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WIMA PROCESS CONTROL SYSTEM



SHIP-TO-STOCK DELIVERIES

Film Capacitors for Electronic Equipment

Edition 2019



Content

SMD Plastic Film Capacitors Size Codes 1812 to 6054	Polyester film, metallized Polyethylene-naphthalate film, metallized Polyphenylene-sulphide film, metallized	WIMA SMD-PET WIMA SMD-PEN WIMA SMD-PPS	17 20 23
Subminiature Capacitors PCM 2.5 mm	Polypropylene film, film/foil Polyester film, metallized	WIMA FKP 02 WIMA MKS 02	27 29
Film/Foil Capacitors PCM 5 mm	Polyester film, film/foil Polypropylene film, film/foil	WIMA FKS 2 WIMA FKP 2	32 34
Film/Foil Capacitors PCM 7.5 to 15 mm	Polyester film, film/foil Polypropylene film, film/foil	WIMA FKS 3 WIMA FKP 3	37 40
Metallized Capacitors PCM 5 mm	Polyester film, metallized Polypropylene film, metallized	WIMA MKS 2 WIMA MKP 2	44 47
Metallized Capacitors PCM 7.5 to 52.5 mm	Polyester film, metallized Polypropylene film, metallized Polypropylene film, metallized	WIMA MKS 4 WIMA MKP 4C WIMA MKP 4	50 56 59
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GTO Capacitors	Polypropylene film, double-sided metallized electrode	WIMA GTO MKP	115
DC-LINK Capacitors	Polypropylene film, metallized Polypropylene film, metallized Polypropylene film, metallized Polypropylene film, metallized Polypropylene film, metallized Polypropylene film, metallized Polypropylene film, metallized	WIMA DC-LINK MKP 3 WIMA DC-LINK MKP 4 WIMA DC-LINK MKP 4S WIMA DC-LINK MKP 5 WIMA DC-LINK MKP 6 WIMA DC-LINK HC WIMA DC-LINK HY	120 122 128 132 134 140 142
PowerBlock	Double-Layer capacitor (SuperCap) modules	WIMA PowerBlock	144
General Information	Explanation of important terminology Construction principles of WIMA film and paper capacitors Typical characteristics and graphs of the plastic film dielectric used Technical data and advantages of WIMA capacitors Selection of WIMA capacitors for pulse applications Recommendation for processing and application of WIMA capacitors WIMA quality and environmental philosophy WIMA part number system Types of packaging and packing units for WIMA capacitors WIMA representations		3 4 5 9 11 13 15 147 148 153

General Information

Explanation of Important Terminology

Nominal Capacitance

The nominal capacitance of a capacitor is usually given in pF, nF or μ F.

Operating/Rated Voltage

Each capacitor is designed for a specified rated voltage in continuous operation. This is usually only valid for ambient temperatures of $T \leq +85^\circ\text{C}$. In the case of higher temperatures a derating factor must be applied to the rated voltage from 85°C .

Insulation Resistance/Time Constant

The insulation resistance is normally expressed in megohms ($M\Omega$) and is measured at a specified voltage after 1 minute. The time constant defines the time in seconds, in which the voltage across the capacitor self-discharges to 37% of the fully charged state and it is expressed as $\tau = R_{is} \times C$.

The insulation resistance or time constant value denotes the quality of the dielectric insulation.

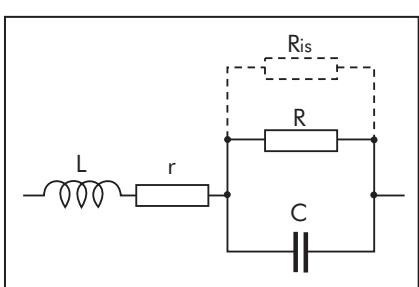
Dissipation Factor

The dissipation factor $\tan \delta$ is the quotient of the resistive and reactive parts of the impedance.

The dielectric losses are illustrated by R in the equivalent circuit diagram.

The insulation resistance R_{is} is in parallel with R , and affects the $\tan \delta$ only at very low frequencies.

The dissipation factor is also affected by the resistance of both electrodes and of the termination – electrode interface. This is represented by the series resistance r . L represents the remaining self-inductance.



Capacitance Tolerance

The tolerance is the permissible actual capacitance relative to the nominal capacitance and it is defined in per cent. The tolerance is to be measured at $+20^\circ\text{C}$ and the permissible tolerance is only valid at the time of shipment.

The capacitance may change after long storage or long usage.

The tolerance, with the exception of $\pm 20\%$, is usually marked on the capacitor body in clear digits.

Temperature Coefficient of Capacitance

The temperature coefficient α expresses the change in capacitance with temperature, relative to the capacitance at the reference temperature of $+20^\circ\text{C}$; it is usually expressed in ppm per $^\circ\text{C}$.

$$C_T = C_{20} \times [1 + \alpha \times (T - 20^\circ\text{C})]$$

C_{20} = capacitance at $+20^\circ\text{C}$

C_T = capacitance at T

α = may be positive or negative.

Pulse Stressing

The ratings on pulse rise time are based on tests in accordance with DIN-IEC 60384 part 1.

The test voltage corresponds to the rated voltage and the test comprises 10000 pulses with a repetition frequency of 1 Hz. The catalogue ratings are in accordance with the CECC specifications which specify that the test pulse rise time shall be 10 times the catalogue rating.

It should also be noted that the pulse rise time (t_{ris}) i.e. $\text{V}/\mu\text{sec}$ also provides the maximum current capability, as it can be determined from the following formula.

$$I = F \times C \times 1.6$$

C in μF / I in amps.

The information on the pulse rise time refers to pulses equal to the rated voltage so that, at lower operating voltages, the permissible pulse rise times may be increased.

Warning Notice/Technical Support

AC voltage load at the mains

Anticipating possible interfering pulses, DC

voltage capacitors must not be operated at the mains (power line), irrespective of the rated AC voltage. For this purpose, use approved interference suppression capacitors only.

Thermal load in the application

If a plastic film capacitor is overstressed due to inappropriate usage under AC voltage conditions, the temperature inside the component may rise to an impermissibly high level. Thus, the dielectric film may subsequently be damaged leading to a short circuit or formation of smoke and even fire in the capacitor.

This may also happen if the capacitor is overheated by an external heat source.

Shock and/or vibration load for larger case sizes

For increased shock and vibration applications involving larger case sizes (i.e., PCM 22.5 mm pin spacing or greater), it is recommended to fix capacitors in an appropriate way; or special pin and plate terminations may be required respectively to minimize lead separation from the capacitor element or the solder joint.

Processing

When processing plastic film capacitors it is mandatory to observe the application recommendations with regard to soldering and/or cleaning and drying processes.

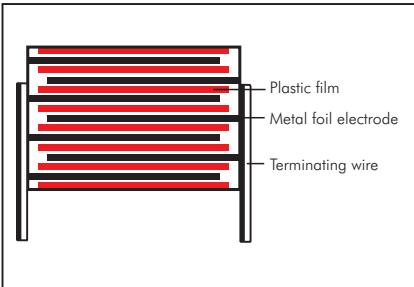
General remarks

All catalogue data, range surveys and application data correspond to the actual state of the art and were elaborated as thoroughly and precisely as possible. They are to be understood as general information, and the right for amendments and construction changes is reserved. Special customized designs which deviate from our catalogue data, irrespective of whether being based on factory standards, specifications or related data, do not release the user from his duty of care with regard to incoming goods inspection and production monitoring. In case of the components being purchased through second or third suppliers we urgently ask to compare the technical details with the data given by the manufacturer. In cases of doubt we recommend use is made of our technical support, since we do not take any responsibility for damages caused by inappropriate use or processing of our capacitors.

Construction Principles of WIMA Capacitors



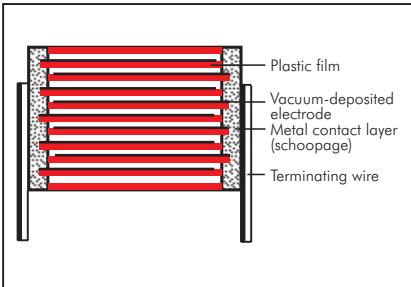
Film and Foil Construction



WIMA Types:

FKP 02	FKS 2	FKP 2
FKS 3	FKP 3	

Metalized Construction



WIMA Types:

SMD-PET	SMD-PEN	SMD-PPS
MKS 4	MKP 4C	MKP 4
MP 3-Y2	DC-LINK MKP 3	DC-LINK MKP 4
DC-LINK HC	DC-LINK HY	

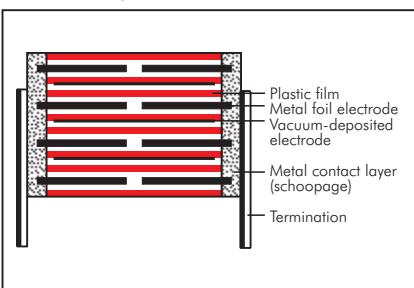
Advantages of Film/Foil Construction:

- High pulse and current rating
 - High insulation resistance
 - Close tolerances up to $\pm 1\%$
- Disadvantages: short circuit at end of life

Advantages of Metallized Construction:

- High capacitances in small box sizes
 - Excellent self-healing ability
 - Very good price/performance ratio
- Disadvantage: low pulse resistance

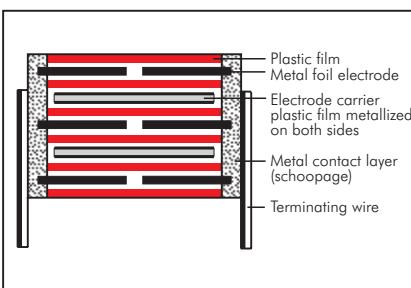
Film and Foil Construction with Internal Series Connection and Self-Healing, Metallized Plastic Film



WIMA Types:

Snubber FKP

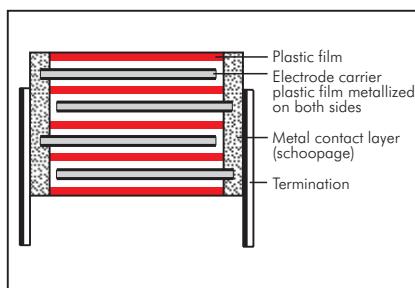
Film and Foil Construction with Internal Series Connection and Self-Healing Plastic Film Metallized on Both Sides



WIMA Types:

FKP 1

Pulse Duty Construction with Self-Healing Plastic Film Metallized on Both Sides

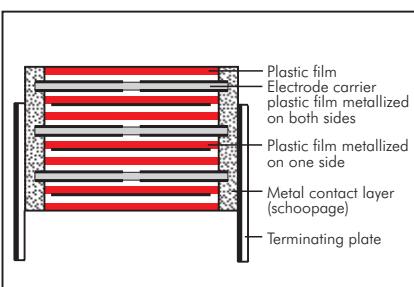


WIMA Types:

MKP 10*	GTO MKP*
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*up to 250 VAC *up to 250 VAC

Pulse Duty Construction with Internal Series Connection and Self-Healing Plastic Film Metallized on Both Sides



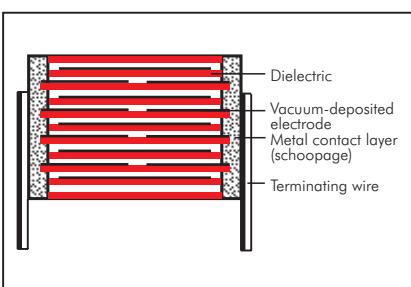
WIMA Types:

MKP 10*	Snubber MKP	GTO MKP*
----------------	--------------------	-----------------

*400 to 700 VAC

*from 400 VAC

Metalized Construction with Internal Series Connection



WIMA Types:

MKS 4*	MKP 4*	MKP 4F
---------------	---------------	---------------

*400 VAC

*400 VAC

MKP-X1 R	MKP-Y2	MP 3R-Y2
-----------------	---------------	-----------------

Typical Characteristics and Graphs of the Polyester (PET) Film



Polyester Film and Foil Types

FKS 2

FKS 3

Metallized Polyester Types

SMD-PET

MKS 02

MKS 2

MKS 4

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Film Properties

Dielectric constant

at 1 kHz and +23° C:

3.3 positive as temperature rise

Specific volume resistance

in $\Omega \text{ cm}$ at +23° C:

10^{18}

Dielectric strength (DC voltage)

in $\text{V}/\mu\text{m}$ at +23° C:

580

Preferred temperature range

in °C:

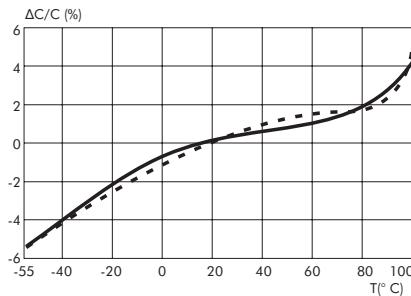
-55 to +100

Dielectric absorption

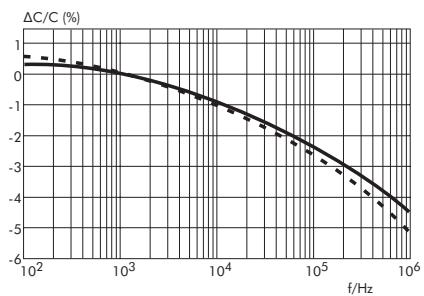
in % at + 23° C:

0.20 to 0.25

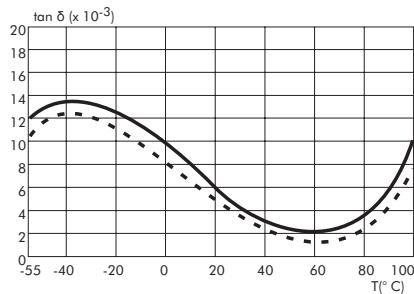
Typical Graphs



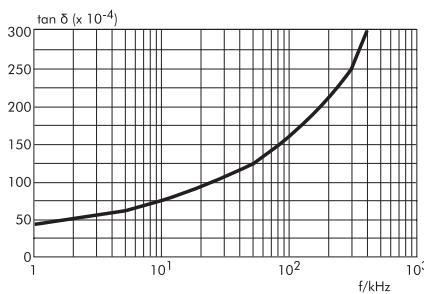
Capacitance change versus temperature
(f=1 kHz) (general guide)



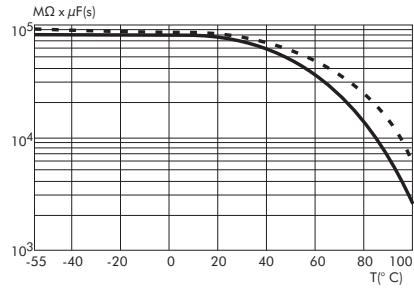
Capacitance change versus frequency
(general guide)



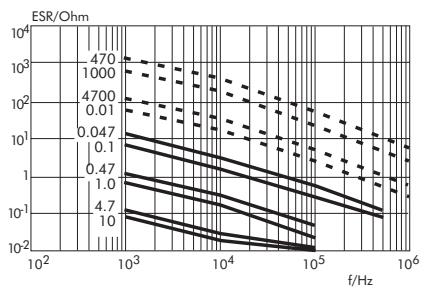
Dissipation factor change versus
temperature (f=1 kHz) (general guide)



Dissipation factor change versus frequency.
Example: MKS 4, 0.1 $\mu\text{F}/400\text{ VDC}$
(general guide)



Insulation resistance change versus
temperature (general guide)



ESR change versus frequency
(general guide)

The broken lines show the film and foil types.

The full lines characterize the metallized versions.



Typical Characteristics and Graphs of the Polypropylene (PP) Film

Polypropylene Film and Foil Types

FKP 02	FKP 2	FKP 3	FKP 1	Snubber FKP
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Metallized Polypropylene Types

MKP 2	MKP 4C	MKP 4	MKP 10	MKP-X2	MKP-X1 R
MKP-Y2	MKP 4F	Snubber MKP	GTO MKP	DC-LINK MKP 3	DC-LINK MKP 4
DC-LINK MKP 4S	DC-LINK MKP 5	DC-LINK MKP 6	DC-LINK HC	DC-LINK HY	

Typical Applications

For high frequency and high pulse applications e.g.

- Sample and hold
- Timing
- LC-Filtering
- Oscillating circuits
- Audio equipment
- High frequency coupling and decoupling
- TV and monitor sets
- Lighting
- Power electronics

Film Properties

Dielectric constant

at 1 kHz and +23° C:

2.2 negative as temperature rise

Specific volume resistance

in $\Omega \text{ cm}$ at +23° C:

6×10^{18}

Dielectric strength (DC voltage)

in $V/\mu\text{m}$ at +23° C:

650

Preferred temperature range

in °C:

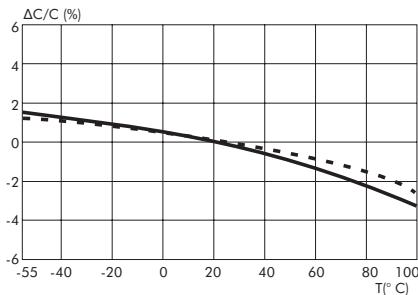
-55 to +100

Dielectric absorption

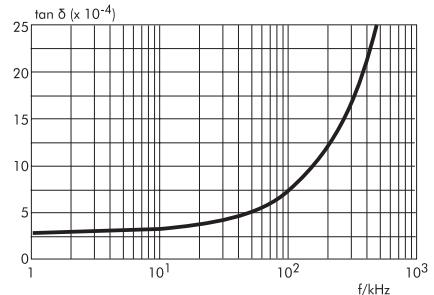
in % at + 23° C:

0.05 to 0.10

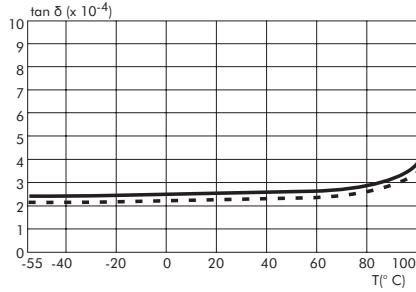
Typical Graphs



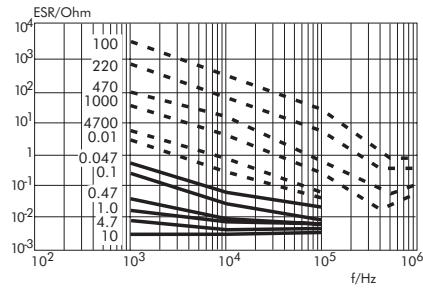
Capacitance change versus temperature
(f=1 kHz) (general guide)



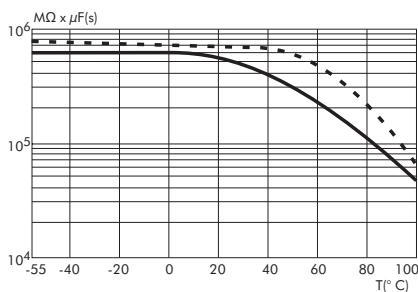
Dissipation factor change versus frequency.
Example: MKP 10, 0.01 $\mu\text{F}/400\text{ VDC}$
(general guide)



Dissipation factor change versus
temperature (f=1 kHz) (general guide)



ESR change versus frequency
(general guide)



Insulation resistance change versus
temperature (general guide)

The broken lines show the film and foil types.

The full lines characterize the metallized versions.

Typical Characteristics and Graphs of the Polyethylene-Naphthalate (PEN) Film



Metallized Polyethylene-Naphthalate Type

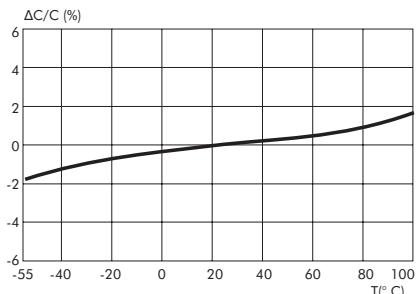
SMD-PEN

Typical Applications

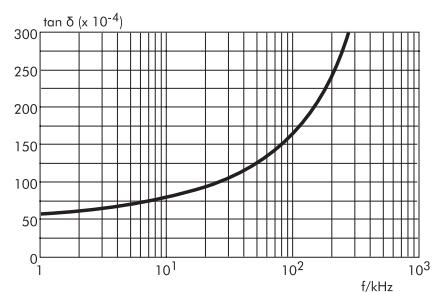
For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Typical Graphs



Capacitance change versus temperature
(f=1 kHz) (general guide)



Dissipation factor change versus frequency.
Example: SMD-PEN, 0.1 μF/250 VDC
(general guide)

Film Properties

Dielectric constant

at 1 kHz and +23° C:

3.0 positive as temperature rise

Specific volume resistance

in Ω cm at +23° C:

10¹⁸

Dielectric strength (DC voltage)

in V/μm at +23° C:

580

Preferred temperature range

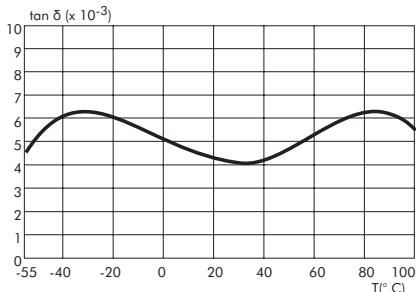
in °C:

-55 to +125

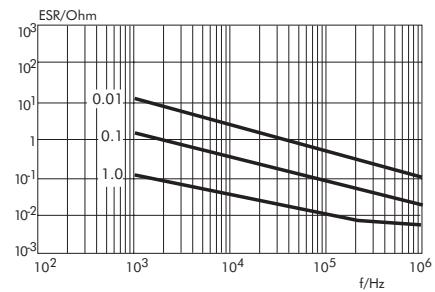
Dielectric absorption

in % at + 23° C:

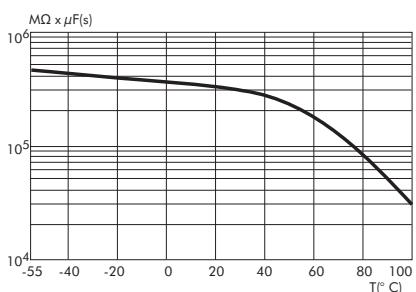
1.0



Dissipation factor change versus
temperature (f=1 kHz) (general guide)



ESR change versus frequency
(general guide)



Insulation resistance change versus
temperature (general guide)

Typical Characteristics and Graphs of the Polyphenylene-Sulphide (PPS) Film



Metallized Polyphenylene-Sulphide Type

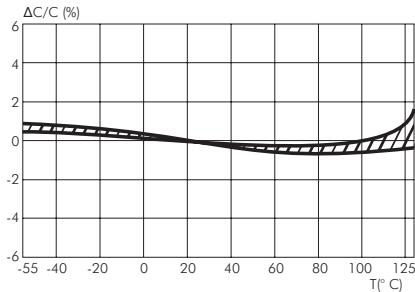
SMD-PPS

Typical Applications

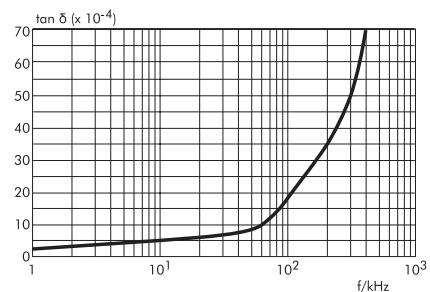
For general applications in high frequency and high temperature circuits e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing
- Filtering
- Oscillating circuits
- TV and monitor sets
- Lighting
- Automotive electronics

Typical Graphs



Capacitance change versus temperature
(f=1 kHz) (general guide)



Dissipation factor change versus frequency.
Example: SMD-PPS, 0.1 µF/63 VDC
(general guide)

Film Properties

Dielectric constant

at 1 kHz and +23° C:

3.0 very constant versus temperature

Specific volume resistance

in Ω cm at +23° C:

5×10^{17}

Dielectric strength (DC voltage)

in V/µm at +23° C:

470

Preferred temperature range

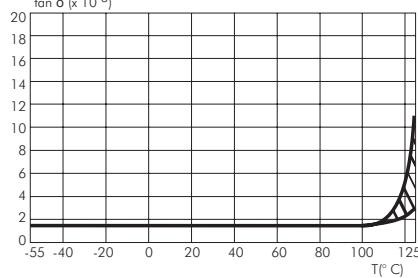
in °C:

-55 to +140

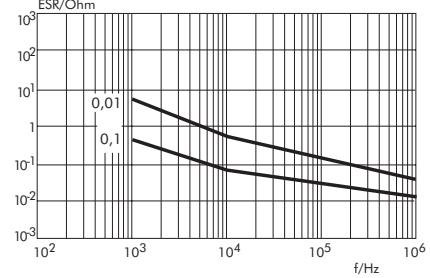
Dielectric absorption

in % at + 23° C:

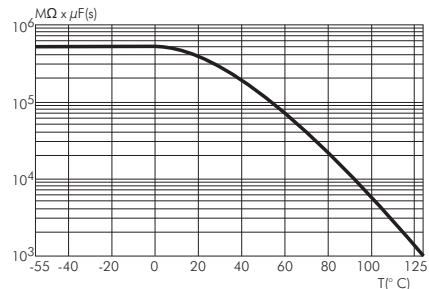
0.05 to 0.10



Dissipation factor change versus
temperature (f=1 kHz) (general guide)



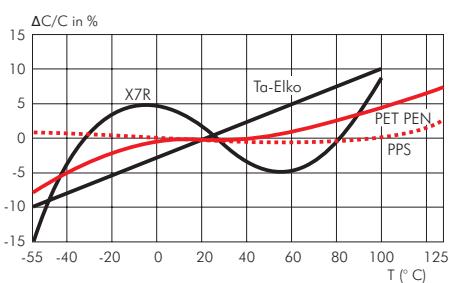
ESR change versus frequency
(general guide)



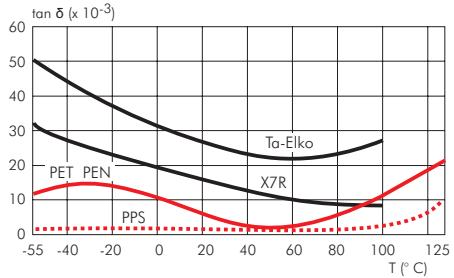
Insulation resistance change versus
temperature (general guide)

Characteristics of Metallized Film Capacitors in Comparison with Other Dielectrics

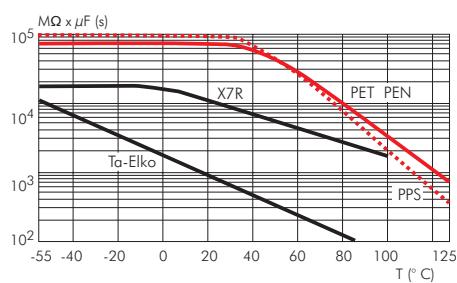
	PET	PP	PEN	PPS	NPO	X7R	Tantalum
Dielectric constant 1 kHz/23° C	3.3 positive as temperature rise	2.2 negative as temperature rise	3.0 positive as temperature rise	3.0 very constant versus temperature	12 ... 40	700...2000	26
Operating temp. (° C)	-55...+100	-55...+100	-55...+125	-55...+140	-55...+125	-55...+125	-55...+125
Dielectric absorption (%)	0.2 ... 0.25	0.05 ... 0.10	1.0	0.05	0.6	2.5	n. a.
ΔC/C versus temperature (%)	±5	±2.5	±5	±1.5	±0.3	±15	±10
ΔC/C versus voltage (%)	negligible	negligible	negligible	negligible	negligible	-20	negligible
ΔC aging rate (%/h decreasing)	negligible	negligible	negligible	negligible	negligible	2	n. a.
Dissipation factor (%) 1 kHz	0.8	0.05	0.8	0.2	0.10	2.5	8
10 kHz	1.5	0.08	1.5	0.25	0.10		
100 kHz	3.0	0.25	3.0	0.5	0.10		
ESR	low	very low	low	very low	low	moderate	high
Ris (MΩ x μF)							
25° C	10 000	100 000	10 000	10 000	10 000	1 000	100
85° C	1 000	10 000	1 000	1 000	1 000	500	10
Capacitance range from pF to μF	1 000 ... 680	27 ... 400	10 000 ... 1.0	10 000 ... 2.2	1... 0.1	100 ... 2.2	100 000 ... 1 000
Capacitance tolerance (±%)	5/10/20	1/2.5/5/10/20	5/10/20	2.5/5/10/20	5/10	10/20	10/20
Self-healing	yes	yes	yes	yes	no	no	no
Typical failure mode at end of life	open	open	open	open	short	short	short
Reliability	high	high	high	high	high	moderate	low
Piezoelectric effect	no	no	no	no	yes	yes	yes
Resistance to thermal and mechanical shock	high	high	high	high	moderate to low	moderate to low	high
Polarity	no	no	no	no	no	no	yes



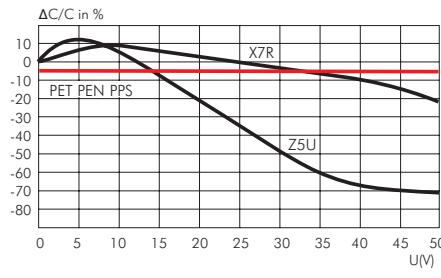
Capacitance
change versus
temperature
(f=1 kHz)
(general guide)



Dissipation
factor change
versus
temperature
(f=1 kHz)
(general guide)



Insulation
resistance
change versus
temperature
(general guide)



Capacitance chan-
ge versus voltage
(general guide)

Technical Data and Advantages of the Film Capacitors

Reliability

The failure rate in fit ($10^{-9}/\text{h}$) for plastic film capacitors is shown in the formula:

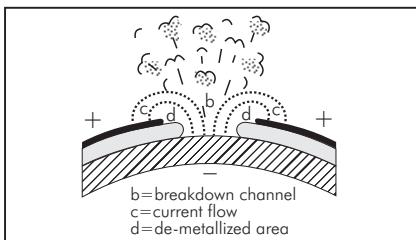
$$\lambda = \lambda_0 \times \Pi_T \times \Pi_V$$

λ_0 = expected value
 Π_T = temperature factor
 Π_V = voltage factor

The expected value has been determined for each component on the basis of life tests. If such a test is carried out at e.g. $T=85^\circ\text{C}$, this corresponds to an operating time of approx. 150 000 - 200 000 h in an equipment with $\leq 40^\circ\text{C}$ ambient temperature. Nowadays the best values are achieved by our metallized Polyester film capacitors with an expected value of 2 fit and a failure rate of $\lambda=10$ fit.

Self-Healing

The self-healing process in metallized plastic film capacitors is started by an electric breakdown, which takes about 10^{-8} sec. Temperatures of approximately 6000 K occur and evaporate the metallization around the failure spot. Insulated areas are formed and the capacitor continues to function properly.

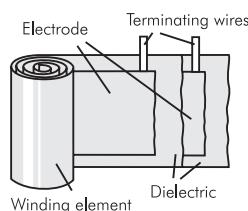


Inductance and Self-Resonance

Depending on the construction, an alternating current in the capacitor winding creates a more or less distinctive magnetic field which can be measured as inductance L. Nowadays, modern plastic film capacitors are contacted over the whole end surface of the winding element. In this way the self-inductance of the winding element is short-circuited and is reduced to the PCM (0.8 nH/mm) and the remaining length of the terminating wires (in case of SMD capacitors the distance between the soldering plates). L and C form a series oscillating circuit; at a frequency of

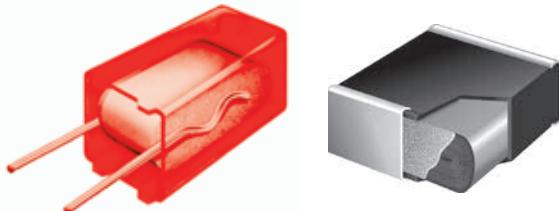
Old type with high self-inductance

The tape length of the winding element determines the value of the self-inductance



Modern WIMA type with low self-inductance

WIMA MKS 02/PCM 2.5 mm WIMA SMD/Size Code 1812
 Self-inductance L < 8 nH Self-inductance L < 6 nH



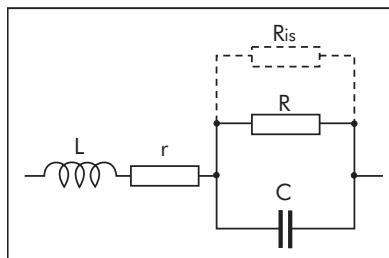
Average value for practical applications: inductance related to length = 0.8 nH/mm
 Example: length of the terminating wires = $2 \times 3 \text{ mm} + \text{PCM}$.

$$f_0 = \frac{1}{2\pi \times \sqrt{L \times C}}$$

the capacitor is in self-resonance and has the lowest impedance, which only consists of r (ESR).

Dissipation Factor and ESR

The dissipation factor $\tan \delta$ is the quotient of the active and reactive components of the impedance. The losses occur mainly in the dielectric and are represented by R in the equivalent circuit diagram. Parallel to R is the insulation resistance R_{is} , which, in fact, only affects $\tan \delta$ at very low frequencies. Further dissipation is caused by the finite conductivity of the electrodes and the transfer resistance between the electrodes and the terminating wires. This is represented in the equivalent circuit diagram by the series resistance r. L represents the remaining self-inductance.



The dissipation factor is, for example, of importance for AC capacitors, which are subjected to strong currents: too high a $\tan \delta$ can lead to excessive heating brought about by the incoming active power and thus to a shorter life time of the capacitor.

Values of ESR are not directly stated in the data sheets of plastic film capacitors. The ESR for an individual capacitance value C can be calculated by the formula:

$$\text{ESR} = \tan \delta \times (2 \times \pi \times f \times C)^{-1}$$

$\tan \delta$: see data sheet of the respective WIMA type

f: frequency of the AC voltage share in the application.

ESR values for certain capacitances see characteristics of film dielectrics page 5.

Box Encapsulation

All WIMA series are produced with the proven box technology, showing the following advantages in comparison with non-encapsulated or dipped versions

- Safe protection of the capacitor element against mechanical stresses during processing and operation
- No danger of internal cracks, delamination or tearing away of the contacts due to construction elasticity
- Excellent self-healing properties of metallized capacitors due to pressure free layers in the winding element
- Solvent-resistant and flame-retardant plastic case in accordance with UL 94 V0
- Clearly defined dimensions allows for close placement and exact setting of parts on PC-boards. Even larger parts are easily robotically insertable.

Stress Computation for WIMA Capacitors

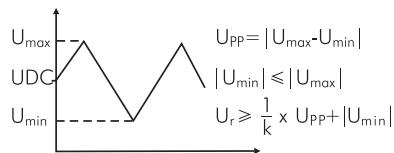


The maximum permissible AC voltage that can be applied to capacitors in **sinusoidal** waveform applications, can be determined from the graphs in this catalogue.

However, where **pulse conditions** exist, the following procedure is to be observed to ensure that the correct capacitor rating is selected for a particular duty:

- 1. Rated Voltage (U_r):** The rated voltage of a capacitor against a zero potential reference point shall take into consideration that the dielectric strength of the capacitor film diminishes with rising frequency. The calculation of the required rated voltage of a capacitor must therefore allow for the correction factor k ; where k = dielectric strength of the film at the frequency f in % is shown in graph 1.

The calculation of the required dielectric strength is shown in the following example (if U_{min} , U_{max} have the same polarity).



Furthermore the rms voltage derived from the peak to peak voltage shall not be greater than the nominal AC voltage rating of the capacitor to avoid the ionization inception level:
 $U_{rms} \leq U_{AC\text{ rated}}$

- 2. Maximum current:** The voltage gradient or rise time of the pulse is taken as the reference point when calculating the maximum current rating of the end contacts. The maximum permissible current load on the end contacts is calculated by means of the voltage rise of the pulses (pulse rise time F_r).

$$I_{max} = F_r \times C \times 1.6$$

The data of the rated pulse rise time F_r for pulses equal to the rated voltage figure in the technical data of the different types.

With low voltage rise in operation (U_{PP}) the permissible current load is calculated as follows:

$$F_{max} = \frac{U_r}{U_{PP}} \times F_r$$

for example
 $U_r = 63 \text{ V}$, $U_{PP} = 12 \text{ V}$, $F_r = 50 \text{ V}/\mu\text{sec}$.

$$\text{hence } F_{max} = \frac{63}{12} \times 50 = 262.5 \text{ V}/\mu\text{sec.}$$

When using maximum current ratings, self-heating must be taken into account at higher frequencies, and must not exceed 10 K.

- 3. Dissipation (heat losses):** The heat dissipated by a capacitor when stressed by non-sinusoidal voltages or when under pulse conditions can be approximately determined from the following formula:

$P_d = U_{rms}^2 \times \omega C \times \tan \delta$ where
 P_d = dissipation in Watts
 (see table 1 for the
 max. W per K).
 U_{rms} = root mean square value of
 the AC voltage share.
 ω = $2\pi \times f$, where f is the re-
 petition frequency of the
 pulse waveform
 $(C = \text{capacitance in Farad})$
 $\tan \delta$ = dissipation factor corres-
 ponding to the frequency of
 the steepest part of the
 pulse.

$$\text{pulse frequency} = \frac{1}{\text{pulse width}}$$

The temperature rise is as follows:

$$\begin{aligned} \text{Temperature rise in K} &= \\ \frac{\text{calculated dissipation}}{\text{specific dissipation}} & \text{ (see table 1)} \end{aligned}$$

In applications where reliability is critical, it is recommended to measure the surface temperature of the capacitor and to take into account that the temperature within the capacitor will be approximately 5 K above the case temperature.

- 4. Determining the permissible AC voltage and AC current at given frequencies:**

To determine the permissible AC voltage (sinusoidal) for applications in a higher frequency spectrum, graphs showing AC voltage derating with frequency are available for the respective WIMA series.

The diagrams refer to a permissible self-heating of:
 $\Delta \delta \leq 10 \text{ K}$

For the WIMA MKP 10 / 0.01 μF / 630 VDC / 400 VAC, for example, this shows – when $f = 50 \text{ kHz}$ – a permissible AC voltage of

$$U_{rms} = 280 \text{ V}$$
 (graph 2)

The AC voltage given in the diagrams can also be used to determine the maximum effective current.

$$Xc = \frac{1}{\omega \times C} = \frac{1}{2 \pi \times 50 \text{ kHz} \times 0.01 \mu\text{F}}$$

$$Xc = 318 \Omega$$

$$Ic = \frac{Uc}{Xc} = \frac{280 \text{ V}}{318 \Omega}$$

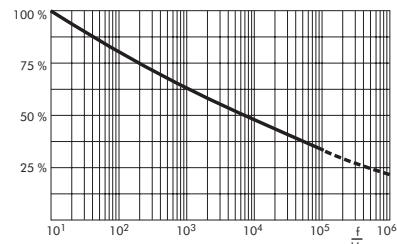
$$Ic = 0.88 \text{ A}$$

The calculated maximum value of the effective current

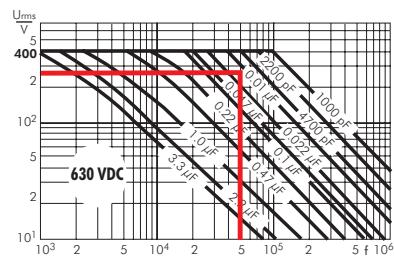
$$I_p = Ic \times \sqrt{2} = 0.88 \text{ A} \times \sqrt{2}$$

$$I_p = 1.24 \text{ A}$$

must not exceed the maximum current rating specified in the maximum pulse rise time calculation (cf. F_{max} on left). In this case, the operating AC voltage is to be reduced accordingly.



Graph 1: Dielectric strength of Polypropylene film as a factor of frequency (general guide).

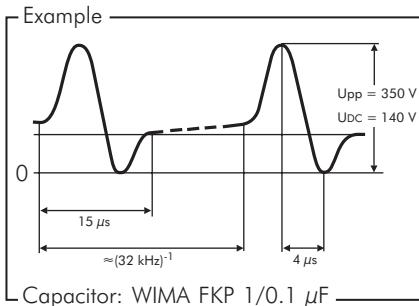


Graph 2: Permissible AC voltage in relation to frequency at 10°C internal temperature rise (general guide).

Printed circuit module PCM (in mm)	Specific dissipation in Watts per K above the ambient temperature
2.5	0.0025
5	0.004
7.5	0.006
10	0.0075
15	0.012
22.5	0.015
27.5	0.025
37.5	0.03

Table 1: The data is for ordinary assembly and ventilation conditions avoiding radiant heat within the chassis of the equipment

The Selection of Capacitors for Pulse Applications



Value from table "pulse rise time WIMA FKP 1", page 72: 7000 V/μsec.

The calculated voltage gradient is lower than the permissible value shown in the catalogue for this capacitor.

Dissipation

$$\text{Given: } U_{\text{rms}} = 85 \text{ V} \\ f = 32 \text{ kHz} \\ C = 0.1 \mu\text{F}$$

The frequency determined from the steepest part of the pulse is:

$$\text{Pulse width} = 15 \mu\text{sec.} = 1 \text{ cycle}$$

Hence pulse frequency =

$$\frac{1}{15 \times 10^{-6}} \cong 66 \text{ kHz}$$

The tan δ of WIMA FKP 1 at 66 kHz $\cong 10 \times 10^{-4}$ (graph 4).

$$P_d = 85^2 \times 2 \pi \times 32 \times 10^3 \times 0.1 \times 10^{-6} \times 10 \times 10^{-4} \cong 0.145 \text{ Watts}$$

The selected capacitor has a pin spacing of 27.5 mm (table 1, page 11 specific dissipation = 0.025 Watts/K) and the

temperature rise due to self-heating is:

$$\text{Temperature rise} = \frac{0.145 \text{ Watts}}{0.025 \text{ Watts/K}} \cong +6 \text{ K}$$

The temperature rise plus the max. ambient temperature \leq max. permissible operating temperature (taking into account the voltage derating factor as detailed in the Technical Data). If the permissible temperature is exceeded, please select a capacitor with a higher voltage rating.

Optionally a recommendation can be offered by our engineers upon receipt of voltage and current oscillographs.

Questionnaire available on demand.

Determination of nominal voltage

Calculation is based on an operating temperature $< +60^\circ \text{C}$ unless other data is given by the user.

$$U_r \geq 350 \text{ V}$$

U_{rms} 85 V (referring to AC voltage share)

Selected nominal voltage:

400 VDC/250 VAC pin spacing 27.5 mm

Permissible voltage gradient

The voltage rise time is:

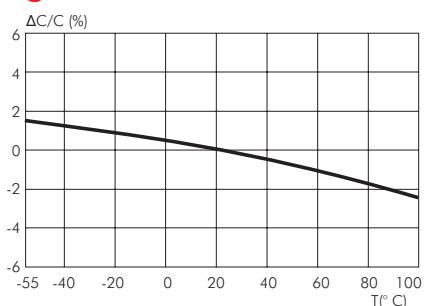
$$\frac{350 \text{ V}}{4 \mu\text{sec.}} \cong 87.5 \text{ V/μsec}$$

WIMA FKP 1 Pulse Capacitors for Very High Current Ratings

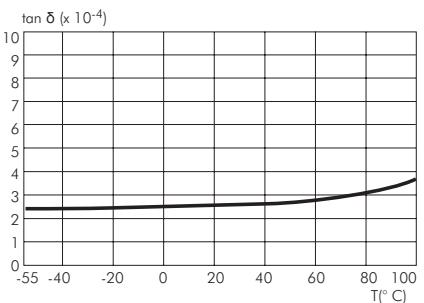
The WIMA FKP1 series was developed for extremely high pulse loads. It has an internal series connection, the metal foil electrodes being combined with a floating electrode metallized on both sides. The metal foil electrodes are safely contacted on both sides of the end surfaces and allow for high current and pulse loading capabilities. At the same time the capacitor is fully self-healing due to the floating electrode metallized on both sides.

As regards pulse loading capability, WIMA FKP 1 represent the high-end of capacitor technology.

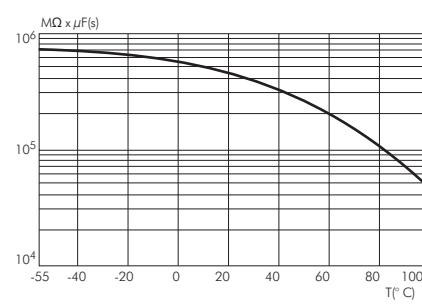
More information see page 72.



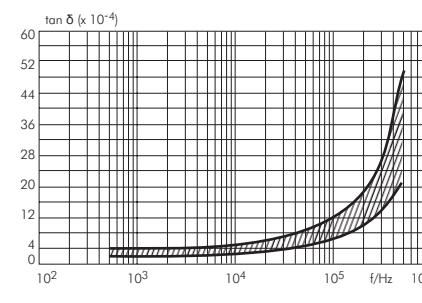
Capacitance change versus temperature ($f=1 \text{ kHz}$) (general guide).



Dissipation factor change versus temperature ($f=1 \text{ kHz}$) (general guide).



Insulation resistance change versus temperature (general guide).



Dissipation factor change versus frequency (general guide).

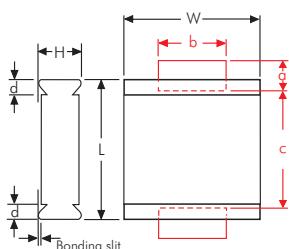
Recommendation for Processing and Application of SMD Capacitors



Layout Form

The components can generally be positioned on the carrier material as desired. In order to prevent soldering shadows or ensure regular temperature distribution, extreme concentration of the components should be avoided. In practice, it has proven best to keep a minimum distance of the soldering surfaces between two WIMA SMDs of twice the height of the components.

Solder Pad Recommendation



Size code	L ± 0.3	W ± 0.3	d	a min.	b min.	c max.
1812	4.8	3.3	0.5	1.2	3.5	3.5
2220	5.7	5.1	0.5	1.2	4	4.5
2824	7.2	6.1	0.5	1.2	4	6.5
4030	10.2	7.6	0.5	2.5	6	9
5040	12.7	10.2	0.7	2.5	6	11.5
6054	15.3	13.7	0.7	2.5	6	14

The solder pad size recommendations given for each individual series are to be understood as minimum dimensions which can at any time be adjusted to the layout form.

Processing

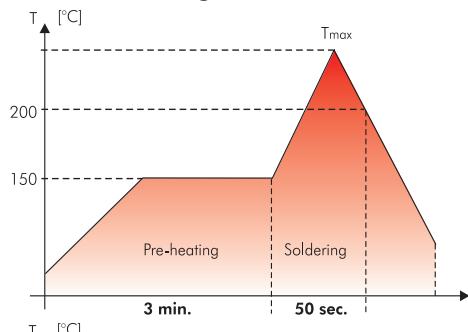
The processing of SMD components

- assembling
- soldering
- electrical final inspection/calibrating

must be regarded as a complete process. The soldering of the printed circuit board, for example, can constitute considerable stress on all the electronic components. The manufacturer's instructions on the processing of the components are mandatory.

Soldering Process

Re-flow soldering



SMD-PET	
Size code	T _{max.}
1812	220° C
2220	230° C
2824	230° C
4030	230° C
5040	240° C
6054	250° C

SMD-PEN	
Size code	T _{max.}
1812	220° C
2220	230° C
2824	230° C
4030	
5040	
6054	

SMD-PPS	
Size code	T _{max.}
1812	250° C
2220	250° C
2824	250° C
4030	250° C
5040	250° C
6054	250° C

Temperature/time graph for the permissible processing temperature of the WIMA SMD film capacitor for typical convection soldering processes.

Due to versatile procedures exact processing parameters for re-flow soldering processes cannot be specified. The graph depicted is to be understood as a recommendation to help establishing a suitable soldering profile fulfilling the requirements

in practice at the user. During processing a max. temperature of $T=210^{\circ}\text{C}$ inside the component should not be exceeded. Due to the differing heat absorption the length of the soldering process should be kept as short as possible for smaller size codes.

SMD Handsoldering

WIMA SMD capacitors with plastic film dielectric are generally suitable for hand-soldering, e.g. for lab purposes, with a soldering iron where, however, similar to automated soldering processes, a certain duration and temperature should not be exceeded. These parameters are dependent on the physical size of the components and the relevant heat absorption involved.

The below data are to be regarded as guideline values and should serve to avoid damage to the dielectric caused by excessive heat during the soldering process. The soldering quality depends on the tool used and on the skill and experience of the person with the soldering iron in hand.

Size code	Temperature °C / °F	Time duration
1812	250 / 482	2 sec plate 1 / 5 sec off / 2 sec plate 2
2220	250 / 482	3 sec plate 1 / 5 sec off / 3 sec plate 2
2824	260 / 500	3 sec plate 1 / 5 sec off / 3 sec plate 2
4030	260 / 500	5 sec plate 1 / 5 sec off / 5 sec plate 2
5040	260 / 500	5 sec plate 1 / 5 sec off / 5 sec plate 2
6054	260 / 500	5 sec plate 1 / 5 sec off / 5 sec plate 2



Recommendation for Processing and Application of SMD Capacitors (Continuation)

Solder Paste

To achieve reliable soldering results one of the following solder alloys have from case to case proven being workable:

Lead free solder paste

Sn - Bi

Sn - Zn (Bi)

Sn - Ag - Cu (suitable for SMD-PET 5040/6054, SMD-PEN and SMD-PPS)

Solder paste with lead

Sn - Pb - Ag (Sn60-Pb40-A, Sn63-Pb37-A)

Washing

WIMA SMD components with plastic encapsulation - like all other components of similar construction irrespective of the make - cannot be regarded as hermetically sealed. Due to today's common washing substances, e. g. on aqueous basis instead of the formerly used halogenated hydrocarbons, with enhanced washing efficiency it became obvious that assembled SMD capacitors may show an impermissibly high deviation of the electrical parameters after a corresponding washing process. Hence it is recommended to refrain from applying industrial washing processes for WIMA SMD capacitors in order to avoid possible damages.

Initial Operation/Calibration

Due to the stress which the components are subjected to during processing, reversible parameter changes occur in almost all electronic components. The capacitance recovery accuracy to be expected with careful processing is within a scope of

$$|\Delta C/C| \leq 5\%.$$

For the initial operation of the device a minimum storage time of

$$t \geq 24 \text{ hours}$$

is to be taken into account. With calibrated devices or when the application is largely dependent on capacitance it is

advisable to prolong the storage time to

$$t \geq 10 \text{ days}$$

In this way ageing effects of the capacitor structure can be anticipated. Parameter changes due to processing are not to be expected after this period of time

Humidity Protection Bags

Taped WIMA SMD capacitors are shipped in humidity protection bags according to JEDEC standard (ESD/EMI-shield/water-vapour proof).

Under controlled conditions the components can be stored two years and more in the originally sealed bag. Opened packing units should immediately be used up for processing. If storage is necessary the opened packing units should be stored air-tight in the original plastic bag.

Reliability

Taking account of the manufacturer's guidelines and compatible processing, the WIMA SMD stand out for the same high quality and reliability as the analogous through-hole WIMA series. The technology of metallized film capacitors used e.g. in WIMA SMD-PET achieves the best values for all fields of application. The expected value is about:

$$\lambda_0 \leq 2 \text{ fit}$$

Furthermore the production of all WIMA components is subject to the regulations laid down by ISO 9001:2015 as well as the guidelines for component specifications set out by IEC quality assessment system (IECQ) for electronic components.

Electrical Characteristics and Fields of Application

Basically the WIMA SMD series have the same electrical characteristics as the analogous through-hole WIMA capacitors. Compared to ceramic or tantalum dielectrics WIMA SMD capacitors have a

number of other outstanding qualities:

- favourable pulse rise time
- low ESR
- low dielectric absorption
- available in high voltage series
- large capacitance spectrum
- stand up to high mechanical stress
- good long-term stability

As regards technical performance as well as quality and reliability, the WIMA SMD series offer the possibility to cover nearly all applications of conventionally through-hole film capacitors with SMD components. Furthermore, the WIMA SMD series can now be used for all the demanding capacitor applications for which, in the past, the use of through-hole components was mandatory:

- measuring techniques
- oscillator circuits
- differentiating and integrating circuits
- A/D or D/A transformers
- sample and hold circuits
- automotive electronics

With the WIMA SMD programme available today, the major part of all plastic film capacitors can be replaced by WIMA SMD components. The field of application ranges from standard coupling capacitors to use in switch-mode power supplies as filter or charging capacitors with high voltage and capacitance values, as well as in telecommunications e.g. the well-known telephone capacitor 1μF/250VDC.

Recommendation for Processing and Application of Through-Hole Capacitors



Soldering Process

Internal temperature of the capacitor must be kept as follows:

Polyester: preheating: $T_{max.} \leq 125^\circ C$
soldering: $T_{max.} \leq 135^\circ C$

Polypropylene: preheating: $T_{max.} \leq 100^\circ C$
soldering: $T_{max.} \leq 110^\circ C$

Single wave soldering

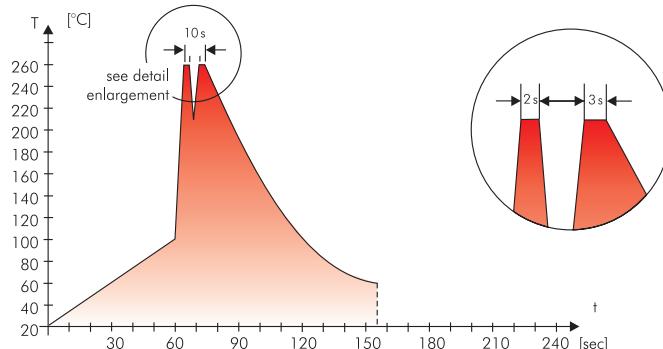
Soldering bath temperature: $T < 260^\circ C$
Dwell time: $t < 5 \text{ sec}$

Double wave soldering

Soldering bath temperature: $T < 260^\circ C$
Dwell time: $\Sigma t < 5 \text{ sec}$

Due to different soldering processes and heat requirements the graphs are to be regarded as a recommendation only.

Wave soldering



WIMA Quality and Environmental Philosophy

ISO 9001:2015 Certification

ISO 9001:2015 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2015 of our factories by the infaz (Institut für Auditierung und Zertifizierung) certifies that organisation, equipment and monitoring of quality assurance in our factories correspond to internationally recognized standards.

WIMA WPCS

The WIMA Process Control System (WPCS) is a quality surveillance and optimization system developed by WIMA. WPCS is a major part of the quality-oriented WIMA production. Points of application during production process:

- incoming material inspection
- metallization
- film inspection
- schoopage
- pre-heating
- pin attachment
- cast resin preparation/encapsulation
- 100% final inspection
- Testing as per customer requirements

WIMA Environmental Policy

All WIMA capacitors, irrespective of whether through-hole devices or SMD, are made of environmentally friendly materials. Neither during manufacture nor in the product itself any toxic substances are used, e.g.

- | | |
|------------------------|------------|
| - Lead | - PBB/PBDE |
| - PCB | - Arsenic |
| - CFC | - Cadmium |
| - Hydrocarbon chloride | - Mercury |
| - Chromium 6+ | - etc. |

We merely use pure, recyclable materials for packing our components, such as:

- carton
- cardboard
- adhesive tape made of paper
- polystyrene

We almost completely refrain from using packing materials such as:

- adhesive tapes made of plastic
- metal clips

RoHS Compliance

According to the RoHS Directive 2011/65/EU as amended from time to time certain hazardous substances like e.g. lead, cadmium, mercury must not be used any longer in electronic equipment as of July 1st, 2006. For the sake of the environment WIMA has refrained from using such substances since years already.



WIMA Kondensatoren sind bleifrei
konform RoHS 2011/65/EU

WIMA capacitors are lead free
in accordance with RoHS 2011/65/EU

Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2004

WIMA's environmental management has been established in accordance with the guidelines of DIN EN ISO 14001:2004 to optimize the production processes with regard to energy and resources.

WIMA SMD Capacitors in Accordance with RoHS 2011/65/EU



WIMA SMD-PET

WIMA SMD-PEN

WIMA SMD-PPS

WIMA SMD capacitors in size codes 1812, 2220, 2824, 4030, 5040 and 6054, capacitance values from 0.01 μF through 6.8 μF and voltage ranges of 63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC and 1000 VDC cover nearly the entire application range of conventional through-hole plastic film capacitors.

The WIMA SMD-PET is designed for general DC-applications e.g. coupling and decoupling, blocking, by-passing or timing and corresponds to the RoHS 2011/65/EU guidelines (Restriction of Hazardous Substances) of the EU.

The WIMA SMD-PEN is applicable for operating temperatures up to +125° C and thus suitable for lead-free solder pro-

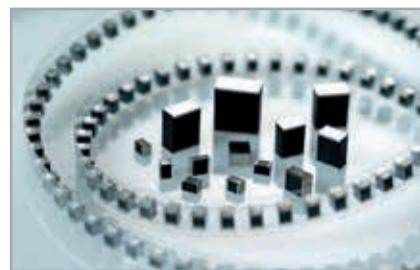
cesses in accordance with RoHS.

The WIMA SMD-PPS has an operating temperature range up to +140° C and stands out for its stable capacitance and frequency behaviour versus temperature. Capacitors of this range are environmentally compatible with the RoHS 2011/65/EU guidelines.

All WIMA SMD series are produced with the proven box technology, showing the following advantages in comparison with non-encapsulated or moulded SMD capacitor versions:

- Safe protection of the capacitor element against mechanical and thermal stresses during processing and operation. When using more temperature resistant dielectrics like PEN or PPS an even larger safety margin than with non-encapsulated parts is obtained.
- No danger of internal cracks or tearing away of the contacts due to construction elasticity.
- No danger of delamination due to solder plates covering the capacitor's entire end surfaces.
- Solvent-resistant, flame-retardant plastic case in accordance with UL 94 V-0.

These features and the wide capacitance range enable WIMA SMDs to substitute other capacitor technologies and become standard components in electronic developments.





Metallized Polyester (PET) SMD Film Capacitors with Box Encapsulation.
Capacitances from 0.01 µF to 6.8 µF. Rated Voltages from 63 VDC to 1000 VDC.
Size Codes from 1812 to 6054.

Special Features

- Size codes 1812, 2220, 2824, 4030, 5040 and 6054 with PET and encapsulated
- Operating temperature up to 100° C
- Self-healing
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Construction

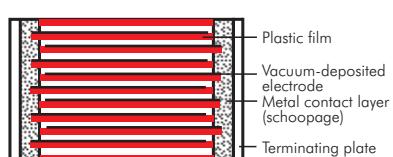
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case, UL 94 V-0

Terminations:

Tinned plates.

Marking:

Box colour: Black.

Electrical Data

Capacitance range:

0.01 µF to 6.8 µF

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC

Capacitance tolerances:

±20%, ±10% (±5% available subject to special enquiry)

Operating temperature range:

-55° C to +100° C (+125° C available subject to special enquiry)

Climatic test category:

55/100/21 according to IEC

for size codes 1812 to 2824

55/100/56 according to IEC

for size codes 4030 to 6054

Insulation resistance at +20° C:

U_r	U_{test}	$C \leq 0.33 \mu F$	$0.33 \mu F < C \leq 6.8 \mu F$
63 VDC 100 VDC	50 V 100 V	$\geq 3.75 \times 10^3 M\Omega$	$\geq 1250 \text{ sec } (M\Omega \times \mu F)$
$\geq 250 \text{ VDC}$	100 V	$\geq 1 \times 10^4 M\Omega$	$\geq 3000 \text{ sec } (M\Omega \times \mu F)$

Measuring time: 1 min.

Dissipation factors at +20° C: $\tan \delta$

at f	$C \leq 0.1 \mu F$	$0.1 \mu F < C \leq 1.0 \mu F$	$C > 1.0 \mu F$
1 kHz	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$	$\leq 10 \times 10^{-3}$
10 kHz	$\leq 15 \times 10^{-3}$	$\leq 15 \times 10^{-3}$	-
100 kHz	$\leq 30 \times 10^{-3}$	-	-

Maximum pulse rise time:

for pulses equal to the rated voltage

Capacitance μF	Pulse rise time V/µsec max. operation/test					
	63 VDC	100 VDC	250 VDC	400 VDC	630 VDC	1000 VDC
0.01 ... 0.022	30/300	35/350	40/400	35/350	40/400	50/500
0.033 ... 0.068	20/200	20/200	40/400	21/210	25/250	32/320
0.1 ... 0.22	10/100	10/100	12/120	14/140	17/170	-
0.33 ... 0.68	8/80	6/60	9/90	10/100	-	-
1.0 ... 2.2	3.5/35	4/40	7/70	-	-	-
3.3 ... 6.8	3/30	3/30	-	-	-	-

Dip Solder Test/Processing

Resistance to soldering heat:

Test Tb in accordance with DIN IEC

60068-2-58/DIN EN 60384-19.

Soldering bath temperature max. 260° C.

Soldering duration max. 5 sec.

Change in capacitance $\Delta C/C < 5\%$.

Soldering process:

Re-flow soldering (see temperature/time graphs page 13).

Test voltage: 1.6 U_r , 2 sec.

Voltage derating:

A voltage derating factor of 1.25 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages

Reliability:

Operational life > 300 000 hours
Failure rate < 2 fit (0.5 x U_r and 40° C)

Packing

Available taped and reeled in blister pack.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	63 VDC/40 VAC*			100 VDC/63 VAC*			250 VDC/160 VAC*		
	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number
0.01 µF	1812	3.0	SMDTC02100KA00_____	1812	3.0	SMDTD02100KA00_____	2220	3.5	SMDTF02100QA00_____
	2220	3.5	SMDTC02100QA00_____	2220	3.5	SMDTD02100QA00_____	2824	3.0	SMDTF02100TA00_____
	2824	3.0	SMDTC02100TA00_____	2824	3.0	SMDTD02100TA00_____			
0.015 "	1812	3.0	SMDTC02150KA00_____	1812	3.0	SMDTD02150KA00_____	2220	3.5	SMDTF02150QA00_____
	2220	3.5	SMDTC02150QA00_____	2220	3.5	SMDTD02150QA00_____	2824	3.0	SMDTF02150TA00_____
	2824	3.0	SMDTC02150TA00_____	2824	3.0	SMDTD02150TA00_____			
0.022 "	1812	3.0	SMDTC02220KA00_____	1812	3.0	SMDTD02220KA00_____	2220	3.5	SMDTF02220QA00_____
	2220	3.5	SMDTC02220QA00_____	2220	3.5	SMDTD02220QA00_____	2824	3.0	SMDTF02220TA00_____
	2824	3.0	SMDTC02220TA00_____	2824	3.0	SMDTD02220TA00_____			
0.033 "	1812	3.0	SMDTC02330KA00_____	1812	3.0	SMDTD02330KA00_____	2220	3.5	SMDTF02330QA00_____
	2220	3.5	SMDTC02330QA00_____	2220	3.5	SMDTD02330QA00_____	2824	3.0	SMDTF02330TA00_____
	2824	3.0	SMDTC02330TA00_____	2824	3.0	SMDTD02330TA00_____	4030	5.0	SMDTF02330VA00_____
0.047 "	1812	3.0	SMDTC02470KA00_____	1812	3.0	SMDTD02470KA00_____	2220	3.5	SMDTF02470QA00_____
	2220	3.5	SMDTC02470QA00_____	2220	3.5	SMDTD02470QA00_____	2824	3.0	SMDTF02470TA00_____
	2824	3.0	SMDTC02470TA00_____	2824	3.0	SMDTD02470TA00_____	4030	5.0	SMDTF02470VA00_____
0.068 "	1812	3.0	SMDTC02680KA00_____	1812	3.0	SMDTD02680KA00_____	2220	4.5*	SMDTF02680QB00_____
	2220	3.5	SMDTC02680QA00_____	2220	3.5	SMDTD02680QA00_____	2824	3.0	SMDTF02680TA00_____
	2824	3.0	SMDTC02680TA00_____	2824	3.0	SMDTD02680TA00_____	4030	5.0	SMDTF02680VA00_____
0.1 µF	1812	4.0*	SMDTC03100KB00_____	1812	4.0*	SMDTD03100KB00_____	2220	4.5*	SMDTF03100QB00_____
	2220	3.5	SMDTC03100QA00_____	2220	3.5	SMDTD03100QA00_____	2824	5.0	SMDTF03100TB00_____
	2824	3.0	SMDTC03100TA00_____	2824	3.0	SMDTD03100TA00_____	4030	5.0	SMDTF03100VA00_____
0.15 "	1812	4.0*	SMDTC03150KB00_____	1812	4.0	SMDTD03150KB00_____	2824	5.0	SMDTF03150TB00_____
	2220	3.5	SMDTC03150QA00_____	2220	3.5	SMDTD03150QA00_____	4030	5.0	SMDTF03150VA00_____
	2824	3.0	SMDTC03150TA00_____	2824	3.0	SMDTD03150TA00_____			
0.22 "	1812	4.0*	SMDTC03220KB00_____	1812	4.0	SMDTD03220KB00_____	2824	5.0	SMDTF03220TB00_____
	2220	3.5	SMDTC03220QA00_____	2220	3.5	SMDTD03220QA00_____	4030	5.0	SMDTF03220VA00_____
	2824	3.0	SMDTC03220TA00_____	2824	3.0	SMDTD03220TA00_____			
0.33 "	1812	4.0	SMDTC03330KB00_____	2220	4.5	SMDTD03330QB00_____	2824	5.0	SMDTF03330TB00_____
	2220	4.5*	SMDTC03330QB00_____	2824	5.0	SMDTD03330TB00_____	4030	5.0	SMDTF03330VA00_____
	2824	5.0*	SMDTC03330TB00_____	4030	5.0	SMDTD03330VA00_____	5040	6.0	SMDTF03330XA00_____
0.47 "	1812	4.0	SMDTC03470KB00_____	2220	4.5	SMDTD03470QB00_____	4030	5.0	SMDTF03470VA00_____
	2220	4.5*	SMDTC03470QB00_____	2824	5.0	SMDTD03470TB00_____	5040	6.0	SMDTF03470XA00_____
	2824	5.0*	SMDTC03470TB00_____	4030	5.0	SMDTD03470VA00_____			
0.68 "	2220	4.5	SMDTC03680QB00_____	2824	5.0	SMDTD03680TB00_____	5040	6.0	SMDTF03680XA00_____
	2824	5.0*	SMDTC03680TB00_____	4030	5.0	SMDTD03680VA00_____			
	4030	5.0	SMDTC03680VA00_____	5040	6.0	SMDTD03680VA00_____			
1.0 µF	2220	4.5	SMDTC04100QB00_____	2824	5.0	SMDTD04100TB00_____	6054	7.0	SMDTF04100YA00_____
	2824	5.0*	SMDTC04100TB00_____	4030	5.0	SMDTD04100VA00_____			
	4030	5.0	SMDTC04100VA00_____	5040	6.0	SMDTD04100XA00_____			
1.5 "	2824	5.0	SMDTC04150TB00_____	4030	5.0	SMDTD04150VA00_____			
	4030	5.0	SMDTC04150VA00_____	5040	6.0	SMDTD04150XA00_____			
2.2 "	2824	5.0	SMDTC04220TB00_____	5040	6.0	SMDTD04220XA00_____			
	4030	5.0	SMDTC04220VA00_____						
3.3 "	4030	5.0	SMDTC04330VA00_____	5040	6.0	SMDTD04330XA00_____			
4.7 "	5040	6.0	SMDTC04470XA00_____	6054	7.0	SMDTD04470YA00_____			
6.8 "	6054	7.0	SMDTC04680YA00_____						

* AC voltage: f = 50 Hz; 1.4 × U_{rms} + UDC ≤ U_r
 Dims. in mm.

Rights reserved to amend design data without prior notification.
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Continuation page 19

Part number completion:
Tolerance: 20 % = M
10 % = K
5 % = J
Packing: bulk = S
Pin length: none = 00
Taped version see page 148.

Continuation

General Data

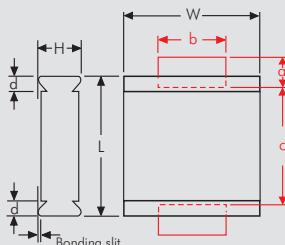
Capacitance	400 VDC/200 VAC*			630 VDC/300 VAC*			1000 VDC/400 VAC*		
	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number
0.01 μF	2824 4030	3.0 5.0	SMDTG02100TA00 SMDTG02100VA00	4030	5.0	SMDTJ02100VA00			
0.015 "	2824 4030	3.0 5.0	SMDTG02150TA00 SMDTG02150VA00	4030	5.0	SMDTJ02150VA00	5040	6.0	SMDTO12150XA00
0.022 "	2824 4030	5.0*	SMDTG02220TB00 SMDTG02220VA00	5040	6.0	SMDTJ02220XA00	5040	6.0	SMDTO12220XA00
0.033 "	2824 4030	5.0 5.0	SMDTG02330TB00 SMDTG02330VA00	5040	6.0	SMDTJ02330XA00	5040	6.0	SMDTO12330XA00
0.047 "	2824 4030	5.0 5.0	SMDTG02470TB00 SMDTG02470VA00	5040	6.0	SMDTJ02470XA00	6054	7.0	SMDTO12470YA00
0.068 "	4030 5040	5.0 6.0	SMDTG02680VA00 SMDTG02680XA00	5040	6.0	SMDTJ02680XA00			
0.1 μF	4030 5040	5.0 6.0	SMDTG03100VA00 SMDTG03100XA00	6054	7.0	SMDTJ03100YA00			
0.15 "	4030 5040	5.0 6.0	SMDTG03150VA00 SMDTG03150XA00	6054	7.0	SMDTJ03150YA00			
0.22 "	5040	6.0	SMDTG03220XA00	6054	7.0	SMDTJ03220YA00			
0.33 "	5040	6.0	SMDTG03330XA00						
0.47 "	6054	7.0	SMDTG03470YA00						

* AC voltage: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

* Version according to catalogue 2013 still available

Dims. in mm.

Solder pad recommendation



Part number completion:						
Tolerance: 20 % = M						
10 % = K						
5 % = J						
Packing: bulk = S						
Pin length: none = 00						
Taped version see page 148.						

