Metallized Polypropylene Film Capacitor. MKP series

Data Sheet

Customer:

Product: Metallized Polypropylene Film Capacitor (BOX type) – MKP series

Rated Voltage : 100V, 250V, 400V, 630V

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Record of change

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

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10-Nov.-2015	10-Nov.-2015	10-Nov.-2015	
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Metallized Polypropylene Film Capacitor. MKP series

MKP are constructed with metalized polypropylene film dielectric, copper-clad steel and epoxy resin coating. They are suitable for blocking, coupling, decoupling filtering, bypass timing, circuit and ideal for use in telecommunication equipments, data processing equipments, industrial instruments, automatic control system and other general electronic equipments.

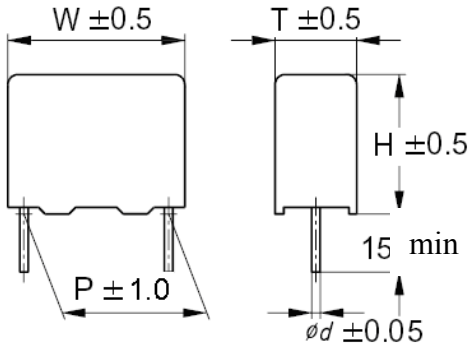
SPECIFICATION:

1. OPERATING TEMPERATURE:-40℃~+105℃
2. CAPACITANCE RANGE:0.01uF~4.7uF
3. CAPACITANCE TOLERANCE:±5%(J), ±10%(K),±20%(M)
4. RATED VOLTAGE:100V,250V,400V, 630V
5. DISSIPATION FACTOR:0.1%MAX AT 1KHz, 25℃
6. INSULATION RESISTANCE:>30000MΩ(C≦0.33uF)
   >10000MΩ*uF(C>0.33uF)
7. TESTING VOLTAGE: WVDCx150% For 1~3sec.
8. SOLDERING RESISTANCE : 260℃±5℃ 3sec.

FEATURES:

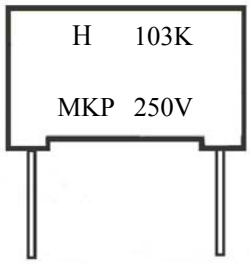
1. Low dissipation factor and high insulation resistance.
2. High stability of capacitance and DF versus temperature and frequency Non-inductive construction and self-healing property.
3. Flame retardant epoxy resin coating.

DIMENSION:



Unit: mm

MARKING:



H: SYMBOL OF HITANO
103: CAPACITANCE
K: TOL.
MKP: SERIES
250V: RATED VOLTAGE

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Metallized Polypropylene Film Capacitor. MKP series

CASE SIZE OF STANDARD PRODUCTS:

Capacitance		2A(100VDC)					2E(250VDC)					2G(400VDC)					2J(630VDC)				
Code	Cap.(uF	W	H	T	P	dΦ	W	H	T	P	dΦ	W	H	T	P	dΦ	W	H	T	P	dΦ
103	0.01											10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6
123	0.012											10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6
153	0.015											10.0	11.0	5.0	7.5	0.6	10.0	12.0	6.0	7.5	0.6
183	0.018											10.0	11.0	5.0	7.5	0.6	10.0	12.0	6.0	7.5	0.6
223	0.022						10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6	13.0	11.0	5.5	10.0	0.6
273	0.027						10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6	13.0	12.0	6.0	10.0	0.6
333	0.033						10.0	9.0	4.0	7.5	0.6	10.0	12.0	6.0	7.5	0.6	13.0	13.0	7.0	10.0	0.6
393	0.039						10.0	9.0	4.0	7.5	0.6	13.0	11.0	5.5	10.0	0.6	13.0	13.0	7.0	10.0	0.6
473	0.047	10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6	13.0	11.0	5.5	10.0	0.6	13.0	14.0	8.0	10.0	0.6
563	0.056	10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6	13.0	12.0	6.0	10.0	0.6	13.0	14.0	8.0	10.0	0.6
683	0.068	10.0	9.0	4.0	7.5	0.6	10.0	11.0	5.0	7.5	0.6	13.0	13.0	7.0	10.0	0.6	18.0	13.0	7.0	15.0	0.8
823	0.082	10.0	11.0	5.0	7.5	0.6	10.0	12.0	6.0	7.5	0.6	13.0	13.0	7.0	10.0	0.6	18.0	13.5	7.5	15.0	0.8
104	0.1	10.0	11.0	5.0	7.5	0.6	10.0	12.0	6.0	7.5	0.6	13.0	14.0	8.0	10.0	0.6	18.0	14.5	8.5	15.0	0.8
124	0.12	10.0	10.0	5.0	7.5	0.6	13.0	12.0	6.0	10.0	0.6	18.0	12.0	6.0	15.0	0.8	18.0	14.5	8.5	15.0	0.8
154	0.15	10.0	12.0	6.0	7.5	0.6	13.0	12.0	6.0	10.0	0.6	18.0	13.0	7.0	15.0	0.8	18.0	16.0	10.0	15.0	0.8
184	0.18	10.0	12.0	6.0	7.5	0.6	13.0	13.0	7.0	10.0	0.6	18.0	13.5	7.5	15.0	0.8	18.0	19.0	11.0	15.0	0.8
224	0.22	13.0	11.0	5.0	10.0	0.6	13.0	13.0	7.0	10.0	0.6	18.0	14.5	7.5	15.0	0.8	18.0	19.0	11.0	15.0	0.8
274	0.27	13.0	12.0	6.0	10.0	0.6	18.0	12.5	6.0	15.0	0.8	18.0	16.0	9.0	15.0	0.8	26.0	18.0	9.0	22.5	0.8
334	0.33	13.0	13.0	7.0	10.0	0.6	18.0	13.0	7.0	15.0	0.8	18.0	16.5	10.0	15.0	0.8	26.0	19.0	10.0	22.5	0.8
394	0.39	13.0	13.0	7.0	10.0	0.6	18.0	14.0	7.5	15.0	0.8	18.0	17.5	11.0	15.0	0.8	26.0	20.0	11.0	22.5	0.8
474	0.47	13.0	14.0	8.0	10.0	0.6	18.0	14.5	7.5	15.0	0.8	26.0	17.0	8.0	22.5	0.8	26.0	21.5	12.0	22.5	0.8
564	0.56	18.0	13.0	7.0	15.0	0.8	18.0	16.0	9.0	15.0	0.8	26.0	18.0	9.0	22.5	0.8	26.0	23.0	14.5	22.5	0.8
684	0.68	18.0	14.5	7.5	15.0	0.8	18.0	18.0	9.0	15.0	0.8	26.0	19.0	10.0	22.5	0.8	26.0	25.0	15.0	22.5	0.8
824	0.82	18.0	15.5	8.0	15.0	0.8	18.0	19.0	10.0	15.0	0.8	26.0	20.0	11.0	22.5	0.8	26.0	25.5	16.5	22.5	0.8
105	1.0	18.0	16.0	9.0	15.0	0.8	18.0	19.0	11.0	15.0	0.8	26.0	21.5	12.0	22.5	0.8	31.0	25.5	16.0	27.5	0.8
125	1.2	18.0	18.0	10.0	15.0	0.8	26.0	18.0	9.0	22.5	0.8	26.0	24.0	14.0	22.5	0.8	31.0	27.5	18.0	27.5	0.8
155	1.5	18.0	19.0	11.0	15.0	0.8	26.0	19.0	10.0	22.5	0.8	26.0	25.0	15.0	22.5	0.8					
185	1.8	26.0	18.0	9.0	22.5	0.8	26.0	20.0	11.0	22.5	0.8										
225	2.2	26.0	18.5	10.0	22.5	0.8	26.0	22.0	12.5	22.5	0.8										

