

## 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

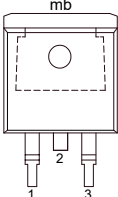

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V <sub>R</sub>	reverse voltage	DC		-	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>mb</sub> ≤ 130 °C; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	-	8	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 130 °C; square-wave pulse		-	-	16	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; <a href="#">Fig. 4</a>		-	-	91	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; <a href="#">Fig. 4</a>		-	-	100	A
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>J</sub> = 25 °C; <a href="#">Fig. 6</a>		-	-	3.4	V
		I <sub>F</sub> = 8 A; T <sub>J</sub> = 125 °C; <a href="#">Fig. 6</a>		-	1.5	1.9	V
		I <sub>F</sub> = 8 A; T <sub>J</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1.4	-	V
Dynamic characteristics							
t <sub>Tr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	12	18	ns
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	19	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	no connection	 <b>D2PAK (SOT404)</b>	
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 <sub>RRM</sub>	repetitive peak reverse voltage		-	600	V
V <sub>RWM</sub>	crest working reverse voltage		-	600	V
V <sub>R</sub>	reverse voltage	DC	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>mb</sub> ≤ 130 °C; square-wave pulse; Fig. 1; Fig. 2; Fig. 3	-	8	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 130 °C; square-wave pulse	-	16	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse; Fig. 4	-	91	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</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

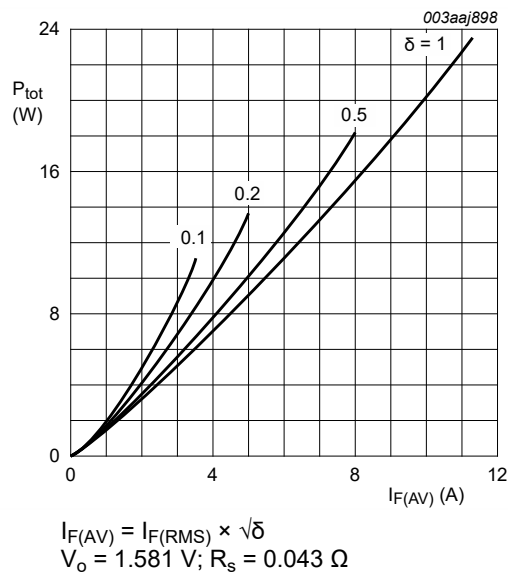


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

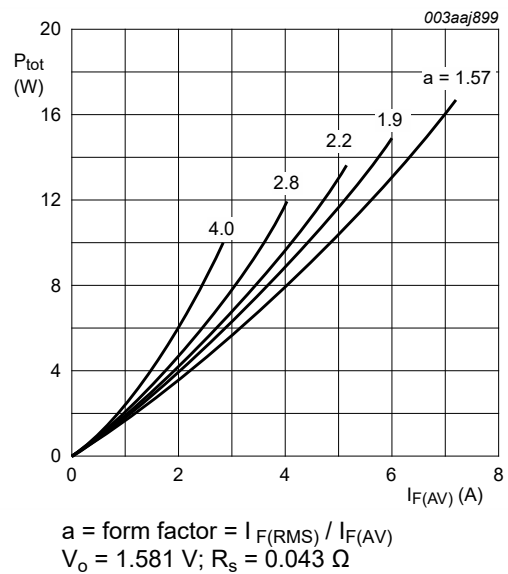


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

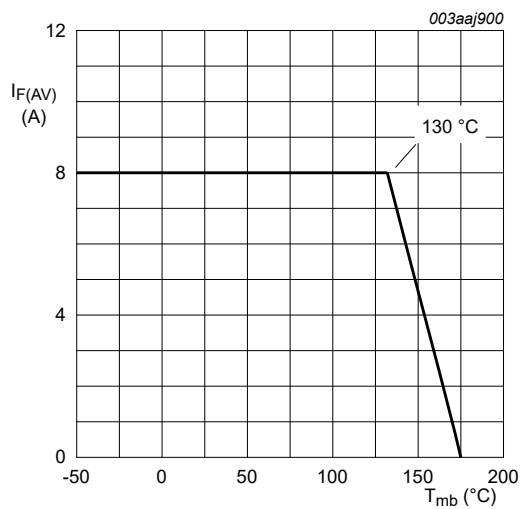


Fig. 3. Average forward current as a function of mounting base temperature; maximum values

