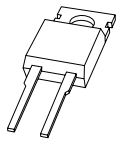


BYC20-600

Rectifier diode, hyperfast

Rev. 01 — 28 November 2007 Product data sheet

1. Product profile

1.1 General description

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

1.2 Features

- Extremely fast switching
- Reduces switching loss in associated MOSFET
- Low thermal resistance
- Low reverse recovery current

1.3 Applications

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

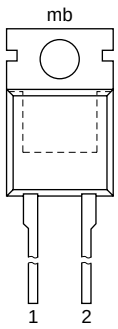
1.4 Quick reference data

- $V_{RRM} \leq 600$ V
- $V_F = 1.54$ V (typ)
- $I_{F(AV)} \leq 20$ A
- $t_{rr} = 19$ ns (typ)

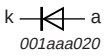
2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Symbol
1	cathode (k)		
2	anode (a)		
mb	mounting base; cathode		



SOD59 (2-lead TO-220AC)



3. Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BYC20-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

4. Limiting values

Table 3. 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	square waveform; $\delta = 1.0$; $T_{mb} \leq 100$ °C	-	500	V
$I_{F(AV)}$	average forward current	square waveform; $\delta = 0.5$; $T_{mb} \leq 93$ °C	-	20	A
I_{FRM}	repetitive peak forward current	square waveform; $\delta = 0.5$; $T_{mb} \leq 93$ °C; $t_p = 25$ µs;	-	40	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms; sinusoidal waveform	-	250	A
		t = 8.3 ms; sinusoidal waveform	-	274	A
T_{stg}	storage temperature		–40	+150	°C
T_j	junction temperature		-	150	°C

5. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j\text{-}mb)}$	thermal resistance from junction to mounting base	with heatsink compound; see Figure 1	-	-	1.2	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

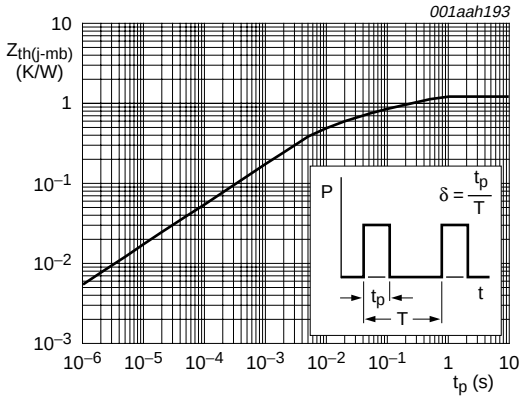


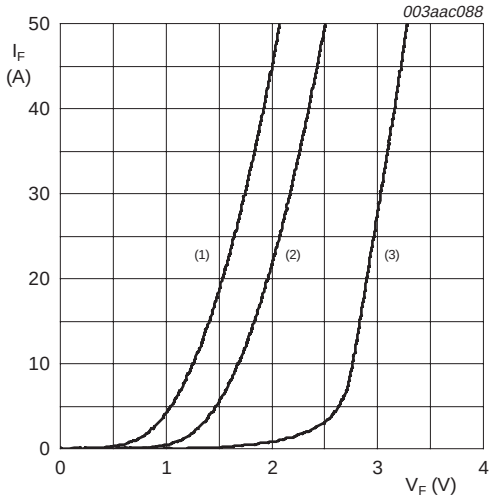
Fig 1. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 5. Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 20 A; T_j = 150 °C; see Figure 2	-	1.54	1.97	V
		I_F = 40 A; T_j = 150 °C; see Figure 2	-	1.95	2.34	V
		I_F = 20 A; see Figure 2	-	1.89	2.9	V
I_R	reverse current	V_R = 600 V	-	16	200	µA
		V_R = 500 V; T_j = 100 °C	-	1.6	3.0	mA
Dynamic characteristics						
t_{rr}	reverse recovery time	I_F = 1 A to V_R = 30 V; dI_F/dt = 50 A/µs; see Figure 3	-	35	55	ns
		I_F = 20 A to V_R = 400 V; dI_F/dt = 500 A/µs; see Figure 3				
		T_j = 25 °C	-	19	-	ns
		T_j = 100 °C	-	32	40	ns
I_{RM}	peak reverse recovery current	I_F = 20 A to V_R = 400 V; T_j = 125 °C; see Figure 3				
		dI_F/dt = 50 A/µs	-	3.0	7.5	A
		dI_F/dt = 500 A/µs	-	9.5	12	A
V_{FR}	forward recovery voltage	I_F = 20 A; dI_F/dt = 100 A/µs; see Figure 4	-	8	11	V



