



PDZ-GW series

Single Zener diodes in a SOD123 package

Rev. 1 — 4 September 2017

Product data sheet

1 Product profile

1.1 General description

General-purpose Zener diodes in a SOD123 small Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Non-repetitive peak reverse power dissipation: $P_{ZSM} \leq 40 \text{ W}$
- Total power dissipation: $P_{tot} \leq 365 \text{ mW}$
- Tolerance series:
B2: approximately $\pm 2 \%$
- Wide working voltage range: nominal 2.4 V to 36 V (E24 range)
- Low reverse current I_R range
- Small plastic package suitable for surface-mounted design
- AEC-Q101 qualified

1.3 Applications

- General regulation functions

1.4 Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|-------------------------|--|-----|-----|-----|------|
| V_F | forward voltage | $I_F = 10 \text{ mA}$ [1] | - | - | 0.9 | V |
| P_{tot} | total power dissipation | $T_{amb} \leq 25 \text{ }^\circ\text{C}$ [2] | - | - | 365 | mW |
| | | [3] | - | - | 625 | mW |


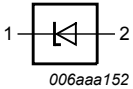
[1] Pulse test: $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$.

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

2 Pinning information

Table 2. Pinning

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|------------------------|--|---|
| 1 | K | cathode ^[1] |  |  |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

3 Ordering information

Table 3. Ordering information

| Type number | Package | | |
|--------------------------------------|---------|--|---------|
| | Name | Description | Version |
| PDZ2.4BGW to PDZ36BGW ^[1] | - | plastic surface-mounted package; 2 leads | SOD123 |

[1] The series consists of 29 types with nominal working voltages from 2.4 V to 36 V.

4 Marking

Table 4. Marking Codes

| Type number | Marking Code | Type number | Marking Code | Type number | Marking Code |
|-------------|--------------|-------------|--------------|-------------|--------------|
| PDZ2.4BGW | B1 | PDZ6.2BGW | BB | PDZ16BGW | BM |
| PDZ2.7BGW | B2 | PDZ6.8BGW | BC | PDZ18BGW | BN |
| PDZ3.0BGW | B3 | PDZ7.5BGW | BD | PDZ20BGW | BP |
| PDZ3.3BGW | B4 | PDZ8.2BGW | BE | PDZ22BGW | BQ |
| PDZ3.6BGW | B5 | PDZ9.1BGW | BF | PDZ24BGW | BR |
| PDZ3.9BGW | B6 | PDZ10BGW | BG | PDZ27BGW | BS |
| PDZ4.3BGW | B7 | PDZ11BGW | BH | PDZ30BGW | BT |
| PDZ4.7BGW | B8 | PDZ12BGW | BJ | PDZ33BGW | BU |
| PDZ5.1BGW | B9 | PDZ13BGW | BK | PDZ36BGW | BV |
| PDZ5.6BGW | BA | PDZ15BGW | BL | | |

5 Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---------------------------------------|-----------------------------|-------|---------------------------|------|
| I_F | forward current | | - | 200 | mA |
| I_{ZSM} | non-repetitive peak reverse current | | - | see characteristics table | |
| P_{ZSM} | non-repetitive peak power dissipation | | [1] - | 40 | W |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [2] - | 365 | mW |
| | | | [3] - | 625 | mW |
| T_j | junction temperature | | - | 150 | |
| T_{amb} | ambient temperature | | -55 | +150 | °C |
| T_{stg} | storage temperature | | -65 | +150 | °C |

[1] $t_p = 100\text{ }\mu\text{s}$; square wave; $T_j = 25\text{ °C}$ prior to surge.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

6 Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|--|-------------|-------|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] - | - | 340 | K/W |
| | | | [2] - | - | 200 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | [3] - | - | - | 50 | K/W |

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2 .

[3] Soldering point of cathode tab.

7 Characteristics

Table 7. Characteristics

$T_j = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------------|-----------------------|-------|-----|-----|------|
| V_F | forward voltage | $I_F = 10\text{ mA}$ | [1] - | - | 0.9 | V |
| V_F | forward voltage | $I_F = 100\text{ mA}$ | [1] - | - | 1.1 | V |

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$.

