BAV70 series

High-speed switching diodes Rev. 8 — 18 March 2015

Product data sheet

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			Package	Configuration
	Nexperia	JEITA	JEDEC	configuration	
BAV70	SOT23	-	TO-236AB	small	dual common cathode
BAV70M	SOT883	SC-101	-	leadless ultra small	dual common cathode
BAV70S	SOT363	SC-88	-	very small	quadruple common cathode/common cathode
BAV70T	SOT416	SC-75	-	ultra small	dual common cathode
BAV70W	SOT323	SC-70	-	very small	dual common cathode

1.2 Features and benefits

- High switching speed: t_{rr} ≤ 4 ns
- Low leakage current
- Small SMD plastic packages
- Low capacitance: C_d ≤ 1.5 pF
- Reverse voltage: V_R ≤ 100 V
- AEC-Q101 qualified

1.3 Applications

- High-speed switching
- General-purpose switching

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Per diode						
I _R	reverse current	V _R = 80 V	-	-	0.5	μΑ
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 Ω ; measured at I_R = 1 mA.



2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
BAV70; BA	AV70T; BAV70W		
1	anode (diode 1)		
2	anode (diode 2)	3	3
3	common cathode	1 2 006aaa144	1 2 006aab034
BAV70M			
1	anode (diode 1)		3
2	anode (diode 2)	1 3	
3	common cathode	Transparent top view	1 2 006aab034
BAV70S			
1	anode (diode 1)		
2	anode (diode 2)	6 5 4	6 5 4
3	common cathode (diode 3 and diode 4)	0	
4	anode (diode 3)	1 2 3	○本 本
5	anode (diode 4)		1 2 3
6	common cathode (diode 1 and diode 2)		006aab104

3. Ordering information

Table 4. Ordering information

Type number	Package					
	Name	Description	Version			
BAV70	-	plastic surface-mounted package; 3 leads	SOT23			
BAV70M	SC-101	leadless ultra small plastic package; 3 solder lands; body 1.0 \times 0.6 \times 0.5 mm	SOT883			
BAV70S	SC-88	plastic surface-mounted package; 6 leads	SOT363			
BAV70T	SC-75	plastic surface-mounted package; 3 leads	SOT416			
BAV70W	SC-70	plastic surface-mounted package; 3 leads	SOT323			

4. Marking

Table 5. Marking codes

Type number	Marking code ^[1]
BAV70	A4*
BAV70M	S4
BAV70S	A4*
BAV70T	A4
BAV70W	A4*

^{[1] * = -:} made in Hong Kong

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	<u>'</u>				'
V_{RRM}	repetitive peak reverse voltage		-	100	V
V_R	reverse voltage		-	100	V
l _F	forward current				
	BAV70	T _{amb} ≤ 25 °C	-	215	mA
	BAV70M	T _s = 90 °C	-	150	mA
	BAV70S	T _s = 60 °C	-	250	mA
	BAV70T	T _s = 90 °C	-	150	mA
	BAV70W	T _{amb} ≤ 25 °C	-	175	mA
I _{FRM}	repetitive peak forward current				
	BAV70		-	450	mA
	BAV70M		-	500	mA
	BAV70S		-	450	mA
	BAV70T		-	500	mA
	BAV70W		-	500	mA
I _{FSM}	non-repetitive peak forward	square wave [1]			
	current	t _p = 1 μs	-	4	А
		t _p = 1 ms	-	1	А
		t _p = 1 s	-	0.5	Α

^{* =} p: made in Hong Kong

^{* =} t: made in Malaysia

^{* =} W: made in China

 Table 6.
 Limiting values ...continued

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

Symbol	Parameter	Conditions	Min	Max	Unit
P _{tot}	total power dissipation	[2]			
	BAV70	T _{amb} ≤ 25 °C	-	250	mW
	BAV70M	$T_{amb} \le 25 ^{\circ}C$ [3]	-	250	mW
	BAV70S	T _s = 60 °C	-	350	mW
	BAV70T	T _s = 90 °C	-	170	mW
	BAV70W	T _{amb} ≤ 25 °C	-	200	mW
Per device)			,	
I _F	forward current				
	BAV70	T _{amb} ≤ 25 °C	-	125	mA
	BAV70M	T _s = 90 °C	-	75	mA
	BAV70S	T _s = 60 °C	-	100	mA
	BAV70T	T _s = 90 °C	-	75	mA
	BAV70W	T _{amb} ≤ 25 °C	-	100	mA
Tj	junction temperature		-	150	°C
T _{amb}	ambient temperature		-65	+150	°C
T _{stg}	storage temperature		-65	+150	°C

