# NXPS20H110C

## 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 SOT78 (TO-220AB) plastic package.

### 1.2 Features and benefits

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

### 1.3 Applications

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

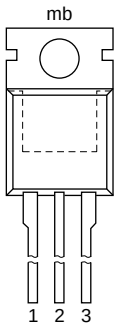
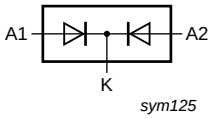
### 1.4 Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{RRM}$ | repetitive peak reverse voltage | | - | - | 110 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; δ = 0.5 ; $T_j \leq 163$ °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 ; $T_{mb} \leq 161$ °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 | $V_R$ = 110 V; $T_j$ = 25 °C; see Figure 7 | - | 2.5 | 6 | µA |
| | | $V_R$ = 110 V; $T_j$ = 125 °C; see Figure 7 | - | 1.5 | 6.5 | 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 | K | mounting base; cathode | | |



**SOT78 (TO-220AB)**



## 3. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| NXPS20H110C | TO-220AB | plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB | SOT78 |

## 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 | | - | 110 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; δ = 0.5 ; $T_j \leq 163$ °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 ; $T_{mb} \leq 161$ °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 |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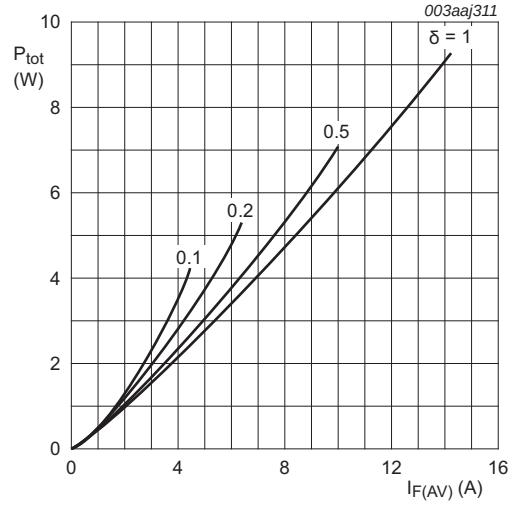
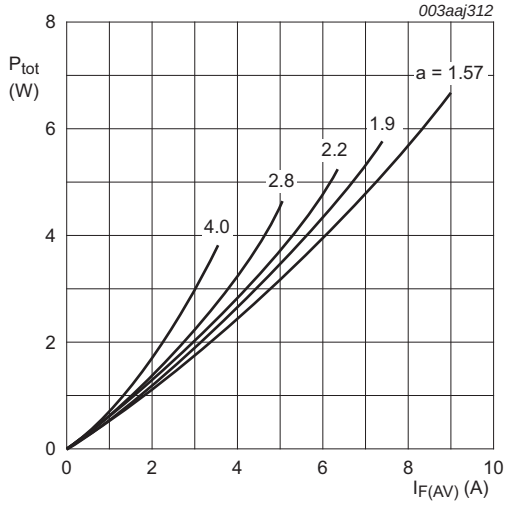



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

$V_O = 0.516$ 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**

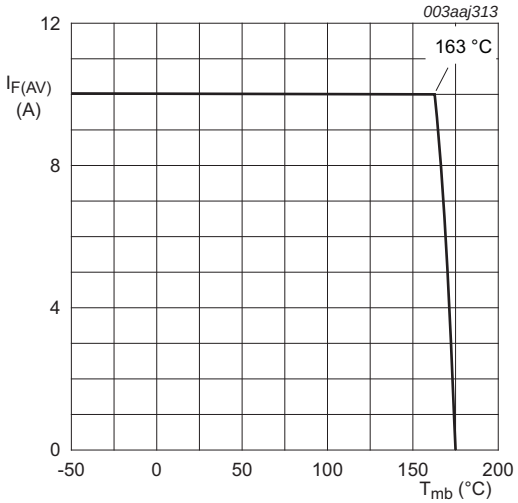



**Fig 3. Average forward current as a function of mounting base temperature; per diode; maximum values**

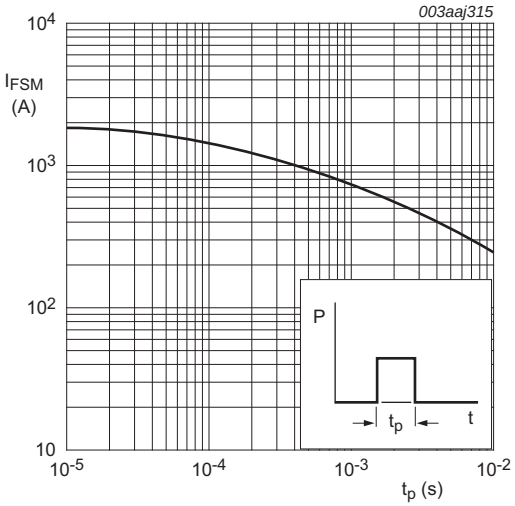



**Fig 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values**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## 5. Thermal characteristics

