



SPECIFICATIONS FOR APPROVAL

CUSTOMER

Ropla Elektronik Sp. z o.o.

ITEM

CL21X Metallized Polyester Film Capacitor

CUSTOMER'S PART NO.

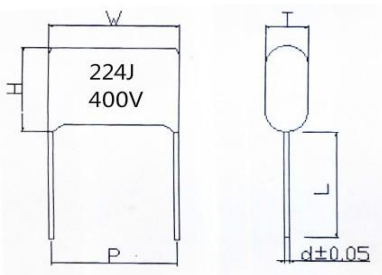
ME224J400DP10-003

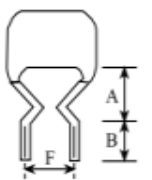
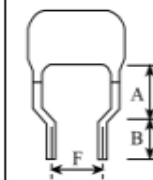
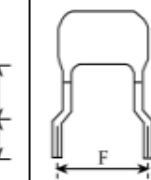
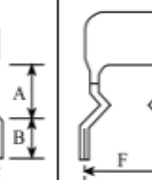
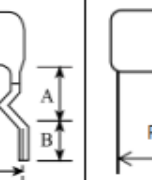
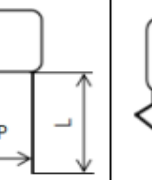
- ◆ If your requirement is special please contact us, we will test products as per your requirement

	Department: Engineering Department	
Metallized polyester film DC fixed capacitors	Prepared by:	Date: 2022/4/25
	Audit :	Version: A/1

(mm)

	CAP (uF)	R. V (VDC)	DF (1KHZ) ≅ %	TOL ±%	W	H	T	P	L	φd±	
					(max)	(max)	(max)	(±0.8)	(±0.7)	0.05	
ME224J400DP10-003	0.22	400V	0.8	5	12.5	11.5	4.5	10	4.5	0.6	V



Code	I	II	III	IV	V	X
Forming shapes						
Applicable range	$P \geq F$		$P \leq F$		P	$P = F$
	$0\text{mm} \leq P - F$ $\leq 3\text{mm}$	$3\text{mm} \leq P - F$ $\leq 8\text{mm}$	$3\text{mm} \leq F - P$ $\leq 5\text{mm}$	$0\text{mm} \leq F - P$ $\leq 3\text{mm}$		
<u>Dimension standard</u>	$A \leq 5.0\text{mm}; B \pm 0.5\text{mm}; F \pm 1.0\text{mm}$					
	$A \leq 5.0\text{mm}; B$ allow deviation $\pm 0.5\text{mm}; F$ allow deviation $\pm 1.0\text{mm};$					

1、 Range

This regulation applies to CL21X metallized polyester film capacitors.

2、 Features

- 2.1) Non-inductive winding structure for metallized polyester film.
- 2.2) Flame retardant epoxy powder encapsulation, good insulation performance.
- 2.3) Small size and light weight.
- 2.4) With self-healing function, wide capacity range and high reliability.

3、 General technical data

- 3.1) Reference Standard: GB/T 7332 (IEC60384-2)
- 3.2) Climate Type: 55/110/56
- 3.3) Rated Voltage: 50/63/100V、 250V、 400V、 630V (When the temperature exceeds 85°C but is lower than 110°C, the rated voltage decreases by 1.25%UR/°C)
- 3.4) Capacity range: 0.001μF---10μF
- 3.5) Capacitance Tolerance: J(±5%)、 K (±10%) 、 M (±20%)
- 3.6) Proof Voltage: 1.6U_R (5S)
- 3.7) Insulation Resistance:
 - U>100V C≤0.33uF ≥15000MΩ(20°C、 100V、 1min)
 - C>0.33uF ≥7500S(20°C、 100V、 1min)
 - U≤100V C≤0.33uF ≥3000MΩ(20°C、 10V、 1min)
 - C>0.33uF ≥1000S(20°C、 10V、 1min)
- 3.8) Loss Tangent: DF ≤0.8 %(20°C、 1KHz); ≤1.5%(20°C、 10KHz)

4、 Materials

4.1) Medium: polyethylene terephthalate film (polyester film)

4.2) Electrode: Aluminized

4.3) Lead wire: Tinned copper clad steel wire

4.4) Encapsulation: Powder epoxy encapsulation

5、 Mark

5.1) The voltage and nominal capacitance and capacitance tolerance to be print on the capacitor.

5.2) Capacitance Representation Method:

PF	100	1000	10000	100000	1000000
NF	0.1	1.0	10.0	100.0	1000.0
μF	0.0001	0.001	0.01	0.1	1.0
代码	101	102	103	104	105

6、 Purpose:

Widely used in communication equipment, tape recorders, TV sets, VCDs and DC or pulsating electrical appliances of various electronic equipment.

