



# 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; $t_p = 300$ $\mu$ 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; $R_L = 100$ $\Omega$ ; $I_{R(meas)} = 3$ 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
<a href="#">BAS521</a>	SC-79	plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body	<a href="#">SOD523</a>

## 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	$T_j = 25\text{ °C}$		-	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	[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	$T_{sp} \leq 90\text{ °C}$	[1] [3]	-	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]  $T_j = 25\text{ °C}$  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.

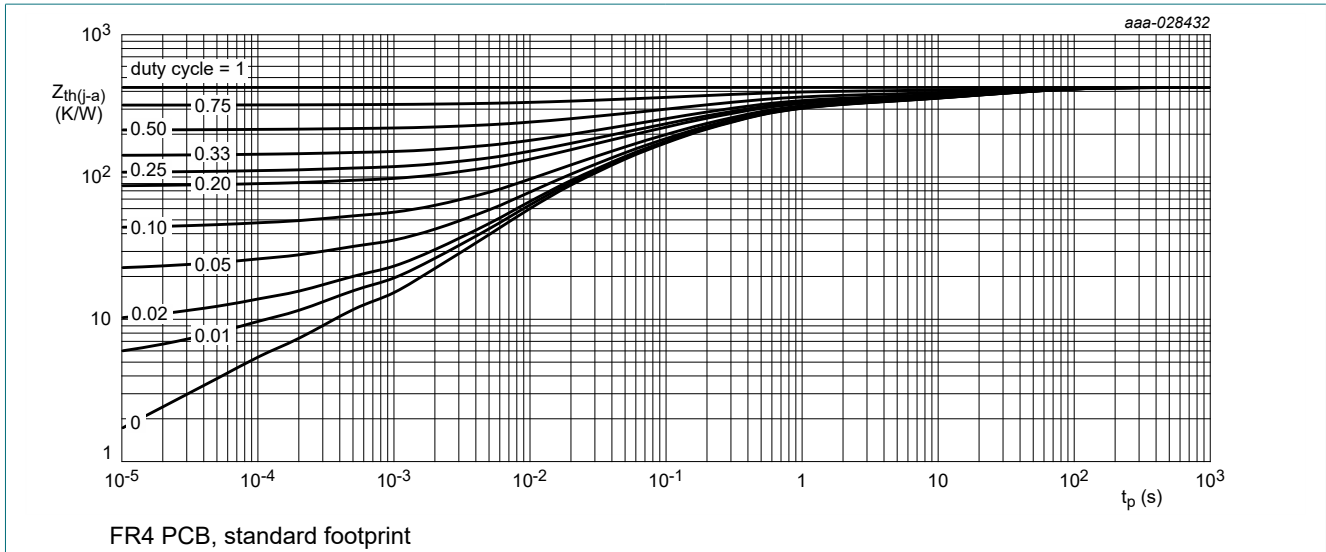


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

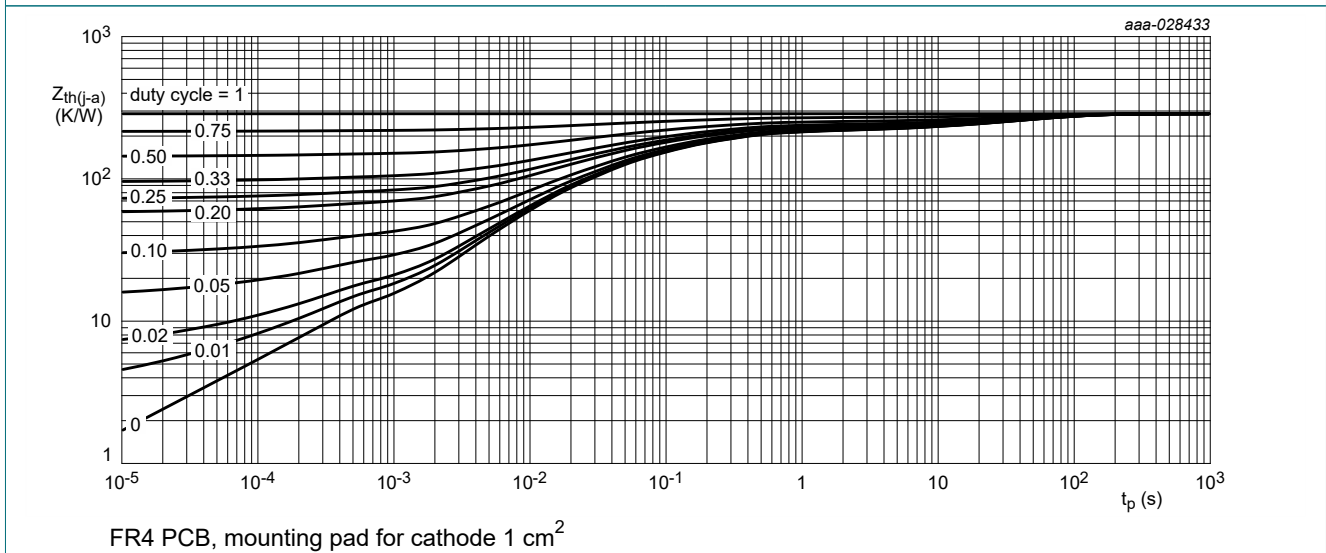
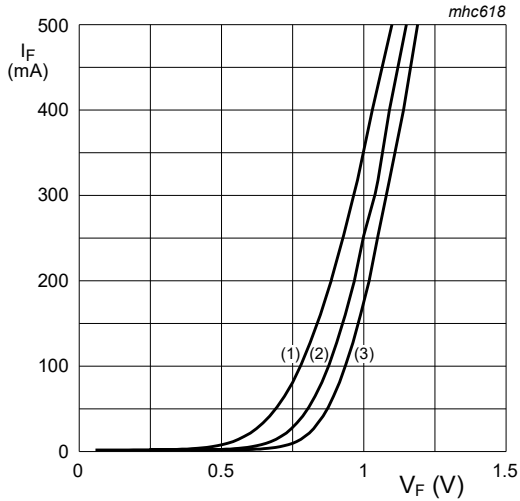


