

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 μ F. 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

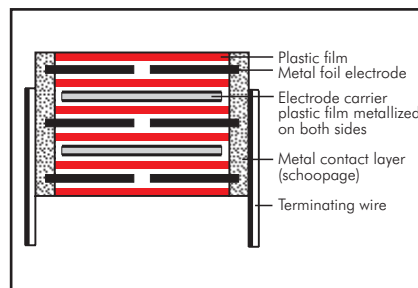
Dielectric:

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 μ F (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:

$\pm 20\%$, $\pm 10\%$, $\pm 5\%$ (other tolerances are available subject to special enquiry)

Operating temperature range:

-55°C to $+100^\circ\text{C}$

Climatic test category:

55/100/56 in accordance with IEC

Test voltage:

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

Dielectric absorption: 0.05 %

Dissipation factors at $+20^\circ\text{C}$: $\tan \delta$

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

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

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

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

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

(mean value: 100 000 sec)

Measuring voltage: 100 V/1 min.

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from $+85^\circ\text{C}$ for DC voltages and from $+75^\circ\text{C}$ for AC voltages

Reliability:

Operational life > 300 000 hours

Failure rate < 1 fit ($0.5 \times U_r$ and 40°C)

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

Capacitance pF/ μ F	max. pulse rise time V/ μ sec at $T_A < 40^\circ\text{C}$								
	400 VDC	630 VDC	850 VDC	1000 VDC	1250 VDC	1600 VDC	2000 VDC	4000 VDC	6000 VDC
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:

$d \leq 0.8 \phi$: 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/sec²

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	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_____
0.033 "	8	15	18	15	FKP1G023304F_____	7	16.5	26.5	22.5	FKP1J022205D_____
0.047 "	6	15	26.5	22.5	FKP1G023305B_____	8.5	18.5	26.5	22.5	FKP1J023305F_____
0.047 "	7	16.5	26.5	22.5	FKP1G024705D_____	10.5	20.5	26.5	22.5	FKP1J024705H_____
0.068 "	8.5	18.5	26.5	22.5	FKP1G026805F_____	9	19	31.5	27.5	FKP1J024706A_____
						11	21	31.5	27.5	FKP1J026806B_____
						9	19	41.5	37.5	FKP1J026807A_____
0.1 µF	10.5	20.5	26.5	22.5	FKP1G031005H_____	13	24	31.5	27.5	FKP1J031006D_____
	9	19	31.5	27.5	FKP1G031006A_____	11	22	41.5	37.5	FKP1J031007B_____
0.15 "	11	21	31.5	27.5	FKP1G031506B_____	13	24	41.5	37.5	FKP1J031507C_____
0.22 "	13	24	31.5	27.5	FKP1G032206D_____	15	26	41.5	37.5	FKP1J032207D_____
	11	22	41.5	37.5	FKP1G032207B_____					
0.33 "	13	24	41.5	37.5	FKP1G033307C_____	19	32	41.5	37.5	FKP1J033307F_____
0.47 "	17	29	41.5	37.5	FKP1G034707E_____	20	39.5	41.5	37.5	FKP1J034707G_____
0.68 "	19	32	41.5	37.5	FKP1G036807F_____	24	45.5	41.5	37.5	FKP1J036807H_____
1.0 µF	20	39.5	41.5	37.5	FKP1G041007G_____	35	50	41.5	37.5	FKP1J041007J_____
1.5 "	31	46	41.5	37.5	FKP1G041507I_____	40	55	41.5	37.5	FKP1J041507K_____
						35	50	57	52.5	FKP1J041509F_____
2.2 "	35	50	41.5	37.5	FKP1G042207J_____	45	55	57	52.5	FKP1J042209H_____
3.3 "	35	50	57	52.5	FKP1G043309F_____					
4.7 "	45	65	57	52.5	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

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

 New range and values

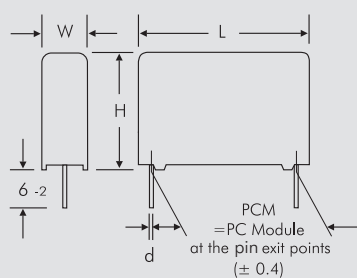
** PCM = Printed circuit module = pin spacing

Dims. in mm.

