



# BAW56W-Q

## High-speed switching diode

18 June 2021

Product data sheet

### 1. General description

High-speed switching 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:  $C_d \leq 2$  pF
- Low leakage current
- Reverse voltage:  $V_R \leq 90$  V
- Very small SMD plastic packages
- Qualified according to AEC-Q101 and recommended for use in automotive applications

### 3. Applications

- High-speed switching
- General-purpose switching

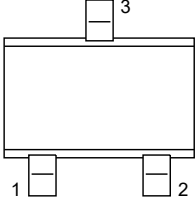
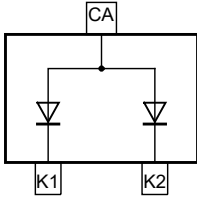
### 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_R$	reverse current	$V_R = 80$ V; $T_{amb} = 25$ °C	-	-	0.5	µA
$V_R$	reverse voltage		-	-	90	V
$t_{rr}$	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω; $I_{R(meas)} = 1$ mA; $T_{amb} = 25$ °C	-	-	4	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 <p>SC-70 (SOT323)</p>	 <p>006aab099</p>
2	K2	cathode (diode 2)		
3	CA	common anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAW56W-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]
BAW56W-Q	A1%

[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
<b>Per diode</b>						
$V_{RRM}$	repetitive peak reverse voltage			-	90	V
$V_R$	reverse voltage			-	90	V
$I_F$	forward current	$T_{amb} \leq 25\text{ °C}$		-	150	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]	-	200	mW
<b>Per device</b>						
$I_F$	forward current	$T_{amb} \leq 25\text{ °C}$		-	130	mA
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-65	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**

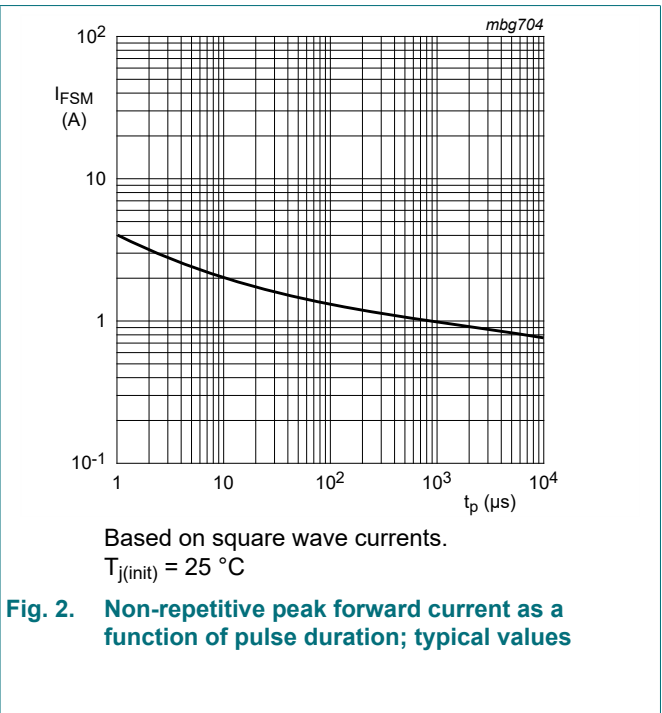
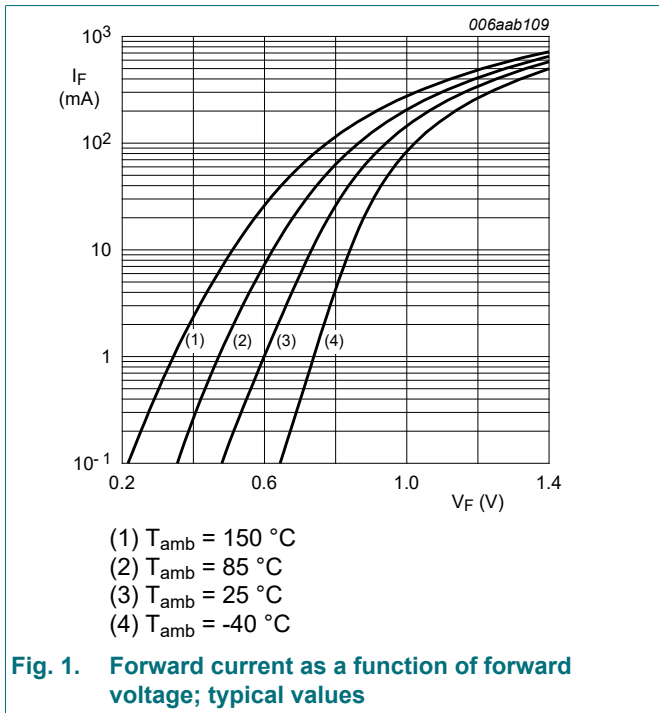
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Per diode</b>							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	300	K/W

