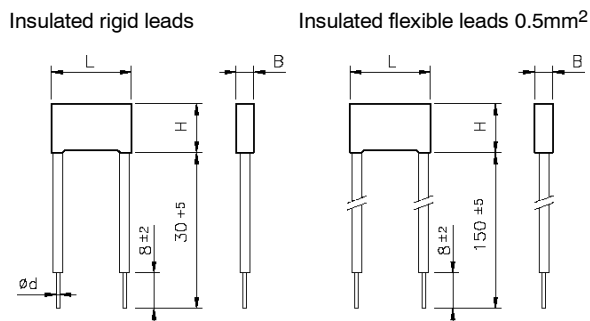
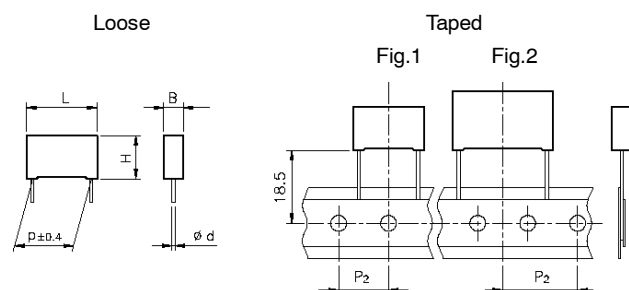


X2 CLASS (EN132400) - MKP Series METALLIZED POLYPROPYLENE FILM CAPACITOR

SELF-HEALING PROPERTIES
Typical applications: interference suppression and «across-the-line» applications. Suitable for use in situations where failure of the capacitor would not lead to danger of electric shock.

PRODUCT CODE: R46



$\varnothing d \pm 0.05$	$p \leq 15^*$	$22.5 \leq p \leq 27.5$	$p = 37.5$
	0.6	0.8	1

*Except for box $\geq 10 \times 16 \times 18$ having $\varnothing d = 0.8 \pm 0.05 \text{ mm}$
All dimensions are in mm.

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: metal layer deposited by evaporation under vacuum.

Winding: non-inductive type.

Leads: tinned wire.

Protection: plastic case, epoxy resin filled. Box material is solvent resistant and flame retardant according to UL94 V0.

Marking: Manufacturer's logo, series, capacitance, tolerance, rated voltage, capacitor class, dielectric code, climatic category, passive flammability category, manufacturing date code, approvals, manufacturing plant.

Climatic category: 40/110/56 IEC 60068-1

Operating temperature range: -40 to +110°C

Related documents: IEC 60384-14 2nd edition '93;
EN 132400.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 275Vac; 50/60Hz

Capacitance range: 0.01 μF to 4.7 μF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):
 $\pm 10\%$ (K); $\pm 20\%$ (M).

Dissipation factor (DF):

$\text{tg} \delta \times 10^{-4}$ at +25°C $\pm 5^\circ\text{C}$: ≤ 10 (6)* at 1kHz

* Typical value

Insulation resistance:

Test conditions

Temperature: +25°C $\pm 5^\circ\text{C}$

Voltage charge time: 1 min

Voltage charge: 100 Vdc

Performance

$\geq 1 \times 10^5 \text{ M}\Omega$ ($5 \times 10^5 \text{ M}\Omega$)* for $C \leq 0.33 \mu\text{F}$

$\geq 30000 \text{ s}$ (150000 s)* for $C > 0.33 \mu\text{F}$

* Typical value

Test voltage between terminations (on all pieces):

1500Vac for 1 s + 2200Vdc for 1 s at +25°C $\pm 5^\circ\text{C}$

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions 1st

Temperature: +40°C $\pm 2^\circ\text{C}$

Relative humidity (RH): 93% $\pm 2\%$

Test duration: 56 days

Test conditions 2nd

Temperature: +60°C $\pm 2^\circ\text{C}$

Relative humidity (RH): 95% $\pm 2\%$

Test duration: 500 hours

Performance

Dielectric strength: no dielectric breakdown or flashover at $4.3 \times V_R$ (d.c.)/1 min

Capacitance change $|\Delta C/C|$: $\leq 5\%$

Insulation resistance: $\geq 50\%$ of initial limit.

Endurance:

Test conditions

Temperature: +110°C $\pm 2^\circ\text{C}$

Test duration: 1000 h

Voltage applied: $1.25 \times V_R + 1000 \text{ Vac}$ 0.1 s/h

Performance

Dielectric strength: no dielectric breakdown or flashover at $4.3 \times V_R$ (d.c.)/1 min

Capacitance change $|\Delta C/C|$: $\leq 10\%$

Insulation resistance: $\geq 50\%$ of initial limit.

Resistance to soldering heat:

Test conditions

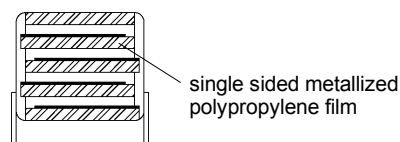
Solder bath temperature: +260°C $\pm 5^\circ\text{C}$

Dipping time (with heat screen): $10 \text{ s} \pm 1 \text{ s}$

Performance

Capacitance change $|\Delta C/C|$: $\leq 2\%$

Winding scheme



November 23, 2001

X2 CLASS (EN132400) - MKP Series METALLIZED POLYPROPYLENE FILM CAPACITOR SELF-HEALING PROPERTIES

(All dimensions are in mm)

