



# BAS116

## Low-leakage diode

5 August 2020

Product data sheet

## 1. General description

Epitaxial medium-speed switching diode with a low leakage current in a small SOT23 plastic SMD 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	$t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{\text{amb}} = 25^\circ\text{C}$	-	-	215	mA
$V_{\text{RRM}}$	repetitive peak reverse voltage	$T_j = 25^\circ\text{C}$	-	-	85	V
$V_F$	forward voltage	$I_F = 50 \text{ mA}$ ; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25^\circ\text{C}$	-	-	1.1	V
$I_R$	reverse current	$V_R = 75 \text{ V}$ ; pulsed; $T_j = 25^\circ\text{C}$	-	0.003	5	nA
$t_{\text{rr}}$	reverse recovery time	$I_F = 10 \text{ mA}$ ; $I_R = 10 \text{ mA}$ ; $R_L = 100 \Omega$ ; $I_{R(\text{meas})} = 1 \text{ mA}$ ; $T_j = 25^\circ\text{C}$	-	0.8	3	$\mu\text{s}$

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	<p>SOT23</p>	<p>006aaa764</p>
2	n.c.	not connected		
3	K	cathode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS116	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

## 7. Marking

Table 4. Marking codes

Type number	Marking code[1]
BAS116	JV%

[1] % = placeholder for manufacturing site code

## 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	$T_j = 25\text{ }^{\circ}\text{C}$		-	85	V
$V_R$	reverse voltage			-	75	V
$I_F$	forward current	$t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	215	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$ ; square wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$		-	4	A
		$t_p = 1\text{ ms}$ ; square wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$		-	1	A
		$t_p = 1\text{ s}$ ; square wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$		-	0.5	A
$I_{FRM}$	repetitive peak forward current			-	500	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[1]	-	250	mW
<b>Per device, one diode loaded</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.

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]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	330	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.  
[2] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 1\text{ mA}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25\text{ }^\circ\text{C}$		-	-	0.9	V
		$I_F = 10\text{ mA}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25\text{ }^\circ\text{C}$		-	-	1	V
		$I_F = 50\text{ mA}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25\text{ }^\circ\text{C}$		-	-	1.1	V
		$I_F = 150\text{ mA}$ ; $t_p \leq 300\text{ }\mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25\text{ }^\circ\text{C}$		-	-	1.25	V
$I_R$	reverse current	$V_R = 75\text{ V}$ ; pulsed; $T_j = 25\text{ }^\circ\text{C}$		-	0.003	5	nA
		$V_R = 75\text{ V}$ ; 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	$I_F = 10\text{ mA}$ ; $I_R = 10\text{ mA}$ ; $R_L = 100\text{ }\Omega$ ; $I_{R(meas)} = 1\text{ mA}$ ; $T_j = 25\text{ }^\circ\text{C}$		-	0.8	3	$\mu\text{s}$

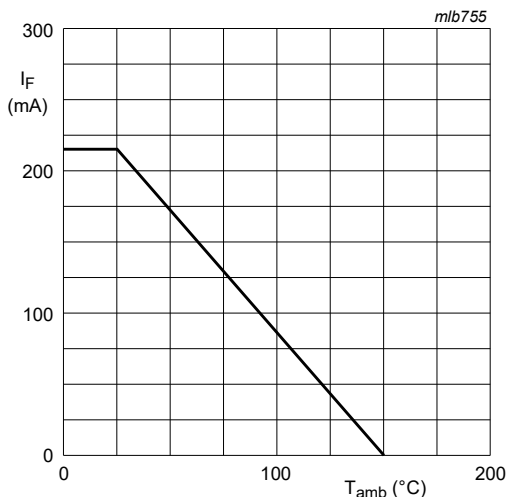
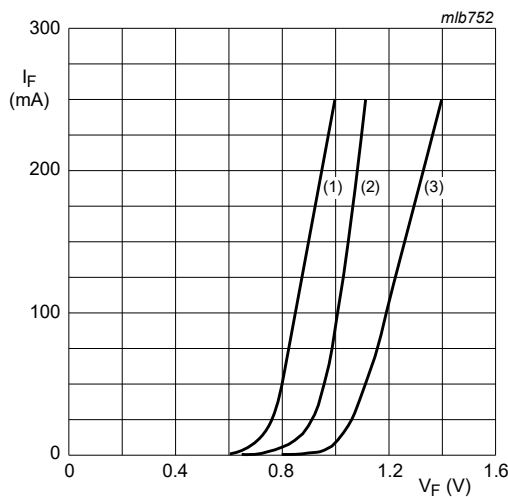
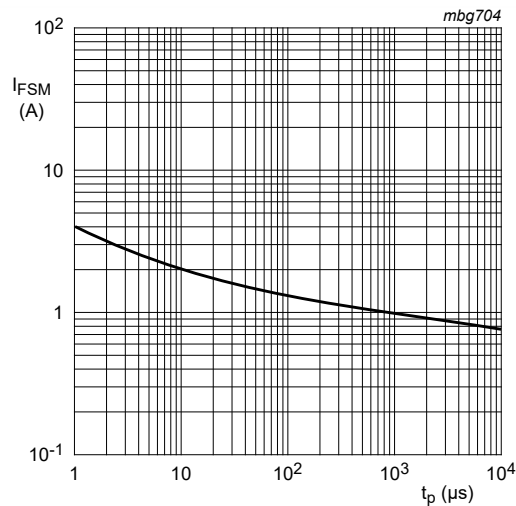


