

# Specification

(Reference)

Title: ESD SUPPRESSOR; RECTANGULAR TYPE

Style: HSPC10, 16

RoHS COMPLIANCE ITEM

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**釜屋電機株式會社**  
**KAMAYA ELECTRIC CO., LTD.**

Issue Dept.: Research & Development Department Hokkaido Research Center

Title: ESD SUPPRESSOR; RECTANGULAR TYPE  
HSPC10,16

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## 1. Scope

1.1 This specification covers the detail requirements for ESD suppressor; rectangular type, style of HSPC10,16.

## 2. Classification

Type designation shall be the following form.

(Example) 

HSPC	16	701	B	02	TP
1	2	3	4	5	6

1 ESD suppressor; rectangular type  Style

2 Size

3 Peak voltage Example: 701 → 700(V), 601 → 600(V)

4 Rated voltage

Symbol	Rated voltage
A	30V max
B	20V max
C	50V max

5 Optional code

Symbol	Optional code
01	Capacitance: 0.1 pF max.
02	Capacitance: 0.2 pF max.

6 Packaging form

## 3. Rating

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

Table-1

Style	ESD capability *1			Rated voltage (V)	Capacitance (pF) *2	Leakage current (μA)
	Peak voltage (V)	Clamping voltage (V)	ESD pulse withstand (pulses)			
HSPC10	600 max.	100 max.	100	30 max.	0.1 max.	1 max.
HSPC16	700 max.	100 max.	100	20 max.	0.2 max.	1 max.
				50 max.		

Style	Category temperature range (°C)
HSPC10	-55 to +125
HSPC16	

\*1 Peak voltage: IEC61000-4-2, 15kV, Aerial discharge, The peak voltage shall be measured.

Clamping voltage: IEC61000-4-2, 15kV, Aerial discharge, The voltage value shall be measured after 30ns from the peak voltage.

ESD pulse withstand: IEC61000-4-2, 15kV, Aerial discharge, The pulse withstand.

\*2 Capacitance: 25°C, 1MHz, 1Vrms

## 4. Packaging form

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

Table-2

Symbol	Packaging form		Standard packaging quantity / units	Application
B	Bulk (loose package)		1,000 pcs.	HSPC10, 16
TH	Paper taping	8mm width, 2mm pitches	10,000 pcs.	HSPC10
TP	Paper taping	8mm width, 4mm pitches	5,000 pcs.	HSPC16

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## 5. Dimensions

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

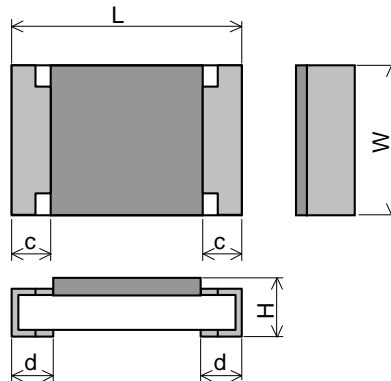
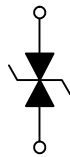


Figure-1  
Table-3

Unit:mm

Style	L	W	H	c	d
HSPC10	1.0±0.05	0.5±0.05	0.35±0.05	0.2±0.1	0.25±0.10
HSPC16	1.6±0.1	0.8 <sup>+0.15</sup> <sub>-0.05</sub>	0.5±0.1	0.3±0.1	0.3±0.1

## 5.2 Equivalent circuits



## 5.3 Net weight (Reference)

Style	Net weight(mg)
HSPC10	0.6
HSPC16	2

## 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 ± 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)

No.	Test items	Condition of test	Performance requirements
1	ESD capability Peak voltage	IEC61000-4-2 The suppressor shall be mounted on the test substrate as shown in Figure-2. Test condition: 15kV, Aerial discharge Measurement: The peak voltage shall be measured.	See Table-1.
2	ESD capability Clamp voltage	IEC61000-4-2 The suppressor shall be mounted on the test substrate as shown in Figure-2. Test condition: 15kV, Aerial discharge Measurement: The voltage value shall be measured after 30ns from the peak voltage.	100V max.

