

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

### Special Features

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

### Typical Applications

For high pulse and high frequency applications e.g.

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

### Construction

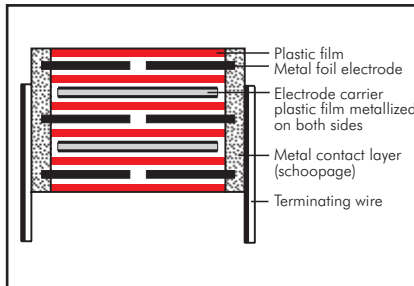
#### Dielectric:

Polypropylene (PP) film

#### Capacitor electrodes:

Aluminium foil and double-sided metallized plastic film

#### Internal construction:



#### Encapsulation:

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

#### Terminations:

Tinned wire.

#### Marking:

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

### Electrical Data

#### Capacitance range:

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

#### Rated voltages:

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

#### Capacitance tolerances:

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

#### Operating temperature range:

-55° C to +100° C

#### Climatic test category:

55/100/56 in accordance with IEC

#### Test voltage:

2 U<sub>r</sub>, 2 sec / 6 kV: 1.6 U<sub>r</sub>, 2 sec.

#### Dielectric absorption: 0.05%

#### Dissipation factors at +20° C: tan δ

at f	C ≤ 0.1 μF	0.1 μF < C ≤ 1.0 μF	C > 1.0 μF
1 kHz	≤ 6 × 10 <sup>-4</sup>	≤ 6 × 10 <sup>-4</sup>	≤ 6 × 10 <sup>-4</sup>
10 kHz	≤ 6 × 10 <sup>-4</sup>	≤ 6 × 10 <sup>-4</sup>	-
100 kHz	≤ 10 × 10 <sup>-4</sup>	-	-

#### Insulation resistance at +20° C:

C ≤ 0.1 μF: ≥ 1 × 10<sup>5</sup> MΩ

(mean value: 5 × 10<sup>5</sup> MΩ)

C > 0.1 μF: ≥ 30 000 sec (MΩ × μF)

(mean value: 100 000 sec)

Measuring voltage: 100 V/1 min.

#### Voltage derating:

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

#### Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit (0.5 × U<sub>r</sub> and 40° C)

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

Capacitance pF/μF	max. pulse rise time V/μsec at T <sub>A</sub> < 40° C								
	400VDC	630VDC	850VDC	1000VDC	1250VDC	1600VDC	2000VDC	4000VDC	6000VDC
100 ... 220	-	-	-	-	56000	56000	-	-	-
330 ... 680	-	-	-	-	51000	56000	56000	56000	56000
1000 ... 2200	29000	29000	2900	29000	29000	46000	51000	51000	51000
3300 ... 6800	9000	14000	2700	27000	29000	29000	29000	29000	29000
0.01 ... 0.022	9000	11000	1100	11000	11000	11000	13000	13000	13000
0.033 ... 0.068	9000	11000	1100	11000	11000	11000	11000	13000	13000
0.1 ... 0.22	7000	11000	1100	11000	11000	11000	11000	13000	13000
0.33 ... 0.68	6000	10000	1100	11000	11000	11000	11000	-	-
1.0 ... 2.2	5000	6600	8300	8300	9500	11000	-	-	-
3.3 ... 4.7	2500	-	-	-	-	-	-	-	-

### Mechanical Tests

#### Pull test on pins:

d ≤ 0.8 φ: 10 N in direction of pins

d > 0.8 φ: 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 × 26 × 31.5 /

PCM 27.5 mm.

Detailed taping information and graphs

at the end of the catalogue.

For further details and graphs please

refer to Technical Information.

