



# 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

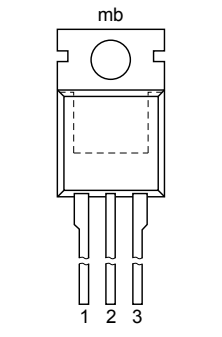
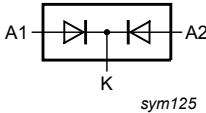
Table 1. Quick reference data

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>	
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

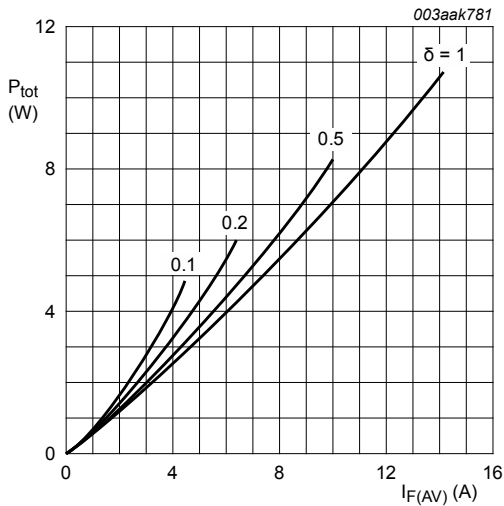
## 8. Limiting values

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

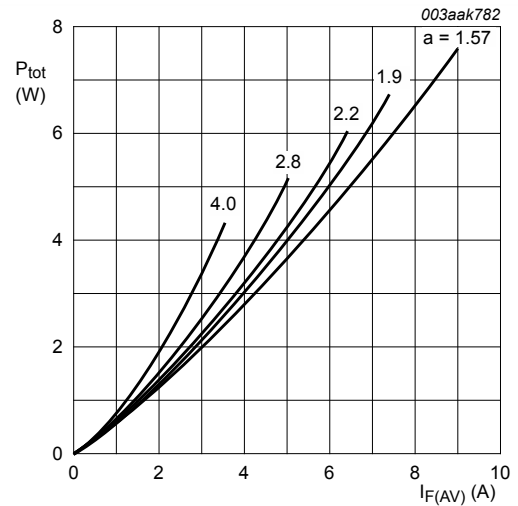
Symbol	Parameter	Conditions	Min	Max	Unit
T <sub>stg</sub>	storage temperature		-65	175	°C
T <sub>j</sub>	junction temperature		-	175	°C



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

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

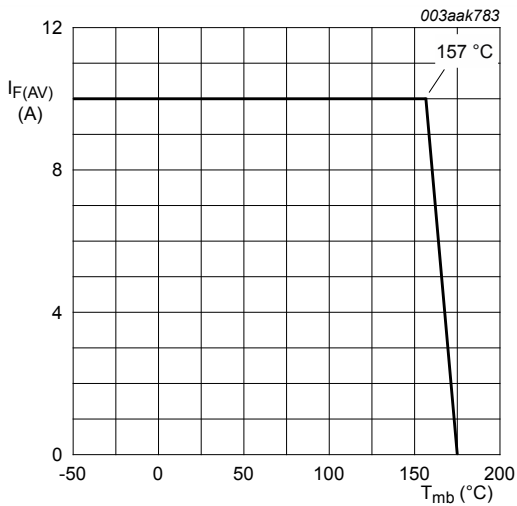
$$V_O = 0.597 \text{ V}; R_S = 0.011 \Omega$$



