

# 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:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$ .

[2] 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 2. Pinning

Pin	Description	Simplified outline	Symbol
1	cathode		
2	anode		

sym006

[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]		
		$t_p = 100$ $\mu$ s	-	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:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$ .

[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<sup>2</sup>.

[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<sup>2</sup>.

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

[3] Soldering point of cathode tab.

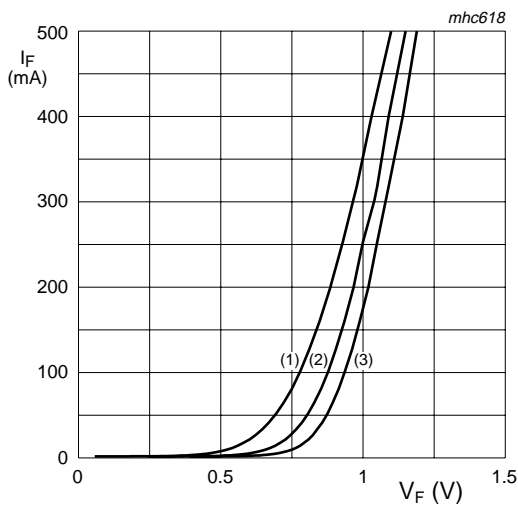
## 7. Characteristics

**Table 7. Characteristics***T<sub>amb</sub> = 25 °C unless otherwise specified.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 100 mA	[1]	-	1.1	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 250 V	-	-	150	nA
		V <sub>R</sub> = 250 V; T <sub>j</sub> = 150 °C	-	-	50	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz	-	-	2	pF
t <sub>rr</sub>	reverse recovery time		[2]	-	50	ns

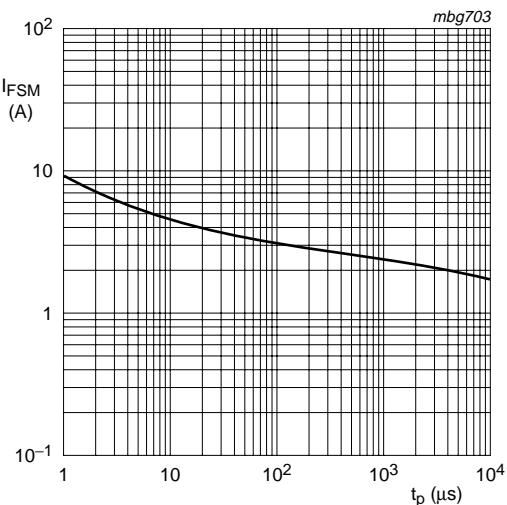
[1] Pulse test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02.

[2] When switched from I<sub>F</sub> = 30 mA to I<sub>R</sub> = 30 mA; R<sub>L</sub> = 100 Ω; measured at I<sub>R</sub> = 3 mA.



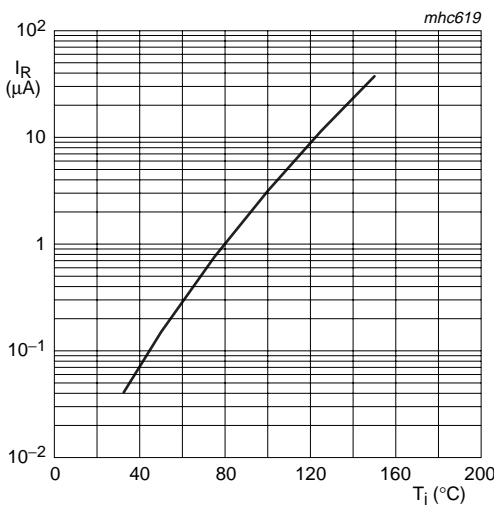
- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$
- (2)  $T_{amb} = 75\text{ }^{\circ}\text{C}$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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



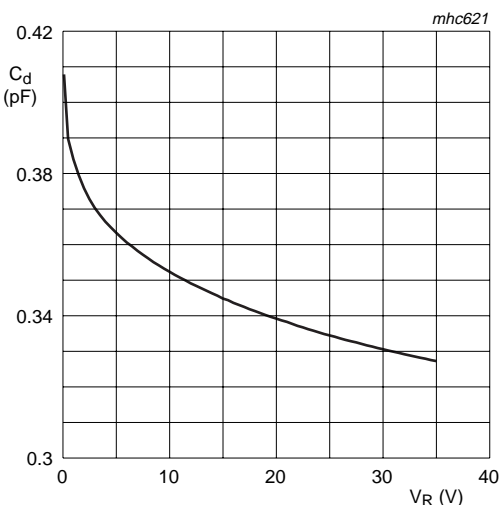
Based on square wave currents.  
 $T_j = 25\text{ }^{\circ}\text{C}$ ; prior to surge