## Continuation

### General Data

Capacitance	400 VDC/250 VAC*					630 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	5	11	18	15	FKP1G011004B_	5	11	18	15	FKP1J011004B_
1500 "	5	11	18	15	FKP1G011504B_	5	11	18	15	FKP1J011504B_
2200 "	5	11	18	15	FKP1G012204B_	5	11	18	15	FKP1J012204B_
3300 "	5	11	18	15	FKP1G013304B_	5	11	18	15	FKP1J013304B_
4700 "	5	11	18	15	FKP1G014704B_	5	11	18	15	FKP1J014704B_
6800 "	5	11	18	15	FKP1G016804B_	6	12.5	18	15	FKP1J016804C_
0.01 µF	5	11	18	15	FKP1G021004B_	7	14	18	15	FKP1J021004D_
0.015 "	6	12.5	18	15	FKP1G021504C_	5	14	26.5	22.5	FKP1J021005A_
0.022 "	7	14	18	15	FKP1G022204D_	8	15	18	15	FKP1J021504F_
0.033 "	5	14	26.5	22.5	FKP1G022205A_	6	15	26.5	22.5	FKP1J021505B_
0.047 "	8	15	18	15	FKP1G023304F_	7	16.5	26.5	22.5	FKP1J022205D_
0.068 "	6	15	26.5	22.5	FKP1G023305B_	8.5	18.5	26.5	22.5	FKP1J023305F_
0.1 µF	7	16.5	26.5	22.5	FKP1G024705D_	10.5	20.5	26.5	22.5	FKP1J024705H_
0.15 "	8.5	18.5	26.5	22.5	FKP1G026805F_	9	19	31.5	27.5	FKP1J024706A_
0.22 "	9	19	31.5	27.5	FKP1G031005H_	11	21	31.5	27.5	FKP1J026806B_
0.33 "	11	21	31.5	27.5	FKP1G031006A_	9	19	41.5	37.5	FKP1J026807A_
0.47 "	13	24	31.5	27.5	FKP1G031506B_	13	24	31.5	27.5	FKP1J031006D_
0.68 "	11	22	41.5	37.5	FKP1G031007B_	11	22	41.5	37.5	FKP1J031007B_
1.0 µF	13	24	31.5	27.5	FKP1G032206D_	13	24	41.5	37.5	FKP1J031507C_
1.5 "	15	26	41.5	37.5	FKP1G032207B_	15	26	41.5	37.5	FKP1J032207D_
2.2 "	11	22	41.5	37.5	FKP1G033307C_	19	32	41.5	37.5	FKP1J033307F_
3.3 "	13	24	41.5	37.5	FKP1G033307E_	20	39.5	41.5	37.5	FKP1J033307G_
4.7 "	17	29	41.5	37.5	FKP1G034707E_	24	45.5	41.5	37.5	FKP1J034707G_
10 "	19	32	41.5	37.5	FKP1G036807F_	24	45.5	41.5	37.5	FKP1J036807H_
100 pF	20	39.5	41.5	37.5	FKP1G041007G_	35	50	41.5	37.5	FKP1J041007J_
150 "	31	46	41.5	37.5	FKP1G041507I_	40	55	41.5	37.5	FKP1J041507K_
220 "	35	50	41.5	37.5	FKP1G042207J_	35	50	57	52.5	FKP1J041509F_
330 "	45	65	57	52.5	FKP1G043309F_	45	55	57	52.5	FKP1J042209H_
470 "					FKP1G044709J_					

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

New values

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

Dims. in mm.

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

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

#### Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD
Taped version see page 145.		

