



# 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

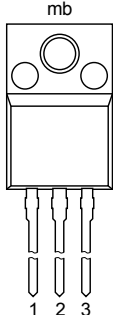
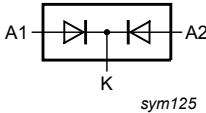
Table 1. Quick reference data

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

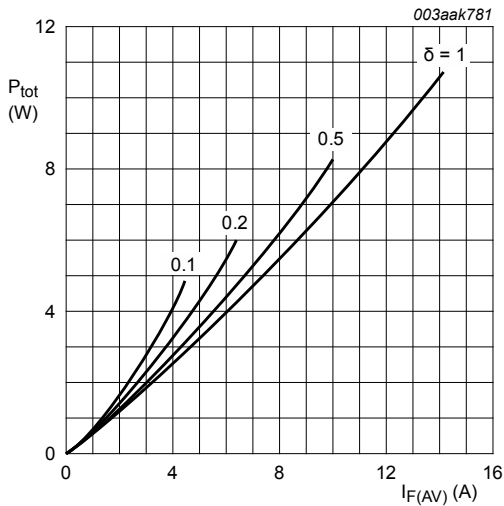
## 8. Limiting values

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

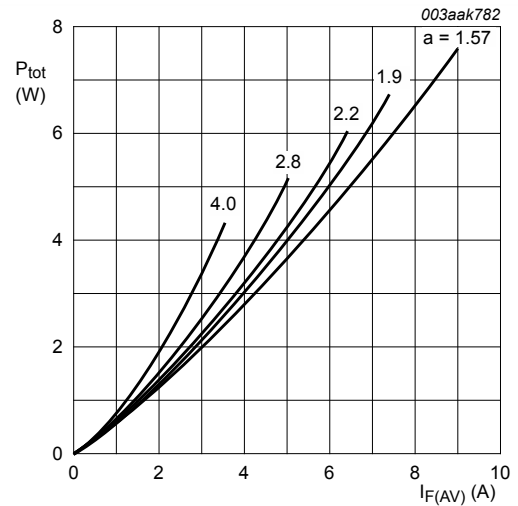
Symbol	Parameter	Conditions	Min	Max	Unit
T <sub>stg</sub>	storage temperature		-65	175	°C
T <sub>j</sub>	junction temperature		-	175	°C



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

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

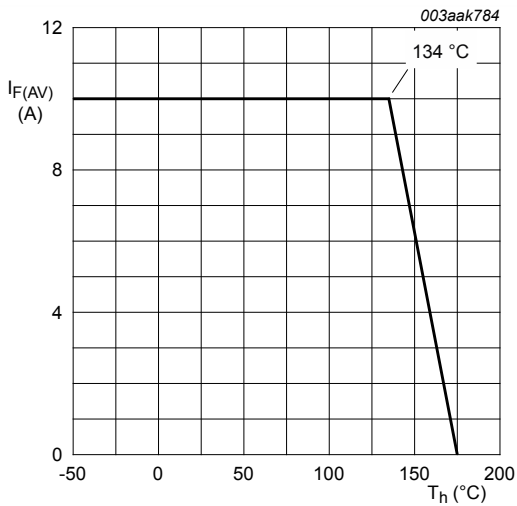
$$V_O = 0.597 \text{ V}; R_S = 0.011 \Omega$$



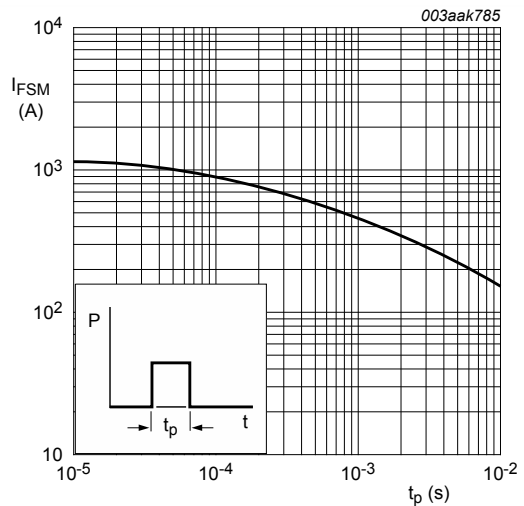
**Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values**

