



BAS21W-Q

High-voltage switching diode

22 April 2024

Product data sheet

1. General description

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

2. Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- Low leakage current
- High reverse voltage $V_R \leq 250$ V
- Low capacitance: $C_d \leq 2$ pF
- Very small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching at high voltage
- High-voltage general-purpose switching
- Voltage clamping
- Reverse polarity protection

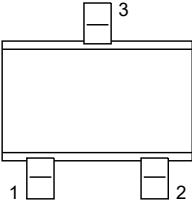
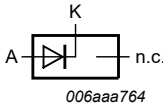
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_F	forward current		-	-	225	mA
I_R	reverse current	$V_R = 200$ V; $T_{amb} = 25$ °C	-	-	100	nA
V_R	reverse voltage		-	-	250	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	-	-	50	ns

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 SC-70 (SOT323)	 006aaa764
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21W-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]
BAS21W-Q	X4%

[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			-	250	V
I _F	forward current			-	225	mA
I _{FSM}	non-repetitive peak forward current	t _p = 1 μs; square wave; T _{j(init)} = 25 °C		-	9	A
		t _p = 100 μs; square wave; T _{j(init)} = 25 °C		-	3	A
		t _p = 10 ms; square wave; T _{j(init)} = 25 °C		-	1.7	A
I _{FRM}	repetitive peak forward current			-	625	mA
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	200	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

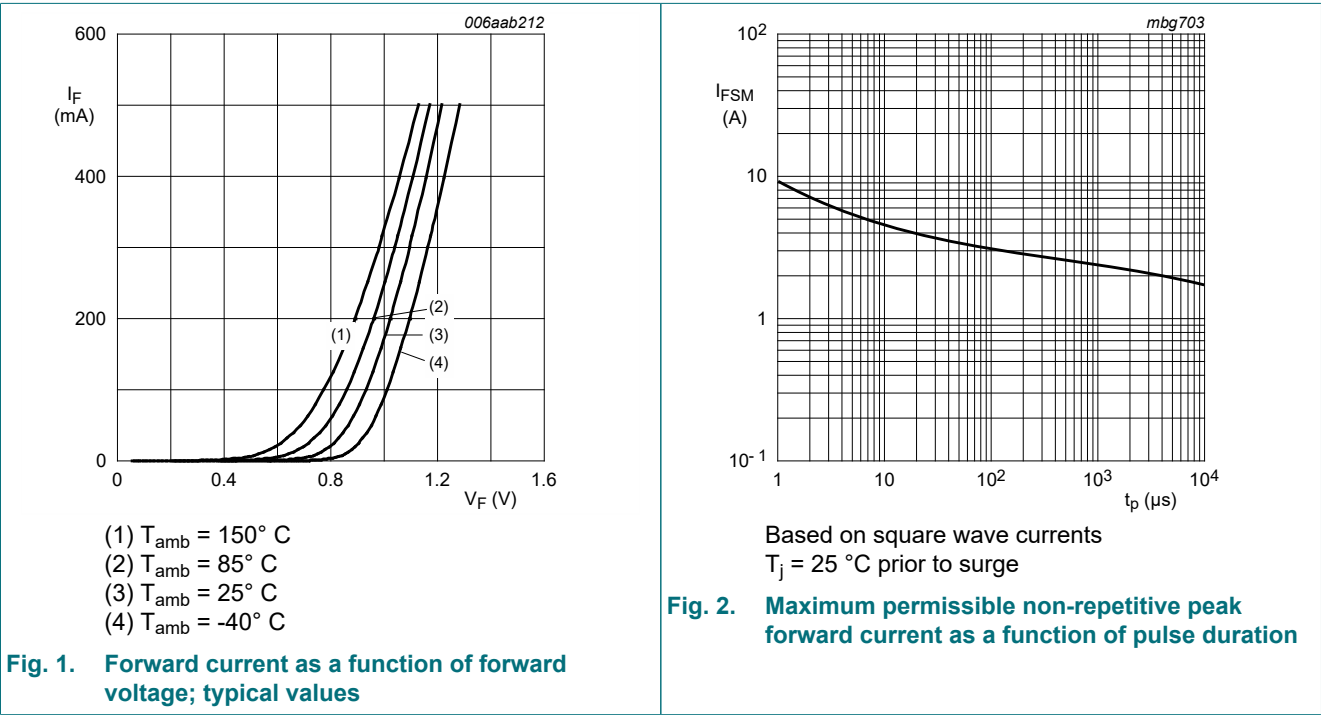
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	300	K/W

