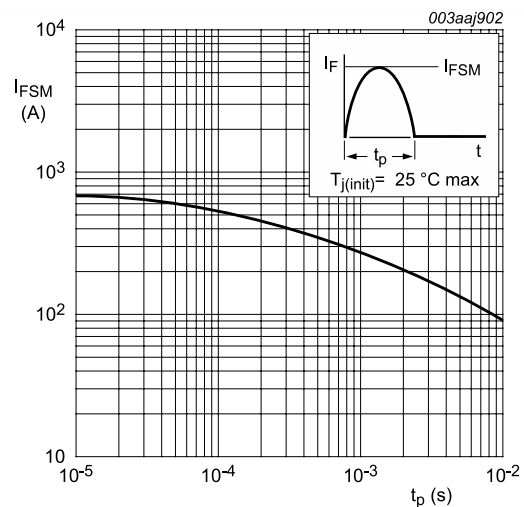


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

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>		-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

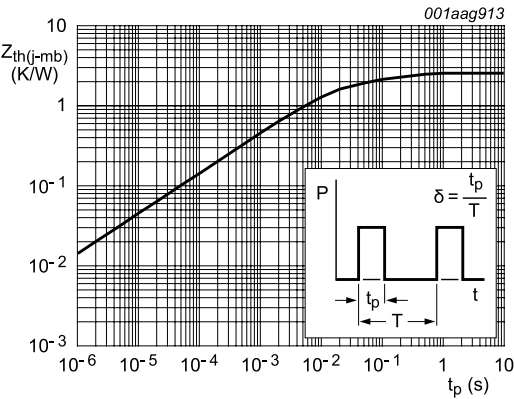
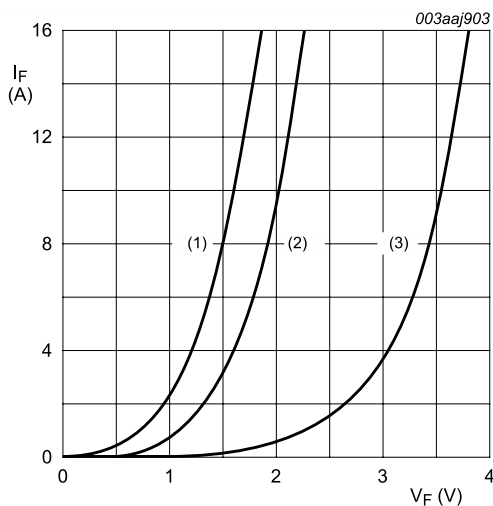


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>J</sub> = 25 °C; <a href="#">Fig. 6</a>		-	-	3.4	V
		I <sub>F</sub> = 8 A; T <sub>J</sub> = 125 °C; <a href="#">Fig. 6</a>		-	1.5	1.9	V
		I <sub>F</sub> = 8 A; T <sub>J</sub> = 150 °C		-	1.4	-	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>J</sub> = 25 °C		-	-	20	μA
		V <sub>R</sub> = 600 V; T <sub>J</sub> = 125 °C		-	-	200	μA
Dynamic characteristics							
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; di <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	17	-	nC
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; di <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 125 °C; <a href="#">Fig. 7</a>		-	90	-	nC
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 8 A; V <sub>R</sub> = 400 V; di <sub>F</sub> /dt = 500 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	19	-	ns
		I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; di <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	12	18	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; di <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	-	2.2	A
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; di <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 125 °C; <a href="#">Fig. 7</a>		-	-	6	A



- (1)  $T_J = 125\text{ °C}$ ; typical values  
 (2)  $T_J = 125\text{ °C}$ ; maximum values  
 (3)  $T_J = 25\text{ °C}$ ; maximum values  
 $V_o = 1.581\text{ V}$ ;  $R_s = 0.043\text{ }\Omega$

