DC Film Capacitors

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Contents

TECHNICAL TERMS EXPLANATION

Rated capacitance
Capacitance referred to 1 kHz, 20±1°C, 65±2% of relative humidity and 96 ±10 kPa.
In case of doubt please refer to IEC 60068-1, sub-clause 5.2.

Capacitance tolerance
Admitted capacitance deviation from the rated capacitance.

Rated temperature (T_R)
The maximum ambient temperature surrounding the capacitor or hottest contact point (e.g. tracks), whichever is higher, at which the rated voltage Vdc or Vac at 50 Hz may be continuously applied.

Rated voltage (V_R)
The maximum direct voltage or the maximum r.m.s. alternating voltage (50 Hz)or the peak value of a pulse voltage which may be continuously applied to a capacitor at any temperature between the lower category temperature and the rated temperature.

Category voltage (V_c)
The maximum direct voltage or the maximum r.m.s. alternating voltage or the peak value of a pulse voltage which may be continuously applied to a capacitor at its upper category temperature.

Temperature derated voltage
The maximum voltage that may be continuously applied to a capacitor for any temperature between the rated temperature and the upper category temperature.

Climatic category
The climatic category which the capacitor belongs to is expressed in numbers (standard IEC 60068-1: example 55/100/56).
The first number represents the lower category temperature (example: -55°C); the second number the upper category temperature (example: +100°C) and the third number represents the number of days relevant to the damp heat test (example: 56 days).

Operating temperature range
The operating temperature of the capacitor is defined as the ambient temperature + self temperature raise + temperature raise due to thermal radiation from other heat sources.

Temperature coefficient of capacitance (α_i)
The change rate of capacitance with temperature measured over a specified range of temperature. It is normally expressed in parts per million per Celsius degree (10^{-6}/°C) and referred to 20°C

$$\alpha_i = \frac{Cl - Co}{Co\ (Ti - To)}$$

where: Ci = Capacitance at temperature Ti
Co = Capacitance at temperature 20±2°C

For more details please refer to EN 130000.

Variation of capacitance with humidity
The capacitance of a plastic film capacitor changes with the ambient humidity. The capacitance change depends upon the dielectric type. Please refer to the graph at page 12.

Dissipation factor (tgδ)
The dissipation factor is the ratio between the resistive and the reactive part of the impedance of the capacitor submitted to a sinusoidal voltage of specified frequency.

Insulation resistance (Ir) / time constant
The insulation resistance is the ratio between an applied D.C. voltage and the resulting leakage current after a minute of charge. It is expressed in MΩ. The time constant is expressed in seconds with the following formula:

$$t\ [s] = Ir\ [M\Omega] \times C\ [\mu F].$$

It states the time necessary to reduce the voltage to the terminals of the capacitor at 37% of a fully charged capacitor value.

Pulse rise time (dv/dt) and K_0
The pulse rise time defines the capability of a capacitor to withstand high current peaks due to fast voltage changes.
The peak current is defined by the following formula:

$$I_p \text{ (peak current)} = C \times dv/dt$$

where: I_p in A; C in μF; dv/dt in V/μs
K_0 is the content of energy of the wave-form applied to the capacitor and it is defined by the following formula:

$$K_0 = 2\int_0^{\tau} (dv/dt)^2\ dt$$

where: τ (pulse width) in μs; K_0 in $V^2/\mu s$.
The maximum values of dv/dt and K_0 mentioned in this catalogue must not be exceeded in order to prevent a dangerous overheating of the capacitor.

APPLICATION NOTES - SAFETY CONDITIONS

1. Operating voltage

1.1 Rated voltage (V_R)

Rated voltage is the max voltage that may be continuously applied at the rated temperature. Values higher than the rated voltage may cause a perforation in the capacitor dielectric or a short circuit.
Metallized capacitors have self-healing properties and the application of voltages higher than rated voltage will not cause an immediate short circuit. Instead, what may occur, is a progressive drop in the insulation resistance with a possible risk of smoke or fire, depending upon the type of electric circuit in which the capacitor is working.
The rated voltage of the capacitor is usually D.C.
If a capacitor marked D.C. is used as an A.C. capacitor, the maximum working voltage is limited by the heat produced or by micro discharges that could take place inside the capacitor. Do not use A.C. voltages higher than those specified in the catalogue for each series.
Note:

a) The A.C. voltages described in the catalogue refer to a sinusoidal wave-form. In case of other types of waveforms or for working conditions different from those described in the catalogue, please contact our Technical Service before using the capacitors.
b) If the capacitor is subject to voltages higher than the rated voltage, caused, for example, by the bad functioning of other equipment, it might be necessary to use a protection device.
c) The Rated Voltage (Vac) can be applied during the whole life of the capacitor in case you are using a suppressor series or those quoting “A.C. APPLICATIONS”.
   In any other case, the Vac can be applied for a max. operating time of 1000 hours.

1.2 Derating of rated voltage for high operating temperature

In case of a plastic film capacitor, the operating temperature (the temperature measured on the hottest point of the capacitor) depends upon the type of dielectric used, the ambient temperature in which the capacitor is placed, the type of voltage applied (A.C. or D.C.) and in case of pulse applications, upon the value of current and frequency applied.
The rated voltage (V_R) is the maximum voltage that can be applied at a temperature ≤ the rated temperature.
For temperatures higher than the rated temperature it is necessary to apply a voltage derating to prevent any damages to the dielectric of the capacitor.
This derating depends, in general, upon the type of dielectrics used (polyester, polypropylene, etc.).
The catalogue quotes the limits for each series.

2. Dissipation (A.C. applications)

When a capacitor is used in A.C. applications at high frequency, internal heating of the capacitor may follow with a possible risk of smoke or fire. This is caused by the heating effect of the current flowing through the internal resistance of the capacitor. The formula used to calculat the max power dissipated by the capacitor is the following:

$$P_{cmax} = \sum_{1}^{N}{}_{i} V^2rmsc_i \times 2\pi f_i \times C \times tg\delta_{max}(f_i) = \sum_{1}^{N}{}_{i} \frac{I^2rmsc_i}{2\pi f_i \times C} \times tg\delta_{max}(f_i)$$

where:

P_{cmax} = max dissipated power in watt
$Vrmsc_i$ = r.m.s. voltage of the i^{th} harmonic in volt
$Irmsc_i$ = r.m.s. current of the i^{th} harmonic in ampere
f_i = frequency of the i^{th} harmonic in hertz
C = capacitance in farad
$tg\delta_{max}(f_i)$ = max. dissipation factor corresponding to the frequency of the i^{th} harmonic
N = number of significant harmonics
$Vrmsc_i$ ($Irmsc_i$) is related to V_{pp} (I_{pp}) as shown in Fig. 2 at page 8.
In case of sinusoidal wave-form (N = 1) the formula to calculate P_{cmax} becomes:

$$P_{cmax} = V^2rmsc \times 2\pi f \times C \times tg\delta_{max}(f) = \frac{I^2rmsc}{2\pi f \times C} \times tg\delta_{max}(f)$$

(to calculate the P_{cmax} for some typical wave-forms, it is possible to use the approximate formulas of Vrmsc and Irmsc listed in the table 1 at page 5).

ΔT_{lim} = allowed capacitor overtemperature in °C.
T_h = max. ambient temperature surrounding the capacitor or hottest contact point (e.g. tracks), whichever is higher, in the worst operation conditions in °C.

Box Type

For $T_h \leq 40°C$

ΔT_{lim} = 40°C for film-foil polypropylene capacitors (KP), polypropylene capacitors with double sided metallized film electrodes (MMKP), metallized polyester film capacitors (MKT).

ΔT_{lim} = 20°C for polypropylene capacitors with single sided metallized film electrodes (MKP).

The outline of ΔT_{lim} vs. T_h is represented in the graph at page 6.
The formula used to calculate the max. power that may be dissipated by the capacitor is:

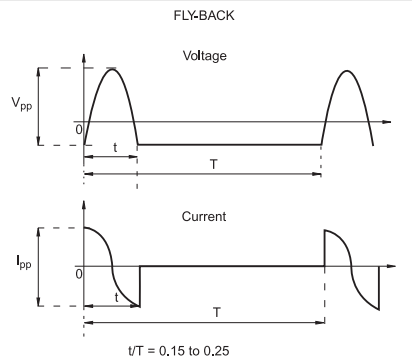
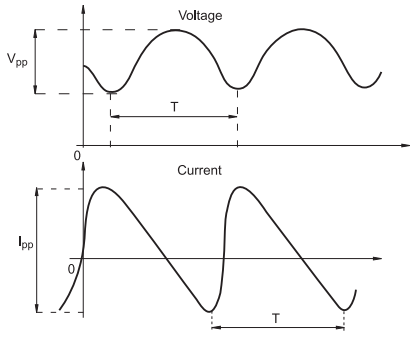
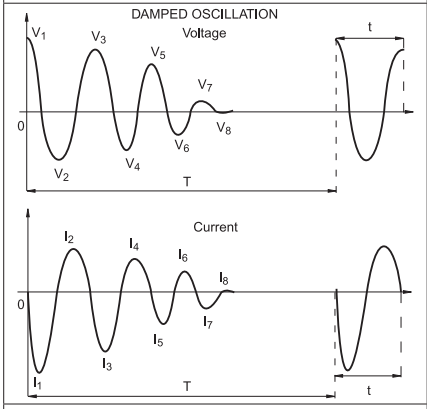
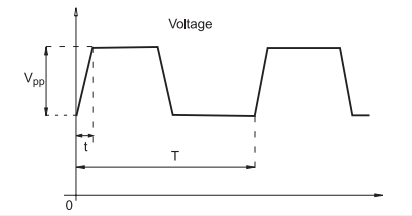
$$P_{clim} = \frac{\Delta T_{lim}}{R_{th}}$$

where:

P_{clim} = maximum power that may be dissipated by the capacitor in W
R_{th} = thermal resistance of the capacitor in °C/W (see table 2 at page 5).
ΔT_{lim} = allowed capacitor overtemperature in °C
It must be: $\mathbf{P_{cmax} \leq P_{clim}}$
In case of a sinusoidal wave-form the graphs of V(f) are illustrated in the pages of the catalogue relative to each series.

Warning:
apart from the derating of the voltage versus the working frequency it is also necessary to consider the derating of the voltage versus the working temperature (see paragraph 1.2).
Do not hesitate to contact our Technical Service for any doubts or more detailed information.

Table 1

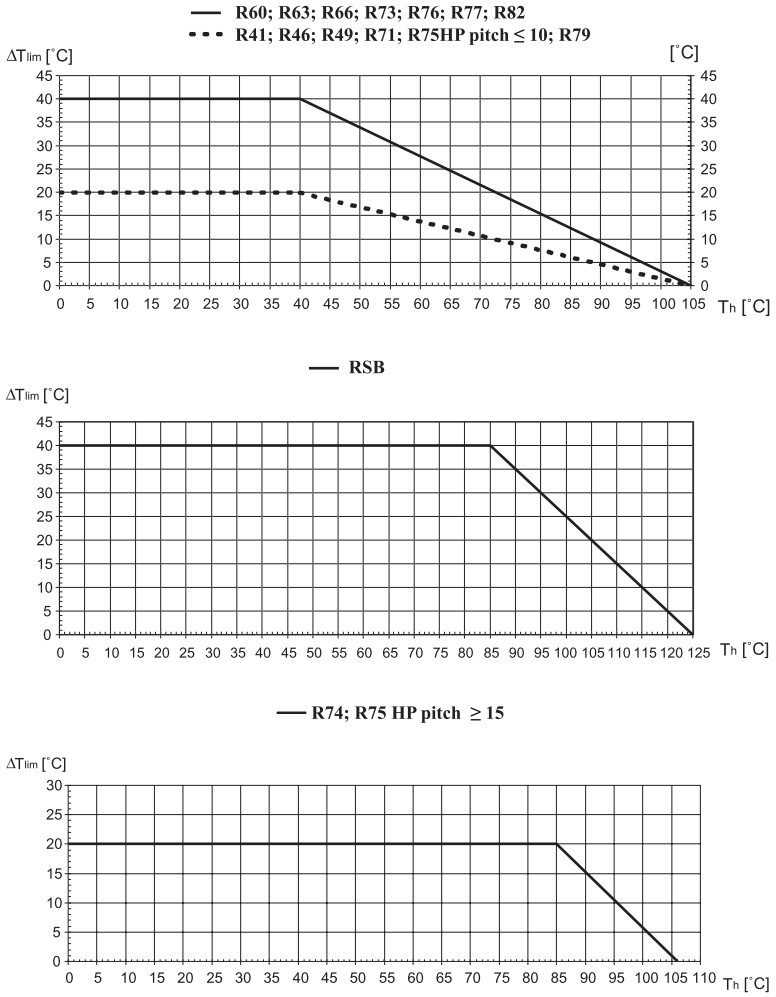
WAVE-FORM	ELECTRICAL PARAMETERS
FLY-BACK 	$V_{rmsc} = \frac{V_{pp}}{1.04}\sqrt{\frac{t}{2T}}$ $I_{rmsc} = \frac{I_{pp}/2}{1.04}\sqrt{\frac{t}{2T}}$ $f = \frac{1}{2t}$ $tg\delta_{max}$ at $f = \frac{1}{2t}$
S-CORRECTION 	$V_{rmsc} = \frac{V_{pp}}{2\sqrt{2}}$ $I_{rmsc} = \frac{I_{pp}}{2\sqrt{2}}$ $f = \frac{1}{T}$ $tg\delta_{max}$ at $f = \frac{1}{T}$
DAMPED OSCILLATION 	$V_{rmsc} = \sqrt{\sum_{i=1}^{8} \frac{V_i^2}{2} \frac{t}{2T}}$ $I_{rmsc} = \sqrt{\sum_{i=1}^{8} \frac{I_i^2}{2} \frac{t}{2T}}$ $f = \frac{1}{t}$ $tg\delta_{max}$ at $f = \frac{1}{t}$
TRAPEZOIDAL 	$V_{rmsc} = V_{pp}\sqrt{\frac{3T-4t}{12T}}$ $f = \frac{1}{T}$ $tg\delta_{max}$ at $f = \frac{1}{4t}$

Note: For axial type see page 6.

Table 2

Pitch	Box			R_{th}
	B	H	L	
(mm)	(mm)			(°C/W)
5.0	2.5	6.5	7.2	127
	3.5	7.5	7.2	111
	4.5	9.5	7.2	94
	5.0	10.0	7.2	90
	6.0	11.0	7.2	82
	7.2	13.0	7.2	73
7.5	2.5	7.0	10.0	107
	3.0	8.0	10.0	98
	3.5	6.5	10.5	100
	3.5	8.5	10.5	91
	4.0	9.0	10.5	86
	5.0	11.0	10.5	75
	6.0	12.0	10.5	69
10.0	4.0	9.0	13.0	79
	5.0	11.0	13.0	69
	6.0	12.0	13.0	64
15.0	4.0	10.0	18.0	65
	5.0	11.0	18.0	60
	6.0	12.0	18.0	56
	7.5	13.5	18.0	51
	6.0	17.5	18.0	48
	7.5	14.5	18.0	49
	8.5	14.5	18.0	48
	9.0	12.5	18.0	50
	7.5	18.5	18.0	45
	10.0	16.0	18.0	44
	13.0	12.0	18.0	45
	11.0	19.0	18.0	40
22.5	6.0	15.0	26.5	43
	6.5	13.5	26.5	44
	7.0	16.0	26.5	41
	8.5	17.0	26.5	38
	10.0	18.5	26.5	36
	11.0	20.0	26.5	34
	13.0	22.0	26.5	31
27.5	9.0	17.0	32.0	35
	10.0	20.0	32.0	32
	11.0	20.0	32.0	31
	13.0	22.0	32.0	29
	13.0	25.0	32.0	28
	14.0	28.0	32.0	26
	15.0	24.5	32.0	27
	18.0	33.0	32.0	23
	22.0	37.0	32.0	21
37.5	11.0	22.0	41.5	27
	13.0	24.0	41.5	25
	16.0	28.5	41.5	23
	19.0	32.0	41.5	21
	20.0	40.0	41.5	19
	24.0	44.0	41.5	17
	30.0	45.0	41.5	16

Maximum Overtemperature ΔT_{lim} vs. T_h for Box Type



Maximum Self-heating rise for series in Axial configuration.

Series	Costruction	Configuration	Maximum ambient Temperature	Maximum Self Temperature rise
A50	MKT	Axial	85°C	10°C
A70	MKP	Axial	85°C	10°C
A72	MKP Film foil	Axial	85°C	10°C

3. Permissible current

The main effect produced by the current flowing through the capacitor is overheating.
If the heating is excessive, the capacitor might deteriorate, which could cause a short or open circuit of the capacitor or a fire.
The heating of the capacitor can be caused by two different types of currents:

3.1 Effective current (r.m.s. current) given by a periodic wave-form, causing the entire body of the capacitor to heat up.

3.2 Peak of current caused by a pulse wave-form**.**

- When a medium-high current pulse flows through the capacitor for a very short time (µs/ns), a localized heating of the ends of the capacitor might take place due to the resistance of the contacts between the leads and end spray and between the end spray and the electrodes of the capacitor.

  These conditions usually take place mainly in the following type of circuits: switching, snubber, fly-back and S-correction.
- The parameters that define this type of phenomenon are dv/dt (pulse rise time) and Ko.

  The pulse rise time defines the capability of a capacitor to withstand high current peaks due to fast voltage changes. The peak current is defined by the following formula:

$$I_p \text{ (peak current)} = C \times dv/dt$$

where: I_p in A; C in µF; dv/dt in V/µs
K_0 is the content of energy of the wave-form applied to the capacitor and it is defined by the following formula:

$$K_0 = 2\int_0^{\tau} (dv/dt)^2 \, dt$$

where: τ = pulse width. K_0 is expressed in $V^2/\mu s$.

The maximum values of dv/dt and K_0 mentioned in this catalogue must not be exceeded in order to prevent a dangerous overheating of the capacitor.
If more than 10,000 pulses are applied, please kindly contact our Technical Service, unless you are using series A72, R73, R74, R75, R76, R77, R79, RSB.

Warning:
If the capacitor is subjected to r.m.s. and pulse currents higher than those admitted, caused for example by a bad functioning of any other equipment, we suggest the use of a protection device.

4. Operating temperature

4.1 ΔT (overtemperature of a capacitor).
As described in the previous paragraphs, when a capacitor is used in A.C. applications the current that flows through the capacitor makes it heat up. If the capacitor heats up too much it might deteriorate causing a short circuit or fire. It is essential that the limits described in the catalogue are not exceeded and that a temperature check on the capacitor is made whenever it is under heavy load.

4.2 Method for determining the overtemperature (ΔT_m) of the capacitor (indicative only).
Figure 1 shows the test lay-out.
The measurement must be made in free air convection. The capacitor being tested must be supplied by the working voltage (Vac) and frequency (f). At a distance of about 50 mm it is necessary to place another capacitor (without any electric supply) on which the ambient temperature(T_2) is measured.
A polystyrene paper is placed between the p.c.b. on which the capacitor is fitted and the capacitor itself.
The temperature (T_1) must be measured in the hottest part of the capacitor being tested by using a thermocouple with a small heating capacity (ø <0.25 mm) or an infrared thermometer.

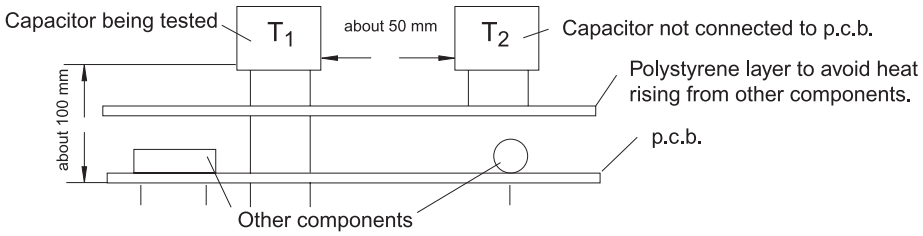


Fig. 1

$\Delta T_m = T_1 - T_2$

4.3 How to calculate the max. ΔT of the capacitor.
To calculate the max. ΔT of the capacitor use the following formula:

$$\Delta T_{max} = \frac{\Delta T_m}{tg\delta_m} \times tg\delta_{max}$$

where:
ΔT_{max} = capacitor overtemperature calculated using the max $tg\delta$ value at the working frequency.
ΔT_m = $T_1 - T_2$ (see paragraph 4.2).
$tg\delta_m$ = dissipation factor of the tested capacitor measured at the working frequency and at the temperature reached by the capacitor under test.
$tg\delta_{max}$ = max. dissipation factor at the working frequency of the capacitor under test (if this value is not available at catalogue, please contact us).

4.4 When using the capacitors, make sure that the ΔT_{max} of the capacitor (own overtemperature), calculated as described in paragraph 4.3, remains within the limits listed in paragraph 2 ($\Delta T_{max} \leq \Delta T_{lim}$) .

Warning:
When a capacitor is used above its max. operating temperature, the dissipation factor ($tg\delta$) increases and consequently the heat generated by the capacitor itself. Temperatures exceeding the maximum admitted value might cause a damage of the dielectric, a short circuit or an increase in the risk of fire or smoke.
The same effects might be caused by other components or parts of the circuit that produce heat and cause localized heatings of the capacitor beyond its performance limits. In this case we suggest to check the temperature of the hottest point of the capacitor subject to the heat produced by the other components.

5. Ionisation

Ionisation may lead to a destructive process of the capacitor.
This phenomenon is due to the air that is inside the capacitor and precisely:

- the air contained inside the dielectric
- the air present in between the different layers of film that form the capacitor
- the air present near the ends of the capacitor

When the intensity of the electric field that is formed in a capacitor exceeds the dielectric rigidity of the air, some microdischarges might take place that could damage the dielectric of the capacitor and/or the metallization itself.
This phenomenon causes a drop in the capacitance and in the case of persistent ionization il may give rise to a short circuit or fire.
The voltage at which the ionization phenomenon is started is called corona inception voltage.

The size of the phenomenon depends upon certain factors such as:

- the amount of air contained in the capacitor
- the type of dielectric used
- impregnating elements (if used)
- the type of electrode (metallized film, film-foil)
- the type of construction (radial, axial)
- the construction parameters (i.e. element flattening)
- the temperature, voltage, working frequency

For a proper use of the capacitor, always make sure that the following condition is satisfied:

$$\mathbf{V_{pp}\ (peak\ to\ peak\ voltage) \leq 2 \times \sqrt{2} \times V_R\ (a.c.)}$$

6. Pulse applications

In case of pulse applications it is necessary to follow these rules that must be considered as the minimum condition to be satisfied to prevent any damages to the capacitor itself and consequently to the circuit and to the equipment the capacitor has been fitted to:

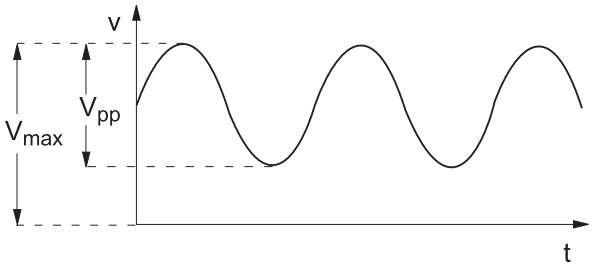


Fig. 2

Wave-form characteristics (Fig. 2)	Capacitor characteristics involved	Choice criteria
V_{max} (max. voltage)	Dielectric strength	V_{max} ≤ V_R (d.c.)
V_{pp} (peak to peak voltage)	Corona Offset Voltage	V_{pp} ≤ 2 x √2 x V_R (a.c.)
dv/dt or Ip (peak current)	Ip = C x dv/dt	dv/dt ≤ catalogue values
K_0 (energy content of the wave-form)	$K_0 = 2\int_0^{\tau} (dv/dt)^2\ dt$	K_0 ≤ catalogue values
*V_{rms} and/or I_{rms} f (wave-form frequency)= 1/T	Max dissipated power: P_{cmax}	V_{rms} vs. f (catalogue graphs) or $P_{cmax} \leq P_{clim}$ (see page 4)

* Calculated without average value (example: in case of sine wave form $V_{rms} : V_{pp} / 2 \times \sqrt{2}$)

7. Across-the-line and interference suppression applications

7.1 When a capacitor is used for this type of application it may be subject to a mains voltage on a permanent basis and to surges caused, for example, by lightning, power commutations etc.

In these working conditions the capacitor must be a component with a safety margin able to satisfy the main International Standards, e.g.:

- IEC 60384-14 (International Standard)
- EN 60384-14 (European Standard)
- UL 1414, UL 1283 (American Standards)
- CSA C22.2 Nr. 1 (Canadian Standards)

For safety reasons it is advisable to use components approved according to the above mentioned standards. *

7.2 Main safety tests related to IEC 60384-14 are listed at page 154.

* For “capacitor connected in serial with main line” (two - phase and three - phase net) application, please read the “SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS” at pag. 152 and contact our Technical Service for choosing the safest solution.

8. Special working conditions

- Humid ambient.

  If used for a long time in a humid ambient, the capacitor might absorb humidity and oxidise the electrodes causing breakage of the capacitor.
  In case of AC application, high humidity would increase the corona effect.
  This phenomenon cause a drop in the capacitance value.
  In case of working condition in AC application more severe than following table, please contact our Technical Service for detailed informations.

	WORKING T°	RELATIVE HUMIDITY
AVERAGE FOR YEAR	25°C	70%
2 WKS COUNTINUOSLY	30°C	90%

- Resin.

  If the capacitor is placed in resin, the following situations might occur:
  - the solvent contained in the resin might deteriorate the characteristics of the capacitor;
  - the heat generated during the polymerisation might damage the capacitor.

- Adhesive curing oven.

  Do not place the polypropylene capacitor in the polymerisation oven of the resin used to glue SMD components: the heat combined with the length of stay in the oven might damage the dielectric of the capacitor with risk of short circuit.
  When the polypropylene capacitor is used together with SMD components, always fit it after the SMD gluing process.

9. Soldering suggestions

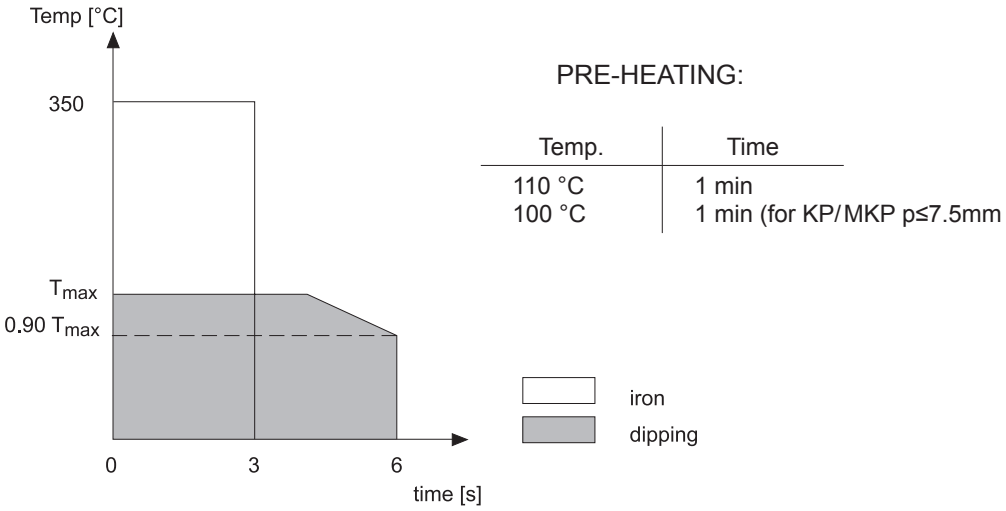
In order to obtain a good solderability, we suggest to observe the following rules:

9.1 Max soldering temperature

Set the temperature so that inside the element the maximum temperature is below the limit:

KP/MKP	110°C
MKT	160°C

Solder within the following temperature profiles especially for iron soldering.



PRE-HEATING:

Temp.	Time
110 °C	1 min
100 °C	1 min (for KP/MKP p≤7.5mm

Box series: T_{max} = 275°C for 4s (260°C for 4s for MKP p ≤ 7.5mm

9.2 General conditions

9.2.1 If two solderings are needed please apply a recovery time until the temperature on the capacitor surface is below 50°C.

9.2.2 Avoid any passing through adhesive curing oven when fixing SMD parts in combination with leaded parts.
Insert leaded parts only after the curing of SMD parts.

9.2.3 Reflow: avoid reflow soldering by combining the lead type with SMD parts.

10. ROHS Compliance

In accordance with Arcotronics commitment to continuously enhance Customer satisfaction and environmental care we inform that the product series of this catalogue are currently available in Lead Free and that they are completely in compliance with all the requirements of the EU Directives and Regulations in matter of Restriction of use of Hazardous Substances (such as 2002/95/EC, known as Rohs Directive). Unique exceptions some products that are currently manufactured with tinfoil film such as product series A72 (only C ≤ 4220pF).
We can furthermore confirm that apart the termination wires (now Lead Free) no other changes were activated on our manufacturing process and that product behaviour vs. soldering processes and performances has not evidenced any difference with the one previously established and validated.
In any further detail is needed please contact us.

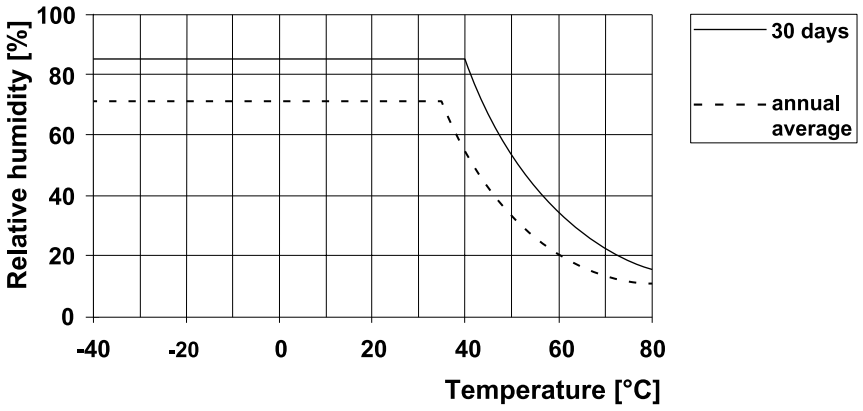
OTHERS

- Any buzzing noise produced by the capacitor is caused by the vibration of the film due to the Coulomb force that is generated between the electrodes with opposite poles. This buzzing noise becomes louder if a wave-form with a high distortion rate or frequency is applied across the capacitor. This buzzing noise is of no damage to the capacitor.
- The capacitor modifies its characteristics according to the ambient conditions in which it operates. In normal conditions a variation in the capacitance takes place due to the amount of humidity contained in the air. The variation mainly depends upon the type of dielectric and the material used for the coating.
- Avoid to store the capacitors in places where the conditions differ from the following:

  * Storage time: ≤ 24 months from the date marked on the label glued to the package.
  * Temperature: -40 to 80°C
  * Humidity:
    - Average per year: ≤70%
    - For 30 full days randomly distributed throughout the year: ≤85%
    - Dew: absent.

    These levels of humidity must be reduced according to the ambient temperature on the basis of the graph that follows.

MAX. HUMIDITY



TYPICAL PROPERTIES AND APPLICATIONS

POLYESTER FILM

Typical properties:

- very wide operating temperature range
- high dielectric constant
- Excellent self-healing properties
- very good ratio box size/ capacitance
- good stability

Typical Applications

- blocking and coupling
- by-passing
- decoupling
- low filtering
- timing
- market sector with professional characteristics

POLYPROPYLENE FILM

Typical properties:

- very low dissipation factor
- very low dielectric absorption
- very high insulation resistance
- good behaviour in frequency
- Excellent self-healing properties. (MKP type)
- very good stability

Typical Applications

- pulse applications
- high current
- A.C. applications
- timing with high stability
- SMPS and TV set
- lighting
- industrial
- filtering high Q

DIELECTRIC ABSORPTION (DA)

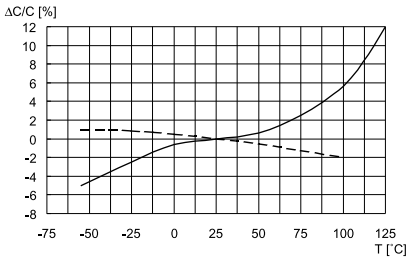
Typical value:

Polyester : 0.5%

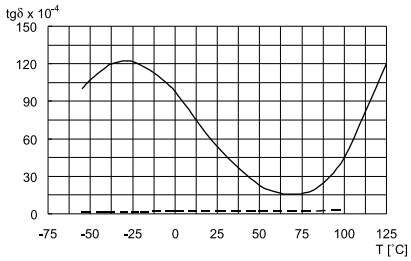
Polypropylene: 0.05%

TYPICAL GRAPHS:

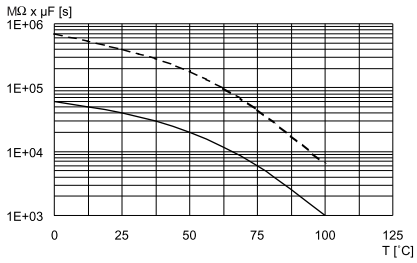
——— Polyester - - - - - - - - Polypropylene



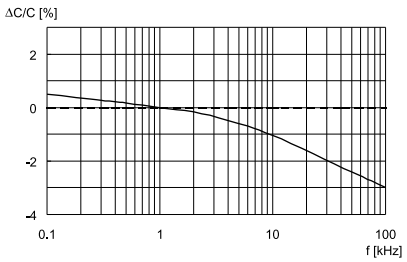
Capacitance change vs. temperature at 1kHz



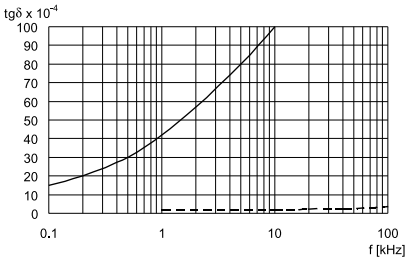
Dissipation factor vs. temperature at 1kHz



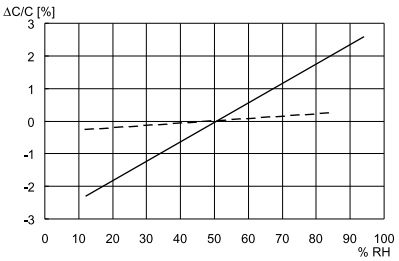
Time constant vs. temperature



Capacitance change vs. frequency (Room temperature)



Dissipation factor vs. frequency (Room temperature)



Capacitance change vs. relative humidity (RH)

PRODUCT CODE SYSTEM AND DATE CODE: BOX AND AXIAL SERIES

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
												-	

DATE CODE (according to EN60062)

Year	Code letter
1998	K
1999	L
2000	M
2001	N
2002	P
2003	R
2004	S
2005	T
2006	U
2007	V
2008	W
2009	X
2010	A
2011	B

Month	Code letter
January	1
February	2
March	3
April	4
May	5
June	6
July	7
August	8
September	9
October	O
November	N
December	D

Digit 1 to 3 Series code.

Digit 4 d.c. or a.c. rated voltage

*A = 310Vac	I = 250Vdc	P = 630Vdc	U = 2000Vdc	3 = 300Vac
C = 50 Vdc	K = 275Vac	Q = 1000Vdc	V = 520Vdc	4 = 440Vac
D = 63Vdc	L = 250Vac	R = 1250Vdc	W = 500Vdc	*5 = 500Vac
E = 100Vdc	*M = 400Vdc	S = 1500Vdc	X = 450Vdc	6 = 600Vac
G = 160Vdc	N = 400Vac	T = 1600Vdc	2 = 230Vac	7 = 700Vac
				9 = 900Vac

(*M = 420 Vdc for R71 Series only) - (*5 = 520 Vac for R475 Series only) - (*A = 330 Vac for R49 Series only)

Digit 5 Pitch (mm) of radial capacitors or length of axial capacitors (**for Polyester, Polypropylene and Suppressor caps**)

C = 5.0	F = 10/11	I = 15/16.5	N = 22.5	R = 27.5	W = 37.5
D = 7.5	H = 14	K = 20.5	Q = 28.0	T = 33.0	

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF (**for Polyester, Polypropylene and Suppressor caps**).

Digit 6 to 9 Indicate the Arcotronics internal capacitance code (**for Precision caps**).

Digit 10 to 11 Mechanical version and/or packaging: see the pages related to each series.

Digit 12 Identifies the dimensions and electrical characteristics

Digit 13 Internal use.

Digit 14 Capacitance tolerance

Code letter	Z	D	P	F	A	L	G	H	J	K	M
Capacitance tolerance	± 1pF	0.5%	0.625%	1%	1.25%	1.5%	2%	2.5%	5%	10%	20%

Code example: R82 Series (Polyester Radial)

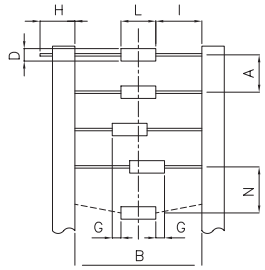
R82 M C 2100 AA 6 0 J

- R82 Series
- V_R = 400 Vdc
- Lead spacing = 5mm
- C = 0.01µF
- Loose version ($4^{+1.5}$ mm)
- Dim. & Electr. char.
- Internal use
- Tolerance 5%

LEAD TAPING AND PACKAGING

LEAD TAPING AND PACKAGING OF AXIAL COMPONENTS FOR AUTOMATIC AND ROBOT INSERTION MACHINES

Technical terms: IEC 60286-1



Description	Symbol	Dimensions (mm)
Component diameter	D	4.5 ... 19.5
Body length	L	11 ... 33
Component pitch	A*	See table I
Reel core diameter	E	85
Arbor hole diameter	M	30
Reel diameter	Ø	355 max.
Tape width	H	6±0.5/9±1**
Body location (lateral deviation)	G	≤ 0.7
Body location (longitudinal deviation)	N	≤ 1.2
Tape spacing	B	See Table II
Lead length from the component body to the adhesive tape	I	≥ 20
Distance between reel flanges	C	See table II

Packaging detail
Available reel Ø 355 mm only.
Reel

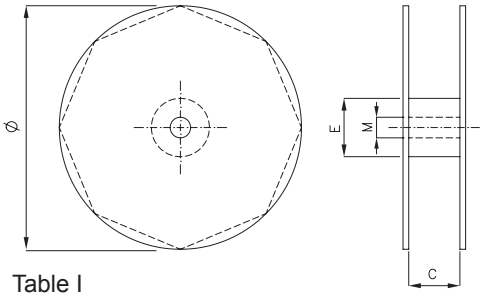


Table I

D max (mm)	A (mm)
≤ 5	5 ±0.5
5.1 ... 9.5	10 ±0.5
9.6 ... 14.7	15 ±0.5
14.8 ... 19.5	20 ±1.0

Table II

L max (mm)	Class	B±1.5 (mm)	C (mm)
≤1			
14.0 ... 20.5	I	52.4	75
	II	63.6	86
RSB	III	73.0	98
26			

Remarks

* Cumulative pitch tolerance must not exceed 1.5 mm over six consecutive components.
** 9±1 for capacitor with L≥31.5

NUMBER OF PIECES FOR PACKING UNIT

D max (mm)	L max (mm)	Loose* (pcs)	Reel Ø 355mm (pcs)
5	11	1500	3000
5.1 ... 5.5	11	1500	1500
5.6 ... 6.5	11	1200	1300
6.6 ... 7.0	11.0 ... 16.5	1750	1100
7.1 ... 7.5	11.0 ... 16.5	1500	1000
7.6 ... 8.0	11.0 ... 16.5	1250	900
8.1 ... 9.5	11.0 ... 16.5	1000	800
5.0 ... 6.0	14.0 ... 16.5	2000	1300
6.1 ... 6.5	14.0 ... 16.5	2000	1200
5.5 ... 6.0	20.5	1500	1300
6.1 ... 6.5	20.5	1250	1200
6.6 ... 7.0	20.5	1250	1100
7.1 ... 7.5	20.5	1000	1000
7.6 ... 8.0	20.5	1000	900
8.1 ... 9.0	20.5	750	800
9.1 ... 10.0	20.5	750	600
10.1 ... 11.5	20.5	500	400
7.0 ... 7.5	28.0	750	1000
7.6 ... 8.0	28.0	500	900
8.1 ... 9.0	28.0	500	800
9.1 ... 10.0	28.0	500	600
10.1 ... 11.0	28.0	500	400
11.1 ... 13.0	28.0	300	400
13.1 ... 15.0	28.0	300	300
15.1 ... 16.5	28.0	300	250

°*Loose version: lead length = $40^{\pm 5}$ mm

NUMBER OF PIECES FOR PACKING UNIT

D max (mm)	L max (mm)	Loose* (pcs)	Reel Ø 355mm (pcs)
10.0 ... 11.5	33.0	400	400
11.6 ... 13.0	33.0	300	400
13.1 ... 15.0	33.0	300	300
15.1 ... 16.5	33.0	200	250
16.6 ... 18.0	33.0	200	200
18.1 ... 20.0	33.0	150	150
20.1 ... 26.4	33.0	100	

*Loose version: lead length = $40^{\pm 5}$ mm

LEAD TAPING AND PACKAGING OF RADIAL COMPONENTS FOR AUTOMATIC INSERTION MACHINES

Technical terms: IEC 60286-2

Pitch = 5 and 7.5 mm

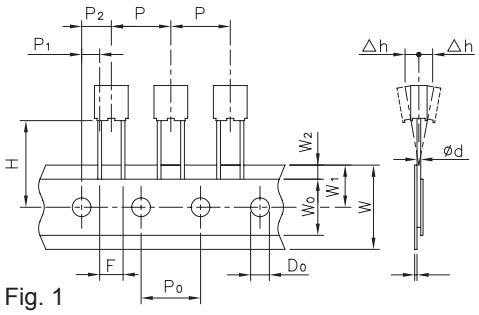


Fig. 1

Pitch = 7.5 mm

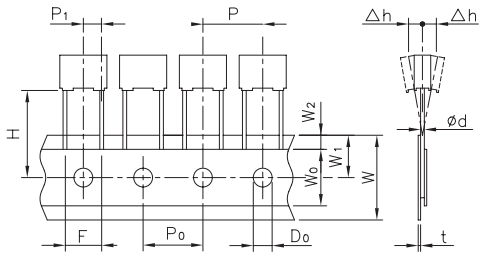
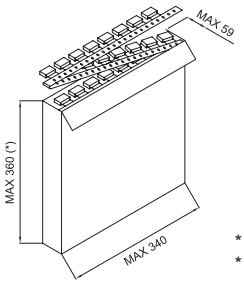


Fig. 2

Description	Symbol	Dimensions (mm)			
		Pitch			Tol.
		5 mm	7.5 mm	7.5 mm	
		Fig.1	Fig.1	Fig. 2	
Lead wire diameter	d	0.5 ... 0.6	0.5 ... 0.6	0.5 ... 0.6	±0.05
Taping pitch	P	12.7	12.7	12.7	±1
Feed hole pitch	P_0	12.7	12.7	12.7	±0.2*
Centering of the lead wire	P_1	3.85	2.6	3.75	±0.7
Centering of the body	P_2	6.35	6.35		±1.3
Lead spacing (pitch)	F	5	7.5	7.5	+0.6 -0.1
Component alignment	Δh	0	0	0	±2
Height of component from tape center	H**	18.5	18.5	18.5	±0.5
Carrier tape width	W	18	18	18	+1 -0.5
Hold down tape width	W_0	6	6	6	min.
Hole position	W_1	9	9	9	±0.5
Hold down tape position	W_2	3	3	3	max.
Feed hole diameter	D_0	4	4	4	±0.2
Tape thickness	t	0.7	0.7	0.7	±0.2

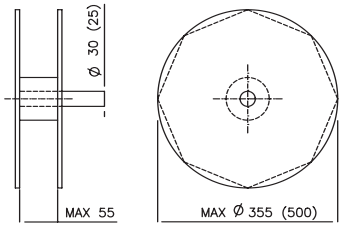
Packaging detail
Two different containers are available:
Fan-fold box (Ammo-pack)
Reel Ø 355 mm only.

Ammo-pack (dimensions in mm)



* Lower dimension available
* upon request (max. 295mm)

Reel (dimensions in mm)



Remarks

* Max 1mm on 20 pitches

** H = 16.5 mm is available upon request.

For orders of capacitors with pitch = 7.5 mm, please specify the requested version (fig.1 or fig.2).

NUMBER OF PIECES FOR PACKING UNIT

Box dimensions B (mm)	H (mm)	L (mm)	Pitch (mm)	Loose *short leads (pcs)	Loose **long leads (pcs)	Ammo (pcs)	Reel Ø355mm (pcs)
2.5	6.5	7.2	5.0	3000	4000	3500	2500
3.5	7.5	7.2	5.0	2000	3000	2500	1800
4.5	9.5	7.2	5.0	1500	2000	1900	1400
5.0	10.0	7.2	5.0	1000	1500	1700	1200
6.0	11.0	7.2	5.0	2000	1000	1400	1000
7.2	13.0	7.2	5.0	1500	750	1150	800

Box dimensions B (mm)	H (mm)	L (mm)	Pitch (mm)	Loose *short leads (pcs)	Loose **long leads (pcs)	Ammo (pcs)	Reel Ø355mm (pcs)
3.0	8.0	10.0	7.5	1500	1750	2800	2100
4.0	9.0	10.0	7.5	2000	1500	2100	1500
5.0	10.5	10.0	7.5	1500	1000	1600	1200
6.0	12.0	10.5	7.5	1000	800	1350	1000

* Short leads: lead length = $4^{+1.5}$ mm (pitch = 5mm); 4^{+2} mm (pitch = 7.5mm)
** Long leads: lead length = $17^{+1/-2}$ mm

LEAD TAPING AND PACKAGING OF RADIAL COMPONENTS FOR ROBOT INSERTION MACHINES

Technical terms: IEC 60286-2

Pitch = 10 mm

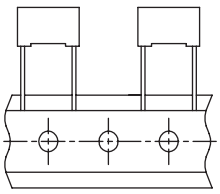


Fig. 1

Pitch = 15 mm

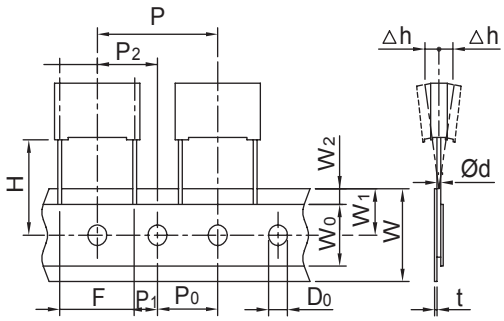


Fig. 2

Pitch = 22.5 mm
Pitch = 27.5 mm

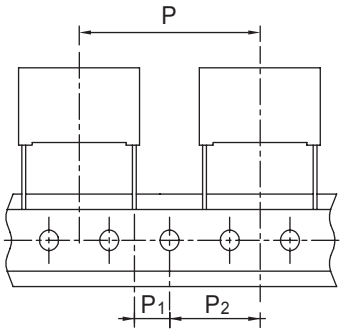


Fig. 3

Description	Symbol	Dimensions (mm)				
		Pitch				Tol.
		10 mm	15 mm	22.5mm	27.5mm	
		Fig.1	Fig.2	Fig.3	Fig.3	
Lead wire diameter	d	0.6	0.6/0.8	0.8	0.8	±0.05
Taping pitch	P	25.4	25.4	38.1	38.1	±1
Feed hole pitch*	P_0	12.7	12.7	12.7	12.7	±0.2**
Centering of the lead wire	P_1	7.7	5.2	7.8	5.3	±0.7
Centering of the body	P_2	12.7	12.7	19.05	19.05	±1.3
Lead spacing (pitch) ***	F	10	15	22.5	27.5	+ 0.6 - 0.1
Component alignment	∆h	0	0	0	0	±2
Height of component from tape center	H****	18.5	18.5	18.5	18.5	±0.5
Carrier tape width	W	18	18	18	18	+1-0. 5
Hold down tape width	W_0	9	10	10	10	min.
Hole position	W_1	9	9	9	9	±0.5
Hold down tape position	W_2	3	3	3	3	max.
Feed hole diameter	D_0	4	4	4	4	±0.2
Tape thickness	t	0.7	0.7	0.7	0.7	±0.2

Remarks

* Available also 15mm.

** Max 1mm on 20 pitches.

*** Pitches 15mm and 10mm taped to 7.5mm (crimped leads) available upon request.

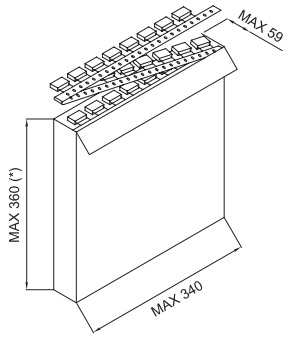
**** H = 16.5 mm is available upon request.

Packaging detail

Two different containers are available: fan-fold box (ammo-pack) and reel:

Ammopack (dimensions in mm)

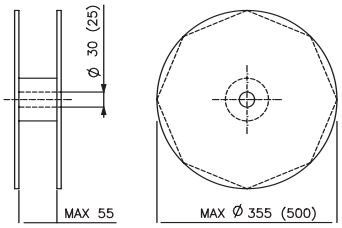
for pitch ≤22.5 mm



* Lower dimension available
* upon request (max. 295mm)

Reel (dimensions in mm)

Ø 355 mm for pitch ≤15 mm
Ø 500 mm for pitch ≥10 mm



NUMBER OF PIECES FOR PACKING UNIT

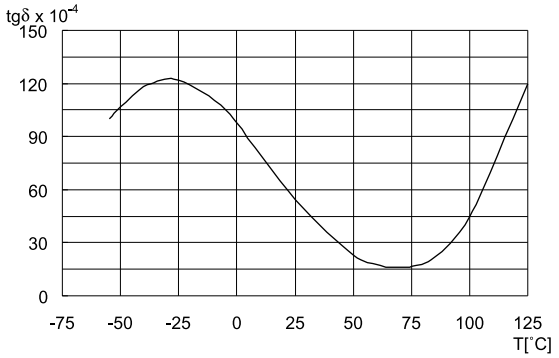
Box dimensions B (mm)	H (mm)	L (mm)	Pitch (mm)	Loose *short leads (pcs)	Loose **long leads (pcs)	Ammo (pcs)	Reel Ø355mm (pcs)	Reel Ø500mm (pcs)
4.0	9.0	13.0	10.0	2000	1800	1000	750	1500
5.0	11.0	13.0	10.0	1300	1500	800	600	1250
6.0	12.0	13.0	10.0	1000	1200	680	500	1000
4.0	10.0	18.0	15.0	2500	1500	1000		1500
5.0	11.0	18.0	15.0	2000	1000	800	600	1250
6.0	12.0	18.0	15.0	1750	900	680	500	1000
7.5	13.5	18.0	15.0	1000	700	500	350	800
6.0	17.5	18.0	15.0	1000	700	680	500	1000
7.5	14.5	18.0	15.0	1000	700	500	350	800
8.5	14.5	18.0	15.0	1000	500	440	300	700
9.0	12.5	18.0	15.0	1000	520	410	270	650
7.5	18.5	18.0	15.0	900	500	500		800
10.0	16.0	18.0	15.0	750	500	380	300	600
13.0	12.0	18.0	15.0	750	490	280	200	480
11.0	19.0	18.0	15.0	450	350	340		500
6.0	15.0	26.5	22.5	805	500	464		700
7.0	16.0	26.5	22.5	700	500	380		550
8.5	17.0	26.5	22.5	468	300	280		450
10.0	18.5	26.5	22.5	396	300	235		350
11.0	20.0	26.5	22.5	360	250	217		350
13.0	22.0	26.5	22.5	300	200			300

Box dimensions B (mm)	H (mm)	L (mm)	Pitch (mm)	Loose *short leads (pcs)	Loose **long leads (pcs)	Ammo (pcs)	Reel Ø355mm (pcs)	Reel Ø500mm (pcs)
9.0	17.0	32.0	27.5	816	408			450
10.0	20.0	32.0	27.5	600	408			350
11.0	20.0	32.0	27.5	560	336			350
13.0	22.0	32.0	27.5	480	288			300
13.0	25.0	32.0	27.5	480	288			
14.0	28.0	32.0	27.5	352	176			
15.0	24.5	32.0	27.5	400	240			
18.0	33.0	32.0	27.5	256	128			
22.0	37.0	32.0	27.5	168	112			
11.0	22.0	41.5	37.5	420	252			
13.0	24.0	41.5	37.5	360	216			
16.0	28.5	41.5	37.5	216	108			
19.0	32.0	41.5	37.5	192	96			
20.0	40.0	41.5	37.5	126	84			
24.0	44.0	41.5	37.5	108	72			
30.0	45.0	41.5	37.5	90	60			

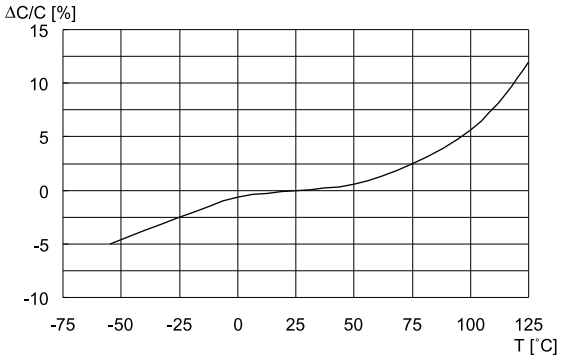
* Short leads: lead length= 4^{+2} mm
** Long leads: lead length= $25^{+2/-1}$ mm

Series	Style	Typical application	Rated voltage	Capacitance range	Page
All	Typical graphs				20
A50	MKT Axial	D.C. multipurpose applications	50Vdc	0.47µF...10.0µF	21 to 25
			63Vdc	0.33µF...10.0µF	
			100Vdc	0.10µF...10.0µF	
			250Vdc	0.047µF...10.0µF	
			400Vdc	0.010µF...3.3µF	
			630Vdc	1000pF...1.0µF	
			1000Vdc	1000pF...0.47µF	
R82	MKT Box pitch: 5mm	D.C. multipurpose applications	50Vdc	2.2µF...4.7µF	26 to 30
			63Vdc	0.10µF...1.5µF	
			100Vdc	1000pF...1.0µF	
			250Vdc	6800pF...0.22µF	
			400Vdc	1000pF...0.068µF	
RSB	MKT Box pitch: 5mm	High performances High temperature D.C. and pulse	50Vdc	2.2µF	31 to 35
			63Vdc	0.10µF...1.5µF	
			100Vdc	4700pF...0.47µF	
			250Vdc	1000pF...0.15µF	
			400Vdc	1000pF...0.047µF	
			500Vdc	1000pF...0.015µF	
			630Vdc	1000pF...0.010µF	
R66	MKT Box pitch: 7.5mm	D.C. multipurpose applications	50Vdc	0.68µF...4.7µF	36 to 40
			63Vdc	0.33µF...3.3µF	
			100Vdc	0.068µF...1.5µF	
			250Vdc	0.022µF...0.33µF	
			400Vdc	6800pF...0.15µF	
			630Vdc	1000pF...0.047µF	
R60	MKT Box pitch: 10mm...37.5mm	D.C. multipurpose applications	50Vdc	1.5µF...5.6µF	41 to 48
			63Vdc	0.68µF...220µF	
			100Vdc	0.33µF...150µF	
			160Vdc	0.22µF...150µF	
			250Vdc	0.1µF...68µF	
			400Vdc	0.015µF...33µF	
			630Vdc	4700pF...10µF	
			1000Vdc	1000pF...4.70µF	
JSP	MKT Box pitch: 22.5mm...37.5mm	D.C. multipurpose applications	63Vdc 100Vdc 160Vdc 250Vdc 400Vdc	4.7µF...470µF 3.3µF...220µF 2.2µF...100µF 1.0µF...56µF 0.33µF...27µF	49 to 54
JSN	MKT Naked Size: 60.80...60.160	D.C. multipurpose applications	100Vdc 160Vdc 250Vdc	10µF...68µF 10µF...33µF 10µF...15µF	55 to 60

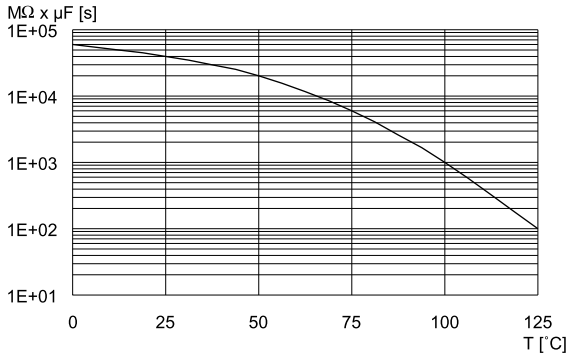
POLYESTER FILM - TYPICAL GRAPHS



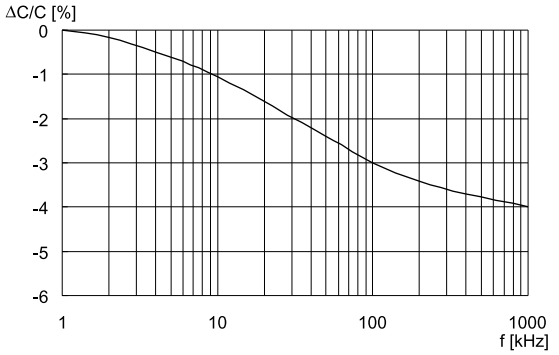
Dissipation factor vs. temperature at 1kHz



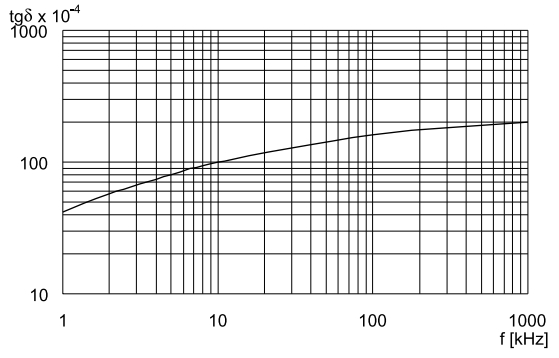
Capacitance change vs. temperature at 1kHz



Time constant vs. temperature



Capacitance change vs. frequency (Room temperature)

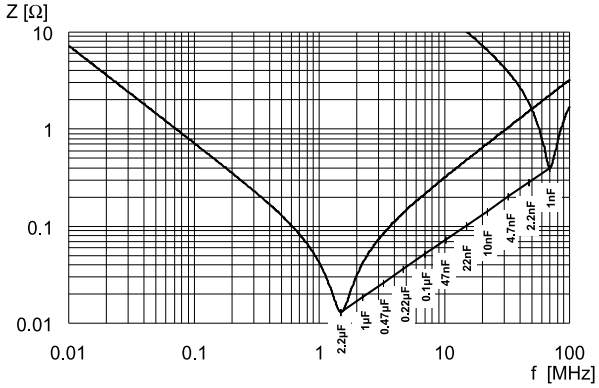


Dissipation factor vs. frequency (Room temperature)

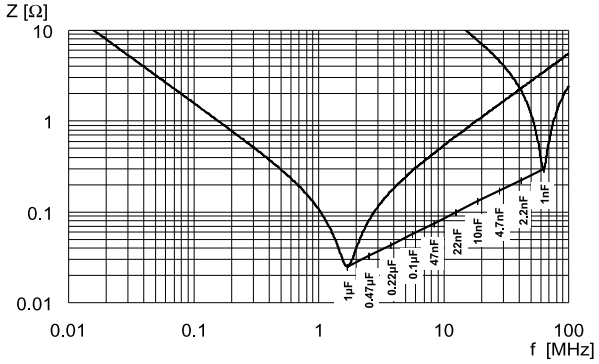
POLYESTER CAPACITORS

Impedance vs. frequency (lead length 2mm). Typical values.

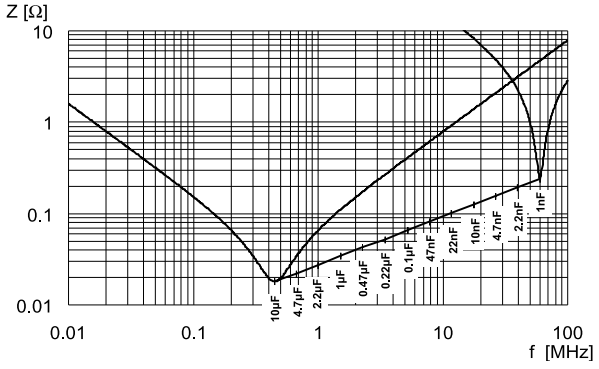
R82 / RSB



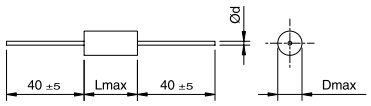
R66



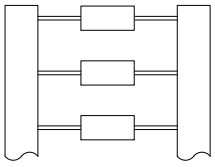
R60



Loose



Taped



METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

Typical applications: blocking, coupling, decoupling, by-passing, interference suppression in low voltage applications (i.e.:AUTOMOTIVE).

PRODUCT CODE: **A50**

D max	<7	≥7<16	≥16
Ød ±0.05	0.6	0.8	1

All dimensions are in mm.

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	5	0										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
C = 50V D = 63V E = 100V I = 250V
M =400V P =630V Q=1000V

Digit 5 Length (mm):
F=11; H=14; K=20.5; Q=28; T=33

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

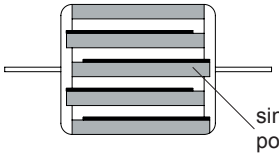
Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Ordering code (Digit 10 to 11)
Reel Ø 355 mm	26
Loose	AA

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).
Plates: aluminium layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire.
Protection: polyester tape wrapping and thermosetting resin end fill.
Marking: Manufacturer's logo, series (1.50), dielectric code (MKT), capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-2

Winding scheme



single sided metallized polyester film

Rated Cap.	50Vdc/30Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.47 µF	5.0	11.0	4.0	0.40 E3	A50CF 3470--0--
0.68 µF	5.0	11.0	4.0	0.40 E3	A50CF 3680--0--
1.0 µF	6.5	11.0	4.0	0.40 E3	A50CF 4100--0--
1.5 µF	7.0	14.0	4.0	0.40 E3	A50CH4150--0--
2.2 µF	8.0	14.0	4.0	0.40 E3	A50CH4220--0--
3.3 µF	7.5	20.5	2.0	0.20 E3	A50CK4330--0--
4.7 µF	8.5	20.5	2.0	0.20 E3	A50CK4470--0--
6.8 µF	10.0	20.5	2.0	0.20 E3	A50CK4680--0--
10.0 µF	12.0	20.5	2.0	0.20 E3	A50CK 5100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	63Vdc/40Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.33 µF	5.0	11.0	4.0	0.50 E3	A50DF 3330--6--
0.47 µF	6.0	14.0	4.0	0.50 E3	A50DH 3470--6--
0.68 µF	6.0	14.0	4.0	0.50 E3	A50DH 3680--6--
1.0 µF	7.0	14.0	4.0	0.50 E3	A50DH 4100--6--
1.5 µF	6.5	20.5	2.0	0.25 E3	A50DK 4150--6--
2.2 µF	8.0	20.5	2.0	0.25 E3	A50DK 4220--6--
3.3 µF	9.5	20.5	2.0	0.25 E3	A50DK 4330--6--
4.7 µF	9.5	28.0	1.5	0.19 E3	A50DQ 4470--6--
6.8 µF	11.0	28.0	1.5	0.19 E3	A50DQ 4680--6--
10.0 µF	11.5	33.0	1.0	0.13 E3	A50DT 5100--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

A50
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A50**

Rated Cap.	100Vdc/63Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.10 µF	5.0	11.0	5.0	1.0 E3	A50EF 3100--6--
0.15 µF	5.0	11.0	5.0	1.0 E3	A50EF 3150--6--
0.22 µF	5.0	11.0	5.0	1.0 E3	A50EF 3220--6--
0.33 µF	6.0	14.0	5.0	1.0 E3	A50EH 3330--6--
0.47 µF	6.0	14.0	5.0	1.0 E3	A50EH 3470--6--
0.68 µF	7.0	14.0	5.0	1.0 E3	A50EH 3680--6--
1.0 µF	7.0	20.5	3.0	0.6 E3	A50EK 4100--6--
1.5 µF	8.0	20.5	3.0	0.6 E3	A50EK 4150--6--
2.2 µF	9.5	20.5	3.0	0.6 E3	A50EK 4220--6--
3.3 µF	9.5	28.0	2.0	0.4 E3	A50EQ 4330--6--
4.7 µF	10.0	33.0	1.0	0.3 E3	A50ET 4470--6--
6.8 µF	12.0	33.0	1.0	0.3 E3	A50ET 4680--6--
10.0 µF	14.5	33.0	1.0	0.3 E3	A50ET 5100--6--

Rated Cap.	250Vdc/160Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.047 µF	5.0	11.0	10.0	5.0 E3	A50IF 2470--6--
0.068 µF	5.0	11.0	10.0	5.0 E3	A50IF 2680--6--
0.10 µF	5.5	14.0	10.0	5.0 E3	A50IH 3100--6--
0.15 µF	5.5	14.0	10.0	5.0 E3	A50IH 3150--6--
0.22 µF	6.5	14.0	10.0	5.0 E3	A50IH 3220--6--
0.33 µF	6.0	20.5	7.0	3.5 E3	A50IK 3330--6--
0.47 µF	7.0	20.5	7.0	3.5 E3	A50IK 3470--6--
0.68 µF	8.5	20.5	7.0	3.5 E3	A50IK 3680--6--
1.0 µF	8.5	28.0	4.0	2.0 E3	A50IQ 4100--6--
1.5 µF	10.0	28.0	4.0	2.0 E3	A50IQ 4150--6--
2.2 µF	11.0	33.0	2.5	1.3 E3	A50IT 4220--6--
3.3 µF	13.0	33.0	2.5	1.3 E3	A50IT 4330--6--
4.7 µF	15.5	33.0	2.5	1.3 E3	A50IT 4470--6--
6.8 µF	18.5	33.0	2.5	1.3 E3	A50IT 4680--6--
10.0 µF	22.0	33.0	2.5	1.3 E3	A50IT 5100--6--

Rated Cap.	400Vdc/200Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.010 µF	5.0	11.0	13.5	11.0 E3	A50MF 2100--6--
0.015 µF	5.0	11.0	13.5	11.0 E3	A50MF 2150--6--
0.022 µF	5.0	11.0	13.5	11.0 E3	A50MF 2220--6--
0.033 µF	5.0	11.0	13.5	11.0 E3	A50MF 2330--6--
0.047 µF	6.0	14.0	13.5	11.0 E3	A50MH 2470--6--
0.068 µF	6.0	14.0	13.5	11.0 E3	A50MH 2680--6--
0.10 µF	6.5	14.0	13.5	11.0 E3	A50MH 3100--6--
0.15 µF	6.0	20.5	10.0	8.0 E3	A50MK 3150--6--
0.22 µF	7.5	20.5	10.0	8.0 E3	A50MK 3220--6--
0.33 µF	8.5	20.5	10.0	8.0 E3	A50MK 3330--6--
0.47 µF	8.5	28.0	6.5	5.2 E3	A50MQ 3470--6--
0.68 µF	10.0	28.0	6.5	5.2 E3	A50MQ 3680--6--
1.0 µF	10.5	33.0	4.0	3.2 E3	A50MT 4100--6--
1.5 µF	12.5	33.0	4.0	3.2 E3	A50MT 4150--6--
2.2 µF	15.0	33.0	4.0	3.2 E3	A50MT 4220--6--
3.3 µF	18.5	33.0	4.0	3.2 E3	A50MT 4330--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Rated Cap.	630Vdc/220Vac*		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
1000 pF	5.0	11.0	20	25.0 E3	A50PF 1100--6--
1500 pF	5.0	11.0	20	25.0 E3	A50PF 1150--6--
2200 pF	5.0	11.0	20	25.0 E3	A50PF 1220--6--
3300 pF	5.0	11.0	20	25.0 E3	A50PF 1330--6--
4700 pF	5.0	11.0	20	25.0 E3	A50PF 1470--6--
6800 pF	5.0	11.0	20	25.0 E3	A50PF 1680--6--
0.010 µF	5.0	14.0	20	25.0 E3	A50PH 2100--6--
0.015 µF	5.0	14.0	20	25.0 E3	A50PH 2150--6--
0.022 µF	6.0	14.0	20	25.0 E3	A50PH 2220--6--
0.033 µF	6.0	20.5	15	19.0 E3	A50PK 2330--6--
0.047 µF	6.0	20.5	15	19.0 E3	A50PK 2470--6--
0.068 µF	7.0	20.5	15	19.0 E3	A50PK 2680--6--
0.10 µF	7.0	28.0	10	13.0 E3	A50PQ 3100--6--
0.15 µF	8.5	28.0	10	13.0 E3	A50PQ 3150--6--
0.22 µF	10.0	28.0	10	13.0 E3	A50PQ 3220--6--
0.33 µF	10.5	33.0	6	7.5 E3	A50PT 3330--6--
0.47 µF	12.0	33.0	6	7.5 E3	A50PT 3470--6--
0.68 µF	14.5	33.0	6	7.5 E3	A50PT 3680--6--
1.0 µF	17.5	33.0	6	7.5 E3	A50PT 4100--6--

Rated Cap.	1000Vdc/250Vac*		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
1000 pF	6.5	14.0	50	100 E3	A50QH 1100--0--
1500 pF	6.5	14.0	50	100 E3	A50QH 1150--0--
2200 pF	6.5	14.0	50	100 E3	A50QH 1220--0--
3300 pF	6.5	14.0	50	100 E3	A50QH 1330--0--
4700 pF	7.5	14.0	50	100 E3	A50QH 1470--0--
6800 pF	8.0	14.0	50	100 E3	A50QH 1680--0--
0.010 µF	7.0	20.5	30	60 E3	A50QK 2100--0--
0.015 µF	7.5	20.5	30	60 E3	A50QK 2150--0--
0.022 µF	9.0	20.5	30	60 E3	A50QK 2220--0--
0.033 µF	8.0	28.0	15	30 E3	A50QQ 2330--0--
0.047 µF	9.0	28.0	15	30 E3	A50QQ 2470--0--
0.068 µF	10.5	28.0	15	30 E3	A50QQ 2680--0--
0.10 µF	12.5	28.0	15	30 E3	A50QQ 3100--0--
0.15 µF	13.5	33.0	10	20 E3	A50QT 3150--0--
0.22 µF	16.0	33.0	10	20 E3	A50QT 3220--0--
0.33 µF	19.0	33.0	10	20 E3	A50QT 3330--0--
0.47 µF	22.0	33.0	10	20 E3	A50QT 3470--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

A50
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A50**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
50 Vdc 63 Vdc 100 Vdc 250 Vdc
400 Vdc 630 Vdc 1000 Vdc

Rated temperature (T_R): +85 °C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 10µF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** ≈ 7nH
max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	C≤0.1µF	0.1µF<C ≤1µF	C >1 µF
1	≤ 80	≤ 80	≤100
10	≤150	≤150	
100	≤250		

Insulation resistance:

Test conditions
Temperature: +25°C±5°C
Voltage charge time: 1 min
Voltage charge:
50 Vdc for V_R <100 Vdc
100 Vdc for V_R ≥100 Vdc

Performance
For V_R ≤100 Vdc
≥ 3750 MΩ for C ≤ 0.33µF (50000 MΩ)*
≥ 1000 s for C > 0.33µF (5000 s)*
For V_R >100 Vdc
≥30000 MΩ for C ≤ 0.33µF (50000 MΩ)*
≥10000 s for C > 0.33µF (17000 s)*
*Typical value

Test voltage between terminations:
1.6xV_R applied for 2 s at +25°C±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

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

Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 50x10^{-4} at 1kHz
Insulation resistance: ≥ 50% of initial limit.

Endurance:

Test conditions
Temperature: +85°C ±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_R

Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
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%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

Performance
Capacitance change |ΔC/C|: ≤ 3% for C≤ 0.1µF
≤ 2% for C> 0.1µF

RELIABILITY:

Reference MIL HDB 217

Application conditions:
Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤ 5 FIT
(1 FIT = 1x10^{-9} failures/components x h)

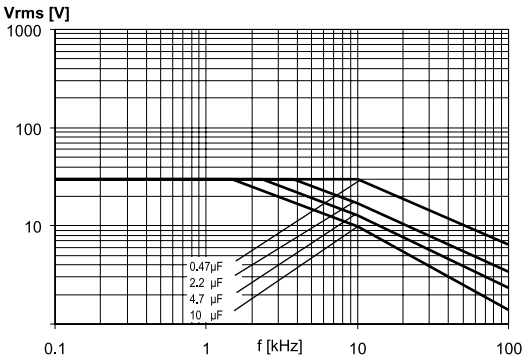
Failure criteria:
(according to DIN 44122)
Short or open circuit
Capacitance change |ΔC/C|: >10%
DF change (Δtgδ): >2 x initial limit.
Insulation resistance: <0.005 x initial limit.

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

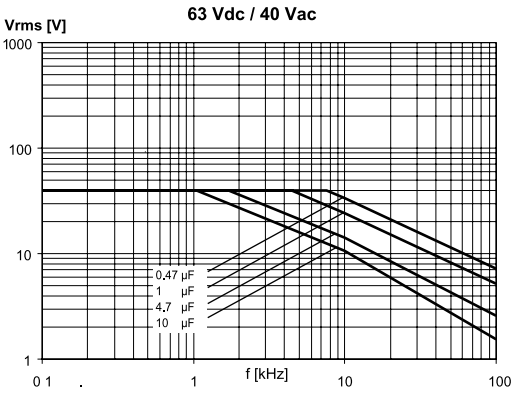
PRODUCT CODE: **A50**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

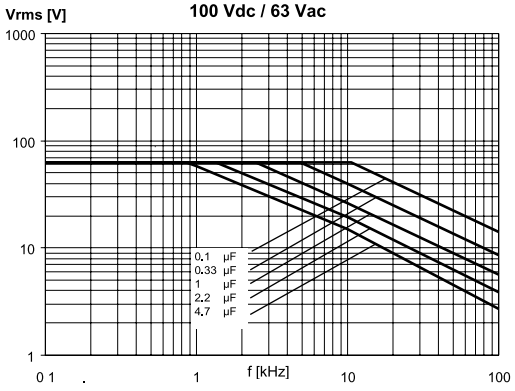
50 Vdc / 30 Vac



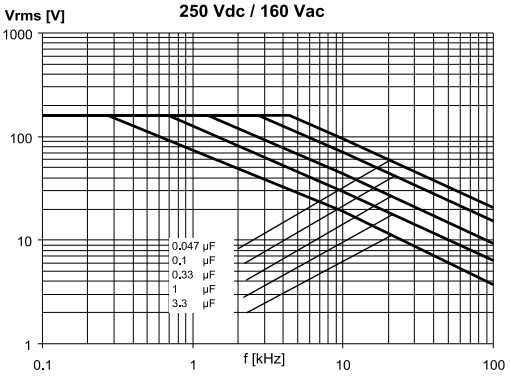
63 Vdc / 40 Vac



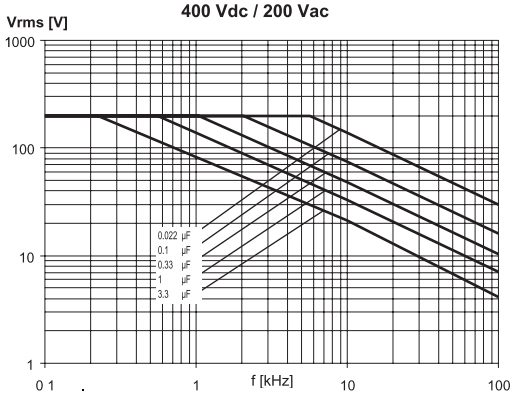
100 Vdc / 63 Vac



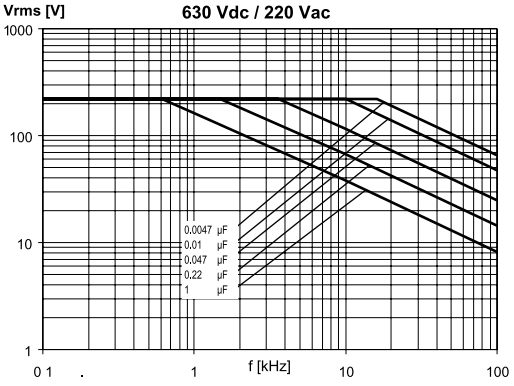
250 Vdc / 160 Vac



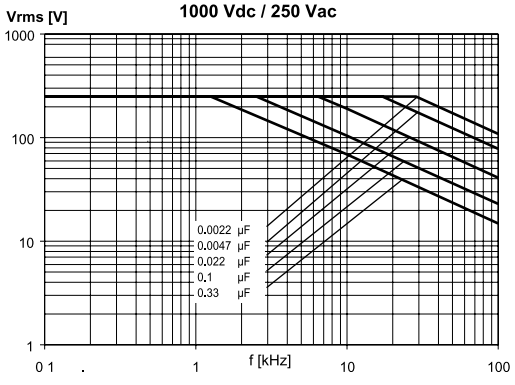
400 Vdc / 200 Vac



630 Vdc / 220 Vac



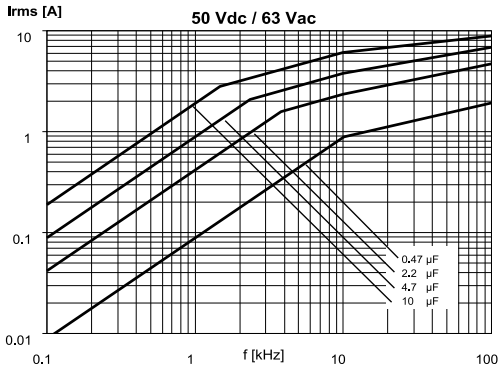
1000 Vdc / 250 Vac

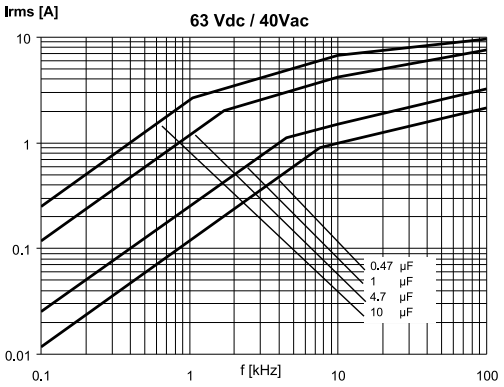


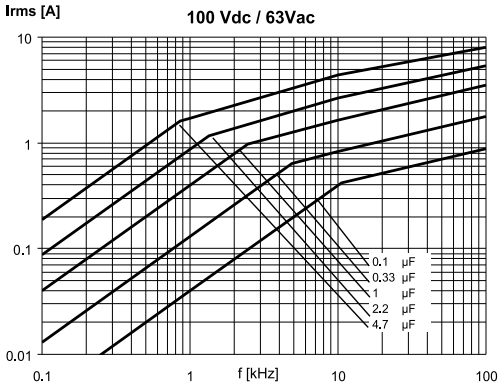
METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

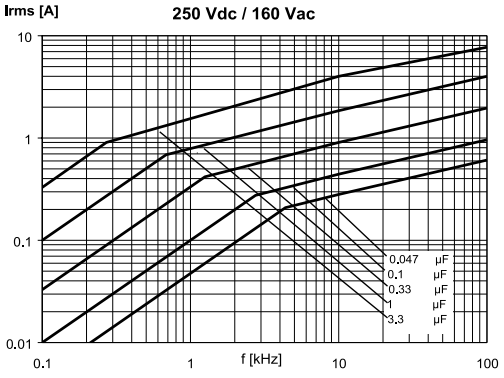
PRODUCT CODE: **A50**

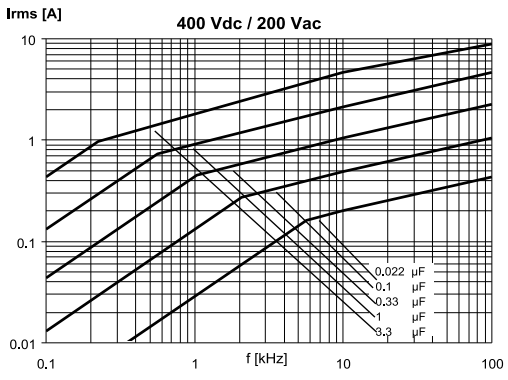
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

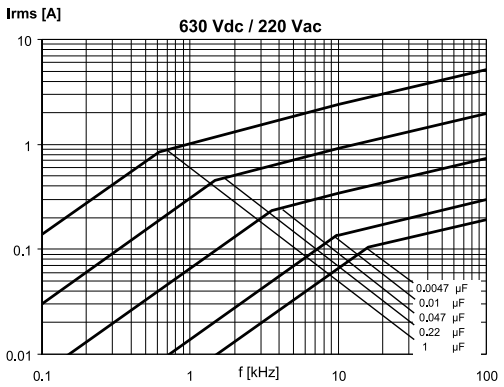


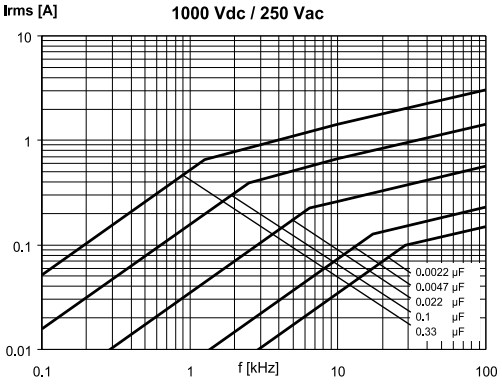






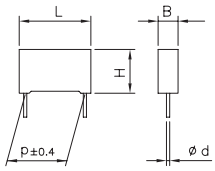




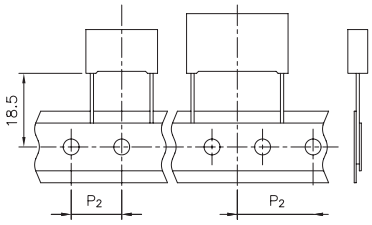


R82
MKT Series

Loose



Taped



All dimensions are in mm.

B	≤6	>6
Ød ±0.05	0.5	0.6

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

Typical applications: by-passing, blocking, coupling, decoupling, timing, oscillator circuits.

For inverter applications please refer to RSB Series.

PRODUCT CODE: **R82**

p = 5mm

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
5.0	<4.5	B +0.1	H +0.1	L +0.2
5.0	≥4.5	B +0.1	H +0.1	L +0.3

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	8	2		C								-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
C = 50V D = 63V E = 100V
I =250V M =400V

Digit 5 Pitch: C = 5 mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

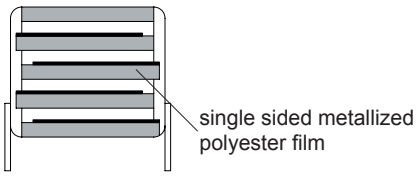
Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Lead length (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		DQ
Reel Ø 355 mm		CK
Loose, short leads	$4^{+1.5}$	AA
Loose, long leads	$17^{+1/-2}$	Z3

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).
Plates: aluminium 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.
Marking: Capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-2

Winding scheme



R82
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

p = 5 mm
PRODUCT CODE: **R82**

a) STACKED version
b) WOUND version

Rated Cap.	50Vdc/30Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
a) 2.2 µF	6.0	11.0	7.2	5.0	100	10.0 E3	R82CC4220--7--
b) 3.3 µF	7.2	13.0	7.2	5.0	25	2.5 E3	R82CC4330--3--
b) 4.7 µF	7.2	13.0	7.2	5.0	25	2.5 E3	R82CC4470--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

STACKED version

Rated Cap.	63Vdc/40Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
0.10 µF	2.5	6.5	7.2	5.0	160	20 E3	R82DC3100--5--
0.15 µF	2.5	6.5	7.2	5.0	160	20 E3	R82DC3150--6--
0.22 µF	2.5	6.5	7.2	5.0	160	20 E3	R82DC3220--6--
0.33 µF	3.5	7.5	7.2	5.0	160	20 E3	R82DC3330--6--
0.47 µF	3.5	7.5	7.2	5.0	160	20 E3	R82DC3470--6--
0.68 µF	4.5	9.5	7.2	5.0	160	20 E3	R82DC3680--6--
1.0 µF	5.0	10.0	7.2	5.0	160	20 E3	R82DC4100--6--
1.5 µF	6.0	11.0	7.2	5.0	160	20 E3	R82DC4150--6--

Rated Cap.	100Vdc/63Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	2.5	6.5	7.2	5.0	200	40 E3	R82EC1100--5--
1500 pF	2.5	6.5	7.2	5.0	200	40 E3	R82EC1150--5--
2200 pF	2.5	6.5	7.2	5.0	200	40 E3	R82EC1220--5--
3300 pF	2.5	6.5	7.2	5.0	200	40 E3	R82EC1330--5--
4700 pF	2.5	6.5	7.2	5.0	200	40 E3	R82EC1470--5--
6800 pF	2.5	6.5	7.2	5.0	200	40 E3	R82EC1680--5--
0.010 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC2100--5--
0.015 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC2150--5--
0.022 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC2220--5--
0.033 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC2330--5--
0.047 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC2470--6--
0.068 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC2680--6--
0.10 µF	2.5	6.5	7.2	5.0	200	40 E3	R82EC3100--7--
0.15 µF	3.5	7.5	7.2	5.0	200	40 E3	R82EC3150--7--
0.22 µF	3.5	7.5	7.2	5.0	200	40 E3	R82EC3220--7--
0.33 µF	4.5	9.5	7.2	5.0	200	40 E3	R82EC3330--7--
0.47 µF	4.5	9.5	7.2	5.0	200	40 E3	R82EC3470--7--
0.68 µF	5.0	10.0	7.2	5.0	200	40 E3	R82EC3680--7--
1.0 µF	6.0	11.0	7.2	5.0	200	40 E3	R82EC4100--7--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

Rated Cap.	250Vdc/140Vac REDUCED SIZES Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.022 µF	2.5	6.5	7.2	5.0	130	65 E3	R82IC2220--6--
0.047 µF	3.5	7.5	7.2	5.0	130	65 E3	R82IC2470--6--
0.068 µF	3.5	7.5	7.2	5.0	130	65 E3	R82IC2680--6--
0.10 µF	4.5	9.5	7.2	5.0	130	65 E3	R82IC3100--6--
0.15 µF	5.0	10.0	7.2	5.0	130	65 E3	R82IC3150--6--
0.22 µF	6.0	11.0	7.2	5.0	130	65 E3	R82IC3220--6--

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
6800 pF	2.5	6.5	7.2	5.0	250	125 E3	R82IC1680--5-
0.010 µF	2.5	6.5	7.2	5.0	250	125 E3	R82IC2100--5--
0.015 µF	2.5	6.5	7.2	5.0	250	125 E3	R82IC2150--5--
0.022 µF	3.5	7.5	7.2	5.0	250	125 E3	R82IC2220--5--
0.033 µF	3.5	7.5	7.2	5.0	250	125 E3	R82IC2330--5--
0.047 µF	4.5	9.5	7.2	5.0	250	125 E3	R82IC2470--5--
0.068 µF	4.5	9.5	7.2	5.0	250	125 E3	R82IC2680--5--
0.10 µF	5.0	10.0	7.2	5.0	250	125 E3	R82IC3100--55-
0.15 µF	6.0	11.0	7.2	5.0	250	125 E3	R82IC3150--5--

Rated Cap.	400Vdc/160Vac REDUCED SIZES Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
6800 pF	2.5	6.5	7.2	5.0	200	160 E3	R82MC1680--6--
0.015 µF	3.5	7.5	7.2	5.0	200	160 E3	R82MC2150--6--
0.033 µF	4.5	9.5	7.2	5.0	200	160 E3	R82MC2330--6--
0.047 µF	5.0	10.0	7.2	5.0	200	160 E3	R82MC2470--6--
0.068 µF	6.0	11.0	7.2	5.0	200	160 E3	R82MC2680--6--

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
1000 pF	2.5	6.5	7.2	5.0	400	320 E3	R82MC1100--5--
1500 pF	2.5	6.5	7.2	5.0	400	320 E3	R82MC1150--5--
2200 pF	2.5	6.5	7.2	5.0	400	320 E3	R82MC1220--5--
3300 pF	2.5	6.5	7.2	5.0	400	320 E3	R82MC1330--5--
4700 pF	2.5	6.5	7.2	5.0	400	320 E3	R82MC1470--5--
6800 pF	3.5	7.5	7.2	5.0	400	320 E3	R82MC1680--5--
0.010 µF	3.5	7.5	7.2	5.0	400	320 E3	R82MC2100--5--
0.015 µF	4.5	9.5	7.2	5.0	400	320 E3	R82MC2150--5--
0.022 µF	4.5	9.5	7.2	5.0	400	320 E3	R82MC2220--5--
0.033 µF	5.0	10.0	7.2	5.0	400	320 E3	R82MC2330--5--
0.047 µF	6.0	11.0	7.2	5.0	400	320 E3	R82MC2470--5--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

R82
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

p = 5 mm
PRODUCT CODE: **R82**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
50 Vdc 63 Vdc 100 Vdc
250 Vdc 400 Vdc

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 4.7µF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):
±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L): ≈7nH
max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	C ≤ 0.1µF	C > 0.1µF
1	≤ 80	≤ 80
10	≤ 120	≤ 120
100	≤ 250	

Insulation resistance:

Test conditions
Temperature: +25°C±5°C
Voltage charge time: 1 min
Voltage charge:
50 Vdc for V_R <100 Vdc
100 Vdc for V_R ≥100 Vdc

Performance
For V_R ≤100 Vdc
≥15000 MΩ for C ≤ 0.33µF
≥ 5000 s for C > 0.33µF and ≤1µF
≥ 1000 s for C > 1µF
For V_R >100 Vdc
≥30000 MΩ
*Typical value

Test voltage between terminations:
1.4xV_R applied for 2 s at +25°C±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions
Temperature: +40°C±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days
Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 50x10^{-4} at 1kHz
Insulation resistance: ≥ 50% of initial limit.

Endurance:

Test conditions
Temperature: +105°C ±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_C
Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤1µF
≤ 20x10^{-4} at 1kHz for C>1µF
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%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

Performance
Capacitance change |ΔC/C|: ≤ 3% for C≤ 0.1µF
≤ 2% for C> 0.1µF

RELIABILITY:

Reference MIL HDB 217

Application conditions:
Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤ 1 FIT
(1 FIT = 1x10^{-9} failures/components x h)

Failure criteria:
(according to DIN 44122)
Short or open circuit
Capacitance change |ΔC/C|: > 10%
DF change (Δtgδ): > 2 x initial limit.
Insulation resistance: < 0.005 x initial limit.

