



PESD3V3S4UD

Quadruple ESD protection diode array

11 April 2023

Product data sheet

1. General description

Quadruple ElectroStatic Discharge (ESD) protection diode array in a SOT457 (SC-74) small Surface-Mounted Device (SMD) plastic package designed to protect up to 4 signal lines from the damage caused by ESD and other transients.

2. Features and benefits

- ESD protection of up to 4 lines
- Max. peak pulse power: $P_{PPM} = 200 \text{ W}$
- Ultra low leakage current: $I_{RM} = 300 \text{ nA}$
- Low clamping voltage: $V_{CL} = 12 \text{ V}$ at $I_{PP} = 20 \text{ A}$
- ESD protection up to 30 kV
- IEC 61000-4-2; level 4 (ESD)
- IEC 61000-4-5; (surge); $I_{PPM} = 20 \text{ A}$

3. Application information

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

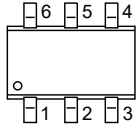
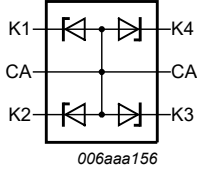
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25 \text{ }^\circ\text{C}$	-	-	3.3	V
C_d	diode capacitance	$f = 1 \text{ MHz}; V_R = 0 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$	-	215	300	pF

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K1	cathode 1	 <p>SC-74; TSOP6 (SOT457)</p>	
2	CA	common anode		
3	K2	cathode 2		
4	K3	cathode 3		
5	CA	common anode		
6	K4	cathode 4		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PESD3V3S4UD	SC-74; TSOP6	plastic, surface-mounted package (SC-74; TSOP6); 6 leads	SOT457

7. Marking

Table 4. Marking codes

Type number	Marking code
PESD3V3S4UD	K4

8. Limiting values

Table 5. Limiting values

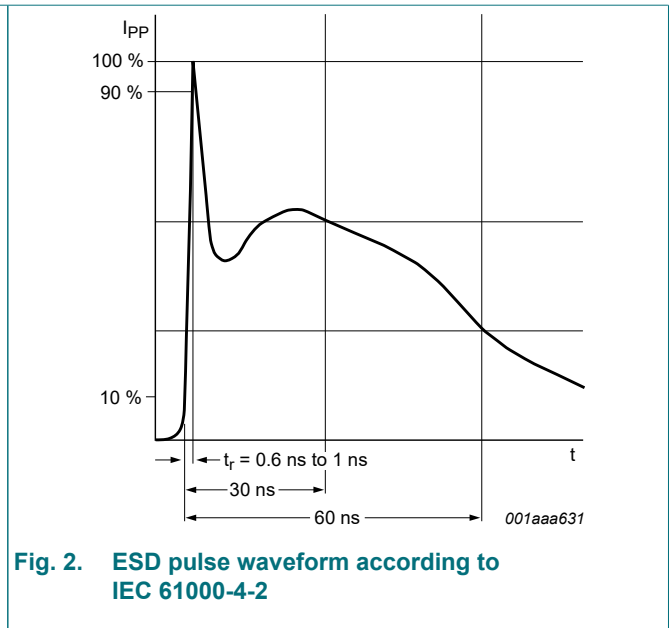
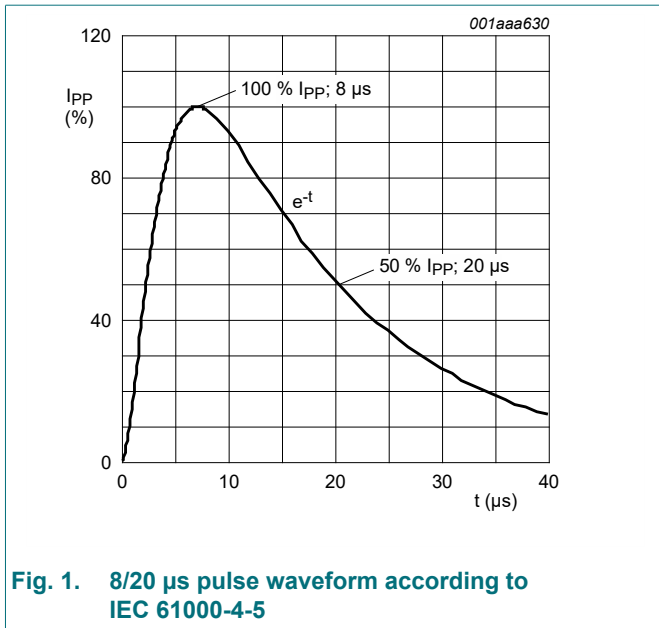
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
P_{PPM}	rated peak pulse power	$t_p = 8/20 \mu s$	[1] [2]	-	200	W
I_{PPM}	rated peak pulse current		[1] [2]	-	20	A
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C
ESD maximum ratings						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2 (contact discharge)	[3] [2]	-	30	kV
		IEC 61000-4-2 (air discharge)		-	15	kV
		HBM MIL-STD-883 (human body model)		-	10	kV

