



IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

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WeEn Semiconductors





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

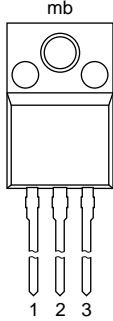
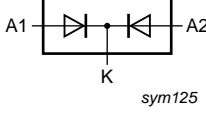
Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------------|---------------------------------|--|-----|------|------|---------|
| V_{RRM} | repetitive peak reverse voltage | | - | - | 100 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_h \leq 147$ °C; per diode; see Figure 1 ; see Figure 2 ; see Figure 3 | - | - | 10 | A |
| $I_{O(AV)}$ | average output current | square-wave pulse; $\delta = 0.5$; $T_h \leq 128$ °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 | μ A |
| | | $V_R = 100$ 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

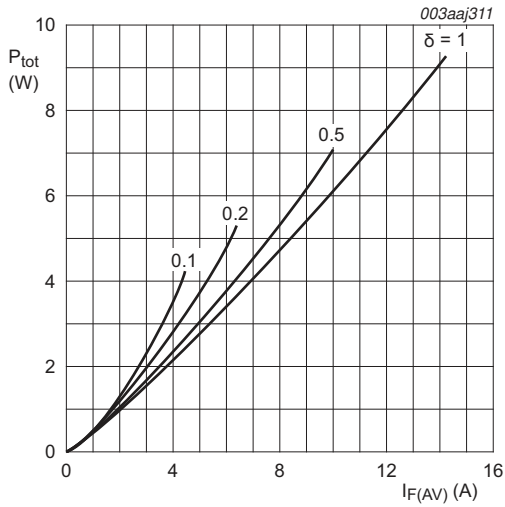
| Type number | Package | | |
|--------------|---------|---|---------|
| | Name | Description | Version |
| NXPS20H100CX | TO-220F | plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack" | SOT186A |

4. Limiting values

Table 4. Limiting values

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

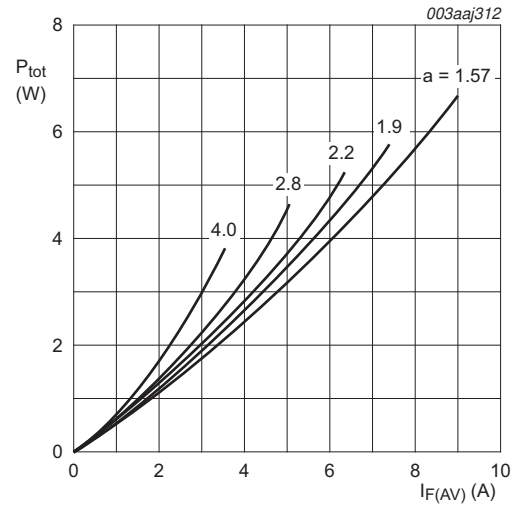
| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------|-------------------------------------|--|-----|-----|------|
| V_{RRM} | repetitive peak reverse voltage | | - | 100 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_h \leq 147$ °C; per diode; see Figure 1 ; see Figure 2 ; see Figure 3 | - | 10 | A |
| $I_{O(AV)}$ | average output current | square-wave pulse; $\delta = 0.5$; $T_h \leq 128$ °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 |



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

$V_O = 0.516 \text{ V}; R_S = 0.010 \Omega$

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



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

$V_O = 0.516 \text{ V}; R_S = 0.010 \Omega$

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

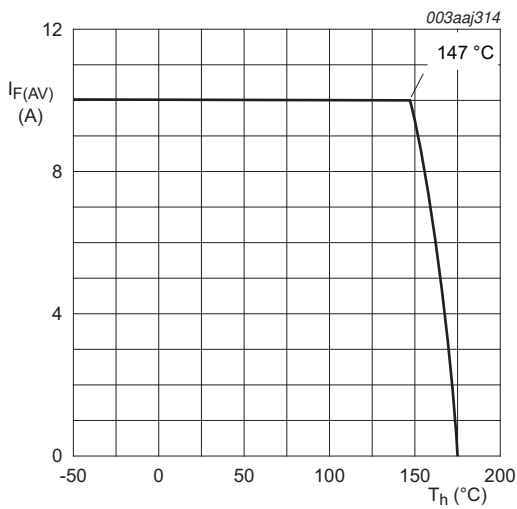


Fig 3. Average forward current as a function of heatsink temperature; per diode; maximum values

