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	$\delta = 0.5$; $t_p = 25$ µs; $T_h \leq 49$ °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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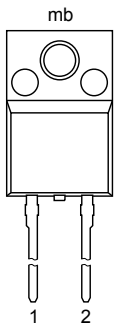
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Dynamic characteristics							
t_{rr}	reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 5		-	50	60	ns

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

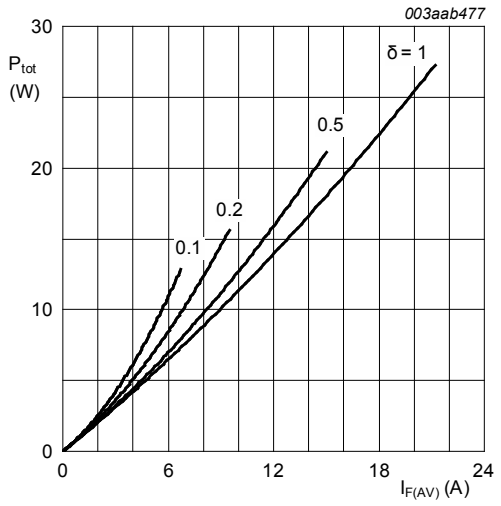
Type number	Package		
	Name	Description	Version
BYT79X-600	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

7. Limiting values

Table 4. Limiting values

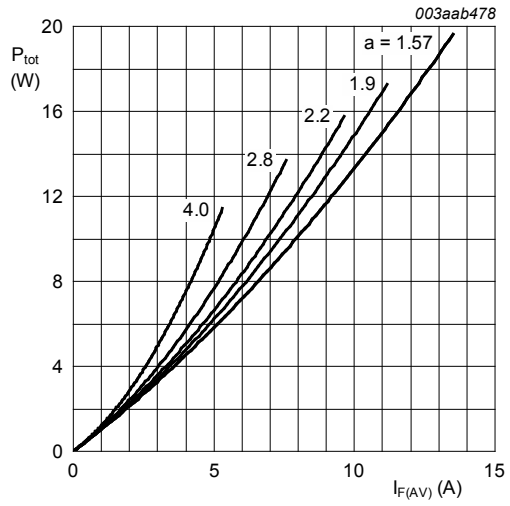
In accordance with the Absolute Maximum Rating System (IEC 60134).

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; δ = 1.0		-	600	V
$I_{F(AV)}$	average forward current	δ = 0.5 ; T_h ≤ 49 °C; Square-wave; Fig. 1; Fig. 2		-	15	A
I_{FRM}	repetitive peak forward current	δ = 0.5 ; t_p = 25 µs; T_h ≤ 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
T_{stg}	storage temperature			-55	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 = 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

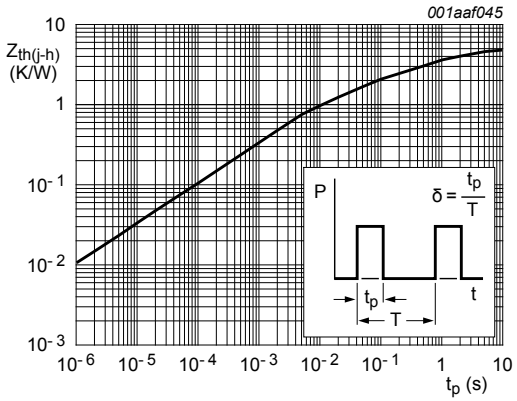


Fig. 3. Transient thermal impedance from junction to heatsink as a function of pulse width

9. Isolation characteristics

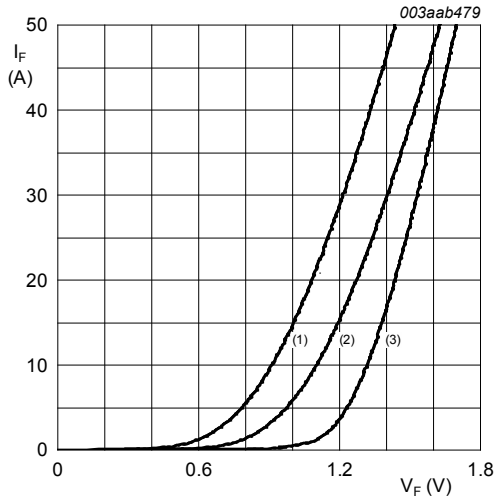
Table 6. Isolation characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 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

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
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
I_R	reverse current	V_R = 600 V; T_j = 25 °C		-	5	50	µA
		V_R = 600 V; T_j = 100 °C		-	0.2	0.8	mA
Dynamic characteristics							
Q_r	recovered charge	I_F = 2 A; V_R ≥ 30 V; dI_F/dt = 20 A/µs; Fig. 5		-	40	70	nC
t_{rr}	reverse recovery time	I_F = 1 A; V_R ≥ 30 V; dI_F/dt = 100 A/µs; T_j = 25 °C; Fig. 5		-	50	60	ns
I_{RM}	peak reverse recovery current	I_F = 10 A; V_R ≥ 30 V; dI_F/dt = 50 A/µs; T_j = 100 °C; Fig. 5		-	3	5.2	A
V_{FR}	forward recovery voltage	I_F = 10 A; dI_F/dt = 10 A/µs; Fig. 6		-	3.2	-	V



