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

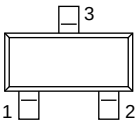
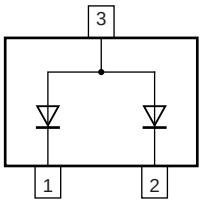
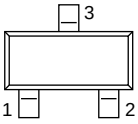
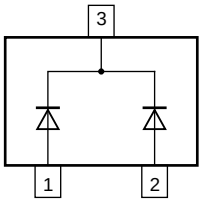
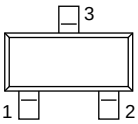
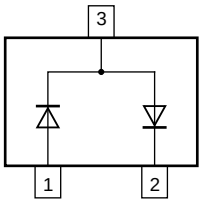
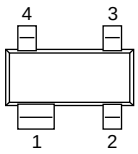
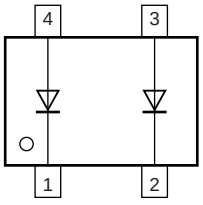
Table 2. Quick reference data

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

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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

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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

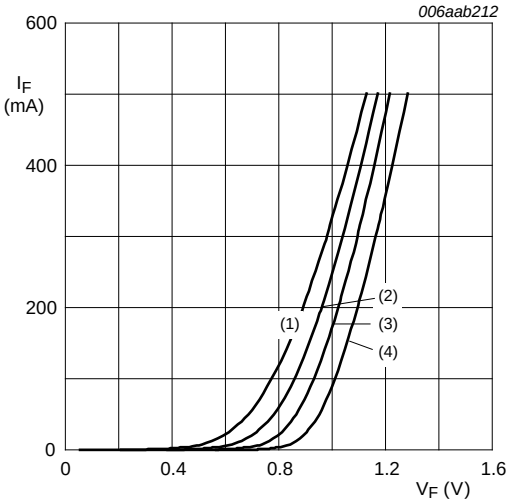
T_{amb} = 25 °C unless otherwise specified.

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.

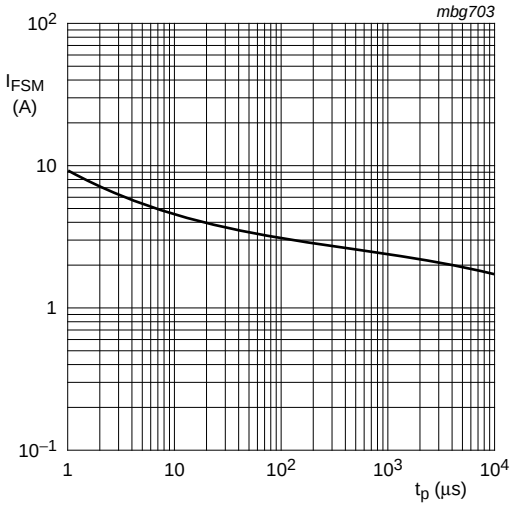
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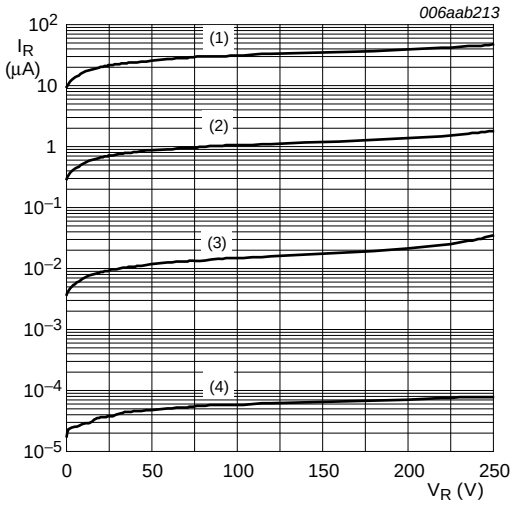
(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −40 °C