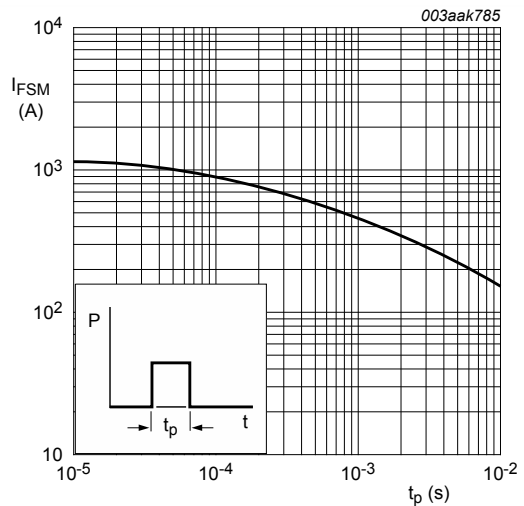
**Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values**

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

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



**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

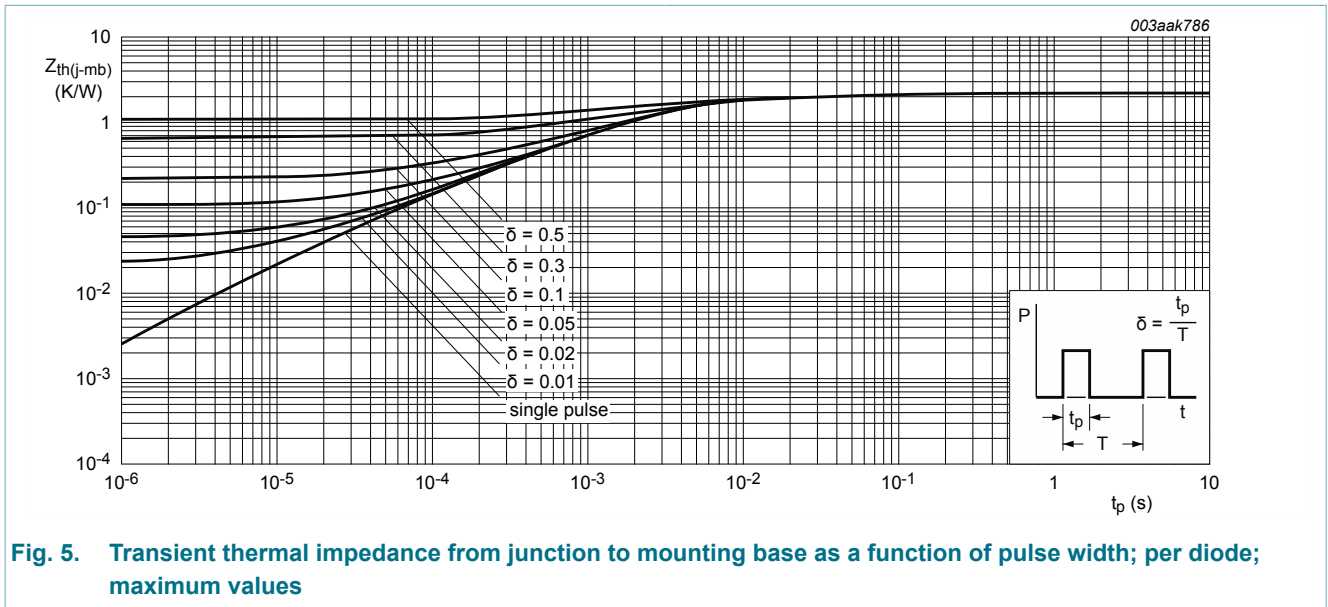
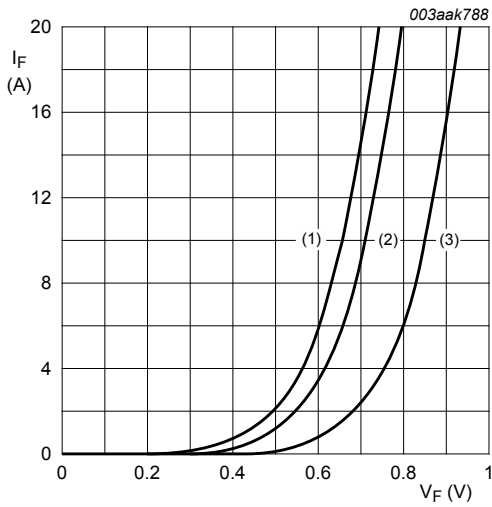


