



BAS116GW

Low leakage switching diode

5 April 2018

Product data sheet

1. General description

Low leakage switching diode, encapsulated in an SOD123 small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} = 0.8 \mu s$
- Low leakage current: $I_R = 3 \text{ pA}$
- Repetitive peak reverse voltage $V_{RRM} \leq 85 \text{ V}$
- Low capacitance: $C_d = 2 \text{ pF}$
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- Low-leakage current applications
- General-purpose switching



4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---------------------------------|---|-----|-------|------|---------|
| V_{RRM} | repetitive peak reverse voltage | $T_j = 25^\circ \text{C}$ | - | - | 85 | V |
| I_F | forward current | $t_p \leq 300 \mu s$; $\delta \leq 0.02$; $T_{amb} = 25^\circ \text{C}$ | - | - | 215 | mA |
| V_R | reverse voltage | $T_j = 25^\circ \text{C}$ | - | - | 75 | V |
| V_F | forward voltage | $I_F = 150 \text{ mA}$; $t_p \leq 300 \mu s$; $\delta \leq 0.02$; $T_j = 25^\circ \text{C}$ | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 75 \text{ V}$; pulsed; $T_j = 25^\circ \text{C}$ | - | 0.003 | 5 | nA |
| t_{rr} | reverse recovery time | $I_F = 10 \text{ mA}$; $I_R = 10 \text{ mA}$; $R_L = 100 \Omega$; $I_{R(meas)} = 1 \text{ mA}$; $T_j = 25^\circ \text{C}$ | - | 0.8 | 3 | μs |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|---|---|
| 1 | K | Cathode |  SOD123 |  sym001 |
| 2 | A | Anode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| BAS116GW | SOD123 | Plastic surface-mounted package; 2 leads | SOD123 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS116GW | GB |

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 | T _j = 25 °C | | - | 85 | V |
| V _R | reverse voltage | | | - | 75 | V |
| I _F | forward current | t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C | | - | 215 | mA |
| I _{FSM} | non-repetitive peak forward current | t _p = 1 μs; T _{j(init)} = 25 °C; square wave | | - | 4 | A |
| | | t _p = 1 ms; T _{j(init)} = 25 °C; square wave | | - | 1 | A |
| | | t _p = 1 s; T _{j(init)} = 25 °C; square wave | | - | 0.5 | A |
| I _{FRM} | repetitive peak forward current | | | - | 500 | mA |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | - | 357 | mW |
| | | | [2] | - | 600 | mW |
| Per device, one diode loaded | | | | | | |
| T _j | junction temperature | | | - | 150 | °C |
| T _{amb} | ambient temperature | | | -55 | 150 | °C |
| T _{stg} | storage temperature | | | -65 | 150 | °C |

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

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

9. 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] | - | - | 350 | K/W |
| | | | [2] | - | - | 210 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [3] | - | - | 58 | K/W |

[1] Device mounted on an FR4 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.

