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	δ = 0.5 ; $T_h \leq 134$ °C; square-wave pulse; per diode; Fig. 1; Fig. 2; Fig. 3		-	-	10	A
$I_{O(AV)}$	average output current	δ = 0.5 ; square-wave pulse; both diodes conducting		-	-	20	A
T_j	junction temperature			-	-	175	°C
Static characteristics							
V_F	forward voltage	I_F = 3 A; T_j = 125 °C; Fig. 6		-	0.53	0.58	V
I_R	reverse current	V_R = 100 V; T_j = 25 °C; Fig. 7		-	-	3	µA

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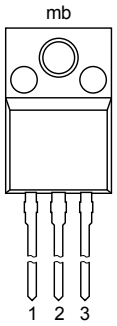
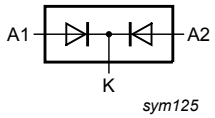
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1	 TO-220F (SOT186A)	
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; Fig. 1; Fig. 2; Fig. 3		-	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; Fig. 4		-	150	A

Symbol	Parameter	Conditions		Min	Max	Unit
T_{stg}	storage temperature			-65	175	°C
T_j	junction temperature			-	175	°C

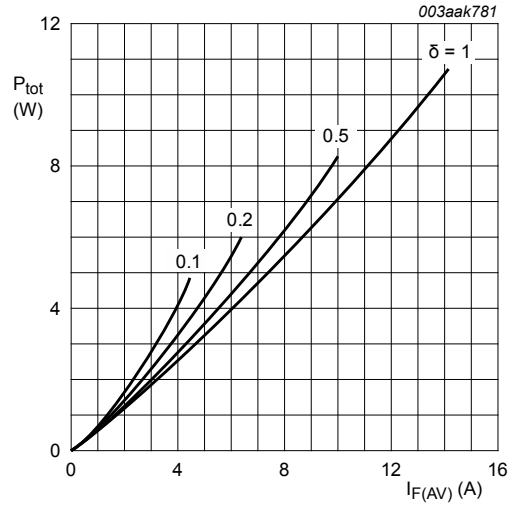


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; per diode; maximum values

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

$$V_O = 0.597\ V;\ R_S = 0.011\ \Omega$$

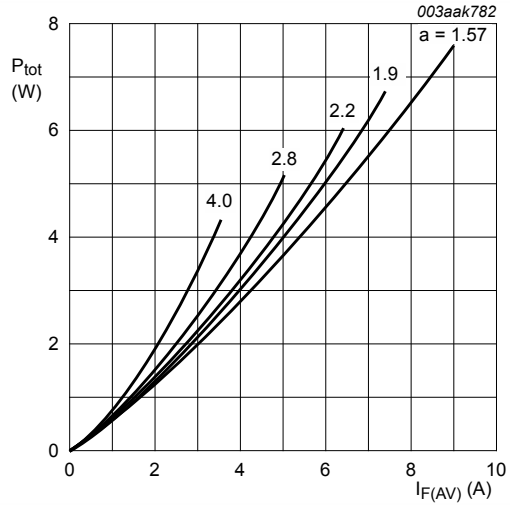


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values

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

$$V_O = 0.597\ V;\ R_S = 0.011\ \Omega$$

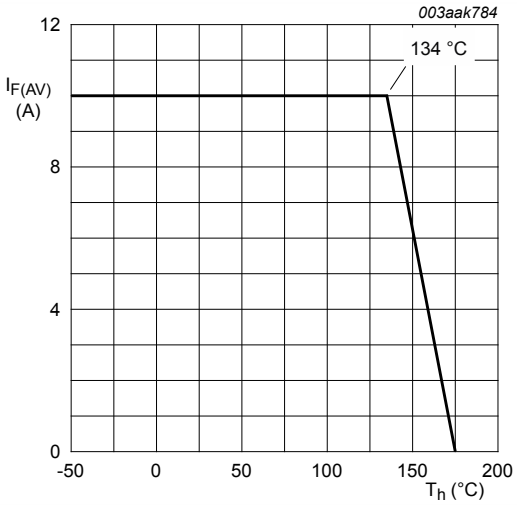


Fig. 3. Average forward current as a function of heatsink temperature; per diode; maximum values