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

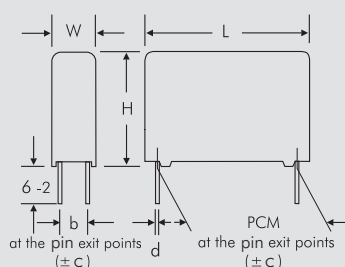
Part number completion:	
Version code:	2-pin = 00
	4-pin = D4
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD
Taped version see page 145.	

2-pin version



∅ d	PCM
0.8	15 - 27.5
1.0	37.5

4-pin version



W	PCM	b	∅ d	c
17	37.5	10	1.0	0.4
19	37.5	10	1.0	0.4
20	37.5	12.5	1.0	0.4
24	37.5	12.5	1.0	0.4
31	37.5	20	1.0	0.4
35	37.5	20	1.0	0.4
40	37.5	20	1.0	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

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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 "	6	12.5	18	15	FKP1R013304C_____	5	14	26.5	22.5	FKP1T011505A_____
4700 "	7	14	18	15	FKP1R014704D_____	8	15	18	15	FKP1T012204F_____
6800 "	8	15	18	15	FKP1R016804F_____	5	14	26.5	22.5	FKP1T012205A_____
	5	14	26.5	22.5	FKP1R016805A_____	6	15	26.5	22.5	FKP1T013305B_____
0.01 µF	7	16.5	26.5	22.5	FKP1R021005D_____	7	16.5	26.5	22.5	FKP1T014705D_____
0.015 "	8.5	18.5	26.5	22.5	FKP1R021505F_____	8.5	18.5	26.5	22.5	FKP1T016805F_____
0.022 "	10.5	20.5	26.5	22.5	FKP1R022205H_____					
0.033 "	11	21	31.5	27.5	FKP1R023306B_____					
	9	19	41.5	37.5	FKP1R023307A_____					
0.047 "	13	24	31.5	27.5	FKP1R024706D_____					
	11	22	41.5	37.5	FKP1R024707B_____					
0.068 "	11	22	41.5	37.5	FKP1R026807B_____					
0.1 µF	15	26	41.5	37.5	FKP1R031007D_____					
0.15 "	17	29	41.5	37.5	FKP1R031507E_____					
0.22 "	19	32	41.5	37.5	FKP1R032207F_____					
0.33 "	24	45.5	41.5	37.5	FKP1R033307H_____					
0.47 "	31	46	41.5	37.5	FKP1R034707I_____					
0.68 "	40	55	41.5	37.5	FKP1R036807K_____					
1.0 µF	35	50	57	52.5	FKP1R041009F_____					
1.5 "	45	65	57	52.5	FKP1R041509J_____					

* 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.

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

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.

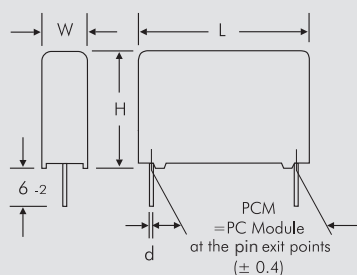
Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

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

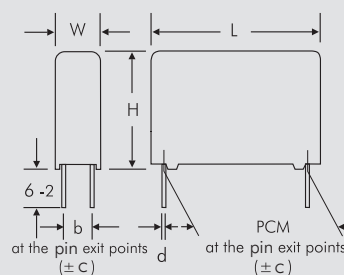
Taped version see page 145.

2-pin version



∅ d	PCM
0.8	15 - 27.5
1.0	37.5

4-pin version



W	PCM	b	∅ d	c
17	37.5	10	1.0	0.4
19	37.5	10	1.0	0.4
20	37.5	12.5	1.0	0.4
24	37.5	12.5	1.0	0.4
31	37.5	20	1.0	0.4
35	37.5	20	1.0	0.4
40	37.5	20	1.0	0.4
35	52.5	20	1.2	0.8
45	52.5	20	1.2	0.8

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Continuation

General Data

Capacitance	W	H	L	PCM**	Part number	Dims. in mm.
470 pF	5	14	26.5	22.5	FKP1Y004705A_	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_	
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_	
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_	
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.	

