WIMA MKP 10

Polypropylene (PP) Capacitors for Pulse Applications with Double-Sided Metallized Electrodes and Schoopage Contacts PCM 7.5 mm to 37.5 mm

Special Features

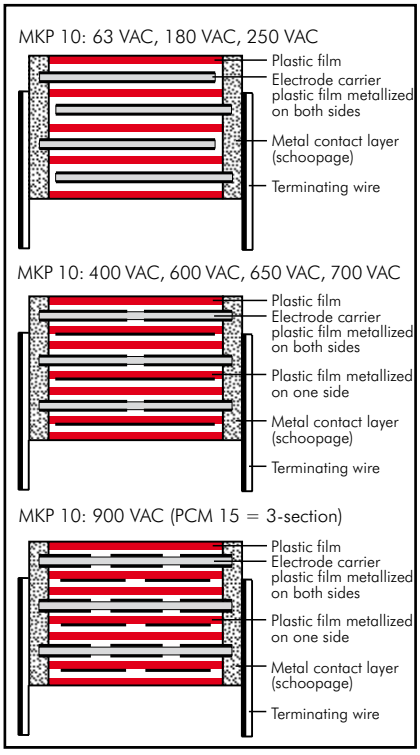
- **Pulse duty construction**
- **Self-healing**
- **Very low dissipation factor**
- **Negative capacitance change versus temperature**
- **According to RoHS 2002/95/EC**

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 15 µF (E12-values on request)
Rated voltages:
100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC, 1600 VDC, 2000 VDC, 2500 VDC
Capacitance tolerances:
±20%, ±10%, ±5%
Operating temperature range:
–55° C to +100° C
Climatic test category:
55/100/56 in accordance with IEC
Insulation resistance at +20° C:
C ⩽ 0.33 µF: ⩾ 1 x 10^5 MΩ
(mean value: 5 x 10^5 MΩ)
C > 0.33 µF: ⩾ 30 000 sec (MΩ x µF)
(mean value: 100 000 sec)
Measuring voltage: 100 V/1 min.
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	⩽ 3 x 10^{-4}	⩽ 3 x 10^{-4}	⩽ 3 x 10^{-4}
10 kHz	⩽ 4 x 10^{-4}	⩽ 6 x 10^{-4}	–
100 kHz	⩽ 15 x 10^{-4}	–	–

Maximum pulse rise time:

Capacitance pF/µF	max. pulse rise time V/µsec at T_A < 40° C							
	100 VDC	250 VDC	400 VDC	630 VDC	1000 VDC	1600 VDC	2000 VDC	2500 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
0.033 ... 0.068	400	800	900	1800	2100	2100	2100	–
0.1 ... 0.22	200	500	500	900	1400	1400	1400	–
0.33 ... 0.68	100	300	400	700	900	900	900	–
1.0 ... 2.2	70	200	200	400	400	500	–	–
3.3 ... 4.7	50	80	100	150	–	–	–	–
6.8 ... 15	35	50	70	–	–	–	–	–

for pulses equal to the rated voltage

Test voltage: 1.6 U_r, 2 sec.
Dielectric absorption:
0.05 %
Voltage derating:
A voltage derating factor of 1.35 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.
Reliability:
Operational life > 300 000 hours
Failure rate < 1 fit (0.5 x U_r and 40° C)

Mechanical Tests

Pull test on pins:
d ⩽ 0.8 ø: 10 N in direction of pins
d > 0.8 ø: 20 N in direction of pins
according to IEC 60068-2-21
Vibration:
6 hours at 10 ... 2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6
Low air density:
1kPa = 10 mbar in accordance with IEC 60068-2-13
Bump test:
4000 bumps at 390 m/sec^2
in accordance with IEC 60068-2-29

Packing

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

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

For further details and graphs please refer to Technical Information.

