



# BAS521

## Single high-voltage switching diode

29 June 2018

Product data sheet

### 1. General description

Single 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
- AEC-Q101 qualified

### 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		-	0.95	1.1	V
$I_R$	reverse current	$V_R = 250$ V		-	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		-	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	 <p style="text-align: center;">SOD523</p>	 <p style="text-align: center;">aaa-028035</p>
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS521	SOD523	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	$T_j = 25\text{ °C}$		-	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

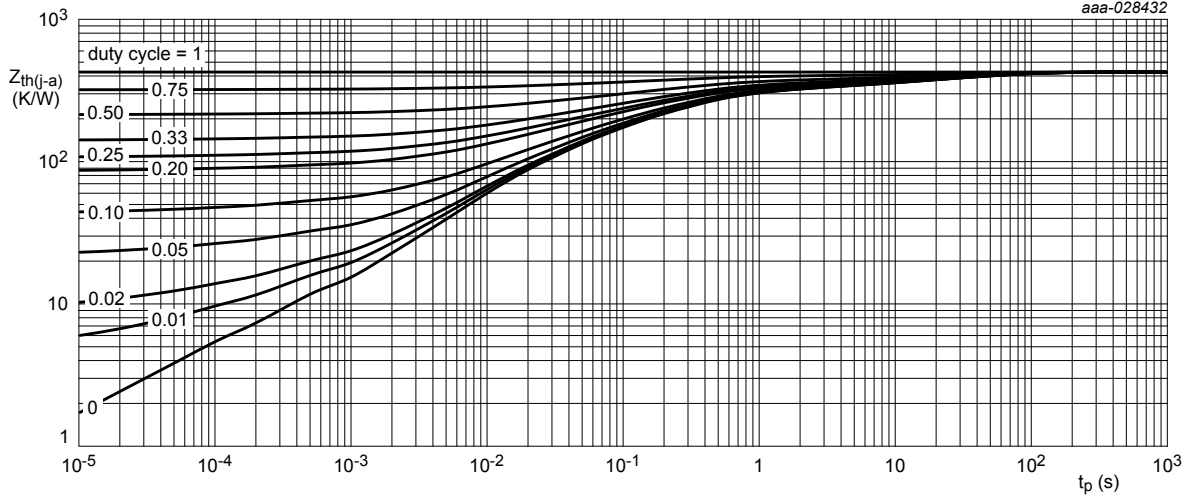
**Table 6. Thermal characteristics**

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.

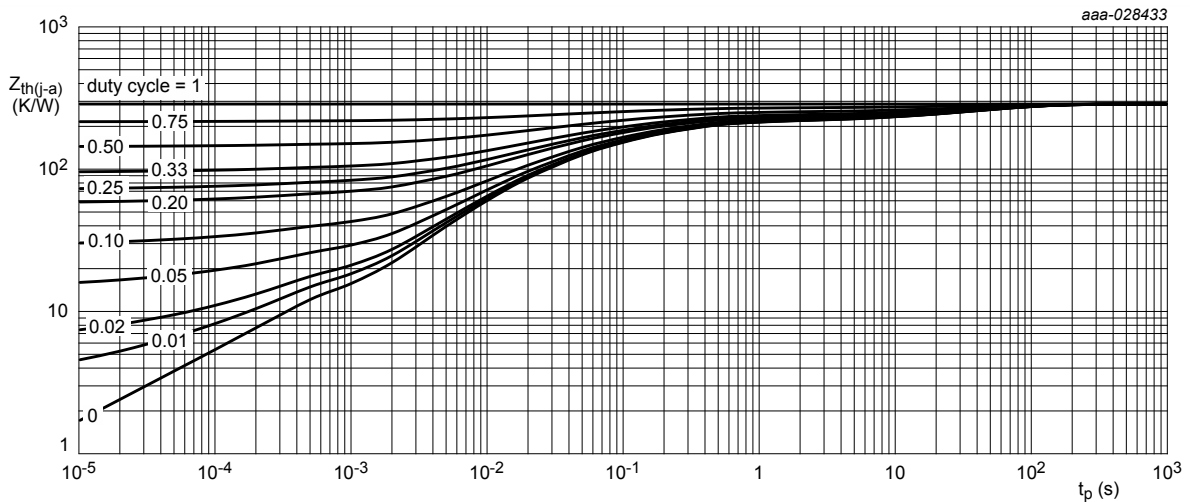
[2] Reflow soldering is the only recommended soldering method.

[3] Soldering point of cathode tab.



