



CL21(MEF)Type Metallized Polyester Film Capacitor

No.

STE-WI-008A-001

Date

2013-01-01

Ver.

V 3.0

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Product specifications

Product name: CL21 Type Film Capacitor

Specifications: Series

Parts origin: China Shantou



汕头高新区松田实业有限公司

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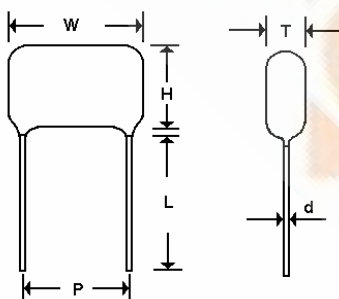
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1. Outline Drawing



2. Features

- ◆Metallized polyester film,non-inductive construction
- ◆Wide capacitance range,small size
- ◆Self-healing property, long life
- ◆Epoxy resin sealing

3. Typical applications

- ◆Suitable blocking, By-passing,and coupling
- ◆Widely used in filter and low pulse circuits

4. Specifications

No.	Item	Demand of performance	Methods of testing
1	Reference standard	GB7332 (IEC60384-2)	
2	Operating Temperature Range	-40~+85℃	
3	Rated Voltage	100VDC、250VDC、 400VDC、630VDC	
4	Capacitance Range	0.01μF -10μF 1KHz 1.0V	
5	Capacitance Tolerance	±5% (J) ±10% (K) 1KHz 1.0V	
6	Voltage Proof (V)	No failure Rated Voltage *1.6U _R	Charge current≤50mA Voltage time: 5S
7	Dissipation Factor (tg δ)	tgδ≤0.01 1KHz	Test conditions: 1KHz, 1.0Vrms、20℃
8	Insulation Resistance	C≤0.33μF ,IR>30000MΩ C>0.33μF ,IR≥10000S(MΩ/μF)	AT 100VDC 60SEC



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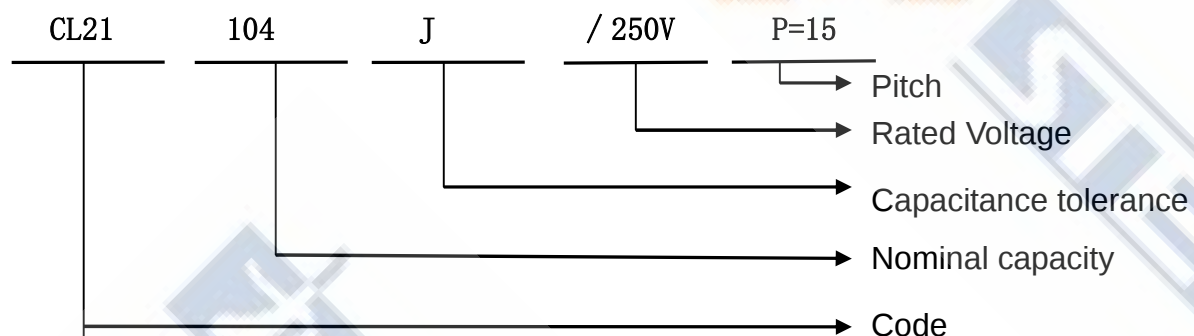
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5. Capacitor series code information

Example:



<1> Nominal capacity

Code	103	104	105	106
PF	10000PF	100000PF		
nF	10nF	100nF	1000nF	
μF	0.01μF	0.1μF	1μF	10μF

<2> Capacitance tolerance

Code	J	K
Capacitance tolerance	±5%	±10%

<3> Pitch

Code	P=10	P=15	P=22.5	P=27.5
Pitch (mm)	10 MM	15 MM	22.5 MM	27.5 MM



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6. Specifications Dimensions

