

| $\varnothing d \pm 0.05$ | $p \leq 15$ | $22.5 \leq p \leq 27.5$ | $p = 37.5$ |
|--------------------------|-------------|-------------------------|------------|
|                          | 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 (50/60Hz) / 560 Vdc  
300Vac (50/60Hz) / 630 Vdc

**Capacitance range:** 0.01µF to 10µF

**Capacitance values:** E6 series (IEC 60063 Norm).

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

**Dissipation factor (DF):**

$\text{tg} \delta \cdot 10^{-4}$  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**

≥1x10<sup>5</sup> MΩ (5x10<sup>5</sup> 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

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.

| Pitch<br>(mm) | Box thickness (B)<br>(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 |

## 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 x  $V_R$  (d.c.)/1 min

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

Insulation resistance: ≥50% of initial limit.

**Resistance to soldering heat:**

**Test conditions**

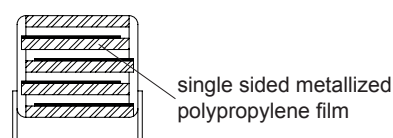
Solder bath temperature: +260°C ± 5°C

Dipping time (with heat screen): 10 s ± 1 s

**Performance**

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

**Winding scheme**



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

APPROVALS

|                                                                                   |                                     |                 |                                     |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------|-------------------------------------|
|  | ENEC<br>IEC 60384-14                | Class X2        | File No.V4413                       |
|  | CSA<br>E 384-14-95<br>(up to 5.6µF) | Across-the-line | File No.154612<br>(LR 83890)        |
|  | UL 1414<br>(up to 1µF)              | Across-the-line | File No.E97797                      |
|  | UL 1283<br>(310 Vac)                | Class X2        | File No.E85238                      |
|  | GB/T 14472-1998<br>(275Vac)         | Class X2        | File CQC3001008199<br>CQC3001008842 |

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

| Standard<br>packaging style        | Lead<br>length<br>(mm) | Taping style           |               |               | Ordering<br>code<br>(Digit 10 to 11) |
|------------------------------------|------------------------|------------------------|---------------|---------------|--------------------------------------|
|                                    |                        | P <sub>2</sub><br>(mm) | Fig.<br>(No.) | Pitch<br>(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 <sup>+2</sup>        |                        |               |               | 00                                   |
| Loose, long leads                  | 25 <sup>-1/+2</sup>    |                        |               |               | 50                                   |
| Loose, long leads                  | 30 <sup>+5</sup>       |                        |               |               | 40                                   |
| Loose, insulated<br>rigid leads    | 30 <sup>+5</sup>       |                        |               |               | 51                                   |
| Loose, insulated<br>flexible leads | 150 <sup>+5</sup>      |                        |               |               | 52                                   |

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

For "capacitor connected in series with main line" (two-phase and three-phase net) application, please contact our Technical Service for choosing the safest solution.

