No.: SPC-K-HTS-0001 /5

Date: 2023. 1. 25

# Data sheet

Title: ESD SUPPRESSOR; RECTANGULAR TYPE

Style: SPC10

# RoHS COMPLIANCE ITEM Halogen and Antimony Free

Note: •Stock conditions

Temperature:  $+5^{\circ}\text{C} \sim +35^{\circ}\text{C}$ Relative humidity:  $25\% \sim 75\%$ 

The period of guarantee: Within 2 year from shipmen t by the company.

Solderability shall be satisfied.

- Product specification contained in this data sheet are subject to change at any time without notice
- If you have any questions or a Purchasing Specification for any quality agreement is necessary, please contact our sales staff.



Hokkaido Research Center Approval by: T. Sannomiya Drawing by: M. Shibuya

SPC10 Page: 1/7

#### 1. Scope

1.1 This data sheet covers the detail requirements for ESD suppressor; rectangular type, style of SPC10.

#### 2. Classification

Type designation shall be the following form.

(Example)	SPC	10	501	Α	01	TH
	1	2	3	4	5	6

1 ESD suppressor; rectangular type \_\_\_\_\_ Style

3 Peak voltage

Symbol	Peak voltage	
501	50×10 <sup>1</sup> V	

4 Rated voltage

Symbol	Rated voltage	
Α	30V max	
С	50V max	

5 Optional code

Symbol	Optional code		
01	Capacitance: 0.1 pF max.		

6 Packaging form

В	Bulk (loose package)
TH	Paper taping

# 3. Rating

3.1 The ratings shall be in accordance with Table-1.

Table-1

		ESD capability *1			Rated voltage Capacitance (V) (pF) *2	Capacitance	Lookaga aurrant
Style		Peak voltage	Clamping voltage ESD pulse withstand			Leakage current (μA)	
		(V)	(V)	(pulses)	(V)	(ρι / 2	(μΑ)
	SPC10	500 max.	100 max.	100	30 max.	0.1 max.	1 max.
	35010	500 max. 100 max.		100	50 max.	U.TITIAX.	i iliax.

Style	Category temperature range (°C)	
SPC10	-55 to +125	

<sup>\*1</sup> Peak voltage: IEC61000-4-2, 8kV, Contact discharge, The peak voltage shall be measured.

Clamping voltage: IEC61000-4-2, 8kV, Contact discharge, The voltage value shall be measured after 30ns from the peak voltage.

ESD pulse withstand: IEC61000-4-2, 8kV, Contact discharge, The pulse withstand.

\*2 Capacitance: 25°C, 1MHz, 1Vrms

SPC10 Page: 2/7

# 4. Packaging form

The standard packaging form shall be in accordance with Table-2.

Table-2

Symbol	Packaging form		Standard packaging quantity / units
В	Bulk (loose package)	1,000 pcs.	
TH	Paper taping	8mm width, 2mm pitches	10,000 pcs.

#### 5. Dimensions

5.1 The suppressor shall be of the design and physical dimensions in accordance with Figure-1 and Table-3.

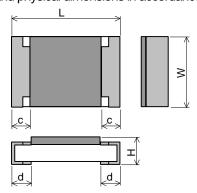


Figure-1

	Unit: mm				
Style	L	W	Н	С	d
SPC10	1.0±0.05	0.5±0.05	0.35±0.05	0.2±0.10	0.25±0.10

# 5.2 Equivalent circuits





SPC10 Page: 3/7

No: SPC-K-HTS-0001

/5

#### 6. Performance

6.1 Unless otherwise specified, the standard range of atmospheric conditions for tests is as follows;

Ambient temperature: 5 °C to 35 °C, Relative humidity: 45 % to 85 %, Air presser: 86 kPa to 106 kPa

If there is any doubt the results, measurements shall be made within the following:

Ambient temperature: 20 °C  $\pm$  2 °C, Relative humidity: 60 % to 70 %, Air presser: 86 kPa to 106 kPa

