

## 1. General description

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

## 2. Features and benefits

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses in associated MOSFET

## 3. Applications

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

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 78\text{ °C}$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	10			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $T_{mb} \leq 78\text{ °C}$ ; square-wave pulse	20			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse	65			A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse	71			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 10\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 4</a>	-	1.4	1.8	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 10\text{ A}$ ; $V_R = 400\text{ V}$ ; $di_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 6</a>	-	19	-	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
BYC10-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

## 7. Marking

Table 4. Marking codes

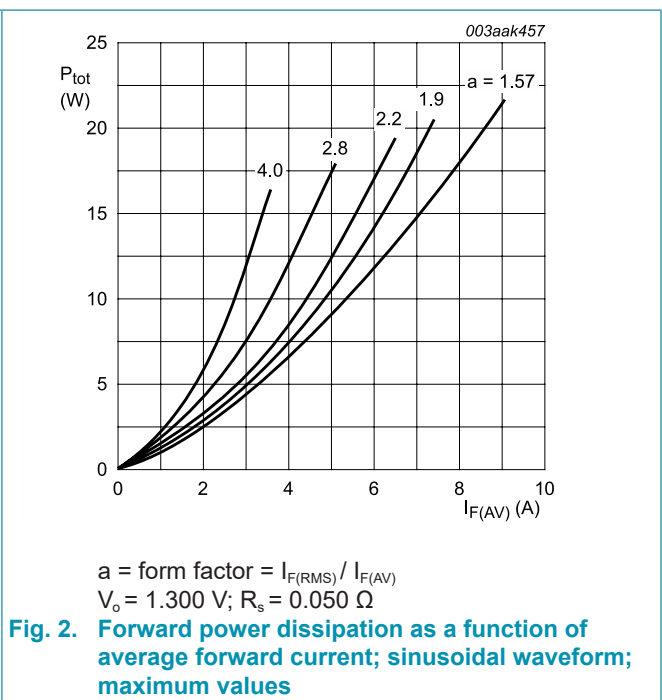
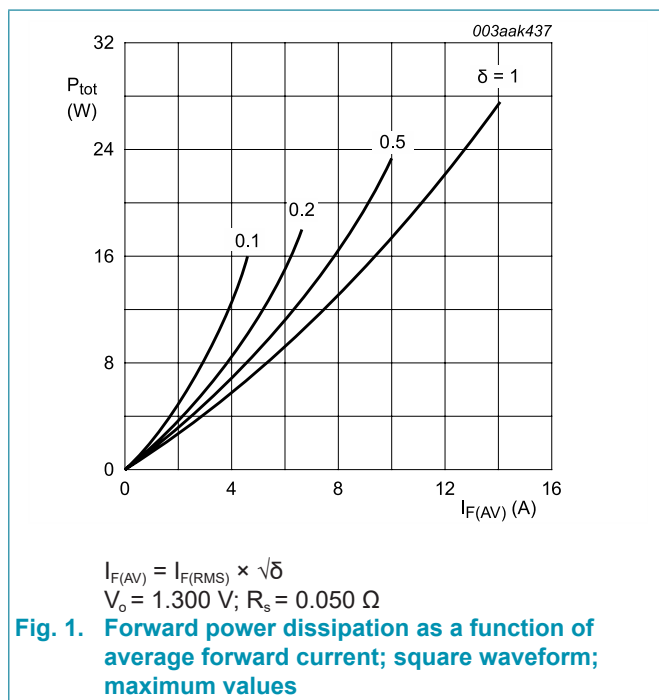
Type number	Marking codes
BYC10-600	BYC10-600

## 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	$T_{mb} \leq 114\text{ °C}$	500	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 78\text{ °C}$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	10	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $T_{mb} \leq 78\text{ °C}$ ; square-wave pulse	20	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse	65	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse	71	A
$T_{stg}$	storage temperature		-40 to 150	°C
$T_j$	junction temperature		150	°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	<a href="#">Fig. 3</a>	-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	60	-	K/W

