SMCJ series

1500 W Transient Voltage Suppressor

11 October 2024 Product data sheet

1. General description

1500 W uni- and bi-directional Transient Voltage Suppressor (TVS) in a SMC Surface-Mounted Device (SMD) plastic package, designed for transient voltage protection.

2. Features and benefits

- Rated peak pulse power at 10/1000 µs waveform: P_{PPM} = 1500 W
- Reverse standoff voltage: V_{RWM} = 7 V to 220 V
- Reverse current: I_R less than 1 µA for $V_{RWM} \geq 11V$
- Excellent clamping capability
- Small plastic package suitable for surface-mounted design

3. Applications

- Power supply protection
- Power management
- Telecom, Computer, Industrial and Consumer electronics application

4. Quick reference data

Table 1. Quick reference data

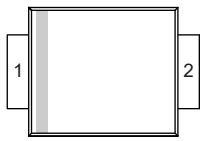
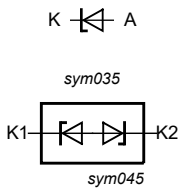
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{RWM}	reverse standoff voltage	T_{amb} = 25 °C		7	-	220	V
P_{PPM}	rated peak pulse power	t_p = 10/1000 µs; T_{amb} = 25 °C	[1]	-	-	1500	W

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Description uni-directional	Description bi-directional	Simplified outline	Graphic symbol
1	cathode [1] [2]	cathode 1	 SMC (SOD1003-1)	
2	anode	cathode 2		

[1] The marking bar indicates the cathode for uni-directional device.
[2] Marking bar is used for uni-directional device only.

6. Ordering information

Table 3. Ordering information

Type number[1]	Package		
	Name	Description	Version
SMCJ series	SMC	plastic, surface mounted package; 2 terminals; 6.86 mm x 6.11 mm x 2.34 mm body	SOD1003-1

[1] The series consists of 92 types with reverse standoff voltages from 7 V to 220 V.

7. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code
SMCJ7.0A	AAA2	SMCJ7.0CA	AFA8
SMCJ7.5A	AAA3	SMCJ7.5CA	AFA9
SMCJ8.0A	AAA4	SMCJ8.0CA	AGA2
SMCJ8.5A	AAA5	SMCJ8.5CA	AGA3
SMCJ9.0A	AAA6	SMCJ9.0CA	AGA4
SMCJ10A	AAA7	SMCJ10CA	AGA5
SMCJ11A	AAA8	SMCJ11CA	AGA6
SMCJ12A	AAA9	SMCJ12CA	AGA7
SMCJ13A	ABA2	SMCJ13CA	AGA8
SMCJ14A	ABA3	SMCJ14CA	AGA9
SMCJ15A	ABA4	SMCJ15CA	AHA2
SMCJ16A	ABA5	SMCJ16CA	AHA3
SMCJ17A	ABA6	SMCJ17CA	AHA4
SMCJ18A	ABA7	SMCJ18CA	AHA5
SMCJ20A	ABA8	SMCJ20CA	AHA6
SMCJ22A	ABA9	SMCJ22CA	AHA7
SMCJ24A	ACA2	SMCJ24CA	AHA8
SMCJ26A	ACA3	SMCJ26CA	AHA9
SMCJ28A	ACA4	SMCJ28CA	AJA2

