



BAS521

High-voltage switching diode

1 July 2023

Product data sheet

1. General description

High-voltage switching diode, fabricated in planar technology, and encapsulated in a SOD523 (SC-79) ultra small 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

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)	 aaa-028035
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS521	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	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	$T_j = 25\text{ }^{\circ}\text{C}$		-	300	V
V_R	reverse voltage			-	300	V
I_F	forward current	$T_{sp} \leq 90\text{ }^{\circ}\text{C}$	[1]	-	250	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$; square wave	[2]	-	4.5	A
I_{FRM}	repetitive peak forward current	$t_p = 1\text{ ms}$; $\delta = 0.25$		-	1	A
P_{tot}	total power dissipation	$T_{sp} \leq 90\text{ }^{\circ}\text{C}$	[1] [3]	-	500	mW
T_j	junction temperature			-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-65	150	$^{\circ}\text{C}$
T_{stg}	storage temperature			-65	150	$^{\circ}\text{C}$

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

[2] $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge.

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

9. Thermal characteristics

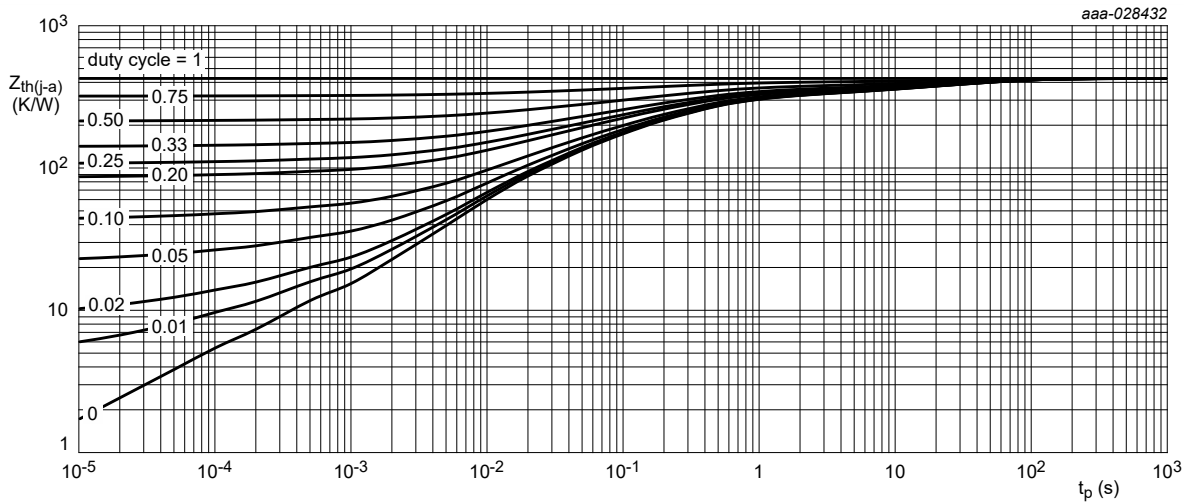
Table 6. Thermal characteristics

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.

