**Product data sheet** 

## 1. General description

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

## 2. Features and benefits

- Fast switching
- Isolated plastic package
- · Low forward voltage drop
- Soft recovery characteristic

## 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		Min	Тур	Max	Unit
$V_R$	reverse voltage	DC		-	-	800	V
I <sub>F(AV)</sub>	average forward current	$δ = 0.5 ; T_h \le 73 °C; SQW; Fig. 1;$ Fig. 2; Fig. 3	[1]	-	-	8	А
I <sub>FRM</sub>	repetitive peak forward current	$\delta = 0.5 \; ; t_p = 25 \; \mu s; T_h \le 73 \; ^{\circ}C; \; SQW$		-	-	16	А
I <sub>FSM</sub>	non-repetitive peak	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; SIN		-	-	60	Α
	forward current	$t_p$ = 8.3 ms; $T_{j(init)}$ = 25 °C; SIN		-	-	66	Α
Static charac	teristics						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 8 A; T <sub>j</sub> = 150 °C; <u>Fig. 5</u>		-	1.07	1.5	V
		I <sub>F</sub> = 20 A; T <sub>j</sub> = 25 °C; <u>Fig. 5</u>		-	1.75	1.95	V
		I <sub>F</sub> = 8 A; T <sub>j</sub> = 25 °C		-	-	1.7	V
Dynamic cha	racteristics			'		'	
t <sub>rr</sub>	reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $dI_F/dt = 100 \text{ A/µs}$ ; $T_j = 25 \text{ °C}$ ; Fig. 6; Fig. 7		-	60	75	ns

<sup>[1]</sup> Neglecting switching and reverse current losses

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# **5. Pinning information**

### **Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	mb	K — A
2	А	anode		001aaa020
mb	n.c.	mounting base; isolated	TO-220F (SOD113)	

# 6. Ordering information

### **Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
BYR29X-800	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

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## 7. 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			-	800	V
$V_{RWM}$	crest working reverse voltage			-	800	V
V <sub>R</sub>	reverse voltage	DC		-	800	V
I <sub>F(AV)</sub>	average forward current	$\delta$ = 0.5 ; T <sub>h</sub> $\leq$ 73 °C; SQW; <u>Fig. 1</u> ; <u>Fig. 2</u> ; <u>Fig. 3</u>	[1]	-	8	Α
I <sub>FRM</sub>	repetitive peak forward current	$δ = 0.5 ; t_p = 25 \mu s; T_h \le 73 °C; SQW$		-	16	А
I <sub>FSM</sub>	non-repetitive peak	$t_p$ = 10 ms; $T_{j(init)}$ = 25 °C; SIN		-	60	Α
	forward current	$t_p$ = 8.3 ms; $T_{j(init)}$ = 25 °C; SIN		-	66	Α
T <sub>stg</sub>	storage temperature			-40	150	°C
T <sub>i</sub>	junction temperature			-	150	°C

#### [1] Neglecting switching and reverse current losses

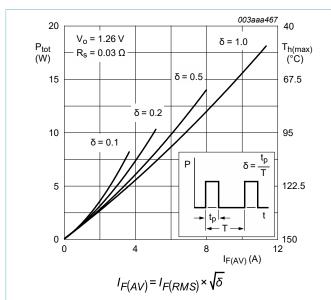


Fig. 1. Forward power dissipation and permissible heatsink temperature as a function of average forward current; square waveform; maximum values

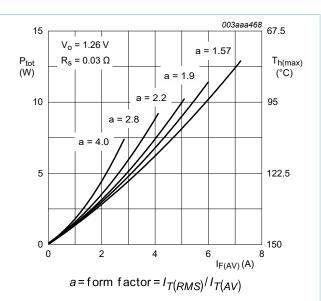
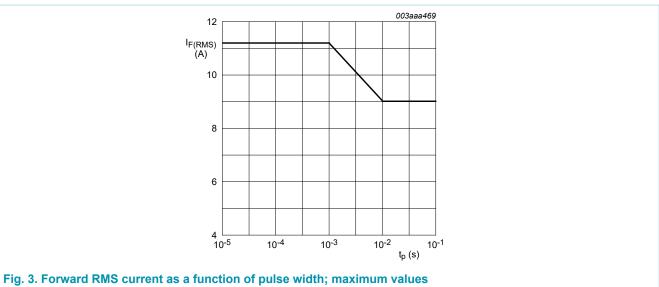


