



PESD5V0U2BT

Ultra low capacitance bidirectional double ESD protection diode

17 April 2023

Product data sheet

1. General description

Ultra low capacitance bidirectional double ElectroStatic Discharge (ESD) protection diode in a SOT23 (TO-236AB) small Surface-Mounted Device (SMD) plastic package designed to protect two data lines from the damage caused by ESD.

2. Features and benefits

- Bidirectional ESD protection of two lines
- Ultra low diode capacitance: $C_d = 2.9$ pF
- IEC 61000-4-2; level 4 (ESD)
- Ultra low leakage current: $I_{RM} = 5$ nA
- ESD protection of up to 10 kV

3. Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- 10/100/1000 Ethernet
- Local Area Network (LAN) equipment
- Communication systems
- Portable electronics
- SIM card protection
- FireWire
- High-speed data lines

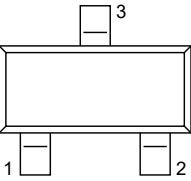
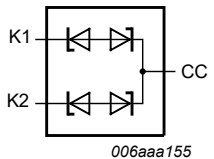
4. Quick reference data

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	-	2.9	3.5	pF

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode (diode 1)	 <p style="text-align: center;">SOT23</p>	 <p style="text-align: center;"><small>006aaa155</small></p>
2	K2	cathode (diode 2)		
3	CC	common cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD5V0U2BT	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PESD5V0U2BT	1U%

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
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]	-	10	kV
		IEC 61000-4-2 (air discharge)		-	15	V
		MIL-STD-883 (human body model)		-	8	kV

[1] Device stressed with ten non-repetitive ESD pulses.

[2] Measured from pin 1 to pin 2.