Metallized Polypropylene Film Capacitor. MKP series

SPECIFICATION & TEST METHODS	
1.SCOPE	This specification applies to film capacitors of following type. Used in electronic equipment.
2.PRODUCT NAME	Metallized Polypropylene film capacitor .
3.CONSTRUCTION (Dimensions and materials)	Dimensions : Refer to dimensions drawing Materials 1.Element : Metallized Polypropylene film. 2.Metal spray : Special solder. (Lead Free) 3.Lead wire : Tinned copper clad-steel wire. (Lead Free) 4.Inner coating : Epoxy resin. (UL-94V-0 Standard) 5.Outer Case: Plastic Case (UL-94V-0 Standard)
4.CHARACTERISTICS	Standard atmospheric conditions. Unless otherwise specified , the standard range of atmospheric conditions for making measurements and tests is as follows: Ambient temperature : 15 to 35℃ Relative humidity : 45 to 85 % Air pressure : 86 to 106 kpa If there may be any doubt on the results, measurements shall be made within the following limits. Ambient temperature : 20℃±5 ℃ Relative humidity : 60 to 70 % Operating temperature range : -40 to +105℃ Operating temperature range is the range of ambient temperature for which the capacitor can be operated continuously at rated voltage.

5.Electrical characteristics

5-1. Rated Voltage (V_R) : 100VDC , 250VDC , 400VDC , 630VDC

Category voltage (Vc) : up to 85℃ Vc=V_R

For temperature between +85℃and +105℃, a decreasing factor of 1.5% per degree ℃ on the nominal voltage V_R has to be applied.

5-2. Rated upper limit temperature : 85℃

Usable upper limit temperature : 105℃

5-3. Capacitance range : 0.01uF to 2.2uF

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

5-5. Dissipation factor (DF%) : LCR METER:HP-4284A, at 20℃±5℃

KHZ	C≤ 0.1 uF	0.1 uF<C≤1.0 uF	1.0 uF<C≤3.0 uF
1	≤ 0.10%	≤ 0.10%	≤ 0.10%
10	≤ 0.25%	≤ 0.35%	≤ 1.20%

5-6. Insulation resistance between terminals Test conditions :

Temperature : 20℃±5℃

Voltage charge time : 1 minute

Voltage charge : 10 VDC (10V ≤ V_R < 100V)

100 VDC (100V ≤ V_R < 500V)

500 VDC (500V ≤ V_R)

Performance: 30000MΩ For C≤1.0 uF

5-7. Test voltage between terminals

1.6×V_R applied for 2 sec , at 20℃±5℃, (cut off current 10mA)

Performance : There shall be no dielectric breakdown or other damage.

5-8. Dielectric strength

Between terminal and enclosure

Apply 200% of rated voltage between terminals and enclosure for 2~5 sec. Method of the test described as below.

