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BYT79X-600

Rectifier diode ultrafast

27 May 2015

Product data sheet

1. General description

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

2. Features and benefits

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

3. Application information

- Output rectifiers in high frequency switched-mode power supplies
- 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_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_h \leq 49$ °C; Square-wave; Fig. 1 ; Fig. 2	-	-	15	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25$ μ s; $T_h \leq 49$ °C; Square-wave	-	-	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3$ ms; $T_{j(init)} = 25$ °C; sinusoidal waveform	-	-	143	A
		$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sinusoidal waveform	-	-	130	A
Static characteristics						
V_F	forward voltage	$I_F = 15$ A; $T_j = 25$ °C; Fig. 4	-	1.16	1.38	V
		$I_F = 15$ A; $T_j = 150$ °C	-	1.01	1.2	V



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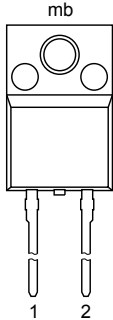
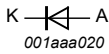
BYT79X-600

Rectifier diode ultrafast

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic characteristics						
t_{rr}	reverse recovery time	$I_F = 1\text{ A}$; $V_R \geq 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 5	-	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

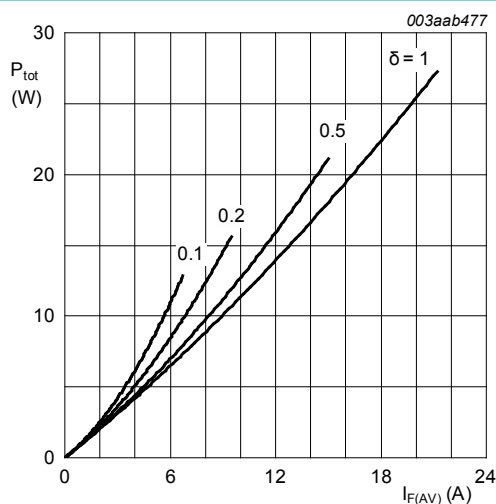
Type number	Package		
	Name	Description	Version
BYT79X-600	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

7. Limiting values

Table 4. Limiting values

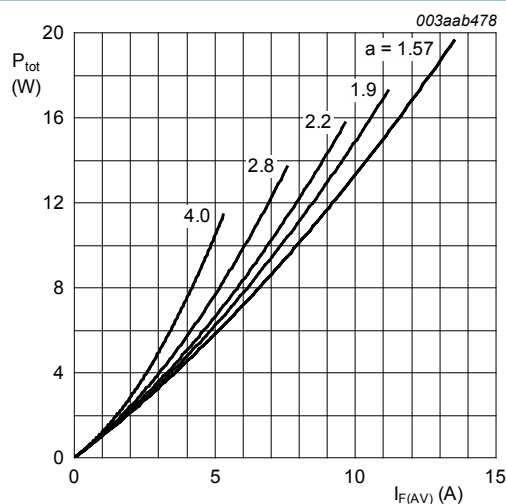
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	600	V
V_{RWM}	crest working reverse voltage		-	600	V
V_R	reverse voltage	Square-wave; $\delta = 1.0$	-	600	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $T_h \leq 49\text{ }^\circ\text{C}$; Square-wave; Fig. 1 ; Fig. 2	-	15	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; $t_p = 25\text{ }\mu\text{s}$; $T_h \leq 49\text{ }^\circ\text{C}$; Square-wave	-	30	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sinusoidal waveform	-	143	A
		$t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; sinusoidal waveform	-	130	A
T_{stg}	storage temperature		-55	150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$



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

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



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

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

8. 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; Fig. 3	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	55	-	K/W

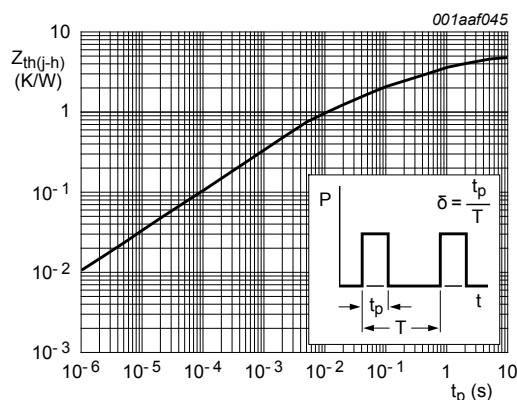


Fig. 3. Transient thermal impedance from junction to heatsink as a function of pulse width

