

## Polypropylene (PP) Capacitors for Pulse Applications with Double-Sided Metallized Electrodes and Schoopage Contacts PCM 7.5 mm to 52.5 mm

### 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

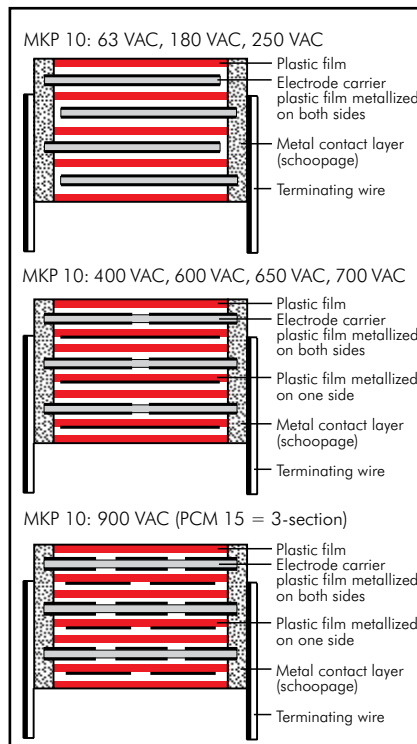
### Construction

**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. Epoxy resin seal: Red

### Electrical Data

#### Capacitance range:

1000 pF to 47  $\mu$ F (E12-values on request)

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

#### Capacitance tolerances:

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

#### Operating temperature range:

$-55^{\circ}$  C to  $+100^{\circ}$  C

#### Insulation resistance at $+20^{\circ}$ C:

$C \leq 0.33 \mu\text{F}$ :  $\geq 1 \times 10^5 \text{ M}\Omega$

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

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

(mean value: 100 000 sec)

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  $+85^{\circ}$  C for DC voltages and from  $+75^{\circ}$  C for AC voltages.

#### Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit ( $0.5 \times U_r$  and  $40^{\circ}$  C)

#### Specific dissipation:

| Box size*<br>WxHxL in mm | Specific dissipation in Watts per K<br>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 10.

#### Dissipation factors at $+20^{\circ}$ 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   | $\leq 3 \times 10^{-4}$  | $\leq 3 \times 10^{-4}$                    | $\leq 3 \times 10^{-4}$ |
| 10 kHz  | $\leq 4 \times 10^{-4}$  | $\leq 6 \times 10^{-4}$                    | -                       |
| 100 kHz | $\leq 15 \times 10^{-4}$ | -  | -                       |

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

| Capacitance<br>pF/ $\mu\text{F}$ | max. pulse rise time V/ $\mu\text{sec}$ at $T_A < 40^{\circ}$ C |         |         |         |          |          |          |          |          |   |
|----------------------------------|---|---------|---------|---------|----------|----------|----------|----------|----------|---|
|                                  | 100 VDC   | 250 VDC | 400 VDC | 630 VDC | 1000 VDC | 1600 VDC | 2000 VDC | 2500 VDC | 3000 VDC |   |
| 1000 ... 2200                    | 1000  | 1800    | 1800    | 1800    | 2800     | 5400     | 9000     | 11000    | -        | - |
| 3300 ... 6800                    | 900   | 1200    | 1200    | 1200    | 2800     | 5400     | 9000     | 11000    | -        | - |
| 0.01 ... 0.022                   | 700   | 1100    | 1200    | 1800    | 2100     | 3000     | 3400     | 11000    | 3400     | - |
| 0.033 ... 0.068                  | 400   | 800     | 900     | 1800    | 2100     | 2100     | 2100     | -        | 2100     | - |
| 0.1 ... 0.22                     | 200   | 500     | 500     | 900     | 1400     | 1400     | 1400     | -        | 1400     | - |
| 0.33 ... 0.68                    | 100   | 300     | 400     | 700     | 900      | 900      | 900      | -        | 900      | - |
| 1.0 ... 2.2                      | 70  | 200     | 200     | 400     | 400      | 500      | 320      | -        | 400      | - |
| 3.3 ... 4.7                      | 50  | 80      | 100     | 150     | 180      | 250      | -        | -        | -        | - |
| 6.8 ... 15                       | 35  | 50      | 70      | 130     | -        | -        | -        | -        | -        | - |
| 22 ... 47                        | 25  | 35      | 35      | -       | -        | -        | -        | -        | -        | - |