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Continuation page 75

## Continuation

### General Data

Capacitance	850 VDC/450 VAC*					1000 VDC/600 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	5	11	18	15	FKP1M011004B_	5	11	18	15	FKP1O111004B_
1500 "	5	11	18	15	FKP1M011504B_	5	11	18	15	FKP1O111504B_
2200 "	5	11	18	15	FKP1M012204B_	5	11	18	15	FKP1O112204B_
3300 "	5	11	18	15	FKP1M013304B_	5	11	18	15	FKP1O113304B_
4700 "	6	12.5	18	15	FKP1M014704C_	6	12.5	18	15	FKP1O114704C_
6800 "	7	14	18	15	FKP1M016804D_	7	14	18	15	FKP1O116804D_
0.01 µF	8	15	18	15	FKP1M021004F_	8	15	18	15	FKP1O121004F_
	6	15	26.5	22.5	FKP1M021005B_	6	15	26.5	22.5	FKP1O121005B_
0.015 "	6	15	26.5	22.5	FKP1M021505B_	6	15	26.5	22.5	FKP1O121505B_
0.022 "	8.5	18.5	26.5	22.5	FKP1M022205F_	8.5	18.5	26.5	22.5	FKP1O122205F_
0.033 "	10.5	20.5	26.5	22.5	FKP1M023305H_	10.5	20.5	26.5	22.5	FKP1O123305H_
	9	19	31.5	27.5	FKP1M023306A_	9	19	31.5	27.5	FKP1O123306A_
0.047 "	11	21	31.5	27.5	FKP1M024706B_	11	21	31.5	27.5	FKP1O124706B_
0.068 "	13	24	31.5	27.5	FKP1M026806D_	13	24	31.5	27.5	FKP1O126806D_
	11	22	41.5	37.5	FKP1M026807B_	11	22	41.5	37.5	FKP1O126807B_
0.1 µF	13	24	41.5	37.5	FKP1M031007C_	13	24	41.5	37.5	FKP1O131007C_
0.15 "	15	26	41.5	37.5	FKP1M031507D_	15	26	41.5	37.5	FKP1O131507D_
0.22 "	19	32	41.5	37.5	FKP1M032207F_	19	32	41.5	37.5	FKP1O132207F_
0.33 "	20	39.5	41.5	37.5	FKP1M033307G_	20	39.5	41.5	37.5	FKP1O133307G_
0.47 "	31	46	41.5	37.5	FKP1M034707I_	31	46	41.5	37.5	FKP1O134707I_
0.68 "	35	50	41.5	37.5	FKP1M036807J_	35	50	41.5	37.5	FKP1O136807J_
1.0 µF	40	55	41.5	37.5	FKP1M041007K_	40	55	41.5	37.5	FKP1O141007K_
	35	50	57	52.5	FKP1M041009F_	35	50	57	52.5	FKP1O141009F_
1.5 "	45	55	57	52.5	FKP1M041509H_	45	55	57	52.5	FKP1O141509H_
2,2 "	45	65	57	52.5	FKP1M042209J_	45	65	57	52.5	FKP1O142209J_

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

New range and values

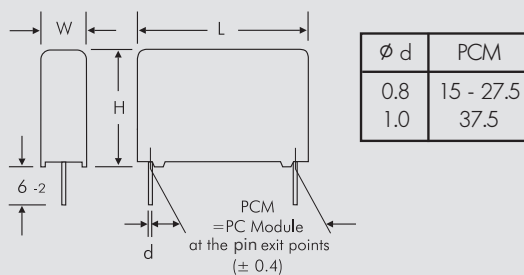
\*\* PCM = Printed circuit module = pin spacing

Dims. in mm.

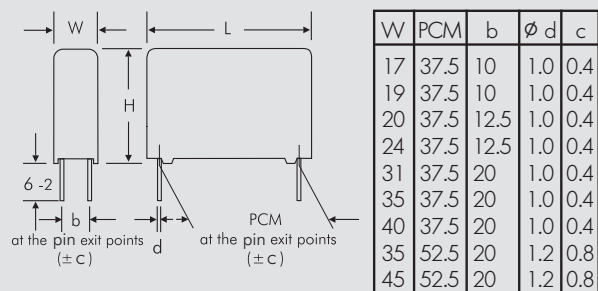
Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

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 145.	