Fig. 1. Forward current as a function of ambient temperature; derating curve

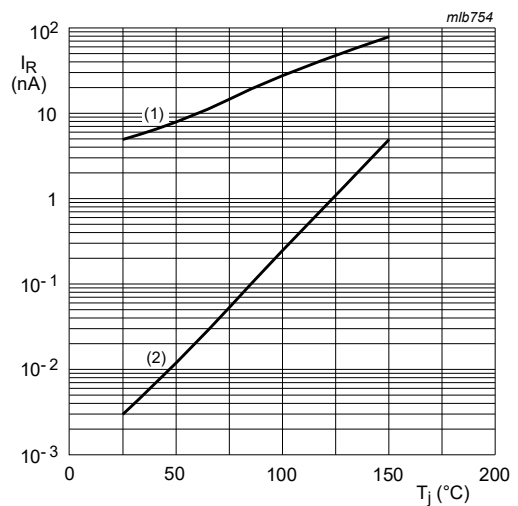


(1)  $T_{amb} = 150\text{ }^\circ\text{C}$ ; typical values  
(2)  $T_{amb} = 25\text{ }^\circ\text{C}$ ; typical values  
(3)  $T_{amb} = 25\text{ }^\circ\text{C}$ ; maximum values  
Fig. 2. Forward current as a function of forward voltage; per diode



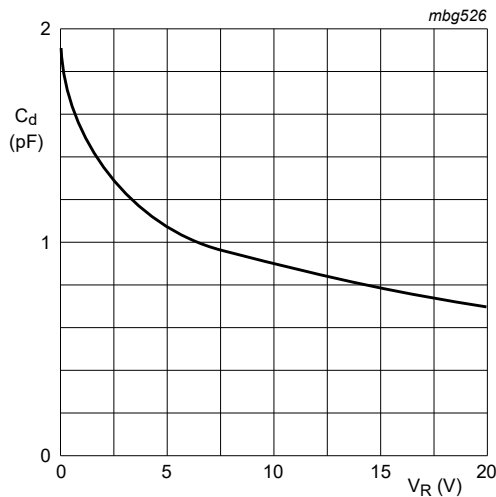
Based on square wave currents.  
 $T_{j(init)} = 25\text{ }^{\circ}\text{C}$

