	DATASHEET	Part No.
	High Performance Electric Shock Protector	HESP 02 100 ES1

CUSTOMER : Xiaomi

DATA SHEET

Product Name	: High Performance Electric Shock Protector
Part No	: HESP 02 100 ES1
Revision Date	: 2016/08/11
Customer Code	:

	Address : AMOTECH. CO. LTD., 17-2 ,JAMWON-DONG, SEOCHO-GU, SEOUL,KOREA
	Contact : TEL) 82-2-544-1351, FAX) 82-2-517-7183

1. Parts description

1.1. Overview

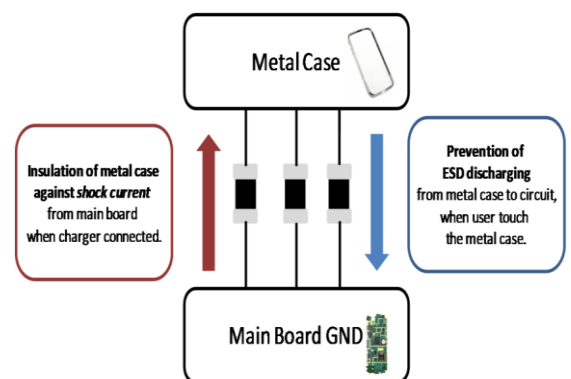
HESP series is the component to protect human body from electric shock when handheld device connected to charger. This component is designed to insulate between external conductor and internal circuit ground. So, it can suppress current leakage from AC 110/220V. It is also can suppress electrostatic discharge with special material and design.

1.2. Features

- ESD protection according to IEC 61000-4-2 (level4)
- Pb & Sb free
- SMD type package
- Bi-direction

1.3. Applications

- Suppressing leakage current and electrostatic discharge at external conductor (metal case etc.)
- Mobile Phone, Notebook etc.



2. Model and Lot Number description

2.1. Model

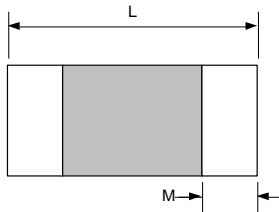
HESP	02	100	E	S1
(1)	(2)	(3)	(4)	(5)

- (1) Series name
- (2) Chip size : 02= 0402 (1.0 x 0.5 mm)
- (3) Capacitance : 100 (100pF)
- (4) Capacitance tolerance : 20%
- (5) Internal Code

