

## 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

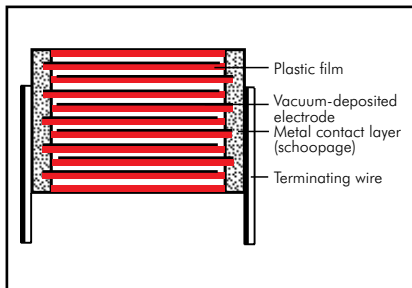
#### Dielectric:

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.

Epoxy resin seal: Red

### Electrical Data

#### Capacitance range:

0.01 µF to 10 µF (E12-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        | $\geq 5 \times 10^3 M\Omega$ (mean value: $3 \times 10^4 M\Omega$ )   | $\geq 1000$ sec ( $M\Omega \times \mu F$ ) (mean value: 3000 sec) |
| 63 VDC         | 50V        | $\geq 1 \times 10^4 M\Omega$ (mean value: $5 \times 10^4 M\Omega$ )   | $\geq 1250$ sec ( $M\Omega \times \mu F$ ) (mean value: 3000 sec) |
| $\geq 100$ VDC | 100V       | $\geq 1.5 \times 10^4 M\Omega$ (mean value: $1 \times 10^5 M\Omega$ ) | $\geq 3000$ sec ( $M\Omega \times \mu F$ ) (mean value: 6000 sec) |

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<br>µF | Pulse rise time V/µsec<br>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/sec<sup>2</sup> 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 $\mu$ F |                |      |     |       |                     | 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 $\mu$ F  |                |      |     |       |                     | 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 $\mu$ F  | 3.5            | 8.5  | 7.2 | 5     | MKS2B041001C00_____ | 5              | 10   | 7.2 | 5     | MKS2C041001F00_____ |
| 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 $\mu$ F   | 11             | 16   | 7.2 | 5     | MKS2B051001N00_____ |                |      |     |       |                     |

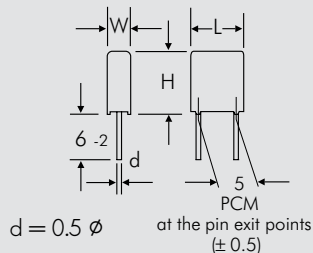
  

| Capacitance  | 100 VDC/63 VAC* |     |     |       |                     | 250 VDC/160 VAC* |      |     |       |                     |
|--------------|-----------------|-----|-----|-------|---------------------|------------------|------|-----|-------|---------------------|
|              | W               | H   | L   | PCM** | Part number         | W                | H    | L   | PCM** | Part number         |
| 0.01 $\mu$ F | 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 $\mu$ F  | 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 $\mu$ F  | 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 145.

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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 $\mu\text{F}$ | 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 $\mu\text{F}$  | 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

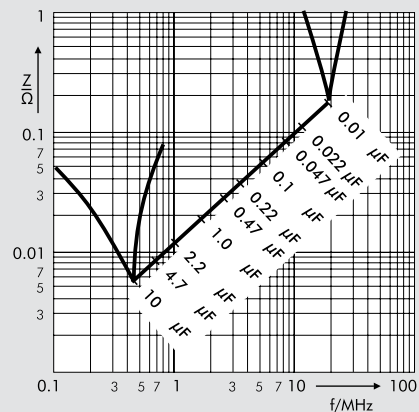
10 % = K

5 % = J

Packing: bulk = S

Pin length: 6-2 = SD

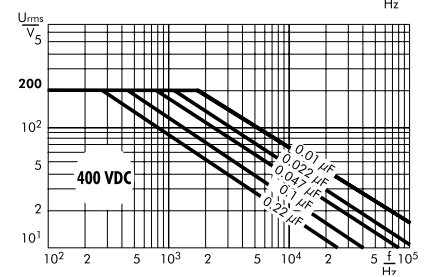
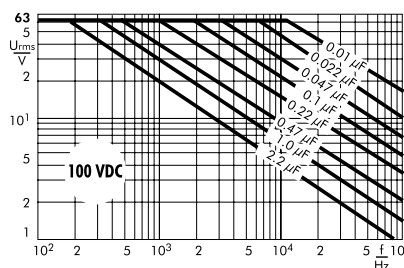
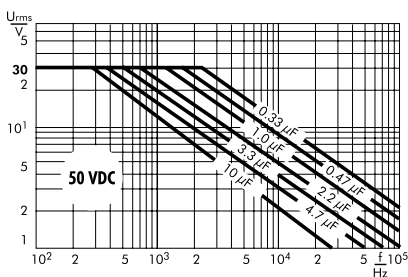
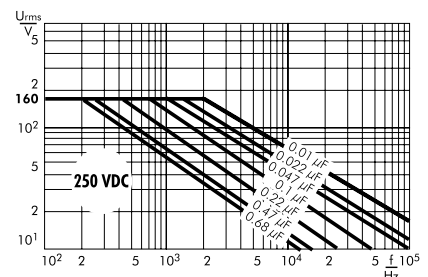
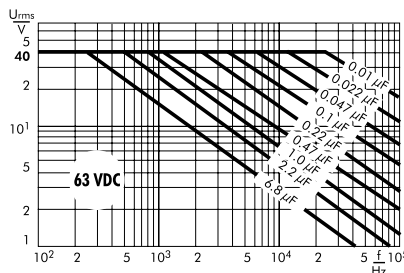
Taped version see page 145.