Type number	Marking code	Type number	Marking code
SMCJ30A	ACA5	SMCJ30CA	AJA3
SMCJ33A	ACA6	SMCJ33CA	AJA4
SMCJ36A	ACA7	SMCJ36CA	AJA5
SMCJ40A	ACA8	SMCJ40CA	AJA6
SMCJ43A	ACA9	SMCJ43CA	AJA7
SMCJ45A	ADA2	SMCJ45CA	AJA8
SMCJ48A	ADA3	SMCJ48CA	AJA9
SMCJ51A	ADA4	SMCJ51CA	AKA2
SMCJ54A	ADA5	SMCJ54CA	AKA3
SMCJ58A	ADA6	SMCJ58CA	AKA4
SMCJ60A	ADA7	SMCJ60CA	AKA5
SMCJ64A	ADA8	SMCJ64CA	AKA6
SMCJ70A	ADA9	SMCJ70CA	AKA7
SMCJ75A	AEA2	SMCJ75CA	AKA8
SMCJ78A	AEA3	SMCJ78CA	AKA9
SMCJ85A	AEA4	SMCJ85CA	ALA2
SMCJ90A	AEA5	SMCJ90CA	ALA3
SMCJ100A	AEA6	SMCJ100CA	ALA4
SMCJ110A	AEA7	SMCJ110CA	ALA5
SMCJ120A	AEA8	SMCJ120CA	ALA6
SMCJ130A	AEA9	SMCJ130CA	ALA7
SMCJ150A	AFA2	SMCJ150CA	ALA8
SMCJ160A	AFA3	SMCJ160CA	ALA9
SMCJ170A	AFA4	SMCJ170CA	AMA2
SMCJ180A	AFA5	SMCJ180CA	AMA3
SMCJ200A	AFA6	SMCJ200CA	AMA4
SMCJ220A	AFA7	SMCJ220CA	AMA5

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
P_{PPM}	rated peak pulse power	t_p = 10/1000 µs	[1]	-	1500	W
I_{PPM}	rated peak pulse current	t_p = 10/1000 µs	[1]	-	see table 8	A
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-55	150	°C

[1] In accordance with IEC 61643-321 (10/1000 µs current waveform).

Table 6. ESD maximum ratings

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_{ESD}	electrostatic discharge voltage	IEC 61000-4-2; contact discharge; T_{amb} = 25°C	[1]	-	30	kV

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

Table 7. ESD standards compliance

Standard	
Per diode	
IEC 61000-4-2; level 4 (ESD)	> 15 kV (air); > 8 kV (contact)
MIL-STD-883; class 3 (human body model)	> 4kV

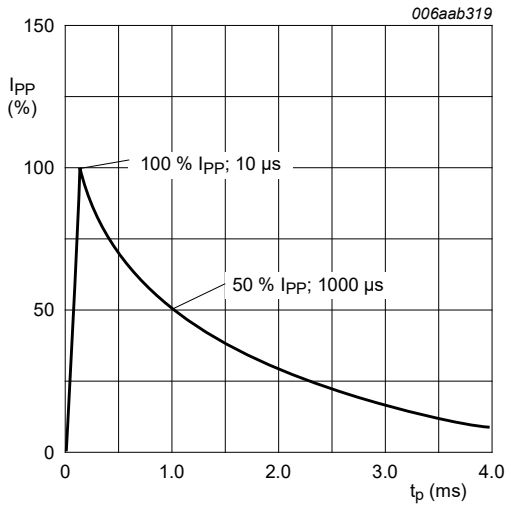


Fig. 1. 10/1000 µs pulse waveform according to IEC 61643-321

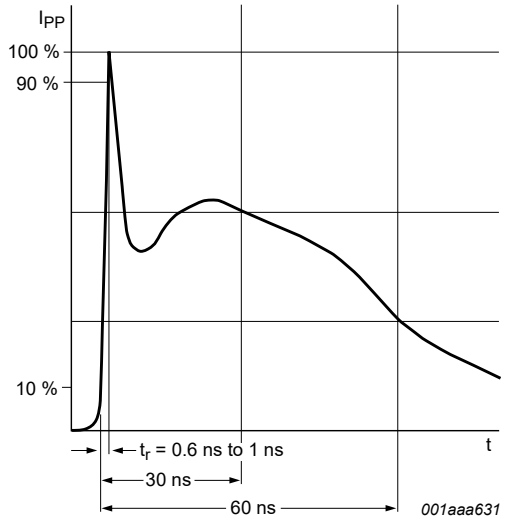


Fig. 2. ESD pulse waveform according to IEC 61000-4-2

9. Characteristics

Table 8. Characteristics per type; SMCJ7.0(C)A to SMCJ220(C)A

T_{amb} = 25°C unless otherwise specified.