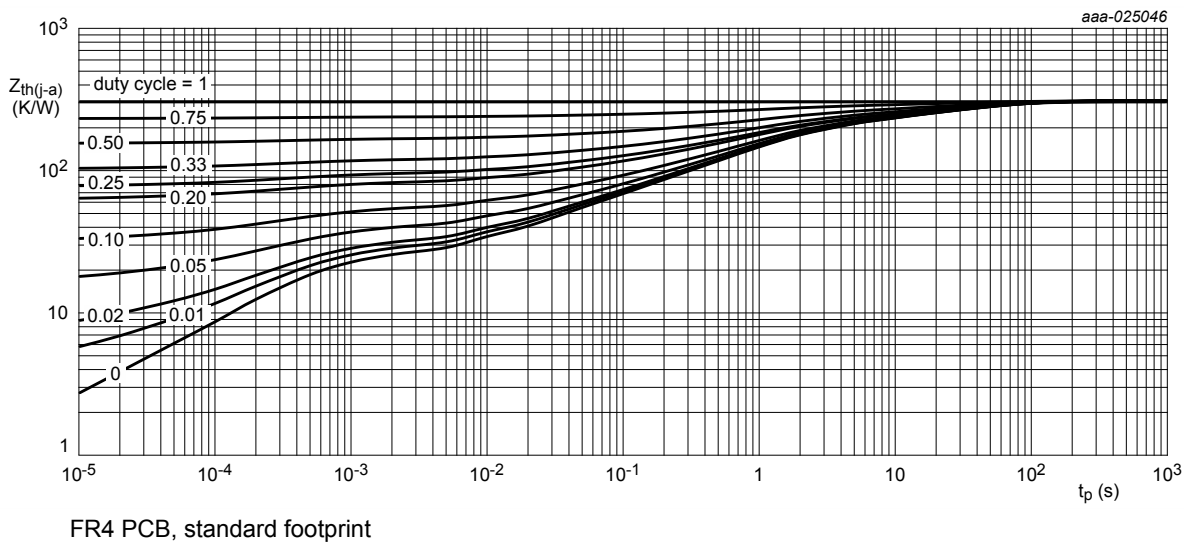


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

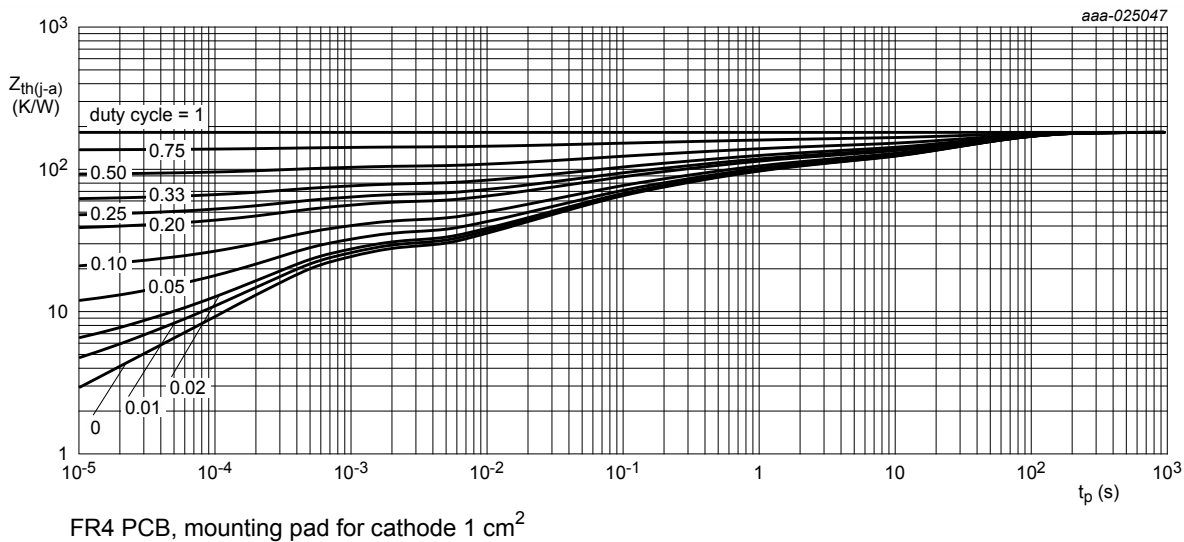


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------|-----------------------|--|-----|-------|------|---------------|
| V_F | forward voltage | $I_F = 1\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$ | - | - | 0.9 | V |
| | | $I_F = 10\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$ | - | - | 1 | V |
| | | $I_F = 50\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$ | - | - | 1.1 | V |
| | | $I_F = 150\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25\text{ }^\circ\text{C}$ | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 75\text{ V}$; pulsed; $T_j = 25\text{ }^\circ\text{C}$ | - | 0.003 | 5 | nA |
| | | $V_R = 75\text{ V}$; pulsed; $T_j = 150\text{ }^\circ\text{C}$ | - | 3 | 80 | nA |
| C_d | diode capacitance | $V_R = 0\text{ V}$; $f = 1\text{ MHz}$; $T_j = 25\text{ }^\circ\text{C}$ | - | 2 | - | pF |
| t_{rr} | reverse recovery time | $I_F = 10\text{ mA}$; $I_R = 10\text{ mA}$; $R_L = 100\text{ }\Omega$; $I_{R(\text{meas})} = 1\text{ mA}$; $T_j = 25\text{ }^\circ\text{C}$ | - | 0.8 | 3 | μs |

