



# PESD5V0L1UA-Q

## Low capacitance unidirectional ESD protection diode

13 June 2022

Product data sheet

### 1. General description

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
- Low diode capacitance:  $C_d = 25$  pF
- Low clamping voltage:  $V_{CL} = 12$  V
- Very low leakage current:  $I_{RM} = 10$  nA
- ESD protection up to 26 kV
- IEC 61000-4-2; level 4 (ESD)
- Qualified according to AEC-Q101 and recommended for use in automotive applications

### 3. Application information

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Communication systems
- SIM card protection
- Portable electronics
- FireWire
- High-speed data lines

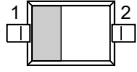
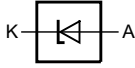
### 4. Quick reference data

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	-	25	30	pF

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 <p>SOD323</p>	 <p>006aaa152</p>
2	A	anode		

[1] The marking bar indicates the cathode.

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0L1UA-Q	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
PESD5V0L1UA-Q	1J

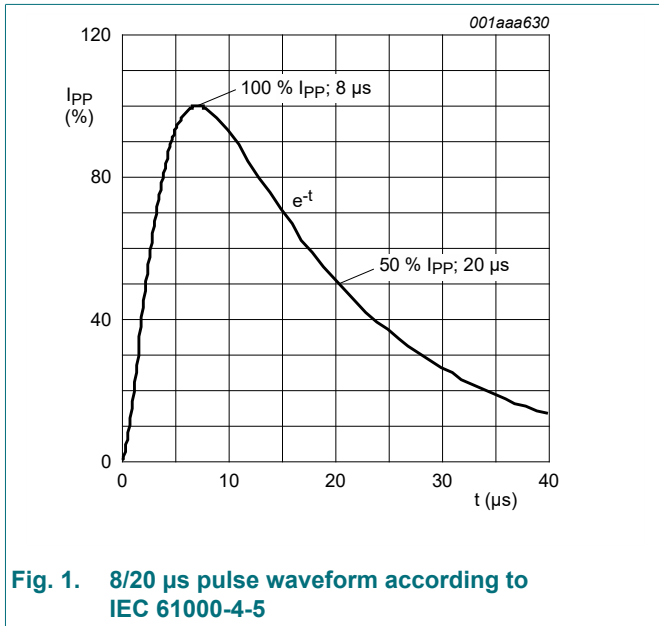
## 8. Limiting values

**Table 5. Limiting values**

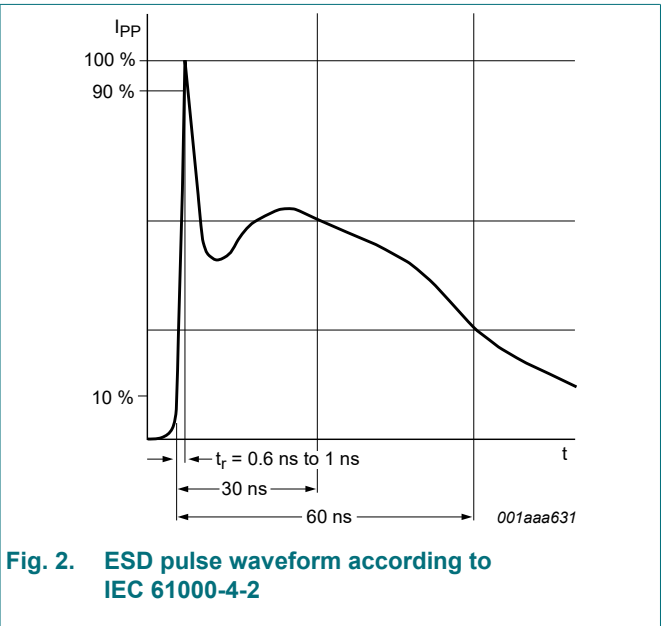
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
$P_{PPM}$	rated peak pulse power	$t_p = 8/20 \mu s$	[1] [2]	-	42	W
$I_{PPM}$	rated peak pulse current		[1] [2]	-	3.5	A
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-55	150	°C
$T_{stg}$	storage temperature			-65	150	°C
<b>ESD maximum ratings</b>						
$V_{ESD}$	electrostatic discharge voltage	IEC 61000-4-2; contact discharge; $T_{amb} = 25 \text{ °C}$	[3]	-	26	kV
		IEC 61000-4-2; air discharge		-	15	kV
		machine model; $T_{amb} = 25 \text{ °C}$		-	400	V
		MIL-STD-883; human body model (HBM); $T_{amb} = 25 \text{ °C}$		-	10	kV

- [1] Non-repetitive current pulse 8/20  $\mu s$  exponential decay waveform according to IEC 61000-4-5.
- [2] Measured from pin 1 to pin 2.
- [3] Device stressed with ten non-repetitive ESD pulses.