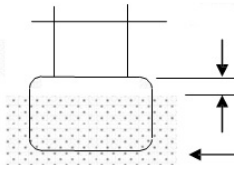
Put the 1 mm diameters of small metallic balls in a vessel.

The test capacitor shall be submerged with the small metallic balls , Distance of the metallic balls and the terminals shall be kept about 2 mm as shown in fig.(V).

The test voltage shall be applied between the short-circuited terminals and the metallic balls.

Performance :There shall be no dielectric breakdown or other damage.

Fig(V)



5-9. Rapid change of temperature. (Testing method IEC 68-2-14 Na)

The test capacitor shall be kept in the testing oven and kept at condition of following table, and it shall be repeated for 5 cycles successively. After the test, the capacitor shall be let alone at the ordinary condition for 2 hours.

Step	temperature	minute
1	-40±3℃	30 ± 3
2	ordinary	3 or under
3	105±2℃	30 ± 3
4	ordinary	3 or under

Performance

Capacitance change Δ C/C : ≤ ± 10%

DF change Δtan δ : ≤ 0.1% at 1 KHZ

Insulation resistance : ≥ 50% of limit value

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 90º and returned to the original position. This operation shall be conducted in a few seconds. Then the body shall be bent 90º 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℃±2℃.

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.

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±5℃
Immersion time : 10±1 sec.

Thickness of heat shunt
(Printed wiring board) : 1.6 mm
Performance :
Capacitance change Δ C/C : ≤ ± 1%
DF change Δtan δ : ≤ 0.1% at 1 KHZ

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

The frequency shall be varied form 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±2℃ and relative humidity of 90% to 95% for 1000 hours.

And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurement shall be made. For other procedures, refer to JIS C 0022.

Performance :

Capacitance change	Δ C/C : ≤ ± 3%
DF change	Δtan δ : ≤ 0.1% at 1 KHZ
Insulation resistance	: ≥ 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±2℃ and a relative humidity of 90 to 95% for 1000 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 20Ω to 1KΩ. For other procedures, refer JIS C 0022.

Performance :

Capacitance change	Δ C/C : ≤ ± 3%
DF change	Δtan δ : ≤ 0.1% at 1 KHZ
Insulation resistance	: ≥ 50% of limit value

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

125% of rated voltage shall be applied to the capacitor at a temperature of +85±2℃ for 2000 hours. (87.5% of rated voltage shall be applied to the capacitor at a temperature of +105±2℃ 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 20Ω to 1KΩ. For other procedures, refer JIS C 5102-1994.

Performance :

Capacitance change	Δ C/C : ≤ ± 3%
DF change	Δtan δ : ≤ 0.1% at 1 KHZ
Insulation resistance	: ≥ 50% of limit value

7-7. △T:

Less than +8℃.

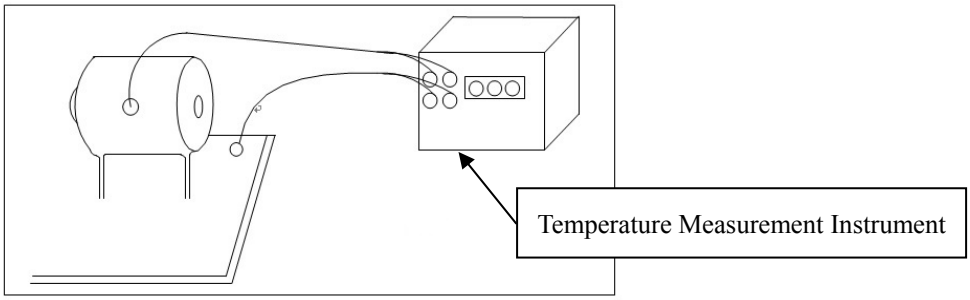
Method of measuring inherent temperature rise

Inherent temperature of capacitor shall be measured by keeping away from heat influence of surrounding components after attaching thermocouple to the capacitor as show below.

(They shall be measured in normal temperature.)

Measurement shall be down by soldering capacitor on the opposite side of the printed circuit board etc. in case of being influenced by heat of surrounding components.

Besides, they shall be measured in calm condition by putting capacitor into box etc. in case of being influence by convection or wind.