R82

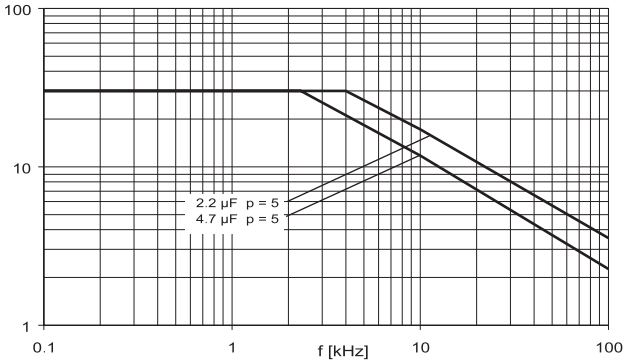
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

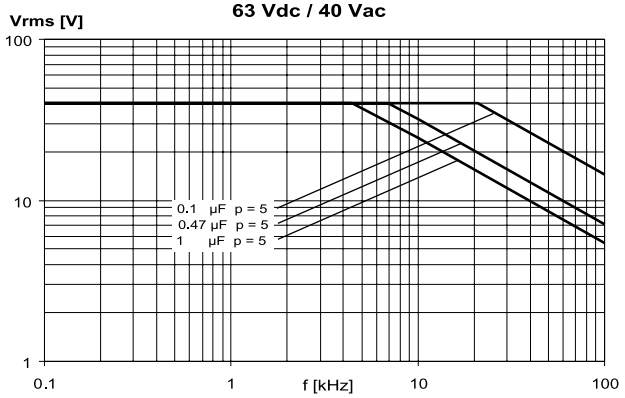
p = 5 mm
PRODUCT CODE: **R82**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

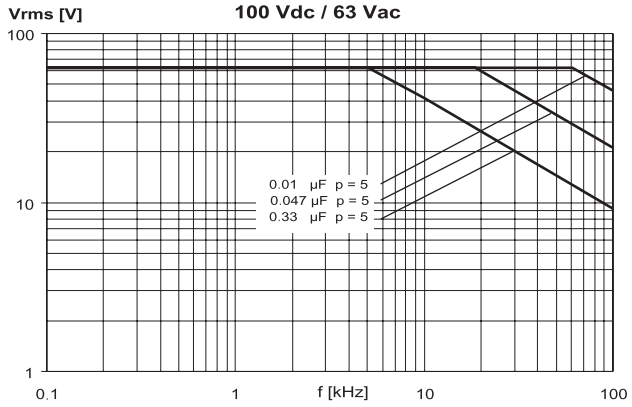
50 Vdc / 30 Vac



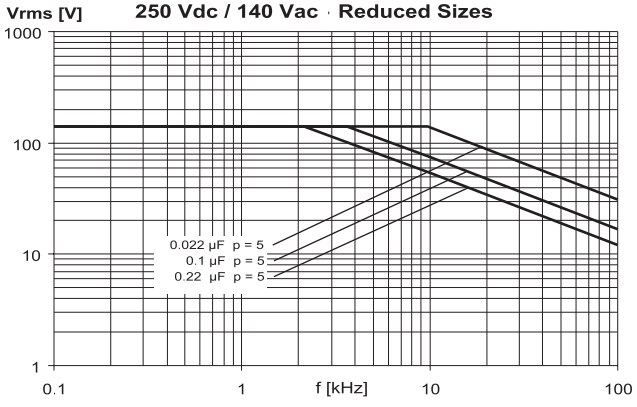
63 Vdc / 40 Vac



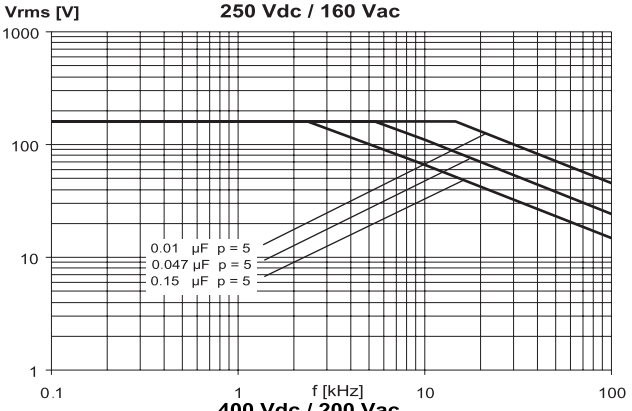
100 Vdc / 63 Vac



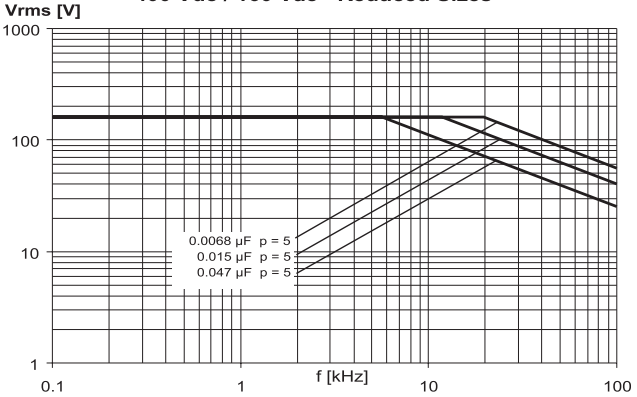
250 Vdc / 140 Vac · Reduced Sizes



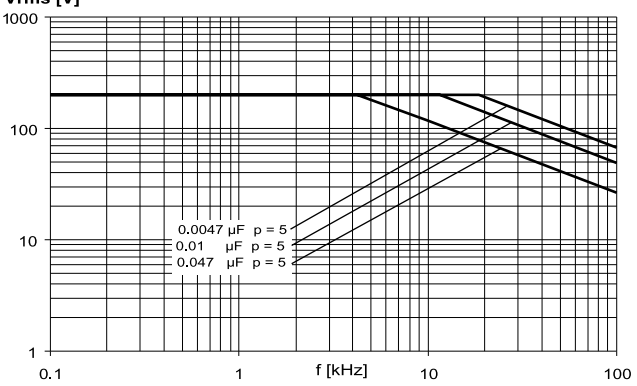
250 Vdc / 160 Vac



400 Vdc / 160 Vac - Reduced Sizes



400 Vdc / 200 Vac

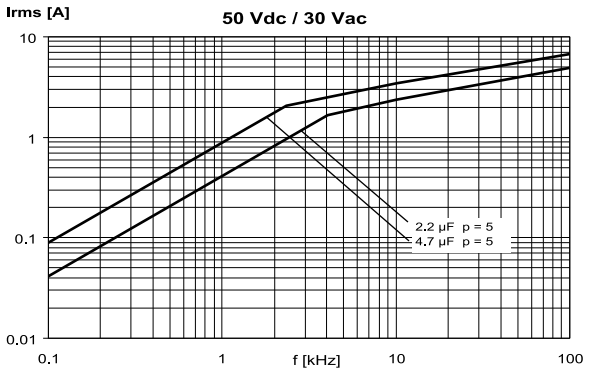


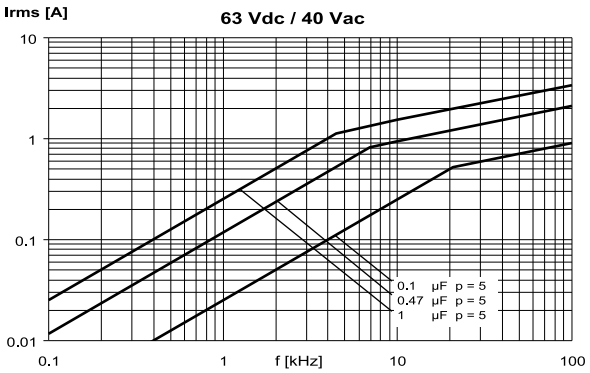
R82
MKT Series

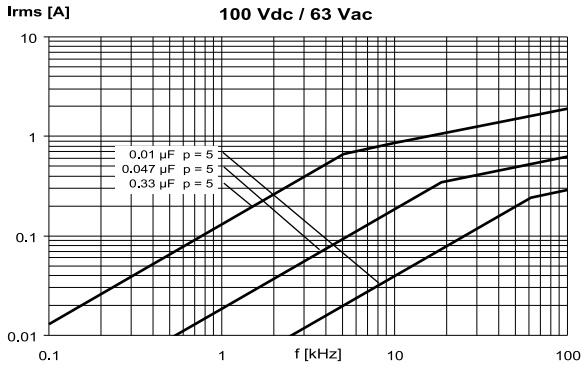
METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

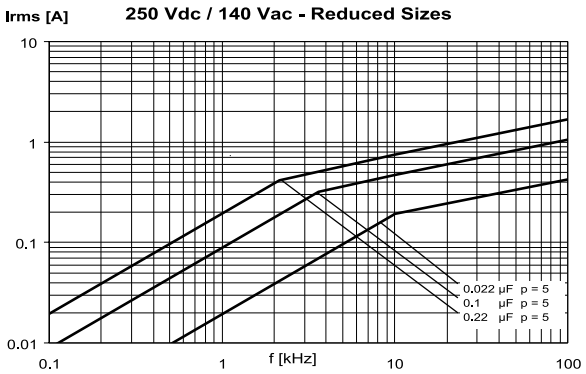
p = 5 mm
PRODUCT CODE: **R82**

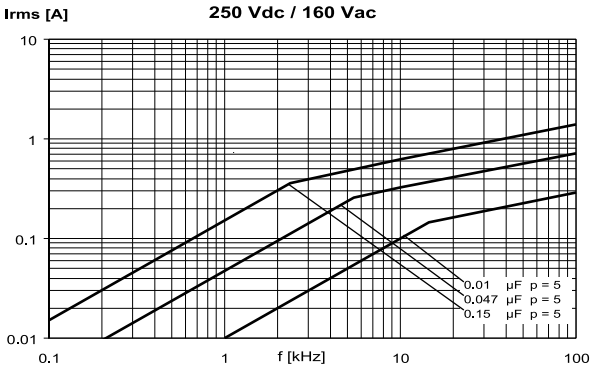
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

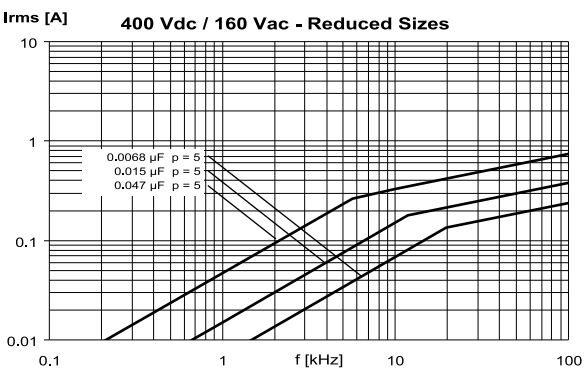


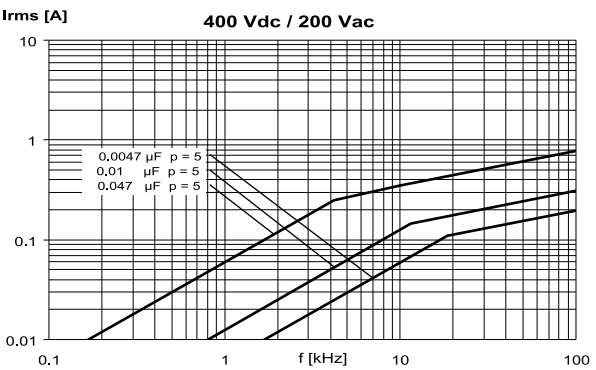








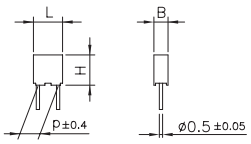




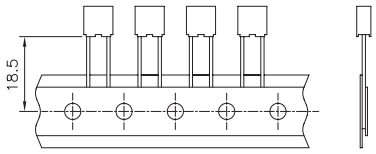
RSB
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
HIGH PERFORMANCES - HIGH TEMPERATURE
D.C. AND PULSE APPLICATIONS
STACKED VERSION

Loose



Taped



All dimensions are in mm.

Typical applications: blocking, coupling, decoupling for a signal from DC to high frequency; pulse, logic and timing circuit, lamp capacitor for electronic compact lamps, inverter for LCD monitors, automotive DC motor suppression.

PRODUCT CODE: **RSB**

p = 5mm

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
5.0	<4.5	B +0.1	H +0.1	L +0.2
5.0	≥4.5	B +0.1	H +0.1	L +0.3

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	S	B		C								-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
C = 50V D = 63V E = 100V I = 250V
M =400V W=500V P = 630V

Digit 5 Pitch: C = 5 mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

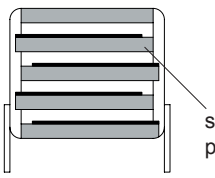
Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Lead length (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		DQ
Reel Ø 355 mm		CK
Loose, short leads	$4^{+1.5}$	AA
Loose, long leads	$17^{+1/-2}$	Z3

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).
Plates: aluminium 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.
Marking: Series (RSB) capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/125/56 IEC 60068-1
Operating temperature range: -55 to +125°C
Related documents: IEC 60384-2

Winding scheme



RSB
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
HIGH PERFORMANCES - HIGH TEMPERATURE
D.C. AND PULSE APPLICATIONS
STACKED VERSION

p = 5 mm
PRODUCT CODE: **RSB**

Rated Cap.	50Vdc/30Vac Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/µs)	Part Number
2.2µF	6.0	11.0	7.2	5.0	200	20 E3	RSBCC4220--1--

Rated Cap.	63Vdc/40Vac Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/µs)	Part Number
0.10 µF	2.5	6.5	7.2	5.0	250	31.5 E3	RSBDC3100--0--
0.15 µF	2.5	6.5	7.2	5.0	250	31.5 E3	RSBDC3150--0--
0.22 µF	2.5	6.5	7.2	5.0	250	31.5 E3	RSBDC3220--1--
0.33 µF	3.5	7.5	7.2	5.0	250	31.5 E3	RSBDC3330--0--
0.47 µF	3.5	7.5	7.2	5.0	250	31.5 E3	RSBDC3470--1--
0.68 µF	4.5	9.5	7.2	5.0	250	31.5 E3	RSBDC3680--1--
1.0 µF	5.0	10.0	7.2	5.0	250	31.5 E3	RSBDC4100--1--
1.5 µF	6.0	11.0	7.2	5.0	250	31.5 E3	RSBDC4150--1--

Rated Cap.	100Vdc/63Vac Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/ µs)	Part Number
4700 pF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC1470--0--
6800 pF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC1680--0--
0.010 µF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2100--0--
0.015 µF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2150--0--
0.022 µF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2220--0--
0.033 µF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2330--0--
0.047 µF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2470--0--
0.068 µF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2680--1--
0.10 µF	3.5	7.5	7.2	5.0	300	60 E3	RSBEC3100--0--
0.15 µF	4.5	9.5	7.2	5.0	300	60 E3	RSBEC3150--0--
0.22 µF	5.0	10.0	7.2	5.0	300	60 E3	RSBEC3220--0--
0.33 µF	6.0	11.0	7.2	5.0	300	60 E3	RSBEC3330--0--
0.47 µF	6.0	11.0	7.2	5.0	300	60 E3	RSBEC3470--1--

Rated Cap.	250Vdc/160Vac Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/ µs)	Part Number
1000 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1100--0--
1500 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1150--0--
2200 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1220--0--
3300 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1330--0--
4700 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1470--0--
6800 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1680--0--
0.010 µF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC2100--0--
0.015 µF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC2150--0--
0.022 µF	3.5	7.5	7.2	5.0	400	20 E4	RSBIC2220--0--
0.033 µF	3.5	7.5	7.2	5.0	400	20 E4	RSBIC2330--0--
0.047 µF	4.5	9.5	7.2	5.0	400	20 E4	RSBIC2470--0--
0.068 µF	4.5	9.5	7.2	5.0	400	20 E4	RSBIC2680--0--
0.10 µF	5.0	10.0	7.2	5.0	400	20 E4	RSBIC3100--0--
0.15 µF	6.0	11.0	7.2	5.0	400	20 E4	RSBIC3150--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	400Vdc/200Vac Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/ µs)	Part Number
1000 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1100--0--
1500 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1150--0--
2200 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1220--0--
3300 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1330--0--
4700 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1470--0--
6800 pF	3.5	7.5	7.2	5.0	600	48 E4	RSBMC1680--0--
0.010 µF	3.5	7.5	7.2	5.0	600	48 E4	RSBMC2100--0--
0.015 µF	3.5	7.5	7.2	5.0	600	48 E4	RSBMC2150--0--
0.022 µF	4.5	9.5	7.2	5.0	600	48 E4	RSBMC2220--0--
0.033 µF	5.0	10.0	7.2	5.0	600	48 E4	RSBMC2330--0--
0.047 µF	6.0	11.0	7.2	5.0	600	48 E4	RSBMC2470--0--

Rated Cap.	500Vdc/220Vac* Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/ µs)	Part Number
1000 pF	2.5	6.5	7.2	5.0	700	70 E4	RSBWC1100--0--
1500 pF	2.5	6.5	7.2	5.0	700	70 E4	RSBWC1150--0--
2200 pF	3.5	7.5	7.2	5.0	700	70 E4	RSBWC1220--0--
3300 pF	3.5	7.5	7.2	5.0	700	70 E4	RSBWC1330--0--
4700 pF	3.5	7.5	7.2	5.0	700	70 E4	RSBWC1470--0--
6800 pF	4.5	9.5	7.2	5.0	700	70 E4	RSBWC1680--0--
0.010 µF	5.0	10.0	7.2	5.0	700	70 E4	RSBWC2100--0--
0.015 µF	6.0	11.0	7.2	5.0	700	70 E4	RSBWC2150--0--

Rated Cap.	630Vdc/220Vac* Std dimensions B	H	L	p	Max dv/dt (V/ µs)	Max K_0 (V^2/ µs)	Part Number
1000 pF	2.5	6.5	7.2	5.0	800	100 E4	RSBPC1100--0--
1500 pF	3.5	7.5	7.2	5.0	800	100 E4	RSBPC1150--0--
2200 pF	3.5	7.5	7.2	5.0	800	100 E4	RSBPC1220--0--
3300 pF	4.5	9.5	7.2	5.0	800	100 E4	RSBPC1330--0--
4700 pF	4.5	9.5	7.2	5.0	800	100 E4	RSBPC1470--0--
6800 pF	5.0	10.0	7.2	5.0	800	100 E4	RSBPC1680--0--
0.010 µF	6.0	11.0	7.2	5.0	800	100 E4	RSBPC2100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note 1: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

Note 2: The rated voltages from 250Vdc to 630Vdc are for pulse applications (i.e.: lamp capacitors).

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

RSB
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
HIGH PERFORMANCES - HIGH TEMPERATURE
D.C. AND PULSE APPLICATIONS
STACKED VERSION

p = 5 mm
PRODUCT CODE: **RSB**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
50 Vdc 63 Vdc 100 Vdc
250 Vdc 400 Vdc 500 Vdc
630 Vdc

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +125°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 2.2µF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** ≈7nH
max 1 nH per 1 mm lead and capacitor length.

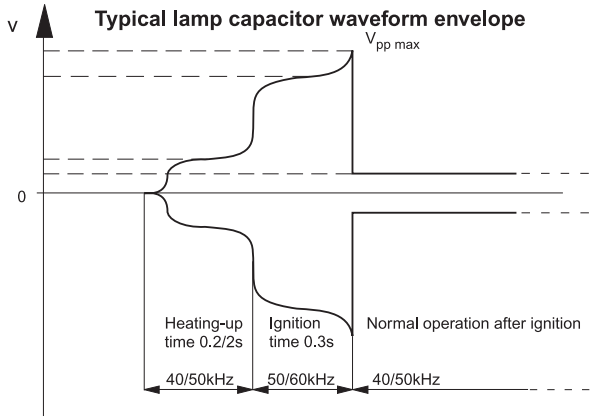
Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	C ≤ 0.1µF	C > 0.1µF
1	≤ 80	≤ 80
10	≤ 120	≤ 120
100	≤ 250	

Insulation resistance:
Test conditions
Temperature: +25°C±5°C
Voltage charge time: 1 min
Voltage charge:
50 Vdc for V_R <100 Vdc
100 Vdc for V_R ≥100 Vdc
Performance
For V_R ≤100 Vdc
≥ 15000 MΩ for C ≤ 0.33µF
≥ 5000 s for C > 0.33µF and ≤1µF
≥ 1000 s for C > 1µF
For V_R >100 Vdc
≥ 30000 MΩ

Test voltage between terminations:
1.6xV_R applied for 2 s at +25°C±5°C.

Electrical characteristics for use as lamp capacitors in lighting applications.



TEST METHOD AND PERFORMANCE

Damp heat, steady state:
Test conditions
Temperature: +40°C±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days
Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgd): ≤ 50x10^{-4} at 1kHz
Insulation resistance: ≥ 50% of initial limit.

Endurance:
Test conditions
Temperature: +125°C ±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_C
Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
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%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**
Storage: standard environmental conditions (see page 12).
Performance
Capacitance change |ΔC/C|: ≤ 3%for C≤ 0.1µF
≤ 2%for C> 0.1µF

RELIABILITY:
Reference MIL HDB 217
Application conditions:
Temperature: +40°C ±2°C
Voltage: 0.5xV_R
Failure rate: ≤ 1 FIT
(1 FIT = 1x10^{-9} failures/components x h)
Failure criteria:
(according to DIN 44122)
Short or open circuit
Capacitance change |ΔC/C|: > 10%
DF change (Δtgδ): > 2 x initial limit.
Insulation resistance: < 0.005 x initial limit.

RSB

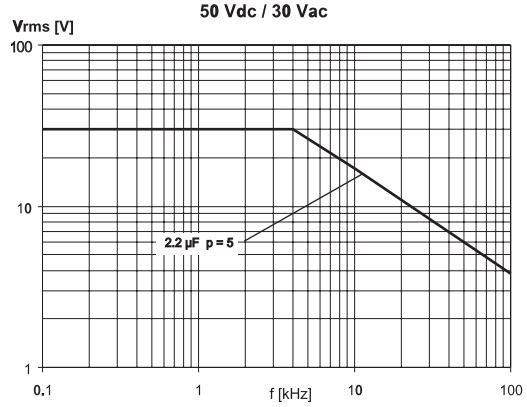
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
HIGH PERFORMANCES - HIGH TEMPERATURE
D.C. AND PULSE APPLICATIONS
STACKED VERSION

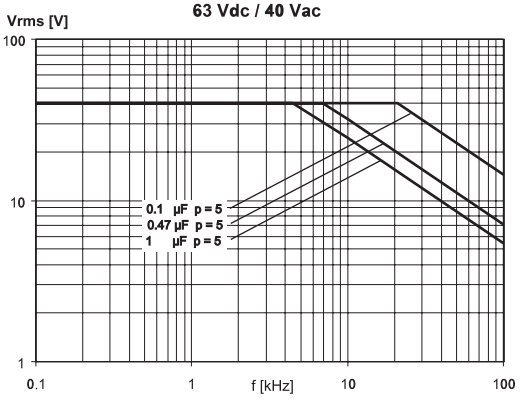
p = 5 mm
PRODUCT CODE: **RSB**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)

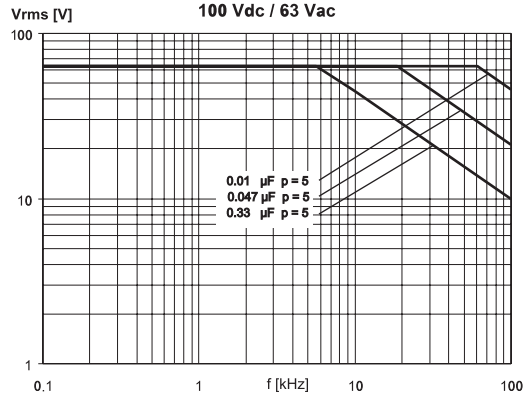
50 Vdc / 30 Vac



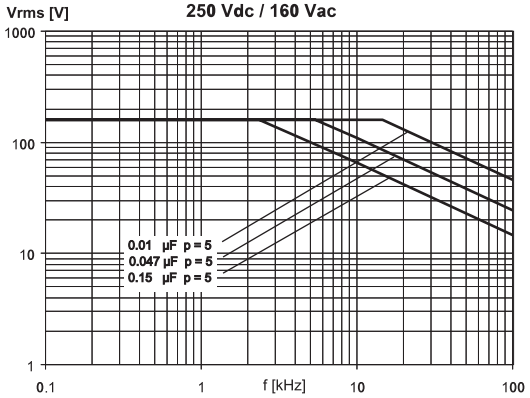
63 Vdc / 40 Vac



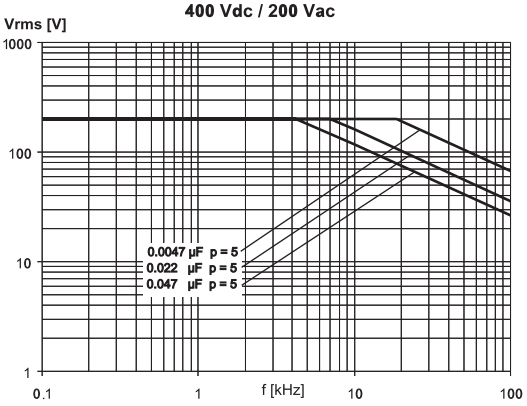
100 Vdc / 63 Vac



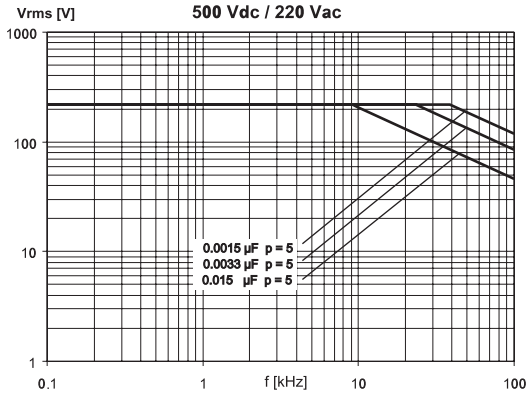
250 Vdc / 160 Vac



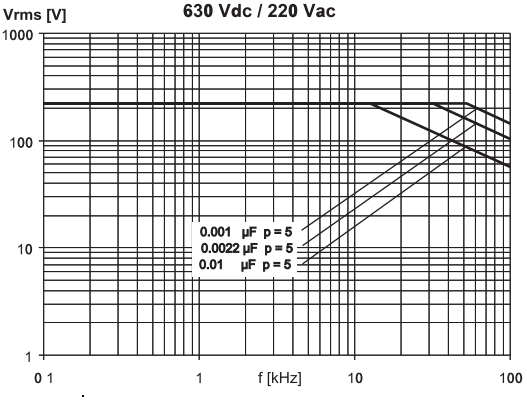
400 Vdc / 200 Vac



500 Vdc / 220 Vac



630 Vdc / 220 Vac



Note: p (pitch) in mm.

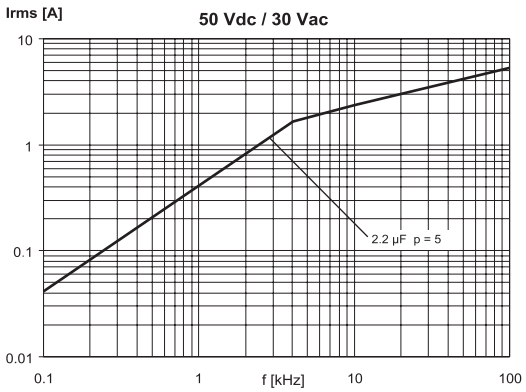
RSB

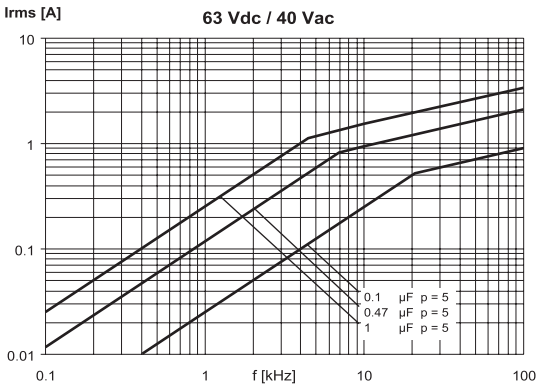
MKT Series

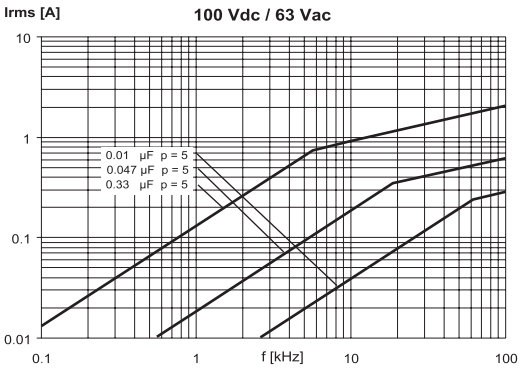
METALLIZED POLYESTER FILM CAPACITOR
HIGH PERFORMANCES - HIGH TEMPERATURE
D.C. AND PULSE APPLICATIONS
STACKED VERSION

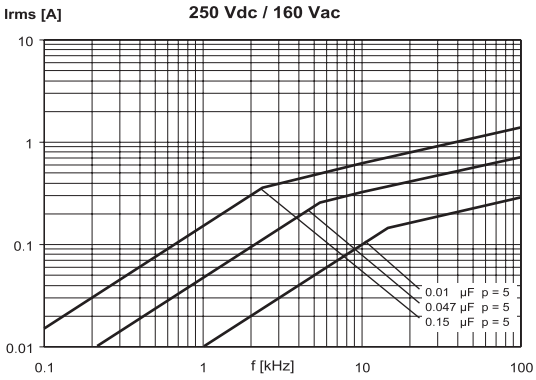
p = 5 mm
PRODUCT CODE: **RSB**

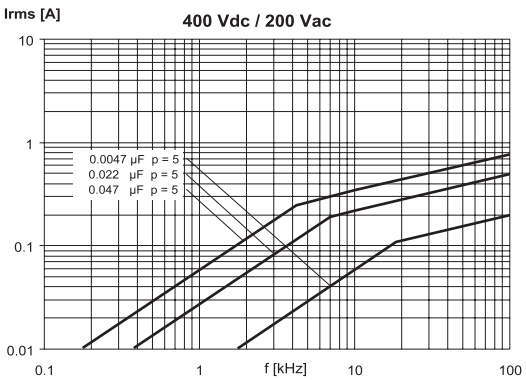
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)

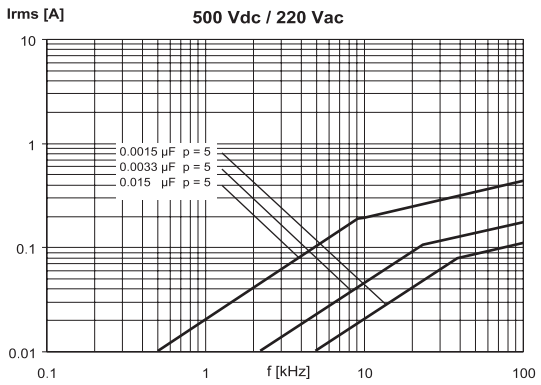


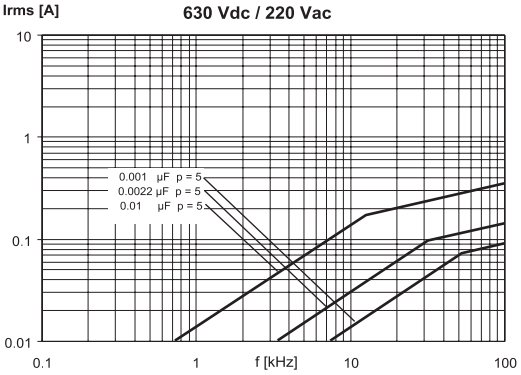










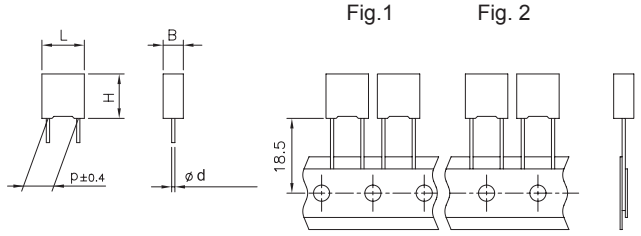


Note: p (pitch) in mm.

R66
MKT Series

Loose Taped

Fig.1 Fig. 2



B	<3.5	≥4.0
Ød ±0.05	0.5	0.6

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR D.C MULTIPURPOSE APPLICATIONS

Typical applications: this series combines small size, good performances in by-passing, blocking and interference suppression in low voltage applications (i.e.: AUTOMOTIVE).

PRODUCT CODE: **R66** **p = 7.5mm**

Note: R66 series has replaced the R84 series (available only upon request).
For new design we suggest the use of the R66 series

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
7.5	All	B +0.1	H +0.1	L +0.2

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	6	6		D								-	

Digit 1 to 3 Series code.
Digit 4 d.c. rated voltage:
C = 50V D = 63V E = 100V
I = 250V M = 400V P = 630V
Digit 5 Pitch: D = 7.5 mm
Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.
Digit 10 to 11 Mechanical version and/or packaging (table1)
Digit 12 Identifies the dimensions and electrical characteristics.
Digit 13 Internal use
Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

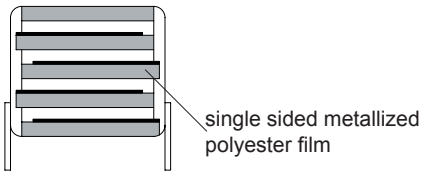
Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Lead length (mm)	Taping style Figure No.	Ordering code (Digit 10 to 11)
AMMO-PACK		1	DQ
AMMO-PACK		2	28
Reel Ø 355 mm		1	CK
Loose, short leads	4^{+2}		AA
Loose, long leads	$17^{+1/-2}$		Z3

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).
Plates: aluminium 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.
Marking: Capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
For stacked technology an upper operating temperature of +125°C is allowed for a max operating time of 1000 h.
Related documents: IEC 60384-2

Winding scheme



R66

MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

p = 7.5 mm

PRODUCT CODE: **R66**

STACKED VERSION

Rated Cap.	50Vdc/30Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.68 µF	3.0	8.0	10.0	7.5	100	10 E3	R66CD3680--6--
1.0 µF	3.0	8.0	10.0	7.5	100	10 E3	R66CD4100--6--
1.5 µF	4.0	9.0	10.0	7.5	100	10 E3	R66CD4150--6--
2.2 µF	5.0	10.5	10.0	7.5	100	10 E3	R66CD4220--6--
4.7 µF	6.0	12.0	10.5	7.5	100	10 E3	R66CD4470--6--

Rated Cap.	63Vdc/40Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.33 µF	3.0	8.0	10.0	7.5	120	15 E3	R66DD3330--7--
0.47 µF	3.0	8.0	10.0	7.5	120	15 E3	R66DD3470--6--
0.68 µF	4.0	9.0	10.0	7.5	120	15 E3	R66DD3680--7--
1.0 µF	4.0	9.0	10.0	7.5	120	15 E3	R66DD4100--7--
1.5 µF	5.0	10.5	10.0	7.5	120	15 E3	R66DD4150--7--
2.2 µF	6.0	12.0	10.5	7.5	120	15 E3	R66DD4220--6--
3.3 µF	6.0	12.0	10.5	7.5	120	15 E3	R66DD4330--6--

Rated Cap.	100Vdc/63Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.068µF	3.0	8.0	10.0	7.5	150	30 E3	R66ED2680--7--
0.10 µF	3.0	8.0	10.0	7.5	150	30 E3	R66ED3100--7--
0.15 µF	3.0	8.0	10.0	7.5	150	30 E3	R66ED3150--7--
0.22 µF	3.0	8.0	10.0	7.5	150	30 E3	R66ED3220--7--
0.33 µF	4.0	9.0	10.0	7.5	150	30 E3	R66ED3330--7--
0.47 µF	4.0	9.0	10.0	7.5	150	30 E3	R66ED3470--7--
0.68 µF	4.0	9.0	10.0	7.5	150	30 E3	R66ED3680--7--
1.0 µF	5.0	10.5	10.0	7.5	150	30 E3	R66ED4100--7--
1.5 µF	6.0	12.0	10.5	7.5	150	30 E3	R66ED4150--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.022µF	3.0	8.0	10.0	7.5	200	100 E3	R66ID 2220--7--
0.033µF	3.0	8.0	10.0	7.5	200	100 E3	R66ID 2330--7--
0.047µF	3.0	8.0	10.0	7.5	200	100 E3	R66ID 2470--7--
0.068µF	3.0	8.0	10.0	7.5	200	100 E3	R66ID 2680--6--
0.10 µF	4.0	9.0	10.0	7.5	200	100 E3	R66ID 3100--7--
0.15 µF	4.0	9.0	10.0	7.5	200	100 E3	R66ID 3150--7--
0.22 µF	5.0	10.5	10.0	7.5	200	100 E3	R66ID 3220--7--
0.33 µF	6.0	12.0	10.5	7.5	200	100 E3	R66ID 3330--6--

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
6800 pF	3.0	8.0	10.0	7.5	275	220 E3	R66MD1680--7--
0.010µF	3.0	8.0	10.0	7.5	275	220 E3	R66MD2100--7--
0.015µF	3.0	8.0	10.0	7.5	275	220 E3	R66MD2150--7--
0.022µF	3.0	8.0	10.0	7.5	275	220 E3	R66MD2220--6--
0.033µF	4.0	9.0	10.0	7.5	275	220 E3	R66MD2330--7--
0.047µF	4.0	9.0	10.0	7.5	275	220 E3	R66MD2470--7--
0.068µF	5.0	10.5	10.0	7.5	275	220 E3	R66MD2680--7--
0.10 µF	6.0	12.0	10.5	7.5	275	220 E3	R66MD3100--6--
0.15 µF	6.0	12.0	10.5	7.5	275	220 E3	R66MD3150--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

a) WOUND version

b) STACKED version

Rated Cap.	630Vdc/220Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
a) 1000 pF	3.0	8.0	10.0	7.5	40	50 E3	R66PD1100--1--
a) 1500 pF	3.0	8.0	10.0	7.5	40	50 E3	R66PD1150--1--
a) 2200 pF	3.0	8.0	10.0	7.5	40	50 E3	R66PD1220--1--
a) 3300 pF	3.0	8.0	10.0	7.5	40	50 E3	R66PD1330--1--
a) 4700 pF	3.0	8.0	10.0	7.5	40	50 E3	R66PD1470--1--
a) 6800 pF	4.0	9.0	10.0	7.5	40	50 E3	R66PD1680--1--
b) 0.010µF	4.0	9.0	10.0	7.5	300	378 E3	R66PD2100--7--
b) 0.015µF	4.0	9.0	10.0	7.5	300	378 E3	R66PD2150--7--
b) 0.022µF	5.0	10.5	10.0	7.5	300	378 E3	R66PD2220--7--
b) 0.033µF	6.0	12.0	10.5	7.5	300	378 E3	R66PD2330--6--
b) 0.047µF	6.0	12.0	10.5	7.5	300	378 E3	R66PD2470--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R66
MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

p = 7.5 mm
PRODUCT CODE: **R66**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
50 Vdc 63 Vdc 100 Vdc
250 Vdc 400 Vdc 630 Vdc

Rated temperature (T_R): +85 °C

Temperature derated voltage:
for temperatures between +85°C and the upper operating temperature (+105°C for wound technology and +125°C for stacked technology) a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000 pF to 4.7 μF

Capacitance values:
E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
± 5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** ≈8nH
(lead length ~2mm)

Dissipation factor (DF):
tgd $10^{-4.}$ at +25°C ”5°C

kHz	tgδ x 10^{-4}
1	≤ 100
10	≤ 150

Insulation resistance:

Test conditions
Temperature +25°C±5°C
Voltage charge time: 1 min
Voltage charge: 50 Vdc for V_R <100 Vdc
100 Vdc for V_R ≥100 Vdc

Performance
For V_R ≤100 Vdc
≥3750 MΩ for C ≤0.33μF (5000 MΩ)*
≥1250 s for C >0.33μF (5000 s)*
For V_R >100 Vdc
≥30000MΩ (50000 MΩ)*
*Typical value

Test voltage between terminals:
1.6xV_R applied for 2 s at +25°C ± 5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions
Temperature: +40°C ±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days
Performance
Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤50x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions
Temperature: +105°C ±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_C
Performance
Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤50 10^{-4} at 10kHz
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%
DF change (Δtgδ): ≤50x10^{-4} at 10kHz
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**

Storage
standard environmental conditions (see page 12).
Performance
Capacitance change |ΔC/C|: ≤3% for C≤0.1μF
≤2% for C>0.1μF

RELIABILITY

Reference MIL HDB 217

Application conditions:
Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤2 FIT
(1 FIT = 1 10^{-9} failures/components h)
Failure criteria:
(according to DIN 44122)
Short or open circuit
Capacitance change |ΔC/C|: >10%
DF change (Δtgδ): >2 x initial limit.
Insulation resistance: <0.005 x initial limit.

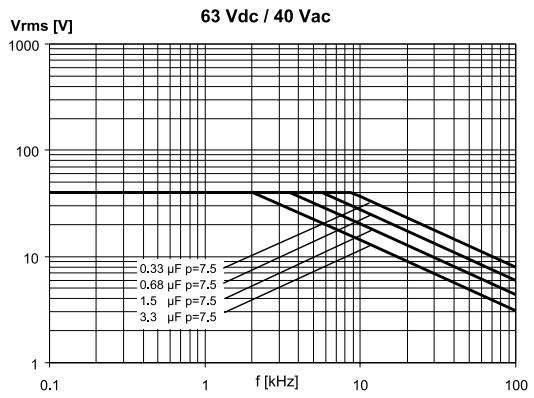
R66

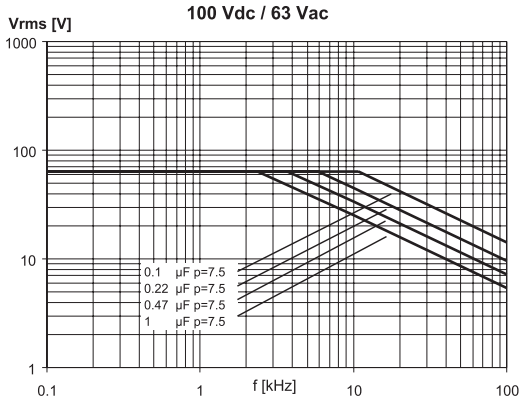
MKT Series

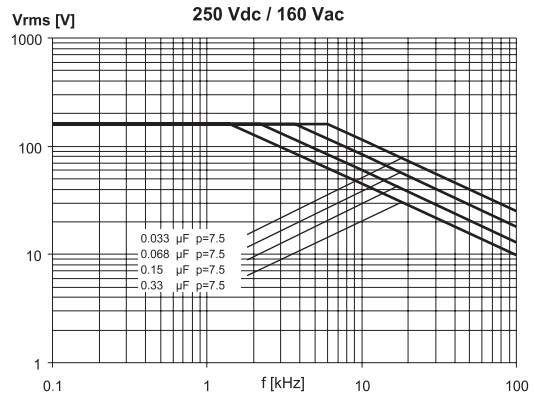
METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

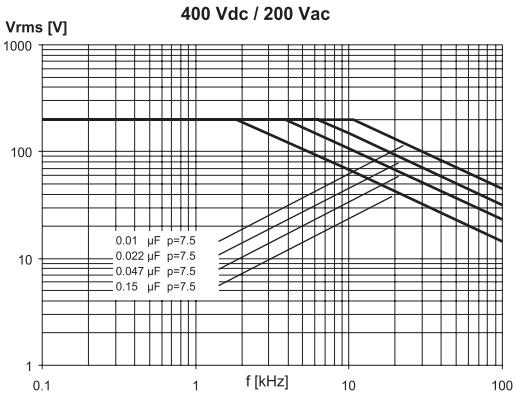
p = 7.5 mm
PRODUCT CODE: **R66**

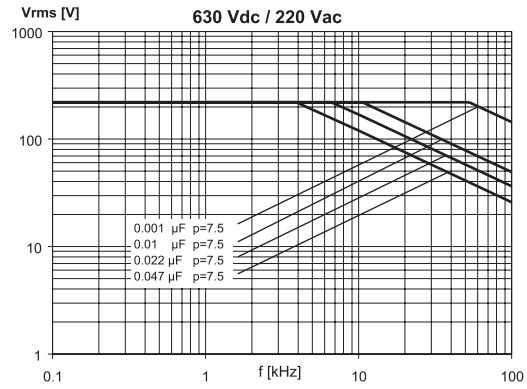
MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)











Note: p (pitch) in mm.

R66

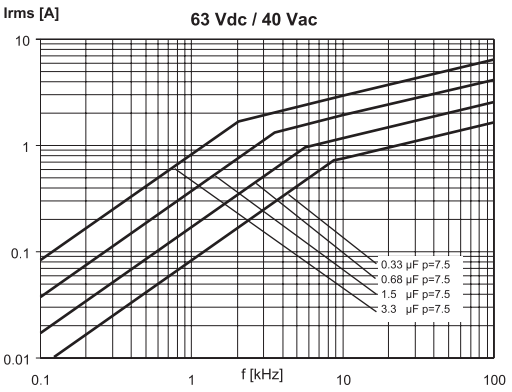
MKT Series

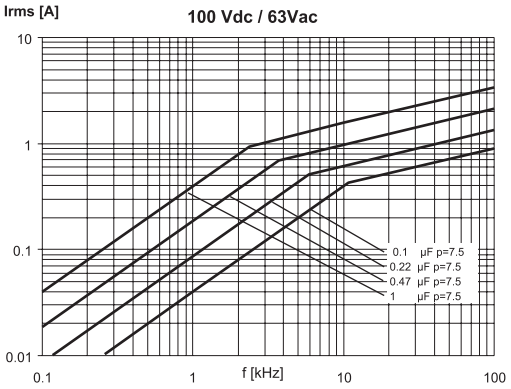
METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

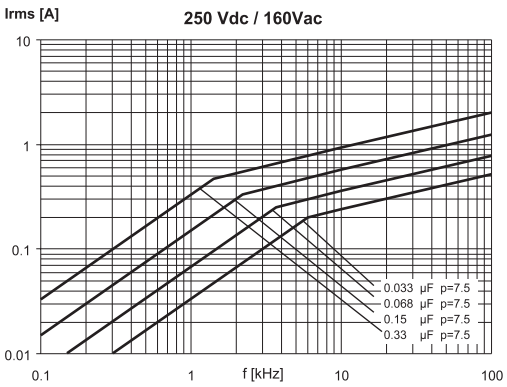
p = 7.5 mm

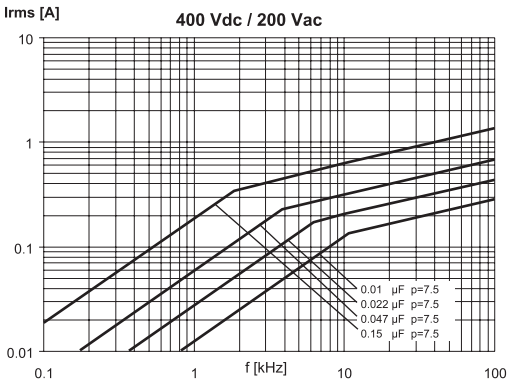
PRODUCT CODE: **R66**

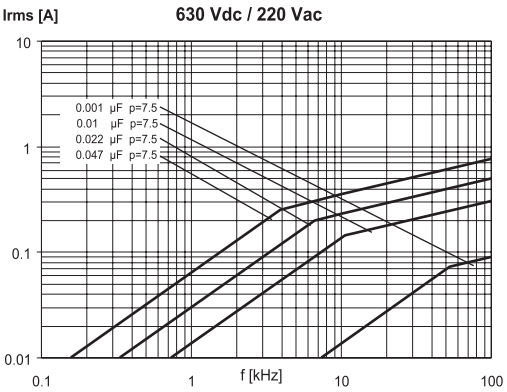
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)





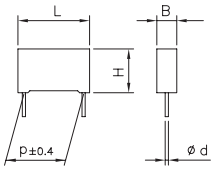






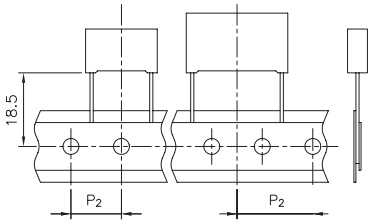
Note: p (pitch) in mm.

Loose



Taped

Fig.1 Fig. 2



Ød ±0.05	p = 10	p > 10	p = 37.5
	0.6	0.8	1.0

All dimensions are in mm.

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	6	0										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
C =50V D =63V E =100V G =160V
I =250V M=400V P =630V Q =1000V

Digit 5 Pitch:
F=10mm; I=15mm; N=22.5mm; R=27.5mm; W=37.5mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

Table 1 (for more detailed information, please refer to page 14)

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 Ø 355mm		12.70	1	10.0/15.0	GY
REEL Ø 500mm		12.70	1	10.0/15.0	CK
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 +2				AA
Loose, long leads (p<10mm)	17 +1/-2				Z3
Loose, long leads (p≥15mm)	30 +5 25 +2/-1				40 50

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

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

Typical applications: blocking, coupling, decoupling, by-passing, interference suppression in low voltage applications (i.e.: AUTOMOTIVE).

PRODUCT CODE: **R60**

Note: Special version, in compliance with DIN 44122 is available upon request.

Construction:

- **STACKED technology for pitch 10mm (Rated Voltage from 50 to 630Vdc)**
- **WOUND technology from pitch 10 to 27.5mm (Rated Voltage from 63 to 1000Vdc)**

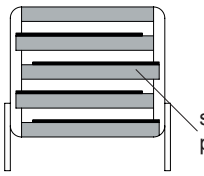
Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
10.0	All	B +0.2	H +0.1	L +0.2
15.0	<7.5	B +0.2	H +0.1	L +0.3
15.0	≥7.5	B +0.2	H +0.1	L +0.5
22.5	All	B +0.2	H +0.1	L +0.3
27.5	All	B +0.2	H +0.1	L +0.3
37.5	All	B +0.3	H +0.1	L +0.3

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).
Plates: aluminium 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.
Marking: Manufacturer's logo (if requested), capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Upper operating temperature of +125°C is allow ed for a max.operating time of 1000h.

Related documents: IEC 60384-2

Winding scheme



R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

STACKED VERSION

Rated Cap.	50Vdc/30Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
1.5 µF	4.0	9.0	13.0	10.0	30	3 E3	R60CF4150--6--
2.2 µF	4.0	9.0	13.0	10.0	30	3 E3	R60CF4220--6--
3.3 µF	5.0	11.0	13.0	10.0	30	3 E3	R60CF4330--6--
4.7 µF	6.0	12.0	13.0	10.0	30	3 E3	R60CF4470--6--
5.6 µF	6.0	12.0	13.0	10.0	30	3 E3	R60CF4560--6--

Rated Cap.	63Vdc/40Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
1.0 µF	4.0	9.0	13.0	10.0	50	6.3 E3	R60DF4100--6--
1.5 µF	5.0	11.0	13.0	10.0	50	6.3 E3	R60DF4150--6--
2.2 µF	5.0	11.0	13.0	10.0	50	6.3 E3	R60DF4220--6--
3.3 µF	6.0	12.0	13.0	10.0	50	6.3 E3	R60DF4330--6--

Rated Cap.	100Vdc/63Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.33 µF	4.0	9.0	13.0	10.0	75	15 E3	R60EF3330--6--
0.47 µF	4.0	9.0	13.0	10.0	75	15 E3	R60EF3470--6--
0.68 µF	4.0	9.0	13.0	10.0	75	15 E3	R60EF3680--6--
1.0 µF	5.0	11.0	13.0	10.0	75	15 E3	R60EF4100--6--
1.5 µF	5.0	11.0	13.0	10.0	75	15 E3	R60EF4150--6--

Rated Cap.	160Vdc/90Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.22 µF	4.0	9.0	13.0	10.0	100	32 E3	R60GF3220--6--
0.33 µF	4.0	9.0	13.0	10.0	100	32 E3	R60GF3330--6--
0.47 µF	5.0	11.0	13.0	10.0	100	32 E3	R60GF3470--6--
0.68 µF	6.0	12.0	13.0	10.0	100	32 E3	R60GF3680--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.10 µF	4.0	9.0	13.0	10.0	150	75 E3	R60IF 3100--6--
0.15 µF	4.0	9.0	13.0	10.0	150	75 E3	R60IF 3150--6--
0.22 µF	5.0	11.0	13.0	10.0	150	75 E3	R60IF 3220--6--
0.33 µF	5.0	11.0	13.0	10.0	150	75 E3	R60IF 3330--6--
0.47 µF	6.0	12.0	13.0	10.0	150	75 E3	R60IF 3470--6--

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.033 µF	4.0	9.0	13.0	10.0	175	140 E3	R60MF2330--6--
0.047 µF	4.0	9.0	13.0	10.0	175	140 E3	R60MF2470--6--
0.068 µF	4.0	9.0	13.0	10.0	175	140 E3	R60MF2680--6--
0.10 µF	5.0	11.0	13.0	10.0	175	140 E3	R60MF3100--6--
0.15 µF	6.0	12.0	13.0	10.0	175	140 E3	R60MF3150--6--

Rated Cap.	630Vdc/220Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/ µs)	(V^2/ µs)	
0.010 µF	4.0	9.0	13.0	10.0	200	250 E3	R60PF2100--6--
0.015 µF	4.0	9.0	13.0	10.0	200	250 E3	R60PF2150--6--
0.022 µF	4.0	9.0	13.0	10.0	200	250 E3	R60PF2220--6--
0.033 µF	5.0	11.0	13.0	10.0	200	250 E3	R60PF2330--6--
0.047 µF	5.0	11.0	13.0	10.0	200	250 E3	R60PF2470--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

WOUND VERSION

Rated Cap.	63Vdc/40Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.68 µF	5.0	11.0	18.0	15.0	2.5	0.32 E3	R60DI 3680--3--
1.0 µF	5.0	11.0	18.0	15.0	2.5	0.32 E3	R60DI 4100--3--
1.5 µF	5.0	11.0	18.0	15.0	2.5	0.32 E3	R60DI 4150--3--
2.2 µF	6.0	12.0	18.0	15.0	2.5	0.32 E3	R60DI 4220--3--
3.3 µF	7.5	13.5	18.0	15.0	2.5	0.32 E3	R60DI 4330--3--
3.3 µF	9.0	12.5	18.0	15.0	2.5	0.32 E3	R60DI 4330--L--
4.7 µF	8.5	14.5	18.0	15.0	2.5	0.32 E3	R60DI 4470--3--
4.7 µF	13.0	12.0	18.0	15.0	2.5	0.32 E3	R60DI 4470--L--
6.8 µF	10.0	16.0	18.0	15.0	2.5	0.32 E3	R60DI 4680--3--
3.3 µF	6.0	15.0	26.5	22.5	1.5	0.19 E3	R60DN4330--3--
4.7 µF	7.0	16.0	26.5	22.5	1.5	0.19 E3	R60DN4470--3--
6.8 µF	7.0	16.0	26.5	22.5	1.5	0.19 E3	R60DN4680--3--
10.0 µF	8.5	17.0	26.5	22.5	1.5	0.19 E3	R60DN5100--3--
15.0 µF	11.0	20.0	26.5	22.5	1.5	0.19 E3	R60DN5150--3--
10.0 µF	9.0	17.0	32.0	27.5	1.0	0.13 E3	R60DR5100--3--
15.0 µF	9.0	17.0	32.0	27.5	1.0	0.13 E3	R60DR5150--4--
22.0 µF	11.0	20.0	32.0	27.5	1.0	0.13 E3	R60DR5220--4--
33.0 µF	13.0	22.0	32.0	27.5	1.0	0.13 E3	R60DR5330--4--
47.0 µF	14.0	28.0	32.0	27.5	1.0	0.13 E3	R60DR5470--4--
68.0 µF	18.0	33.0	32.0	27.5	1.0	0.13 E3	R60DR5680--4--
100.0 µF	22.0	37.0	32.0	27.5	1.0	0.13 E3	R60DR6100--0--
22.0 µF	11.0	22.0	41.5	37.5	0.8	0.10 E3	R60DW5220--3--
33.0 µF	11.0	22.0	41.5	37.5	0.8	0.10 E3	R60DW5330--4--
47.0 µF	13.0	24.0	41.5	37.5	0.8	0.10 E3	R60DW5470--4--
68.0 µF	19.0	32.0	41.5	37.5	0.8	0.10 E3	R60DW5680--3--
100.0 µF	19.0	32.0	41.5	37.5	0.8	0.10 E3	R60DW6100--4--
150.0 µF	20.0	40.0	41.5	37.5	0.8	0.10 E3	R60DW6150--0--
220.0 µF	24.0	44.0	41.5	37.5	0.8	0.10 E3	R60DW6220--0--

Rated Cap.	100Vdc/63Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.33 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 3330--3--
0.47 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 3470--3--
0.68 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 3680--3--
1.0 µF	5.0	11.0	18.0	15.0	3.0	0.6 E3	R60EI 4100--3--
1.5 µF	7.5	13.5	18.0	15.0	3.0	0.6 E3	R60EI 4150--3--
2.2 µF	8.5	14.5	18.0	15.0	3.0	0.6 E3	R60EI 4220--3--
2.2 µF	9.0	12.5	18.0	15.0	3.0	0.6 E3	R60EI 4220--L--
3.3 µF	10.0	16.0	18.0	15.0	3.0	0.6 E3	R60EI 4330--3--
3.3 µF	13.0	12.0	18.0	15.0	3.0	0.6 E3	R60EI 4330--L--
4.7 µF	11.0	19.0	18.0	15.0	3.0	0.6 E3	R60EI 4470--3--
1.5 µF	6.0	15.0	26.5	22.5	2.0	0.4 E3	R60EN4150--3--
2.2 µF	6.0	15.0	26.5	22.5	2.0	0.4 E3	R60EN4220--3--
3.3 µF	7.0	16.0	26.5	22.5	2.0	0.4 E3	R60EN4330--3--
4.7 µF	8.5	17.0	26.5	22.5	2.0	0.4 E3	R60EN4470--3--
6.8 µF	10.0	18.5	26.5	22.5	2.0	0.4 E3	R60EN4680--3--
10.0 µF	13.0	22.0	26.5	22.5	2.0	0.4 E3	R60EN5100--3--
4.7 µF	9.0	17.0	32.0	27.5	1.5	0.3 E3	R60ER4470--3--
6.8 µF	9.0	17.0	32.0	27.5	1.5	0.3 E3	R60ER4680--3--
10.0 µF	9.0	17.0	32.0	27.5	1.5	0.3 E3	R60ER5100--4--
15.0 µF	11.0	20.0	32.0	27.5	1.5	0.3 E3	R60ER5150--4--
22.0 µF	13.0	22.0	32.0	27.5	1.5	0.3 E3	R60ER5220--4--
33.0 µF	14.0	28.0	32.0	27.5	1.5	0.3 E3	R60ER5330--4--
47.0 µF	18.0	33.0	32.0	27.5	1.5	0.3 E3	R60ER5470--4--
68.0 µF	22.0	37.0	32.0	27.5	1.5	0.3 E3	R60ER5680--0--
15.0 µF	11.0	22.0	41.5	37.5	1.0	0.2 E3	R60EW5150--4--
22.0 µF	11.0	22.0	41.5	37.5	1.0	0.2 E3	R60EW5220--4--
33.0 µF	13.0	24.0	41.5	37.5	1.0	0.2 E3	R60EW5330--4--
47.0 µF	16.0	28.5	41.5	37.5	1.0	0.2 E3	R60EW5470--4--
68.0 µF	19.0	32.0	41.5	37.5	1.0	0.2 E3	R60EW5680--5--
100.0 µF	20.0	40.0	41.5	37.5	1.0	0.2 E3	R60EW6100--0--
150.0 µF	24.0	44.0	41.5	37.5	1.0	0.2 E3	R60EW6150--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Rated Cap.	160Vdc/90Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.33 µF	5.0	11.0	18.0	15.0	9.0	2.90 E3	R60GI 3330--3--
0.47 µF	5.0	11.0	18.0	15.0	9.0	2.90 E3	R60GI 3470--3--
0.68 µF	5.0	11.0	18.0	15.0	9.0	2.90 E3	R60GI 3680--3--
1.0 µF	7.5	13.5	18.0	15.0	9.0	2.90 E3	R60GI 4100--3--
1.5 µF	8.5	14.5	18.0	15.0	9.0	2.90 E3	R60GI 4150--3--
1.5 µF	9.0	12.5	18.0	15.0	9.0	2.90 E3	R60GI 4150--L--
2.2 µF	10.0	16.0	18.0	15.0	9.0	2.90 E3	R60GI 4220--3--
2.2 µF	13.0	12.0	18.0	15.0	9.0	2.90 E3	R60GI 4220--L--
3.3 µF	11.0	19.0	18.0	15.0	9.0	2.90 E3	R60GI 4330--3--
1.5 µF	6.0	15.0	26.5	22.5	5.5	1.70 E3	R60GN4150--3--
2.2 µF	7.0	16.0	26.5	22.5	5.5	1.70 E3	R60GN4220--3--
3.3 µF	8.5	17.0	26.5	22.5	5.5	1.70 E3	R60GN4330--3--
4.7 µF	11.0	20.0	26.5	22.5	5.5	1.70 E3	R60GN4470--3--
6.8 µF	13.0	22.0	26.5	22.5	5.5	1.70 E3	R60GN4680--3--
3.3 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR4330--3--
4.7 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR4470--3--
6.8 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR4680--4--
10.0 µF	9.0	17.0	32.0	27.5	3.0	0.96 E3	R60GR5100--4--
15.0 µF	11.0	20.0	32.0	27.5	3.0	0.96 E3	R60GR5150--4--
22.0 µF	13.0	22.0	32.0	27.5	3.0	0.96 E3	R60GR5220--4--
33.0 µF	14.0	28.0	32.0	27.5	3.0	0.96 E3	R60GR5330--0--
47.0 µF	18.0	33.0	32.0	27.5	3.0	0.96 E3	R60GR5470--0--
68.0 µF	22.0	37.0	32.0	27.5	3.0	0.96 E3	R60GR5680--0--
10.0 µF	11.0	22.0	41.5	37.5	2.0	0.64 E3	R60GW5100--3--
15.0 µF	11.0	22.0	41.5	37.5	2.0	0.64 E3	R60GW5150--4--
22.0 µF	11.0	22.0	41.5	37.5	2.0	0.64 E3	R60GW5220--4--
33.0 µF	13.0	24.0	41.5	37.5	2.0	0.64 E3	R60GW5330--4--
47.0 µF	16.0	28.5	41.5	37.5	2.0	0.64 E3	R60GW5470--4--
68.0 µF	19.0	32.0	41.5	37.5	2.0	0.64 E3	R60GW5680--0--
100.0 µF	20.0	40.0	41.5	37.5	2.0	0.64 E3	R60GW6100--0--
150.0 µF	30.0	45.0	41.5	37.5	2.0	0.64 E3	R60GW6150--0--

Rated Cap.	250Vdc/160Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.10 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3100--3--
0.15 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3150--3--
0.22 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3220--3--
0.33 µF	5.0	11.0	18.0	15.0	12	6.0 E3	R60II 3330--3--
0.47 µF	6.0	12.0	18.0	15.0	12	6.0 E3	R60II 3470--3--
0.68 µF	7.5	13.5	18.0	15.0	12	6.0 E3	R60II 3680--3--
0.68 µF	9.0	12.5	18.0	15.0	12	6.0 E3	R60II 3680--L--
1.0 µF	8.5	14.5	18.0	15.0	12	6.0 E3	R60II 4100--3--
1.0 µF	13.0	12.0	18.0	15.0	12	6.0 E3	R60II 4100--L--
1.5 µF	10.0	16.0	18.0	15.0	12	6.0 E3	R60II 4150--3--
0.47 µF	6.0	15.0	26.5	22.5	8	4.0 E3	R60IN 3470--3--
0.68 µF	6.0	15.0	26.5	22.5	8	4.0 E3	R60IN 3680--3--
1.0 µF	6.0	15.0	26.5	22.5	8	4.0 E3	R60IN 4100--3--
1.5 µF	7.0	16.0	26.5	22.5	8	4.0 E3	R60IN 4150--3--
2.2 µF	10.0	18.5	26.5	22.5	8	4.0 E3	R60IN 4220--3--
3.3 µF	11.0	20.0	26.5	22.5	8	4.0 E3	R60IN 4330--3--
1.5 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4150--3--
2.2 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4220--3--
3.3 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4330--4--
4.7 µF	9.0	17.0	32.0	27.5	5	2.5 E3	R60IR 4470--4--
6.8 µF	11.0	20.0	32.0	27.5	5	2.5 E3	R60IR 4680--4--
10.0 µF	13.0	22.0	32.0	27.5	5	2.5 E3	R60IR 5100--4--
15.0 µF	14.0	28.0	32.0	27.5	5	2.5 E3	R60IR 5150--4--
22.0 µF	18.0	33.0	32.0	27.5	5	2.5 E3	R60IR 5220--0--
33.0 µF	22.0	37.0	32.0	27.5	5	2.5 E3	R60IR 5330--0--
4.7 µF	11.0	22.0	41.5	37.5	4	2.0 E3	R60IW 4470--3--
6.8 µF	11.0	22.0	41.5	37.5	4	2.0 E3	R60IW 4680--4--
10.0 µF	11.0	22.0	41.5	37.5	4	2.0 E3	R60IW 5100--4--
15.0 µF	13.0	24.0	41.5	37.5	4	2.0 E3	R60IW 5150--4--
22.0 µF	16.0	28.5	41.5	37.5	4	2.0 E3	R60IW 5220--4--
33.0 µF	19.0	32.0	41.5	37.5	4	2.0 E3	R60IW 5330--4--
47.0 µF	20.0	40.0	41.5	37.5	4	2.0 E3	R60IW 5470--0--
68.0 µF	24.0	44.0	41.5	37.5	4	2.0 E3	R60IW 5680--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

WOUND VERSION

Rated Cap.	400Vdc/200Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.015 µF	4.0	9.0	13.0	10.0	30.0	24.0 E3	R60MF2150--3--
0.022 µF	4.0	9.0	13.0	10.0	30.0	24.0 E3	R60MF2220--3--
0.033 µF	4.0	9.0	13.0	10.0	30.0	24.0 E3	R60MF2330--3--
0.047 µF	4.0	9.0	13.0	10.0	30.0	24.0 E3	R60MF2470--3--
0.068 µF	4.0	9.0	13.0	10.0	30.0	24.0 E3	R60MF2680--4--
0.068 µF	5.0	11.0	13.0	10.0	30.0	24.0 E3	R60MF2680--3--
0.10 µF	5.0	11.0	13.0	10.0	30.0	24.0 E3	R60MF3100--4--
0.10 µF	6.0	12.0	13.0	10.0	30.0	24.0 E3	R60MF3100--3--
0.15 µF	6.0	12.0	13.0	10.0	30.0	24.0 E3	R60MF3150--3--
0.022 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 2220--3--
0.047 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 2470--3--
0.068 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 2680--3--
0.10 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 3100--3--
0.15 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 3150--3--
0.22 µF	5.0	11.0	18.0	15.0	20.0	16.0 E3	R60MI 3220--4--
0.22 µF	6.0	12.0	18.0	15.0	20.0	16.0 E3	R60MI 3220--3--
0.33 µF	7.5	13.5	18.0	15.0	20.0	16.0 E3	R60MI 3330--3--
0.33 µF	9.0	12.5	18.0	15.0	20.0	16.0 E3	R60MI 3330--L--
0.47 µF	7.5	13.5	18.0	15.0	20.0	16.0 E3	R60MI 3470--4--
0.47 µF	8.5	14.5	18.0	15.0	20.0	16.0 E3	R60MI 3470--3--
0.47 µF	9.0	12.5	18.0	15.0	20.0	16.0 E3	R60MI 3470--L1-
0.47 µF	13.0	12.0	18.0	15.0	20.0	16.0 E3	R60MI 3470--L--
0.68 µF	10.0	16.0	18.0	15.0	20.0	16.0 E3	R60MI 3680--4--
0.68 µF	11.0	19.0	18.0	15.0	20.0	16.0 E3	R60MI 3680--3--
0.68 µF	13.0	12.0	18.0	15.0	20.0	16.0 E3	R60MI 3680--L--
1.0 µF	11.0	19.0	18.0	15.0	20.0	16.0 E3	R60MI 4100--3--
0.22 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3220--3--
0.33 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3330--3--
0.47 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3470--3--
0.68 µF	6.0	15.0	26.5	22.5	10.0	8.0 E3	R60MN3680--4--
0.68 µF	7.0	16.0	26.5	22.5	10.0	8.0 E3	R60MN3680--3--
1.0 µF	8.5	17.0	26.5	22.5	10.0	8.0 E3	R60MN4100--4--
1.0 µF	10.0	18.5	26.5	22.5	10.0	8.0 E3	R60MN4100--3--
1.5 µF	10.0	18.5	26.5	22.5	10.0	8.0 E3	R60MN4150--4--
1.5 µF	11.0	20.0	26.5	22.5	10.0	8.0 E3	R60MN4150--3--
2.2 µF	13.0	22.0	26.5	22.5	10.0	8.0 E3	R60MN4220--3--
0.68 µF	9.0	17.0	32.0	27.5	8.5	3.4 E3	R60MR3680--3--
1.0 µF	9.0	17.0	32.0	27.5	8.5	3.4 E3	R60MR4100--3--
1.5 µF	9.0	17.0	32.0	27.5	8.5	3.4 E3	R60MR4150--4--
2.2 µF	11.0	20.0	32.0	27.5	8.5	3.4 E3	R60MR4220--4--
3.3 µF	13.0	22.0	32.0	27.5	8.5	3.4 E3	R60MR4330--4--
4.7 µF	14.0	28.0	32.0	27.5	8.5	3.4 E3	R60MR4470--4--
6.8 µF	18.0	33.0	32.0	27.5	8.5	3.4 E3	R60MR4680--4--
10.0 µF	22.0	37.0	32.0	27.5	8.5	3.4 E3	R60MR5100--4--
3.3 µF	11.0	22.0	41.5	37.5	6.0	2.4 E3	R60MW4330--3--
4.7 µF	11.0	22.0	41.5	37.5	6.0	2.4 E3	R60MW4470--4--
6.8 µF	13.0	24.0	41.5	37.5	6.0	2.4 E3	R60MW4680--4--
10.0 µF	16.0	28.5	41.5	37.5	6.0	2.4 E3	R60MW5100--4--
15.0 µF	24.0	44.0	41.5	37.5	6.0	2.4 E3	R60MW5150--3--
22.0 µF	24.0	44.0	41.5	37.5	6.0	2.4 E3	R60MW5220--4--
33.0 µF	30.0	45.0	41.5	37.5	6.0	2.4 E3	R60MW5330--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	630Vdc/220*Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
4700 pF	4.0	9.0	13.0	10.0	40	50 E3	R60PF1470--3--
6800 pF	4.0	9.0	13.0	10.0	40	50 E3	R60PF1680--3--
0.010 µF	4.0	9.0	13.0	10.0	40	50 E3	R60PF2100--3--
0.015 µF	4.0	9.0	13.0	10.0	40	50 E3	R60PF2150--3--
0.022 µF	4.0	9.0	13.0	10.0	40	50 E3	R60PF2220--4--
0.022 µF	5.0	11.0	13.0	10.0	40	50 E3	R60PF2220--3--
0.033 µF	5.0	11.0	13.0	10.0	40	50 E3	R60PF2330--4--
0.033 µF	6.0	12.0	13.0	10.0	40	50 E3	R60PF2330--3--
0.047 µF	6.0	12.0	13.0	10.0	40	50 E3	R60PF2470--3--
0.033 µF	5.0	11.0	18.0	15.0	25	31 E3	R60PI 2330--3--
0.047 µF	5.0	11.0	18.0	15.0	25	31 E3	R60PI 2470--3--
0.068 µF	5.0	11.0	18.0	15.0	25	31 E3	R60PI 2680--4--
0.068 µF	6.0	12.0	18.0	15.0	25	31 E3	R60PI 2680--3--
0.10 µF	6.0	12.0	18.0	15.0	25	31 E3	R60PI 3100--4--
0.10 µF	7.5	13.5	18.0	15.0	25	31 E3	R60PI 3100--3--
0.10 µF	9.0	12.5	18.0	15.0	25	31 E3	R60PI 3100--L--
0.15 µF	7.5	13.5	18.0	15.0	25	31 E3	R60PI 3150--4--
0.15 µF	8.5	14.5	18.0	15.0	25	31 E3	R60PI 3150--3--
0.22 µF	8.5	14.5	18.0	15.0	25	31 E3	R60PI 3220--4--
0.22 µF	10.0	16.0	18.0	15.0	25	31 E3	R60PI 3220--3--
0.33 µF	10.0	16.0	18.0	15.0	25	31 E3	R60PI 3330--3--
0.10 µF	6.0	15.0	26.5	22.5	12	15 E3	R60PN3100--3--
0.15 µF	6.0	15.0	26.5	22.5	12	15 E3	R60PN3150--3--
0.22 µF	6.0	15.0	26.5	22.5	12	15 E3	R60PN3220--4--
0.22 µF	7.0	16.0	26.5	22.5	12	15 E3	R60PN3220--3--
0.33 µF	7.0	16.0	26.5	22.5	12	15 E3	R60PN3330--5--
0.33 µF	8.5	17.0	26.5	22.5	12	15 E3	R60PN3330--4--
0.33 µF	10.0	18.5	26.5	22.5	12	15 E3	R60PN3330--3--
0.47 µF	10.0	18.5	26.5	22.5	12	15 E3	R60PN3470--4--
0.47 µF	11.0	20.0	26.5	22.5	12	15 E3	R60PN3470--3--
0.68 µF	11.0	20.0	26.5	22.5	12	15 E3	R60PN3680--4--
0.68 µF	13.0	22.0	26.5	22.5	12	15 E3	R60PN3680--3--
0.33 µF	9.0	17.0	32.0	27.5	10	12 E3	R60PR3330--3--
0.47 µF	9.0	17.0	32.0	27.5	10	12 E3	R60PR3470--4--
0.68 µF	11.0	20.0	32.0	27.5	10	12 E3	R60PR3680--4--
1.0 µF	11.0	20.0	32.0	27.5	10	12 E3	R60PR4100--5--
1.5 µF	18.0	33.0	32.0	27.5	10	12 E3	R60PR4150--3--
2.2 µF	18.0	33.0	32.0	27.5	10	12 E3	R60PR4220--4--
3.3 µF	22.0	37.0	32.0	27.5	10	12 E3	R60PR4330--4--
4.7 µF	22.0	37.0	32.0	27.5	10	12 E3	R60PR4470--4--
1.0 µF	11.0	22.0	41.5	37.5	8	9.6 E3	R60PW4100--3--
1.5 µF	11.0	22.0	41.5	37.5	8	9.6 E3	R60PW4150--4--
2.2 µF	13.0	24.0	41.5	37.5	8	9.6 E3	R60PW4220--4--
3.3 µF	16.0	28.5	41.5	37.5	8	9.6 E3	R60PW4330--4--
4.7 µF	19.0	32.0	41.5	37.5	8	9.6 E3	R60PW4470--4--
6.8 µF	20.0	40.0	41.5	37.5	8	9.6 E3	R60PW4680--0--
10.0 µF	24.0	44.0	41.5	37.5	8	9.6 E3	R60PW5100--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R60

MKT Series

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

WOUND VERSION

Rated Cap.	1000Vdc/250Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
1000 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1100--0--
1500 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1150--0--
2200 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1220--0--
3300 pF	4.0	9.0	13.0	10.0	60	120 E3	R60QF 1330--0--
4700 pF	5.0	11.0	13.0	10.0	60	120 E3	R60QF 1470--0--
6800 pF	6.0	12.0	13.0	10.0	60	120 E3	R60QF 1680--0--
0.010 µF	5.0	11.0	18.0	15.0	30	60 E3	R60QI 2100--0--
0.015 µF	5.0	11.0	18.0	15.0	30	60 E3	R60QI 2150--3--
0.022 µF	6.0	12.0	18.0	15.0	30	60 E3	R60QI 2220--3--
0.033 µF	7.5	13.5	18.0	15.0	30	60 E3	R60QI 2330--3--
0.033 µF	9.0	12.5	18.0	15.0	30	60 E3	R60QI 2330--L--
0.047 µF	10.0	16.0	18.0	15.0	30	60 E3	R60QI 2470--0--
0.047 µF	13.0	12.0	18.0	15.0	30	60 E3	R60QI 2470--L--
0.068 µF	11.0	19.0	18.0	15.0	30	60 E3	R60QI 2680--0--
0.033 µF	6.0	15.0	26.5	22.5	15	30 E3	R60QN2330--0--
0.047 µF	6.0	15.0	26.5	22.5	15	30 E3	R60QN2470--0--
0.068 µF	7.0	16.0	26.5	22.5	15	30 E3	R60QN2680--3--
0.10 µF	8.5	17.0	26.5	22.5	15	30 E3	R60QN3100--3--
0.15 µF	13.0	22.0	26.5	22.5	15	30 E3	R60QN3150--0--
0.15 µF	9.0	17.0	32.0	27.5	12	24 E3	R60QR3150--3--
0.22 µF	9.0	17.0	32.0	27.5	12	24 E3	R60QR3220--4--
0.33 µF	11.0	20.0	32.0	27.5	12	24 E3	R60QR3330--4--
0.47 µF	13.0	22.0	32.0	27.5	12	24 E3	R60QR3470--4--
0.68 µF	14.0	28.0	32.0	27.5	12	24 E3	R60QR3680--4--
1.00 µF	18.0	33.0	32.0	27.5	12	24 E3	R60QR4100--4--
1.50 µF	22.0	37.0	32.0	27.5	12	24 E3	R60QR4150--4--
0.47 µF	11.0	22.0	41.5	37.5	10	20 E3	R60QW3470--3--
0.68 µF	11.0	22.0	41.5	37.5	10	20 E3	R60QW3680--4--
1.00 µF	13.0	24.0	41.5	37.5	10	20 E3	R60QW4100--4--
1.50 µF	16.0	28.5	41.5	37.5	10	20 E3	R60QW4150--4--
2.20 µF	19.0	32.0	41.5	37.5	10	20 E3	R60QW4220--3--
3.30 µF	24.0	44.0	41.5	37.5	10	20 E3	R60QW4330--0--
4.70 µF	30.0	45.0	41.5	37.5	10	20 E3	R60QW4470--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note 1: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

Note 2: Rated voltages higher than 1000Vdc are available upon request.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 151).

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **R60**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 50Vdc - 63Vdc -100Vdc - 160Vdc - 250Vdc - 400Vdc - 630Vdc-1000Vdc .

Rated temperature (T_R): +85°C

Temperature derated voltage:

for temperatures between +85°C and +125°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 220µF

Capacitance values:

E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:** ±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** (lead length ~2mm)

Pitch (mm)	10	15	22.5	27.5	37.5
L(nH) ≈	9	10	18	18	22

Dissipation factor (DF):

tgδ 10^{-4} at +25°C ±5°C

kHz	C≤1µF	C>1µF
1	≤100	≤100
10	≤150	

Insulation resistance:

Test conditions

Temperature: +25°C±5°C
Voltage charge time: 1 min
Voltage charge: 50 Vdc for V_R <100 Vdc
100 Vdc for V_R ≥100 Vdc

Performance

For V_R ≤100 Vdc
≥3750 MΩ for C ≤0.33µF (50000 MΩ)*
≥1250 s for C >0.33µF (5000 s)*

For V_R >100 Vdc
≥30000 MΩ for C ≤0.33µF (50000 MΩ)*
≥10000 s for C >0.33µF (17000 s)*

*Typical value

Test voltage between terminations:

1.6xV_R applied for 2 s at +25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤50x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions

Temperature: +105°C±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_C

Performance

Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤50x10^{-4} at 10kHz for C≤1µF
≤30x10^{-4} at 1kHz for C>1µF
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%
DF change (Δtgδ): ≤50x10^{-4} at 10kHz for C≤1µF
≤30x10^{-4} at 1kHz for C>1µF
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

Performance

Capacitance change |ΔC/C|: ≤3% for C ≤0.1µF
≤2% for C >0.1µF

RELIABILITY:

Reference MIL HDB 217

Application conditions:

Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤5 FIT
(1 FIT = 1x10^{-9} failures/componentsxh)

Failure criteria:

Short or open circuit
Capacitance change |ΔC/C|: >10%
DF change (Δtgδ): >2xinitial limit.
Insulation resistance: <0.005xinitial limit.

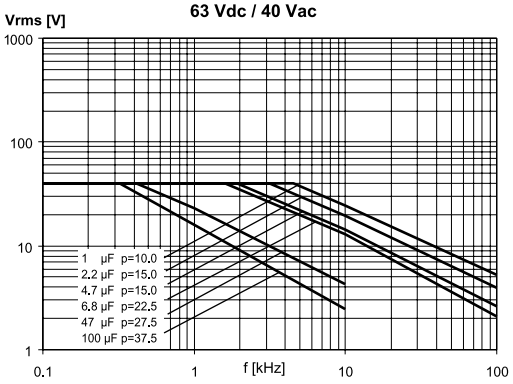
R60
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

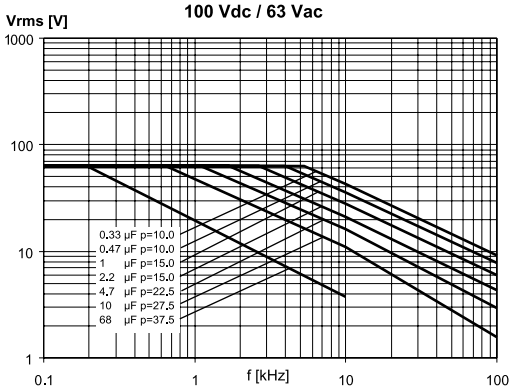
PRODUCT CODE: **R60**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

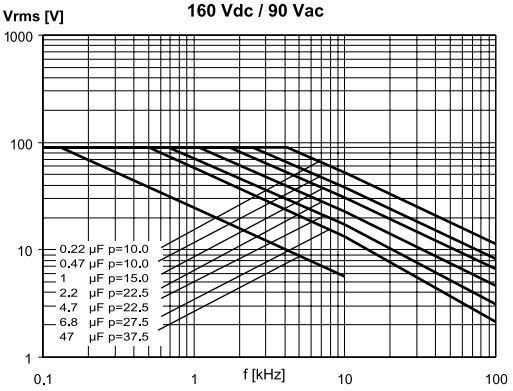
63 Vdc / 40 Vac



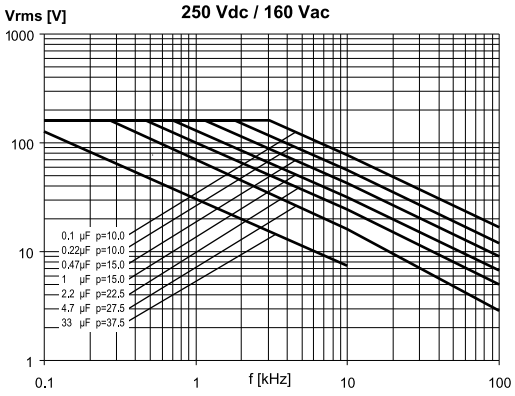
100 Vdc / 63 Vac



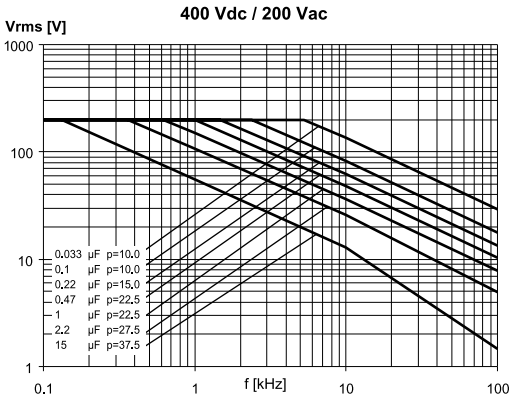
160 Vdc / 90 Vac



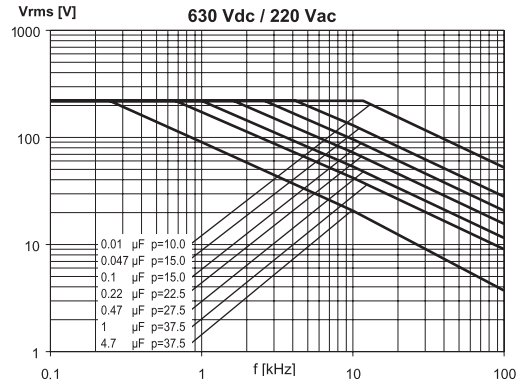
250 Vdc / 160 Vac



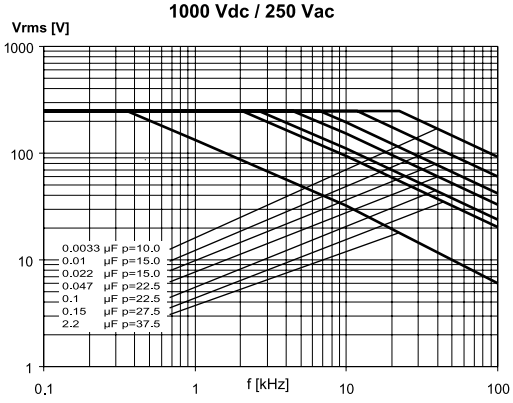
400 Vdc / 200 Vac



630 Vdc / 220 Vac



1000 Vdc / 250 Vac

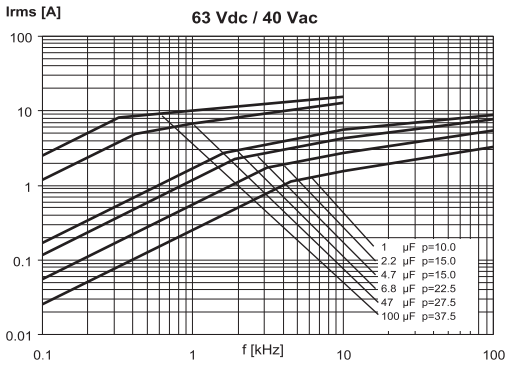


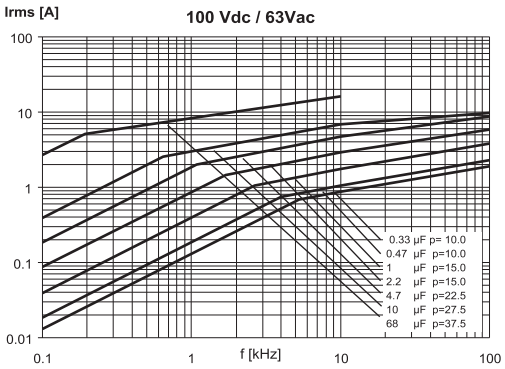
Note: p (pitch) in mm.

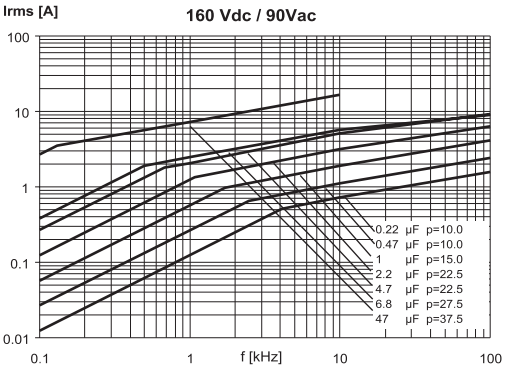
METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

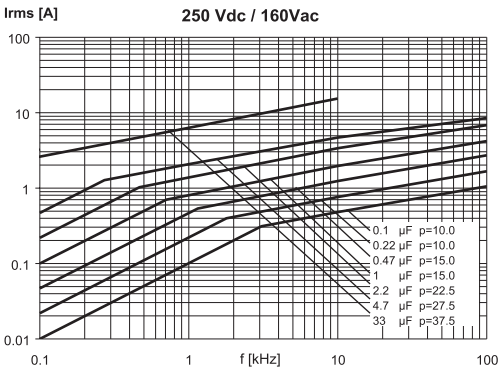
PRODUCT CODE: **R60**

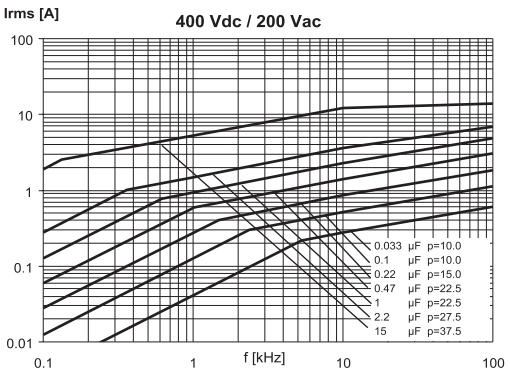
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

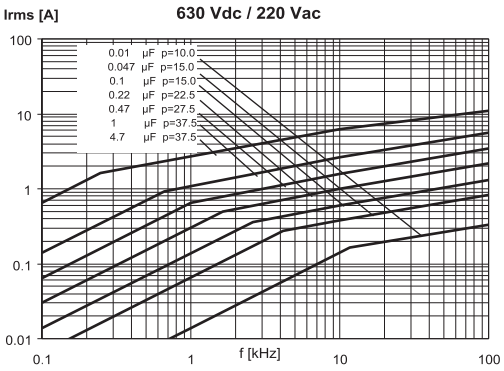


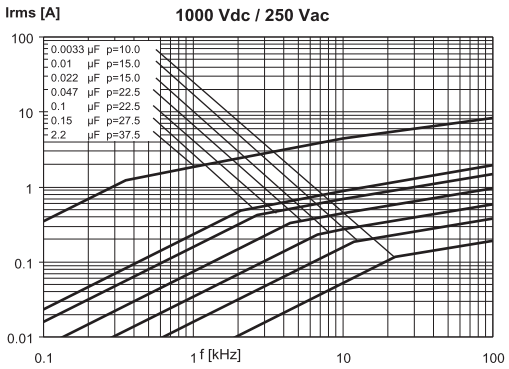










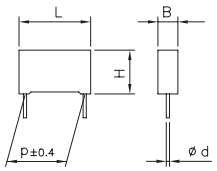


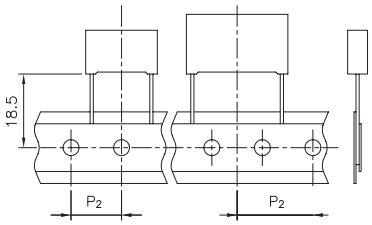
Note: p (pitch) in mm.

JSP
MKT Series

Loose Taped

Fig.1 Fig. 2





Ød ±0.05	p = 22.5÷27.5	p = 37.5
	0.8	1.0

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

Typical applications: blocking, coupling, decoupling, by-passing, interference suppression in low voltage applications (i.e.:Automotive)

PRODUCT CODE: **JSP**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
J	S	P										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage
D = 63Vdc; E = 100Vdc; G = 160Vdc;
I = 250Vdc;

Digit 5 Pitch: N=22.5mm R=27.5mm W=37.5mm

Digit 6 to 9 Digits 7-8-9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to optain the rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimension and electrical characteristics.

Digit 13 Internal use.

Digit 14 Capacitance Tolerance:
J=±5%; K=±10%; M=±20%;

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads	$25^{-1/+2}$				50
	$30^{-0/+5}$				40

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

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).

Plates: aluminium layer deposited by evaporation under vacuum.

Winding: non-inductive type.

Construction: Stacked technology.

Leads: tinned wire.

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

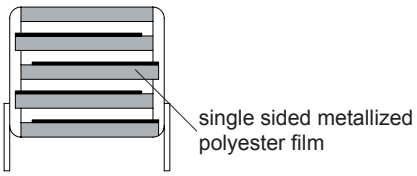
Marking: Manufacturer's logo, series , capacitance, tolerance, D.C. rated voltage, manufacturing date code.