### Mechanical Tests

#### Pull test on pins:

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

$d > 0.8 \phi$ : 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:** 1 kPa = 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 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    | 10   | 7.5   | MKP1F021502C |
| 0.022 "     | 4               | 9    | 10   | 7.5   | MKP1D022202C | 4                | 9    | 10   | 7.5   | MKP1F022202C |
| 0.033 "     | 5               | 10.5 | 10.3 | 7.5   | MKP1D023302E | 5                | 10.5 | 10.3 | 7.5   | MKP1F023302E |
| 0.047 "     | 4               | 9    | 13   | 10    | MKP1D023303C | 4                | 9    | 13   | 10    | MKP1F023303C |
| 0.068 "     | 5               | 10.5 | 10.3 | 7.5   | MKP1D024702E | 5                | 10.5 | 10.3 | 7.5   | MKP1F024702E |
|             | 4               | 9    | 13   | 10    | MKP1D024703C | 4                | 9    | 13   | 10    | MKP1F024703C |
|             | 5               | 11   | 13   | 10    | MKP1D026803F | 5                | 11   | 13   | 10    | MKP1F026803F |
|             | 5               | 11   | 18   | 15    | MKP1F026804B |                  |      |      |       |              |
| 0.1 µF      | 6               | 12   | 13   | 10    | MKP1D031003G | 6                | 12   | 13   | 10    | MKP1F031003G |
| 0.15 "      | 6               | 12.5 | 18   | 15    | MKP1D031504C | 6                | 12.5 | 18   | 15    | MKP1F031504C |
| 0.22 "      | 7               | 14   | 18   | 15    | MKP1D032204D | 7                | 14   | 18   | 15    | MKP1F032204D |
| 0.33 "      | 8               | 15   | 18   | 15    | MKP1D033304F | 8                | 15   | 18   | 15    | MKP1F033304F |
| 0.47 "      | 9               | 16   | 18   | 15    | MKP1D034704J | 9                | 16   | 18   | 15    | MKP1F034704J |
| 0.68 "      | 7               | 16.5 | 26.5 | 22.5  | MKP1D034705D | 7                | 16.5 | 26.5 | 22.5  | MKP1F034705D |
|             | 8.5             | 18.5 | 26.5 | 22.5  | MKP1D036805F | 8.5              | 18.5 | 26.5 | 22.5  | MKP1F036805F |
|             | 9               | 19   | 31.5 | 27.5  | MKP1F036806A |                  |      |      |       |              |
| 1.0 µF      | 10.5            | 19   | 26.5 | 22.5  | MKP1D041005G | 11               | 21   | 26.5 | 22.5  | MKP1F041005I |
| 1.5 "       | 11              | 21   | 31.5 | 27.5  | MKP1D041506B | 11               | 21   | 31.5 | 27.5  | MKP1F041006B |
| 2.2 "       | 13              | 24   | 31.5 | 27.5  | MKP1D042206D | 13               | 24   | 31.5 | 27.5  | MKP1F041506D |
| 3.3 "       | 17              | 29   | 31.5 | 27.5  | MKP1D043306G | 13               | 24   | 41.5 | 37.5  | MKP1F041507C |
| 4.7 "       | 20              | 39.5 | 31.5 | 27.5  | MKP1D044706J | 15               | 26   | 31.5 | 27.5  | MKP1F042206F |
| 6.8 "       | 17              | 29   | 41.5 | 37.5  | MKP1D044707E | 13               | 24   | 41.5 | 37.5  | MKP1F042207C |
|             | 19              | 32   | 41.5 | 37.5  | MKP1D046807F | 17               | 34.5 | 31.5 | 27.5  | MKP1F043306I |
|             |                 |      |      |       |              | 17               | 29   | 41.5 | 37.5  | MKP1F043307E |
| 10 µF       | 20              | 39.5 | 41.5 | 37.5  | MKP1D051007G | 20               | 39.5 | 31.5 | 27.5  | MKP1F044706J |
| 15 "        | 24              | 45.5 | 41.5 | 37.5  | MKP1D051507H | 19               | 32   | 41.5 | 37.5  | MKP1F044707F |
|             | 31              | 46   | 41.5 | 37.5  | MKP1D051507I | 20               | 39.5 | 41.5 | 37.5  | MKP1F046807G |
|             | 35              | 50   | 41.5 | 37.5  | MKP1D052207J | 24               | 45.5 | 41.5 | 37.5  | MKP1F051007H |
|             | 40              | 55   | 41.5 | 37.5  | MKP1D053307K | 35               | 50   | 41.5 | 37.5  | MKP1F051507J |
|             | 35              | 50   | 57   | 52.5  | MKP1D053309F | 35               | 50   | 57   | 52.5  | MKP1F051509F |
|             | 45              | 65   | 57   | 52.5  | MKP1D054709J | 45               | 65   | 57   | 52.5  | MKP1F053309J |

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

■ New values

\*\* 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 128. |       |      |



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

■ New values

\*\* PCM = Printed circuit module = pin spacing

\* Admissible AC voltage 280 VAC max..

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<br>4-pin = D4        |
| Tolerance:                  | 20 % = M<br>10 % = K<br>5 % = J |
| Packing:                    | bulk = S                        |
| Pin length:                 | 6-2 = SD                        |
| Taped version see page 128. |                                 |