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC61000-4-5.

[2] Measured from pin 1, 3, 4 or 6 to 2 or 5

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



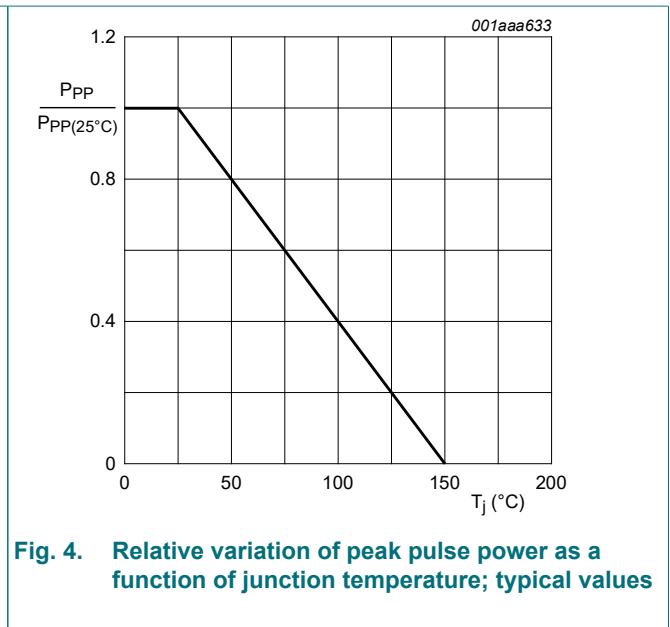
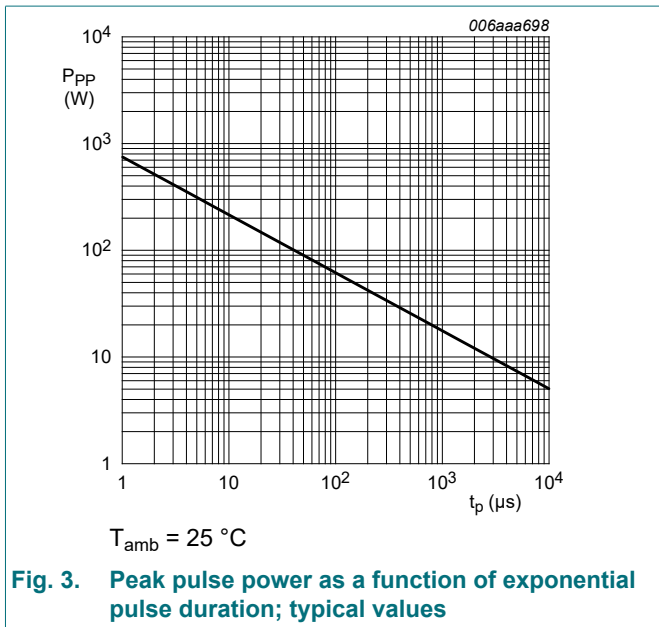
9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25\text{ °C}$	-	-	3.3	V
V_{BR}	breakdown voltage	$I_R = 1\text{ mA}; T_{amb} = 25\text{ °C}$	5.3	5.6	5.9	V
I_{RM}	reverse leakage current	$V_{RWM} = 3.3\text{ V}; T_{amb} = 25\text{ °C}$	-	300	800	nA
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 0\text{ V}; T_{amb} = 25\text{ °C}$	-	215	300	pF
V_{CL}	clamping voltage	$I_{PP} = 1\text{ A}; T_{amb} = 25\text{ °C}$	[1] [2]	-	8	V
		$I_{PP} = 20\text{ A}; T_{amb} = 25\text{ °C}$	[1] [2]	-	12	V
R_{diff}	differential resistance	$I_R = 5\text{ mA}; T_{amb} = 25\text{ °C}$	-	-	25	Ω