(1) T_j = 150 °C; typical values

(2) T_j = 150 °C; maximum values

(3) T_j = 25 °C; maximum values

Fig 2. Forward current as a function of forward voltage

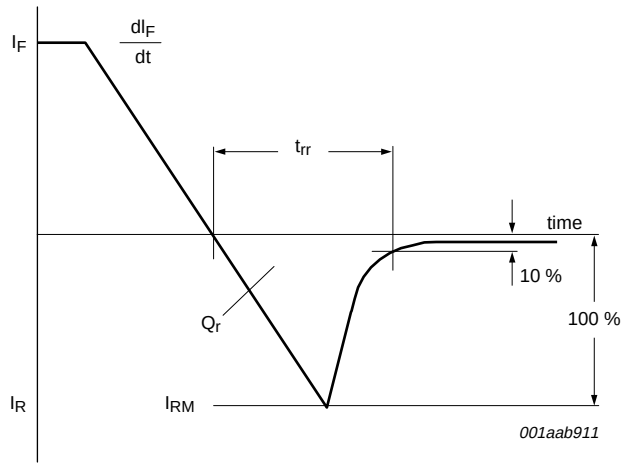


Fig 3. Reverse recovery definitions

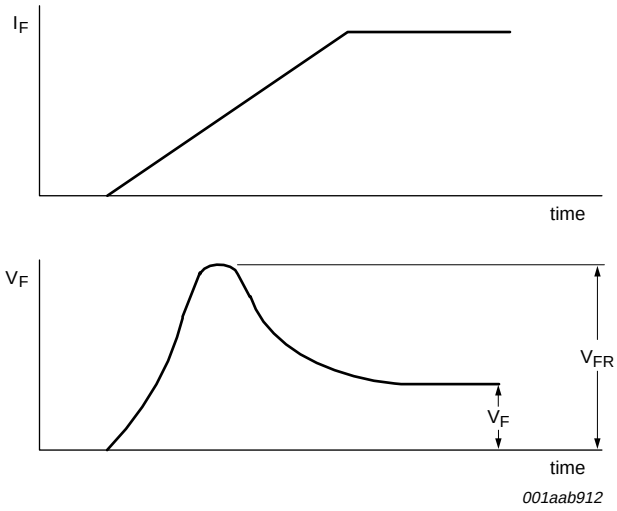
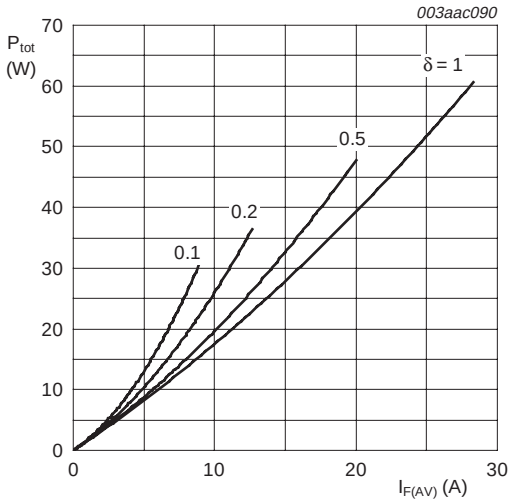
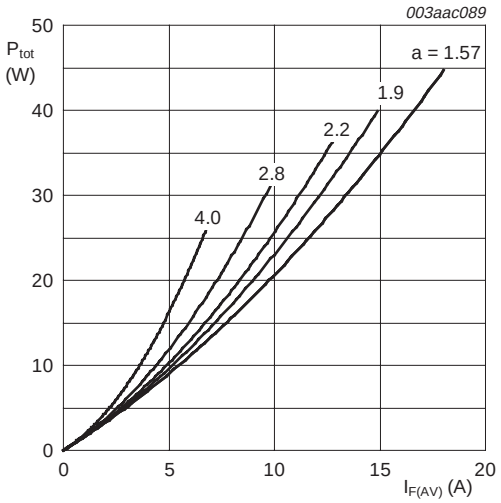


Fig 4. Forward recovery definitions



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

Fig 5. Forward power dissipation as a function of average forward current; square waveform; maximum values

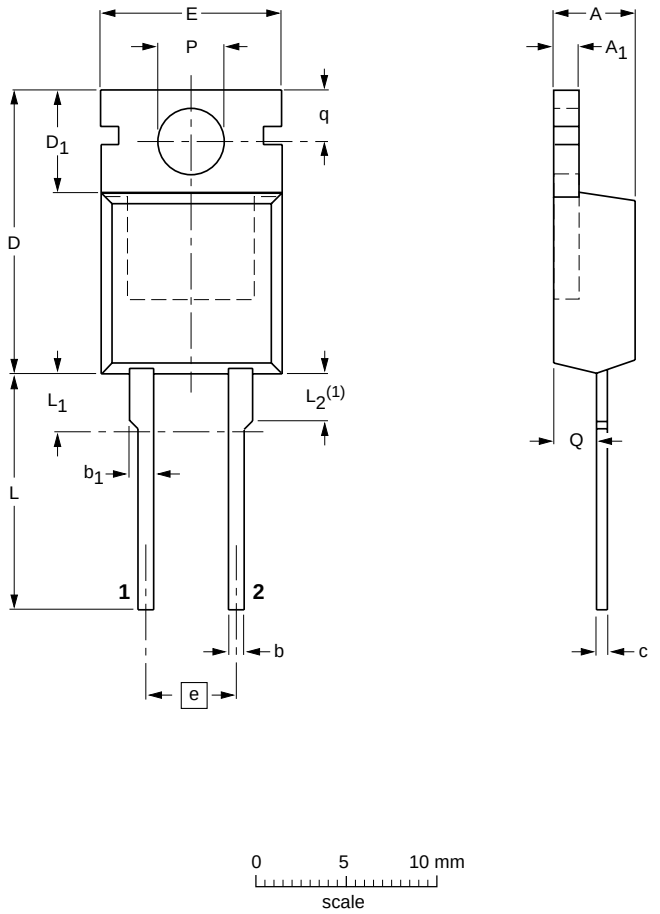


a = form factor = $I_{F(RMS)} / I_{F(AV)}$

Fig 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

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 4.1	1.39 1.27	0.9 0.7	1.3 1.0	0.7 0.4	15.8 15.2	6.4 5.9	10.3 9.7	5.08	15.0 13.5	3.30 2.79	3.0	3.8 3.6	3.0 2.7	2.6 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 (2-lead TO-220AC)

8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC20-600_1	20071128	Product data sheet	-	-

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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