

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

Special Features

- Pulse duty construction
- Self-healing
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2011/65/EC

Typical Applications

For pulse applications e.g.

- Switch mode power supplies
- TV and monitor sets
- Lighting
- Audio/video equipment

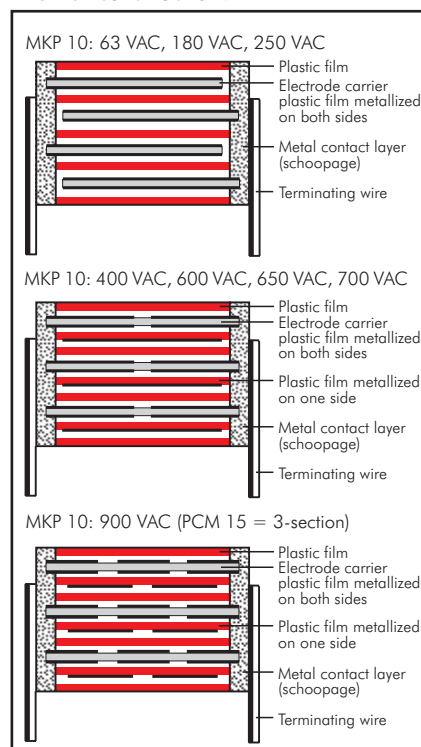
Construction

Dielectric: Polypropylene (PP) film

Capacitor electrodes:

Double-sided metallized plastic film

Internal construction:



Encapsulation:

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

Terminations: Tinned wire.

Marking: Colour: Red.

Marking: Black. Epoxy resin seal: Red

Electrical Data

Capacitance range:

1000 pF to 47 μ F (E12-values on request)

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

Capacitance tolerances:

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

Operating temperature range:

-55°C to $+100^{\circ}\text{C}$

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

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

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

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

(mean value: 100 000 sec)

Measuring voltage: 100 V/1 min.

Test voltage: 2 sec.

L	$\leq 2000 \text{ VDC}$	2500 VDC	$\geq 3000 \text{ VDC}$
< 41.5	1.6 U_r	1.4 U_r	1.2 U_r
41.5	1.4 U_r	1.4 U_r	1.2 U_r
57	1.2 U_r	1.2 U_r	1.2 U_r

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	$\leq 3 \times 10^{-4}$	$\leq 3 \times 10^{-4}$	$\leq 3 \times 10^{-4}$
10 kHz	$\leq 4 \times 10^{-4}$	$\leq 6 \times 10^{-4}$	–
100 kHz	$\leq 15 \times 10^{-4}$	–	–

Maximum pulse rise time for pulses equal to the rated voltage

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

Mechanical Tests

Pull test on pins:

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

$d > 0.8 \phi$: 20 N in direction of pins

according to IEC 60068-2-21

Vibration: 6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density: 1 kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

Climatic test category:

55/100/56 in accordance with IEC

Dielectric absorption: 0.05 %

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from $+85^{\circ}\text{C}$ 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)

Specific dissipation:

Box size* W x H x L in mm	Specific dissipation in Watts per K above the ambient temperature
35 x 50 x 57	0.132
45 x 55 x 57	0.164
45 x 65 x 57	0.184

* other box sizes see page 10.

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.

General Data

Taped version see page 148.

