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BAV23 series

Dual high-voltage switching diodes

Rev. 07 — 19 March 2010 Product data sheet

1. Product profile

1.1 General description

Dual high-voltage switching diodes, encapsulated in small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEDEC	
BAV23A	SOT23	TO-236AB	dual common anode
BAV23C	SOT23	TO-236AB	dual common cathode
BAV23S	SOT23	TO-236AB	dual series
BAV23	SOT143B	-	dual isolated

1.2 Features and benefits

- High switching speed: $t_{rr} \leq 50$ ns
- Low leakage current
- Repetitive peak reverse voltage: $V_{RRM} \leq 250$ V
- Low capacitance: $C_d \leq 2$ pF
- Small SMD plastic package

1.3 Applications

- High-speed switching at high voltage
- High-voltage general-purpose switching

1.4 Quick reference data

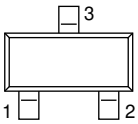
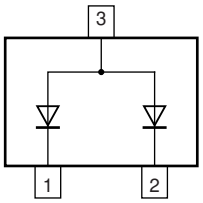
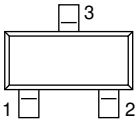
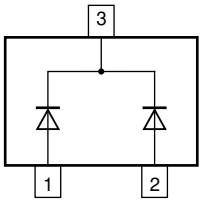
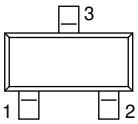
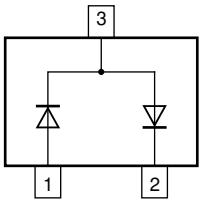
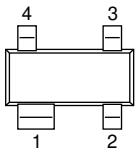
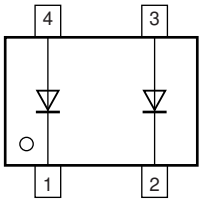
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_R	reverse current	$V_R = 200$ V	-	-	100	nA
V_R	reverse voltage		-	-	200	V
t_{rr}	reverse recovery time	[1]	-	-	50	ns

[1] When switched from $I_F = 10$ mA to $I_R = 10$ mA; $R_L = 100\ \Omega$; measured at $I_R = 1$ mA.

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
BAV23A			
1	cathode (diode 1)		
2	cathode (diode 2)		
3	common anode		006aab099
BAV23C			
1	anode (diode 1)		
2	anode (diode 2)		
3	common cathode		006aab034
BAV23S			
1	anode (diode 1)		
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		006aaa763
BAV23			
1	cathode (diode 1)		
2	cathode (diode 2)		
3	anode (diode 2)		
4	anode (diode 1)		006aab100

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BAV23A	-	plastic surface-mounted package; 3 leads	SOT23
BAV23C			
BAV23S			
BAV23	-	plastic surface-mounted package; 4 leads	SOT143B

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
BAV23A	*V0
BAV23C	*V9
BAV23S	*V5
BAV23	*L3

[1] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

5. Limiting values

Table 6. 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			-	250	V
V_R	reverse voltage			-	200	V
I_F	forward current		[1]	-	225	mA
			[2]	-	125	mA
I_{FRM}	repetitive peak forward current			-	625	mA
I_{FSM}	non-repetitive peak forward current	square wave	[3]			
		t_p = 1 μs		-	9	A
		t_p = 100 μs		-	3	A
		t_p = 10 ms		-	1.7	A

Table 6. Limiting values *...continued*

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[4]	-	250	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−65	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[1] Single diode loaded.

[2] Double diode loaded.

[3] T_j = 25 °C prior to surge.

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

6. Thermal characteristics

Table 7. 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
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	360	K/W

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

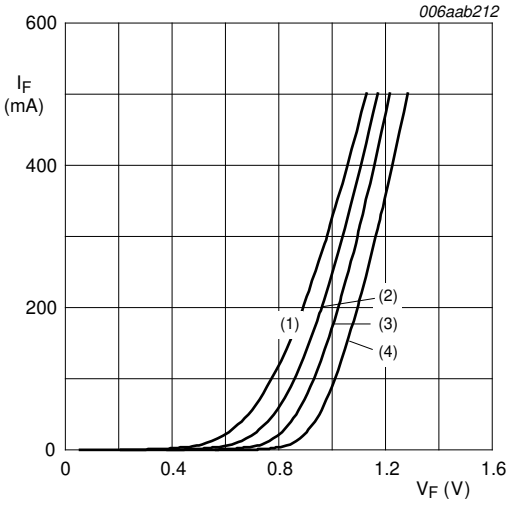
7. Characteristics

Table 8. Characteristics

T_{amb} = 25 °C unless otherwise specified.