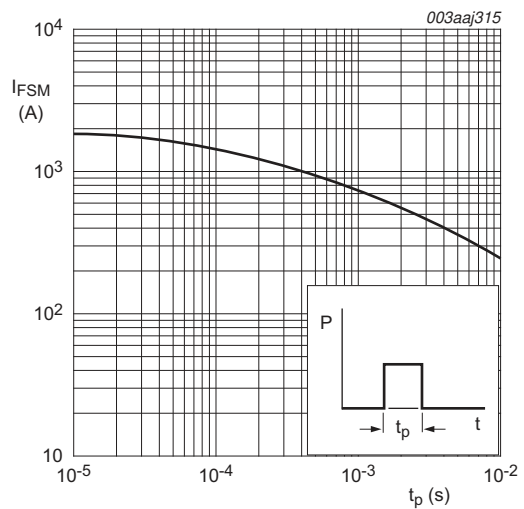
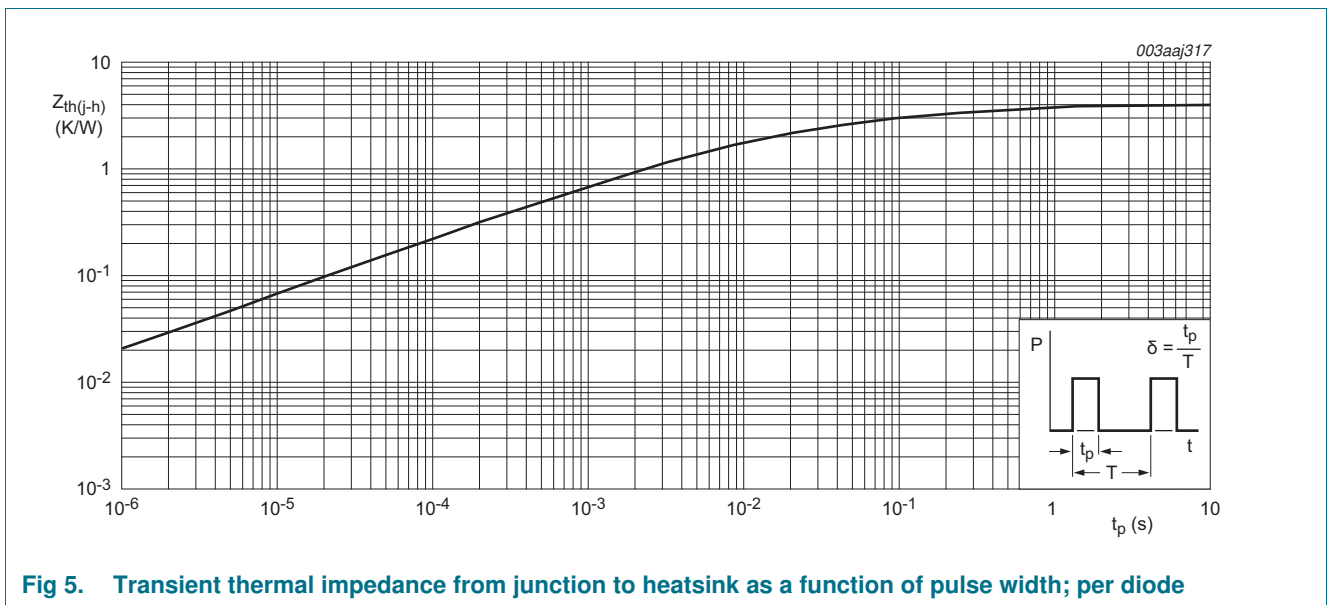


