



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

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline  | Graphic symbol  |
|-----|--------|-------------|---|---|
| 1   | K      | Cathode     | <br>SOD123 | <br>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     | $T_j = 25\text{ °C}$  |     | -   | 85  | V    |
| $V_R$                               | reverse voltage                     |   |     | -   | 75  | V    |
| $I_F$                               | forward current                     | $t_p \leq 300\ \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$ |     | -   | 215 | mA   |
| $I_{FSM}$                           | non-repetitive peak forward current | $t_p = 1\ \mu\text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave  |     | -   | 4   | A    |
|                                     |                                     | $t_p = 1\ \text{ms}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave    |     | -   | 1   | A    |
|                                     |                                     | $t_p = 1\ \text{s}$ ; $T_{j(\text{init})} = 25\text{ °C}$ ; square wave     |     | -   | 0.5 | A    |
| $I_{FRM}$                           | repetitive peak forward current     |   |     | -   | 500 | mA   |
| $P_{tot}$                           | total power dissipation             | $T_{amb} \leq 25\text{ °C}$   | [1] | -   | 357 | mW   |
|                                     |                                     |   | [2] | -   | 600 | mW   |
| <b>Per device, one diode loaded</b> |                                     |   |     |     |     |      |
| $T_j$                               | 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 1cm<sup>2</sup>.

## 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 1cm<sup>2</sup>.

[3] Soldering point of cathode tab.