#### 2-pin version



#### 4-pin version



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Continuation page 76

## Continuation

### General Data

Capacitance	1250 VDC/600 VAC*					1600 VDC/650 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF						5	11	18	15	FKP1T001004B_____
150 "						5	11	18	15	FKP1T001504B_____
220 "						5	11	18	15	FKP1T002204B_____
330 "						5	11	18	15	FKP1T003304B_____
470 "						5	11	18	15	FKP1T004704B_____
680 "						5	11	18	15	FKP1T006804B_____
1000 pF	5	11	18	15	FKP1R011004B_____	6	12.5	18	15	FKP1T011004C_____
1500 "	5	11	18	15	FKP1R011504B_____	5	14	26.5	22.5	FKP1T011005A_____
2200 "	5	11	18	15	FKP1R012204B_____	7	14	18	15	FKP1T011504D_____
3300 "	5	11	18	15	FKP1R012204B_____	5	14	26.5	22.5	FKP1T011505A_____
4700 "	6	12.5	18	15	FKP1R013304C_____	8	15	18	15	FKP1T012204F_____
6800 "	7	14	18	15	FKP1R014704D_____	5	14	26.5	22.5	FKP1T012205A_____
	8	15	18	15	FKP1R016804F_____	6	15	26.5	22.5	FKP1T013305B_____
	5	14	26.5	22.5	FKP1R016805A_____	7	16.5	26.5	22.5	FKP1T014705D_____
						8.5	18.5	26.5	22.5	FKP1T016805F_____
0.01 µF	7	16.5	26.5	22.5	FKP1R021005D_____	10.5	20.5	26.5	22.5	FKP1T021005H_____
0.015 "	8.5	18.5	26.5	22.5	FKP1R021505F_____	11	21	31.5	27.5	FKP1T021506B_____
0.022 "	10.5	20.5	26.5	22.5	FKP1R022205H_____	11	21	31.5	27.5	FKP1T022206B_____
0.033 "	11	21	31.5	27.5	FKP1R023306B_____	13	24	31.5	27.5	FKP1T023306D_____
	9	19	41.5	37.5	FKP1R023307A_____	13	24	41.5	37.5	FKP1T023307C_____
0.047 "	13	24	31.5	27.5	FKP1R024706D_____	13	24	41.5	37.5	FKP1T024707C_____
	11	22	41.5	37.5	FKP1R024707B_____					
0.068 "	11	22	41.5	37.5	FKP1R026807B_____	15	26	41.5	37.5	FKP1T026807D_____
0.1 µF	15	26	41.5	37.5	FKP1R031007D_____	17	29	41.5	37.5	FKP1T031007E_____
0.15 "	17	29	41.5	37.5	FKP1R031507E_____	20	39.5	41.5	37.5	FKP1T031507G_____
0.22 "	19	32	41.5	37.5	FKP1R032207F_____	24	45.5	41.5	37.5	FKP1T032207H_____
0.33 "	24	45.5	41.5	37.5	FKP1R033307H_____	31	46	41.5	37.5	FKP1T033307L_____
0.47 "	31	46	41.5	37.5	FKP1R034707I_____	40	55	41.5	37.5	FKP1T034707K_____
0.68 "	40	55	41.5	37.5	FKP1R036807K_____	35	50	57	52.5	FKP1T036809F_____
1.0 µF	35	50	57	52.5	FKP1R041009F_____	45	55	57	52.5	FKP1T041009H_____
1.5 "	45	65	57	52.5	FKP1R041509J_____					

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

■ 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 145.	

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Continuation page 77

## Continuation

### General Data

Capacitance	2000 VDC/700 VAC~*					4000 VDC/700 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
100 pF	5	11	18	15	FKP1U001004B_____					
150 "	5	11	18	15	FKP1U001504B_____					
220 "	5	11	18	15	FKP1U002204B_____					
330 "	6	12.5	18	15	FKP1U003304C_____					
470 "	6	12.5	18	15	FKP1U004704C_____	5	14	26.5	22.5	FKP1X004705A_____
680 "	6	12.5	18	15	FKP1U006804C_____	5	14	26.5	22.5	FKP1X006805A_____
1000 pF	7	14	18	15	FKP1U011004D_____	5	14	26.5	22.5	FKP1X011005A_____
	5	14	26.5	22.5	FKP1U011005A_____					
1500 "	6	15	26.5	22.5	FKP1U011505B_____	7	16.5	26.5	22.5	FKP1X011505D_____
2200 "	7	16.5	26.5	22.5	FKP1U012205D_____	8.5	18.5	26.5	22.5	FKP1X012205F_____
3300 "	7	16.5	26.5	22.5	FKP1U013305D_____	10.5	20.5	26.5	22.5	FKP1X013305H_____
4700 "	8.5	18.5	26.5	22.5	FKP1U014705F_____	11	21	31.5	27.5	FKP1X014706B_____
6800 "	10.5	20.5	26.5	22.5	FKP1U016805H_____	13	24	31.5	27.5	FKP1X016806D_____
0.01 µF	11	21	31.5	27.5	FKP1U021006B_____	15	26	31.5	27.5	FKP1X021006F_____
0.015 "	13	24	31.5	27.5	FKP1U021506D_____	13	24	41.5	37.5	FKP1X021507C_____
0.022 "	15	26	31.5	27.5	FKP1U022206F_____	17	29	41.5	37.5	FKP1X022207E_____
	13	24	41.5	37.5	FKP1U022207C_____					
0.033 "	13	24	41.5	37.5	FKP1U023307C_____	20	39.5	41.5	37.5	FKP1X023307G_____
0.047 "	17	29	41.5	37.5	FKP1U024707E_____	24	45.5	41.5	37.5	FKP1X024707H_____
0.068 "	19	32	41.5	37.5	FKP1U026807F_____	31	46	41.5	37.5	FKP1X026807I_____
0.1 µF	20	39.5	41.5	37.5	FKP1U031007G_____	35	50	41.5	37.5	FKP1X031007J_____
0.15 "	24	45.5	41.5	37.5	FKP1U031507H_____	40	55	41.5	37.5	FKP1X031507K_____
0.22 "	35	50	41.5	37.5	FKP1U032207J_____	45	55	57	52.5	FKP1X032209H_____
0.22 "	40	55	41.5	37.5	FKP1U033307K_____					
0.47 "	45	55	57	52.5	FKP1U034709H_____					
0.68 "	45	65	57	52.5	FKP1U036809J_____					