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).



## 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:  $T_{max.} \leq 110^{\circ}C$

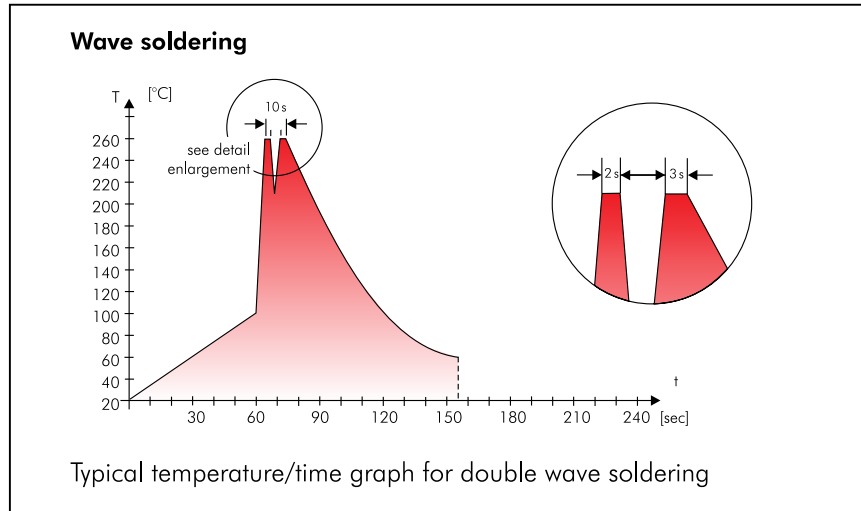
### Single wave soldering

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.



## WIMA Quality and Environmental Philosophy

### ISO 9001:2008 Certification

ISO 9001:2008 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2008 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-healing
- 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
- 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 2011/65/EU 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

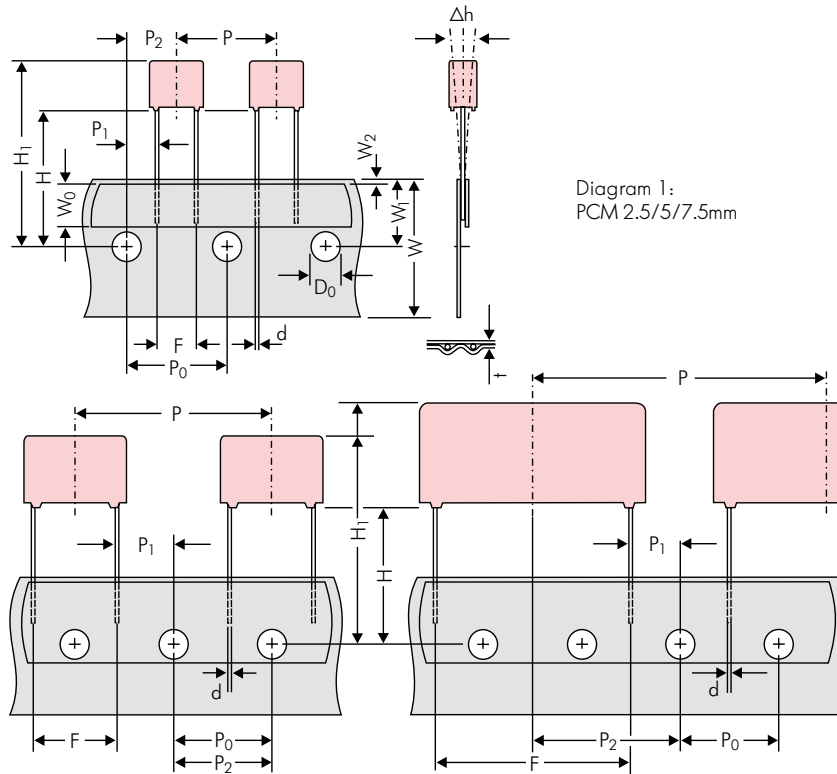
WIMA capacitors are lead free in accordance with RoHS 2011/65/EU

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.

