



BAS521-Q

High-voltage switching diode

15 June 2022

Product data sheet

1. General description

High-voltage switching diode, encapsulated in an ultra small SOD523 (SC-79) flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- High reverse voltage: $V_R \leq 300$ V
- Repetitive peak forward current: $I_{FRM} \leq 1$ A
- Ultra small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching
- High-voltage switching

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_F	forward current	$T_{sp} \leq 90$ °C	[1]	-	250	mA
V_{RRM}	repetitive peak reverse voltage	$T_j = 25$ °C	-	-	300	V
V_R	reverse voltage		-	-	300	V
V_F	forward voltage	$I_F = 100$ mA; $t_p = 300$ μ s; $\delta = 0.02$; pulsed; $T_{amb} = 25$ °C	-	0.95	1.1	V
I_R	reverse current	$V_R = 250$ V; $T_{amb} = 25$ °C	-	30	150	nA
t_{rr}	reverse recovery time	$I_F = 30$ mA; $I_R = 30$ mA; $R_L = 100$ Ω ; $I_{R(meas)} = 3$ mA; $T_{amb} = 25$ °C	-	16	50	ns

[1] T_{sp} is the solder point temperature at the soldering point of the cathode tab.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-79 (SOD523)	 K \rightarrow A aaa-028035
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS521-Q	SC-79	plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body	SOD523

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS521-Q	L4

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage	$T_j = 25\text{ °C}$	-	300	V
V_R	reverse voltage		-	300	V
I_F	forward current	$T_{sp} \leq 90\text{ °C}$	[1]	250	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$; square wave; $T_{j(\text{init})} = 25\text{ °C}$	-	4.5	A
I_{FRM}	repetitive peak forward current	$t_p = 1\text{ ms}$; $\delta = 0.25$	-	1	A
P_{tot}	total power dissipation	$T_{sp} \leq 90\text{ °C}$	[1] [2]	500	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-65	150	°C
T_{stg}	storage temperature		-65	150	°C

[1] T_{sp} is the solder point temperature at the soldering point of the cathode tab.

[2] Reflow soldering is the only recommended soldering method.

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] [2]	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	120	K/W

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

[2] Reflow soldering is the only recommended soldering method.

[3] Soldering point of cathode tab.

