



PESD18VF1BL

Ultra low capacitance bidirectional ESD protection diode

10 July 2018

Product data sheet

1. General description

Ultra low capacitance bidirectional ElectroStatic Discharge (ESD) protection diode in a DFN1006-2 (SOD882) leadless ultra small Surface-Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and other transients.

2. Features and benefits

- Ultra low diode capacitance $C_d = 0.35$ pF
- High reverse standoff voltage $V_{RWM} = 18$ V
- Very small voltage dependency of the capacitance
- ESD protection up to ± 10 kV according to IEC 61000-4-2, level 4
- AEC-Q101 qualified

3. Applications

- NFC antenna protection
- Protection of high-speed data lines

4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|---|------|------|-----|------|
| V_{RWM} | reverse standoff voltage | $T_{amb} = 25$ °C | - | - | 18 | V |
| C_d | diode capacitance | $f = 1$ MHz; $V_R = 0$ V; $T_{amb} = 25$ °C | 0.28 | 0.35 | 0.5 | pF |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------|--|----------------|
| 1 | K1 | cathode (diode 1) | <p>Transparent top view DFN1006-2 (SOD882)</p> | <p>sym045</p> |
| 2 | K2 | cathode (diode 2) | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|-----------|--|---------|
| | Name | Description | Version |
| PESD18VF1BL | DFN1006-2 | DFN1006-2: leadless ultra small plastic package; 2 terminals | SOD882 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PESD18VF1BL | WM |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|----------------------------|---------------------------------|---|---------|-----|-----|------|
| I_{PPM} | rated peak pulse current | $t_p = 8/20 \mu s$; IEC 61000-4-5; IEC 61643-321 | [1] | - | 1 | A |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 150 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |
| ESD maximum ratings | | | | | | |
| V_{ESD} | electrostatic discharge voltage | IEC 61000-4-2; contact discharge | [1] [2] | - | 10 | kV |
| | | IEC 61000-4-2; air discharge | [1] [2] | - | 15 | kV |
| | | MIL-STD-883; human body model; HBM | [1] | - | 10 | kV |
| | | machine model; MM | [1] | - | 400 | V |

[1] Measured from pin 1 to pin 2.

[2] Device stressed with ten non-repetitive ESD pulses.

