



# IMPORTANT NOTICE

10 December 2015

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## 1. Global joint venture starts operations as WeEn Semiconductors

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Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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Thank you for your cooperation and understanding,

WeEn Semiconductors





# BYC8-600P

Hyperfast power diode

3 January 2014

Product data sheet

## 1. General description

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

## 2. Features and benefits

- Fast switching
- Low leakage current
- 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

## 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	$\delta = 0.5$ ; $T_{mb} \leq 130$ °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	8	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8$ A; $T_j = 125$ °C; <a href="#">Fig. 6</a>	-	1.5	1.9	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>	-	12	18	ns

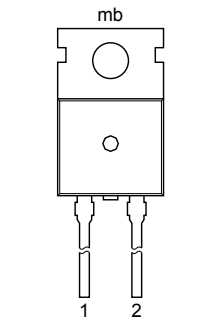
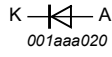


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## 5. Pinning information

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; 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 code
BYC8-600P	BYC8-600P

## 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	$\delta = 0.5$ ; $T_{mb} \leq 130\text{ }^\circ\text{C}$ ; 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

Symbol	Parameter	Conditions	Min	Max	Unit
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(initial)</sub> = 25 °C; sine-wave pulse; Fig. 4	-	91	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(initial)</sub> = 25 °C; sine-wave pulse; Fig. 4	-	100	A
T <sub>stg</sub>	storage temperature		-65	175	°C
T <sub>j</sub>	junction temperature		-	175	°C

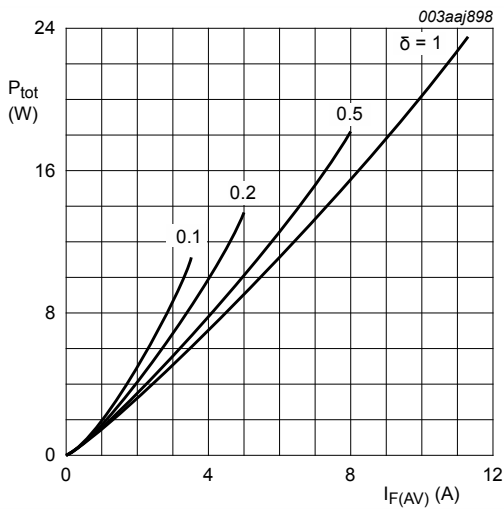


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

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

$$V_O = 1.581 \text{ V}; R_S = 0.043 \text{ } \Omega$$

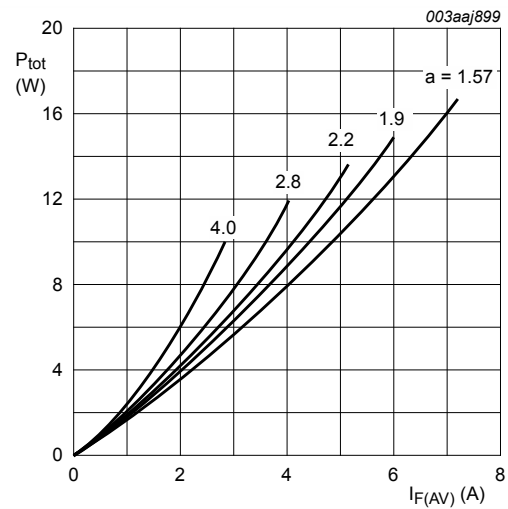


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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

$$V_O = 1.581 \text{ V}; R_S = 0.043 \text{ } \Omega$$

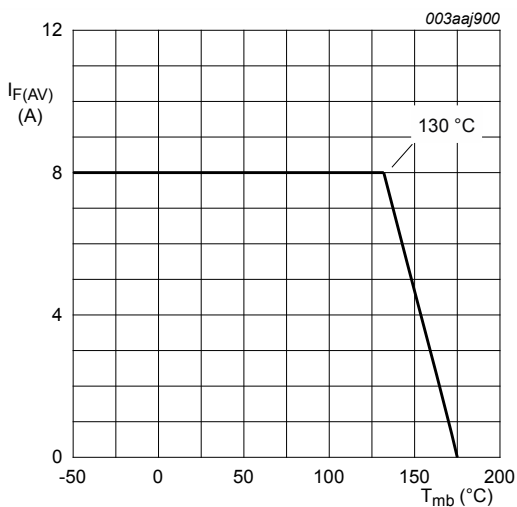


Fig. 3. Average forward current as a function of mounting base temperature; maximum values