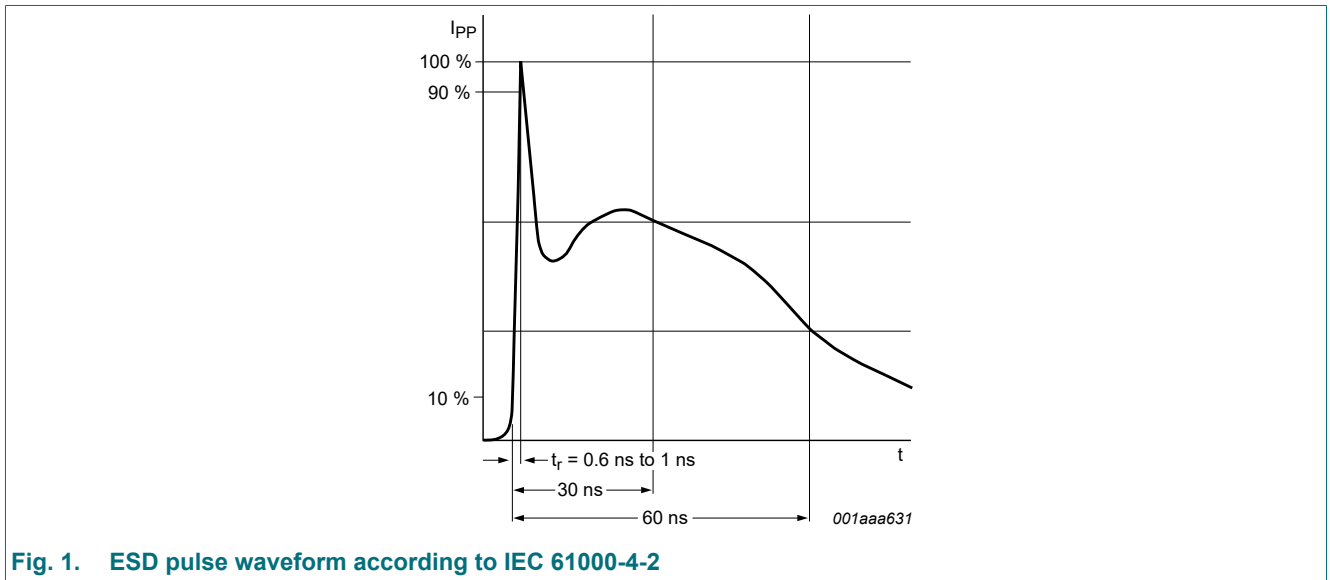
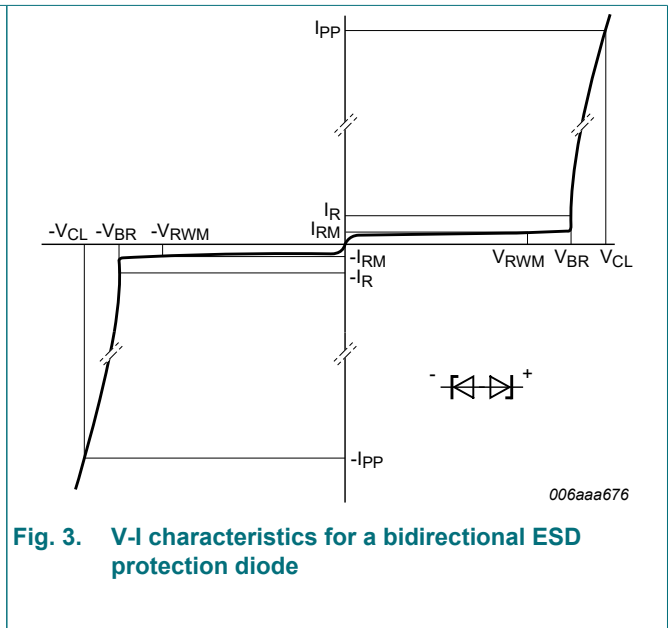
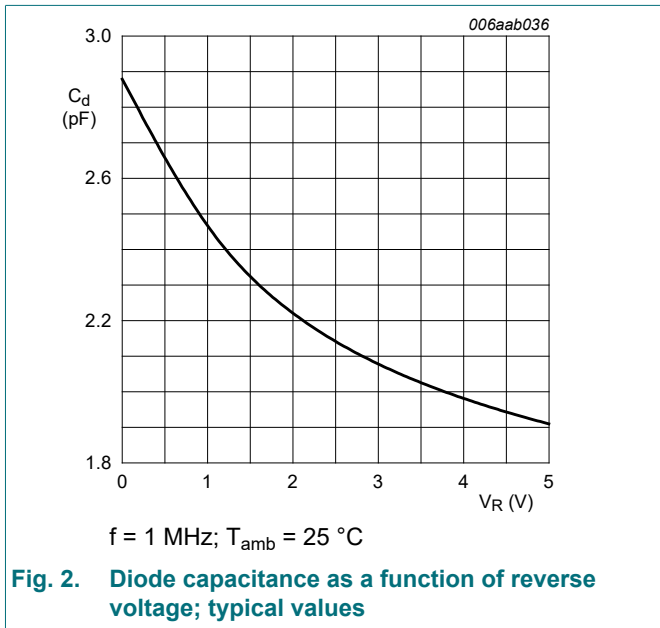


Fig. 1. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	5	V
V_{BR}	breakdown voltage	$I_R = 5\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	5.5	7	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	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	2.9	3.5	pF
		$f = 1\text{ MHz}; V_R = 5\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	1.9	-	pF
R_{diff}	differential resistance	$I_R = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	100	Ω



