



# BAS516

## High-speed switching diode

1 October 2022

Product data sheet

## 1. General description

High-speed switching diode, encapsulated in a ultra small and flat lead SOD523 (SC-79) Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- High switching speed:  $t_{rr} \leq 4 \text{ ns}$
- Low capacitance
- Low leakage current
- Reverse voltage:  $V_R \leq 100 \text{ V}$
- Small SMD plastic package
- Repetitive peak reverse voltage:  $V_{RRM} \leq 100 \text{ V}$

## 3. Applications

- High-speed switching
- General-purpose switching


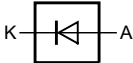
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
$V_R$	reverse voltage	$T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	100	V
$I_R$	reverse current	$V_R = 80 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	0.5	$\mu\text{A}$
$t_{rr}$	reverse recovery time	$I_F = 10 \text{ mA}; I_R = 10 \text{ mA}; R_L = 100 \text{ }\Omega;$ $I_{R(meas)} = 1 \text{ mA}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	4	ns

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-79 (SOD523)	 006aab040
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">BAS516</a>	SC-79	plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body	<a href="#">SOD523</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
BAS516	6

## 8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
<b>Per diode</b>						
$V_{RRM}$	repetitive peak reverse voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$		-	100	V
$V_R$	reverse voltage			-	100	V
$I_F$	forward current		[1]	-	250	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$ ; square wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$		-	4	A
		$t_p = 1\text{ ms}$ ; square wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$		-	1	A
		$t_p = 1\text{ s}$ ; square wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$		-	0.5	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 0.5\text{ ms}$ ; $\delta \leq 0.25$		-	500	mA
$P_{tot}$	total power dissipation	$T_{sp} \leq 90\text{ }^{\circ}\text{C}$	[1] [2]	-	500	mW
<b>Per device</b>						
$T_j$	junction temperature			-	150	$^{\circ}\text{C}$
$T_{amb}$	ambient temperature			-65	150	$^{\circ}\text{C}$
$T_{stg}$	storage temperature			-65	150	$^{\circ}\text{C}$

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

[2] Soldering point of cathode tab.

## 9. Thermal characteristics

Table 6. Thermal characteristics

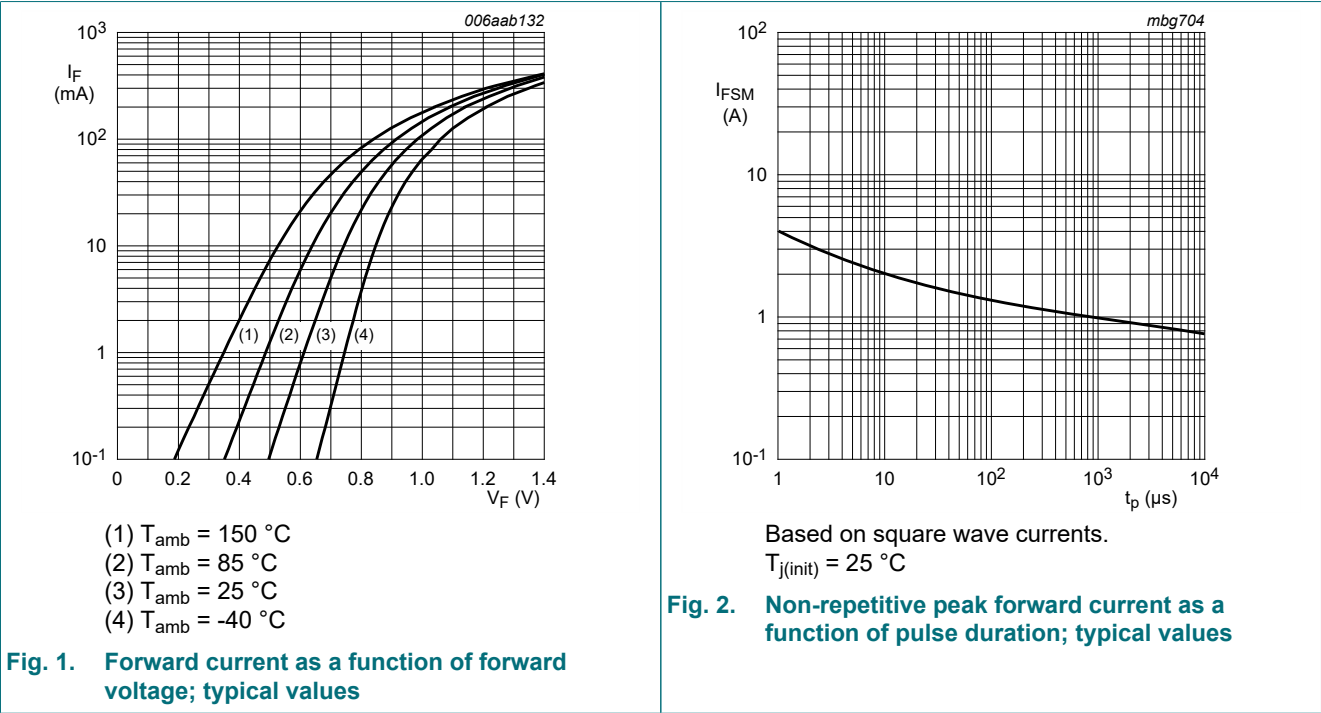
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[1]	-	-	120	K/W

