PESD5V0U1UA

Ultra low capacitance unidirectional ESD protection diode

14 April 2023 **Product data sheet**

1. General description

Ultra low capacitance unidirectional ElectroStatic Discharge (ESD) protection diode in a very small SOD323 (SC-76) Surface-Mounted Device (SMD) plastic package designed to protect one signal line from the damage caused by ESD and other transients.

2. Features and benefits

- Unidirectional ESD protection of one line
- ESD protection up to 9 kV
- IEC 61000-4-2; level 4 (ESD)
- Ultra low diode capacitance: C_d = 2 pF
- Very low leakage current: I_{RM} = 1 nA

3. Applications

- USB interfaces
- 10/100/1000 Mbit/s Ethernet
- FireWire
- High-speed data lines
- Subscriber Identity Module (SIM) card protection
- Cellular handsets and accessories
- Portable electronics
- Communication systems
- Computers and peripherals
- 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 °C		-	-	5	V
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	2	2.6	pF
		f = 1 MHz; V_R = 5 V; T_{amb} = 25 °C		-	1.7	2.3	pF

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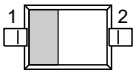
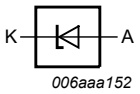
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SOD323	
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0U1UA	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
PESD5V0U1UA	C7

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
I_{PPM}	rated peak pulse current	t_p = 8/20 µs		-	1.3	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)	[1] [2]	-	9	kV
		MIL-STD-883 (human body model)		-	10	kV

[1] Device stressed with ten non-repetitive ESD pulses.
[2] Measured from pin 1 to pin 2.

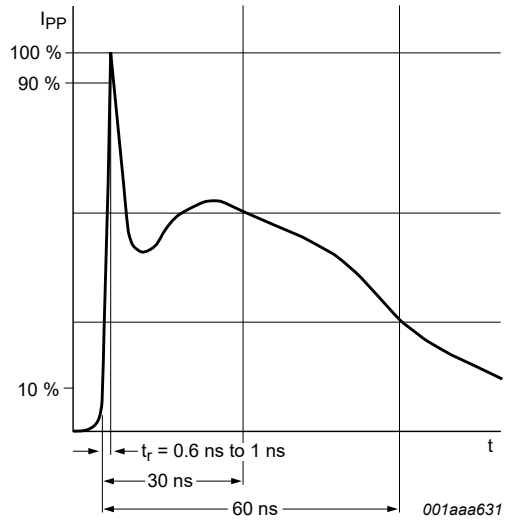
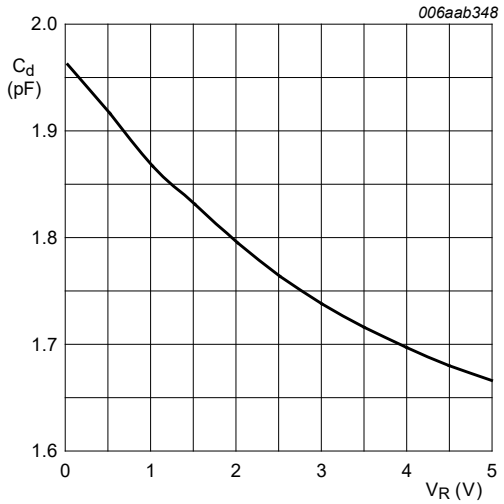


Fig. 1. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		-	-	5	V
V_{BR}	breakdown voltage	I_R = 5 mA; T_{amb} = 25 °C		5.8	6.8	8.8	V
I_{RM}	reverse leakage current	V_{RWM} = 5 V; T_{amb} = 25 °C		-	1	100	nA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; T_{amb} = 25 °C		-	2	2.6	pF
		f = 1 MHz; V_R = 5 V; T_{amb} = 25 °C		-	1.7	2.3	pF
V_{CL}	clamping voltage	I_{PP} = 1 A; T_{amb} = 25 °C		-	9	-	V
		I_{PPM} = 1.3 A; T_{amb} = 25 °C		-	9.5	11	V
R_{diff}	differential resistance	I_R = 1 mA; T_{amb} = 25 °C		-	-	100	Ω



