



# 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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Thank you for your cooperation and understanding,

WeEn Semiconductors





# NXPS20S100C

Dual power Schottky diode

30 January 2013

Product data sheet

## 1. General description

Dual common cathode power Schottky diode designed for high frequency switched mode power supplies in a SOT78 (TO-220AB) plastic package.

## 2. Features and benefits

- High junction temperature capability
- Low leakage current
- Negligible switching losses
- Optimised design to give low  $V_F$  and high  $T_{j(max)}$

## 3. Applications

- DC to DC converters
- Freewheeling diode
- OR-ing diode
- Switched mode power supply rectifier

## 4. Quick reference data

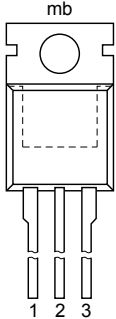
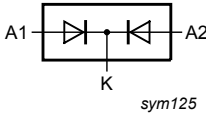
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	100	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 157$ °C; square-wave pulse; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	-	10	A
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; square-wave pulse; both diodes conducting	-	-	20	A
$T_j$	junction temperature		-	-	175	°C
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 3$ A; $T_j = 125$ °C; <a href="#">Fig. 6</a>	-	0.53	0.58	V
$I_R$	reverse current	$V_R = 100$ V; $T_j = 25$ °C; <a href="#">Fig. 7</a>	-	-	3	$\mu$ A



## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 <p>TO-220AB (SOT78)</p>	 <p>sym125</p>
2	K	cathode		
3	A2	anode 2		
mb	K	mounting base; cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NXPS20S100C	TO-220AB	plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB	SOT78

## 7. Marking

Table 4. Marking codes

Type number	Marking code
NXPS20S100C	NXPS20S100C

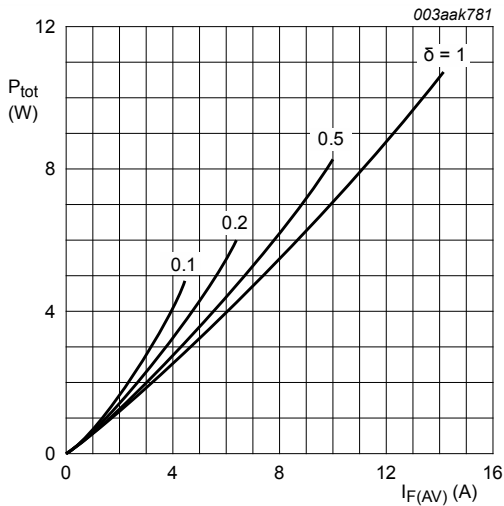
## 8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	100	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_{mb} \leq 157\text{ }^\circ\text{C}$ ; square-wave pulse; per diode; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>	-	10	A
$I_{O(AV)}$	average output current	$\delta = 0.5$ ; square-wave pulse; both diodes conducting	-	20	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 10\text{ ms}$ ; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$ ; sine-wave pulse; <a href="#">Fig. 4</a>	-	150	A

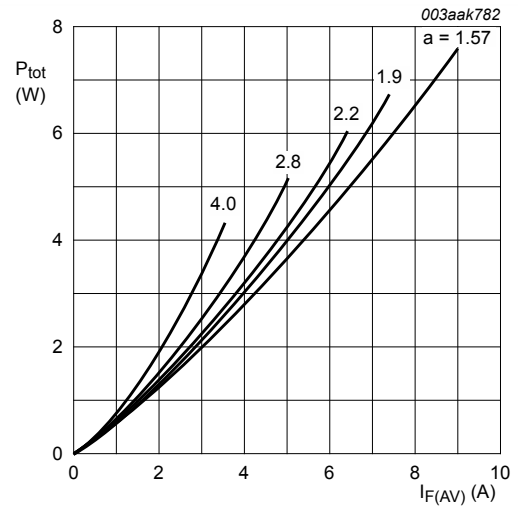
Symbol	Parameter	Conditions	Min	Max	Unit
T <sub>stg</sub>	storage temperature		-65	175	°C
T <sub>j</sub>	junction temperature		-	175	°C



