

## 1. General description

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

## 2. Features and benefits

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

## 3. Applications

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

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values			Unit
<b>Absolute maximum rating</b>						
$V_{RRM}$	repetitive peak reverse voltage		600			V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 120\text{ °C}$	9			A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $T_{mb} \leq 120\text{ °C}$ ; square-wave pulse	18			A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; sine-wave pulse	70			A
		$t_p = 8.3\text{ ms}$ ; sine-wave pulse	77			A
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}$ ; $T_j = 25\text{ °C}$	-	1.12	1.25	V
		$I_F = 8\text{ A}$ ; $T_j = 150\text{ °C}$ ; <a href="#">Fig. 2</a>	-	0.97	1.11	V
		$I_F = 20\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 2</a>	-	1.31	1.45	V
<b>Dynamic characteristics</b>						
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}$ ; $V_R = 30\text{ V}$ ; $di_F/dt = 100\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig. 3</a>	-	50	60	ns

## 5. Pinning information

Table 2. Pinning information

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

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYV29-600	TO-220AC	plastic single-ended package; heatsink mounted; 1 mounting hole; 2-lead TO-220AC	SOD59

## 7. Marking

Table 4. Marking codes

Type number	Marking codes
BYV29-600	BYV29-600

## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Values	Unit
$V_{RRM}$	repetitive peak reverse voltage		600	V
$V_{RWM}$	crest working reverse voltage		600	V
$V_R$	reverse voltage	$\delta = 1.0$ ; square-wave pulse; $T_{mb} \leq 100\text{ °C}$	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; square-wave pulse; $T_{mb} \leq 120\text{ °C}$	9	A
$I_{FRM}$	repetitive peak forward current	$\delta = 0.5$ ; $T_{mb} \leq 120\text{ °C}$ ; square-wave pulse	18	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; sine-wave pulse	70	A
		$t_p = 8.3\text{ ms}$ ; sine-wave pulse	77	A
$T_{stg}$	storage temperature		-40 to 150	°C
$T_j$	junction temperature		150	°C

## 9. Thermal characteristics

Table 6. Thermal characteristics

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

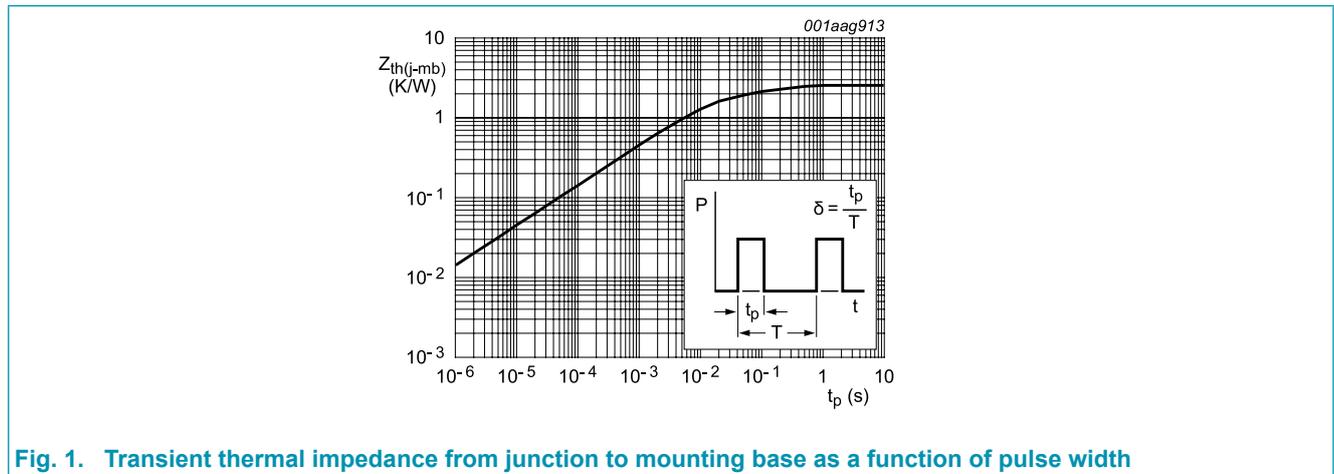
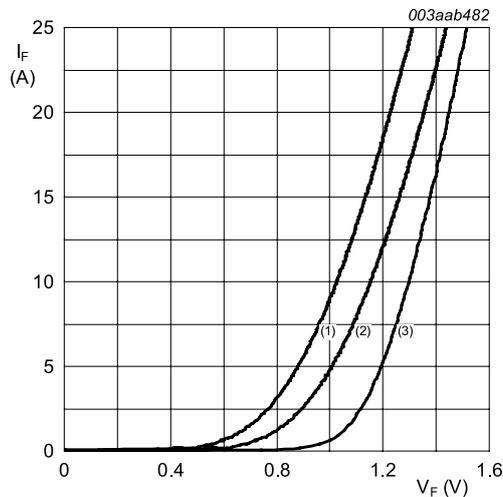


Fig. 1. Transient thermal impedance from junction to mounting base as a function of pulse width

