

Polypropylene (PP) Capacitors for Pulse Applications with Metal Foil Electrodes, Schoopage Contacts, Double-Sided Metallization and Self-Healing Internal Series Connection for Highest Current Carrying Capability PCM 15 mm to 37.5 mm

Special Features

- Extremely high pulse duty
- Self-healing
- Internal series connection
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2002/95/EC

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

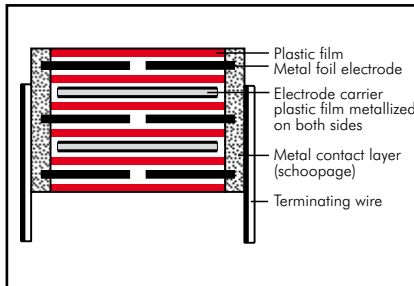
Dielectric:

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.
Epoxy resin seal: Yellow

Electrical Data

Capacitance range:

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

Rated voltages:

400 VDC, 630 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

Insulation resistance at +20° C:

$C \leq 0.1 \mu\text{F}$: $\geq 1 \times 10^5 \text{ M}\Omega$

(mean value: $5 \times 10^5 \text{ M}\Omega$)

$C > 0.1 \mu\text{F}$: $\geq 30\,000 \text{ sec (M}\Omega \times \mu\text{F)}$

(mean value: 100\,000 sec)

Measuring voltage: 100 V/1 min.

Test voltage:

$2 U_r$, 2 sec / 6 kV: $1.6 U_r$, 2 sec.

Maximum pulse rise time:

| Capacitance pF/µF | max. pulse rise time V/µsec at $T_A < 40^\circ \text{C}$ | | | | | | | |
|----------------------|--|--------|---------|---------|---------|---------|---------|---------|
| | 400VDC | 630VDC | 1000VDC | 1250VDC | 1600VDC | 2000VDC | 4000VDC | 6000VDC |
| 100 ... 220 | - | - | - | - | 56000 | 56000 | - | - |
| 330 ... 680 | - | - | - | - | 51000 | 56000 | 56000 | 56000 |
| 1000 ... 2200 | 29000 | 29000 | 29000 | 29000 | 46000 | 51000 | 51000 | 51000 |
| 3300 ... 6800 | 9000 | 14000 | 27000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| 0.01 ... 0.022 | 9000 | 11000 | 11000 | 11000 | 11000 | 13000 | 13000 | 13000 |
| 0.033 ... 0.068 | 9000 | 11000 | 11000 | 11000 | 11000 | 11000 | - | - |
| 0.1 ... 0.22 | 7000 | 11000 | 11000 | 11000 | 11000 | - | - | - |

for pulses equal to the rated voltage

Mechanical Tests

Pull test on leads:

$d \leq 0.8 \phi$: 10 N in direction of leads

$d > 0.8 \phi$: 20 N in direction of leads

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

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 | $\leq 3 \times 10^{-4}$ | $\leq 3 \times 10^{-4}$ |
| 10 kHz | $\leq 4 \times 10^{-4}$ | $\leq 6 \times 10^{-4}$ |
| 100 kHz | $\leq 10 \times 10^{-4}$ | - |

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)

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 | FKP1G011004B00_____ | 5 | 11 | 18 | 15 | FKP1J011004B00_____ |
| 1500 „ | 5 | 11 | 18 | 15 | FKP1G011504B00_____ | 5 | 11 | 18 | 15 | FKP1J011504B00_____ |
| 2200 „ | 5 | 11 | 18 | 15 | FKP1G012204B00_____ | 5 | 11 | 18 | 15 | FKP1J012204B00_____ |
| 3300 „ | 5 | 11 | 18 | 15 | FKP1G013304B00_____ | 5 | 11 | 18 | 15 | FKP1J013304B00_____ |
| 4700 „ | 5 | 11 | 18 | 15 | FKP1G014704B00_____ | 5 | 11 | 18 | 15 | FKP1J014704B00_____ |
| 6800 „ | 5 | 11 | 18 | 15 | FKP1G016804B00_____ | 6 | 12.5 | 18 | 15 | FKP1J016804C00_____ |
| 0.01 µF | 5 | 11 | 18 | 15 | FKP1G021004B00_____ | 7 | 14 | 18 | 15 | FKP1J021004D00_____ |
| 0.015 „ | 6 | 12.5 | 18 | 15 | FKP1G021504C00_____ | 5 | 14 | 26.5 | 22.5 | FKP1J021005A00_____ |
| 0.022 „ | 7 | 14 | 18 | 15 | FKP1G022204D00_____ | 8 | 15 | 18 | 15 | FKP1J021504F00_____ |
| | | | | | | 5 | 14 | 26.5 | 22.5 | FKP1J021505B00_____ |
| 0.033 „ | 8 | 15 | 18 | 15 | FKP1G023304F00_____ | 8.5 | 18.5 | 26.5 | 22.5 | FKP1J022205D00_____ |
| | | | | | | | | | | |
| 0.047 „ | 7 | 16.5 | 26.5 | 22.5 | FKP1G024705D00_____ | 10.5 | 20.5 | 26.5 | 22.5 | FKP1J024705H00_____ |
| | | | | | | | | | | |
| 0.068 „ | 8.5 | 18.5 | 26.5 | 22.5 | FKP1G026805F00_____ | 11 | 21 | 31.5 | 27.5 | FKP1J026806B00_____ |
| | | | | | | | | | | |
| 0.1 µF | 10.5 | 20.5 | 26.5 | 22.5 | FKP1G031005H00_____ | 13 | 24 | 31.5 | 27.5 | FKP1J031006D00_____ |
| | 9 | 19 | 31.5 | 27.5 | FKP1G031006A00_____ | 11 | 22 | 41.5 | 37.5 | FKP1J031007B00_____ |
| 0.15 „ | 11 | 21 | 31.5 | 27.5 | FKP1G031506B00_____ | 13 | 24 | 41.5 | 37.5 | FKP1J031507C00_____ |
| 0.22 „ | 13 | 24 | 31.5 | 27.5 | FKP1G032206D00_____ | 15 | 26 | 41.5 | 37.5 | FKP1J032207D00_____ |