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

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



**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

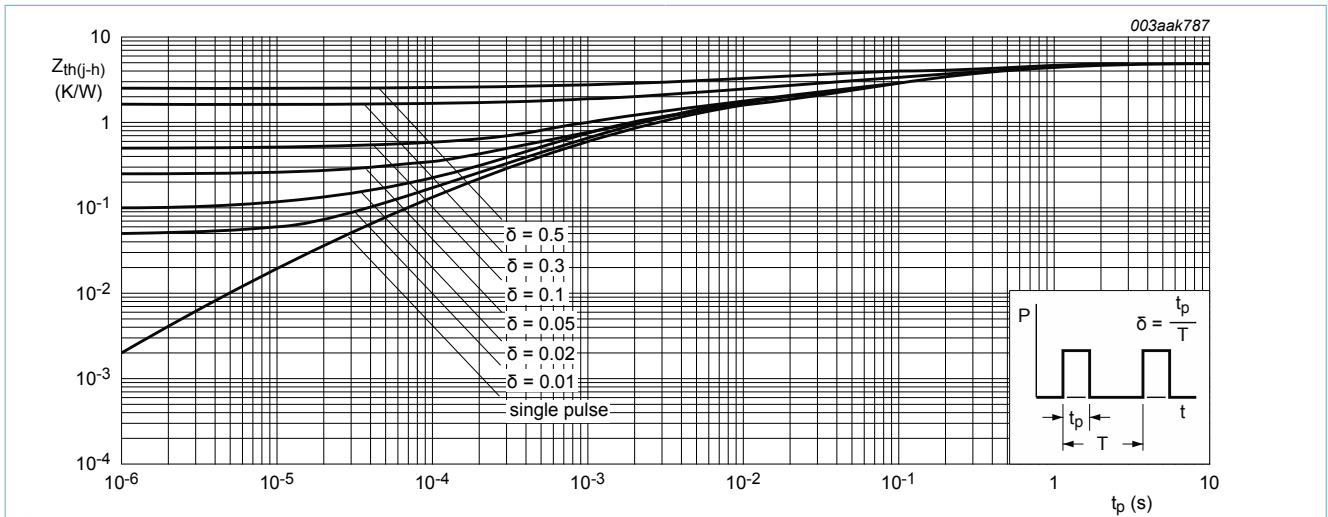


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse width; per diode; maximum values

### 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

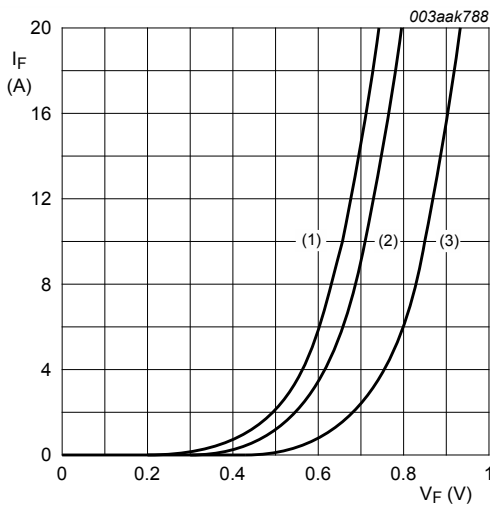


Fig. 6. Forward current as a function of forward voltage; per diode

- (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

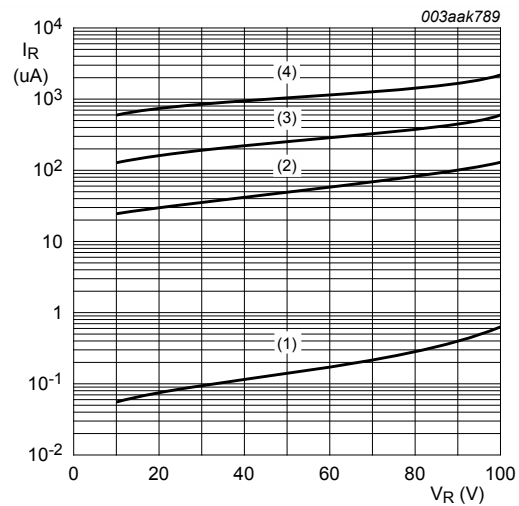


Fig. 7. Reverse leakage current as a function of reverse voltage; per diode; typical values

