



# BAS416

## Low-leakage diode

2 October 2020

Product data sheet

## 1. General description

Epitaxial, medium-speed switching diode with a low leakage current encapsulated in a small SOD323 SMD plastic package.

## 2. Features and benefits

- Plastic SMD package
- Low leakage current: typ. 3 pA
- Switching time: typ. 0.8  $\mu$ s
- Continuous reverse voltage: max. 75 V
- Repetitive peak reverse voltage: max. 85 V
- Repetitive peak forward current: max. 500 mA.
- AEC-Q101 qualified

## 3. Applications

- Low-leakage current applications in surface mounted circuits.

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current	$T_j = 25\text{ }^\circ\text{C}$	-	-	200	mA
$V_{RRM}$	repetitive peak reverse voltage		-	-	85	V
$V_F$	forward voltage	$I_F = 50\text{ mA}; T_j = 25\text{ }^\circ\text{C}$	-	-	1.1	V
$I_R$	reverse current	$V_R = 75\text{ V}; \text{pulsed}; T_j = 25\text{ }^\circ\text{C}$	-	0.003	5	nA
$t_{rr}$	reverse recovery time	$I_F = 10\text{ mA}; I_R = 10\text{ mA}; R_L = 100\text{ }\Omega;$ $I_{R(\text{meas})} = 1\text{ mA}; T_j = 25\text{ }^\circ\text{C}$	-	0.8	3	$\mu$ s

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SOD323	 aaa-032142
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS416	SOD323	plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body	SOD323

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BAS416	D4

## 8. 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	$T_j = 25\text{ °C}$		-	85	V
$V_R$	reverse voltage			-	75	V
$I_F$	forward current			-	200	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	4	A
		$t_p = 1\text{ ms}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	1	A
		$t_p = 1\text{ s}$ ; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	0.5	A
$I_{FRM}$	repetitive peak forward current			-	500	mA
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25\text{ °C}$	[1]	-	250	mW
$T_j$	junction temperature			-	150	°C
$T_{\text{amb}}$	ambient temperature			-55	150	°C
$T_{\text{stg}}$	storage temperature			-65	150	°C

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

## 9. Thermal characteristics

Table 6. Thermal characteristics

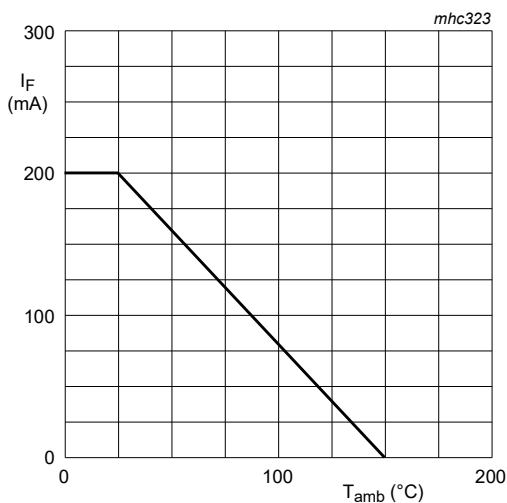
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	In free air	[1]	-	-	450	K/W

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

## 10. Characteristics

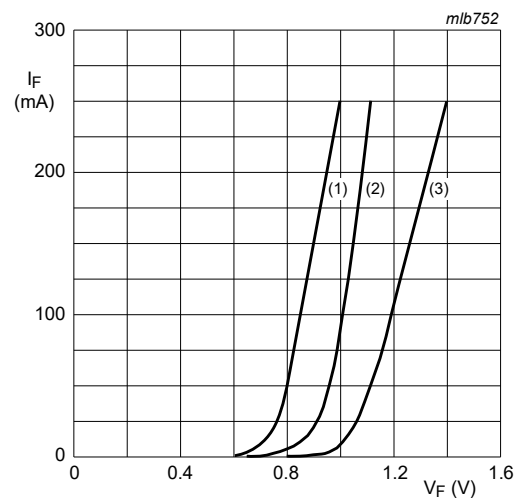
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$		-	-	0.9	V
		$I_F = 10 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$		-	-	1	V
		$I_F = 50 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$		-	-	1.1	V
		$I_F = 150 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$		-	-	1.25	V
$I_R$	reverse current	$V_R = 75 \text{ V}; \text{ pulsed}; T_j = 25 \text{ }^\circ\text{C}$		-	0.003	5	nA
		$V_R = 75 \text{ V}; \text{ pulsed}; T_j = 150 \text{ }^\circ\text{C}$		-	3	80	nA
$C_d$	diode capacitance	$V_R = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$		-	2	-	pF
$t_{rr}$	reverse recovery time	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \text{ }^\Omega;$ $I_{R(\text{meas})} = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$		-	0.8	3	$\mu\text{s}$