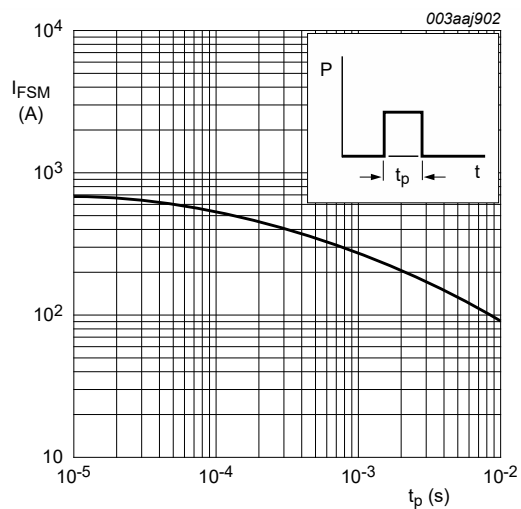


Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

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

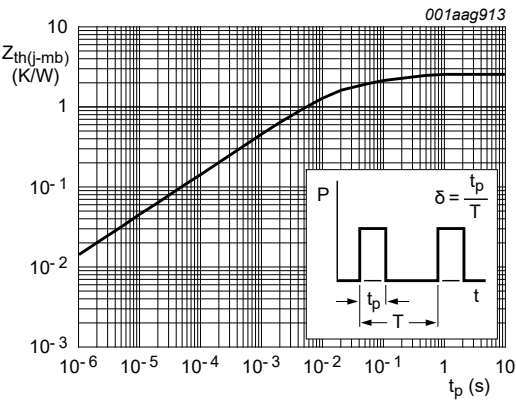
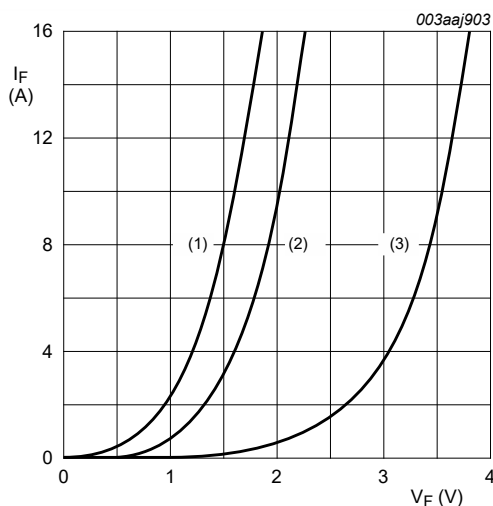


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>J</sub> = 25 °C; <a href="#">Fig. 6</a>		-	-	3.4	V
		I <sub>F</sub> = 8 A; T <sub>J</sub> = 125 °C; <a href="#">Fig. 6</a>		-	1.5	1.9	V
		I <sub>F</sub> = 8 A; T <sub>J</sub> = 150 °C; <a href="#">Fig. 6</a>		-	1.4	-	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>J</sub> = 25 °C		-	-	20	μA
		V <sub>R</sub> = 600 V; T <sub>J</sub> = 125 °C		-	-	200	μA
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	12	18	ns
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	19	-	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	-	2.2	A
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 125 °C; <a href="#">Fig. 7</a>		-	-	6	A
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 25 °C; <a href="#">Fig. 7</a>		-	17	-	nC
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 200 V; dI <sub>F</sub> /dt = 200 A/μs; T <sub>J</sub> = 125 °C; <a href="#">Fig. 7</a>		-	90	-	nC



