



# BYC5-600P

Hyperfast power diode

24 December 2014

Product data sheet

## 1. General description

Hyperfast power diode in a SOD59 package.

## 2. Features and benefits

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

## 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	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 133$ °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	5	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5$ A; $T_j = 25$ °C; <a href="#">Fig. 6</a>	-	2.5	3.3	V
		$I_F = 5$ A; $T_j = 150$ °C; <a href="#">Fig. 6</a>	-	1.4	2.1	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1$ A; $V_R = 30$ V; $dI_F/dt = 200$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	11	-	ns

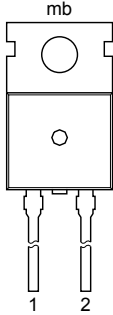
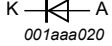


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## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p style="text-align: center;">TO-220AC (SOD59)</p>	
2	A	anode		
mb	mb	mounting base; connected to cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC5-600P	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

## 7. Marking

Table 4. Marking codes

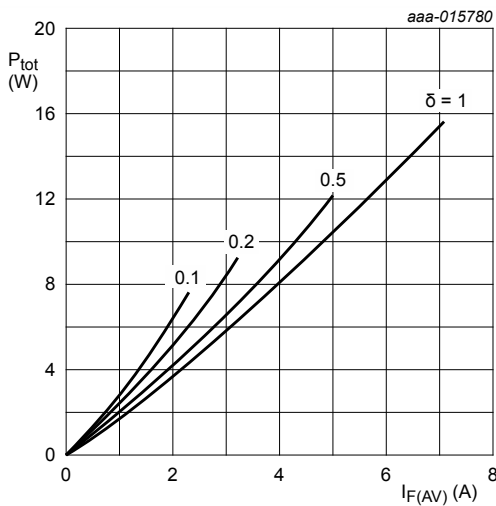
Type number	Marking code
BYC5-600P	BYC5-600P

## 8. Limiting values

**Table 5. Limiting values**

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

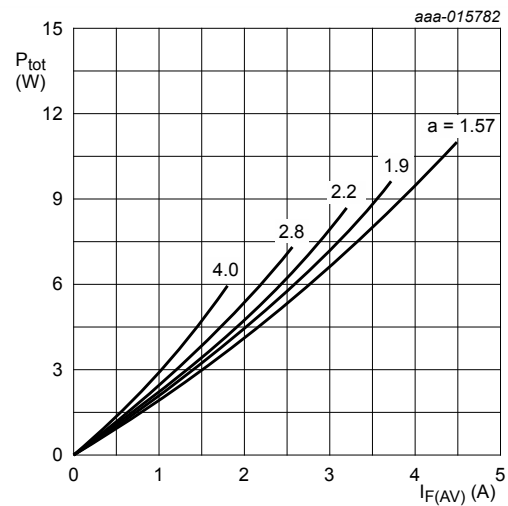
Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 133\text{ }^\circ\text{C}$ ; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	5	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 133\text{ }^\circ\text{C}$ ; 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; Fig. 4	-	60	A
		$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse; Fig. 4	-	65	A
$T_{stg}$	storage temperature		-65	175	$^\circ\text{C}$
$T_j$	junction temperature		-	175	$^\circ\text{C}$



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

$$V_o = 1.801\text{ V}; R_s = 0.062\text{ }\Omega$$

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



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

$$V_o = 1.801\text{ V}; R_s = 0.062\text{ }\Omega$$

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

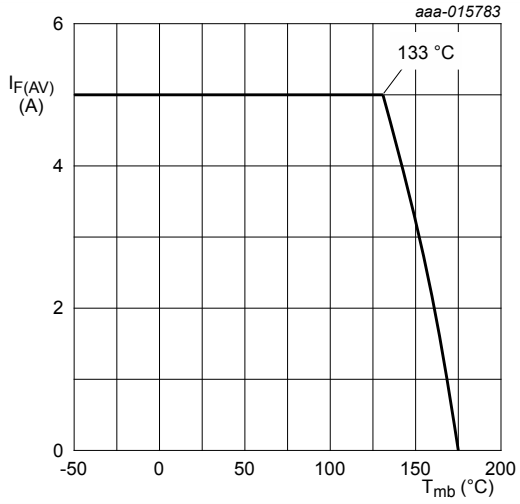


Fig. 3. Forward current as a function of mounting base temperature; maximum values

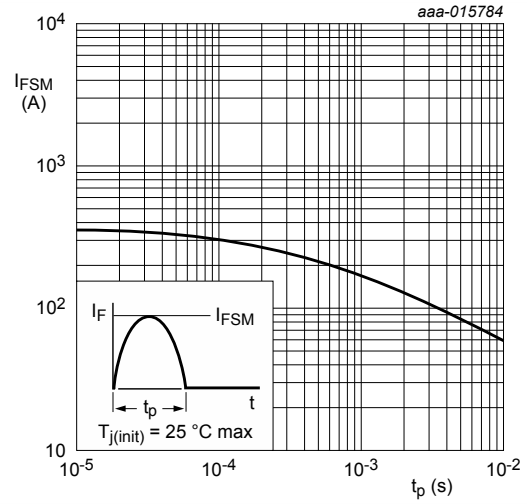


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

### 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	with heatsink compound; <a href="#">Fig. 5</a>	-	-	3.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