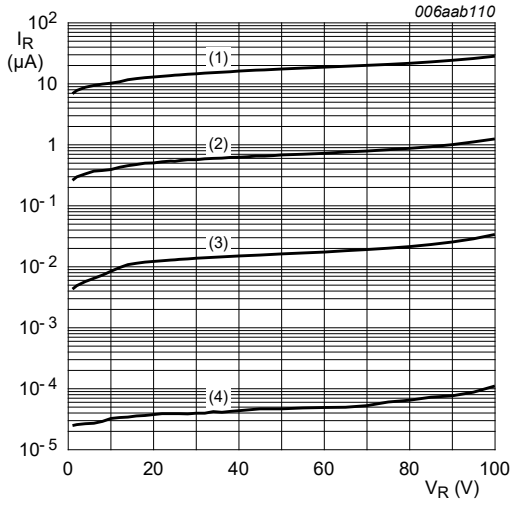
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

## 10. Characteristics

Table 7. Characteristics

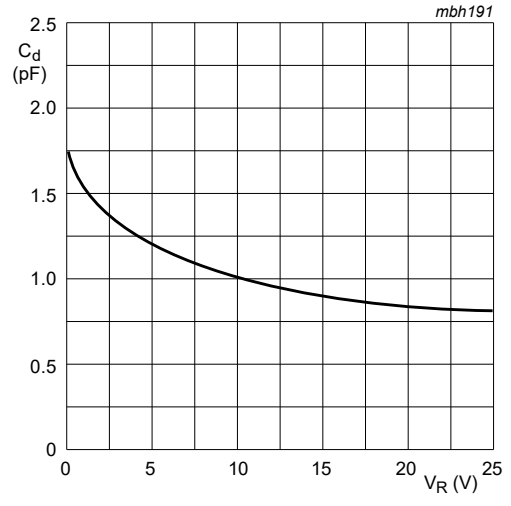
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 1 \text{ mA}; t_p \leq 300 \text{ }\mu\text{s}; \delta \leq 0.02;$ pulsed; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	715	mV
		$I_F = 10 \text{ mA}; t_p \leq 300 \text{ }\mu\text{s}; \delta \leq 0.02;$ 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	$\mu\text{A}$
		$V_R = 25 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	30	$\mu\text{A}$
		$V_R = 80 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	150	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	2	pF
$t_{rr}$	reverse recovery time	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \text{ }\Omega;$ $I_{R(\text{meas})} = 1 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	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)  $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

