BYC8-600

Hyperfast power diode

9 August 2017 Product data sheet

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

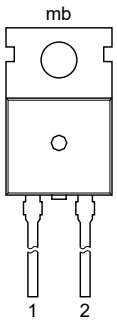
4. Quick reference data

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	$\delta = 0.5$; $T_{mb} \leq 109$ °C; square-wave pulse; Fig. 1; Fig. 2		-	-	8	A
Static characteristics							
V_F	forward voltage	$I_F = 8$ A; $T_j = 150$ °C; Fig. 4		-	1.4	1.85	V
Dynamic characteristics							
t_{rr}	reverse recovery time	$I_F = 8$ A; $V_R = 400$ V; $dI_F/dt = 500$ A/µs; $T_j = 25$ °C; Fig. 5		-	19	-	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; cathode		

6. Ordering information

Table 3. Ordering information

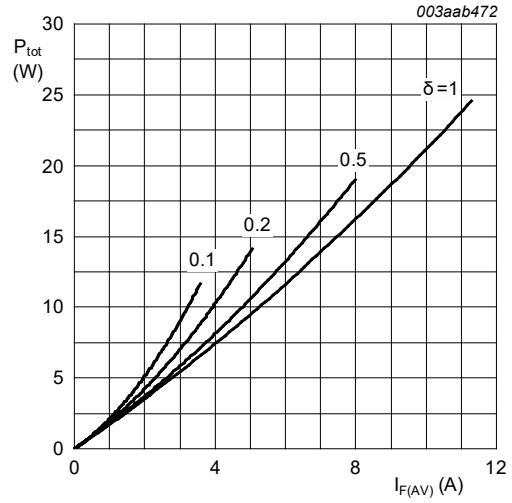
Type number	Package		
	Name	Description	Version
BYC8-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

7. Limiting values

Table 4. Limiting values

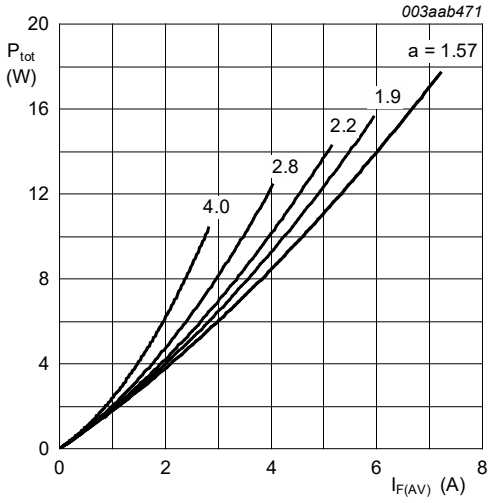
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	600	V
V_{RWM}	crest working reverse voltage			-	600	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; T_{mb} ≤ 109 °C; square-wave pulse; Fig. 1; Fig. 2		-	8	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; T_{mb} ≤ 109 °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		-	80	A
		t_p = 8.3 ms; $T_{j(init)}$ = 25 °C; sine-wave pulse		-	88	A
T_{stg}	storage temperature			-40	150	°C
T_j	junction temperature			-	150	°C



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

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



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

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
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	Fig. 3		-	-	2.2	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient free air			-	60	-	K/W

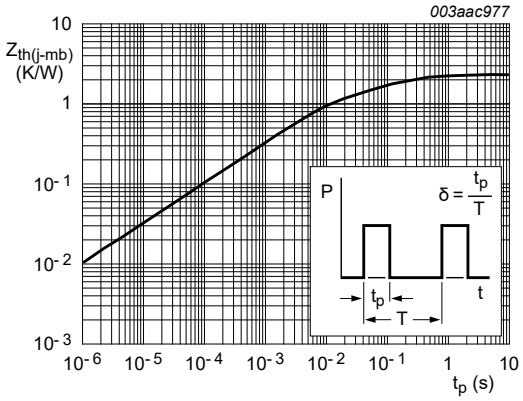
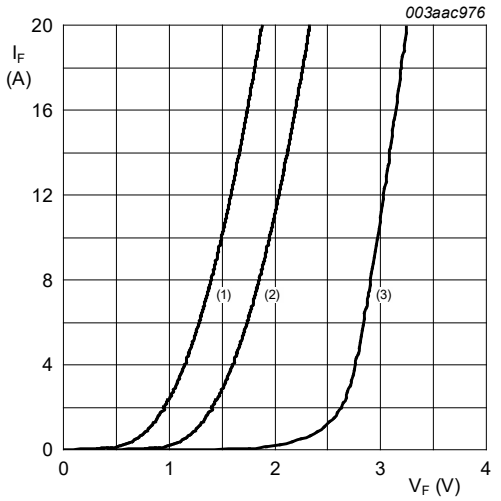


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V_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		-	1.4	1.85	V
		I_F = 16 A; T_j = 150 °C		-	1.7	2.3	V
I_R	reverse current	V_R = 600 V; T_j = 25 °C		-	9	150	µA
		V_R = 600 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; Fig. 5		-	30	52	ns
		I_F = 8 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; Fig. 5		-	19	-	ns
		I_F = 8 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 100 °C; Fig. 5		-	32	40	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		-	12	-	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 °C; typical values

