
# BAV199W

## Low-leakage double diode

**4 November 2020** **Product data sheet**

## 1. General description

Epitaxial, medium-speed switching, double diode in a small plastic SOT323 (SC-70) SMD package. The diodes are connected in series.

## 2. Features and benefits

- Small plastic SMD package
- Low leakage current: typ. 3 pA
- Switching time: typ. 0.8 µs
- 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.

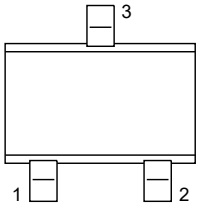
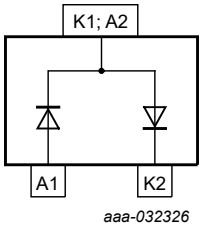
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Per diode** | | | | | | | |
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | - | 75 | V |
| $I_R$ | reverse current | $V_R$ = 75 V; $T_j$ = 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) |  |  |
| 2 | K2 | cathode (diode 2) | | |
| 3 | K1, A2 | cathode (diode 1) and anode (diode 2) | | |



**SC-70 (SOT323)**



*aaa-032326*

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| BAV199W | SC-70 | plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body | SOT323 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code[1] |
|---|---|
| BAV199W | JY% |

[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 | $T_{sp}$ = 90 °C; $T_{amb}$ = 25 °C; single diode loaded | [1] | - | 135 | mA |
| | | $T_{sp}$ = 90 °C; $T_{amb}$ = 25 °C; double diode loaded | [1] | - | 110 | 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 | single diode loaded; $T_{sp}$ = 90 °C | [1] | - | 150 | mW |
| | | double diode loaded; $T_{sp}$ = 90 °C | | - | 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 |

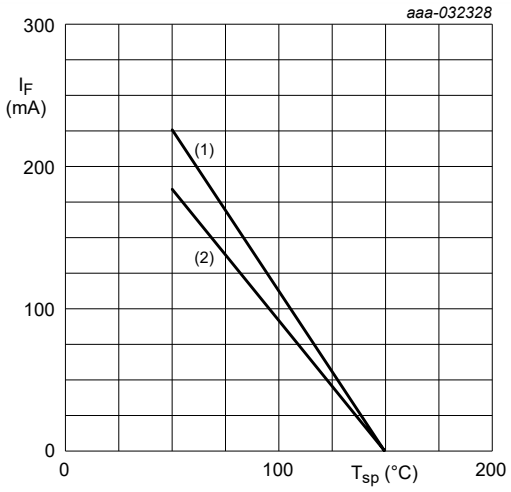
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | $T_{sp}$ = 90 °C | [2] | - | - | 400 | K/W |

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

## 10. Characteristics

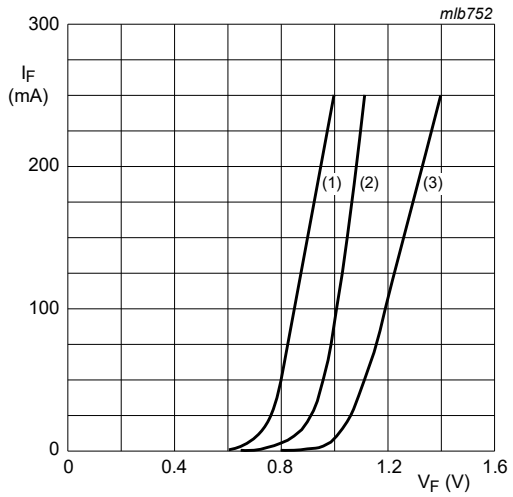
**Table 7. Characteristics**

| 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; $T_j$ = 25 °C | | - | 0.003 | 5 | nA |
| | | $V_R$ = 75 V; $T_j$ = 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 |



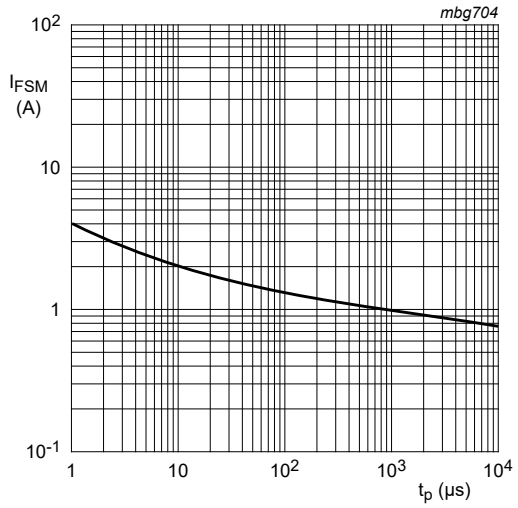

Device mounted on an FR4 printed-circuit board.
(1) Single diode loaded
(2) Double diode loaded