| Capacitance | 1000 VDC/600 VAC* | | | | | 1250 VDC/600 VAC* | | | | |
|-------------|-------------------|------|------|-------|---------------------|-------------------|------|------|-------|---------------------|
| | W | H | L | PCM** | Part number | W | H | L | PCM** | Part number |
| 1000 pF | 5 | 11 | 18 | 15 | FKP1O111004B00_____ | 5 | 11 | 18 | 15 | FKP1R011004B00_____ |
| 1500 „ | 5 | 11 | 18 | 15 | FKP1O111504B00_____ | 5 | 11 | 18 | 15 | FKP1R011504B00_____ |
| 2200 „ | 5 | 11 | 18 | 15 | FKP1O112204B00_____ | 5 | 11 | 18 | 15 | FKP1R012204B00_____ |
| 3300 „ | 5 | 11 | 18 | 15 | FKP1O113304B00_____ | 6 | 12.5 | 18 | 15 | FKP1R013304C00_____ |
| 4700 „ | 6 | 12.5 | 18 | 15 | FKP1O114704C00_____ | 7 | 14 | 18 | 15 | FKP1R014704D00_____ |
| 6800 „ | 7 | 14 | 18 | 15 | FKP1O116804D00_____ | 8 | 15 | 18 | 15 | FKP1R016804F00_____ |
| 0.01 µF | 8 | 15 | 18 | 15 | FKP1O121004F00_____ | 7 | 16.5 | 26.5 | 22.5 | FKP1R016805A00_____ |
| | | | | | | | | | | |
| 0.015 „ | 6 | 15 | 26.5 | 22.5 | FKP1O121505B00_____ | 8.5 | 18.5 | 26.5 | 22.5 | FKP1R021505F00_____ |
| 0.022 „ | 8.5 | 18.5 | 26.5 | 22.5 | FKP1O122205F00_____ | | | | | |
| 0.033 „ | 10.5 | 20.5 | 26.5 | 22.5 | FKP1O123305H00_____ | 11 | 21 | 31.5 | 27.5 | FKP1R022205H00_____ |
| | | | | | | | | | | |
| 0.047 „ | 11 | 21 | 31.5 | 27.5 | FKP1O124706B00_____ | 13 | 24 | 31.5 | 27.5 | FKP1R023307A00_____ |
| | | | | | | | | | | |
| 0.068 „ | 13 | 24 | 31.5 | 27.5 | FKP1O126806D00_____ | 11 | 22 | 41.5 | 37.5 | FKP1R024707B00_____ |
| | | | | | | | | | | |
| 0.1 µF | 13 | 24 | 41.5 | 37.5 | FKP1O131007C00_____ | 15 | 26 | 41.5 | 37.5 | FKP1R031007D00_____ |
| 0.15 „ | 15 | 26 | 41.5 | 37.5 | FKP1O131507D00_____ | 17 | 29 | 41.5 | 37.5 | FKP1R031507E00_____ |
| 0.22 „ | 19 | 32 | 41.5 | 37.5 | FKP1O132207F00_____ | 19 | 32 | 41.5 | 37.5 | FKP1R032207F00_____ |

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

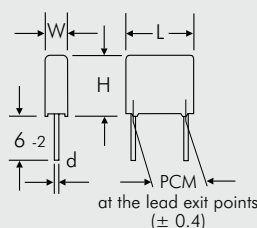
** PCM = Printed circuit module = lead spacing

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.

| ∅ d | PCM |
|-----|-----------|
| 0.8 | 15 - 27.5 |
| 1.0 | 37.5 |



Part number completion:

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

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

Taped version see page 127.

Continuation

General Data

| Capacitance | 1600 VDC/650 VAC* | | | | | 2000 VDC/700 VAC* | | | | |
|-------------|-------------------|------|------|-------|---------------------|-------------------|------|------|-------|---------------------|
| | W | H | L | PCM** | Part number | W | H | L | PCM** | Part number |
| 100 pF | 5 | 11 | 18 | 15 | FKP1T001004B00_____ | 5 | 11 | 18 | 15 | FKP1U001004B00_____ |
| 150 " | 5 | 11 | 18 | 15 | FKP1T001504B00_____ | 5 | 11 | 18 | 15 | FKP1U001504B00_____ |
| 220 " | 5 | 11 | 18 | 15 | FKP1T002204B00_____ | 5 | 11 | 18 | 15 | FKP1U002204B00_____ |
| 330 " | 5 | 11 | 18 | 15 | FKP1T003304B00_____ | 6 | 12.5 | 18 | 15 | FKP1U003304C00_____ |
| 470 " | 5 | 11 | 18 | 15 | FKP1T004704B00_____ | 6 | 12.5 | 18 | 15 | FKP1U004704C00_____ |
| 680 " | 5 | 11 | 18 | 15 | FKP1T006804B00_____ | 6 | 12.5 | 18 | 15 | FKP1U006804C00_____ |
| 1000 pF | 6 | 12.5 | 18 | 15 | FKP1T011004C00_____ | 7 | 14 | 18 | 15 | FKP1U011004D00_____ |
| | 5 | 14 | 26.5 | 22.5 | FKP1T011005A00_____ | 5 | 14 | 26.5 | 22.5 | FKP1U011005A00_____ |
| 1500 " | 7 | 14 | 18 | 15 | FKP1T011504D00_____ | 6 | 15 | 26.5 | 22.5 | FKP1U011505B00_____ |
| | 5 | 14 | 26.5 | 22.5 | FKP1T011505A00_____ | | | | | |
| 2200 " | 8 | 15 | 18 | 15 | FKP1T012204F00_____ | 7 | 16.5 | 26.5 | 22.5 | FKP1U012205D00_____ |
| | 5 | 14 | 26.5 | 22.5 | FKP1T012205A00_____ | | | | | |
| 3300 " | 6 | 15 | 26.5 | 22.5 | FKP1T013305B00_____ | 7 | 16.5 | 26.5 | 22.5 | FKP1U013305D00_____ |
| 4700 " | 7 | 16.5 | 26.5 | 22.5 | FKP1T014705D00_____ | 8.5 | 18.5 | 26.5 | 22.5 | FKP1U014705F00_____ |
| 6800 " | 8.5 | 18.5 | 26.5 | 22.5 | FKP1T016805F00_____ | 10.5 | 20.5 | 26.5 | 22.5 | FKP1U016805H00_____ |
| 0.01 µF | 10.5 | 20.5 | 26.5 | 22.5 | FKP1T021005H00_____ | 11 | 21 | 31.5 | 27.5 | FKP1U021006B00_____ |
| 0.015 " | 11 | 21 | 31.5 | 27.5 | FKP1T021506B00_____ | 13 | 24 | 31.5 | 27.5 | FKP1U021506D00_____ |
| 0.022 " | 11 | 21 | 31.5 | 27.5 | FKP1T022206B00_____ | 15 | 26 | 31.5 | 27.5 | FKP1U022206F00_____ |
| | | | | | | 13 | 24 | 41.5 | 37.5 | FKP1U022207C00_____ |
| 0.033 " | 13 | 24 | 31.5 | 27.5 | FKP1T023306D00_____ | 13 | 24 | 41.5 | 37.5 | FKP1U023307C00_____ |
| | 13 | 24 | 41.5 | 37.5 | FKP1T023307C00_____ | | | | | |
| 0.047 " | 13 | 24 | 41.5 | 37.5 | FKP1T024707C00_____ | 17 | 29 | 41.5 | 37.5 | FKP1U024707E00_____ |
| 0.068 " | 15 | 26 | 41.5 | 37.5 | FKP1T026807D00_____ | 19 | 32 | 41.5 | 37.5 | FKP1U026807F00_____ |
| 0.1 µF | 17 | 29 | 41.5 | 37.5 | FKP1T031007E00_____ | | | | | |