## Continuation

### General Data

| Capacitance | 1000 VDC/600 VAC* |      |      |            |                   | 1600 VDC/650 VAC* |      |      |       |                   |
|-------------|-------------------|------|------|------------|-------------------|-------------------|------|------|-------|-------------------|
|             | W                 | H    | L    | PCM**      | Part number       | W                 | H    | L    | PCM** | Part number       |
| 1000 pF     | 4                 | 9    | 10   | <b>7.5</b> | MKP1O111002C_____ | 4                 | 9    | 13   | 10    | MKP1T011003C_____ |
|             | 4                 | 9    | 13   | 10         | MKP1O111003C_____ |                   |      |      |       |                   |
| 1500 "      | 4                 | 9    | 10   | <b>7.5</b> | MKP1O111502C_____ | 4                 | 9    | 13   | 10    | MKP1T011503C_____ |
|             | 4                 | 9    | 13   | 10         | MKP1O111503C_____ |                   |      |      |       |                   |
| 2200 "      | 4                 | 9    | 10   | <b>7.5</b> | MKP1O112202C_____ | 4                 | 9    | 13   | 10    | MKP1T012203C_____ |
|             | 4                 | 9    | 13   | 10         | MKP1O112203C_____ |                   |      |      |       |                   |
| 3300 "      | 4                 | 9    | 10   | <b>7.5</b> | MKP1O113302C_____ | 4                 | 9    | 13   | 10    | MKP1T013303C_____ |
|             | 4                 | 9    | 13   | 10         | MKP1O113303C_____ |                   |      |      |       |                   |
| 4700 "      | 4.5               | 9.5  | 10.3 | <b>7.5</b> | MKP1O114702D_____ | 5                 | 11   | 13   | 10    | MKP1T014703F_____ |
|             | 4                 | 9    | 13   | 10         | MKP1O114703C_____ |                   |      |      |       |                   |
| 6800 "      | 5.7               | 12.5 | 10.3 | <b>7.5</b> | MKP1O116802F_____ | 6                 | 12   | 13   | 10    | MKP1T016803G_____ |
|             | 5                 | 11   | 13   | 10         | MKP1O116803F_____ |                   |      |      |       |                   |
| 0.01 µF     | 5                 | 11   | 13   | 10         | MKP1O121003F_____ | 5                 | 11   | 18   | 15    | MKP1T021004B_____ |
|             | 5                 | 11   | 18   | 15         | MKP1O121004B_____ |                   |      |      |       |                   |
| 0.015 "     | 6                 | 12   | 13   | 10         | MKP1O121503G_____ | 6                 | 12.5 | 18   | 15    | MKP1T021504C_____ |
|             | 5                 | 11   | 18   | 15         | MKP1O121504B_____ |                   |      |      |       |                   |
| 0.022 "     | 6                 | 12.5 | 18   | 15         | MKP1O122204C_____ | 7                 | 14   | 18   | 15    | MKP1T022204D_____ |
|             | 6                 | 15   | 26.5 | 22.5       | MKP1O122205B_____ |                   |      |      |       |                   |
| 0.033 "     | 7                 | 14   | 18   | 15         | MKP1O123304D_____ | 8                 | 15   | 18   | 15    | MKP1T023304F_____ |
|             | 6                 | 15   | 26.5 | 22.5       | MKP1O123305B_____ |                   |      |      |       |                   |
| 0.047 "     | 8                 | 15   | 18   | 15         | MKP1O124704F_____ | 7                 | 16.5 | 26.5 | 22.5  | MKP1T024705D_____ |
|             | 6                 | 15   | 26.5 | 22.5       | MKP1O124705B_____ |                   |      |      |       |                   |
| 0.068 "     | 7                 | 16.5 | 26.5 | 22.5       | MKP1O126805D_____ | 10.5              | 19   | 26.5 | 22.5  | MKP1T026805G_____ |
|             | 9                 | 19   | 31.5 | 27.5       | MKP1O126806A_____ |                   |      |      |       |                   |
| 0.1 µF      | 8.5               | 18.5 | 26.5 | 22.5       | MKP1O131005F_____ | 11                | 21   | 26.5 | 22.5  | MKP1T031005I_____ |
|             | 11                | 21   | 31.5 | 27.5       | MKP1O131006B_____ |                   |      |      |       |                   |
| 0.15 "      | 11                | 21   | 26.5 | 22.5       | MKP1O131505I_____ | 13                | 24   | 31.5 | 27.5  | MKP1T031506D_____ |
|             | 11                | 21   | 31.5 | 27.5       | MKP1O131506B_____ |                   |      |      |       |                   |
| 0.22 "      | 11                | 21   | 31.5 | 27.5       | MKP1O132206B_____ | 15                | 26   | 31.5 | 27.5  | MKP1T032206F_____ |
|             | 13                | 24   | 41.5 | 37.5       | MKP1O132207C_____ |                   |      |      |       |                   |
| 0.33 "      | 15                | 26   | 31.5 | 27.5       | MKP1O133306F_____ | 17                | 34.5 | 31.5 | 27.5  | MKP1T033306I_____ |
|             | 13                | 24   | 41.5 | 37.5       | MKP1O133307C_____ |                   |      |      |       |                   |
| 0.47 "      | 17                | 29   | 31.5 | 27.5       | MKP1O134706G_____ | 20                | 39.5 | 31.5 | 27.5  | MKP1T034706J_____ |
|             | 13                | 24   | 41.5 | 37.5       | MKP1O134707C_____ |                   |      |      |       |                   |
| 0.68 "      | 20                | 39.5 | 31.5 | 27.5       | MKP1O136806J_____ | 20                | 39.5 | 41.5 | 37.5  | MKP1T036807G_____ |
|             | 17                | 29   | 41.5 | 37.5       | MKP1O136807E_____ |                   |      |      |       |                   |
| 1.0 µF      | 20                | 39.5 | 41.5 | 37.5       | MKP1O141007G_____ | 24                | 45.5 | 41.5 | 37.5  | MKP1T041007H_____ |
| 1.5 "       | 24                | 45.5 | 41.5 | 37.5       | MKP1O141507H_____ | 31                | 46   | 41.5 | 37.5  | MKP1T041507I_____ |
| 2.2 "       | 31                | 46   | 41.5 | 37.5       | MKP1O142207I_____ | 40                | 55   | 41.5 | 37.5  | MKP1T042207K_____ |
|             |                   |      |      |            |                   | 35                | 50   | 57   | 52.5  | MKP1T042209F_____ |
| 3.3 "       | 40                | 55   | 41.5 | 37.5       | MKP1O143307K_____ | 45                | 65   | 57   | 52.5  | MKP1T043309J_____ |
|             |                   |      |      |            |                   |                   |      |      |       |                   |
| 4.7 "       | 45                | 55   | 57   | 52.5       | MKP1O144709H_____ |                   |      |      |       |                   |