[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	$I_F = 100\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1	V
		$I_F = 200\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1.25	V
I_R	reverse current	$V_R = 200\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
		$V_R = 200\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$		-	-	100	μA
C_d	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	2	pF
t_{rr}	reverse recovery time	$I_F = 10\text{ mA}; I_R = 10\text{ mA}; R_L = 100\text{ }\Omega;$ $I_{R(meas)} = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	50	ns



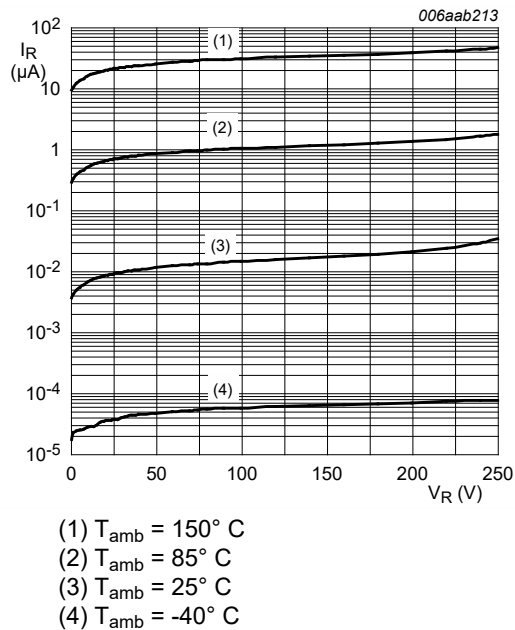


Fig. 3. Reverse current as a function of reverse voltage; typical values

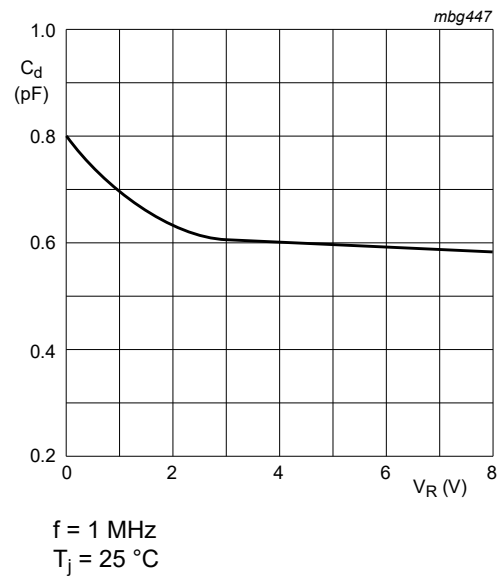
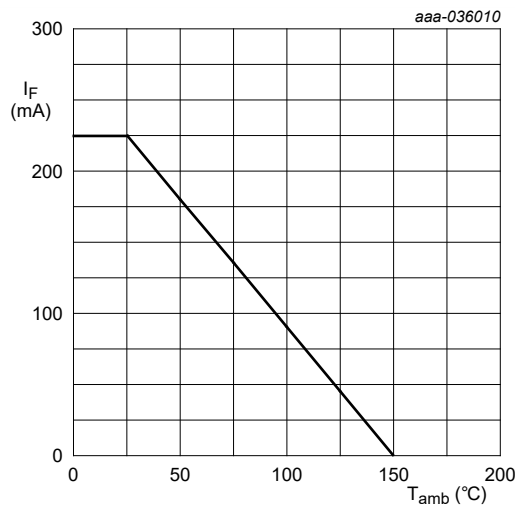