Size code	L ± 0.3	W ± 0.3	d	a min.	b min.	c max.
1812	4.8	3.3	0.5	1.2	3.5	3.5
2220	5.7	5.1	0.5	1.2	4	4.5
2824	7.2	6.1	0.5	1.2	4	6.5
4030	10.2	7.6	0.5	2.5	6	9
5040	12.7	10.2	0.7	2.5	6	11.5
6054	15.3	13.7	0.7	2.5	6	14

Rights reserved to amend design data without prior notification.



Metallized Polyethylene-Naphthalate (PEN) SMD Film Capacitors with Box Encapsulation. Capacitances from 0.01 μF to 1.0 μF . Rated Voltages from 63 VDC to 400 VDC. Size Codes from 1812 to 2824.

Special Features

- Size codes 1812, 2220 and 2824, with PEN and encapsulated
- Operating temperature up to 125° C
- Self-healing
- Suitable for lead-free soldering
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Construction

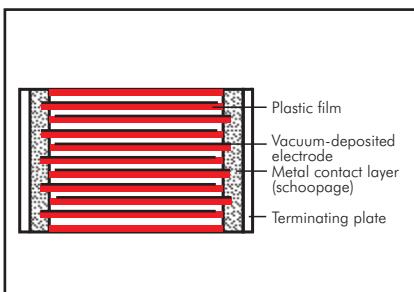
Dielectric:

Polyethylene-Naphthalate (PEN) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case, UL 94 V-0

Terminations:

Tinned plates.

Marking:

Colour: Black.

Electrical Data

Capacitance range:

0.01 μF to 1.0 μF

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$ ($\pm 5\%$ available subject to special enquiry)

Operating temperature range:

-55° C to +125° C

Climatic test category:

55/125/21 according to IEC

Insulation resistance at +20° C:

U_r	U_{test}	$C \leq 0.33 \mu\text{F}$	$0.33 \mu\text{F} < C \leq 1.0 \mu\text{F}$
63 VDC 100 VDC	50 V 100 V	$\geq 3.75 \times 10^3 \text{ M}\Omega$	$\geq 1250 \text{ sec } (\text{M}\Omega \times \mu\text{F})$
$\geq 250 \text{ VDC}$	100 V	$\geq 1 \times 10^4 \text{ M}\Omega$	$\geq 3000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$

Measuring time: 1 min.

Dissipation factors at +20° C: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1.0 \mu\text{F}$
1 kHz	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$
10 kHz	$\leq 15 \times 10^{-3}$	$\leq 15 \times 10^{-3}$
100 kHz	$\leq 30 \times 10^{-3}$	-

Maximum pulse rise time:

for pulses equal to the rated voltage

Capacitance μF	Pulse rise time V/ μsec max. operation/test			
	63 VDC	100 VDC	250 VDC	400 VDC
0.01 ... 0.022	30/300	35/350	40/400	35/350
0.033 ... 0.068	20/200	20/200	40/400	21/210
0.1 ... 0.22	10/100	10/100	12/120	-
0.33 ... 0.68	8/80	6/60	-	-
1.0	3.5/35	4/40	-	-

Dip Solder Test/Processing

Resistance to soldering heat:

Test Tb in accordance with DIN IEC

60068-2-58/DIN EN 60384-23.

Soldering bath temperature max. 260° C.

Soldering duration max. 5 sec.

Change in capacitance $\Delta C/C < 5\%$.

Soldering process:

Re-flow soldering (see temperature/time graphs page 13).

Test voltage: 1.6 U_r , 2 sec.

Voltage derating:

A voltage derating factor of 1.25 % per K must be applied from +100° C for DC voltages and from +90° C for AC voltages

Reliability:

Operational life > 300 000 hours
Failure rate < 2 fit (0.5 x U_r and 40° C)

Packing

Available taped and reeled in blister pack.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	Size code	H ± 0.3	63 VDC/40 VAC*		100 VDC/63 VAC*	
			Part number	Size code	H ± 0.3	Part number
0.01 µF	1812	3.0	SMDNC02100KA00_	1812	3.0	SMDND02100KA00_
	2220	3.5	SMDNC02100QA00_	2220	3.5	SMDND02100QA00_
	2824	3.0	SMDNC02100TA00_	2824	3.0	SMDND02100TA00_
0.015 "	1812	3.0	SMDNC02150KA00_	1812	3.0	SMDND02150KA00_
	2220	3.5	SMDNC02150QA00_	2220	3.5	SMDND02150QA00_
	2824	3.0	SMDNC02150TA00_	2824	3.0	SMDND02150TA00_
0.022 "	1812	3.0	SMDNC02220KA00_	1812	3.0	SMDND02220KA00_
	2220	3.5	SMDNC02220QA00_	2220	3.5	SMDND02220QA00_
	2824	3.0	SMDNC02220TA00_	2824	3.0	SMDND02220TA00_
0.033 "	1812	3.0	SMDNC02330KA00_	1812	3.0	SMDND02330KA00_
	2220	3.5	SMDNC02330QA00_	2220	3.5	SMDND02330QA00_
	2824	3.0	SMDNC02330TA00_	2824	3.0	SMDND02330TA00_
0.047 "	1812	3.0	SMDNC02470KA00_	1812	3.0	SMDND02470KA00_
	2220	3.5	SMDNC02470QA00_	2220	3.5	SMDND02470QA00_
	2824	3.0	SMDNC02470TA00_	2824	3.0	SMDND02470TA00_
0.068 "	1812	3.0	SMDNC02680KA00_	1812	3.0	SMDND02680KA00_
	2220	3.5	SMDNC02680QA00_	2220	3.5	SMDND02680QA00_
	2824	3.0	SMDNC02680TA00_	2824	3.0	SMDND02680TA00_
0.1 µF	1812	4.0	SMDNC03100KB00_	1812	4.0	SMDND03100KB00_
	2220	3.5	SMDNC03100QA00_	2220	3.5	SMDND03100QA00_
	2824	3.0	SMDNC03100TA00_	2824	3.0	SMDND03100TA00_
0.15 "	1812	4.0	SMDNC03150KB00_	1812	4.0	SMDND03150KB00_
	2220	3.5	SMDNC03150QA00_	2220	3.5	SMDND03150QA00_
	2824	3.0	SMDNC03150TA00_	2824	3.0	SMDND03150TA00_
0.22 "	2220	3.5	SMDNC03220QA00_	2220	3.5	SMDND03220QA00_
	2824	3.0	SMDNC03220TA00_	2824	3.0	SMDND03220TA00_
0.33 "	2220	4.5	SMDNC03330QB00_	2220	4.5	SMDND03330QB00_
	2824	5.0	SMDNC03330TB00_	2824	5.0	SMDND03330TB00_
0.47 "	2220	4.5	SMDNC03470QB00_	2220	4.5	SMDND03470QB00_
	2824	5.0	SMDNC03470TB00_	2824	5.0	SMDND03470TB00_
0.68 "	2824	5.0	SMDNC03680TB00_	2824	5.0	SMDND03680TB00_
1.0 µF	2824	5.0	SMDNC04100TB00_	2824	5.0	SMDND04100TB00_

* AC voltage: f = 50 Hz; 1.4 x U_{rms} + UDC ≤ U_r

Dims in mm.

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: none = 00

Taped version see page 148.

Rights reserved to amend design data without prior notification.

Continuation page 22



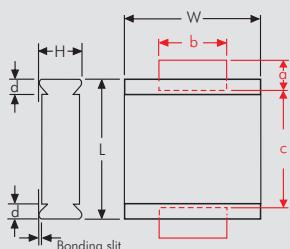
Continuation

General Data

Capacitance	Size code	250 VDC/160 VAC*			400 VDC/200 VAC*		
		H ± 0.3	Part number	Size code	H ± 0.3	Part number	
0.01 µF	2220 2824	3.5 3.0	SMDNF02100QA00_____ SMDNF02100TA00_____	2824	3.0	SMDNG02100TA00_____	
0.015 "	2220 2824	3.5 3.0	SMDNF02150QA00_____ SMDNF02150TA00_____	2824	3.0	SMDNG02150TA00_____	
0.022 "	2220 2824	3.5 3.0	SMDNF02220QA00_____ SMDNF02220TA00_____	2824	5.0	SMDNG02220TB00_____	
0.033 "	2220 2824	3.5 3.0	SMDNF02330QA00_____ SMDNF02330TA00_____	2824	5.0	SMDNG02330TB00_____	
0.047 "	2220 2824	3.5 3.0	SMDNF02470QA00_____ SMDNF02470TA00_____	2824	5.0	SMDNG02470TB00_____	
0.068 "	2220 2824	4.5 3.0	SMDNF02680QB00_____ SMDNF02680TA00_____				
0.1 µF	2220 2824	4.5 5.0	SMDNF03100QB00_____ SMDNF03100TB00_____				
0.15 "	2824	5.0	SMDNF03150TB00_____				

* AC voltage: f = 50 Hz; $1.4 \times U_{rms} + UDC \leq U_r$

Dims in mm.



Part number completion:						
Tolerance: 20 % = M						
10 % = K						
5 % = J						
Packing: bulk = S						
Pin length: none = 00						
Taped version see page 148.						

Size code	L ± 0.3	W ± 0.3	d	a min.	b min.	c max.
1812	4.8	3.3	0.5	1.2	3.5	3.5
2220	5.7	5.1	0.5	1.2	4	4.5
2824	7.2	6.1	0.5	1.2	4	6.5

Rights reserved to amend design data without prior notification.



Metallized Polyphenylene-Sulphide (PPS) SMD Film Capacitors with Box Encapsulation. Capacitances from 0.01 μF to 2.2 μF . Rated Voltages from 63 VDC to 1000 VDC. Size Codes from 1812 to 6054.

Special Features

- Size codes 1812, 2220, 2824, 4030, 5040 and 6054 with PPS and encapsulated
- Operating temperature up to 140° C
- Self-healing
- Suitable for lead-free soldering
- Low dissipation factor
- Low dielectric absorption
- Very constant capacitance value versus temperature
- According to RoHS 2011/65/EU

Electrical Data

Capacitance range: 0.01 μF to 2.2 μF

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$ ($\pm 5\%$ available subject to special enquiry)

Operating temperature range:

-55° C to +140° C

Climatic test category:

55/140/56 in accordance with IEC

Insulation resistance at +20° C:

U_r	U_{test}	$C \leq 0.33 \mu\text{F}$	$0.33 \mu\text{F} < C \leq 2.2 \mu\text{F}$
63 VDC 100 VDC	50 V 100 V	$\geq 1 \times 10^4 \text{ M}\Omega$	$\geq 3000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$
$\geq 250 \text{ VDC}$	100 V	$\geq 3 \times 10^4 \text{ M}\Omega$	$\geq 6000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$

Measuring time: 1 min.

Dissipation factors at +20° C: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1.0 \mu\text{F}$	$C > 1.0 \mu\text{F}$
1 kHz	$\leq 15 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 20 \times 10^{-4}$
10 kHz	$\leq 25 \times 10^{-4}$	$\leq 25 \times 10^{-4}$	-
100 kHz	$\leq 50 \times 10^{-4}$	-	-

Maximum pulse rise time: for pulses equal to the rated voltage

Capacitance μF	Pulse rise time V/ μsec max. operation/test					
	63 VDC	100 VDC	250 VDC	400 VDC	630 VDC	1000 VDC
0.01 ... 0.022	25/250	25/250	30/300	35/350	40/400	45/450
0.033 ... 0.068	15/150	15/150	20/200	25/250	28/280	32/320
0.1 ... 0.22	10/100	10/100	12/120	15/150	-	-
0.33 ... 0.68	5/50	5/50	6/60	8/80	-	-
1.0 ... 2.2	3/30	3/30	-	-	-	-

Dip Solder Test/Processing

Resistance to soldering heat:

Test Tb in accordance with DIN IEC 60068-2-58/DIN EN 60384-20.

Soldering bath temperature max. 260° C.

Soldering duration max. 5 sec.

Change in capacitance $\Delta C/C < 5\%$.

Soldering process:

Re-flow soldering (see temperature/time graphs page 13).

Test voltage:

1.6 U_r , 2 sec.

Voltage derating:

For DC and AC voltages a voltage derating factor of 1% per K must be applied from +100° C and of 2% per K from +125° C.

Reliability:

Operational life > 300 000 hours
Failure rate < 2 fit ($0.5 \times U_r$ and 40° C)

Typical Applications

For general applications in high temperature circuits e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing
- Filtering
- Oscillating circuits

Construction

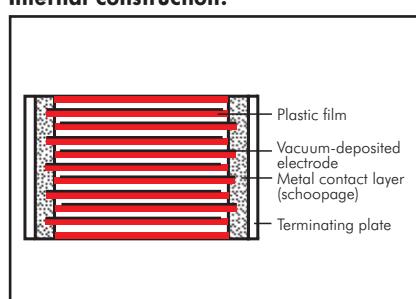
Dielectric:

Polyphenylene-sulphide (PPS) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case, UL 94 V-0

Terminations:

Tinned plates.

Marking:

Box colour: Black.

Packing

Available taped and reeled in blister pack.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	63 VDC/40 VAC*			100 VDC/63 VAC*			250 VDC/160 VAC*		
	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number
0.01 μF	1812 2220	3.0 3.5	SMDIC02100KA00_____ SMDIC02100QA00_____	1812 2220	3.0 3.5	SMDID02100KA00_____ SMDID02100QA00_____	2220	3.5	SMDIF02100QA00_____
0.015 "	1812 2220	3.0 3.5	SMDIC02150KA00_____ SMDIC02150QA00_____	1812 2220	3.0 3.5	SMDID02150KA00_____ SMDID02150QA00_____	2220	3.5	SMDIF02150QA00_____
0.022 "	1812 2220	3.0 3.5	SMDIC02220KA00_____ SMDIC02220QA00_____	1812 2220	3.0 3.5	SMDID02220KA00_____ SMDID02220QA00_____	2220 2824	3.5 3.0	SMDIF02220QA00_____ SMDIF02220TA00_____
0.033 "	1812 2220 2824	3.0 3.5 3.0	SMDIC02330KA00_____ SMDIC02330QA00_____ SMDIC02330TA00_____	1812 2220 2824	3.0 3.5 3.0	SMDID02330KA00_____ SMDID02330QA00_____ SMDID02330TA00_____	2824 4030	3.0 5.0	SMDIF02330TA00_____ SMDIF02330VA00_____
0.047 "	1812 2220 2824	3.0 3.5 3.0	SMDIC02470KA00_____ SMDIC02470QA00_____ SMDIC02470TA00_____	1812 2220 2824	3.0 3.5 3.0	SMDID02470KA00_____ SMDID02470QA00_____ SMDID02470TA00_____	2824 4030	5.0 5.0	SMDIF02470TB00_____ SMDIF02470VA00_____
0.068 "	1812 2220 2824	3.0 3.5 3.0	SMDIC02680KA00_____ SMDIC02680QA00_____ SMDIC02680TA00_____	2220 2824	3.5 3.0	SMDID02680QA00_____ SMDID02680TA00_____	2824 4030	5.0 5.0	SMDIF02680TB00_____ SMDIF02680VA00_____
0.1 μF	1812 2220 2824	3.0 3.5 3.0	SMDIC03100KA00_____ SMDIC03100QA00_____ SMDIC03100TA00_____	2220 2824	3.5 3.0	SMDID03100QA00_____ SMDID03100TA00_____	2824 4030 5040	5.0 5.0 6.0	SMDIF03100TB00_____ SMDIF03100VA00_____ SMDIF03100XA00_____
0.15 "	1812 2220 2824	4.0 3.5 3.0	SMDIC03150KB00_____ SMDIC03150QA00_____ SMDIC03150TA00_____	2824	3.0	SMDID03150TA00_____	4030 5040 6054	5.0 6.0 7.0	SMDIF03150VA00_____ SMDIF03150XA00_____ SMDIF03150YA00_____
0.22 "	2220 2824	4.5 5.0	SMDIC03220QB00_____ SMDIC03220TB00_____	2220 2824	4.5 5.0	SMDID03220QB00_____ SMDID03220TB00_____	4030 5040 6054	5.0 6.0 7.0	SMDIF03220VA00_____ SMDIF03220XA00_____ SMDIF03220YA00_____
0.33 "	2220 2824 4030	4.5 5.0 5.0	SMDIC03330QB00_____ SMDIC03330TB00_____ SMDIC03330VA00_____	2824 4030	5.0 5.0	SMDID03330TB00_____ SMDID03330VA00_____	5040 6054	6.0 7.0	SMDIF03330XA00_____ SMDIF03330YA00_____
0.47 "	2220 2824 4030	4.5 5.0 5.0	SMDIC03470QB00_____ SMDIC03470TB00_____ SMDIC03470VA00_____	2824 4030	5.0 5.0	SMDID03470TB00_____ SMDID03470VA00_____	6054	7.0	SMDIF03470YA00_____
0.68 "	2824 4030	5.0 5.0	SMDIC03680TB00_____ SMDIC03680VA00_____	4030	5.0	SMDID03680VA00_____			
1.0 μF	2824 4030 5040	5.0 5.0 6.0	SMDIC04100TB00_____ SMDIC04100VA00_____ SMDIC04100XA00_____	5040	6.0	SMDID04100XA00_____	Part number completion: Tolerance: 20 % = M 10 % = K 5 % = J Packing: bulk = S Pin length: none = 00 Taped version see page 148.		
1.5 "	4030 5040	5.0 6.0	SMDIC04150VA00_____ SMDIC04150XA00_____	6054	7.0	SMDID04150YA00_____			
2.2 "	6054	7.0	SMDIC04220YA00_____	6054	7.0	SMDID04220YA00_____			

* AC voltages: $f \leq 400 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Dims. in mm.

Rights reserved to amend design data without prior notification.

Continuation page 25

Continuation

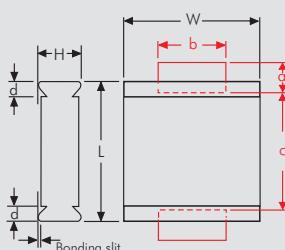
General Data

Capacitance	Size code	400 VDC/200 VAC*		630 VDC/300 VAC*			1000 VDC/400 VAC*		
		H ± 0.3	Part number	Size code	H ± 0.3	Part number	Size code	H ± 0.3	Part number
0.01 μF				5040	6.0	SMDIJ02100XA00_____	5040	6.0	SMDIO12100XA00_____
0.015 "				5040	6.0	SMDIJ02150XA00_____	5040	6.0	SMDIO12150XA00_____
0.022 "	4030 5040	5.0 6.0	SMDIG02220VA00_____ SMDIG02220XA00_____	5040	6.0	SMDIJ02220XA00_____	6054	7.0	SMDIO12220YA00_____
0.033 "	4030 5040	5.0 6.0	SMDIG02330VA00_____ SMDIG02330XA00_____	5040	6.0	SMDIJ02330XA00_____	6054	7.0	SMDIO12330YA00_____
0.047 "	4030 5040	5.0 6.0	SMDIG02470VA00_____ SMDIG02470XA00_____	5040	6.0	SMDIJ02470XA00_____			
0.068 "	4030 5040	5.0 6.0	SMDIG02680VA00_____ SMDIG02680XA00_____	6054	7.0	SMDIJ02680YA00_____			
0.1 μF	4030 5040 6054	5.0 6.0 7.0	SMDIG03100VA00_____ SMDIG03100XA00_____ SMDIG03100YA00_____						
0.15 "	5040 6054	6.0 7.0	SMDIG03150XA00_____ SMDIG03150YA00_____						
0.22 "	6054	7.0	SMDIG03220YA00_____						
0.33 "	6054	7.0	SMDIG03330YA00_____						

* AC voltages: $f \leq 400 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Dims. in mm.

Solder pad recommendation



Part number completion:						
Tolerance: 20 % = M						
10 % = K						
5 % = J						
Packing: bulk = S						
Pin length: none = 00						
Taped version see page 148.						

Size code	L ± 0.3	W ± 0.3	d	a min.	b min.	c max.
1812	4.8	3.3	0.5	1.2	3.5	3.5
2220	5.7	5.1	0.5	1.2	4	4.5
2824	7.2	6.1	0.5	1.2	4	6.5
4030	10.2	7.6	0.5	2.5	6	9
5040	12.7	10.2	0.7	2.5	6	11.5
6054	15.3	13.7	0.7	2.5	6	14

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WIMA Miniature Capacitors in PCM 2.5 mm



The WIMA series with PCM 2.5 mm are contacted at the end surfaces and have very low self-inductance due to the small pin spacing of the capacitor and its fully contacted electrodes. Furthermore, the pulse and current loading capacities basically increase, the smaller the PCM can be designed, because – provided that the thickness of the film is the same – a longer band length is needed to achieve a particular capacitance value.

WIMA capacitors are produced with the proven box technology using solvent-resistant, flame-retardant plastic cases according to UL 94 V-0. They are environmentally compatible with the RoHS 2011/65/EU guidelines of the European Union.

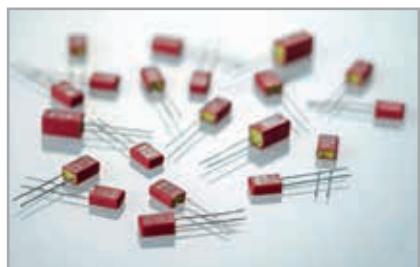
WIMA subminiature capacitors in PCM 2.5 mm are outstandingly suitable as reservoir and decoupling capacitors for high-speed digital circuits and for HF decoupling in the field of high frequencies. Due to their excellent electrical properties they can replace ceramic capacitors in applications where quality and reliability are required. Due to their reduced dimensions they open up new possibilities for use in applications with limited space requirements and high package density.

WIMA FKP 02

WIMA MKS 02

WIMA plastic film capacitors in PCM 2.5 mm are available in metallized, self-healing version WIMA MKS 02 or in pulse duty film and foil versions WIMA FKP 02. As a dielectric, Polyester or Polypropylene film is used. The capacitance range includes values of 100 pF through 1.0 µF and voltage ratings of 50 VDC, 63 VDC, 100 VDC, 250 VDC and 400 VDC.

The realization of the smallest plastic film capacitors in the world has been made possible by the use of ultra-thin plastic film in thicknesses of 0.8 µm and below. The film processing with highly sensitive machines requires a high degree of experience and technical know-how.



**Polypropylene (PP) Film/Foil Capacitors for Pulse Applications in PCM 2.5 mm.
Capacitances from 100 pF to 0.01 µF. Rated Voltages from 63 VDC to 400 VDC.**

Special Features

- Pulse duty construction
- PCM 2.5 mm
- Close tolerances up to $\pm 2.5\%$
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.

- Sample and hold
- Timing
- LC-Filtering
- Oscillating circuits
- Audio equipment

Construction

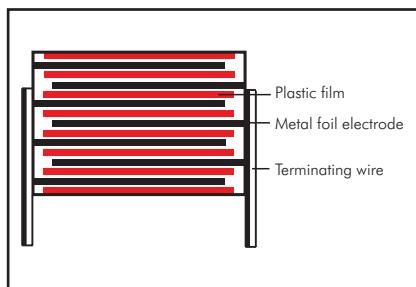
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Metal foil

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

100 pF to 0.01 µF (E12-values on request)

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2.5\%$

Operating temperature range:

-55° C to +100° C

Test specifications:

In accordance with IEC 60384-13

Climatic test category:

55/100/21 in accordance with IEC

Insulation resistance

at +20° C: $\geq 3 \times 10^5 \text{ M}\Omega$

Measuring voltage:

$U_r = 63 \text{ V}$: $U_{\text{test}} = 50 \text{ V}/1 \text{ min.}$

$U_r \geq 100 \text{ V}$: $U_{\text{test}} = 100 \text{ V}/1 \text{ min.}$

Test voltage:

$2 U_r$, 2 sec.

Maximum pulse rise time:

1000 V/µsec for pulses equal to the rated voltage

Dielectric absorption:

0.05%

Temperature coefficient:

$-200 \times 10^{-6}/^\circ \text{C}$ (typical)

Dissipation factors

at +20° C: $\tan \delta$

at f	$C \leq 0.01 \mu\text{F}$
1 kHz	$\leq 5 \times 10^{-4}$
10 kHz	$\leq 6 \times 10^{-4}$
100 kHz	$\leq 8 \times 10^{-4}$

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.

Reliability:

Operational life > 300 000 hours
Failure rate < 5 fit (0.5 x U_r and 40° C)

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

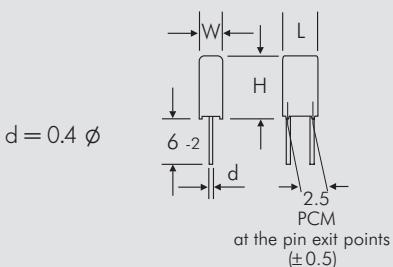
General Data

Capacitance	63 VDC/40 VAC*					100 VDC/63 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	2.5	7	4.6	2.5	FKP0C001000B00_____	2.5	7	4.6	2.5	FKP0D001000B00_____
150 "	2.5	7	4.6	2.5	FKP0C001500B00_____	2.5	7	4.6	2.5	FKP0D001500B00_____
220 "	2.5	7	4.6	2.5	FKP0C002200B00_____	2.5	7	4.6	2.5	FKP0D002200B00_____
330 "	2.5	7	4.6	2.5	FKP0C003300B00_____	2.5	7	4.6	2.5	FKP0D003300B00_____
470 "	2.5	7	4.6	2.5	FKP0C004700B00_____	2.5	7	4.6	2.5	FKP0D004700B00_____
680 "	2.5	7	4.6	2.5	FKP0C006800B00_____	2.5	7	4.6	2.5	FKP0D006800B00_____
1000 pF	2.5	7	4.6	2.5	FKP0C011000B00_____	2.5	7	4.6	2.5	FKP0D011000B00_____
1500 "	2.5	7	4.6	2.5	FKP0C011500B00_____	2.5	7	4.6	2.5	FKP0D011500B00_____
2200 "	3	7.5	4.6	2.5	FKP0C012200C00_____	3	7.5	4.6	2.5	FKP0D012200C00_____
3300 "	3.8	8.5	4.6	2.5	FKP0C013300D00_____	3.8	8.5	4.6	2.5	FKP0D013300D00_____
4700 "	4.6	9	4.6	2.5	FKP0C014700E00_____	4.6	9	4.6	2.5	FKP0D014700E00_____
6800 "	4.6	9	4.6	2.5	FKP0C016800E00_____	4.6	9	4.6	2.5	FKP0D016800E00_____
0.01 μ F	5.5	10	4.6	2.5	FKP0C021000F00_____	5.5	10	4.6	2.5	FKP0D021000F00_____
Capacitance	250 VDC/160 VAC*					400 VDC/200 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	2.5	7	4.6	2.5	FKP0F001000B00_____	2.5	7	4.6	2.5	FKP0G001000B00_____
150 "	2.5	7	4.6	2.5	FKP0F001500B00_____	2.5	7	4.6	2.5	FKP0G001500B00_____
220 "	2.5	7	4.6	2.5	FKP0F002200B00_____	2.5	7	4.6	2.5	FKP0G002200B00_____
330 "	2.5	7	4.6	2.5	FKP0F003300B00_____	2.5	7	4.6	2.5	FKP0G003300B00_____
470 "	2.5	7	4.6	2.5	FKP0F004700B00_____	2.5	7	4.6	2.5	FKP0G004700B00_____
680 "	2.5	7	4.6	2.5	FKP0F006800B00_____	3	7.5	4.6	2.5	FKP0G006800C00_____
1000 pF	2.5	7	4.6	2.5	FKP0F011000B00_____	3.8	8.5	4.6	2.5	FKP0G011000D00_____
1500 "	3	7.5	4.6	2.5	FKP0F011500C00_____	4.6	9	4.6	2.5	FKP0G011500E00_____
2200 "	3.8	8.5	4.6	2.5	FKP0F012200D00_____	4.6	9	4.6	2.5	FKP0G012200E00_____
3300 "	4.6	9	4.6	2.5	FKP0F013300E00_____	5.5	10	4.6	2.5	FKP0G013300F00_____
4700 "	5.5	10	4.6	2.5	FKP0F014700F00_____					

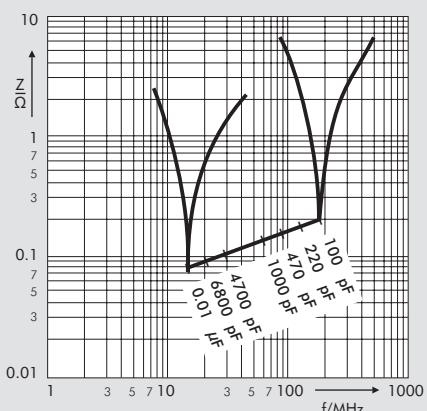
* AC voltage: $f \leq 400$ Hz; $1.4 \times U_{rms} + UDC \leq U_f$

** PCM = Printed circuit module = pin spacing

Dims. in mm.



Part number completion:	
Tolerance:	20 % = M 10 % = K 5 % = J 2.5 % = H
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	



Impedance change with frequency (general guide).

Rights reserved to amend design data without prior notification.

The values of the WIMA FKS 02 and WIMA FKM 02 ranges according to the main catalogue 2009 are still available on request.

**Metallized Polyester (PET) Capacitors in PCM 2.5 mm.
Capacitances from 3300 pF to 1.0 µF. Rated Voltages from 63 VDC to 400 VDC.**

Special Features

- High volume/capacitance ratio and reduced base
- PCM 2.5 mm
- Self-healing
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Construction

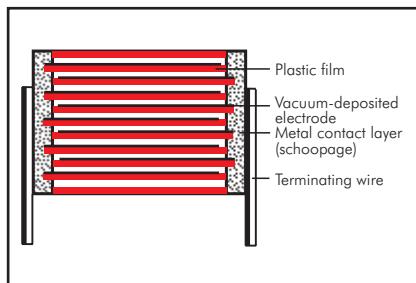
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Silver.

Electrical Data

Capacitance range:

3300 pF to 1.0 µF (IEC-values on request)

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC

Capacitance tolerances:

±20%, ±10% (±5% available subject to special enquiry)

Operating temperature range:

-55°C to +100°C

Test specifications:

In accordance with IEC 60384-2

Climatic test category:

55/100/21 in accordance with IEC

Insulation resistance at +20°C:

Dissipation factors at + 20° C: tan δ

at f	$C \leq 0.1 \mu F$	$0.1 \mu F < C \leq 1.0 \mu F$
1 kHz	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$
10 kHz	$\leq 15 \times 10^{-3}$	$\leq 15 \times 10^{-3}$
100 kHz	$\leq 30 \times 10^{-3}$	-

Voltage derating:

A voltage derating factor of 1.25 % per K must be applied from +85°C for DC voltages and from +75°C for AC voltages.

Reliability:

Operational life > 300 000 hours

Failure rate < 2 fit ($0.5 \times U_r$ and 40°C)

U_r	U_{test}	$C \leq 0.33 \mu F$	$0.33 \mu F < C \leq 1.0 \mu F$
63 VDC	50 V	$\geq 3.75 \times 10^3 M\Omega$	$\geq 1250 \text{ sec } (M\Omega \times \mu F)$
$\geq 100 \text{ VDC}$	100 V	$\geq 1 \times 10^4 M\Omega$	-

Measuring time: 1 min.

Test voltage: $1.6 U_r$, 2 sec.

Maximum pulse rise time:

Capacitance pF/µF	Pulse rise time V/µsec max. operation/test
3300 ... 6800	100 / 1000
0.01 ... 0.022	50 / 500
0.033 ... 0.068	30 / 300
0.1 ... 0.33	20 / 200
0.47 ... 1.0	15 / 150

for pulses equal to the rated voltage

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec^2 in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

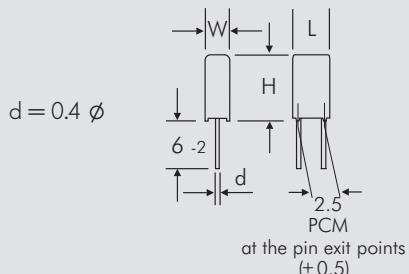
Capacitance	63 VDC/40 VAC*					100 VDC/63 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	2.5	7	4.6	2.5	MKS0C021000B00_____	2.5	7	4.6	2.5	MKS0D021000B00_____
0.015 "	2.5	7	4.6	2.5	MKS0C021500B00_____	2.5	7	4.6	2.5	MKS0D021500B00_____
0.022 "	2.5	7	4.6	2.5	MKS0C022200B00_____	2.5	7	4.6	2.5	MKS0D022200B00_____
0.033 "	2.5	7	4.6	2.5	MKS0C023300B00_____	2.5	7	4.6	2.5	MKS0D023300B00_____
0.047 "	2.5	7	4.6	2.5	MKS0C024700B00_____	2.5	7	4.6	2.5	MKS0D024700B00_____
0.068 "	2.5	7	4.6	2.5	MKS0C026800B00_____	2.5	7	4.6	2.5	MKS0D026800B00_____
0.1 μF	3	7.5	4.6	2.5	MKS0C031000C00_____	3	7.5	4.6	2.5	MKS0D031000C00_____
0.15 "	3	7.5	4.6	2.5	MKS0C031500C00_____	3.8	8.5	4.6	2.5	MKS0D031500D00_____
0.22 "	3	7.5	4.6	2.5	MKS0C032200C00_____	4.6	9	4.6	2.5	MKS0D032200E00_____
0.33 "	3.8	8.5	4.6	2.5	MKS0C033300D00_____	5.5	10	4.6	2.5	MKS0D033300F00_____
0.47 "	4.6	9	4.6	2.5	MKS0C034700E00_____					
0.68 "	5.5	10	4.6	2.5	MKS0C036800F00_____					
1.0 μF	5.5	10	4.6	2.5	MKS0C041000F00_____					
<hr/>										
Capacitance	250 VDC/160 VAC*					400 VDC/200 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
3300 pF	2.5	7	4.6	2.5	MKS0F013300B00_____	2.5	7	4.6	2.5	MKS0G013300B00_____
4700 "	2.5	7	4.6	2.5	MKS0F014700B00_____	2.5	7	4.6	2.5	MKS0G014700B00_____
6800 "	2.5	7	4.6	2.5	MKS0F016800B00_____	2.5	7	4.6	2.5	MKS0G016800B00_____
0.01 μF	2.5	7	4.6	2.5	MKS0F021000B00_____	3	7.5	4.6	2.5	MKS0G021000C00_____
0.015 "	2.5	7	4.6	2.5	MKS0F021500B00_____	3.8	8.5	4.6	2.5	MKS0G021500D00_____
0.022 "	2.5	7	4.6	2.5	MKS0F022200B00_____	4.6	9	4.6	2.5	MKS0G022200E00_____
0.033 "	3	7.5	4.6	2.5	MKS0F023300C00_____	5.5	10	4.6	2.5	MKS0G023300F00_____
0.047 "	3.8	8.5	4.6	2.5	MKS0F024700D00_____	5.5	10	4.6	2.5	MKS0G024700F00_____
0.068 "	4.6	9	4.6	2.5	MKS0F026800E00_____					
0.1 μF	5.5	10	4.6	2.5	MKS0F031000F00_____					

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

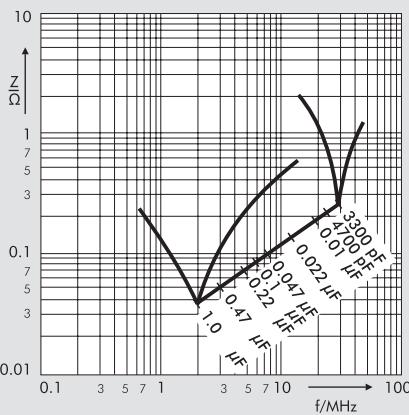
 New range and value

** PCM = Printed circuit module = pin spacing

Dims. in mm.



Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6.2 = SD
Taped version see page 149.	

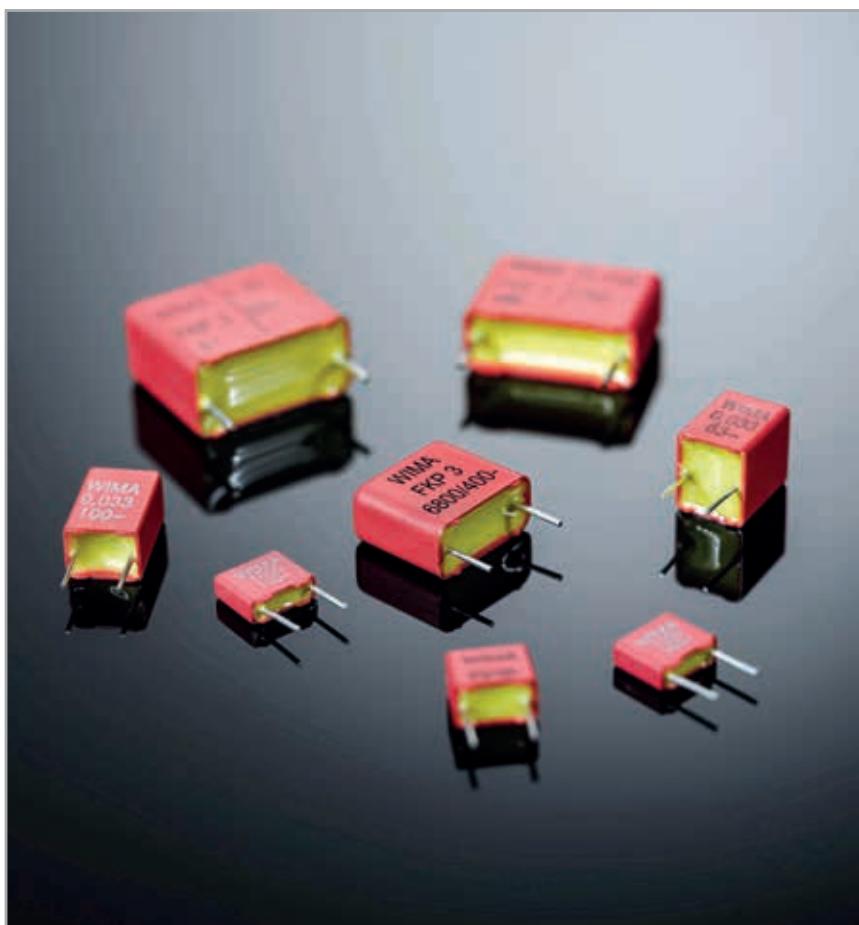


Impedance change with frequency
(general guide).

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WIMA Capacitors in PCM 5 - 15 mm with Pulse Duty Film/Foil Construction



WIMA FKS 2

WIMA FKP 2

WIMA FKS 3

WIMA FKP 3

In the case of film and foil types, the electrode is not applied as for the metalized capacitors, but is wound with the dielectric as a metal foil. Due to their lower series resistance, the components produced this way have excellent pulse and current carrying capability, as well as a very high insulation resistance.

The film/foil construction is mainly used for capacitors with smaller capacitance value. The advantage of this construction principle is the easy contactability of the metal foil electrodes and the good pulse strength. To avoid breakdowns caused by weak spots in the dielectric, the insulating film chosen is always thicker than theoretically required by the values which are deter-

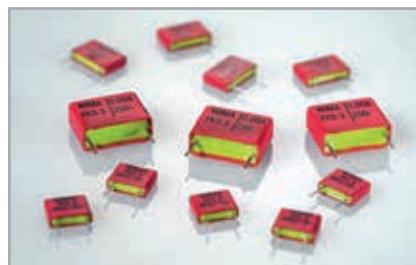
mined from the specific breakdown strength of the material.

WIMA film/foil capacitors in PCM 5 mm, 7.5 mm, 10 mm and 15 mm are available in two dielectric versions.

Capacitors with a Polyester dielectric (PET) are suitable for general applications such as coupling, decoupling and by-passing.

Polypropylene capacitors (PP) are used in the high frequency field. This includes resonant circuits, power supplies, deflection circuits, oscillator circuits and audio equipment.

WIMA capacitors are produced with the proven box technology using solvent-resistant, flame-retardant plastic cases according to UL 94 V-0. They are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.





**Polyester (PET) Film/Foil Capacitors for Pulse Applications in PCM 5 mm.
Capacitances from 1000 pF to 0.047 µF. Rated Voltages from 63 VDC to 630 VDC.**

Special Features

- Pulse duty construction
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- Coupling
- Decoupling

Construction

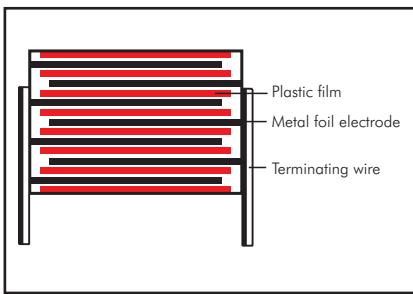
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Metal foil

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: White.

Electrical Data

Capacitance range:

1000 pF to 0.047 µF
(E12-values on request)

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC,
630 VDC

Capacitance tolerances:

± 20%, ± 10%, ± 5%

Operating temperature range:

-55° C to +100° C

Test specifications:

In accordance with IEC 60384-11

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance at +20° C:

≥ 1 x 10⁵ MΩ

Measuring voltage: 100 V/1 min.

Test voltage:

2 U_r, 2 sec.

Maximum pulse rise time:

1000 V/usec for pulses equal to the

rated voltage

Dissipation factors at +20° C: tan δ

at f	C ≤ 0.047 µF
1 kHz	≤ 7 x 10 ⁻³
10 kHz	≤ 15 x 10 ⁻³
100 kHz	≤ 20 x 10 ⁻³

Voltage derating:

A voltage derating factor of 1.25 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.

Reliability:

Operational life > 300 000 hours
Failure rate < 5 fit (0.5 x U_r and 40° C)

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	63 VDC/40 VAC*					100 VDC/63 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	2.5	6.5	7.2	5	FKS2C011001A00-----	2.5	6.5	7.2	5	FKS2D011001A00-----
1500 "	2.5	6.5	7.2	5	FKS2C011501A00-----	2.5	6.5	7.2	5	FKS2D011501A00-----
2200 "	2.5	6.5	7.2	5	FKS2C012201A00-----	2.5	6.5	7.2	5	FKS2D012201A00-----
3300 "	2.5	6.5	7.2	5	FKS2C013301A00-----	2.5	6.5	7.2	5	FKS2D013301A00-----
4700 "	2.5	6.5	7.2	5	FKS2C014701A00-----	2.5	6.5	7.2	5	FKS2D014701A00-----
6800 "	2.5	6.5	7.2	5	FKS2C016801A00-----	2.5	6.5	7.2	5	FKS2D016801A00-----
0.01 μF	3	7.5	7.2	5	FKS2C021001B00-----	3	7.5	7.2	5	FKS2D021001B00-----
0.015 "	3.5	8.5	7.2	5	FKS2C021501C00-----	3.5	8.5	7.2	5	FKS2D021501C00-----
0.022 "	4.5	9.5	7.2	5	FKS2C022201E00-----	4.5	9.5	7.2	5	FKS2D022201E00-----
0.033 "	5.5	11.5	7.2	5	FKS2C023301H00-----	5.5	11.5	7.2	5	FKS2D023301H00-----
0.047 "	7.2	13	7.2	5	FKS2C024701K00-----	7.2	13	7.2	5	FKS2D024701K00-----

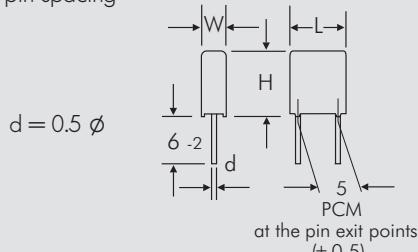
Capacitance	250 VDC/160 VAC*					400 VDC/200 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	2.5	6.5	7.2	5	FKS2F011001A00-----	2.5	6.5	7.2	5	FKS2G011001A00-----
1500 "	2.5	6.5	7.2	5	FKS2F011501A00-----	2.5	6.5	7.2	5	FKS2G011501A00-----
2200 "	2.5	6.5	7.2	5	FKS2F012201A00-----	2.5	6.5	7.2	5	FKS2G012201A00-----
3300 "	2.5	6.5	7.2	5	FKS2F013301A00-----	2.5	6.5	7.2	5	FKS2G013301A00-----
4700 "	2.5	6.5	7.2	5	FKS2F014701A00-----	2.5	6.5	7.2	5	FKS2G014701A00-----
6800 "	2.5	6.5	7.2	5	FKS2F016801A00-----	3	7.5	7.2	5	FKS2G016801B00-----
0.01 μF	3	7.5	7.2	5	FKS2F021001B00-----	3.5	8.5	7.2	5	FKS2G021001C00-----
0.015 "	3.5	8.5	7.2	5	FKS2F021501C00-----	4.5	9.5	7.2	5	FKS2G021501E00-----
0.022 "	4.5	9.5	7.2	5	FKS2F022201E00-----	5.5	11.5	7.2	5	FKS2G022201H00-----
0.033 "	5.5	11.5	7.2	5	FKS2F023301H00-----	7.2	13	7.2	5	FKS2G023301K00-----
0.047 "	7.2	13	7.2	5	FKS2F024701K00-----					

Capacitance	630 VDC/250 VAC*					Part number
	W	H	L	PCM**		
1000 pF	3	7.5	7.2	5	FKS2J011001B00-----	
1500 "	3	7.5	7.2	5	FKS2J011501B00-----	
2200 "	3	7.5	7.2	5	FKS2J012201B00-----	
3300 "	3	7.5	7.2	5	FKS2J013301B00-----	
4700 "	3.5	8.5	7.2	5	FKS2J014701C00-----	
6800 "	4.5	9.5	7.2	5	FKS2J016801E00-----	
0.01 μF	4.5	9.5	7.2	5	FKS2J021001E00-----	
0.015 "	5.5	11.5	7.2	5	FKS2J021501H00-----	
0.022 "	7.2	13	7.2	5	FKS2J022201K00-----	

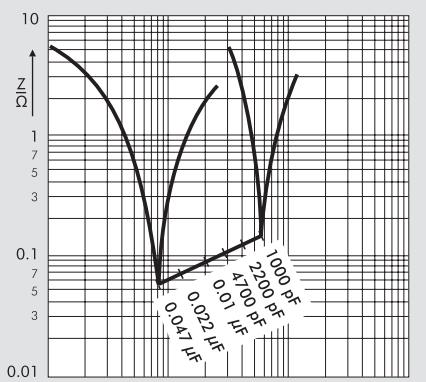
* AC voltage: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = pin spacing

Dims. in mm.



Rights reserved to amend design data without prior notification.



Impedance change with frequency
(general guideline).

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.



**Polypropylene (PP) Film/Foil Capacitors for Pulse Applications in PCM 5 mm.
Capacitances from 33 pF to 0.033 µF. Rated Voltages from 63 VDC to 1000 VDC.**

Special Features

- Pulse duty construction
- Close tolerances up to $\pm 2.5\%$ ($\pm 1\%$ on request)
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.

- Sample and hold
- Timing
- LC-Filtering
- Oscillating circuits
- Audio equipment

Construction

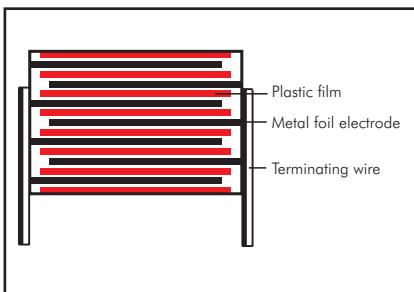
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Metal foil

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

33 pF to 0.033 µF (E12-values on request)

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 800 VDC, 1000 VDC

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2.5\%$ ($\pm 2\%$, $\pm 1.5\%$ or $\pm 1\%$ available as precision capacitors subject to special enquiry)

Operating temperature range:

-55°C to +100°C

Test specifications:

In accordance with IEC 60384-13

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance

at +20°C: $\geq 3 \times 10^5 \Omega$

Measuring voltage:

$U_r = 63 \text{ V}$: $U_{\text{test}} = 50 \text{ V}/1 \text{ min.}$

$U_r \geq 100 \text{ V}$: $U_{\text{test}} = 100 \text{ V}/1 \text{ min.}$

Dissipation factors

at +20°C: $\tan \delta$

at f	$C \leq 1000 \text{ pF}$	$1000 \text{ pF} < C \leq 4700 \text{ pF}$	$C > 4700 \text{ pF}$
1 kHz	$\leq 5 \times 10^{-4}$	$\leq 5 \times 10^{-4}$	$\leq 5 \times 10^{-4}$
10 kHz	$\leq 6 \times 10^{-4}$	$\leq 6 \times 10^{-4}$	$\leq 6 \times 10^{-4}$
100 kHz	$\leq 8 \times 10^{-4}$	$\leq 8 \times 10^{-4}$	-
1 MHz	$\leq 10 \times 10^{-4}$	-	-

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Test voltage:

2 U_r , 2 sec.

Maximum pulse rise time:

1000 V/µsec for pulses equal to the rated voltage

Dielectric absorption:

0.05%

Temperature coefficient:

$-200 \times 10^{-6}/^\circ\text{C}$ (typical)

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85°C for DC voltages and from +75°C for AC voltages

Reliability:

Operational life > 300 000 hours

Failure rate < 5 fit (0.5 x U_r and 40°C)

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

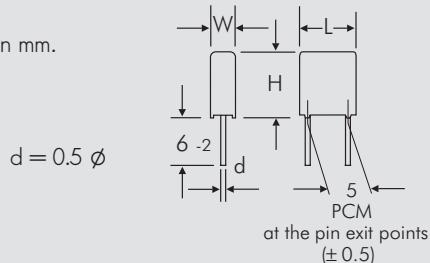
Capacitance	63 VDC/40 VAC*					100 VDC/63 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	4.5	6	7.2	5	FKP2C001001D00_____	4.5	6	7.2	5	FKP2D001001D00_____
150 "	4.5	6	7.2	5	FKP2C001501D00_____	4.5	6	7.2	5	FKP2D001501D00_____
220 "	4.5	6	7.2	5	FKP2C002201D00_____	4.5	6	7.2	5	FKP2D002201D00_____
330 "	4.5	6	7.2	5	FKP2C003301D00_____	4.5	6	7.2	5	FKP2D003301D00_____
470 "	4.5	6	7.2	5	FKP2C004701D00_____	4.5	6	7.2	5	FKP2D004701D00_____
680 "	4.5	6	7.2	5	FKP2C006801D00_____	4.5	6	7.2	5	FKP2D006801D00_____
1000 pF	4.5	6	7.2	5	FKP2C011001D00_____	4.5	6	7.2	5	FKP2D011001D00_____
1500 "	4.5	6	7.2	5	FKP2C011501D00_____	4.5	6	7.2	5	FKP2D011501D00_____
2200 "	4.5	6	7.2	5	FKP2C012201D00_____	4.5	6	7.2	5	FKP2D012201D00_____
3300 "	4.5	6	7.2	5	FKP2C013301D00_____	5.5	7	7.2	5	FKP2D013301G00_____
4700 "	4.5	6	7.2	5	FKP2C014701D00_____	5.5	7	7.2	5	FKP2D014701G00_____
6800 "	4.5	6	7.2	5	FKP2C016801D00_____	5.5	7	7.2	5	FKP2D016801G00_____
0.01 μ F	5.5	7	7.2	5	FKP2C021001G00_____	6.5	8	7.2	5	FKP2D021001I00_____
0.015 "	6.5	8	7.2	5	FKP2C021501I00_____	7.2	8.5	7.2	5	FKP2D021501J00_____
0.022 "	7.2	8.5	7.2	5	FKP2C022201J00_____	8.5	10	7.2	5	FKP2D022201L00_____
0.033 "	8.5	10	7.2	5	FKP2C023301L00_____					
Capacitance	250 VDC/160 VAC*					400 VDC/220 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	4.5	6	7.2	5	FKP2F001001D00_____	4.5	6	7.2	5	FKP2G001001D00_____
150 "	4.5	6	7.2	5	FKP2F001501D00_____	4.5	6	7.2	5	FKP2G001501D00_____
220 "	4.5	6	7.2	5	FKP2F002201D00_____	4.5	6	7.2	5	FKP2G002201D00_____
330 "	4.5	6	7.2	5	FKP2F003301D00_____	4.5	6	7.2	5	FKP2G003301D00_____
470 "	4.5	6	7.2	5	FKP2F004701D00_____	4.5	6	7.2	5	FKP2G004701D00_____
680 "	4.5	6	7.2	5	FKP2F006801D00_____	4.5	6	7.2	5	FKP2G006801D00_____
1000 pF	4.5	6	7.2	5	FKP2F011001D00_____	4.5	6	7.2	5	FKP2G011001D00_____
1500 "	4.5	6	7.2	5	FKP2F011501D00_____	4.5	6	7.2	5	FKP2G011501D00_____
2200 "	4.5	6	7.2	5	FKP2F012201D00_____	4.5	6	7.2	5	FKP2G012201D00_____
3300 "	5.5	7	7.2	5	FKP2F013301G00_____	5.5	7	7.2	5	FKP2G013301G00_____
4700 "	6.5	8	7.2	5	FKP2F014701I00_____	6.5	8	7.2	5	FKP2G014701I00_____
6800 "	6.5	8	7.2	5	FKP2F016801J00_____	7.2	8.5	7.2	5	FKP2G016801J00_____
0.01 μ F	7.2	8.5	7.2	5	FKP2F021001J00_____	8.5	10	7.2	5	FKP2G021001L00_____
0.015 "	8.5	10	7.2	5	FKP2F021501L00_____					

* AC voltage; $f \leq 1000$ Hz; $1.4 \times U_{rms} + U_{DC} \leq U_r$

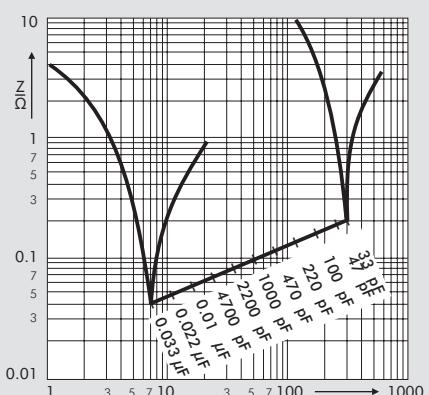
** PCM = Printed circuit module = pin spacing

E12 values and individual values available from 27 pF up on request.

Dims in mm



Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
	2.5 % = H
	2 % = G
	1.5 % = F
	1 % = E
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	



Impedance change with frequency
(general guide).

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Continuation page 36

Continuation

General Data

Capacitance	630 VDC/250 VAC*					800 VDC/250 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	4.5	6	7.2	5	FKP2J001001D00_____	4.5	6	7.2	5	FKP2L001001D00_____
150 "	4.5	6	7.2	5	FKP2J001501D00_____	4.5	6	7.2	5	FKP2L001501D00_____
220 "	4.5	6	7.2	5	FKP2J002201D00_____	4.5	6	7.2	5	FKP2L002201D00_____
330 "	4.5	6	7.2	5	FKP2J003301D00_____	4.5	6	7.2	5	FKP2L003301D00_____
470 "	4.5	6	7.2	5	FKP2J004701D00_____	5.5	7	7.2	5	FKP2L004701G00_____
680 "	4.5	6	7.2	5	FKP2J006801D00_____	5.5	7	7.2	5	FKP2L006801G00_____
1000 pF	4.5	6	7.2	5	FKP2J011001D00_____	5.5	7	7.2	5	FKP2L011001G00_____
1500 "	4.5	6	7.2	5	FKP2J011501D00_____	5.5	7	7.2	5	FKP2L011501G00_____
2200 "	5.5	7	7.2	5	FKP2J012201G00_____	6.5	8	7.2	5	FKP2L012201I00_____
3300 "	6.5	8	7.2	5	FKP2J013301I00_____	7.2	8.5	7.2	5	FKP2L013301J00_____
4700 "	6.5	8	7.2	5	FKP2J014701I00_____	8.5	10	7.2	5	FKP2L014701L00_____
6800 "	7.2	8.5	7.2	5	FKP2J016801J00_____					
0.01 μF	8.5	10	7.2	5	FKP2J021001L00_____					

Capacitance	1000 VDC/250 VAC*					Part number
	W	H	L	PCM**		
33 pF	4.5	6	7.2	5	FKP2O100331D00_____	
47 "	4.5	6	7.2	5	FKP2O100471D00_____	
68 "	4.5	6	7.2	5	FKP2O100681D00_____	
100 pF	4.5	6	7.2	5	FKP2O101001D00_____	
150 "	4.5	6	7.2	5	FKP2O101501D00_____	
220 "	4.5	6	7.2	5	FKP2O102201D00_____	
330 "	4.5	6	7.2	5	FKP2O103301D00_____	
470 "	5.5	7	7.2	5	FKP2O104701G00_____	
680 "	5.5	7	7.2	5	FKP2O106801G00_____	
1000 pF	6.5	8	7.2	5	FKP2O111001I00_____	
1500 "	7.2	8.5	7.2	5	FKP2O111501J00_____	
2200 "	8.5	10	7.2	5	FKP2O112201L00_____	

E12 values and individual values available from 27 pF up on request.

Dims. in mm.

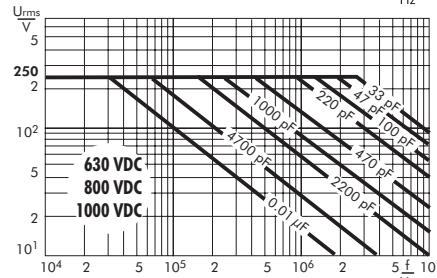
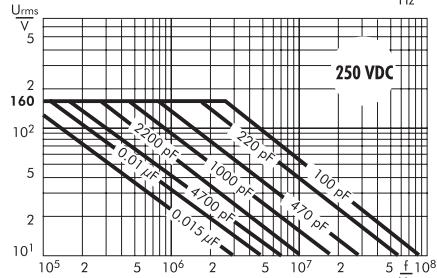
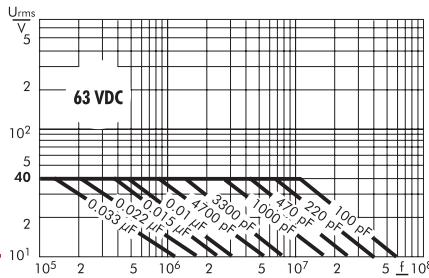
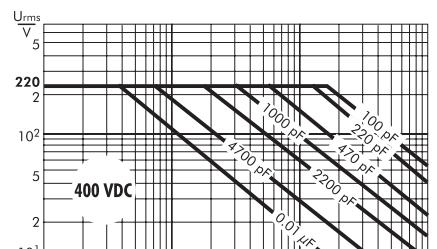
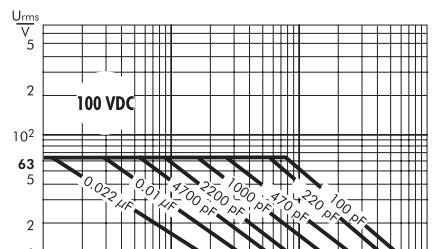
Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
	2.5 % = H
	2 % = G
	1.5 % = F
	1 % = E
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

* AC voltage: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

** PCM = Printed circuit module = pin spacing.

Rights reserved to amend design data without prior notification.

Permissible AC voltage
in relation to frequency
at 10° C internal temperature rise
(general guide).



**Polyester (PET) Film/Foil Capacitors for Pulse Applications
in PCM 7.5 mm to 15 mm. Capacitances from 1000 pF to 0.22 µF.
Rated Voltages from 100 VDC to 630 VDC.**

Special Features

- Pulse duty construction
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- Coupling
- Decoupling

Construction

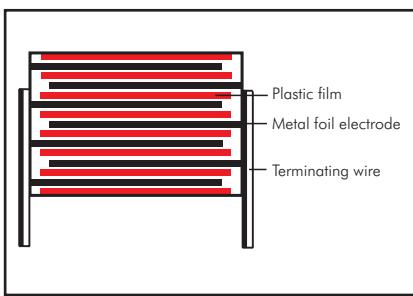
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Metal foil

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: White.

Electrical Data

Capacitance range:

1000 pF to 0.22 µF (E12-values on request)

Rated voltages:

100 VDC, 250 VDC, 400 VDC, 630 VDC

Capacitance tolerances:

± 20%, ± 10%, ± 5%

Operating temperature range:

-55° C to +100° C

Test specifications:

In accordance with IEC 60384-11

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance at +20° C:

≥ 1 x 10⁵ MΩ

Measuring voltage: 100 V/1 min.

Test voltage: 2 U_r, 2 sec.

Maximum pulse rise time:

1000 V/µsec for pulses equal to the rated voltage

Dissipation factors at +20° C: tan δ

at f	C ≤ 0,22 µF
1 kHz	≤ 7 x 10 ⁻³
10 kHz	≤ 15 x 10 ⁻³
100 kHz	≤ 20 x 10 ⁻³

Voltage derating:

A voltage derating factor of 1.25 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.

Reliability:

Operational life > 300 000 hours
Failure rate < 5 fit (0.5 x U_r and 40° C)

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

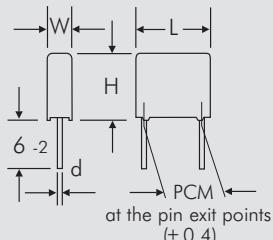
Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	3	8.5	10	7.5	FKS3D011002B00_----	3	8.5	10	7.5	FKS3F011002B00_----
1500 "	3	8.5	10	7.5	FKS3D011502B00_----	3	8.5	10	7.5	FKS3F011502B00_----
2200 "	3	8.5	10	7.5	FKS3D012202B00_----	3	8.5	10	7.5	FKS3F012202B00_----
3300 "	3	8.5	10	7.5	FKS3D013302B00_----	3	8.5	10	7.5	FKS3F013302B00_----
4700 "	3	8.5	10	7.5	FKS3D014702B00_----	3	8.5	10	7.5	FKS3F014702B00_----
6800 "	3	8.5	10	7.5	FKS3D016802B00_----	3	9	13	10	FKS3F016802B00_----
						3	8.5	10	7.5	FKS3F016803A00_----
						3	9	13	10	FKS3F016803A00_----
0.01 µF	3	8.5	10	7.5	FKS3D021002B00_----	3	9	13	10	FKS3F021003A00_----
	3	9	13	10	FKS3D021003A00_----					
0.015 "	3	8.5	10	7.5	FKS3D021502B00_----	4	9.5	13	10	FKS3F021503D00_----
	3	9	13	10	FKS3D021503A00_----					
0.022 "	3	8.5	10	7.5	FKS3D022202B00_----	5	11	13	10	FKS3F022203F00_----
	3	9	13	10	FKS3D022203A00_----					
0.033 "	4	9.5	13	10	FKS3D023303D00_----	6	12	13	10	FKS3F023303G00_----
0.047 "	4	9.5	13	10	FKS3D024703D00_----	6	12.5	18	15	FKS3F024704C00_----
0.068 "	5	11	13	10	FKS3D026803F00_----	7	14	18	15	FKS3F026804D00_----
0.1 µF	6	12	13	10	FKS3D031003G00_----	8	15	18	15	FKS3F031004F00_----
0.15 "	7	14	18	15	FKS3D031504D00_----	9	16	18	15	FKS3F031504J00_----
0.22 "	8	15	18	15	FKS3D032204F00_----					

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = pin spacing.

Dims. in mm.

The values of the WIMA FKM 3 range according to the main catalogue 2009 are still available on request.



Part number completion:	
Tolerance:	20 % = M 10 % = K 5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

$$\begin{aligned} d &= 0.5 \text{ } \varnothing \text{ if } W = 3 \\ d &= 0.6 \text{ } \varnothing \text{ if } W \geq 4 \\ d &= 0.8 \text{ } \varnothing \text{ if } PCM = 15 \end{aligned} \quad \left. \right\} \text{PCM 7.5 and 10}$$

Rights reserved to amend design data without prior notification.

Continuation page 39

Continuation

General Data

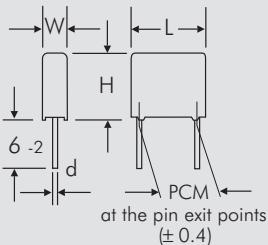
Capacitance	400 VDC/250 VAC*					630 VDC/300 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	3	9	13	10	FKS3G011003A00_____	3	9	13	10	FKS3J011003A00_____
1500 "	3	9	13	10	FKS3G011503A00_____	3	9	13	10	FKS3J011503A00_____
2200 "	3	9	13	10	FKS3G012203A00_____	3	9	13	10	FKS3J012203A00_____
3300 "	3	9	13	10	FKS3G013303A00_____	4	9.5	13	10	FKS3J013303D00_____
4700 "	3	9	13	10	FKS3G014703A00_____	4	9.5	13	10	FKS3J014703D00_____
6800 "	3	9	13	10	FKS3G016803A00_____	5	11	13	10	FKS3J016803F00_____
0.01 µF	4	9.5	13	10	FKS3G021003D00_____	6	12	13	10	FKS3J021003G00_____
0.015 "	5	11	13	10	FKS3G021503F00_____	6	12.5	18	15	FKS3J021504C00_____
0.022 "	6	12	13	10	FKS3G022203G00_____	7	14	18	15	FKS3J022204D00_____
0.033 "	6	12.5	18	15	FKS3G023304C00_____	8	15	18	15	FKS3J023304F00_____
0.047 "	7	14	18	15	FKS3G024704D00_____					
0.068 "	8	15	18	15	FKS3G026804F00_____					
0.1 µF	9	16	18	15	FKS3G031004J00_____					

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leqslant U_r$

** PCM = Printed circuit module = pin spacing.

Dims. in mm.

The values of the WIMA FKM 3 range according to the main catalogue 2009 are still available on request..



Part number completion:

Tolerance: 20 % = M
10 % = K
5 % = J

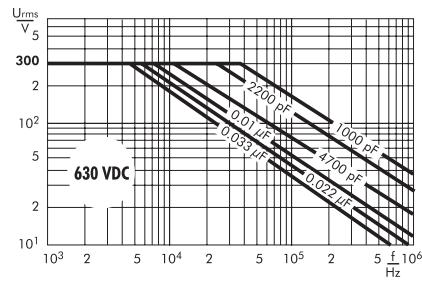
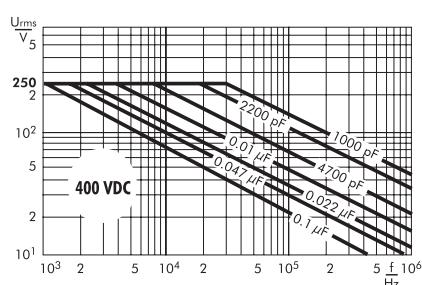
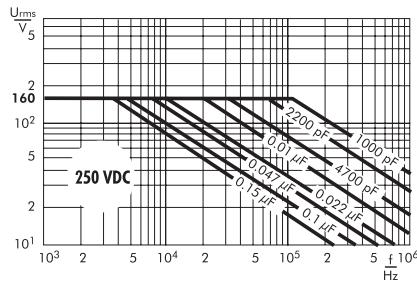
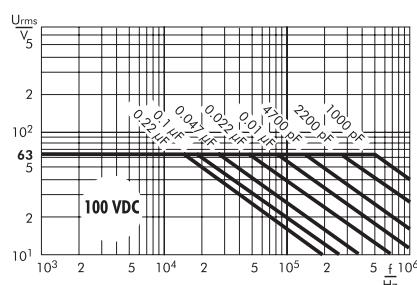
Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 149.

$$\begin{aligned} d &= 0.5 \phi \text{ if } W = 3 \\ d &= 0.6 \phi \text{ if } W \geq 4 \\ d &= 0.8 \phi \text{ if } \text{PCM} = 15 \end{aligned} \quad \left. \right\} \text{PCM 7.5 and 10}$$

Rights reserved to amend design data without prior notification.

Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).





**Polypropylene (PP) Film and Foil Capacitors for Pulse Applications
in PCM 7.5 mm to 15 mm. Capacitances from 100 pF to 0.22 µF.
Rated Voltages from 63 VDC to 1000 VDC.**

Special Features

- Pulse duty construction
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.

- Sample and hold
- Timing
- LC-Filtering
- Oscillating circuits
- Audio equipment

Construction

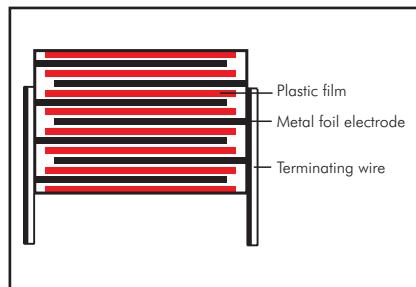
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Metal foil

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

100 pF to 0.22 µF (E12-values on request)

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 850 VDC, 1000 VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55° C to +100° C

Test specifications:

In accordance with IEC 60384-13

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance at +20° C:

$\geq 3 \times 10^5$ MΩ

Measuring voltage:

$U_r = 63$ V; $U_{test} = 50$ V/1 min.

$U_r \geq 100$ V; $U_{test} = 100$ V/1 min.

Test voltage:

$2 U_r$, 2 sec.

Maximum pulse rise time:

1000 V/µsec for pulses equal to the rated voltage

Dielectric absorption:

0.05 %

Temperature coefficient:

$-200 \times 10^{-6}/^\circ\text{C}$ (general guide)

Dissipation factors

at +20° C: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 0.22 \mu\text{F}$
1 kHz	$\leq 5 \times 10^{-4}$	$\leq 5 \times 10^{-4}$
10 kHz	$\leq 6 \times 10^{-4}$	$\leq 6 \times 10^{-4}$
100 kHz	$\leq 8 \times 10^{-4}$	-

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.

