

BAT15-03W

Single silicon RF Schottky diode



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

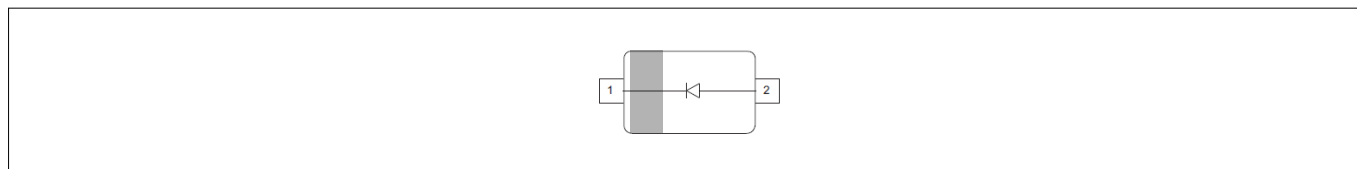


Table 1 Part information

| 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!

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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 | $T_S \leq 78\text{ °C}$ ¹⁾ |
| 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.*

¹ 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 | μA | $V_R = 1\text{ V}$ |
| 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 | – | Ω | $I_F = 10\text{ mA} / 50\text{ mA}$ ¹⁾ |
| 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

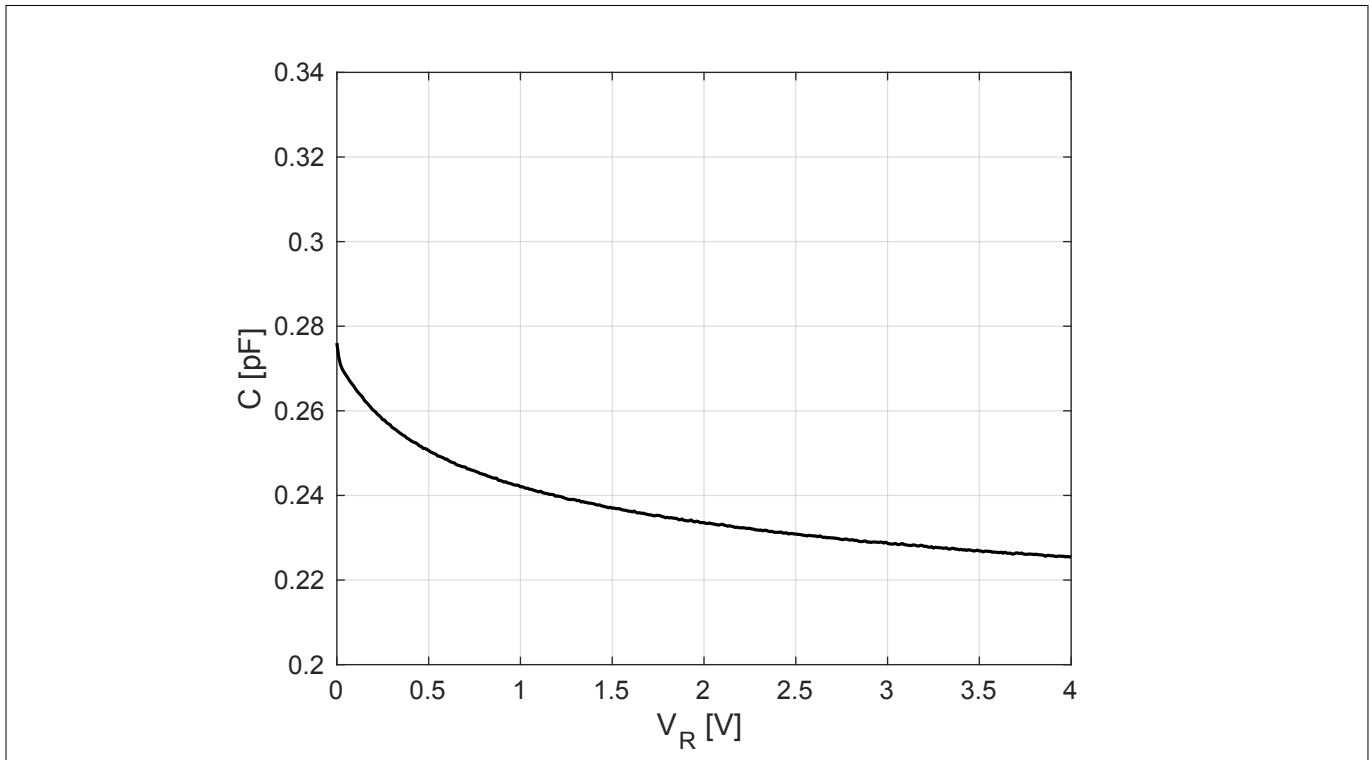


Figure 1 Diode capacitance C vs. reverse voltage V_R at frequency $f = 1\text{ MHz}$