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

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

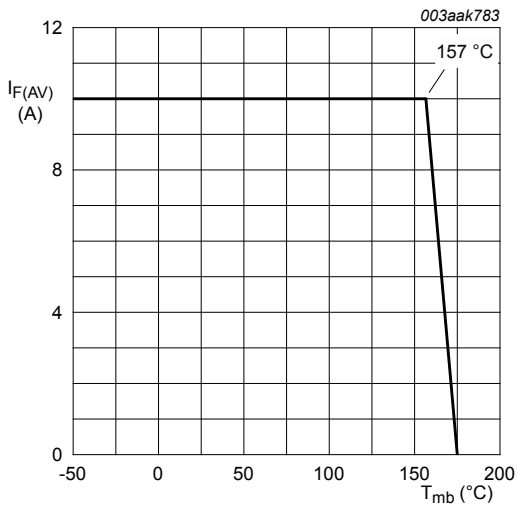
$$V_O = 0.597 \text{ V}; R_S = 0.011 \Omega$$



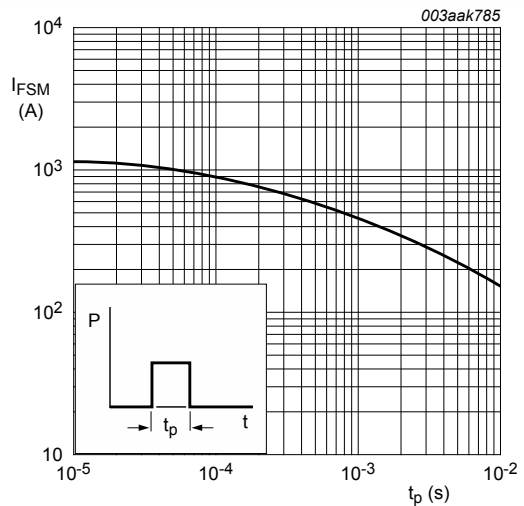
**Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values**

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

$$V_O = 0.597 \text{ V}; R_S = 0.011 \Omega$$



**Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values**



**Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values**

### 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	with heatsink compound; per diode; <a href="#">Fig. 5</a>	-	-	2.2	K/W
		with heatsink compound; both diodes conducting	-	-	1.3	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	60	-	K/W