Climatic category: 55/105/56 IEC 60068-1

Operating temperature range: -55°C up to +125°C

Related documents: IEC 60384-2

Winding scheme



JSP

MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **JSP**

Rated Cap.	63Vdc / 40 Vac Std dimensions						Part number
	B	H	L	P	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
4.7 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN4470--0--
5.6 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN4560--0--
6.8 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN4680--0--
8.2 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN4820--0--
10 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN5100--0--
12 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN5120--0--
15 µF	7.0	16.0	26.5	22.5	25.0	3.15 E3	JSP DN5150--0--
18 µF	8.5	17.0	26.5	22.5	25.0	3.15 E3	JSP DN5180--0--
22 µF	8.5	17.0	26.5	22.5	25.0	3.15 E3	JSP DN5220--0--
27 µF	11.0	20.0	26.5	22.5	25.0	3.15 E3	JSP DN5270--0--
33 µF	11.0	20.0	26.5	22.5	25.0	3.15 E3	JSP DN5330--0--
39 µF	13.0	22.0	26.5	22.5	25.0	3.15 E3	JSP DN5390--0--
47 µF	13.0	22.0	26.5	22.5	25.0	3.15 E3	JSP DN5470--0--
15 µF	9.0	17.0	32.0	27.5	20.0	2.52 E3	JSP DR5150--0--
18 µF	9.0	17.0	32.0	27.5	20.0	2.52 E3	JSP DR5180--0--
22 µF	9.0	17.0	32.0	27.5	20.0	2.52 E3	JSP DR5220--0--
27 µF	9.0	17.0	32.0	27.5	20.0	2.52 E3	JSP DR5270--0--
33 µF	11.0	20.0	32.0	27.5	20.0	2.52 E3	JSP DR5330--0--
39 µF	11.0	20.0	32.0	27.5	20.0	2.52 E3	JSP DR5390--0--
47 µF	13.0	25.0	32.0	27.5	20.0	2.52 E3	JSP DR5470--0--
56 µF	13.0	25.0	32.0	27.5	20.0	2.52 E3	JSP DR5560--0--
68 µF	14.0	28.0	32.0	27.5	20.0	2.52 E3	JSP DR5680--0--
82 µF	14.0	28.0	32.0	27.5	20.0	2.52 E3	JSP DR5820--0--
100 µF	18.0	33.0	32.0	27.5	20.0	2.52 E3	JSP DR6100--0--
120 µF	18.0	33.0	32.0	27.5	20.0	2.52 E3	JSP DR6120--0--
33 µF	11.0	22.0	41.5	37.5	15.0	1.89 E3	JSP DW5330--0--
39 µF	11.0	22.0	41.5	37.5	15.0	1.89 E3	JSP DW5390--0--
47 µF	11.0	22.0	41.5	37.5	15.0	1.89 E3	JSP DW5470--0--
56 µF	11.0	22.0	41.5	37.5	15.0	1.89 E3	JSP DW5560--0--
68 µF	13.0	24.0	41.5	37.5	15.0	1.89 E3	JSP DW5680--0--
82 µF	13.0	24.0	41.5	37.5	15.0	1.89 E3	JSP DW5820--0--
100 µF	16.0	28.5	41.5	37.5	15.0	1.89 E3	JSP DW6100--0--
120 µF	16.0	28.5	41.5	37.5	15.0	1.89 E3	JSP DW6120--0--
150 µF	19.0	32.0	41.5	37.5	15.0	1.89 E3	JSP DW6150--0--
180 µF	19.0	32.0	41.5	37.5	15.0	1.89 E3	JSP DW6180--0--
220 µF	20.0	40.0	41.5	37.5	15.0	1.89 E3	JSP DW6220--0--
270 µF	24.0	44.0	41.5	37.5	15.0	1.89 E3	JSP DW6270--0--
330 µF	24.0	44.0	41.5	37.5	15.0	1.89 E3	JSP DW6330--0--
390 µF	30.0	45.0	41.5	37.5	15.0	1.89 E3	JSP DW6390--0--
470 µF	30.0	45.0	41.5	37.5	15.0	1.89 E3	JSP DW6470--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

Rated Cap.	100Vdc / 63 Vac Std dimensions						Part number
	B	H	L	P	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
3.3 µF	7.0	16.0	26.5	22.5	27.0	5.4 E3	JSP EN4330--0--
3.9 µF	7.0	16.0	26.5	22.5	27.0	5.4 E3	JSP EN4390--0--
4.7 µF	7.0	16.0	26.5	22.5	27.0	5.4 E3	JSP EN4470--0--
5.6 µF	7.0	16.0	26.5	22.5	27.0	5.4 E3	JSP EN4560--0--
6.8 µF	7.0	16.0	26.5	22.5	27.0	5.4 E3	JSP EN4680--0--
8.2 µF	7.0	16.0	26.5	22.5	27.0	5.4 E3	JSP EN4820--0--
10 µF	8.5	17.0	26.5	22.5	27.0	5.4 E3	JSP EN5100--0--
12 µF	8.5	17.0	26.5	22.5	27.0	5.4 E3	JSP EN5120--0--
15 µF	8.5	17.0	26.5	22.5	27.0	5.4 E3	JSP EN5150--0--
18 µF	11.0	20.0	26.5	22.5	27.0	5.4 E3	JSP EN5180--0--
22 µF	11.0	20.0	26.5	22.5	27.0	5.4 E3	JSP EN5220--0--
27 µF	13.0	22.0	26.5	22.5	27.0	5.4 E3	JSP EN5270--0--
33 µF	13.0	22.0	26.5	22.5	27.0	5.4 E3	JSP EN5330--0--
10 µF	9.0	17.0	32.0	27.5	22.0	4.4 E3	JSP ER5100--0--
12 µF	9.0	17.0	32.0	27.5	22.0	4.4 E3	JSP ER5120--0--
15 µF	9.0	17.0	32.0	27.5	22.0	4.4 E3	JSP ER5150--0--
18 µF	9.0	17.0	32.0	27.5	22.0	4.4 E3	JSP ER5180--0--
22 µF	11.0	20.0	32.0	27.5	22.0	4.4 E3	JSP ER5220--0--
27 µF	11.0	20.0	32.0	27.5	22.0	4.4 E3	JSP ER5270--0--
33 µF	13.0	25.0	32.0	27.5	22.0	4.4 E3	JSP ER5330--0--
39 µF	13.0	25.0	32.0	27.5	22.0	4.4 E3	JSP ER5390--0--
47 µF	14.0	28.0	32.0	27.5	22.0	4.4 E3	JSP ER5470--0--
56 µF	14.0	28.0	32.0	27.5	22.0	4.4 E3	JSP ER5560--0--
68 µF	18.0	33.0	32.0	27.5	22.0	4.4 E3	JSP ER5680--0--
82 µF	18.0	33.0	32.0	27.5	22.0	4.4 E3	JSP ER5820--0--
22 µF	11.0	22.0	41.5	37.5	17.0	3.4 E3	JSP EW5220--0--
27 µF	11.0	22.0	41.5	37.5	17.0	3.4 E3	JSP EW5270--0--
33 µF	11.0	22.0	41.5	37.5	17.0	3.4 E3	JSP EW5330--0--
39 µF	11.0	22.0	41.5	37.5	17.0	3.4 E3	JSP EW5390--0--
47 µF	13.0	24.0	41.5	37.5	17.0	3.4 E3	JSP EW5470--0--
56 µF	13.0	24.0	41.5	37.5	17.0	3.4 E3	JSP EW5560--0--
68 µF	16.0	28.5	41.5	37.5	17.0	3.4 E3	JSP EW5680--0--
82 µF	16.0	28.5	41.5	37.5	17.0	3.4 E3	JSP EW5820--0--
100 µF	19.0	32.0	41.5	37.5	17.0	3.4 E3	JSP EW6100--0--
120 µF	19.0	32.0	41.5	37.5	17.0	3.4 E3	JSP EW6120--0--
150 µF	20.0	40.0	41.5	37.5	17.0	3.4 E3	JSP EW6150--0--
180 µF	24.0	44.0	41.5	37.5	17.0	3.4 E3	JSP EW6180--0--
220 µF	30.0	45.0	41.5	37.5	17.0	3.4 E3	JSP EW6220--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

JSP

MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **JSP**

Rated Cap.	160Vdc / 90 Vac Std dimensions						Part number
	B	H	L	P	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
2.2 µF	7.0	16.0	26.5	22.5	35.0	11.2 E3	JSP GN4220--0--
2.7 µF	7.0	16.0	26.5	22.5	35.0	11.2 E3	JSP GN4270--0--
3.3 µF	7.0	16.0	26.5	22.5	35.0	11.2 E3	JSP GN4330--0--
3.9 µF	7.0	16.0	26.5	22.5	35.0	11.2 E3	JSP GN4390--0--
4.7 µF	8.5	17.0	26.5	22.5	35.0	11.2 E3	JSP GN4470--0--
5.6 µF	8.5	17.0	26.5	22.5	35.0	11.2 E3	JSP GN4560--0--
6.8 µF	11.0	20.0	26.5	22.5	35.0	11.2 E3	JSP GN4680--0--
8.2 µF	11.0	20.0	26.5	22.5	35.0	11.2 E3	JSP GN4820--0--
10 µF	13.0	22.0	26.5	22.5	35.0	11.2 E3	JSP GN5100--0--
12 µF	13.0	22.0	26.5	22.5	35.0	11.2 E3	JSP GN5120--0--
3.3 µF	9.0	17.0	32.0	27.5	30.0	9.6 E3	JSP GR4330--0--
3.9 µF	9.0	17.0	32.0	27.5	30.0	9.6 E3	JSP GR4390--0--
4.7 µF	9.0	17.0	32.0	27.5	30.0	9.6 E3	JSP GR4470--0--
5.6 µF	9.0	17.0	32.0	27.5	30.0	9.6 E3	JSP GR4560--0--
6.8 µF	9.0	17.0	32.0	27.5	30.0	9.6 E3	JSP GR4680--0--
8.2 µF	11.0	20.0	32.0	27.5	30.0	9.6 E3	JSP GR4820--0--
10 µF	11.0	20.0	32.0	27.5	30.0	9.6 E3	JSP GR5100--0--
12 µF	13.0	25.0	32.0	27.5	30.0	9.6 E3	JSP GR5120--0--
15 µF	13.0	25.0	32.0	27.5	30.0	9.6 E3	JSP GR5150--0--
18 µF	14.0	28.0	32.0	27.5	30.0	9.6 E3	JSP GR5180--0--
22 µF	18.0	33.0	32.0	27.5	30.0	9.6 E3	JSP GR5220--0--
27 µF	18.0	33.0	32.0	27.5	30.0	9.6 E3	JSP GR5270--0--
10 µF	11.0	22.0	41.5	37.5	25.0	8.0 E3	JSP GW5100--0--
12 µF	11.0	22.0	41.5	37.5	25.0	8.0 E3	JSP GW5120--0--
15 µF	11.0	22.0	41.5	37.5	25.0	8.0 E3	JSP GW5150--0--
18 µF	13.0	24.0	41.5	37.5	25.0	8.0 E3	JSP GW5180--0--
22 µF	16.0	28.5	41.5	37.5	25.0	8.0 E3	JSP GW5220--0--
27 µF	16.0	28.5	41.5	37.5	25.0	8.0 E3	JSP GW5270--0--
33 µF	19.0	32.0	41.5	37.5	25.0	8.0 E3	JSP GW5330--0--
39 µF	19.0	32.0	41.5	37.5	25.0	8.0 E3	JSP GW5390--0--
47 µF	20.0	40.0	41.5	37.5	25.0	8.0 E3	JSP GW5470--0--
56 µF	20.0	40.0	41.5	37.5	25.0	8.0 E3	JSP GW5560--0--
68 µF	24.0	44.0	41.5	37.5	25.0	8.0 E3	JSP GW5680--0--
82 µF	24.0	44.0	41.5	37.5	25.0	8.0 E3	JSP GW5820--0--
100 µF	30.0	45.0	41.5	37.5	25.0	8.0 E3	JSP GW6100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

Rated Cap.	250Vdc / 160 Vac Std dimensions						Part number
	B	H	L	P	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
1 µF	7.0	16.0	26.5	22.5	40.0	20.0 E3	JSP IN4100--0--
1.2 µF	7.0	16.0	26.5	22.5	40.0	20.0 E3	JSP IN4120--0--
1.5 µF	7.0	16.0	26.5	22.5	40.0	20.0 E3	JSP IN4150--0--
1.8 µF	7.0	16.0	26.5	22.5	40.0	20.0 E3	JSP IN4180--0--
2.2 µF	7.0	16.0	26.5	22.5	40.0	20.0 E3	JSP IN4220--0--
2.7 µF	8.5	17.0	26.5	22.5	40.0	20.0 E3	JSP IN4270--0--
3.3 µF	8.5	17.0	26.5	22.5	40.0	20.0 E3	JSP IN4330--0--
3.9 µF	11.0	20.0	26.5	22.5	40.0	20.0 E3	JSP IN4390--0--
4.7 µF	11.0	20.0	26.5	22.5	40.0	20.0 E3	JSP IN4470--0--
5.6 µF	13.0	22.0	26.5	22.5	40.0	20.0 E3	JSP IN4560--0--
6.8 µF	13.0	22.0	26.5	22.5	40.0	20.0 E3	JSP IN4680--0--
2.2 µF	9.0	17.0	32.0	27.5	35.0	17.5 E3	JSP IR4220--0--
2.7 µF	9.0	17.0	32.0	27.5	35.0	17.5 E3	JSP IR4270--0--
3.3 µF	9.0	17.0	32.0	27.5	35.0	17.5 E3	JSP IR4330--0--
3.9 µF	9.0	17.0	32.0	27.5	35.0	17.5 E3	JSP IR4390--0--
4.7 µF	11.0	20.0	32.0	27.5	35.0	17.5 E3	JSP IR4470--0--
5.6 µF	11.0	20.0	32.0	27.5	35.0	17.5 E3	JSP IR4560--0--
6.8 µF	13.0	25.0	32.0	27.5	35.0	17.5 E3	JSP IR4680--0--
8.2 µF	13.0	25.0	32.0	27.5	35.0	17.5 E3	JSP IR4820--0--
10 µF	14.0	28.0	32.0	27.5	35.0	17.5 E3	JSP IR5100--0--
12 µF	18.0	33.0	32.0	27.5	35.0	17.5 E3	JSP IR5120--0--
15 µF	18.0	33.0	32.0	27.5	35.0	17.5 E3	JSP IR5150--0--
18 µF	18.0	33.0	32.0	27.5	35.0	17.5 E3	JSP IR5180--0--
5.6 µF	11.0	22.0	41.5	37.5	30.0	15.0 E3	JSP IW4560--0--
6.8 µF	11.0	22.0	41.5	37.5	30.0	15.0 E3	JSP IW4680--0--
8.2 µF	11.0	22.0	41.5	37.5	30.0	15.0 E3	JSP IW4820--0--
10 µF	13.0	24.0	41.5	37.5	30.0	15.0 E3	JSP IW5100--0--
12 µF	13.0	24.0	41.5	37.5	30.0	15.0 E3	JSP IW5120--0--
15 µF	16.0	28.5	41.5	37.5	30.0	15.0 E3	JSP IW5150--0--
18 µF	16.0	28.5	41.5	37.5	30.0	15.0 E3	JSP IW5180--0--
22 µF	19.0	32.0	41.5	37.5	30.0	15.0 E3	JSP IW5220--0--
27 µF	19.0	32.0	41.5	37.5	30.0	15.0 E3	JSP IW5270--0--
33 µF	20.0	40.0	41.5	37.5	30.0	15.0 E3	JSP IW5330--0--
39 µF	24.0	44.0	41.5	37.5	30.0	15.0 E3	JSP IW5390--0--
47 µF	30.0	45.0	41.5	37.5	30.0	15.0 E3	JSP IW5470--0--
56 µF	30.0	45.0	41.5	37.5	30.0	15.0 E3	JSP IW5560--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

JSP
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS
PRODUCT CODE: **JSP**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 63Vdc, 100Vdc, 160Vdc, 250Vdc, 400Vdc.

Rated temperature: +85°C.

Temperature derated voltage: for temperatures between +85°C and the upper operating temperature a decreasing factor of 1.25% per degree °C on the rated V_R (d.c. and a.c.) has to be applied.

Capacitance range: 0.33µF to 470µF.

Capacitance values: E12 series (IEC 60063 Norm).

Capacitance tolerance (measured at 1kHz): ±5%; ±10%; ±20%

Total self-indurance (L): (lead length ~ 2 mm)

Pitch (mm)	22.5	27.5	37.5
L(nH)	18	18	22

Dissipation factor (DF):

tgδx10^{-4} at +25°C ±5°C

kHz	C<0.1 µF	C>0.1 µF
1	≤100	≤100
10	≤150	-

.

Insulation Resistance:

Test conditions

Temperature: +25°C±5°C

Voltage charge time: 1 min

Voltage charge: 50Vdc for V_R< 100Vdc
100Vdc for V_R ≥ 100Vdc

Performance

For V_R ≤ 100 Vdc

≥ 3750 MΩ for C≤0.33 µF (50000 MΩ)*

≥ 1250 s for C>0.33 µF (5000 s)*

For V_R > 100 Vdc

≥30000 MΩ for C≤0.33 µF (50000 MΩ)*

≥10000 s for C>0.33 µF (17000 s)*

*Typical value.

Test voltage between terminations:

1.6 x V_R for 2s at +25°C ±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions 1

Temperature: +40°C±2°C

Relative humidity(RH): 93%±2°C

Test duration: 56 days

Performance

Capacitance change |ΔC/C|: ≤ 5%

DF change (Δtgδ): ≤ 50x10^{-4} at 1kHz

Insulation resistance: ≥ 50% of limit

Endurance:

Test conditions 1 st

Temperature: 105°C ±2°C

Test duration: 2000 h

Voltage applied: 1.25xV_R

Test conditions 2 st

Temperature: 125°C ±2°C

Test duration: 1000 h

Voltage applied: 1.25xV_R

Performance

Capacitance change |ΔC/C|: ≤ 5%

DF change (Δtgδ): ≤ 50x10^{-4} at 10kHz for C≤1 µF
≤ 30x10^{-4} at 1kHz for C>1 µF

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%

DF change (Δtgδ): ≤ 50x10^{-4} at 10kHz for C≤1 µF
≤ 30x10^{-4} at 1kHz for C>1 µF

Insulation resistance: ≥ initial limit

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12 of DC film capacity catalogue).

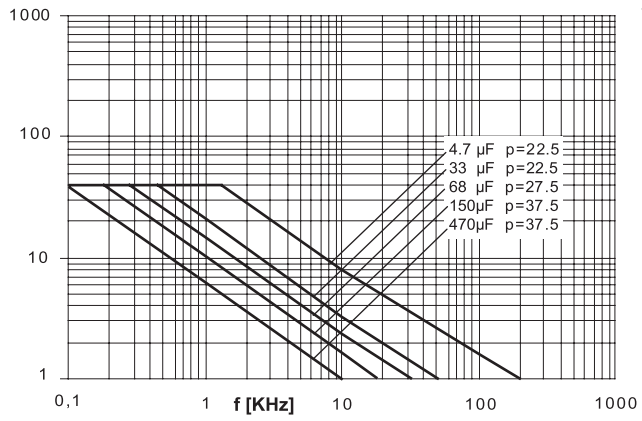
Performance

Capacitance change |ΔC/C|: ≤ 2%

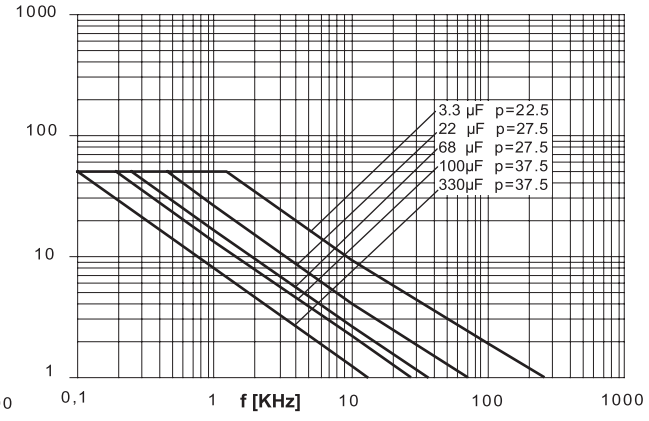
METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / T_h = 80°C)

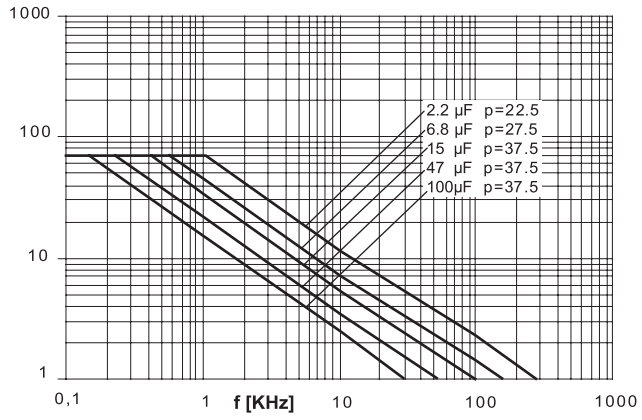
63Vdc / 40Vac



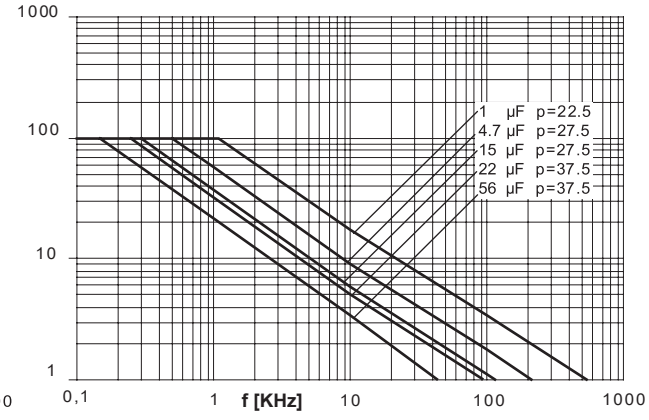
100Vdc / 50Vac



160Vdc / 70Vac



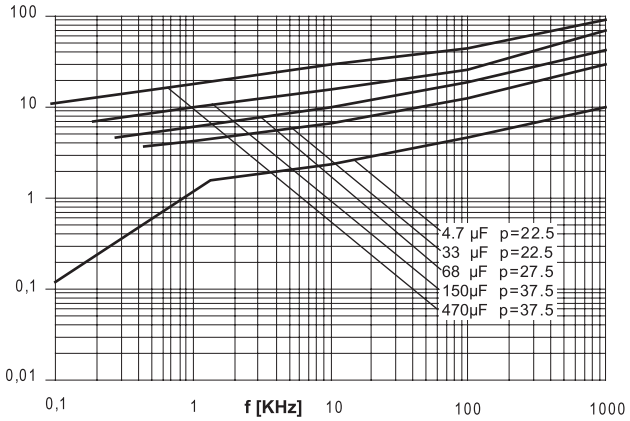
250Vdc / 100Vac



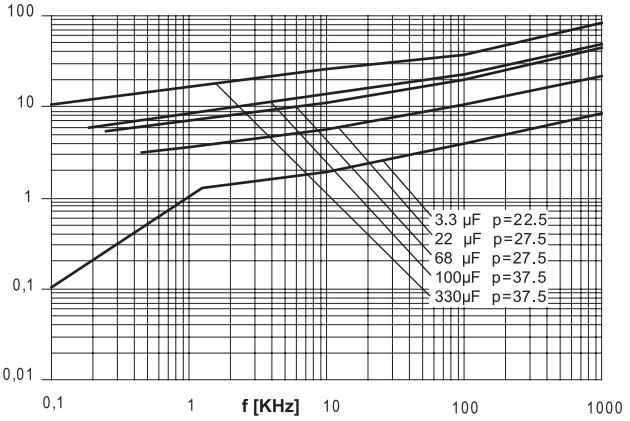
Note: *Th= max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / T_h = 80°C)

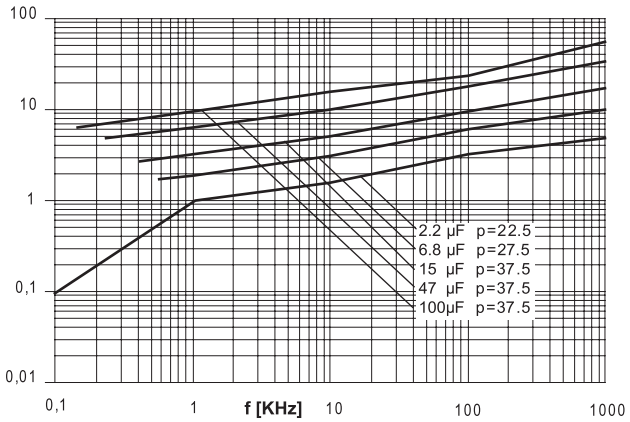
Irms [A] **63Vdc / 40Vac**



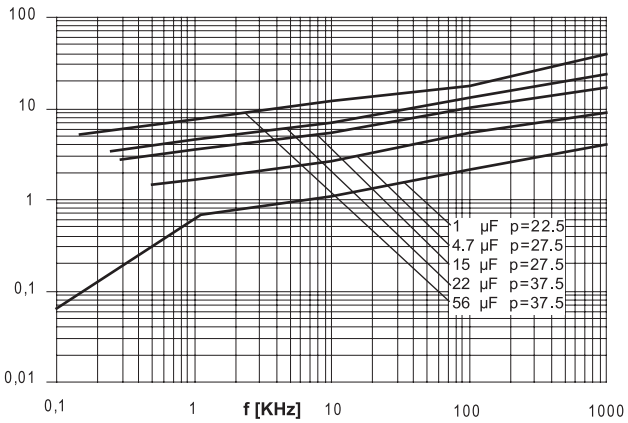
Irms [A] **100Vdc / 50Vac**



Irms [A] **160Vdc / 70Vac**



Irms [A] **250Vdc / 100Vac**



Note: *Th= max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C

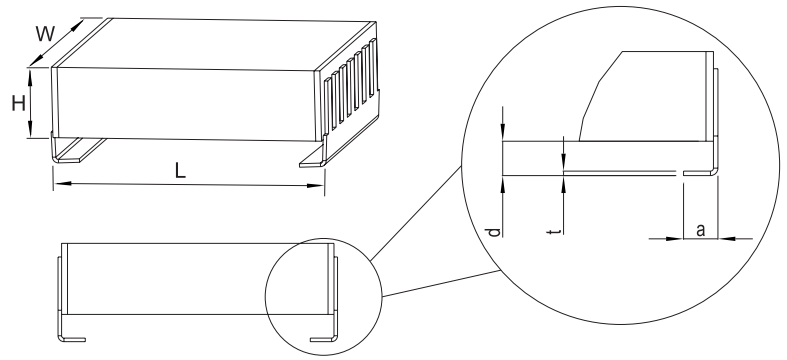
JSN
MKT Series

METALLIZED POLYESTER FILM CAPACITOR

PRODUCT CODE: **JSN**

Market Applications

JSN series (Jumbo Stacked Naked) film capacitor has been designed especially for Automotive Power Electronics applications that require high reliability long life and severe working conditions (high operating temperature and very stressable mechanical and vibration requirements).
Some of the applications for both the 14V and 42V Powernet are the following:
Integrated Starter Alternator, Camless, Common rail, Electric Power steering, climate control, DC/DC and AC/ DC converters.
JSN series could be used for the power electronics in electric/hybrid and fuel cell cars.
Moreover JSN series is suitable to be used for low power DC/DC and AC/DC converters for Telecom and Industrial applications like radio link, telecom central office, small welding machines ecc.



d (±1.0)	2.0mm
a (±1.0)	2.0mm
t (±0.1)	0.2mm

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
J	S	N											

Digit 1 to 3	Series code.
Digit 4	d.c. rated voltage E = 100V; G = 160V; I = 250V
Digit 5	Size code (see table 1):
Digit 6 to 9	Digits 7-8-9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to optain the rated Capacitance in pF.
Digit 10	Capacitance Tolerance: K=±10%; M=±20%;
Digit 11	Dielectric: B=PET H.T.
Digit 12	Version (see table1): 6 and 8 = see drawing A to P = special
Digit 13	Packaging M=bulk; L=taped (tray)
Digit 14	Internal use

MOUNTING & SOLDERING

- JSN series is to be mounted with reflow process (see thermal profile) or gluing.

CAUTION

Hand assembly
In case of hand assembly with soldering iron the following reccomandation must be taken :

- Maximum temperature on the soldering iron: 250°C for (max time 5s)

Avoid contact between the soldering iron and the body of the capacitor
If PC Boards are assembled by hand, care must be taken to avoid mechanical damage. We recommend:
- using tweeezers, the components should be gripped across the two terminals
- the usage of a pen under vacuum on the capacitor is recommended

Table 1

Terminals Code digit 12	Size code (Digit 5)		
	60.80 (K)	60.115 (J)	60.160 (L)
$W_{terminal}$ = 20,0 mm	**6**	**6**	*
$W_{terminal}$ = 30,0 mm			*
$W_{terminal}$ = 40,0 mm			**8**

*also available upon special request.

JSN
MKT Series

METALLIZED POLYESTER FILM CAPACITOR

PRODUCT CODE: **JSN**

Rated Cap.	Size code	100Vdc / 63Vac					Part number
		W Max	H Max	L Max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
10 µF	60.80	21.5	7.0	17.0	27.0	5.4 E3	JSNEK5100-B6--
15 µF	60.115	30.0	8.0	17.0	27.0	5.4 E3	JSNEJ5150-B6--
22 µF	60.80	21.5	14.0	17.0	27.0	5.4 E3	JSNEK5220-B6--
33 µF	60.115	30.0	15.0	17.0	27.0	5.4 E3	JSNEJ5330-B6--
47 µF	60.160	42.9	15.0	17.0	27.0	5.4 E3	JSNEL5470-B8--
68 µF	60.160	42.9	21.0	17.0	27.0	5.4 E3	JSNEL5680-B8--

Tolerance: K (±10%); M (±20%)
Packaging
Internal use

Rated Cap.	Size code	160Vdc / 90Vac					Part number
		W Max	H Max	L Max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
10 µF	60.80	21.5	15.0	17.0	35.0	11.2 E3	JSNGK5100-B6--
15 µF	60.115	30.0	15.0	17.0	35.0	11.2 E3	JSNGJ5150-B6--
22 µF	60.115	30.0	23.0	17.0	35.0	11.2 E3	JSNGJ5220-B6--
33 µF	60.160	42.9	23.0	17.0	35.0	11.2 E3	JSNGL5330-B8--

Tolerance: K (±10%); M (±20%)
Packaging
Internal use

Rated Cap.	Size code	250Vdc / 160Vac					Part number
		W Max	H Max	L Max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	
10 µF	60.115	30.0	20.0	17.0	40.0	20.0 E3	JSNIJ5100-B6--
15 µF	60.160	42.9	20.0	17.0	40.0	20.0 E3	JSNIL5150-B8--

Tolerance: K (±10%); M (±20%)
Packaging
Internal use

Customized versions (voltage,size,capacitance) available on request

All dimensions are in mm

METALLIZED POLYESTER FILM CAPACITOR

PRODUCT CODE: **JSN**

GENERAL TECHNICAL DATA

Dielectric: Metallized polyester film (PET H.T.).

Construction: Stacked Naked capacitor with special terminals.

Terminals: Copper tinned lead frame. Customized terminals aravailable upon request.

Marking: Manufacturer's logo, capacitance, D.C. rated voltage.

Operating temperature range -55°C up to 125°C

Climatic category: 55/125/56 IEC 60068-1

Storage conditions: Temperature range: 0°C up to +40°C
Humidity: 60% R.H. max.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 100Vdc, 160Vdc, 250Vdc,

Category Voltage (V_c): V_C=V_R up to 105°C.
For temperatures between +105 and +125°C a decreasing factor of 1.25% per degree °C has to be applied.

Rated temperature(T_R): +105°C.

Capacitance range: 10µF to 68µF.

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerance (measured at 1kHz):
±10% (K); ±20% (M)
(Other tolerances are available upon request)

Dissipation Factor (tgδ): ≤ 0.01 at 1kHz – T=25°C±5°C

Insulation Resistance:

Test conditions

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

Performance

≥ 250s for V_R = 100Vdc
≥ 400s for V_R = 160Vdc
≥ 800s for V_R = 250Vdc

Test voltage between terminations:
1.4x V_R applied for 2s at +25°C±5

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤ 7%
DF change (Δtgδ):	≥ 50x10^{-4} at 1kHz
Insulation resistance:	≥ 50% of limit value

Endurance:

Test conditions

Temperature:	125°C ±2°C
Test duration:	2000 h
Voltage applied:	1.25xV_C

Performance

Capacitance change |ΔC/C|:	≤ 5%
DF change (Δtgδ):	≤ 50x10^{-4} at 1kHz
Insulation resistance:	≥ 50% of limit value

Rapid change of temperature:

Test conditions

Temperature:	1h at -55°C; 1h at +125°C
Number of cycles:	1000

Performance

Capacitance change |ΔC/C|:	≤ 3%
DF change (Δtgδ):	≤ 50x10^{-4} at 1kHz
Insulation resistance:	≥ limit value

No mechanical damage.

Long term stability (after two years**):**

Storage: standard environmental conditions.

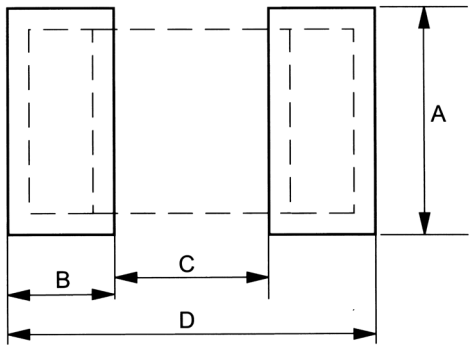
Performance

Capacitance change |ΔC/C|: ≤ 3%

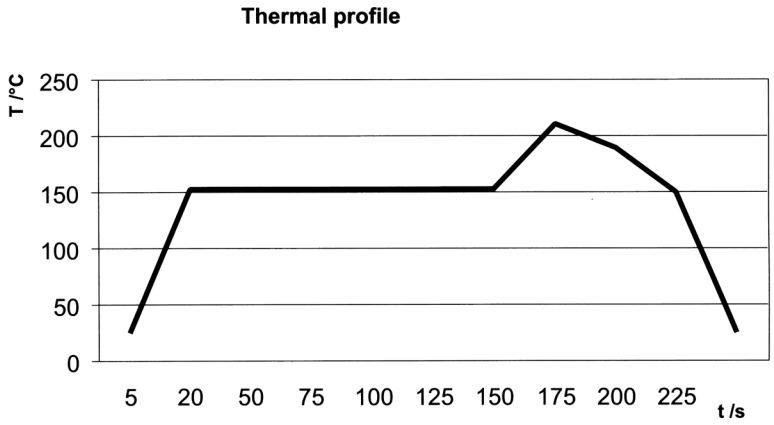
Reliability (reference MIL HDB 217)**:**

Failure rate:	≤ 1 FIT (40°C – 0.5x V_R)
Failure criteria:	Typical open circuit
Capacitance change:	|ΔC/C|>10%
DF change:	(Δtgδ.>2xinitial limit)
Insulation resistance:	> 0.005 x initial value

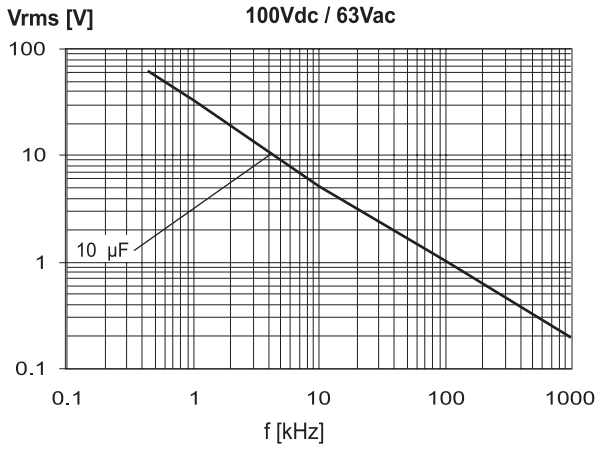
Size code	A	B	C	D
60.80	21.9	5.0	10.2	20.4
60.115	30.4	5.0	10.2	20.4
60.160	43.3	5.0	10.2	20.4

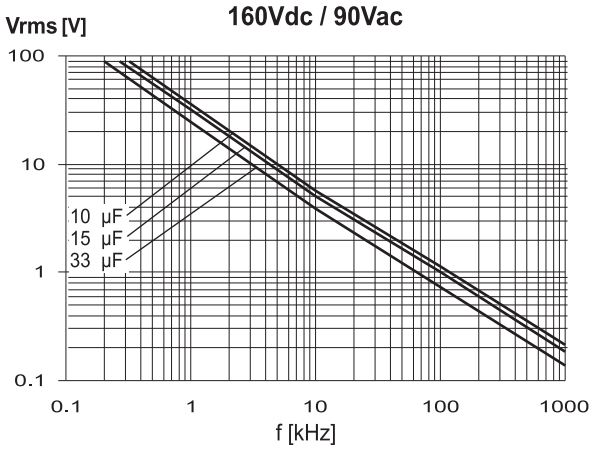


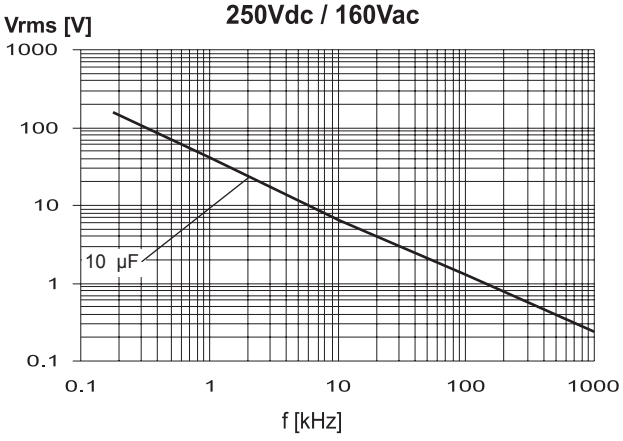
Typical Thermal profile for reflow process:



MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / $T_h \leq 40°C$)

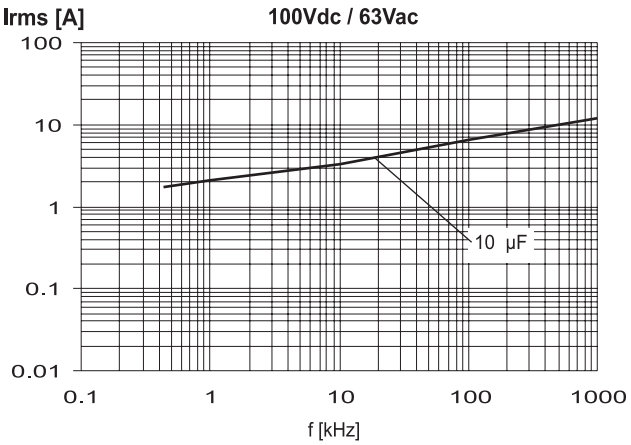


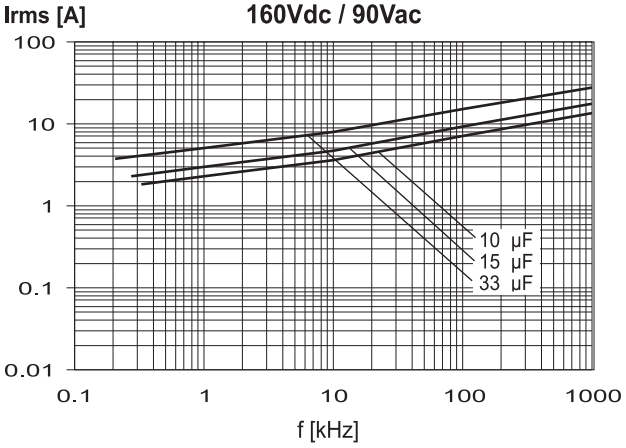


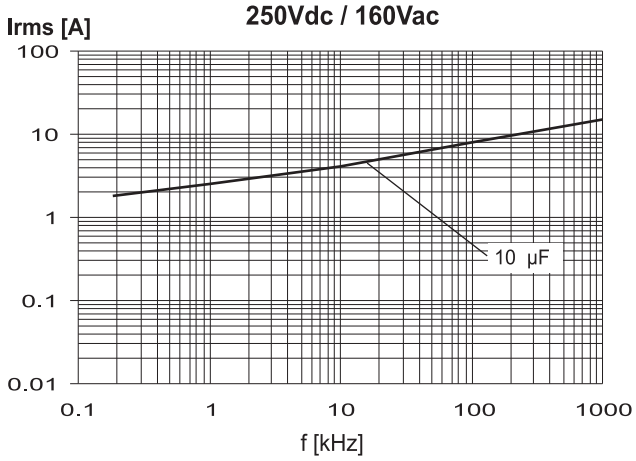


Note: *Th= max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / $T_h \leq 40°C$)





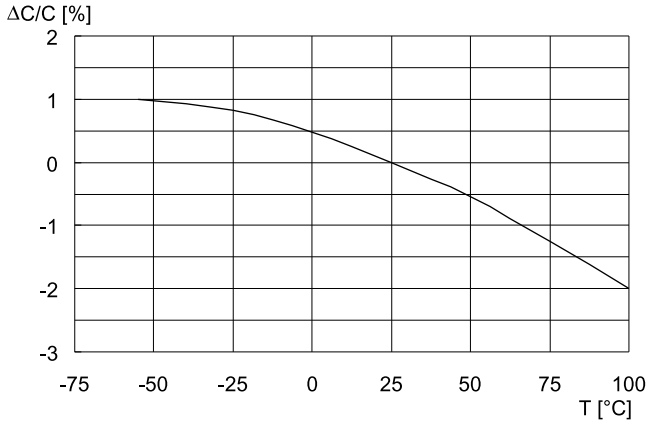


Note: *Th= max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C

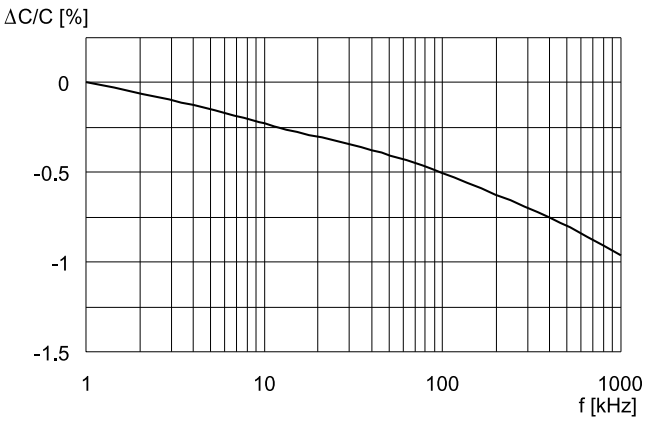
Polypropylene Capacitors

Series	Style	Typical application	Rated voltage	Capacitance range	Page
All	Typical graphs				62 to 63
A70	MKP Axial	Multipurpose applications	160Vdc	0.022µF...4.7µF	64 to 68
			250Vdc	0.010µF...3.3µF	
			400Vdc	6800pF...1.5µF	
			630Vdc	1000pF...0.68µF	
A72	KP Axial	High current applications	100Vdc	4700pF...0.010µF	69 to 73
			250Vdc	2200pF...0.015µF	
			400Vdc	47pF...0.010µF	
			630Vdc	0.015µF...0.33µF	
			1000Vdc	3300pF...0.10µF	
			1500Vdc	2200pF...0.068µF	
			2000Vdc	1000pF...0.047µF	
R71	MKP Box Pitch: 10mm...37.5mm	P.F.C. applications	420Vdc	0.010µF...22µF	74 to 78
			520Vdc	0.010µF...22µF	
			630Vdc	0.010µF...15µF	
			1000Vdc	0.22µF...10µF	
R73	KP Box Pitch: 15mm...37.5mm	High current applications	100Vdc	0.047µF...0.15µF	79 to 88
			160Vdc	0.033µF...0.10µF	
			250Vdc	0.015µF...0.047µF	
			400Vdc	0.010µF...0.047µF	
			630Vdc	0.010µF...2.2µF	
			1000Vdc	3300pF...1.5µF	
			1250Vdc	2200pF...0.82µF	
			1600Vdc	1000pF...0.56µF	
			2000Vdc	100pF...0.22µF	
R74	MKP Box Pitch: 10mm...37.5mm	A.C. applications	250Vac	0.010µF...0.15µF	89 to 104
			400Vac	2200pF...3.3µF	
			500Vac	1000pF...2.2µF	
			700Vac	470pF...1.0µF	
			900Vac	1000pF...0.47µF	
			600Vac MINI version	470pF...0.018µF	
			500Vac (125°C)	1000pF...0.1µF	
			700Vac (125°C)	680pF...0.068µF	
R75 H.P.	MKP Box Pitch: 7.5mm...37.5mm	D.C. and Pulse applications	250Vdc	0.027µF...33.0µF	105 to 115
			400Vdc	0.010µF...15.0µF	
			630Vdc	1000pF...8.2µF	
			1000Vdc	220 pF...3.9µF	
			1250Vdc	8200pF...2.2µF	
			1600Vdc	3900pF...1.5µF	
			2000Vdc	1000pF...1.0µF	
R76	MMKP Box Pitch: 7.5mm...37.5mm	D.C. and Pulse applications	250Vdc	6800pF...15.0µF	116 to 127
			400Vdc	2700pF...8.2µF	
			630Vdc	680pF...5.6µF	
			1000Vdc	220pF...2.2µF	
			1600Vdc	3300pF...1.2µF	
			2000Vdc	100pF...0.68µF	
R77	MMKP Box Pitch: 10mm...27.5mm	A.C. applications	250Vac	0.0270µF...0.10µF	128 to 133
			300Vac	0.010µF...0.10µF	
			400Vac	5600pF...0.10µF	
			500Vac	1000pF...0.10µF	
			700Vac	1000pF...0.027µF	
			900Vac	1000pF...0.018µF	
R79	MKP Box Pitch: 5mm	Multipurpose applications	160Vdc	0.039µF...0.22µF	134 to 138
			250Vdc	0.012µF...0.15µF	
			400Vdc	3900pF...0.047µF	
			630Vdc	1000pF...0.018µF	
JSP	MKP Box pitch: 22.5mm...37.5mm	D.C. multipurpose applications	250Vdc	2.2µF...56µF	139 to 144
			400Vdc	1.5µF...33µF	
			630Vdc	1.0µF...22µF	

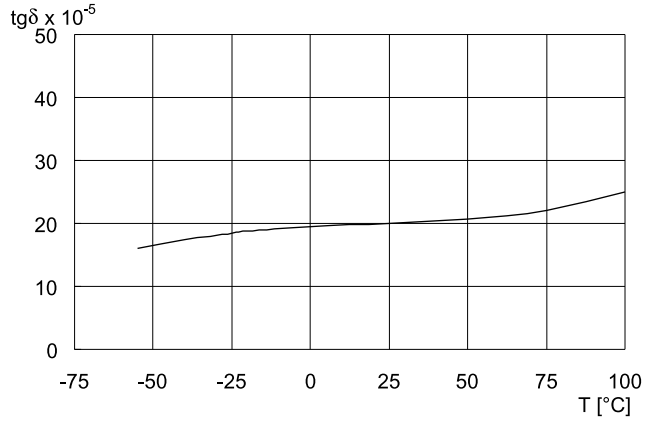
POLYPROPYLENE FILM - TYPICAL GRAPHS



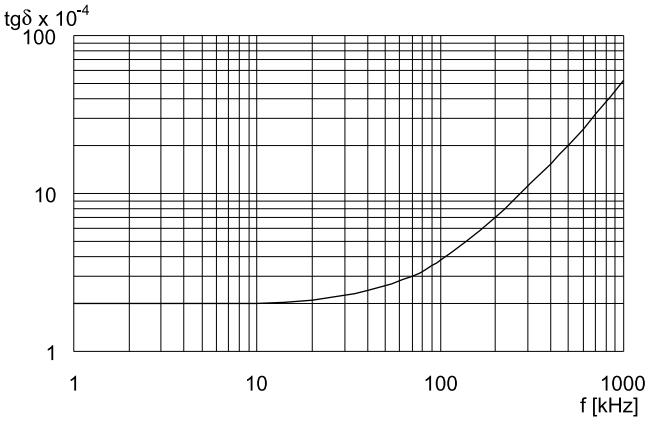
Capacitance change vs. temperature at 1kHz



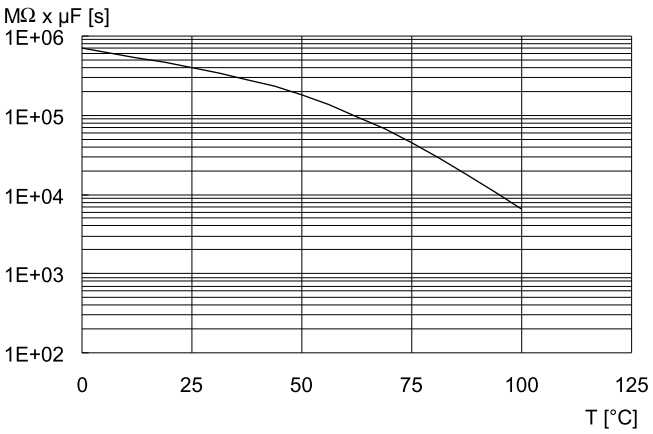
Capacitance change vs. frequency (Room temperature)



Dissipation factor vs. temperature at 1kHz



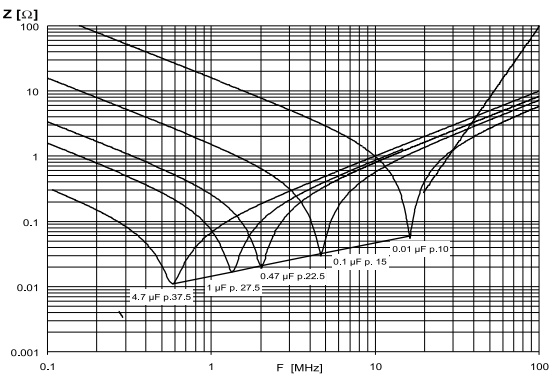
Dissipation factor vs. frequency (Room temperature)



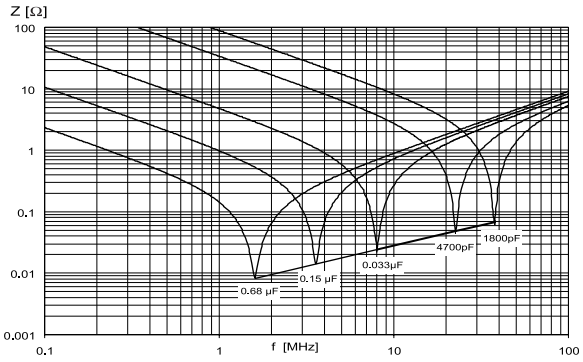
Time constant vs. temperature

POLYPROPYLENE FILM - TYPICAL GRAPHS
Impedance vs.frequency (lead length 2mm).
Typical values.

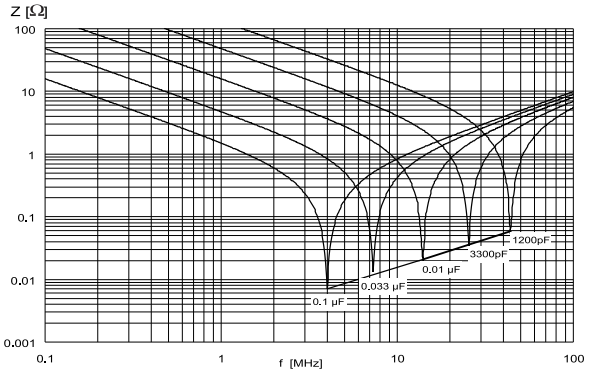
R.71



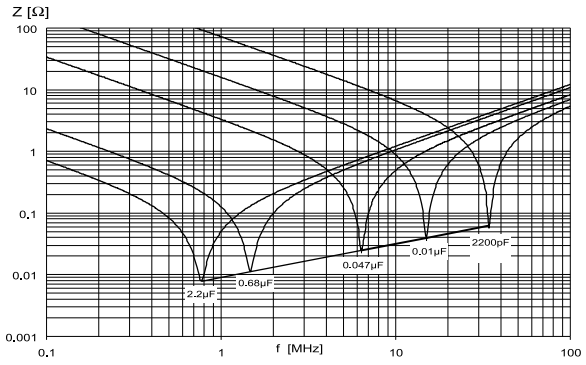
R.73



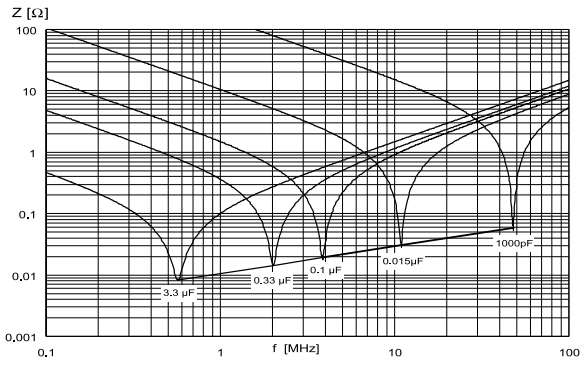
R.74



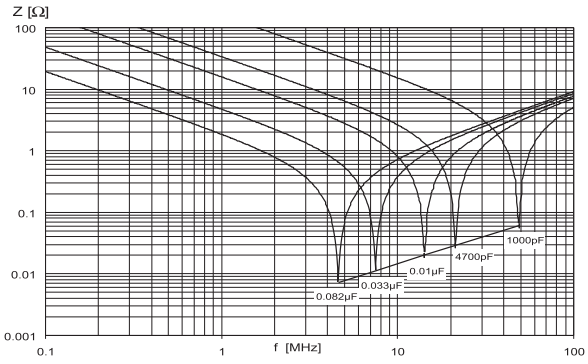
R.75HP



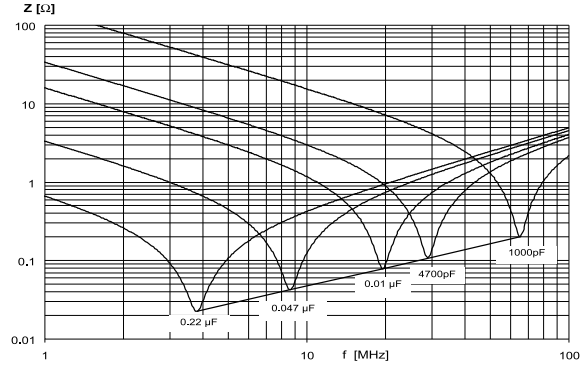
R.76



R.77

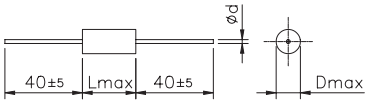


R79

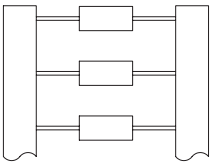


A70
MKP Series

Loose



Taped



D max	5	>5 ≤ 7	>7<16	≥16
Ød ±0.05	0.5	0.6	0.8	1

All dimensions are in mm.

METALLIZED POLYPROPYLENE CAPACITOR MULTIPURPOSE APPLICATIONS

Typical applications: temperature compensation circuits, timing, oscillator circuits, power factor correction and coupling capacitor in SMPS applications.

PRODUCT CODE: **A70**

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	7	0										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
G =160V I =250V M= 400V P = 630V

Digit 5 Length (mm):
F=11; H=14; K=20.5; Q=28; T=33

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

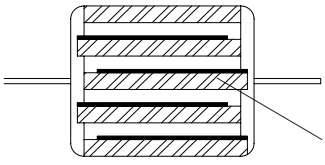
Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Ordering code (Digit 10 to 11)
Reel Ø 355 mm	26
Loose	AA

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.
Plates: aluminium layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire.
Protection: polyester tape wrapping and thermosetting resin end fill.
Marking: Manufacturer's logo, series (1.70), dielectric code (MKP), capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-16

Winding scheme



A70
MKP Series

METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A70**

Rated Cap.	160Vdc/90Vac		Max dv/dt	Max K_0	Part Number
	D max	L max	(V/µs)	(V^2/µs)	
0.022 µF	5.0	11.0	5	1.60 E3	A70GF 2220--0--
0.033 µF	5.0	11.0	5	1.60 E3	A70GF 2330--0--
0.047 µF	5.0	11.0	5	1.60 E3	A70GF 2470--0--
0.068 µF	5.5	14.0	5	1.60 E3	A70GH 2680--0--
0.10 µF	5.5	14.0	5	1.60 E3	A70GH 3100--0--
0.15 µF	6.5	14.0	5	1.60 E3	A70GH 3150--0--
0.22 µF	7.5	14.0	5	1.60 E3	A70GH 3220--0--
0.33 µF	7.0	20.5	3	0.96 E3	A70GK 3330--0--
0.47 µF	8.0	20.5	3	0.96 E3	A70GK 3470--0--
0.68 µF	8.0	28.0	2	0.64 E3	A70GQ 3680--0--
1.0 µF	9.5	28.0	2	0.64 E3	A70GQ 4100--0--
1.5 µF	11.0	28.0	2	0.64 E3	A70GQ 4150--0--
2.2 µF	12.0	33.0	1	0.32 E3	A70GT 4220--0--
3.3 µF	14.5	33.0	1	0.32 E3	A70GT 4330--0--
4.7 µF	17.0	33.0	1	0.32 E3	A70GT 4470--0--

Rated Cap.	400Vdc/220Vac*		Max dv/dt	Max K_0	Part Number
	D max	L max	(V/µs)	(V^2/µs)	
6800 pF	5.0	11.0	25.0	20.0 E3	A70MF 1680--0--
0.010 µF	5.5	14.0	13.5	11.0 E3	A70MH 2100--0--
0.015 µF	6.0	14.0	13.5	11.0 E3	A70MH 2150--0--
0.022 µF	6.0	14.0	13.5	11.0 E3	A70MH 2220--0--
0.033 µF	6.5	14.0	13.5	11.0 E3	A70MH 2330--0--
0.047 µF	8.0	14.0	13.5	11.0 E3	A70MH 2470--0--
0.068 µF	7.0	20.5	10.0	8.0 E3	A70MK 2680--0--
0.10 µF	8.0	20.5	10.0	8.0 E3	A70MK 3100--0--
0.15 µF	8.0	28.0	6.5	5.2 E3	A70MQ 3150--0--
0.22 µF	9.5	28.0	6.5	5.2 E3	A70MQ 3220--0--
0.33 µF	11.0	28.0	6.5	5.2 E3	A70MQ 3330--0--
0.47 µF	13.0	28.0	6.5	5.2 E3	A70MQ 3470--0--
0.68 µF	13.5	33.0	4.0	3.2 E3	A70MT 3680--0--
1.0 µF	16.5	33.0	4.0	3.2 E3	A70MT 4100--0--
1.5 µF	20.0	33.0	4.0	3.2 E3	A70MT 4150--0--

Rated Cap.	250Vdc/200Vac		Max dv/dt	Max K_0	Part Number
	D max	L max	(V/µs)	(V^2/µs)	
0.010 µF	5.0	11.0	11.0	5.5 E3	A70IF 2100--0--
0.015 µF	5.0	11.0	11.0	5.5 E3	A70IF 2150--0--
0.022 µF	5.5	14.0	10.0	5.0 E3	A70IH 2220--0--
0.033 µF	5.5	14.0	10.0	5.0 E3	A70IH 2330--0--
0.047 µF	6.0	14.0	10.0	5.0 E3	A70IH 2470--0--
0.068 µF	7.0	14.0	10.0	5.0 E3	A70IH 2680--0--
0.10 µF	8.5	14.0	10.0	5.0 E3	A70IH 3100--0--
0.15 µF	7.5	20.5	7.0	3.5 E3	A70IK 3150--0--
0.22 µF	9.0	20.5	7.0	3.5 E3	A70IK 3220--0--
0.33 µF	8.5	28.0	4.0	2.0 E3	A70IQ 3330--0--
0.47 µF	10.0	28.0	4.0	2.0 E3	A70IQ 3470--0--
0.68 µF	11.5	28.0	4.0	2.0 E3	A70IQ 3680--0--
1.0 µF	12.5	33.0	2.5	1.3 E3	A70IT 4100--0--
1.5 µF	15.0	33.0	2.5	1.3 E3	A70IT 4150--0--
2.2 µF	18.0	33.0	2.5	1.3 E3	A70IT 4220--0--
3.3 µF	21.5	33.0	2.5	1.3 E3	A70IT 4330--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	630Vdc/250Vac*		Max dv/dt	Max K_0	Part Number
	D max	L max	(V/µs)	(V^2/µs)	
1000 pF	5.0	11.0	30	38.0 E3	A70PF 1100--0--
1500 pF	5.0	11.0	30	38.0 E3	A70PF 1150--0--
2200 pF	5.0	11.0	30	38.0 E3	A70PF 1220--0--
3300 pF	5.0	11.0	30	38.0 E3	A70PF 1330--0--
4700 pF	5.0	11.0	30	38.0 E3	A70PF 1470--0--
6800 pF	5.5	14.0	20	25.0 E3	A70PH 1680--0--
0.010 µF	6.0	14.0	20	25.0 E3	A70PH 2100--0--
0.015 µF	7.0	14.0	20	25.0 E3	A70PH 2150--0--
0.022 µF	8.5	14.0	20	25.0 E3	A70PH 2220--0--
0.033 µF	7.5	20.5	15	19.0 E3	A70PK 2330--0--
0.047 µF	8.5	20.5	15	19.0 E3	A70PK 2470--0--
0.068 µF	8.5	28.0	10	13.0 E3	A70PQ 2680--0--
0.10 µF	10.0	28.0	10	13.0 E3	A70PQ 3100--0--
0.15 µF	11.5	28.0	10	13.0 E3	A70PQ 3150--0--
0.22 µF	12.5	33.0	6	7.6 E3	A70PT 3220--0--
0.33 µF	15.0	33.0	6	7.6 E3	A70PT 3330--0--
0.47 µF	17.5	33.0	6	7.6 E3	A70PT 3470--0--
0.68 µF	21.0	33.0	6	7.6 E3	A70PT 3680--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note 1: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

Note 2: Special version for line applications (rated voltage 250 Vac) available upon request.

* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

A70
MKP Series

METALLIZED POLYPROPYLENE CAPACITOR MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A70**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 160 Vdc - 250Vdc
400 Vdc - 630 Vdc

Rated temperature (T_R): +85°C

Temperature derated voltage:

for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 4.7µF

Capacitance values:

E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**

±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:**

max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):

$tg\delta x10^{-4}$ at +25°C ±5°C

kHz	C<0.1 µF	0.1 µF to 1 µF	>1 µF
1	≤ 6	≤ 6	≤ 6
10	≤10	≤20	
100	≤30		

Insulation resistance:

Test conditions

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

Performance

≥$1x10^5$ MΩ for C ≤ 0.33 µF ($5x10^5$ MΩ)*
≥30000 s for C > 0.33 µF (150000 s)*

*Typical value

Test voltage between terminations:

1.6xV_R applied for 2 s at +25°C ±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤$10x10^{-4}$ at 1kHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions

Temperature: +85°C±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_R

Performance

Capacitance change |ΔC/C|: ≤3%
DF change (Δtgδ): ≤$10x10^{-4}$ at 10kHz for C≤1µF
≤$10x10^{-4}$ at 1kHz for C>1µF
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|: ≤1%
DF change (Δtgδ): ≤$10x10^{-4}$ at 10kHz for C≤1µF
≤$10x10^{-4}$ at 1kHz for C>1µF
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

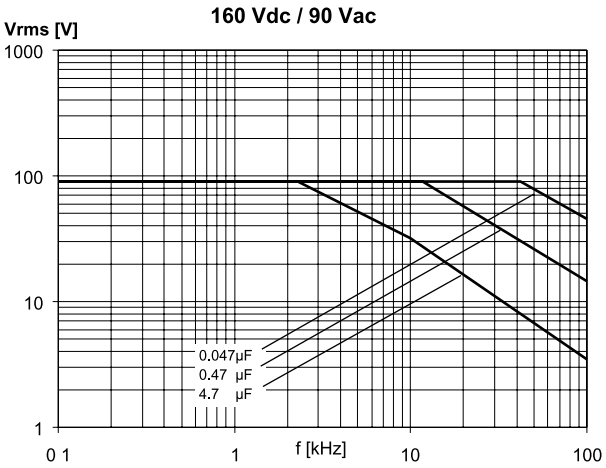
Performance

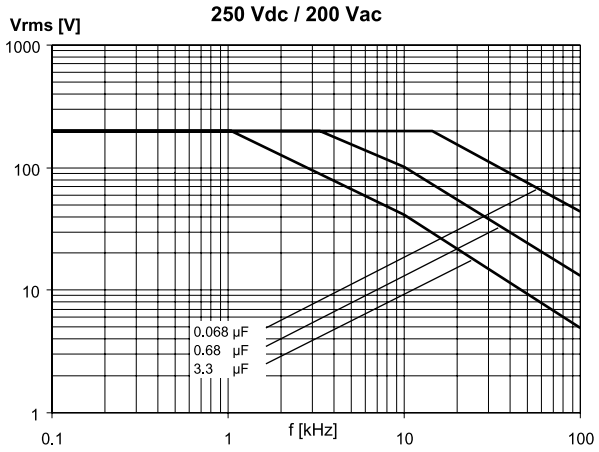
Capacitance change |ΔC/C|: ≤0.5%

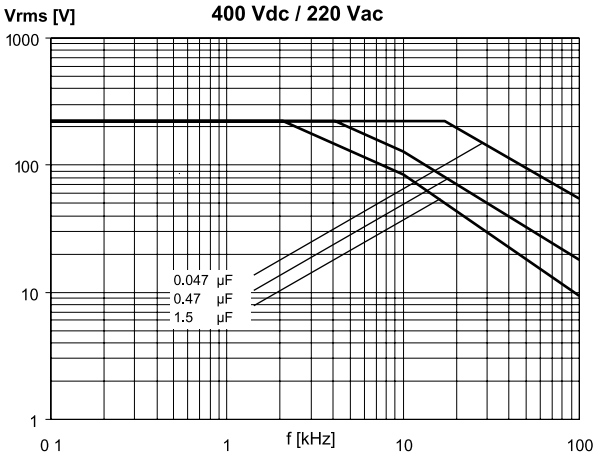
METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS

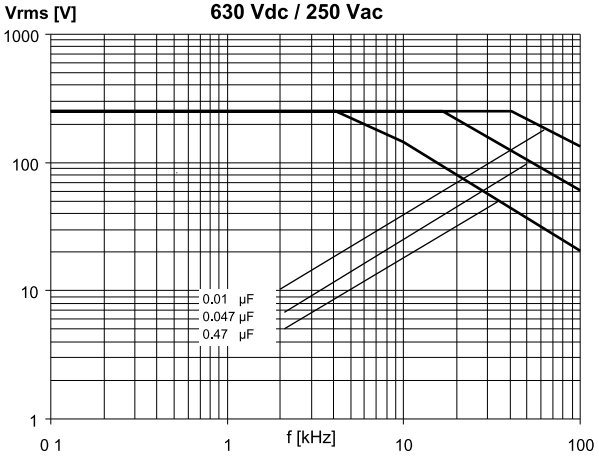
PRODUCT CODE: **A70**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)





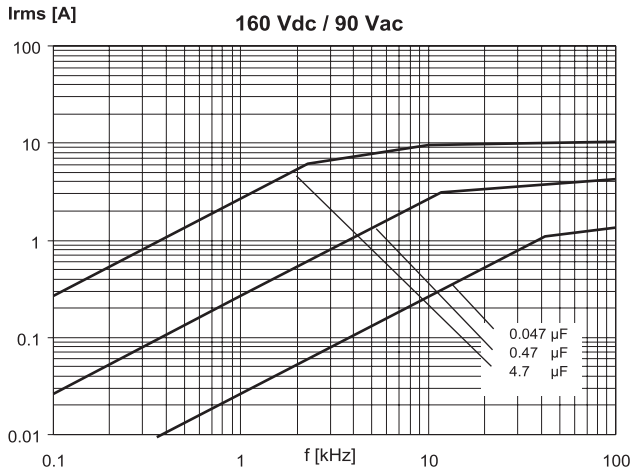


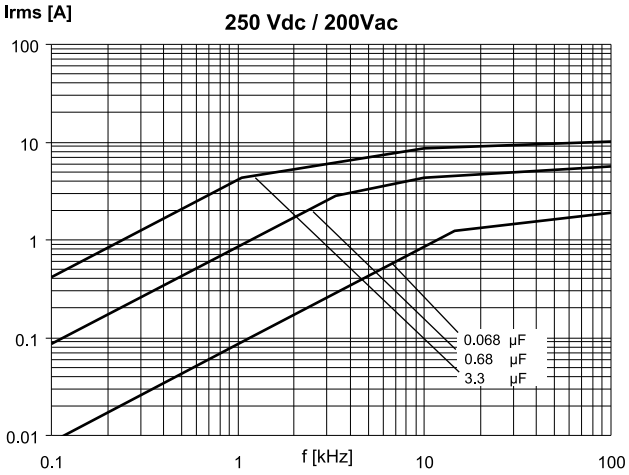


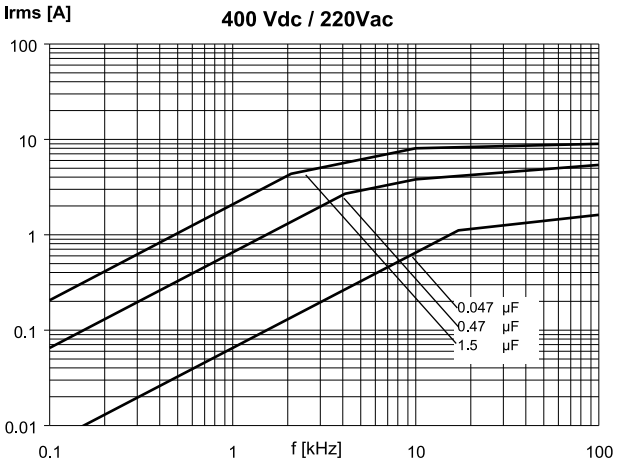
METALLIZED POLYPROPYLENE CAPACITOR
MULTIPURPOSE APPLICATIONS

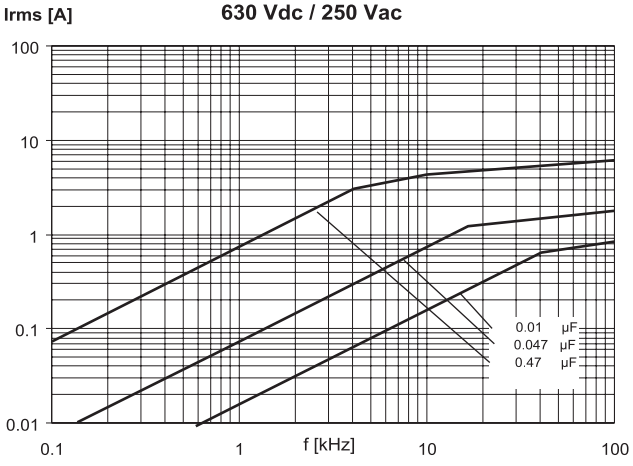
PRODUCT CODE: **A70**

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)



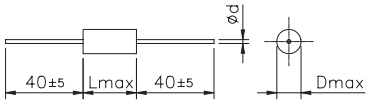




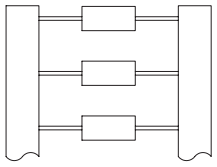


A72
KP Series

Loose



Taped



FILM-FOIL POLYPROPYLENE CAPACITOR HIGH CURRENT APPLICATIONS

Typical applications: switching spikes suppression and resonant capacitor in SMPS, deflection circuits in TV-sets (S-correction and fly-back tuning), applications with high voltage and high current.

PRODUCT CODE: **A72**

D max	5	>5 ≤ 7	>7<16	≥16
Ød ±0.05	0.5	0.6	0.8	1

All dimensions are in mm.

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	7	2										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
E =100V I = 250V M= 400V
P =630V Q =1000V S=1500V U = 2000V

Digit 5 Length (mm):
F=11; H=14; K=20.5; Q=28; T=33

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Ordering code (Digit 10 to 11)
Reel Ø 355 mm	26
Loose	AA

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: metal foil for 1 section;
metal foil + metallized film for 2 sections.

Winding: non-inductive type.

Leads: tinned wire.

Protection: polyester tape wrapping and thermosetting resin end fill.

Marking: manufacturer's logo, series (1.72), dielectric code (KP), capacitance, tolerance, D.C. rated voltage.

Climatic category: 55/105/56 IEC 68-1

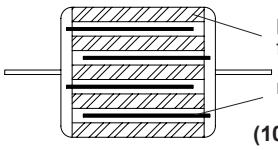
Operating temperature range: -55 to +105°C

Related documents: IEC 60384-13

A72
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

PRODUCT CODE: **A72**



1 section
(100-250-400Vdc)

Rated Cap.	100Vdc/63Vac D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
4700 pF	5.0	11.0	3000	0.60 E6	A72EF1470--0--
6800 pF	5.0	11.0	3000	0.60 E6	A72EF1680--0--
0.010 µF	5.0	11.0	3000	0.60 E6	A72EF2100--0--

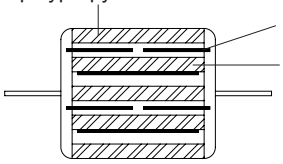
Rated Cap.	250Vdc/125Vac* D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
2200 pF	5.0	11.0	5000	2.50 E6	A72IF 1220--0--
3300 pF	5.0	11.0	5000	2.50 E6	A72IF 1330--0--
4700 pF	7.0	16.5	4500	2.30 E6	A72II 1470--0--
6800 pF	7.0	16.5	4500	2.30 E6	A72II 1680--0--
0.010 µF	7.5	16.5	4500	2.30 E6	A72II 2100--0--
0.015 µF	8.5	16.5	4500	2.30 E6	A72II 2150--0--

Rated Cap.	400Vdc/160Vac D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
47 pF	5.0	11.0	13000	10.0 E6	A72MF 0047--0--
68 pF	5.0	11.0	13000	10.0 E6	A72MF 0068--0--
100 pF	5.0	11.0	13000	10.0 E6	A72MF 0100--0--
150 pF	5.0	11.0	13000	10.0 E6	A72MF 0150--0--
220 pF	5.0	11.0	13000	10.0 E6	A72MF 0220--0--
330 pF	5.0	11.0	13000	10.0 E6	A72MF 0330--0--
470 pF	5.0	11.0	13000	10.0 E6	A72MF 0470--0--
680 pF	5.0	11.0	13000	10.0 E6	A72MF 0680--0--
1000 pF	5.0	11.0	13000	10.0 E6	A72MF 1100--0--
1500 pF	5.0	11.0	13000	10.0 E6	A72MF 1150--0--
2200 pF	6.5	16.5	6500	5.2 E6	A72MI 1220--0--
3300 pF	6.5	16.5	6500	5.2 E6	A72MI 1330--0--
4700 pF	7.0	16.5	6500	5.2 E6	A72MI 1470--0--
6800 pF	8.0	16.5	6500	5.2 E6	A72MI 1680--0--
0.010 µF	9.0	16.5	6500	5.2 E6	A72MI 2100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

polypropylene film dielectric



2 sections
(630-1000-1500-2000Vdc)

Rated Cap.	630Vdc/300Vac D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.015 µF	8.5	20.5	4300	5.4 E6	A72PK 2150--0--
0.022 µF	9.5	20.5	4300	5.4 E6	A72PK 2220--0--
0.033 µF	9.0	28.0	2600	3.3 E6	A72PQ2330--0--
0.047 µF	10.0	28.0	2600	3.3 E6	A72PQ2470--0--
0.068 µF	11.5	28.0	2600	3.3 E6	A72PQ2680--0--
0.10 µF	13.5	28.0	2600	3.3 E6	A72PQ3100--0--
0.15 µF	14.0	33.0	1800	2.3 E6	A72PT 3150--0--
0.22 µF	16.5	33.0	1800	2.3 E6	A72PT 3220--0--
0.33 µF	19.5	33.0	1800	2.3 E6	A72PT 3330--0--

Rated Cap.	1000Vdc/400Vac D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
3300 pF	8.5	20.5	14000	28.0 E6	A72QK 1330--0--
4700 pF	9.5	20.5	14000	28.0 E6	A72QK 1470--0--
6800 pF	8.0	28.0	5000	10.0 E6	A72QQ1680--0--
0.010 µF	8.5	28.0	5000	10.0 E6	A72QQ2100--0--
0.015 µF	10.0	28.0	5000	10.0 E6	A72QQ2150--0--
0.022 µF	11.0	28.0	5000	10.0 E6	A72QQ2220--0--
0.033 µF	13.0	28.0	5000	10.0 E6	A72QQ2330--0--
0.047 µF	14.0	33.0	3700	7.4 E6	A72QT 2470--0--
0.068 µF	16.0	33.0	3700	7.4 E6	A72QT 2680--0--
0.10 µF	19.0	33.0	3700	7.4 E6	A72QT 3100--0--

Rated Cap.	1500Vdc/450Vac D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
2200 pF	8.0	20.5	17000	51 E6	A72SK 1220--0--
3300 pF	9.5	20.5	17000	51 E6	A72SK 1330--0--
4700 pF	8.5	28.0	6000	18 E6	A72SQ1470--0--
6800 pF	8.5	28.0	6000	18 E6	A72SQ1680--0--
0.010 µF	9.5	28.0	6000	18 E6	A72SQ2100--0--
0.015 µF	11.0	28.0	6000	18 E6	A72SQ2150--0--
0.022 µF	12.5	28.0	6000	18 E6	A72SQ2220--0--
0.033 µF	13.5	33.0	4500	13 E6	A72ST 2330--0--
0.047 µF	16.0	33.0	4500	13 E6	A72ST 2470--0--
0.068 µF	18.0	33.0	4500	13 E6	A72ST 2680--0--

Rated Cap.	2000Vdc/500Vac D max	L max	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
1000 pF	8.5	20.5	27000	108 E6	A72UK 1100--0--
1500 pF	9.5	20.5	27000	108 E6	A72UK 1150--0--
2200 pF	11.0	20.5	27000	108 E6	A72UK 1220--0--
3300 pF	9.0	28.0	9800	39 E6	A72UQ1330--0--
4700 pF	9.5	28.0	9800	39 E6	A72UQ1470--0--
6800 pF	11.0	28.0	9800	39 E6	A72UQ1680--0--
0.010 µF	13.0	28.0	9800	39 E6	A72UQ2100--0--
0.015 µF	13.5	33.0	7000	28 E6	A72UT 2150--0--
0.022 µF	16.0	33.0	7000	28 E6	A72UT 2220--0--
0.033 µF	20.0	33.0	7000	28 E6	A72UT 2330--0--
0.047 µF	22.5	33.0	7000	28 E6	A72UT 2470--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The dv/dt test is carried out at 2 times the above values.

The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

A72
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

PRODUCT CODE: **A72**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 100 Vdc - 250 Vdc - 400 Vdc
for 1 section.
630Vdc- 1000Vdc-1500Vdc-2000Vdc
for 2 sections.

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 47pF to 0.015µF for 1 section
1000pF to 0.33µF for 2 sections

Capacitance values:
E6 series (IEC 63 Norm)

Capacitance tolerances (measured at 1 kHz)**:**
±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:**
max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	C≤0.1µF	>0.1 µF
10	≤ 5	≤ 5
100	≤10	

Insulation resistance:

Test conditions

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

Performance
≥1x10^5 MΩ (Typ.value: 5x10^5 MΩ)

Test voltage between terminations:
2xV_R applied for 2 s at +25°C±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤5x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+85°C
Test duration:	1000 h
Voltage applied:	1.5xV_R

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤5x10^{-4} at 1kHz
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|:	≤1%
DF change (Δtgδ):	≤5x10^{-4} at 1kHz
Insulation resistance:	≥ initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

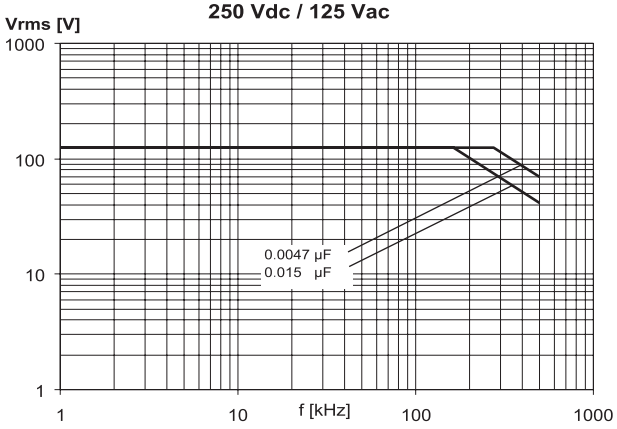
Performance
Capacitance change |ΔC/C|: ≤0.5%

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

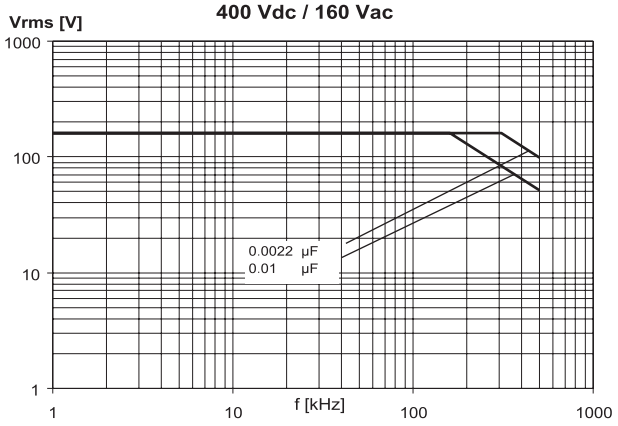
PRODUCT CODE: **A72**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

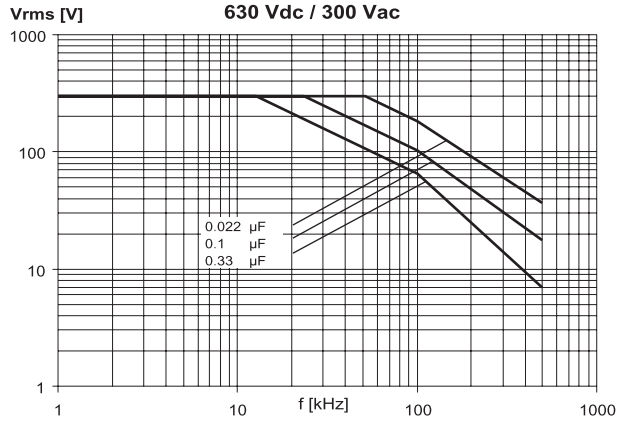
250 Vdc / 125 Vac



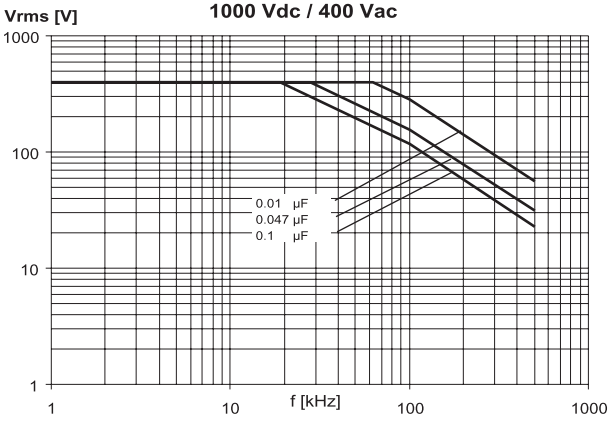
400 Vdc / 160 Vac



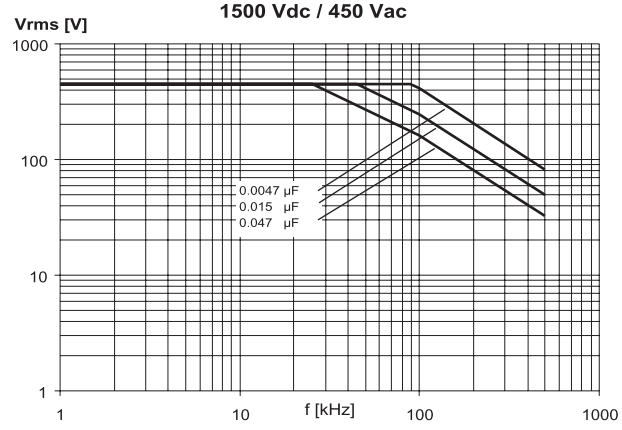
630 Vdc / 300 Vac



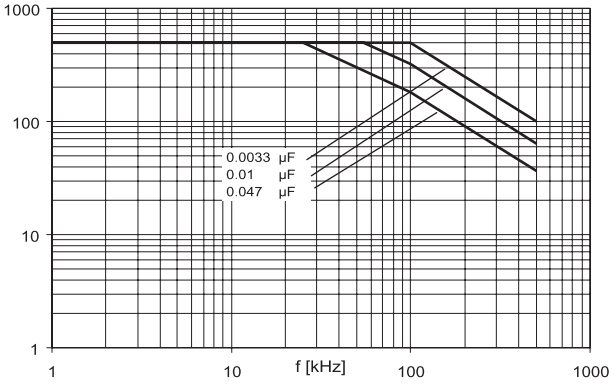
1000 Vdc / 400 Vac



1500 Vdc / 450 Vac



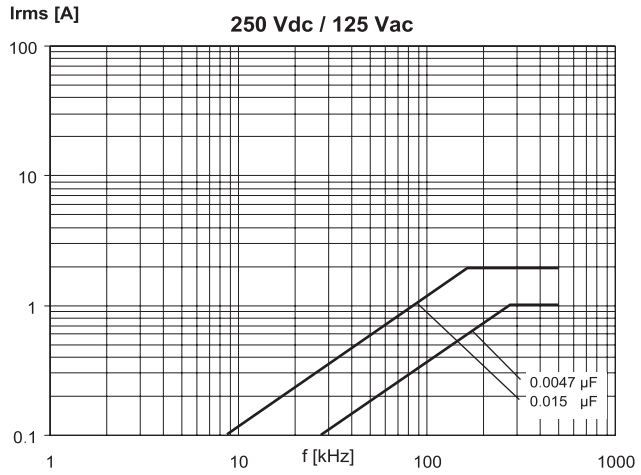
2000 Vdc / 500 Vac

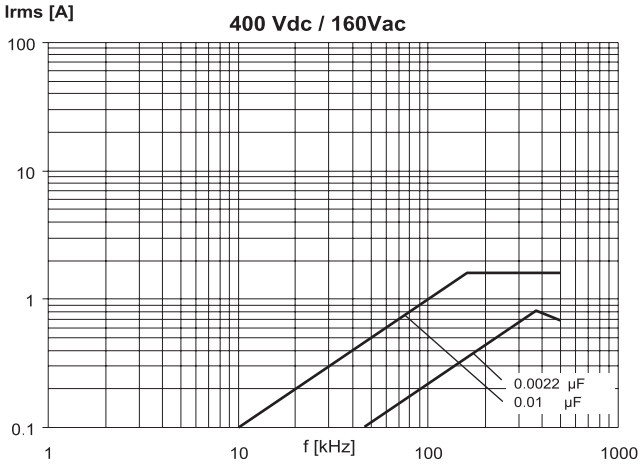


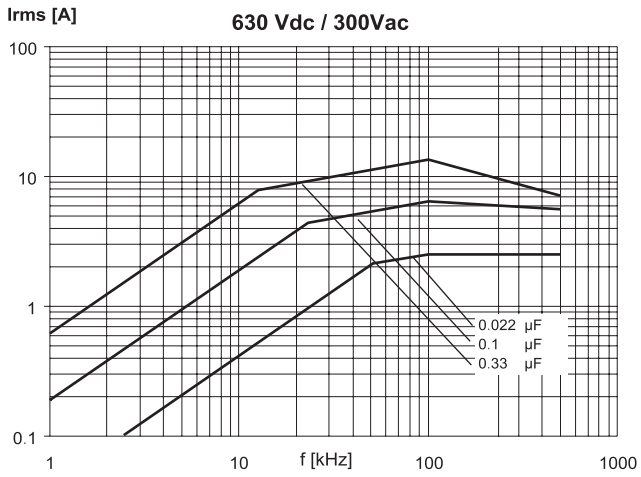
FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

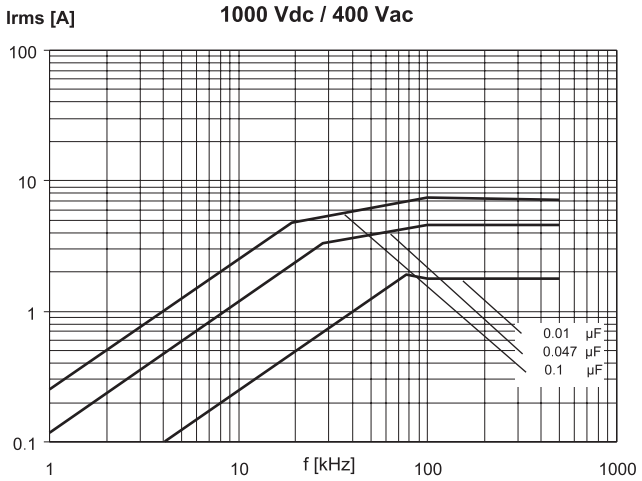
PRODUCT CODE: **A72**

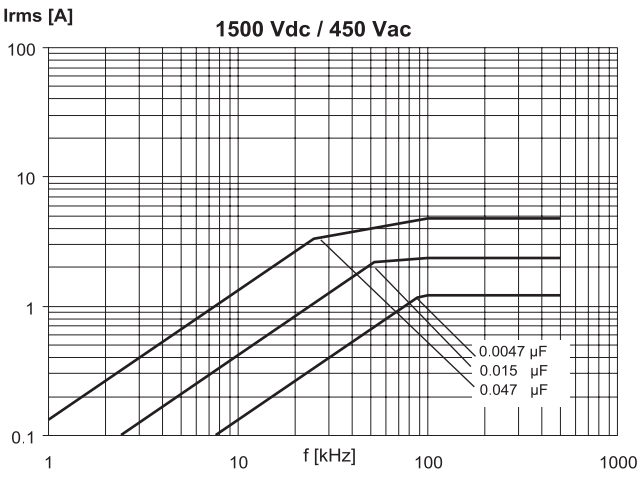
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

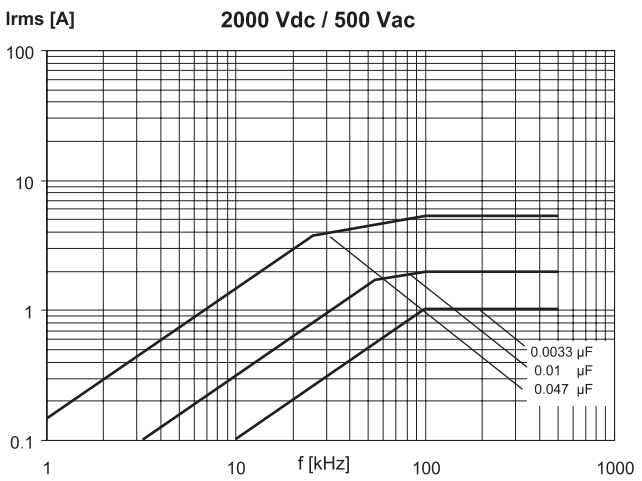












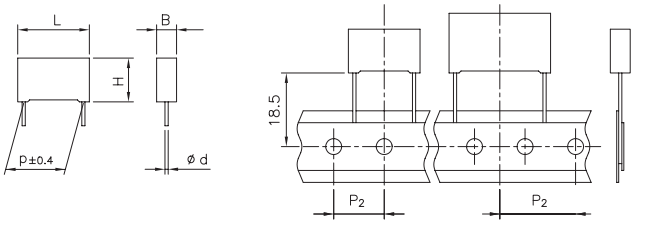
R71
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

Typical applications: P.F.C. (Power Factor Correction)
PRODUCT CODE: **R71**

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

*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

MKP Series

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, D.C. rated voltage.
Operating temperature range: -40 to +110°C
For temperatures between +105°C and 110°C a decreasing factor of 4% per degree C on the rated voltage V_R has to be applied.

ELECTRICAL CHARACTERISTICS

Capacitance range: 0.01µF to 22µF
Capacitance tolerances (measured at 1 kHz)**:**
±5% (J) ±10% (K); ±20% (M);
Tolerance available upon requests

Total self-inductance (L)**:** (lead length ~2mm)

Pitch (mm)	10	15	22.5	27.5	37.5
L(nH) ≈	9	10	18	18	20

Dissipation factor (DF):
tgδx10^{-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 x 10^5 MΩ for C ≤0.33µF (5 x 10^5 MΩ)*
≥30000 s for C >0.33µF (150000 s)*
*Typical value

Test voltage between terminations:
1.6xV_R applied for 2 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
Capacitance change |ΔC/C|: ≤5%
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions
Temperature: +105°C±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_R

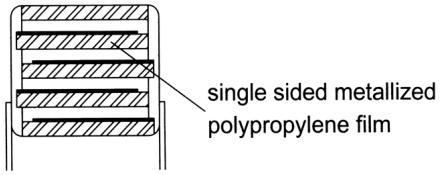
Performance
Capacitance change |ΔC/C|: ≤5%
Insulation resistance: ≥50% of initial limit.