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

     New values

\*\* 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 128. |            |

Continuation page 60

## Continuation

### General Data

| Capacitance | 2000 VDC/700 VAC* |      |      |       |                   | 2500 VDC/900 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_____ |
|             |                   |      |      |       |                   | 6                 | 15   | 26.5 | 22.5  | MKP1V011005B_____ |
| 1500 "      | 4                 | 9    | 13   | 10    | MKP1U011503C_____ | 5                 | 11   | 18   | 15    | MKP1V011504B_____ |
|             |                   |      |      |       |                   | 6                 | 15   | 26.5 | 22.5  | MKP1V011505B_____ |
| 2200 "      | 5                 | 11   | 13   | 10    | MKP1U012203F_____ | 5                 | 11   | 18   | 15    | MKP1V012204B_____ |
|             |                   |      |      |       |                   | 6                 | 15   | 26.5 | 22.5  | MKP1V012205B_____ |
| 3300 "      | 5                 | 11   | 18   | 15    | MKP1U013304B_____ | 5                 | 11   | 18   | 15    | MKP1V013304B_____ |
|             |                   |      |      |       |                   | 6                 | 15   | 26.5 | 22.5  | MKP1V013305B_____ |
| 4700 "      | 5                 | 11   | 18   | 15    | MKP1U014704B_____ | 6                 | 12.5 | 18   | 15    | MKP1V014704C_____ |
|             |                   |      |      |       |                   | 6                 | 15   | 26.5 | 22.5  | MKP1V014705B_____ |
| 6800 "      | 6                 | 12.5 | 18   | 15    | MKP1U016804C_____ | 7                 | 14   | 18   | 15    | MKP1V016804D_____ |
|             |                   |      |      |       |                   | 6                 | 15   | 26.5 | 22.5  | MKP1U016805B_____ |
| 0.01 µF     | 7                 | 14   | 18   | 15    | MKP1U021004D_____ | 8.5               | 18.5 | 26.5 | 22.5  | MKP1V021005F_____ |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.015 "     | 8                 | 15   | 18   | 15    | MKP1U021504F_____ | 10.5              | 19   | 26.5 | 22.5  | MKP1V021505G_____ |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.022 "     | 9                 | 16   | 18   | 15    | MKP1U022204J_____ | 11                | 21   | 26.5 | 22.5  | MKP1V022205I_____ |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.033 "     | 8.5               | 18.5 | 26.5 | 22.5  | MKP1U023305F_____ |                   |      |      |       |                   |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.047 "     | 10.5              | 19   | 26.5 | 22.5  | MKP1U024705G_____ |                   |      |      |       |                   |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.068 "     | 11                | 21   | 26.5 | 22.5  | MKP1U026805I_____ |                   |      |      |       |                   |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.1 µF      | 13                | 24   | 31.5 | 27.5  | MKP1U031006D_____ |                   |      |      |       |                   |
| 0.15 "      | 15                | 26   | 31.5 | 27.5  | MKP1U031506F_____ |                   |      |      |       |                   |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.22 "      | 17                | 34.5 | 31.5 | 27.5  | MKP1U032206I_____ |                   |      |      |       |                   |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 0.33 "      | 19                | 32   | 41.5 | 37.5  | MKP1U033307F_____ |                   |      |      |       |                   |
| 0.47 "      | 20                | 39.5 | 41.5 | 37.5  | MKP1U034707G_____ |                   |      |      |       |                   |
| 0.68 "      | 24                | 45.5 | 41.5 | 37.5  | MKP1U036807H_____ |                   |      |      |       |                   |
| 1.0 µF      | 35                | 50   | 41.5 | 37.5  | MKP1U041007J_____ |                   |      |      |       |                   |
| 1.5 "       | 40                | 55   | 41.5 | 37.5  | MKP1U041507K_____ |                   |      |      |       |                   |
|             |                   |      |      |       |                   |                   |      |      |       |                   |
| 2.2 "       | 45                | 55   | 57   | 52.5  | MKP1U042209H_____ |                   |      |      |       |                   |

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

New values

\*\* 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 128.

Rights reserved to amend design data without prior notification.

Continuation page 61

## Continuation

### General Data

| Capacitance  | 3000 VDC/700 VAC* |      |      |       | Part number  |
|--------------|-------------------|------|------|-------|--------------|
|              | W                 | H    | L    | PCM** |              |
| 0.01 $\mu$ F | 6                 | 15   | 26.5 | 22.5  | MKP1W021005B |
| 0.015 "      | 7                 | 16.5 | 26.5 | 22.5  | MKP1W021505D |
| 0.022 "      | 8.5               | 18.5 | 26.5 | 22.5  | MKP1W022205F |
| 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 $\mu$ F  | 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  | MKP1W034707J |
| 0.68 "       | 35                | 50   | 41.5 | 37.5  | MKP1W036807L |
| 1.0 $\mu$ F  | 40                | 55   | 41.5 | 37.5  | MKP1W041007K |
|              | 35                | 50   | 57   | 52.5  | MKP1W041009F |
| 1.5 "        | 45                | 55   | 57   | 52.5  | MKP1W041509H |

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

New range

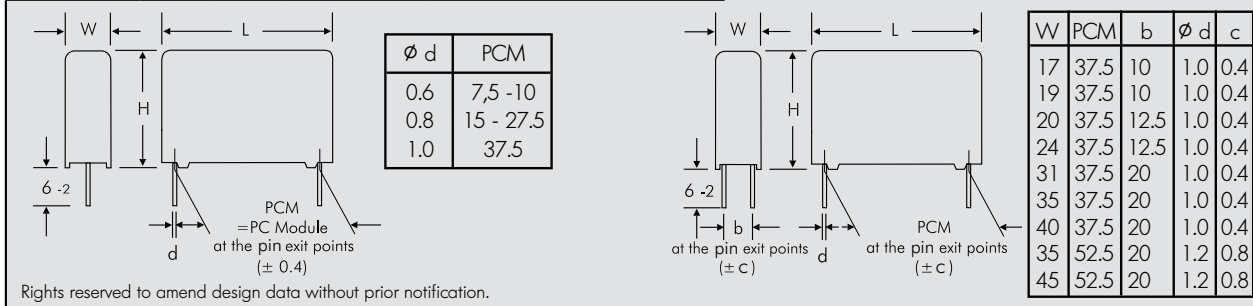
\*\* PCM = Printed circuit module = pin spacing

Dims. in mm.