**Fig. 1. 8/20  $\mu s$  pulse waveform according to IEC 61000-4-5**



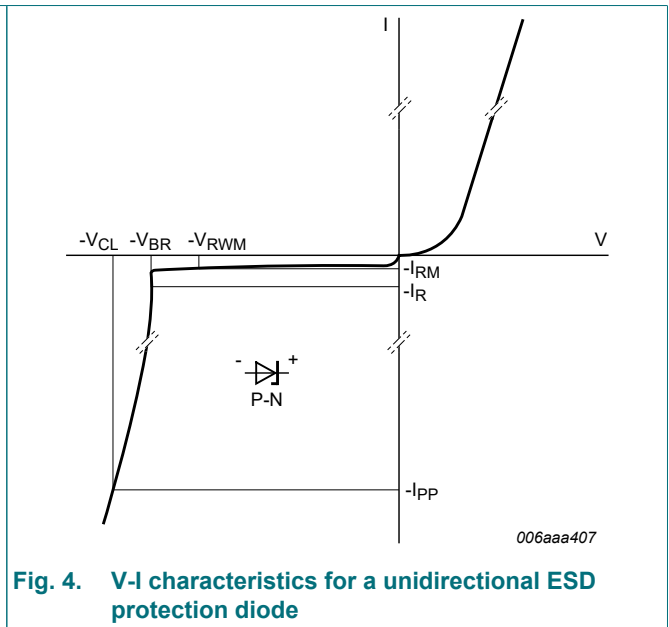
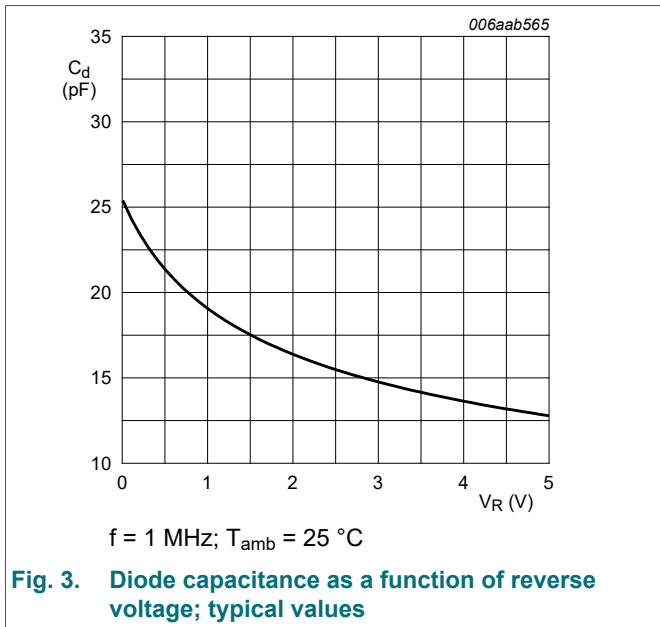
**Fig. 2. ESD pulse waveform according to IEC 61000-4-2**

### 9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 200 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	1.2	V
$V_{RWM}$	reverse standoff voltage	$T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	5	V
$V_{BR}$	breakdown voltage	$I_R = 5 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	6.4	6.8	7.2	V
$I_{RM}$	reverse leakage current	$V_{RWM} = 5 \text{ V}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	10	100	nA
$C_d$	diode capacitance	$f = 1 \text{ MHz}$ ; $V_R = 0 \text{ V}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	25	30	pF
$V_{CL}$	clamping voltage	$I_{PP} = 1 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1] [2]	-	9	V
		$I_{PPM} = 3.5 \text{ A}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1] [2]	-	12	V
$R_{\text{diff}}$	differential resistance	$I_R = 5 \text{ mA}$ ; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	-	-	30	$\Omega$

- [1] Non-repetitive current pulse 8/20  $\mu\text{s}$  exponential decay waveform according to IEC 61000-4-5.
- [2] Measured from pin 1 to pin 2.