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



$V_R = 250\text{ V}$

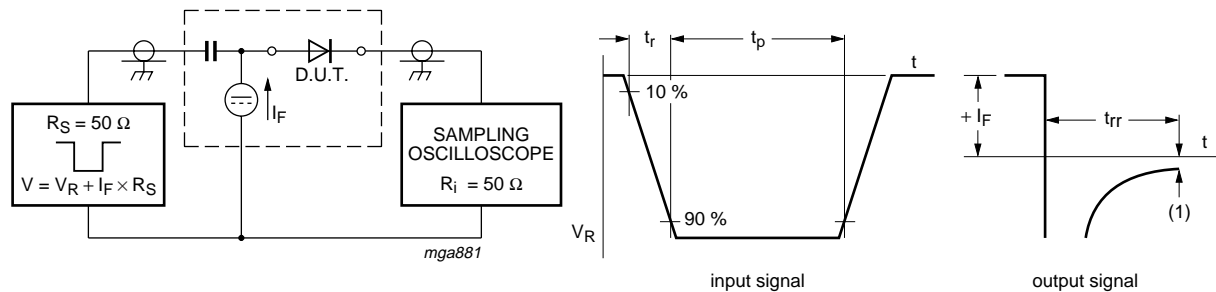
Fig 3. Reverse current as a function of junction temperature; typical values



$f = 1\text{ MHz}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$

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

## 8. Test information



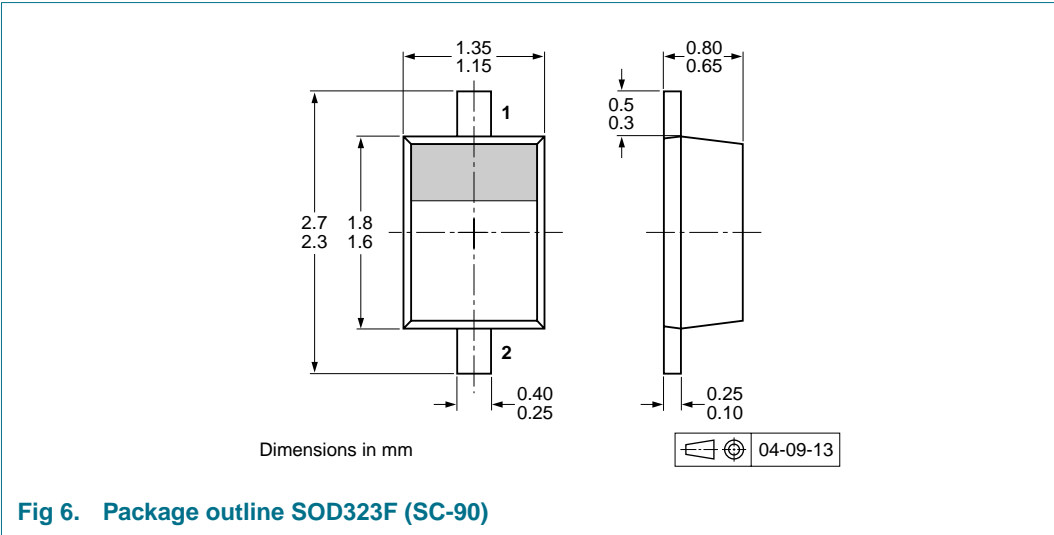
(1)  $I_R = 1\text{ mA}$

Input signal: reverse pulse rise time  $t_r = 0.6\text{ ns}$ ; reverse voltage pulse duration  $t_p = 100\text{ ns}$ ; duty cycle  $\delta = 0.05$

Oscilloscope: rise time  $t_r = 0.35\text{ ns}$

**Fig 5. Reverse recovery time test circuit and waveforms**

9. Package outline



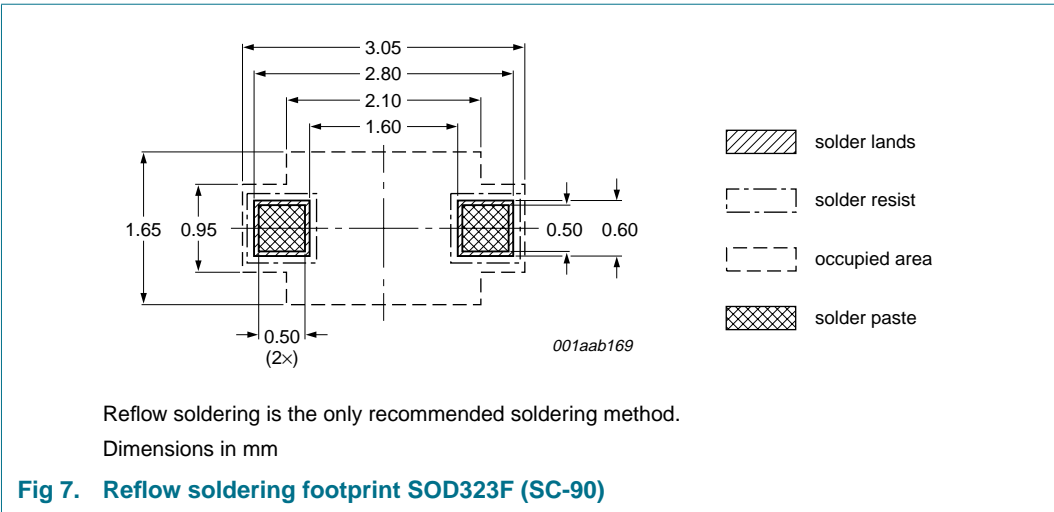
10. Packing information

**Table 8. Packing methods**  
The indicated -xxx are the last three digits of the 12NC ordering code.<sup>[1]</sup>

Type number	Package	Description	Packing quantity	
			3000	10000
BAS21J	SOD323F	4 mm pitch, 8 mm tape and reel	-115	-135

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

11. Soldering



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 <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Product [short] data sheet	Production	This document contains the product specification.

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[2] The term 'short data sheet' is explained in section "Definitions".

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