**Fig. 1. Maximum permissible continuous forward current as a function of solder point temperature; typical values.**



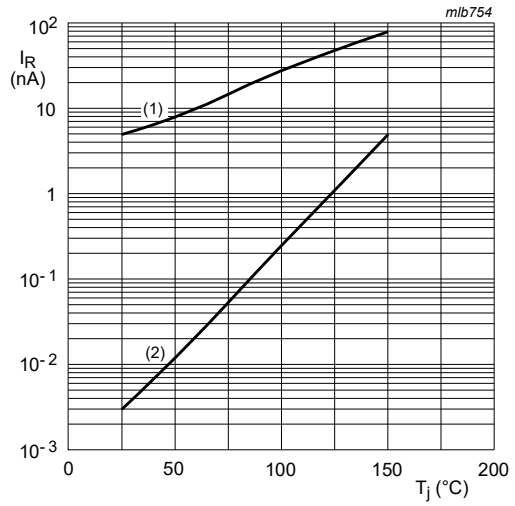

(1) $T_{amb}$ = 150 °C; typical values
(2) $T_{amb}$ = 25 °C; typical values
(3) $T_{amb}$ = 25 °C; maximum values

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



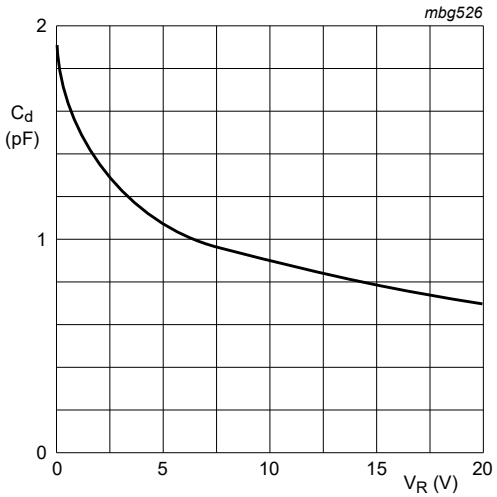

Based on square wave currents.
$T_{j(init)}$ = 25 °C

**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

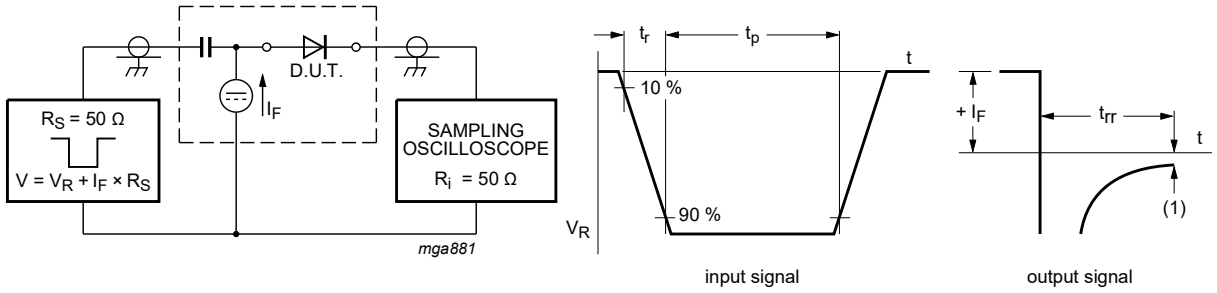
**Fig. 4. Reverse current as a function of junction temperature**




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

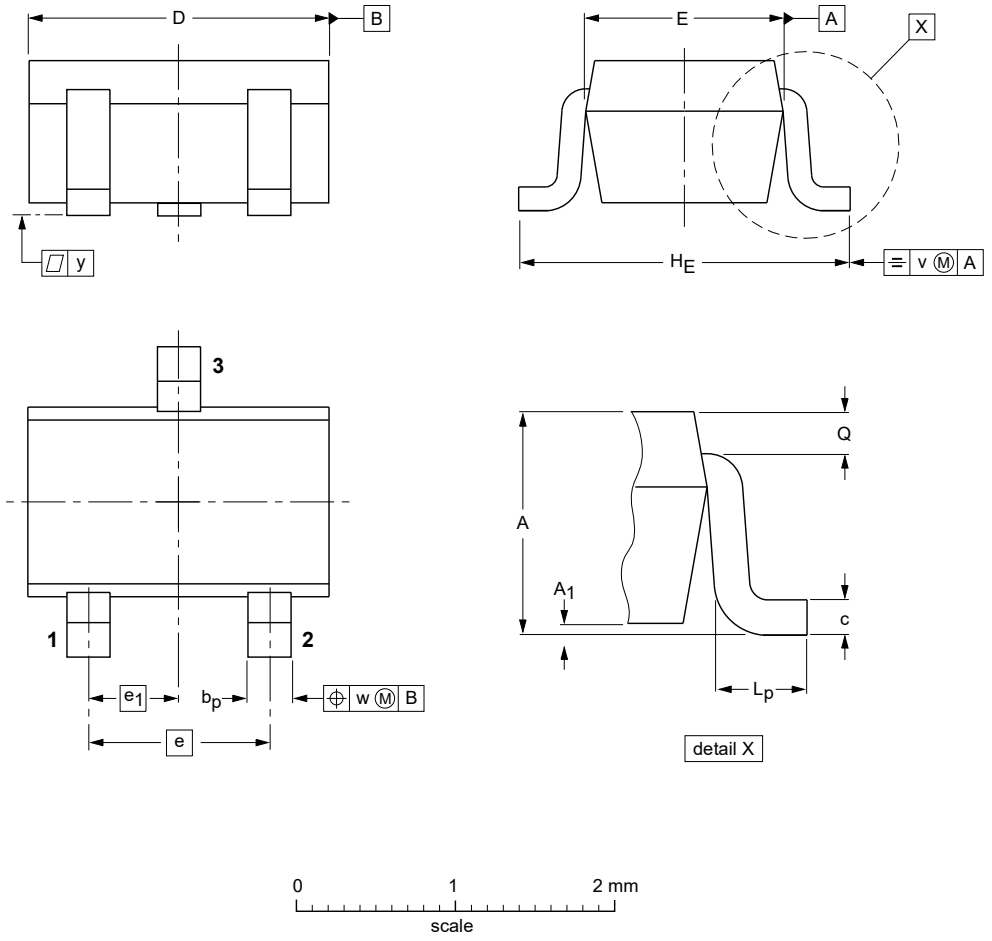
**Fig. 6. Reverse recovery time test circuit and waveforms**

