



# BAV170

## Low-leakage double diode

2 October 2020

Product data sheet

### 1. General description

Epitaxial, medium-speed switching, double diode in a small SOT23 plastic SMD package. The diodes are in common cathode configuration.

### 2. Features and benefits

- Plastic SMD package
- Low leakage current: typ. 3 pA
- Switching time: typ. 0.8 us
- 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 |
|------------------|-----------------|--|-----|-------|-----|------|
| <b>Per diode</b> |                 |  |     |       |     |      |
| $V_R$            | reverse voltage | $T_j = 25\text{ }^\circ\text{C}$                               | -   | -     | 75  | V    |
| $I_R$            | reverse current | $V_R = 75\text{ V}$ ; pulsed; $T_j = 25\text{ }^\circ\text{C}$ | -   | 0.003 | 5   | nA   |

### 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description     | Simplified outline | Graphic symbol    |
|-----|--------|-----------------|--------------------|-------------------|
| 1   | A1     | anode (diode 1) | <p>SOT23</p>       | <p>aaa-032141</p> |
| 2   | A2     | anode (diode 2) |                    |                   |
| 3   | CC     | common cathode  |                    |                   |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description  | Version |
| BAV170      | SOT23   | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | SOT23   |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code[1] |
|-------------|-----------------|
| BAV170      | JX%             |

[1] % = placeholder for manufacturing site code

## 8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol           | Parameter                           | Conditions  |     | Min | Max | Unit |
|------------------|-------------------------------------|---|-----|-----|-----|------|
| <b>Per diode</b> |                                     |   |     |     |     |      |
| $V_R$            | reverse voltage                     | $T_j = 25\text{ °C}$  |     | -   | 75  | V    |
| $V_{RRM}$        | repetitive peak reverse voltage     |   |     | -   | 85  | V    |
| $I_F$            | forward current                     | $T_{amb} = 25\text{ °C}$ ; single diode loaded                                  | [1] | -   | 215 | mA   |
|                  |                                     | $T_{amb} = 25\text{ °C}$ ; double diode loaded                                  | [1] | -   | 125 | mA   |
| $I_{FRM}$        | repetitive peak forward current     | $T_j = 25\text{ °C}$  |     | -   | 500 | 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    |
| $P_{tot}$        | total power dissipation             | $T_{amb} \leq 25\text{ °C}$   | [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

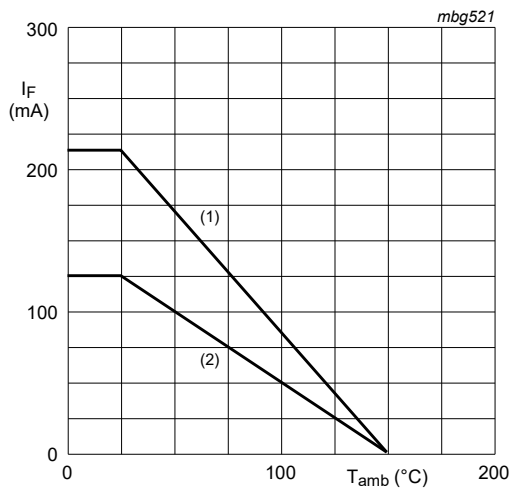
| Symbol         | Parameter  | Conditions  | Min | Typ | Max | Unit |
|----------------|--|-------------|-----|-----|-----|------|
| $R_{th(j-a)}$  | thermal resistance from junction to ambient      | in free air | [1] | -   | 500 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [2] | -   | 360 | K/W  |

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.  
 [2] Soldering point of cathode tab.

