



IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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Thank you for your cooperation and understanding,

WeEn Semiconductors





BYV25FX-600

Enhanced ultrafast power diode

Rev. 02 — 7 March 2011

Product data sheet

1. Product profile

1.1 General description

Enhanced ultrafast power diode in a SOD113 (2-lead TO-220F) plastic package.

1.2 Features and benefits

- High thermal cycling performance
- Isolated package
- Low on-state losses
- Low thermal resistance
- Soft recovery characteristic

1.3 Applications

- Dual Mode (DCM and CCM) PFC
- Power Factor Correction (PFC) for Interleaved Topology

1.4 Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|---------------------------------|---|-----|------|-----|------|
| V_{RRM} | repetitive peak reverse voltage | | - | - | 600 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_h \leq 97\text{ }^\circ\text{C}$; see Figure 1 ; see Figure 2 | - | - | 5 | A |
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 5\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 5 | - | 1.3 | 1.9 | V |
| | | $I_F = 5\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; see Figure 5 | - | 1.1 | 1.7 | V |
| Dynamic characteristics | | | | | | |
| t_{rr} | reverse recovery time | $I_F = 1\text{ A}$; $V_R = 30\text{ V}$; $di_F/dt = 100\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$; see Figure 6 | - | 17.5 | 35 | ns |



2. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------------|--------------------|----------------|
| 1 | K | cathode | | |
| 2 | A | anode | | |
| mb | n.c. | mounting base; isolated | | |

SOD113 (TO-220F)

3. Ordering information

Table 3. Ordering information

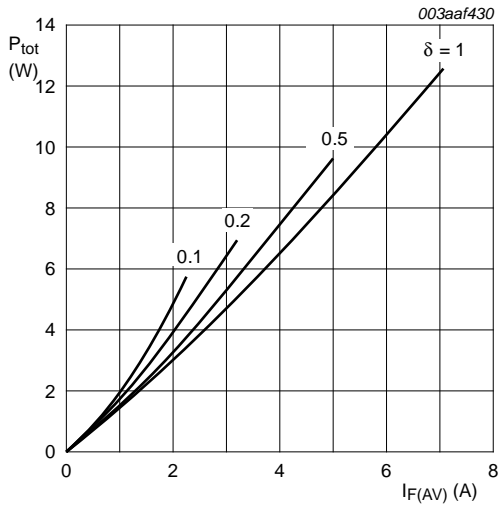
| Type number | Package | | |
|-------------|---------|---|---------|
| | Name | Description | Version |
| BYV25FX-600 | TO-220F | plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO-220 "full pack" | SOD113 |

4. Limiting values

Table 4. Limiting values

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

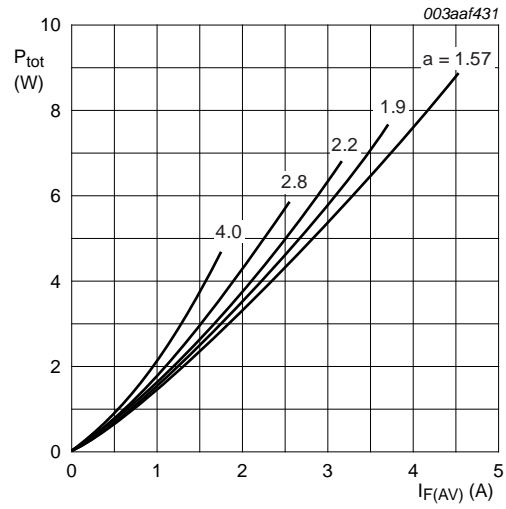
| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------|-------------------------------------|---|-----|----------|------|
| V_{RRM} | repetitive peak reverse voltage | | - | 600 | V |
| V_{RWM} | crest working reverse voltage | | - | 600 | V |
| V_R | reverse voltage | DC | - | 600 | V |
| $I_{F(AV)}$ | average forward current | square-wave pulse; $\delta = 0.5$; $T_h \leq 97$ °C; see Figure 1 ; see Figure 2 | - | 5 | A |
| I_{FRM} | repetitive peak forward current | square-wave pulse; $\delta = 0.5$; $t_p = 25$ μ s; $T_h \leq 97$ °C | - | 10 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 10$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C; see Figure 3 $t_p = 8.3$ ms; sine-wave pulse; $T_{j(init)} = 25$ °C; see Figure 3 | - | 60 66 | A |
| T_{stg} | storage temperature | | -40 | 150 | °C |
| T_j | junction temperature | | - | 150 | °C |