Reliability:

Operational life > 300 000 hours
Failure rate < 5 fit ($0.5 \times U_r$ and 40° C)

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec^2 in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	63 VDC/40 VAC*					100 VDC/63 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF						3	8.5	10	7.5	FKP3D001002B00_____
150 „						3	8.5	10	7.5	FKP3D001502B00_____
220 „						3	8.5	10	7.5	FKP3D002202B00_____
330 „						3	8.5	10	7.5	FKP3D003302B00_____
470 „						3	8.5	10	7.5	FKP3D004702B00_____
680 „						3	8.5	10	7.5	FKP3D006802B00_____
1000 pF						3	8.5	10	7.5	FKP3D011002B00_____
1500 „						3	8.5	10	7.5	FKP3D011502B00_____
2200 „						3	8.5	10	7.5	FKP3D012202B00_____
3300 „						3	8.5	10	7.5	FKP3D013302B00_____
4700 „						3	8.5	10	7.5	FKP3D014702B00_____
6800 „						4	9	10	7.5	FKP3D016802C00_____
0.01 µF	4	9	10	7.5	FKP3C021502C00_____	4	9	10	7.5	FKP3D021002C00_____
0.015 „	4	9.5	13	10	FKP3C022203D00_____	4	9.5	13	10	FKP3D021503D00_____
0.022 „	4	9.5	13	10	FKP3C023303D00_____	5	11	13	10	FKP3D022203F00_____
0.033 „	4	9.5	13	10	FKP3C024703F00_____	6	12	13	10	FKP3D023303G00_____
0.047 „	5	11	13	10	FKP3C026803G00_____	5	11	18	15	FKP3D024704B00_____
0.068 „	6	12	13	10	FKP3C026804C00_____	6	12.5	18	15	FKP3D026804C00_____
0.1 µF	6	12.5	18	15	FKP3C031004C00_____	7	14	18	15	FKP3D031004D00_____
0.15 „	8	15	18	15	FKP3C031504F00_____	9	16	18	15	FKP3D031504J00_____
0.22 „	9	16	18	15	FKP3C032204J00_____					
100 pF	3	8.5	10	7.5	FKP3F001002B00_____	3	8.5	10	7.5	FKP3G001002B00_____
150 „	3	8.5	10	7.5	FKP3F001502B00_____	3	8.5	10	7.5	FKP3G001502B00_____
220 „	3	8.5	10	7.5	FKP3F002202B00_____	3	8.5	10	7.5	FKP3G002202B00_____
330 „	3	8.5	10	7.5	FKP3F003302B00_____	3	8.5	10	7.5	FKP3G003302B00_____
470 „	3	8.5	10	7.5	FKP3F004702B00_____	3	8.5	10	7.5	FKP3G004702B00_____
680 „	3	8.5	10	7.5	FKP3F006802B00_____	3	8.5	10	7.5	FKP3G006802B00_____
1000 pF	3	8.5	10	7.5	FKP3F011002B00_____	3	8.5	10	7.5	FKP3G011002B00_____
1500 „	3	8.5	10	7.5	FKP3F011502B00_____	4	9	10	7.5	FKP3G011502C00_____
2200 „	4	9	10	7.5	FKP3F012202C00_____	4	9	10	7.5	FKP3G012202C00_____
3300 „	3	9	13	10	FKP3F013303A00_____	4	9.5	13	10	FKP3G013303D00_____
4700 „	4	9.5	13	10	FKP3F014703D00_____	5	11	13	10	FKP3G014703F00_____
6800 „	5	11	13	10	FKP3F016803F00_____	6	12	13	10	FKP3G016803G00_____
0.01 µF	5	11	13	10	FKP3F021003F00_____	5	11	18	15	FKP3G021004B00_____
0.015 „	6	12	13	10	FKP3F021503G00_____	6	12.5	18	15	FKP3G021504C00_____
0.022 „	6	12.5	18	15	FKP3F022204C00_____	7	14	18	15	FKP3G022204D00_____
0.033 „	7	14	18	15	FKP3F023304D00_____	8	15	18	15	FKP3G023304F00_____
0.047 „	8	15	18	15	FKP3F024704F00_____	9	16	18	15	FKP3G024704J00_____
0.068 „	9	16	18	15	FKP3F026804J00_____					

* AC voltage: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

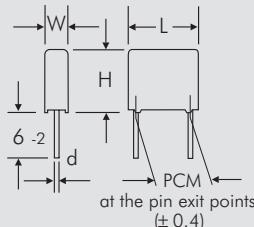
** PCM = Printed circuit module = pin spacing

Dims. in mm.

$$d = 0.5 \text{ } \varnothing \text{ if } W = 3 \\ d = 0.6 \text{ } \varnothing \text{ if } W \geq 4 \\ d = 0.8 \text{ } \varnothing \text{ if } PCM = 15$$

PCM 7.5 and 10
PCM at the pin exit points (± 0.4)

Rights reserved to amend design data without prior notification.



Part number completion:	
Tolerance:	20 % = M 10 % = K 5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

Continuation

General Data

Capacitance	630 VDC/300 VAC*					850 VDC/300 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	3	8.5	10	7.5	FKP3J001002B00	3	8.5	10	7.5	FKP3M001002B00
150 "	3	8.5	10	7.5	FKP3J001502B00	3	8.5	10	7.5	FKP3M001502B00
220 "	3	8.5	10	7.5	FKP3J002202B00	3	8.5	10	7.5	FKP3M002202B00
330 "	3	8.5	10	7.5	FKP3J003302B00	3	8.5	10	7.5	FKP3M003302B00
470 "	3	8.5	10	7.5	FKP3J004702B00	3	8.5	10	7.5	FKP3M004702B00
680 "	3	8.5	10	7.5	FKP3J006802B00	3	8.5	10	7.5	FKP3M006802B00
1000 pF	4	9	10	7.5	FKP3J011002C00	4	9	10	7.5	FKP3M011002C00
1500 "	4	9.5	13	10	FKP3J011503D00	4	9.5	13	10	FKP3M011503D00
2200 "	4	9.5	13	10	FKP3J012203D00	4	9.5	13	10	FKP3M012203D00
3300 "	5	11	13	10	FKP3J013303F00	5	11	13	10	FKP3M013303F00
4700 "	6	12	13	10	FKP3J014703G00	6	12	13	10	FKP3M014703G00
6800 "	5	11	18	15	FKP3J016804B00	5	11	18	15	FKP3M016804B00
0.01 μF	6	12.5	18	15	FKP3J021004C00	6	12.5	18	15	FKP3M021004C00
0.015 "	8	15	18	15	FKP3J021504F00	8	15	18	15	FKP3M021504F00
0.022 "	9	16	18	15	FKP3J022204J00	9	16	18	15	FKP3M022204J00
0.033 "	9	16	18	15	FKP3J023304J00					

Capacitance	1000 VDC/300 VAC*					Part number
	W	H	L	PCM**		
100 pF	3	8.5	10	7.5	FKP3O101002B00	
150 "	3	8.5	10	7.5	FKP3O101502B00	
220 "	3	8.5	10	7.5	FKP3O102202B00	
330 "	3	8.5	10	7.5	FKP3O103302B00	
470 "	3	8.5	10	7.5	FKP3O104702B00	
680 "	3	8.5	10	7.5	FKP3O106802B00	
1000 pF	4	9	10	7.5	FKP3O111002C00	
1500 "	4	9.5	13	10	FKP3O111503D00	
2200 "	4	9.5	13	10	FKP3O112203D00	
3300 "	5	11	13	10	FKP3O113303F00	
4700 "	6	12	13	10	FKP3O114703G00	
6800 "	5	11	18	15	FKP3O116804B00	
0.01 μF	6	12.5	18	15	FKP3O121004C00	
0.015 "	8	15	18	15	FKP3O121504F00	
0.022 "	9	16	18	15	FKP3O122204J00	

* AC voltage: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

New range

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Part number completion:

Tolerance: 20 % = M
10 % = K
5 % = J

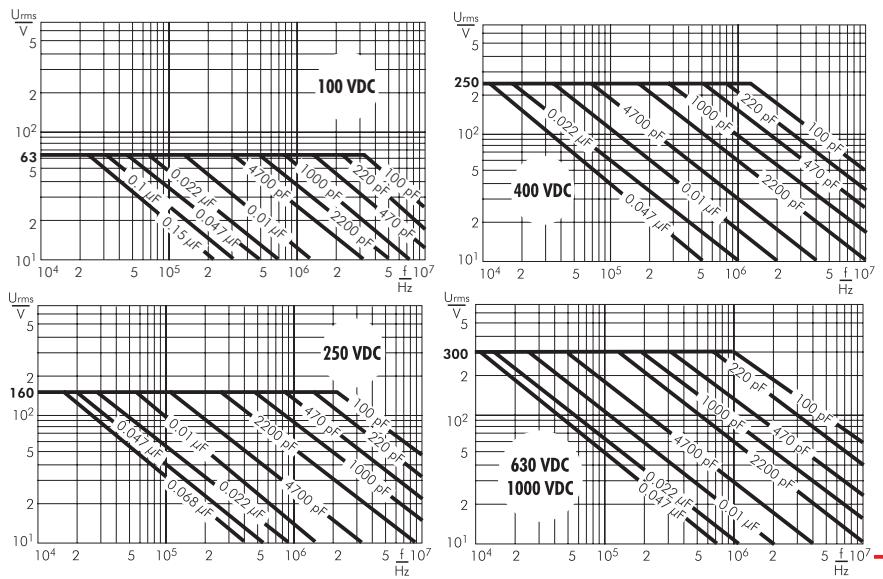
Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

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Permissible AC voltage
in relation to frequency
at 10° C internal temperature rise
(general guide).



WIMA Capacitors with Metallized, Self-Healing Construction PCM 5 to 52.5 mm



WIMA MKS 2

WIMA MKP 2

WIMA MKS 4

WIMA MKP 4C

WIMA MKP 4

In the case of metallized capacitors, thin layers of aluminium (approx. 0.03 µm) are vacuum-deposited on the insulating film as conducting electrodes. In the case of a breakdown, the short circuit current causes the thin metal coating to evaporate around the point of failure and an insulating area is formed. The capacitor remains intact (self-healing). Due to their construction principle metallized capacitors stand out for their very favourable capacitance/volume ratio.

Metallized WIMA capacitors in PCM 5 mm – 52.5 mm are available in two dielectric versions.

Capacitors with a Polyester dielectric (PET) are suitable for general applications such

as coupling, decoupling and by-passing. By making use of ultra thin film and appropriate manufacturing experience, it has been possible to achieve high capacitance values in very small box sizes. The WIMA MKS 2 for example is available with capacitance values up to 10 µF in PCM 5 mm whereas the MKS 4 is offering capacitances up to 680 µF in PCM 52.5 mm.

Polypropylene capacitors (PP) are used in the high frequency field. This includes resonant circuits, power supplies, deflection circuits, oscillator circuits and audio equipment. WIMA metallized Polypropylene capacitors in PCM 5 - 37.5 mm are available with capacitance values up to 10 µF and voltage ratings up to 1000 VDC.

Upon customer request, larger box sizes can be supplied in 4-pin versions. Types with terminating plates can also be manufactured on request. The advantage of this method of construction, besides the improved mechanical stability of the component on the board, is the excellent electrical contact reliability.

WIMA capacitors are produced with the proven box technology using solvent-resistant, flame-retardant plastic cases according to UL 94 V-0. They are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.





**Metallized Polyester (PET) Capacitors in PCM 5 mm.
Capacitances from 0.01 µF to 10 µF. Rated Voltages from 50 VDC to 630 VDC.**

Special Features

- High volume/capacitance ratio
- Self-healing
- AEC-Q200 qualified
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Construction

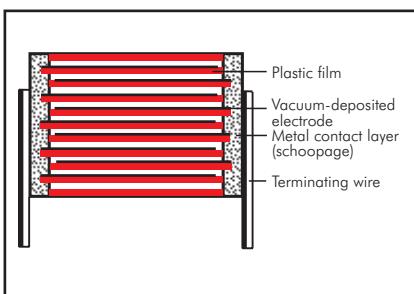
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Silver/White.

Electrical Data

Capacitance range:

0.01 µF to 10 µF (IEC-values on request)

Rated voltages:

50 VDC, 63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

$U_r = 50$ VDC: -55°C to +100°C

$U_r \geq 63$ VDC: -55°C to +125°C

Climatic test category:

55/100/21 in accordance with IEC

Insulation resistance at +20°C:

U_r	U_{test}	$C \leq 0.33 \mu F$	$0.33 \mu F < C \leq 10 \mu F$
50 VDC	10V	$\geq 5 \times 10^3 M\Omega$	≥ 1000 sec ($M\Omega \times \mu F$)
63 VDC	50V	$\geq 1 \times 10^4 M\Omega$	≥ 1250 sec ($M\Omega \times \mu F$)
≥ 100 VDC	100V	$\geq 1.5 \times 10^4 M\Omega$	≥ 3000 sec ($M\Omega \times \mu F$)

Measuring time: 1 min.

Dissipation factors at +20°C: $\tan \delta$

at f	$C \leq 0.1 \mu F$	$0.1 \mu F < C \leq 1.0 \mu F$	$C > 1.0 \mu F$
1 kHz	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$	$\leq 10 \times 10^{-3}$
10 kHz	$\leq 15 \times 10^{-3}$	$\leq 15 \times 10^{-3}$	-
100 kHz	$\leq 30 \times 10^{-3}$	-	-

Maximum pulse rise time:

for pulses equal to the rated voltage

Capacitance μF	Pulse rise time V/ μ sec max. operation/test					
	50 VDC	63 VDC	100 VDC	250 VDC	400 VDC	630 VDC
0.01 ... 0.022	-	35/350	35/350	50/500	80/800	110/1100
0.033 ... 0.068	-	20/200	25/250	50/500	80/800	90/900
0.1 ... 0.47	10/100	15/150	20/200	50/500	80/800	-
0.68 ... 1.0	8/80	12/120	15/150	25/250	-	-
1.5 ... 3.3	8/80	7.5/75	10/100	-	-	-
4.7	5/50	5/50	-	-	-	-
6.8	3/30	3/30	-	-	-	-
10	2.5/25	-	-	-	-	-

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

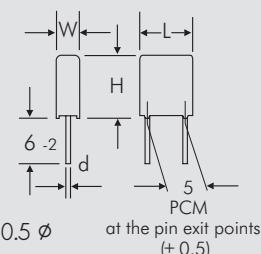
General Data

Capacitance	50 VDC/30 VAC*					63 VDC/40 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF						2.5	6.5	7.2	5	MKS2C021001A00_____
0.015 "						2.5	6.5	7.2	5	MKS2C021501A00_____
0.022 "						2.5	6.5	7.2	5	MKS2C022201A00_____
0.033 "						2.5	6.5	7.2	5	MKS2C023301A00_____
0.047 "						2.5	6.5	7.2	5	MKS2C024701A00_____
0.068 "						2.5	6.5	7.2	5	MKS2C026801A00_____
0.1 μF						2.5	6.5	7.2	5	MKS2C031001A00_____
0.15 "						2.5	6.5	7.2	5	MKS2C031501A00_____
0.22 "						3	7.5	7.2	5	MKS2C032201B00_____
0.33 "	2.5	6.5	7.2	5	MKS2B033301A00_____	3.5	8.5	7.2	5	MKS2C033301C00_____
0.47 "	3	7.5	7.2	5	MKS2B034701B00_____	3.5	8.5	7.2	5	MKS2C034701C00_____
0.68 "	3.5	8.5	7.2	5	MKS2B036801C00_____	4.5	9.5	7.2	5	MKS2C036801E00_____
1.0 μF	3.5	8.5	7.2	5	MKS2B041001C00_____	5	10	7.2	5	MKS2C041001FO0_____
1.5 "	4.5	9.5	7.2	5	MKS2B041501E00_____	5.5	11.5	7.2	5	MKS2C041501H00_____
2.2 "	5	10	7.2	5	MKS2B042201F00_____	7.2	13	7.2	5	MKS2C042201K00_____
3.3 "	5.5	11.5	7.2	5	MKS2B043301H00_____	7.2	13	7.2	5	MKS2C043301K00_____
4.7 "	7.2	13	7.2	5	MKS2B044701K00_____	8.5	14	7.2	5	MKS2C044701M00_____
6.8 "	8.5	14	7.2	5	MKS2B046801M00_____	11	16	7.2	5	MKS2C046801N00_____
10 μF	11	16	7.2	5	MKS2B051001N00_____					
Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	2.5	6.5	7.2	5	MKS2D021001A00_____	2.5	6.5	7.2	5	MKS2F021001A00_____
0.015 "	2.5	6.5	7.2	5	MKS2D021501A00_____	2.5	6.5	7.2	5	MKS2F021501A00_____
0.022 "	2.5	6.5	7.2	5	MKS2D022201A00_____	2.5	6.5	7.2	5	MKS2F022201A00_____
0.033 "	2.5	6.5	7.2	5	MKS2D023301A00_____	3.5	8.5	7.2	5	MKS2F023301C00_____
0.047 "	2.5	6.5	7.2	5	MKS2D024701A00_____	3.5	8.5	7.2	5	MKS2F024701C00_____
0.068 "	2.5	6.5	7.2	5	MKS2D026801A00_____	3.5	8.5	7.2	5	MKS2F026801C00_____
0.1 μF	2.5	6.5	7.2	5	MKS2D031001A00_____	4.5	9.5	7.2	5	MKS2F031001E00_____
0.15 "	3.5	8.5	7.2	5	MKS2D031501C00_____	5	10	7.2	5	MKS2F031501F00_____
0.22 "	3.5	8.5	7.2	5	MKS2D032201C00_____	5.5	11.5	7.2	5	MKS2F032201H00_____
0.33 "	4.5	9.5	7.2	5	MKS2D033301E00_____	7.2	13	7.2	5	MKS2F033301K00_____
0.47 "	4.5	9.5	7.2	5	MKS2D034701E00_____	8.5	14	7.2	5	MKS2F034701M00_____
0.68 "	5	10	7.2	5	MKS2D036801F00_____	11	16	7.2	5	MKS2F036801N00_____
1.0 μF	7.2	13	7.2	5	MKS2D041001K00_____					
1.5 "	8.5	14	7.2	5	MKS2D041501M00_____					
2.2 "	11	16	7.2	5	MKS2D042201N00_____					

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = pin spacing.

Dims. in mm.



Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

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Continuation page 46

Continuation

General Data

Capacitance	400 VDC/200 VAC*					630 VDC/220 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	2.5	6.5	7.2	5	MKS2G021001A00-----	5.5	11.5	7.2	5	MKS2J021001H00-----
0.015 "	2.5	6.5	7.2	5	MKS2G021501A00-----	7.2	13	7.2	5	MKS2J021501K00-----
0.022 "	3.5	8.5	7.2	5	MKS2G022201C00-----	7.2	13	7.2	5	MKS2J022201K00-----
0.033 "	4.5	9.5	7.2	5	MKS2G023301E00-----	7.2	13	7.2	5	MKS2J023301K00-----
0.047 "	4.5	9.5	7.2	5	MKS2G024701E00-----	8.5	14	7.2	5	MKS2J024701M00-----
0.068 "	5.5	11.5	7.2	5	MKS2G026801H00-----					
0.1 μF	7.2	13	7.2	5	MKS2G031001K00-----					
0.15 "	8.5	14	7.2	5	MKS2G031501M00-----					
0.22 "	11	16	7.2	5	MKS2G032201N00-----					

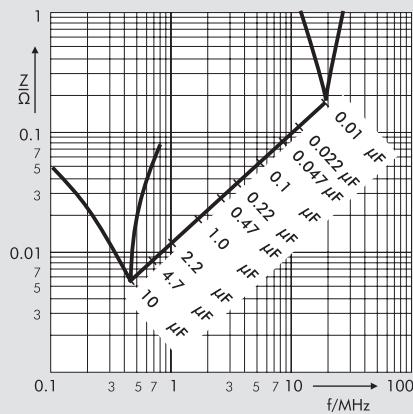
* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

** PCM = Printed circuit module = pin spacing.

Dims. in mm.

The values of the WIMA MKM 2 range according to the main catalogue 2009 are still available on request.

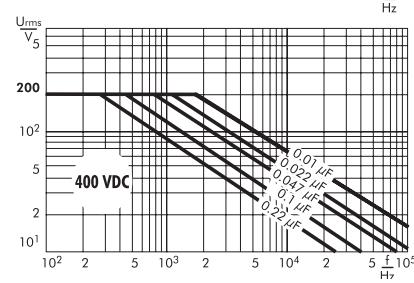
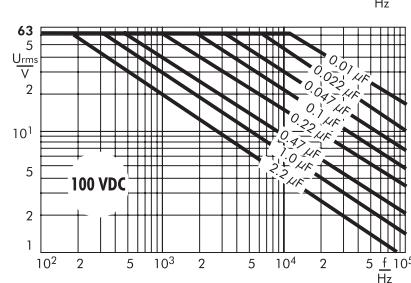
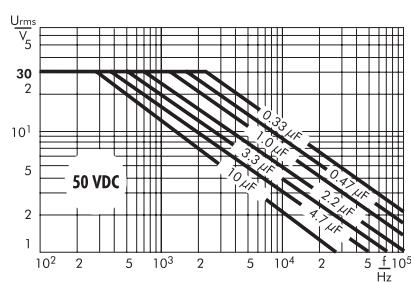
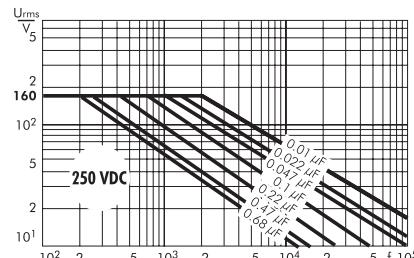
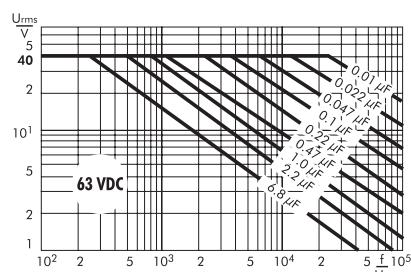
Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	



Impedance change with frequency (general guide).

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Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).



**Metallized Polypropylene (PP) Capacitors in PCM 5 mm.
Capacitances from 1000 pF to 1.0 µF. Rated Voltages from 63 VDC to 1000 VDC.**

Special Features

- High volume/capacitance ratio
- Self-healing
- Increased pulse duty from 250 VDC rated voltage
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- AEC-Q200 qualified
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.

- Sample and hold
- Timing
- Oscillating circuits
- High frequency coupling and decoupling

Construction

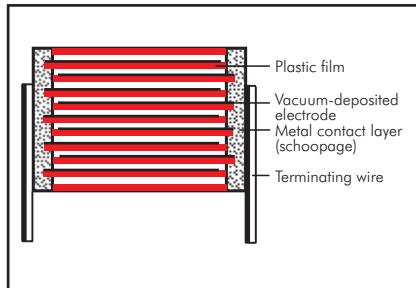
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

1000 pF to 1.0 µF (E12-values on request)

Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 800 VDC, 1000 VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55°C to +100°C

Test specifications:

In accordance with IEC 60384-16

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance at +20°C:

$\geq 1 \times 10^5 \Omega$

Measuring voltage:

$U_r = 63 \text{ V}$: $U_{\text{test}} = 50 \text{ V}/1 \text{ min.}$

$U_r \geq 100 \text{ V}$: $U_{\text{test}} = 100 \text{ V}/1 \text{ min.}$

Test voltage:

$1.6 U_r$, 2 sec.

Maximum pulse rise time:

Capacitance pF/µF	max. pulse rise time V/µsec						
	63 VDC	100 VDC	250 VDC	400 VDC	630 VDC	800 VDC	1000 VDC
1000 ... 2200	-	-	-	300	400	450	500
3300 ... 6800	-	-	-	300	400	450	500
0.01 ... 0.022	100	100	250	300	400	450	500
0.033 ... 0.068	100	100	250	300	400	450	-
0.1 ... 0.22	100	100	250	250	-	-	-
0.33 ... 0.68	100	100	250	-	-	-	-
1.0	70	70	-	-	-	-	-

for pulses equal to the rated voltage

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Dielectric absorption:

0.05 %

Dissipation factors

at +20°C: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1.0 \mu\text{F}$
1 kHz	$\leq 5 \times 10^{-4}$	$\leq 5 \times 10^{-4}$
10 kHz	$\leq 8 \times 10^{-4}$	$\leq 8 \times 10^{-4}$
100 kHz	$\leq 25 \times 10^{-4}$	-

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85°C for DC voltages and from +75°C for AC voltages

Reliability:

Operational life > 300 000 hours
Failure rate < 2 fit (0.5 x U_r and 40°C)

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



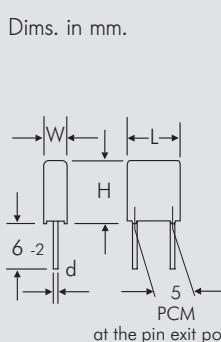
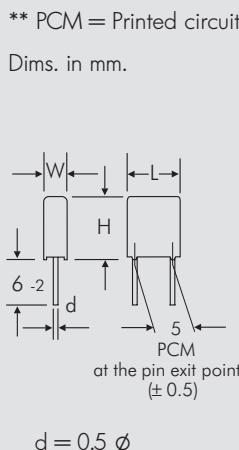
Continuation

General Data

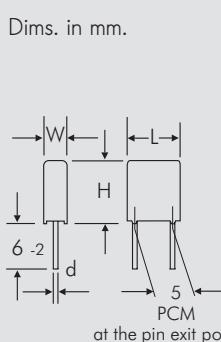
Capacitance	63 VDC/40 VAC*					100 VDC/63 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	3	7.5	7.2	5	MKP2C021001B00_----	3	7.5	7.2	5	MKP2D021001B00_----
0.015 "	3	7.5	7.2	5	MKP2C021501B00_----	3	7.5	7.2	5	MKP2D021501B00_----
0.022 "	3	7.5	7.2	5	MKP2C022201B00_----	3	7.5	7.2	5	MKP2D022201B00_----
0.033 "	3	7.5	7.2	5	MKP2C023301B00_----	3	7.5	7.2	5	MKP2D023301B00_----
0.047 "	3.5	8.5	7.2	5	MKP2C024701C00_----	3.5	8.5	7.2	5	MKP2D024701C00_----
0.068 "	4.5	9.5	7.2	5	MKP2C026801E00_----	4.5	9.5	7.2	5	MKP2D026801E00_----
0.1 μF	5	10	7.2	5	MKP2C031001F00_----	5	10	7.2	5	MKP2D031001F00_----
0.15 "	5.5	11.5	7.2	5	MKP2C031501H00_----	5.5	11.5	7.2	5	MKP2D031501H00_----
0.22 "	7.2	13	7.2	5	MKP2C032201K00_----	7.2	13	7.2	5	MKP2D032201K00_----
0.33 "	8.5	14	7.2	5	MKP2C033301M00_----	8.5	14	7.2	5	MKP2D033301M00_----
0.47 "	8.5	14	7.2	5	MKP2C034701M00_----	8.5	14	7.2	5	MKP2D034701M00_----
0.68 "	8.5	14	7.2	5	MKP2C036801M00_----	8.5	14	7.2	5	MKP2D036801M00_----
1.0 μF	11	16	7.2	5	MKP2C041001N00_----	11	16	7.2	5	MKP2D041001N00_----
Capacitance	250 VDC/160 VAC*					400 VDC/200 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF						3	7.5	7.2	5	MKP2G011001B00_----
1500 "						3	7.5	7.2	5	MKP2G011501B00_----
2200 "						3	7.5	7.2	5	MKP2G012201B00_----
3300 "						3	7.5	7.2	5	MKP2G013301B00_----
4700 "						3	7.5	7.2	5	MKP2G014701B00_----
6800 "						3	7.5	7.2	5	MKP2G016801B00_----
0.01 μF	3	7.5	7.2	5	MKP2F021001B00_----	3.5	8.5	7.2	5	MKP2G021001C00_----
0.015 "	3	7.5	7.2	5	MKP2F021501B00_----	3.5	8.5	7.2	5	MKP2G021501C00_----
0.022 "	3	7.5	7.2	5	MKP2F022201B00_----	4.5	9.5	7.2	5	MKP2G022201E00_----
0.033 "	3	7.5	7.2	5	MKP2F023301B00_----	5.5	11.5	7.2	5	MKP2G023301H00_----
0.047 "	3.5	8.5	7.2	5	MKP2F024701C00_----	7.2	13	7.2	5	MKP2G024701K00_----
0.068 "	4.5	9.5	7.2	5	MKP2F026801E00_----	7.2	13	7.2	5	MKP2G026801K00_----
0.1 μF	5	10	7.2	5	MKP2F031001F00_----	8.5	14	7.2	5	MKP2G031001M00_----
0.15 "	7.2	13	7.2	5	MKP2F031501K00_----	11	16	7.2	5	MKP2G031501N00_----
0.22 "	7.2	13	7.2	5	MKP2F032201K00_----					
0.33 "	8.5	14	7.2	5	MKP2F033301M00_----					
0.47 "	11	16	7.2	5	MKP2F034701N00_----					
Capacitance	630 VDC/250 VAC*					Dims. in mm.				
	W	H	L	PCM**	Part number	W	H	L	PCM	Part number completion:
1000 pF	3	7.5	7.2	5	MKP2J011001B00_----					Tolerance: 20 % = M
1500 "	3	7.5	7.2	5	MKP2J011501B00_----					10 % = K
2200 "	3	7.5	7.2	5	MKP2J012201B00_----					5 % = J
3300 "	3	7.5	7.2	5	MKP2J013301B00_----					Packing: bulk = S
4700 "	3	7.5	7.2	5	MKP2J014701B00_----					Pin length: 6-2 = SD
6800 "	3.5	8.5	7.2	5	MKP2J016801C00_----					Taped version see page 149.
0.01 μF	4.5	9.5	7.2	5	MKP2J021001E00_----					
0.015 "	5	10	7.2	5	MKP2J021501F00_----					
0.022 "	5.5	11.5	7.2	5	MKP2J022201H00_----					
0.033 "	7.2	13	7.2	5	MKP2J023301K00_----					
0.047 "	8.5	14	7.2	5	MKP2J024701M00_----					
0.068 "	11	16	7.2	5	MKP2J026801N00_----					

* AC voltage: $f \leq 400 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

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$$d = 0.5 \phi$$



$$d = 0.5 \phi$$

Continuation page 49

Continuation

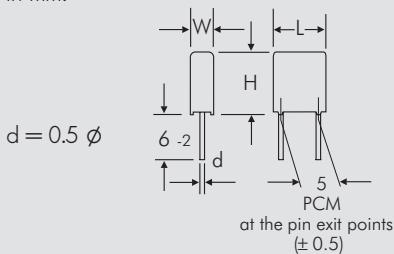
General Data

Capacitance	800 VDC/250 VAC*					1000 VDC/250 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	3	7.5	7.2	5	MKP2L011001B00-----	3	7.5	7.2	5	MKP2O111001B00-----
1500 "	3	7.5	7.2	5	MKP2L011501B00-----	3	7.5	7.2	5	MKP2O111501B00-----
2200 "	3	7.5	7.2	5	MKP2L012201B00-----	3	7.5	7.2	5	MKP2O112201B00-----
3300 "	3	7.5	7.2	5	MKP2L013301B00-----	3.5	8.5	7.2	5	MKP2O113301C00-----
4700 "	3.5	8.5	7.2	5	MKP2L014701C00-----	4.5	9.5	7.2	5	MKP2O114701E00-----
6800 "	4.5	9.5	7.2	5	MKP2L016801E00-----	5	10	7.2	5	MKP2O116801F00-----
0.01 μF	5	10	7.2	5	MKP2L021001F00-----	7.2	13	7.2	5	MKP2O121001K00-----
0.015 "	5.5	11.5	7.2	5	MKP2L021501H00-----	8.5	14	7.2	5	MKP2O121501M00-----
0.022 "	7.2	13	7.2	5	MKP2L022201K00-----	11	16	7.2	5	MKP2O122201N00-----
0.033 "	8.5	14	7.2	5	MKP2L023301M00-----					
0.047 "	11	16	7.2	5	MKP2L024701N00-----					

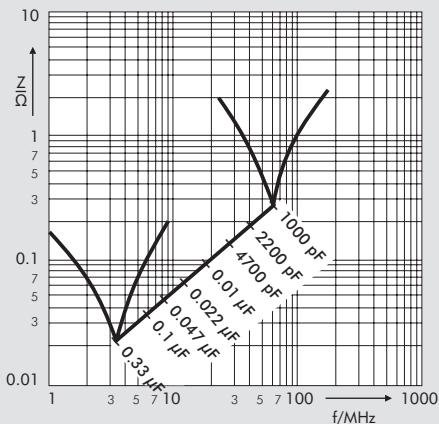
* AC voltage: $f \leq 400$ Hz; $1.4 \times U_{rms} + U_{DC} \leq U_r$

** PCM = printed circuit module = pin spacing.

Dims. in mm.



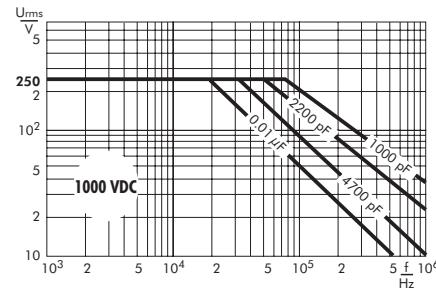
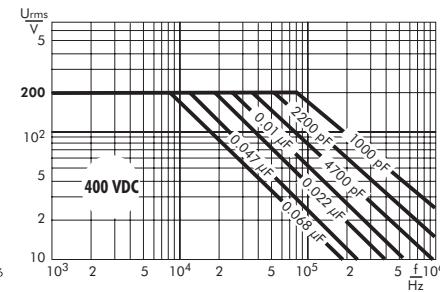
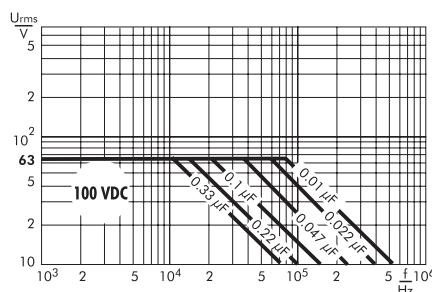
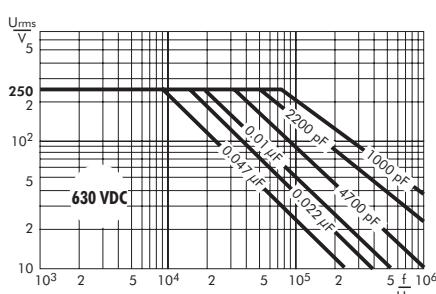
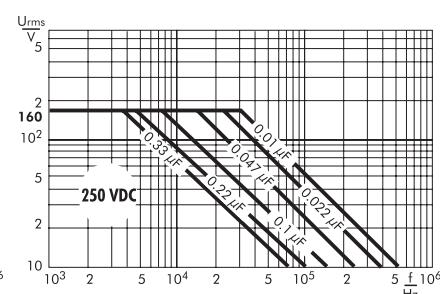
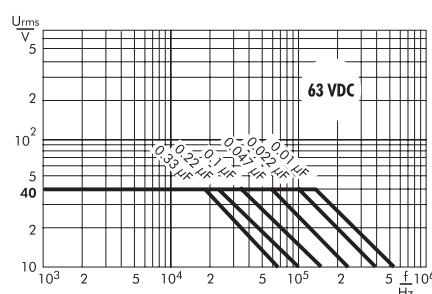
Part number completion:
Tolerance: 20 % = M
10 % = K
5 % = J
Packing: bulk = S
Pin length: 6.2 = SD
Taped version see page 149.



Impedance change with frequency (general guide).

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Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).



**Metallized Polyester (PET) Capacitors
in PCM 7.5 mm to 52.5 mm. Capacitances from 1000 pF to 680 µF.
Rated Voltages from 50 VDC to 2000 VDC.**

Special Features

- High volume/capacitance ratio
- Self-healing
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Smoothing
- Timing

Construction

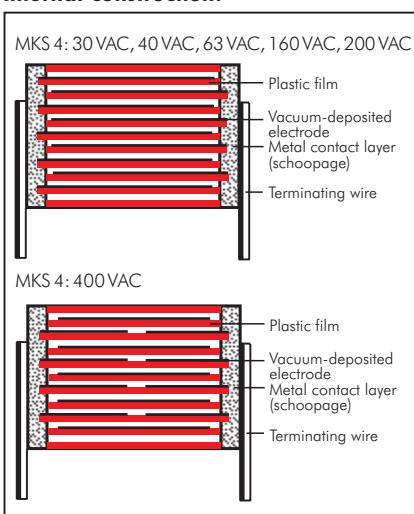
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

1000 pF to 680 µF (E12-values on request)

Rated voltages:

50 VDC, 63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC, 1500 VDC, 2000 VDC

Capacitance tolerances:

±20%, ±10% ±5%

Operating temperature range:

$U_r = 50$ VDC: -55°C to $+100^\circ\text{C}$

$U_r \geq 63$ VDC: -55°C to $+125^\circ\text{C}$

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance

at $+20^\circ\text{C}$:

U_r	U_{test}	$C \leq 0.33 \mu\text{F}$	$0.33 \mu\text{F} < C \leq 680 \mu\text{F}$
50 VDC	10V	$\geq 5 \times 10^3 \text{ M}\Omega$	$\geq 1500 \text{ sec } (\text{M}\Omega \times \mu\text{F})$
63 VDC	50V	$\geq 1 \times 10^4 \text{ M}\Omega$	$\geq 3000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$
100 VDC	100V	$\geq 1.5 \times 10^4 \text{ M}\Omega$	$\geq 5000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$
≥ 250 VDC	100V	$\geq 3 \times 10^4 \text{ M}\Omega$	$\geq 10000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$

Measuring time: 1 min.

Dissipation factors

at $+20^\circ\text{C}$: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1.0 \mu\text{F}$	$C > 1.0 \mu\text{F}$
1 kHz	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$	$\leq 10 \times 10^{-3}$
10 kHz	$\leq 15 \times 10^{-3}$	$\leq 15 \times 10^{-3}$	—
100 kHz	$\leq 30 \times 10^{-3}$	—	—

Maximum pulse rise time:

for pulses equal to the rated voltage

Capacitance $\mu\text{F}/\mu\text{F}$	Pulse rise time V/ μsec max. operation/test								
	50VDC	63VDC	100VDC	250VDC	400VDC	630VDC	1000VDC	1500VDC	2000VDC
1000 ... 6800	—	—	—	—	—	—	70/700	90/900	100/1000
0.01 ... 0.022	—	30/300	30/300	35/350	38/380	40/400	50/500	50/500	60/600
0.033 ... 0.068	—	15/150	15/150	20/200	25/250	32/320	26/260	35/350	40/400
0.1 ... 0.22	10/100	10/100	12/120	15/150	15/150	17/170	20/200	35/350	40/400
0.33 ... 0.68	9/90	9/90	9/90	10/100	10/100	13/130	20/200	20/200	38/380
1.0 ... 2.2	6/60	6/60	5/50	6/60	9/90	13/130	14/140	15/150	15/150
3.3 ... 6.8	2.5/25	3/30	3/30	6/60	6/60	9/90	12/120	—	—
10 ... 22	2.5/25	2.5/25	2.5/25	3/30	6/60	6/60	6/60	—	—
33 ... 68	2.5/25	2.5/25	2.5/25	3/30	3/30	—	—	—	—
100 ... 220	2.5/25	2.5/25	2.5/25	2.5/25	0.9/9	—	—	—	—
330 ... 680	0.2/2	0.2/2	0.3/3	—	—	—	—	—	—

Mechanical Tests

Pull test on pins:

$d \leq 0.8 \text{ mm}$: 10 N in direction of pins

$d > 0.8 \text{ mm}$: 20 N in direction of pins according to IEC 60068-2-21

Vibration: 6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	50 VDC/30 VAC*					63 VDC/40 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF						2.5	7	10	7.5	MKS4C021002A-----
0.015 "						4	9	13	10	MKS4C021003C-----
0.022 "						2.5	7	10	7.5	MKS4C021502A-----
0.033 "						4	9	13	10	MKS4C021503C-----
0.047 "						2.5	7	10	7.5	MKS4C022202A-----
0.068 "						4	9	13	10	MKS4C022203C-----
0.1 μF	2.5	7	10	7.5	MKS4B031002A-----	2.5	7	10	7.5	MKS4C031002A-----
0.15 "	2.5	7	10	7.5	MKS4B031502A-----	4	9	13	10	MKS4C031003C-----
0.22 "	2.5	7	10	7.5	MKS4B032202A-----	2.5	7	10	7.5	MKS4C031502A-----
0.33 "	2.5	7	10	7.5	MKS4B033302A-----	4	9	13	10	MKS4C031503C-----
0.47 "	3	8.5	10	7.5	MKS4B034702B-----	3	8.5	10	7.5	MKS4C032202B-----
0.68 "	4	9	10	7.5	MKS4B036802C-----	4	9	13	10	MKS4C032203C-----
1.0 μF	4	9	10	7.5	MKS4B041002C-----	4	9	13	10	MKS4C041002E-----
1.5 "	5	10.5	10.3	7.5	MKS4B041502E-----	5	10.5	10.3	7.5	MKS4C041003C-----
2.2 "	5.7	12.5	10.3	7.5	MKS4B042202F-----	5.7	12.5	10.3	7.5	MKS4C041502F-----
3.3 "	5.7	12.5	10.3	7.5	MKS4B043302F-----	5	11	13	10	MKS4C041503F-----
4.7 "	7.2	12.5	10.3	7.5	MKS4B044702G-----	6	12.5	18	15	MKS4C042202F-----
6.8 "	6	12	13	10	MKS4B044703G-----	6	12	13	10	MKS4C042204C-----
	7.2	12.5	10.3	7.5	MKS4B046802G-----	7	14	18	15	MKS4C043303G-----
	6	12	13	10	MKS4B046803G-----	6	15	26.5	22.5	MKS4C043304D-----
10 μF	9	16	18	15	MKS4B051004J-----	8.5	18.5	26.5	22.5	MKS4C044704D-----
15 "	11	21	26.5	22.5	MKS4B051505I-----	11	21	31.5	27.5	MKS4C044705F-----
22 "	11	21	31.5	27.5	MKS4B052206B-----	11	21	26.5	22.5	MKS4C051005F-----
33 "	13	24	31.5	27.5	MKS4B053306D-----	13	24	31.5	27.5	MKS4C051506B-----
47 "	15	26	31.5	27.5	MKS4B054706F-----	15	26	31.5	27.5	MKS4C052206D-----
	13	24	41.5	37.5	MKS4B054707C-----	17	29	31.5	27.5	MKS4C053306F-----
68 "	20	39.5	31.5	27.5	MKS4B056806J-----	17	29	41.5	37.5	MKS4C054706G-----
	17	29	41.5	37.5	MKS4B056807E-----	20	39.5	31.5	27.5	MKS4C054707E-----
100 μF	19	32	41.5	37.5	MKS4B061007F-----	20	39.5	41.5	37.5	MKS4C056806J-----
150 "	20	39.5	41.5	37.5	MKS4B061507G-----	24	45.5	41.5	37.5	MKS4C056807F-----
220 "	24	45.5	41.5	37.5	MKS4B062207H-----	40	55	41.5	37.5	MKS4C062207K-----
330 "	40	55	41.5	37.5	MKS4B063307K-----	45	55	57	52.5	MKS4C063309H-----
470 "	35	50	57	52.5	MKS4B064709F-----	45	55	57	52.5	MKS4C064709H-----
680 "	45	55	57	52.5	MKS4B066809H-----	45	65	57	52.5	MKS4C066809J-----

* AC voltages: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = printed circuit module = pin spacing

Dims. in mm.

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Continuation

General Data

Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	2.5 4	7 9	10 13	7.5 10	MKS4D021002A MKS4D021003C	3 4	8.5 9	10 13	7.5 10	MKS4F021002B MKS4F021003C
0.015 "	2.5 4	7 9	10 13	7.5 10	MKS4D021502A MKS4D021503C	3 4	8.5 9	10 13	7.5 10	MKS4F021502B MKS4F021503C
0.022 "	2.5 4	7 9	10 13	7.5 10	MKS4D022202A MKS4D022203C	3 4	8.5 9	10 13	7.5 10	MKS4F022202B MKS4F022203C
0.033 "	2.5 4	7 9	10 13	7.5 10	MKS4D023302A MKS4D023303C	3 4	8.5 9	10 13	7.5 10	MKS4F023302B MKS4F023303C
0.047 "	2.5 4	7 9	10 13	7.5 10	MKS4D024702A MKS4D024703C	3 4	8.5 9	10 13	7.5 10	MKS4F024702B MKS4F024703C
0.068 "	2.5 4	7 9	10 13	7.5 10	MKS4D026802A MKS4D026803C	4 4	9 9	10 13	7.5 10	MKS4F026802C MKS4F026803C
0.1 μF	2.5 4	7 9	10 13	7.5 10	MKS4D031002A MKS4D031003C	4 4	9 9	10 13	7.5 10	MKS4F031002C MKS4F031003C
0.15 "	3 4	8.5 9	10 13	7.5 10	MKS4D031502B MKS4D031503C	5 4	10.5 9	10.3 13	7.5 10	MKS4F031502E MKS4F031503C
0.22 "	3 4	8.5 9	10 13	7.5 10	MKS4D032202B MKS4D032203C	5 5	10.5 11	10.3 13	7.5 10	MKS4F032202E MKS4F032203F
0.33 "	4 4	9 9	10 13	7.5 10	MKS4D033302C MKS4D033303C	5.7 5	12.5 11	10.3 13	7.5 10	MKS4F033302F MKS4F033303F
0.47 "	4.5 4	9.5 9	10.3 13	7.5 10	MKS4D034702D MKS4D034703C	6 6	12 12.5	13 18	10 15	MKS4F034703G MKS4F034704C
0.68 "	5 4	10.5 9	10.3 13	7.5 10	MKS4D036802E MKS4D036803C	7	14	18	15	MKS4F036804D
1.0 μF	5.7 5	12.5 11	10.3 13	7.5 10	MKS4D041002F MKS4D041003F	8 6	15 15	18 26.5	15 22.5	MKS4F041004F MKS4F041005B
1.5 "	6 7	12 14	13 18	10 15	MKS4D041503G MKS4D041504D	9 7	16 16.5	18 26.5	15 22.5	MKS4F041504J MKS4F041505D
2.2 "	8 6	15 15	18 26.5	15 22.5	MKS4D042204F MKS4D042205B	10.5 9	19 19	26.5 31.5	22.5 27.5	MKS4F042205G MKS4F042206A
3.3 "	9 7	16 16.5	18 26.5	15 22.5	MKS4D043304J MKS4D043305D	11 11	21 21	26.5 31.5	22.5 27.5	MKS4F043305I MKS4F043306B
4.7 "	10.5 9	19 19	26.5 31.5	22.5 27.5	MKS4D044705G MKS4D044706A	11 11	21 21	31.5 31.5	27.5 27.5	MKS4F044706B
6.8 "	10.5 11	19 21	26.5 31.5	22.5 27.5	MKS4D046805G MKS4D046806B	13	24	31.5	27.5	MKS4F046806D
10 μF	13	24	31.5	27.5	MKS4D051006D	17	29	31.5	27.5	MKS4F051006G
15 "	13	24	31.5	27.5	MKS4D051506D	17	34.5	31.5	27.5	MKS4F051506L
22 "	15	26	31.5	27.5	MKS4D052206F	17	29	41.5	37.5	MKS4F051507E
33 "	17	29	31.5	27.5	MKS4D053306G	19	32	41.5	37.5	MKS4F052207F
47 "	13	24	41.5	37.5	MKS4D053307C	24	45.5	41.5	37.5	MKS4F053307H
68 "	17	29	41.5	37.5	MKS4D054707E	31	46	41.5	37.5	MKS4F054707L
	20	39.5	41.5	37.5	MKS4D056807G	40	55	41.5	37.5	MKS4F056807K
100 μF	24	45.5	41.5	37.5	MKS4D061007H	45	65	57	52.5	MKS4F061009J
150 "	31	46	41.5	37.5	MKS4D061507I	45	65	57	52.5	MKS4F061509J
220 "	40	55	41.5	37.5	MKS4D062207K					
330 "	45	55	57	52.5	MKS4D063309H					
470 "	45	65	57	52.5	MKS4D064709J					

* AC voltages: f = 50 Hz; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U$,

** PCM = printed circuit module = pin spacing

Dims. in mm.

Rights reserved to amend design data without prior notification.

Part number completion:				
Version code:	2-pin	= 00		
	4-pin	= D4		
Tolerance:	20 %	= M		
	10 %	= K		
	5 %	= J		
Packing:	bulk	= S		
Pin length:	6-2	= SD		
Taped version see page 149.				

Continuation page 53

Continuation

General Data

Capacitance	400 VDC/200 VAC*					630 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	3	8.5	10	7.5	MKS4G021002B_____	3	8.5	10	7.5*	MKS4J021002B_____
	4	9	13	10	MKS4G021003C_____	4	9	13	10	MKS4J021003C_____
0.015 "	3	8.5	10	7.5	MKS4G021502B_____	4	9	10	7.5*	MKS4J021502C_____
	4	9	13	10	MKS4G021503C_____	4	9	13	10	MKS4J021503C_____
0.022 "	4	9	10	7.5	MKS4G022202C_____	4.5	9.5	10.3	7.5*	MKS4J022202D_____
	4	9	13	10	MKS4G022203C_____	4	9	13	10	MKS4J022203C_____
0.033 "	4	9	10	7.5	MKS4G023302C_____	5	10.5	10.3	7.5*	MKS4J023302E_____
	4	9	13	10	MKS4G023303C_____	5	11	13	10	MKS4J023303F_____
0.047 "	5	10.5	10.3	7.5	MKS4G024702E_____	5.7	12.5	10.3	7.5*	MKS4J024702F_____
	4	9	13	10	MKS4G024703C_____	6	12	13	10	MKS4J024703G_____
0.068 "	5	10.5	10.3	7.5	MKS4G026802E_____	6	12	13	10	MKS4J026803G_____
	4	9	13	10	MKS4G026803C_____	5	11	18	15	MKS4J026804B_____
0.1 μF	5	10.5	10.3	7.5	MKS4G031002E_____	6	12.5	18	15	MKS4J031004C_____
	5	11	13	10	MKS4G031003F_____	6	15	26.5	22.5	MKS4J031005B_____
0.15 "	5.7	12.5	10.3	7.5	MKS4G031502F_____	7	14	18	15	MKS4J031504D_____
	6	12	13	10	MKS4G031503G_____	6	15	26.5	22.5	MKS4J031505B_____
0.22 "	6	12	13	10	MKS4G032203G_____	8	15	18	15	MKS4J032204F_____
	6	12.5	18	15	MKS4G032204C_____	6	15	26.5	22.5	MKS4J032205B_____
0.33 "	8	15	18	15	MKS4G033304F_____	7	16.5	26.5	22.5	MKS4J033305D_____
	9	19				9	19	31.5	27.5	MKS4J033306A_____
0.47 "	8	15	18	15	MKS4G034704F_____	10.5	19	26.5	22.5	MKS4J034705G_____
	6	15	26.5	22.5	MKS4G034705B_____	9	19	31.5	27.5	MKS4J034706A_____
0.68 "	7	16.5	26.5	22.5	MKS4G036805D_____	11	21	26.5	22.5	MKS4J036805I_____
	11	21				11	21	31.5	27.5	MKS4J036806B_____
1.0 μF	10.5	19	26.5	22.5	MKS4G041005G_____	11	21	31.5	27.5	MKS4J041006B_____
	11	21	31.5	27.5	MKS4G041006B_____	15	26	31.5	27.5	MKS4J041506F_____
1.5 "	11	21	26.5	22.5	MKS4G041505I_____	11	21	31.5	27.5	MKS4J041506B_____
	11	21	31.5	27.5	MKS4G041506B_____	17	34.5	31.5	27.5	MKS4J042206I_____
2.2 "	11	21	31.5	27.5	MKS4G042206B_____	15	26	41.5	37.5	MKS4J042207D_____
	13	24	31.5	27.5	MKS4G043306D_____	20	39.5	31.5	27.5	MKS4J043306J_____
3.3 "	17	29	31.5	27.5	MKS4G044706G_____	19	32	41.5	37.5	MKS4J0443307F_____
	20	39.5				20	39.5	41.5	37.5	MKS4J044707G_____
4.7 "	17	34.5	31.5	27.5	MKS4G046806I_____	24	45.5	41.5	37.5	MKS4J046807H_____
	15	26	41.5	37.5	MKS4G046807D_____					
10 μF	19	32	41.5	37.5	MKS4G051007F_____	35	50	41.5	37.5	MKS4J051007J_____
	20	39.5	41.5	37.5	MKS4G051507G_____	40	55	41.5	37.5	MKS4J051507K_____
15 "	31	46	41.5	37.5	MKS4G052207I_____	45	55	57	52.5	MKS4J052209H_____
	35	50	41.5	37.5	MKS4G053307J_____					
22 "	35	50	57	52.5	MKS4G054709F_____					
	45	65	57	52.5	MKS4G056809J_____					

* AC voltages: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

**PCM = printed circuit module = pin spacing

* Admissible AC voltage 250 VAC max.

Dims. in mm.

Part number completion:

Version code: 2-pin = 00
4-pin = D4

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

Rights reserved to amend design data without prior notification.

Continuation page 54



Continuation

General Data

Capacitance	1000 VDC/400 VAC*					1500 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	3	8.5	10	7.5	MKS4O111002B_____	4	9	13	10	MKS4S011003C_____
	4	9	13	10	MKS4O111003C_____					
1500 "	3	8.5	10	7.5	MKS4O111502B_____	4	9	13	10	MKS4S011503C_____
	4	9	13	10	MKS4O111503C_____					
2200 "	3	8.5	10	7.5	MKS4O112202B_____	4	9	13	10	MKS4S012203C_____
	4	9	13	10	MKS4O112203C_____					
3300 "	4	9	10	7.5	MKS4O113302C_____	4	9	13	10	MKS4S013303C_____
	4	9	13	10	MKS4O113303C_____					
4700 "	4	9	10	7.5	MKS4O114702C_____	4	9	13	10	MKS4S014703C_____
	4	9	13	10	MKS4O114703C_____	5	11	18	15	MKS4S014704B_____
6800 "	4.5	9.5	10.3	7.5	MKS4O116802D_____	5	11	13	10	MKS4S016803F_____
	4	9	13	10	MKS4O116803C_____	5	11	18	15	MKS4S016804B_____
0.01 µF	5	10.5	10.3	7.5	MKS4O121002E_____	6	12	13	10	MKS4S021003G_____
	5	11	13	10	MKS4O121003F_____	5	11	18	15	MKS4S021004B_____
0.015 "	5.7	12.5	10.3	7.5	MKS4O121502F_____	6	12.5	18	15	MKS4S021504C_____
	6	12	13	10	MKS4O121503G_____					
0.022 "	5	11	18	15	MKS4O122204B_____	7	14	18	15	MKS4S022204D_____
						6	15	26.5	22.5	MKS4S022205B_____
0.033 "	6	12.5	18	15	MKS4O123304C_____	8	15	18	15	MKS4S023304F_____
	6	15	26.5	22.5	MKS4O123305B_____	6	15	26.5	22.5	MKS4S023305B_____
0.047 "	7	14	18	15	MKS4O124704D_____	7	16.5	26.5	22.5	MKS4S024705D_____
	6	15	26.5	22.5	MKS4O124705B_____					
0.068 "	8	15	18	15	MKS4O126804F_____	8.5	18.5	26.5	22.5	MKS4S026805F_____
	6	15	26.5	22.5	MKS4O126805B_____					
0.1 µF	9	16	18	15	MKS4O131004J_____	10.5	19	26.5	22.5	MKS4S031005G_____
	7	16.5	26.5	22.5	MKS4O131005D_____	9	19	31.5	27.5	MKS4S031006A_____
0.15 "	8.5	18.5	26.5	22.5	MKS4O131505F_____	11	21	31.5	27.5	MKS4S031506B_____
0.22 "	10.5	19	26.5	22.5	MKS4O132205G_____	13	24	31.5	27.5	MKS4S032206D_____
0.33 "	11	21	26.5	22.5	MKS4O133305I_____	17	34.5	31.5	27.5	MKS4S033306I_____
	11	21	31.5	27.5	MKS4O133306B_____	17	29	41.5	37.5	MKS4S033307E_____
0.47 "	13	24	31.5	27.5	MKS4O134706D_____	20	39.5	31.5	27.5	MKS4S034706J_____
						17	29	41.5	37.5	MKS4S034707E_____
0.68 "	15	26	31.5	27.5	MKS4O136806F_____	20	39.5	41.5	37.5	MKS4S036807G_____
1.0 µF	17	29	31.5	27.5	MKS4O141006G_____	24	45.5	41.5	37.5	MKS4S041007H_____
	17	29	41.5	37.5	MKS4O141007E_____					
1.5 "	19	32	41.5	37.5	MKS4O141507F_____	31	46	41.5	37.5	MKS4S041507I_____
2.2 "	20	39.5	41.5	37.5	MKS4O142207G_____	35	50	41.5	37.5	MKS4S042207J_____
3.3 "	24	45.5	41.5	37.5	MKS4O143307H_____	35	50	57	52.5	MKS4S042209F_____
4.7 "	35	50	41.5	37.5	MKS4O144707J_____	45	55	57	52.5	MKS4S043309H_____
6.8 "	40	55	41.5	37.5	MKS4O146807K_____	45	65	57	52.5	MKS4S044709J_____
	35	50	57	52.5	MKS4O146809F_____					
10 µF	45	55	57	52.5	MKS4O151009H_____					

* AC voltages: f = 50 Hz; 1.4 × U_{rms} + UDC ≤ U_r

** PCM = printed circuit module = pin spacing

Dims. in mm.

Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

Taped version see page 149.

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Continuation

General Data

Capacitance	2000 VDC/400 VAC*				Part number
	W	H	L	PCM**	
1000 pF	4	9	13	10	MKS4U011003C-----
1500 "	4	9	13	10	MKS4U011503C-----
2200 "	5	11	13	10	MKS4U012203F-----
3300 "	6	12	13	10	MKS4U013303H-----
	5	11	18	15	MKS4U013304B-----
4700 "	5	11	18	15	MKS4U014704B-----
6800 "	6	12.5	18	15	MKS4U016804C-----
0.01 µF	7	14	18	15	MKS4U021004D-----
	6	15	26.5	22.5	MKS4U021005B-----
0.015 "	6	15	26.5	22.5	MKS4U021505B-----
0.022 "	7	16.5	26.5	22.5	MKS4U022205D-----
0.033 "	10.5	19	26.5	22.5	MKS4U023305G-----
0.047 "	11	21	26.5	22.5	MKS4U024705I-----
	11	21	31.5	27.5	MKS4U024706B-----
0.068 "	11	21	31.5	27.5	MKS4U026806B-----
0.1 µF	13	24	31.5	27.5	MKS4U031006D-----
0.15 "	17	29	31.5	27.5	MKS4U031506G-----
	13	24	41.5	37.5	MKS4U031507C-----
0.22 "	17	29	41.5	37.5	MKS4U032207E-----
0.33 "	20	39.5	41.5	37.5	MKS4U033307G-----
0.47 "	24	45.5	41.5	37.5	MKS4U034707H-----
0.68 "	31	46	41.5	37.5	MKS4U036807I-----
1.0 µF	40	55	41.5	37.5	MKS4U041007K-----
	35	50	57	52.5	MKS4U041009F-----
1.5 "	45	55	57	52.5	MKS4U041509H-----
2.2 "	45	65	57	52.5	MKS4U042209J-----

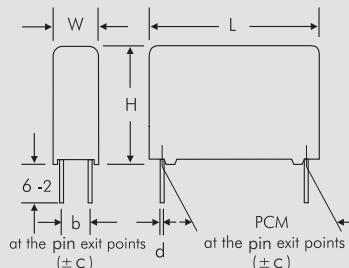
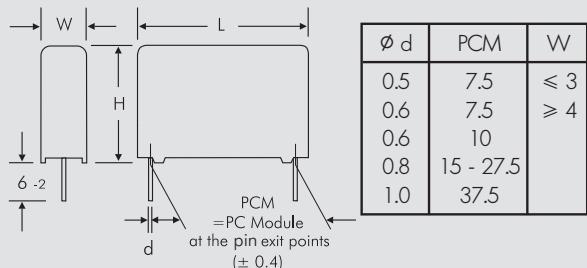
* AC voltage: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

** PCM = Printed circuit module = pin spacing

Dims. in mm.

The values of the WIMA MKM 4 ranges according to the main catalogue 2009 are still available on request.

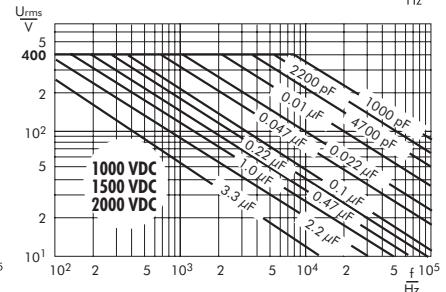
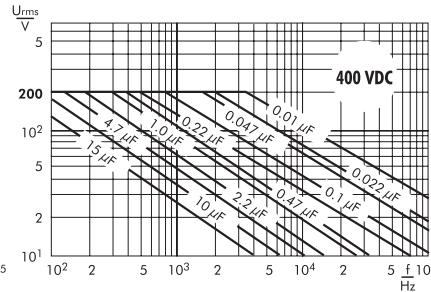
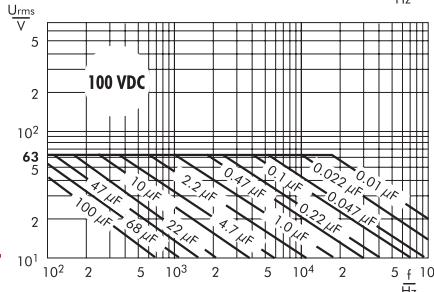
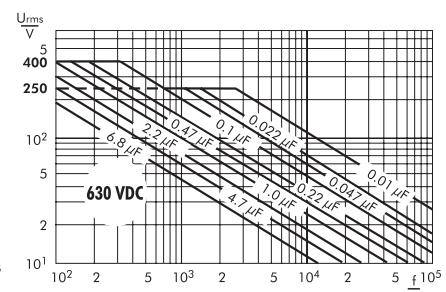
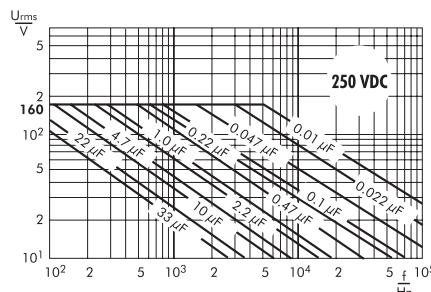
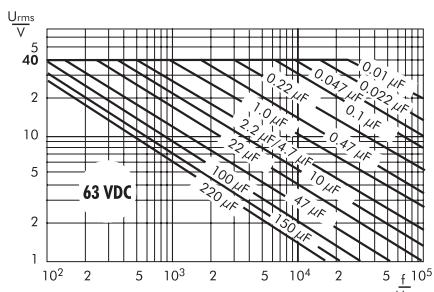
Part number completion:	
Version code:	2-pin = 00 4-pin = D4
Tolerance:	20 % = M 10 % = K 5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	



W	PCM	b	Ø d	c
17	37.5	10	1.0	0.4
19	37.5	10	1.0	0.4
20	37.5	12.5	1.0	0.4
24	37.5	12.5	1.0	0.4
31	37.5	20	1.0	0.4
35	37.5	20	1.0	0.4
40	37.5	20	1.0	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

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Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).





**Compact Type: Metallized Polypropylene (PP)- Capacitors
in PCM 10 mm to 22.5 mm. Capacitances from 0.068 µF to 2.2 µF.
Rated Voltages from 450 VDC to 630 VDC.**

Special Features

- Very compact size, high volume/capacitance ratio
- Self-healing
- Very high ripple and peak current
- High frequency AC operation capability
- High voltage capability
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.
■ PFC (power factor correction)

Construction

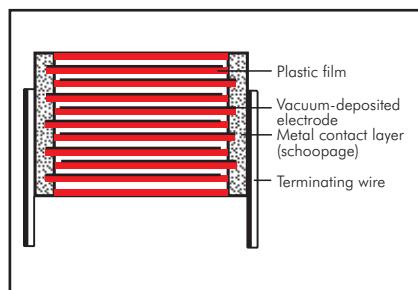
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

0.068 µF to 2.2 µF (E12-values on request)

Rated voltages:

450 VDC, 520 VDC, 630 VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55° C to +110° C

Climatic test category:

55/110/56 in accordance with IEC

Insulation resistance

at +20° C: $C \leq 0.33 \mu F: \geq 1 \times 10^5 M\Omega$

$C > 0.33 \mu F: \geq 30000 \text{ sec} (M\Omega \times \mu F)$

Measuring voltage: 100 V/1 min.

Test specifications:

In accordance with 60384-16

Test voltage:

1.6 U_r 2sec

Dielectric absorption:

0.05%

Reliability:

Operational life > 300 000 hours

Failure rate < 24 fit ($0.5 \times U_r$ and 40° C)

Dissipation factors

at +20° C: $\tan \delta$

at f	$C \leq 0.1 \mu F$	$0.1 \mu F < C \leq 1.0 \mu F$	$C > 1.0 \mu F$
1 kHz	$\leq 10 \times 10^{-4}$	$\leq 10 \times 10^{-4}$	$\leq 10 \times 10^{-4}$
10 kHz	$\leq 25 \times 10^{-4}$	$\leq 25 \times 10^{-4}$	-
100 kHz	$\leq 150 \times 10^{-4}$	-	-

Reference frequency 1 kHz in accordance with IEC 60384-1

Maximum pulse rise time:

PCM	max. pulse rise time t/V/µsec at $T_A < 40^\circ C$		
	450 VDC	520 VDC	630 VDC
10	140	200	250
15	120	160	180
22.5	100	110	130

for pulses equal to the rated voltage

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

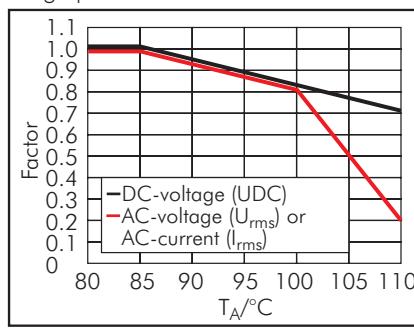
4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Derating:

$85^\circ C < T_A \leq 110^\circ C: UDC; U_{rms}$
Compared to nominal voltage, the admissible AC voltage (U_{rms}) and DC voltage (UDC) have to be reduced by 1.33% per K according to the graph.

$100^\circ C \leq T_A: I_{rms}; U_{rms}$

The admissible AC voltage (U_{rms}) or the admissible AC current (I_{rms}) must be reduced by a derating factor according to the graph:



Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	450 VDC/160 VAC*					520 VDC/200 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.068 µF	4	9	13	10	MKPCH026803C00_____	4	9	13	10	MKPCH226803C00_____
0.1 µF	4	9	13	10	MKPCH031003C00_____	5	11	13	10	MKPCH231003F00_____
	5	11	18	15	MKPCH031004B00_____					
0.15 "	4	9	13	10	MKPCH031503C00_____	5	11	13	10	MKPCH231503F00_____
	5	11	18	15	MKPCH031504B00_____	5	11	18	15	MKPCH231504B00_____
0.22 "	5	11	13	10	MKPCH032203F00_____	6	12	13	10	MKPCH232203G00_____
	5	11	18	15	MKPCH032204B00_____	5	11	18	15	MKPCH232204B00_____
0.33 "	6	12	13	10	MKPCH033303G00_____	6	12.5	18	15	MKPCH233304C00_____
	5	11	18	15	MKPCH033304B00_____					
0.47 "	8	12	13	10	MKPCH034703I00_____	7	14	18	15	MKPCH234704D00_____
	5	11	18	15	MKPCH034704B00_____	6	15	26.5	22.5	MKPCH234705B00_____
0.68 "	6	12.5	18	15	MKPCH036804C00_____	9	14	18	15	MKPCH236804H00_____
						6	15	26.5	22.5	MKPCH236805B00_____
1.0 µF	7	14	18	15	MKPCH041004D00_____	9	16	18	15	MKPCH241004J00_____
	6	15	26.5	22.5	MKPCH041005B00_____	7	16.5	26.5	22.5	MKPCH241005D00_____
1.5 "	7	16.5	26.5	22.5	MKPCH041505D00_____	10.5	19	26.5	22.5	MKPCH241505G00_____
2.2 "	8.5	18.5	26.5	22.5	MKPCH042205F00_____	10.5	20.5	26.5	22.5	MKPCH242205H00_____

Capacitance	630 VDC/200 VAC*				
	W	H	L	PCM**	Part number
0.068 µF	4	9	13	10	MKPcj026803C00_____
0.1 µF	5	11	13	10	MKPcj031003F00_____
0.15 "	6	12	13	10	MKPcj031503G00_____
	5	11	18	15	MKPcj031504B00_____
0.22 "	8	12	13	10	MKPcj032203I00_____
	6	12.5	18	15	MKPcj032204C00_____
0.33 "	7	14	18	15	MKPcj033304D00_____
	6	15	26.5	22.5	MKPcj033305B00_____
0.47 "	8	15	18	15	MKPcj034704F00_____
	6	15	26.5	22.5	MKPcj034705B00_____
0.68 "	9	16	18	15	MKPcj036804J00_____
	7	16.5	26.5	22.5	MKPcj036805D00_____
1.0 µF	8.5	18.5	26.5	22.5	MKPcj041005F00_____
1.5 "	10.5	19	26.5	22.5	MKPcj041505G00_____
2.2 "	11	21	26.5	22.5	MKPcj042205I00_____

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

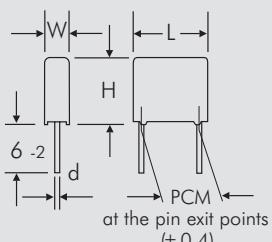
Taped version see page 149.

* AC voltages: $f \leq 1 \text{ kHz}$

** PCM = Printed circuit module = pin spacing

Dims. in mm.