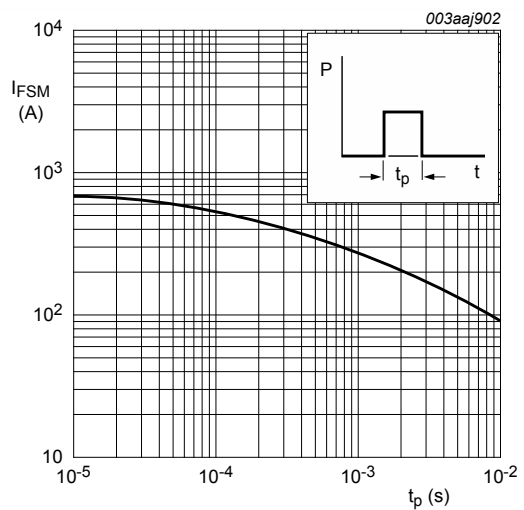


Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

## 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

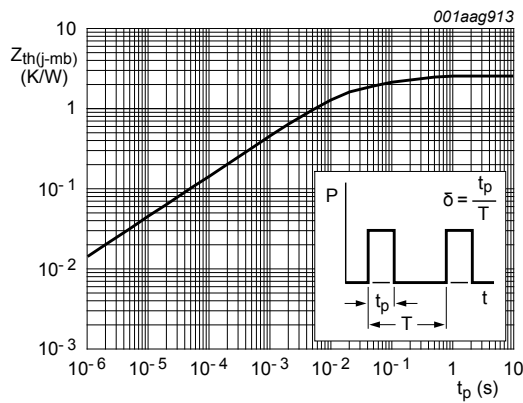


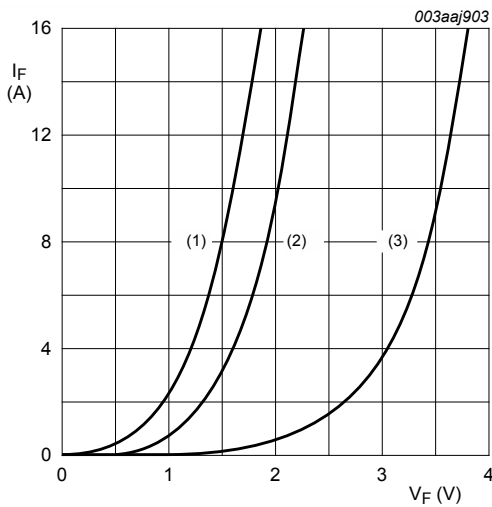
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

## 10. Characteristics

Table 7. Characteristics

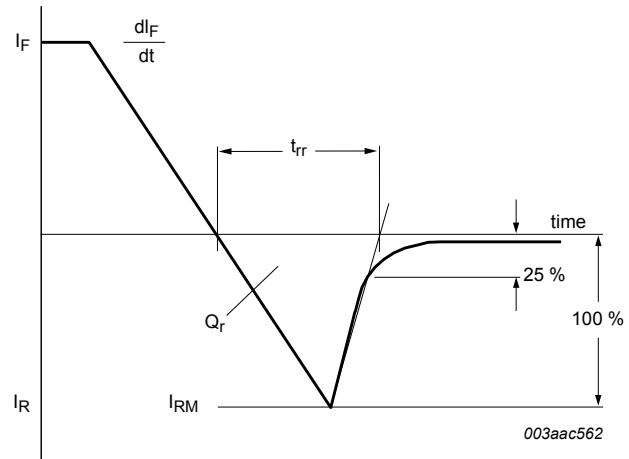
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}; T_j = 25\text{ °C};$ <a href="#">Fig. 6</a>	-	-	3.4	V
		$I_F = 8\text{ A}; T_j = 125\text{ °C};$ <a href="#">Fig. 6</a>	-	1.5	1.9	V
		$I_F = 8\text{ A}; T_j = 150\text{ °C}$	-	1.4	-	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	20	$\mu\text{A}$
		$V_R = 600\text{ V}; T_j = 125\text{ °C}$	-	-	200	$\mu\text{A}$
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ <a href="#">Fig. 7</a>	-	17	-	nC
		$I_F = 8\text{ A}; V_R = 200\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 125\text{ °C};$ <a href="#">Fig. 7</a>	-	90	-	nC
$t_{rr}$	reverse recovery time	$I_F = 8\text{ A}; V_R = 400\text{ V}; dI_F/dt = 500\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ <a href="#">Fig. 7</a>	-	19	-	ns