## 10. Characteristics

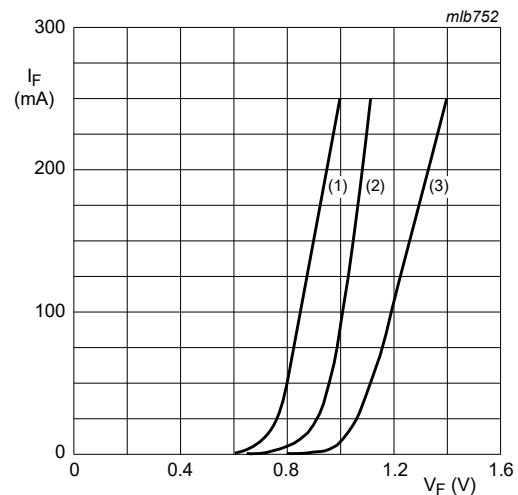
Table 7. Characteristics

| Symbol           | Parameter             | Conditions  | Min | Typ   | Max  | Unit          |
|------------------|-----------------------|---|-----|-------|------|---------------|
| <b>Per diode</b> |                       |   |     |       |      |               |
| $V_F$            | 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 | $I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; I_{R(\text{meas})} = 1 \text{ mA}; R_L = 100 \text{ }^\Omega; T_j = 25 \text{ }^\circ\text{C}; \text{measured at } I_R = 1 \text{ mA}$ | -   | 0.8   | 3    | $\mu\text{s}$ |



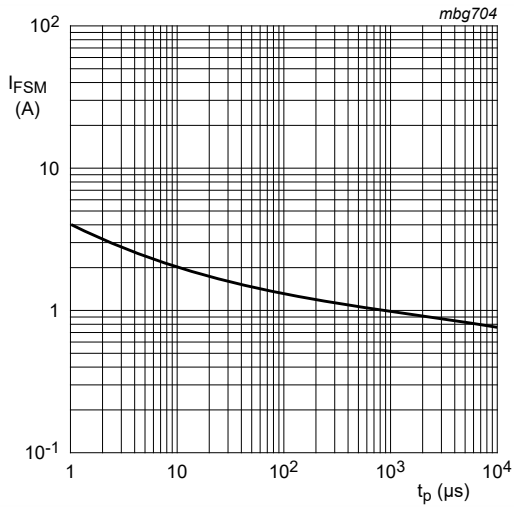
Device mounted on an FR4 printed-circuit board.  
 (1) Single diode loaded  
 (2) Double diode loaded

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



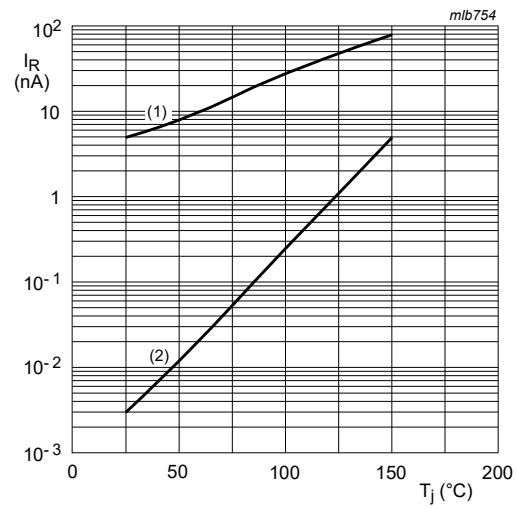
(1)  $T_{amb} = 150 \text{ }^\circ\text{C}$ ; typical values  
 (2)  $T_{amb} = 25 \text{ }^\circ\text{C}$ ; typical values  
 (3)  $T_{amb} = 25 \text{ }^\circ\text{C}$ ; maximum values

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



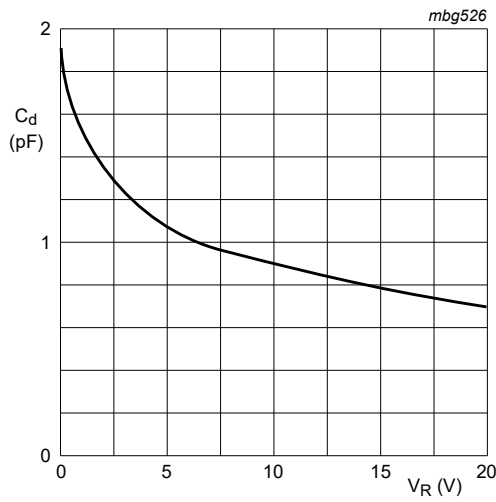
Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$

