# BAV170

## Low-leakage double diode

1 April 2023 **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.

## 3. Applications

- Low-leakage current applications in surface mounted circuits.

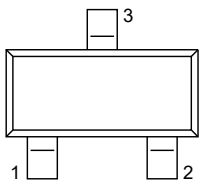
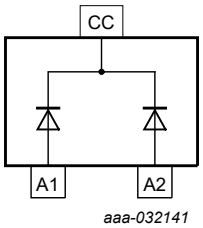
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Per diode** | | | | | | | |
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | - | 75 | V |
| $I_R$ | reverse current | $V_R$ = 75 V; pulsed; $T_j$ = 25 °C | | - | 0.003 | 5 | nA |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | A1 | anode (diode 1) |   **SOT23** |   *aaa-032141* |
| 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 |
|---|---|---|---|---|---|---|
| **Per diode** | | | | | | |
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | 75 | V |
| $V_{RRM}$ | repetitive peak reverse voltage | | | - | 85 | V |
| $I_F$ | forward current | single diode loaded; $T_{amb}$ = 25 °C | [1] | - | 215 | mA |
| | | double diode loaded; $T_{amb}$ = 25 °C | [1] | - | 125 | mA |
| $I_{FRM}$ | repetitive peak forward current | $T_j$ = 25 °C | | - | 500 | mA |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 1 µs; square wave; $T_{j(init)}$ = 25 °C | | - | 4 | A |
| | | $t_p$ = 1 ms; square wave; $T_{j(init)}$ = 25 °C | | - | 1 | A |
| | | $t_p$ = 1 s; square wave; $T_{j(init)}$ = 25 °C | | - | 0.5 | A |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq$ 25 °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**

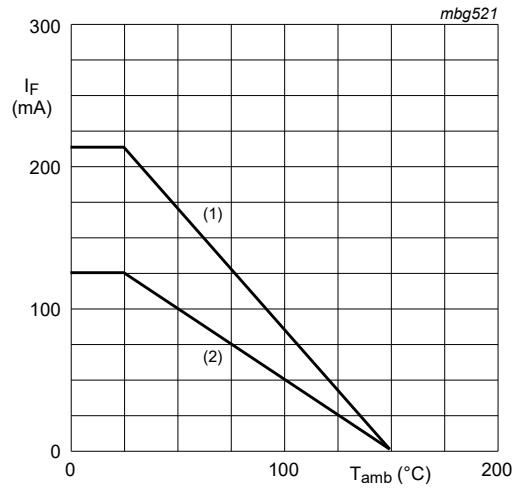
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 500 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [2] | - | - | 360 | K/W |

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

# 10. Characteristics

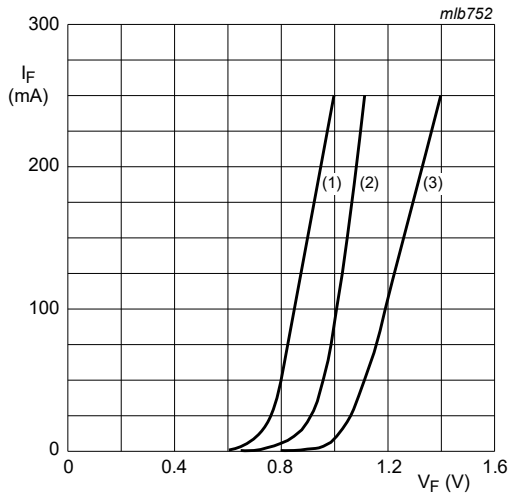
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Per diode** | | | | | | | |
| $V_F$ | forward voltage | $I_F$ = 1 mA; $T_j$ = 25 °C | | - | - | 0.9 | V |
| | | $I_F$ = 10 mA; $T_j$ = 25 °C | | - | - | 1 | V |
| | | $I_F$ = 50 mA; $T_j$ = 25 °C | | - | - | 1.1 | V |
| | | $I_F$ = 150 mA; $T_j$ = 25 °C | | - | - | 1.25 | V |
| $I_R$ | reverse current | $V_R$ = 75 V; pulsed; $T_j$ = 25 °C | | - | 0.003 | 5 | nA |
| | | $V_R$ = 75 V; pulsed; $T_j$ = 150 °C | | - | 3 | 80 | nA |
| $C_d$ | diode capacitance | $V_R$ = 0 V; f = 1 MHz; $T_j$ = 25 °C | | - | 2 | - | pF |
| $t_{rr}$ | reverse recovery time | $I_F$ = 10 mA; $I_R$ = 10 mA; $I_{R(meas)}$ = 1 mA; $R_L$ = 100 Ω; $T_j$ = 25 °C; measured at $I_R$ = 1 mA | | - | 0.8 | 3 | µs |



