



BAW56W

High-speed switching diode

1 July 2022

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

3. Applications

- High-speed switching
- General-purpose switching

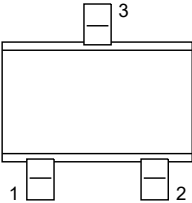
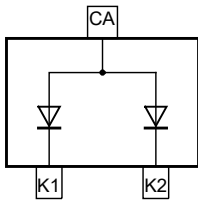
4. Quick reference data

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		-	-	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)	 SC-70 (SOT323)	 006aab099
2	K2	cathode (diode 2)		
3	CA	common anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAW56W	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	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
Per diode						
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	$t_p = 1\text{ }\mu\text{s}$; square wave; $T_{j(init)} = 25\text{ °C}$		-	4	A
		$t_p = 1\text{ ms}$; square wave; $T_{j(init)} = 25\text{ °C}$		-	1	A
		$t_p = 1\text{ s}$; square wave; $T_{j(init)} = 25\text{ °C}$		-	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
Per device						
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

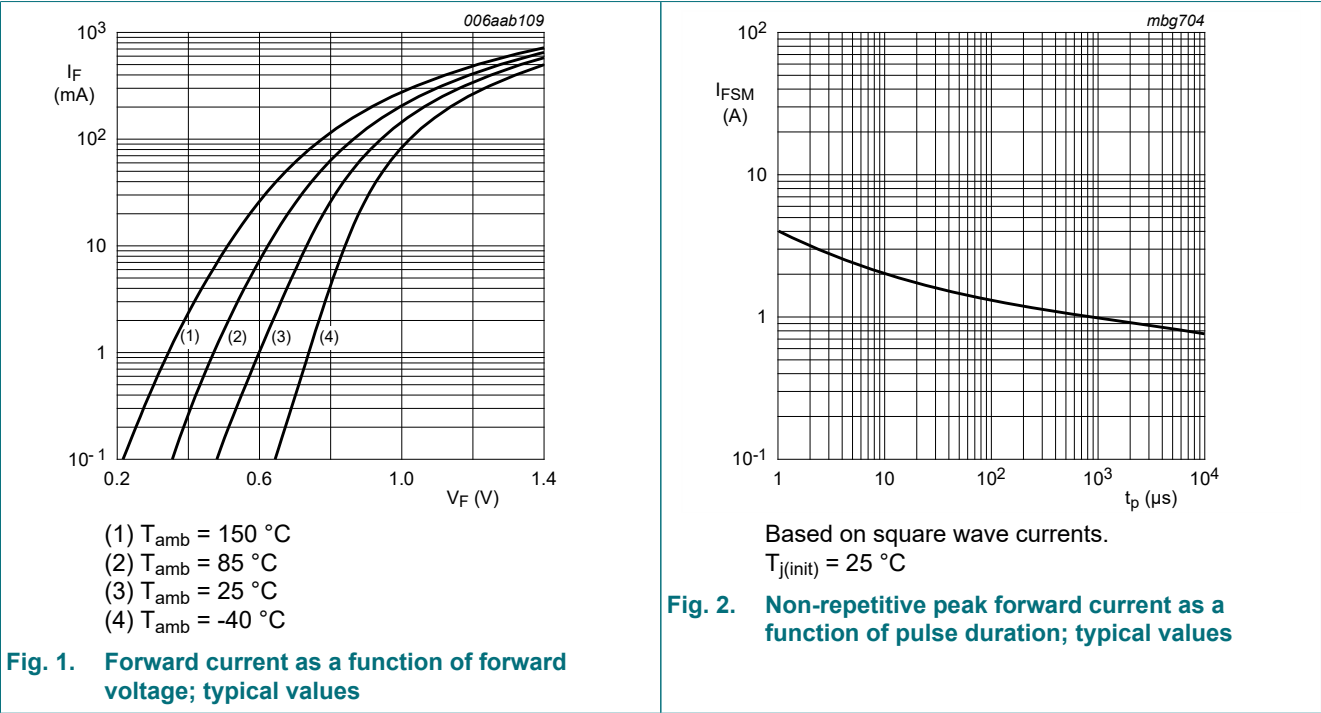
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	300	K/W

