BAV74-Q

High-speed double diode

23 January 2024 **Product data sheet**

1. General description

The BAV74-Q consists of two high-speed switching diodes with common cathodes, fabricated in planar technology, and encapsulated in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Small plastic SMD package
- High switching speed: max. 4 ns
- Continuous reverse voltage: max. 50 V
- Repetitive peak reverse voltage: max. 60 V
- Repetitive peak forward current: max. 450 mA
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching in thick and thin-film circuits

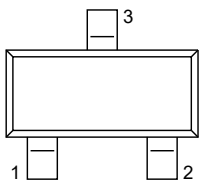
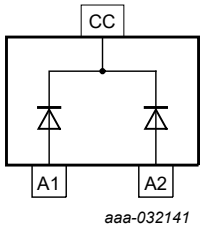
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_R	reverse voltage			-	-	50	V
I_R	reverse current	V_R = 25 V; T_j = 25 °C		-	-	30	nA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)		
2	A2	anode (diode 2)		
3	CC	common cathode		

SOT23

aaa-032141

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV74-Q	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]
BAV74-Q	JA%

[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			-	50	V
V_{RRM}	repetitive peak reverse voltage			-	60	V
I_F	forward current	single diode loaded	[1]	-	215	mA
		double diode loaded	[1]	-	125	mA
I_{FRM}	repetitive peak forward current			-	450	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 µs; square wave; T_j = 25 °C prior to surge		-	4	A
		t_p = 1 ms; square wave; T_j = 25 °C prior to surge		-	1	A
		t_p = 1 s; square wave; T_j = 25 °C prior to surge		-	0.5	A
P_{tot}	total power dissipation	T_{amb} = 25 °C	[1]	-	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

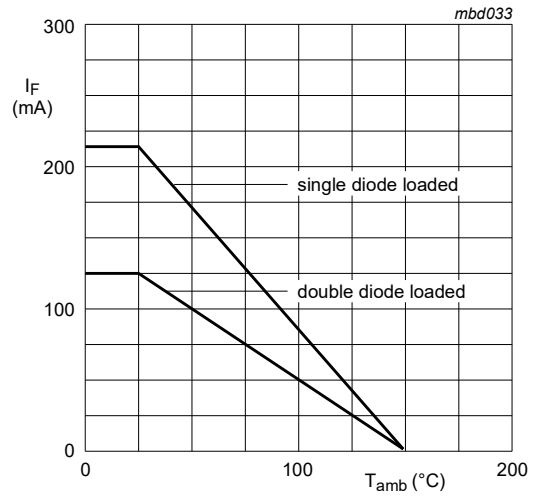
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	360	K/W

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

10. Characteristics

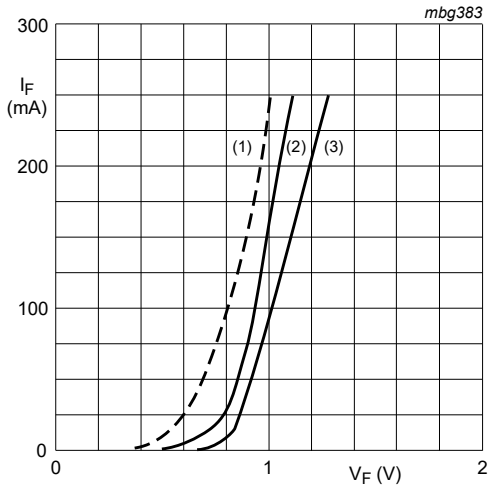
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 1 mA; T_j = 25 °C		-	-	715	mV
		I_F = 10 mA; T_j = 25 °C		-	-	855	mV
		I_F = 100 mA; T_j = 25 °C		-	-	1	V
I_R	reverse current	V_R = 25 V; T_j = 25 °C		-	-	30	nA
		V_R = 50 V; T_j = 25 °C		-	-	0.1	µA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA
		V_R = 50 V; T_j = 150 °C		-	-	100	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_j = 25 °C		-	-	1.5	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		-	-	4	ns
V_{FRM}	peak forward recovery voltage	I_F = 10 mA; t_r = 20 ns; T_j = 25 °C		-	-	1.75	V