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 cm<sup>2</sup>

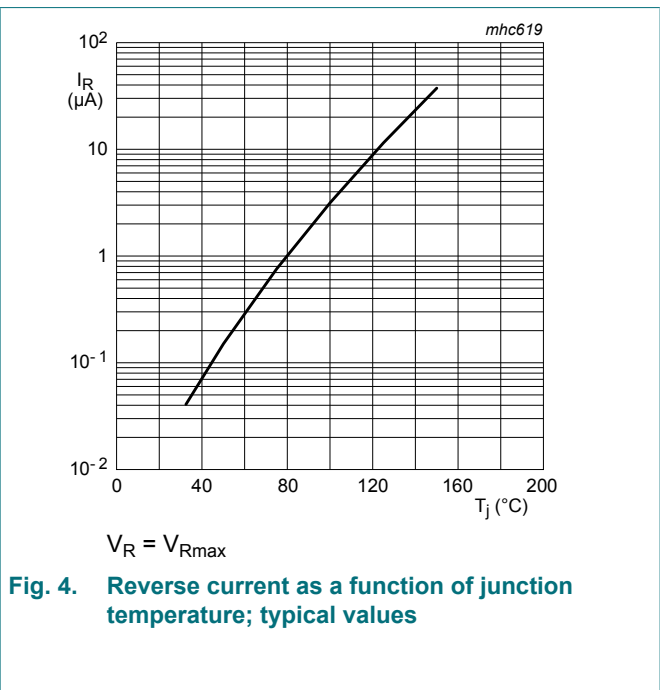
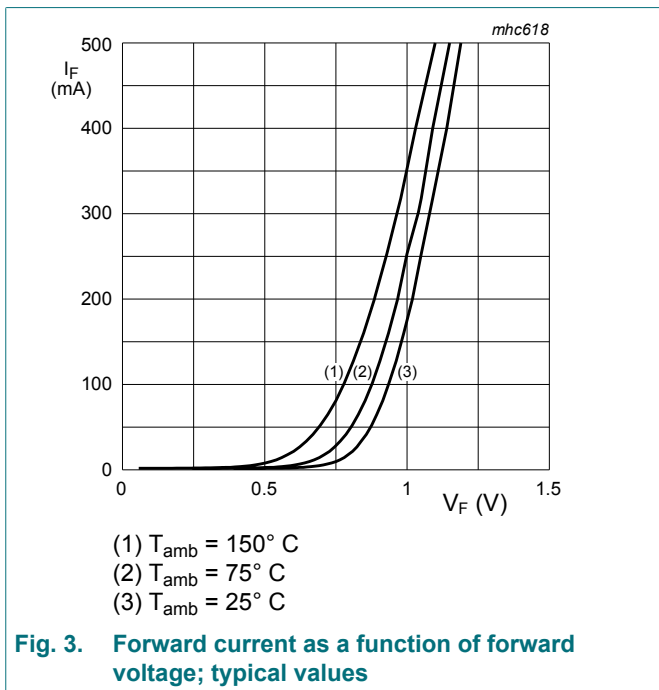
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

