



# 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





# NXPS20S100CX

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 SOT186A (TO-220F) "full pack" plastic package.

## 2. Features and benefits

- High junction temperature capability
- Isolated package
- 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

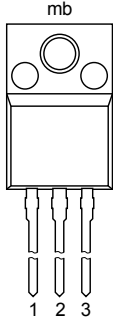
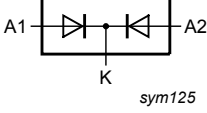
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{RRM}$	repetitive peak reverse voltage		-	-	100	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $T_h \leq 134$ °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-220F (SOT186A)</p>	 <p>sym125</p>
2	K	cathode		
3	A2	anode 2		
mb	n.c.	mb; isolated		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
NXPS20S100CX	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A

## 7. Marking

Table 4. Marking codes

Type number	Marking code
NXPS20S100CX	NXPS20S100CX

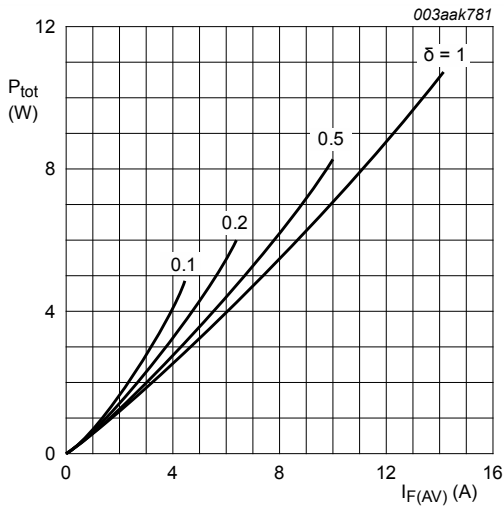
## 8. Limiting values

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	$\delta = 0.5$ ; $T_h \leq 134$ °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	$t_p = 10$ ms; $T_{j(init)} = 25$ °C; sine-wave pulse; <a href="#">Fig. 4</a>	-	150	A

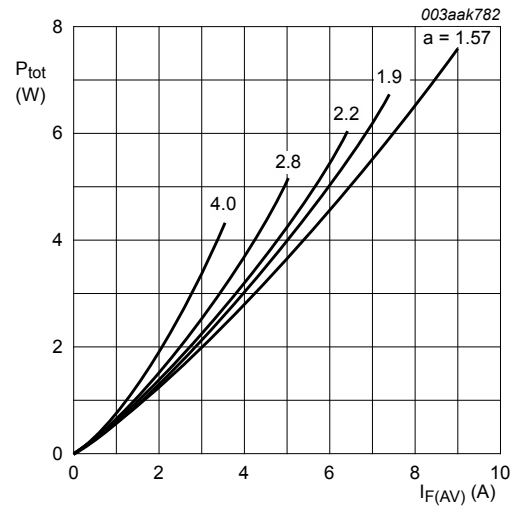
Symbol	Parameter	Conditions	Min	Max	Unit
T <sub>stg</sub>	storage temperature		-65	175	°C
T <sub>j</sub>	junction temperature		-	175	°C



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

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

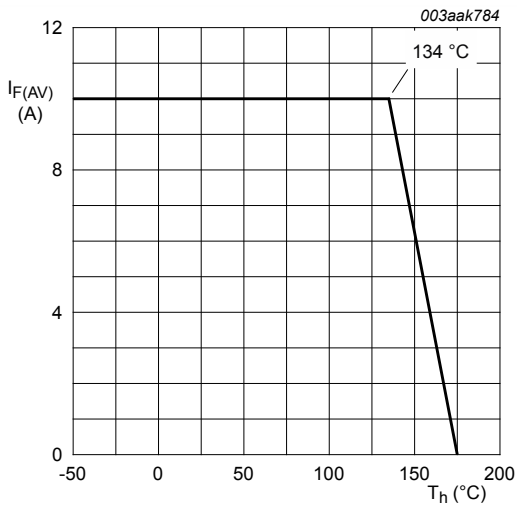
$$V_O = 0.597 \text{ V}; R_S = 0.011 \Omega$$



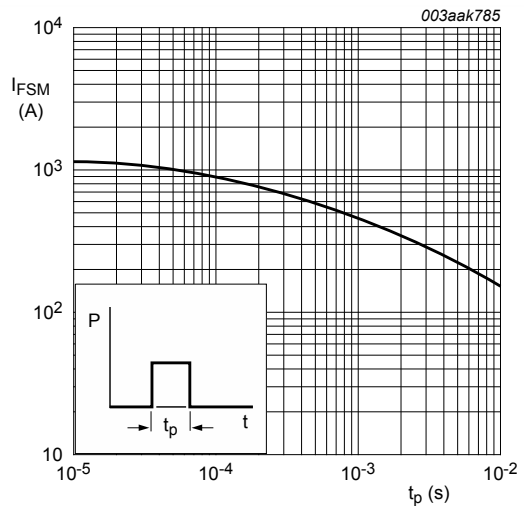
**Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values**