**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

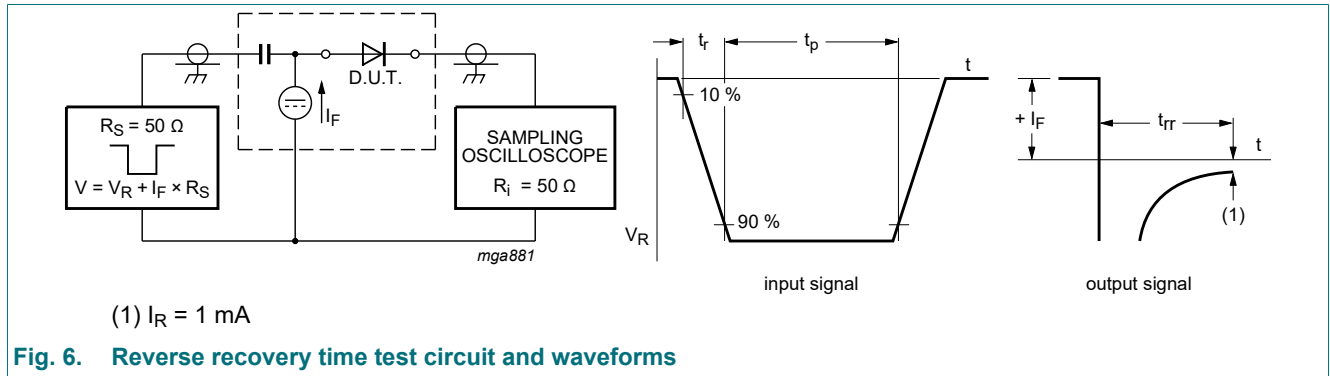
**Fig. 4. Reverse current as a function of junction temperature**