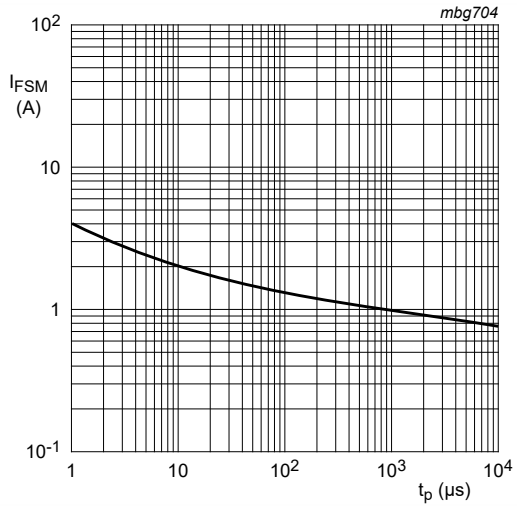
Device mounted on an FR4 PCB standard footprint

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



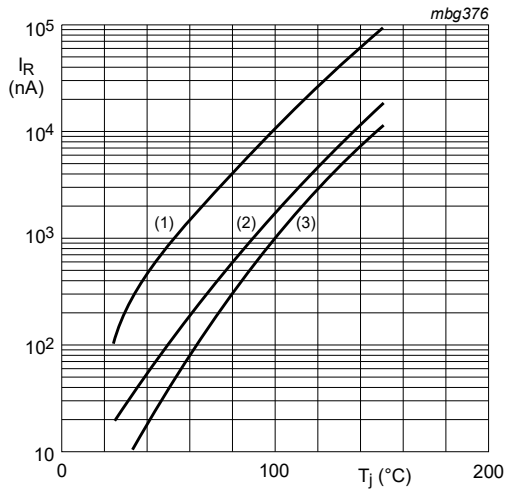
(1) T_j = 150 °C; typical values
(2) T_j = 25 °C; typical values
(3) T_j = 25 °C; maximum values

Fig. 2. Forward current as a function of forward voltage



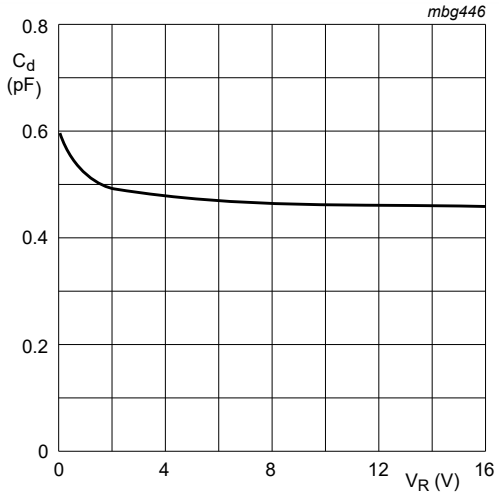
Based on square wave currents.
$T_{j(init)}$ = 25 °C

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



(1) V_R = 50 V; maximum values
(2) V_R = 50 V; typical values
(3) V_R = 25 V; typical values

