

**Rectifier diodes  
ultrafast, rugged**

**BYW29EX series**

**GENERAL DESCRIPTION**

Glass passivated epitaxial rectifier diodes in a full pack plastic envelope, featuring low forward voltage drop, ultra-fast recovery times, soft recovery characteristic and guaranteed reverse surge and ESD capability. They are intended for use in switched mode power supplies and high frequency circuits in general where low conduction and switching losses are essential.

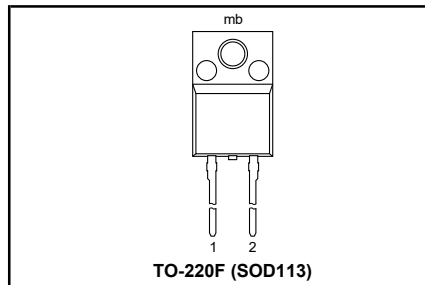
**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	MAX.	MAX.	UNIT
$V_{RRM}$	Repetitive peak reverse voltage	150	200	V
$V_F$	Forward voltage	0.895	0.895	V
$I_{F(AV)}$	Forward current	8	8	A
$t_{rr}$	Reverse recovery time	25	25	ns
$I_{RRM}$	Repetitive peak reverse current	0.2	0.2	A

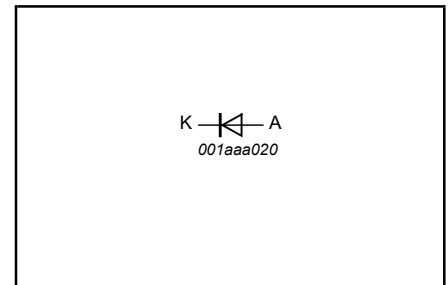
**PINNING - SOD113**

PIN	DESCRIPTION
1	cathode
2	anode
case	isolated

**PIN CONFIGURATION**



**SYMBOL**



**LIMITING VALUES**

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
$V_{RRM}$	Repetitive peak reverse voltage		-	-150	-200	V
$V_{RWM}$	Crest working reverse voltage		-	150	200	V
$V_R$	Continuous reverse voltage		-	150	200	V
$I_{F(AV)}$	Average forward current <sup>1</sup>	square wave; $\delta = 0.5$ ; $T_{hs} \leq 106^\circ\text{C}$ sinusoidal; $a = 1.57$ ; $T_{hs} \leq 109^\circ\text{C}$	-	8		A
$I_{F(RMS)}$	RMS forward current		-	7.3		A
$I_{FRM}$	Repetitive peak forward current	$t = 25 \mu\text{s}$ ; $\delta = 0.5$ ; $T_{hs} \leq 106^\circ\text{C}$	-	16		A
$I_{FSM}$	Non-repetitive peak forward current	$t = 10 \text{ms}$ $t = 8.3 \text{ms}$ sinusoidal; with reapplied	-	80		A
$I_{FSM}$	Non-repetitive peak forward current	$t = 8.3 \text{ms}$ sinusoidal; with reapplied	-	88		A
$I^2t$	$I^2t$ for fusing	$V_{RWM(max)}$ $t = 10 \text{ms}$	-	32		A <sup>2</sup> s
$I_{RRM}$	Repetitive peak reverse current	$t_p = 2 \mu\text{s}$ ; $\delta = 0.001$	-	0.2		A
$I_{RSM}$	Non-repetitive peak reverse current	$t_p = 100 \mu\text{s}$	-	0.2		A
$T_{stg}$	Storage temperature		-40	150		°C
$T_j$	Operating junction temperature		-	150		°C

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

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### ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_C$	Electrostatic discharge capacitor voltage	Human body model; $C = 250 \text{ pF}$ ; $R = 1.5 \text{ k}\Omega$	-	8	kV

### ISOLATION LIMITING VALUE & CHARACTERISTIC

$T_{hs} = 25 \text{ }^\circ\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{isol}$	R.M.S. isolation voltage from both terminals to external heatsink	$f = 50\text{-}60 \text{ Hz}$ ; sinusoidal waveform; R.H. $\leq 65\%$ ; clean and dustfree	-		2500	V
$C_{isol}$	Capacitance from both terminals to external heatsink	$f = 1 \text{ MHz}$	-	10	-	pF

### THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}hs}$	Thermal resistance junction to heatsink	with heatsink compound	-	-	5.5	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	without heatsink compound in free air	-	55	7.2	K/W

