IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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If you have any questions related to this document, please contact our nearest sales office via e-mail or phone (details via salesaddresses@ween-semi.com).

Thank you for your cooperation and understanding,

WeEn Semiconductors

BYC8X-600

Hyperfast rectifier diode, low switching loss

Rev. 02 — 13 March 2009 Product data sheet

1. Product profile

1.1 General description

Hyperfast epitaxial rectifier diode in a SOD113 (2-lead TO-220F) plastic package.

1.2 Features and benefits

- Low reverse recovery current and low thermal resistance
- Reduces switching losses in associated MOSFET

1.3 Applications

- Continuous Current Mode (CCM) Power Factor Correction (PFC)
- Half-bridge/full-bridge switched-mode power supplies
- Half-bridge lighting ballasts

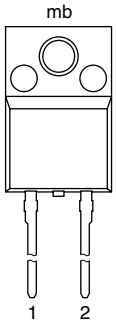
1.4 Quick reference data

Table 1. Quick reference

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; δ = 0.5; T_h = 59 °C; see Figure 1; see Figure 2	-	-	8	A
Dynamic characteristics						
t_{rr}	reverse recovery time	I_F = 8 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; see Figure 5	-	19	-	ns
Static characteristics						
V_F	forward voltage	I_F = 8 A; T_j = 150 °C; see Figure 4	-	1.4	1.85	V

2. Pinning information

Table 2. Pinning information

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

3. Ordering information

Table 3. Ordering information

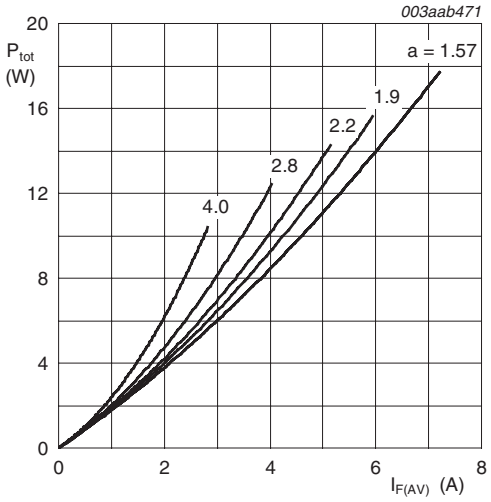
Type number	Package		
	Name	Description	Version
BYC8X-600	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack"	SOD113

4. Limiting values

Table 4. Limiting values

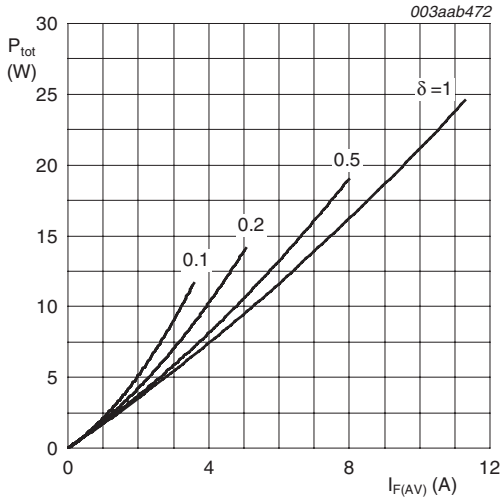
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	600	V
V_{RWM}	crest working reverse voltage		-	600	V
$I_{F(AV)}$	average forward current	square-wave pulse; δ = 0.5; T_h = 59 °C; see Figure 1; see Figure 2	-	8	A
I_{FRM}	repetitive peak forward current	square-wave pulse; δ = 0.5; t_p = 25 µs; T_h = 59 °C	-	16	A
I_{FSM}	non-repetitive peak forward current	t_p = 10 ms; sine-wave pulse; $T_{j(init)}$ = 25 °C	-	80	A
		t_p = 8.3 ms; sine-wave pulse; $T_{j(init)}$ = 25 °C	-	88	A
T_{stg}	storage temperature		-40	150	°C
T_j	junction temperature		-	150	°C