[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
Per diode						
V _F	forward voltage	I _F = 1 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C	-	-	715	mV
		I _F = 10 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C	-	-	855	mV
		I _F = 50 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C	-	-	1	V
		I _F = 150 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C	-	-	1.25	V
I _R	reverse current	V _R = 25 V; T _{amb} = 25 °C	-	-	30	nA
		V _R = 80 V; T _{amb} = 25 °C	-	-	0.5	μA
		V _R = 25 V; T _j = 150 °C	-	-	30	μA
		V _R = 80 V; T _j = 150 °C	-	-	150	μA
C _d	diode capacitance	V _R = 0 V; f = 1 MHz; T _{amb} = 25 °C	-	-	2	pF
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
V _{FRM}	peak forward recovery voltage	I _F = 10 mA; t _r = 20 ns; T _{amb} = 25 °C	-	-	1.75	V



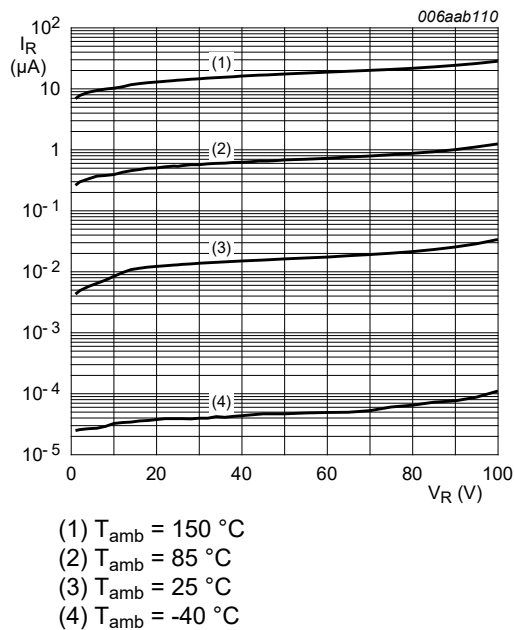


Fig. 3. Reverse current as a function of reverse voltage; typical values

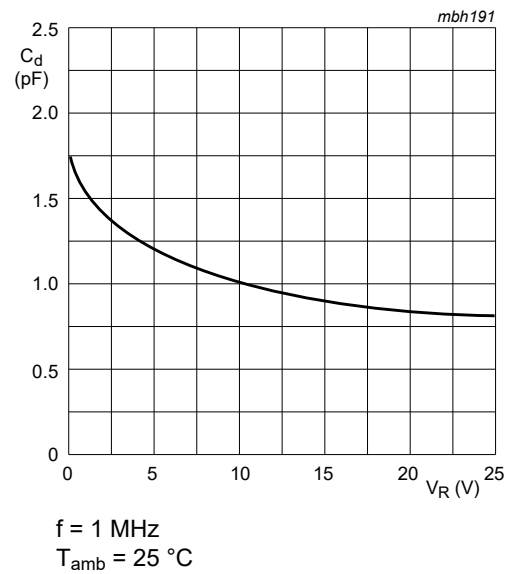
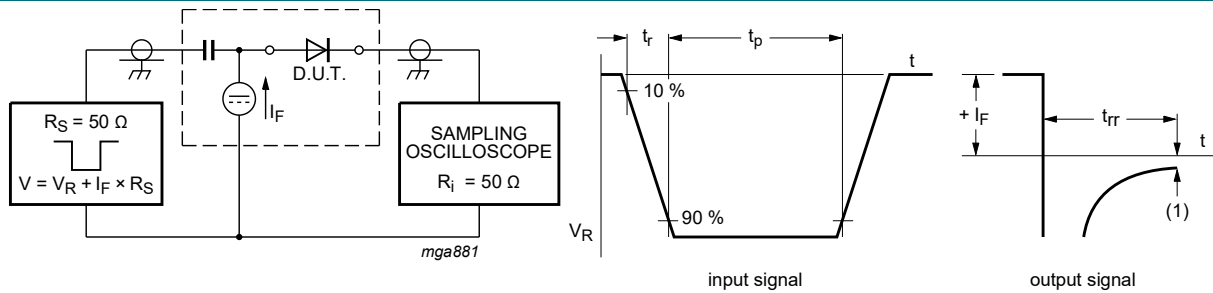