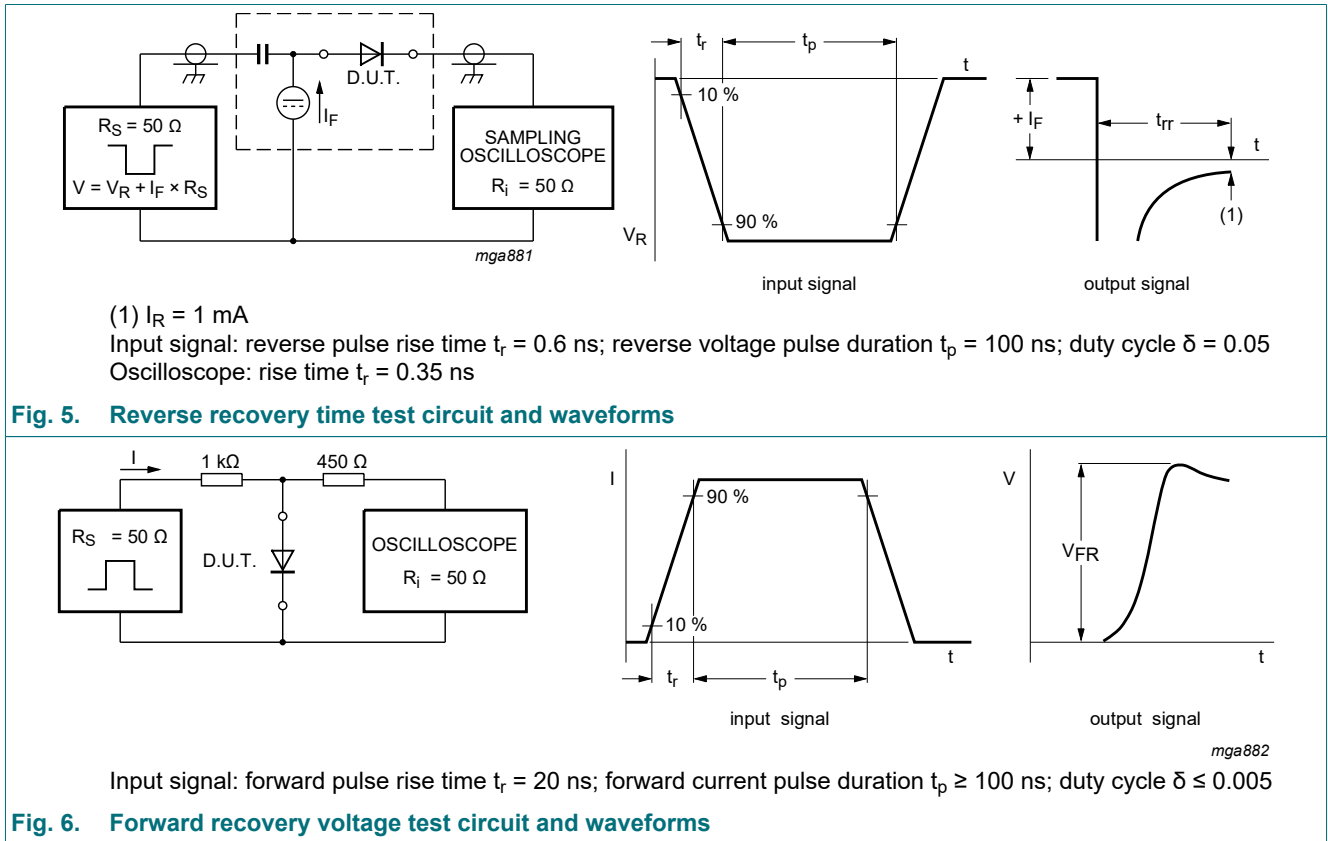
**Fig. 3. Reverse current as a function of reverse voltage; typical values**



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

**Fig. 4. 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

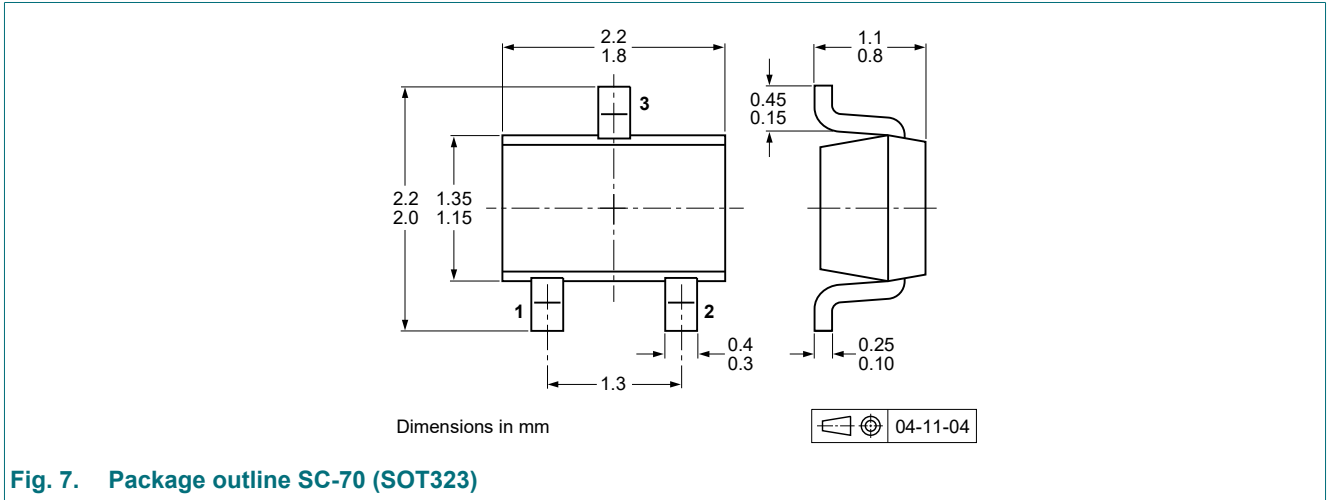


Fig. 7. Package outline SC-70 (SOT323)

