

# BAS16H

High-speed switching diode in SOD123F package

Rev. 01 — 15 April 2005

Product data sheet

## 1. Product profile

### 1.1 General description

The BAS16H is a high-speed switching diode fabricated in planar technology, and encapsulated in a SOD123F small and flat plastic package.

### 1.2 Features

- High switching speed: max. 4 ns
- Continuous reverse voltage: max. 100 V
- Repetitive peak reverse voltage: max. 100 V
- Repetitive peak forward current: max. 500 mA
- Small and flat plastic package

### 1.3 Applications

- High-speed switching in hybrid thick and thin-film circuits
- Mobile communication
- Digital (still) cameras
- Personal Digital Assistants (PDA)
- Personal Computer Memory Card International Association (PCMCIA) cards

### 1.4 Quick reference data



Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_R$	reverse voltage		-	-	100	V
$I_{FRM}$	repetitive peak forward current		-	-	500	mA
$t_{rr}$	reverse recovery time		[1]	-	4	ns

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

## 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
BAS16H	-	plastic surface mounted package; 2 leads	SOD123F

## 4. Marking

Table 4: Marking codes

Type number	Marking code
BAS16H	A1

## 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		-	100	V
$V_R$	reverse voltage		-	100	V
$I_F$	forward current		[1]	215	mA
$I_{FRM}$	repetitive peak forward current		-	500	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 50 \mu s$	[2]	4	A
		$t_p = 1 ms$	[2]	2	A
		$t_p = 10 ms$	[2]	1.5	A
$P_{tot}$	total power dissipation		[1]	0.38	W
			[3]	0.83	W
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	+150	°C
$T_{stg}$	storage temperature		-65	+150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) with 60  $\mu m$  copper strip line.

[2] Square wave;  $T_j = 25 \text{ }^\circ\text{C}$  prior to surge.

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

## 6. Thermal characteristics

**Table 6: Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	330	K/W
			[2]	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		-	-	70	K/W

[1] Device mounted on an FR4 PCB with 60  $\mu m$  copper strip line.

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

## 7. Characteristics

**Table 7: Characteristics**

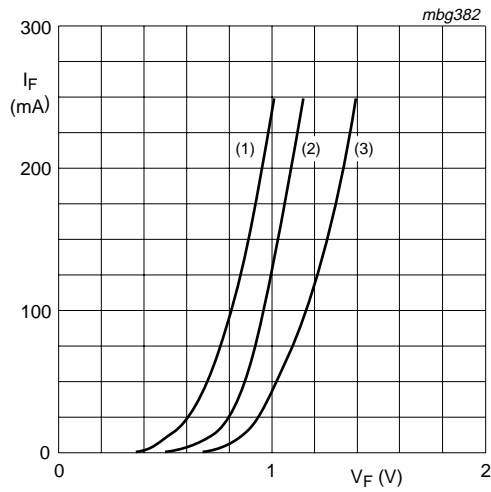
$T_{amb} = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 1\text{ mA}$	[1]	-	715	mV
		$I_F = 10\text{ mA}$	[1]	-	855	mV
		$I_F = 50\text{ mA}$	[1]	-	1	V
		$I_F = 150\text{ mA}$	[1]	-	1.25	V
$I_R$	reverse current	$V_R = 25\text{ V}$	-	-	30	nA
		$V_R = 75\text{ V}$	-	-	1	$\mu\text{A}$
		$V_R = 25\text{ V}; T_j = 150\text{ °C}$	-	-	30	$\mu\text{A}$
		$V_R = 75\text{ V}; T_j = 150\text{ °C}$	-	-	50	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}$	-	-	1.5	pF
$t_{rr}$	reverse recovery time		[2]	-	4	ns
$V_{FR}$	forward recovery voltage		[3]	-	1.75	V

[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

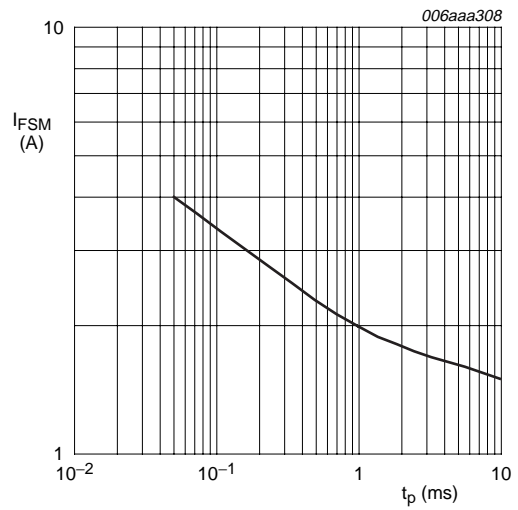
[2] When switched from  $I_F = 10\text{ mA}$  to  $I_R = 10\text{ mA}$ ;  $R_L = 100\text{ }\Omega$ ; measured at  $I_R = 1\text{ mA}$ .

[3] When switched from  $I_F = 10\text{ mA}$ ;  $t_p = 20\text{ ns}$ .