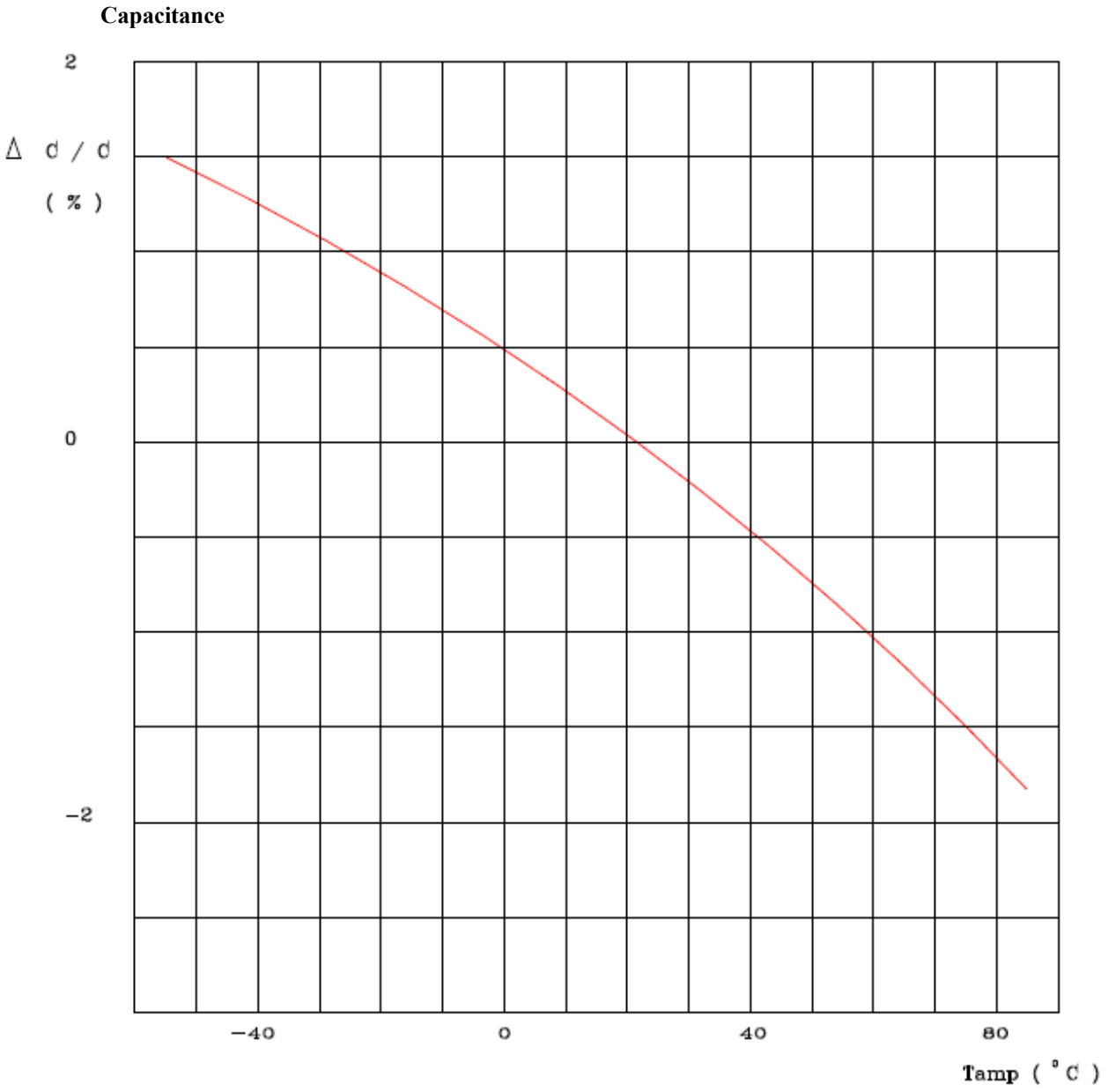
8. Rated Voltage Pulse Slope dv/dt (V/μs)

Pitch / V.R	7.5 m/m	10 m/m	15 m/m	20 m/m	27.5 m/m	32.5 m/m	37.5 m/m
100 VDC	130	110	100	70	50	35	25
250 VDC	230	220	200	130	100	70	50
400 VDC	250	350	300	200	150	110	80
630 VDC	300	420	400	250	180	140	90

Metallized Polypropylene Film Capacitor. MKP series

Capacitance change as a function of ambient temperature:

Typical curve

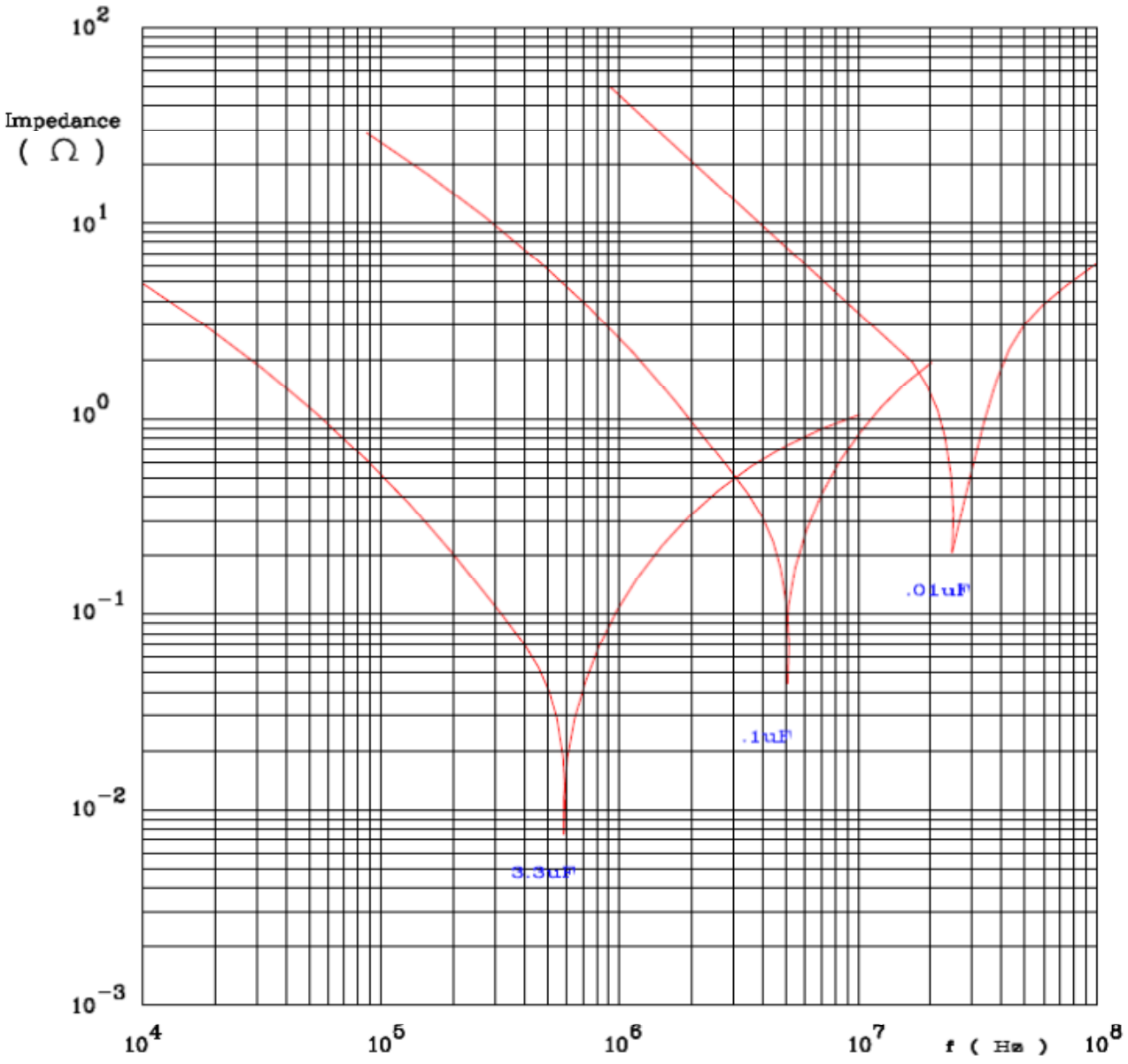


** **All capacitance values are specified at 1K Hz**

Metallized Polypropylene Film Capacitor. MKP series

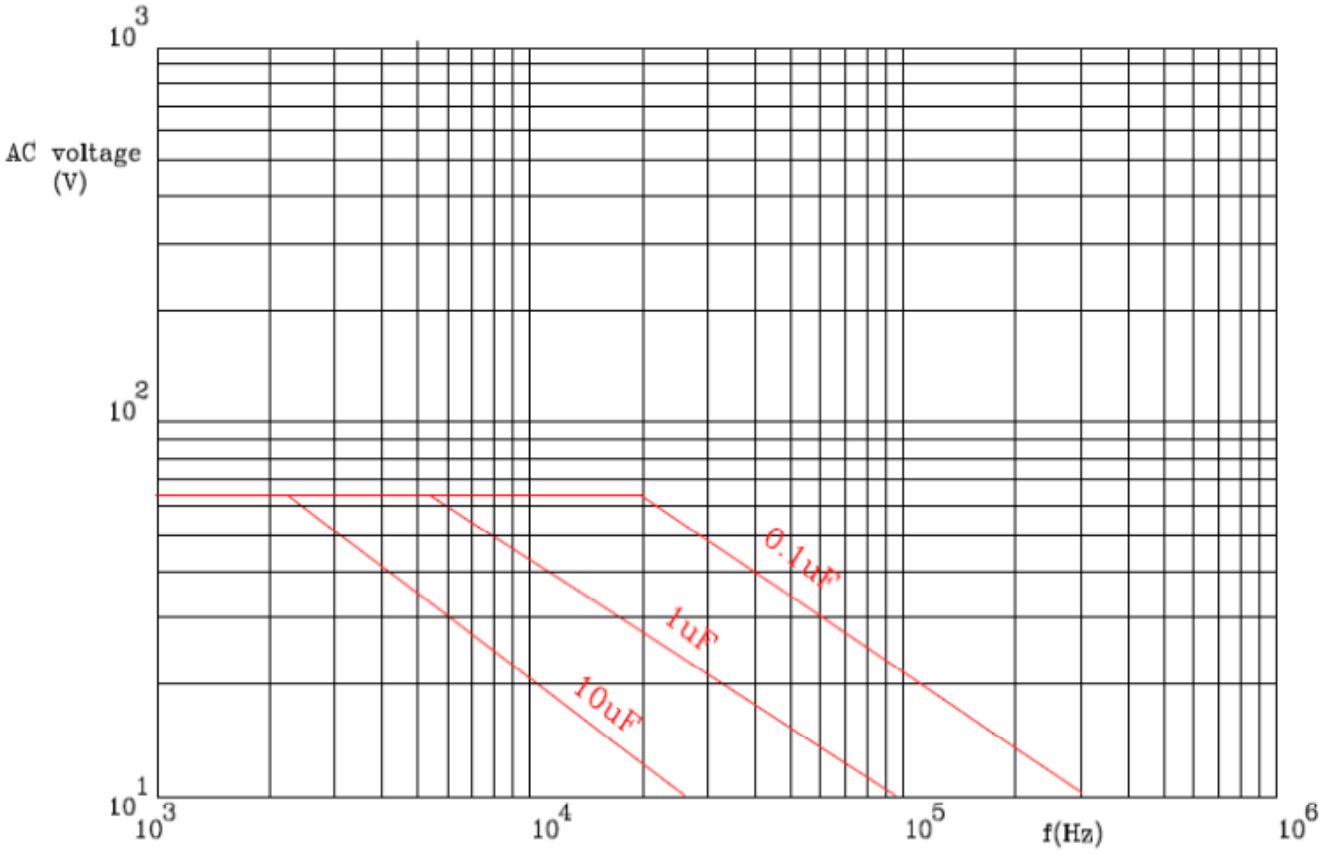
Impedance as a function of frequency:

Typical curves.



