

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

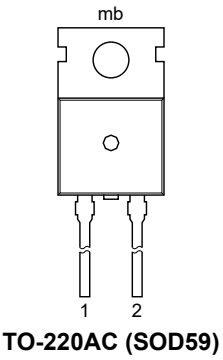
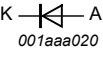
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V _R	reverse voltage	DC		-	-	600	V
I _{F(AV)}	average forward current	δ = 0.5; T _{mb} ≤ 103 °C; SQW; Fig. 1 ; Fig. 2		-	-	8	A
I _{FRM}	repetitive peak forward current	δ = 0.5; t _p = 25 μs; T _{mb} ≤ 103 °C; SQW		-	-	16	A
I _{FSM}	non-repetitive peak forward current	t _p = 8.3 ms; T _{j(init)} = 150 °C; SIN		-	-	60	A
		t _p = 10 ms; T _{j(init)} = 150 °C; SIN		-	-	55	A
Static characteristics							
V _F	forward voltage	I _F = 8 A; T _j = 25 °C		-	2	2.9	V
		I _F = 8 A; T _j = 150 °C; Fig. 4		-	1.5	1.85	V
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _j = 25 °C		-	30	52	ns
		I _F = 8 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _j = 100 °C		-	32	40	ns
		I _F = 8 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _j = 25 °C; Fig. 5		-	20	-	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 TO-220AC (SOD59)	
2	A	anode		
mb	mb	mounting base; connected to cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYC8D-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 _{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	δ = 0.5; T _{mb} ≤ 103 °C; SQW; Fig. 1; Fig. 2	-	8	A
I _{FRM}	repetitive peak forward current	δ = 0.5; t _p = 25 μs; T _{mb} ≤ 103 °C; SQW	-	16	A
I _{FSM}	non-repetitive peak forward current	t _p = 8.3 ms; T _{j(init)} = 150 °C; SIN	-	60	A
		t _p = 10 ms; T _{j(init)} = 150 °C; SIN	-	55	A
T _{stg}	storage temperature		-40	150	°C
T _j	junction temperature		-	150	°C

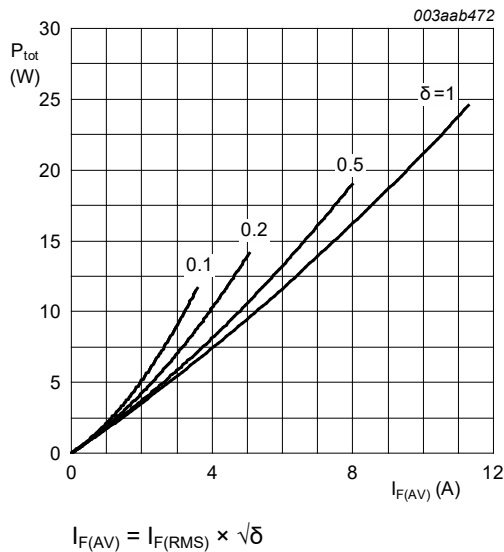


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

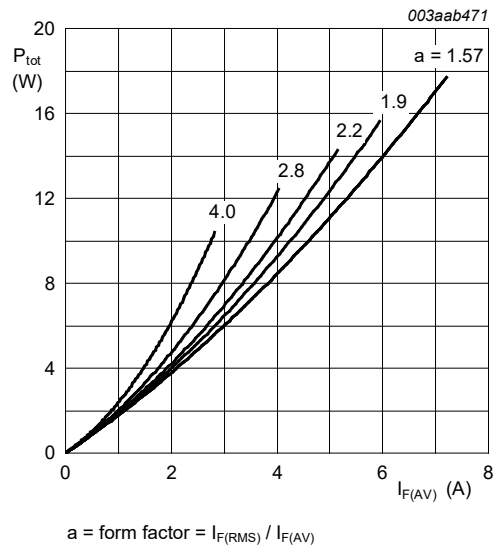


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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	Fig. 3		-	-	2.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