序号	容量	额定电压: 63VDC/100VDC																							
		脚距 (P=7.5)				脚距 (P=10)				脚距 (P=15)				脚距 (P=20)				脚距 (P=22.5)				脚距 (P=27.5)			
		W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d
1	103	9.5	7.0	4.0	0.6																				
2	153	9.5	7.5	4.5	0.6																				
3	223	9.5	7.0	3.5	0.6																				
4	333	9.5	7.5	4.5	0.6																				
5	473	9.5	7.5	4.5	0.6																				
6	683	9.5	7.5	4.5	0.6																				
7	104	9.5	8.5	5.0	0.6	12.0	7.5	4.5	0.6																
8	154	9.5	8.5	4.5	0.6	12.0	7.5	4.5	0.6																
9	184	9.5	8.5	4.5	0.6	12.0	7.5	4.0	0.6																
10	224	9.5	7.5	4.5	0.6	12.0	7.5	4.5	0.6																
11	334	9.5	8.5	5.0	0.6	12.0	7.5	4.5	0.6																
12	474	9.5	9.0	5.0	0.6	12.0	8.0	4.5	0.6	17.0	9.0	5.0	0.8												
13	564	9.5	8.0	5.0	0.6	12.0	8.5	4.5	0.6	17.0	9.0	5.0	0.8												
14	684	9.5	9.0	5.0	0.6	12.0	9.0	5.0	0.6	17.0	10.0	5.5	0.8												
15	105	9.5	9.5	5.5	0.6	12.0	10.0	6.0	0.6	17.0	11.5	6.5	0.8												
16	125									17.0	10.5	5.5	0.8												
17	155									17.0	11.0	6.0	0.8	22.0	10.5	5.5	0.8								
18	225									18.0	13.0	8.0	0.8	22.0	11.0	6.0	0.8	24.0	10.5	6.0	0.8				
19	335									17.0	16.0	9.5	0.8	22.0	13.5	7.0	0.8	24.0	13.0	6.5	0.8	29.0	13.0	6.5	0.8
20	475													22.0	15.5	8.5	0.8	24.0	14.5	8.0	0.8	29.0	14.5	8.0	0.8
21	685													22.0	17.0	10.5	0.8	24.0	16.0	10.0	0.8	29.0	16.5	9.5	0.8
22	106																					29.0	17.0	10.5	0.8