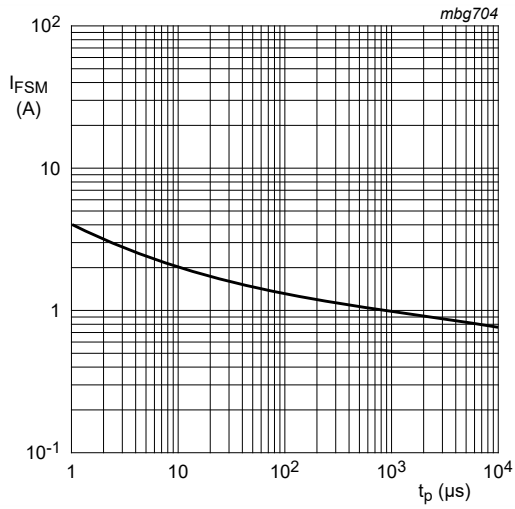
Device mounted on an FR4 printed-circuit board.

Fig. 1. Maximum permissible continuous forward current as a function of ambient temperature.



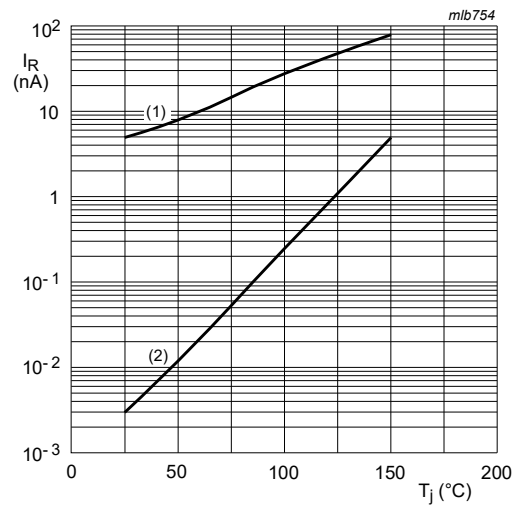
- (1)  $T_{amb} = 150 \text{ }^\circ\text{C}$ ; typical values
- (2)  $T_{amb} = 25 \text{ }^\circ\text{C}$ ; typical values
- (3)  $T_{amb} = 25 \text{ }^\circ\text{C}$ ; maximum values

Fig. 2. Forward current as a function of forward voltage; per diode



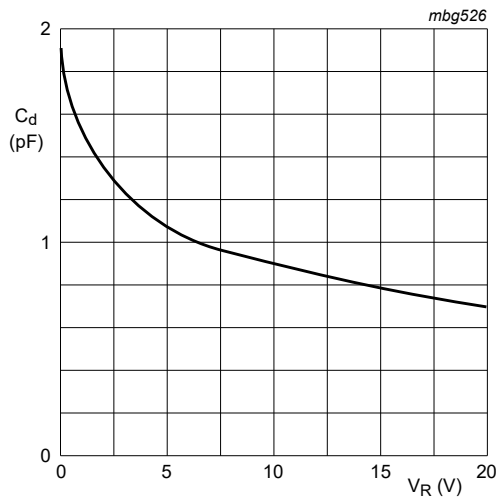
Based on square wave currents.  
 $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$

**Fig. 3. Non-repetitive peak forward current as a function of pulse duration; typical values**



$V_R = 75\text{ V}$   
 (1) Maximum values  
 (2) Typical values

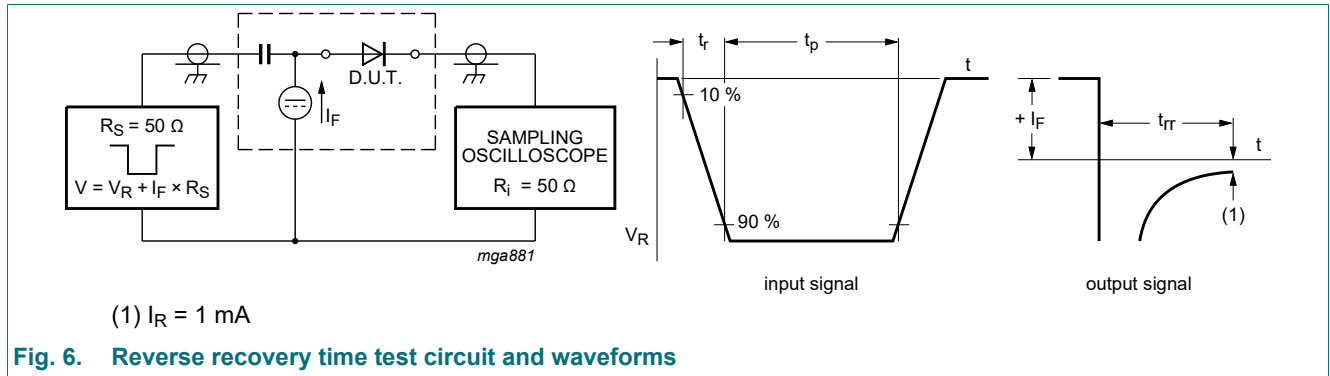
**Fig. 4. Reverse current as a function of junction temperature**



