

## 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

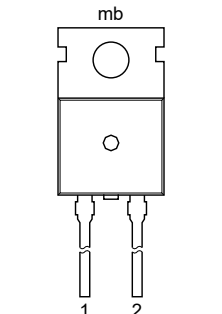
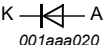
## 4. Quick reference data

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	$\delta = 0.5$ ; $T_{mb} \leq 109\text{ }^{\circ}\text{C}$ ; square-wave pulse; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a>	-	-	8	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}$ ; $T_j = 150\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 4</a>	-	1.4	1.85	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 8\text{ A}$ ; $V_R = 400\text{ V}$ ; $dI_F/dt = 500\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 5</a>	-	19	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>TO-220AC (SOD59)</p>	 <p>001aaa020</p>
2	A	anode		
mb	mb	mounting base; cathode		

6. Ordering information

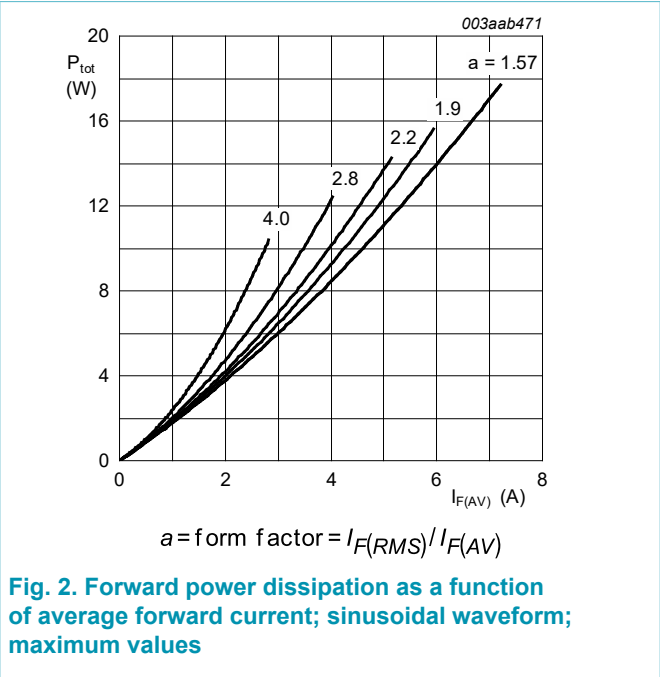
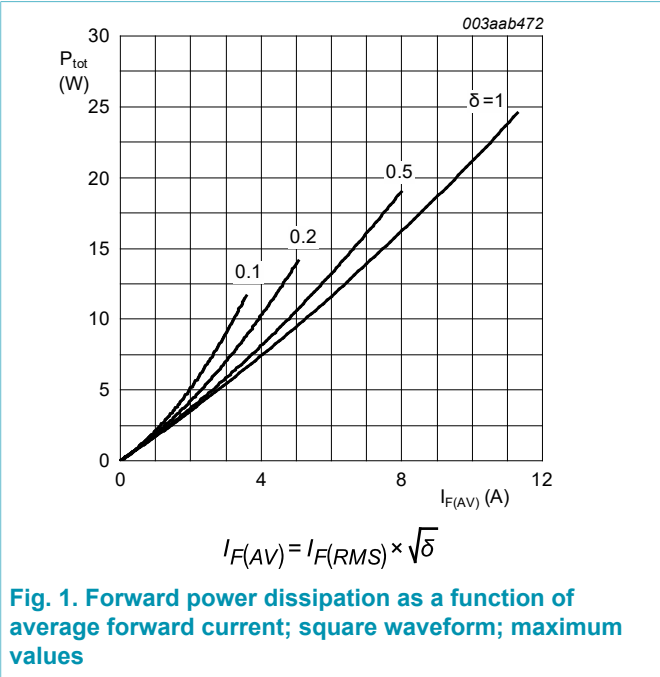
Table 3. Ordering information

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 <sub>RRM</sub>	repetitive peak reverse voltage		-	600	V
V <sub>RWM</sub>	crest working reverse voltage		-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>mb</sub> ≤ 109 °C; square-wave pulse; Fig. 1; Fig. 2	-	8	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>mb</sub> ≤ 109 °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	-	80	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sine-wave pulse	-	88	A
T <sub>stg</sub>	storage temperature		-40	150	°C
T <sub>j</sub>	junction temperature		-	150	°C