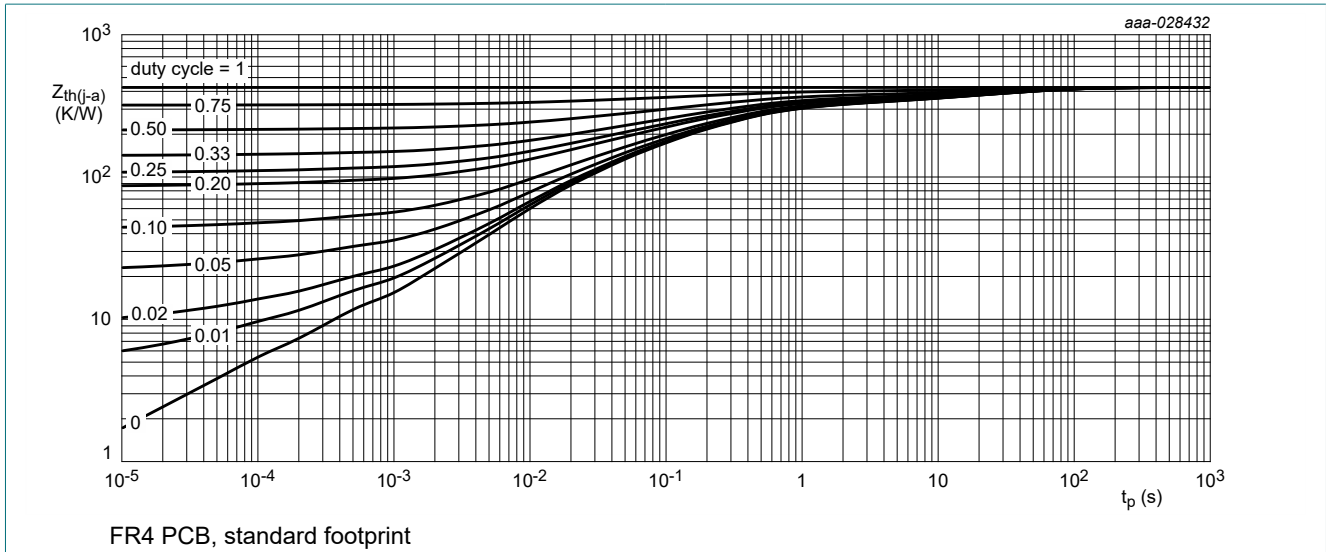


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

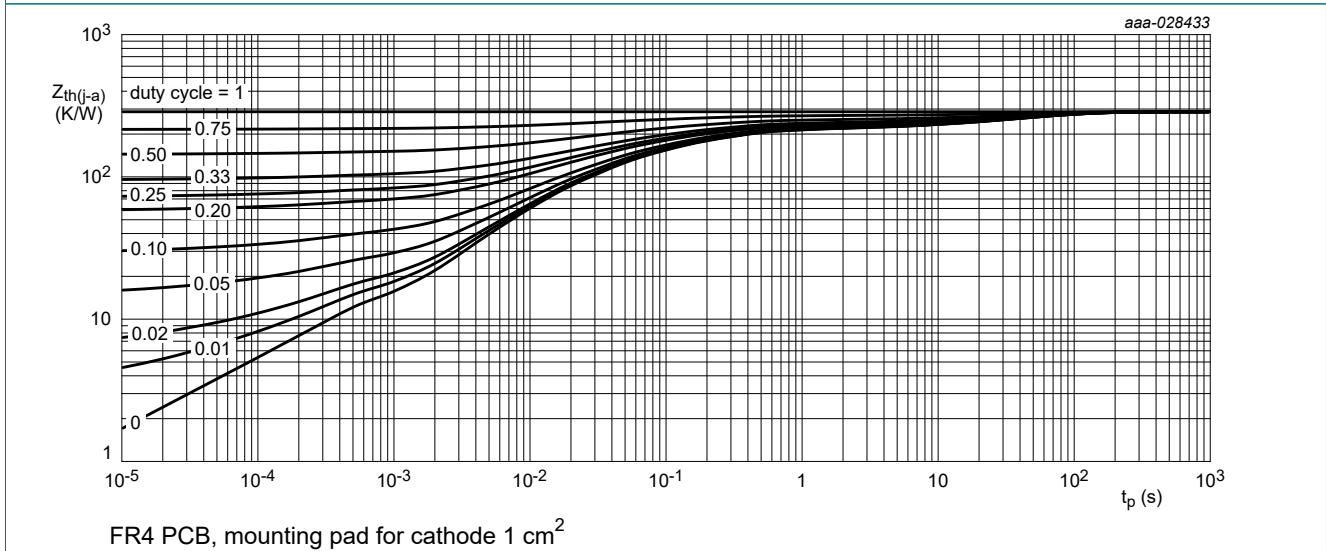
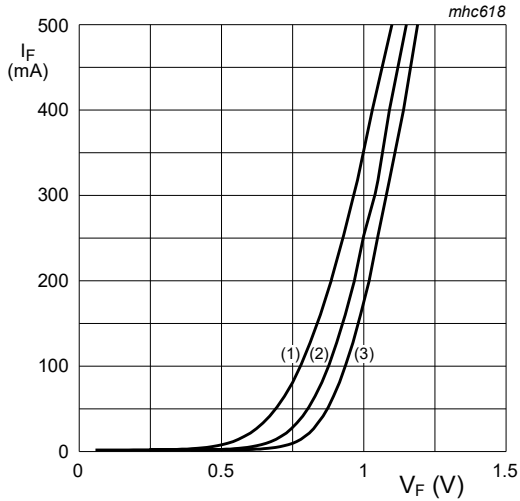


