NXPS20H100CX

Dual power Schottky diode

Rev. 2 — 24 May 2012 **Product data sheet**

1. Product profile

1.1 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.

1.2 Features and benefits

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

1.3 Applications

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

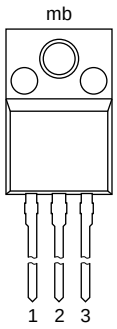
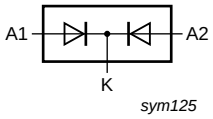
1.4 Quick reference data

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	square-wave pulse; δ = 0.5 ; $T_h \leq 147$ °C; per diode; see Figure 1; see Figure 2; see Figure 3	-	-	10	A
$I_{O(AV)}$	average output current	square-wave pulse; δ = 0.5 ; $T_h \leq 128$ °C; both diodes conducting	-	-	20	A
T_j	junction temperature		-	-	175	°C
Static characteristics						
V_F	forward voltage	I_F = 10 A; T_j = 25 °C; see Figure 6	-	-	0.77	V
		I_F = 10 A; T_j = 125 °C; see Figure 6	-	0.59	0.64	V
I_R	reverse current	V_R = 100 V; T_j = 25 °C; see Figure 7	-	2	4.5	µA
		V_R = 100 V; T_j = 125 °C; see Figure 7	-	1	6	mA

2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode 1		
2	K	cathode		
3	A2	anode 2		
mb	n.c.	mb; isolated		

SOT186A (TO-220F)

3. Ordering information

Table 3. Ordering information

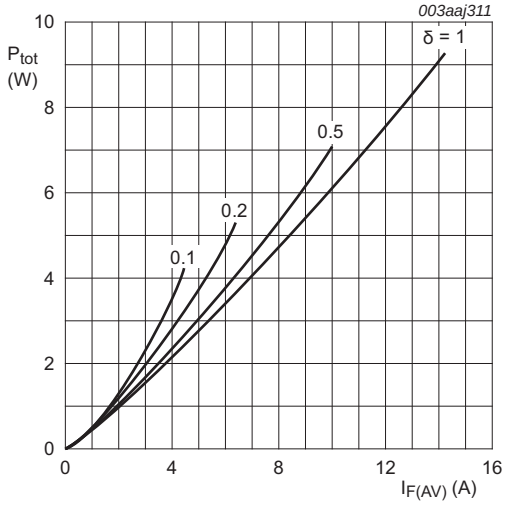
Type number	Package		
	Name	Description	Version
NXPS20H100CX	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A

4. Limiting values

Table 4. Limiting values

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

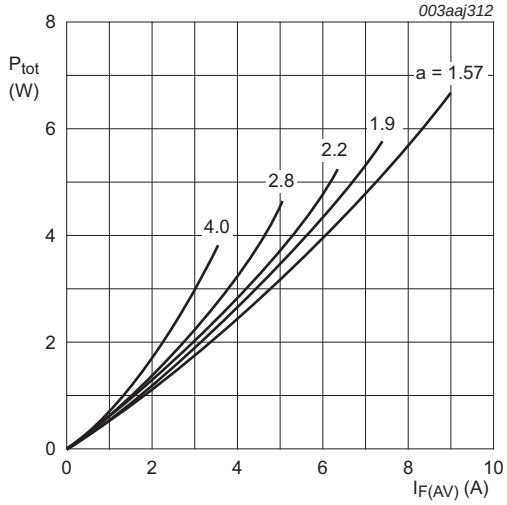
Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	100	V
$I_{F(AV)}$	average forward current	square-wave pulse; δ = 0.5 ; $T_h \leq 147$ °C; per diode; see Figure 1; see Figure 2; see Figure 3	-	10	A
$I_{O(AV)}$	average output current	square-wave pulse; δ = 0.5 ; $T_h \leq 128$ °C; both diodes conducting	-	20	A
I_{FSM}	non-repetitive peak forward current	sine-wave pulse; t_p = 10 ms; $T_{j(init)}$ = 25 °C; see Figure 4	-	250	A
T_{stg}	storage temperature		-65	175	°C
T_j	junction temperature		-	175	°C



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

$V_O = 0.516$ V; $R_S = 0.010\ \Omega$

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



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

$V_O = 0.516$ V; $R_S = 0.010\ \Omega$

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

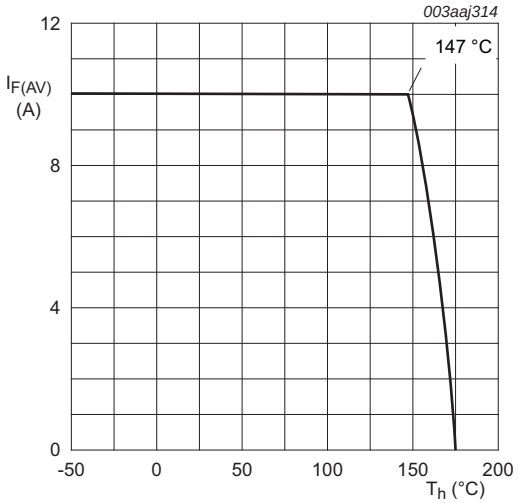


Fig 3. Average forward current as a function of heatsink temperature; per diode; maximum values