^[1] $T_i = 25$ °C prior to surge.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter Conditions		Min	Тур	Max	Unit
Per diode	'					
R _{th(j-a)}	thermal resistance from junction to ambient	in free air [1]				
	BAV70		-	-	500	K/W
	BAV70M	[2]		-	500	K/W
	BAV70W		-	-	625	K/W
R _{th(j-t)}	thermal resistance from junction to tie-point					
	BAV70		-	-	360	K/W
	BAV70W		-	-	300	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point					
	BAV70S		-	-	255	K/W
	BAV70T		-	-	350	K/W

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

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^[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

^[3] Reflow soldering is the only recommended soldering method.

^[2] Reflow soldering is the only recommended soldering method.

7. Characteristics

Table 8. Characteristics

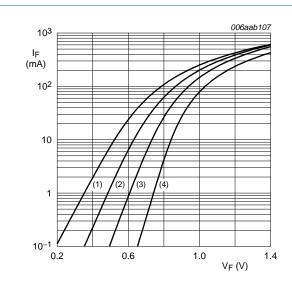
 $T_{amb} = 25$ °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Per diode			1			
V _F	forward voltage	[1]				
		I _F = 1 mA	-	-	715	mV
		I _F = 10 mA	-	-	855	mV
		$I_F = 50 \text{ mA}$	-	-	1	V
		I _F = 150 mA	-	-	1.25	V
I _R	reverse current	V _R = 25 V	-	-	30	nA
		$V_{R} = 80 \text{ V}$	-	-	0.5	μΑ
		$V_R = 25 \text{ V}; T_j = 150 ^{\circ}\text{C}$	-	-	30	μΑ
		$V_R = 80 \text{ V}; T_j = 150 ^{\circ}\text{C}$	-	-	100	μΑ
C _d	diode capacitance	$V_R = 0 V; f = 1 MHz$	-	-	1.5	pF
t _{rr}	reverse recovery time	[2]	-	-	4	ns
V_{FR}	forward recovery voltage	[3]	-	-	1.75	V

^[1] Pulse test: $t_p \leq 300~\mu s;~\delta \leq 0.02.$

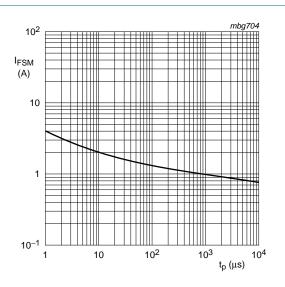
^[2] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 $\Omega;$ measured at I_R = 1 mA.

^[3] When switched from $I_F = 10$ mA; $t_r = 20$ ns.



- (1) $T_{amb} = 150 \, ^{\circ}C$
- (2) $T_{amb} = 85 \, ^{\circ}C$
- (3) $T_{amb} = 25 \, ^{\circ}C$
- (4) $T_{amb} = -40 \, ^{\circ}C$

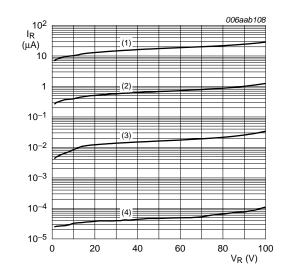
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.

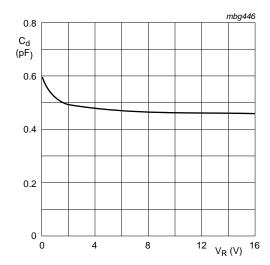
 $T_i = 25$ °C; prior to surge

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



- (1) $T_{amb} = 150 \, ^{\circ}C$
- (2) $T_{amb} = 85 \, ^{\circ}C$
- (3) $T_{amb} = 25 \, ^{\circ}C$
- (4) $T_{amb} = -40 \, ^{\circ}C$

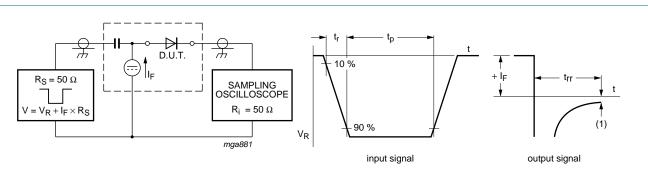
Fig 3. Reverse current as a function of reverse voltage; typical values



