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Buyer: _____

Specifications For Approval

承認原

Part Name 部品名	Polyester Film Capacitor
Model Name	C-FILM PEF - Ammo Tapping
Specification 规格	FULL SERIES
CODE NO 部品编号	PEFAM222K1000
Remarks 特记事项	

裁決 簽 章處	裁	檢討	審核	承認
	決			
	欄	/	/	/

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Seoryong Electronics Limited

Series :

POLYESTER FILM CAPACITOR (PEF)

[illegible]

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[illegible]

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SERIES TYPE	PEF	ISSUE NO	2	REVISION NO.	2	2 / 12
DATE ORIGINATED	JAN 01. 2004	ORIGINATED BY	C. J. Xiong QA Supervisor	ORIGINATOR SIGNATURE	熊昌軍	
DATE APPROVED	JAN 01. 2004	APPROVED BY	D. H. LEE G. MANAGER	APPROVAL SIGNATURE	李东熙	
SUBMITTED BY TITLE		Karen Chu CHIEF OF ADMIN.		DATE JAN 01. 2004	Karen Chu	

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SPECIFICATION	POLYESTER FILM CAPACITOR					PAGE
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1. SCOPE

This specification applies to Polyester film capacitor (PEF) used in electronics components.

2. FEATURES

- 2.1 Inductive type (radial lead) applying for KS C 6035, JICS 5113
- 2.2 Low power dissipation factor.
- 2.3 High insulation resistance.
- 2.4 Very high reliability.
- 2.5 Temperature coefficient of capacitance is negative and almost constant.
- 2.6 Small and light weight.

3. GENERAL CHARACTERISTICS

- 3.1 Capacitance range : 0.0001uF ~ 0.39uF
- 3.2 Standard tolerance : $\pm 5\%$ (J), $\pm 10\%$ (K) 101~151 (J= $\pm 10\%$)
- 3.3 Operating temperature range : -40°C ~ $+85^{\circ}\text{C}$
- 3.4 Standard working voltage : 100VDC(2A), 250VDC(2E), 1000VDC(3A)

4. PART NUMBER CODE

The part number code include all information needed to specify the product characteristic.

Example : PEF AM 222K1000

(4.1) (4.2) (4.3)

4.1 Capacitor Classification

As a polyester film capacitors with vacuum-evaporated aluminium electrode and welded wire termination and sealed with epoxy resin, the part number begins with "PEF". The meaning of each letter is as follows:
"PEF" denotes Polyester Film Type.

4.2. Packing method

AM = Ammo Tapping; BS= Bulk Straight Lead; LC= Lead Cut

4.3 Characteristics of Products

"683" denotes nominal capacitance (in pF). The first two digits indicates the two most significant digits of the capacitance value and the third digit gives the number of zeroes. In this case, 222 = 2200pF

"K" denotes tolerance. In this case, K = $\pm 10\%$

"3A" denotes the rated DC volage. In this case, 3A = 1000VDC

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5. CONSTRUCTION

The winding of Polyester film, AL foil and welded lead wire to the edge, coated with epoxy resin. (Color : Green)

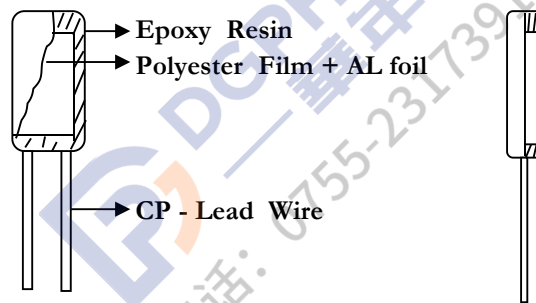
5.1 Materials

5.1.1 Dielectric : Polyester Film.

5.1.2 electrode : AL foil.