| Rated Cap.<br>(*) | 275 Vac / 560 Vdc<br>Std dimensions |      |      |      | Ø d | Max<br>dv/dt at<br>390Vdc<br>(V/µs) | Part Number |      |       |   |
|-------------------|-------------------------------------|------|------|------|-----|-------------------------------------|-------------|------|-------|---|
|                   | B                                   | H    | L    | p    |     |                                     |             |      |       |   |
| 0.010 µF          | 4.0                                 | 9.0  | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 2100 | -- N0 | - |
| 0.015 µF          | 4.0                                 | 9.0  | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 2150 | -- N0 | - |
| 0.022 µF          | 4.0                                 | 9.0  | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 2220 | -- N0 | - |
| 0.033 µF          | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 2330 | -- M1 | - |
| 0.047 µF          | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 2470 | -- N0 | - |
| 0.068 µF          | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 2680 | -- M1 | - |
| 0.1 µF            | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                                 | R46 KF      | 3100 | -- M1 | M |
| #0.010 µF         | 4.0                                 | 10.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2100 | -- N0 | - |
| 0.010 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2100 | -- 01 | - |
| #0.015 µF         | 4.0                                 | 10.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2150 | -- N0 | - |
| 0.015 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2150 | -- 01 | - |
| #0.022 µF         | 4.0                                 | 10.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2220 | -- N0 | - |
| 0.022 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2220 | -- 01 | - |
| #0.033 µF         | 4.0                                 | 10.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2330 | -- N0 | - |
| 0.033 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2330 | -- 01 | - |
| #0.047 µF         | 4.0                                 | 10.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2470 | -- N0 | - |
| 0.047 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2470 | -- 01 | - |
| #0.068 µF         | 4.0                                 | 10.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 2680 | -- N0 | - |
| 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 | - |
| 0.15 µF           | 6.0                                 | 12.0 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3150 | -- M2 | - |
| 0.15 µF           | 9.0                                 | 12.5 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3150 | -- L2 | - |
| 0.22 µF           | 7.5                                 | 13.5 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3220 | -- M2 | - |
| 0.22 µF           | 9.0                                 | 12.5 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3220 | -- L2 | - |
| 0.22 µF           | 6.0                                 | 17.5 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3220 | -- 02 | - |
| 0.33 µF           | 8.5                                 | 14.5 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3330 | -- N0 | - |
| 0.33 µF           | 10.0                                | 16.0 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3330 | -- M1 | - |
| 0.33 µF           | 9.0                                 | 12.5 | 18.0 | 15.0 | 0.6 | 400                                 | R46 KI      | 3330 | -- N1 | M |
| 0.33 µF           | 7.5                                 | 18.5 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3330 | -- 02 | - |
| 0.33 µF           | 13.0                                | 12.0 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3330 | -- 01 | - |
| #0.47 µF          | 7.5                                 | 18.5 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3470 | -- 02 | M |
| 0.47 µF           | 10.0                                | 16.0 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3470 | -- N0 | M |
| 0.47 µF           | 11.0                                | 19.0 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3470 | -- M1 | - |
| 0.56 µF           | 11.0                                | 19.0 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3560 | -- N0 | - |
| 0.60 µF           | 11.0                                | 19.0 | 18.0 | 15.0 | 0.8 | 400                                 | R46 KI      | 3600 | -- N0 | M |
| 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           | 6.0                                 | 15.0 | 26.5 | 22.5 | 0.8 | 200                                 | R46 KN      | 3330 | -- N0 | - |
| 0.47 µF           | 7.0                                 | 16.0 | 26.5 | 22.5 | 0.8 | 200                                 | R46 KN      | 3470 | -- N0 | - |
| 0.68 µF           | 10.0                                | 18.5 | 26.5 | 22.5 | 0.8 | 200                                 | R46 KN      | 3680 | -- M2 | - |
| 1.0 µF            | 10.0                                | 18.5 | 26.5 | 22.5 | 0.8 | 200                                 | R46 KN      | 4100 | -- N2 | M |
| 1.0 µF            | 11.0                                | 20.0 | 26.5 | 22.5 | 0.8 | 200                                 | R46 KN      | 4100 | -- N1 | - |
| 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 | - |
| 2.2 µF            | 14.0                                | 28.0 | 32.0 | 27.5 | 0.8 | 150                                 | R46 KR      | 4220 | -- M1 | - |
| 3.3 µF            | 18.0                                | 33.0 | 32.0 | 27.5 | 0.8 | 150                                 | R46 KR      | 4330 | -- M2 | - |
| 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 | - |
| 5.6 µF            | 20.0                                | 40.0 | 41.5 | 37.5 | 1.0 | 100                                 | R46 KW      | 4560 | -- M1 | M |
| 6.8 µF            | 24.0                                | 44.0 | 41.5 | 37.5 | 1.0 | 100                                 | R46 KW      | 4680 | -- M1 | - |
| 10.0 µF           | 30.0                                | 45.0 | 41.5 | 37.5 | 1.0 | 100                                 | R46 KW      | 5100 | -- M1 | - |

Rated voltage (K=275Vac)

Mechanical version and packaging (Table 1)

Tolerance: K (±10%); M (±20%)

