

# BAS101; BAS101S

## High-voltage switching diodes

Rev. 02 — 14 December 2009

Product data sheet

## 1. Product profile

### 1.1 General description

High-voltage switching diodes, encapsulated in a SOT23 small Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEITA	
BAS101	SOT23	-	single
BAS101S	SOT23	-	dual series

### 1.2 Features

- High switching speed:  $t_{rr} \leq 50$  ns
- Low leakage current
- Repetitive peak reverse voltage:  $V_{RRM} \leq 300$  V
- Low capacitance:  $C_d \leq 2$  pF
- Reverse voltage:  $V_R \leq 300$  V
- Small SMD plastic package

### 1.3 Applications

- High-speed switching
- High-voltage switching
- Voltage clamping
- Reverse polarity protection

### 1.4 Quick reference data

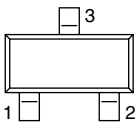
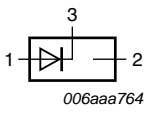
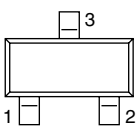
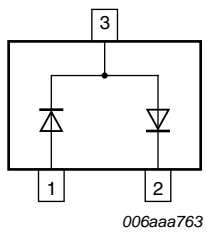
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$I_F$	forward current		-	-	200	mA
$I_R$	reverse current	$V_R = 250$ V	-	-	150	nA
$V_R$	reverse voltage		-	-	300	V
$t_{rr}$	reverse recovery time		[1]	-	50	ns

[1] 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 3. Pinning**

Pin	Description	Simplified outline	Symbol
<b>BAS101</b>			
1	anode		
2	not connected		
3	cathode		
<b>BAS101S</b>			
1	anode (diode 1)		
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		

## 3. Ordering information

**Table 4. Ordering information**

Type number	Package		Version
	Name	Description	
BAS101	-	plastic surface-mounted package; 3 leads	SOT23
BAS101S			

## 4. Marking

**Table 5. Marking codes**

Type number	Marking code <sup>[1]</sup>
BAS101	*HQ
BAS101S	*HR

[1] \* = -: made in Hong Kong  
 \* = p: made in Hong Kong  
 \* = t: made in Malaysia  
 \* = W: made in China

## 5. Limiting values

**Table 6. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit
<b>Per diode</b>					
$V_{RRM}$	repetitive peak reverse voltage		-	300	V
		series connection	-	600	V
$V_R$	reverse voltage		-	300	V
		series connection	-	600	V
$I_F$	forward current		-	200	mA
		series connection	-	100	mA
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1$ ms; $\delta \leq 0.25$	-	1	A
$I_{FSM}$	non-repetitive peak forward current	square wave; $t_p \leq 1$ $\mu$ s	[1] -	9	A
<b>Per device</b>					
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[2] -	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

[1]  $T_j = 25$  °C prior to surge

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

## 6. Thermal characteristics

**Table 7. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per device</b>						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	-	500	K/W

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

## 7. Characteristics

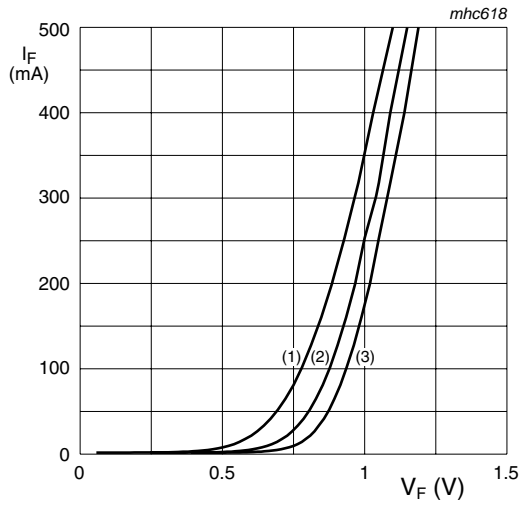
**Table 8. Characteristics**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per diode</b>						
$V_F$	forward voltage	$I_F = 100\text{ mA}$	[1]	-	1.1	V
$I_R$	reverse current	$V_R = 250\text{ V}$	-	-	150	nA
		$V_R = 250\text{ V}; T_j = 150\text{ °C}$	-	-	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	-	2	pF
$t_{rr}$	reverse recovery time		[2]	-	50	ns

