



MMBZ15VCT-Q

Double ESD protection diode

30 September 2025

Product data sheet

1. General description

Unidirectional double ElectroStatic Discharge (ESD) protection diode in a common cathode configuration, encapsulated in a SOT23 small Surface-Mounted Device (SMD) plastic package. The device is designed for ESD and transient overvoltage protection of up to two signal lines.

2. Features and benefits

- Unidirectional ESD protection of two lines
- Bidirectional ESD protection of one line
- Very low diode capacitance: $C_d \leq 42$ pF
- Reverse stand-off voltage: $V_{RWM} = 12$ V
- Low clamping voltage: $V_{CL} = 24$ V typ. at $I_{PP} = 6$ A
- ESD protection up to 30 kV (IEC 61000-4-2)
- Ultra low leakage current: $I_{RM} < 1$ nA
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Computers and peripherals
- Audio and video equipment
- Cellular handsets and accessories
- Automotive electronic control units
- Portable electronics

4. Quick reference data

Table 1. Quick reference data

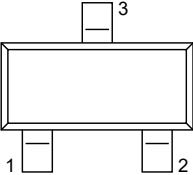
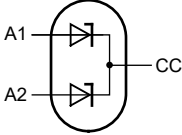
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	$T_{amb} = 25$ °C		-	-	12	V
I_{PPM}	rated peak pulse current	$t_p = 8/20$ µs	[1] [2]	-	-	6	A
C_d	diode capacitance	$f = 1$ MHz; $V_R = 0$ V; $T_{amb} = 25$ °C		-	36	42	pF

[1] Device stressed with 8/20 µs exponential decay waveform according to IEC 61000-4-5

[2] Measured across either pins 1 and 3 or pins 2 and 3

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 SOT23	 sym002
2	A2	anode (diode 2)		
3	CC	common cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
MMBZ15VCT-Q	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]
MMBZ15VCT-Q	YN%

[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
P _{PPM}	rated peak pulse power	t _p = 10/1000 µs	[1] [2]	-	20	W
I _{PPM}	rated peak pulse current		[1] [2]	-	1	A
		t _p = 8/20 µs	[3] [2]	-	6	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	[4]	-	30	kV
		IEC 61000-4-2; air discharge	[4]	-	30	kV

- [1] In accordance with IEC 61643-321 (10/1000 µs current waveform)
- [2] Measured across either pins 1 and 3 or pins 2 and 3
- [3] Device stressed with 8/20 µs exponential decay waveform according to IEC 61000-4-5
- [4] Device stressed with ten non-repetitive ESD pulses

