



BAS31

General purpose switching diode

24 April 2025

Product data sheet

1. General description

General purpose switching diode, encapsulated in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Small plastic SMD package
- Switching speed: max. 50 ns
- General application
- Continuous reverse voltage: max. 90 V
- Repetitive peak reverse voltage: max. 110 V
- Repetitive peak forward current: max. 600 mA
- Repetitive peak reverse current: max. 600 μ A
- AEC-Q101 qualified

3. Applications

- General purpose switching in e.g. surface mounted circuits

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_R	reverse voltage		-	-	90	V
t_{rr}	reverse recovery time	$I_F = 30$ mA; $I_R = 30$ mA; $R_L = 100$ Ω ; $I_{R(meas)} = 3$ mA; $T_{amb} = 25$ $^{\circ}$ C	-	-	50	ns
I_R	reverse current	$V_R = 90$ V; $T_j = 150$ $^{\circ}$ C	-	-	100	μ A

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS31	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]
BAS31	%V1

[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			-	110	V
V_R	reverse voltage			-	90	V
I_F	forward current	continuous; per diode		-	250	mA
				-	150	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1\text{ }\mu\text{s}$; square wave; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$		-	10	A
		$t_p = 100\text{ }\mu\text{s}$; square wave; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$		-	4	A
		$t_p = 1\text{ s}$; square wave; $T_{j(\text{init})} = 25\text{ }^\circ\text{C}$		-	0.75	A
I_{FRM}	repetitive peak forward current			-	600	mA
P_{tot}	total power dissipation	$T_{\text{amb}} \leq 25\text{ }^\circ\text{C}$	[1]	-	250	mW
T_j	junction temperature			-	150	$^\circ\text{C}$
T_{stg}	storage temperature			-65	150	$^\circ\text{C}$

[1] Device mounted on an FR4 printed-circuit board.

9. Thermal characteristics

Table 6. Thermal characteristics

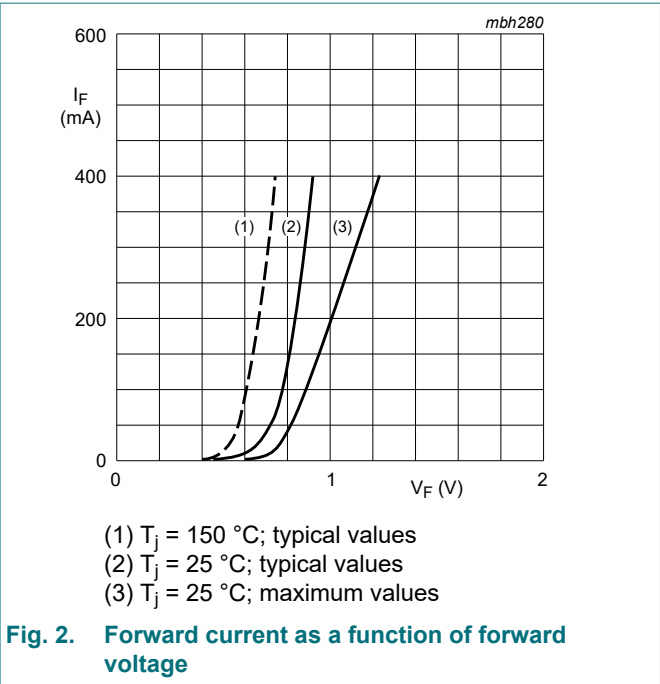
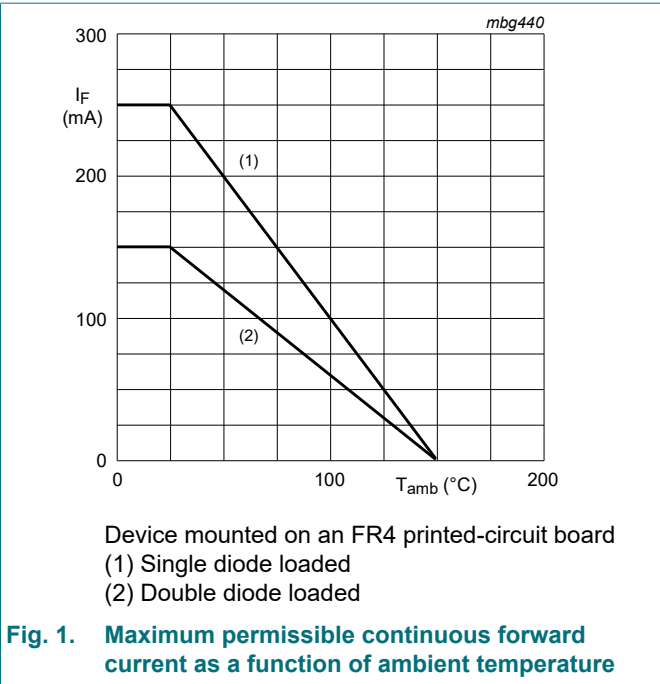
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient		[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	360	K/W