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序号	容量	额定电压: 250VDC																							
		脚距 (P=7.5)				脚距 (P=10)				脚距 (P=15)				脚距 (P=20)				脚距 (P=22.5)				脚距 (P=27.5)			
		W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d
1	103	9.5	7.5	4.5	0.6	12.0	7.5	4.5	0.6																
2	153	9.5	8.0	5.0	0.6	12.0	7.0	4.0	0.6																
3	223	9.5	8.0	4.5	0.6	12.0	7.0	4.0	0.6																
4	273	9.5	8.0	4.5	0.6	12.0	7.0	4.0	0.6																
5	333	9.5	8.0	4.5	0.6	12.0	9.0	5.0	0.6																
6	393	9.5	8.0	4.5	0.6	12.0	7.0	4.0	0.6																
7	473	9.5	8.0	4.5	0.6	12.0	7.5	4.0	0.6																
8	563	9.5	7.5	4.5	0.6	12.0	7.5	4.0	0.6																
9	683	9.5	8.0	4.5	0.6	12.0	7.0	4.0	0.6																
10	823	9.5	8.0	4.5	0.6	12.0	7.5	4.5	0.6																
11	104	9.5	8.0	5.0	0.6	12.0	7.5	4.5	0.6																
12	154					12.0	8.5	4.5	0.6																
13	184					12.0	9.5	5.0	0.6																
14	224					12.0	10.0	5.5	0.6	17.0	10.0	5.5	0.8												
15	274					12.0	11.0	6.0	0.6	17.0	9.0	5.0	0.8												
16	334					12.0	13.0	6.0	0.6	17.0	9.0	5.0	0.8												
17	394									17.0	9.5	5.5	0.8												
18	474									17.0	10.5	5.5	0.8												
19	564									17.0	11.0	5.5	0.8												
20	684									17.0	11.5	6.5	0.8	22.0	10.5	5.5	0.8	24.0	10.0	5.5	0.8	29.0	12.0	5.5	0.8
21	824									17.0	13.0	6.5	0.8	22.0	11.0	6.0	0.8	24.0	10.5	6.0	0.8	29.0	12.5	6.0	0.8
22	105									17.0	14.0	7.5	0.8	22.0	12.0	6.5	0.8	24.0	12.5	6.0	0.8	29.0	13.5	6.5	0.8
23	125													22.0	13.0	7.0	0.8	24.0	13.0	6.5	0.8	29.0	12.5	5.5	0.8
24	155													22.0	14.0	7.5	0.8	24.0	14.5	7.0	0.8	29.0	13.0	6.0	0.8
25	185													22.0	15.0	8.5	0.8	24.0	15.5	7.5	0.8	29.0	13.5	7.0	0.8
26	205													22.0	16.0	8.0	0.8	24.0	16.0	8.0	0.8	29.0	14.0	7.0	0.8
27	225													22.0	16.0	9.5	0.8	24.0	16.0	8.0	0.8	29.0	15.5	7.0	0.8
28	255													22.0	16.5	10.0	0.8	24.0	16.5	8.5	0.8	29.0	15.0	8.0	0.8
29	305													22.0	18.5	10.5	0.8	24.0	18.0	10.0	0.8	29.0	17.0	8.5	0.8
30	335													22.0	19.0	11.0	0.8	24.0	18.5	10.5	0.8	29.0	17.0	9.0	0.8
31	475																	24.0	20.5	12.5	0.8	29.0	19.5	11.0	0.8
32	565																					29.0	22.0	12.0	0.8
33	685																					29.0	22.0	13.5	0.8



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		脚距 (P=7.5)				脚距 (P=10)				脚距 (P=15)				脚距 (P=20)				脚距 (P=22.5)				脚距 (P=27.5)			
		W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d
1	103	9.5	7.5	4.5	0.6	12.0	7.5	4.5	0.6																
2	153	9.5	8.0	5.0	0.6	12.0	7.0	4.0	0.6																
3	183	9.5	7.5	4.5	0.6	12.0	7.0	4.0	0.6																
4	223	9.5	8.0	4.5	0.6	12.0	7.0	4.0	0.6																
5	333	9.5	7.0	4.5	0.6	12.0	9.0	5.0	0.6																
6	473	9.5	8.0	4.5	0.6	12.0	7.5	4.5	0.6	17.0	10.5	6.5	0.8												
7	683	9.5	8.0	5.0	0.6	12.0	8.0	5.0	0.6	17.0	8.0	5.0	0.8												
8	823	9.5	8.5	5.0	0.6	12.0	9.5	5.0	0.6	17.0	9.0	5.0	0.8												
9	104	9.5	9.0	5.5	0.6	12.0	9.5	5.0	0.6	17.0	10.0	5.0	0.8												
10	154					12.0	10.5	6.5	0.6	17.0	8.5	4.5	0.8												
11	224					12.0	12.0	7.5	0.6	17.0	10.0	5.5	0.8												
12	334					12.0	10.5	5.5	0.6	17.0	11.0	6.0	0.8	22.0	10.0	5.5	0.8	24.0	10.0	5.0	0.8				
13	394									17.0	13.0	6.0	0.8	22.0	10.0	5.5	0.8	24.0	10.0	5.0	0.8				
14	474									17.0	14.0	7.5	0.8	22.0	12.0	6.5	0.8	24.0	10.5	5.5	0.8				
15	684									17.0	15.5	8.5	0.8	22.0	14.0	7.5	0.8	24.0	13.0	6.0	0.8	29.0	11.5	6.0	0.8
16	824									17.0	15.5	9.0	0.8	22.0	14.5	7.5	0.8	24.0	14.0	7.5	0.8	29.0	12.0	7.0	0.8
17	105									17.0	16.5	11.5	0.8	22.0	15.5	8.5	0.8	24.0	15.0	8.0	0.8	29.0	13.5	6.5	0.8
18	125													22.0	17.0	9.0	0.8	24.0	15.5	9.0	0.8	29.0	14.0	7.5	0.8
19	155													22.0	17.0	10.0	0.8	24.0	16.0	9.5	0.8	29.0	15.5	8.5	0.8
20	185													22.0	18.0	11.5	0.8	24.0	17.5	11.0	0.8	29.0	16.5	9.0	0.8
21	205													22.0	18.5	12.0	0.8	24.0	18.0	11.5	0.8	29.0	17.5	9.5	0.8
22	225													22.0	19.5	13.0	0.8	24.0	20.5	12.0	0.8	29.0	18.0	10.0	0.8
23	255																					29.0	19.5	10.0	0.8
24	335																					29.0	20.5	11.5	0.8
25	395																					29.0	22.5	13.5	0.8
26	475																					29.0	24.5	15.5	0.8
27	475 (P=30)																					33.0	22.0	12.0	0.8



