

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

### Special Features

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

### Typical Applications

For high frequency applications e.g.

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

### Construction

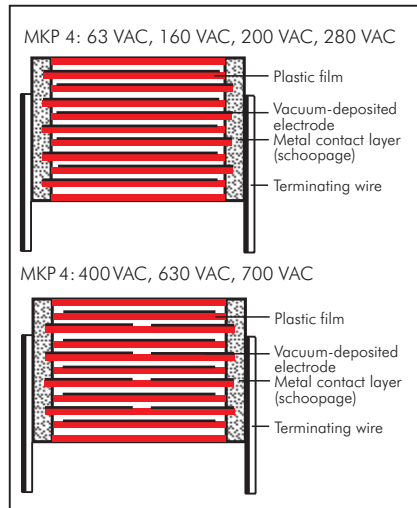
#### Dielectric:

Polypropylene (PP) film

#### Capacitor electrodes:

Vacuum-deposited

#### Internal construction:



#### Encapsulation:

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

#### Terminations:

Tinned wire.

#### Marking:

Colour: Red. Marking: Black.  
Epoxy resin seal: Red

### Electrical Data

#### Capacitance range:

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

#### Rated voltages:

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

#### Capacitance tolerances:

±20%, ±10%, ±5%

#### Operating temperature range:

-55° C to +100° C

#### Climatic test category:

55/100/56 in accordance with IEC

#### Insulation resistance at +20° C:

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

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

$C > 0.33 \mu\text{F}$ :  $\geq 30\,000 \text{ sec (M}\Omega \times \mu\text{F)}$

(mean value: 100\,000 sec)

Measuring voltage: 100 V/1 min.

#### Maximum pulse rise time:

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

for pulses equal to the rated voltage

#### Dissipation factors at +20° C:

$\tan \delta \leq 10 \times 10^{-4}$  at 1 kHz

#### Test specifications:

In accordance with IEC 60384-16

**Test voltage:** 1.6 U<sub>r</sub>, 2 sec.

**Dielectric absorption:** 0.05%

#### Voltage derating:

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

#### Reliability:

Operational life > 300\,000 hours

Failure rate < 2 fit (0.5 x U<sub>r</sub> and 40° C).

### 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:

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

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

For further details and graphs please refer to Technical Information.

## Continuation

### General Data

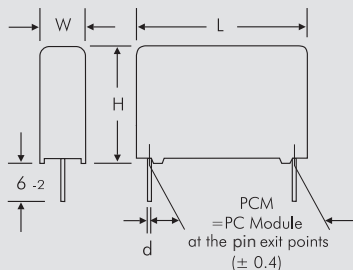
Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 $\mu$ F	3	8.5	10	<b>7.5</b>	MKP4D021002B00_____	3	8.5	10	<b>7.5</b>	MKP4F021002B00_____
0.015 "	3	8.5	10	<b>7.5</b>	MKP4D021502B00_____	3	8.5	10	<b>7.5</b>	MKP4F021502B00_____
0.022 "	3	8.5	10	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

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

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

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

Dims. in mm.



$\phi$ d	PCM	W
0.5	7.5	= 3
0.6	7.5	$\geq 4$
0.6	10	
0.8	15 - 27.5	
1.0	37.5	

Part number completion:

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

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

Taped version see page 145.