# Typical Dimensions for Taping Configuration



\*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 <sub>0</sub>        | 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 <sub>1</sub>        | 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 <sub>2</sub>        | 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 <sub>0</sub>        | 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 <sub>0</sub>        | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  | 12.7 ±0.3<br>cumulative pitch error max. 1.0 mm/20 pitch  |
| Feed hole centre to pin                          | P <sub>1</sub>        | 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 <sub>2</sub>        | 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<br>18.5 ±0.5                                   | 16.5 ±0.3<br>18.5 ±0.5                                   | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    | 16.5 ±0.5<br>18.5 ±0.5                                    |
| Feed hole centre to top edge of the component    | H <sub>1</sub>        | H+H <sub>component</sub> < H <sub>1</sub><br>32.25 max.  | H+H <sub>component</sub> < H <sub>1</sub><br>32.25 max.  | H+H <sub>component</sub> < H <sub>1</sub><br>24.5 to 31.5 | H+H <sub>component</sub> < H <sub>1</sub><br>25.0 to 31.5 | H+H <sub>component</sub> < H <sub>1</sub><br>26.0 to 37.0 | H+H <sub>component</sub> < H <sub>1</sub><br>30.0 to 43.0 | H+H <sub>component</sub> < H <sub>1</sub><br>35.0 to 45.0 |
| Pin spacing at upper edge of carrier tape        | F                     | 2.5 ±0.5   | 5.0 <sup>+0.8</sup> <sub>-0.2</sub>                      | 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 <sup>+0.06</sup> <sub>-0.05</sub>        | 0.5 ±0.05 or 0.6 <sup>+0.06</sup> <sub>-0.05</sub>        | 0.8 <sup>+0.08</sup> <sub>-0.05</sub>                     | 0.8 <sup>+0.08</sup> <sub>-0.05</sub>                     | 0.8 <sup>+0.08</sup> <sub>-0.05</sub>                     |
| 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 146)                      | ROLL/AMMO             |  |  | AMMO  |   |   |   |   |
|  | REEL                  | φ 360 max.<br>φ 30 ±1                                    | B 52 ±2<br>58 ±2 } depending on comp. dimensions         | REEL  | φ 360 max.<br>φ 30 ±1                                     | 52 ±2<br>58 ±2 or 66 ±2                                   | REEL  | φ 500 max.<br>φ 25 ±1                                     |
| Unit   | see details page 147. |  |  |   |   |   |   |   |

Dims in mm.

\* Diameter of pins see General Data.

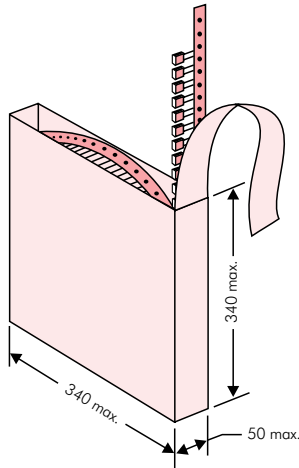
\* PCM 10 and PCM 15 can be crimped to PCM 7.5.

Position of components according to PCM 7.5 (sketch 11). P<sub>0</sub> = 12.7 or 15.0 is possible

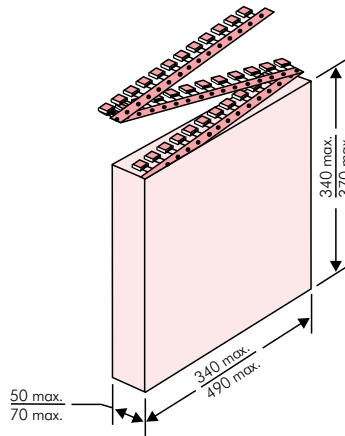
Please clarify customer-specific deviations with the manufacturer.