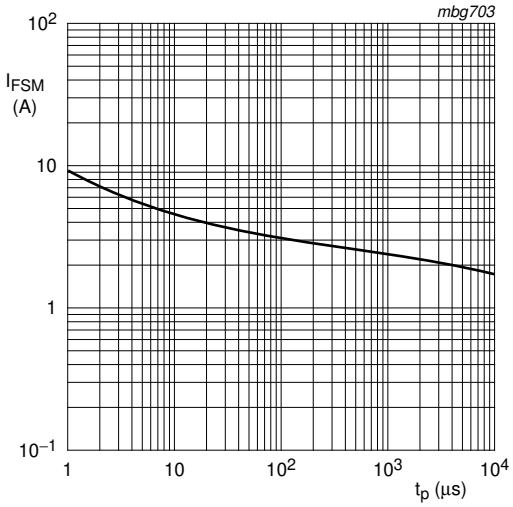
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 100 mA		-	-	1.0	V
		I_F = 200 mA		-	-	1.25	V
I_R	reverse current	V_R = 200 V		-	-	100	nA
		V_R = 200 V; T_j = 150 °C		-	-	100	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V		-	-	2	pF
t_{rr}	reverse recovery time		[1]	-	-	50	ns

[1] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.



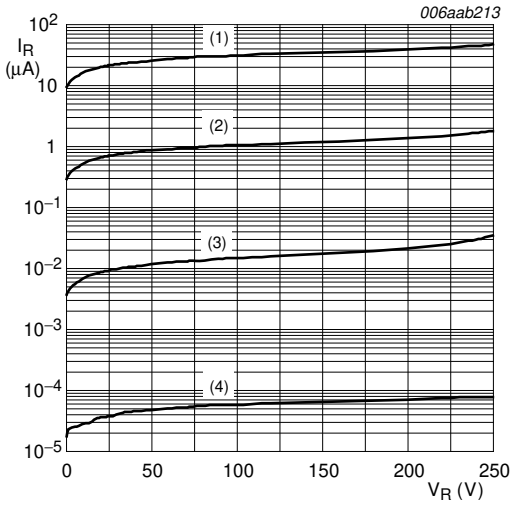
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −40 °C

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



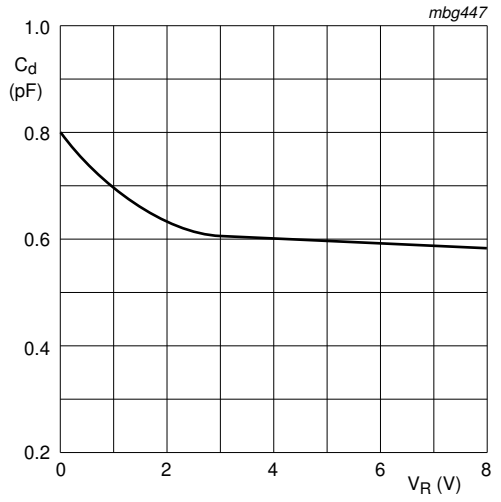
Based on square wave currents.
T_j = 25 °C; prior to surge

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



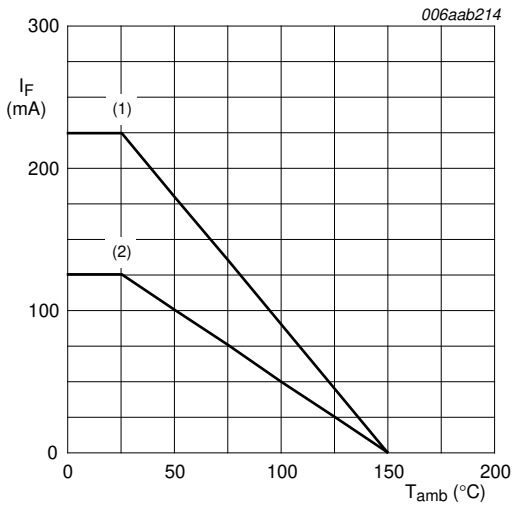
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −40 °C