$d = 0.6 \varnothing$ if PCM = 10
 $d = 0.8 \varnothing$ if PCM = 15 - 22.5



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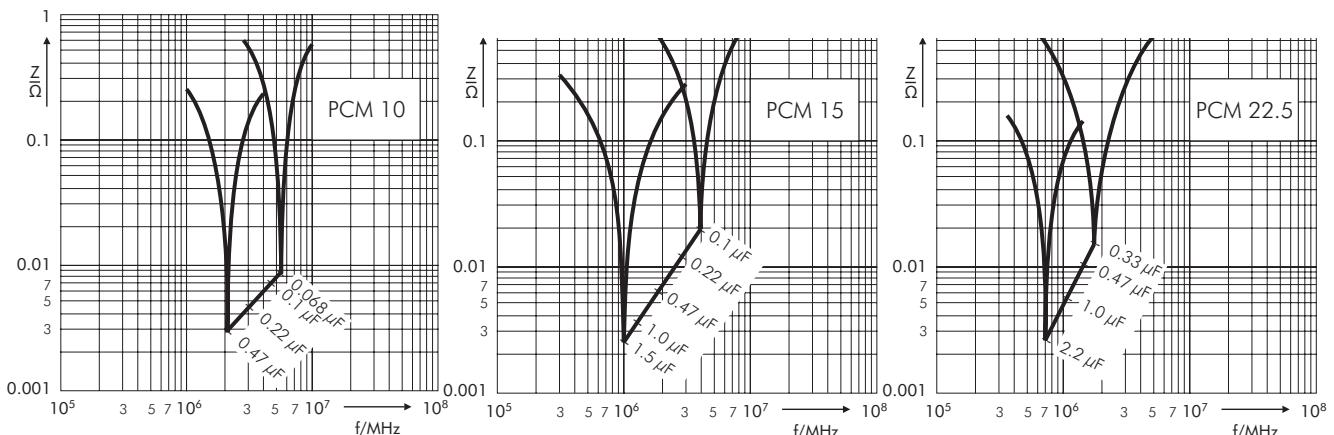
Continuation page 58

WIMA MKP 4C

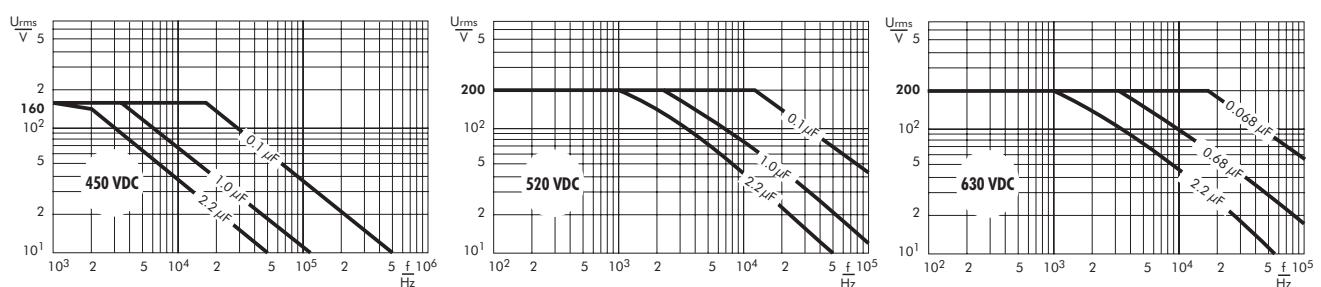


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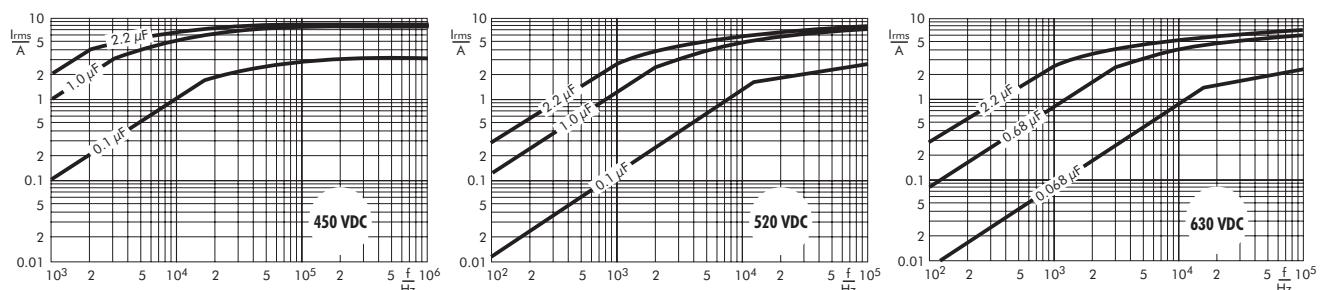
Impedance change with frequency
(general guide).



Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).



Permissible AC current in relation to frequency at 10° C internal temperature rise (general guide).



**Metallized Polypropylene (PP) Capacitors
in PCM 7.5 mm to 37.5 mm. Capacitances from 1000 pF to 10 µF.
Rated Voltages from 100 VDC to 2000 VDC.**

Special Features

- High volume/capacitance ratio
- Self-healing
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.

- Sample and hold
- Timing
- Oscillating circuits
- High frequency coupling and decoupling

Construction

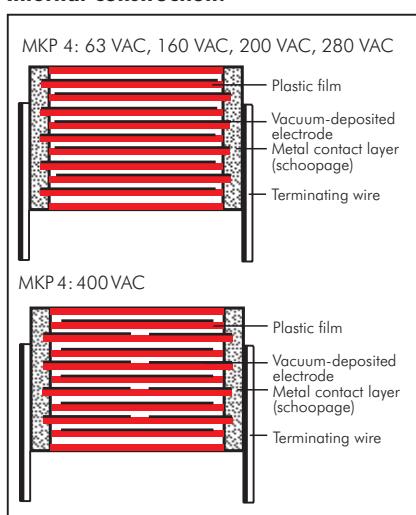
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

1000 pF to 10 µF (E12-values on request)

Rated voltages:

100 VDC, 250 VDC, 400 VDC, 630 VDC, 850 VDC, 1000 VDC, 1600 VDC, 2000 VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55°C to +100°C

Climatic test category:

55/100/56 in accordance with IEC

Insulation resistance

at +20°C: C ≤ 0.33 µF: ≥ 1 × 10⁵ MΩ

C > 0.33 µF: ≥ 30 000 sec (MΩ × µF)

Measuring voltage: 100 V/1 min.

Dissipation factors

at +20°C:

at f	C ≤ 0.1 µF	0.1 µF < C ≤ 1.0 µF	C > 1.0 µF
1 kHz	≤ 6 × 10 ⁻⁴	≤ 6 × 10 ⁻⁴	≤ 6 × 10 ⁻⁴
10 kHz	≤ 8 × 10 ⁻⁴	≤ 8 × 10 ⁻⁴	-
100 kHz	≤ 25 × 10 ⁻⁴	-	-

Maximum pulse rise time:

Capacitance pF/µF	max. pulse rise time V/µsec at T _A < 40°C CC							
	100VDC	250VDC	400VDC	630VDC	850VDC	1000VDC	1600VDC	2000VDC
1000 ... 2200	-	-	-	-	2200	2200	3500	5200
3300 ... 6800	-	-	-	-	1150	1150	2700	3500
0.01 ... 0.022	450	450	450	500	550	550	1800	2700
0.033 ... 0.068	250	250	300	350	400	400	900	1800
0.1 ... 0.22	150	150	200	250	300	300	500	900
0.33 ... 0.68	100	100	150	200	200	200	-	-
1.0 ... 2.2	75	100	100	150	150	150	-	-
3.3 ... 4.7	60	100	100	120	140	140	-	-
6.8 ... 10	40	50	60	85	-	-	-	-

for pulses equal to the rated voltage

Mechanical Tests

Pull test on pins:

d ≤ 0.8 Ø: 10 N in direction of pins

d > 0.8 Ø: 20 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Test specifications:

In accordance with IEC 60384-16

Test voltage:

1.6 U_r, 2 sec.

Dielectric absorption:

0.05%

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85°C for DC voltages and from +75°C for AC voltages.

Reliability:

Operational life > 300 000 hours Failure rate < 2 fit (0.5 × U_r and 40°C).

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

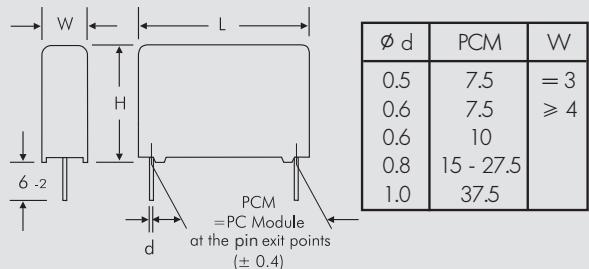
Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	3	8.5	10	7.5	MKP4D021002B00_____	3	8.5	10	7.5	MKP4F021002B00_____
0.015 "	3	8.5	10	7.5	MKP4D021502B00_____	3	8.5	10	7.5	MKP4F021502B00_____
0.022 "	3	8.5	10	7.5	MKP4D022202B00_____	3	8.5	10	7.5	MKP4F022202B00_____
0.033 "	3	8.5	10	7.5	MKP4D023302B00_____	3	8.5	10	7.5	MKP4F023302B00_____
	4	9	13	10	MKP4D023303C00_____	4	9	13	10	MKP4F023303C00_____
0.047 "	4	9	10	7.5	MKP4D024702C00_____	4	9	10	7.5	MKP4F024702C00_____
	4	9	13	10	MKP4D024703C00_____	4	9	13	10	MKP4F024703C00_____
0.068 "	4	9	10	7.5	MKP4D026802C00_____	4	9	10	7.5	MKP4F026802C00_____
	4	9	13	10	MKP4D026803C00_____	4	9	13	10	MKP4F026803C00_____
0.1 μF	4.5	9.5	10.3	7.5	MKP4D031002D00_____	4.5	9.5	10.3	7.5	MKP4F031002D00_____
	4	9	13	10	MKP4D031003C00_____	4	9	13	10	MKP4F031003C00_____
0.15 "	5	10.5	10.3	7.5	MKP4D031502E00_____	5	10.5	10.3	7.5	MKP4F031502E00_____
	5	11	13	10	MKP4D031503F00_____	5	11	13	10	MKP4F031503F00_____
0.22 "	6	12	13	10	MKP4D032203G00_____	6	12	13	10	MKP4F032203G00_____
	5	11	18	15	MKP4D032204B00_____	5	11	18	15	MKP4F032204B00_____
0.33 "	6	12.5	18	15	MKP4D033304C00_____	6	12.5	18	15	MKP4F033304C00_____
0.47 "	7	14	18	15	MKP4D034704D00_____	7	14	18	15	MKP4F034704D00_____
0.68 "	8	15	18	15	MKP4D036804F00_____	8	15	18	15	MKP4F036804F00_____
	6	15	26.5	22.5	MKP4D036805B00_____	6	15	26.5	22.5	MKP4F036805B00_____
1.0 μF	7	16.5	26.5	22.5	MKP4D041005D00_____	7	16.5	26.5	22.5	MKP4F041005D00_____
1.5 "	10.5	19	26.5	22.5	MKP4D041505G00_____	10.5	19	26.5	22.5	MKP4F041505G00_____
2.2 "	11	21	26.5	22.5	MKP4D042205I00_____	11	21	26.5	22.5	MKP4F042205I00_____
	11	21	31.5	27.5	MKP4D042206B00_____	11	21	31.5	27.5	MKP4F042206B00_____
3.3 "	13	24	31.5	27.5	MKP4D043306D00_____	13	24	31.5	27.5	MKP4F043306D00_____
4.7 "	13	24	31.5	27.5	MKP4D044706D00_____	15	26	31.5	27.5	MKP4F044706F00_____
6.8 "	15	26	31.5	27.5	MKP4D046806F00_____	17	29	31.5	27.5	MKP4F046806G00_____
	13	24	41.5	37.5	MKP4D046807C00_____	15	26	41.5	37.5	MKP4F046807D00_____
10 μF	17	29	41.5	37.5	MKP4D051007E00_____	19	32	41.5	37.5	MKP4F051007F00_____

* AC voltages: $f \leq 400 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = pin spacing

The high values and large box sizes according to main catalogue 2015 are still available on request.

Dims. in mm.



Rights reserved to amend design data without prior notification.

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

Continuation page 61

Continuation

General Data

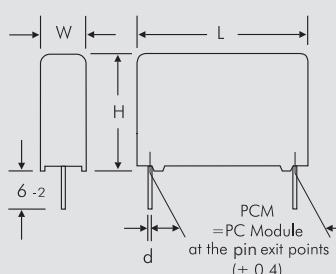
Capacitance	400 VDC/220 VAC*					630 VDC/280 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	3	8.5	10	7.5	MKP4G021002B00_____	3	8.5	10	7.5	MKP4J021002B00_____
0.015 "	4	9	10	7.5	MKP4G021502C00_____	4	9	13	10	MKP4J021003C00_____
0.022 "	4.5	9.5	10.3	7.5	MKP4G022202D00_____	4	9	13	10	MKP4J021503C00_____
0.033 "	5	10.5	10.3	7.5	MKP4G023302E00_____	5	10.5	10.3	7.5	MKP4J023302E00_____
0.047 "	5	10.5	10.3	7.5	MKP4G024702E00_____	5.7	12.5	10.3	7.5	MKP4J024702F00_____
0.068 "	5.7	12.5	10.3	7.5	MKP4G026802F00_____	6	12	13	10	MKP4J026803G00_____
	5	11	13	10	MKP4G026803F00_____	6	12.5	18	15	MKP4J026804C00_____
0.1 μF	6	12	13	10	MKP4G031003G00_____	7	14	18	15	MKP4J031004D00_____
	5	11	18	15	MKP4G031004B00_____	8	15	18	15	MKP4J031504F00_____
0.15 "	6	12.5	18	15	MKP4G031504C00_____	6	15	26.5	22.5	MKP4J031505B00_____
0.22 "	7	14	18	15	MKP4G032204D00_____	9	16	18	15	MKP4J032204J00_____
0.33 "	8	15	18	15	MKP4G033304F00_____	7	16.5	26.5	22.5	MKP4J033305D00_____
	6	15	26.5	22.5	MKP4G033305B00_____	8.5	18.5	26.5	22.5	MKP4J033305F00_____
0.47 "	7	16.5	26.5	22.5	MKP4G034705D00_____	10.5	19	26.5	22.5	MKP4J034705G00_____
	11	21	31.5	22.5	MKP4G034705B00_____	11	21	31.5	27.5	MKP4J034706B00_____
0.68 "	8.5	18.5	26.5	22.5	MKP4G036805F00_____	11	21	31.5	27.5	MKP4J036806B00_____
1.0 μF	11	21	26.5	22.5	MKP4G041005I00_____	13	24	31.5	27.5	MKP4J041006D00_____
	11	21	31.5	27.5	MKP4G041006B00_____	15	26	31.5	27.5	MKP4J041506F00_____
1.5 "	11	21	31.5	27.5	MKP4G041506B00_____	17	29	41.5	37.5	MKP4J042207E00_____
2.2 "	15	26	31.5	27.5	MKP4G042206F00_____	19	32	41.5	37.5	MKP4J043307F00_____
3.3 "	17	29	31.5	27.5	MKP4G043306G00_____					
	17	29	41.5	37.5	MKP4G043307E00_____					
4.7 "	19	32	41.5	37.5	MKP4G044707F00_____	20	39.5	41.5	37.5	MKP4J044707G00_____
6.8 "	20	39.5	41.5	37.5	MKP4G046807G00_____	24	45.5	41.5	37.5	MKP4J046807H00_____
10 μF	24	45.5	41.5	37.5	MKP4G051007H00_____	35	50	41.5	37.5	MKP4J051007J00_____

* AC voltages: $f \leq 400 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = pin spacing

The high values and large box sizes according to main catalogue 2015 are still available on request.

Dims. in mm.



ϕ	d	PCM	W
0.5		7.5	= 3
0.6		7.5	≥ 4
0.6		10	
0.8		15 - 27.5	
1.0		37.5	

Part number completion:

Tolerance: 20 % = M
10 % = K
5 % = J

Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 149.

Rights reserved to amend design data without prior notification.

Continuation page 62



Continuation

General Data

Capacitance	850 VDC/400 VAC*					1000 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKP4M011003C00_____	4	9	13	10	MKP4O111003C00_____
1500 "	4	9	13	10	MKP4M011503C00_____	4	9	13	10	MKP4O111503C00_____
2200 "	4	9	13	10	MKP4M012203C00_____	4	9	13	10	MKP4O112203C00_____
3300 "	4	9	13	10	MKP4M013303C00_____	4	9	13	10	MKP4O113303C00_____
4700 "	4	9	13	10	MKP4M014703C00_____	4	9	13	10	MKP4O114703C00_____
6800 "	4	9	13	10	MKP4M016803C00_____	5	11	13	10	MKP4O116803F00_____
0.01 μ F	5	11	13	10	MKP4M021003F00_____	5	11	13	10	MKP4O121003F00_____
0.015 "	5	11	13	10	MKP4M021503F00_____	5	11	13	10	MKP4O121503F00_____
	5	11	18	15	MKP4M021504B00_____	5	11	18	15	MKP4O121504B00_____
0.022 "	5	11	18	15	MKP4M022204B00_____	5	11	18	15	MKP4O122204B00_____
0.033 "	6	12.5	18	15	MKP4M023304C00_____	6	12.5	18	15	MKP4O123304C00_____
0.047 "	7	14	18	15	MKP4M024704D00_____	7	14	18	15	MKP4O124704D00_____
0.068 "	8	15	18	15	MKP4M026804F00_____	8	15	18	15	MKP4O126804F00_____
	6	15	26.5	22.5	MKP4M026805B00_____	6	15	26.5	22.5	MKP4O126805B00_____
0.1 μ F	9	16	18	15	MKP4M031004J00_____	9	16	18	15	MKP4O131004J00_____
	7	16.5	26.5	22.5	MKP4M031005D00_____	7	16.5	26.5	22.5	MKP4O131005D00_____
0.15 "	8.5	18.5	26.5	22.5	MKP4M031505F00_____	8.5	18.5	26.5	22.5	MKP4O131505F00_____
0.22 "	11	21	26.5	22.5	MKP4M032205I00_____	11	21	26.5	22.5	MKP4O132205I00_____
	11	21	31.5	27.5	MKP4M032206B00_____	11	21	31.5	27.5	MKP4O132206B00_____
0.33 "	11	21	31.5	27.5	MKP4M033306B00_____	11	21	31.5	27.5	MKP4O133306B00_____
0.47 "	13	24	31.5	27.5	MKP4M034706D00_____	13	24	31.5	27.5	MKP4O134706D00_____
0.68 "	17	29	31.5	27.5	MKP4M036806G00_____	17	29	31.5	27.5	MKP4O136806G00_____
1.0 μ F	17	29	41.5	37.5	MKP4M041007E00_____	17	29	41.5	37.5	MKP4O141007E00_____
1.5 "	20	39.5	41.5	37.5	MKP4M041507G00_____	20	39.5	41.5	37.5	MKP4O141507G00_____
2.2 "	24	45.5	41.5	37.5	MKP4M042207H00_____	24	45.5	41.5	37.5	MKP4O142207H00_____
3.3 "	31	46	41.5	37.5	MKP4M043307I00_____	31	46	41.5	37.5	MKP4O143307I00_____
4.7 "	35	50	41.5	37.5	MKP4M044707J00_____	35	50	41.5	37.5	MKP4O144707J00_____

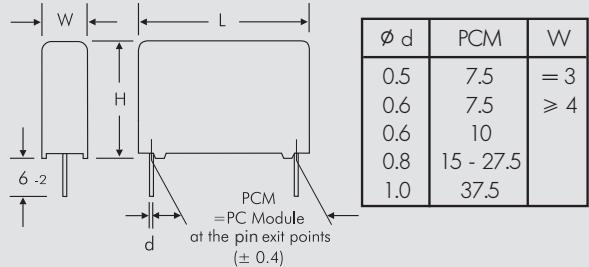
* AC voltages: $f \leq 400$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

New values and range

** PCM = Printed circuit module = pin spacing

The high values and large box sizes according to main catalogue 2015 are still available on request.

Dims. in mm.



Rights reserved to amend design data without prior notification.

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

Continuation page 63

WIMA MKP 4



Continuation

General Data

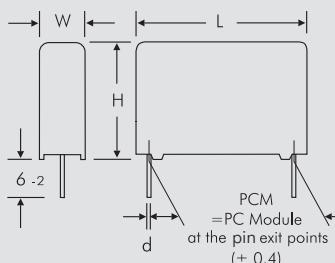
Capacitance	1600 VDC/630 VAC*					2000 VDC/700 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKP4T011003C00-----	4	9	13	10	MKP4U011003C00-----
1500 "	4	9	13	10	MKP4T011503C00-----	4	9	13	10	MKP4U011503C00-----
2200 "	4	9	13	10	MKP4T012203C00-----	4	9	13	10	MKP4U012203C00-----
3300 "	4	9	13	10	MKP4T013303C00-----	4	9	13	10	MKP4U013303C00-----
4700 "	4	9	13	10	MKP4T014703C00-----	4	9	13	10	MKP4U014703C00-----
6800 "	5	11	13	10	MKP4T016803F00-----	5	11	13	10	MKP4U016803B00-----
						5	11	18	15	MKP4U016804B00-----
0.01 μF	5	11	13	10	MKP4T021003F00-----	6	12.5	18	15	MKP4U021004C00-----
0.015 "	5	11	18	15	MKP4T021504B00-----	7	14	18	15	MKP4U021504D00-----
0.022 "	6	12.5	18	15	MKP4T022204C00-----	8	15	18	15	MKP4U022204F00-----
0.033 "	7	14	18	15	MKP4T023304D00-----	9	16	18	15	MKP4U023304J00-----
0.047 "	9	16	18	15	MKP4T024704J00-----	6	15	26.5	22.5	MKP4U023305B00-----
0.068 "	6	15	26.5	22.5	MKP4T024705B00-----	7	16.5	26.5	22.5	MKP4U024705D00-----
0.1 μF	8.5	18.5	26.5	22.5	MKP4T031005F00-----	8.5	18.5	26.5	22.5	MKP4U026805F00-----
						11	21	26.5	22.5	MKP4U031005I00-----

* AC voltages: $f \leq 400$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

New ranges

** PCM = Printed circuit module = pin spacing

Dims in mm



Ø d	PCM	W
0.5	7.5	= 3
0.6	7.5	≥ 4
0.6	10	
0.8	15 - 27.5	
1.0	37.5	

Part number completion:

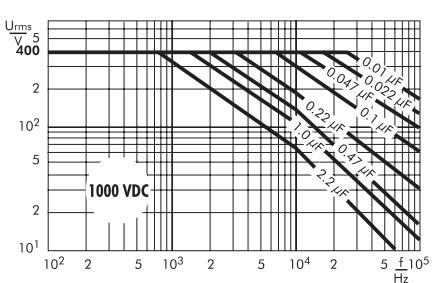
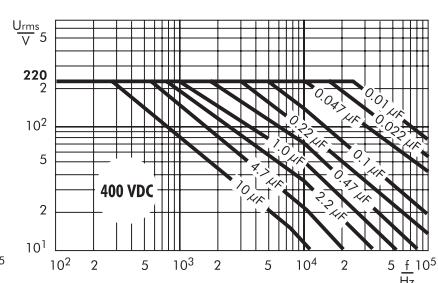
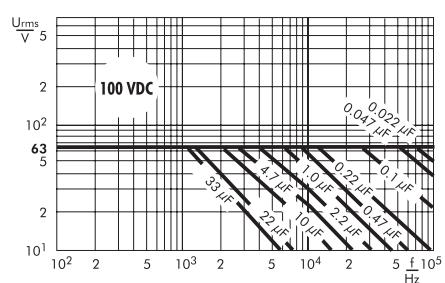
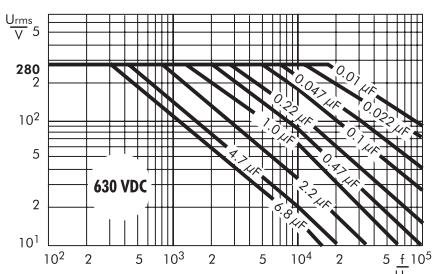
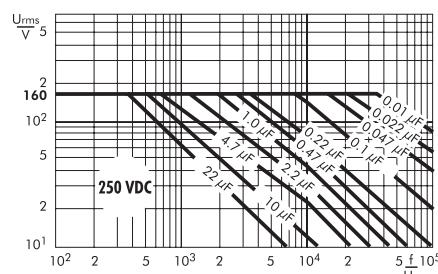
Tolerance: 20 % = M
10 % = K
5 % = J

Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 149.

Rights reserved to amend design data without prior notification.

Permissible AC voltage
in relation to frequency
at 10° C internal temperature rise
(general guide).



WIMA Capacitors for Good Contact at High Pulse Ratings



and high capacitances remain unchanged.

The WIMA FKP 1 series was developed to withstand extremely high pulse loads. It has an internal series connection, the metal foil electrodes being combined with a floating electrode metallized on both sides. The metal foil electrodes are safely contacted on both sides of the end surfaces. At the same time the capacitor is fully self-healing due to the floating electrode metallized on both sides. As regards pulse loading capability, WIMA FKP 1 represents the high-end of capacitor technology.

WIMA pulse capacitors are suitable for high pulse and high frequency applications in e.g. switch mode power supplies, TV and monitor sets, lighting industry, audio/video equipment, converters in drives and power electronics or in electronic ballasts. They are available with capacitances from 100 pF through 47 µF and with voltage ratings from 100 VDC through 6000 VDC.

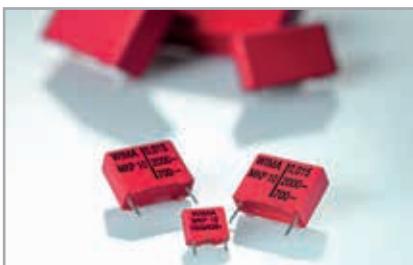
WIMA pulse capacitors are produced with the proven box technology using solvent-resistant, flame-retardant plastic cases according to UL 94 V-0. They are environmentally compatible with the RoHS 2011/65/EU regulations.

WIMA MKP 10

WIMA FKP 1

An important construction criterion in the manufacture of reliable, self-healing capacitors for pulse applications is the current-carrying capacity of the contacts, i.e. the connection between the terminating wires and the electrodes.

The construction principle of the WIMA MKP 10 series consists of a non-metallized dielectric film and an carrier film metallized on both sides acting as electrode. Due to the metallization on both sides, the electrical conductivity is considerably improved and the contact surface between the electrodes and the schoopage layer is doubled. This results in better contact and allows high current and pulse loading capability. The properties of metallized capacitors such as excellent self-healing



Polypropylene (PP) Capacitors for Pulse Applications with Double-Sided Metallized Electrodes in PCM 7.5 mm to 52.5 mm. Capacitances from 1000 pF to 47 µF. Rated Voltages from 100 VDC to 3000 VDC.

Special Features

- Pulse duty construction
- Self-healing
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2011/65/EU

Typical Applications

- For pulse applications e.g.
- Switch mode power supplies
 - TV and monitor sets
 - Lighting
 - Audio/video equipment

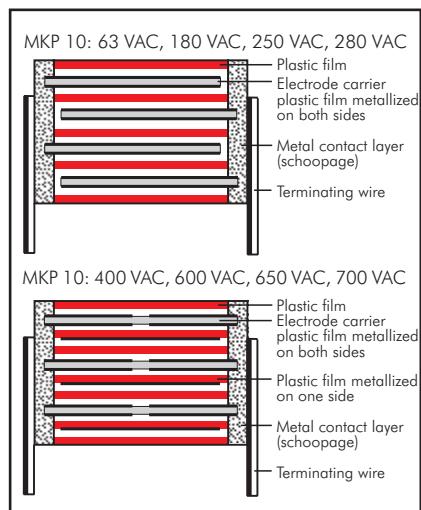
Construction

Dielectric: Polypropylene (PP) film

Capacitor electrodes:

Double-sided metallized plastic film

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations: Tinned wire.

Marking: Colour: Red.

Marking: Black.

Electrical Data

Capacitance range:

1000 pF to 47 µF (E12-values on request)

Rated voltages: 100VDC, 250VDC, 400VDC, 630VDC, 850VDC, 1000VDC, 1250VDC, 1600VDC, 2000VDC, 2500VDC, 3000VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55° C to +110° C

Insulation resistance

at +20° C: $C \leq 0.33 \mu F: \geq 1 \times 10^5 M\Omega$

$C > 0.33 \mu F: \geq 30000 \text{ sec} (M\Omega \times \mu F)$

Measuring voltage: 100 V/1 min.

Test voltage:

2 sec.

L	$\leq 2000 \text{ VDC}$	2500 VDC	$\geq 3000 \text{ VDC}$
< 41.5	1.6 U_r	1.4 U_r	1.2 U_r
41.5	1.4 U_r	1.4 U_r	1.2 U_r
57	1.2 U_r	1.2 U_r	1.2 U_r

Climatic test category:

55/100/56 in accordance with IEC

Dielectric absorption: 0.05%

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.

Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit ($0.5 \times U_r$ and 40° C)

Specific dissipation:

Box size* WxHxL in mm	Specific dissipation in Watts per K above the ambient temperature
35 x 50 x 57	0.132
45 x 55 x 57	0.164
45 x 65 x 57	0.184

* other box sizes see page 11.

Dissipation factors at + 20° C: $\tan \delta$

at f	$C \leq 0.1 \mu F$	$0.1 \mu F < C \leq 1.0 \mu F$	$C > 1.0 \mu F$
1 kHz	$\leq 6 \times 10^{-4}$	$\leq 6 \times 10^{-4}$	$\leq 6 \times 10^{-4}$
10 kHz	$\leq 6 \times 10^{-4}$	$\leq 6 \times 10^{-4}$	—
100 kHz	$\leq 15 \times 10^{-4}$	—	—

Maximum pulse rise time

Capacitance pF/µF	max. pulse rise time V/µsec at $T_A < 40^\circ C$										
	100VDC	250VDC	400VDC	630VDC	850VDC	1000VDC	1250VDC	1600VDC	2000VDC	2500VDC	3000VDC
1000 ... 2200	1250	2300	2300	2300	3500	3500	7000	7000	11500	11500	—
3300 ... 6800	1150	1500	1500	1500	3500	3500	7000	7000	11500	11500	—
0.01 ... 0.022	900	1400	1500	1500	2700	2700	3800	3800	4400	11500	—
0.033 ... 0.068	500	1000	1150	1400	2700	2700	2700	2700	2700	2700	2700
0.1 ... 0.22	250	650	650	1150	1800	1800	1800	1800	1800	1800	1800
0.33 ... 0.68	130	390	500	900	1150	1150	1150	1150	1150	1150	1150
1.0 ... 2.2	90	250	250	500	500	500	650	650	650	650	500
3.3 ... 4.7	65	100	130	190	230	230	330	330	—	—	—
6.8 ... 15	45	65	90	160	—	—	—	—	—	—	—
22 ... 47	30	45	45	—	—	—	—	—	—	—	—

Mechanical Tests

Pull test on pins:

$d \leq 0.8 \text{ } \phi$: 10 N in direction of pins

$d > 0.8 \text{ } \phi$: 20 N in direction of pins according to IEC 60068-2-21

Vibration: 6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	100 VDC/63 VAC*					250 VDC/180 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	10	7.5	MKP1D011002C_____	4	9	10	7.5	MKP1F011002C_____
1500 "	4	9	10	7.5	MKP1D011502C_____	4	9	10	7.5	MKP1F011502C_____
2200 "	4	9	10	7.5	MKP1D012202C_____	4	9	10	7.5	MKP1F012202C_____
3300 "	4	9	10	7.5	MKP1D013302C_____	4	9	10	7.5	MKP1F013302C_____
4700 "	4	9	10	7.5	MKP1D014702C_____	4	9	10	7.5	MKP1F014702C_____
6800 "	4	9	10	7.5	MKP1D016802C_____	4	9	10	7.5	MKP1F016802C_____
0.01 µF	4	9	10	7.5	MKP1D021002C_____	4	9	10	7.5	MKP1F021002C_____
0.015 "	4	9	10	7.5	MKP1D021502C_____	4	9	13	10	MKP1F021503C_____
0.022 "	4	9	10	7.5	MKP1D022202C_____	4	9	13	10	MKP1F022203C_____
0.033 "	5	10.5	10.3	7.5	MKP1D023302E_____	5	10.5	10.3	7.5	MKP1F023302E_____
0.047 "	5	10.5	10.3	7.5	MKP1D024702E_____	5	10.5	10.3	7.5	MKP1F024702E_____
0.068 "	5	11	13	10	MKP1D026803F_____	5	11	13	10	MKP1F026803F_____
0.1 µF	6	12	13	10	MKP1D031003G_____	6	12	13	10	MKP1F031003G_____
0.15 "	6	12.5	18	15	MKP1D031504C_____	5	11	18	15	MKP1F031004B_____
0.22 "	7	14	18	15	MKP1D032204D_____	6	12.5	18	15	MKP1F031504C_____
0.33 "	8	15	18	15	MKP1D033304F_____	6	15	26.5	22.5	MKP1F031505B_____
0.47 "	9	16	18	15	MKP1D034704J_____	7	14	18	15	MKP1F032204D_____
0.68 "	7	16.5	26.5	22.5	MKP1D034705D_____	6	15	26.5	22.5	MKP1F032205B_____
0.68 "	8.5	18.5	26.5	22.5	MKP1D036805F_____	8	15	18	15	MKP1F033304F_____
1.0 µF	10.5	19	26.5	22.5	MKP1D041005G_____	9	16	18	15	MKP1F033305B_____
1.5 "	11	21	31.5	27.5	MKP1D041506B_____	7	16.5	26.5	22.5	MKP1F034704J_____
2.2 "	13	24	31.5	27.5	MKP1D042206D_____	8.5	18.5	26.5	22.5	MKP1F034705D_____
3.3 "	17	29	31.5	27.5	MKP1D043306G_____	9	19	31.5	27.5	MKP1F036805F_____
4.7 "	20	39.5	31.5	27.5	MKP1D044706J_____	11	21	26.5	22.5	MKP1F041005I_____
6.8 "	17	29	41.5	37.5	MKP1D044707E_____	11	21	31.5	27.5	MKP1F041006B_____
6.8 "	19	32	41.5	37.5	MKP1D046807F_____	13	24	41.5	37.5	MKP1F041506D_____
10 µF	20	39.5	41.5	37.5	MKP1D051007G_____	13	24	41.5	37.5	MKP1F041507C_____
15 "	24	45.5	41.5	37.5	MKP1D051507H_____	15	26	31.5	27.5	MKP1F042206F_____
	31	46	41.5	37.5	MKP1D051507I_____	13	24	41.5	37.5	MKP1F042207C_____
22 "	35	50	41.5	37.5	MKP1D052207J_____	17	29	41.5	37.5	MKP1F043306I_____
33 "	40	55	41.5	37.5	MKP1D053307K_____	20	39.5	31.5	27.5	MKP1F043307E_____
	35	50	57	52.5	MKP1D053309F_____	19	32	41.5	37.5	MKP1F044706J_____
47 "	45	65	57	52.5	MKP1D054709J_____	20	39.5	41.5	37.5	MKP1F044707F_____

* AC voltage: f ≤ 1000 Hz; 1.4 × U_{rms} + UDC ≤ U_r

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Rights reserved to amend design data without prior notification.

Part number completion:

Version code: 2-pin = 00
4-pin = D4

Tolerance: 20 % = M
10 % = K
5 % = J

Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 149.

Continuation

General Data

Capacitance	400 VDC/250 VAC*					630 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	10	7.5	MKP1G011002C-----	4	9	10	7.5*	MKP1J011002C-----
1500 "	4	9	10	7.5	MKP1G011502C-----	4	9	10	7.5*	MKP1J011502C-----
2200 "	4	9	10	7.5	MKP1G012202C-----	4	9	10	7.5*	MKP1J012202C-----
3300 "	4	9	10	7.5	MKP1G013302C-----	4	9	10	7.5*	MKP1J013302C-----
4700 "	4	9	10	7.5	MKP1G014702C-----	4	9	10	7.5*	MKP1J014702C-----
6800 "	4	9	10	7.5	MKP1G016802C-----	4	9	10	7.5*	MKP1J016802C-----
						4	9	13	10	MKP1J016803C-----
0.01 μF	4	9	10	7.5	MKP1G021002C-----	5	10.5	10.3	7.5*	MKP1J021002E-----
	4	9	13	10	MKP1G021003C-----	4	9	13	10	MKP1J021003C-----
0.015 "	5	10.5	10.3	7.5	MKP1G021502E-----	5	11	13	10	MKP1J021503F-----
	4	9	13	10	MKP1G021503C-----	5	11	18	15	MKP1J021504B-----
0.022 "	5	10.5	10.3	7.5	MKP1G022202E-----	5	11	13	10	MKP1J022203F-----
	4	9	13	10	MKP1G022203C-----	5	11	18	15	MKP1J022204B-----
0.033 "	5.7	12.5	10.3	7.5	MKP1G023302F-----	6	12	13	10	MKP1J023303G-----
	5	11	13	10	MKP1G023303F-----	5	11	18	15	MKP1J023304B-----
0.047 "	6	12	13	10	MKP1G024703G-----	6	12.5	18	15	MKP1J024704C-----
	5	11	18	15	MKP1G024704B-----	6	15	26.5	22.5	MKP1J024705B-----
0.068 "	6	12.5	18	15	MKP1G026804C-----	7	14	18	15	MKP1J026804D-----
	6	15	26.5	22.5	MKP1G026805B-----	6	15	26.5	22.5	MKP1J026805B-----
0.1 μF	7	14	18	15	MKP1G031004D-----	9	16	18	15	MKP1J031004J-----
	6	15	26.5	22.5	MKP1G031005B-----	7	16.5	26.5	22.5	MKP1J031005D-----
0.15 "	8	15	18	15	MKP1G031504F-----	8.5	18.5	26.5	22.5	MKP1J031505F-----
	6	15	26.5	22.5	MKP1G031505B-----	9	19	31.5	27.5	MKP1J031506A-----
0.22 "	9	16	18	15	MKP1G032204J-----	8.5	18.5	26.5	22.5	MKP1J032205F-----
	7	16.5	26.5	22.5	MKP1G032205D-----	9	19	31.5	27.5	MKP1J032206A-----
0.33 "	8.5	18.5	26.5	22.5	MKP1G033305F-----	11	21	26.5	22.5	MKP1J033305I-----
	9	19	31.5	27.5	MKP1G033306A-----	11	21	31.5	27.5	MKP1J033306B-----
0.47 "	10.5	19	26.5	22.5	MKP1G034705G-----	11	21	31.5	27.5	MKP1J034706B-----
	9	19	31.5	27.5	MKP1G034706A-----					
0.68 "	11	21	26.5	22.5	MKP1G036805I-----	15	26	31.5	27.5	MKP1J036806F-----
	11	21	31.5	27.5	MKP1G036806B-----	13	24	41.5	37.5	MKP1J036807C-----
1.0 μF	13	24	31.5	27.5	MKP1G041006D-----	17	29	31.5	27.5	MKP1J041006G-----
	13	24	41.5	37.5	MKP1G041007C-----	15	26	41.5	37.5	MKP1J041007D-----
1.5 "	17	29	31.5	27.5	MKP1G041506G-----	20	39.5	31.5	27.5	MKP1J041506J-----
	13	24	41.5	37.5	MKP1G041507C-----	19	32	41.5	37.5	MKP1J041507F-----
2.2 "	20	39.5	31.5	27.5	MKP1G042206J-----	20	39.5	41.5	37.5	MKP1J042207G-----
	17	29	41.5	37.5	MKP1G042207E-----					
3.3 "	20	39.5	41.5	37.5	MKP1G043307G-----	24	45.5	41.5	37.5	MKP1J043307H-----
4.7 "	20	39.5	41.5	37.5	MKP1G044707G-----	35	50	41.5	37.5	MKP1J044707J-----
6.8 "	24	45.5	41.5	37.5	MKP1G046807H-----	40	55	41.5	37.5	MKP1J046807K-----
						35	50	57	52.5	MKP1J046809F-----
10 μF	35	50	41.5	37.5	MKP1G051007J-----	45	55	57	52.5	MKP1J051009H-----
	35	50	57	52.5	MKP1G051009F-----					
15 "	40	55	41.5	37.5	MKP1G051507K-----					
	35	50	57	52.5	MKP1G051509F-----					
22 "	45	65	57	52.5	MKP1G052209J-----					

* AC voltage: f ≤ 1000 Hz; 1.4 × U_{rms} + UDC ≤ U_r

** PCM = Printed circuit module = pin spacing

* Admissible AC voltage 280 VAC.

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

Version code: 2-pin = 00

4-pin = D4

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

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Continuation

General Data

Capacitance	850 VDC/450 VAC*					1000 VDC/600 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	10	7.5	MKP1M011002C-----	4	9	10	7.5	MKP1O111002C-----
	4	9	13	10	MKP1M011003C-----	4	9	13	10	MKP1O111003C-----
1500 "	4	9	10	7.5	MKP1M011502C-----	4	9	10	7.5	MKP1O111502C-----
	4	9	13	10	MKP1M011503C-----	4	9	13	10	MKP1O111503C-----
2200 "	4	9	10	7.5	MKP1M012202C-----	4	9	10	7.5	MKP1O112202C-----
	4	9	13	10	MKP1M012203C-----	4	9	13	10	MKP1O112203C-----
3300 "	4	9	10	7.5	MKP1M013302C-----	4	9	10	7.5	MKP1O113302C-----
	4	9	13	10	MKP1M013303C-----	4	9	13	10	MKP1O113303C-----
4700 "	4.5	9.5	10.3	7.5	MKP1M014702D-----	4.5	9.5	10.3	7.5	MKP1O114702D-----
	4	9	13	10	MKP1M014703C-----	4	9	13	10	MKP1O114703C-----
6800 "	5.7	12.5	10.3	7.5	MKP1M016802F-----	5.7	12.5	10.3	7.5	MKP1O116802F-----
	5	11	13	10	MKP1M016803F-----	5	11	13	10	MKP1O116803F-----
0.01 µF	5	11	13	10	MKP1M021003F-----	5	11	13	10	MKP1O121003F-----
	5	11	18	15	MKP1M021004B-----	5	11	18	15	MKP1O121004B-----
0.015 "	6	12	13	10	MKP1M021503G-----	6	12	13	10	MKP1O121503G-----
	5	11	18	15	MKP1M021504B-----	5	11	18	15	MKP1O121504B-----
0.022 "	6	12.5	18	15	MKP1M022204C-----	6	12.5	18	15	MKP1O122204C-----
	6	15	26.5	22.5	MKP1M022205B-----	6	15	26.5	22.5	MKP1O122205B-----
0.033 "	7	14	18	15	MKP1M023304D-----	7	14	18	15	MKP1O123304D-----
	6	15	26.5	22.5	MKP1M023305B-----	6	15	26.5	22.5	MKP1O123305B-----
0.047 "	8	15	18	15	MKP1M024704F-----	8	15	18	15	MKP1O124704F-----
	6	15	26.5	22.5	MKP1M024705B-----	6	15	26.5	22.5	MKP1O124705B-----
0.068 "	7	16.5	26.5	22.5	MKP1M026805D-----	7	16.5	26.5	22.5	MKP1O126805D-----
	8.5	18.5	26.5	22.5	MKP1M031005F-----	8.5	18.5	26.5	22.5	MKP1O131005F-----
0.15 "	11	21	31.5	27.5	MKP1M031006B-----	11	21	31.5	27.5	MKP1O131006B-----
	11	21	26.5	22.5	MKP1M031505I-----	11	21	26.5	22.5	MKP1O131505I-----
0.22 "	11	21	31.5	27.5	MKP1M031506B-----	11	21	31.5	27.5	MKP1O131506B-----
	11	21	31.5	27.5	MKP1M032206B-----	11	21	31.5	27.5	MKP1O132206B-----
0.33 "	13	24	31.5	27.5	MKP1M033306D-----	13	24	31.5	27.5	MKP1O133306D-----
	15	26	31.5	27.5	MKP1M033306F-----	15	26	31.5	27.5	MKP1O133306F-----
0.47 "	13	24	41.5	37.5	MKP1M033307C-----	13	24	41.5	37.5	MKP1O133307C-----
	17	29	31.5	27.5	MKP1M034706G-----	17	29	31.5	27.5	MKP1O134706G-----
0.68 "	13	24	41.5	37.5	MKP1M034707C-----	13	24	41.5	37.5	MKP1O134707C-----
	20	39.5	31.5	27.5	MKP1M036806J-----	20	39.5	31.5	27.5	MKP1O136806J-----
1.0 µF	17	29	41.5	37.5	MKP1M036807E-----	17	29	41.5	37.5	MKP1O136807E-----
	24	45.5	41.5	37.5	MKP1M041507H-----	24	45.5	41.5	37.5	MKP1O141507H-----
1.5 "	31	46	41.5	37.5	MKP1M042207I-----	31	46	41.5	37.5	MKP1O142207I-----
	40	55	41.5	37.5	MKP1M043307K-----	40	55	41.5	37.5	MKP1O143307K-----
2.2 "	35	50	57	52.5	MKP1M043309F-----	35	50	57	52.5	MKP1O143309F-----
	45	55	57	52.5	MKP1M044709H-----	45	55	57	52.5	MKP1O144709H-----

* AC voltage: f ≤ 1000 Hz; 1.4 × U_{rms} + UDC ≤ U_r

New range

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

Taped version see page 149.

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Continuation page 69

Continuation

General Data

Capacitance	1250 VDC/600 VAC*					1600 VDC/650 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKP1R011003C-----	4	9	13	10	MKP1T011003C-----
1500 "	4	9	13	10	MKP1R011503C-----	4	9	13	10	MKP1T011503C-----
2200 "	4	9	13	10	MKP1R012203C-----	4	9	13	10	MKP1T012203C-----
3300 "	4	9	13	10	MKP1R013303C-----	4	9	13	10	MKP1T013303C-----
4700 "	5	11	13	10	MKP1R014703F-----	5	11	13	10	MKP1T014703F-----
6800 "	6	12	13	10	MKP1R016803G-----	6	12	13	10	MKP1T016803G-----
	5	11	18	15	MKP1R016804B-----	5	11	18	15	MKP1T016804B-----
0.01 µF	5	11	18	15	MKP1R021004B-----	5	11	18	15	MKP1T021004B-----
0.015 "	6	12.5	18	15	MKP1R021504C-----	6	12.5	18	15	MKP1T021504C-----
	6	15	26.5	22.5	MKP1R021505B-----	6	15	26.5	22.5	MKP1T021505B-----
0.022 "	7	14	18	15	MKP1R022204D-----	7	14	18	15	MKP1T022204D-----
	6	15	26.5	22.5	MKP1R022205B-----	6	15	26.5	22.5	MKP1T022205B-----
0.033 "	8	15	18	15	MKP1R023304F-----	8	15	18	15	MKP1T023304F-----
	6	15	26.5	22.5	MKP1R023305B-----	6	15	26.5	22.5	MKP1T023305B-----
0.047 "	7	16.5	26.5	22.5	MKP1R024705D-----	7	16.5	26.5	22.5	MKP1T024705D-----
	9	19	31.5	27.5	MKP1R024706A-----	9	19	31.5	27.5	MKP1T024706A-----
0.068 "	10.5	19	26.5	22.5	MKP1R026805G-----	10.5	19	26.5	22.5	MKP1T026805G-----
	9	19	31.5	27.5	MKP1R026806A-----	9	19	31.5	27.5	MKP1T026806A-----
0.1 µF	11	21	26.5	22.5	MKP1R031005I-----	11	21	26.5	22.5	MKP1T031005I-----
	11	21	31.5	27.5	MKP1R031006B-----	11	21	31.5	27.5	MKP1T031006B-----
0.15 "	13	24	31.5	27.5	MKP1R031506D-----	13	24	31.5	27.5	MKP1T031506D-----
0.22 "	15	26	31.5	27.5	MKP1R032206F-----	15	26	31.5	27.5	MKP1T032206F-----
	13	24	41.5	37.5	MKP1R032207C-----	13	24	41.5	37.5	MKP1T032207C-----
0.33 "	17	34.5	31.5	27.5	MKP1R033306I-----	17	34.5	31.5	27.5	MKP1T033306I-----
	17	29	41.5	37.5	MKP1R033307E-----	17	29	41.5	37.5	MKP1T033307E-----
0.47 "	20	39.5	31.5	27.5	MKP1R034706J-----	20	39.5	31.5	27.5	MKP1T034706J-----
	19	32	41.5	37.5	MKP1R034707F-----	19	32	41.5	37.5	MKP1T034707F-----
0.68 "	20	39.5	41.5	37.5	MKP1R036807G-----	20	39.5	41.5	37.5	MKP1T036807G-----
1.0 µF	24	45.5	41.5	37.5	MKP1R041007H-----	24	45.5	41.5	37.5	MKP1T041007H-----
1.5 "	31	46	41.5	37.5	MKP1R041507I-----	31	46	41.5	37.5	MKP1T041507I-----
2.2 "	40	55	41.5	37.5	MKP1R042207K-----	40	55	41.5	37.5	MKP1T042207K-----
	35	50	57	52.5	MKP1R042209F-----	35	50	57	52.5	MKP1T042209F-----
3.3 "	45	65	57	52.5	MKP1R043309J-----	45	65	57	52.5	MKP1T043309J-----

* AC voltage: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

New range

** PCM = Printed circuit module = pin spacing

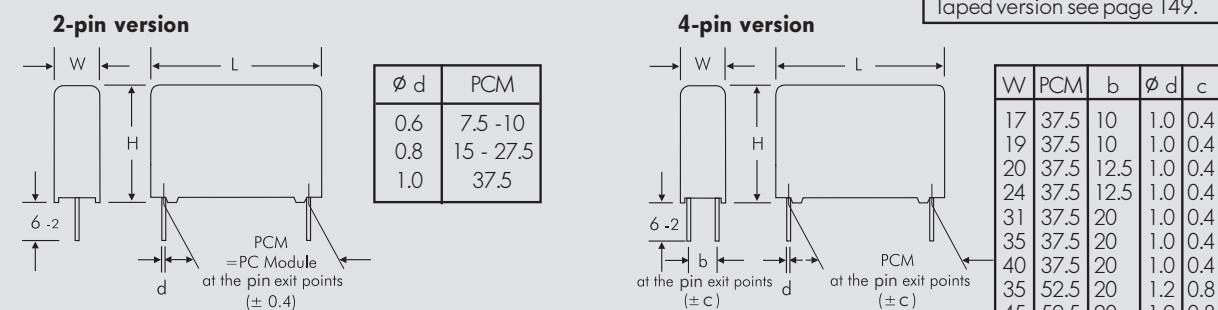
Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

Taped version see page 149.



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Continuation page 70



Continuation

General Data

Capacitance	2000 VDC/700 VAC*					2500 VDC/700 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKP1U011003C_____	5	11	18	15	MKP1V011004B_____
1500 "	4	9	13	10	MKP1U011503C_____	6	15	26.5	22.5	MKP1V011005B_____
2200 "	5	11	13	10	MKP1U012203F_____	5	11	18	15	MKP1V012204B_____
	5	11	18	15	MKP1U012204B_____	6	15	26.5	22.5	MKP1V012205B_____
3300 "	5	11	18	15	MKP1U013304B_____	5	11	18	15	MKP1V013304B_____
	6	15	26.5	22.5	MKP1U014704B_____	6	12.5	18	15	MKP1V014704C_____
4700 "	5	11	18	15	MKP1U014705B_____	6	15	26.5	22.5	MKP1V014705B_____
	6	15	26.5	22.5	MKP1U016804C_____	7	14	18	15	MKP1V016804D_____
6800 "	6	12.5	18	15	MKP1U016805B_____	7	16.5	26.5	22.5	MKP1V016805D_____
0.01 µF	7	14	18	15	MKP1U021004D_____	8.5	18.5	26.5	22.5	MKP1V021005F_____
	6	15	26.5	22.5	MKP1U021005B_____					
0.015 "	8	15	18	15	MKP1U021504F_____	10.5	19	26.5	22.5	MKP1V021505G_____
	6	15	26.5	22.5	MKP1U021505B_____					
0.022 "	9	16	18	15	MKP1U022204J_____	11	21	26.5	22.5	MKP1V022205I_____
	7	16.5	26.5	22.5	MKP1U022205D_____					
0.033 "	8.5	18.5	26.5	22.5	MKP1U023305F_____	11	21	26.5	22.5	MKP1V023305I_____
	9	19	31.5	27.5	MKP1U023306A_____	9	19	31.5	27.5	MKP1V023306A_____
0.047 "	10.5	19	26.5	22.5	MKP1U024705G_____	11	21	31.5	27.5	MKP1V024706B_____
	11	21	31.5	27.5	MKP1U024706B_____					
0.068 "	11	21	26.5	22.5	MKP1U026805I_____	13	24	31.5	27.5	MKP1V026806D_____
	11	21	31.5	27.5	MKP1U026806B_____					
0.1 µF	13	24	31.5	27.5	MKP1U031006D_____	15	26	31.5	27.5	MKP1V031006F_____
	15	26	31.5	27.5	MKP1U031506F_____	13	24	41.5	37.5	MKP1V031007C_____
0.15 "	13	24	41.5	37.5	MKP1U031507C_____	17	34.5	31.5	27.5	MKP1V031506I_____
0.22 "	17	34.5	31.5	27.5	MKP1U032206I_____	15	26	41.5	37.5	MKP1V031507D_____
	17	29	41.5	37.5	MKP1U032207E_____	19	32	41.5	37.5	MKP1V032207F_____
0.33 "	19	32	41.5	37.5	MKP1U033307F_____	24	45.5	41.5	37.5	MKP1V033307H_____
0.47 "	20	39.5	41.5	37.5	MKP1U034707G_____	31	46	41.5	37.5	MKP1V034707I_____
0.68 "	24	45.5	41.5	37.5	MKP1U036807H_____	35	50	41.5	37.5	MKP1V036807J_____
1.0 µF	35	50	41.5	37.5	MKP1U041007J_____	40	55	41.5	37.5	MKP1V041007K_____
	40	55	41.5	37.5	MKP1U041507K_____	35	50	57	52.5	MKP1V041009F_____
1.5 "	35	50	57	52.5	MKP1U041509F_____	45	55	57	52.5	MKP1V041509H_____
2.2 "	45	55	57	52.5	MKP1U042209H_____					

* AC voltage: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Rights reserved to amend design data without prior notification.

Part number completion:

Version code: 2-pin = 00
4-pin = D4

Tolerance: 20 % = M
10 % = K
5 % = J

Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 149.

Continuation page 71

Continuation

General Data

Capacitance	3000 VDC/700 VAC*				Part number
	W	H	L	PCM**	
0.01 μF	8.5	18.5	26.5	22.5	MKP1W021005F-----
0.015 "	10.5	19	26.5	22.5	MKP1W021505G-----
0.022 "	11	21	26.5	22.5	MKP1W022205I-----
0.033 "	11	21	26.5	22.5	MKP1W023305I-----
"	9	19	31.5	27.5	MKP1W023306A-----
0.047 "	11	21	31.5	27.5	MKP1W024706B-----
0.068 "	13	24	31.5	27.5	MKP1W026806D-----
0.1 μF	15	26	31.5	27.5	MKP1W031006F-----
"	13	24	41.5	37.5	MKP1W031007C-----
0.15 "	17	34.5	31.5	27.5	MKP1W031506I-----
"	15	26	41.5	37.5	MKP1W031507D-----
0.22 "	19	32	41.5	37.5	MKP1W032207F-----
0.33 "	24	45.5	41.5	37.5	MKP1W033307H-----
0.47 "	31	46	41.5	37.5	MKP1W034707I-----
0.68 "	35	50	41.5	37.5	MKP1W036807J-----
1.0 μF	40	55	41.5	37.5	MKP1W041007K-----
"	35	50	57	52.5	MKP1W041009F-----
1.5 "	45	55	57	52.5	MKP1W041509H-----

* AC voltage: $f \leq 1000 \text{ Hz}; 1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

** PCM = Printed circuit module = pin spacing

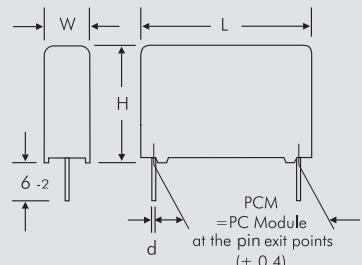
Dims. in mm.

The box sizes according to the main catalogue 2015
are still available on request

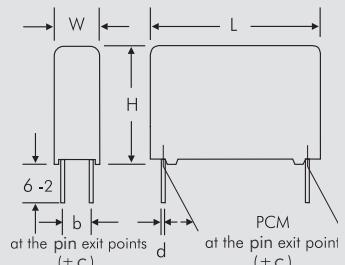
Ionisation inception
level in isolated
cases may be lower
than admissible
rated AC voltage.

Part number completion:	
Version code:	2-pin = 00 4-pin = D4
Tolerance:	20 % = M 10 % = K 5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD

Taped version see page 149.



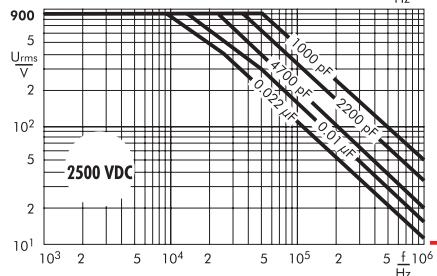
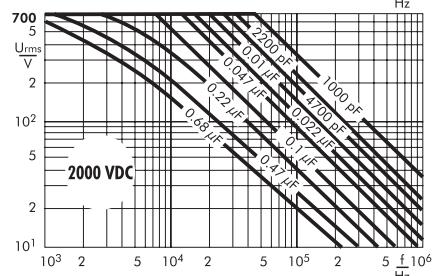
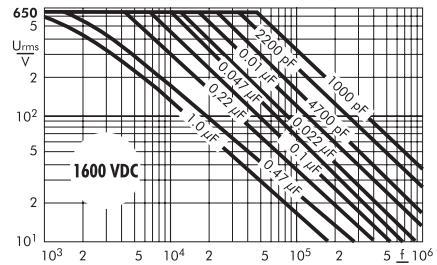
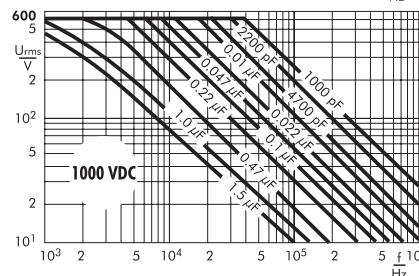
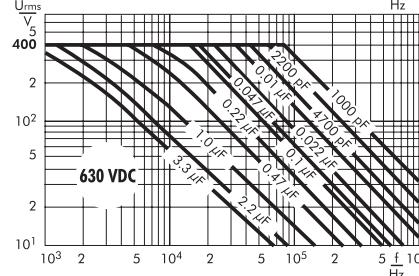
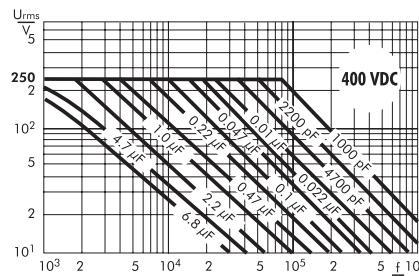
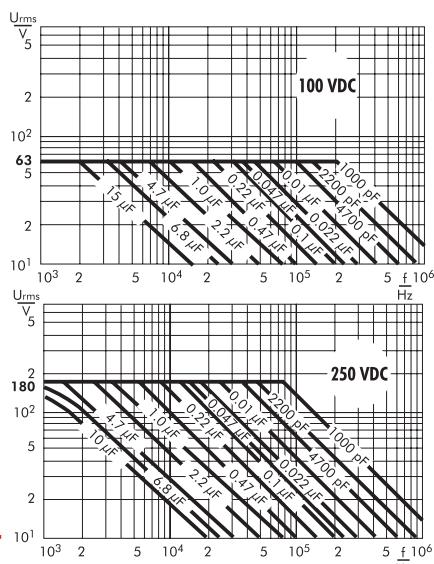
ϕ d	PCM
0.6	7.5 - 10
0.8	15 - 27.5
1.0	37.5



W	PCM	b	ϕ d	c
17	37.5	10	1.0	0.4
19	37.5	10	1.0	0.4
20	37.5	12.5	1.0	0.4
24	37.5	12.5	1.0	0.4
31	37.5	20	1.0	0.4
35	37.5	20	1.0	0.4
40	37.5	20	1.0	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

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Permissible AC voltage
in relation to frequency
at 10° C internal temperature rise
(general guide).





**Polypropylene (PP) Capacitors for Pulse Applications with Metal Foil
Electrodes and Metallized Internal Series Connection in PCM 15 mm to 52.5 mm.
Capacitances from 100 pF to 4.7 µF. Rated Voltages from 400 VDC to 6000 VDC.**

Special Features

- Extremely high pulse duty
- Self-healing
- Internal series connection
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2011/65/EU

Typical Applications

For high pulse and high frequency applications e.g.

- Switch mode power supplies
- Converters in drives and power electronics
- Deflection systems in monitors and TV-sets
- Electronic ballasts

Construction

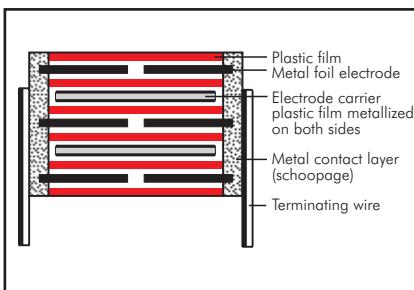
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Aluminium foil and double-sided metallized plastic film

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

100 pF to 4.7 µF (E12-values on request)

Rated voltages:

400 VDC, 630 VDC, 850 VDC, 1000 VDC, 1250 VDC, 1600 VDC, 2000 VDC, 4000 VDC, 6000 VDC

Capacitance tolerances:

±20%, ±10%, ±5% (other tolerances are available subject to special enquiry)

Operating temperature range:

-55°C to +100°C

Climatic test category:

55/100/56 in accordance with IEC

Test voltage: 2 U_r, 2 sec / 6 kV: PCM < 37.5 1.6 U_r, 2 sec, PCM 37.5 1.2 U_r, 2 sec.

Dielectric absorption:

0.05%

Dissipation factors

at +20°C: tan δ

at f	C ≤ 0.1 µF	0.1 µF < C ≤ 1.0 µF	C > 1.0 µF
1 kHz	≤ 5x10 ⁻⁴	≤ 5x10 ⁻⁴	≤ 5x10 ⁻⁴
10 kHz	≤ 6x10 ⁻⁴	≤ 6x10 ⁻⁴	-
100 kHz	≤ 10x10 ⁻⁴	-	-

Maximum pulse rise time:

for pulses equal to the rated voltage

Capacitance pF/µF	max. pulse rise time V/µsec at T _A < 40°C							
	400 VDC	630 VDC	850 VDC	1000 VDC	1250 VDC	1600 VDC	2000 VDC	4000 VDC
100 ... 220	-	-	-	-	-	56000	56000	-
330 ... 680	-	-	-	-	-	51000	56000	56000
1000 ... 2200	29000	29000	29000	29000	29000	46000	51000	51000
3300 ... 6800	9000	14000	27000	27000	29000	29000	29000	29000
0.01 ... 0.022	9000	11000	11000	11000	11000	11000	13000	13000
0.033 ... 0.068	9000	11000	11000	11000	11000	11000	13000	13000
0.1 ... 0.22	7000	11000	11000	11000	11000	11000	11000	13000
0.33 ... 0.68	6000	10000	11000	11000	11000	11000	11000	13000
1.0 ... 2.2	5000	6600	8300	8300	9500	11000	-	-
3.3 ... 4.7	2500	-	-	-	-	-	-	-

Mechanical Tests

Pull test on pins:

d ≤ 0.8 Ø: 10 N in direction of pins
d > 0.8 Ø: 20 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Insulation resistance at +20°C:

C ≤ 0.1 µF: ≥ 1 x 10⁵ MΩ
C > 0.1 µF: ≥ 30 000 sec (MΩ x µF)

Measuring voltage: 100 V/1 min.

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85°C for DC voltages and from +75°C for AC voltages

Reliability:

Operational life > 300 000 hours
Failure rate < 1 fit (0.5 x U_r and 40°C)

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	400 VDC/250 VAC*					630 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	5	11	18	15	FKP1G011004B-----	5	11	18	15	FKP1J011004B-----
1500 "	5	11	18	15	FKP1G011504B-----	5	11	18	15	FKP1J011504B-----
2200 "	5	11	18	15	FKP1G012204B-----	5	11	18	15	FKP1J012204B-----
3300 "	5	11	18	15	FKP1G013304B-----	5	11	18	15	FKP1J013304B-----
4700 "	5	11	18	15	FKP1G014704B-----	5	11	18	15	FKP1J014704B-----
6800 "	5	11	18	15	FKP1G016804B-----	6	12.5	18	15	FKP1J016804C-----
0.01 µF	5	11	18	15	FKP1G021004B-----	7	14	18	15	FKP1J021004D-----
0.015 "	6	12.5	18	15	FKP1G021504C-----	5	14	26.5	22.5	FKP1J021005A-----
0.022 "	7	14	18	15	FKP1G022204D-----	8	15	18	15	FKP1J021504F-----
0.033 "	5	14	26.5	22.5	FKP1G022205A-----	6	15	26.5	22.5	FKP1J021505B-----
0.047 "	8	15	18	15	FKP1G023304F-----	7	16.5	26.5	22.5	FKP1J022205D-----
0.068 "	6	15	26.5	22.5	FKP1G023305B-----	8.5	18.5	26.5	22.5	FKP1J023305F-----
0.15 "	7	16.5	26.5	22.5	FKP1G024705D-----	10.5	20.5	26.5	22.5	FKP1J024705H-----
0.22 "	7	16.5	26.5	22.5	FKP1G024705D-----	9	19	31.5	27.5	FKP1J024706A-----
0.33 "	8	18.5	26.5	22.5	FKP1G026805F-----	11	21	31.5	27.5	FKP1J026806B-----
0.47 "	8.5	18.5	26.5	22.5	FKP1G026805F-----	9	19	41.5	37.5	FKP1J026807A-----
0.1 µF	10.5	20.5	26.5	22.5	FKP1G031005H-----	13	24	31.5	27.5	FKP1J031006D-----
0.15 "	9	19	31.5	27.5	FKP1G031006A-----	11	22	41.5	37.5	FKP1J031007B-----
0.22 "	11	21	31.5	27.5	FKP1G031506B-----	13	24	41.5	37.5	FKP1J031507C-----
0.33 "	13	24	31.5	27.5	FKP1G032206D-----	15	26	41.5	37.5	FKP1J032207D-----
0.47 "	11	22	41.5	37.5	FKP1G032207B-----	19	32	41.5	37.5	FKP1J033307F-----
0.68 "	13	24	41.5	37.5	FKP1G033307C-----	20	39.5	41.5	37.5	FKP1J034707G-----
0.15 "	17	29	41.5	37.5	FKP1G034707E-----	24	45.5	41.5	37.5	FKP1J036807H-----
0.22 "	19	32	41.5	37.5	FKP1G036807F-----					
1.0 µF	20	39.5	41.5	37.5	FKP1G041007G-----	35	50	41.5	37.5	FKP1J041007J-----
1.5 "	31	46	41.5	37.5	FKP1G041507I-----	40	55	41.5	37.5	FKP1J041507K-----
2.2 "	35	50	41.5	37.5	FKP1G042207J-----	35	50	57	52.5	FKP1J041509F-----
3.3 "	35	50	57	52.5	FKP1G043309F-----	45	55	57	52.5	FKP1J042209H-----
4.7 "	45	65	57	52.5	FKP1G044709J-----					

* AC voltages: f ≤ 1000 Hz; 1.4 × U_{rms} + UDC ≤ U_r

** PCM = Printed circuit module = pin spacing

Dims. in mm.

The values of the WIMA FKP 4 range according to main catalogue 2015 are still available on request.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

Taped version see page 149.

