

# BAT15-03W

## Single silicon RF Schottky diode



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Simulation



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## Product description

This Infineon RF Schottky diode is a silicon low barrier N-type device with an integrated guard ring on-chip for over-voltage protection. Its low barrier height, low forward voltage and low junction capacitance make BAT15-03W a suitable choice for mixer and detector functions in applications which frequencies are as high as 12 GHz.



## Feature list

- Low inductance  $L_S = 1.8$  nH (typical)
- Low capacitance  $C = 0.28$  pF (typical) at 1 MHz
- Industry standard SOD323 package (2.5 mm x 1.25 mm x 0.9 mm)
- Pb-free, RoHS compliant and halogen-free

## Product validation

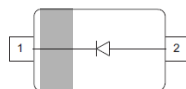
Qualified for industrial applications according to the relevant tests of JEDEC47/20/22.

## Potential applications

For mixers and detectors in:

- Sensor interfaces of security systems
- Telematic systems
- Compensators
- Radar systems for industrial use

## Device information



**Table 1** Part information

| Product name / Ordering code   | Package | Pin configuration  | Marking | Pieces/Reel |
|--------------------------------|---------|--------------------|---------|-------------|
| BAT15-03W / BAT1503WE6327HTSA1 | SOD323  | Single, with leads | white P | 3 k         |

**Attention:** ESD (Electrostatic discharge) sensitive device, observe handling precautions!

**Table of contents**

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|          |   |   |
|----------|---|---|
|          | <b>Product description</b> .....                    | 1 |
|          | <b>Feature list</b> .....                           | 1 |
|          | <b>Product validation</b> .....                     | 1 |
|          | <b>Potential applications</b> .....                 | 1 |
|          | <b>Device information</b> .....                     | 1 |
|          | <b>Table of contents</b> .....                      | 2 |
| <b>1</b> | <b>Absolute maximum ratings</b> .....               | 2 |
| <b>2</b> | <b>Electrical performance in test fixture</b> ..... | 3 |
| 2.1      | Electrical characteristics .....                    | 3 |
| 2.2      | Characteristic curves .....                         | 3 |
| <b>3</b> | <b>Thermal characteristics</b> .....                | 5 |
| <b>4</b> | <b>Package information SOD323</b> .....             | 7 |
|          | <b>Revision history</b> .....                       | 8 |
|          | <b>Disclaimer</b> .....                             | 9 |

**1 Absolute maximum ratings**

**Table 2 Absolute maximum ratings at  $T_A = 25\text{ °C}$ , unless otherwise specified**

| Parameter               | Symbol    | Values |      | Unit | Note or test condition                |
|-------------------------|-----------|--------|------|------|---------------------------------------|
|                         |           | Min.   | Max. |      |                                       |
| Diode reverse voltage   | $V_R$     | –      | 4    | V    |                                       |
| Forward current         | $I_F$     | –      | 110  | mA   |                                       |
| Total power dissipation | $P_{TOT}$ | –      | 100  | mW   | $T_S \leq 78\text{ °C}$ <sup>1)</sup> |
| Junction temperature    | $T_J$     | –      | 150  | °C   |                                       |
| Operating temperature   | $T_{OP}$  | -55    | 150  |      |                                       |
| Storage temperature     | $T_{STG}$ | -55    | 150  |      |                                       |

**Attention:** *Stresses above the maximum values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Exceeding only one of these values may cause irreversible damage to the component.*

<sup>1</sup>  $T_S$  is the soldering point temperature.