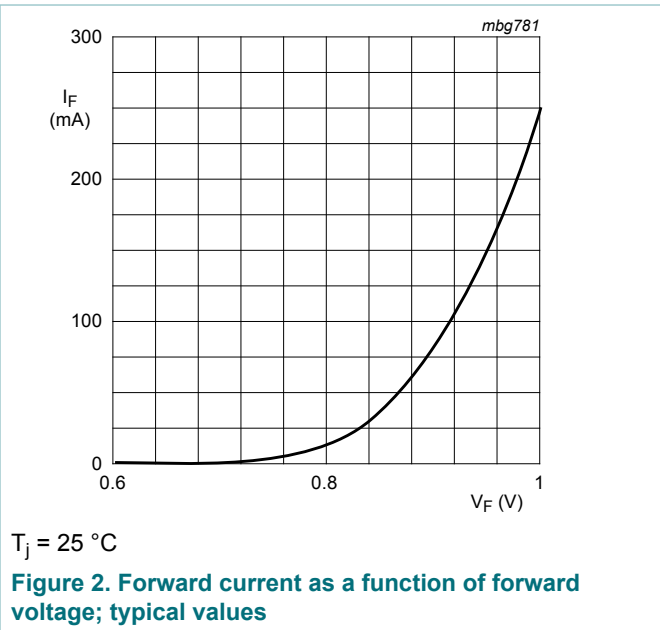
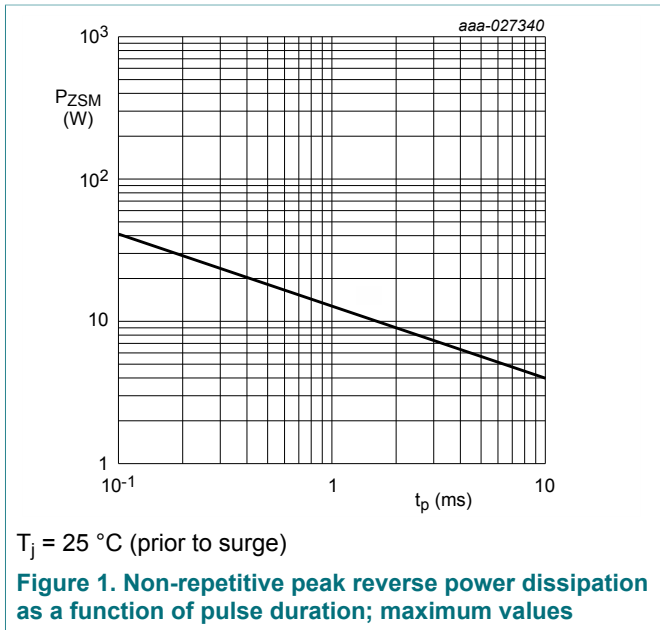
Table 8. Characteristics per type; PDZ2.4BGW to PDZ36BGW

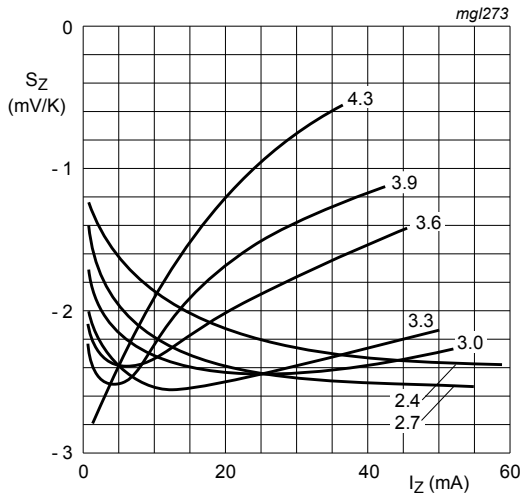
 $T_j = 25\text{ °C}$ unless otherwise specified.

