

# Class X2 Metallized Polypropylene Film Capacitor. MPX series

## *Data Sheet*

Customer: \_\_\_\_\_

Product: Metallized Polypropylene Film Capacitor Class X2 – MPX series \_\_\_\_\_

Rated Voltage : 275VAC/310VAC \_\_\_\_\_

Issued Date: 25-Nov.-2015 \_\_\_\_\_

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### **Record of change**

Date	Ver.	Description	Page
25-Nov.-2015	1		

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25-Nov.-2015	25-Nov.-2015	25-Nov.-2015	
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# Class X2 Metallized Polypropylene Film Capacitor. MPX series

**MPX** are constructed with metallized polypropylene film dielectric, copper-clad steel lead and epoxy resin coating. They are designed for interference suppression and across-the-line applications. They are suitable for use in situations where failure of the capacitor would not lead to danger of electric shock.

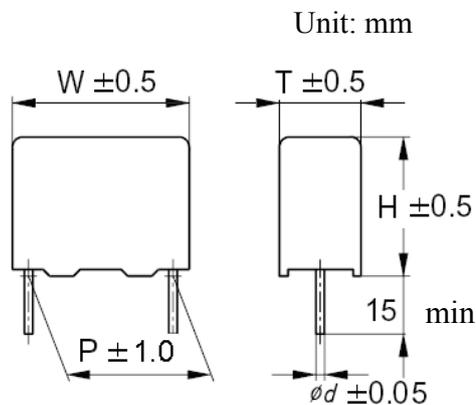
## SPECIFICATION:

- OPERATING TEMPERATURE:  $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$
- CAPACITANCE RANGE:  $0.001\mu\text{F} \sim 1.0\mu\text{F}$
- CAPACITANCE TOLERANCE:  $\pm 5\%$ (J),  $\pm 10\%$ (K)
- RATED VOLTAGE: 275VAC(VDE/ENEC,CQC), 310VAC(UL)
- DISSIPATION FACTOR: 0.1%MAX AT 1KHz,  $20^{\circ}\text{C}$   
0.3%MAX AT 10KHZ,  $20^{\circ}\text{C}$
- INSULATION RESISTANCE:  
A: BETWEEN TERMINALS:  $>30,000\text{M}\Omega$ ( $C \leq 0.33\mu\text{F}$ ),  $>10,000\text{M}\Omega$ ( $C > 0.33\mu\text{F}$ )  
B: BETWEEN TERMINALS AND CASE:  $>30,000\text{M}\Omega$  MEASURED AT  $100 \pm 15\text{VDC}$ , 1 min AND  $20^{\circ}\text{C}$
- VOLTAGE WITHSTANDING:  
A: BETWEEN TERMINALS: 4.3UR(VDC) 1 min.  
B: BETWEEN TERMINALS AND CASE: 2000VAC AT 60Hz, 1 min

## RELATED DOCUMENTS:

DIN EN 60384-14(VDE 0565 Teil 1-1), IEC60384-14(Ed.3), EN132400,  
UL 60384-14/CSAE60384-14/-1/IEC 60384-14/-1

## DIMENSION:



## PART NUMBERING:

<u>MPX</u> SERIES	<u>104</u> CAPACITANCE IN 3DIGITS 332=0.0033uF 104= 0.1 uF 474=0.47uF 105= 1 uF	<u>K</u> TOL. J= $\pm 5\%$ K= $\pm 10\%$	<u>2E</u> W.V. 2E=275Vac 2F=310Vac	<u>B</u> Package//Lead Style B = Bulk C = Lead Cut	<u>A</u> Extra Code for Size & Lead length A = Smaller Size S = Smallest Size Omit if one size 5 = 5mm Lead Length After Cut
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## Class X2 Metallized Polypropylene Film Capacitor. MPX series