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

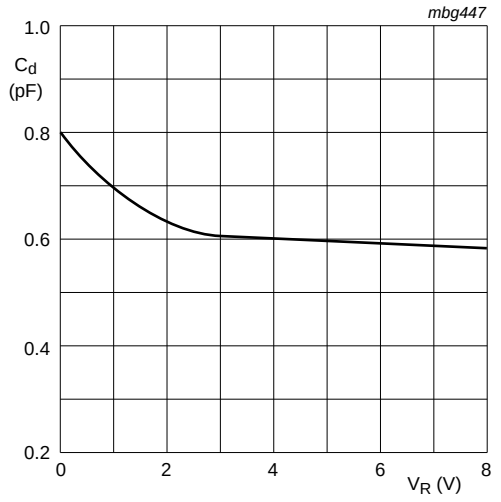


(1) T_{amb} = 150 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = −40 °C

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

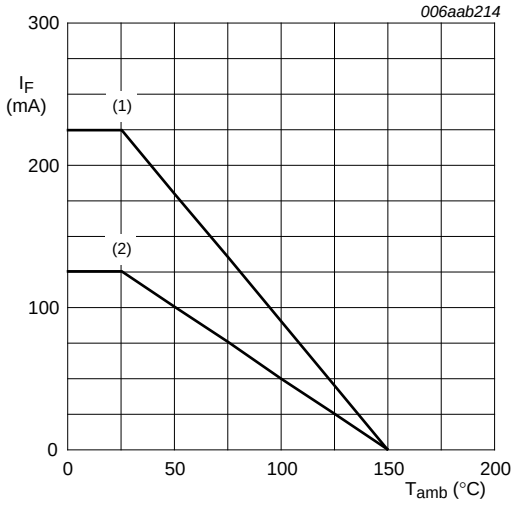
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f = 1 MHz; T_{amb} = 25 °C

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



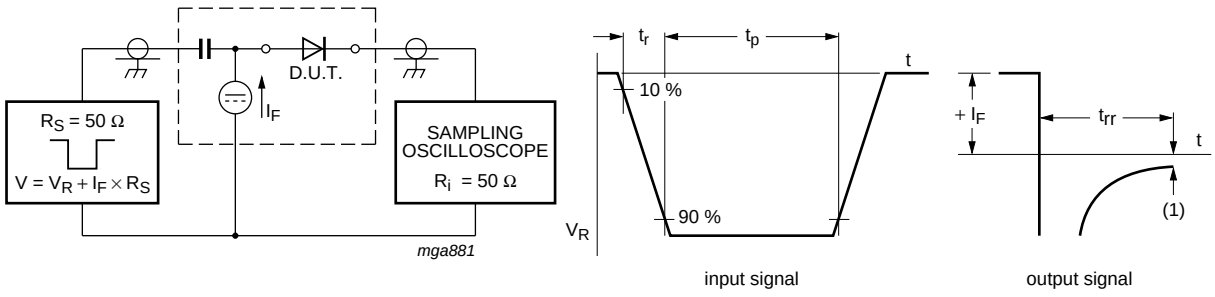
FR4 PCB, standard footprint

(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

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9. Package outline

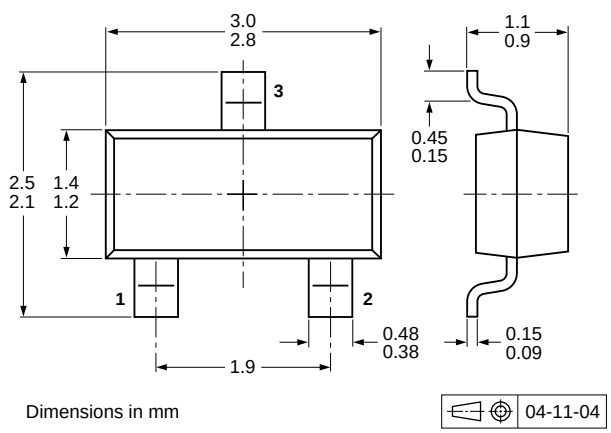


Fig 7. Package outline SOT23 (TO-236AB)

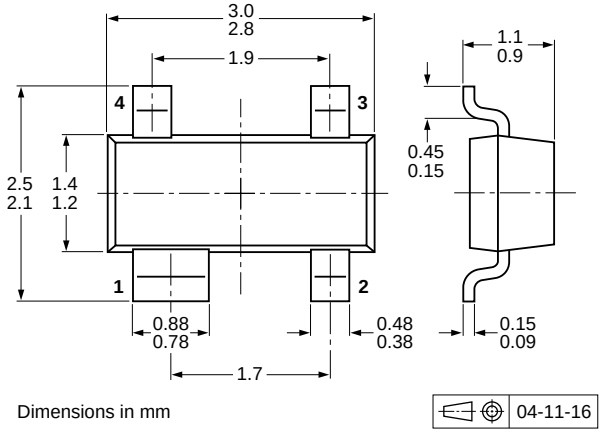


Fig 8. Package outline SOT143B

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.