| PDZx BGW | Sel | Working voltage V_Z (V); $I_Z = 5\text{ mA}$ | | Maximum differential resistance r_{dif} (Ω) | | Reverse current I_R (μA) | | Temperature coefficient S_Z (mV/K); $I_Z = 5\text{ mA}$ | Diode capacitance C_d (pF) ^[1] | Non-repetitive peak reverse current I_{ZSM} (A) ^[2] |
|-------------|-----|--|-------|---|---------------------|--|-----------|---|--|---|
| | | Min | Max | $I_Z = 0.5\text{ mA}$ | $I_Z = 5\text{ mA}$ | Max | V_R (V) | Typ | Max | Max |
| 2.4 | B | 2.43 | 2.63 | 1000 | 100 | 50 | 1.0 | -1.6 | 450 | 8.0 |
| 2.7 | B | 2.69 | 2.91 | 1000 | 100 | 20 | 1.0 | -2.0 | 440 | 8.0 |
| 3.0 | B | 2.85 | 3.07 | 1000 | 95 | 10 | 1.0 | -2.1 | 425 | 8.0 |
| 3.3 | B | 3.32 | 3.53 | 1000 | 95 | 5 | 1.0 | -2.4 | 410 | 8.0 |
| 3.6 | B | 3.60 | 3.85 | 500 @ 1 mA | 90 | 5 | 1.0 | -2.4 | 390 | 8.0 |
| 3.9 | B | 3.89 | 4.16 | 500 @ 1 mA | 90 | 3 | 1.0 | -2.5 | 370 | 8.0 |
| 4.3 | B | 4.17 | 4.48 | 600 @ 1 mA | 90 | 3 | 1.0 | -2.5 | 350 | 8.0 |
| 4.7 | B | 4.55 | 4.75 | 600 @ 1 mA | 90 | 2 | 1.0 | -1.4 | 325 | 8.0 |
| 5.1 | B | 4.96 | 5.20 | 250 | 60 | 2 | 1.5 | 0.3 | 300 | 5.5 |
| 5.6 | B | 5.48 | 5.73 | 100 | 50 | 1 | 2.5 | 1.9 | 275 | 5.5 |
| 6.2 | B | 6.06 | 6.33 | 80 | 50 | 0.5 | 3.0 | 2.7 | 250 | 5.5 |
| 6.8 | B | 6.65 | 6.93 | 60 | 40 | 0.5 | 3.5 | 3.4 | 215 | 5.5 |
| 7.5 | B | 7.28 | 7.60 | 60 | 10 | 0.5 | 4.0 | 4.0 | 170 | 3.5 |
| 8.2 | B | 8.02 | 8.36 | 60 | 10 | 0.5 | 5.0 | 4.6 | 150 | 3.5 |
| 9.1 | B | 8.85 | 9.23 | 60 | 10 | 0.5 | 6.0 | 5.5 | 120 | 3.5 |
| 10 | B | 9.77 | 10.21 | 60 | 10 | 0.1 | 7.0 | 6.4 | 110 | 3.5 |
| 11 | B | 10.78 | 11.22 | 60 | 10 | 0.1 | 8.0 | 7.4 | 108 | 3.0 |
| 12 | B | 11.74 | 12.24 | 80 | 10 | 0.1 | 9.0 | 8.4 | 105 | 3.0 |
| 13 | B | 12.91 | 13.49 | 80 | 10 | 0.1 | 10.0 | 9.4 | 103 | 2.5 |
| 15 | B | 14.34 | 14.98 | 80 | 15 | 0.05 | 11.0 | 11.4 | 99 | 2.0 |
| 16 | B | 15.85 | 16.51 | 80 | 20 | 0.05 | 12.0 | 12.4 | 97 | 1.5 |
| 18 | B | 17.56 | 18.35 | 80 | 20 | 0.05 | 13.0 | 14.4 | 93 | 1.5 |
| 20 | B | 19.52 | 20.39 | 100 | 20 | 0.05 | 15.0 | 16.4 | 88 | 1.5 |
| 22 | B | 21.54 | 22.47 | 100 | 25 | 0.05 | 17.0 | 18.4 | 84 | 1.3 |
| 24 | B | 23.72 | 24.78 | 120 | 30 | 0.05 | 19.0 | 20.4 | 80 | 1.3 |

| PDZx BGW | Sel | Working voltage V_Z (V); $I_Z = 5$ mA | | Maximum differential resistance r_{dif} (Ω) | | Reverse current I_R (μ A) | | Temperature coefficient S_Z (mV/K); $I_Z = 5$ mA | Diode capacitance C_d (pF) ^[1] | Non-repetitive peak reverse current I_{ZSM} (A) ^[2] |
|-------------|-----|---|-------|---|--------------|-------------------------------------|-----------|--|--|---|
| | | Min | Max | $I_Z = 0.5$ mA | $I_Z = 5$ mA | Max | V_R (V) | Typ | Max | Max |
| 27 | B | 26.19 | 27.53 | 150 | 40 | 0.05 | 21.0 | 23.4 | 73 | 1.0 |
| 30 | B | 29.19 | 30.69 | 200 | 40 | 0.05 | 23.0 | 26.6 | 66 | 1.0 |
| 33 | B | 32.15 | 33.79 | 250 | 40 | 0.05 | 25.0 | 29.7 | 60 | 0.9 |
| 36 | B | 35.07 | 36.87 | 300 | 60 | 0.05 | 27.0 | 33.0 | 59 | 0.8 |

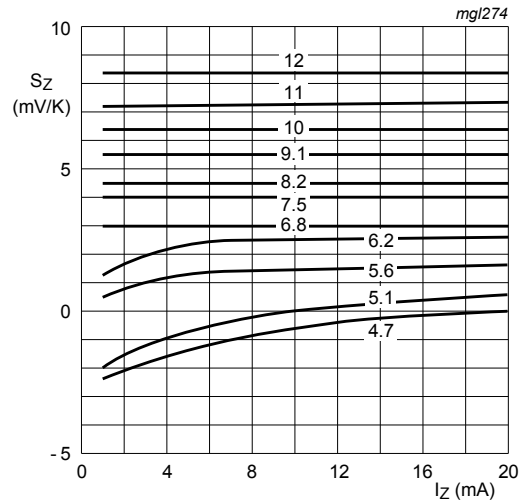
[1] $f = 1$ MHz; $V_R = 0$ V.
 [2] $t_p = 100$ μ s; $T_{amb} = 25$ °C.





