



# BAV199S-Q

Low-leakage quadruple diode

27 July 2022

Product data sheet

## 1. General description

High-speed quadruple switching diode, encapsulated in a SOT363 (SC-88) very small Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Plastic SMD package
- Low leakage current: typ. 3 pA
- Switching time: typ. 0.8  $\mu$ s
- Continuous reverse voltage: max. 75 V
- Repetitive peak reverse voltage: max. 85 V
- Repetitive peak forward current: max. 500 mA
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

- Low leakage current applications in surface mounted circuits

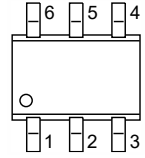
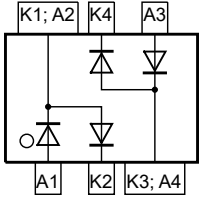
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current	$t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	215	mA
$V_{\text{RRM}}$	repetitive peak reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$	-	-	85	V
$V_F$	forward voltage	$I_F = 50 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	-	1.1	V
$I_R$	reverse current	$V_R = 75 \text{ V}$ ; pulsed; $T_j = 25 \text{ }^\circ\text{C}$	-	0.003	5	nA
$t_{\text{rr}}$	reverse recovery time	$I_F = 10 \text{ mA}$ ; $I_R = 10 \text{ mA}$ ; $R_L = 100 \Omega$ ; $I_{R(\text{meas})} = 1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	0.8	3	$\mu\text{s}$

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 <p><b>TSSOP6 (SOT363)</b></p>	 <p>006aab101</p>
2	K2	cathode (diode 2)		
3	K3; A4	cathode (diode 3), anode (diode 4)		
4	A3	anode (diode 3)		
5	K4	cathode (diode 4)		
6	K1; A2	cathode (diode 1), anode (diode 2)		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">BAV199S-Q</a>	TSSOP6	plastic, surface-mounted package; 6 leads; 0.65 mm pitch; 2.1 mm x 1.25 mm x 0.95 mm body	<a href="#">SOT363</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BAV199S-Q	2F%

[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
$V_{RRM}$	repetitive peak reverse voltage	$T_j = 25\text{ °C}$		-	85	V
$V_R$	reverse voltage			-	75	V
$I_F$	forward current	$t_p \leq 300\ \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ °C}$		-	215	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\ \mu\text{s}$ ; 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
$I_{FRM}$	repetitive peak forward current			-	500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	250	mW
<b>Per device, one diode loaded</b>						
$T_j$	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] [3]	-	-	260	K/W

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

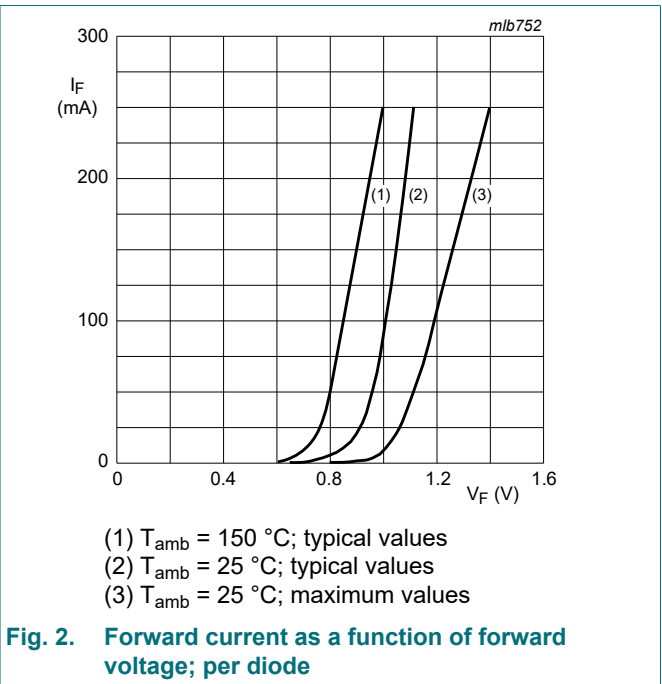
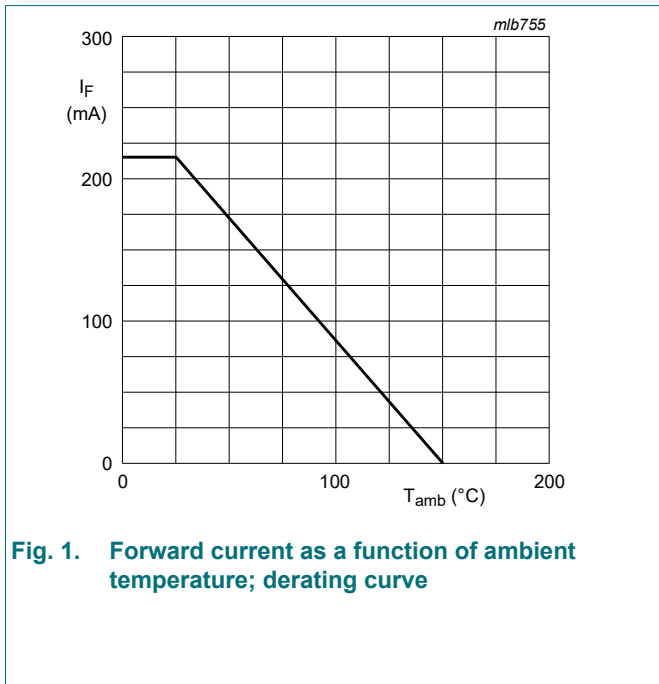
[2] Soldering point of cathode tab.