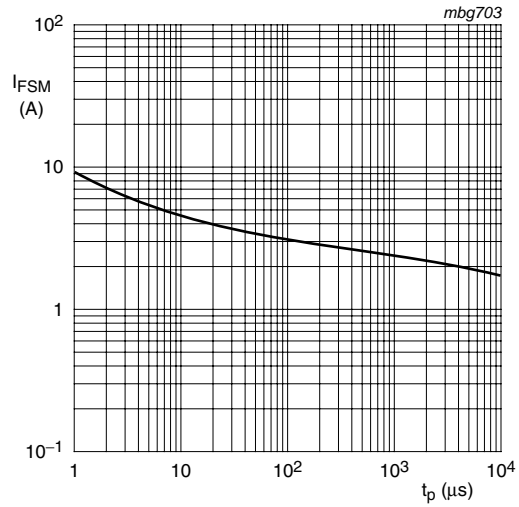
[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

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



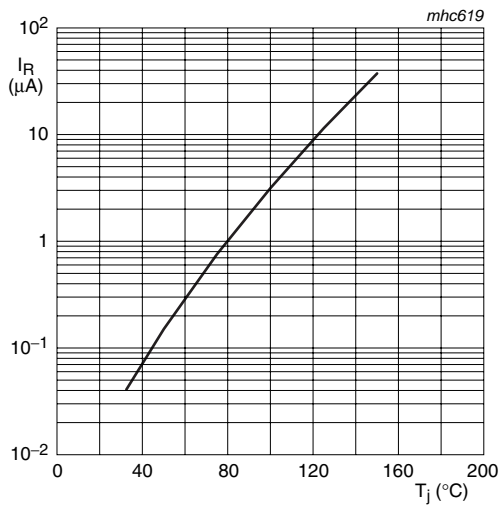
- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 75\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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



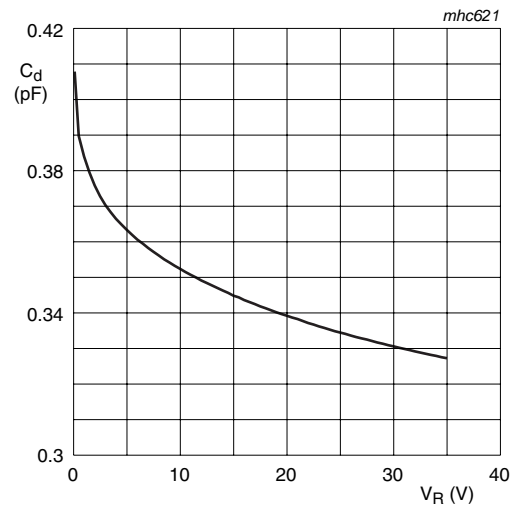
Based on square wave currents  
 $T_j = 25\text{ }^{\circ}\text{C}$ ; prior to surge

**Fig 2. Non-repetitive peak forward current as a function of pulse duration; maximum values**



$V_R = 300\text{ V}$

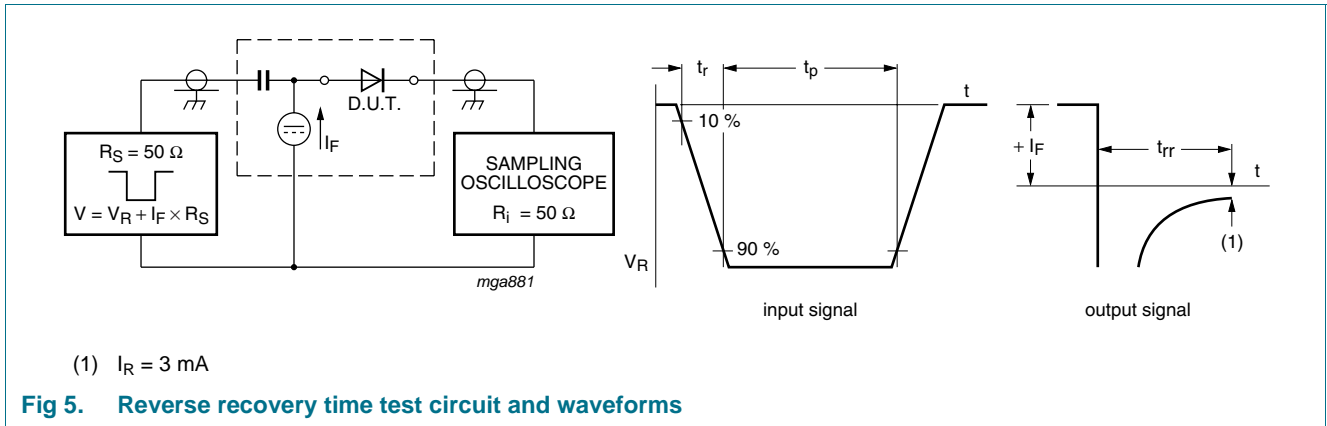
**Fig 3. Reverse current as a function of junction temperature; typical values**