Rated Cap. (*)	275 Vac				Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number
	B	H	L	p			
0.010 µF	5.0	11.0	13.0	10.0	0.6	500	R46.KF. 2100.-.M1. -
0.015 µF	5.0	11.0	13.0	10.0	0.6	500	R46.KF. 2150.-.M1. -
0.022 µF	5.0	11.0	13.0	10.0	0.6	500	R46.KF. 2220.-.M1. -
0.033 µF	5.0	11.0	13.0	10.0	0.6	500	R46.KF. 2330.-.M1. -
0.047 µF	6.0	12.0	13.0	10.0	0.6	500	R46.KF. 2470.-.M1. -
0.068 µF	6.0	12.0	13.0	10.0	0.6	500	R46.KF. 2680.-.M1. -
0.010 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 2100.-.01. -
0.015 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 2150.-.01. -
0.022 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 2220.-.01. -
0.033 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 2330.-.01. -
0.047 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 2470.-.01. -
0.068 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 2680.-.01. -
0.10 µF	5.0	11.0	18.0	15.0	0.6	400	R46.KI. 3100.-.M1.M
0.10 µF	6.0	12.0	18.0	15.0	0.6	400	R46.KI. 3100.-.01. -
0.15 µF	6.0	12.0	18.0	15.0	0.6	400	R46.KI. 3150.-.M2.M
0.15 µF	7.5	13.5	18.0	15.0	0.6	400	R46.KI. 3150.-.M1. -
0.22 µF	7.5	13.5	18.0	15.0	0.6	400	R46.KI. 3220.-.M2.M
0.22 µF	8.5	14.5	18.0	15.0	0.6	400	R46.KI. 3220.-.M1. -
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46.KI. 3330.-.M1. -
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46.KI. 3470.-.M1. -
0.15 µF	6.0	15.0	26.5	22.5	0.8	200	R46.KN. 3150.-.01. -
0.22 µF	6.0	15.0	26.5	22.5	0.8	200	R46.KN. 3220.-.M1. -
0.33 µF	7.0	16.0	26.5	22.5	0.8	200	R46.KN. 3330.-.M1. -
0.47 µF	8.5	17.0	26.5	22.5	0.8	200	R46.KN. 3470.-.M1. -
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R46.KN. 3470.-.01. -
0.68 µF	10.0	18.5	26.5	22.5	0.8	200	R46.KN. 3680.-.M2. -
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R46.KN. 3680.-.M1. -
1.0 µF	13.0	22.0	26.5	22.5	0.8	200	R46.KN. 4100.-.M1. -
0.47 µF	9.0	17.0	32.0	27.5	0.8	150	R46.KR. 3470.-.01. -
0.68 µF	9.0	17.0	32.0	27.5	0.8	150	R46.KR. 3680.-.M1. -
0.68 µF	10.0	20.0	32.0	27.5	0.8	150	R46.KR. 3680.-.01. -
1.0 µF	11.0	20.0	32.0	27.5	0.8	150	R46.KR. 4100.-.M1. -
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R46.KR. 4150.-.M1. -
1.5 µF	15.0	24.5	32.0	27.5	0.8	150	R46.KR. 4150.-.01. -
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R46.KR. 4220.-.M1. -
2.2 µF	18.0	33.0	32.0	27.5	0.8	150	R46.KR. 4220.-.01. -
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46.KR. 4330.-.M2. -
3.3 µF	22.0	37.0	32.0	27.5	0.8	150	R46.KR. 4330.-.M1. -
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R46.KR. 4470.-.M1. -
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R46.KW.4220.-.M1. -
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R46.KW.4330.-.M1. -
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46.KW.4470.-.M1. -

Mechanical version and packaging (Table 1)

Tolerance: K (± 10%); M (± 20%)

(*) E12 series available up to 5.6µF upon request

Table 1

Standard packaging style	Lead length (mm)	Taping style			Ordering code (Digit 10 to 11)
		P ₂ (mm)	Fig. (No.)	Pitch (mm)	
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø355mm		12.70	1	10.0/15.0	CK
REEL Ø500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 +2				00
Loose, long leads	25 -1/+2				50
Loose, insulated rigid leads	30 +5				51
Loose, insulated flexible leads	150 ±5				52

Note: Ammo-pack is the preferred packaging for taped version.

APPROVALS

	ENEC-IMQ EN132400 CB	Class X2	File No. V4413 File No. IT-1524
	CSA C22.2 N°1 (up to 1µF)	Across-the-line	File No. LR 83890
	UL 1414 (up to 1µF)	Across-the-line	File No.E97797
	UL 1283 (310 Vac)	Electromagnetic Interference Filters	File No.E85238
	CCEE IEC60384-14	Class X2	File No.CH0045034-2000

CSA and UL 1414 for 250Vac only.

Approved according to EN 132400 (IEC 60384-14 2nd edition 1993 plus Amendment A1: 1995).

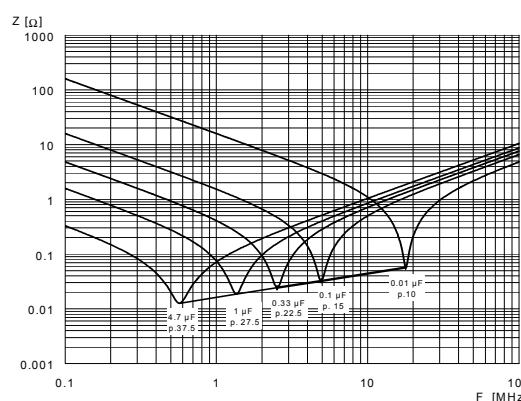
According to IEC 60065.

(*) ENEC mark has replaced all the following European National marks:



TYPICAL GRAPHS

Z = f (f) (lead length 2 mm). Typical values.



November 23, 2001