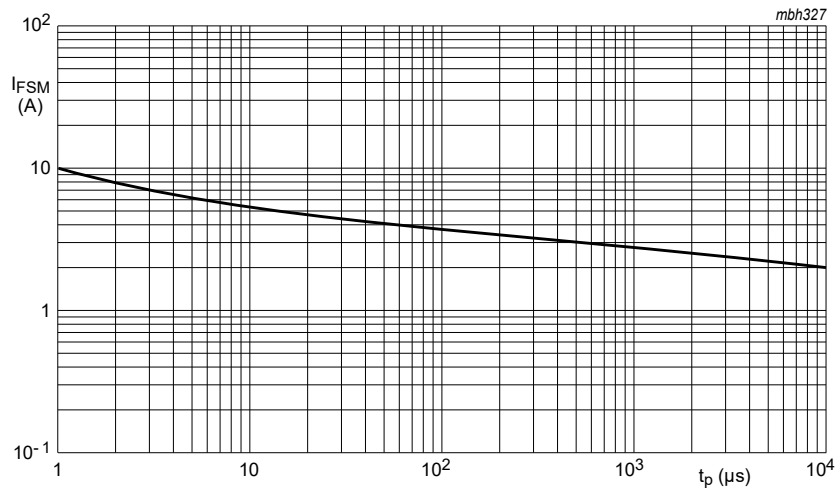
[1] Device mounted on an FR4 printed-circuit board.

10. Characteristics

Table 7. Characteristics

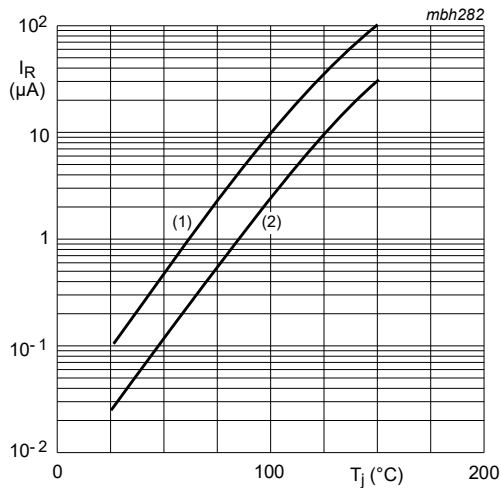
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$		120	-	170	V
V_F	forward voltage	$I_F = 10\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	-	750	mV
		$I_F = 50\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	-	840	mV
		$I_F = 100\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	-	900	mV
		$I_F = 200\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	-	1	V
		$I_F = 400\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	-	1.25	V
I_R	reverse current	$V_R = 90\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	-	100	nA
		$V_R = 90\text{ V}$; $T_j = 150\text{ }^{\circ}\text{C}$		-	-	100	μA
C_d	diode capacitance	$V_R = 0\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	35	pF
t_{rr}	reverse recovery time	$I_F = 30\text{ mA}$; $I_R = 30\text{ mA}$; $R_L = 100\text{ }\Omega$; $I_{R(meas)} = 3\text{ mA}$; $T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	50	ns
I_{RM}	peak reverse recovery current			-	-	600	mA





