

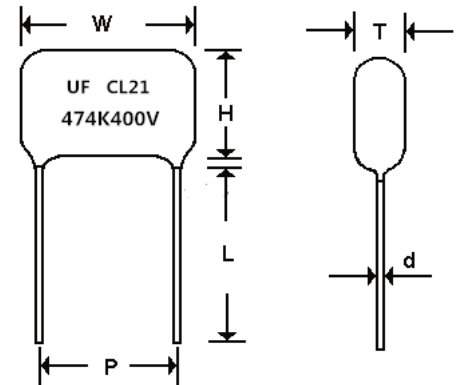
CL21 (MEF) Type Metallized Polyester Film Capacitor

1. Features

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

2. Typical applications

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



L = 18mm min

Drawing of CL21 Series

3. Specifications

No	tem	Demand of performance	Methods of testing
1	Reference standard	GB7332 (IEC60384-2)	
2	Operating Temperature Range	-40~+85°C	
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; Standard tol. : +/-10%	
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°C
8	Insulation Resistance	C ≤0.33μF ,IR >30000MΩ C >0.33μF ,IR ≥10000S(MΩ/μF)	AT 100VDC 60SEC

4. How to order:

<u>CL21</u>	<u>F</u>	<u>104</u>	<u>K</u>	<u>0250</u>	<u>0100</u>	<u>B</u>	<u>000</u>
Type	Material Code	Capacitance Code	Tolerance	Rated Voltage	Size Code	Package Code	Suffix Indicate Special Requirement
CL21	F: Plastic Film Cap For CL21	pF Code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow) 105 = 1uF 104 = 0.1uF 103 = 0.01uF	J: +/-5% K: +/-10%	For DC Voltage 0100: 100VDC 0250: 250VDC 0400: 400VDC 0630: 630VDC	Code for Pitch Size 0100: pitch size 10mm 0150: pitch size 15mm 0200: pitch size 20mm 0225: pitch size 22.5mm 0275: pitch size 27.5mm	B: Bulk A: Ammo Taped	000: Indicating Standard If for cut leads or long leads: 000: mean standard LL 035: cut leads to 3.5mm 040: cut leads to 4mm 250: 25mm long leads



5. CL21 Series Capacitors Dimensions (Table 1)

Unit: mm

VDC		100V					250V					400V					630V					
uF	Code	P	Wmax	Tmax	Hmax	d	P	Wmax	Tmax	Hmax	d	P	Wmax	Tmax	Hmax	d	P	Wmax	Tmax	Hmax	d	
0.01	103	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	
0.015	153	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	
0.018	183	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	11.0	0.6	10	13.0	6.0	11.0	0.6	
0.022	223	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	7.0	11.0	0.6	10	13.0	7.0	11.0	0.6	
													15	18.0	6.0	9.0	0.8					
0.027	273	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	
0.033	333											10	13.0	6.0	10.0	0.6	10	13.0	6.0	10.0	0.6	
		10	13.0	6.0	10.0	0.6	10	13.0	6.0	10.0	0.6						15	18.0	6.0	10.0	0.8	
0.039	393																15	18.0	7.0	11.0	0.8	
		10	13.0	6.0	10.0	0.6	10	13.0	7.0	10.0	0.6	10	13.0	6.0	10.0	0.6	10	13.0	6.0	10.0	0.6	
0.047	473											15	18.0	7.0	11.0	0.8	10	13.0	7.0	10.5	0.6	
		10	13.0	7.0	10.5	0.6	10	13.0	7.0	10.5	0.6	10	13.0	7.0	10.5	0.6	15	18.0	7.0	10.5	0.8	
0.056	563																10	13.0	8.0	11.0	0.6	
																	15	18.0	6.0	9.0	0.8	
		10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6	10	13.0	6.0	9.0	0.6						
0.068	683																10	13.0	8.0	12.0	0.6	
		10	13.0	6.5	10.0	0.6	10	13.0	6.5	10.0	0.6	10	13.0	6.5	10.0	0.6	15	18.0	6.0	10.0	0.8	
0.082	823	10	13.0	7.0	10.0	0.6	10	13.0	7.0	10.0	0.6	10	13.0	7.0	10.0	0.6	10	13.0	7.5	12.0	0.6	
0.1	104																10	13.0	8.0	13.0	0.6	
													10	13.0	7.0	11.0	0.6	15	18.0	6.5	12.0	0.8
		10	13.0	7.0	10.0	0.6	10	13.0	7.0	10.0	0.6	15	18.0	6.5	12.0	0.8	20	23.0	8.0	13.0	0.8	
0.15	154											15	18.0	6.0	10.0	0.8						
		10	13.0	7.0	10.0	0.6	10	13.0	7.0	10.0	0.6	10	13.0	7.5	12.0	0.6	15	18.0	8.0	13.5	0.8	
0.18	184											22.5	25.0	6.0	11.5	0.8	15	18.0	8.5	13.5	0.8	
		10	13.0	7.0	10.0	0.6	10	13.0	7.0	11.0	0.6	15	18.0	7.0	11.5	0.8	22.5	25.0	7.0	12.0	0.8	
0.22	224											20	23.0	6.0	10.0	0.8	22.5	25.0	7.0	12.5	0.8	
													10	13.0	9.0	13.5	0.6	15	18.0	9.5	14.5	0.8
		10	13.0	7.0	11.0	0.6	15	18.0	7.0	11.5	0.8	15	18.0	7.0	11.5	0.8	20	23.0	8.0	13.0	0.8	
0.27	274	10	13.0	7.0	11.0	0.6																
		15	18.0	6.0	10.0	0.8	15	18.0	6.0	10.0	0.8	15	18.0	7.0	12.5	0.8	20	23.0	8.0	14.0	0.8	
0.33	334											15	18.0	8.0	13.0	0.8	27.5	31.0	7.5	13.0	0.8	
		10	13.0	7.0	11.0	0.6	10	13.0	13.5	7.5	0.6	20	23.0	7.0	12.0	0.8	22.5	25.0	8.5	14.0	0.8	
		15	18.0	6.0	11.0	0.8	15	18.0	6.0	11.0	0.8	22.5	25.0	6.0	10.5	0.8	20	23.0	9.0	14.0	0.8	
0.39	394	10	13.0	8.0	12.0	0.6											27.5	31.0	7.5	14.0	0.8	
		15	18.0	7.0	11.0	0.8	15	18.0	7.0	11.0	0.8	15	18.0	8.0	14.0	0.8	20	23.0	9.0	15.5	0.8	

