BAS40 series; 1PSxxSB4x series General-purpose Schottky diodes

Rev. 9 — 18 March 2015

Product data sheet

1. Product profile

1.1 General description

General-purpose Schottky diodes in small Surface-Mounted Device (SMD) plastic packages.

Table 1. **Product overview**

Type number	Package		Configuration
	NXP	JEITA	
1PS70SB40	SOT323	SC-70	single diode
1PS76SB40	SOD323	SC-76	single diode
1PS79SB40	SOD523	SC-79	single diode
BAS40	SOT23	-	single diode
BAS40H	SOD123F	-	single diode
BAS40L	SOD882	-	single diode
BAS40W	SOT323	SC-70	single diode
1PS70SB44	SOT323	SC-70	dual series
BAS40-04	SOT23	-	dual series
BAS40-04W	SOT323	SC-70	dual series
1PS70SB45	SOT323	SC-70	dual common cathode
1PS75SB45	SOT416	SC-75	dual common cathode
BAS40-05	SOT23	-	dual common cathode
BAS40-05W	SOT323	SC-70	dual common cathode
1PS70SB46	SOT323	SC-70	dual common anode
BAS40-06	SOT23	-	dual common anode
BAS40-06W	SOT323	SC-70	dual common anode
BAS40-07	SOT143B	-	dual isolated
BAS40-07V	SOT666	-	dual isolated
BAS40-05V	SOT666	-	quadruple common cathode/ common cathode
1PS88SB48	SOT363	SC-88	quadruple common cathode/ common cathode
BAS40XY	SOT363	SC-88	quadruple; 2 series



1.2 Features and benefits

- High switching speed
- High breakdown voltage
- AEC-Q101 qualified

- Low leakage current
- Low capacitance

1.3 Applications

Ultra high-speed switching

Voltage clamping

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
Per diode						
I _F	forward current		-	-	120	mA
V _F	forward voltage	I _F = 1 mA [1]	-	-	380	mV
V_R	reverse voltage		-	-	40	V

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

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
BAS40H; 1PS	576SB40; 1PS79SB40		
1	cathode [1]		
2	anode	001aab540	1] 2 sym001
BAS40L			
1	cathode [1]		B .4
2	anode	Transparent top view	1][2 sym001
BAS40; BAS	40W; 1PS70SB40		
1	anode		
2	not connected	3	3
3	cathode	1 2 006aaa144	1 2 n.c.

 Table 3.
 Pinning ...continued

Pin	Description	Simplified outline	Symbol
BAS40-04; BA	AS40-04W; 1PS70SB44		
1	anode (diode 1)		
2	cathode (diode 2)	3	3
3	cathode (diode 1), anode (diode 2)	1 2 006aaa144	1 2 006aaa437
BAS40-05; BA	AS40-05W; 1PS70SB45; 1PS75SB45		
1	anode (diode 1)		3
2	anode (diode 2)	3	
3	cathode (diode 1), cathode (diode 2)	1 2 006aaa144	1 2 006aaa438
BAS40-06; BA	AS40-06W; 1PS70SB46		
1	cathode (diode 1)		_
2	cathode (diode 2)	3	3
3	anode (diode 1), anode (diode 2)	1 2 006aaa144	1 2 006aaa439
BAS40-07			
1	cathode (diode 1)		
2	cathode (diode 2)	4 3	4 3
3	anode (diode 2)		
4	anode (diode 1)	1 2	1 2 006aaa434
BAS40-07V			1
1	anode (diode 1)		
2	not connected	6 5 4	6 5 4
3	cathode (diode 2)		
4	anode (diode 2)		
5	not connected		1 2 3 006aaa440
6	cathode (diode 1)	1 2 3	

 Table 3.
 Pinning ...continued

Pin	Description	Simplified outline	Symbol		
BAS40-0	5V; 1PS88SB48				
1	anode (diode 1)				
2	anode (diode 2)	6 5 4	6 5 4		
3	cathode (diode 3), cathode (diode 4)				
4	anode (diode 3)	0			
5	anode (diode 4)	1 2 3 001aab555	1 2 3		
6	cathode (diode 1), cathode (diode 2)		006aaa446		
BAS40X	Υ	-	<u>'</u>		
1	anode (diode 1)				
2	cathode (diode 2)	6 5 4	6 5 4		
3	anode (diode 3), cathode (diode 4)	0			
4	anode (diode 4)	1 2 3			
5	cathode (diode 3)				
6	cathode (diode 1), anode (diode 2)		1 2 3 006aaa256		