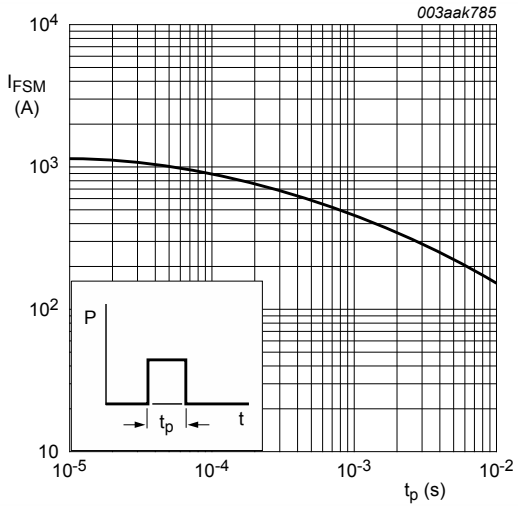


Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values

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; Fig. 5		-	-	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

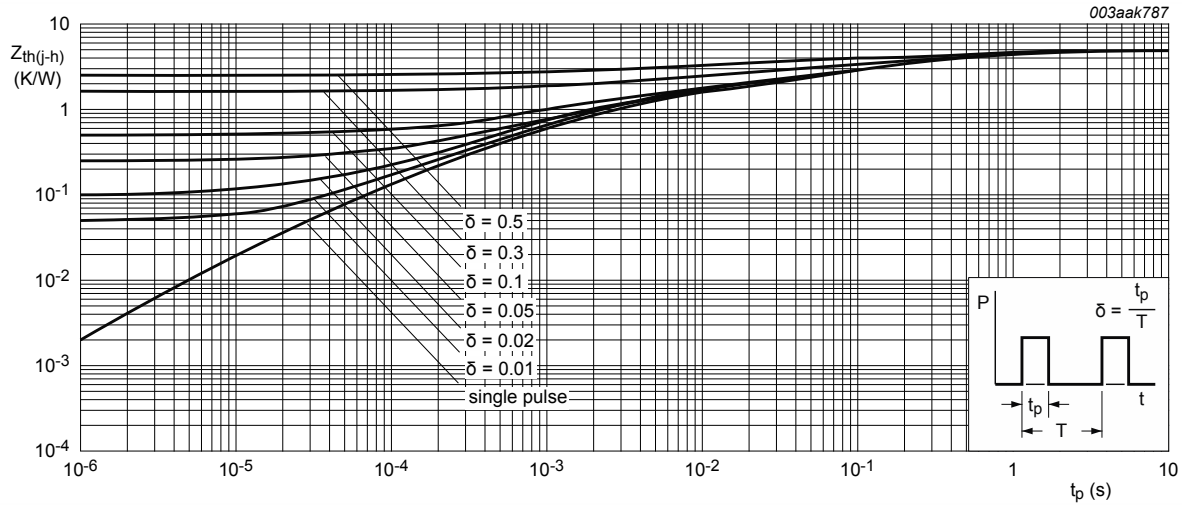


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse width; per diode; maximum values

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
Static characteristics							
V_F	forward voltage	I_F = 3 A; T_j = 25 °C; Fig. 6		-	0.67	0.72	V
		I_F = 10 A; T_j = 25 °C; Fig. 6		-	0.8	0.85	V
		I_F = 3 A; T_j = 125 °C; Fig. 6		-	0.53	0.58	V
		I_F = 10 A; T_j = 125 °C; Fig. 6		-	0.66	0.71	V
I_R	reverse current	V_R = 100 V; T_j = 25 °C; Fig. 7		-	-	3	µA
		V_R = 100 V; T_j = 125 °C; Fig. 7		-	-	3	mA
Dynamic characteristics							
C_d	diode capacitance	f = 1 MHz; V_R = 10 V; T_j = 25 °C; Fig. 8		-	130	-	pF

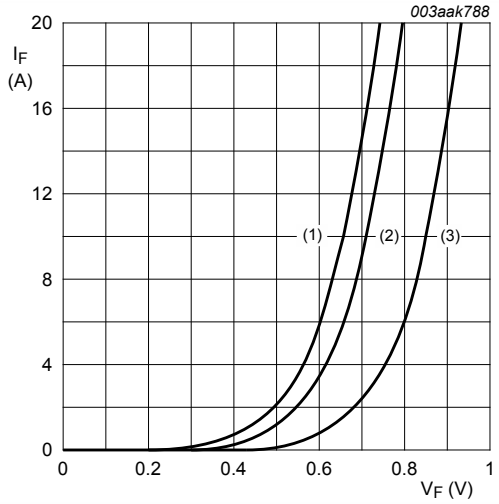


Fig. 6. Forward current as a function of forward voltage; per diode

(1) T_j = 125 °C; typical values;
(2) T_j = 125 °C; maximum values;
(3) T_j = 25 °C; maximum values;
V_O = 0.597 V; R_S = 0.011 Ω