### 13. Soldering

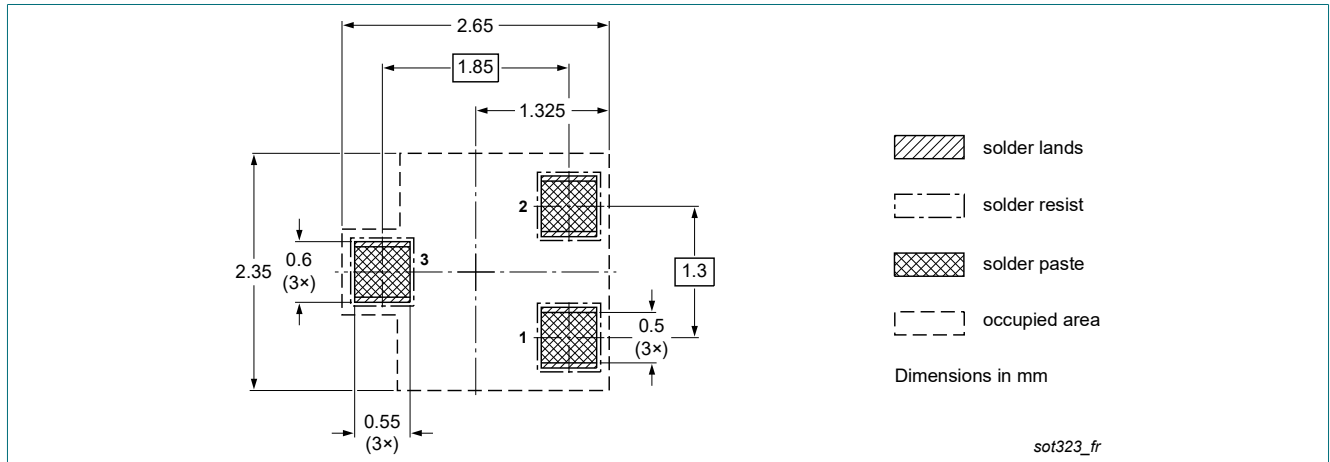


Fig. 8. Reflow soldering footprint for SC-70 (SOT323)

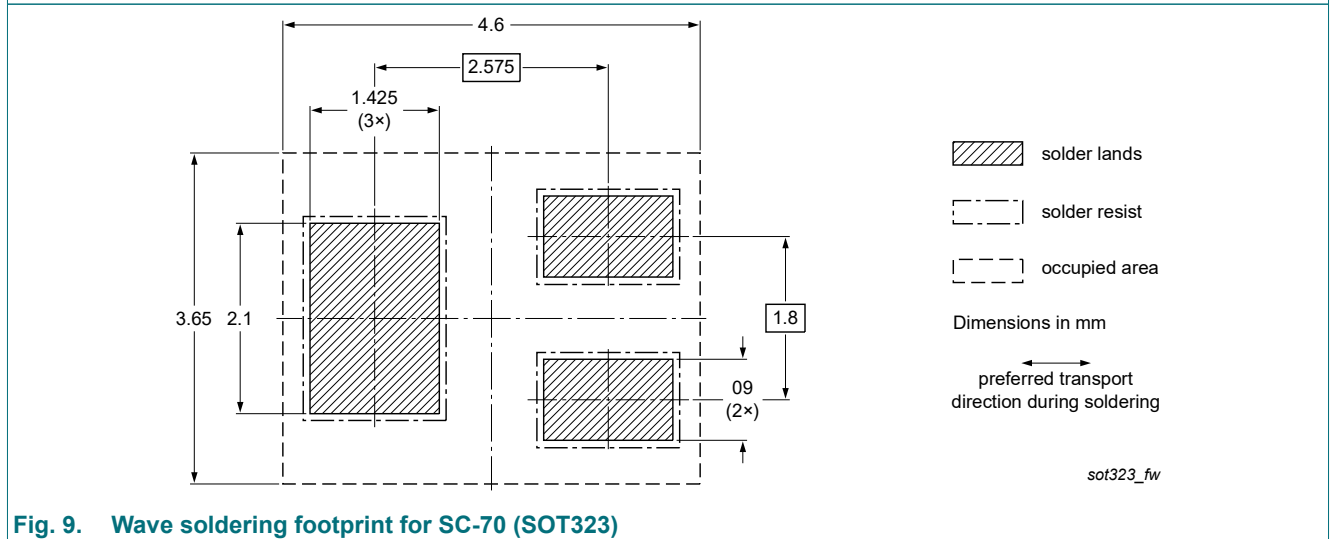


Fig. 9. Wave soldering footprint for SC-70 (SOT323)



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAW56W-Q v.1	20210618	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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