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Table-4(2)

No.	Test items	Condition of test	Performance requirements
3	ESD capability ESD pulse withstand	IEC61000-4-2 The suppressor shall be mounted on the test substrate as shown in Figure-2. Test condition: 15kV, Aerial discharge Applied pulses: 100 pulses Measurement: After examination, the current value when the rated voltage is applied is measured.	10μA max.
4	Capacitance	Measurement condition: Frequency: 1MHz±10% Voltage: 1 Vrms±0.2Vrms Ambient temperature: 25°C±2 °C	See Table-1.
5	Leakage current	Measurement voltage: The rated voltage Measurement: The current value when the measurement voltage is applied is measured.	1μA max.
6	Terminal bond strength of the face plating	JIS C 61000-2-21 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	Leakage current: 10μA max. No evidence of mechanical damage.
7	Resistance to soldering heat	JIS C 60068-2-58 Test by a piece. Temp. of solder bath: 260 °C ± 5 °C Immersion time: 10 s ± 1 s After immersion into solder, leaving the room temp. for 48h or more, and then measure the leakage current.  • 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.	Leakage current: 10μA max. No evidence of appearance damage
8	Solderability	JIS C 60068-2-58 Test by a piece Flux: Rosin-Methanol Temp. of solder bath: 235 °C ± 5 °C Immersion time: 2 s ± 0.5 s	The surface of terminal immersed shall be min. of 95 % covered with a new coating of solder.
9	Solvent	JIS C 60068-2-45 The specimen shall be cleansed at normal temperature for 90s using Isopropyl alcohol.	No evidence of appearance damage
10	Rapid change temperature	JIS C 60068-2-14 The suppressor shall be mounted on the test substrate as shown in Figure-2. 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.	Leakage current: 10μA max. No evidence of appearance damage

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Table-4(3)

No.	Test items	Condition of test	Performance requirements
11	Humidity (Steady state)	JIS C 60068-2-78 The suppressor shall be mounted on the test substrate as shown in Figure-2. 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.	Leakage current: 10μA max. No evidence of appearance damage
12	Load life in humidity	The suppressor shall be mounted on the test substrate as shown in Figure-2. Test temp. & relative humidity: 60±2°C & 90~95% R.H. Test voltage: The 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.	Leakage current: 10μA max. No evidence of appearance damage
13	Endurance at 85 °C	The suppressor shall be mounted on the test substrate as shown in Figure-2. Test temp.: 85±2°C Test voltage: The 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.	Leakage current: 10μA max. No evidence of appearance damage