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## Continuation

### General Data

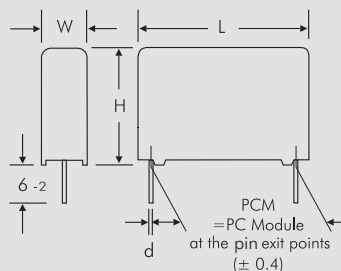
Capacitance	400 VDC/220 VAC*					630 VDC/280 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 $\mu$ F	3	8.5	10	<b>7.5</b>	MKP4G021002B00_____	3	8.5	10	<b>7.5</b>	MKP4J021002B00_____
0.015 "	4	9	10	<b>7.5</b>	MKP4G021502C00_____	4	9	10	<b>7.5</b>	MKP4J021003C00_____
	4	9	13	10	MKP4G021503C00_____	4	9	13	10	MKP4J021502C00_____
0.022 "	4.5	9.5	10.3	<b>7.5</b>	MKP4G022202D00_____	4.5	9.5	10.3	<b>7.5</b>	MKP4J022202D00_____
	4	9	13	10	MKP4G022203C00_____	4	9	13	10	MKP4J022203C00_____
0.033 "	5	10.5	10.3	<b>7.5</b>	MKP4G023302E00_____	5	10.5	10.3	<b>7.5</b>	MKP4J023302E00_____
	4	9	13	10	MKP4G023303C00_____	4	9	13	10	MKP4J023303C00_____
0.047 "	5	10.5	10.3	<b>7.5</b>	MKP4G024702E00_____	5.7	12.5	10.3	<b>7.5</b>	MKP4J024702F00_____
	5	11	13	10	MKP4G024703F00_____	5	11	13	10	MKP4J024703F00_____
0.068 "	5.7	12.5	10.3	<b>7.5</b>	MKP4G026802F00_____	6	12	13	10	MKP4J026803G00_____
	5	11	13	10	MKP4G026803F00_____	6	12.5	18	15	MKP4J026804C00_____
0.1 $\mu$ F	6	12	13	10	MKP4G031003G00_____	7	14	18	15	MKP4J031004D00_____
	5	11	18	15	MKP4G031004B00_____					
0.15 "	6	12.5	18	15	MKP4G031504C00_____	8	15	18	15	MKP4J031504F00_____
						6	15	26.5	22.5	MKP4J031505B00_____
0.22 "	7	14	18	15	MKP4G032204D00_____	9	16	18	15	MKP4J032204J00_____
						7	16.5	26.5	22.5	MKP4J032205D00_____
0.33 "	8	15	18	15	MKP4G033304F00_____	8.5	18.5	26.5	22.5	MKP4J033305F00_____
	6	15	26.5	22.5	MKP4G033305B00_____					
0.47 "	7	16.5	26.5	22.5	MKP4G034705D00_____	10.5	19	26.5	22.5	MKP4J034705G00_____
						11	21	31.5	27.5	MKP4J034706B00_____
0.68 "	8.5	18.5	26.5	22.5	MKP4G036805F00_____	11	21	31.5	27.5	MKP4J036806B00_____
1.0 $\mu$ F	11	21	26.5	22.5	MKP4G041005I00_____	13	24	31.5	27.5	MKP4J041006D00_____
	11	21	31.5	27.5	MKP4G041006B00_____					
1.5 "	11	21	31.5	27.5	MKP4G041506B00_____	15	26	31.5	27.5	MKP4J041506F00_____
2.2 "	15	26	31.5	27.5	MKP4G042206F00_____	17	29	41.5	37.5	MKP4J042207E00_____
3.3 "	17	29	31.5	27.5	MKP4G043306G00_____	19	32	41.5	37.5	MKP4J043307F00_____
	17	29	41.5	37.5	MKP4G043307E00_____					
4.7 "	19	32	41.5	37.5	MKP4G044707F00_____	20	39.5	41.5	37.5	MKP4J044707G00_____
6.8 "	20	39.5	41.5	37.5	MKP4G046807G00_____	24	45.5	41.5	37.5	MKP4J046807H00_____
10 $\mu$ F	24	45.5	41.5	37.5	MKP4G051007H00_____	35	50	41.5	37.5	MKP4J051007J00_____

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

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

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

Dims. in mm.



$\phi$ d	PCM	W
0.5	7.5	= 3
0.6	7.5	$\geq 4$
0.6	10	
0.8	15 - 27.5	
1.0	37.5	

Part number completion:

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

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

Taped version see page 145.

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## Continuation

### General Data

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

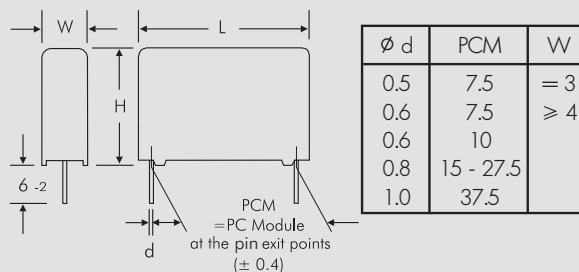
\* AC voltages:  $f \leq 400 \text{ Hz}$ ;  $1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

■ New values and range

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

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

Dims. in mm.



