

## 1. General description

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

## 2. Features and benefits

- Low on-state loss
- Ultra low leakage
- Low switching loss
- Fast switching
- Soft recovery characteristic
- High thermal cycling performance
- Low thermal resistance

## 3. Applications

- Home appliance power supply
- Discontinuous Current Mode (DCM) Power Factor Correction (PFC)

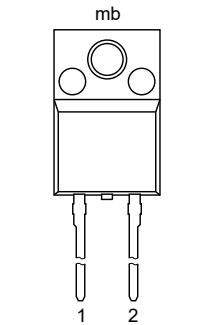
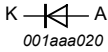
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V <sub>RRM</sub>	repetitive peak reverse voltage			-	-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>h</sub> ≤ 71 °C; square-wave; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		-	-	15	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>h</sub> ≤ 71 °C; square-wave		-	-	30	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sinusoidal waveform; <a href="#">Fig. 4</a>		-	-	150	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sinusoidal waveform		-	-	165	A
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.1	1.38	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 125 °C; <a href="#">Fig. 6</a>		-	0.96	1.25	V
Dynamic characteristics							
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	50	60	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>TO-220F (SOD113)</p>	
2	A	anode		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BYT79X-600P	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

7. Marking

Table 4. Marking codes

Type number	Marking code
BYT79X-600P	BYT79X-600P

8. Limiting values

Table 5. 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-wave; δ = 1.0		-	600	V
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; T <sub>h</sub> ≤ 71 °C; square-wave; Fig. 1; Fig. 2; Fig. 3		-	15	A
I <sub>FRM</sub>	repetitive peak forward current	δ = 0.5 ; t <sub>p</sub> = 25 μs; T <sub>h</sub> ≤ 71 °C; square-wave		-	30	A
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 10 ms; T <sub>j(init)</sub> = 25 °C; sinusoidal waveform; Fig. 4		-	150	A
		t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C; sinusoidal waveform		-	165	A
T <sub>stg</sub>	storage temperature			-65	175	°C
T <sub>j</sub>	junction temperature			-	175	°C