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode; maximum values

### 10. Characteristics

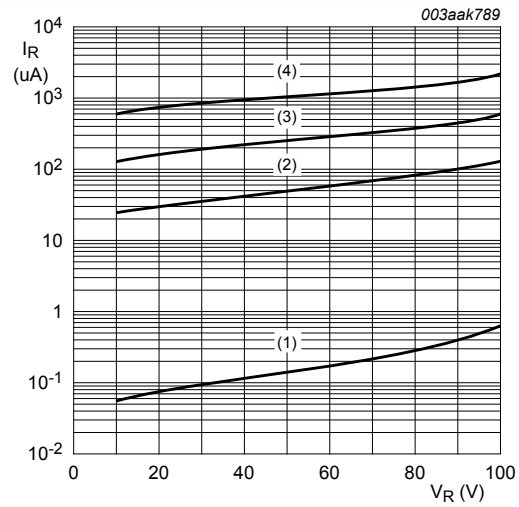
Table 7. Characteristics

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	$\text{mA}$
<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	-	$\text{pF}$



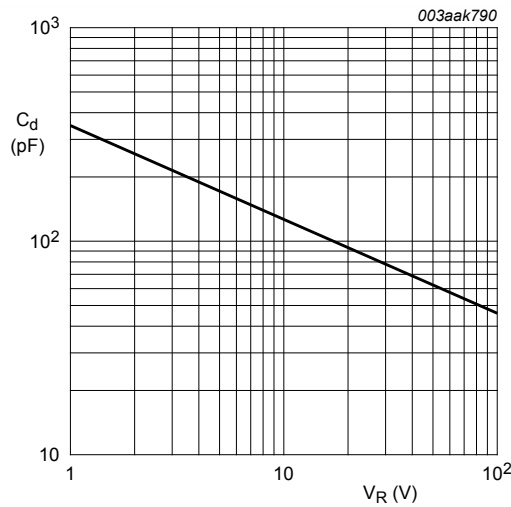
**Fig. 6. Forward current as a function of forward voltage; per diode**

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



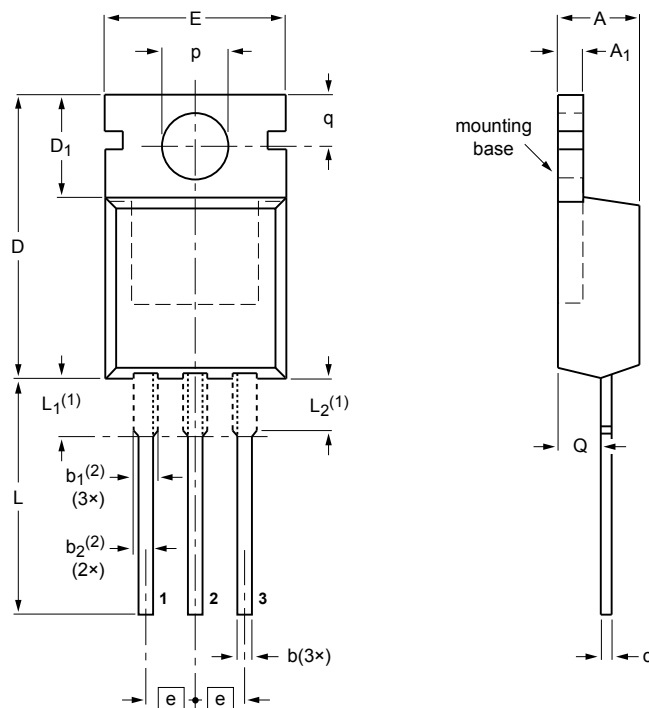
**Fig. 8. Diode junction capacitance as a function of applied reverse voltage; per diode; typical values**

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

### 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

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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.
Product [short] data sheet	Production	This document contains the product specification.

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