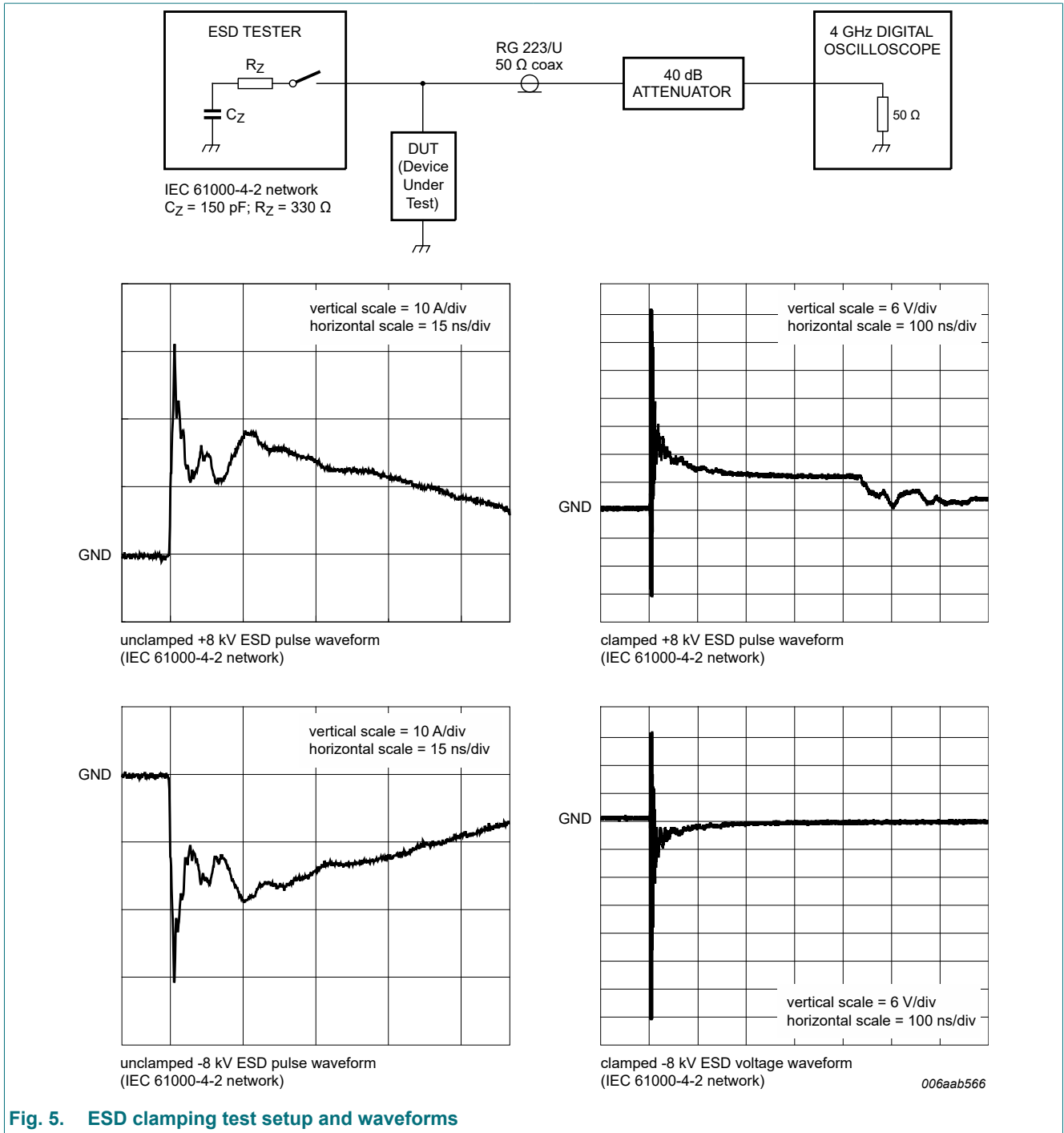


Fig. 5. ESD clamping test setup and waveforms

## 10. Application information

The device is designed for protection of one unidirectional data or signal line from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are either positive or negative with respect to ground.

