BYC8-600

Hyperfast rectifier diode, low switching loss

Product data sheet

1. Product profile

1.1 General description

Hyperfast rectifier diode in a SOD59 (2-lead TO-220AC) plastic package.

1.2 Features and benefits

- Low reverse recovery current and low thermal resistance
- Reduces switching losses in associated MOSFET

1.3 Applications

- Continuous Current Mode (CCM) Power Factor Correction (PFC)
- Half-bridge/full-bridge switched-mode power supplies
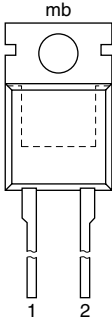- Half-bridge lighting ballasts

1.4 Quick reference data

Table 1.   Quick reference

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$; $T_{mb} \leq 109$ °C; see Figure 1; see Figure 2	-	-	8	A
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; see Figure 5	-	19	-	ns
Static characteristics						
V_F	forward voltage	$I_F = 8$ A; $T_j = 150$ °C; see Figure 4	-	1.4	1.85	V

founded by Philips

2. Pinning information

Table 2.   Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
mb	mb	mounting base; cathode		

mb

1   2

**SOD59
(TO-220AC)**

K ——▷|—— A
001aaa020

3. 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

## 4. 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	square-wave pulse; δ = 0.5; $T_{mb} ≤ 109$ °C; see Figure 1; see Figure 2	-	8	A
I_{FRM}	repetitive peak forward current	square-wave pulse; δ = 0.5; t_p = 25 μs; $T_{mb} ≤ 109$ °C	-	16	A
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms; sine-wave pulse; $T_{j(init)}$ = 150 °C	-	60	A
		t_p = 10 ms; sine-wave pulse; $T_{j(init)}$ = 150 °C	-	55	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C

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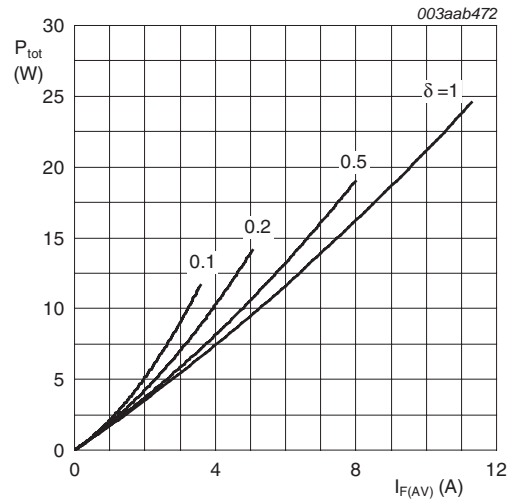
$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

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

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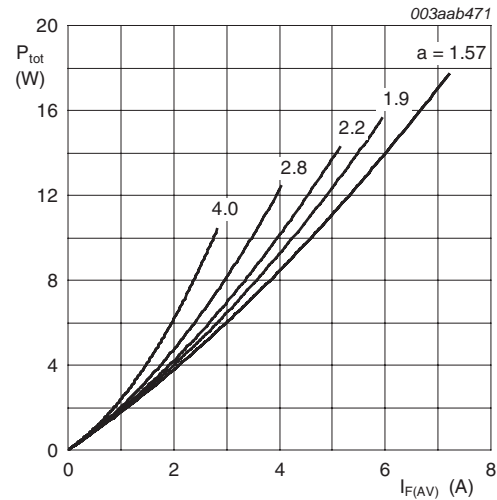
$$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$$

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

5. Thermal characteristics

Table 5. **Thermal characteristics**

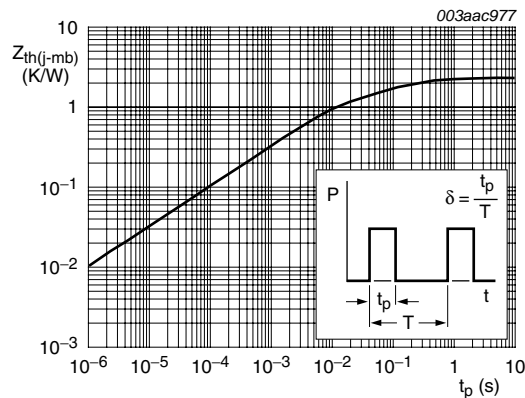| Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	see Figure 3	-	-	2.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	60	-	K/W

