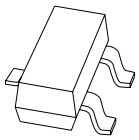


BAS101; BAS101S

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

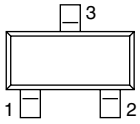
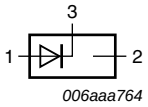
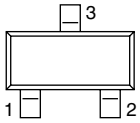
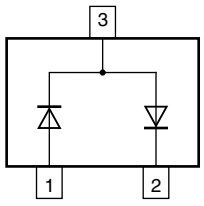
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
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
BAS101			
1	anode		
2	not connected		
3	cathode		
BAS101S			
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		
	Name	Description	Version
BAS101	-	plastic surface-mounted package; 3 leads	SOT23
BAS101S			

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
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
Per diode						
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; $t_p \leq 1$ μs	[1]	-	9	A
Per device						
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
Per device							
$R_{th(j-a)}$	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

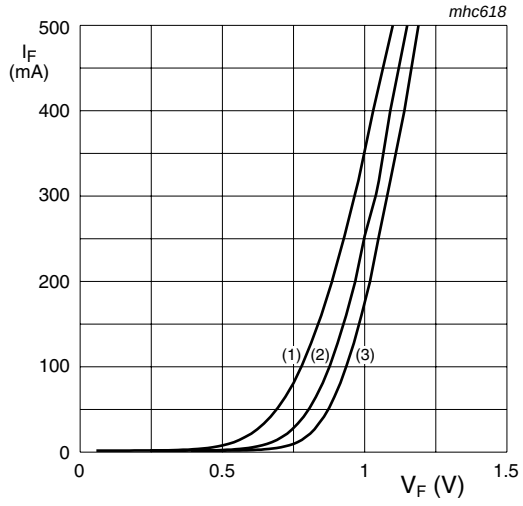
Table 8. Characteristics

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

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

[1] Pulse test: $t_p \leq 300$ μs; $\delta \leq 0.02$.

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

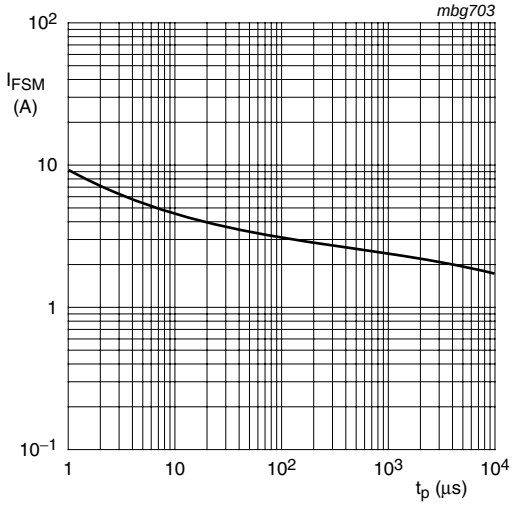


(1) T_{amb} = 150 °C

(2) T_{amb} = 75 °C

(3) T_{amb} = 25 °C

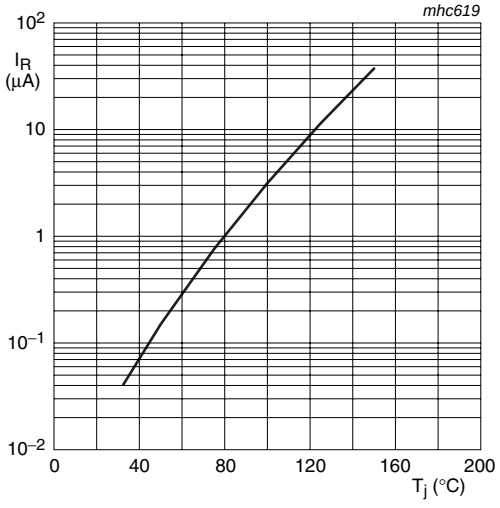
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents

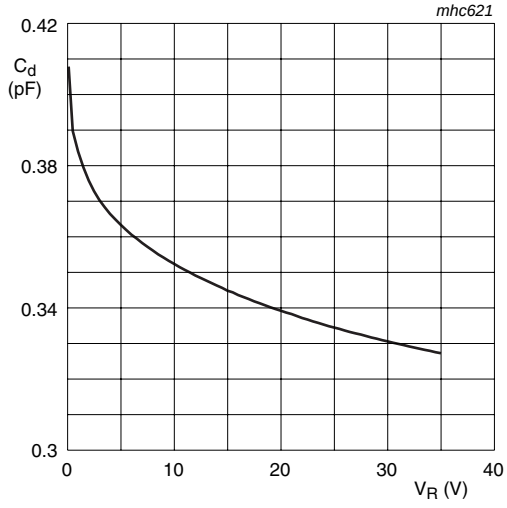
T_j = 25 °C; prior to surge

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



V_R = 300 V

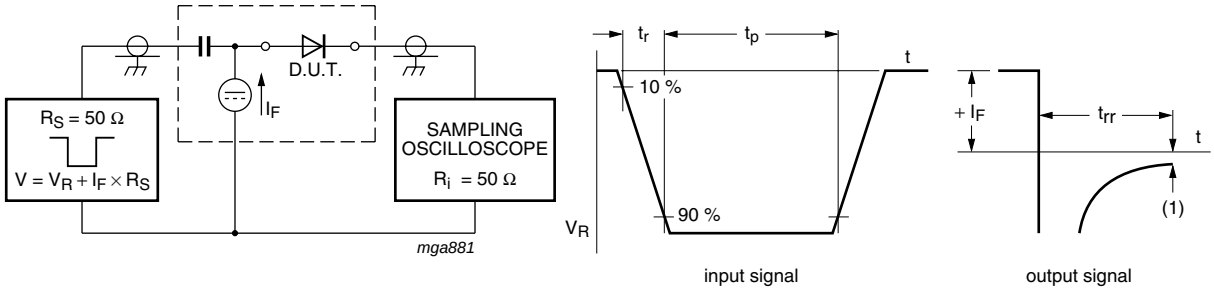
Fig 3. Reverse current as a function of junction temperature; typical values



f = 1 MHz; T_{amb} = 25 °C

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

8. Test information



(1) $I_R = 3$ mA

Fig 5. Reverse recovery time test circuit and waveforms

9. Package outline

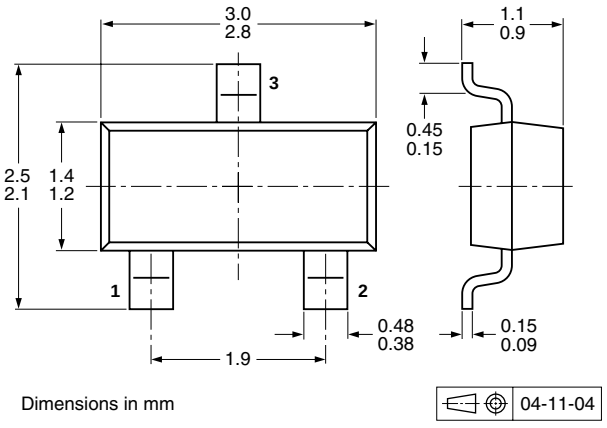


Fig 6. Package outline SOT23 (TO-236AB)