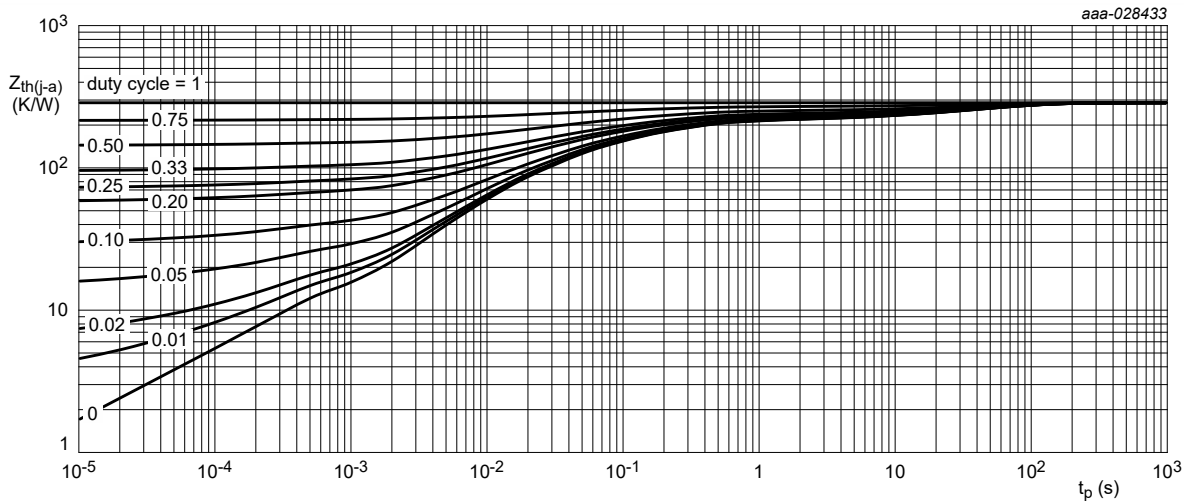
[2] Reflow soldering is the only recommended soldering method.

[3] Soldering point of cathode tab.