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

Electrical performance in test fixture

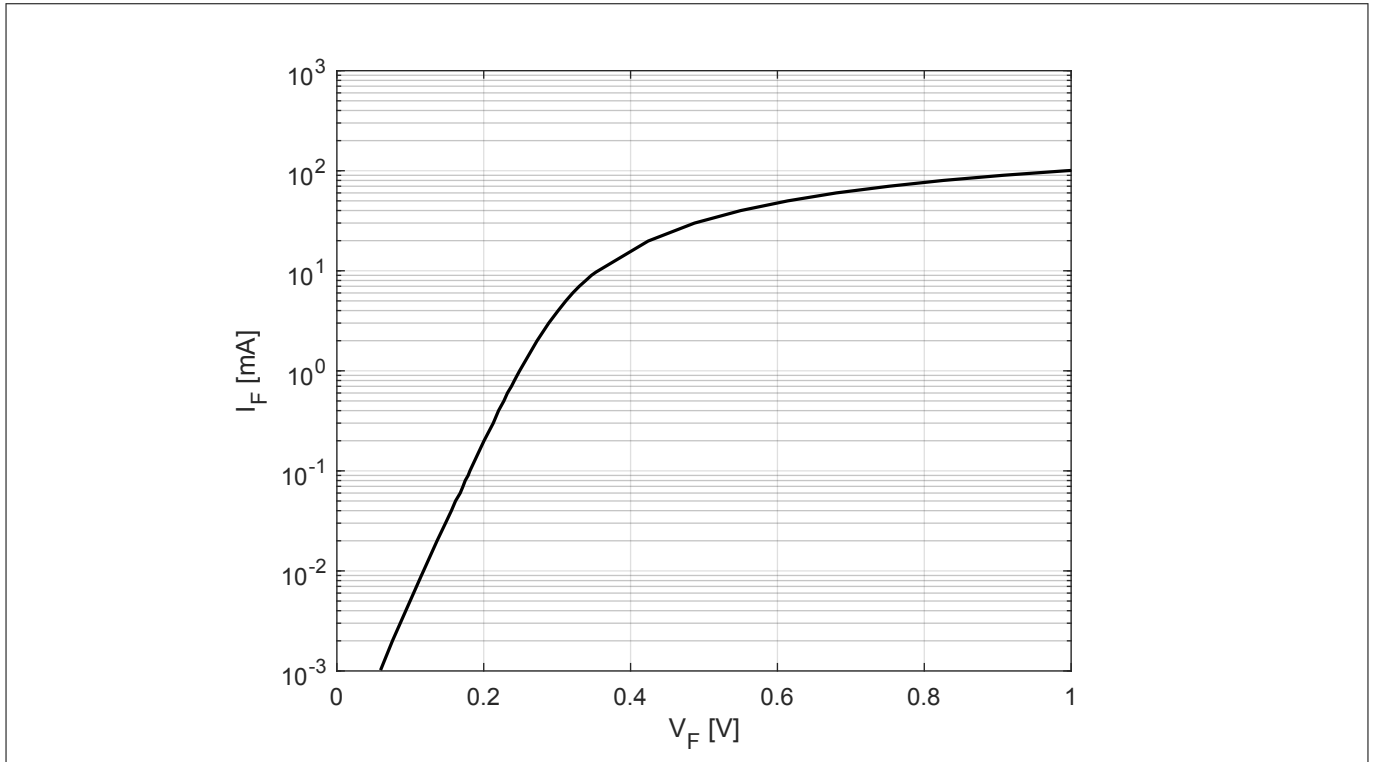


Figure 2 Forward current I_F vs. forward voltage V_F