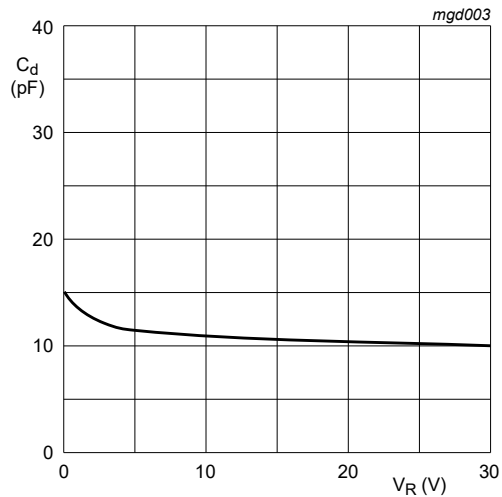
Based on square wave currents
 $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge

Fig. 3. Maximum permissible non-repetitive peak forward current as a function of pulse duration



(1) $V_R = 90\text{ V}$; maximum values
(2) $V_R = 90\text{ V}$; typical values

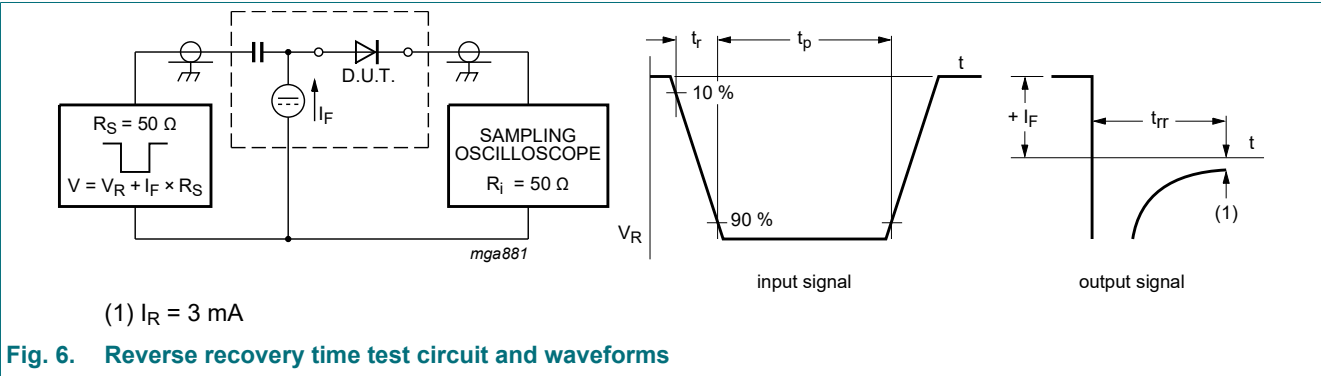
Fig. 4. Reverse current as a function of junction temperature



