BAS101

High-voltage switching diode

5 April 2024 Product data sheet

1. General description

High-voltage switching dual diode, encapsulated in a SOT23 small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- Low leakage current
- Repetitive peak reverse voltage: $V_{RRM} \leq 300$
- Low capacitance: $C_d \leq 2$ pF
- Reverse voltage: $V_R \leq 300$ V
- Small SMD plastic package
- AEC-Q101 qualified

3. Applications

- High-speed switching
- High-voltage switching
- Voltage clamping
- Reverse polarity protection

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_F	forward current			-	-	200	mA
I_R	reverse current	V_R = 250 V; T_{amb} = 25 °C		-	-	150	nA
V_R	reverse voltage			-	-	300	V
t_{rr}	reverse recovery time	When switched from I_F = 30 mA to I_R = 30 mA; R_L = 100 Ω; measured at I_R = 3 mA; T_{amb} = 25 °C		-	-	50	ns

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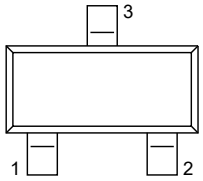
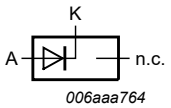
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 SOT23	
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAS101	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]
BAS101	%HQ

[1] % = placeholder for manufacturing site code

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8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_{RRM}	repetitive peak reverse voltage			-	300	V
V_R	reverse voltage			-	300	V
I_F	forward current			-	200	mA
I_{FSM}	non-repetitive peak forward current	$t_p \leq 1$ µs; square wave; $T_{j(init)} = 25$ °C		-	9	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1$ ms; $\delta \leq 0.25$		-	1	A
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	250	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{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
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W

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

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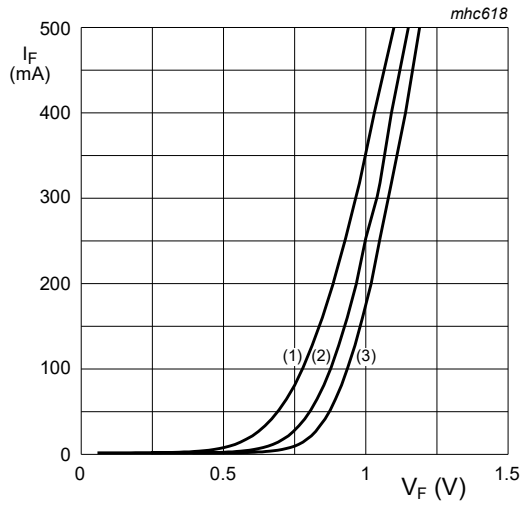
10. Characteristics

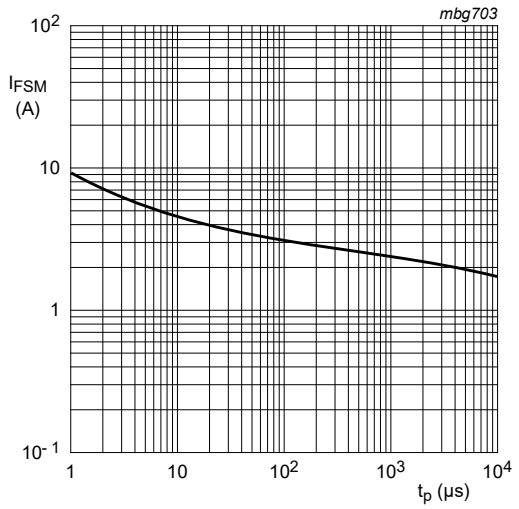
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 100 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; T_{amb} = 25 °C		-	-	1.1	V
I_R	reverse current	V_R = 250 V; T_{amb} = 25 °C		-	-	150	nA
		V_R = 250 V; T_j = 150 °C		-	-	100	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_{amb} = 25 °C		-	-	2	pF
t_{rr}	reverse recovery time	When switched from I_F = 30 mA to I_R = 30 mA; R_L = 100 Ω; measured at I_R = 3 mA; T_{amb} = 25 °C		-	-	50	ns



(1) T_{amb} = 150° C
(2) T_{amb} = 75° C
(3) T_{amb} = 25° C

Fig. 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.
$T_{j(init)}$ = 25 °C prior to surge.