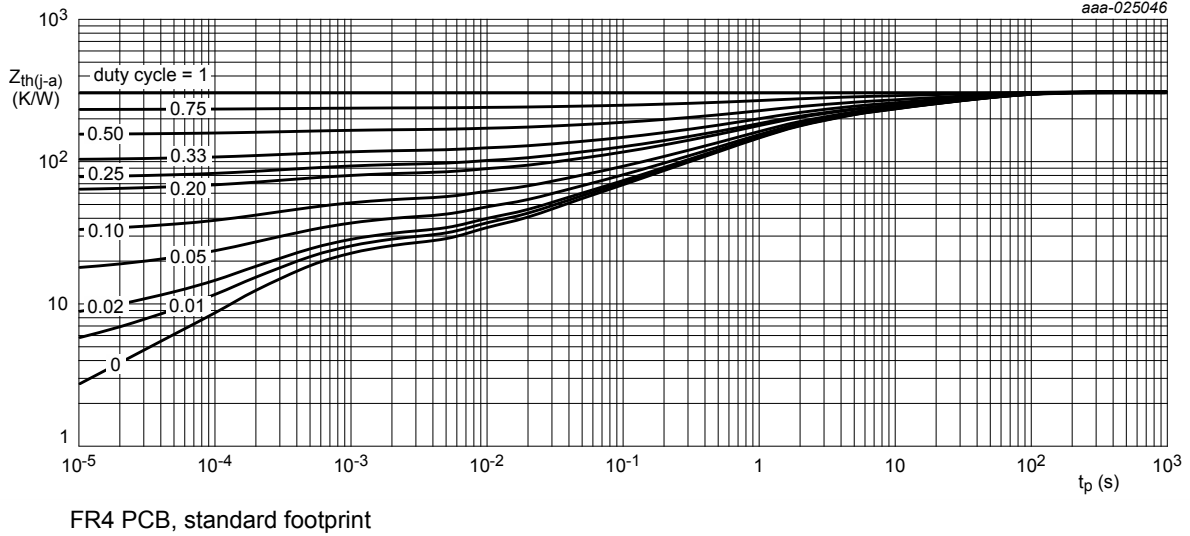


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

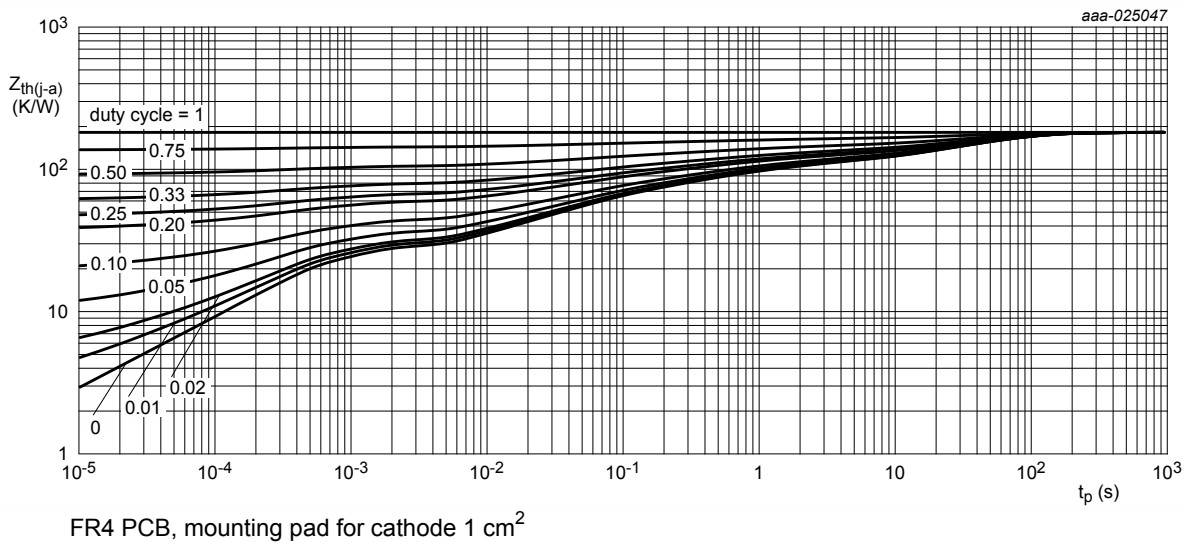
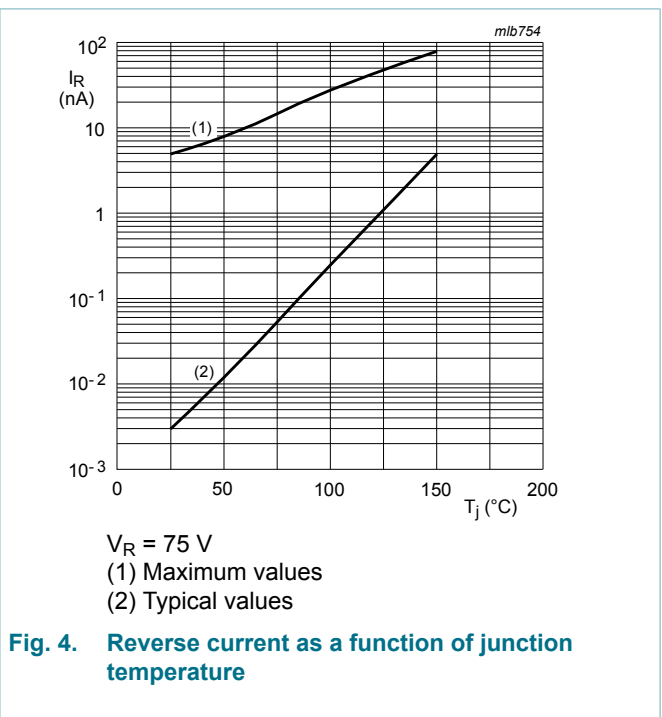
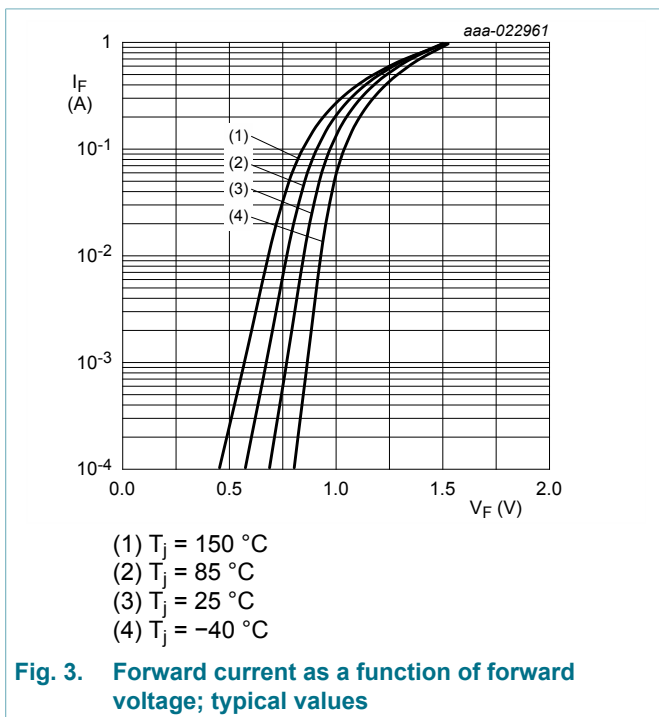


