**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 μs
- · 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	Тур	Max	Unit
l <sub>F</sub>	forward current	t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C	-	-	215	mA
$V_{RRM}$	repetitive peak reverse voltage	T <sub>j</sub> = 25 °C	-	-	85	V
V <sub>F</sub>	forward voltage	$I_F$ = 50 mA; $t_p \le 300$ μs; $δ \le 0.02$ ; $T_j$ = 25 °C	-	-	1.1	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 75 V; pulsed; T <sub>j</sub> = 25 °C	-	0.003	5	nA
t <sub>rr</sub>	reverse recovery time	$I_F$ = 10 mA; $I_R$ = 10 mA; $R_L$ = 100 Ω; $I_{R(meas)}$ = 1 mA; $T_j$ = 25 °C	-	0.8	3	μs



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# 5. Pinning information

#### **Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)		
2	K2	cathode (diode 2)	 П6 П5 П4	K1; A2 K4 A3
3	K3; A4	cathode (diode 3), anode (diode 4)		
4	A3	anode (diode 3)		
5	K4	cathode (diode 4)	☐1 ☐2 ☐3 TOOODS (COTSOS)	A1 K2 K3; A4
6	K1; A2	cathode (diode 1), anode (diode 2)	TSSOP6 (SOT363)	006aab101

# 6. Ordering information

### **Table 3. Ordering information**

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

## 7. Marking

### Table 4. Marking codes

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

[1] % = placeholder for manufacturing site code

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## 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 <sub>j</sub> = 25 °C		-	85	V
V <sub>R</sub>	reverse voltage			-	75	V
I <sub>F</sub>	forward current	$t_p \le 300 \ \mu s; \ \delta \le 0.02; \ T_{amb} = 25 \ ^{\circ}C$		-	215	mA
I <sub>FSM</sub>	non-repetitive peak	t <sub>p</sub> = 1 μs; square wave; T <sub>j(init)</sub> = 25 °C		-	4	А
	forward current	t <sub>p</sub> = 1 ms; square wave; T <sub>j(init)</sub> = 25 °C		-	1	А
		t <sub>p</sub> = 1 s; square wave; T <sub>j(init)</sub> = 25 °C		-	0.5	Α
I <sub>FRM</sub>	repetitive peak forward current			-	500	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	250	mW
Per device,	one diode loaded					
Tj	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

<sup>[1]</sup> 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	Тур	Max	Unit
R <sub>th(j-a)</sub>	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

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

<sup>[2]</sup> Soldering point of cathode tab.

<sup>[3]</sup> Soldering point at pins 2, 3, 5 and 6.

### Low-leakage quadruple diode

## 10. Characteristics

**Table 7. Characteristics** 

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>F</sub>	forward voltage	$I_F$ = 1 mA; $t_p \le 300$ μs; $δ \le 0.02$ ; $T_j$ = 25 °C	-	-	0.9	V
		$I_F$ = 10 mA; $t_p$ ≤ 300 μs; δ ≤ 0.02; $T_j$ = 25 °C	-	-	1	V
		$I_F$ = 50 mA; $t_p$ ≤ 300 μs; δ ≤ 0.02; $T_j$ = 25 °C	-	-	1.1	V
		$I_F$ = 150 mA; $t_p$ ≤ 300 μs; δ ≤ 0.02; $T_j$ = 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	$I_F$ = 10 mA; $I_R$ = 10 mA; $R_L$ = 100 Ω; $I_{R(meas)}$ = 1 mA; $T_j$ = 25 °C	-	0.8	3	μs

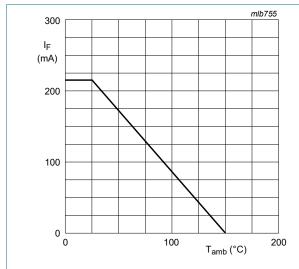
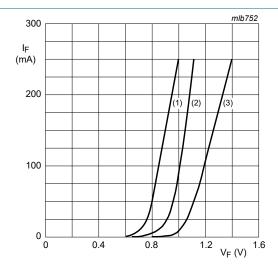