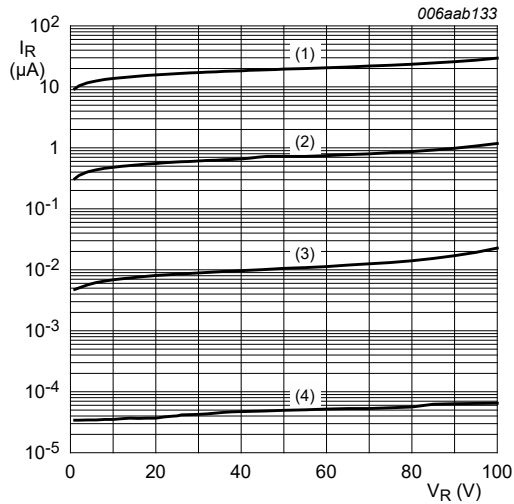
[1] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

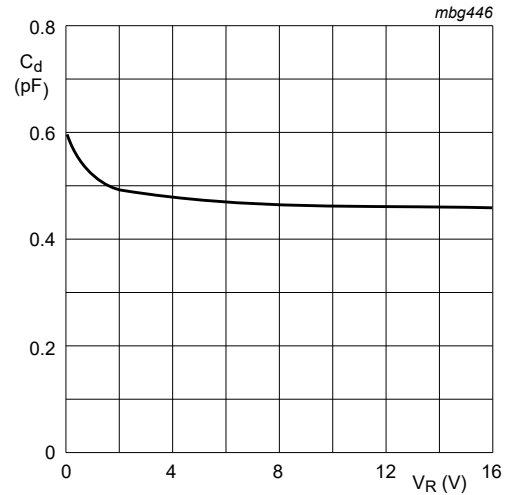
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	715	mV
		I <sub>F</sub> = 10 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	855	mV
		I <sub>F</sub> = 50 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	1	V
		I <sub>F</sub> = 150 mA; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; pulsed; T <sub>amb</sub> = 25 °C		-	-	1.25	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 25 V; T <sub>amb</sub> = 25 °C		-	-	30	nA
		V <sub>R</sub> = 80 V; T <sub>amb</sub> = 25 °C		-	-	0.5	μA
		V <sub>R</sub> = 25 V; T <sub>j</sub> = 150 °C		-	-	30	μA
		V <sub>R</sub> = 80 V; T <sub>j</sub> = 150 °C		-	-	50	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>amb</sub> = 25 °C		-	-	1	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; R <sub>L</sub> = 100 Ω; I <sub>R(meas)</sub> = 1 mA; T <sub>amb</sub> = 25 °C		-	-	4	ns
V <sub>FRM</sub>	peak forward recovery voltage	I <sub>F</sub> = 10 mA; t <sub>r</sub> = 20 ns; T <sub>amb</sub> = 25 °C		-	-	1.75	V