All dimensions are in mm

# UL, CSA and CQC approvals are in progress.

E12 Series available upon request

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

APPROVALS

|                                                                                   |                                     |                 |                                     |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------|-------------------------------------|
|  | ENEC<br>IEC 60384-14                | Class X2        | File No.V4413                       |
|  | CSA<br>E 384-14-95<br>(up to 5.6µF) | Across-the-line | File No.154612<br>(LR 83890)        |
|  | UL 1414<br>(up to 1µF)              | Across-the-line | File No.E97797                      |
|  | UL 1283<br>(310 Vac)                | Class X2        | File No.E85238                      |
|  | GB/T 14472-1998<br>(275Vac)         | Class X2        | File CQC3001008199<br>CQC3001008842 |

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

| Standard<br>packaging style        | Lead<br>length<br>(mm) | Taping style           |               |               | Ordering<br>code<br>(Digit 10 to 11) |
|------------------------------------|------------------------|------------------------|---------------|---------------|--------------------------------------|
|                                    |                        | P <sub>2</sub><br>(mm) | Fig.<br>(No.) | Pitch<br>(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 <sup>+2</sup>        |                        |               |               | 00                                   |
| Loose, long leads                  | 25 <sup>-1/+2</sup>    |                        |               |               | 50                                   |
| Loose, long leads                  | 30 <sup>+5</sup>       |                        |               |               | 40                                   |
| Loose, insulated<br>rigid leads    | 30 <sup>+5</sup>       |                        |               |               | 51                                   |
| Loose, insulated<br>flexible leads | 150 <sup>+5</sup>      |                        |               |               | 52                                   |

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

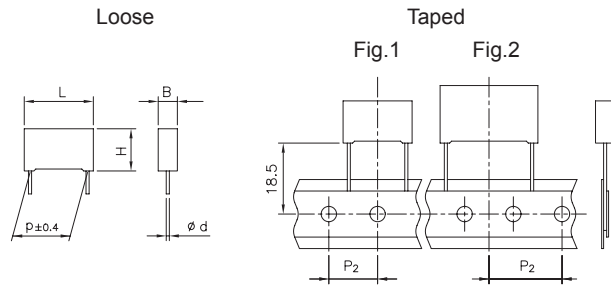
For "capacitor connected in series with main line" (two-phase and three-phase net) application, please contact our Technical Service for choosing the safest solution.