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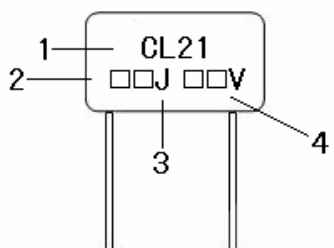
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序号	容量	额定电压: 630VDC																							
		脚距 (P=7.5)				脚距 (P=10)				脚距 (P=15)				脚距 (P=20)				脚距 (P=22.5)				脚距 (P=27.5)			
		W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d	W	H	T	d
1	102	9.5	7.0	4.0	0.6																				
2	152	9.5	7.0	4.0	0.6																				
3	222	9.5	7.5	4.5	0.6																				
4	332	9.5	8.5	5.0	0.6																				
5	472	9.5	9.0	5.0	0.6																				
6	562	9.5	9.0	5.0	0.6																				
7	682	9.5	9.5	5.5	0.6																				
8	103	9.5	7.0	4.0	0.6	12.0	7.5	4.5	0.6																
9	153	9.5	8.0	5.0	0.6	12.0	8.5	5.0	0.6																
10	223	9.5	8.0	4.5	0.6	12.0	7.0	4.0	0.6																
11	333	9.5	9.0	4.5	0.6	12.0	8.5	5.0	0.6	17.0	8.0	5.0	0.8												
12	473					12.0	8.5	5.5	0.6	17.0	9.5	5.0	0.8												
13	563					12.0	10.0	5.5	0.6	17.0	10.5	5.5	0.8												
14	683					12.0	10.0	7.0	0.6	17.0	9.0	5.5	0.8												
15	823					12.0	10.5	7.5	0.6	17.0	10.5	5.5	0.8												
16	104					12.0	11.5	8.0	0.6	17.0	10.5	5.5	0.8												
17	154									17.0	11.0	6.0	0.8												
18	224									17.0	12.5	7.5	0.8	22.0	11.0	6.0	0.8								
19	334									17.0	15.0	8.5	0.8	22.0	13.0	7.0	0.8	24.0	12.5	6.5	0.8				
20	474									17.0	16.5	10.0	0.8	22.0	15.0	8.0	0.8	24.0	14.0	7.5	0.8	29.0	13.0	6.5	0.8
21	564													22.0	15.0	9.0	0.8	24.0	14.5	8.0	0.8	29.0	14.0	7.5	0.8
22	684													22.0	16.5	10.0	0.8	24.0	15.5	9.5	0.8	29.0	14.5	8.0	0.8
23	824													22.0	17.5	11.5	0.8	24.0	16.5	10.0	0.8	29.0	16.5	8.5	0.8
24	105													22.0	19.5	11.5	0.8	24.0	18.0	11.5	0.8	29.0	20.0	10.0	0.8
25	155																	24.0	21.0	14.5	0.8	29.0	19.0	12.5	0.8
26	205																					29.0	24.0	13.5	0.8
27	225																					29.0	24.5	14.0	0.8