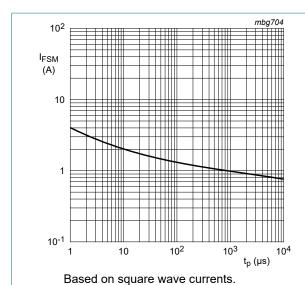
Fig. 1. Forward current as a function of ambient temperature; derating curve



- (1)  $T_{amb}$  = 150 °C; typical values (2)  $T_{amb}$  = 25 °C; typical values
- (3) T<sub>amb</sub> = 25 °C; maximum values

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

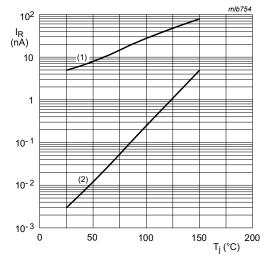
### Low-leakage quadruple diode



T<sub>j(init)</sub> = 25 °C

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

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



V<sub>R</sub> = 75 V

- (1) Maximum values
- (2) Typical values

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

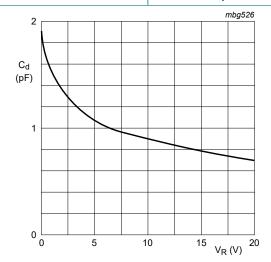
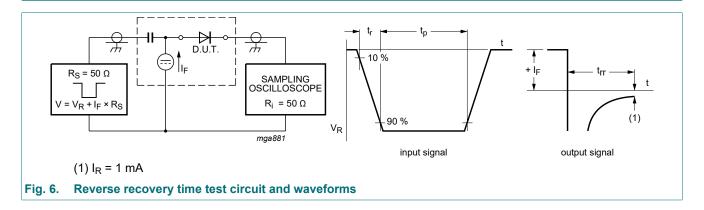


Fig. 5. Diode capacitance as a function of reverse voltage; typical values

Low-leakage quadruple diode

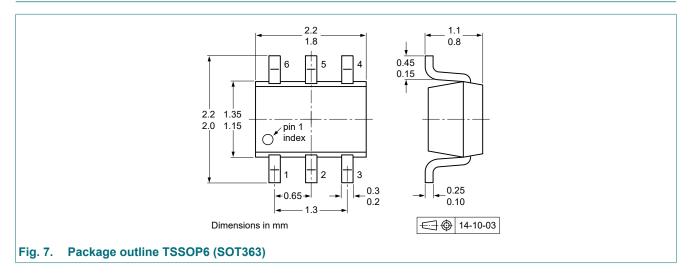
## 11. Test information



### **Quality information**

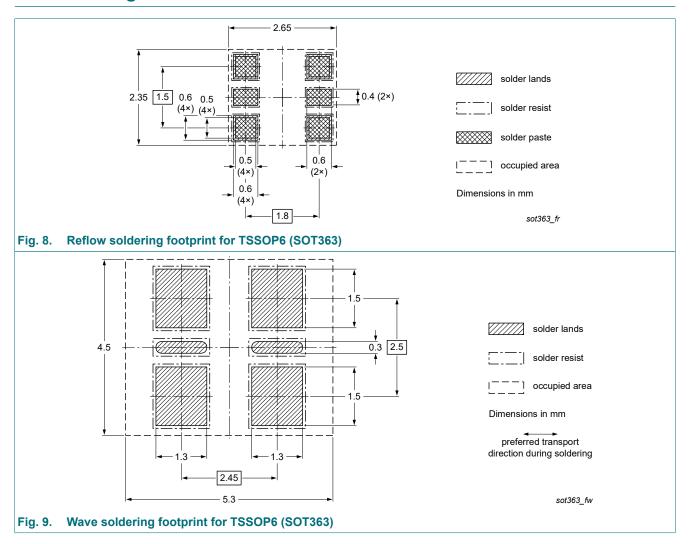
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

# 12. Package outline



### Low-leakage quadruple diode

## 13. Soldering



## Low-leakage quadruple diode

# 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	Product status changed					
BAV199S-Q v.1	20220525	Objective data sheet	-	-			

### Low-leakage quadruple diode

## 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.

- Please consult the most recently issued document before initiating or completing a design.
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BAV199S-C

### Low-leakage quadruple diode

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