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



R71

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

PRODUCT CODE: **R71**

Rated Cap.	420Vdc/220Vac Std dimensions B	H	L	p	Ø d (mm)	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.010 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 2100--0--
0.015 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 2150--0--
0.022 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 2220--0--
0.033 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 2330--0--
0.047 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 2470--0--
0.068 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 2680--3--
0.10 µF	4.0	9.0	13.0	10.0	0.6	250	210 E3	R71MF 3100--3--
0.15 µF	5.0	11.0	13.0	10.0	0.6	250	210 E3	R71MF 3150--3--
0.22 µF	6.0	12.0	13.0	10.0	0.6	250	210 E3	R71MF 3220--3--
0.10 µF	5.0	11.0	18.0	15.0	0.6	160	134 E3	R71MI 3100--0--
0.15 µF	5.0	11.0	18.0	15.0	0.6	160	134 E3	R71MI 3150--0--
0.22 µF	5.0	11.0	18.0	15.0	0.6	160	134 E3	R71MI 3220--0--
0.33 µF	6.0	12.0	18.0	15.0	0.6	160	134 E3	R71MI 3330--0--
0.47 µF	7.5	13.5	18.0	15.0	0.6	160	134 E3	R71MI 3470--0--
0.47 µF	6.0	17.5	18.0	15.0	0.6	160	134 E3	R71MI 3470--1--
0.47 µF	9.0	12.5	18.0	15.0	0.6	160	134 E3	R71MI 3470--2--
0.68 µF	6.0	17.5	18.0	15.0	0.6	160	134 E3	R71MI 3680--4--
0.68 µF	8.5	14.5	18.0	15.0	0.6	160	134 E3	R71MI 3680--3--
0.68 µF	13.0	12.0	18.0	15.0	0.8	160	134 E3	R71MI 3680--2--
1.0 µF	7.5	18.5	18.0	15.0	0.8	160	134 E3	R71MI 4100--4-M
1.0 µF	10.0	16.0	18.0	15.0	0.8	160	134 E3	R71MI 4100--3--
1.5 µF	11.0	19.0	18.0	15.0	0.8	160	134 E3	R71MI 4150--3-
0.22 µF	6.0	15.0	26.5	22.5	0.8	100	84 E3	R71MN 3220--0--
0.33 µF	6.0	15.0	26.5	22.5	0.8	100	84 E3	R71MN 3330--0--
0.47 µF	6.0	15.0	26.5	22.5	0.8	100	84 E3	R71MN 3470--0--
0.68 µF	6.0	15.0	26.5	22.5	0.8	100	84 E3	R71MN 3680--0--
1.0 µF	7.0	16.0	26.5	22.5	0.8	100	84 E3	R71MN 4100--3--
1.5 µF	8.5.	17.0	26.5	22.5	0.8	100	84 E3	R71MN 4150--3-M
1.5 µF	10.0	18.5	26.5	22.5	0.8	100	84 E3	R71MN 4150--0--
2.2 µF	10.0	18.5	26.5	22.5	0.8	100	84 E3	R71MN 4220--4-M
2.2 µF	11.0	20.0	26.5	22.5	0.8	100	84 E3	R71MN 4220--3--
3.3 µF	13.0	22.0	26.5	22.5	0.8	100	84 E3	R71MN 4330--3--
0.68 µF	9.0	17.0	32.0	27.5	0.8	80	67 E3	R71MR 3680--0--
1.0 µF	9.0	17.0	32.0	27.5	0.8	80	67 E3	R71MR 4100--0--
1.5 µF	11.0	20.0	32.0	27.5	0.8	80	67 E3	R71MR 4150--0--
2.2 µF	13.0	22.0	32.0	27.5	0.8	80	67 E3	R71MR 4220--0--
3.3 µF	14.0	28.0	32.0	27.5	0.8	80	67 E3	R71MR 4330--3--
4.7 µF	18.0	33.0	32.0	27.5	0.8	80	67 E3	R71MR 4470--0--
6.8 µF	22.0	37.0	32.0	27.5	0.8	80	67 E3	R71MR 4680--0--
3.3 µF	11.0	22.0	41.5	37.5	1.0	60	50 E3	R71MW 4330--0--
4.7 µF	16.0	28.5	41.5	37.5	1.0	60	50 E3	R71MW 4470--0--
6.8 µF	19.0	32.0	41.5	37.5	1.0	60	50 E3	R71MW 4680--0--
10.0 µF	20.0	40.0	41.5	37.5	1.0	60	50 E3	R71MW 5100--0--
15.0 µF	24.0	44.0	41.5	37.5	1.0	60	50 E3	R71MW 5150--0--
22.0 µF	30.0	45.0	41.5	37.5	1.0	60	50 E3	R71MW 5220--0--

Mechanical version and packaging
Internal use
Tolerance: K (±10%); M (±20%)

Rated Cap.	520Vdc/250Vac* Std dimensions B	H	L	p	Ø d (mm)	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.010 µF	4.0	9.0	13.0	10.0	0.6	300	312 E3	R71VF 2100--0--
0.015 µF	4.0	9.0	13.0	10.0	0.6	300	312 E3	R71VF 2150--0--
0.022 µF	4.0	9.0	13.0	10.0	0.6	300	312 E3	R71VF 2220--0--
0.033 µF	4.0	9.0	13.0	10.0	0.6	300	312 E3	R71VF 2330--0--
0.047 µF	4.0	9.0	13.0	10.0	0.6	300	312 E3	R71VF 2470--3--
0.068 µF	4.0	9.0	13.0	10.0	0.6	300	312 E3	R71VF 2680--3--
0.10 µF	5.0	11.0	13.0	10.0	0.6	300	312 E3	R71VF 3100--3--
0.15 µF	6.0	12.0	13.0	10.0	0.6	300	312 E3	R71VF 3150--3--
0.10 µF	5.0	11.0	18.0	15.0	0.6	200	208 E3	R71VI 3100--0--
0.15 µF	5.0	11.0	18.0	15.0	0.6	200	208 E3	R71VI 3150--3--
0.22 µF	6.0	12.0	18.0	15.0	0.6	200	208 E3	R71VI 3220--3--
0.22 µF	6.0	17.5	18.0	15.0	0.6	200	208 E3	R71VI 3220--1--
0.33 µF	6.0	17.5	18.0	15.0	0.6	200	208 E3	R71VI 3330--4--
0.33 µF	7.5	13.5	18.0	15.0	0.6	200	208 E3	R71VI 3330--3--
0.33 µF	9.0	12.5	18.0	15.0	0.6	200	208 E3	R71VI 3330--2--
0.47 µF	8.5	14.5	18.0	15.0	0.6	200	208 E3	R71VI 3470--3--
0.47 µF	7.5	18.5	18.0	15.0	0.8	200	208 E3	R71VI 3470--1--
0.47 µF	13.0	12.0	18.0	15.0	0.8	200	208 E3	R71VI 3470--2--
0.68 µF	10.0	16.0	18.0	15.0	0.8	200	208 E3	R71VI 3680--3--
1.0 µF	11.0	19.0	18.0	15.0	0.8	200	208 E3	R71VI 4100--3-M
0.22 µF	6.0	15.0	26.5	22.5	0.8	120	125 E3	R71VN 3220--0--
0.33 µF	6.0	15.0	26.5	22.5	0.8	120	125 E3	R71VN 3330--0--
0.47 µF	6.0	15.0	26.5	22.5	0.8	120	125 E3	R71VN 3470--3--
0.68 µF	7.0	16.0	26.5	22.5	0.8	120	125 E3	R71VN 3680--3--
1.0 µF	10.0	18.5	26.5	22.5	0.8	120	125 E3	R71VN 4100--3--
1.5 µF	11.0	20.0	26.5	22.5	0.8	120	125 E3	R71VN 4150--3--
2.2 µF	13.0	22.0	26.5	22.5	0.8	120	125 E3	R71VN 4220--3--
0.68 µF	9.0	17.0	32.0	27.5	0.8	100	104 E3	R71VR 3680--0--
1.0 µF	9.0	17.0	32.0	27.5	0.8	100	104 E3	R71VR 4100--3--
1.0 µF	11.0	20.0	32.0	27.5	0.8	100	104 E3	R71VR 4100--0--
1.5 µF	11.0	20.0	32.0	27.5	0.8	100	104 E3	R71VR 4150--0--
2.2 µF	13.0	25.0	32.0	27.5	0.8	100	104 E3	R71VR 4220--3--
2.2 µF	14.0	28.0	32.0	27.5	0.8	100	104 E3	R71VR 4220--0--
3.3 µF	14.0	28.0	32.0	27.5	0.8	100	104 E3	R71VR 4330--3--
3.3 µF	18.0	33.0	32.0	27.5	0.8	100	104 E3	R71VR 4330--0--
4.7 µF	18.0	33.0	32.0	27.5	0.8	100	104 E3	R71VR 4470--3--
4.7 µF	22.0	37.0	32.0	27.5	0.8	100	104 E3	R71VR 4470--0--
6.8 µF	22.0	37.0	32.0	27.5	0.8	100	104 E3	R71VR 4680--3--
2.2 µF	11.0	22.0	41.5	37.5	1.0	70	73 E3	R71VW 4220--0--
3.3 µF	13.0	24.0	41.5	37.5	1.0	70	73 E3	R71VW 4330--3--
3.3 µF	16.0	28.5	41.5	37.5	1.0	70	73 E3	R71VW 4330--0--
4.7 µF	16.0	28.5	41.5	37.5	1.0	70	73 E3	R71VW 4470--0--
6.8 µF	19.0	32.0	41.5	37.5	1.0	70	73 E3	R71VW 4680--3--
6.8 µF	20.0	40.0	41.5	37.5	1.0	70	73 E3	R71VW 4680--0--
10.0 µF	20.0	40.0	41.5	37.5	1.0	70	73 E3	R71VW 5100--3--
10.0 µF	24.0	44.0	41.5	37.5	1.0	70	73 E3	R71VW 5100--0--
15.0 µF	24.0	44.0	41.5	37.5	1.0	70	73 E3	R71VW 5150--3--
15.0 µF	30.0	45.0	41.5	37.5	1.0	70	73 E3	R71VW 5150--0--
22.0 µF	30.0	45.0	41.5	37.5	1.0	70	73 E3	R71VW 5220--0--

Mechanical version and packaging
Internal use
Tolerance: K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitors may work at higher dv/dt. In this case the maximum value allowed is obtained multiplyng the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristics K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors at page 145.

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Fig. (No.)	Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		12.70	2	10.0/15.0	DQ
AMMO-PACK		19.05	3	22.5	DQ
REEL Ø 355mm		12.70	2	10.0/15.0	GY
REEL Ø 500mm		12.70	2	10.0/15.0	CK
REEL Ø 500mm		19.05	3	22.5/27.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads (p≥15mm)	30^{+5} $25^{+2/-1}$				40 50

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

METALLIZED POLYPROPYLENE FILM CAPACITOR

PRODUCT CODE: **R71**

Rated Cap.	630Vdc/275Vac* Std dimensions				Ø d	Max dv/dt	Max K_0	Part Number
	B	H	L	p	(mm)	(V/µs)	(V^2/µs)	
0.010 µF	4.0	9.0	13.0	10.0	0.6	400	504 E3	R71PF 2100--3--
0.015 µF	4.0	9.0	13.0	10.0	0.6	400	504 E3	R71PF 2150--3--
0.022 µF	4.0	9.0	13.0	10.0	0.6	400	504 E3	R71PF 2220--3--
0.033 µF	5.0	11.0	13.0	10.0	0.6	400	504 E3	R71PF 2330--0--
0.047 µF	5.0	11.0	13.0	10.0	0.6	400	504 E3	R71PF 2470--3--
0.068 µF	6.0	12.0	13.0	10.0	0.6	400	504 E3	R71PF 2680--3--
0.1 µF	6.0	12.0	13.0	10.0	0.6	400	504 E3	R71PF 3100--3-M
0.010 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 2100--0--
0.015 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 2150--0--
0.022 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 2220--0--
0.033 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 2330--0--
0.047 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 2470--0--
0.068 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 2680--0--
0.10 µF	5.0	11.0	18.0	15.0	0.6	250	315 E3	R71PI 3100--3--
0.15 µF	6.0	12.0	18.0	15.0	0.6	250	315 E3	R71PI 3150--3--
0.15 µF	6.0	17.5	18.0	15.0	0.6	250	315 E3	R71PI 3150--4--
0.22 µF	7.5	13.5	18.0	15.0	0.6	250	315 E3	R71PI 3220--3--
0.22 µF	6.0	17.5	18.0	15.0	0.6	250	315 E3	R71PI 3220--1--
0.22 µF	9.0	12.5	18.0	15.0	0.6	250	315 E3	R71PI 3220--2--
0.33 µF	8.5	14.5	18.0	15.0	0.6	250	315 E3	R71PI 3330--3--
0.33 µF	7.5	18.5	18.0	15.0	0.8	250	315 E3	R71PI 3330--1--
0.33 µF	9.0	12.5	18.0	15.0	0.6	250	315 E3	R71PI 3330--4-M
0.33 µF	13.0	12.0	18.0	15.0	0.8	250	315 E3	R71PI 3330--2--
0.47 µF	7.5	18.5	18.0	15.0	0.8	250	315 E3	R71PI 3470--4-M
0.47 µF	10.0	16.0	18.0	15.0	0.8	250	315 E3	R71PI 3470--3-M
0.68 µF	11.0	19.0	18.0	15.0	0.8	250	315 E3	R71PI 3680--3-M
0.15 µF	6.0	15.0	26.5	22.5	0.8	160	202 E3	R71PN 3150--0--
0.22 µF	6.0	15.0	26.5	22.5	0.8	160	202 E3	R71PN 3220--0--
0.33 µF	6.0	15.0	26.5	22.5	0.8	160	202 E3	R71PN 3330--3--
0.47 µF	7.0	16.0	26.5	22.5	0.8	160	202 E3	R71PN 3470--3--
0.68 µF	10.0	18.5	26.5	22.5	0.8	160	202 E3	R71PN 3680--3--
1.0 µF	10.0	18.5	26.5	22.5	0.8	160	202 E3	R71PN 4100--4-M
1.0 µF	11.0	20.0	26.5	22.5	0.8	160	202 E3	R71PN 4100--3--
0.68 µF	9.0	17.0	32.0	27.5	0.8	115	145 E3	R71PR 3680--0--
1.0 µF	11.0	20.0	32.0	27.5	0.8	115	145 E3	R71PR 4100--0--
1.5 µF	13.0	22.0	32.0	27.5	0.8	115	145 E3	R71PR 4150--0--
2.2 µF	14.0	28.0	32.0	27.5	0.8	115	145 E3	R71PR 4220--0--
3.3 µF	18.0	33.0	32.0	27.5	0.8	115	145 E3	R71PR 4330--0--
4.7 µF	22.0	37.0	32.0	27.5	0.8	115	145 E3	R71PR 4470--0--
1.5 µF	11.0	22.0	41.5	37.5	1.0	80	100 E3	R71PW 4150--0--
2.2 µF	13.0	24.0	41.5	37.5	1.0	80	100 E3	R71PW 4220--0--
3.3 µF	16.0	28.5	41.5	37.5	1.0	80	100 E3	R71PW 4330--0--
4.7 µF	19.0	32.0	41.5	37.5	1.0	80	100 E3	R71PW 4470--0--
6.8 µF	20.0	40.0	41.5	37.5	1.0	80	100 E3	R71PW 4680--0--
10.0 µF	24.0	44.0	41.5	37.5	1.0	80	100 E3	R71PW 5100--0--
15.0 µF	30.0	45.0	41.5	37.5	1.0	80	100 E3	R71PW 5150--0--

Mechanical version and packaging (table 1)
Internal use
Tolerance: K (±10%); M (±20%)

All dimensions are in mm.

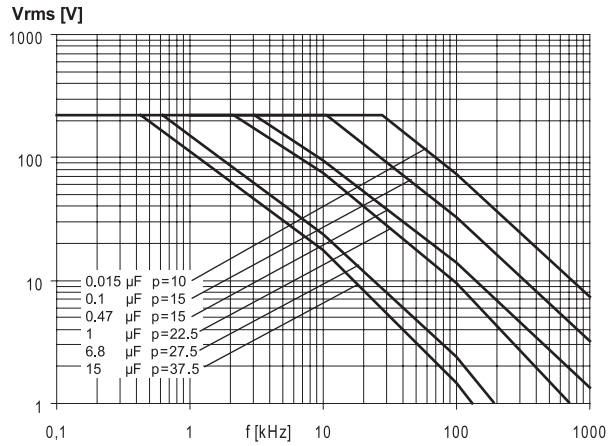
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitors may work at higher dv/dt. In this case the maximum value allowed is obtained multiplyng the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristics K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors at page 145.

Rated Cap.	1000Vdc/275Vac* Std dimensions				Ø d	Max dv/dt	Max K_0	Part Number
	B	H	L	p	(mm)	(V/µs)	(V^2/µs)	
0.22 µF	9.0	17.0	32.0	27.5	0.8	180	360 E3	R71QR3220--0--
0.27 µF	9.0	17.0	32.0	27.5	0.8	180	360 E3	R71QR3270--0--
0.33 µF	9.0	17.0	32.0	27.5	0.8	180	360 E3	R71QR3330--1--
0.33 µF	11.0	20.0	32.0	27.5	0.8	180	360 E3	R71QR3330--0--
0.39 µF	9.0	17.0	32.0	27.5	0.8	180	360 E3	R71QR3390--1--
0.39 µF	11.0	20.0	32.0	27.5	0.8	180	360 E3	R71QR3390--0--
0.47 µF	9.0	17.0	32.0	27.5	0.8	180	360 E3	R71QR3470--1--
0.47 µF	13.0	22.0	32.0	27.5	0.8	180	360 E3	R71QR3470--0--
0.56 µF	9.0	17.0	32.0	27.5	0.8	180	360 E3	R71QR3560--1--
0.56 µF	13.0	22.0	32.0	27.5	0.8	180	360 E3	R71QR3560--0--
0.68 µF	11.0	20.0	32.0	27.5	0.8	180	360 E3	R71QR3680--1--
0.68 µF	14.0	28.0	32.0	27.5	0.8	180	360 E3	R71QR3680--0--
0.82 µF	11.0	20.0	32.0	27.5	0.8	180	360 E3	R71QR3820--1--
0.82 µF	14.0	28.0	32.0	27.5	0.8	180	360 E3	R71QR3820--0--
1.0 µF	13.0	22.0	32.0	27.5	0.8	180	360 E3	R71QR4100--1--
1.0 µF	18.0	33.0	32.0	27.5	0.8	180	360 E3	R71QR4100--0--
1.2 µF	13.0	25.0	32.0	27.5	0.8	180	360 E3	R71QR4120--1--
1.2 µF	18.0	33.0	32.0	27.5	0.8	180	360 E3	R71QR4120--0--
1.5 µF	14.0	28.0	32.0	27.5	0.8	180	360 E3	R71QR4150--1--
1.5 µF	18.0	33.0	32.0	27.5	0.8	180	360 E3	R71QR4150--0--
1.8 µF	14.0	28.0	32.0	27.5	0.8	180	360 E3	R71QR4180--1--
1.8 µF	22.0	37.0	32.0	27.5	0.8	180	360 E3	R71QR4180--0--
2.2 µF	18.0	33.0	32.0	27.5	0.8	180	360 E3	R71QR4220--1--
2.2 µF	22.0	37.0	32.0	27.5	0.8	180	360 E3	R71QR4220--0--
2.7 µF	18.0	33.0	32.0	27.5	0.8	180	360 E3	R71QR4270--1--
3.3 µF	22.0	37.0	32.0	27.5	0.8	180	360 E3	R71QR4330--1--
3.9 µF	22.0	37.0	32.0	27.5	0.8	180	360 E3	R71QR4390--1--
0.68 µF	11.0	22.0	41.5	37.5	1.0	150	300 E3	R71QW3680--0--
0.82 µF	13.0	24.0	41.5	37.5	1.0	150	300 E3	R71QW3820--0--
1.0 µF	11.0	22.0	41.5	37.5	1.0	150	300 E3	R71QW4100--1--
1.0 µF	13.0	24.0	41.5	37.5	1.0	150	300 E3	R71QW4100--0--
1.2 µF	11.0	22.0	41.5	37.5	1.0	150	300 E3	R71QW4120--1--
1.2 µF	16.0	28.5	41.5	37.5	1.0	150	300 E3	R71QW4120--0--
1.5 µF	11.0	22.0	41.5	37.5	1.0	150	300 E3	R71QW4150--1--
1.5 µF	16.0	28.5	41.5	37.5	1.0	150	300 E3	R71QW4150--0--
1.8 µF	13.0	24.0	41.5	37.5	1.0	150	300 E3	R71QW4180--1--
1.8 µF	19.0	32.0	41.5	37.5	1.0	150	300 E3	R71QW4180--0--
2.2 µF	16.0	28.5	41.5	37.5	1.0	120	240 E3	R71QW4220--1--
2.2 µF	19.0	32.0	41.5	37.5	1.0	120	240 E3	R71QW4220--0--
2.7 µF	16.0	28.5	41.5	37.5	1.0	120	240 E3	R71QW4270--1--
2.7 µF	20.0	40.0	41.5	37.5	1.0	120	240 E3	R71QW4270--0--
3.3 µF	19.0	32.0	41.5	37.5	1.0	120	240 E3	R71QW4330--1--
3.3 µF	24.0	44.0	41.5	37.5	1.0	120	240 E3	R71QW4330--0--
3.9 µF	19.0	32.0	41.5	37.5	1.0	120	240 E3	R71QW4390--1--
3.9 µF	24.0	44.0	41.5	37.5	1.0	120	240 E3	R71QW4390--0--
4.7 µF	20.0	40.0	41.5	37.5	1.0	80	160 E3	R71QW4470--1--
4.7 µF	24.0	44.0	41.5	37.5	1.0	80	160 E3	R71QW4470--0--
5.6 µF	20.0	40.0	41.5	37.5	1.0	80	160 E3	R71QW4560--1--
5.6 µF	30.0	45.0	41.5	37.5	1.0	80	160 E3	R71QW4560--0--
6.8 µF	24.0	44.0	41.5	37.5	1.0	80	160 E3	R71QW4680--1--
8.2 µF	24.0	44.0	41.5	37.5	1.0	80	160 E3	R71QW4820--1--
10.0 µF	30.0	45.0	41.5	37.5	1.0	80	160 E3	R71QW5100--1--

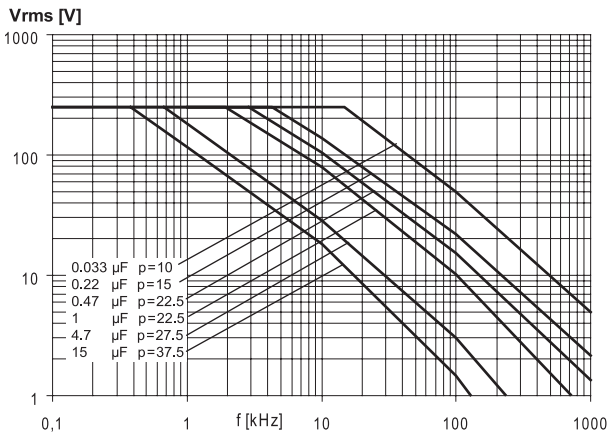
Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

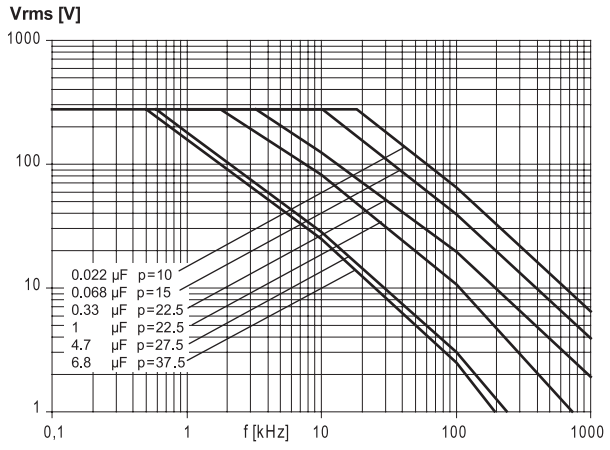
420Vdc / 220Vac



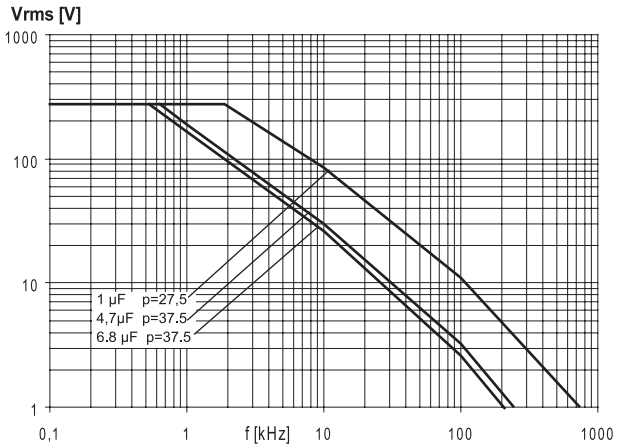
520Vdc / 250Vac



630Vdc / 275Vac



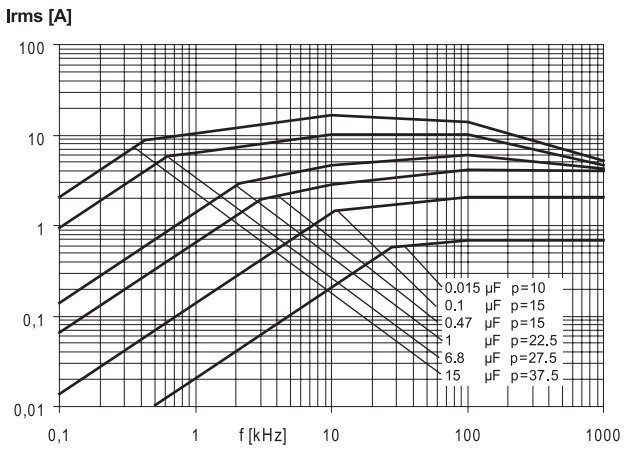
1000Vdc / 275Vac



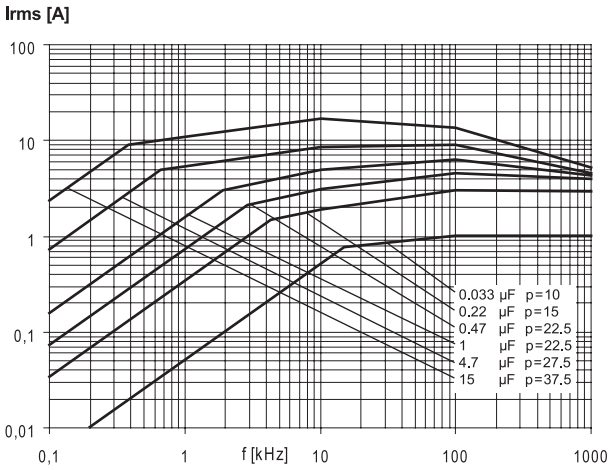
Note: p (pitch) in mm.

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

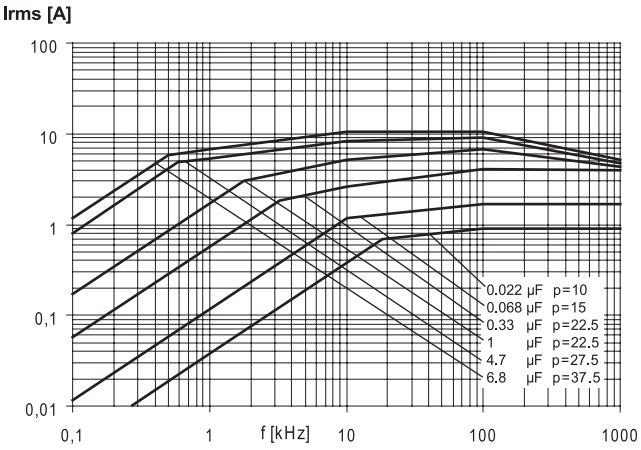
420Vdc / 220Vac



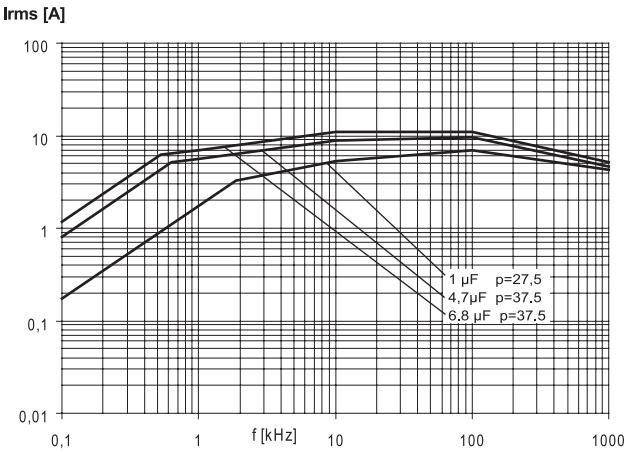
520Vdc / 250Vac



630Vdc / 275Vac



1000Vdc / 275Vac



Note: p (pitch) in mm.

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

Typical applications: deflection circuits in TV-sets (fly-back tuning), switching spikes suppression in SMPS, SNUBBER and SCR commutating circuits, switching circuit in electronic ballasts, applications with high voltage and very high current.

PRODUCT CODE: **R73**

PLEASE USE SERIES R76 OR R77 INSTEAD

Loose

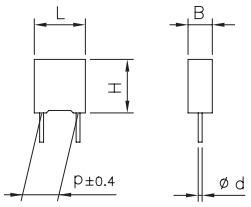
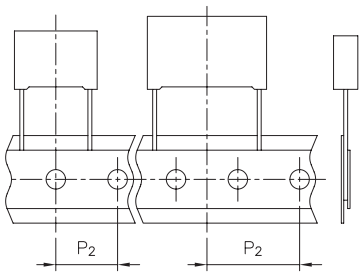


Fig. 1 Fig. 2

Taped



Ød±0.05	15 ≤ p ≤27.5	p = 37.5
	0.8	1.0

All dimensions are in mm

Pitch	Box thickness	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	3										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
for 1 section
E = 100V G = 160V I = 250V
M = 400V
for 2 sections
P = 630V Q = 1000V R = 1250V
T = 1600V U = 2000V

Digit 5 Pitch:
I = 15 mm; N = 22.5mm;
R = 27.5mm; W= 37.5mm.

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use.

Digit 14 Capacitance tolerance:
H=2.5% (*); J=5%; K=10%
(*) Only for 2 sections.

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: metal foil for 1 section.
metal foil + metallized film for 2 sections.

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: capacitance, tolerance, D.C. rated voltage, manufacturer's logo, series (R73), dielectric code (KP), manufacturing date code.

Climatic category: 55/105/56 IEC 60068-1

Operating temperature range: -55 to +105°C

Related documents: IEC 60384-13

Table 1 (for more detailed information, please refer to page 14.)

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

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

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

PRODUCT CODE: **R73**

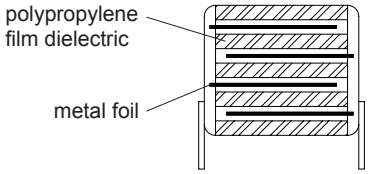
Rated Cap.	100Vdc / 63Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.047 µF	5.0	11.0	18.0	15.0	2400	0.48 E6	R73EI 2470--0--
0.068 µF	6.0	12.0	18.0	15.0	2400	0.48 E6	R73EI 2680--0--
0.10 µF	7.5	13.5	18.0	15.0	2400	0.48 E6	R73EI 3100--0--
0.15 µF	10.0	16.0	18.0	15.0	2400	0.48 E6	R73EI 3150--0--

Rated Cap.	160Vdc / 90Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.033 µF	5.0	11.0	18.0	15.0	3000	0.96 E6	R73GI 2330--0--
0.047 µF	6.0	12.0	18.0	15.0	3000	0.96 E6	R73GI 2470--0--
0.068 µF	7.5	13.5	18.0	15.0	3000	0.96 E6	R73GI 2680--0--
0.10 µF	10.0	16.0	18.0	15.0	3000	0.96 E6	R73GI 3100--0--

Rated Cap.	250Vdc / 125Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.015 µF	5.0	11.0	18.0	15.0	4800	2.4 E6	R73II 2150--0--
0.022 µF	6.0	12.0	18.0	15.0	4800	2.4 E6	R73II 2220--0--
0.033 µF	7.5	13.5	18.0	15.0	4800	2.4 E6	R73II 2330--0--
0.047 µF	10.0	16.0	18.0	15.0	4800	2.4 E6	R73II 2470--0--

Rated Cap.	400Vdc / 160Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.010 µF	5.0	11.0	18.0	15.0	6000	4.8 E6	R73MI 2100--0--
0.015 µF	6.0	12.0	18.0	15.0	6000	4.8 E6	R73MI 2150--0--
0.022 µF	7.5	13.5	18.0	15.0	6000	4.8 E6	R73MI 2220--0--
0.033 µF	8.5	14.5	18.0	15.0	6000	4.8 E6	R73MI 2330--0--
0.047 µF	10.0	16.0	18.0	15.0	6000	4.8 E6	R73MI 2470--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)



1 section
(100-160-250-400Vdc)

All dimensions are in mm.

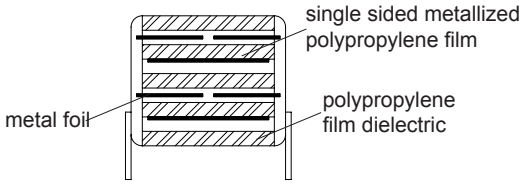
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

PRODUCT CODE: **R73**



2 sections
(630Vdc)

Rated Cap.	630Vdc / 300Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.010 µF	5.0	11.0	18.0	15.0	11000	14.0 E6	R73PI 2100--0--
0.012 µF	5.0	11.0	18.0	15.0	11000	14.0 E6	R73PI 2120--0--
0.015 µF	6.0	12.0	18.0	15.0	11000	14.0 E6	R73PI 2150--0--
0.018 µF	6.0	12.0	18.0	15.0	11000	14.0 E6	R73PI 2180--0--
0.022 µF	7.5	13.5	18.0	15.0	11000	14.0 E6	R73PI 2220--0--
0.027 µF	7.5	13.5	18.0	15.0	11000	14.0 E6	R73PI 2270--0--
0.033 µF	8.5	14.5	18.0	15.0	11000	14.0 E6	R73PI 2330--0--
0.039 µF	10.0	16.0	18.0	15.0	11000	14.0 E6	R73PI 2390--0--
0.047 µF	10.0	16.0	18.0	15.0	11000	14.0 E6	R73PI 2470--0--
0.039 µF	6.0	15.0	26.5	22.5	11000	14.0 E6	R73PN 2390--0--
0.047 µF	7.0	16.0	26.5	22.5	11000	14.0 E6	R73PN 2470--0--
0.056 µF	7.0	16.0	26.5	22.5	11000	14.0 E6	R73PN 2560--0--
0.068 µF	8.5	17.0	26.5	22.5	11000	14.0 E6	R73PN 2680--0--
0.082 µF	10.0	18.5	26.5	22.5	11000	14.0 E6	R73PN 2820--0--
0.10 µF	10.0	18.5	26.5	22.5	11000	14.0 E6	R73PN 3100--0--
0.10 µF	9.0	17.0	32.0	27.5	11000	14.0 E6	R73PR 3100--0--
0.12 µF	9.0	17.0	32.0	27.5	11000	14.0 E6	R73PR 3120--0--
0.15 µF	11.0	20.0	32.0	27.5	11000	14.0 E6	R73PR 3150--0--
0.18 µF	11.0	20.0	32.0	27.5	11000	14.0 E6	R73PR 3180--1--
0.18 µF	13.0	22.0	32.0	27.5	11000	14.0 E6	R73PR 3180--0--
0.22 µF	13.0	22.0	32.0	27.5	11000	14.0 E6	R73PR 3220--0--
0.27 µF	13.0	25.0	32.0	27.5	11000	14.0 E6	R73PR 3270--1--
0.33 µF	14.0	28.0	32.0	27.5	11000	14.0 E6	R73PR 3330--0--
0.39 µF	14.0	28.0	32.0	27.5	11000	14.0 E6	R73PR 3390--1--
0.39 µF	18.0	33.0	32.0	27.5	11000	14.0 E6	R73PR 3390--0--
0.47 µF	18.0	33.0	32.0	27.5	11000	14.0 E6	R73PR 3470--0--
0.56 µF	18.0	33.0	32.0	27.5	11000	14.0 E6	R73PR 3560--1--
0.56 µF	22.0	37.0	32.0	27.5	11000	14.0 E6	R73PR 3560--0--
0.68 µF	22.0	37.0	32.0	27.5	11000	14.0 E6	R73PR 3680--0--
0.82 µF	22.0	37.0	32.0	27.5	11000	14.0 E6	R73PR 3820--1--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);

Rated Cap.	630Vdc / 300Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.22 µF	11.0	22.0	41.5	37.5	3000	3.8 E6	R73PW3220--0--
0.27 µF	11.0	22.0	41.5	37.5	3000	3.8 E6	R73PW3270--0--
0.33 µF	11.0	22.0	41.5	37.5	3000	3.8 E6	R73PW3330--1--
0.33 µF	13.0	24.0	41.5	37.5	3000	3.8 E6	R73PW3330--0--
0.39 µF	13.0	24.0	41.5	37.5	3000	3.8 E6	R73PW3390--0--
0.47 µF	13.0	24.0	41.5	37.5	3000	3.8 E6	R73PW3470--1--
0.47 µF	16.0	28.5	41.5	37.5	3000	3.8 E6	R73PW3470--0--
0.56 µF	16.0	28.5	41.5	37.5	3000	3.8 E6	R73PW3560--0--
0.68 µF	16.0	28.5	41.5	37.5	3000	3.8 E6	R73PW3680--0--
0.82 µF	19.0	32.0	41.5	37.5	3000	3.8 E6	R73PW3820--0--
1.0 µF	20.0	40.0	41.5	37.5	3000	3.8 E6	R73PW4100--0--
1.2 µF	20.0	40.0	41.5	37.5	3000	3.8 E6	R73PW4120--0--
1.5 µF	24.0	44.0	41.5	37.5	3000	3.8 E6	R73PW4150--0--
1.8 µF	30.0	45.0	41.5	37.5	3000	3.8 E6	R73PW4180--0--
2.2 µF	30.0	45.0	41.5	37.5	3000	3.8 E6	R73PW4220--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);

All dimensions are in mm.

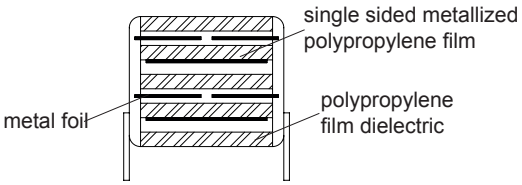
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS.

PRODUCT CODE: **R73**



2 sections
(1000Vdc)

Rated Cap.	1000Vdc / 400Vac Std dimensions				Max dv/dt	K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
3300 pF	5.0	11.0	18.0	15.0	28000	56 E6	R73QI 1330--3--
3900 pF	5.0	11.0	18.0	15.0	28000	56 E6	R73QI 1390--3--
4700 pF	5.0	11.0	18.0	15.0	28000	56 E6	R73QI 1470--3--
5600 pF	5.0	11.0	18.0	15.0	28000	56 E6	R73QI 1560--3--
6800 pF	5.0	11.0	18.0	15.0	28000	56 E6	R73QI 1680--3--
8200 pF	5.0	11.0	18.0	15.0	28000	56 E6	R73QI 1820--3--
0.010 µF	6.0	12.0	18.0	15.0	28000	56 E6	R73QI 2100--3--
0.012 µF	6.0	12.0	18.0	15.0	28000	56 E6	R73QI 2120--3--
0.015 µF	7.5	13.5	18.0	15.0	28000	56 E6	R73QI 2150--3--
0.018 µF	8.5	14.5	18.0	15.0	28000	56 E6	R73QI 2180--3--
0.022 µF	8.5	14.5	18.0	15.0	28000	56 E6	R73QI 2220--3--
0.027 µF	10.0	16.0	18.0	15.0	28000	56 E6	R73QI 2270--3--
0.015 µF	6.0	15.0	26.5	22.5	11000	22 E6	R73QN 2150--3--
0.018 µF	6.0	15.0	26.5	22.5	11000	22 E6	R73QN 2180--3--
0.022 µF	6.0	15.0	26.5	22.5	11000	22 E6	R73QN 2220--3--
0.027 µF	7.0	16.0	26.5	22.5	11000	22 E6	R73QN 2270--3--
0.033 µF	7.0	16.0	26.5	22.5	11000	22 E6	R73QN 2330--3--
0.039 µF	8.5	17.0	26.5	22.5	11000	22 E6	R73QN 2390--3--
0.047 µF	8.5	17.0	26.5	22.5	11000	22 E6	R73QN 2470--3--
0.056 µF	10.0	18.5	26.5	22.5	11000	22 E6	R73QN 2560--3--
0.068 µF	11.0	20.0	26.5	22.5	11000	22 E6	R73QN 2680--3--
0.047 µF	9.0	17.0	32.0	27.5	11000	22 E6	R73QR 2470--3--
0.056 µF	9.0	17.0	32.0	27.5	11000	22 E6	R73QR 2560--3--
0.068 µF	9.0	17.0	32.0	27.5	11000	22 E6	R73QR 2680--3--
0.082 µF	9.0	17.0	32.0	27.5	11000	22 E6	R73QR 2820--4--
0.082 µF	11.0	20.0	32.0	27.5	11000	22 e6	R73QR 2820--3--
0.10 µF	11.0	20.0	32.0	27.5	11000	22 E6	R73QR 3100--3--
0.12 µF	11.0	20.0	32.0	27.5	11000	22 E6	R73QR 3120--4--
0.12 µF	13.0	22.0	32.0	27.5	11000	22 E6	R73QR 3120--3--
0.15 µF	13.0	22.0	32.0	27.5	11000	22 E6	R73QR 3150--3--
0.18 µF	13.0	25.0	32.0	27.5	11000	22 E6	R73QR 3180--4--
0.22 µF	14.0	28.0	32.0	27.5	11000	22 E6	R73QR 3220--3--
0.27 µF	18.0	33.0	32.0	27.5	11000	22 E6	R73QR 3270--3--
0.33 µF	18.0	33.0	32.0	27.5	11000	22 E6	R73QR 3330--3--
0.47 µF	22.0	37.0	32.0	27.5	11000	22 E6	R73QR 3470--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%);

Rated Cap.	1000Vdc / 400Vac Std dimensions				Max dv/dt	K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.12 µF	11.0	22.0	41.5	37.5	4500	9 E6	R73QW3120--3--
0.15 µF	11.0	22.0	41.5	37.5	4500	9 E6	R73QW3150--3--
0.18 µF	11.0	22.0	41.5	37.5	4500	9 E6	R73QW3180--3--
0.22 µF	13.0	24.0	41.5	37.5	4500	9 E6	R73QW3220--3--
0.27 µF	13.0	24.0	41.5	37.5	4500	9 E6	R73QW3270--4--
0.27 µF	16.0	28.5	41.5	37.5	4500	9 E6	R73QW3270--3--
0.33 µF	16.0	28.5	41.5	37.5	4500	9 E6	R73QW3330--3--
0.39 µF	16.0	28.5	41.5	37.5	4500	9 E6	R73QW3390--3--
0.47 µF	19.0	32.0	41.5	37.5	4500	9 E6	R73QW3470--3--
0.56 µF	19.0	32.0	41.5	37.5	4500	9 E6	R73QW3560--3--
0.68 µF	20.0	40.0	41.5	37.5	4500	9 E6	R73QW3680--3--
0.82 µF	20.0	40.0	41.5	37.5	4500	9 E6	R73QW3820--3--
1.0 µF	24.0	44.0	41.5	37.5	4500	9 E6	R73QW4100--3--
1.2 µF	30.0	45.0	41.5	37.5	4500	9 E6	R73QW4120--3--
1.5 µF	30.0	45.0	41.5	37.5	4500	9 E6	R73QW4150--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%);

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

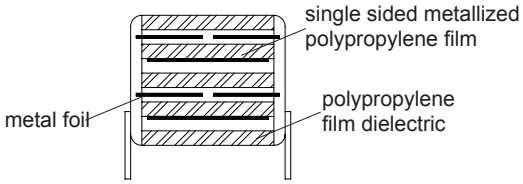
R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS.

PRODUCT CODE: **R73**

Rated Cap.	1250Vdc / 450Vac Std dimensions				Max dv/dt	K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
2200 pF	5.0	11.0	18.0	15.0	30000	75 E6	R73RI 1220--0--
2700 pF	5.0	11.0	18.0	15.0	30000	75 E6	R73RI 1270--0--
3300 pF	6.0	12.0	18.0	15.0	30000	75 E6	R73RI 1330--0--
3900 pF	6.0	12.0	18.0	15.0	30000	75 E6	R73RI 1390--0--
4700 pF	7.5	13.5	18.0	15.0	30000	75 E6	R73RI 1470--0--
5600 pF	7.5	13.5	18.0	15.0	30000	75 E6	R73RI 1560--0--
6800 pF	8.5	14.5	18.0	15.0	30000	75 E6	R73RI 1680--0--
8200 pF	10.0	16.0	18.0	15.0	30000	75 E6	R73RI 1820--0--
8200 pF	6.0	15.0	26.5	22.5	11000	27 E6	R73RN 1820--0--
0.010 µF	6.0	15.0	26.5	22.5	11000	27 E6	R73RN 2100--0--
0.012 µF	6.0	15.0	26.5	22.5	11000	27 E6	R73RN 2120--0--
0.015 µF	7.0	16.0	26.5	22.5	11000	27 E6	R73RN 2150--0--
0.018 µF	7.0	16.0	26.5	22.5	11000	27 E6	R73RN 2180--0--
0.022 µF	8.5	17.0	26.5	22.5	11000	27 E6	R73RN 2220--0--
0.027 µF	10.0	18.5	26.5	22.5	11000	27 E6	R73RN 2270--0--
0.033 µF	10.0	18.5	26.5	22.5	11000	27 E6	R73RN 2330--0--
0.039 µF	9.0	17.0	32.0	27.5	11000	27 E6	R73RR 2390--0--
0.047 µF	11.0	20.0	32.0	27.5	11000	27 E6	R73RR 2470--0--
0.056 µF	11.0	20.0	32.0	27.5	11000	27 E6	R73RR 2560--0--
0.068 µF	13.0	22.0	32.0	27.5	11000	27 E6	R73RR 2680--0--
0.082 µF	13.0	25.0	32.0	27.5	11000	27 E6	R73RR 2820--1--
0.10 µF	13.0	25.0	32.0	27.5	11000	27 E6	R73RR 3100--1--
0.12 µF	14.0	28.0	32.0	27.5	11000	27 E6	R73RR 3120--1--
0.12 µF	18.0	33.0	32.0	27.5	11000	27 E6	R73RR 3120--0--
0.15 µF	18.0	33.0	32.0	27.5	11000	27 E6	R73RR 3150--0--
0.18 µF	18.0	33.0	32.0	27.5	11000	27 E6	R73RR 3180--0--
0.22 µF	22.0	37.0	32.0	27.5	11000	27 E6	R73RR 3220--0--
0.082 µF	11.0	22.0	41.5	37.5	5500	14 E6	R73RW2820--0--
0.10 µF	11.0	22.0	41.5	37.5	5500	14 E6	R73RW3100--0--
0.12 µF	11.0	22.0	41.5	37.5	5500	14 E6	R73RW3120--1--
0.12 µF	13.0	24.0	41.5	37.5	5500	14 E6	R73RW3120--0--
0.15 µF	13.0	24.0	41.5	37.5	5500	14 E6	R73RW3150--0--
0.18 µF	13.0	24.0	41.5	37.5	5500	14 E6	R73RW3180--1--
0.18 µF	16.0	28.5	41.5	37.5	5500	14 E6	R73RW3180--0--
0.22 µF	16.0	28.5	41.5	37.5	5500	14 E6	R73RW3220--0--
0.27 µF	16.0	28.5	41.5	37.5	5500	14 E6	R73RW3270--0--
0.33 µF	19.0	32.0	41.5	37.5	5500	14 E6	R73RW3330--0--
0.39 µF	20.0	40.0	41.5	37.5	5500	14 E6	R73RW3390--0--
0.47 µF	20.0	40.0	41.5	37.5	5500	14 E6	R73RW3470--0--
0.56 µF	20.0	40.0	41.5	37.5	5500	14 E6	R73RW3560--0--
0.68 µF	24.0	44.0	41.5	37.5	5500	14 E6	R73RW3680--0--
0.82 µF	30.0	45.0	41.5	37.5	5500	14 E6	R73RW3820--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%);



2 sections
(1250Vdc)

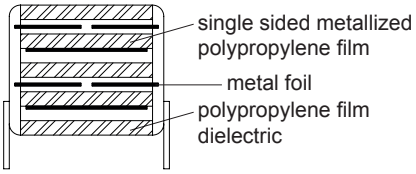
All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

PRODUCT CODE: **R73**



2 sections
(1600Vdc)

Rated Cap.	1600Vdc / 450Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
1000 pF	5.0	11.0	18.0	15.0	34000	109 E6	R73TI 1100--0--
1200 pF	5.0	11.0	18.0	15.0	34000	109 E6	R73TI 1120--0--
1500 pF	5.0	11.0	18.0	15.0	34000	109 E6	R73TI 1150--0--
1800 pF	5.0	11.0	18.0	15.0	34000	109 E6	R73TI 1180--0--
2200 pF	6.0	12.0	18.0	15.0	34000	109 E6	R73TI 1220--0--
2700 pF	6.0	12.0	18.0	15.0	34000	109 E6	R73TI 1270--0--
3300 pF	7.5	13.5	18.0	15.0	34000	109 E6	R73TI 1330--0--
3900 pF	7.5	13.5	18.0	15.0	34000	109 E6	R73TI 1390--0--
4700 pF	8.5	14.5	18.0	15.0	34000	109 E6	R73TI 1470--0--
5600 pF	10.0	16.0	18.0	15.0	34000	109 E6	R73TI 1560--0--
6800 pF	10.0	16.0	18.0	15.0	34000	109 E6	R73TI 1680--0--
5600 pF	6.0	15.0	26.5	22.5	11000	35 E6	R73TN 1560--0--
6800 pF	6.0	15.0	26.5	22.5	11000	35 E6	R73TN 1680--0--
8200 pF	6.0	15.0	26.5	22.5	11000	35 E6	R73TN 1820--0--
0.010 µF	6.0	15.0	26.5	22.5	11000	35 E6	R73TN 2100--0--
0.012 µF	7.0	16.0	26.5	22.5	11000	35 E6	R73TN 2120--0--
0.015 µF	8.5	17.0	26.5	22.5	11000	35 E6	R73TN 2150--0--
0.018 µF	8.5	17.0	26.5	22.5	11000	35 E6	R73TN 2180--0--
0.022 µF	10.0	18.5	26.5	22.5	11000	35 E6	R73TN 2220--0--
0.027 µF	9.0	17.0	32.0	27.5	11000	35 E6	R73TR 2270--0--
0.033 µF	11.0	20.0	32.0	27.5	11000	35 E6	R73TR 2330--0--
0.039 µF	11.0	20.0	32.0	27.5	11000	35 E6	R73TR 2390--0--
0.047 µF	13.0	22.0	32.0	27.5	11000	35 E6	R73TR 2470--0--
0.056 µF	13.0	22.0	32.0	27.5	11000	35 E6	R73TR 2560--0--
0.068 µF	14.0	28.0	32.0	27.5	11000	35 E6	R73TR 2680--1--
0.082 µF	14.0	28.0	32.0	27.5	11000	35 E6	R73TR 2820--0--
0.10 µF	18.0	33.0	32.0	27.5	11000	35 E6	R73TR 3100--0--
0.12 µF	18.0	33.0	32.0	27.5	11000	35 E6	R73TR 3120--0--
0.15 µF	22.0	37.0	32.0	27.5	11000	35 E6	R73TR 3150--0--
0.18 µF	22.0	37.0	32.0	27.5	11000	35 E6	R73TR 3180--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

Rated Cap.	1600Vdc / 450Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.033 µF	11.0	22.0	41.5	37.5	6500	21 E6	R73TW 2330--0--
0.039 µF	11.0	22.0	41.5	37.5	6500	21 E6	R73TW 2390--0--
0.047 µF	11.0	22.0	41.5	37.5	6500	21 E6	R73TW 2470--0--
0.056 µF	11.0	22.0	41.5	37.5	6500	21 E6	R73TW 2560--0--
0.068 µF	11.0	22.0	41.5	37.5	6500	21 E6	R73TW 2680--0--
0.082 µF	11.0	22.0	41.5	37.5	6500	21 E6	R73TW 2820--0--
0.10 µF	13.0	24.0	41.5	37.5	6500	21 E6	R73TW 3100--0--
0.12 µF	16.0	28.5	41.5	37.5	6500	21 E6	R73TW 3120--0--
0.15 µF	16.0	28.5	41.5	37.5	6500	21 E6	R73TW 3150--0--
0.18 µF	16.0	28.5	41.5	37.5	6500	21 E6	R73TW 3180--0--
0.22 µF	19.0	32.0	41.5	37.5	6500	21 E6	R73TW 3220--0--
0.27 µF	20.0	40.0	41.5	37.5	6500	21 E6	R73TW 3270--0--
0.33 µF	20.0	40.0	41.5	37.5	6500	21 E6	R73TW 3330--0--
0.39 µF	24.0	44.0	41.5	37.5	6500	21 E6	R73TW 3390--0--
0.47 µF	24.0	44.0	41.5	37.5	6500	21 E6	R73TW 3470--1--
0.47 µF	30.0	45.0	41.5	37.5	6500	21 E6	R73TW 3470--0--
0.56 µF	24.0	44.0	41.5	37.5	6500	21 E6	R73TW 3560--1--
0.56 µF	30.0	45.0	41.5	37.5	6500	21 E6	R73TW 3560--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

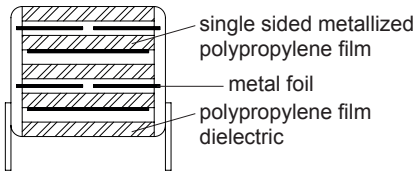
All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS

PRODUCT CODE: **R73**



2 sections
(2000Vdc)

Rated Cap.	2000Vdc / 500Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
100 pF	5.0	11.0	18.0	15.0	54000	216 E6	R73UI 0100--0--
150 pF	5.0	11.0	18.0	15.0	54000	216 E6	R73UI 0150--0--
220 pF	5.0	11.0	18.0	15.0	54000	216 E6	R73UI 0220--0--
330 pF	5.0	11.0	18.0	15.0	54000	216 E6	R73UI 0330--0--
470 pF	5.0	11.0	18.0	15.0	54000	216 E6	R73UI 0470--0--
680 pF	5.0	11.0	18.0	15.0	54000	216 E6	R73UI 0680--0--
1000 pF	6.0	12.0	18.0	15.0	54000	216 E6	R73UI 1100--0--
1200 pF	6.0	12.0	18.0	15.0	54000	216 E6	R73UI 1120--0--
1500 pF	7.5	13.5	18.0	15.0	54000	216 E6	R73UI 1150--0--
1800 pF	7.5	13.5	18.0	15.0	54000	216 E6	R73UI 1180--0--
2200 pF	8.5	14.5	18.0	15.0	54000	216 E6	R73UI 1220--0--
2700 pF	10.0	16.0	18.0	15.0	54000	216 E6	R73UI 1270--0--
2700 pF	6.0	15.0	26.5	22.5	11000	44 E6	R73UN 1270--0--
3300 pF	6.0	15.0	26.5	22.5	11000	44 E6	R73UN 1330--0--
3900 pF	6.0	15.0	26.5	22.5	11000	44 E6	R73UN 1390--0--
4700 pF	7.0	16.0	26.5	22.5	11000	44 E6	R73UN 1470--0--
5600 pF	7.0	16.0	26.5	22.5	11000	44 E6	R73UN 1560--0--
6800 pF	8.5	17.0	26.5	22.5	11000	44 E6	R73UN 1680--0--
8200 pF	8.5	17.0	26.5	22.5	11000	44 E6	R73UN 1820--0--
0.010 µF	10.0	18.5	26.5	22.5	11000	44 E6	R73UN 2100--0--
0.012 µF	11.0	20.0	26.5	22.5	11000	44 E6	R73UN 2120--0--
0.010 µF	9.0	17.0	32.0	27.5	11000	44 E6	R73UR 2100--0--
0.012 µF	9.0	17.0	32.0	27.5	11000	44 E6	R73UR 2120--0--
0.015 µF	11.0	20.0	32.0	27.5	11000	44 E6	R73UR 2150--0--
0.018 µF	13.0	22.0	32.0	27.5	11000	44 E6	R73UR 2180--0--
0.022 µF	13.0	22.0	32.0	27.5	11000	44 E6	R73UR 2220--0--
0.027 µF	14.0	28.0	32.0	27.5	11000	44 E6	R73UR 2270--1--
0.033 µF	14.0	28.0	32.0	27.5	11000	44 E6	R73UR 2330--1-
0.033 µF	18.0	33.0	32.0	27.5	11000	44 E6	R73UR 2330--0--
0.039 µF	18.0	33.0	32.0	27.5	11000	44 E6	R73UR 2390--0--
0.047 µF	18.0	33.0	32.0	27.5	11000	44 E6	R73UR 2470--0--
0.056 µF	22.0	37.0	32.0	27.5	11000	44 E6	R73UR 2560--0--
0.068 µF	22.0	37.0	32.0	27.5	11000	44 E6	R73UR 2680--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

Rated Cap.	2000Vdc / 500Vac Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.018 µF	11.0	22.0	41.5	37.5	9000	36 E6	R73UW 2180--0--
0.022 µF	11.0	22.0	41.5	37.5	9000	36 E6	R73UW 2220--0--
0.027 µF	11.0	22.0	41.5	37.5	9000	36 E6	R73UW 2270--0--
0.033 µF	13.0	24.0	41.5	37.5	9000	36 E6	R73UW 2330--0--
0.039 µF	13.0	24.0	41.5	37.5	9000	36 E6	R73UW 2390--0--
0.047 µF	16.0	28.5	41.5	37.5	9000	36 E6	R73UW 2470--0--
0.056 µF	16.0	28.5	41.5	37.5	9000	36 E6	R73UW 2560--0--
0.068 µF	16.0	28.5	41.5	37.5	9000	36 E6	R73UW 2680--0--
0.082 µF	19.0	32.0	41.5	37.5	9000	36 E6	R73UW 2820--0--
0.10 µF	20.0	40.0	41.5	37.5	9000	36 E6	R73UW 3100--0--
0.12 µF	20.0	40.0	41.5	37.5	9000	36 E6	R73UW 3120--0--
0.15 µF	24.0	44.0	41.5	37.5	9000	36 E6	R73UW 3150--0--
0.18 µF	30.0	45.0	41.5	37.5	9000	36 E6	R73UW 3180--0--
0.22 µF	30.0	45.0	41.5	37.5	9000	36 E6	R73UW 3220--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

R73
KP Series

FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS.

PRODUCT CODE: **R73**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
100 Vdc - 160 Vdc - 250 Vdc - 400 Vdc
for 1 section.
630 Vdc - 1000 Vdc - 1250 Vdc - 1600 Vdc - 2000 Vdc
for 2 sections.

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.), has to be applied.

Capacitance range
0.010µF to 0.15µF 1 section
100pF to 2.2 µF 2 sections

Capacitance values:
E6 series (IEC 60063 Norm)
for 1 section and 2 sections (values <1nF)
E12 series (IEC 60063 Norm)
for 2 sections (values >1nF)

Capacitance tolerances (measured at 1 kHz):
±5% (J); ±10% (K) for 1 section
±2.5% (H); ±5% (J); ±10% (K) for 2 sections

Total self inductance (L):
(Leads length ~2 mm)

Pitch (mm)	15	22.5	27.5	37.5
L (nH) ≈	10	18	18	20

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	C≤0.1µF	0.1µF<C≤1.0µF	C>1µF
1	≤ 3	≤3	≤3
10	≤ 4	≤6	
100	≤10		

Insulation resistance:

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

Performance
≥1x10^5 MΩ for C≤0.33µF (5x10^5 MΩ)*
≥30000 s for C>0.33µF (150000 s)*
*Typical value

Test voltage between terminations:
2.5xV_R for 1 section
2.0xV_R for 2 sections
applied for 2 s at 25°C± 5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

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

Performance
Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤5x10^{-4} at 1KHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions
Temperature: +85°C±2°C
Test duration: 1000 h
Voltage applied: 1.5xV_R

Performance
Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤5x10^{-4} at 1KHz
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| ≤1%
DF change (Δtgδ): ≤5x10^{-4} at 1KHz
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**
Storage: standard environmental conditions (see page 12).

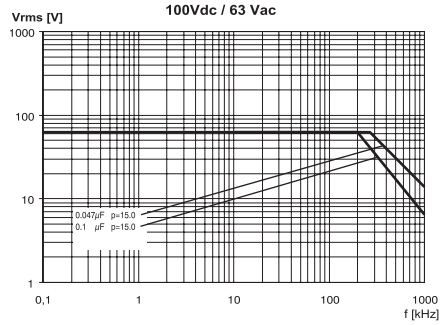
Performance
Capacitance change |ΔC/C|: ≤0.5%

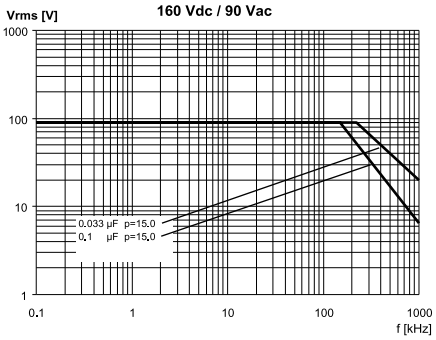
R73
KP Series

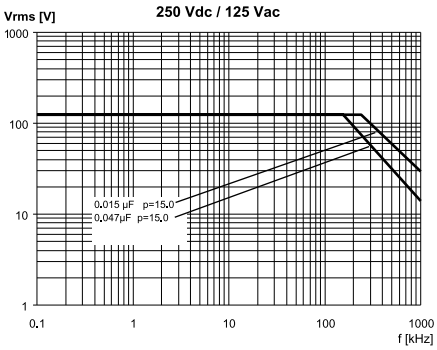
FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS.

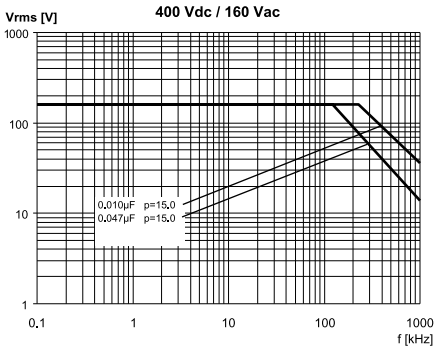
PRODUCT CODE: **R73**

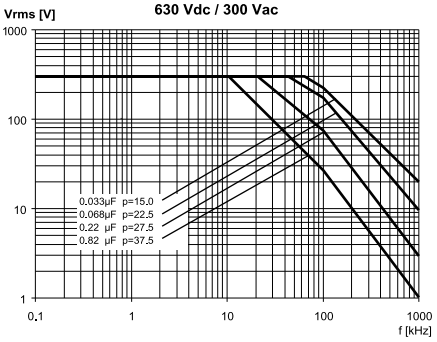
MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

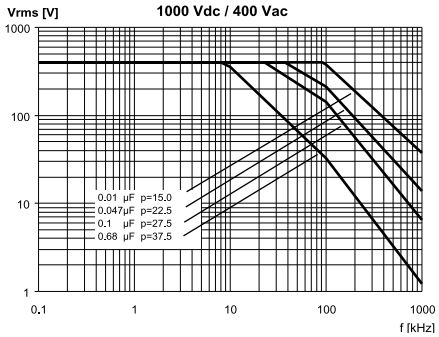


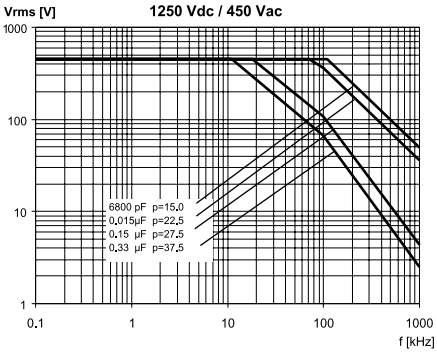


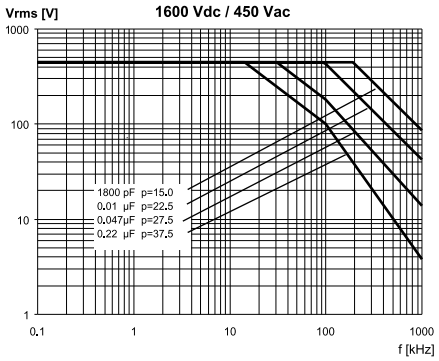


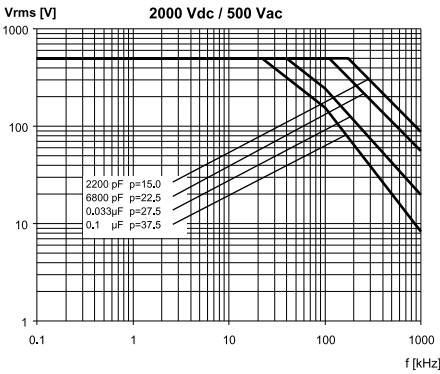










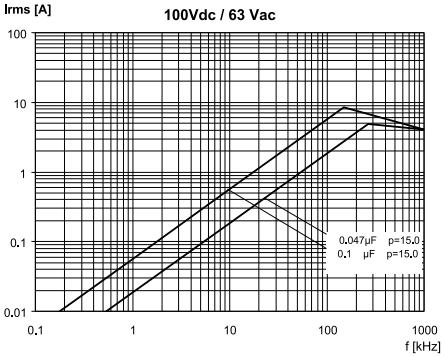


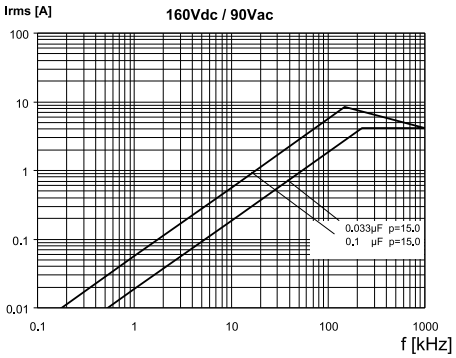
Note: p (pitch) in mm.

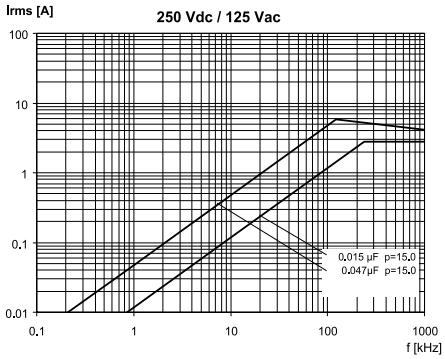
FILM-FOIL POLYPROPYLENE CAPACITOR
HIGH CURRENT APPLICATIONS.

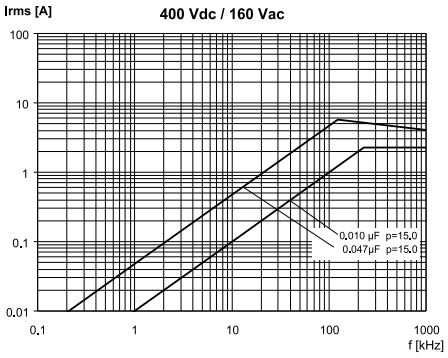
PRODUCT CODE: **R73**

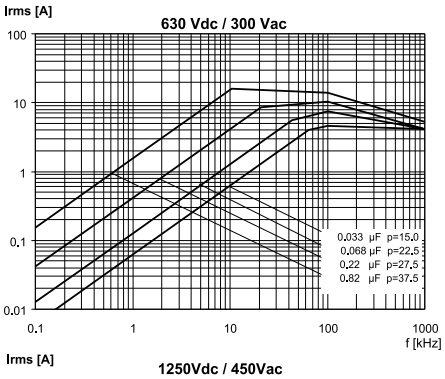
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

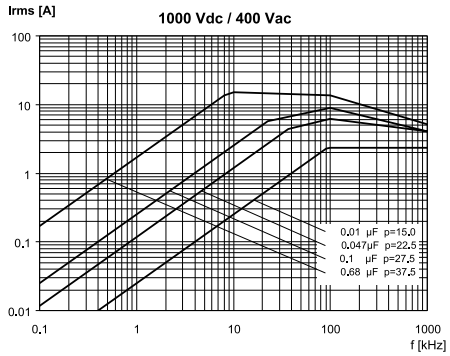


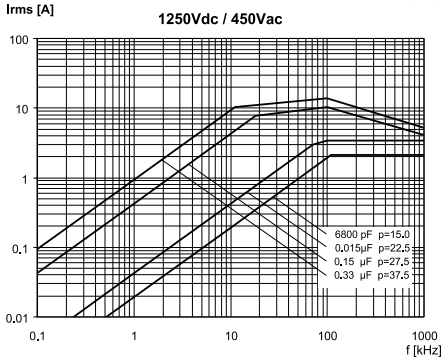


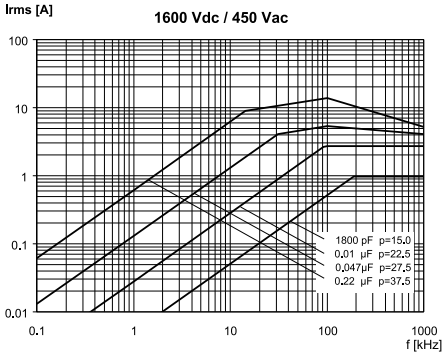


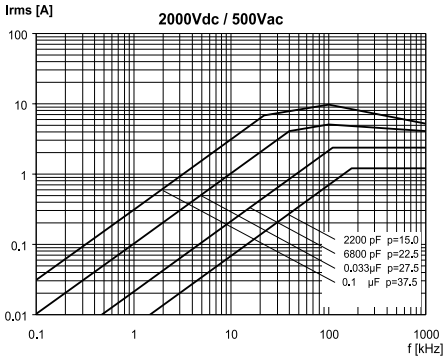












Note: p (pitch) in mm.

R74
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR A.C. APPLICATIONS

Typical applications: electronic lighting (i.e. car headlamp and ballast), pulse applications with high A.C. voltage and high current.

PRODUCT CODE: **R74**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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

Loose

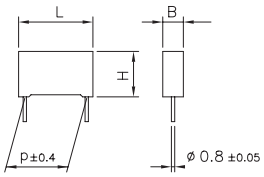


Fig.1

Taped

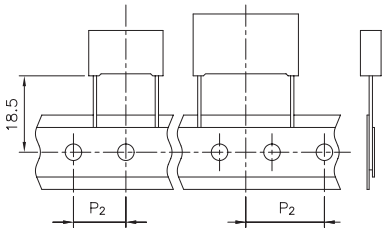


Fig.2

Ød ±0.05	p = 10	15 ≤ p ≤ 27.5	p = 37.5
	0.6	0.8	1.0

All dimensions are in mm.

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.
Plates: aluminium 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 (R74), dielectric code (MKP), capacitance, tolerance, A.C. rated voltage, manufacturing date code.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-16; IEC 60384-17

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	4										-	

Digit 1 to 3 Series code.

Digit 4 a.c. rated voltage:
L = 250V N = 400V 5 = 500V
7 = 700V 9 = 900V

Digit 5 Pitch: F=10.0mm; I =15.0mm; N=22.5mm; R=27.5mm W=37.5mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use.

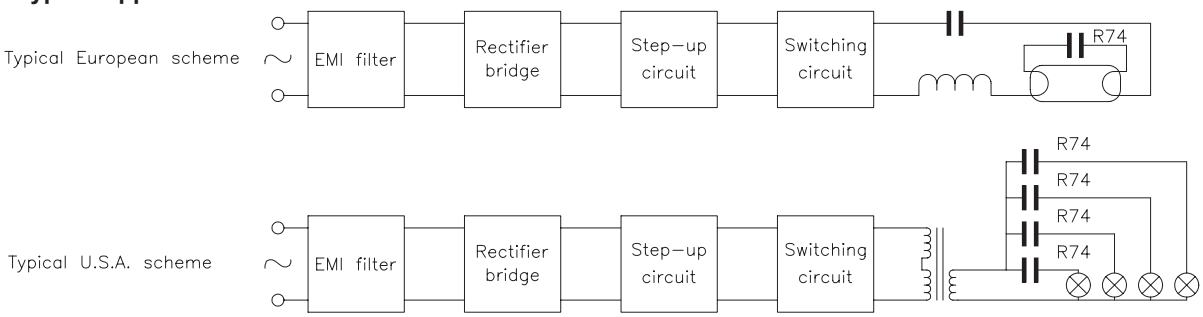
Digit 14 Capacitance tolerance:
J=5%; K=10%

Table 1 (for more detailed information, please refer to page 14)

Standard packaging style	Lead length (mm)	Taping style P2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
AMMO-PACK	Kinked execution from p=15 mm to p=7.5 mm				KN
AMMO-PACK					KL
REEL Ø 355mm		12.70	1	10.0/15.0	GY
REEL Ø 500mm		12.70	1	10.0/15.0	CK
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 +2				AA
Loose, long leads (p=10mm)	17 +1/-2				JM
Loose, long leads	30 +5				40
(p≥15mm)	25 +2/-1				50

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

Typical application: LAMP CAPACITOR IN ELECTRONIC BALLAST

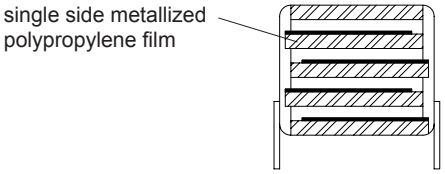


R74

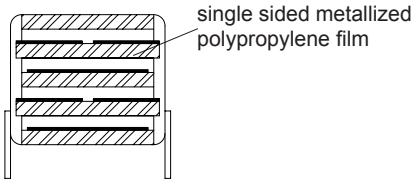
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR A.C. APPLICATIONS

PRODUCT CODE: **R74**



1 section
(250 Vac)



2 sections
(400Vac)

Rated Cap.	250Vac* (1 section) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.010 µF	4.0	9.0	13.0	10.0	300	38 E4	R74LF2100--0--
0.012 µF	4.0	9.0	13.0	10.0	300	38 E4	R74LF2120--0--
0.015 µF	5.0	11.0	13.0	10.0	300	38 E4	R74LF2150--0--
0.018 µF	5.0	11.0	13.0	10.0	300	38 E4	R74LF2180--0--
0.022 µF	6.0	12.0	13.0	10.0	300	38 E4	R74LF2220--0--
0.027 µF	6.0	12.0	13.0	10.0	300	38 E4	R74LF2270--0--
0.015 µF	5.0	11.0	18.0	15.0	250	31 E4	R74LI 2150--0--
0.018 µF	5.0	11.0	18.0	15.0	250	31 E4	R74LI 2180--0--
0.022 µF	5.0	11.0	18.0	15.0	250	31 E4	R74LI 2220--0--
0.027 µF	5.0	11.0	18.0	15.0	250	31 E4	R74LI 2270--0--
0.033 µF	5.0	11.0	18.0	15.0	250	31 E4	R74LI 2330--0--
0.039 µF	6.0	12.0	18.0	15.0	250	31 E4	R74LI 2390--0--
0.047 µF	6.0	12.0	18.0	15.0	250	31 E4	R74LI 2470--0--
0.056 µF	7.5	13.5	18.0	15.0	250	31 E4	R74LI 2560--0--
0.068 µF	7.5	13.5	18.0	15.0	250	31 E4	R74LI 2680--0--
0.068 µF	9.0	12.5	18.0	15.0	250	31 E4	R74LI 2680--6--
0.082 µF	8.5	14.5	18.0	15.0	250	31 E4	R74LI 2820--0--
0.082 µF	13.0	12.0	18.0	15.0	250	31 E4	R74LI 2820--6--
0.10 µF	8.5	14.5	18.0	15.0	250	31 E4	R74LI 3100--0--
0.10 µF	13.0	12.0	18.0	15.0	250	31 E4	R74LI 3100--6--
0.12 µF	10.0	16.0	18.0	15.0	250	31 E4	R74LI 3120--0--
0.15 µF	11.0	19.0	18.0	15.0	250	31 E4	R74LI 3150--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

Rated Cap.	400Vac (2 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
2200 pF	4.0	9.0	13.0	10.0	2200	570 E4	R74NF 1220--0--
2700 pF	4.0	9.0	13.0	10.0	2200	570 E4	R74NF 1270--0--
3300 pF	4.0	9.0	13.0	10.0	2200	570 E4	R74NF 1330--0--
3900 pF	5.0	11.0	13.0	10.0	2200	570 E4	R74NF 1390--0--
4700 pF	5.0	11.0	13.0	10.0	2200	570 E4	R74NF 1470--0--
5600 pF	5.0	11.0	13.0	10.0	2200	570 E4	R74NF 1560--0--
6800 pF	6.0	12.0	13.0	10.0	2200	570 E4	R74NF 1680--0--
8200 pF	6.0	12.0	13.0	10.0	2200	570 E4	R74NF 1820--0--
6800 pF	5.0	11.0	18.0	15.0	2000	520 E4	R74NI 1680--0--
8200 pF	5.0	11.0	18.0	15.0	2000	520 E4	R74NI 1820--0--
0.010 µF	5.0	11.0	18.0	15.0	2000	520 E4	R74NI 2100--0--
0.012 µF	6.0	12.0	18.0	15.0	2000	520 E4	R74NI 2120--0--
0.015 µF	6.0	12.0	18.0	15.0	2000	520 E4	R74NI 2150--0--
0.018 µF	7.5	13.5	18.0	15.0	2000	520 E4	R74NI 2180--0--
0.022 µF	7.5	13.5	18.0	15.0	2000	520 E4	R74NI 2220--0--
0.022 µF	9.0	12.5	18.0	15.0	2000	520 E4	R74NI 2220--6--
0.027 µF	8.5	14.5	18.0	15.0	2000	520 E4	R74NI 2270--0--
0.027 µF	13.0	12.0	18.0	15.0	2000	520 E4	R74NI 2270--6--
0.033 µF	8.5	14.5	18.0	15.0	2000	520 E4	R74NI 2330--0--
0.033 µF	13.0	12.0	18.0	15.0	2000	520 E4	R74NI 2330--6--
0.039 µF	10.0	16.0	18.0	15.0	2000	520 E4	R74NI 2390--0--
0.039 µF	13.0	12.0	18.0	15.0	2000	520 E4	R74NI 2390--6--
0.047 µF	10.0	16.0	18.0	15.0	2000	520 E4	R74NI 2470--0--
0.056 µF	11.0	19.0	18.0	15.0	2000	520 E4	R74NI 2560--0--
0.039 µF	6.0	15.0	26.5	22.5	800	208 E4	R74NN2390--0--
0.047 µF	7.0	16.0	26.5	22.5	800	208 E4	R74NN2470--0--
0.056 µF	7.0	16.0	26.5	22.5	800	208 E4	R74NN2560--0--
0.068 µF	8.5	17.0	26.5	22.5	800	208 E4	R74NN2680--0--
0.082 µF	10.0	18.5	26.5	22.5	800	208 E4	R74NN2820--0--
0.10 µF	10.0	18.5	26.5	22.5	800	208 E4	R74NN3100--0--
0.12 µF	11.0	20.0	26.5	22.5	800	208 E4	R74NN3120--0--
0.15 µF	13.0	22.0	26.5	22.5	800	208 E4	R74NN3150--0--
0.15 µF	9.0	17.0	32.0	27.5	380	70 E4	R74NR3150--0--
0.18 µF	9.0	17.0	32.0	27.5	380	70 E4	R74NR3180--0--
0.22 µF	11.0	20.0	32.0	27.5	380	70 E4	R74NR3220--0--
0.27 µF	11.0	20.0	32.0	27.5	380	70 E4	R74NR3270--0--
0.33 µF	13.0	22.0	32.0	27.5	380	70 E4	R74NR3330--0--
0.39 µF	13.0	22.0	32.0	27.5	380	70 E4	R74NR3390--0--
0.47 µF	14.0	28.0	32.0	27.5	380	70 E4	R74NR3470--0--
0.56 µF	14.0	28.0	32.0	27.5	380	70 E4	R74NR3560--0--
0.68 µF	14.0	28.0	32.0	27.5	380	70 E4	R74NR3680--0--
0.82 µF	18.0	33.0	32.0	27.5	380	70 E4	R74NR3820--0--
1.0 µF	18.0	33.0	32.0	27.5	380	70 E4	R74NR4100--0--
0.47 µF	11.0	22.0	41.5	37.5	180	40 E4	R74NW3470--0--
0.56 µF	11.0	22.0	41.5	37.5	180	40 E4	R74NW3560--0--
0.68 µF	13.0	24.0	41.5	37.5	180	40 E4	R74NW3680--0--
0.82 µF	16.0	28.5	41.5	37.5	180	40 E4	R74NW3820--0--
1.0 µF	16.0	28.5	41.5	37.5	180	40 E4	R74NW4100--0--
1.2 µF	19.0	32.0	41.5	37.5	180	40 E4	R74NW4120--0--
1.5 µF	19.0	32.0	41.5	37.5	180	40 E4	R74NW4150--0--
1.8 µF	20.0	40.0	41.5	37.5	180	40 E4	R74NW4180--0--
2.2 µF	24.0	44.0	41.5	37.5	180	40 E4	R74NW4220--0--
2.7 µF	24.0	44.0	41.5	37.5	180	40 E4	R74NW4270--0--
3.3 µF	30.0	45.0	41.5	37.5	180	40 E4	R74NW4330--0--

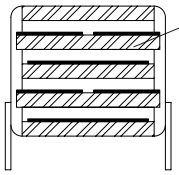
Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

R74

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**



single sided metallized
polypropylene film

2 sections
(500Vac)

Rated Cap.	500Vac (2 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
1000 pF	4.0	9.0	13.0	10.0	6000	1920 E4	R745F 1100--0--
1200 pF	4.0	9.0	13.0	10.0	6000	1920 E4	R745F 1120--0--
1500 pF	4.0	9.0	13.0	10.0	6000	1920 E4	R745F 1150--0--
1800 pF	4.0	9.0	13.0	10.0	6000	1920 E4	R745F 1180--0--
2200 pF	5.0	11.0	13.0	10.0	6000	1920 E4	R745F 1220--0--
2700 pF	5.0	11.0	13.0	10.0	6000	1920 E4	R745F 1270--0--
3300 pF	6.0	12.0	13.0	10.0	6000	1920 E4	R745F 1330--0--
3900 pF	6.0	12.0	13.0	10.0	6000	1920 E4	R745F 1390--0--
1500 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1150--3--
1500 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1150--0--
1800 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1180--3--
1800 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1180--0--
2200 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1220--3--
2200 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1220--0--
2700 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1270--3--
2700 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1270--0--
3300 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1330--3--
3300 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1330--0--
3900 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1390--3--
3900 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1390--0--
4700 pF	4.0	10.0	18.0	15.0	4500	1440 E4	R745I 1470--3--
4700 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1470--0--
5600 pF	5.0	11.0	18.0	15.0	4500	1440 E4	R745I 1560--0--
6800 pF	6.0	12.0	18.0	15.0	4500	1440 E4	R745I 1680--0--
8200 pF	6.0	12.0	18.0	15.0	4500	1440 E4	R745I 1820--0--
0.010 µF	6.0	12.0	18.0	15.0	4500	1440 E4	R745I 2100--0--
0.012 µF	7.5	13.5	18.0	15.0	4500	1440 E4	R745I 2120--0--
0.015 µF	7.5	13.5	18.0	15.0	4500	1440 E4	R745I 2150--0--
0.015 µF	13.0	12.0	18.0	15.0	4500	1440 E4	R745I 2150--6--
0.018 µF	8.5	14.5	18.0	15.0	4500	1440 E4	R745I 2180--0--
0.018 µF	13.0	12.0	18.0	15.0	4500	1440 E4	R745I 2180--6--
0.022 µF	10.0	16.0	18.0	15.0	4500	1440 E4	R745I 2220--0--
0.022 µF	13.0	12.0	18.0	15.0	4500	1440 E4	R745I 2220--6--
0.027 µF	10.0	16.0	18.0	15.0	4500	1440 E4	R745I 2270--0--
0.033 µF	11.0	19.0	18.0	15.0	4500	1440 E4	R745I 2330--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

Rated Cap.	500Vac (2 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
0.018 µF	6.0	15.0	26.5	22.5	1800	576 E4	R745N2180--0--
0.022 µF	6.0	15.0	26.5	22.5	1800	576 E4	R745N2220--0--
0.027 µF	7.0	16.0	26.5	22.5	1800	576 E4	R745N2270--0--
0.033 µF	7.0	16.0	26.5	22.5	1800	576 E4	R745N2330--0--
0.039 µF	8.5	17.0	26.5	22.5	1800	576 E4	R745N2390--0--
0.047 µF	10.0	18.5	26.5	22.5	1800	576 E4	R745N2470--0--
0.056 µF	10.0	18.5	26.5	22.5	1800	576 E4	R745N2560--0--
0.068 µF	11.0	20.0	26.5	22.5	1800	576 E4	R745N2680--0--
0.082 µF	13.0	22.0	26.5	22.5	1800	576 E4	R745N2820--0--
0.10 µF	13.0	22.0	26.5	22.5	1800	576 E4	R745N3100--0--
0.10 µF	9.0	17.0	32.0	27.5	500	160 E4	R745R3100--0--
0.12 µF	9.0	17.0	32.0	27.5	500	160 E4	R745R3120--0--
0.15 µF	9.0	17.0	32.0	27.5	500	160 E4	R745R3150--0--
0.18 µF	11.0	20.0	32.0	27.5	500	160 E4	R745R3180--0--
0.22 µF	11.0	20.0	32.0	27.5	500	160 E4	R745R3220--0--
0.27 µF	13.0	22.0	32.0	27.5	500	160 E4	R745R3270--0--
0.33 µF	14.0	28.0	32.0	27.5	500	160 E4	R745R3330--0--
0.39 µF	14.0	28.0	32.0	27.5	500	160 E4	R745R3390--0--
0.47 µF	14.0	28.0	32.0	27.5	500	160 E4	R745R3470--0--
0.56 µF	18.0	33.0	32.0	27.5	500	160 E4	R745R3560--0--
0.68 µF	18.0	33.0	32.0	27.5	500	160 E4	R745R3680--0--
0.82 µF	22.0	37.0	32.0	27.5	500	160 E4	R745R3820--0--
1.0 µF	22.0	37.0	32.0	27.5	500	160 E4	R745R4100--0--
0.33 µF	11.0	22.0	41.5	37.5	300	96 E4	R745W3330--0--
0.39 µF	11.0	22.0	41.5	37.5	300	96 E4	R745W3390--0--
0.47 µF	13.0	24.0	41.5	37.5	300	96 E4	R745W3470--0--
0.56 µF	13.0	24.0	41.5	37.5	300	96 E4	R745W3560--0--
0.68 µF	16.0	28.5	41.5	37.5	300	96 E4	R745W3680--0--
0.82 µF	16.0	28.5	41.5	37.5	300	96 E4	R745W3820--0--
1.0 µF	19.0	32.0	41.5	37.5	300	96 E4	R745W4100--0--
1.2 µF	19.0	32.0	41.5	37.5	300	96 E4	R745W4120--0--
1.5 µF	20.0	40.0	41.5	37.5	300	96 E4	R745W4150--0--
1.8 µF	24.0	44.0	41.5	37.5	300	96 E4	R745W4180--0--
2.2 µF	24.0	44.0	41.5	37.5	300	96 E4	R745W4220--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm.