[1] Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC61000-4-5.

[2] Measured from pin 1, 3, 4 or 6 to 2 or 5



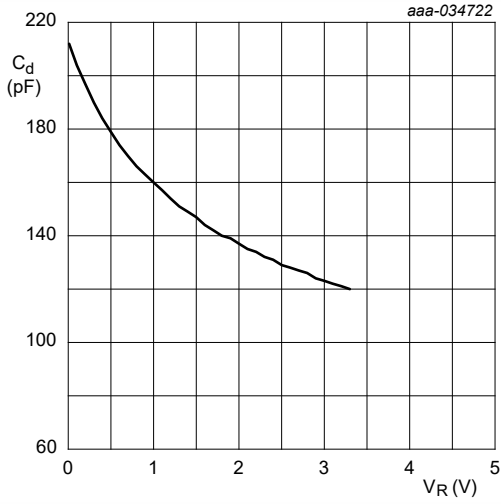


Fig. 5. Diode capacitance as a function of reverse voltage; typical values

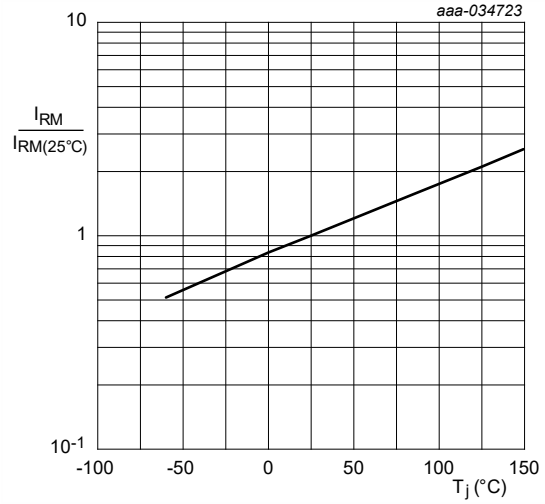


Fig. 6. Relative variation of reverse leakage current as a function of junction temperature; typical values