Type number		Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V) at test current I_T			Reverse leakage current I_{RM} at V_{RWM} (µA)	Test current I_T (mA)	Clamping voltage V_{CL} (V)	
uni-directional	bi-directional	Max	Min	Typ	Max	Max		Max	I_{PPM} (A)
SMCJ7.0A	SMCJ7.0CA	7.0	7.78	8.19	8.60	200/400	10	12.0	125.0
SMCJ7.5A	SMCJ7.5CA	7.5	8.33	8.77	9.21	100/200	1	12.9	116.3
SMCJ8.0A	SMCJ8.0CA	8.0	8.89	9.36	9.83	50/100	1	13.6	110.3
SMCJ8.5A	SMCJ8.5CA	8.5	9.44	9.92	10.40	20/40	1	14.4	104.2
SMCJ9.0A	SMCJ9.0CA	9.0	10.00	10.55	11.10	10/20	1	15.4	97.4
SMCJ10A	SMCJ10CA	10	11.10	11.70	12.30	5/10	1	17.0	88.3
SMCJ11A	SMCJ11CA	11	12.20	12.85	13.50	1	1	18.2	82.5
SMCJ12A	SMCJ12CA	12	13.30	14.00	14.70	1	1	19.9	75.4
SMCJ13A	SMCJ13CA	13	14.40	15.15	15.90	1	1	21.5	69.8
SMCJ14A	SMCJ14CA	14	15.60	16.40	17.20	1	1	23.2	64.7
SMCJ15A	SMCJ15CA	15	16.70	17.60	18.50	1	1	24.4	61.5
SMCJ16A	SMCJ16CA	16	17.80	18.75	19.70	1	1	26.0	57.7
SMCJ17A	SMCJ17CA	17	18.90	19.90	20.90	1	1	27.6	54.4
SMCJ18A	SMCJ18CA	18	20.00	21.05	22.10	1	1	29.2	51.4
SMCJ20A	SMCJ20CA	20	22.20	23.35	24.50	1	1	32.4	46.3
SMCJ22A	SMCJ22CA	22	24.40	25.65	26.90	1	1	35.5	42.3
SMCJ24A	SMCJ24CA	24	26.70	28.10	29.50	1	1	38.9	38.6
SMCJ26A	SMCJ26CA	26	28.90	30.40	31.90	1	1	42.1	35.7
SMCJ28A	SMCJ28CA	28	31.10	32.75	34.40	1	1	45.4	33.1
SMCJ30A	SMCJ30CA	30	33.30	35.05	36.80	1	1	48.4	31.0
SMCJ33A	SMCJ33CA	33	36.70	38.65	40.60	1	1	53.3	28.2
SMCJ36A	SMCJ36CA	36	40.00	42.10	44.20	1	1	58.1	25.9
SMCJ40A	SMCJ40CA	40	44.40	46.75	49.10	1	1	64.5	23.3
SMCJ43A	SMCJ43CA	43	47.80	50.30	52.80	1	1	69.4	21.7
SMCJ45A	SMCJ45CA	45	50.00	52.65	55.30	1	1	72.7	20.6
SMCJ48A	SMCJ48CA	48	53.30	56.10	58.90	1	1	77.4	19.4
SMCJ51A	SMCJ51CA	51	56.70	59.70	62.70	1	1	82.4	18.2
SMCJ54A	SMCJ54CA	54	60.00	63.15	66.30	1	1	87.1	17.3
SMCJ58A	SMCJ58CA	58	64.40	67.80	71.20	1	1	93.6	16.1
SMCJ60A	SMCJ60CA	60	66.70	70.20	73.70	1	1	96.8	15.5
SMCJ64A	SMCJ64CA	64	71.10	74.85	78.60	1	1	103.0	14.6
SMCJ70A	SMCJ70CA	70	77.80	81.90	86.00	1	1	113.0	13.3
SMCJ75A	SMCJ75CA	75	83.20	87.65	92.10	1	1	121.0	12.4
SMCJ78A	SMCJ78CA	78	86.70	91.25	95.80	1	1	126.0	11.9
SMCJ85A	SMCJ85CA	85	94.40	99.20	104.0	1	1	137.0	11.0
SMCJ90A	SMCJ90CA	90	100.0	105.5	111.0	1	1	146.0	10.3