## 7. Test substrate

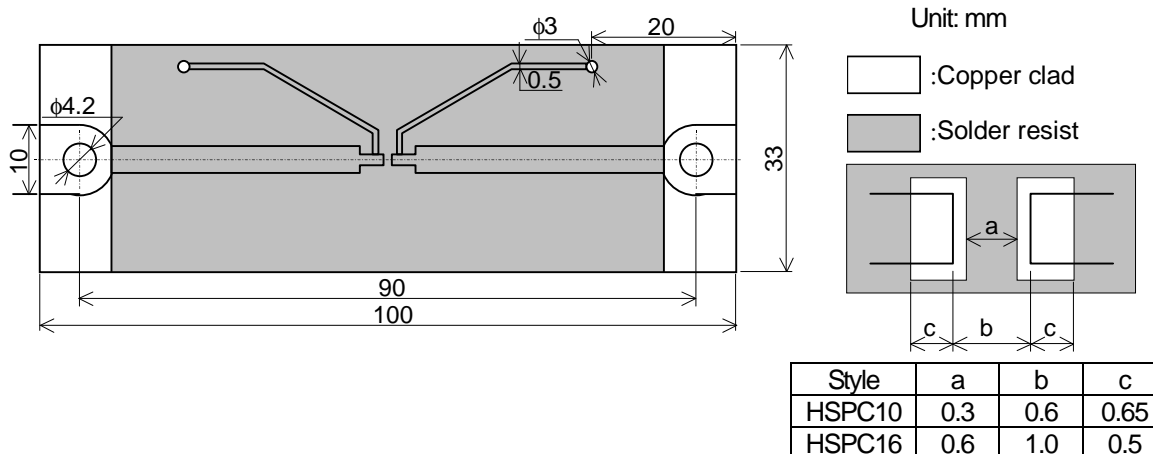


Figure-2 HSPC TEST SUBSTRATE

Remark 1). Material: Epoxide woven glass

Thickness: 1.6mm Thickness of copper clad: 0.035mm

## 8. Taping

8.1 Applicable documents JIS C 0806-3: 1999, EIAJ ET-7200B: 2003

## 8.2 Taping dimensions

8.2.1 Paper taping (8mm width, 2mm pitches)

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

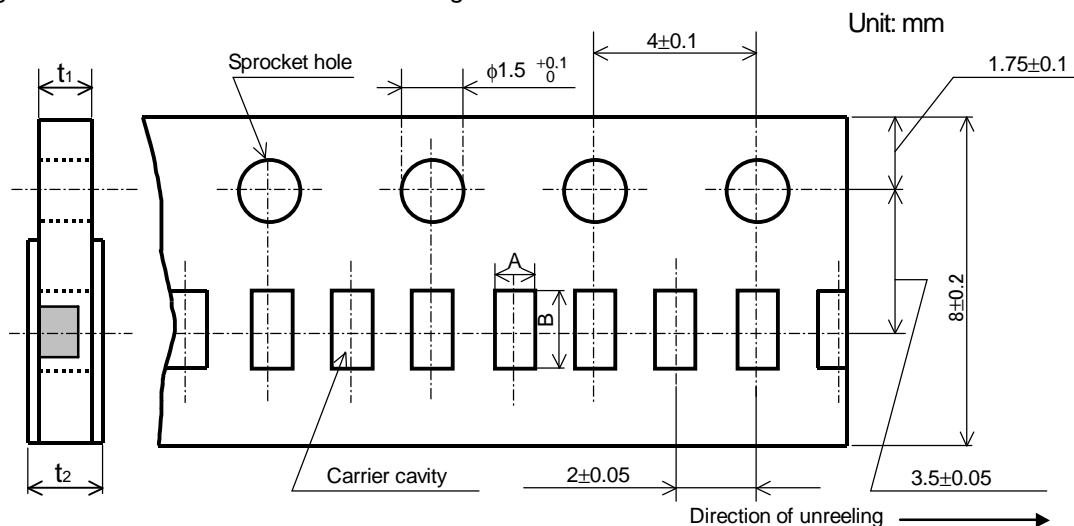


Figure-3

Table-5

Unit: mm

Style	A	B	t <sub>1</sub>	t <sub>2</sub>
HSPC10	0.65 <sup>+0.05</sup> <sub>-0.10</sub>	1.15 <sup>+0.05</sup> <sub>-0.10</sub>	0.4 ± 0.05	0.5max.

8.2.2 Paper taping (8mm width, 2mm pitches)

Taping dimensions shall be in accordance with Figure-4 and Table-6.