unidirectional configuration
T_{amb} = 25 °C; f = 1 MHz

Fig. 2. Diode capacitance as a function of reverse voltage; typical values

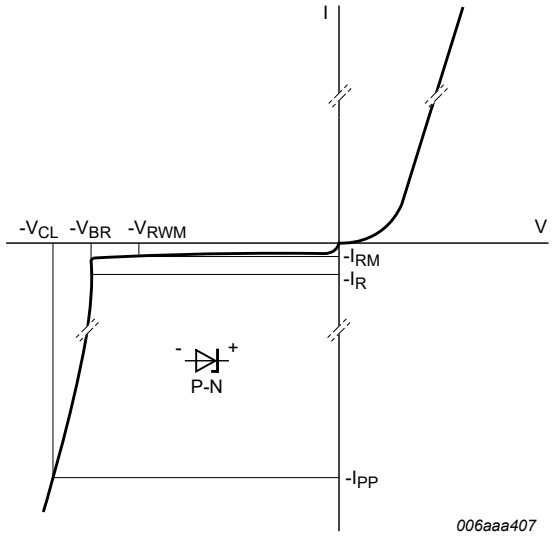


Fig. 3. V-I characteristics for a unidirectional ESD protection diode

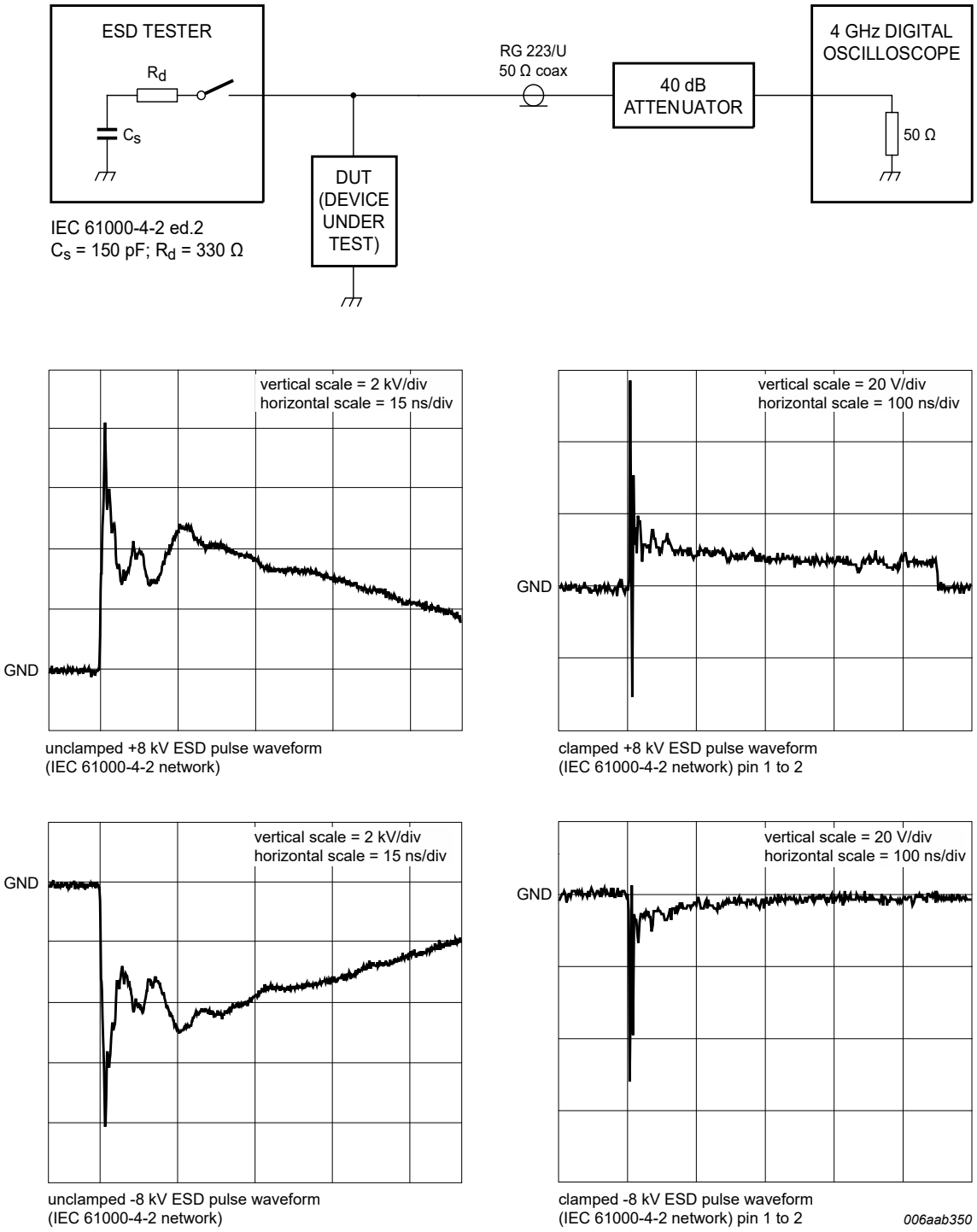


Fig. 4. ESD clamping test setup and waveforms

10. Application information

The device is designed for the protection of one unidirectional data or signal line from the damage caused by ESD. The device may be used on lines where the signal polarities are either positive or negative with respect to ground.