| Rated Cap.<br>(*) | 300 Vac / 630 Vdc<br>Std dimensions |      |      |      | Ø d | Max<br>dv/dt at<br>390Vdc<br>(V/ µs) | Part Number |      |       |   |
|-------------------|-------------------------------------|------|------|------|-----|--------------------------------------|-------------|------|-------|---|
|                   | B                                   | H    | L    | p    |     |                                      |             |      |       |   |
| 0.010 µF          | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 2100 | -- M1 | - |
| 0.015 µF          | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 2150 | -- M1 | - |
| 0.022 µF          | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 2220 | -- M1 | - |
| 0.033 µF          | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 2330 | -- M1 | - |
| 0.047 µF          | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 2470 | -- M1 | - |
| 0.068 µF          | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 2680 | -- M1 | - |
| 0.1 µF            | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                                  | R46 3F      | 3100 | -- M1 | M |
| 0.010 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 2100 | -- 01 | - |
| 0.015 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 2150 | -- 01 | - |
| 0.022 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 2220 | -- 01 | - |
| 0.033 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 2330 | -- 01 | - |
| 0.047 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 2470 | -- 01 | - |
| 0.068 µF          | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 2680 | -- 01 | - |
| 0.1 µF            | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3100 | -- M1 | M |
| 0.1 µF            | 6.0                                 | 12.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3100 | -- 01 | - |
| 0.15 µF           | 6.0                                 | 12.0 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3150 | -- M2 | M |
| 0.15 µF           | 7.5                                 | 13.5 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3150 | -- M1 | - |
| 0.22 µF           | 7.5                                 | 13.5 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3220 | -- M2 | M |
| 0.22 µF           | 8.5                                 | 14.5 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3220 | -- M1 | - |
| 0.22 µF           | 9.0                                 | 12.5 | 18.0 | 15.0 | 0.6 | 400                                  | R46 3I      | 3220 | -- L2 | - |
| 0.33 µF           | 10.0                                | 16.0 | 18.0 | 15.0 | 0.8 | 400                                  | R46 3I      | 3330 | -- M1 | - |
| 0.33 µF           | 13.0                                | 12.0 | 18.0 | 15.0 | 0.8 | 400                                  | R46 3I      | 3330 | -- 01 | - |
| 0.47 µF           | 11.0                                | 19.0 | 18.0 | 15.0 | 0.8 | 400                                  | R46 3I      | 3470 | -- M1 | - |
| 0.15 µF           | 6.0                                 | 15.0 | 26.5 | 22.5 | 0.8 | 200                                  | R46 3N      | 3150 | -- 01 | - |
| 0.22 µF           | 6.0                                 | 15.0 | 26.5 | 22.5 | 0.8 | 200                                  | R46 3N      | 3220 | -- M1 | - |
| 0.33 µF           | 7.0                                 | 16.0 | 26.5 | 22.5 | 0.8 | 200                                  | R46 3N      | 3330 | -- M1 | - |
| 0.47 µF           | 8.5                                 | 17.0 | 26.5 | 22.5 | 0.8 | 200                                  | R46 3N      | 3470 | -- M1 | - |
| 0.68 µF           | 10.0                                | 18.5 | 26.5 | 22.5 | 0.8 | 200                                  | R46 3N      | 3680 | -- M2 | - |
| 1.0 µF            | 13.0                                | 22.0 | 26.5 | 22.5 | 0.8 | 200                                  | R46 3N      | 4100 | -- M1 | - |
| 0.47 µF           | 9.0                                 | 17.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 3470 | -- 01 | - |
| 0.68 µF           | 9.0                                 | 17.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 3680 | -- M1 | - |
| 0.68 µF           | 10.0                                | 20.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 3680 | -- 01 | - |
| 1.0 µF            | 11.0                                | 20.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4100 | -- M1 | - |
| 1.5 µF            | 13.0                                | 22.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4150 | -- M1 | - |
| 1.5 µF            | 15.0                                | 24.5 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4150 | -- 01 | - |
| 2.2 µF            | 14.0                                | 28.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4220 | -- M1 | - |
| 2.2 µF            | 18.0                                | 33.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4220 | -- 01 | - |
| 3.3 µF            | 18.0                                | 33.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4330 | -- M2 | - |
| 3.3 µF            | 22.0                                | 37.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4330 | -- M1 | - |
| 4.7 µF            | 22.0                                | 37.0 | 32.0 | 27.5 | 0.8 | 150                                  | R46 3R      | 4470 | -- M1 | - |
| 2.2 µF            | 13.0                                | 24.0 | 41.5 | 37.5 | 1.0 | 100                                  | R46 3W      | 4220 | -- M1 | - |
| 3.3 µF            | 16.0                                | 28.5 | 41.5 | 37.5 | 1.0 | 100                                  | R46 3W      | 4330 | -- M1 | - |
| 4.7 µF            | 19.0                                | 32.0 | 41.5 | 37.5 | 1.0 | 100                                  | R46 3W      | 4470 | -- M1 | - |
| 5.6 µF            | 20.0                                | 40.0 | 41.5 | 37.5 | 1.0 | 100                                  | R46 3W      | 4560 | -- M1 | M |
| 6.8 µF            | 24.0                                | 44.0 | 41.5 | 37.5 | 1.0 | 100                                  | R46 3W      | 4680 | -- M1 | - |
| 10.0 µF           | 30.0                                | 45.0 | 41.5 | 37.5 | 1.0 | 100                                  | R46 3W      | 5100 | -- M1 | - |

Rated voltage (3=300Vac)

Mechanical version and packaging (Table 1)

Tolerance: K (±10%); M (±20%)



| Ø d ±0.05 | p ≤15       | p = 22.5 |
|-----------|-------------|----------|
|           | 0.6 or 0.8* | 0.8      |

\*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:** 40/125/56 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<sub>R</sub>):** 275 Vac (50/60Hz) / 560 Vdc

**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 x V<sub>R</sub> +1000Vac 0.1 s/h

#### Performance

Dielectric strength: no dielectric breakdown or flashover at 4.3 x V<sub>R</sub> (d.c.)/1 min

Capacitance change  $\Delta C/C$ : ≤ 10%

Insulation resistance: ≥ 50% of initial limit.

