

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

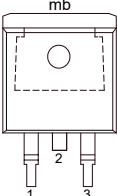
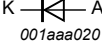
4. Quick reference data

Table 1. Quick reference data

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	n.c.	no connection	 D2PAK (SOT404)	
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	$\delta = 0.5$; $T_{mb} \leq 130\text{ }^{\circ}\text{C}$; square-wave pulse; Fig. 1 ; Fig. 2 ; Fig. 3	-	8	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_{mb} \leq 130\text{ }^{\circ}\text{C}$; square-wave pulse	-	16	A
I_{FSM}	non-repetitive peak forward current	$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; sine-wave pulse; Fig. 4	-	91	A
		$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; sine-wave pulse; Fig. 4	-	100	A
T_{stg}	storage temperature		-65	175	$^{\circ}\text{C}$
T_j	junction temperature		-	175	$^{\circ}\text{C}$

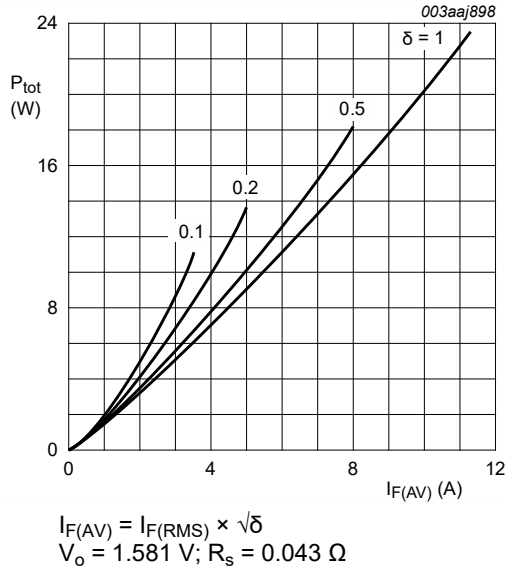


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

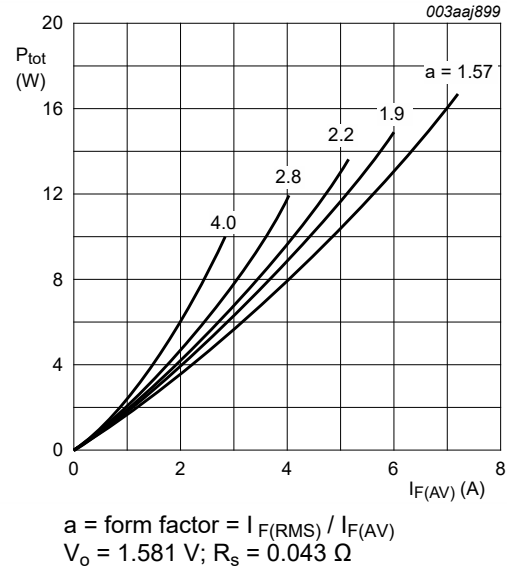


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

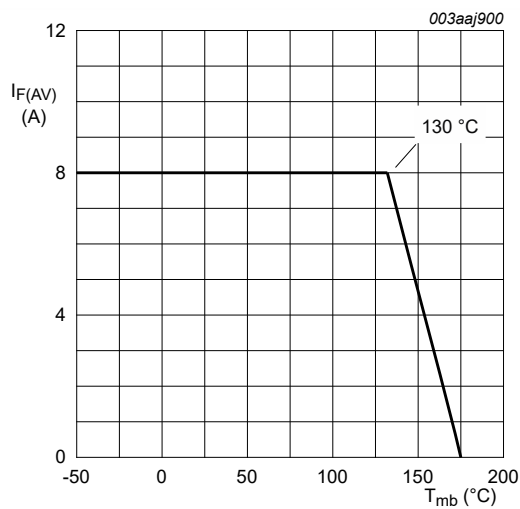


Fig. 3. Average forward current as a function of mounting base temperature; maximum values