### CASE SIZE OF STANDARD PRODUCTS:

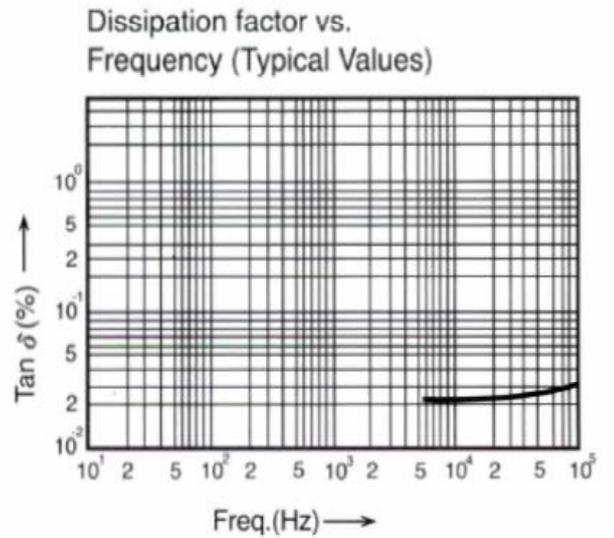
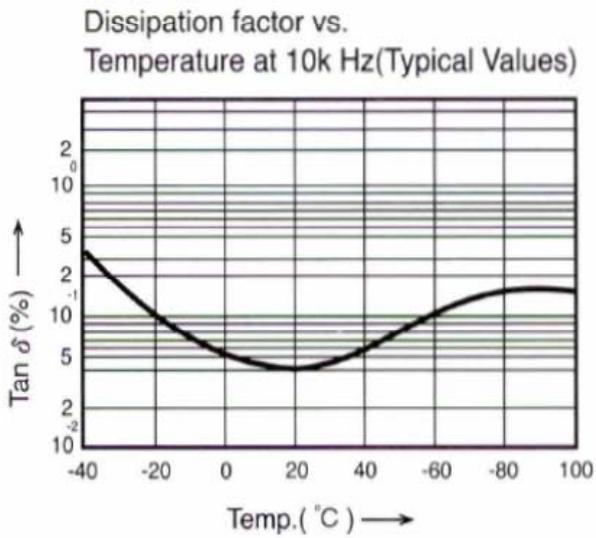
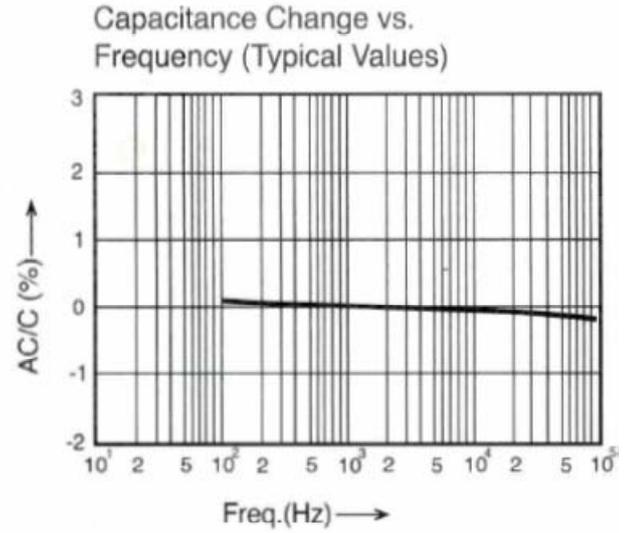
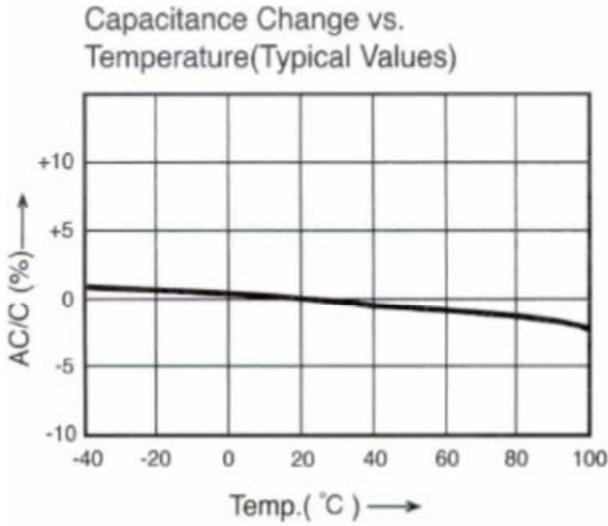
RV		275 /310 VAC					RV		275 /310 VAC				
CAP(uF)	SIZE	W	H	T	P	dØ	CAP(uF)	SIZE	W	H	T	P	dØ
	0.001~ 0.0082		13.0	11.0	5.0	10.0		0.6	0.10		13.0 18.0	12.0 12.0	6.0 6.0
0.010		13.0 18.0	11.0 11.0	5.0 5.0	10.0 15.0	0.6 0.8	0.15		13.0 18.0	13.0 12.0	7.0 6.0	10.0 15.0	0.6 0.8
0.012		18.0	11.0	5.0	10.0	0.8	0.15		18.0	14.5	8.5	15.0	0.8
0.015		18.0	11.0	5.0	15.0	0.8	0.22		18.0	14.5	8.5	15.0	0.8
0.018		18.0	11.0	5.0	15.0	0.8	0.22		26.5	16.5	7.0	22.5	0.8
0.022		13.0	11.0	5.0	10.0	0.6	0.27		18.0	16.0	10.0	15.0	0.8
