



PESD5V0S1BA

Bidirectional ESD protection diode

23 August 2018

Product data sheet

1. General description

Bidirectional ElectroStatic Discharge (ESD) protection diode in very small SOD323 (SC-76) SM plastic package designed to protect one signal line from the damage caused by ESD and other transients.

2. Features and benefits

- Bidirectional ESD protection of one line
- Max. peak pulse power: $P_{PPM} = 130 \text{ W}$
- Low clamping voltage: $V_{(CL)R} = 14 \text{ V}$
- Low leakage current: $I_{RM} = 5 \text{ nA}$
- ESD protection $> 30 \text{ kV}$
- IEC 61000-4-2, level 4 (ESD)
- IEC 61000-4-5 (surge); $I_{PPM} = 12 \text{ A}$
- Very small SMD plastic package
- AEC-Q101 qualified

3. Applications

- Cellular handsets and accessories
- Portable electronics
- Computers and peripherals
- Communication systems
- Audio and video equipment

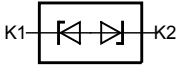
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	-	5	V
C_d	diode capacitance	$f = 1 \text{ MHz}$; $V_R = 0 \text{ V}$; $T_{amb} = 25 \text{ }^{\circ}\text{C}$	-	35	45	pF

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 SOD323	 <i>sym045</i>
2	K2	cathode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0S1BA	SOD323	plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body	SOD323

7. Marking

Table 4. Marking codes

Type number	Marking code
PESD5V0S1BA	E6

8. Limiting values

Table 5. Limiting values

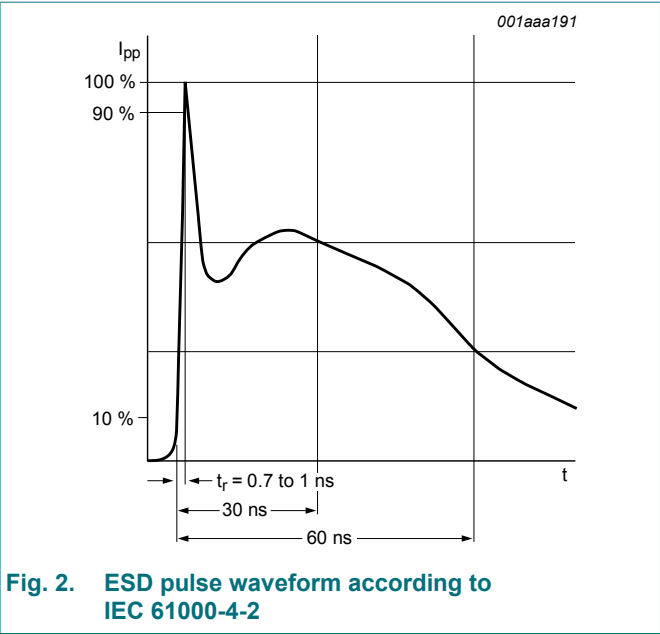
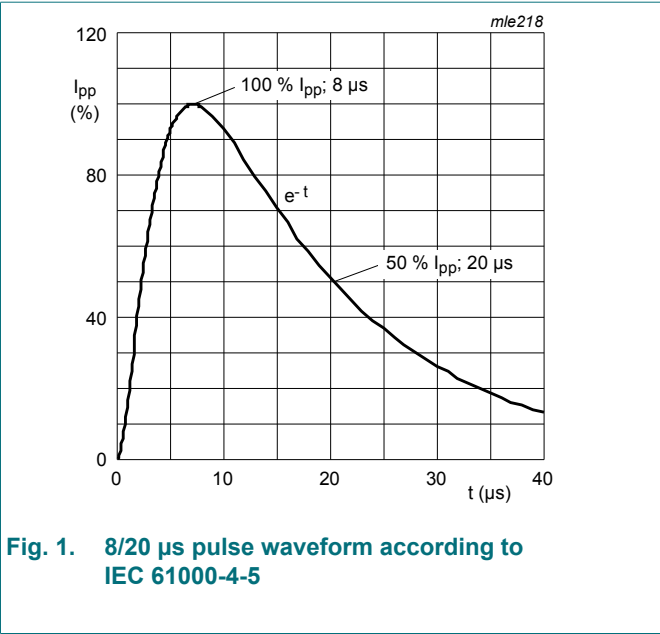
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
P _{PPM}	rated peak pulse power	t _p = 8/20 μs	[1] [2]	-	130	W
I _{PPM}	rated peak pulse current		[1] [2]	-	12	A
T _j	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C
ESD maximum ratings						
V _{ESD}	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[2] [3]	-	30	kV
		HBM MIL-Std 883		-	10	kV

[1] Non-repetitive current pulse 8/20 μs exponentially decaying waveform according to IEC 61000-4-5

[2] Measured from pin 1 to pin 2.