Continuation

General Data

Capacitance	100 VDC/63 VAC*					250 VDC/180 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	4	9	10	**7.5**	MKP1D011002C00____	4	9	10	**7.5**	MKP1F011002C00____
1500 „	4	9	10	**7.5**	MKP1D011502C00____	4	9	10	**7.5**	MKP1F011502C00____
2200 „	4	9	10	**7.5**	MKP1D012202C00____	4	9	10	**7.5**	MKP1F012202C00____
3300 „	4	9	10	**7.5**	MKP1D013302C00____	4	9	10	**7.5**	MKP1F013302C00____
4700 „	4	9	10	**7.5**	MKP1D014702C00____	4	9	10	**7.5**	MKP1F014702C00____
6800 „	4	9	10	**7.5**	MKP1D016802C00____	4	9	10	**7.5**	MKP1F016802C00____
0.01 µF	4	9	10	**7.5**	MKP1D021002C00____	4	9	10	**7.5**	MKP1F021002C00____
						4	9	13	10	MKP1F021003C00____
0.015 „	4	9	10	**7.5**	MKP1D021502C00____	4	9	10	**7.5**	MKP1F021502C00____
						4	9	13	10	MKP1F021503C00____
0.022 „	4	9	10	**7.5**	MKP1D022202C00____	4	9	10	**7.5**	MKP1F022202C00____
						4	9	13	10	MKP1F022203C00____
0.033 „	5	10.5	10.3	**7.5**	MKP1D023302E00____	5	10.5	10.3	**7.5**	MKP1F023302E00____
	4	9	13	10	MKP1D023303C00____	4	9	13	10	MKP1F023303C00____
0.047 „	5	10.5	10.3	**7.5**	MKP1D024702E00____	5	10.5	10.3	**7.5**	MKP1F024702E00____
	4	9	13	10	MKP1D024703C00____	4	9	13	10	MKP1F024703C00____
0.068 „	5	11	13	10	MKP1D026803F00____	5	11	13	10	MKP1F026803F00____
						5	11	18	15	MKP1F026804B00____
0.1 µF	6	12	13	10	MKP1D031003G00____	6	12	13	10	MKP1F031003G00____
						5	11	18	15	MKP1F031004B00____
0.15 „	6	12.5	18	15	MKP1D031504C00____	6	12.5	18	15	MKP1F031504C00____
						6	15	26.5	22.5	MKP1F031505B00____
0.22 „	7	14	18	15	MKP1D032204D00____	7	14	18	15	MKP1F032204D00____
						6	15	26.5	22.5	MKP1F032205B00____
0.33 „	8	15	18	15	MKP1D033304F00____	8	15	18	15	MKP1F033304F00____
						6	15	26.5	22.5	MKP1F033305B00____
0.47 „	9	16	18	15	MKP1D034704J00____	9	16	18	15	MKP1F034704J00____
	7	16.5	26.5	22.5	MKP1D034705D00____	7	16.5	26.5	22.5	MKP1F034705D00____
0.68 „	8.5	18.5	26.5	22.5	MKP1D036805F00____	8.5	18.5	26.5	22.5	MKP1F036805F00____
						9	19	31.5	27.5	MKP1F036806A00____
1.0 µF	10.5	19	26.5	22.5	MKP1D041005G00____	11	21	26.5	22.5	MKP1F041005I00____
						11	21	31.5	27.5	MKP1F041006B00____
1.5 „	11	21	31.5	27.5	MKP1D041506B00____	13	24	31.5	27.5	MKP1F041506D00____
						13	24	41.5	37.5	MKP1F041507C00____
2.2 „	13	24	31.5	27.5	MKP1D042206D00____	15	26	31.5	27.5	MKP1F042206F00____
						13	24	41.5	37.5	MKP1F042207C00____
3.3 „	17	29	31.5	27.5	MKP1D043306G00____	17	34.5	31.5	27.5	MKP1F043306I00____
						17	29	41.5	37.5	MKP1F043307E00____
4.7 „	20	39.5	31.5	27.5	MKP1D044706J00____	20	39.5	31.5	27.5	MKP1F044706J00____
	17	29	41.5	37.5	MKP1D044707E00____	19	32	41.5	37.5	MKP1F044707F00____
6.8 „	19	32	41.5	37.5	MKP1D046807F00____	20	39.5	41.5	37.5	MKP1F046807G00____
10 µF	20	39.5	41.5	37.5	MKP1D051007G00____	24	45.5	41.5	37.5	MKP1F051007H00____
15 „	24	45.5	41.5	37.5	MKP1D051507H00____					

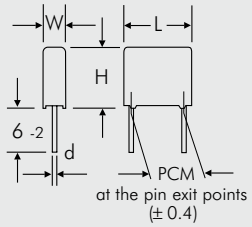
* AC voltage: f ⩽ 1000 Hz; 1.4 x U_{rms} + UDC ⩽ U_r

** PCM = Printed circuit module = pin spacing

Dims. in mm.

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

Ø d	PCM
0.6	7.5 - 10
0.8	15 - 27.5
1.0	37.5



Part number completion:

Tolerance: 20 % = M
10 % = K
5 % = J
Packing: bulk = S
Pin length: 6-2 = SD

Taped version see page 127.