| Capacitance | 4000 VDC/700 VAC* | | | | | 6000 VDC/700 VAC* | | | | |
|-------------|-------------------|------|------|-------|---------------------|-------------------|------|------|-------|---------------------|
| | W | H | L | PCM** | Part number | W | H | L | PCM** | Part number |
| 470 pF | 5 | 14 | 26.5 | 22.5 | FKP1X004705A00_____ | 5 | 14 | 26.5 | 22.5 | FKP1Y004705A00_____ |
| 680 " | 5 | 14 | 26.5 | 22.5 | FKP1X006805A00_____ | 5 | 14 | 26.5 | 22.5 | FKP1Y006805A00_____ |
| 1000 pF | 5 | 14 | 26.5 | 22.5 | FKP1X011005A00_____ | 5 | 14 | 26.5 | 22.5 | FKP1Y011005A00_____ |
| 1500 " | 7 | 16.5 | 26.5 | 22.5 | FKP1X011505D00_____ | 7 | 16.5 | 26.5 | 22.5 | FKP1Y011505D00_____ |
| 2200 " | 8.5 | 18.5 | 26.5 | 22.5 | FKP1X012205F00_____ | 10.5 | 20.5 | 26.5 | 22.5 | FKP1Y012205H00_____ |
| 3300 " | 10.5 | 20.5 | 26.5 | 22.5 | FKP1X013305H00_____ | 10.5 | 20.5 | 26.5 | 22.5 | FKP1Y013305H00_____ |
| 4700 " | 11 | 21 | 31.5 | 27.5 | FKP1X014706B00_____ | 11 | 21 | 31.5 | 27.5 | FKP1Y014706B00_____ |
| 6800 " | 13 | 24 | 31.5 | 27.5 | FKP1X016806D00_____ | 13 | 24 | 31.5 | 27.5 | FKP1Y016806D00_____ |
| 0.01 µF | 15 | 26 | 31.5 | 27.5 | FKP1X021006F00_____ | 15 | 26 | 31.5 | 27.5 | FKP1Y021006F00_____ |
| 0.015 " | 13 | 24 | 41.5 | 37.5 | FKP1X021507C00_____ | 13 | 24 | 41.5 | 37.5 | FKP1Y021507C00_____ |
| 0.022 " | 17 | 29 | 41.5 | 37.5 | FKP1X022207E00_____ | 17 | 29 | 41.5 | 37.5 | FKP1Y022207E00_____ |

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

** PCM = Printed circuit module = lead 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:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Lead length: 6-2 = SD

Taped version see page 127.

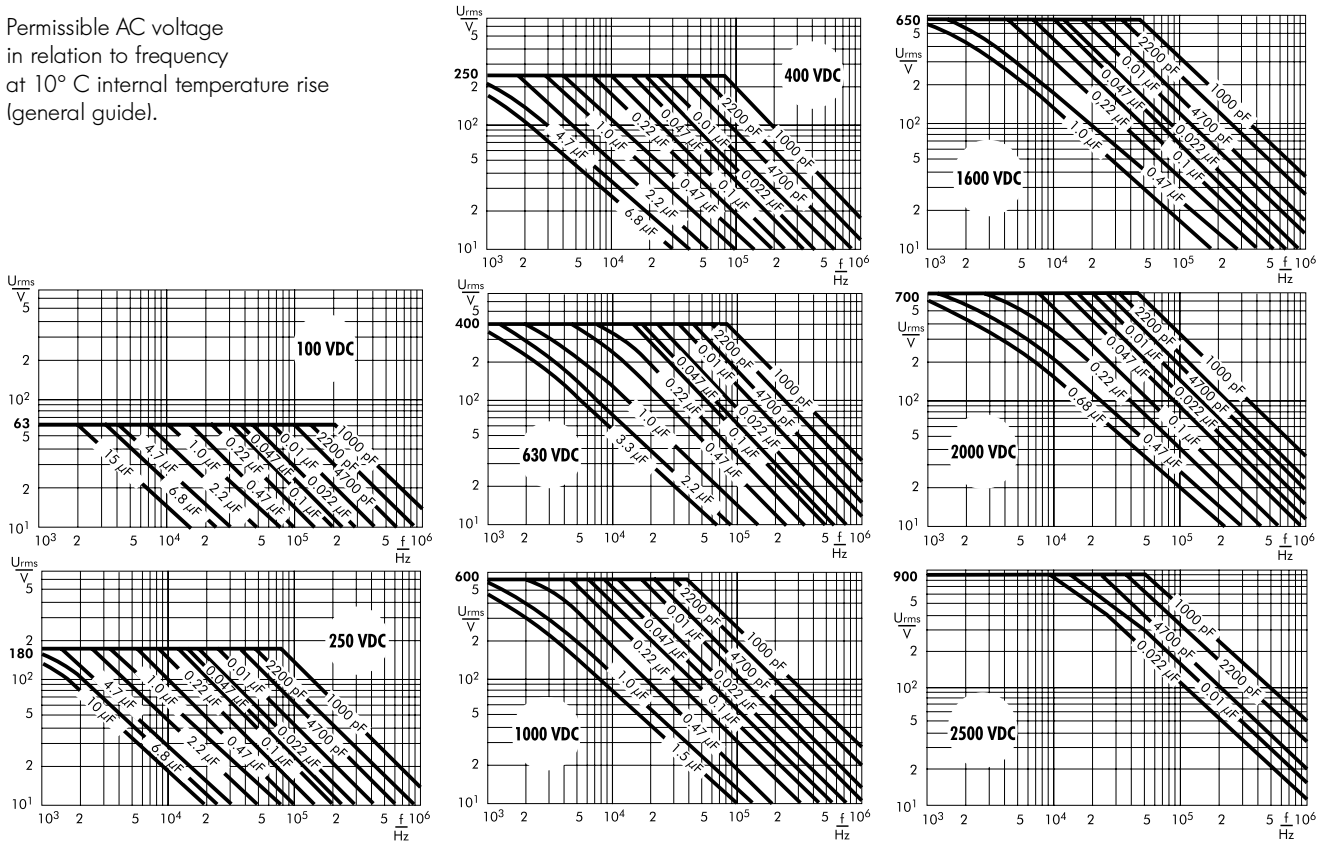
AC voltage graphs see page 61.