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

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

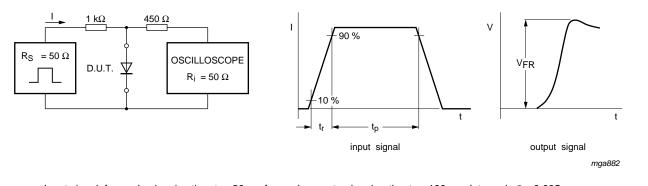
8. Test information



(1) $I_R = 1 \text{ mA}$

Input signal: reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty cycle δ = 0.05 Oscilloscope: rise time t_r = 0.35 ns

Fig 5. Reverse recovery time test circuit and waveforms



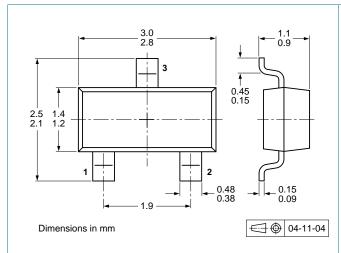
Input signal: forward pulse rise time t_r = 20 ns; forward current pulse duration $t_p \ge 100$ ns; duty cycle $\delta \le 0.005$

Fig 6. Forward recovery voltage test circuit and waveforms

8.1 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.

9. Package outline



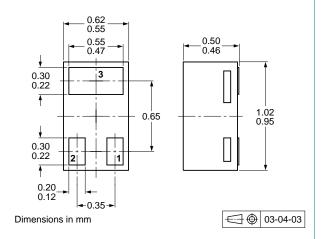
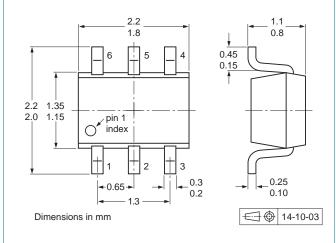


Fig 7. Package outline BAV70 (SOT23/TO-236AB)

Fig 8. Package outline BAV70M (SOT883/SC-101)



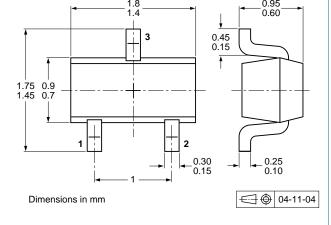


Fig 9. Package outline BAV70S (SOT363/SC-88)

Fig 10. Package outline BAV70T (SOT416/SC-75)

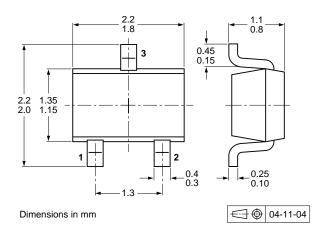


Fig 11. Package outline BAV70W (SOT323/SC-70)

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10. Packing information

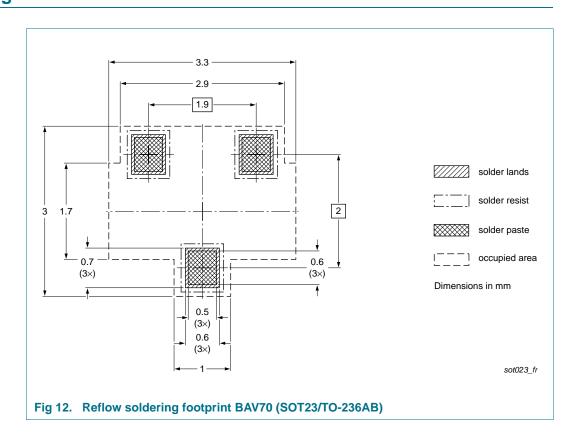
Table 9. Packing methods

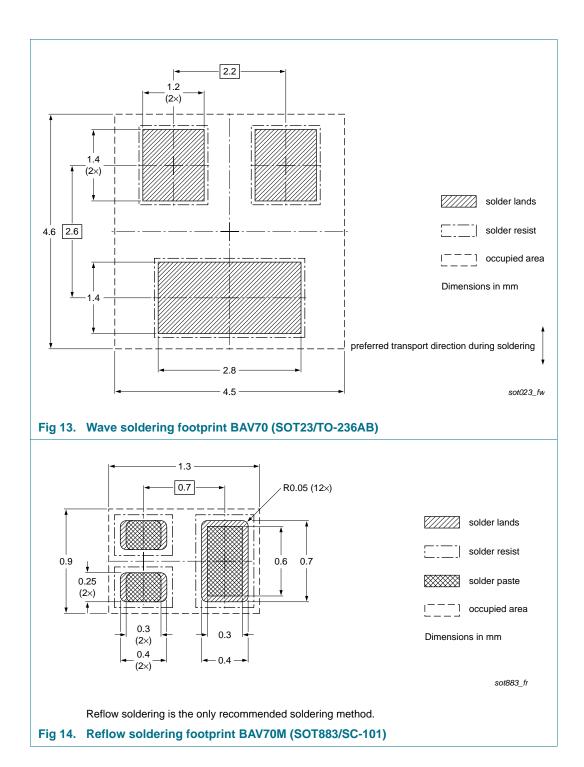
The indicated -xxx are the last three digits of the 12NC ordering code.[1]