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

### General Data

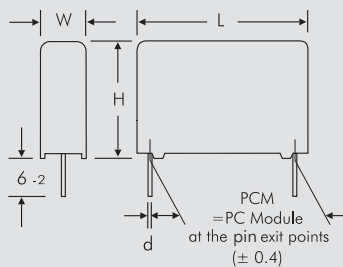
Capacitance	1600 VDC/630 VAC*					2000 VDC/700 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKP4T011003C00_	4	9	13	10	MKP4U011003C00_
1500 "	4	9	13	10	MKP4T011503C00_	4	9	13	10	MKP4U011503C00_
2200 "	4	9	13	10	MKP4T012203C00_	4	9	13	10	MKP4U012203C00_
3300 "	4	9	13	10	MKP4T013303C00_	4	9	13	10	MKP4U013303C00_
4700 "	4	9	13	10	MKP4T014703C00_	4	9	13	10	MKP4U014703C00_
6800 "	5	11	13	10	MKP4T016803F00_	5	11	13	10	MKP4U016803F00_
						5	11	18	15	MKP4U016804B00_
0.01 μF	5	11	13	10	MKP4T021003F00_	6	12.5	18	15	MKP4U021004C00_
0.015 "	5	11	18	15	MKP4T021504B00_	7	14	18	15	MKP4U021504D00_
0.022 "	6	12.5	18	15	MKP4T022204C00_	8	15	18	15	MKP4U022204F00_
0.033 "	7	14	18	15	MKP4T023304D00_	9	16	18	15	MKP4U023304J00_
	6	15	26.5	22.5	MKP4T023305B00_	6	15	26.5	22.5	MKP4U023305B00_
0.047 "	9	16	18	15	MKP4T024704J00_	7	16.5	26.5	22.5	MKP4U024705D00_
	6	15	26.5	22.5	MKP4T024705B00_					
0.068 "	7	16.5	26.5	22.5	MKP4T026805D00_	8.5	18.5	26.5	22.5	MKP4U026805F00_
0.1 μF	8.5	18.5	26.5	22.5	MKP4T031005F00_	11	21	26.5	22.5	MKP4U031005I00_

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

New ranges

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

Dims in mm



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

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

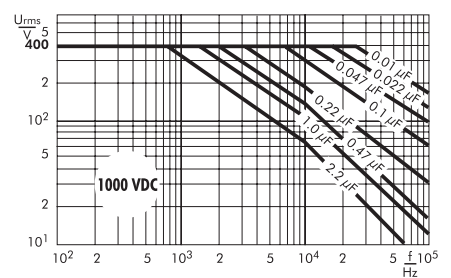
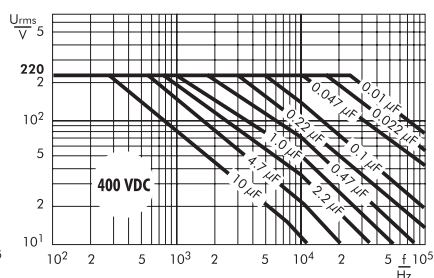
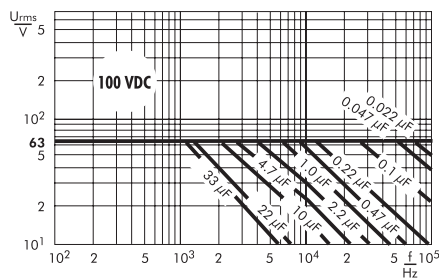
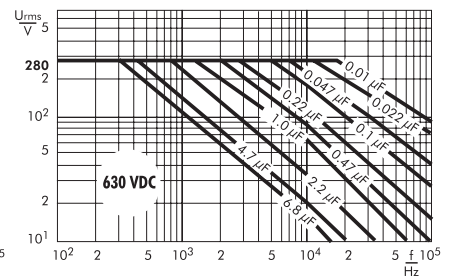
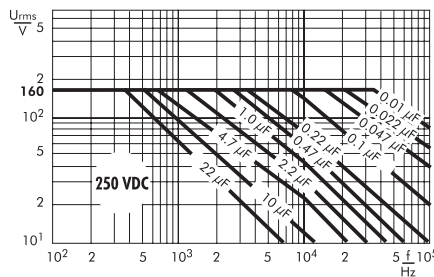
Packing: bulk = S

Pin length: 6-2 = SD

Taped version see page 145.