WIMA MKP 10



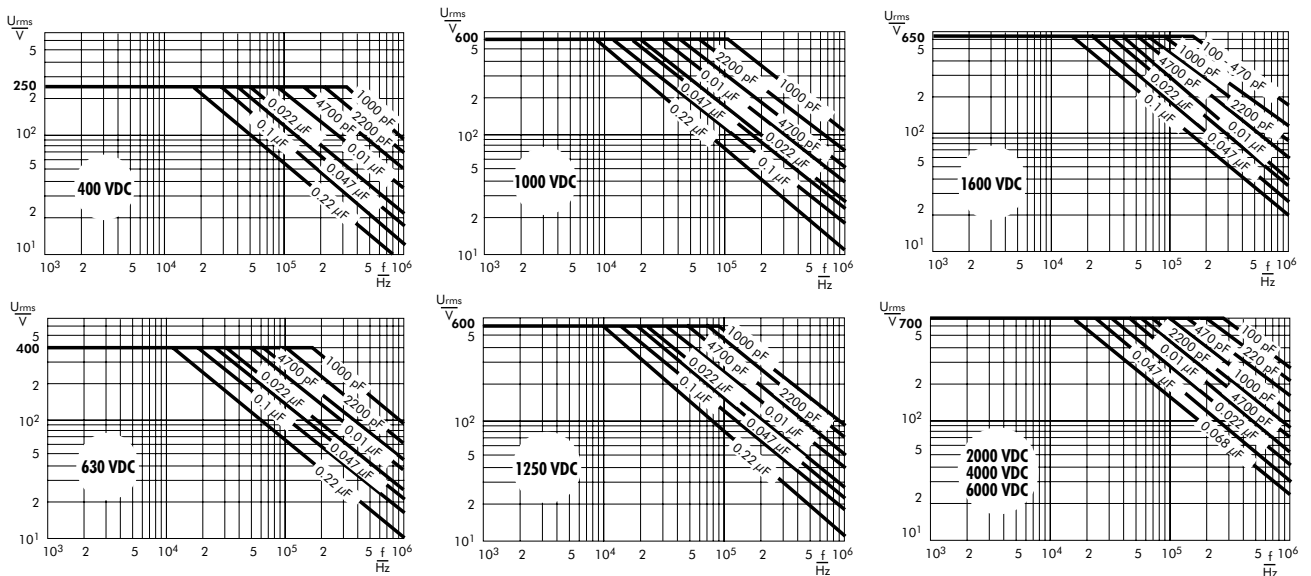
Continuation

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



WIMA FKP 1

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



Technical information and general data see page 66.

Recommendation for Processing and Application of Through-Hole Capacitors

Soldering Process

A preheating of through-hole WIMA capacitors is allowed for temperatures $T_{\max} < 100^{\circ}\text{C}$. In practice a preheating duration of $t < 5$ min. has been proven to be best.

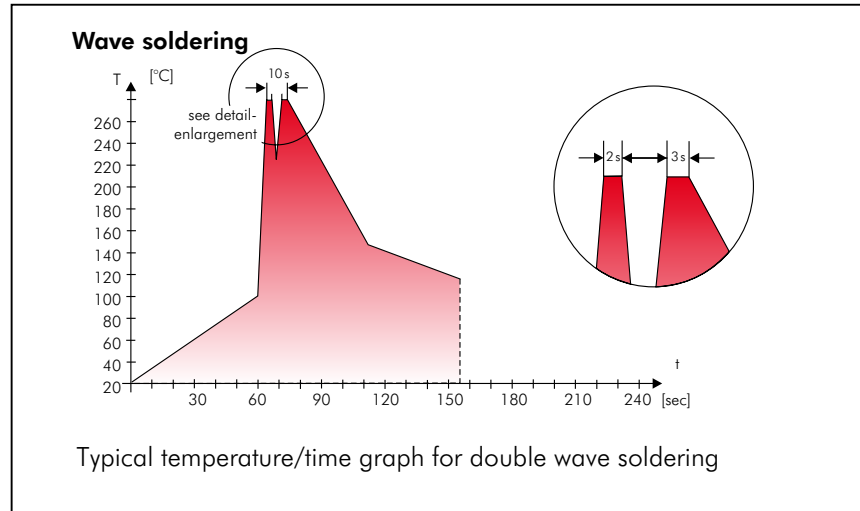
Single wave soldering

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

Double wave soldering

Soldering bath temperature: $T < 260^{\circ}\text{C}$
Immersion time: $2 \times t < 3$ sec

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



WIMA Quality and Environmental Philosophy

ISO 9001:2000 Certification

ISO 9001:2000 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2000 of our factories by the VDE inspectorate 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 of WPCS during production process:

- incoming material inspection
- metallization
- film inspection
- schoopage
- pre-healing
- lead attachment
- cast resin preparation/encapsulation
- 100% final inspection
- AQL check

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
- PCB
- CFC
- Hydrocarbon chloride
- Chromium 6+
- PBB/PBDE
- Arsenic
- Cadmium
- Mercury
- 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:

- foamed polystyrene (Styropor®)
- adhesive tapes made of plastic
- metal clips

RoHS Compliance

According to the RoHS Directive 2002/95/EC 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 2002/95/EG

WIMA capacitors are lead free in accordance with RoHS 2002/95/EC

Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2005

WIMA's environmental management has been established in accordance with the guidelines of DIN EN ISO 14001:2005. The certification has been granted in June 2006.

