



BAW56-Q

High-speed switching diode

23 August 2021

Product data sheet

1. General description

High-speed switching diode, encapsulated in a small SOT23 (TO-236AB) 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
- Small SMD plastic packages
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching
- General-purpose switching

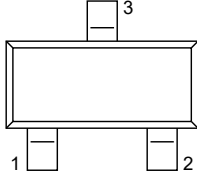
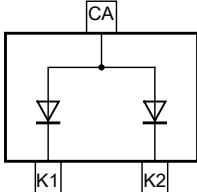
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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)	 <p style="text-align: center;">SOT23</p>	 <p style="text-align: center;">006aab099</p>
2	K2	cathode (diode 2)		
3	CA	common anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAW56-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]
BAW56-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
Per diode						
V_{RRM}	repetitive peak reverse voltage			-	90	V
V_R	reverse voltage			-	90	V
I_F	forward current	$T_{amb} \leq 25\text{ °C}$		-	215	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]	-	250	mW
Per device						
I_F	forward current	$T_{amb} \leq 25\text{ °C}$		-	125	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

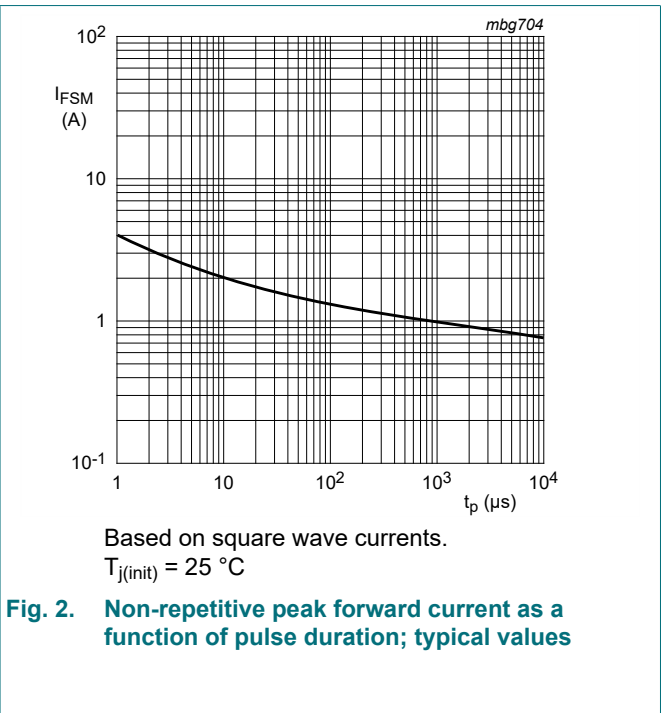
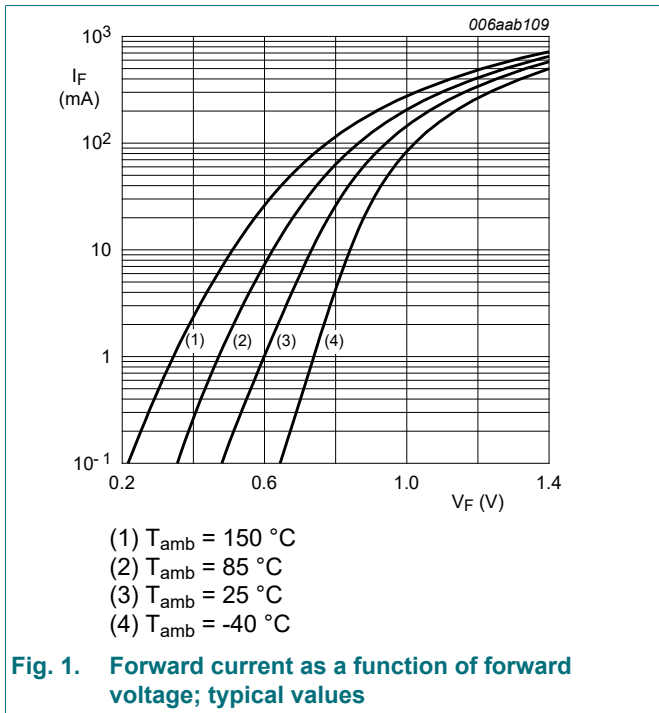
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	360	K/W

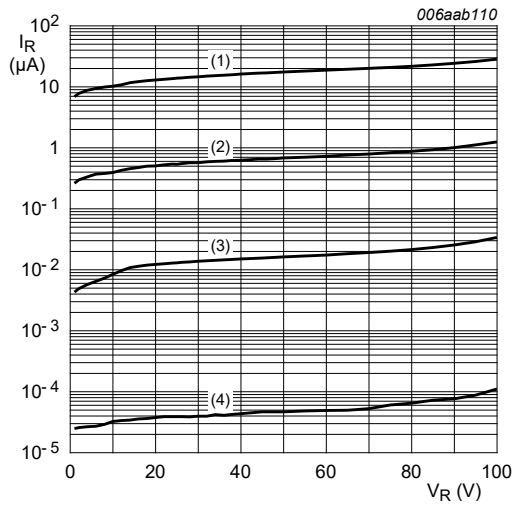
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