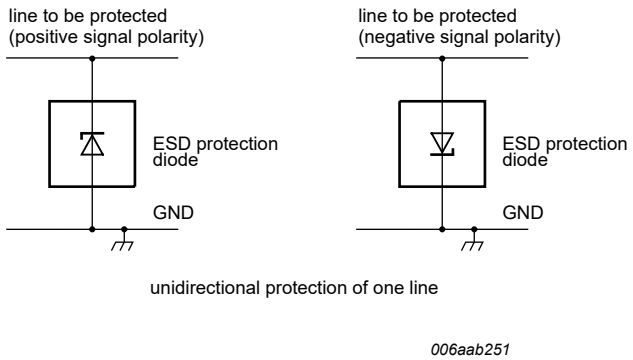


Fig. 5. Application diagram

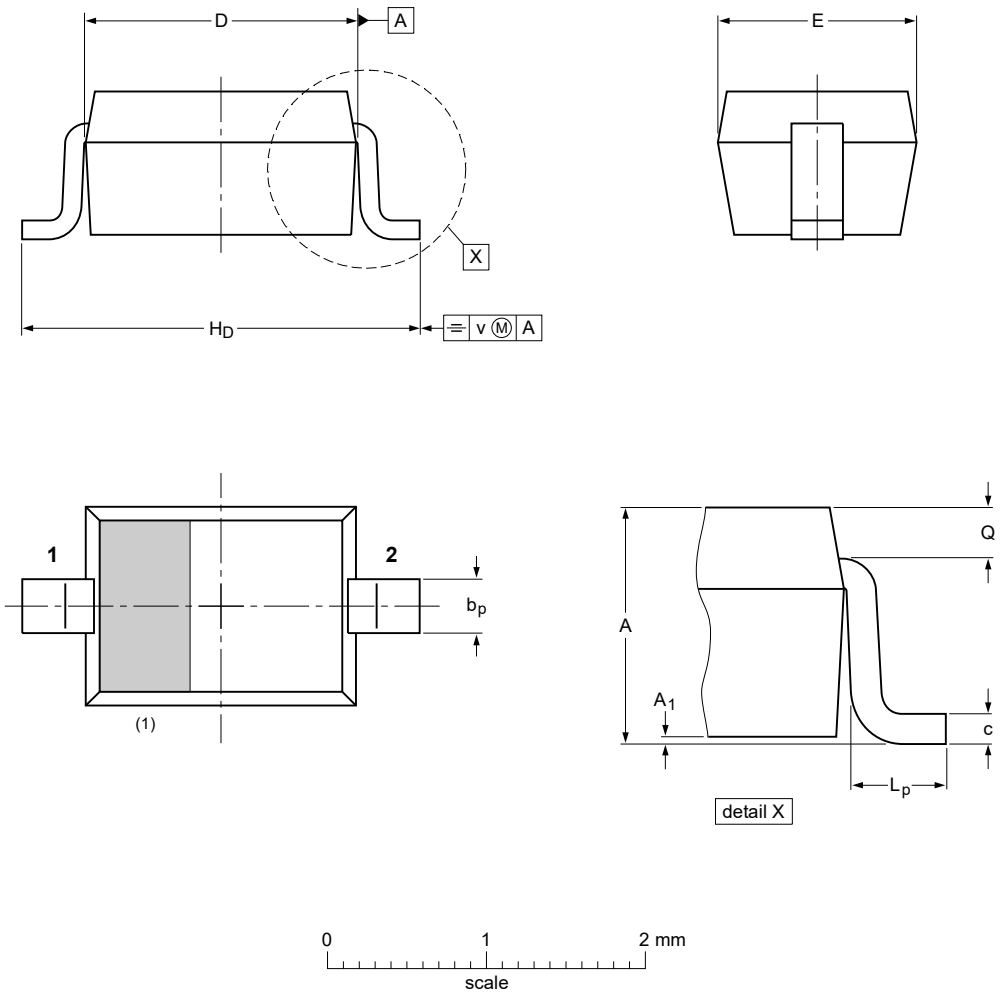
Circuit board layout and protection device placement

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. Keep parallel signal paths to a minimum.
4. Avoid running protected conductors in parallel with unprotected conductors.
5. Minimize all Printed-Circuit Board (PCB) conductive loops including power and ground loops.
6. Minimize the length of the transient return path to ground.
7. Avoid using shared transient return paths to a common ground point.
8. Use ground planes whenever possible. For multilayer PCBs, use ground vias.

