ARCOTRONICS

R.46

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.

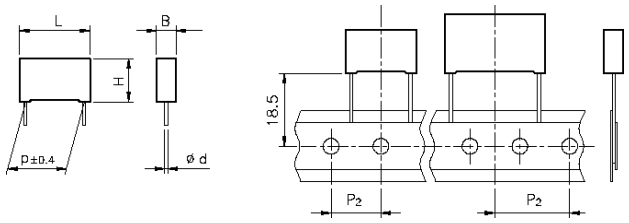
PRODUCT CODE: **R46**

Note: R.46 series has replaced the 1.40 series and 1.47 series. For new design we suggest the use of the R.46 series.

Loose

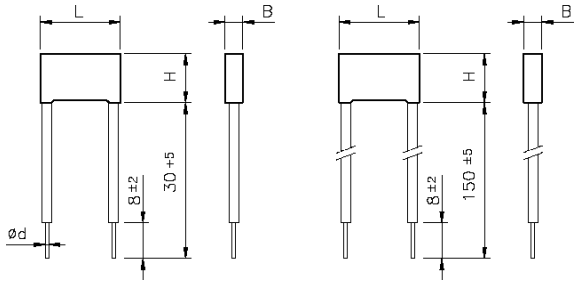
Taped

Fig.1 Fig.2



Insulated rigid leads

Insulated flexible leads 0.5mm²



∅ d ±0.05	p ≤15	22.5≤p≤27.5	p = 37.5
	0.6 or 0.8*	0.8	1

*See size table.
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, thermosetting 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, EN 132400.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 275Vac/300Vac; 50/60Hz

Capacitance range: 0.01µF to 5.6µF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±10% (K); ±20% (M).

Dissipation factor (DF):
$tg\delta \times 10^{-4}$ at +25°C ±5°C: ≤10 (6)* at 1kHz
* Typical value

Insulation resistance:

Test conditions

Temperature:	+25°C±5°C
Voltage charge time:	1 min
Voltage charge:	100 Vdc

Performance

≥ 1×10^5 MΩ (5×10^5 MΩ)*	for C ≤ 0.33µF
≥ 30000 s (150000 s)*	for C > 0.33µF

* Typical value

Test voltage between terminations (on all pieces)**:**
1500Vac for 1 s + 2200Vdc for 1 s at +25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions 1st

Temperature:	+40°C±2°C
Relative humidity (RH):	93% ±2%
Test duration:	56 days

Test conditions 2nd

Temperature:	+60°C±2°C
Relative humidity (RH):	95% ±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 |ΔC/C|:	≤5%
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+110°C±2°C
Test duration:	1000 h
Voltage applied:	$1.25 \times V_R$ +1000Vac 0.1 s/h

Performance

Dielectric strength:	no dielectric breakdown or flashover at $4.3 \times V_R$ (d.c.)/1 min
Capacitance change |ΔC/C|:	≤10%
Insulation resistance:	≥50% of initial limit.

Resistance to soldering heat:

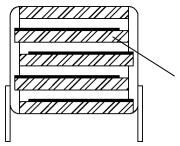
Test conditions

Solder bath temperature: +260°C±5°C
Dipping time (with heat screen):10 s±1 s

Performance

Capacitance change |ΔC/C|: ≤2%

Winding scheme



X2 CLASS (EN132400) - MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

SELF-HEALING PROPERTIES

Rated Cap. (*)	275/300Vac				Ø d	Max dv/dt at 390Vdc	Part Number
	B	H	L	p		(V/ µs)	
0.010 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2100 - - M1 -
0.015 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2150 - - M1 -
0.022 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2200 - - M1 -
0.033 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2330 - - M1 -
0.047 µF	6.0	12.0	13.0	10.0	0.6	500	R46 - F 2470 - - M1 -
0.068 µF	6.0	12.0	13.0	10.0	0.6	500	R46 - F 2680 - - M1 -
0.1 µF	6.0	12.0	13.0	10.0	0.6	500	R46 - F 3100 - - M1 M
0.010 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2100 - - 01 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2150 - - 01 -
0.022 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2220 - - 01 -
0.033 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2330 - - 01 -
0.047 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2470 - - 01 -
0.068 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2680 - - 01 -
0.10 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 3100 - - M1 M
0.10 µF	6.0	12.0	18.0	15.0	0.6	400	R46 - I 3100 - - 01 -
0.15 µF	6.0	12.0	18.0	15.0	0.6	400	R46 - I 3150 - - M2 M
0.15 µF	7.5	13.5	18.0	15.0	0.6	400	R46 - I 3150 - - M1 -
0.15 µF	9.0	12.0	18.0	15.0	0.6	400	R46 - I 3150 - - L2 -
0.22 µF	6.0	17.5	18.0	15.0	0.6	400	R46 - I 3220 - - 02 -
0.22 µF	7.5	13.5	18.0	15.0	0.6	400	R46 - I 3220 - - M2 M
0.22 µF	8.5	14.5	18.0	15.0	0.6	400	R46 - I 3220 - - M1 -
0.22 µF	9.0	12.5	18.0	15.0	0.6	400	R46 - I 3220 - - L2 -
0.33 µF	7.5	18.5	18.0	15.0	0.8	400	R46 - I 3330 - - 02 -
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46 - I 3330 - - M1 -
0.33 µF	13.0	12.0	18.0	15.0	0.8	400	R46 - I 3330 - - 01 -
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46 - I 3470 - - M1 -
0.15 µF	6.0	15.0	26.5	22.5	0.8	200	R46 - N 3150 - - 01 -
0.22 µF	6.0	15.0	26.5	22.5	0.8	200	R46 - N 3220 - - M1 -
0.33 µF	7.0	16.0	26.5	22.5	0.8	200	R46 - N 3330 - - M1 -
0.47 µF	8.5	17.0	26.5	22.5	0.8	200	R46 - N 3470 - - M1 -
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R46 - N 3470 - - 01 -
0.68 µF	10.0	18.5	26.5	22.5	0.8	200	R46 - N 3680 - - M2 -
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R46 - N 3680 - - M1 -
1.0 µF	13.0	22.0	26.5	22.5	0.8	200	R46 - N 4100 - - M1 -
0.47 µF	9.0	17.0	32.0	27.5	0.8	150	R46 - R 3470 - - 01 -
0.68 µF	9.0	17.0	32.0	27.5	0.8	150	R46 - R 3680 - - M1 -
0.68 µF	10.0	20.0	32.0	27.5	0.8	150	R46 - R 3680 - - 01 -
1.0 µF	11.0	20.0	32.0	27.5	0.8	150	R46 - R 4100 - - M1 -
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R46 - R 4150 - - M1 -
1.5 µF	15.0	24.5	32.0	27.5	0.8	150	R46 - R 4150 - - 01. -
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R46 - R 4220 - - M1 -
2.2 µF	18.0	33.0	32.0	27.5	0.8	150	R46 - R 4220 - - 01 -
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46 - R 4330 - - M2 -
3.3 µF	22.0	37.0	32.0	27.5	0.8	150	R46 - R 4330 - - M1 -
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R46 - R 4470 - - M1 -
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R46 - W 4220 - - M1 -
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R46 - W 4330 - - M1 -
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46 - W 4470 - - M1 -
5.6 µF	20.0	40.0	41.5	37.5	1.0	100	R46 - W 4560 - - M1 M

Rated voltage (K=275Vac, 3=300Vac)
Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)

(*)C > 5.6 µF available upon request

E12 Series available upon request

All dimensions are in mm

APPROVALS

(**)	ENEC-IMQ IEC 60384-14	Class X2	File No.V4413
	CAN/CSA E 384-14-95	Across-the-line	File No.1271537 (LR 83890)
	UL 1414 (up to 1µF)	Across-the-line	File No.E97797
	UL 1283 (310 Vac)	Class X2	File No.E85238
	GB/T 14472-1998 (275Vac)	Class X2	File No.pending

CSA and UL 1414 for 250Vac only.
Approved according to IEC 60384-14:1993+ A1:1995 (EN132400:1994+A2:1998+A3:1998+A4:2001).
According to IEC 60065.
(**) ENEC mark has replaced all the following European National marks:

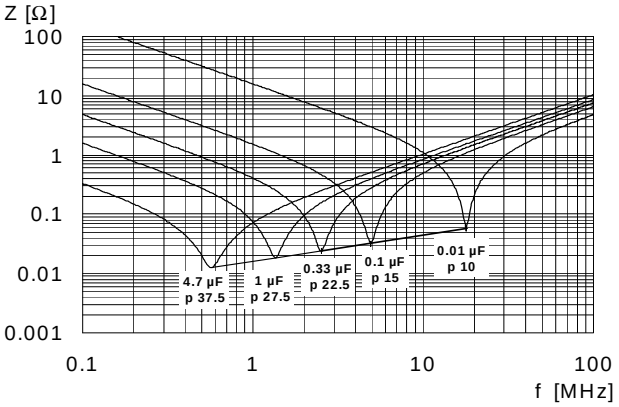
Table 1 (For more detailed information, please refer to page 16)

Standard packaging style	Lead length	Taping style			Ordering code
	(mm)	P_2 (mm)	Fig. (No.)	Pitch (mm)	(Digit 10 to 11)
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL ⌀355mm		12.70	1	10.0/15.0	CK
REEL ⌀500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4^{+2}				00
Loose, long leads	$25^{-1/+2}$				50
Loose, long leads	30^{+5}				40
Loose, insulated rigid leads	30^{+5}				51
Loose, insulated flexible leads	150^{+5}				52