- (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

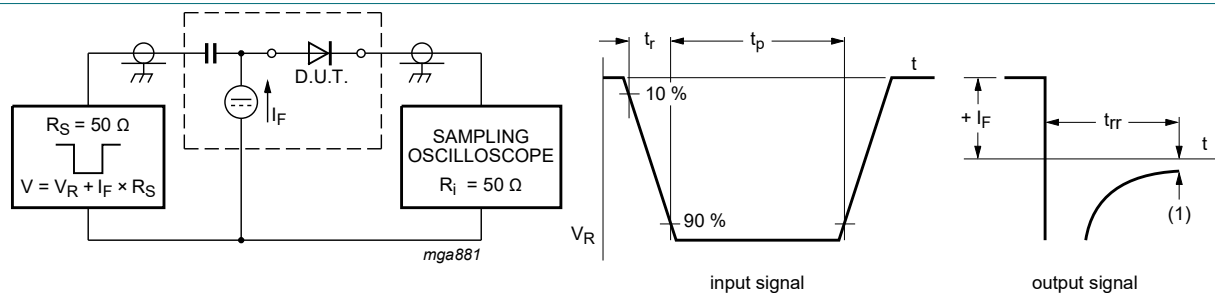
**Fig. 3. Reverse current as a function of reverse voltage; typical values**



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

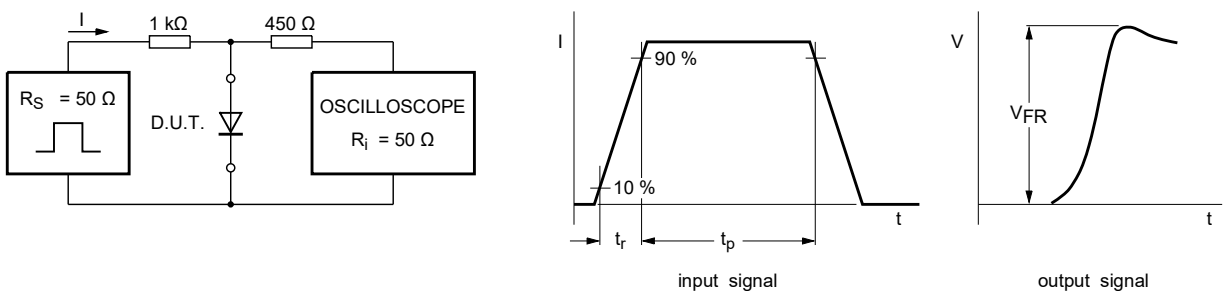
**Fig. 4. Diode capacitance as a function of reverse voltage; typical values**

## 11. 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  $t_r = 0.35\text{ ns}$

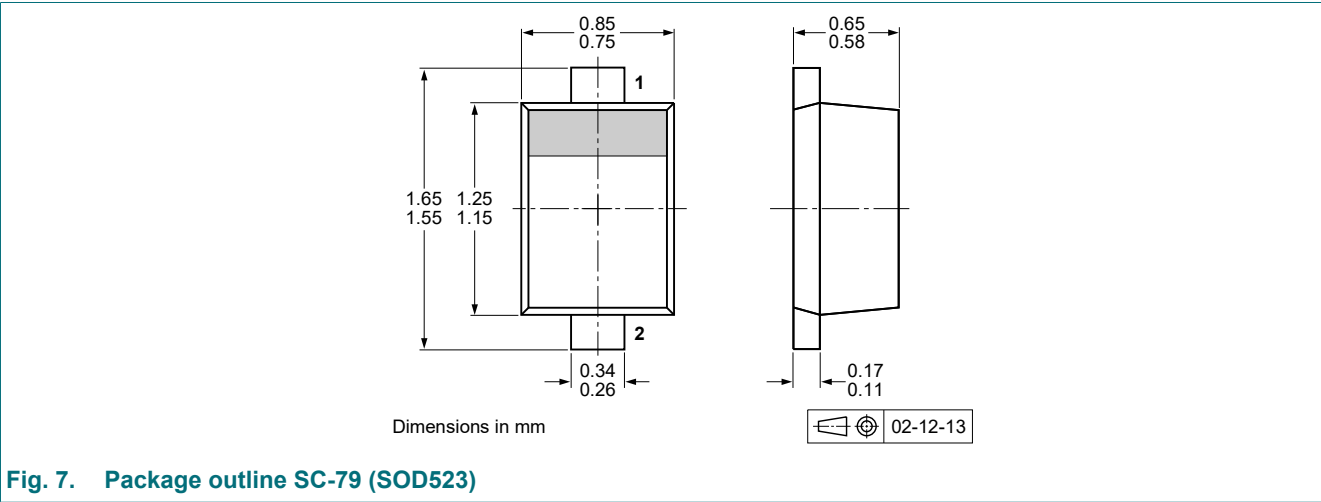
**Fig. 5. Reverse recovery time test circuit and waveforms**