0.022		18.0	11.0	5.0	15.0	0.8	0.33		18.0	14.5	8.5	15.0	0.8
0.027		18.0	11.0	5.0	15.0	0.8	0.33		18.0	16.0	10.0	15.0	0.8
0.033		13.0 18.0	11.0 11.0	5.0 5.0	10.0 15.0	0.6 0.8	0.39		26.5 26.5	17.0 19.0	8.5 10.0	22.5 22.5	0.8
0.039		18.0	11.0	5.0	15.0	0.8	0.47		18.0 26.5	16.0 17.0	10.0 8.5	15.0 22.5	0.8
0.047		13.0 18.0	11.0 11.0	5.0 5.0	10.0 15.0	0.6 0.8	0.47		32.0	20.0	11.0	27.5	0.8
0.056		13.0 18.0	11.0 11.0	5.0 5.0	10.0 15.0	0.6 0.8	0.56		26.5	19.0	10.0	22.5	0.8
0.068		13.0 18.0	11.0 11.0	5.0 5.0	10.0 15.0	0.6 0.8	0.68		26.5 32.0	19.0 20.0	10.0 11.0	22.5 27.5	0.8
0.082		13.0 18.0	11.0 12.0	5.0 6.0	10.0 15.0	0.6 0.8	0.82		26.5	21.5	12.5	22.5	0.8
							1.0		26.5	21.5	12.5	22.5	0.8
							1.0		32.5	22.0	13.0	27.5	0.8

