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.

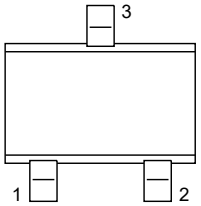
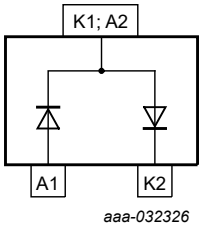
4. Quick reference data

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

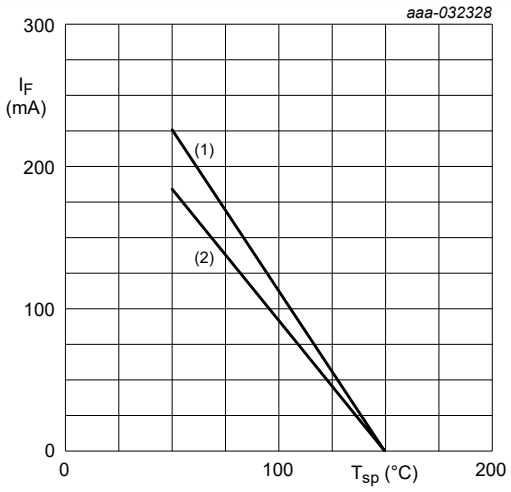
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point	T_{sp} = 90 °C	[2]	-	-	400	K/W

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

10. Characteristics

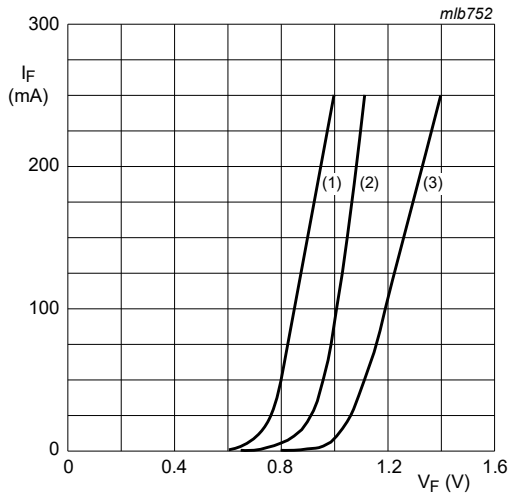
Table 7. Characteristics

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



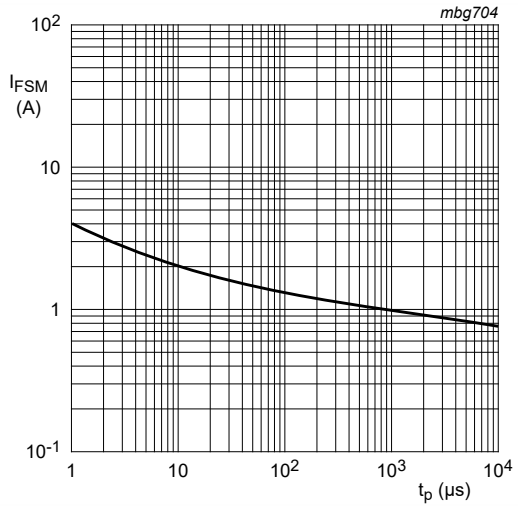
Device mounted on an FR4 printed-circuit board.
(1) Single diode loaded
(2) Double diode loaded

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



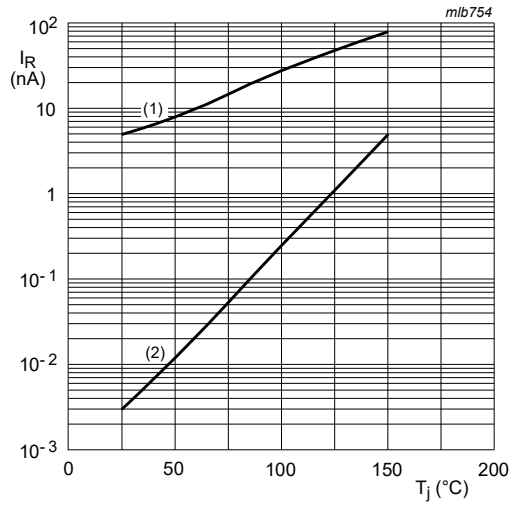
(1) T_{amb} = 150 °C; typical values
(2) T_{amb} = 25 °C; typical values
(3) T_{amb} = 25 °C; maximum values