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

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



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

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

5. 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; see Figure 3	-	-	4.8	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air		-	55	-	K/W

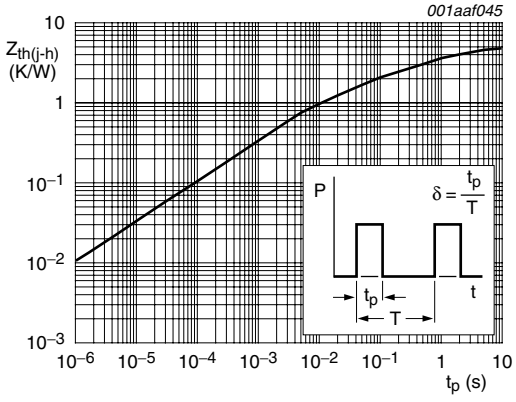


Fig 3. Transient thermal impedance from junction to heatsink as a function of pulse width

6. Isolation characteristics

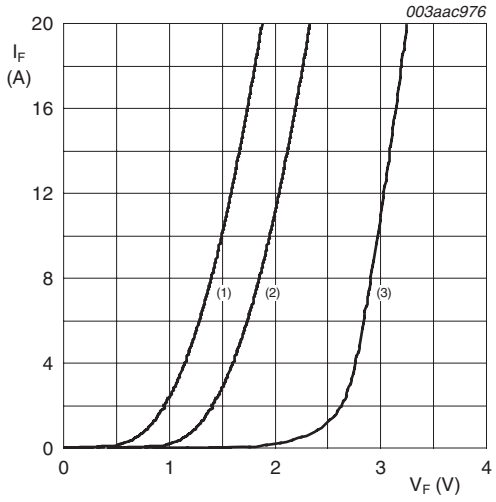
Table 6. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	f = 1 MHz; RH = 65 %; between all pins and external heatsink	-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink	-	10	-	pF

7. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 8 A; T_j = 150 °C; see Figure 4	-	1.4	1.85	V
		I_F = 8 A; T_j = 25 °C	-	2	2.9	V
		I_F = 16 A; T_j = 150 °C	-	1.7	2.3	V
I_R	reverse current	V_R = 500 V; T_j = 100 °C	-	1.1	3	mA
		V_R = 600 V	-	9	150	µA
Dynamic characteristics						
Q_r	recovered charge	I_F = 1 A; dI_F/dt = 100 A/µs	-	12	-	nC
t_{rr}	reverse recovery time	I_F = 8 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 100 °C	-	32	40	ns
		I_F = 1 A; V_R = 30 V; dI_F/dt = 50 A/µs; T_j = 25 °C	-	30	52	ns
		I_F = 8 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 25 °C; see Figure 5	-	19	-	ns
I_{RM}	peak reverse recovery current	I_F = 10 A; V_R = 400 V; dI_F/dt = 500 A/µs; T_j = 100 °C	-	9.5	12	A
		I_F = 8 A; V_R = 400 V; dI_F/dt = 50 A/µs; T_j = 125 °C	-	1.5	5.5	A
V_{FR}	forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A/µs; T_j = 25 °C; see Figure 6	-	8	10	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