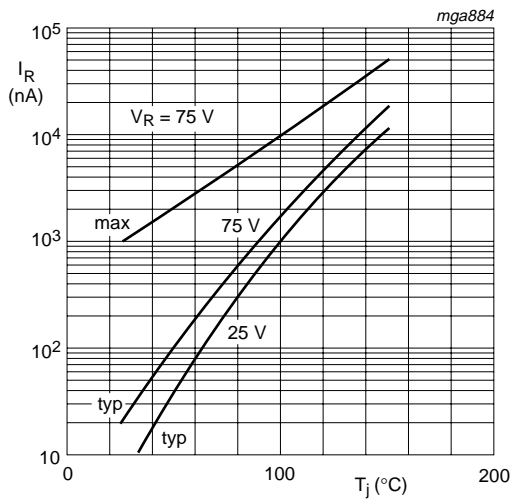
- (1)  $T_{amb} = 150\text{ °C}$ ; typical values
- (2)  $T_{amb} = 25\text{ °C}$ ; typical values
- (3)  $T_{amb} = 25\text{ °C}$ ; maximum values

**Fig 1. Forward current as a function of forward voltage**

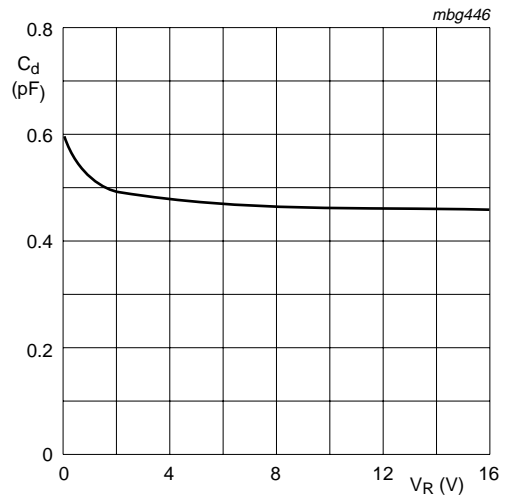


Based on square wave currents  
 $T_j = 25\text{ °C}$ ; prior to surge

**Fig 2. Non-repetitive peak forward current as a function of pulse duration**



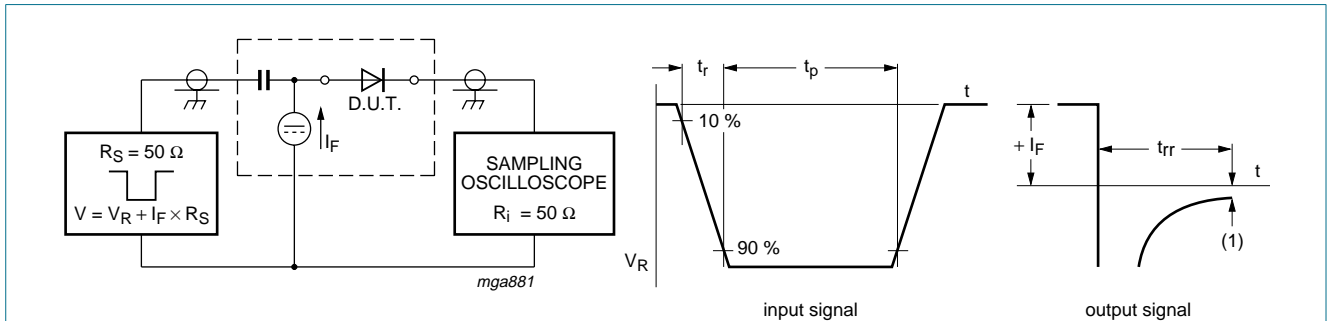
**Fig 3. Reverse current as a function of junction temperature**