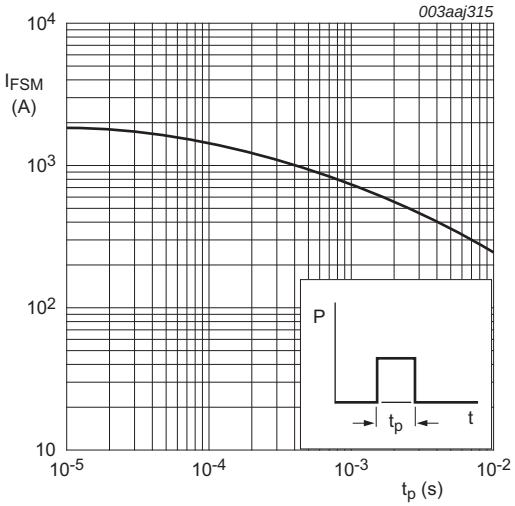


Fig 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values

5. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; per diode; see Figure 5	-	-	4	K/W
		with heatsink compound; both diodes conducting	-	-	3.2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	55	-	K/W

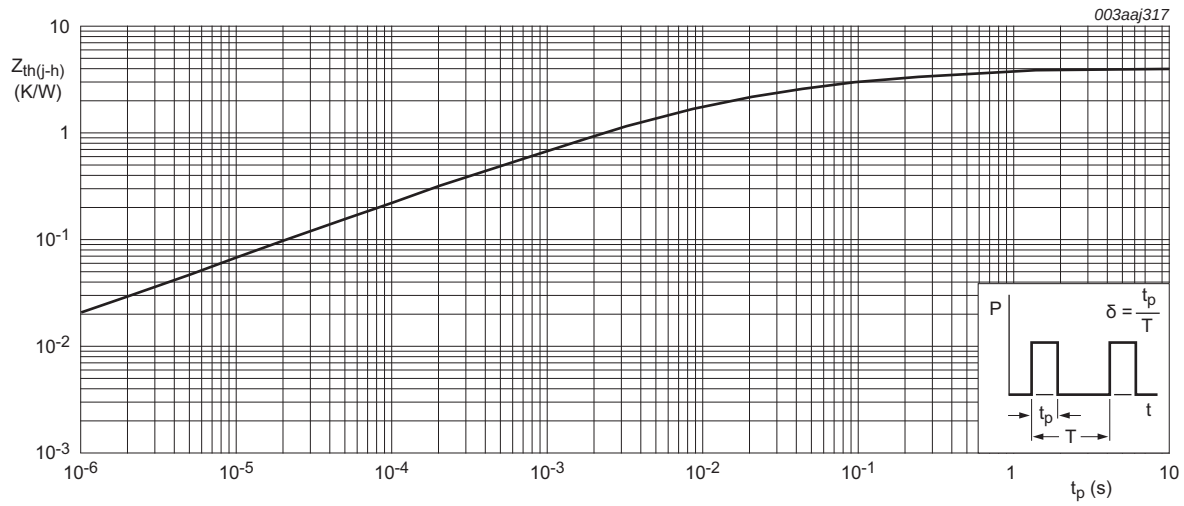


Fig 5. Transient thermal impedance from junction to heatsink as a function of pulse width; per diode

