BAS21W series

High-voltage switching diodes

Rev. 01 — 9 October 2009 Product data sheet

1. Product profile

1.1 General description

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

Table 1. Product overview

Type number	Configuration	Package		Package configuration
		Nexperia	JEDEC	
BAS21W	single	SOT323	SC-70	very small
BAS21AW	dual common anode			
BAS21SW	dual series			

1.2 Features

- High switching speed: $t_{rr} \leq 50$ ns
- Low leakage current
- High reverse voltage: $V_R \leq 250$ V
- Low capacitance: $C_d \leq 2$ pF
- Very small SMD plastic package
- AEC-Q101 qualified

1.3 Applications

- High-speed switching
- General-purpose switching
- Voltage clamping
- Reverse polarity protection

1.4 Quick reference data

Table 2. Quick reference data

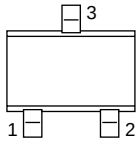
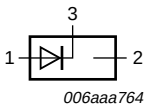
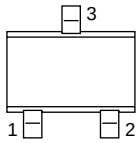
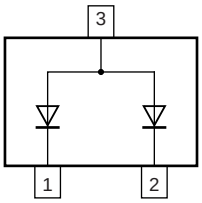
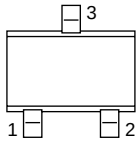
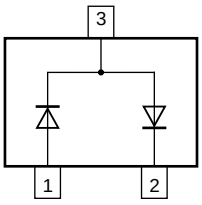
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current		[1]	-	-	225	mA
I_R	reverse current	V_R = 200 V		-	-	100	nA
V_R	reverse voltage			-	-	250	V
t_{rr}	reverse recovery time		[2]	-	-	50	ns

[1] Single diode loaded.

[2] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
BAS21W			
1	anode		
2	not connected		
3	cathode		
BAS21AW			
1	cathode (diode 1)		
2	cathode (diode 2)		
3	common anode		
BAS21SW			
1	anode (diode 1)		
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		

006aaa764

006aab099

006aaa763

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BAS21W	SC-70	plastic surface-mounted package; 3 leads	SOT323
BAS21AW			
BAS21SW			

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
BAS21W	X4*
BAS21AW	X6*
BAS21SW	X5*

[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_R	reverse voltage			-	250	V
I_F	forward current		[1]	-	225	mA
			[2]	-	125	mA
I_{FRM}	repetitive peak forward current			-	625	mA
I_{FSM}	non-repetitive peak forward current	square wave	[3]			
		t_p = 1 µs		-	9	A
		t_p = 100 µs		-	3	A
		t_p = 10 ms		-	1.7	A
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[4]	-	200	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			–55	+150	°C
T_{stg}	storage temperature			–65	+150	°C

[1] Single diode loaded.

[2] Double diode loaded.

[3] T_j = 25 °C prior to surge.

[4] 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]	-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	300	K/W

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

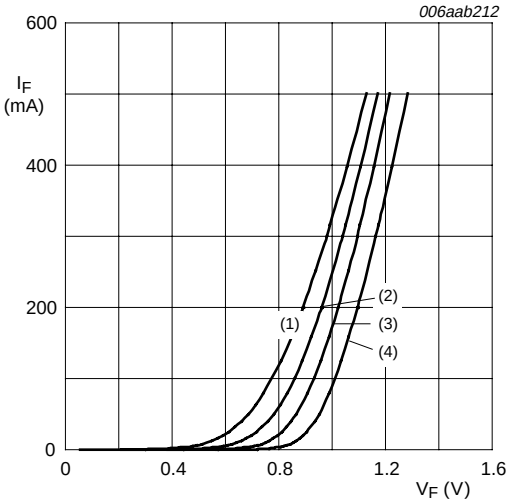
7. Characteristics

Table 8. Characteristics

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

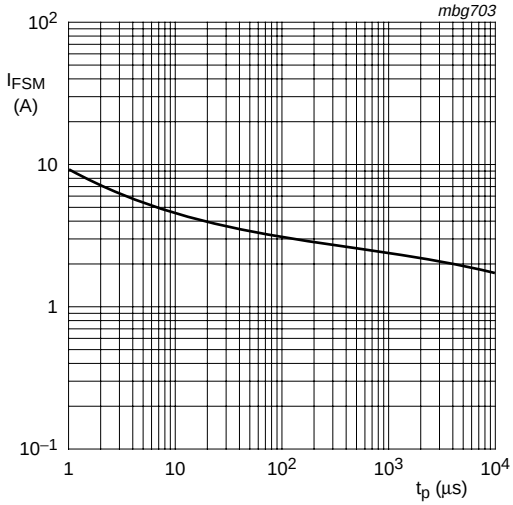
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 100 mA		-	-	1.0	V
		I_F = 200 mA		-	-	1.25	V
I_R	reverse current	V_R = 200 V		-	-	100	nA
		V_R = 200 V; T_j = 150 °C		-	-	100	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V		-	-	2	pF
t_{rr}	reverse recovery time		[1]	-	-	50	ns

[1] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.