## APPROVALS

|  |                        |                 |                             |
|--|------------------------|-----------------|-----------------------------|
|  | ENEC<br>IEC 60384-14   | Class X2        | File No.CA08.00063          |
|  | CSA<br>E 384-14-95     | Across-the-line | File No.154612<br>(LR83890) |
|  | UL 1414<br>(up to 1µF) | Across-the-line | File No.E97797              |
|  | UL 1283<br>(310 Vac)   | Class X2        | File No.E85238              |

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:



## X2 CLASS (EN132400) - MKP 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**

# NEW 125°C

| Rated Cap. | 275 Vac / 560 Vdc<br>Std dimensions |      |      |      | 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 K F 2100 - - H1 - |
| 0.015 µF   | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                        | R46 K F 2150 - - H1 - |
| 0.022 µF   | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                        | R46 K F 2220 - - H1 - |
| 0.033 µF   | 5.0                                 | 11.0 | 13.0 | 10.0 | 0.6 | 500                        | R46 K F 2330 - - H1 - |
| 0.047 µF   | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                        | R46 K F 2470 - - H1 - |
| 0.068 µF   | 6.0                                 | 12.0 | 13.0 | 10.0 | 0.6 | 500                        | R46 K F 2680 - - H1 M |
| 0.010 µF   | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 2100 - - H1 - |
| 0.015 µF   | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 2150 - - H1 - |
| 0.022 µF   | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 2220 - - H1 - |
| 0.033 µF   | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 2330 - - H1 - |
| 0.047 µF   | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 2470 - - H1 - |
| 0.068 µF   | 5.0                                 | 11.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 2680 - - H1 - |
| 0.10 µF    | 6.0                                 | 12.0 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3100 - - H1 - |
| 0.15 µF    | 6.0                                 | 17.5 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3150 - - H2 - |
| 0.15 µF    | 9.0                                 | 12.5 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3150 - - H3 - |
| 0.15 µF    | 7.5                                 | 13.5 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3150 - - H1 - |
| 0.22 µF    | 8.5                                 | 14.5 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3220 - - H1 - |
| 0.22 µF    | 6.0                                 | 17.5 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3220 - - H2 M |
| 0.22 µF    | 9.0                                 | 12.5 | 18.0 | 15.0 | 0.6 | 400                        | R46 K I 3220 - - H3 M |
| 0.22 µF    | 7.5                                 | 18.5 | 18.0 | 15.0 | 0.8 | 400                        | R46 K I 3220 - - H4 - |
| 0.33 µF    | 10.0                                | 16.0 | 18.0 | 15.0 | 0.8 | 400                        | R46 K I 3330 - - H1 M |
| 0.33 µF    | 7.5                                 | 18.5 | 18.0 | 15.0 | 0.8 | 400                        | R46 K I 3330 - - H2 M |
| 0.33 µF    | 13.0                                | 12.0 | 18.0 | 15.0 | 0.8 | 400                        | R46 K I 3330 - - H3 M |
| 0.47 µF    | 11.0                                | 19.0 | 18.0 | 15.0 | 0.8 | 400                        | R46 K I 3470 - - H1 M |
| 0.15 µF    | 6.0                                 | 15.0 | 26.5 | 22.5 | 0.8 | 200                        | R46 K N 3150 - - H1 - |
| 0.22 µF    | 6.0                                 | 15.0 | 26.5 | 22.5 | 0.8 | 200                        | R46 K N 3220 - - H1 - |
| 0.33 µF    | 7.0                                 | 16.0 | 26.5 | 22.5 | 0.8 | 200                        | R46 K N 3330 - - H1 - |
| 0.47 µF    | 10.0                                | 18.5 | 26.5 | 22.5 | 0.8 | 200                        | R46 K N 3470 - - H1 - |
| 0.68 µF    | 11.0                                | 20.0 | 26.5 | 22.5 | 0.8 | 200                        | R46 K N 3680 - - H1 - |
| 1.0 µF     | 13.0                                | 22.0 | 26.5 | 22.5 | 0.8 | 200                        | R46 K N 4100 - - H1 - |

Rated voltage (K=275Vac)

Mechanical version and packaging (Table 1)

Tolerance: K (±10%); M (±20%)

E12 Series available upon request

All dimensions are in mm

For "capacitor connected in series with main line" (two-phase and three-phase net) application, please contact our Technical Service for choosing the safest solution.