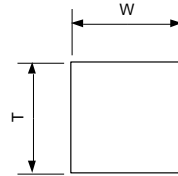
3. Style and Dimension

3.1. Appearance and dimension

• Top view



• Side view

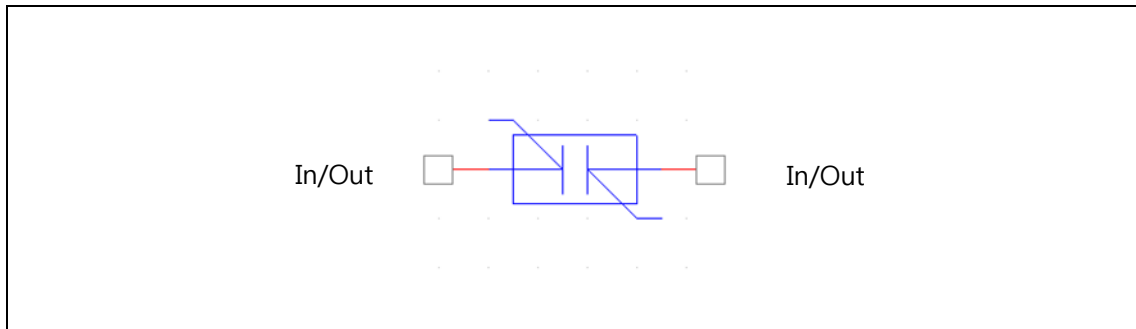


Unit : mm

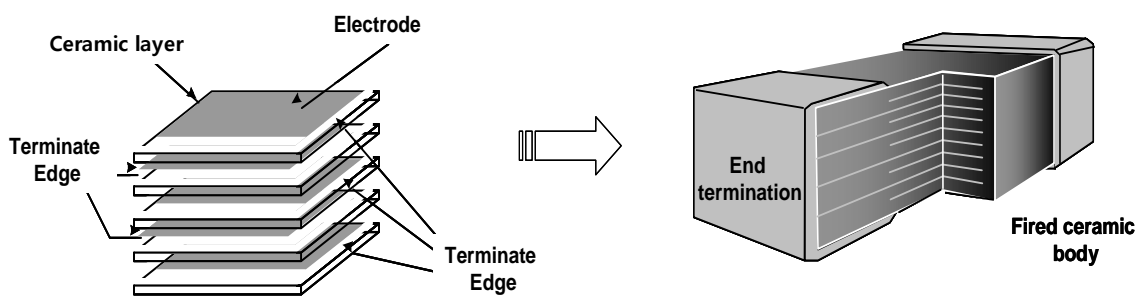
Item	Size	Tolerance
L	1.0	±0.05
W	0.5	±0.05
T	0.5	±0.05
M	0.25	±0.10

* Chip Weight : 1.6mg

3.2. Equivalent circuit



4. Structure and materials



Item	Material
Ceramic body	LTCC
Internal electrode	Ag or Ag/Pd
External electrode	Ag – Ni– Sn
Plate layer	Ni ≥ 1 μm, Sn ≥ 2 μm

5. Specifications

5.1. Electrical characteristics

Parameter	Value
Shock Current (IEC 60990 standard)	50 μA max. * TA abnormal mode
Capacitance (Cp, @ 1MHz)	100 pF (80 ~ 120 pF)
Capacitance tolerance	20%
Leakage Current (IL, @ 50Vdc)	5 μA max.
ESD Capability (IEC61000-4-2 Direct Discharge)	Level 4

◆ Typical characteristics

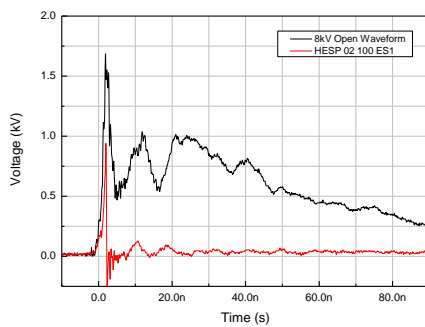


Fig. 1 ESD response

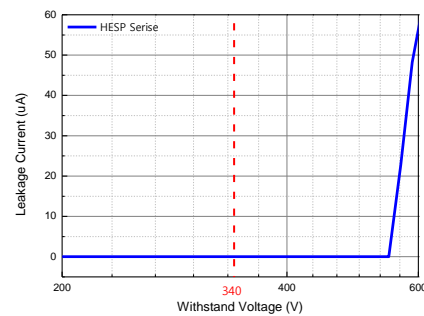


Fig. 2 DC voltage withstand

5.2. Temperature range

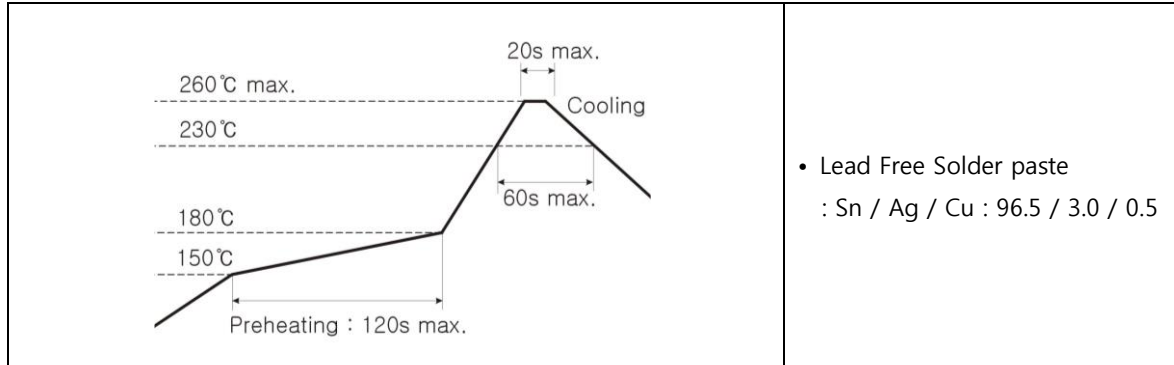
- 1) Operating Temperature range : -40 ~ +85°C
- 2) Storage Temperature range : -40 ~ +85°C