Fig. 4. Diode capacitance as a function of reverse voltage; typical values

11. Test information

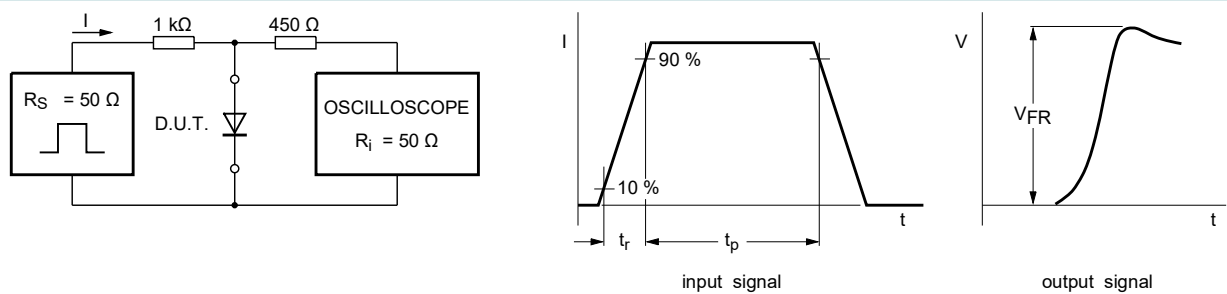


(1) $I_R = 1 \text{ mA}$

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

12. Package outline

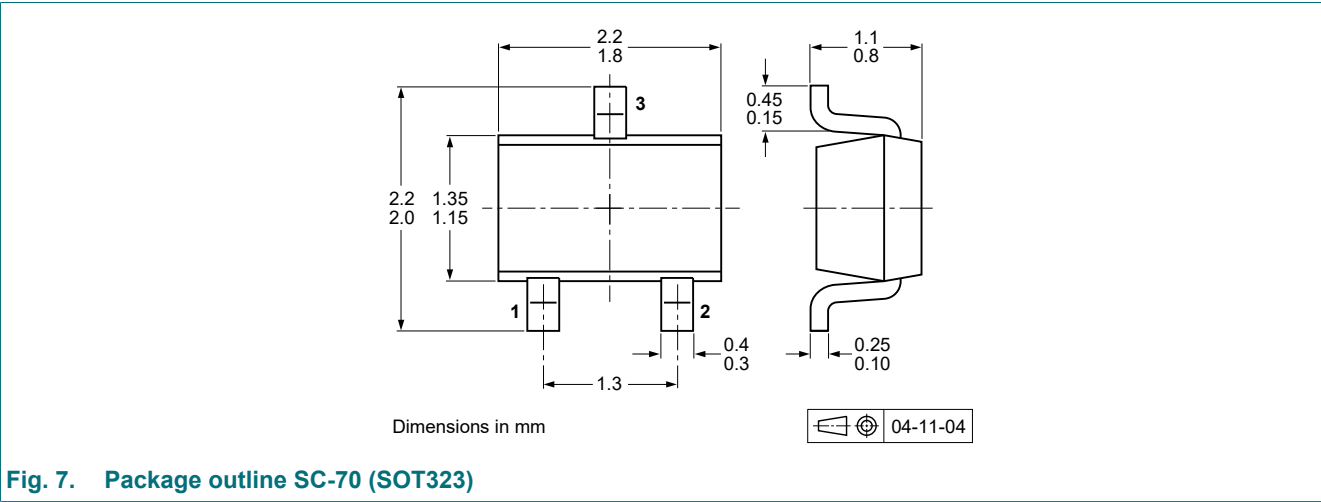


Fig. 7. Package outline SC-70 (SOT323)