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Continuation page 74



Continuation

General Data

Capacitance	850 VDC/450 VAC*					1000 VDC/600 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	5	11	18	15	FKP1M011004B-----	5	11	18	15	FKP1O111004B-----
1500 "	5	11	18	15	FKP1M011504B-----	5	11	18	15	FKP1O111504B-----
2200 "	5	11	18	15	FKP1M012204B-----	5	11	18	15	FKP1O112204B-----
3300 "	5	11	18	15	FKP1M013304B-----	5	11	18	15	FKP1O113304B-----
4700 "	6	12.5	18	15	FKP1M014704C-----	6	12.5	18	15	FKP1O114704C-----
6800 "	7	14	18	15	FKP1M016804D-----	7	14	18	15	FKP1O116804D-----
0.01 µF	8	15	18	15	FKP1M021004F-----	8	15	18	15	FKP1O121004F-----
	6	15	26.5	22.5	FKP1M021005B-----	6	15	26.5	22.5	FKP1O121005B-----
0.015 "	6	15	26.5	22.5	FKP1M021505B-----	6	15	26.5	22.5	FKP1O121505B-----
0.022 "	8.5	18.5	26.5	22.5	FKP1M022205F-----	8.5	18.5	26.5	22.5	FKP1O122205F-----
0.033 "	10.5	20.5	26.5	22.5	FKP1M023305H-----	10.5	20.5	26.5	22.5	FKP1O123305H-----
	9	19	31.5	27.5	FKP1M023306A-----	9	19	31.5	27.5	FKP1O123306A-----
0.047 "	11	21	31.5	27.5	FKP1M024706B-----	11	21	31.5	27.5	FKP1O124706B-----
0.068 "	13	24	31.5	27.5	FKP1M026806D-----	13	24	31.5	27.5	FKP1O126806D-----
	11	22	41.5	37.5	FKP1M026807B-----	11	22	41.5	37.5	FKP1O126807B-----
0.1 µF	13	24	41.5	37.5	FKP1M031007C-----	13	24	41.5	37.5	FKP1O131007C-----
0.15 "	15	26	41.5	37.5	FKP1M031507D-----	15	26	41.5	37.5	FKP1O131507D-----
0.22 "	19	32	41.5	37.5	FKP1M032207F-----	19	32	41.5	37.5	FKP1O132207F-----
0.33 "	20	39.5	41.5	37.5	FKP1M033307G-----	20	39.5	41.5	37.5	FKP1O133307G-----
0.47 "	31	46	41.5	37.5	FKP1M034707I-----	31	46	41.5	37.5	FKP1O134707I-----
0.68 "	35	50	41.5	37.5	FKP1M036807J-----	35	50	41.5	37.5	FKP1O136807J-----
1.0 µF	40	55	41.5	37.5	FKP1M041007K-----	40	55	41.5	37.5	FKP1O141007K-----
	35	50	57	52.5	FKP1M041009F-----	35	50	57	52.5	FKP1O141009F-----
1.5 "	45	55	57	52.5	FKP1M041509H-----	45	55	57	52.5	FKP1O141509H-----
2.2 "	45	65	57	52.5	FKP1M042209J-----	45	65	57	52.5	FKP1O142209J-----

* AC voltages: $f \leq 1000$ Hz; $1.4 \times U_{ms} + UDC \leq U_r$

New range

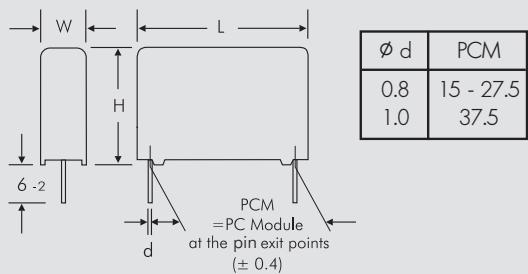
** PCM = Printed circuit module = pin spacing

Dims. in mm.

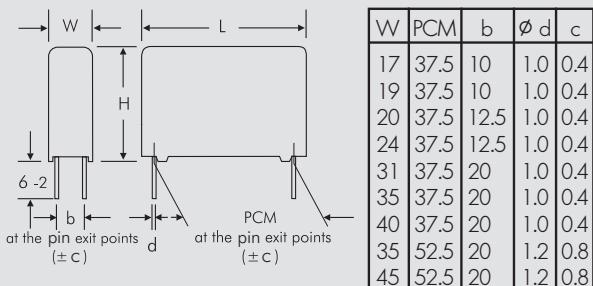
Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:				
Version code:	2-pin	= 00		
	4-pin	= D4		
Tolerance:	20 %	= M		
	10 %	= K		
	5 %	= J		
Packing:	bulk	= S		
Pin length:	6-2	= SD		
Taped version see page 149.				

2-pin version



4-pin version



Rights reserved to amend design data without prior notification

Continuation page 75



Continuation

General Data

Capacitance	1250 VDC/600 VAC*					1600 VDC/650 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF						5	11	18	15	FKP1T001004B_____
150 "						5	11	18	15	FKP1T001504B_____
220 "						5	11	18	15	FKP1T002204B_____
330 "						5	11	18	15	FKP1T003304B_____
470 "						5	11	18	15	FKP1T004704B_____
680 "						5	11	18	15	FKP1T006804B_____
1000 pF	5	11	18	15	FKP1R011004B_____	6	12.5	18	15	FKP1T011004C_____
1500 "	5	11	18	15	FKP1R011504B_____	5	14	26.5	22.5	FKP1T011005A_____
2200 "	5	11	18	15	FKP1R012204B_____	7	14	18	15	FKP1T011504D_____
3300 "	6	12.5	18	15	FKP1R013304C_____	5	14	26.5	22.5	FKP1T012204F_____
4700 "	7	14	18	15	FKP1R014704D_____	8	15	18	15	FKP1T013305A_____
6800 "	8	15	18	15	FKP1R016804F_____	5	14	26.5	22.5	FKP1T014705D_____
	5	14	26.5	22.5	FKP1R016805A_____	7	15	26.5	22.5	FKP1T016805F_____
0.01 µF	7	16.5	26.5	22.5	FKP1R021005D_____	10.5	20.5	26.5	22.5	FKP1T021005H_____
0.015 "	8.5	18.5	26.5	22.5	FKP1R021505F_____	11	21	31.5	27.5	FKP1T021506B_____
0.022 "	10.5	20.5	26.5	22.5	FKP1R022205H_____	11	21	31.5	27.5	FKP1T022206B_____
0.033 "	11	21	31.5	27.5	FKP1R023306B_____	13	24	31.5	27.5	FKP1T023306D_____
0.047 "	9	19	41.5	37.5	FKP1R023307A_____	13	24	41.5	37.5	FKP1T023307C_____
	13	24	31.5	27.5	FKP1R024706D_____	13	24	41.5	37.5	FKP1T024707C_____
0.068 "	11	22	41.5	37.5	FKP1R024707B_____	15	26	41.5	37.5	FKP1T026807D_____
0.1 µF	15	26	41.5	37.5	FKP1R031007D_____	17	29	41.5	37.5	FKP1T031007E_____
0.15 "	17	29	41.5	37.5	FKP1R031507E_____	20	39.5	41.5	37.5	FKP1T031507G_____
0.22 "	19	32	41.5	37.5	FKP1R032207F_____	24	45.5	41.5	37.5	FKP1T032207H_____
0.33 "	24	45.5	41.5	37.5	FKP1R033307H_____	31	46	41.5	37.5	FKP1T033307I_____
0.47 "	31	46	41.5	37.5	FKP1R034707I_____	40	55	41.5	37.5	FKP1T034707K_____
0.68 "	40	55	41.5	37.5	FKP1R036807K_____	35	50	57	52.5	FKP1T036809F_____
1.0 µF	35	50	57	52.5	FKP1R041009F_____	45	55	57	52.5	FKP1T041009H_____
1.5 "	45	65	57	52.5	FKP1R041509J_____					

* AC voltages: f ≤ 1000 Hz; 1.4 × U_{rms} + UDC ≤ U_r

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:	
Version code:	2-pin = 00 4-pin = D4
Tolerance:	20 % = M 10 % = K 5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

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Continuation page 76



Continuation

General Data

Capacitance	2000 VDC/700 VAC~*					4000 VDC/700 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	5	11	18	15	FKP1U001004B-----					
150 "	5	11	18	15	FKP1U001504B-----					
220 "	5	11	18	15	FKP1U002204B-----					
330 "	6	12.5	18	15	FKP1U003304C-----					
470 "	6	12.5	18	15	FKP1U004704C-----	5	14	26.5	22.5	FKP1X004705A-----
680 "	6	12.5	18	15	FKP1U006804C-----	5	14	26.5	22.5	FKP1X006805A-----
1000 pF	7	14	18	15	FKP1U011004D-----	5	14	26.5	22.5	FKP1X011005A-----
	5	14	26.5	22.5	FKP1U011005A-----					
1500 "	6	15	26.5	22.5	FKP1U011505B-----	7	16.5	26.5	22.5	FKP1X011505D-----
2200 "	7	16.5	26.5	22.5	FKP1U012205D-----	8.5	18.5	26.5	22.5	FKP1X012205F-----
3300 "	7	16.5	26.5	22.5	FKP1U013305D-----	10.5	20.5	26.5	22.5	FKP1X013305H-----
4700 "	8.5	18.5	26.5	22.5	FKP1U014705F-----	11	21	31.5	27.5	FKP1X014706B-----
6800 "	10.5	20.5	26.5	22.5	FKP1U016805H-----	13	24	31.5	27.5	FKP1X016806D-----
0.01 µF	11	21	31.5	27.5	FKP1U021006B-----	15	26	31.5	27.5	FKP1X021006F-----
0.015 "	13	24	31.5	27.5	FKP1U021506D-----	13	24	41.5	37.5	FKP1X021507C-----
0.022 "	15	26	31.5	27.5	FKP1U022206F-----	17	29	41.5	37.5	FKP1X022207E-----
	13	24	41.5	37.5	FKP1U022207C-----					
0.033 "	13	24	41.5	37.5	FKP1U023307C-----	20	39.5	41.5	37.5	FKP1X023307G-----
0.047 "	17	29	41.5	37.5	FKP1U024707E-----	24	45.5	41.5	37.5	FKP1X024707H-----
0.068 "	19	32	41.5	37.5	FKP1U026807F-----	31	46	41.5	37.5	FKP1X026807I-----
0.1 µF	20	39.5	41.5	37.5	FKP1U031007G-----	35	50	41.5	37.5	FKP1X031007J-----
0.15 "	24	45.5	41.5	37.5	FKP1U031507H-----	40	55	41.5	37.5	FKP1X031507K-----
0.22 "	35	50	41.5	37.5	FKP1U032207J-----	45	55	57	52.5	FKP1X032209H-----
0.33 "	40	55	41.5	37.5	FKP1U033307K-----					
0.47 "	45	55	57	52.5	FKP1U034709H-----					
0.68 "	45	65	57	52.5	FKP1U036809J-----					

* AC voltages: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

** PCM = Printed circuit module = pin spacing

Dims. in mm.

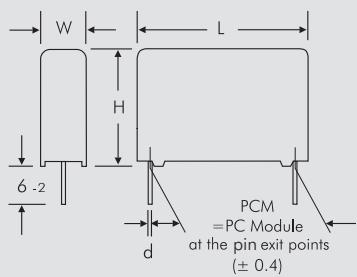
Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

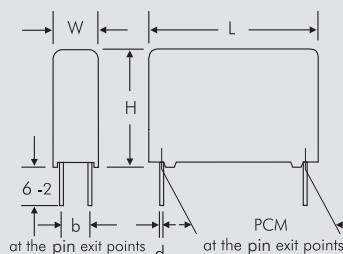
Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

Taped version see page 149.

2-pin version



4-pin version



W	PCM	b	Ø d	c
17	37.5	10	1.0	0.4
19	37.5	10	1.0	0.4
20	37.5	12.5	1.0	0.4
24	37.5	12.5	1.0	0.4
31	37.5	20	1.0	0.4
35	37.5	20	1.0	0.4
40	37.5	20	1.0	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

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Continuation

General Data

Capacitance	6000 VDC/700 VAC*					Dims. in mm.
	W	H	L	PCM**	Part number	
470 pF	5	14	26.5	22.5	FKP1Y004705A	Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.
680 "	5	14	26.5	22.5	FKP1Y006805A	
1000 pF	5	14	26.5	22.5	FKP1Y011005A	
1500 "	7	16.5	26.5	22.5	FKP1Y011505D	
2200 "	10.5	20.5	26.5	22.5	FKP1Y012205H	
3300 "	10.5	20.5	26.5	22.5	FKP1Y013305H	
4700 "	11	21	31.5	27.5	FKP1Y014706B	
6800 "	13	24	31.5	27.5	FKP1Y016806D	
0.01 µF	15	26	31.5	27.5	FKP1Y021006F	
0.015 "	13	24	41.5	37.5	FKP1Y021507C	
0.022 "	17	29	41.5	37.5	FKP1Y022207E	
0.033 "	20	39.5	41.5	37.5	FKP1Y023307G	
0.047 "	24	45.5	41.5	37.5	FKP1Y024707H	
0.068 "	31	46	41.5	37.5	FKP1Y026807I	
0.1 µF	35	50	41.5	37.5	FKP1Y031007J	
0.15 "	40	55	41.5	37.5	FKP1Y031507K	
0.22 "	45	55	57	52.5	FKP1Y032209H	

Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

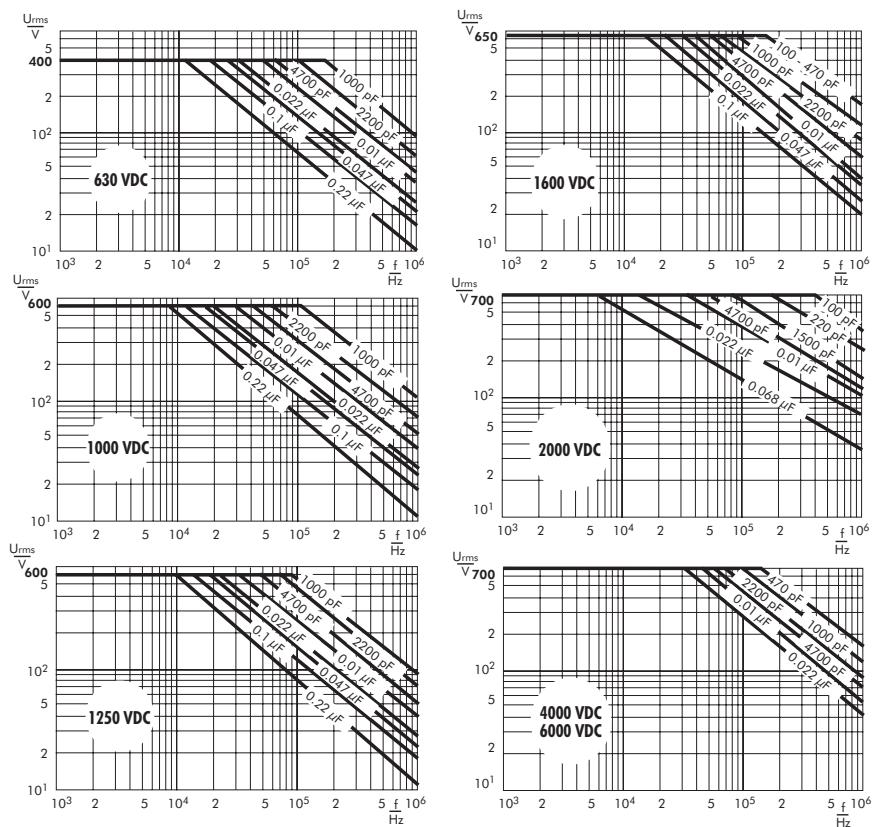
Taped version see page 149.

* AC voltages: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

** PCM = Printed circuit module = pin spacing

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Permissible AC voltage
in relation to frequency
at 10° C internal temperature rise
(general guidel).



WIMA Radio Interference Suppression Capacitors for Overvoltage Protection



WIMA MKP-X2

WIMA MKP-X1 R

WIMA MKP-Y2

WIMA MP 3-X2

WIMA MP 3-X1

WIMA MP 3-Y2/3R-Y2

Depending on the application, radio interference suppression capacitors remain on the mains for an uninterrupted period of 10, 20 or more years. They need not only satisfy EMC requirements in suppressing outgoing interference from an application but they also have to protect the application from incoming power surges. Hence careful selection of these components is essential.

The special feature of WIMA Polypropylene RFI capacitors are the high capacitance values at smaller case sizes compared to metallized paper capacitors, being available with capacitances from 1000 pF through 10 μ F at AC voltages of 300 VAC, 305 VAC and 440 VAC for class X2, X1

and Y2. Based on the dielectric used they are highly cost-effective.

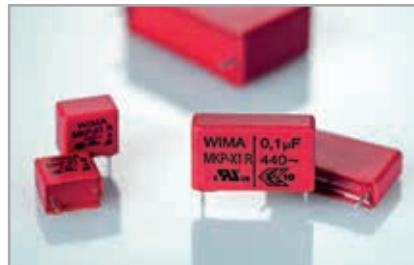
WIMA metallized paper capacitors are neither actively nor passively flammable. The components are resin impregnated under vacuum and encapsulated with self-extinguishing cast resin. Thanks to the good oxidation behaviour of the paper dielectric, they have outstanding self-healing properties even with high energy pulses. The capacitors are specified for temperatures up to 110° C and are available for class X1, X2 and Y2 applications.

Class X capacitors are connected between phase and neutral or phase and phase conductors. Class Y capacitors have an increased degree of electrical and mechanical safety and are connected, for example, between phase conductors and earthed casing, and thus by-pass operating insulation.

WIMA RFI capacitors with metallized paper dielectric are available with capacitances from 1000 pF through 1.0 μ F and voltage ratings of 250 VAC, 275 VAC, 300 VAC, 440 VAC and 500 VAC.

The specified rated AC voltage takes into account a rise of the mains voltage of up to 10% above the nominal value, in accordance with IEC 60384-14.

The components are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.



**Metallized Polypropylene (PP) RFI-Capacitors Class X2
in PCM 7.5 mm to 37.5 mm. Capacitances from 1000 pF to 10 µF.
Rated Voltage 305 VAC.**

Special Features

- Reliable self-healing
- High degree of interference suppression due to good attenuation and low ESR
- According to RoHS 2011/65/EU

Typical Applications

- Class X2 RFI applications to meet EMC regulations**
- Capacitors connected to the mains between phase and neutral or phase conductors
 - General requirements, pulse peak voltage ≤ 2.5 kV

Construction

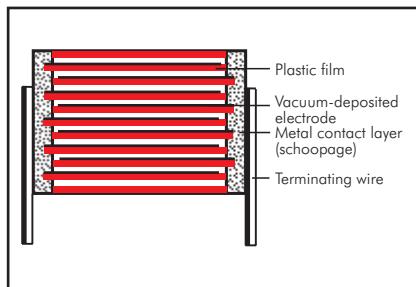
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 1000 pF to 10 µF

Rated voltage: 305 VAC

Continuous DC voltage* (general guide):
 ≤ 560 V

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$, $\pm 5\%$

Operating temperature range:

-55°C to +105°C

Climatic test category:

55/105/56 in accordance with IEC

Passive flammability class:

B for capacitors with $V > 1750$ mm³

C for capacitors with $V \leq 1750$ mm³

Test specifications:

In accordance with IEC 60384-14

Dissipation factors at +20°C: $\tan \delta$

at f	$C \leq 0.1$ µF	$0.1 \mu F < C \leq 1.0$ µF	$C > 1.0$ µF
1 kHz	$\leq 18 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 20 \times 10^{-4}$
10 kHz	$\leq 20 \times 10^{-4}$	$\leq 60 \times 10^{-4}$	-
100 kHz	$\leq 50 \times 10^{-4}$	-	-

Approvals:

Country	Authority	Specification	Symbol	Approval-No.
Germany	VDE	IEC 60384-14/4		40003472
USA/Canada	UL	UL 60384-14 CAN/CSA-E60384-14		E 134915

Mechanical Tests

Pull test on pins: 10 N in direction of pins according to IEC 60068-2-21

Vibration: 6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time du/dt ($F_{max.}$) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times UAC / UDC$$

if the DC operating voltage UDC is higher than $\sqrt{2} \times UAC$

Insulation resistance at +20°C:

$C \leq 0.33$ µF: $\geq 1.5 \times 10^4$ MΩ

$C > 0.33$ µF: ≥ 5000 sec (MΩ × µF)

Measuring voltage: 100 V/1 min.

Maximum pulse rise time:

100 V/µsec for pulses equal to a voltage amplitude with $\sqrt{2} \times 305$ VAC = 432 V according to IEC 60384-14

Test voltage:

$C \leq 1.0$ µF: 2260 VDC, 2 sec.

$C > 1.0$ µF: 1800 VDC, 2 sec.

Reliability:

Operational life > 300 000 hours

Failure rate < 2 fit (0.5 x U_r and 40°C)

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

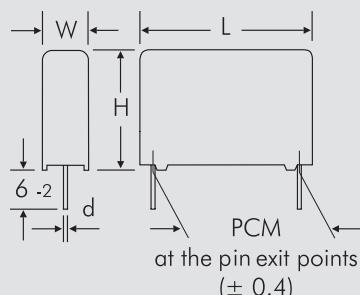
Capacitance	W	H	L	305 VAC*	PCM**	Part number
1000 pF	4	9	10		7.5	MKX2AW11002C00_____
1200 "	4	9	10		7.5	MKX2AW11202C00_____
1500 "	4	9	10		7.5	MKX2AW11502C00_____
1800 "	4	9	10		7.5	MKX2AW11802C00_____
2200 "	4	9	10		7.5	MKX2AW12202C00_____
2700 "	4	9	10		7.5	MKX2AW12702C00_____
3300 "	4	9	10		7.5	MKX2AW13302C00_____
3900 "	4	9	10		7.5	MKX2AW13902C00_____
4700 "	4	9	10		7.5	MKX2AW14702C00_____
5600 "	4	9	10		7.5	MKX2AW15602C00_____
6800 "	4	9	10		7.5	MKX2AW16802C00_____
8200 "	4	9	10		7.5	MKX2AW18202C00_____
0.01 µF	4	9	10		7.5	MKX2AW21002C00_____
	5	11	13	10		MKX2AW21003F00_____
0.012 "	4	9	10		7.5	MKX2AW21202C00_____
	5	11	13	10		MKX2AW21203F00_____
0.015 "	4	9	10		7.5	MKX2AW21502C00_____
	5	11	13	10		MKX2AW21503F00_____
0.018 "	4	9	10		7.5	MKX2AW21802C00_____
	5	11	13	10		MKX2AW21803F00_____
0.022 "	4	9	10		7.5	MKX2AW22202C00_____
	5	11	13	10		MKX2AW22203F00_____
0.027 "	5	10.5	10.3		7.5	MKX2AW22702E00_____
	5	11	13	10		MKX2AW22703F00_____
0.033 "	5	10.5	10.3		7.5	MKX2AW23302E00_____
	5	11	13	10		MKX2AW23303F00_____
0.039 "	5.7	12.5	10.3		7.5	MKX2AW23902F00_____
	5	11	13	10		MKX2AW23903F00_____
0.047 "	5.7	12.5	10.3		7.5	MKX2AW24702F00_____
	6	12.5	13	10		MKX2AW24703H00_____
	5	11	18	15		MKX2AW24704B00_____
0.056 "	6	12.5	13	10		MKX2AW25603H00_____
	5	11	18	15		MKX2AW25604B00_____
0.068 "	6	12.5	13	10		MKX2AW26803H00_____
	5	11	18	15		MKX2AW26804B00_____
0.082 "	6	12.5	13	10		MKX2AW28203H00_____
	5	11	18	15		MKX2AW28204B00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

d = 0.6 Ø if PCM < 15
d = 0.8 Ø if PCM ≥ 15



Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

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Continuation

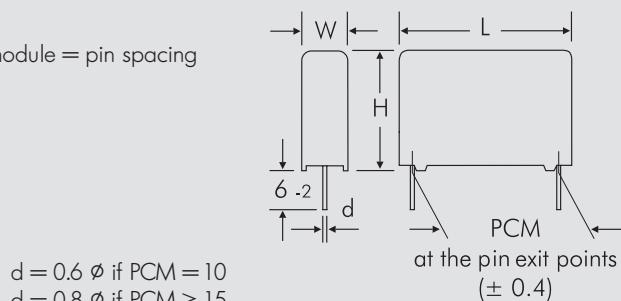
General Data

Capacitance	W	H	L	305 VAC*	PCM**	Part number
0.1 μF	8	12	13		10	MKX2AW31003I00_____
	5	11	18		15	MKX2AW31004B00_____
	6	12.5	18		15	MKX2AW31004C00_____
0.12 "	6	12.5	18		15	MKX2AW31204C00_____
0.15 "	6	12.5	18		15	MKX2AW31504C00_____
	8	15	18		15	MKX2AW31504F00_____
	6	15	26.5		22.5	MKX2AW31505B00_____
0.18 "	8	15	18		15	MKX2AW31804F00_____
	6	15	26.5		22.5	MKX2AW31805B00_____
0.22 "	9	14	18		15	MKX2AW32204H00_____
	8	15	18		15	MKX2AW32204F00_____
	6	15	26.5		22.5	MKX2AW32205B00_____
0.27 "	8	15	18		15	MKX2AW32704F00_____
	7	16.5	26.5		22.5	MKX2AW32705D00_____
0.33 "	11	14	18		15	MKX2AW33304M00_____
	9	16	18		15	MKX2AW33304J00_____
	7	16.5	26.5		22.5	MKX2AW33305D00_____
0.39 "	8.5	18.5	26.5		22.5	MKX2AW33905F00_____
0.47 "	8.5	18.5	26.5		22.5	MKX2AW34705F00_____
	10.5	19	26.5		22.5	MKX2AW34705G00_____
	9	19	31.5		27.5	MKX2AW34706A00_____
0.56 "	10.5	19	26.5		22.5	MKX2AW35605G00_____
	9	19	31.5		27.5	MKX2AW35606A00_____
0.68 "	10.5	19	26.5		22.5	MKX2AW36805G00_____
	11	21	26.5		22.5	MKX2AW36805I00_____
	9	19	31.5		27.5	MKX2AW36806A00_____
0.82 "	11	21	26.5		22.5	MKX2AW38205I00_____
	9	19	31.5		27.5	MKX2AW38206A00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.



Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

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Continuation page 82



Continuation

General Data

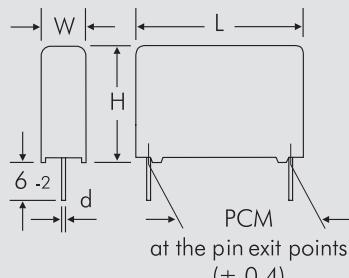
Capacitance	W	H	L	305 VAC*	Part number
				PCM**	
1.0 μF	11	21	26.5	22.5	MKX2AW41005I00_____
	11	21	31.5	27.5	MKX2AW41006B00_____
	13	24	31.5	27.5	MKX2AW41006D00_____
1.2 "	11	21	31.5	27.5	MKX2AW41206B00_____
1.5 "	13	24	31.5	27.5	MKX2AW41506D00_____
	15	26	31.5	27.5	MKX2AW41506F00_____
	13	24	41.5	37.5	MKX2AW41507C00_____
1.8 "	13	24	31.5	27.5	MKX2AW41806D00_____
	13	24	41.5	37.5	MKX2AW41807C00_____
2.2 "	15	26	31.5	27.5	MKX2AW42206F00_____
	17	29	31.5	27.5	MKX2AW42206G00_____
	13	24	41.5	37.5	MKX2AW42207C00_____
	15	26	41.5	37.5	MKX2AW42207D00_____
2.7 "	17	29	31.5	27.5	MKX2AW42706G00_____
	15	26	41.5	37.5	MKX2AW42707D00_____
	17	29	41.5	37.5	MKX2AW42707E00_____
3.3 "	17	34.5	31.5	27.5	MKX2AW43306I00_____
	20	39.5	31.5	27.5	MKX2AW43306J00_____
	15	26	41.5	37.5	MKX2AW43307D00_____
	17	29	41.5	37.5	MKX2AW43307E00_____
3.9 "	17	34.5	31.5	27.5	MKX2AW43906I00_____
	17	29	41.5	37.5	MKX2AW43907E00_____
	19	32	41.5	37.5	MKX2AW43907F00_____
4.7 "	20	39.5	31.5	27.5	MKX2AW44706J00_____
	19	32	41.5	37.5	MKX2AW44707F00_____
	20	39.5	41.5	37.5	MKX2AW44707G00_____
5.6 "	19	32	41.5	37.5	MKX2AW45607F00_____
	20	39.5	41.5	37.5	MKX2AW45607G00_____
6.8 "	20	39.5	41.5	37.5	MKX2AW46807G00_____
	24	45.5	41.5	37.5	MKX2AW46807H00_____
8.2 "	24	45.5	41.5	37.5	MKX2AW48207H00_____
	31	46	41.5	37.5	MKX2AW48207I00_____
10 μF	24	45.5	41.5	37.5	MKX2AW51007H00_____
	31	46	41.5	37.5	MKX2AW51007I00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

$d = 0.8 \text{ } \varnothing$ if $\text{PCM} \leq 27.5$
 $d = 1.0 \text{ } \varnothing$ if $\text{PCM} = 37.5$



Part number completion:
Tolerance: 20 % = M
10 % = K
5 % = J
Packing: bulk = S
Pin length: 6-2 = SD
Taped version see page 149.

Rights reserved to amend design data without prior notification.

**Metallized Polypropylene (PP) RFI-Capacitors Class X1
with Internal Series Connection in PCM 10 mm to 37.5 mm.
Capacitances from 1000 pF to 2.2 µF. Rated Voltage 440 VAC.**

Special Features

- Reliable self-healing
- Increased corona inception level due to internal series connection
- High degree of interference suppression due to good attenuation and low ESR
- According to RoHS 2011/65/EU

Typical Applications

- Class X1 RFI applications to meet EMC regulations**
- Capacitors connected to the mains between phase and neutral or phase and phase conductors
 - High peak voltage applications, pulse peak voltage $\leq 4 \text{ kV}$

Construction

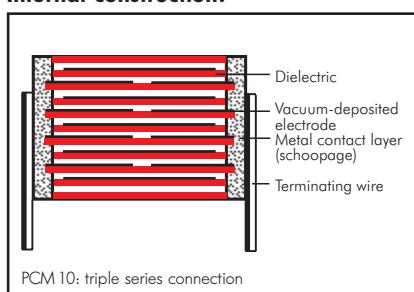
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 1000 pF to 2.2 µF

Rated voltage: 440 VAC

Continuous DC voltage* (general guide):
 $\leq 1000 \text{ V}$

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$, $\pm 5\%$

Operating temperature range:

-55°C to +105°C

Climatic test category:

55/105/56 in accordance with IEC

Passive flammability class:

B for capacitors with $V > 1750 \text{ mm}^3$

C for capacitors with $V \leq 1750 \text{ mm}^3$

Test specifications:

In accordance with IEC 60384-14

Dissipation factors at +20°C: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1.0 \mu\text{F}$	$C > 1.0 \mu\text{F}$
1 kHz	$\leq 18 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 30 \times 10^{-4}$
10 kHz	$\leq 20 \times 10^{-4}$	$\leq 60 \times 10^{-4}$	-
100 kHz	$\leq 100 \times 10^{-4}$	-	-

Approvals:

Country	Authority	Specification	Symbol	Approval-No.
Germany	VDE	IEC 60384-14/4		40041297
USA/Canada	UL	UL 60384-14 CAN/CSA-E60384-14		E 134915

Mechanical Tests

Pull test on pins: 10 N in direction of pins according to IEC 60068-2-21

Vibration: 6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time dU/dt ($F_{max.}$) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times UAC / UDC$$

if the DC operating voltage UDC is higher than $\sqrt{2} \times UAC$

Insulation resistance at +20°C:

$C \leq 0.33 \mu\text{F}: \geq 1.5 \times 10^4 \text{ M}\Omega$

$C > 0.33 \mu\text{F}: \geq 5000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$

Measuring voltage: 100 V/1 min.

Maximum pulse rise time:

100 V/µsec for pulses equal to a voltage amplitude with $\sqrt{2} \times 440 \text{ VAC} = 623 \text{ V}$ according to IEC 60384-14

Test voltage:

$C \leq 1.0 \mu\text{F}: 2260 \text{ VDC}, 2\text{sec.}$

$C > 1.0 \mu\text{F}: 1900 \text{ VDC}, 2\text{sec.}$

Reliability:

Operational life > 300 000 hours

Failure rate < 2 fit (0.5 x U_r and 40°C)

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

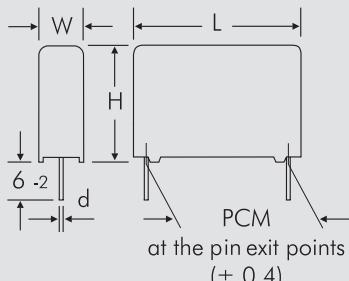
Capacitance	W	H	440 VAC*		Part number
			L	PCM**	
1000 pF	4	9.5	13	10	MKX14W11003D00-----
1200 "	4	9.5	13	10	MKX14W11203D00-----
1500 "	4	9.5	13	10	MKX14W11503D00-----
1800 "	4	9.5	13	10	MKX14W11803D00-----
2200 "	4	9.5	13	10	MKX14W12203D00-----
2700 "	4	9.5	13	10	MKX14W12703D00-----
3300 "	4	9.5	13	10	MKX14W13303D00-----
3900 "	4	9.5	13	10	MKX14W13903D00-----
4700 "	5	11	13	10	MKX14W14703F00-----
5600 "	5	11	13	10	MKX14W15603F00-----
6800 "	6	12.5	13	10	MKX14W16803H00-----
	5	11	18	15	MKX14W16804B00-----
8200 "	6	12.5	13	10	MKX14W18203H00-----
	5	11	18	15	MKX14W18204B00-----
0.01 µF	8	12	13	10	MKX14W21003I00-----
	5	11	18	15	MKX14W21004B00-----
0.012 "	5	11	18	15	MKX14W21204B00-----
0.015 "	5	11	18	15	MKX14W21504B00-----
0.018 "	5	11	18	15	MKX14W21804B00-----
0.022 "	6	12.5	18	15	MKX14W22204C00-----
0.027 "	6	12.5	18	15	MKX14W22704C00-----
0.033 "	8	15	18	15	MKX14W23304F00-----
0.039 "	8	15	18	15	MKX14W23904F00-----
0.047 "	8	15	18	15	MKX14W24704F00-----
0.056 "	8	15	18	15	MKX14W25604F00-----
0.068 "	9	16	18	15	MKX14W26804J00-----
	6	15	26.5	22.5	MKX14W26805B00-----
0.082 "	7	16.5	26.5	22.5	MKX14W28205D00-----

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

$$d = 0.6 \text{ } \varnothing \text{ if PCM} = 10 \\ d = 0.8 \text{ } \varnothing \text{ if PCM} = 15 - 22.5$$



Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

Rights reserved to amend design data without prior notification.

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Continuation

General Data

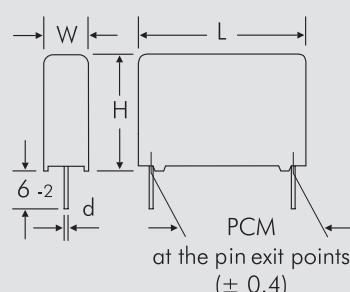
Capacitance	W	H	440 VAC*		Part number
			L	PCM**	
0.1 μF	6	15	26.5	22.5	MKX14W31005B00_____
	7	16.5	26.5	22.5	MKX14W31005D00_____
0.12 "	7	16.5	26.5	22.5	MKX14W31205D00_____
	8.5	18.5	26.5	22.5	MKX14W31205F00_____
0.15 "	7	16.5	26.5	22.5	MKX14W31505D00_____
	8.5	18.5	26.5	22.5	MKX14W31505F00_____
	9	19	31.5	27.5	MKX14W31506A00_____
0.18 "	8.5	18.5	26.5	22.5	MKX14W31805F00_____
	10.5	19	26.5	22.5	MKX14W31805G00_____
	9	19	31.5	27.5	MKX14W31806A00_____
0.22 "	8.5	18.5	26.5	22.5	MKX14W32205F00_____
	11	21	26.5	22.5	MKX14W32205I00_____
	9	19	31.5	27.5	MKX14W32206A00_____
0.27 "	10.5	19	26.5	22.5	MKX14W32705G00_____
	9	19	31.5	27.5	MKX14W32706A00_____
	11	21	31.5	27.5	MKX14W32706B00_____
0.33 "	11	21	26.5	22.5	MKX14W33305I00_____
	9	19	31.5	27.5	MKX14W33306A00_____
	11	21	31.5	27.5	MKX14W33306B00_____
	13	24	41.5	37.5	MKX14W33307C00_____
0.39 "	11	21	31.5	27.5	MKX14W33906B00_____
	13	24	31.5	27.5	MKX14W33906D00_____
	13	24	41.5	37.5	MKX14W33907C00_____
0.47 "	11	21	31.5	27.5	MKX14W34706B00_____
	15	26	31.5	27.5	MKX14W34706F00_____
	13	24	41.5	37.5	MKX14W34707C00_____
0.56 "	13	24	31.5	27.5	MKX14W35606D00_____
	15	26	31.5	27.5	MKX14W35606F00_____
	13	24	41.5	37.5	MKX14W35607C00_____
	15	26	41.5	37.5	MKX14W35607D00_____
0.68 "	15	26	31.5	27.5	MKX14W36806F00_____
	17	29	31.5	27.5	MKX14W36806G00_____
	13	24	41.5	37.5	MKX14W36807C00_____
	15	26	41.5	37.5	MKX14W36807D00_____
	17	29	41.5	37.5	MKX14W36807E00_____
0.82 "	15	26	31.5	27.5	MKX14W38206F00_____
	17	34.5	31.5	27.5	MKX14W38206I00_____
	13	24	41.5	37.5	MKX14W38207C00_____
	17	29	41.5	37.5	MKX14W38207E00_____
	19	32	41.5	37.5	MKX14W38207F00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

d = 0.8 Ø if PCM ≤ 27.5
d = 1.0 Ø if PCM = 37.5



Part number completion:

Tolerance: 20 % = M
10 % = K
5 % = J

Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 149.

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Continuation

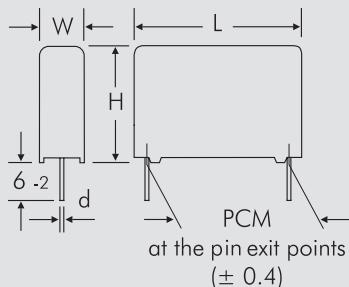
General Data

Capacitance	W	H	440 VAC*		Part number
			L	PCM**	
1.0 μF	17	29	31.5	27.5	MKX14W41006G00_____
	20	39.5	31.5	27.5	MKX14W41006J00_____
	15	26	41.5	37.5	MKX14W41007D00_____
	17	29	41.5	37.5	MKX14W41007E00_____
	20	39.5	41.5	37.5	MKX14W41007G00_____
1.2 "	17	34.5	31.5	27.5	MKX14W41206I00_____
	17	29	41.5	37.5	MKX14W41207E00_____
1.5 "	20	39.5	31.5	27.5	MKX14W41506J00_____
	19	32	41.5	37.5	MKX14W41507F00_____
1.8 "	19	32	41.5	37.5	MKX14W41807F00_____
2.2 "	20	39.5	41.5	37.5	MKX14W42207G00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.



Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

$$d = 0.8 \varnothing \text{ if } \text{PCM} = 27.5$$

$$d = 1.0 \varnothing \text{ if } \text{PCM} = 37.5$$

Rights reserved to amend design data without prior notification.

**Metallized Polypropylene (PP) RFI-Capacitors Class Y2
in PCM 10 mm to 37.5 mm. Capacitances from 1000 pF to 1.0 µF.
Rated Voltage 300 VAC.**

Special Features

- Reliable self-healing
- High degree of interference suppression due to good attenuation and low ESR
- According to RoHS 2011/65/EU

Typical Applications

Class Y2 RFI applications to meet EMC regulations

- Capacitors connected to the mains between phase or neutral and earthed casing
- By-passing of the basic or supplementary insulation, pulse peak voltage $\leq 5 \text{ kV}$

Construction

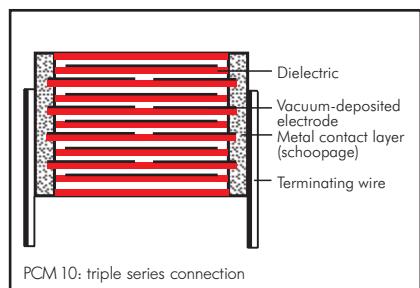
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 1000 pF to 1.0 µF

Rated voltage: 300 VAC

Continuous DC voltage* (general guide):
 $\leq 1000 \text{ V}$

Capacitance tolerances:

$\pm 20\%$, $\pm 10\%$, $\pm 5\%$

Operating temperature range:

-55° C to $+105^\circ \text{ C}$

Climatic test category:

55/105/56 in accordance with IEC

Passive flammability class:

B for capacitors with $V > 1750 \text{ mm}^3$

C for capacitors with $V \leq 1750 \text{ mm}^3$

Dissipation factors at $+20^\circ \text{ C}$: $\tan \delta$

at f	$C \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C \leq 1.0 \mu\text{F}$
1 kHz	$\leq 18 \times 10^{-4}$	$\leq 20 \times 10^{-4}$
10 kHz	$\leq 20 \times 10^{-4}$	$\leq 60 \times 10^{-4}$
100 kHz	$\leq 100 \times 10^{-4}$	—

Approvals:

Country	Authority	Specification	Symbol	Approval-No.
Germany	VDE	IEC 60384-14/4		40008997
USA/Canada	UL	UL 60384-14 CAN/CSA-E60384-14		E 134915

Mechanical Tests

Pull test on pins: 10 N in direction of pins according to IEC 60068-2-21

Vibration: 6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec^2 in accordance with IEC 60068-2-29

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time dU/dt ($F_{max.}$) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times UAC / UDC$$

if the DC operating voltage UDC is higher than $\sqrt{2} \times UAC$



Continuation

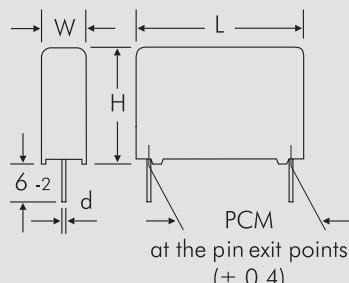
General Data

Capacitance	W	H	L	PCM**	Part number
1000 pF	4	9.5	13	10	MKY22W11003D00_____
1200 "	4	9.5	13	10	MKY22W11203D00_____
1500 "	4	9.5	13	10	MKY22W11503D00_____
1800 "	4	9.5	13	10	MKY22W11803D00_____
2200 "	4	9.5	13	10	MKY22W12203D00_____
2700 "	4	9.5	13	10	MKY22W12703D00_____
3300 "	4	9.5	13	10	MKY22W13303D00_____
3900 "	4	9.5	13	10	MKY22W13903D00_____
4700 "	5	11	13	10	MKY22W14703F00_____
5600 "	5	11	13	10	MKY22W15603F00_____
6800 "	6	12.5	13	10	MKY22W16803H00_____
	5	11	18	15	MKY22W16804B00_____
8200 "	6	12.5	13	10	MKY22W18203H00_____
	5	11	18	15	MKY22W18204B00_____
0.01 µF	8	12	13	10	MKY22W21003I00_____
	5	11	18	15	MKY22W21004B00_____
0.012 "	5	11	18	15	MKY22W21204B00_____
0.015 "	5	11	18	15	MKY22W21504B00_____
0.018 "	5	11	18	15	MKY22W21804B00_____
0.022 "	6	12.5	18	15	MKY22W22204C00_____
0.027 "	6	12.5	18	15	MKY22W22704C00_____
0.033 "	8	15	18	15	MKY22W23304F00_____
0.039 "	8	15	18	15	MKY22W23904F00_____
0.047 "	8	15	18	15	MKY22W24704F00_____
0.056 "	8	15	18	15	MKY22W25604F00_____
0.068 "	9	16	18	15	MKY22W26804J00_____
	6	15	26.5	22.5	MKY22W26805B00_____
0.082 "	7	16.5	26.5	22.5	MKY22W28205D00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.



d = 0.6 Ø if PCM = 10
d = 0.8 Ø if PCM = 15 - 22.5

Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

Rights reserved to amend design data without prior notification.

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Continuation

General Data

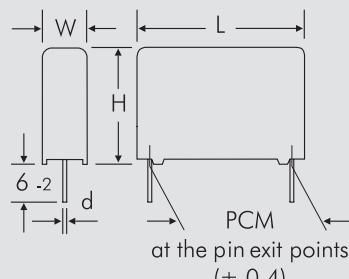
Capacitance	W	H	300 VAC*	PCM**	Part number
	L				
0.1 μF	7	16.5	26.5	22.5	MKY22W31005D00_____
0.12 "	8.5	18.5	26.5	22.5	MKY22W31205F00_____
0.15 "	8.5	18.5	26.5	22.5	MKY22W31505F00_____
	9	19	31.5	27.5	MKY22W31506A00_____
0.18 "	10.5	19	26.5	22.5	MKY22W31805G00_____
	9	19	31.5	27.5	MKY22W31806A00_____
0.22 "	11	21	26.5	22.5	MKY22W32205I00_____
	9	19	31.5	27.5	MKY22W32206A00_____
0.27 "	11	21	31.5	27.5	MKY22W32706B00_____
0.33 "	11	21	31.5	27.5	MKY22W33306B00_____
	13	24	41.5	37.5	MKY22W33307C00_____
0.39 "	13	24	31.5	27.5	MKY22W33906D00_____
	13	24	41.5	37.5	MKY22W33907C00_____
0.47 "	15	26	31.5	27.5	MKY22W34706F00_____
	13	24	41.5	37.5	MKY22W34707C00_____
0.56 "	15	26	31.5	27.5	MKY22W35606F00_____
	13	24	41.5	37.5	MKY22W35607C00_____
	15	26	41.5	37.5	MKY22W35607D00_____
0.68 "	17	29	31.5	27.5	MKY22W36806G00_____
	15	26	41.5	37.5	MKY22W36807D00_____
	17	29	41.5	37.5	MKY22W36807E00_____
0.82 "	17	34.5	31.5	27.5	MKY22W38206I00_____
	17	29	41.5	37.5	MKY22W38207E00_____
	19	32	41.5	37.5	MKY22W38207F00_____
1.0 μF	20	39.5	31.5	27.5	MKY22W41006J00_____
	17	29	41.5	37.5	MKY22W41007E00_____
	20	39.5	41.5	37.5	MKY22W41007G00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

$$d = 0.8 \text{ } \phi \text{ if } \text{PCM} \leq 27.5 \\ d = 1.0 \text{ } \phi \text{ if } \text{PCM} = 37.5$$



Part number completion:
 Tolerance: 20 % = M
 10 % = K
 5 % = J
 Packing: bulk = S
 Pin length: 6-2 = SD
 Taped version see page 149.

Rights reserved to amend design data without prior notification.



**Metallized Paper (MP) RFI-Capacitors Class X2
in PCM 10 mm to 22.5 mm. Capacitances from 1000 pF to 0.33 µF.
Rated Voltages 250 VAC and 275 VAC.**

Special Features

- Particularly high reliability against active and passive flammability
- Excellent self-healing as well as high voltage strength
- High degree of interference suppression due to good attenuation and low ESR
- For temperatures up to +110° C
- According to RoHS 2011/65/EU

Typical Applications

Class X2 RFI applications to meet EMC regulations

- Capacitors connected to the mains between phase and neutral or phase and phase conductors
- General requirements, pulse peak voltage $\leq 2.5 \text{ kV}$

Construction

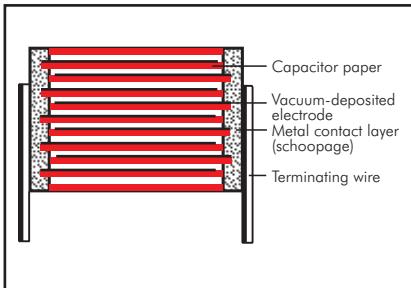
Dielectric:

Paper, epoxy resin impregnated

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Self-extinguishing epoxy resin, UL 94 V-0, metal foil

Terminations:

Tinned wire.

Marking:

Marking: Black on Silver.

Electrical Data

Capacitance range:

1000 pF to 0.33 µF (E12-values on request)

Rated voltages:

250 VAC, 275 VAC

Continuous DC voltage*

(general guide): $\leq 630 \text{ V}$

Capacitance tolerances:

$\pm 20\%$

Operating temperature range:

-40° C to +110° C

Climatic test category:

40/110/56/C in accordance with IEC

Insulation resistance at +20° C:

$\geq 12 \times 10^3 \text{ M}\Omega$

Measuring voltage: 100 V/1 min.

Dissipation factors:

$\tan \delta \leq 13 \times 10^{-3}$ at 1 kHz and +20° C

Test specifications:

In accordance with IEC 60384-14

Approvals:

Authority	Specification	Symbol	Approval-No.
UL/Demko	EN 60384-14		ENECL-02832
UL	UL 60384-14 CAN/CSA-E60384-14		E 100438

Mounting Recommendation

To minimize or avoid shock and/or vibration stresses to terminating wires and solder connections we recommend to fix voluminous resin-potted MP capacitors as from e.g. PCM 22.5 mm in an appropriate way since for constructional reasons they do not sit tight on the board.

* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time dU/dt ($F_{max.}$) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times UAC / UDC$$

if the DC operating voltage UDC is higher than $\sqrt{2} \times UAC$

Maximum pulse rise time:

Capacitance pF/µF	Pulse rise time V/µsec max. operation
1000 ... 0.068	1500
0.1 ... 0.33	750

for pulses equal to a voltage amplitude with $\sqrt{2} \times UAC = 390 \text{ V}$ according to IEC 60384-14

Test voltage:

1300 VDC, 2 sec.

Reliability:

Operational life > 300 000 hours
Failure rate < 1 fit ($0.5 \times U_r$ and 40° C)

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	250 VAC*					275 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	8.5	13.5	10	MPX20W1100FA00_____	4	8.5	13.5	10	MPX21W1100FA00_____
1500 "	4	8.5	13.5	10	MPX20W1150FA00_____	4	8.5	13.5	10	MPX21W1150FA00_____
2200 "	4	8.5	13.5	10	MPX20W1220FA00_____	4	8.5	13.5	10	MPX21W1220FA00_____
3300 "	4	8.5	13.5	10	MPX20W1330FA00_____	4	8.5	13.5	10	MPX21W1330FA00_____
4700 "	5	10	13.5	10	MPX20W1470FB00_____	5	10	13.5	10	MPX21W1470FB00_____
6800 "	5	13	19	15	MPX20W1680FC00_____	5	13	19	15	MPX21W1680FC00_____
0.01 μF	5	13	19	15	MPX20W2100FC00_____	5	13	19	15	MPX21W2100FC00_____
0.015 "	5	13	19	15	MPX20W2150FC00_____	5	13	19	15	MPX21W2150FC00_____
0.022 "	5	13	19	15	MPX20W2220FC00_____	5	13	19	15	MPX21W2220FC00_____
0.033 "	6	14	19	15	MPX20W2330FD00_____	6	14	19	15	MPX21W2330FD00_____
0.047 "	7	15	19	15	MPX20W2470FE00_____	7	15	19	15	MPX21W2470FE00_____
0.068 "	8	17	19	15	MPX20W2680FF00_____	8	17	19	15	MPX21W2680FF00_____
0.1 μF	10	18	19	15	MPX20W3100FG00_____	10	18	19	15	MPX21W3100FG00_____
	8	20	28	22.5	MPX20W3100FH00_____	8	20	28	22.5	MPX21W3100FH00_____
0.15 "	8	20	28	22.5	MPX20W3150FH00_____	8	20	28	22.5	MPX21W3150FH00_____
0.22 "	10	22	28	22.5	MPX20W3220FI00_____	10	22	28	22.5	MPX21W3220FI00_____
0.33 "	12	24	28	22.5	MPX20W3330FJ00_____	12	24	28	22.5	MPX21W3330FJ00_____

* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Upon request with long pins 35.2 mm max.

Dims. in mm.

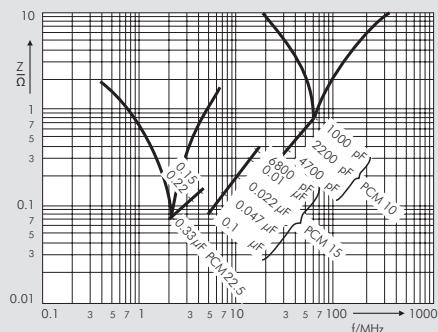
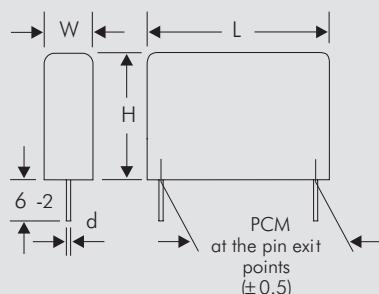
Part number completion:

Tolerance: 20 % = M

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.



Impedance change with frequency
(general guide)

Rights reserved to amend design data without prior notification.



**Metallized Paper (MP) RFI-Capacitors Class X1
in PCM 10 mm to 15 mm. Capacitances from 1000 pF to 0.033 µF.
Rated Voltages from 300 VAC to 500 VAC.**

Special Features

- Particularly high reliability against active and passive flammability
- Excellent self-healing as well as high voltage strength
- High degree of interference suppression due to good attenuation and low ESR
- For temperatures up to +110° C
- According to RoHS 2011/65/EU

Electrical Data

Capacitance range:

1000 pF to 0.033 µF (E12-values on request)

Rated voltages:

300 VAC, 440 VAC, 500 VAC

Continuous DC voltage*

(general guide):

≤ 730 V for 300 VAC

≤ 850 V for 440 VAC and 500 VAC

Capacitance tolerances:

±20%

Operating temperature range:

-40° C to +110° C

Climatic test category:

40/110/56/C in accordance with IEC

Insulation resistance

at +20° C:

≥ 12 x 10³ MΩ

Measuring voltage:

100 V/1 min. for 300 VAC and 440 VAC

500 V/1 min. for 500 VAC

Dissipation factors:

tan δ ≤ 13 x 10⁻³ at 1 kHz and +20° C

Approvals:

Test specifications:

In accordance with IEC 60384-14

Maximum pulse rise time:

Capacitance pF/µF	Pulse rise time V/µsec max. operation
1000 ... 4700	2500
6800 ... 0.022	1750
0.033	750

for pulses equal to a voltage amplitude with $\sqrt{2} \times 300 \text{ VAC} = 425 \text{ V}$,
with $\sqrt{2} \times 440 \text{ VAC} = 623 \text{ V}$,
with $\sqrt{2} \times 500 \text{ VAC} = 707 \text{ V}$
according to IEC 60384-14

Test voltage:

2300 VDC, 2 sec.

Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit (0.5 x U_r and 40° C)

Typical Applications

Class X1 RFI applications to meet EMC regulations

- Capacitors connected to the mains between phase and neutral or phase and phase conductors
- High peak voltage applications, pulse peak voltage ≤ 4 kV

Construction

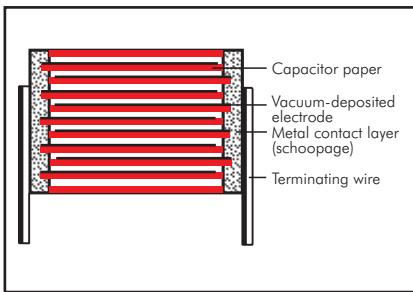
Dielectric:

Paper, epoxy resin impregnated

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Self-extinguishing epoxy resin, UL 94 V-0, metal foil

Terminations:

Tinned wire.

Marking:

Marking: Black on Silver.

Mounting Recommendation

To minimize or avoid shock and/or vibration stresses to terminating wires and solder connections we recommend to fix voluminous resin-potted MP capacitors as from e.g. PCM 22.5 mm in an appropriate way since for constructional reasons they do not sit tight on the board.

* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time dU/dt ($F_{max.}$) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times U_{AC} / U_{DC}$$

if the DC operating voltage U_{DC} is higher than $\sqrt{2} \times U_{AC}$

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	300 VAC*					440 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	8.5	13.5	10	MPX12W1100FA00_____					
1500 "	4	8.5	13.5	10	MPX12W1150FA00_____					
2200 "	4	8.5	13.5	10	MPX12W1220FA00_____					
3300 "	4	8.5	13.5	10	MPX12W1330FA00_____					
4700 "	5	10	13.5	10	MPX12W1470FB00_____					
6800 "	5	13	19	15	MPX12W1680FC00_____	5	13	19	15	MPX14W1680FG00_____

Capacitance	500 VAC*					Part number completion:
	W	H	L	PCM**	Part number	
6800 pF	5	13	19	15	MPX15W1680FC00_____	
0.01 μF	5	13	19	15	MPX15W2100FC00_____	
0.015 "	6	14	19	15	MPX15W2150FD00_____	
0.022 "	7	15	19	15	MPX15W2220FE00_____	
0.033 "	10	18	19	15	MPX15W2330FG00_____	

Part number completion:
Tolerance: 20 % = M
Packing: bulk = S
Pin length: 6-2 = SD
Taped version see page 149.

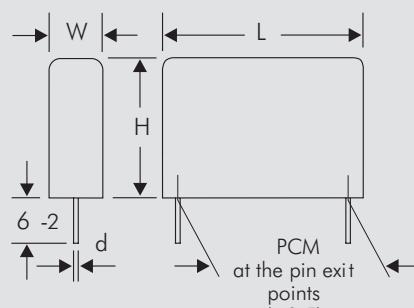
* f = 50/60 Hz

** PCM = Printed circuit module = pin spacing

Upon request with long pins 35.2 mm max.

Dims in mm.

d = 0.6 Ø if PCM10
d = 0.8 Ø if PCM≥15

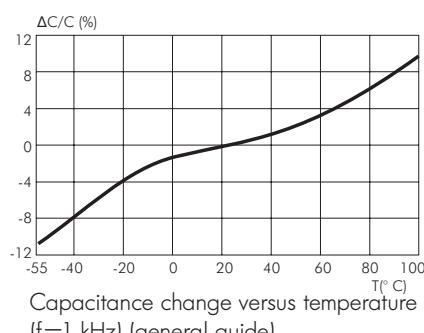


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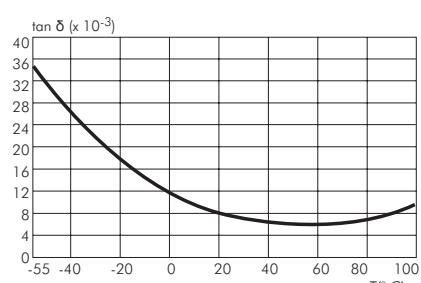
Typical Graphs of the Capacitor Paper Dielectric

valid for:

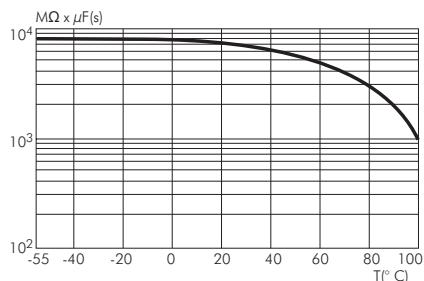
MP 3-X2
MP 3-X1
MP 3-Y2 / 3R-Y2



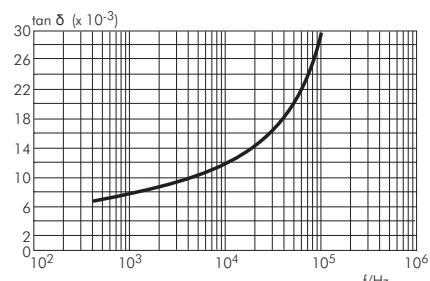
Capacitance change versus temperature
(f=1 kHz) (general guide)



Dissipation factor change versus
temperature (f= 1 kHz) (general guide)



Insulation resistance change versus
temperature (general guide)



Dissipation factor change versus
frequency (general guide).



**Metallized Paper (MP) RFI-Capacitors Class Y2
in PCM 10 mm to 27.5 mm. Capacitances from 1000 pF to 0.1 µF.
Rated Voltages 250 VAC and 300 VAC.**

Special Features

- Particularly high reliability against active and passive flammability
- Excellent self-healing as well as high voltage strength
- Twice the safety by internal series connection (300 VAC)
- High degree of interference suppression due to good attenuation and low ESR
- For temperatures up to +110° C
- According to RoHS 2011/65/EU

Typical Applications

- Class Y2 RFI applications to meet EMC regulations**
- Capacitors connected to the mains between phase or neutral and earthed casing
 - By-passing of the basic or supplementary insulation, pulse peak voltage $\leq 5 \text{ kV}$

Construction

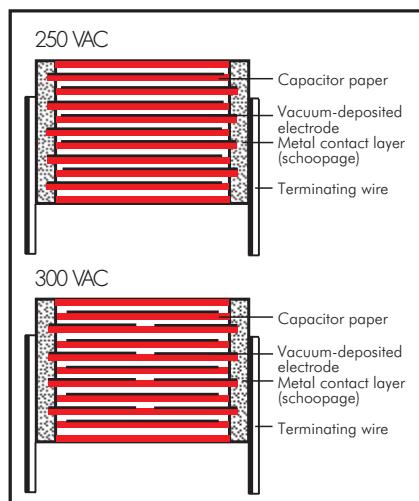
Dielectric:

Paper, epoxy resin impregnated

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Self-extinguishing epoxy resin, UL 94 V-0, metal foil

Terminations:

Tinned wire.

Marking:

Marking: Black on Silver.

Electrical Data

Capacitance range:

1000 pF to 0.1 µF (E12-values on request)

Rated voltages:

250 VAC, 300 VAC

Continuous DC voltage*

(general guide):

250 VAC: $\leq 1000 \text{ V}$

300 VAC: $\leq 1250 \text{ V}$

Capacitance tolerances:

$\pm 20\%$

Operating temperature range:

-40° C to +110° C

Climatic test category:

250 VAC: 40/110/56/C

300 VAC: 40/110/56/B

in accordance with IEC

Insulation resistance

at +20° C: $\geq 12 \times 10^3 \text{ M}\Omega$

Measuring voltage: 100 V/1 min.

Dissipation factors:

$\tan \delta \leq 13 \times 10^{-3}$ at 1 kHz and +20° C

Test specifications:

in accordance with IEC 60384-14

Approvals:

Authority	Specification	Symbol	Approval-No.
UL/Demko	EN 60384-14		ENEC-02833 (250 VAC) ENEC-02399 (300 VAC)
UL	UL 60384-14 CAN/CSA-E60384-14		E 100438

Mechanical Tests

Pull test on pins: 10 N in direction of pins according to IEC 60068-2-21

Vibration: 6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

* If safety-approved EMI suppression capacitors are operated with a DC voltage being above the specified AC voltage rating the given approvals are no longer valid (IEC 60384-14).

Furthermore the permissible pulse rise time du/dt ($F_{max.}$) will be subject to a reduction according to

$$F_{max.} = F_r \times \sqrt{2} \times UAC / UDC$$

if the DC operating voltage UDC is higher than $\sqrt{2} \times UAC$

Maximum pulse rise time 250 VAC:

Capacitance pF/µF	Pulse rise time V/µsec max. operation
1000 ... 4700	2500
6800 ... 0.022	1750

Maximum pulse rise time 300 VAC:

Capacitance pF/µF	Pulse rise time V/µsec max. operation
1000 ... 4700	2500
6800 ... 0.015	1850
0.022 ... 0.1	600

for pulses equal to a voltage amplitude with $\sqrt{2} \times 250 \text{ VAC} = 355 \text{ V}$

with $\sqrt{2} \times 300 \text{ VAC} = 425 \text{ V}$

according to IEC 60384-14

Test voltage: 2400 VDC, 2sec.

Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit (0.5 x U_r and 40° C)

Packing

Available taped and reeled.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

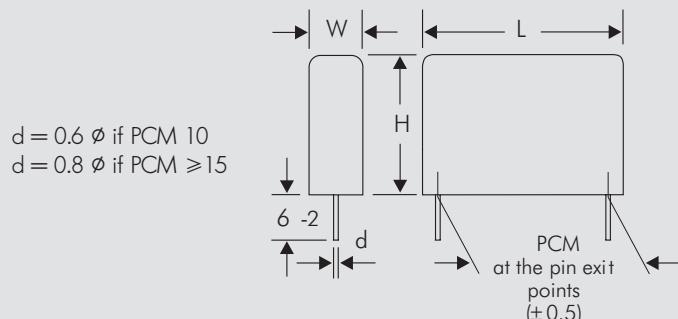
Capacitance	250 VAC*					300 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	8.5	13.5	10	MPY20W1100FA00_____	5	13	19	15	MPRY2W1100FC00_____
1500 "	4	8.5	13.5	10	MPY20W1150FA00_____	5	13	19	15	MPRY2W1150FC00_____
2200 "	4	8.5	13.5	10	MPY20W1220FA00_____	5	13	19	15	MPRY2W1220FC00_____
3300 "	4	8.5	13.5	10	MPY20W1330FA00_____	5	13	19	15	MPRY2W1330FC00_____
4700 "	5	10	13.5	10	MPY20W1470FB00_____	6	14	19	15	MPRY2W1470FD00_____
6800 "	5	13	19	15	MPY20W1680FC00_____	7	15	19	15	MPRY2W1680FE00_____
0.01 μF	5	13	19	15	MPY20W2100FC00_____	8	17	19	15	MPRY2W2100FF00_____
0.015 "	6	14	19	15	MPY20W2150FD00_____	10	18	19	15	MPRY2W2150FG00_____
0.022 "	7	15	19	15	MPY20W2220FE00_____	8	20	28	22.5	MPRY2W2220FH00_____
0.033 "						8	20	28	22.5	MPRY2W2330FH00_____
0.047 "						10	22	28	22.5	MPRY2W2470FI00_____
0.068 "						12	24	28	22.5	MPRY2W2680FJ00_____
0.1 μF						13	25	33	27.5	MPRY2W3100FK00_____

* f = 50/60 Hz

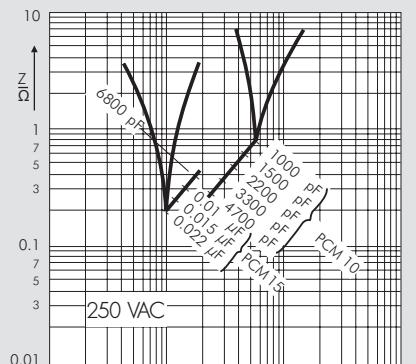
** PCM = Printed circuit module = pin spacing

Upon request with long pins 35.2 mm max.

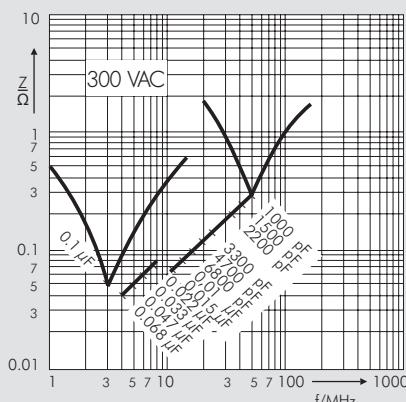
Dims. in mm.



Part number completion:
 Tolerance: 20 % = M
 Packing: bulk = S
 Pin length: 6-2 = SD
 Taped version see page 149.



Impedance change with frequency
(general guidel)



Impedance change with frequency
(general guidel)

Rights reserved to amend design data without prior notification.

WIMA Filter Capacitors



WIMA MKP 4F

Due to their typical circuit position AC filter capacitors have to exhibit good high-frequency characteristics and at the same time high AC voltage capabilities. They in general fulfil two requirements:

- Low AC impedance to dissipate high-frequency interference signals
- Attenuation of transient voltage pulses caused e.g. by switching.

WIMA filter capacitors are designed on the basis of low-loss Polypropylene film and exhibit high AC current capability at high frequencies as well as low ESL and ESR values.

They are available with capacitances from

0.68 μF up to 75 μF and rated voltages of 250 VAC, 275 VAC, 305 VAC, 350 VAC and 440 VAC for an operational temperature range of -55° C to +105° C. The 440 VAC range has an internal series connection and stands out for an increased corona discharge inception voltage.

Their metallized construction, i.e. a thin aluminium layer serving as electrode being vapour-deposited onto the insulating film, entails very good self-healing properties of WIMA filter capacitors in case of a dielectric breakdown. The short-circuit current causes the thin metal layer to vaporize around the discharge channel and thus forming an insulating "halo". The capacitor remains fully operative.

Further positive features are the dry construction and thus the waiver of additional impregnating agents, the very favourable capacitance/volume ratio and the long life time at high capacitance long-term stability even under demanding operating conditions.

WIMA capacitors are produced with the proven box technology using solvent-resistant, flame-retardant plastic cases according to UL 94 V-0. They are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.



**Metallized Polypropylen (PP) Filter Capacitors
in PCM 27.5 mm to 52.5 mm. Capacitances from 0.68 µF to 75 µF.
Rate Voltages from 230 VAC to 440 VAC.**

Special Features

- High volume/capacitance ratio
- High peak current capabilities
- Self-healing
- Long lifetime
- According to RoHS 2011/65/EU

Typical Applications

For high frequency applications e.g.

- AC filtering in UPS systems
- Harmonic filter
- Welding equipment
- Renewable energy - grid interface

Construction

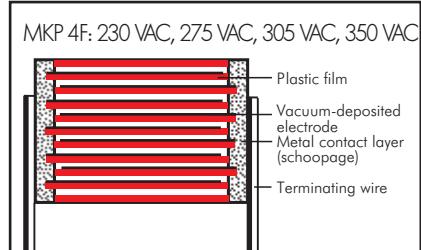
Dielectric:

Polypropylene (PP) film

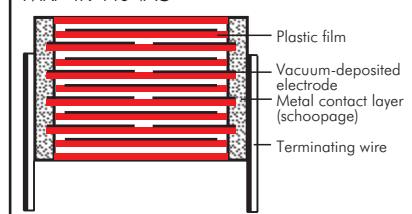
Capacitor electrodes:

Vacuum-deposited

Internal construction:



MKP 4F: 230 VAC, 275 VAC, 305 VAC, 350 VAC



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

0.68 µF to 75 µF

Rated voltages: 230 VAC, 275 VAC, 305 VAC, 350 VAC, 440 VAC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55° C to +105° C

Climatic test category:

55/105/56 in accordance with IEC

Insulation resistance at +20° C:

≥ 30 000 sec (MΩ x µF)

Measuring voltage: 100 V/1 min.