6. Isolation characteristics

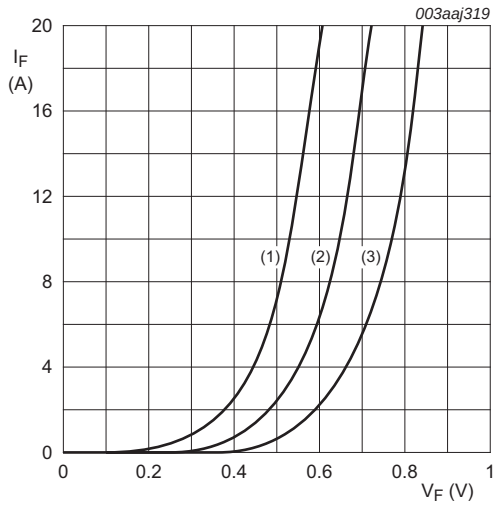
Table 6. Isolation characteristics

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

7. Characteristics

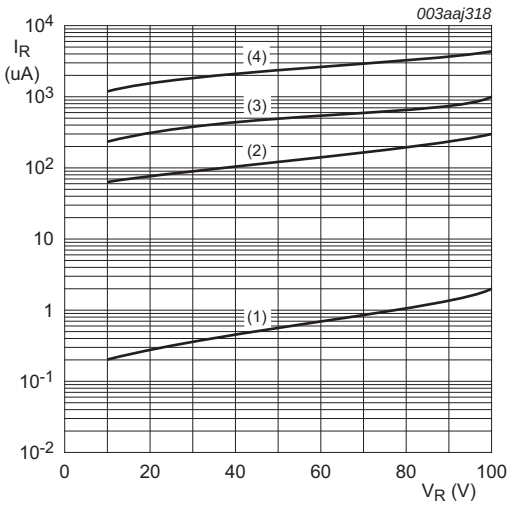
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
V_F	forward voltage	I_F = 8 A; T_j = 25 °C; see Figure 6	-	-	0.71	V
		I_F = 10 A; T_j = 25 °C; see Figure 6	-	-	0.77	V
		I_F = 16 A; T_j = 25 °C; see Figure 6	-	-	0.81	V
		I_F = 20 A; T_j = 25 °C; see Figure 6	-	-	0.88	V
		I_F = 8 A; T_j = 125 °C; see Figure 6	-	0.56	0.58	V
		I_F = 10 A; T_j = 125 °C; see Figure 6	-	0.59	0.64	V
		I_F = 16 A; T_j = 125 °C; see Figure 6	-	0.65	0.68	V
		I_F = 20 A; T_j = 125 °C; see Figure 6	-	0.67	0.73	V
I_R	reverse current	V_R = 100 V; T_j = 25 °C; see Figure 7	-	2	4.5	µA
		V_R = 100 V; T_j = 125 °C; see Figure 7	-	1	6	mA
Dynamic characteristics						
C_d	diode capacitance	f = 1 MHz; V_R = 10 V; T_j = 25 °C; see Figure 8	-	250	-	pF



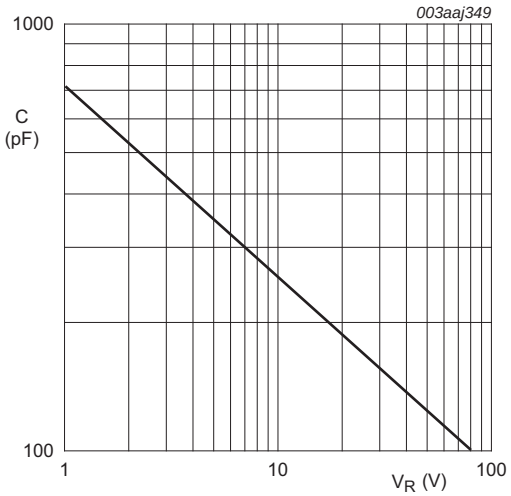
(1) T_j = 125 °C; typical values;
(2) T_j = 125 °C; maximum values;
(3) T_j = 25 °C; maximum values;
V_O = 0.516 V; R_S = 0.010 Ω

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



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



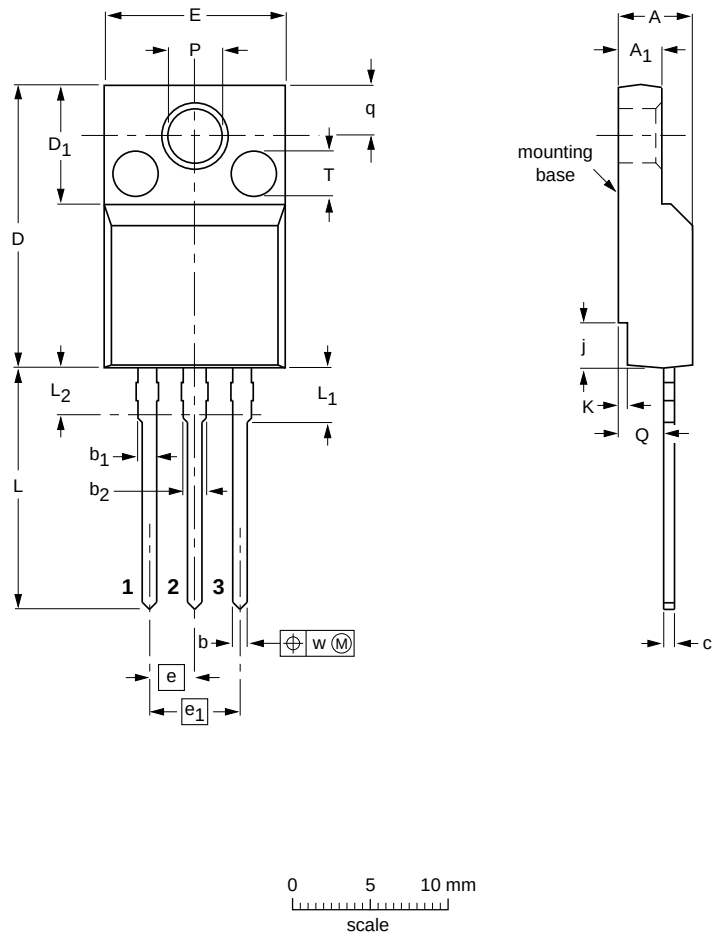
$f = 1\ MHz;\ T_j = 25\ °C$

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

8. 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 SOT186A (TO-220F)

9. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
NXPS20H100CX v.2	20120524	Product data sheet	-	NXPS20H100CX v.1
Modifications:	• Status changed from preliminary to product. • Various changes to content.			
NXPS20H100CX v.1	20120420	Preliminary data sheet	-	-

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10.1 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.
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Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".

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12. Contents

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