

BAV199

Low-leakage double diode

1 April 2023 Product data sheet

1. General description

Epitaxial, medium-speed switching, double diode in a small SOT23 Surface-Mounted Device (SMD) plastic package. The diodes are connected in series.

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.

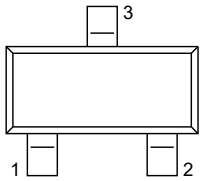
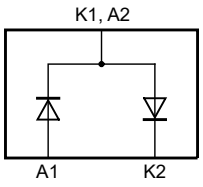
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_R	reverse voltage			-	-	75	V
I_R	reverse current	V_R = 75 V; T_j = 150 °C		-	3	80	nA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 **SOT23**	
2	K2	cathode (diode 2)		
3	K1, A2	cathode (diode 1) and anode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV199	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]
BAV199	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			-	75	V
V_{RRM}	repetitive peak reverse voltage			-	85	V
I_F	forward current	single diode loaded		-	160	mA
		double diode loaded		-	140	mA
I_{FRM}	repetitive peak forward current			-	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
Per device; one diode loaded						
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	250	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	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.

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9. Thermal characteristics

Table 6. Thermal characteristics

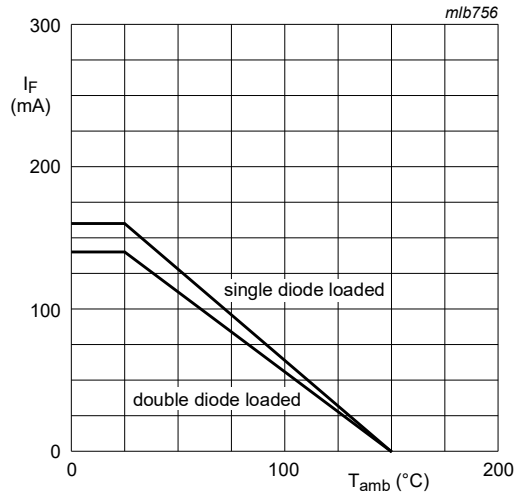
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	single diode loaded; in free air	[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	360	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

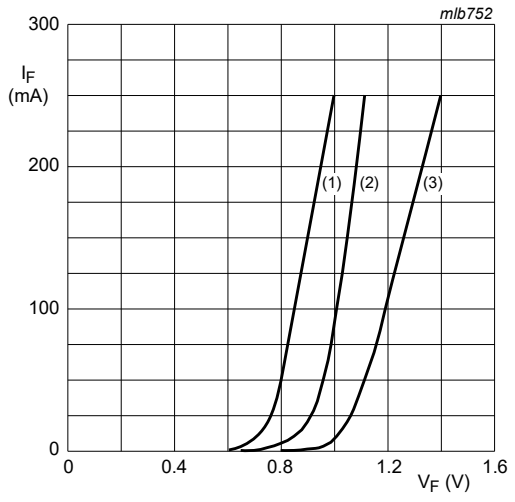
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 1 mA; T_j = 25 °C		-	-	900	mV
		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_{amb} = 25 °C		-	0.8	3	µs
V_{FRM}	peak forward recovery voltage	I_F = 10 mA; t_r = 20 ns; T_{amb} = 25 °C		-	-	1.75	V



Device mounted on an FR4 printed-circuit board.

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

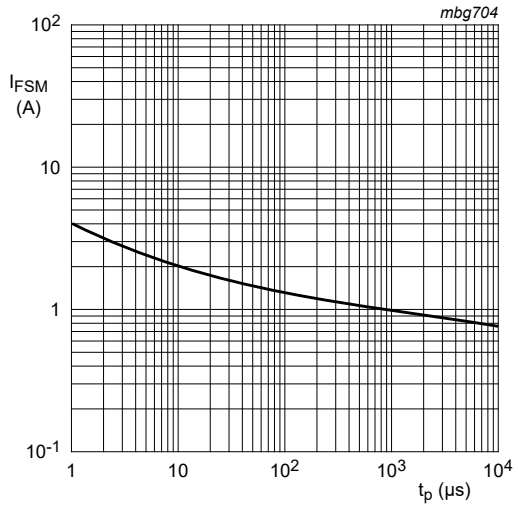


(1) T_{amb} = 150 °C; typical values
(2) T_{amb} = 25 °C; typical values
(3) T_{amb} = 25 °C; maximum values