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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**	MKP1G011002C00____	4	9	10	**7.5***	MKP1J011002C00____
1500 „	4	9	10	**7.5**	MKP1G011502C00____	4	9	10	**7.5***	MKP1J011502C00____
2200 „	4	9	10	**7.5**	MKP1G012202C00____	4	9	10	**7.5***	MKP1J012202C00____
3300 „	4	9	10	**7.5**	MKP1G013302C00____	4	9	10	**7.5***	MKP1J013302C00____
4700 „	4	9	10	**7.5**	MKP1G014702C00____	4	9	10	**7.5***	MKP1J014702C00____
6800 „	4	9	10	**7.5**	MKP1G016802C00____	4	9	10	**7.5***	MKP1J016802C00____
						4	9	13	10	MKP1J016803C00____
0.01 µF	4	9	10	**7.5**	MKP1G021002C00____	5	10.5	10.3	**7.5***	MKP1J021002E00____
	4	9	13	10	MKP1G021003C00____	4	9	13	10	MKP1J021003C00____
0.015 „	5	10.5	10.3	**7.5**	MKP1G021502E00____	5	11	13	10	MKP1J021503F00____
	4	9	13	10	MKP1G021503C00____	5	11	18	15	MKP1J021504B00____
0.022 „	5	10.5	10.3	**7.5**	MKP1G022202E00____	5	11	13	10	MKP1J022203F00____
	4	9	13	10	MKP1G022203C00____	5	11	18	15	MKP1J022204B00____
0.033 „	5.7	12.5	10.3	**7.5**	MKP1G023302F00____	6	12	13	10	MKP1J023303G00____
	5	11	13	10	MKP1G023303F00____	5	11	18	15	MKP1J023304B00____
0.047 „	6	12	13	10	MKP1G024703G00____	6	12.5	18	15	MKP1J024704C00____
	5	11	18	15	MKP1G024704B00____	6	15	26.5	22.5	MKP1J024705B00____
0.068 „	6	12.5	18	15	MKP1G026804C00____	7	14	18	15	MKP1J026804D00____
	6	15	26.5	22.5	MKP1G026805B00____	6	15	26.5	22.5	MKP1J026805B00____
0.1 µF	7	14	18	15	MKP1G031004D00____	9	16	18	15	MKP1J031004J00____
	6	15	26.5	22.5	MKP1G031005B00____	7	16.5	26.5	22.5	MKP1J031005D00____
0.15 „	8	15	18	15	MKP1G031504F00____	8.5	18.5	26.5	22.5	MKP1J031505F00____
	6	15	26.5	22.5	MKP1G031505B00____	9	19	31.5	27.5	MKP1J031506A00____
0.22 „	9	16	18	15	MKP1G032204J00____	8.5	18.5	26.5	22.5	MKP1J032205F00____
	7	16.5	26.5	22.5	MKP1G032205D00____	9	19	31.5	27.5	MKP1J032206A00____
0.33 „	8.5	18.5	26.5	22.5	MKP1G033305F00____	11	21	26.5	22.5	MKP1J033305I00____
	9	19	31.5	27.5	MKP1G033306A00____	11	21	31.5	27.5	MKP1J033306B00____
0.47 „	10.5	19	26.5	22.5	MKP1G034705G00____	11	21	31.5	27.5	MKP1J034706B00____
	9	19	31.5	27.5	MKP1G034706A00____					
0.68 „	11	21	26.5	22.5	MKP1G036805I00____	15	26	31.5	27.5	MKP1J036806F00____
	11	21	31.5	27.5	MKP1G036806B00____	13	24	41.5	37.5	MKP1J036807C00____
1.0 µF	13	24	31.5	27.5	MKP1G041006D00____	17	29	31.5	27.5	MKP1J041006G00____
	13	24	41.5	37.5	MKP1G041007C00____	15	26	41.5	37.5	MKP1J041007D00____
1.5 „	17	29	31.5	27.5	MKP1G041506G00____	20	39.5	31.5	27.5	MKP1J041506J00____
	13	24	41.5	37.5	MKP1G041507C00____	19	32	41.5	37.5	MKP1J041507F00____
2.2 „	20	39.5	31.5	27.5	MKP1G042206J00____	20	39.5	41.5	37.5	MKP1J042207G00____
	17	29	41.5	37.5	MKP1G042207E00____					
3.3 „	20	39.5	41.5	37.5	MKP1G043307G00____	24	45.5	41.5	37.5	MKP1J043307H00____
4.7 „	20	39.5	41.5	37.5	MKP1G044707G00____					
6.8 „	24	45.5	41.5	37.5	MKP1G046807H00____					

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

** 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 AC voltage.

Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD

Taped version see page 127.