Test voltage:

1.5 U_rDC, 10sec.

Test specifications:

In accordance with IEC 61071 and 60068

Dissipation factors at +20° C: tan δ

at f	PCM 27.5	PCM 37.5	PCM 52.5
1 kHz	≤ 5 x 10 ⁻⁴	≤ 10 x 10 ⁻⁴	≤ 15 x 10 ⁻⁴
10 kHz	≤ 20 x 10 ⁻⁴	≤ 45 x 10 ⁻⁴	≤ 90 x 10 ⁻⁴

Reference frequency 1 kHz in accordance with IEC 60384-1

Maximum pulse rise time:

PCM	max. pulse rise time V/µsec at T _A < 40° C				
	230 VAC	275 VAC	305 VAC	350 VAC	440 VAC
27.5	45	55	68	100	110
37.5	20	30	35	50	70
52.5	10	13	15	25	40

for pulses equal to the rated voltage (U_rDC)

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21

Vibration:

6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

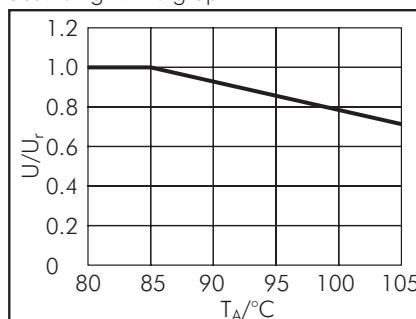
1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Voltage derating:

A voltage derating factor must be applied according to the graph:



Reliability:

Operational life > 60 000 hours at U_r
Failure rate < 10 fit (0.5 x U_r and 40° C)

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	I_s A	I_{rms} (10 kHz) at 85°C A	Part number
1.0 μF	9	19	31.5	27.5	2	45	2.5	MKPF3Y41006A_____
1.5 "	11	21	31.5	27.5	2/4	70	3	MKPF3Y41506B_____
2.2 "	11	21	31.5	27.5	2/4	100	3.5	MKPF3Y42206B_____
3.3 "	13	24	31.5	27.5	2/4	150	5	MKPF3Y43306D_____
4.7 "	15	26	31.5	27.5	2/4	210	7.5	MKPF3Y44706F_____
6.8 "	17	29	31.5	27.5	2/4	300	8.5	MKPF3Y46806G_____
10 μF	20	39.5	31.5	27.5	2/4	450	11.5	MKPF3Y51006J_____
	19	32	41.5	37.5	2/4	200	8	MKPF3Y51007F_____
12 "	19	32	41.5	37.5	2/4	240	10	MKPF3Y51207F_____
15 "	20	39.5	41.5	37.5	2/4	300	12	MKPF3Y51507G_____
20 "	24	45.5	41.5	37.5	2/4	400	14	MKPF3Y52007H_____
22 "	24	45.5	41.5	37.5	2/4	440	15	MKPF3Y52207H_____
25 "	31	46	41.5	37.5	2/4	500	17	MKPF3Y52507I_____
30	31	46	41.5	37.5	2/4	600	19	MKPF3Y53007I_____
	25	45	57	52.5	2/4	300	15	MKPF3Y53009D_____
35 "	35	50	41.5	37.5	2/4	700	20.5	MKPF3Y53507J_____
	25	45	57	52.5	2/4	350	15	MKPF3Y53509D_____
40 "	30	45	57	52.5	2/4	400	17.5	MKPF3Y54009E_____
45 "	30	45	57	52.5	2/4	450	18.5	MKPF3Y54509E_____
50 "	35	50	57	52.5	4	500	21	MKPF3Y55009F_____
55 "	35	50	57	52.5	4	550	22	MKPF3Y55509F_____
60 "	45	55	57	52.5	4	600	23	MKPF3Y56009H_____
65 "	45	55	57	52.5	4	650	25.5	MKPF3Y56509H_____
70 "	45	55	57	52.5	4	700	26	MKPF3Y57009H_____
75 "	45	65	57	52.5	4	750	27	MKPF3Y57509J_____

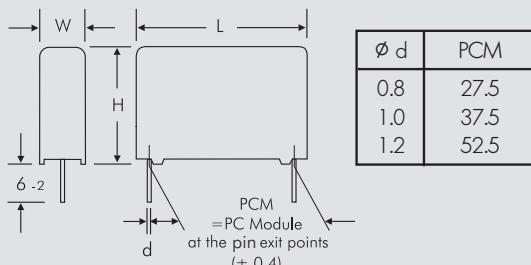
* AC voltages: $f \leq 100$ Hz

** PCM = Printed circuit module = pin spacing

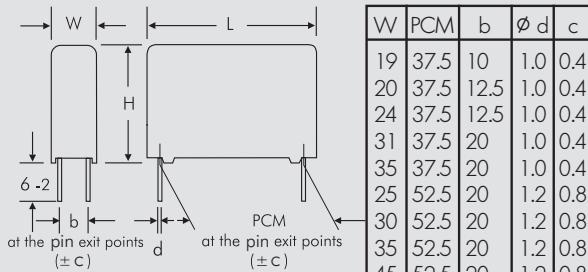
Dims. in mm.

Part number completion:	
Version code:	2-pin = 00
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

2-pin version



4-pin version



Rights reserved to amend design data without prior notification.

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Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	275 VAC*/600 VDC		Part number
						I _S A	I _{rms} (10 kHz) at 85°C A	
1.0 µF	9	19	31.5	27.5	2	55	2.5	MKPF1W41006A-----
1.5 "	11	21	31.5	27.5	2/4	80	3.5	MKPF1W41506B-----
2.2 "	13	24	31.5	27.5	2/4	120	5	MKPF1W42206D-----
3.3 "	15	26	31.5	27.5	2/4	180	5.5	MKPF1W43306F-----
4.7 "	17	34.5	31.5	27.5	2/4	260	8	MKPF1W44706I-----
6.8 "	20	39.5	31.5	27.5	2/4	370	10	MKPF1W46806J-----
10 µF	20	39.5	41.5	37.5	2/4	300	10	MKPF1W51007G-----
12 "	20	39.5	41.5	37.5	2/4	360	12	MKPF1W51207G-----
15 "	24	45.5	41.5	37.5	2/4	450	14	MKPF1W51507H-----
	25	45	57	52.5	2/4	195	11	MKPF1W51509D-----
20 "	31	46	41.5	37.5	2/4	600	16	MKPF1W52007I-----
	25	45	57	52.5	2/4	260	12	MKPF1W52009D-----
22 "	25	45	57	52.5	2/4	286	14	MKPF1W52209D-----
25 "	30	45	57	52.5	2/4	325	16	MKPF1W52509E-----
30	35	50	57	52.5	4	390	17	MKPF1W53009F-----
35 "	35	50	57	52.5	4	455	20	MKPF1W53509F-----
40 "	45	55	57	52.5	4	520	21	MKPF1W54009H-----
45 "	45	55	57	52.5	4	585	23	MKPF1W54509H-----
50 "	45	65	57	52.5	4	650	24	MKPF1W55009J-----

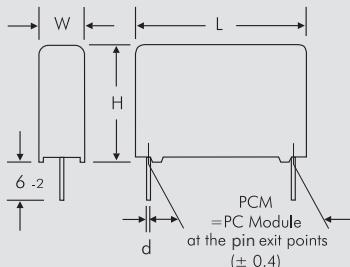
* AC voltages: f ≤ 100 Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

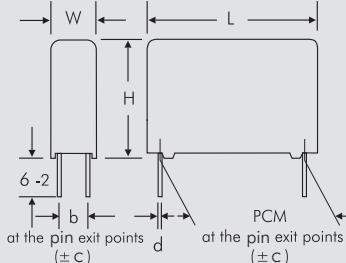
Part number completion:	
Version code:	2-pin = 00
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

2-pin version



Ø d	PCM
0.8	27.5
1.0	37.5
1.2	52.5

4-pin version



W	PCM	b	Ø d	c
19	37.5	10	1.0	0.4
20	37.5	12.5	1.0	0.4
24	37.5	12.5	1.0	0.4
31	37.5	20	1.0	0.4
35	37.5	20	1.0	0.4
25	52.5	20	1.2	0.8
30	52.5	20	1.2	0.8
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

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Continuation

General Data

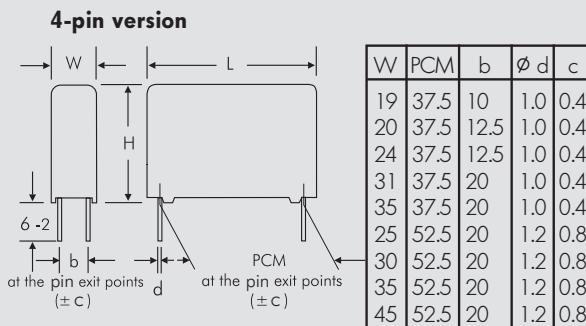
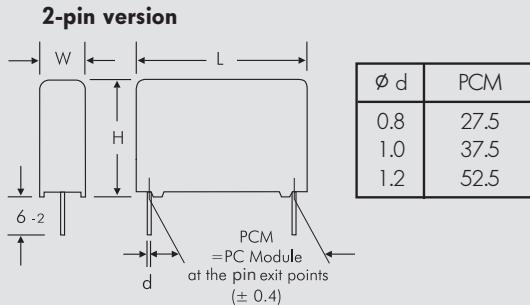
Capacitance	W	H	L	PCM**	Pin	I_s A	I_{rms} (10 kHz) at 85°C A	Part number
0.68 μ F	9	19	31.5	27.5	2	50	2	MKPFAW36806A_____
1.0 μ F	11	21	31.5	27.5	2/4	68	3	MKPFAW41006B_____
1.5 "	13	24	31.5	27.5	2/4	110	4	MKPFAW41506D_____
2.2 "	15	26	31.5	27.5	2/4	150	5	MKPFAW42206F_____
3.3 "	17	29	31.5	27.5	2/4	220	7	MKPFAW43306G_____
4.7 "	20	39.5	31.5	27.5	2/4	320	9	MKPFAW44706J_____
6.8 "	20	39.5	41.5	37.5	2/4	245	10	MKPFAW46807G_____
10 μ F	24	45.5	41.5	37.5	2/4	350	12	MKPFAW51007H_____
	25	45	57	52.5	2/4	150	10	MKPFAW51009D_____
12 "	24	45.5	41.5	37.5	2/4	420	13	MKPFAW51207H_____
15 "	31	46	41.5	37.5	2/4	525	15	MKPFAW51507I_____
	25	45	57	52.5	2/4	225	13	MKPFAW51509D_____
20 "	40	55	41.5	37.5	2/4	700	19	MKPFAW52007K_____
	30	45	57	52.5	2/4	300	14	MKPFAW52009E_____
22 "	35	50	57	52.5	4	330	16	MKPFAW52209F_____
25 "	35	50	57	52.5	4	375	17	MKPFAW52509F_____
30	45	55	57	52.5	4	450	21	MKPFAW53009H_____
35 "	45	65	57	52.5	4	525	22	MKPFAW53509J_____

* AC voltages: $f \leq 100$ Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Part number completion:	
Version code:	2-pin = 00
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	



Rights reserved to amend design data without prior notification.

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Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	I_s A	I_{rms} (10 kHz) at 85° C A	Part number
0.68 μ F	9	19	31.5	27.5	2	70	1.5	MKPFBW36806A_____
1.0 μ F	11	21	31.5	27.5	2/4	100	3	MKPFBW41006B_____
1.5 "	13	24	31.5	27.5	2/4	150	4	MKPFBW41506D_____
2.2 "	15	26	31.5	27.5	2/4	220	5	MKPFBW42206F_____
3.3 "	17	29	31.5	27.5	2/4	330	7	MKPFBW43306G_____
4.7 "	20	39.5	31.5	27.5	2/4	470	11	MKPFBW44706J_____
6.8 "	20	39.5	41.5	37.5	2/4	340	10	MKPFBW46807G_____
10 μ F	24	45.5	41.5	37.5	2/4	500	13	MKPFBW51007H_____
	25	45	57	52.5	2/4	250	11	MKPFBW51009D_____
12 "	24	45.5	41.5	37.5	2/4	600	14	MKPFBW51207H_____
15 "	31	46	41.5	37.5	2/4	750	16	MKPFBW51507I_____
	25	45	57	52.5	2/4	375	13	MKPFBW51509D_____
20 "	40	55	41.5	37.5	2/4	1000	18	MKPFBW52007K_____
	30	45	57	52.5	2/4	500	16	MKPFBW52009E_____
22 "	35	50	57	52.5	4	550	18	MKPFBW52209F_____
25 "	35	50	57	52.5	4	625	19	MKPFBW52509F_____
30 "	45	55	57	52.5	4	750	22	MKPFBW53009H_____
35 "	45	65	57	52.5	4	870	25	MKPFBW53509J_____

Capacitance	W	H	L	PCM**	Pin	I_s A	I_{rms} (10 kHz) at 85° C A	Part number
0.68 "	13	24	31.5	27.5	2/4	74.8	3	MKPF4W36806D_____
1.0 μ F	13	24	31.5	27.5	2/4	110	4	MKPF4W41006D_____
1.5 "	17	29	31.5	27.5	2/4	165	5	MKPF4W41506G_____
2.2 "	20	39.5	31.5	27.5	2/4	240	6	MKPF4W42206J_____
3.3 "	20	39.5	41.5	37.5	2/4	230	7.5	MKPF4W43307G_____
4.7 "	24	45.5	41.5	37.5	2/4	330	8.5	MKPF4W44707H_____
6.8 "	31	46	41.5	37.5	2/4	480	11.5	MKPF4W46807I_____
10 μ F	30	45	57	52.5	2/4	400	16	MKPF4W51009E_____
12 "	35	50	57	52.5	4	480	17	MKPF4W51209F_____

* AC voltages: $f \leq 100$ Hz

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Part number completion:

Version code: 2-pin = 00

4-pin = D4

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

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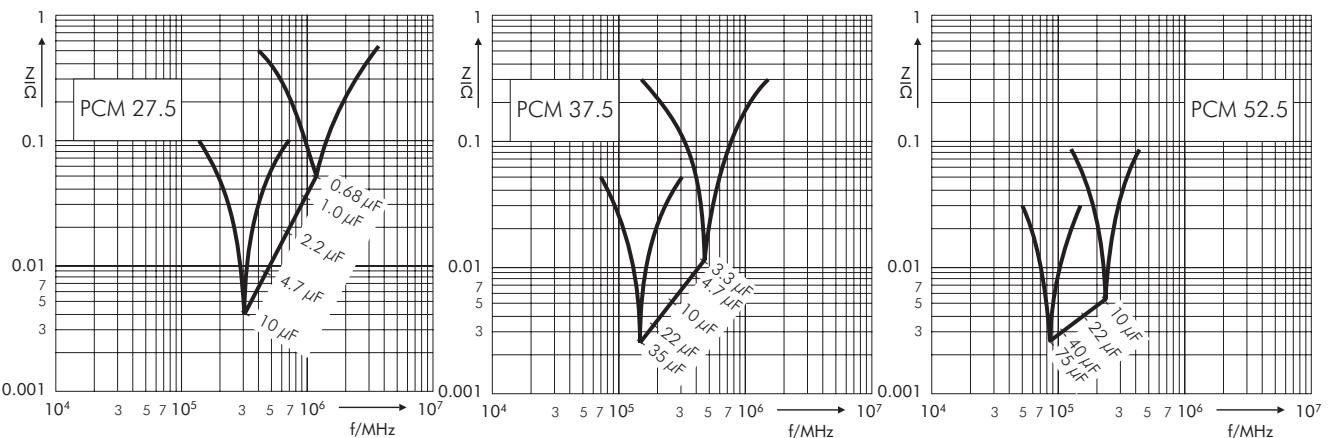
Continuation page 102

WIMA MKP 4F

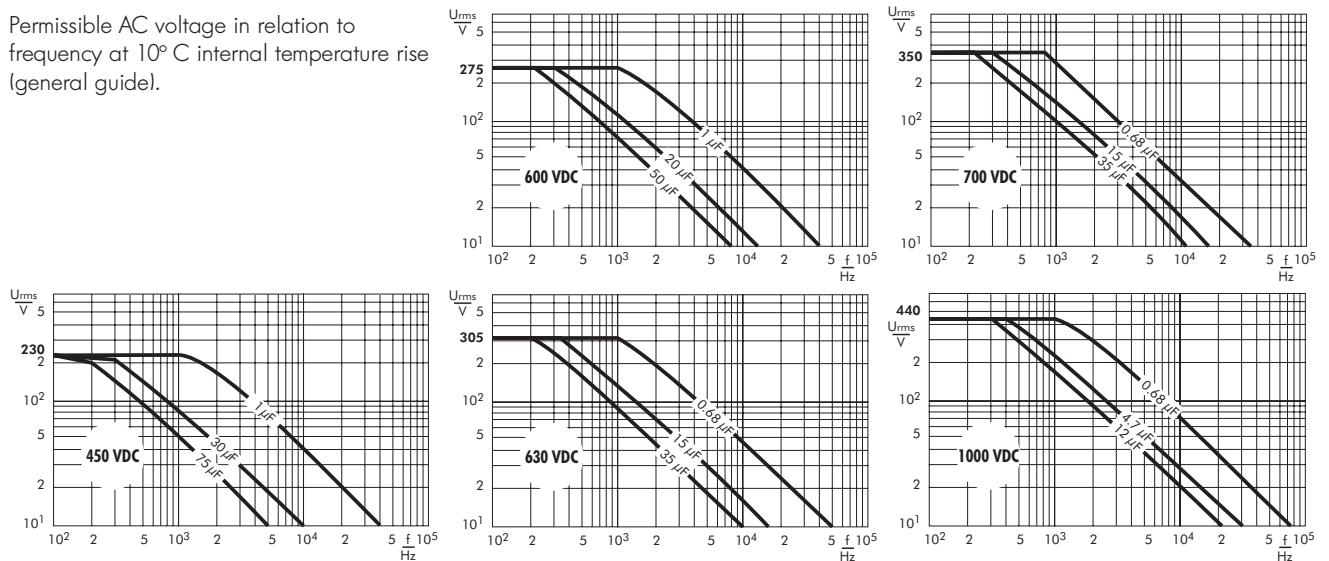


Continuation

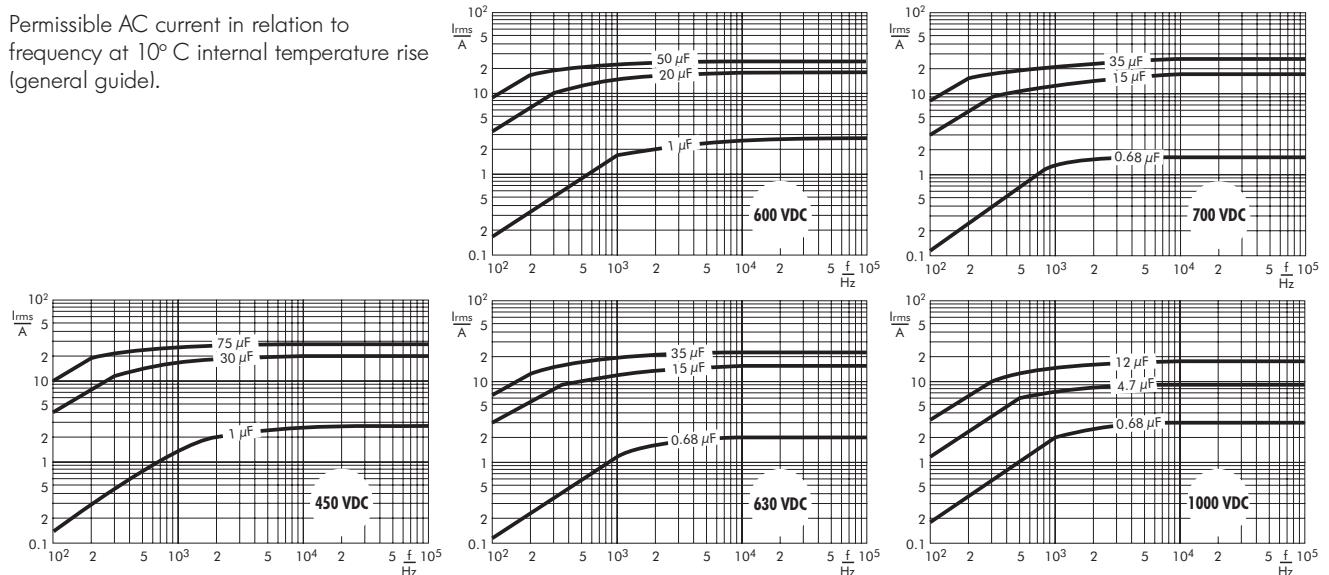
Impedance change with frequency
(general guide).



Permissible AC voltage in relation to frequency at 10° C internal temperature rise
(general guide).



Permissible AC current in relation to frequency at 10° C internal temperature rise
(general guide).



WIMA Snubber Capacitors with Plates or Lead Terminations for Best Contacts



WIMA Snubber MKP

WIMA Snubber FKP

Development of the WIMA Snubber MKP and WIMA Snubber FKP capacitor series for high power conversion is based on decades of experience with Polypropylene film pulse capacitors.

WIMA Snubber capacitors are available both as double-sided metallized pulse version – WIMA Snubber MKP – and for extremely high pulse ratings in self-healing film/foil technology – WIMA Snubber FKP. Their electrical performance as well as the manifold number of available connecting options makes the WIMA Snubber technology unique:

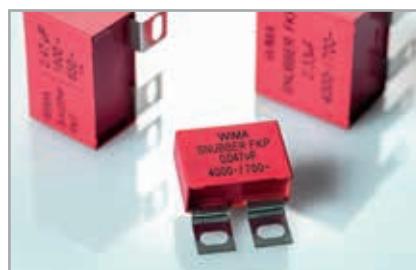
- Plates soldered directly to the schoopage for safe contacts at high rms currents

- Low inductance construction achieved by end-surface contacts
- High pulse reliability due to double-sided metallization and/or film/foil construction
- High voltage/overvoltage strength by internal series connection with self-healing metallized floating electrode
- Available in various contact configurations
- Solvent-resistant, flame retardant plastic case in accordance with UL 94 V-0
- Production sites ISO 9001:2015 certified

WIMA Snubber capacitors are manufactured under conditions of large volume production, but are also available in small quantities as individually configurable high-rel. components.

WIMA Snubber capacitors are available with capacitances from 0.01 µF through 8.0 µF and with rated voltages from 630 VDC through 4000 VDC.

All components are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.





Snubber MKP Capacitors for Pulse Applications with Double-Sided Metallized Electrodes and Internal Series Connection. Capacitances from 0.047 µF to 8.0 µF. Rated Voltages from 700 VDC to 3000 VDC.

Special Features

- Pulse duty construction
- Self-healing
- Particularly reliable contact-configurations: 4-pin versions and screwable plate connections
- Internal series connection
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2011/65/EU

Typical Applications

For high pulse and high frequency applications requiring extremely reliable contacts e.g.
■ IGBT-applications

Construction

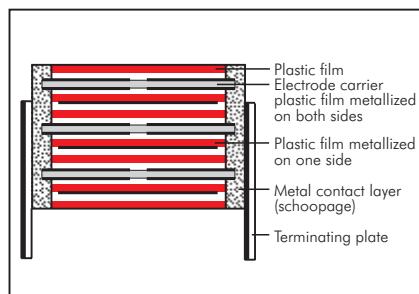
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Double-sided metallized plastic film

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire or plates.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 0.047 µF to 8.0 µF

Rated voltages: 700 VDC, 850 VDC, 1000 VDC, 1250 VDC, 1700 VDC, 2000 VDC, 2500 VDC, 3000 VDC

Capacitance tolerances:

±20%, ±10%, ±5% (other tolerances are available subject to special enquiry)

Operating temperature range:

-55° C to +100° C

Insulation resistance at +20° C:

C ≤ 0.33 µF: ≥ 1 x 10⁵ MΩ

C > 0.33 µF: ≥ 30 000 sec (MΩ x µF)

Measuring voltage: 100 V/1 min.

Test voltage: 2 sec

L	≤2000 VDC	2500 VDC	≥3000 VDC
<41.5	1.6 U _r	1.4 U _r	1.2 U _r
41.5	1.4 U _r	1.4 U _r	1.2 U _r
56	1.2 U _r	1.2 U _r	1.2 U _r

Dissipation factors at + 20° C: tan δ

at f	C ≤ 0.1 µF	0.1 µF < C ≤ 1.0 µF	C > 1.0 µF
1 kHz	≤ 6 x 10 ⁻⁴	≤ 6 x 10 ⁻⁴	≤ 6 x 10 ⁻⁴
10 kHz	≤ 6 x 10 ⁻⁴	≤ 6 x 10 ⁻⁴	—
100 kHz	≤ 15 x 10 ⁻⁴	—	—

Climatic test category:

55/100/56 in accordance with IEC

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages

Reliability:

Operational life > 300 000 hours
Failure rate < 1 fit (0.5 x U_r and 40° C)

Specific dissipation:

Box size*	Specific dissipation in Watts per K above the ambient temperature
19x31x56	0.068
23x34x56	0.079
27x37.5x56	0.092
33x48x56	0.122
37x54x56	0.142

* other box sizes see page 11.

Maximum pulse rise time:

Capacitance µF	max. pulse rise time V/µsec at T _A < 40° C							
	700VDC	850VDC	1000VDC	1250VDC	1700VDC	2000VDC	2500VDC	3000VDC
0.047 ... 0.22	1150	1150	1800	1800	1800	1800	1800	1800
0.33 ... 0.68	900	900	1150	1150	1150	1150	1150	1150
1.0 ... 2.2	500	500	500	500	650	650	650	650
2.5 ... 6.8	190	190	390	390	500	—	—	—
7.0 ... 8.0	90	90	—	—	—	—	—	—

for pulses equal to the rated voltage

Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the plates the screw torque is to be limited to max. 5 Nm.

For further details and graphs please refer to Technical Information.

Packing

Packing units at the end of the catalogue.

Packing quantities may vary depending on the plate version.

Continuation

General Data

Capacitance	700 VDC/420 VAC*			850 VDC/450 VAC*			1000 VDC/600 VAC*					
	W	H	L	Part number	W	H	L	Part number	W	H	L	Part number
0.22 "									11	21	31.5	SNMPO132206B_____
0.33 "					15	26	31.5	SNMPM033306F_____	11	22	41.5	SNMPO132207B_____
0.47 "	11	21	31.5	SNMPK034706B_____	13	24	41.5	SNMPM033307C_____	15	26	31.5	SNMPO133306F_____
0.68 "	11	22	41.5	SNMPK034707B_____	15	26	41.5	SNMPM034707D_____	13	24	41.5	SNMPO133307C_____
	15	26	31.5	SNMPK036806F_____	17	29	41.5	SNMPM036807E_____	15	26	41.5	SNMPO134706G_____
	13	24	41.5	SNMPK036807C_____					17	29	41.5	SNMPO134707D_____
												SNMPO136807E_____
1.0 μ F	17	29	31.5	SNMPK041006G_____	19	32	41.5	SNMPM041007F_____	20	39.5	41.5	SNMPO141007G_____
	15	26	41.5	SNMPK041007D_____					23	34	56	SNMPO141008E_____
1.5 "	19	32	41.5	SNMPK041507F_____	20	39.5	41.5	SNMPM041507G_____	24	45.5	41.5	SNMPO141507H_____
					23	34	56	SNMPM041508E_____	23	34	56	SNMPO141508E_____
2.0 "	20	39.5	41.5	SNMPK042007G_____	24	45.5	41.5	SNMPM042007H_____	31	46	41.5	SNMPO142007I_____
					23	34	56	SNMPM042008E_____	27	37.5	56	SNMPO142008H_____
2.2 "	20	39.5	41.5	SNMPK042207G_____	24	45.5	41.5	SNMPM042207H_____	31	46	41.5	SNMPO142207I_____
					23	34	56	SNMPM042208E_____	27	37.5	56	SNMPO142208H_____
2.5 "	24	45.5	41.5	SNMPK042507H_____	31	46	41.5	SNMPM042507I_____	35	50	41.5	SNMPO142507J_____
					27	37.5	56	SNMPM042508H_____	33	48	56	SNMPO142508J_____
3.0 "	24	45.5	41.5	SNMPK043007H_____	31	46	41.5	SNMPM043007I_____	40	55	41.5	SNMPO143007K_____
					27	37.5	56	SNMPM043008H_____	33	48	56	SNMPO143008J_____
3.3 "	24	45.5	41.5	SNMPK043307H_____	35	50	41.5	SNMPM043307J_____	40	55	41.5	SNMPO143307K_____
					33	48	56	SNMPM043308J_____	33	48	56	SNMPO143308J_____
4.0 "	31	46	41.5	SNMPK044007I_____	35	50	41.5	SNMPM044007J_____	37	54	56	SNMPO144008L_____
					33	48	56	SNMPM044008J_____				
4.7 "	31	46	41.5	SNMPK044707I_____	33	48	56	SNMPM044708J_____	37	54	56	SNMPO144708L_____
5.0 "	31	46	41.5	SNMPK045007I_____	33	48	56	SNMPM045008J_____	37	54	56	SNMPO145008L_____
6.0 "	35	50	41.5	SNMPK046007J_____	37	54	56	SNMPM046008L_____	37	54	56	SNMPO146008L_____
					33	48	56	SNMPK046008J_____				
7.0 "	40	55	41.5	SNMPK047007K_____	37	54	56	SNMPM047008L_____				
					33	48	56	SNMPK047008J_____				
8.0 "	37	54	56	SNMPK048008L_____								

* AC voltages: f \leq 1000 Hz; $1.4 \times U_{rms} + UDC \leq U_r$

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Versions and dimensional drawings see page 111.

Part number completion:

Version codes see page 113.

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

none = 00 (for plate versions)

Rights reserved to amend design data without prior notification.

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Continuation

General Data

Capacitance	1250 VDC/600 VAC*			1700 VDC/650 VAC*			2000 VDC/700 VAC*					
	W	H	L	Part number	W	H	L	Part number	W	H	L	Part number
0.068 μF									11	21	31.5	SNMPU026806B
									11	22	41.5	SNMPU026807B
0.1 μF					11	21	31.5	SNMPTA31006B	13	24	31.5	SNMPU031006D
0.15 "					11	22	41.5	SNMPTA31007B	11	22	41.5	SNMPU031007B
0.22 "	11	21	31.5	SNMPRO32206B	15	26	31.5	SNMPTA32206F	15	26	31.5	SNMPU031506F
"	11	22	41.5	SNMPRO32207B	13	24	41.5	SNMPTA32207C	13	24	41.5	SNMPU031507C
0.33 "	15	26	31.5	SNMPRO33306F	17	34.5	31.5	SNMPTA33306I	19	32	41.5	SNMPU033307F
"	13	24	41.5	SNMPRO33307C	15	26	41.5	SNMPTA33307D	20	39.5	41.5	SNMPU034707G
0.47 "	17	29	31.5	SNMPRO34706G	19	32	41.5	SNMPTA34707F	23	34	56	SNMPU034708E
"	15	26	41.5	SNMPRO34707D	20	39.5	41.5	SNMPTA36807G	24	45.5	41.5	SNMPU036807H
0.68 "	17	29	41.5	SNMPRO36807E	23	34	56	SNMPTA36808E	27	37.5	56	SNMPU036808H
1.0 μF	20	39.5	41.5	SNMPRO41007G	24	45.5	41.5	SNMPTA41007H	35	50	41.5	SNMPU041007J
"	23	34	56	SNMPRO41008E	27	37.5	56	SNMPTA41008H	33	48	56	SNMPU041008J
1.5 "	24	45.5	41.5	SNMPRO41507H	31	46	41.5	SNMPTA41507I	40	55	41.5	SNMPU041507K
"	23	34	56	SNMPRO41508E	27	37.5	56	SNMPTA41508H	33	48	56	SNMPU041508J
2.0 "	31	46	41.5	SNMPRO42007I	40	55	41.5	SNMPTA42007K	37	54	56	SNMPU042008L
"	27	37.5	56	SNMPRO42008H	33	48	56	SNMPTA42008J				
2.2 "	31	46	41.5	SNMPRO42207I	40	55	41.5	SNMPTA42207K	37	54	56	SNMPU042008L
"	27	37.5	56	SNMPRO42208H	33	48	56	SNMPTA42208J				
2.5 "	35	50	41.5	SNMPRO42507J	37	54	56	SNMPTA42508L				
"	33	48	56	SNMPRO42508J								
3.0 "	40	55	41.5	SNMPRO43007K	37	54	56	SNMPTA43008L				
"	33	48	56	SNMPRO43008J								
3.3 "	40	55	41.5	SNMPRO43307K								
"	33	48	56	SNMPRO43308J								
4.0 "	37	54	56	SNMPRO44008L								
4.7 "	37	54	56	SNMPRO44708L								
5.0 "	37	54	56	SNMPRO45008L								
6.0 "	37	54	56	SNMPRO46008L								

* AC voltages: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Versions and dimensional drawings see page 111.

Part number completion:

Version codes see page 113.

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

none = 00 (for plate versions)

Rights reserved to amend design data without prior notification.

Continuation page 107

Continuation

General Data

Capacitance	2500 VDC/700 VAC*				3000 VDC/700 VAC*			
	W	H	L	Part number	W	H	L	Part number
0.047 μF	11	21	31.5	SNMPV024706B	11	21	31.5	SNMPV024706B
	11	22	41.5	SNMPV024707B	11	22	41.5	SNMPV024707B
0.068 "	13	24	31.5	SNMPV026806D	13	24	31.5	SNMPV026806D
	11	22	41.5	SNMPV026807B	11	22	41.5	SNMPV026807B
0.1 μF	15	26	31.5	SNMPV031006F	15	26	31.5	SNMPV031006F
	13	24	41.5	SNMPV031007C	13	24	41.5	SNMPV031007C
0.15 "	15	26	41.5	SNMPV031507D	15	26	41.5	SNMPV031507D
	19	32	41.5	SNMPV032207F	19	32	41.5	SNMPV032207F
0.22 "	24	45.5	41.5	SNMPV033307H	24	45.5	41.5	SNMPV033307H
	31	46	41.5	SNMPV034707I	31	46	41.5	SNMPV034707I
0.33 "	27	37.5	56	SNMPV034708H	27	37.5	56	SNMPV034708H
	35	50	41.5	SNMPV036807J	35	50	41.5	SNMPV036807J
0.68 "	33	48	56	SNMPV036808J	33	48	56	SNMPV036808J
	40	55	41.5	SNMPV041007K	40	55	41.5	SNMPV041007K
1.0 μF	33	48	56	SNMPV041008J	33	48	56	SNMPV041008J
	37	54	56	SNMPV041508L	37	54	56	SNMPV041508L

* AC voltages: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Versions and dimensional drawings see page 111.

Part number completion:

Version codes see page 113.

Tolerance: 20 % = M

10 % = K

5 % = J

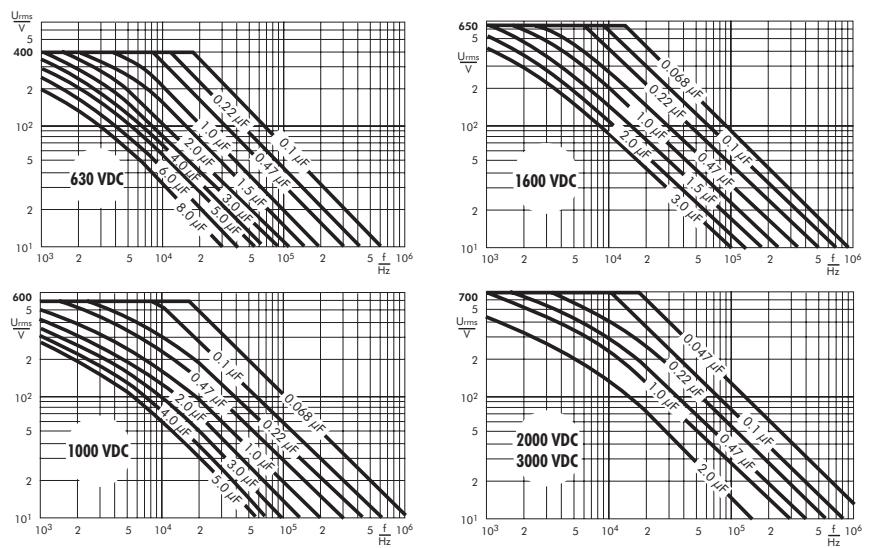
Packing: bulk = S

Pin length: 6-2 = SD

none = 00 (for plate versions)

Rights reserved to amend design data without prior notification.

Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).





Snubber FKP Capacitors for High Pulse Applications with Metal Foil Electrodes and Metallized Internal Series Connection. Capacitances from 0.01 µF to 3.3 µF. Rated Voltages from 630 VDC to 4000 VDC.

Special Features

- High pulse duty
- Self-healing
- Particularly reliable contact-configurations: 4-pin versions and screwable plate connections
- Internal series connection
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2011/65/EU

Typical Applications

For high pulse and high frequency applications requiring extremely reliable contacts e.g.
■ IGBT-applications

Construction

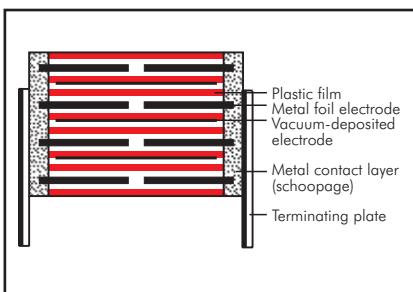
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Aluminium foil and single-sided metallized plastic film

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire or plates.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 0.01 µF to 3.3 µF

Rated voltages: 630 VDC, 1000 VDC, 1250 VDC, 1600 VDC, 2000 VDC, 3000 VDC, 4000 VDC

Capacitance tolerances:

±20%, ±10%, ±5% (other tolerances are available subject to special enquiry)

Operating temperature range:

-55° C to +100° C

Insulation resistance at +20° C:

C ≤ 0.33 µF: ≥ 1 x 10⁵ MΩ

C > 0.33 µF: ≥ 30 000 sec (MΩ x µF)

Measuring voltage: 100 V/1 min.

Test voltage: 2 sec

L	≤ 2000 VDC	≥ 3000 VDC
< 41.5	1.6 U _r	1.2 U _r
41.5	1.4 U _r	1.2 U _r
56	1.2 U _r	1.2 U _r

Dissipation factors at + 20° C: tan δ

at f	C ≤ 0.1 µF	0.1 µF < C ≤ 1.0 µF	C > 1.0 µF
1 kHz	≤ 5 x 10 ⁻⁴	≤ 5 x 10 ⁻⁴	≤ 5 x 10 ⁻⁴
10 kHz	≤ 6 x 10 ⁻⁴	≤ 6 x 10 ⁻⁴	—
100 kHz	≤ 10 x 10 ⁻⁴	—	—

Maximum pulse rise time:

Capacitance µF	max. pulse rise time V/µsec at T _A < 40° C						
	630 VDC	1000 VDC	1250 VDC	1600 VDC	2000 VDC	3000 VDC	4000 VDC
0.01 ... 0.022	—	11000	11000	11000	11000	11000	11000
0.033 ... 0.068	9000	9000	9000	9000	9000	9000	9000
0.1 ... 0.22	9000	9000	9000	9000	9000	9000	9000
0.33 ... 0.68	5000	5000	5000	5000	5000	5000	5000
1.0 ... 3.3	1600	2000	2000	2000	—	—	—

for pulses equal to the rated voltage

Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the plates the screw torque is to be limited to max. 5 Nm.

For further details and graphs please refer to Technical Information.

Climatic test category:

55/100/56 in accordance with IEC

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages

Reliability:

Operational life > 300 000 hours
Failure rate < 1 fit (0.5 x U_r and 40° C)

Specific dissipation:

Box size* WxHxL in mm	Specific dissipation in Watts per K above the ambient temperature
19x31x56	0.068
23x34x56	0.079
27x37.5x56	0.092
33x48x56	0.122
37x54x56	0.142

* other box sizes see page 11.

Packing

Packing units at the end of the catalogue.

Packing quantities may vary depending on the plate version.

Continuation

General Data

Capacitance	630 VDC/400 VAC*				1000 VDC/600 VAC*			
	W	H	L	Part number	W	H	L	Part number
0.022 μF					11	22	41.5	SNFPO122207B-----
0.033 "					11	22	41.5	SNFPO123307B-----
0.047 "	11	22	41.5	SNFPJ024707B-----	11	22	41.5	SNFPO124707B-----
0.068 "	11	22	41.5	SNFPJ026807B-----	11	22	41.5	SNFPO126807B-----
0.1 μF	11	22	41.5	SNFPJ031007B-----	11	22	41.5	SNFPO131007B-----
0.15 "	11	22	41.5	SNFPJ031507B-----	15	26	41.5	SNFPO131507D-----
0.22 "	13	24	41.5	SNFPJ032207C-----	17	29	41.5	SNFPO132207E-----
0.33 "	15	26	41.5	SNFPJ033307D-----	19	32	41.5	SNFPO133307F-----
0.47 "	17	29	41.5	SNFPJ034707E-----	20	39.5	41.5	SNFPO134707G-----
0.68 "	19	32	41.5	SNFPJ036807F-----	24	45.5	41.5	SNFPO136807H-----
					23	34	56	SNFPO136808E-----
1.0 μF	20	39.5	41.5	SNFPJ041007G-----	31	46	41.5	SNFPO141007I-----
1.5 "	24	45.5	41.5	SNFPJ041507H-----	27	37.5	56	SNFPO141008H-----
2.2 "	31	46	41.5	SNFPJ042207I-----	35	50	41.5	SNFPO141507J-----
2.5 "	35	50	41.5	SNFPJ042507J-----	33	48	56	SNFPO141508J-----
3.0 "	37	54	56	SNFPJ043008L-----	37	54	56	SNFPO142208L-----
3.3 "	37	54	56	SNFPJ043308L-----				
Capacitance	1250 VDC/600 VAC*				1600 VDC/650 VAC*			
	W	H	L	Part number	W	H	L	Part number
0.01 μF					11	22	41.5	SNFPT021007B-----
0.015 "					11	22	41.5	SNFPT021507B-----
0.022 "	11	22	41.5	SNFPR022207B-----	11	22	41.5	SNFPT022207B-----
0.033 "	11	22	41.5	SNFPR023307B-----	11	22	41.5	SNFPT023307B-----
0.047 "	11	22	41.5	SNFPR024707B-----	11	22	41.5	SNFPT024707B-----
0.068 "	11	22	41.5	SNFPR026807B-----	15	26	41.5	SNFPT026807D-----
0.1 μF	11	22	41.5	SNFPR031007B-----	17	29	41.5	SNFPT031007E-----
0.15 "	15	26	41.5	SNFPR031507D-----	19	32	41.5	SNFPT031507F-----
0.22 "	17	29	41.5	SNFPR032207E-----	20	39.5	41.5	SNFPT032207G-----
0.33 "	19	32	41.5	SNFPR033307F-----	24	45.5	41.5	SNFPT033307H-----
0.47 "	20	39.5	41.5	SNFPR034707G-----	31	46	41.5	SNFPT034707I-----
0.68 "	24	45.5	41.5	SNFPR036807H-----	35	50	41.5	SNFPT036807J-----
	23	34	56	SNFPR036808E-----	27	37.5	56	SNFPT036808H-----
1.0 μF	31	46	41.5	SNFPR041007I-----	33	48	56	SNFPT041008J-----
1.5 "	33	48	56	SNFPR041508J-----				

* AC voltages: $f \leq 1000 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Versions and dimensional drawings see page 111.

Part number completion:

Version codes see page 113.

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

none = 00 (for plate versions)

Rights reserved to amend design data without prior notification.

Continuation page 110

WIMA Snubber FKP



Continuation

General Data

* AC voltages: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Versions and dimensional drawings see page 111.

Part number completion:

Version codes see page 113.

Tolerance: 20 % = M

10 % = K

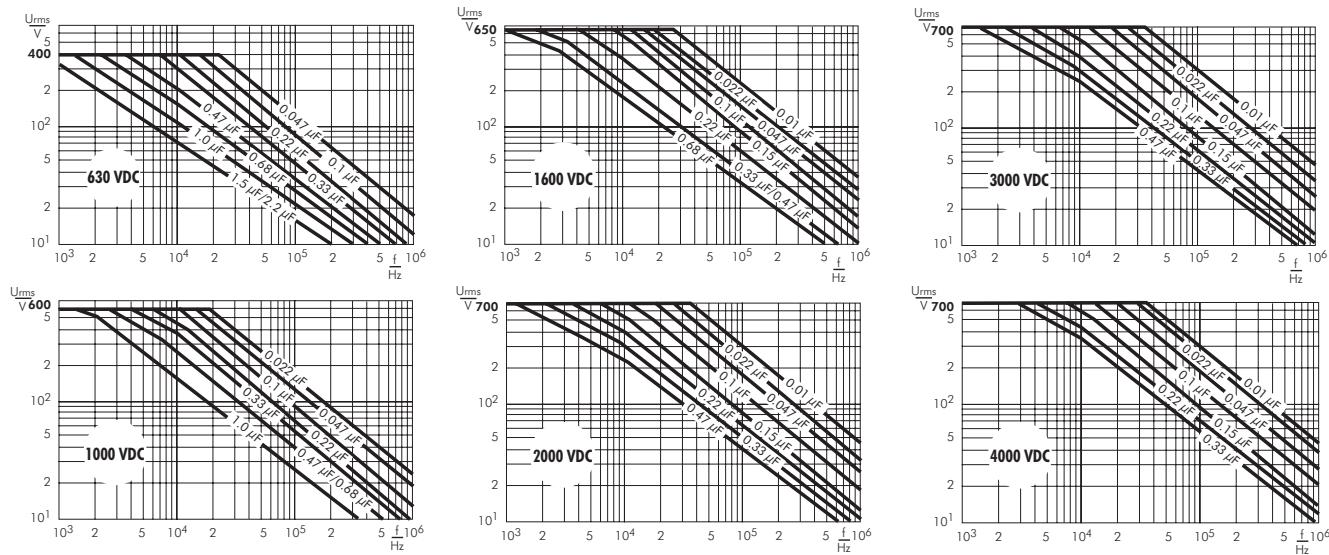
5 % = J

Packing: bulk = S

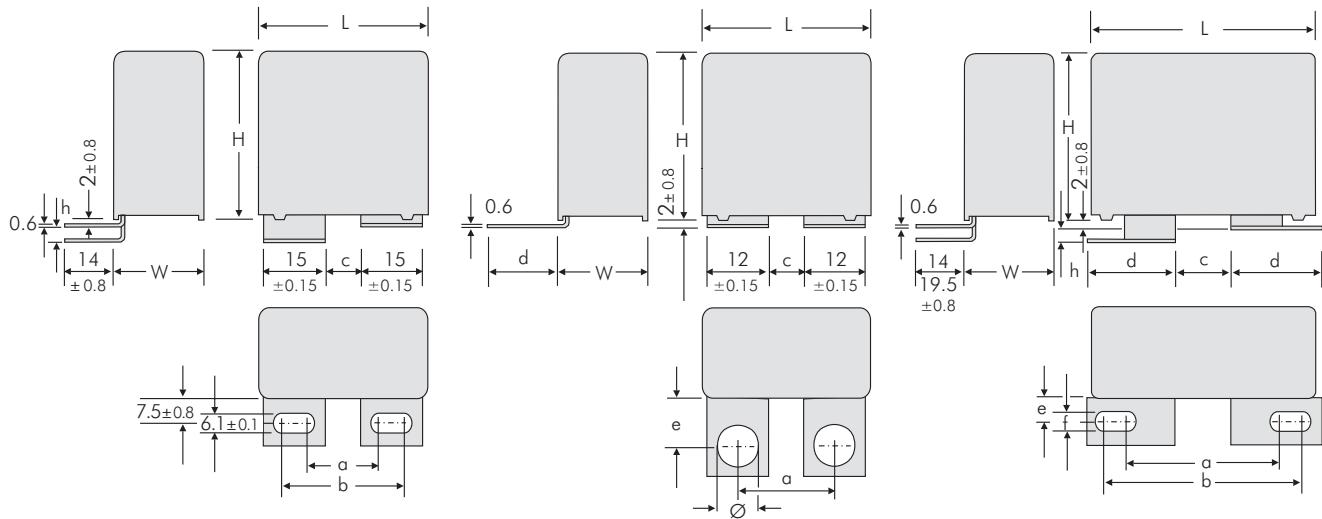
Pin length: 6-2 = SD

Rights reserved to amend design data without prior notification.

Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).



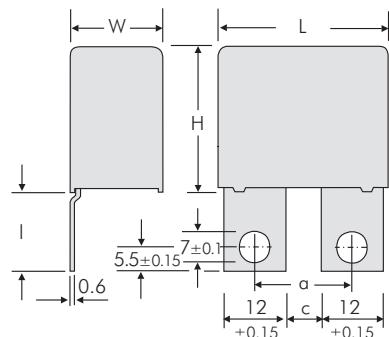
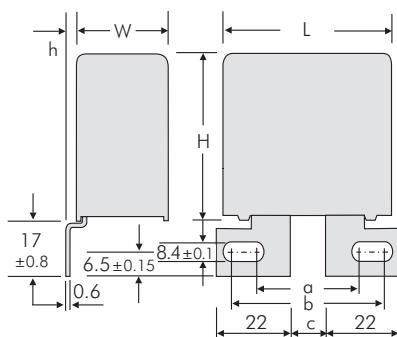
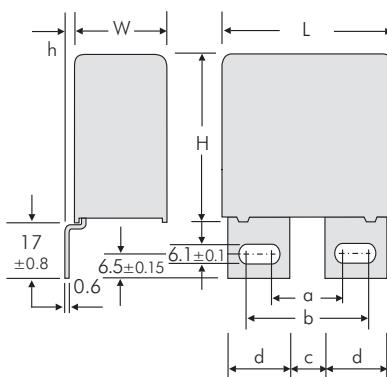
Versions of WIMA Snubber- and DC-LINK MKP 4- Capacitors



Version	L	a ±0.5	b ±0.5	c ±0.5	h ±0.8
A1	41.5	17.5	28	7.5	0
A1.5	41.5	17.5	28	7.5	3.5
A1	56	20	30	10	0
A1.1.1	56	28	38	18	0
A1.4.1	56	28	38	18	3.5

Version	L	a ±0.5	c ±0.5	d ±0.8	e ±0.8	Ø ±0.1
A1.6	41.5	18	6	21.5	16	7
A1.6.1	41.5	22	10	18.5	13	7
A1.6.2	41.5	23	10	18.5	13	8
A1.6	56	29	17	21.5	16	7

Version	L	a ±0.5	b ±0.5	c ±0.5	d ±0.15	e ±0.8 ±0.1	f	h ±0.8
A2	41.5	36	46.5	14.5	22	7.5	8.4	0
A2.4.1	41.5	33.5	39.5	7.5	22	13	8.4	0
A2.6.1	41.5	31.5	41.5	14	22	13	6.1	3.5
A2.6.2	41.5	31.5	41.5	14	22	13	6.1	0
A2.8	41.5	36	46.5	14.5	22	7.5	8.4	3.5
A2.1	56	39.5	45.5	13.5	22	7.5	8.4	0
A2.1.2	56	36	45.5	14.5	21.5	7.5	8.4	0

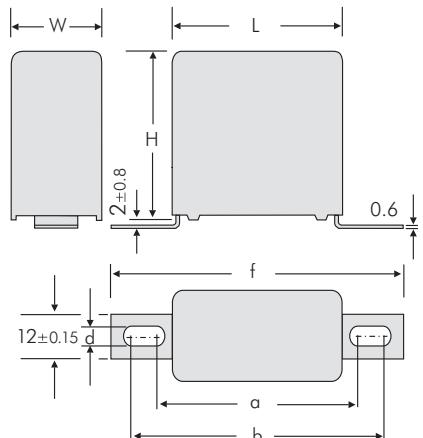


Version	L	a ±0.5	b ±0.5	c ±0.5	d ±0.15	h ±0.8
A3	41.5	17.5	27.5	7.5	15	0
A3.5	41.5	17.5	27.5	7.5	15	3
A3.12	41.5	17.5	30	7.5	16.5	0
A3	56	20	30	10	15	0
A3.1	56	28	38	18	15	0
A3.5	56	20	30	10	15	3
A3.10	56	28	38	18	15	3

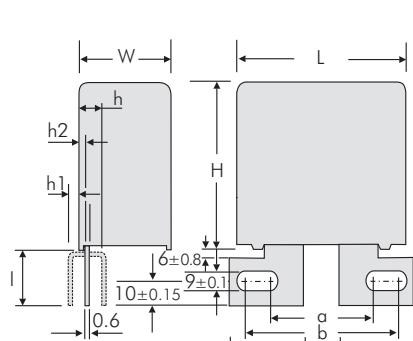
Version	L	a ±0.5	b ±0.5	c ±0.5	h ±0.8
A3.9	41.5	36	46.5	14.5	0
A3.11	41.5	36	46.5	14.5	3
A3.2	56	36	46.5	14.5	0
A3.3	56	36	46.5	14.5	3

Version	L	a ±0.5	c ±0.5	I ±0.8
A3.8	41.5 W>17	18	6	23
A3.8.1	41.5 W>17	22	10	17.5
A3.8.2	41.5 W>17	22	10	23

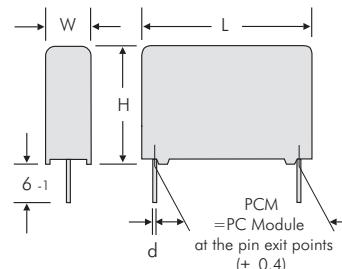
Versions of WIMA Snubber- and DC-LINK MKP 4- Capacitors



Version	L	a ±0.8	b ±0.8	f ±0.8	d ±0.1
A4.9	31.5 W ≥ 15	44	47	57	4.5
A4.10	31.5 W ≥ 15	43	59	69	6.1
A4.2	41.5 W ≥ 15	54	57	67	4.5
A4	41.5 W ≥ 15	53	69	79	6.1
A4.7	56	65	68	78	4.5
A4	56	64	80	90	6.1



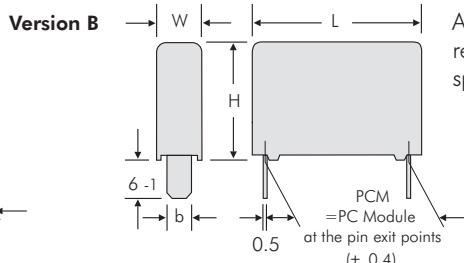
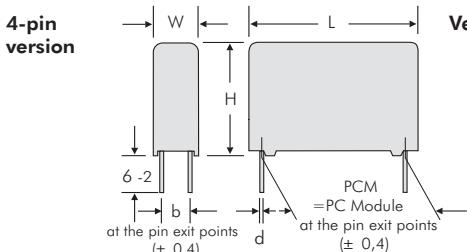
2-pin
version



PCM	d
28.5*	0.8
38.5*	1.2
49.5*	1.2

*apply only to Snubber

Dims. in mm



Additional special versions can be realized. Please contact us with your specific needs.

W	H	L	PCM	b	d
11	21	31.5	27.5	5	0.8
13	24	31.5	27.5	7.5	0.8
15	26	31.5	27.5	7.5	0.8
17	29	31.5	27.5	10	0.8
19	30	31.5	27.5	10	0.8
17	34.5	31.5	27.5	10	0.8
20	39.5	31.5	27.5	12.5	0.8
22	43.5	31.5	27.5	12.5	0.8
11	22	41.5	37.5	5	1
13	24	41.5	37.5	7.5	1
15	26	41.5	37.5	7.5	1
17	29	41.5	37.5	10	1
19	32	41.5	37.5	10	1
20	39.5	41.5	37.5	12.5	1
24	45.5	41.5	37.5	12.5	1
31	46	41.5	37.5	20	1
35	50	41.5	37.5	20	1
40	55	41.5	37.5	20	1
19	31	56	48.5	12.5	1
23	34	56	48.5	15	1
27	37.5	56	48.5	15	1
33	48	56	48.5	20	1
37	54	56	48.5	20	1

L	PCM	b ±0.15
31.5	28.5	8
41.5	38.5	8
56	49.5	8

Versions of WIMA Snubber- and DC-LINK MKP 4- Capacitors



Version code		D2	D4	B8	1A	1B	1C	1H	1I	1S	2A	2B	2Q	2F	2J	2K	2M	3A	3C	3D	3E	3G	3K	3L	3M	3N	3O	3P	3Q	4A	4C	4J	4L	4M	6A	6B	6C	
W x H x L	Size code	2-pin	4-pin	B8	A1	A1.1	A1.4.1	A1.5	A1.6	A1.6.1	A1.6.2	A2	A2.1	A2.1.2	A2.4.1	A2.6.1	A2.6.2	A2.8	A3	A3.1	A3.2	A3.3	A3.5	A3.8	A3.8.1	A3.8.2	A3.9	A3.10	A3.11	A3.12	A4	A4.2	A4.7	A4.9	A4.10	A6	A6.3	A6.4
11 x 21 x 31.5	6B																																					
13 x 24 x 31.5	6D																																					
15 x 26 x 31.5	6F																																					
17 x 29 x 31.5	6G																																					
17 x 34.5 x 31.5	6I																																					
11 x 22 x 41.5	7B																																					
13 x 24 x 41.5	7C																																					
15 x 26 x 41.5	7D																																					
17 x 29 x 41.5	7E																																					
19 x 32 x 41.5	7F																																					
20 x 39.5 x 41.5	7G																																					
24 x 45.5 x 41.5	7H																																					
31 x 46 x 41.5	7I																																					
35 x 50 x 41.5	7J																																					
40 x 55 x 41.5	7K																																					
19 x 31 x 56	8D																																					
23 x 34 x 56	8E																																					
27 x 37.5 x 56	8H																																					
33 x 48 x 56	8J																																					
37 x 54 x 56	8L																																					

Possible connecting respective plate versions - depending on box size.

■ 4-pin versions on request.

WIMA GTO Capacitors with Screw Connection for High Current Carrying Capability



WIMA GTO MKP

WIMA GTO MKP capacitors are especially designed to attenuate voltage spikes on GTO (Gate-Turn-Off) Thyristors and IGBT (Insulated Gate Bipolar Transistor). They are manufactured in dry-type technology with double-sided metallized electrodes and encapsulated in a cylindrical plastic case sealed with self-extinguishing polyurethane resin.

Their construction principle combined with the Polypropylene dielectric used creates outstanding features, e.g.:

- Very low self-inductance
- High pulse reliability

- High rms current carrying capability
- Very low dissipation factor
- Negative capacitance change versus temperature
- Excellent self-healing properties
- Outstanding mechanical stability
- High shock and vibration resistance
- Solvent-resistant, flame-retardant plastic case in accordance with UL 94 V-0
- Almost unlimited life expectancy

Fields of applications are designs where high current and voltage carrying capabilities are required, e.g. converter equipment in power generation or in traction technology for train drives, hoists, crane drives etc.

WIMA GTO MKP capacitors are available with capacitances from 1.0 µF through 100 µF and with nominal voltages from 400 VDC through 2000 VDC. For mounting purposes M6 and M8 threaded terminations are possible. Customer-specific requirements can be realized on demand.

All components are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.



GTO MKP Capacitors for Pulse Applications with Internal Series Connection. Capacitances from 1.0 µF to 100 µF. Rated Voltages from 400 VDC to 2000 VDC.

Special Features

- Pulse duty construction
- Self-healing
- Cylindrical capacitor body with axial screw and thread connections size M6 or M8
- Internal series connection from 400 VAC
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2011/65/EU

Typical Applications

- For high pulse and high frequency applications requiring extremely reliable contacts e.g.
- Damping of voltage spikes on GTO-Thyristors

Construction

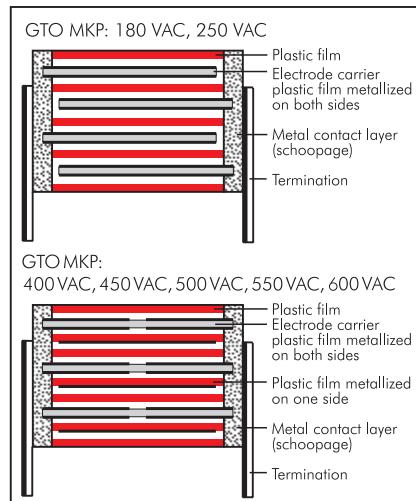
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Double-sided metallized plastic film

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with PU seal, UL 94 V-0

Terminations:

Axial screw connection M6 or M8.

Marking:

Colour: Red. Marking: Black on Silver.

Electrical Data

Capacitance range:

1.0 µF to 100 µF

Rated voltages:

400 VDC, 600 VDC, 850 VDC, 1000 VDC, 1200 VDC, 1500 VDC, 2000 VDC

Capacitance tolerances:

±20%, ±10%, ±5%

Operating temperature range:

-55° C to +85° C

Climatic test category:

55/085/56 in accordance with IEC

Insulation resistance at +20° C:

≥ 10 000 sec (MΩ x µF)

Measuring voltage: 100 V/1 min.

Test voltage:

1.2 U_r, 2 sec.

Dielectric absorption:

0.05%

Dissipation factors at + 20° C: tan δ

at f	$C \leq 20 \mu F$	$20 \mu F < C \leq 50 \mu F$	$C > 50 \mu F$
1 kHz	$\leq 3 \times 10^{-4}$	$\leq 5 \times 10^{-4}$	$\leq 8 \times 10^{-4}$

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +65° C for DC voltages and from +60° C for AC voltages.

Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit (0.5 x U_r and 40° C)

Specific dissipation:

Box size DxL in mm	Specific dissipation in Watts per K above the ambient temperature
60x49	0.186
70x49	0.231
80x49	0.280
90x49	0.333
90x58	0.364
90x97	0.501

Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the capacitor the screw torque is to be limited to max. 5 Nm.

For further details and graphs please refer to Technical Information.

Packing

Transportation-safe packing in cardboard boxes.

Packing units

D	pcs. per packing unit
60	12
70	8
80	6
90	6



Continuation

General Data

Capacitance	400 VDC/180 VAC*				600 VDC/250 VAC*			
	D x L mm	du/dt V/ μ sec	$I_{max.}$ A	Part number	D x L mm	du/dt V/ μ sec	$I_{max.}$ A	Part number
3.5 μ F					60 x 49	200	770	GTOMI04350GA00_____
4 "					60 x 49	200	890	GTOMI04400GA00_____
4.5 "					60 x 49	200	990	GTOMI04450GA00_____
5 "					60 x 49	180	1090	GTOMI04500GA00_____
6 "					60 x 49	180	1310	GTOMI04600GA00_____
8 "					60 x 49	80	610	GTOMI04800GA00_____
10 μ F					60 x 49	80	780	GTOMI05100GA00_____
15 "	60 x 49	50	790	GTOMG05150GA00_____	60 x 49	80	1150	GTOMI05150GA00_____
20 "	60 x 49	50	1050	GTOMG05200GA00_____	70 x 49	80	1540	GTOMI05200GB00_____
25 "	60 x 49	50	1330	GTOMG05250GA00_____	70 x 49	80	1940	GTOMI05250GB00_____
30 "	60 x 49	50	1610	GTOMG05300GA00_____	80 x 49	80	2340	GTOMI05300GC00_____
40 "	70 x 49	50	2090	GTOMG05400GB00_____	90 x 49	80	3080	GTOMI05400GD00_____
50 "	80 x 49	50	2680	GTOMG05500GC00_____	90 x 58	60	3050	GTOMI05500GE00_____
60 "	80 x 49	50	3240	GTOMG05600GC00_____	90 x 97	35	2140	GTOMI05600GF00_____
70 "	90 x 49	50	3630	GTOMG05700GD00_____	90 x 97	35	2520	GTOMI05700GF00_____
80 "	90 x 49	50	4100	GTOMG05800GD00_____	90 x 97	35	2810	GTOMI05800GF00_____
90 "	90 x 58	40	3800	GTOMG05900GE00_____	90 x 97	35	3200	GTOMI05900GF00_____
100 μ F	90 x 58	40	4300	GTOMG06100GE00_____	90 x 97	35	3550	GTOMI06100GF00_____

Capacitance	850 VDC/400 VAC*				1000 VDC/450 VAC*			
	D x L mm	du/dt V/ μ sec	$I_{max.}$ A	Part number	D x L mm	du/dt V/ μ sec	$I_{max.}$ A	Part number
3 μ F	60 x 49	200	770	GTOMM04300GA00_____	60 x 49	260	790	GTOMO14300GA00_____
3.5 "	60 x 49	200	770	GTOMM04350GA00_____	60 x 49	260	910	GTOMO14350GA00_____
4 "	60 x 49	200	890	GTOMM04400GA00_____	60 x 49	260	1050	GTOMO14400GA00_____
4.5 "	60 x 49	200	990	GTOMM04450GA00_____	60 x 49	260	1170	GTOMO14450GA00_____
5 "	60 x 49	200	1090	GTOMM04500GA00_____	60 x 49	260	1310	GTOMO14500GA00_____
6 "	60 x 49	200	1310	GTOMM04600GA00_____	60 x 49	260	1550	GTOMO14600GA00_____
8 "	60 x 49	200	1740	GTOMM04800GA00_____	70 x 49	260	2080	GTOMO14800GB00_____
10 μ F	70 x 49	200	2190	GTOMM05100GB00_____	70 x 49	260	2600	GTOMO15100GB00_____
15 "	70 x 49	200	3230	GTOMM05150GB00_____	90 x 49	260	3920	GTOMO15150GD00_____
20 "	80 x 49	200	4310	GTOMM05200GC00_____	90 x 58	200	4300	GTOMO15200GE00_____
25 "	90 x 49	200	5390	GTOMM05250GD00_____	90 x 97	120	3050	GTOMO15250GF00_____
30 "	90 x 58	160	4800	GTOMM05300GE00_____	90 x 97	120	3580	GTOMO15300GF00_____
40 "	90 x 97	100	3780	GTOMM05400GF00_____	90 x 97	120	4770	GTOMO15400GF00_____
50 "	90 x 97	100	4790	GTOMM05500GF00_____				
60 "	90 x 97	100	5800	GTOMM05600GF00_____				

* AC voltage: $f \leq 1000$ Hz; $1.4 \times U_{rms} + UDC \leq U_r$

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: none = 00

Rights reserved to amend design data without prior notification.

Continuation page 117

Continuation

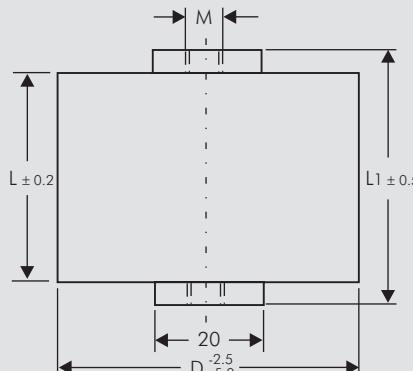
General Data

Capacitance	1200 VDC/500 VAC*				1500 VDC/550 VAC*			
	D x L mm	du/dt V/μsec	I _{max.} A	Part number	D x L mm	du/dt V/μsec	I _{max.} A	Part number
1 μF					60 x 49	400	420	GTOMS04100GA00_____
1.5 "					60 x 49	400	590	GTOMS04150GA00_____
2 "					60 x 49	400	820	GTOMS04200GA00_____
2.5 "	60 x 49	300	770	GTOMQ04250GA00_____	60 x 49	400	1010	GTOMS04250GA00_____
3 "	60 x 49	300	950	GTOMQ04300GA00_____	60 x 49	400	1220	GTOMS04300GA00_____
3.5 "	60 x 49	300	1070	GTOMQ04350GA00_____	60 x 49	400	1400	GTOMS04350GA00_____
4 "	60 x 49	300	1230	GTOMQ04400GA00_____	70 x 49	400	1630	GTOMS04400GB00_____
4.5 "	60 x 49	300	1380	GTOMQ04450GA00_____	70 x 49	400	1800	GTOMS04450GB00_____
5 "	60 x 49	300	1570	GTOMQ04500GA00_____	70 x 49	400	2010	GTOMS04500GB00_____
6 "	70 x 49	300	1840	GTOMQ04600GB00_____	80 x 49	400	2390	GTOMS04600GC00_____
8 "	70 x 49	300	2470	GTOMQ04800GB00_____	90 x 49	400	3210	GTOMS04800GD00_____
10 μF	80 x 49	300	3080	GTOMQ05100GC00_____	90 x 58	320	3210	GTOMS05100GE00_____
15 "	90 x 58	230	3550	GTOMQ05150GE00_____	90 x 97	180	2690	GTOMS05150GF00_____
20 "	90 x 97	130	2690	GTOMQ05200GF00_____	90 x 97	180	3600	GTOMS05200GF00_____
25 "	90 x 97	130	3370	GTOMQ05250GF00_____				
30 "	90 x 97	130	4110	GTOMQ05300GF00_____				

Capacitance	2000 VDC/600 VAC*			
	D x L mm	du/dt V/μsec	I _{max.} A	Part number
1 μF	60 x 49	500	500	GTOMU04100GA00_____
1.5 "	60 x 49	500	750	GTOMU04150GA00_____
2 "	70 x 49	500	1000	GTOMU04200GB00_____
2.5 "	70 x 49	500	1250	GTOMU04250GB00_____
3 "	80 x 49	500	1500	GTOMU04300GC00_____
3.5 "	80 x 49	500	1750	GTOMU04350GC00_____
4 "	90 x 49	500	2000	GTOMU04400GD00_____
4.5 "	90 x 49	500	2250	GTOMU04450GD00_____
5 "	90 x 58	500	2500	GTOMU04500GE00_____
6 "	90 x 58	450	2700	GTOMU04600GE00_____
8 "	90 x 97	400	3200	GTOMU04800GF00_____
10 μF	90 x 97	300	3000	GTOMU05100GF00_____

* AC voltage: $f \leq 1000 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.