Fig. 2. Non-repetitive peak forward current as a function of pulse duration; maximum values

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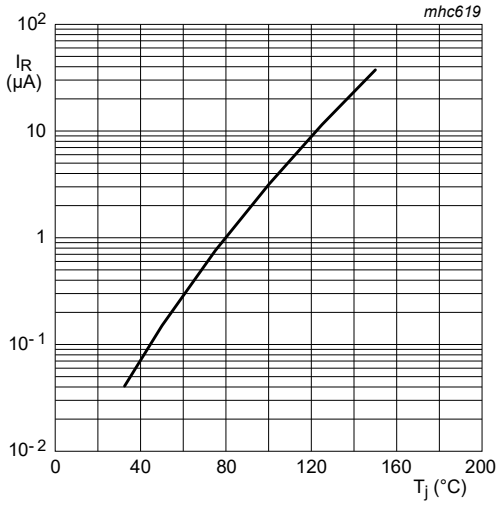
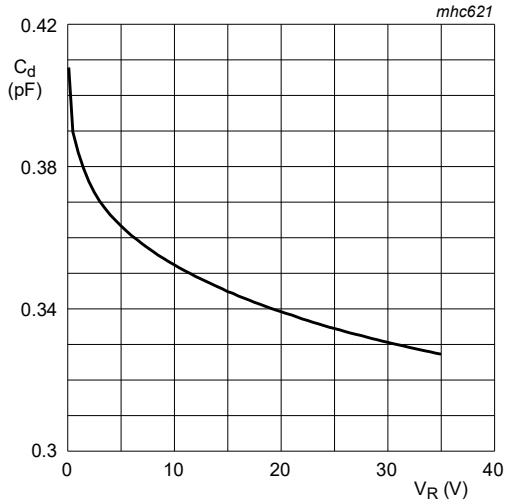


V_R = 300 V

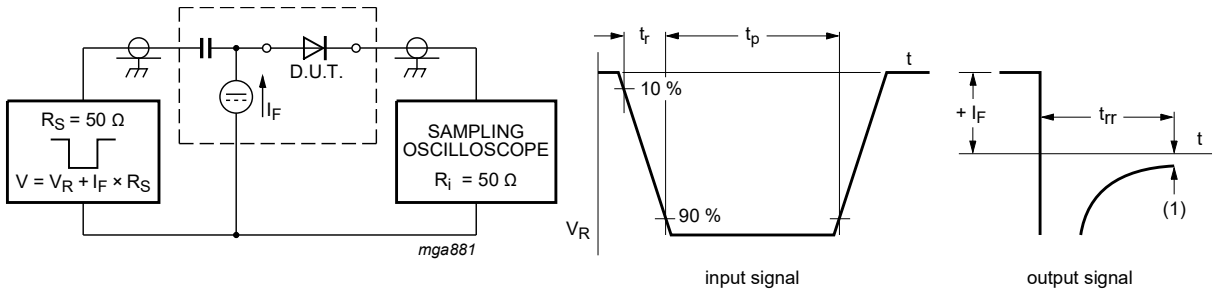
Fig. 3. Reverse current as a function of junction temperature; typical values



f = 1 MHz
T_{amb} = 25 °C

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

11. Test information



(1) I_R = 3 mA

Fig. 5. Reverse recovery time test circuit and waveforms

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.

