



BAV70W-Q

High-speed switching double diode

14 June 2021

Product data sheet

1. General description

High-speed switching double diode, encapsulated in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low capacitance: $C_d \leq 1.5$ pF
- Low leakage current
- Reverse voltage: $V_R \leq 100$ V
- Very small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching
- General-purpose switching

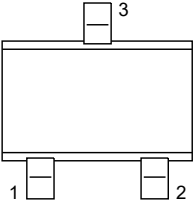
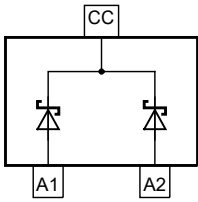
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_R	reverse current	$V_R = 80$ V; $T_{amb} = 25$ °C	-	-	0.5	μ A
V_R	reverse voltage		-	-	100	V
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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 SC-70 (SOT323)	 006aab034
2	A2	anode (diode 2)		
3	CC	common cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV70W-Q	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]
BAV70W-Q	A4%

[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			-	100	V
V_{RRM}	repetitive peak reverse voltage			-	100	V
I_F	forward current	$T_{amb} \leq 25\text{ °C}$		-	175	mA
I_{FRM}	repetitive peak forward current			-	500	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$; square wave	[1]	-	4	A
		$t_p = 1\text{ ms}$; square wave	[1]	-	1	A
		$t_p = 1\text{ s}$; square wave	[1]	-	0.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2]	-	200	mW
Per device						
I_F	forward current	$T_{amb} \leq 25\text{ °C}$		-	100	mA
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] $t_j = 25\text{ °C}$ prior to surge

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

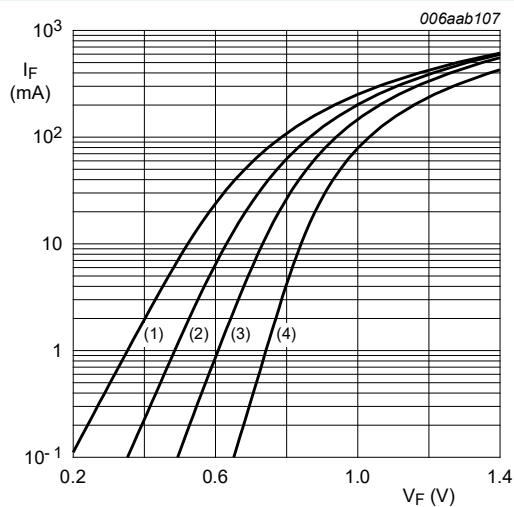
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W

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

10. Characteristics

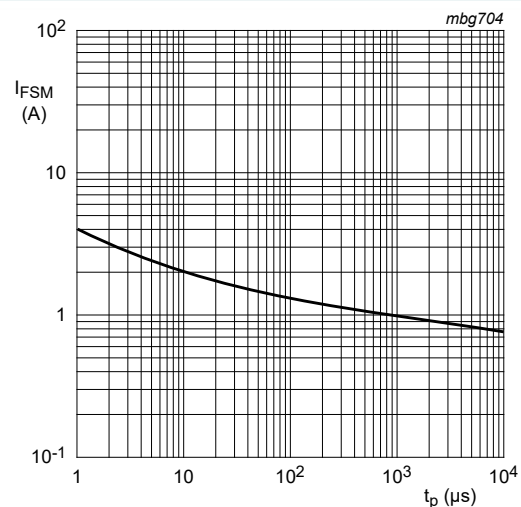
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V_F	forward voltage	$I_F = 1 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; pulsed; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	715	mV
		$I_F = 10 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; pulsed; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	855	mV
		$I_F = 50 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; pulsed; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	1	V
		$I_F = 150 \text{ mA}$; $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$; pulsed; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	1.25	V
I_R	reverse current	$V_R = 25 \text{ V}$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	30	nA
		$V_R = 80 \text{ V}$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	0.5	μA
		$V_R = 25 \text{ V}$; $T_j = 150 \text{ } ^\circ\text{C}$	-	-	30	μA
		$V_R = 80 \text{ V}$; $T_j = 150 \text{ } ^\circ\text{C}$	-	-	100	μA
C_d	diode capacitance	$V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	1.5	pF
t_{rr}	reverse recovery time	$I_F = 10 \text{ mA}$; $I_R = 10 \text{ mA}$; $I_{R(\text{meas})} = 1 \text{ mA}$; $R_L = 100 \text{ } \Omega$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	4	ns
V_{FRM}	peak forward recovery voltage	$I_F = 10 \text{ mA}$; $t_r = 20 \text{ ns}$; $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$	-	-	1.75	V



