



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

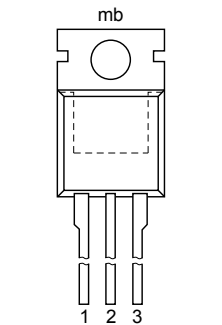
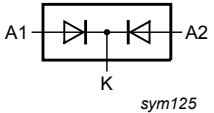
Table 1. Quick reference data

| 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; 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 |
| 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 | μ 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; 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 | $t_p = 10\text{ ms}$; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$; 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 |

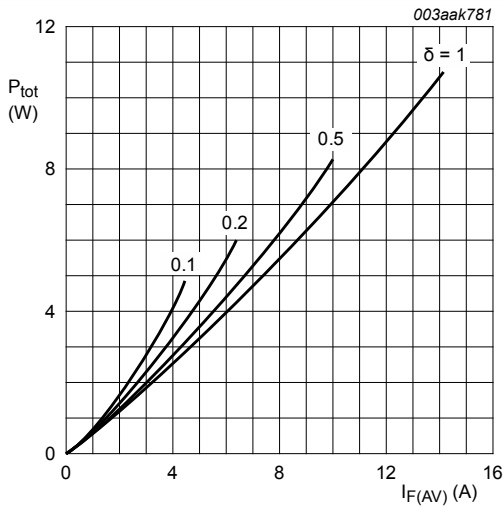


Fig. 1. Forward power dissipation as a function of average forward current; square waveform; per diode; maximum values

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

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

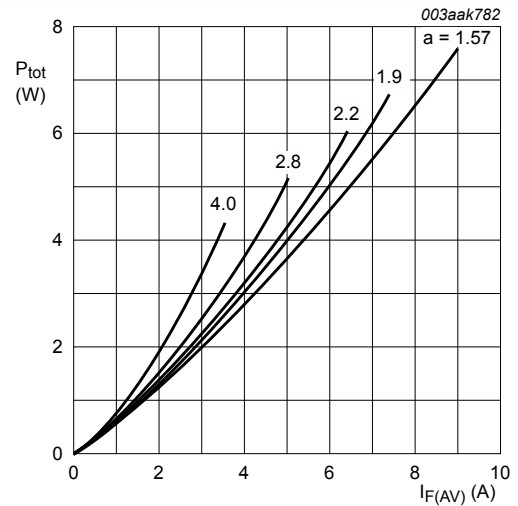


Fig. 2. Forward power dissipation as a function of average forward current; sinusoidal waveform; per diode; maximum values

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

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

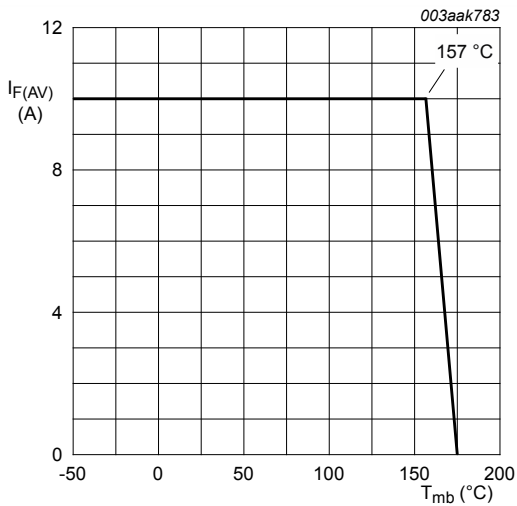


Fig. 3. Average forward current as a function of mounting base temperature; per diode; maximum values

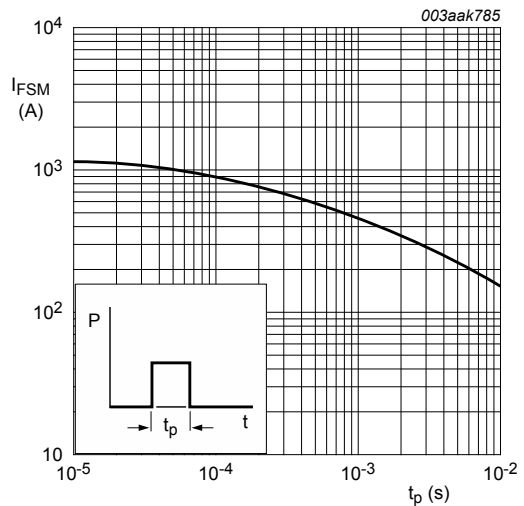


Fig. 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values

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; Fig. 5 | - | - | 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 |