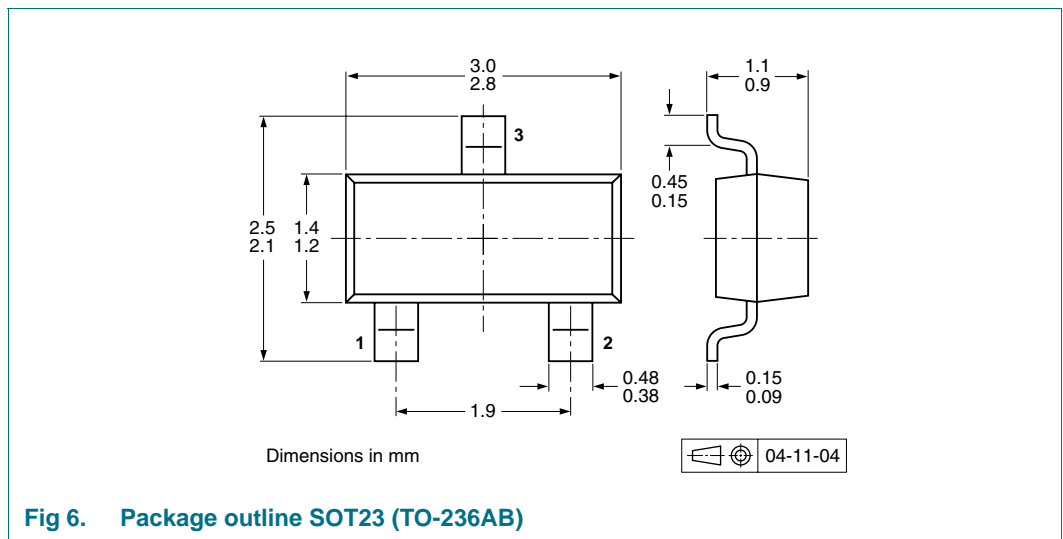
$f = 1\text{ MHz}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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