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



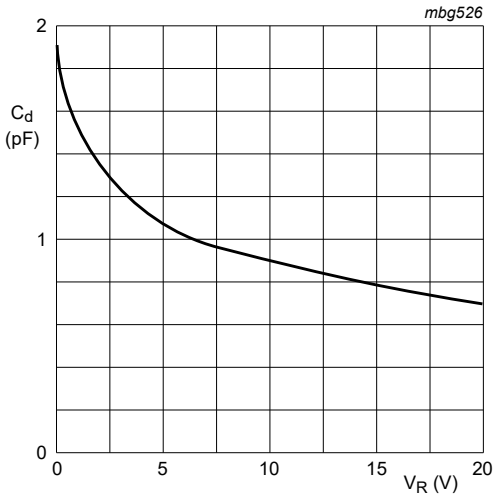
Based on square wave currents.
$T_{j(init)}$ = 25 °C

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

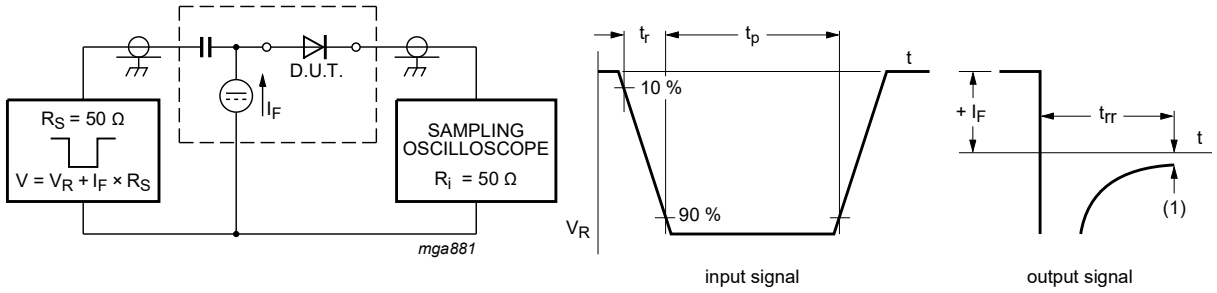
Fig. 4. Reverse current as a function of junction temperature



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

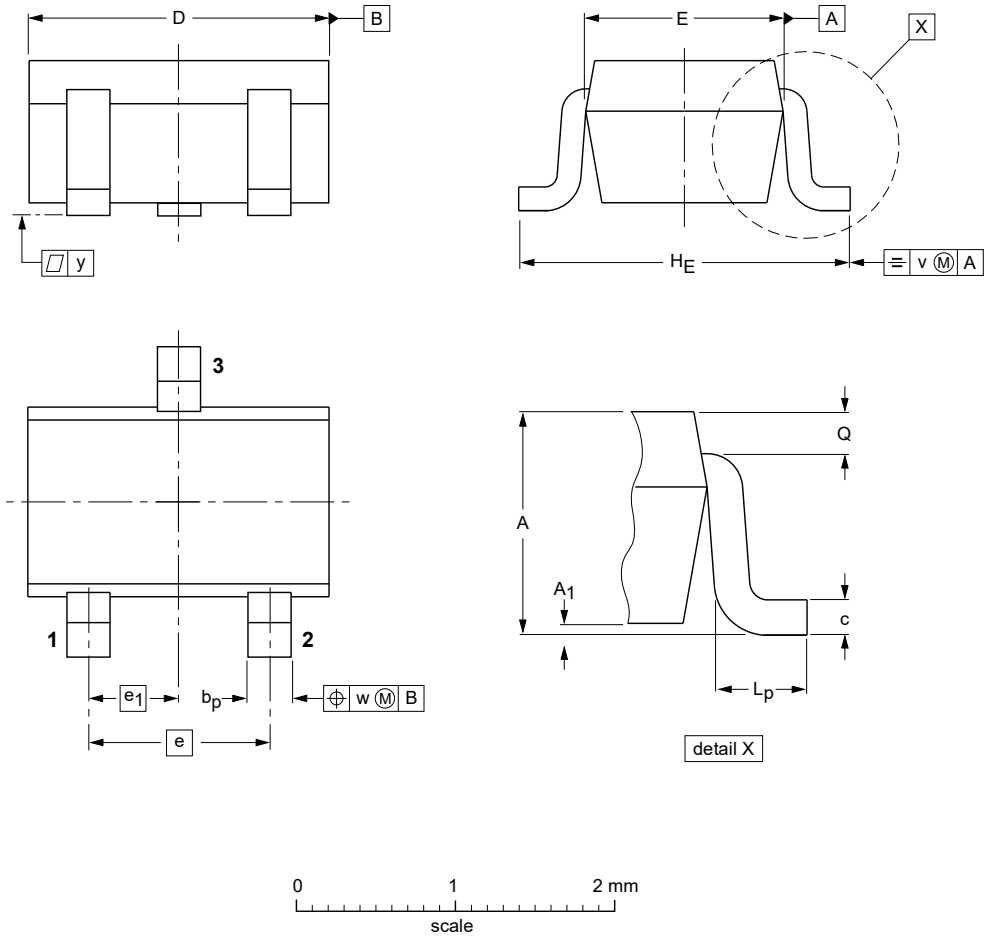
Fig. 6. Reverse recovery time test circuit and waveforms

