

X2 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
 SELF-HEALING PROPERTIES

Typical applications: This special R46 release is designed for applications in series with the main

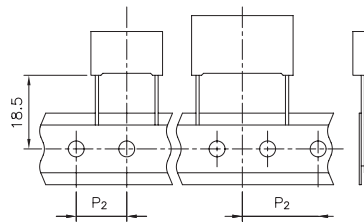
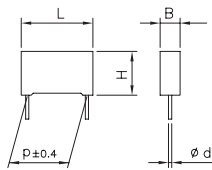
PRODUCT CODE: R46

Loose

Taped

Fig.1

Fig.2



Ø d ±0.05	p ≤15	22.5 ≤ p ≤ 27.5	p = 37.5
	0.6 or 0.8*	0.8	1.0

*See size table.

All dimensions are in mm.

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
10.0	All	B +0.2	H +0.1	L +0.2
15.0	<7.5	B +0.2	H +0.1	L +0.3
15.0	≥7.5	B +0.2	H +0.1	L +0.5
22.5	All	B +0.2	H +0.1	L +0.3
27.5	All	B +0.2	H +0.1	L +0.3
37.5	All	B +0.3	H +0.1	L +0.3

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 60384-14.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 275Vac (50/60Hz) / 560 Vdc

Capacitance range: 0.022µF to 10µF

Capacitance values: E6 series (IEC 60063 Norm).

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

tolerance ±5% (J) available upon request

Dissipation factor (DF):

tgδ 10⁻⁴ at +25°C ±5°C: ≤15 (8)* at 1kHz

* Typical value

Insulation resistance:

Test conditions

Temperature: +25°C±5°C

Voltage charge time: 1 min

Voltage charge: 100 Vdc

Performance

≥1x10⁵ MΩ (5x10⁵ 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

Test conditions 3rd

Temperature: +40°C ± 2°C

Relative humidity (RH): 93% ±2%

Test duration: 500 hours

Voltage value: 230 Vac, 50 Hz

Performance

Dielectric strength: no dielectric breakdown or flashover at 4.3 x 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 x V_R +1000Vac 0.1 s/h

Performance

Dielectric strength: no dielectric breakdown or flashover at 4.3 x 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%

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APPROVALS

Rated Cap. (*)	275 Vac / 560 Vdc Std dimensions					Ø d	Max dv/dt at 390Vdc (V/µs)	Part Number		
	B	H	L	p						
0.010 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2100 -- S0	-	
0.015 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2150 -- S0	-	
0.022 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2220 -- S0	-	
0.033 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2330 -- S0	-	
0.047 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2470 -- S1	-	
0.068 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	2680 -- S0	-	
0.10 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	3100 -- S1	M	
0.10 µF	6.0	12.0	18.0	15.0	0.6	400	R46 KI	3100 -- S0	-	
0.15 µF	6.0	12.0	18.0	15.0	0.6	400	R46 KI	3150 -- S1	M	
0.15 µF	7.5	13.5	18.0	15.0	0.6	400	R46 KI	3150 -- S0	-	
0.15 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3150 -- S3	-	
0.22 µF	7.5	13.5	18.0	15.0	0.6	400	R46 KI	3220 -- S1	M	
0.22 µF	8.5	14.5	18.0	15.0	0.6	400	R46 KI	3220 -- S0	-	
0.22 µF	6.0	17.5	18.0	15.0	0.6	400	R46 KI	3220 -- S2	-	
0.22 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3220 -- S3	-	
0.33 µF	13.0	12.0	18.0	15.0	0.8	400	R46 KI	3330 -- S1	-	
0.33 µF	8.5	14.5	18.0	15.0	0.8	400	R46 KI	3330 -- S3	M	
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46 KI	3330 -- S0	-	
0.33 µF	7.5	18.5	18.0	15.0	0.8	400	R46 KI	3330 -- S2	-	
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3470 -- S0	-	
0.47 µF	10.0	16.0	18.0	15.0	0.8	400	R46 KI	3470 -- S1	M	
0.56 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3560 -- S0	-	
0.68 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3680 -- S0	M	
0.22 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3220 -- S0	-	
0.33 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3330 -- S1	M	
0.33 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3330 -- S0	-	
0.47 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3470 -- S1	M	
0.47 µF	8.5	17.0	26.5	22.5	0.8	200	R46 KN	3470 -- S0	-	
0.68 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	3680 -- S0	-	
1.0 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	4100 -- S2	M	
1.0 µF	11.0	20.0	26.5	22.5	0.8	200	R46 KN	4100 -- S1	-	
1.2 µF	13.0	22.0	26.5	22.5	0.8	200	R46 KN	4120 -- S0	-	
0.47 µF	9.0	17.0	32.0	27.5	0.8	150	R46 KR	3470 -- S0	-	
0.68 µF	9.0	17.0	32.0	27.5	0.8	150	R46 KR	3680 -- S1	-	
1.0 µF	11.0	20.0	32.0	27.5	0.8	150	R46 KR	4100 -- S1	-	
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R46 KR	4150 -- S1	-	
2.2 µF	13.0	25.0	32.0	27.5	0.8	150	R46 KR	4220 -- S2	-	
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4330 -- S2	-	
4.7 µF	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4470 -- S2	-	
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4150 -- S1	-	
2.2 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4220 -- S2	M	
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R46 KW	4220 -- S1	-	
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4330 -- S1	-	
4.7 µF	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4470 -- S2	M	
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46 KW	4470 -- S1	-	
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R46 KW	4680 -- S2	-	
10.0 µF	30.0	45.0	41.5	37.5	1.0	100	R46 KW	5100 -- S1	-	

	ENEC IEC 60384-14	Class X2	File No.V4413
	UL 1414 (up to 1µF, 85°C; 250Vac)	Across-the-line	File No.E97797
	CSA - C22.2 No.1 (up to 1µF, 85°C; 250Vac)	Across-the-line certified for Canada	File No.E97797
	UL 1283 (310 Vac)	Electromagnetic Interference Filters	File No.E85238
	CSA - C22.2 No.8 (310 Vac)	Electromagnetic Interference Filters certified for Canada	File No.E85238
	GB/T 14472	Class X2	File CQC03001008199 CQC03001008842

Approved according to IEC 60384-14
 According to IEC 60065

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



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 Ø500mm		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, 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.

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

300Vac Available upon request
 E12 Series available upon request
 All dimensions are in mm