Electrical performance in test fixture

## 2 Electrical performance in test fixture

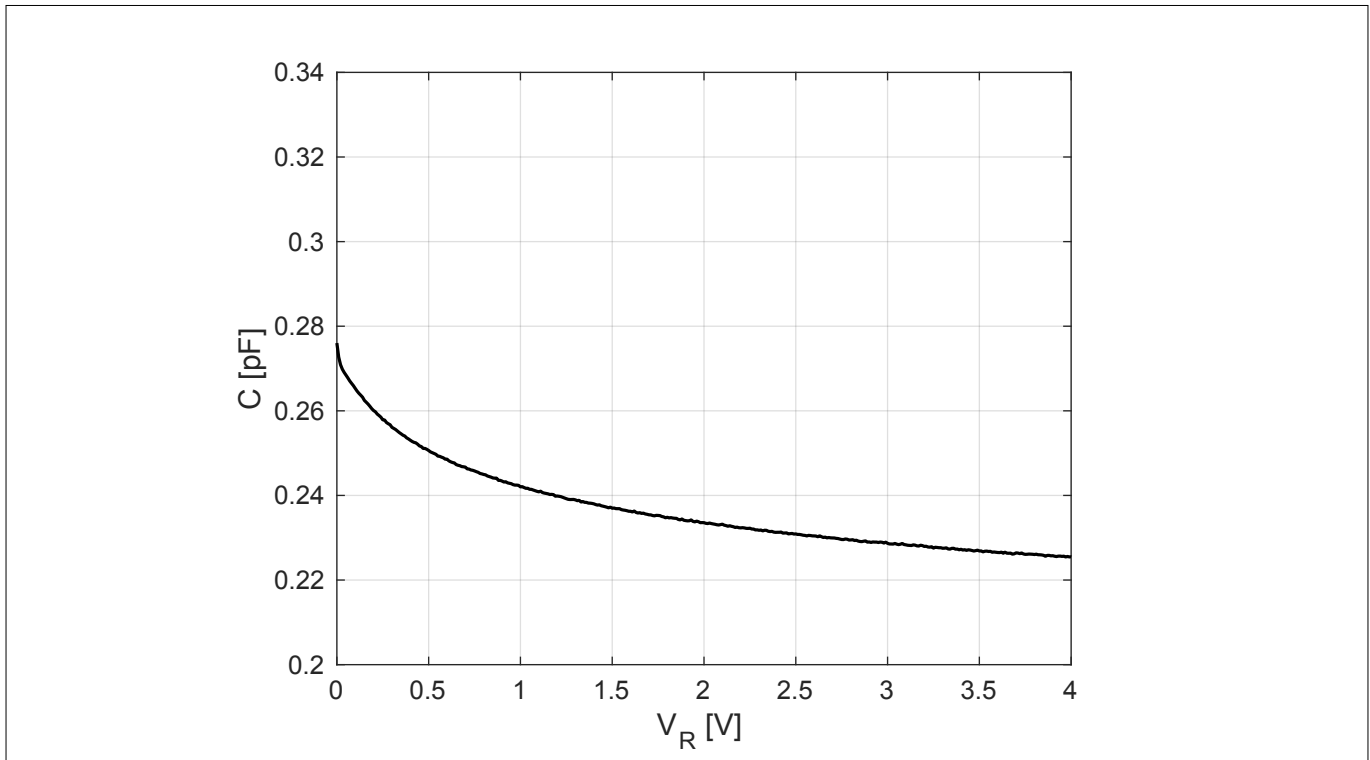
### 2.1 Electrical characteristics

**Table 3** Electrical characteristics at  $T_A = 25\text{ °C}$ , unless otherwise specified

| Parameter                       | Symbol   | Values |      |      | Unit          | Note or test condition                            |
|---------------------------------|----------|--------|------|------|---------------|---|
|                                 |          | Min.   | Typ. | Max. |               |   |
| Breakdown voltage               | $V_{BR}$ | 4      | –    | –    | V             | $I_R = 100\text{ }\mu\text{A}$                    |
| Reverse current                 | $I_R$    | –      | –    | 5    | $\mu\text{A}$ | $V_R = 1\text{ V}$                                |
| Forward voltage                 | $V_F$    | 0.16   | 0.25 | 0.32 | V             | $I_F = 1\text{ mA}$                               |
|                                 |          | 0.25   | 0.35 | 0.41 |               | $I_F = 10\text{ mA}$                              |
| Differential forward resistance | $R_F$    | –      | 5.8  | –    | $\Omega$      | $I_F = 10\text{ mA} / 50\text{ mA}$ <sup>1)</sup> |
| Capacitance                     | $C$      | –      | 0.28 | 0.35 | pF            | $V_R = 0\text{ V}, f = 1\text{ MHz}$              |
| Inductance                      | $L_S$    | –      | 1.8  | –    | nH            |   |

