



# BYV29FX-600

Enhanced ultrafast power diode

Rev. 5 — 16 April 2012

Product data sheet

## 1. Product profile

### 1.1 General description

Enhanced ultrafast power diode in a SOD113 (2-lead TO-220F) plastic package.

### 1.2 Features and benefits

- High thermal cycling performance
- Isolated package
- Low on-state losses
- Low thermal resistance
- Soft recovery characteristic

### 1.3 Applications

- Dual Mode (DCM and CCM) PFC
- Power Factor Correction (PFC) for Interleaved Topology

### 1.4 Quick reference data

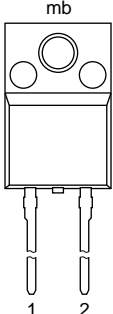

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_h \leq 72$ °C; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	-	9	A
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8$ A; $T_j = 25$ °C; see <a href="#">Figure 5</a>	-	1.45	1.9	V
		$I_F = 8$ A; $T_j = 150$ °C; see <a href="#">Figure 5</a>	-	1.25	1.7	V



## 2. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		 001aaa020
2	A	anode		
mb	n.c.	mounting base; isolated		

**SOD113 (TO-220F)**

## 3. Ordering information

**Table 3. Ordering information**

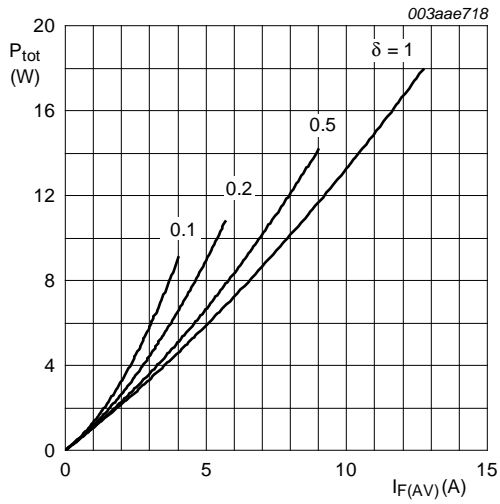
Type number	Package		
	Name	Description	Version
BYV29FX-600	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

## 4. Limiting values

**Table 4. Limiting values**

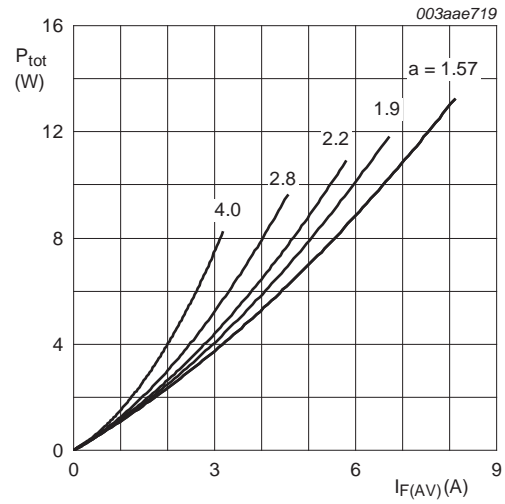
*In accordance with the Absolute Maximum Rating System (IEC 60134).*

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	600	V
$V_{RWM}$	crest working reverse voltage		-	600	V
$V_R$	reverse voltage	DC	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; $\delta = 0.5$ ; $T_h \leq 72\text{ °C}$ ; see <a href="#">Figure 1</a> ; see <a href="#">Figure 2</a>	-	9	A
$I_{FRM}$	repetitive peak forward current	square-wave pulse; $\delta = 0.5$ ; $t_p = 25\text{ }\mu\text{s}$ ; $T_h \leq 72\text{ °C}$	-	18	A
$I_{FSM}$	non-repetitive peak forward current	sine-wave pulse; $t_p = 10\text{ ms}$ ; $T_{j(init)} = 25\text{ °C}$ ; see <a href="#">Figure 3</a>	-	91	A
		sine-wave pulse; $t_p = 8.3\text{ ms}$ ; $T_{j(init)} = 25\text{ °C}$ ; see <a href="#">Figure 3</a>	-	100	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