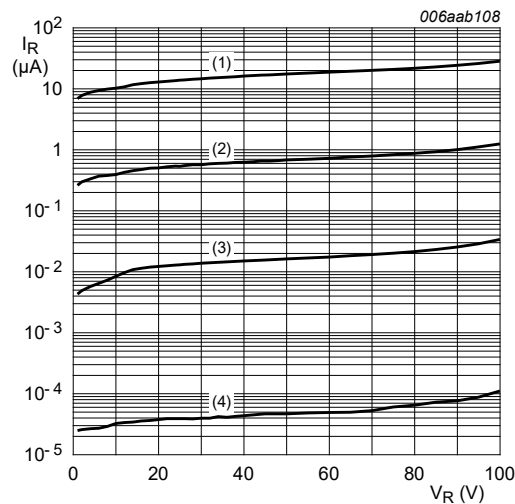
- (1) $T_j = 150 \text{ } ^\circ\text{C}$
- (2) $T_j = 85 \text{ } ^\circ\text{C}$
- (3) $T_j = 25 \text{ } ^\circ\text{C}$
- (4) $T_j = -40 \text{ } ^\circ\text{C}$

Fig. 1. Forward current as a function of forward voltage; typical values



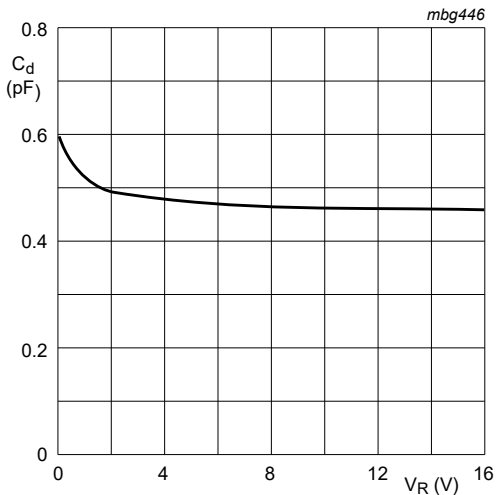
Based on square wave currents.
 $T_{j(\text{init})} = 25 \text{ } ^\circ\text{C}$

Fig. 2. Non-repetitive peak forward current as a function of pulse duration; typical values



- (1) $T_j = 150\text{ }^\circ\text{C}$
- (2) $T_j = 85\text{ }^\circ\text{C}$
- (3) $T_j = 25\text{ }^\circ\text{C}$
- (4) $T_j = -40\text{ }^\circ\text{C}$

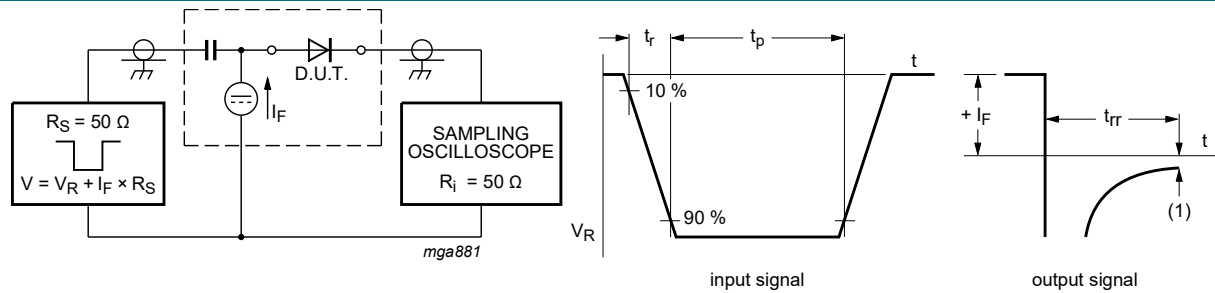
Fig. 3. Reverse current as a function of reverse voltage; typical values