[3] Device stressed with ten non-repetitive ElectroStatic Discharge (ESD) pulses



9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	5	V
V_{BR}	breakdown voltage	$I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	5.5	-	9.5	V
I_{RM}	reverse leakage current	$V_{RWM} = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	5	100	nA
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	35	45	pF
V_{CL}	clamping voltage	$I_{PP} = 1\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ [1] [2]	-	-	10	V
		$I_{PPM} = 12\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$ [1] [2]	-	-	14	V
r_{dif}	differential resistance	$I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	50	Ω

[1] Non-repetitive current pulse 8/20 μs exponentially decaying waveform according to IEC61000-4-5.
[2] Measures from pin 1 to pin 2.

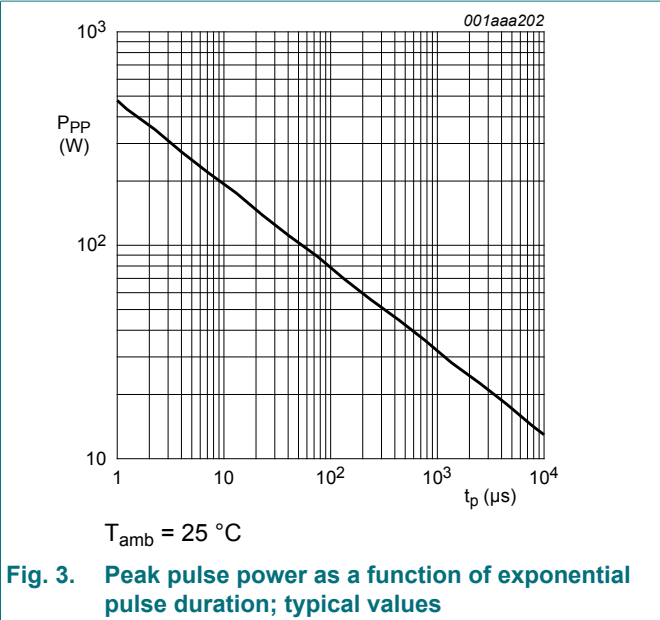


Fig. 3. Peak pulse power as a function of exponential pulse duration; typical values

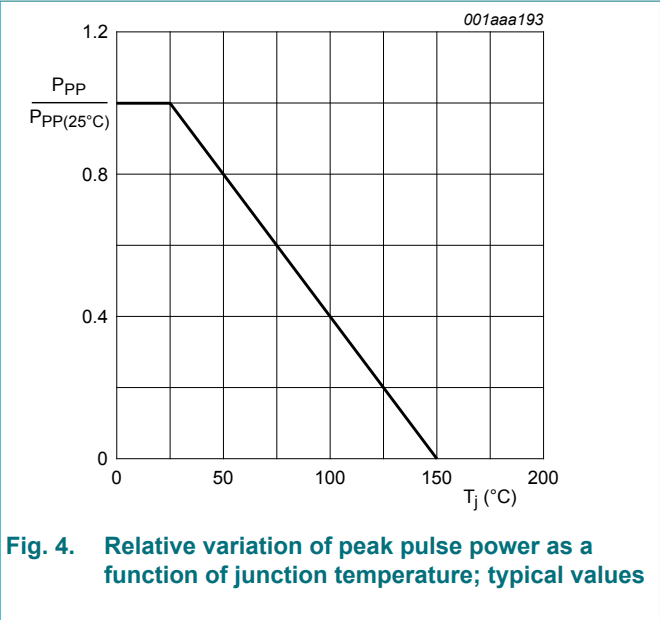


Fig. 4. Relative variation of peak pulse power as a function of junction temperature; typical values