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



f = 1 MHz; T_{amb} = 25 °C

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



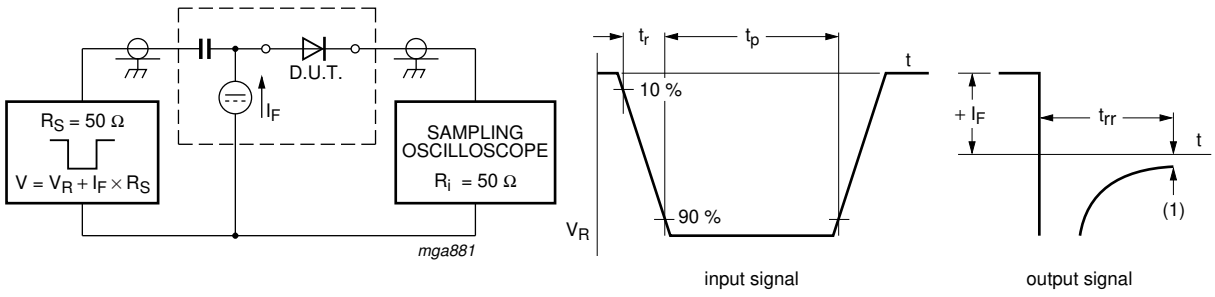
FR4 PCB, standard footprint

(1) Single diode loaded.

(2) Double diode loaded.

Fig 5. Forward current as a function of ambient temperature; derating curves

8. Test information



(1) I_R = 1 mA

Fig 6. Reverse recovery time test circuit and waveforms

9. Package outline

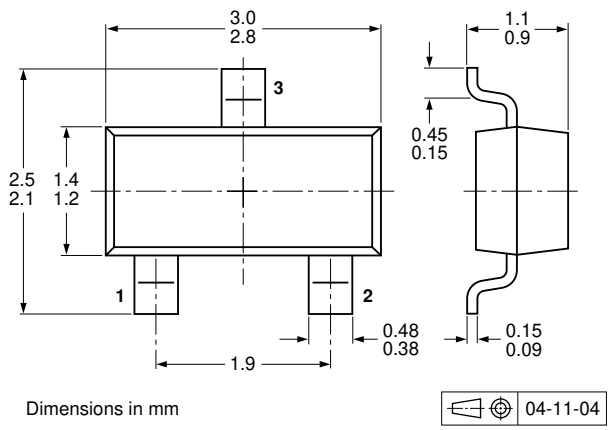


Fig 7. Package outline SOT23 (TO-236AB)

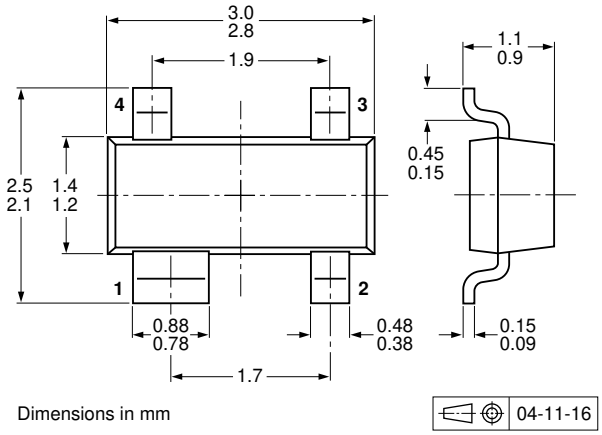


Fig 8. Package outline SOT143B

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

Type number	Package	Description	Packing quantity	
			3000	10000
BAV23A	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
BAV23C				
BAV23S				
BAV23	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-235