5.3. Measurement method

parameter	Shock Current	Capacitance (Cp)	Leakage Current (IL)
Equipment	Leak Current Tester	Capacitance meter	Source meter
Terminal to be Tested			

6. Soldering (Reflow soldering)

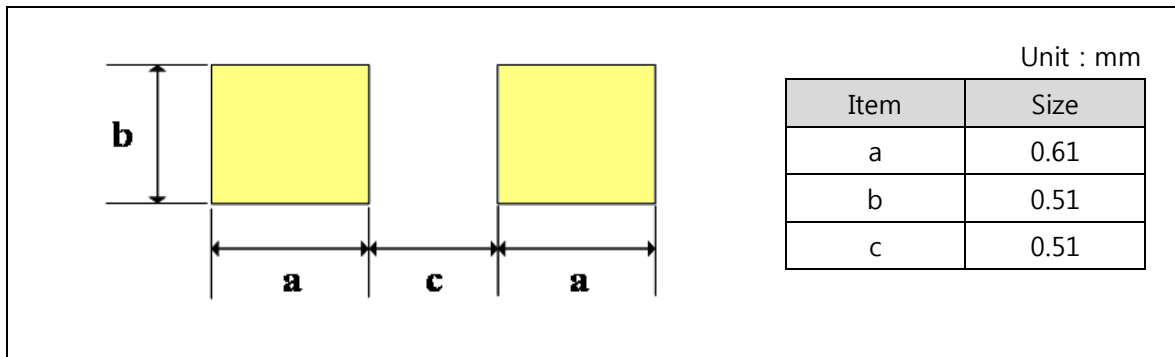
6.1. Soldering condition



Follow the recommended soldering conditions to avoid degradation of performance .

- This product is designed for reflow soldering only. Do not use flow soldering.
- Use non-activated flux. (Max. Cl content less than 0.2%)
- Reflow cycle times should be done less than 3 times.