FR4 PCB, standard footprint

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



FR4 PCB, mounting pad for cathode 1 cm²

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

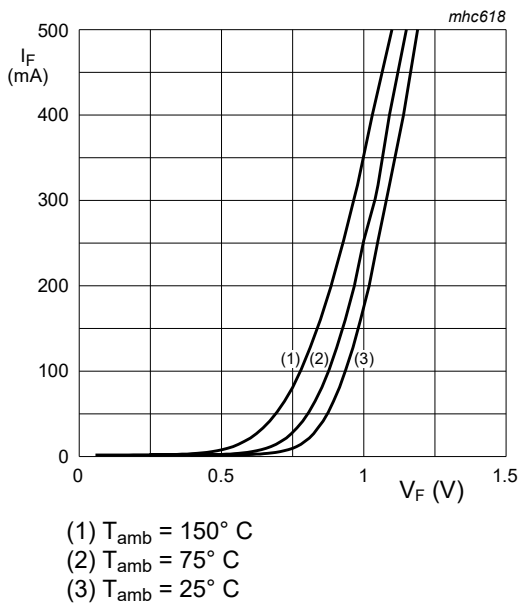


Fig. 3. Forward current as a function of forward voltage; typical values

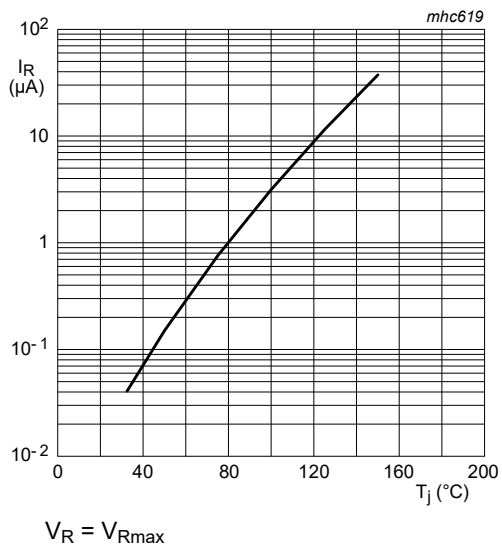


Fig. 4. Reverse current as a function of junction temperature; typical values

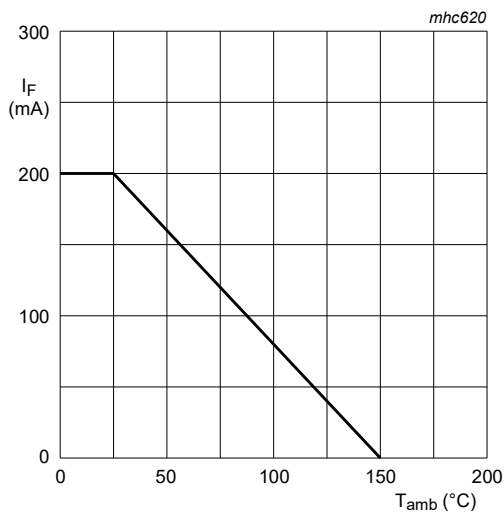


Fig. 5. Forward current as a function of ambient temperature; derating curve

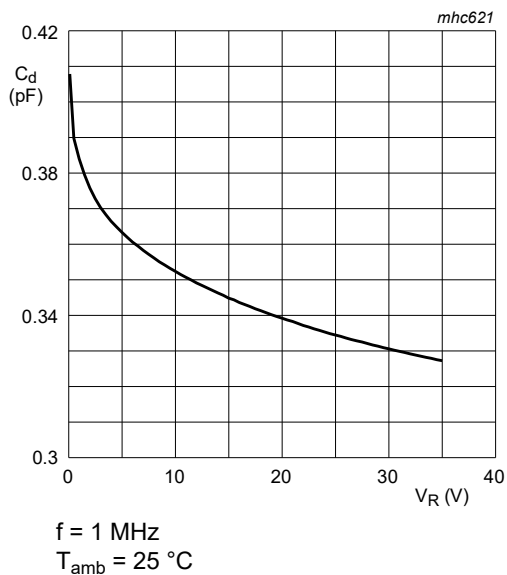
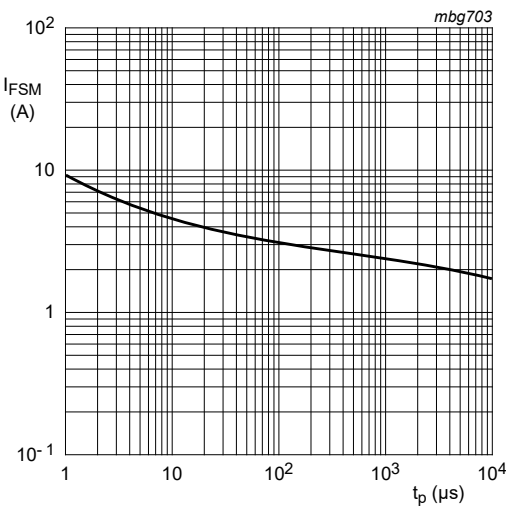


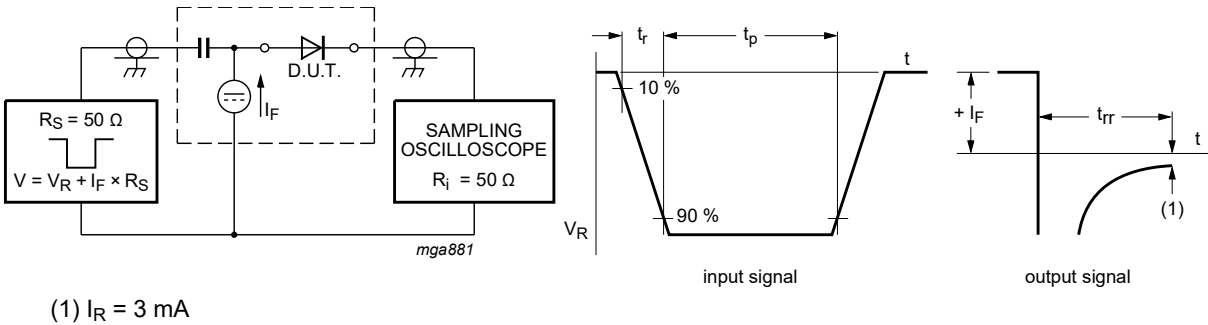
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
 $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge.