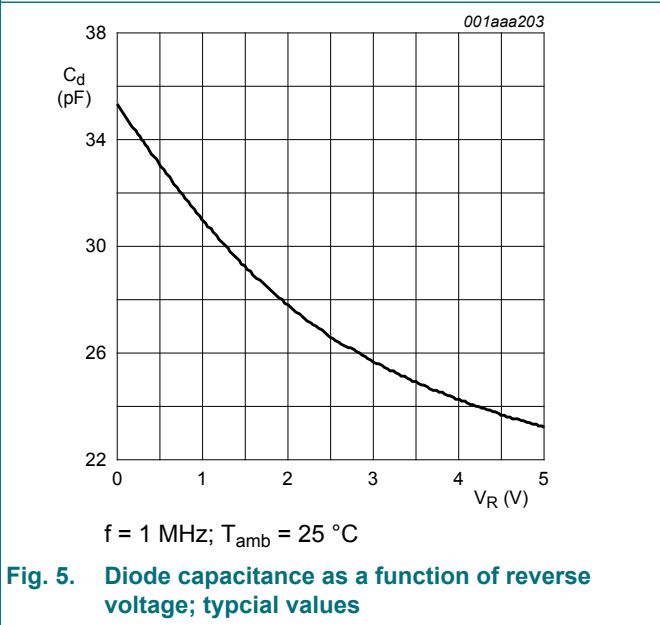


Fig. 5. Diode capacitance as a function of reverse voltage; typical values

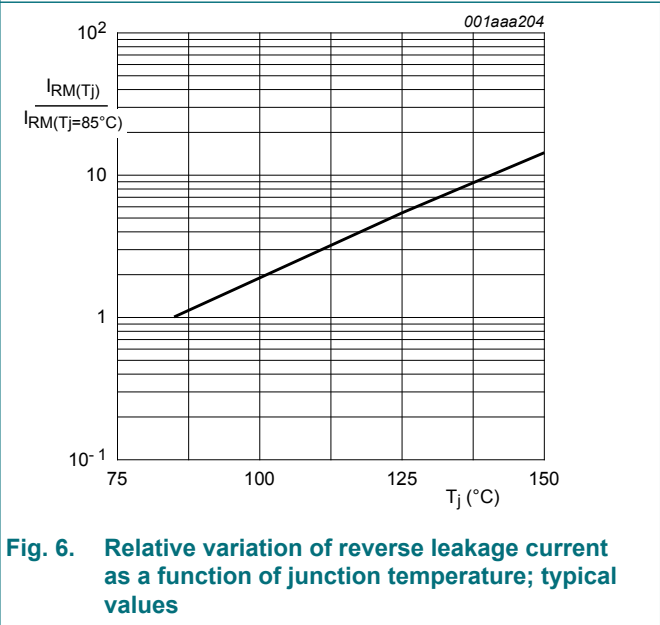


Fig. 6. Relative variation of reverse leakage current as a function of junction temperature; typical values