Ultra low capacitance bidirectional double ESD protection diode

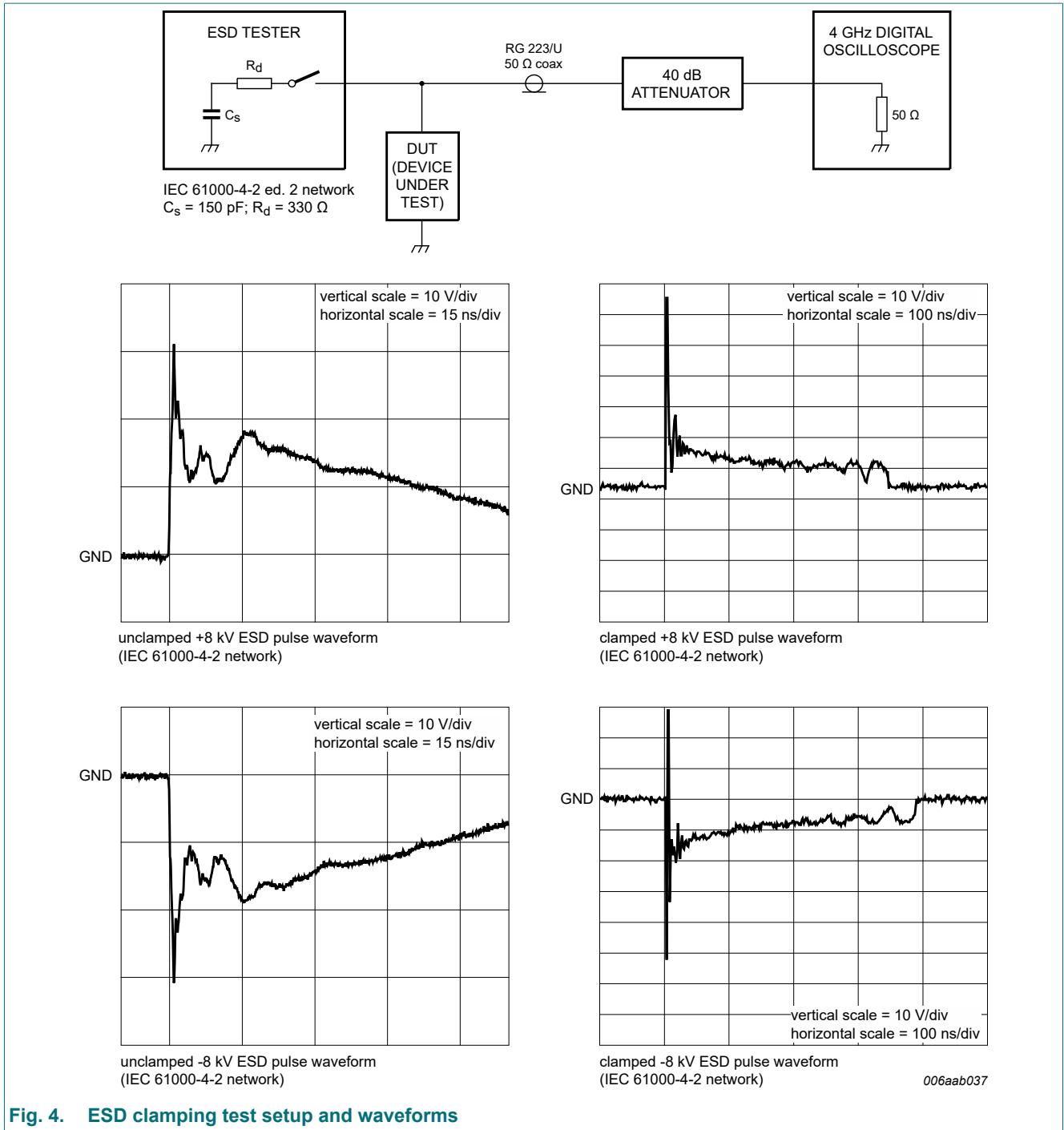


Fig. 4. ESD clamping test setup and waveforms

10. Application information

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

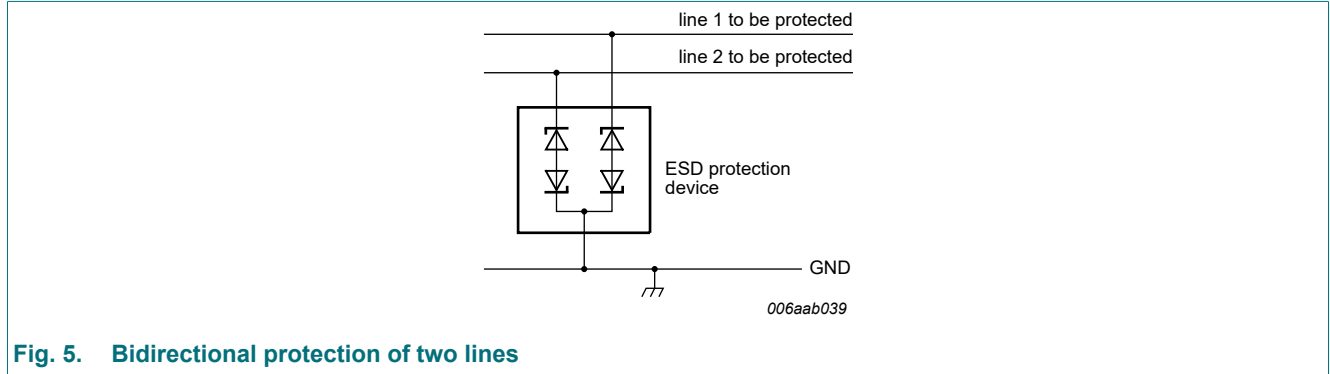