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

$V_o = 1.499 \text{ V}; R_s = 0.041 \text{ } \Omega$

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



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

$V_o = 1.499 \text{ V}; R_s = 0.041 \text{ } \Omega$

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

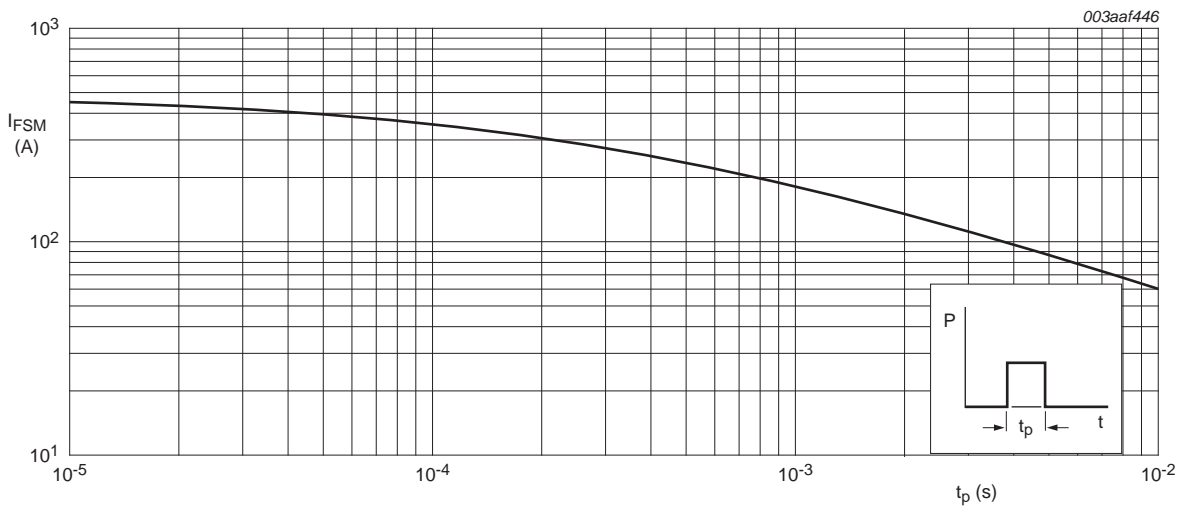


Fig 3. Non-repetitive peak forward current as a function of pulse width; square waveform; maximum values

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; see Figure 4 | - | - | 5.5 | K/W |
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | - | 55 | - | K/W |

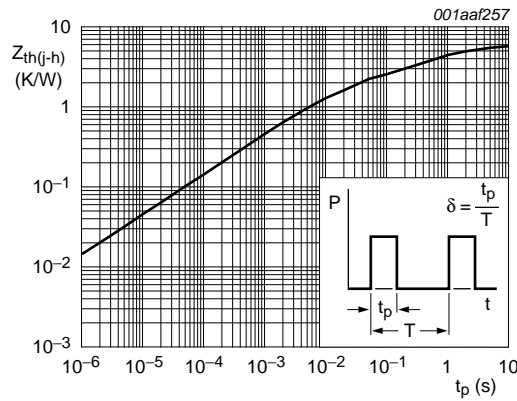


Fig 4. Transient thermal impedance from junction to heatsink as a function of pulse width