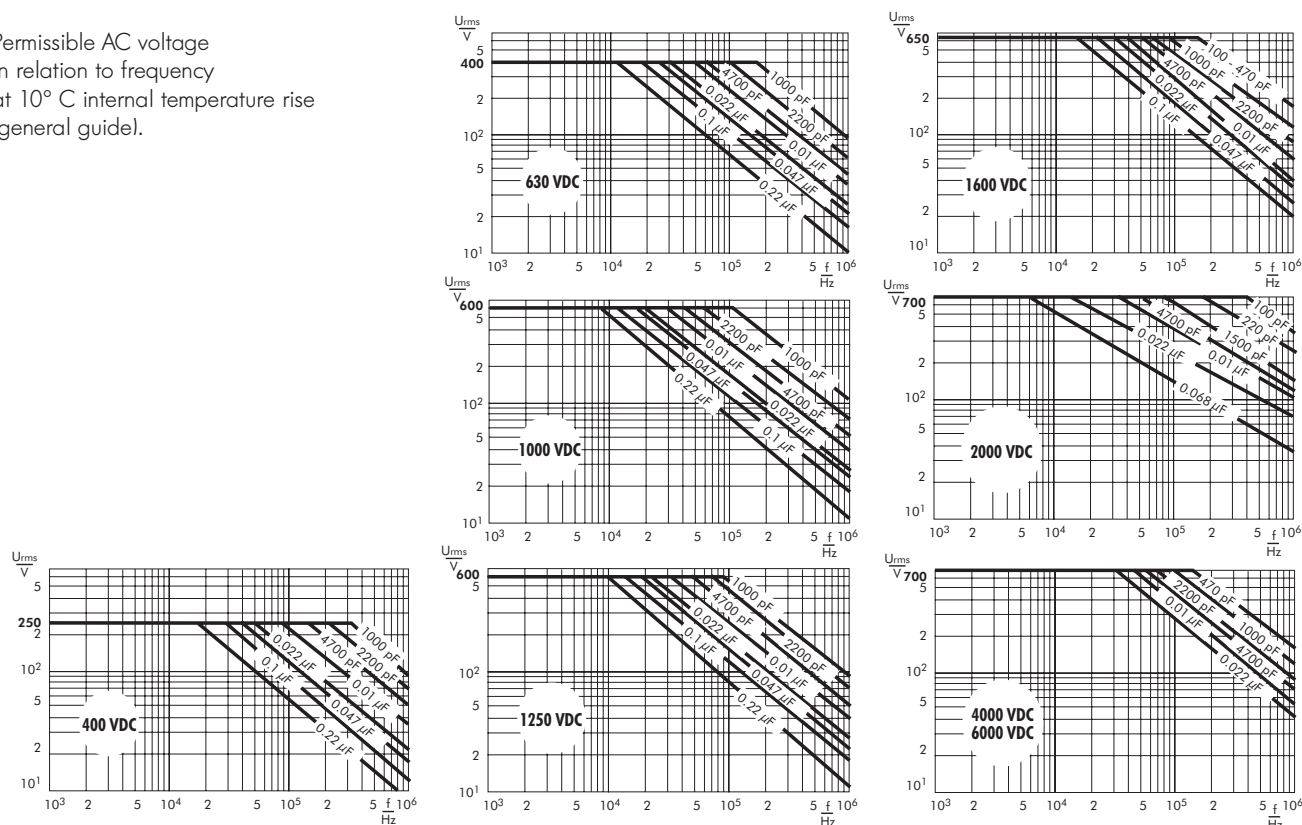
* AC voltages: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

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: $T_{\max.} \leq 125^{\circ}\text{C}$
soldering: $T_{\max.} \leq 135^{\circ}\text{C}$

Polypropylene: preheating: $T_{\max.} \leq 100^{\circ}\text{C}$
soldering: $T_{\max.} \leq 110^{\circ}\text{C}$