5.1.3 Lead : Solder Plated Copper Covered Steel Wire.

5.1.4 Coating : Epoxy Resin (Color : Green) : PEF 101J 100V, PEF 151J 100V



5.2 Physical Dimensions

5.2.1 Dimensions of standard size capacitors (PEF).

6. MARKING

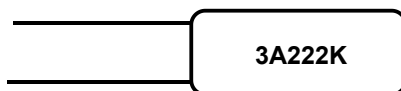
Capacitance, Tolerance, Rated voltage, and Production Code are marked on the capacitor.

Eg : 0.0022uf 10% 1000V

222 = Capacitance

K = Tolerance (J = 5%; K = 10%)

3A = Rated Voltage(1000V)



7. STANDARD PACKING

7.1 Method

7.1.1 Bulk type capacitors are to be packed in polybag with 500pcs each.

7.1.2 Taping type capacitors are to be packed in ammo box.

8. PRODUCT CHARACTERISTICS

Electrical Test Conditions :

Unless otherwise specified, the standard range of atmospheric conditions for marking measurements and test are as follows :

ambient temperature : 15°C ~ 35°C

relative humidity : 45% ~ 75%

air pressure : 86kpa ~ 106kpa

If there may be any doubt on the results, measurements shall be within the following limits :

ambient temperature : 20°C + 2°C

relative humidity : 65 + 5%

air pressure : 101.3kpa

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8. PRODUCT CHARACTERISTICS

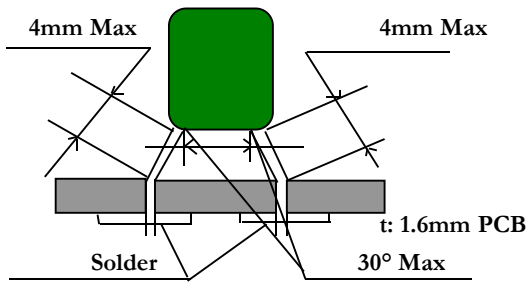
8.1 Electrical Characteristics

No	Item	Conditions (Per KS C 6035 , JIS C 5102)	Specification
1	Capacitance & Tolerance	Frequency : 1KHz $\pm$ 0.1KHz Temperature : 20 $\pm$ 2°C Humidity : 65%	J : $\pm$ 5%, K : $\pm$ 10%, 101~151 (J= $\pm$ 10%)
2	Tangent of loss angle	Frequency : 1 KHz $\pm$ 0.2KHz Temperature : 20 $\pm$ 2°C	1 KHz : 1.0% Max
3	Insulation resistance	Test voltage : Rated DC voltage Temperature : 20°C Duration : 60 $\pm$ 5sec	0.33 μ F $\geq$ C : 10,000M Ω Min 0.33 μ F < C : 3,000M Ω .uF Min
4	Dielectric Withstanding Voltage	Test voltage : 250% of Rated DC voltage Duration : 1 - 5 sec	No abnormality
5	Re-Flow Soldering Heat	Temperature : 150°C Duration : 60 sec. Max	Without crack or other damage
6	Solderability	Temp of solder : 235 $\pm$ 5°C Immersion time : 2 $\pm$ 0.5sec Solder composition: 99.0/0.7/0.3, Sn/Cu/Ag Flux composition : 10% in concentration of rosin Solder bath method	More Than 95% of circumferential surface of lead wire shall be covered with new solder.
7	Resistance to Solvent	Solvent : Isopropylalcohol Temp of solvent : 20~25°C Time : Rub 10 Times	No abnormality on appearance and marking

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8.2 Mechanical Characteristics