Rated voltage (Vrms) versus frequency

100 Vdc / 63 Vac

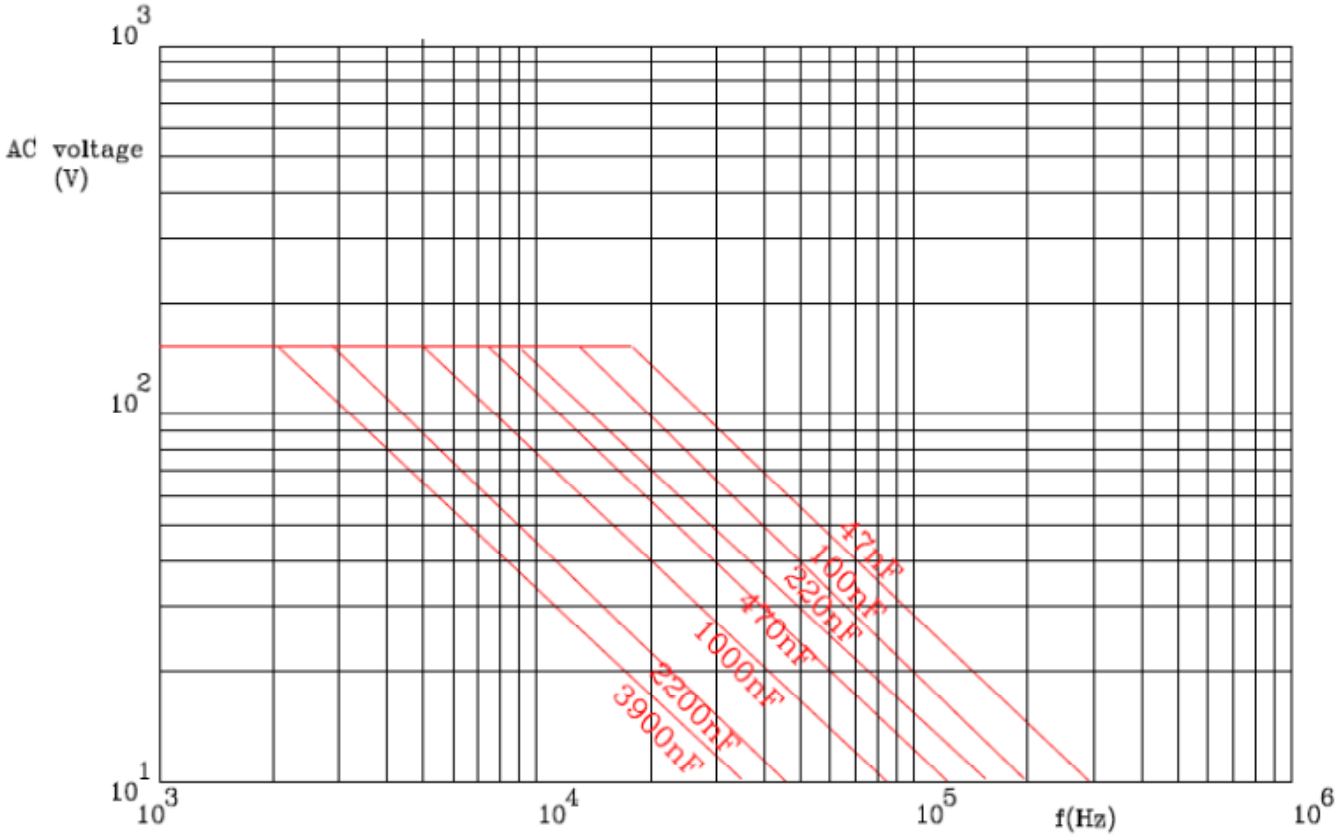


**** AC voltage as a function of frequency at temp≦85℃, for Vrdc＝100V**

Metallized Polypropylene Film Capacitor. MKP series

Rated voltage (Vrms) versus frequency

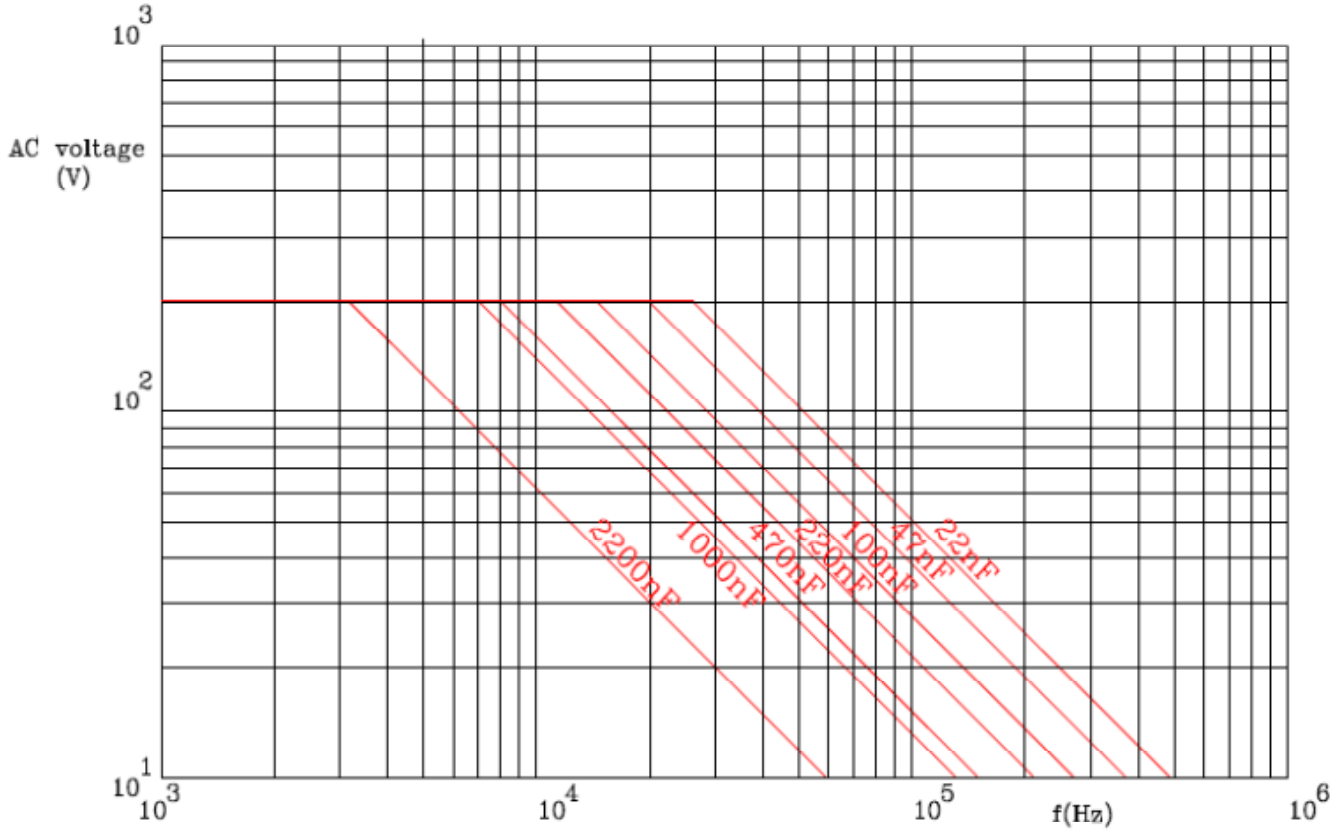
250 Vdc / 160 Vac



