BAS21J

Single high-speed switching diode

Rev. 01 — 8 March 2007 **Product data sheet**

1. Product profile

1.1 General description

Single high-speed switching diode, encapsulated in a SOD323F (SC-90) very small and flat lead Surface-Mounted Device (SMD) plastic package.

1.2 Features

- High switching speed: $t_{rr} \leq 50$ ns
- Low leakage current
- Repetitive peak reverse voltage: $V_{RRM} \leq 300$ V
- Excellent coplanarity and improved thermal behavior
- Low capacitance: $C_d \leq 2$ pF
- Reverse voltage: $V_R \leq 300$ V
- Very small and flat lead SMD plastic package

1.3 Applications

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

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current		[1]	-	-	250	mA
I_R	reverse current	V_R = 250 V		-	-	150	nA
V_R	reverse voltage			-	-	300	V
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.

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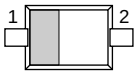
2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	cathode [1]		 sym006
2	anode		

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS21J	SC-90	plastic surface-mounted package; 2 leads	SOD323F

4. Marking

Table 4. Marking codes

Type number	Marking code
BAS21J	AN

5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	300	V
V_R	reverse voltage			-	300	V
I_F	forward current		[1]	-	250	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 0.5$ ms; $\delta \leq 0.25$		-	1	A
I_{FSM}	non-repetitive peak forward current	square wave	[2]			
		$t_p = 100$ µs		-	3	A
		$t_p = 1$ ms		-	2.3	A
		$t_p = 10$ ms		-	1.7	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[3][4]	-	550	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			–65	+150	°C
T_{stg}	storage temperature			–65	+150	°C

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

[2] $T_j = 25$ °C prior to surge.

[3] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[4] Reflow soldering is the only recommended soldering method.

6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2]	-	-	230	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	55	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[2] Reflow soldering is the only recommended soldering method.

[3] Soldering point of cathode tab.

7. Characteristics

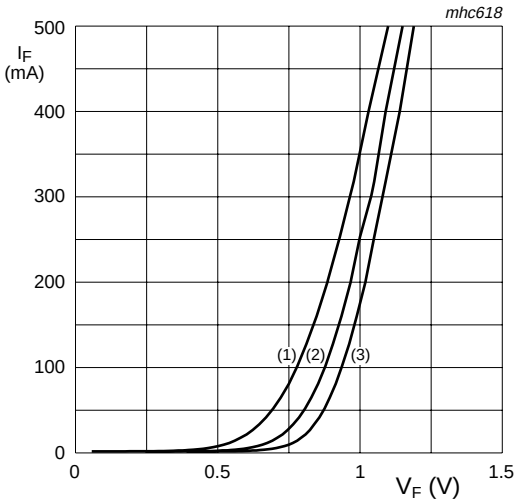
Table 7. Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
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		-	-	50	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.

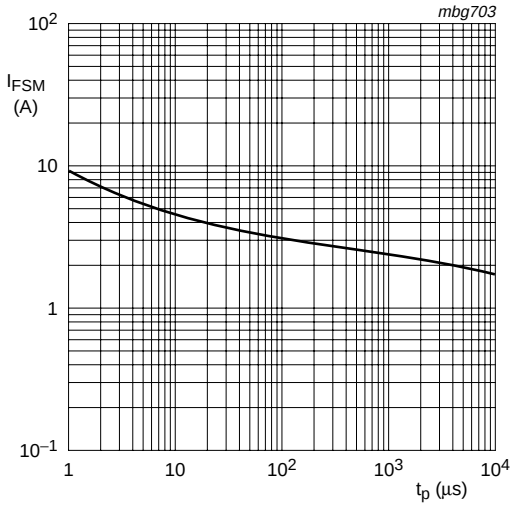


(1) T_{amb} = 150 °C

(2) T_{amb} = 75 °C

(3) T_{amb} = 25 °C

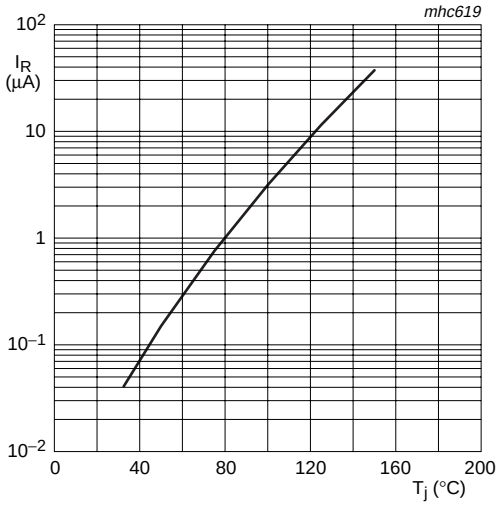
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.