7. Characteristic

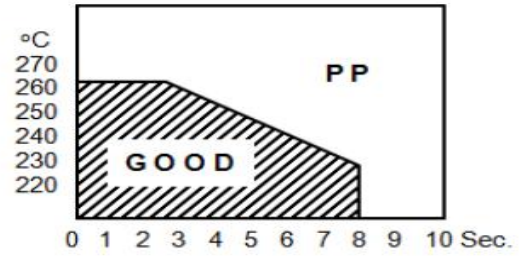
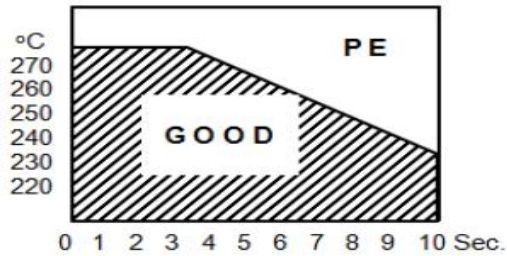
No.	Item	Test Condition	Requirement						
1	Capacitance Tolerance	Frequency: 1KHZ \pm 0.1KHZ Measuring voltage: \leq 1Vrms	\pm 5% (J) \pm 10% (K)						
2	Loss Tangent	Frequency: 1KHZ \pm 0.1KHZ Measuring voltage: \leq 1Vrms	\leq 0.8%						
3	Insulation Resistance	Test Voltage: $U_R > 100VDC$ was test with 100VDC, $U_R \leq 100VDC$ was test with 10VDC Temperature: 20°C \pm 15°C duration: 60 \pm 5sec	$U > 100V$ $C \leq 0.33\mu F \geq 15000M\Omega(20^\circ C, 100V, 1min)$ $C > 0.33\mu F \geq 7500S(20^\circ C, 100V, 1min)$ $U \leq 100V$ $C \leq 0.33\mu F \geq 3000M\Omega(20^\circ C, 10V, 1min)$ $C > 0.33\mu F \geq 1000S(20^\circ C, 10V, 1min)$						
4	Proof Voltage	Between Leads: Test Voltage : 1.6 U_R , duration : 5sec (P=5mm) Wire Leads and Case: Test Voltage: 2 U_R , duration: 5sec When the temperature exceeds 85 °C but is lower than 110 °C, the rated voltage decreases by 1.25% $U_R/^\circ C$	No breakdown or arcing						
5	rapid change of temperature	Temperature: $\theta A = -55^\circ C$, $\theta B = +110^\circ C$ Exposure time at high and low temperature: 30min Conversion time: 2 ~ 3min cycle index: 5	No visible damage of appearance $\Delta c/c \leq \pm 5\%$ $tg\delta \leq 0.8\%$						
6	Wire lead tensile strength	Tension : <table border="1" style="width: 100%;"> <thead> <tr> <th>Wire Lead diameter (mm)</th> <th>Tension</th> </tr> </thead> <tbody> <tr> <td>0.3 < d \leq 0.5</td> <td>0.51kg</td> </tr> <tr> <td>0.5 < d \leq 0.8</td> <td>1.0kg</td> </tr> </tbody> </table>	Wire Lead diameter (mm)	Tension	0.3 < d \leq 0.5	0.51kg	0.5 < d \leq 0.8	1.0kg	No mechanical damage, such as lead breakage and looseness
Wire Lead diameter (mm)	Tension								
0.3 < d \leq 0.5	0.51kg								
0.5 < d \leq 0.8	1.0kg								
7	Wire lead bending strength	(half of the terminal) , Load: <table border="1" style="width: 100%;"> <thead> <tr> <th>Wire Lead diameter (mm)</th> <th>Load</th> </tr> </thead> <tbody> <tr> <td>0.3 < d \leq 0.5</td> <td>0.51Kg</td> </tr> <tr> <td>0.5 < d \leq 0.8</td> <td>1.0Kg</td> </tr> </tbody> </table> In both positive and negative directions, it should be bent twice in each direction continuously, and the bending angle = 90°	Wire Lead diameter (mm)	Load	0.3 < d \leq 0.5	0.51Kg	0.5 < d \leq 0.8	1.0Kg	No mechanical damage, such as lead breakage and looseness
Wire Lead diameter (mm)	Load								
0.3 < d \leq 0.5	0.51Kg								
0.5 < d \leq 0.8	1.0Kg								

8	Weldability	Ta Method 1 Solder Temperature: 260°C±5°C Solder Time : 2.0±0.5sec Solder : Environmental protection material (lead-free)	More than 95% of the area has tin	
9	Durability			
NO.	Project	Performance	Test Condition	
9.1	temperature cycle	Appearance	no significant change	Test temperature cycle: 5 cycles in total. Each cycle includes: 1.+20 +/- 2°C, 3 min 2. -55 +0/-3 °C , 30 min 3. +20 +/- 2°C, 3 min 4. +110 +3/-0 °C, 30 min 5. +20 +/- 2°C, 3 min
		Proof Voltage	matching No. 4	
		Capacitance change rate ($\Delta C/C$)	$\leq \pm 5\%$	
		Loss	$\Delta DF < 0.20\%$.(1KHz)	
9.2	high temperature loading	Appearance	No significant change,and the sign should be clearly identifiable	The test base on IEC 60384-2. Refer to JIS C 5102-1994. Test temperature : +110 +/- 2 °C.
		Proof Voltage	matching No. 4	110% voltage application: 1000 +24/-0 hour;
		Capacitance change rate ($\Delta C/C$)	$\leq \pm 8\%$	After the test, allow to stand at standard temperature and humidity for 1.5 +/- 0.5 hours before measuring.
		Loss	$\Delta DF < 0.20\%$.(1KHz)	
		Insulation Resistance (I.R.)	$\geq 50\%$ of initial value	
9.3	Wet and heat loading	Appearance	No significant change,and the sign should be clearly identifiable	Refer to JIS C 0022. Test temperature : +40 +/- 2°C Test humidity : 90% to 95% R.H. Test voltage : Rated voltage Test duration : 500 +24/-0 hours
		Proof Voltage	matching No. 4	