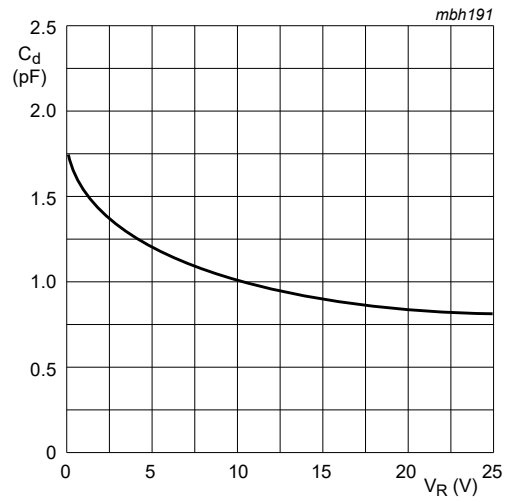
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V_F	forward voltage	$I_F = 1 \text{ mA}; t_p \leq 300 \text{ }\mu\text{s}; \delta \leq 0.02;$ pulsed; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	715	mV
		$I_F = 10 \text{ mA}; t_p \leq 300 \text{ }\mu\text{s}; \delta \leq 0.02;$ pulsed; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	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
		$V_R = 80 \text{ V}; T_j = 150 \text{ }^\circ\text{C}$	-	-	150	μA
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) $T_{amb} = 150^\circ\text{C}$
- (2) $T_{amb} = 85^\circ\text{C}$
- (3) $T_{amb} = 25^\circ\text{C}$
- (4) $T_{amb} = -40^\circ\text{C}$

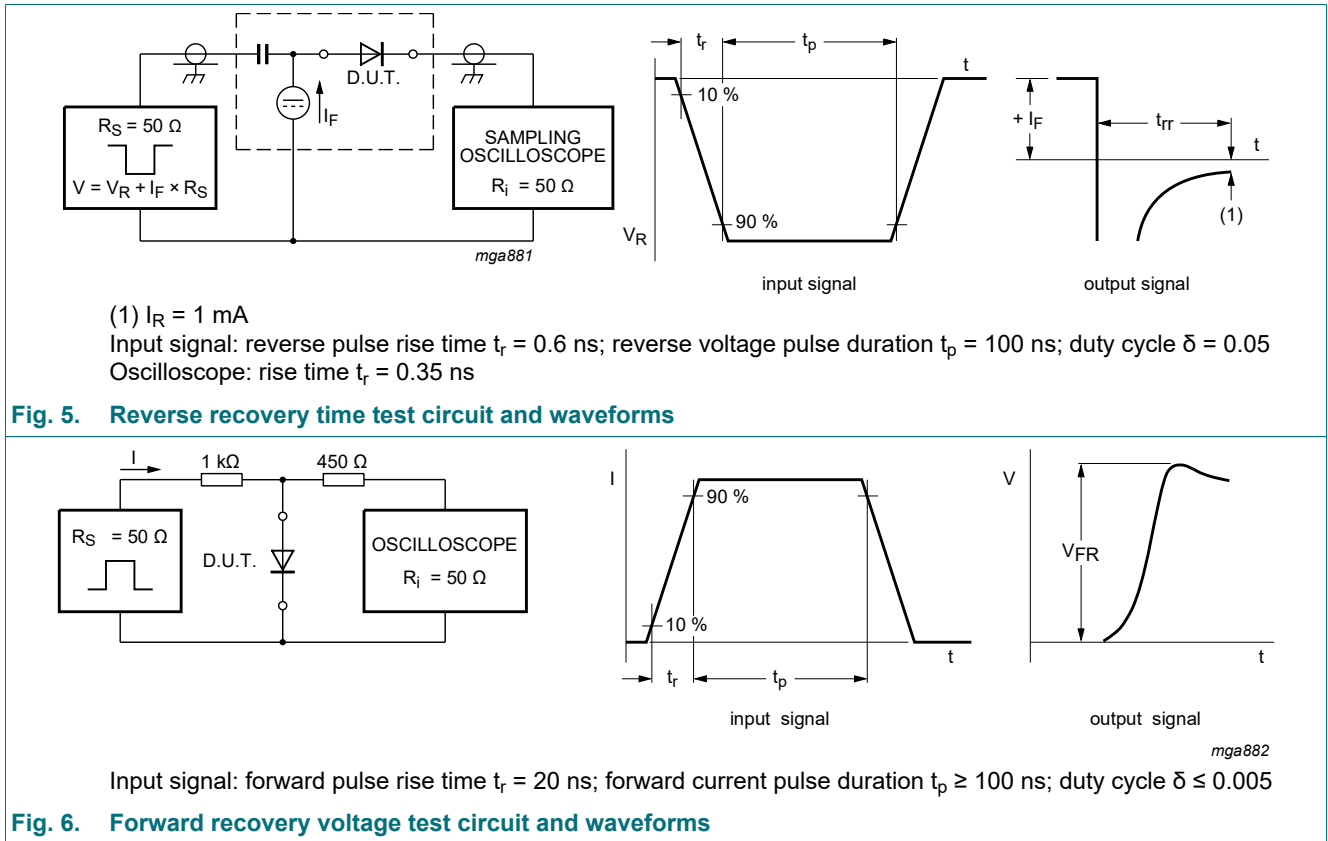
Fig. 3. Reverse current as a function of reverse voltage; typical values