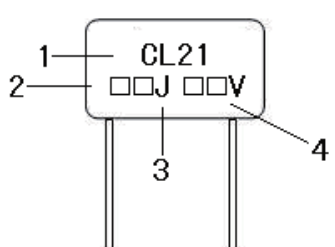


5. CL21 Series Capacitors Dimensions (Table 2)

Unit: mm

VDC		100V					250V					400V					630V					
uF	Code	P	Wmax	Tmax	Hmax	d	P	Wmax	Tmax	Hmax	d	P	Wmax	Tmax	Hmax	d	P	Wmax	Tmax	Hmax	d	
0.47	474											15	18.0	9.0	15.0	0.8						
		10	13.0	7.0	13.0	0.6						20	23.0	7.0	14.0	0.8	20	23.0	10.0	17.0	0.8	
		15	18.0	7.0	12.0	0.8	15	18.0	7.0	12.0	0.8	22.5	25.0	7.0	14.0	0.8	22.5	25.0	9.0	16.0	0.8	
																		27.5	31.0	8.0	15.5	0.8
0.5	504	15	18.0	6.0	11.0	0.8	15	18.0	7.5	12.5	0.8	15	18.0	8.5	15.0	0.8	20	23.0	10.5	17.5	0.8	
0.56	564											15	18.0	9.0	16.0	0.8	20	23.0	11.0	18.0	0.8	
		10	13.0	7.0	12.0	0.6						20	23.0	8.0	15.0	0.8	22.5	25.0	10.5	17.0	0.8	
		15	18.0	7.0	12.0	0.8	15	18.0	8.0	13.0	0.8	22.5	25.0	8.0	13.5	0.8						
0.68	684											20	23.0	8.0	15.0	0.8						
												15	18.0	11.0	16.0	0.8						
		10	13.0	7.0	12.0	0.6						22.5	25.0	8.0	15.0	0.8	20	23.0	12.0	19.0	0.8	
		15	18.0	7.0	12.5	0.8	15	18.0	9.0	14.0	0.8	27.5	31.0	7.0	14.0	0.8						
0.82	824											22.5	25.0	8.5	16.0	0.8						
		15	18.0	7.5	13.0	0.8	15	18.0	9.0	15.0	0.8	20	23.0	9.0	16.0	0.8	27.5	31.0	10.0	19.0	0.8	
1	105											20	23.0	10.0	16.5	0.8						
												22.5	25.0	10.0	16.0	0.8						
								15	18.0	10.0	16.0	0.8						27.5	31.0	11.5	20.0	0.8
		15	18.0	8.0	13.0	0.8	20	23.0	8.0	15.0	0.8	27.5	31.0	8.5	15.0	0.8						
1.2	125	15	18.0	9.5	14.5	0.8	15	18.0	11.0	16.0	0.8	27.5	31.0	9.0	15.5	0.8						
		20	23.0	8.0	13.0	0.8	20	23.0	9.0	16.0	0.8	20	23.0	11.0	18.0	0.8	27.5	31.0	12.0	21.0	0.8	
1.5	155	15	18.0	10.0	15.0	0.8						22.5	25.0	12.0	19.0	0.8						
		20	23.0	8.0	14.5	0.8	20	23.0	10.0	16.5	0.8											
							22.5	25.0	9.0	16.0	0.8	27.5	31.0	10.0	17.0	0.8	27.5	31.0	13.5	23.0	0.8	
1.8	185											22.5	25.0	12.0	20.5	0.8						
		20	23.0	8.0	17.0	0.8	20	23.0	11.0	17.5	0.8	27.5	31.0	10.0	18.5	0.8						
2	205						22.5	25.0	11.0	17.5	0.8	27.5	31.0	12.0	18.5	0.8						
		20	23.0	8.5	17.0	0.8	27.5	31.0	10.0	16.5	0.8											
2.2	225						20	23.0	12.0	18.5	0.8	27.5	31.0	12.0	21.0	0.8						
							22.5	25.0	11.5	18.0	0.8											
		20	23.0	10.0	17.0	0.8	27.5	31.0	10.0	17.0	0.8											
2.5	255	20	23.0	10.0	17.0	0.8	27.5	31.0	10.0	18.5	0.8	27.5	31.0	12.5	21.0	0.8						
2.7	275						20	23.0	13.0	19.5	0.8											
		20	23.0	10.0	18.0	0.8	27.5	31.0	11.0	18.0	0.8	27.5	31.0	13.0	21.0	0.8						
2.9	295	20	23.0	10.5	18.5	0.8																
3	305						27.5	31.0	12.0	18.5	0.8											
3.3	335	20	23.0	11.0	19.0	0.8	27.5	31.0	12.0	20.0	0.8											
4.5	455	22.5	25.0	12.0	20.0	0.8																
		27.5	31.0	11.0	19.0	0.8	27.5	31.0	13.5	21.5	0.8											