### 2.2 Characteristic curves

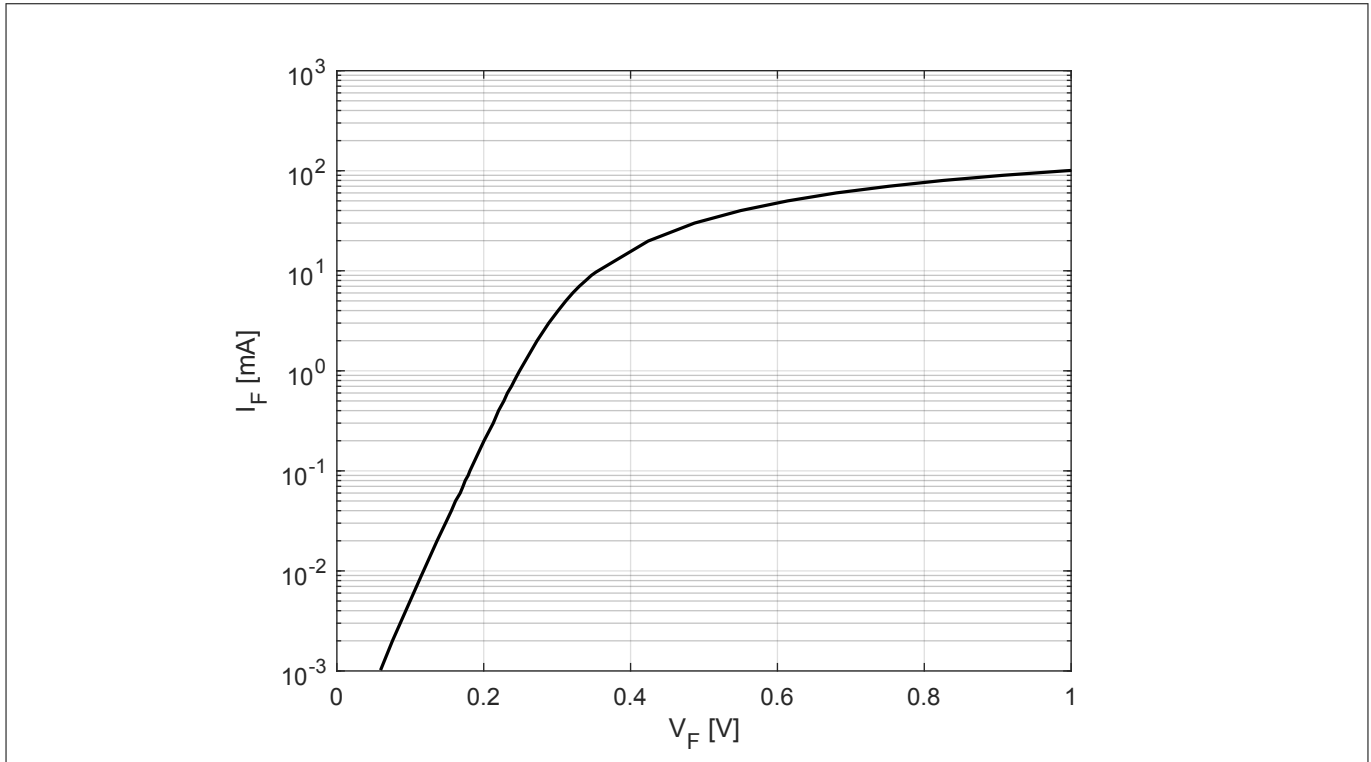
At  $T_A = 25\text{ °C}$ , unless otherwise specified