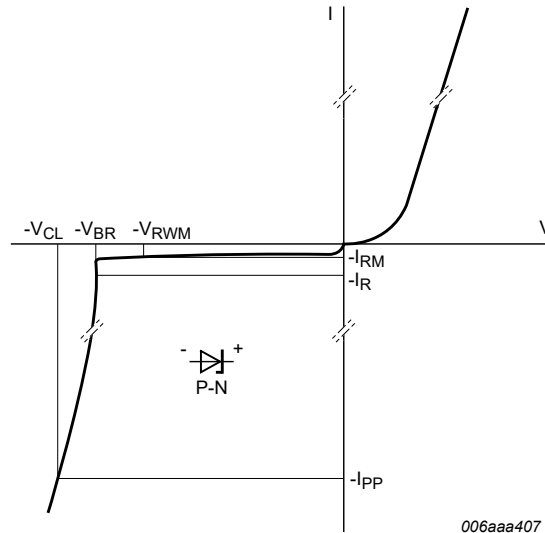


Fig. 7. V-I characteristics for a unidirectional ESD protection diode

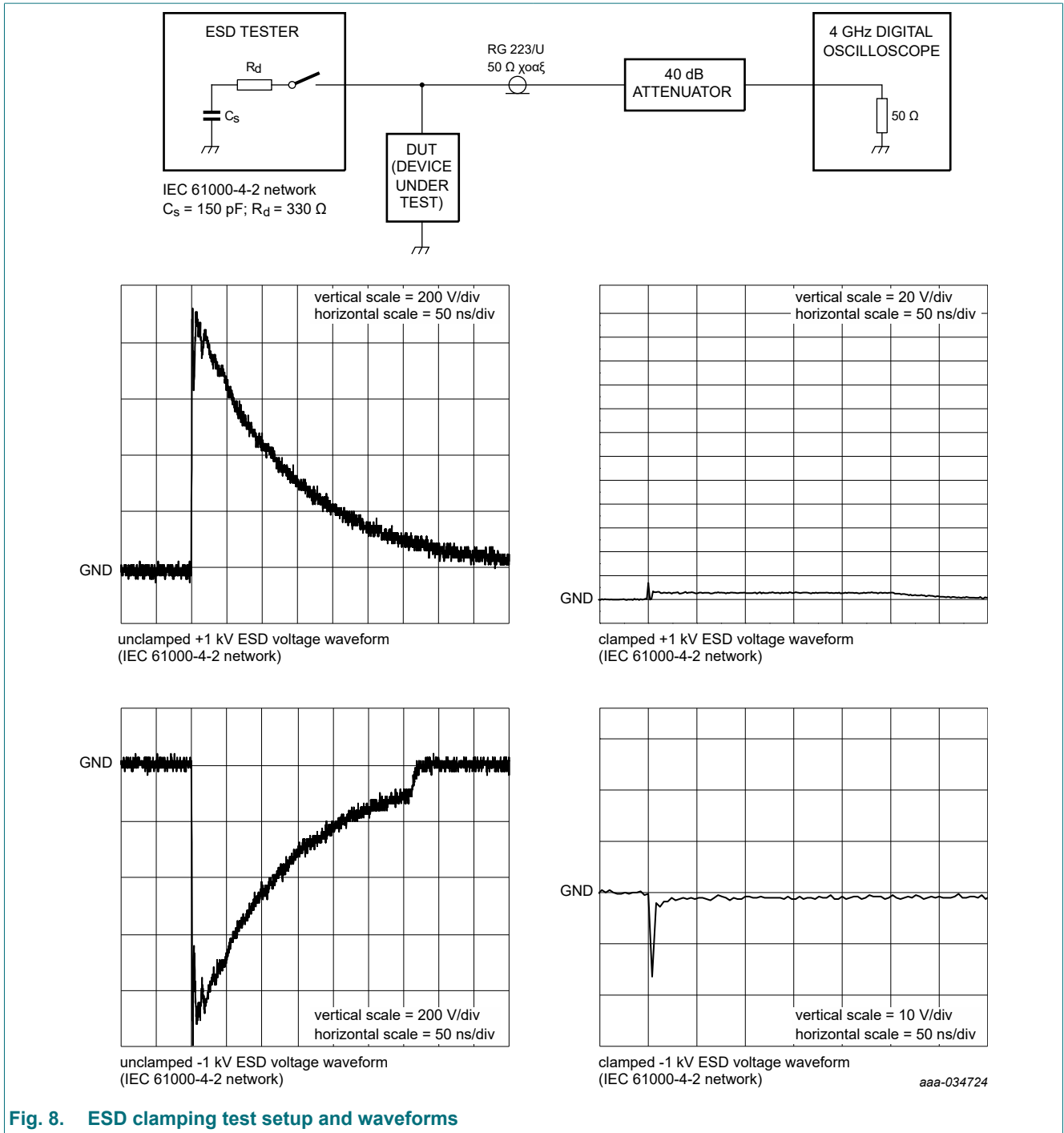


Fig. 8. ESD clamping test setup and waveforms

10. Application information

The device is designed for protection of up to 4 unidirectional data lines from surge pulses and ESD damage. The device is suitable on lines where the signal polarities are both, positive and negative with respect to ground.

