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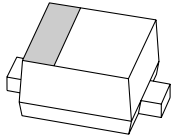
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Kind regards,

Team Nexperia



# BAS521

## Single high-voltage switching diode

Rev. 2 — 5 November 2010

Product data sheet

## 1. Product profile

### 1.1 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.

### 1.2 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

### 1.3 Applications

- High-speed switching
- High-voltage switching

### 1.4 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
$V_R$	reverse voltage		-	-	300	V
$t_{rr}$	reverse recovery time		[2] -	16	50	ns

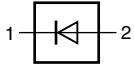

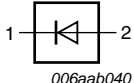
[1]  $T_{sp}$  is the solder point temperature at the soldering point of the cathode tab.

[2] When switched from  $I_F = 30$  mA to  $I_R = 30$  mA;  $R_L = 100$   $\Omega$ ; measured at  $I_R = 3$  mA.



## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode	[1]	
2	anode		

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS521	SC-79	plastic surface-mounted package; 2 leads	SOD523

## 4. Marking

Table 4. Marking codes

Type number	Marking code
BAS521	L4

## 5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	reverse voltage		-	300	V
$V_{RRM}$	repetitive peak reverse voltage		-	300	V
$I_F$	forward current	$T_{sp} \leq 90 \text{ }^\circ\text{C}$	[1]	250	mA
$I_{FRM}$	repetitive peak forward current	$t_p = 1 \text{ ms};$ $\delta = 0.25$	-	1	A
$I_{FSM}$	non-repetitive peak forward current	square wave; $t_p = 1 \text{ } \mu\text{s}$	[2]	4.5	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.

## 6. 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.

## 7. Characteristics

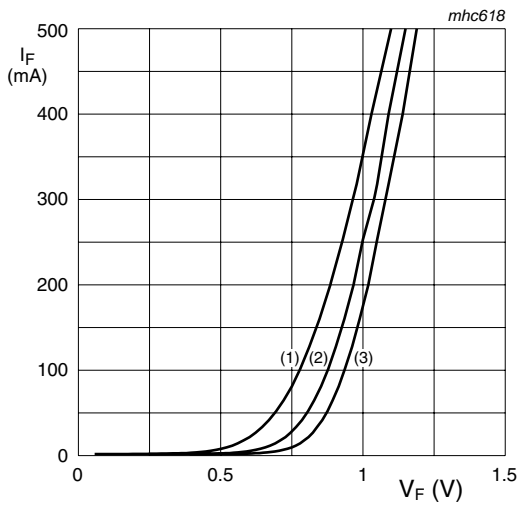
**Table 7. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{BR}$	breakdown voltage	$I_R = 100\ \mu\text{A}$	300	340	-	V
$V_F$	forward voltage	$I_F = 100\ \text{mA}$	[1]	0.95	1.1	V
$I_R$	reverse current	$V_R = 250\ \text{V}$	-	30	150	nA
		$V_R = 250\ \text{V};$ $T_{amb} = 150\ \text{°C}$	-	40	100	$\mu\text{A}$
$C_d$	diode capacitance	$f = 1\ \text{MHz}; V_R = 0\ \text{V}$	-	0.4	5	pF
$t_{rr}$	reverse recovery time		[2]	16	50	ns

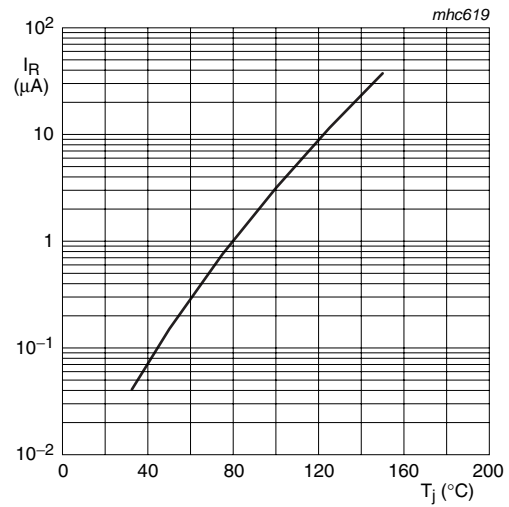
[1] Pulse test:  $t_p = 300\ \mu\text{s}; \delta = 0.02$ .

[2] When switched from  $I_F = 30\ \text{mA}$  to  $I_R = 30\ \text{mA}; R_L = 100\ \Omega$ ; measured at  $I_R = 3\ \text{mA}$ .



