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
	Nexperia	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

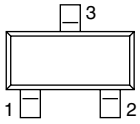
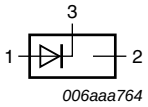
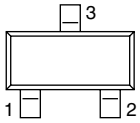
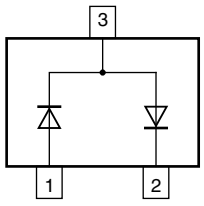
Table 2. Quick reference data

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 Ω; 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

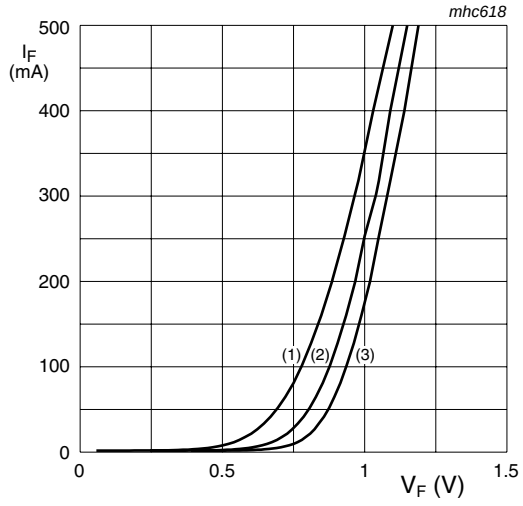
Table 8. Characteristics

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.

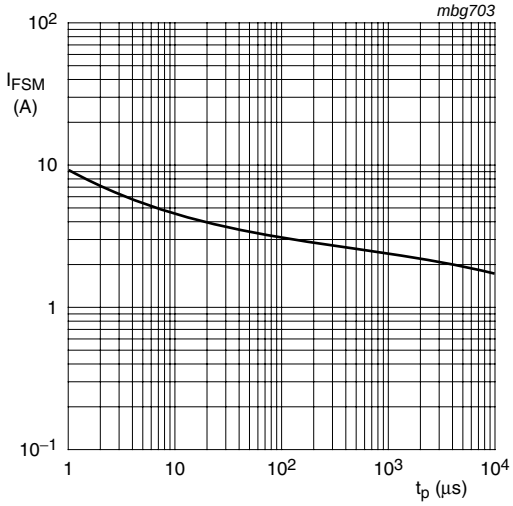


(1) T_{amb} = 150 °C

(2) T_{amb} = 75 °C

(3) T_{amb} = 25 °C

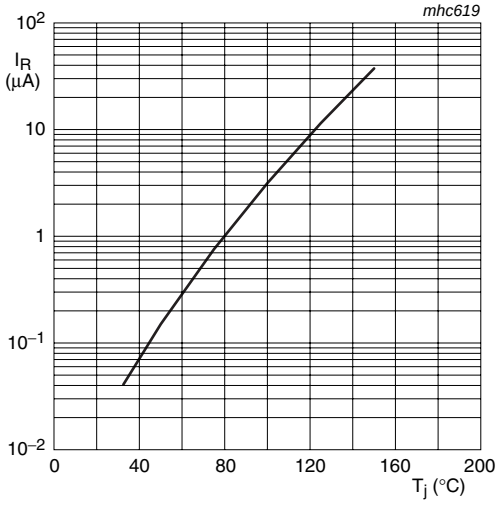
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents

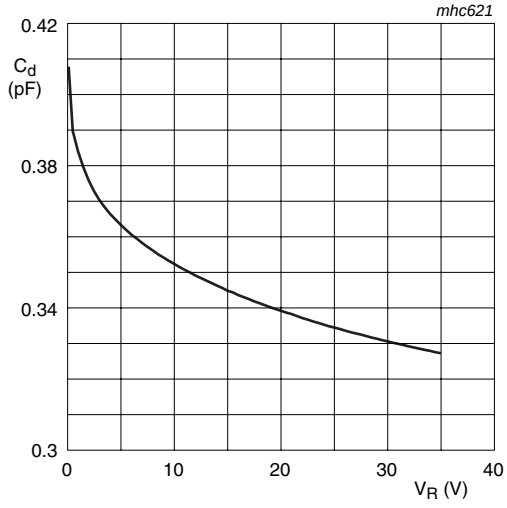
T_j = 25 °C; prior to surge

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



V_R = 300 V

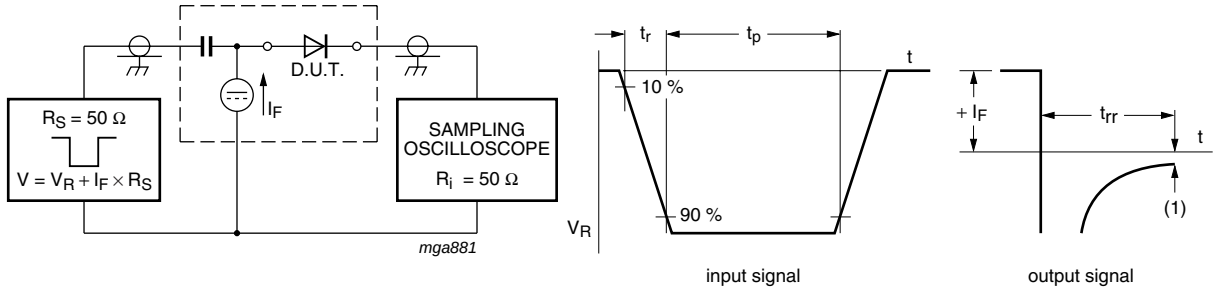
Fig 3. Reverse current as a function of junction temperature; typical values



