BAV99 series

High-speed switching diodes

1. Product profile

1.1 General description

High-speed switching diodes, encapsulated in small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package			Configuration	Package configuration
	NXP	JEITA	JEDEC		
BAV99	SOT23	-	TO-236AB	dual series	small
BAV99S	SOT363	SC-88	-	quadruple; 2 series	very small
BAV99W	SOT323	SC-70	-	dual series	very small

1.2 Features

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Small SMD plastic packages
- Low capacitance: $C_d \leq 1.5$ pF
- Reverse voltage: $V_R \leq 100$ V

1.3 Applications

- High-speed switching
- General-purpose switching
- Reverse polarity protection

1.4 Quick reference data

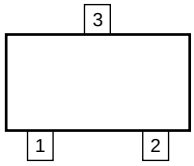
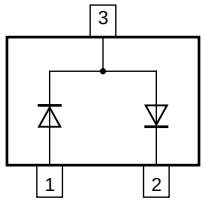
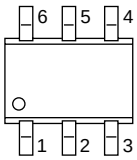
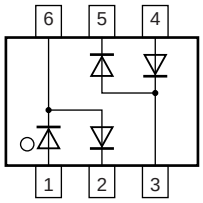
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
I_R	reverse current	$V_R = 80$ V		-	-	0.5	µA
V_R	reverse voltage			-	-	100	V
t_{rr}	reverse recovery time		[1]	-	-	4	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
BAV99; BAV99W			
1	anode (diode 1)	 006aaa144	 006aaa763
2	cathode (diode 2)		
3	cathode (diode 1), anode (diode 2)		
BAV99S			
1	anode (diode 1)		 006aab101
2	cathode (diode 2)		
3	cathode (diode 3), anode (diode 4)		
4	anode (diode 3)		
5	cathode (diode 4)		
6	cathode (diode 1), anode (diode 2)		

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BAV99	-	plastic surface-mounted package; 3 leads	SOT23
BAV99S	SC-88	plastic surface-mounted package; 6 leads	SOT363
BAV99W	SC-70	plastic surface-mounted package; 3 leads	SOT323

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
BAV99	A7*
BAV99S	K1*
BAV99W	A7*

[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			-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current					
	BAV99		[1]	-	215	mA
			[2]	-	125	mA
	BAV99S		[1]	-	200	mA
	BAV99W		[1]	-	150	mA
			[2]	-	130	mA
I_{FRM}	repetitive peak forward current			-	500	mA
I_{FSM}	non-repetitive peak forward current	square wave	[3]			
		t_p = 1 µs		-	4	A
		t_p = 1 ms		-	1	A
		t_p = 1 s		-	0.5	A
P_{tot}	total power dissipation		[1][4]			
	BAV99	$T_{amb} \leq 25$ °C		-	250	mW
	BAV99S	$T_{amb} \leq 85$ °C	[5]	-	250	mW
	BAV99W	$T_{amb} \leq 25$ °C		-	200	mW
Per device						
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.

[5] Soldering points at pins 2, 3, 5 and 6.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2]				
	BAV99			-	-	500	K/W
	BAV99W			-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point						
	BAV99			-	-	360	K/W
	BAV99S		[3]	-	-	260	K/W
	BAV99W			-	-	300	K/W

[1] Single diode loaded.

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

[3] Soldering points at pins 2, 3, 5 and 6.

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 = 1 mA		-	-	715	mV
		I_F = 10 mA		-	-	855	mV
		I_F = 50 mA		-	-	1	V
		I_F = 150 mA		-	-	1.25	V
I_R	reverse current	V_R = 25 V		-	-	30	nA
		V_R = 80 V		-	-	0.5	µA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA
		V_R = 80 V; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V		-	-	1.5	pF
t_{rr}	reverse recovery time		[1]	-	-	4	ns
V_{FR}	forward recovery voltage		[2]	-	-	1.75	V

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

[2] When switched from I_F = 10 mA; t_r = 20 ns.

9. Package outline

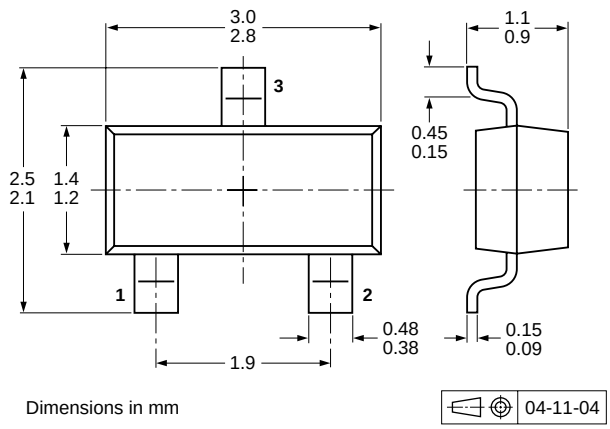


Fig 7. Package outline BAV99 (SOT23/TO-236AB)

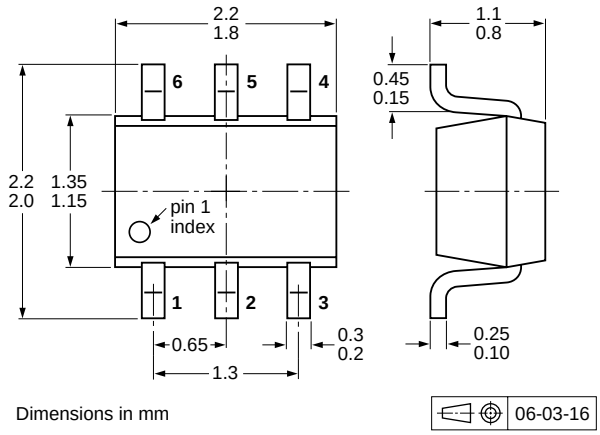


Fig 8. Package outline BAV99S (SOT363/SC-88)

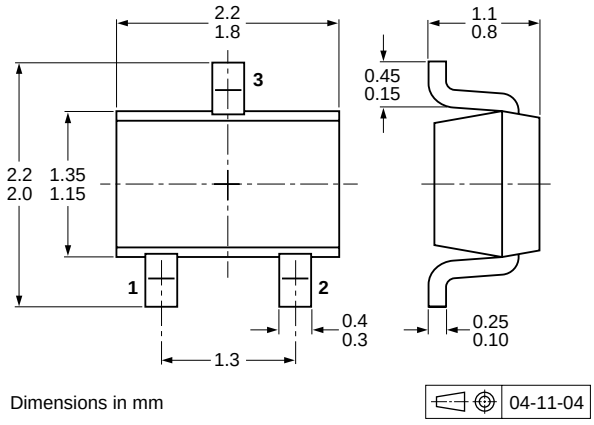


Fig 9. Package outline BAV99W (SOT323/SC-70)

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
BAV99	SOT23	4 mm pitch, 8 mm tape and reel		-215	-235
BAV99S	SOT323	4 mm pitch, 8 mm tape and reel		-115	-135
BAV99W	SOT363	4 mm pitch, 8 mm tape and reel; T1	[2]	-115	-135
		4 mm pitch, 8 mm tape and reel; T2	[3]	-125	-165

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

[2] T1: normal taping

[3] T2: reverse taping