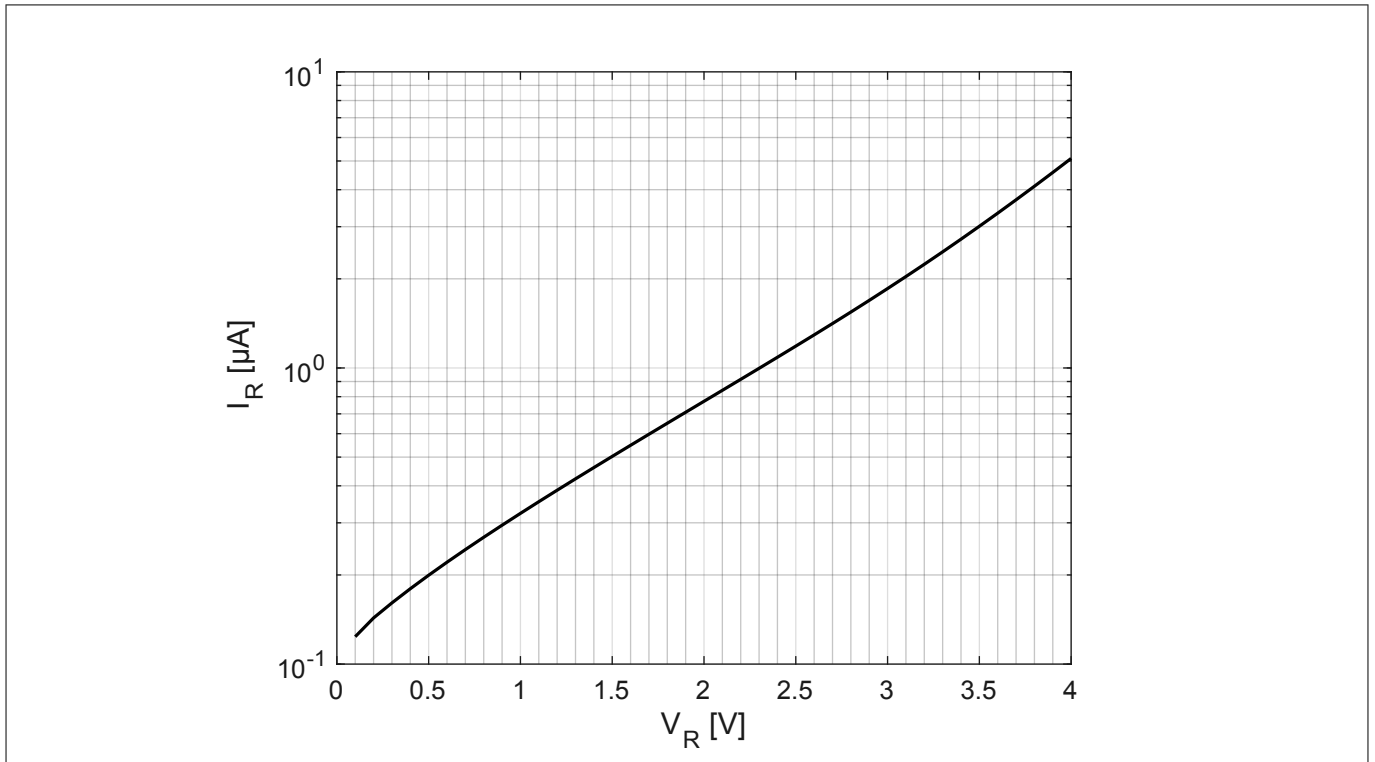


Figure 3 Reverse current I_R vs. reverse voltage V_R

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 | $T_S = 78\text{ °C}$ ¹⁾ |