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

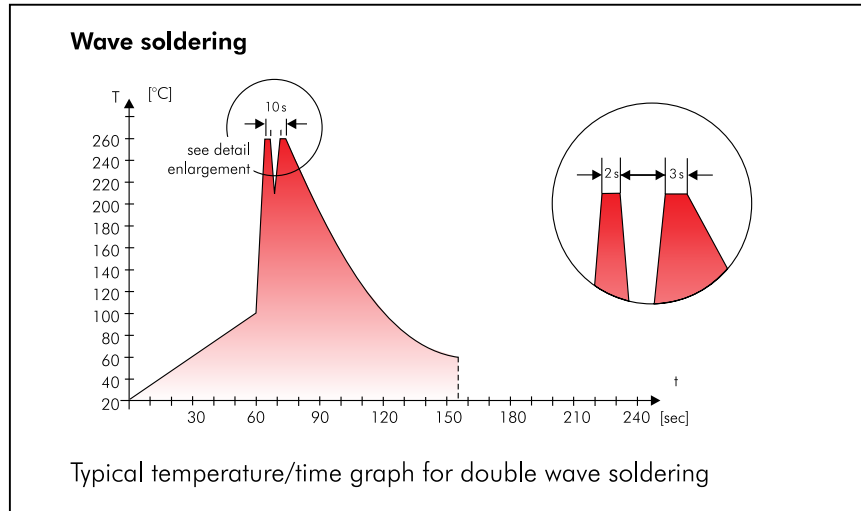
### Single wave soldering

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

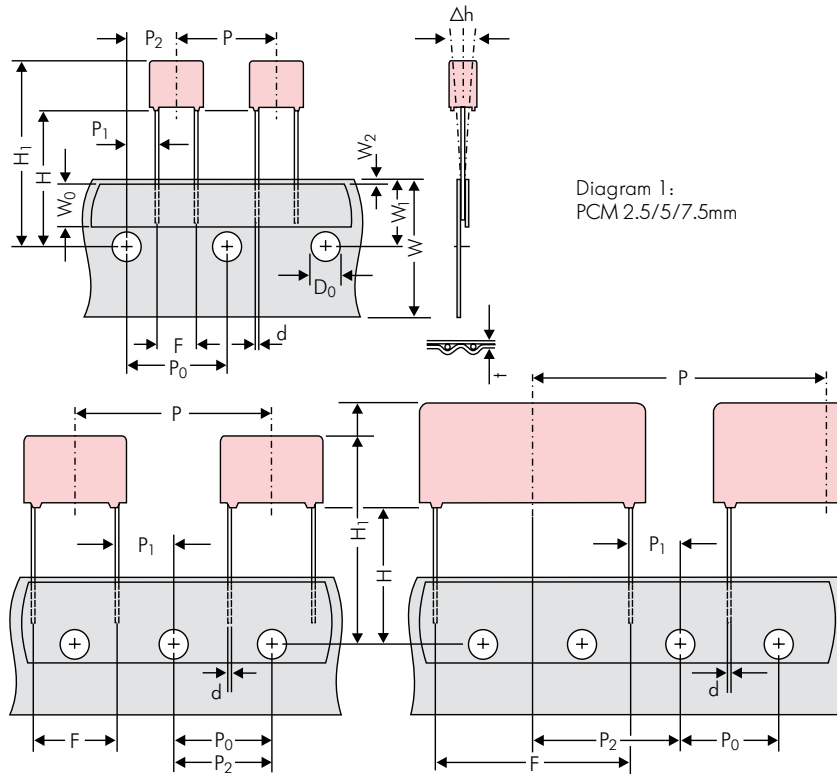


Diagram 1:  
PCM 2.5/5/7.5mm

Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5\*mm

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

Designation	Symbol	Dimensions for Radial Taping						
		PCM 2.5 taping	PCM 5 taping	PCM 7.5 taping	PCM 10 taping*	PCM 15 taping*	PCM 22.5 taping	PCM 27.5 taping
Carrier tape width	W	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5
Hold-down tape width	W <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 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch
Feed hole centre to pin	P <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 18.5 ±0.5	16.5 ±0.3 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5
Feed hole centre to top edge of the component	H <sub>1</sub>	H+H <sub>component</sub> < H <sub>1</sub> 32.25 max.	H+H <sub>component</sub> < H <sub>1</sub> 32.25 max.	