No	Item	Conditions (Per KS C 6035 , JIS C 5102)	Specification									
1	Lead tensile strength	Capacitor shall be held by on lead and the load shall be gradually applied in the lead out direction untill the applied load reached as specified in Table 2. The pull load specified shall be applied for at least 10 sec. Table 2 <table><tr><th>Lead's Diameter</th><th>Pull Load</th><th>Times</th></tr><tr><td>0.5 mm</td><td>10.0 N (1.0Kgf)</td><td>10Sec + 1 Sec.</td></tr><tr><td>0.6 to 0.8 mm</td><td>20.0 N (2.0Kgf)</td><td>10Sec + 1 Sec.</td></tr></table>	Lead's Diameter	Pull Load	Times	0.5 mm	10.0 N (1.0Kgf)	10Sec + 1 Sec.	0.6 to 0.8 mm	20.0 N (2.0Kgf)	10Sec + 1 Sec.	Without mecanical damage such as break or looseness of lead
Lead's Diameter	Pull Load	Times										
0.5 mm	10.0 N (1.0Kgf)	10Sec + 1 Sec.										
0.6 to 0.8 mm	20.0 N (2.0Kgf)	10Sec + 1 Sec.										
2	Lead bending strength	Capacitor shall be fixed b vertically to the plane and load as specified in Table 3 will be applied to the lead in the following manner : 1)Bend it to the original state, 2)restore it to the original state, 3)bend it to another right angle, 4)return to the beginning state. Table 3 <table><tr><th>Lead's Diameter</th><th>Bend Load</th><th>Condition</th></tr><tr><td>0.5 mm</td><td>5.0 N (0.5Kgf)</td><td>90°</td></tr><tr><td>0.6 to 0.8 mm</td><td>10.0 N (1.0Kgf)</td><td>2 Cycle</td></tr></table>	Lead's Diameter	Bend Load	Condition	0.5 mm	5.0 N (0.5Kgf)	90°	0.6 to 0.8 mm	10.0 N (1.0Kgf)	2 Cycle	Without mecanical damage such as break or looseness of lead
Lead's Diameter	Bend Load	Condition										
0.5 mm	5.0 N (0.5Kgf)	90°										
0.6 to 0.8 mm	10.0 N (1.0Kgf)	2 Cycle										
3	Vibration proof	Vibration freq. range : 10 ~ 55Hz sweep rate : 10 ~ 55 ~10Hz about 1 min Capacitor shall be mounted as shown below :  Test shall be carried out in arbitrary 2 directions to each other for 45 min each, 6 hrs in total and existence of opening, short circuit , etc shall be checked within 30 min before completion of test.	No eletrical discountinuity such as opening or short circuit of 0.5ms or more. Also abnormality on apperance after test.									

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8.3 Endurance Characteristics

No	Item	Conditions (Per KS C 6035 , JIS C 5102)	Specification
1	Resistance to heat	Temp : 85℃ ± 2℃ Duration : 2 + 1 hrs, -0 hrs	1) C : Within + 5% ~ - 2% 2) tanδ: 1.0% Max 3) I.R. : 5,000MΩ Min
2	Resistance to cold	Temperature : -25℃ ± 3℃ Duration : 2+1 hrs -0 hrs	1) C : Within + 0% ~ - 5% 2) tanδ: 1.0% Max
3	High temperature loading	Temperature : 85℃ ± 3℃ Vol Applied : Rated voltage Duration : 500+48hrs, -0hrs *measurement to be taken only 16 hrs after take it out the chamber	1) C : Within ± 8% 2) tanδ: 1.9% Max 3) I.R. : 3,000MΩ Min
4	Moisture resistance loading	Temperature : 40 ± 2℃ Humidity : 90%~95% Vol Applied : Rated voltage Duration : 500+ 48 hrs -0 hrs Withstanding vol test : 175% of rated vol for 1 min. *measurement to be taken only 16 hrs after take it out the chamber	1) C : Within ± 8% 2) tanδ: 2.2% Max 3) I.R. : 2,500MΩ Min 4) No abnormality after withstanding voltage test
5	Resistance to soldering heat	Temp of solder : 280~285℃ Immersion time : 5 ± 0.5sec Withstanding vol test : 200% of Rated DC voltage for 1 min. between leads.	1) C : Within ± 3% 2) No damage in appearance 3) No abnormality after withstanding voltage test

9. APPLICABLE REFERENCES

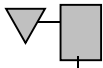
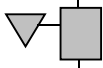
9.1 KS C 5107, JIS C 5113, IEC 384-1 : Plastic Film Capacitors (Characteristics M) for Direct Current.

