



# BYC8B-600P

Hyperfast power diode

26 February 2014

Product data sheet

## 1. General description

Hyperfast power diode in a SOT404 (D2PAK) surface-mountable plastic package.

## 2. Features and benefits

- Fast switching
- Surface-mountable package
- 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

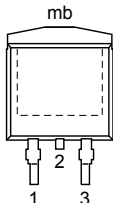
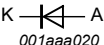


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## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	no connection	 <p style="text-align: center;">D2PAK (SOT404)</p>	
2	K	cathode[1]		
3	A	anode		
mb	K	mounting base; connected to cathode		

[1] It is not possible to connect to pin 2 of the SOT404 package.

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC8B-600P	D2PAK	plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped)	SOT404

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BYC8B-600P	BYC8B-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	$\delta = 0.5$ ; $T_{mb} \leq 130\text{ °C}$ ; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	8	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $t_p = 25\ \mu\text{s}$ ; $T_{mb} \leq 130\text{ °C}$ ; square-wave pulse	-	16	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\ \text{ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; sine-wave pulse; Fig. 4	-	91	A

Symbol	Parameter	Conditions	Min	Max	Unit
		$t_p = 8.3 \text{ ms}$ ; $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$ ; sine-wave pulse; Fig. 4	-	100	A
$T_{\text{stg}}$	storage temperature		-65	175	$^\circ\text{C}$
$T_j$	junction temperature		-	175	$^\circ\text{C}$

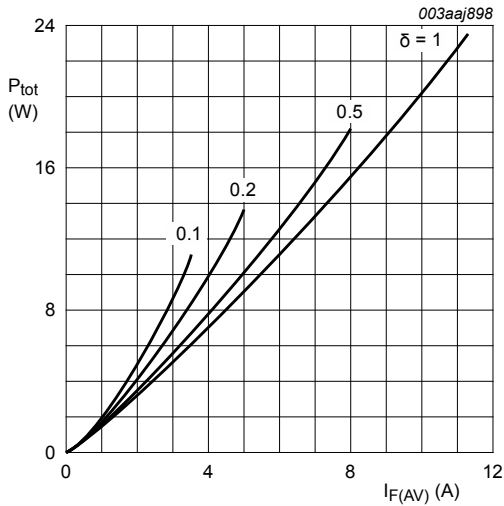


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

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

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

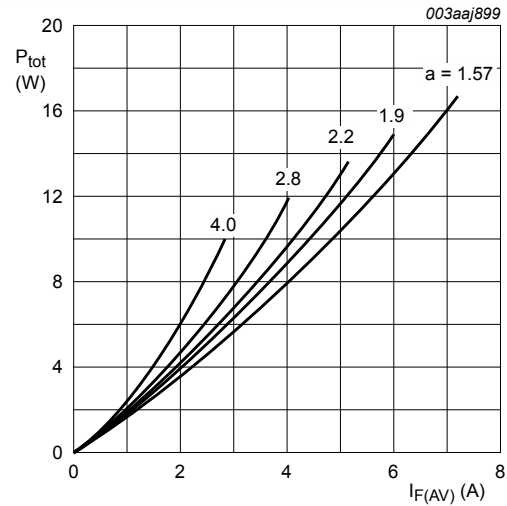


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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

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

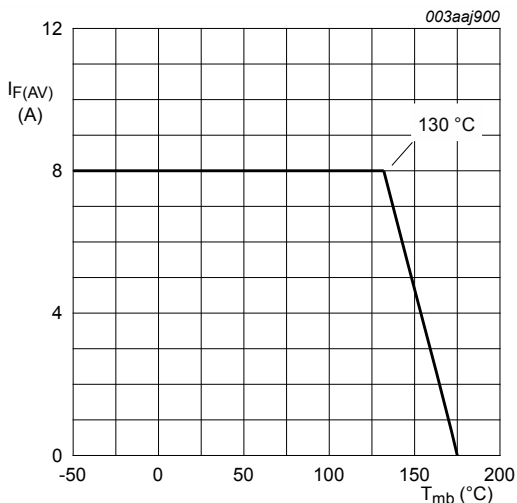


Fig. 3. Average forward current as a function of mounting base temperature; maximum values