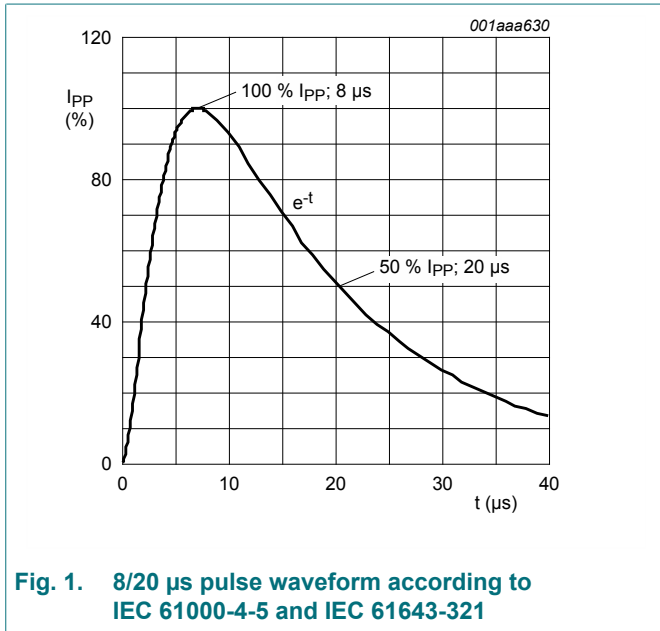


Fig. 1. 8/20 μs pulse waveform according to IEC 61000-4-5 and IEC 61643-321

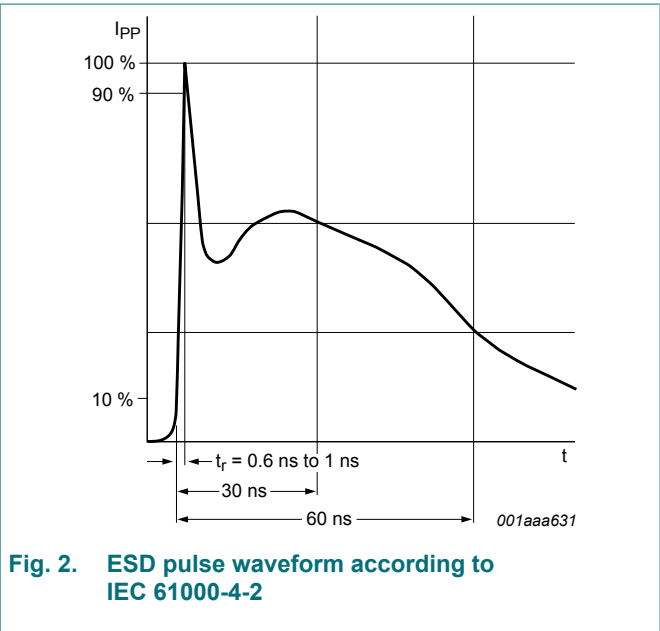


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------|---|------|------|-----|------|
| V _{RWM} | reverse standoff voltage | T _{amb} = 25 °C | - | - | 18 | V |
| V _{BR} | breakdown voltage | I _R = 10 mA; T _{amb} = 25 °C | 19 | 22 | 24 | V |
| I _{RM} | reverse leakage current | V _R = 18 V; T _{amb} = 25 °C | - | 1 | 30 | nA |
| C _d | diode capacitance | f = 1 MHz; V _R = 0 V; T _{amb} = 25 °C | 0.28 | 0.35 | 0.5 | pF |
| V _{CL} | clamping voltage | I _{PP} = 1 A; t _p = 8/20 μs; IEC 61000-4-5; IEC 61643-321; T _{amb} = 25 °C | [1] | - | 17 | V |
| R _{dyn} | dynamic resistance | I _R = 10 A; T _{amb} = 25 °C | [2] | 0.8 | - | Ω |

[1] Measured from pin 1 to pin 2.

[2] Non-repetitive current pulse, Transmission Line Pulse (TLP) t_p = 100 ns; square pulse; ANSI / ESD STM5.5.1-2008.