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

6. 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; see Figure 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	-	9	150	µA
		V_R = 500 V; T_j = 100 °C	-	1.1	3	mA
Dynamic characteristics						
Q_r	recovered charge	I_F = 1 A; dI_F/dt = 100 A/µs; T_j = 25 °C	-	12	-	nC
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; see Figure 5	-	19	-	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
V_{FR}	forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs; see Figure 6	-	8	10	V

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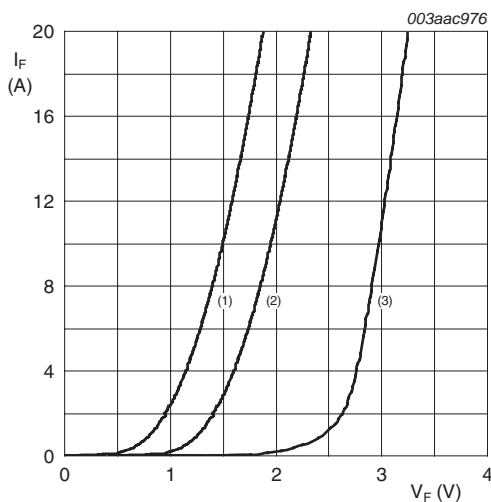
(1) $T_j = 150 °C$; typical values
(2) $T_j = 150 °C$; maximum values
(3) $T_j = 25 °C$; maximum values

Fig 4.   Forward current as a function of forward voltage
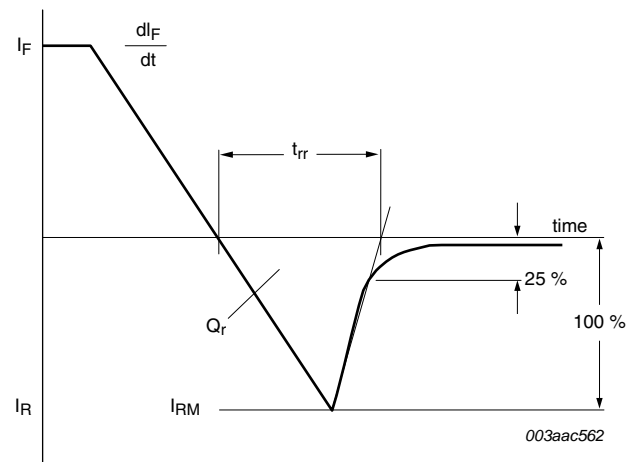

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Fig 5.   Reverse recovery definitions; ramp recovery
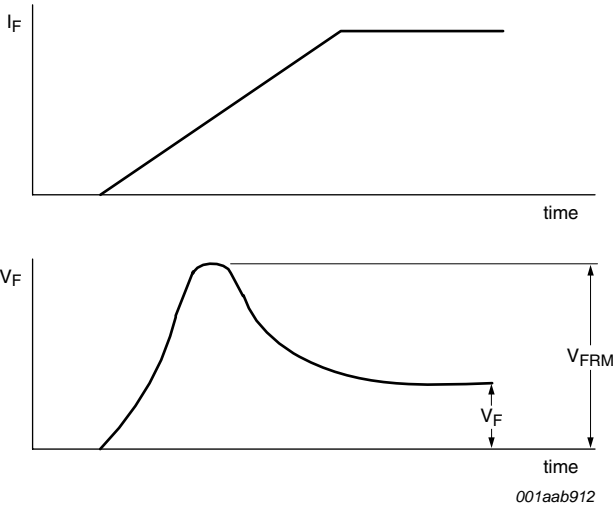
Fig 6.   Forward recovery definitions