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4. Ordering information

Type number	Package					
	Name	Version				
1PS70SB40	SC-70	plastic surface-mounted package; 3 leads	SOT323			
1PS76SB40	SC-76	plastic surface-mounted package; 2 leads	SOD323			
1PS79SB40	SC-79	plastic surface-mounted package; 2 leads	SOD523			
BAS40	-	plastic surface-mounted package; 3 leads	SOT23			
BAS40H	-	plastic surface-mounted package; 2 leads	SOD123F			
BAS40L	-	leadless ultra small plastic package; 2 terminals; body 1.0 \times 0.6 \times 0.5 mm	SOD882			
BAS40W	SC-70	plastic surface-mounted package; 3 leads	SOT323			
1PS70SB44	SC-70	plastic surface-mounted package; 3 leads	SOT323			
BAS40-04	-	plastic surface-mounted package; 3 leads	SOT23			
BAS40-04W	SC-70	plastic surface-mounted package; 3 leads	SOT323			
1PS70SB45	SC-70	plastic surface-mounted package; 3 leads	SOT323			
1PS75SB45	SC-75	plastic surface-mounted package; 3 leads	SOT416			
BAS40-05	-	plastic surface-mounted package; 3 leads	SOT23			
BAS40-05W	SC-70	plastic surface-mounted package; 3 leads	SOT323			
1PS70SB46	SC-70	plastic surface-mounted package; 3 leads	SOT323			
BAS40-06	-	plastic surface-mounted package; 3 leads	SOT23			
BAS40-06W	SC-70	plastic surface-mounted package; 3 leads	SOT323			
BAS40-07	-	plastic surface-mounted package; 4 leads	SOT143B			
BAS40-07V	-	plastic surface-mounted package; 6 leads	SOT666			
BAS40-05V	-	plastic surface-mounted package; 6 leads	SOT666			
1PS88SB48	SC-88	plastic surface-mounted package; 6 leads	SOT363			
BAS40XY	SC-88	plastic surface-mounted package; 6 leads	SOT363			

4. Marking

Table 5. Marking codes

Type number	Marking code[1]	Type number	Marking code ^[1]
1PS70SB40	6*3	1PS75SB45	45
1PS76SB40	S4	BAS40-05	45*
1PS79SB40	Т	BAS40-05W	65*
BAS40	43*	1PS70SB46	6*6
BAS40H	AJ	BAS40-06	46*
BAS40L	S6	BAS40-06W	66*
BAS40W	63*	BAS40-07	47*
1PS70SB44	6*4	BAS40-07V	67
BAS40-04	44*	BAS40-05V	65
BAS40-04W	64*	1PS88SB48	8*5
1PS70SB45	6*5	BAS40XY	40*

^{[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 N		Min	Max	Unit
Per diode					
V_R	reverse voltage		-	40	V
l _F	forward current		-	120	mA
I _{FRM}	repetitive peak forward current	$t_p \leq 1 \text{ s; } \delta \leq 0.5$	-	120	mA
I _{FSM}	non-repetitive peak forward current	$t_p \le 10 \text{ ms}$	[1] -	200	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.

^{* =} p: made in Hong Kong

^{* =} t: made in Malaysia

^{* =} W: made in China

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Per devic	е						
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	<u>[1]</u>				
	SOT23			-	-	500	K/W
	SOT143B			-	-	500	K/W
	SOT363 (1PS88SB48)			-	-	416	K/W
	SOT416			-	-	833	K/W
	SOT666 (BAS40-05V)		[2]	-	-	225	K/W
	SOT666 (BAS40-07V)		[2]	-	-	416	K/W
	SOD123F		[2]	-	-	330	K/W
	SOD323			-	-	450	K/W
	SOD523		[2]	-	-	450	K/W
	SOD882		[2]	-	-	500	K/W
	SOT323			-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point						
	SOT363 (BAS40XY)		[3]	-	-	260	K/W

^[1] Device mounted on an FR4 Printed-Circuit Board (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	Тур	Max	Unit		
Per diode	Per diode							
V_{F}	forward voltage	<u>[1</u>	1]					
		I _F = 1 mA	-	-	380	mV		
		I _F = 10 mA	-	-	500	mV		
		I _F = 40 mA	-	-	1	V		
I _R	reverse current	V _R = 30 V	-	-	1	μΑ		
		V _R = 40 V	-	-	10	μΑ		
C _d	diode capacitance	V _R = 0 V; f = 1 MHz	-	-	5	pF		