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

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



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

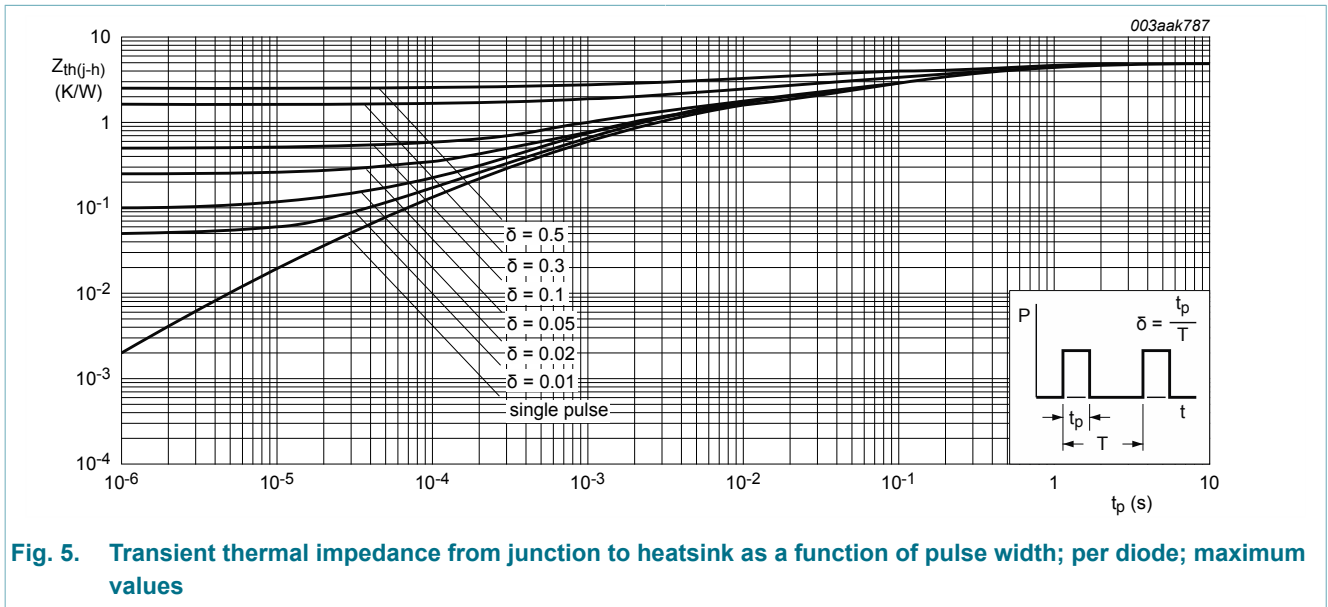


**Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values**

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; per diode; <a href="#">Fig. 5</a>	-	-	5	K/W
		with heatsink compound; both diodes conducting	-	-	4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	55	-	K/W



## 10. Isolation characteristics

Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz < f < 60 Hz; sinusoidal waveform ; RH ≤ 65 %; clean and dust free; from all terminals to external heatsink	-	-	2500	V
$C_{isol}$	isolation capacitance	from cathode to external heatsink ; f = 1 MHz	-	10	-	pF

### 11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 3 A; T <sub>j</sub> = 25 °C; Fig. 6	-	0.67	0.72	V
		I <sub>F</sub> = 10 A; T <sub>j</sub> = 25 °C; Fig. 6	-	0.8	0.85	V
		I <sub>F</sub> = 3 A; T <sub>j</sub> = 125 °C; Fig. 6	-	0.53	0.58	V
		I <sub>F</sub> = 10 A; T <sub>j</sub> = 125 °C; Fig. 6	-	0.66	0.71	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 100 V; T <sub>j</sub> = 25 °C; Fig. 7	-	-	3	μA
		V <sub>R</sub> = 100 V; T <sub>j</sub> = 125 °C; Fig. 7	-	-	3	mA
<b>Dynamic characteristics</b>						
C <sub>d</sub>	diode capacitance	f = 1 MHz; V <sub>R</sub> = 10 V; T <sub>j</sub> = 25 °C; Fig. 8	-	130	-	pF

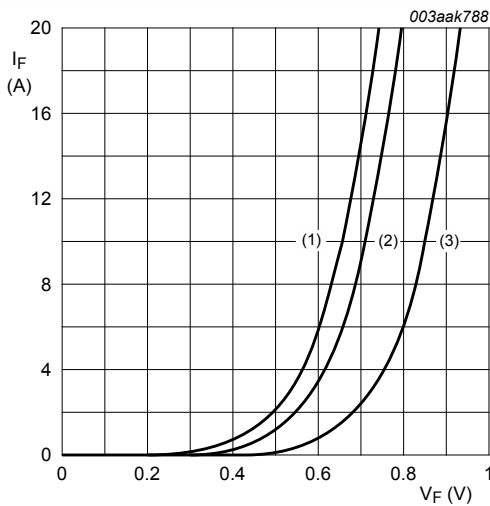


Fig. 6. Forward current as a function of forward voltage; per diode

- (1) T<sub>j</sub> = 125 °C; typical values;
  - (2) T<sub>j</sub> = 125 °C; maximum values;
  - (3) T<sub>j</sub> = 25 °C; maximum values;
- V<sub>O</sub> = 0.597 V; R<sub>S</sub> = 0.011 Ω

