



# BYC15-600

Hyperfast power diode

Rev.03 - 24 February 2018

Product data sheet

## 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
- Half-bridge or full-bridge switched-mode
- Half-bridge lighting ballasts

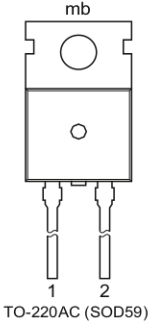
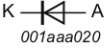
## 4. Quick reference data

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	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 98$ °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	15			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25$ $\mu$ s; $T_{mb} \leq 98$ °C; square-wave pulse	30			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	200			A
		$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse	220			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 15$ A; $T_j = 150$ °C; <a href="#">Fig. 3</a>	-	1.4	2	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 15$ A; $V_R = 400$ V; $dI_F/dt = 500$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 4</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; cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC15-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

## 7. Marking

Table 4. Marking codes

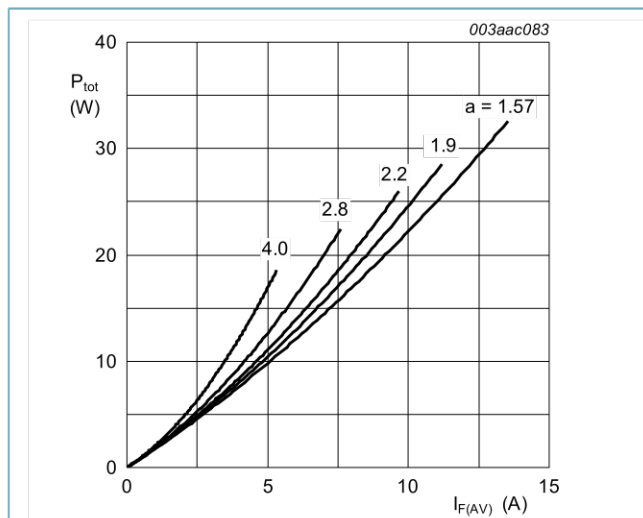
Type number	Marking codes
BYC15-600	BYC15-600

## 8. Limiting values

**Table 5. Limiting values**

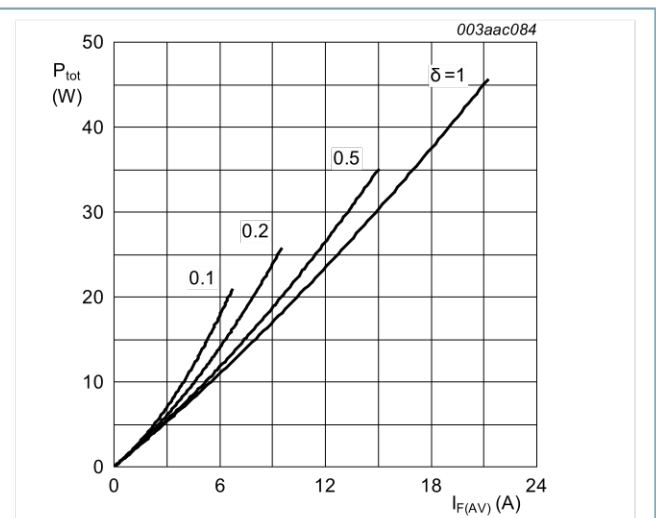
In accordance with the Absolute Maximum Rating System (IEC 60134).

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	$T_{mb} \leq 100\text{ }^\circ\text{C}$ ; DC	500	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 98\text{ }^\circ\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	15	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 98\text{ }^\circ\text{C}$ ; square-wave pulse	30	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	200	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse	220	A
$T_{stg}$	storage temperature		-40 to 150	$^\circ\text{C}$
$T_j$	junction temperature		150	$^\circ\text{C}$