**Table 7. Characteristics**

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

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



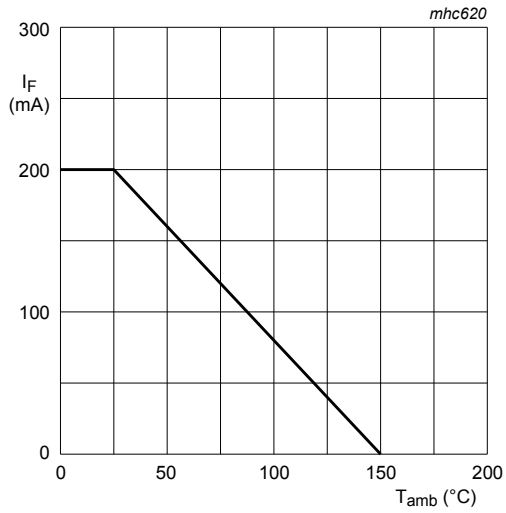


Fig. 5. Forward current as a function of ambient temperature; derating curve

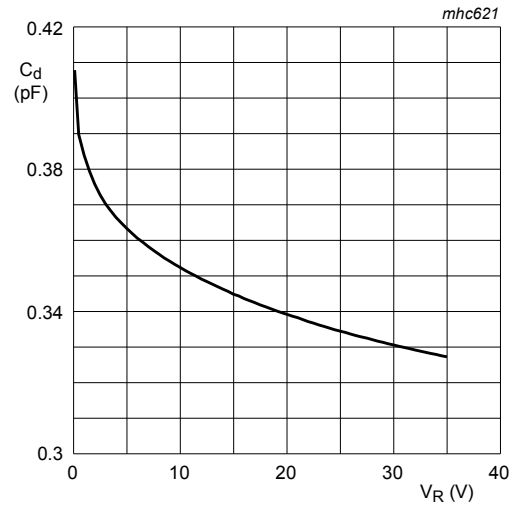
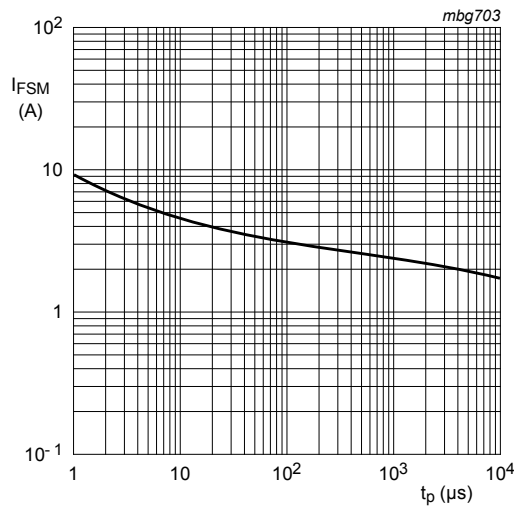


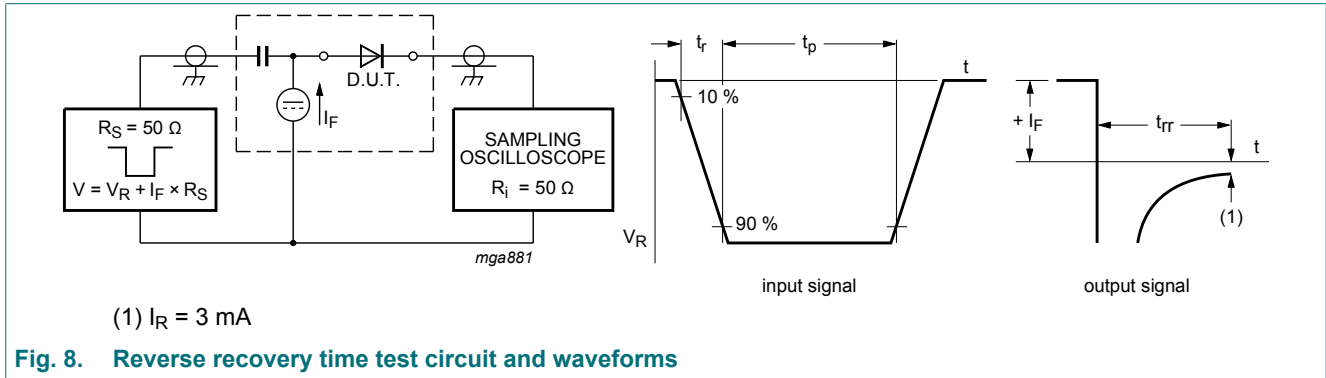
Fig. 6. Diode capacitance as a function of reverse voltage; typical values  
 $f = 1 \text{ MHz}$   
 $T_{amb} = 25 \text{ °C}$