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11. Soldering

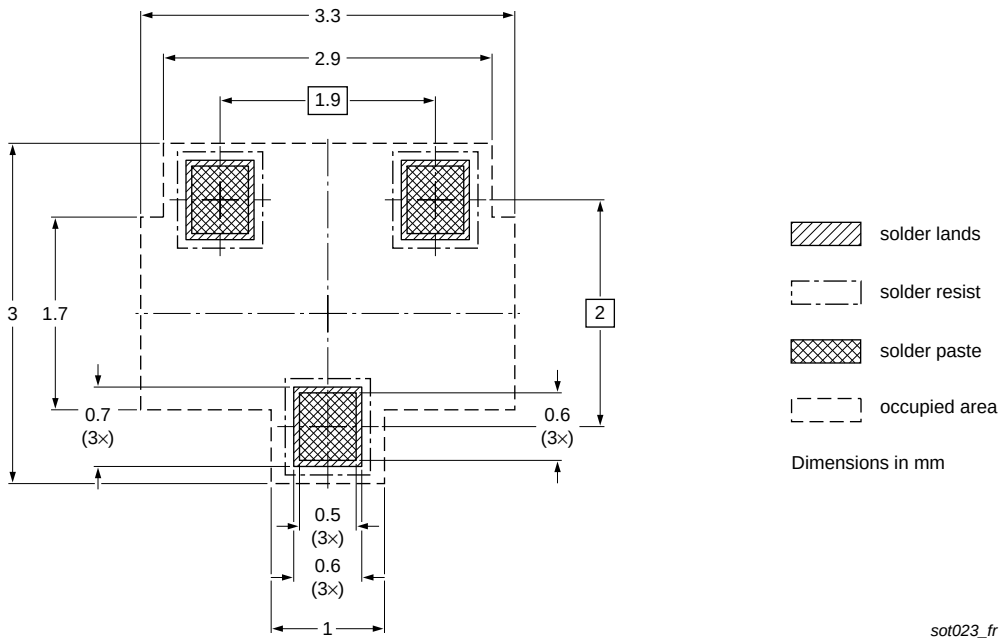


Fig 9. Reflow soldering footprint SOT23 (TO-236AB)

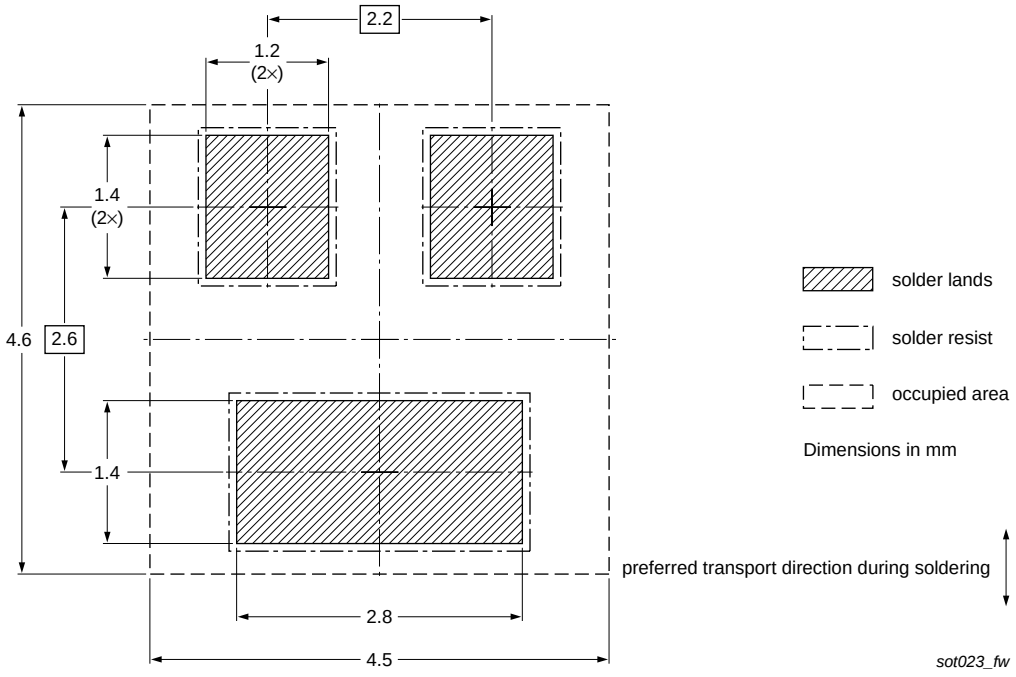


Fig 10. Wave soldering footprint SOT23 (TO-236AB)