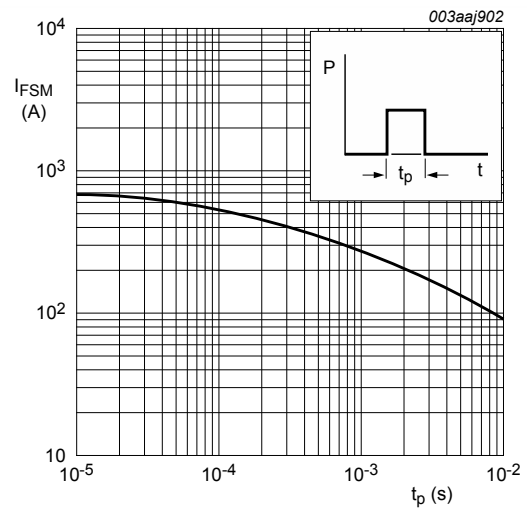


Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

## 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	in free air	-	60	-	K/W

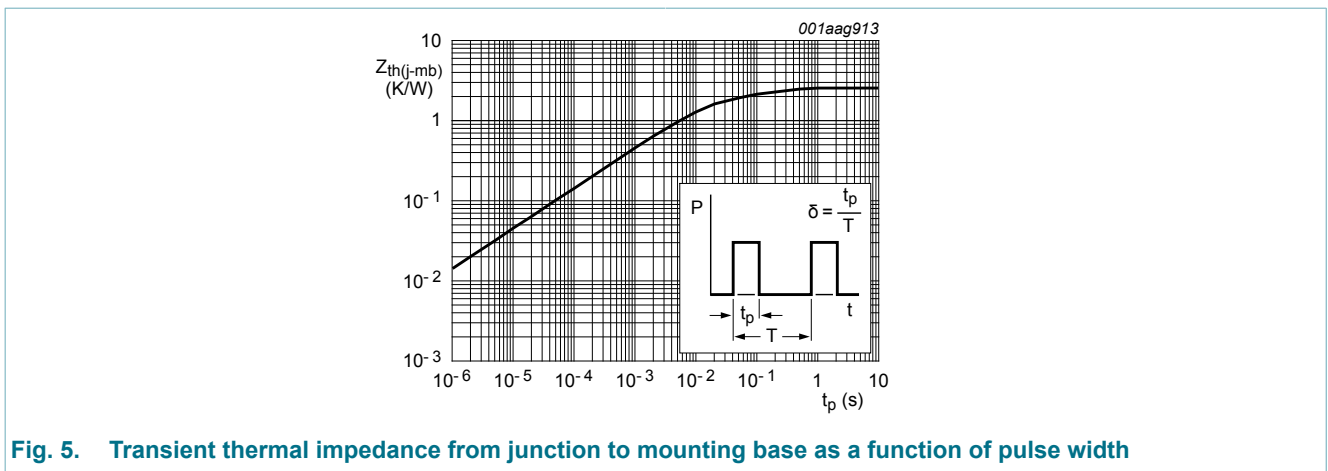


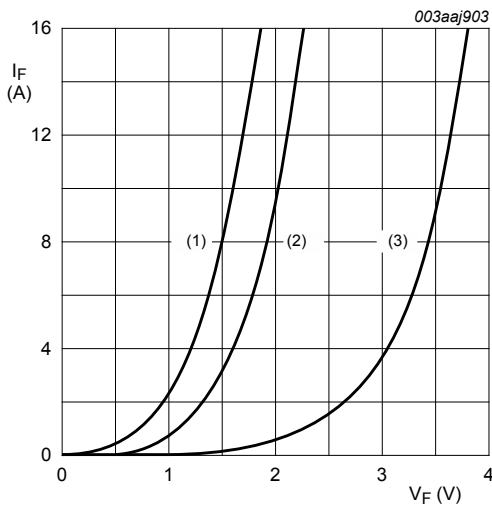
Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

## 10. Characteristics

Table 7. Characteristics

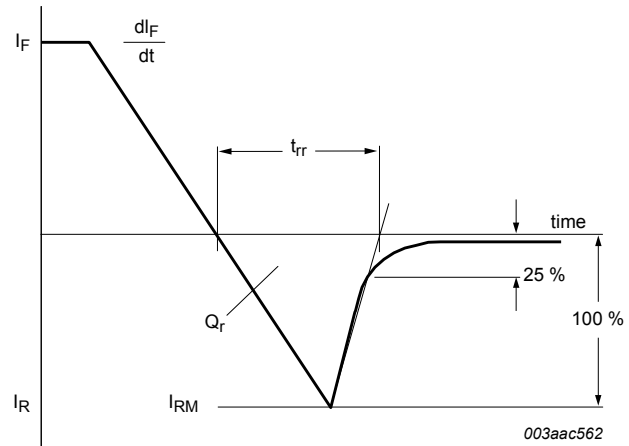
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}; T_j = 25\text{ °C};$ <a href="#">Fig. 6</a>	-	-	3.4	V
		$I_F = 8\text{ A}; T_j = 125\text{ °C};$ <a href="#">Fig. 6</a>	-	1.5	1.9	V
		$I_F = 8\text{ A}; T_j = 150\text{ °C}$	-	1.4	-	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	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 200\text{ A}/\mu\text{s}; T_j = 25\text{ °C};$ <a href="#">Fig. 7</a>	-	12	18	ns