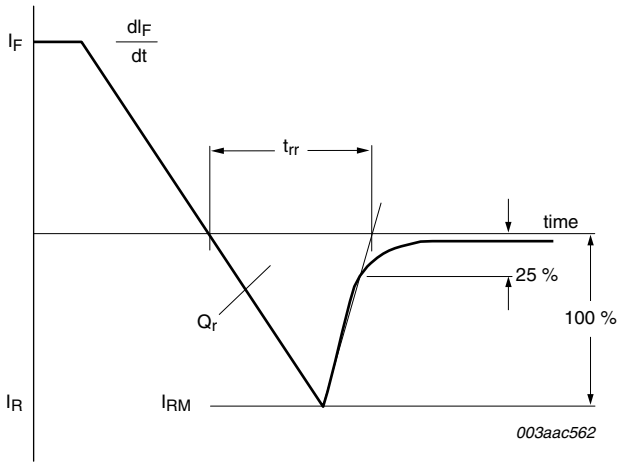


Fig 5. Reverse recovery definitions; ramp recovery

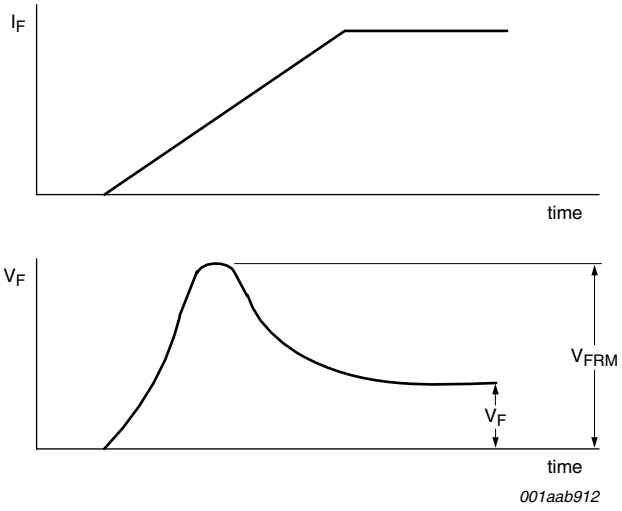
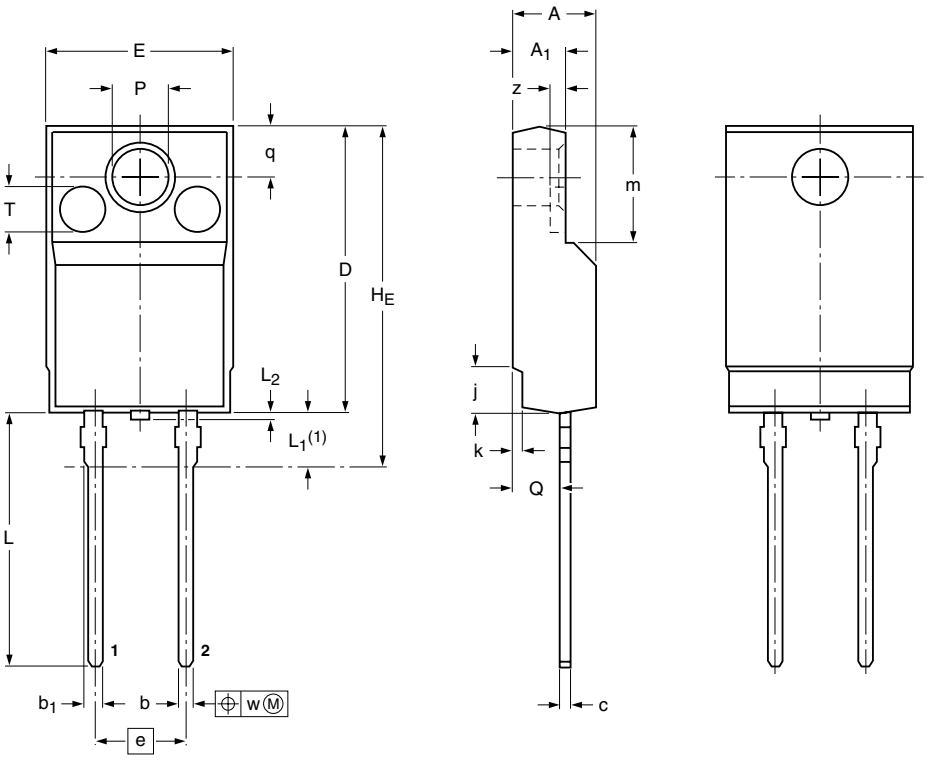


Fig 6. Forward recovery definitions

8. 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 SOD113 (TO-220F)

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BYC8X-600_2	20090313	Product data sheet	-	BYC8X-600_1
Modifications:	• Forward voltage values updated in characteristics. • Recovered charge parameter added in characteristics.			
BYC8X-600_1	20070905	Product data sheet	-	-

10. Legal information

10.1 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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