6.2 The performance shall be satisfied in Table-4.

Table-4(1)

ESD capability   Peak voltage   EIC61000-4-2   The suppressor shall be mounted on the test substrate as shown in Figure-2. Test condition: 8kV, Contact discharge Measurement: The peak voltage shall be measured.   100V max.			Table +(1)	T
Peak voltage	No.	Test items	Condition of test	Performance requirements
as shown in Figure-2, Test condition: 8kV, Contact discharge   Measurement: The peak voltage shall be measured.   100V max.	1	ESD capability	IEC61000-4-2	500V max.
Test condition: 8kV, Contact discharge   Measurement: The peak voltage shall be measured.		Peak voltage	The suppressor shall be mounted on the test substrate	
Measurement: The peak voltage shall be measured.			as shown in Figure–2.	
Measurement: The peak voltage shall be measured.			Test condition: 8kV, Contact discharge	
ESD capability   The suppressor shall be mounted on the test substrate as shown in Figure -2. Test condition: 8kV, Contact discharge Measurement: The voltage value shall be measured after 30ns from the peak voltage.   IEC61000-4:2   IEC61000-4:				
The suppressor shall be mounted on the test substrate as shown in Figure—2. Test condition: 8kV, Contact discharge Measurement: The voltage value shall be measured after 30ns from the peak voltage.    ESD capability   ESD pulse withstand   EC61000-4-2   The suppressor shall be mounted on the test substrate as shown in Figure—2. Test condition: 8kV, Contact discharge Applied pulses: 100 pulses Measurement: After examination, the current value when the rated voltage is applied is measured.    Capacitance   Measurement condition: Frequency: 1MHz±10% Voltage: 1 Vms±0.2Vms Ambient temperature:25°C±2°C   Teminal bond strength of the face plating   Measurement: The current value when the measurement voltage: Rated voltage Measurement: The current value when the measurement voltage is applied is measured.    Terminal bond strength of the face plating   Tips C 60068-2-21   The suppressor shall be mounted on the test substrate as shown in Figure—2. Bending value: 3 mm (Among the fulcrums: 90 mm) Duration: 10 s±1 s   The suppressor shall be mounted on the test substrate as shown in Figure—2. Bending value: 3 mm (Among the fulcrums: 90 mm) Duration: 10 s±1 s   The suppressor shall be mounted on the test substrate as shown in Figure—2. Bending value: 3 mm (Among the fulcrums: 90 mm) Duration: 10 s±1 s   The suppressor shall be mounted on the test substrate as shown in Figure—2. Bending value: 3 mm (Among the fulcrums: 90 mm) Duration: 10 s±1 s   The surface of mechanical damage.    The surface of solder appearance damage   Tips of solder bath: 260 °C ±5 °C   Immersion into solder, leaving the room temp. for 48h or more, and then measure the leakage current.   The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.   The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.   The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.   Tips of solder solder.   Tips of solder solder.   Tips of solder solder.   Tips of so	2	ESD capability		100V max.
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Measurement: The voltage value shall be measured after 30ns from the peak voltage.				
SED capability   IEC61000-4-2   IEC61000-4-2   The suppressor shall be mounted on the test substrate as shown in Figure-2. Test condition: 8kV, Contact discharge Applied pulses: 100 pulses Measurement. After examination, the current value when the rated voltage is applied is measured.    Capacitance				
ESD capability   ESD pulse withstand   EC61000-4-2   The suppressor shall be mounted on the test substrate as shown in Figure-2. Test condition: 8kV, Contact discharge Applied pulses: 100 pulses Measurement: After examination, the current value when the rated voltage is applied is measured.   O.1pF max.				
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Capacitance   Measurement condition: Frequency: 1MHz±10% Voltage: 1 Vms±0.2Vms Ambient temperature:25°C±2°C				
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<ul> <li>Reflow soldering         Pre—heating: 150 °C ~ 180 °C, 120 s max.         Peak: 260 °C ± 5 °C, 10 s max.         Reflow cycle: 2 times         After immersion into solder, leaving the room temp. for         48h or more, and then measure the leakage current.     </li> <li>Solderability         JIS C 60068-2-58         Test by a piece         Flux: Rosin–Methanol         Temp. of solder: bath: 235 °C ± 5 °C     </li> </ul>			,	
Pre-heating: $150  ^{\circ}\text{C} \sim 180  ^{\circ}\text{C}$ , $120  \text{s}$ max.  Peak: $260  ^{\circ}\text{C} \pm 5  ^{\circ}\text{C}$ , $10  \text{s}$ max.  Reflow cycle: 2 times  After immersion into solder, leaving the room temp. for 48h or more, and then measure the leakage current.  Solderability  JIS C 60068-2-58  Test by a piece Flux: Rosin-Methanol Temp. of solder: bath: $235  ^{\circ}\text{C} \pm 5  ^{\circ}\text{C}$ The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.	• 6			
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After immersion into solder, leaving the room temp. for 48h or more, and then measure the leakage current.  8 Solderability  JIS C 60068-2-58 Test by a piece Flux: Rosin–Methanol Temp. of solder: bath: 235 °C ± 5 °C  The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.			· · · · · · · · · · · · · · · · · · ·	
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Test by a piece shall be min. of 95 % covered with a new coating of solder.  Temp. of solder: bath: 235 °C ± 5 °C	<u> </u>			
Flux: Rosin–Methanol Temp. of solder: bath: 235 °C ± 5 °C  a new coating of solder.	8	Solderability		
Temp. of solder: bath: 235 °C ± 5 °C				
			Flux: Rosin-Methanol	a new coating of solder.
			Temp. of solder: bath: 235 °C ± 5 °C	
			Immersion time: $2 s \pm 0.5 s$	