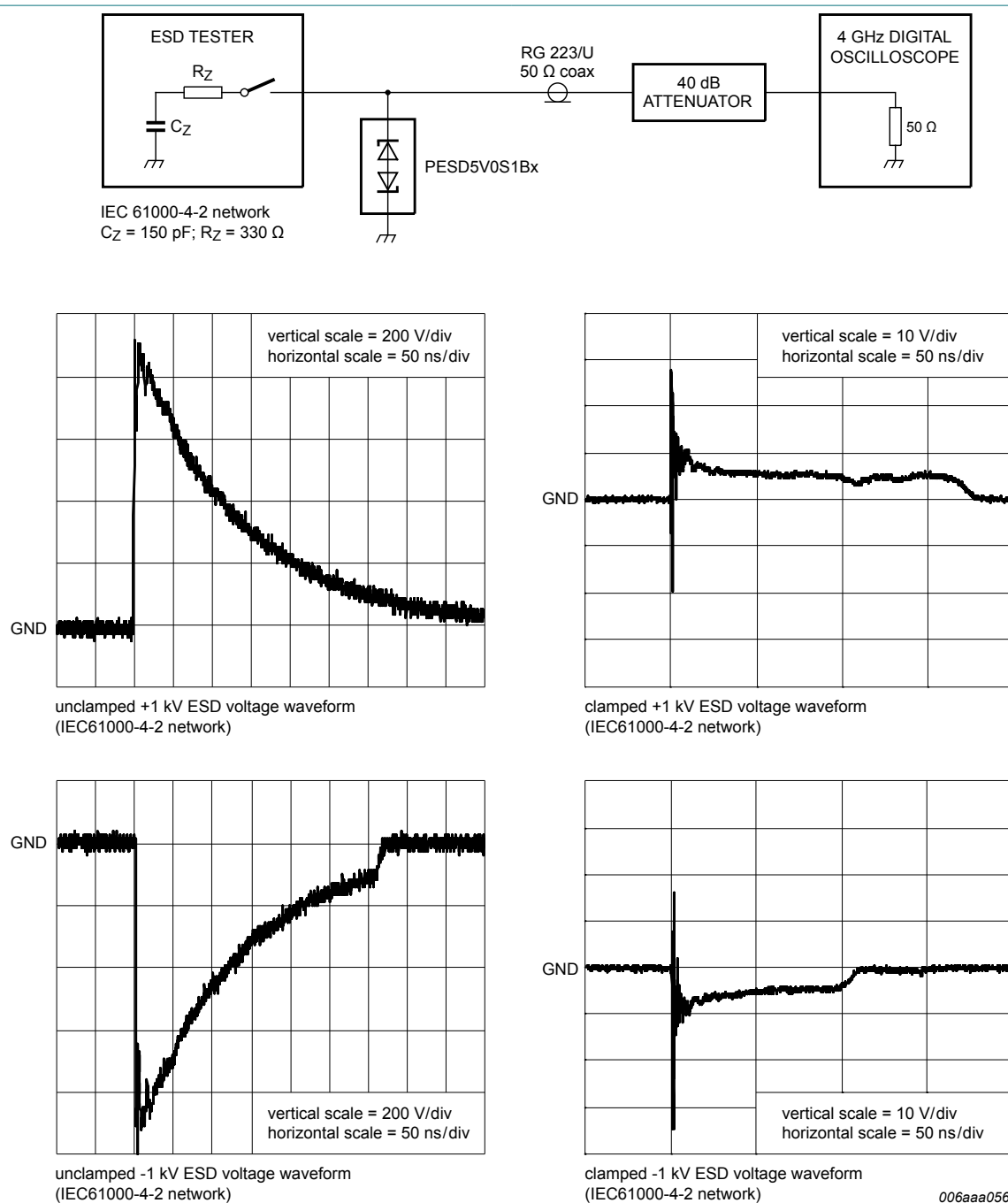


Fig. 7. ESD clamping test setup and waveforms

10. Application information

The device is designed for the protection of one bidirectional data or signal line from the damage caused by ESD and/or other surge pulses. The device may be used on lines where the signal polarities are both, positive and negative with respect to ground. It provides a surge capability of 130 W per line for an 8/20 μ s waveform.

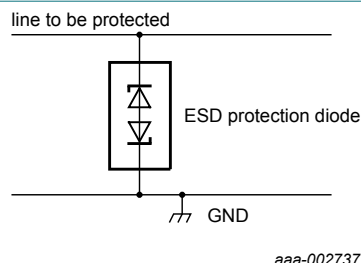


Fig. 8. Bidirectional protection of one signal line

Circuit board layout and protection device placement

Circuit board layout is critical for the suppression of ESD, Electrical Fast Transient (EFT) and surge transients. The following guidelines are recommended:

1. Place the device as close to the input terminal or connector as possible.
2. Minimize the path length between the device and the protected line.
3. Avoid running protected conductors in parallel with unprotected conductors.
4. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.
7. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

11. Test information

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.