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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**	MKP1O111002C00_____	4	9	13	10	MKP1T011003C00_____
	4	9	13	10	MKP1O111003C00_____					
1500 „	4	9	10	**7.5**	MKP1O111502C00_____	4	9	13	10	MKP1T011503C00_____
	4	9	13	10	MKP1O111503C00_____					
2200 „	4	9	10	**7.5**	MKP1O112202C00_____	4	9	13	10	MKP1T012203C00_____
	4	9	13	10	MKP1O112203C00_____					
3300 „	4	9	10	**7.5**	MKP1O113302C00_____	4	9	13	10	MKP1T013303C00_____
	4	9	13	10	MKP1O113303C00_____					
4700 „	4.5	9.5	10.3	**7.5**	MKP1O114702D00_____	5	11	13	10	MKP1T014703F00_____
	4	9	13	10	MKP1O114703C00_____					
6800 „	5.7	12.5	10.3	**7.5**	MKP1O116802F00_____	6	12	13	10	MKP1T016803G00_____
	5	11	13	10	MKP1O116803F00_____	5	11	18	15	MKP1T016804B00_____
0.01 µF	5	11	13	10	MKP1O121003F00_____	5	11	18	15	MKP1T021004B00_____
	5	11	18	15	MKP1O121004B00_____					
0.015 „	6	12	13	10	MKP1O121503G00_____	6	12.5	18	15	MKP1T021504C00_____
	5	11	18	15	MKP1O121504B00_____	6	15	26.5	22.5	MKP1T021505B00_____
0.022 „	6	12.5	18	15	MKP1O122204C00_____	7	14	18	15	MKP1T022204D00_____
	6	15	26.5	22.5	MKP1O122205B00_____	6	15	26.5	22.5	MKP1T022205B00_____
0.033 „	7	14	18	15	MKP1O123304D00_____	8	15	18	15	MKP1T023304F00_____
	6	15	26.5	22.5	MKP1O123305B00_____	6	15	26.5	22.5	MKP1T023305B00_____
0.047 „	8	15	18	15	MKP1O124704F00_____	7	16.5	26.5	22.5	MKP1T024705D00_____
	6	15	26.5	22.5	MKP1O124705B00_____	9	19	31.5	27.5	MKP1T024706A00_____
0.068 „	7	16.5	26.5	22.5	MKP1O126805D00_____	10.5	19	26.5	22.5	MKP1T026805G00_____
						9	19	31.5	27.5	MKP1T026806A00_____
0.1 µF	8.5	18.5	26.5	22.5	MKP1O131005F00_____	11	21	26.5	22.5	MKP1T031005I00_____
	11	21	31.5	27.5	MKP1O131006B00_____	11	21	31.5	27.5	MKP1T031006B00_____
0.15 „	11	21	26.5	22.5	MKP1O131505I00_____	13	24	31.5	27.5	MKP1T031506D00_____
	11	21	31.5	27.5	MKP1O131506B00_____					
0.22 „	11	21	31.5	27.5	MKP1O132206B00_____	15	26	31.5	27.5	MKP1T032206F00_____
						13	24	41.5	37.5	MKP1T032207C00_____
0.33 „	15	26	31.5	27.5	MKP1O133306F00_____	17	34.5	31.5	27.5	MKP1T033306I00_____
	13	24	41.5	37.5	MKP1O133307C00_____	17	29	41.5	37.5	MKP1T033307E00_____
0.47 „	17	29	31.5	27.5	MKP1O134706G00_____	20	39.5	31.5	27.5	MKP1T034706J00_____
	13	24	41.5	37.5	MKP1O134707C00_____	19	32	41.5	37.5	MKP1T034707F00_____
0.68 „	20	39.5	31.5	27.5	MKP1O136806J00_____	20	39.5	41.5	37.5	MKP1T036807G00_____
	17	29	41.5	37.5	MKP1O136807E00_____					
1.0 µF	20	39.5	41.5	37.5	MKP1O141007G00_____	24	45.5	41.5	37.5	MKP1T041007H00_____
1.5 „	24	45.5	41.5	37.5	MKP1O141507H00_____					

* AC voltage: f ⩽ 1000 Hz; 1.4 x U_{rms} + UDC ⩽ U_r

** 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:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD

Taped version see page 127.