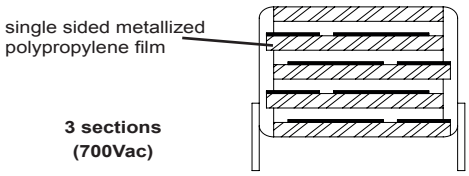
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt.
In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

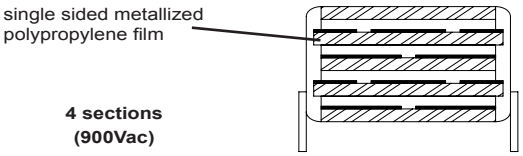
R74

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR A.C. APPLICATIONS

PRODUCT CODE: **R74**





Rated Cap.	700Vac (3 sections) Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
470 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 0470--3--
680 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 0680--3--
820 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 0820--3--
1000 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 1100--3--
1000 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1100--0--
1200 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 1120--3--
1200 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1120--0--
1500 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 1150--3--
1500 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1150--0--
1800 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 1180--3--
1800 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1180--0--
2200 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R747I 1220--3--
2200 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1220--0--
2700 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1270--0--
3300 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R747I 1330--0--
3900 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R747I 1390--0--
4700 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R747I 1470--0--
5600 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R747I 1560--0--
6800 pF	7.5	13.5	18.0	15.0	9500	3800 E4	R747I 1680--0--
8200 pF	7.5	13.5	18.0	15.0	9500	3800 E4	R747I 1820--0--
8200 pF	9.0	12.5	18.0	15.0	9500	3800 E4	R747I 1820--6--
0.010 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R747I 2100--0--
0.010 µF	13.0	12.0	18.0	15.0	9500	3800 E4	R747I 2100--6--
0.012 µF	10.0	16.0	18.0	15.0	9500	3800 E4	R747I 2120--0--
0.012 µF	13.0	12.0	18.0	15.0	9500	3800 E4	R747I 2120--6--
0.015 µF	10.0	16.0	18.0	15.0	9500	3800 E4	R747I 2150--0--
0.018 µF	11.0	19.0	18.0	15.0	9500	3800 E4	R747I 2180--0--
8200 pF	6.0	15.0	26.5	22.5	4500	1800 E4	R747N1820--0--
0.010 µF	6.0	15.0	26.5	22.5	4500	1800 E4	R747N2100--0--
0.012 µF	6.0	15.0	26.5	22.5	4500	1800 E4	R747N2120--0--
0.015 µF	6.0	15.0	26.5	22.5	4500	1800 E4	R747N2150--0--
0.018 µF	7.0	16.0	26.5	22.5	4500	1800 E4	R747N2180--0--
0.022 µF	8.5	17.0	26.5	22.5	4500	1800 E4	R747N2220--0--
0.027 µF	8.5	17.0	26.5	22.5	4500	1800 E4	R747N2270--0--
0.033 µF	10.0	18.5	26.5	22.5	4500	1800 E4	R747N2330--0--
0.039 µF	10.0	18.5	26.5	22.5	4500	1800 E4	R747N2390--0--
0.047 µF	11.0	20.0	26.5	22.5	4500	1800 E4	R747N2470--0--
0.056 µF	13.0	22.0	26.5	22.5	4500	1800 E4	R747N2560--0--
0.068 µF	13.0	22.0	26.5	22.5	4500	1800 E4	R747N2680--0--
0.039 µF	9.0	17.0	32.0	27.5	700	280 E4	R747R2390--0--
0.047 µF	9.0	17.0	32.0	27.5	700	280 E4	R747R2470--0--
0.056 µF	9.0	17.0	32.0	27.5	700	280 E4	R747R2560--0--
0.068 µF	11.0	20.0	32.0	27.5	700	280 E4	R747R2680--0--
0.082 µF	11.0	20.0	32.0	27.5	700	280 E4	R747R2820--0--
0.10 µF	13.0	22.0	32.0	27.5	700	280 E4	R747R3100--0--
0.12 µF	13.0	22.0	32.0	27.5	700	280 E4	R747R3120--0--
0.15 µF	14.0	28.0	32.0	27.5	700	280 E4	R747R3150--0--
0.18 µF	14.0	28.0	32.0	27.5	700	280 E4	R747R3180--0--
0.22 µF	18.0	33.0	32.0	27.5	700	280 E4	R747R3220--0--
0.27 µF	18.0	33.0	32.0	27.5	700	280 E4	R747R3270--0--
0.33 µF	22.0	37.0	32.0	27.5	700	280 E4	R747R3330--0--
0.15 µF	11.0	22.0	41.5	37.5	400	160 E4	R747W3150--0--
0.18 µF	13.0	24.0	41.5	37.5	400	160 E4	R747W3180--0--
0.22 µF	13.0	24.0	41.5	37.5	400	160 E4	R747W3220--0--
0.27 µF	16.0	28.5	41.5	37.5	400	160 E4	R747W3270--0--
0.33 µF	16.0	28.5	41.5	37.5	400	160 E4	R747W3330--0--
0.39 µF	19.0	32.0	41.5	37.5	400	160 E4	R747W3390--0--
0.47 µF	19.0	32.0	41.5	37.5	400	160 E4	R747W3470--0--
0.56 µF	20.0	40.0	41.5	37.5	400	160 E4	R747W3560--0--
0.68 µF	24.0	44.0	41.5	37.5	400	160 E4	R747W3680--0--
0.82 µF	24.0	44.0	41.5	37.5	400	160 E4	R747W3820--0--
1.0 µF	30.0	45.0	41.5	37.5	400	160 E4	R747W4100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

Rated Cap.	900Vac (4 sections) Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
1000 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1100--0--
1200 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1120--0--
1500 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1150--0--
1800 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1180--0--
2200 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1220--0--
2700 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1270--0--
3300 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1330--0--
3900 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1390--0--
4700 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1470--0--
5600 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1560--0--
6800 pF	6.0	15.0	26.5	22.5	2500	1100 E4	R749N1680--0--
8200 pF	7.0	16.0	26.5	22.5	2500	1100 E4	R749N1820--0--
0.010 µF	7.0	16.0	26.5	22.5	2500	1100 E4	R749N2100--0--
0.012 µF	8.5	17.0	26.5	22.5	2500	1100 E4	R749N2120--0--
0.015 µF	10.0	18.5	26.5	22.5	2500	1100 E4	R749N2150--0--
0.018 µF	10.0	18.5	26.5	22.5	2500	1100 E4	R749N2180--0--
0.022 µF	11.0	20.0	26.5	22.5	2500	1100 E4	R749N2220--0--
0.027 µF	13.0	22.0	26.5	22.5	2500	1100 E4	R749N2270--0--
0.033 µF	13.0	22.0	26.5	22.5	2500	1100 E4	R749N2330--0--
0.022 µF	9.0	17.0	32.0	27.5	1500	660 E4	R749R2220--0--
0.027 µF	9.0	17.0	32.0	27.5	1500	660 E4	R749R2270--0--
0.033 µF	11.0	20.0	32.0	27.5	1500	660 E4	R749R2330--0--
0.039 µF	11.0	20.0	32.0	27.5	1500	660 E4	R749R2390--0--
0.047 µF	13.0	22.0	32.0	27.5	1500	660 E4	R749R2470--0--
0.056 µF	13.0	22.0	32.0	27.5	1500	660 E4	R749R2560--0--
0.068 µF	14.0	28.0	32.0	27.5	1500	660 E4	R749R2680--0--
0.082 µF	14.0	28.0	32.0	27.5	1500	660 E4	R749R2820--0--
0.10 µF	18.0	33.0	32.0	27.5	1500	660 E4	R749R3100--0--
0.12 µF	18.0	33.0	32.0	27.5	1500	660 E4	R749R3120--0--
0.15 µF	18.0	33.0	32.0	27.5	1500	660 E4	R749R3150--0--
0.068 µF	11.0	22.0	41.5	37.5	900	400 E4	R749W2680--0--
0.082 µF	11.0	22.0	41.5	37.5	900	400 E4	R749W2820--0--
0.10 µF	13.0	24.0	41.5	37.5	900	400 E4	R749W3100--0--
0.12 µF	13.0	24.0	41.5	37.5	900	400 E4	R749W3120--0--
0.15 µF	16.0	28.5	41.5	37.5	900	400 E4	R749W3150--0--
0.18 µF	16.0	28.5	41.5	37.5	900	400 E4	R749W3180--0--
0.22 µF	19.0	32.0	41.5	37.5	900	400 E4	R749W3220--0--
0.27 µF	20.0	40.0	41.5	37.5	900	400 E4	R749W3270--0--
0.33 µF	20.0	40.0	41.5	37.5	900	400 E4	R749W3330--0--
0.39 µF	24.0	44.0	41.5	37.5	900	400 E4	R749W3390--0--
0.47 µF	24.0	44.0	41.5	37.5	900	400 E4	R749W3470--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt.
In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

R74
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
250Vac (630Vdc) - 400Vac (1300Vdc)
500Vac (1600Vdc) - 700Vac (2000Vdc)
900Vac (2200Vdc)

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (a.c. and d.c.) has to be applied.

Capacitance range:
470pF to 3.3 µF

Capacitance values:
E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):
±5% (J); ±10% (K).

Total self inductance: (L)
(Lead length (2 mm)

Pitch (mm)	10	15	22.5	27.5	37.5
L (nH) ≈	9	10	18	18	20

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

	1kHz	10kHz	100kHz
C ≤2.2nF	≤ 1.0	≤ 2.0	≤ 3.0
2.2nF < C ≤ 0.027µF	≤ 1.0	≤ 2.0	≤ 8.0
0.027µF < C ≤ 0.1µF	≤ 4.0	≤ 6.0	≤ 25.0
0.1µF < C ≤ 1µF	≤ 5.0	≤ 8.0	
C >1µF	≤ 6.0		

Insulation resistance:

Test conditions

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

Performance

≥1x10^5 MΩ for C≤0.33µF
≥30000s for C>0.33µF

Test voltage between terminations:
1.6xV_R applied for 2 s at 25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤10x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+85°C±2°C
Test duration:	2000 h
Voltage applied:	1.25xV_R (a.c.) at 50Hz

Performance

Capacitance change |ΔC/C|:	≤5%
DF change (Δtgδ):	≤15x10^{-4} at 10kHz
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|:	≤1%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
Insulation resistance:	≥initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (page 12).

Performance

Capacitance change |ΔC/C|: ≤0.5%

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MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
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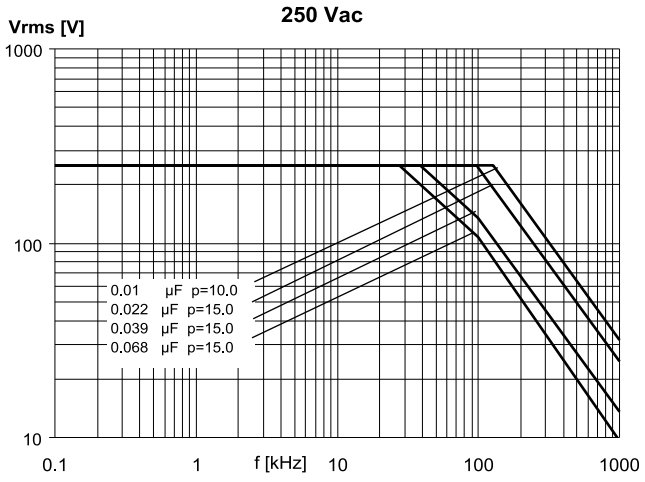
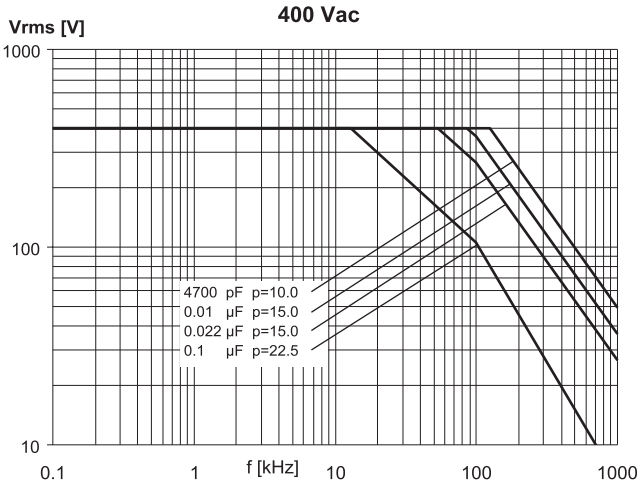
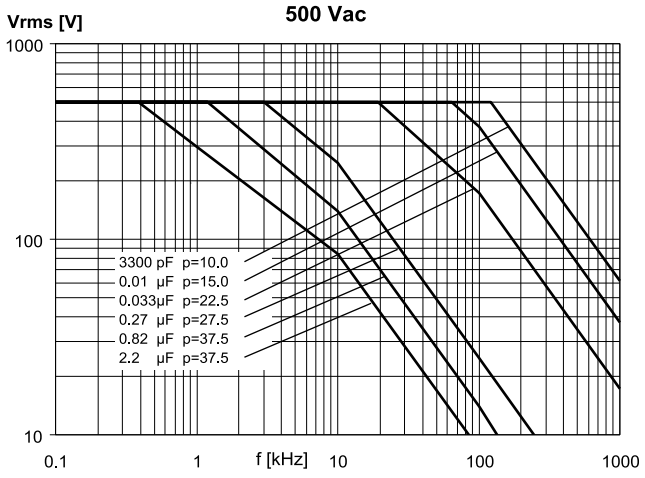
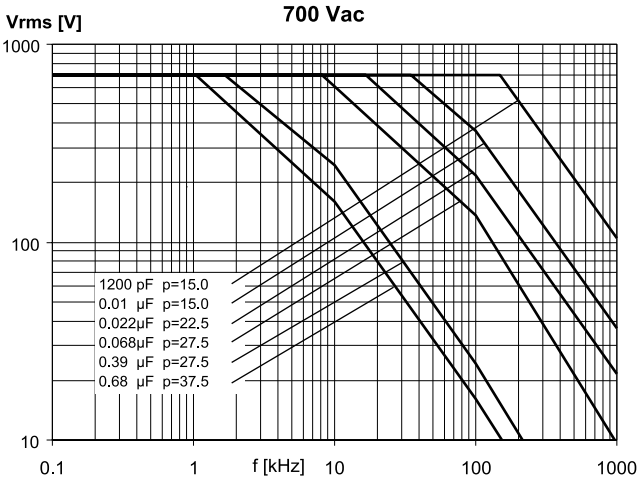
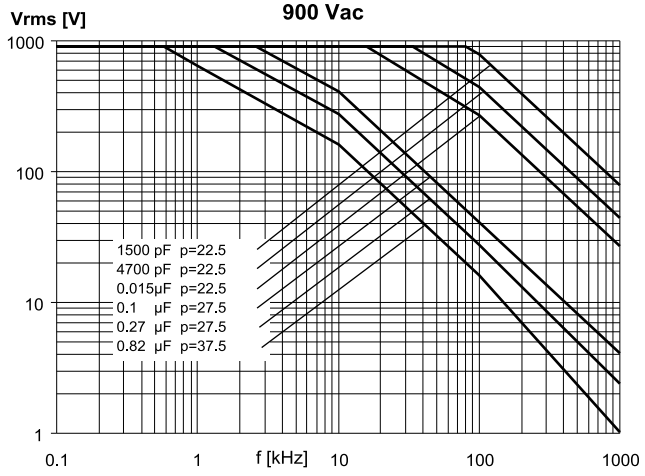
MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)











Note: p (pitch) in mm.

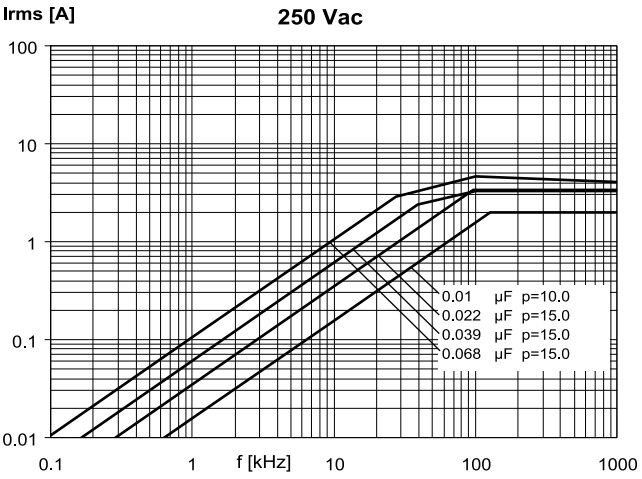
R74

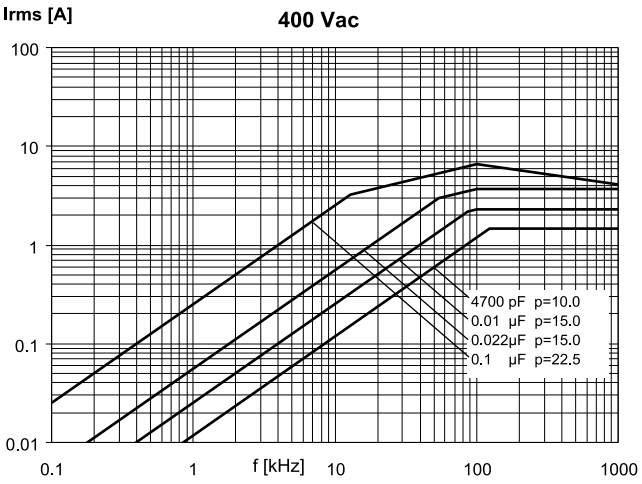
MKP Series

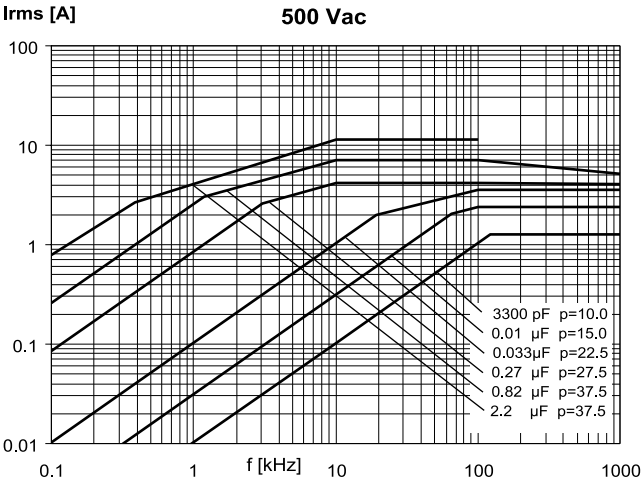
METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

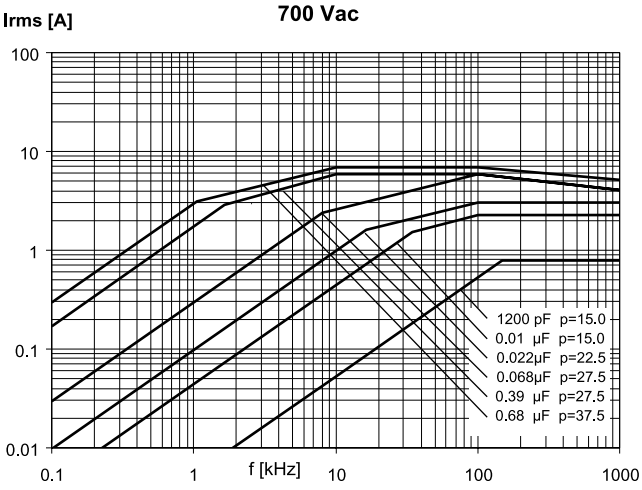
PRODUCT CODE: **R74**

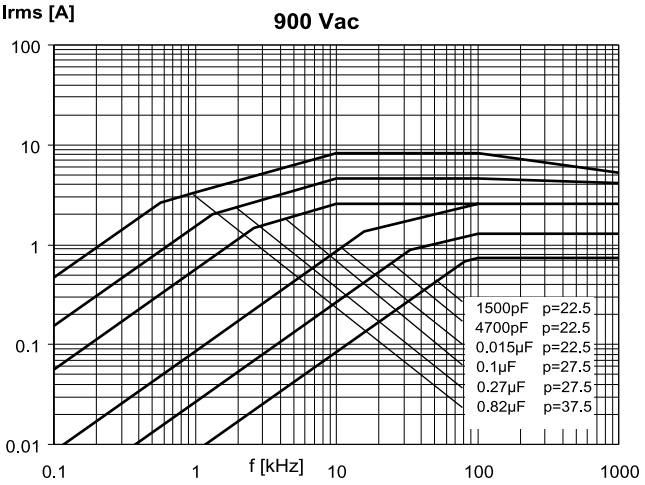
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)











Note: p (pitch) in mm.

R74 MINI VERSION
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR A.C. APPLICATIONS

Typical applications: electronic lighting (i.e. car headlamp and ballast), pulse applications with high A.C. voltage and high current.

PRODUCT CODE: **R74**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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

Loose

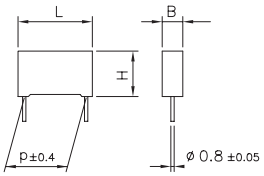


Fig.1

Taped

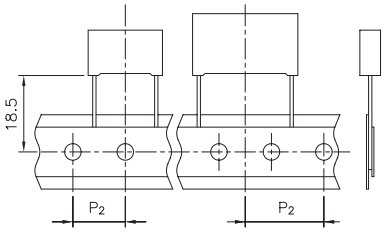


Fig.2

Ød ±0.05	p = 10	p = 15
	0.6	0.8

All dimensions are in mm.

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	4	7								R	-	

Digit 1 to 3 Series code.

Digit 4 a.c. rated voltage:
6 = 600V

Digit 5 Pitch: F=10.0mm; I =15.0mm.

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use.

Digit 14 Capacitance tolerance:
J=5%; K=10%

GENERAL TECHNICAL DATA

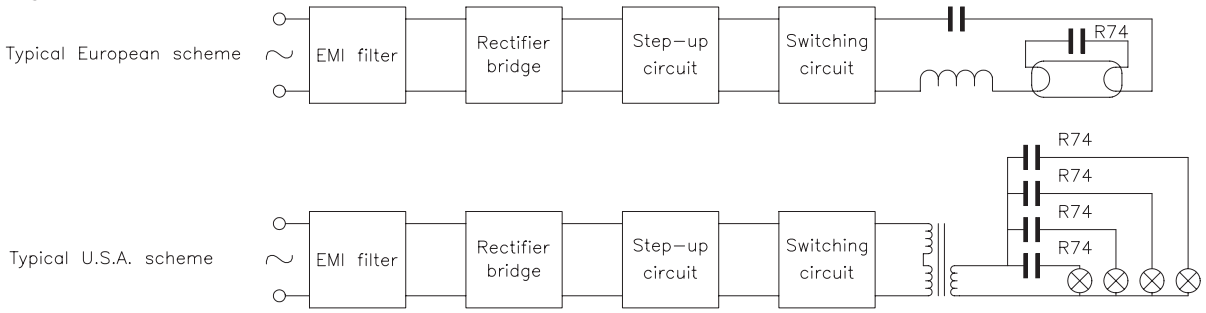
Dielectric: polypropylene film.
Plates: aluminium layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire.
Protection: plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL94 V-0.
Marking: manufacturer's logo, series (R74), dielectric code (MKP), capacitance, tolerance, A.C. rated voltage, manufacturing date code.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-16; IEC 60384-17

Table 1 (for more detailed information, please refer to page 14)

Standard packaging style	Lead length (mm)	Taping style P2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK	Kinked execution from p=15 mm to p=7.5 mm				KN
AMMO-PACK					KL
REEL Ø 355mm		12.70	1	10.0/15.0	GY
REEL Ø 500mm		12.70	1	10.0/15.0	CK
Loose, short leads	4^{+2}				AA
Loose, long leads (p=10mm)	$17^{-2/+1}$				JM
Loose, long leads	30^{+5}				40
(p≥15mm)	$25^{-1/+2}$				50

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

Typical application: LAMP CAPACITOR IN ELECTRONIC BALLAST

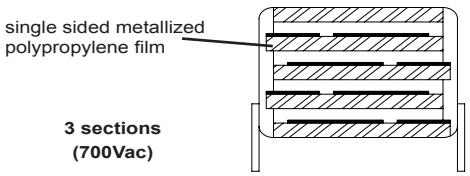


R74 MINI VERSION

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**



Rated Cap.	600Vac (3 sections) Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
470 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 0470--0--
680 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 0680--0--
820 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 0820--0--
1000 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 1100--0--
1200 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 1120--0--
1500 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 1150--0--
1800 pF	4.0	9.0	13.0	10.0	10000	4000 E4	R746F 1180--0--
2200 pF	5.0	11.0	13.0	10.0	10000	4000 E4	R746F 1220--0--
2700 pF	5.0	11.0	13.0	10.0	10000	4000 E4	R746F 1270--0--
3300 pF	6.0	12.0	13.0	10.0	10000	4000 E4	R746F 1330--0--
3900 pF	6.0	12.0	13.0	10.0	10000	4000 E4	R746F 1390--0--
2300 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R746I 1230--0--
2700 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R746I 1270--0--
3900 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R746I 1390--0--
4700 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R746I 1470--0--
6800 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R746I 1680--0--
0.012 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R746I 2120--0--
0.015 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R746I 2150--0--
0.018 µF	10.0	16.0	18.0	15.0	9500	3800 E4	R746I 2180--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt.
In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

R74 MINI VERSION

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR A.C. APPLICATIONS

PRODUCT CODE: **R74**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):

600Vac (2000Vdc)

Rated temperature (T_R): +85°C

Temperature derated voltage:

for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (a.c. and d.c.) has to be applied.

Capacitance range:

470pF to 0.018µF

Capacitance values:

E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):

±5% (J); ±10% (K).

Total self inductance: (L)

(Lead length (2 mm)

Pitch (mm)	10	15
L (nH) ≈	9	10

Dissipation factor (DF):

tgδ 10^{-4} at +25°C ±5°C

	1kHz	100kHz
All	≤ 15	≤ 15

Insulation resistance:

Test conditions

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

Performance

≥1x10^5 MΩ

Test voltage between terminations:

1.6xV_R applied for 2 s at 25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤10x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+85°C±2°C
Test duration:	2000 h
Voltage applied:	V_R (a.c.) at 50Hz

Performance

Capacitance change |ΔC/C|:	≤10%
DF change (Δtgδ):	≤15x10^{-4} at 10kHz
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|:	≤1%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
Insulation resistance:	≥initial limit.

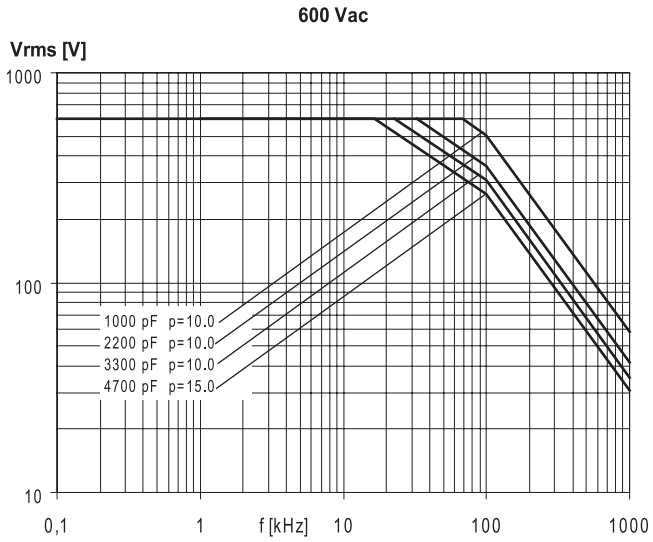
Long term stability (after two years)**:**

Storage: standard environmental conditions (page 12).

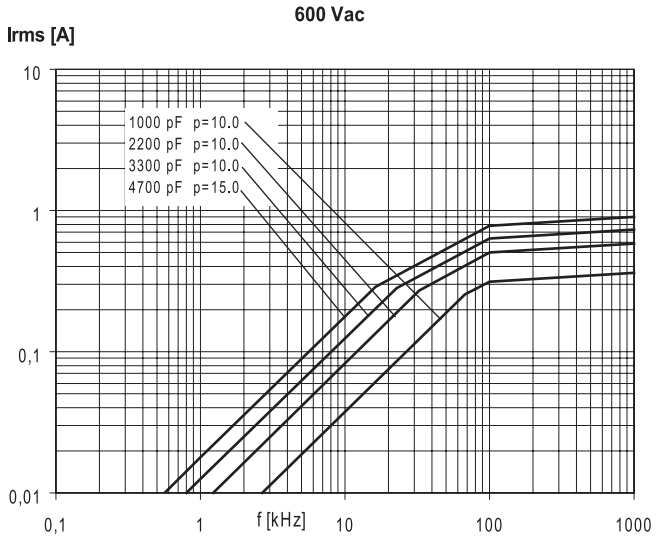
Performance

Capacitance change |ΔC/C|: ≤1%

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)



MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)



R74 125°C
MKP Series

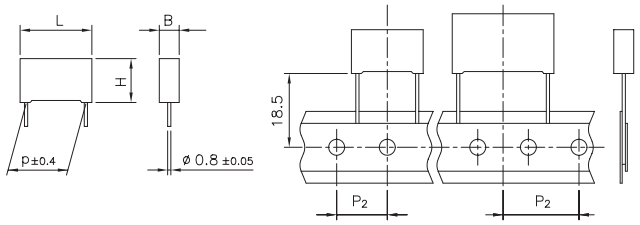
METALLIZED POLYPROPYLENE FILM CAPACITOR A.C. APPLICATIONS

Typical applications: electronic lighting (i.e. car headlamp and ballast), pulse applications with high A.C. voltage and high current.

PRODUCT CODE: **R74**

Loose Taped

Fig.1 Fig.2



Ød ±0.05	p = 10	p ≥15
	0.6	0.8

All dimensions are in mm.

Pitch (mm)	Box thickness (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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	4									H	-	

Digit 1 to 3 Series code.

Digit 4 a.c. rated voltage:
5 = 500V 7 = 700V

Digit 5 Pitch: F=10.0mm; I =15.0mm; N=22.5mm;

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use.

Digit 14 Capacitance tolerance:
J=5%; K=10%

GENERAL TECHNICAL DATA

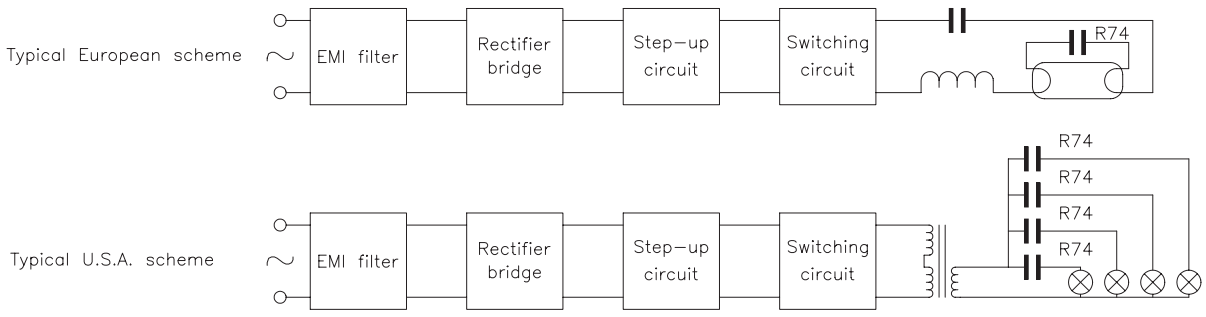
Dielectric: polypropylene film.
Plates: aluminium layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire.
Protection: plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL94 V0.
Marking: manufacturer's logo, series (R74), dielectric code (MKP), capacitance, tolerance, A.C. rated voltage, manufacturing date code.
Climatic category: 55/125/56 IEC 60068-1
Operating temperature range: -55 to +125°C
Related documents: IEC 60384-16; IEC 60384-17

Table 1 (for more detailed information, please refer to page 14)

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
AMMO-PACK	Kinked execution from p=15 mm to p=7.5 mm				KN
AMMO-PACK					KL
REEL Ø 355mm		12.70	1	10.0/15.0	GY
REEL Ø 500mm		12.70	1	10.0/15.0	CK
REEL Ø 500mm		19.05	2	22.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads (p=10mm)	$17^{+1/-2}$				JM
Loose, long leads (p≥15mm)	30^{+5}				40
	$25^{+2/-1}$				50

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

Typical application: LAMP CAPACITOR IN ELECTRONIC BALLAST

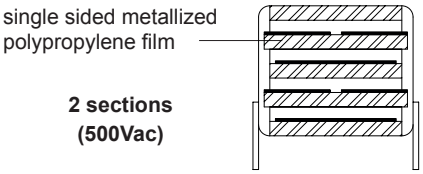


R74 125°C

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**

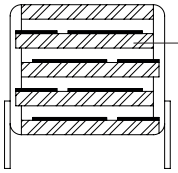


2 sections
(500Vac)

Rated Cap.	500Vac (2 sections) Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
1000 pF	4.0	9.0	13.0	10.0	6000	1.28 E7	R745F 1100--H0-
1200 pF	4.0	9.0	13.0	10.0	6000	1.28 E7	R745F 1120--H0-
1500 pF	4.0	9.0	13.0	10.0	6000	1.28 E7	R745F 1150--H0-
1800 pF	5.0	11.0	13.0	10.0	6000	1.28 E7	R745F 1180--H0-
2200 pF	5.0	11.0	13.0	10.0	6000	1.28 E7	R745F 1220--H0-
2700 pF	5.0	11.0	13.0	10.0	6000	1.28 E7	R745F 1270--H0-
3300 pF	6.0	12.0	13.0	10.0	6000	1.28 E7	R745F 1330--H0-
3900 pF	6.0	12.0	13.0	10.0	6000	1.28 E7	R745F 1390--H0-
2700 pF	4.0	10.0	18.0	15.0	4500	8.00 E6	R745I 1270--H3-
3300 pF	4.0	10.0	18.0	15.0	4500	8.00 E6	R745I 1330--H3-
3900 pF	4.0	10.0	18.0	15.0	4500	8.00 E6	R745I 1390--H3-
4700 pF	5.0	11.0	18.0	15.0	4500	8.00 E6	R745I 1470--H0-
5600 pF	5.0	11.0	18.0	15.0	4500	8.00 E6	R745I 1560--H0-
6800 pF	6.0	12.0	18.0	15.0	4500	8.00 E6	R745I 1680--H0-
8200 pF	6.0	12.0	18.0	15.0	4500	8.00 E6	R745I 1820--H0-
0.010 µF	6.0	12.0	18.0	15.0	4500	8.00 E6	R745I 2100--H0-
0.012 µF	7.5	13.5	18.0	15.0	4500	8.00 E6	R745I 2120--H0-
0.015 µF	7.5	13.5	18.0	15.0	4500	8.00 E6	R745I 2150--H0-
0.015 µF	13.0	12.0	18.0	15.0	4500	8.00 E6	R745I 2150--H1-
0.018 µF	8.5	14.5	18.0	15.0	4500	8.00 E6	R745I 2180--H0-
0.018 µF	13.0	12.0	18.0	15.0	4500	8.00 E6	R745I 2180--H1-
0.022 µF	10.0	16.0	18.0	15.0	4500	8.00 E6	R745I 2220--H0-
0.022 µF	13.0	12.0	18.0	15.0	4500	8.00 E6	R745I 2220--H1-
0.027 µF	10.0	16.0	18.0	15.0	4500	8.00 E6	R745I 2270--H0-
0.033 µF	11.0	19.0	18.0	15.0	4500	8.00 E6	R745I 2330--H0-
0.018 µF	6.0	15.0	26.5	22.5	1200	3.84 E6	R745N2180--H0-
0.022 µF	6.0	15.0	26.5	22.5	1200	3.84 E4	R745N2220--H0-
0.027 µF	7.0	16.0	26.5	22.5	1200	3.84 E4	R745N2270--H0-
0.033 µF	7.0	16.0	26.5	22.5	1200	3.84 E4	R745N2330--H0-
0.039 µF	8.5	17.0	26.5	22.5	1200	3.84 E4	R745N2390--H0-
0.047 µF	10.0	18.5	26.5	22.5	1200	3.84 E4	R745N2470--H0-
0.056 µF	10.0	18.5	26.5	22.5	1200	3.84 E4	R745N2560--H0-
0.068 µF	11.0	20.0	26.5	22.5	1200	3.84 E4	R745N2680--H0-
0.082 µF	13.0	22.0	26.5	22.5	1200	3.84 E4	R745N2820--H0-
0.10 µF	13.0	22.0	26.5	22.5	1200	3.84 E4	R745N3100--H0-

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm



3 sections
(700Vac)

Rated Cap.	700Vac (3 sections) Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
680 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I0680--H3-
820 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I0820--H3-
1000 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I1100--H3-
1200 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I1120--H3-
1300 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I1130--H3-
1800 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I1180--H3-
2200 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I1220--H3-
2500 pF	4.0	10.0	18.0	15.0	9500	960 E4	R747I1250--H3-
2700 pF	5.0	11.0	18.0	15.0	9500	960 E4	R747I1270--H0-
3300 pF	5.0	11.0	18.0	15.0	9500	960 E4	R747I1330--H0-
3600 pF	6.0	12.0	18.0	15.0	9500	960 E4	R747I1360--H0-
3900 pF	6.0	12.0	18.0	15.0	9500	960 E4	R747I1390--H0-
4300 pF	6.0	12.0	18.0	15.0	9500	960 E4	R747I1430--H0-
4700 pF	6.0	12.0	18.0	15.0	9500	960 E4	R747I1470--H0-
5200 pF	6.0	12.0	18.0	15.0	9500	960 E4	R747I1520--H0-
5600 pF	6.0	12.0	18.0	15.0	9500	960 E4	R747I1560--H0-
6200 pF	7.5	13.5	18.0	15.0	9500	960 E4	R747I1620--H0-
6800 pF	7.5	13.5	18.0	15.0	9500	960 E4	R747I1680--H0-
8200 pF	7.5	13.5	18.0	15.0	9500	960 E4	R747I1820--H0-
8200 pF	9.0	12.5	18.0	15.0	9500	960 E4	R747I1820--H1-
0.010 µF	8.5	14.5	18.0	15.0	9500	960 E4	R747I2100--H0-
0.010 µF	13.0	12.0	18.0	15.0	9500	960 E4	R747I2100--H1-
0.012 µF	10.0	16.0	18.0	15.0	9500	960 E4	R747I2120--H0-
0.012 µF	13.0	12.0	18.0	15.0	9500	960 E4	R747I2120--H1-
0.015 µF	10.0	16.0	18.0	15.0	9500	960 E4	R747I2150--H0-
0.018 µF	11.0	19.0	18.0	15.0	9500	960 E4	R747I2180--H0-
6200 pF	6.0	15.0	26.5	22.5	4500	420 E4	R747N1620--H0-
6800 pF	6.0	15.0	26.5	22.5	4500	420 E4	R747N1680--H0-
7500 pF	6.0	15.0	26.5	22.5	4500	420 E4	R747N1750--H0-
8200 pF	6.0	15.0	26.5	22.5	4500	420 E4	R747N1820--H0-
0.010 µF	6.0	15.0	26.5	22.5	4500	420 E4	R747N2100--H0-
0.012 µF	6.0	15.0	26.5	22.5	4500	420 E4	R747N2120--H0-
0.015 µF	6.0	15.0	26.5	22.5	4500	420 E4	R747N2150--H0-
0.018 µF	7.0	16.0	26.5	22.5	4500	420 E4	R747N2180--H0-
0.022 µF	8.5	17.0	26.5	22.5	4500	420 E4	R747N2220--H0-
0.027 µF	8.5	17.0	26.5	22.5	4500	420 E4	R747N2270--H0-
0.033 µF	10.0	18.5	26.5	22.5	4500	420 E4	R747N2330--H0-
0.039 µF	10.0	18.5	26.5	22.5	4500	420 E4	R747N2390--H0-
0.047 µF	11.0	20.0	26.5	22.5	4500	420 E4	R747N2470--H0-
0.056 µF	13.0	22.0	26.5	22.5	4500	420 E4	R747N2560--H0-
0.062 µF	13.0	22.0	26.5	22.5	4500	420 E4	R747N2620--H0-
0.068 µF	13.0	22.0	26.5	22.5	4500	420 E4	R747N2680--H0-

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt.
In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage waveform and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

R74 125°C
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
500Vac (1600Vdc) - 700Vac (2000Vdc)

Rated temperature (T_R): +105°C

Temperature derated voltage:
for temperatures between +105°C and +125°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (a.c. and d.c.) has to be applied.

Capacitance range:
680pF to 0.1 µF

Capacitance values:
E12 series (IEC 60063 Norm) mainly.

Capacitance tolerances (measured at 1 kHz):
±5% (J); ±10% (K).

Total self inductance: (L)
(Lead length (2 mm)

Pitch (mm)	10	15	22.5
L (nH) ≈	9	10	18

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

	1kHz	10kHz	100kHz
C ≤2.2nF	≤ 1.0	≤ 2.0	≤ 3.0
2.2nF < C ≤ 0.027µF	≤ 1.0	≤ 2.0	≤ 8.0
0.027µF < C ≤ 0.1µF	≤ 4.0	≤ 6.0	≤ 25.0

Insulation resistance:

Test conditions

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

Performance
≥1x10^5 MΩ for C≤0.33µF

Test voltage between terminations:
1.6xV_R applied for 2 s at 25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤10x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions 1

Temperature:	+125°C +0/-2°C
Test duration:	2000 h
Voltage applied:	0.94 x V_R (a.c.) at 50Hz

Test conditions 2

Temperature:	+105°C ±2°C
Test duration:	2000 h
Voltage applied:	1.25 x V_R (a.c.) at 50Hz

Performance

Capacitance change |ΔC/C|:	≤5%
DF change (Δtgδ):	≤15x10^{-4} at 10kHz
Insulation resistance:	≥50% of initial limit.

Resistance to soldering heat:

Test conditions 1

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

Performance

Capacitance change|ΔC/C|:	≤1%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
Insulation resistance:	≥initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (page 12).

Performance

Capacitance change |ΔC/C|:	≤0.5%

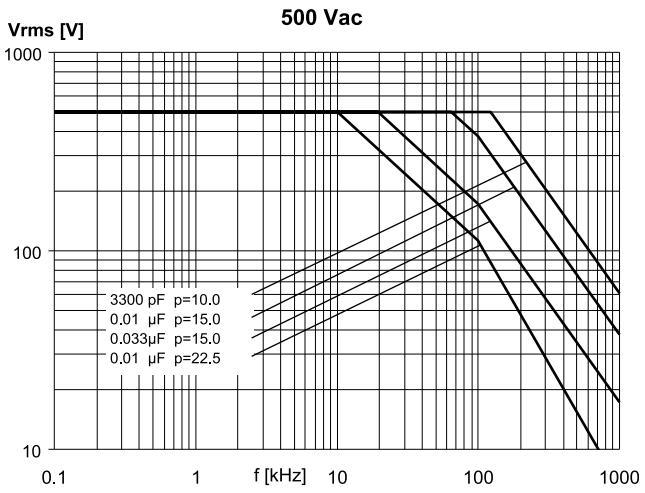
R74 125°C

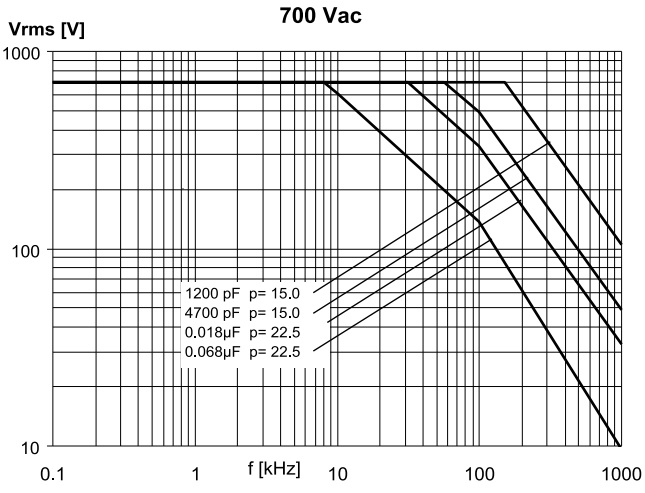
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)





Note: p (pitch) in mm.

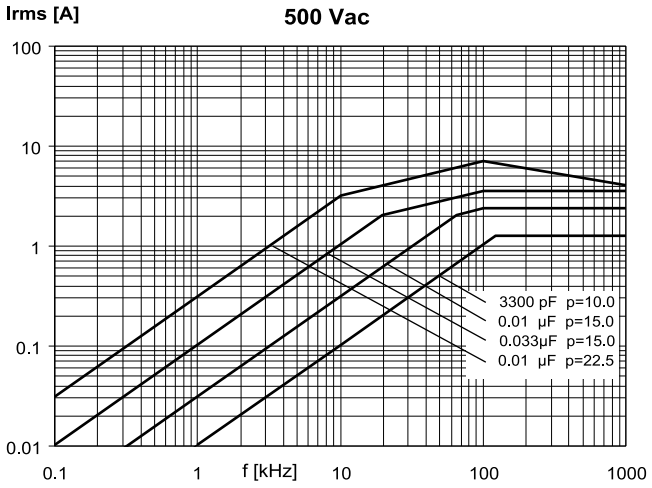
R74 125°C

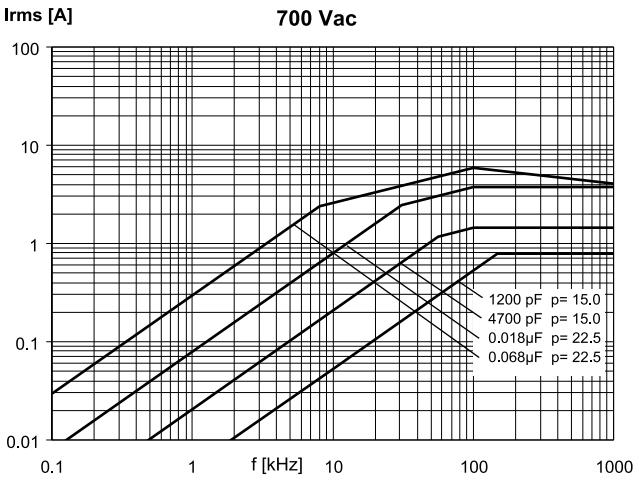
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
A.C. APPLICATIONS

PRODUCT CODE: **R74**

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)





Note: p (pitch) in mm.

R75
MKP Series

Loose

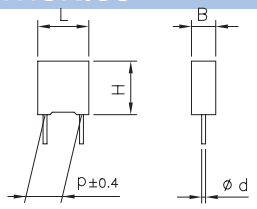
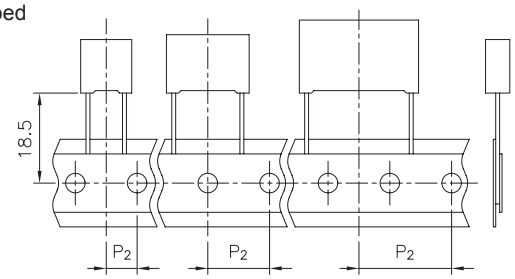


Fig. 1 Fig. 2 Fig. 3

Taped



Ød±0.05	p=7.5	p=10	15≤p≤27.5	p = 37.5
	0.5	0.6	0.8	1.0

All dimensions are in mm.

HIGH PERFORMANCES

METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

Typical applications: deflection circuits in TV-sets and monitors (S-correction), resonant capacitor in electronic ballast and compact lamp, power factor correction and coupling capacitor in SMPS, timing and oscillator circuits.

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

Pitch	Box thickness	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
7.5	All	B +0.1	H +0.1	L +0.2
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	5										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
G = 160V I = 250V M= 400V
P = 630V Q = 1000V R= 1250V
T = 1600V U =2000V

Digit 5 Pitch:
D = 7.5 mm; F = 10 mm; I = 15 mm;
N = 22.5 mm; R = 27.5mm; W = 37.5mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics (0 to 9).

Digit 13 Internal use.

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: aluminium layer deposited by evaporation under vacuum.

Winding: non-inductive type.

Leads: for Ø ≥ 0,6mm : tinned wire
for Ø = 0,5mm : tinned wire, low thermical conductivity

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

Marking: manufacturer's logo, series (R75), dielectric code (MKP), capacitance, tolerance, D.C. rated voltage, manufacturing date code.

Climatic category: 55/105/56 IEC 60068-1

Operating temperature range: -55 to +105°C

Related documents: IEC 60384-16

Table 1 (for more detailed information, please refer to pages 14).

Standard packaging style	Lead length	Taping style			Ordering code
	(mm)	P_2 (mm)	Fig. (No.)	Pitch (mm)	(Digit 10 to 11)
AMMO-PACK		6.35	1	7.5	DQ
AMMO-PACK		12.70	2	10.0/15.0	DQ
AMMO-PACK		19.05	3	22.5	DQ
REEL Ø 355mm		6.35	1	7.5	CK
REEL Ø 355mm		12.70	2	10.0/15.0	GY
REEL Ø 500mm		12.70	2	10.0/15.0	CK
REEL Ø 500mm		19.05	3	22.5/27.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads (p<10mm)	$17^{+1/-2}$				Z3
Loose, long leads (p10mm)	$18^{+1/-1}$				JM
Loose, long leads (p≥15mm)	30^{+5} $25^{+2/-1}$				40 50

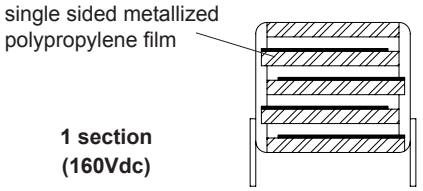
Note: Ammo-pack is the preferred packaging for taped version.

R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

Rated Cap.	160Vdc / 70Vac Reduced sizes				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.10 µF	4.0	9.0	10.0	7.5	100	32 E3	R75GD 3100--B--
0.12 µF	5.0	10.5	10.0	7.5	100	32 E3	R75GD 3120--B--
0.15 µF	5.0	10.5	10.0	7.5	100	32 E3	R75GD 3150--B--
0.18 µF	6.0	12.0	10.5	7.5	100	32 E3	R75GD 3180--A--
0.22 µF	6.0	12.0	10.5	7.5	100	32 E3	R75GD 3220--A--
0.12 µF	4.0	9.0	13.0	10.0	90	28 E3	R75GF 3120--A--
0.15 µF	4.0	9.0	13.0	10.0	90	28 E3	R75GF 3150--A--
0.18 µF	5.0	11.0	13.0	10.0	90	28 E3	R75GF 3180--A--
0.22 µF	5.0	11.0	13.0	10.0	90	28 E3	R75GF 3220--A--
0.27 µF	6.0	12.0	13.0	10.0	90	28 E3	R75GF 3270--A--
0.33 µF	6.0	12.0	13.0	10.0	90	28 E3	R75GF 3330--A--



The derating curves of previous table are not included this catalogue, available upon request.

Rated Cap.	160Vdc / 90Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
0.068 µF	4.0	9.0	10.0	7.5	300	74 E3	R75GD2680--4--
0.082 µF	4.0	9.0	10.0	7.5	300	74 E3	R75GD2820--4--
0.10 µF	5.0	10.5	10.0	7.5	300	74 E3	R75GD3100--4--
0.12 µF	5.0	10.5	10.0	7.5	300	74 E3	R75GD3120--4--
0.15 µF	6.0	12.0	10.5	7.5	300	74 E3	R75GD3150--0--
0.18 µF	6.0	12.0	10.5	7.5	300	74 E3	R75GD3180--3--
0.082 µF	4.0	9.0	13.0	10.0	180	58 E3	R75GF 2820--0--
0.10 µF	4.0	9.0	13.0	10.0	180	58 E3	R75GF 3100--3--
0.12 µF	5.0	11.0	13.0	10.0	180	58 E3	R75GF 3120--0--
0.15 µF	5.0	11.0	13.0	10.0	180	58 E3	R75GF 3150--0--
0.18 µF	6.0	12.0	13.0	10.0	180	58 E3	R75GF 3180--0--
0.22 µF	6.0	12.0	13.0	10.0	180	58 E3	R75GF 3220--3--
0.18 µF	5.0	11.0	18.0	15.0	100	32 E3	R75GI 3180--0--
0.22 µF	5.0	11.0	18.0	15.0	100	32 E3	R75GI 3220--0--
0.27 µF	6.0	12.0	18.0	15.0	100	32 E3	R75GI 3270--0--
0.33 µF	6.0	12.0	18.0	15.0	100	32 E3	R75GI 3330--0--
0.39 µF	7.5	13.5	18.0	15.0	100	32 E3	R75GI 3390--0--
0.47 µF	7.5	13.5	18.0	15.0	100	32 E3	R75GI 3470--0--
0.47 µF	9.0	12.5	18.0	15.0	100	32 E3	R75GI 3470--6--
0.56 µF	8.5	14.5	18.0	15.0	100	32 E3	R75GI 3560--0--
0.56 µF	9.0	12.5	18.0	15.0	100	32 E3	R75GI 3560--6--
0.68 µF	8.5	14.5	18.0	15.0	100	32 E3	R75GI 3680--0--
0.68 µF	13.0	12.0	18.0	15.0	100	32 E3	R75GI 3680--6--
0.82 µF	10.0	16.0	18.0	15.0	100	32 E3	R75GI 3820--0--
1.0 µF	10.0	16.0	18.0	15.0	100	32 E3	R75GI 4100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	160Vdc / 90Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.82 µF	7.0	16.0	26.5	22.5	60	19 E3	R75GN 3820--0--
1.0 µF	7.0	16.0	26.5	22.5	60	19 E3	R75GN 4100--0--
1.2 µF	8.5	17.0	26.5	22.5	60	19 E3	R75GN 4120--0--
1.5 µF	10.0	18.5	26.5	22.5	60	19 E3	R75GN 4150--0--
1.8 µF	10.0	18.5	26.5	22.5	60	19 E3	R75GN 4180--0--
1.5 µF	9.0	17.0	32.0	27.5	50	16 E3	R75GR 4150--0--
1.8 µF	9.0	17.0	32.0	27.5	50	16 E3	R75GR 4180--0--
2.2 µF	11.0	20.0	32.0	27.5	50	16 E6	R75GR 4220--3--
2.7 µF	11.0	20.0	32.0	27.5	50	16 E3	R75GR 4270--0--
3.3 µF	13.0	22.0	32.0	27.5	50	16 E3	R75GR 4330--0--
3.9 µF	13.0	22.0	32.0	27.5	50	16 E3	R75GR 4390--0--
4.7 µF	13.0	25.0	32.0	27.5	50	16 E3	R75GR 4470--3--
5.6 µF	14.0	28.0	32.0	27.5	50	16 E3	R75GR 4560--0--
6.8 µF	18.0	33.0	32.0	27.5	50	16 E3	R75GR 4680--0--
8.2 µF	18.0	33.0	32.0	27.5	50	16 E3	R75GR 4820--0--
10.0 µF	22.0	37.0	32.0	27.5	50	16 E3	R75GR 5100--0--
12.0 µF	22.0	37.0	32.0	27.5	50	16 E3	R75GR 5120--0--
3.3 µF	11.0	22.0	41.5	37.5	35	11 E3	R75GW4330--0--
3.9 µF	11.0	22.0	41.5	37.5	35	11 E3	R75GW4390--0--
4.7 µF	11.0	22.0	41.5	37.5	35	11 E3	R75GW4470--0--
5.6 µF	13.0	24.0	41.5	37.5	35	11 E3	R75GW4560--0--
6.8 µF	16.0	28.5	41.5	37.5	35	11 E3	R75GW4680--0--
8.2 µF	16.0	28.5	41.5	37.5	35	11 E3	R75GW4820--0--
10.0 µF	19.0	32.0	41.5	37.5	35	11 E3	R75GW5100--0--
12.0 µF	19.0	32.0	41.5	37.5	35	11 E3	R75GW5120--0--
15.0 µF	20.0	40.0	41.5	37.5	35	11 E3	R75GW5150--0--
18.0 µF	20.0	40.0	41.5	37.5	35	11 E3	R75GW5180--0--
22.0 µF	24.0	44.0	41.5	37.5	35	11 E3	R75GW5220--0--
27.0 µF	30.0	45.0	41.5	37.5	35	11 E3	R75GW5270--0--
33.0 µF	30.0	45.0	41.5	37.5	35	11 E3	R75GW5330--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

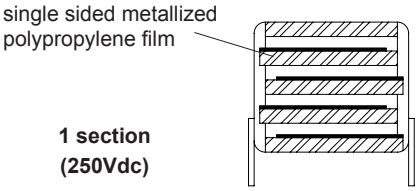
All dimensions are mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**



Rated Cap.	250Vdc / 140Vac Reduced sizes				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.068 µF	4.0	9.0	10.0	7.5	180	90 E3	R75ID 2680--B--
0.082 µF	4.0	9.0	10.0	7.5	180	90 E3	R75ID 2820--B--
0.10 µF	5.0	10.5	10.0	7.5	180	90 E3	R75ID 3100--B--
0.12 µF	5.0	10.5	10.0	7.5	180	90 E3	R75ID 3120--B--
0.15 µF	6.0	12.0	10.5	7.5	180	90 E3	R75ID 3150--A--
0.18 µF	6.0	12.0	10.5	7.5	180	90 E3	R75ID 3180--A--
0.082 µF	4.0	9.0	13.0	10.0	150	75 E3	R75IF 2820--A--
0.10 µF	4.0	9.0	13.0	10.0	150	75 E3	R75IF 3100--A--
0.12 µF	5.0	11.0	13.0	10.0	150	75 E3	R75IF 3120--A--
0.15 µF	5.0	11.0	13.0	10.0	150	75 E3	R75IF 3150--A--
0.18 µF	6.0	12.0	13.0	10.0	150	75 E3	R75IF 3180--A--
0.22 µF	6.0	12.0	13.0	10.0	150	75 E3	R75IF 3220--A--

The derating curves of previous table are not included this catalogue, available upon request.

Rated Cap.	250Vdc / 160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.027 µF	4.0	9.0	10.0	7.5	650	150 E3	R75ID2270--4--
0.033 µF	4.0	9.0	10.0	7.5	650	150 E3	R75ID2330--4--
0.039 µF	4.0	9.0	10.0	7.5	650	150 E3	R75ID2390--4--
0.047 µF	4.0	9.0	10.0	7.5	650	150 E3	R75ID2470--4--
0.056 µF	4.0	9.0	10.0	7.5	650	150 E3	R75ID2560--4--
0.068 µF	5.0	10.5	10.0	7.5	650	150 E3	R75ID2680--4--
0.082 µF	5.0	10.5	10.0	7.5	650	150 E3	R75ID2820--4--
0.10 µF	6.0	12.0	10.5	7.5	650	150 E3	R75ID3100--3--
0.12 µF	6.0	12.0	10.5	7.5	650	150 E3	R75ID3120--3--
0.033 µF	4.0	9.0	13.0	10.0	550	140 E3	R75IF 2330--0--
0.039 µF	4.0	9.0	13.0	10.0	550	140 E3	R75IF 2390--0--
0.047 µF	4.0	9.0	13.0	10.0	550	140 E3	R75IF 2470--3--
0.056 µF	4.0	9.0	13.0	10.0	550	140 E3	R75IF 2560--3--
0.068 µF	4.0	9.0	13.0	10.0	550	140 E3	R75IF 2680--3--
0.082 µF	5.0	11.0	13.0	10.0	550	140 E3	R75IF 2820--3--
0.10 µF	5.0	11.0	13.0	10.0	550	140 E3	R75IF 3100--3--
0.12 µF	6.0	12.0	13.0	10.0	550	140 E3	R75IF 3120--3--
0.15 µF	6.0	12.0	13.0	10.0	550	140 E3	R75IF 3150--3--
0.12 µF	5.0	11.0	18.0	15.0	300	100 E3	R75II 3120--3--
0.15 µF	5.0	11.0	18.0	15.0	300	100 E3	R75II 3150--3--
0.18 µF	5.0	11.0	18.0	15.0	300	100 E3	R75II 3180--4--
0.22 µF	5.0	11.0	18.0	15.0	300	100 E3	R75II 3220--4--
0.27 µF	6.0	12.0	18.0	15.0	300	100 E3	R75II 3270--4--
0.33 µF	6.0	12.0	18.0	15.0	300	100 E3	R75II 3330--4--
0.39 µF	7.5	13.5	18.0	15.0	300	100 E3	R75II 3390--4--
0.39 µF	9.0	12.5	18.0	15.0	300	100 E3	R75II 3390--7--
0.47 µF	7.5	13.5	18.0	15.0	300	100 E3	R75II 3470--4--
0.47 µF	9.0	12.5	18.0	15.0	300	100 E3	R75II 3470--8--
0.56 µF	7.5	13.5	18.0	15.0	300	100 E3	R75II 3560--4--
0.56 µF	9.0	12.5	18.0	15.0	300	100 E3	R75II 3560--8--
0.68 µF	8.5	14.5	18.0	15.0	300	100 E3	R75II 3680--4--
0.68 µF	13.0	12.0	18.0	15.0	300	100 E3	R75II 3680--8--
0.82 µF	10.0	16.0	18.0	15.0	300	100 E3	R75II 3820--4--
0.82 µF	13.0	12.0	18.0	15.0	300	100 E3	R75II 3820--8--
1.0 µF	10.0	16.0	18.0	15.0	300	100 E3	R75II 4100--4--
1.2 µF	11.0	19.0	18.0	15.0	300	100 E3	R75II 4120--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are mm.

Rated Cap.	250Vdc / 160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.39 µF	6.0	15.0	26.5	22.5	125	63 E3	R75IN 3390--3--
0.47 µF	6.0	15.0	26.5	22.5	125	63 E3	R75IN 3470--3--
0.56 µF	6.0	15.0	26.5	22.5	125	63 E3	R75IN 3560--4--
0.68 µF	6.0	15.0	26.5	22.5	125	63 E3	R75IN 3680--4--
0.82 µF	7.0	16.0	26.5	22.5	125	63 E3	R75IN 3820--4--
1.0 µF	7.0	16.0	26.5	22.5	125	63 E3	R75IN 4100--4--
1.2 µF	8.5	17.0	26.5	22.5	125	63 E3	R75IN 4120--4--
1.5 µF	10.0	18.5	26.5	22.5	125	63 E3	R75IN 4150--4--
1.8 µF	10.0	18.5	26.5	22.5	125	63 E3	R75IN 4180--4--
2.2 µF	11.0	20.0	26.5	22.5	125	63 E3	R75IN 4220--4--
2.7 µF	13.0	22.0	26.5	22.5	125	63 E3	R75IN 4270--4--
3.3 µF	13.0	22.0	26.5	22.5	125	63 E3	R75IN 4330--4--
1.0 µF	9.0	17.0	32.0	27.5	100	50 E3	R75IR 4100--3--
1.2 µF	9.0	17.0	32.0	27.5	100	50 E3	R75IR 4120--3--
1.5 µF	9.0	17.0	32.0	27.5	100	50 E3	R75IR 4150--4--
1.8 µF	9.0	17.0	32.0	27.5	100	50 E3	R75IR 4180--4--
2.2 µF	11.0	20.0	32.0	27.5	100	50 E3	R75IR 4220--5--
2.7 µF	11.0	20.0	32.0	27.5	100	50 E3	R75IR 4270--4--
3.3 µF	13.0	22.0	32.0	27.5	100	50 E3	R75IR 4330--4--
3.9 µF	13.0	22.0	32.0	27.5	100	50 E3	R75IR 4390--4--
4.7 µF	13.0	25.0	32.0	27.5	100	50 E3	R75IR 4470--5--
5.6 µF	14.0	28.0	32.0	27.5	100	50 E3	R75IR 4560--4--
6.8 µF	18.0	33.0	32.0	27.5	100	50 E3	R75IR 4680--4--
8.2 µF	18.0	33.0	32.0	27.5	100	50 E3	R75IR 4820--4--
10.0 µF	22.0	37.0	32.0	27.5	100	50 E3	R75IR 5100--4--
12.0 µF	22.0	37.0	32.0	27.5	100	50 E3	R75IR 5120--4--
3.3 µF	11.0	22.0	41.5	37.5	40	20 E3	R75IW4330--4--
3.9 µF	11.0	22.0	41.5	37.5	40	20 E3	R75IW4390--4--
4.7 µF	11.0	22.0	41.5	37.5	40	20 E3	R75IW4470--4--
5.6 µF	13.0	24.0	41.5	37.5	40	20 E3	R75IW4560--4--
6.8 µF	16.0	28.5	41.5	37.5	40	20 E3	R75IW4680--4--
8.2 µF	16.0	28.5	41.5	37.5	40	20 E3	R75IW4820--4--
10.0 µF	19.0	32.0	41.5	37.5	40	20 E3	R75IW5100--4--
12.0 µF	19.0	32.0	41.5	37.5	40	20 E3	R75IW5120--4--
15.0 µF	20.0	40.0	41.5	37.5	40	20 E3	R75IW5150--4--
18.0 µF	20.0	40.0	41.5	37.5	40	20 E3	R75IW5180--4--
22.0 µF	24.0	44.0	41.5	37.5	40	20 E3	R75IW5220--4--
27.0 µF	24.0	44.0	41.5	37.5	40	20 E3	R75IW5270--4--
33.0 µF	30.0	45.0	41.5	37.5	40	20 E3	R75IW5330--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

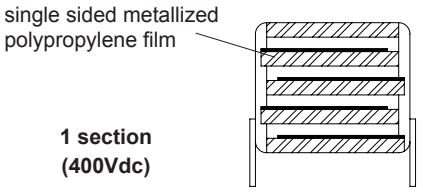
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

Rated Cap.	400Vdc / 200Vac Reduced sizes				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.027 µF	4.0	9.0	10.0	7.5	390	312 E3	R75MD2270--B--
0.033 µF	5.0	10.5	10.0	7.5	390	312 E3	R75MD2330--B--
0.039 µF	5.0	10.5	10.0	7.5	390	312 E3	R75MD2390--B--
0.047 µF	5.0	10.5	10.0	7.5	390	312 E3	R75MD2470--B--
0.056 µF	6.0	12.0	10.5	7.5	390	312 E3	R75MD2560--A--
0.068 µF	6.0	12.0	10.5	7.5	390	312 E3	R75MD2680--A--



The derating curves of previous table are not included this catalogue, available upon request.

Rated Cap.	400Vdc / 220Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.010 µF	4.0	9.0	10.0	7.5	1500	360 E3	R75MD2100--4--
0.012 µF	4.0	9.0	10.0	7.5	1500	360 E3	R75MD2120--4--
0.015 µF	4.0	9.0	10.0	7.5	1500	360 E3	R75MD2150--4--
0.018 µF	4.0	9.0	10.0	7.5	1500	360 E3	R75MD2180--4--
0.022 µF	4.0	9.0	10.0	7.5	1500	360 E3	R75MD2220--4--
0.027 µF	5.0	10.5	10.0	7.5	1500	360 E3	R75MD2270--4--
0.033 µF	5.0	10.5	10.0	7.5	1500	360 E3	R75MD2330--4--
0.039 µF	6.0	12.0	10.5	7.5	1500	360 E3	R75MD2390--3--
0.047 µF	6.0	12.0	10.5	7.5	1500	360 E3	R75MD2470--3--
0.015 µF	4.0	9.0	13.0	10.0	1300	336 E3	R75MF 2150--0--
0.018 µF	4.0	9.0	13.0	10.0	1300	336 E3	R75MF 2180--0--
0.022 µF	4.0	9.0	13.0	10.0	1300	336 E3	R75MF 2220--3--
0.027 µF	4.0	9.0	13.0	10.0	1300	336 E3	R75MF 2270--3--
0.033 µF	5.0	11.0	13.0	10.0	1300	336 E3	R75MF 2330--3--
0.039 µF	5.0	11.0	13.0	10.0	1300	336 E3	R75MF 2390--3--
0.047 µF	5.0	11.0	13.0	10.0	1300	336 E3	R75MF 2470--3--
0.056 µF	6.0	12.0	13.0	10.0	1300	336 E3	R75MF 2560--3--
0.068 µF	6.0	12.0	13.0	10.0	1300	336 E3	R75MF 2680--3--
0.068 µF	5.0	11.0	18.0	15.0	900	240 E3	R75MI 2680--3--
0.082 µF	5.0	11.0	18.0	15.0	900	240 E3	R75MI 2820--3--
0.10 µF	5.0	11.0	18.0	15.0	900	240 E3	R75MI 3100--3--
0.12 µF	6.0	12.0	18.0	15.0	900	240 E3	R75MI 3120--3--
0.15 µF	6.0	12.0	18.0	15.0	900	240 E3	R75MI 3150--3--
0.18 µF	7.5	13.5	18.0	15.0	900	240 E3	R75MI 3180--3--
0.22 µF	7.5	13.5	18.0	15.0	900	240 E3	R75MI 3220--3--
0.22 µF	9.0	12.5	18.0	15.0	900	240 E3	R75MI 3220--7--
0.27 µF	8.5	14.5	18.0	15.0	900	240 E3	R75MI 3270--3--
0.27 µF	9.0	12.5	18.0	15.0	900	240 E3	R75MI 3270--7--
0.33 µF	10.0	16.0	18.0	15.0	900	240 E3	R75MI 3330--3--
0.33 µF	13.0	12.0	18.0	15.0	900	240 E3	R75MI 3330--7--
0.39 µF	10.0	16.0	18.0	15.0	900	240 E3	R75MI 3390--3--
0.47 µF	10.0	16.0	18.0	15.0	900	240 E3	R75MI 3470--3--
0.56 µF	11.0	19.0	18.0	15.0	900	240 E3	R75MI 3560--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	400Vdc / 220Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.18 µF	6.0	15.0	26.5	22.5	300	144 E3	R75MN 3180--3--
0.22 µF	6.0	15.0	26.5	22.5	300	144 E3	R75MN 3220--3--
0.27 µF	6.0	15.0	26.5	22.5	300	144 E3	R75MN 3270--3--
0.33 µF	6.0	15.0	26.5	22.5	300	144 E3	R75MN 3330--3--
0.39 µF	7.0	16.0	26.5	22.5	300	144 E3	R75MN 3390--3--
0.47 µF	7.0	16.0	26.5	22.5	300	144 E3	R75MN 3470--3--
0.56 µF	8.5	17.0	26.5	22.5	300	144 E3	R75MN 3560--3--
0.68 µF	10.0	18.5	26.5	22.5	300	144 E3	R75MN 3680--3--
0.82 µF	10.0	18.5	26.5	22.5	300	144 E3	R75MN 3820--3--
1.0 µF	11.0	20.0	26.5	22.5	300	144 E3	R75MN 4100--3--
1.2 µF	13.0	22.0	26.5	22.5	300	144 E3	R75MN 4120--3--
1.5 µF	13.0	22.0	26.5	22.5	300	144 E3	R75MN 4150--3--
0.56 µF	9.0	17.0	32.0	27.5	130	104 E3	R75MR 3560--3--
0.68 µF	9.0	17.0	32.0	27.5	130	104 E3	R75MR 3680--3--
0.82 µF	9.0	17.0	32.0	27.5	130	104 E3	R75MR 3820--3--
1.0 µF	11.0	20.0	32.0	27.5	130	104 E3	R75MR 4100--4--
1.2 µF	11.0	20.0	32.0	27.5	130	104 E3	R75MR 4120--3--
1.5 µF	13.0	22.0	32.0	27.5	130	104 E3	R75MR 4150--3--
1.8 µF	13.0	22.0	32.0	27.5	130	104 E3	R75MR 4180--3--
2.2 µF	13.0	25.0	32.0	27.5	130	104 E3	R75MR 4220--4--
2.7 µF	14.0	28.0	32.0	27.5	130	104 E3	R75MR 4270--3--
3.3 µF	18.0	33.0	32.0	27.5	130	104 E3	R75MR 4330--3--
3.9 µF	18.0	33.0	32.0	27.5	130	104 E3	R75MR 4390--3--
4.7 µF	22.0	37.0	32.0	27.5	130	104 E3	R75MR 4470--3--
5.6 µF	22.0	37.0	32.0	27.5	130	104 E3	R75MR 4560--3--
1.2 µF	11.0	22.0	41.5	37.5	70	56 E3	R75MW4120--3--
1.5 µF	11.0	22.0	41.5	37.5	70	56 E3	R75MW4150--3--
1.8 µF	11.0	22.0	41.5	37.5	70	56 E3	R75MW4180--3--
2.2 µF	11.0	22.0	41.5	37.5	70	56 E3	R75MW4220--3--
2.7 µF	13.0	24.0	41.5	37.5	70	56 E3	R75MW4270--3--
3.3 µF	16.0	28.5	41.5	37.5	70	56 E3	R75MW4330--3--
3.9 µF	16.0	28.5	41.5	37.5	70	56 E3	R75MW4390--3--
4.7 µF	19.0	32.0	41.5	37.5	70	56 E3	R75MW4470--3--
5.6 µF	19.0	32.0	41.5	37.5	70	56 E3	R75MW4560--3--
6.8 µF	19.0	32.0	41.5	37.5	70	56 E3	R75MW4680--3--
8.2 µF	20.0	40.0	41.5	37.5	70	56 E3	R75MW4820--3--
10.0 µF	20.0	40.0	41.5	37.5	70	56 E3	R75MW5100--4--
12.0 µF	24.0	44.0	41.5	37.5	70	56 E3	R75MW5120--3--
15.0 µF	30.0	45.0	41.5	37.5	70	56 E3	R75MW5150--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

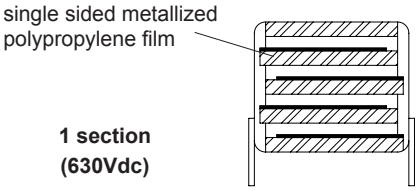
* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 151)

R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

Rated Cap.	630Vdc / 220Vac* Reduced sizes				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.010 µF	4.0	9.0	10.0	7.5	600	760 E3	R75PD2100--B--
0.012 µF	4.0	9.0	10.0	7.5	600	760 E3	R75PD2120--B--
0.015 µF	5.0	10.5	10.0	7.5	600	760 E3	R75PD2150--B--
0.018 µF	5.0	10.5	10.0	7.5	600	760 E3	R75PD2180--B--
0.022 µF	6.0	12.0	10.5	7.5	600	760 E3	R75PD2220--A--
0.027 µF	6.0	12.0	10.5	7.5	600	760 E3	R75PD2270--A--



The derating curves of previous table are not included this catalogue, available upon request.

Rated Cap.	630Vdc / 250Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1100--4--
1200 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1120--4--
1500 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1150--4--
1800 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1180--4--
2200 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1220--4--
2700 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1270--4--
3300 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1330--4--
3900 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1390--4--
4700 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1470--4--
5600 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1560--4--
6800 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1680--4--
8200 pF	4.0	9.0	10.0	7.5	2400	760 E3	R75PD1820--4--
0.010 µF	5.0	10.5	10.0	7.5	2400	760 E3	R75PD2100--4--
0.012 µF	5.0	10.5	10.0	7.5	2400	760 E3	R75PD2120--4--
0.015 µF	6.0	12.0	10.5	7.5	2400	760 E3	R75PD2150--3--
0.018 µF	6.0	12.0	10.5	7.5	2400	760 E3	R75PD2180--3--
1000 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1100--0--
1200 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1120--0--
1500 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1150--0--
1800 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1180--0--
2200 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1220--0--
2700 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1270--0--
3300 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1330--0--
3900 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1390--0--
4700 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1470--0--
5600 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1560--0--
6800 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1680--0--
8200 pF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF1820--0--
0.010 µF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF2100--3--
0.012 µF	4.0	9.0	13.0	10.0	2000	690 E3	R75PF2120--3--
0.015 µF	5.0	11.0	13.0	10.0	2000	690 E3	R75PF2150--3--
0.018 µF	5.0	11.0	13.0	10.0	2000	690 E3	R75PF2180--3--
0.022 µF	6.0	12.0	13.0	10.0	2000	690 E3	R75PF2220--3--
0.027 µF	5.0	11.0	18.0	15.0	1000	504 E3	R75PI 2270--0--
0.033 µF	5.0	11.0	18.0	15.0	1000	504 E3	R75PI 2330--0--
0.039 µF	5.0	11.0	18.0	15.0	1000	504 E3	R75PI 2390--3--
0.047 µF	5.0	11.0	18.0	15.0	1000	504 E3	R75PI 2470--3--
0.056 µF	5.0	11.0	18.0	15.0	1000	504 E3	R75PI 2560--3--
0.068 µF	6.0	12.0	18.0	15.0	1000	504 E3	R75PI 2680--3--
0.082 µF	6.0	12.0	18.0	15.0	1000	504 E3	R75PI 2820--3--
0.10 µF	7.5	13.5	18.0	15.0	1000	504 E3	R75PI 3100--3--
0.10 µF	9.0	12.5	18.0	15.0	1000	504 E3	R75PI 3100--7--
0.12 µF	7.5	13.5	18.0	15.0	1000	504 E3	R75PI 3120--3--
0.12 µF	9.0	12.5	18.0	15.0	1000	504 E3	R75PI 3120--7--
0.15 µF	8.5	14.5	18.0	15.0	1000	504 E3	R75PI 3150--3--
0.15 µF	13.0	12.0	18.0	15.0	1000	504 E3	R75PI 3150--7--
0.18 µF	10.0	16.0	18.0	15.0	1000	504 E3	R75PI 3180--3--
0.18 µF	13.0	12.0	18.0	15.0	1000	504 E3	R75PI 3180--7--
0.22 µF	10.0	16.0	18.0	15.0	1000	504 E3	R75PI 3220--3--
0.27 µF	11.0	19.0	18.0	15.0	1000	504 E3	R75PI 3270--3--
0.33 µF	11.0	19.0	18.0	15.0	1000	504 E3	R75PI 3330--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	630Vdc / 250Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.082 µF	6.0	15.0	26.5	22.5	400	315 E3	R75PN 2820--3--
0.10 µF	6.0	15.0	26.5	22.5	400	315 E3	R75PN 3100--3--
0.12 µF	6.0	15.0	26.5	22.5	400	315 E3	R75PN 3120--3--
0.15 µF	6.0	15.0	26.5	22.5	400	315 E3	R75PN 3150--3--
0.18 µF	7.0	16.0	26.5	22.5	400	315 E3	R75PN 3180--3--
0.22 µF	7.0	16.0	26.5	22.5	400	315 E3	R75PN 3220--3--
0.27 µF	8.5	17.0	26.5	22.5	400	315 E3	R75PN 3270--3--
0.33 µF	10.0	18.5	26.5	22.5	400	315 E3	R75PN 3330--3--
0.39 µF	10.0	18.5	26.5	22.5	400	315 E3	R75PN 3390--3--
0.47 µF	11.0	20.0	26.5	22.5	400	315 E3	R75PN 3470--3--
0.56 µF	11.0	20.0	26.5	22.5	400	315 E3	R75PN 3560--3--
0.68 µF	13.0	22.0	26.5	22.5	400	315 E3	R75PN 3680--3--
0.39 µF	9.0	17.0	32.0	27.5	180	227 E3	R75PR 3390--3--
0.47 µF	9.0	17.0	32.0	27.5	180	227 E3	R75PR 3470--4--
0.56 µF	11.0	20.0	32.0	27.5	180	227 E3	R75PR 3560--3--
0.68 µF	11.0	20.0	32.0	27.5	180	227 E3	R75PR 3680--3--
0.82 µF	13.0	22.0	32.0	27.5	180	227 E3	R75PR 3820--3--
1.0 µF	13.0	22.0	32.0	27.5	180	227 E3	R75PR 4100--3--
1.2 µF	14.0	28.0	32.0	27.5	180	227 E3	R75PR 4120--4--
1.5 µF	14.0	28.0	32.0	27.5	180	227 E3	R75PR 4150--3--
1.8 µF	18.0	33.0	32.0	27.5	180	227 E3	R75PR 4180--3--
2.2 µF	18.0	33.0	32.0	27.5	180	227 E3	R75PR 4220--3--
2.7 µF	22.0	37.0	32.0	27.5	180	227 E3	R75PR 4270--3--
3.3 µF	22.0	37.0	32.0	27.5	180	227 E3	R75PR 4330--3--
0.68 µF	11.0	22.0	41.5	37.5	90	113 E3	R75PW3680--3--
0.82 µF	11.0	22.0	41.5	37.5	90	113 E3	R75PW3820--3--
1.0 µF	11.0	22.0	41.5	37.5	90	113 E3	R75PW4100--3--
1.2 µF	13.0	24.0	41.5	37.5	90	113 E3	R75PW4120--3--
1.5 µF	13.0	24.0	41.5	37.5	90	113 E3	R75PW4150--3--
1.8 µF	16.0	28.5	41.5	37.5	90	113 E3	R75PW4180--3--
2.2 µF	16.0	28.5	41.5	37.5	90	113 E3	R75PW4220--3--
2.7 µF	19.0	32.0	41.5	37.5	90	113 E3	R75PW4270--3--
3.3 µF	19.0	32.0	41.5	37.5	90	113 E3	R75PW4330--3--
3.9 µF	19.0	32.0	41.5	37.5	90	113 E3	R75PW4390--4--
4.7 µF	20.0	40.0	41.5	37.5	90	113 E3	R75PW4470--3--
5.6 µF	20.0	40.0	41.5	37.5	90	113 E3	R75PW4560--4--
6.8 µF	24.0	44.0	41.5	37.5	90	113 E3	R75PW4680--3--
8.2 µF	30.0	45.0	41.5	37.5	90	113 E3	R75PW4820--3--

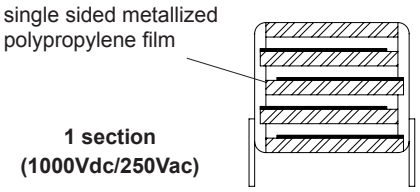
Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)
All dimensions are mm.

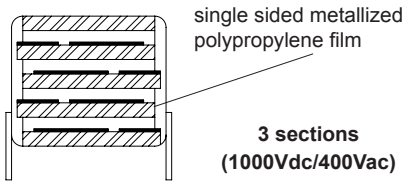
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.
* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 151)

R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**





Rated Cap.	1000Vdc / 250Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2µs)	
0.012 µF	5.0	11.0	18.0	15.0	2000	900 E3	R75QI 2120--0--
0.015 µF	5.0	11.0	18.0	15.0	2000	900 E3	R75QI 2150--0--
0.018 µF	5.0	11.0	18.0	15.0	2000	900 E3	R75QI 2180--0--
0.022 µF	5.0	11.0	18.0	15.0	2000	900 E3	R75QI 2220--0--
0.027 µF	6.0	12.0	18.0	15.0	2000	900 E3	R75QI 2270--0--
0.033 µF	6.0	12.0	18.0	15.0	2000	900 E3	R75QI 2330--0--
0.039 µF	7.5	13.5	18.0	15.0	2000	900 E3	R75QI 2390--0--
0.047 µF	7.5	13.5	18.0	15.0	2000	900 E3	R75QI 2470--0--
0.047 µF	9.0	12.5	18.0	15.0	2000	900 E3	R75QI 2470--6--
0.056 µF	8.5	14.5	18.0	15.0	2000	900 E3	R75QI 2560--0--
0.056 µF	9.0	12.5	18.0	15.0	2000	900 E3	R75QI 2560--6--
0.068 µF	8.5	14.5	18.0	15.0	2000	900 E3	R75QI 2680--0--
0.068 µF	13.0	12.0	18.0	15.0	2000	900 E3	R75QI 2680--6--
0.082 µF	10.0	16.0	18.0	15.0	2000	900 E3	R75QI 2820--0--
0.10 µF	11.0	19.0	18.0	15.0	2000	900 E3	R75QI 3100--0--
0.047 µF	6.0	15.0	26.5	22.5	600	600 E3	R75QN 2470--0--
0.056 µF	6.0	15.0	26.5	22.5	600	600 E3	R75QN 2560--0--
0.068 µF	6.0	15.0	26.5	22.5	600	600 E3	R75QN 2680--0--
0.082 µF	7.0	16.0	26.5	22.5	600	600 E3	R75QN 2820--0--
0.10 µF	7.0	16.0	26.5	22.5	600	600 E3	R75QN 3100--0--
0.12 µF	8.5	17.0	26.5	22.5	600	600 E3	R75QN 3120--0--
0.15 µF	10.0	18.5	26.5	22.5	600	600 E3	R75QN 3150--0--
0.18 µF	10.0	18.5	26.5	22.5	600	600 E3	R75QN 3180--0--
0.22 µF	11.0	20.0	26.5	22.5	600	600 E3	R75QN 3220--0--
0.15 µF	9.0	17.0	32.0	27.5	200	400 E3	R75QR 3150--0--
0.18 µF	9.0	17.0	32.0	27.5	200	400 E4	R75QR 3180--0--
0.22 µF	11.0	20.0	32.0	27.5	200	400E4	R75QR 3220--1--
0.27 µF	11.0	20.0	32.0	27.5	200	400 E3	R75QR 3270--0--
0.33 µF	13.0	22.0	32.0	27.5	200	400 E3	R75QR 3330--0--
0.39 µF	13.0	22.0	32.0	27.5	200	400 E3	R75QR 3390--0--
0.47 µF	13.0	25.0	32.0	27.5	200	400 E3	R75QR 3470--1--
0.56 µF	14.0	28.0	32.0	27.5	200	400 E3	R75QR 3560--1--
0.68 µF	18.0	33.0	32.0	27.5	200	400 E3	R75QR 3680--0--
0.82 µF	18.0	33.0	32.0	27.5	200	400 E3	R75QR 3820--0--
1.0 µF	18.0	33.0	32.0	27.5	200	400 E3	R75QR 4100--0--
1.2 µF	22.0	37.0	32.0	27.5	200	400 E4	R75QR 4120--0--
1.5 µF	22.0	37.0	32.0	27.5	200	400 E3	R75QR 4150--0--
0.27 µF	11.0	22.0	41.5	37.5	150	300 E3	R75QW3270--0--
0.33 µF	11.0	22.0	41.5	37.5	150	300 E3	R75QW3330--0--
0.39 µF	11.0	22.0	41.5	37.5	150	300 E3	R75QW3390--0--
0.47 µF	11.0	22.0	41.5	37.5	150	300 E3	R75QW3470--0--
0.56 µF	13.0	24.0	41.5	37.5	150	300 E3	R75QW3560--0--
0.68 µF	13.0	24.0	41.5	37.5	150	300E3	R75QW3680--0--
0.82 µF	16.0	28.5	41.5	37.5	150	300 E3	R75QW3820--0--
1.0 µF	16.0	28.5	41.5	37.5	150	300 E3	R75QW4100--0--
1.2 µF	19.0	32.0	41.5	37.5	150	300 E3	R75QW4120--0--
1.5 µF	19.0	32.0	41.5	37.5	150	300 E3	R75QW4150--0--
1.8 µF	20.0	40.0	41.5	37.5	150	300 E3	R75QW4180--0--
2.2 µF	20.0	40.0	41.5	37.5	150	300 E3	R75QW4220--0--
2.7 µF	24.0	44.0	41.5	37.5	150	300 E3	R75QW4270--0--
3.3 µF	30.0	45.0	41.5	37.5	150	300 E3	R75QW4330--0--
3.9 µF	30.0	45.0	41.5	37.5	150	300 E3	R75QW4390--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	1000Vdc / 400Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
220 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0220--3--
270 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0270--3--
330 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0330--3--
390 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0390--3--
470 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0470--3--
560 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0560--3--
680 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0680--3--
820 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 0820--3--
1000 pF	3.0	8.0	10.0	7.5	4000	8.0 E6	R75QD 1100--3--
1200 pF	4.0	9.0	10.0	7.5	4000	8.0 E6	R75QD 1120--3--
1500 pF	4.0	9.0	10.0	7.5	4000	8.0 E6	R75QD 1150--3--
1800 pF	4.0	9.0	10.0	7.5	4000	8.0 E6	R75QD 1180--3--
2200 pF	4.0	9.0	10.0	7.5	4000	8.0 E6	R75QD 1220--3--
2700 pF	4.0	9.0	10.0	7.5	4000	8.0 E6	R75QD 1270--3--
3300 pF	4.0	9.0	10.0	7.5	4000	8.0 E6	R75QD 1330--3--
3900 pF	5.0	10.5	10.0	7.5	4000	8.0 E6	R75QD 1390--3--
4700 pF	5.0	10.5	10.0	7.5	4000	8.0 E6	R75QD 1470--3--
5600 pF	5.0	10.5	10.0	7.5	4000	8.0 E6	R75QD 1560--3--
6800 pF	6.0	12.0	10.5	7.5	4000	8.0 E6	R75QD 1680--3--
8200 pF	6.0	12.0	10.5	7.5	4000	8.0 E6	R75QD 1820--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.