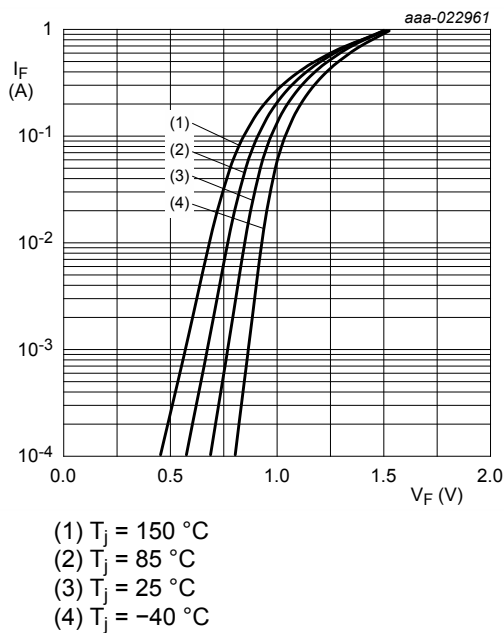


Fig. 3. Forward current as a function of forward voltage; typical values

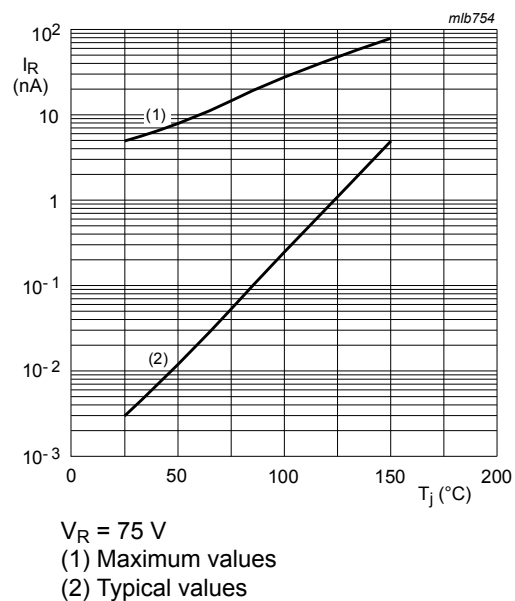
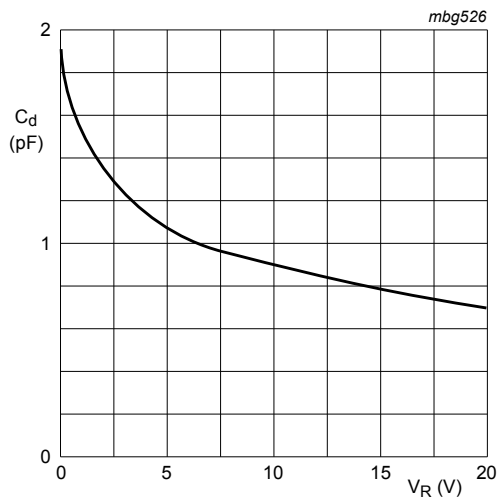
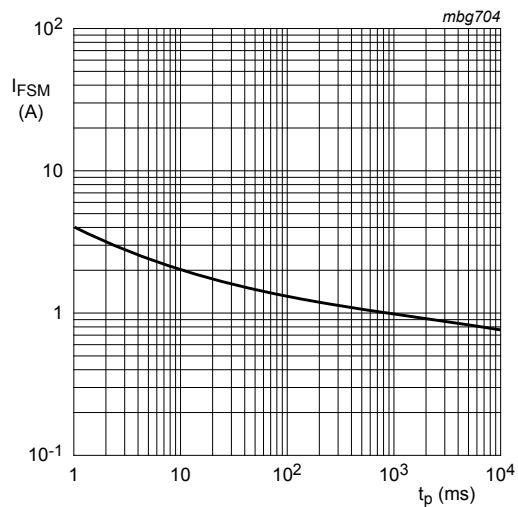