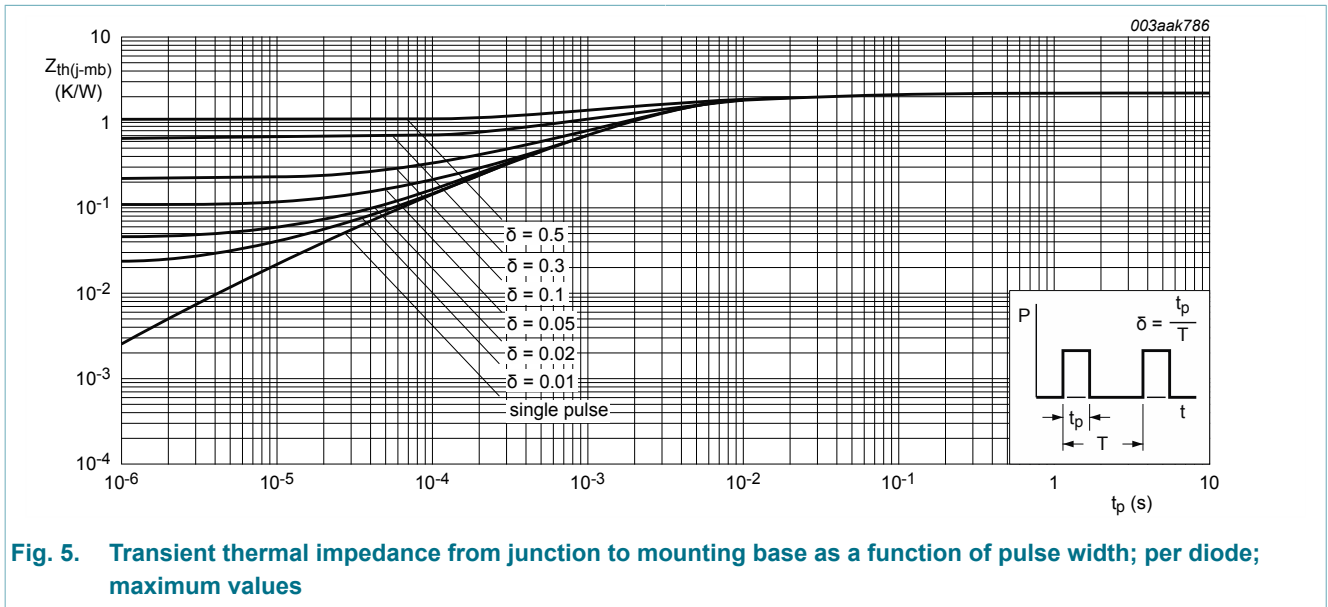


Fig. 5. Transient thermal impedance from junction to mounting base as a function of pulse width; per diode; maximum values

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------|---|-----|------|------|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 3\text{ A}; T_j = 25\text{ °C};$ Fig. 6 | - | 0.67 | 0.72 | V |
| | | $I_F = 10\text{ A}; T_j = 25\text{ °C};$ Fig. 6 | - | 0.8 | 0.85 | V |
| | | $I_F = 3\text{ A}; T_j = 125\text{ °C};$ Fig. 6 | - | 0.53 | 0.58 | V |
| | | $I_F = 10\text{ A}; T_j = 125\text{ °C};$ Fig. 6 | - | 0.66 | 0.71 | V |
| I_R | reverse current | $V_R = 100\text{ V}; T_j = 25\text{ °C};$ Fig. 7 | - | - | 3 | μA |
| | | $V_R = 100\text{ V}; T_j = 125\text{ °C};$ Fig. 7 | - | - | 3 | mA |
| Dynamic characteristics | | | | | | |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 10\text{ V}; T_j = 25\text{ °C};$ Fig. 8 | - | 130 | - | pF |