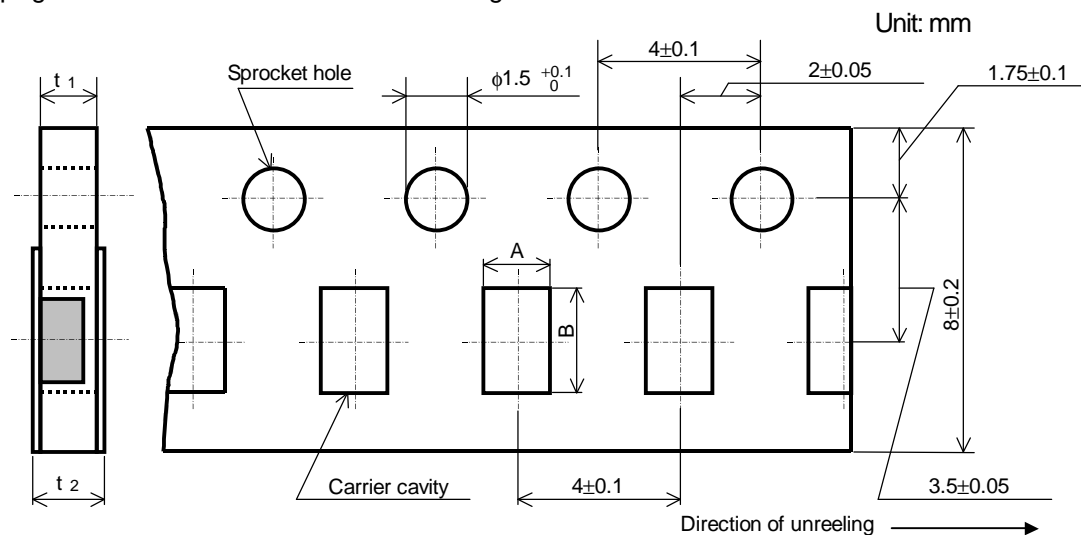


Figure-4

Table-6

Unit: mm

Style	A	B	t <sub>1</sub>	t <sub>2</sub>
HSPC16	1.15 ± 0.15	1.9 ± 0.2	0.6 ± 0.1	0.8max.

- 1). The cover tapes shall not cover the sprocket holes.
- 2). 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  $\pm 0.2\text{mm}$ .
- 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-5.
- 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.
- 7). 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.

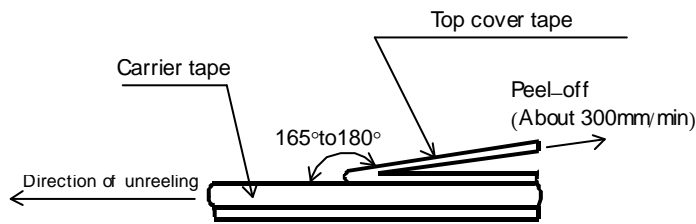


Figure-5

### 8.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure-6 and Table-7.

Plastic reel (Based on EIAJ ET-7200B)

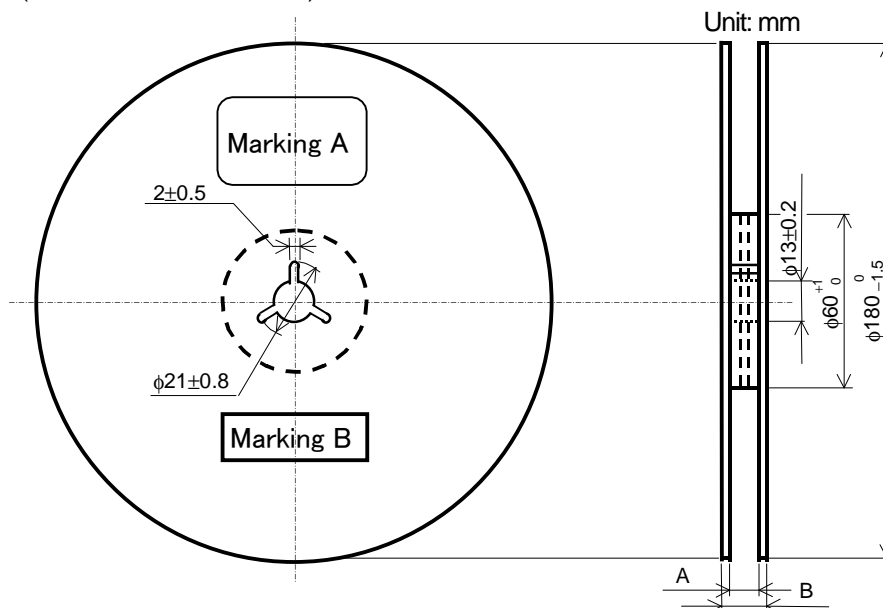


Figure-6

Table-7

Style	A	B	Note
HSPC10,16	9 $^{+1.0}_0$	11.4±1.0	Injection molding
		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.

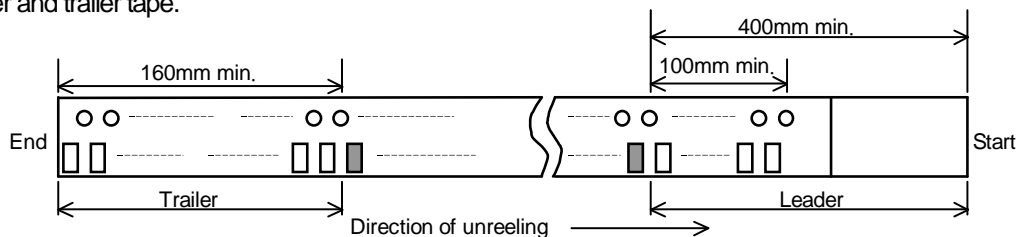


Figure-7

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)



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