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

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



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

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

## 9. Thermal characteristics

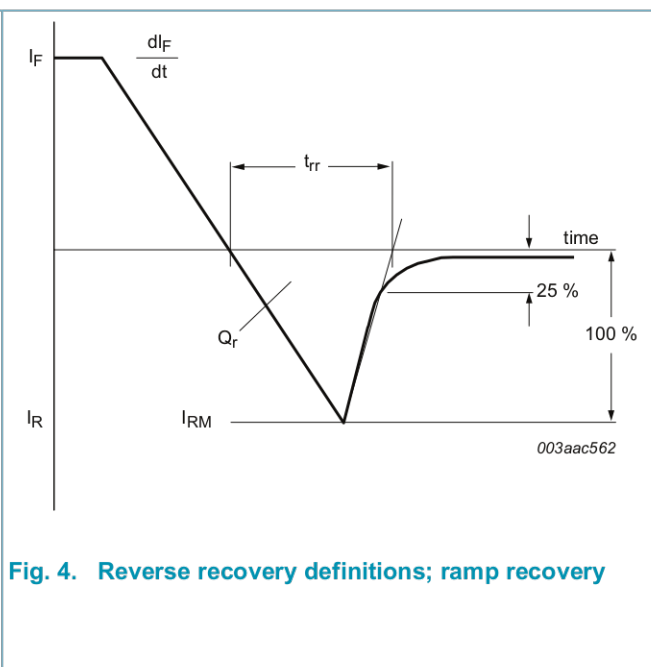
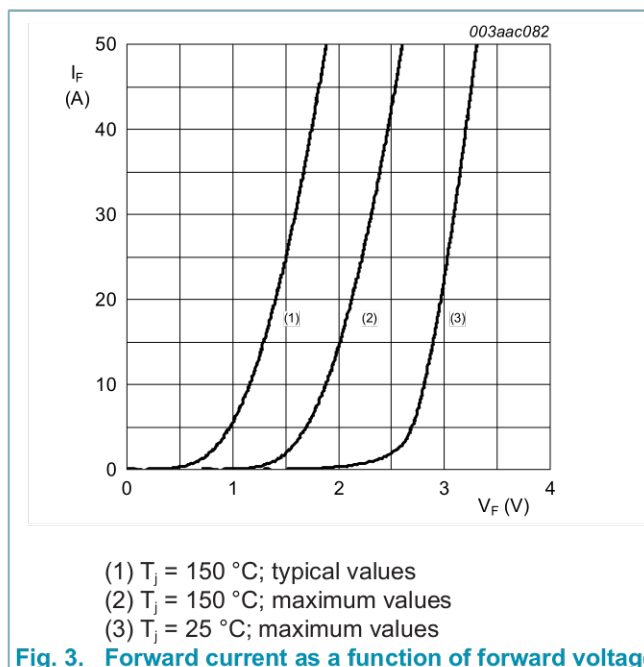
**Table 6. Thermal characteristics**

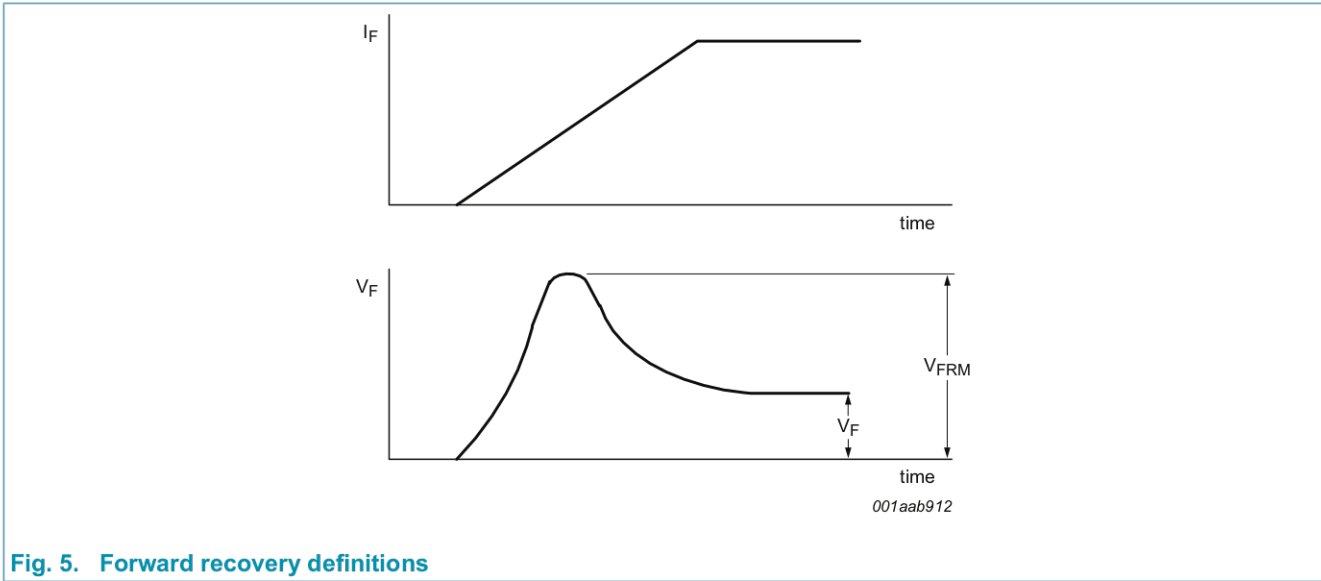
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound	-	-	1.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 30A; T_j = 150\text{ }^\circ\text{C};$ <a href="#">Fig. 3</a>	-	1.7	2.3	V
		$I_F = 15A; T_j = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 3</a>	-	1.9	2.9	V
		$I_F = 15A; T_j = 150\text{ }^\circ\text{C};$ <a href="#">Fig. 3</a>	-	1.4	2	V
$I_R$	reverse current	$V_R = 600V; T_j = 25\text{ }^\circ\text{C}$	-	12	200	$\mu\text{A}$
		$V_R = 500V; T_j = 100\text{ }^\circ\text{C}$	-	1.1	3	mA
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 15A; V_R = 400V; dI_F/dt = 500A/\mu\text{s}; T_j = 100\text{ }^\circ\text{C};$ <a href="#">Fig. 4</a>	-	32	40	ns
		$I_F = 1A; V_R = 30V; dI_F/dt = 50A/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 4</a>	-	35	55	ns
		$I_F = 15A; V_R = 400V; dI_F/dt = 500A/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 4</a>	-	19	-	ns
$I_{RM}$	peak reverse recovery current	$I_F = 15A; V_R = 400V; dI_F/dt = 500A/\mu\text{s}; T_j = 125\text{ }^\circ\text{C};$ <a href="#">Fig. 4</a>	-	9.5	12	A
		$I_F = 15A; V_R = 400V; dI_F/dt = 50A/\mu\text{s}; T_j = 125\text{ }^\circ\text{C};$ <a href="#">Fig. 4</a>	-	3	7.5	A
$V_{FR}$	forward recovery voltage	$I_F = 15A; dI_F/dt = 100A/\mu\text{s}; T_j = 25\text{ }^\circ\text{C};$ <a href="#">Fig. 5</a>	-	8	11	V