## 10. Characteristics

**Table 7. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 20\text{ A}; T_j = 25\text{ }^\circ\text{C}; \text{ Fig. 2}$	-	1.31	1.45	V
		$I_F = 8\text{ A}; T_j = 25\text{ }^\circ\text{C}$	-	1.12	1.25	V
		$I_F = 8\text{ A}; T_j = 150\text{ }^\circ\text{C}; \text{ Fig. 2}$	-	0.97	1.11	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	2	50	$\mu\text{A}$
		$V_R = 600\text{ V}; T_j = 100\text{ }^\circ\text{C}$	-	0.1	0.35	mA
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 2\text{ A}; V_R = 30\text{ V}; dI_F/dt = 20\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}; \text{ Fig. 3}$	-	40	70	nC
$t_{rr}$	reverse recovery time	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}; \text{ Fig. 3}$	-	50	60	ns
$I_{RM}$	peak reverse recovery current	$I_F = 10\text{ A}; V_R = 30\text{ V}; dI_F/dt = 50\text{ A}/\mu\text{s}; T_j = 100\text{ }^\circ\text{C}; \text{ Fig. 3}$	-	3	5.5	A
$V_{FR}$	forward recovery voltage	$I_F = 10\text{ A}; dI_F/dt = 10\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}; \text{ Fig. 4}$	-	3.2	-	V



- (1)  $T_j = 150\text{ }^\circ\text{C}$ ; typical values
- (2)  $T_j = 150\text{ }^\circ\text{C}$ ; maximum values
- (3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values

**Fig. 2. Forward current as a function of forward voltage**

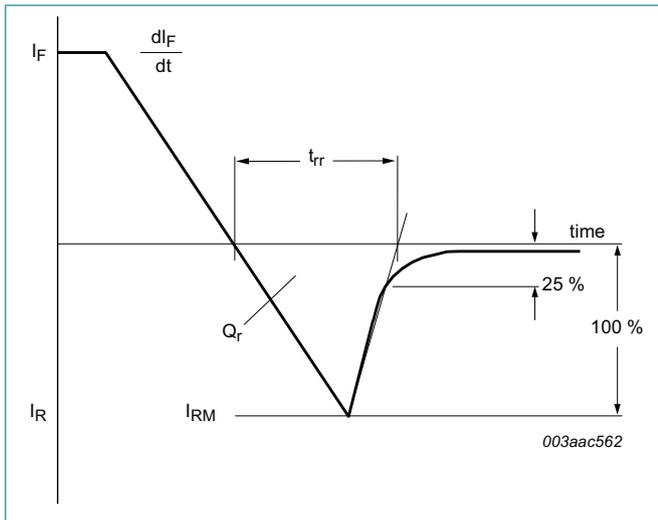


Fig. 3. Reverse recovery definitions; ramp recovery

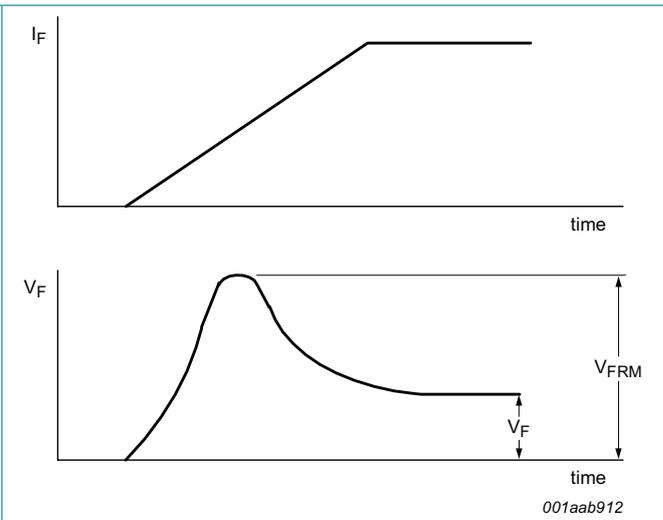
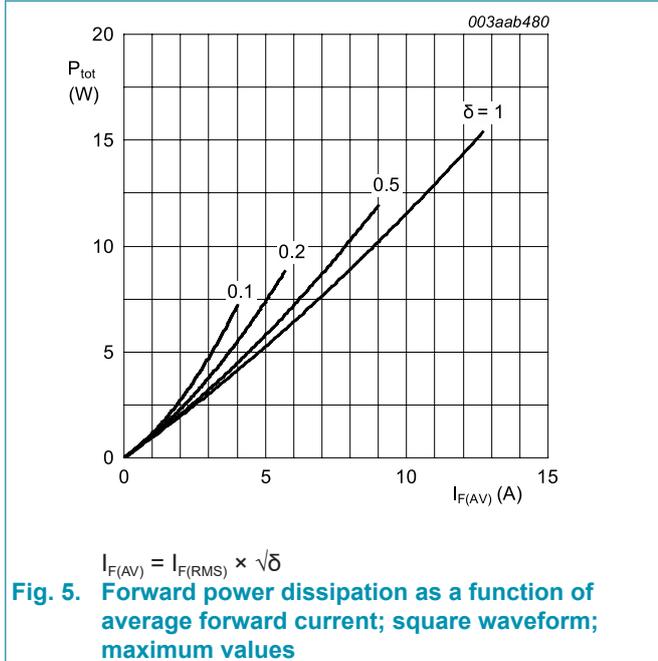
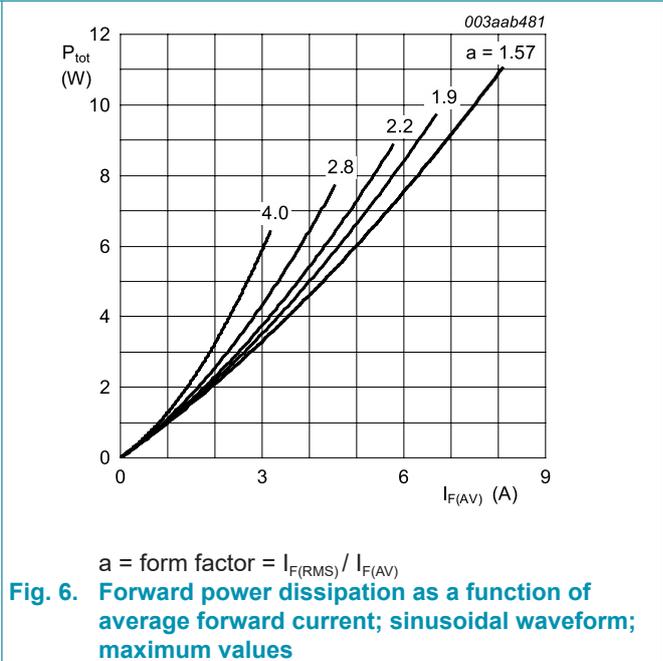