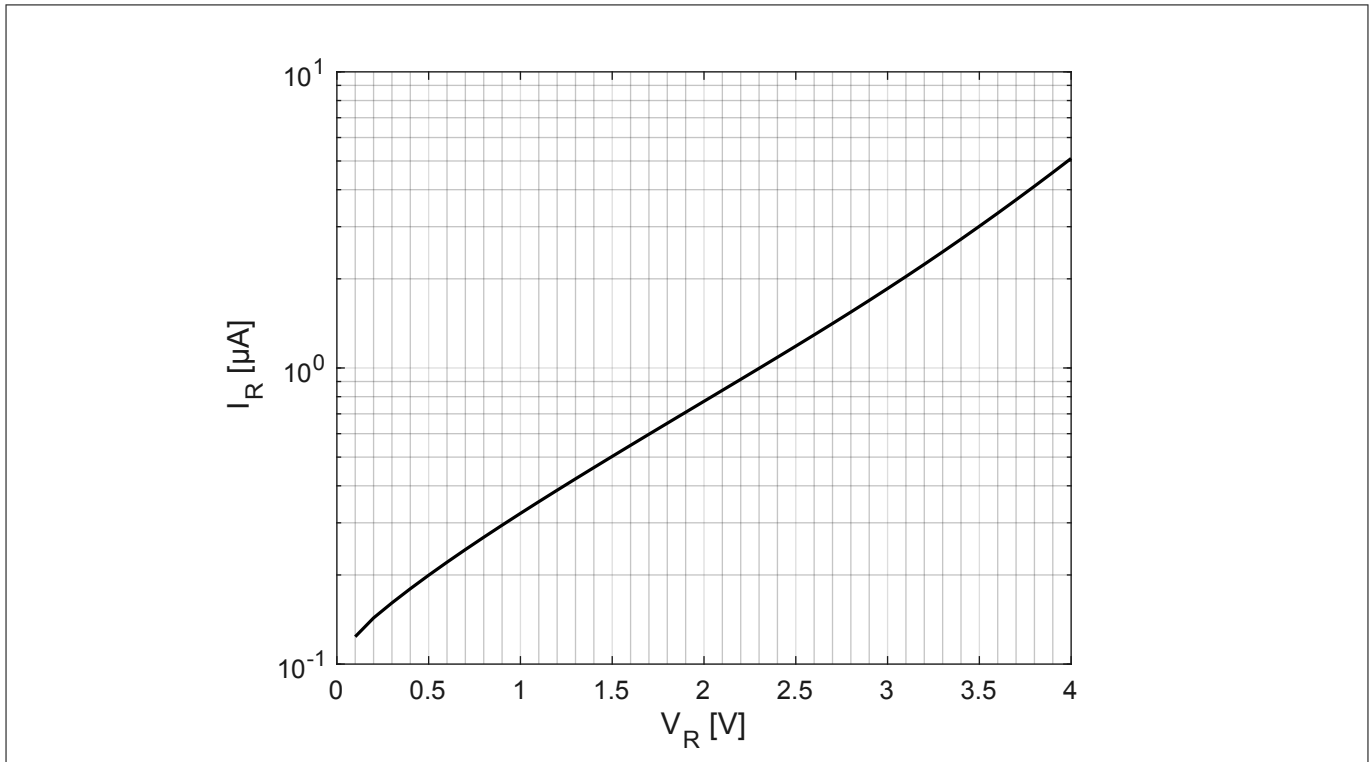
**Figure 1** Diode capacitance  $C$  vs. reverse voltage  $V_R$  at frequency  $f = 1\text{ MHz}$

<sup>1)</sup> 
$$R_F = \frac{V_F(50\text{ mA}) - V_F(10\text{ mA})}{50\text{ mA} - 10\text{ mA}}$$