Typical Dimensions for Taping Configuration

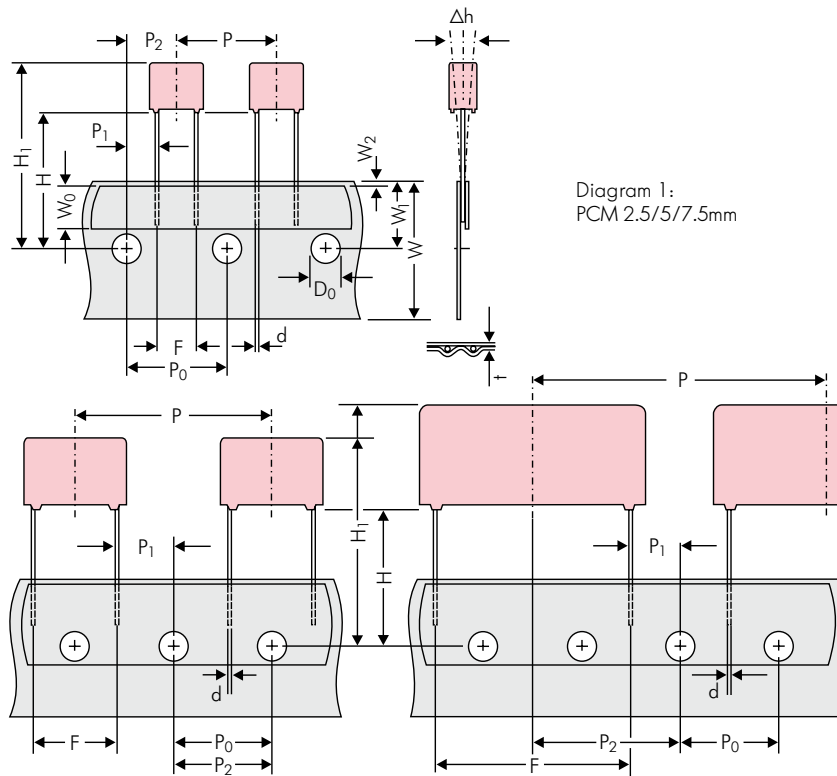


Diagram 1:
PCM 2.5/5/7.5mm

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 lead | 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 |
| Lead 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 |
| Lead diameter | d | 0.4 ±0.05 | 0.5 ±0.05 | 0.5 ±0.05 or 0.6 ^{+0.06} _{-0.05} | 0.5 ±0.05 or 0.6 ^{+0.06} _{-0.05} | 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 | 0.7 ±0.2 | 0.7 ±0.2 | 0.7 ±0.2 | 0.7 ±0.2 | 0.7 ±0.2 | 0.7 ±0.2 | 0.7 ±0.2 |
| Package (see also page 128) | ROLL/AMMO | | | AMMO | | | | |
| | REEL | φ 360 max. φ 30 ±1 | B 52 ±2 58 ±2 } depending on comp. dimensions | REEL | φ 360 max. φ 30 ±1 | 52 ±2 58 ±2 or 66 ±2 | REEL | φ 500 max. φ 25 ±1 |
| Unit | see details page 130. | | | | | | | |

Dims in mm.

* Diameter of leads see General Data.

* PCM 10 and PCM 15 can be crimped to PCM 7.5.

Position of components according to PCM 7.5 (sketch 11). P₀ = 12.7 or 15.0 is possible

Please clarify customer-specific deviations with the manufacturer.