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

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

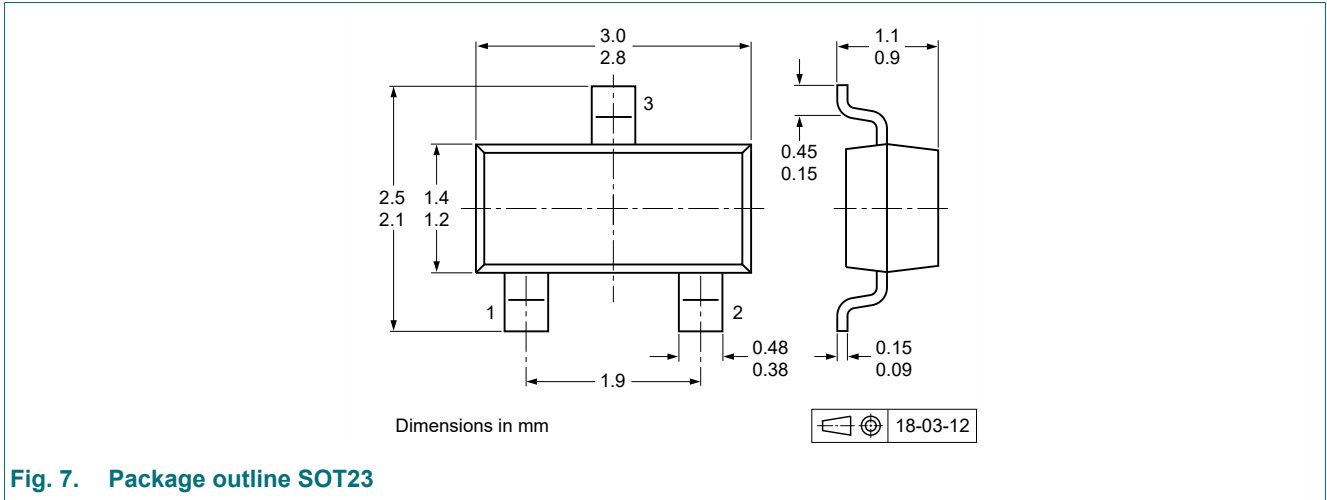


Fig. 7. Package outline SOT23

13. Soldering

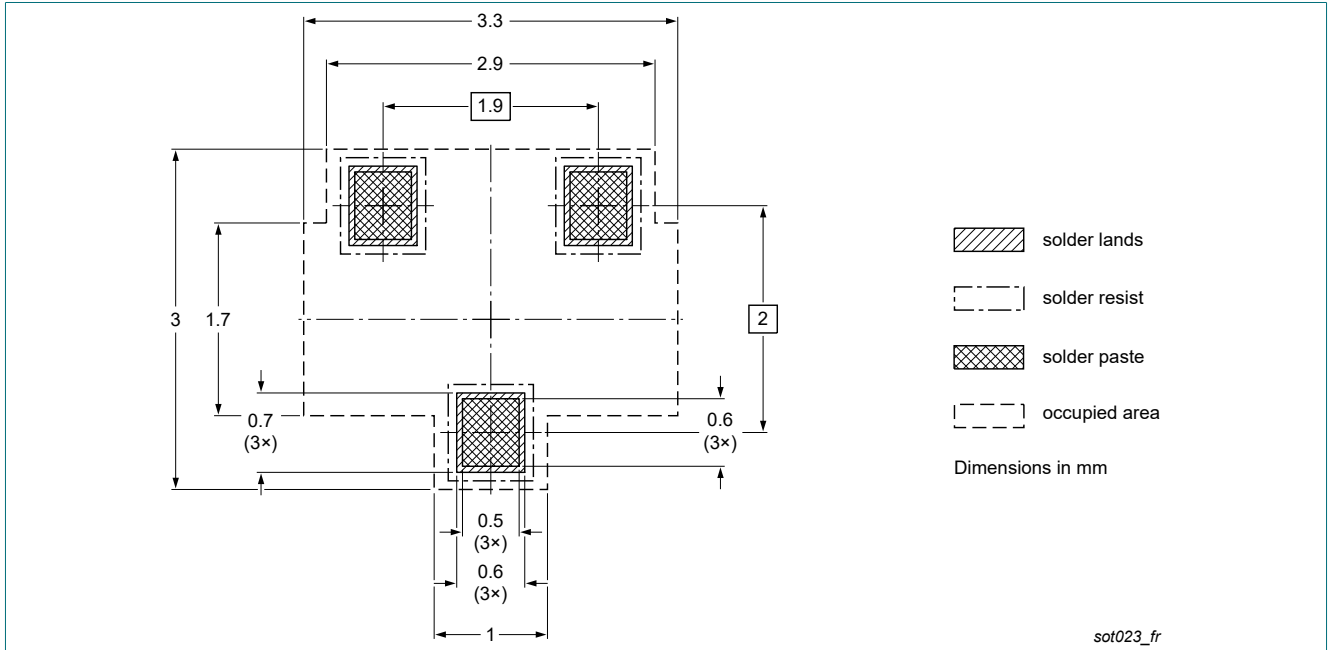