Fig. 2. Forward power dissipation and permissible heatsink temperature as a function of average forward current; sinusoidal waveform; maximum values

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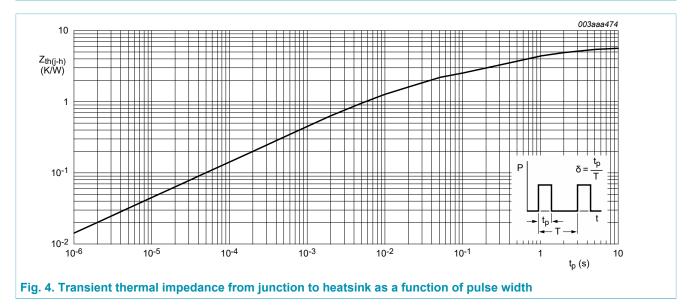


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## 8. Thermal characteristics

#### **Table 5. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
R <sub>th(j-h)</sub>	thermal resistance from junction to heatsink	with heatsink compound; Fig. 4	-	-	5.5	K/W
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient free air	in free air	-	55	-	K/W



## 9. Isolation characteristics

### **Table 6. Isolation characteristics**

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>isol(RMS)</sub>	RMS isolation voltage	50 Hz ≤ f ≤ 60 Hz; RH ≤ 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free	-	-	2500	V
C <sub>isol</sub>	isolation capacitance	from cathode to external heatsink	-	10	-	pF

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## 10. Characteristics

**Table 7. Characteristics** 

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Static charac	cteristics					
$V_{F}$	forward voltage	I <sub>F</sub> = 8 A; T <sub>j</sub> = 150 °C; <u>Fig. 5</u>	-	1.07	1.5	V
		I <sub>F</sub> = 20 A; T <sub>j</sub> = 25 °C; <u>Fig. 5</u>	-	1.75	1.95	V
		I <sub>F</sub> = 8 A; T <sub>j</sub> = 25 °C	-	-	1.7	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 800 V; T <sub>j</sub> = 25 °C	-	1	10	μA
		V <sub>R</sub> = 800 V; T <sub>j</sub> = 100 °C	-	0.1	0.2	mA
Dynamic cha	racteristics					
t <sub>rr</sub>	reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $dI_F/dt = 100 \text{ A/}\mu\text{s}$ ; $T_j = 25 \text{ °C}$ ; Fig. 6; Fig. 7	-	60	75	ns
I <sub>RM</sub>	peak reverse recovery current	$I_F = 10 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 50 \text{ A/}\mu\text{s};$ $T_j = 100 \text{ °C}; \underline{\text{Fig. 6}}; \underline{\text{Fig. 8}}$	-	-	6	Α
Q <sub>r</sub>	recovered charge	$I_F = 2 \text{ A}$ ; $V_R = 30 \text{ V}$ ; $dI_F/dt = 20 \text{ A/s}$ ; $T_j = 25 \text{ °C}$ ; Fig. 9; Fig. 6	-	150	200	nC
$V_{FR}$	forward recovery voltage	$I_F = 10 \text{ A}$ ; $dI_F/dt = 10 \text{ A/}\mu\text{s}$ ; $T_j = 25 \text{ °C}$ ; Fig. 10	-	5	-	V