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering

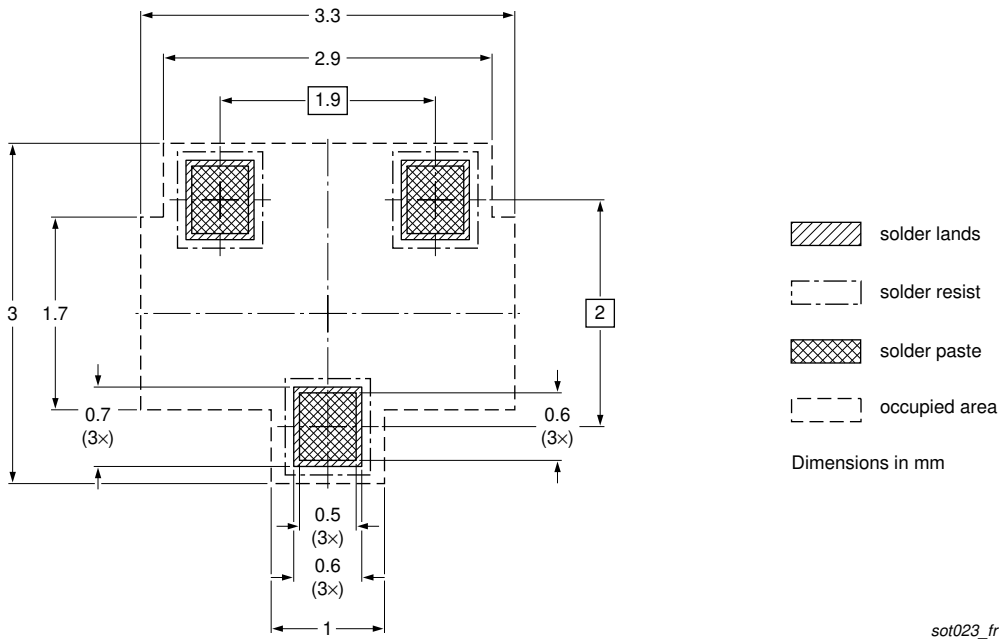


Fig 9. Reflow soldering footprint SOT23 (TO-236AB)

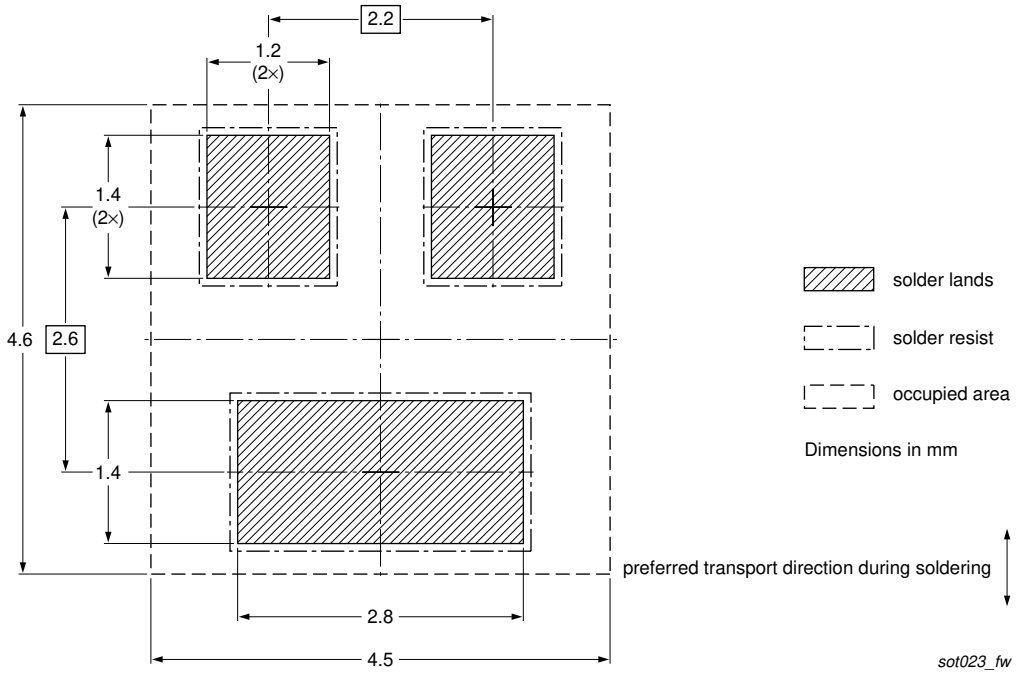


Fig 10. Wave soldering footprint SOT23 (TO-236AB)