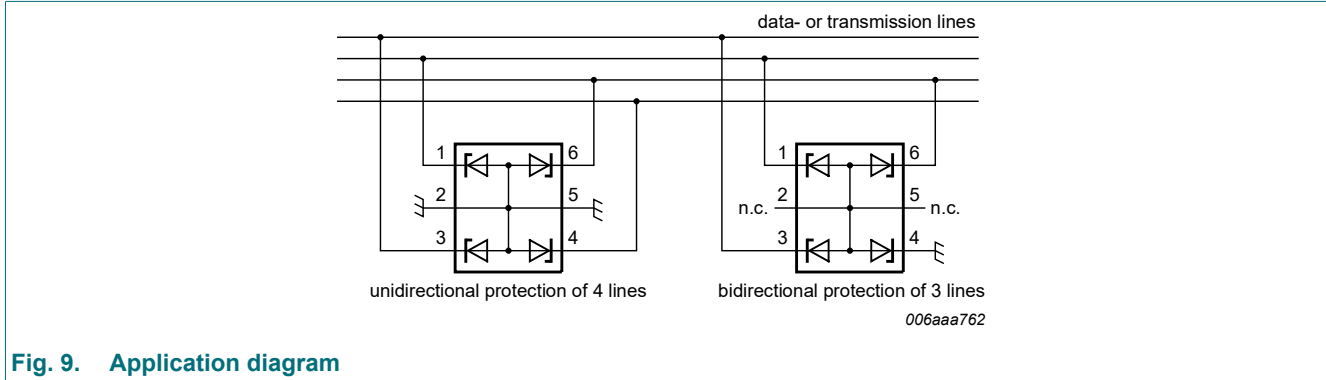


Fig. 9. Application diagram

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