Note: Dimension Tolerance: P≤10 (W、H、T、) ±1; P≥15 (W、H、T、) ±1.5; d±0.05 ,L:20 min (Unit: mm)

7. Marking

Example	Explain	
	1	CL21: Series code
	2	□□: Nominal capacity
	3	J: Capacitance tolerance
	4	□□V: Rated Voltage

8. Test Method And Performance

No.	Item	Demand of performance		Methods of testing
1	Lead strength Test	Tensile Strength	Pin and capacitance ontology was found no damage	① Lead wire diameter ≤ 0.5 mm, tensile strength $\geq 0.5\text{kg}/10\text{S}$; ② Lead wire diameter $> 0.5\text{mm}$, $\leq 0.8\text{mm}$, tensile strength $\geq 1.0\text{kg}/10\text{S}$; ③ Lead wire diameter $> 0.8\text{mm}$, tensile strength $\geq 2.0\text{kg}/20\text{S}$.
		Bending Strength	Pin and capacitance ontology was found no damage	Bending strength: 0.5 kg (5N) Bending time: both sides continuous bending 4 times, each time bending 90° .
2	Welding heat resistance test	① Appearance: No visible damage ② Flag is clear ③ Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ of the initial value ④ $\text{tg}\delta \leq 0.003$		Soldering Temperature: $260 \pm 5^\circ\text{C}$ Soldering Time: $5 \pm 1\text{SEC}$
3	Solder ability Test	① About 95% of the wire covered with tin ② Flag is clear ③ Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ of the initial value ④ $\text{tg}\delta \leq 0.003$		Soldering Temperature: $235 \pm 5^\circ\text{C}$ Soldering Time: $2 \pm 0.5\text{SEC}$ Solder composition: Sn 97.5% + Ag 2% + Cu 0.5%



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No.	Item	Demand of performance	Methods of testing
4	Vibration Test	① Appearance: No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③tg δ : $C \leq 1\mu F$, ≤ 0.003 Added value $C > 1\mu F$, ≤ 0.002 Added value ④IR: $\geq 50\%$ of the initial value	Testing frequency: 10-55Hz, 10-500Hz, 10-2000Hz Amplitude: 0.75mm Maximum acceleration: 98m/S ² Duration:6 hours
5	Dry and heat Test	① Appearance: No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③tg δ : $C \leq 1\mu F$, ≤ 0.003 Added value $C > 1\mu F$, ≤ 0.002 Added value ④IR: $\geq 50\%$ of the initial value	Testing temperature: 85 $\pm 2^{\circ}\text{C}$ Testing time: 1 hours
6	Cold Test	① Appearance: No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③tg δ : $C \leq 1\mu F$, ≤ 0.003 Added value $C > 1\mu F$, ≤ 0.002 Added value ④IR: $\geq 50\%$ of the initial value	Testing temperature: -40 $\pm 2^{\circ}\text{C}$ Testing time: 1 hours
7	Temperature change quickly test	① Appearance: No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③tg δ : $C \leq 1\mu F$, ≤ 0.003 Added value $C > 1\mu F$, ≤ 0.002 Added value ④IR: $\geq 50\%$ of the initial value	temperature cycling test: In the -40 $^{\circ}\text{C}$ conditions-keep 30 min, again in +85 $^{\circ}\text{C}$ conditions keep 30 min, this is a cycle. The above conditions process cycle 5 times.
8	Steady-state wet-hot tests	① Appearance: No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 1\%$ ③tg δ : $C \leq 1\mu F$, ≤ 0.001 Added value $C > 1\mu F$, ≤ 0.003 Added value ④IR: $\geq 50\%$ of the initial value ⑤Testing withstand voltage vent voltage without any breakdown.	Testing temperature: 40 $\pm 2^{\circ}\text{C}$ Relative humidity: 90-95% Testing time: 5 hours
9	Endurance Test	① Appearance: No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③tg δ : $C \leq 1\mu F$, ≤ 0.005 Added value $C > 1\mu F$, ≤ 0.003 Added value ④IR: $\geq 50\%$ of the initial value	Testing temperature: 85 $\pm 3^{\circ}\text{C}$ Testing time: 1000 hours Testing Voltage: Rated Voltage*1.25VDC 1 Ω Lines should be added - varistor, varistor for each volt applied voltage is 1 Ω