**8. Test information**



**9. Package outline**



**10. Packing information**

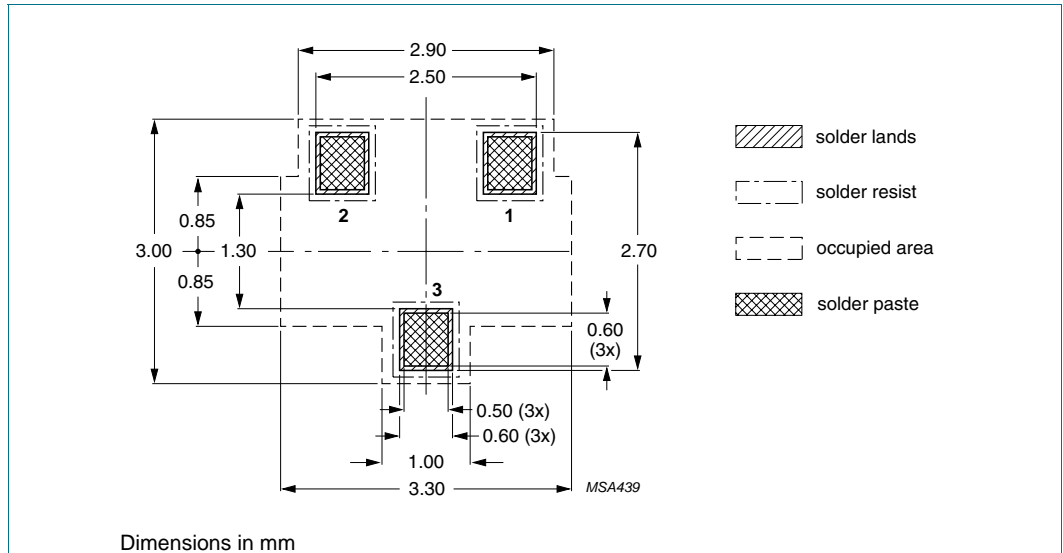
**Table 9. Packing methods**

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

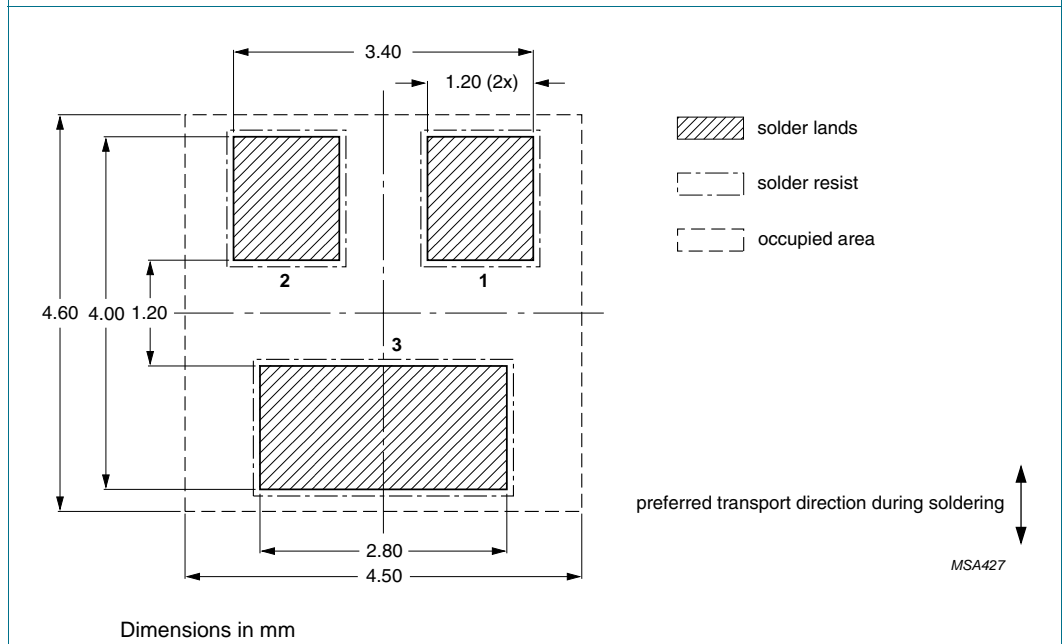
Type number	Package	Description	Packing quantity	
			3000	10000
BAS101	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
BAS101S				

[1] For further information and the availability of packing methods, see [Section 15](#).

**11. Soldering**

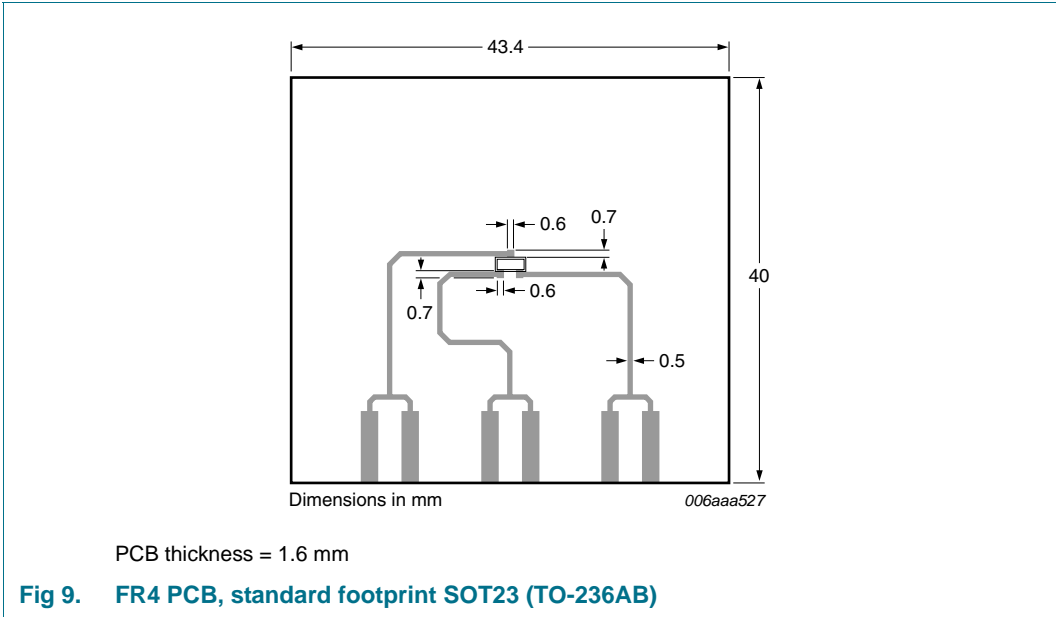


**Fig 7. Reflow soldering footprint SOT23 (TO-236AB)**



**Fig 8. Wave soldering footprint SOT23 (TO-236AB)**

12. Mounting





## 13. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS101_BAS101S_2	20091214	Product data sheet	-	BAS101_BAS101S_1
Modifications:	<ul style="list-style-type: none"><li>• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.</li><li>• <a href="#">Table 3 "Pinning"</a>: updated</li></ul>			
BAS101_BAS101S_1	20060908	Product data sheet	-	-

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### 14.1 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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