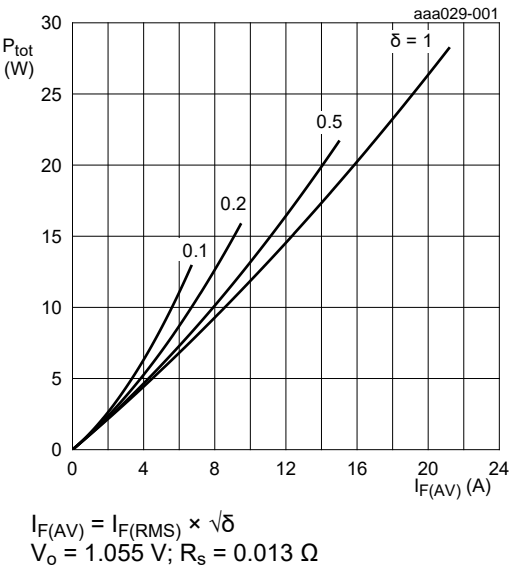


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; maximum values

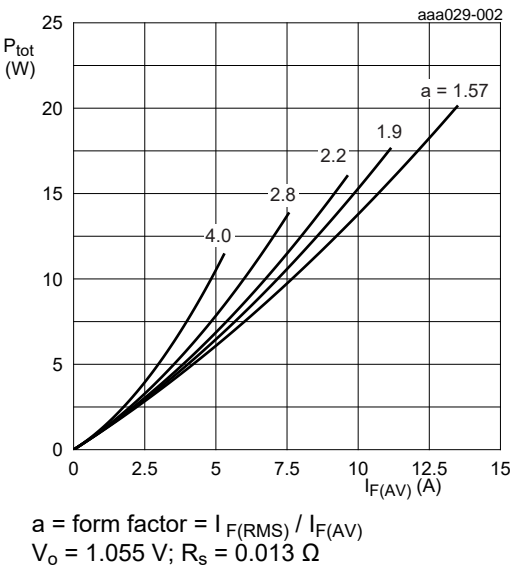


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; maximum values

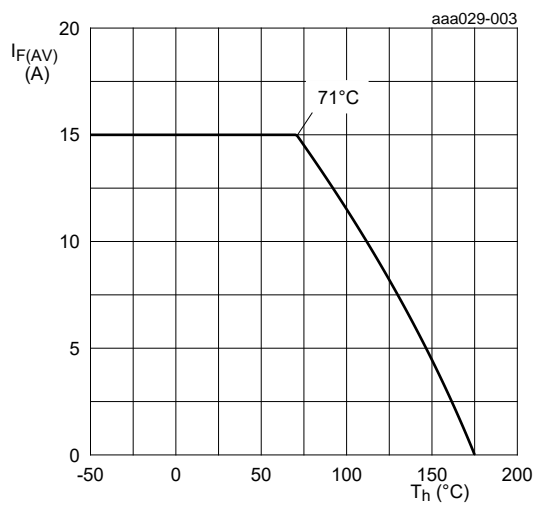


Fig. 3. Forward current as a function of heatsink temperature; maximum values

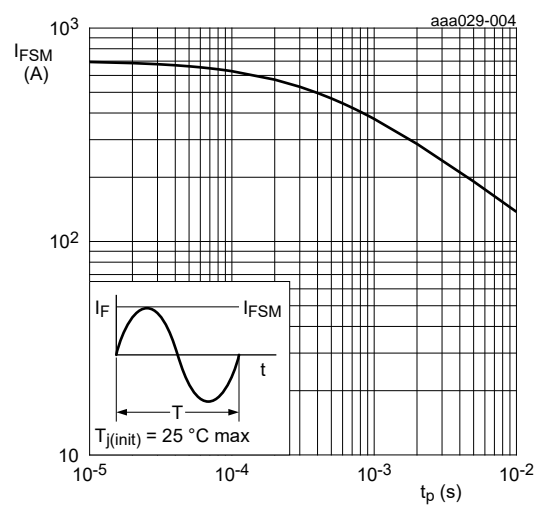
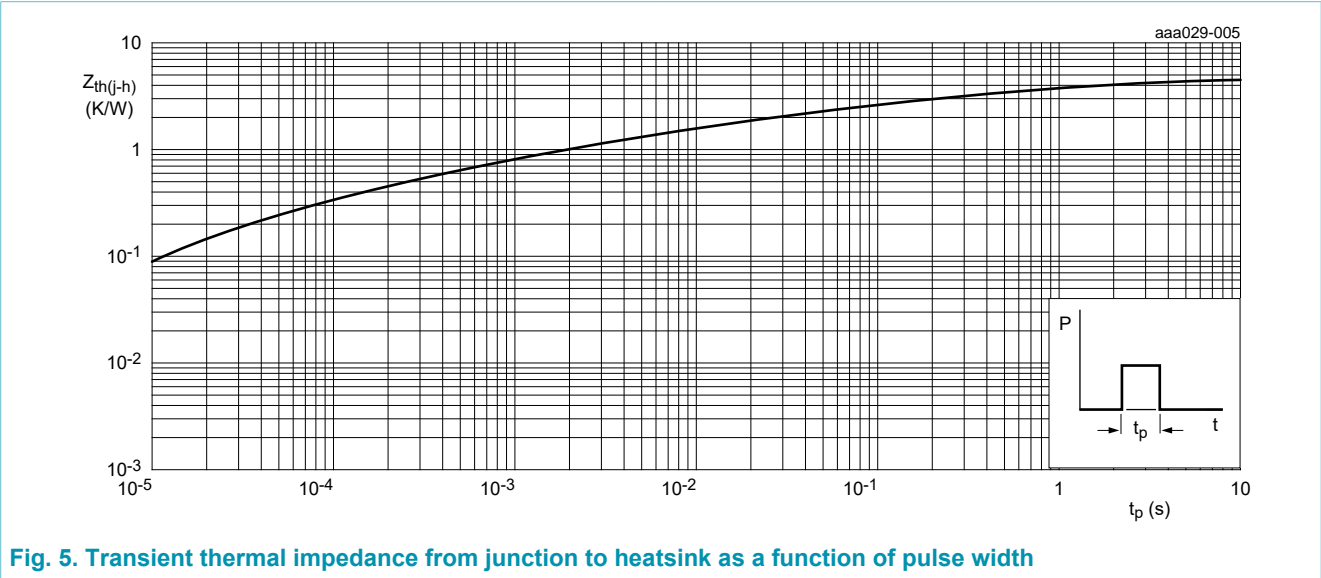


