



# BYC8-600

Hyperfast power diode

23 May 2013

Product data sheet

## 1. General description

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

## 2. Features and benefits

- Low reverse recovery current and 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	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 109$ °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	-	-	8	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8$ A; $T_j = 150$ °C; <a href="#">Fig. 4</a>	-	1.4	1.85	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 8$ A; $V_R = 400$ V; $dI_F/dt = 500$ A/ $\mu$ s; $T_j = 25$ °C; <a href="#">Fig. 5</a>	-	19	-	ns

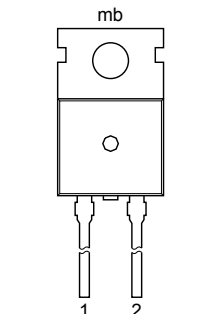
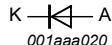


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## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>TO-220AC (SOD59)</p>	
2	A	anode		
mb	mb	mounting base; cathode		

## 6. Ordering information

Table 3. Ordering information

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

## 7. Limiting values

Table 4. 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
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 109\text{ }^\circ\text{C}$ ; square-wave pulse; Fig. 1; Fig. 2	-	8	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_{mb} \leq 109\text{ }^\circ\text{C}$ ; square-wave pulse	-	16	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$ ; $T_{j(\text{init})} = 150\text{ }^\circ\text{C}$ ; sine-wave pulse	-	60	A
		$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 150\text{ }^\circ\text{C}$ ; sine-wave pulse	-	55	A
$T_{stg}$	storage temperature		-40	150	$^\circ\text{C}$
$T_j$	junction temperature		-	150	$^\circ\text{C}$

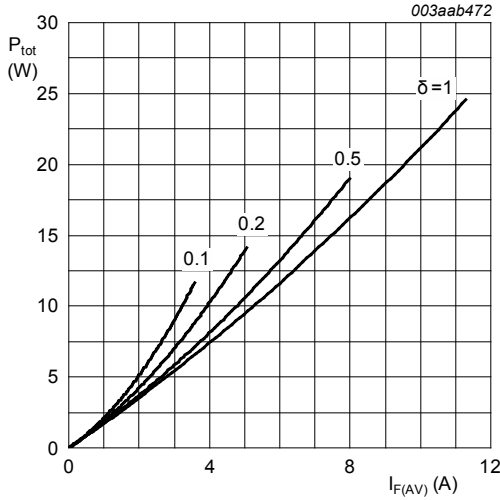


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

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

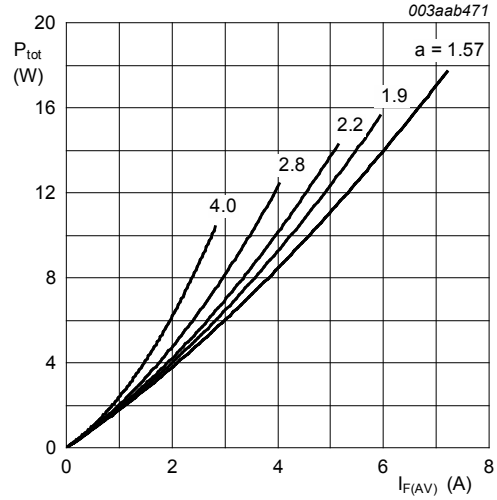


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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

## 8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 3	-	-	2.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	60	-	K/W

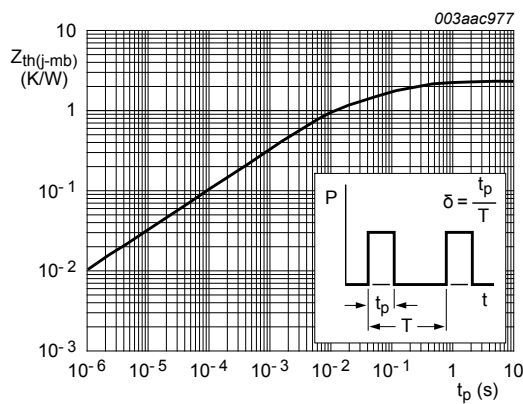
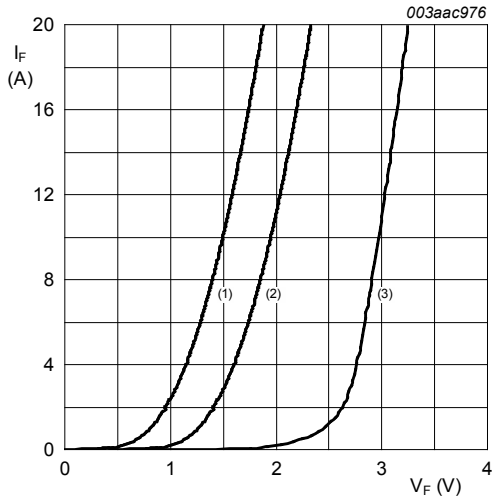