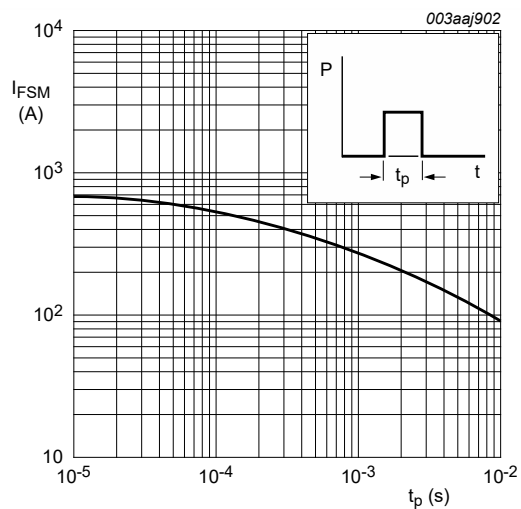


Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

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	Fig. 5		-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

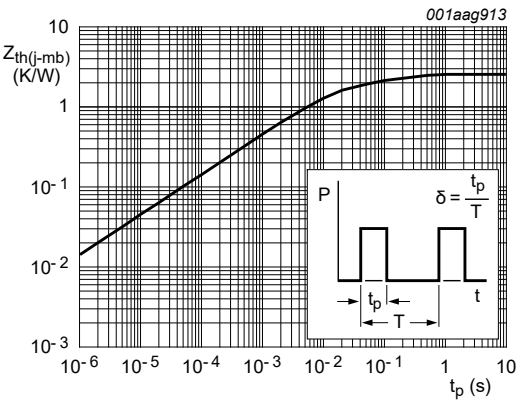
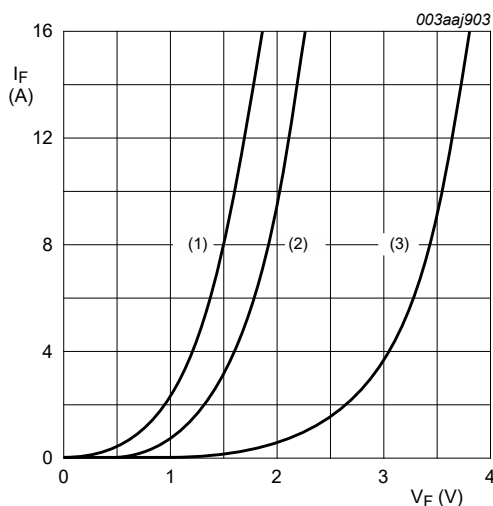


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 8 A; T _J = 25 °C; Fig. 6		-	-	3.4	V
		I _F = 8 A; T _J = 125 °C; Fig. 6		-	1.5	1.9	V
		I _F = 8 A; T _J = 150 °C; Fig. 6		-	1.4	-	V
I _R	reverse current	V _R = 600 V; T _J = 25 °C		-	-	20	μA
		V _R = 600 V; T _J = 125 °C		-	-	200	μA
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 200 A/μs; T _J = 25 °C; Fig. 7		-	12	18	ns
		I _F = 8 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _J = 25 °C; Fig. 7		-	19	-	ns
I _{RM}	peak reverse recovery current	I _F = 8 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _J = 25 °C; Fig. 7		-	-	2.2	A
		I _F = 8 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _J = 125 °C; Fig. 7		-	-	6	A
Q _r	recovered charge	I _F = 8 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _J = 25 °C; Fig. 7		-	17	-	nC
		I _F = 8 A; V _R = 200 V; dI _F /dt = 200 A/μs; T _J = 125 °C; Fig. 7		-	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