Single wave soldering

Soldering bath temperature: $T < 260^{\circ}\text{C}$

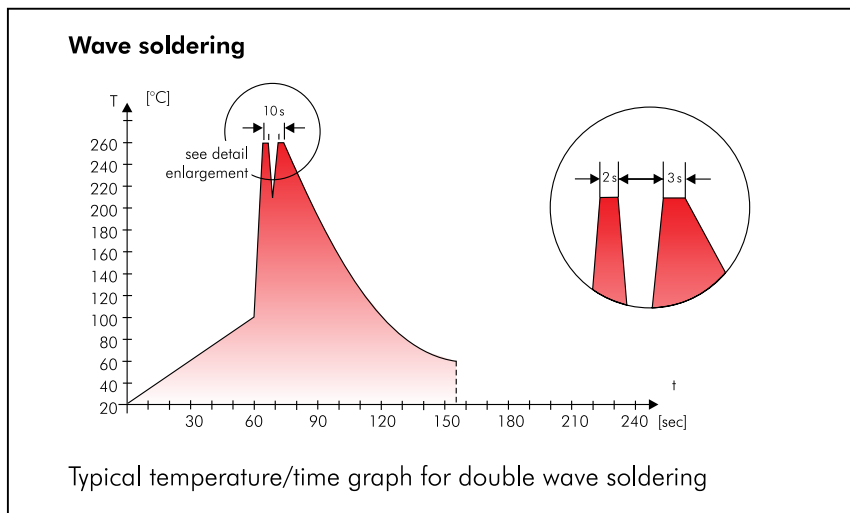
Dwell time: $t < 5\text{ sec}$

Double wave soldering

Soldering bath temperature: $T < 260^{\circ}\text{C}$

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 | – PBB/PBDE |
| – PCB | – Arsenic |
| – CFC | – Cadmium |
| – Hydrocarbon chloride | – Mercury |
| – Chromium 6+ | – 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