Ultra low capacitance bidirectional ESD protection diode

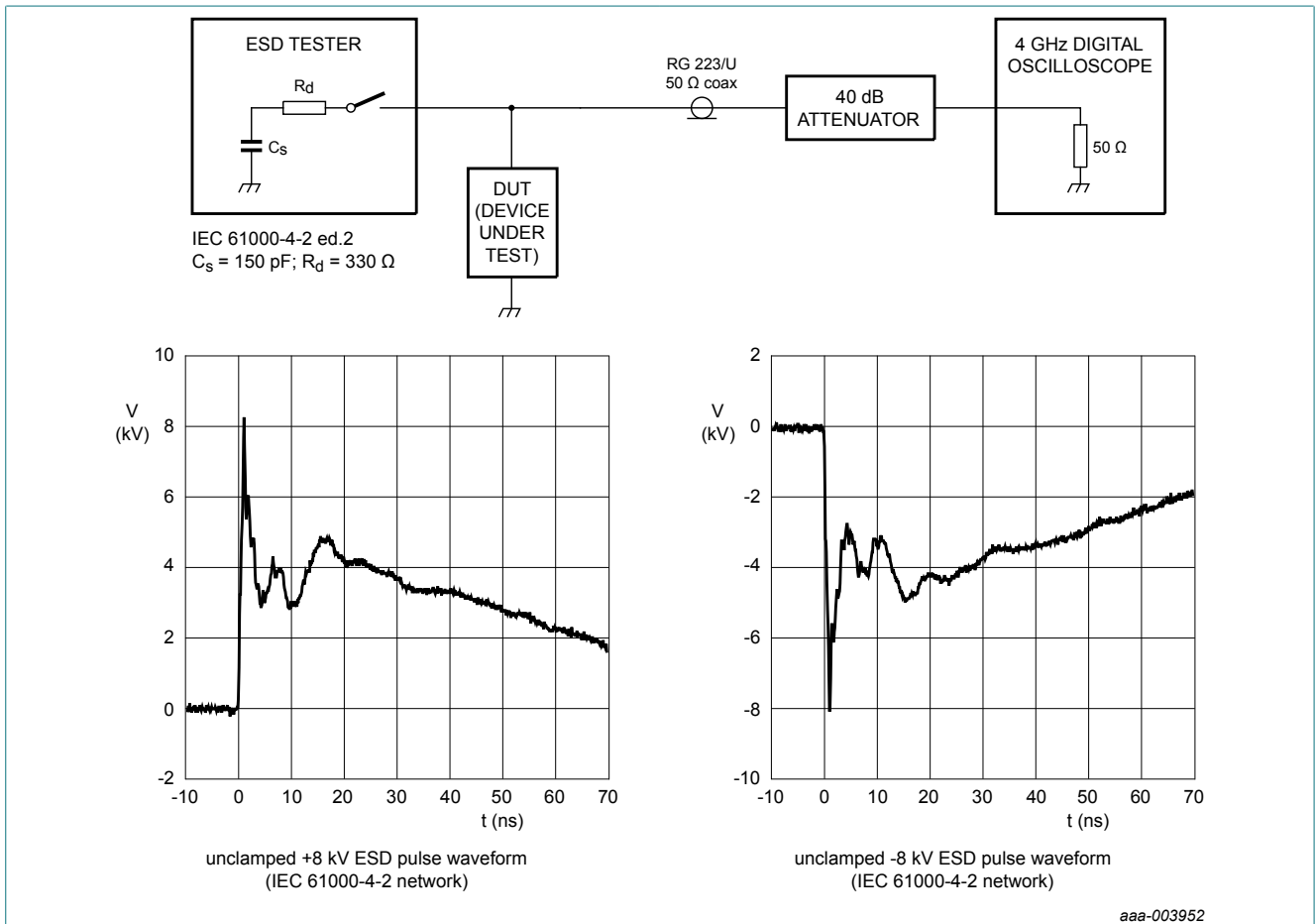


Fig. 3. ESD clamping test setup and waveforms

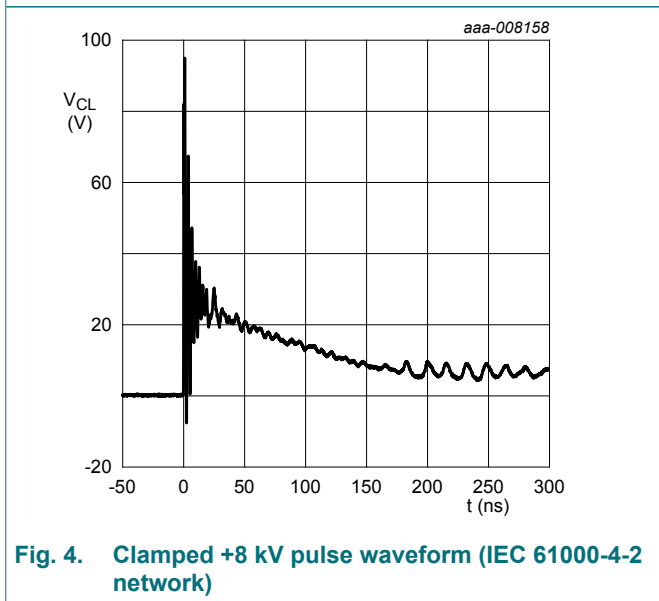


Fig. 4. Clamped +8 kV pulse waveform (IEC 61000-4-2 network)

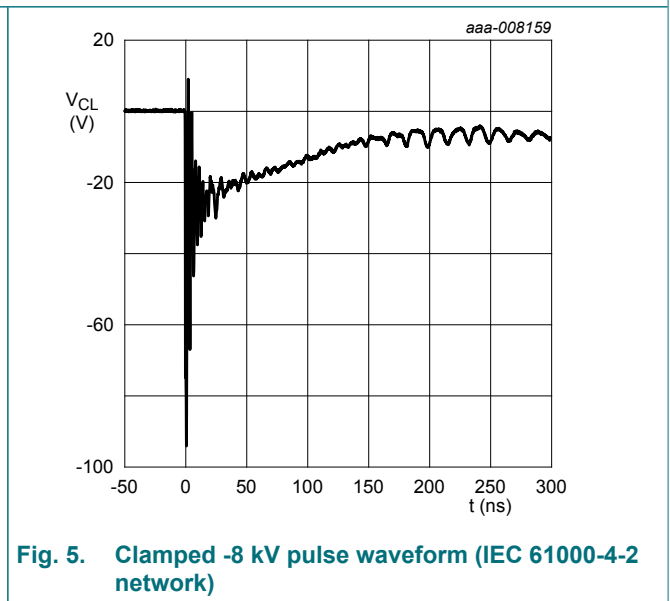


Fig. 5. Clamped -8 kV pulse waveform (IEC 61000-4-2 network)