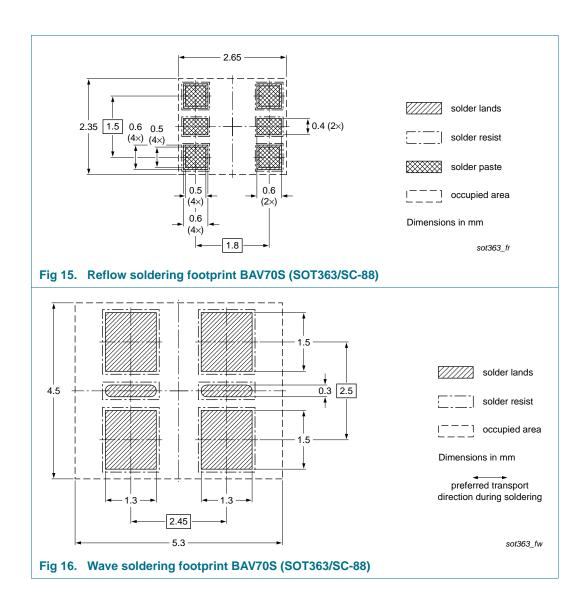
Type number Package		Description	Packing quantity		
			3000	10000	
BAV70	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235	
BAV70M	SOT883	2 mm pitch, 8 mm tape and reel	-	-315	
BAV70S	SOT363	4 mm pitch, 8 mm tape and reel; T1	-115	-135	
		4 mm pitch, 8 mm tape and reel; T2	-125	-165	
BAV70T	SOT416	4 mm pitch, 8 mm tape and reel	-115	-135	
BAV70W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-135	

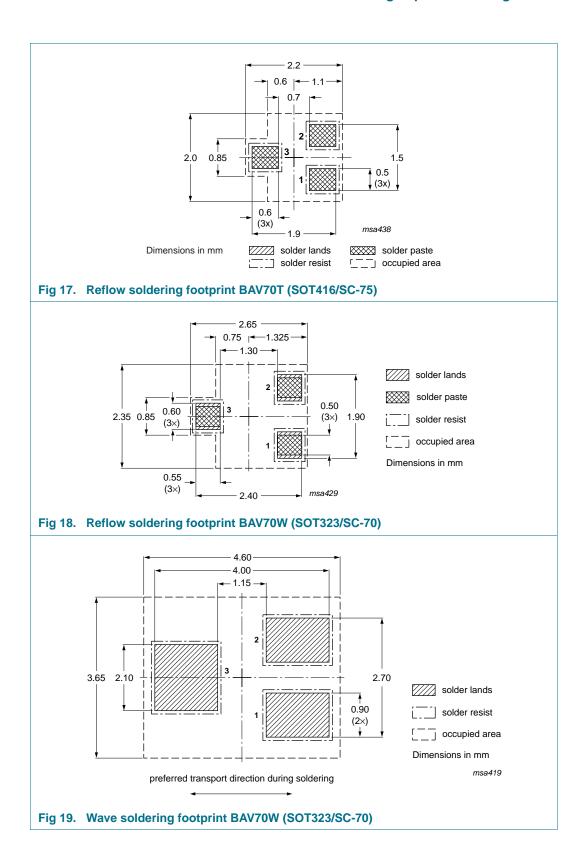
- [1] For further information and the availability of packing methods, see Section 14.
- [2] T1: normal taping
- [3] T2: reverse taping

11. Soldering









12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes		
BAV70_SER v.8	20150318	Product data sheet	-	BAV70_SER_7		
Modifications:	guidelines of NXP Semiconductors.					
	 Legal texts 	have been adapted to the ne	ew company name who	ere appropriate.		
BAV70_SER_7	20071127	Product data sheet	-	BAV70_6 BAV70S_2 BAV70T_3 BAV70W_6		
BAV70_6	20020403	Product specification	-	BAV70_5		
BAV70S_2	19971021	Product specification	-	BAV70S_1		
BAV70T_3	20040204	Product specification	-	BAV70T_2		
BAV70W_6	20020405	Product specification	-	BAV70W_5		

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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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BAV70 series

High-speed switching diodes

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