



# BAS416-Q

## Low-leakage switching diode

18 April 2023

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 us
- Continuous reverse voltage: max. 75 V
- Repetitive peak reverse voltage: max. 85 V
- Repetitive peak forward current: max. 500 mA
- Qualified according to AEC-Q101 and recommended for use in automotive applications

### 3. Applications

- Low-leakage current applications in surface mounted circuits

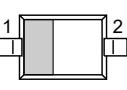
### 4. Quick reference data

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	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \Omega; I_{R(meas)} = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	0.8	3	$\mu\text{s}$

### 5. Pinning information

Table 2. Pinning information

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

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS416-Q	SOD323	plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body	<a href="#">SOD323</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BAS416-Q	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	$T_j = 25^\circ\text{C}$		-	85	V
$V_R$	reverse voltage			-	75	V
$I_F$	forward current			-	200	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1 \mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25^\circ\text{C}$		-	4	A
		$t_p = 1 \text{ ms}$ ; square wave; $T_{j(\text{init})} = 25^\circ\text{C}$		-	1	A
		$t_p = 1 \text{ s}$ ; square wave; $T_{j(\text{init})} = 25^\circ\text{C}$		-	0.5	A
$I_{FRM}$	repetitive peak forward current			-	500	mA
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25^\circ\text{C}$	[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

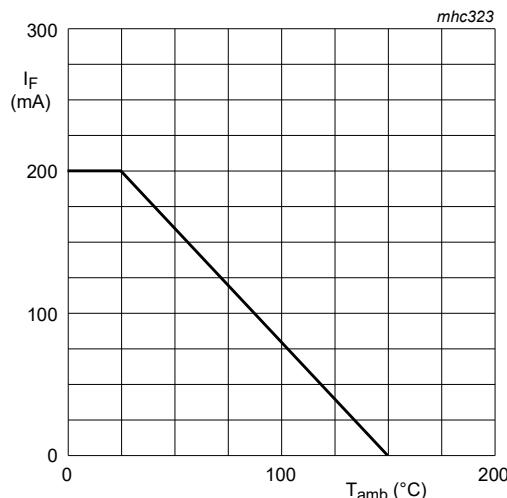
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{\text{th}(j-a)}$	thermal resistance from junction to ambient	In free air	[1]	-	-	450	K/W

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

## 10. Characteristics

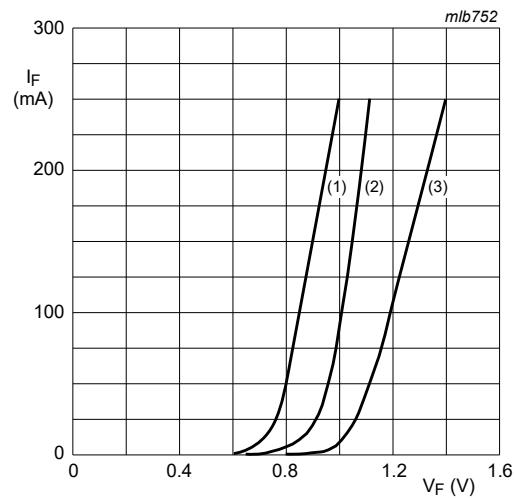
Table 7. Characteristics

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	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \Omega$ $I_{R(\text{meas})} = 1 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	0.8	3	μs



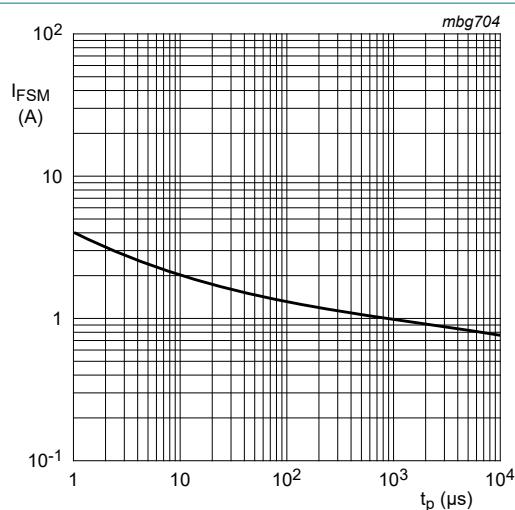
Device mounted on an FR4 printed-circuit board.