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

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

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

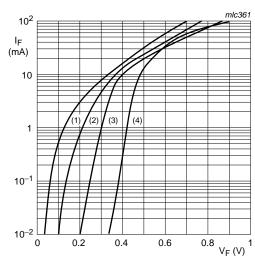
(1)

(2)

(3)

mlc362

V_R (V) 40



- (1) $T_{amb} = 125 \, ^{\circ}C$
- (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



(1) $T_{amb} = 125 \, ^{\circ}C$

10³

10²

10

 10^{-1}

10-2

I_R (μΑ)

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

Fig 2. Reverse current as a function of reverse voltage; typical values

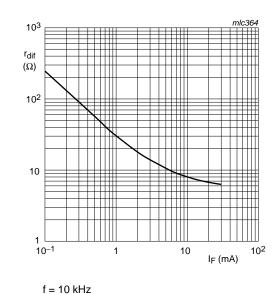
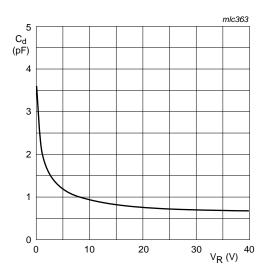


Fig 3. Differential resistance as a function of forward current; typical values



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

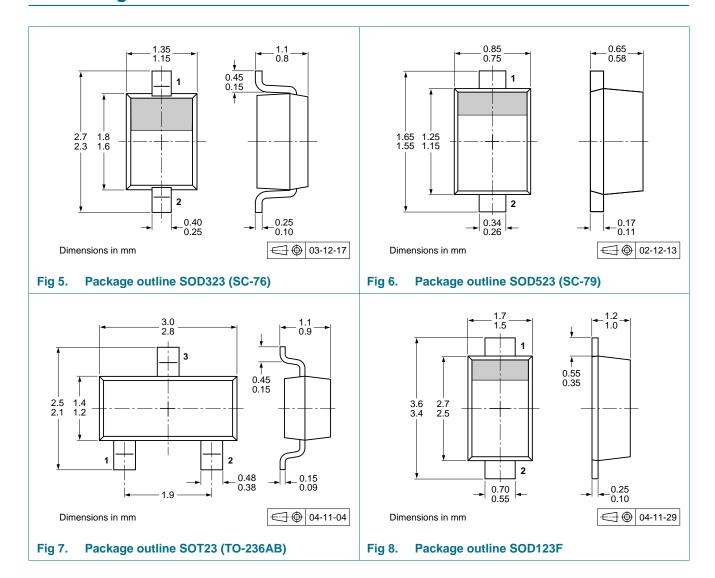
Fig 4. Diode capacitance as a function of reverse voltage; typical values