Fig. 8. Reflow soldering footprint for SOT23

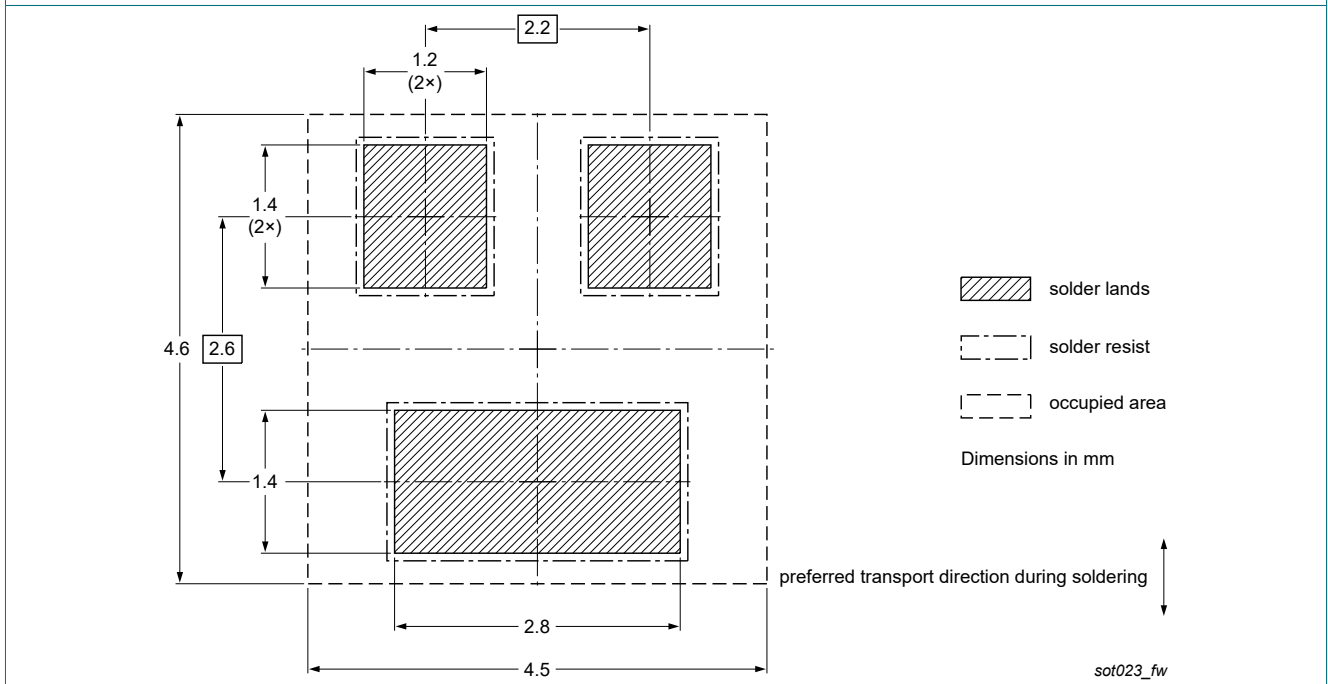


Fig. 9. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAW56-Q v.1	20210823	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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