## Types of Tape Packaging of Capacitors for Automatic Radial Insertion

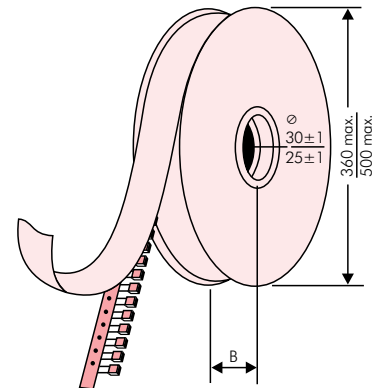
### ■ ROLL Packaging



### ■ 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.

|   |                                      |                                   |              |
|---|--------------------------------------|-----------------------------------|--------------|
| <b>WIMA</b> Best Capacitors Made In Germany |                                      | Werk Unna                         |              |
| Supplier-ID: 123456789                      | <b>RoHS</b><br>2011/65/EU            | Date Code: 08.10.10               |              |
|   |                                      |                                   |              |
| Purchase Order No. (P/O): Bestellung xyz    |                                      | Quantity: 5.000                   |              |
|   |                                      |                                   |              |
| Customer Part No.: KUNDETEILENUMMER         |                                      | Customer No.: 0000100002          |              |
|   |                                      | Gross Weight [g]: 1870            |              |
| WIMA Confirmation No.: 0001004053000100     |                                      | WIMA Part No.: MKS2C034701C00K8SD |              |
|   |                                      |                                   |              |
| Handling Unit:                              | MKS 2                                | QTY: 5.000                        | COO: DE      |
|   | MKS 2 0.47 µF 63 VDC 3.5x8.5x7.2 RM5 |                                   |              |
| 1000067326                                  | Standard 10% Loss - Standard         | Drühte 6-2                        | Week 03/2011 |
|   | Vorlage Debitor Inland               |                                   |              |