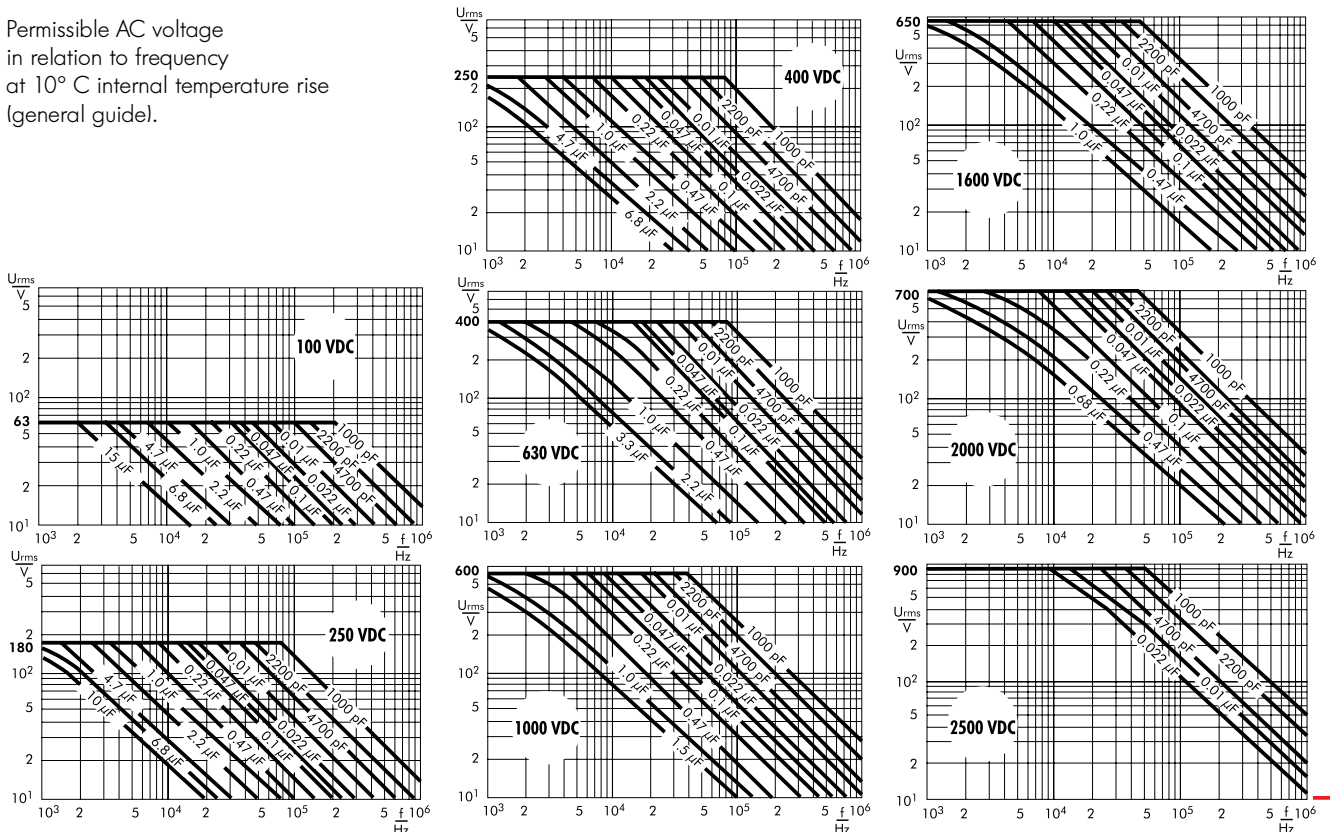
Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

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 128. |       |      |



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

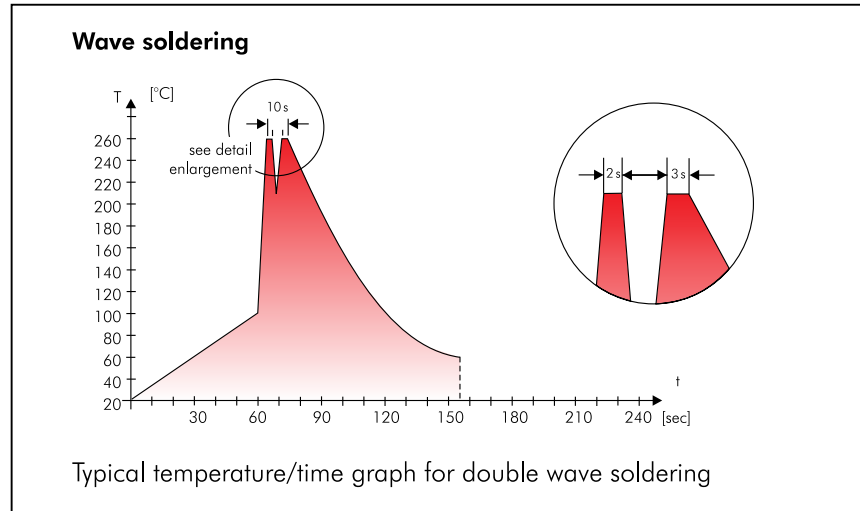
#### Single wave soldering

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 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
- pin 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 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