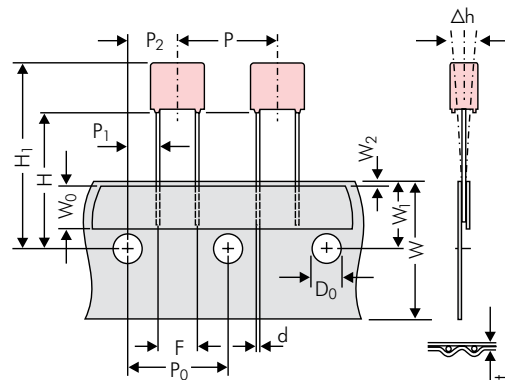


Diagram 1:
PCM 2.5/5/7.5mm

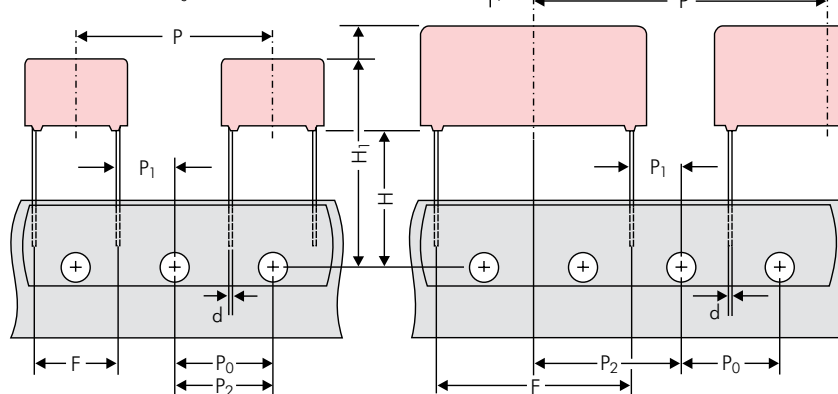


Diagram 2: PCM 10/15 mm

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 ₀	6.0 for hot-sealing adhesive tape	6.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape
Hole position	W ₁	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5
Hold-down tape position	W ₂	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.
Feed hole diameter	D ₀	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2
Pitch of component	P	12.7 ±1.0	12.7 ±1.0	12.7 ±1.0	25.4 ±1.0	25.4 ±1.0	38.1 ±1.5	38.1 ±1.5 or 50.8 ±1.5
Feed hole pitch	P ₀	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch
Feed hole centre to pin	P ₁	5.1 ±0.5	3.85 ±0.7	2.6 ±0.7	7.7 ±0.7	5.2 ±0.7	7.8 ±0.7	5.3 ±0.7
Hole centre to component centre	P ₂	6.35 ±1.3	6.35 ±1.3	6.35 ±1.3	12.7 ±1.3	12.7 ±1.3	19.05 ±1.3	19.05 ±1.3
Feed hole centre to bottom edge of the component	H	16.5 ±0.3 18.5 ±0.5	16.5 ±0.3 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5
Feed hole centre to top edge of the component	H ₁	H+H _{component} < H ₁ 32.25 max.	H+H _{component} < H ₁ 32.25 max.	H+H _{component} < H ₁ 24.5 to 31.5	H+H _{component} < H ₁ 25.0 to 31.5	H+H _{component} < H ₁ 26.0 to 37.0	H+H _{component} < H ₁ 30.0 to 43.0	H+H _{component} < H ₁ 35.0 to 45.0
Pin spacing at upper edge of carrier tape	F	2.5 ±0.5	5.0 ^{+0.8} _{-0.2}	7.5 ±0.8	10.0 ±0.8	15 ±0.8	22.5 ±0.8	27.5 ±0.8
Pin diameter	d	0.4 ±0.05	0.5 ±0.05	0.5 ±0.05 or 0.6 ^{+0.06} _{-0.05}	0.5 ±0.05 or 0.6 ^{+0.06} _{-0.05}	0.8 ^{+0.08} _{-0.05}	0.8 ^{+0.08} _{-0.05}	0.8 ^{+0.08} _{-0.05}
Component alignment	Δh	± 2.0 max.	± 2.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.
Total tape thickness	t	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2
Package (see also page 146)		ROLL/AMMO			AMMO			
		REEL ø 360 max. ø 30 ±1	B 52 ±2 58 ±2 } depending on comp. dimensions		REEL ø 360 max. ø 30 ±1	52 ±2 58 ±2 or 66 ±2	REEL ø 500 max. ø 25 ±1	54 ±2 60 ±2 68 ±2 } depending on PCM and component dimensions
Unit		see details page 147.						

Dims in mm.

* Diameter of pins see General Data.

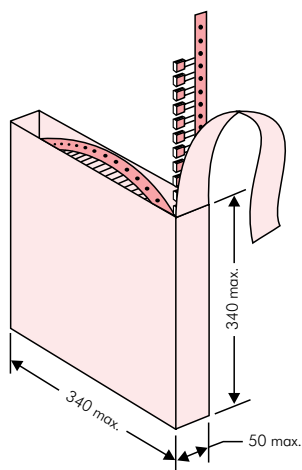
Please clarify customer-specific deviations with the manufacturer.

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

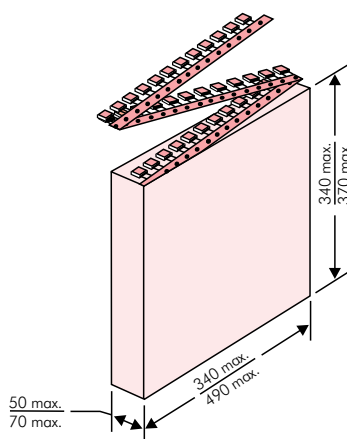
Position of components according to PCM 7.5 (sketch 1). P₀ = 12.7 or 15.0 is possible

Types of Tape Packaging of Capacitors for Automatic Radial Insertion

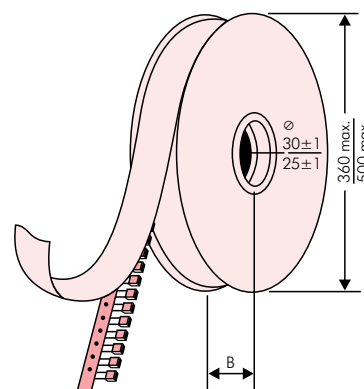
■ ROLL Packaging



■ 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.