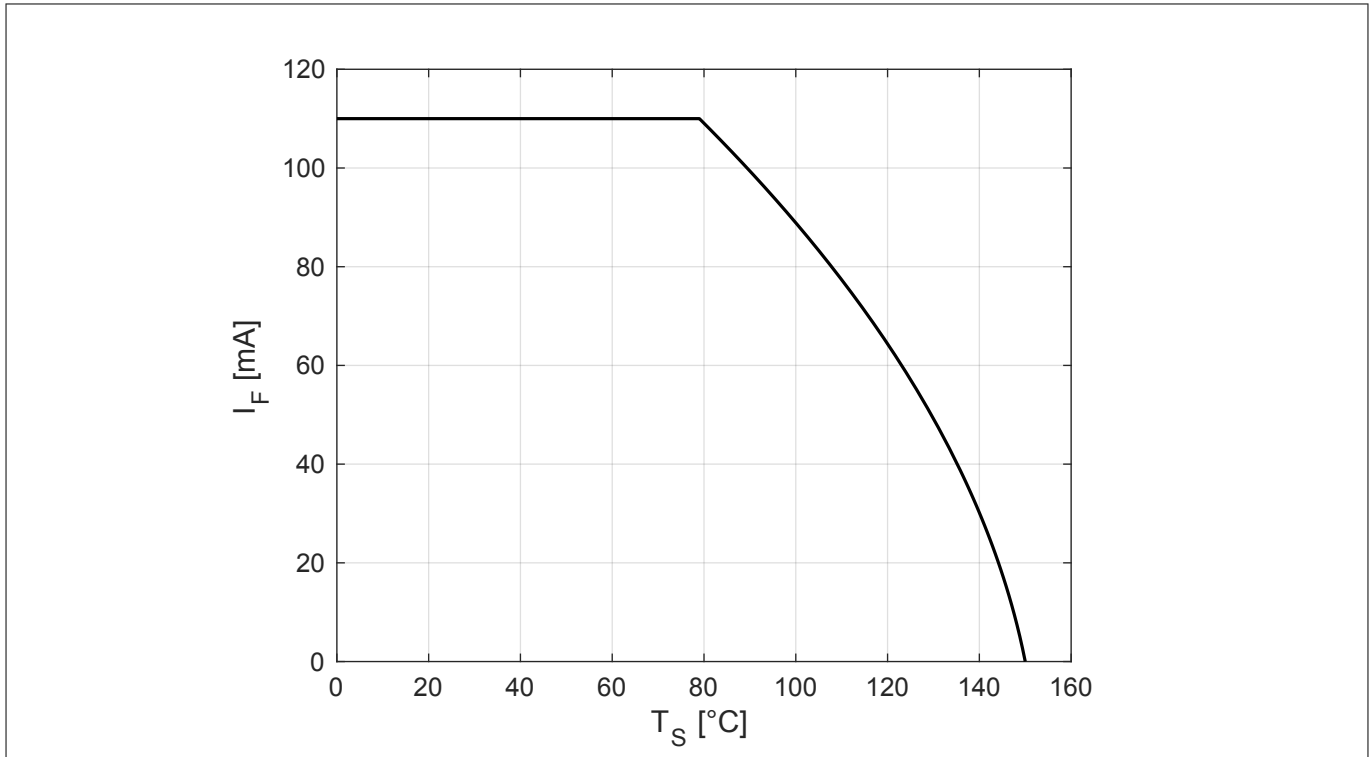


Figure 4 Permissible forward current I_F in DC operation

¹ For R_{thJS} in other conditions refer to the curves in this chapter.