### 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

**Plastic surface-mounted package; 3 leads** **SOT323**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.4<br>0.3 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.23<br>0.13 | 0.2 | 0.2 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT323 | | | SC-70 | | | ~~04-11-04~~<br>06-03-16 |

**Fig. 7. Package outline SC-70 (SOT323)**

## 13. Soldering

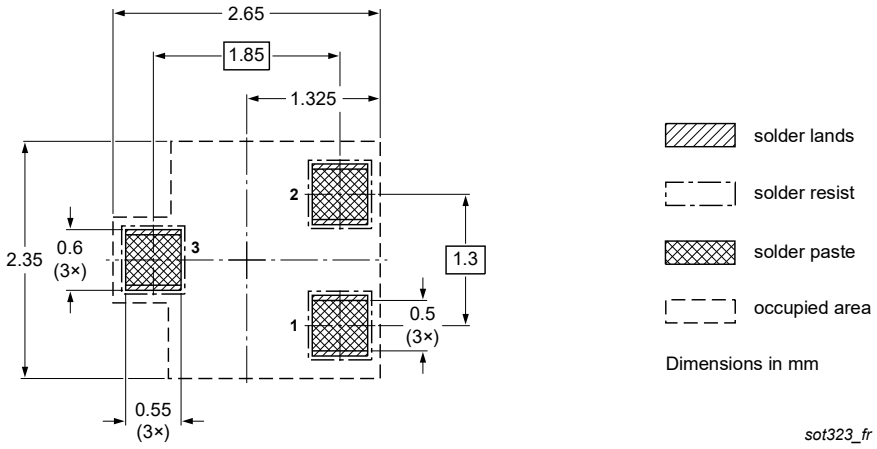



**Fig. 8. Reflow soldering footprint for SC-70 (SOT323)**

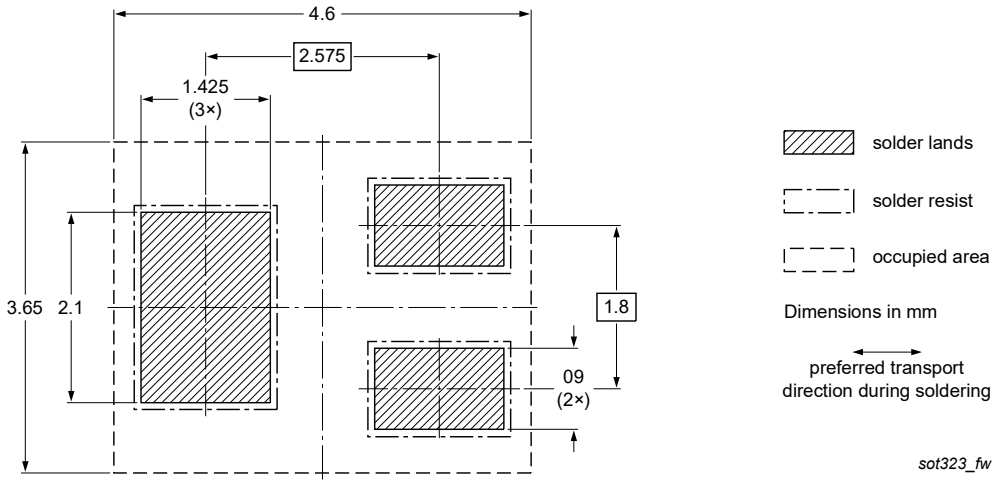



**Fig. 9. Wave soldering footprint for SC-70 (SOT323)**

## 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| BAV199W v.3 | 20201104 | Product data sheet | - | BAV199W v.2 |
| Modifications: | • AEC-Q101 qualified attributes inserted in sections "Features and benefits", "Test information"and "Legal information".<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.<br>• $P_{tot}$ value adapted at double diode. | | | |
| BAV199W v.2 | 19990511 | Product data sheet | - | BAV199W v.1 |
| BAV199W v.1 | 19980109 | 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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