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

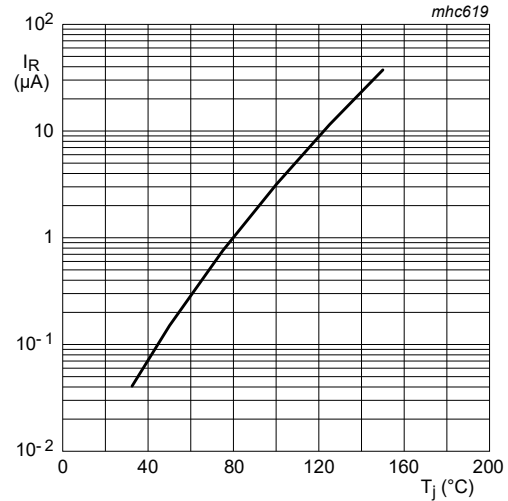
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 100 \mu A$; $T_{amb} = 25 \text{ }^\circ C$	300	340	-	V
V_F	forward voltage	$I_F = 100 \text{ mA}$; $t_p = 300 \mu s$; $\delta = 0.02$; pulsed; $T_{amb} = 25 \text{ }^\circ C$	-	0.95	1.1	V
I_R	reverse current	$V_R = 250 \text{ V}$; $T_{amb} = 25 \text{ }^\circ C$	-	30	150	nA
		$V_R = 250 \text{ V}$; $T_{amb} = 150 \text{ }^\circ C$	-	40	100	μA
C_d	diode capacitance	$V_R = 0 \text{ V}$; $f = 1 \text{ MHz}$; $T_{amb} = 25 \text{ }^\circ C$	-	0.4	5	pF
t_{rr}	reverse recovery time	$I_F = 30 \text{ mA}$; $I_R = 30 \text{ mA}$; $R_L = 100 \Omega$; $I_{R(meas)} = 3 \text{ mA}$; $T_{amb} = 25 \text{ }^\circ C$	-	16	50	ns



- (1) $T_{amb} = 150^\circ\text{C}$
- (2) $T_{amb} = 75^\circ\text{C}$
- (3) $T_{amb} = 25^\circ\text{C}$

Fig. 3. Forward current as a function of forward voltage; typical values



$V_R = V_{Rmax}$

Fig. 4. Reverse current as a function of junction temperature; typical values

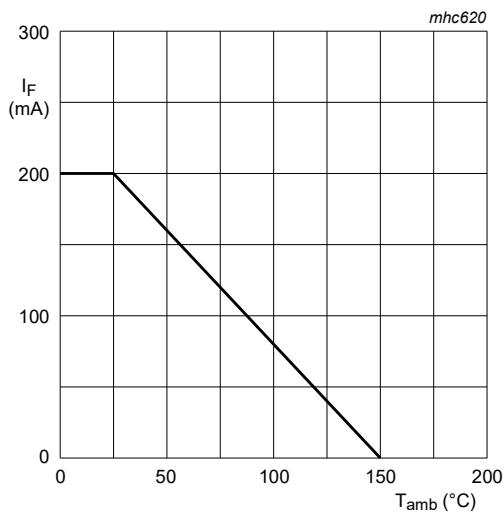
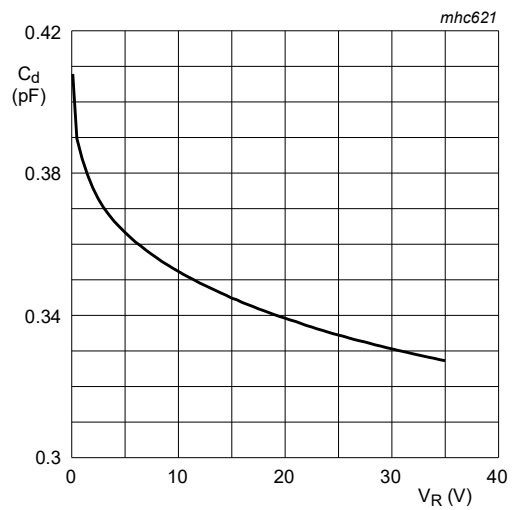
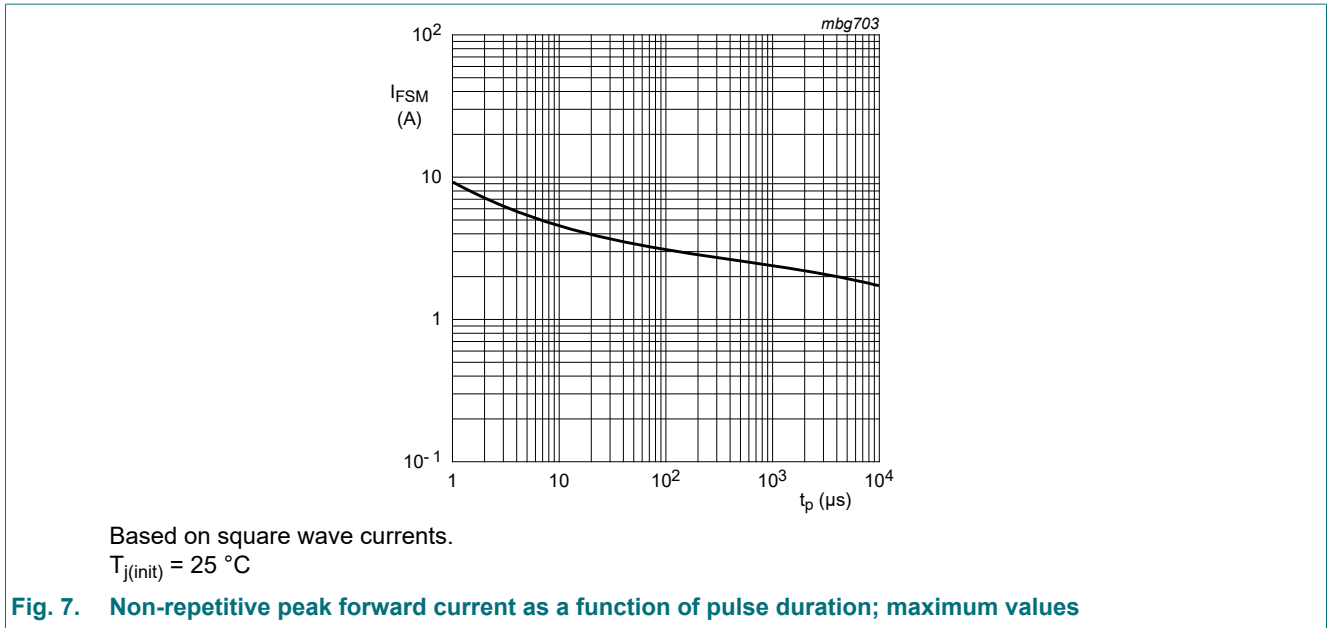