- (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

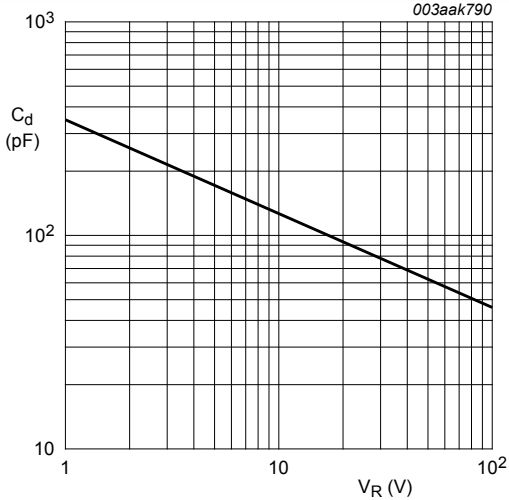


Fig. 8. Diode junction capacitance as a function of applied reverse voltage; per diode; typical values

f = 1 MHz; Tj = 25 °C

## 12. Package outline

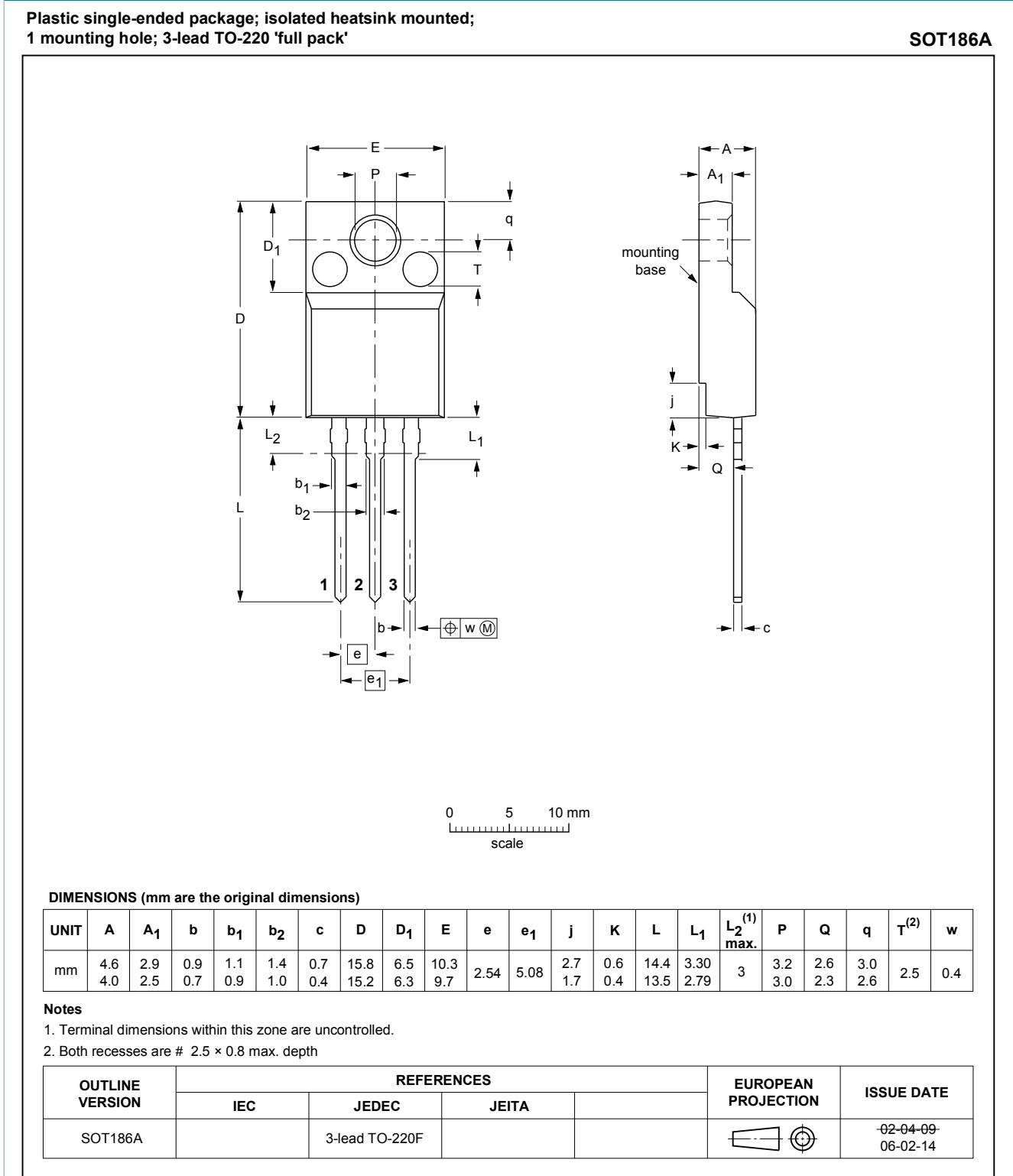


Fig. 9. Package outline TO-220F (SOT186A)

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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.
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