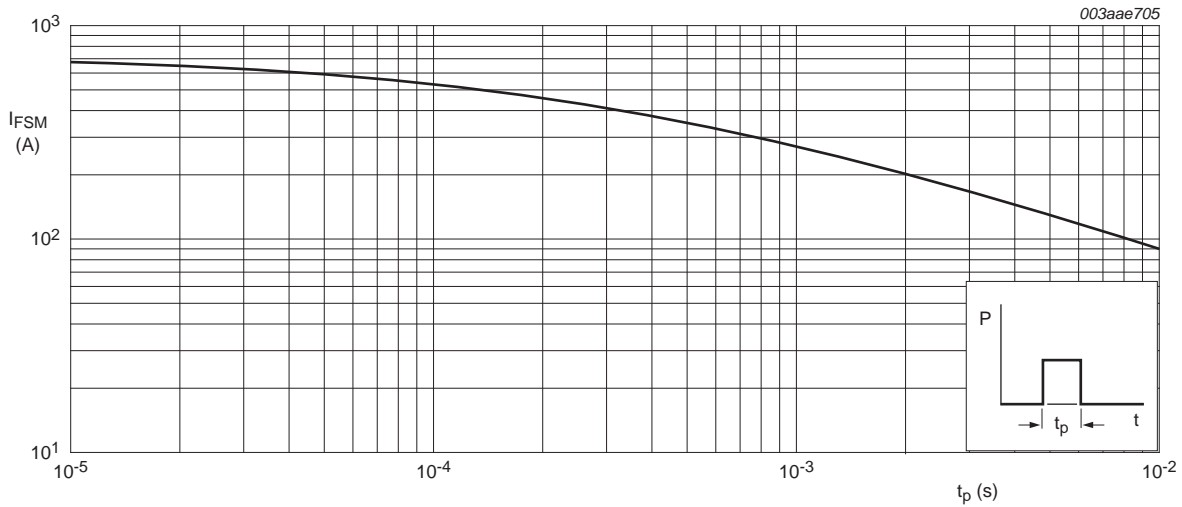
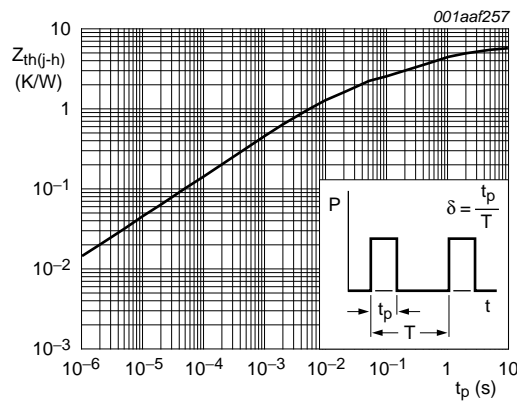


Fig 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

## 5. Thermal characteristics

**Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound ; see <a href="#">Figure 4</a>	-	-	5.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	55	-	K/W



**Fig 4. Transient thermal impedance from junction to heatsink as a function of pulse width**

## 6. Isolation characteristics

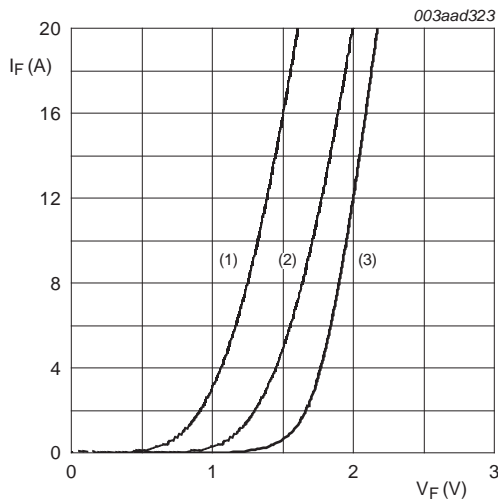
**Table 6. Isolation characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	$50 \text{ Hz} \leq f \leq 60 \text{ Hz}$ ; $RH \leq 65 \%$ ; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
$C_{isol}$	isolation capacitance	$f = 1 \text{ MHz}$ ; from cathode to external heatsink	-	10	-	pF