Fig. 5. Forward current as a function of ambient temperature; derating curve

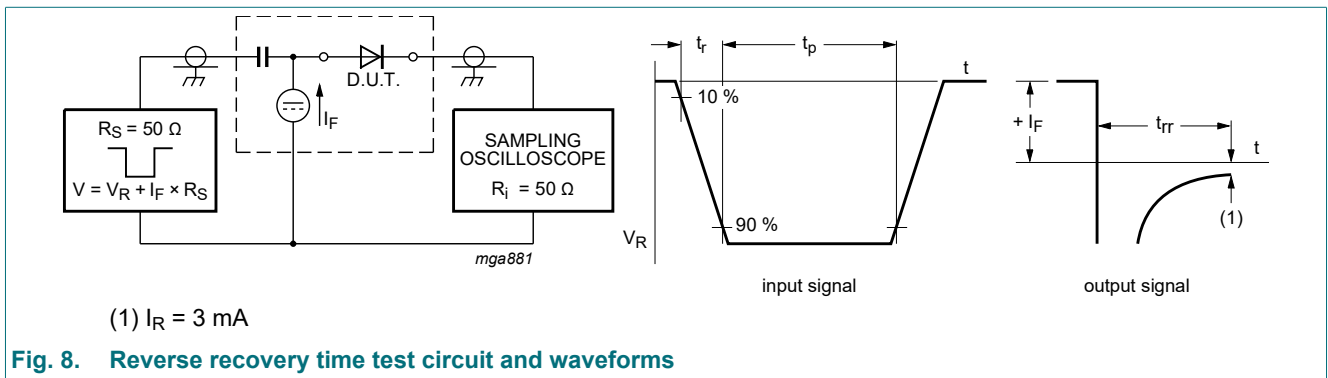


$f = 1\text{ MHz}$
 $T_{amb} = 25^\circ\text{C}$

Fig. 6. 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

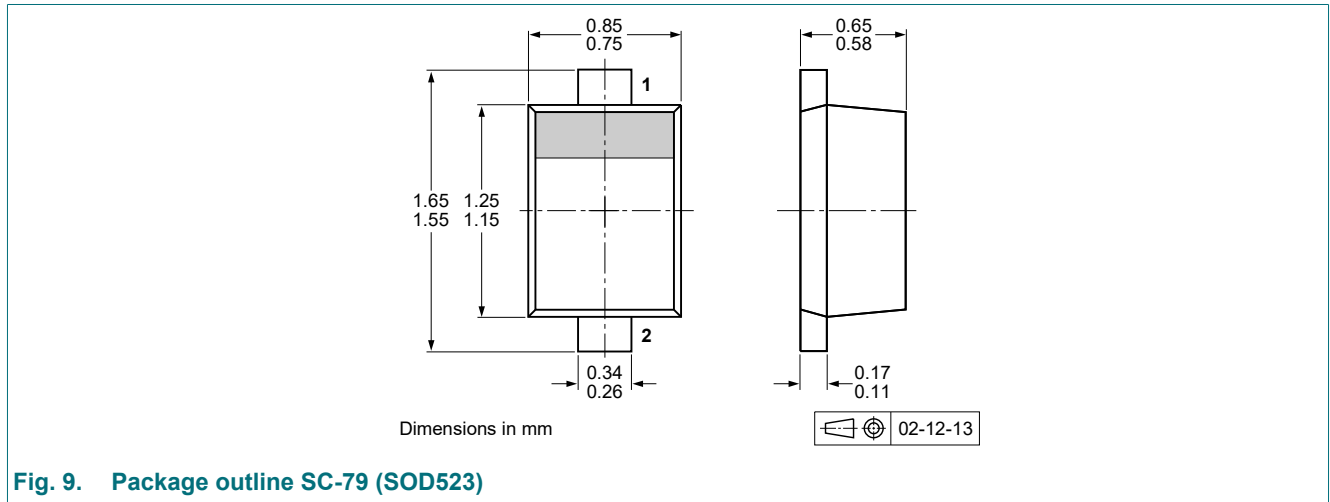


Fig. 9. Package outline SC-79 (SOD523)

13. Soldering

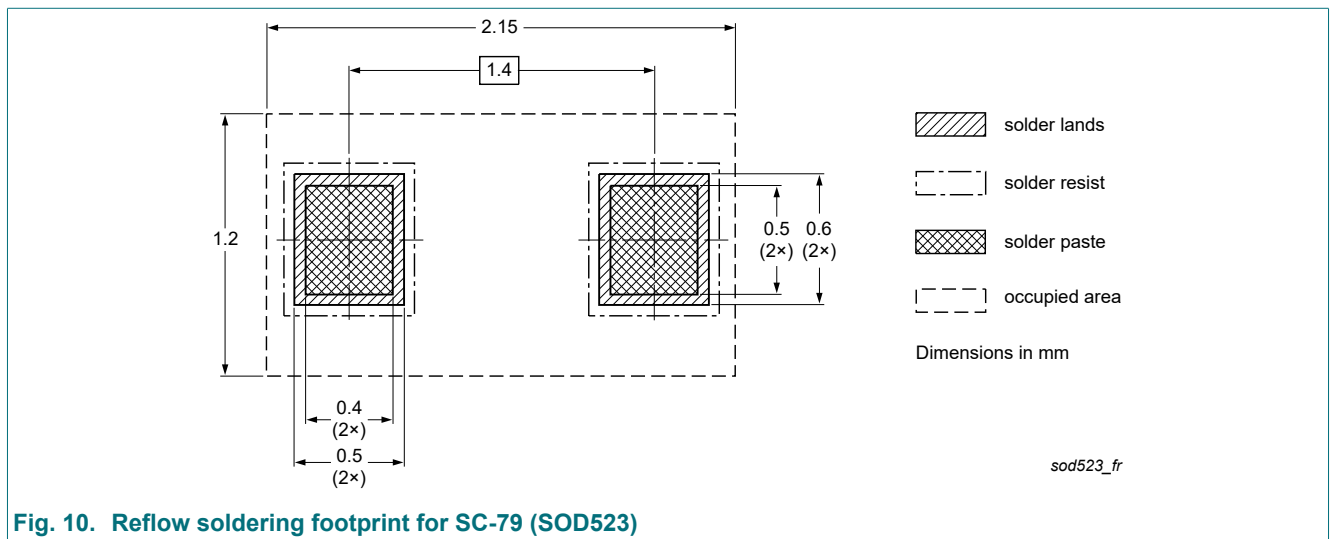


Fig. 10. Reflow soldering footprint for SC-79 (SOD523)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS521-Q v.1	20220615	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.
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Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	1
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	2
9. Thermal characteristics.....	2
10. Characteristics.....	3
11. Test information.....	5
12. Package outline.....	6
13. Soldering.....	6
14. Revision history.....	7
15. Legal information.....	8

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