(2) T_j = 150 °C; maximum values

(3) T_j = 25 °C; maximum values

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

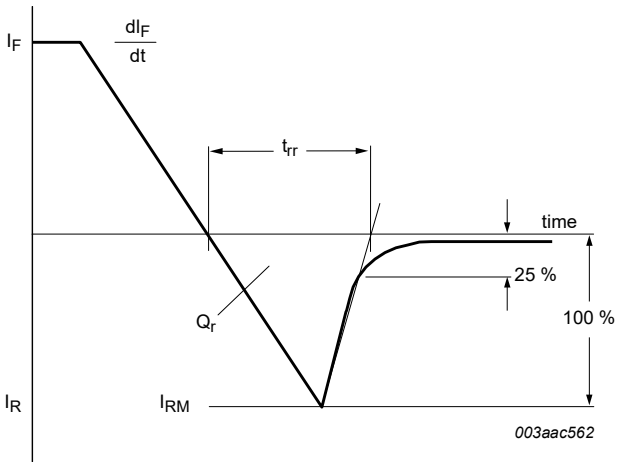


Fig. 5. Reverse recovery definitions; ramp recovery

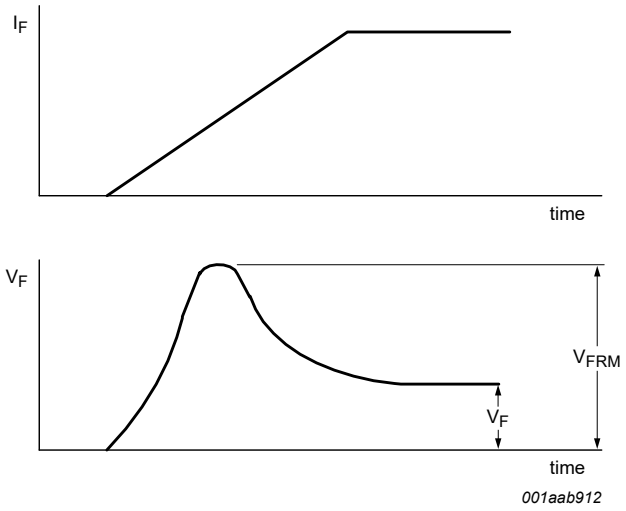
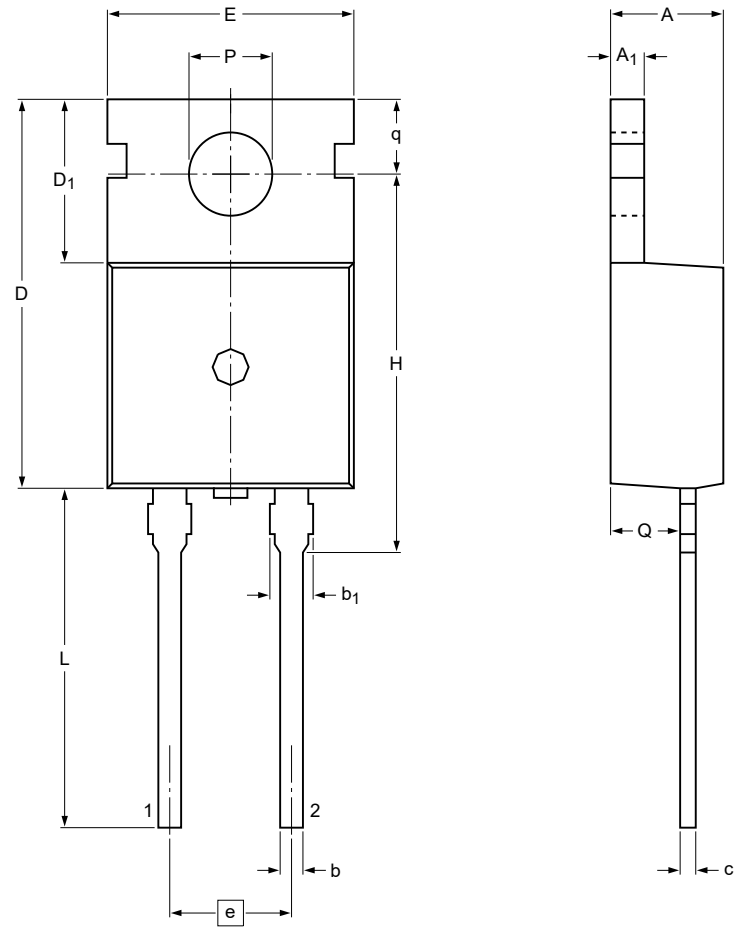


Fig. 6. Forward recovery definitions

10. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC **SOD59**



0 5 10 mm

scale

Dimensions

Unit		A	A_1	b	b_1 (1)	c	D	D_1	E	e	H	L	P	Q	q
mm	max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	5.08 (REF)	16.25	15.0	3.80	2.6	2.9
	nom	4.3	1.15	0.70	1.3	0.45	15.6	6.4	9.65		15.70	12.5	3.65	2.2	2.7
	min														

Note

1. Protruded dambar are included in the dimension.

sod059_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD59	2-lead TO-220AC					~~09-08-25~~ 12-11-27

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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