9.2 KS C 6035, JIS C 5102, IEC 384-1 : Methods for Test for fixed Capacitors for Electronic Equipment

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10. PROCESS FLOW CHART

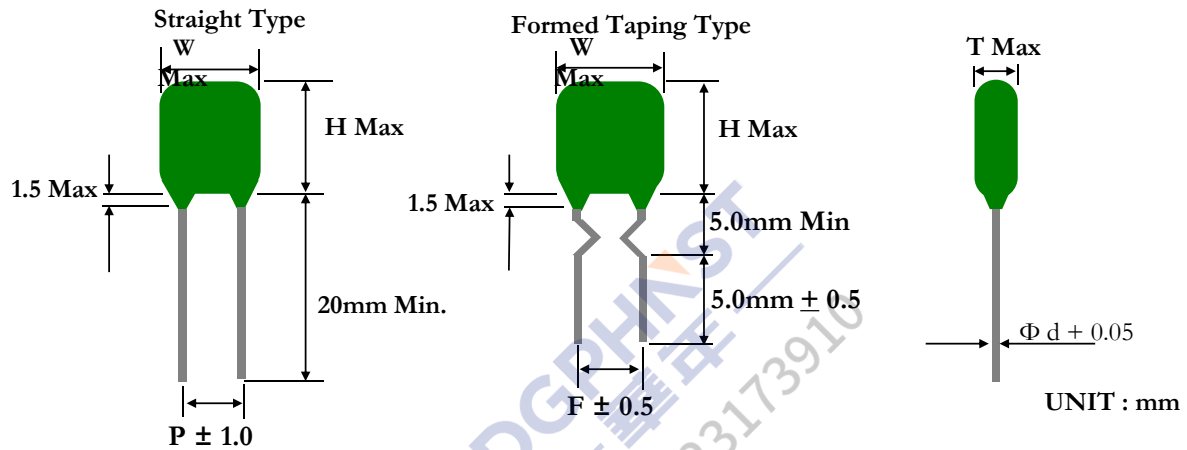
Flow	Process	Sub Process	Material	Machinery /	Control Items	Responsible Section	Remark
	WINDING	Material pick up. After press, check capacitance	Polyester Film, Aluminium Foil, Solder plated cover copper steel wire	Winding Machine	Capacitance, Element size & shape	Production Operator/IPQC	Winding operating instruction, Production Control Sheet, Winding check sheet
	ELEMENT TAPING	Tape element into fibre board for easy next process	Masking Tape & Fibre Board	Element Taping Machine	Taping quantity per fibre board	Production Operator	Element taping operating instruction, Production Control Data, Element taping check sheet
	HEAT PRESS	Heating		Heat Press M/C	Capacitance, Press temp., time, and pressure.	Production Operator/IPQC	Press operating instruction, Production Control Data.
	Silicon Oil by pass	Add Silicon Oil to protect Epoxy not dip on lead wire	Silicon Oil	By pass machine	Silicon Oil mixture ratio and distance between element & lead wire	Production Operator	Silicon Oil by pass operating instruction, Production Control Data
	COATING	Material pick up	Epoxy Resin	Dipping m/c, Oven	Dipping time, Oven (Temp. & Time)	Production Operator	Coating operating instruction, Production Control Data,
	MARKING	Material pick up	Laser	Auto-marking m/c, Oven	Marking appearance and spec	Production Operator	Marking operating instruction, production Control Data.
	COSMETICS INSPECTION	Fibre board removal	Surface and mechanic check		Marking appearance, size, lead wire, coating	Production Operator	Appearance Inspection instruction, Production Control Data
	AUTO-TESTING			Auto-Sorting m/c	Electrical spec check : Capacitance, Tan, TV, IR.	Production Operator/IPQC	Auto-Testing operating instruction, Production Control Data
	FORMING & TAPING		Heating Tape, Taping Box	Forming Taping m/c	Electrical spec check, Forming Style, Lead length and space distance	Production Operator/IPQC	Forming & Taping operating instruction, Production Control Data
	PACKING		Label, Carton Boxes	Visual, Scale	Spec., Quantity, Bar Code Label	Packing Operator	Packing Operating Instruction
	FINAL OUTGOING INSPECTION		Appearance Structure, Determine pass or fail through electrical sampling test	LCR - Meter, IR Meter, Puncture Tester	Coating, Marking, Forming, Mixing	OQC	Outgoing Inspection Procedure