6. Isolation characteristics

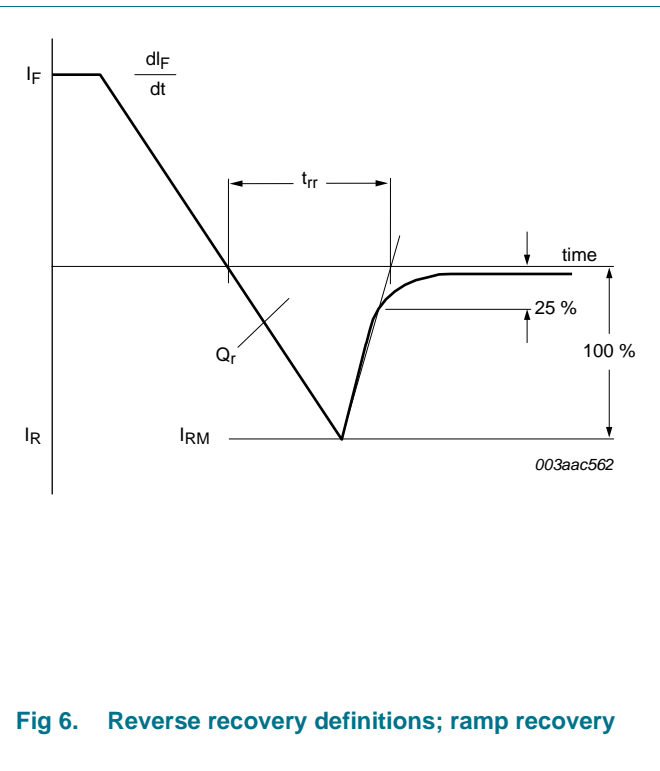
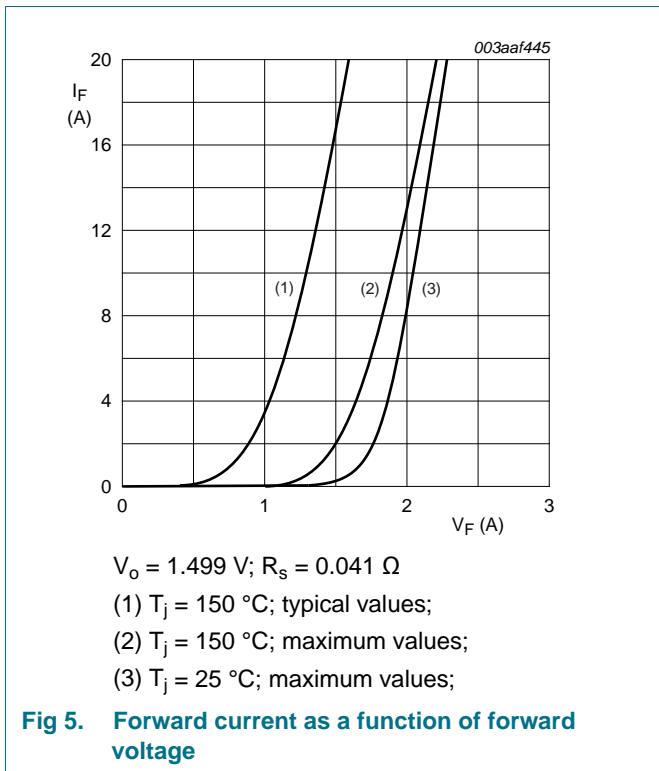
Table 6. Isolation characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------|-----------------------|--|-----|-----|------|------|
| $V_{isol(RMS)}$ | RMS isolation voltage | $50 \text{ Hz} \leq f \leq 60 \text{ Hz}$; $RH \leq 65 \%$; from all pins to external heatsink; sinusoidal waveform; clean and dust free | - | - | 2500 | V |
| C_{isol} | isolation capacitance | $f = 1 \text{ MHz}$; from cathode to external heatsink | - | 10 | - | pF |

7. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------------------|---|-----|------|-----|---------------|
| Static characteristics | | | | | | |
| V_F | forward voltage | $I_F = 5 \text{ A}; T_j = 25 \text{ }^\circ\text{C};$ see Figure 5 | - | 1.3 | 1.9 | V |
| | | $I_F = 5 \text{ A}; T_j = 150 \text{ }^\circ\text{C};$ see Figure 5 | - | 1.1 | 1.7 | V |
| I_R | reverse current | $V_R = 600 \text{ V}; T_j = 100 \text{ }^\circ\text{C}$ | - | - | 1.5 | mA |
| | | $V_R = 600 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$ | - | - | 50 | μA |
| Dynamic characteristics | | | | | | |
| Q_r | recovered charge | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ see Figure 6 | - | 13 | - | nC |
| t_{rr} | reverse recovery time | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ see Figure 6 | - | 17.5 | 35 | ns |
| I_{RM} | peak reverse recovery current | $I_F = 1 \text{ A}; V_R = 30 \text{ V}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ see Figure 6 | - | 1.5 | - | A |
| V_{FRM} | forward recovery voltage | $I_F = 1 \text{ A}; dI_F/dt = 100 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C};$ see Figure 7 | - | 3.2 | - | V |