(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

Fig. 4. Forward current as a function of forward voltage

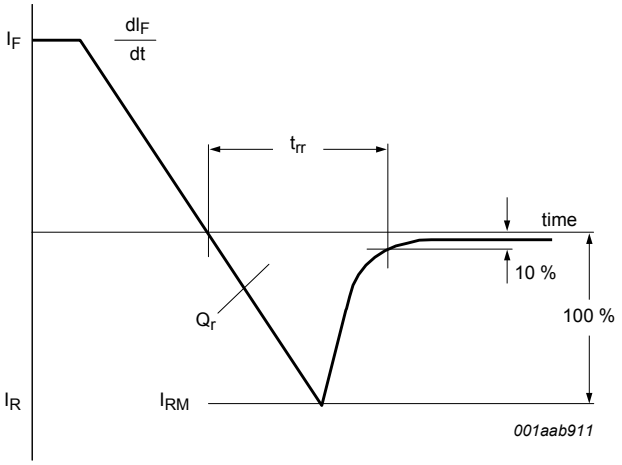


Fig. 5. Forward recovery definitions

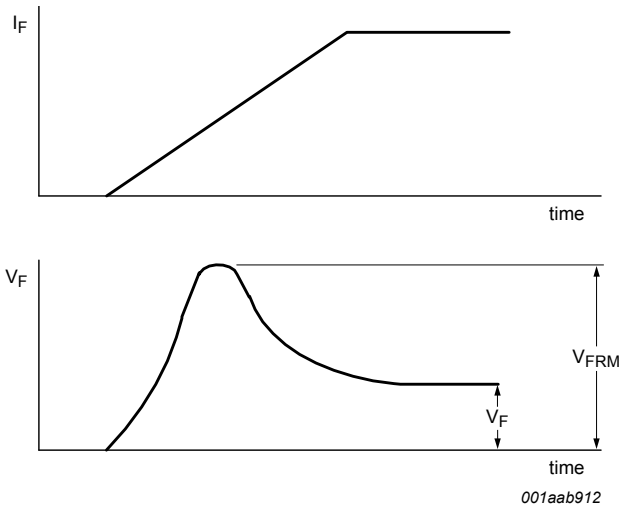
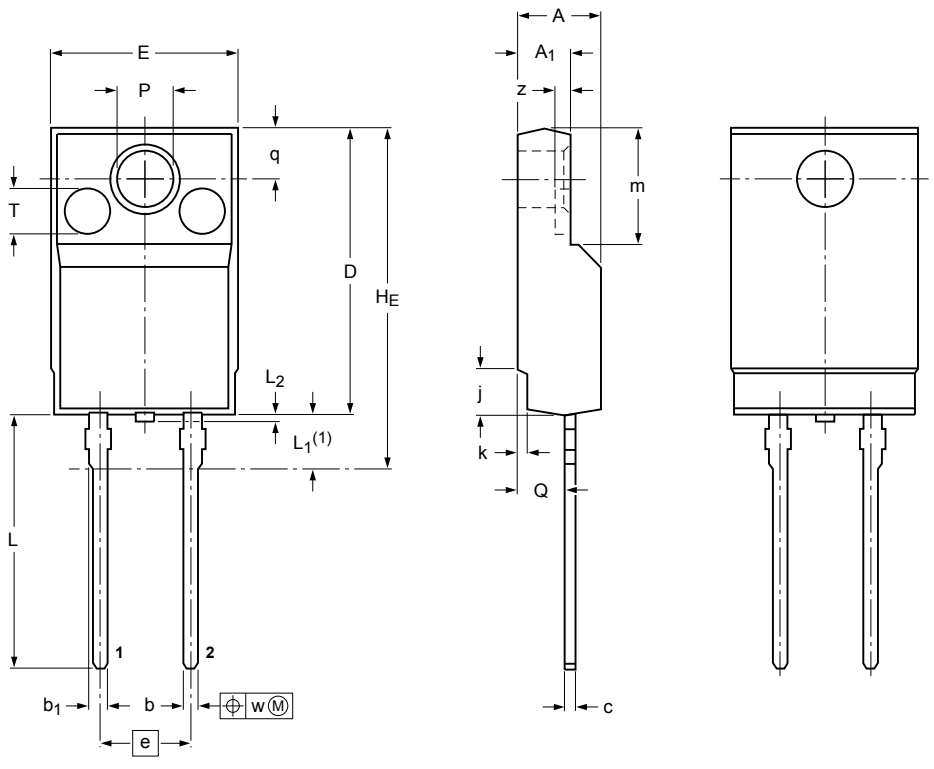


Fig. 6. Forward recovery definitions

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 L_1.
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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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Date of release: 27 May 2015