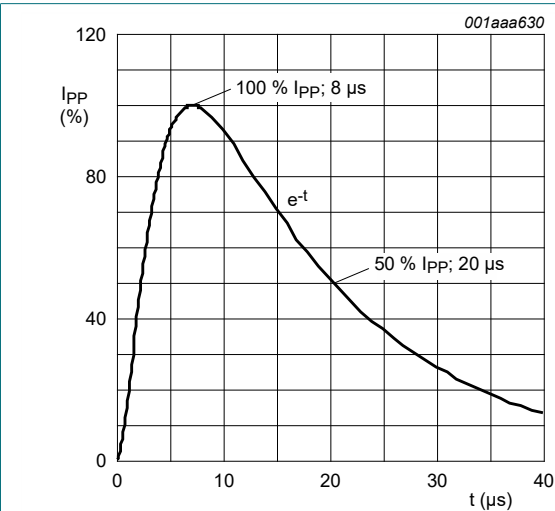


Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5

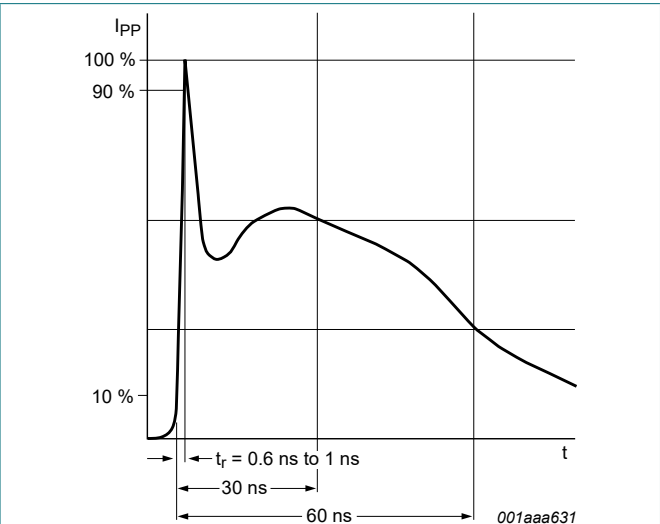


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R _{th(j-a)}	thermal resistance from junction to ambient	in free air	[1]	-	500	-	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point		[2]	-	100	-	K/W

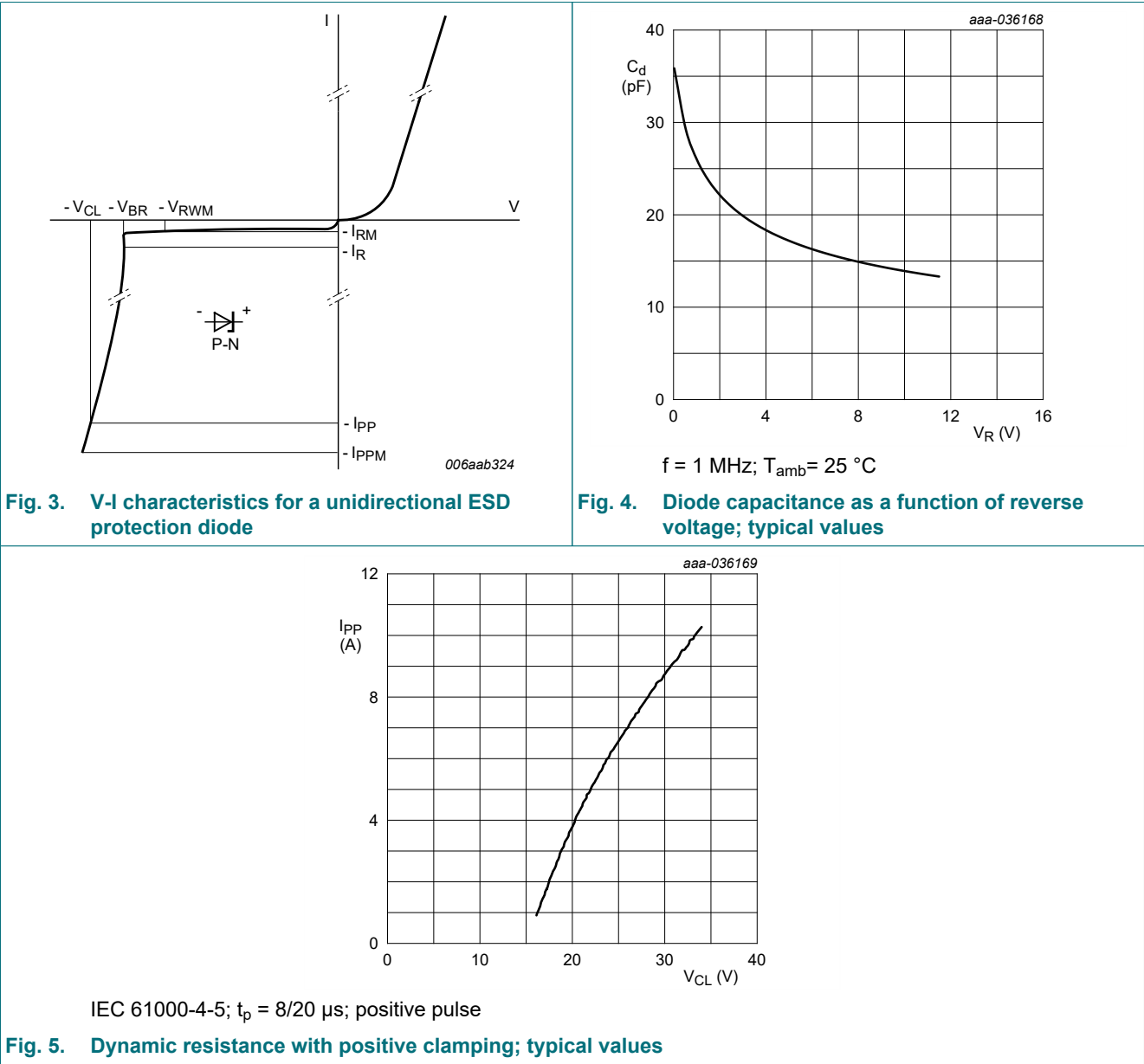
- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint
- [2] Soldering points at pin 1 and 2