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

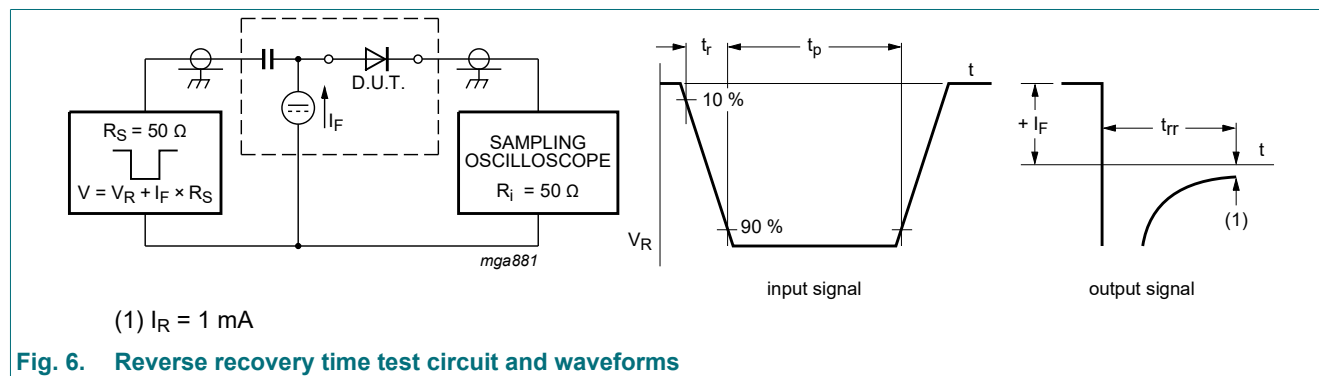
Fig. 4. Reverse current as a function of junction temperature