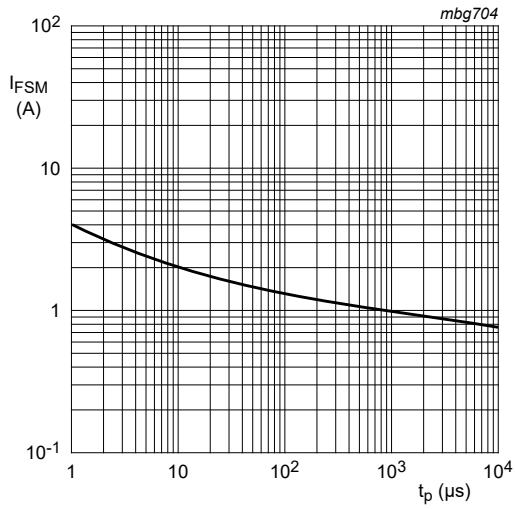
[3] Soldering point at pins 2, 3, 5 and 6.

## 10. Characteristics

Table 7. Characteristics

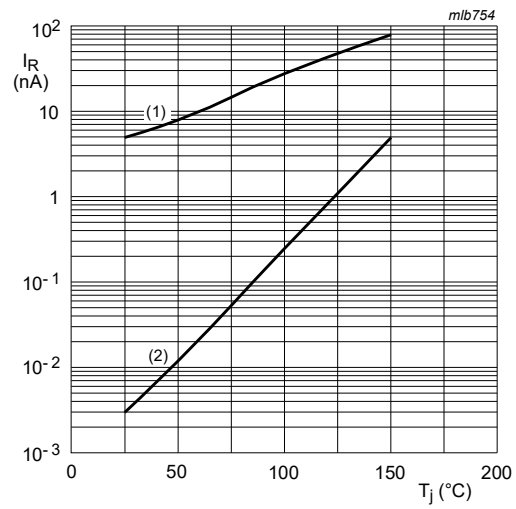
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C	-	-	0.9	V
		I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C	-	-	1	V
		I <sub>F</sub> = 50 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C	-	-	1.1	V
		I <sub>F</sub> = 150 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>j</sub> = 25 °C	-	-	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 75 V; pulsed; T <sub>j</sub> = 25 °C	-	0.003	5	nA
		V <sub>R</sub> = 75 V; pulsed; T <sub>j</sub> = 150 °C	-	3	80	nA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>j</sub> = 25 °C	-	2	-	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; R <sub>L</sub> = 100 Ω; I <sub>R(meas)</sub> = 1 mA; T <sub>j</sub> = 25 °C	-	0.8	3	μs





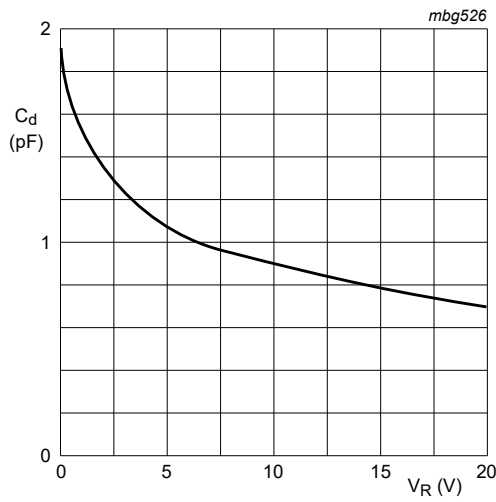
Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$

