

BAS21W series

High-voltage switching diodes Rev. 01 — 9 October 2009

Product data sheet

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	
		NXP	JEDEC	configuration	
BAS21W	single	SOT323	SC-70	very small	
BAS21AW	dual common anode				
BAS21SW	dual series				

1.2 Features

- High switching speed: $t_{rr} \le 50$ ns
- Low leakage current
- High reverse voltage: V_R ≤ 250 V
- Low capacitance: C_d ≤ 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	Тур	Max	Unit
Per diode						
I _F	forward current		<u>[1]</u> _	-	225	mA
I _R	reverse current	$V_{R} = 200 \text{ V}$	-	-	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 not connected 3 cathode **BAS21AW** cathode (diode 1) 2 cathode (diode 2) 3 common anode 006aab099 BAS21SW anode (diode 1) 2 cathode (diode 2) cathode (diode 1), anode (diode 2) 本

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					

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006aaa763

Marking 4.

Table 5. **Marking codes**

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

^{[1] * = -:} made in Hong Kong

Limiting values 5.

Limiting values Table 6.

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]		
		$t_p = 1 \mu s$	-	9	Α
		t _p = 100 μs	-	3	Α
		$t_p = 10 \text{ ms}$	-	1.7	Α
Per device					
P _{tot}	total power dissipation	$T_{amb} \le 25 ^{\circ}C$	[4] _	200	mW
Tj	junction temperature		-	150	°C
T _{amb}	ambient temperature		-55	+150	°C
T _{stg}	storage temperature		-65	+150	°C
T _j T _{amb}	junction temperature ambient temperature	T _{amb} ≤ 25 °C	- -55	150 +150	°C

^[1] Single diode loaded.

^{* =} p: made in Hong Kong

^{* =} t: made in Malaysia

^{* =} W: made in China

^[2] Double diode loaded.

^[3] $T_i = 25$ °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	Тур	Max	Unit
Per device						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	<u>[1]</u> -	-	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.

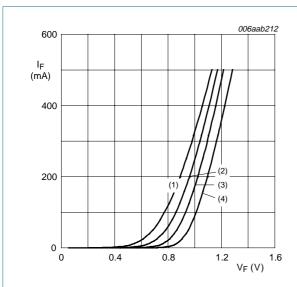
7. Characteristics

Table 8. Characteristics

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

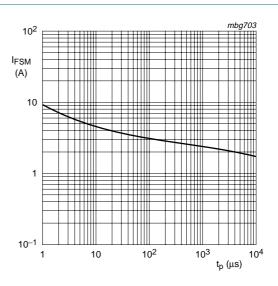
Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Per diode)					
V_{F}	forward voltage	$I_F = 100 \text{ mA}$	-	-	1.0	V
		$I_F = 200 \text{ mA}$	-	-	1.25	V
I _R reverse current	reverse current	V _R = 200 V	-	-	100	nA
		V _R = 200 V; T _j = 150 °C	-	-	100	μΑ
C _d	diode capacitance	$f = 1 MHz; V_R = 0 V$	-	-	2	pF
t _{rr}	reverse recovery time		<u>[1]</u> _	-	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) $T_{amb} = 150 \, ^{\circ}C$
- (2) $T_{amb} = 85 \, ^{\circ}C$
- (3) $T_{amb} = 25 \, ^{\circ}C$
- (4) $T_{amb} = -40 \, ^{\circ}C$

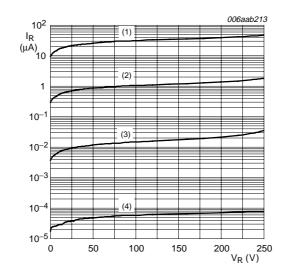
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.

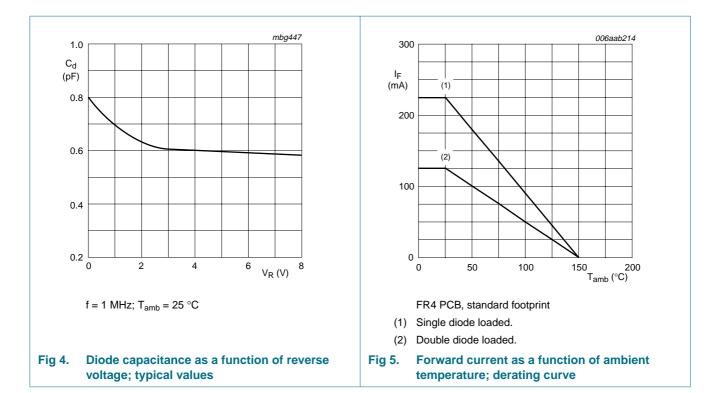
 $T_j = 25$ °C; prior to surge

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

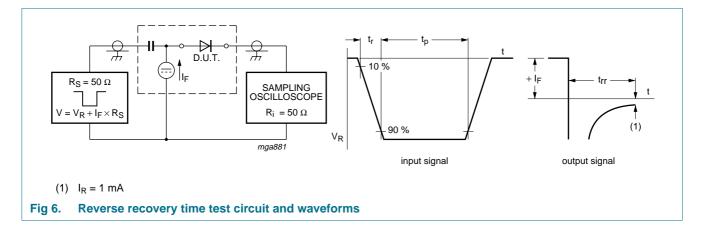


- (1) $T_{amb} = 150 \, ^{\circ}C$
- (2) $T_{amb} = 85 \, ^{\circ}C$
- (3) $T_{amb} = 25 \,^{\circ}C$
- (4) $T_{amb} = -40 \, ^{\circ}C$

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



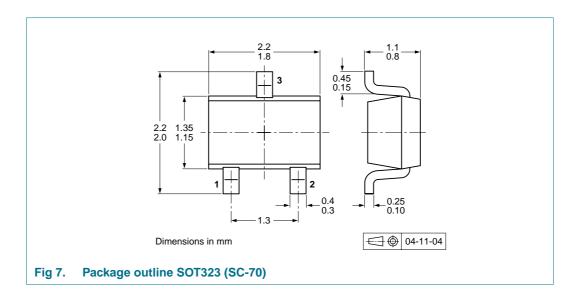
8. Test information



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



10. Packing information

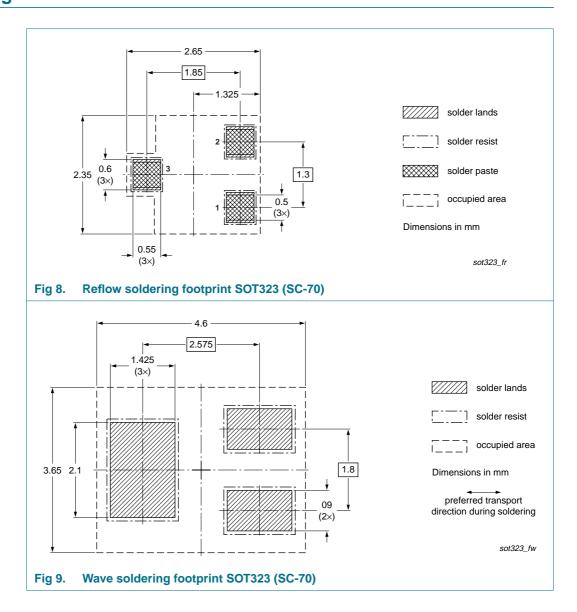
Table 9. Packing methods

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





12. Revision history

Table 10. Revision history

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

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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.
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BAS21W series

High-voltage switching diodes

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