WIMA Best Capacitors Made in Germany		Werk Unna	
Supplier-ID: 123456789	RoHS 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:	MKS 2	QTY: 5.000	COO: DE
	MKS 2 0.47 µF 63 VDC 3.5x8.5x7.2 RM5		
	Standard 10% Loss - Standard	Drühte 6-2	Week 03/2011
1000067326	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					
	H16.5	H18.5	ø 360	ø 500		340 × 340	490 × 370								
	W	H	L	Codes	S	N	O	F	I	H	J	A	C	B	D
2.5 mm	2.5	7	4.6	0B	5000	2200		2500		–		2800		–	
	3	7.5	4.6	0C	5000	2000		2300		–		2300		–	
	3.8	8.5	4.6	0D	5000	1500		1800		–		1800		–	
	4.6	9	4.6	0E	5000	1200		1500		–		1500		–	
	5.5	10	4.6	0F	5000	900		1200		–		1200		–	
5 mm	2.5	6.5	7.2	1A	5000	2200		2500		–		2800		–	
	3	7.5	7.2	1B	5000	2000		2300		–		2300		–	
	3.5	8.5	7.2	1C	5000	1600		2000		–		2000		–	
	4.5	6	7.2	1D	6000	1300		1500		–		1500		–	
	4.5	9.5	7.2	1E	4000	1300		1500		–		1500		–	
	5	10	7.2	1F	3500	1100		1400		–		1400		–	
	5.5	7	7.2	1G	4000	1000		1200		–		1200		–	
	5.5	11.5	7.2	1H	2500	1000		1200		–		1200		–	
	6.5	8	7.2	1I	2500	800		1000		–		1000		–	
	7.2	8.5	7.2	1J	2500	700		1000		–		1000		–	
	7.2	13	7.2	1K	2000	700		950		–		1000		–	
	8.5	10	7.2	1L	2000	600		800		–		800		–	
	8.5	14	7.2	1M	1500	600		800		–		800		–	
	11	16	7.2	1N	1000	500		600		–		400		–	
7.5 mm	2.5	7	10	2A	5000	–		2500		4400		2500		–	
	3	8.5	10	2B	5000	–		2200		4300		2300		4150	
	4	9	10	2C	4000	–		1700		3200		1700		3100	
	4.5	9.5	10.3	2D	3500	–		1500		2900		1400		2700	
	5	10.5	10.3	2E	3000	–		1300		2500		1300		–	
	5.7	12.5	10.3	2F	2000	–		1000		2200		1100		–	
	7.2	12.5	10.3	2G	1500	–		900		1800		1000		–	
10 mm	3	9	13	3A	3000	–		1100		2200		–		1900	
	4	8.5	13.5	FA	3000	–		900		1600		–		1450	
	4	9	13	3C	3000	–		900		1600		–		1450	
	4	9.5	13	3D	3000	–		900		1600		–		1400	
	5	10	13.5	FB	2000	–		700		1300		–		1200	
	5	11	13	3F	3000	–		700		1300		–		1200	
	6	12	13	3G	2400	–		550		1100		–		1000	
	6	12.5	13	3H	2400	–		550		1100		–		1000	
	8	12	13	3I	2000	–		400		800		–		740	
15 mm	5	11	18	4B	2400	–		600		1200		–		1150	
	5	13	19	FC	1000	–		600		1200		–		1200	
	6	12.5	18	4C	2000	–		500		1000		–		1000	
	6	14	19	FD	1000	–		500		1000		–		1000	
	7	14	18	4D	1600	–		450		900		–		850	