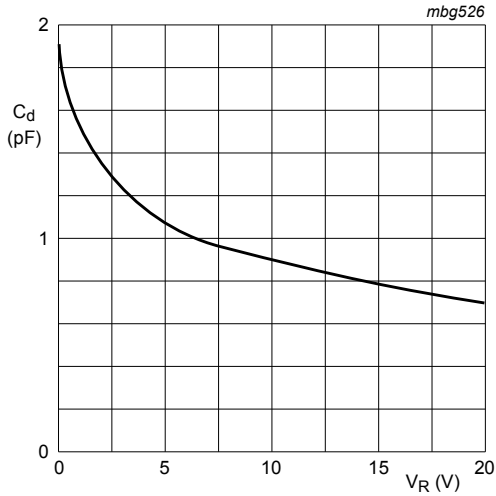
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

Table 7. Characteristics

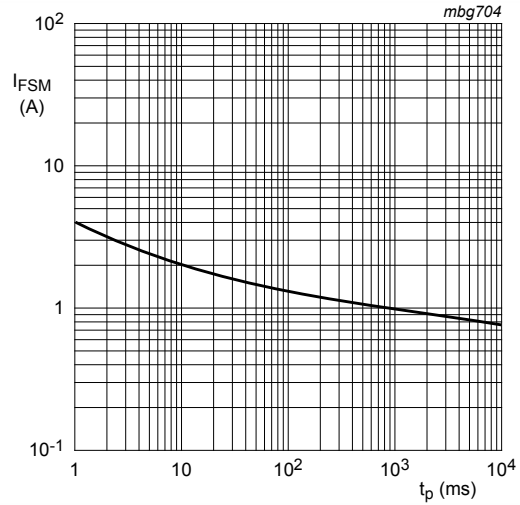
| Symbol          | Parameter             | Conditions  | Min | Typ   | Max  | Unit |
|-----------------|-----------------------|---|-----|-------|------|------|
| V <sub>F</sub>  | forward voltage       | I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C  | -   | -     | 0.9  | V    |
|                 |                       | I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C   | -   | -     | 1    | V    |
|                 |                       | I <sub>F</sub> = 50 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C   | -   | -     | 1.1  | V    |
|                 |                       | I <sub>F</sub> = 150 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>J</sub> = 25 °C  | -   | -     | 1.25 | V    |
| I <sub>R</sub>  | reverse current       | V <sub>R</sub> = 75 V; pulsed; T <sub>J</sub> = 25 °C   | -   | 0.003 | 5    | nA   |
|                 |                       | V <sub>R</sub> = 75 V; pulsed; T <sub>J</sub> = 150 °C  | -   | 3     | 80   | nA   |
| C <sub>d</sub>  | diode capacitance     | V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>J</sub> = 25 °C   | -   | 2     | -    | pF   |
| t <sub>rr</sub> | reverse recovery time | I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; R <sub>L</sub> = 100 Ω; I <sub>R(meas)</sub> = 1 mA; T <sub>J</sub> = 25 °C | -   | 0.8   | 3    | μs   |