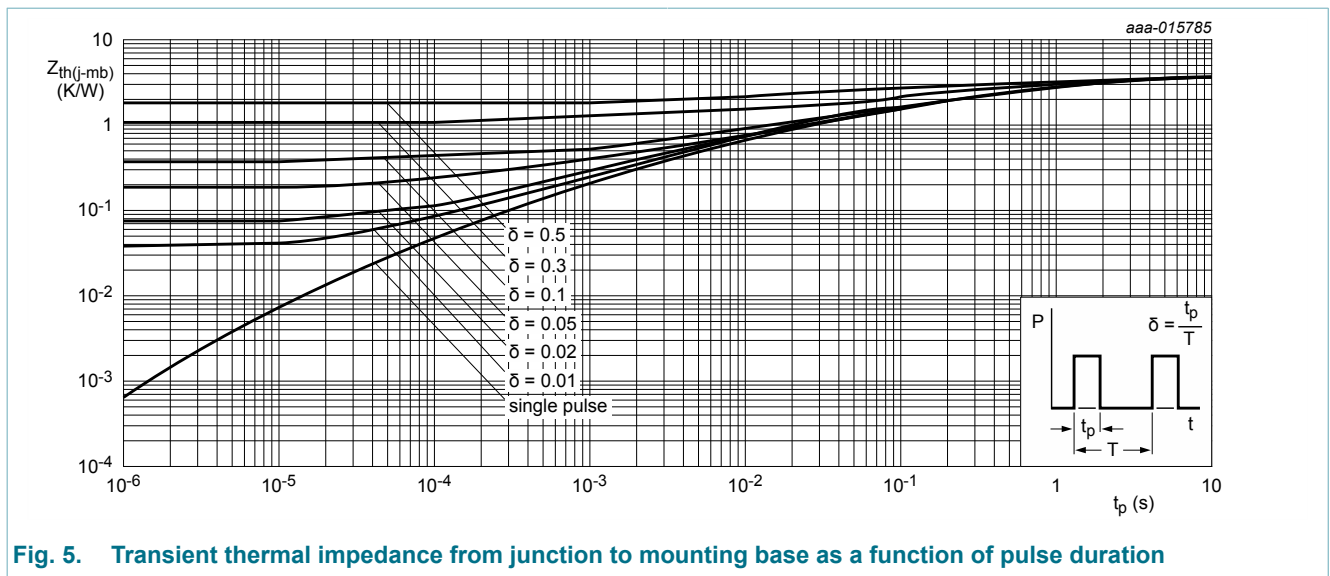
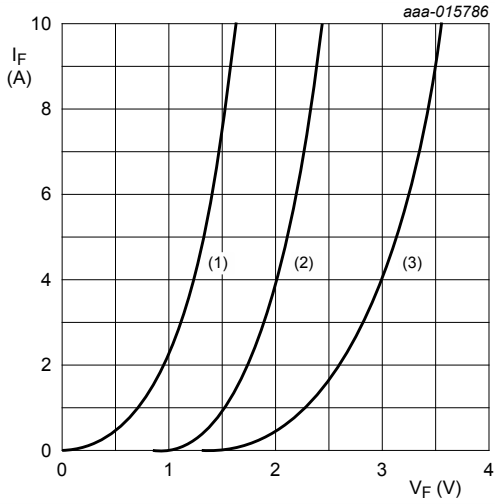


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

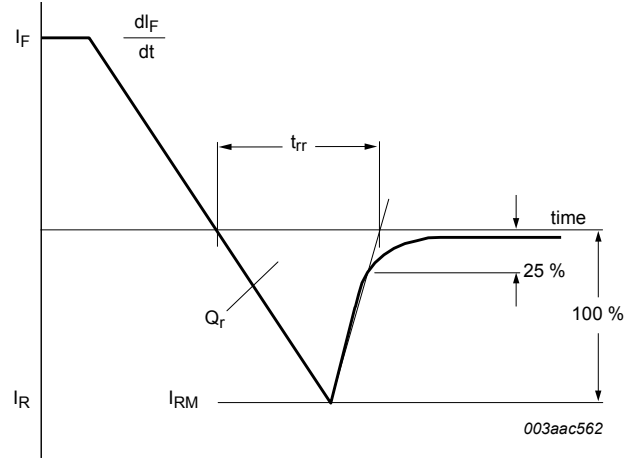
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 5\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 6</a>	-	2.5	3.3	V
		$I_F = 5\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 6</a>	-	1.4	2.1	V
$I_R$	reverse current	$V_R = 600\text{ V}$ ; $T_j = 25\text{ °C}$	-	-	10	$\mu\text{A}$
		$V_R = 600\text{ V}$ ; $T_j = 150\text{ °C}$	-	-	0.6	mA
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 5\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	19	-	nC
		$I_F = 5\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 7</a>	-	45	-	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	11	-	ns
		$I_F = 5\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	23	-	ns
		$I_F = 5\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 7</a>	-	28	-	ns
		$I_F = 5\text{ A}$ ; $V_R = 400\text{ V}$ ; $dI_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	13	25	ns
$I_{RM}$	peak reverse recovery current	$I_F = 5\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 7</a>	-	1.7	-	A
		$I_F = 5\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$ ; <a href="#">Fig. 7</a>	-	3.2	-	A