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

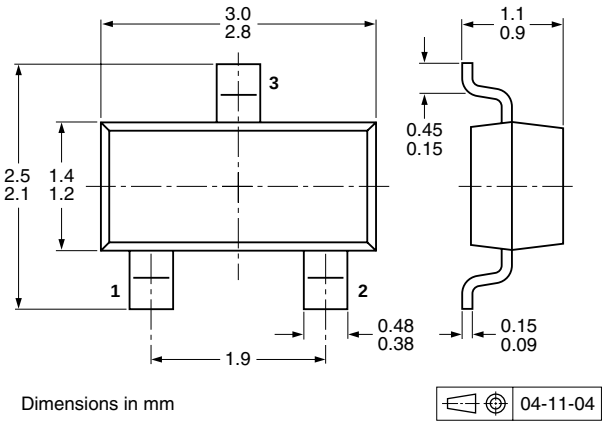
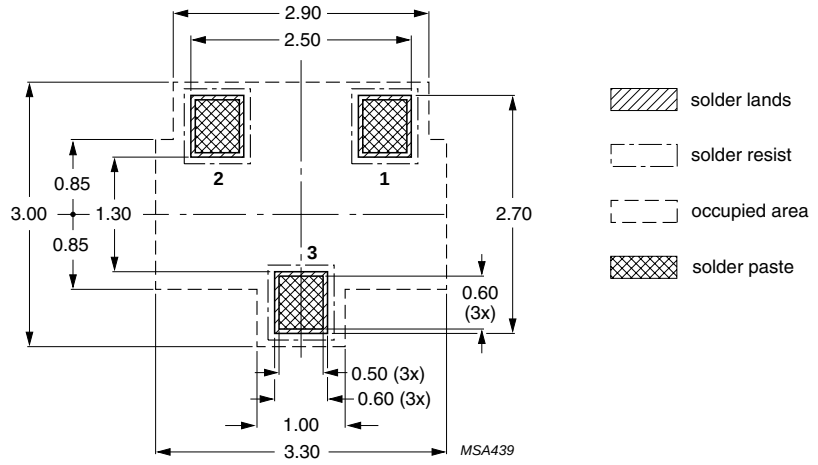


Fig 6. Package outline SOT23 (TO-236AB)

10. Packing information

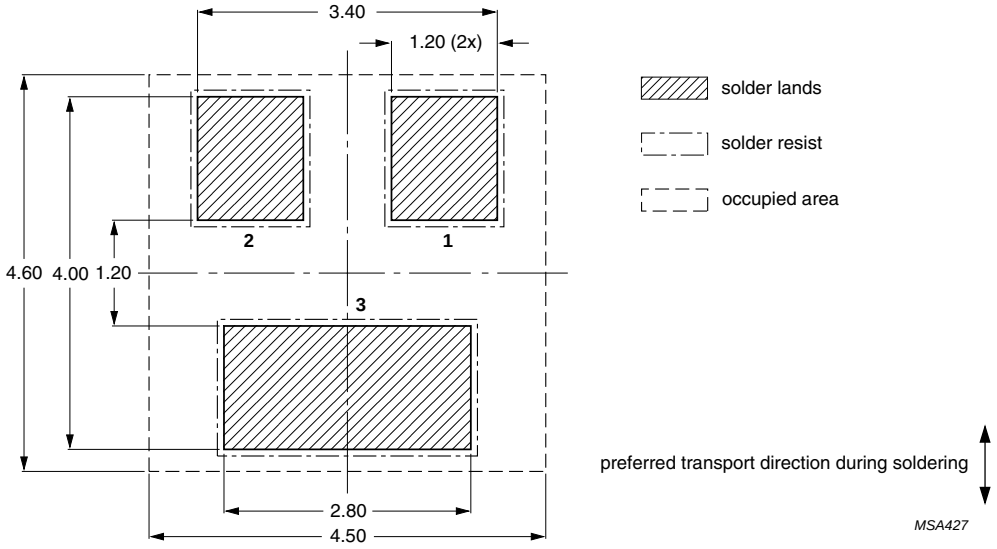
Please refer to packing information on www.nexperia.com.

11. Soldering



Dimensions in mm

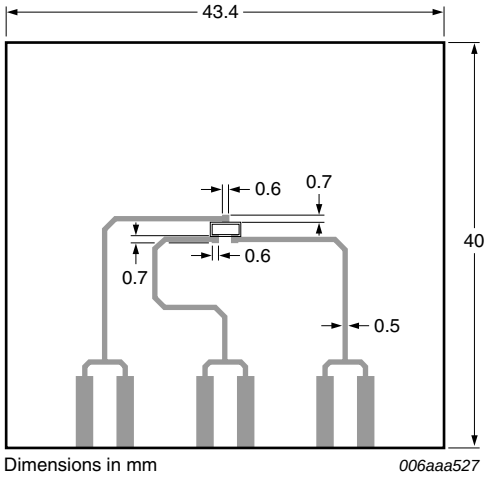
Fig 7. Reflow soldering footprint SOT23 (TO-236AB)



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".

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