Continuation

General Data

Capacitance	400 VDC/250 VAC*					630 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	10	7.5	MKP1G011002C	4	9	10	7.5*	MKP1J011002C
1500 "	4	9	10	7.5	MKP1G011502C	4	9	10	7.5*	MKP1J011502C
2200 "	4	9	10	7.5	MKP1G012202C	4	9	10	7.5*	MKP1J012202C
3300 "	4	9	10	7.5	MKP1G013302C	4	9	10	7.5*	MKP1J013302C
4700 "	4	9	10	7.5	MKP1G014702C	4	9	10	7.5*	MKP1J014702C
6800 "	4	9	10	7.5	MKP1G016802C	4	9	10	7.5*	MKP1J016802C
						4	9	13	10	MKP1J016803C
0.01 µF	4	9	10	7.5	MKP1G021002C	5	10.5	10.3	7.5*	MKP1J021002E
	4	9	13	10	MKP1G021003C	4	9	13	10	MKP1J021003C
0.015 "	5	10.5	10.3	7.5	MKP1G021502E	5	11	13	10	MKP1J021503F
	4	9	13	10	MKP1G021503C	5	11	18	15	MKP1J021504B
0.022 "	5	10.5	10.3	7.5	MKP1G022202E	5	11	13	10	MKP1J022203F
	4	9	13	10	MKP1G022203C	5	11	18	15	MKP1J022204B
0.033 "	5.7	12.5	10.3	7.5	MKP1G023302F	6	12	13	10	MKP1J023303G
	5	11	13	10	MKP1G023303F	5	11	18	15	MKP1J023304B
0.047 "	6	12	13	10	MKP1G024703G	6	12.5	18	15	MKP1J024704C
	5	11	18	15	MKP1G024704B	6	15	26.5	22.5	MKP1J024705B
0.068 "	6	12.5	18	15	MKP1G026804C	7	14	18	15	MKP1J026804D
	6	15	26.5	22.5	MKP1G026805B	6	15	26.5	22.5	MKP1J026805B
0.1 µF	7	14	18	15	MKP1G031004D	9	16	18	15	MKP1J031004J
	6	15	26.5	22.5	MKP1G031005B	7	16.5	26.5	22.5	MKP1J031005D
0.15 "	8	15	18	15	MKP1G031504F	8.5	18.5	26.5	22.5	MKP1J031505F
	6	15	26.5	22.5	MKP1G031505B	9	19	31.5	27.5	MKP1J031506A
0.22 "	9	16	18	15	MKP1G032204J	8.5	18.5	26.5	22.5	MKP1J032205F
	7	16.5	26.5	22.5	MKP1G032205D	9	19	31.5	27.5	MKP1J032206A
0.33 "	8.5	18.5	26.5	22.5	MKP1G033305F	11	21	26.5	22.5	MKP1J033305I
	9	19	31.5	27.5	MKP1G033306A	11	21	31.5	27.5	MKP1J033306B
0.47 "	10.5	19	26.5	22.5	MKP1G034705G	11	21	31.5	27.5	MKP1J034706B
	9	19	31.5	27.5	MKP1G034706A					
0.68 "	11	21	26.5	22.5	MKP1G036805I	15	26	31.5	27.5	MKP1J036806F
	11	21	31.5	27.5	MKP1G036806B	13	24	41.5	37.5	MKP1J036807C
1.0 µF	13	24	31.5	27.5	MKP1G041006D	17	29	31.5	27.5	MKP1J041006G
	13	24	41.5	37.5	MKP1G041007C	15	26	41.5	37.5	MKP1J041007D
1.5 "	17	29	31.5	27.5	MKP1G041506G	20	39.5	31.5	27.5	MKP1J041506J
	13	24	41.5	37.5	MKP1G041507C	19	32	41.5	37.5	MKP1J041507F
2.2 "	20	39.5	31.5	27.5	MKP1G042206J	20	39.5	41.5	37.5	MKP1J042207G
	17	29	41.5	37.5	MKP1G042207E					
3.3 "	20	39.5	41.5	37.5	MKP1G043307G	24	45.5	41.5	37.5	MKP1J043307H
4.7 "	20	39.5	41.5	37.5	MKP1G044707G	35	50	41.5	37.5	MKP1J044707J
6.8 "	24	45.5	41.5	37.5	MKP1G046807H	40	55	41.5	37.5	MKP1J046807K
						35	50	57	52.5	MKP1J046809F
10 µF	35	50	41.5	37.5	MKP1G051007J	45	55	57	52.5	MKP1J051009H
	35	50	57	52.5	MKP1G051009F					
15 "	40	55	41.5	37.5	MKP1G051507K					
	35	50	57	52.5	MKP1G051509F					
22 "	45	65	57	52.5	MKP1G052209J					

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

■ New values

** PCM = Printed circuit module = pin spacing

* Admissible AC voltage 280 VAC max..

Dims. in mm.

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

Rights reserved to amend design data without prior notification.

Part number completion:

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

Taped version see page 148.