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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	MKP1U011003C00_ _ _ _	5	11	18	15	MKP1V011004B00_ _ _ _
						6	15	26.5	22.5	MKP1V011005B00_ _ _ _
1500 „	4	9	13	10	MKP1U011503C00_ _ _ _	5	11	18	15	MKP1V011504B00_ _ _ _
						6	15	26.5	22.5	MKP1V011505B00_ _ _ _
2200 „	5	11	13	10	MKP1U012203F00_ _ _ _	5	11	18	15	MKP1V012204B00_ _ _ _
	5	11	18	15	MKP1U012204B00_ _ _ _	6	15	26.5	22.5	MKP1V012205B00_ _ _ _
3300 „	5	11	18	15	MKP1U013304B00_ _ _ _	5	11	18	15	MKP1V013304B00_ _ _ _
						6	15	26.5	22.5	MKP1V013305B00_ _ _ _
4700 „	5	11	18	15	MKP1U014704B00_ _ _ _	6	12.5	18	15	MKP1V014704C00_ _ _ _
	6	15	26.5	22.5	MKP1U014705B00_ _ _ _	6	15	26.5	22.5	MKP1V014705B00_ _ _ _
6800 „	6	12.5	18	15	MKP1U016804C00_ _ _ _	7	14	18	15	MKP1V016804D00_ _ _ _
	6	15	26.5	22.5	MKP1U016805B00_ _ _ _	7	16.5	26.5	22.5	MKP1V016805D00_ _ _ _
0.01 µF	7	14	18	15	MKP1U021004D00_ _ _ _	8.5	18.5	26.5	22.5	MKP1V021005F00_ _ _ _
	6	15	26.5	22.5	MKP1U021005B00_ _ _ _					
0.015 „	8	15	18	15	MKP1U021504F00_ _ _ _	10.5	19	26.5	22.5	MKP1V021505G00_ _ _ _
	6	15	26.5	22.5	MKP1U021505B00_ _ _ _					
0.022 „	9	16	18	15	MKP1U022204J00_ _ _ _	11	21	26.5	22.5	MKP1V022205I00_ _ _ _
	7	16.5	26.5	22.5	MKP1U022205D00_ _ _ _					
0.033 „	8.5	18.5	26.5	22.5	MKP1U023305F00_ _ _ _					
	9	19	31.5	27.5	MKP1U023306A00_ _ _ _					
0.047 „	10.5	19	26.5	22.5	MKP1U024705G00_ _ _ _					
	11	21	31.5	27.5	MKP1U024706B00_ _ _ _					
0.068 „	11	21	26.5	22.5	MKP1U026805I00_ _ _ _					
	11	21	31.5	27.5	MKP1U026806B00_ _ _ _					
0.1 µF	13	24	31.5	27.5	MKP1U031006D00_ _ _ _					
0.15 „	15	26	31.5	27.5	MKP1U031506F00_ _ _ _					
	13	24	41.5	37.5	MKP1U031507C00_ _ _ _					
0.22 „	17	34.5	31.5	27.5	MKP1U032206I00_ _ _ _					
	17	29	41.5	37.5	MKP1U032207E00_ _ _ _					
0.33 „	19	32	41.5	37.5	MKP1U033307F00_ _ _ _					
0.47 „	20	39.5	41.5	37.5	MKP1U034707G00_ _ _ _					
0.68 „	24	45.5	41.5	37.5	MKP1U036807H00_ _ _ _					

* AC voltage: f ⩽ 1000 Hz; 1.4 x U_{rms} + UDC ⩽ U_r

** 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:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	6-2 = SD

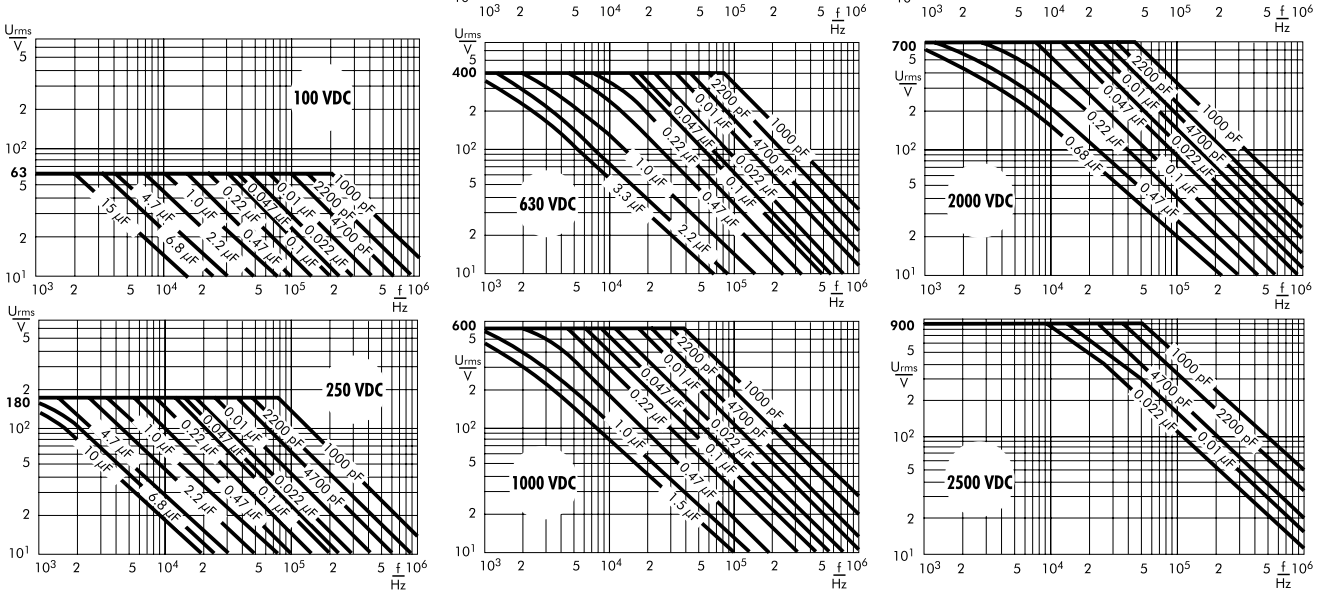
Taped version see page 127.