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 1\text{ mA}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	0.73	-	V
V_{RWM}	reverse standoff voltage	$T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	-	12	V
V_{BR}	breakdown voltage	$I_R = 1\text{ mA}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	14.25	15	15.75	V
I_{RM}	reverse leakage current	$V_{\text{RWM}} = 12\text{ V}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	1	50	nA
C_d	diode capacitance	$f = 1\text{ MHz}$; $V_R = 0\text{ V}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	-	36	42	pF
V_{CL}	clamping voltage	$I_{\text{PPM}} = 6\text{ A}$; $t_p = 8/20\text{ }\mu\text{s}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$	[1]	24	-	V
S_Z	temperature coefficient	$I_Z = 1\text{ mA}$	-	11.6	-	mV/K

[1] Device stressed with 8/20 μs exponential decay waveform according to IEC 61000-4-5



11. Application information

The device is designed for the protection of two lines from the damage caused by ESD and surge pulses.

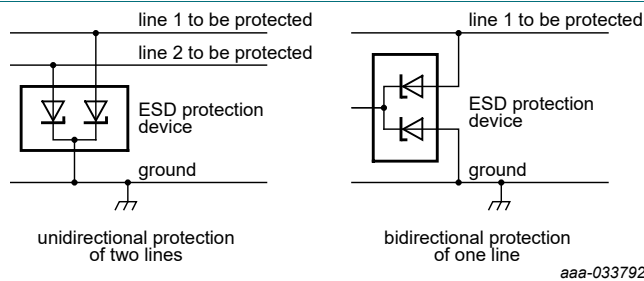


Fig. 6. Typical application: ESD protection of data lines

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.

12. 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.