Continuation

General Data

Capacitance	1000 VDC/600 VAC*					1600 VDC/650 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	10	7.5	MKP1O111002C_____	4	9	13	10	MKP1T011003C_____
	4	9	13	10	MKP1O111003C_____					
1500 "	4	9	10	7.5	MKP1O111502C_____	4	9	13	10	MKP1T011503C_____
	4	9	13	10	MKP1O111503C_____					
2200 "	4	9	10	7.5	MKP1O112202C_____	4	9	13	10	MKP1T012203C_____
	4	9	13	10	MKP1O112203C_____					
3300 "	4	9	10	7.5	MKP1O113302C_____	4	9	13	10	MKP1T013303C_____
	4	9	13	10	MKP1O113303C_____					
4700 "	4.5	9.5	10.3	7.5	MKP1O114702D_____	5	11	13	10	MKP1T014703F_____
	4	9	13	10	MKP1O114703C_____					
6800 "	5.7	12.5	10.3	7.5	MKP1O116802F_____	6	12	13	10	MKP1T016803G_____
	5	11	13	10	MKP1O116803F_____	5	11	18	15	MKP1T016804B_____
0.01 µF	5	11	13	10	MKP1O121003F_____	5	11	18	15	MKP1T021004B_____
	5	11	18	15	MKP1O121004B_____					
0.015 "	6	12	13	10	MKP1O121503G_____	6	12.5	18	15	MKP1T021504C_____
	5	11	18	15	MKP1O121504B_____	6	15	26.5	22.5	MKP1T021505B_____
0.022 "	6	12.5	18	15	MKP1O122204C_____	7	14	18	15	MKP1T022204D_____
	6	15	26.5	22.5	MKP1O122205B_____	6	15	26.5	22.5	MKP1T022205B_____
0.033 "	7	14	18	15	MKP1O123304D_____	8	15	18	15	MKP1T023304F_____
	6	15	26.5	22.5	MKP1O123305B_____	6	15	26.5	22.5	MKP1T023305B_____
0.047 "	8	15	18	15	MKP1O124704F_____	7	16.5	26.5	22.5	MKP1T024705D_____
	6	15	26.5	22.5	MKP1O124705B_____	9	19	31.5	27.5	MKP1T024706A_____
0.068 "	7	16.5	26.5	22.5	MKP1O126805D_____	10.5	19	26.5	22.5	MKP1T026805G_____
						9	19	31.5	27.5	MKP1T026806A_____
0.1 µF	8.5	18.5	26.5	22.5	MKP1O131005F_____	11	21	26.5	22.5	MKP1T031005I_____
	11	21	31.5	27.5	MKP1O131006B_____	11	21	31.5	27.5	MKP1T031006B_____
0.15 "	11	21	26.5	22.5	MKP1O131505I_____	13	24	31.5	27.5	MKP1T031506D_____
	11	21	31.5	27.5	MKP1O131506B_____					
0.22 "	11	21	31.5	27.5	MKP1O132206B_____	15	26	31.5	27.5	MKP1T032206F_____
						13	24	41.5	37.5	MKP1T032207C_____
0.33 "	15	26	31.5	27.5	MKP1O133306F_____	17	34.5	31.5	27.5	MKP1T033306I_____
	13	24	41.5	37.5	MKP1O133307C_____	17	29	41.5	37.5	MKP1T033307E_____
0.47 "	17	29	31.5	27.5	MKP1O134706G_____	20	39.5	31.5	27.5	MKP1T034706J_____
	13	24	41.5	37.5	MKP1O134707C_____	19	32	41.5	37.5	MKP1T034707F_____
0.68 "	20	39.5	31.5	27.5	MKP1O136806J_____	20	39.5	41.5	37.5	MKP1T036807G_____
	17	29	41.5	37.5	MKP1O136807E_____					
1.0 µF	20	39.5	41.5	37.5	MKP1O141007G_____	24	45.5	41.5	37.5	MKP1T041007H_____
1.5 "	24	45.5	41.5	37.5	MKP1O141507H_____	31	46	41.5	37.5	MKP1T041507I_____
2.2 "	31	46	41.5	37.5	MKP1O142207I_____	40	55	41.5	37.5	MKP1T042207K_____
						35	50	57	52.5	MKP1T042209F_____
3.3 "	40	55	41.5	37.5	MKP1O143307K_____	45	65	57	52.5	MKP1T043309J_____
	35	50	57	52.5	MKP1O143309F_____					
4.7 "	45	55	57	52.5	MKP1O144709H_____					

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

■ New values

** PCM = Printed circuit module = pin spacing

Dims. in mm.

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

Rights reserved to amend design data without prior notification.

Part number completion:

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

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

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

Taped version see page 148.

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Continuation

General Data

Capacitance	2000 VDC/700 VAC*					2500 VDC/900 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKP1U011003C_____	5	11	18	15	MKP1V011004B_____
1500 "	4	9	13	10	MKP1U011503C_____	6	15	26.5	22.5	MKP1V011005B_____
2200 "	5	11	13	10	MKP1U012203F_____	6	15	26.5	22.5	MKP1V011504B_____
3300 "	5	11	18	15	MKP1U012204B_____	6	15	26.5	22.5	MKP1V011505B_____
4700 "	5	11	18	15	MKP1U013304B_____	5	11	18	15	MKP1V012204B_____
6800 "	6	15	26.5	22.5	MKP1U014704B_____	6	15	26.5	22.5	MKP1V012205B_____
	6	15	26.5	22.5	MKP1U014705B_____	5	11	18	15	MKP1V013304B_____
	6	12.5	18	15	MKP1U016804C_____	6	12.5	18	15	MKP1V013305B_____
	6	15	26.5	22.5	MKP1U016805B_____	6	15	26.5	22.5	MKP1V014704C_____
0.01 µF	7	14	18	15	MKP1U021004D_____	6	15	26.5	22.5	MKP1V014705B_____
0.015 "	8	15	18	15	MKP1U021504F_____	7	14	18	15	MKP1V016804D_____
0.022 "	9	16	18	15	MKP1U022204J_____	7	16.5	26.5	22.5	MKP1V016805D_____
0.033 "	8.5	18.5	26.5	22.5	MKP1U022205D_____	8.5	18.5	26.5	22.5	MKP1V021005F_____
0.047 "	9	19	31.5	27.5	MKP1U023305F_____	10.5	19	26.5	22.5	MKP1V021505G_____
0.068 "	10.5	19	26.5	22.5	MKP1U023306A_____	11	21	26.5	22.5	MKP1V022205I_____
	11	21	31.5	27.5	MKP1U024705G_____					
	11	21	26.5	22.5	MKP1U024706B_____					
	11	21	31.5	27.5	MKP1U026805I_____					
	11	21	31.5	27.5	MKP1U026806B_____					
0.1 µF	13	24	31.5	27.5	MKP1U031006D_____					
0.15 "	15	26	31.5	27.5	MKP1U031506F_____					
	13	24	41.5	37.5	MKP1U031507C_____					
0.22 "	17	34.5	31.5	27.5	MKP1U032206I_____					
	17	29	41.5	37.5	MKP1U032207E_____					
0.33 "	19	32	41.5	37.5	MKP1U033307F_____					
0.47 "	20	39.5	41.5	37.5	MKP1U034707G_____					
0.68 "	24	45.5	41.5	37.5	MKP1U036807H_____					
1.0 µF	35	50	41.5	37.5	MKP1U041007J_____					
1.5 "	40	55	41.5	37.5	MKP1U041507K_____					
	35	50	57	52.5	MKP1U041509F_____					
2.2 "	45	55	57	52.5	MKP1U042209H_____					

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

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 148.		