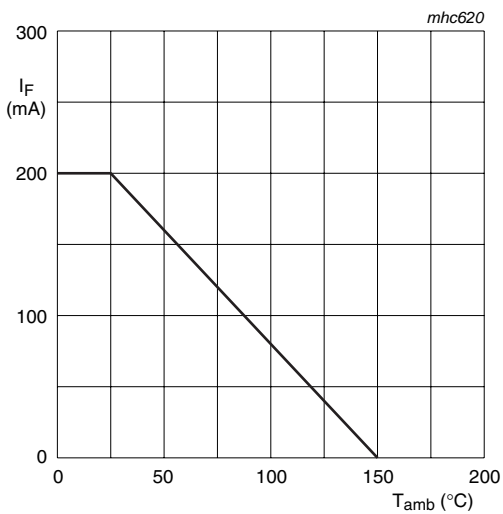
- (1)  $T_{amb} = 150\text{ }^\circ\text{C}$
- (2)  $T_{amb} = 75\text{ }^\circ\text{C}$
- (3)  $T_{amb} = 25\text{ }^\circ\text{C}$

**Fig 1. Forward current as a function of forward voltage; typical values**

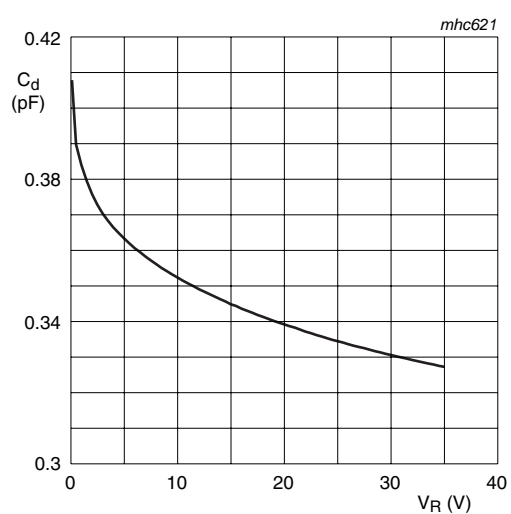


$V_R = V_{Rmax}$

**Fig 2. Reverse current as a function of junction temperature; typical values**

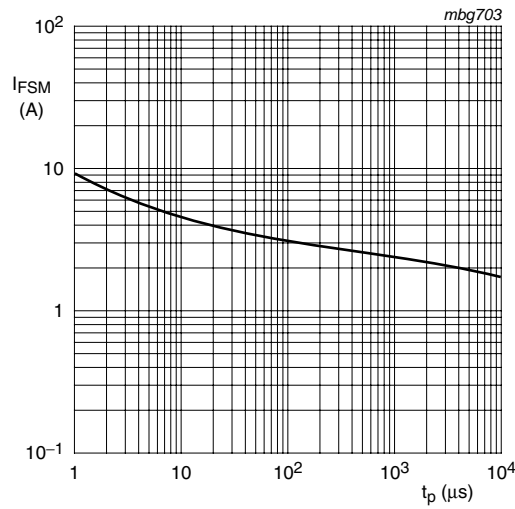


**Fig 3. Forward current as a function of ambient temperature; derating curve**



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

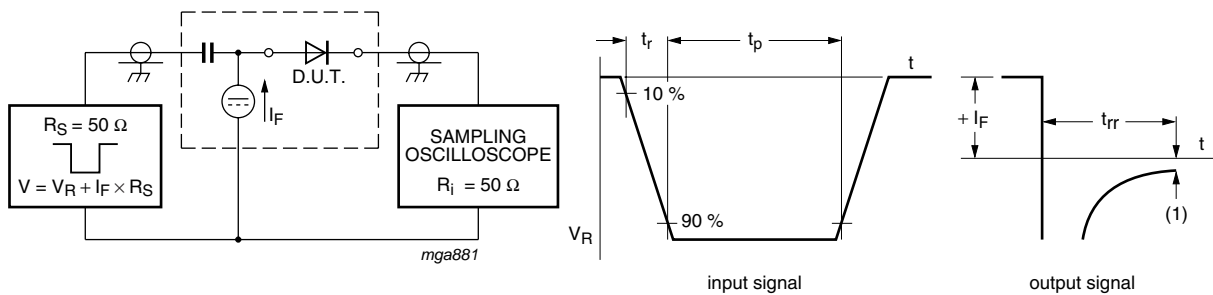
**Fig 4. Diode capacitance as a function of reverse voltage; typical values**