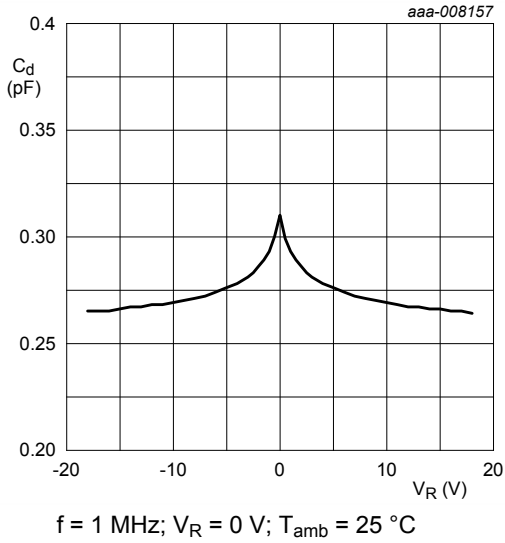


Fig. 6. Diode capacitance as a function of reverse voltage; typical values

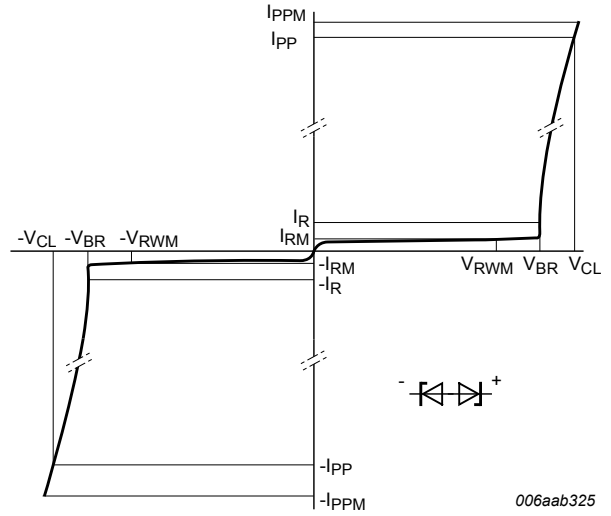


Fig. 7. V-I characteristics for a bidirectional ESD protection diode

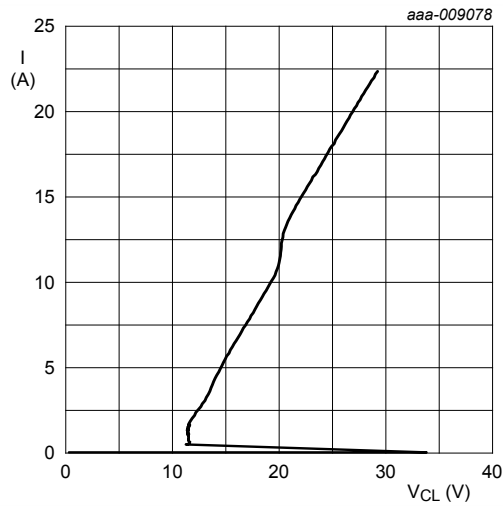


Fig. 8. Dynamic resistance

10. Application information

The device is designed for the protection of one bidirectional data line from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are both positive and negative with respect to ground.