Rights reserved to amend design data without prior notification.

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Continuation

General Data

Capacitance	W	H	L	PCM**	Part number
0.01 μF	6	15	26.5	22.5	MKP1W021005B
0.015 "	7	16.5	26.5	22.5	MKP1W021505D
0.022 "	8.5	18.5	26.5	22.5	MKP1W022205F
0.033 "	11	21	26.5	22.5	MKP1W023305I
	9	19	31.5	27.5	MKP1W023306A
0.047 "	11	21	31.5	27.5	MKP1W024706B
0.068 "	13	24	31.5	27.5	MKP1W026806D
0.1 μF	15	26	31.5	27.5	MKP1W031006F
	13	24	41.5	37.5	MKP1W031007C
0.15 "	17	34.5	31.5	27.5	MKP1W031506I
	15	26	41.5	37.5	MKP1W031507D
0.22 "	19	32	41.5	37.5	MKP1W032207F
0.33 "	24	45.5	41.5	37.5	MKP1W033307H
0.47 "	31	46	41.5	37.5	MKP1W034707I
0.68 "	35	50	41.5	37.5	MKP1W036807J
1.0 μF	40	55	41.5	37.5	MKP1W041007K
	35	50	57	52.5	MKP1W041009F
1.5 "	45	55	57	52.5	MKP1W041509H

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

■ New range

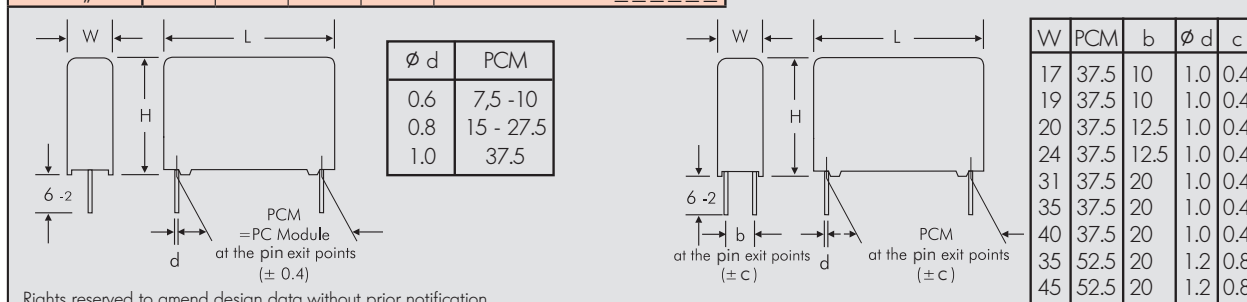
** PCM = Printed circuit module = pin spacing

Dims. in mm.

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

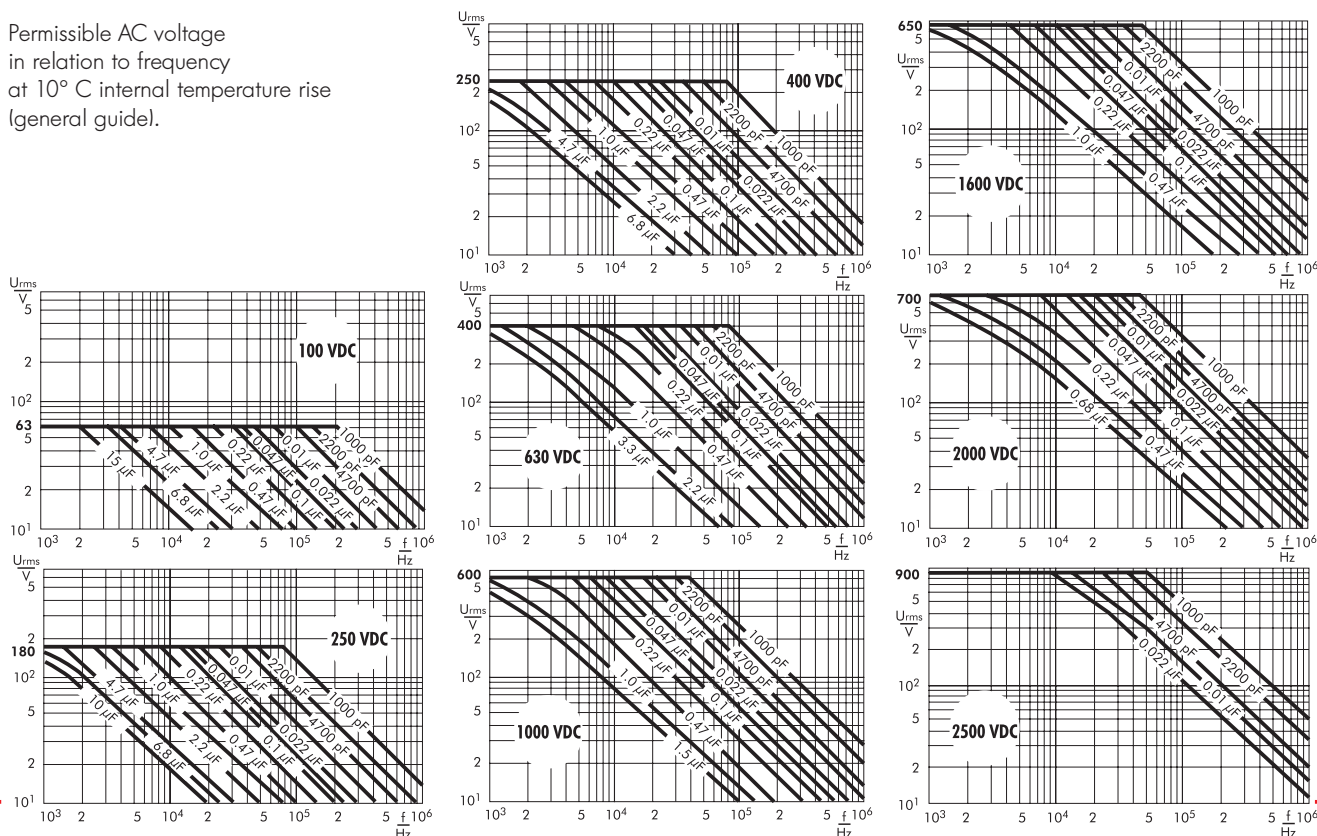
Part number completion:

Version code:	2-pin	= 00
	4-pin	= D4
Tolerance:	20 %	= M
	10 %	= K
	5 %	= J
Packing:	bulk	= S
Pin length:	6-2	= SD
Taped version see page 148.		



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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

A preheating of through-hole WIMA capacitors is allowed for temperatures $T_{\max} < 100^{\circ}\text{C}$. In practice a preheating duration of $t < 5$ min. has been proven to be best.

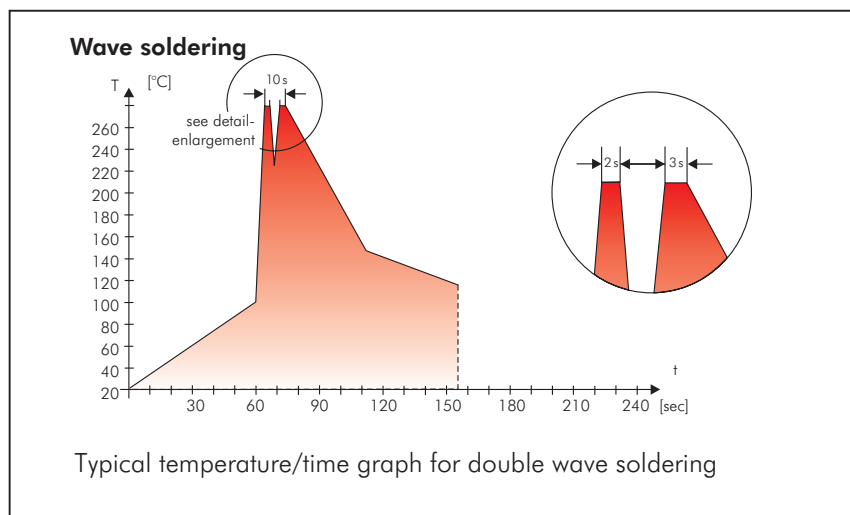
Single wave soldering

Soldering bath temperature: $T < 260^{\circ}\text{C}$
Immersion time: $t < 5$ sec

Double wave soldering

Soldering bath temperature: $T < 260^{\circ}\text{C}$
Immersion time: $2 \times t < 3$ sec

Due to different soldering processes and heat requirements the graphs are to be regarded as a recommendation only.



WIMA Quality and Environmental Philosophy

ISO 9001:2008 Certification

ISO 9001:2008 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2008 of our factories by the VDE inspectorate certifies that organisation, equipment and monitoring of quality assurance in our factories correspond to internationally recognized standards.

WIMA WPCS

The WIMA Process Control System (WPCS) is a quality surveillance and optimization system developed by WIMA. WPCS is a major part of the quality-oriented WIMA production. Points of application of WPCS during production process:

- incoming material inspection
- metallization
- film inspection
- schoopage
- pre-healing
- pin attachment
- cast resin preparation/encapsulation
- 100% final inspection
- AQL check

WIMA Environmental Policy

All WIMA capacitors, irrespective of whether through-hole devices or SMD, are made of environmentally friendly materials. Neither during manufacture nor in the product itself any toxic substances are used, e.g.

- | | |
|------------------------|------------|
| – Lead | – 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/EC 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/EC

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

Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2004

WIMA's environmental management has been established in accordance with the guidelines of DIN EN ISO 14001:2004 to optimize the production processes with regard to energy and resources.