13. Package outline

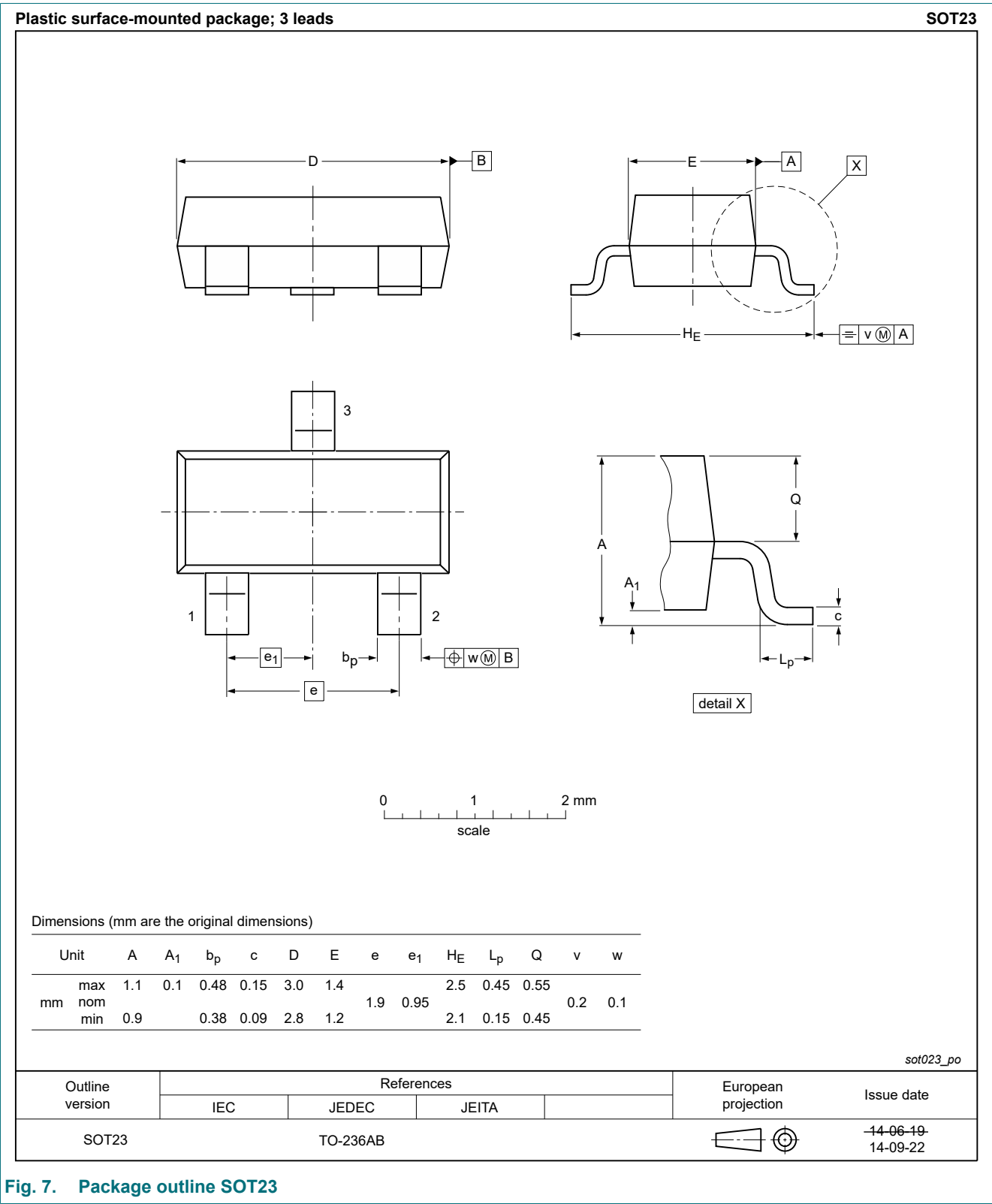
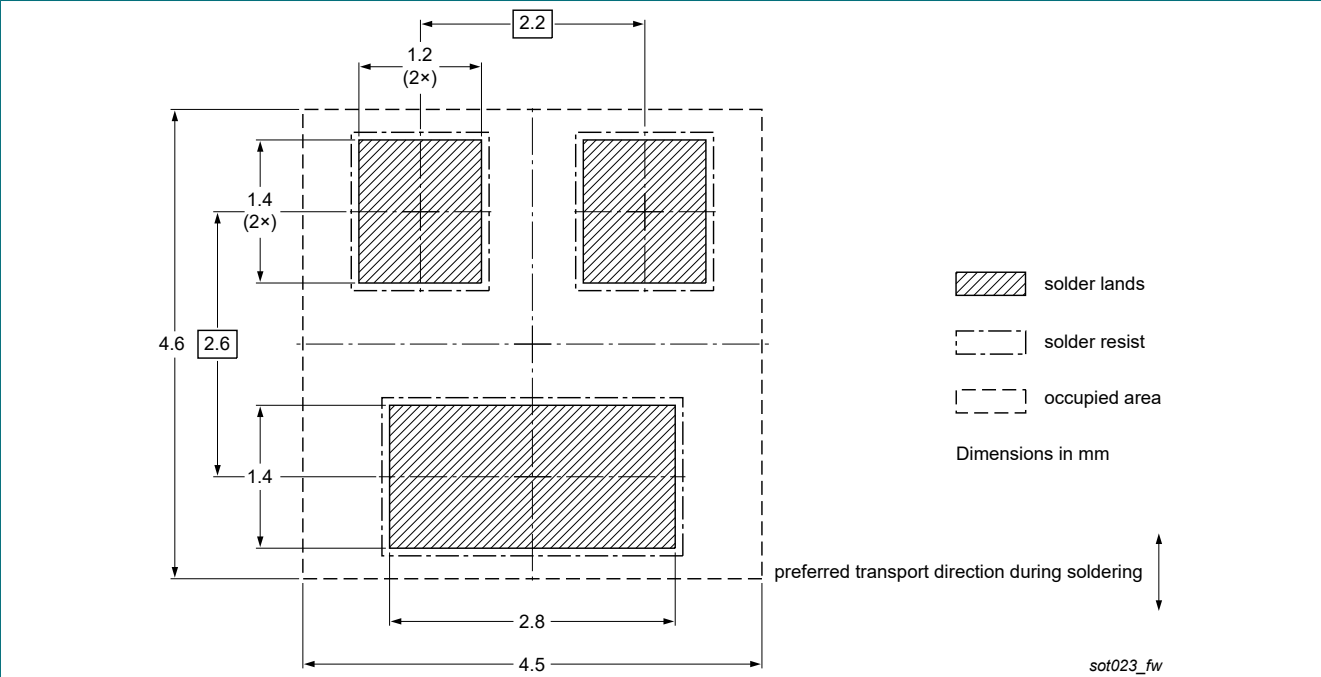
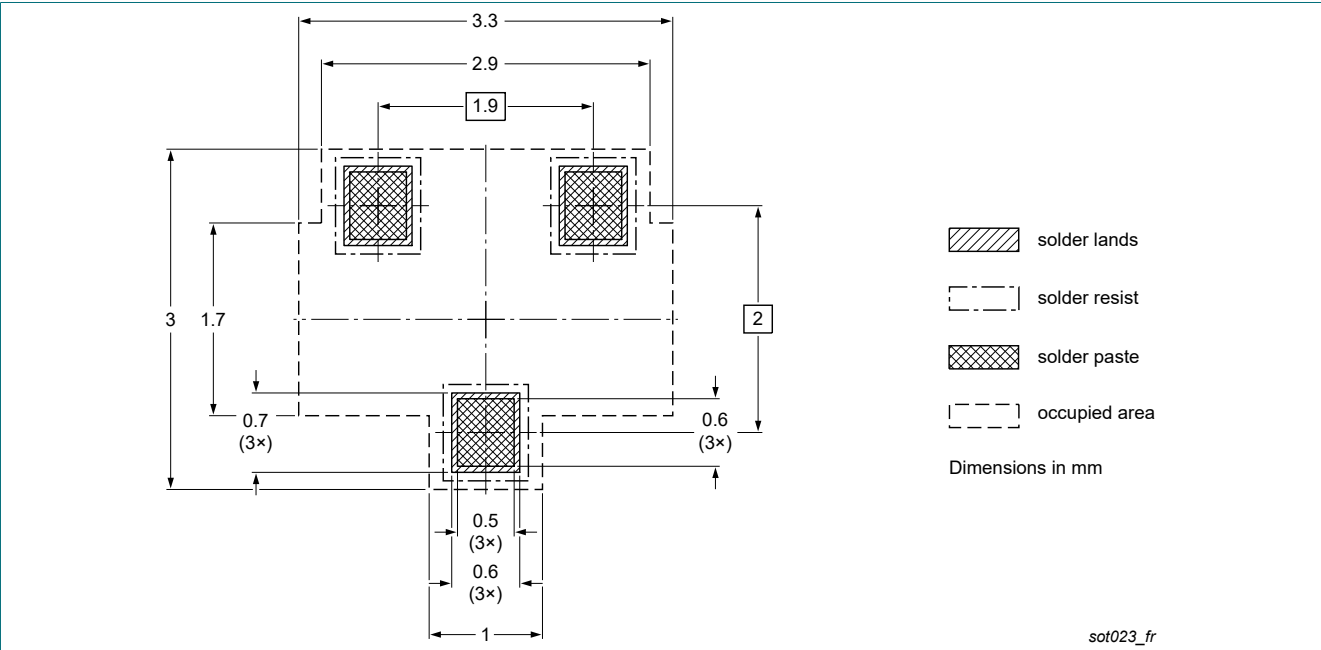


Fig. 7. Package outline SOT23

14. Soldering



15. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
MMBZ15VCT-Q v.1	20250930	Product data sheet	-	-

16. 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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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