Packing Quantities for Bulk Capacitors and TPS*



| PCM | Size | | | | pcs. per packaging unit bulk | | | pcs. per packaging unit/TPS* | |
|----------------|------|------|-----------|-----------|------------------------------|----------------------|------------------|------------------------------|----------------------|
| | W | H | L | Codes | Mini M | Standard S | Maxi G | Mini X | Standard Y |
| 2.5 mm | 2.5 | 7 | 4.6 | 0B | 1000 | 5000 | 10 000 | - | - |
| | 3 | 7.5 | 4.6 | 0C | 1000 | 5000 | 10 000 | - | - |
| | 3.8 | 8.5 | 4.6 | 0D | 1000 | 5000 | 10 000 | - | - |
| | 4.6 | 9 | 4.6 | 0E | 1000 | 5000 | 10 000 | - | - |
| | 5.5 | 10 | 4.6 | 0F | 1000 | 5000 | 10 000 | - | - |
| 5 mm | 2.5 | 6.5 | 7.2 | 1A | 2000 | 5000 | 10 000 | - | - |
| | 3 | 7.5 | 7.2 | 1B | 1000 | 5000 | - | - | - |
| | 3.5 | 8.5 | 7.2 | 1C | 1000 | 5000 | - | - | - |
| | 4.5 | 6 | 7.2 | 1D | 1000 | 6000 | - | - | - |
| | 4.5 | 9.5 | 7.2 | 1E | 1000 | 4000 | - | - | - |
| | 5 | 10 | 7.2 | 1F | 1000 | 3500 | - | - | - |
| | 5.5 | 7 | 7.2 | 1G | 1000 | 4000 | - | - | - |
| | 5.5 | 11.5 | 7.2 | 1H | 500 | 2500 | - | - | - |
| | 6.5 | 8 | 7.2 | 1I | 1000 | 2500 | - | - | - |
| | 7.2 | 8.5 | 7.2 | 1J | 500 | 2500 | - | - | - |
| | 7.2 | 13 | 7.2 | 1K | 500 | 2000 | - | - | - |
| | 8.5 | 10 | 7.2 | 1L | 500 | 2000 | - | - | - |
| | 8.5 | 14 | 7.2 | 1M | 500 | 1500 | - | - | - |
| 11 | 16 | 7.2 | 1N | 250 | 1000 | - | - | - | |
| 7.5 mm | 2.5 | 7 | 10 | 2A | 1000 | 5000 | - | - | - |
| | 3 | 8.5 | 10 | 2B | 1000 | 5000 | - | - | - |
| | 4 | 9 | 10 | 2C | 1000 | 4000 | - | - | - |
| | 4.5 | 9.5 | 10.3 | 2D | 1000 | 3500 | - | - | - |
| | 5 | 10.5 | 10.3 | 2E | 1000 | 3000 | - | - | - |
| | 5.7 | 12.5 | 10.3 | 2F | 500 | 2000 | - | - | - |
| | 7.2 | 12.5 | 10.3 | 2G | 500 | 1500 | - | - | - |
| 10 mm | 3 | 9 | 13 | 3A | 1000 | 3000 | - | - | - |
| | 4 | 8.5 | 13.5 | 3A | 500 | 3000 | - | - | - |
| | 4 | 9 | 13 | 3C | 1000 | 3000 | - | - | - |
| | 4 | 9.5 | 13 | 3D | 1000 | 3000 | - | - | - |
| | 5 | 10 | 13.5 | 3B | 500 | 2000 | - | - | - |
| | 5 | 11 | 13 | 3F | 1000 | 3000 | - | - | - |
| | 6 | 12 | 13 | 3G | 800 | 2400 | - | - | - |
| | 6 | 12.5 | 13 | 3H | 800 | 2400 | - | - | - |
| 8 | 12 | 13 | 3I | 500 | 2000 | - | - | - | |
| 15 mm | 5 | 11 | 18 | 4B | 800 | 2400 | - | - | - |
| | 5 | 13 | 19 | 4C | 200 | 1000 | - | - | - |
| | 6 | 12.5 | 18 | 4C | 500 | 2000 | - | - | - |
| | 6 | 14 | 19 | 4D | 250 | 1000 | - | - | - |
| | 7 | 14 | 18 | 4D | 400 | 1600 | - | - | - |
| | 7 | 15 | 19 | 4E | 250 | 1000 | - | - | - |
| | 8 | 15 | 18 | 4F | 400 | 1200 | - | - | - |
| | 8 | 17 | 19 | 4F | 100 | 500 | - | - | - |
| | 9 | 14 | 18 | 4H | 400 | 1200 | - | - | - |
| | 9 | 16 | 18 | 4J | 300 | 900 | - | - | - |
| | 10 | 18 | 19 | 4G | 100 | 500 | - | - | - |
| 11 | 14 | 18 | 4M | 300 | 1000 | - | - | - | |
| 22.5 mm | 5 | 14 | 26.5 | 5A | 300 | 1200 | - | - | - |
| | 6 | 15 | 26.5 | 5B | 250 | 1000 | - | - | - |
| | 7 | 16.5 | 26.5 | 5D | 190 | 760 | - | - | - |
| | 8 | 20 | 28 | 5H | 125 | 500 | - | - | - |
| | 8.5 | 18.5 | 26.5 | 5F | 125 | 500 | - | - | - |
| | 10 | 22 | 28 | 5I | - | - | - | 90 | 540 |
| | 10.5 | 19 | 26.5 | 5G | - | - | - | 170 | 680 |
| | 10.5 | 20.5 | 26.5 | 5H | - | - | - | 170 | 680 |
| | 11 | 21 | 26.5 | 5I | - | - | - | 170 | 680 |
| 12 | 24 | 28 | 5J | - | - | - | 75 | 450 | |
| 27.5 mm | 9 | 19 | 31.5 | 6A | - | - | - | 160 | 640 |
| | 11 | 21 | 31.5 | 6B | - | - | - | 136 | 544 |
| | 13 | 24 | 31.5 | 6D | - | - | - | 112 | 448 |
| | 13 | 25 | 33 | 6K | - | - | - | 56 | 336 |
| | 15 | 26 | 31.5 | 6F | - | - | - | 96 | 384 |
| | 15 | 26 | 33 | 6L | - | - | - | 48 | 288 |
| | 17 | 29 | 31.5 | 6G | - | - | - | 88 | 176 |
| | 17 | 34.5 | 31.5 | 6I | - | - | - | 88 | 176 |
| | 20 | 32 | 33 | 6M | - | - | - | 36 | 216 |
| | 20 | 39.5 | 31.5 | 6J | - | - | - | 36 | 144 |
| 37.5 mm | 9 | 19 | 41.5 | 7A | - | - | - | 60 | 480 |
| | 11 | 22 | 41.5 | 7B | - | - | - | 51 | 408 |
| | 13 | 24 | 41.5 | 7C | - | - | - | 84 | 252 |
| | 15 | 26 | 41.5 | 7D | - | - | - | 72 | 144 |
| | 17 | 29 | 41.5 | 7E | - | - | - | 66 | 132 |
| | 19 | 32 | 41.5 | 7F | - | - | - | 54 | 108 |
| | 20 | 39.5 | 41.5 | 7G | - | - | - | 27 | 108 |
| | 24 | 45.5 | 41.5 | 7H | - | - | - | 21 | 84 |