**Electrical performance in test fixture**



**Figure 2** Forward current  $I_F$  vs. forward voltage  $V_F$



**Figure 3** Reverse current  $I_R$  vs. reverse voltage  $V_R$

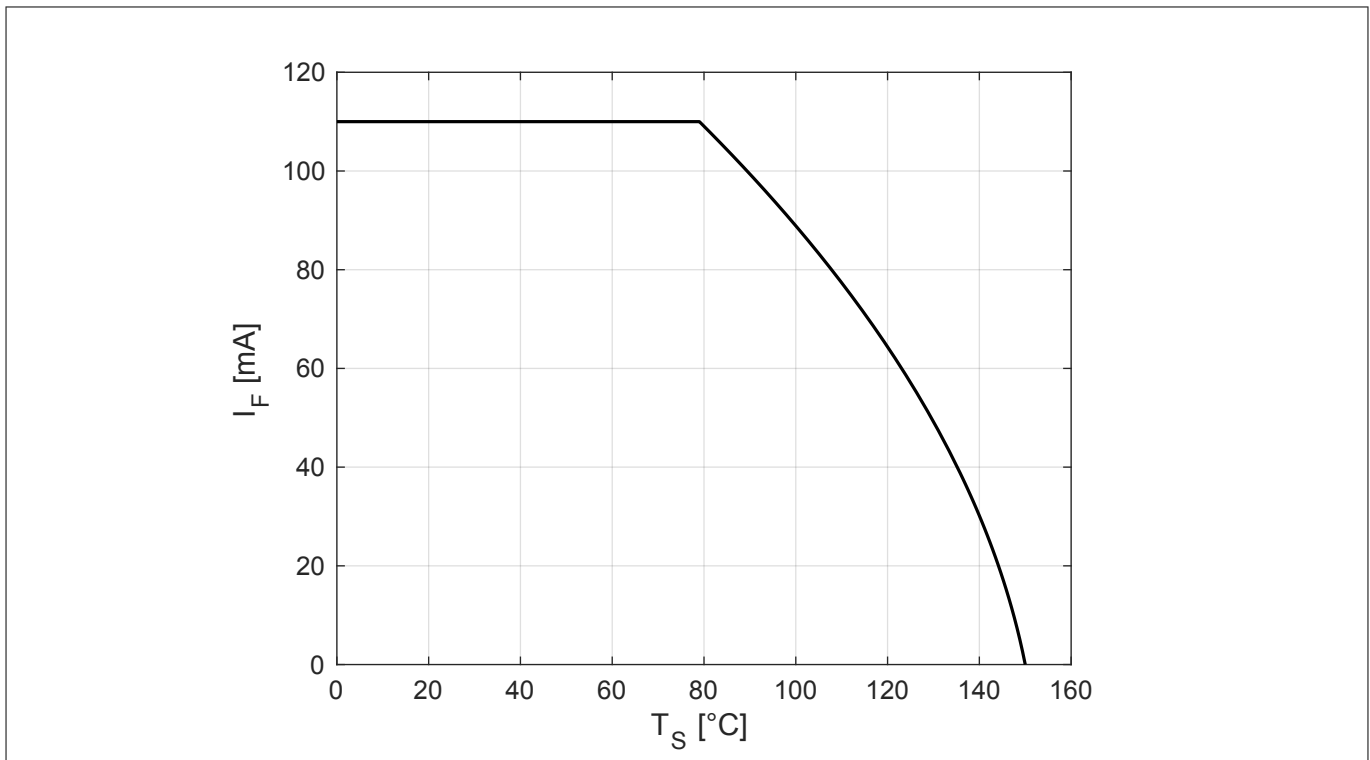
*Note:* The curves shown in this chapter have been generated using typical devices but shall not be understood as a guarantee that all devices have identical characteristic curves.