### SAFETY APPROVALS:

Approve Monogram		Country	Related Standard	Rated Voltage	Capacitance
UL		U.S.A.	UL60384-14	250VAC 275VAC 310VAC	0.001uF~1.0uF
cUL		Canada	UL 60384-14 CSA E60384-14	250VAC 275VAC 310VAC	0.001uF~1.0uF
ENEC		EEPCA	DIN EN60384-14 (VDE 0565 Teil 1-1) IEC 60384-14(ed.3)	275VAC	0.0047uF~1.0uF
VDE		GERMANY	DIN EN60384-14 (VDE 0565 Teil 1-1) IEC 60384-14(ed.3)	275VAC	0.0047uF~1.0uF
CQC		CHINA	GB/T 14472-1998	275VAC	0.0047uF~1.0uF

# Class X2 Metallized Polypropylene Film Capacitor. MPX series

## TEMPERATURE AND FRWQUENCY CHARACTERISTICS:



## Class X2 Metallized Polypropylene Film Capacitor. MPX series

<b>SPECIFICATION &amp; TEST METHODS</b>	
<b>1.SCOPE</b>	This specification applies to film capacitors of following type. Used in electronic equipment.
<b>2.PRODUCT NAME</b>	Class X2 Metallized Polypropylene Capacitors for interference suppression
<b>3.CONSTRUCTION (Dimensions and materials)</b>	<p>Dimensions : Refer to dimensions drawing</p> <p>Materials</p> <p>1.Element : Metallized polypropylene film.</p> <p>2.Metal spray : Special solder. (Lead Free)</p> <p>3.Lead wire : Tinned copper clad-steel wire. (Lead Free)</p> <p>4.Inner filling : Polyurethane resin. (UL-94V-0 Standard)</p> <p>5.Outer Case: Plastic Case (UL-94V-0 Standard)</p>
<b>4.CHARACTERISTICS</b>	<p>Standard atmospheric conditions.</p> <p>Unless otherwise specified , the standard range of atmospheric conditions for making measurements and tests is as follows:</p> <p>Ambient temperature : 15 to 35°C</p> <p>Relative humidity : 45 to 85 % Air pressure : 86 to 106 kpa</p> <p>If there may be any doubt on the results, measurements shall be made within the following limits.</p> <p>Ambient temperature : 20°C±5 °C</p> <p>Relative humidity : 60 to 70 % Operating temperature range : -40 to +100°C</p> <p>Operating temperature range is the range of ambient temperature for which the capacitor can be operated continuously at rated voltage.</p>

# Class X2 Metallized Polypropylene Film Capacitor. MPX series

## 5. Electrical characteristics

**5-1. Rated Voltage:** 275VAC(VDE/ENEC,CQC), 310VAC(UL)

**5-2. Operating temperature range:** -40 ~ 100°C

**5-3. Capacitance range:** 0.001uF to 1.0uF

**5-4. Capacitance tolerances :** ±5% ( J ) , ±10% ( K ) (Measured at 1KHz,1V)

**5-5. Dissipation factor (DF%) :** Test Instrument: LCR METER:HP-4284A

: 0.1%Max at 1KHz, 20°C

0.3%Max at 10KHZ, 20°C

**5-6. Insulation resistance:** A: Between terminals: >30,000MΩ(C≤0.33uF) >10,000MΩ(C>0.33uF)

B: Between terminals and case: >30,000 MΩ measured at 100±15VDC, 1 min and 20°C

**5-7. Withstand voltage:** A: Between terminals: 4.3UR(VDC) 1 min.

B: Between terminals and case: 2000VAC at 60Hz, 1 min

## 6. Mechanical characteristics

**6-1. Terminal strength** (Testing method IEC 68-2-21) Tensile :

(Test Ual)

A load of 10 N(1.0kg) shall be gradually applied to the terminal in the axial direction and held thus for 10 sec.

Bending : (Test Ub)

While a load of 500g applied to the lead wire, the body of the capacitor shall be bent 90° and returned to the original position. This operation shall be conducted in a few seconds. Then the body shall be bent 90° at the same speed in the opposite direction and returned to the original position.

Performance : There shall be no such mechanical damage as terminal damage etc.

## 7. Endurance characteristics

**7-1. Solderability** (Testing method IEC 68-2-20 Ta)

Solder temperature : 235°C±2°C.

Immersion time : 2±0.5 sec.

For other procedures refer to JIS C 0050

performance : At least 95% of the circumferential face of lead wire up to immersed level shall be covered with new solder.

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**7-2. Resistance to soldering heat :** (Testing method IEC 68-2-20 Tb) For other procedures than those specified below refer to JIS C 5102.  
Solder bath method

Solder temperature :  $260 \pm 5^{\circ}\text{C}$   
Immersion time :  $10 \pm 1$  sec.