Packing Units for Taped Capacitors with Radial Leads

| PCM | Size | | | | ROLL | | REEL | | | | AMMO | | | |
|----------------|------|------|-----------|-----------|-------|-------|-------|-----|----------|-----|-----------|-----|-----------|---|
| | | | | | H16.5 | H18.5 | ø 360 | | ø 500 | | 340 x 340 | | 490 x 370 | |
| | W | H | L | Codes | N | O | F | I | H | J | A | C | B | D |
| 2.5 mm | 2.5 | 7 | 4.6 | 0B | 2200 | | 2500 | | | | 2800 | | | |
| | 3 | 7.5 | 4.6 | 0C | 2000 | | 2300 | | | | 2300 | | | |
| | 3.8 | 8.5 | 4.6 | 0D | 1500 | | 1800 | | | | 1800 | | | |
| | 4.6 | 9 | 4.6 | 0E | 1200 | | 1500 | | | | 1500 | | | |
| | 5.5 | 10 | 4.6 | 0F | 900 | | 1200 | | | | 1200 | | | |
| 5 mm | 2.5 | 6.5 | 7.2 | 1A | 2200 | | 2500 | | | | 2800 | | | |
| | 3 | 7.5 | 7.2 | 1B | 2000 | | 2300 | | | | 2300 | | | |
| | 3.5 | 8.5 | 7.2 | 1C | 1600 | | 2000 | | | | 2000 | | | |
| | 4.5 | 6 | 7.2 | 1D | 1300 | | 1500 | | | | 1500 | | | |
| | 4.5 | 9.5 | 7.2 | 1E | 1300 | | 1500 | | | | 1500 | | | |
| | 5 | 10 | 7.2 | 1F | 1100 | | 1400 | | | | 1400 | | | |
| | 5.5 | 7 | 7.2 | 1G | 1000 | | 1200 | | | | 1200 | | | |
| | 5.5 | 11.5 | 7.2 | 1H | 1000 | | 1200 | | | | 1200 | | | |
| | 6.5 | 8 | 7.2 | 1I | 800 | | 1000 | | | | 1000 | | | |
| | 7.2 | 8.5 | 7.2 | 1J | 700 | | 1000 | | | | 1000 | | | |
| | 7.2 | 13 | 7.2 | 1K | 700 | | 950 | | | | 1000 | | | |
| | 8.5 | 10 | 7.2 | 1L | 600 | | 800 | | | | 800 | | | |
| | 8.5 | 14 | 7.2 | 1M | 600 | | 800 | | | | 800 | | | |
| 11 | 16 | 7.2 | 1N | 500 | | 700 | | | | 700 | | | | |
| 7.5 mm | 2.5 | 7 | 10 | 2A | | | 2500 | | 4400 | | 2500 | | | |
| | 3 | 8.5 | 10 | 2B | | | 2200 | | 4300 | | 2300 | | 4150 | |
| | 4 | 9 | 10 | 2C | | | 1700 | | 3200 | | 1700 | | 3100 | |
| | 4.5 | 9.5 | 10.3 | 2D | | | 1500 | | 2900 | | 1400 | | 2800 | |
| | 5 | 10.5 | 10.3 | 2E | | | 1300 | | 2500 | | 1300 | | | |
| | 5.7 | 12.5 | 10.3 | 2F | | | 1000 | | 2200 | | 1100 | | | |
| | 7.2 | 12.5 | 10.3 | 2G | | | 900 | | 1800 | | 1000 | | | |
| 10 mm | 3 | 9 | 13 | 3A | | | 1100 | | 2200 | | | | 1900 | |
| | 4 | 8.5 | 13.5 | FA | | | 900 | | 1600 | | | | 1450 | |
| | 4 | 9 | 13 | 3C | | | 900 | | 1600 | | | | 1450 | |
| | 4 | 9.5 | 13 | 3D | | | 900 | | 1600 | | | | 1400 | |
| | 5 | 10 | 13.5 | FB | | | 700 | | 1300 | | | | 1200 | |
| | 5 | 11 | 13 | 3F | | | 700 | | 1300 | | | | 1200 | |
| | 6 | 12 | 13 | 3G | | | 550 | | 1100 | | | | 1000 | |
| | 6 | 12.5 | 13 | 3H | | | 550 | | 1100 | | | | 1000 | |
| 8 | 12 | 13 | 3I | | | 400 | | 800 | | | | 740 | | |
| 15 mm | 5 | 11 | 18 | 4B | | | 600 | | 1200 | | | | 1150 | |
| | 5 | 13 | 19 | FC | | | 600 | | 1200 | | | | 1200 | |
| | 6 | 12.5 | 18 | 4C | | | 500 | | 1000 | | | | 1000 | |
| | 6 | 14 | 19 | FD | | | 500 | | 1000 | | | | 1000 | |
| | 7 | 14 | 18 | 4D | | | 450 | | 900 | | | | 850 | |
| | 7 | 15 | 19 | FE | | | 450 | | 900 | | | | 850 | |
| | 8 | 15 | 18 | 4F | | | 400 | | 800 | | | | 740 | |
| | 8 | 17 | 19 | FF | | | 400 | | 800 | | | | 740 | |
| | 9 | 14 | 18 | 4H | | | 350 | | 700 | | | | 650 | |
| | 9 | 16 | 18 | 4J | | | 350 | | 700 | | | | 650 | |
| | 10 | 18 | 19 | FG | | | 300 | | 650 | | | | 590 | |
| 11 | 14 | 18 | 4M | | | 300 | | 600 | | | | 540 | | |
| 22.5 mm | 5 | 14 | 26.5 | 5A | | | | | 800 | | | | 770 | |
| | 6 | 15 | 26.5 | 5B | | | | | 700 | | | | 640 | |
| | 7 | 16.5 | 26.5 | 5D | | | | | 600 | | | | 550 | |
| | 8 | 20 | 28 | FH | | | | | 500 | | | | 480 | |
| | 8.5 | 18.5 | 26.5 | 5F | | | | | 480 | | | | 450 | |
| | 10 | 22 | 28 | FI | | | | | 420 | | | | 380 | |
| | 10.5 | 19 | 26.5 | 5G | | | | | 400 | | | | 360 | |
| | 10.5 | 20.5 | 26.5 | 5H | | | | | 400 | | | | 360 | |
| | 11 | 21 | 26.5 | 5I | | | | | 380 | | | | 350 | |
| | 12 | 24 | 28 | FJ | | | | | 350 | | | | 310 | |
| 27.5 mm | 9 | 19 | 31.5 | 6A | | | | | 460/340* | | | | 420 | |
| | 11 | 21 | 31.5 | 6B | | | | | 380/280* | | | | 350 | |
| | 13 | 24 | 31.5 | 6D | | | | | 300 | | | | 290 | |
| | 15 | 26 | 31.5 | 6F | | | | | 270 | | | | 250 | |

* for 2-inch transport pitches.

Samples and pre-production needs 1 packing unit minimum.

■ Moulded versions.

Rights reserved to amend design data without prior notification.



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: Special features (e.g. Snubber versions)
- Field 15: Capacitance tolerance
- Field 16: Packing
- Field 17 - 18: Lead 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 µF | | | 2.5x6.5x7.2 | | - | | 20% | bulk | 6 -2 | | |