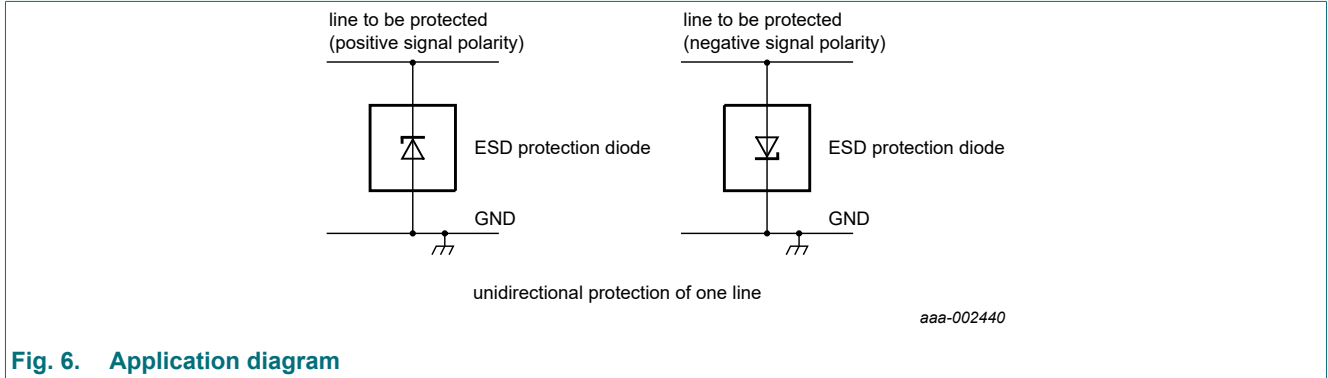


Fig. 6. Application diagram

### 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. 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

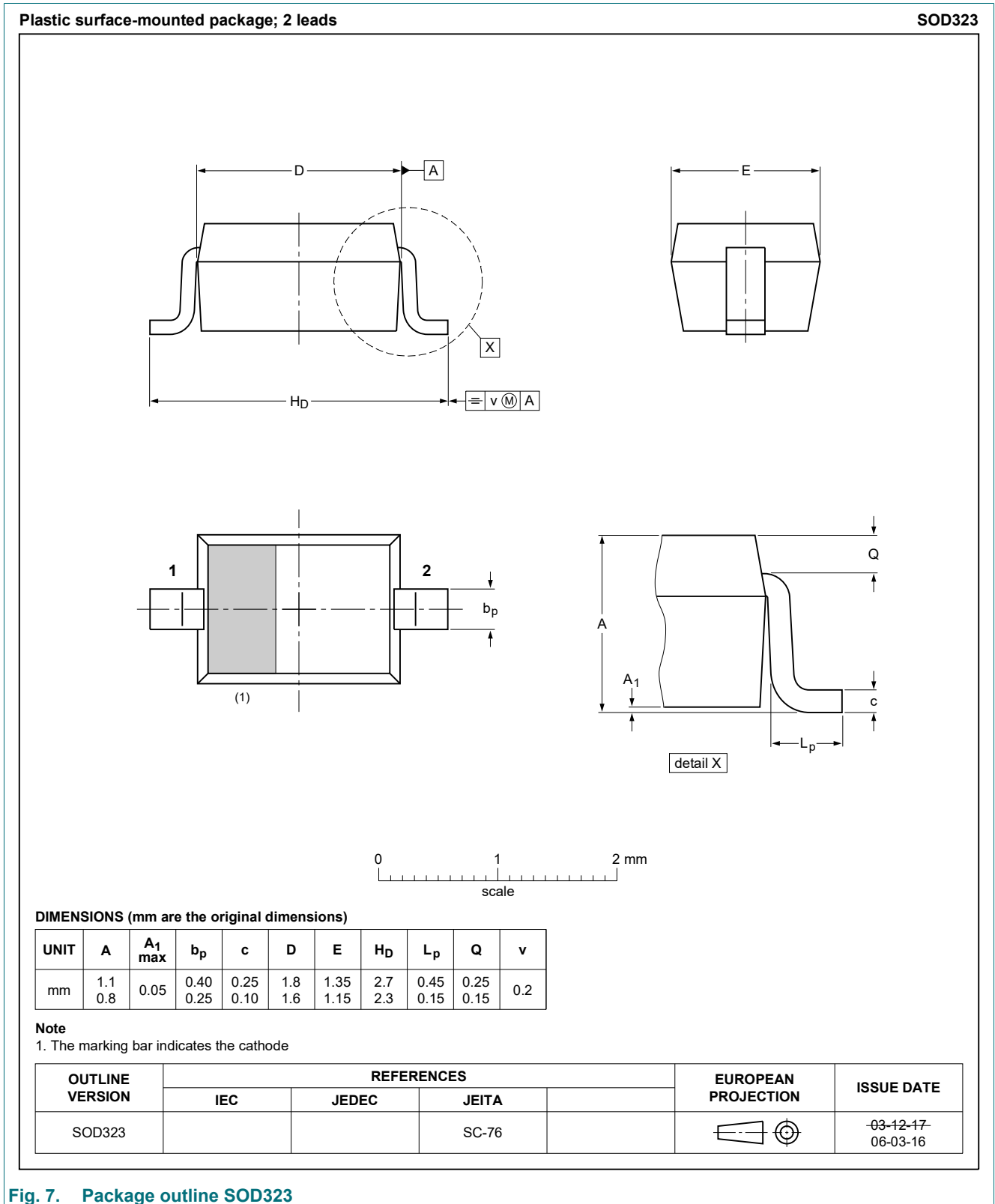


Fig. 7. Package outline SOD323

### 13. Soldering

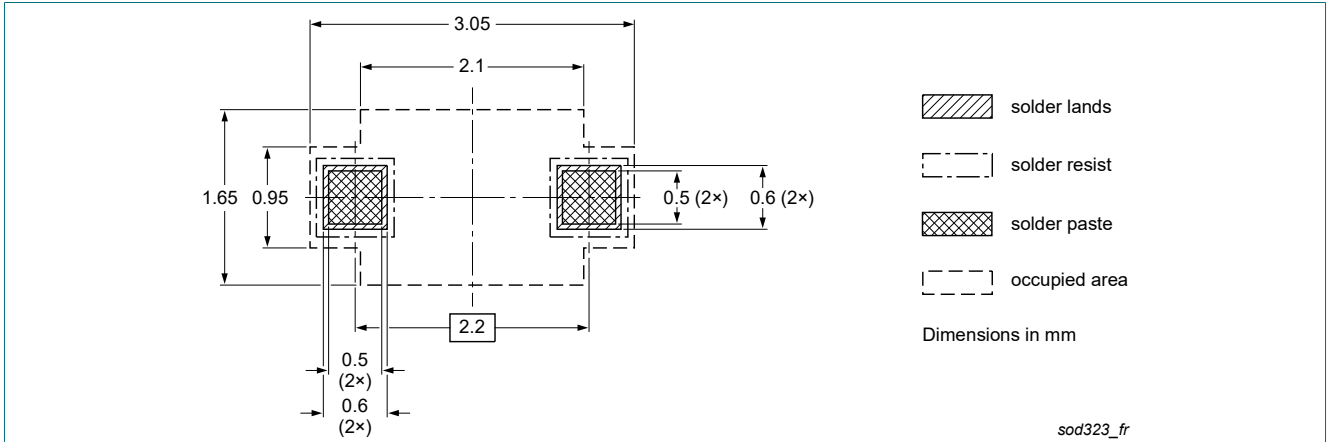