9. Isolation characteristics

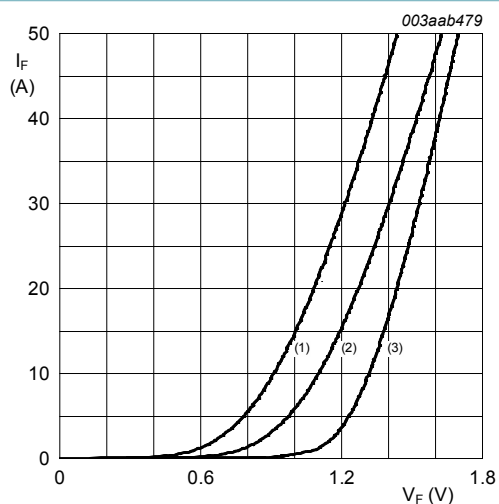
Table 6. Isolation characteristics

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	from cathode to external heatsink	-	10	-	pF

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	$I_F = 15 \text{ A}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 4}$	-	1.16	1.38	V
		$I_F = 15 \text{ A}; T_j = 150 \text{ }^\circ\text{C}$	-	1.01	1.2	V
I_R	reverse current	$V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	5	50	μA
		$V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$	-	0.2	0.8	mA
Dynamic characteristics						
Q_r	recovered charge	$I_F = 2 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 20 \text{ A}/\mu\text{s}; \text{ Fig. 5}$	-	40	70	nC
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	50	60	ns
I_{RM}	peak reverse recovery current	$I_F = 10 \text{ A}; V_R \geq 30 \text{ V}; dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 100 \text{ }^\circ\text{C}; \text{ Fig. 5}$	-	3	5.2	A
V_{FR}	forward recovery voltage	$I_F = 10 \text{ A}; dI_F/dt = 10 \text{ A}/\mu\text{s}; \text{ Fig. 6}$	-	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. 4. Forward current as a function of forward voltage