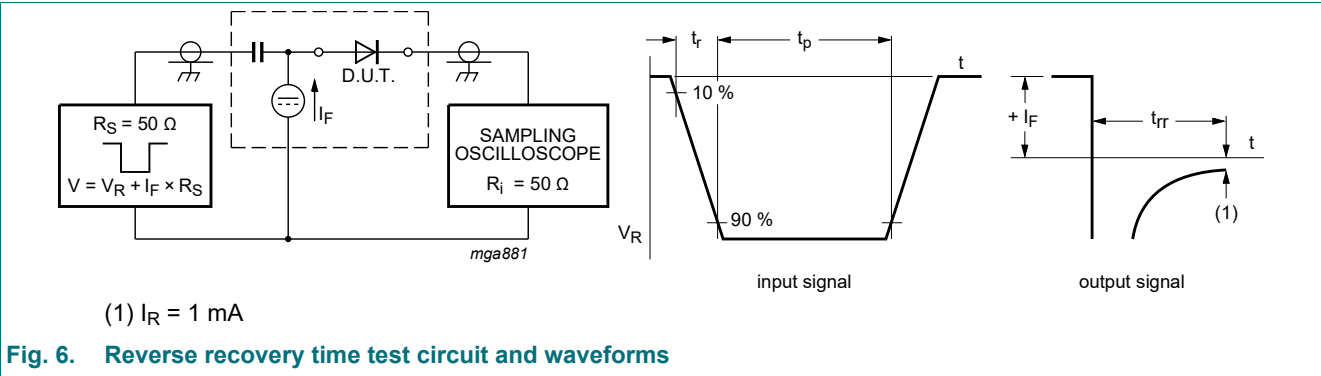
Fig. 4. Diode capacitance as a function of reverse voltage; typical values