13. Soldering

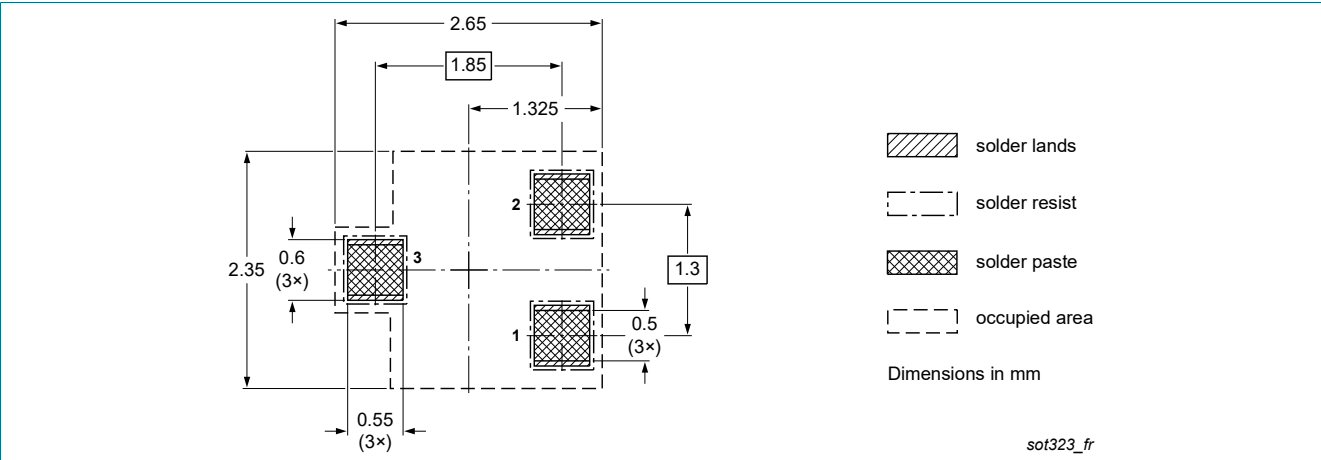


Fig. 8. Reflow soldering footprint for SC-70 (SOT323)

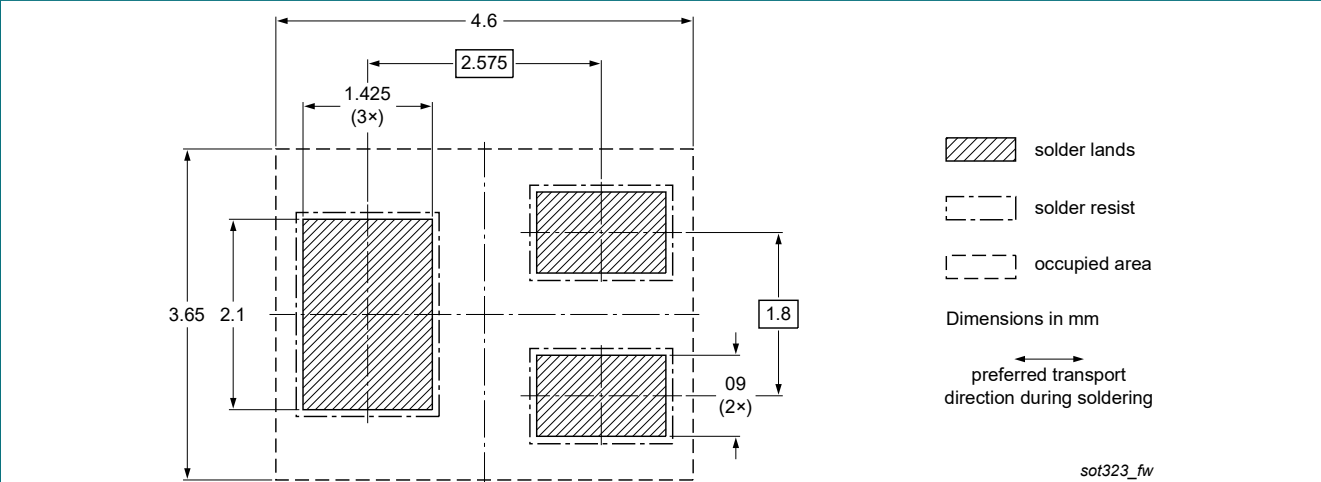


Fig. 9. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAW56W v.7	20220701	Product data sheet	-	BAV756S_BAW56_SE Rv.6
Modification:	<ul style="list-style-type: none"> Family data sheet reduced to single type data sheets. Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). Packing information removed. 			
BAV756S_BAW56_SE Rv.6	20150318	Product data sheet	-	BAV756S_BAW56_SE R_5
BAV756S_BAW56_SE R_5	20071126	Product data sheet	-	BAV756S_2 BAW56_4 BAW56S_2 BAW56T_2 BAW56W_4
BAV756S_2	19971021	Product specification	-	BAV756S_1
BAW56_4	20030325	Product specification	-	BAW56_3
BAW56S_2	19971021	Product specification	-	BAW56S_1
BAW56T_2	19971219	Product specification	-	-
BAW56W_4	19990511	Product specification	-	BAW56W_3

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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