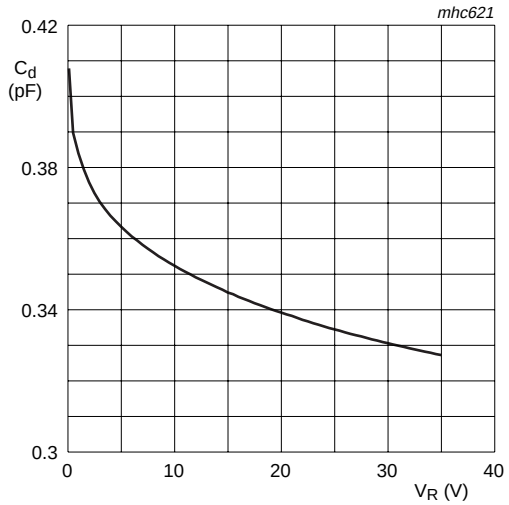
T_j = 25 °C; prior to surge

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



V_R = 250 V

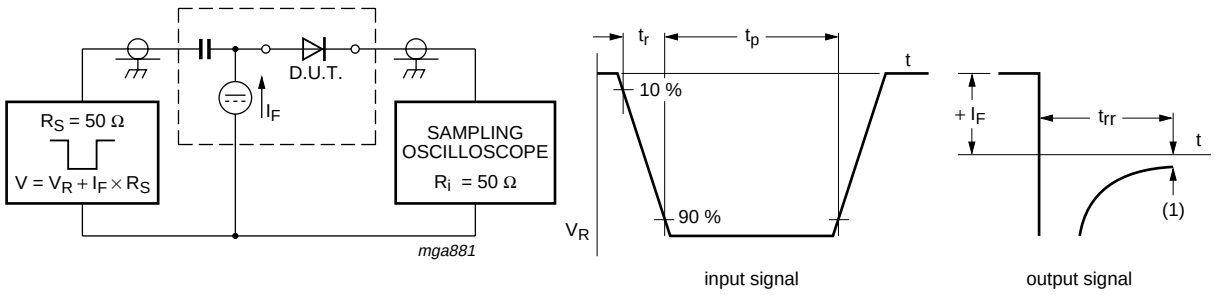
Fig 3. Reverse current as a function of junction temperature; typical values



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 = 1 mA

Input signal: reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty cycle δ = 0.05

Oscilloscope: rise time t_r = 0.35 ns

Fig 5. Reverse recovery time test circuit and waveforms

9. Package outline

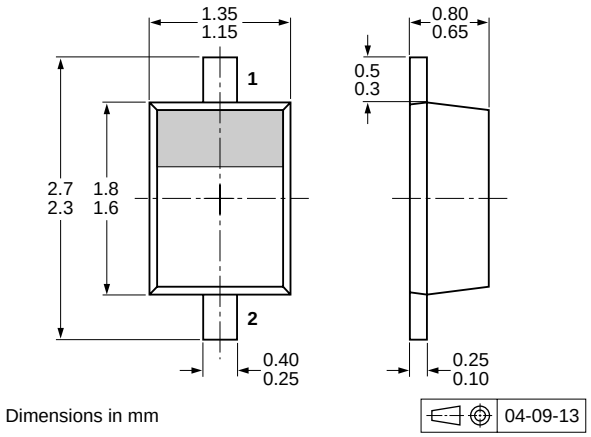
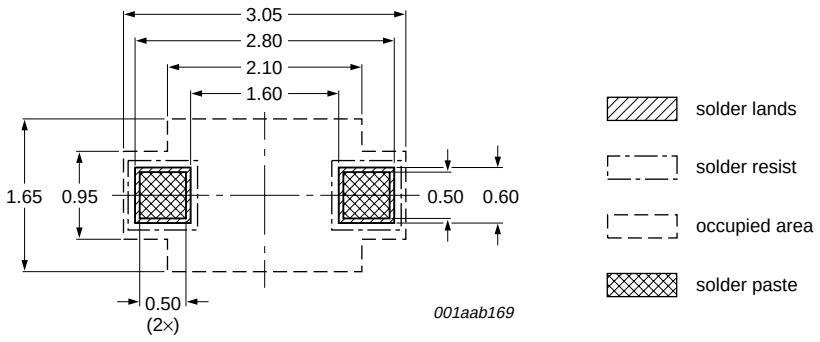


Fig 6. Package outline SOD323F (SC-90)

10. Packing information

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

11. Soldering



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 7. Reflow soldering footprint SOD323F (SC-90)

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS21J_1	20070308	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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