6.2. PCB pattern design condition (recommended)



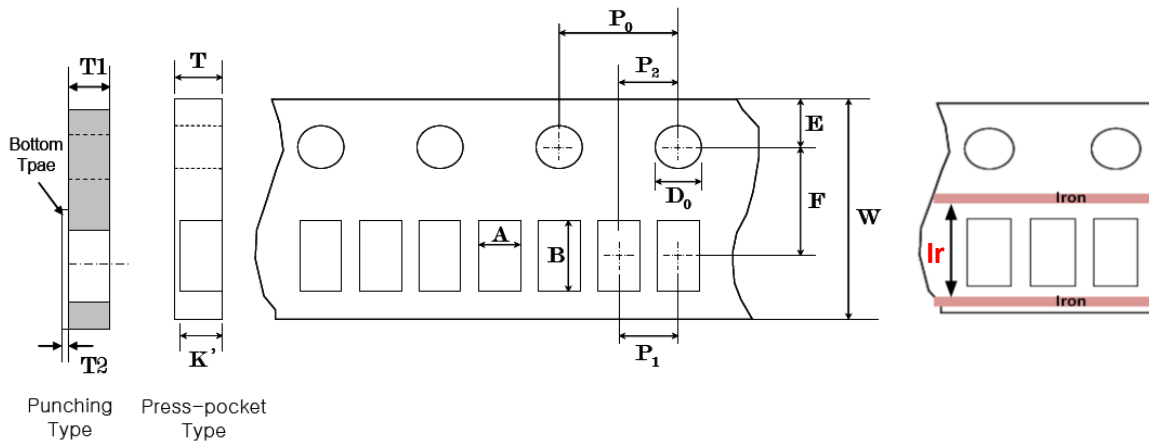
7. Caution

- 1) Storage environment : -5~40°C temperature, 20~70% humidity (MSL Level 1)
- 2) Do not use in high temperature/high humidity and a corrosive atmosphere like sulfide, chloride gas which could damage the solderability.
- 3) Do not expose to mechanical shock to avoid crack.
- 4) Use chips within 6 months. If over 6 months, check solderability before use.

8. Packaging specification

8.1 Carrier tape Specification

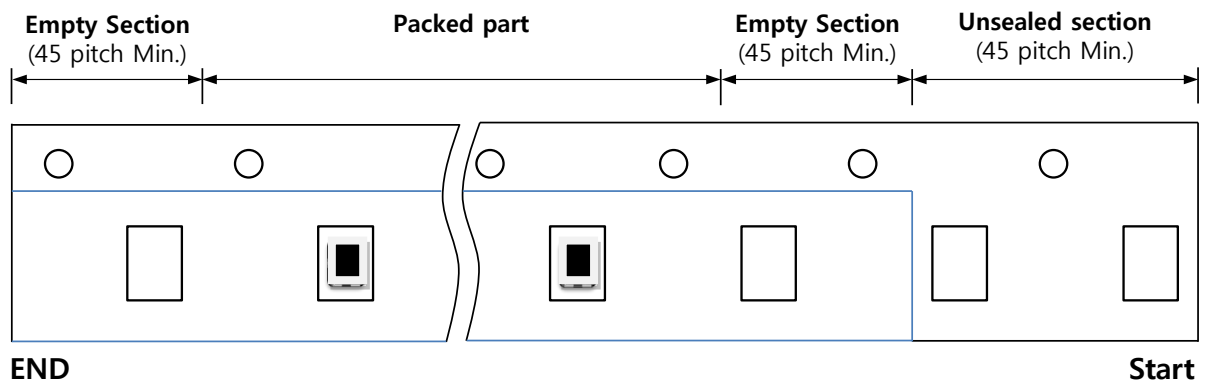
8.1.1. Size



(Unit : mm)

	A	B	D ₀	E	F	P ₀	P ₁	P ₂	W	K'	T	T1	T2	Ir
Spec.	0.62	1.12	1.55	1.75	3.50	4.00	2.00	2.00	8.0	0.60	0.65	0.60	0.1	2.5
Tolerance	±0.04	±0.04	±0.10	±0.05	±0.05	±0.10	±0.05	±0.05	±0.1	±0.03	±0.03	±0.05	Max.	Typ.

8.1.2. Chip Locations

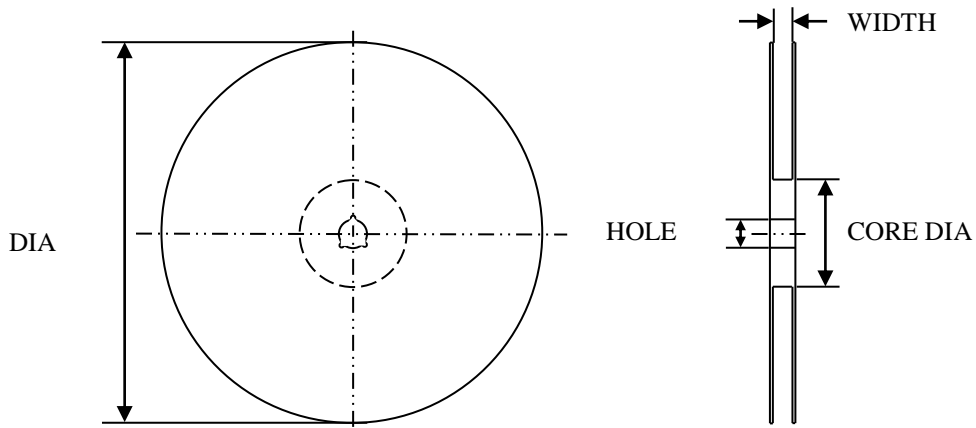


8.1.3. Material

- 1) Pater carrier tape : Laminated virgin pulp
- 2) Top tape : Polyester film
- 3) Bottom tape : Adhesive coated paper