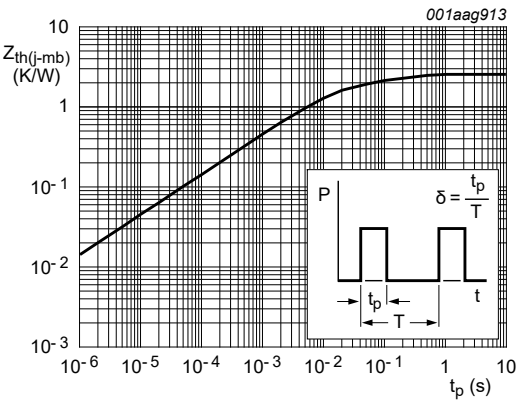
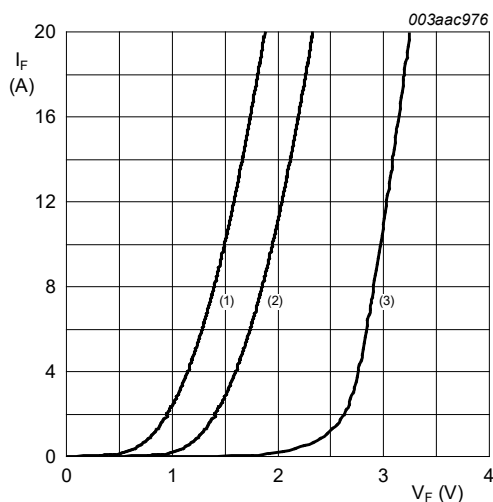


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V _F	forward voltage	I _F = 8 A; T _J = 25 °C		-	2	2.9	V
		I _F = 8 A; T _J = 150 °C; Fig. 4		-	1.5	1.85	V
I _R	reverse current	V _R = 600 V; T _J = 25 °C		-	9	40	μA
		V _R = 500 V; T _J = 100 °C		-	1.1	3	mA
Dynamic characteristics							
t _{rr}	reverse recovery time	I _F = 1 A; V _R = 30 V; dI _F /dt = 50 A/μs; T _J = 25 °C		-	30	52	ns
		I _F = 8 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _J = 100 °C		-	32	40	ns
		I _F = 8 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _J = 25 °C; Fig. 5		-	20	-	ns
I _{RM}	peak reverse recovery current	I _F = 8 A; V _R = 400 V; dI _F /dt = 50 A/μs; T _J = 125 °C		-	1.5	5.5	A
		I _F = 8 A; V _R = 400 V; dI _F /dt = 500 A/μs; T _J = 100 °C		-	9.5	12	A
Q _r	recovered charge	I _F = 1 A; V _R = 100 V; dI _F /dt = 100 A/μs; T _J = 25 °C		-	13	-	nC
V _{FR}	forward recovery voltage	I _F = 10 A; dI _F /dt = 100 A/μs; T _J = 25 °C; Fig. 6		-	8	10	V



- (1) $T_J = 150\text{ °C}$; typical values
 (2) $T_J = 150\text{ °C}$; maximum values
 (3) $T_J = 25\text{ °C}$; maximum values