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12. Package outline

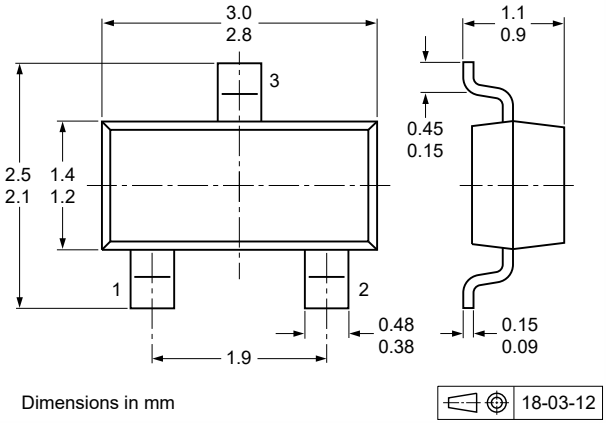

Fig. 6. Package outline SOT23

13. Soldering

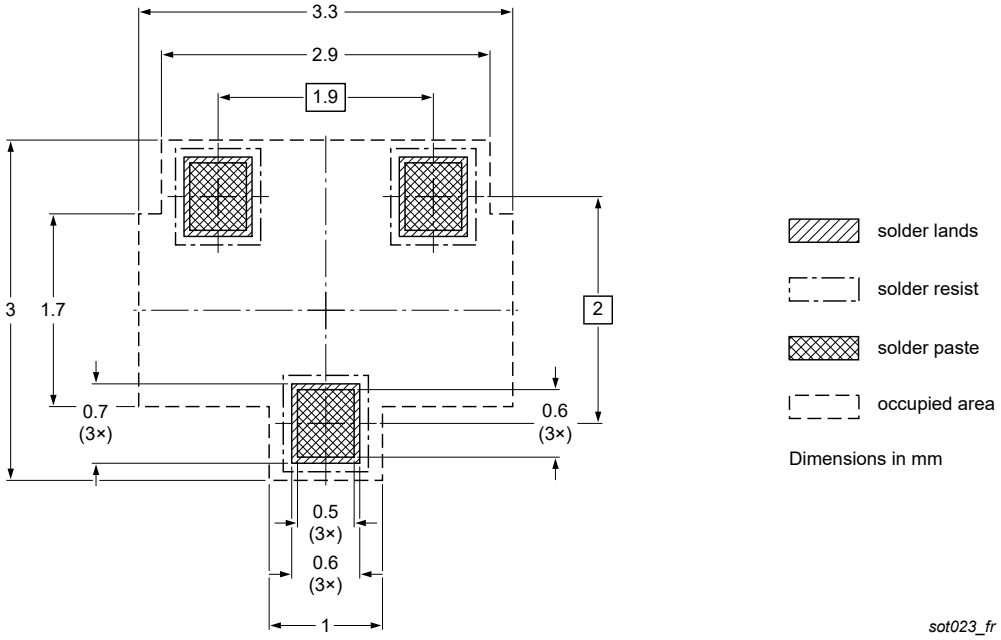

Fig. 7. Reflow soldering footprint for SOT23

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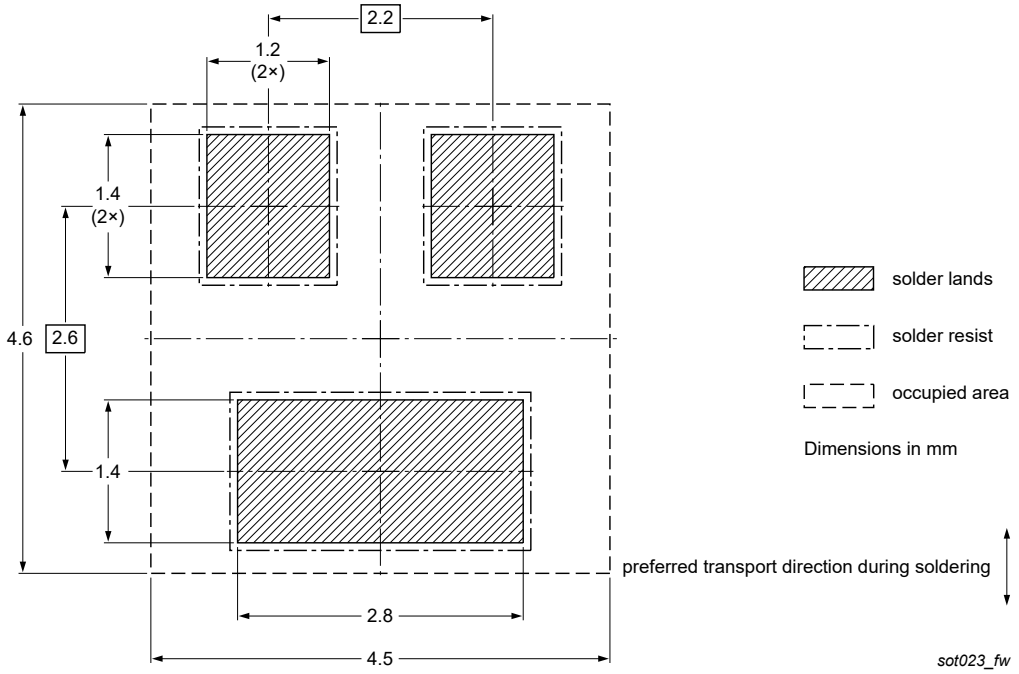
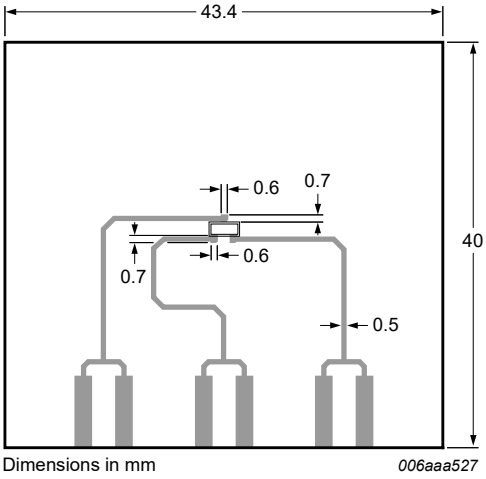


Fig. 8. Wave soldering footprint for SOT23

14. Mounting



PCB thickness = 1.6 mm

Fig. 9. FR4 PCB, standard footprint SOT23

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15. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS101 v.3	20240405	Product data sheet	-	BAS101_BAS101S_2
Modifications:	• Family data sheet splitted to single type data sheets. • Characteristics: Notes of Fig. 2 and 3 changed • Section "Packing information" removed.			
BAS101_BAS101S_2	20091214	Product data sheet	-	BAS101_BAS101S_1
BAS101_BAS101S_1	20060908	Product data sheet	-	-

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16. 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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