Type number		Reverse standoff voltage V_{RWM} (V)	Breakdown voltage V_{BR} (V) at test current I_T			Reverse leakage current I_{RM} at V_{RWM} (µA)	Test current I_T (mA)	Clamping voltage V_{CL} (V)	
uni-directional	bi-directional	Max	Min	Typ	Max	Max		Max	I_{PPM} (A)
SMCJ100A	SMCJ100CA	100	111.0	117.0	123.0	1	1	162.0	9.3
SMCJ110A	SMCJ110CA	110	122.0	128.5	135.0	1	1	177.0	8.5
SMCJ120A	SMCJ120CA	120	133.0	140.0	147.0	1	1	193.0	7.8
SMCJ130A	SMCJ130CA	130	144.0	151.5	159.0	1	1	209.0	7.2
SMCJ150A	SMCJ140CA	150	167.0	176.0	185.0	1	1	243.0	6.2
SMCJ160A	SMCJ160CA	160	178.0	187.5	197.0	1	1	259.0	5.8
SMCJ170A	SMCJ170CA	170	189.0	199.0	209.0	1	1	275.0	5.5
SMCJ180A	SMCJ180CA	180	201.0	211.5	222.0	1	1	292.0	5.1
SMCJ200A	SMCJ200CA	200	224.0	235.5	247.0	1	1	324.0	4.6
SMCJ220A	SMCJ220CA	220	246.0	259.0	272.0	1	1	356.0	4.2

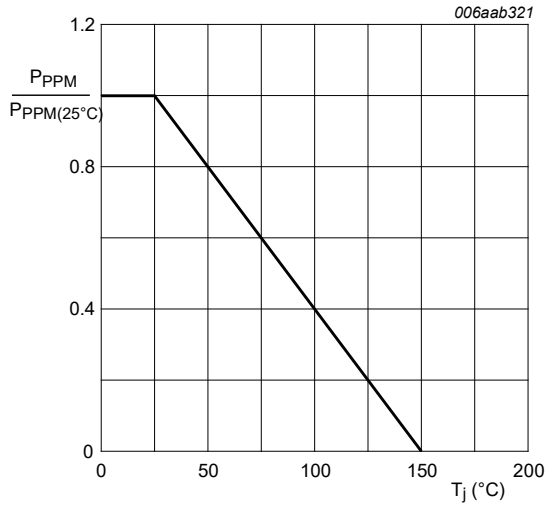
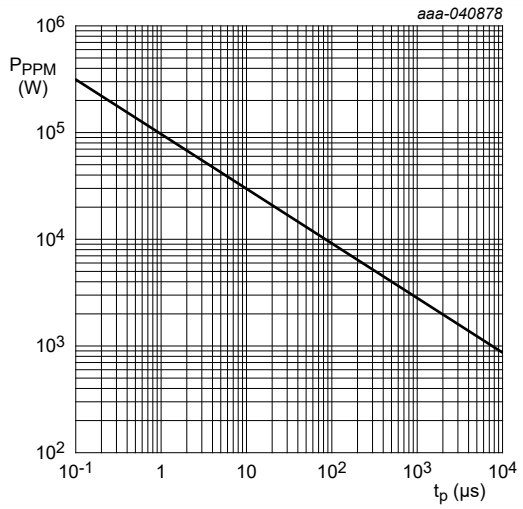


Fig. 3. Relative variation of rated peak pulse power as a function of junction temperature; typical values



[1][2][3]

T_{amb} = 25 °C

Fig. 4. Peak pulse power as a function of pulse duration; typical values

[1] Peak pulse power derating curve derived from typical measured values using 8/20 µs and 10/1000 µs waveforms.
[2] In accordance with IEC 61000-4-5 (8/20 µs waveforms).
[3] In accordance with IEC 61643-321 (10/1000 µs waveforms).