Typical Dimensions for Taping Configuration

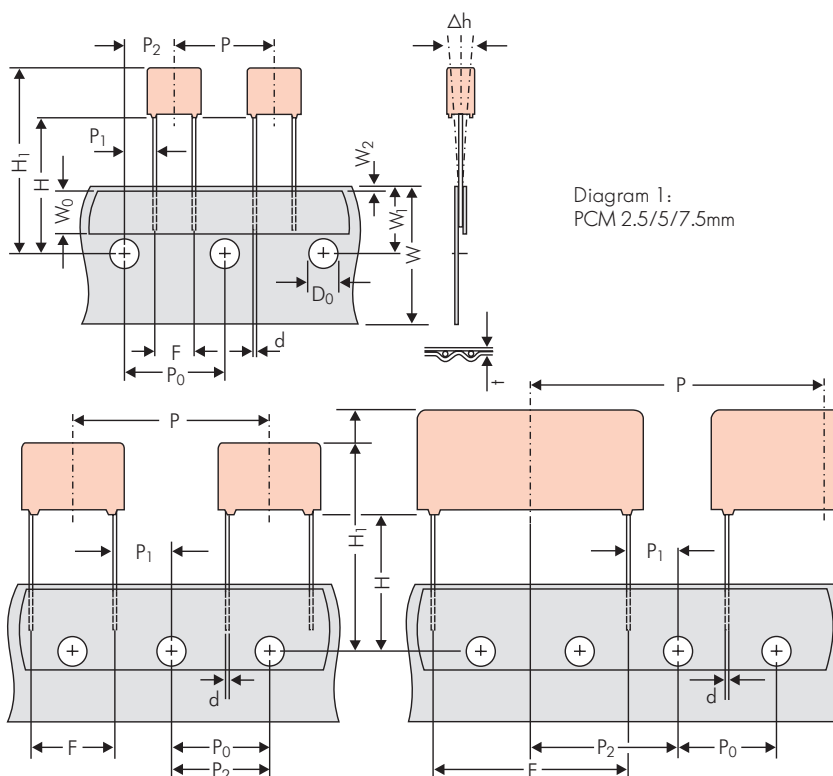


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5*mm

*PCM 27.5 taping possible with two feed holes between components

Dimensions for Radial Taping								
Designation	Symbol	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	16.5 ±0.3	16.5 ±0.5	16.5 ±0.5	16.5 ±0.5	16.5 ±0.5	16.5 ±0.5
		18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±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 149)		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 B 52 ±2 58 ±2 or REEL ϕ 500 max. ϕ 25 ±1 B 54 ±2 60 ±2 54 ±2 68 ±2 } depending on PCM and component dimensions				
Unit		see details page 150.						

Dims in mm.

* Diameter of pins see General Data.

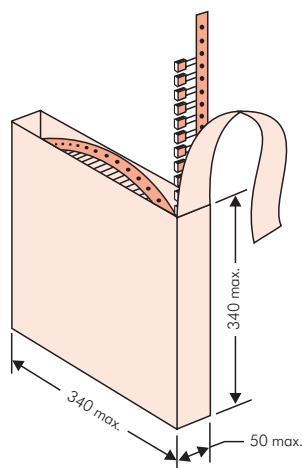
* PCM 10 and PCM 15 can be crimped to PCM 7.5.

Position of components according to PCM 7.5 (sketch 11). P₀ = 12.7 or 15.0 is possible

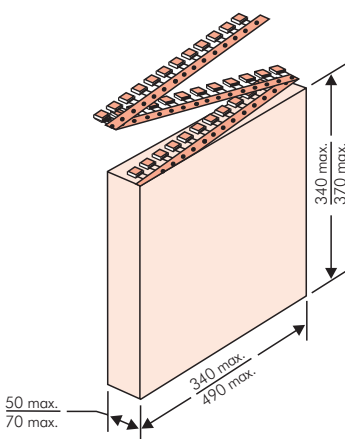
Please clarify customer-specific deviations with the manufacturer.

Types of Tape Packaging of Capacitors for Automatic Radial Insertion

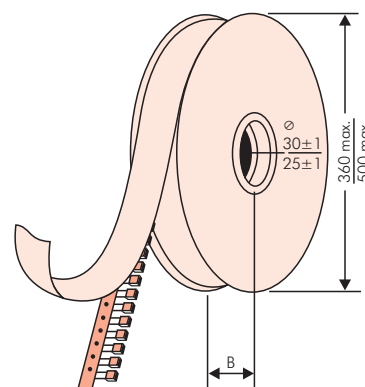
■ ROLL Packaging



■ 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.

WIMA Best Capacitors Made in Germany		Werk Unna	
Supplier-ID: 123456789	RoHS 2011/65/EC	Date Code: 08.10.10	
Purchase Order No. (P/O): Bestellung xyz		Quantity: 5.000	
Customer Part No.: KUNDETEILENUMMER		Customer No.: 0000100002	
WIMA Confirmation No.: 0001004063000100		Gross Weight [g]: 1870	
WIMA Part No.: MKS2C034701C00K89D			
Handling Unit:	MKS 2	QTY: 5.000	COO: DE
1000067326	MKS 2 0.47 μ F 63 VDC 3.5x8.5x7.2 RMS		
	Standard 10% Loss - Standard Drähte 6-2		
	Vorlage Debitur Inland	Week 03/2011	