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 0.8	0.1	0.4 0.3	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.23 0.13	0.2	0.2

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

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

13. Soldering

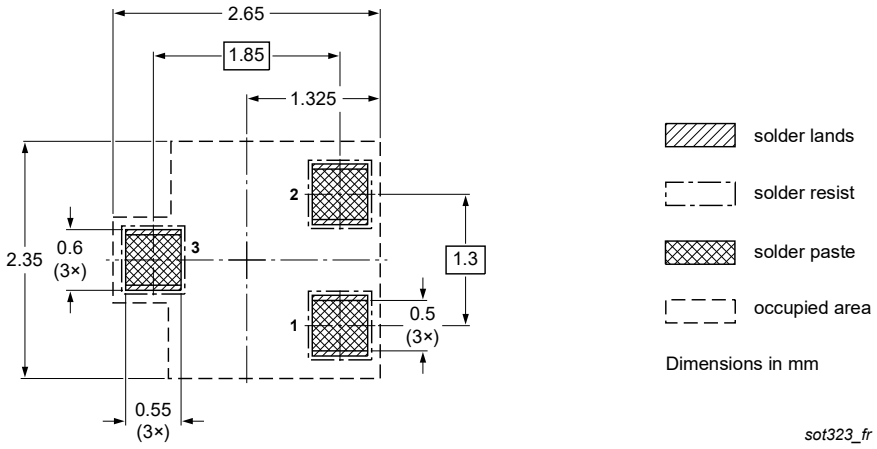


Fig. 8. Reflow soldering footprint for SC-70 (SOT323)

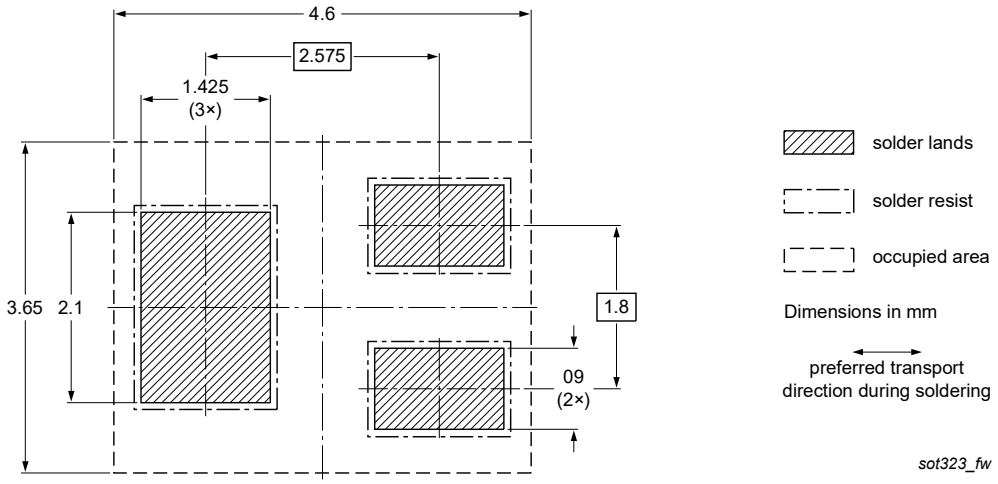


Fig. 9. Wave soldering footprint for SC-70 (SOT323)

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". • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • 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".
[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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