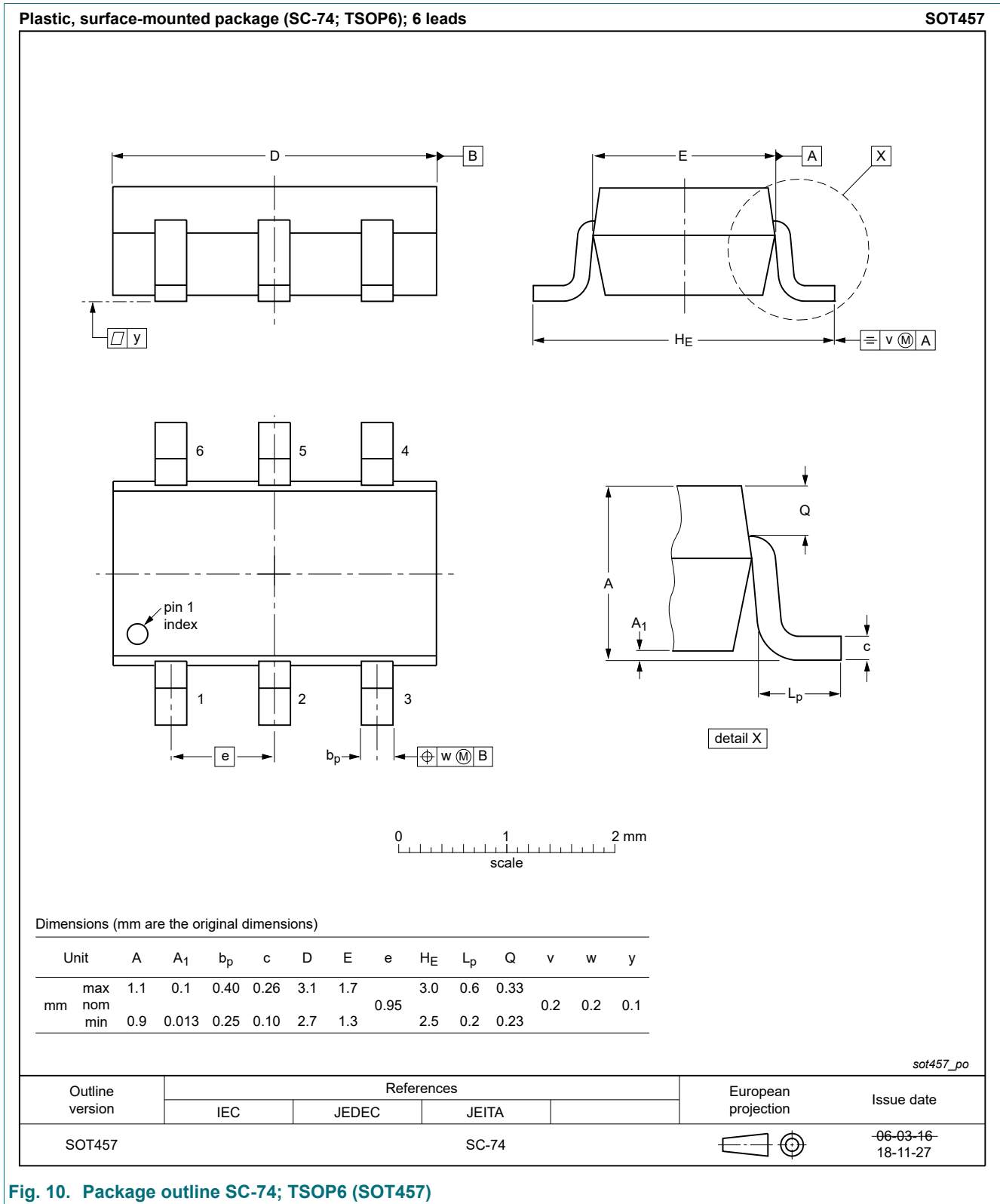


Fig. 10. Package outline SC-74; TSOP6 (SOT457)