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	<a href="#">Fig. 3</a>		-	-	2.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air			-	60	-	K/W

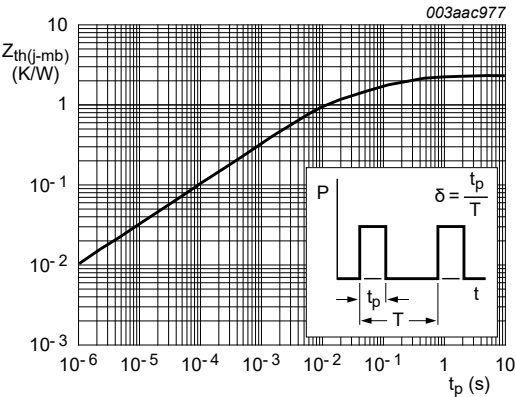
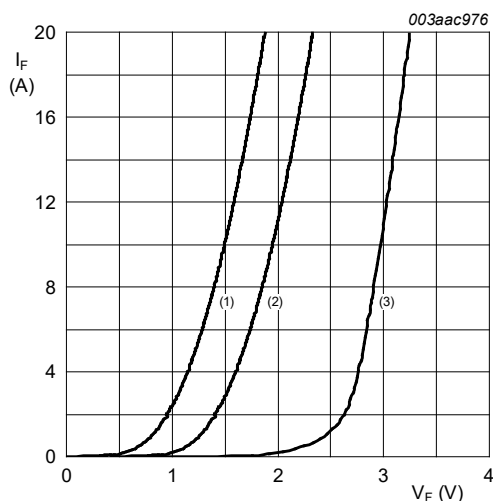


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

## 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>j</sub> = 25 °C		-	2	2.9	V
		I <sub>F</sub> = 8 A; T <sub>j</sub> = 150 °C; <a href="#">Fig. 4</a>		-	1.4	1.85	V
		I <sub>F</sub> = 16 A; T <sub>j</sub> = 150 °C		-	1.7	2.3	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C		-	9	150	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 100 °C		-	1.1	3	mA
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 = 50 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 5</a>		-	30	52	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. 5</a>		-	19	-	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> = 100 °C; <a href="#">Fig. 5</a>		-	32	40	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 8 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 125 °C		-	1.5	5.5	A
		I <sub>F</sub> = 8 A; V <sub>R</sub> = 400 V; dI <sub>F</sub> /dt = 500 A/μs; T <sub>j</sub> = 100 °C		-	9.5	12	A
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 1 A; V <sub>R</sub> = 100 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C		-	12	-	nC
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	8	10	V



- (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. 4. Forward current as a function of forward voltage

