

# BYV29-600

Rectifier diode ultrafast

Rev. 02 — 24 October 2007

Product data sheet

## 1. Product profile

### 1.1 General description

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

### 1.2 Features

- Fast switching
- Soft recovery characteristic
- Low forward voltage drop
- Low thermal resistance
- High thermal cycling performance

### 1.3 Applications

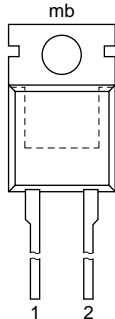

- High frequency switched-mode power supplies
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

### 1.4 Quick reference data

- $V_{RRM} \leq 600 \text{ V}$
- $V_F \leq 1.11 \text{ V}$
- $I_{F(AV)} \leq 9 \text{ A}$
- $t_{rr} \leq 60 \text{ ns}$

## 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		Version
	Name	Description	
BYV29-600	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 <sub>RRM</sub>	repetitive peak reverse voltage		-	600	V
V <sub>RWM</sub>	crest working reverse voltage		-	600	V
V <sub>R</sub>	reverse voltage	square waveform; $\delta = 1.0$ ; $T_{mb} \leq 100\text{ }^{\circ}\text{C}$	-	600	V
I <sub>F(AV)</sub>	average forward current	square waveform; $\delta = 0.5$ ; $T_{mb} \leq 120\text{ }^{\circ}\text{C}$	-	9	A
I <sub>FRM</sub>	repetitive peak forward current	square waveform; $\delta = 0.5$ ; $T_{mb} \leq 120\text{ }^{\circ}\text{C}$	-	18	A
I <sub>FSM</sub>	non-repetitive peak forward current	t = 10 ms; sinusoidal waveform	-	70	A
		t = 8.3 ms; sinusoidal waveform	-	77	A
T <sub>stg</sub>	storage temperature		-40	+150	°C
T <sub>j</sub>	junction temperature		-	150	°C

### 5. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R <sub>th(j-mb)</sub>	thermal resistance from junction to mounting base	with heatsink compound; see <a href="#">Figure 1</a>	-	-	2.5	K/W
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	-	60	-	K/W

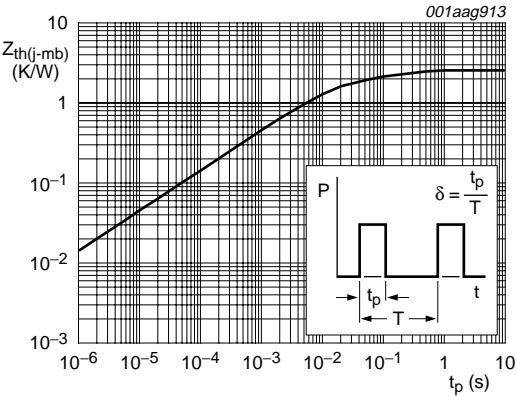
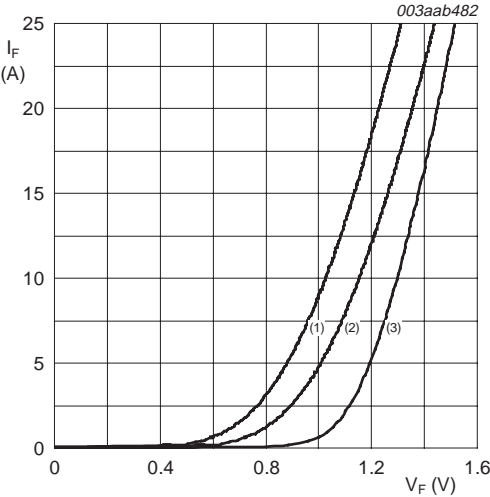


Fig 1. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 5. Characteristics  
*T<sub>j</sub> = 25 °C unless otherwise specified.*

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> = 150 °C; see <a href="#">Figure 2</a>	-	0.97	1.11	V
		I <sub>F</sub> = 8 A	-	1.12	1.25	V
		I <sub>F</sub> = 20 A; see <a href="#">Figure 2</a>	-	1.31	1.45	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V	-	2	50	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 100 °C	-	0.1	0.35	mA
Dynamic characteristics						
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 2 A to V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 20 A/μs; see <a href="#">Figure 3</a>	-	40	70	nC
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A to V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 100 A/μs; see <a href="#">Figure 3</a>	-	50	60	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 10 A to V <sub>R</sub> ≥ 30 V; dI <sub>F</sub> /dt = 50 A/μs; T <sub>j</sub> = 100 °C; see <a href="#">Figure 3</a>	-	3	5.5	A
V <sub>FR</sub>	forward recovery voltage	I <sub>F</sub> = 10 A; dI <sub>F</sub> /dt = 10 A/μs; see <a href="#">Figure 4</a>	-	3.2	-	V



- (1) T<sub>j</sub> = 150 °C; typical values
- (2) T<sub>j</sub> = 150 °C; maximum values
- (3) T<sub>j</sub> = 25 °C; maximum values