D	L	L1	M
60	49	55	M6
70	49	55	M6
80	49	55	M8
90	49	55	M8
90	58	64	M8
90	97	103	M8

Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	none = 00

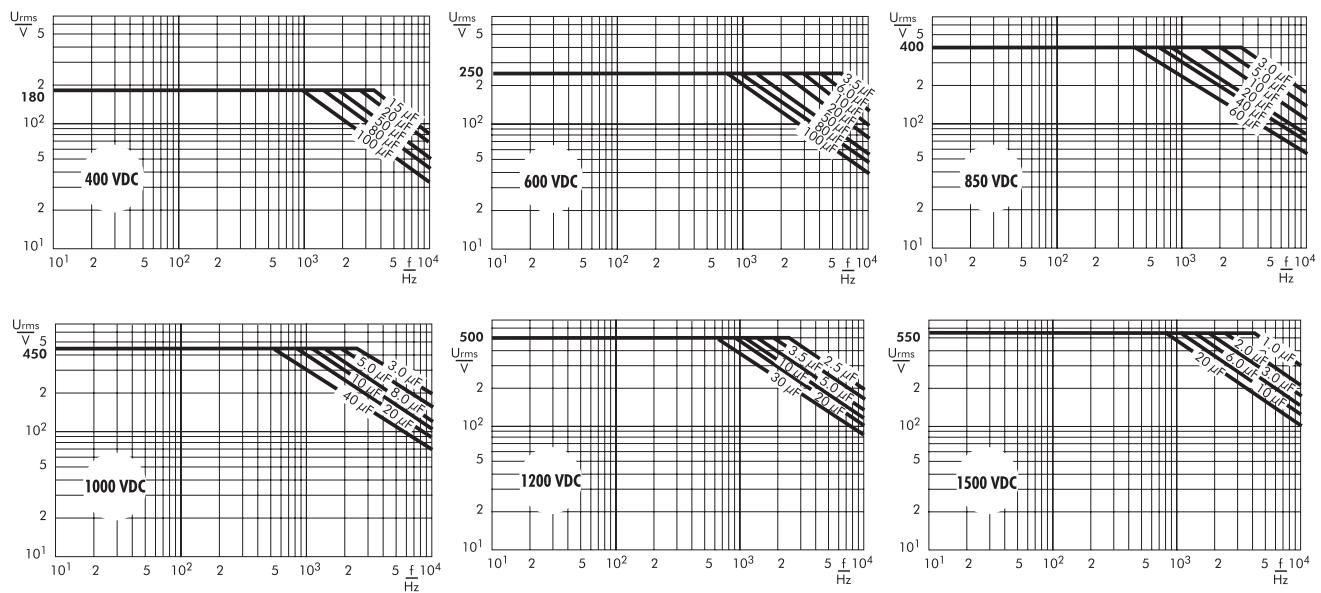
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Continuation page 118

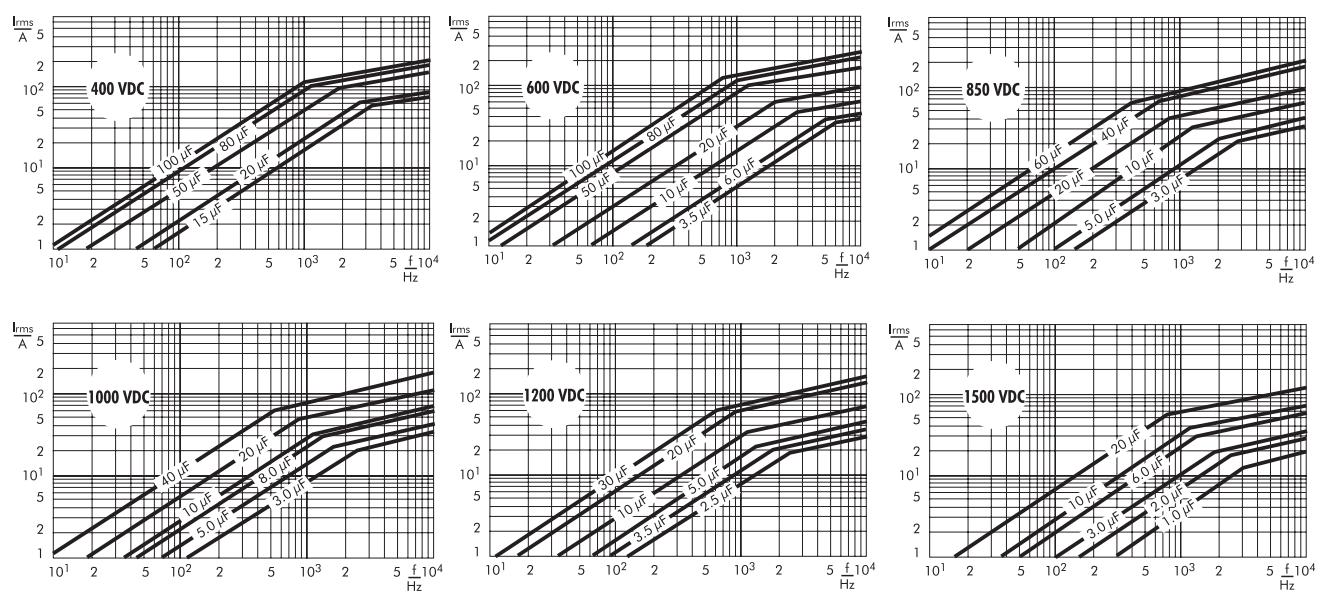


Continuation

Permissible AC voltage in relation to frequency
at 20° C internal temperature rise (general guide).



Permissible AC current in relation to frequency
at 20° C internal temperature rise (general guide).



WIMA Intermediate Circuit Capacitors for Applications in High Power Converter Technology



WIMA DC-LINK MKP 3

WIMA DC-LINK MKP 4

WIMA DC-LINK MKP 4S

WIMA DC-LINK MKP 5

WIMA DC-LINK MKP 6

WIMA DC-LINK HC

WIMA DC-LINK HY

WIMA DC-LINK capacitors are especially designed for applications in high power converter technology where they are more and more substituting electrolytic capacitors due to increasing electrical requirements. Manufactured with a low loss Polypropylene dielectric they show a higher current carrying capability as well as lower dissipation/self-heating at high frequencies compared to electrolytic capacitors. Further outstanding features are, e.g.:

- Very high capacitance/volume ratio
- High voltage rating per component
- Very low dissipation factor (ESR)
- Very high insulation resistance
- Excellent self-healing properties
- Long life expectancy
- Non-polar construction

- Particularly reliable contact configuration
- High shock and vibration resistance
- Outstanding mechanical stability

WIMA DC-LINK MKP 3 capacitors in cylindrical case with screw fixing are available with capacitances from 35 µF through 200 µF and with voltage ranges from 700 VDC through 1500 VDC. They can be provided with male or female terminations.

WIMA DC-LINK MKP 4 capacitors with rectangular case are available with capacitance values from 1 µF through 400 µF and with rated voltages from 400 VDC through 1300 VDC. For mounting purposes 2-pin and 4-pin versions are possible. The WIMA DC-LINK MKP 4S series has been designed for stringent requirements.

WIMA DC-LINK MKP 5 capacitors in cylindrical plastic case are available with capacitances from 16 µF through 260 µF and with rated voltages from 500 VDC through 1300 VDC. They are provided with tinned wire terminations for PCB mounting.

WIMA DC-LINK MKP 6 capacitors have a cylindrical aluminium case. They are available with capacitances from 75 µF through 4920 µF and with rated voltages from 600 VDC through 1500 VDC. For bus bar mounting they are designed with male or female terminations and screw bolt.

Customized solutions e.g. can be realized with WIMA DC-LINK HC and WIMA DC-LINK HY with variable connecting configurations.

All components are environmentally compatible with the RoHS 2011/65/EU regulations of the European Union.





Metallized Polypropylene (PP) - Capacitors for DC-Link Applications.
Capacitances from 35 µF to 200 µF.
Rated Voltages from 700 VDC to 1500 VDC.

Special Features

- Very high volume/capacitance ratio
- Self-healing properties
- With cylindrical plastic case and screw fixing
- Dry construction without electrolyte or oil
- No internal fuse required
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU
- Customer-specific capacitances or voltages on request

Electrical Data

Capacitance range: 35 µF to 200 µF
Rated voltages: 700 VDC, 900 VDC, 1100 VDC, 1300 VDC, 1500 VDC
Capacitance tolerances: ±20%, ±10%, (±5% available subject to special enquiry)
Operating temperature range: -40° C to +85° C
Insulation resistance at +20° C:
 $\geq 5000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$
Measuring voltage: 100 V/1 min.

Dielectric loss factor
 $\tan \delta_0: 2 \times 10^{-4}$
Test voltage: 1.5 U_r, 2sec
Dielectric absorption:
0.05 %
Reliability:
Operational life > 100 000 hours
Failure rate < 50 fit (hot spot ≤ 70° C)

Typical Applications

DC capacitors with high capacitances for applications in power electronics also at non-sinusoidal voltages and currents e.g. in

- Wind power systems
- Inverters

Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors.

Packing

Transport-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information.

Construction

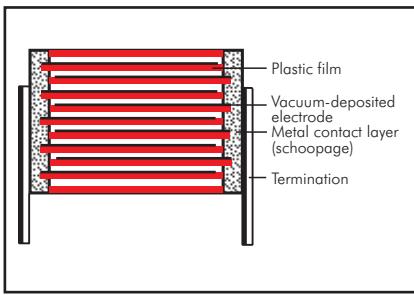
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

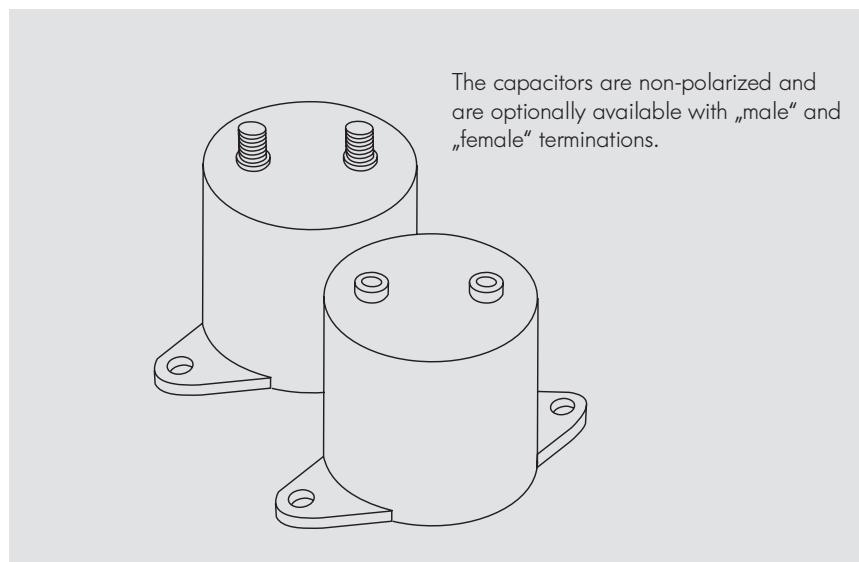
Solvent-resistant, flame-retardant plastic case with PU-sealing and screw fixing, UL 94 V-0

Terminations:

Screw connection (male or female).

Marking:

Colour: Black. Marking: Gold.



The capacitors are non-polarized and are optionally available with „male“ and „female“ terminations.

Continuation

General Data

U_R	C_N	D x L mm	I_{ms} (1 kHz)* A	ESR (1 kHz)* mΩ	R_{th} K/W	L_e nH	Approx. weight g	Part number
700 VDC	150 µF	84.5 x 51	100	0.9	7.0	< 32	430	DCP3K06150G100_____
	200 "	84.5 x 64	100	1.0	8.5	< 40	510	DCP3K06200G200_____
900 VDC	100 µF	84.5 x 51	90	1.0	7.2	< 30	430	DCP3N06100G100_____
	140 "	84.5 x 64	100	1.3	8.5	< 40	510	DCP3N06140G200_____
1100 VDC	70 µF	84.5 x 51	100	1.1	7.0	< 32	430	DCP3P05700G100_____
	90 "	84.5 x 64	100	1.2	8.5	< 40	510	DCP3P05900G200_____
1300 VDC	50 µF	84.5 x 51	60	1.7	7.0	< 35	430	DCP3R25500G100_____
	70 "	84.5 x 64	50	2.1	8.5	< 40	510	DCP3R25700G200_____
1500 VDC	35 µF	84.5 x 51	60	1.7	7.0	< 35	430	DCP3S05350G100_____
	50 "	84.5 x 64	70	1.9	8.5	< 40	510	DCP3S05500G200_____

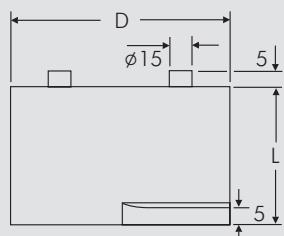
Contacts can handle: peak currents \hat{I} up to 5 kA
surge currents I_S up to 20 kA

Customer-specific capacitances or voltages on request

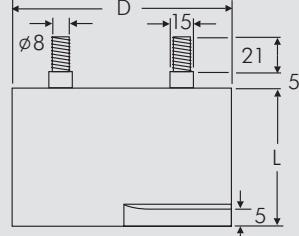
* General guide

Dims. in mm.

female

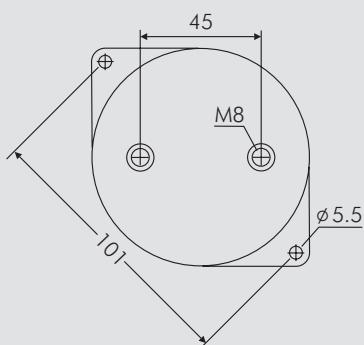
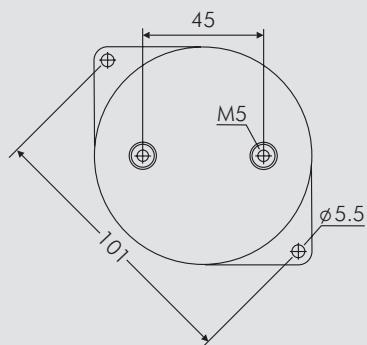


male



Part number completion:

Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Connection:	male = OM
	female = OF



D	L
84.5	51
84.5	64

Rights reserved to amend design data without prior notification.



Metallized Polypropylene (PP) - Capacitors for DC-Link Applications.
Capacitances from 1.0 µF to 400 µF.
Rated Voltages from 400 VDC to 1300 VDC.

Special Features

- Capacitances up to 400 µF
- High volume/capacitance ratio
- Excellent self-healing properties
- Very low dissipation factor
- High reliability
- 2-pin and 4-pin contact configuration (plate versions on request)
- AEC-Q200 qualified
- According to RoHS 2011/65/EU

Typical Applications

As intermediate circuit capacitor e.g. in high power converter technology, power supplies, solar inverters etc.

Construction

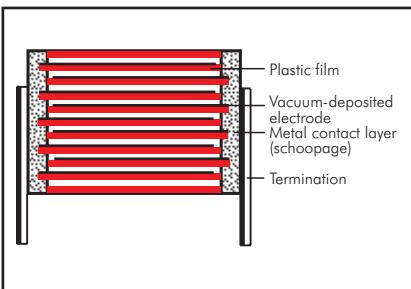
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire (plate versions on request).

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 1 µF to 400 µF (intermediate values on request)

Rated voltages: 400VDC, 500VDC, 600VDC, 800VDC, 900VDC, 1100VDC, 1300VDC

Capacitance tolerances: ±20%, ±10%, ±5%

Operating temperature range: -55° C to +105° C (hot spot including self-heating)

Climatic test category: 55/085/56 in accordance with IEC
Dissipation factors at +20° C:

PCM	1 kHz	10 kHz
27.5	$\leq 15 \times 10^{-4}$	$\leq 160 \times 10^{-4}$
37.5	$\leq 30 \times 10^{-4}$	$\leq 210 \times 10^{-4}$
52.5	$\leq 50 \times 10^{-4}$	$\leq 260 \times 10^{-4}$

Voltage and current derating:

A derating factor of 1.35% per K must be applied from +85° C for DC voltages and from +70° C for AC currents (I_{rms}). Additionally a derating factor of 4.5% per K must be applied from +85° C for AC currents (I_{rms})

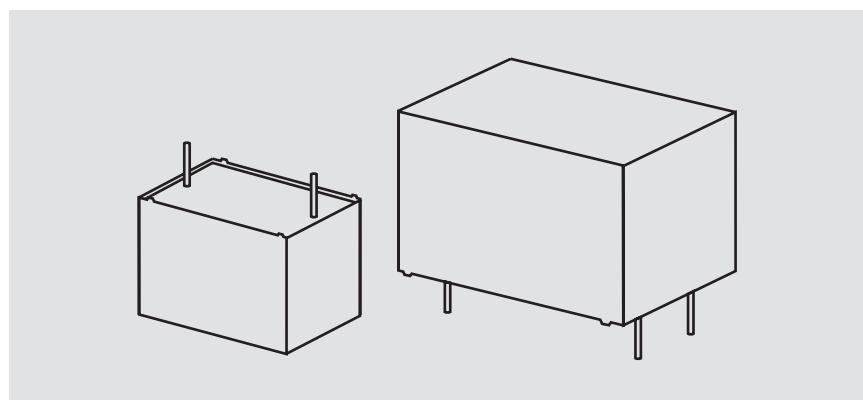
Reliability: Operational life > 100 000 hours (U_r and 70° C)
Failure rate λ_0 ($0.5 \times U_r$ and 40° C)

$\Pi = C_N [\mu F] \times U_r [V]$	λ_0
$\Pi \leq 10\,000$	< 2 fit
$10\,000 < \Pi \leq 25\,000$	< 5 fit
$25\,000 < \Pi \leq 50\,000$	< 10 fit
$50\,000 < \Pi \leq 100\,000$	< 20 fit
$\Pi > 100\,000$	< 30 fit

Maximum pulse rise time:

PCM	max. pulse rise time V/µsec at $T_A < 40^\circ C$						
	400 VDC	500 VDC	600 VDC	800 VDC	900 VDC	1100 VDC	1300 VDC
27.5	11	15	27	29	35	43	50
37.5	8	10	19	21	22	29	35
52.5	5	7	13	15	18	21	25

for pulses equal to the rated voltage



Insulation resistance at +20° C:

$\geq 30\,000$ sec ($M\Omega \times \mu F$)

Measuring voltage: 100 V/1 min.

Test voltage:

1.2 U_r , 2sec

Dielectric absorption: 0.05 %

Specific dissipation:

Box size WxHxL in mm	Specific dissipation in Watts per K above the ambient temperature
9x19x31.5	0.021
11x21x31.5	0.025
13x24x31.5	0.030
15x26x31.5	0.034
17x29x31.5	0.039
27x15x41.5	0.043
17x34.5x31.5	0.044
20x39.5x31.5	0.053
19x32x41.5	0.054
20x39.5x41.5	0.065
24x45.5x41.5	0.080
31x46x41.5	0.092
35x50x41.5	0.106
40x55x41.5	0.123
35x50x57	0.132
45x55x57	0.164
45x65x57	0.184

Packing

Packing units at the end of the catalogue

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	400 VDC (70° C) / 300 VDC (85° C)			Part number
						I _s A	I _{rms} * (10 kHz)* A	ESR (10 kHz)* mΩ	
1 μF	9	19	31.5	27.5	2	11	1	238.7	DCP4G041006A-----
2 "	9	19	31.5	27.5	2	22	1.5	119.4	DCP4G042006A-----
3 "	9	19	31.5	27.5	2	33	1.5	79.6	DCP4G043006A-----
4 "	9	19	31.5	27.5	2	44	2	59.7	DCP4G044006A-----
5 "	9	19	31.5	27.5	2	55	2	47.7	DCP4G045006A-----
7 "	9	19	31.5	27.5	2	77	2.5	34.1	DCP4G047006A-----
10 μF	11	21	31.5	27.5	2/4	110	3.5	23.9	DCP4G051006B-----
15 "	13	24	31.5	27.5	2/4	165	4.5	15.9	DCP4G051506D-----
20 "	15	26	31.5	27.5	2/4	220	5.5	11.9	DCP4G052006F-----
25 "	17	29	31.5	27.5	2/4	275	6.5	9.5	DCP4G052506G-----
30 "	17	34.5	31.5	27.5	2/4	330	7	8	DCP4G053006I-----
40 "	20	39.5	31.5	27.5	2/4	440	9.5	6	DCP4G054006J-----
50 "	20	39.5	41.5	37.5	2/4	400	11	5.4	DCP4G055007G-----
60 "	20	39.5	41.5	37.5	2/4	480	11.5	4.8	DCP4G056007G-----
70 "	24	45.5	41.5	37.5	2/4	560	15	3.6	DCP4G057007H-----
80 "	24	45.5	41.5	37.5	2/4	640	17	2.7	DCP4G058007H-----
90 "	24	45.5	41.5	37.5	2/4	720	17.5	2.6	DCP4G059007H-----
100 μF	31	46	41.5	37.5	2/4	800	19	2.5	DCP4G061007I-----
120 "	31	46	41.5	37.5	2/4	960	20	2.3	DCP4G061207I-----
140 "	35	50	41.5	37.5	2/4	1120	22.5	2.1	DCP4G061407J-----
150 "	35	50	41.5	37.5	2/4	1200	23	2	DCP4G061507J-----
160 "	40	55	41.5	37.5	2/4	1280	28	1.6	DCP4G061607K-----
180 "	40	55	41.5	37.5	2/4	1440	29.5	1.4	DCP4G061807K-----
190 "	40	55	41.5	37.5	2/4	1520	31.5	1.2	DCP4G061907K-----
200 "	40	55	41.5	37.5	2/4	1600	32.5	1.2	DCP4G062007K-----
220 "	35	50	57	52.5	4	1100	27	1.8	DCP4G062209F-----
250 "	45	55	57	52.5	4	1250	32	1.6	DCP4G062509H-----
270 "	45	55	57	52.5	4	1350	33.5	1.5	DCP4G062709H-----
300 "	45	55	57	52.5	4	1500	35	1.3	DCP4G063009H-----
330 "	45	65	57	52.5	4	1650	37	1.2	DCP4G063309J-----
350 "	45	65	57	52.5	4	1750	40	1.1	DCP4G063509J-----
370 "	45	65	57	52.5	4	1850	41.5	1.1	DCP4G063709J-----
400 "	45	65	57	52.5	4	2000	43	1	DCP4G064009J-----

* General guide

* Permissible I_{rms} at 10° C internal temperature rise (general guide)

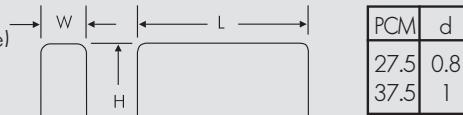
** PCM = Printed circuit module = pin spacing

Dims. in mm.

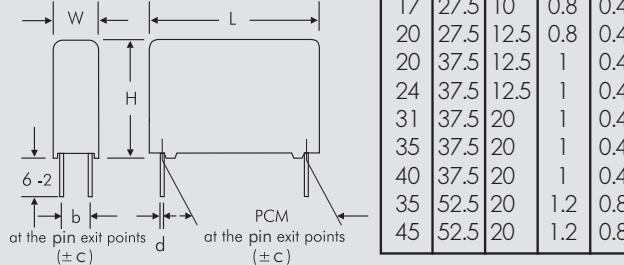
Part number completion:	
Version code:	2-pin = D2 4-pin = D4
Tolerance:	20 % = M 10 % = K 5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

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2-pin version



4-pin version



Continuation page 124



Continuation

General Data

Capacitance	500 VDC (70° C) / 400 VDC (85° C)								Part number
	W	H	L	PCM**	Pin	I _S A	I _{rms} * (10 kHz)* A	ESR (10 kHz)* mΩ	
1 µF	9	19	31.5	27.5	2	15	1	238.7	DCP4H141006A-----
2 "	9	19	31.5	27.5	2	30	1.5	119.4	DCP4H142006A-----
3 "	9	19	31.5	27.5	2	45	1.5	79.6	DCP4H143006A-----
5 "	9	19	31.5	27.5	2	75	2.5	47.7	DCP4H145006A-----
7 "	11	21	31.5	27.5	2/4	105	3	34.1	DCP4H147006B-----
8 "	13	24	31.5	27.5	2/4	120	3	29.8	DCP4H148006D-----
10 µF	13	24	31.5	27.5	2/4	150	4	23.9	DCP4H151006D-----
12 "	15	26	31.5	27.5	2/4	180	4	19.9	DCP4H151206F-----
15 "	17	29	31.5	27.5	2/4	225	5	15.9	DCP4H151506G-----
20 "	17	34.5	31.5	27.5	2/4	300	6	11.9	DCP4H152006I-----
22 "	20	39.5	31.5	27.5	2/4	330	7	10.9	DCP4H152206J-----
25 "	20	39.5	31.5	27.5	2/4	375	7.5	9.5	DCP4H152506J-----
30 "	20	39.5	41.5	37.5	2/4	300	9	7.9	DCP4H153007G-----
35 "	20	39.5	41.5	37.5	2/4	350	8.5	9.1	DCP4H153507G-----
40 "	20	39.5	41.5	37.5	2/4	400	10	5.7	DCP4H154007G-----
	24	45.5	41.5	37.5	2/4	400	10	8	DCP4H154007H-----
45 "	24	45.5	41.5	37.5	2/4	450	12.5	5	DCP4H154507H-----
50 "	24	45.5	41.5	37.5	2/4	500	13	4.8	DCP4H155007H-----
55 "	24	45.5	41.5	37.5	2/4	550	14	4	DCP4H155507H-----
60 "	31	46	41.5	37.5	2/4	600	14	4.7	DCP4H156007I-----
65 "	31	46	41.5	37.5	2/4	650	16.5	3.3	DCP4H156507I-----
70 "	31	46	41.5	37.5	2/4	700	18	2.9	DCP4H157007I-----
75 "	31	46	41.5	37.5	2/4	750	17	3.2	DCP4H157507I-----
80 "	31	46	41.5	37.5	2/4	800	18	2.8	DCP4H158007I-----
85 "	35	50	41.5	37.5	2/4	850	10.5	3.2	DCP4H158507J-----
90 "	35	50	41.5	37.5	2/4	900	21	2.4	DCP4H159007J-----
95 "	35	50	41.5	37.5	2/4	950	21.5	2.2	DCP4H159507J-----
100 µF	35	50	41.5	37.5	2/4	1000	24	1.9	DCP4H161007J-----
	35	50	57	52.5	4	700	18	4	DCP4H161009F-----
110 "	40	55	41.5	37.5	2/4	1100	19	2.9	DCP4H161107K-----
	35	50	57	52.5	4	770	19	3.6	DCP4H161109F-----
120 "	40	55	41.5	37.5	2/4	1200	22.5	2.7	DCP4H161207K-----
	35	50	57	52.5	4	840	20	3.3	DCP4H161209F-----
130 "	40	55	41.5	37.5	2/4	1300	23	2.4	DCP4H161307K-----
	35	50	57	52.5	4	910	21	3.1	DCP4H161309F-----
140 "	35	50	57	52.5	4	980	21.5	2.8	DCP4H161409F-----
150 "	35	50	57	52.5	4	1050	22.5	2.7	DCP4H161509F-----
160 "	45	55	57	52.5	4	1120	25.5	2.5	DCP4H161609H-----
170 "	45	55	57	52.5	4	1190	26.5	2.3	DCP4H161709H-----
180 "	45	55	57	52.5	4	1260	27	2.2	DCP4H161809H-----
190 "	45	55	57	52.5	4	1330	28	2.1	DCP4H161909H-----
200 "	45	55	57	52.5	4	1400	28.5	2	DCP4H162009H-----
210 "	45	55	57	52.5	4	1470	29.5	1.9	DCP4H162109H-----
220 "	45	65	57	52.5	4	1540	32	1.8	DCP4H162209J-----
240 "	45	65	57	52.5	4	1680	33.5	1.7	DCP4H162409J-----

* General guide

* Permissible I_{rms} at 10° C internal temperature rise (general guide)

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Rights reserved to amend design data without prior notification.

Continuation page 125

Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	600 VDC (70° C) / 450 VDC (85° C)			Part number
						I _s A	I _{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	
2 µF	9	19	31.5	27.5	2	54	2	56	DCP4I042006A-----
5 „	13	24	31.5	27.5	2/4	135	3.5	22	DCP4I045006D-----
7 „	15	26	31.5	27.5	2/4	189	4.5	16	DCP4I047006F-----
10 µF	17	29	31.5	27.5	2/4	270	6	11	DCP4I051006G-----
	27	15	41.5	37.5	2/4	190	6.5	10	DCP4I051007M-----
15 „	17	34.5	31.5	27.5	2/4	405	7.5	7.4	DCP4I051506I-----
20 „	20	39.5	31.5	27.5	2/4	540	9	6.2	DCP4I052006J-----
25 „	20	39.5	41.5	37.5	2/4	380	10	6.2	DCP4I052007G-----
30 „	24	45.5	41.5	37.5	2/4	475	11.5	5	DCP4I052507G-----
35 „	24	45.5	41.5	37.5	2/4	570	14	4.1	DCP4I053007H-----
40 „	31	46	41.5	37.5	2/4	665	14.5	3.8	DCP4I053507H-----
45 „	31	46	41.5	37.5	2/4	760	16.5	3.3	DCP4I054007I-----
50 „	35	50	41.5	37.5	2/4	855	17	3.2	DCP4I054507I-----
55 „	35	50	41.5	37.5	2/4	950	19	2.9	DCP4I055007J-----
60 „	35	50	41.5	37.5	2/4	1045	17	3.8	DCP4I055507J-----
65 „	40	55	41.5	37.5	2/4	1140	17.5	3.4	DCP4I056007J-----
	35	50	57	52.5	4	1235	19.5	3.3	DCP4I056507K-----
70 „	40	55	41.5	37.5	2/4	845	20	3.3	DCP4I056509F-----
	35	50	57	52.5	4	1330	20	3.1	DCP4I057007K-----
75 „	40	55	41.5	37.5	2/4	910	20.5	3.1	DCP4I057009F-----
	35	50	57	52.5	4	1425	20.5	3	DCP4I057507K-----
80 „	40	55	41.5	37.5	2/4	975	21	3	DCP4I057509F-----
	35	50	57	52.5	4	1520	22	2.6	DCP4I058007K-----
85 „	35	50	57	52.5	4	1040	22	2.6	DCP4I058009F-----
90 „	35	50	57	52.5	4	1105	22.5	2.1	DCP4I058509F-----
95 „	45	55	57	52.5	4	1170	23.5	1.9	DCP4I059009F-----
	45	55	57	52.5	4	1235	24	2.8	DCP4I059509H-----
100 µF	45	55	57	52.5	4	1300	25	2.6	DCP4I061009H-----
110 „	45	55	57	52.5	4	1430	26.5	2.3	DCP4I061109H-----
115 „	45	65	57	52.5	4	1495	27.5	2.5	DCP4I061159J-----
120 „	45	65	57	52.5	4	1560	28	2.3	DCP4I061209J-----
130 „	45	65	57	52.5	4	1690	29.5	2.1	DCP4I061309J-----
140 „	45	65	57	52.5	4	1820	31	1.9	DCP4I061409J-----
150 „	45	65	57	52.5	4	1950	33	1.7	DCP4I061509J-----

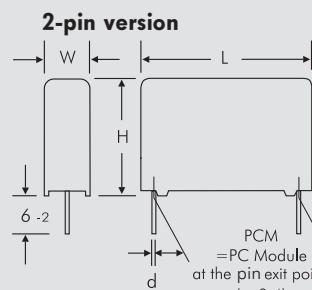
* General guide

** PCM = Printed circuit module = pin spacing

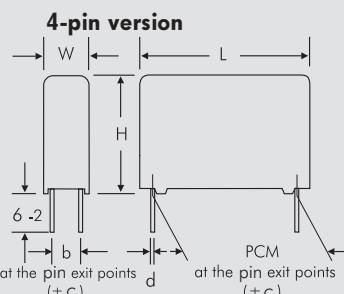
Dims. in mm.

Part number completion:	
Version code:	2-pin = D2
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

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PCM	d
27.5	0.8
37.5	1



W	PCM	b	d	c
11	27.5	5	0.8	0.4
13	27.5	7.5	0.8	0.4
15	27.5	7.5	0.8	0.4
17	27.5	10	0.8	0.4
20	27.5	12.5	0.8	0.4
19	37.5	10	1	0.4
20	37.5	12.5	1	0.4
24	37.5	12.5	1	0.4
27	37.5	20	1	0.4
31	37.5	20	1	0.4
35	37.5	20	1	0.4
40	37.5	20	1	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8



Continuation

General Data

Capacitance	800 VDC (70° C) / 700 VDC (85° C)								Part number
	W	H	L	PCM**	Pin	I _S A	I _{ms} (10 kHz)* A	ESR (10 kHz)* mΩ	
2 µF	9	19	31.5	27.5	2	58	2	52	DCP4L042006A-----
5 "	13	24	31.5	27.5	2/4	145	4	21	DCP4L045006D-----
7 "	17	29	31.5	27.5	2/4	203	5	15	DCP4L047006G-----
10 µF	17	34.5	31.5	27.5	2/4	290	6.5	10	DCP4L051006I-----
15 "	20	39.5	31.5	27.5	2/4	435	9	6.9	DCP4L051506J-----
	20	39.5	41.5	37.5	2/4	315	9.5	6.9	DCP4L051507G-----
20 "	20	39.5	41.5	37.5	2/4	420	10	6.2	DCP4L052007G-----
25 "	24	45.5	41.5	37.5	2/4	525	12.5	5	DCP4L052507H-----
30 "	24	45.5	41.5	37.5	2/4	630	14	4.1	DCP4L053007H-----
35 "	31	46	41.5	37.5	2/4	735	15.5	3.8	DCP4L053507I-----
40 "	31	46	41.5	37.5	2/4	840	16.5	3.3	DCP4L054007I-----
45 "	35	50	41.5	37.5	2/4	945	17.5	3.4	DCP4L054507J-----
50 "	35	50	41.5	37.5	2/4	1050	19	3	DCP4L055007J-----
55 "	40	55	41.5	37.5	2/4	1155	19.5	3.2	DCP4L055507K-----
	35	50	57	52.5	4	825	20.4	3.2	DCP4L055509F-----
60 "	40	55	41.5	37.5	2/4	1260	20.5	2.9	DCP4L056007K-----
	35	50	57	52.5	4	900	21.5	2.9	DCP4L056009F-----
65 "	35	50	57	52.5	4	975	22.5	2.2	DCP4L056509F-----
70 "	45	55	57	52.5	4	1050	23.5	3	DCP4L057009H-----
75 "	45	55	57	52.5	4	1125	24	2.9	DCP4L057509H-----
80 "	45	55	57	52.5	4	1200	24.5	3	DCP4L058009H-----
85 "	45	65	57	52.5	4	1275	25	2.6	DCP4L058509J-----
90 "	45	65	57	52.5	4	1350	25.5	2.5	DCP4L059009J-----
95 "	45	65	57	52.5	4	1425	26	2.4	DCP4L059509J-----
100 µF	45	65	57	52.5	4	1500	26.5	2.3	DCP4L061009J-----
110 "	45	65	57	52.5	4	1650	27.5	2.2	DCP4L061109J-----
115 "	45	65	57	52.5	4	1725	28	2.1	DCP4L061159J-----

Capacitance	900 VDC (70° C) / 760 VDC (85° C)								Part number
	W	H	L	PCM**	Pin	I _S A	I _{ms} (10 kHz)* A	ESR (10 kHz)* mΩ	
2 µF	11	21	31.5	27.5	2/4	70	2.5	44	DCP4N042006B-----
5 "	17	29	31.5	27.5	2/4	175	4.5	18	DCP4N045006G-----
7 "	17	34.5	31.5	27.5	2/4	245	6	13	DCP4N047006I-----
10 µF	20	39.5	31.5	27.5	2/4	350	8	8.8	DCP4N051006J-----
	20	39.5	41.5	37.5	2/4	220	8.5	8.8	DCP4N051007G-----
15 "	20	39.5	41.5	37.5	2/4	330	10.5	5.8	DCP4N051507G-----
20 "	24	45.5	41.5	37.5	2/4	440	13	4.8	DCP4N052007H-----
25 "	31	46	41.5	37.5	2/4	550	15.5	3.8	DCP4N052507I-----
30 "	31	46	41.5	37.5	2/4	660	15.5	3.7	DCP4N053007I-----
35 "	35	50	41.5	37.5	2/4	770	18	3.2	DCP4N053507J-----
40 "	40	55	41.5	37.5	2/4	880	19.5	3.2	DCP4N054007K-----
	35	50	57	52.5	4	720	20.5	3.2	DCP4N054009F-----
45 "	35	50	57	52.5	4	810	21	2.8	DCP4N054509F-----
50 "	35	50	57	52.5	4	900	22	3.3	DCP4N055009F-----
55 "	35	50	57	52.5	4	990	22.5	3.2	DCP4N055509F-----
	45	55	57	52.5	4	990	22.5	3.2	DCP4N055509H-----
60 "	45	55	57	52.5	4	1080	23	3	DCP4N056009H-----
65 "	45	55	57	52.5	4	1170	24	2.9	DCP4N056509H-----
70 "	45	65	57	52.5	4	1260	24.5	3.3	DCP4N057009J-----
75 "	45	65	57	52.5	4	1350	25	2.9	DCP4N057509J-----
80 "	45	65	57	52.5	4	1440	25.5	2.8	DCP4N058009J-----

* General guide

** PCM = Printed circuit module = pin spacing

Dims. in mm.

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Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	1100 VDC (70° C) / 920 VDC (85° C)			Part number
						I _S A	I _{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	
2 µF	13	24	31.5	27.5	2/4	86	3	36	DCP4P042006D-----
3 "	15	26	31.5	27.5	2/4	129	4	23	DCP4P043006F-----
5 "	17	34.5	31.5	27.5	2/4	215	5.5	14	DCP4P045006I-----
7 "	20	39.5	31.5	27.5	2/4	301	7.5	10	DCP4P047006J-----
	19	32	41.5	37.5	2/4	203	7.5	10	DCP4P047007F-----
10 µF	20	39.5	41.5	37.5	2/4	290	9.5	7.2	DCP4P051007G-----
15 "	31	46	41.5	37.5	2/4	435	13	5.4	DCP4P051507I-----
20 "	31	46	41.5	37.5	2/4	580	14	5.2	DCP4P052007I-----
	35	50	41.5	37.5	2/4	580	15	4.7	DCP4P052007J-----
25 "	40	55	41.5	37.5	2/4	725	16.5	4.6	DCP4P052507K-----
30 "	35	50	57	52.5	4	630	17.5	4.4	DCP4P053009F-----
35 "	35	50	57	52.5	4	735	18	4	DCP4P053509F-----
40 "	45	55	57	52.5	4	840	19	4.5	DCP4P054009H-----
45 "	45	55	57	52.5	4	945	20	4.1	DCP4P054509H-----
50 "	45	65	57	52.5	4	1050	21	4.1	DCP4P055009J-----
55 "	45	65	57	52.5	4	1150	22	3.8	DCP4P055509J-----
60 "	45	65	57	52.5	4	1260	23	3.5	DCP4P056009J-----
<hr/>									
Capacitance	W	H	L	PCM**	Pin	1300 VDC (70° C) / 1100 VDC (85° C)			Part number
						I _S A	I _{rms} (10 kHz)* A	ESR (10 kHz)* mΩ	
2 µF	15	26	31.5	27.5	2/4	100	3	36	DCP4R242006F-----
5 "	20	39.5	31.5	27.5	2/4	250	6	14	DCP4R245006J-----
	20	39.5	41.5	37.5	2/4	175	7	14	DCP4R245007G-----
7 "	20	39.5	41.5	37.5	2/4	245	8	10	DCP4R247007G-----
10 µF	24	45.5	41.5	37.5	2/4	350	10.5	7.2	DCP4R251007H-----
15 "	31	46	41.5	37.5	2/4	525	14	4.8	DCP4R251507I-----
20 "	40	55	41.5	37.5	2/4	700	17.5	4	DCP4R252007K-----
	35	50	57	52.5	4	500	18	4	DCP4R252009F-----
25 "	35	50	57	52.5	4	625	19	3.6	DCP4R252509F-----
30 "	45	55	57	52.5	4	750	20	4	DCP4R253009H-----
35 "	45	65	57	52.5	4	875	21	4.1	DCP4R253509J-----
40 "	45	65	57	52.5	4	1000	22	3.7	DCP4R254009J-----

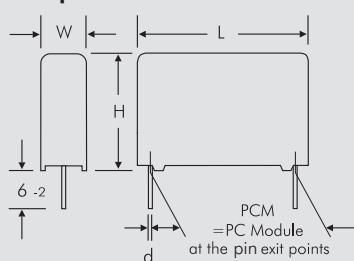
* General guide

** PCM = Printed circuit module = pin spacing

Dims. in mm.

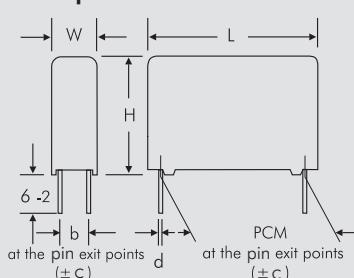
Part number completion:	
Version code:	2-pin = D2
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

2-pin version



PCM	d
27.5	0.8
37.5	1

4-pin version



W	PCM	b	d	c
11	27.5	5	0.8	0.4
13	27.5	7.5	0.8	0.4
15	27.5	7.5	0.8	0.4
17	27.5	10	0.8	0.4
20	27.5	12.5	0.8	0.4
19	37.5	10	1	0.4
20	37.5	12.5	1	0.4
24	37.5	12.5	1	0.4
31	37.5	20	1	0.4
35	37.5	20	1	0.4
40	37.5	20	1	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

Rights reserved to amend design data without prior notification.



Metallized Polypropylene (PP) - DC-Link Capacitors for STRINGENT REQUIREMENTS. Capacitances from 0.47 µF to 80 µF. Rated Voltages from 450 VDC to 1050 VDC.

Special Features

- Capacitances up to 80 µF
- High volume/capacitance ratio
- Excellent self-healing properties
- For stringent requirements
- Very low dissipation factor
- High reliability
- 2-pin and 4-pin contact configuration (plate versions on request)
- According to RoHS 2011/65/EU

Typical Applications

As intermediate circuit capacitor e.g. in high power converter technology, power supplies, solar inverters etc.

Construction

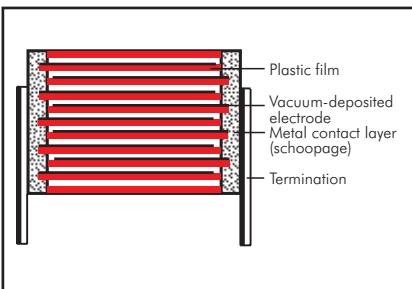
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire (plate versions on request).

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 0.47 µF to 80 µF (intermediate values on request)

Rated voltages: 450 VDC, 630 VDC, 800 VDC, 900 VDC, 1050 VDC

Capacitance tolerances: ±20%, ±10%, ±5%

Operating temperature range: -55°C to +105°C (hot spot including self-heating)

Climatic test category: 55/085/56 in accordance with IEC

Dissipation factors at +20°C:

PCM	1 kHz
27.5	≤ 12 × 10 ⁻⁴
37.5	≤ 25 × 10 ⁻⁴
52.5	≤ 45 × 10 ⁻⁴

Voltage and current derating:

A derating factor of 1.35% per K must be applied from +85°C for DC voltages and from +70°C for AC currents (I_{rms}). Additionally a derating factor of 4.5% per K must be applied from +85°C for AC currents (I_{rms})

Reliability: Operational life > 100 000 hours (U_r and 70°C)

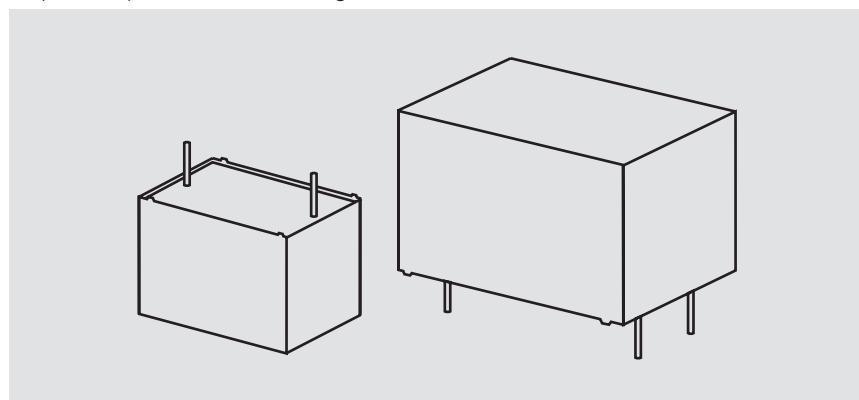
Failure rate λ_0 (0.5 × U_r and 40°C)

$\Pi = C_N [\mu F] \times U_r [V]$	λ_0
$\Pi \leq 10\,000$	< 2 fit
$10\,000 < \Pi \leq 25\,000$	< 5 fit
$25\,000 < \Pi \leq 50\,000$	< 10 fit
$50\,000 < \Pi \leq 100\,000$	< 20 fit
$\Pi > 100\,000$	< 30 fit

Maximum pulse rise time:

PCM	max. pulse rise time V/µsec at $T_A < 40^\circ C$				
	450 VDC	630 VDC	800 VDC	900 VDC	1050 VDC
27.5	48	59	71	81	93
37.5	32	41	51	60	69
52.5	27	32	37	43	48

for pulses equal to the rated voltage



Insulation resistance at +20°C:

≥ 30 000 sec (MΩ × µF)

Measuring voltage: 100 V/1 min.

Test voltage:

1.6 U_r , 2sec

Dielectric absorption: 0.05 %

Specific dissipation:

Box size WxHxL in mm	Specific dissipation in Watts per K above the ambient temperature
11×21×31.5	0.025
13×24×31.5	0.030
15×26×31.5	0.034
17×29×31.5	0.039
17×34.5×31.5	0.044
20×39.5×31.5	0.053
15×26×41.5	0.042
17×29×41.5	0.048
19×32×41.5	0.054
20×39.5×41.5	0.065
24×45.5×41.5	0.080
31×46×41.5	0.092
35×50×41.5	0.106
40×55×41.5	0.123
35×50×57	0.132
45×55×57	0.164
45×65×57	0.184

Packing

Packing units at the end of the catalogue.

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	450 VDC (70° C) / 300 VDC (85° C)			Part number
						I _S A 10 K	I _{rms} (10 kHz)* A 20 K	ESR (10 kHz)* mΩ	
2.2 µF	11	21	31.5	27.5	2/4	106	4.3	6.1	DCPSH042206B-----
3.3 "	13	24	31.5	27.5	2/4	158	5.3	7.5	DCPSH043306D-----
4.7 "	15	26	31.5	27.5	2/4	226	6.2	8.8	DCPSH044706F-----
6.8 "	17	29	31.5	27.5	2/4	326	7.4	10.5	DCPSH046806G-----
10 µF	19	32	41.5	37.5	2/4	320	9.6	13.6	DCPSH051007F-----
15 "	20	39.5	41.5	37.5	2/4	480	11.8	16.7	DCPSH051507G-----
20 "	24	45.5	41.5	37.5	2/4	640	13.9	19.7	DCPSH052007H-----
25 "	31	46	41.5	37.5	2/4	800	15.5	21.9	DCPSH052507I-----
30 "	31	46	41.5	37.5	2/4	960	16.3	23.0	DCPSH053007I-----
35 "	35	50	41.5	37.5	2/4	1120	18.3	25.8	DCPSH053507J-----
40	40	55	41.5	37.5	2/4	1280	20.3	28.7	DCPSH054007K-----
	35	50	57	52.5	4	1080	21.0	29.7	DCPSH054009F-----
45 "	35	50	57	52.5	4	1215	21.7	30.7	DCPSH054509F-----
50 "	35	50	57	52.5	4	1350	22.4	31.7	DCPSH055009F-----
55 "	45	55	57	52.5	4	1485	25.4	35.9	DCPSH055509H-----
60 "	45	55	57	52.5	4	1620	26.0	36.8	DCPSH056009H-----
65 "	45	55	57	52.5	4	1755	26.3	37.2	DCPSH056509H-----
70 "	45	65	57	52.5	4	1890	28.2	39.8	DCPSH057009J-----
75 "	45	65	57	52.5	4	2025	28.6	40.4	DCPSH057509J-----
80 "	45	65	57	52.5	4	2160	29.0	41.0	DCPSH058009J-----

Capacitance	W	H	L	PCM**	Pin	630 VDC (70° C) / 450 VDC (85° C)			Part number
						I _S A 10 K	I _{rms} (10 kHz)* A 20 K	ESR (10 kHz)* mΩ	
1.5 µF	11	21	31.5	27.5	2/4	89	3.8	5.4	DCPSJ041506B-----
2.2 "	13	24	31.5	27.5	2/4	130	4.7	6.6	DCPSJ042206D-----
3.3 "	15	26	31.5	27.5	2/4	195	5.7	8.0	DCPSJ043306F-----
4.7 "	17	34.5	31.5	27.5	2/4	277	7.1	10.0	DCPSJ044706I-----
6.8 "	17	29	41.5	37.5	2/4	279	8.2	11.6	DCPSJ046807E-----
10 µF	20	39.5	41.5	37.5	2/4	410	10.5	14.8	DCPSJ051007G-----
15 "	31	46	41.5	37.5	2/4	615	14.0	19.8	DCPSJ051507I-----
20 "	35	50	41.5	37.5	2/4	820	16.0	22.6	DCPSJ052007J-----
25 "	40	55	41.5	37.5	2/4	1025	18.0	25.5	DCPSJ052507K-----
30 "	35	50	57	52.5	4	960	19.6	27.7	DCPSJ053009F-----
35 "	35	50	57	52.5	4	1120	20.4	28.8	DCPSJ053509F-----
40 "	45	55	57	52.5	4	1280	23.4	33.1	DCPSJ054009H-----
45 "	45	55	57	52.5	4	1440	25.5	36.1	DCPSJ054509H-----
50 "	45	65	57	52.5	4	1600	26.4	37.3	DCPSJ055009J-----
55 "	45	65	57	52.5	4	1760	26.9	38.0	DCPSJ055509J-----
60 "	45	65	57	52.5	4	1920	27.5	38.8	DCPSJ056009J-----

* General guide.

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Rights reserved to amend design data without prior notification.

Part number completion:

Version code: 2-pin = D2

4-pin = D4

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 149.

Continuation page 130



Continuation

General Data

Capacitance	W	H	L	PCM**	Pin	800 VDC (70° C) / 630 VDC (85° C)		ESR (10 kHz)* mΩ	Part number
						I_S A 10 K	I_{rms} (10 kHz)* A 20 K		
1.0 µF	11	21	31.5	27.5	2/4	71	3.3	4.6	23.1
1.5 "	13	24	31.5	27.5	2/4	107	4.2	5.9	17.0
2.2 "	15	26	31.5	27.5	2/4	156	5.0	7.0	13.7
3.3 "	17	29	31.5	27.5	2/4	234	6.1	8.5	10.6
4.7 "	19	32	41.5	37.5	2/4	240	7.8	11.0	8.8
6.8 "	20	39.5	41.5	37.5	2/4	347	9.5	13.5	7.1
10 µF	24	45.5	41.5	37.5	2/4	510	11.7	16.4	5.9
15 "	31	46	41.5	37.5	2/4	765	14.0	19.8	4.7
20 "	40	55	41.5	37.5	2/4	1020	17.2	24.3	4.1
	35	50	57	52.5	4	740	17.9	25.2	4.1
25 "	35	50	57	52.5	4	925	18.6	26.2	3.8
30 "	45	55	57	52.5	4	1110	21.8	30.8	3.5
35 "	45	65	57	52.5	4	1295	24.0	33.9	3.2
40 "	45	65	57	52.5	4	1480	24.8	35.0	3.0
<hr/>									
Capacitance	W	H	L	PCM**	Pin	900 VDC (70° C) / 750 VDC (85° C)		ESR (10 kHz)* mΩ	Part number
						I_S A 10 K	I_{rms} (10 kHz)* A 20 K		
0.68 µF	11	21	31.5	27.5	2/4	55	2.8	3.9	32.8
1.0 µF	13	24	31.5	27.5	2/4	81	3.6	5.1	23.1
1.5 "	15	26	31.5	27.5	2/4	122	4.5	6.3	17.0
2.2 "	17	29	31.5	27.5	2/4	178	5.3	7.5	13.7
3.3 "	17	29	41.5	37.5	2/4	198	6.7	9.5	10.6
4.7 "	20	39.5	41.5	37.5	2/4	282	8.6	12.1	8.8
6.8 "	24	45.5	41.5	37.5	2/4	408	10.6	15.0	7.1
10 µF	31	46	41.5	37.5	2/4	600	12.5	17.7	5.9
15 "	40	55	41.5	37.5	2/4	900	16.2	22.9	4.7
20 "	35	50	57	52.5	4	860	17.9	25.3	4.1
25 "	45	55	57	52.5	4	1075	20.7	29.3	3.8

* General guide

** PCM = Printed circuit module = pin spacing

Dims. in mm.

Part number completion:

Version code:	2-pin	= D2
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD

Taped version see page 149.

Rights reserved to amend design data without prior notification.

Continuation page 131

Continuation

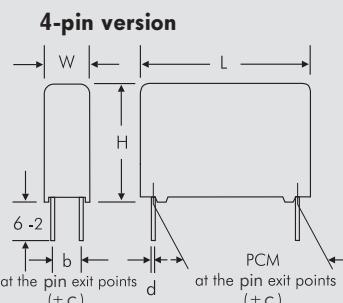
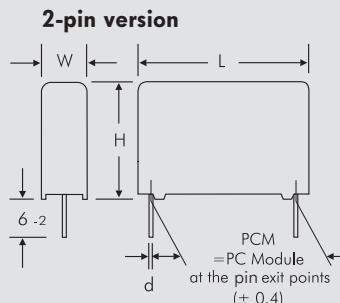
General Data

Capacitance	W	H	L	PCM**	Pin	1050 VDC (70° C) / 875 VDC (85° C)		ESR (10 kHz)* mΩ	Part number
						I_S A	I_{rms} (10 kHz)* A		
						10 K	20 K		
0.47 µF	11	21	31.5	27.5	2/4	44	2.4	3.4	44.0
0.68 "	11	21	31.5	27.5	2/4	63	2.8	3.9	32.8
1.0 µF	13	24	31.5	27.5	2/4	93	3.6	5.1	23.1
1.5 "	17	29	31.5	27.5	2/4	140	4.8	6.8	17.0
2.2 "	15	26	41.5	37.5	2/4	104	5.0	7.0	17.0
3.3 "	17	34.5	31.5	27.5	2/4	205	5.7	8.0	13.7
4.7 "	17	29	41.5	37.5	2/4	152	5.9	8.4	13.7
6.8 "	19	32	41.5	37.5	2/4	307	7.1	10.0	10.6
10 µF	20	39.5	31.5	27.5	2/4	228	7.1	10.1	10.6
15 "	20	39.5	41.5	37.5	2/4	324	8.6	12.1	8.8
20 "	31	46	41.5	37.5	2/4	469	11.4	16.0	7.1
15 "	35	50	41.5	37.5	2/4	690	13.4	19.0	5.9
20 "	35	50	57	52.5	4	720	16.8	23.8	4.7
20 "	45	55	57	52.5	4	960	19.9	28.2	4.1

* General guide

** PCM = Printed circuit module = pin spacing

Dims. in mm.



Part number completion:	
Version code:	2-pin = D2
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 149.	

Rights reserved to amend design data without prior notification.



**Metallized Polypropylene (PP) - Capacitors in Cylindrical Case
for DC-Link Applications. Capacitances from 16 µF to 260 µF.
Rated Voltages from 500 VDC to 1300 VDC.**

Special Features

- Very high volume/capacitance ratio
- Self-healing properties
- With cylindrical plastic case for PCB mounting
- Dry construction without electrolyte or oil
- No internal fuse required
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU
- Customer-specific capacitances or voltages on request

Typical Applications

DC capacitors with high capacitances for applications in power electronics also at non-sinusoidal voltages and currents e.g. in

- Wind power systems
- Inverters

Construction

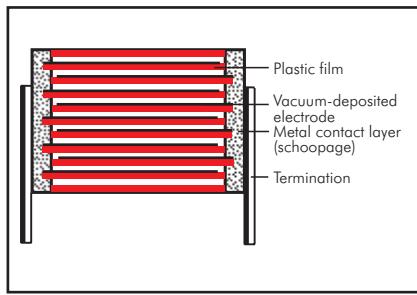
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with PU-sealing, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Grey. Marking: Black on silver label.

Electrical Data

Capacitance range: 16 µF to 260 µF
Rated voltages: 500 VDC, 700 VDC, 900 VDC, 1100 VDC, 1300 VDC
Capacitance tolerances: ±20%, ±10%
 (±5% available subject to special enquiry)
Operating temperature range:
 -40° C to +85° C
Insulation resistance at +20° C:
 ≥ 5000 sec (MΩ x µF)
 Measuring voltage: 100 V/1 min.

Dielectric loss factor tan δ₀:
 2 x 10⁻⁴
Test voltage: 1.5 U_r, 2sec
Dielectric absorption:
 0.05 %
Reliability:
 Operational life > 100 000 hours
 Failure rate < 50 fit (hot spot ≤ 70° C)

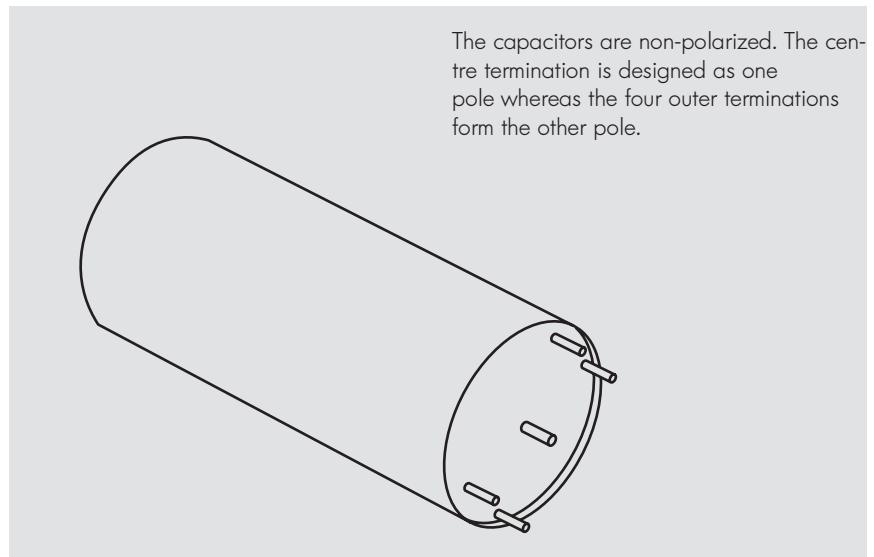
Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors.

Packing

Transportation-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information.



The capacitors are non-polarized. The centre termination is designed as one pole whereas the four outer terminations form the other pole.

Continuation

General Data

U_R	C_N	D x L mm	I_{ms} (1 kHz)* A	ESR (1 kHz)* mΩ	R_{th} K/W	L_e nH	Approx. weight g	Part number
500 VDC	85 µF	50 x 57	35	2.0	11.0	< 45	120	DCP5H15850D000_____
	195 "	50 x 95	32	3.4	7.5	< 65	190	DCP5H16195D100_____
	260 "	50 x 120	30	5.2	6.0	< 85	220	DCP5H16260D200_____
700 VDC	59 µF	50 x 57	30	1.9	11.0	< 45	120	DCP5K05590D000_____
	143 "	50 x 95	32	3.5	7.5	< 65	190	DCP5K06143D100_____
	190 "	50 x 120	25	4.7	6.0	< 85	220	DCP5K06190D200_____
900 VDC	53 µF	50 x 57	35	2.3	11.0	< 45	120	DCP5N05530D000_____
	114 "	50 x 95	32	4.2	7.5	< 65	190	DCP5N06114D100_____
	158 "	50 x 120	30	6.0	6.0	< 85	220	DCP5N06158D200_____
1100 VDC	30 µF	50 x 57	20	2.8	11.0	< 45	120	DCP5P05300D000_____
	72 "	50 x 95	25	4.5	7.5	< 65	190	DCP5P05720D100_____
	100 "	50 x 120	25	6.1	6.0	< 85	220	DCP5P06100D200_____
1300 VDC	16 µF	50 x 57	20	3.0	11.0	< 45	120	DCP5R25160D000_____
	40 "	50 x 95	25	5.7	7.5	< 65	190	DCP5R25400D100_____
	55 "	50 x 120	25	7.7	6.0	< 85	220	DCP5R25550D200_____

Contacts can handle: peak currents \hat{I} up to 1.1 kA
surge currents I_S up to 3.5 kA

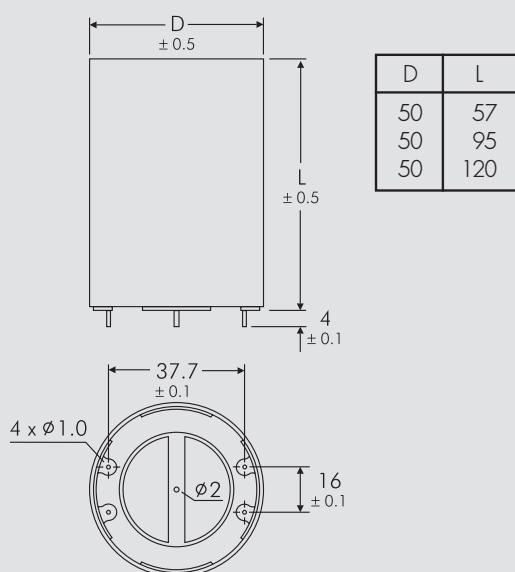
Customer-specific capacitances or voltages on request

* General guide

Dims. in mm.

Part number completion:

Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	none = 00



Rights reserved to amend design data without prior notification.



**Metallized Polypropylene (PP) - Capacitors in Cylindrical Case.
MKP 6 with High Volume/Capacitance Ratio, MKP 6 HP with Higher Current Carrying
Capability. Capacitances from 75 µF to 4920 µF. Rated Voltages from 600 VDC to 1500 VDC.**

Special Features

- Very high volume/capacitance ratio
- Self-healing properties
- With cylindrical aluminium case for bus bar mounting
- Dry construction without electrolyte or oil
- No internal fuse required
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU
- Customer-specific capacitances or voltages on request

Typical Applications

DC capacitors with high capacitances for applications in power electronics also at non-sinusoidal voltages and currents e.g. in

- Wind power systems
- Inverters

Construction

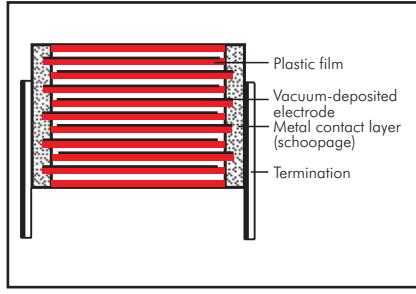
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Aluminium case with PU-sealing, UL 94 V-0

Terminations:

Screw connection (male or female), screw bolt M12 x 16.

Marking:

Colour: Metallic. Marking: Black on silver label.

Electrical Data

Capacitance range: 75 µF to 4920 µF
Rated voltages: 600 VDC, 700 VDC, 900 VDC, 1100 VDC, 1300 VDC, 1500 VDC
Capacitance tolerances: ±20%, ±10%
 (±5% available subject to special enquiry)
Operating temperature range:
 -40° C to +85° C
Insulation resistance at +20° C:
 ≥ 5000 sec (MΩ x µF)
 Measuring voltage: 100 V/1 min.

Dielectric loss factor tan δ₀: 2 x 10⁻⁴
Test voltage between terminals
 at +25° C: 1.5 U_r_{DC}, 10sec
Test voltage between terminals and case
 at +25° C and 50 Hz: 3 kV_{AC}, 1 min.
Dielectric absorption:
 0.05 %
Reliability:
 Operational life > 100 000 hours
 Failure rate < 50 fit (hot spot ≤ 70° C)

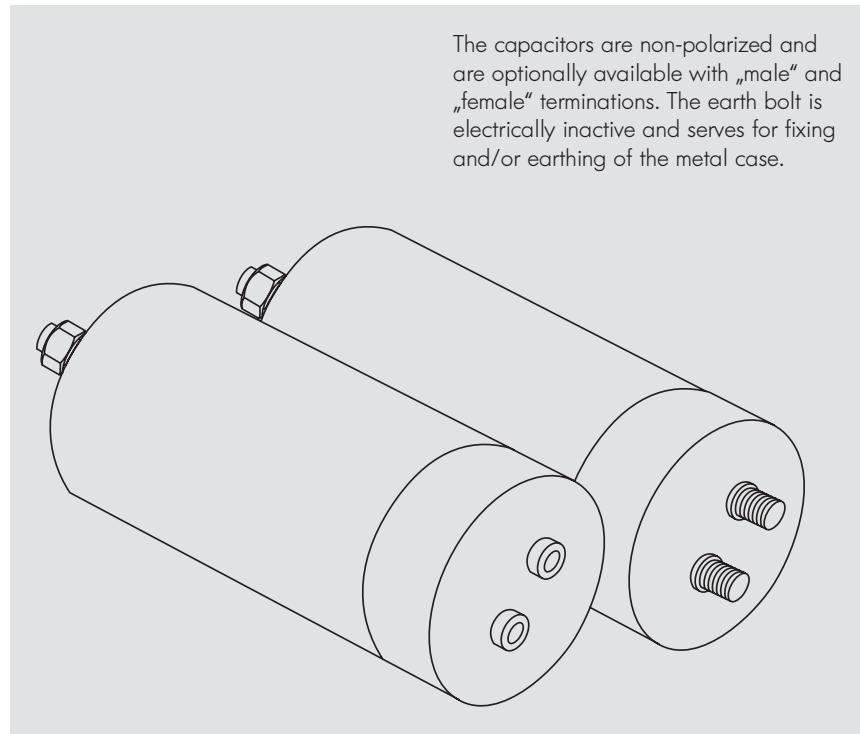
Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors.

Packing

Transportation-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information.



Continuation

General Data

U_R 70° C	U_R 85° C	C_N	D x L mm	I _{rms} (max.)* at 70° C A	ESR (1 kHz)* mΩ	L _e nH	Approx. weight g	Part number
600 VDC	450 VDC	320 µF	85 x 60	25	2.1	< 40	380	DCP6106320EB00-----
		460 "	85 x 76	25	2.1	< 40	480	DCP6106460EC00-----
		520 "	85 x 85	30	2.0	< 40	540	DCP6106520ED00-----
		620 "	85 x 95	30	1.9	< 40	600	DCP6106620EE00-----
		760 "	85 x 110	30	1.7	< 40	690	DCP6106760EF00-----
		780 "	85 x 120	30	1.7	< 40	700	DCP6106780E000-----
		950 "	85 x 132	35	1.8	< 40	850	DCP6106950E100-----
		1030 "	85 x 140	35	1.8	< 40	880	DCP6107103EG00-----
		1220 "	116 x 95	40	1.7	< 40	1200	DCP6107122EN00-----
		1500 "	116 x 110	40	1.7	< 40	1390	DCP6107150E000-----
		1640 "	116 x 120	40	1.6	< 40	1510	DCP6107164EP00-----
		1890 "	116 x 132	40	1.6	< 40	1660	DCP6107189EQ00-----
		2030 "	116 x 140	40	1.6	< 40	1760	DCP6107203ER00-----
700 VDC	600 VDC	230 µF	85 x 60	25	1.9	< 40	380	DCP6K06230EB00-----
		330 "	85 x 76	25	1.9	< 40	480	DCP6K06330EC00-----
		380 "	85 x 85	30	1.7	< 40	540	DCP6K06380ED00-----
		450 "	85 x 95	30	1.7	< 40	600	DCP6K06450EE00-----
		550 "	85 x 110	30	1.8	< 40	690	DCP6K06550EF00-----
		585 "	85 x 120	30	1.8	< 40	700	DCP6K06585E000-----
		690 "	85 x 132	35	1.8	< 40	850	DCP6K06690E100-----
		740 "	85 x 140	35	1.8	< 40	880	DCP6K06740EG00-----
		890 "	116 x 95	40	1.7	< 40	1200	DCP6K06890EN00-----
		1090 "	116 x 110	40	1.7	< 40	1390	DCP6K07109E000-----
		1190 "	116 x 120	40	1.8	< 40	1510	DCP6K07119EP00-----
		1370 "	116 x 132	40	1.8	< 40	1660	DCP6K07137EQ00-----
		1470 "	116 x 140	40	1.8	< 40	1760	DCP6K07147ER00-----
900 VDC	760 VDC	190 µF	85 x 60	30	1.9	< 40	380	DCP6N06190EB00-----
		270 "	85 x 76	30	1.9	< 40	480	DCP6N06270EC00-----
		315 "	85 x 85	30	1.8	< 40	540	DCP6N06315ED00-----
		360 "	85 x 95	30	1.7	< 40	600	DCP6N06360EE00-----
		450 "	85 x 110	30	1.7	< 40	690	DCP6N06450EF00-----
		480 "	85 x 120	35	1.8	< 40	700	DCP6N06480E000-----
		550 "	85 x 132	35	1.8	< 40	850	DCP6N06550E100-----
		620 "	85 x 140	35	1.8	< 40	880	DCP6N06620EG00-----
		730 "	116 x 95	40	1.7	< 40	1200	DCP6N06730EN00-----
		900 "	116 x 110	40	1.7	< 40	1390	DCP6N06900E000-----
		980 "	116 x 120	40	1.8	< 40	1510	DCP6N06980EP00-----
		1130 "	116 x 132	40	1.8	< 40	1660	DCP6N07113EQ00-----
		1200 "	116 x 140	40	1.8	< 40	1760	DCP6N07120ER00-----
1100 VDC	920 VDC	120 µF	85 x 60	30	2.0	< 40	380	DCP6P06120EB00-----
		170 "	85 x 76	30	2.0	< 40	480	DCP6P06170EC00-----
		200 "	85 x 85	30	1.9	< 40	540	DCP6P06200ED00-----
		230 "	85 x 95	30	1.9	< 40	600	DCP6P06230EE00-----
		290 "	85 x 110	30	1.8	< 40	690	DCP6P06290EF00-----
		325 "	85 x 120	40	1.8	< 40	700	DCP6P06325E000-----
		360 "	85 x 132	40	1.8	< 40	850	DCP6P06360E100-----
		390 "	85 x 140	40	2.0	< 40	880	DCP6P06390EG00-----
		470 "	116 x 95	40	1.8	< 40	1200	DCP6P06470EN00-----
		580 "	116 x 110	40	1.8	< 40	1390	DCP6P06580E000-----
		630 "	116 x 120	40	1.7	< 40	1510	DCP6P06630EP00-----
		720 "	116 x 132	40	1.7	< 40	1660	DCP6P06720EQ00-----
		780 "	116 x 140	40	1.6	< 40	1760	DCP6P06780ER00-----

Contacts can handle: peak currents I_{pk} up to 5 kA
surge currents I_S up to 20 kA

Customer-specific capacitances or voltages on request

* General guide

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Connection: male = OM

female = OF

Rights reserved to amend design data without prior notification.