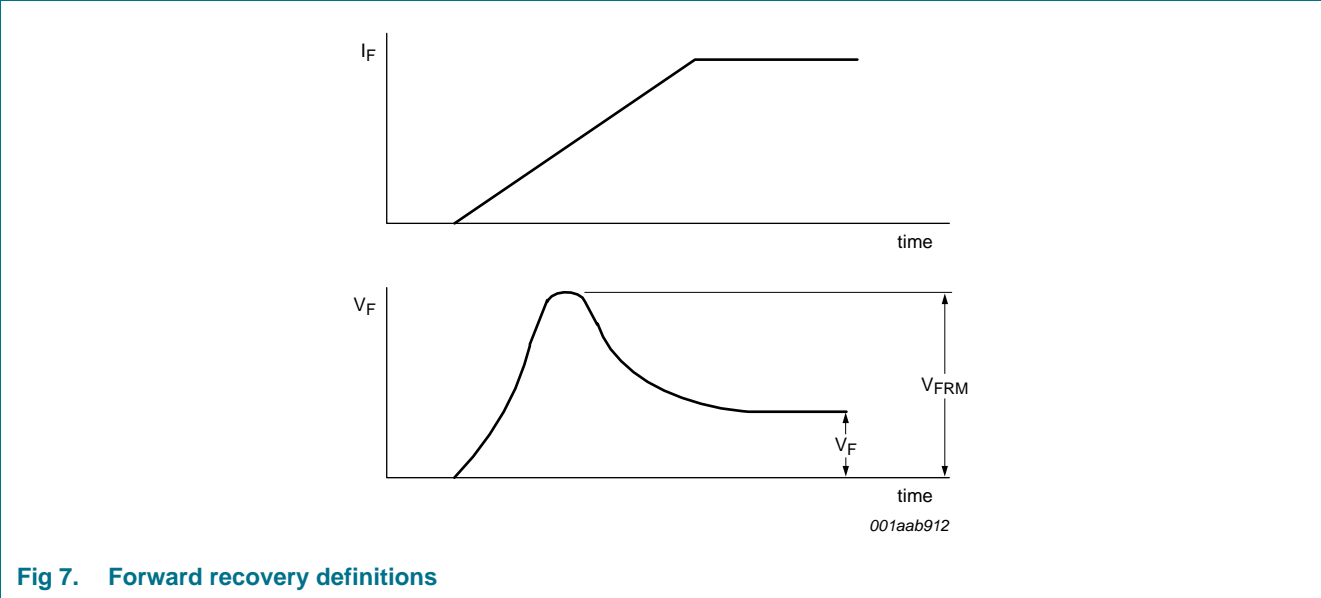


Fig 7. Forward recovery definitions

8. Package outline

Plastic single-ended package; isolated heatsink mounted;
1 mounting hole; 2-lead TO-220 'full pack'