The pulse characteristic K_0 depends on the voltage waveform and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

Note: * Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 151)

R75

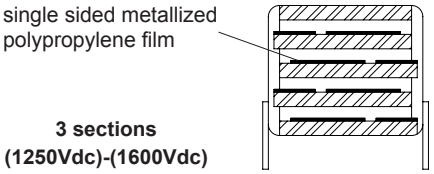
MKP Series

METALLIZED

HIGH PERFORMANCES

POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**



Rated Cap.	1250Vdc / 600Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
8200 pF	5.0	11.0	18.0	15.0	3300	825 E4	R75RI 1820--3--
0.010 µF	5.0	11.0	18.0	15.0	3300	825 E4	R75RI 2100--3--
0.012 µF	6.0	12.0	18.0	15.0	3300	825 E4	R75RI 2120--3--
0.015 µF	6.0	12.0	18.0	15.0	3300	825 E4	R75RI 2150--3--
0.018 µF	7.5	13.5	18.0	15.0	3300	825 E4	R75RI 2180--3--
0.022 µF	7.5	13.5	18.0	15.0	3300	825 E4	R75RI 2220--3--
0.022 µF	9.0	12.5	18.0	15.0	3300	825 E4	R75RI 2220--7--
0.027 µF	8.5	14.5	18.0	15.0	3300	825 E4	R75RI 2270--3--
0.027 µF	13.0	12.0	18.0	15.0	3300	825 E4	R75RI 2270--7--
0.033 µF	10.0	16.0	18.0	15.0	3300	825 E4	R75RI 2330--3--
0.033 µF	13.0	12.0	18.0	15.0	3300	825 E4	R75RI 2330--7--
0.039 µF	10.0	16.0	18.0	15.0	3300	825 E4	R75RI 2390--3--
0.047 µF	11.0	19.0	18.0	15.0	3300	825 E4	R75RI 2470--3--
0.056 µF	11.0	19.0	18.0	15.0	3300	825 E4	R75RI 2560--3--
0.033 µF	6.0	15.0	26.5	22.5	2100	525 E4	R75RN 2330--3--
0.039 µF	6.0	15.0	26.5	22.5	2100	525 E4	R75RN 2390--3--
0.047 µF	7.0	16.0	26.5	22.5	2100	525 E4	R75RN 2470--3--
0.056 µF	7.0	16.0	26.5	22.5	2100	525 E4	R75RN 2560--3--
0.068 µF	8.5	17.0	26.5	22.5	2100	525 E4	R75RN 2680--3--
0.082 µF	10.0	18.5	26.5	22.5	2100	525 E4	R75RN 2820--3--
0.10 µF	10.0	18.5	26.5	22.5	2100	525 E4	R75RN 3100--3--
0.12 µF	11.0	20.0	26.5	22.5	2100	525 E4	R75RN 3120--3--
0.15 µF	13.0	22.0	26.5	22.5	2100	525 E4	R75RN 3150--3--
0.10 µF	9.0	17.0	32.0	27.5	500	125 E4	R75RR 3100--4--
0.12 µF	9.0	17.0	32.0	27.5	500	125 E4	R75RR 3120--4--
0.15 µF	11.0	20.0	32.0	27.5	500	125 E4	R75RR 3150--4--
0.18 µF	11.0	20.0	32.0	27.5	500	125 E4	R75RR 3180--4--
0.22 µF	13.0	22.0	32.0	27.5	500	125 E4	R75RR 3220--4--
0.27 µF	13.0	25.0	32.0	27.5	500	125 E4	R75RR 3270--4--
0.33 µF	13.0	25.0	32.0	27.5	500	125 E4	R75RR 3330--4--
0.39 µF	18.0	33.0	32.0	27.5	500	125 E4	R75RR 3390--4--
0.47 µF	18.0	33.0	32.0	27.5	500	125 E4	R75RR 3470--4--
0.56 µF	18.0	33.0	32.0	27.5	500	125 E4	R75RR 3560--4--
0.68 µF	22.0	37.0	32.0	27.5	500	125 E4	R75RR 3680--4--
0.82 µF	22.0	37.0	32.0	27.5	500	125 E4	R75RR 3820--4--
0.27 µF	11.0	22.0	41.5	37.5	360	125 E4	R75RW3270--3--
0.33 µF	11.0	22.0	41.5	37.5	360	125 E4	R75RW3330--3--
0.39 µF	13.0	24.0	41.5	37.5	360	125 E4	R75RW3390--3--
0.47 µF	16.0	28.5	41.5	37.5	360	125 E4	R75RW3470--4--
0.56 µF	16.0	28.5	41.5	37.5	360	125 E4	R75RW3560--4--
0.68 µF	16.0	28.5	41.5	37.5	360	125 E4	R75RW3680--4--
0.82 µF	19.0	32.0	41.5	37.5	360	125 E4	R75RW3820--4--
1.0 µF	20.0	40.0	41.5	37.5	360	125 E4	R75RW4100--3--
1.2 µF	20.0	40.0	41.5	37.5	360	125 E4	R75RW4120--4--
1.5 µF	24.0	44.0	41.5	37.5	360	125 E4	R75RW4150--4--
1.8 µF	24.0	44.0	41.5	37.5	360	125 E4	R75RW4180--3--
2.2 µF	30.0	45.0	41.5	37.5	360	125 E4	R75RW4220--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	1600Vdc / 650Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
3900 pF	4.0	10.0	18.0	15.0	6000	1900 E4	R75TI 1390--3--
4700 pF	4.0	10.0	18.0	15.0	6000	1900 E4	R75TI 1470--3--
5600 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R75TI 1560--3--
6800 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R75TI 1680--3--
8200 pF	6.0	12.0	18.0	15.0	6000	1900 E4	R75TI 1820--3--
0.010 µF	6.0	12.0	18.0	15.0	6000	1900 E4	R75TI 2100--3--
0.012 µF	7.5	13.5	18.0	15.0	6000	1900 E4	R75TI 2120--3--
0.015 µF	7.5	13.5	18.0	15.0	6000	1900 E4	R75TI 2150--3--
0.018 µF	8.5	14.5	18.0	15.0	6000	1900 E4	R75TI 2180--3--
0.018 µF	9.0	12.5	18.0	15.0	6000	1900 E4	R75TI 2180--7--
0.022 µF	10.0	16.0	18.0	15.0	6000	1900 E4	R75TI 2220--3--
0.022 µF	13.0	12.0	18.0	15.0	6000	1900 E4	R75TI 2220--7--
0.027 µF	10.0	16.0	18.0	15.0	6000	1900 E4	R75TI 2270--3--
0.033 µF	11.0	19.0	18.0	15.0	6000	1900 E4	R75TI 2330--3--
0.027 µF	6.0	15.0	26.5	22.5	3000	960 E4	R75TN 2270--3--
0.033 µF	7.0	16.0	26.5	22.5	3000	960 E4	R75TN 2330--3--
0.039 µF	7.0	16.0	26.5	22.5	3000	960 E4	R75TN 2390--3--
0.047 µF	8.5	17.0	26.5	22.5	3000	960 E4	R75TN 2470--3--
0.056 µF	10.0	18.5	26.5	22.5	3000	960 E4	R75TN 2560--3--
0.068 µF	10.0	18.5	26.5	22.5	3000	960 E4	R75TN 2680--3--
0.082 µF	11.0	20.0	26.5	22.5	3000	960 E4	R75TN 2820--3--
0.10 µF	13.0	22.0	26.5	22.5	3000	960 E4	R75TN 3100--3--
0.12 µF	13.0	22.0	26.5	22.5	3000	960 E4	R75TN 3120--3--
0.068 µF	9.0	17.0	32.0	27.5	1500	480 E4	R75TR 2680--3--
0.082 µF	9.0	17.0	32.0	27.5	1500	480 E4	R75TR 2820--3--
0.10 µF	11.0	20.0	32.0	27.5	1500	480 E4	R75TR 3100--4--
0.12 µF	11.0	20.0	32.0	27.5	1500	480 E4	R75TR 3120--3--
0.15 µF	13.0	22.0	32.0	27.5	1500	480 E4	R75TR 3150--3--
0.18 µF	13.0	22.0	32.0	27.5	1500	480 E4	R75TR 3180--3--
0.22 µF	13.0	25.0	32.0	27.5	1500	480 E4	R75TR 3220--4--
0.27 µF	18.0	33.0	32.0	27.5	1500	480 E4	R75TR 3270--3--
0.33 µF	18.0	33.0	32.0	27.5	1500	480 E4	R75TR 3330--3--
0.39 µF	18.0	33.0	32.0	27.5	1500	480 E4	R75TR 3390--3--
0.47 µF	22.0	37.0	32.0	27.5	1500	480 E4	R75TR 3470--3--
0.56 µF	22.0	37.0	32.0	27.5	1500	480 E4	R75TR 3560--3--
0.18 µF	11.0	22.0	41.5	37.5	750	240 E4	R75TW 3180--3--
0.22 µF	11.0	22.0	41.5	37.5	750	240 E4	R75TW 3220--3--
0.27 µF	13.0	24.0	41.5	37.5	750	240 E4	R75TW 3270--3--
0.33 µF	16.0	28.5	41.5	37.5	750	240 E4	R75TW 3330--3--
0.39 µF	16.0	28.5	41.5	37.5	750	240 E4	R75TW 3390--3--
0.47 µF	16.0	28.5	41.5	37.5	750	240 E4	R75TW 3470--3--
0.56 µF	19.0	32.0	41.5	37.5	750	240 E4	R75TW 3560--3--
0.68 µF	19.0	32.0	41.5	37.5	750	240 E4	R75TW 3680--3--
0.82 µF	20.0	40.0	41.5	37.5	750	240 E4	R75TW 3820--3--
1.0 µF	24.0	44.0	41.5	37.5	750	240 E4	R75TW 4100--3--
1.2 µF	24.0	44.0	41.5	37.5	750	240 E4	R75TW 4120--3--
1.5 µF	30.0	45.0	41.5	37.5	750	240 E4	R75TW 4150--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)
All dimensions are mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

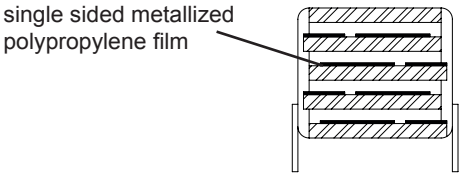
R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

Rated Cap.	2000Vdc / 700Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1100--4--
1200 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1120--4--
1500 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1150--4--
1800 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1180--4--
2200 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1220--4--
2700 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1270--4--
3300 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R75UI 1330--4--
3900 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R75UI 1390--3--
4700 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R75UI 1470--3--
5600 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R75UI 1560--3--
6800 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R75UI 1680--3--
8200 pF	7.5	13.5	18.0	15.0	9500	3800 E4	R75UI 1820--3--
0.010 µF	7.5	13.5	18.0	15.0	9500	3800 E4	R75UI 2100--3--
0.012 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R75UI 2120--3--
0.012 µF	9.0	12.5	18.0	15.0	9500	3800 E4	R75UI 2120--7--
0.015 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R75UI 2150--3--
0.015 µF	13.0	12.0	18.0	15.0	9500	3800 E4	R75UI 2150--7--
0.018 µF	10.0	16.0	18.0	15.0	9500	3800 E4	R75UI 2180--3--
0.018 µF	13.0	12.0	18.0	15.0	9500	3800 E4	R75UI 2180--7--
0.022 µF	11.0	19.0	18.0	15.0	9500	3800 E4	R75UI 2220--3--
0.027 µF	11.0	19.0	18.0	15.0	9500	3800 E4	R75UI 2270--3--
4700 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 1470--3--
5600 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 1560--3--
6800 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 1680--3--
8200 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 1820--3--
0.010 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 2100--3--
0.012 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 2120--3--
0.015 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 2150--3--
0.018 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 2180--3--
0.022 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R75UN 2220--3--
0.027 µF	7.0	16.0	26.5	22.5	3500	1400 E4	R75UN 2270--3--
0.033 µF	8.5	17.0	26.5	22.5	3500	1400 E4	R75UN 2330--3--
0.039 µF	10.0	18.5	26.5	22.5	3500	1400 E4	R75UN 2390--3--
0.047 µF	10.0	18.5	26.5	22.5	3500	1400 E4	R75UN 2470--3--
0.056 µF	11.0	20.0	26.5	22.5	3500	1400 E4	R75UN 2560--3--
0.068 µF	13.0	22.0	26.5	22.5	3500	1400 E4	R75UN 2680--3--
0.047 µF	9.0	17.0	32.0	27.5	1000	400 E4	R75UR 2470--3--
0.056 µF	9.0	17.0	32.0	27.5	1000	400 E4	R75UR 2560--3--
0.068 µF	9.0	17.0	32.0	27.5	1000	400 E4	R75UR 2680--4--
0.082 µF	11.0	20.0	32.0	27.5	1000	400 E4	R75UR 2820--4--
0.10 µF	11.0	20.0	32.0	27.5	1000	400 E4	R75UR 3100--3--
0.12 µF	13.0	22.0	32.0	27.5	1000	400 E4	R75UR 3120--3--
0.15 µF	13.0	25.0	32.0	27.5	1000	400 E4	R75UR 3150--4--
0.18 µF	14.0	28.0	32.0	27.5	1000	400 E4	R75UR 3180--3--
0.22 µF	14.0	28.0	32.0	27.5	1000	400 E4	R75UR 3220--4--
0.27 µF	18.0	33.0	32.0	27.5	1000	400 E4	R75UR 3270--3--
0.33 µF	18.0	33.0	32.0	27.5	1000	400 E4	R75UR 3330--4--
0.39 µF	22.0	37.0	32.0	37.5	1000	400 E4	R75UR 3390--3--
0.47 µF	22.0	37.0	32.0	27.5	1000	400 E4	R75UR 3470--4--
0.15 µF	11.0	22.0	41.5	37.5	500	200 E4	R75UW3150--3--
0.18 µF	13.0	24.0	41.5	37.5	500	200 E4	R75UW3180--3--
0.22 µF	13.0	24.0	41.5	37.5	500	200 E4	R75UW3220--3--
0.27 µF	16.0	28.5	41.5	37.5	500	200 E4	R75UW3270--3--
0.33 µF	16.0	28.5	41.5	37.5	500	200 E4	R75UW3330--3--
0.39 µF	19.0	32.0	41.5	37.5	500	200 E4	R75UW3390--3--
0.47 µF	19.0	32.0	41.5	37.5	500	200 E4	R75UW3470--3--
0.56 µF	20.0	40.0	41.5	37.5	500	200 E4	R75UW3560--4--
0.68 µF	20.0	40.0	41.5	37.5	500	200 E4	R75UW3680--3--
0.82 µF	24.0	44.0	41.5	37.5	500	200 E4	R75UW3820--4--
1.0 µF	24.0	44.0	41.5	37.5	500	200 E4	R75UW4100--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)



3 sections (2000Vdc)

All dimensions are mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.
The dv/dt test is carried out at 2 times the above values.

R75
MKP Series

HIGH PERFORMANCES

METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
160Vdc - 250Vdc - 400Vdc - 630Vdc -1000Vdc for 1 section.
1250Vdc - 1600Vdc - 2000Vdc for 3 sections.

Rated temperature (T_R): +85°C

Temperature derated voltage:
The following decreasing factor has to be applied on the rated voltage:
+85°C to +105°C: 2.00% per °C for V_R (d.c.)
+85°C to +105°C: 1.25% per °C for V_R (a.c.)

Capacitance range:
1000 pF to 33µF for 1 section.
1000 pF to 2.2µF for 3 sections.

Capacitance values:
E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** (Lead length ~2 mm)

Pitch (mm)	7.5	10	15	22.5	27.5	37.5
L (nH) ≈	8	9	10	18	18	20

Dissipation factor (DF):
tgδx10^{-4} at +25°C±5°C

kHz	C≤0.1µF	0.1<C≤1.0µF	1<C≤4.7µF	C>4.7µF
1	≤ 4	≤5	≤6	≤10
10	≤ 6	≤8		
100	≤25			

Insulation resistance:

Test conditions

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

Performance
≥1x10^5 MΩ for C≤0.33µF (5x10^5 MΩ)*
≥30000 s for C >0.33µF (150000 s)*
* Typical value.

Test voltage between terminations:
1.6xV_R applied for 2 s at +25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤10x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+85°C±2°C
Test duration:	2000 h
Voltage applied:	1.25xV_R

Performance

Capacitance change |ΔC/C|:	≤3%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz for C≤1µF ≤10x10^{-4} at 1kHz for C>1µF
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|:	≤1%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz for C≤1µF ≤10x10^{-4} at 1kHz for C>1µF
Insulation resistance:	≥initial limit.

Long term stability (after two years)**:**
Storage: standard environmental conditions (see page 12)
Performance
Capacitance change |ΔC/C|: ≤0.5%

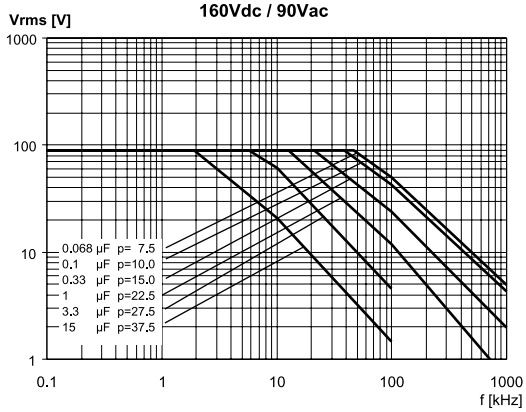
R75
MKP Series

HIGH PERFORMANCES
METALLIZED POLYPROPYLENE FILM CAPACITOR D.C. AND PULSE APPLICATIONS

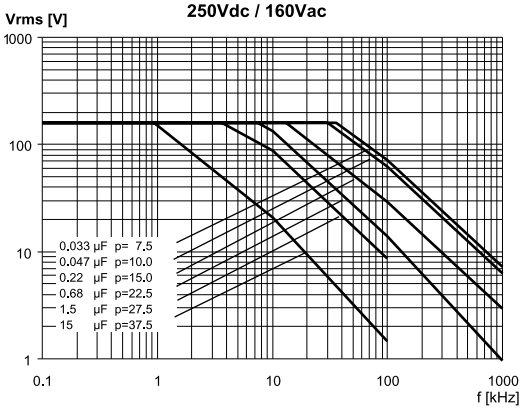
PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

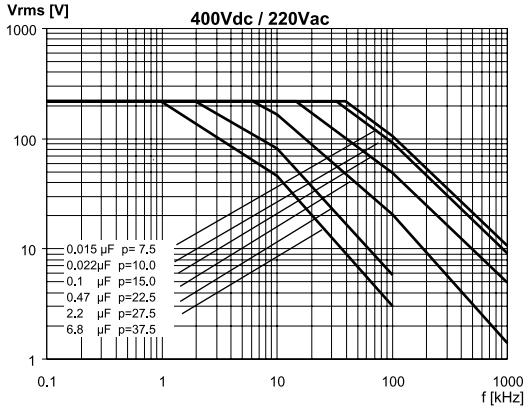
160Vdc / 90Vac



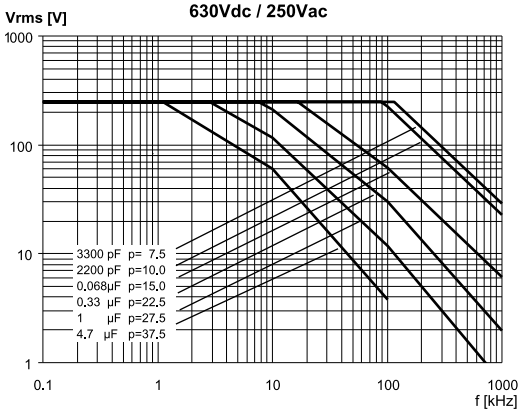
250Vdc / 160Vac



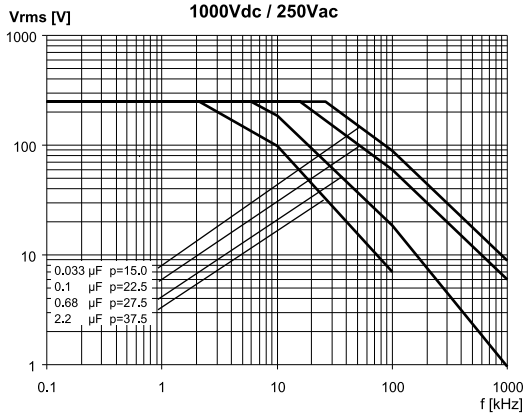
400Vdc / 220Vac



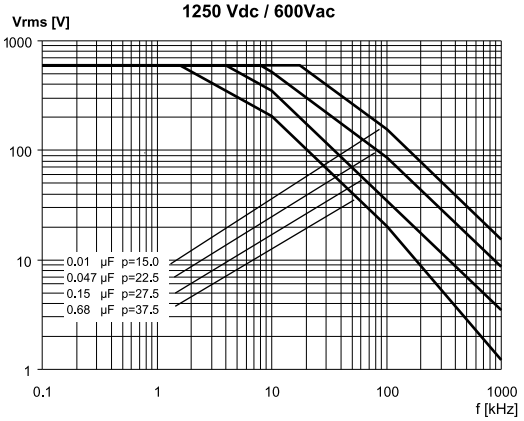
630Vdc / 250Vac



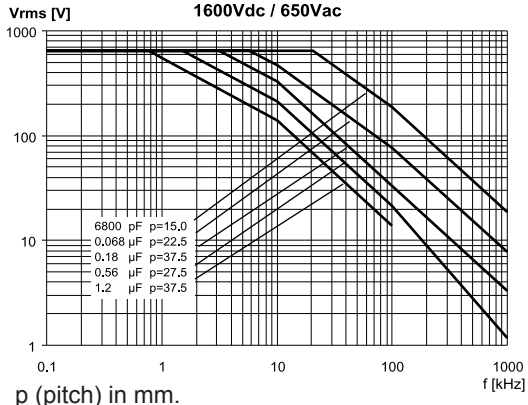
1000Vdc / 250Vac



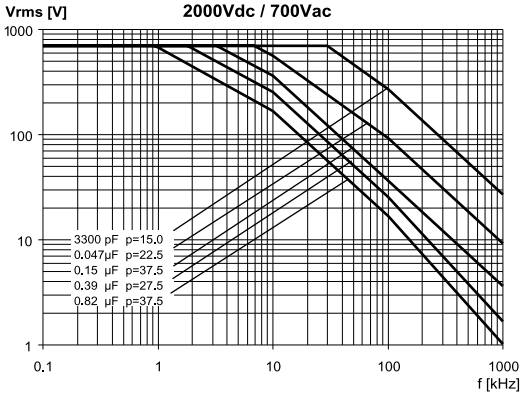
1250 Vdc / 600Vac



1600Vdc / 650Vac



2000Vdc / 700Vac



Note: p (pitch) in mm.

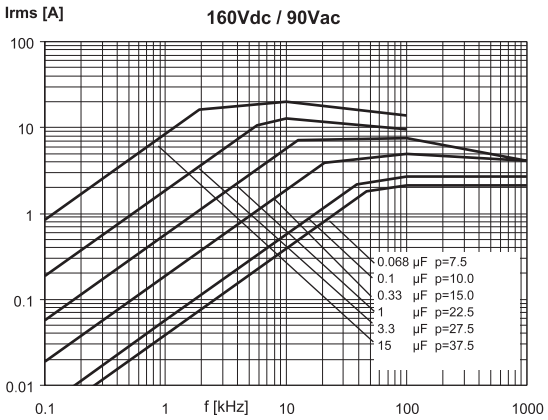
09/2008

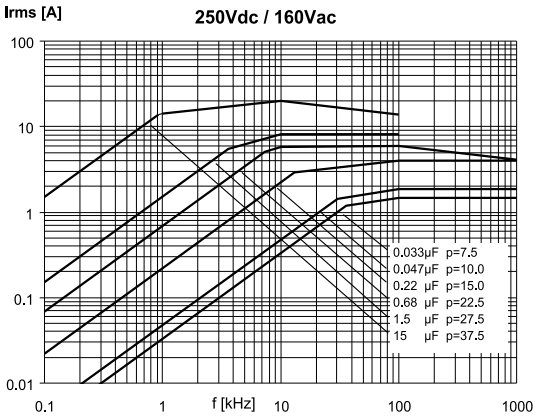
HIGH PERFORMANCES

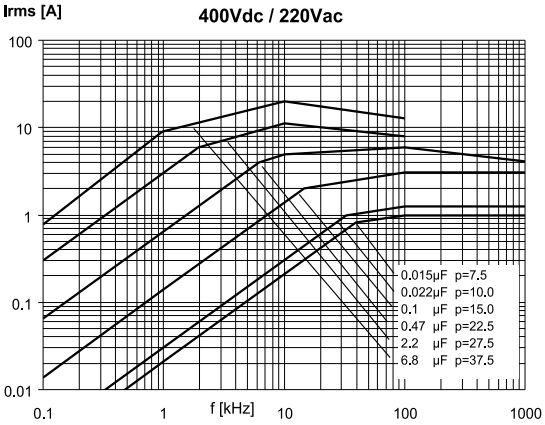
METALLIZED POLYPROPYLENE FILM CAPACITOR
D.C. AND PULSE APPLICATIONS

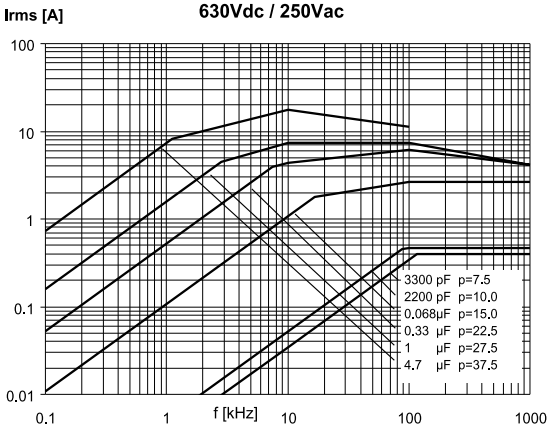
PRODUCT CODE: **R75 (Digit 12: 0 to 9)**

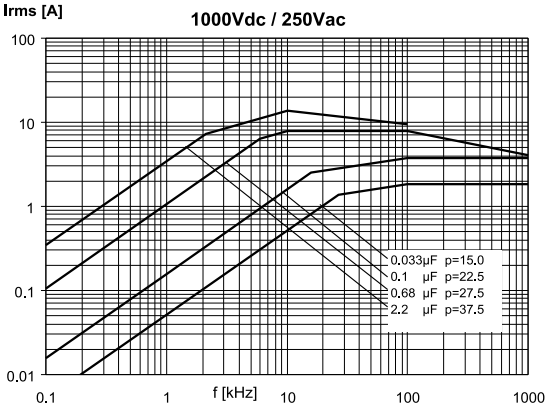
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

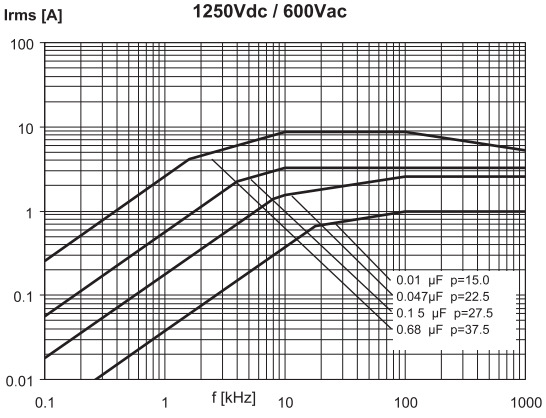


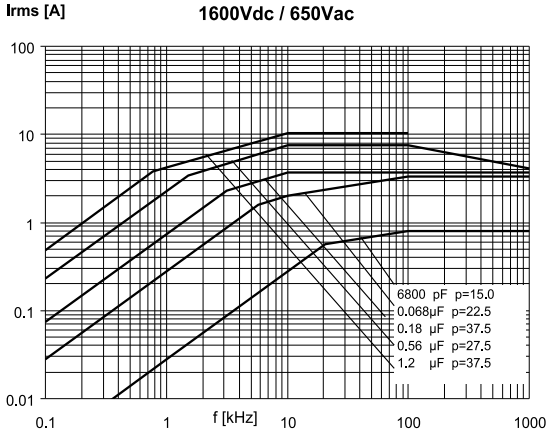


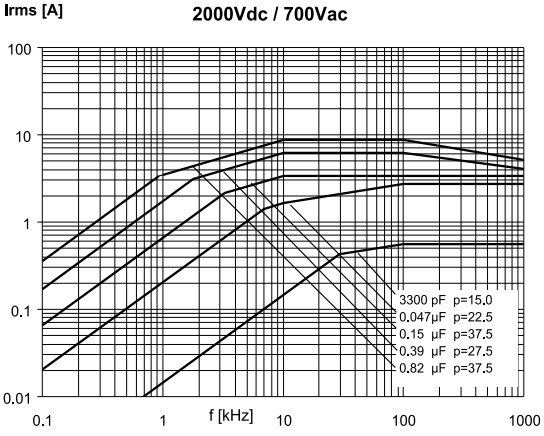












Note: p (pitch) in mm.

R76

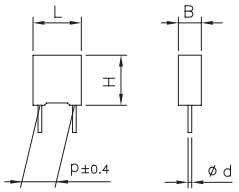
MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

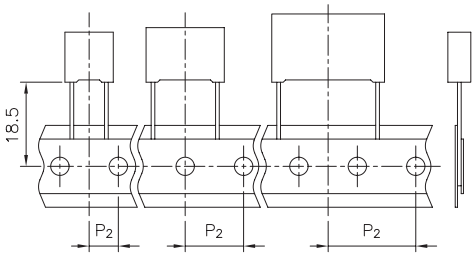
Typical applications: deflection circuits in TV-sets (S-correction and fly-back tuning) and monitors, switching spikes suppression in SMPS, lamp capacitor for electronic ballast and compact lamps, SNUBBER and SCR commutating circuits, applications with high voltage and high current.

PRODUCT CODE: **R76**

Loose



Taped



	p = 7.5	p =10	15 ≤ p ≤27.5	p = 37.5
B	≤3,5 >3,5	all	all	all
Ød±0.05	0.5 0.6	0.6	0.8	1.0

All dimensions are in mm.

Pitch	Box thickness	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
7.5	All	B +0.1	H +0.1	L +0.2
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	6										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
I = 250V M = 400V P = 630V
Q = 1000V T = 1600V U = 2000V

Digit 5 Pitch:
D=7.5 mm; F=10mm; I=15mm;
N=22.5mm; R=27.5mm; W=37.5mm.

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use.

Digit 14 Capacitance tolerance:
H=2.5%; J=5%; K=10%

Table 1 (for more detailed information, please refer to pages 14).

Standard packaging style	Lead length	Taping style			Ordering code
	(mm)	P_2 (mm)	Fig. (No.)	Pitch (mm)	(Digit 10 to 11)
AMMO-PACK		6.35	1	7.5	DQ
AMMO-PACK		12.70	2	10.0/15.0	DQ
AMMO-PACK		19.05	3	22.5	DQ
REEL Ø 355mm		6.35	1	7.5	CK
REEL Ø 355mm		12.70	2	10.0/15.0	GY
REEL Ø 500mm		12.70	2	10.0/15.0	CK
REEL Ø 500mm		19.05	3	22.5/27.5	CK
Loose, short leads	4^{+2}				SE
Loose, long leads (p<10mm)	$17^{+1/-2}$				Z3
Loose, long leads (p10mm)	$18^{+1/-1}$				JM
Loose, long leads (p≥15mm)	30^{+5} $25^{+2/-1}$				40 50

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

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.
Plates: double sided metallized polyester film.
Winding: non-inductive type.

Leads: for Ø ≥ 0,6mm : tinned wire
for Ø = 0,5mm : tinned wire, low thermical conductivity

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

Marking: manufacturer's logo, series (R76), dielectric code (MKP), capacitance, tolerance, D.C. rated voltage, manufacturing date code.

Climatic category: 55/105/56 IEC 60068-1

Operating temperature range: -55 to +105°C

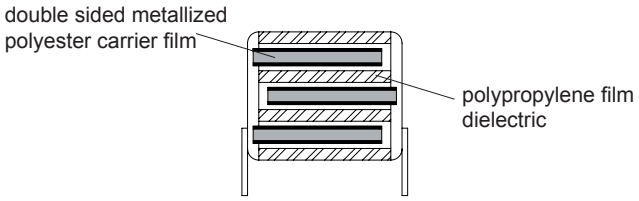
Related documents: IEC 60384-16

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**



1 section
(250Vdc)

Rated Cap.	250Vdc / 180Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
6800 pF	3.0	8.0	10.0	7.5	1100	55 E4	R76ID1680--3--
8200 pF	3.0	8.0	10.0	7.5	1100	55 E4	R76ID1820--3--
0.010 µF	3.0	8.0	10.0	7.5	1100	55 E4	R76ID2100--3--
0.012 µF	4.0	9.0	10.0	7.5	1100	55 E4	R76ID2120--4--
0.015 µF	4.0	9.0	10.0	7.5	1100	55 E4	R76ID2150--4--
0.018 µF	4.0	9.0	10.0	7.5	1100	55 E4	R76ID2180--4--
0.022 µF	4.0	9.0	10.0	7.5	1100	55 E4	R76ID2220--4--
0.027 µF	5.0	10.5	10.0	7.5	1100	55 E4	R76ID2270--4--
0.033 µF	5.0	10.5	10.0	7.5	1100	55 E4	R76ID2330--4--
0.039 µF	6.0	12.0	10.5	7.5	1100	55 E4	R76ID2390--3--
0.047 µF	6.0	12.0	10.5	7.5	1100	55 E4	R76ID2470--3--
0.027 µF	4.0	9.0	13.0	10.0	1000	50 E4	R76IF2270--3--
0.033 µF	4.0	9.0	13.0	10.0	1000	50 E4	R76IF2330--3--
0.039 µF	4.0	9.0	13.0	10.0	1000	50 E4	R76IF2390--3--
0.047 µF	5.0	11.0	13.0	10.0	1000	50 E4	R76IF2470--3--
0.056 µF	5.0	11.0	13.0	10.0	1000	50 E4	R76IF2560--3--
0.068 µF	6.0	12.0	13.0	10.0	1000	50 E4	R76IF2680--3--
0.082 µF	6.0	12.0	13.0	10.0	1000	50 E4	R76IF2820--3--
0.068 µF	5.0	11.0	18.0	15.0	550	28 E4	R76II 2680--3--
0.082 µF	5.0	11.0	18.0	15.0	550	28 E4	R76II 2820--3--
0.10 µF	5.0	11.0	18.0	15.0	550	28 E4	R76II 3100--3--
0.12 µF	6.0	12.0	18.0	15.0	550	28 E4	R76II 3120--3--
0.15 µF	6.0	12.0	18.0	15.0	550	28 E4	R76II 3150--3--
0.18 µF	7.5	13.5	18.0	15.0	550	28 E4	R76II 3180--3--
0.18 µF	9.0	12.5	18.0	15.0	550	28 E4	R76II 3180--7--
0.22 µF	7.5	13.5	18.0	15.0	550	28 E4	R76II 3220--3--
0.22 µF	9.0	12.5	18.0	15.0	550	28 E4	R76II 3220--7--
0.27 µF	8.5	14.5	18.0	15.0	550	28 E4	R76II 3270--3--
0.27 µF	9.0	12.5	18.0	15.0	550	28 E4	R76II 3270--7--
0.33 µF	10.0	16.0	18.0	15.0	550	28 E4	R76II 3330--3--
0.33 µF	13.0	12.0	18.0	15.0	550	28 E4	R76II 3330--7--
0.39 µF	10.0	16.0	18.0	15.0	550	28 E4	R76II 3390--3--
0.47 µF	11.0	19.0	18.0	15.0	550	28 E4	R76II 3470--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

Rated Cap.	250Vdc / 180Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.22 µF	6.0	15.0	26.5	22.5	250	13 E4	R76IN 3220--0--
0.27 µF	6.0	15.0	26.5	22.5	250	13 E4	R76IN 3270--3--
0.33 µF	6.0	15.0	26.5	22.5	250	13 E4	R76IN 3330--3--
0.39 µF	7.0	16.0	26.5	22.5	250	13 E4	R76IN 3390--3--
0.47 µF	7.0	16.0	26.5	22.5	250	13 E4	R76IN 3470--3--
0.56 µF	8.5	17.0	26.5	22.5	250	13 E4	R76IN 3560--3--
0.68 µF	10.0	18.5	26.5	22.5	250	13 E4	R76IN 3680--3--
0.82 µF	10.0	18.5	26.5	22.5	250	13 E4	R76IN 3820--3--
1.0 µF	11.0	20.0	26.5	22.5	250	13 E4	R76IN 4100--3--
1.2 µF	13.0	22.0	26.5	22.5	250	13 E4	R76IN 4120--3--
0.82 µF	9.0	17.0	32.0	27.5	200	10 E4	R76IR 3820--3--
1.0 µF	11.0	20.0	32.0	27.5	200	10 E4	R76IR 4100--3--
1.2 µF	11.0	20.0	32.0	27.5	200	10 E4	R76IR 4120--4--
1.5 µF	13.0	22.0	32.0	27.5	200	10 E4	R76IR 4150--3--
1.8 µF	13.0	22.0	32.0	27.5	200	10 E4	R76IR 4180--4--
2.2 µF	14.0	28.0	32.0	27.5	200	10 E4	R76IR 4220--4--
2.7 µF	18.0	33.0	32.0	27.5	200	10 E4	R76IR 4270--3--
3.3 µF	18.0	33.0	32.0	27.5	200	10 E4	R76IR 4330--3--
3.9 µF	18.0	33.0	32.0	27.5	200	10 E4	R76IR 4390--3--
4.7 µF	22.0	37.0	32.0	27.5	200	10 E4	R76IR 4470--3--
5.6 µF	22.0	37.0	32.0	27.5	200	10 E4	R76IR 4560--4--
1.2 µF	11.0	22.0	41.5	37.5	100	5 E4	R76IW4120--3--
1.5 µF	11.0	22.0	41.5	37.5	100	5 E4	R76IW4150--3--
1.8 µF	11.0	22.0	41.5	37.5	100	5 E4	R76IW4180--3--
2.2 µF	13.0	24.0	41.5	37.5	100	5 E4	R76IW4220--3--
2.7 µF	13.0	24.0	41.5	37.5	100	5 E4	R76IW4270--3--
3.3 µF	16.0	28.5	41.5	37.5	100	5 E4	R76IW4330--3--
3.9 µF	16.0	28.5	41.5	37.5	100	5 E4	R76IW4390--3--
4.7 µF	19.0	32.0	41.5	37.5	100	5 E4	R76IW4470--3--
5.6 µF	19.0	32.0	41.5	37.5	100	5 E4	R76IW4560--3--
6.8 µF	20.0	40.0	41.5	37.5	100	5 E4	R76IW4680--3--
8.2 µF	20.0	40.0	41.5	37.5	100	5 E4	R76IW4820--3--
10.0 µF	24.0	44.0	41.5	37.5	100	5 E4	R76IW5100--3--
12.0 µF	30.0	45.0	41.5	37.5	100	5 E4	R76IW5120--3--
15.0 µF	30.0	45.0	41.5	37.5	100	5 E4	R76IW5150--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm.

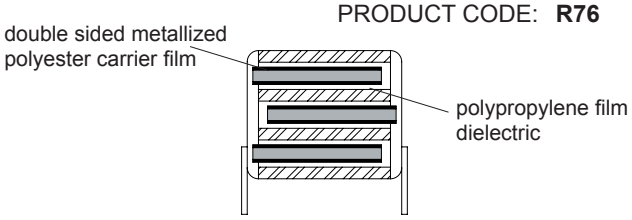
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**



1 section (400Vdc)

Rated Cap.	400Vdc / 250Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
2700 pF	3.0	8.0	10.0	7.5	1700	136 E4	R76MD1270--3--
3300 pF	3.0	8.0	10.0	7.5	1700	136 E4	R76MD1330--3--
3900 pF	3.0	8.0	10.0	7.5	1700	136 E4	R76MD1390--3--
4700 pF	3.0	8.0	10.0	7.5	1700	136 E4	R76MD1470--3--
5600 pF	3.0	8.0	10.0	7.5	1700	136 E4	R76MD1560--3--
6800 pF	4.0	9.0	10.0	7.5	1700	136 E4	R76MD1680--4--
8200 pF	4.0	9.0	10.0	7.5	1700	136 E4	R76MD1820--4--
0.010 µF	4.0	9.0	10.0	7.5	1700	136 E4	R76MD2100--4--
0.012 µF	4.0	9.0	10.0	7.5	1700	136 E4	R76MD2120--4--
0.015 µF	5.0	10.5	10.0	7.5	1700	136 E4	R76MD2150--4--
0.018 µF	5.0	10.5	10.0	7.5	1700	136 E4	R76MD2180--4--
0.022 µF	6.0	12.0	10.5	7.5	1700	136 E4	R76MD2220--3--
0.027 µF	6.0	12.0	10.5	7.5	1700	136 E4	R76MD2270--3--
0.010 µF	4.0	9.0	13.0	10.0	1500	120 E4	R76MF 2100--0--
0.012 µF	4.0	9.0	13.0	10.0	1500	120 E4	R76MF 2120--0--
0.015 µF	4.0	9.0	13.0	10.0	1500	120 E4	R76MF 2150--3--
0.018 µF	4.0	9.0	13.0	10.0	1500	120 E4	R76MF 2180--3--
0.022 µF	4.0	9.0	13.0	10.0	1500	120 E4	R76MF 2220--3--
0.027 µF	5.0	11.0	13.0	10.0	1500	120 E4	R76MF 2270--3--
0.033 µF	5.0	11.0	13.0	10.0	1500	120 E4	R76MF 2330--3--
0.039 µF	6.0	12.0	13.0	10.0	1500	120 E4	R76MF 2390--3--
0.047 µF	6.0	12.0	13.0	10.0	1500	120 E4	R76MF2470--3--
0.033 µF	5.0	11.0	18.0	15.0	900	72 E4	R76MI 2330--0--
0.039 µF	5.0	11.0	18.0	15.0	900	72 E4	R76MI 2390--3--
0.047 µF	5.0	11.0	18.0	15.0	900	72 E4	R76MI 2470--3--
0.056 µF	5.0	11.0	18.0	15.0	900	72 E4	R76MI 2560--3--
0.068 µF	6.0	12.0	18.0	15.0	900	72 E4	R76MI 2680--3--
0.082 µF	6.0	12.0	18.0	15.0	900	72 E4	R76MI 2820--3--
0.10 µF	7.5	13.5	18.0	15.0	900	72 E4	R76MI 3100--3--
0.10 µF	9.0	12.5	18.0	15.0	900	72 E4	R76MI 3100--7--
0.12 µF	7.5	13.5	18.0	15.0	900	72 E4	R76MI 3120--3--
0.12 µF	9.0	12.5	18.0	15.0	900	72 E4	R76MI 3120--7--
0.15 µF	8.5	14.5	18.0	15.0	900	72 E4	R76MI 3150--3--
0.15 µF	13.0	12.0	18.0	15.0	900	72 E4	R76MI 3150--7--
0.18 µF	10.0	16.0	18.0	15.0	900	72 E4	R76MI 3180--3--
0.18 µF	13.0	12.0	18.0	15.0	900	72 E4	R76MI 3180--7--
0.22 µF	10.0	16.0	18.0	15.0	900	72 E4	R76MI 3220--3--
0.27 µF	11.0	19.0	18.0	15.0	900	72 E4	R76MI 3270--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

Rated Cap.	400Vdc / 250Vac* Std dimensions B	H	L	p	Max dv/dt (V/µs)	Max K_0 (V^2/µs)	Part Number
0.12 µF	6.0	15.0	26.5	22.5	500	40 E4	R76MN3120--3--
0.15 µF	6.0	15.0	26.5	22.5	500	40 E4	R76MN 3150--3--
0.18 µF	6.0	15.0	26.5	22.5	500	40 E4	R76MN 3180--3--
0.22 µF	7.0	16.0	26.5	22.5	500	40 E4	R76MN 3220--3--
0.27 µF	8.5	17.0	26.5	22.5	500	40 E4	R76MN 3270--3--
0.33 µF	8.5	17.0	26.5	22.5	500	40 E4	R76MN 3330--3--
0.39 µF	10.0	18.5	26.5	22.5	500	40 E4	R76MN 3390--3--
0.47 µF	10.0	18.5	26.5	22.5	500	40 E4	R76MN 3470--3--
0.56 µF	11.0	20.0	26.5	22.5	500	40 E4	R76MN 3560--3--
0.68 µF	13.0	22.0	26.5	22.5	500	40 E4	R76MN 3680--3--
0.39 µF	9.0	17.0	32.0	27.5	300	24 E4	R76MR 3390--3--
0.47 µF	9.0	17.0	32.0	27.5	300	24 E4	R76MR 3470--3--
0.56 µF	11.0	20.0	32.0	27.5	300	24 E4	R76MR 3560--3--
0.68 µF	11.0	20.0	32.0	27.5	300	24 E4	R76MR 3680--3--
0.82 µF	13.0	22.0	32.0	27.5	300	24 E4	R76MR 3820--3--
1.0 µF	13.0	22.0	32.0	27.5	300	24 E4	R76MR 4100--4--
1.2 µF	14.0	28.0	32.0	27.5	300	24 E4	R76MR 4120--4--
1.5 µF	18.0	33.0	32.0	27.5	300	24 E4	R76MR 4150--3--
1.8 µF	18.0	33.0	32.0	27.5	300	24 E4	R76MR 4180--3--
2.2 µF	22.0	37.0	32.0	27.5	300	24 E4	R76MR 4220--3--
2.7 µF	22.0	37.0	32.0	27.5	300	24 E4	R76MR 4270--3--
1.0 µF	11.0	22.0	41.5	37.5	180	14 E4	R76MW4100--3--
1.2 µF	13.0	24.0	41.5	37.5	180	14 E4	R76MW4120--3--
1.5 µF	13.0	24.0	41.5	37.5	180	14 E4	R76MW4150--3--
1.8 µF	16.0	28.5	41.5	37.5	180	14 E4	R76MW4180--3--
2.2 µF	19.0	32.0	41.5	37.5	180	14 E4	R76MW4220--3--
2.7 µF	19.0	32.0	41.5	37.5	180	14 E4	R76MW4270--3--
3.3 µF	19.0	32.0	41.5	37.5	180	14 E4	R76MW4330--3--
3.9 µF	20.0	40.0	41.5	37.5	180	14 E4	R76MW4390--3--
4.7 µF	20.0	40.0	41.5	37.5	180	14 E4	R76MW4470--3--
5.6 µF	24.0	44.0	41.5	37.5	180	14 E4	R76MW4560--3--
6.8 µF	30.0	45.0	41.5	37.5	180	14 E4	R76MW4680--3--
8.2 µF	30.0	45.0	41.5	37.5	180	14 E4	R76MW4820--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R76

MMKP Series

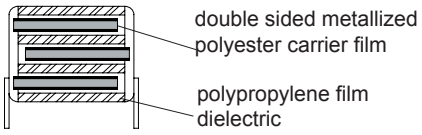
POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**

Rated Cap.	630Vdc/250Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
680 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD0680--0--
820 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD0820--0--
1000 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD1100--0--
1200 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD1120--0--
1500 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD1150--0--
1800 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD1180--0--
2200 pF	3.0	8.0	10.0	7.5	2800	353 E4	R76PD1220--0--
2700 pF	4.0	9.0	10.0	7.5	2800	353 E4	R76PD1270--4--
3300 pF	4.0	9.0	10.0	7.5	2800	355 E4	R76PD1330--4--
3900 pF	4.0	9.0	10.0	7.5	2800	353 E4	R76PD1390--4--
4700 pF	4.0	9.0	10.0	7.5	2800	353 E4	R76PD1470--4--
5600 pF	4.0	9.0	10.0	7.5	2800	353 E4	R76PD1560--4--
6800 pF	5.0	10.5	10.0	7.5	2800	353 E4	R76PD1680--4--
8200 pF	5.0	10.5	10.0	7.5	2800	353 E4	R76PD1820--4--
0.010 µF	6.0	12.0	10.5	7.5	2800	353 E4	R76PD2100--3--
0.012 µF	6.0	12.0	10.5	7.5	2800	353 E4	R76PD2120--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

1 section (630Vdc/250Vac)



All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.

The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for across-the-line applications.

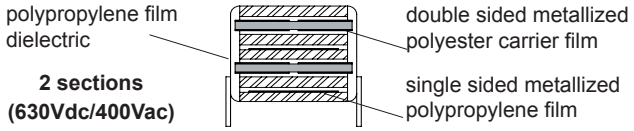
Please refer to Interference Suppression Capacitors (page145)

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**



Rated Cap.	630Vdc / 400Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
3900 pF	4.0	9.0	13.0	10.0	3000	378 E4	R76PF1390--0--
4700 pF	4.0	9.0	13.0	10.0	3000	378 E4	R76PF1470--0--
5600 pF	4.0	9.0	13.0	10.0	3000	378 E4	R76PF1560--0--
6800 pF	4.0	9.0	13.0	10.0	3000	378 E4	R76PF1680--0--
8200 pF	4.0	9.0	13.0	10.0	3000	378 E4	R76PF1820--0--
0.010 µF	5.0	11.0	13.0	10.0	3000	378 E4	R76PF2100--3--
0.012 µF	5.0	11.0	13.0	10.0	3000	378 E4	R76PF2120--3--
0.015 µF	6.0	12.0	13.0	10.0	3000	378 E4	R76PF2150--3--
0.018 µF	6.0	12.0	13.0	10.0	3000	378 E4	R76PF2180--3--
0.012 µF	5.0	11.0	18.0	15.0	2500	315 E4	R76PI 2120--0--
0.015 µF	5.0	11.0	18.0	15.0	2500	315 E4	R76PI 2150--0--
0.018 µF	5.0	11.0	18.0	15.0	2500	315 E4	R76PI 2180--0--
0.022 µF	5.0	11.0	18.0	15.0	2500	315 E4	R76PI 2220--3--
0.027 µF	5.0	11.0	18.0	15.0	2500	315 E4	R76PI 2270--3--
0.033 µF	6.0	12.0	18.0	15.0	2500	315 E4	R76PI 2330--3--
0.039 µF	6.0	12.0	18.0	15.0	2500	315 E4	R76PI 2390--3--
0.047 µF	7.5	13.5	18.0	15.0	2500	315 E4	R76PI 2470--3--
0.047 µF	9.0	12.5	18.0	15.0	2500	315 E4	R76PI 2470--7--
0.056 µF	7.5	13.5	18.0	15.0	2500	315 E4	R76PI 2560--3--
0.056 µF	9.0	12.5	18.0	15.0	2500	315 E4	R76PI 2560--7--
0.068 µF	8.5	14.5	18.0	15.0	2500	315 E4	R76PI 2680--3--
0.068 µF	9.0	12.5	18.0	15.0	2500	315 E4	R76PI 2680--7--
0.082 µF	8.5	14.5	18.0	15.0	2500	315 E4	R76PI 2820--3--
0.082 µF	13.0	12.0	18.0	15.0	2500	315 E4	R76PI 2820--7--
0.10 µF	10.0	16.0	18.0	15.0	2500	315 E4	R76PI 3100--3--
0.12 µF	11.0	19.0	18.0	15.0	2500	315 E4	R76PI 3120--3--
0.047 µF	6.0	15.0	26.5	22.5	1500	189 E4	R76PN 2470--0--
0.056 µF	6.0	15.0	26.5	22.5	1500	189 E4	R76PN 2560--0--
0.068 µF	6.0	15.0	26.5	22.5	1500	189 E4	R76PN 2680--0--
0.082 µF	6.0	15.0	26.5	22.5	1500	189 E4	R76PN 2820--3--
0.10 µF	6.0	15.0	26.5	22.5	1500	189 E4	R76PN 3100--3--
0.12 µF	7.0	16.0	26.5	22.5	1500	189 E4	R76PN 3120--3--
0.15 µF	8.5	17.0	26.5	22.5	1500	189 E4	R76PN 3150--3--
0.18 µF	8.5	17.0	26.5	22.5	1500	189 E4	R76PN 3180--3--
0.22 µF	10.0	18.5	26.5	22.5	1500	189 E4	R76PN 3220--3--
0.27 µF	11.0	20.0	26.5	22.5	1500	189 E4	R76PN 3270--3--
0.33 µF	11.0	20.0	26.5	22.5	1500	189 E4	R76PN 3330--3--
0.39 µF	13.0	22.0	26.5	22.5	1500	189 E4	R76PN 3390--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

Rated Cap.	630Vdc / 400Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.15 µF	9.0	17.0	32.0	27.5	900	113 E4	R76PR 3150--3--
0.18 µF	9.0	17.0	32.0	27.5	900	113 E4	R76PR 3180--3--
0.22 µF	9.0	17.0	32.0	27.5	900	113 E4	R76PR 3220--3--
0.27 µF	9.0	17.0	32.0	27.5	900	113 E4	R76PR 3270--3--
0.33 µF	11.0	20.0	32.0	27.5	900	113 E4	R76PR 3330--4--
0.39 µF	11.0	20.0	32.0	27.5	900	113 E4	R76PR 3390--3--
0.47 µF	13.0	22.0	32.0	27.5	900	113 E4	R76PR 3470--3--
0.56 µF	13.0	22.0	32.0	27.5	900	113 E4	R76PR 3560--3--
0.68 µF	13.0	25.0	32.0	27.5	900	113 E4	R76PR 3680--4--
0.82 µF	14.0	28.0	32.0	27.5	900	113 E4	R76PR 3820--3--
1.0 µF	18.0	33.0	32.0	27.5	900	113 E4	R76PR 4100--3--
1.2 µF	18.0	33.0	32.0	27.5	900	113 E4	R76PR 4120--3--
1.5 µF	22.0	37.0	32.0	27.5	900	113 E4	R76PR 4150--3--
1.8 µF	22.0	37.0	32.0	27.5	900	113 E4	R76PR 4180--3--
0.33 µF	11.0	22.0	41.5	37.5	450	56 E4	R76PW3330--3--
0.39 µF	11.0	22.0	41.5	37.5	450	56 E4	R76PW3390--3--
0.47 µF	11.0	22.0	41.5	37.5	450	56 E4	R76PW3470--3--
0.56 µF	11.0	22.0	41.5	37.5	450	56 E4	R76PW3560--3--
0.68 µF	11.0	22.0	41.5	37.5	450	56 E4	R76PW3680--3--
0.82 µF	13.0	24.0	41.5	37.5	450	56 E4	R76PW3820--3--
1.0 µF	16.0	28.5	41.5	37.5	450	56 E4	R76PW4100--3--
1.2 µF	16.0	28.5	41.5	37.5	450	56 E4	R76PW4120--3--
1.5 µF	16.0	28.5	41.5	37.5	450	56 E4	R76PW4150--3--
1.8 µF	19.0	32.0	41.5	37.5	450	56 E4	R76PW4180--3--
2.2 µF	20.0	40.0	41.5	37.5	450	56 E4	R76PW4220--3--
2.7 µF	20.0	40.0	41.5	37.5	450	56 E4	R76PW4270--3--
3.3 µF	24.0	44.0	41.5	37.5	450	56 E4	R76PW4330--3--
3.9 µF	30.0	45.0	41.5	37.5	450	56 E4	R76PW4390--3--
4.7 µF	30.0	45.0	41.5	37.5	450	56 E4	R76PW4470--3--
5.6 µF	30.0	45.0	41.5	37.5	450	56 E4	R76PW4560--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R76

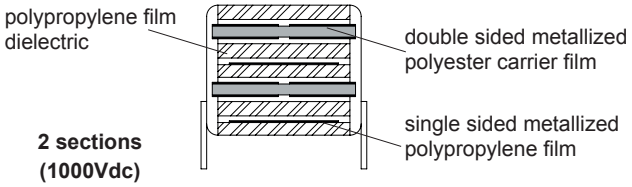
MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**

Rated Cap.	1000Vdc / 400Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
220 pF	3.0	8.0	10.0	7.5	6000	1200 E4	R76QD 0220--0--
270 pF	3.0	8.0	10.0	7.5	6000	1200 E4	R76QD 0270--0--
330 pF	3.0	8.0	10.0	7.5	6000	1200 E4	R76QD 0330--0--
390 pF	3.0	8.0	10.0	7.5	6000	1200 E4	R76QD 0390--0--
470 pF	3.0	8.0	10.0	7.5	6000	1200 E4	R76QD 0470--0--
560 pF	3.0	8.0	10.0	7.5	6000	1200 E4	R76QD 0560--0--
680 pF	4.0	9.0	10.0	7.5	6000	1200 E4	R76QD 0680--4--
820 pF	4.0	9.0	10.0	7.5	6000	1200 E4	R76QD 0820--4--
1000 pF	4.0	9.0	10.0	7.5	6000	1200 E4	R76QD 1100--4--
1200 pF	4.0	9.0	10.0	7.5	6000	1200 E4	R76QD 1120--4--
1500 pF	5.0	10.5	10.0	7.5	6000	1200 E4	R76QD 1150--4--
1800 pF	5.0	10.5	10.0	7.5	6000	1200 E4	R76QD 1180--4--
2200 pF	5.0	10.5	10.0	7.5	6000	1200 E4	R76QD 1220--4--
2700 pF	6.0	12.0	10.5	7.5	6000	1200 E4	R76QD 1270--0--
3300 pF	6.0	12.0	10.5	7.5	6000	1200 E4	R76QD 1330--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%)*; J (±5%); K (±10%)



All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

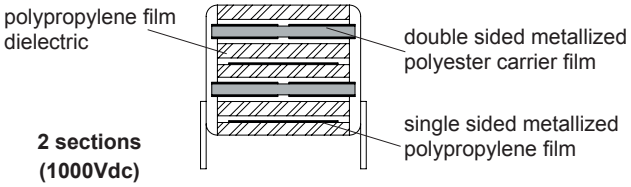
* Tolerance H (+2.5%) for C ≥1000pF

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**



Rated Cap.	1000Vdc / 600Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
470 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 0470--0--
560 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 0560--0--
680 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 0680--0--
820 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 0820--0--
1000 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1100--0--
1200 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1120--0--
1500 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1150--0--
1800 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1180--0--
2200 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1220--0--
2700 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1270--0--
3300 pF	4.0	9.0	13.0	10.0	4800	960 E4	R76QF 1330--3--
3900 pF	5.0	11.0	13.0	10.0	4800	960 E4	R76QF 1390--3--
4700 pF	5.0	11.0	13.0	10.0	4800	960 E4	R76QF 1470--3--
5600 pF	6.0	12.0	13.0	10.0	4800	960 E4	R76QF 1560--3--
6800 pF	6.0	12.0	13.0	10.0	4800	960 E4	R76QF 1680--3--
8200 pF	4.0	10.0	18.0	15.0	3300	660 E4	R76QI 1820--4--
8200 pF	5.0	11.0	18.0	15.0	3300	660 E4	R76QI 1820--0--
0.010 µF	4.0	10.0	18.0	15.0	3300	660 E4	R76QI 2100--4--
0.010 µF	5.0	11.0	18.0	15.0	3300	660 E4	R76QI 2100--3--
0.012 µF	5.0	11.0	18.0	15.0	3300	660 E4	R76QI 2120--3--
0.015 µF	5.0	11.0	18.0	15.0	3300	660 E4	R76QI 2150--4--
0.018 µF	5.0	11.0	18.0	15.0	3300	660 E4	R76QI 2180--4--
0.022 µF	6.0	12.0	18.0	15.0	3300	660 E4	R76QI 2220--4--
0.022 µF	9.0	12.5	18.0	15.0	3300	660 E4	R76QI 2220--7--
0.027 µF	7.5	13.5	18.0	15.0	3300	660 E4	R76QI 2270--4--
0.027 µF	9.0	12.5	18.0	15.0	3300	660 E4	R76QI 2270--7--
0.033 µF	7.5	13.5	18.0	15.0	3300	660 E4	R76QI 2330--4--
0.033 µF	13.0	12.0	18.0	15.0	3300	660 E4	R76QI 2330--7--
0.039 µF	8.5	14.5	18.0	15.0	3300	660 E4	R76QI 2390--4--
0.047 µF	8.5	14.5	18.0	15.0	3300	660 E4	R76QI 2470--4--
0.027 µF	6.0	15.0	26.5	22.5	2100	420 E4	R76QN 2270--0--
0.033 µF	6.0	15.0	26.5	22.5	2100	420 E4	R76QN 2330--3--
0.039 µF	6.0	15.0	26.5	22.5	2100	420 E4	R76QN 2390--3--
0.047 µF	7.0	16.0	26.5	22.5	2100	420 E4	R76QN 2470--3--
0.056 µF	7.0	16.0	26.5	22.5	2100	420 E4	R76QN 2560--3--
0.068 µF	8.5	17.0	26.5	22.5	2100	420 E4	R76QN 2680--3--
0.082 µF	10.0	18.5	26.5	22.5	2100	420 E4	R76QN 2820--3--
0.10 µF	10.0	18.5	26.5	22.5	2100	420 E4	R76QN 3100--3--
0.12 µF	11.0	20.0	26.5	22.5	2100	420 E4	R76QN 3120--3--
0.15 µF	13.0	22.0	26.5	22.5	2100	420 E4	R76QN 3150--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%)*; J (±5%); K (±10%)

Rated Cap.	1000Vdc / 600Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.10 µF	9.0	17.0	32.0	27.5	1000	200 E4	R76QR 3100--4--
0.12 µF	9.0	17.0	32.0	27.5	1000	200 E4	R76QR 3120--4--
0.15 µF	11.0	20.0	32.0	27.5	1000	200 E4	R76QR 3150--3--
0.18 µF	13.0	22.0	32.0	27.5	1000	200 E4	R76QR 3180--3--
0.22 µF	13.0	22.0	32.0	27.5	1000	200 E4	R76QR 3220--3--
0.27 µF	13.0	25.0	32.0	27.5	1000	200 E4	R76QR 3270--4--
0.33 µF	14.0	28.0	32.0	27.5	1000	200 E4	R76QR 3330--3--
0.39 µF	18.0	33.0	32.0	27.5	1000	200 E4	R76QR 3390--3--
0.47 µF	18.0	33.0	32.0	27.5	1000	200 E4	R76QR 3470--3--
0.56 µF	22.0	37.0	32.0	27.5	1000	200 E4	R76QR 3560--3--
0.68 µF	22.0	37.0	32.0	27.5	1000	200 E4	R76QR 3680--3--
0.18 µF	11.0	22.0	41.5	37.5	500	100 E4	R76QW 3180--3--
0.22 µF	11.0	22.0	41.5	37.5	500	100 E4	R76QW 3220--3--
0.27 µF	13.0	24.0	41.5	37.5	500	100 E4	R76QW 3270--3--
0.33 µF	13.0	24.0	41.5	37.5	500	100 E4	R76QW 3330--3--
0.39 µF	16.0	28.5	41.5	37.5	500	100 E4	R76QW 3390--3--
0.47 µF	16.0	28.5	41.5	37.5	500	100 E4	R76QW 3470--3--
0.56 µF	16.0	28.5	41.5	37.5	500	100 E4	R76QW 3560--3--
0.68 µF	19.0	32.0	41.5	37.5	500	100 E4	R76QW 3680--3--
0.82 µF	20.0	40.0	41.5	37.5	500	100 E4	R76QW 3820--3--
1.0 µF	20.0	40.0	41.5	37.5	500	100 E4	R76QW 4100--3--
1.2 µF	24.0	44.0	41.5	37.5	500	100 E4	R76QW 4120--3--
1.5 µF	24.0	44.0	41.5	37.5	500	100 E4	R76QW 4150--3--
1.8 µF	30.0	45.0	41.5	37.5	500	100 E4	R76QW 4180--3--
2.2 µF	30.0	45.0	41.5	37.5	500	100 E4	R76QW 4220--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%)*; J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

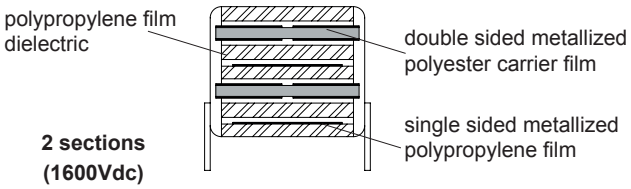
* Tolerance H (+2.5%) for C ≥1000pF

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**



Rated Cap.	1600Vdc / 650Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
3300 pF	4.0	10.0	18.0	15.0	6000	1900 E4	R76TI1330--4--
3300 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI1330--3--
3900 pF	4.0	10.0	18.0	15.0	6000	1900 E4	R76TI1390--4--
3900 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI1390--3--
4700 pF	4.0	10.0	18.0	15.0	6000	1900 E4	R76TI1470--4--
4700 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI1470--3--
5600 pF	4.0	10.0	18.0	15.0	6000	1900 E4	R76TI1560--4--
5600 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI1560--3--
6800 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI1680--3--
8200 pF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI1820--4--
0.010 µF	5.0	11.0	18.0	15.0	6000	1900 E4	R76TI2100--4--
0.012 µF	6.0	12.0	18.0	15.0	6000	1900 E4	R76TI2120--4--
0.015 µF	6.0	12.0	18.0	15.0	6000	1900 E4	R76TI2150--4--
0.018 µF	7.5	13.5	18.0	15.0	6000	1900 E4	R76TI2180--4--
0.018 µF	9.0	12.5	18.0	15.0	6000	1900 E4	R76TI2180--7--
0.022 µF	7.5	13.5	18.0	15.0	6000	1900 E4	R76TI2220--4--
0.022 µF	13.0	12.0	18.0	15.0	6000	1900 E4	R76TI2220--7--
0.027 µF	8.5	14.5	18.0	15.0	6000	1900 E4	R76TI2270--4--
0.033 µF	8.5	14.5	18.0	15.0	6000	1900 E4	R76TI2330--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

Rated Cap.	1600Vdc / 650Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.015 µF	6.0	15.0	26.5	22.5	3000	960 E4	R76TN 2150--3--
0.018 µF	6.0	15.0	26.5	22.5	3000	960 E4	R76TN 2180--3--
0.022 µF	6.0	15.0	26.5	22.5	3000	960 E4	R76TN 2220--3--
0.027 µF	6.0	15.0	26.5	22.5	3000	960 E4	R76TN 2270--3--
0.033 µF	6.0	15.0	26.5	22.5	3000	960 E4	R76TN 2330--4--
0.039 µF	7.0	16.0	26.5	22.5	3000	960 E4	R76TN 2390--4--
0.047 µF	7.0	16.0	26.5	22.5	3000	960 E4	R76TN 2470--4--
0.056 µF	8.5	17.0	26.5	22.5	3000	960 E4	R76TN 2560--4--
0.068 µF	10.0	18.5	26.5	22.5	3000	960 E4	R76TN 2680--4--
0.082 µF	10.0	18.5	26.5	22.5	3000	960 E4	R76TN 2820--4--
0.10 µF	11.0	20.0	26.5	22.5	3000	960 E4	R76TN 3100--4--
0.039 µF	9.0	17.0	32.0	27.5	2000	640 E4	R76TR 2390--3--
0.047 µF	9.0	17.0	32.0	27.5	2000	640 E4	R76TR 2470--3--
0.056 µF	9.0	17.0	32.0	27.5	2000	640 E4	R76TR 2560--3--
0.068 µF	9.0	17.0	32.0	27.5	2000	640 E4	R76TR 2680--3--
0.082 µF	11.0	20.0	32.0	27.5	2000	640 E4	R76TR 2820--3--
0.10 µF	11.0	20.0	32.0	27.5	2000	640 E4	R76TR 3100--3--
0.12 µF	13.0	22.0	32.0	27.5	2000	640 E4	R76TR 3120--3--
0.15 µF	13.0	25.0	32.0	27.5	2000	640 E4	R76TR 3150--4--
0.18 µF	14.0	28.0	32.0	27.5	2000	640 E4	R76TR 3180--4--
0.22 µF	18.0	33.0	32.0	27.5	2000	640 E4	R76TR 3220--3--
0.27 µF	18.0	33.0	32.0	27.5	2000	640 E4	R76TR 3270--3--
0.33 µF	18.0	33.0	32.0	27.5	2000	640 E4	R76TR 3330--3--
0.39 µF	22.0	37.0	32.0	27.5	2000	640 E4	R76TR 3390--3--
0.47 µF	22.0	37.0	32.0	27.5	2000	640 E4	R76TR 3470--3--
0.082 µF	11.0	22.0	41.5	37.5	1200	384 E4	R76TW 2820--3--
0.10 µF	11.0	22.0	41.5	37.5	1200	384 E4	R76TW 3100--3--
0.12 µF	11.0	22.0	41.5	37.5	1200	384 E4	R76TW 3120--3--
0.15 µF	11.0	22.0	41.5	37.5	1200	384 E4	R76TW 3150--3--
0.18 µF	13.0	24.0	41.5	37.5	1200	384 E4	R76TW 3180--3--
0.22 µF	13.0	24.0	41.5	37.5	1200	384 E4	R76TW 3220--3--
0.27 µF	13.0	24.0	41.5	37.5	1200	384 E4	R76TW 3270--3--
0.33 µF	16.0	28.5	41.5	37.5	1200	384 E4	R76TW 3330--3--
0.39 µF	16.0	28.5	41.5	37.5	1200	384 E4	R76TW 3390--3--
0.47 µF	19.0	32.0	41.5	37.5	1200	384 E4	R76TW 3470--3--
0.56 µF	20.0	40.0	41.5	37.5	1200	384 E4	R76TW 3560--3--
0.68 µF	20.0	40.0	41.5	37.5	1200	384 E4	R76TW 3680--3--
0.82 µF	24.0	44.0	41.5	37.5	1200	384 E4	R76TW 3820--3--
1.0 µF	24.0	44.0	41.5	37.5	1200	384 E4	R76TW 4100--3--
1.2 µF	30.0	45.0	41.5	37.5	1200	384 E4	R76TW 4120--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

All dimensions are in mm.

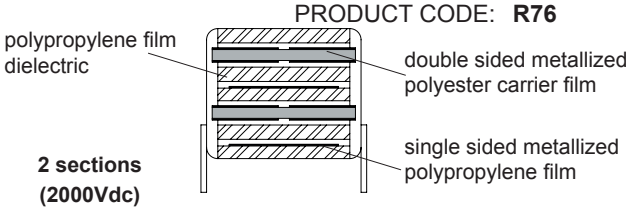
Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**



2 sections (2000Vdc)

Rated Cap.	2000Vdc / 700Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
100 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0100--4--
120 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0120--4--
150 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0150--4--
180 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0180--4--
220 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0220--4--
220 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0220--0--
270 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0270--4--
270 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0270--0--
330 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0330--4--
330 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0330--0--
390 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0390--4--
390 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0390--0--
470 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0470--4--
470 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0470--0--
560 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0560--4--
560 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0560--0--
680 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0680--4--
680 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0680--0--
820 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 0820--4--
820 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 0820--0--
1000 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 1100--4--
1000 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1100--3--
1200 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 1120--4--
1200 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1120--3--
1500 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 1150--4--
1500 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1150--3--
1800 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 1180--4--
1800 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1180--3--
2200 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 1220--4--
2200 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1220--3--
2700 pF	4.0	10.0	18.0	15.0	9500	3800 E4	R76UI 1270--4--
2700 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1270--3--
3300 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1330--4--
3900 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1390--4--
4700 pF	5.0	11.0	18.0	15.0	9500	3800 E4	R76UI 1470--4--
5600 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R76UI 1560--4--
6800 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R76UI 1680--4--
8200 pF	6.0	12.0	18.0	15.0	9500	3800 E4	R76UI 1820--4--
0.010 µF	7.5	13.5	18.0	15.0	9500	3800 E4	R76UI 2100--4--
0.010 µF	13.0	12.0	18.0	15.0	9500	3800 E4	R76UI 2100--7--
0.012 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R76UI 2120--4--
0.015 µF	8.5	14.5	18.0	15.0	9500	3800 E4	R76UI 2150--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%)*; (J (±5%); K (±10%)

All dimensions are in mm

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

* Tolerance H (±2.5%) for C ≥1000pF

Rated Cap.	2000Vdc / 700Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1100--0--
1200 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1120--0--
1500 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1150--0--
1800 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1180--0--
2200 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1220--0--
2700 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1270--0--
3300 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1330--0--
3900 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1390--0--
4700 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1470--0--
5600 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1560--0--
6800 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1680--0--
8200 pF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN1820--3--
0.010 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN2100--3--
0.012 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN2120--3--
0.015 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN2150--4--
0.018 µF	6.0	15.0	26.5	22.5	3500	1400 E4	R76UN2180--4--
0.022 µF	7.0	16.0	26.5	22.5	3500	1400 E4	R76UN2220--4--
0.027 µF	7.0	16.0	26.5	22.5	3500	1400 E4	R76UN2270--4--
0.033 µF	8.5	17.0	26.5	22.5	3500	1400 E4	R76UN2330--4--
0.039 µF	10.0	18.0	26.5	22.5	3500	1400 E4	R76UN2390--4--
0.047 µF	10.0	18.0	26.5	22.5	3500	1400 E4	R76UN2470--4--
0.056 µF	11.0	20.0	26.5	22.5	3500	1400 E4	R76UN2560--4--
0.022 µF	9.0	17.0	32.0	27.5	2300	920 E4	R76UR 2220--3--
0.027 µF	9.0	17.0	32.0	27.5	2300	920 E4	R76UR 2270--3--
0.033 µF	9.0	17.0	32.0	27.5	2300	920 E4	R76UR 2330--3--
0.039 µF	9.0	17.0	32.0	27.5	2300	920 E4	R76UR 2390--4--
0.047 µF	11.0	20.0	32.0	27.5	2300	920 E4	R76UR 2470--3--
0.056 µF	13.0	22.0	32.0	27.5	2300	920 E4	R76UR 2560--3--
0.068 µF	13.0	22.0	32.0	27.5	2300	920 E4	R76UR 2680--3--
0.082 µF	13.0	25.0	32.0	27.5	2300	920 E4	R76UR 2820--4--
0.10 µF	14.0	28.0	32.0	27.5	2300	920 E4	R76UR 3100--3--
0.12 µF	18.0	33.0	32.0	27.5	2300	920 E4	R76UR 3120--3--
0.15 µF	18.0	33.0	32.0	27.5	2300	920 E4	R76UR 3150--3--
0.18 µF	22.0	37.0	32.0	27.5	2300	920 E4	R76UR 3180--3--
0.22 µF	22.0	37.0	32.0	27.5	2300	920 E4	R76UR 3220--3--
0.033 µF	11.0	22.0	41.5	37.5	1500	600 E4	R76UW2330--3--
0.039 µF	11.0	22.0	41.5	37.5	1500	600 E4	R76UW2390--3--
0.047 µF	11.0	22.0	41.5	37.5	1500	600 E4	R76UW2470--3--
0.056 µF	11.0	22.0	41.5	37.5	1500	600 E4	R76UW2560--3--
0.068 µF	11.0	22.0	41.5	37.5	1500	600 E4	R76UW2680--3--
0.082 µF	11.0	22.0	41.5	37.5	1500	600 E4	R76UW2820--3--
0.10 µF	13.0	24.0	41.5	37.5	1500	600 E4	R76UW3100--3--
0.12 µF	13.0	24.0	41.5	37.5	1500	600 E4	R76UW3120--3--
0.15 µF	16.0	28.5	41.5	37.5	1500	600 E4	R76UW3150--3--
0.18 µF	16.0	28.5	41.5	37.5	1500	600 E4	R76UW3180--3--
0.22 µF	19.0	32.0	41.5	37.5	1500	600 E4	R76UW3220--3--
0.27 µF	20.0	40.0	41.5	37.5	1500	600 E4	R76UW3270--3--
0.33 µF	20.0	40.0	41.5	37.5	1500	600 E4	R76UW3330--3--
0.39 µF	24.0	44.0	41.5	37.5	1500	600 E4	R76UW3390--3--
0.47 µF	24.0	44.0	41.5	37.5	1500	600 E4	R76UW3470--3--
0.56 µF	30.0	45.0	41.5	37.5	1500	600 E4	R76UW3560--3--
0.68 µF	30.0	45.0	41.5	37.5	1500	600 E4	R76UW3680--3--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); (J (±5%); K (±10%)

R76

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **R76**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):

250Vdc - 400Vdc - 630Vdc for 1 section
630Vdc - 1000Vdc - 1600Vdc - 2000Vdc for 2 sections.

Rated temperature (T_R):

+85°C for V_R (d.c.)
+75°C for V_R (a.c.)

Temperature derated voltage:

The following decreasing factor has to be applied on the rated voltage:
+85°C to +105°C: 1.25% per °C for V_R (d.c.).
+75°C to +105°C: 1.35% per °C for V_R (a.c.)

Capacitance range:

680pF to 15µF 1 section
100pF to 5.6µF 2 sections

Capacitance values:

E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**

±5% (J); ±10% (K) for C<1000pF
±2.5% (H); ±5% (J); ±10% (K); for C≥1000pF

Total self-inductance (L)**:**

(Lead length ~2 mm)

Pitch (mm)	7.5	10	15	22.5	27.5	37.5
L (nH) ≈	8	9	10	18	18	20

Dissipation factor (DF):

tgδx10^{-4} at +25°C ±5°C

kHz	C≤0.1µF	0.1µF<C≤1.0µF	C>1µF
1	≤ 3	≤3	≤4
10	≤ 4	≤6	
100	≤15		

Insulation resistance:

Test conditions

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

Performance

≥1x10^5 MΩ for C≤0.33µF (5x10^5 MΩ)*
≥30000 s for C>0.33µF (150000 s)*
* Typical value.

Test voltage between terminations:

1.6xV_R applied for 2 s at +25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤10x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions

Temperature: +85°C±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_R (d.c.)

Performance

Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤10x10^{-4} at 10kHz for C≤1µF
≤10x10^{-4} at 1kHz for C>1µF
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|: ≤1%
DF change (Δtgδ): ≤10x10^{-4} at 10kHz for C≤1µF
≤10x10^{-4} at 1kHz for C>1µF
Insulation resistance: ≥initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

Performance

Capacitance change |ΔC/C|: ≤0.5%

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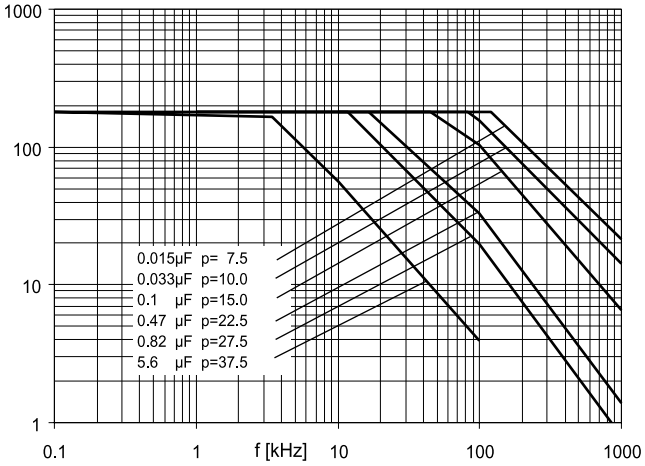
MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

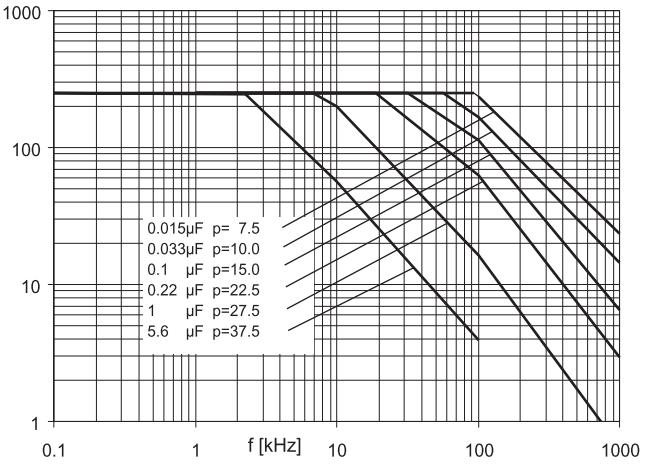
PRODUCT CODE: **R76**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

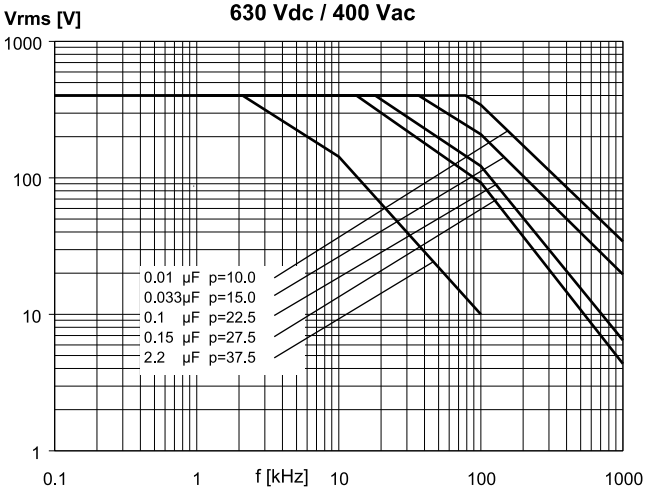
250 Vdc / 180 Vac



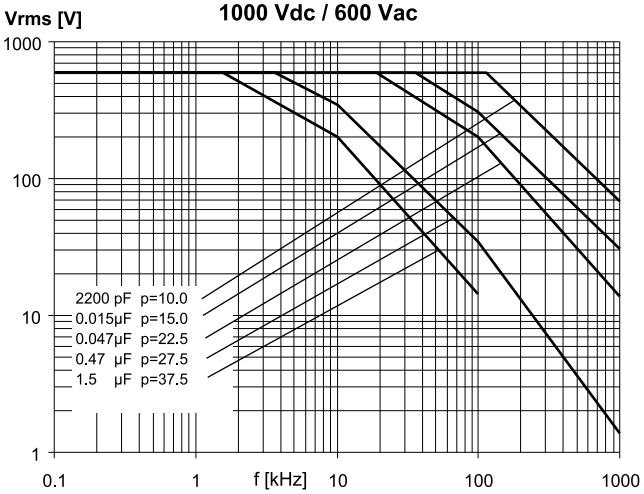
400 Vdc / 250 Vac



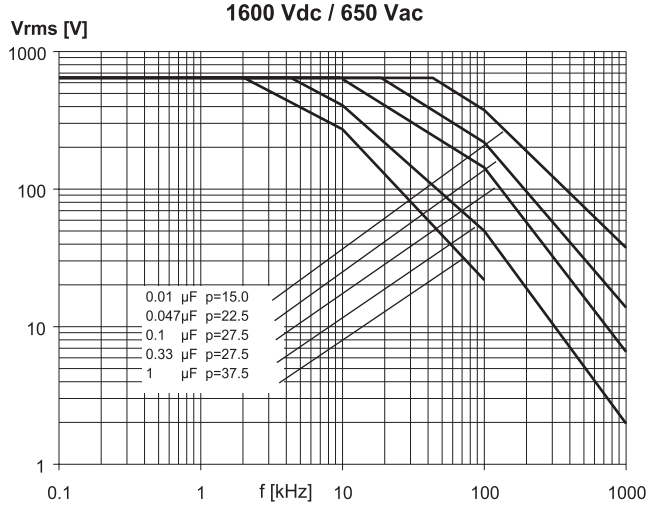
630 Vdc / 400 Vac



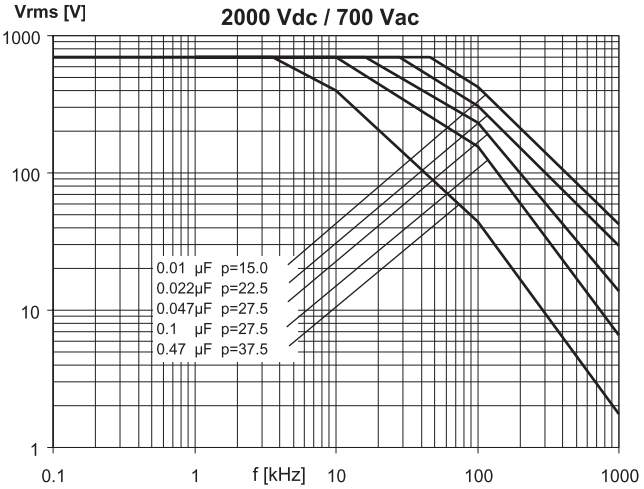
1000 Vdc / 600 Vac



1600 Vdc / 650 Vac



2000 Vdc / 700 Vac



Note: p (pitch) in mm.

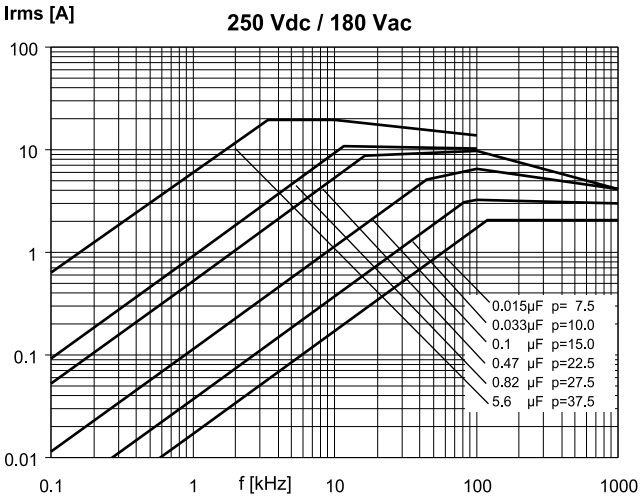
R76

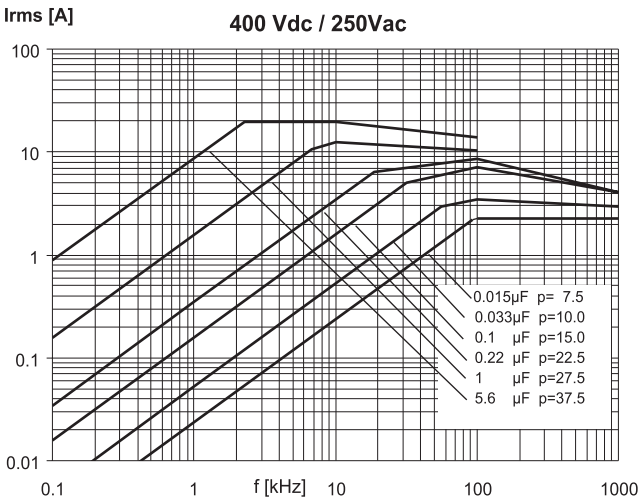
MMKP Series

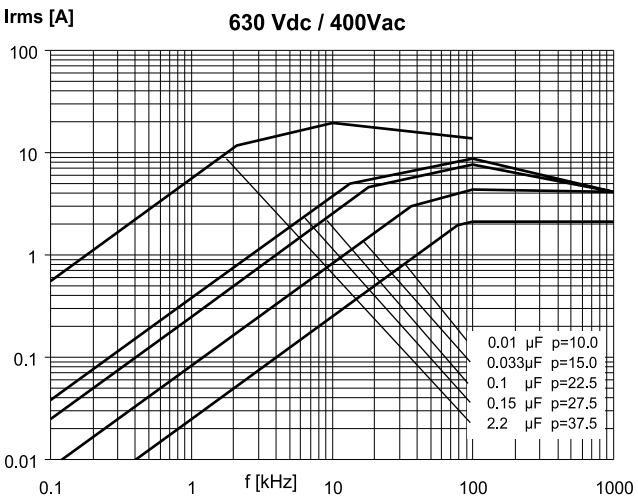
POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES D.C. AND PULSE APPLICATIONS

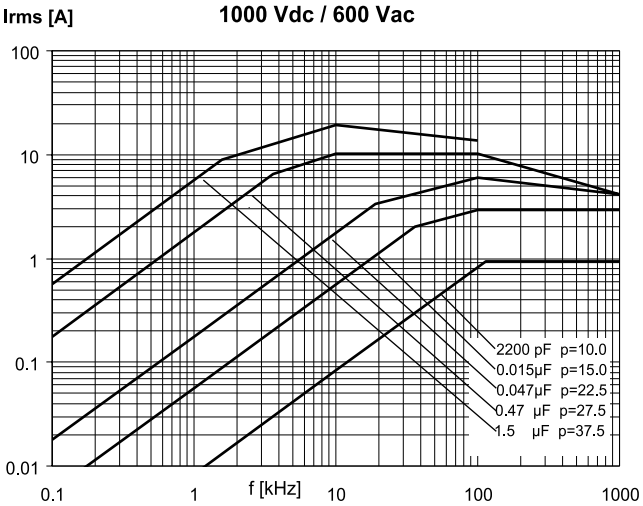
PRODUCT CODE: **R76**

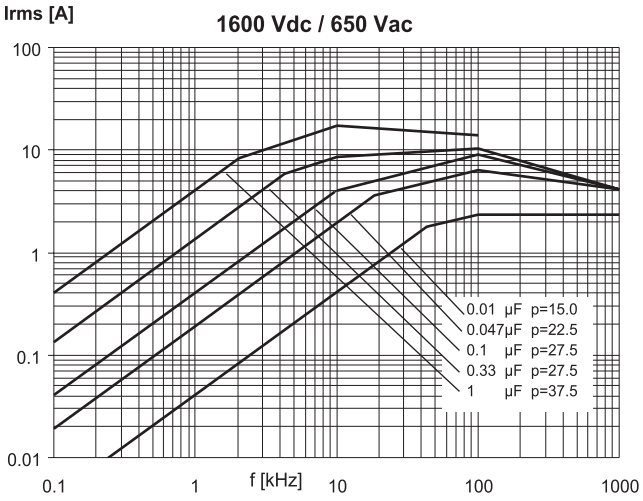
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

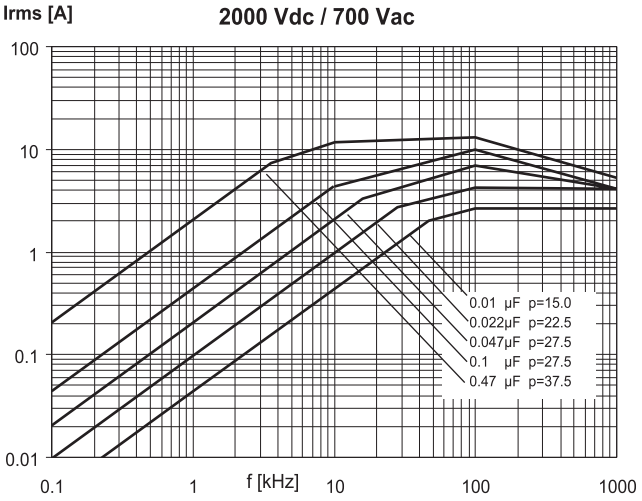












Note: p (pitch) in mm.

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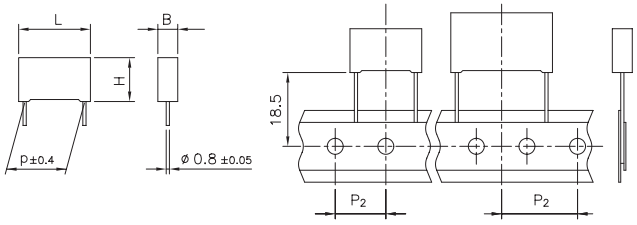
MMKP Series

Loose Taped

Fig. 1 Fig. 2



Ød±0.05	p ≥15
	0.8

All dimensions are in mm.

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES A.C. APPLICATIONS

Typical applications: electronic lighting (i.e. car headlamp and ballast), pulse applications with high A.C. voltage and HIGH current.

PRODUCT CODE: **R77**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	7										-	

Digit 1 to 3 Series code.

Digit 4 a.c. rated voltage: L =250V
3 = 300V N=400V 5 =500V
7 = 700V 9 =900V

Digit 5 Pitch:
I=15mm; N=22.5mm; R=27.5mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use.

Digit 14 Capacitance tolerance:
H=2.5%; J=5%; K=10%

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.
Plates: double sided metallized polyester film.
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 (R77), dielectric code (MKP), capacitance, tolerance, A.C. rated voltage, manufacturing date code.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-16; IEC 60384-17

Table 1 (for more detailed information, please refer to page 14).

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	15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø 355mm		12.70	1	15.0	GY
REEL Ø 500mm		12.70	1	15.0	CK
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads Loose, long leads Loose, long leads	4^{+2} 30^{+5} $25^{+2/-1}$				AA 40 50

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

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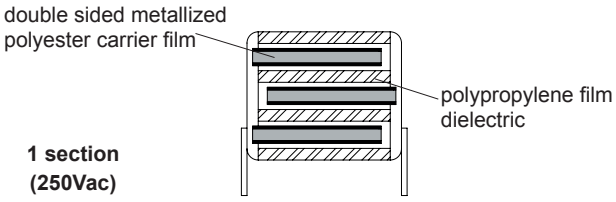
MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES A.C. APPLICATIONS

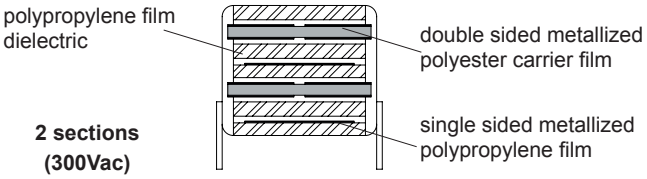
PRODUCT CODE: **R77**



1 section
(250Vac)

Rated Cap.	250Vac* (1 section) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.027 µF	6.0	12.0	18.0	15.0	900	110 E4	R77LI 2270--0--
0.033 µF	6.0	12.0	18.0	15.0	900	110 E4	R77LI 2330--0--
0.039 µF	6.0	12.0	18.0	15.0	900	110 E4	R77LI 2390--0--
0.047 µF	7.5	13.5	18.0	15.0	900	110 E4	R77LI 2470--0--
0.056 µF	7.5	13.5	18.0	15.0	900	110 E4	R77LI 2560--0--
0.068 µF	8.5	14.5	18.0	15.0	900	110 E4	R77LI 2680--0--
0.082 µF	10.0	16.0	18.0	15.0	900	110 E4	R77LI 2820--0--
0.10 µF	10.0	16.0	18.0	15.0	900	110 E4	R77LI 3100--0--

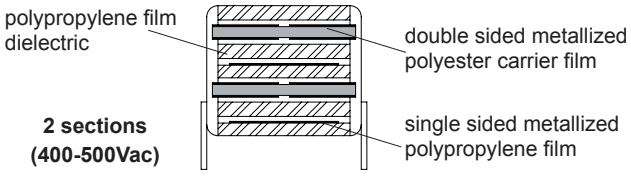
Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)



2 sections
(300Vac)

Rated Cap.	300Vac (2 sections)* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.010 µF	5.0	11.0	18.0	15.0	2500	400 E4	R773I 2100--0--
0.012 µF	5.0	11.0	18.0	15.0	2500	400 E4	R773I 2120--0--
0.015 µF	5.0	11.0	18.0	15.0	2500	400 E4	R773I 2150--0--
0.018 µF	5.0	11.0	18.0	15.0	2500	400 E4	R773I 2180--0--
0.022 µF	6.0	12.0	18.0	15.0	2500	400 E4	R773I 2220--0--
0.027 µF	6.0	12.0	18.0	15.0	2500	400 E4	R773I 2270--0--
0.033 µF	7.5	13.5	18.0	15.0	2500	400 E4	R773I 2330--0--
0.039 µF	7.5	13.5	18.0	15.0	2500	400 E4	R773I 2390--0--
0.047 µF	8.5	14.5	18.0	15.0	2500	400 E4	R773I 2470--0--
0.056 µF	10.0	16.0	18.0	15.0	2500	400 E4	R773I 2560--0--
0.068 µF	10.0	16.0	18.0	15.0	2500	400 E4	R773I 2680--0--
0.056 µF	6.0	15.0	26.5	22.5	1500	240 E4	R773N2560--0--
0.068 µF	7.0	16.0	26.5	22.5	1500	240 E4	R773N2680--0--
0.082 µF	7.0	16.0	26.5	22.5	1500	240 E4	R773N2820--0--
0.10 µF	8.5	17.0	26.5	22.5	1500	240 E4	R773N3100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)



2 sections
(400-500Vac)

Rated Cap.	400Vac (2 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
5600 pF	5.0	11.0	18.0	15.0	3300	660 E4	R77NI 1560--0--
6800 pF	5.0	11.0	18.0	15.0	3300	660 E4	R77NI 1680--0--
8200 pF	5.0	11.0	18.0	15.0	3300	660 E4	R77NI 1820--0--
0.010 µF	6.0	12.0	18.0	15.0	3300	660 E4	R77NI 2100--0--
0.012 µF	6.0	12.0	18.0	15.0	3300	660 E4	R77NI 2120--0--
0.015 µF	7.5	13.5	18.0	15.0	3300	660 E4	R77NI 2150--0--
0.018 µF	7.5	13.5	18.0	15.0	3300	660 E4	R77NI 2180--0--
0.022 µF	8.5	14.5	18.0	15.0	3300	660 E4	R77NI 2220--0--
0.027 µF	10.0	16.0	18.0	15.0	3300	660 E4	R77NI 2270--0--
0.033 µF	10.0	16.0	18.0	15.0	3300	660 E4	R77NI 2330--0--
0.027 µF	6.0	15.0	26.5	22.5	2100	420 E4	R77NN2270--0--
0.033 µF	7.0	16.0	26.5	22.5	2100	420 E4	R77NN2330--0--
0.039 µF	7.0	16.0	26.5	22.5	2100	420 E4	R77NN2390--0--
0.047 µF	8.5	17.0	26.5	22.5	2100	420 E4	R77NN2470--0--
0.056 µF	8.5	17.0	26.5	22.5	2100	420 E4	R77NN2560--0--
0.068 µF	10.0	18.5	26.5	22.5	2100	420 E4	R77NN2680--0--
0.082 µF	10.0	18.5	26.5	22.5	2100	420 E4	R77NN2820--0--
0.10 µF	11.0	20.0	26.5	22.5	2100	420 E4	R77NN3100--0--

Rated Cap.	500Vac (2 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1100--0--
1200 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1120--0--
1500 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1150--0--
1800 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1180--0--
2200 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1220--0--
2700 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1270--0--
3300 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1330--0--
3900 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1390--0--
4700 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1470--0--
5600 pF	5.0	11.0	18.0	15.0	4500	1200 E4	R775I 1560--0--
6800 pF	6.0	12.0	18.0	15.0	4500	1200 E4	R775I 1680--0--
8200 pF	6.0	12.0	18.0	15.0	4500	1200 E4	R775I 1820--0--
0.010 µF	7.5	13.5	18.0	15.0	4500	1200 E4	R775I 2100--0--
0.012 µF	7.5	13.5	18.0	15.0	4500	1200 E4	R775I 2120--0--
0.015 µF	8.5	14.5	18.0	15.0	4500	1200 E4	R775I 2150--0--
0.018 µF	10.0	16.0	18.0	15.0	4500	1200 E4	R775I 2180--0--
0.022 µF	10.0	16.0	18.0	15.0	4500	1200 E4	R775I 2220--0--
0.018 µF	6.0	15.0	26.5	22.5	2500	650 E4	R775N2180--0--
0.022 µF	7.0	16.0	26.5	22.5	2500	650 E4	R775N2220--0--
0.027 µF	7.0	16.0	26.5	22.5	2500	650 E4	R775N2270--0--
0.033 µF	8.5	17.0	26.5	22.5	2500	650 E4	R775N2330--0--
0.039 µF	10.0	18.5	26.5	22.5	2500	650 E4	R775N2390--0--
0.047 µF	10.0	18.5	26.5	22.5	2500	650 E4	R775N2470--0--
0.056 µF	11.0	20.0	26.5	22.5	2500	650 E4	R775N2560--0--
0.068 µF	11.0	20.0	32.0	27.5	1100	290 E4	R775R2680--0--
0.082 µF	11.0	20.0	32.0	27.5	1100	290 E4	R775R2820--0--
0.10 µF	13.0	22.0	32.0	27.5	1100	290 E4	R775R3100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V. The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

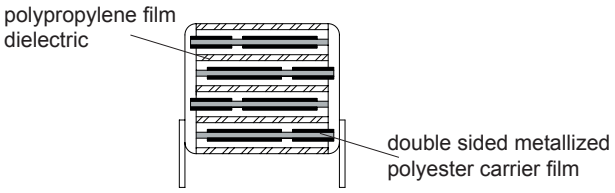
* Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R77

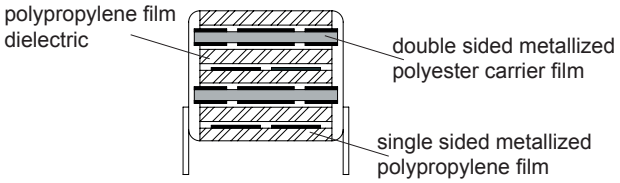
MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES A.C. APPLICATIONS

PRODUCT CODE: **R77**



3 sections
(700Vac)



4 sections
(900Vac)

Rated Cap.	700Vac (3 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	5.0	11.0	18.0	15.0	9500	3000 E4	R777I 1100--0--
1200 pF	5.0	11.0	18.0	15.0	9500	3000 E4	R777I 1120--0--
1500 pF	5.0	11.0	18.0	15.0	9500	3000 E4	R777I 1150--0--
1800 pF	5.0	11.0	18.0	15.0	9500	3000 E4	R777I 1180--0--
2200 pF	5.0	11.0	18.0	15.0	9500	3000 E4	R777I 1220--0--
2700 pF	6.0	12.0	18.0	15.0	9500	3000 E4	R777I 1270--0--
3300 pF	6.0	12.0	18.0	15.0	9500	3000 E4	R777I 1330--0--
3900 pF	7.5	13.5	18.0	15.0	9500	3000 E4	R777I 1390--0--
4700 pF	7.5	13.5	18.0	15.0	9500	3000 E4	R777I 1470--0--
5600 pF	8.5	14.5	18.0	15.0	9500	3000 E4	R777I 1560--0--
6800 pF	8.5	14.5	18.0	15.0	9500	3000 E4	R777I 1680--0--
8200 pF	10.0	16.0	18.0	15.0	9500	3000 E4	R777I 1820--0--
8200 pF	6.0	15.0	26.5	22.5	4500	1400 E4	R777N1820--0--
0.010 µF	6.0	15.0	26.5	22.5	4500	1400 E4	R777N2100--0--
0.012 µF	7.0	16.0	26.5	22.5	4500	1400 E4	R777N2120--0--
0.015 µF	8.5	17.0	26.5	22.5	4500	1400 E4	R777N2150--0--
0.018 µF	10.0	18.5	26.5	22.5	4500	1400 E4	R777N2180--0--
0.022 µF	10.0	18.5	26.5	22.5	4500	1400 E4	R777N2220--0--
0.027 µF	11.0	20.0	26.5	22.5	4500	1400 E4	R777N2270--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

Rated Cap.	900Vac (4 sections) Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1100--0--
1200 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1120--0--
1500 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1150--0--
1800 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1180--0--
2200 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1220--0--
2700 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1270--0--
3300 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1330--0--
3900 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1390--0--
4700 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1470--0--
5600 pF	6.0	15.0	26.5	22.5	9500	3800 E4	R779N1560--0--
6800 pF	7.0	16.0	26.5	22.5	9500	3800 E4	R779N1680--0--
8200 pF	7.0	16.0	26.5	22.5	9500	3800 E4	R779N1820--0--
0.010 µF	8.5	17.0	26.5	22.5	9500	3800 E4	R779N2100--0--
0.012 µF	10.0	18.5	26.5	22.5	9500	3800 E4	R779N2120--0--
0.015 µF	10.0	18.5	26.5	22.5	9500	3800 E4	R779N2150--0--
0.018 µF	11.0	20.0	26.5	22.5	9500	3800 E4	R779N2180--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R /V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

R77

MMKP Series

POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES A.C. APPLICATIONS

PRODUCT CODE: **R77**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):

250Vac (630Vdc) 300Vac (800Vdc)
400Vac (1000Vdc) 500Vac (1300Vdc)
700Vac(1600Vdc) 900Vac (2000Vdc)

Rated temperature (T_R): + 85°C for V_R (d.c.)
+105°C for V_R (a.c.)