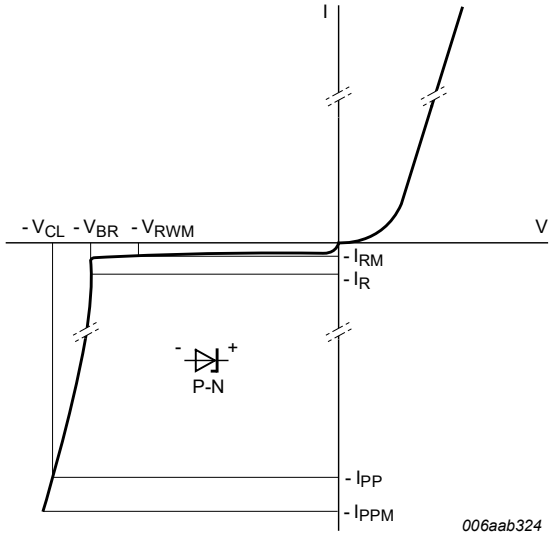


Fig. 5. V-I characteristics for a unidirectional TVS protection diode

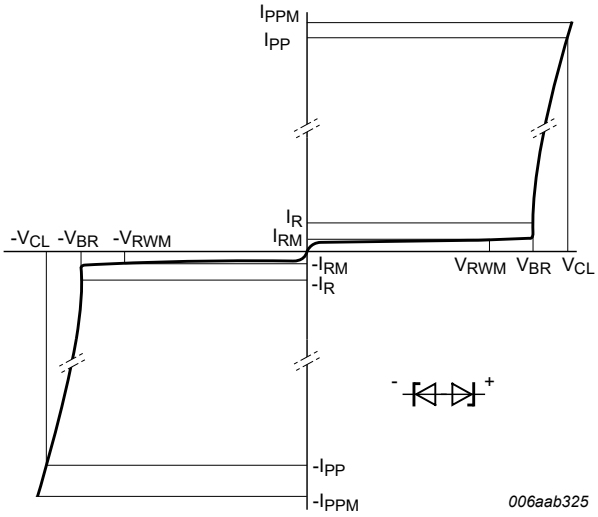
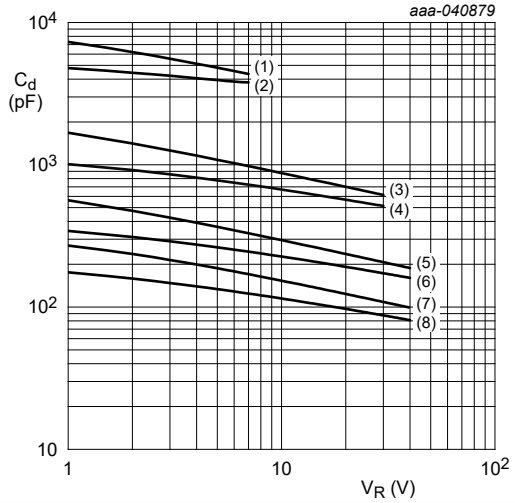