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

**Fig. 5. Diode capacitance as a function of reverse voltage; typical values**

## 11. Test information



### 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.

## 12. Package outline

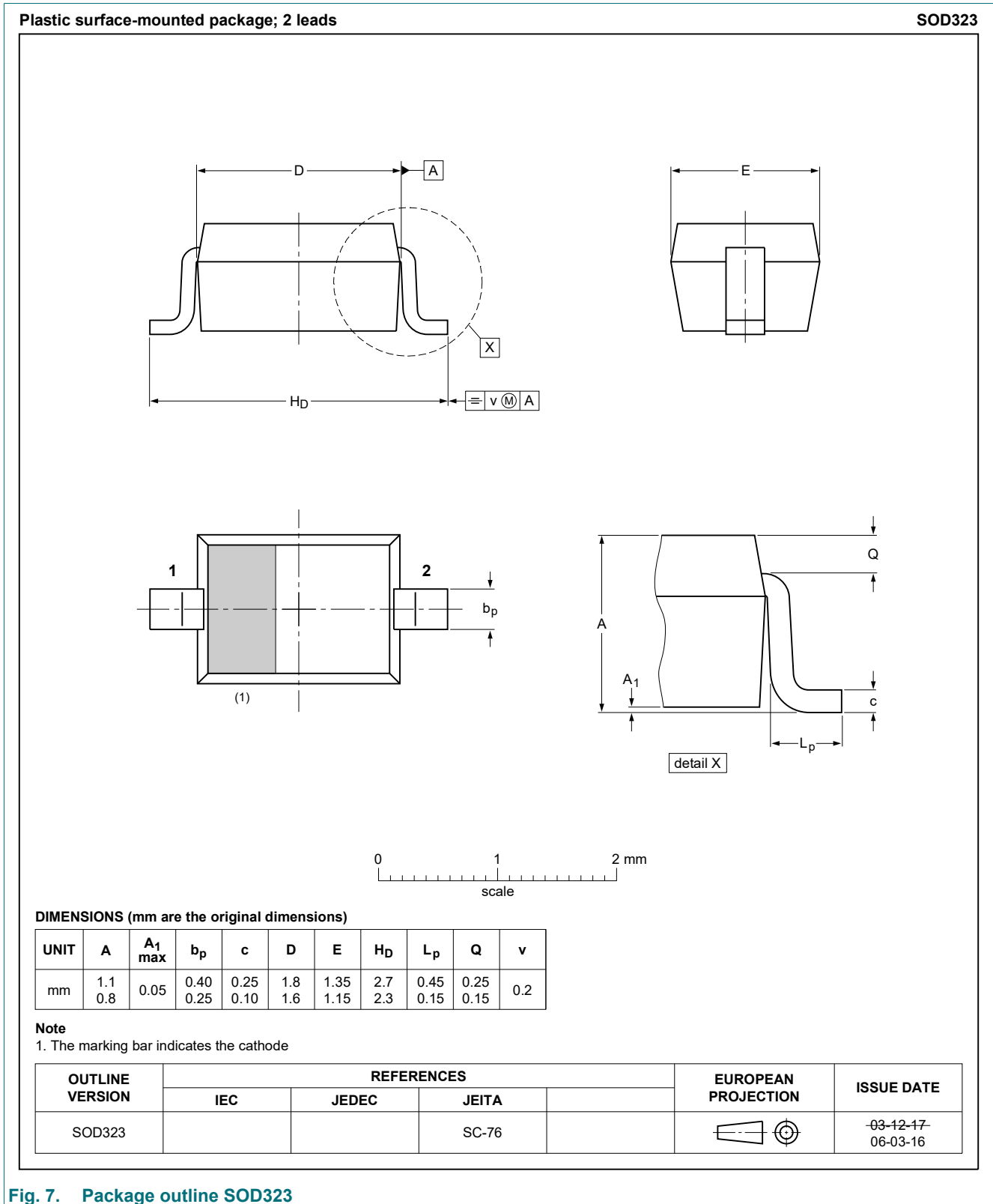


Fig. 7. Package outline SOD323

### 13. Soldering

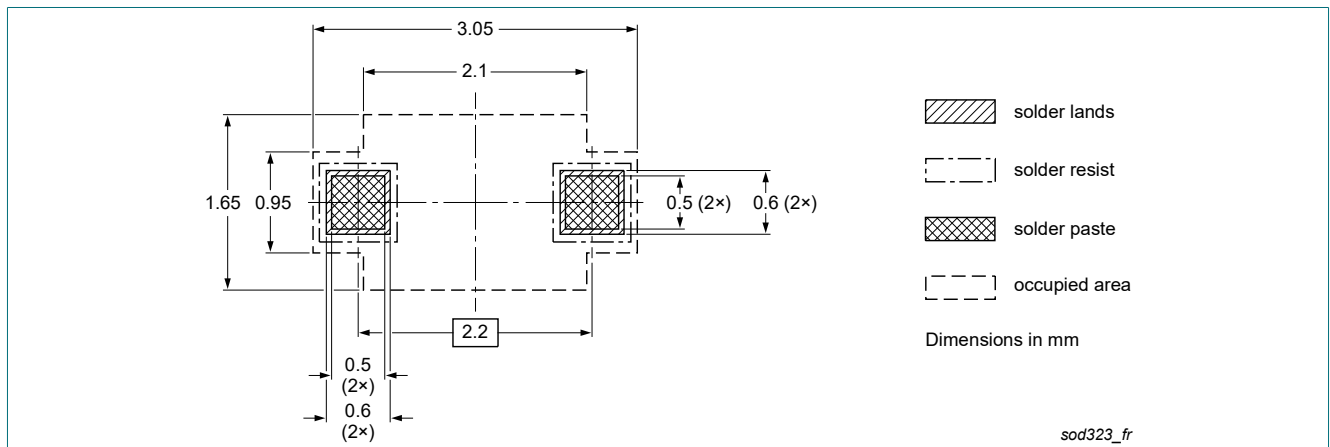


Fig. 8. Reflow soldering footprint for SOD323

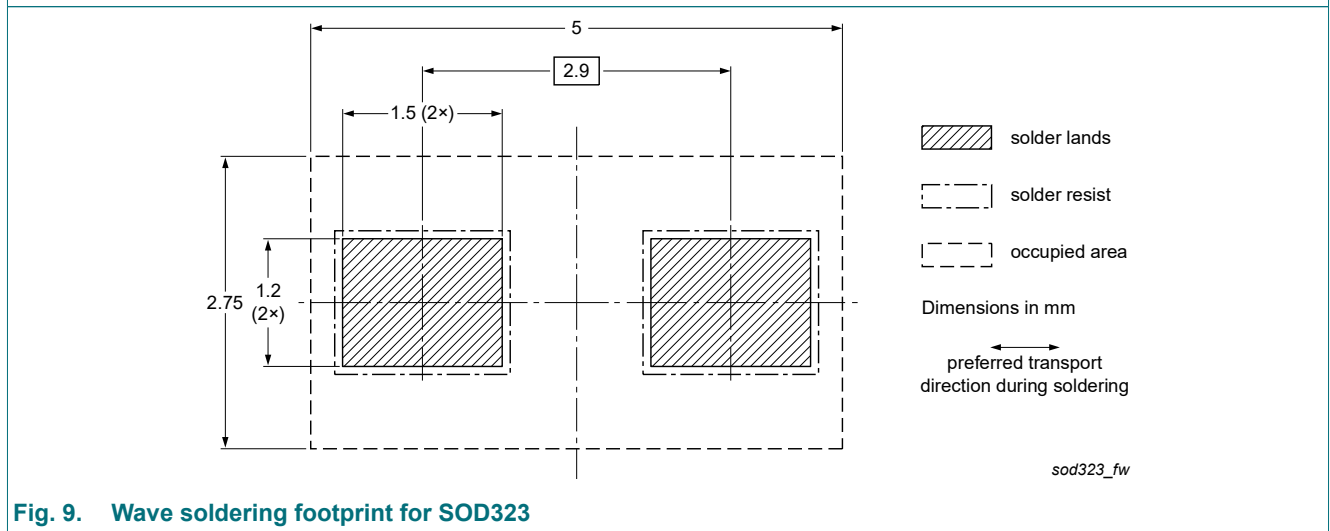


Fig. 9. Wave soldering footprint for SOD323

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS416 v.3	20201002	Product data sheet	-	BAS416 v.2
Modifications:	<ul style="list-style-type: none"><li>• AEC-Q101 qualified attributes inserted in sections "Features and benefits", "Test information" and "Legal information".</li><li>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li></ul>			
BAS416 v.2	20040126	Product data sheet	-	BAS416 v.1
BAS416 v.1	20021119	Product data sheet	-	-



## 15. Legal information

### 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 <https://www.nexperia.com>.

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