7. Package outline

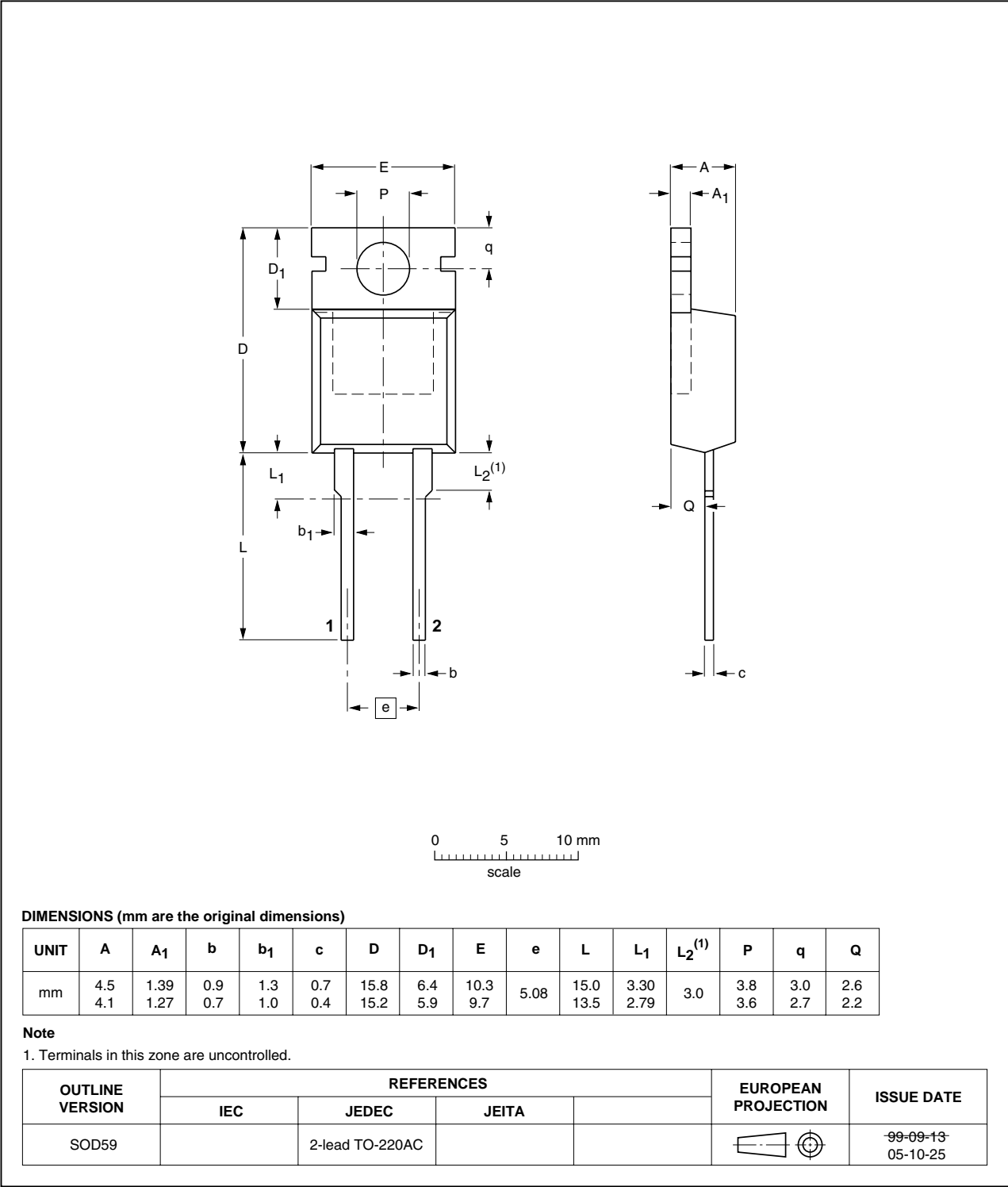**Plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC**   **SOD59**

DIMENSIONS (mm are the original dimensions)

UNIT	A	A$_1$	b	b$_1$	c	D	D$_1$	E	e	L	L$_1$	L$_2$$^{(1)}$	P	q	Q
mm	4.5	1.39	0.9	1.3	0.7	15.8	6.4	10.3	5.08	15.0	3.30	3.0	3.8	3.0	2.6
	4.1	1.27	0.7	1.0	0.4	15.2	5.9	9.7		13.5	2.79		3.6	2.7	2.2

Note

1. Terminals in this zone are uncontrolled.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD59		2-lead TO-220AC				~~99-09-13~~ 05-10-25

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

8. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC8-600_6	20090312	Product data sheet	-	BYC8-600_5
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.			
	• Legal texts have been adapted to the new company name where appropriate.			
BYC8-600_5	20010401	Product specification	-	BYC8-600_4
BYC8-600_4	20001101	Product specification	-	BYC8-600_3
BYC8-600_3	19990501	Product specification	-	BYC8-600_2
BYC8-600_2	19980901	Product specification	-	BYC8-600_1
BYC8-600_1	19971001	Product specification	-	-

9. Legal information

9.1 Data sheet status

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.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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11. Contents