Fig. 6. V-I characteristics for a bidirectional TVS diode



T_{amb} = 25 °C; f = 1 MHz

(1) SMCJ7.0A (5) SMCJ100A

(2) SMCJ7.0CA (6) SMCJ100CA

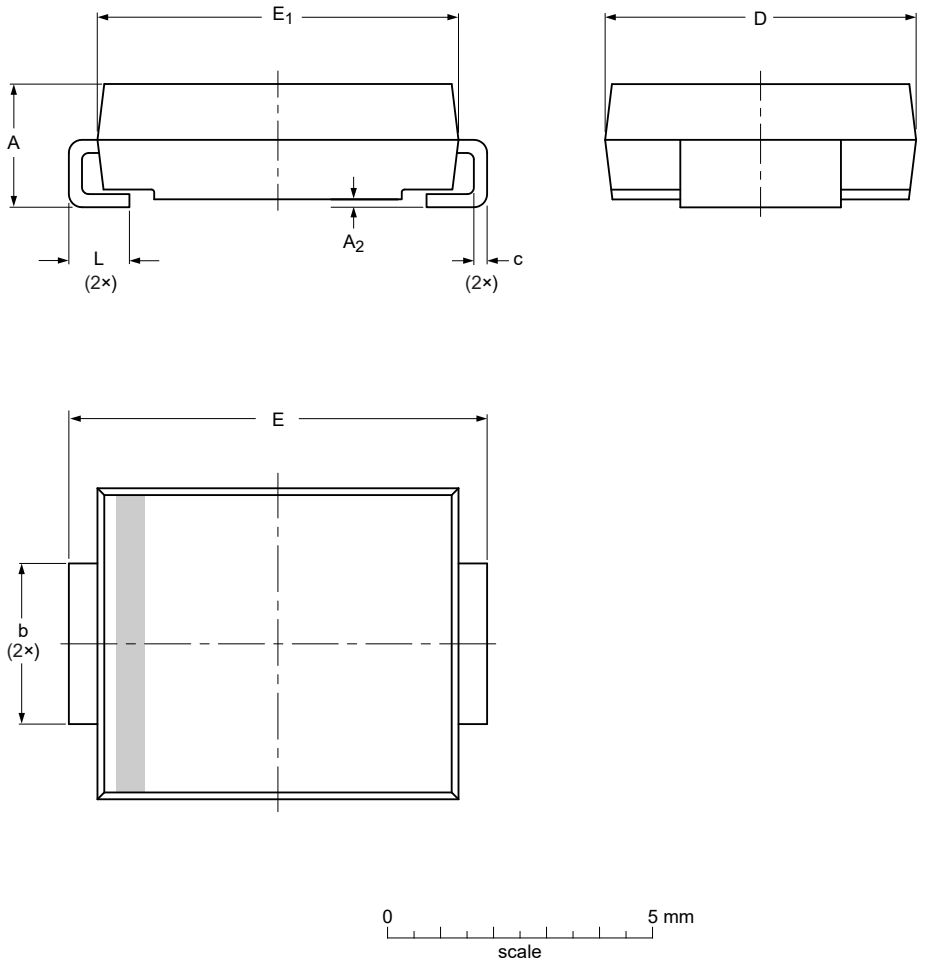
(3) SMCJ30A (7) SMCJ220A

(4) SMCJ30CA (8) SMCJ220CA

Fig. 7. Diode capacitance as a function of reverse voltage; typical values

10. Package outline

SMC: plastic, surface mounted package; 2 terminals; 6.86 mm x 6.11 mm x 2.34 mm body **SOD1003-1**



Dimensions (mm are the original dimensions)

Unit[1]		A	A_2	b	c	D	E	E_1	L
mm	max	2.72	0.25	3.20	0.41	6.22	8.15	7.11	1.52
	nom								
	min	2.10	0.05	2.75	0.15	5.55	7.75	6.60	0.76

sod1003-1_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD1003-1						24-05-28

Fig. 8. Package outline SMC (SOD1003-1)