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

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

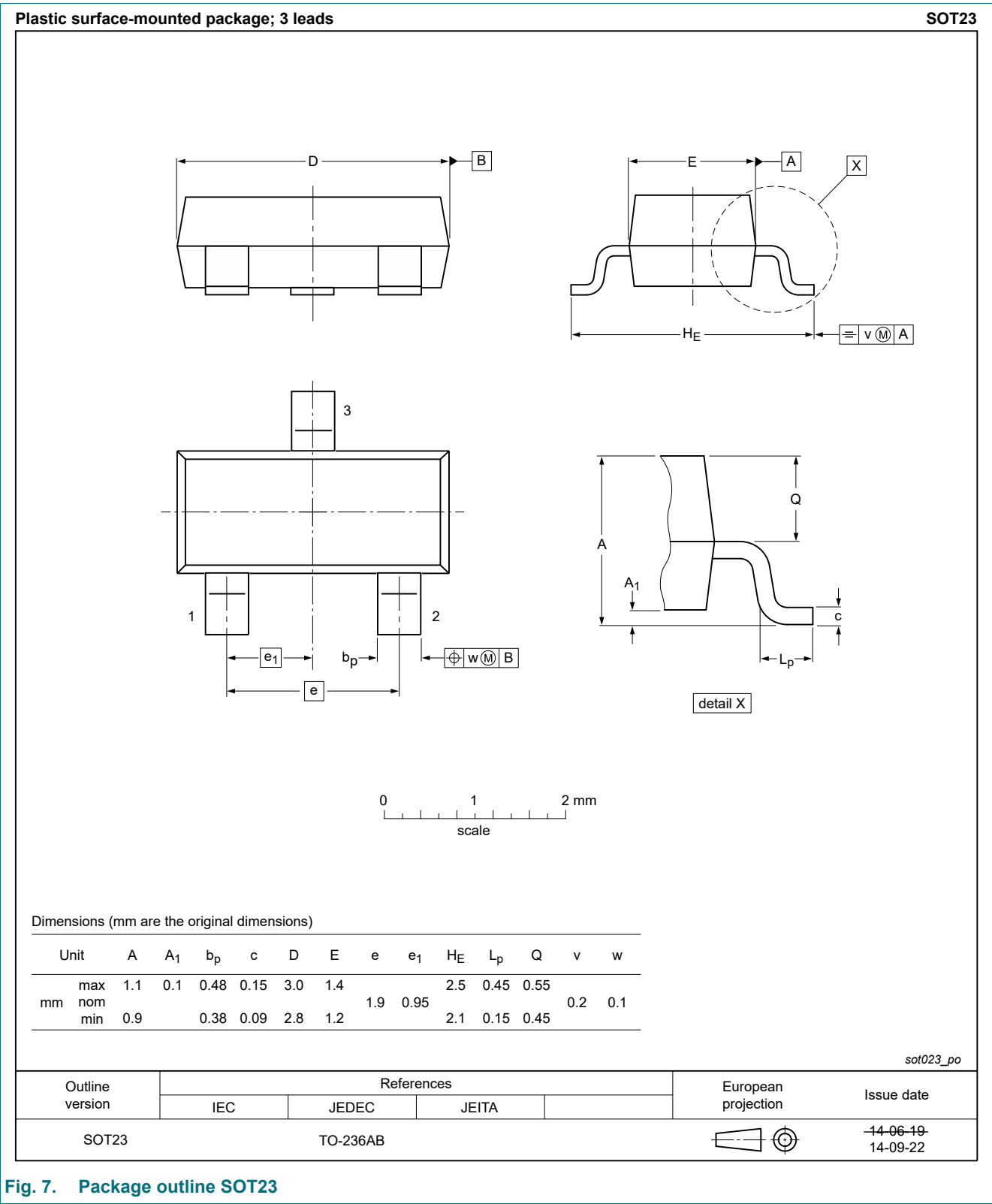


Fig. 7. Package outline SOT23

13. Soldering



Fig. 8. Reflow soldering footprint for SOT23

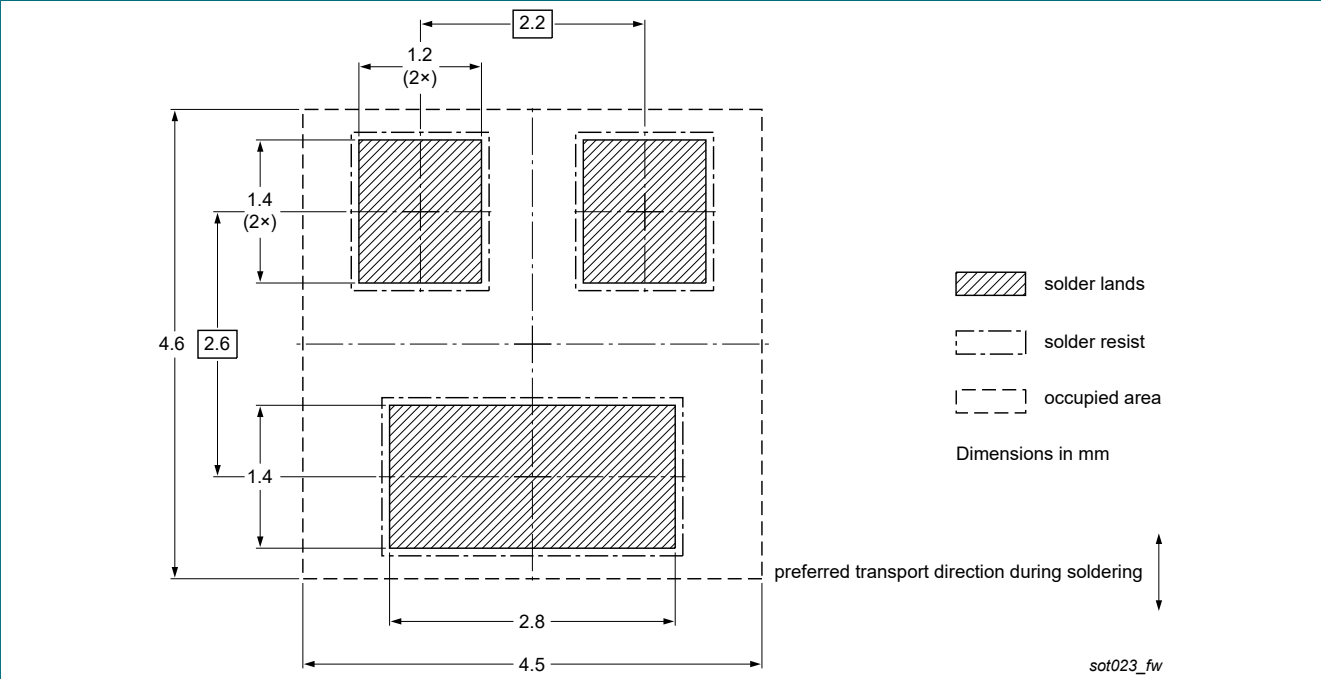


Fig. 9. Wave soldering footprint for SOT23

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS116 v.3	20200805	Product data sheet	-	BAS116 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>			
BAS116 v.2	20031212	Product data sheet	-	BAS116 v.1
BAS116 v.1	19990526	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".
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