Fig. 4. Non-repetitive peak forward current as a function of pulse width; sinusoidal waveform; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; Fig. 5	-	-	4.8	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	55	-	K/W



10. Isolation characteristics

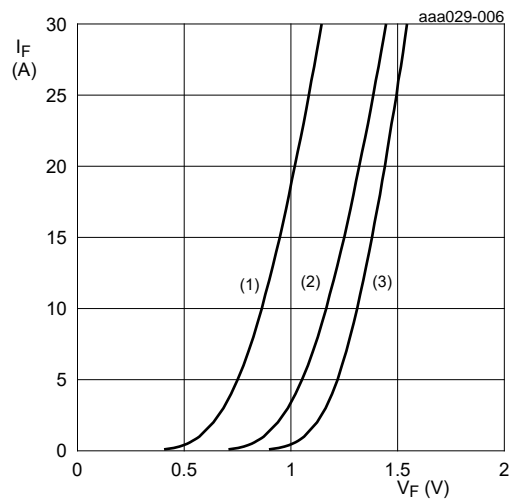
Table 7. Isolation characteristics

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

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 15 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 6</a>		-	1.1	1.38	V
		I <sub>F</sub> = 15 A; T <sub>j</sub> = 125 °C; <a href="#">Fig. 6</a>		-	0.96	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 600 V; T <sub>j</sub> = 25 °C		-	1	10	μA
		V <sub>R</sub> = 600 V; T <sub>j</sub> = 125 °C		-	80	200	μA
Dynamic characteristics							
Q <sub>r</sub>	recovered charge	I <sub>F</sub> = 2 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 20 A/μs; <a href="#">Fig. 7</a>		-	60	110	nC
		I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a>		-	60	-	nC
t <sub>rr</sub>	reverse recovery time			-	50	60	ns
I <sub>RM</sub>	peak reverse recovery current	I <sub>F</sub> = 1 A; V <sub>R</sub> = 30 V; dI <sub>F</sub> /dt = 100 A/μs; T <sub>j</sub> = 100 °C		-	3	-	A



V<sub>o</sub> = 1.055 V; R<sub>s</sub> = 0.013 Ω  
(1) T<sub>j</sub> = 125 °C; typical values  
(2) T<sub>j</sub> = 125 °C; maximum values  
(3) T<sub>j</sub> = 25 °C; maximum values