**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

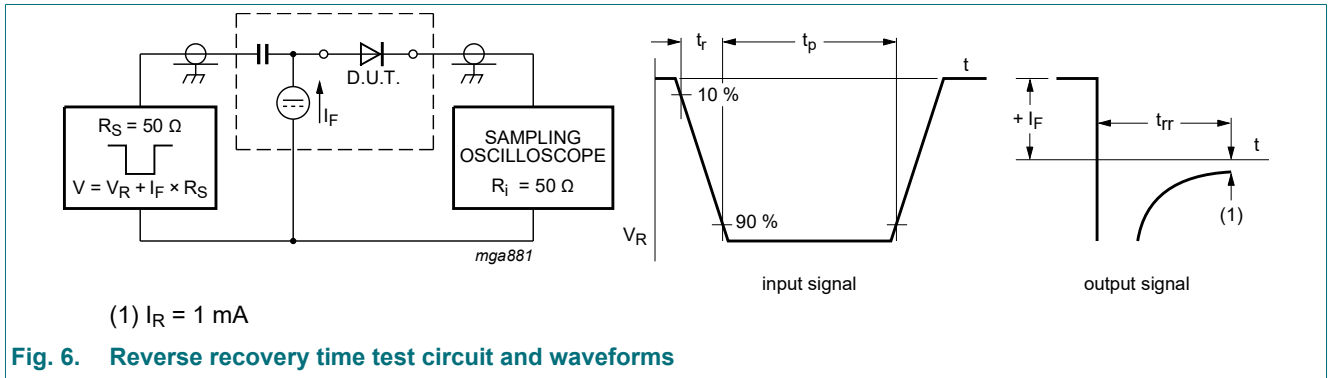
**Fig. 4. Reverse current as a function of junction temperature**