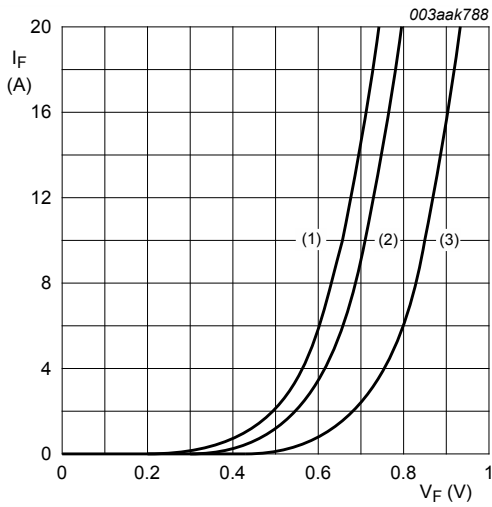


Fig. 6. Forward current as a function of forward voltage; per diode

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

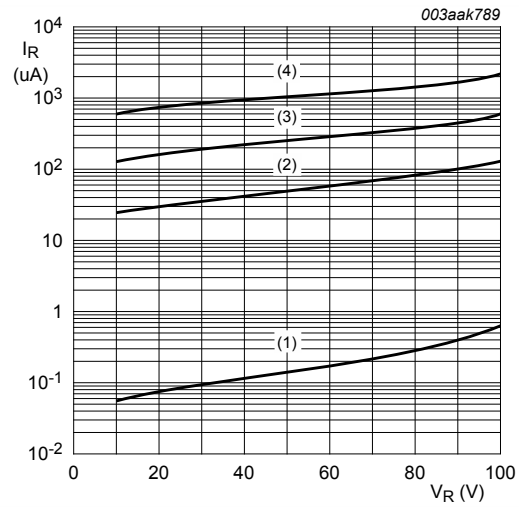


Fig. 7. Reverse leakage current as a function of reverse voltage; per diode; typical values

- (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

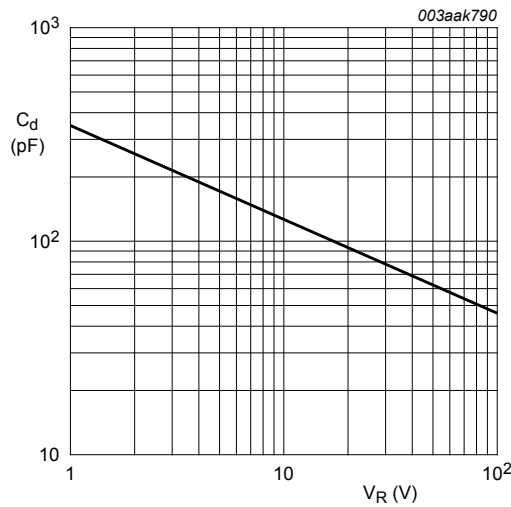


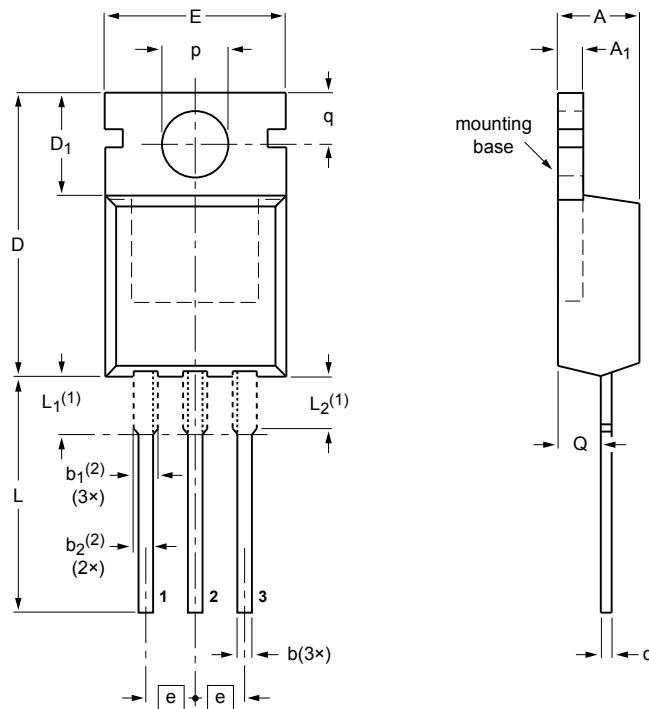
Fig. 8. Diode junction capacitance as a function of applied reverse voltage; per diode; typical values

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

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 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 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

- Lead shoulder designs may vary.
- 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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|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
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