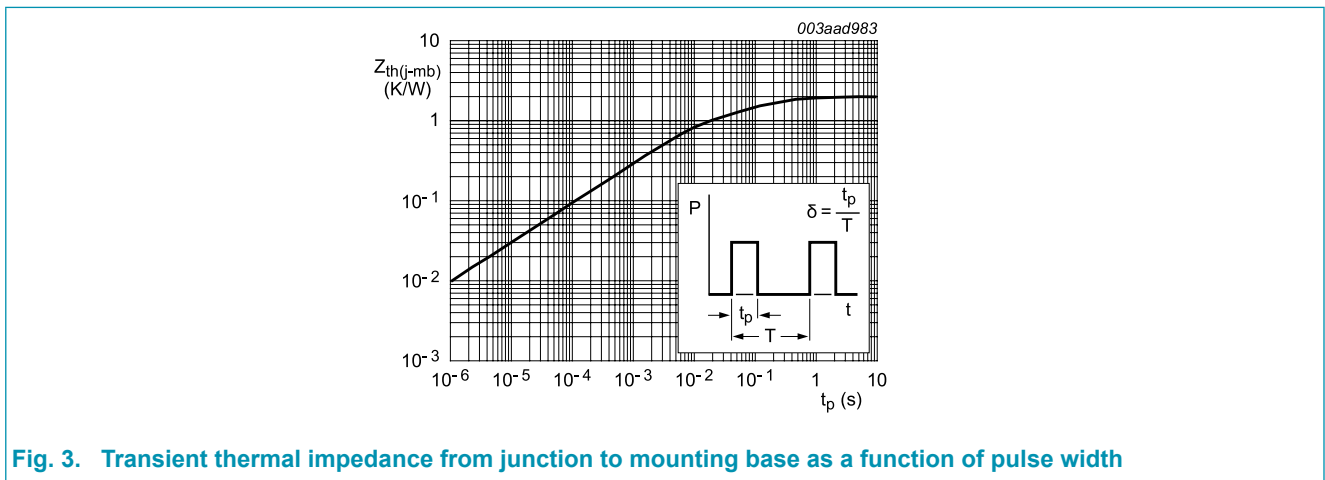
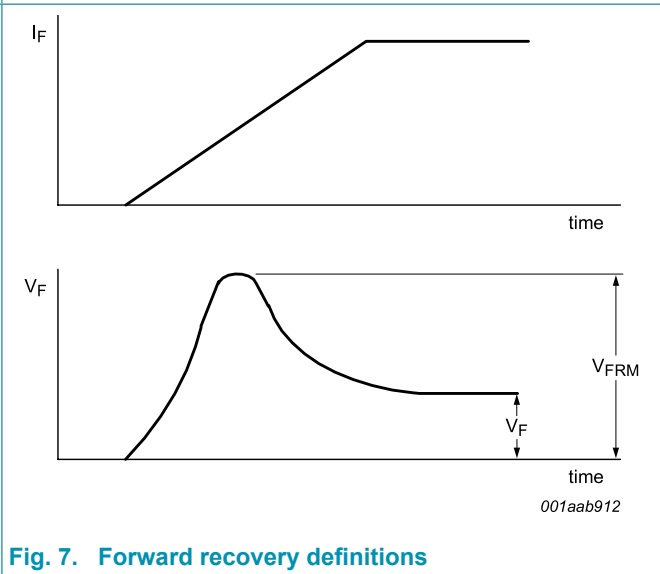
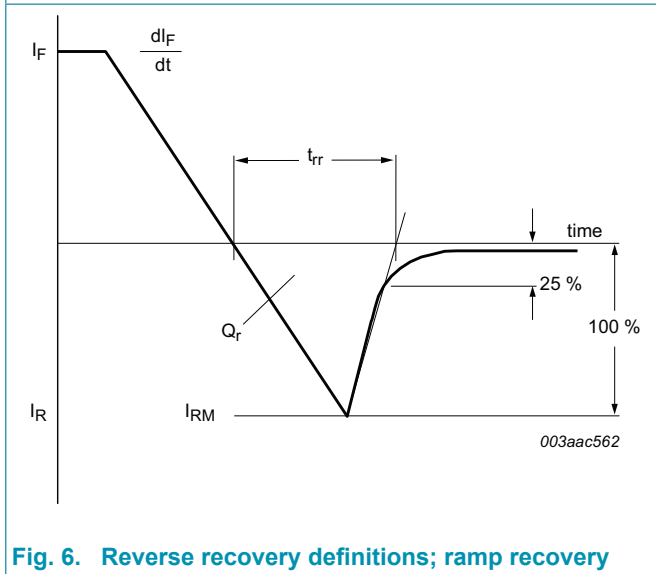