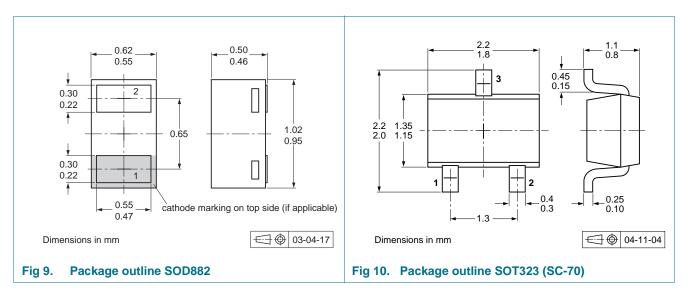
8. Test information

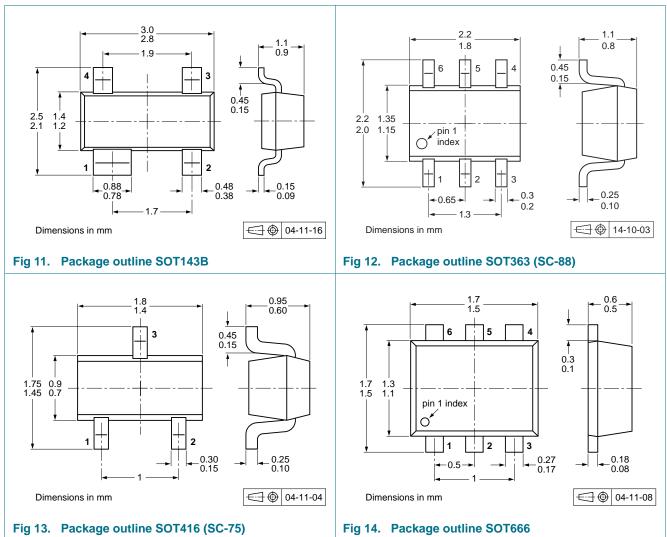
8.1 Quality information

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







10. Packing information

Table 9. Packing methods

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

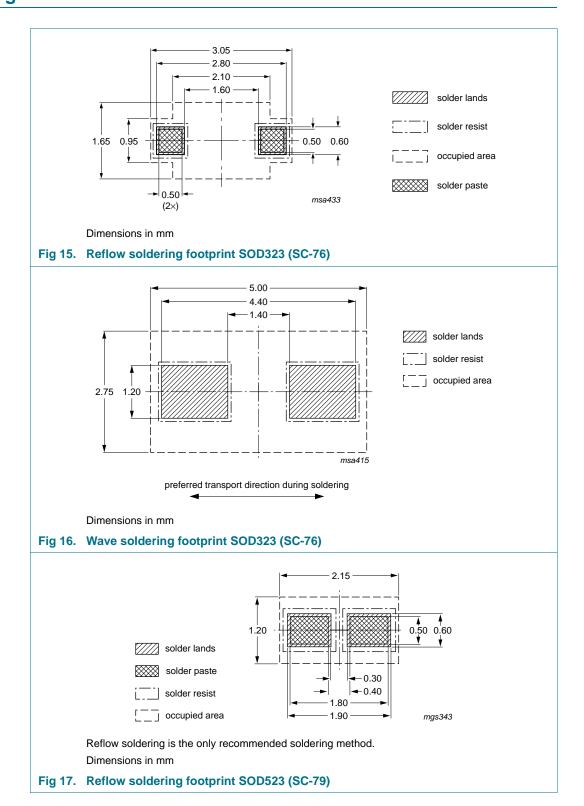
Type number	Package	Description	Pack	Packing quantity			
			3000	4000	8000	10000	
1PS70SB40	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
1PS76SB40	SOD323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
1PS79SB40	SOD523	2 mm pitch, 8 mm tape and reel	-	-	-315	-	
		4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
BAS40	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235	
BAS40H	SOD123F	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
BAS40L	SOD882	2 mm pitch, 8 mm tape and reel	-	-	-	-315	
BAS40W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
1PS70SB44	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
BAS40-04	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235	
BAS40-04W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
1PS70SB45	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
1PS75SB45	SOT416	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
BAS40-05	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235	
BAS40-05W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
1PS70SB46	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
BAS40-06	SOT23	4 mm pitch, 8 mm tape and reel	-215	-	-	-235	
BAS40-06W	SOT323	4 mm pitch, 8 mm tape and reel	-115	-	-	-135	
BAS40-07	SOT143B	4 mm pitch, 8 mm tape and reel	-215	-	-	-235	
BAS40-07V	SOT666	2 mm pitch, 8 mm tape and reel	-	-	-315	-	
		4 mm pitch, 8 mm tape and reel	-	-115	-	-	
BAS40-05V	SOT666	2 mm pitch, 8 mm tape and reel	-	-	-315	-	
		4 mm pitch, 8 mm tape and reel	-	-115	-	-	
1PS88SB48	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	
BAS40XY	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	

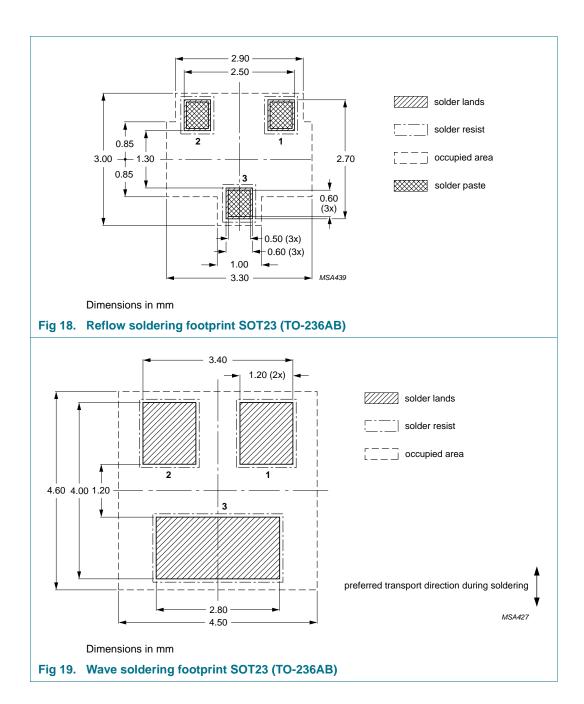
^[1] For further information and the availability of packing methods, see Section 14.