Fig. 4. Forward recovery definitions



$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$   
 Fig. 5. Forward power dissipation as a function of average forward current; square waveform; maximum values

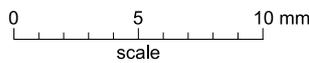
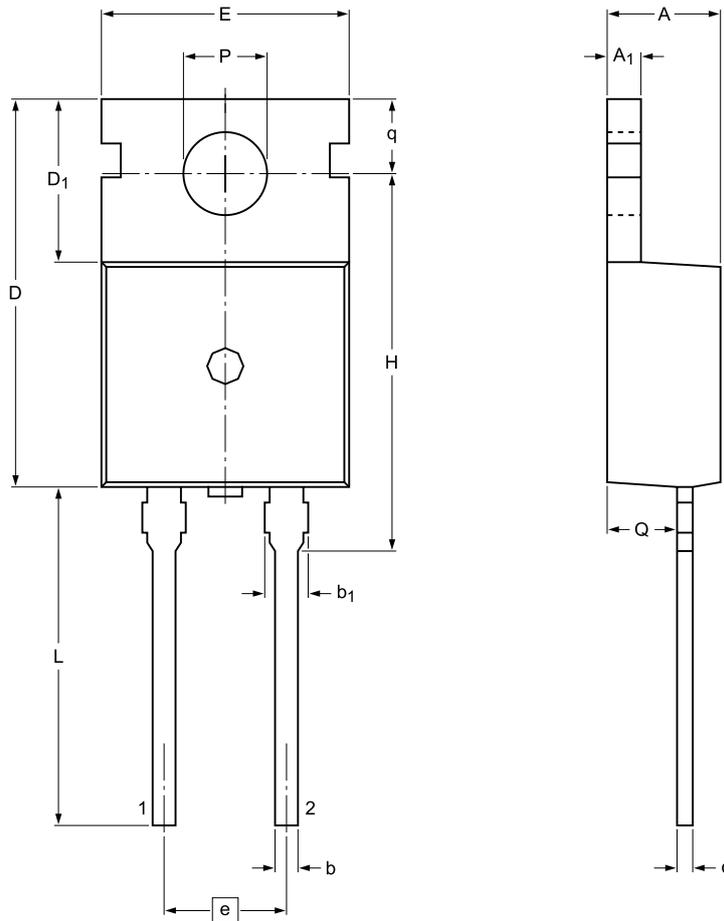


$a = \text{form factor} = I_{F(RMS)} / I_{F(AV)}$   
 Fig. 6. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

### 11. Package outline

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

SOD59



Dimensions

Unit	A	A <sub>1</sub>	b	b <sub>1</sub> (1)	c	D	D <sub>1</sub>	E	e	H	L	P	Q	q
max	4.7	1.40	0.95	1.7	0.65	15.8	6.8	10.30	5.08	16.25	15.0	3.80	2.6	2.9
nom									(REF)					
min	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

Note

1. Protruded dambar are included in the dimension.

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

## 12. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC29-600 v.3	20180307	Product data sheet	-	BYV29-600_2
Modifications:	Change from NXP version to WeEn version			
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>: VF values updated.</li> </ul>			
BYV29-600_1	20000201	Product specification	-	-

## 13. Legal information

### 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.

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