**Thermal characteristics**

**3 Thermal characteristics**

**Table 4 Thermal resistance**

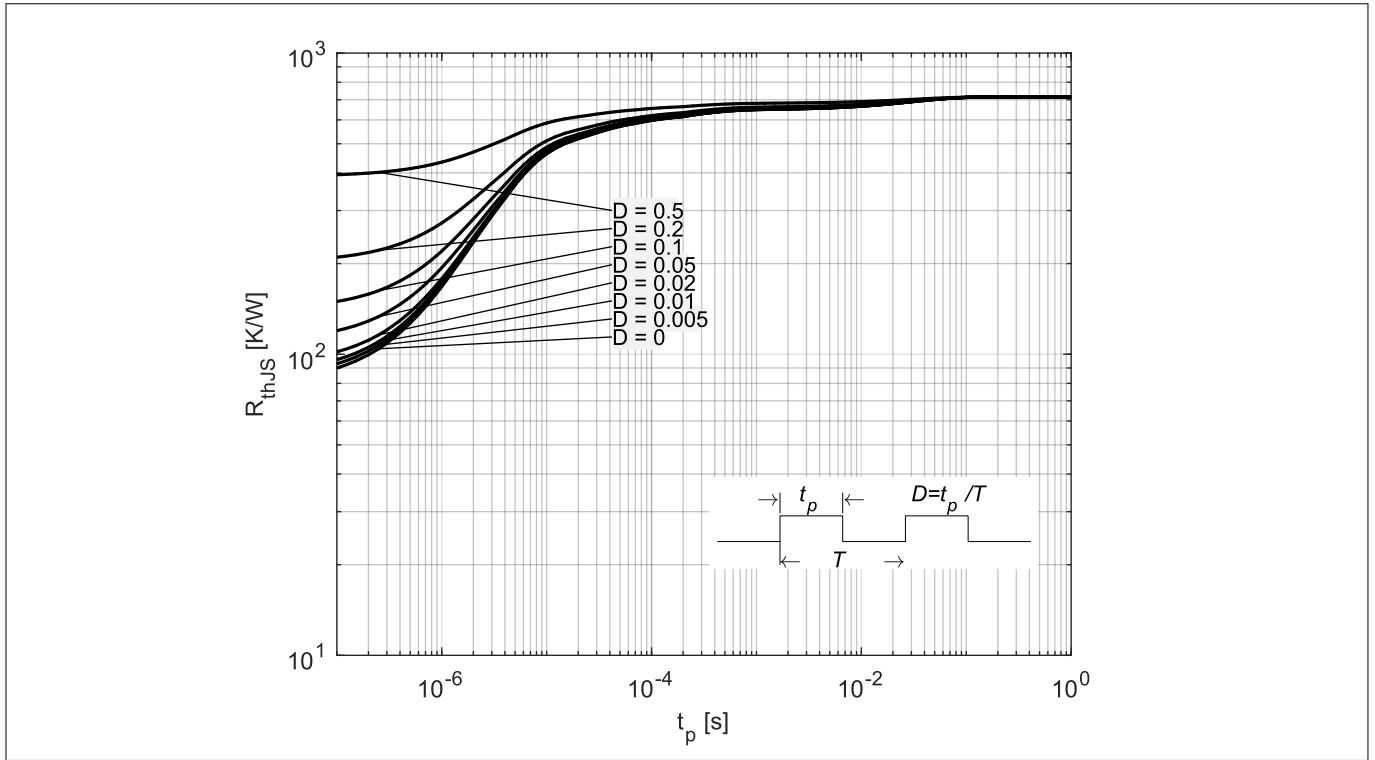
| Parameter                                       | Symbol     | Values |      |      | Unit | Note or test condition             |
|---|------------|--------|------|------|------|------------------------------------|
|   |            | Min.   | Typ. | Max. |      |                                    |
| Thermal resistance (junction - soldering point) | $R_{thJS}$ | -      | 715  | -    | K/W  | $T_S = 78\text{ °C}$ <sup>1)</sup> |



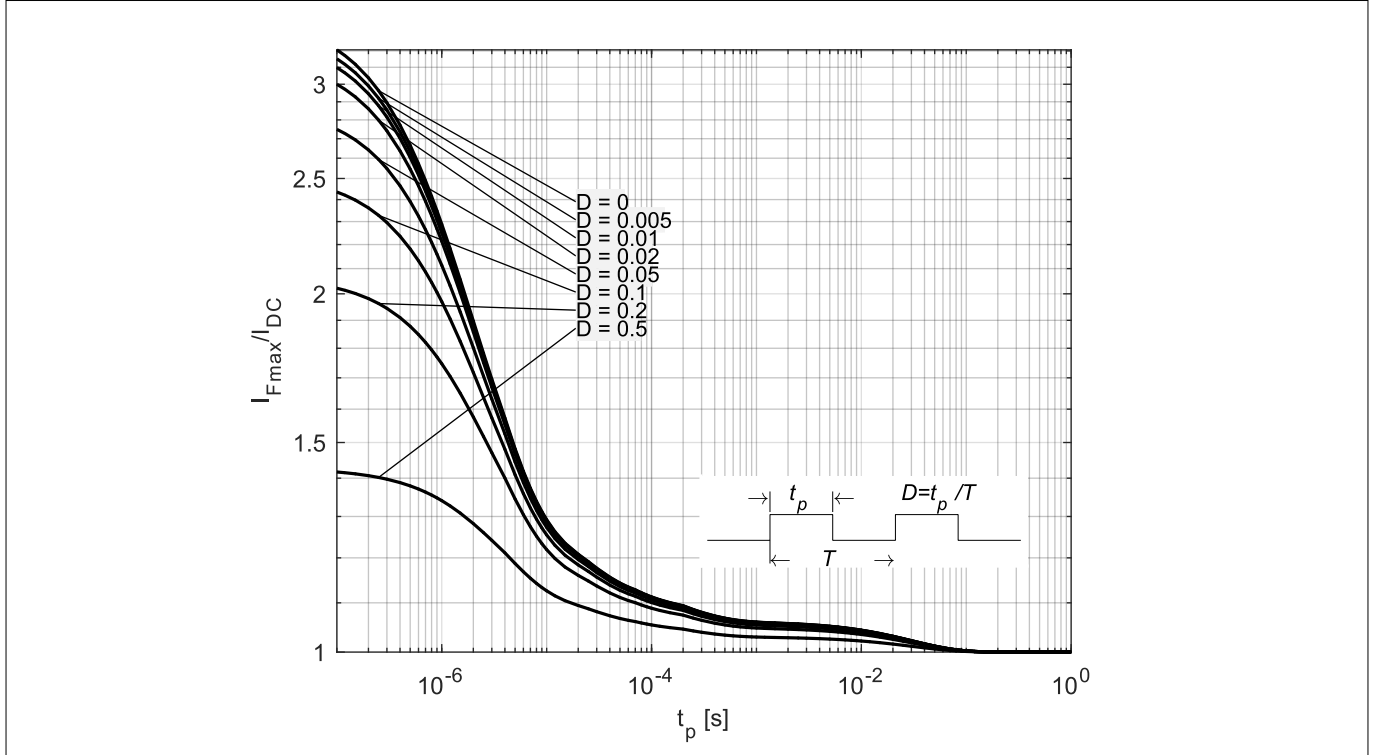
**Figure 4 Permissible forward current  $I_F$  in DC operation**