Thermal characteristics

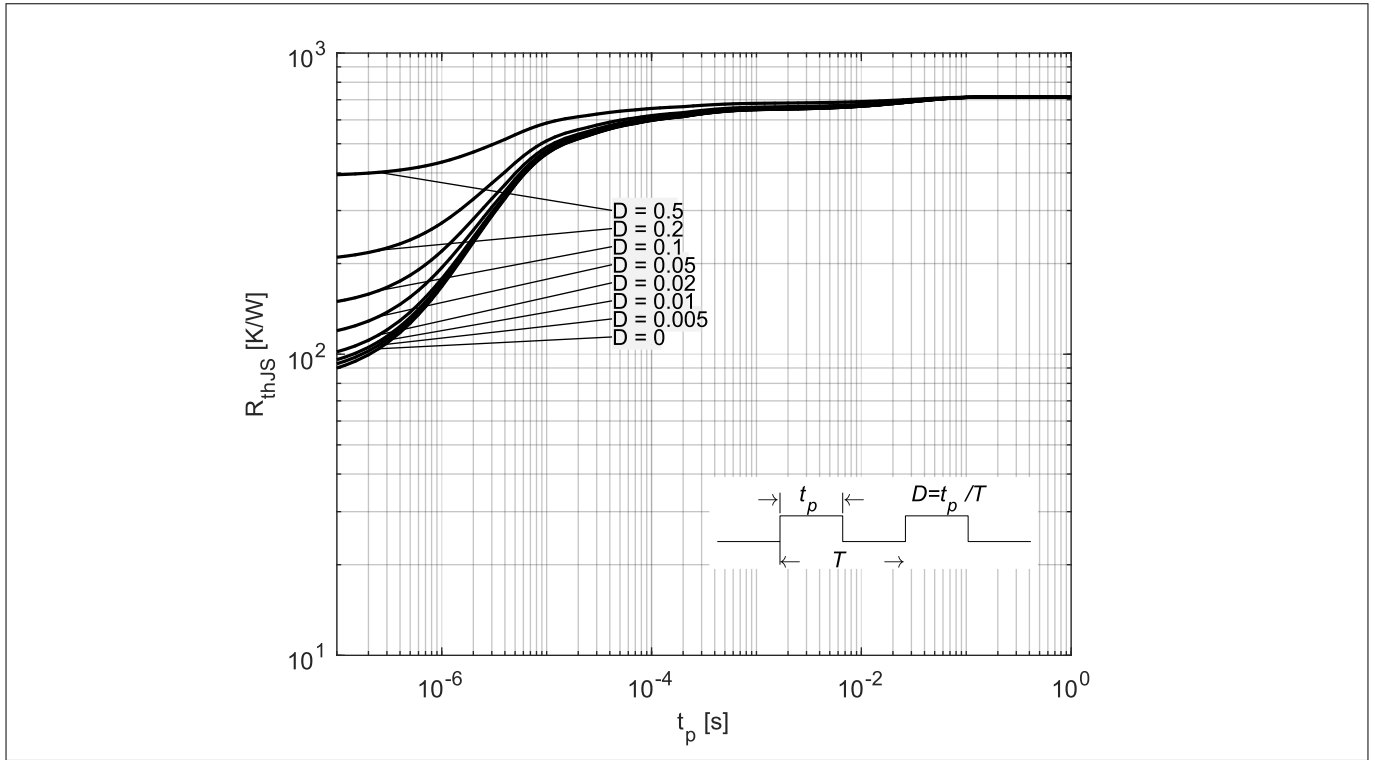


Figure 5 Thermal resistance R_{thJS} in pulse operation

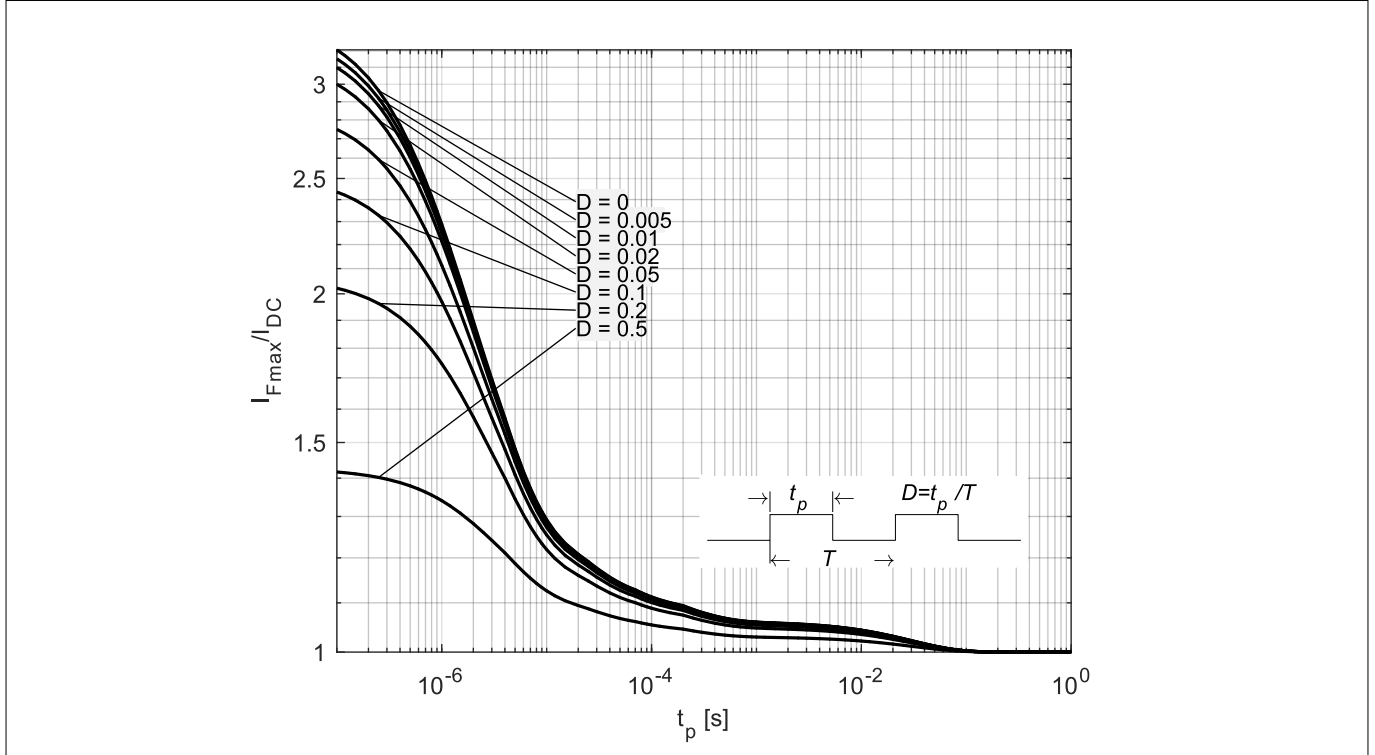


Figure 6 Permissible forward current ratio I_{Fmax}/I_{DC} in pulse operation