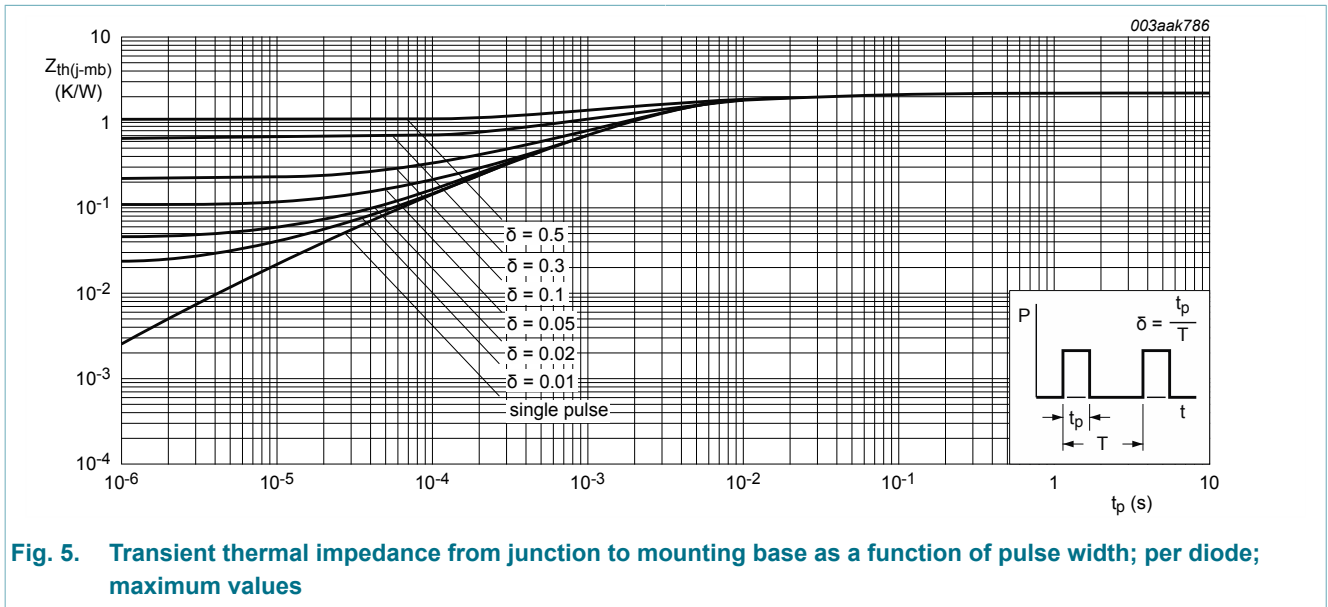
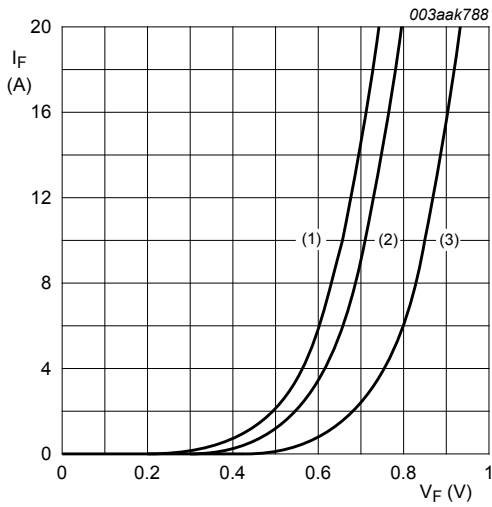


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode; maximum values

### 10. Characteristics

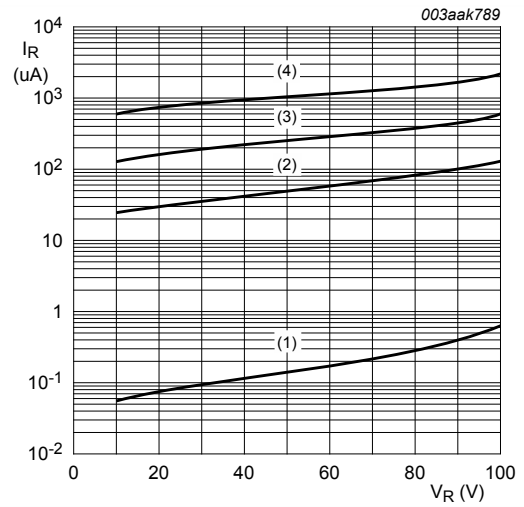
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$V_F$	forward voltage	$I_F = 3\text{ A}; T_j = 25\text{ °C};$ <a href="#">Fig. 6</a>	-	0.67	0.72	V
		$I_F = 10\text{ A}; T_j = 25\text{ °C};$ <a href="#">Fig. 6</a>	-	0.8	0.85	V
		$I_F = 3\text{ A}; T_j = 125\text{ °C};$ <a href="#">Fig. 6</a>	-	0.53	0.58	V
		$I_F = 10\text{ A}; T_j = 125\text{ °C};$ <a href="#">Fig. 6</a>	-	0.66	0.71	V
$I_R$	reverse current	$V_R = 100\text{ V}; T_j = 25\text{ °C};$ <a href="#">Fig. 7</a>	-	-	3	$\mu\text{A}$
		$V_R = 100\text{ V}; T_j = 125\text{ °C};$ <a href="#">Fig. 7</a>	-	-	3	mA
<b>Dynamic characteristics</b>						
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 10\text{ V}; T_j = 25\text{ °C};$ <a href="#">Fig. 8</a>	-	130	-	pF