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



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

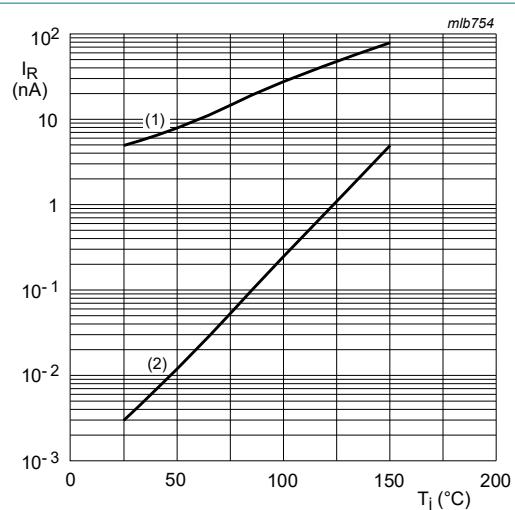
Fig. 2. Forward current as a function of forward voltage; per diode



Based on square wave currents.

$T_{j(\text{init})} = 25^\circ\text{C}$

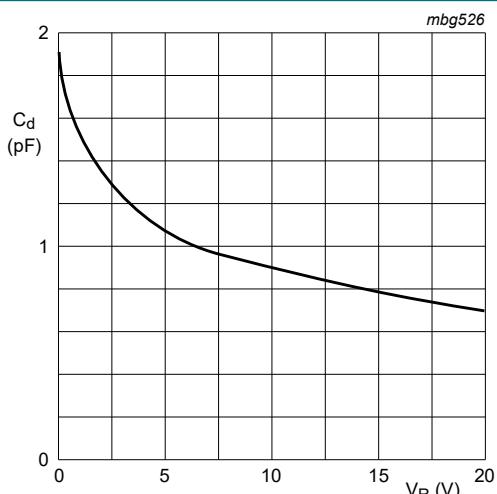
**Fig. 3. Non-repetitive peak forward current as a function of pulse duration; typical values**



$V_R = 75\text{ V}$

(1) Maximum values  
(2) Typical values

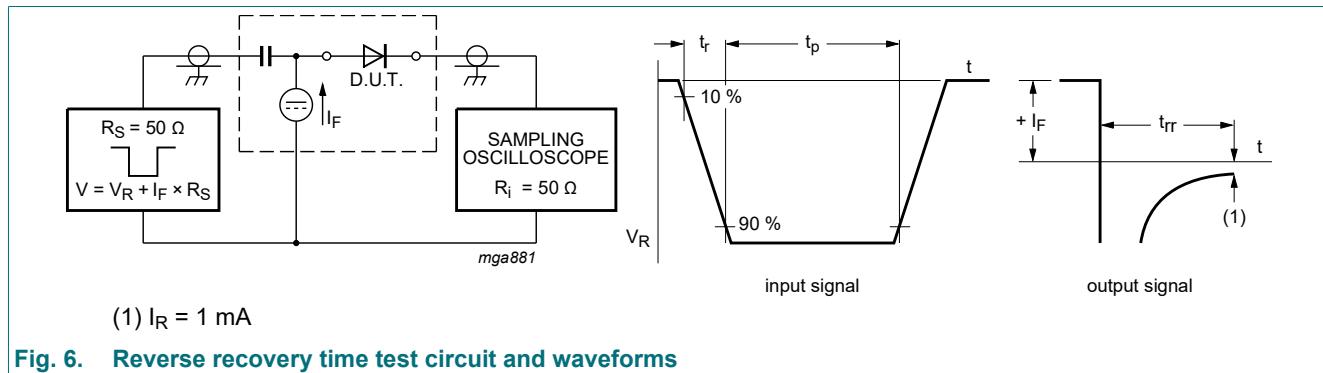
**Fig. 4. Reverse current as a function of junction temperature**