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

Fig. 4. Diode capacitance as a function of reverse voltage; typical values

11. Test information

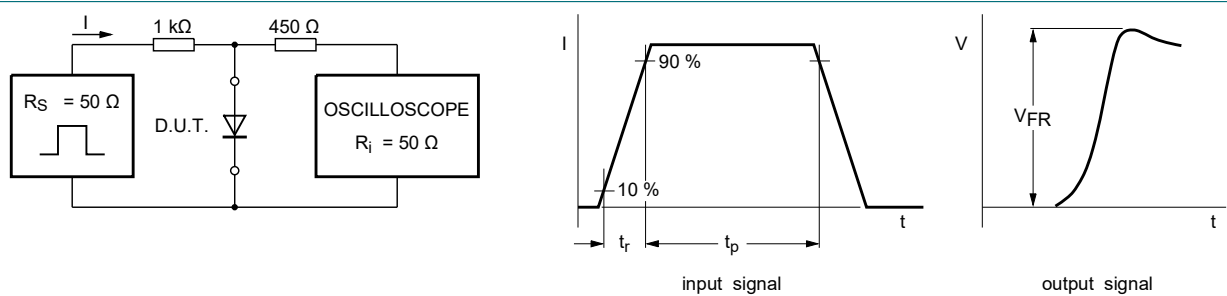


(1) $I_R = 1 \text{ mA}$

Input signal: reverse pulse rise time $t_r = 0.6 \text{ ns}$; reverse voltage pulse duration $t_p = 100 \text{ ns}$; duty cycle $\delta = 0.05$

Oscilloscope: rise time $t_r = 0.35 \text{ ns}$

Fig. 5. Reverse recovery time test circuit and waveforms



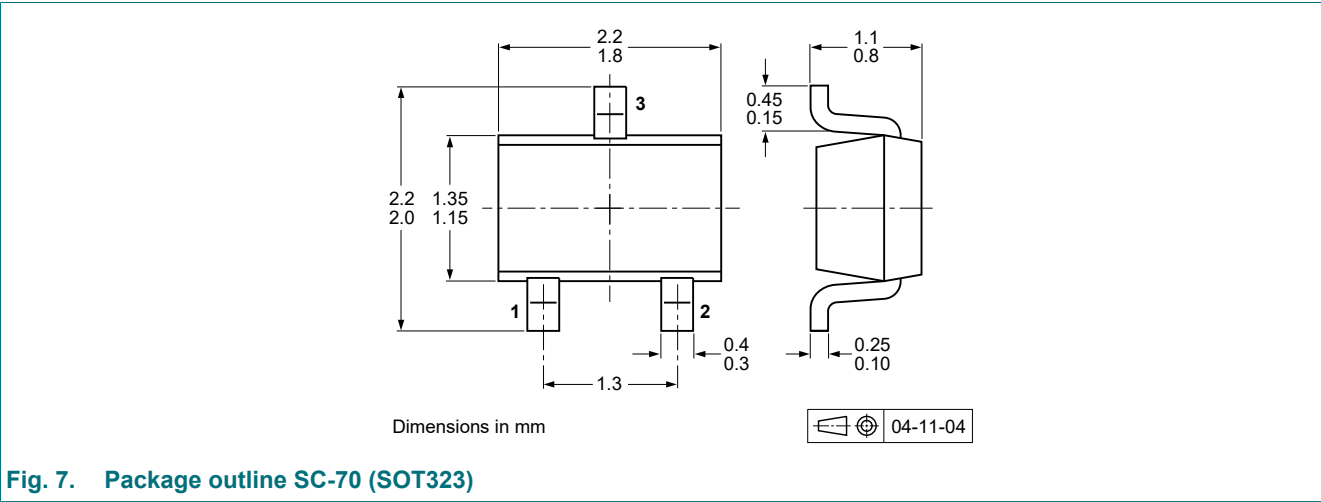
Input signal: forward pulse rise time $t_r = 20 \text{ ns}$; forward current pulse duration $t_p \geq 100 \text{ ns}$; duty cycle $\delta \leq 0.005$