	7	15	19	FE	1000	–		450		900		–		850	
	8	15	18	4F	1200	–		400		800		–		740	
	8	17	19	FF	500	–		400		800		–		740	
	9	14	18	4H	1200	–		350		700		–		650	
	9	16	18	4J	900	–		350		700		–		650	
	10	18	19	FG	500	–		300		650		–		590	
	11	14	18	4M	1000	–		300		600		–		540	
22.5 mm	5	14	26.5	5A	1200	–		–		800		–		770	
	6	15	26.5	5B	1000	–		–		700		–		640	
	7	16.5	26.5	5D	760	–		–		600		–		550	
	8	20	28	FH	500	–		–		500		–		480	
	8.5	18.5	26.5	5F	500	–		–		480		–		450	
	10	22	28	FI	570*	–		–		420		–		380	
	10.5	19	26.5	5G	594*	–		–		400		–		360	
	10.5	20.5	26.5	5H	594*	–		–		400		–		360	
	11	21	26.5	5I	561*	–		–		380		–		350	
	12	24	28	FJ	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	ROLL		pcs. per packing unit				AMMO			
								REEL							
	W	H	L	Codes		H16.5	H18.5	ø 360	ø 500	340 x 340	490 x 370				
					S	N	O	F	I	H	J	A	C	B	D
27.5 mm	9	19	31.5	6A	567*	–	–	–	–	460/340*	–	–	–	420	–
	11	21	31.5	6B	459*	–	–	–	–	380/280*	–	–	–	350	–
	13	24	31.5	6D	378*	–	–	–	–	300	–	–	–	290	–
	13	25	33	FK	405*	–	–	–	–	–	–	–	–	–	–
	15	26	31.5	6F	324*	–	–	–	–	270	–	–	–	250	–
	15	26	33	FL	324*	–	–	–	–	–	–	–	–	–	–
	17	29	31.5	6G	198*	–	–	–	–	–	–	–	–	–	–
	17	34.5	31.5	6I	198*	–	–	–	–	–	–	–	–	–	–
	20	32	33	FM	162*	–	–	–	–	–	–	–	–	–	–
	20	39.5	31.5	6J	162*	–	–	–	–	–	–	–	–	–	–
37.5 mm	9	19	41.5	7A	441*	–	–	–	–	–	–	–	–	–	–
	11	22	41.5	7B	357*	–	–	–	–	–	–	–	–	–	–
	13	24	41.5	7C	294*	–	–	–	–	–	–	–	–	–	–
	15	26	41.5	7D	252*	–	–	–	–	–	–	–	–	–	–
	17	29	41.5	7E	154*	–	–	–	–	–	–	–	–	–	–
	19	32	41.5	7F	140*	–	–	–	–	–	–	–	–	–	–
	20	39.5	41.5	7G	126*	–	–	–	–	–	–	–	–	–	–
	24	45.5	41.5	7H	112*	–	–	–	–	–	–	–	–	–	–
	31	46	41.5	7I	84*	–	–	–	–	–	–	–	–	–	–
	35	50	41.5	7J	35*	–	–	–	–	–	–	–	–	–	–
	40	55	41.5	7K	28*	–	–	–	–	–	–	–	–	–	–
48.5 mm	19	31	56	8D	120*	–	–	–	–	–	–	–	–	–	–
	23	34	56	8E	80*	–	–	–	–	–	–	–	–	–	–
	27	37.5	56	8H	84*	–	–	–	–	–	–	–	–	–	–
	33	48	56	8J	25*	–	–	–	–	–	–	–	–	–	–
	37	54	56	8L	25*	–	–	–	–	–	–	–	–	–	–
52.5 mm	25	45	57	9D	70*	–	–	–	–	–	–	–	–	–	–
	30	45	57	9E	60*	–	–	–	–	–	–	–	–	–	–
	35	50	57	9F	25*	–	–	–	–	–	–	–	–	–	–
	45	55	57	9H	20*	–	–	–	–	–	–	–	–	–	–
	45	65	57	9J	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