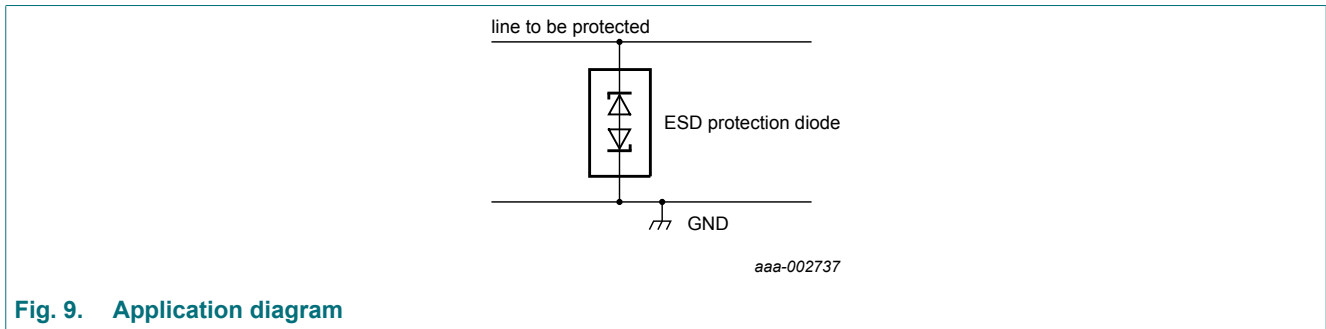


Fig. 9. Application diagram

Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

11. Test information

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

12. Package outline

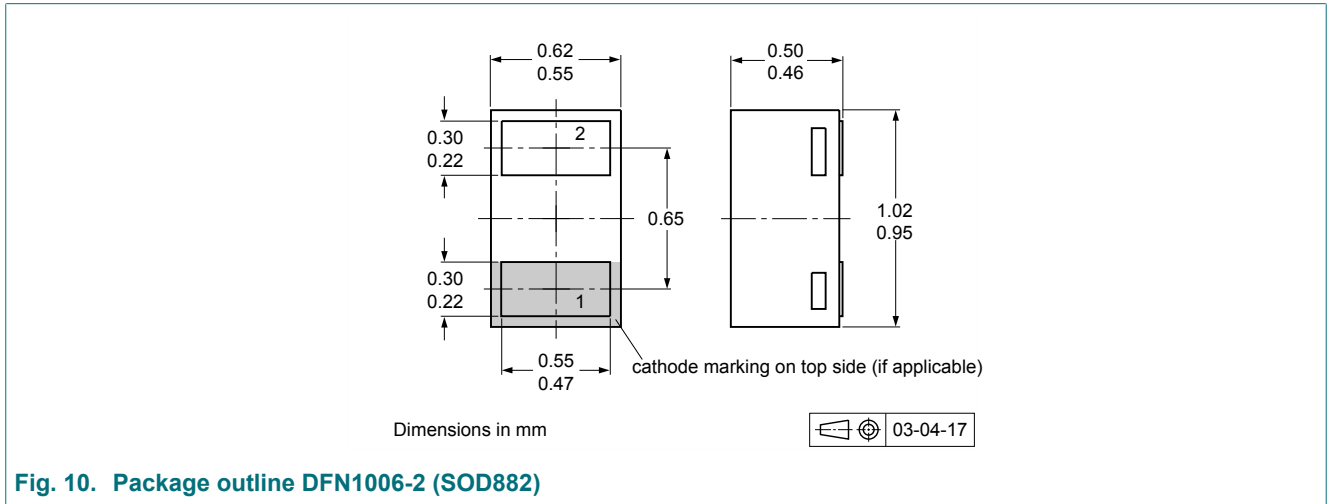


Fig. 10. Package outline DFN1006-2 (SOD882)

13. Soldering

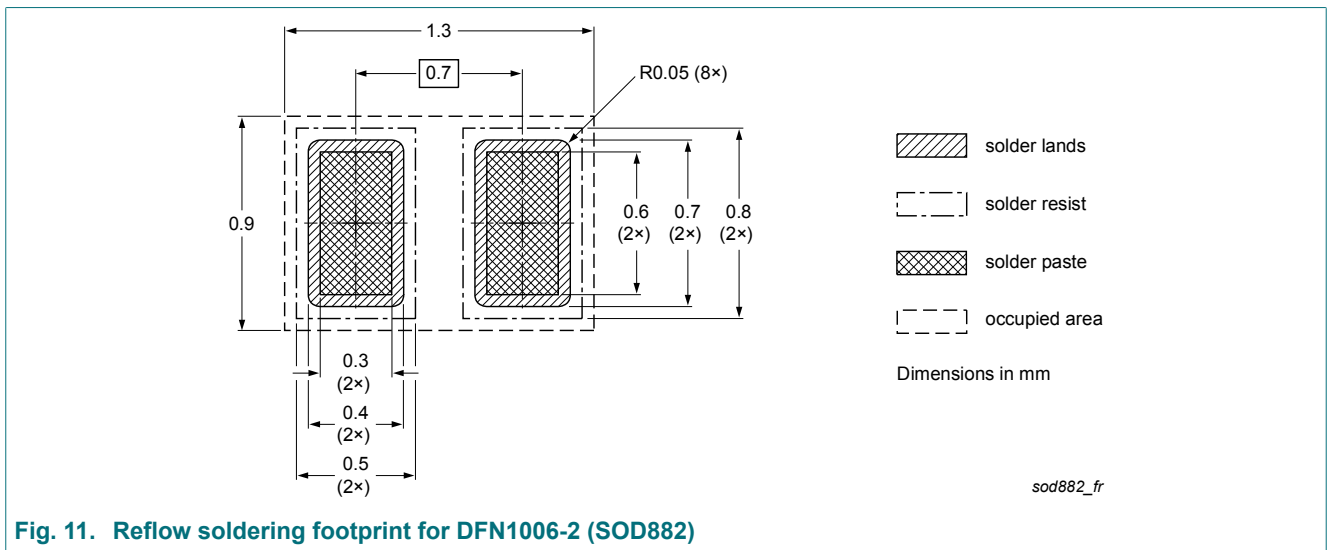


Fig. 11. Reflow soldering footprint for DFN1006-2 (SOD882)

14. Revision history

Table 7. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|-----------------|---|--------------------|---------------|-----------------|
| PESD18VF1BL v.2 | 20180710 | Product data sheet | - | PESD18VF1BL v.1 |
| Modifications> | <ul style="list-style-type: none">• AEC-Q101 qualification added• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.• Legal texts have been adapted to the new company name where appropriate. | | | |
| PESD18VF1BL v.1 | 20130902 | Product data sheet | - | - |

15. Legal information

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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