Fig. 6. 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



13. Soldering

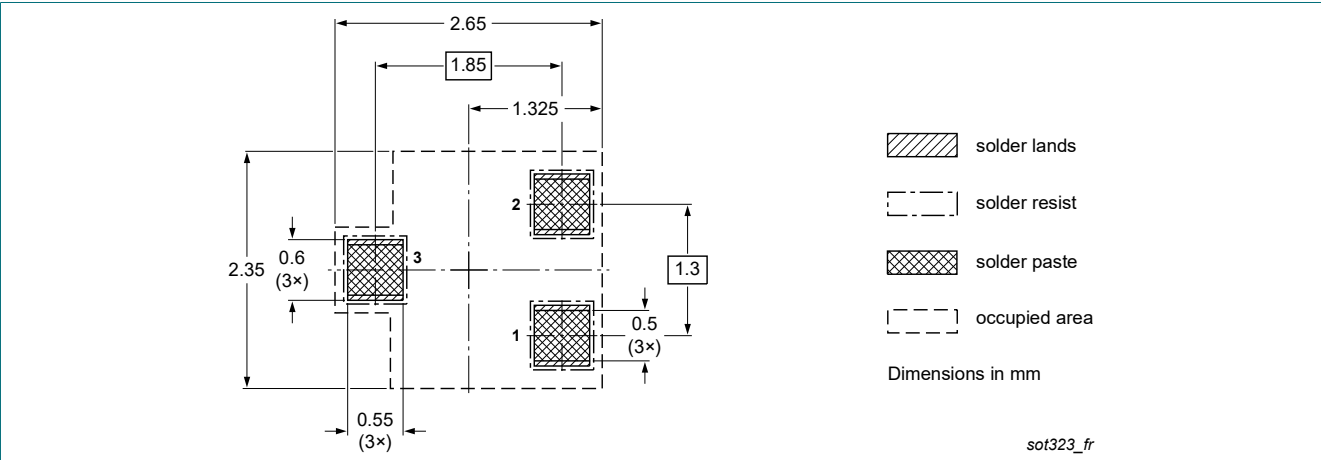


Fig. 8. Reflow soldering footprint for SC-70 (SOT323)

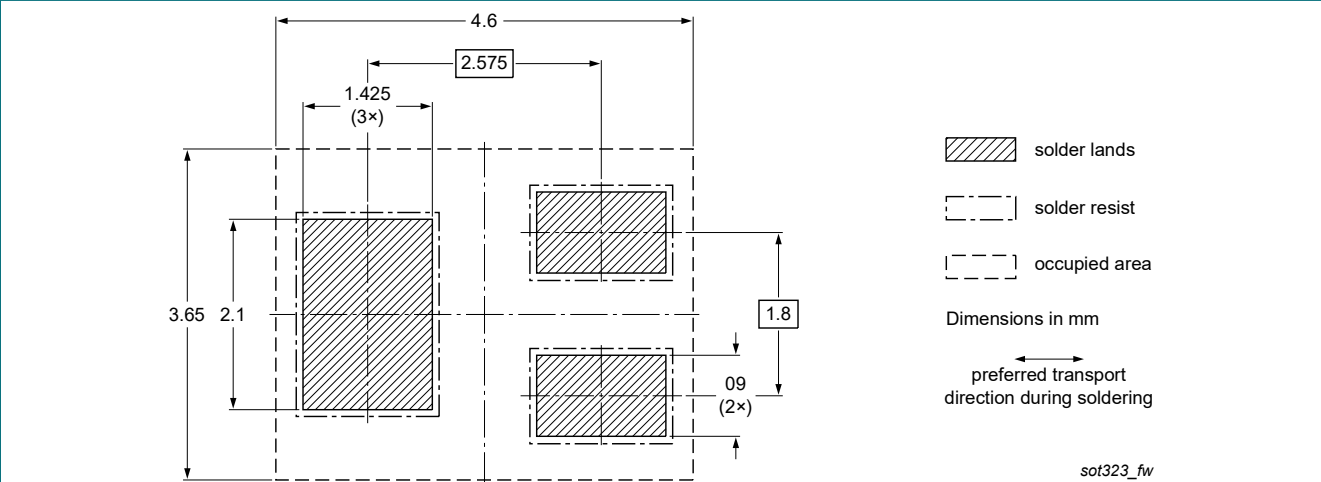


Fig. 9. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV70W-Q v.1	20210614	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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