 Material
  Operation
  Inspection
  Operation & Inspection
  End

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11. DIMENSION - NORMAL SIZE



Cap (uF) \ VDC		100VDC					
		W	H	T	P	F	d
101	0.00010	6.0	12.0	5.0	5.0	5.0	0.5
151	0.00015	6.0	12.0	5.0	5.0	5.0	0.5
221	0.00022	8.0	12.0	6.0	5.0	5.0	0.5
271	0.00027	6.0	12.0	6.0	5.0	5.0	0.5
331	0.00033	6.0	12.0	5.0	5.0	5.0	0.5
471	0.00047	7.0	11.0	4.0	5.0	5.0	0.5
681	0.00068	7.0	11.0	4.0	5.0	5.0	0.5
102	0.0010	6.0	11.0	4.0	3.5	5.0	0.5
122	0.0012	6.0	11.0	4.0	3.5	5.0	0.5
152	0.0015	6.0	11.0	4.0	3.5	5.0	0.5
182	0.0018	6.0	11.0	4.0	3.5	5.0	0.5
222	0.0022	6.0	11.0	4.0	3.5	5.0	0.5
272	0.0027	6.0	11.0	4.0	3.5	5.0	0.5
332	0.0033	6.0	11.0	4.0	3.5	5.0	0.5
392	0.0039	6.0	11.0	4.0	3.5	5.0	0.5
472	0.0047	6.0	11.0	4.0	3.5	5.0	0.5
562	0.0056	6.0	11.0	4.0	3.5	5.0	0.5
682	0.0068	6.0	11.0	4.0	3.5	5.0	0.5
822	0.0082	6.0	12.0	4.0	3.5	5.0	0.5
103	0.010	6.5	12.0	4.0	3.5	5.0	0.5
123	0.012	6.5	12.0	4.0	3.5	5.0	0.5
153	0.015	6.5	13.0	5.0	5.0	5.0	0.5
183	0.018	7.0	13.0	5.0	5.0	5.0	0.5
223	0.022	7.0	13.0	5.0	5.5	5.0	0.5
243	0.024	7.0	13.0	5.0	5.5	5.0	0.5
273	0.027	8.0	13.5	5.0	5.5	5.0	0.5
333	0.033	8.0	13.5	5.0	5.5	5.0	0.5
393	0.039	8.0	13.5	5.0	5.5	5.0	0.5
473	0.047	9.0	13.5	6.5	5.5	5.0	0.5
563	0.056	10.0	13.5	6.5	7.0	5.0	0.5
683	0.068	10.0	12.5	6.5	7.0	5.0	0.5
823	0.082	11.0	14.0	6.5	7.0	5.0	0.5
104	0.1	11.0	13.5	6.5	7.0	5.0	0.5
124	0.12	11.0	13.5	6.5	7.0	5.0	0.5
154	0.15	11.0	13.5	6.5	7.5	5.0	0.5
224	0.22	12.0	14.0	7.0	7.5	5.0	0.5
Cap (uF) \ VDC		1000VDC					
		W	H	T	P	F	d
222	0.00220	8.0	14.0	5.0	5.0	5.0	0.5