Fig. 4. Forward current as a function of forward voltage

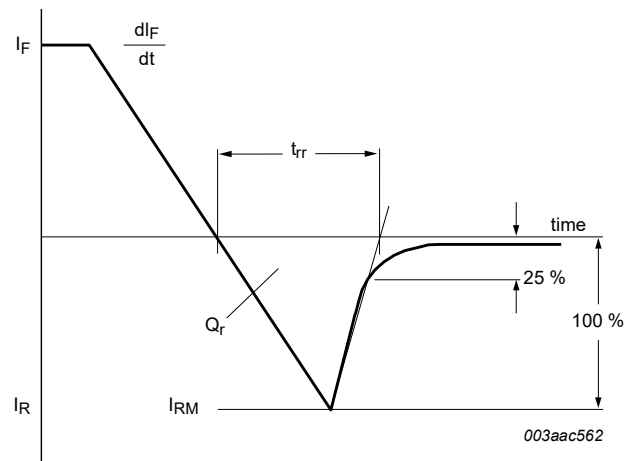


Fig. 5. Reverse recovery definitions; ramp recovery

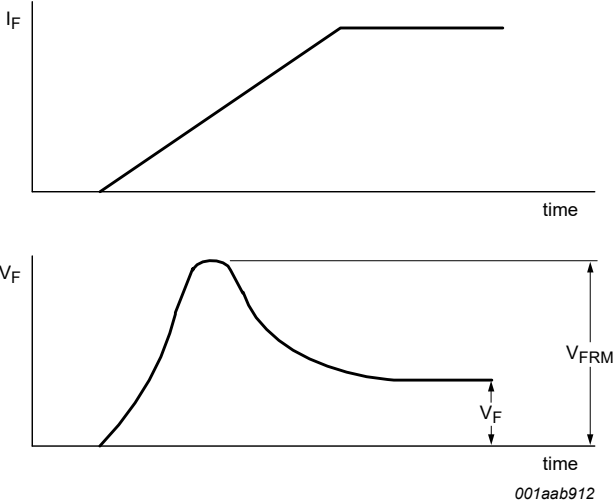


Fig. 6. Forward recovery definitions

10. Package outline

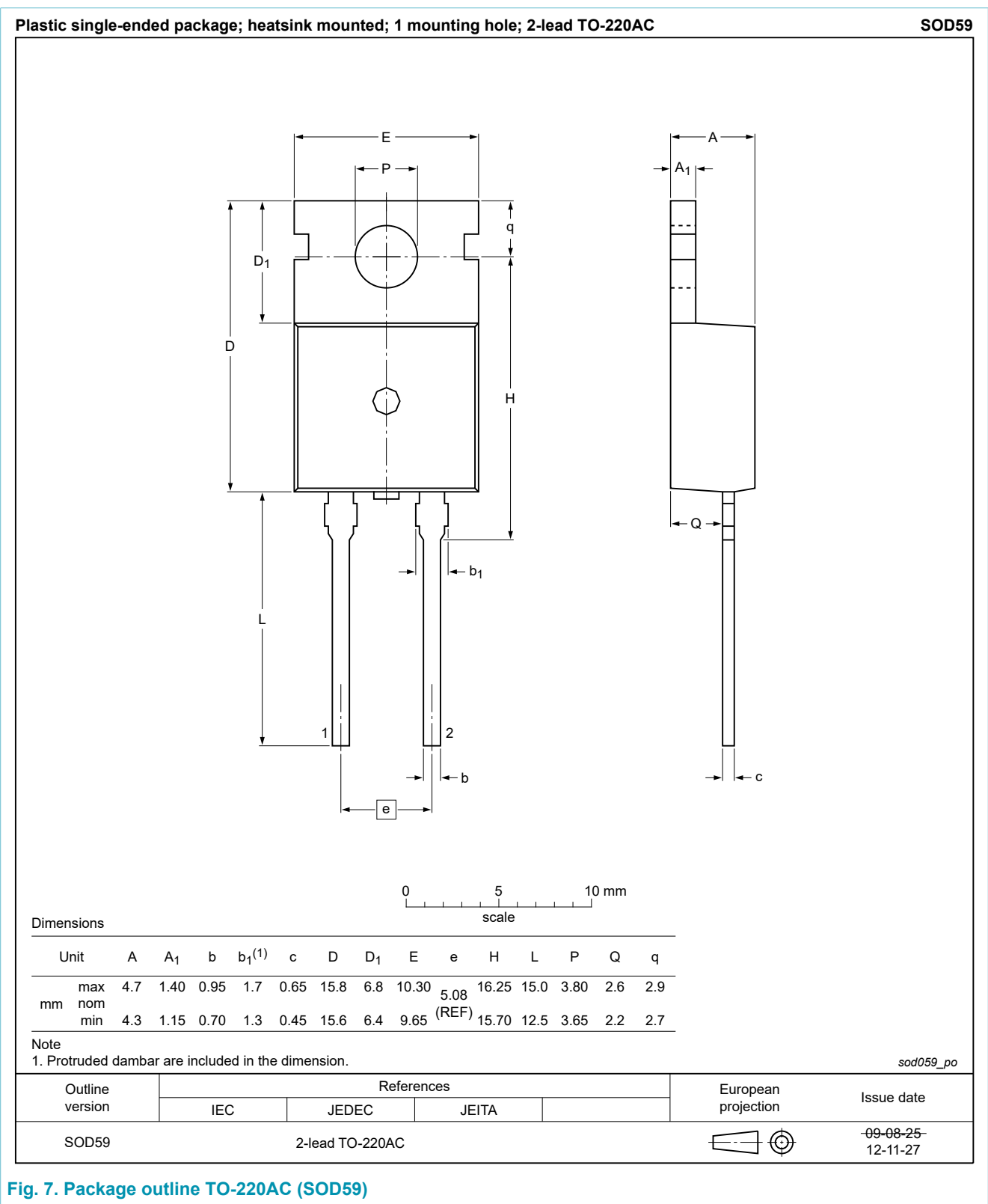


Fig. 7. Package outline TO-220AC (SOD59)

11. 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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