## 7. Characteristics

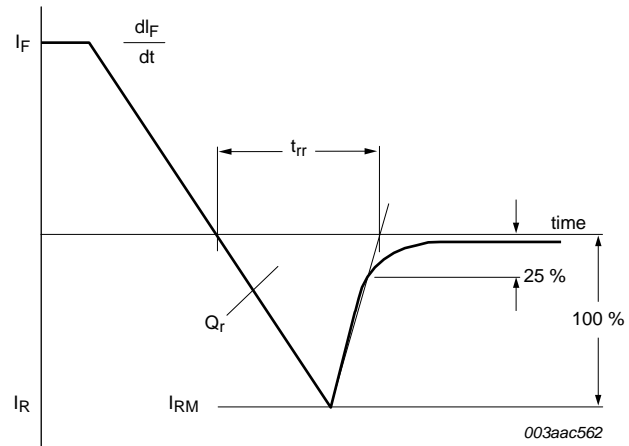
**Table 7. Characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 8\text{ A}; T_j = 25\text{ °C};$ see <a href="#">Figure 5</a>	-	1.45	1.9	V
		$I_F = 8\text{ A}; T_j = 150\text{ °C};$ see <a href="#">Figure 5</a>	-	1.25	1.7	V
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 25\text{ °C}$	-	-	50	$\mu\text{A}$
		$V_R = 600\text{ V}; T_j = 100\text{ °C}$	-	-	1.5	mA
<b>Dynamic characteristics</b>						
$Q_r$	recovered charge	$I_F = 1\text{ A}; V_R = 30\text{ V}; dI_F/dt = 100\text{ A/s};$ $T_j = 25\text{ °C};$ see <a href="#">Figure 6</a>	-	13	-	nC
$t_{rr}$	reverse recovery time	$T_j = 25\text{ °C};$ see <a href="#">Figure 6</a>	-	17.5	35	ns
$I_{RM}$	peak reverse recovery current		-	1.5	-	A
$V_{FRM}$	forward recovery voltage	$I_F = 1\text{ A}; dI_F/dt = 100\text{ A/s}; T_j = 25\text{ °C};$ see <a href="#">Figure 7</a>	-	3.2	-	V



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

**Fig 5. Forward current as a function of forward voltage**



**Fig 6. Reverse recovery definitions; ramp recovery**

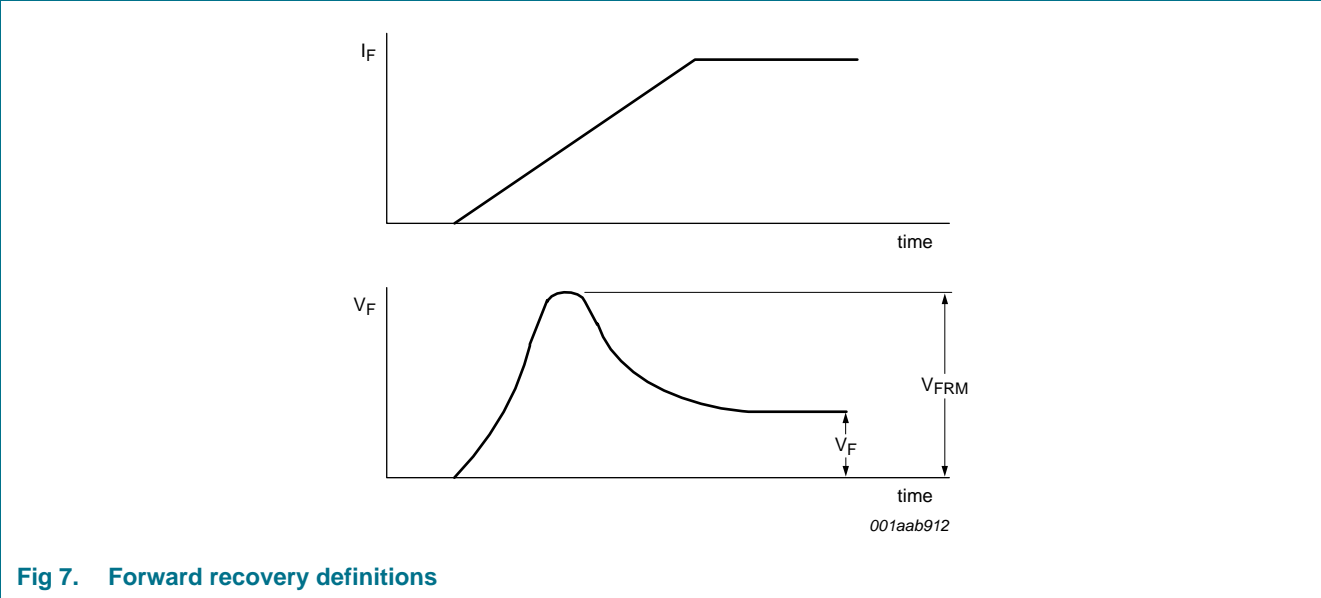


Fig 7. Forward recovery definitions

8. Package outline

Plastic single-ended package; isolated heatsink mounted;  
1 mounting hole; 2-lead TO-220 'full pack'