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

■ 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

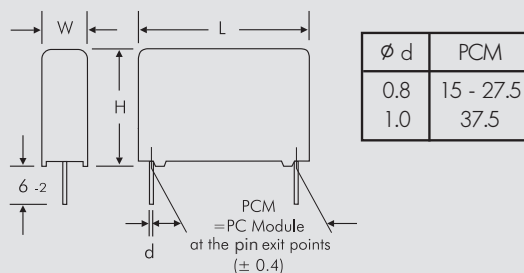
5 % = J

Packing: bulk = S

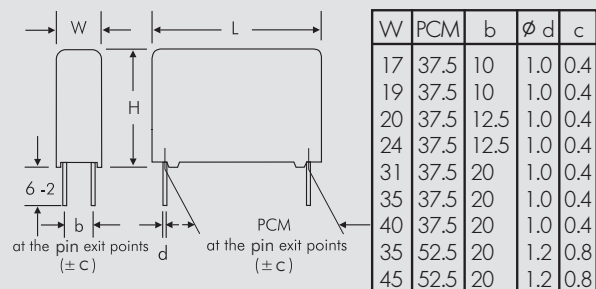
Pin length: 6-2 = SD

Taped version see page 145.

#### 2-pin version



#### 4-pin version



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Continuation page 78

## Continuation

### General Data

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

Part number completion:

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

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

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

Taped version see page 145.

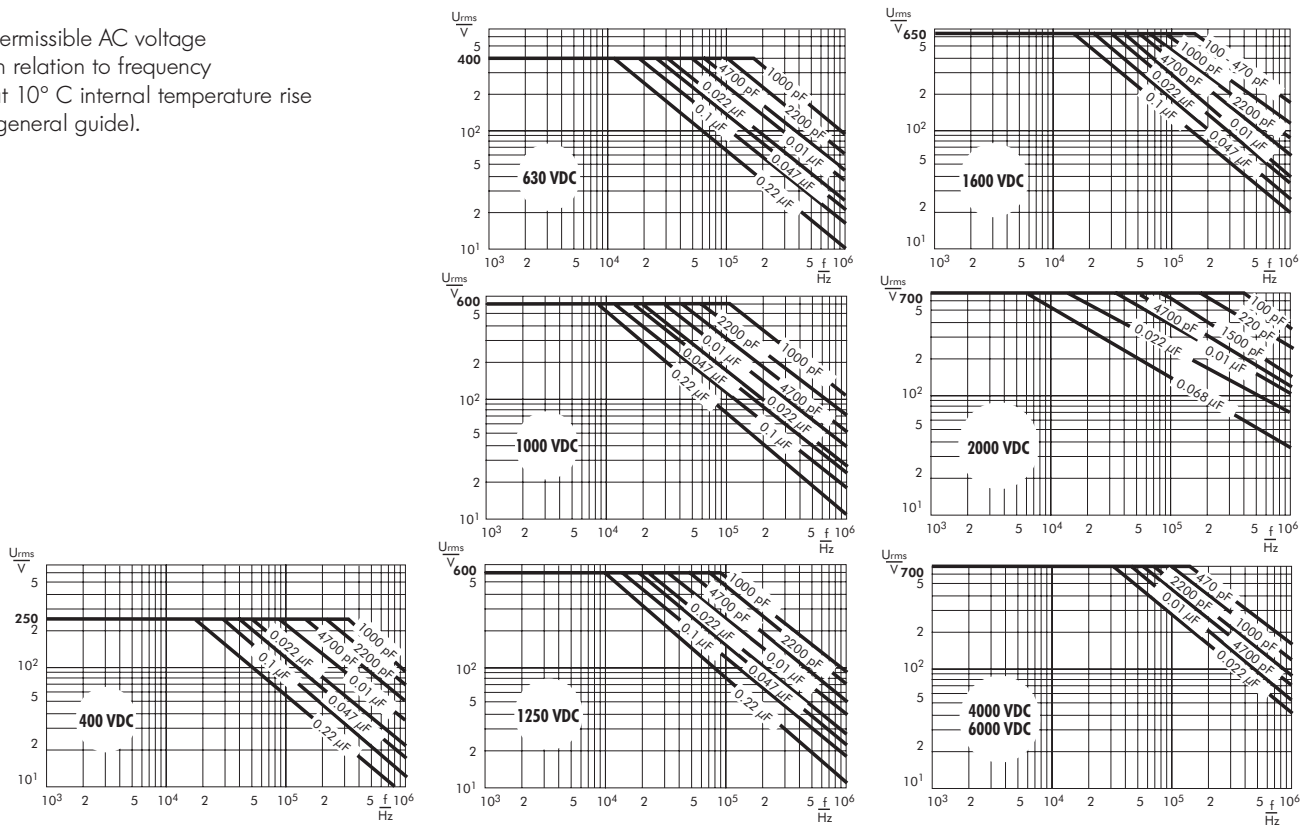
\* AC voltages:  $f \leq 1000 \text{ Hz}$ ;  $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