Temperature derated voltage:
For temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree C on the rated voltage V_R (d.c.) has to be applied.

Capacitance range:
1000pF to 0.1μF

Capacitance values:
E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±2.5% (H); ±5% (J); ±10% (K).

Total self inductance: (L)
(Lead length ≈2 mm)

Pitch (mm)	15	22.5	27.5
L (nH) ≈	10	18	18

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	tgδx10^{-4}
10	≤ 6
100	≤ 10

Insulation resistance:

Test conditions

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

Performance

≥1x10^5 MΩ (Typ.value: 5x10^5 MΩ)

Test voltage between terminations:
1.6xV_R applied for 2 s at 25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤10x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+105°C±2°C
Test duration:	2000 h
Voltage applied:	1.25xV_R (a.c.) at 50Hz

Performance

Capacitance change |ΔC/C|:	≤2%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
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|:	≤1%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
Insulation resistance:	≥initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12).

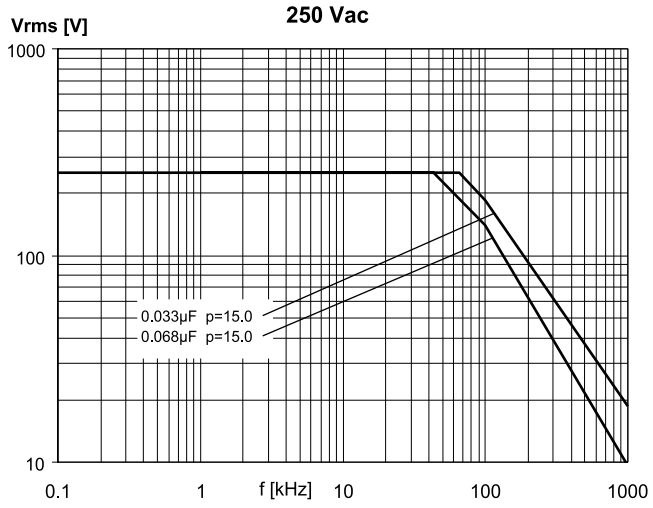
Performance

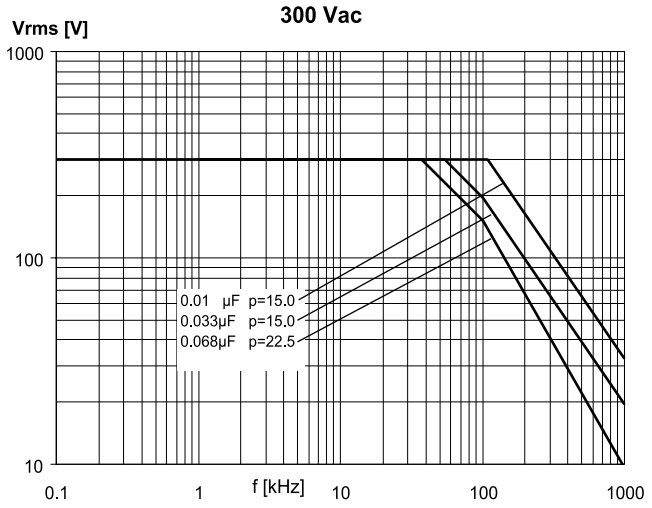
Capacitance change |ΔC/C|: ≤0.5%

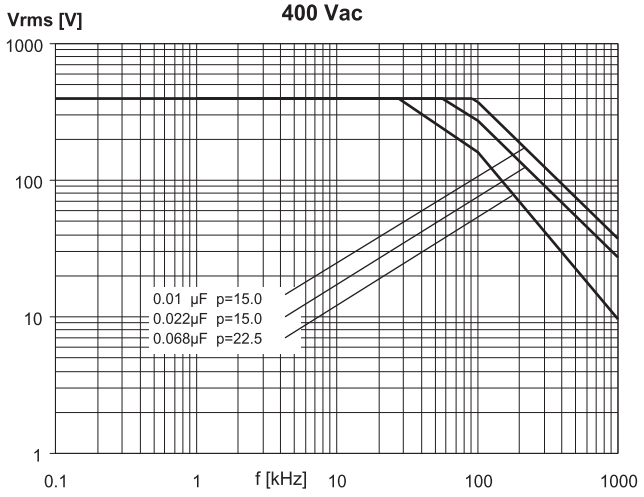
POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES
A.C. APPLICATIONS

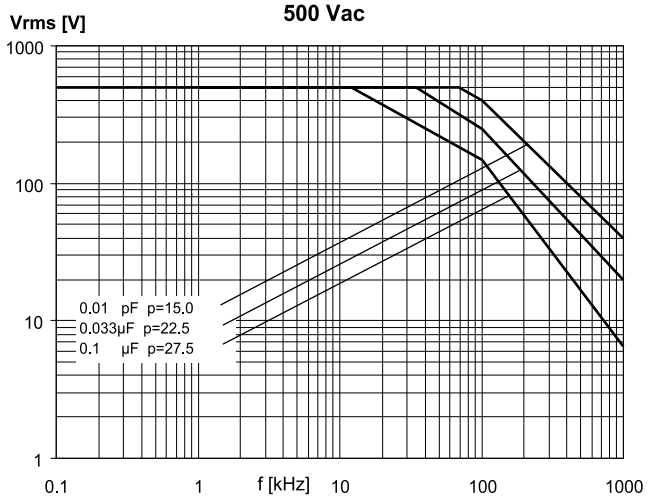
PRODUCT CODE: **R77**

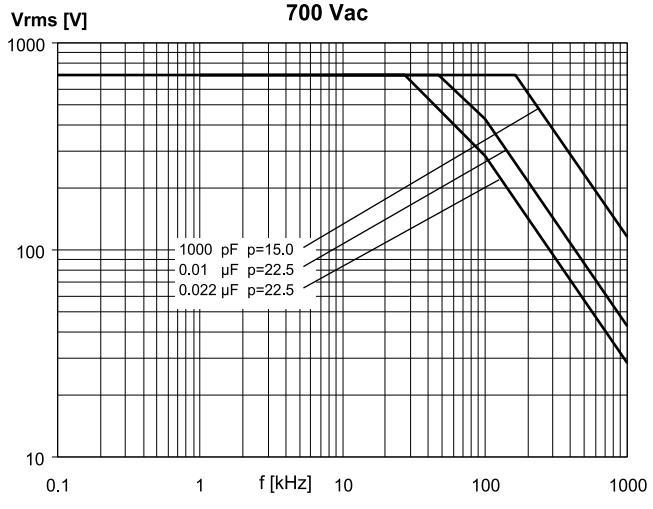
MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

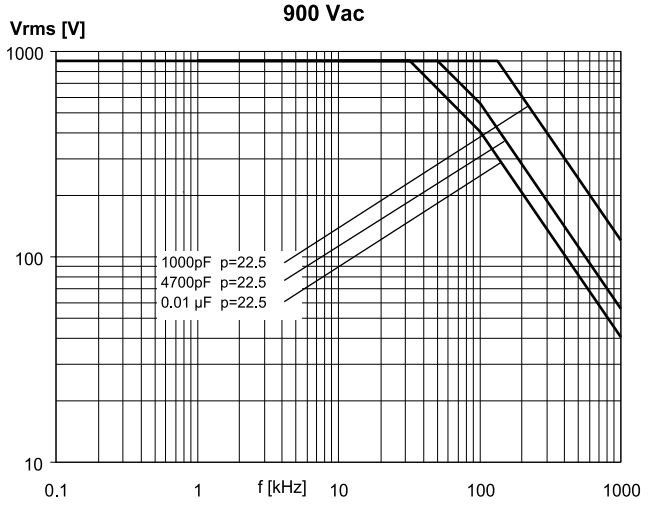












Note: p (pitch) in mm.

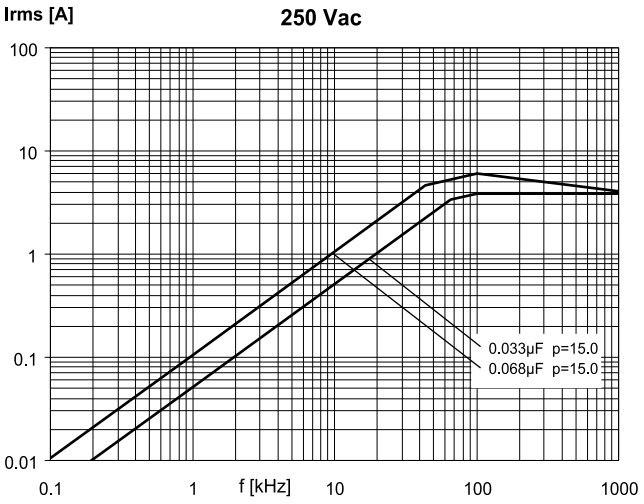
R77

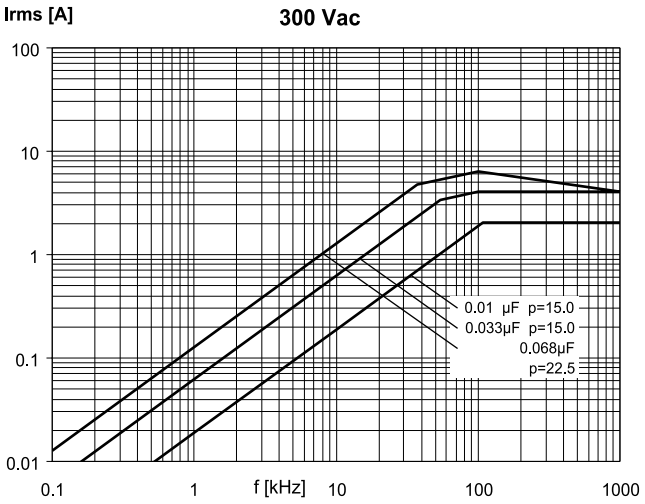
MMKP Series

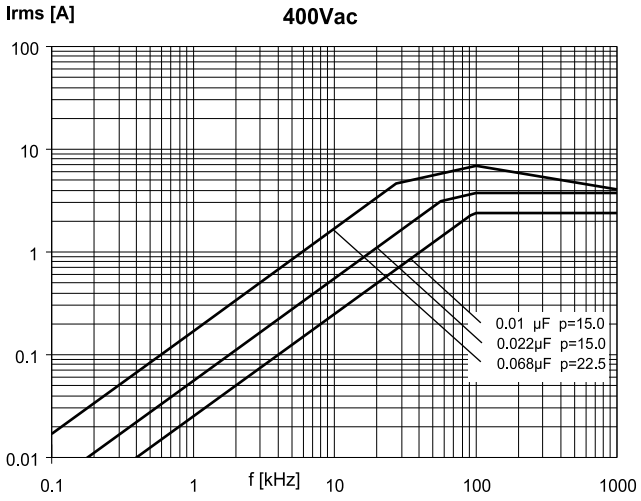
POLYPROPYLENE CAPACITOR WITH DOUBLE SIDED METALLIZED FILM ELECTRODES
A.C. APPLICATIONS

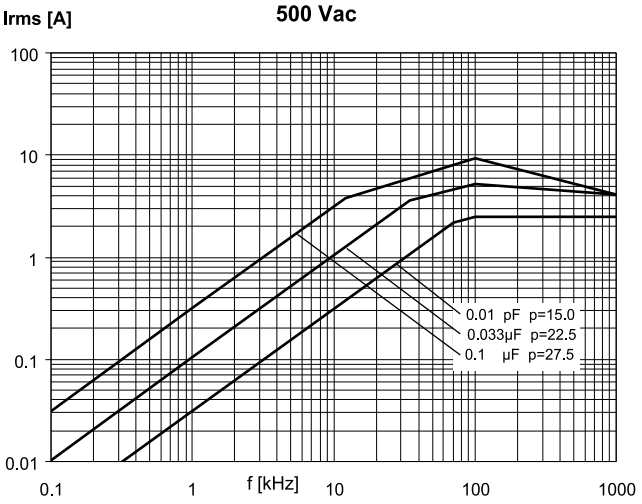
PRODUCT CODE: **R77**

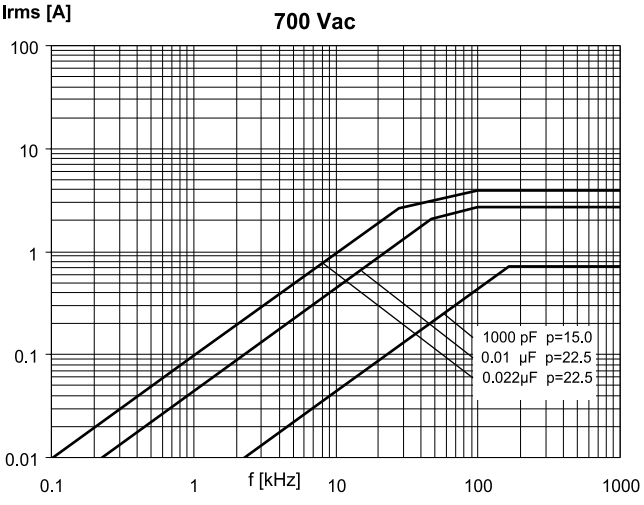
MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

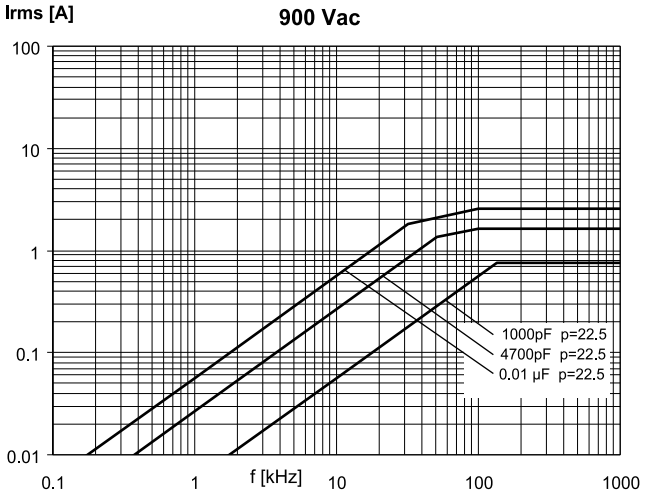












Note: p (pitch) in mm.

R79
MKP Series

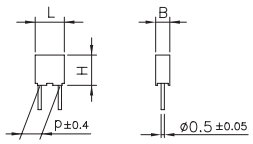
METALLIZED POLYPROPYLENE FILM CAPACITOR MULTIPURPOSE APPLICATIONS

Typical applications: timing, oscillator circuits, high frequency coupling and decoupling.

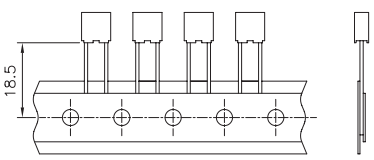
PRODUCT CODE: **R79**

p = 5mm

Loose



Taped



All dimensions are in mm.

Pitch	Box thickness	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
5.0	<4.5	B +0.1	H +0.1	L +0.2
5.0	≥4.5	B +0.1	H +0.1	L +0.3

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	9		C								-	

Digit 1 to 3	Series code
Digit 4	d.c. rated voltage: G = 160V I = 250V M = 400V P = 630V
Digit 5	Pitch: C = 5mm
Digit 6 to 9	Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.
Digit 10 to 11	Mechanical version and packaging (table 1)
Digit 12	Identifies the dimensions and electrical characteristics.
Digit 13	Internal use.
Digit 14	Capacitance tolerance: H=2.5%; J=5%; K=10%

Table 1 (for more detailed information, please refer to page 14)

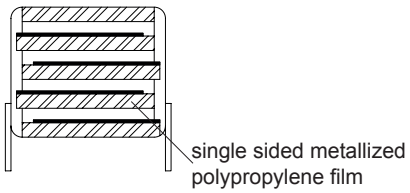
Standard packaging style	Lead length (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		DQ
REEL Ø 355mm		CK
Loose, short leads	4 $^{+1.5}$	AA
Loose, long leads	17 $^{+1/-2}$	Z3

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

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.
Plates: aluminium layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire, low thermical conductivity.
Protection: plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL94.
Marking: manufacturer's logo, series (R79), capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-16

Winding scheme



R79
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR MULTIPURPOSE APPLICATIONS

p = 5 mm
PRODUCT CODE: **R79**

Rated Cap.	160Vdc/70Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.039 µF	3.5	7.5	7.2	5.0	100	32 E3	R79GC2390--4--
0.047 µF	4.5	9.5	7.2	5.0	100	32 E3	R79GC2470--4--
0.056 µF	4.5	9.5	7.2	5.0	100	32 E3	R79GC2560--4--
0.068 µF	4.5	9.5	7.2	5.0	100	32 E3	R79GC2680--4--
0.082 µF	5.0	10.0	7.2	5.0	100	32 E3	R79GC2820--4--
0.10 µF	5.0	10.0	7.2	5.0	100	32 E3	R79GC3100--4--
0.12 µF	6.0	11.0	7.2	5.0	100	32 E3	R79GC3120--4--
0.15 µF	6.0	11.0	7.2	5.0	100	32 E3	R79GC3150--4--
0.18 µF	7.2	13.0	7.2	5.0	100	32 E3	R79GC3180--4--
0.22 µF	7.2	13.0	7.2	5.0	100	32 E3	R79GC3220--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%)

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.012 µF	3.5	7.5	7.2	5.0	250	125 E3	R79IC2120--4--
0.015 µF	3.5	7.5	7.2	5.0	250	125 E3	R79IC2150--4--
0.018 µF	3.5	7.5	7.2	5.0	250	125 E3	R79IC2180--4--
0.022 µF	3.5	7.5	7.2	5.0	250	125 E3	R79IC2220--4--
0.027 µF	3.5	7.5	7.2	5.0	250	125 E3	R79IC2270--4--
0.033 µF	3.5	7.5	7.2	5.0	250	125 E3	R79IC2330--4--
0.039 µF	4.5	9.5	7.2	5.0	250	125 E3	R79IC2390--4--
0.047 µF	4.5	9.5	7.2	5.0	250	125 E3	R79IC2470--4--
0.056 µF	4.5	9.5	7.2	5.0	250	125 E3	R79IC2560--4--
0.068 µF	5.0	10.0	7.2	5.0	250	125 E3	R79IC2680--4--
0.082 µF	6.0	11.0	7.2	5.0	250	125 E3	R79IC2820--4--
0.10 µF	6.0	11.0	7.2	5.0	250	125 E3	R79IC3100--4--
0.12 µF	7.2	13.0	7.2	5.0	250	125 E3	R79IC3120--4--
0.15 µF	7.2	13.0	7.2	5.0	250	125 E3	R79IC3150--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
3900 pF	3.5	7.5	7.2	5.0	400	320 E3	R79MC1390--4--
4700 pF	3.5	7.5	7.2	5.0	400	320 E3	R79MC1470--4--
5600 pF	3.5	7.5	7.2	5.0	400	320 E3	R79MC1560--4--
6800 pF	3.5	7.5	7.2	5.0	400	320 E3	R79MC1680--4--
8200 pF	3.5	7.5	7.2	5.0	400	320 E3	R79MC1820--4--
0.010 µF	3.5	7.5	7.2	5.0	400	320 E3	R79MC2100--4--
0.012 µF	4.5	9.5	7.2	5.0	400	320 E3	R79MC2120--4--
0.015 µF	4.5	9.5	7.2	5.0	400	320 E3	R79MC2150--4--
0.018 µF	5.0	10.0	7.2	5.0	400	320 E3	R79MC2180--4--
0.022 µF	5.0	10.0	7.2	5.0	400	320 E3	R79MC2220--4--
0.027 µF	6.0	11.0	7.2	5.0	400	320 E3	R79MC2270--4--
0.033 µF	6.0	11.0	7.2	5.0	400	320 E3	R79MC2330--4--
0.039 µF	7.2	13.0	7.2	5.0	400	320 E3	R79MC2390--4--
0.047 µF	7.2	13.0	7.2	5.0	400	320 E3	R79MC2470--4--

Rated Cap.	630Vdc/220Vac* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1000 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1100--4--
1200 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1120--4--
1500 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1150--4--
1800 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1180--4--
2200 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1220--4--
2700 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1270--4--
3300 pF	3.5	7.5	7.2	5.0	500	630 E3	R79PC1330--4--
3900 pF	4.5	9.5	7.2	5.0	600	630 E3	R79PC1390--4--
4700 pF	4.5	9.5	7.2	5.0	600	630 E3	R79PC1470--4--
5600 pF	4.5	9.5	7.2	5.0	600	630 E3	R79PC1560--4--
6800 pF	5.0	10.0	7.2	5.0	600	630 E3	R79PC1680--4--
8200 pF	5.0	10.0	7.2	5.0	600	630 E3	R79PC1820--4--
0.010 µF	6.0	11.0	7.2	5.0	600	630 E3	R79PC2100--4--
0.012 µF	6.0	11.0	7.2	5.0	600	630 E3	R79PC2120--4--
0.015 µF	7.2	13.0	7.2	5.0	600	630 E3	R79PC2150--4--
0.018 µF	7.2	13.0	7.2	5.0	600	630 E3	R79PC2180--4--

Mechanical version and packaging (Table1)
Internal use
Tolerance: H (±2.5%); J (±5%); K (±10%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

R79
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR MULTIPURPOSE APPLICATIONS

p = 5 mm
PRODUCT CODE: **R79**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 160Vdc - 250 Vdc 400 Vdc - 630 Vdc

Rated temperature (T_R): +85°C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 0.22 µF

Capacitance values:
E12 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±2.5% (H); ±5% (J); ±10% (K).

Total self-inductance (L)**:** ≈ 6 nH
(lead length ≈2 mm).

Temperature coefficient (ppm/°C):
-200 (typical value).

Dissipation factor (DF):
tgd 10^{-4} at +25°C ±5°C

kHz	MKP C≤0.1 µF	MKP C>0.1 µF
	tgδx10^{-4}	tgδx10^{-4}
1	≤ 6	≤ 6
10	≤10	≤10
100	≤30	

Dielectric absorption (DA): 0.05%

Insulation resistance:

Test conditions

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

Performance
≥1x10^5 MΩ (Typ.value: 5x10^5 MΩ)

Test voltage between terminations:
1.6xV_R applied for 2 s at +25°C±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions

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

Performance

Capacitance change |ΔC/C |:	≤3%
DF change (Δtgδ):	≤10x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+85°C±2°C
Test duration:	1000 h
Voltage applied:	1.25xV_R

Performance

Capacitance change |ΔC/C |:	≤3%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
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%
DF change (Δtgδ):	≤10x10^{-4} at 10kHz
Insulation resistance:	≥ initial limit.

Long term stability (after two years)**:**
Storage: standard environmental conditions (see page 12).

Performance
Capacitance change |ΔC/C |: ≤0.5%

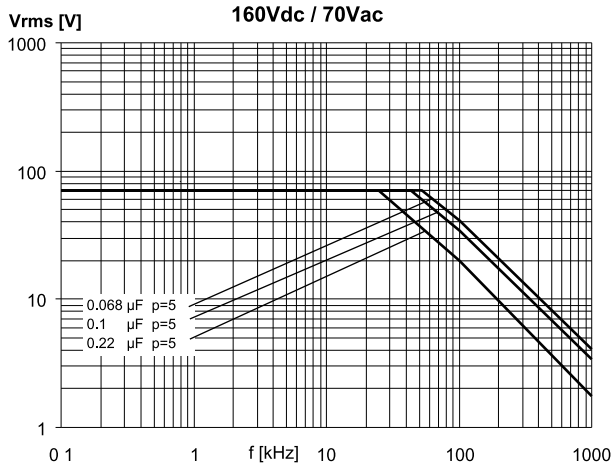
R79

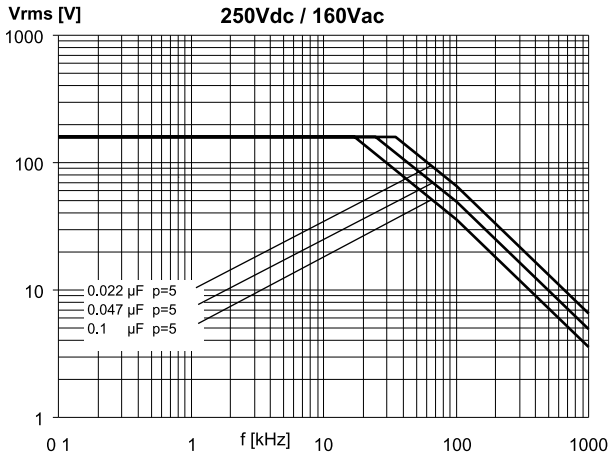
MKP Series

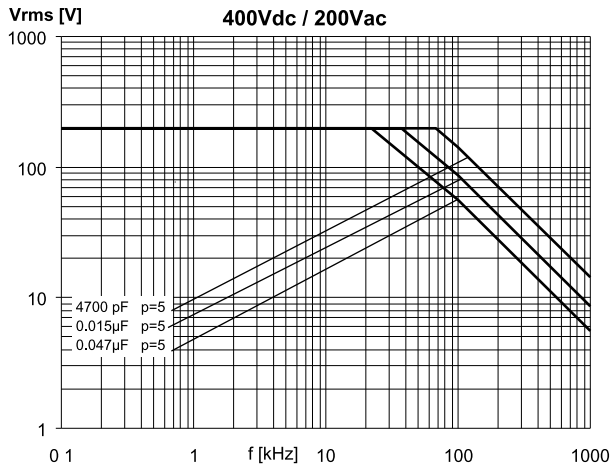
METALLIZED POLYPROPYLENE FILM CAPACITOR
MULTIPURPOSE APPLICATIONS

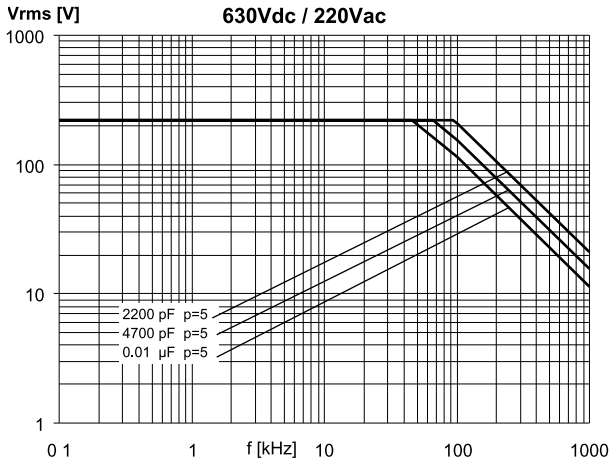
p = 5 mm
PRODUCT CODE: **R79**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)









Note: p (pitch) in mm.

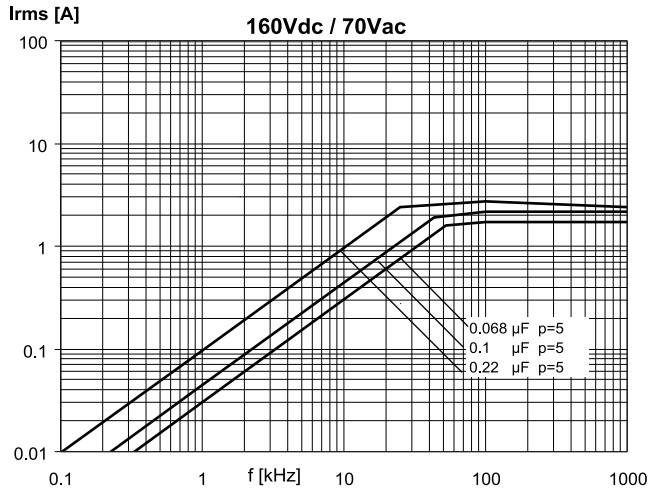
R79

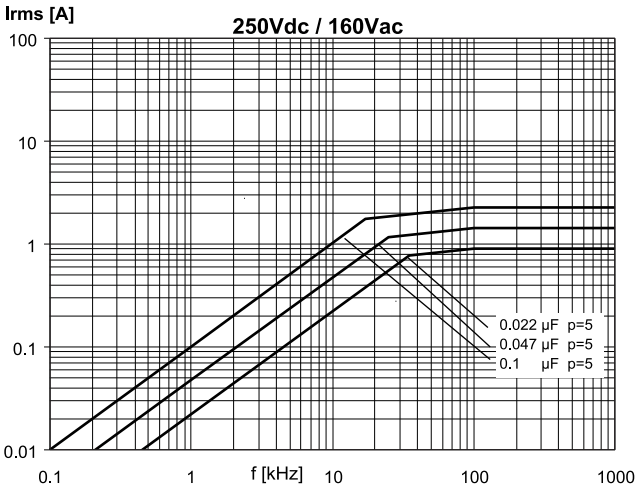
MKP Series

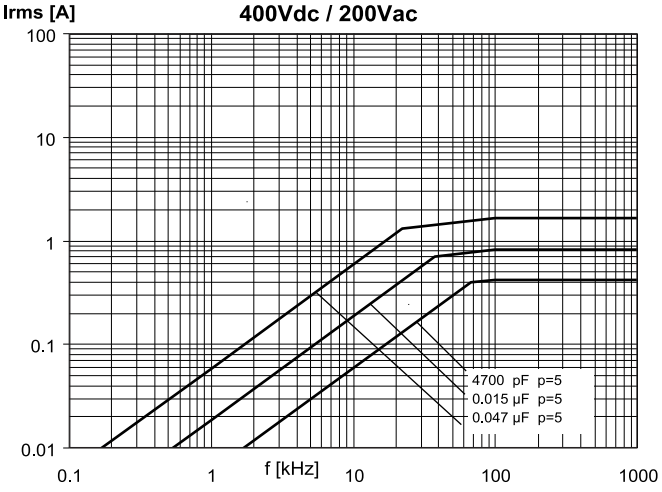
METALLIZED POLYPROPYLENE FILM CAPACITOR
MULTIPURPOSE APPLICATIONS

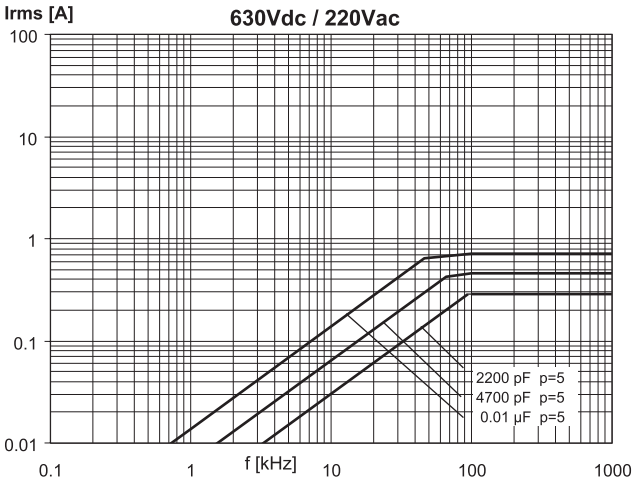
p = 5 mm
PRODUCT CODE: **R79**

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)







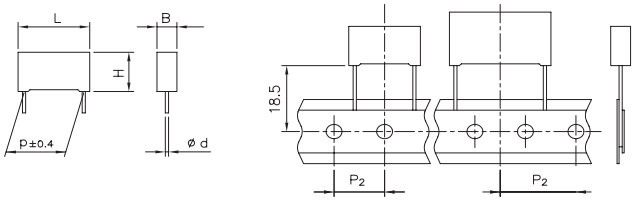


Note: p (pitch) in mm.

JSP
MKP Series

Loose Taped

Fig.1 Fig. 2



Ød ±0.05	p = 22.5÷27.5	p = 37.5
	0.8	1.0

All dimensions are in mm.

METALLIZED POLYPROPYLENE FILM CAPACITOR
D.C. AND PULSE APPLICATIONS

Typical applications: Automotive and Industrial applications Capacitor for DC-DC converter, inverter and supply High Capacitance per volume

PRODUCT CODE: **JSP**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
J	S	P										-	

Digit 1 to 3 Series code.
Digit 4 d.c. rated voltage
I = 250Vdc; M = 400Vdc; P=630Vdc.
Digit 5 Pitch: N=22.5mm; R=27.5mm; W=37.5mm.
Digit 6 to 9 Digits 7-8-9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to optain the rated Capacitance in pF.
Digit 10 to 11 Mechanical version and/or packaging (table 1).
Digit 12 Identifies the dimension and electrical characteristics.
Digit 13 Internal use.
Digit 14 Capacitance Tolerance:
J=±5%; K=±10%; M=±20%.

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4 +2				AA
Loose, long leads	25 -1/+2				50
	30 -0/+5				40

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

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: aluminium layer deposited by evaporation under vacuum.

Winding: non-inductive type.

Construction: Stacked technology.

Leads: tinned wire.

Protection: plastic case,thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL94 V-0.

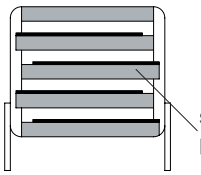
Marking: Manufacturer's logo, series (JSP), capacitance, tolerance, D.C. rated voltage, manufacturing date code.

Climatic category: 55/105/56 IEC 60068-1.

Operating temperature range: -55°C up to +125°C.

Related documents: IEC 60384-2.

Winding scheme



JSP

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **JSP**

Rated Cap.	250Vdc / 160Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
2.2 µF	7.0	16.0	26.5	22.5	125	63 E3	JSP IN4220--A--
2.7 µF	7.0	16.0	26.5	22.5	125	63 E3	JSP IN4270--A--
3.3 µF	8.5	17.0	26.5	22.5	125	63 E3	JSP IN4330--A--
3.9 µF	8.5	17.0	26.5	22.5	125	63 E3	JSP IN4390--A--
4.7 µF	11.0	20.0	26.5	22.5	125	63 E3	JSP IN4470--A--
5.6 µF	11.0	20.0	26.5	22.5	125	63 E3	JSP IN4560--A--
6.8 µF	13.0	22.0	26.5	22.5	125	63 E3	JSP IN4680--A--
8.2 µF	13.0	22.0	26.5	22.5	125	63 E3	JSP IN4820--A--
3.3 µF	9.0	17.0	32.0	27.5	100	50 E3	JSP IR4330--A--
3.9 µF	9.0	17.0	32.0	27.5	100	50 E3	JSP IR4390--A--
4.7 µF	9.0	17.0	32.0	27.5	100	50 E3	JSP IR4470--A--
5.6 µF	11.0	20.0	32.0	27.5	100	50 E3	JSP IR4560--A--
6.8 µF	11.0	20.0	32.0	27.5	100	50 E3	JSP IR4680--A--
8.2 µF	13.0	22.0	32.0	27.5	100	50 E3	JSP IR4820--A--
10 µF	13.0	22.0	32.0	27.5	100	50 E3	JSP IR5100--A--
12 µF	18.0	33.0	32.0	27.5	100	50 E3	JSP IR5120--A--
15 µF	18.0	33.0	32.0	27.5	100	50 E3	JSP IR5150--A--
18 µF	18.0	33.0	32.0	27.5	100	50 E3	JSP IR5180--A--
22 µF	18.0	33.0	32.0	27.5	100	50 E3	JSP IR5220--A--
27 µF	22.0	37.0	32.0	27.5	100	50 E3	JSP IR5270--A--
6.8 µF	11.0	22.0	41.5	37.5	40	20 E3	JSPIW4680--A--
8.2 µF	11.0	22.0	41.5	37.5	40	20 E3	JSPIW4820--A--
10 µF	11.0	22.0	41.5	37.5	40	20 E3	JSPIW5100--A--
12 µF	13.0	24.0	41.5	37.5	40	20 E3	JSPIW5120--A--
15 µF	13.0	24.0	41.5	37.5	40	20 E3	JSPIW5150--A--
18 µF	16.0	28.5	41.5	37.5	40	20 E3	JSPIW5180--A--
22 µF	16.0	28.5	41.5	37.5	40	20 E3	JSPIW5220--A--
27 µF	19.0	32.0	41.5	37.5	40	20 E3	JSPIW5270--A--
33 µF	19.0	32.0	41.5	37.5	40	20 E3	JSPIW5330--A--
39 µF	20.0	40.0	41.5	37.5	40	20 E3	JSPIW5390--A--
47 µF	24.0	44.0	41.5	37.5	40	20 E3	JSPIW5470--A--
56 µF	30.0	45.0	41.5	37.5	40	20 E3	JSPIW5560--A--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

Rated Cap.	400Vdc / 200Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1.5 µF	7.0	16.0	26.5	22.5	180	144 E3	JSP MN4150--A--
1.8 µF	7.0	16.0	26.5	22.5	180	144 E3	JSP MN4180--A--
2.2 µF	7.0	16.0	26.5	22.5	180	144 E3	JSP MN4220--A--
2.7 µF	8.5	17.0	26.5	22.5	180	144 E3	JSP MN4270--A--
3.3 µF	11.0	20.0	26.5	22.5	180	144 E3	JSP MN4330--A--
4.7 µF	11.0	20.0	26.5	22.5	180	144 E3	JSP MN4470--A--
5.6 µF	13.0	22.0	26.5	22.5	180	144 E3	JSP MN4560--A--
6.8 µF	13.0	22.0	26.5	22.5	180	144 E3	JSP MN4680--A--
2.2 µF	9.0	17.0	32.0	27.5	130	104 E3	JSP MR4220--A--
2.7 µF	9.0	17.0	32.0	27.5	130	104 E3	JSP MR4270--A--
3.3 µF	9.0	17.0	32.0	27.5	130	104 E3	JSP MR4330--A--
3.9 µF	9.0	17.0	32.0	27.5	130	104 E3	JSP MR4390--A--
4.7 µF	11.0	20.0	32.0	27.5	130	104 E3	JSP MR4470--A--
5.6 µF	11.0	20.0	32.0	27.5	130	104 E3	JSP MR4560--A--
6.8 µF	13.0	22.0	32.0	27.5	130	104 E3	JSP MR4680--A--
8.2 µF	13.0	22.0	32.0	27.5	130	104 E3	JSP MR4820--A--
10 µF	18.0	33.0	32.0	27.5	130	104 E3	JSP MR5100--A--
12 µF	18.0	33.0	32.0	27.5	130	104 E3	JSP MR5120--A--
15 µF	18.0	33.0	32.0	27.5	130	104 E3	JSP MR5150--A--
18 µF	18.0	33.0	32.0	27.5	130	104 E3	JSP MR5180--A--
22 µF	22.0	37.0	32.0	27.5	130	104 E3	JSP MR5220--A--
5.6 µF	11.0	22.0	41.5	37.5	70	56 E3	JSPMW4560--A--
6.8 µF	11.0	22.0	41.5	37.5	70	56 E3	JSPMW4680--A--
8.2 µF	11.0	22.0	41.5	37.5	70	56 E3	JSPMW4820--A--
10 µF	13.0	24.0	41.5	37.5	70	56 E3	JSPMW5100--A--
12 µF	13.0	24.0	41.5	37.5	70	56 E3	JSPMW5120--A--
15 µF	16.0	28.5	41.5	37.5	70	56 E3	JSPMW5150--A--
18 µF	16.0	28.5	41.5	37.5	70	56 E3	JSPMW5180--A--
22 µF	19.0	32.0	41.5	37.5	70	56 E3	JSPMW5220--A--
27 µF	19.0	32.0	41.5	37.5	70	56 E3	JSPMW5270--A--
33 µF	20.0	40.0	41.5	37.5	70	56 E3	JSPMW5330--A--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

JSP

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

D.C. AND PULSE APPLICATIONS

PRODUCT CODE: **JSP**

Rated Cap.	630Vdc / 220Vac Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
1.0 µF	7.0	16.0	26.5	22.5	250	315 E3	JSP PN4100--A--
1.2 µF	7.0	16.0	26.5	22.5	250	315 E3	JSP PN4120--A--
1.5 µF	8.5	17.0	26.5	22.5	250	315 E3	JSP PN4150--A--
1.8 µF	11.0	20.0	26.5	22.5	250	315 E3	JSP PN4180--A--
2.2 µF	11.0	20.0	26.5	22.5	250	315 E3	JSP PN4220--A--
2.7 µF	13.0	22.5	26.5	22.5	250	315 E3	JSP PN4270--A--
3.3 µF	13.0	22.5	26.5	22.5	250	315 E3	JSP PN4330--A--
1.5 µF	9.0	17.0	32.0	27.5	180	227 E3	JSP PR4150--A--
1.8 µF	9.0	17.0	32.0	27.5	180	227 E3	JSP PR4180--A--
2.2 µF	9.0	17.0	32.0	27.5	180	227 E3	JSP PR4220--A--
2.7 µF	11.0	20.0	32.0	27.5	180	227 E3	JSP PR4270--A--
3.3 µF	11.0	20.0	32.0	27.5	180	227 E3	JSP PR4330--A--
3.9 µF	13.0	22.0	32.0	27.5	180	227 E3	JSP PR4390--A--
4.7 µF	13.0	22.0	32.0	27.5	180	227 E3	JSP PR4470--A--
5.6 µF	18.0	33.0	32.0	27.5	180	227 E3	JSP PR4560--A--
6.8 µF	18.0	33.0	32.0	27.5	180	227 E3	JSP PR4680--A--
8.2 µF	18.0	33.0	32.0	27.5	180	227 E3	JSP PR4820--A--
10 µF	18.0	33.0	32.0	27.5	180	227 E3	JSP PR5100--A--
12 µF	22.0	37.0	32.0	27.5	180	227 E3	JSP PR5120--A--
3.3 µF	11.0	22.0	41.5	37.5	90	113 E3	JSP PW4330--A--
3.9 µF	11.0	22.0	41.5	37.5	90	113 E3	JSP PW4390--A--
4.7 µF	11.0	22.0	41.5	37.5	90	113 E3	JSP PW4470--A--
5.6 µF	13.0	24.0	41.5	37.5	90	113 E3	JSP PW4560--A--
6.8 µF	13.0	24.0	41.5	37.5	90	113 E3	JSP PW4680--A--
8.2 µF	16.0	28.5	41.5	37.5	90	113 E3	JSP PW4820--A--
10 µF	16.0	28.5	41.5	37.5	90	113 E3	JSP PW5100--A--
12 µF	19.0	32.0	41.5	37.5	90	113 E3	JSP PW5120--A--
15 µF	19.0	32.0	41.5	37.5	90	113 E3	JSP PW5150--A--
18 µF	20.0	40.0	41.5	37.5	90	113 E3	JSP PW5180--A--
22 µF	24.0	44.0	41.5	37.5	90	113 E3	JSP PW5220--A--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%);M (±20%)

JSP
MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR
D.C. AND PULSE APPLICATIONS
PRODUCT CODE: **JSP**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 250Vdc - 400Vdc - 630Vdc.

Rated temperature: +85°C.

Temperature derated voltage:

for temperatures between +85°C and the upper operating temperature a decreasing factor of 1.25% per degree °C on the rated V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1.0μF to 56μF.

Capacitance values: E12 series (IEC 60063 Norm).

Capacitance tolerance (measured at 1kHz):
±5% (J); ±10% (K); ±20% (M).

Total self-indurance (L): (lead length ~ 2 mm)

Pitch (mm)	22.5	27.5	37.5
L(nH)	18	18	22

Dissipation factor (DF):

$tg\delta x10^{-4}$ at +25°C ±5°C

kHz	1μF≤C≤10μF	C>10μF
1	≤10	≤15
10	≤ 30	≤100

.

Insulation Resistance:

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

Performance
≥30000 s (150000 s)*
*Typical value.

Test voltage between terminations:
1.6 x V_R for 2s at +25°C ±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions 1
Temperature: +40°C±2°C
Relative humidity(RH): 93%±2°C
Test duration: 56 days

Performance
Capacitance change |ΔC/C|: ≤ 2%
DF change (Δtgδ): ≤ $10x10^{-4}$ at 1kHz
Insulation resistance: ≥ 50% of initial limit

Endurance:

Test conditions 1st
Temperature: 105°C ±2°C
Test duration: 2000 h
Voltage applied: $1.25xV_R$

Test conditions 2nd
Temperature: +125°C ±2°C
Test duration: 1000 h
Voltage applied: $1.25xV_R$

Performance
Capacitance change |ΔC/C|: ≤ 3%
DF change (Δtgδ): ≤ $10x10^{-4}$ at 1kHz
Insulation resistance: ≥ 50% of initial limit

Resistance to soldering heat:

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

Performance
Capacitance change |ΔC/C|: ≤ 1%
DF change (Δtgδ): ≤ $10x10^{-4}$ at 10kHz for C≤1μF
≤ $10x10^{-4}$ at 1kHz for C>1μF
Insulation resistance: ≥ initial limit

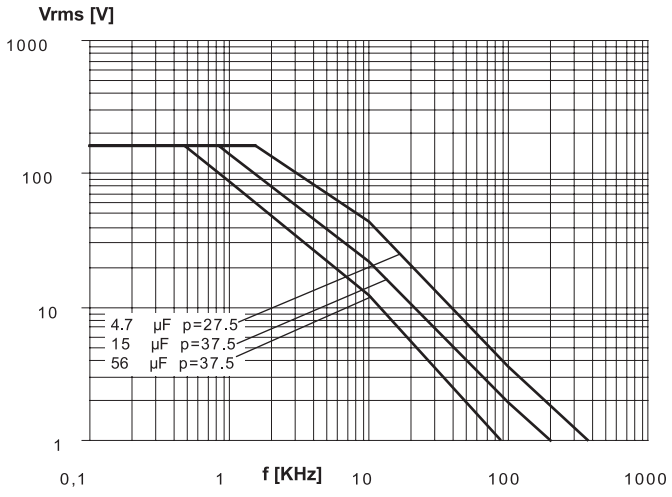
Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12 of DC film capacity catalogue).

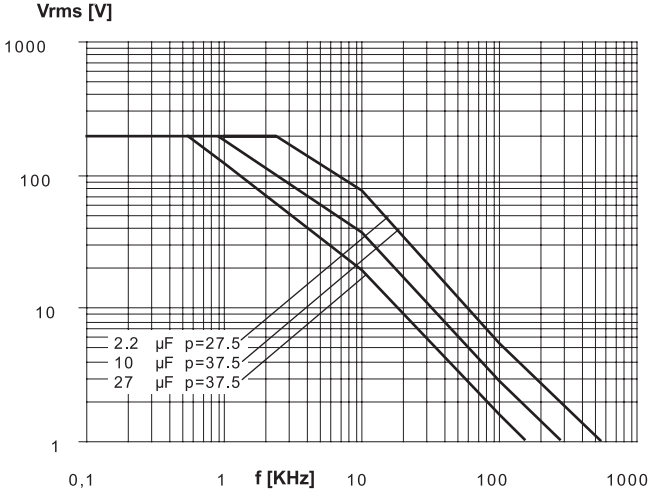
Performance
Capacitance change |ΔC/C|: ≤ 1%

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / T_h = 80°C)

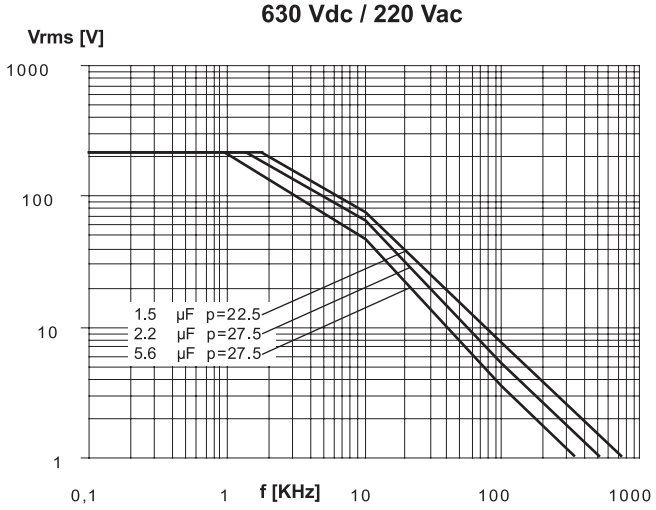
250 Vdc / 160 Vac



400 Vdc / 200 Vac



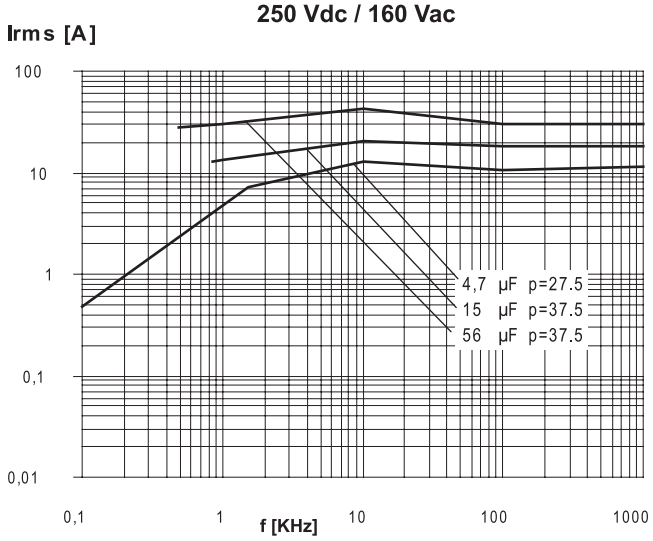
630 Vdc / 220 Vac



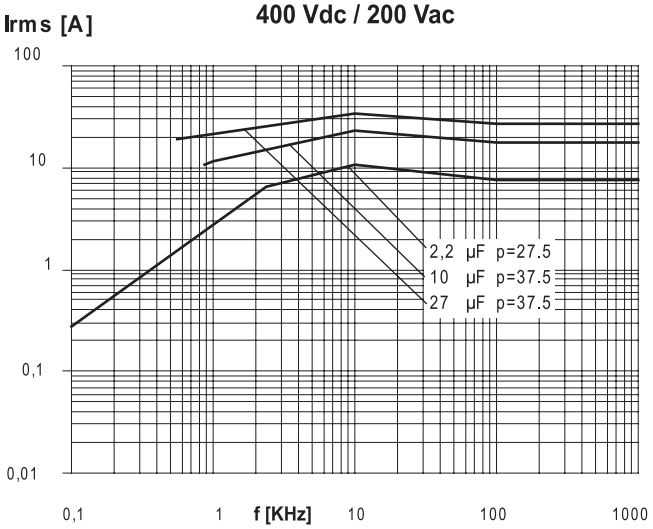
Note: *Th= max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / T_h = 80°C)

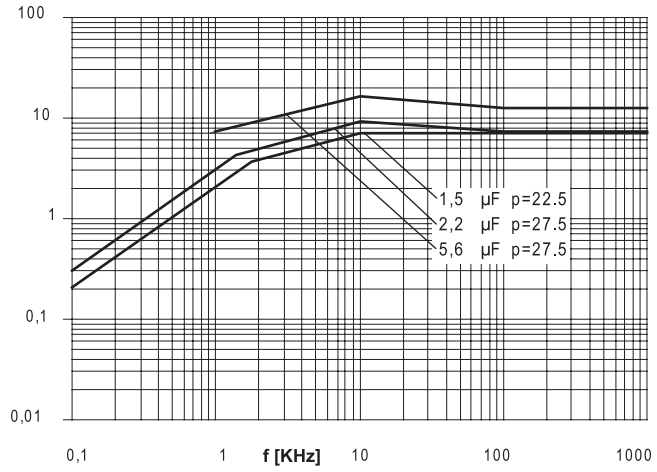
250 Vdc / 160 Vac



400 Vdc / 200 Vac



630 Vdc / 220 Vac



Note: *Th= max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C

Interference Suppression, RC Units and Modules.

CONTENTS

INFORMATION ON INTERNATIONAL STANDARDS

- **SAFETY**

Electronic devices such as TV sets, radios, computers, stereos, hair dryers, washing machines, etc. are all connected to the mains power supply and all generate «noise».
Since these devices, even when in the off mode, are continuously connected to the mains they must comply with rigorous safety standards. In addition, the noise they generate can be picked up by TV sets and radios in the form of visual and audible distortions and, in the case of computers, as malfunctions and errors.
This noise must be filtered or suppressed.

- **MAIN INTERNATIONAL COMMITTEES**

- IEC (International Electrotechnical Commission)
- CEN (European Committee for Standardization / Comité Européen de Normalisation)
- CENELEC (European Committee for Electrotechnical Standardization / Comité Européen de Normalisation Electrotechnique)

Note: EN . . . (European Standard / Norme Européenne)

- **NEW EUROPEAN STANDARD (EN 60384-14)**

With the aim to standardize all the European National Standards and have only one Standard of reference in all the member countries of CENELEC, EN 132400 Standard was issued on 26th June, 1995 replacing all the European National Standards in force up to that date.
The European Standard EN 132400 was identical to the International Standard IEC 60384-14 2nd Edition 1993. The IEC and CENELEC Committees had worked in order to have the two standards identical also in the name: now the European Standard EN 132400 has been superseded by EN 60384-14 that is identical to the International Standard IEC 60384-14.

Effects of the coming into force of EN 132400 Standard:

- since 26th June 1995 it is no longer possible to request approvals according to the old European National Standards (VDE, ASEV, IMQ, etc.);
- any national body can issue the approval and its validity is recognized by the bodies of all the other CENELEC member countries with no need to repeat the tests;
- marking: the coordinating committee has released their unified logo (**ENEC mark** = European Norms Electrical Certification) that is recognised throughout Europe as being equivalent to the individual marks of countries. It is issued for Luminaries and components, IT equipment, transformers, switches, suppression capacitors and filters.
  At present, the name of the standard IEC 60384-14, is stamped near the logo of the institute performing the tests. Please note that if the component is approved according to the IEC 60384-14 or EN 132400, it is no longer necessary to stamp the marking relevant to the old European National Standards;
- approval certificates relevant to the old European National Standards: they remained valid till to 26th June 2000.

- **SIGNIFICANT TESTS OF THE IEC 60384-14**

Listed below you find the summary tables and some information on the most significant tests of the 60384-14 Standard (see table 1, 2 and 3).
Table 1

Test	IEC 60384-14
Impulse voltage before Endurance test	YES
Active Flammability test	YES
Passive Flammability test	YES

Table 2

Application	Peak pulse in service	Peak impulse before endurance test	Sub-class IEC 60384-14
High pulse application	**>2.5kV; ≤4.0kV**	4 kV per C ≤ 1μF 4/√C kV per C >1μF	**X1**
General purposes	**≤2.5kV**	2.5 kV per C ≤1μF 2.5/√C kV per C >1μF	**X2**
General purposes	**≤1.2kV**	None	**X3**

Table 3

Type of insulation bridged	Rated voltage	Peak impulse before endurance test	Sub-class IEC 60384-14
Double or reinforced insulation	≤500Vac	8 kV	Y1
Basic or supplementary insulation	≥150Vac; ≤300Vac	5 kV	Y2
Basic or supplementary insulation	≥150Vac; ≤250Vac	None	Y3
Basic or supplementary insulation	<150Vac	2.5kV	Y4

- **CCA (CENELEC CERTIFICATION AGREEMENT) AND CB (CERTIFICATION BODY) TEST CERTIFICATE:**
  These have their origin from an agreement taken by the Certification Bodies. Following these agreements, certificates are issued which are called CCA and CB certificates.
  These certificates allow the mutual recognition at a European (CCA) and world (CB) level and are particularly effective in case the reference standards are the EN ...

- **MAIN STANDARDS FOR SUPPRESSION CAPACITORS**

EUROPE

Reference Standard: EN 60384-14 (ex-former EN 132400)
This standard is identical to IEC 60384-14. It harmonizes and supersedes any previous national standards into only one European Standard

U.S.A.

Reference Standard: UL 1414 and UL 1283
UL 1414: Across-the-line applications
- Max capacitance value: 1μF
- Max operating temperature: +85°C
- Max Voltage: 250Vac

UL 1283: Electromagnetic Interference filters
- The UL 1283 approval can be requested also for capacitance values higher than 1μF, temperatures higher than +85°C and voltages higher than 250Vac.

CANADA

Reference Standard: CAN/CSA C22.2N°1 and CAN/CSA 384-14
CAN/CSA C22.2 N°1 : Across-the-line applications
- Max capacitance value: 1μF
- Max operating temperature: +85°C
- Max Voltage: 250Vac

CAN/CSA 384-14: Across-the-line applications
- The **CAN/CSA 384-14** approval is identical to IEC 60384-14. It harmonizes and can be requested also for capacitance values higher than 1μF, temperatures higher than +85°C and voltages higher than 250Vac.

CHINA

Reference Standard: GB/T14472
From August 1st 2003 all the old marks have been replaced by:
- **CCC** (China Compulsory Certification) which is compulsory and it is foreseen only for a list of more critical products. Capacitors are not included in this list (http://www.cqc.com.cn/ccc/catalogureeng.pdf)
- **CQC** is the general standard and mark of the new Body. It may be utilized in all other cases (e.g. for capacitors) and it is optional but very appreciated by Chinese Authorities and helpful in case the component is included in a product where CCC is compulsory .

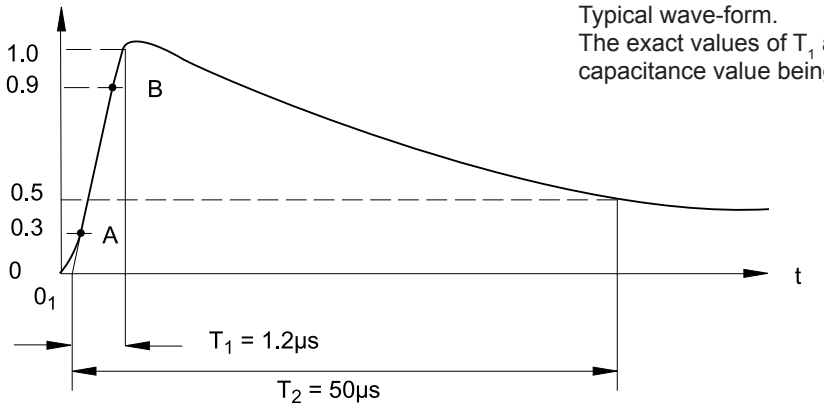
TESTS RELATED TO IEC 60384-14

According to IEC 60384-14 our X1, X2 and Y2 suppression capacitors withstand the following tests (type test):

- IMPULSE VOLTAGE TEST (before ENDURANCE TEST)

  V_{PEAK} = 2.5KV (CLASS X2) V_{PEAK} = 4.0KV (CLASS X1)

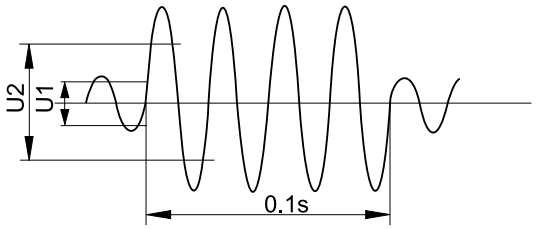
  V_{PEAK} = 5.0KV (CLASS Y2)



Typical wave-form.
The exact values of T_1 and T_2 depend on the capacitance value being tested.

- ENDURANCE TEST

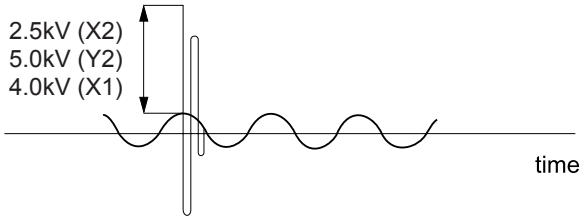
  The capacitors are tested for 1000 hours at upper category temperature with a voltage of 1.25 V_R for Class X2 and X1, 1.7 V_R for Class Y2.
  Every hour the test voltage is increased up to 1000 V_{RMS}/50Hz for a period of 0.1 s.



U1 = Rated Voltage
U2 = 1000V_{RMS}

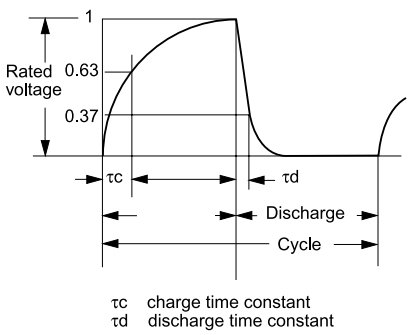
- ACTIVE FLAMMABILITY TEST

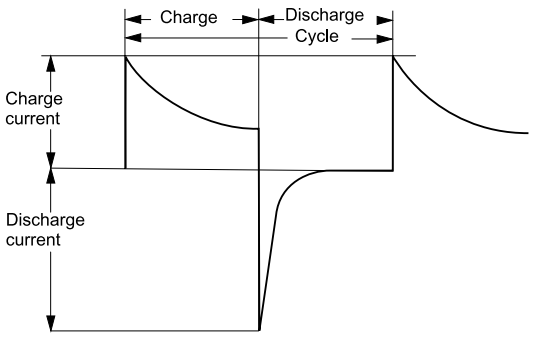
  The capacitors are tested at the rated voltage (Vac) at 50 Hz with superimposed 20 pulses at 2.5kV for Class X2, 4.0kV for Class X1 and 5kV for Class Y2 with an interval between the successive pulses of 5 seconds.
  The rated voltage is kept for 2 min after the last discharge. At the end of the test the capacitor does not burn (control made with the cheese-cloth wrapped on the body of capacitors).



- CHARGE AND DISCHARGE TEST

  The capacitors are subjected to 10000 cycles of charge and discharge at the rate of approximately one operation per second.



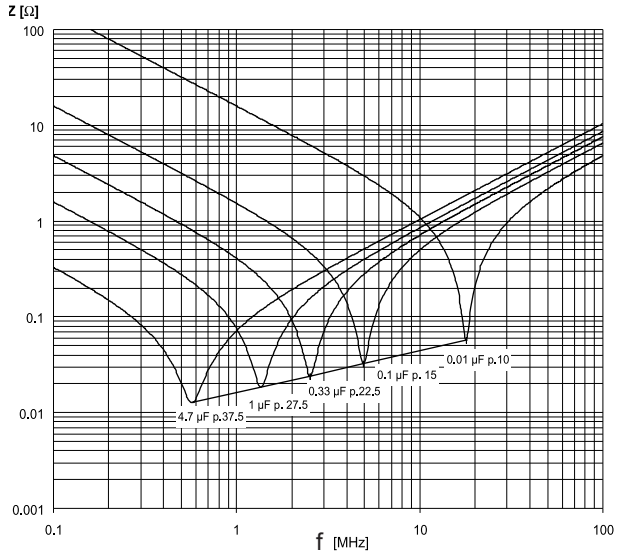


INTERFERENCE SUPPRESSION CAPACITORS

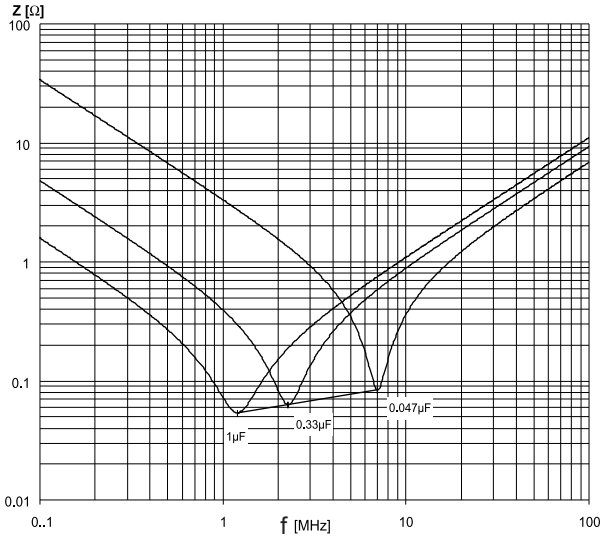
- **TYPICAL GRAPHS**

  Z = Impedance vs.frequency (lead length 2mm).
  Typical Values.

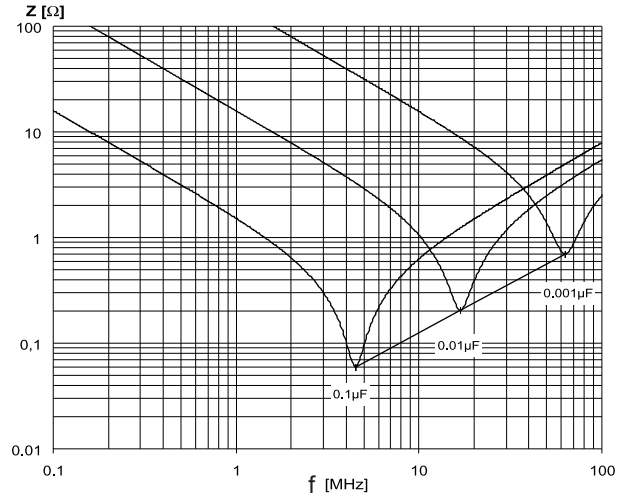
R.46



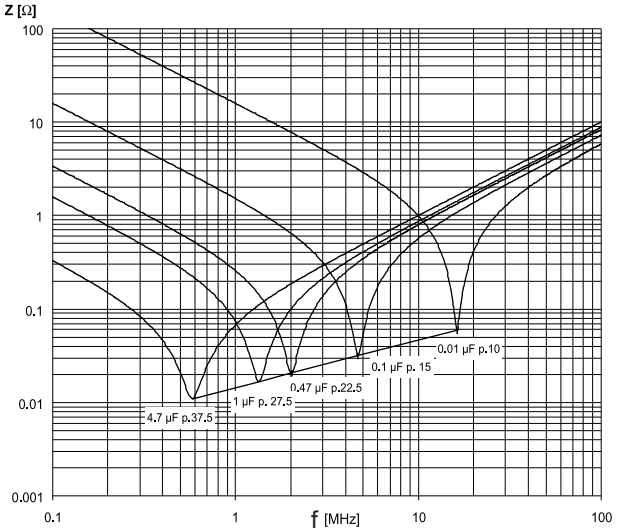
R.49



R.41



R.47



R.46

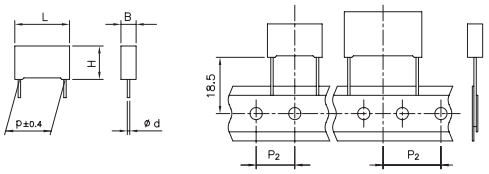
X2 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

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.

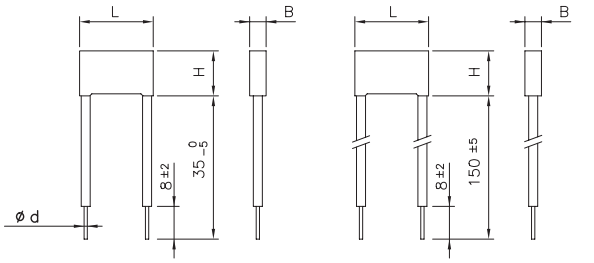
PRODUCT CODE: **R46**

Loose Taped

Fig.1 Fig.2



Insulated rigid leads Insulated flexible leads 0.5mm²



Ø 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.

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	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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
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);
tolerance ±5% (J) available upon request

Dissipation factor (DF):
tgδ 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
≥1x10^5 MΩ (5x10^5 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 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

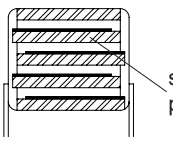
Performance
Dielectric strength: no dielectric breakdown or flashover at 4.3 x V_R (d.c.)/1 min
Capacitance change |ΔC/C|: ≤10%
Insulation resistance: ≥50% of initial limit.

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%

Winding scheme



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X2 CLASS (IEC 60384-14) - MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

SELF-HEALING PROPERTIES

Rated Cap.	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc	Part Number		
	B	H	L	p		(V/ µs)			
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	-
0.10 µF	6.0	12.0	13.0	10.0	0.6	500	R46 KF	3100 - - M1	M
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	-
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	-
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	-
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	13.0	25.0	32.0	27.5	0.8	150	R46 KR	4220 - - M2	-
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	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4470 - - M2	-
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R46 KR	4470 - - M1	-
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4150 - - M1	-
2.2 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4220 - - M2	M
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	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4470 - - M2	M
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46 KW	4470 - - M1	-
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R46 KW	4680 - - M2	-
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

E12 Series available upon request

APPROVALS

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

Approved according to IEC 60384-14
According to IEC 60065

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

Table 1

Standard packaging style	Lead length (mm)	Taping style P2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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	$150^{\pm5}$				52

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

For “capacitor connected in serial with main line” (two - phase and three - phase net) application, please read the “SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS” at pag. 178 and contact our Technical Service for choosing the safest solution.

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X2 CLASS (IEC 60384-14) - MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

SELF-HEALING PROPERTIES

Rated Cap.	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc	Part Number		
	B	H	L	p		(V/ µs)			
0.033 µF	4.0	9.0	13.0	10.0	0.6	500	R46 KF	2330 - - P0	-
0.047 µF	4.0	9.0	13.0	10.0	0.6	500	R46 KF	2470 - - P0	-
0.068 µF	5.0	11.0	13.0	10.0	0.6	500	R46 KF	2680 - - P0	-
0.1 µF	5.0	11.0	13.0	10.0	0.6	500	R46 KF	3100 - - P1	M
0.1 µF	6.0	12.0	13.0	10.0	0.6	500	R46 KF	3100 - - P0	-
0.15 µF	6.0	12.0	13.0	10.0	0.6	500	R46 KF	3150 - - P0	M
0.15 µF	5.0	11.0	18.0	15.0	0.6	400	R46 KI	3150 - - P0	-
0.22 µF	6.0	12.0	18.0	15.0	0.6	400	R46 KI	3220 - - P0	-
0.33 µF	7.5	13.5	18.0	15.0	0.6	400	R46 KI	3330 - - P0	-
0.33 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3330 - - P1	
0.33 µF	6.0	17.5	18.0	15.0	0.6	400	R46 KI	3330 - - P2	-
0.47 µF	8.5	14.5	18.0	15.0	0.6	400	R46 KI	3470 - - P0	
0.47 µF	9.0	12.5	18.0	15.0	0.6	400	R46 KI	3470 - - P1	M
0.47 µF	6.0	17.5	18.0	15.0	0.6	400	R46 KI	3470 - - P2	M
0.47 µF	7.5	18.5	18.0	15.0	0.8	400	R46 KI	3470 - - P3	-
0.68 µF	10.0	16.0	18.0	15.0	0.8	400	R46 KI	3680 - - P1	M
0.68 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3680 - - P0	-
0.82 µF	11.0	19.0	18.0	15.0	0.8	400	R46 KI	3820 - - P0	M
0.47 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3470 - - P1	-
0.56 µF	6.0	15.0	26.5	22.5	0.8	200	R46 KN	3560 - - P1	M
0.56 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3560 - - P0	-
0.68 µF	7.0	16.0	26.5	22.5	0.8	200	R46 KN	3680 - - P0	-
1.0 µF	8.5	17.0	26.5	22.5	0.8	200	R46 KN	4100 - - P1	M
1.0 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	4100 - - P0	-
1.5 µF	10.0	18.5	26.5	22.5	0.8	200	R46 KN	4150 - - P1	M
1.5 µF	11.0	20.0	26.5	22.5	0.8	200	R46 KN	4150 - - P0	-
2.2 µF	13.0	22.0	26.5	22.5	0.8	200	R46 KN	4220 - - P0	M
1.0 µF	9.0	17.0	32.0	27.5	0.8	150	R46 KR	4100 - - P0	-
1.5 µF	11.0	20.0	32.0	27.5	0.8	150	R46 KR	4150 - - P0	-
2.2 µF	13.0	22.0	32.0	27.5	0.8	150	R46 KR	4220 - - P0	-
3.3 µF	14.0	28.0	32.0	27.5	0.8	150	R46 KR	4330 - - P0	-
4.7 µF	14.0	28.0	32.0	27.5	0.8	150	R46 KR	4470 - - P1	M
4.7 µF	18.0	33.0	32.0	27.5	0.8	150	R46 KR	4470 - - P0	-
6.8 µF	22.0	37.0	32.0	27.5	0.8	150	R46 KR	4680 - - P0	-
2.2 µF	11.0	22.0	41.5	37.5	1.0	100	R46 KW	4220 - - P0	-
3.3 µF	13.0	24.0	41.5	37.5	1.0	100	R46 KW	4330 - - P0	-
4.7 µF	16.0	28.5	41.5	37.5	1.0	100	R46 KW	4470 - - P0	-
6.8 µF	19.0	32.0	41.5	37.5	1.0	100	R46 KW	4680 - - P0	-
10.0 µF	20.0	40.0	41.5	37.5	1.0	100	R46 KW	5100 - - P0	-

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

All dimensions are in mm

E12 Series available upon request

APPROVALS

(**)	ENEC IEC 60384-14	Class X2	File No.V4413
c UL us	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

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

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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	$150^{\pm5}$				52

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

For “capacitor connected in serial with main line” (two - phase and three - phase net) application, please read the “SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS” at pag. 178 and contact our Technical Service for choosing the safest solution.

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

Rated Cap.	300 Vac / 630 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc	Part Number		
	B	H	L	p		(V/ µs)			
0.010 µF	4.0	9.0	13.0	10.0	0.6	500	R46 3F	2100 - - N0	-
0.015 µF	4.0	9.0	13.0	10.0	0.6	500	R46 3F	2150 - - N0	-
0.022 µF	4.0	9.0	13.0	10.0	0.6	500	R46 3F	2220 - - N0	-
0.033 µF	5.0	11.0	13.0	10.0	0.6	500	R46 3F	2330 - - M1	-
0.047 µF	5.0	11.0	13.0	10.0	0.6	500	R46 3F	2470 - - N0	-
0.068 µF	6.0	12.0	13.0	10.0	0.6	500	R46 3F	2680 - - M1	-
0.10 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	-
0.10 µF	5.0	11.0	18.0	15.0	0.6	400	R46 3I	3100 - - M1	-
0.15 µF	6.0	12.0	18.0	15.0	0.6	400	R46 3I	3150 - - M2	-
0.15 µF	9.0	12.5	18.0	15.0	0.6	400	R46 3I	3150 - - L2	-
0.22 µF	7.5	13.5	18.0	15.0	0.6	400	R46 3I	3220 - - M2	-
0.22 µF	9.0	12.5	18.0	15.0	0.6	400	R46 3I	3220 - - L2	-
0.22 µF	6.0	17.5	18.0	15.0	0.6	400	R46 3I	3220 - - 02	-
0.33 µF	8.5	14.5	18.0	15.0	0.6	400	R46 3I	3330 - - N0	-
0.33 µF	10.0	16.0	18.0	15.0	0.8	400	R46 3I	3330 - - M1	-
0.33 µF	7.5	18.5	18.0	15.0	0.8	400	R46 3I	3330 - - 02	-
0.33 µF	13.0	12.0	18.0	15.0	0.8	400	R46 3I	3330 - - 01	-
0.47 µF	10.0	16.0	18.0	15.0	0.8	400	R46 3I	3470 - - N0	M
0.47 µF	11.0	19.0	18.0	15.0	0.8	400	R46 3I	3470 - - M1	-
0.56 µF	11.0	19.0	18.0	15.0	0.8	400	R46 3I	3560 - - N0	-
0.60 µF	11.0	19.0	18.0	15.0	0.8	400	R46 3I	3600 - - N0	-
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	6.0	15.0	26.5	22.5	0.8	200	R46 3N	3330 - - N0	-
0.47 µF	7.0	16.0	26.5	22.5	0.8	200	R46 3N	3470 - - N0	-
0.68 µF	10.0	18.5	26.5	22.5	0.8	200	R46 3N	3680 - - M2	-
1.0 µF	10.0	18.5	26.5	22.5	0.8	200	R46 3N	4100 - - N2	M
1.0 µF	11.0	20.0	26.5	22.5	0.8	200	R46 3N	4100 - - N1	-
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	-
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	-
2.2 µF	13.0	25.0	32.0	27.5	0.8	150	R46 3R	4220 - - M2	-
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R46 3R	4220 - - M1	-
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46 3R	4330 - - M2	-
4.7 µF	18.0	33.0	32.0	27.5	0.8	150	R46 3R	4470 - - M2	-
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R46 3R	4470 - - M1	-
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R46 3W	4150 - - M1	-
2.2 µF	11.0	22.0	41.5	37.5	1.0	100	R46 3W	4220 - - M2	M
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	16.0	28.5	41.5	37.5	1.0	100	R46 3W	4470 - - M2	M
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46 3W	4470 - - M1	-
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R46 3W	4680 - - M2	-
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%)

All dimensions are in mm
E12 Series available upon request

APPROVALS

(**)	ENEC IEC 60384-14	Class X2	File No.V4413
cULus	UL 1414 (up to 1µF, 85°C; 250Vac)	Across-the-line	File No.E97797
cULus	CSA - C22.2 No.1 (up to 1µF, 85°C; 250Vac)	Across-the-line certified for Canada	File No.E97797
cULus	UL 1283 (310 Vac)	Electromagnetic Interference Filters	File No.E85238
cULus	CSA - C22.2 No.8 (310 Vac)	Electromagnetic Interference Filters certified for Canada	File No.E85238
CQC	GB/T 14472	Class X2	FileCQC03001008199 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 P2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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.

For “capacitor connected in serial with main line” (two - phase and three - phase net) application, please read the “SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS” at pag. 178 and contact our Technical Service for choosing the safest solution.

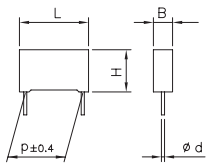
R.46

X2 CLASS (IEC 60384-14) - 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.

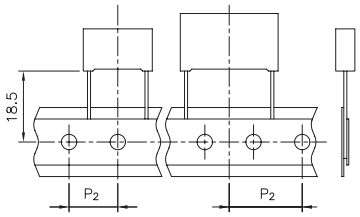
PRODUCT CODE: **R46**

Loose



Taped

Fig.1 Fig.2



Ø 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; EN 60384-14

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 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_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.

APPROVALS

(**)	ENEC IEC 60384-14	Class X2	File No.CA08.00063
c UL us	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

Approved according to IEC 60384-14
According to IEC 60065
(**) ENEC mark has replaced all the following European National marks:

Rated Cap.	275 Vac / 560 Vdc Std dimensions B	H	L	p	Ø 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 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%)

300Vac available upon request

E12 Series available upon request

All dimensions are in mm

For "capacitor connected in serial with main line" (two - phase and three - phase net) application, please read the "SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS" at pag. 178 and contact our Technical Service for choosing the safest solution.

R.46 S VERSION

X2 CLASS (IEC 60384-14) - MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

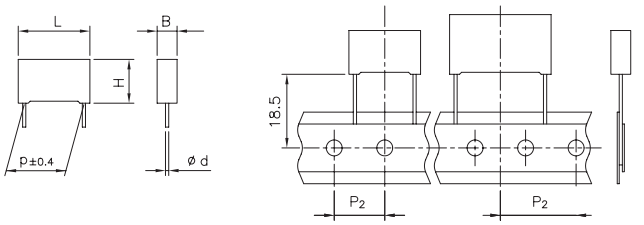
SELF-HEALING PROPERTIES

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	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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
≥1x10^5 MΩ (5x10^5 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

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%

R.46 S VERSION

X2 CLASS (IEC60384-14) - MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

SELF-HEALING PROPERTIES

Rated Cap. (*)	275 Vac / 560 Vdc Std dimensions				Ø d	Max dv/dt at 390Vdc	Part Number		
	B	H	L	p		(V/ µs)			
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	-

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

APPROVALS

(**)	ENEC IEC 60384-14	Class X2	File No.V4413
c UL us	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
CQC	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 P2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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.

R.46+R

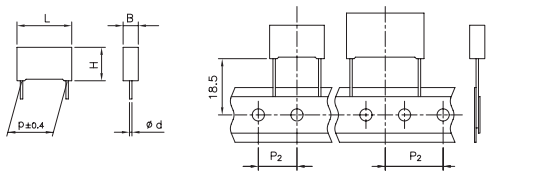
Capacitors with discharge resistor
X2 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

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.

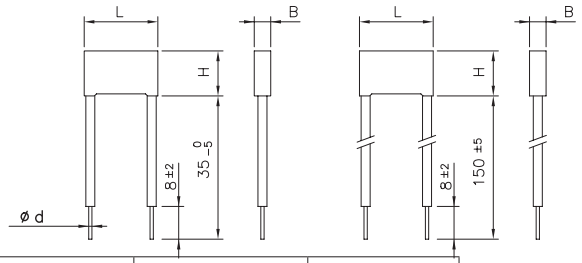
PRODUCT CODE: **R46**

Loose Taped

Fig.1 Fig.2



Insulated rigid leads Insulated flexible leads 0.5mm²



Ø d ±0.05	P= 22.5 to 27.5	p = 37.5
	0.8	1

All dimensions are in mm.

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
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
300Vac (50/60Hz) / 630 Vdc

Capacitance range: 0.22µF to 10µF

Capacitance values: E6 series (IEC 60063 Norm).

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

Dissipation factor (DF):
tgδ 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
≥1x10^5 MΩ (5x10^5 MΩ)* for C≤0.33µF
≥30000 s (150000 s)* for C>0.33µF
* Typical value

Test voltage between terminations (on all pieces)**:**

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

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%

APPROVALS

ENEC 03	ENEC IEC 60384-14	Class X2	File No.V4413
c UL us	UL 1283 (310Vac-105°C)	Electromagnetic Interference Filters	File No.E85238
	CSA - C22.2 No.8 (310Vac-105°C)	Electromagnetic Interference Filters certified for Canada	File No.E85238

Approved according to IEC 60384-14
According to IEC 60065.

R.46+R

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

PRODUCT CODE: **R46**

Rated Cap. (*)	275 Vac / 560 Vdc Std dimensions B	H	L	p	Ø d	Max dv/dt at 390Vdc (V/ µs)	Part Number
0.22 µF	7.0	16.0	26.5	22.5	0.8	200	R46KN 3220 - - 01 - x
0.33 µF	8.5	17.0	26.5	22.5	0.8	200	R46KN 3330 - - 01 - x
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R46KN 3470 - - 01 - x
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R46KN 3680 - - 01 - x
0.47 µF	11.0	20.0	32.0	27.5	0.8	150	R46KR 3470 - - 01 - x
0.68 µF	11.0	20.0	32.0	27.5	0.8	150	R46KR 3680 - - M1 - x
1.0 µF	13.0	22.0	32.0	27.5	0.8	150	R46KR 4100 - - M1 - x
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R46KR 4150 - - M1 - x
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R46KR 4220 - - M1 - x
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R46KR 4330 - - M2 - x
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R46KR 4470 - - M1 - x
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R46KW 4150 - - M1 - x
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R46KW 4220 - - M1 - x
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R46KW 4330 - - M1 - x
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R46KW 4470 - - M1 - x
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R46KW 4680 - - M2 - x
10.0 µF	24.0	44.0	41.5	37.5	1.0	100	R46KW 5100 - - M1 - x

Rated voltage (K=275Vac)
Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)
Value of discharge resistor (Table 2)

Rated Cap. (*)	300 Vac / 630 Vdc Std dimensions B	H	L	p	Ø d	Max dv/dt at 390Vdc (V/ µs)	Part Number
0.22 µF	7.0	16.0	26.5	22.5	0.8	200	R463N 3220 - - 01 - x
0.33 µF	8.5	17.0	26.5	22.5	0.8	200	R463N 3330 - - 01 - x
0.47 µF	10.0	18.5	26.5	22.5	0.8	200	R463N 3470 - - 01 - x
0.68 µF	11.0	20.0	26.5	22.5	0.8	200	R463N 3680 - - 01 - x
0.47 µF	11.0	20.0	32.0	27.5	0.8	150	R463R 3470 - - 01 - x
0.68 µF	11.0	20.0	32.0	27.5	0.8	150	R463R 3680 - - M1 - x
1.0 µF	13.0	22.0	32.0	27.5	0.8	150	R463R 4100 - - M1 - x
1.5 µF	13.0	22.0	32.0	27.5	0.8	150	R463R 4150 - - M1 - x
2.2 µF	14.0	28.0	32.0	27.5	0.8	150	R463R 4220 - - M1 - x
3.3 µF	18.0	33.0	32.0	27.5	0.8	150	R463R 4330 - - M2 - x
4.7 µF	22.0	37.0	32.0	27.5	0.8	150	R463R 4470 - - M1 - x
1.5 µF	11.0	22.0	41.5	37.5	1.0	100	R463W 4150 - - M1 - x
2.2 µF	13.0	24.0	41.5	37.5	1.0	100	R463W 4220 - - M1 - x
3.3 µF	16.0	28.5	41.5	37.5	1.0	100	R463W 4330 - - M1 - x
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R463W 4470 - - M1 - x
6.8 µF	20.0	40.0	41.5	37.5	1.0	100	R463W 4680 - - M2 - x
10.0 µF	24.0	44.0	41.5	37.5	1.0	100	R463W 5100 - - M1 - x

Rated voltage (3=300Vac)
Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)
Value of discharge resistor (Table 2)

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Fig. (No.)	Pitch (mm)	Ordering code (Digit 10 to 11)
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

PRODUCT CODE SYSTEM

The part number, comprising 15 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R	4	6										-		-

Digit 1 to 3 — Series code.
Digit 4 — a.c. rated voltage:
K = 275Vac; 3 = 300Vac
Digit 5 — Pitch:
N = 22.5; R = 27.5; W = 37.5 mm
Digit 6 to 9 — Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.
Digit 10 to 11 — Mechanical version and/or packaging (table 1)
Digit 12 — Identifies the dimensions and electrical characteristics.
Digit 13 — Internal use
Digit 14 — Capacitance tolerance:
K=±10%; M=±20%
Digit 15 — Value of the discharge resistor (tolerance±10%) according to the following table*:

Table 2

R	code (x)
470 kΩ	E
680 kΩ	F
1 MΩ	G
1.2 MΩ	L
1.5 MΩ	N
2.2 MΩ	P
3.3 MΩ	Q
4.7 MΩ	S
6.8 MΩ	T
10 MΩ	V

*Other resistors are avaible upon request.

All dimensions are in mm

R.47

X2 CLASS (IEC 60384-14) - 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: **R47**

Loose

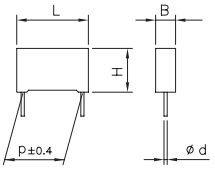


Fig.1

Taped

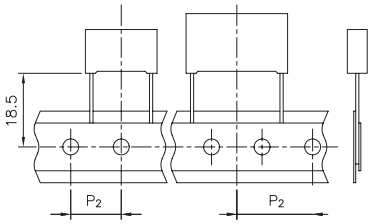


Fig.2

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	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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 - 2 sections.

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): 440Vac / 1000Vdc; 50/60Hz

Capacitance range: 4700pF to 2.2μF

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 x 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
≥1x10^5 MΩ for C≤0.33μF
≥30000 s for C>0.33μF

Test voltage between terminations (on all pieces)**:**
1700Vac for 1 s + 2700Vdc 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 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

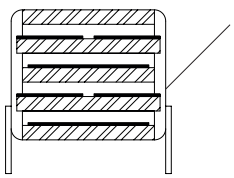
Performance
Dielectric strength: no dielectric breakdown or flashover at 4.3 x V_R (d.c.)/1 min
Capacitance change |ΔC/C|: ≤10%
Insulation resistance: ≥50% of initial limit.

