



BAS416

Low-leakage diode

2 October 2020

Product data sheet

1. General description

Epitaxial, medium-speed switching diode with a low leakage current encapsulated in a small SOD323 SMD plastic package.

2. Features and benefits

- Plastic SMD package
- Low leakage current: typ. 3 pA
- Switching time: typ. 0.8 μ s
- Continuous reverse voltage: max. 75 V
- Repetitive peak reverse voltage: max. 85 V
- Repetitive peak forward current: max. 500 mA.
- AEC-Q101 qualified

3. Applications

- Low-leakage current applications in surface mounted circuits.

4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---------------------------------|--|-----|-------|-----|---------|
| I_F | forward current | $T_j = 25\text{ }^\circ\text{C}$ | - | - | 200 | mA |
| V_{RRM} | repetitive peak reverse voltage | | - | - | 85 | V |
| V_F | forward voltage | $I_F = 50\text{ mA}; T_j = 25\text{ }^\circ\text{C}$ | - | - | 1.1 | V |
| I_R | reverse current | $V_R = 75\text{ V}; \text{pulsed}; T_j = 25\text{ }^\circ\text{C}$ | - | 0.003 | 5 | nA |
| t_{rr} | reverse recovery time | $I_F = 10\text{ mA}; I_R = 10\text{ mA}; R_L = 100\text{ }\Omega;$ $I_{R(\text{meas})} = 1\text{ mA}; T_j = 25\text{ }^\circ\text{C}$ | - | 0.8 | 3 | μ s |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--------------------|----------------|
| 1 | K | cathode | SOD323 | aaa-032142 |
| 2 | A | anode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| BAS416 | SOD323 | plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body | SOD323 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAS416 | D4 |

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 | $T_j = 25\text{ °C}$ | | - | 85 | V |
| V_R | reverse voltage | | | - | 75 | V |
| I_F | forward current | | | - | 200 | mA |
| I_{FSM} | non-repetitive peak forward current | $t_p = 1\text{ }\mu\text{s}$; square wave; $T_{j(\text{init})} = 25\text{ °C}$ | | - | 4 | A |
| | | $t_p = 1\text{ ms}$; square wave; $T_{j(\text{init})} = 25\text{ °C}$ | | - | 1 | A |
| | | $t_p = 1\text{ s}$; square wave; $T_{j(\text{init})} = 25\text{ °C}$ | | - | 0.5 | A |
| I_{FRM} | repetitive peak forward current | | | - | 500 | mA |
| P_{tot} | total power dissipation | $T_{\text{amb}} \leq 25\text{ °C}$ | [1] | - | 250 | mW |
| 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.

9. Thermal characteristics

Table 6. Thermal characteristics

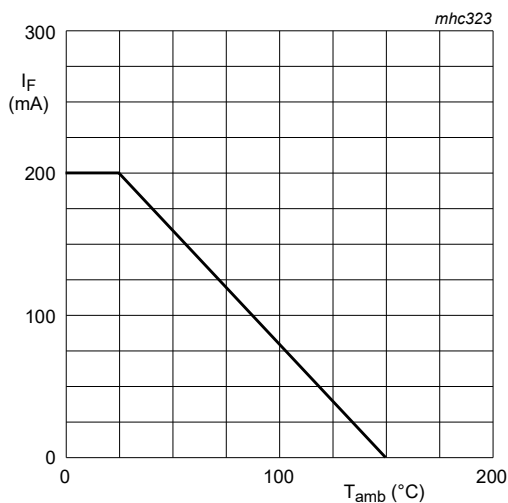
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---------------|---|-------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | In free air | [1] | - | - | 450 | K/W |

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

10. Characteristics

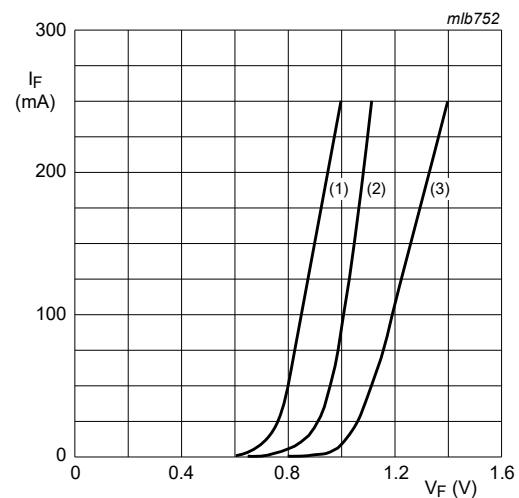
Table 7. Characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|----------|-----------------------|--|--|-----|-------|------|---------------|
| V_F | forward voltage | $I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | | - | - | 0.9 | V |
| | | $I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | | - | - | 1 | V |
| | | $I_F = 50 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | | - | - | 1.1 | V |
| | | $I_F = 150 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$ | | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 75 \text{ V}; \text{ pulsed}; T_j = 25 \text{ }^\circ\text{C}$ | | - | 0.003 | 5 | nA |
| | | $V_R = 75 \text{ V}; \text{ pulsed}; T_j = 150 \text{ }^\circ\text{C}$ | | - | 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 |