11. Soldering

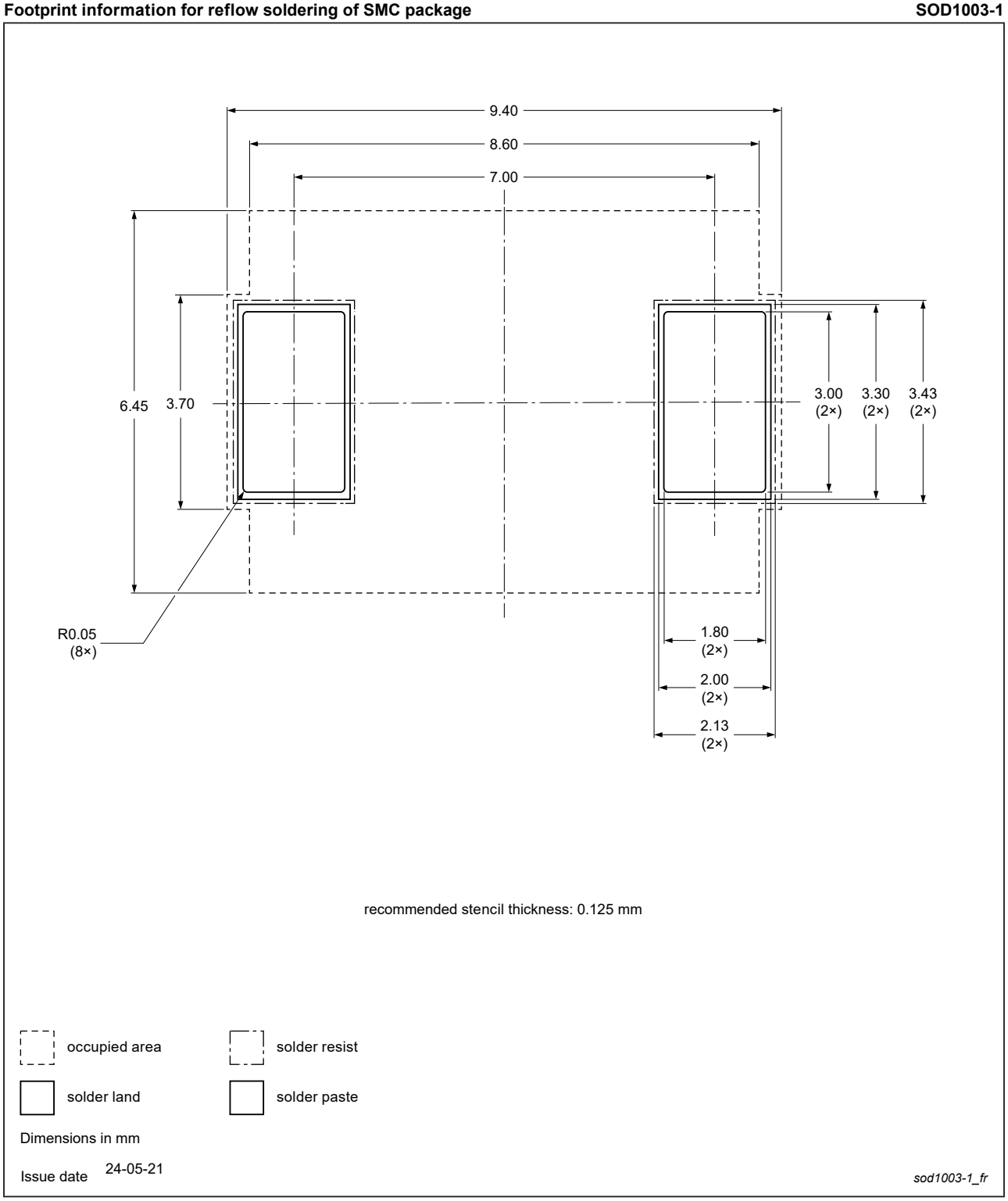


Fig. 9. Reflow soldering footprint for SMC (SOD1003-1)

12. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
SMCJ_SER v.1	20241011	Product data sheet	-	-

13. 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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Date of release: 11 October 2024