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

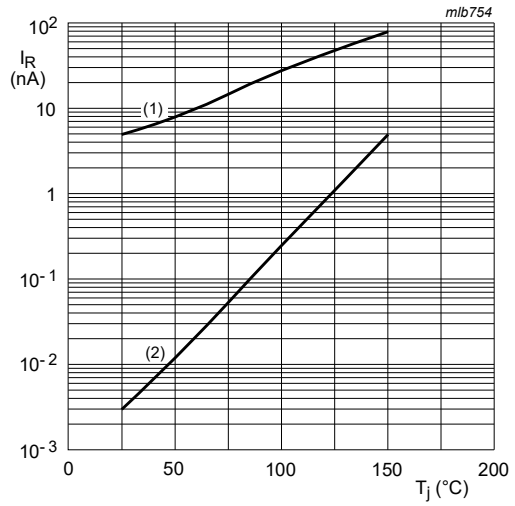
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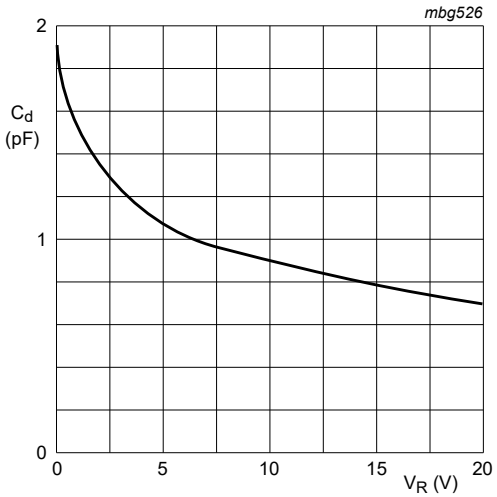
Based on square wave currents.
$T_{j(init)}$ = 25 °C

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



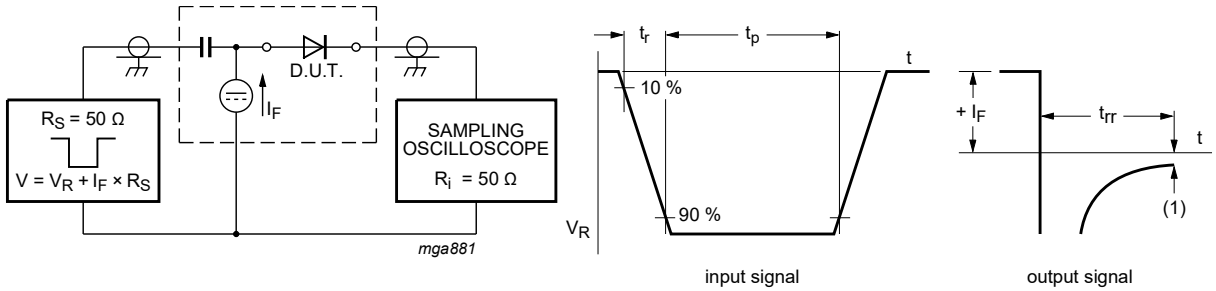
f = 1 MHz; T_{amb} = 25 °C

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

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11. Test information

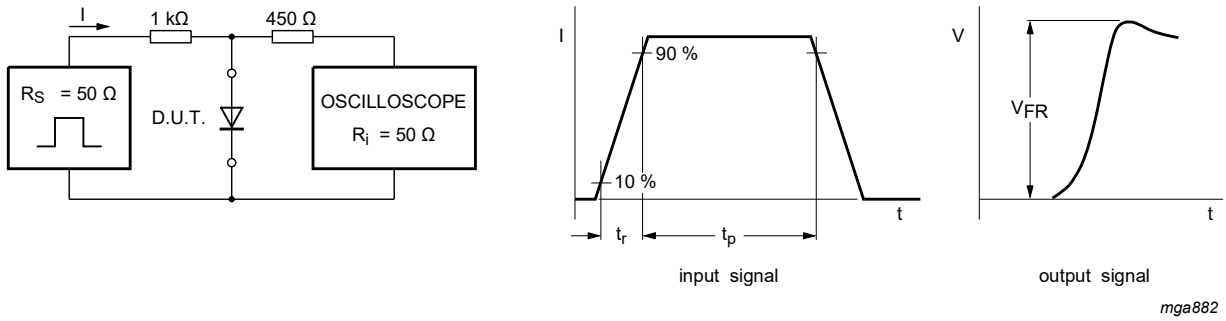


(1) I_R = 1 mA

Input signal: reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty cycle δ = 0.05

Oscilloscope: rise time t_r = 0.35 ns

Fig. 6. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time t_r = 20 ns; forward current pulse duration t_p ≥ 100 ns; duty cycle δ ≤ 0.005