H+H <sub>component</sub> < H <sub>1</sub> 24.5 to 31.5	H+H <sub>component</sub> < H <sub>1</sub> 25.0 to 31.5	H+H <sub>component</sub> < H <sub>1</sub> 26.0 to 37.0	H+H <sub>component</sub> < H <sub>1</sub> 30.0 to 43.0	H+H <sub>component</sub> < H <sub>1</sub> 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. φ 30 ±1	B 52 ±2 58 ±2 } depending on comp. dimensions	REEL	φ 360 max. φ 30 ±1	52 ±2 58 ±2 or 66 ±2	REEL	φ 500 max. φ 25 ±1
Unit	see details page 147.							

Dims in mm.

\* Diameter of pins see General Data.

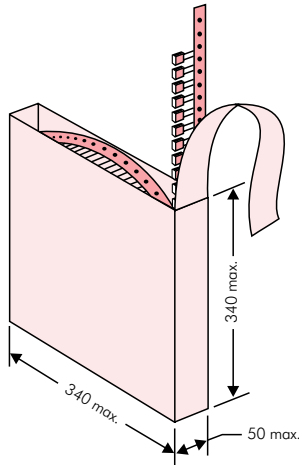
\* PCM 10 and PCM 15 can be crimped to PCM 7.5.

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

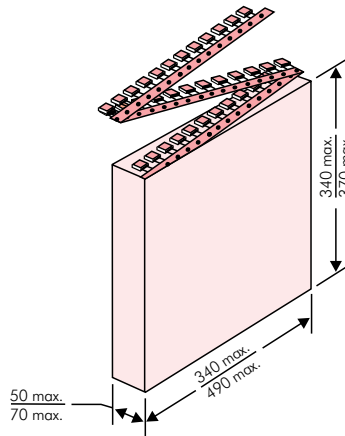
Please clarify customer-specific deviations with the manufacturer.

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

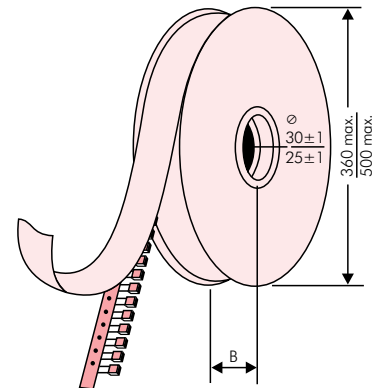
### ■ ROLL Packaging



### ■ 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> 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.: MKS2C034701C00K88D	
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 RM5</b>	
1000067326	Standard 10% Loss - Standard	Dichte 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 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.   Moulded versions. Rights reserved to amend design data without prior notification. Samples and pre-production needs on request.