Continuation page 61

WIMA MKP 10

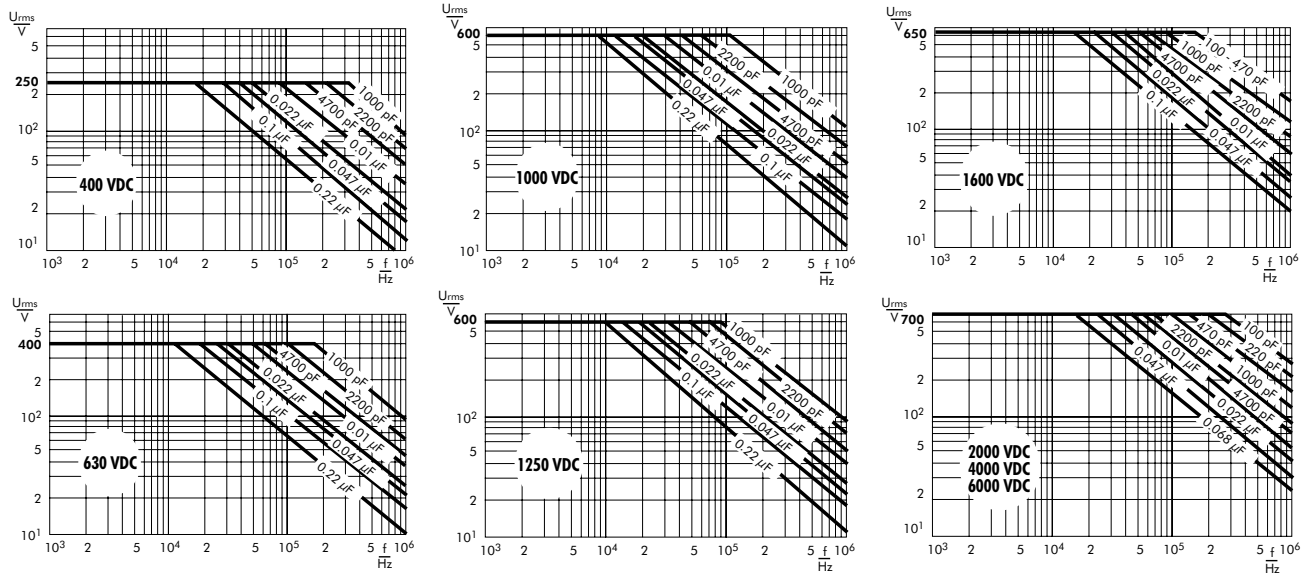
Continuation

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



WIMA FKP 1

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



Technical information and general data see page 66.

Recommendation for Processing and Application of Through-Hole Capacitors

Soldering Process

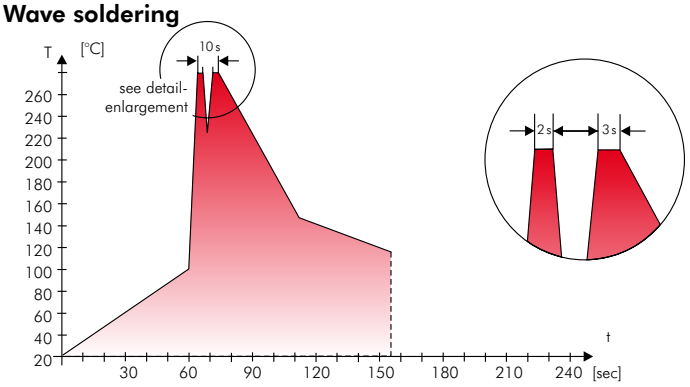
A preheating of through-hole WIMA capacitors is allowed for temperatures $T_{max} < 100°C$.
In practice a preheating duration of $t < 5$ min. has been proven to be best.