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%

Winding scheme



R.47

X2 CLASS (IEC60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

PRODUCT CODE: **R47**

Rated Cap.	440 Vac / 1000 Vdc Std dimensions				Ø d	Max dv/dt at 420Vdc	Part Number
	B	H	L	p		(V/ µs)	
4700 pF	4.0	9.0	13.0	10.0	0.6	750	R474F 1470 - - 01 -
6800 pF	5.0	11.0	13.0	10.0	0.6	750	R474F 1680 - - 01 -
8200 pF	6.0	12.0	13.0	10.0	0.6	750	R474F 1820 - - 01 -
0.010 µF	6.0	12.0	13.0	10.0	0.6	750	R474F 2100 - - 01 -
0.010 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2100 - - 01 -
0.012 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2120 - - 01 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2150 - - 01 -
0.018 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2180 - - 01 -
0.022 µF	6.0	12.0	18.0	15.0	0.6	600	R474I 2220 - - 01 -
0.027 µF	6.0	12.0	18.0	15.0	0.6	600	R474I 2270 - - 01 -
0.033 µF	6.0	12.0	18.0	15.0	0.6	600	R474I 2330 - - 01 -
0.039 µF	7.5	13.5	18.0	15.0	0.6	600	R474I 2390 - - 01 -
0.047 µF	7.5	13.5	18.0	15.0	0.6	600	R474I 2470 - - 01 -
0.047 µF	6.0	17.5	18.0	15.0	0.6	600	R474I 2470 - - 02 -
0.047 µF	9.0	12.5	18.0	15.0	0.6	600	R474I 2470 - - 03 -
0.056 µF	8.5	14.5	18.0	15.0	0.6	600	R474I 2560 - - 01 -
0.068 µF	10.0	16.0	18.0	15.0	0.8	600	R474I 2680 - - 01 -
0.068 µF	7.5	18.5	18.0	15.0	0.8	600	R474I 2680 - - 02 -
0.068 µF	13.0	12.0	18.0	15.0	0.8	600	R474I 2680 - - 03 -
0.082 µF	10.0	16.0	18.0	15.0	0.8	600	R474I 2820 - - 01 -
0.10 µF	11.0	19.0	18.0	15.0	0.8	600	R474I 3100 - - 01 -
0.047 µF	6.0	15.0	26.5	22.5	0.8	300	R474N 2470 - - 01 -
0.047 µF	6.5	13.5	26.5	22.5	0.8	300	R474N 2470 - - 02 -
0.068 µF	6.0	15.0	26.5	22.5	0.8	300	R474N 2680 - - 01 -
0.10 µF	7.0	16.0	26.5	22.5	0.8	300	R474N 3100 - - 01 -
0.12 µF	8.5	17.0	26.5	22.5	0.8	300	R474N 3120 - - 01 -
0.15 µF	10.0	18.5	26.5	22.5	0.8	300	R474N 3150 - - 01 -
0.18 µF	10.0	18.5	26.5	22.5	0.8	300	R474N 3180 - - 01 -
0.22 µF	11.0	20.0	26.5	22.5	0.8	300	R474N 3220 - - 01 -
0.27 µF	13.0	22.0	26.5	22.5	0.8	300	R474N 3270 - - 01 -
0.33 µF	13.0	22.0	26.5	22.5	0.8	300	R474N 3330 - - 01 -
0.15 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3150 - - 01 -
0.18 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3180 - - 01 -
0.22 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3220 - - 01 -
0.27 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3270 - - 02 -
0.33 µF	11.0	20.0	32.0	27.5	0.8	225	R474R 3330 - - 02 -
0.39 µF	11.0	20.0	32.0	27.5	0.8	225	R474R 3390 - - 01 -
0.47 µF	13.0	22.0	32.0	27.5	0.8	225	R474R 3470 - - 01 -
0.56 µF	13.0	22.0	32.0	27.5	0.8	225	R474R 3560 - - 01 -
0.68 µF	14.0	28.0	32.0	27.5	0.8	225	R474R 3680 - - 01 -
0.82 µF	18.0	33.0	32.0	27.5	0.8	225	R474R 3820 - - 01 -
1.0 µF	18.0	33.0	32.0	27.5	0.8	225	R474R 4100 - - 01 -
1.2 µF	18.0	33.0	32.0	27.5	0.8	225	R474R 4120 - - 01 -
1.5 µF	22.0	37.0	32.0	27.5	0.8	225	R474R 4150 - - 01 -
0.47 µF	11.0	22.0	41.5	37.5	1.0	150	R474W 3470 - - 01 -
0.56 µF	11.0	22.0	41.5	37.5	1.0	150	R474W 3560 - - 01 -
0.68 µF	13.0	24.0	41.5	37.5	1.0	150	R474W 3680 - - 01 -
0.82 µF	16.0	28.5	41.5	37.5	1.0	150	R474W 3820 - - 01 -
1.0 µF	16.0	28.5	41.5	37.5	1.0	150	R474W 4100 - - 01 -
1.2 µF	19.0	32.0	41.5	37.5	1.0	150	R474W 4120 - - 01 -
1.5 µF	19.0	32.0	41.5	37.5	1.0	150	R474W 4150 - - 01 -
1.8 µF	20.0	40.0	41.5	37.5	1.0	150	R474W 4180 - - 01 -
2.2 µF	20.0	40.0	41.5	37.5	1.0	150	R474W 4220 - - 01 -

Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)

All dimensions are in mm

APPROVALS

(*)	ENEC IEC 60384-14	Class X2	File No. CA08.00101
c UL us	UL 1414 up to 1µF, 85°C; 250Vac)	Across-the-line	File No. E97797
	UL 1283	Electromagnetic Interference Filters	File No. E85238

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 P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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

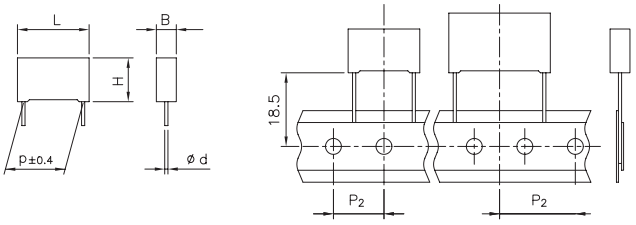
Note: Ammo-pack is the preferred packaging for taped version.

R.47

X1 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

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.

GENERAL TECHNICAL DATA

Dielectric: polypropylene film - 2 sections.

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; EN60384-14

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 440Vac / 1000Vdc; 50/60Hz

Capacitance range: 4700pF to 2.2μF

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 x 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

≥1x10^5 MΩ	for C≤0.33μF
≥30000 s	for C>0.33μF

Test voltage between terminations (on all pieces)**:**
1700Vac for 1 s + 2700Vdc for 1 s at +25°C±5°C

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.
Class X1 shall be applied for PERMANENTLY CONNECTED APPARATUS.

Note: **PERMANENTLY CONNECTED APPARATUS:**
apparatus which is intended for connection to the mains by a connection which cannot be loosened **BY HAND**.
BY HAND:
operation that does not require the use of any object such a tool, coin, etc.

PRODUCT CODE: **R47**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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 |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%

R.47

X1 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

PRODUCT CODE: **R47**

APPROVALS

(*)	ENEC IEC 60384-14	Class X1	File No. CA08.00101
cULus	UL 1414 up to 1µF, 85°C; 250Vac)	Across-the-line	File No. E97797
	UL 1283	Electromagnetic Interference Filters	File No. E85238

Approved according to IEC 60384-14
According to IEC 60065.

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

Rated Cap.	440 Vac / 1000 Vdc Std dimensions				Ø d	Max dv/dt at 420Vdc	Part Number
	B	H	L	p		(V/ µs)	
4700 pF	4.0	9.0	13.0	10.0	0.6	750	R474F 1470 - - A1 -
6800 pF	5.0	11.0	13.0	10.0	0.6	750	R474F 1680 - - A1 -
8200 pF	6.0	12.0	13.0	10.0	0.6	750	R474F 1820 - - A1 -
0.010 µF	6.0	12.0	13.0	10.0	0.6	750	R474F 2100 - - A1 -
0.010 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2100 - - A1 -
0.012 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2120 - - A1 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2150 - - A1 -
0.018 µF	5.0	11.0	18.0	15.0	0.6	600	R474I 2180 - - A1 -
0.022 µF	6.0	12.0	18.0	15.0	0.6	600	R474I 2220 - - A1 -
0.027 µF	6.0	12.0	18.0	15.0	0.6	600	R474I 2270 - - A1 -
0.033 µF	6.0	12.0	18.0	15.0	0.6	600	R474I 2330 - - A1 -
0.039 µF	7.5	13.5	18.0	15.0	0.6	600	R474I 2390 - - A1 -
0.047 µF	7.5	13.5	18.0	15.0	0.6	600	R474I 2470 - - A1 -
0.047 µF	6.0	17.5	18.0	15.0	0.6	600	R474I 2470 - - A2 -
0.047 µF	9.0	12.5	18.0	15.0	0.6	600	R474I 2470 - - A3 -
0.056 µF	8.5	14.5	18.0	15.0	0.6	600	R474I 2560 - - A1 -
0.068 µF	10.0	16.0	18.0	15.0	0.8	600	R474I 2680 - - A1 -
0.068 µF	7.5	18.5	18.0	15.0	0.8	600	R474I 2680 - - A2 -
0.068 µF	13.0	12.0	18.0	15.0	0.8	600	R474I 2680 - - A3 -
0.082 µF	10.0	16.0	18.0	15.0	0.8	600	R474I 2820 - - A1 -
0.10 µF	11.0	19.0	18.0	15.0	0.8	600	R474I 3100 - - A1 -
0.047 µF	6.0	15.0	26.5	22.5	0.8	300	R474N 2470 - - A1 -
0.047 µF	6.5	13.5	26.5	22.5	0.8	300	R474N 2470 - - A2 -
0.068 µF	6.0	15.0	26.5	22.5	0.8	300	R474N 2680 - - A1 -
0.10 µF	7.0	16.0	26.5	22.5	0.8	300	R474N 3100 - - A1 -
0.12 µF	8.5	17.0	26.5	22.5	0.8	300	R474N 3120 - - A1 -
0.15 µF	10.0	18.5	26.5	22.5	0.8	300	R474N 3150 - - A1 -
0.18 µF	10.0	18.5	26.5	22.5	0.8	300	R474N 3180 - - A1 -
0.22 µF	11.0	20.0	26.5	22.5	0.8	300	R474N 3220 - - A1 -
0.27 µF	13.0	22.0	26.5	22.5	0.8	300	R474N 3270 - - A1 -
0.33 µF	13.0	22.0	26.5	22.5	0.8	300	R474N 3330 - - A1 -
0.15 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3150 - - A1 -
0.18 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3180 - - A1 -
0.22 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3220 - - A1 -
0.27 µF	9.0	17.0	32.0	27.5	0.8	225	R474R 3270 - - A2 -
0.33 µF	11.0	20.0	32.0	27.5	0.8	225	R474R 3330 - - A2 -
0.39 µF	11.0	20.0	32.0	27.5	0.8	225	R474R 3390 - - A1 -
0.47 µF	13.0	22.0	32.0	27.5	0.8	225	R474R 3470 - - A1 -
0.56 µF	13.0	22.0	32.0	27.5	0.8	225	R474R 3560 - - A1 -
0.68 µF	14.0	28.0	32.0	27.5	0.8	225	R474R 3680 - - A1 -
0.82 µF	18.0	33.0	32.0	27.5	0.8	225	R474R 3820 - - A1 -
1.0 µF	18.0	33.0	32.0	27.5	0.8	225	R474R 4100 - - A1 -
1.2 µF	18.0	33.0	32.0	27.5	0.8	225	R474R 4120 - - A1 -
1.5 µF	22.0	37.0	32.0	27.5	0.8	225	R474R 4150 - - A1 -
0.47 µF	11.0	22.0	41.5	37.5	1.0	150	R474W 3470 - - A1 -
0.56 µF	11.0	22.0	41.5	37.5	1.0	150	R474W 3560 - - A1 -
0.68 µF	13.0	24.0	41.5	37.5	1.0	150	R474W 3680 - - A1 -
0.82 µF	16.0	28.5	41.5	37.5	1.0	150	R474W 3820 - - A1 -
1.0 µF	16.0	28.5	41.5	37.5	1.0	150	R474W 4100 - - A1 -
1.2 µF	19.0	32.0	41.5	37.5	1.0	150	R474W 4120 - - A1 -
1.5 µF	19.0	32.0	41.5	37.5	1.0	150	R474W 4150 - - A1 -
1.8 µF	20.0	40.0	41.5	37.5	1.0	150	R474W 4180 - - A1 -
2.2 µF	20.0	40.0	41.5	37.5	1.0	150	R474W 4220 - - A1 -

Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)

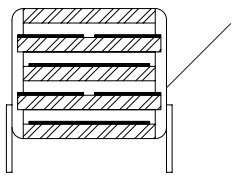
All dimensions are in mm

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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

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

Winding scheme



single sided metallized polypropylene film

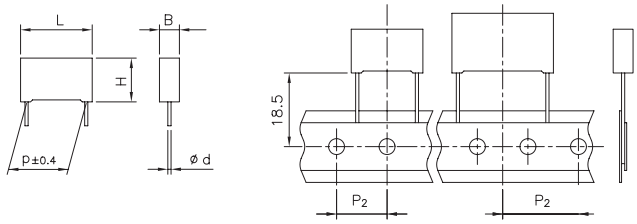
2 sections

R.47

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

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.

GENERAL TECHNICAL DATA

Dielectric: polypropylene film - 2 sections.

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: 40/85/56 IEC 60068-1

Operating temperature range: -40 to +85°C

Related documents: IEC 60384-14; EN 60384-14.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 520Vac / 1000Vdc; 50/60Hz

Capacitance range: 4700pF to 2.2μF

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 x 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
≥1x10^5 MΩ for C≤0.33μF
≥30000 s for C>0.33μF

Test voltage between terminations (on all pieces)**:**
1700Vac for 1 s + 2700Vdc for 1 s at +25°C±5°C

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.

V = 520Vac

PRODUCT CODE: **R475**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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 |ΔC/C|: ≤5%
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions
Temperature: +85°C ± 2°C
Test duration: 1000 h
Voltage applied: 1.25 x V_R +1000Vac 0.1 s/h

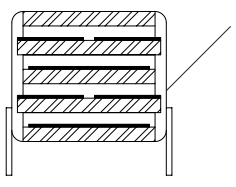
Performance
Dielectric strength: no dielectric breakdown or flashover at 4.3 x V_R (d.c.)/1 min
Capacitance change |ΔC/C|: ≤10%
Insulation resistance: ≥50% of initial limit.

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%

Winding scheme



R.47

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

PRODUCT CODE: **R475**

Rated Cap.	520 Vac / 1000 Vdc Std dimensions				Ø d	Max dv/dt at 420Vdc	Part Number
	B	H	L	p		(V/ µs)	
4700 pF	4.0	9.0	13.0	10.0	0.6	750	R475F 1470 - - 01 -
6800 pF	5.0	11.0	13.0	10.0	0.6	750	R475F 1680 - - 01 -
8200 pF	6.0	12.0	13.0	10.0	0.6	750	R475F 1820 - - 01 -
0.010 µF	6.0	12.0	13.0	10.0	0.6	750	R475F 2100 - - 01 -
0.010 µF	5.0	11.0	18.0	15.0	0.6	600	R475I 2100 - - 01 -
0.012 µF	5.0	11.0	18.0	15.0	0.6	600	R475I 2120 - - 01 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	600	R475I 2150 - - 01 -
0.018 µF	5.0	11.0	18.0	15.0	0.6	600	R475I 2180 - - 01 -
0.022 µF	6.0	12.0	18.0	15.0	0.6	600	R475I 2220 - - 01 -
0.027 µF	6.0	12.0	18.0	15.0	0.6	600	R475I 2270 - - 01 -
0.033 µF	6.0	12.0	18.0	15.0	0.6	600	R475I 2330 - - 01 -
0.039 µF	7.5	13.5	18.0	15.0	0.6	600	R475I 2390 - - 01 -
0.047 µF	7.5	13.5	18.0	15.0	0.6	600	R475I 2470 - - 01 -
0.047 µF	6.0	17.5	18.0	15.0	0.6	600	R475I 2470 - - 02 -
0.047 µF	9.0	12.5	18.0	15.0	0.6	600	R475I 2470 - - 03 -
0.056 µF	8.5	14.5	18.0	15.0	0.6	600	R475I 2560 - - 01 -
0.068 µF	10.0	16.0	18.0	15.0	0.8	600	R475I 2680 - - 01 -
0.068 µF	7.5	18.5	18.0	15.0	0.8	600	R475I 2680 - - 02 -
0.068 µF	13.0	12.0	18.0	15.0	0.8	600	R475I 2680 - - 03 -
0.082 µF	10.0	16.0	18.0	15.0	0.8	600	R475I 2820 - - 01 -
0.10 µF	11.0	19.0	18.0	15.0	0.8	600	R475I 3100 - - 01 -
0.047 µF	6.0	15.0	26.5	22.5	0.8	300	R475N 2470 - - 01 -
0.047 µF	6.5	13.5	26.5	22.5	0.8	300	R475N 2470 - - 02 -
0.068 µF	6.0	15.0	26.5	22.5	0.8	300	R475N 2680 - - 01 -
0.10 µF	7.0	16.0	26.5	22.5	0.8	300	R475N 3100 - - 01 -
0.12 µF	8.5	17.0	26.5	22.5	0.8	300	R475N 3120 - - 01 -
0.15 µF	10.0	18.5	26.5	22.5	0.8	300	R475N 3150 - - 01 -
0.18 µF	10.0	18.5	26.5	22.5	0.8	300	R475N 3180 - - 01 -
0.22 µF	11.0	20.0	26.5	22.5	0.8	300	R475N 3220 - - 01 -
0.27 µF	13.0	22.0	26.5	22.5	0.8	300	R475N 3270 - - 01 -
0.33 µF	13.0	22.0	26.5	22.5	0.8	300	R475N 3330 - - 01 -
0.15 µF	9.0	17.0	32.0	27.5	0.8	225	R475R 3150 - - 01 -
0.18 µF	9.0	17.0	32.0	27.5	0.8	225	R475R 3180 - - 01 -
0.22 µF	9.0	17.0	32.0	27.5	0.8	225	R475R 3220 - - 01 -
0.27 µF	9.0	17.0	32.0	27.5	0.8	225	R475R 3270 - - 02 -
0.33 µF	11.0	20.0	32.0	27.5	0.8	225	R475R 3330 - - 02 -
0.39 µF	11.0	20.0	32.0	27.5	0.8	225	R475R 3390 - - 01 -
0.47 µF	13.0	22.0	32.0	27.5	0.8	225	R475R 3470 - - 01 -
0.56 µF	13.0	22.0	32.0	27.5	0.8	225	R475R 3560 - - 01 -
0.68 µF	14.0	28.0	32.0	27.5	0.8	225	R475R 3680 - - 01 -
0.82 µF	18.0	33.0	32.0	27.5	0.8	225	R475R 3820 - - 01 -
1.0 µF	18.0	33.0	32.0	27.5	0.8	225	R475R 4100 - - 01 -
1.2 µF	18.0	33.0	32.0	27.5	0.8	225	R475R 4120 - - 01 -
1.5 µF	22.0	37.0	32.0	27.5	0.8	225	R475R 4150 - - 01 -
0.47 µF	11.0	22.0	41.5	37.5	1.0	150	R475W 3470 - - 01 -
0.56 µF	11.0	22.0	41.5	37.5	1.0	150	R475W 3560 - - 01 -
0.68 µF	13.0	24.0	41.5	37.5	1.0	150	R475W 3680 - - 01 -
0.82 µF	16.0	28.5	41.5	37.5	1.0	150	R475W 3820 - - 01 -
1.0 µF	16.0	28.5	41.5	37.5	1.0	150	R475W 4100 - - 01 -
1.2 µF	19.0	32.0	41.5	37.5	1.0	150	R475W 4120 - - 01 -
1.5 µF	19.0	32.0	41.5	37.5	1.0	150	R475W 4150 - - 01 -
1.8 µF	20.0	40.0	41.5	37.5	1.0	150	R475W 4180 - - 01 -
2.2 µF	20.0	40.0	41.5	37.5	1.0	150	R475W 4220 - - 01 -

Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)

All dimensions are in mm

APPROVALS

(*)	ENEC IEC 60384-14	Class X2	File No. CA08.00101
c UL us	UL 1414 up to 1µF, 85°C; 250Vac)	Across-the-line	File No. E97797
	UL 1283 (440 Vac 110°C)	Electromagnetic Interference Filters	File No. E85238

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 P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
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

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

R.49

X1 CLASS (IEC 60384-14) - 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.
Class X1 shall be applied for PERMANENTLY CONNECTED APPARATUS.

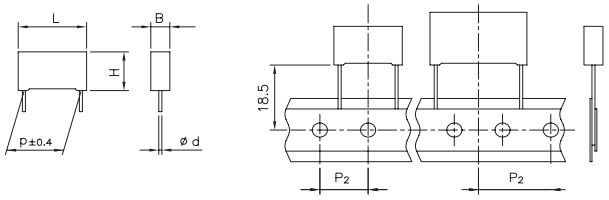
Note: **PERMANENTLY CONNECTED APPARATUS:** apparatus which is intended for connection to the mains by a connection which cannot be loosened **BY HAND**.
BY HAND: operation that does not require the use of any object such a tool, coin, etc.

PRODUCT CODE: **R49**

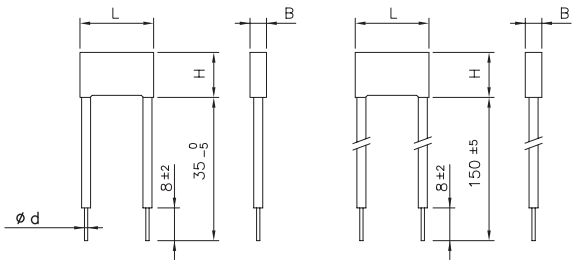
Note: R.49 series has replaced the 1.58 series (available upon request). For new design we suggest the use of the R.49 series.

Loose Taped

Fig.1 Fig.2



Insulated rigid leads Insulated flexible leads 0.5mm²



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	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(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): 310Vac / 800Vdc; (50/60Hz)
330Vac / 800Vdc; (50/60Hz)

Capacitance range: 0.01μF to 6.8μF

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):
tgδx10⁻⁴ 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
≥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
Temperature: +40°C±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days

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

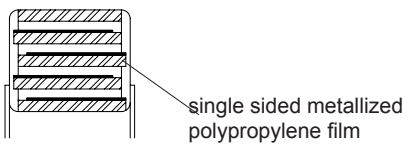
Performance
Dielectric strength: no dielectric breakdown or flashover at 4.3 x V_R (d.c.)/1 min
Capacitance change |ΔC/C|: ≤10%
Insulation resistance: ≥50% of initial limit.

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%

Winding scheme



R.49

X1 CLASS (IEC 60384-14) - MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

SELF-HEALING PROPERTIES

PRODUCT CODE: **R49**

Rated Cap. (*)	310 Vac / 800 Vdc Std dimensions B	H	L	p	Ø d	Max dv/dt at 440Vdc (V/ µs)	Part Number
0.010 µF	5.0	11.0	13.0	10.0	0.6	600	R49AF 2100 - - 01 -
0.015 µF	5.0	11.0	13.0	10.0	0.6	600	R49AF 2150 - - 01 -
0.022 µF	6.0	12.0	13.0	10.0	0.6	600	R49AF 2120 - - 01 -
0.033 µF	6.0	12.0	13.0	10.0	0.6	600	R49AF 2330 - - 01 -
0.010 µF	5.0	11.0	18.0	15.0	0.6	500	R49AI 2100 - - 01 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	500	R49AI 2150 - - 01 -
0.022 µF	5.0	11.0	18.0	15.0	0.6	500	R49AI 2220 - - 01 -
0.033 µF	5.0	11.0	18.0	15.0	0.6	500	R49AI 2330 - - 01 -
0.047 µF	6.0	12.5	18.0	15.0	0.6	500	R49AI 2470 - - 01 -
0.068 µF	6.0	12.0	18.0	15.0	0.6	500	R49AI 2680 - - M1 -M
0.068 µF	7.5	13.5	18.0	15.0	0.6	500	R49AI 2680 - - 01 -
0.10 µF	7.5	13.5	18.0	15.0	0.6	500	R49AI 3100 - -M1 -M
0.10 µF	8.5	14.5	18.0	15.0	0.6	500	R49AI 3100 - - 01 -
0.15 µF	10.0	16.0	18.0	15.0	0.8	500	R49AI 3150 - - 01 -
0.10 µF	6.0	15.0	26.5	22.5	0.8	400	R49AN 3100 - - 01
0.15 µF	7.0	16.0	26.5	22.5	0.8	400	R49AN 3150 - - 01
0.22 µF	8.5	17.0	26.5	22.5	0.8	400	R49AN 3220 - - 01
0.33 µF	10.0	18.5	26.5	22.5	0.8	400	R49AN 3330 - - 01
0.47 µF	11.0	20.0	26.5	22.5	0.8	400	R49AN 3470 - - 01
0.33 µF	9.0	17.0	32.0	27.5	0.8	200	R49AR 3330 - - 01
0.47 µF	11.0	20.0	32.0	27.5	0.8	200	R49AR 3470 - - 01
0.68 µF	13.0	22.0	32.0	27.5	0.8	200	R49AR 3680 - - 01
1.0 µF	14.0	28.0	32.0	27.5	0.8	200	R49AR 4100 - - 01
1.5 µF	18.0	33.0	32.0	27.5	0.8	200	R49AR 4150 - - 01
2.2 µF	22.0	37.0	32.0	27.5	0.8	200	R49AR 4220 - - 01

Mechanical version and packaging (Table1)
Tolerance: K (±10%); M (±20%)

All dimensions are in mm

E12 Series available upon request

For “capacitor connected in serial with main line” (two - phase and three - phase net) application, please read the “SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITORS” at pag. 152 and contact our Technical Service for choosing the safest solution.

Rated Cap. (*)	330 Vac / 800 Vdc Std dimensions B	H	L	p	Ø d	Max dv/dt at 440Vdc (V/ µs)	Part Number
0.047 µF	5.0	11.0	18.0	15.0	0.6	500	R49AI 2470 - - B1 -
0.068 µF	6.0	12.0	18.0	15.0	0.6	500	R49AI 2680 - - B1
0.068 µF	6.0	17.5	18.0	15.0	0.6	500	R49AI 2680 - - A2 -
0.10 µF	6.0	17.5	18.0	15.0	0.6	500	R49AI 3100 - - A2 -
0.15 µF	13.0	12.0	18.0	15.0	0.8	500	R49AI 3150 - - A3 -
0.15 µF	8.5	14.5	18.0	15.0	0.8	500	R49AI 3150 - - B1 M
0.22 µF	10.0	16.0	18.0	15.0	0.8	500	R49AI 3220 - - B2 M
0.22 µF	11.0	19.0	18.0	15.0	0.8	500	R49AI 3220 - - B1-
0.15 µF	6.0	15.0	26.5	22.5	0.8	400	R49AN 3150 - - B1 -
0.22 µF	7.0	16.0	26.5	22.5	0.8	400	R49AN 3220 - - B1 -
0.33 µF	8.5	17.0	26.5	22.5	0.8	400	R49AN 3330 - - B1 M
0.47 µF	10.0	18.5	26.5	22.5	0.8	400	R49AN 3470 - - B1 M
0.68 µF	13.0	22.0	26.5	22.5	0.8	400	R49AN 3680 - - B1 M
0.33 µF	9.0	17.0	32.0	27.5	0.8	200	R49AR 3330 - - A1 -
0.47 µF	11.0	20.0	32.0	27.5	0.8	200	R49AR 3470 - - A1 -
0.68 µF	11.0	20.0	32.0	27.5	0.8	200	R49AR 3680 - - B1 -
0.68 µF	13.0	22.0	32.0	27.5	0.8	200	R49AR 3680 - - A1 -
1.0 µF	13.0	25.0	32.0	27.5	0.8	200	R49AR 4100 - - B1 -
1.0 µF	14.0	28.0	32.0	27.5	0.8	200	R49AR 4100 - - A1 -
1.5 µF	14.0	28.0	32.0	27.5	0.8	200	R49AR 4150 - - B1 -
1.5 µF	18.0	33.0	32.0	27.5	0.8	200	R49AR 4150 - - A1 -
2.2 µF	18.0	33.0	32.0	27.5	0.8	200	R49AR 4220 - - B1 -
2.2 µF	22.0	37.0	32.0	27.5	0.8	200	R49AR 4220 - - A1 -
3.3 µF	22.0	37.0	32.0	27.5	0.8	200	R49AR 4330 - - B1 -
0.68 µF	11.0	22.0	41.5	37.5	1.0	100	R49AW 3680 - - B1 -
1.0 µF	11.0	22.0	41.5	37.5	1.0	100	R49AW 4100 - - B1 -
1.5 µF	13.0	24.0	41.5	37.5	1.0	100	R49AW 4150 - - B1 -
2.2 µF	16.0	28.5	41.5	37.5	1.0	100	R49AW 4220 - - B1 -
3.3 µF	19.0	32.0	41.5	37.5	1.0	100	R49AW 4330 - - B1 -
4.7 µF	19.0	32.0	41.5	37.5	1.0	100	R49AW 4470 - - B1 -
6.8 µF	30.0	45.0	41.5	37.5	1.0	100	R49AW 4680 - - B1 -

Mechanical version and packaging (Table1)
Tolerance: K (±10%); M (±20%)

APPROVALS

	ENEC IEC 60384-14	Class X1	File No.CA08.00030
	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 Canad	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

Approved according to IEC 60384-14

According to IEC 60065.

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Fig. (No.)	Pitch (mm)	Ordering code (Digit 10 to 11)
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	$150^{\pm5}$				52

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

R.49+R

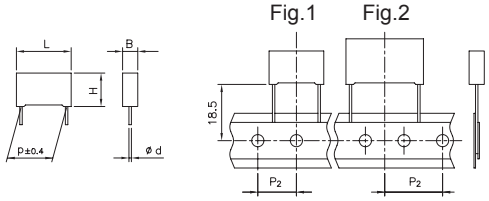
Capacitors with discharge resistor
X1 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

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.
Class X1 shall be applied for PERMANENTLY CONNECTED APPARATUS.

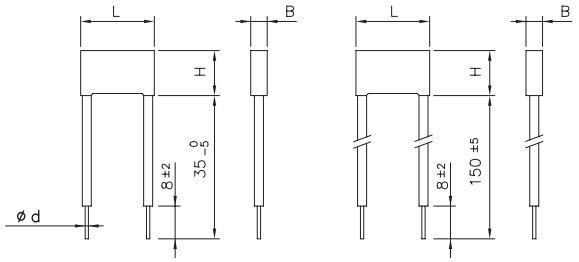
Note: **PERMANENTLY CONNECTED APPARATUS:** apparatus which is intended for connection to the mains by a connection which cannot be loosened **BY HAND**.
BY HAND: operation that does not require the use of any object such a tool, coin, etc.

Loose Taped

Fig.1 Fig.2



Insulated rigid leads Insulated flexible leads 0.5mm²



Ø d ±0.05	p= 27.5	p = 37.5
	0.8	1

All dimensions are in mm.

PRODUCT CODE: **R49**

Pitch	Box thickness	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
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 132400.

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 330Vac; 800Vdc(50/60Hz)*

Capacitance range: 0.33µF to 6.8µF

Capacitance values: E6 series (IEC 60063 Norm).

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

Dissipation factor (DF):
tgδx10^{-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
≥1x10^5 MΩ (5x10^5 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
Temperature: +40°C±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days

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%

R.49+R

Capacitor with discharge resistor
X1 CLASS (IEC 60384-14) - MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES
PRODUCT CODE: **R49**

Rated Cap. (*)	330 Vac / 800 Vdc Std dimensions B	H	L	p	Ø d	Max dv/dt at 440Vdc (V/ µs)	Part Number
0.33 µF	9.0	17.0	32.0	27.5	0.8	200	R49AR 3330 - - B1 - -
0.47 µF	11.0	20.0	32.0	27.5	0.8	200	R49AR 3470 - - B1 - -
0.68 µF	13.0	22.0	32.0	27.5	0.8	200	R49AR 3680 - - B1 - -
1.0 µF	13.0	22.0	32.0	27.5	0.8	200	R49AR 4100 - - B1 M -
1.0 µF	14.0	28.0	32.0	27.5	0.8	200	R49AR 4100 - - B2 - -
1.5 µF	18.0	33.0	32.0	27.5	0.8	200	R49AR 4150 - - B1 M -
1.5 µF	14.0	28.0	32.0	27.5	0.8	200	R49AR 4150 - - B2 - -
2.2 µF	22.0	37.0	32.0	27.5	0.8	200	R49AR 4220 - - B1 - -
0.68 µF	11.0	22.0	41.5	37.5	1.0	100	R49AW 3680 - - A1 - -
1.0 µF	11.0	22.0	41.5	37.5	1.0	100	R49AW 4100 - - B1 - -
1.5 µF	13.0	24.0	41.5	37.5	1.0	100	R49AW 4150 - - B1 - -
2.2 µF	16.0	28.5	41.5	37.5	1.0	100	R49AW 4220 - - B1 - -
3.3 µF	19.0	32.0	41.5	37.5	1.0	100	R49AW 4330 - - B1 - -
4.7 µF	20.0	40.0	41.5	37.5	1.0	100	R49AW 4470 - - B1 - -
6.8 µF	30.0	45.0	41.5	37.5	1.0	100	R49AW 4680 - - B1 - -

Rated voltage (A=330Vac)
Mechanical version and packaging (Table 1)
Tolerance: K (±10%); M (±20%)
Value of discharge resistor (Table 2)

All dimensions are in mm

APPROVALS

	ENEC IEC 60384-14	Class X1	File No.CA08.00030
c UL us	UL 1283 (310 Vac-105°C)	Electromagnetic Interference Filters	File No.E85238
	CSA - C22.2 No.8 (310 Vac-105°C)	Electromagnetic Interference Filters certified for Canada	File No.E85238

Approved according to IEC 60384-14
According to IEC 60065.

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Fig. (No.)	Pitch (mm)	Ordering code (Digit 10 to 11)
REEL Ø500mm		19.05	2	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

PRODUCT CODE SYSTEM

The part number, comprising 15 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R	4	9										-		-

Digit 1 to 3 — Series code.
Digit 4 — a.c. rated voltage:
A = 330Vac;
Digit 5 — Pitch:
R = 27.5; W = 37.5 mm
Digit 6 to 9 — Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.
Digit 10 to 11 — Mechanical version and/or packaging (table 1)
Digit 12 — Identifies the dimensions and electrical characteristics.
Digit 13 — Internal use
Digit 14 — Capacitance tolerance:
K=±10%; M=±20%
Digit 15 — Value of the discharge resistor (tolerance±10%) according to the following table*:

Table 2

R	code (-)
470 kΩ	E
680 kΩ	F
1 MΩ	G
1.2 MΩ	L
1.5 MΩ	N
2.2 MΩ	P
3.3 MΩ	Q
4.7 MΩ	S
6.8 MΩ	T
10 MΩ	V

*Other resistors are avaible upon request.

R.41

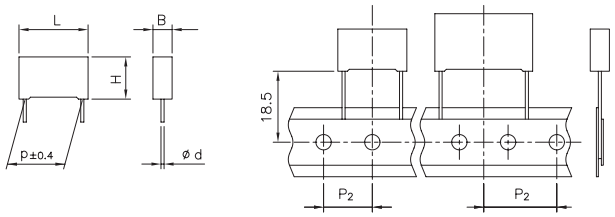
Y2 / X1 CLASS (IEC 60384-14) MKP Series
METALLIZED POLYPROPYLENE FILM CAPACITOR
SELF-HEALING PROPERTIES

Typical applications: Interference suppression and «across-the-line» applications. Suitable for use in situations where failure of the capacitor could lead to danger of electric shock.
PRODUCT CODE: **R41**

Note: R.41 series has replaced the R73 series (available only upon request). For new design we suggest the use of the R.41 series.

Loose Taped

Fig.1 Fig.2



Ø d ±0.05	p = 7.5	p = 10	p = 15	15<p≤27.5	p = 37.5
	0.5	0.6	0.6 or 0.8*	0.8	1

* See size table.
All dimensions are in mm.

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm) B max	H max	L max
7.5	All	B +0.1	H +0.1	L +0.2
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: Ø ≥ 0.6 tinned wire.
Ø = 0.5 tinned wire, low thermical conductivity.
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): 300Vac / 1000Vdc; 50/60Hz
Capacitance range: 1000pF to 1.0µF
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: ≤30 (20)* at 1kHz
* Typical value
Insulation resistance:
Test conditions
Temperature: +25°C±5°C
Voltage charge time: 1 min
Voltage charge: 100 Vdc
Performance
≥1 x 10^5 MΩ (5 x 10^5 MΩ)* for C ≤0.33µF
≥30000 s (150000 s)* for C >0.33µF
* Typical value
Test voltage between terminations (on all pieces):
2500Vac for 1 s + 5000Vdc for 1 s at +25°C±5°C

TEST METHOD AND PERFORMANCE

Damp heat, steady state:
Test conditions
Temperature: +40±2°C
Relative humidity (RH): 93 ±2%
Test duration: 56 days
Performance
Dielectric strength: no dielectric breakdown or flashover at 1500Vac/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: 1.7 x V_R + 1000Vac 0.1 s/h
Performance
Dielectric strength: no dielectric breakdown or flashover at 1500Vac/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%

R.41

Y2 / X1 CLASS (IEC 60384-14) 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 could lead to danger of electric shock.

PRODUCT CODE: **R41**

Rated Cap.	300 Vac/1000Vdc Std dimensions B	H	L	p	Ø d	Max dv/dt at 420Vdc (V/ µs)	Part Number
1000 pF	4.0	9.0	10.0	7.5	0.5	800	R413D 1100 - - 00 -
2200 pF	4.0	9.0	10.0	7.5	0.5	800	R413D 1220 - - 00 -
3300 pF	5.0	10.5	10.0	7.5	0.5	800	R413D 1330 - - 00 -
4700 pF	6.0	12.0	10.5	7.5	0.5	800	R413D 1470 - - 00 -
1000 pF	4.0	9.0	13.0	10.0	0.6	800	R413F 1100 - - 00 -
1500 pF	4.0	9.0	13.0	10.0	0.6	800	R413F 1150 - - 00 -
2200 pF	4.0	9.0	13.0	10.0	0.6	800	R413F 1220 - - 00 -
3300 pF	4.0	9.0	13.0	10.0	0.6	800	R413F 1330 - - M1 -
4700 pF	5.0	11.0	13.0	10.0	0.6	800	R413F 1470 - - M1 -
6800 pF	6.0	12.0	13.0	10.0	0.6	800	R413F 1680 - - 00 -M
3300 pF	5.0	11.0	18.0	15.0	0.6	600	R413I 1330 - - 00 -
4700 pF	5.0	11.0	18.0	15.0	0.6	600	R413I 1470 - - 00 -
6800 pF	5.0	11.0	18.0	15.0	0.6	600	R413I 1680 - - 00 -
0.010 µF	5.0	11.0	18.0	15.0	0.6	600	R413I 2100 - - 00 -
0.015 µF	5.0	11.0	18.0	15.0	0.6	600	R413I 2150 - - M1 -
0.022 µF	6.0	12.0	18.0	15.0	0.6	600	R413I 2220 - - M1 -
0.033 µF	7.5	13.5	18.0	15.0	0.6	600	R413I 2330 - - M1 -
0.047 µF	8.5	14.5	18.0	15.0	0.6	600	R413I 2470 - - M1 -
0.068 µF	11.0	19.0	18.0	15.0	0.8	600	R413I 2680 - - 00 -
0.047 µF	6.0	15.0	26.5	22.5	0.8	500	R413N 2470 - - 00 -
0.068 µF	6.0	15.0	26.5	22.5	0.8	500	R413N 2680 - - M1M -
0.068 µF	7.0	16.0	26.5	22.5	0.8	500	R413N 2680 - - 00 -
0.10 µF	8.5	17.0	26.5	22.5	0.8	500	R413N 3100 - - M1 -
0.15 µF	10.0	18.5	26.5	22.5	0.8	500	R413N 3150 - - M1 -
0.22 µF	13.0	22.0	26.5	22.5	0.8	500	R413N 3220 - - 00
0.22 µF	13.0	22.0	32.0	27.5	0.8	400	R413R 3220 - - 00 -
0.33 µF	14.0	28.0	32.0	27.5	0.8	400	R413R 3330 - - 00 -
0.47 µF	18.0	33.0	32.0	27.5	0.8	400	R413R 3470 - - 00 -
0.68 µF	18.0	33.0	32.0	27.5	0.8	400	R413R 3680 - - 00 -
0.47 µF	13.0	24.0	41.5	37.5	1.0	300	R413W 3470 - - 00 -
0.68 µF	16.0	28.5	41.5	37.5	1.0	300	R413W 3680 - - 00 -
1.0 µF	20.0	40.0	41.5	37.5	1.0	300	R413W 4100 - - 00 -

Mechanical version and packaging (Table1)
Tolerance: K (±10%); M (±20%)

E12 Series available upon request

All dimensions are in mm.

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Fig. (No.)	Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		6.35	1	7.5	DQ
AMMO-PACK		12.70	1	10.0/15.0	DQ
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø 355mm		6.35	1	7.5	CK
REEL Ø 500mm		12.70	1	10.0/15.0	CK
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4^{+2}				00
Loose, long leads (p<10mm)	$17^{+1/-2}$				Z3
Loose, long leads (p=10mm)	$25^{\pm1}$				JY
Loose, long leads (p≥15mm)	$25^{+2/-1}$				50
	30^{+5}				40

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

APPROVALS

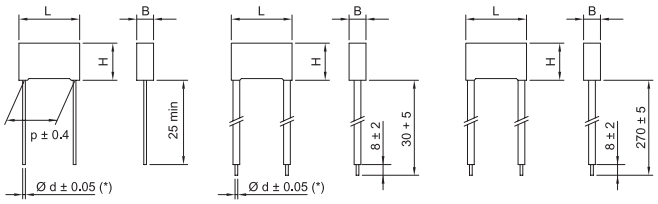
(*)	ENEC IEC 60384-14	Class Y2 / X1	File No. V4160
cULus	UL 1414 (250Vac- 85°C)	Across-the-line	FileNo.E97797
cULus	CSA - C22.2 No.1 (250Vac- 85°C)	Across-the-line certified for Canada	File No. E 97797
cULus	UL 1283 (300 Vac-110°C)	Electromagnetic Interference Filters	File No. E85238
cULus	CSA - C22.2 No.8 (300 Vac-110°C)	Electromagnetic Interference Filters certified for Canada	File No.E85238
CQC	GB IT 14472	Class Y2 / X1	File CQC03001006820 CQC03001006821 (in progress for pitch 7.5 mm)

Approved according to IEC 60384-14

According to IEC 60065.

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

Tinned wire | Insulated rigid leads | Insulated flexible leads 0.5mm²



All dimensions are in mm

(*) Remark:

Tinned winned & insulated rigid lead
C≤0.22µF both leads have Ød=0.6mm
C≥0.25µF both leads have Ød=0.8mm

Typical applications: RC units are used to eliminate transient phenomena whilst a circuit is being switched and as radio interference suppressor of contacts.

PRODUCT CODE: **F43**

GENERAL TECHNICAL DATA

Climatic category:
55/100/56 IEC 60068-1
40/100/56 (275Vac) IEC 60068-1

Insulation resistance (Ir):
≥3 · 10^4 MΩ for C≤ 0.33 µF
≥3000 s for C> 0.33 µF

Rated voltage (V_R):
D.C. inclusive of the peak value of the superimposed A.C. component; A.C. r.m.s. of sinusoidal value at 50/60 Hz.

Nominal rating of the resistance:
R≥10 Ω; nominal values of the series E12.

Power rating of the resistance (Max permitted power):

1/2 W	1 W	2 W
C≤0.10 µF	0.10 µF<C≤0.22 µF	C≥0.25 µF

Test voltage Vdc between terminals:
1.6 V_R applied for 2 s at +25°C ±5°C
4.3 V_R applied for 2 s at +25°C ±5°C (only for 275Vac)

Test voltage between terminals and case:
2500 Vac applied for 2 s at +25°C ±5°C

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

Connections:
tinned wire (preferred), insulated rigid leads or insulated flexible leads.

Mounting:
RC units are mounted in parallel with the contacts to be protected or in parallel with the inductive load (fig.1-2). RC units are generally mounted in parallel with the contacts to suppress radio interferences (fig.1).

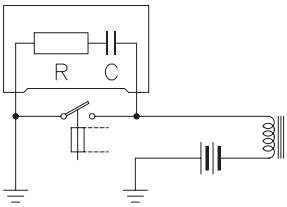


Fig. 1

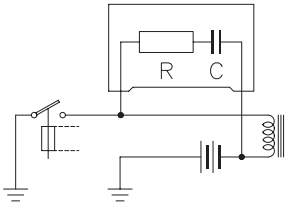


Fig. 2

APPROVALS (only for 275 Vac) IEC60384-14 Class X2 (UL 1414 - 85°C; 250Vac)

Note: Only approved RC units can be used for line application.
Available models: not all the RC combinations are available but can be produced on request.

Rated cap.	250 Vdc/ 160Vac				400 Vdc/ 200 Vac				630 Vdc/ 220 Vac				275 Vac Class X2				R (Ω)
	B	H	L	p	B	H	L	p	B	H	L	p	B	H	L	p	
0.010 µF													7.5	14.5	18.0	15.0	10 to 1000 E12 Series
0.015 µF													7.5	14.5	18.0	15.0	
0.022 µF									7.5	14.5	18.0	15.0	7.5	14.5	18.0	15.0	
0.033 µF													7.5	14.5	18.0	15.0	
0.047 µF													7.5	14.5	18.0	15.0	
0.068 µF													10.0	16.0	18.0	15.0	
0.10 µF									7.0	16.0	26.5	22.5	8.5	17.0	26.5	22.5	
0.15 µF													10.0	20.0	26.5	22.5	10 to 470 E12 Series
0.22 µF													11.0	20.0	26.5	22.5	
0.25 µF	8.5	14.5	18.0	15.0	7.0	16.0	26.5	22.5	11.0	20.0	26.5	22.5	11.0	20.0	32.0	27.5	10 to 100 E12 Series
0.33 µF	6.0	15.0	26.5	22.5									11.0	20.0	32.0	27.5	
0.47 µF	8.5	17.0	26.5	22.5									13.0	22.0	32.0	27.5	
0.50 µF	8.5	17.0	26.5	22.5	10.0	18.5	26.5	22.5	13.0	22.0	32.0	27.5	13.0	22.0	32.0	27.5	
0.68 µF													18.0	33.0	32.0	27.5	
1.0 µF	10.0	18.5	26.5	22.5	13.0	22.0	32.0	27.5					18.0	33.0	32.0	27.5	10 to 22 E12 Series

All dimensions are in mm.

F5A

Capacitor / Varistor unit

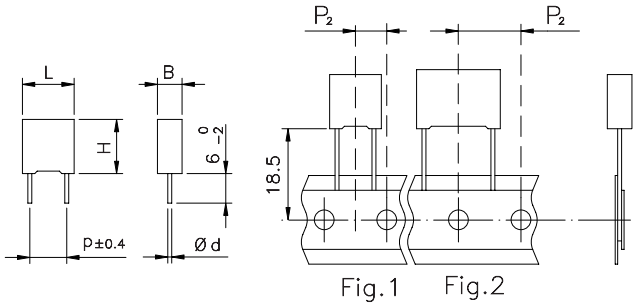


Fig.1 Fig.2

Ød ±0.05	p = 5mm	p = 10mm
	0.6	0.7

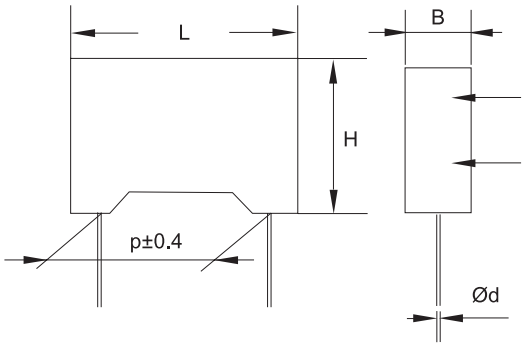
METALLIZED POLYESTER FILM CAPACITOR WITH INTEGRATED CERAMIC VARISTOR

Typical applications: these component units are used to reduce transient phenomena and act as EMI-RFI suppressors for automotive motors and other suppression applications.

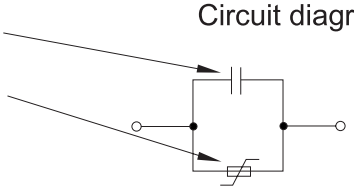
- Engine blower fans
- Heating/air-conditioning blowers
- Electric window regulators
- Electric windshield wipers
- Central locking systems
- Electric sun roofs
- Fuel/oil pumps
- Electrically operated seats

PRODUCT CODE: **F5A**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
5.0	<5.0	B +0.1	H +0.1	L +0.2
5.0	≥5.0	B +0.1	H +0.1	L +0.3
10.0		B +0.2	H +0.1	L +0.35



Circuit diagram



The F5A Series was designed for different suppression conditions and peak voltage limitation. Different operating and clamping voltages allow an optimal adaption to the different application requirements. Best results for suppression purposes are achieved by using low inductive MKT capacitors in parallel construction with ceramic varistor in one single case.
The leaded EMI-RFI suppression element F5A is mainly prepared for Automotive applications without PC-board (e.g. motor suppression) or mixed leaded and SMD PC-boards.
Upon customer's request there is also the possibility to create and deliver special versions.

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
F	5	A										-	

Digit 1 to 3 Series code.

Digit 4 d.c. Rated voltage:

A = 5V B = 18V H = 25V J = 30V
N = 45V C = 50V D = 63V

Digit 5 Pitch (mm): C=5; F=10

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (Table1)

Digit 12 Varistor voltage (Table 2).

Digit 13 Size code

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

GENERAL CHARACTERISTICS

Capacitor: metallized polyester film (MKT).

Varistor: metal oxide with silver palladium plates.

Protection: plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL 94 V0.

Leads: tinned wire.

Marking: Manufacturer's logo (only pitch 10mm), series (F5A), capacitance, tolerance, D.C. rated voltage, manufacturing date code.

Climatic category: 55/125/56 IEC 60068-1

Operating temperature range: -55 to +125°C

Table 1 **Packaging**

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		6.35	1	5	DQ
AMMO-PACK		1.27	2	10	DQ
REEL Ø 355mm		6.35	1	5	CK
REEL Ø 500mm		1.27	2	10	CK
Loose, short leads	4^{+2}				AA
Loose, long leads	$17^{+1/-2}$				Z3

Other packaging styles are available upon request.

F5A

Capacitor / Varistor unit

METALLIZED POLYESTER FILM CAPACITOR WITH INTEGRATED CERAMIC VARISTOR

PRODUCT CODE: **F5A**

ELECTRICAL CHARACTERISTICS

Capacitance range: 0.1µF to 3.3µF (see Table 3)
Capacitance values: E12 series (IEC 60063 Norm).
Capacitance tolerance: ±5% (J); ±10% (K); ±20% (M).
Rated voltage (V_R): 5Vdc - 15Vdc - 25Vdc - 30Vdc - 45Vdc - 50Vdc - 63Vdc

Temperature derated voltage:
for temperature over 100°C a decreasing factor of 2% per degree has to be applied on the rated voltage V_R.

Varistor voltage (V_v): 1mA (see Table 2) tol. ±10%
Varistor voltage range: 8Vdc to 82Vdc
V_{RMS} range: 4Vac to 50Vac
Clamping voltage (V_c): 1A; 8/20µs (see Table 2).
Peak current (I_p): 8/20µs (see Table 2).
Transient Energy (W_p): max (2ms) (see Table 2).
Power dissipation (P_{max}): 0.008W

Leakage current (I_{dc}): ≤50µA @ V_R
Dissipation Factor (D.F.):
tgδ x 10^{-4} at 25°C ±5°C

kHz	tgδ x 10^{-4}
1	80
100	300

Table 2 **Voltage and energy**

Digit 4		Digit 12					
letter	V_R (Vdc)	letter	V_v (Vdc)	V_{RMS} (Vac)	V_c (V)	W_P (J)	I_P (A)
A	5	B	8	4	17	0.3	150
		E	11	6	25	0.4	200
		I	15	8	30	0.5	200
B	18	B	22	14	38	0.5	200
		E	27	17	44	0.6	200
H	25	A	33	20	54	0.7	200
J	30	D	39	25	65	1.0	200
		I	47	30	77	1.0	200
N	45	B	56	35	90	0.4	100
C	50	C	68	40	110	0.5	100
D	63	C	82	50	135	0.6	100

Table 3 **Capacitance and size**

Rated Cap. (µF)	Rated Voltage (V_R)	Size code	Size (Std dimensions)			
			B	H	L	p
0.1 to 0.47	5 to 63	5	4.5	9.5	7.2	5.0
0.56 to 1.5	5 to 63	6	5.0	10.0	7.2	5.0
1.8 to 2.2	5 to 63	7	6.0	11.0	7.2	5.0
0.1 to 1.0	5 to 63	2	5.0	11.0	13.0	10.0
1.2 to 1.5	5 to 63	3	6.0	12.0	13.0	10.0

All dimensions are in mm.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

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

Performance
Capacitance change |ΔC/C|: ≤5%
Varistor voltage change: ≤10%
DF change (Δtgδ): ≤50x10^{-4} @ 1kHz
Leakage current at V_R: ≤100µA

Endurance:

Test conditions
Temperature: +125°C±2°C / 100°C±2°C
Voltage applied: 0.5xV_R / 1.0xV_R
Test duration: 1000 h

Performance
Capacitance change |ΔC/C|: ≤10%
Varistor voltage change: ≤10%
DF change (Δtgδ): ≤50x10^{-4} @ 1kHz
Leakage current at V_R: ≤100µA

Resistance to soldering heat:

Test conditions
Temperature: +260°C±5°C
Test duration: 10±1s

Performance
Capacitance change |ΔC/C|: ≤3%
Varistor voltage change: ≤5%
DF change (Δtgδ): ≤30x10^{-4} @ 1kHz
Leakage current at V_R: ≤50µA

Peak current derating:

Test conditions
Reference CECC 42000 / test C 2.1;
Test duration: 100 times (2ms)
Time betwee each current peak: 120s

Performance
Capacitance change |ΔC/C|: ≤10%
Varistor voltage change: ≤10%
DF change (Δtgδ): ≤30x10^{-4} @ 1kHz
Leakage current at V_R: ≤100µA

Long term stability (after two years):

Test conditions
Temperature: -40°C to +80°C
Humidity: ≤70%

Performance
Capacitance change |ΔC/C|: ≤3%
Varistor voltage change: ≤5%
DF change (Δtgδ): ≤20x10^{-4} @ 1kHz
Leakage current at V_R: ≤50µA

Reliability:
Reference MIL HDB 217

Application conditions:
Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤2 FIT
(1FIT = 1x10^{-9} failures/componentsxh)

Failure criteria:
Capacitance change |ΔC/C|: >10%
Varistor voltage change: >10%
DF change (Δtgδ): ≤20x10^{-4} @ 1kHz
Leakage current at V_R: ≤200µA

Warning: the component F5A is a protection and suppression combined passive component. Strong overloading (much higher energy, current or voltage) can strongly damage the component with the risk of explosion and fire.

F5B

Capacitor / Diode unit

METALLIZED POLYESTER FILM CAPACITOR WITH INTEGRATED BIDIRECTIONAL SUPPRESSOR DIODE
HIGH PERFORMANCE PEAK REDUCTION

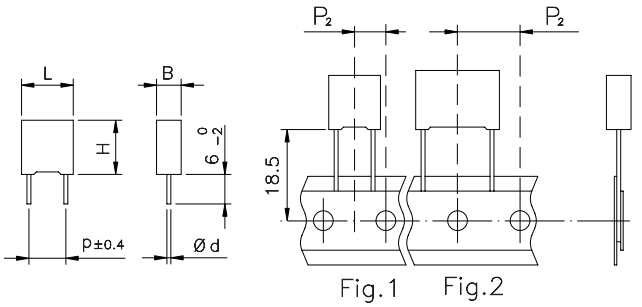


Fig.1 Fig.2

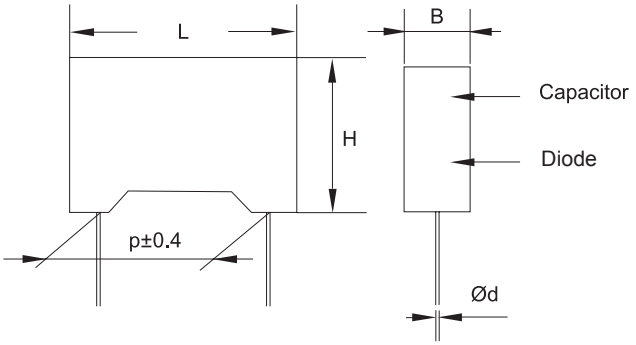
Ød ±0.05	p = 5mm	p = 10mm
	0.6	0.7

Typical applications: these component units are used to strongly reduce transient phenomena and act as EMI-RFI suppressors for automotive motors and other suppression applications of very high performance.

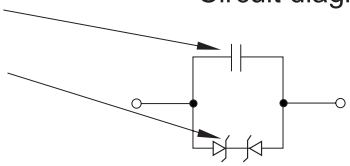
- Engine blower fans
- Heating/air-conditioning blowers
- Electric window regulators
- Electric windshield wipers
- Central locking systems
- Electric sun roofs
- Fuel/oil pumps
- Electrically operated seats

PRODUCT CODE: **F5B**

Pitch	Box thickness (B)	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
5.0		B +0.1	H +0.1	L +0.3
10.0		B +0.1	H +0.1	L +0.35



Circuit diagram



The F5B Series was designed for ambitious suppression demands and peak voltage limitation.
Different operating and clamping voltages allow an optimal adaption to the different application requirements.
Best results for suppression purposes are achieved by using low inductive MKT capacitors in parallel construction with bidirectional suppressor diode (TVS, Transient Voltage Suppressor) in one single case.
The leaded EMI-RFI suppression element F5B is mainly prepared for Automotive applications without PC-board (e.g. motor suppression) or mixed leaded and SMD PC-boards.
Upon customer's request there is also the possibility to create and deliver special versions.

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
F	5	B										-	

Digit 1 to 3 Series code.

Digit 4 d.c. Rated voltage:

A = 5V B = 18V H = 25V J = 30V

N = 45V C = 50V D = 63V

Digit 5 Pitch (mm): C=5; F=10

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (Table1)

Digit 12 Nominal diode voltage (Table 2).

Digit 13 Size code

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

GENERAL CHARACTERISTICS

Capacitor: metallized polyester film (MKT).

Varistor: bidirectional Transient Voltage Suppressor Diode

Protection: plastic case, thermosetting resin filled. Box material is solvent resistant and flame retardant according to UL 94 V0.

Leads: tinned wire.

Marking: Manufacturer's logo (only pitch 10mm), series (F5B), capacitance, tolerance, D.C. rated voltage, manufacturing date code.

Climatic category: 55/125/56 IEC 60068-1

Operating temperature range: -55 to +125°C

Table 1 **Packaging**

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		6.35	1	5	DQ
AMMO-PACK		1.27	2	10	DQ
REEL Ø 355mm		6.35	1	5	CK
REEL Ø 500mm		1.27	2	10	CK
Loose, short leads	4^{+2}				AA
Loose, long leads	$17^{+1/-2}$				Z3

Other packaging styles are available upon request.

METALLIZED POLYESTER FILM CAPACITOR WITH INTEGRATED BIDIRECTIONAL SUPPRESSOR DIODE
HIGH PERFORMANCE PEAK REDUCTION

PRODUCT CODE: **F5B**

ELECTRICAL CHARACTERISTICS

Capacitance range: 100nF to 3.3µF
Capacitance values: E12 series (IEC 60063 Norm).
Capacitance tolerance: ±5% (J); ±10% (K); ±20% (M).
Rated voltage (V_R): 5Vdc - 15Vdc - 25Vdc - 30Vdc - 45Vdc - 50Vdc - 63Vdc

Temperature derated voltage:
for temperature over 100°C a decreasing factor of 2% per degree has to be applied on the rated voltage V_R.
Breakdown Voltage (V_{BR}): see table 2, tolerance ±10%
Diode Voltage range: 10Vdc to 78Vdc
Max **Clamping voltage (V_c) at max. Peak Current** :see Table 2
Power dissipation (P_{max}): 400W or 600W (Pulse 10/700µs)
Thermal Resistance: see Table 3
Leakage current (I_{dc}): ≤50µA @ V_R
Dissipation Factor (D.F.):
tgδ x 10^{-4} at 25°C ±5°C

kHz	tgδ x 10^{-4}
1	80
100	250

Table 2 **Voltage and energy**

Digit 4		Digit 12			600W type		400W type	
letter	V_R (Vdc)	**letter** (600W type)	**letter** (400W type)	V_{BR} (Vdc) @1mA	V_{Cmax} (V)@Ip(A) 10/700µs		V_{Cmax} (V)@Ip(A) 10/700µs	
A	5	E	F	10	14	37	15	28
		I	K	15	20	29	20	21
B	18	B	C	22	28	24	28	16
		E	F	27	33	31	33	14
H	25	A	B	30	36	20	36	13
		C	D	33	40	19	40	12
J	30	D	E	36	43	18	43	12
		I	K	39	46	17	46	11
		N	P	44	52	16	52	10
N	45	B	C	53	62	14	61	9
C	50	C	D	68	78	12	78	8
D	63	C	D	78	89	11	88	7

Table 3 **Capacitance and size**

Rated Cap. (µF)	R_{th} (°C/W)	**Size Code**	**Rated Voltage** V_R	Ød ±0.05	**Size** (Std dimensions)			
					B	H	L	p
0.1 to 1.2	82	7	5 to 63	0.6	6.0	11.0	7.2	5.0
1.5 to 2.2	73	8	5 to 50	0.6	7.2	13.0	7.2	5.0
0.1 to 1.5	64	3	5 to 63	0.7	6.0	12.0	13.0	10.0

All dimensions are in mm.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

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

Performance
Capacitance change |ΔC/C|: ≤5%
Varistor voltage change: ≤10%
DF change (Δtgδ): ≤50x10^{-4} @ 1kHz
Leakage current at V_R: ≤100µA

Endurance:

Test conditions
Temperature: +125°C±2°C / 100°C±2°C
Voltage applied: 0.5xV_R / 1.0xV_R
Test duration: 1000 h

Performance
Capacitance change |ΔC/C|: ≤10%
Varistor voltage change: ≤10%
DF change (Δtgδ): ≤50x10^{-4} @ 1kHz
Leakage current at V_R: ≤100µA

Resistance to soldering heat:

Test conditions
Temperature: +260°C±5°C
Test duration: 10±1s

Performance
Capacitance change |ΔC/C|: ≤3%
Varistor voltage change: ≤5%
DF change (Δtgδ): ≤30x10^{-4} @ 1kHz
Leakage current at V_R: ≤50µA

Peak current derating:

Test conditions
Pulse 10/700µs, 300V_p; 100 cycles with alternating polarity
Time between each current peak: 120s

Performance
Capacitance change |ΔC/C|: ≤10%
Breakdown voltage change: ≤10%
DF change (Δtgδ): ≤30x10^{-4} @ 1kHz
Leakage current at V_R: ≤100µA

Long term stability (after two years):

Test conditions
Temperature: -40°C to +80°C
Humidity: ≤70%

Performance
Capacitance change |ΔC/C|: ≤3%
Varistor voltage change: ≤5%
DF change (Δtgδ): ≤20x10^{-4} @ 1kHz
Leakage current at V_R: ≤50µA

Reliability:
Reference MIL HDB 217

Application conditions:
Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤3 FIT
(1FIT = 1x10^{-9} failures/componentsxh)

Failure criteria:
Capacitance change |ΔC/C|: >10%
Varistor voltage change: >10%
DF change (Δtgδ): >20x10^{-4} @ 1kHz
Leakage current at V_R: >200µA

Warning: the component F5B is a protection and suppression combined passive component. Strong overloading (much higher energy, current or voltage) can strongly damage the component with the risk of explosion and fire.

Capacitive power supply application

Series	Style	Typical application	Rated voltage	Capacitance range	Page
All	Short guide to choose the right film capacitor used in series with the main				178
R60 3	MKT Box Pitch: 22.5mm… 37.5mm	A.C. applications (Capacitive power supply)	300Vac	0.15µF… 6.8µF	180 to 181
R75 2 R75 L	MKP Box Pitch: 10mm… 37.5mm	A.C. applications (Capacitive power supply)	230Vac	0.033µF… 6.8µF	182 to 184
			250Vac	0.010µF… 10µF	
R.47	MKP Box Pitch: 10mm… 37.5mm	X2 Class	440Vac (110°C)	4700pF… 2.2µF	159 to 164
		X1 Class	440Vac (110°C)	4700pF… 2.2µF	
		X2 Class	520Vac (85°C)	4700pF… 2.2µF	
R.46 Sversion	MKP Box Pitch: 15mm… 37.5mm	X2 Class	275Vac (110°C) Special applications	0.010µF… 10µF	155 to 156

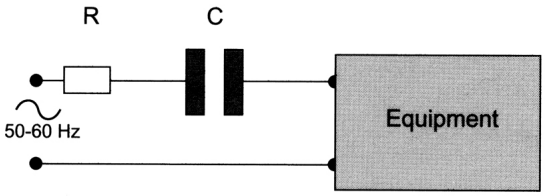
SHORT GUIDE TO CHOOSE THE RIGHT FILM CAPACITOR USED IN SERIES WITH THE MAIN (I.E. CAPACITIVE POWER SUPPLY)

SERIES with the MAIN

Applications:

- Energy meters.
- Control boards for WHITE goods and home appliances.
- Relays and switching gears for industrial applications.
- Rolling shutters control units
- Proximity sensors
- All the applications where the capacitors is used to store energy or to divide the main voltage.

Electric scheme



Main performances requested to the capacitor.

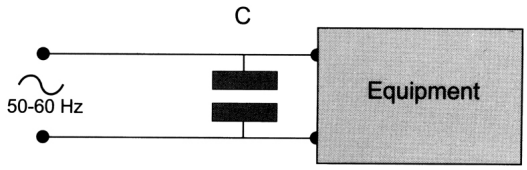
- Capacitance stability.The most suitable series to be used in serial with the main are:
- **R.60 3 (300Vac):** HIGH Capacitance Stability
  Polyester capacitor with impregnation and series construction; good self-healing properties and good properties in damp environment.
- **R.75 2 (230Vac) and R75 L (250Vac):** GOOD Capacitance Stability (Best Fitting components in terms of both size & performances).
  Polypropylene capacitor with parallel construction and small dimensions; good self-healing properties and good properties in damp environment.
- **R.47 (440Vac):** Polypropylene capacitor with series construction and approved as Class X2 or X1 noise suppressor; high self-healing properties.
- **R.46S (275Vac):** Polypropylene capacitor officially approved as Class X2 noise suppressor with internal protection against damp environment.

PARALLEL with the MAIN

Applications:

The capacitor in parallel with the main is requested by international standard with the main goal of noise suppression and safety.

Electric scheme



Main performances requested to the capacitor.

- Safety (under severe Impulse Voltage test)
- Endurance tests required by the International Standards.

The most suitable series to be used in parallel with the main are:

- **R.46 (275-300Vac):** Polypropylene capacitor officially approved as Class X2 noise suppressor.
- **R.46S (275Vac):** Polypropylene capacitor officially approved as Class X2 noise suppressor with internal protection against damp environment.
- **R.46 125°C (275Vac):** Polypropylene capacitor officially approved as Class X2 noise suppressor for application up 125°C.
- **R.49 (310-330Vac):** Polypropylene capacitor officially approved as Class X1 noise suppressor.
- **R.47 (440Vac):** Polypropylene capacitor with series construction and approved as Class X2 or X1 noise suppressor; high self-healing properties.

SERIES with the MAIN	parallel construction	series construction
	HIGH Capacitance Stability	**GOOD Capacitance Stability (Best Fitting components in term of both size & performance)**
Series	**R60 3**	**R75 2 - R75 L**
Pitch	22.5 - 37.5 mm	10 - 37.5 mm
Dielectric	Polyester	Polypropylene
Electrodes	Metallized film	Metallized film
Capacitance range	0.15µF - 6.8µF	10nF - 10µF
Rated voltage	300 Vac	230 - 250 Vac
Available tolerance	±5%; ±10%; ±20% ;	±10%; ±20%;(*);
Pulse rise time (dv/dt)	100 to 200 V/µs	70 to 1500 V/µs
Climatic category (IEC 60068-1)	55/105/56	55/105/56
Operating temperature range	-55°C to +105°C	-55°C to +105°C
Packaging	Loose or taped	Loose or taped
SERIES with the MAIN (X class)	series construction	parallel construction
	X2 - X1 class	**X2 class**
Series	**R.47**	**R.46 S**version
Pitch	10 - 37.5 mm	15 - 37.5 mm
Dielectric	Polypropylene	Polypropylene
Electrodes	Metallized film	Metallized film
Capacitance range	4700pF - 2.2µF	10nF - 10µF
Rated voltage	440 - 520 Vac	275 Vac
Available tolerance	±10%; ±20%;(*);	±10%; ±20%;(*) ;
Pulse rise time (dv/dt)	150 to 750 V/µs	100 to 500 V/µs
Climatic category (IEC 60068-1)	40/110/56	40/110/56
Operating temperature range	-40°C to +110°C	-40°C to +110°C
Packaging	Loose or taped	Loose or taped

(*)Tolerance ±5% (J) available upon request

For more details concerning the series, please refer to the relevant catalogue pages.

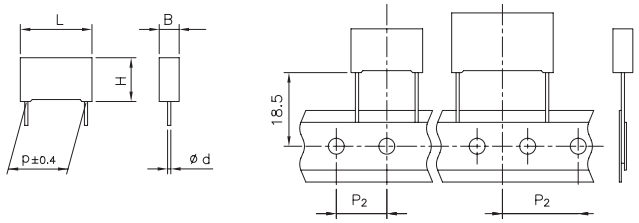
R60 3

MKT Series for 300 Vac

METALLIZED POLYESTER FILM CAPACITOR DESIGNED FOR A.C. APPLICATIONS

Loose Taped

Fig.1 Fig.2



Ø d ±0.05	P = 22.5 ÷ 27.5	P = 37.5
	0.8	1.0

All dimensions are in mm.

Typical applications: This special R60 3 release is specifically designed for applications in series with the main, i.e.: power capacitive supply, line divider, with the request to long stability of capacitance value.

HIGH Capacitance Stability

PRODUCT CODE: **R60 3**

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	6	0	3									-	

Digit 1 to 3 Series code.

Digit 4 A.C. Rated voltage:
3 = 300 Vac / 560 Vdc

Digit 5 Pitch (mm): N = 22.5; R = 27.5; W = 37.5

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (Table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate), impregnated.

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, A.C. rated voltage, dielectric code, manufacturing data code.

Climatic category: 55/105/56 IEC 60068-1.

Operating temperature range: -55 to +105°C

Related documents: IEC 60384-2

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R) 300 Vac / 560 Vdc

Rated temperature (T_R) +85°C

Temperature derated voltage:
for temperatures between +85°C and the upper operating temperature a decreasing factor of 1.25 % per degree °C on the rated voltege V_R has to be applied.

Capacitance range 0.15µF to 6.8µF

Capacitance values E6 series (IEC 60063 Norm)

Capacitance tolerances (measured at 1 kHz):
±5% (J);±10% (K); ±20% (M).

Total self-inductance (L): (lead length ~2mm)

Pitch (mm)	22.5	27.5	37.5
L(nH) ≈	18	18	22

Dissipation factor (DF): tgδx10^{-4} at +25°C ±5°C:

KhZ	C≤1µF	C>1µF
1	≤100	≤100
10	≤150	-

Insulation resistance:

Test conditions

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

Performance

≥30000 MΩ for C ≤0.33µF (50000 MΩ)*
≥10000 s for C >0.33µF (17000 s)*
*Typical value

Test voltage between terminations:
2200 Vdc for 2 s at +25°C±5°C

Table 1

Standard packaging style	Lead length (mm)	Taping style P_2 (mm)	Taping style Fig. (No.)	Taping style Pitch (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		19.05	2	22.5	DQ
REEL Ø 500mm		19.05	2	22.5/27.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads	$25^{-1/+2}$				50
Loose, long leads	30^{+5}				40

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

R60 3

MKT Series for 300 Vac

METALLIZED POLYESTER FILM CAPACITOR DESIGNED FOR A.C. APPLICATIONS

Rated Cap.	300Vac / 560Vdc Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.15 µF	7.0	16.0	26.5	22.5	200	120 E3	R603N 3150--0--
0.18 µF	7.0	16.0	26.5	22.5	200	120 E3	R603N 3180--0--
0.22 µF	7.0	16.0	26.5	22.5	200	120 E3	R603N 3220--0--
0.27 µF	8.5	17.0	26.5	22.5	200	120 E3	R603N 3270--0--
0.33 µF	10.0	18.5	26.5	22.5	200	120 E3	R603N 3330--0--
0.39 µF	10.0	18.5	26.5	22.5	200	120 E3	R603N 3390--0--
0.47 µF	11.0	20.0	26.5	22.5	200	120 E3	R603N 3470--0--
0.56 µF	11.0	20.0	26.5	22.5	200	120 E3	R603N 3560--0--
0.68 µF	13.0	22.0	26.5	22.5	200	120 E3	R603N 3680--0--
0.47 µF	9.0	17.0	32.0	27.5	150	90 E3	R603R 3470--0--
0.56 µF	11.0	20.0	32.0	27.5	150	90 E3	R603R 3560--0--
0.68 µF	11.0	20.0	32.0	27.5	150	90 E3	R603R 3680--0--
0.82 µF	11.0	20.0	32.0	27.5	150	90 E3	R603R 3820--0--
1.0 µF	13.0	22.0	32.0	27.5	150	90 E3	R603R 4100--0--
1.2 µF	13.0	22.0	32.0	27.5	150	90 E3	R603R 4120--0--
1.5 µF	14.0	28.0	32.0	27.5	150	90 E3	R603R 4150--0--
1.8 µF	14.0	28.0	32.0	27.5	150	90 E3	R603R 4180--0--
2.2 µF	18.0	33.0	32.0	27.5	150	90 E3	R603R 4220--0--
2.7 µF	18.0	33.0	32.0	27.5	150	90 E3	R603R 4270--0--
3.3 µF	22.0	37.0	32.0	27.5	150	90 E3	R603R 4330--0--
1.0 µF	11.0	22.0	41.5	37.5	100	60 E3	R603W 4100--0--
1.2 µF	13.0	24.0	41.5	37.5	100	60 E3	R603W 4120--0--
1.5 µF	16.0	28.5	41.5	37.5	100	60 E3	R603W 4150--0--
1.8 µF	16.0	28.5	41.5	37.5	100	60 E3	R603W 4180--0--
2.2 µF	19.0	32.0	41.5	37.5	100	60 E3	R603W 4220--0--
2.7 µF	19.0	32.0	41.5	37.5	100	60 E3	R603W 4270--0--
3.3 µF	20.0	40.0	41.5	37.5	100	60 E3	R603W 4330--0--
3.9 µF	20.0	40.0	41.5	37.5	100	60 E3	R603W 4390--0--
4.7 µF	24.0	44.0	41.5	37.5	100	60 E3	R603W 4470--0--
5.6 µF	24.0	44.0	41.5	37.5	100	60 E3	R603W 4560--0--
6.8 µF	30.0	45.0	41.5	37.5	100	60 E3	R603W 4680--0--

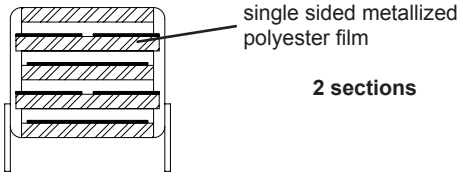
Mechanical version and packaging
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm

E12 series available upon request.

Appropriate for permanent operation at nominal voltage (means 300 Vac at rated temperature 85°C).

Winding scheme



2 sections

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions 1st

Temperature:	+40°C±2°C
Voltage:	300 Vac (V_R)
Relative humidity (RH):	93% ±2%
Test duration:	56 days

Test conditions 2nd

Temperature:	+70°C±2°C
Voltage:	300 Vac (V_T)
Relative humidity (RH):	93% ±2%
Test duration:	7 days

Performance

Capacitance change |ΔC/C|:	≤5%
DF change (Δtgδ):	≤50x10^{-4} at 1kHz
Insulation resistance:	≥50% of initial limit.

Endurance:

Test conditions

Temperature:	+105°C±2°C
Test duration:	1000 h
Voltage applied:	1.25xV_R (375 Vac)

Performance

Capacitance change |ΔC/C|:	≤10%
DF change (Δtgδ):	≤30x10^{-4} at 1kHz
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%
DF change (Δtgδ):	≤30x10^{-4} at 1kHz
Insulation resistance:	≥ initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page12)

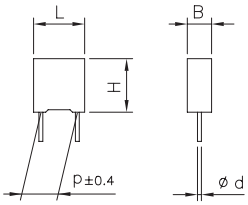
Performance:

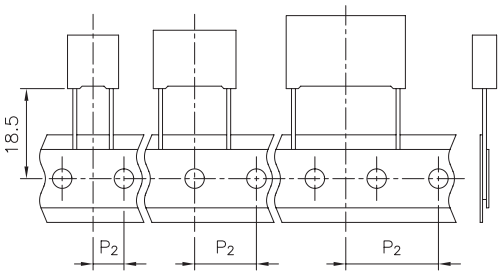
Capacitance chenge |ΔC/C|:	≤2%

R75 2 - R75 L

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR





Ød±0.05	15≤p≤27.5	p = 37.5
	0.8	1.0

All dimensions are in mm.

Typical applications: This special release is specifically designed for application in series with the main (Capacitive power supply), with particular protection against severe ambient conditions.

BEST FITTING COMPONENTS IN TERMS OF BOTH SIZE & PERFORMANCES

PRODUCT CODE: **R752 (Digit 12: 0 to 9)**
R75L Digit 12: 0 to 9)

Pitch	Box thickness	Maximum dimensions (mm)		
(mm)	(mm)	B max	H max	L max
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

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	7	5										-	

Digit 1 to 3 Series code.

Digit 4 a.c. rated voltage:
2 = 230V L = 250V

Digit 5 Pitch:
I=15mm; N= 22.5 mm;
R=27.5mm; W=37.5mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table 1)

Digit 12 Identifies the dimensions and electrical characteristics (0 to 9).

Digit 13 Internal use.

Digit 14 Capacitance tolerance: K=10%; M=20%
Tolerance ± 5% (J) available upon request

GENERAL TECHNICAL DATA

Dielectric: polypropylene film.

Plates: aluminium 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 (R75), dielectric code (MKP), capacitance, tolerance, A.C. rated voltage, manufacturing date code.

Climatic category: 55/105/56 IEC 60068-1

Operating temperature range: -55 to +105°C

Related documents: IEC 60384-16

Winding scheme

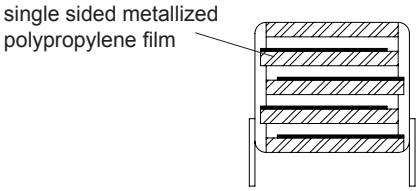


Table 1

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	2	15.0	DQ
AMMO-PACK		19.05	3	22.5	DQ
REEL Ø 355mm		12.70	2	15.0	GY
REEL Ø 500mm		12.70	2	15.0	CK
REEL Ø 500mm		19.05	3	22.5/27.5	CK
Loose, short leads	4^{+2}				AA
Loose, long leads (p≥15mm)	30^{+5} $25^{+2/-1}$				40 50

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

R75 2 - R75 L

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

PRODUCT CODE: **R752 (Digit 12: 0 to 9)**
R75L (Digit 12: 0 to 9)

Rated Cap.	230Vac / 400Vdc* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.033 µF	4.0	9.0	13.0	10.0	1000	800 E3	R752F 2330--0--
0.100 µF	6.0	12.0	13.0	10.0	1000	800 E3	R752F 3100--0--
0.082 µF	5.0	11.0	18.0	15.0	700	560 E3	R752I 2820--0--
0.10 µF	5.0	11.0	18.0	15.0	700	560 E3	R752I 3100--0--
0.15 µF	6.0	12.0	18.0	15.0	700	560 E3	R752I 3150--0--
0.18 µF	6.0	12.0	18.0	15.0	700	560 E3	R752I 3180--0--
0.22 µF	7.5	13.5	18.0	15.0	700	560 E3	R752I 3220--0--
0.27 µF	8.5	14.5	18.0	15.0	700	560 E3	R752I 3270--0--
0.33 µF	8.5	14.5	18.0	15.0	700	560 E3	R752I 3330--0--
0.47 µF	10.0	16.0	18.0	15.0	700	560 E3	R752I 3470--0--
0.27 µF	6.0	15.0	26.5	22.5	250	200 E3	R752N 3270--0--
0.33 µF	6.0	15.0	26.5	22.5	250	200 E3	R752N 3330--0--
0.47 µF	7.0	16.0	26.5	22.5	250	200 E3	R752N 3470--0--
0.56 µF	8.5	17.0	26.5	22.5	250	200 E3	R752N 3560--0--
0.68 µF	10.0	18.5	26.5	22.5	250	200 E3	R752N 3680--0--
0.82 µF	10.0	18.5	26.5	22.5	250	200 E3	R752N 3820--0--
1.0 µF	11.0	20.0	26.5	22.5	250	200 E3	R752N 4100--0--
1.5 µF	13.0	22.0	26.5	22.5	250	200 E3	R752N 4150--0--
0.47 µF	9.0	17.0	32.0	27.5	130	104 E3	R752R 3470--0--
0.56 µF	9.0	17.0	32.0	27.5	130	104 E3	R752R 3560--0--
0.68 µF	9.0	17.0	32.0	27.5	130	104 E3	R752R 3680--0--
0.82 µF	9.0	17.0	32.0	27.5	130	104 E3	R752R 3820--0--
1.0 µF	11.0	20.0	32.0	27.5	130	104 E3	R752R 4100--0--
1.2 µF	11.0	20.0	32.0	27.5	130	104 E3	R752R 4120--0--
1.5 µF	13.0	22.0	32.0	27.5	130	104 E3	R752R 4150--0--
1.8 µF	13.0	22.0	32.0	27.5	130	104 E3	R752R 4180--0--
2.2 µF	14.0	28.0	32.0	27.5	130	104 E3	R752R 4220--0--
2.7 µF	18.0	33.0	32.0	27.5	130	104 E3	R752R 4270--0--
3.3 µF	18.0	33.0	32.0	27.5	130	104 E3	R752R 4330--0--
3.9 µF	18.0	33.0	32.0	27.5	130	104 E3	R752R 4390--0--
4.7 µF	22.0	37.0	32.0	27.5	130	104 E3	R752R 4470--0--
1.8 µF	11.0	22.0	41.5	37.5	70	56 E3	R752W 4180--0--
2.2 µF	13.0	24.0	41.5	37.5	70	56 E3	R752W 4220--0--
2.7 µF	13.0	24.0	41.5	37.5	70	56 E3	R752W 4270--0--
3.3 µF	16.0	28.5	41.5	37.5	70	56 E3	R752W 4330--0--
3.9 µF	16.0	28.5	41.5	37.5	70	56 E3	R752W 4390--0--
4.7 µF	19.0	32.0	41.5	37.5	70	56 E3	R752W 4470--0--
5.6 µF	19.0	32.0	41.5	37.5	70	56 E3	R752W 4560--0--
6.8 µF	20.0	40.0	41.5	37.5	70	56 E3	R752W 4680--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: K (±10%); M (±20%)

All dimensions are in mm

Rated Cap.	250Vac / 560Vdc* Std dimensions				Max dv/dt	Max K_0	Part Number
	B	H	L	p	(V/µs)	(V^2/µs)	
0.010 µF	4.0	9.0	13.0	10.0	1500	168 E4	R75LF 2100--0--
0.015 µF	4.0	9.0	13.0	10.0	1500	168 E4	R75LF 2150--0--
0.022 µF	4.0	9.0	13.0	10.0	1500	168 E4	R75LF 2220--0--
0.033 µF	5.0	11.0	13.0	10.0	1500	168 E4	R75LF 2330--0--
0.047 µF	5.0	11.0	13.0	10.0	1500	168 E4	R75LF 2470--0--
0.068 µF	6.0	12.0	13.0	10.0	1500	168 E4	R75LF 2680--0--
0.056 µF	5.0	11.0	18.0	15.0	900	101 E4	R75LI 2560--0--
0.068 µF	5.0	11.0	18.0	15.0	900	101 E4	R75LI 2680--0--
0.082 µF	5.0	11.0	18.0	15.0	900	101 E4	R75LI 2820--0--
0.10 µF	6.0	12.0	18.0	15.0	900	101 E4	R75LI 3100--0--
0.15 µF	7.5	13.5	18.0	15.0	900	101 E4	R75LI 3150--0--
0.18 µF	7.5	13.5	18.0	15.0	900	101 E4	R75LI 3180--0--
0.22 µF	8.5	14.5	18.0	15.0	900	101 E4	R75LI 3220--0--
0.27 µF	10.0	16.0	18.0	15.0	900	101 E4	R75LI 3270--0--
0.33 µF	10.0	16.0	18.0	15.0	900	101 E4	R75LI 3330--0--
0.22 µF	6.0	15.0	26.5	22.5	300	336 E3	R75LN 3220--0--
0.27 µF	6.0	15.0	26.5	22.5	300	336 E3	R75LN 3270--0--
0.33 µF	7.0	16.0	26.5	22.5	300	336 E3	R75LN 3330--0--
0.47 µF	8.5	17.0	26.5	22.5	300	336 E3	R75LN 3470--0--
0.56 µF	10.0	18.5	26.5	22.5	300	336 E3	R75LN 3560--0--
0.68 µF	11.0	20.0	26.5	22.5	300	336 E3	R75LN 3680--0--
0.82 µF	11.0	20.0	26.5	22.5	300	336 E3	R75LN 3820--0--
1.0 µF	13.0	22.0	26.5	22.5	300	336 E3	R75LN 4100--0--
0.33 µF	9.0	17.0	32.0	27.5	150	168 E3	R75LR 3330--0--
0.39 µF	9.0	17.0	32.0	27.5	150	168 E3	R75LR 3390--0--
0.47 µF	9.0	17.0	32.0	27.5	150	168 E3	R75LR 3470--0--
0.56 µF	9.0	17.0	32.0	27.5	150	168 E3	R75LR 3560--0--
0.68 µF	11.0	20.0	32.0	27.5	150	168 E3	R75LR 3680--0--
0.82 µF	11.0	20.0	32.0	27.5	150	168 E3	R75LR 3820--0--
1.0 µF	13.0	22.0	32.0	27.5	150	168 E3	R75LR 4100--0--
1.2 µF	13.0	22.0	32.0	27.5	150	168 E3	R75LR 4120--0--
1.5 µF	13.0	25.0	32.0	27.5	150	168 E3	R75LR 4150--0--
1.8 µF	18.0	33.0	32.0	27.5	150	168 E3	R75LR 4180--0--
2.2 µF	18.0	33.0	32.0	27.5	150	168 E3	R75LR 4220--0--
2.7 µF	18.0	33.0	32.0	27.5	150	168 E3	R75LR 4270--0--
3.3 µF	22.0	37.0	32.0	27.5	150	168 E3	R75LR 4330--0--
3.9 µF	22.0	37.0	32.0	27.5	150	168 E3	R75LR 4390--0--
1.2 µF	11.0	22.0	41.5	37.5	90	101 E3	R75LW 4120--0--
1.5 µF	13.0	24.0	41.5	37.5	90	101 E3	R75LW 4150--0--
1.8 µF	13.0	24.0	41.5	37.5	90	101 E3	R75LW 4180--0--
2.2 µF	16.0	28.5	41.5	37.5	90	101 E3	R75LW 4220--0--
2.7 µF	16.0	28.5	41.5	37.5	90	101 E3	R75LW 4270--0--
3.3 µF	19.0	32.0	41.5	37.5	90	101 E3	R75LW 4330--0--
3.9 µF	19.0	32.0	41.5	37.5	90	101 E3	R75LW 4390--0--
4.7 µF	20.0	40.0	41.5	37.5	90	101 E3	R75LW 4470--0--
5.6 µF	20.0	40.0	41.5	37.5	90	101 E3	R75LW 4560--0--
6.8 µF	24.0	44.0	41.5	37.5	90	101 E3	R75LW 4680--0--
8.2 µF	24.0	44.0	41.5	37.5	90	101 E3	R75LW 4820--0--
10.0 µF	30.0	45.0	41.5	37.5	90	101 E3	R75LW 5100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: K (±10%); M (±20%)

E12 Series available upon request

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table. The dv/dt test is carried out at 2 times the above values.

*Not suitable for EMI filtering applications.

R75 2 - R75 L

MKP Series

METALLIZED POLYPROPYLENE FILM CAPACITOR

PRODUCT CODE: **R752 (Digit 12: 0 to 9)**
R75L (Digit 12: 0 to 9)

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R): 230Vac (400Vdc) - 250Vac (560Vdc)
Rated temperature (T_R):+85°C

Temperature derated voltage:
The following decreasing factor has to be applied on the rated voltage:
+85°C to +105°C: 2.00% per °C for V_R (d.c.)
+85°C to +105°C: 0.5% per °C for V_R (a.c.)

Capacitance range: 0.056 µF to 10 µF.
Capacitance values:
E12 series (IEC 60063 Norm).

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

Total self-inductance (L)**:** (Lead length ~2 mm)

Pitch (mm)	15	22.5	27.5	37.5
L (nH) ≈	10	18	18	20

Dissipation factor (DF):
tgδx10^{-4} at +25°C±5°C

kHz	C≤0.1µF	0.1<C≤1.0µF	1<C≤3.3µF	3.3<C≤10µF
1	≤ 4	≤5	≤6	≤10
10	≤ 6	≤8		
100	≤25			

Insulation resistance:

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

Performance
≥1x10^5 MΩ for C≤0.33µF (5x10^5 MΩ)*
≥30000 s for C >0.33µF (150000 s)*
* Typical value.

Test voltage between terminations:

1.6xV_R applied for 2 s at +25°C±5°C

Surge test:

1500 Vpk (10 pulses) for 230Vac

1700 Vpk (10 pulses) for 250Vac

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

Performance
Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤10x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Test conditions 2nd
Temperature: +40°C±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days
Voltage applied: V_R

Performance
Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤10x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Test conditions 3rd
Temperature: +85°C±2°C
Relative humidity (RH): 85% ±2%
Test duration: 250 h
Voltage applied: V_R

Performance
Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤10x10^{-4} at 1kHz
Insulation resistance: ≥50% of initial limit.

Endurance:

Test conditions
Temperature: +85°C±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_R

Performance
Capacitance change |ΔC/C|: ≤5%
DF change (Δtgδ): ≤10x10^{-4} at 10kHz for C≤1µF
≤10x10^{-4} at 1kHz for C>1µF
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|: ≤1%
DF change (Δtgδ): ≤10x10^{-4} at 10kHz for C≤1µF
≤10x10^{-4} at 1kHz for C>1µF
Insulation resistance: ≥initial limit.

Long term stability (after two years)**:**

Storage: standard environmental conditions (see page 12 of DC film capacitors catalogue)

Performance
Capacitance change |ΔC/C|: ≤0.5%