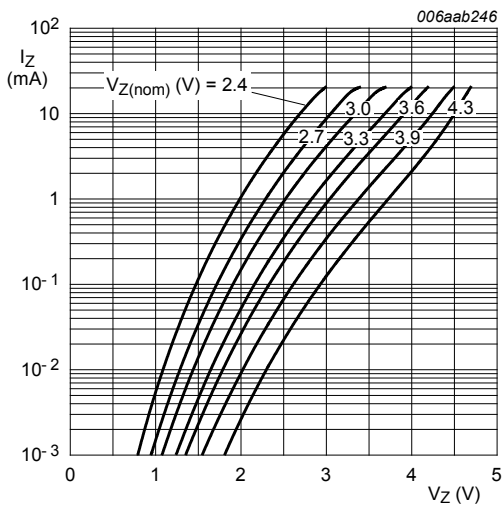
PDZ2.4BGW to PDZ4.3BGW
 $T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$

Figure 3. Temperature coefficient as a function of working current; typical values



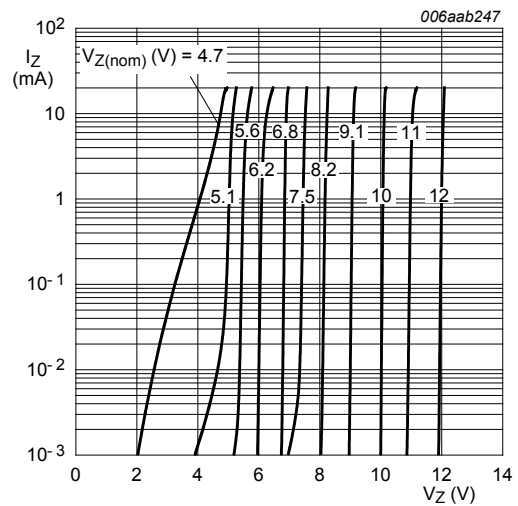
PDZ4.7BGW to PDZ12BGW
 $T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$

Figure 4. Temperature coefficient as a function of working current; typical values



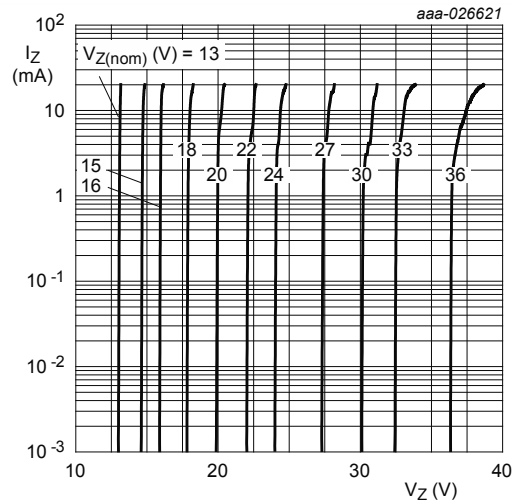
PDZ2.4BGW to PDZ4.3BGW
 $T_j = 25\text{ }^\circ\text{C}$

Figure 5. Working current as a function of working voltage; typical values



PDZ4.7BGW to PDZ12BGW
 $T_j = 25\text{ }^\circ\text{C}$

Figure 6. Working current as a function of working voltage; typical values



PDZ13BGW to PDZ36BGW

T_j = 25 °C

Figure 7. Working current as a function of working voltage; typical values

8 Test information

8.1 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.