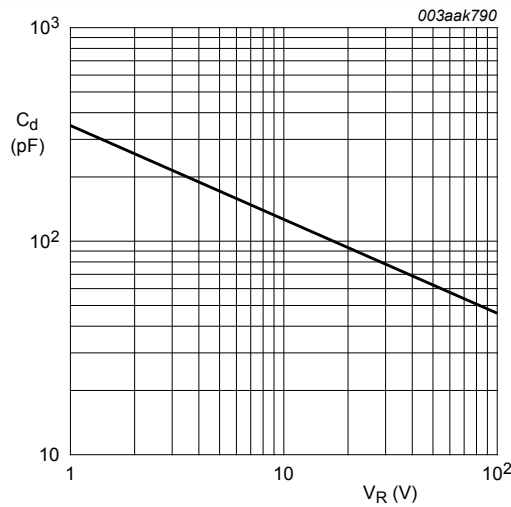
**Fig. 6. Forward current as a function of forward voltage; per diode**

- (1)  $T_j = 125\text{ °C}$ ; typical values;
- (2)  $T_j = 125\text{ °C}$ ; maximum values;
- (3)  $T_j = 25\text{ °C}$ ; maximum values;
- $V_O = 0.597\text{ V}$ ;  $R_S = 0.011\text{ }\Omega$



**Fig. 7. Reverse leakage current as a function of reverse voltage; per diode; typical values**

- (1)  $T_j = 25\text{ °C}$ ; typical values;
- (2)  $T_j = 100\text{ °C}$ ; typical values;
- (3)  $T_j = 125\text{ °C}$ ; typical values;
- (4)  $T_j = 150\text{ °C}$ ; typical values



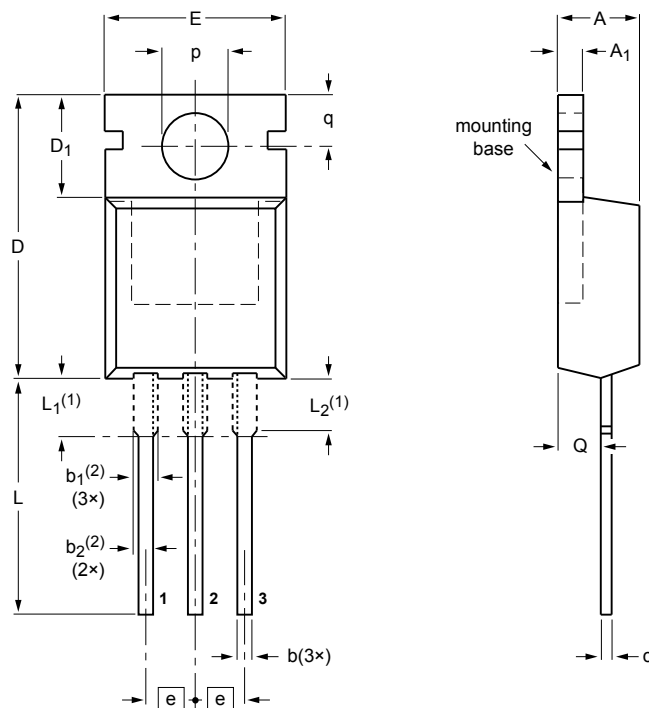
**Fig. 8. Diode junction capacitance as a function of applied reverse voltage; per diode; typical values**

$f = 1\text{ MHz}$ ;  $T_j = 25\text{ °C}$

### 11. Package outline

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78



**DIMENSIONS** (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub> (2)	b <sub>2</sub> (2)	c	D	D <sub>1</sub>	E	e	L	L <sub>1</sub> (1)	L <sub>2</sub> (1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

**Notes**

- 1. Lead shoulder designs may vary.
- 2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT78		3-lead TO-220AB	SC-46		08-04-23 08-06-13

**Fig. 9. Package outline TO-220AB (SOT78)**

## 12. Legal information

### 12.1 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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## 13. 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 .....	2
9	Thermal characteristics .....	4
10	Characteristics .....	4
11	Package outline .....	6
12	Legal information .....	7
12.1	Data sheet status .....	7
12.2	Definitions .....	7
12.3	Disclaimers .....	7
12.4	Trademarks .....	8

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Date of release: 30 January 2013