No: SPC-K-HTS-0001

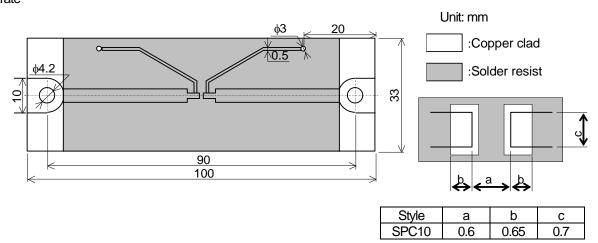
ESD SUPPRESSOR; RECTANGULAR TYPE

SPC10 Page: 4/7

Table-4(2)

		1able-4(2)	T
9	Solvent	JIS C 60068-2-45	No evidence of appearance
		The specimen shall be cleansed at normal temperature	damage
		for 90s using Isopropyl alcohol.	
10	Rapid change temperature	JIS C 60068-2-14	Leakage current: 10μA max.
		The suppressor shall be mounted on the test substrate	No evidence of appearance
		as shown in Figure–2.	damage
		Lower temperature: –55 °C	
		Upper temperature: +125 °C	
		Duration of exposure at each temperature: 30 min.	
		Number of cycles: 100 cycles	
		After examination, leaving the room temp. for 48h or	
		more, and then measure the leakage current.	
11	Humidity	JIS C 60068-2-78	Leakage current: 10µA max.
	(Steady state)	The suppressor shall be mounted on the test substrate as	No evidence of appearance
		shown in Figure-2.	damage
		Test temp. & relative humidity: 60±2°C & 90~95% RH.	
		Test period: 1,000 <sup>+48</sup> <sub>0</sub> h	
		After examination, leaving the room temp. for 48h or	
		more, and then measure the leakage current.	
12	Load life in humidity	The suppressor shall be mounted on the test substrate as	Leakage current: 10μA max.
		shown in Figure-2.	No evidence of appearance
		Test temp. & relative humidity: 60±2°C & 90~95% R.H.	damage
		Test voltage: Rated voltage shall be applied continuously.	
		Test period: 1,000 <sup>+48</sup> <sub>0</sub> h	
		After examination, leaving the room temp. for 48h or	
		more, and then measure the leakage current.	
13	Endurance at 85 °C	The suppressor shall be mounted on the test substrate as	Leakage current: 10μA max.
		shown in Figure–2.	No evidence of appearance
	Test temp.: 85±2°C		damage
		Test voltage: Rated voltage shall be applied continuously.	
		Test period: 1,000 <sup>+48</sup> <sub>0</sub> h	
		After examination, leaving the room temp. for 48h or	
		more, and then measure the leakage current.	