Fig. 7. Non-repetitive peak forward current as a function of pulse duration; maximum values

11. Test information



(1) $I_R = 3\text{ mA}$

Fig. 8. Reverse recovery time test circuit and waveforms

12. Package outline

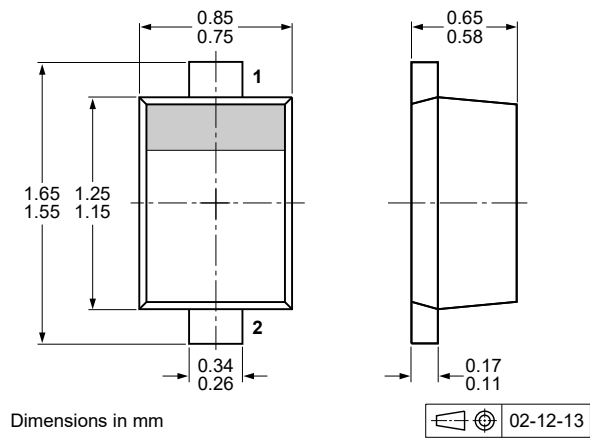


Fig. 9. Package outline SC-79 (SOD523)

13. Soldering

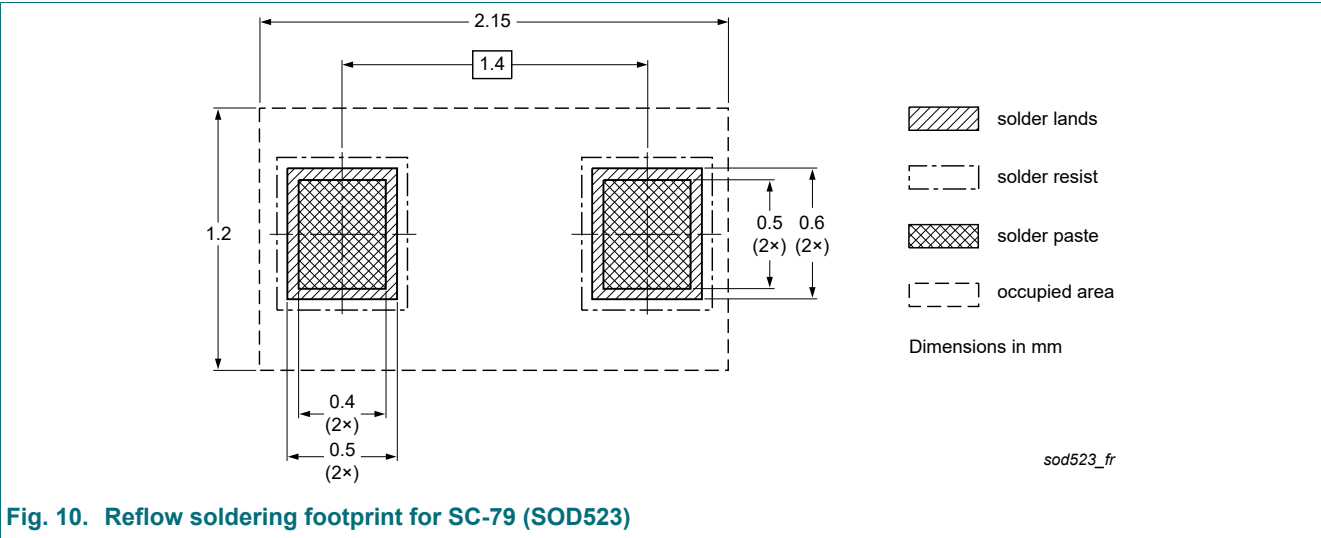


Fig. 10. Reflow soldering footprint for SC-79 (SOD523)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS521 v.4	20230701	Product data sheet	-	BAS521 v.2
Modifications:	Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
BAS521 v.3	20180629	Product data sheet	-	BAS521 v.2
BAS521 v.2	20101105	Product data sheet	-	BAS521_1
BAS521_1	20030812	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.

- [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".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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