### STATIC CHARACTERISTICS

$T_j = 25 \text{ }^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_F$	Forward voltage	$I_F = 8 \text{ A}$ ; $T_j = 150 \text{ }^\circ\text{C}$	-	0.80	0.895	V
		$I_F = 8 \text{ A}$	-	0.92	1.05	V
		$I_F = 20 \text{ A}$	-	1.1	1.3	V
$I_R$	Reverse current	$V_R = V_{RWM}$ ; $T_j = 100 \text{ }^\circ\text{C}$	-	0.2	0.6	mA
		$V_R = V_{RWM}$	-	2	10	$\mu\text{A}$

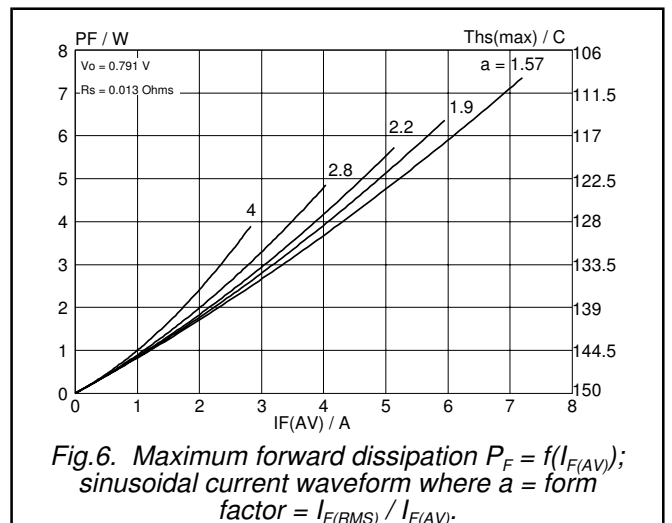
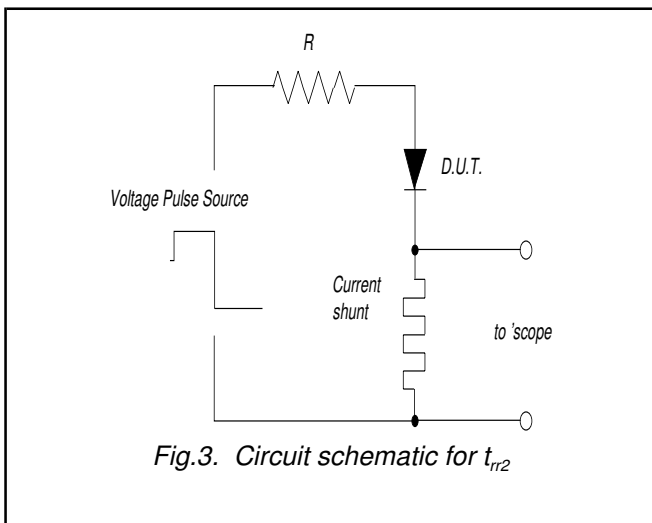
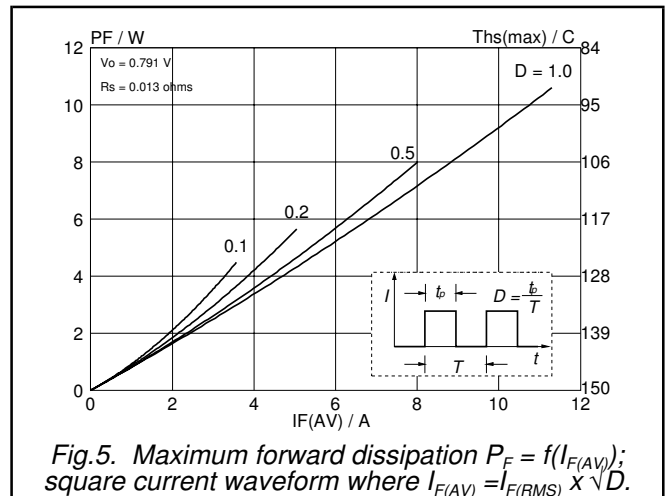
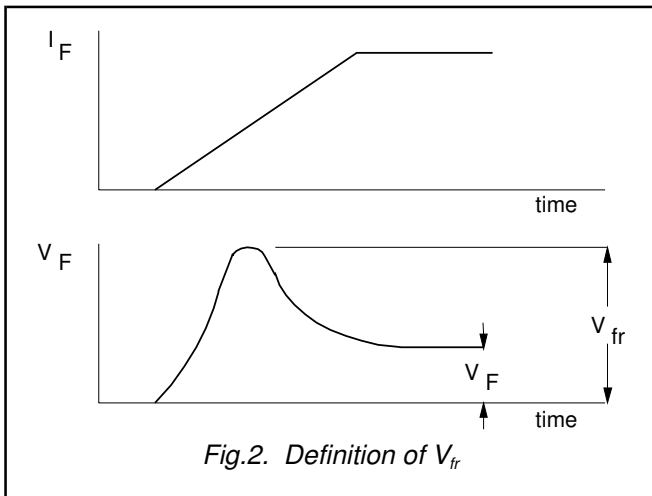
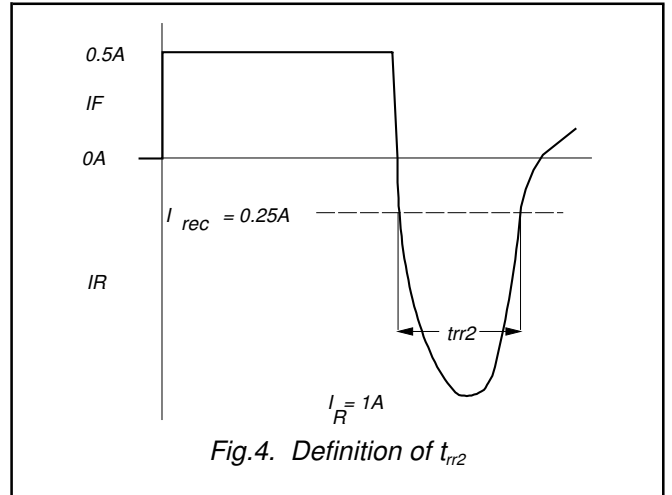
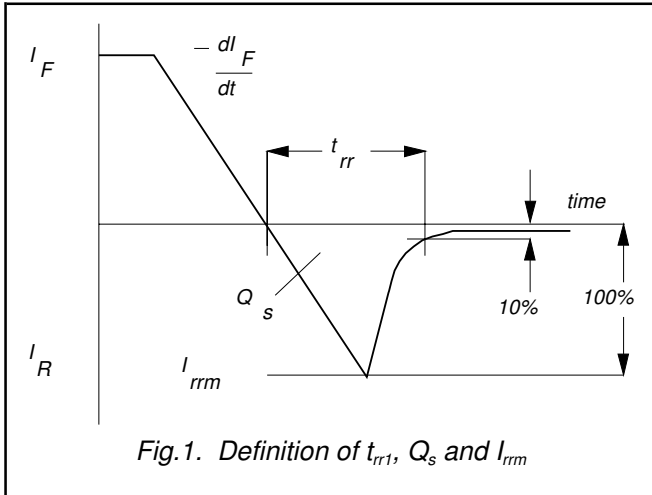
### DYNAMIC CHARACTERISTICS