# 7. Test substrate



# Figure-2 SPC TEST SUBSTRATE

Remark 1). Material: Epoxide woven glass

Thickness: 1. 6mm Thickness of copper clad: 0. 035mm

SPC10 Page: 5/7

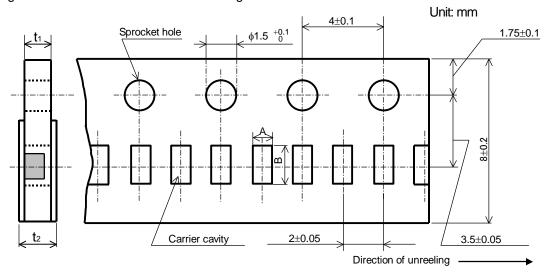
### 8. Taping

8.1 Applicable documents JIS C 0806–3: 2014, EIAJ ET-7200C: 2010.

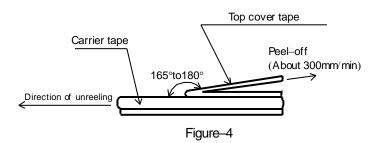
#### 8.2 Taping dimensions

Paper taping (8mm width, 2mm pitches)

Taping dimensions shall be in accordance with Figure-3 and Table-5.



- 1). The cover tapes shall not cover the sprocket holes.
- Tapes in adjacent layers shall not stick together in the packing.
- 3). Components shall not stick to the carrier tape or to the cover tape.
- 4). Pitch tolerance over any 10 pitches ±0.2mm.
- 5). The peel strength of the top cover tape shall be with in 0.1N to 0.5N on the test method as shown in the following Figure-4.
- 6). When the tape is bent with the minimum radius for 25 mm, the tape shall not be damaged and the components shall maintain their position and orientation in the tape.
- In no case shall there be two or more consecutive components missing.
   The maximum number of missing components shall be one or 0.1%, whichever is greater.
- 8). The suppressors shall be faced to upward at the over coating side in the carrier cavity.



SPC10 Page: 6/7

# 8.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure–5 and Table–6.

Plastic reel (Based on EIAJ ET-7200C)

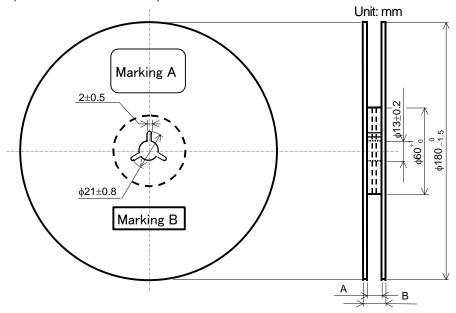


Figure-5

	Tab	ole-6	Unit: mm
Style	Α	В	Note
SPC10	0 9 +1.0	11.4±1.0	Injection molding
3FC10	9 0	13±1.0	Vacuum forming

Note: Marking label shall be marked on a place of Marking A or two place of marking A and B.

# 8.4 Leader and trailer tape.

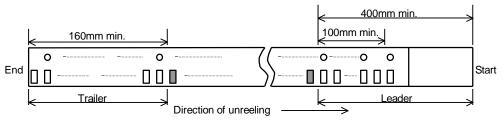


Figure-6

# 9. Marking on package

The label of a minimum package shall be legibly marked with follows.

# 9.1 Marking A

- (1) Classification (Style, Peak voltage, Rated voltage, Optional code, Packaging form) (2) Quantity (3) Lot number
- (4) Manufacturer's name or trade mark (5) Others
- 9.2 Marking B (KAMAYA Control label)