BARCODE „Code 39“



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

PCM	Size				bulk	pcs. per packing unit									
						ROLL		REEL				AMMO			
	W	H	L	Codes		S	H16.5	H18.5	ø 360	ø 500	340 × 340	490 × 370			
						N	O	F	I	H	J	A	C	B	D
2.5 mm	2.5	7	4.6	0B	5000										
	3	7.5	4.6	0C	5000										
	3.8	8.5	4.6	0D	5000										
	4.6	9	4.6	0E	5000										
	5.5	10	4.6	0F	5000										
5 mm	2.5	6.5	7.2	1A	5000										
	3	7.5	7.2	1B	5000										
	3.5	8.5	7.2	1C	5000										
	4.5	6	7.2	1D	6000										
	4.5	9.5	7.2	1E	4000										
	5	10	7.2	1F	3500										
	5.5	7	7.2	1G	4000										
	5.5	11.5	7.2	1H	2500										
	6.5	8	7.2	1I	2500										
	7.2	8.5	7.2	1J	2500										
	7.2	13	7.2	1K	2000										
	8.5	10	7.2	1L	2000										
	8.5	14	7.2	1M	1500										
11	16	7.2	1N	1000											
7.5 mm	2.5	7	10	2A	5000										
	3	8.5	10	2B	5000										
	4	9	10	2C	4000										
	4.5	9.5	10.3	2D	3500										
	5	10.5	10.3	2E	3000										
	5.7	12.5	10.3	2F	2000										
	7.2	12.5	10.3	2G	1500										
10 mm	3	9	13	3A	3000										
	4	8.5	13.5	FA	3000										
	4	9	13	3C	3000										
	4	9.5	13	3D	3000										
	5	10	13.5	FB	2000										
	5	11	13	3F	3000										
	6	12	13	3G	2400										
	6	12.5	13	3H	2400										
8	12	13	3I	2000											
15 mm	5	11	18	4B	2400										
	5	13	19	FC	1000										
	6	12.5	18	4C	2000										
	6	14	19	FD	1000										
	7	14	18	4D	1600										
	7	15	19	FE	1000										
	8	15	18	4F	1200										
	8	17	19	FF	500										
	9	14	18	4H	1200										
	9	16	18	4J	900										
	10	18	19	FG	500										
11	14	18	4M	1000											
22.5 mm	5	14	26.5	5A	1200										
	6	15	26.5	5B	1000										
	7	16.5	26.5	5D	760										
	8	20	28	FH	500										
	8.5	18.5	26.5	5F	500										
	10	22	28	FI	540*										
	10.5	19	26.5	5G	680*										
	10.5	20.5	26.5	5H	680*										
	11	21	26.5	5I	680*										
	12	24	28	FJ	450*										

* 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 × 340	490 × 370	H16.5	H18.5	H16.5	H18.5
					S	N	O	F	I	H	J	A	C	B	D
27.5 mm	9	19	31.5	6A	640*	–	–	–	–	460/340*	–	–	–	420	–
	11	21	31.5	6B	544*	–	–	–	–	380/280*	–	–	–	350	–
	13	24	31.5	6D	448*	–	–	–	–	300	–	–	–	290	–
	13	25	33	FK	336*	–	–	–	–	–	–	–	–	–	–
	15	26	31.5	6F	384*	–	–	–	–	270	–	–	–	250	–
	15	26	33	FL	288*	–	–	–	–	–	–	–	–	–	–
	17	29	31.5	6G	176*	–	–	–	–	–	–	–	–	–	–
	17	34.5	31.5	6I	176*	–	–	–	–	–	–	–	–	–	–
	19	30	31.5	6L	50*	–	–	–	–	–	–	–	–	–	–
	20	32	33	FM	216*	–	–	–	–	–	–	–	–	–	–
	20	39.5	31.5	6J	144*	–	–	–	–	–	–	–	–	–	–
37.5 mm	9	19	41.5	7A	480*	–	–	–	–	–	–	–	–	–	–
	11	22	41.5	7B	408*	–	–	–	–	–	–	–	–	–	–
	13	24	41.5	7C	252*	–	–	–	–	–	–	–	–	–	–
	15	26	41.5	7D	144*	–	–	–	–	–	–	–	–	–	–
	17	29	41.5	7E	132*	–	–	–	–	–	–	–	–	–	–
	19	32	41.5	7F	108*	–	–	–	–	–	–	–	–	–	–
	20	39.5	41.5	7G	108*	–	–	–	–	–	–	–	–	–	–
	24	45.5	41.5	7H	84*	–	–	–	–	–	–	–	–	–	–
	31	46	41.5	7I	72*	–	–	–	–	–	–	–	–	–	–
	35	50	41.5	7J	35*	–	–	–	–	–	–	–	–	–	–
	40	55	41.5	7K	28*	–	–	–	–	–	–	–	–	–	–
48.5 mm	19	31	56	8D	50*	–	–	–	–	–	–	–	–	–	–
	23	34	56	8E	72*	–	–	–	–	–	–	–	–	–	–
	27	37.5	56	8H	60*	–	–	–	–	–	–	–	–	–	–
	33	48	56	8J	48*	–	–	–	–	–	–	–	–	–	–
	37	54	56	8L	25*	–	–	–	–	–	–	–	–	–	–
52.5 mm	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.