Single wave soldering
Soldering bath temperature: $T < 260°C$
Immersion time: $t < 5$ sec

Double wave soldering
Soldering bath temperature: $T < 260°C$
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.

Wave soldering



Typical temperature/time graph for double wave soldering

WIMA Quality and Environmental Philosophy

ISO 9001:2008 Certification

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

WIMA WPCS

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

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

WIMA Environmental Policy

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

- **Lead**
- **PCB**
- **CFC**
- **Hydrocarbon chloride**
- **Chromium 6+**
- **PBB/PBDE**
- **Arsenic**
- **Cadmium**
- **Mercury**
- **etc.**

We merely use pure, recyclable materials for packing our components, such as:

- **carton**
- **cardboard**
- **adhesive tape made of paper**
- **polystyrene**

We almost completely refrain from using packing materials such as:

- **foamed polystyrene (Styropor®)**
- **adhesive tapes made of plastic**
- **metal clips**

RoHS Compliance

According to the RoHS Directive 2002/95/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 refraind from using such substances since years already.

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.

08.11

Typical Dimensions for Taping Configuration

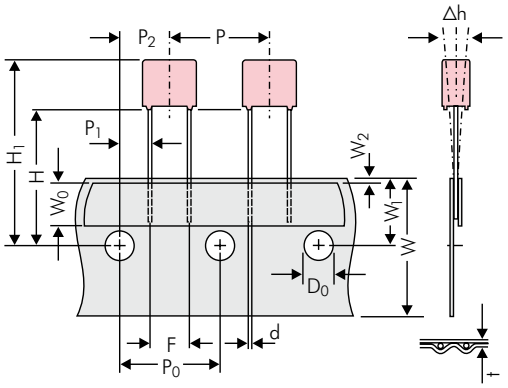


Diagram 1:
PCM 2.5/5/7.5mm

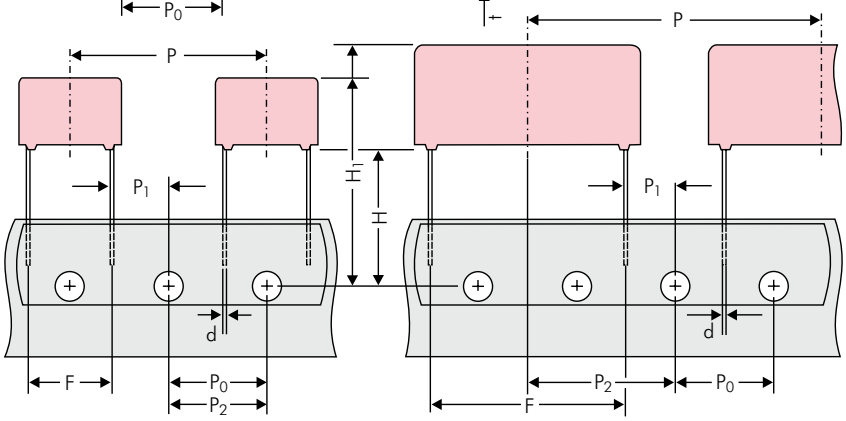


Diagram 2: PCM 10/15 mm

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 128)		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 B 52 ±2 / 58 ±2 / 66 ±2 or REEL ø 500 max. ø 25 ±1 B 54 ±2 / 60 ±2 / 68 ±2 } depending on PCM and component dimensions				
Unit		see details page 130.						

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). P_0 = 12.7 or 15.0 is possible

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 ø 360		REEL ø 500		AMMO 340 × 340		AMMO 490 × 370	
						H16.5	H18.5	H16.5	H18.5	H16.5	H18.5	H16.5	H18.5	H16.5	H18.5
	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		700		–		700		–	
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		2800	
	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**	540*	–		–		420		–		380	
	10.5	19	26.5	**5G**	680*	–		–		400		–		360	
	10.5	20.5	26.5	**5H**	680*	–		–		400		–		360	
	11	21	26.5	**5I**	680*	–		–		380		–		350	
	12	24	28	**FJ**	450*	–		–		350		–		310	

* Tray Packing-System
Samples and pre-production needs on request.

Moulded versions.