**** AC voltage as a function of frequency at temp≦85℃, for Vrdc＝250V**

Rated voltage (Vrms) versus frequency

400 Vdc / 200 Vac

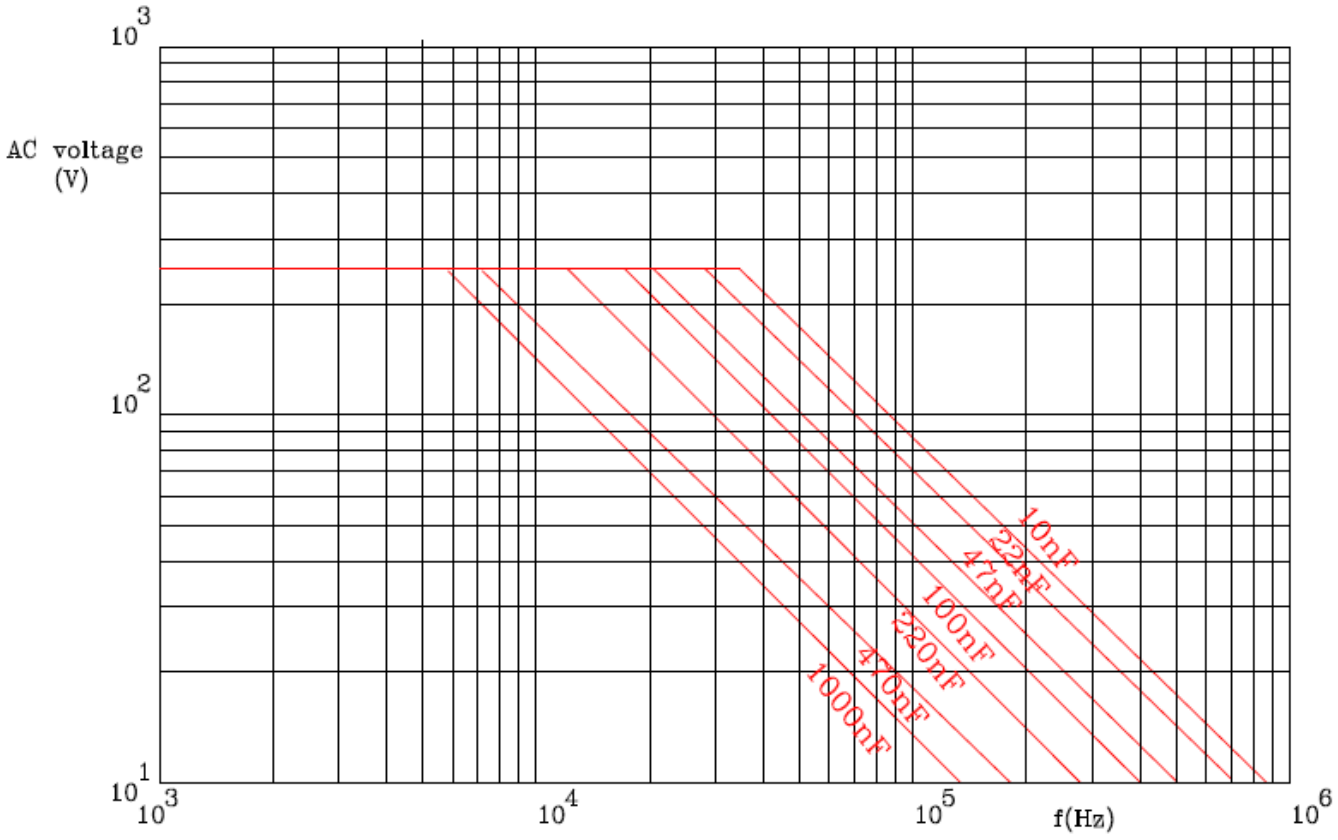


**** AC voltage as a function of frequency at temp≦85℃, for Vrdc＝400V**

Metallized Polypropylene Film Capacitor. MKP series