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

## 9. Characteristics

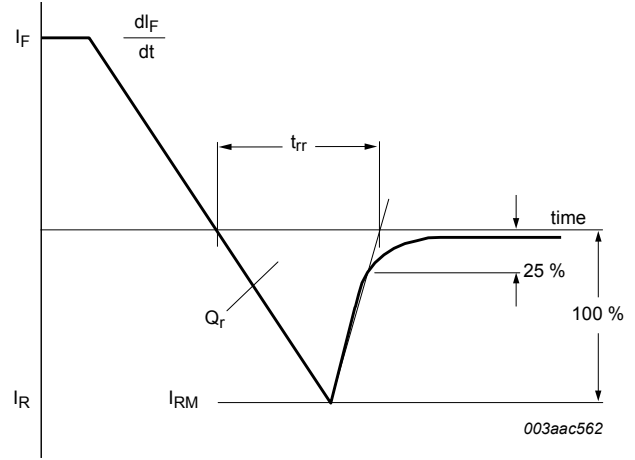
Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}$ ; $T_j = 25\text{ °C}$	-	2	2.9	V
		$I_F = 8\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 4</a>	-	1.4	1.85	V
		$I_F = 16\text{ A}$ ; $T_j = 150\text{ °C}$	-	1.7	2.3	V
$I_R$	reverse current	$V_R = 600\text{ V}$ ; $T_j = 25\text{ °C}$	-	9	150	$\mu\text{A}$
		$V_R = 500\text{ V}$ ; $T_j = 100\text{ °C}$	-	1.1	3	$\text{mA}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 1\text{ A}$ ; $V_R = 100\text{ V}$ ; $dI_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$	-	12	-	$\text{nC}$
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $dI_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$	-	30	52	$\text{ns}$
		$I_F = 8\text{ A}$ ; $V_R = 400\text{ V}$ ; $dI_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 5</a>	-	19	-	$\text{ns}$
		$I_F = 8\text{ A}$ ; $V_R = 400\text{ V}$ ; $dI_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 100\text{ °C}$	-	32	40	$\text{ns}$
$I_{RM}$	peak reverse recovery current	$I_F = 8\text{ A}$ ; $V_R = 400\text{ V}$ ; $dI_F/dt = 50\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ °C}$	-	1.5	5.5	A
		$I_F = 8\text{ A}$ ; $V_R = 400\text{ V}$ ; $dI_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 100\text{ °C}$	-	9.5	12	A
$V_{FR}$	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. 6</a>	-	8	10	V

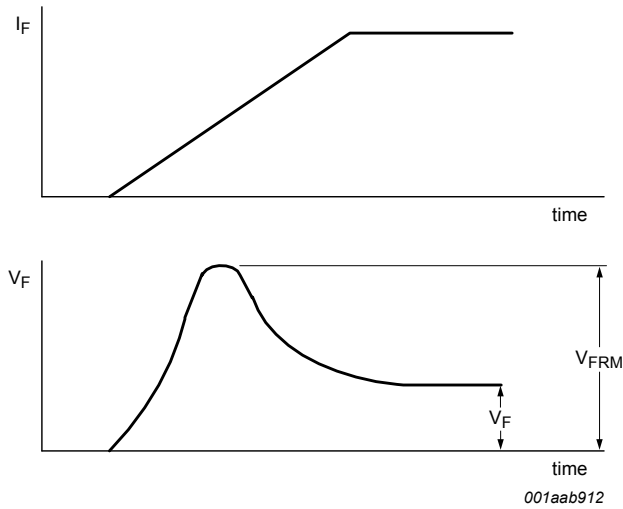


**Fig. 4. Forward current as a function of forward voltage**

- (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. 5. Reverse recovery definitions; ramp recovery**