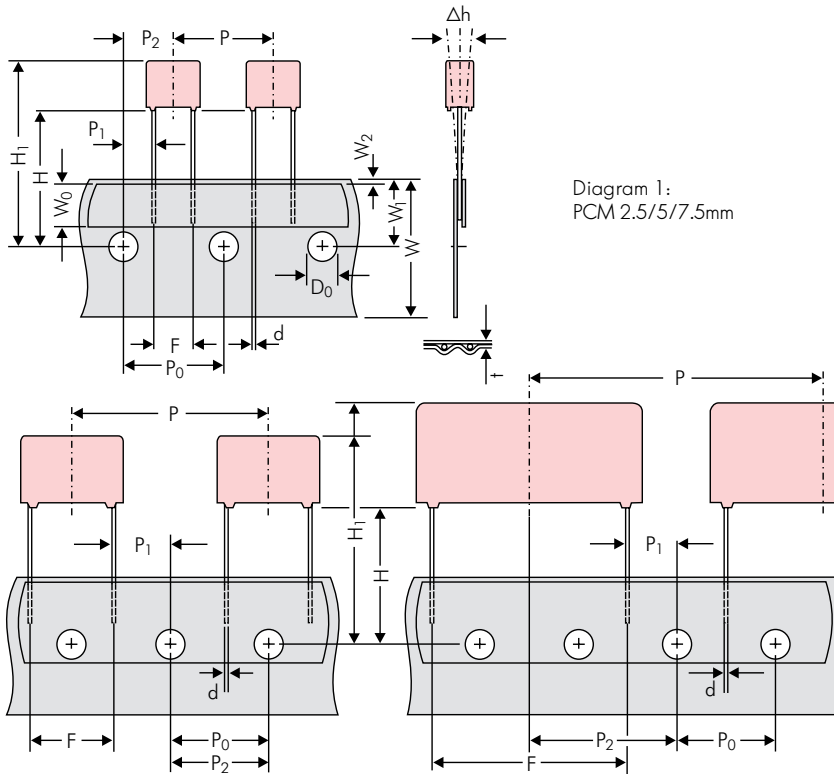


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5\*mm

\*PCM 27.5 tapping possible with two feed holes between components

| Designation                                      | Symbol                | Dimensions for Radial Taping                             |  |   |   |   |   |   |      |                       |                         |   |
|--|-----------------------|--|--|---|---|---|---|---|------|-----------------------|-------------------------|---|
|  |                       | PCM 2.5 tapping  | PCM 5 tapping  | PCM 7.5 tapping   | PCM 10 tapping*   | PCM 15 tapping*   | PCM 22.5 tapping  | PCM 27.5 tapping  |      |                       |                         |   |
| 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  | 16.5 ±0.3  | 16.5 ±0.3   | 16.5 ±0.3   | 16.5 ±0.3   | 16.5 ±0.3   | 16.5 ±0.3   |      |                       |                         |   |
| 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 129)                      | 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 | 54 ±2<br>60 ±2<br>68 ±2 | depending on PCM and component dimensions |
| Unit   | see details page 130. |  |  |   |   |   |   |   |      |                       |                         |   |

Dims in mm.

\* Diameter of pins see General Data.

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

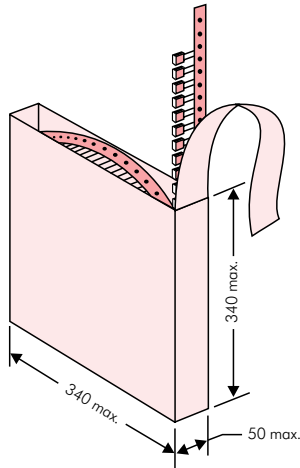
Position of components according to PCM 7.5 (sketch 1). P<sub>0</sub> = 12.7 or 15.0 is possible

Please clarify customer-specific deviations with the manufacturer.

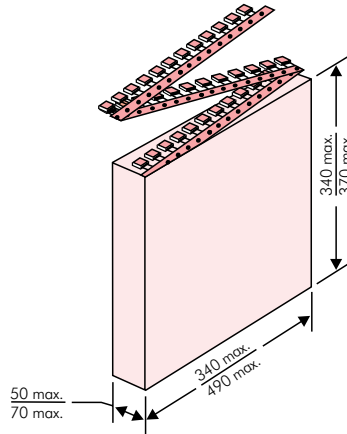


## Types of Tape Packaging of Capacitors for Automatic Radial Insertion

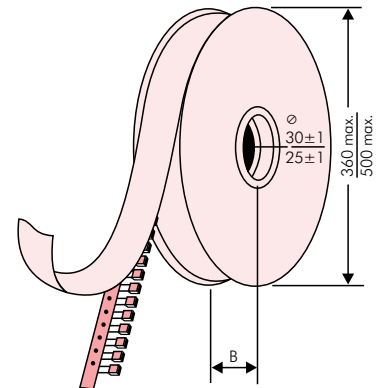
### ■ ROLL Packaging



### ■ 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/EC                   | 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.: MKS2C034701C00K89D           |                          |
|   |   |                          |
| Handling Unit: <b>MKS 2</b>                 | <b>QTY: 5.000</b>                           | <b>COO: DE</b>           |
|   | <b>MKS 2 0.47 µF 63 VDC 3.5x8.5x7.2 RMS</b> |                          |
| <b>1000067326</b>                           | Standard 10% Loss - Standard                | Drahte 6-2               |
|   | Vorlage Debitor Inland                      | Week 03/2011             |