**Table 5. 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; see Figure 5 | - | - | 1.6 | K/W |
| | | with heatsink compound; both diodes conducting | - | - | 0.9 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | - | 60 | - | K/W |

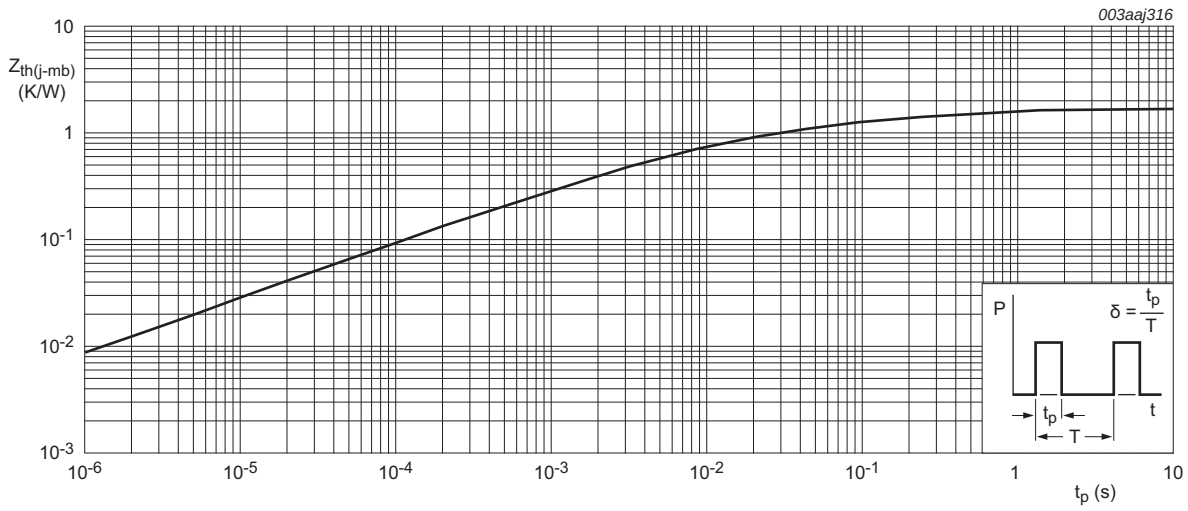


**Fig 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode**


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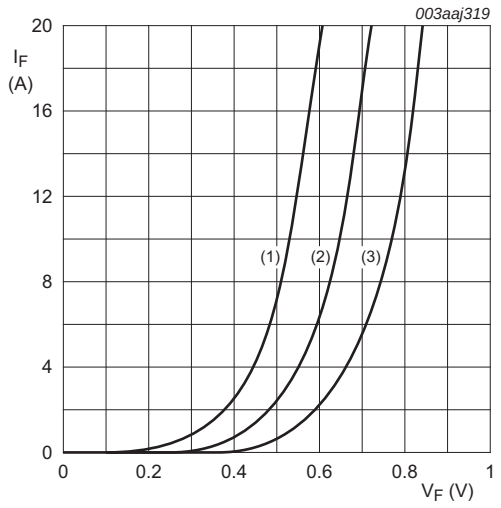
# 6. Characteristics