Fig. 5. Bidirectional protection of two lines

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

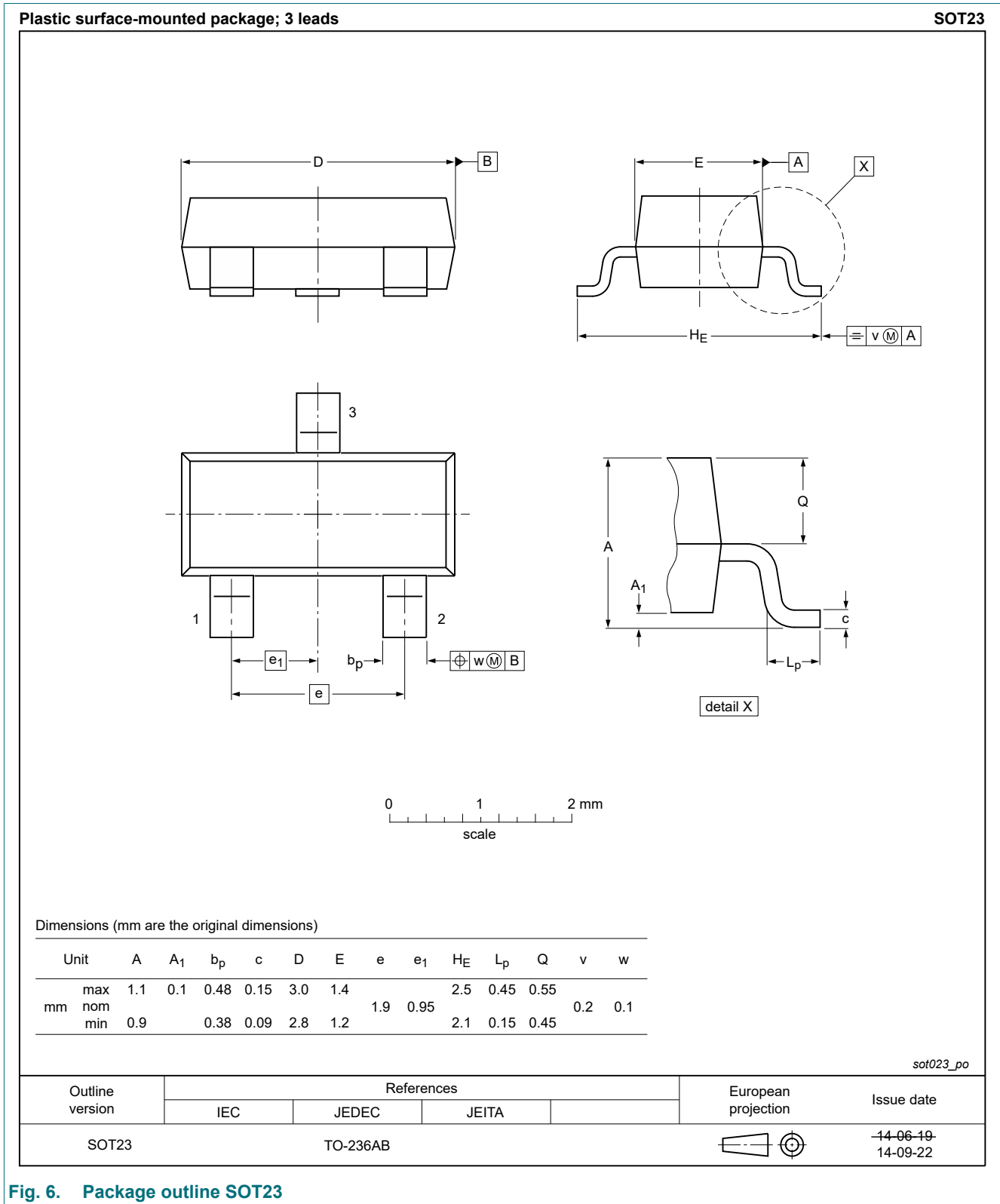


Fig. 6. Package outline SOT23

12. Soldering

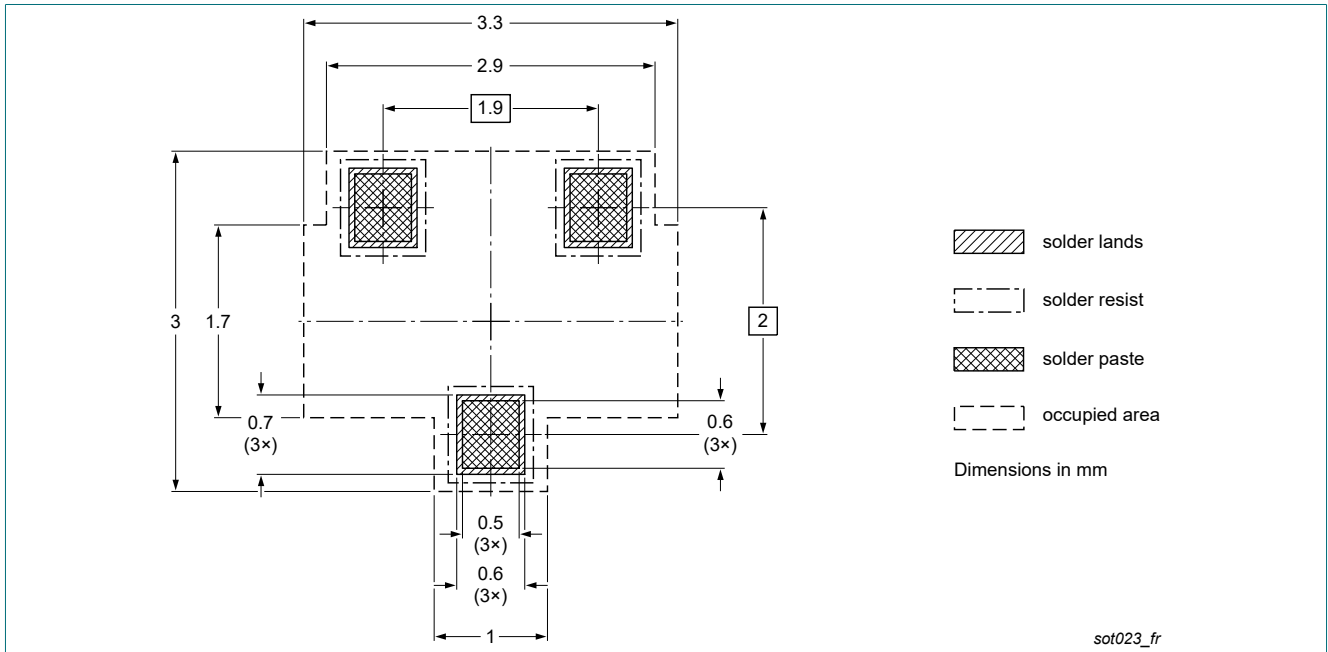