<sup>1</sup> For  $R_{thJS}$  in other conditions refer to the curves in this chapter.

**Thermal characteristics**



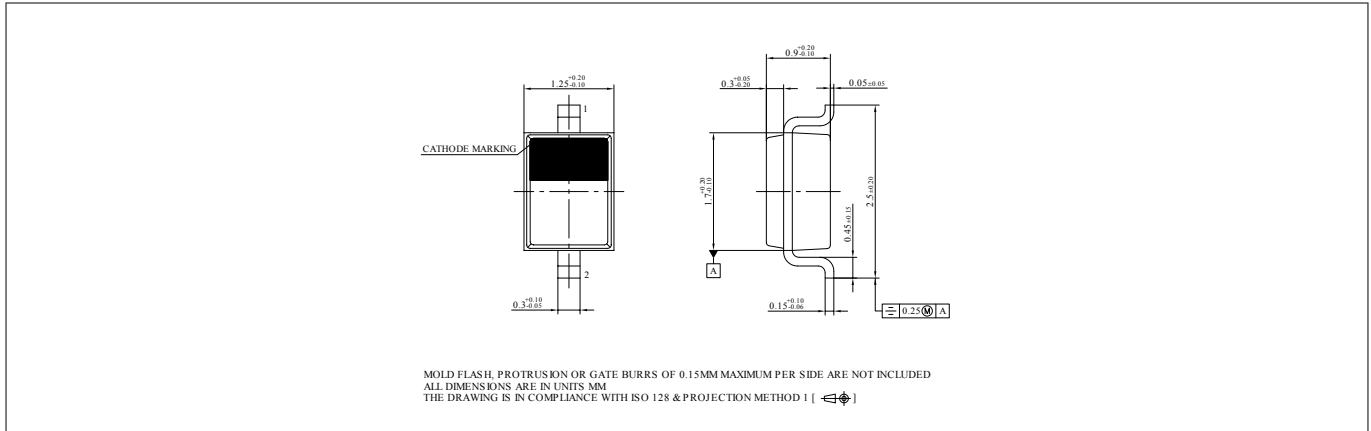
**Figure 5 Thermal resistance  $R_{thJS}$  in pulse operation**