$V_o = 1.801 \text{ V}; R_s = 0.062 \text{ } \Omega$   
 (1)  $T_j = 150 \text{ } ^\circ\text{C}$ ; typical values  
 (2)  $T_j = 150 \text{ } ^\circ\text{C}$ ; maximum values  
 (3)  $T_j = 25 \text{ } ^\circ\text{C}$ ; maximum values

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



**Fig. 7. Reverse recovery definitions; ramp recovery**

### 11. Package outline

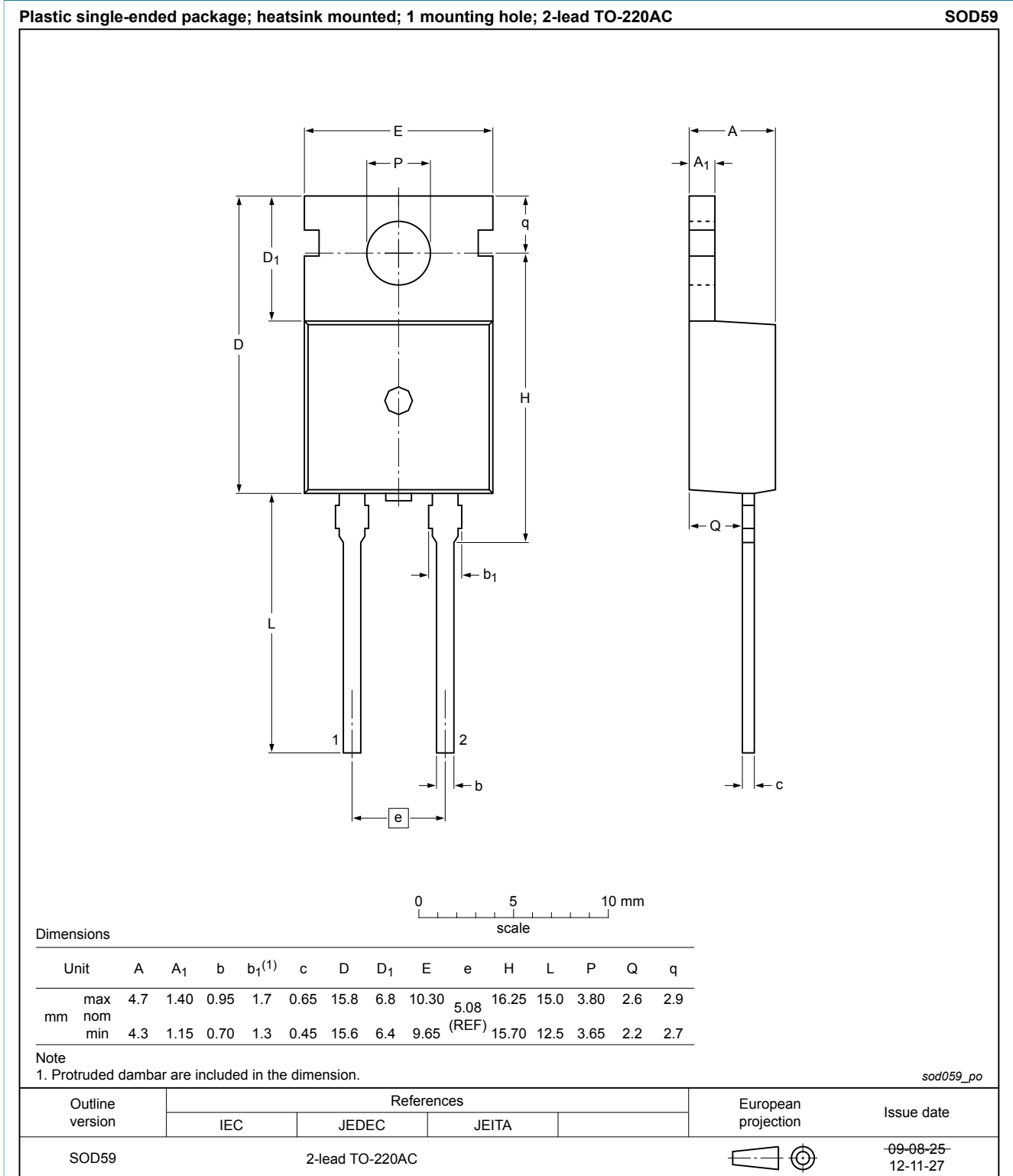


Fig. 8. Package outline TO-220AC (SOD59)



## 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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**Date of release: 24 December 2014**