Continuation

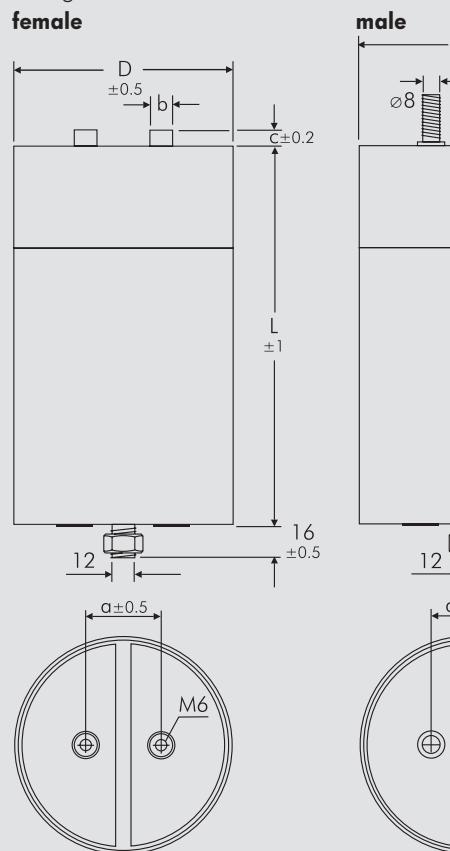
General Data

	U_R 70° C	C_N	D x L mm	I _{rms} (max.)* at 70° C A	ESR (1 kHz)* mΩ	L _e nH	Approx. weight g	Part number
1300 VDC	1100 VDC	85 µF	85 x 60	30	2.1	< 40	380	DCP6R25850EB00-----
		120 "	85 x 76	30	2.1	< 40	480	DCP6R26120EC00-----
		135 "	85 x 85	30	1.9	< 40	540	DCP6R26135ED00-----
		160 "	85 x 95	30	1.9	< 40	600	DCP6R26160EE00-----
		200 "	85 x 110	30	1.8	< 40	690	DCP6R26200EF00-----
		215 "	85 x 120	30	1.8	< 40	700	DCP6R26215E000-----
		250 "	85 x 132	40	2.2	< 40	850	DCP6R26250E100-----
		270 "	85 x 140	40	2.2	< 40	880	DCP6R26270EG00-----
		320 "	116 x 95	40	1.8	< 40	1200	DCP6R26320EN00-----
		390 "	116 x 110	40	1.8	< 40	1390	DCP6R26390EO00-----
		430 "	116 x 120	40	1.7	< 40	1510	DCP6R26430EP00-----
		490 "	116 x 132	40	1.7	< 40	1660	DCP6R26490EQ00-----
		530 "	116 x 140	40	1.6	< 40	1760	DCP6R26530ER00-----
		75 µF	85 x 60	25	2.5	< 40	380	DCP6S05750EB00-----
		110 "	85 x 76	25	2.5	< 40	480	DCP6S06110EC00-----
		120 "	85 x 85	25	2.3	< 40	540	DCP6S06120ED00-----
1500 VDC	1250 VDC	145 "	85 x 95	30	2.3	< 40	600	DCP6S06145EE00-----
		180 "	85 x 110	30	2.3	< 40	690	DCP6S06180EF00-----
		195 "	85 x 120	40	2.4	< 40	700	DCP6S06195E000-----
		225 "	85 x 132	40	2.4	< 40	850	DCP6S06225E100-----
		240 "	85 x 140	40	2.5	< 40	880	DCP6S06240EG00-----
		290 "	116 x 95	40	1.8	< 40	1200	DCP6S06290EN00-----
		355 "	116 x 110	40	1.8	< 40	1390	DCP6S06355EO00-----
		390 "	116 x 120	40	1.7	< 40	1510	DCP6S06390EP00-----
		445 "	116 x 132	40	1.7	< 40	1660	DCP6S06445EQ00-----
		480 "	116 x 140	40	1.7	< 40	1760	DCP6S06480ER00-----

Contacts can handle: peak currents \hat{I} up to 5 kA
surge currents I_S up to 20 kA

Customer-specific capacitances or voltages on request

* General guide



Part number completion:
Tolerance: 20 % = M
10 % = K
5 % = J
Packing: bulk = S
Connection: male = 0M
female = 0F

D	L	a	b	c
85	60	32	12	6
85	76	32	12	6
85	85	32	12	6
85	95	32	12	6
85	110	32	12	6
85	120	32	12	6
85	132	32	12	6
85	140	32	12	6
116	95	50	14	5
116	110	50	14	5
116	120	50	14	5
116	132	50	14	5
116	140	50	14	5

Dims. in mm.

Rights reserved to amend design data without prior notification.

**Continuation: Versions with increased dimensioning
for higher current carrying capability**

General Data

U_R 70° C	U_R 85° C	C_N	D x L mm	I _{rms} (max.)* at 70° C A	ESR (1 kHz)* mΩ	L _e nH	Approx. weight g	Part number
600 VDC	450 VDC	640 µF	85 x 110	50	1.3	< 40	690	DCHPI06640EF00_____
		920 "	85 x 140	50	1.3	< 40	880	DCHPI06920EG00_____
		1040 "	85 x 155	60	1.3	< 40	980	DCHPI07104EH00_____
		1240 "	85 x 185	60	1.3	< 60	1165	DCHPI07124E100_____
		1520 "	85 x 210	60	1.2	< 60	1400	DCHPI07152E200_____
		1660 "	85 x 235	60	1.2	< 60	1480	DCHPI07166EK00_____
		1900 "	85 x 252	60	1.2	< 60	1590	DCHPI07190EK00_____
		2060 "	85 x 260	60	1.2	< 60	1640	DCHPI07206EL00_____
		2490 "	85 x 345	70	1.0	< 70	2190	DCHPI07249EM00_____
		1260 "	116 x 110	80	1.2	< 40	1385	DCHPI07126EO00_____
		1820 "	116 x 140	80	1.2	< 40	1765	DCHPI07182ER00_____
		2060 "	116 x 158	80	1.1	< 40	1990	DCHPI07206ES00_____
		2440 "	116 x 185	80	1.1	< 60	2330	DCHPI07244ET00_____
		3000 "	116 x 215	80	1.0	< 60	2710	DCHPI07300EU00_____
		3280 "	116 x 230	90	1.0	< 60	2900	DCHPI07328E700_____
		3780 "	116 x 255	90	1.0	< 60	3210	DCHPI07378EV00_____
		4060 "	116 x 295	90	1.0	< 70	3720	DCHPI07406EW00_____
		4920 "	116 x 342	100	0.7	< 70	4350	DCHPI07492EX00_____
700 VDC	600 VDC	460 µF	85 x 110	50	1.3	< 40	690	DCHPK06460EF00_____
		660 "	85 x 140	50	1.3	< 40	880	DCHPK06660EG00_____
		760 "	85 x 155	60	1.2	< 40	980	DCHPK06760EH00_____
		900 "	85 x 185	60	1.2	< 60	1165	DCHPK06900E100_____
		1100 "	85 x 210	60	1.2	< 60	1400	DCHPK07110E200_____
		1200 "	85 x 235	60	1.2	< 60	1480	DCHPK07120EJ00_____
		1380 "	85 x 252	70	1.1	< 60	1590	DCHPK07138EK00_____
		1480 "	85 x 260	70	1.1	< 60	1640	DCHPK07148EL00_____
		1800 "	85 x 345	80	1.0	< 70	2190	DCHPK07180EM00_____
		920 "	116 x 110	80	1.3	< 40	1385	DCHPK06920EO00_____
		1320 "	116 x 140	80	1.3	< 40	1765	DCHPK07132ER00_____
		1500 "	116 x 158	80	1.3	< 40	1990	DCHPK07150ES00_____
		1780 "	116 x 185	80	1.2	< 60	2330	DCHPK07178ET00_____
		2180 "	116 x 215	90	1.2	< 60	2710	DCHPK07218EU00_____
		2380 "	116 x 230	90	1.0	< 60	2900	DCHPK07238E700_____
		2740 "	116 x 255	90	1.0	< 60	3210	DCHPK07274EV00_____
		2940 "	116 x 295	90	1.0	< 70	3720	DCHPK07294EW00_____
		3570 "	116 x 342	110	0.7	< 70	4350	DCHPK07357EX00_____
900 VDC	760 VDC	380 µF	85 x 110	50	1.4	< 40	690	DCHPN06380EF00_____
		540 "	85 x 140	50	1.4	< 40	880	DCHPN06540EG00_____
		630 "	85 x 155	60	1.3	< 40	980	DCHPN06630EH00_____
		720 "	85 x 185	60	1.3	< 60	1165	DCHPN06720E100_____
		900 "	85 x 210	60	1.1	< 60	1400	DCHPN06900E200_____
		1000 "	85 x 235	70	1.0	< 60	1480	DCHPN07100EJ00_____
		1140 "	85 x 252	70	0.9	< 60	1590	DCHPN07114EK00_____
		1240 "	85 x 260	70	0.9	< 60	1640	DCHPN07124EL00_____
		1500 "	85 x 345	80	0.7	< 70	2190	DCHPN07150EM00_____

Contacts can handle: peak currents \hat{I} up to 10 kA
surge currents I_S up to 40 kA

Customer-specific capacitances or voltages on request

* General guide

Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Connection:	male = OM female = OF

Rights reserved to amend design data without prior notification.

Continuation page 138



Continuation

General Data

	U_R 70° C	C_N	D x L mm	I _{rms} (max.)* at 70° C A	ESR (1 kHz)* mΩ	L _e nH	Approx. weight g	Part number
900 VDC	760 VDC	760 µF	116 x 110	80	1.3	< 40	1385	DCHPN06760EO00
		1100 "	116 x 140	80	1.3	< 40	1765	DCHPN07110ER00
		1240 "	116 x 158	80	1.3	< 40	1990	DCHPN07124ES00
		1460 "	116 x 185	80	1.2	< 60	2330	DCHPN07146ET00
		1800 "	116 x 215	90	1.2	< 60	2710	DCHPN07180EU00
		1960 "	116 x 230	90	1.0	< 60	2900	DCHPN07196E700
		2260 "	116 x 255	90	1.0	< 60	3210	DCHPN07226EV00
		2400 "	116 x 295	90	1.0	< 70	3720	DCHPN07240EW00
		2940 "	116 x 342	110	0.7	< 70	4350	DCHPN07294EX00
		240 µF	85 x 110	50	1.3	< 40	690	DCHPP06240EF00
1100 VDC	920 VDC	340 "	85 x 140	50	1.2	< 40	880	DCHPP06340EG00
		400 "	85 x 155	50	1.2	< 40	980	DCHPP06400EH00
		460 "	85 x 185	50	1.2	< 60	1165	DCHPP06460EI00
		580 "	85 x 210	60	1.2	< 60	1400	DCHPP06580E200
		640 "	85 x 235	60	1.1	< 60	1480	DCHPP06640EJ00
		720 "	85 x 252	60	1.1	< 60	1590	DCHPP06720EK00
		780 "	85 x 260	60	1.2	< 60	1640	DCHPP06780EL00
		960 "	85 x 345	80	1.0	< 70	2190	DCHPP06960EM00
		480 "	116 x 110	80	1.4	< 40	1385	DCHPP06480EO00
		700 "	116 x 140	80	1.3	< 40	1765	DCHPP06700ER00
		780 "	116 x 158	80	1.3	< 40	1990	DCHPP06780ES00
		940 "	116 x 185	80	1.3	< 60	2330	DCHPP06940ET00
		1160 "	116 x 215	90	1.2	< 60	2710	DCHPP07116EU00
		1260 "	116 x 230	90	1.2	< 60	2900	DCHPP07126E700
		1440 "	116 x 255	90	1.1	< 60	3210	DCHPP07144EV00
		1560 "	116 x 295	90	1.0	< 70	3720	DCHPP07156EV00
		1890 "	116 x 342	110	0.8	< 70	4350	DCHPP07189EX00
1300 VDC	1100 VDC	170 µF	85 x 110	50	1.3	< 40	690	DCHPR26170EF00
		240 "	85 x 140	50	1.3	< 40	880	DCHPR26240EG00
		270 "	85 x 155	50	1.2	< 40	980	DCHPR26270EH00
		320 "	85 x 185	60	1.2	< 60	1165	DCHPR26320EI00
		400 "	85 x 210	60	1.2	< 60	1400	DCHPR26400E200
		440 "	85 x 235	60	1.1	< 60	1480	DCHPR26440EJ00
		500 "	85 x 252	60	1.1	< 60	1590	DCHPR26500EK00
		540 "	85 x 260	60	1.2	< 60	1640	DCHPR26540EL00
		660 "	85 x 345	80	1.0	< 70	2190	DCHPR26660EM00
		330 "	116 x 110	80	1.4	< 40	1385	DCHPR26330EO00
		480 "	116 x 140	80	1.4	< 40	1765	DCHPR26480ER00
		540 "	116 x 158	80	1.3	< 40	1990	DCHPR26540ES00
		640 "	116 x 185	80	1.3	< 60	2330	DCHPR26640ET00
		780 "	116 x 215	90	1.2	< 60	2710	DCHPR26780EU00
		860 "	116 x 230	90	1.2	< 60	2900	DCHPR26860E700
		980 "	116 x 255	90	1.1	< 60	3210	DCHPR26980EV00
		1060 "	116 x 295	90	1.1	< 70	3720	DCHPR27106EW00
		1290 "	116 x 342	110	0.8	< 70	4350	DCHPR27129EX00

Contacts can handle: peak currents \hat{I} up to 10 kA
surge currents I_S up to 40 kA

Customer-specific capacitances or voltages on request

* General guide

Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Connection:	male = OM female = OF

Rights reserved to amend design data without prior notification.

Continuation page 139

Continuation

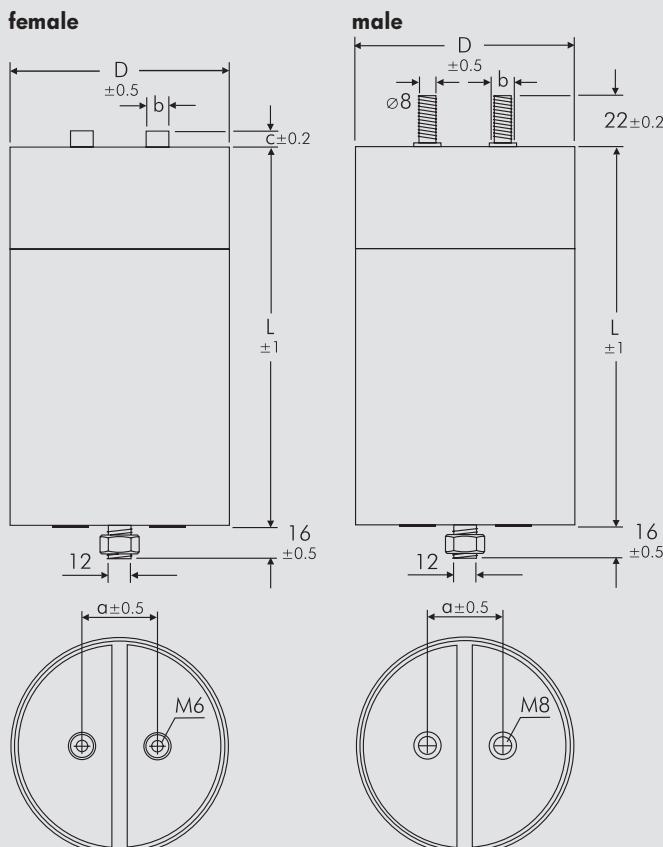
General Data

U_R 70°C	U_R 85°C	C_N	D x L mm	I_{rms} (max.)* at 70°C A	ESR (1 kHz)* $m\Omega$	L_e nH	Approx. weight g	Part number
1500 VDC	1250 VDC	150 μF	85 x 110	50	1.3	< 40	690	DCHPS06150EF00_____
		220 "	85 x 140	50	1.3	< 40	880	DCHPS06220EG00_____
		240 "	85 x 155	50	1.2	< 40	980	DCHPS06240EH00_____
		290 "	85 x 185	60	1.2	< 60	1165	DCHPS06290E100_____
		360 "	85 x 210	60	1.2	< 60	1400	DCHPS06360E200_____
		390 "	85 x 235	60	1.1	< 60	1480	DCHPS06390EJ00_____
		450 "	85 x 252	60	1.1	< 60	1590	DCHPS06450EK00_____
		480 "	85 x 260	60	1.1	< 60	1640	DCHPS06480EL00_____
		585 "	85 x 345	80	1.0	< 70	2190	DCHPS06585EM00_____
		300 "	116 x 110	80	1.5	< 40	1385	DCHPS06300EO00_____
		430 "	116 x 140	80	1.4	< 40	1765	DCHPS06430ER00_____
		490 "	116 x 158	80	1.4	< 40	1990	DCHPS06490ES00_____
		580 "	116 x 185	80	1.4	< 60	2330	DCHPS06580ET00_____
		710 "	116 x 215	90	1.3	< 60	2710	DCHPS06710EU00_____
		780 "	116 x 230	90	1.2	< 60	2900	DCHPS06780E700_____
		890 "	116 x 255	90	1.2	< 60	3210	DCHPS06890EV00_____
		960 "	116 x 295	90	1.1	< 70	3720	DCHPS06960EW00_____
		1170 "	116 x 342	110	0.8	< 70	4350	DCHPS07117EX00_____

Contacts can handle: peak currents \hat{I} up to 10 kA
surge currents I_S up to 40 kA

Customer-specific capacitances or voltages on request

* General guide



Part number completion:				
Tolerance:				20 % = M
10 % = K				5 % = J
Packing:				bulk = S
Connection:				male = OM female = OF

D	L	a	b	c
85	110	32	12	6
85	140	32	12	6
85	155	32	12	6
85	185	32	12	6
85	210	32	12	6
85	235	32	12	6
85	252	32	12	6
85	260	32	12	6
85	345	32	12	6
116	110	50	14	5
116	140	50	14	5
116	158	50	14	5
116	185	50	14	5
116	215	50	14	5
116	230	50	14	5
116	255	50	14	5
116	295	50	14	5
116	342	50	14	5

Dims. in mm.

Rights reserved to amend design data without prior notification.

WIMA DC-LINK HC



Metallized Polypropylene (PP) - Capacitors for DC-Link Applications.
Capacitances from 140 µF to 8250 µF. Rated Voltages from 450 VDC to 1500 VDC.

Special Features

- Very high volume/capacitance ratio
- Self-healing, internal safety disconnector
- Safe contact configurations by screwable plates
- Dry construction without electrolyte or oil
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU
- Customer-specific tabs, capacitances or voltages on request
- 105° C version on request

Electrical Data

Capacitance range: 140 µF to 8250 µF
Rated voltages: 450 VDC, 900 VDC, 1500 VDC
Capacitance tolerance: ±10%
Operating temperature: -55° C to +85° C (+105° C on request)
Insulation resistance at +20° C:
≥ 30 000 sec (MΩ x µF)
Measuring voltage: 100 V/1 min.
Self-inductance: ≤ 50 nH depending on tab configuration
ESR at +20° C: See General Data.

Test voltage: 1.5 U_r, 10 sec

Dielectric absorption: 0.05 %

Voltage derating:

A derating factor of 1.35% per K must be applied from +70° C for AC currents (I_{rms})

Reliability:

Operational life > 100 000 hours at 70° C hot spot

Failure rate < 50 fit (hot spot ≤ 70° C)

Specific dissipation:

See General Data.

Standards: in accordance with IEC 61071

Typical Applications

As intermediate circuit capacitor e.g. in high power converter technology

Construction

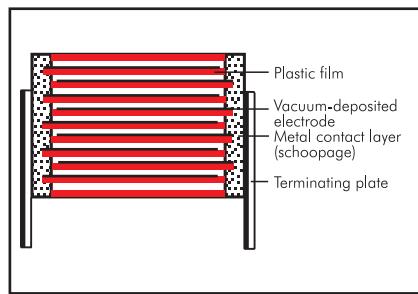
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



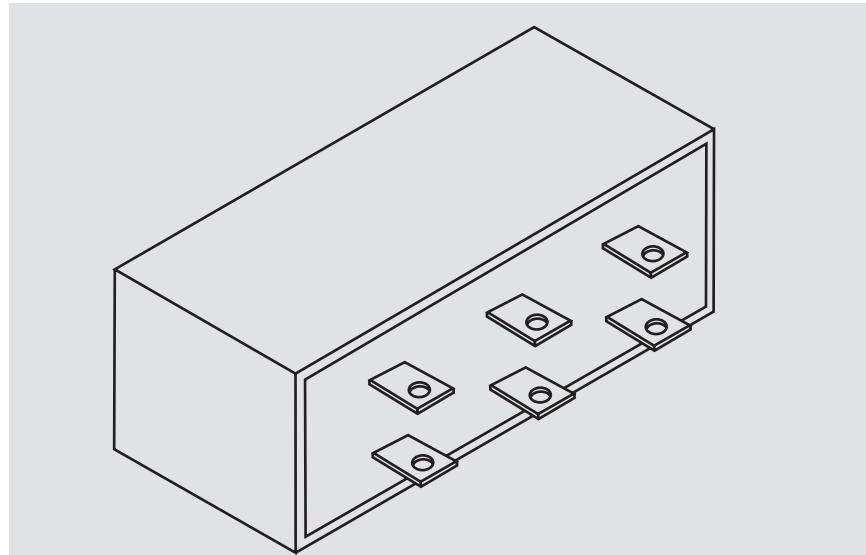
Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the capacitor the screw torque is to be limited to max. 5 Nm.

Packing

Transportation-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information.



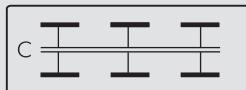
Continuation

General Data

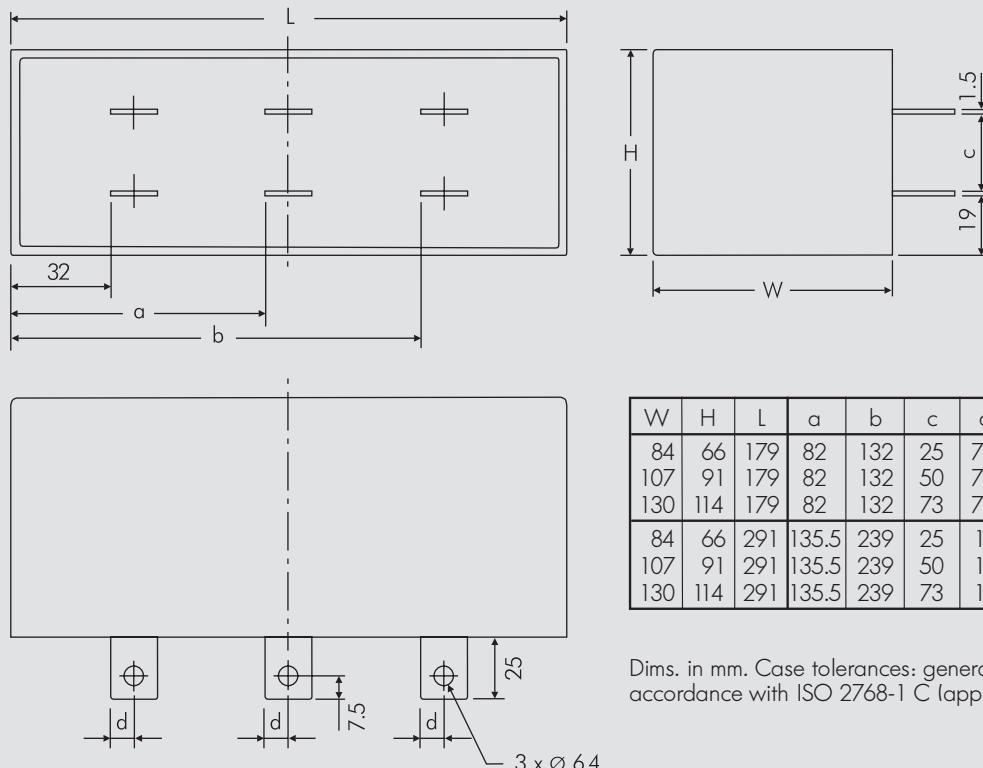
U_R	C_N	E_N W_S	Size (mm)			I _{rms} (max.) [*] A	I [*] kA	I _S [*] kA	ESR (1 kHz)* mΩ	R _{rh} * K/W	Approx. weight g	Part number
450 VDC	1440 µF	146	84	66	179	100	4.6	18.6	0.3	2.8	1220	DCHCH07144JB00KS00
	2400 "	243	84	66	291	170	7.7	30.9	0.2	1.8	1985	DCHCH07240JH00KS00
	3000 "	304	107	91	179	120	6.7	26.7	0.3	2.0	2145	DCHCH07300JC00KS00
	4950 "	501	130	114	179	140	8.7	34.9	0.3	1.5	3265	DCHCH07495JE00KS00
	5000 "	506	107	91	291	190	11.1	44.5	0.2	1.3	3485	DCHCH07500JJ00KS00
	8250 "	835	130	114	291	210	14.5	58.1	0.2	1.1	5305	DCHCH07825JJ00KS00
900 VDC	450 µF	182	84	66	179	90	2.2	8.8	0.5	2.8	1220	DCHCN06450JB00KS00
	750 "	304	84	66	291	140	3.7	14.6	0.3	1.8	1985	DCHCN06750JH00KS00
	940 "	381	107	91	179	100	2.9	11.6	0.5	2.0	2145	DCHCN06940JC00KS00
	1500 "	608	130	114	179	110	3.5	14.1	0.5	1.5	3265	DCHCN07150JE00KS00
	1560 "	632	107	91	291	160	4.8	19.3	0.3	1.3	3485	DCHCN07156JJ00KS00
	2600 "	1053	130	114	291	180	6.1	24.4	0.3	1.1	5305	DCHCN07260JJ00KS00
1500 VDC	140 µF	158	84	66	179	60	1.2	4.9	0.9	2.8	1220	DCHCS06140JB00KS00
	230 "	259	84	66	291	100	2.0	8.1	0.6	1.8	1985	DCHCS06230JH00KS00
	280 "	315	107	91	179	80	1.5	6.1	0.8	2.0	2145	DCHCS06280JC00KS00
	460 "	518	130	114	179	90	1.8	7.3	0.8	1.5	3265	DCHCS06460JE00KS00
	470 "	529	107	91	291	130	2.5	10.2	0.5	1.3	3485	DCHCS06470JJ00KS00
	790 "	889	130	114	291	150	3.1	12.5	0.4	1.1	5305	DCHCS06790JJ00KS00

* General guide

External wiring:



Customer-specific tabs, capacitances or voltages on request



Dims. in mm. Case tolerances: general tolerances in accordance with ISO 2768-1 C (approximate)

Rights reserved to amend design data without prior notification.



**Metallized Polypropylene (PP) - Capacitors for Hybrid Drives.
Capacitance 500 µF. Rated Voltage 450 VDC.**

Special Features

- Very high volume/capacitance ratio
- Self-healing, internal safety disconnector
- Safe contact configuration by screwable plates
- Dry construction without electrolyte or oil
- Very low dissipation factor
- Negative capacitance change versus temperature
- Very low dielectric absorption
- According to RoHS 2011/65/EU
- Customer-specific capacitances or voltages on request

Electrical Data

- Capacitance range:**
500 µF
Rated voltage:
450 VDC
Capacitance tolerances:
±20%, ±10%, (±5% available subject to special enquiry)
Operating temperature range:
−55° C to +85° C (hot spot ≤+110° C in combination with a heatsink)
Insulation resistance at +20° C:
≥ 10 000 sec (MΩ x µF)
Measuring voltage: 100 V/1 min.

Dielectric loss factor tan δ₀: 2 × 10^{−4}

Test voltage: 1.3 U_r, 2sec

Dielectric absorption: 0.05 %

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltage.

Reliability:

Operational life > 100 000 hours at 40° C
Failure rate < 36 fit (0.75 x U_r and 40° C)

Typical Applications

As intermediate circuit capacitor e.g.
in hybrid drives

Construction

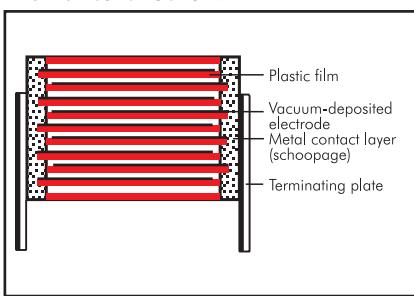
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardant plastic case with PU seal, UL 94 V-0

Terminations:

Tinned plates

Marking:

Colour: Black. Marking: Gold.

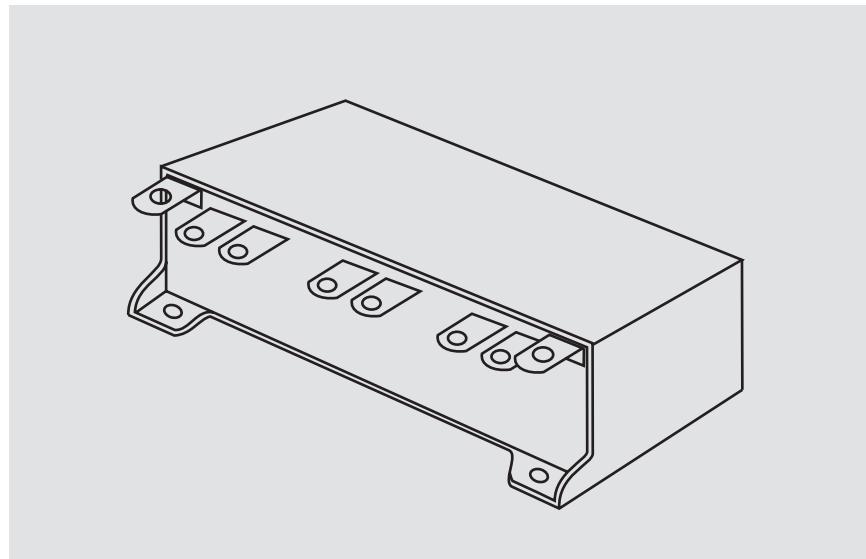
Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the capacitor the screw torque is to be limited to max. 5 Nm.

Packing

Transport-safe packing in cardboard boxes.

For further details and graphs please refer to Technical Information.



Continuation

General Data

Capacitance	U_R	I_{max} A	I_{rms}^* A	L_e nH	ESR* $m\Omega$	Approx. weight g	Part number
500 μF	450 VDC	5000	120**	< 15	0.8**	1400	DCHYH06500JG00_____

* $f = 1\text{kHz}$

Customized solutions can be realized on request

** General guide

Part number completion:

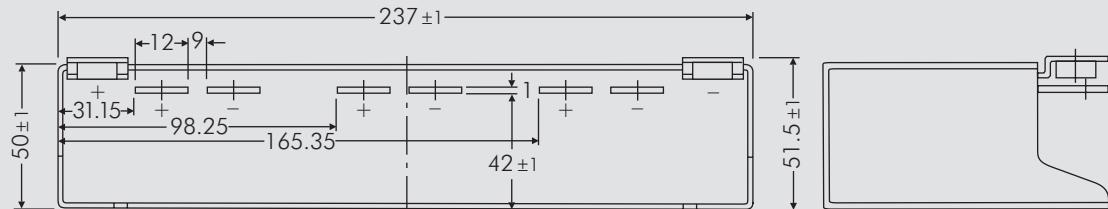
Tolerance: 20 % = M

10 % = K

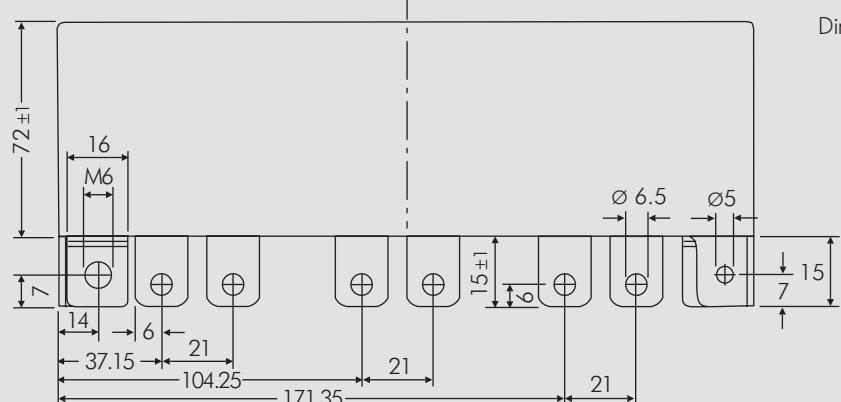
5 % = J

Packing: bulk = S

Pin length: none = 00



Dims. in mm.



Rights reserved to amend design data without prior notification.

Double-Layer Capacitor (SuperCap) Modules with Very High Capacitances

Special Features

- **Modules with very high capacitance values from 62 F to 500 F and rated voltages from 16 VDC to 125 VDC**
- **Discharge current up to 1900 A**
- **Maintenance-free**
- **Series connected**
- **Actively balanced**
- **According to RoHS 2011/65/EU**

General Data

U _R	C _N	Dimensions			Part number
		W	H	L	
16 V	105 F	157	69	250	MCPBA0B105MC00QV00
	500 F	157	156	250	MCPBA0B500MC00QV00
62.5 V	125 F	283	156	439	MCPBB4B125MC00QV00
125 V	62 F	409	156	575	MCPBDAA620MC00QV00

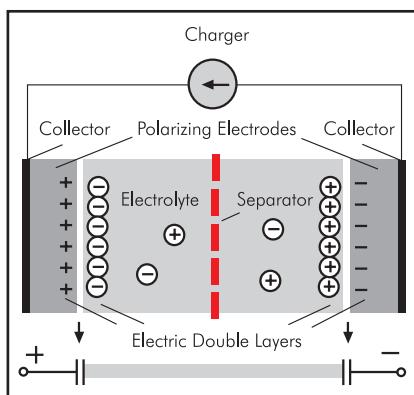
Construction

Encapsulation: Metal case IP65

Terminal tread size: M8 / M10

Marking: Colour: Black. Marking: Gold

Internal construction:



The WIMA PowerBlock range has a modular design. The configurations displayed are representative examples which at any time can be adapted in terms of capacitance, voltage or dimensions. Customized solutions can be realized on request.



Application:

WIMA PowerBlock modules stores energy and releases it within short time in e.g.:

- Motor start in construction, agriculture and earth moving machines, trucks, busses, vessels, generators
- Railway technology e.g. locomotives, electric tramway, metro etc.
- Hybrid and heavy transportation in e.g. construction, agricultural and forest machines, city busses, forklifts, cranes etc.
- Automated guided vehicles (AGV) in production facilities, in-plant logistic systems etc.
- Uninterruptible power supply (UPS) in hospitals, telecommunication systems, oil and gas extraction etc.
- Wind power systems e.g. in pitch control.

Advantages:

- Fast supply of several 100 - 1000 A in direct current operation
- Operating temperature range from -40° C to +65° C
- Maintenance-free operation with up to 1 million charge/discharge cycles
- Life expectancy >10 years
- Low weight against batteries or secondary batteries
- Environmentally friendly materials
- No risk of damage due to complete discharge of the component
- Very fast recharge of the PowerBlock.

Conclusion:

The use of PowerBlocks as energy storage increases efficiency and life time of the applications, saves weight and cost for maintenance, and is environmentally friendly.

Continuation

Technical Data

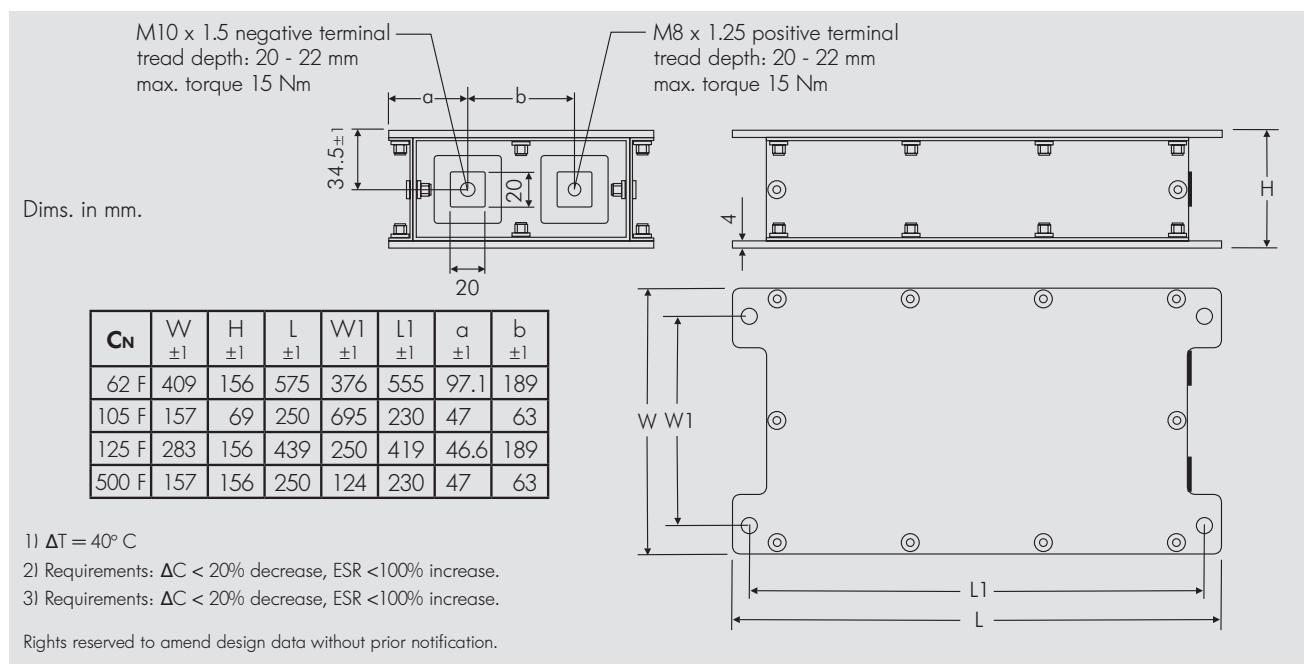
Rated capacitance:	C _N [F]	105	500	125	62
Capacitance tolerance:	[%]		0%/ \pm 20%		
Rated voltage:	U _R [V]		16	62.5	125
Max. continuous current ¹⁾ :	I _C [A, rms]	54	130	130	130
Current, peak (1 sec):	I _P [A]	up to 680	up to 1900	up to 1900	up to 1900
Max. ESR, initial:	R _{DC} [mΩ]	5.2	2.1	8.3	16.4
Max. stored energy: \pm 20%	E _{max.} [Wh]	3.7	17.8	67.8	134.5
Operating temperature:	T _{op} [°C]		-40° C ... +65° C		
Storage temperature:	T _{st} [°C]		-40° C ... +70° C		
Weight:	m [kg]	2.3	4.4	16	31.9
Volume:	V [l]	2.7	6.1	19.4	36.7

Additional Data

Case:	-	AlMg3
Lug terminals:	-	M8 / M10

Comparative Data

Lifetime:					
in hours ²⁾	[h]	90 000, rated voltage, 25° C			
in cycles ³⁾	cycles	>1 million, rated voltage, 25° C			
Energy density:					
gravimetric	E _d [Wh/kg]	1.62	4.03	4.24	4.21
volumetric	E _v [Wh/l]	1.38	2.9	3.5	3.67



Fields of Application for WIMA PowerBlock Modules

Motor Start

WIMA PowerBlock Modules replace, protect or support conventional batteries to reliably crank big diesel engines in e.g.:

- Trucks
- Construction, agricultural and earth moving machines
- Busses and trains
- Vessels
- Generators
- etc.

During start-up of a big diesel engine the energy requirement is quite high. By using WIMA PowerBlock modules the battery layout can be designed smaller and thus lower in weight which leads to a significant reduction of fuel cost and emission of harmful substances.

Railway Technology

WIMA PowerBlock modules store braking energy and immediately release it for engine starting, acceleration or peak-load levelling in e.g.:

- Locomotives
- Electric tramway
- etc.

The use of PowerBlock modules as energy storage increases efficiency and life time of transportation systems, saves weight and cost for maintenance, and is environmentally friendly.

Hybrid/Heavy Transportation

WIMA PowerBlock modules in hybrid drives support diesel engines with fast and frequent dynamic loads in e.g.:

- City busses
- Construction machines, agricultural machines and forestry equipment
- Forklifts, cranes
- etc.

The use of WIMA PowerBlock modules as energy storage leads to significant saving in terms of fuel consumption and considerably reduces exhaust and noise emission.

Automated Guided Vehicles (AGV)

WIMA PowerBlock modules serve as rechargeable or exchangeable energy storage in independent, automated guided vehicles (AGV) in e.g.:

- **Warehouse and distribution environments**
- Production facilities
- In-plant logistic systems
- etc.

The use of PowerBlock modules as energy storage saves weight, reduces cost for maintenance and increases efficiency and life time of the transportation system.

Uninterruptible Power Supply (UPS)

Cascaded WIMA PowerBlock modules are used as emergency power supply in e.g.:

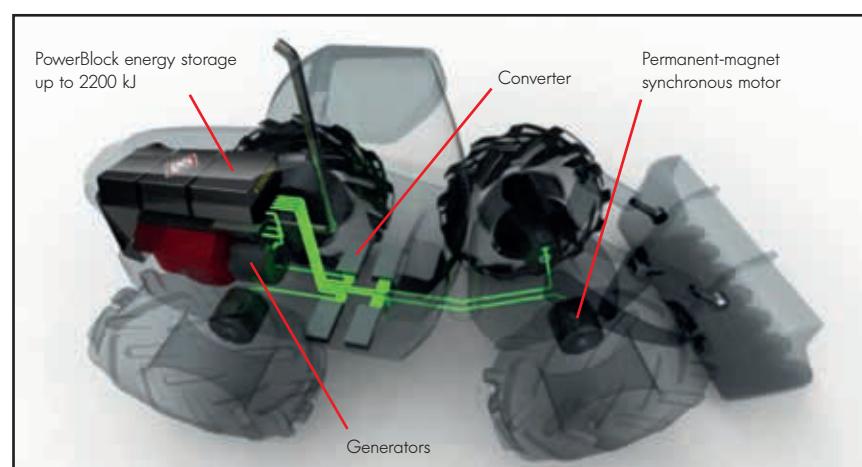
- Hospitals
- Telecommunication systems
- Oil production plants
- Gas extraction
- etc.

By reliably bridging short-term power outages cost-intensive system crashes can be avoided.

WIMA Competence

WIMA has many years of experience in construction of customized energy storage modules based on double layer capacitors. Design and construction of individual solutions is coordinated with the user. Customer's advantages are:

- High expertise due to many years of manufacturing and field experience
- Individual design related to
 - environment
 - space requirements
 - fixing
 - connecting options
- Flexible capacitance or voltage due to serial or parallel cascading of single cells with 350 F to 3,000 F
- Laser-based, reliable welding of the single cells
- Robust, vibration resistant construction according to IP-25 - IP-69 K on demand
- Various technical options, e.g.:
 - temperature monitoring
 - overvoltage signal
 - voltage monitoring
 - industrial connector/CAN-connector
 - application-adapted cooling
 - custom-specific protection class
- Pulse current, endurance and voltage tests accord. to IEC 62576 or DIN EN 62391-1
- Prototype and small series production
- Ready for connection supply.



VISEDO electrified wheel-loader using WIMA PowerBlock energy storage modules.



A WIMA part number consists of 18 digits and is composed as follows:

- Field 1 - 4: Type description
- Field 5 - 6: Rated voltage
- Field 7 - 10: Capacitance
- Field 11 - 12: Size and PCM
- Field 13 - 14: Version code (e.g. Snubber versions)
- Field 15: Capacitance tolerance
- Field 16: Packing
- Field 17 - 18: Pin length (untaped)

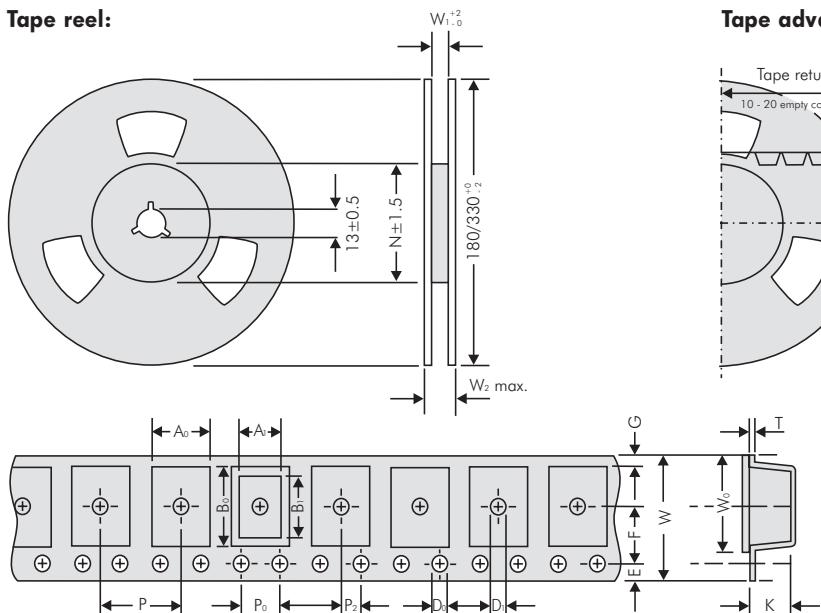
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
M	K	S	2	C	0	2	1	0	0	1	A	0	0	M	S	S	D
MKS 2				63 VDC			0.01 μ F			2.5x6.5x7.2			-	20%		bulk	6-2
Type description:				Rated voltage:				Capacitance:				Size:				Tolerance:	
SMD-PET	= SMDT	50 VDC	= B0	22 pF	= 0022	4.8x3.3x3	Size 1812	= KA	±20%	= M							
SMD-PEN	= SMDN	63 VDC	= C0	47 pF	= 0047	4.8x3.3x4	Size 1812	= KB	±10%	= K							
SMD-PPS	= SMDI	100 VDC	= D0	100 pF	= 0100	5.7x5.1x3.5	Size 2220	= QA	±5%	= J							
FKP 02	= FKPO	250 VDC	= F0	150 pF	= 0150	5.7x5.1x4.5	Size 2220	= QB	±2.5%	= H							
MKS 02	= MKSO	400 VDC	= G0	220 pF	= 0220	7.2x6.1x3	Size 2824	= TA	±1%	= E							
FKS 2	= FKS2	450 VDC	= H0	330 pF	= 0330	7.2x6.1x5	Size 2824	= TB									
FKP 2	= FKP2	520 VDC	= H2	470 pF	= 0470	10.2x7.6x5	Size 4030	= VA									
FKS 3	= FKS3	600 VDC	= I0	680 pF	= 0680	12.7x10.2x6	Size 5040	= XA									
FKP 3	= FKP 3	630 VDC	= JO	1000 pF	= 1100	15.3x13.7x7	Size 6054	= YA									
MKS 2	= MKS2	700 VDC	= K0	1500 pF	= 1150	2.5x7x4.6	PCM 2.5	= OB									
MKP 2	= MKP2	800 VDC	= L0	2200 pF	= 1220	3x7.5x4.6	PCM 2.5	= OC									
MKS 4	= MKS4	850 VDC	= M0	3300 pF	= 1330	2.5x6.5x7.2	PCM 5	= 1A									
MKP 4C	= MKP4C	900 VDC	= NO	4700 pF	= 1470	3x7.5x7.2	PCM 5	= 1B									
MKP 4	= MKP4	1000 VDC	= O1	6800 pF	= 1680	2.5x7x10	PCM 7.5	= 2A									
MKP 10	= MKP1	1100 VDC	= P0	0.01 μ F	= 2100	3x8.5x10	PCM 7.5	= 2B									
FKP 1	= FKP1	1200 VDC	= Q0	0.022 μ F	= 2220	3x9x13	PCM 10	= 3A									
MKP-X2	= MKX2	1250 VDC	= R0	0.047 μ F	= 2470	4x9x13	PCM 10	= 3C									
MKP-X1 R	= MKX1	1500 VDC	= S0	0.1 μ F	= 3100	5x11x18	PCM 15	= 4B									
MKP-Y2	= MKY2	1600 VDC	= T0	0.22 μ F	= 3220	6x12.5x18	PCM 15	= 4C									
MP 3-X2	= MPX2	2000 VDC	= U0	0.47 μ F	= 3470	5x14x26.5	PCM 22.5	= 5A									
MP 3-X1	= MPX1	2500 VDC	= V0	1 μ F	= 4100	6x15x26.5	PCM 22.5	= 5B									
MP 3-Y2	= MPY2	3000 VDC	= W0	2.2 μ F	= 4220	9x19x31.5	PCM 27.5	= 6A									
MP 3R-Y2	= MPRY	4000 VDC	= X0	4.7 μ F	= 4470	11x21x31.5	PCM 27.5	= 6B									
MKP 4F	= MKPF	6000 VDC	= Y0	10 μ F	= 5100	9x19x41.5	PCM 37.5	= 7A									
Snubber MKP	= SNMP	250 VAC	= 0W	22 μ F	= 5220	11x22x41.5	PCM 37.5	= 7B									
Snubber FKP	= SNFP	275 VAC	= 1W	47 μ F	= 5470	19x31x56	PCM 48.5	= 8D									
GTO MKP	= GTOM	300 VAC	= 2W	100 μ F	= 6100	25x45x57	PCM 52.5	= 9D									
DC-LINK MKP 3	= DCP3	305 VAC	= AW	220 μ F	= 6220	...											
DC-LINK MKP 4	= DCP4	350 VAC	= BW	1000 μ F	= 7100												
DC-LINK MKP 4S	= DCPS	440 VAC	= 4W	1500 μ F	= 7150												
DC-LINK MKP 5	= DCP5	500 VAC	= 5W	...													
DC-LINK MKP 6	= DCP6	...															
DC-LINK HC	= DCHC																
DC-LINK HY	= DCHY																

The data on this page is not complete and serves only to explain the part number system. Part number information is listed on the pages of the respective WIMA range.

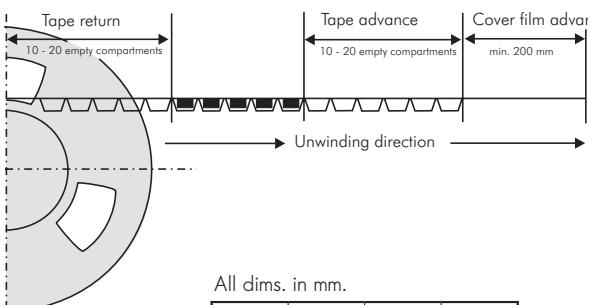
Blister Tape Packaging and Packing Units of the WIMA SMD Capacitors



Tape reel:



Tape advance and return:



All dims. in mm.

Type	W2max	W1± ² ₀	N±1.5
1812	19	12.4	62
2220	19	12.4	62
2824	19	12.4	62
4030	22.4	16.4	60
5040	30.4	24.4	90
6054	30.4	24.4	90

Packing units

Size Code 1812		A ₀ ±0.1	A ₁ ±0.1	B ₀ ±0.1	B ₁ +0.1 -0	D ₀ +0.1 -0	D ₁ +0.1 -0	P ±0.1	P ₀ * ±0.1	P ₂ ±0.05	E ±0.1	F ±0.05	G	W ±0.3	W ₀ ±0.2	K ±0.1	T ±0.1
Box size	Code																
4.8x3.3x3	KA	3.55	3.3	5.1	4.8	Ø1.5	Ø1.5	8	4	2	1.75	5.5	2.2	12	9.5	3.4	0.3
4.8x3.3x4	KB	3.55	3.3	5.1	4.8	Ø1.5	Ø1.5	8	4	2	1.75	5.5	2.2	12	9.5	4.4	0.3

Size Code 2220		A ₀ ±0.1	A ₁ ±0.1	B ₀ ±0.1	B ₁ +0.1 -0	D ₀ +0.1 -0	D ₁ +0.1 -0	P ±0.1	P ₀ * ±0.1	P ₂ ±0.05	E ±0.1	F ±0.05	G	W ±0.3	W ₀ ±0.2	K ±0.1	T ±0.1
Box size	Code																
5.7x5.1x3.5	QA	6.3	5.7	5.6	5.1	Ø1.5	Ø1.5	8	4	2	1.75	5.5	1.95	12	9.5	3.7	0.3
5.7x5.1x4.5	QB	6.3	5.7	5.6	5.1	Ø1.5	Ø1.5	8	4	2	1.75	5.5	1.95	12	9.5	4.7	0.3

Size Code 2824		A ₀ ±0.1	A ₁ ±0.1	B ₀ ±0.1	B ₁ +0.1 -0	D ₀ +0.1 -0	D ₁ +0.1 -0	P ±0.1	P ₀ * ±0.1	P ₂ ±0.05	E ±0.1	F ±0.05	G	W ±0.3	W ₀ ±0.2	K ±0.1	T ±0.1
Box size	Code																
7.2x6.1x3	TA	6.6	6.1	7.7	7.2	Ø1.5	Ø1.5	12	4	2	1.75	5.5	0.9	12	9.5	3.4	0.3
7.2x6.1x5	TB	6.6	6.1	7.7	7.2	Ø1.5	Ø1.5	12	4	2	1.75	5.5	0.9	12	9.5	5.4	0.4

Size Code 4030		A ₀ ±0.1	A ₁ ±0.1	B ₀ ±0.1	B ₁ +0.1 -0	D ₀ +0.1 -0	D ₁ +0.1 -0	P ±0.1	P ₀ * ±0.1	P ₂ ±0.05	E ±0.1	F ±0.05	G	W ±0.3	W ₀ ±0.2	K ±0.1	T ±0.1
Box size	Code																
	VA	10.7	10.2	8.1	9.1	Ø1.5	Ø1.5	16	4	2	1.75	7.5	1.9	16	13.3	5.5	0.3
	XA	13.5	12.7	11	11.5	Ø1.5	Ø1.5	16	4	2	1.75	11.5	4.7	24	21.3	6.5	0.3
	YA	17.0	16.5	15.6	15.0	Ø1.5	Ø1.5	20	4	2	1.75	11.5	2.95	24	21.3	7.5	0.3

		taped Reel 180 mm Ø	taped Reel 330 mm Ø	bulk Standard
		775		2000
		600		1000
		450		500

Part number codes for SMD packing

W (Blister)	Ø in mm	Code
12	180	P
12	330	Q
16	330	R
24	330	T
Bulk Standard		S

Typical Dimensions for Taping Configuration

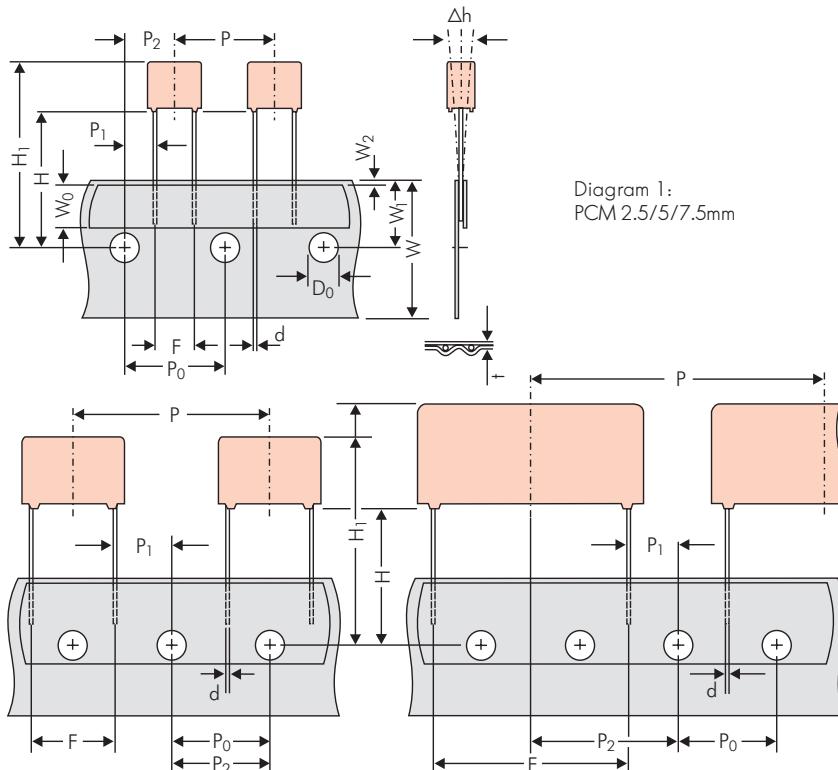


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5*mm

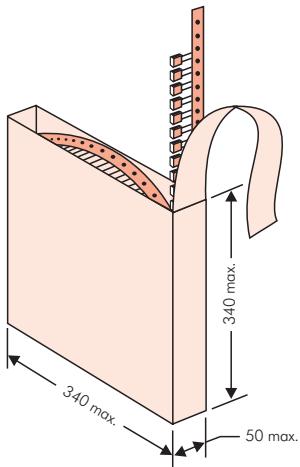
*PCM 27.5 taping possible with two feed holes between components

Designation	Symbol	Dimensions for Radial Taping																		
		PCM 2.5 taping	PCM 5 taping	PCM 7.5 taping	PCM 10 taping*	PCM 15 taping*	PCM 22.5 taping	PCM 27.5 taping												
Carrier tape width	W	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5												
Hold-down tape width	W ₀	6.0 for hot-sealing adhesive tape	6.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape												
Hole position	W ₁	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5												
Hold-down tape position	W ₂	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.												
Feed hole diameter	D ₀	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2												
Pitch of component	P	12.7 ±1.0	12.7 ±1.0	12.7 ±1.0	25.4 ±1.0	25.4 ±1.0	38.1 ±1.5	38.1 ±1.5 or 50.8 ±1.5												
Feed hole pitch	P ₀	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch												
Feed hole centre to pin	P ₁	5.1 ±0.5	3.85 ±0.7	2.6 ±0.7	7.7 ±0.7	5.2 ±0.7	7.8 ±0.7	5.3 ±0.7												
Hole centre to component centre	P ₂	6.35 ±1.3	6.35 ±1.3	6.35 ±1.3	12.7 ±1.3	12.7 ±1.3	19.05 ±1.3	19.05 ±1.3												
Feed hole centre to bottom edge of the component	H	16.5 ±0.3 18.5 ±0.5	16.5 ±0.3 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5												
Feed hole centre to top edge of the component	H ₁	H+H _{component} < H ₁ 32.25 max.	H+H _{component} < H ₁ 32.25 max.	H+H _{component} < H ₁ 24.5 to 31.5	H+H _{component} < H ₁ 25.0 to 31.5	H+H _{component} < H ₁ 26.0 to 37.0	H+H _{component} < H ₁ 30.0 to 43.0	H+H _{component} < H ₁ 35.0 to 45.0												
Pin spacing at upper edge of carrier tape	F	2.5 ±0.5	5.0 ±0.8 -0.2	7.5 ±0.8	10.0 ±0.8	15 ±0.8	22.5 ±0.8	27.5 ±0.8												
Pin diameter	d	0.4 ±0.05	0.5 ±0.05	*0.5 ±0.05 or 0.6 ±0.06	*0.5 ±0.05 or 0.6 ±0.06	0.8 ±0.08 -0.05	0.8 ±0.08 -0.05	0.8 ±0.08 -0.05												
Component alignment	Δh	± 2.0 max.	± 2.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.												
Total tape thickness	t	0.6 ±0.2	0.6 ±0.2	0.6 ±0.2	0.6 ±0.2	0.6 ±0.2	0.6 ±0.2	0.6 ±0.2												
Package (see also page 150)	ROLL/AMMO		AMMO																	
	REEL Ø 360 max. Ø 30 ±1		B 58 ±2	depending on comp. dimensions																
Unit		see details page 151.																		
Dims in mm.																				
• Diameter of pins see General Data.																				
* PCM 10 and PCM 15 can be crimped to PCM 7.5.																				
Position of components according to PCM 7.5 Isketch 11. P ₀ = 12.7 or 15.0 is possible																				
Please clarify customer-specific deviations with the manufacturer.																				

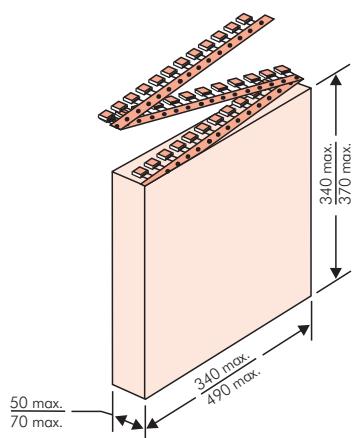
Types of Tape Packaging of Capacitors for Automatic Radial Insertion



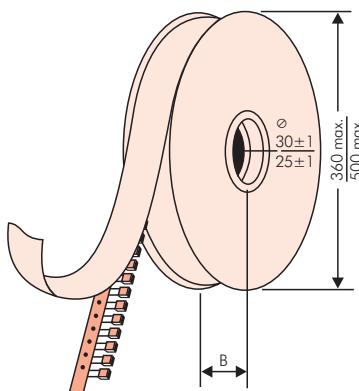
■ ROLL Packaging



■ AMMO Packaging



■ REEL Packaging



BAR CODE (Labelling)

Labelling of package units in plain text and with alphanumerical Bar Code

Scanner decoding of

- WIMA supplier number
- Customer's P/O number
- Customer's part number
- WIMA confirmation number
- WIMA part number
- Lot number
- Date code
- Quantity

In addition part description of

- article
- capacitance value
- rated voltage
- dimensions
- capacitance tolerance
- packing

as well as gross weight and customer's name are indicated in plain text.



BARCODE „Code 39“

Packing Quantities for Capacitors with Radial Pins in PCM 2.5 mm to 22.5 mm



PCM	Size				bulk	ROLL		pcs. per packing unit				AMMO			
						H16.5	H18.5	REEL		Ø 360		Ø 500		340 x 340	
	W	H	L	Codes	S	N	O	F	I	H	J	A	C	B	D
2.5 mm	2.5	7	4.6	0B	5000	2200		2500		—		2800		—	
	3	7.5	4.6	0C	5000	2000		2300		—		2300		—	
	3.8	8.5	4.6	0D	5000	1500		1800		—		1800		—	
	4.6	9	4.6	0E	5000	1200		1500		—		1500		—	
	5.5	10	4.6	0F	5000	900		1200		—		1200		—	
5 mm	2.5	6.5	7.2	1A	5000	2200		2500		—		2800		—	
	3	7.5	7.2	1B	5000	2000		2300		—		2300		—	
	3.5	8.5	7.2	1C	5000	1600		2000		—		2000		—	
	4.5	6	7.2	1D	6000	1300		1500		—		1500		—	
	4.5	9.5	7.2	1E	4000	1300		1500		—		1500		—	
	5	10	7.2	1F	3500	1100		1400		—		1400		—	
	5.5	7	7.2	1G	4000	1000		1200		—		1200		—	
	5.5	11.5	7.2	1H	2500	1000		1200		—		1200		—	
	6.5	8	7.2	1I	2500	800		1000		—		1000		—	
	7.2	8.5	7.2	1J	2500	700		1000		—		1000		—	
	7.2	13	7.2	1K	2000	700		950		—		1000		—	
	8.5	10	7.2	1L	2000	600		800		—		800		—	
	8.5	14	7.2	1M	1500	600		800		—		800		—	
	11	16	7.2	1N	1000	500		600		—		640		—	
7.5 mm	2.5	7	10	2A	5000	—		2500		4400		2500		—	
	3	8.5	10	2B	5000	—		2200		4300		2300		4150	
	4	9	10	2C	4000	—		1700		3200		1700		3100	
	4.5	9.5	10.3	2D	3500	—		1500		2900		1400		2700	
	5	10.5	10.3	2E	3000	—		1300		2500		1300		—	
	5.7	12.5	10.3	2F	2000	—		1000		2200		1100		—	
	7.2	12.5	10.3	2G	1500	—		900		1800		1000		—	
10 mm	3	9	13	3A	3000	—		1100		2200		—		1900	
	4	8.5	13.5	FA	3000	—		900		1600		—		1450	
	4	9	13	3C	3000	—		900		1600		—		1450	
	4	9.5	13	3D	3000	—		900		1600		—		1400	
	5	10	13.5	FB	2000	—		700		1300		—		1200	
	5	11	13	3F	3000	—		700		1300		—		1200	
	6	12	13	3G	2400	—		550		1100		—		1000	
	6	12.5	13	3H	2400	—		550		1100		—		1000	
15 mm	8	12	13	3I	2000	—		400		800		—		740	
	5	11	18	4B	2400	—		600		1200		—		1150	
	5	13	19	FC	1000	—		600		1200		—		1200	
	6	12.5	18	4C	2000	—		500		1000		—		1000	
	6	14	19	FD	1000	—		500		1000		—		1000	
	7	14	18	4D	1600	—		450		900		—		850	
	7	15	19	FE	1000	—		450		900		—		850	
	8	15	18	4F	1200	—		400		800		—		740	
	8	17	19	FF	500	—		400		800		—		740	
	9	14	18	4H	1200	—		350		700		—		650	
	9	16	18	4J	900	—		350		700		—		650	
	10	18	19	FG	500	—		300		650		—		590	
22.5 mm	11	14	18	4M	1000	—		300		600		—		540	
	5	14	26.5	5A	1200	—		—		800		—		770	
	6	15	26.5	5B	1000	—		—		700		—		640	
	7	16.5	26.5	5D	760	—		—		600		—		550	
	8	20	28	FH	500	—		—		500		—		480	
	8.5	18.5	26.5	5F	500	—		—		480		—		450	
	10	22	28	FI	570*	—		—		420		—		380	
	10.5	19	26.5	5G	594*	—		—		400		—		360	
	10.5	20.5	26.5	5H	594*	—		—		400		—		360	
	11	21	26.5	5I	561*	—		—		380		—		350	
	12	24	28	FJ	480*	—		—		350		—		310	

* TPS (Tray-Packaging-System). Plate versions may have different packing units.
Samples and pre-production needs on request.

Moulded versions.

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Packing Quantities for Capacitors with Radial Pins in PCM 27.5 mm to 52.5 mm



PCM	Size				bulk	ROLL		pcs. per packing unit				AMMO			
						H16.5	H18.5	REEL		Ø 360	Ø 500	H16.5	H18.5	340 × 340	490 × 370
	W	H	L	Codes		S	N	O	F	I	H	J	A	C	B
27.5 mm	9	19	31.5	6A	567*	—	—	—	—	—	460/340*	—	—	—	420
	11	21	31.5	6B	459*	—	—	—	—	—	380/280*	—	—	—	350
	13	24	31.5	6D	378*	—	—	—	—	—	300	—	—	—	290
	13	25	33	FK	405*	—	—	—	—	—	—	—	—	—	—
	15	26	31.5	6F	324*	—	—	—	—	—	270	—	—	—	250
	15	26	33	FL	324*	—	—	—	—	—	—	—	—	—	—
	17	29	31.5	6G	198*	—	—	—	—	—	—	—	—	—	—
	17	34.5	31.5	6I	198*	—	—	—	—	—	—	—	—	—	—
	20	32	33	FM	162*	—	—	—	—	—	—	—	—	—	—
	20	39.5	31.5	6J	162*	—	—	—	—	—	—	—	—	—	—
37.5 mm	9	19	41.5	7A	441*	—	—	—	—	—	—	—	—	—	—
	11	22	41.5	7B	357*	—	—	—	—	—	—	—	—	—	—
	13	24	41.5	7C	294*	—	—	—	—	—	—	—	—	—	—
	15	26	41.5	7D	252*	—	—	—	—	—	—	—	—	—	—
	17	29	41.5	7E	154*	—	—	—	—	—	—	—	—	—	—
	19	32	41.5	7F	140*	—	—	—	—	—	—	—	—	—	—
	20	39.5	41.5	7G	126*	—	—	—	—	—	—	—	—	—	—
	24	45.5	41.5	7H	112*	—	—	—	—	—	—	—	—	—	—
	31	46	41.5	7I	84*	—	—	—	—	—	—	—	—	—	—
	35	50	41.5	7J	35*	—	—	—	—	—	—	—	—	—	—
48.5 mm	40	55	41.5	7K	28*	—	—	—	—	—	—	—	—	—	—
	19	31	56	8D	120*	—	—	—	—	—	—	—	—	—	—
	23	34	56	8E	80*	—	—	—	—	—	—	—	—	—	—
	27	37.5	56	8H	84*	—	—	—	—	—	—	—	—	—	—
	33	48	56	8J	25*	—	—	—	—	—	—	—	—	—	—
52.5 mm	37	54	56	8L	25*	—	—	—	—	—	—	—	—	—	—
	25	45	57	9D	70*	—	—	—	—	—	—	—	—	—	—
	30	45	57	9E	60*	—	—	—	—	—	—	—	—	—	—
	35	50	57	9F	25*	—	—	—	—	—	—	—	—	—	—
	45	55	57	9H	20*	—	—	—	—	—	—	—	—	—	—
	45	65	57	9J	20*	—	—	—	—	—	—	—	—	—	—

* for 2-inch transport pitches.

* TPS (Tray-Packung-System). Plate versions may have different packing units.
Samples and pre-production needs on request.

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Updated data on www.wima.com

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