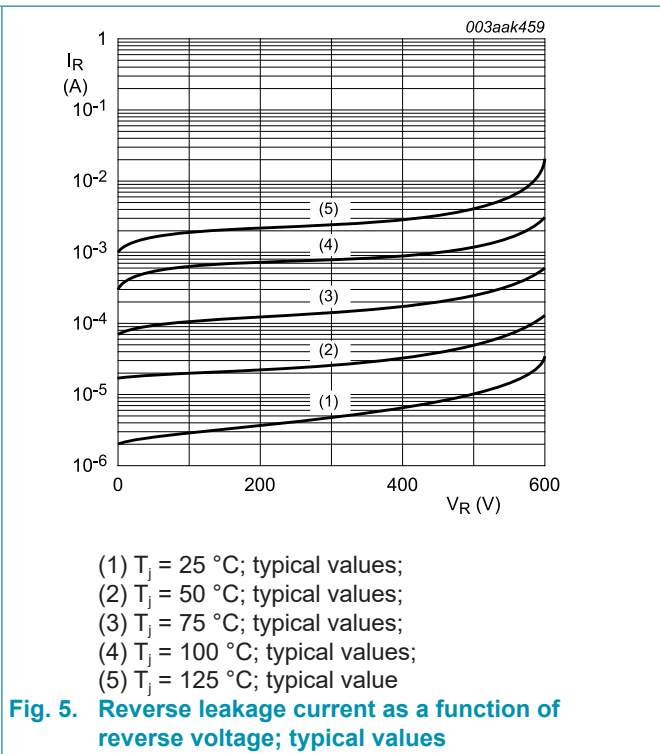
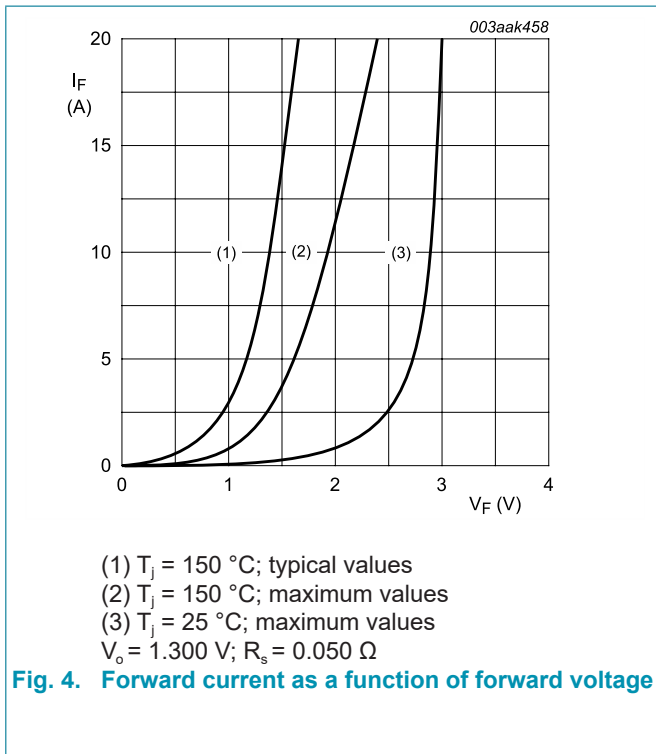