6. Marking of Polyester Capacitor

Example	Explanation	
	1	CL21: Series code
	2	□□: Capacitance Code
	3	J: Capacitance Tolerance
	4	□□V: Rated Voltage

7. 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 °C.
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%
4	Vibration Test	① Appearance : No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③ $\text{tg}\delta$: $C \leq 1\mu\text{F}$, ≤ 0.003 Added value $C > 1\mu\text{F}$, ≤ 0.002 Added value ④ IR: $\geq 50\%$ of the initial value		Testing frequency: 10-55Hz, 10-500Hz, 10-2000Hz Amplitude: 0.75mm Maximum acceleration: $98\text{m}/\text{S}^2$ Duration: 6 hours

No.	Item	Demand of performance	Methods of testing
5	Dry and heat Test	① Appearance : No visible damage ② Change rate of capacitance(1KHz) $\Delta C/C \leq 5\%$ ③tg δ : $C \leq 1\mu F, \leq 0.003$ Added value $C > 1\mu F, \leq 0.002$ Added value ④IR: $\geq 50\%$ of the initial value	Testing temperature: $85 \pm 2^\circ C$ 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 : $C \leq 1\mu F, \leq 0.003$ Added value $C > 1\mu F, \leq 0.002$ Added value ④IR: $\geq 50\%$ of the initial value	Testing temperature: $-40 \pm 2^\circ C$ 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 : $C \leq 1\mu F, \leq 0.003$ Added value $C > 1\mu F, \leq 0.002$ Added value ④IR: $\geq 50\%$ of the initial value	temperature cycling test: In the $-40^\circ C$ conditions-keep 30 min, again in $+85^\circ C$ 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 : $C \leq 1\mu F, \leq 0.001$ Added value $C > 1\mu F, \leq 0.003$ Added value ④IR: $\geq 50\%$ of the initial value ⑤Testing withstand voltage vent voltage without any breakdown.	Testing temperature: $40 \pm 2^\circ C$ 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 : $C \leq 1\mu F, \leq 0.005$ Added value $C > 1\mu F, \leq 0.003$ Added value ④IR: $\geq 50\%$ of the initial value	Testing temperature: $85 \pm 3^\circ C$ Testing time: 1000 hours Testing Voltage : Rated Voltage*1.25VDC 1Ω Lines should be added - varistor, varistor for each volt applied voltage is 1Ω

8

. Storage conditions

8.1 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.)