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

TYPICAL GRAPHS

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



R.46

X2 CLASS (EN132400) - MKP Series

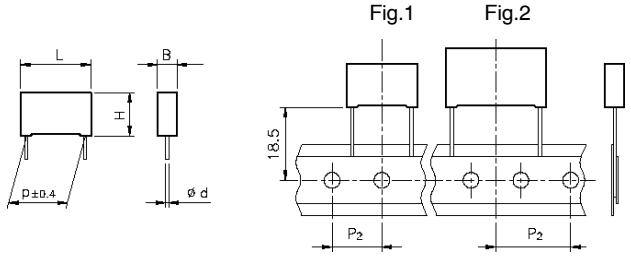
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

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**

Loose Taped

Fig.1 Fig.2



∅ d ±0.05	p ≤15	p = 22.5
	0.6 or 0.8*	0.8

*See size table.
All dimensions are in mm.

NEW 125°C

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.
Plates: metal layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire.
Protection: plastic case, thermosetting 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: 40/125/56 IEC 60068-1
Operating temperature range: -40 to +125°C
Related documents: IEC 60384-14 2nd edition '93; EN 132400.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 275Vac/300Vac; 50/60Hz
Capacitance range: 0.01µF to 1µF

TEST METHOD AND PERFORMANCE

Endurance:

Test conditions

Temperature: +125°C ± 2°C
Test duration: 1000 h
Voltage applied: 1.25 × V_R +1000Vac 0.1 s/h

Performance

Dielectric strength: no dielectric breakdown or flashover at 4.3 × V_R (d.c.)/1 min
Capacitance change |ΔC/C|: ≤10%
Insulation resistance: ≥50% of initial limit.

APPROVALS

(*)	ENEC-IMQ IEC 60384-14	Class X2	File No.CA08.00063
	CAN/CSA E 384-14-95	Across-the-line	File No.1271537 (LR83890) pending
	UL 1283 (310 Vac)	Class X2	File No.E85238

CSA and UL 1414 for 250Vac only.
Approved according to IEC 60384-14:1993+ A1:1995 (EN132400:1994+A2:1998+A3:1998+A4:2001).
According to IEC 60065.

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

Rated Cap.	275/300Vac B	H	L	p	∅ d	Max dv/dt at 390Vdc (V/ µs)	Part Number
0.010 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2100 - - H1 -
0.015 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2150 - - H1 -
0.022 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2200 - - H1 -
0.033 µF	5.0	11.0	13.0	10.0	0.6	500	R46 - F 2330 - - H1 -
0.047 µF	6.0	12.0	13.0	10.0	0.6	500	R46 - F 2470 - - H1 -
0.068 µF	6.0	12.0	13.0	10.0	0.6	500	R46 - F 2680 - - H1 M
0.010 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2100 - - H1 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2150 - - H1 -
0.022 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2220 - - H1 -
0.033 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2330 - - H1 -
0.047 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2470 - - H1 -
0.068 µF	5.0	11.0	18.0	15.0	0.6	400	R46 - I 2680 - - H1 -
0.10 µF	6.0	12.0	18.0	15.0	0.6	400	R46 - I 3100 - - H1 -
0.15 µF	6.0	17.5	18.0	15.0	0.6	400	R46 - I 3150 - - H2 -
0.15 µF	9.0	12.5	18.0	15.0	0.6	400	R46 - I 3150 - - H3 -
0.15 µF	7.5	13.5	18.0	15.0	0.6	400	R46 - I 3150 - - H1 -
0.22 µF	8.5	14.5	18.0	15.0	0.6	400	R46 - I 3220 - - H1 -
0.22 µF	6.0	17.5	18.0	15.0	0.6	400	R46 - I 3220 - - H2 M
0.22 µF	9.0	12.5	18.0	15.0	0.6	400	R46 - I 3220 - - H3 M
0.22 µF	7.5	18.5	18.0	15.0	0.6	400	R46 - I 3220 - - H4 -
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46 - I 3330 - - H1 M
0.33 µF	7.5	18.5	18.0	15.0	0.8	400	R46 - I 3330 - - H2 M
0.33 µF	13.0	12.0	18.0	15.0	0.8	400	R46 - I 3330 - - H3 M
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46 - I 3470 - - H1 M
0.15 µF	6.0	15.0	26.5	22.5	0.8	200	R46 - N 3150 - - H1 -
0.22 µF	6.0	15.0	26.5	22.5	0.8	200	R46 - N 3220 - - H1 -
0.33 µF	7.0	16.0	26.5	22.5	0.8	200	R46 - N 3330 - - H1 -
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R46 - N 3470 - - H1 -
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R46 - N 3680 - - H1 -
1.0 µF	13.0	22.0	26.5	22.5	0.8	200	R46 - N 4100 - - H1 -

Rated voltage (K=275Vac, 3=300Vac)
Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)

E12 Series available upon request
All dimensions are in mm

For all other characteristics or performance see page 115.