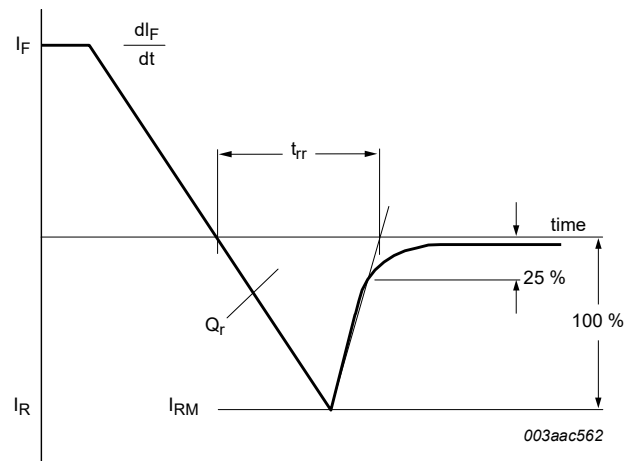


Fig. 7. Reverse recovery definitions; ramp recovery

11. Package outline

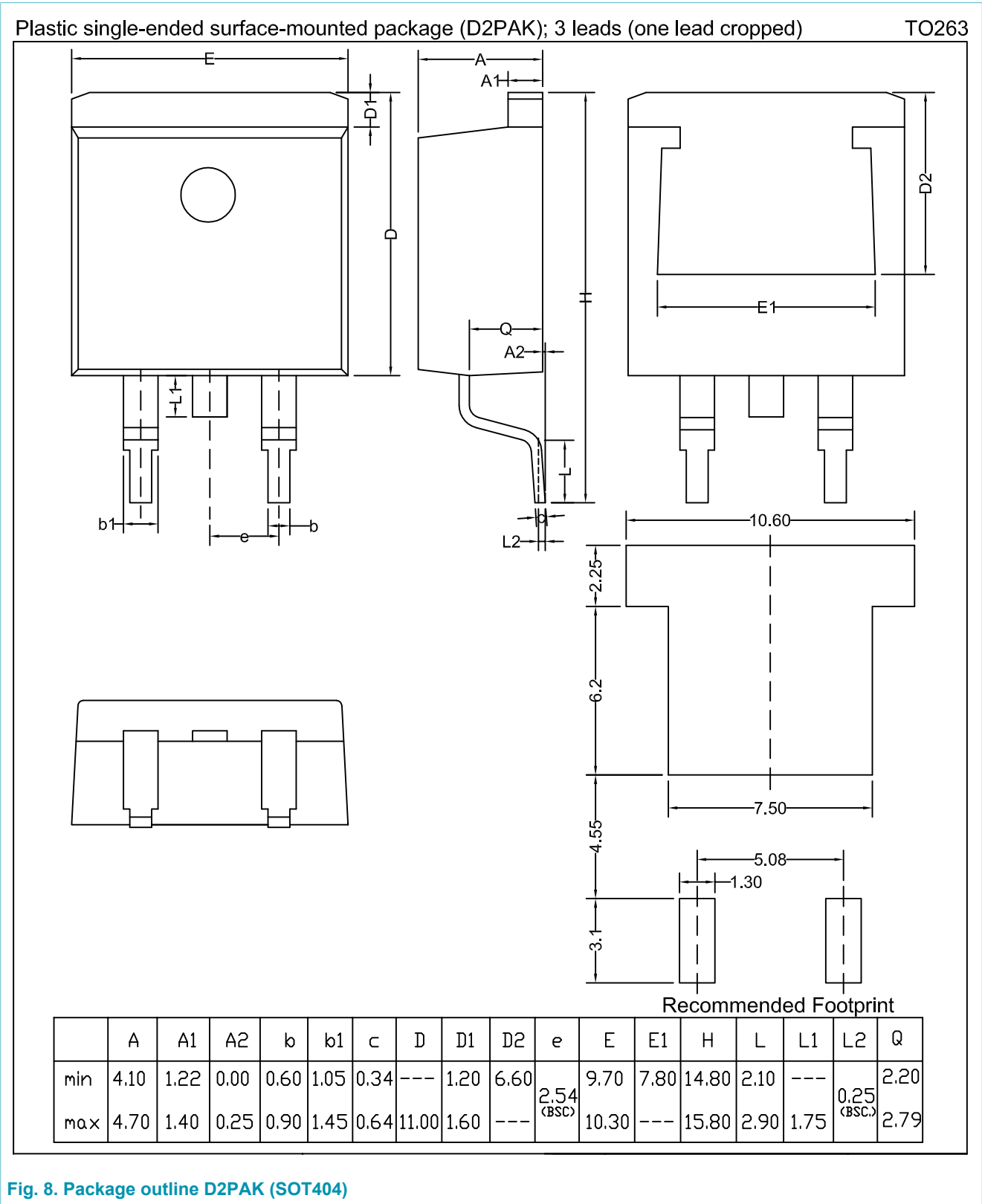


Fig. 8. Package outline D2PAK (SOT404)

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

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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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Date of release: 13 August 2018



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Промышленная ул, дом № 19, литера Н,
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