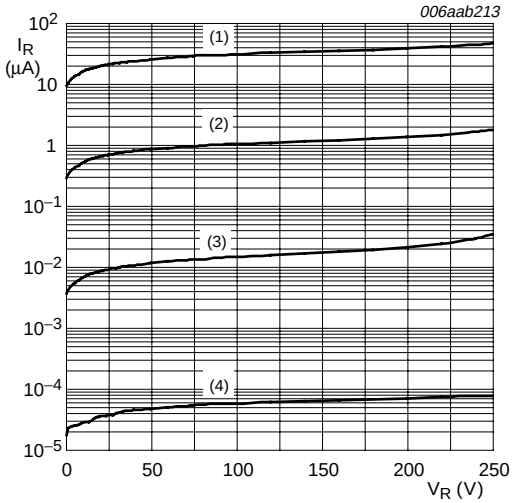
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −40 °C

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



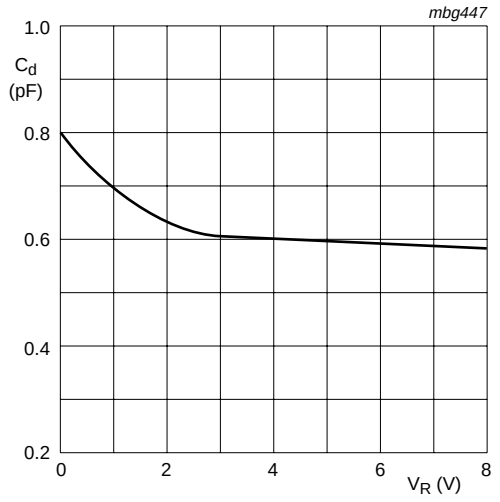
Based on square wave currents.
T_j = 25 °C; prior to surge

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



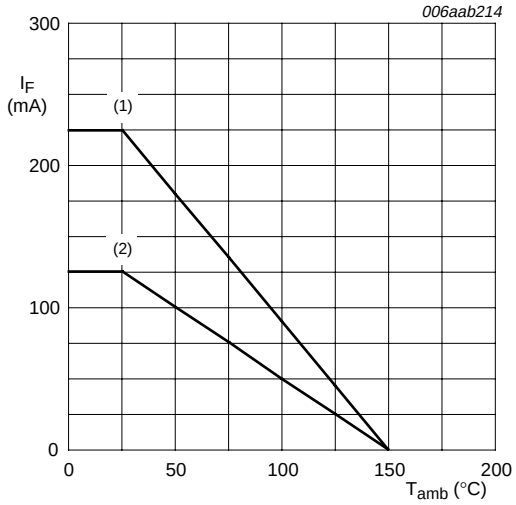
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −40 °C

Fig 3. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

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



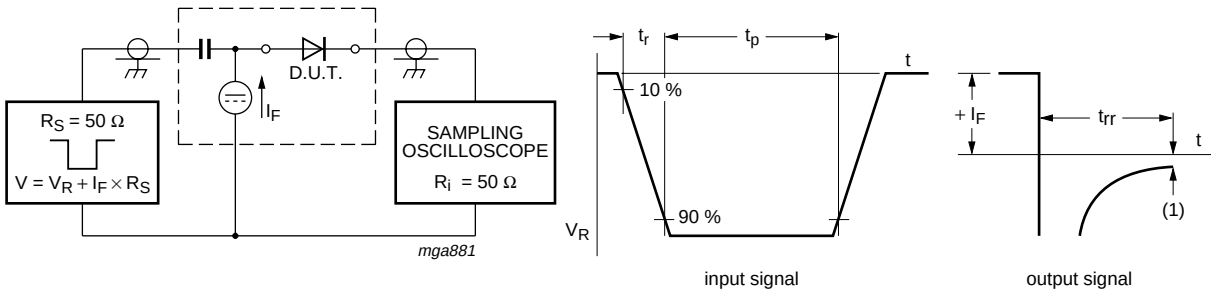
FR4 PCB, standard footprint

(1) Single diode loaded.