Fig. 4. Reverse current as a function of junction temperature



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

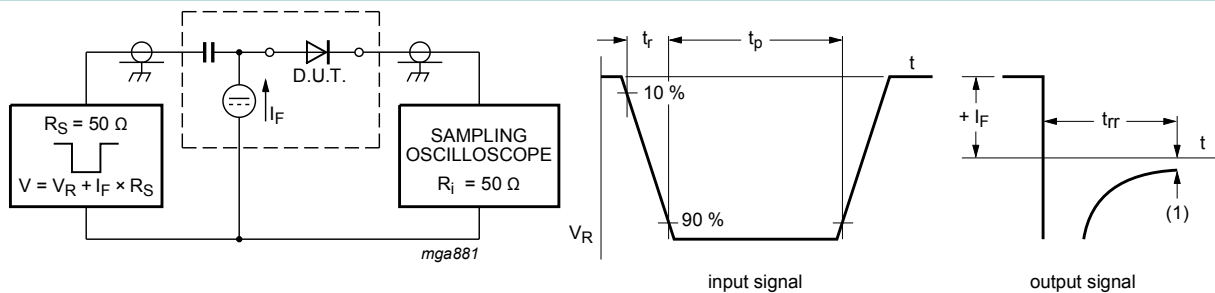
Fig. 5. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
 $T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$

Fig. 6. Non-repetitive peak forward current as a function of pulse duration; maximum values