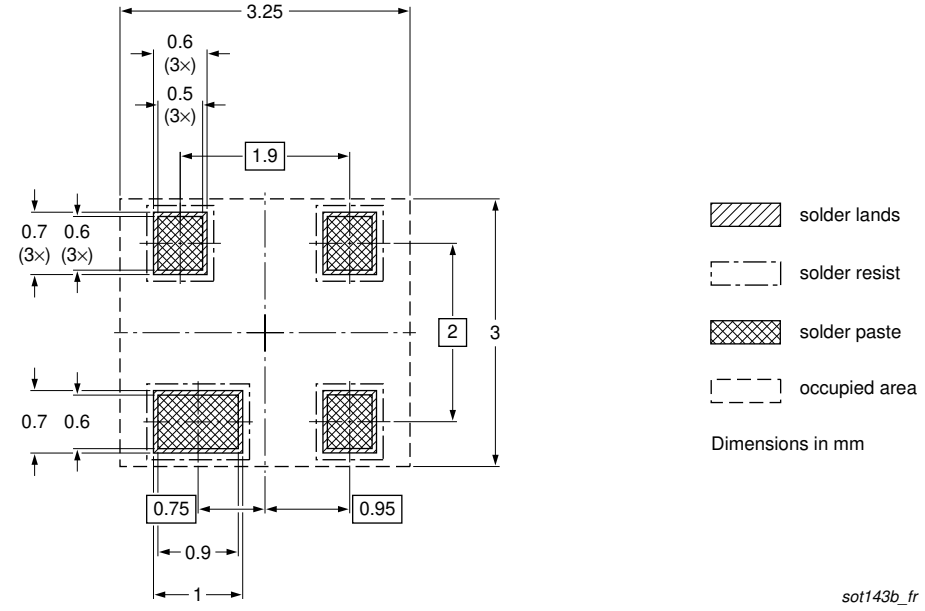


Fig 11. Reflow soldering footprint SOT143B

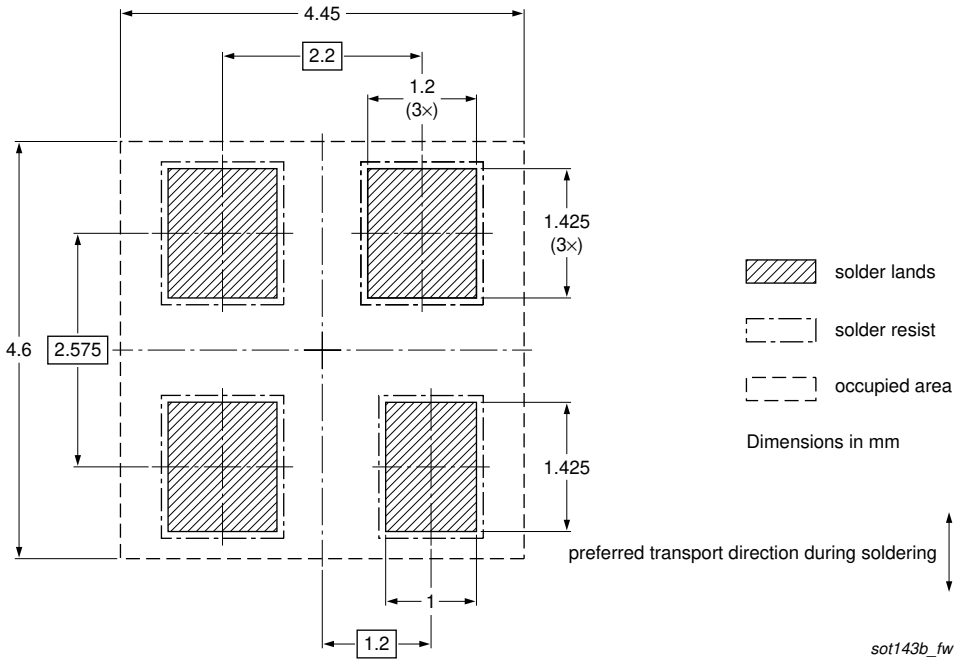


Fig 12. Wave soldering footprint SOT143B

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAV23_SER_7	20100319	Product data sheet	-	BAV23_SER_6
Modifications:	• Type numbers BAV23A/DG, BAV23C/DG, BAV23S/DG and BAV23/DG deleted • Type numbers BAV23A and BAV23C added • Table 5 “Marking codes”: updated • Figure 6: adaptation of test condition to specified characteristics in Table 8 • Figure 9, 10, 11 and 12: updated • Section 13 “Legal information”: updated			
BAV23_SER_6	20080303	Product data sheet	-	BAV23S_5 BAV23_2
BAV23S_5	20011012	Product specification	-	BAV23S_4
BAV23_2	19960917	Product specification	-	BAV23_1

13. Legal information

13.1 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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15. Contents

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Document identifier: BAV23_SER_7