Fig. 7. Reflow soldering footprint for SOT23

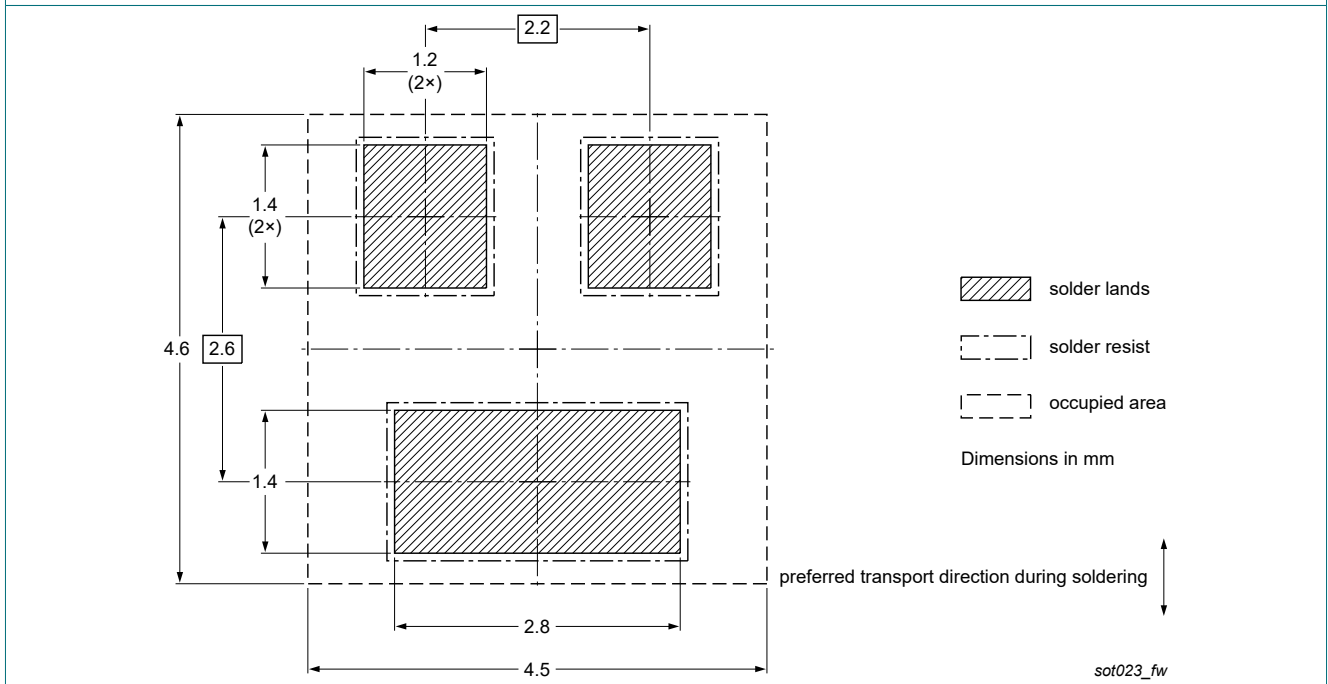


Fig. 8. Wave soldering footprint for SOT23

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD5V0U2BT v.2	20230417	Product data sheet	-	PESD5V0U2BT v.1
Modifications:	<ul style="list-style-type: none">Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s)The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia			
PESD5V0U2BT v.1	20070327	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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