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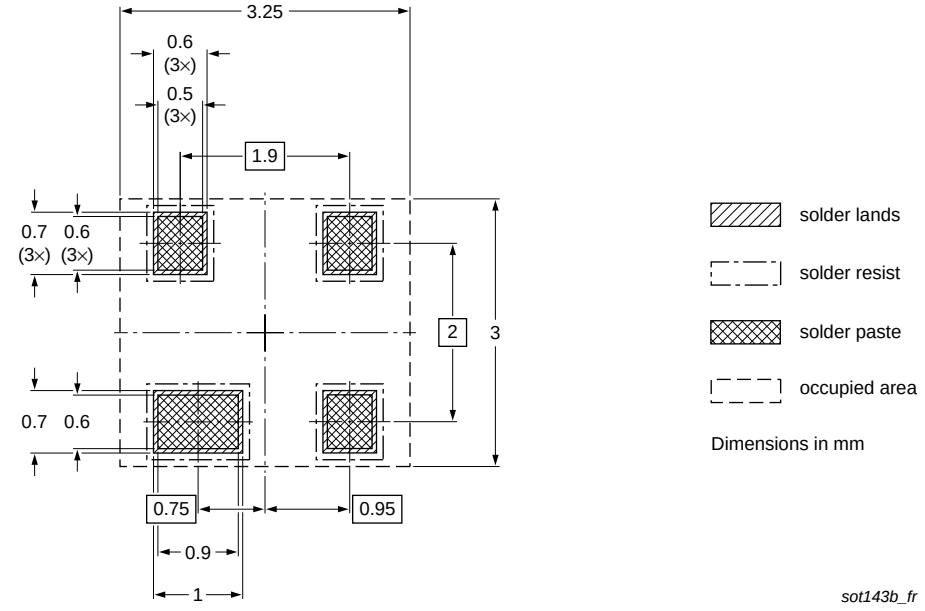


Fig 11. Reflow soldering footprint SOT143B

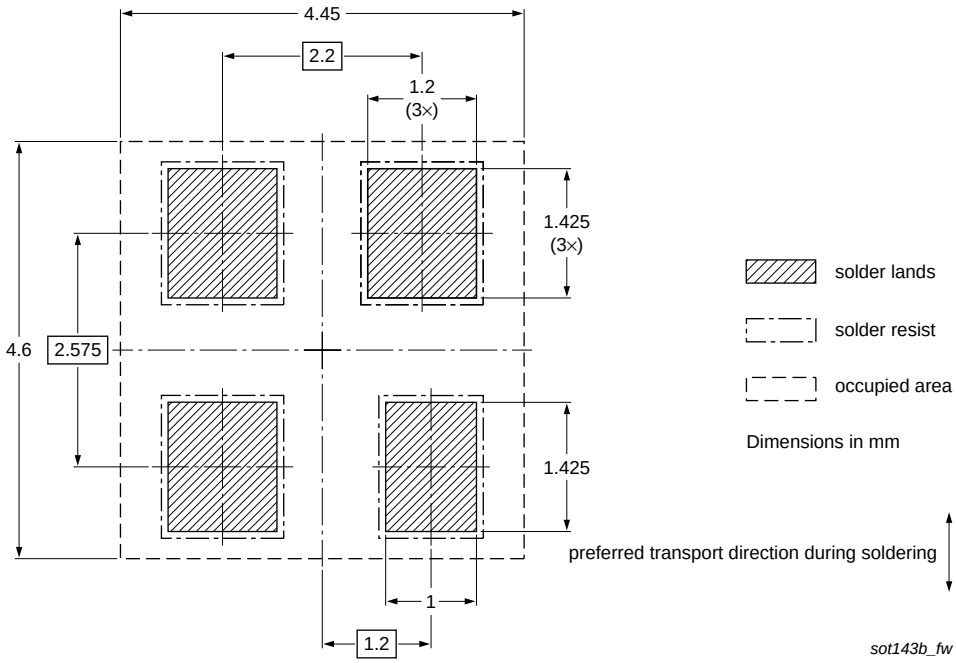


Fig 12. Wave soldering footprint SOT143B

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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

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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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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