12. Package outline

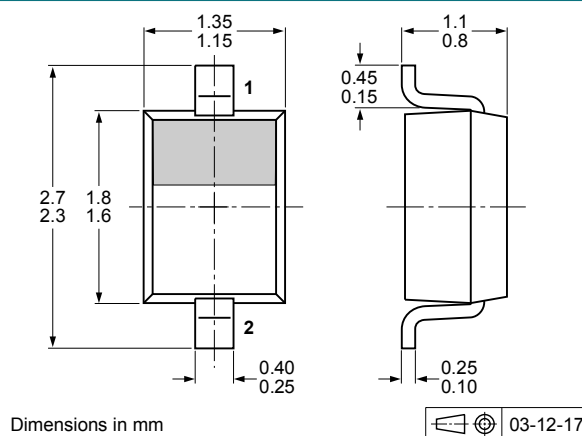


Fig. 9. Package outline SOD323

13. Soldering

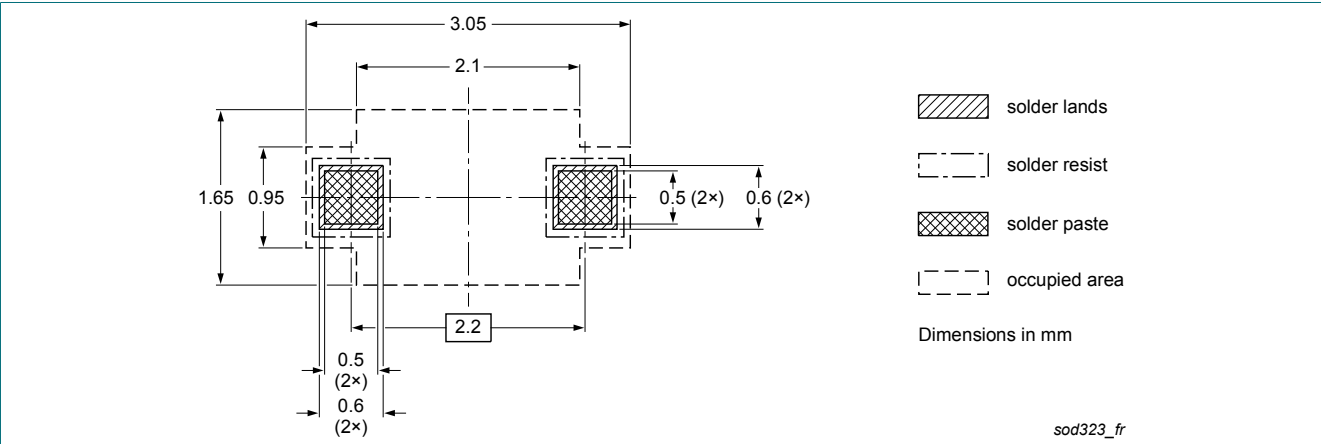


Fig. 10. Reflow soldering footprint for SOD323

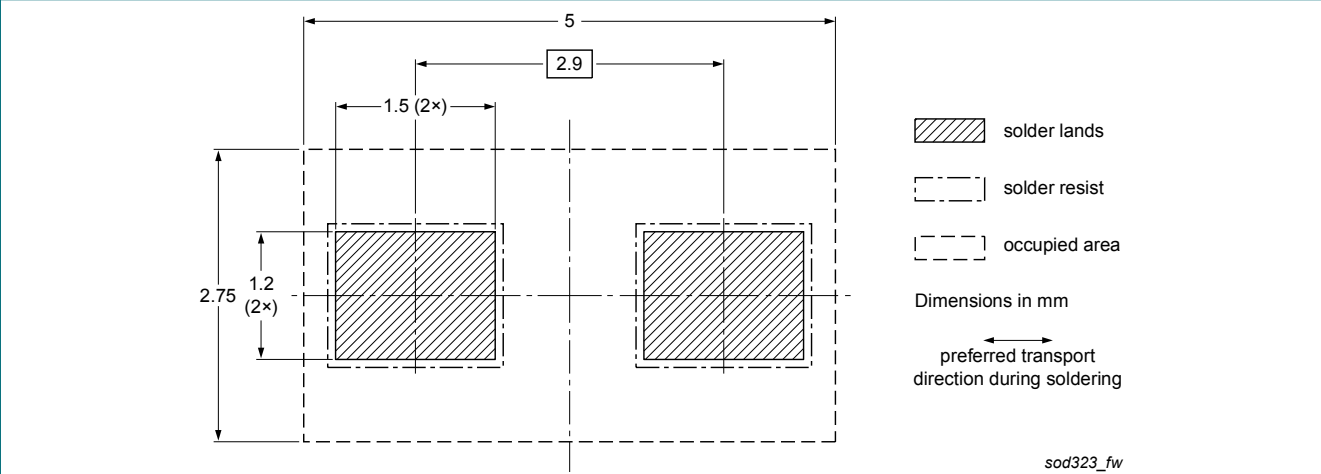


Fig. 11. Wave soldering footprint for SOD323

14. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0S1BA v.1	20180823	Product data sheet	-	PESD5V0S1BA _BB_BL_4
Modifications:	• Features and benefit AEC-Q101 qualified added. • AEC-Q101 quality information added. • Limiting values; T_{amb} updated to -55°C. • Application information: updated. • Soldering section added. • The format of this data sheet had been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate.			
PESD5V0S1BA _BB_BL_4	20090820	Product data sheet	-	PESD5V0S1BA _BB_BL_3
PESD5V0S1BA _BB_BL_3	20041217	Product data sheet	-	PESD5V0S1BA _BB_BL_2
PESD5V0S1BA _BB_BL_2	20040322	Product specification	-	PESD5V0S1BA _BB_BL_1
PESD5V0S1BA _BB_BL_1	20040304	Product specification	-	-

15. Legal information

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 <https://www.nexperia.com>.

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