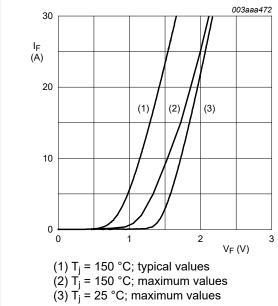


Fig. 5. Forward current as a function of forward voltage

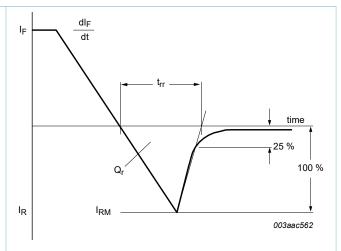


Fig. 6. Reverse recovery definitions; ramp recovery

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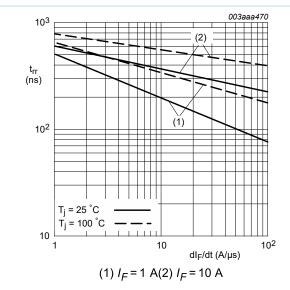


Fig. 7. Reverse recovery time as a function of rate of change of forward current at indicated temperatures; maximum values

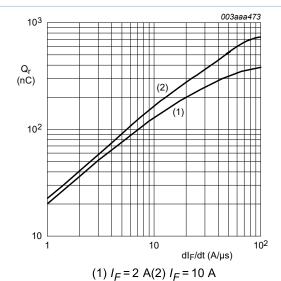


Fig. 9. Recovered charge as a function of rate of change of forward current

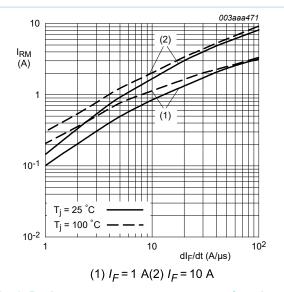


Fig. 8. Peak reverse recovery current as a function of rate of change of forward current at indicated temperatures

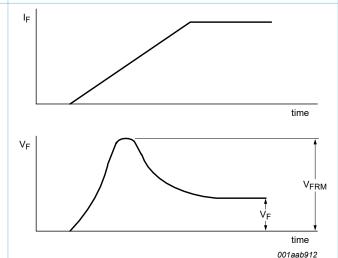
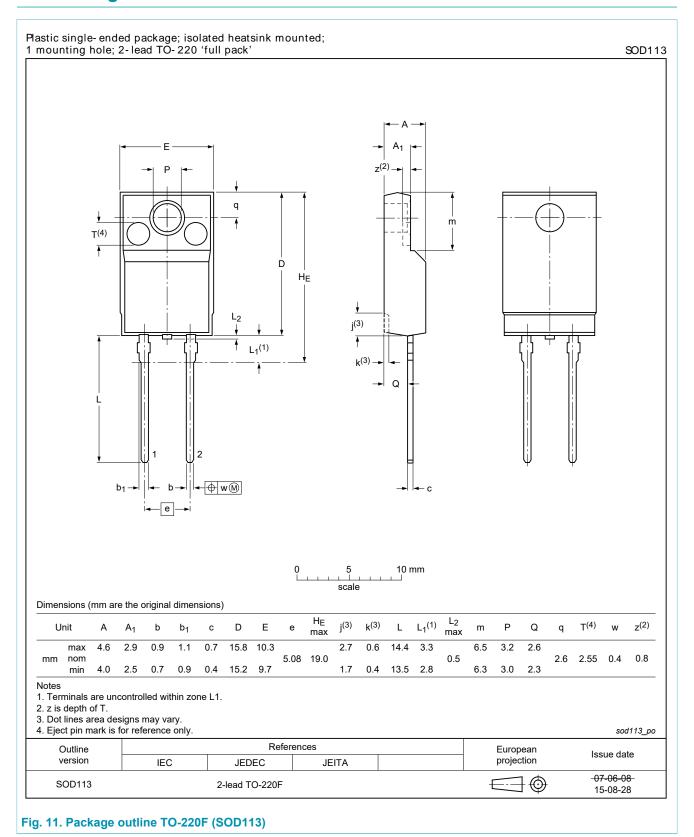


Fig. 10. Forward recovery definitions

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## 11. Package outline



**Product data sheet** 

#### **Ultrafast power diode**

## 12. 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.
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