(2) Double diode loaded.

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

8. Test information



(1) I_R = 1 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

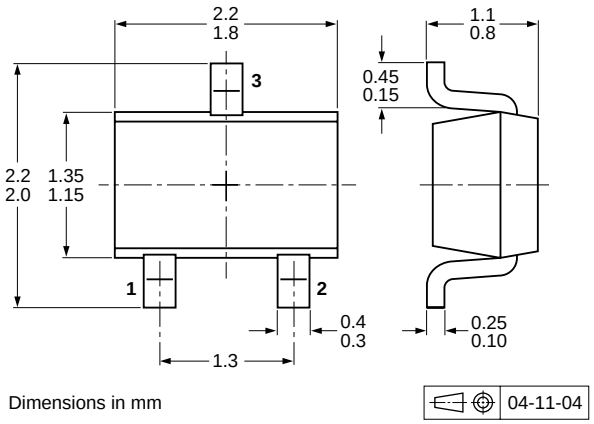


Fig 7. Package outline SOT323 (SC-70)

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
BAS21W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-135
BAS21AW				
BAS21SW				

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

11. Soldering

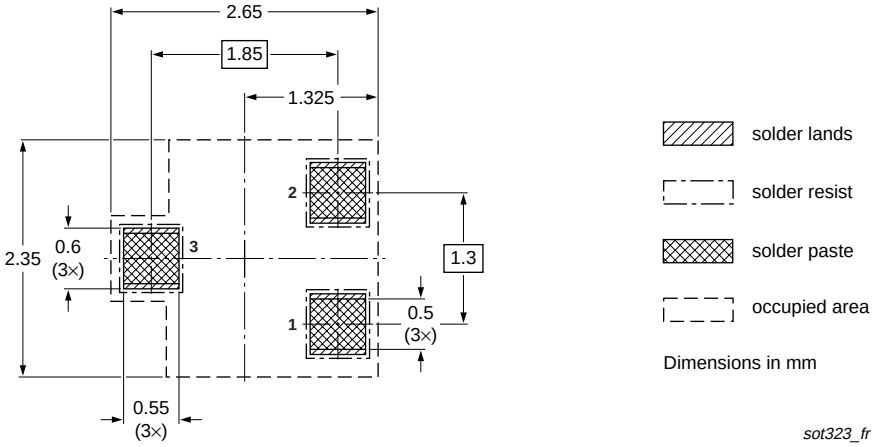


Fig 8. Reflow soldering footprint SOT323 (SC-70)

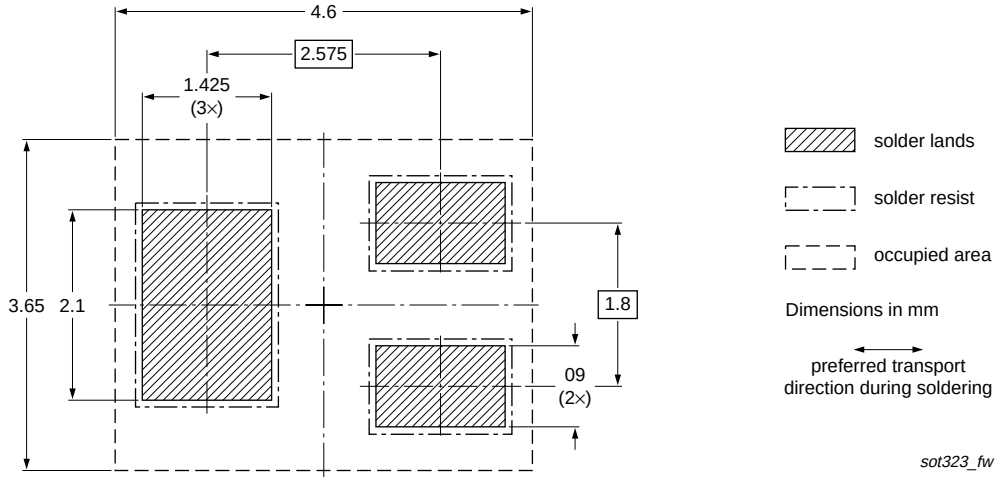


Fig 9. Wave soldering footprint SOT323 (SC-70)

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS21W_SER_1	20091009	Product data sheet	-	-

13. Legal information

13.1 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.nexperia.com.

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15. Contents

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