Fig 4. Non-repetitive peak forward current as a function of pulse width; square waveform; per diode; maximum values

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 |



6. Isolation characteristics

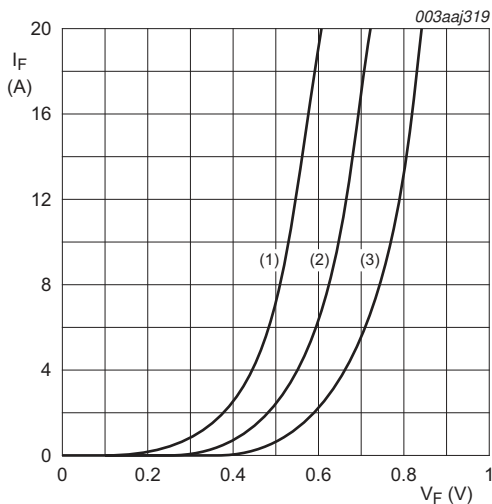
Table 6. Isolation characteristics

| 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

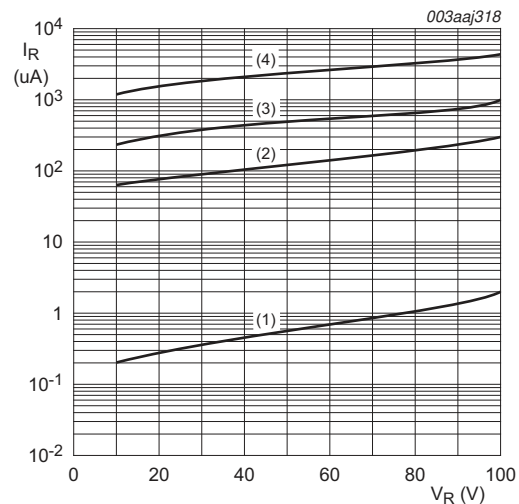
Table 7. Characteristics

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



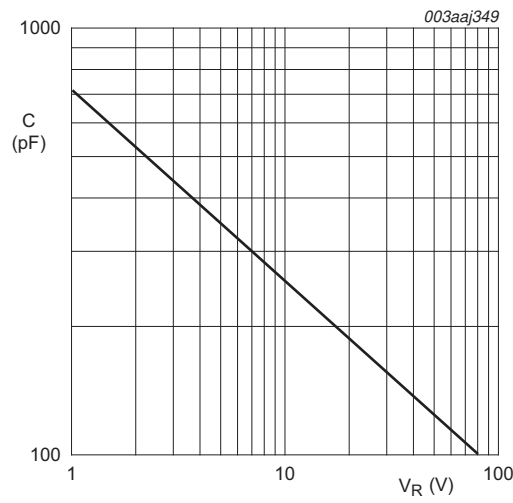
(1) $T_j = 125 \text{ }^\circ\text{C};$ typical values;
 (2) $T_j = 125 \text{ }^\circ\text{C};$ maximum values;
 (3) $T_j = 25 \text{ }^\circ\text{C};$ maximum values;
 $V_O = 0.516 \text{ V}; R_S = 0.010 \text{ } \Omega$

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



(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 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