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	12	18	ns
$I_{RM}$	peak reverse recovery current	$I_F = 8\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	-	2.2	A
		$I_F = 8\text{ A}$ ; $V_R = 200\text{ V}$ ; $dI_F/dt = 200\text{ A}/\mu\text{s}$ ; $T_j = 125\text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	-	6	A



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

- (1)  $T_j = 125\text{ }^\circ\text{C}$ ; typical values;
  - (2)  $T_j = 125\text{ }^\circ\text{C}$ ; maximum values;
  - (3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values;
- $V_O = 1.581\text{ V}$ ;  $R_S = 0.043\text{ }\Omega$



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

### 11. Package outline

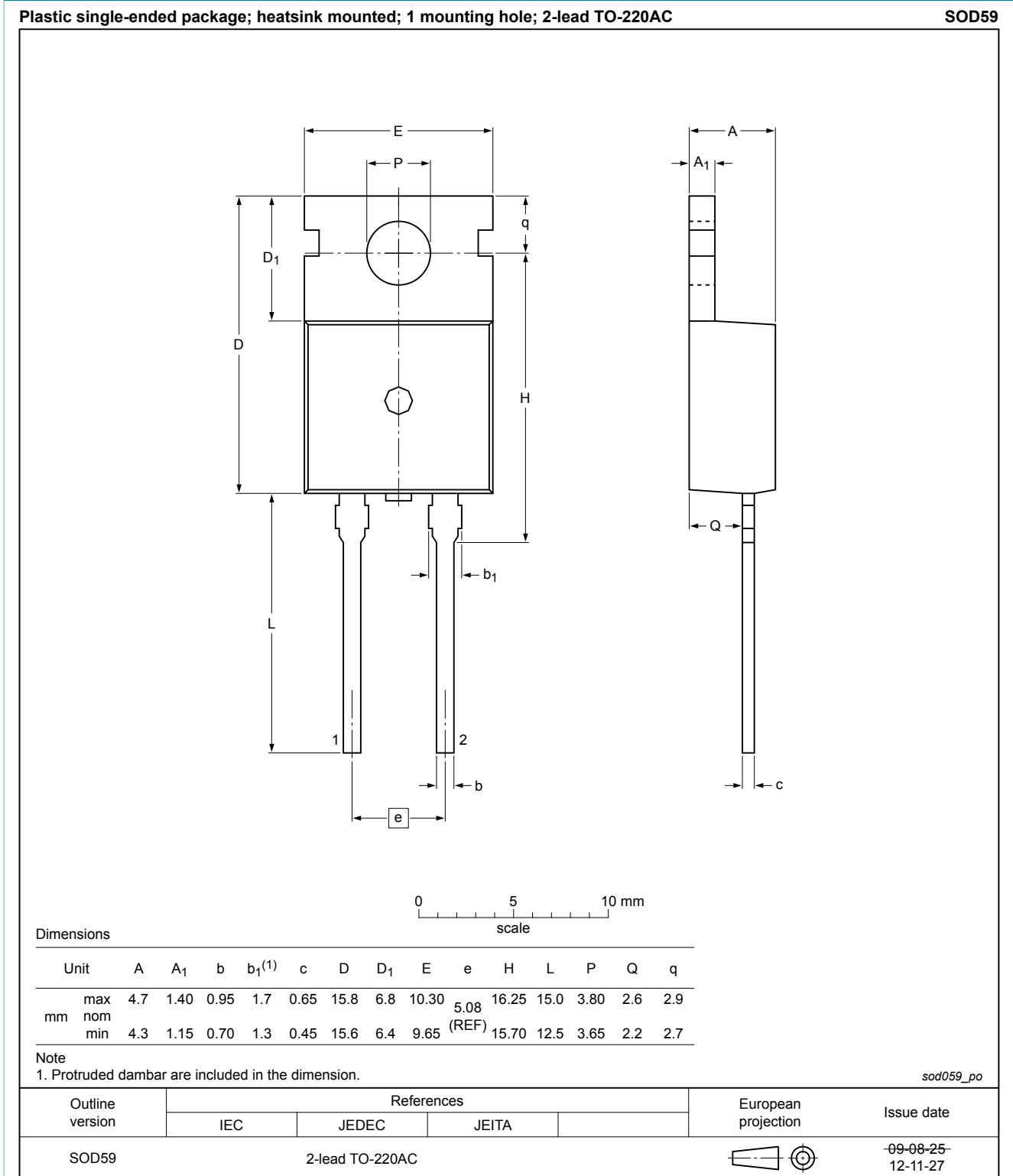


Fig. 8. Package outline TO-220AC (SOD59)

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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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
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