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

PCM	Size				bulk	pcs. per packing units ROLL		REEL ø 360		REEL ø 500		AMMO 340 x 340		AMMO 490 x 370	
						H16.5	H18.5	H16.5	H18.5	H16.5	H18.5	H16.5	H18.5	H16.5	H18.5
	W	H	L	Codes	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*	–		–		270		–		250	
	15	26	31.5	**6F**	384*	–		–		–		–		–	
	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-inchl transport pitches.

* Tray Packing System
Samples and pre-production needs on request.

Moulded versions.

07.12

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: Special features (e.g. Snubber versions)
Field 15: Capacitance tolerance
Field 16: Packing
Field 17 - 18: Lead 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				2.5 x 6.5 x 7.2		-		20%	bulk	6 -2	

Type description:

SMD-PET	= SMDT
SMD-PPS	= SMDI
FKP 02	= FKP0
MKS 02	= MKS0
FKS 2	= FKS2
FKP 2	= FKP2
MKS 2	= MKS2
MKP 2	= MKP2
FKS 3	= FKS3
FKP 3	= FKP3
MKS 4	= MKS4
MKP 4	= MKP4
MKP 10	= MKP1
FKP 4	= FKP4
FKP 1	= FKP1
MKP-X2	= MKX2
MKP-X2 R	= MKXR
MKP-Y2	= MKY2
MP 3-X2	= MPX2
MP 3-X1	= MPX1
MP 3-Y2	= MPY2
MP 3R-Y2	= MPRY
Snubber MKP	= SNMP
Snubber FKP	= SNFP
GTO MKP	= GTOM
DC-LINK MKP 4	= DCP4
DC-LINK MKP 5	= DCP5
DC-LINK MKP 6	= DCP6
DC-LINK HC	= DCH_
SuperCap C	= SCSC
SuperCap MC	= SCMC
SuperCap R	= SCSR
SuperCap MR	= SCMR

Rated voltage:

2.5 VDC	= A1
4 VDC	= A2
14 VDC	= A3
28 VDC	= A4
40 VDC	= A5
5 VDC	= A6
50 VDC	= B0
63 VDC	= C0
100 VDC	= D0
160 VDC	= E0
250 VDC	= F0
400 VDC	= G0
450 VDC	= H0
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
400 VAC	= 3W
440 VAC	= 4W
500 VAC	= 5W
...	

Capacitance:

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
1 F	= A010
2.5 F	= A025
50 F	= A500
100 F	= B100
110 F	= B110
600 F	= B600
1200 F	= C120
...	

Size:

4.8 x 3.3 x 3 Size 1812	= KA
4.8 x 3.3 x 4 Size 1812	= KB
5.7 x 5.1 x 3.5 Size 2220	= QA
5.7 x 5.1 x 4.5 Size 2220	= QB
7.2 x 6.1 x 3 Size 2824	= TA
7.2 x 6.1 x 5 Size 2824	= TB
10.2 x 7.6 x 5 Size 4030	= VA
12.7 x 10.2 x 6 Size 5040	= XA
15.3 x 13.7 x 7 Size 6054	= YA
2.5 x 7 x 4.6 PCM 2.5	= 0B
3 x 7.5 x 4.6 PCM 2.5	= 0C
2.5 x 6.5 x 7.2 PCM 5	= 1A
3 x 7.5 x 7.2 PCM 5	= 1B
2.5 x 7 x 10 PCM 7.5	= 2A
3 x 8.5 x 10 PCM 7.5	= 2B
3 x 9 x 13 PCM 10	= 3A
4 x 9 x 13 PCM 10	= 3C
5 x 11 x 18 PCM 15	= 4B
6 x 12.5 x 18 PCM 15	= 4C
5 x 14 x 26.5 PCM 22.5	= 5A
6 x 15 x 26.5 PCM 22.5	= 5B
9 x 19 x 31.5 PCM 27.5	= 6A
11 x 21 x 31.5 PCM 27.5	= 6B
9 x 19 x 41.5 PCM 37.5	= 7A
11 x 22 x 41.5 PCM 37.5	= 7B
94 x 49 x 182 DCH_	= H0
94 x 77 x 182 DCH_	= H1
...	

Special features:

Standard	= 00
Version A1	= 1A
Version A1.1.1	= 1B
Version A1.2	= 1C
...	

Tolerance:

20%	= M
10%	= K
5%	= J
2.5%	= H
1%	= E
...	

Packing:

AMMO H16.5 340 x 340	= A
AMMO H16.5 490 x 370	= B
AMMO H18.5 340 x 340	= C
AMMO H18.5 490 x 370	= 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 Standard	= S
TPS Standard	= Y
...	

Lead 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.