Fig 2. Forward current as a function of forward voltage

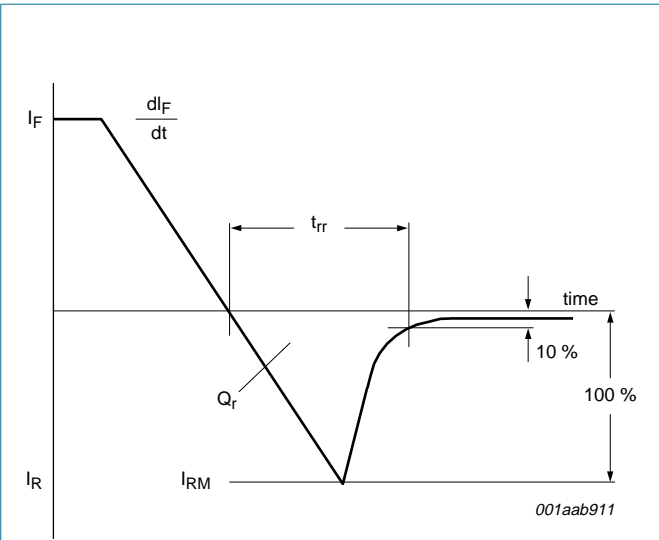


Fig 3. Reverse recovery definitions

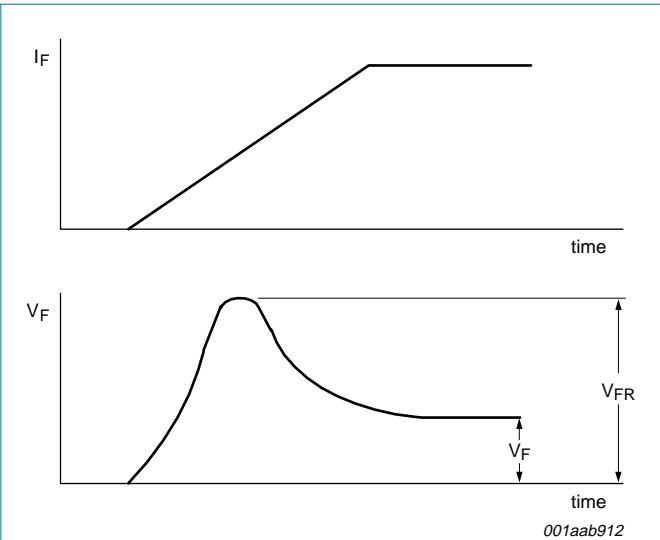
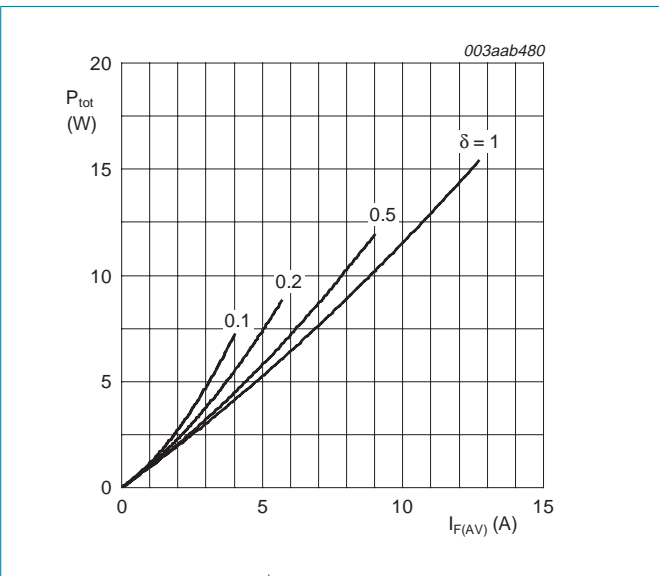
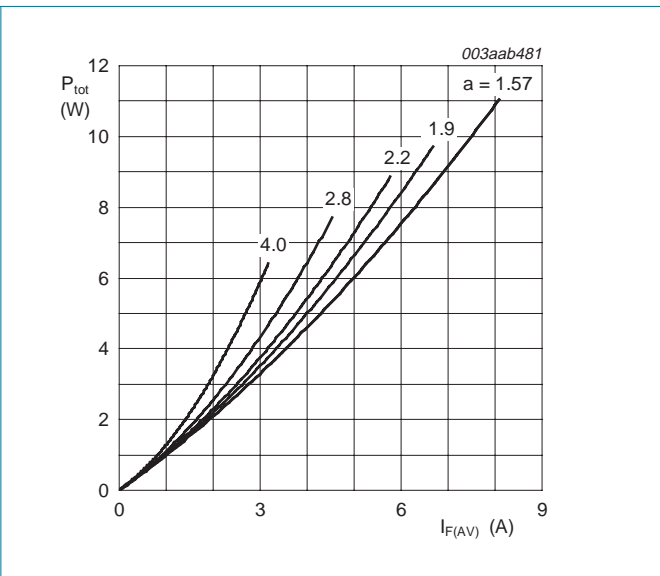