BARCODE „Code 39“

# Packing Quantities for Capacitors with Radial Pins in PCM 2.5 mm to 22.5 mm



| PCM            | Size |      |           |           | bulk | pcs. per packing unit |       |       |       |       |           |           |      |   |
|----------------|------|------|-----------|-----------|------|-----------------------|-------|-------|-------|-------|-----------|-----------|------|---|
|                |      |      |           |           |      | ROLL                  |       | REEL  |       |       |           | AMMO      |      |   |
|                | W    | H    | L         | Codes     |      | S                     | H16.5 | H18.5 | ø 360 | ø 500 | 340 x 340 | 490 x 370 |      |   |
|                |      |      |           |           | N    | O                     | F     | I     | H     | J     | A         | C         | B    | D |
| <b>2.5 mm</b>  | 2.5  | 7    | 4.6       | <b>0B</b> | 5000 |                       | 2200  | 2500  |       |       | 2800      |           |      |   |
|                | 3    | 7.5  | 4.6       | <b>0C</b> | 5000 |                       | 2000  | 2300  |       |       | 2300      |           |      |   |
|                | 3.8  | 8.5  | 4.6       | <b>0D</b> | 5000 |                       | 1500  | 1800  |       |       | 1800      |           |      |   |
|                | 4.6  | 9    | 4.6       | <b>0E</b> | 5000 |                       | 1200  | 1500  |       |       | 1500      |           |      |   |
|                | 5.5  | 10   | 4.6       | <b>0F</b> | 5000 |                       | 900   | 1200  |       |       | 1200      |           |      |   |
| <b>5 mm</b>    | 2.5  | 6.5  | 7.2       | <b>1A</b> | 5000 |                       | 2200  | 2500  |       |       | 2800      |           |      |   |
|                | 3    | 7.5  | 7.2       | <b>1B</b> | 5000 |                       | 2000  | 2300  |       |       | 2300      |           |      |   |
|                | 3.5  | 8.5  | 7.2       | <b>1C</b> | 5000 |                       | 1600  | 2000  |       |       | 2000      |           |      |   |
|                | 4.5  | 6    | 7.2       | <b>1D</b> | 6000 |                       | 1300  | 1500  |       |       | 1500      |           |      |   |
|                | 4.5  | 9.5  | 7.2       | <b>1E</b> | 4000 |                       | 1300  | 1500  |       |       | 1500      |           |      |   |
|                | 5    | 10   | 7.2       | <b>1F</b> | 3500 |                       | 1100  | 1400  |       |       | 1400      |           |      |   |
|                | 5.5  | 7    | 7.2       | <b>1G</b> | 4000 |                       | 1000  | 1200  |       |       | 1200      |           |      |   |
|                | 5.5  | 11.5 | 7.2       | <b>1H</b> | 2500 |                       | 1000  | 1200  |       |       | 1200      |           |      |   |
|                | 6.5  | 8    | 7.2       | <b>1I</b> | 2500 |                       | 800   | 1000  |       |       | 1000      |           |      |   |
|                | 7.2  | 8.5  | 7.2       | <b>1J</b> | 2500 |                       | 700   | 1000  |       |       | 1000      |           |      |   |
|                | 7.2  | 13   | 7.2       | <b>1K</b> | 2000 |                       | 700   | 950   |       |       | 1000      |           |      |   |
|                | 8.5  | 10   | 7.2       | <b>1L</b> | 2000 |                       | 600   | 800   |       |       | 800       |           |      |   |
|                | 8.5  | 14   | 7.2       | <b>1M</b> | 1500 |                       | 600   | 800   |       |       | 800       |           |      |   |
| 11             | 16   | 7.2  | <b>1N</b> | 1000      |      | 500                   | 600   |       |       | 400   |           |           |      |   |
| <b>7.5 mm</b>  | 2.5  | 7    | 10        | <b>2A</b> | 5000 |                       |       | 2500  | 4400  |       | 2500      |           |      |   |
|                | 3    | 8.5  | 10        | <b>2B</b> | 5000 |                       |       | 2200  | 4300  |       | 2300      |           | 4150 |   |
|                | 4    | 9    | 10        | <b>2C</b> | 4000 |                       |       | 1700  | 3200  |       | 1700      |           | 3100 |   |
|                | 4.5  | 9.5  | 10.3      | <b>2D</b> | 3500 |                       |       | 1500  | 2900  |       | 1400      |           | 2700 |   |
|                | 5    | 10.5 | 10.3      | <b>2E</b> | 3000 |                       |       | 1300  | 2500  |       | 1300      |           |      |   |
|                | 5.7  | 12.5 | 10.3      | <b>2F</b> | 2000 |                       |       | 1000  | 2200  |       | 1100      |           |      |   |
|                | 7.2  | 12.5 | 10.3      | <b>2G</b> | 1500 |                       |       | 900   | 1800  |       | 1000      |           |      |   |