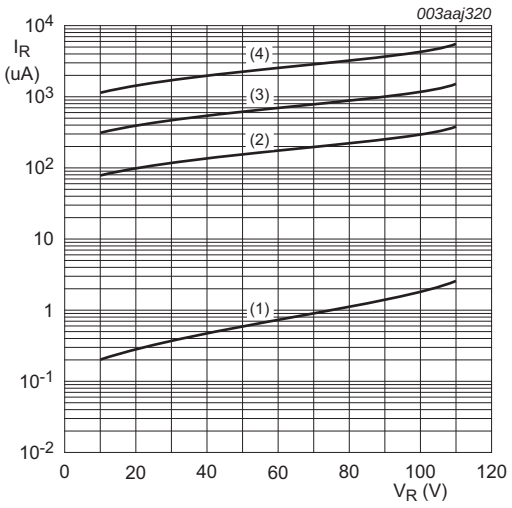
**Table 6. Characteristics**

| 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 | $V_R$ = 110 V; $T_j$ = 25 °C; see Figure 7 | - | 2.5 | 6 | µA |
| | | $V_R$ = 110 V; $T_j$ = 125 °C; see Figure 7 | - | 1.5 | 6.5 | 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**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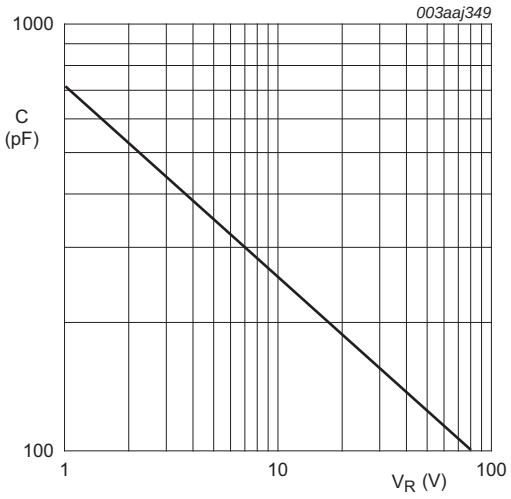


$f = 1\ MHz;\ T_j = 25\ °C$

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


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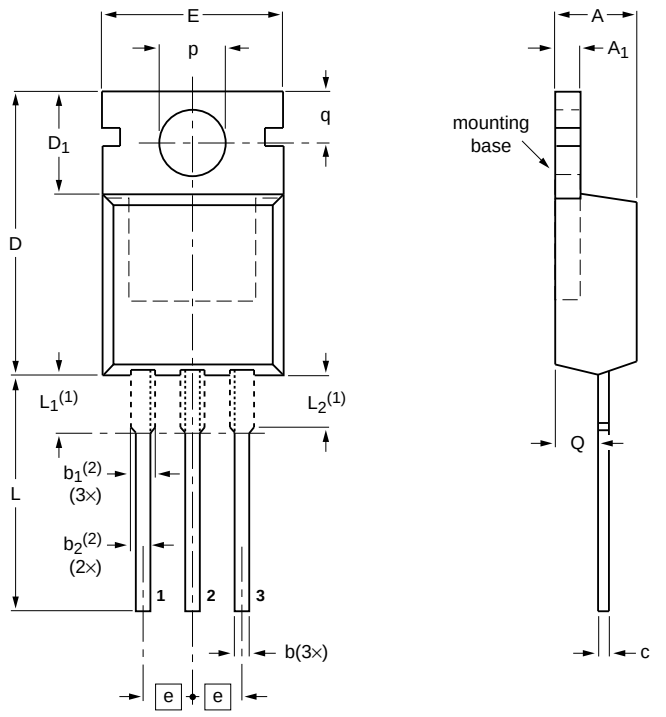
# 7. Package outline

**Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB** **SOT78**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ | b | $b_1$(2) | $b_2$(2) | c | D | $D_1$ | E | e | L | $L_1$(1) | $L_2$(1) max. | p | q | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 4.7<br>4.1 | 1.40<br>1.25 | 0.9<br>0.6 | 1.6<br>1.0 | 1.3<br>1.0 | 0.7<br>0.4 | 16.0<br>15.2 | 6.6<br>5.9 | 10.3<br>9.7 | 2.54 | 15.0<br>12.8 | 3.30<br>2.79 | 3.0 | 3.8<br>3.5 | 3.0<br>2.7 | 2.6<br>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~~<br>08-06-13 |

**Fig 9. Package outline SOT78 (TO-220AB)**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## 8. Revision history

**Table 7. Revision history**

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| NXPS20H110C v.2 | 20120524 | Product data sheet | - | NXPS20H110C v.1 |
| Modifications: | • Status changed from preliminary to product.<br>• Various changes to content. | | | |
| NXPS20H110C v.1 | 20120420 | Preliminary data sheet | - | - |


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|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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[2] The term 'short data sheet' is explained in section "Definitions".

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