11. Test information



(1) $I_R = 1 \text{ mA}$

Fig. 7. Reverse recovery time test circuit and waveforms

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

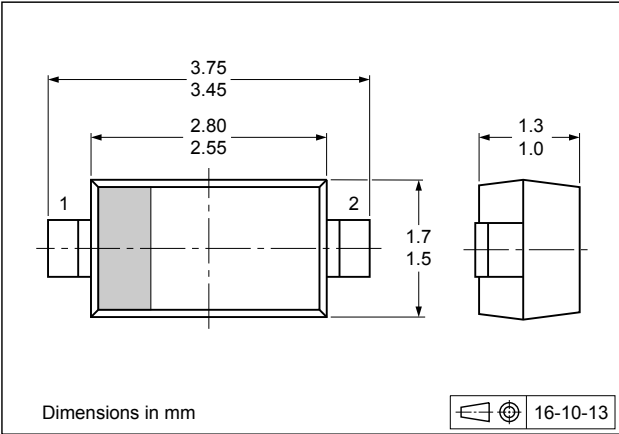


Fig. 8. Package outline SOD123

13. Soldering

SOD123

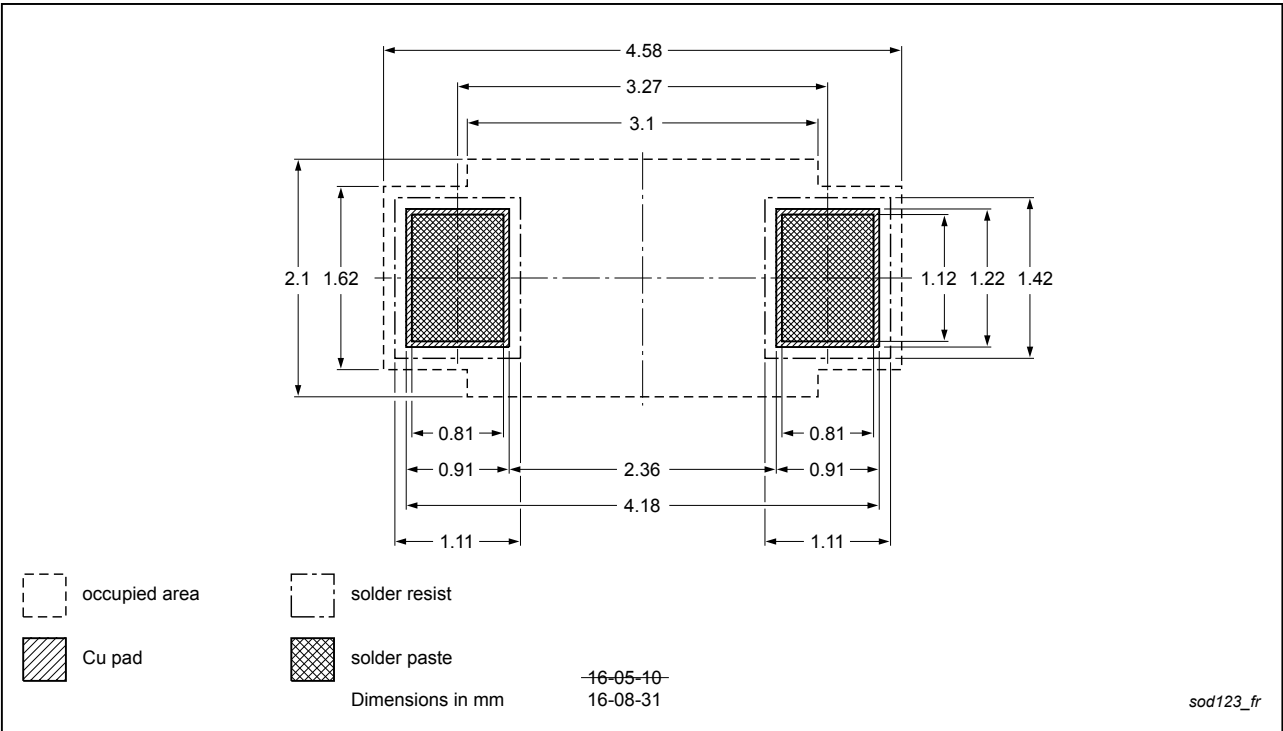


Fig. 9. Reflow soldering footprint for SOD123

SOD123

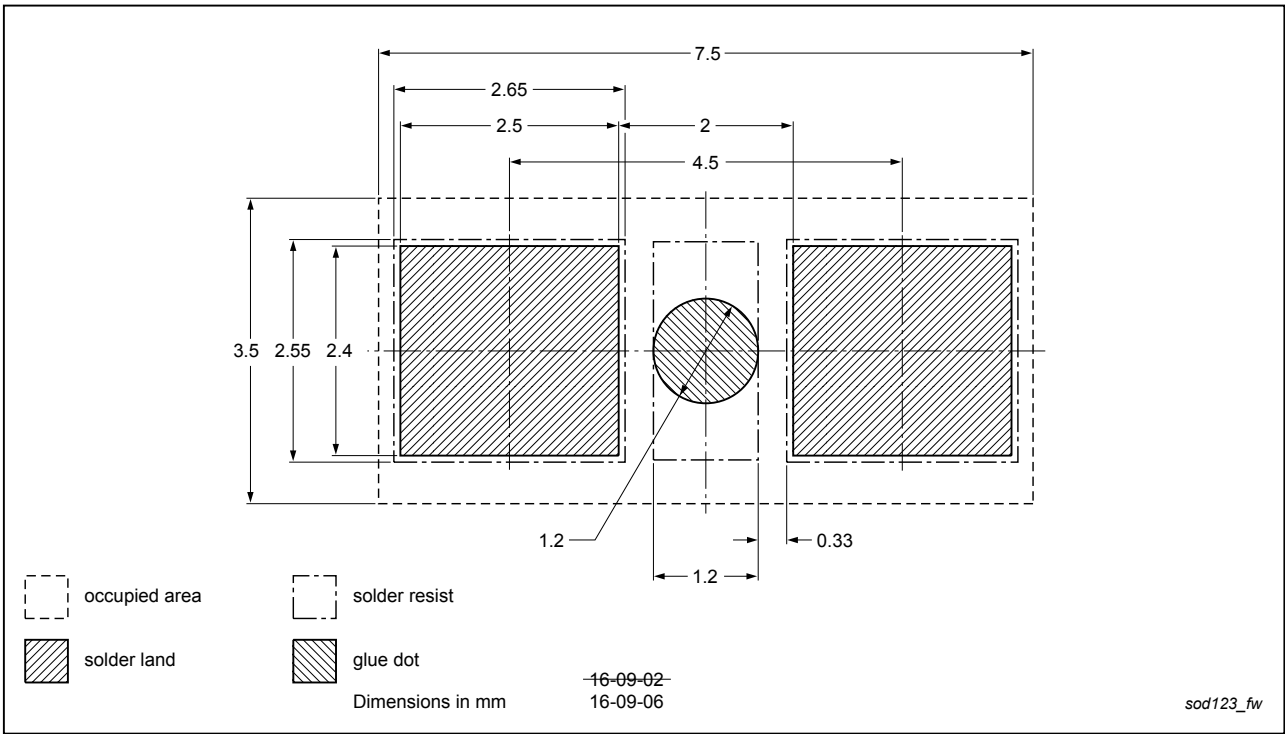


Fig. 10. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|--------------|
| BAS116GW v.2 | 20180405 | Product data sheet | - | BAS116GW v.1 |
| Modifications: | <ul style="list-style-type: none">Unit corrected to nA in Table 7, reverse current at 150 °C | | | |
| BAS116GW v.1 | 20161124 | 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. |

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