| <b>10 mm</b>   | 3    | 9    | 13        | <b>3A</b> | 3000 |                       |       | 1100  | 2200  |       |           |           | 1900 |   |
|                | 4    | 8.5  | 13.5      | <b>FA</b> | 3000 |                       |       | 900   | 1600  |       |           |           | 1450 |   |
|                | 4    | 9    | 13        | <b>3C</b> | 3000 |                       |       | 900   | 1600  |       |           |           | 1450 |   |
|                | 4    | 9.5  | 13        | <b>3D</b> | 3000 |                       |       | 900   | 1600  |       |           |           | 1400 |   |
|                | 5    | 10   | 13.5      | <b>FB</b> | 2000 |                       |       | 700   | 1300  |       |           |           | 1200 |   |
|                | 5    | 11   | 13        | <b>3F</b> | 3000 |                       |       | 700   | 1300  |       |           |           | 1200 |   |
|                | 6    | 12   | 13        | <b>3G</b> | 2400 |                       |       | 550   | 1100  |       |           |           | 1000 |   |
|                | 6    | 12.5 | 13        | <b>3H</b> | 2400 |                       |       | 550   | 1100  |       |           |           | 1000 |   |
| 8              | 12   | 13   | <b>3I</b> | 2000      |      |                       | 400   | 800   |       |       |           | 740       |      |   |
| <b>15 mm</b>   | 5    | 11   | 18        | <b>4B</b> | 2400 |                       |       | 600   | 1200  |       |           |           | 1150 |   |
|                | 5    | 13   | 19        | <b>FC</b> | 1000 |                       |       | 600   | 1200  |       |           |           | 1200 |   |
|                | 6    | 12.5 | 18        | <b>4C</b> | 2000 |                       |       | 500   | 1000  |       |           |           | 1000 |   |
|                | 6    | 14   | 19        | <b>FD</b> | 1000 |                       |       | 500   | 1000  |       |           |           | 1000 |   |
|                | 7    | 14   | 18        | <b>4D</b> | 1600 |                       |       | 450   | 900   |       |           |           | 850  |   |
|                | 7    | 15   | 19        | <b>FE</b> | 1000 |                       |       | 450   | 900   |       |           |           | 850  |   |
|                | 8    | 15   | 18        | <b>4F</b> | 1200 |                       |       | 400   | 800   |       |           |           | 740  |   |
|                | 8    | 17   | 19        | <b>FF</b> | 500  |                       |       | 400   | 800   |       |           |           | 740  |   |
|                | 9    | 14   | 18        | <b>4H</b> | 1200 |                       |       | 350   | 700   |       |           |           | 650  |   |
|                | 9    | 16   | 18        | <b>4J</b> | 900  |                       |       | 350   | 700   |       |           |           | 650  |   |
|                | 10   | 18   | 19        | <b>FG</b> | 500  |                       |       | 300   | 650   |       |           |           | 590  |   |
| 11             | 14   | 18   | <b>4M</b> | 1000      |      |                       | 300   | 600   |       |       |           | 540       |      |   |
| <b>22.5 mm</b> | 5    | 14   | 26.5      | <b>5A</b> | 1200 |                       |       |       | 800   |       |           |           | 770  |   |
|                | 6    | 15   | 26.5      | <b>5B</b> | 1000 |                       |       |       | 700   |       |           |           | 640  |   |
|                | 7    | 16.5 | 26.5      | <b>5D</b> | 760  |                       |       |       | 600   |       |           |           | 550  |   |
|                | 8    | 20   | 28        | <b>FH</b> | 500  |                       |       |       | 500   |       |           |           | 480  |   |
|                | 8.5  | 18.5 | 26.5      | <b>5F</b> | 500  |                       |       |       | 480   |       |           |           | 450  |   |
|                | 10   | 22   | 28        | <b>FI</b> | 570* |                       |       |       | 420   |       |           |           | 380  |   |
|                | 10.5 | 19   | 26.5      | <b>5G</b> | 594* |                       |       |       | 400   |       |           |           | 360  |   |
|                | 10.5 | 20.5 | 26.5      | <b>5H</b> | 594* |                       |       |       | 400   |       |           |           | 360  |   |
|                | 11   | 21   | 26.5      | <b>5I</b> | 561* |                       |       |       | 380   |       |           |           | 350  |   |
|                | 12   | 24   | 28        | <b>FJ</b> | 480* |                       |       |       | 350   |       |           |           | 310  |   |