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

**Fig 5. Non-repetitive peak forward current as a function of pulse duration; maximum values**

## 8. Test information



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

**Fig 6. Reverse recovery time test circuit and waveforms**

### 8.1 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.

## 9. Package outline

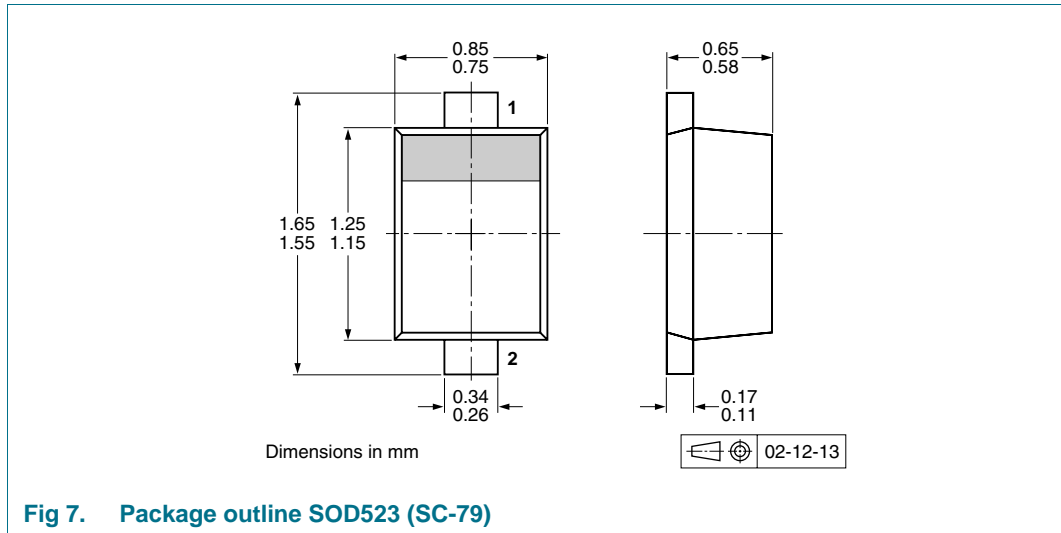


Fig 7. Package outline SOD523 (SC-79)

## 10. Packing information

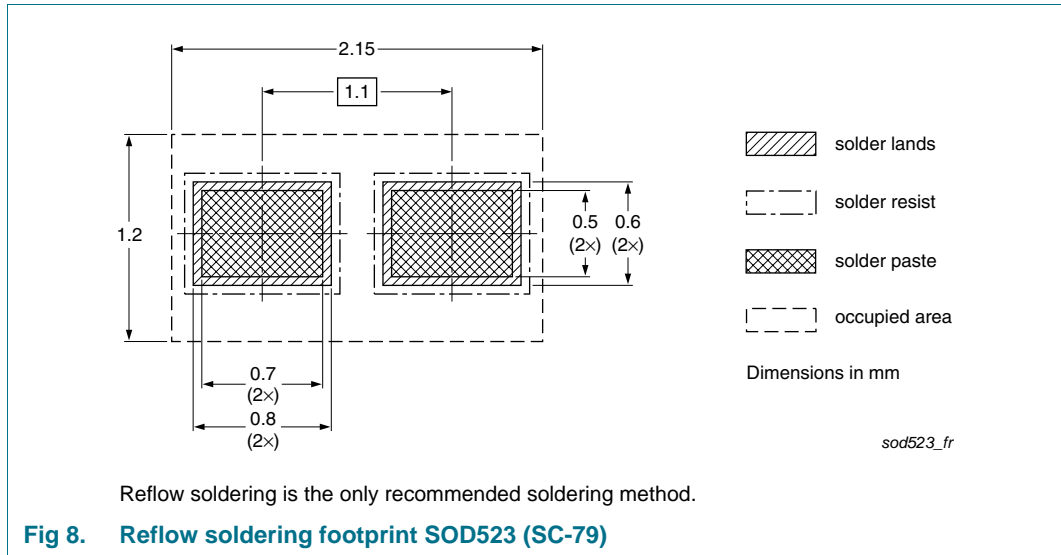
**Table 8. Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

Type number	Package	Description	Packing quantity		
			3000	8000	10000
BAS521	SOD523	2 mm pitch, 8 mm tape and reel	-	-315	-
		4 mm pitch, 8 mm tape and reel	-115	-	-
			-	-	-135

[1] For further information and the availability of packing methods, see [Section 14](#).

**11. Soldering**





## 12. Revision history

**Table 9.** Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS521 v.2	20101105	Product data sheet	-	BAS521_1
Modifications:		<ul style="list-style-type: none"><li>• <a href="#">Section 1.2 “Features and benefits”</a>: amended</li><li>• <a href="#">Section 8 “Test information”</a>: added</li><li>• <a href="#">Figure 7</a>: superseded by minimized package outline drawing</li><li>• <a href="#">Section 10 “Packing information”</a>: added</li><li>• <a href="#">Section 11 “Soldering”</a>: added</li><li>• <a href="#">Section 13 “Legal information”</a>: updated</li></ul>		
BAS521_1	20030812	Product data sheet	-	-

## 13. Legal information

### 13.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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".

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