$f = 1\text{ MHz}$ ;  $T_j = 25\text{ °C}$

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

**8. Test information**

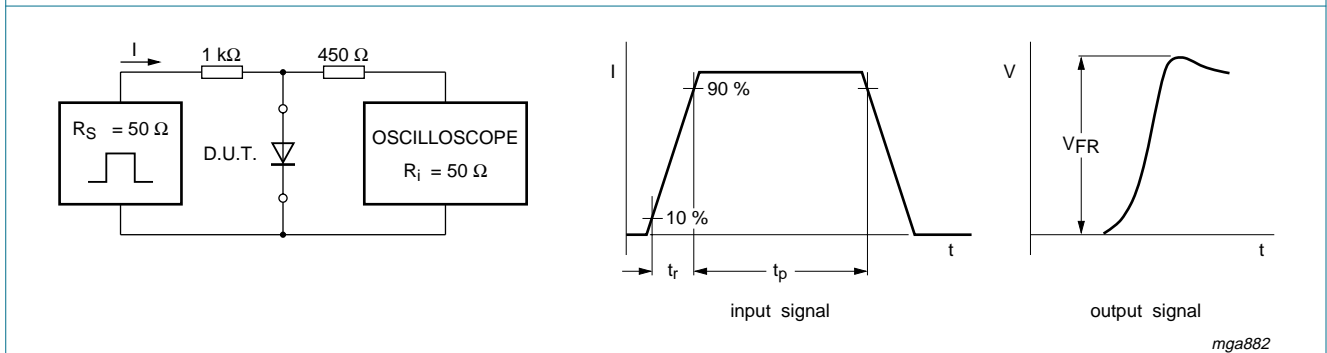


(1)  $I_R = 1 \text{ mA}$

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

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

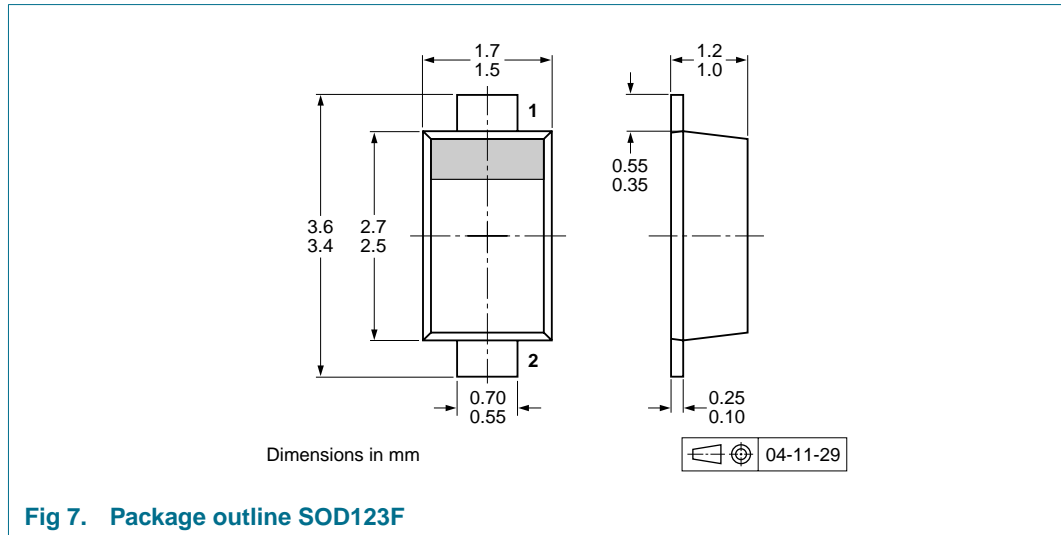
**Fig 5. Reverse recovery time test circuit and waveforms**



Input signal: forward pulse rise time  $t_r = 20 \text{ ns}$ ; forward current pulse duration  $t_p \geq 100 \text{ ns}$ ; duty factor  $\delta \leq 0.005$

**Fig 6. Forward recovery voltage test circuit and waveforms**

## 9. Package outline



## 10. Packing information

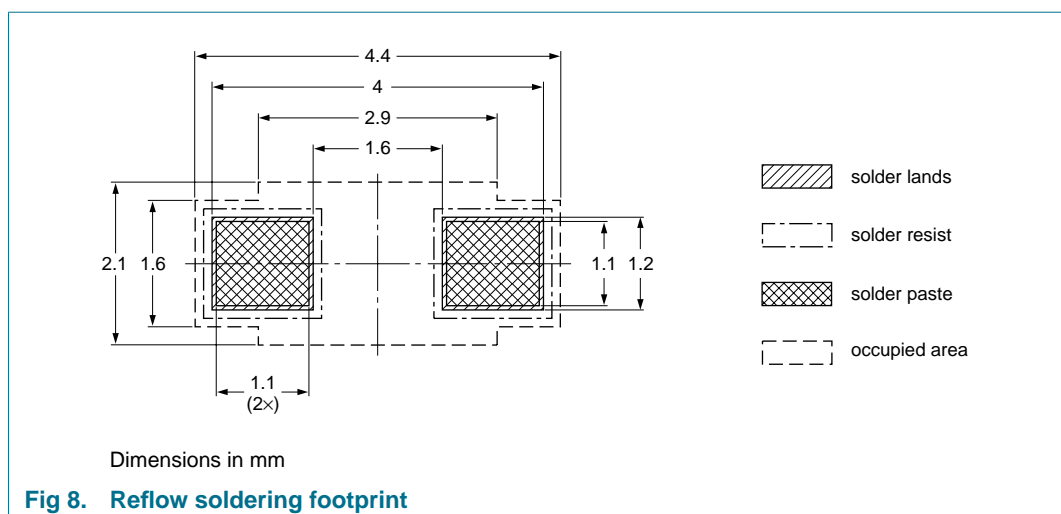
**Table 8: Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code. [1]

Type number	Package	Description	Packing quantity
			3000
BAS16H	SOD123F	4 mm pitch, 8 mm tape and reel	-115

[1] For further information and the availability of packing methods, see [Section 16](#).

## 11. Soldering



## 12. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BAS16H_1	20050415	Product data sheet	-	9397 750 14478	-



## 13. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2]</sup> <sup>[3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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