Rated voltage (Vrms) versus frequency

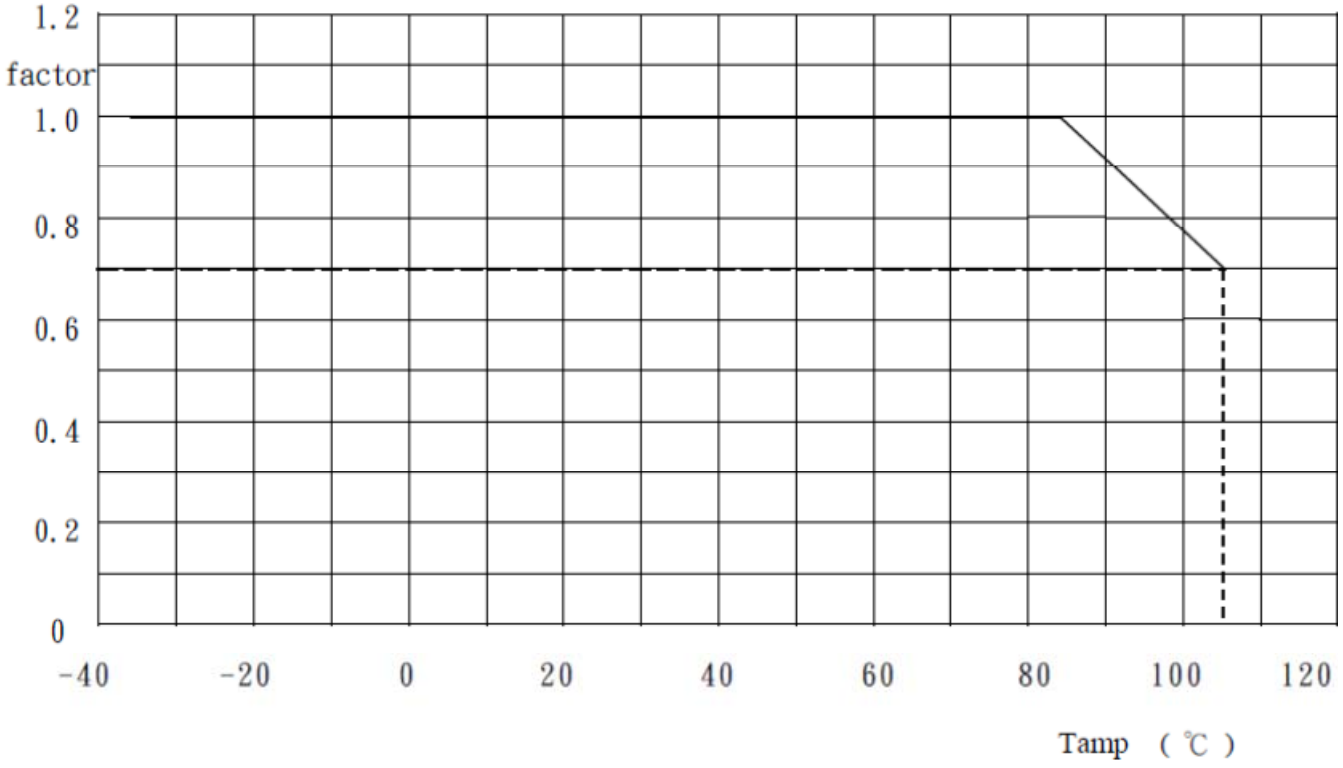
630 Vdc / 250 Vac



**** AC voltage as a function of frequency at temp≦85℃, for Vrdc＝630V**

Maximum DC voltage and AC voltage (sinewave) as a Function of temperature

(voltage derating)



**** Multiplying factor as a function of temperature .**