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

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

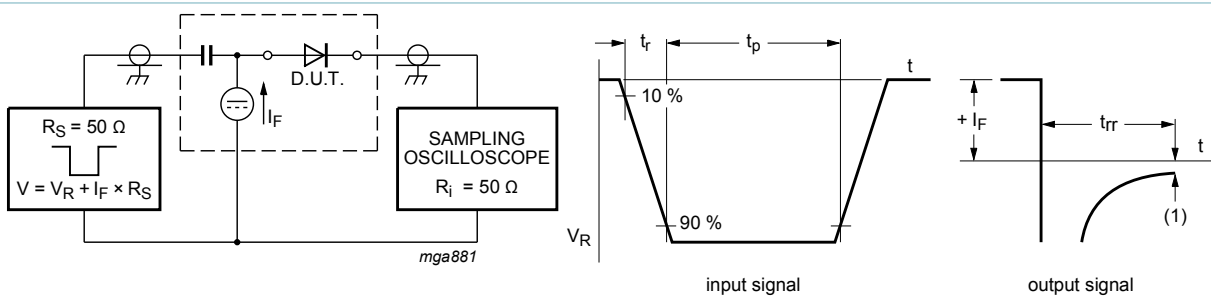


Based on square wave currents.

$T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$

**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

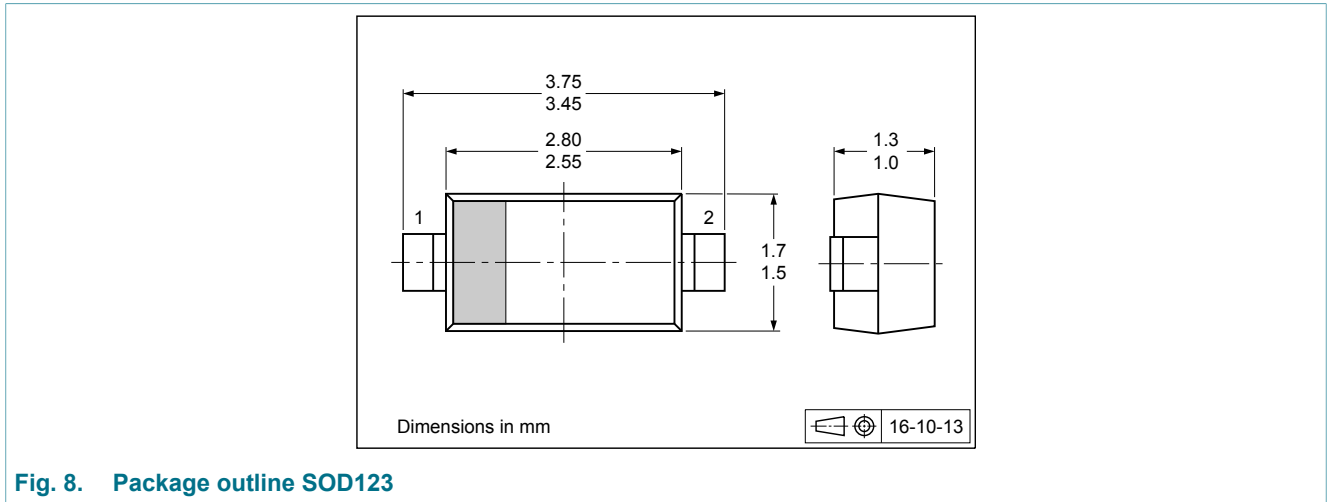


Fig. 8. Package outline SOD123

## 13. Soldering

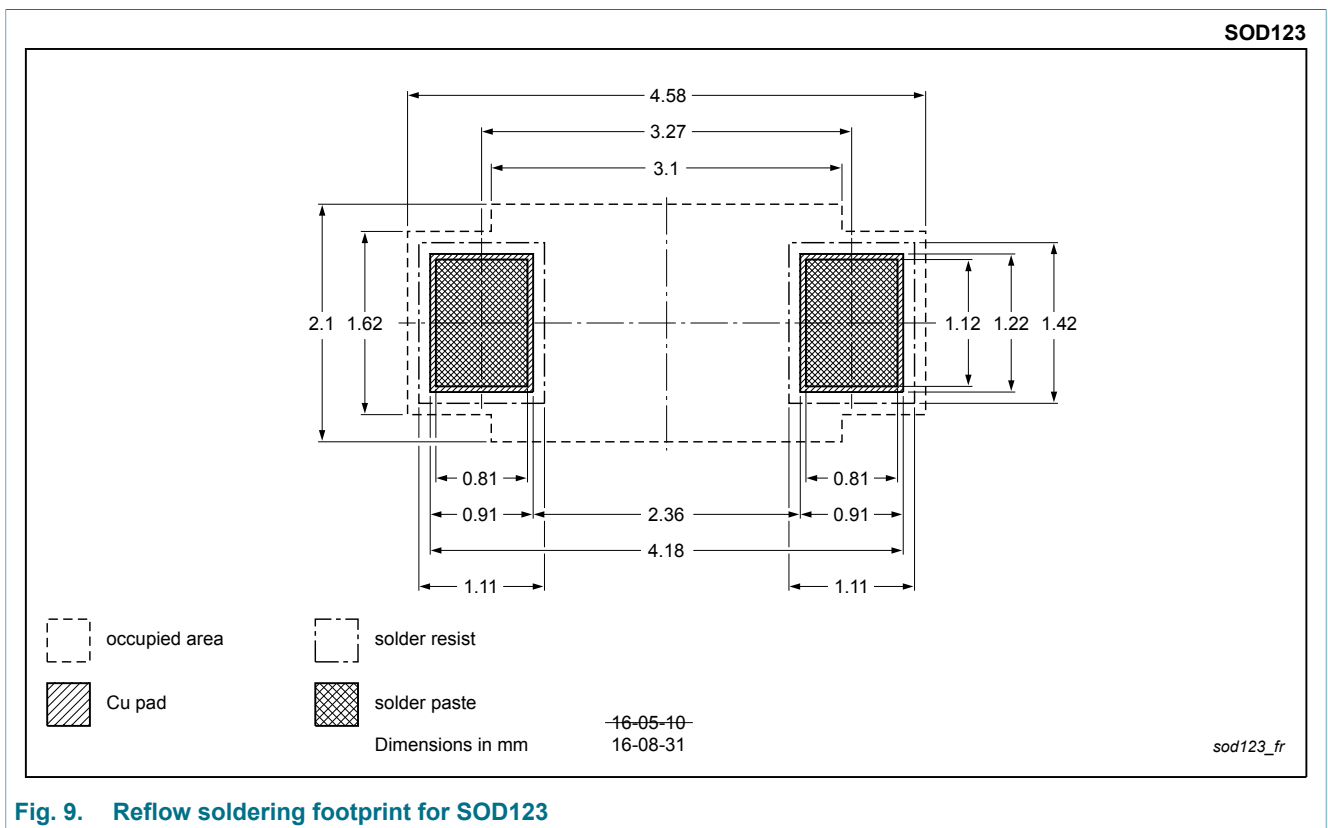


Fig. 9. Reflow soldering footprint for SOD123

SOD123

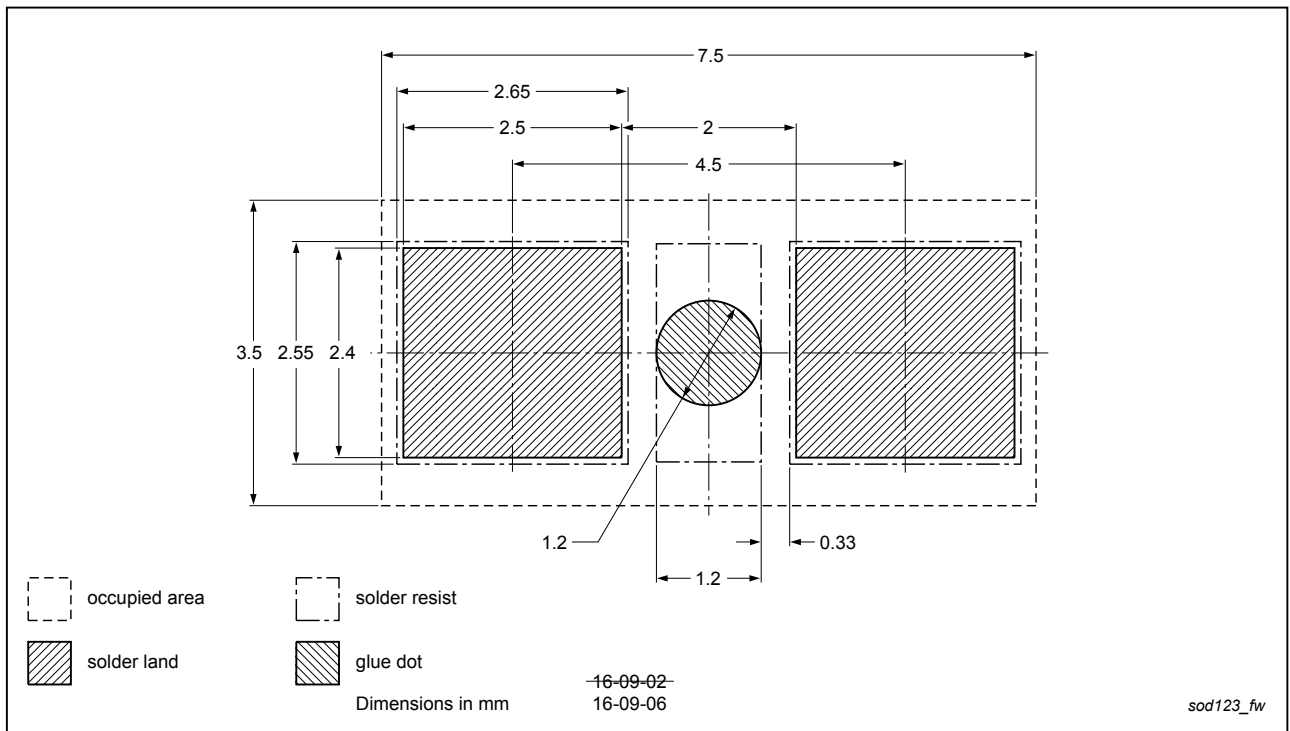


Fig. 10. Wave soldering footprint for SOD123



## 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"><li>Unit corrected to nA in Table 7, reverse current at 150 °C</li></ul> |                    |               |              |
| 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.                                     |

- [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".
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## 16. Contents

|                                 |    |
|---------------------------------|----|
| 1. General description.....     | 1  |
| 2. Features and benefits.....   | 1  |
| 3. Applications.....            | 1  |
| 4. Quick reference data.....    | 1  |
| 5. Pinning information.....     | 2  |
| 6. Ordering information.....    | 2  |
| 7. Marking.....                 | 2  |
| 8. Limiting values.....         | 3  |
| 9. Thermal characteristics..... | 3  |
| 10. Characteristics.....        | 5  |
| 11. Test information.....       | 6  |
| 12. Package outline.....        | 7  |
| 13. Soldering.....              | 7  |
| 14. Revision history.....       | 9  |
| 15. Legal information.....      | 10 |

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Date of release: 5 April 2018