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 8 \text{ A}$ ; $V_R = 400 \text{ V}$ ; $di_F/dt = 500 \text{ A}/\mu\text{s}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; <a href="#">Fig. 7</a>	-	19	-	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**

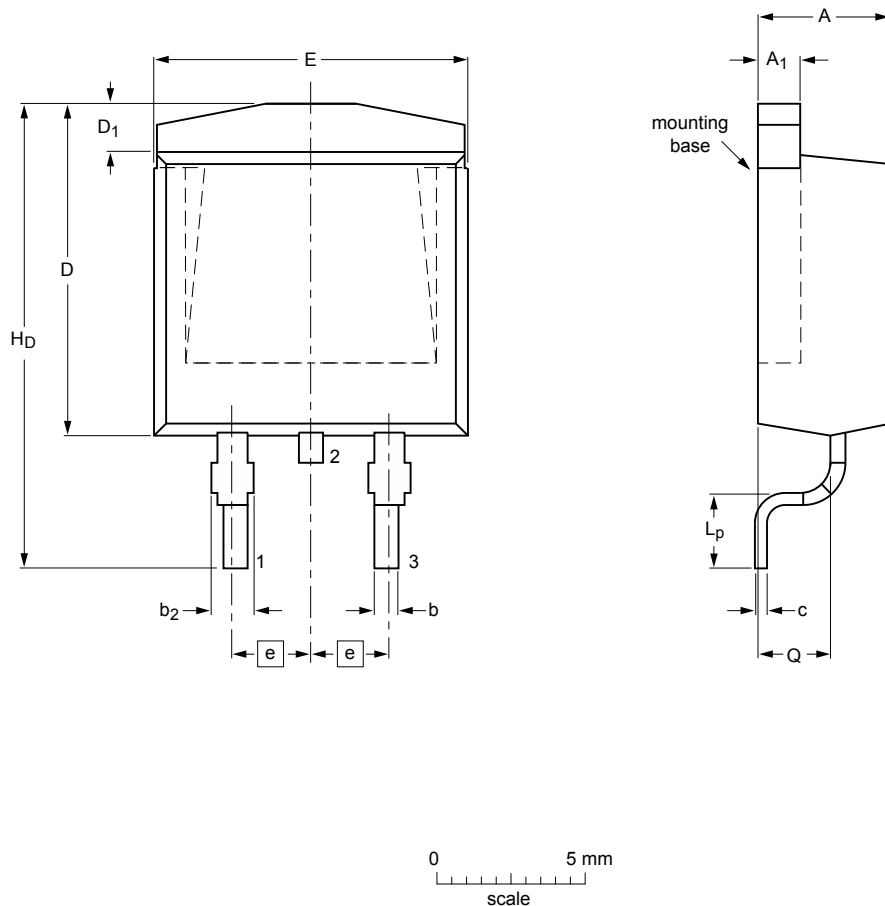
- (1)  $T_j = 125 \text{ }^\circ\text{C}$ ; typical values;
  - (2)  $T_j = 125 \text{ }^\circ\text{C}$ ; maximum values;
  - (3)  $T_j = 25 \text{ }^\circ\text{C}$ ; maximum values;
- $V_O = 1.581 \text{ V}$ ;  $R_S = 0.043 \text{ } \Omega$



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

### 11. Package outline

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) SOT404



Dimensions (mm are the original dimensions)

Unit	A	A <sub>1</sub>	b	b <sub>2</sub>	c	D	D <sub>1</sub>	E	e	H <sub>D</sub>	L <sub>p</sub>	Q
max	4.5	1.40	0.85	1.45	0.64	11	1.6	10.3		15.8	2.9	2.6
nom									2.54			
min	4.1	1.27	0.60	1.05	0.46		1.2	9.7		14.8	2.1	2.2

sot404\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT404					-06-03-16- 13-02-25

Fig. 8. Package outline D2PAK (SOT404)

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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