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

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

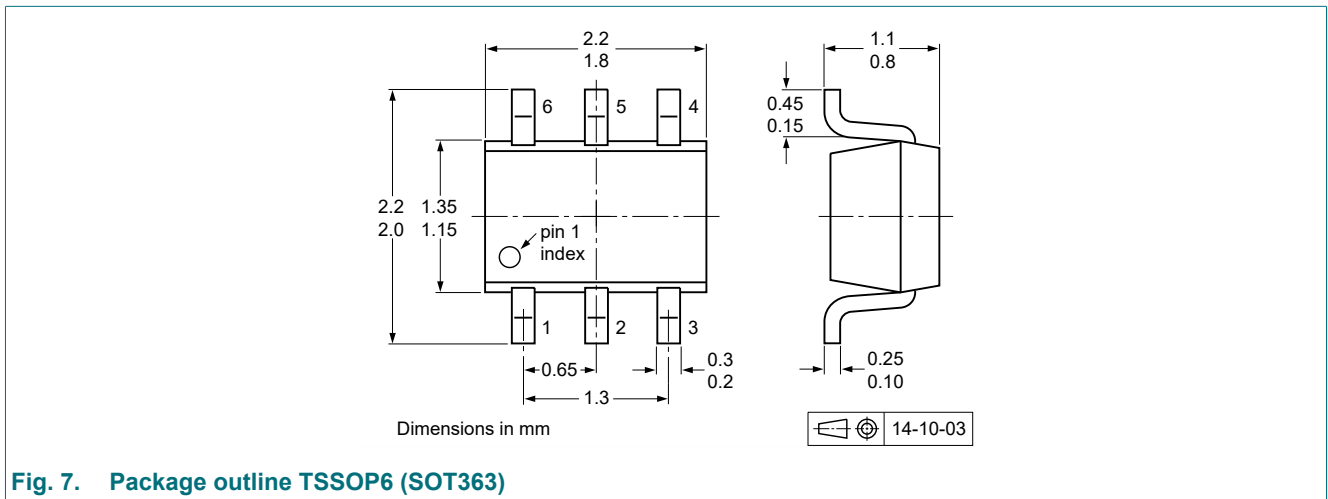
### 11. Test information



#### 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



### 13. Soldering

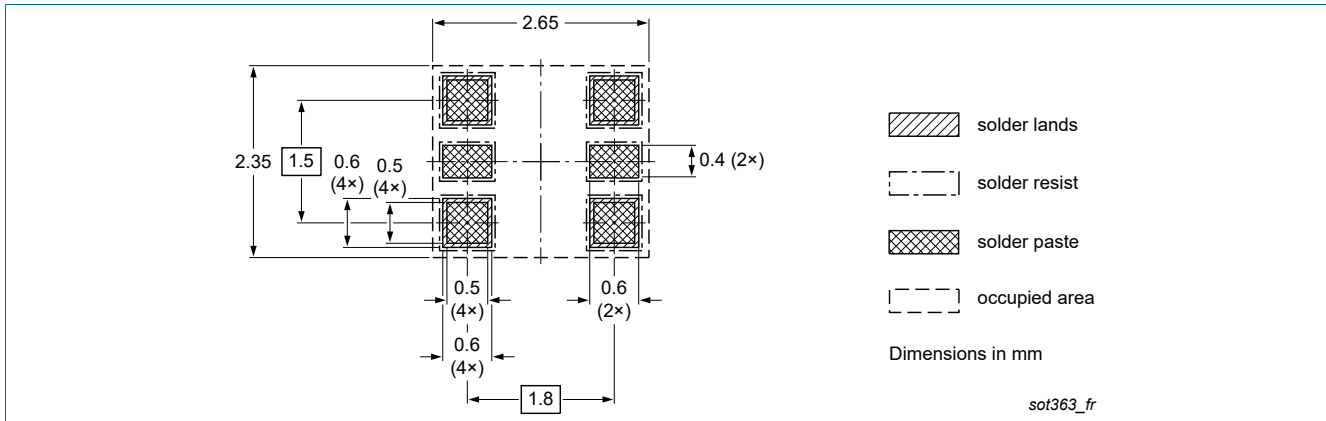


Fig. 8. Reflow soldering footprint for TSSOP6 (SOT363)

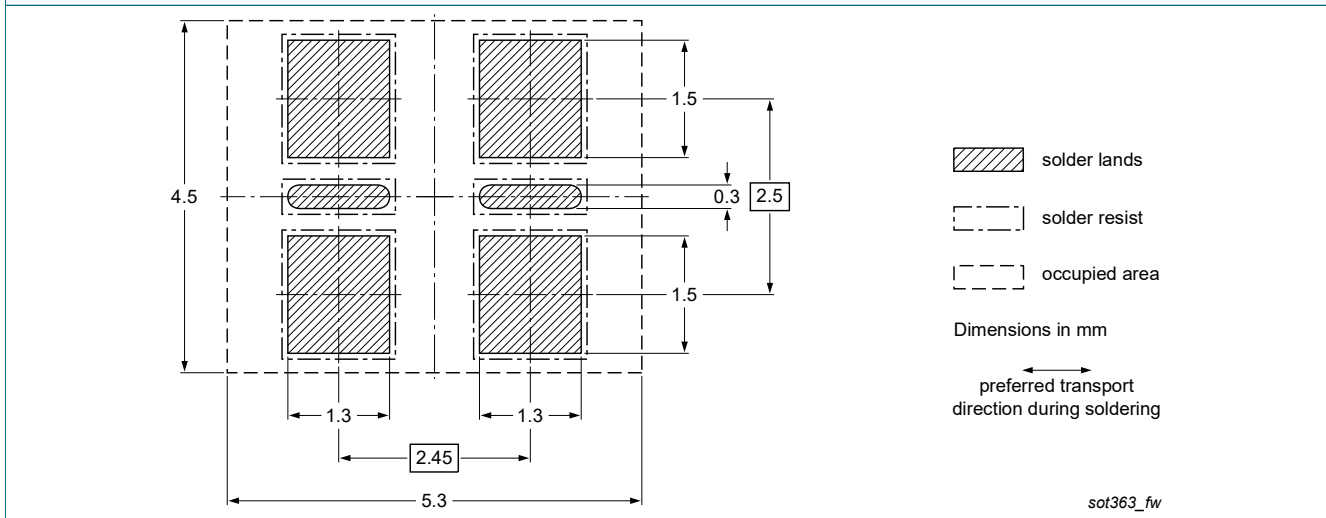


Fig. 9. Wave soldering footprint for TSSOP6 (SOT363)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV199S-Q v.2	20220727	Product data sheet	-	BAV199S-Q v.1
Modifications:	• Product status changed			
BAV199S-Q v.1	20220525	Objective 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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