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

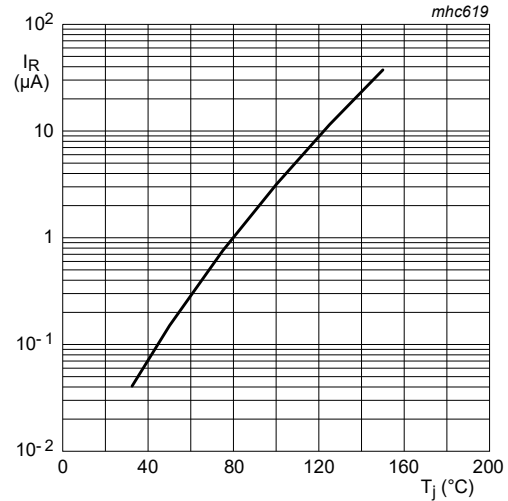
Table 7. Characteristics

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	$\mu A$
$C_d$	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



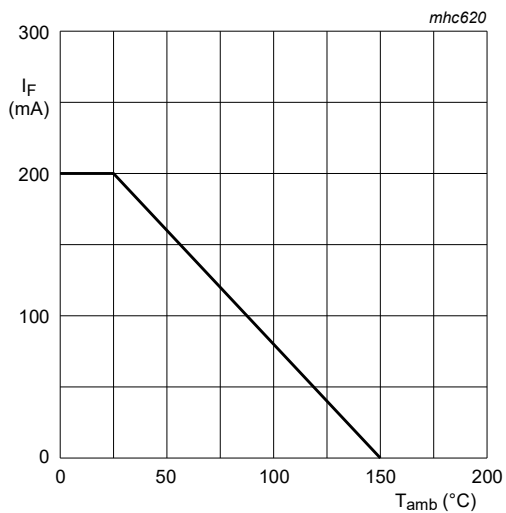
- (1)  $T_{amb} = 150^\circ\text{C}$
- (2)  $T_{amb} = 75^\circ\text{C}$
- (3)  $T_{amb} = 25^\circ\text{C}$