$T_j = 25 \text{ }^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$Q_s$	Reverse recovery charge	$I_F = 2 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 20 \text{ A}/\mu\text{s}$	-	4	11	nC
$t_{rr1}$	Reverse recovery time	$I_F = 1 \text{ A}$ ; $V_R \geq 30 \text{ V}$ ; $-di_F/dt = 100 \text{ A}/\mu\text{s}$	-	20	25	ns
$t_{rr2}$	Reverse recovery time	$I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$ ; $I_{rec} = 0.25 \text{ A}$	-	15	20	ns
$V_{fr}$	Forward recovery voltage	$I_F = 1 \text{ A}$ ; $di_F/dt = 10 \text{ A}/\mu\text{s}$	-	1	-	V

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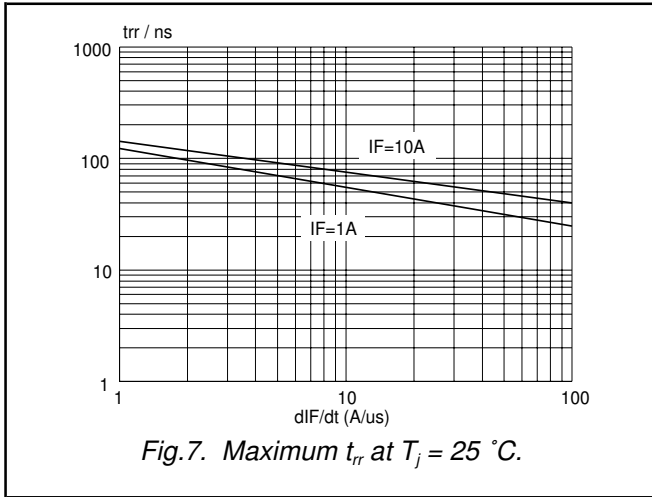


Fig.7. Maximum  $t_{rr}$  at  $T_j = 25\text{ }^\circ\text{C}$ .