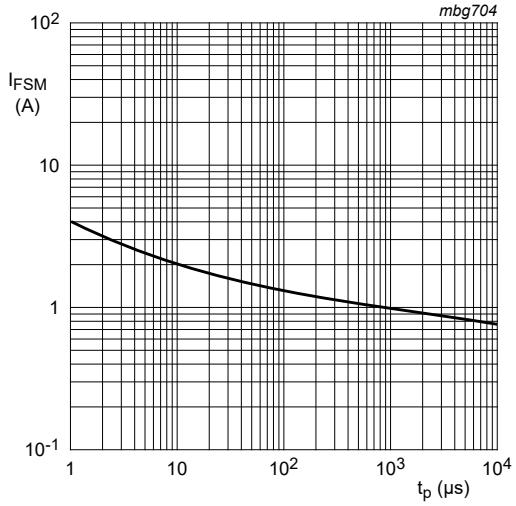
Device mounted on an FR4 printed-circuit board.

Fig. 1. Maximum permissible continuous forward current as a function of ambient temperature.



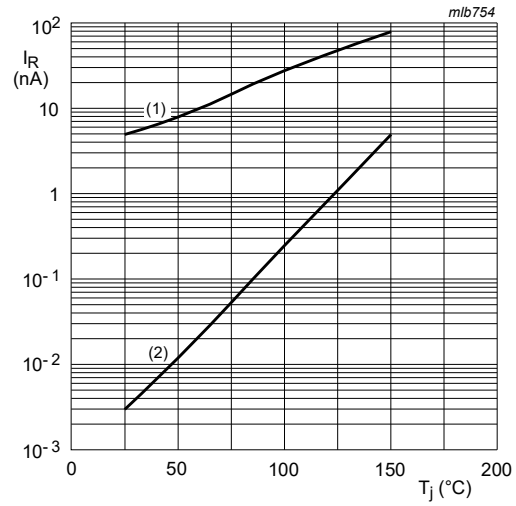
- (1) $T_{amb} = 150 \text{ }^\circ\text{C}$; typical values
- (2) $T_{amb} = 25 \text{ }^\circ\text{C}$; typical values
- (3) $T_{amb} = 25 \text{ }^\circ\text{C}$; maximum values

Fig. 2. Forward current as a function of forward voltage; per diode



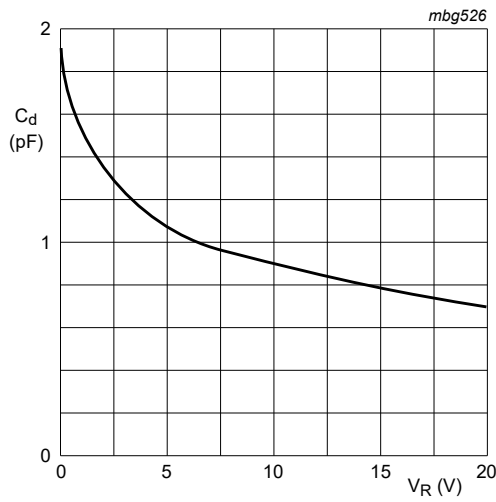
Based on square wave currents.
 $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$

Fig. 3. Non-repetitive peak forward current as a function of pulse duration; typical values



$V_R = 75\text{ V}$
 (1) Maximum values
 (2) Typical values

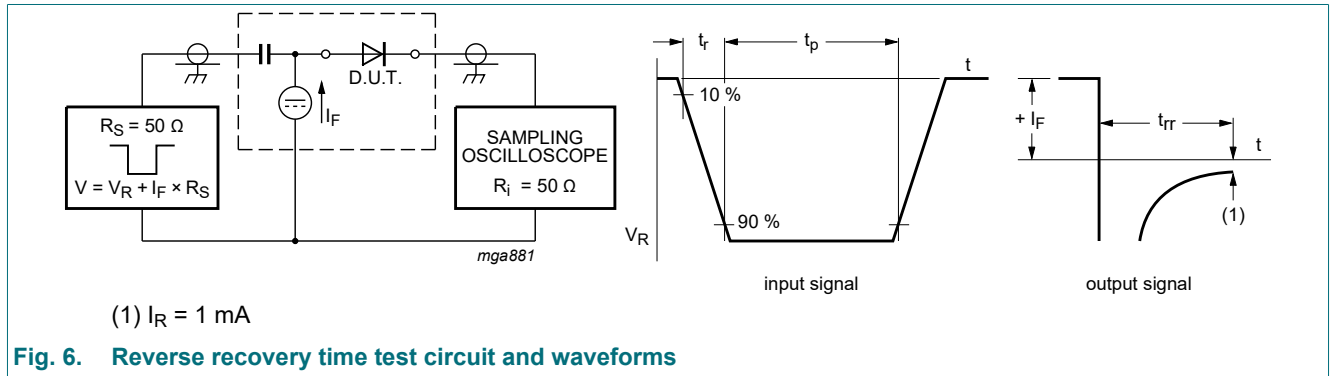
Fig. 4. Reverse current as a function of junction temperature