Fig. 6. Forward current as a function of forward voltage

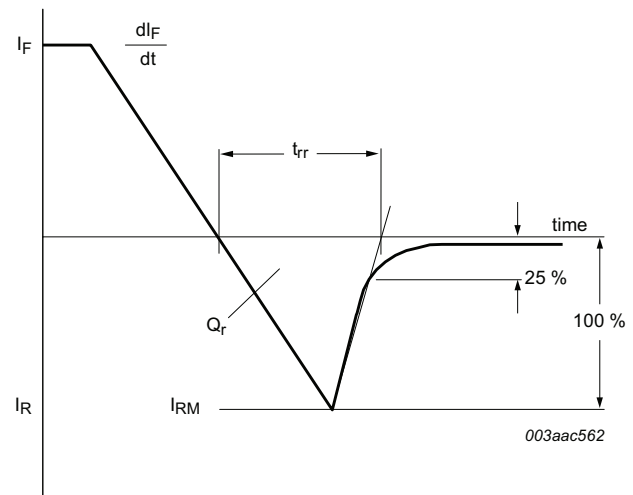
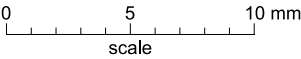
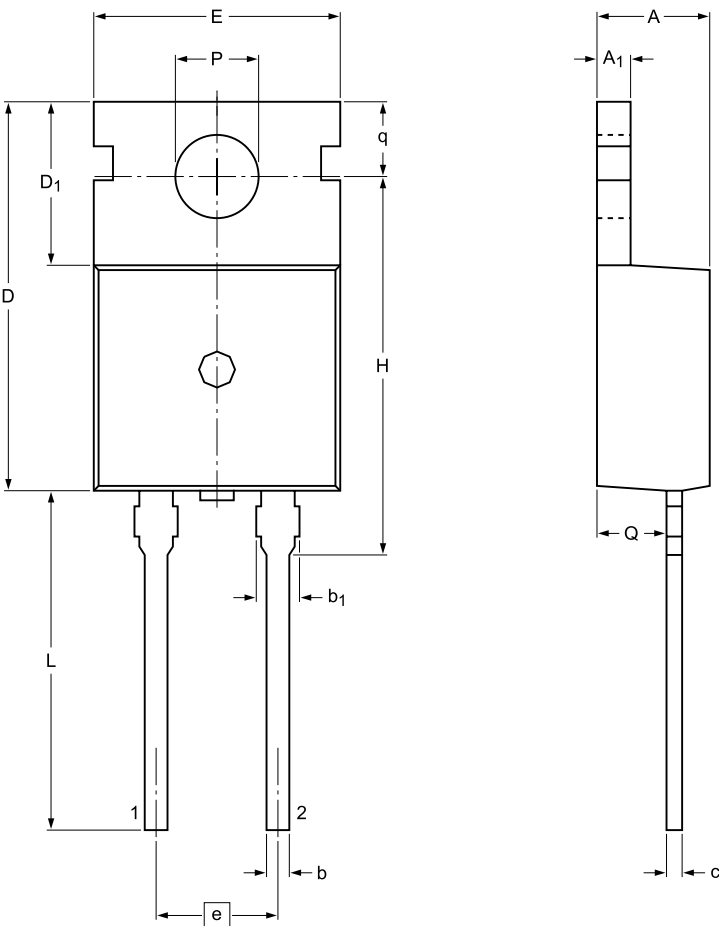


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC SOD59



Dimensions														
Unit	A	A <sub>1</sub>	b	b <sub>1</sub> (1)	c	D	D <sub>1</sub>	E	e	H	L	P	Q	q
mm	max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	16.25	15.0	3.80	2.6	2.9
	nom								5.08					
	min	4.3	1.15	0.70	1.3	0.45	15.6	6.4	9.65 (REF)	15.70	12.5	3.65	2.2	2.7

Note  
1. Protruded dambar are included in the dimension.

sod059\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD59	2-lead TO-220AC					<del>09-08-25</del> 12-11-27

## 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.
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13. Contents

1. General description..... 1

2. Features and benefits ..... 1

3. Applications ..... 1

4. Quick reference data..... 1

5. Pinning information..... 2

6. Ordering information..... 2

7. Marking..... 2

8. Limiting values ..... 3

9. Thermal characteristics ..... 5

10. Characteristics..... 6

11. Package outline ..... 7

12. Legal information ..... 8

13. Contents ..... 10

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**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
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