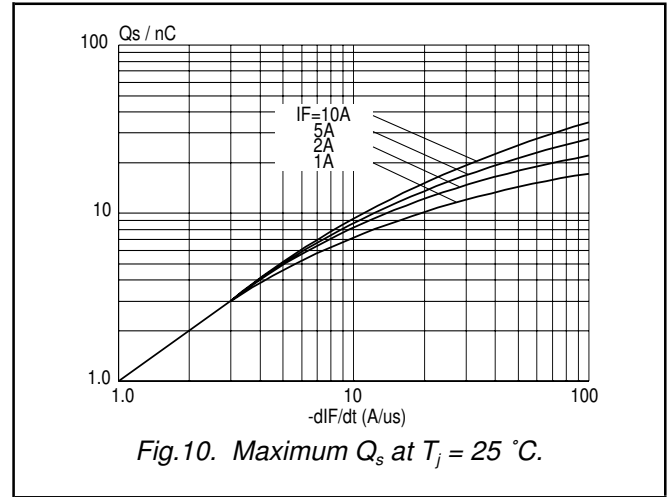


Fig.10. Maximum  $Q_s$  at  $T_j = 25\text{ }^\circ\text{C}$ .

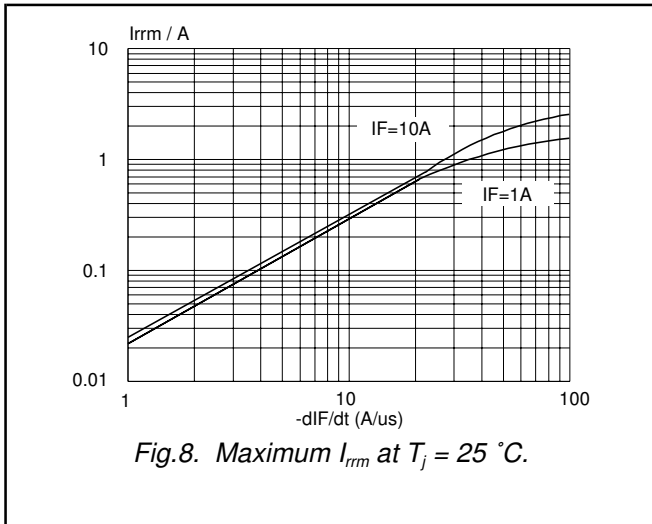


Fig.8. Maximum  $I_{rrm}$  at  $T_j = 25\text{ }^\circ\text{C}$ .

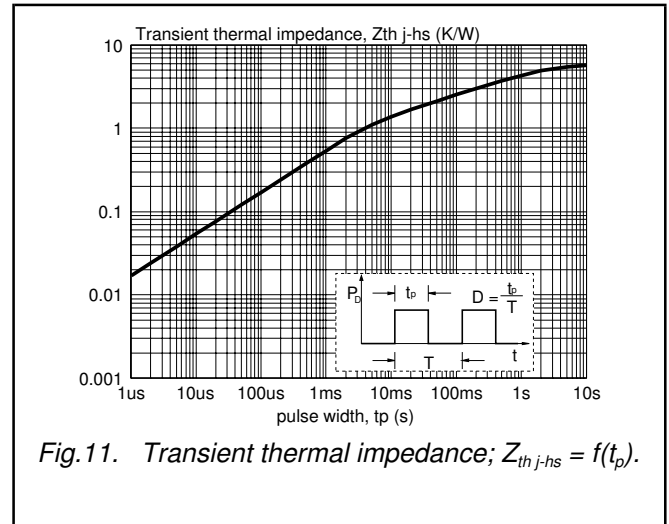


Fig.11. Transient thermal impedance;  $Z_{th\ j-hs} = f(t_p)$ .