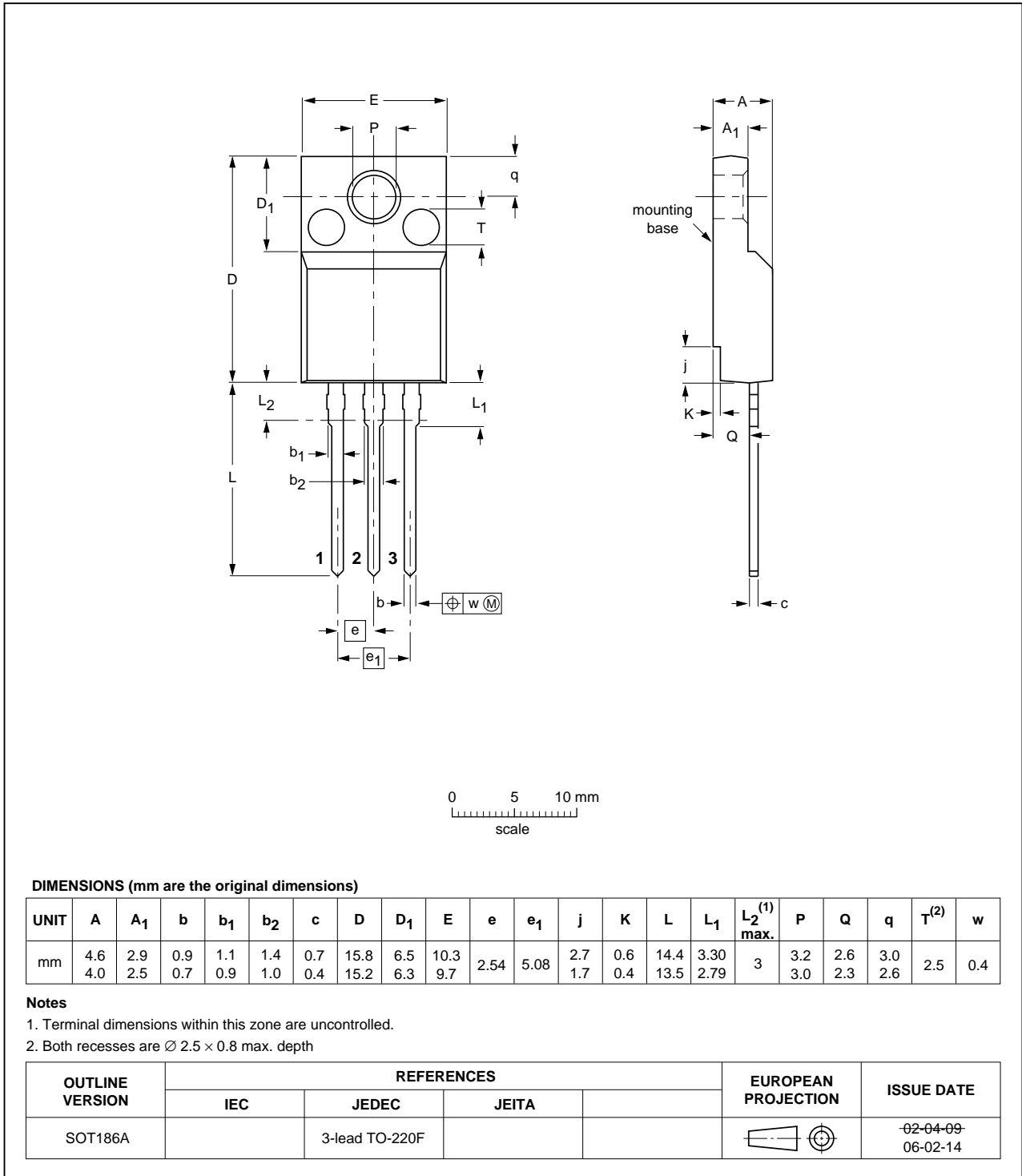


Fig 9. Package outline SOT186A (TO-220F)

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: | <ul style="list-style-type: none">• Status changed from preliminary to product.• Various changes to content. | | | |
| NXPS20H100CX v.1 | 20120420 | Preliminary data sheet | - | - |

10. Legal information

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. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.

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

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12. Contents

1 Product profile1

1.1 General description1

1.2 Features and benefits1

1.3 Applications1

1.4 Quick reference data1

2 Pinning information2

3 Ordering information2

4 Limiting values2

5 Thermal characteristics4

6 Isolation characteristics4

7 Characteristics5

8 Package outline7

9 Revision history8

10 Legal information9

10.1 Data sheet status9

10.2 Definitions9

10.3 Disclaimers9

10.4 Trademarks10

11 Contact information10

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