Fig. 7. Forward recovery voltage test circuit and waveforms

12. Package outline

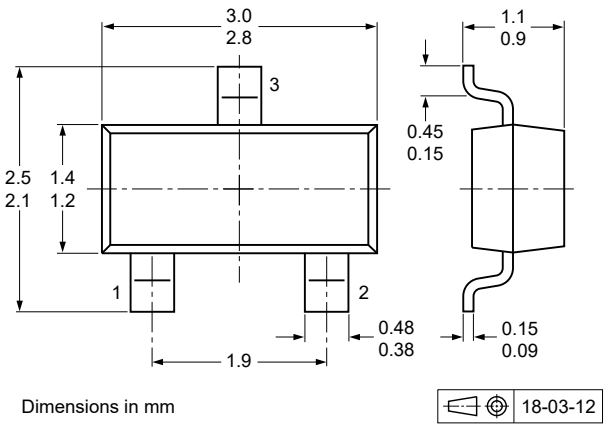


Fig. 8. Package outline SOT23

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13. Soldering

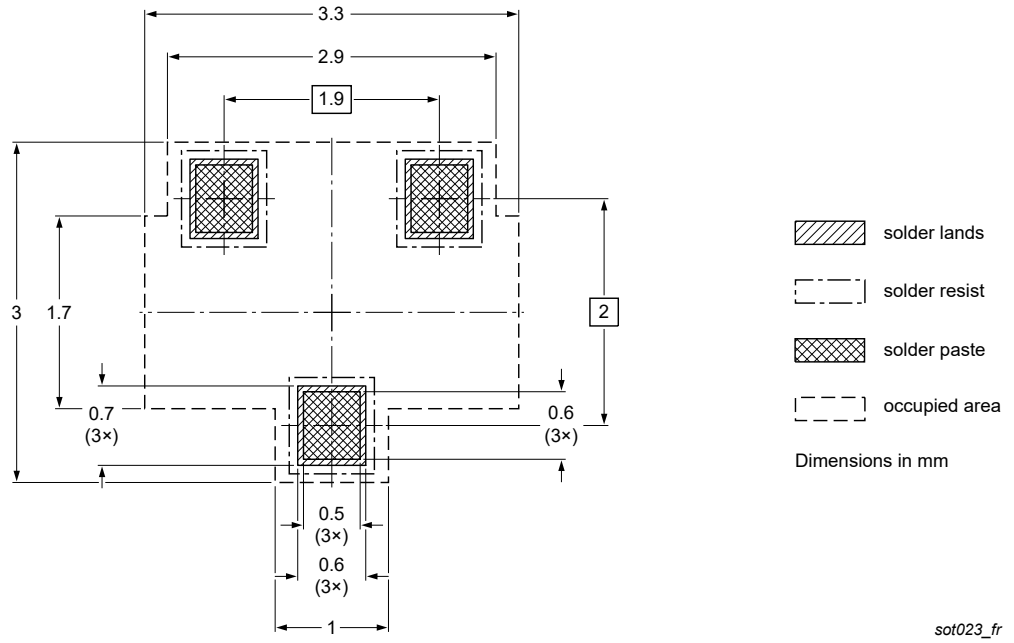


Fig. 9. Reflow soldering footprint for SOT23

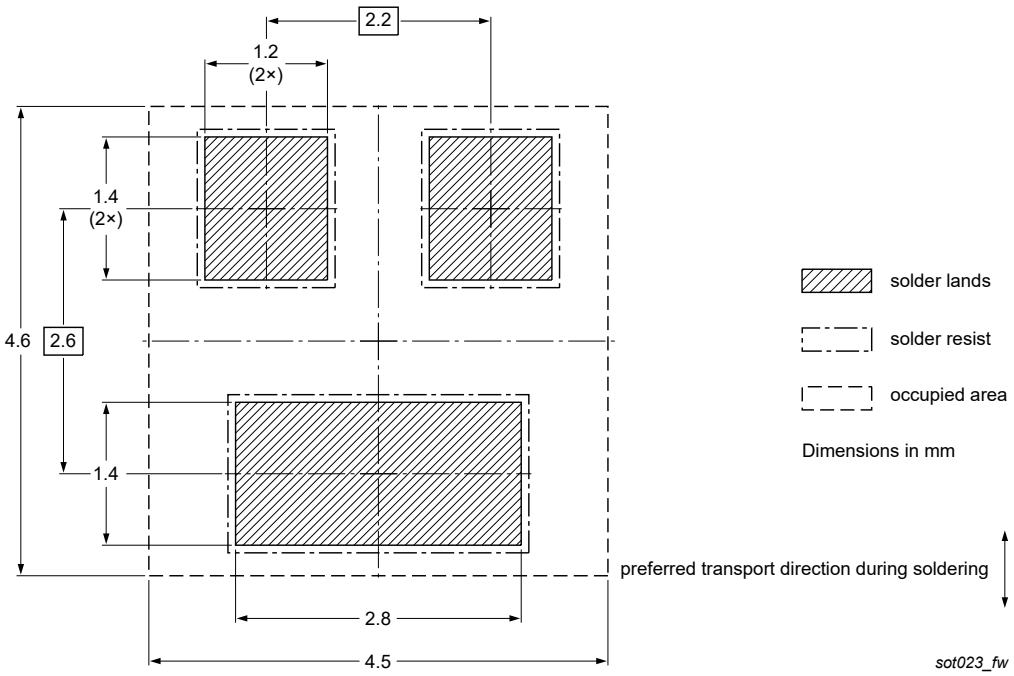


Fig. 10. Wave soldering footprint for SOT23

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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV199 v.4	20230401	Product data sheet	-	BAV199 v.3
Modifications:	• Product changed to non automotive. Please refer to the automotive product(s) with -Q.			
BAV199 v.3	20200901	Product data sheet	-	BAV199 v.2
BAV199 v.2	20011012	Product data sheet	-	BAV199 v.1
BAV199 v.1	19990511	Product data sheet	-	-

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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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