FR4 PCB, standard footprint

Fig. 5. Forward current as a function of ambient temperature; derating curve

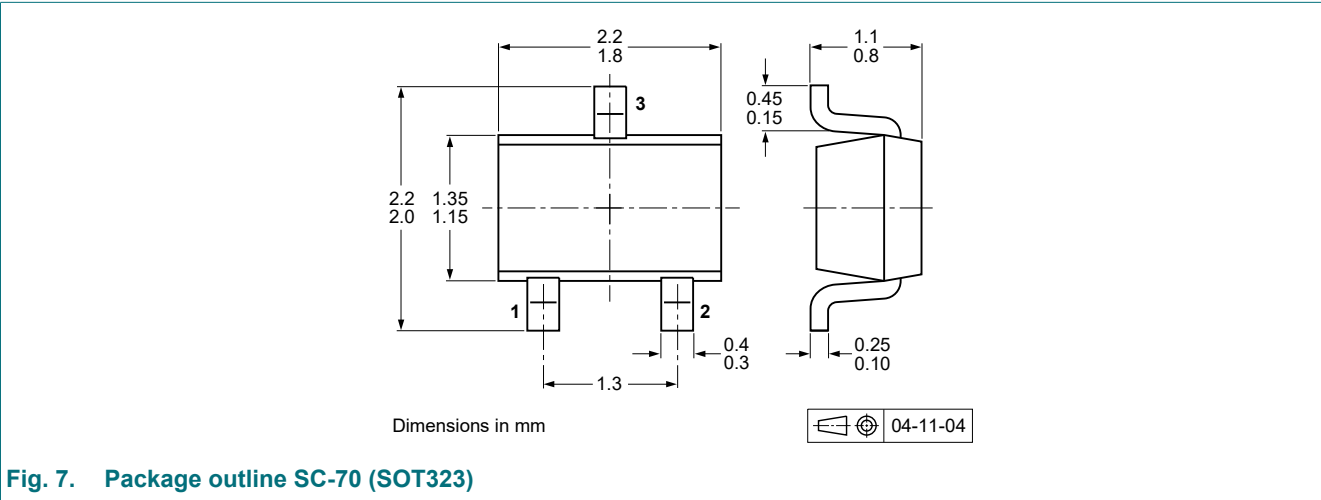
11. Test information



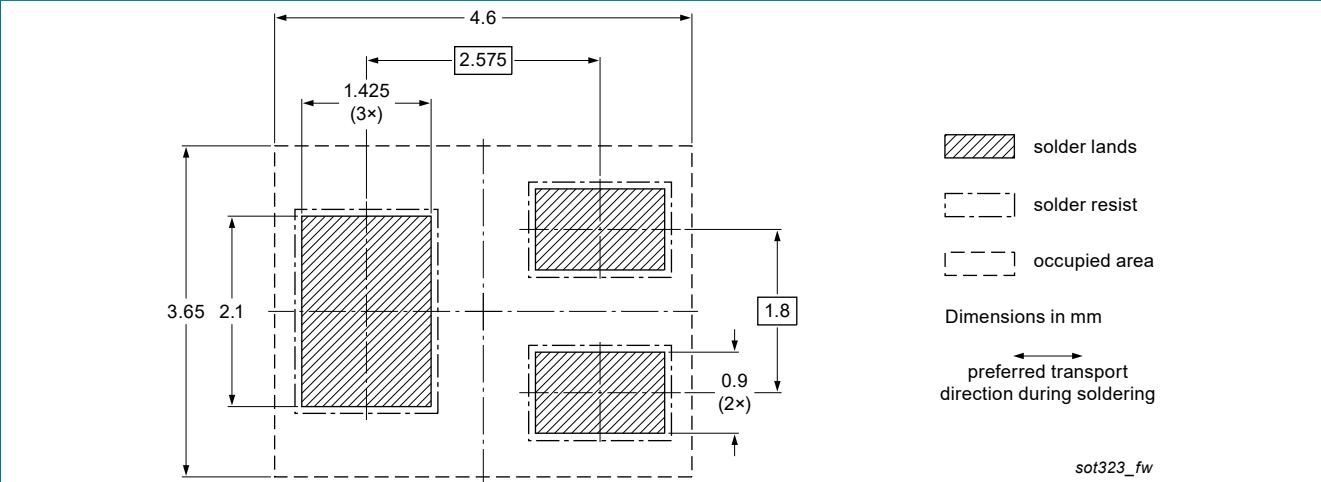
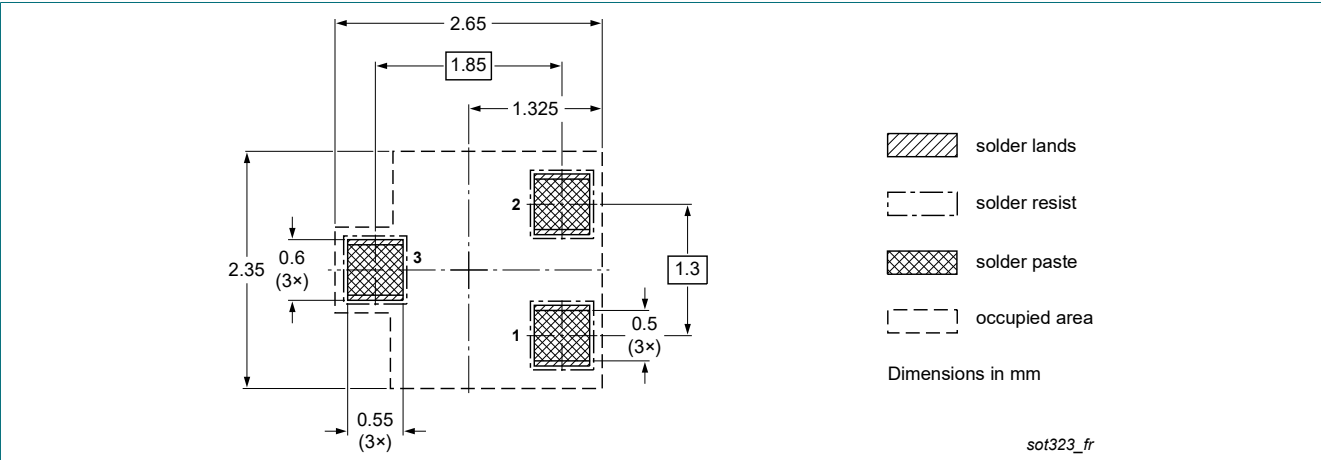
Quality information

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



13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21W-Q v.1	20240422	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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Date of release: 22 April 2024

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