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

**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

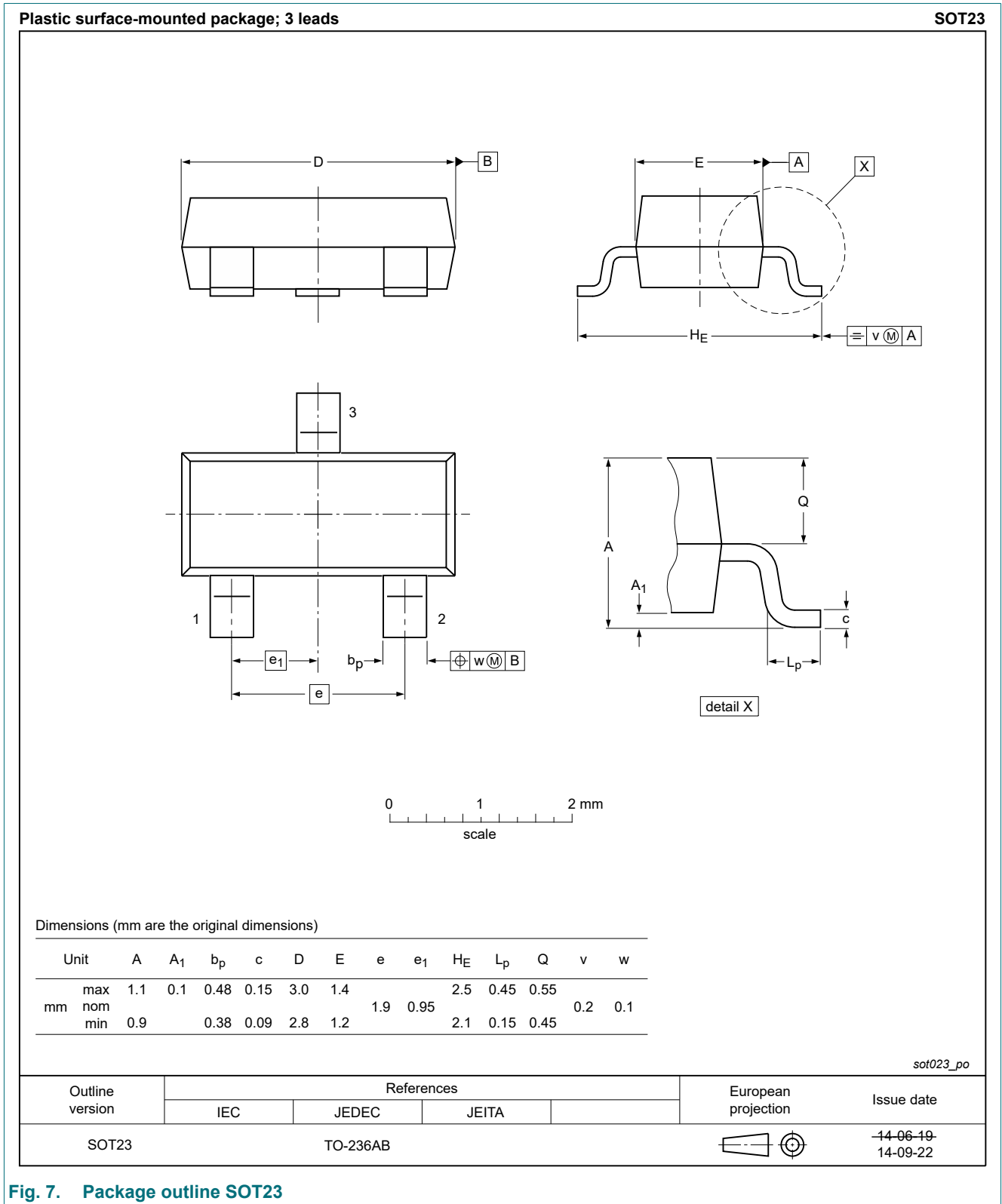


Fig. 7. Package outline SOT23

### 13. Soldering

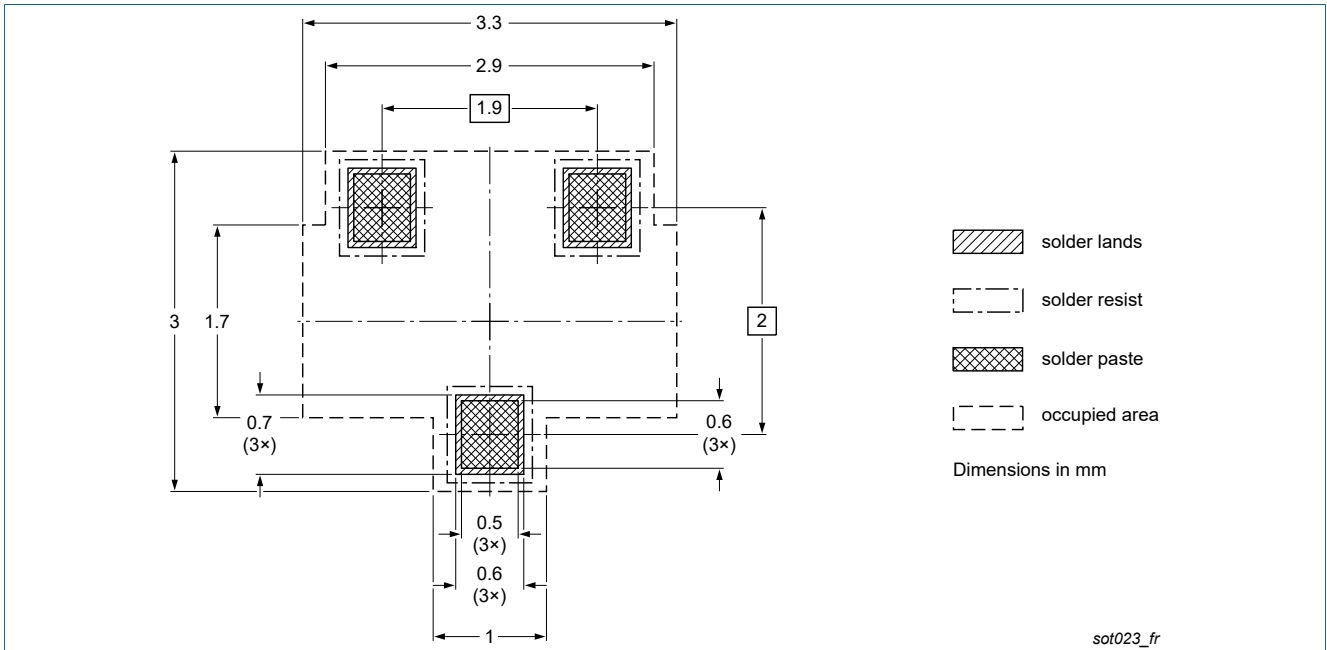


Fig. 8. Reflow soldering footprint for SOT23

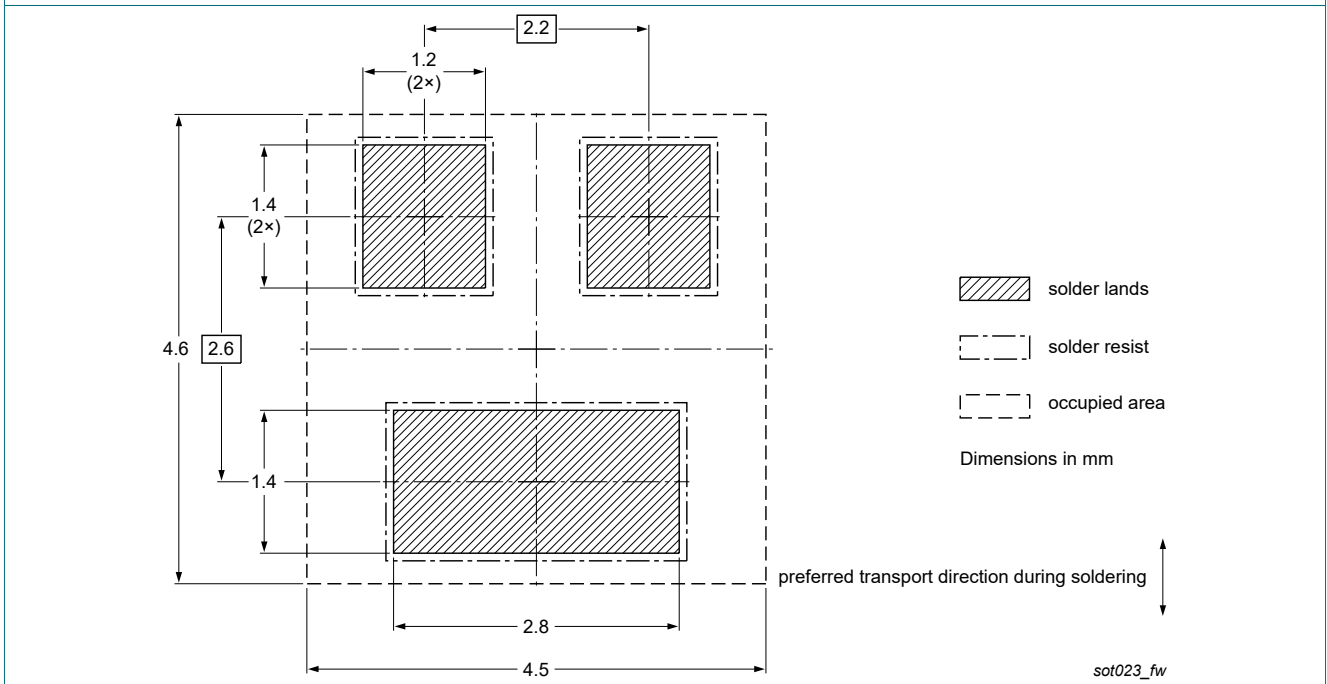


Fig. 9. Wave soldering footprint for SOT23

## 14. Revision history

**Table 8. Revision history**

| Data sheet ID  | Release date   | Data sheet status  | Change notice | Supersedes |
|----------------|--|--------------------|---------------|------------|
| BAV170 v.3     | 20201002   | Product data sheet | -             | BAV170 v.2 |
| Modifications: | <ul style="list-style-type: none"><li>• AEC-Q101 qualified attributes inserted in sections "Features and benefits", "Test information" and "Legal information".</li><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li></ul> |                    |               |            |
| BAV170 v.2     | 20030325   | Product data sheet | -             | BAV170 v.1 |
| BAV170 v.1     | 19990511   | 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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