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 × 340 | 490 × 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      |           | 2800 |   |
|                | 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> | 540* |                       |       |       | 420   |       |           |           | 380  |   |
|                | 10.5 | 19   | 26.5      | <b>5G</b> | 680* |                       |       |       | 400   |       |           |           | 360  |   |
|                | 10.5 | 20.5 | 26.5      | <b>5H</b> | 680* |                       |       |       | 400   |       |           |           | 360  |   |
|                | 11   | 21   | 26.5      | <b>5I</b> | 680* |                       |       |       | 380   |       |           |           | 350  |   |
|                | 12   | 24   | 28        | <b>FJ</b> | 450* |                       |       |       | 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 × 340 |       | 490 × 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> | 640* | –                     | –     | –     | –     | 460/340* | –     | –     | –         | 420   |           |       |
|                | 11   | 21   | 31.5      | <b>6B</b> | 544* | –                     | –     | –     | –     | 380/280* | –     | –     | –         | 350   |           |       |
|                | 13   | 24   | 31.5      | <b>6D</b> | 448* | –                     | –     | –     | –     | 300      | –     | –     | –         | 290   |           |       |
|                | 13   | 25   | 33        | <b>6K</b> | 336* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 15   | 26   | 31.5      | <b>6F</b> | 384* | –                     | –     | –     | –     | 270      | –     | –     | –         | 250   |           |       |
|                | 15   | 26   | 33        | <b>6L</b> | 288* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 17   | 29   | 31.5      | <b>6G</b> | 176* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 17   | 34.5 | 31.5      | <b>6I</b> | 176* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 20   | 32   | 33        | <b>6M</b> | 216* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 20   | 39.5 | 31.5      | <b>6J</b> | 144* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
| <b>37.5 mm</b> | 9    | 19   | 41.5      | <b>7A</b> | 480* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 11   | 22   | 41.5      | <b>7B</b> | 408* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 13   | 24   | 41.5      | <b>7C</b> | 252* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 15   | 26   | 41.5      | <b>7D</b> | 144* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 17   | 29   | 41.5      | <b>7E</b> | 132* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 19   | 32   | 41.5      | <b>7F</b> | 108* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 20   | 39.5 | 41.5      | <b>7G</b> | 108* | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 24   | 45.5 | 41.5      | <b>7H</b> | 84*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 31   | 46   | 41.5      | <b>7I</b> | 72*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 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> | 50*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 23   | 34   | 56        | <b>8E</b> | 72*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 27   | 37.5 | 56        | <b>8H</b> | 60*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 33   | 48   | 56        | <b>8J</b> | 48*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
|                | 37   | 54   | 56        | <b>8L</b> | 25*  | –                     | –     | –     | –     | –        | –     | –     | –         | –     |           |       |
| <b>52.5 mm</b> | 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.