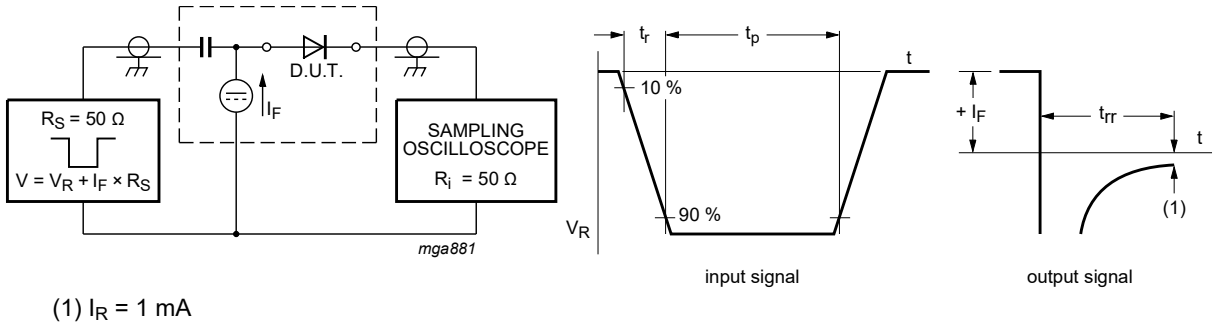
Fig. 4. Reverse current as a function of junction temperature