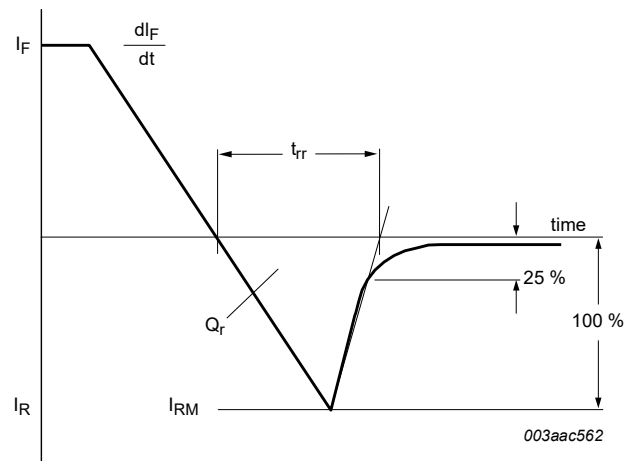


Fig. 5. Reverse recovery definitions; ramp recovery

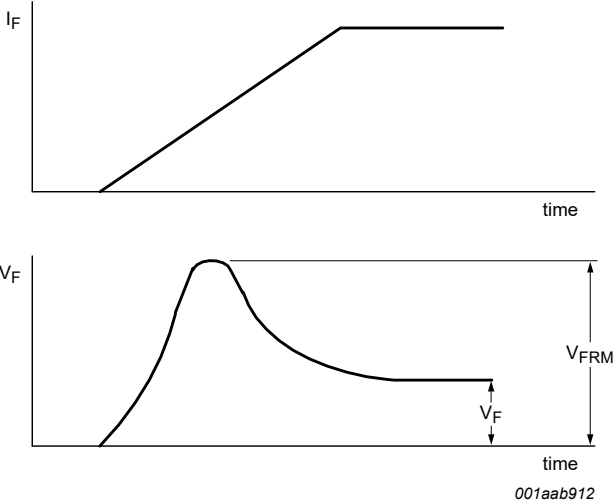


Fig. 6. Forward recovery definitions

10. Package outline

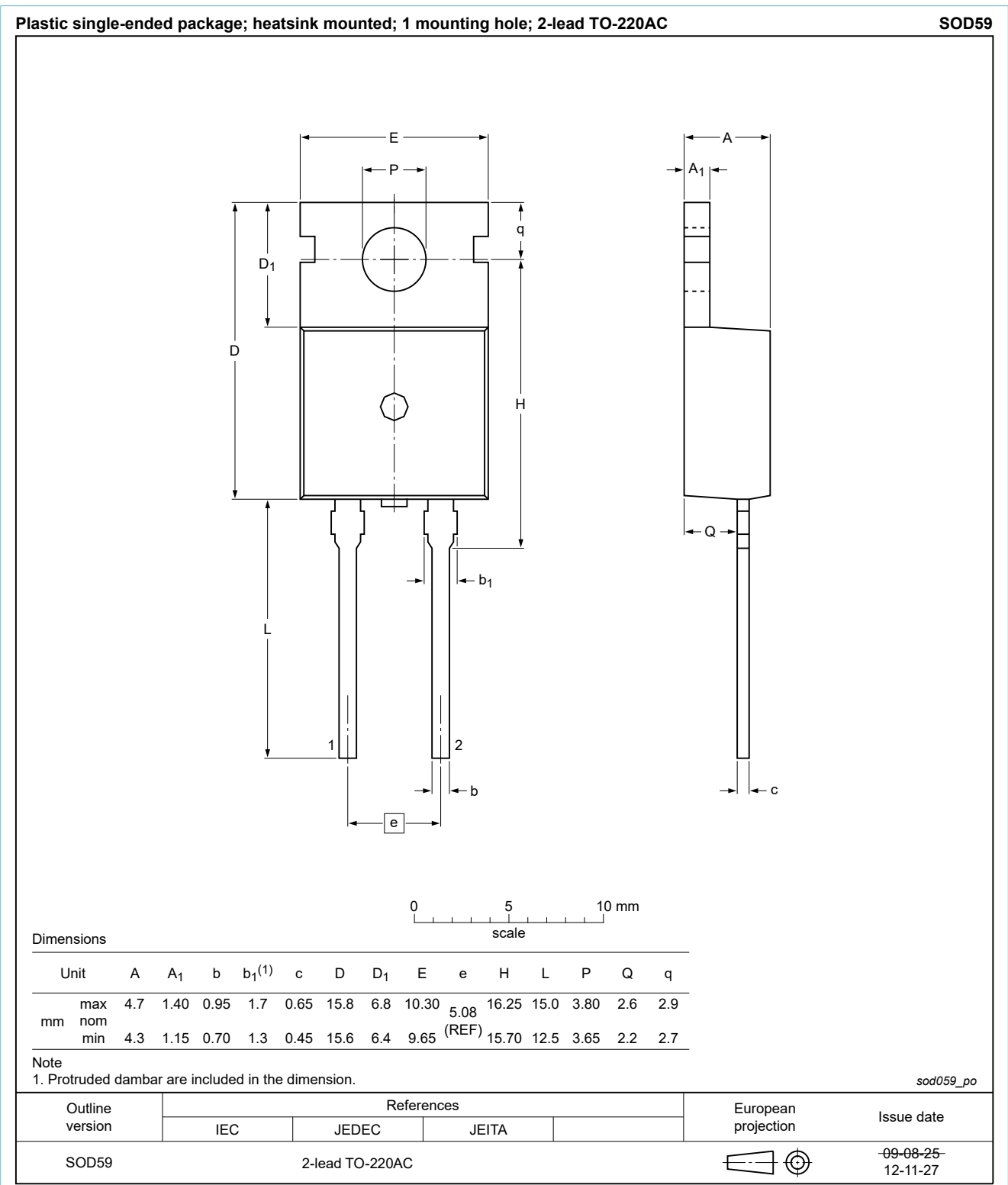


Fig. 7. Package outline TO-220AC (SOD59)

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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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