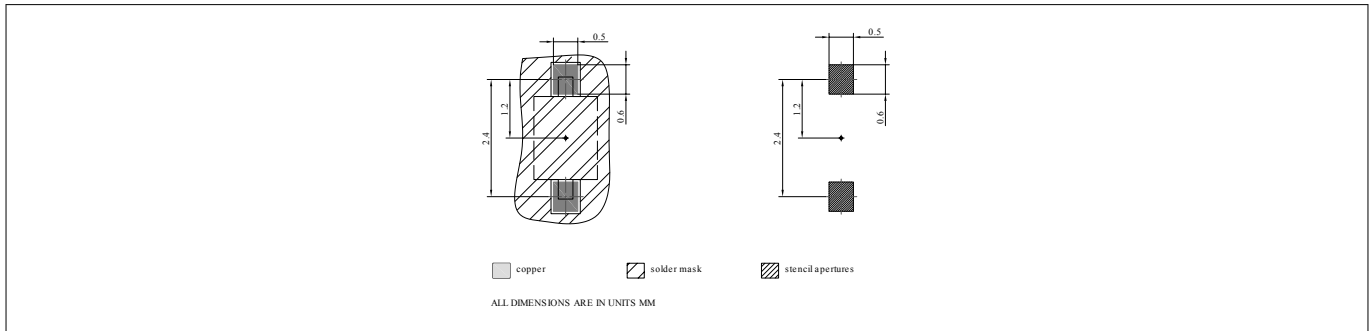
**Figure 6 Permissible forward current ratio  $I_{Fmax}/I_{DC}$  in pulse operation**

**Package information SOD323**

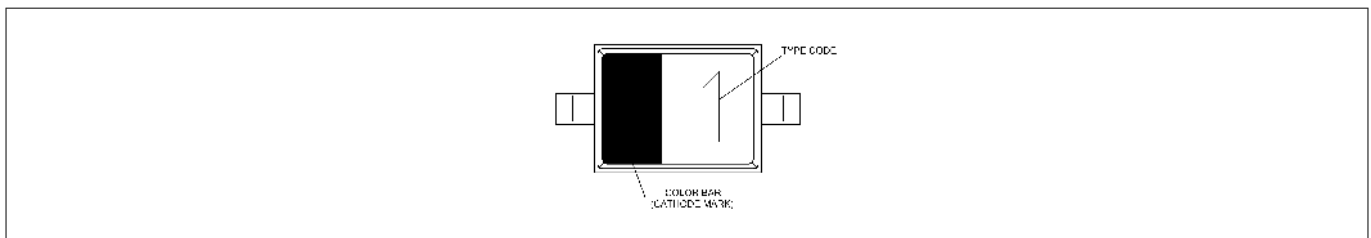
**4 Package information SOD323**



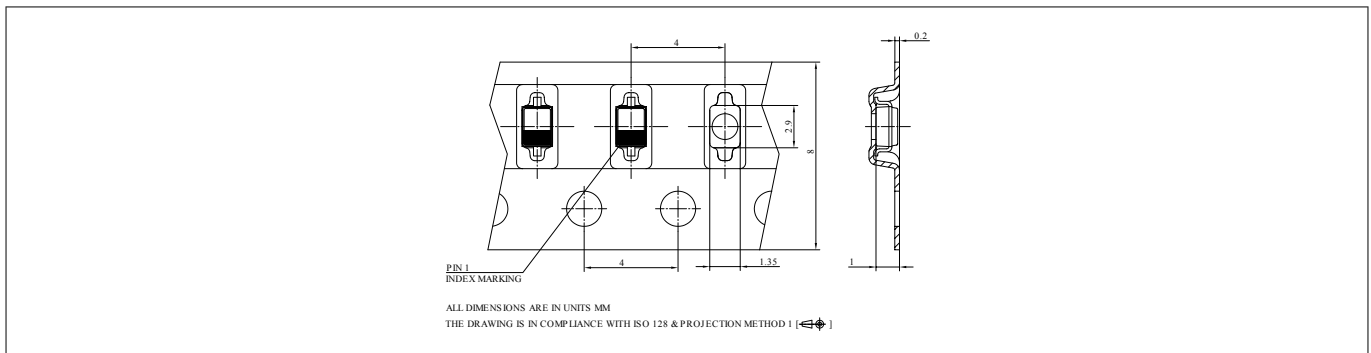
**Figure 7 Package outline**



**Figure 8 Foot print**



**Figure 9 Marking layout example**



**Figure 10 Tape dimensions**

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Revision history

## Revision history

| Document version | Date of release | Description of changes  |
|------------------|-----------------|---|
| 1.0              | 2018-09-07      | <ul style="list-style-type: none"><li>• Change from series datasheet to individual one</li><li>• Initial release of datasheet</li><li>• Typical values and curves updated to the values of the production (No product or process change behind)</li><li>• Typical values added</li><li>• Typical curves removed</li></ul> |



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