New values

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

Rights reserved to amend design data without prior notification.

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



## 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:  $T < 260^{\circ}C$

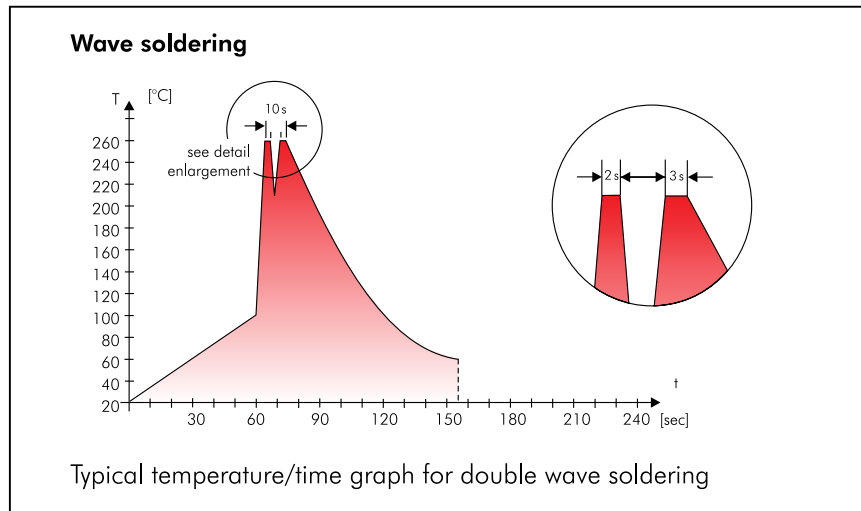
Dwell time:  $t < 5 \text{ sec}$

### 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

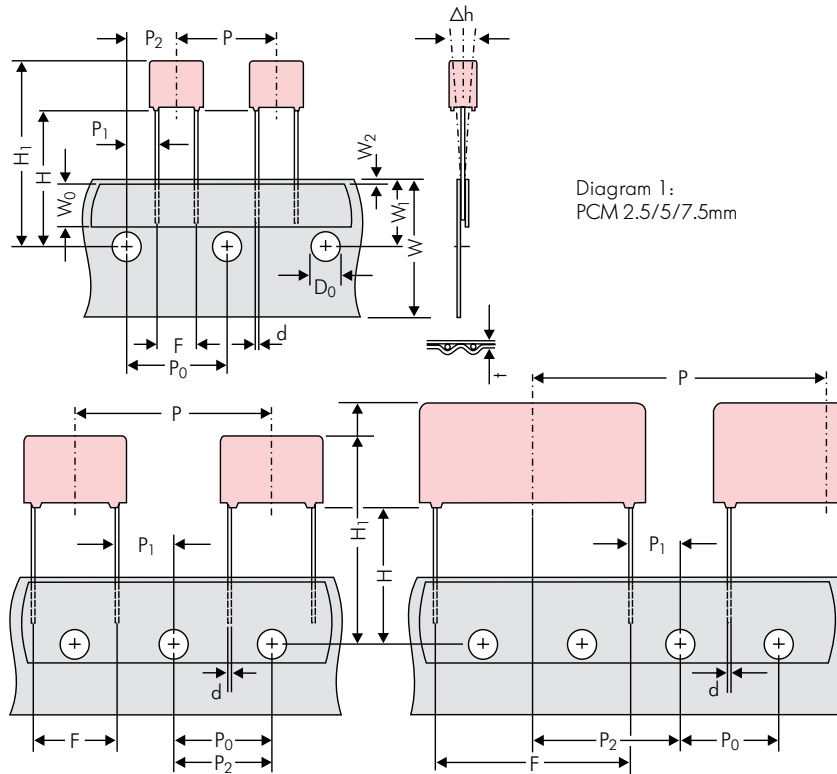


Diagram 1:  
PCM 2.5/5/7.5mm

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.

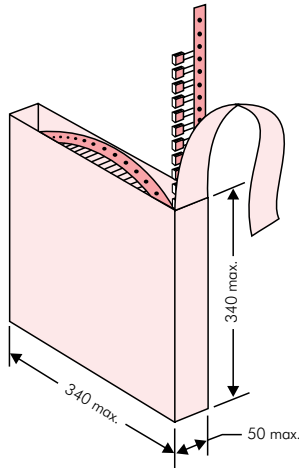
Position of components according to PCM 7.5 (sketch 11). P<sub>0</sub> = 12.7 or 15.0 is possible

Please clarify customer-specific deviations with the manufacturer.

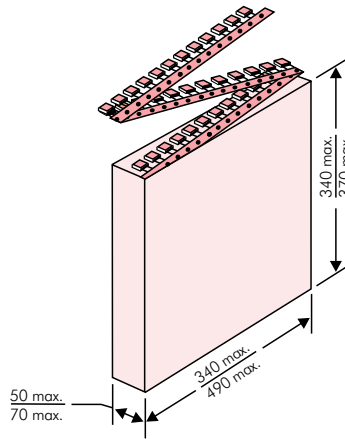


## Types of Tape Packaging of Capacitors for Automatic Radial Insertion

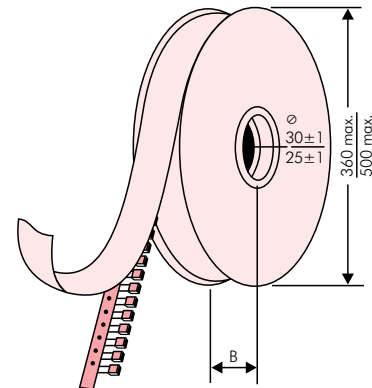
### ■ ROLL Packaging



### ■ 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>	
<b>1000067326</b>	Standard 10% Loss - Standard Dichte 6-2	Week 03/2011
	Vorlage Debitor Inland	

BARCODE „Code 39“

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



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

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

■ Moulded versions.

Rights reserved to amend design data without prior notification.



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

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

\* for 2-inch transport pitches.

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

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

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



A WIMA part number consists of 18 digits and is composed as follows:

- Field 1 - 4: Type description
- Field 5 - 6: Rated voltage
- Field 7 - 10: Capacitance
- Field 11 - 12: Size and PCM
- Field 13 - 14: Version code (e.g. Snubber versions)
- Field 15: Capacitance tolerance
- Field 16: Packing
- Field 17 - 18: Pin length (untaped)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>M</b>	<b>K</b>	<b>S</b>	<b>2</b>	<b>C</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>A</b>	<b>0</b>	<b>0</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>D</b>
MKS 2				63 VDC		0.01 µF			2.5x6.5x7.2			-		20%	bulk	6 -2	

<p><b>Type description:</b></p> <p>SMD-PET = SMDT                  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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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.