**Fig. 6. Forward recovery definitions**

### 10. Package outline

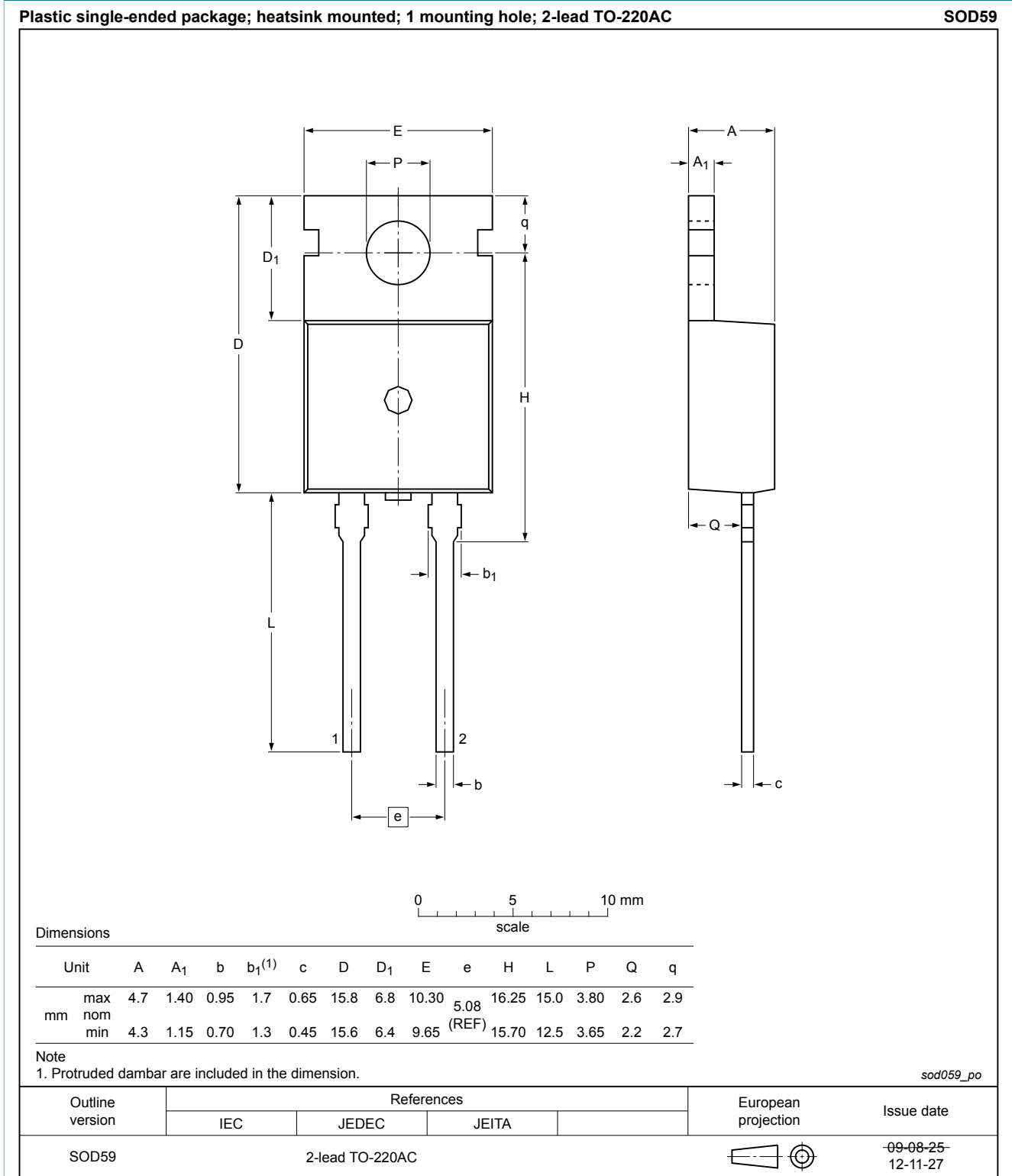


Fig. 7. Package outline TO-220AC (SOD59)

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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.
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