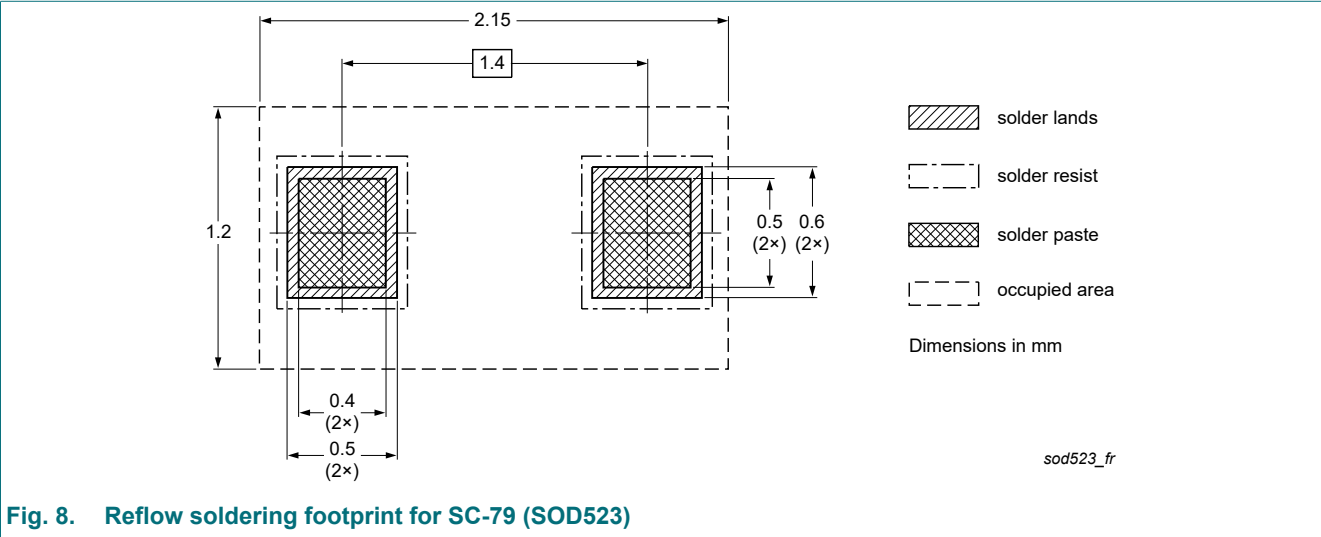
Input signal: forward pulse rise time  $t_r = 20\text{ ns}$ ; forward current pulse duration  $t_p \geq 100\text{ ns}$ ; duty cycle  $\delta \leq 0.005$

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

12. Package outline



13. Soldering



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS516 v.7	20221001	Product data sheet	-	BAS16_SER_6
Modifications:	<ul style="list-style-type: none"> <li>Family data sheet reduced to single type data sheet.</li> <li>Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).</li> </ul>			
BAS16_SER_6	20140924	Product data sheet	-	BAS16_SER_5
BAS16_SER_5	20080825	Product data sheet	-	BAS16_4 BAS16H_1 BAS16J_1 BAS16L_1 BAS16T_1 BAS16VV_BAS16VY_3 BAS16W_4 BAS316_4 BAS516_1
BAS16_4	20011010	Product specification	-	BAS16_3
BAS16H_1	20050415	Product data sheet	-	-
BAS16J_1	20070308	Product data sheet	-	-
BAS16L_1	20030623	Product specification	-	-
BAS16T_1	19980120	Product specification	-	-
BAS16VV_BAS16VY_3	20070420	Product data sheet	-	BAS16VV_BAS16VY_2
BAS16W_4	19990506	Product specification	-	BAS16W_3
BAS316_4	20040204	Product specification	-	BAS316_3
BAS516_1	19980831	Product specification	-	-

## 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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