Thickness of heat shunt  
( Printed wiring board ) : 1.6 mm  
Performance :  
Capacitance change  $\Delta C/C$  :  $\leq \pm 3\%$   
DF change  $\Delta \tan \delta$  :  $\leq 0.2\%$  at 1 KHZ

**7-3. Vibration proof :** (Testing method IEC 68-2-6 Fc)

The frequency shall be varied from 10Hz to 55Hz at 1.5mm amplitude and back to 10Hz in approximately 1 minute intervals.

This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular directions. During the last 30 min of vibration in each direction, checks shall be made for open or short-circuiting and interruption. For other procedures, refer to JIS C 0040.

Performance :

Bending strength: There shall be no open or short-circuiting and the connections must be stabilized.

Appearance : There shall be no such mechanical damage as terminal damage etc.

**7-4. Damp heat ( steady state ) :** (Testing method IEC 68-2-3 Ca)

The capacitor shall be stored at a temperature of  $40 \pm 2^{\circ}\text{C}$  and relative humidity of 90% to 95% for 1000 hours. And then the capacitor shall be subjected to standard atmospheric conditions for  $1.5 \pm 0.5$  hours, after which measurement shall be made. For other procedures, refer to JIS C 0022.

Performance :

Capacitance change  $\Delta C/C$  :  $\leq \pm 5\%$   
DF change  $\Delta \tan \delta$  :  $\leq 0.2\%$  at 1 KHZ  
Insulation resistance :  $\geq 50\%$  of limit value

**7-5. Damp heat with load :**

The DC rated voltage shall be applied continuously to the capacitor at a temperature of  $40 \pm 2^{\circ}\text{C}$  and a relative humidity of 90 to 95% for 1000 hours.

And then the capacitor shall be subjected to standard atmospheric conditions for  $1.5 \pm 0.5$  hours, after which measurement shall be made. The load resistor in series with the capacitor shall be  $20\Omega$  to  $1\text{K}\Omega$ . For other procedures, refer JIS C 0022.

Performance :

Capacitance change  $\Delta C/C$  :  $\leq \pm 5\%$   
DF change  $\Delta \tan \delta$  :  $\leq 0.2\%$  at 1 KHZ  
Insulation resistance :  $\geq 50\%$  of limit value

## Class X2 Metallized Polypropylene Film Capacitor. MPX series

### 7-6. Electrical endurance : (Testing method : IEC 60384-2)

125% of rated voltage shall be applied to the capacitor at a temperature of  $+100\pm 2^{\circ}\text{C}$  for 2000 hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours ,after which measurement shall be made. The load resistor in series with the capacitor shall be  $20\Omega$  to  $1\text{K}\Omega$ . For other procedures, refer JIS C5102-1994.

Performance :

Capacitance change	$\Delta C/C : \leq \pm 5\%$
DF change	$\Delta \tan \delta : \leq 0.2\%$ at 1 KHZ
Insulation resistance	: $\geq 50\%$ of limit value

### 7-6. Temperature Cycle : (Testing method : IEC 60384-2)

Test temperature cycle: Total 5 cycles

Each cycle includes: 1.  $+20\pm 2^{\circ}\text{C}$  for 3 min.

2.  $-40\pm 3^{\circ}\text{C}$  for 3 min.

3.  $+20\pm 2^{\circ}\text{C}$  for 3 min.

4.  $+100\pm 2^{\circ}\text{C}$  for 3 min.

5.  $+20\pm 2^{\circ}\text{C}$  for 3 min.

And then the capacitor shall be subjected to standard atmospheric conditions for  $1.5\pm 0.5$  hours, after which measurement shall be made

Performance :

Capacitance change	$\Delta C/C : \leq \pm 5\%$
DF change	$\Delta \tan \delta : \leq 0.2\%$ at 1 KHZ
Insulation resistance	: $\geq 50\%$ of limit value