WIMA Part Number System

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

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

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

Type description:		Rated voltage:		Capacitance:		Size:		Tolerance:	
SMD-PET	= SMDT	2.5 VDC	= A1	22 pF	= 0022	4.8x3.3x3 Size 1812	= KA	20%	= M
SMD-PPS	= SMDI	4 VDC	= A2	47 pF	= 0047	4.8x3.3x4 Size 1812	= KB	10%	= K
FKP 02	= FKPO	14 VDC	= A3	100 pF	= 0100	5.7x5.1x3.5 Size 2220	= QA	5%	= J
MKS 02	= MKSO	28 VDC	= A4	150 pF	= 0150	5.7x5.1x4.5 Size 2220	= QB	2.5%	= H
FKS 2	= FKS2	40 VDC	= A5	220 pF	= 0220	7.2x6.1x3 Size 2824	= TA	1%	= E
FKP 2	= FKP2	5 VDC	= A6	330 pF	= 0330	7.2x6.1x5 Size 2824	= TB	...	
MKS 2	= MKS2	50 VDC	= B0	470 pF	= 0470	10.2x7.6x5 Size 4030	= VA		
MKP 2	= MKP2	63 VDC	= C0	680 pF	= 0680	12.7x10.2x6 Size 5040	= XA		
FKS 3	= FKS3	100 VDC	= D0	1000 pF	= 1100	15.3x13.7x7 Size 6054	= YA		
FKP 3	= FKP3	160 VDC	= E0	1500 pF	= 1150	2.5x7x4.6 PCM2.5	= 0B		
MKS 4	= MKS4	250 VDC	= F0	2200 pF	= 1220	3x7.5x4.6 PCM2.5	= 0C		
MKP 4	= MKP4	400 VDC	= G0	3300 pF	= 1330	2.5x6.5x7.2 PCM5	= 1A		
MKP 10	= MKP1	450 VDC	= H0	4700 pF	= 1470	3x7.5x7.2 PCM5	= 1B		
FKP 4	= FKP4	600 VDC	= I0	6800 pF	= 1680	2.5x7x10 PCM7.5	= 2A		
FKP 1	= FKP1	630 VDC	= J0	0.01 μF	= 2100	3x8.5x10 PCM7.5	= 2B		
MKP-X2	= MKX2	700 VDC	= K0	0.022 μF	= 2220	3x9x13 PCM10	= 3A		
MKP-X2 R	= MKXR	800 VDC	= L0	0.047 μF	= 2470	4x9x13 PCM10	= 3C		
MKP-Y2	= MKY2	850 VDC	= M0	0.1 μF	= 3100	5x11x18 PCM15	= 4B		
MP 3-X2	= MPX2	900 VDC	= N0	0.22 μF	= 3220	6x12.5x18 PCM15	= 4C		
MP 3-X1	= MPX1	1000 VDC	= O1	0.47 μF	= 3470	5x14x26.5 PCM22.5	= 5A		
MP 3-Y2	= MPY2	1100 VDC	= P0	1 μF	= 4100	6x15x26.5 PCM22.5	= 5B		
MP 3R-Y2	= MPRY	1200 VDC	= Q0	2.2 μF	= 4220	9x19x31.5 PCM27.5	= 6A		
Snubber MKP	= SNMP	1250 VDC	= R0	4.7 μF	= 4470	11x21x31.5 PCM27.5	= 6B		
Snubber FKP	= SNFP	1500 VDC	= S0	10 μF	= 5100	9x19x41.5 PCM37.5	= 7A		
GTO MKP	= GTOM	1600 VDC	= T0	22 μF	= 5220	11x22x41.5 PCM37.5	= 7B		
DC-LINK MKP 3	= DCP3	2000 VDC	= U0	47 μF	= 5470	94x49x182 DCH_	= H0		
DC-LINK MKP 4	= DCP4	2500 VDC	= V0	100 μF	= 6100	94x77x182 DCH_	= H1		
DC-LINK MKP 4S	= DCPS	3000 VDC	= W0	220 μF	= 6220	...			
DC-LINK MKP 5	= DCP5	4000 VDC	= X0	1 F	= A010				
DC-LINK MKP 6	= DCP6	6000 VDC	= Y0	2.5 F	= A025				
DC-LINK HC	= DCH_	250 VAC	= 0W	50 F	= A500				
DC-LINK HY	= DCHY	275 VAC	= 1W	100 F	= B100				
SuperCap C	= SCSC	300 VAC	= 2W	110 F	= B110				
SuperCap MC	= MC_	400 VAC	= 3W	600 F	= B600				
SuperCap C60	= SCSC	440 VAC	= 4W	1200 F	= C120				
SuperCap R	= SCSR	500 VAC	= 5W	...					
SuperCap MR	= MRPP	...							

Packing:	
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
...	

Version code:	
Standard	= 00
Version A1	= 1A
Version A1.1.1	= 1B
Version A2	= 2A
...	

Pin length (untaped)	
3.5 ±0.5	= C9
6 -2	= SD
16 ±1	= P1
...	

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.