12. Soldering

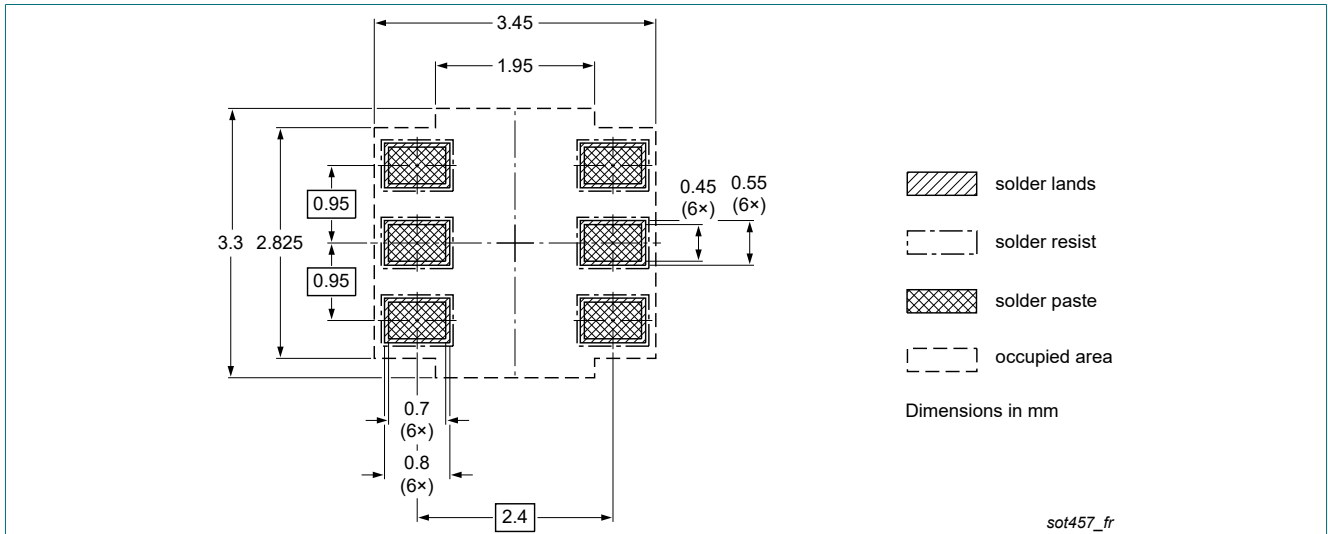


Fig. 11. Reflow soldering footprint for SC-74; TSOP6 (SOT457)

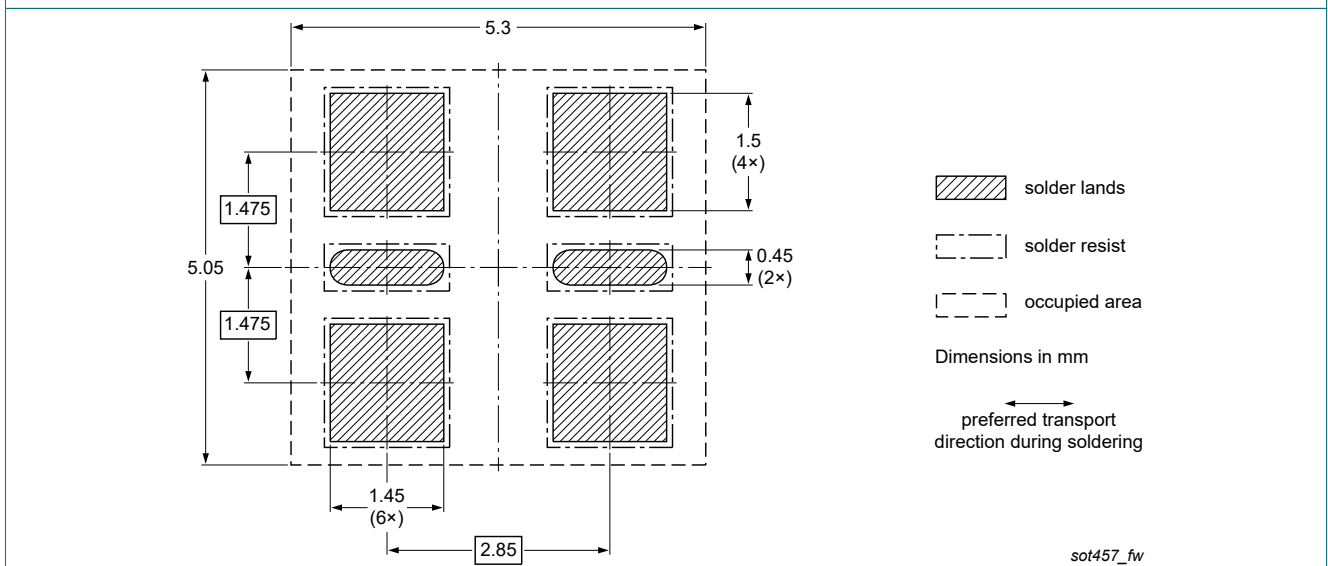


Fig. 12. Wave soldering footprint for SC-74; TSOP6 (SOT457)

13. Revision history

Table 7. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PESD3V3S4UD v.3	20230411	Product data sheet	-	PESDXS4UD_SER_2
Modifications:	<ul style="list-style-type: none"> Family data sheet reduced to single type data sheet. Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). 			
PESDXS4UD_SER_2	20090821	Product data sheet	-	PESDXS4UD_SER_1
PESDXS4UD_SER_1	20060704	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".
- [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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