| | | | | | | | | | | | | | | | | | |
|--|--|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <p>Type description:</p> <p>SMD-PET = SMDT SMD-PPS = SMDI FKP 02 = FKP0 MKS 02 = MKS0 FKS 2 = FKS2 FKP 2 = FKP2 MKS 2 = MKS2 MKP 2 = MKP2 FKS 3 = FKS3 FKP 3 = FKP3 MKS 4 = MKS4 MKP 4 = MKP4 MKP 10 = MKP1 FKP 4 = FKP4 FKP 1 = FKP1 MKP-X2 = MKX2 MKP-X2 R = MKXR MKP-Y2 = MKY2 MP 3-X2 = MPX2 MP 3-X1 = MPX1 MP 3-Y2 = MPY2 MP 3R-Y2 = MPRY Snubber MKP = SNMP Snubber FKP = SNFP GTO MKP = GTOM DC-LINK MKP 4 = DCP4 DC-LINK MKP C = DCPC DC-LINK HC = DCH_ SuperCap C = SCSC SuperCap MC = SMC SuperCap R = SCSR SuperCap MR = SCMR</p> | <p>Rated voltage:</p> <p>2.5 VDC = A1 4 VDC = A2 14 VDC = A3 28 VDC = A4 40 VDC = A5 5 VDC = A6 50 VDC = B0 63 VDC = C0 100 VDC = D0 160 VDC = E0 250 VDC = F0 400 VDC = G0 450 VDC = H0 600 VDC = I0 630 VDC = J0 700 VDC = K0 800 VDC = L0 850 VDC = M0 900 VDC = N0 1000 VDC = O1 1100 VDC = P0 1200 VDC = Q0 1250 VDC = R0 1500 VDC = S0 1600 VDC = T0 2000 VDC = U0 2500 VDC = V0 3000 VDC = W0 4000 VDC = X0 6000 VDC = Y0 250 VAC = 0W 275 VAC = 1W 300 VAC = 2W 400 VAC = 3W 440 VAC = 4W 500 VAC = 5W</p> | <p>Capacitance:</p> <p>22 pF = 0022 47 pF = 0047 100 pF = 0100 150 pF = 0150 220 pF = 0220 330 pF = 0330 470 pF = 0470 680 pF = 0680 1000 pF = 1100 1500 pF = 1150 2200 pF = 1220 3300 pF = 1330 4700 pF = 1470 6800 pF = 1680 0.01 µF = 2100 0.022 µF = 2220 0.047 µF = 2470 0.1 µF = 3100 0.22 µF = 3220 0.47 µF = 3470 1 µF = 4100 2.2 µF = 4220 4.7 µF = 4470 10 µF = 5100 22 µF = 5220 47 µF = 5470 100 µF = 6100 220 µF = 6220 1 F = A010 2.5 F = A025 50 F = A500 100 F = B100 110 F = B110 600 F = B600 1200 F = C120 ...</p> | <p>Size:</p> <p>4.8x3.3x3 Size 1812 = X1 4.8x3.3x4 Size 1812 = X2 5.7x5.1x3.5 Size 2220 = Y1 5.7x5.1x4.5 Size 2220 = Y2 7.2x6.1x3 Size 2824 = T1 7.2x6.1x5 Size 2824 = T2 10.2x7.6x5 Size 4030 = K1 12.7x10.2x6 Size 5040 = V1 15.3x13.7x7 Size 6054 = Q1 2.5x7x4.6 PCM 2.5 = 0B 3x7.5x4.6 PCM 2.5 = 0C 2.5x6.5x7.2 PCM 5 = 1A 3x7.5x7.2 PCM 5 = 1B 2.5x7x10 PCM 7.5 = 2A 3x8.5x10 PCM 7.5 = 2B 3x9x13 PCM 10 = 3A 4x9x13 PCM 10 = 3C 5x11x18 PCM 15 = 4B 6x12.5x18 PCM 15 = 4C 5x14x26.5 PCM 22.5 = 5A 6x15x26.5 PCM 22.5 = 5B 9x19x31.5 PCM 27.5 = 6A 11x21x31.5 PCM 27.5 = 6B 9x19x41.5 PCM 37.5 = 7A 11x22x41.5 PCM 37.5 = 7B 94x49x182 DCH_ = H0 94x77x182 DCH_ = H1 ...</p> | <p>Tolerance:</p> <p>20% = M 10% = K 5% = J 2.5% = H 1% = E ...</p> <p>Packing:</p> <p>AMMO H16.5 340x340 = A AMMO H16.5 490x370 = B AMMO H18.5 340x340 = C AMMO H18.5 490x370 = D REEL H16.5 360 = F REEL H16.5 500 = H REEL H18.5 360 = I REEL H18.5 500 = J ROLL H16.5 = N ROLL H18.5 = O BLISTER W12 180 = P BLISTER W12 330 = Q BLISTER W16 330 = R BLISTER W24 330 = T Bulk Mini = M Bulk Standard = S Bulk Maxi = G TPS Mini = X TPS Standard = Y ...</p> | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

| | |
|--|--|
| <p>Special features:</p> <p>Standard = 00 Version A1 = 1A Version A1.1.1 = 1B Version A1.2 = 1C ...</p> | <p>Lead length (untaped)</p> <p>3.5 ±0.5 = C9 6 -2 = SD 16 ±1 = P1 ...</p> |
|--|--|

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.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Film Capacitors](#) category:

Click to view products by [WIMA](#) manufacturer:

Other Similar products are found below :

[F339X134748MIP2T0](#) [F450KG153J250ALH0J](#) [750-1018](#) [FKP1-1500160010P15](#) [FKP1R031007D00JYSD](#) [FKP1R031507E00JYSD](#)
[FKP1U024707E00KYSD](#) [82DC4100CK60J](#) [82EC1100DQ50K](#) [PFR5101J100J11L16.5TA18](#) [PME261JB5220KR19T0](#) [A451GK223M040A](#)
[A561ED221M450A](#) [QXJ2E474KTPT](#) [QXL2B333KTPT](#) [R49AN347000A1K](#) [EEC2G505HQA406](#) [B25668A6676A375](#) [B25673A4282E140](#)
[BFC233868148](#) [BFC2370GC222](#) [C3B2AD44400B20K](#) [C4ASWBU3220A3EK](#) [CB027C0473J--](#) [CB177I0184J--](#) [CB182K0184J--](#) [23PW210](#)
[950CQW5H-F](#) [SBDC3470AA10J](#) [SCD105K122A3-22](#) [2N3155](#) [A571EH331M450A](#) [FKP1-2202KV5P15](#) [FKS3-680040010P10](#)
[QXL2E473KTPT](#) [445450-1](#) [B25669A3996J375](#) [46KI322000M1M](#) [46KR415050M1K](#) [4BSNBX4100ZBFJ](#) [MKP383510063JKP2T0](#)
[MKPY2-.02230020P15](#) [MKT 1813-368-015](#) [4055292001](#) [46KN410000N1K](#) [EEC2E106HQA405](#) [EEC2G205HQA402](#) [EEC2G805HQA415](#)
[P409CP224M250AH470](#) [82EC2150DQ50K](#)