$f = 1\text{ MHz}$
 $T_j = 25\text{ }^{\circ}\text{C}$

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

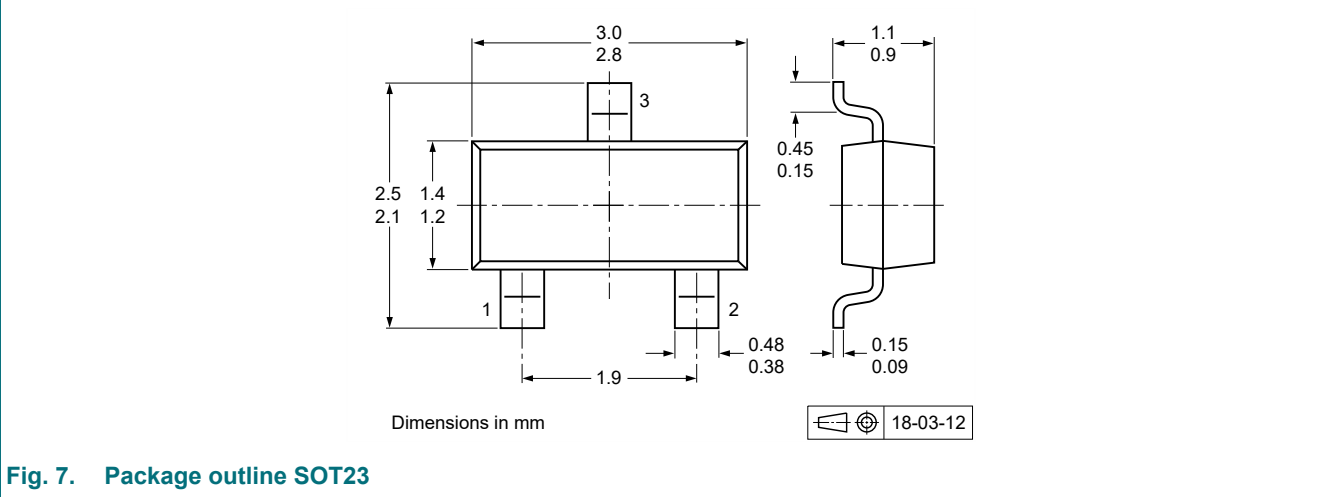
11. Test information



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



13. Soldering

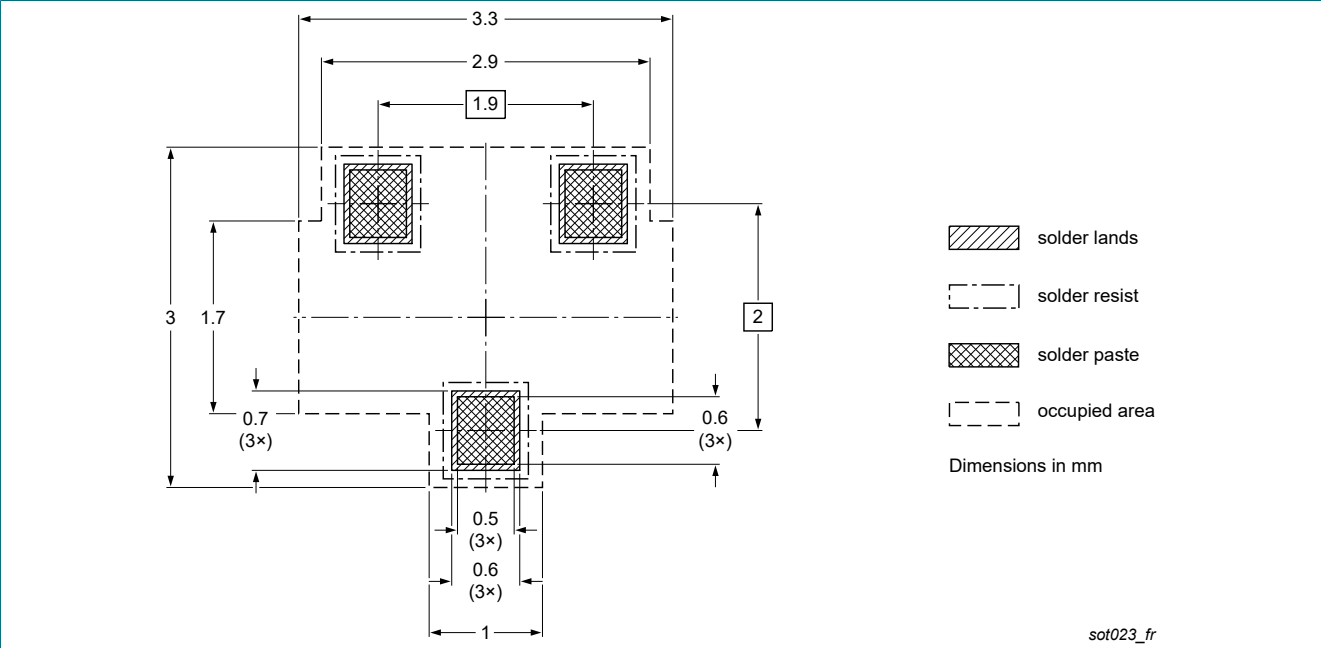


Fig. 8. Reflow soldering footprint for SOT23

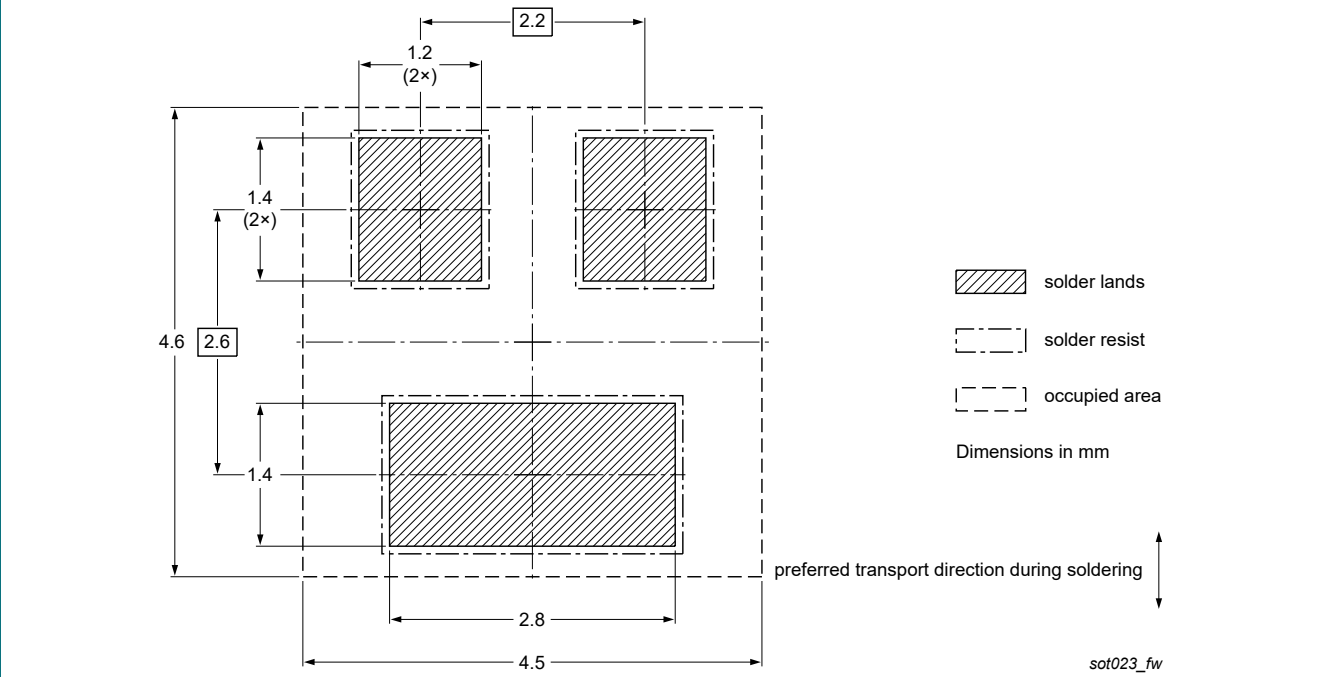


Fig. 9. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS31 v.3	20250424	Product data sheet	-	BAS29_31_35 v.2
Modifications:	<ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.Legal texts have been adapted to the new company name where appropriate.Family data sheet split to single type data sheets.			
BAS29_31_35 v.2	20030320	Product data sheet	-	BAS29_31_35 v.1
BAS29_31_35 v.1	20010910	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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