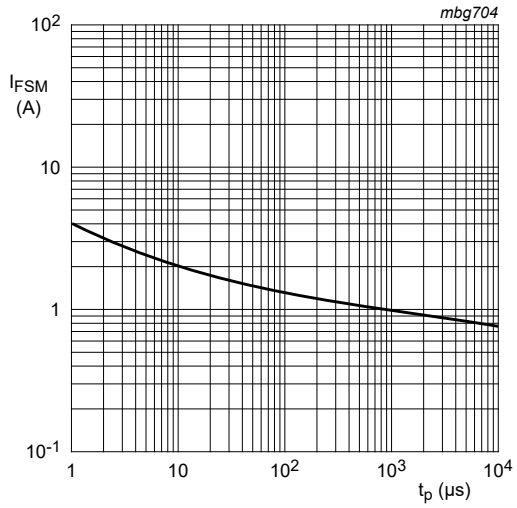

Device mounted on an FR4 printed-circuit board.
(1) Single diode loaded
(2) Double diode loaded

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



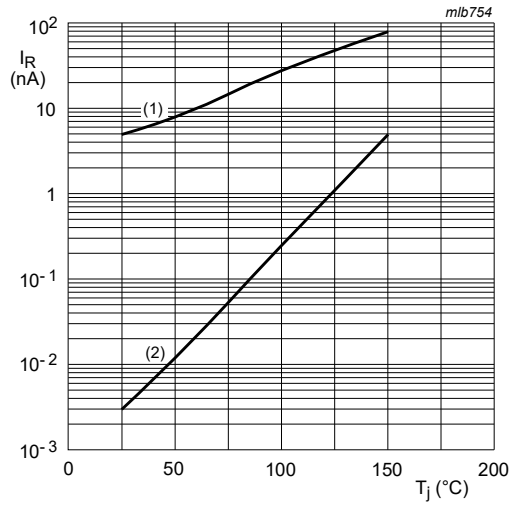

(1) $T_{amb}$ = 150 °C; typical values
(2) $T_{amb}$ = 25 °C; typical values
(3) $T_{amb}$ = 25 °C; maximum values

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



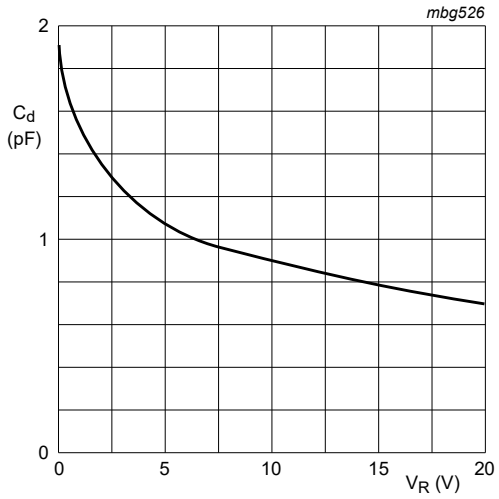

Based on square wave currents.
$T_{j(init)}$ = 25 °C

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




$V_R$ = 75 V
(1) Maximum values
(2) Typical values

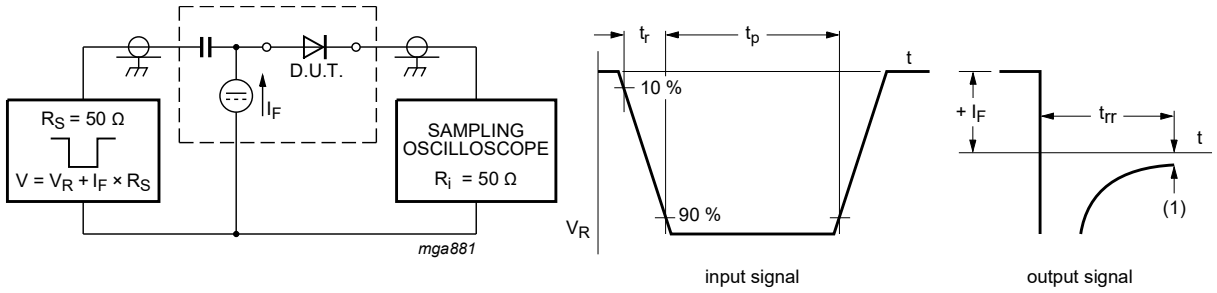
**Fig. 4. Reverse current as a function of junction temperature**