## 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>6K</b>	405*	-	-	-	-	-	-	-	-				
	15	26	31.5	<b>6F</b>	324*	-	-	-	-	270	-	-	250				
	15	26	33	<b>6L</b>	324*	-	-	-	-	-	-	-	-				
	17	29	31.5	<b>6G</b>	198*	-	-	-	-	-	-	-	-				
	17	34.5	31.5	<b>6I</b>	198*	-	-	-	-	-	-	-	-				
	20	32	33	<b>6M</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  SMD-PEN = SMDN  SMD-PPS = SMDI  FKP 02 = FKPO  MKS 02 = MKS0  FKS 2 = FKS2  FKP 2 = FKP2  FKS 3 = FKS3  FKP 3 = FKP 3  MKS 2 = MKS2  MKP 2 = MKP2  MKS 4 = MKS4  MKP 4C = MKPC  MKP 4 = MKP4  MKP 10 = MKP1  FKP 1 = FKP1  MKP-X2 = MKX2  MKP-X1 R = MKX1  MKP-Y2 = MKY2  MP 3-X2 = MPX2  MP 3-X1 = MPX1  MP 3-Y2 = MPY2  MP 3R-Y2 = MPRY  MKP 4F = MKPF  Snubber MKP = SNMP  Snubber FKP = SNFP  GTO MKP = GTOM  DC-LINK MKP 3 = DCP3  DC-LINK MKP 4 = DCP4  DC-LINK MKP 4S = DCP5  DC-LINK MKP 5 = DCP5  DC-LINK MKP 6 = DCP6  DC-LINK HC = DCHC  DC-LINK HY = DCHY</p>	<p><b>Rated voltage:</b></p> <p>50 VDC = B0  63 VDC = C0  100 VDC = D0  250 VDC = F0  400 VDC = G0  450 VDC = H0  520 VDC = H2  600 VDC = I0  630 VDC = J0  700 VDC = K0  800 VDC = L0  850 VDC = M0  900 VDC = N0  1000 VDC = O1  1100 VDC = P0  1200 VDC = Q0  1250 VDC = R0  1500 VDC = S0  1600 VDC = T0  2000 VDC = U0  2500 VDC = V0  3000 VDC = W0  4000 VDC = X0  6000 VDC = Y0  250 VAC = 0W  275 VAC = 1W  300 VAC = 2W  305 VAC = AW  350 VAC = BW  440 VAC = 4W  500 VAC = 5W  ...</p>	<p><b>Capacitance:</b></p> <p>22 pF = 0022  47 pF = 0047  100 pF = 0100  150 pF = 0150  220 pF = 0220  330 pF = 0330  470 pF = 0470  680 pF = 0680  1000 pF = 1100  1500 pF = 1150  2200 pF = 1220  3300 pF = 1330  4700 pF = 1470  6800 pF = 1680  0.01 µF = 2100  0.022 µF = 2220  0.047 µF = 2470  0.1 µF = 3100  0.22 µF = 3220  0.47 µF = 3470  1 µF = 4100  2.2 µF = 4220  4.7 µF = 4470  10 µF = 5100  22 µF = 5220  47 µF = 5470  100 µF = 6100  220 µF = 6220  1000 µF = 7100  1500 µF = 7150  ...</p>	<p><b>Size:</b></p> <p>4.8x3.3x3 Size 1812 = KA  4.8x3.3x4 Size 1812 = KB  5.7x5.1x3.5 Size 2220 = QA  5.7x5.1x4.5 Size 2220 = QB  7.2x6.1x3 Size 2824 = TA  7.2x6.1x5 Size 2824 = TB  10.2x7.6x5 Size 4030 = VA  12.7x10.2x6 Size 5040 = XA  15.3x13.7x7 Size 6054 = YA  2.5x7x4.6 PCM 2.5 = 0B  3x7.5x4.6 PCM 2.5 = 0C  2.5x6.5x7.2 PCM 5 = 1A  3x7.5x7.2 PCM 5 = 1B  2.5x7x10 PCM 7.5 = 2A  3x8.5x10 PCM 7.5 = 2B  3x9x13 PCM 10 = 3A  4x9x13 PCM 10 = 3C  5x11x18 PCM 15 = 4B  6x12.5x18 PCM 15 = 4C  5x14x26.5 PCM 22.5 = 5A  6x15x26.5 PCM 22.5 = 5B  9x19x31.5 PCM 27.5 = 6A  11x21x31.5 PCM 27.5 = 6B  9x19x41.5 PCM 37.5 = 7A  11x22x41.5 PCM 37.5 = 7B  19x31x56 PCM 48.5 = 8D  25x45x57 PCM 52.5 = 9D  ...</p> <p><b>Version code:</b></p> <p>Standard = 00  Version A1 = 1A  Version A1.1.1 = 1B  Version A2 = 2A  ...</p>	<p><b>Tolerance:</b></p> <p>±20% = M  ±10% = K  ±5% = J  ±2.5% = H  ±1% = E  ...</p> <p><b>Packing:</b></p> <p>AMMO H16.5 340x340 = A  AMMO H16.5 490x370 = B  AMMO H18.5 340x340 = C  AMMO H18.5 490x370 = D  REEL H16.5 360 = F  REEL H16.5 500 = H  REEL H18.5 360 = I  REEL H18.5 500 = J  ROLL H16.5 = N  ROLL H18.5 = O  BLISTER W12 180 = P  BLISTER W12 330 = Q  BLISTER W16 330 = R  BLISTER W24 330 = T  Bulk/TPS Standard = S  ...</p> <p><b>Pin length (untaped)</b></p> <p>3.5 ±0.5 = C9  6 -2 = SD  16 ±1 = P1  ...</p> <p><b>Pin length (taped)</b></p> <p>none = 00</p>
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