Fig. 8. Reflow soldering footprint for SOD323

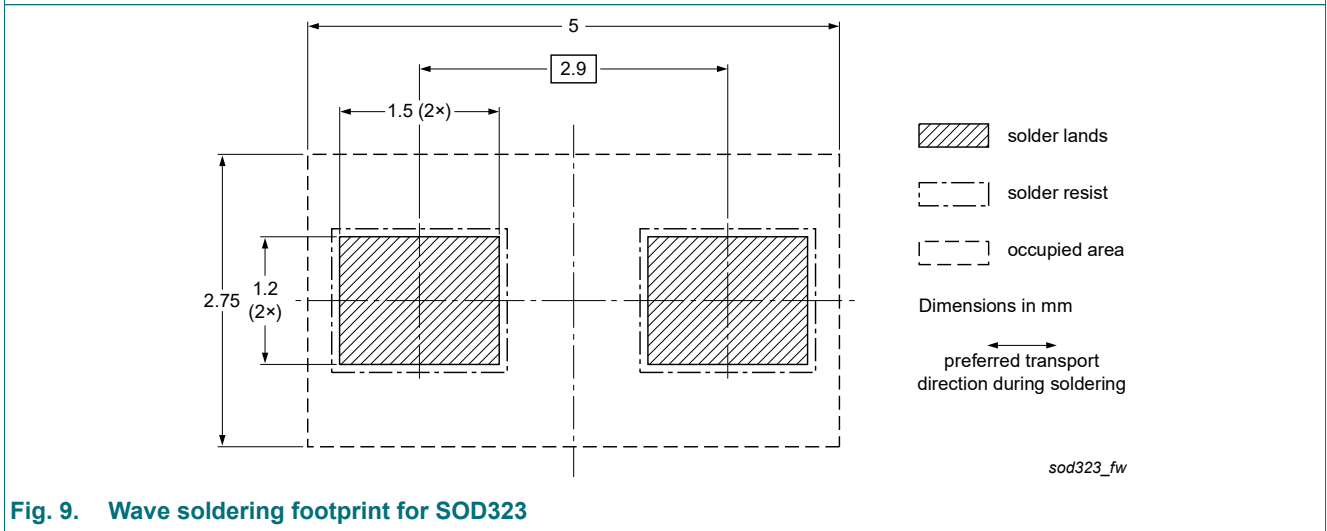


Fig. 9. Wave soldering footprint for SOD323



## 14. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0L1UA-Q v.1	20220613	Product data sheet	-	-

## 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".
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