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

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

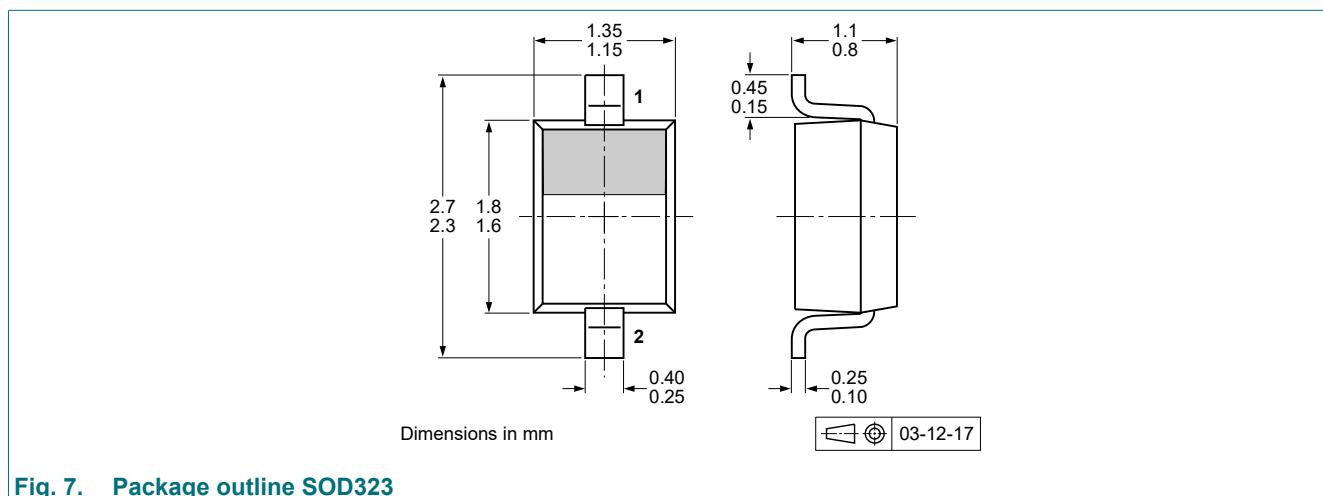
## 11. Test information



### 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



## 13. Soldering

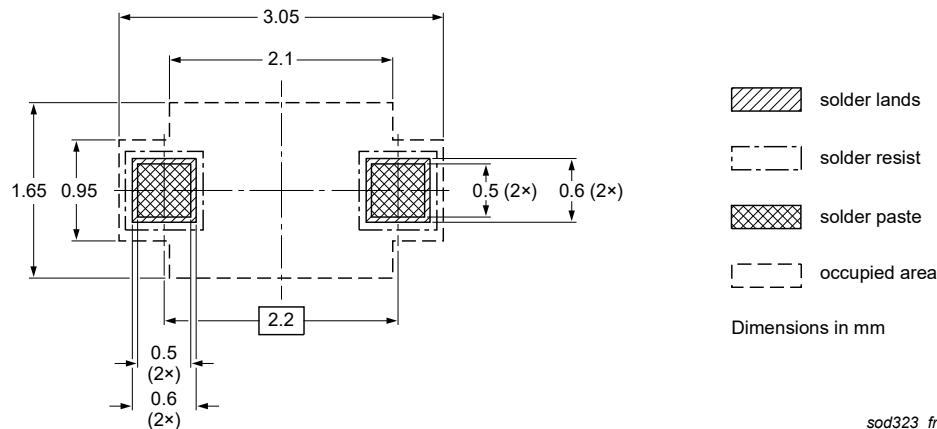


Fig. 8. Reflow soldering footprint for SOD323

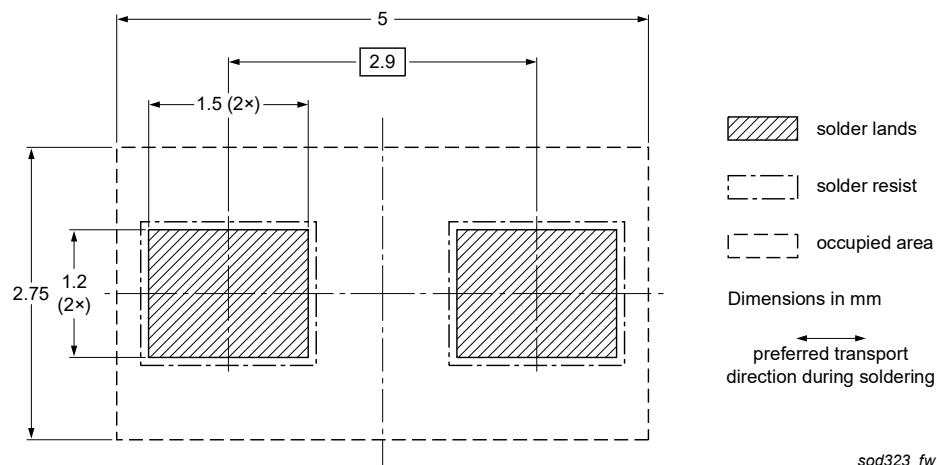


Fig. 9. Wave soldering footprint for SOD323

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS416-Q v.1	20230418	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.

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