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

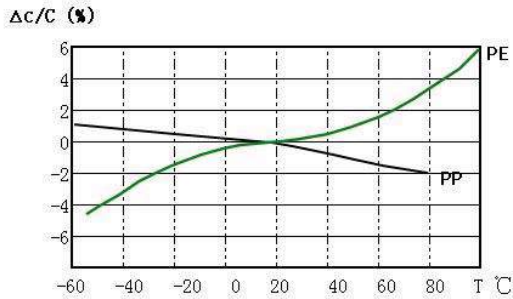
A、Temperature: $20 \pm 5^\circ C$ B、Humidity: $65 \pm 5\% RH$

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

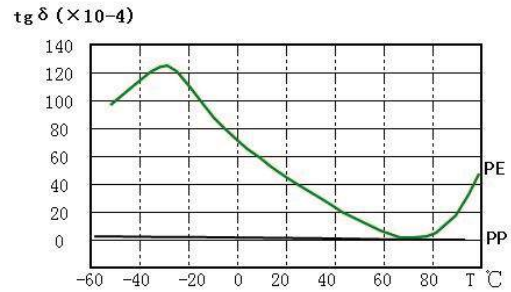
Bulk: ≤ 24 months Taping: ≤ 12 months

9. Film capacitor characteristics typical curve

Temperature Characteristics

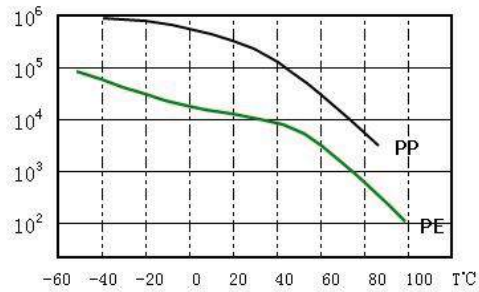


Capacitance vs.temperature at 1KHz



Dissipation factor vs.temperature at 1KHz

I. R (MΩ)

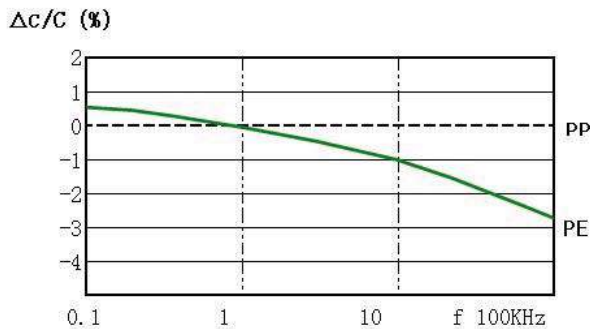


I.R.vs.temperature

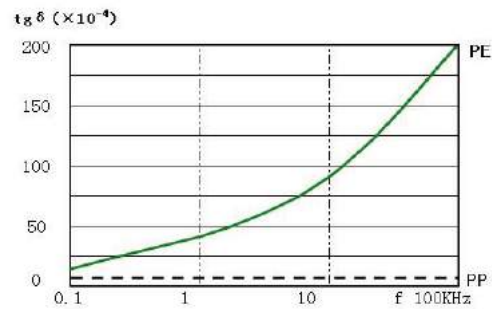
PE: Polyester Film

PP: Polypropylene Film

Frequency Characteristics

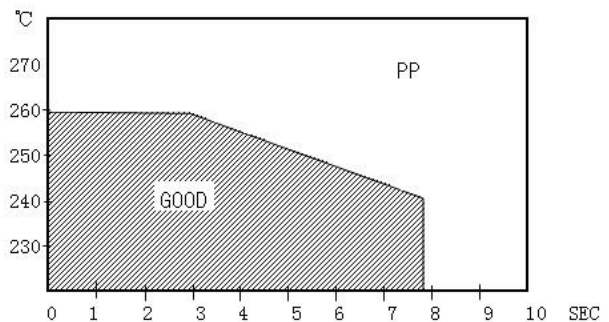
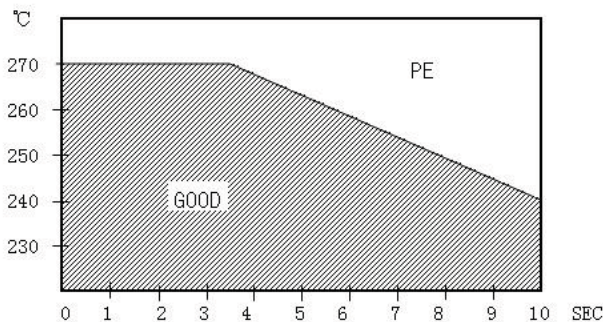


Capacitance vs.frequency (Room temperature)



Dissipation factor vs. frequency (Room Temperature)

Soldering temperature vs time



Important Note: CL21 metallized polyester capacitors is not suitable for reflow soldering welding.