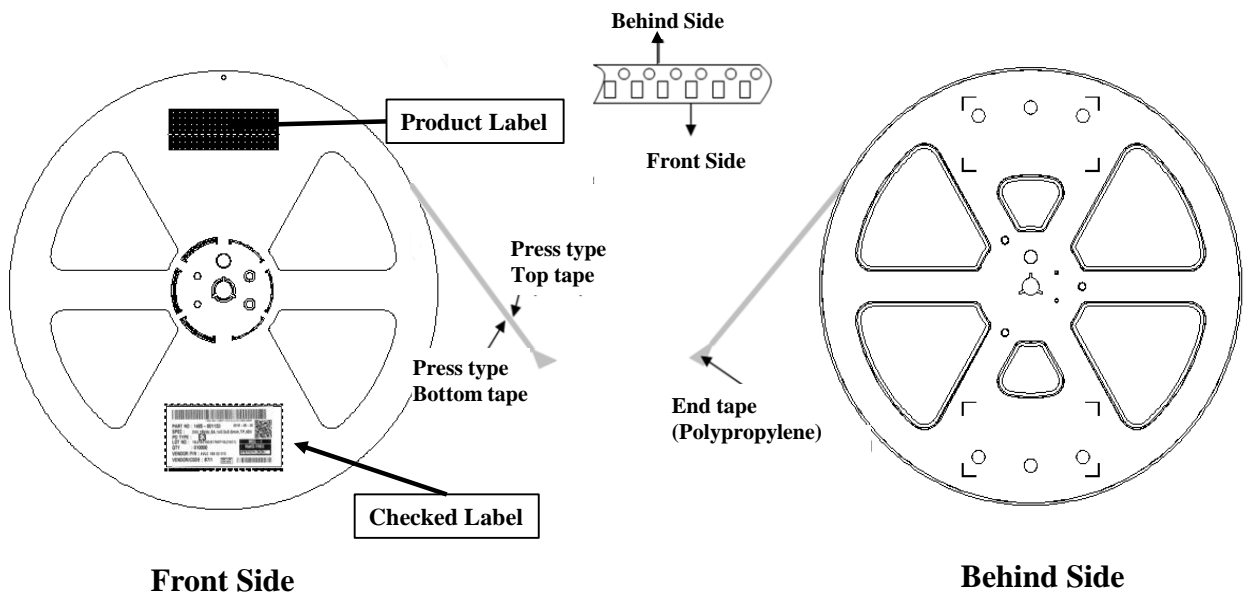
8.2. Reel Specification

8.2.1. Size




Item	DIA	WIDTH	CORE DIA	HOLE
Size (mm)	178.0±0.5	9.0±0.5	60.0±1.0	13.2±0.3

8.2.2. Label adherence and winding direction






8.2.3. Material

- Plastic reel : GPS(General Purpose Styrene)

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8.3 Box packaging Specification

Box	Small	Medium	Large
Size (mm)	183 (W) x 185 (D) x 70 (T)	200 (W) x 375 (D) x 205 (T)	375 (W) x 390 (D) x 205 (T)
Quantity	5 reel = 10,000 ea/reel x 5 = 50,000 ea	5 small boxes = 10,000 ea/reel X 25 = 250,000 ea	10 Medium boxes = 10,000 ea/reel X 50 = 500,000 ea
Detail			

8.4. Label Specification

Size : Reel & Small boxes : 80 X 40 (mm)