Package information SOD323

4 Package information SOD323

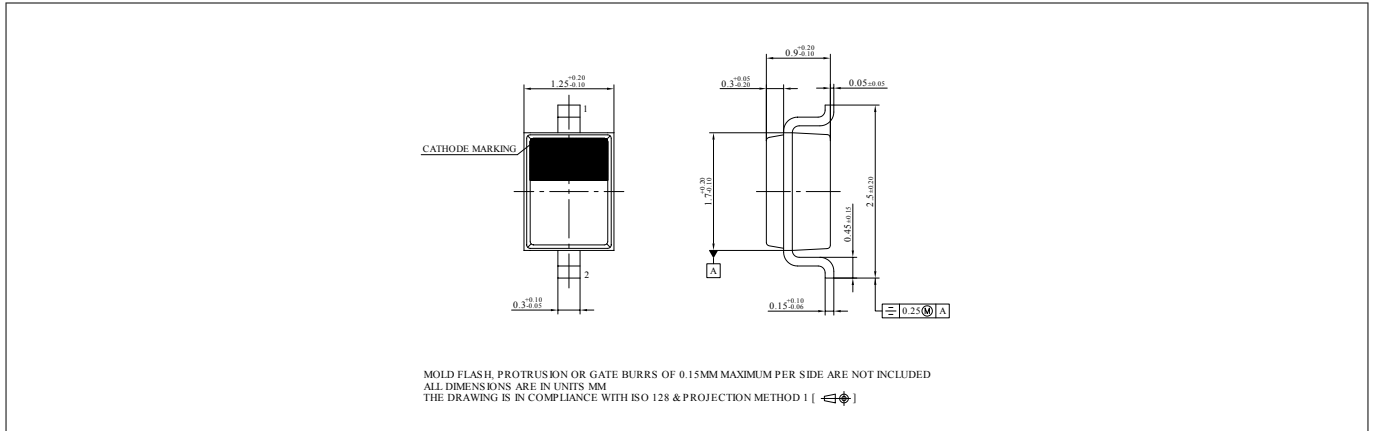


Figure 7 Package outline

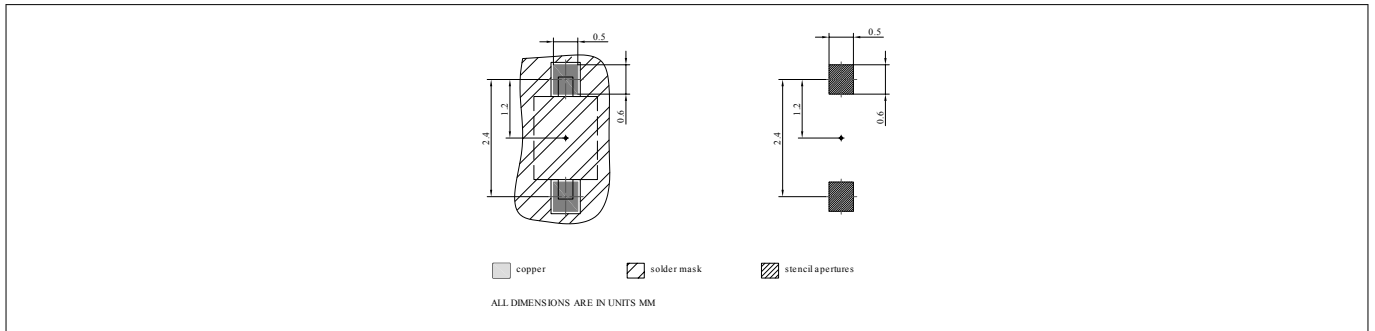


Figure 8 Foot print

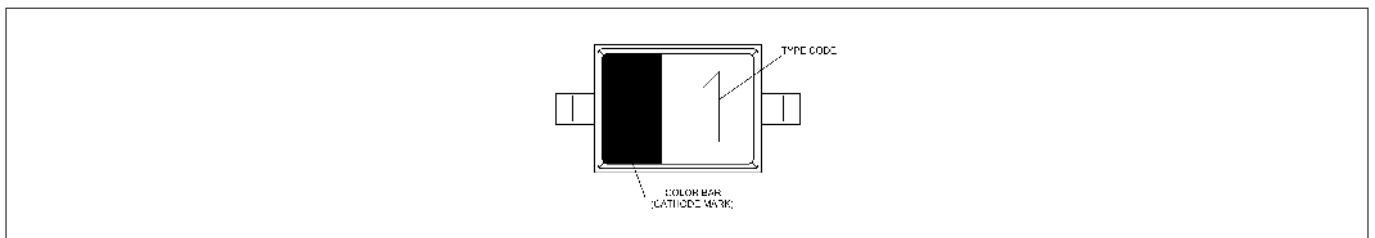