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

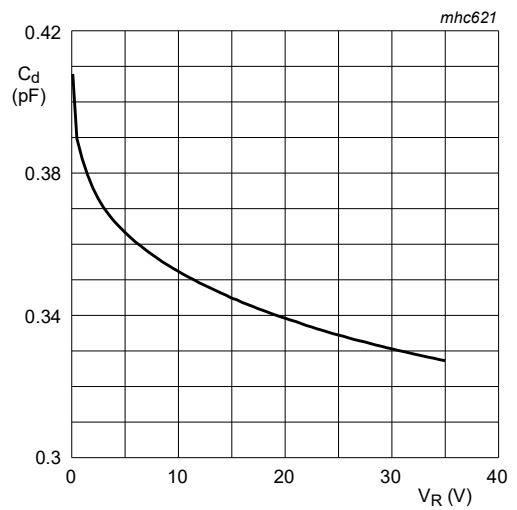


$V_R = V_{Rmax}$

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

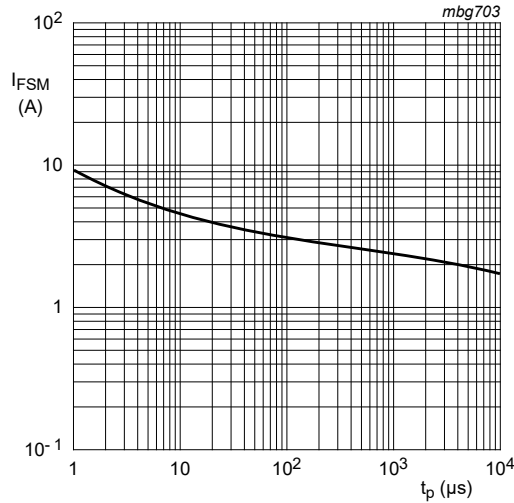


**Fig. 5. Forward current as a function of ambient temperature; derating curve**



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

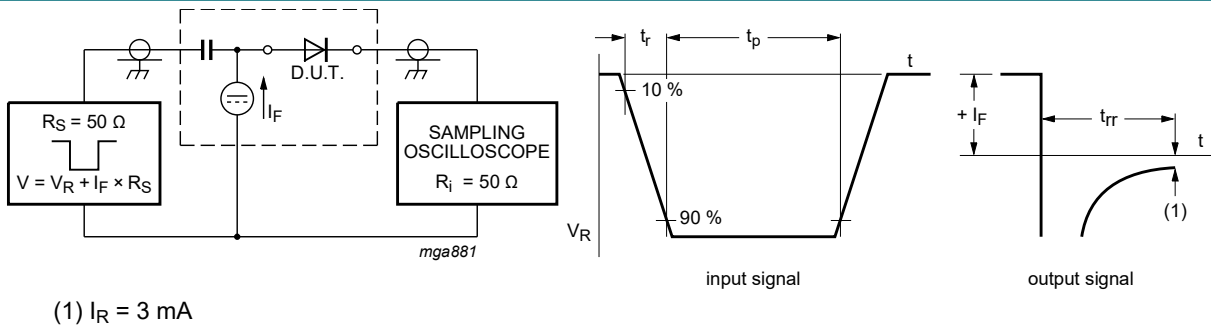
**Fig. 6. Diode capacitance as a function of reverse voltage; typical values**



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

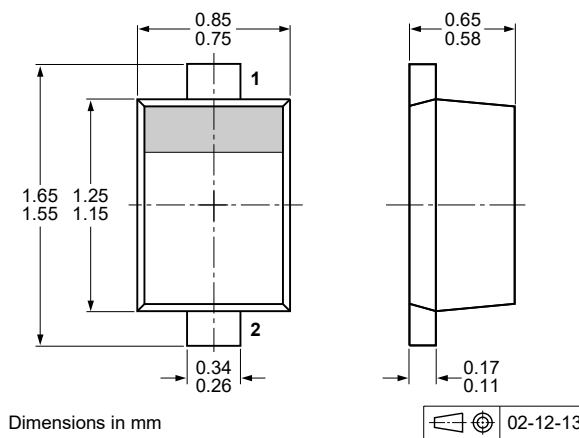


Fig. 9. Package outline SC-79 (SOD523)

### 13. Soldering

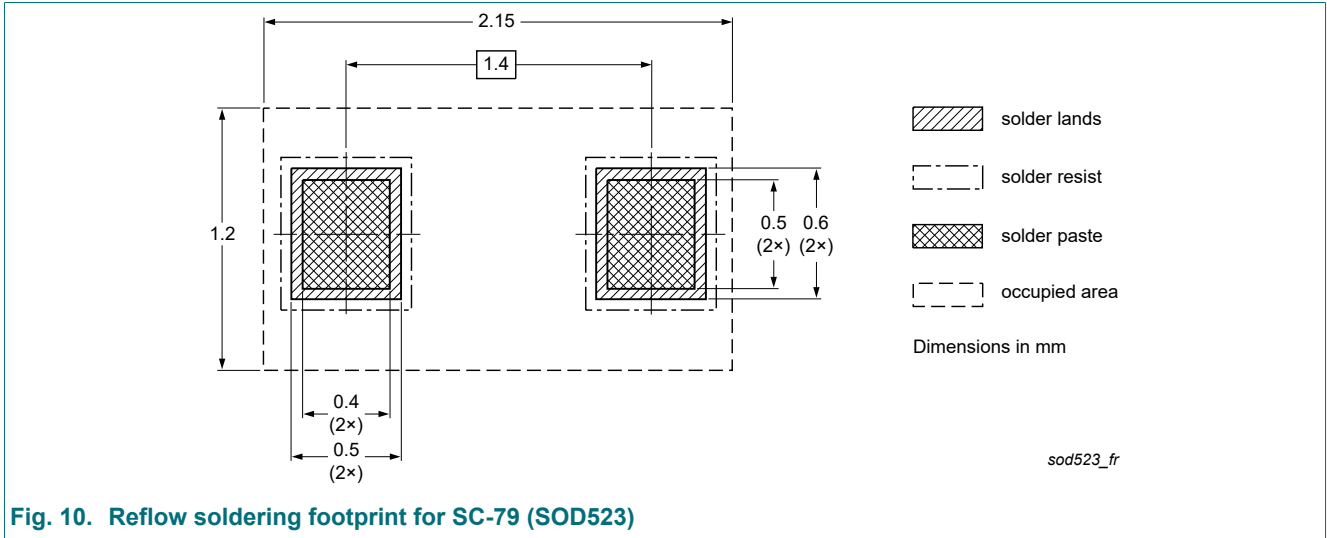


Fig. 10. Reflow soldering footprint for SC-79 (SOD523)

## 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:	<ul style="list-style-type: none"><li>Product changed to non-automotive qualification. Please refer to <a href="http://nexperia.com">nexperia.com</a> for automotive (-Q) product alternative(s).</li></ul>			
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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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