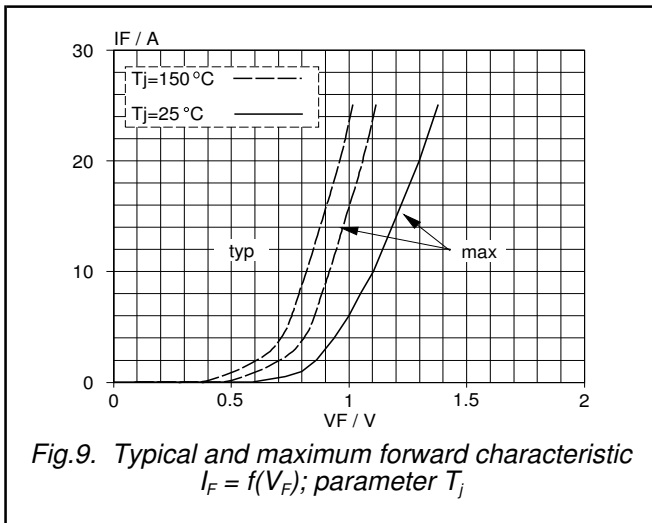


Fig.9. Typical and maximum forward characteristic  $I_F = f(V_F)$ ; parameter  $T_j$

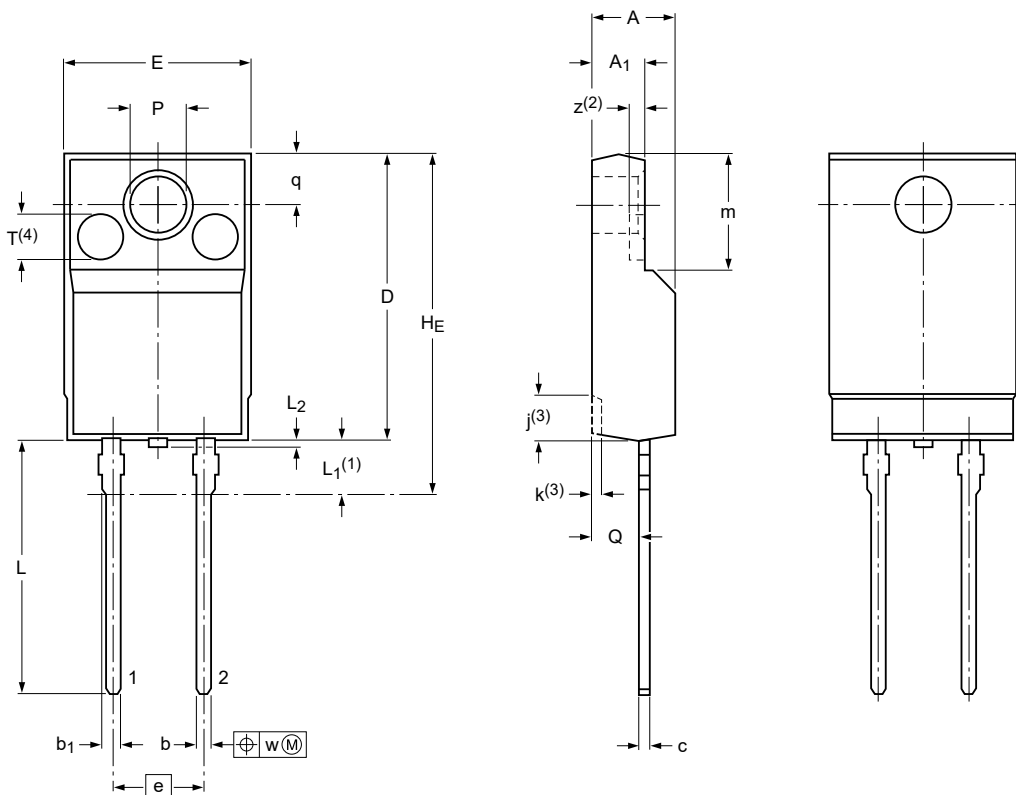
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**MECHANICAL DATA**

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

SOD113



Dimensions (mm are the original dimensions)

Unit	A	A <sub>1</sub>	b	b <sub>1</sub>	c	D	E	e	H <sub>E</sub> max	j <sup>(3)</sup>	k <sup>(3)</sup>	L	L <sub>1</sub> <sup>(1)</sup>	L <sub>2</sub> max	m	P	Q	q	T <sup>(4)</sup>	w	z <sup>(2)</sup>	
max	4.6	2.9	0.9	1.1	0.7	15.8	10.3			2.7	0.6	14.4	3.3		6.5	3.2	2.6					
nom								5.08	19.0					0.5					2.6	2.55	0.4	0.8
min	4.0	2.5	0.7	0.9	0.4	15.2	9.7			1.7	0.4	13.5	2.8		6.3	3.0	2.3					

Notes

1. Terminals are uncontrolled within zone L1.
2. z is depth of T.
3. Dot lines area designs may vary.
4. Eject pin mark is for reference only.

sod113\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOD113	2-lead TO-220F				07-06-08- 15-08-28

## 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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