SOD113

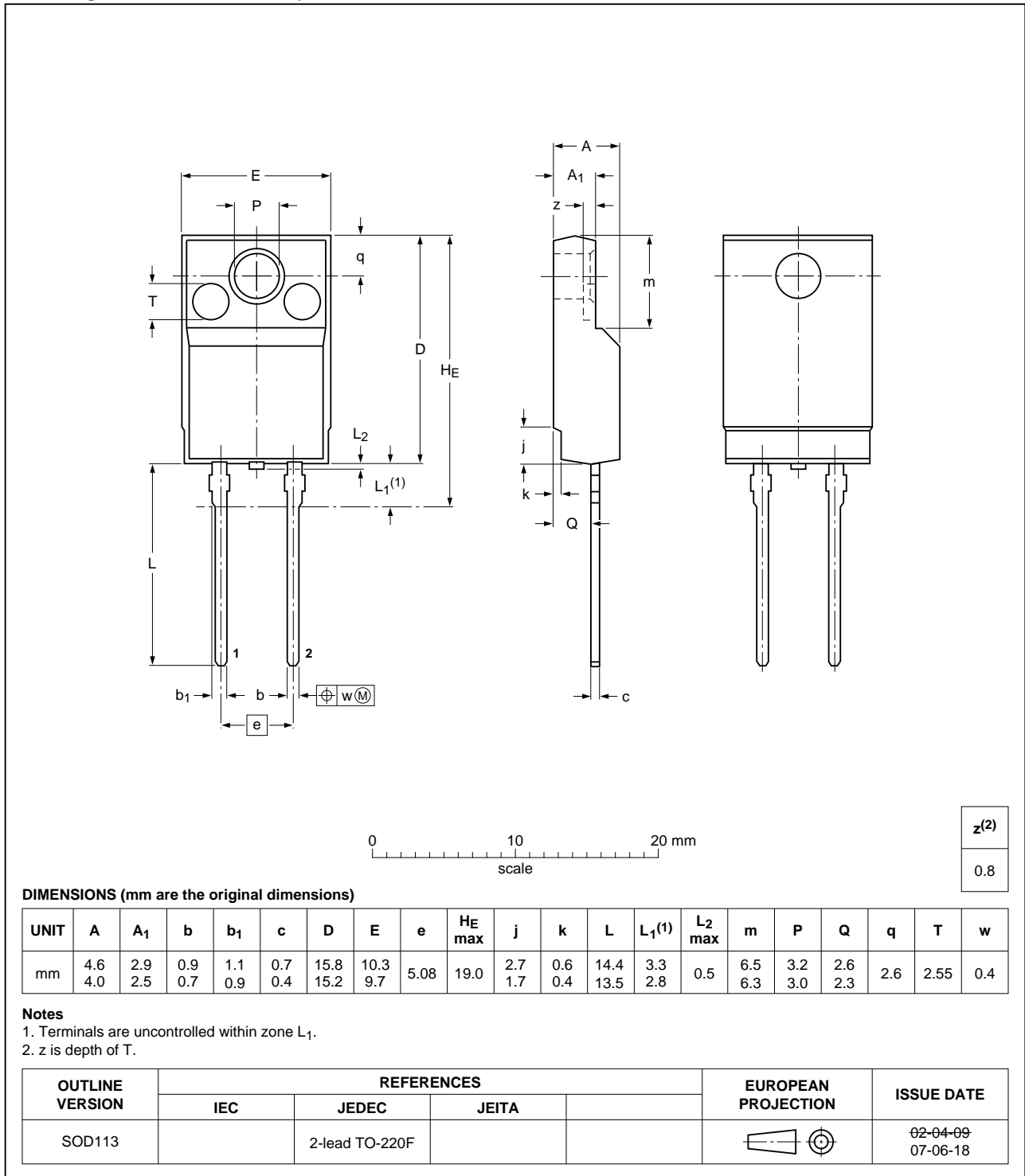


Fig 8. Package outline SOD113 (TO-220F)

## 9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYV29FX-600 v.5	20120416	Product data sheet	-	BYV29FX-600 v.4
Modifications:	• Various changes to content.			
BYV29FX-600 v.4	20110307	Product data sheet	-	BYV29FX-600 v.3



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### 10.1 Data sheet status

Document status <sup>[1]</sup> [2]	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.

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

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