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

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

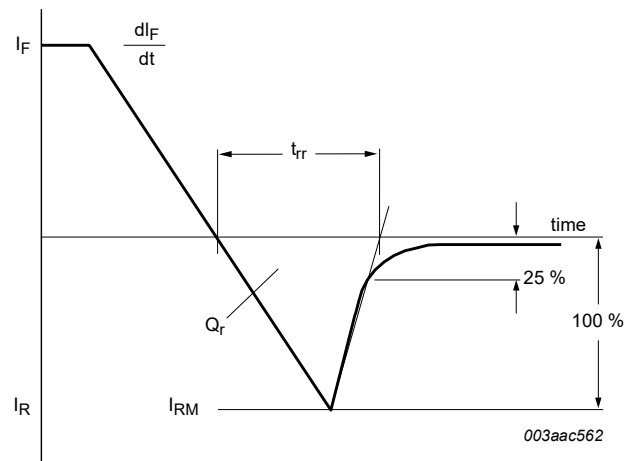


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

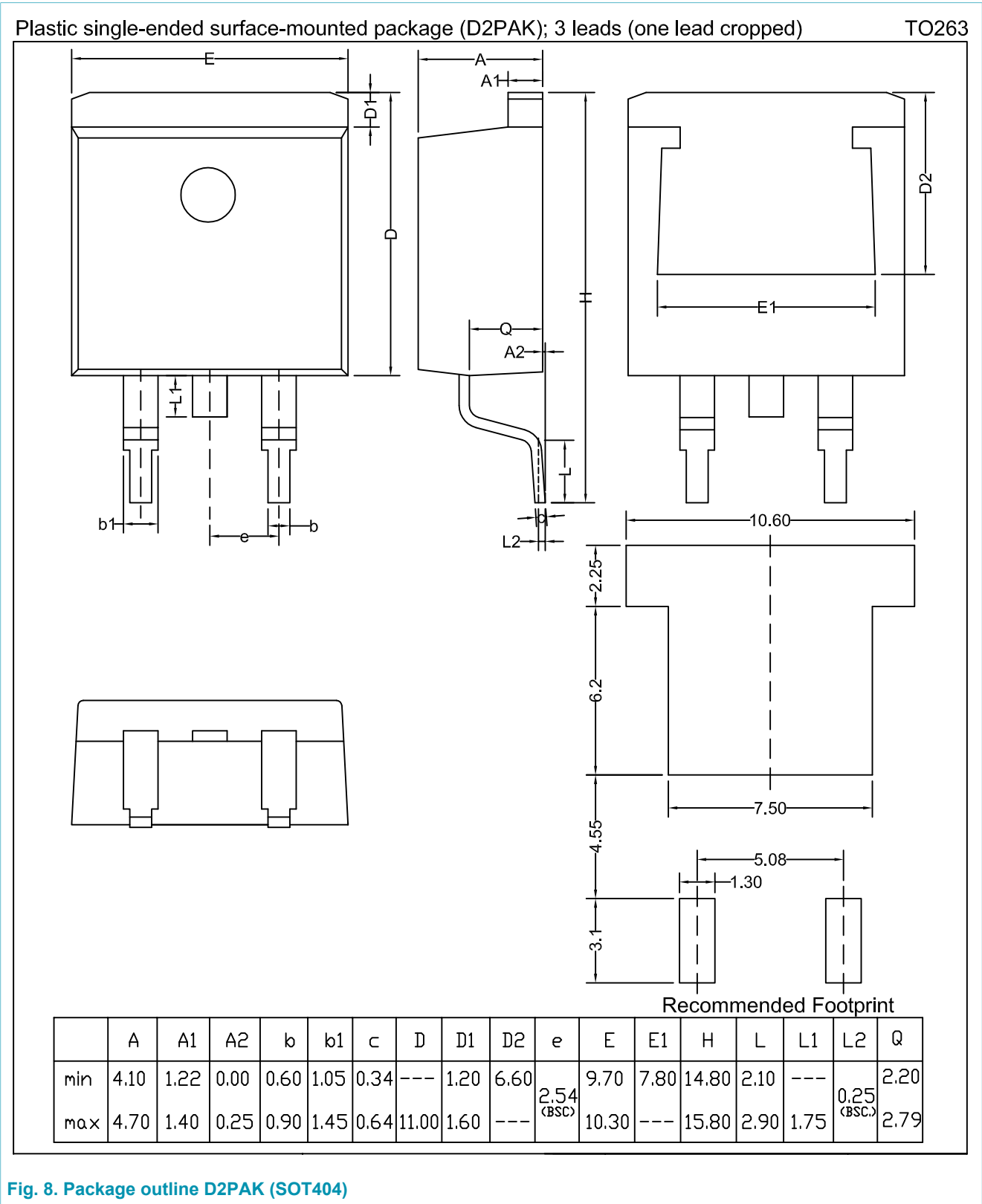


Fig. 8. Package outline D2PAK (SOT404)

## 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.
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13. Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 5

10. Characteristics.....6

11. Package outline..... 7

12. Legal information..... 8

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