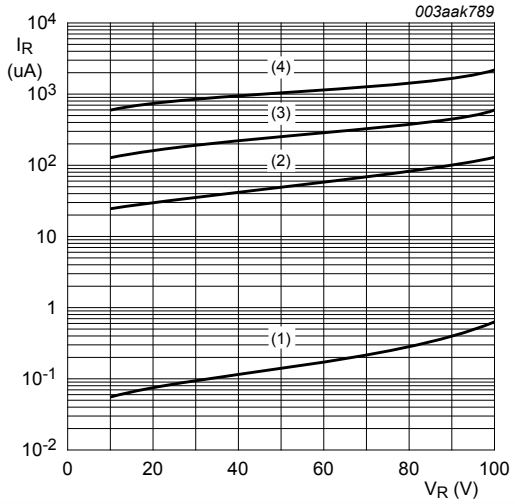


Fig. 7. Reverse leakage current as a function of reverse voltage; per diode; typical values

(1) T_j = 25 °C; typical values;
(2) T_j = 100 °C; typical values;
(3) T_j = 125 °C; typical values;
(4) T_j = 150 °C; typical values

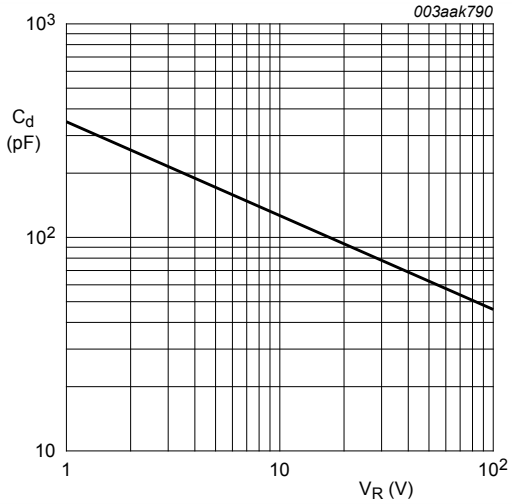


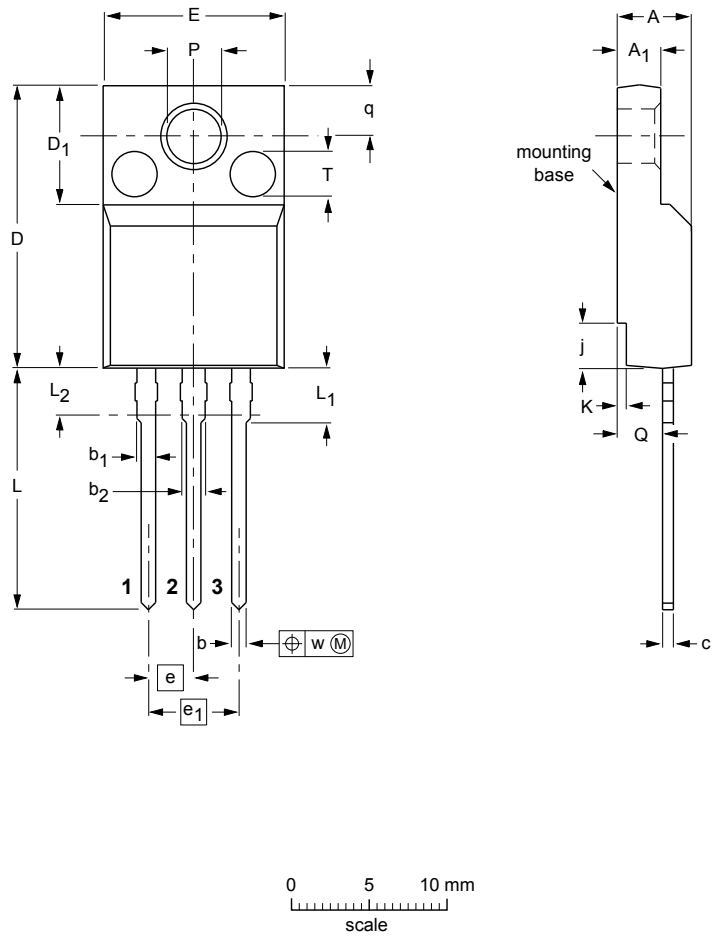
Fig. 8. Diode junction capacitance as a function of applied reverse voltage; per diode; typical values

$f = 1\ MHz;\ T_j = 25\ °C$

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_1	b	b_1	b_2	c	D	D_1	E	e	e_1	j	K	L	L_1	L_2 (1) max.	P	Q	q	T (2)	w
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	1.4 1.0	0.7 0.4	15.8 15.2	6.5 6.3	10.3 9.7	2.54	5.08	2.7 1.7	0.6 0.4	14.4 13.5	3.30 2.79	3	3.2 3.0	2.6 2.3	3.0 2.6	2.5	0.4

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

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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.
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