Fig 4. Forward recovery definitions



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

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



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

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

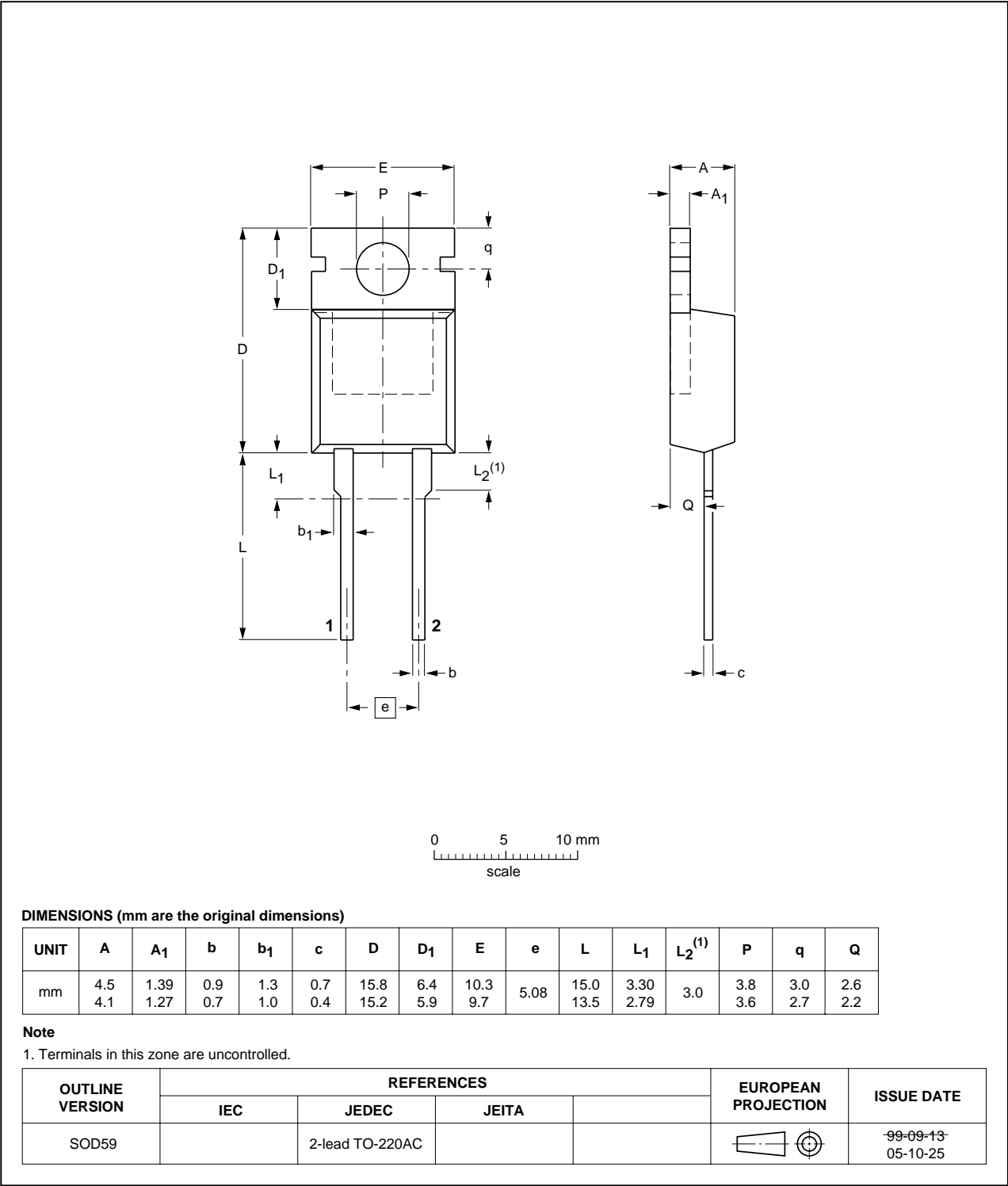


Fig 7. Package outline SOD59 (2-lead TO-220AC)

## 8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV29-600_2	20071024	Product data sheet	-	BYV29-600_1
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• <a href="#">Table 5 "Characteristics" on page 3</a>: <math>V_F</math> values updated.</li></ul>			
BYV29-600_1	20000201	Product specification	-	-

## 9. Legal information

### 9.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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".

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11. Contents

1 Product profile ..... 1

1.1 General description..... 1

1.2 Features ..... 1

1.3 Applications ..... 1

1.4 Quick reference data..... 1

2 Pinning information..... 1

3 Ordering information..... 2

4 Limiting values..... 2

5 Thermal characteristics..... 2

6 Characteristics..... 3

7 Package outline ..... 5

8 Revision history..... 6

9 Legal information..... 7

9.1 Data sheet status ..... 7

9.2 Definitions..... 7

9.3 Disclaimers..... 7

9.4 Trademarks..... 7

10 Contact information..... 7

11 Contents ..... 8



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