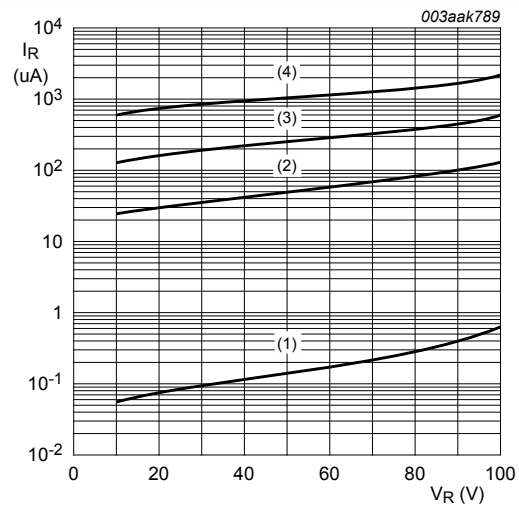


Fig. 7. Reverse leakage current as a function of reverse voltage; per diode; typical values

- (1) T<sub>j</sub> = 25 °C; typical values;
- (2) T<sub>j</sub> = 100 °C; typical values;
- (3) T<sub>j</sub> = 125 °C; typical values;
- (4) T<sub>j</sub> = 150 °C; typical values

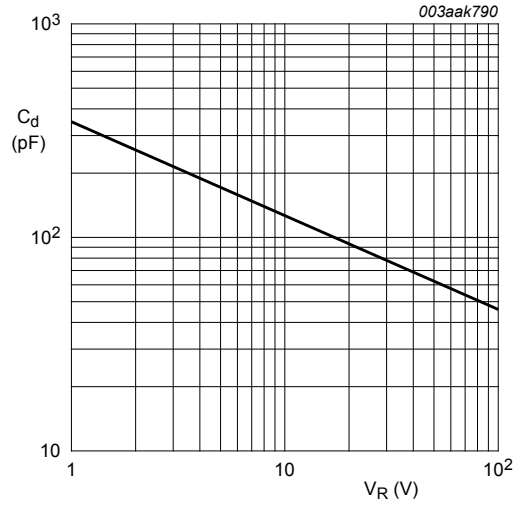


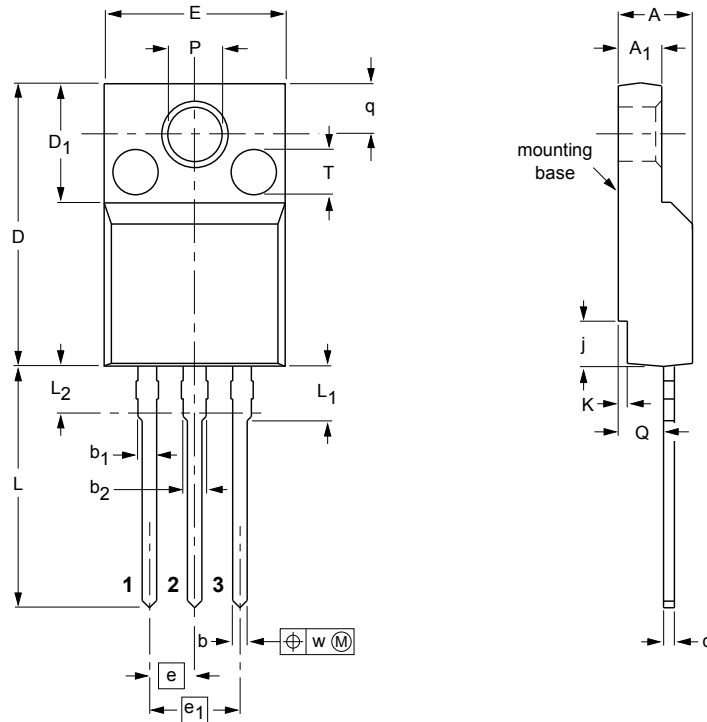
Fig. 8. Diode junction capacitance as a function of applied reverse voltage; per diode; typical values

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

## 12. Package outline

Plastic single-ended package; isolated heatsink mounted;  
1 mounting hole; 3-lead TO-220 'full pack'

SOT186A



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	E	e	e <sub>1</sub>	j	K	L	L <sub>1</sub>	L <sub>2</sub> <sup>(1)</sup> max.	P	Q	q	T <sup>(2)</sup>	w
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3	2.54	5.08	2.7	0.6	14.4	3.30	3	3.2	2.6	3.0	2.5	0.4
	4.0	2.5	0.7	0.9	1.0	0.4	15.2	6.3	9.7			1.7	0.4	13.5	2.79		3.0	2.3	2.6		

**Notes**

- 1. Terminal dimensions within this zone are uncontrolled.
- 2. Both recesses are # 2.5 × 0.8 max. depth

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT186A		3-lead TO-220F			02-04-09 06-02-14

Fig. 9. Package outline TO-220F (SOT186A)



## 13. Legal information

### 13.1 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.

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