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

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

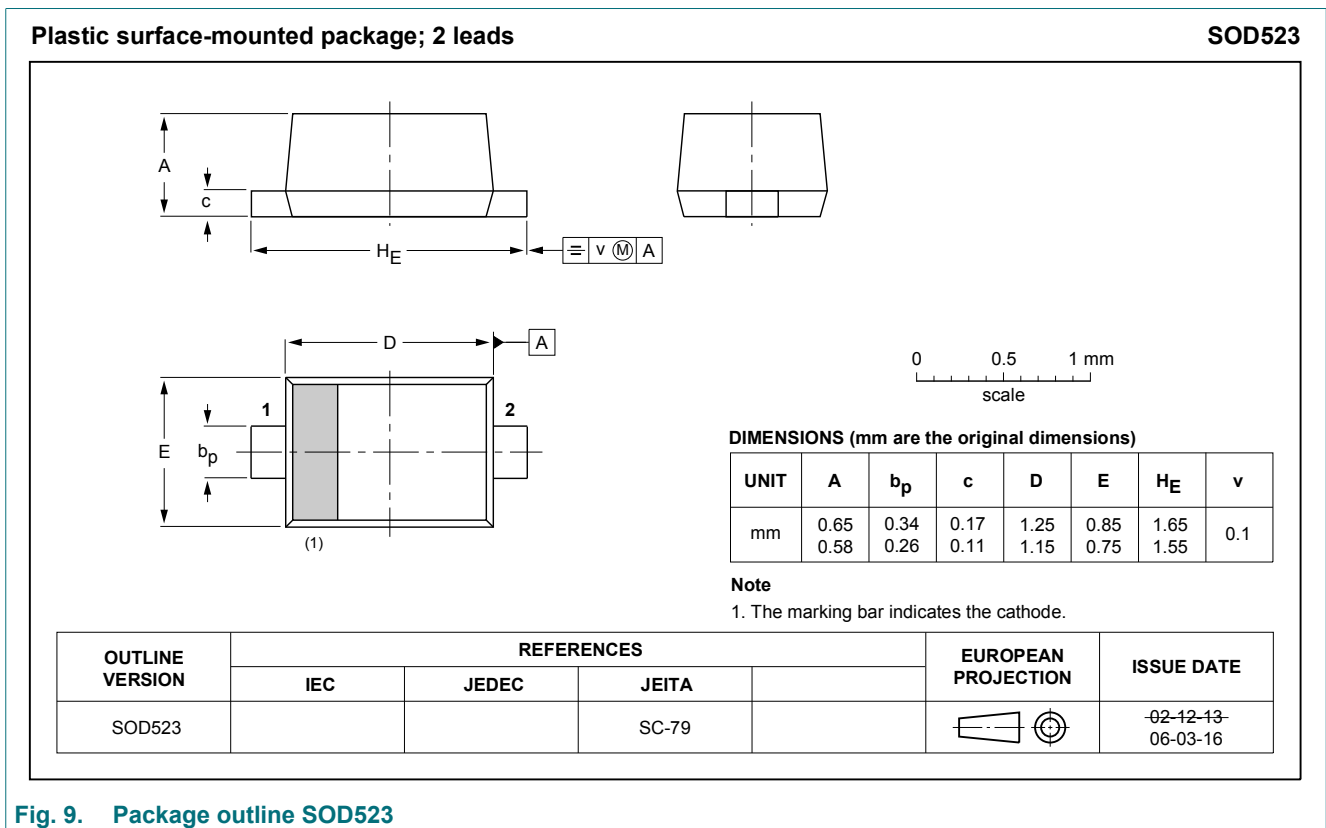
### 11. Test information



#### 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



### 13. Soldering

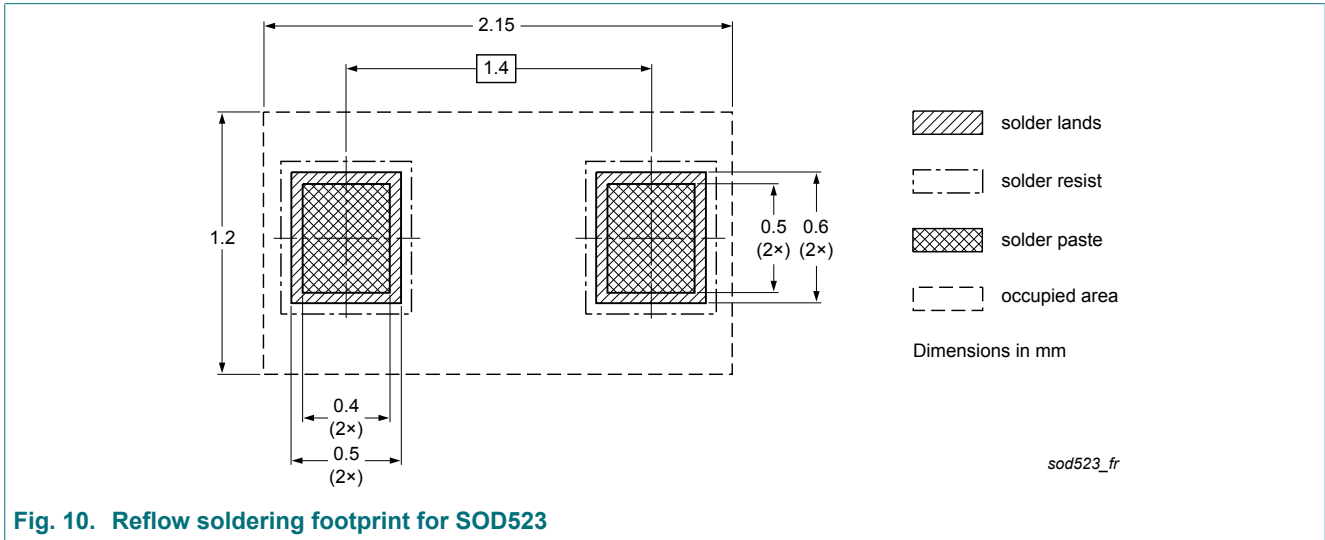


Fig. 10. Reflow soldering footprint for SOD523



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS521 v.3	20180629	Product data sheet	-	BAS521 v.2
Modifications:	<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Packing section removed.</li></ul>			
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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