SOD113

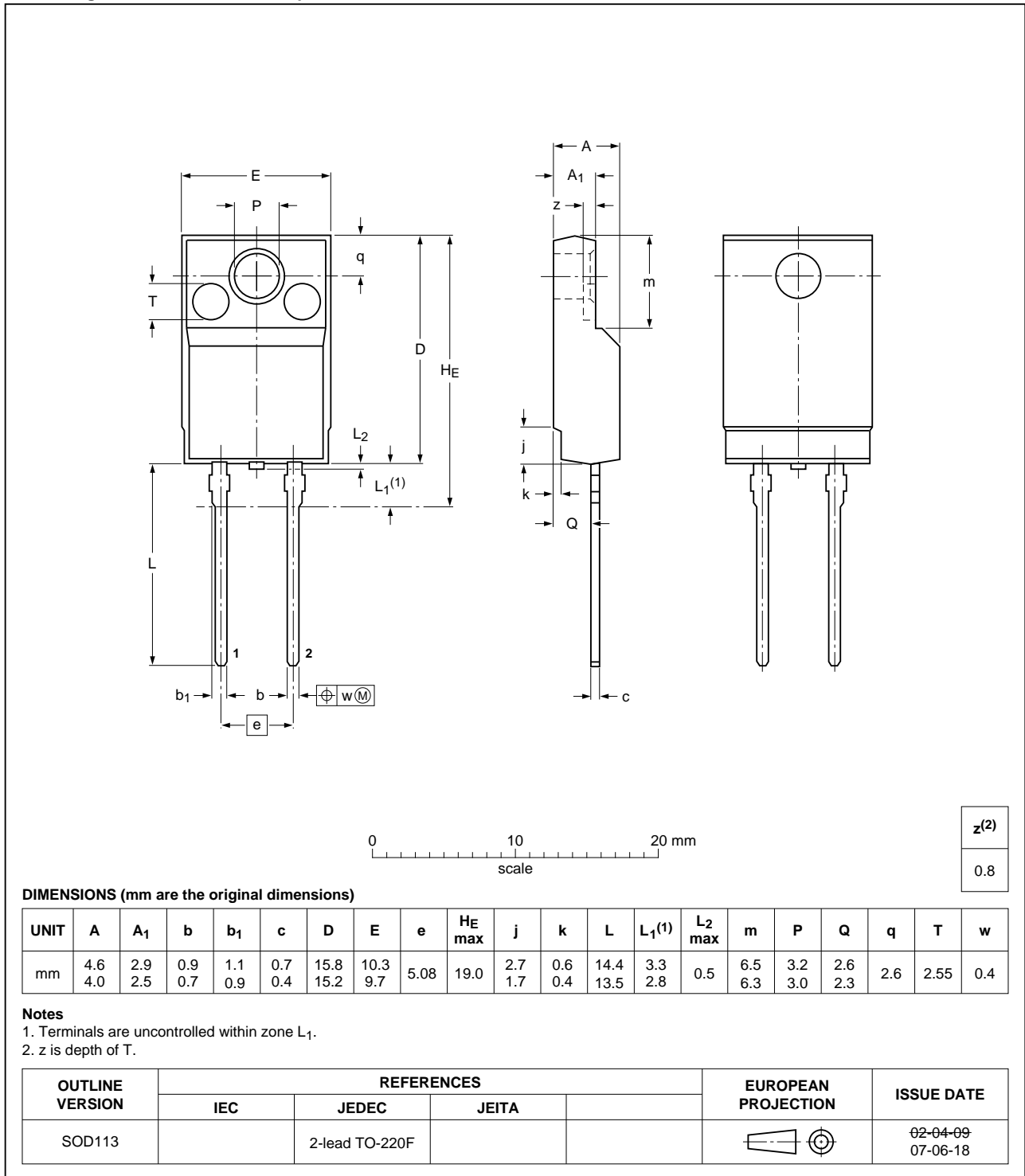


Fig 8. Package outline SOD113 (TO-220F)

9. Revision history

Table 8. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|-------------------------------|--------------------|---------------|-----------------|
| BYV25FX-600 v.2 | 20110307 | Product data sheet | - | BYV25FX-600 v.1 |
| Modifications: | • Various changes to content. | | | |
| BYV25FX-600 v.1 | 20101004 | Product 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. |
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[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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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12. Contents

| | | |
|-----------|--|-----------|
| 1 | Product profile | 1 |
| 1.1 | General description | 1 |
| 1.2 | Features and benefits | 1 |
| 1.3 | Applications | 1 |
| 1.4 | Quick reference data | 1 |
| 2 | Pinning information | 2 |
| 3 | Ordering information | 2 |
| 4 | Limiting values | 2 |
| 5 | Thermal characteristics | 4 |
| 6 | Isolation characteristics | 4 |
| 7 | Characteristics | 5 |
| 8 | Package outline | 7 |
| 9 | Revision history | 8 |
| 10 | Legal information | 9 |
| 10.1 | Data sheet status | 9 |
| 10.2 | Definitions | 9 |
| 10.3 | Disclaimers | 9 |
| 10.4 | Trademarks | 10 |
| 11 | Contact information | 10 |

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