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SPECIFICATION

METALLIZED POLYESTER FILM CAPACITOR

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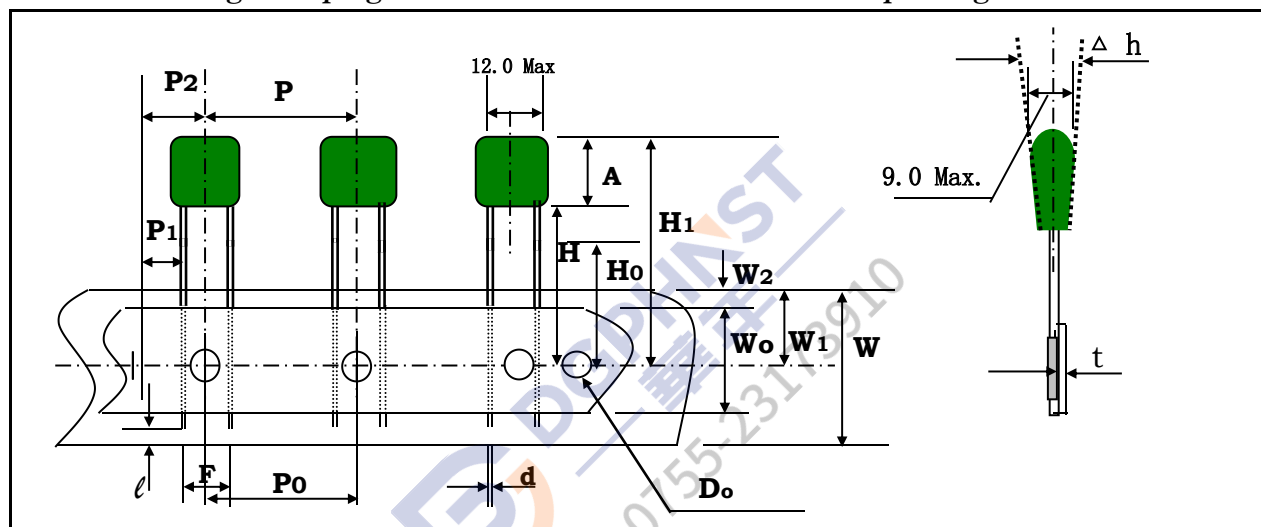
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12. PACKING METHOD

12.1 Forming & Taping Information for Automatic Insertion packing

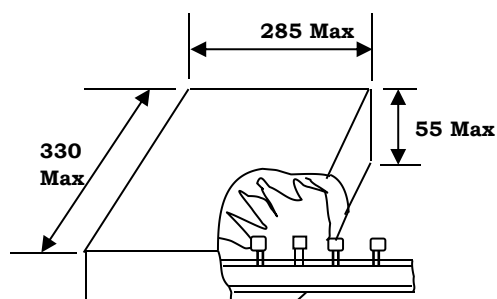


Symbol	A	d	F	P	Po	P1	P2	W	W _o	W ₁	W ₂
Value	12.5	0.5	7.0	12.7	12.7	3.85	6.35	18.0	6.0	9.0	0 ~ 3.0
Tolerance	Max	± 0.05	± 0.8	± 1.0	± 0.3	± 0.7	± 1.3	± 0.5	Min.	± 0.5	0

Symbol	H	H _o	H ₁	Do	l	Δh	t
Value	20.0	16.0	32.25	4.0	2.0	0	0.7
Tolerance	Max	± 0.5	Max	± 0.3	Max	± 2.0	± 2.0

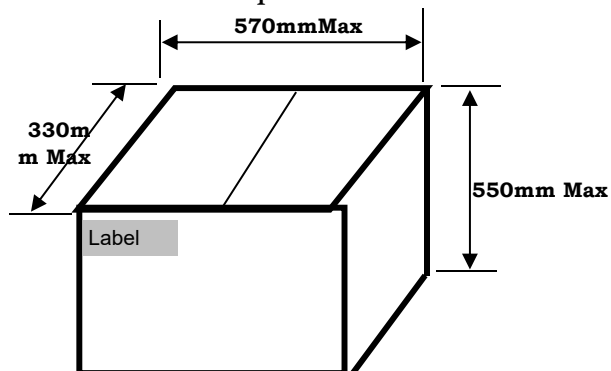
> Packed into Carton Box

A. Ammo Taping Inner Box



B. Carton Box

10 Inner Boxes are packed into 1 Carton Box



Marking on the surface :