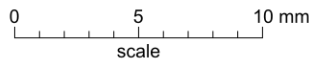
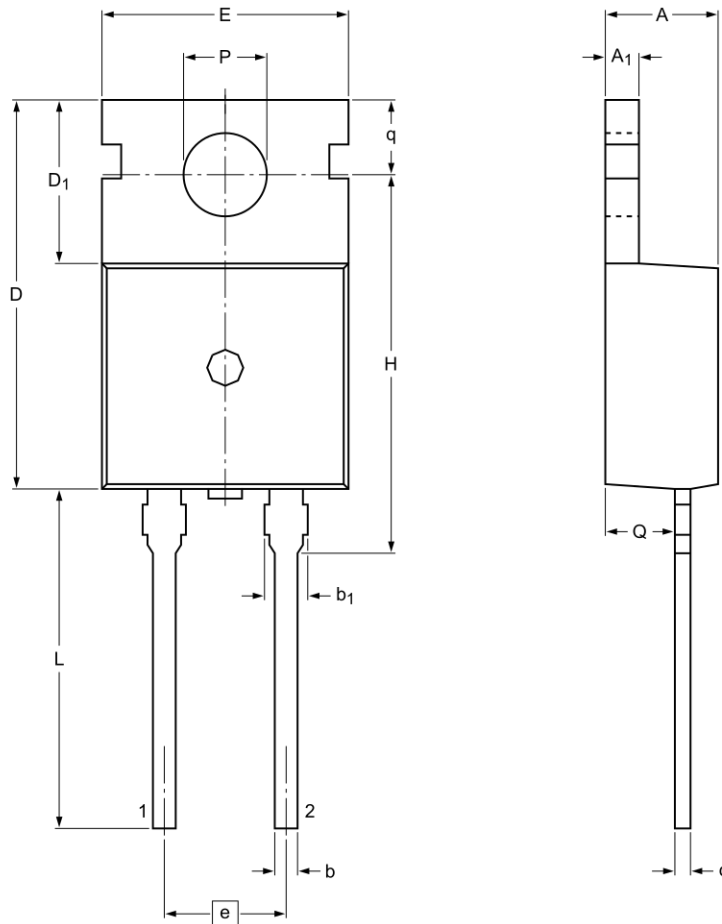


**Fig. 5. Forward recovery definitions**

### 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				09-08-25 12-11-27

## 12. Revision history

**Table 8. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC15-600 v.3	20180224	Product data sheet	-	BYC15-600 v.2
Modifications:	Change from NXP version to WeEn version			
BYC15-600 v.2	20100729	Product data sheet	-	BYC15-600 v.1
Modifications:	Various changes to content.			
BYC15-600 v.1	20071129	Product data sheet	-	-



## 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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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