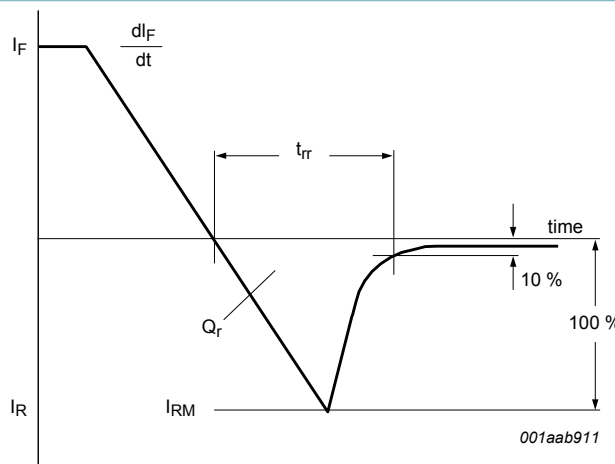


Fig. 5. Forward recovery definitions

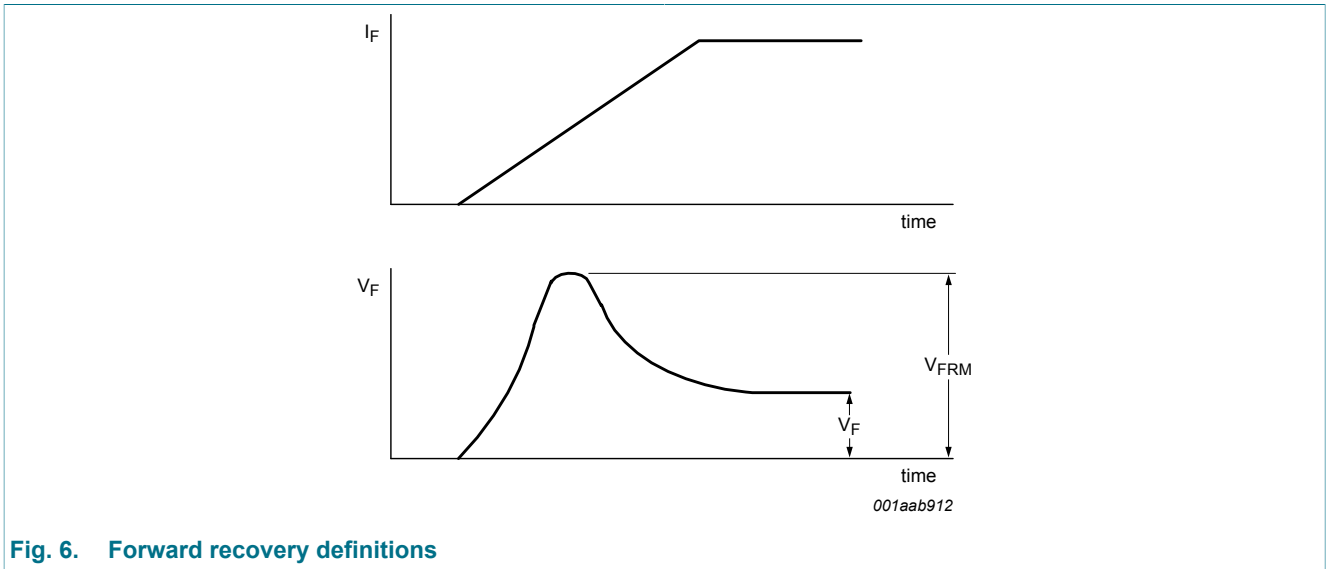
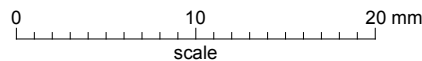
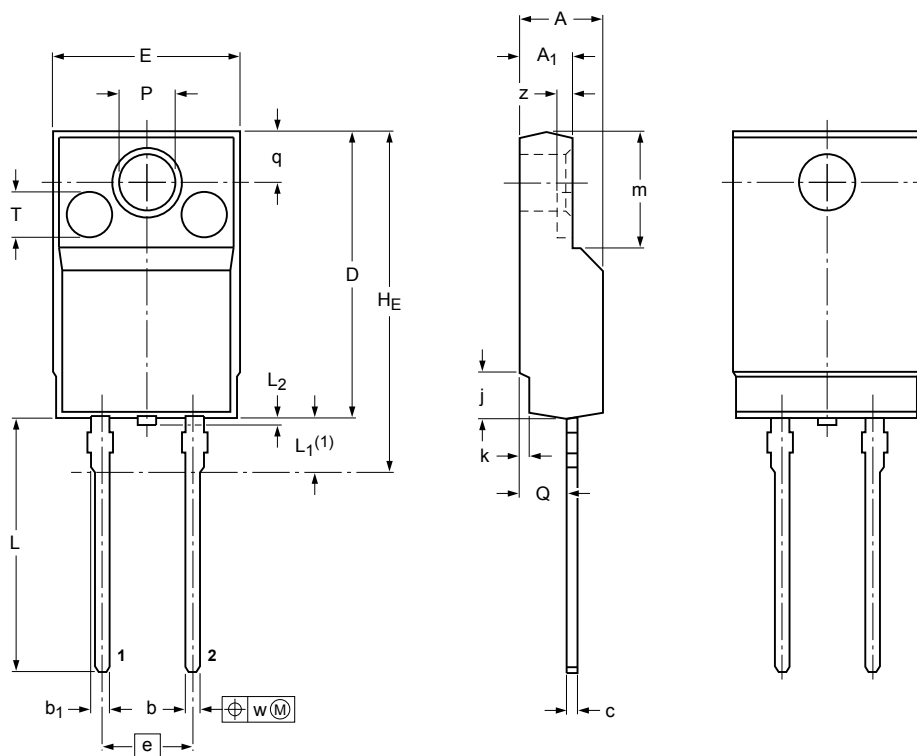


Fig. 6. Forward recovery definitions

11. Package outline

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

SOD113



z(2)
0.8

DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁	c	D	E	e	H _E max	j	k	L	L ₁ (1)	L ₂ max	m	P	Q	q	T	w
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	0.7 0.4	15.8 15.2	10.3 9.7	5.08	19.0	2.7 1.7	0.6 0.4	14.4 13.5	3.3 2.8	0.5	6.5 6.3	3.2 3.0	2.6 2.3	2.6	2.55	0.4

Notes

- 1. Terminals are uncontrolled within zone L₁.
- 2. z is depth of T.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOD113		2-lead TO-220F			02-04-09 07-06-18

Fig. 7. Package outline TO-220F (SOD113)

12. Legal information

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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.
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