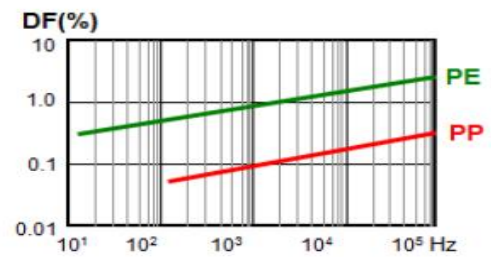
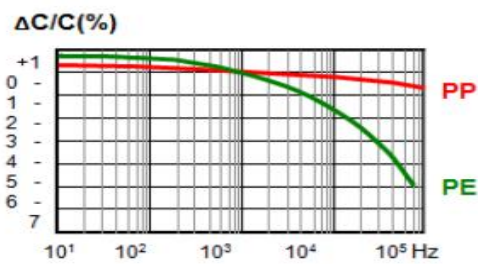
		Capacitance change rate ($\Delta C/C$)	$\leq \pm 10\%$	After the test, allow to stand at standard temperature and humidity for 1.5 +/- 0.5 hours before measuring.	
		Loss	$\Delta DF < 0.20\%$.(1KHz)		
		Insulation Resistance (I.R.)	$\geq 50\%$ of initial value		
9.4	Soldering temperature bearing capacity	Appearance	No significant change, and the sign should be clearly identifiable	<p>The test base on IEC 68-2-20 Tb.</p> <p>Welding temperature : 260 +/- 5°C.</p> <p>Dip duration : 5 +/- 0.5 sec. .(P=5mm) 10 +/- 0.5 sec. .(P=7.5mm)</p> <p>Dip thickness: 4 +/- 0.8 mm from the root</p> <p>After the test, allow to stand at standard temperature and humidity for 1.5 +/- 0.5 hours before measuring.</p>	
		Proof voltage between terminals	matching No. 4		
		Capacitance change rate ($\Delta C/C$)	$\leq \pm 3\%$		
		Connector	It should be stable		
9.5	Dry heat resistance	Appearance	No significant change, and the sign should be clearly identifiable	<p>Test temperature : +110 +/- 2°C</p> <p>Test duration : 16 +1/-0 hours</p>	
		Proof voltage	matching No. 4		
		Capacitance change rate ($\Delta C/C$)	$\leq \pm 5\%$		
9.6	Cold resistance	Appearance	No significant change, and the sign should be clearly identifiable	<p>Test temperature : -55 +/- 2 °C</p> <p>Test duration : 2 +/- 1 hours</p>	
		Proof voltage	matching No. 4		
		Capacitance change rate ($\Delta C/C$)	$\leq \pm 5\%$		
9.7	Vibration resistance	Connection strength	Neither cause an open circuit, nor cause a short circuit. The connection should be stable.	<p>The test base on IEC 68-2-6 Fc.</p> <p>Frequency change : 10--500 Hz.</p> <p>The vibration distance : 0.75 mm.</p> <p>The test direction : X, Y, Z.</p> <p>The test duration : 2 hours +1/-0 each direction</p>	
		Appearance	No mechanical damage		

9.8	severe temperature changes	Appearance	No significant change	The test base on IEC 68-2-14 Na. Test temperature . High temperature : +110 +/-5 °C Low temperature : -55 +/-5°C Each temperature 30 minutes +/- 10%
		Proof voltage	matching No. 4	
		Appearance	No mechanical damage	
9.9	Short circuit charge and discharge	Capacitance change rate ($\Delta C/C$)	$\leq \pm 3\%$ (1KHZ)	The voltage of Short circuit charge and discharge : U_R
		Loss change rate (ΔDF)	< 3% (10KHz)	The times of short circuit charging and discharging : 3 times
		Insulation Resistance (I.R.)	matching No. 3	Sampling quantity: 10 pcs /batch
9.10	Normal temperature storage	Capacitance change rate ($\Delta C/C$)	$\leq \pm 2\%$ (1KHZ)	Temperature: $\leq 35^\circ C$ Humidity : $\leq 80\%$ Storage time : 30-35 days
		Loss change rate (ΔDF)	matching No.2	
		Insulation Resistance (I.R.)	matching No. 3	

Soldering Temperature VS Time



Frequency Characteristics



Temperature Characteristics