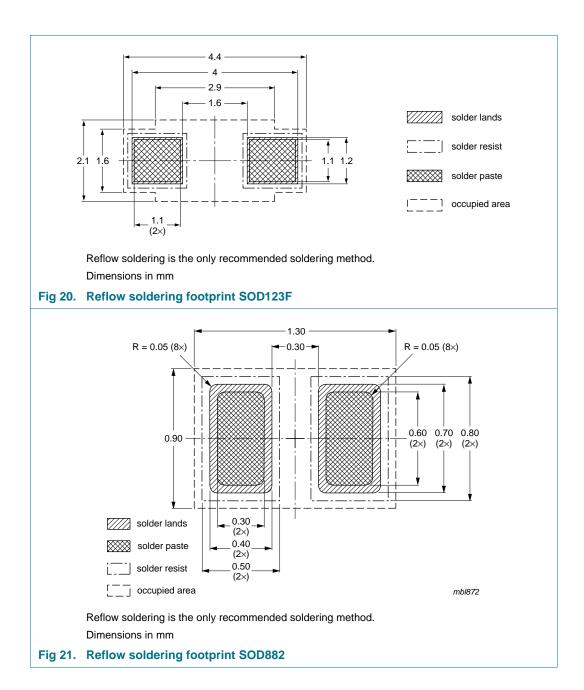
^[2] T1: normal taping

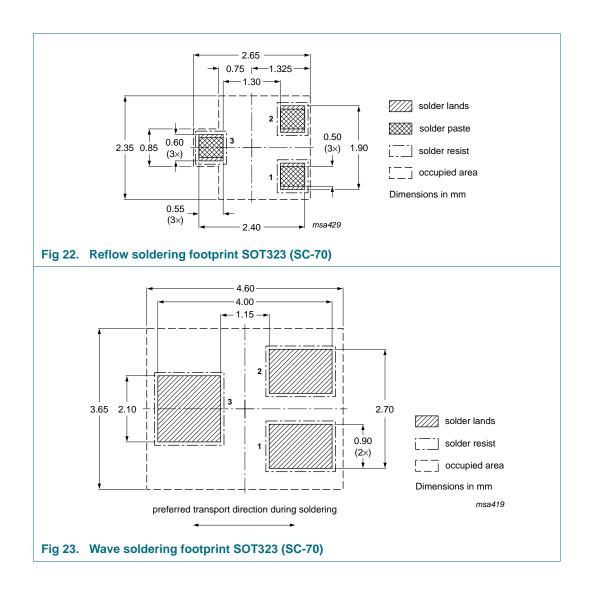
^[3] T2: reverse taping

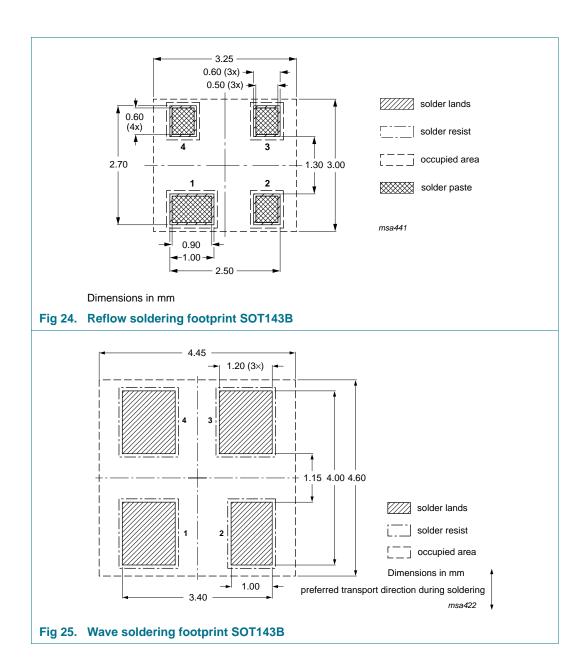
11. Soldering

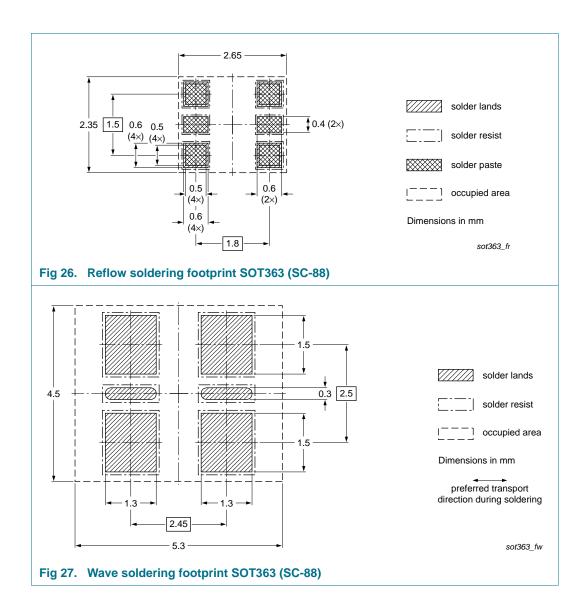


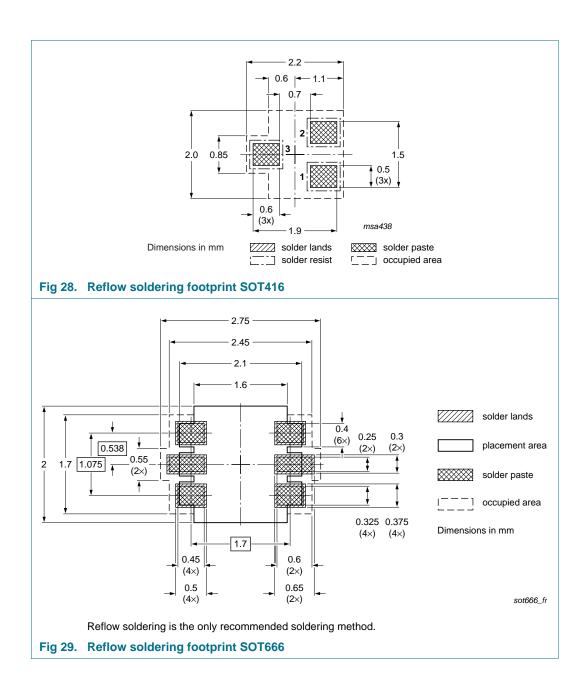












12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS40_1PSXXSB4X_SER v.9	20150318	Product data sheet	-	BAS40_1PSXXSB4X_SER_8
Modifications:		this data sheet has bee NXP Semiconductors.	n redesigned to co	mply with the new identity
	 Legal texts ha 	ave been adapted to the	new company nan	ne where appropriate.
BAS40_1PSXXSB4X_SER_8	20100113	Product data sheet	-	BAS40_1PSXXSB4X_SER_7
BAS40_1PSXXSB4X_SER_7	20060512	Product data sheet	-	BAS40_1PSXXSB4X_SER_6
BAS40_1PSXXSB4X_SER_6	20050809	Product data sheet	-	1PS70SB40_3 1PS75SB45_2 1PS76SB40_3 1PS79SB40_2 1PS88SB48_3 BAS40H_1 BAS40L_1 BAS40-05V_1 BAS40-07V_1 BAS40W_3 BAS40_SERIES_5
1PS70SB40_3	19990426	Product specification	-	1PS70SB40_2
1PS75SB45_2	19990426	Product specification	-	1PS75SB45_1
1PS76SB40_3	20040126	Product specification	-	1PS76SB40_2
1PS79SB40_2	19990426	Product specification	-	1PS79SB40_1
1PS88SB48_3	20021107	Product specification	-	1PS88SB48_2
BAS40H_1	20050425	Product data sheet	-	-
BAS40L_1	20030520	Product specification	-	-
BAS40-05V_1	20021121	Product specification	-	-
BAS40-07V_1	20020327	Product specification	-	-
BAS40W_3	19990426	Product specification	-	BAS40W_2
BAS40_SERIES_5	20011010	Product specification	-	BAS40_4

BAS40 series; 1PSxxSB4x series

General-purpose Schottky diodes

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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BAS40_1PSXXSB4X_SER

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BAS40 series; 1PSxxSB4x series

General-purpose Schottky diodes

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BAS40 series; 1PSxxSB4x series

NXP Semiconductors

General-purpose Schottky diodes

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