10. Packing information

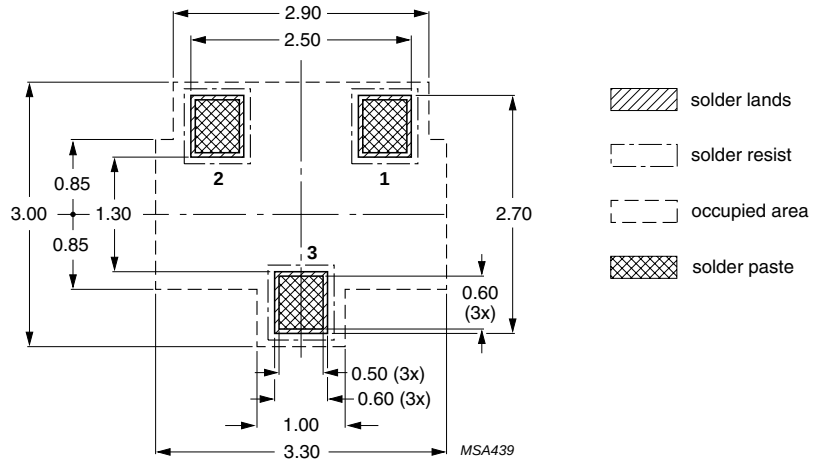
Table 9. Packing methods

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

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

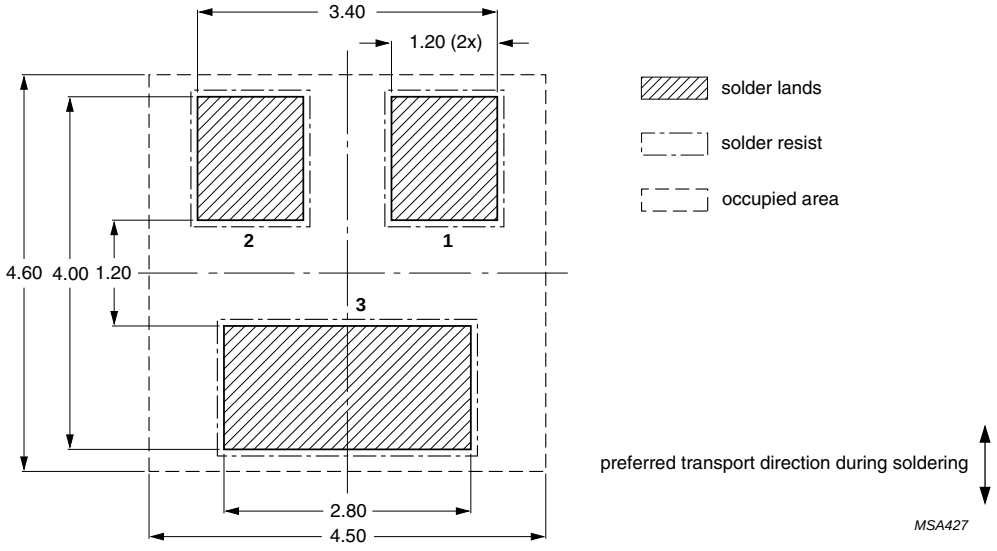
[1] For further information and the availability of packing methods, see Section 15.

11. Soldering



Dimensions in mm

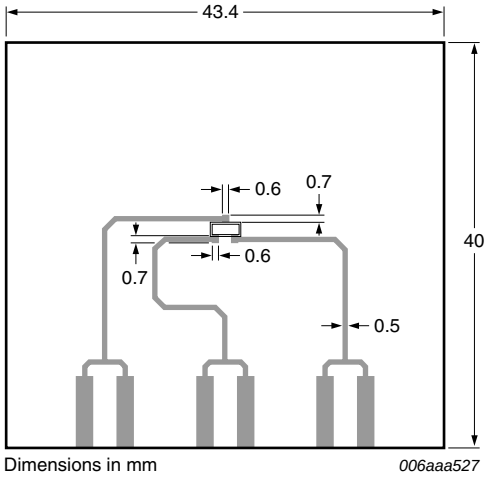
Fig 7. Reflow soldering footprint SOT23 (TO-236AB)



Dimensions in mm

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

12. Mounting



PCB thickness = 1.6 mm

Fig 9. FR4 PCB, standard footprint SOT23 (TO-236AB)

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:	• 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. • Table 3 “Pinning”: updated			
BAS101_BAS101S_1	20060908	Product data sheet	-	-

14. Legal information

14.1 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 URL http://www.nxp.com.

14.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

14.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nxp.com/profile/terms, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

14.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

15. Contact information

For more information, please visit: **http://www.nxp.com**

For sales office addresses, please send an email to: **salesaddresses@nxp.com**

16. Contents

1	**Product profile**	**1**
1.1	General description	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data	1
2	**Pinning information**	**2**
3	**Ordering information**	**2**
4	**Marking**	**2**
5	**Limiting values**	**3**
6	**Thermal characteristics**	**3**
7	**Characteristics**	**4**
8	**Test information**	**6**
9	**Package outline**	**6**
10	**Packing information**	**6**
11	**Soldering**	**7**
12	**Mounting**	**8**
13	**Revision history**	**9**
14	**Legal information**	**10**
14.1	Data sheet status	10
14.2	Definitions	10
14.3	Disclaimers	10
14.4	Trademarks	10
15	**Contact information**	**10**
16	**Contents**	**11**

For more information, please visit: http://www.nxp.com
For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 14 December 2009

Document identifier: BAS101_BAS101S_2