\* TPS (Tray-Packing-System). Plate versions may have different packing units. Samples and pre-production needs on request.

■ Moulded versions.

Rights reserved to amend design data without prior notification.



## Packing Quantities for Capacitors with Radial Pins in PCM 27.5 mm to 52.5 mm

| PCM            | Size |      |      |           | bulk | pcs. per packing unit |   |       |       |          |       |       |           |       |           |       |       |
|----------------|------|------|------|-----------|------|-----------------------|---|-------|-------|----------|-------|-------|-----------|-------|-----------|-------|-------|
|                |      |      |      |           |      | ROLL                  |   | REEL  |       |          |       | AMMO  |           |       |           |       |       |
|                | W    | H    | L    | Codes     |      | S                     | N | O     | ø 360 |          | ø 500 |       | 340 x 340 |       | 490 x 370 |       |       |
|                |      |      |      |           |      |                       |   | H16.5 | H18.5 | H16.5    | H18.5 | H16.5 | H18.5     | H16.5 | H18.5     | H16.5 | H18.5 |
|                |      |      |      |           |      |                       |   | F     | I     | H        | J     | A     | C         | B     | D         |       |       |
| <b>27.5 mm</b> | 9    | 19   | 31.5 | <b>6A</b> | 567* | -                     | - | -     | -     | 460/340* | -     | -     | 420       |       |           |       |       |
|                | 11   | 21   | 31.5 | <b>6B</b> | 459* | -                     | - | -     | -     | 380/280* | -     | -     | 350       |       |           |       |       |
|                | 13   | 24   | 31.5 | <b>6D</b> | 378* | -                     | - | -     | -     | 300      | -     | -     | 290       |       |           |       |       |
|                | 13   | 25   | 33   | <b>FK</b> | 405* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 15   | 26   | 31.5 | <b>6F</b> | 324* | -                     | - | -     | -     | 270      | -     | -     | 250       |       |           |       |       |
|                | 15   | 26   | 33   | <b>FL</b> | 324* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 17   | 29   | 31.5 | <b>6G</b> | 198* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 17   | 34.5 | 31.5 | <b>6I</b> | 198* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 20   | 32   | 33   | <b>FM</b> | 162* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 20   | 39.5 | 31.5 | <b>6J</b> | 162* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
| <b>37.5 mm</b> | 9    | 19   | 41.5 | <b>7A</b> | 441* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 11   | 22   | 41.5 | <b>7B</b> | 357* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 13   | 24   | 41.5 | <b>7C</b> | 294* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 15   | 26   | 41.5 | <b>7D</b> | 252* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 17   | 29   | 41.5 | <b>7E</b> | 154* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 19   | 32   | 41.5 | <b>7F</b> | 140* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 20   | 39.5 | 41.5 | <b>7G</b> | 126* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 24   | 45.5 | 41.5 | <b>7H</b> | 112* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 31   | 46   | 41.5 | <b>7I</b> | 84*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 35   | 50   | 41.5 | <b>7J</b> | 35*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 40   | 55   | 41.5 | <b>7K</b> | 28*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
| <b>48.5 mm</b> | 19   | 31   | 56   | <b>8D</b> | 120* | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 23   | 34   | 56   | <b>8E</b> | 80*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 27   | 37.5 | 56   | <b>8H</b> | 84*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 33   | 48   | 56   | <b>8J</b> | 25*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 37   | 54   | 56   | <b>8L</b> | 25*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
| <b>52.5 mm</b> | 25   | 45   | 57   | <b>9D</b> | 70*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 30   | 45   | 57   | <b>9E</b> | 60*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 35   | 50   | 57   | <b>9F</b> | 25*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 45   | 55   | 57   | <b>9H</b> | 20*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |
|                | 45   | 65   | 57   | <b>9J</b> | 20*  | -                     | - | -     | -     | -        | -     | -     | -         |       |           |       |       |