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 µF				2.5x6.5x7.2		-		20%	bulk	6 -2	
Type description:				Rated voltage:		Capacitance:				Size:		Tolerance:		Packing:			
SMD-PET = SMDT				50 VDC = B0		22 pF = 0022				4.8x3.3x3 Size 1812 = KA		±20% = M		AMMO H16.5 340x340 = A			
SMD-PEN = SMDN				63 VDC = C0		47 pF = 0047				4.8x3.3x4 Size 1812 = KB		±10% = K		AMMO H16.5 490x370 = B			
SMD-PPS = SMDI				100 VDC = D0		100 pF = 0100				5.7x5.1x3.5 Size 2220 = QA		±5% = J		AMMO H18.5 340x340 = C			
FKP 02 = FKPO				250 VDC = F0		150 pF = 0150				5.7x5.1x4.5 Size 2220 = QB		±2.5% = H		AMMO H18.5 490x370 = D			
MKS 02 = MKS0				400 VDC = G0		220 pF = 0220				7.2x6.1x3 Size 2824 = TA		±1% = E		REEL H16.5 360 = F			
FKS 2 = FKS2				450 VDC = H0		330 pF = 0330				7.2x6.1x5 Size 2824 = TB		...		REEL H16.5 500 = H			
FKP 2 = FKP2				520 VDC = H2		470 pF = 0470				10.2x7.6x5 Size 4030 = VA				REEL H18.5 360 = I			
FKS 3 = FKS3				600 VDC = I0		680 pF = 0680				12.7x10.2x6 Size 5040 = XA				REEL H18.5 500 = J			
FKP 3 = FKP 3				630 VDC = J0		1000 pF = 1100				15.3x13.7x7 Size 6054 = YA				ROLL H16.5 = N			
MKS 2 = MKS2				700 VDC = K0		1500 pF = 1150				2.5x7x4.6 PCM 2.5 = 0B				ROLL H18.5 = O			
MKP 2 = MKP2				800 VDC = L0		2200 pF = 1220				3x7.5x4.6 PCM 2.5 = 0C				BLISTER W12 180 = P			
MKS 4 = MKS4				850 VDC = M0		3300 pF = 1330				2.5x6.5x7.2 PCM 5 = 1A				BLISTER W12 330 = Q			
MKP 4C = MKPC				900 VDC = N0		4700 pF = 1470				3x7.5x7.2 PCM 5 = 1B				BLISTER W16 330 = R			
MKP 4 = MKP4				1000 VDC = O1		6800 pF = 1680				2.5x7x10 PCM 7.5 = 2A				BLISTER W24 330 = T			
MKP 10 = MKP1				1100 VDC = P0		0.01 µF = 2100				3x8.5x10 PCM 7.5 = 2B				Bulk/TPS Standard = S			
FKP 1 = FKP1				1200 VDC = Q0		0.022 µF = 2220				3x9x13 PCM 10 = 3A				...			
MKP-X2 = MKX2				1250 VDC = R0		0.047 µF = 2470				4x9x13 PCM 10 = 3C							
MKP-X1 R = MKX1				1500 VDC = S0		0.1 µF = 3100				5x11x18 PCM 15 = 4B							
MKP-Y2 = MKY2				1600 VDC = T0		0.22 µF = 3220				6x12.5x18 PCM 15 = 4C							
MP 3-X2 = MPX2				2000 VDC = U0		0.47 µF = 3470				5x14x26.5 PCM 22.5 = 5A							
MP 3-X1 = MPX1				2500 VDC = V0		1 µF = 4100				6x15x26.5 PCM 22.5 = 5B							
MP 3-Y2 = MPY2				3000 VDC = W0		2.2 µF = 4220				9x19x31.5 PCM 27.5 = 6A							
MP 3R-Y2 = MPRY				4000 VDC = X0		4.7 µF = 4470				11x21x31.5 PCM 27.5 = 6B							
MKP 4F = MKPF				6000 VDC = Y0		10 µF = 5100				9x19x41.5 PCM 37.5 = 7A							
Snubber MKP = SNMP				250 VAC = 0V		22 µF = 5220				11x22x41.5 PCM 37.5 = 7B							
Snubber FKP = SNFP				275 VAC = 1W		47 µF = 5470				19x31x56 PCM 48.5 = 8D							
GTO MKP = GTOM				300 VAC = 2W		100 µF = 6100				25x45x57 PCM 52.5 = 9D							
DC-LINK MKP 3 = DCP3				305 VAC = AV		220 µF = 6220				...							
DC-LINK MKP 4 = DCP4				350 VAC = BV		1000 µF = 7100											
DC-LINK MKP 4S = DCP5				440 VAC = 4W		1500 µF = 7150											
DC-LINK MKP 5 = DCP5				500 VAC = 5W		...											
DC-LINK MKP 6 = DCP6				...													
DC-LINK HC = DCHC																	
DC-LINK HY = DCHY																	

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