f = 1 MHz; $T_{amb}$ = 25 °C

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

## 11. Test information




(1) $I_R$ = 1 mA

**Fig. 6. Reverse recovery time test circuit and waveforms**

## 12. Package outline

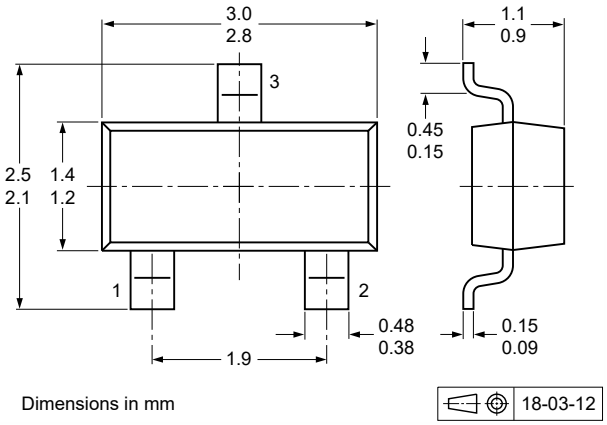



**Fig. 7. Package outline SOT23**

## 13. Soldering

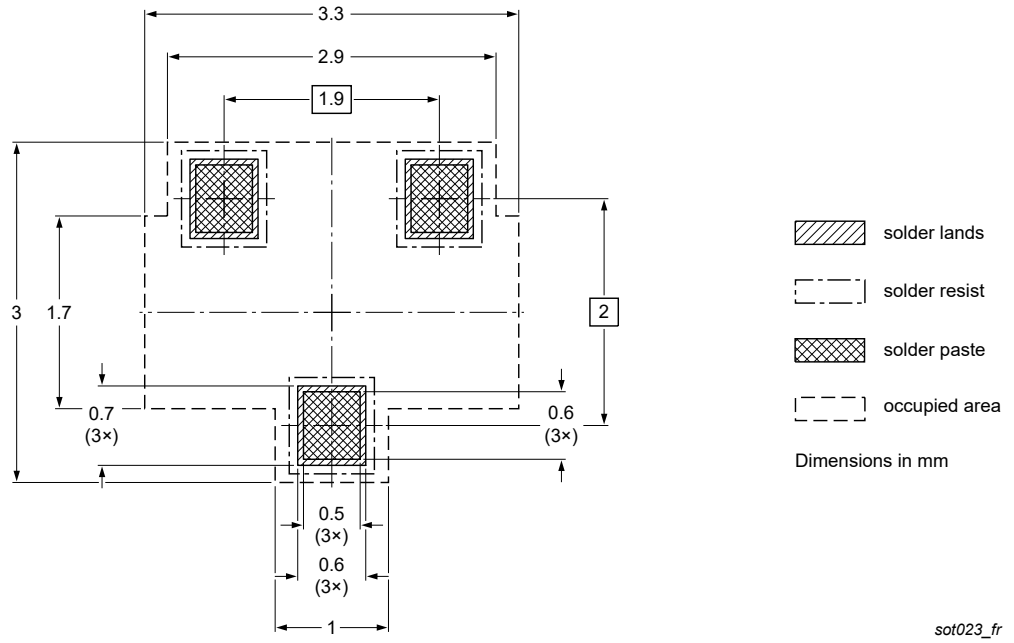



**Fig. 8. Reflow soldering footprint for SOT23**

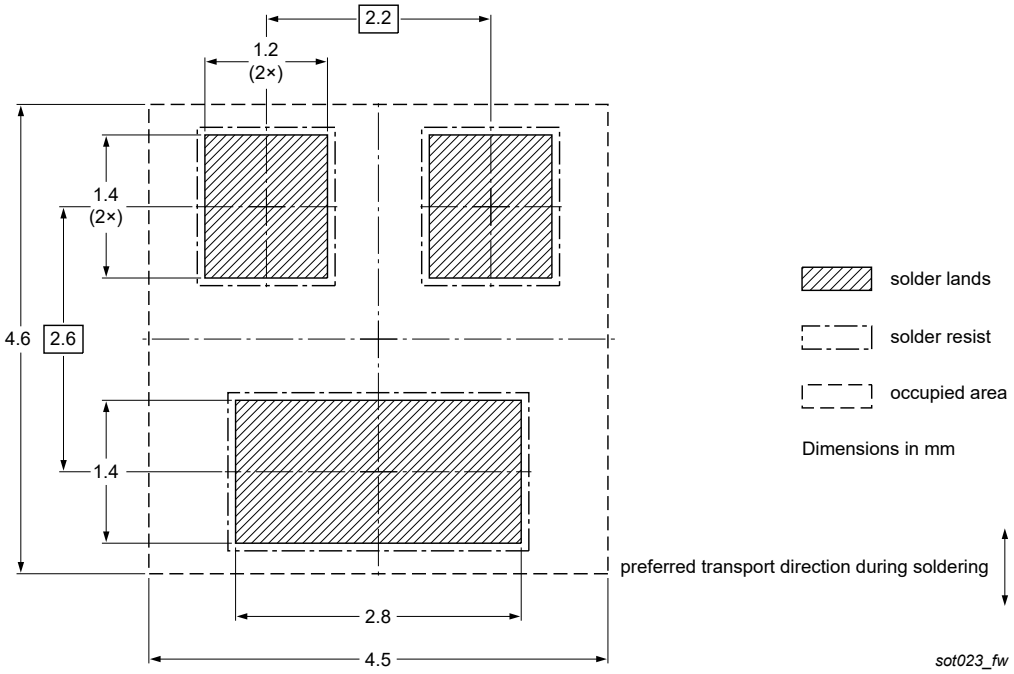



**Fig. 9. Wave soldering footprint for SOT23**

## 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BAV170 v.4 | 20230401 | Product data sheet | - | BAV170 v.3 |
| Modifications: | • Product changed to non-automotive qualification. Please refer to nexperia.com for automotive(-Q) product alternative(s).<br>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.<br>• Legal texts have been adapted to the new company name where appropriate. | | | |
| BAV170 v.3 | 20201002 | Product data sheet | - | BAV170 v.2 |
| 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".
[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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