\* for 2-inch transport pitches.

\* TPS (Tray-Packing-System). Plate versions may have different packing units. Samples and pre-production needs on request.

■ Moulded versions. Rights reserved to amend design data without prior notification.

Updated data on [www.wima.com](http://www.wima.com)





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       |
| <b>M</b> | <b>K</b> | <b>S</b> | <b>2</b> | <b>C</b> | <b>0</b> | <b>2</b> | <b>1</b> | <b>0</b> | <b>0</b>    | <b>1</b> | <b>A</b> | <b>0</b> | <b>0</b> | <b>M</b> | <b>S</b> | <b>S</b> | <b>D</b> |
| MKS 2    |          |          |          | 63 VDC   |          | 0.01 µF  |          |          | 2.5x6.5x7.2 |          | -        |          | 20%      | bulk     | 6 -2     |          |          |

|  |  |   |  |   |
|--|--|---|--|---|
| <p><b>Type description:</b></p> <p>SMD-PET = SMDT<br/>                 SMD-PEN = SMDN<br/>                 SMD-PPS = SMDI<br/>                 FKP 02 = FKPO<br/>                 MKS 02 = MKS0<br/>                 FKS 2 = FKS2<br/>                 FKP 2 = FKP2<br/>                 FKS 3 = FKS3<br/>                 FKP 3 = FKP 3<br/>                 MKS 2 = MKS2<br/>                 MKP 2 = MKP2<br/>                 MKS 4 = MKS4<br/>                 MKP 4C = MKPC<br/>                 MKP 4 = MKP4<br/>                 MKP 10 = MKP1<br/>                 FKP 1 = FKP1<br/>                 MKP-X2 = MKX2<br/>                 MKP-X1 R = MKX1<br/>                 MKP-Y2 = MKY2<br/>                 MP 3-X2 = MPX2<br/>                 MP 3-X1 = MPX1<br/>                 MP 3-Y2 = MPY2<br/>                 MP 3R-Y2 = MPRY<br/>                 MKP 4F = MKPF<br/>                 Snubber MKP = SNMP<br/>                 Snubber FKP = SNFP<br/>                 GTO MKP = GTOM<br/>                 DC-LINK MKP 3 = DCP3<br/>                 DC-LINK MKP 4 = DCP4<br/>                 DC-LINK MKP 4S = DCP5<br/>                 DC-LINK MKP 5 = DCP5<br/>                 DC-LINK MKP 6 = DCP6<br/>                 DC-LINK HC = DCHC<br/>                 DC-LINK HY = DCHY</p> | <p><b>Rated voltage:</b></p> <p>50 VDC = B0<br/>                 63 VDC = C0<br/>                 100 VDC = D0<br/>                 250 VDC = F0<br/>                 400 VDC = G0<br/>                 450 VDC = H0<br/>                 520 VDC = H2<br/>                 600 VDC = I0<br/>                 630 VDC = J0<br/>                 700 VDC = K0<br/>                 800 VDC = L0<br/>                 850 VDC = M0<br/>                 900 VDC = N0<br/>                 1000 VDC = O1<br/>                 1100 VDC = P0<br/>                 1200 VDC = Q0<br/>                 1250 VDC = R0<br/>                 1500 VDC = S0<br/>                 1600 VDC = T0<br/>                 2000 VDC = U0<br/>                 2500 VDC = V0<br/>                 3000 VDC = W0<br/>                 4000 VDC = X0<br/>                 6000 VDC = Y0<br/>                 250 VAC = 0W<br/>                 275 VAC = 1W<br/>                 300 VAC = 2W<br/>                 305 VAC = AW<br/>                 350 VAC = BW<br/>                 440 VAC = 4W<br/>                 500 VAC = 5W<br/>                 ...</p> | <p><b>Capacitance:</b></p> <p>22 pF = 0022<br/>                 47 pF = 0047<br/>                 100 pF = 0100<br/>                 150 pF = 0150<br/>                 220 pF = 0220<br/>                 330 pF = 0330<br/>                 470 pF = 0470<br/>                 680 pF = 0680<br/>                 1000 pF = 1100<br/>                 1500 pF = 1150<br/>                 2200 pF = 1220<br/>                 3300 pF = 1330<br/>                 4700 pF = 1470<br/>                 6800 pF = 1680<br/>                 0.01 µF = 2100<br/>                 0.022 µF = 2220<br/>                 0.047 µF = 2470<br/>                 0.1 µF = 3100<br/>                 0.22 µF = 3220<br/>                 0.47 µF = 3470<br/>                 1 µF = 4100<br/>                 2.2 µF = 4220<br/>                 4.7 µF = 4470<br/>                 10 µF = 5100<br/>                 22 µF = 5220<br/>                 47 µF = 5470<br/>                 100 µF = 6100<br/>                 220 µF = 6220<br/>                 1000 µF = 7100<br/>                 1500 µF = 7150<br/>                 ...</p> | <p><b>Size:</b></p> <p>4.8x3.3x3 Size 1812 = KA<br/>                 4.8x3.3x4 Size 1812 = KB<br/>                 5.7x5.1x3.5 Size 2220 = QA<br/>                 5.7x5.1x4.5 Size 2220 = QB<br/>                 7.2x6.1x3 Size 2824 = TA<br/>                 7.2x6.1x5 Size 2824 = TB<br/>                 10.2x7.6x5 Size 4030 = VA<br/>                 12.7x10.2x6 Size 5040 = XA<br/>                 15.3x13.7x7 Size 6054 = YA<br/>                 2.5x7x4.6 PCM 2.5 = 0B<br/>                 3x7.5x4.6 PCM 2.5 = 0C<br/>                 2.5x6.5x7.2 PCM 5 = 1A<br/>                 3x7.5x7.2 PCM 5 = 1B<br/>                 2.5x7x10 PCM 7.5 = 2A<br/>                 3x8.5x10 PCM 7.5 = 2B<br/>                 3x9x13 PCM 10 = 3A<br/>                 4x9x13 PCM 10 = 3C<br/>                 5x11x18 PCM 15 = 4B<br/>                 6x12.5x18 PCM 15 = 4C<br/>                 5x14x26.5 PCM 22.5 = 5A<br/>                 6x15x26.5 PCM 22.5 = 5B<br/>                 9x19x31.5 PCM 27.5 = 6A<br/>                 11x21x31.5 PCM 27.5 = 6B<br/>                 9x19x41.5 PCM 37.5 = 7A<br/>                 11x22x41.5 PCM 37.5 = 7B<br/>                 19x31x56 PCM 48.5 = 8D<br/>                 25x45x57 PCM 52.5 = 9D<br/>                 ...</p> <p><b>Version code:</b></p> <p>Standard = 00<br/>                 Version A1 = 1A<br/>                 Version A1.1.1 = 1B<br/>                 Version A2 = 2A<br/>                 ...</p> | <p><b>Tolerance:</b></p> <p>±20% = M<br/>                 ±10% = K<br/>                 ±5% = J<br/>                 ±2.5% = H<br/>                 ±1% = E<br/>                 ...</p> <p><b>Packing:</b></p> <p>AMMO H16.5 340x340 = A<br/>                 AMMO H16.5 490x370 = B<br/>                 AMMO H18.5 340x340 = C<br/>                 AMMO H18.5 490x370 = D<br/>                 REEL H16.5 360 = F<br/>                 REEL H16.5 500 = H<br/>                 REEL H18.5 360 = I<br/>                 REEL H18.5 500 = J<br/>                 ROLL H16.5 = N<br/>                 ROLL H18.5 = O<br/>                 BLISTER W12 180 = P<br/>                 BLISTER W12 330 = Q<br/>                 BLISTER W16 330 = R<br/>                 BLISTER W24 330 = T<br/>                 Bulk/TPS Standard = S<br/>                 ...</p> <p><b>Pin length (untaped)</b></p> <p>3.5 ±0.5 = C9<br/>                 6 -2 = SD<br/>                 16 ±1 = P1<br/>                 ...</p> <p><b>Pin length (taped)</b></p> <p>none = 00</p> |
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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.