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

## 10. Characteristics

Table 7. Characteristics

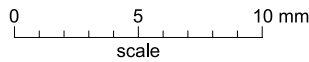
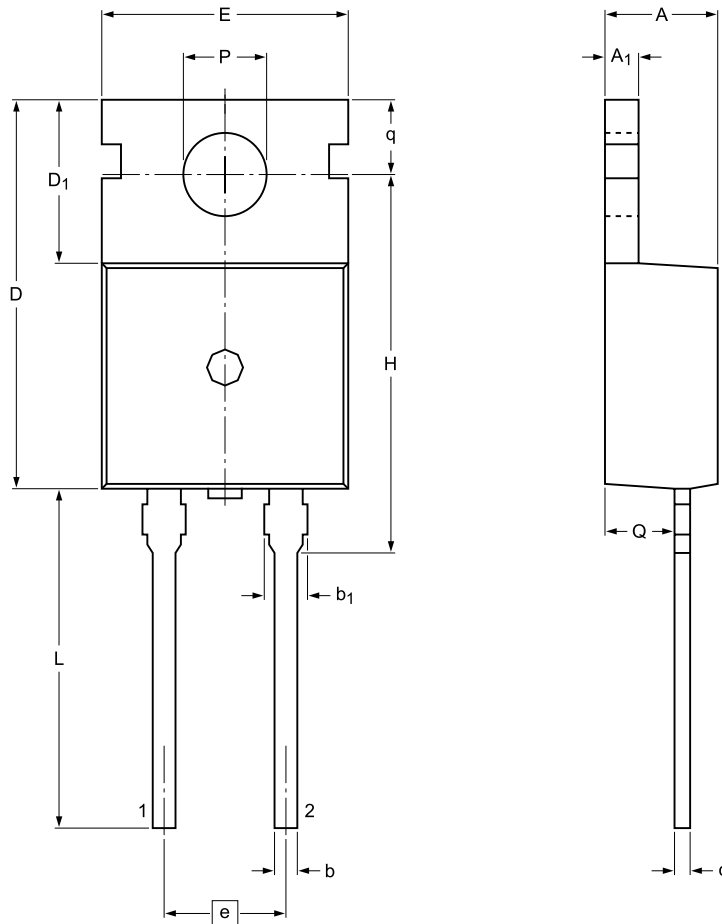
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 10\text{ A}; T_j = 25\text{ °C};$ <a href="#">Fig. 4</a>	-	2	2.9	V
		$I_F = 10\text{ A}; T_j = 150\text{ °C};$ <a href="#">Fig. 4</a>	-	1.4	1.8	V
		$I_F = 20\text{ A}; T_j = 150\text{ °C};$ <a href="#">Fig. 4</a>	-	1.7	2.3	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C};$ <a href="#">Fig. 5</a>	-	9	200	$\mu\text{A}$
		$V_R = 500\text{ V}; T_j = 100\text{ °C};$ <a href="#">Fig. 5</a>	-	1.1	3	mA
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ <a href="#">Fig. 6</a>	-	35	55	ns
		$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s};$ $T_j = 25\text{ °C};$ <a href="#">Fig. 6</a>	-	19	-	ns
		$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s};$ $T_j = 100\text{ °C};$ <a href="#">Fig. 6</a>	-	32	40	ns
$I_{RM}$	peak reverse recovery current	$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s};$ $T_j = 125\text{ °C};$ <a href="#">Fig. 6</a>	-	3	7.5	A
		$I_F = 10\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s};$ $T_j = 125\text{ °C};$ <a href="#">Fig. 6</a>	-	9.5	12	A
$V_{FRM}$	forward recovery voltage	$I_F = 10\text{ A}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ <a href="#">Fig. 7</a>	-	8	11	V



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

Note

1. Protruded dambar are included in the dimension.

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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

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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 .....	4
10. Characteristics.....	5
11. Package outline .....	7
12. Legal information .....	8
13. Contents .....	10

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