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

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

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

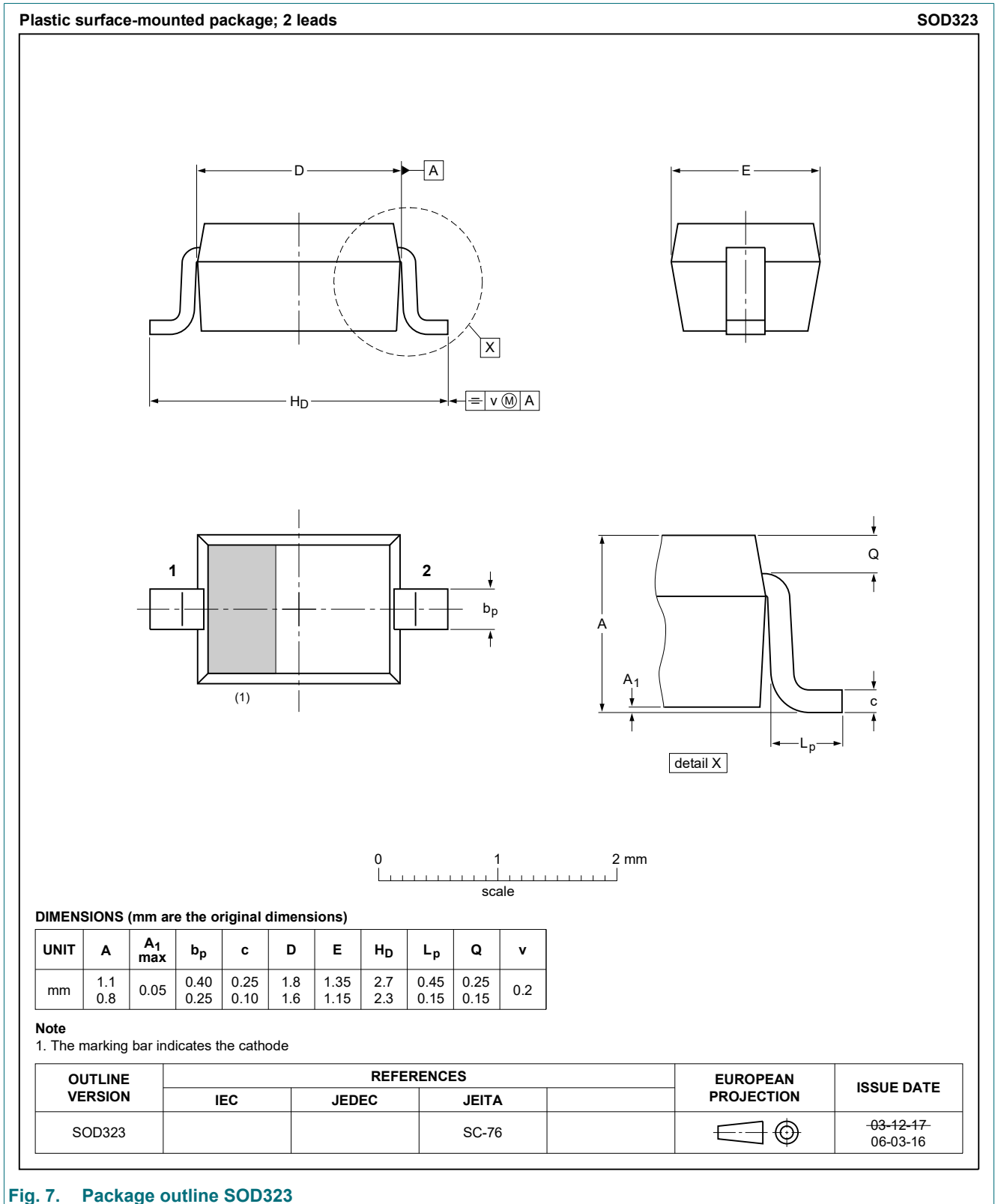


Fig. 7. Package outline SOD323

13. Soldering

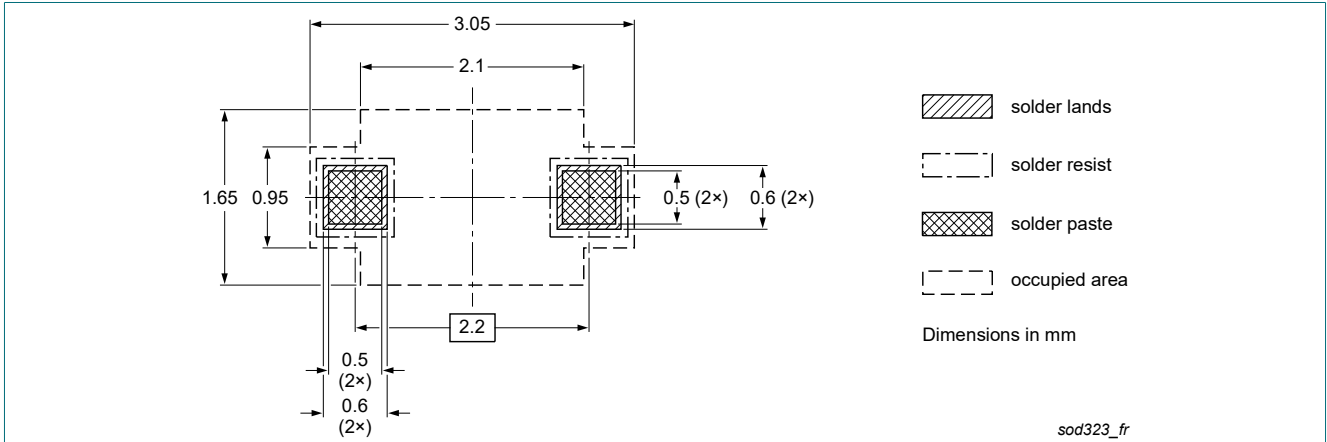


Fig. 8. Reflow soldering footprint for SOD323

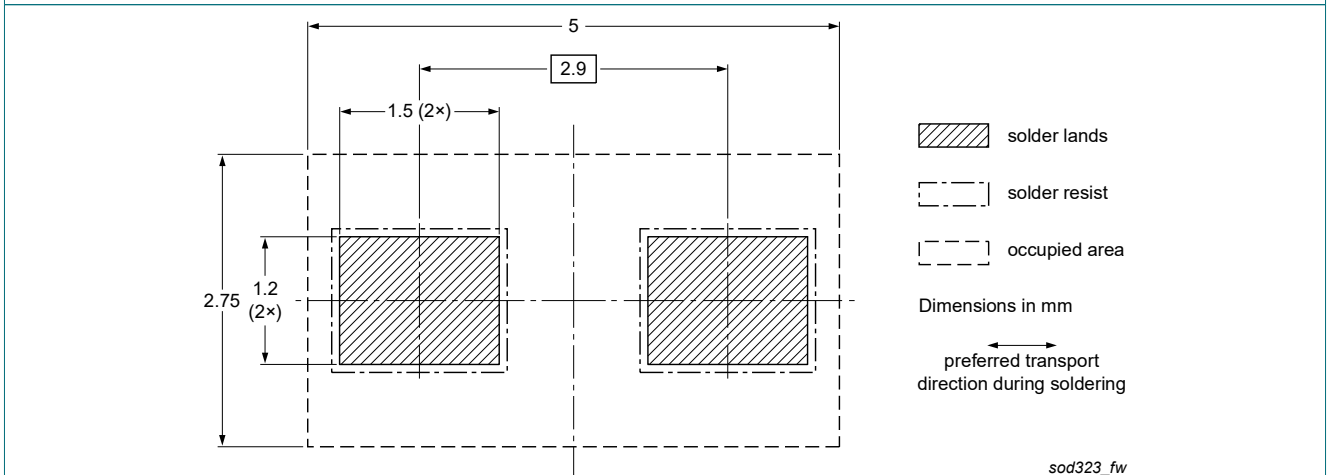


Fig. 9. Wave soldering footprint for SOD323

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--|--------------------|---------------|------------|
| BAS416 v.3 | 20201002 | Product data sheet | - | BAS416 v.2 |
| Modifications: | <ul style="list-style-type: none">• AEC-Q101 qualified attributes inserted in sections "Features and benefits", "Test information" and "Legal information".• 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. | | | |
| BAS416 v.2 | 20040126 | Product data sheet | - | BAS416 v.1 |
| BAS416 v.1 | 20021119 | 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".
- [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 <https://www.nexperia.com>.

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For sales office addresses, please send an email to: salesaddresses@nexperia.com
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