CL21(MEF)Type Metallized Polyester Film Capacitor

No.

STE-WI-008A-001

Date

2013-01-01

Ver.

V 3.0

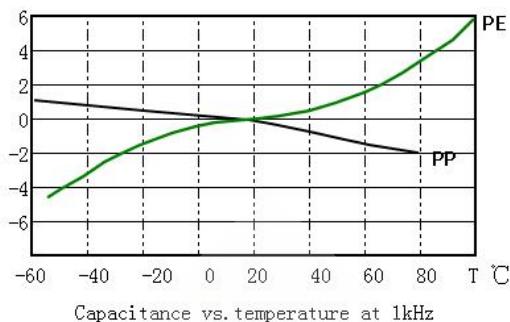
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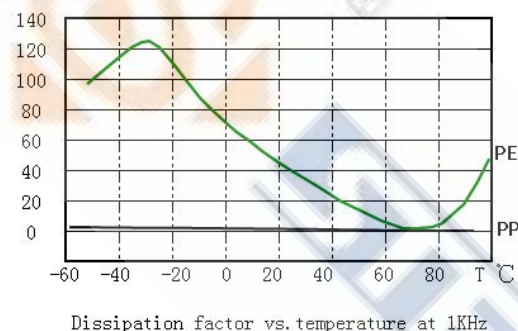
9. Film capacitor characteristics typical curve

Temperature Characteristics

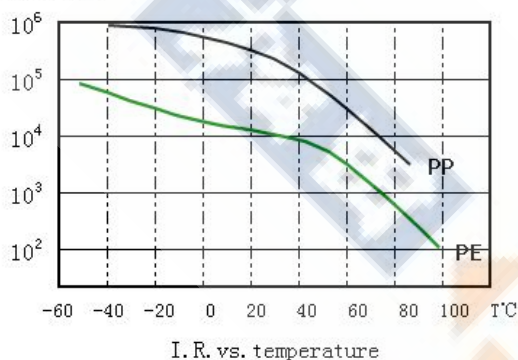
$\Delta C/C$ (%)



$\text{tg } \delta (\times 10^{-4})$



I. R (MΩ)

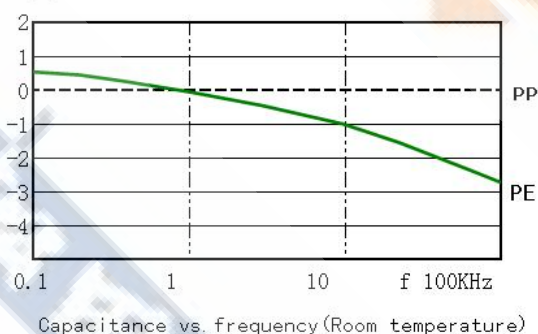


PE: 聚酯薄膜 (Polyester Film)

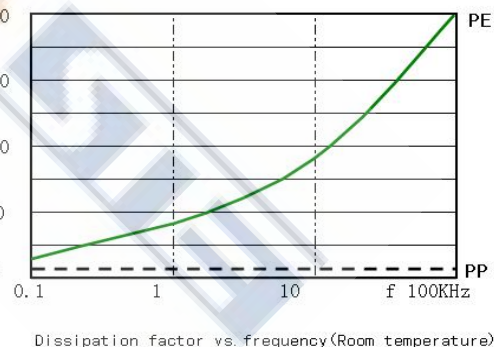
PP: 聚丙烯薄膜 (Polypropylene Film)