Fig. 6. Forward current as a function of forward voltage

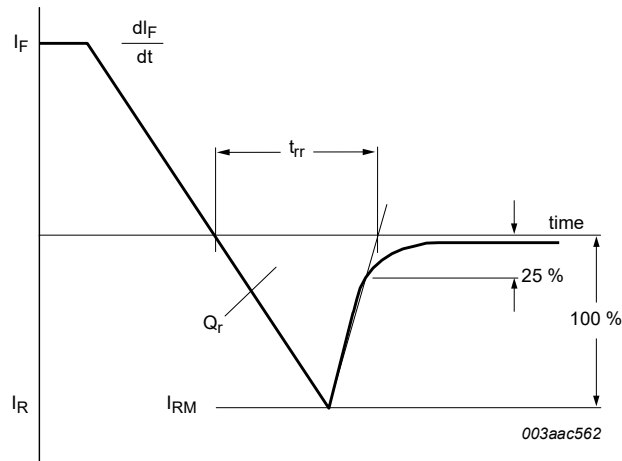


Fig. 7. Reverse recovery definitions; ramp recovery

12. Package outline

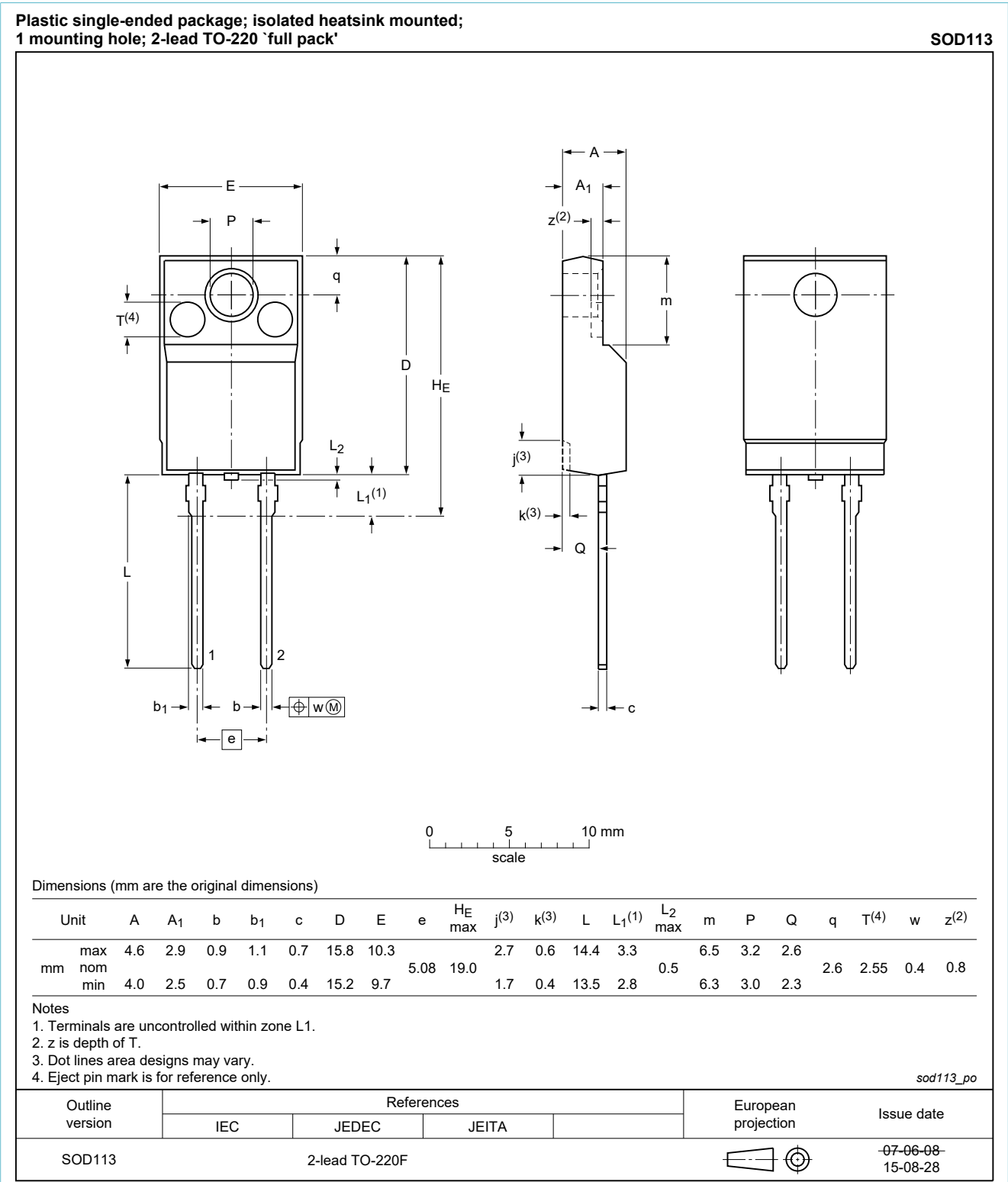


Fig. 8. Package outline TO-220F (SOD113)

## 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.
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14. Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 5

10. Isolation characteristics.....5

11. Characteristics.....6

12. Package outline..... 7

13. Legal information..... 8

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