9 Package outline

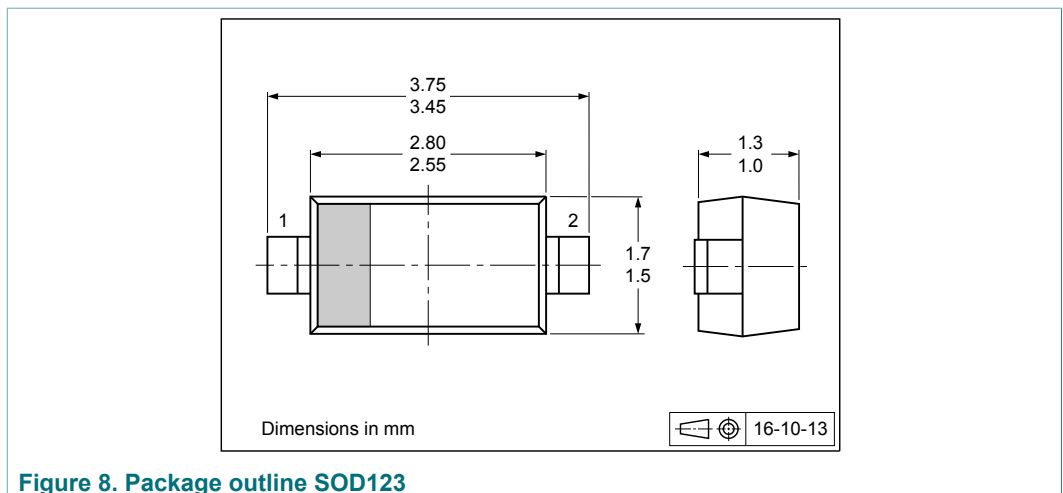
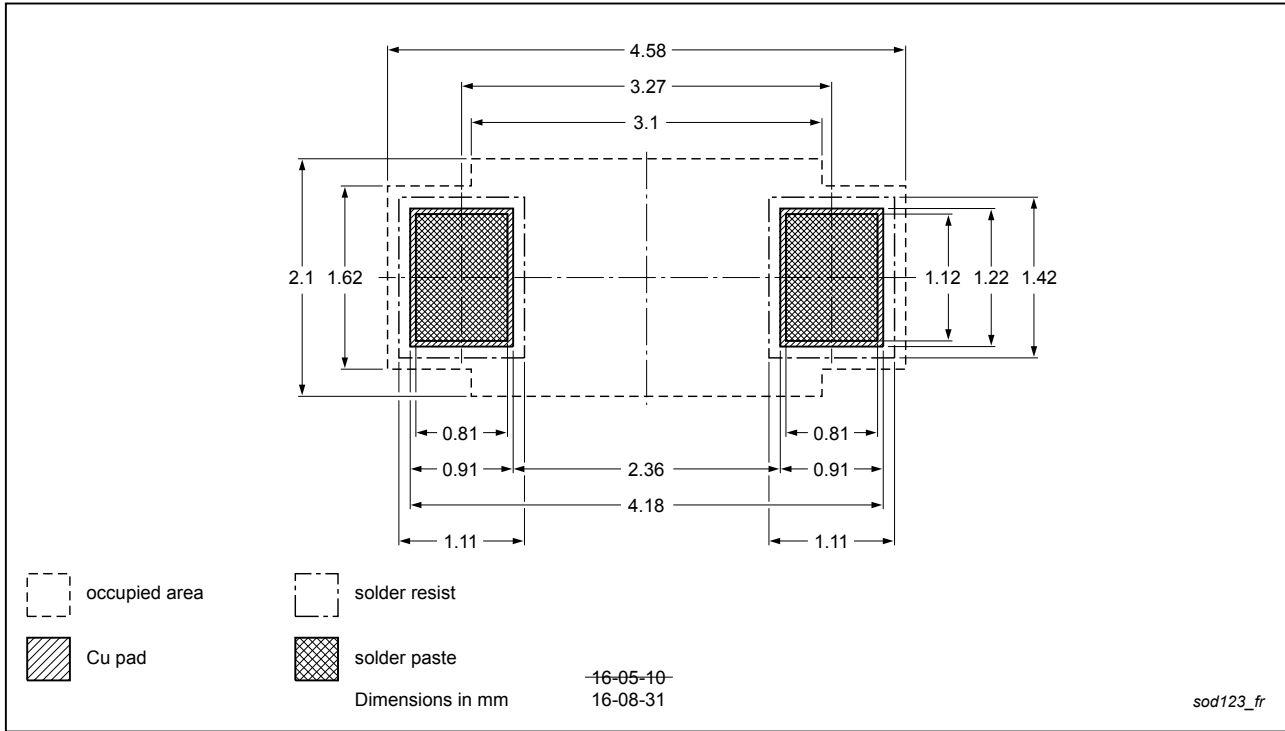


Figure 8. Package outline SOD123

10 Soldering

SOD123



Reflow soldering is the only recommended soldering method.
Dimensions in mm.

Figure 9. Reflow soldering footprint SOD123

11 Revision history

Table 9. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--------------|--------------------|---------------|------------|
| PDZ-GW_SER v.1 | 20170904 | Product data sheet | - | - |

12 Legal information

12.1 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. |

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

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