Frequency Characteristics

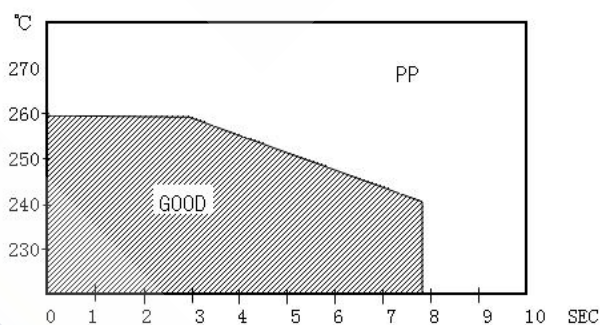
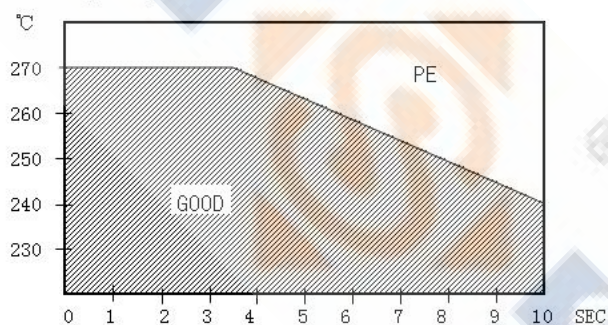
$\Delta C/C$ (%)



$\text{tg } \delta (\times 10^{-4})$



Soldering Temperature VS Time



Note: film capacitor is not suitable for reflow soldering welding, otherwise the product due to thermal contraction lead to performance problems



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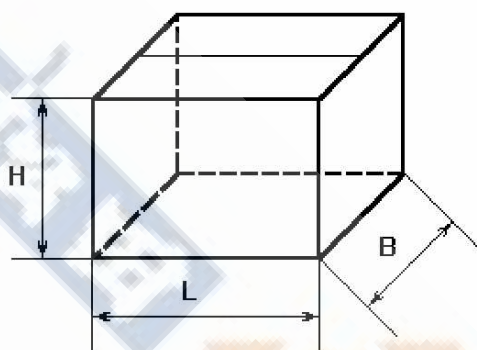
10 Package transports

10.1 capacitors with plastic bags before packing, each bag is an exact multiple of 100, bags were placed within the product label, and then loaded into the packaging cartons.

10.2 transport packaging carton in any way, but you should avoid direct rain and snow shower water and mechanical damage

10.3 sketch of packaging carton:

L: 48cm B: 32cm H: 32cm



11. Storage conditions

11.1 It must be noted that the solder ability of the terminals may be deteriorated when stored in an atmosphere filled with moisture, dust or a reactive oxidizing gas.(hydrogen chloride, hydrogen sulfide, sulfuric acid, etc.)

11.2 It shouldn't be located in particularly high temperature and high humidity, it must submit to the following conditions (under the unchanging primal package):

A、 Temperature: $20 \pm 5^{\circ}\text{C}$

B、 Humidity: $65 \pm 5\% \text{RH}$

C、 Storage time: (from the date marked on the capacitor's body or the label glued to the package)

Bulk: ≤ 24 months

Taping: ≤ 12 months



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12. Environmental management control material

NO.	Types of hazardous substances	The name of the hazardous substances	Limited level
1	Heavy metals	Cadmium (Cd)/Cadmium Compounds	<100ppm
		Lead (Pb)/Lead Compounds	<1000ppm
		Mercury (Hg)/Mercury Compounds	<1000ppm
		Hexavalent-Chromium (Cr^{6+}) Compounds	<1000ppm
2	Organic bromide	PBBs	<1000ppm
		PBDEs	<1000ppm

13. Test Report

(ROHS report see attachment)