Figure 9 Marking layout example

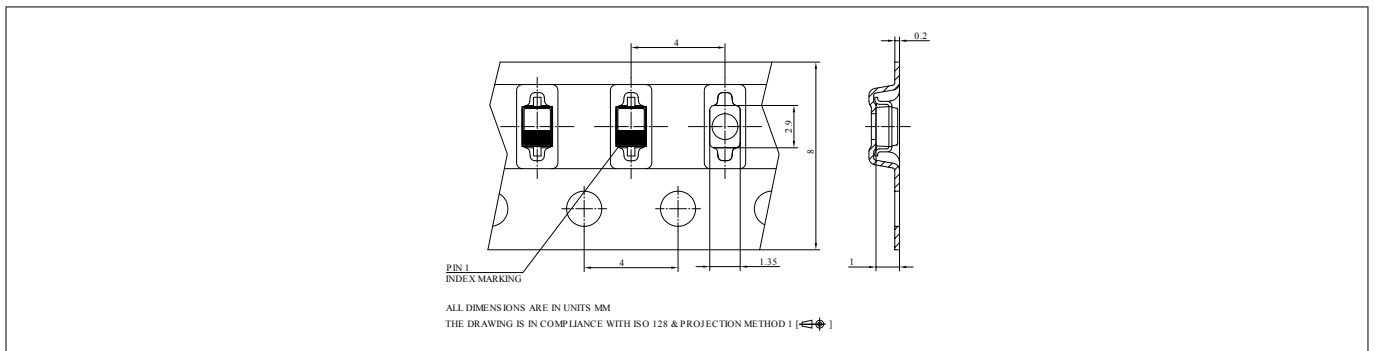


Figure 10 Tape dimensions

Revision history

Revision history

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

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