# WIMA Part Number System

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 $\mu$ F         |   |   | 2.5x6.5x7.2                |    | -   | 20% | bulk | 6-2   |    |    |    |
| <b>Type description:</b> |   |   |   | <b>Rated voltage:</b> |   | <b>Capacitance:</b>  |   |   | <b>Size:</b>               |    | <b>Tolerance:</b>   |     |      | <b>Packing:</b>   |    |    |    |
| SMD-PET = SMDT           |   |   |   | 50 VDC = B0           |   | 22 pF = 0022         |   |   | 4.8x3.3x3 Size 1812 = KA   |    | ±20% = M  |     |      | <b>Packing:</b><br>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>... |    |    |    |
| SMD-PPS = SMDI           |   |   |   | 63 VDC = C0           |   | 47 pF = 0047         |   |   | 4.8x3.3x4 Size 1812 = KB   |    | ±10% = K  |     |      |   |    |    |    |
| FKP 02 = FKP0            |   |   |   | 100 VDC = D0          |   | 100 pF = 0100        |   |   | 5.7x5.1x3.5 Size 2220 = QA |    | ±5% = J   |     |      |   |    |    |    |
| MKS 02 = MKS0            |   |   |   | 250 VDC = F0          |   | 150 pF = 0150        |   |   | 5.7x5.1x4.5 Size 2220 = QB |    | ±2.5% = H   |     |      |   |    |    |    |
| FKS 2 = FKS2             |   |   |   | 400 VDC = G0          |   | 220 pF = 0220        |   |   | 7.2x6.1x3 Size 2824 = TA   |    | ±1% = E   |     |      |   |    |    |    |
| FKP 2 = FKP2             |   |   |   | 450 VDC = H0          |   | 330 pF = 0330        |   |   | 7.2x6.1x5 Size 2824 = TB   |    | ...   |     |      |   |    |    |    |
| MKS 2 = MKS2             |   |   |   | 600 VDC = I0          |   | 470 pF = 0470        |   |   | 10.2x7.6x5 Size 4030 = VA  |    | <b>Tolerance:</b><br>±20% = M<br>±10% = K<br>±5% = J<br>±2.5% = H<br>±1% = E<br>... |     |      |   |    |    |    |
| MKS 2 = MKP2             |   |   |   | 630 VDC = J0          |   | 680 pF = 0680        |   |   | 10.2x7.6x6 Size 4030 = VA  |    |   |     |      |   |    |    |    |
| FKS 3 = FKS3             |   |   |   | 700 VDC = K0          |   | 1000 pF = 1100       |   |   | 12.7x10.2x6 Size 5040 = XA |    |   |     |      |   |    |    |    |
| FKP 3 = FKP3             |   |   |   | 800 VDC = L0          |   | 1500 pF = 1150       |   |   | 15.3x13.7x7 Size 6054 = YA |    |   |     |      |   |    |    |    |
| MKS 4 = MKS4             |   |   |   | 850 VDC = M0          |   | 2200 pF = 1220       |   |   | 2.5x7x4.6 PCM 2.5 = 0B     |    |   |     |      |   |    |    |    |
| MKP 4 = MKP4             |   |   |   | 900 VDC = N0          |   | 3300 pF = 1330       |   |   | 3x7.5x4.6 PCM 2.5 = 0C     |    |   |     |      |   |    |    |    |
| MKP 10 = MKP1            |   |   |   | 1000 VDC = O1         |   | 4700 pF = 1470       |   |   | 2.5x6.5x7.2 PCM 5 = 1A     |    |   |     |      |   |    |    |    |
| FKP 4 = FKP4             |   |   |   | 1100 VDC = P0         |   | 6800 pF = 1680       |   |   | 3x7.5x7.2 PCM 5 = 1B       |    |   |     |      |   |    |    |    |
| FKP 1 = FKP1             |   |   |   | 1200 VDC = Q0         |   | 0.01 $\mu$ F = 2100  |   |   | 2.5x7x10 PCM 7.5 = 2A      |    |   |     |      |   |    |    |    |
| MKP-X2 = MKX2            |   |   |   | 1250 VDC = R0         |   | 0.022 $\mu$ F = 2220 |   |   | 3x8.5x10 PCM 7.5 = 2B      |    |   |     |      |   |    |    |    |
| MKP-X2 R = MKXR          |   |   |   | 1500 VDC = S0         |   | 0.047 $\mu$ F = 2470 |   |   | 3x9x13 PCM 10 = 3A         |    |   |     |      |   |    |    |    |
| MKP-Y2 = MKY2            |   |   |   | 1600 VDC = T0         |   | 0.1 $\mu$ F = 3100   |   |   | 4x9x13 PCM 10 = 3C         |    |   |     |      |   |    |    |    |
| MP 3-X2 = MPX2           |   |   |   | 2000 VDC = U0         |   | 0.22 $\mu$ F = 3220  |   |   | 5x11x18 PCM 15 = 4B        |    |   |     |      |   |    |    |    |
| MP 3-X1 = MPX1           |   |   |   | 2500 VDC = V0         |   | 0.47 $\mu$ F = 3470  |   |   | 6x12.5x18 PCM 15 = 4C      |    |   |     |      |   |    |    |    |
| MP 3-Y2 = MPY2           |   |   |   | 3000 VDC = W0         |   | 1 $\mu$ F = 4100     |   |   | 5x14x26.5 PCM 22.5 = 5A    |    |   |     |      |   |    |    |    |
| MP 3R-Y2 = MPRY          |   |   |   | 4000 VDC = X0         |   | 2.2 $\mu$ F = 4220   |   |   | 6x15x26.5 PCM 22.5 = 5B    |    |   |     |      |   |    |    |    |
| Snubber MKP = SNMP       |   |   |   | 6000 VDC = Y0         |   | 4.7 $\mu$ F = 4470   |   |   | 9x19x31.5 PCM 27.5 = 6A    |    |   |     |      |   |    |    |    |
| GTO MKP = GTOM           |   |   |   | 250 VAC = 0W          |   | 10 $\mu$ F = 5100    |   |   | 11x21x31.5 PCM 27.5 = 6B   |    |   |     |      |   |    |    |    |
| DC-LINK MKP 3 = DCP3     |   |   |   | 275 VAC = 1W          |   | 22 $\mu$ F = 5220    |   |   | 9x19x41.5 PCM 37.5 = 7A    |    |   |     |      |   |    |    |    |
| DC-LINK MKP 4 = DCP4     |   |   |   | 300 VAC = 2W          |   | 47 $\mu$ F = 5470    |   |   | 11x22x41.5 PCM 37.5 = 7B   |    |   |     |      |   |    |    |    |
| DC-LINK MKP 4S = DCP4S   |   |   |   | 400 VAC = 3W          |   | 100 $\mu$ F = 6100   |   |   | 94x49x182 DCH_ = H0        |    |   |     |      |   |    |    |    |
| DC-LINK MKP 5 = DCP5     |   |   |   | 440 VAC = 4W          |   | 220 $\mu$ F = 6220   |   |   | 94x77x182 DCH_ = H1        |    |   |     |      |   |    |    |    |
| DC-LINK MKP 6 = DCP6     |   |   |   | 500 VAC = 5W          |   | 1000 $\mu$ F = 7100  |   |   | ...                        |    |   |     |      |   |    |    |    |
| DC-LINK HC = DCH_        |   |   |   | ...                   |   | ...                  |   |   | ...                        |    |   |     |      |   |    |    |    |
| DC-LINK HY = DCHY        |   |   |   | ...                   |   | ...                  |   |   | ...                        |    |   |     |      |   |    |    |    |
|                          |   |   |   |                       |   |                      |   |   | <b>Version code:</b>       |    | <b>Pin length (untaped)</b>   |     |      |   |    |    |    |
|                          |   |   |   |                       |   |                      |   |   | Standard = 00              |    | 3.5 ±0.5 = C9   |     |      |   |    |    |    |
|                          |   |   |   |                       |   |                      |   |   | Version A1 = 1A            |    | 6-2 = SD  |     |      |   |    |    |    |
|                          |   |   |   |                       |   |                      |   |   | Version A1.1.1 = 1B        |    | 16 ±1 = P1  |     |      |   |    |    |    |
|                          |   |   |   |                       |   |                      |   |   | Version A2 = 2A            |    | ...   |     |      |   |    |    |    |
|                          |   |   |   |                       |   |                      |   |   | ...                        |    | ...   |     |      |   |    |    |    |

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.