11. Package outline

Plastic surface-mounted package; 2 leads **SOD323**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	H_D	L_p	Q	v
mm	1.1 0.8	0.05	0.40 0.25	0.25 0.10	1.8 1.6	1.35 1.15	2.7 2.3	0.45 0.15	0.25 0.15	0.2

Note

1. The marking bar indicates the cathode

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOD323			SC-76			~~03-12-17~~ 06-03-16

Fig. 6. Package outline SOD323

12. Soldering

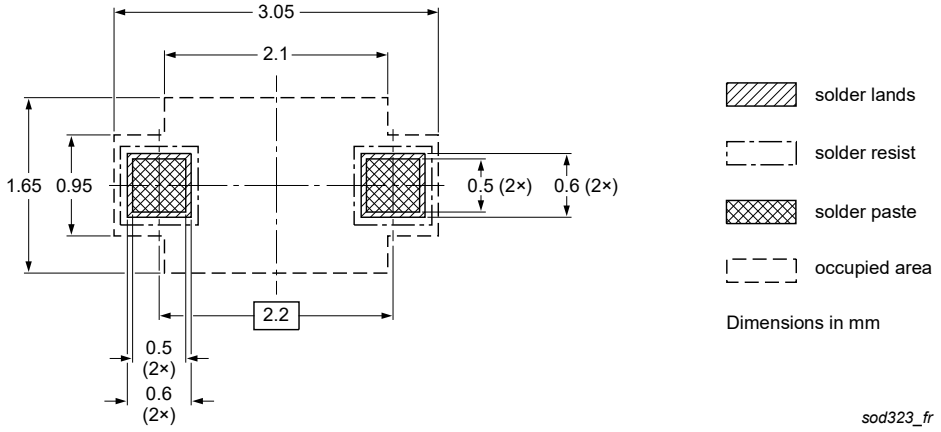


Fig. 7. Reflow soldering footprint for SOD323

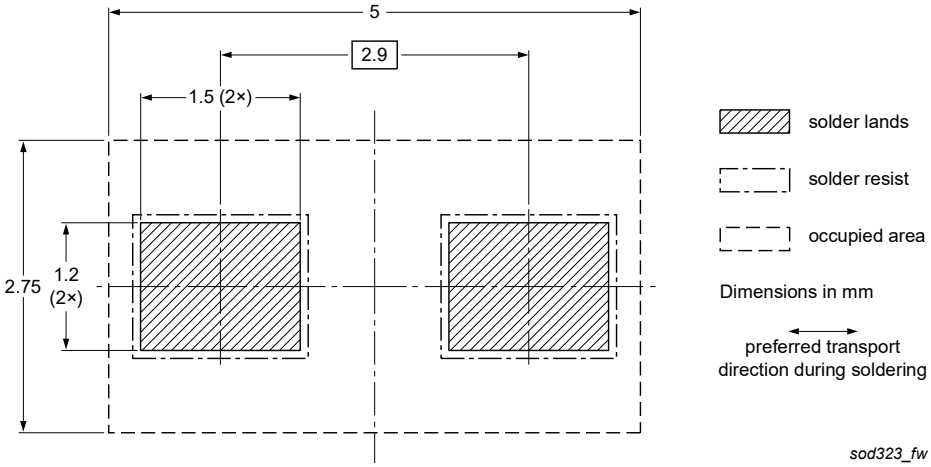


Fig. 8. Wave soldering footprint for SOD323

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0U1UA v.3	20230414	Product data sheet	-	PESD5V0U1UA v.2
Modifications:	• Product changed to standard qualification. Please refer to automotive -Q product(s).			
PESD5V0U1UA v.2	20200602	Product data sheet	-	PESD5V0U1UA_UB_UL_1
PESD5V0U1UA_UB_UL_1	20081030	Product data sheet	-	-

14. 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".
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