1. Item
2. Capacitance Value
3. W.V.
4. Quantity
5. Lot No.
6. Part No.
7. Manufacturer Name

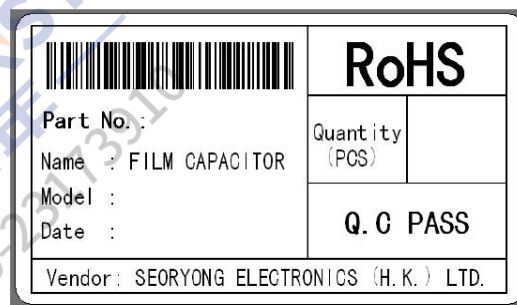
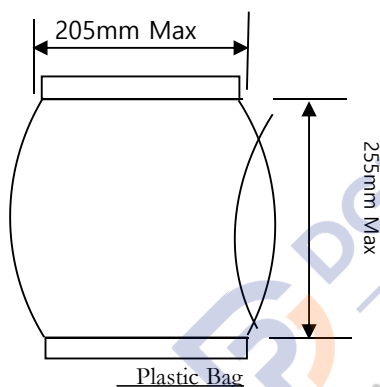
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13.2 Plastic Bag packing for Bulk

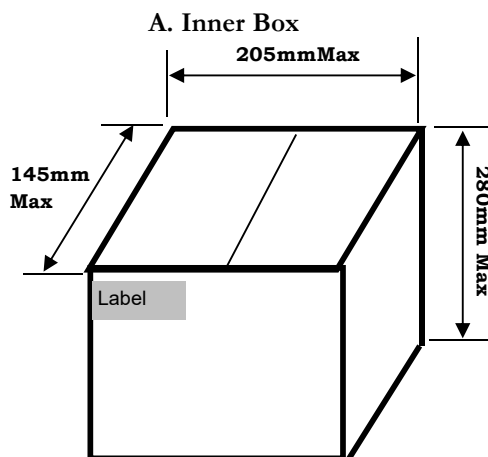
500pcs ~ 2000pcs are packed into plastic bag subject to the dimension of capacitor.

A label will be adhesive on each plastic bag which contains items, capacitance, tolerance, Withstand Voltage, Quantity and Lot no.

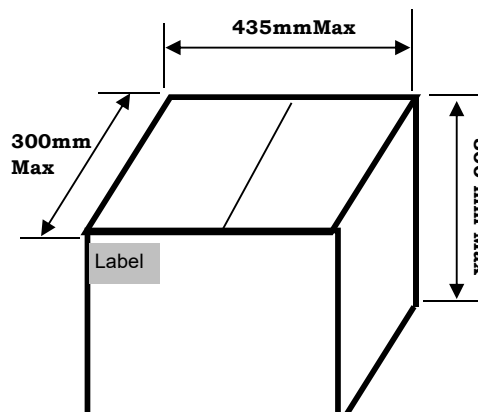


Label on plastic Bag

> Carton Box



B. Outer Box



4 Inner Boxes are packed into 1 Carton Box

Marking on the surface of the box :

1. Item
2. Capacitance Value
3. W.V.
4. Quantity
5. Lot No.
6. Part No.
7. Manufacturer Name

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13. Ordering Information

→ RATED VOLTAGE :

050	=	50 Vdc
100	=	100 Vdc
250	=	250 Vdc
400	=	400 Vdc

→ TOLERANCE :

J	: ± 5%
K	: ± 10%

→ CAPACITANCE VALUE :

102 : 1000pf

Capacitance value reading

101	100pF	0.0001uF	0.1nF
102	1000pF	0.001uF	1nF
103	10000pF	0.01uF	10nF
104	100000pF	0.1uF	100nF
105	1000000pF	1uF	1000nF

→ PACKING TYPE :

AM: Ammo Tapping
BS : Bulk Straight Lead

→ ITEM :

PEF : Polyester Film Capacitor (Mylar Cap.)

Example :

1. PEF BS 222 K 1000 : Polyester film Cap, Bulk Straight Lead, 0.0022uf, 10%,1000Vdc
2. PEF AM 222 K 1000 : Polyester film Cap, Ammo Tapping, 0.0022uf , 10%, 1000Vdc