f = 1 MHz; T_j = 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

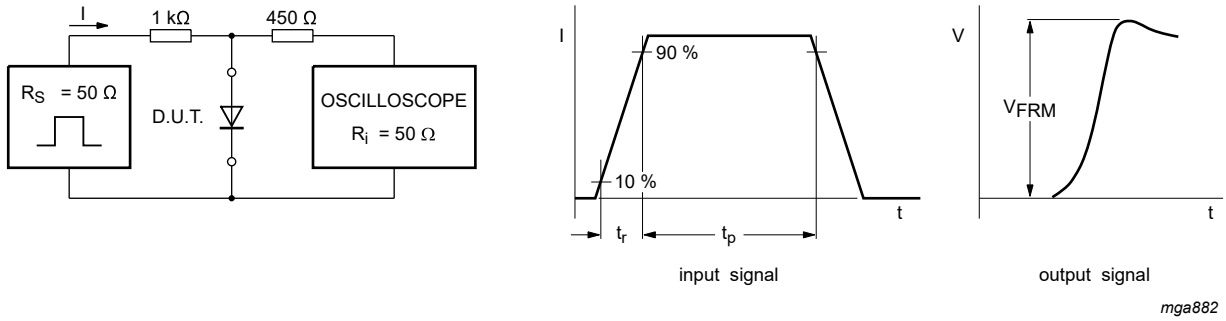


Fig. 7. Forward recovery voltage test circuit and waveforms

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

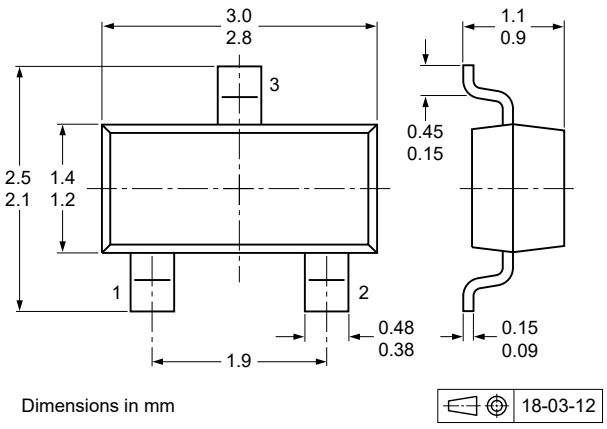


Fig. 8. Package outline SOT23

13. Soldering

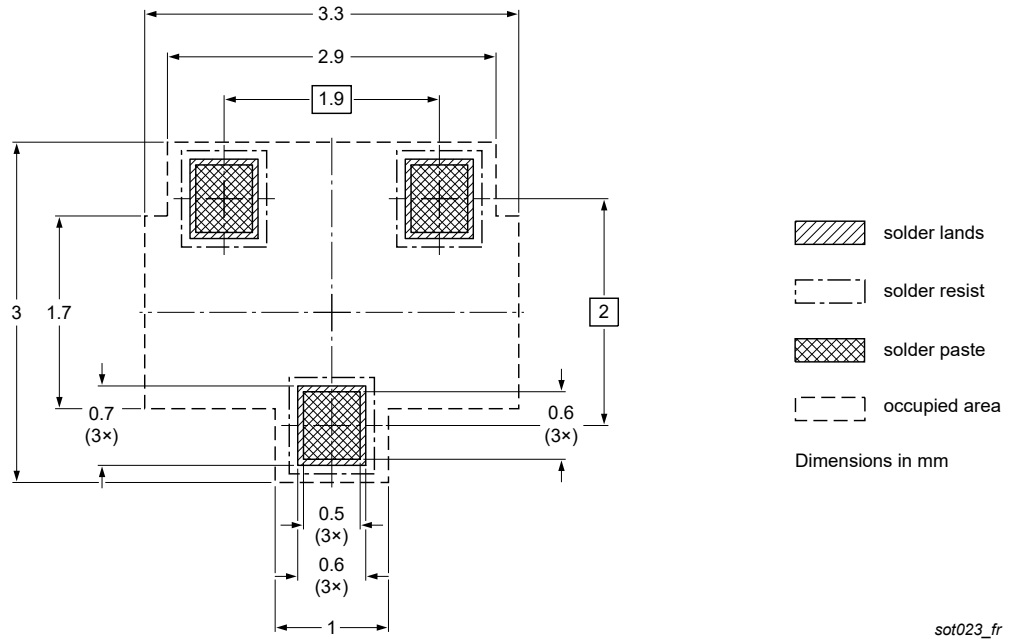


Fig. 9. Reflow soldering footprint for SOT23

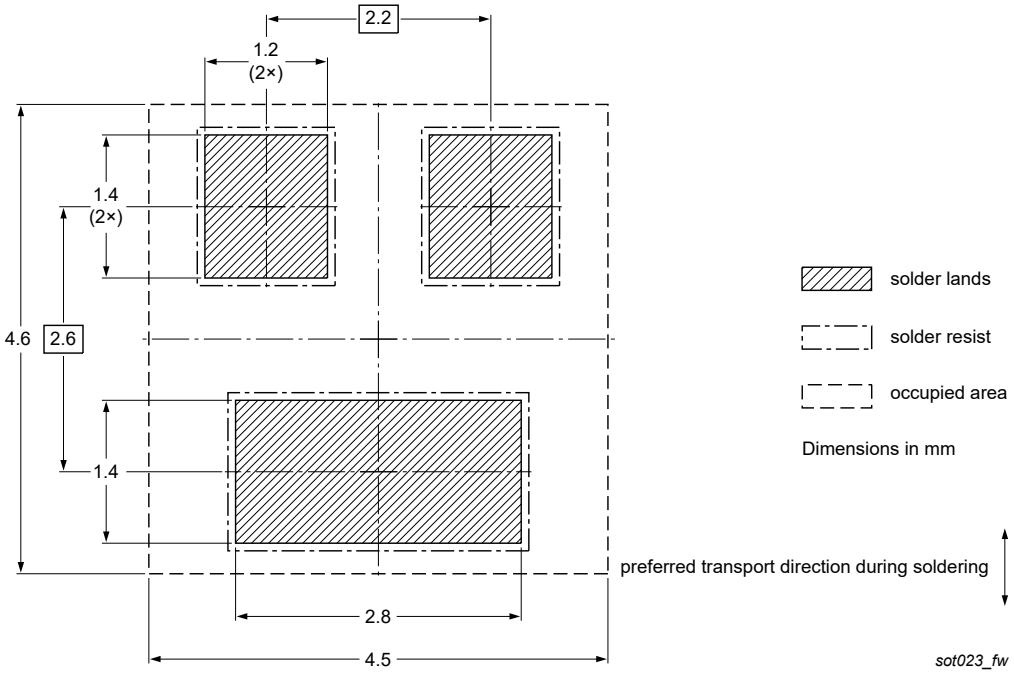


Fig. 10. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV74-Q v.1	20240123	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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