

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

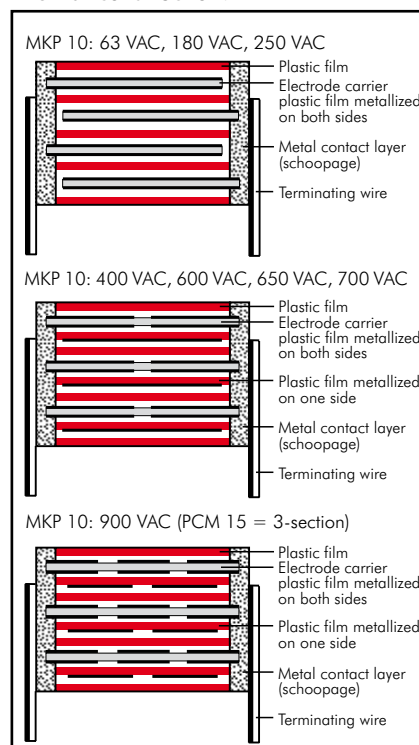
Construction

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 μ F (E12-values on request)

Rated voltages:

100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC, 1600 VDC, 2000 VDC, 2500 VDC

Capacitance tolerances:

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

Operating temperature range:

-55°C to $+100^{\circ}\text{C}$

Climatic test category:

55/100/56 in accordance with IEC

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

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

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

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

(mean value: 100 000 sec)

Measuring voltage: 100 V/1 min.

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:

Capacitance pF/ μ F	max. pulse rise time V/ μ sec at $T_A < 40^{\circ}\text{C}$							
	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

Mechanical Tests

Pull test on leads:

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

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

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	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_
0.015 "	4	9	10	7.5	MKP1D021502C00_	4	9	10	7.5	MKP1F021502C00_
0.022 "	4	9	10	7.5	MKP1D022202C00_	4	9	10	7.5	MKP1F022202C00_
0.033 "	5	10.5	10.3	7.5	MKP1D023302E00_	5	10.5	10.3	7.5	MKP1F023302E00_
0.047 "	4	9	13	10	MKP1D023303C00_	4	9	13	10	MKP1F023303C00_
0.068 "	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_
	5	11	13	10	MKP1D026803F00_	5	11	13	10	MKP1F026803F00_
					MKP1D026804B00_	5	11	18	15	MKP1F026804B00_
0.1 µF	6	12	13	10	MKP1D031003G00_	6	12	13	10	MKP1F031003G00_
0.15 "	6	12.5	18	15	MKP1D031504C00_	6	12.5	18	15	MKP1F031504C00_
0.22 "	7	14	18	15	MKP1D032204D00_	6	15	26.5	22.5	MKP1F031505B00_
0.33 "	8	15	18	15	MKP1D033304F00_	7	14	18	15	MKP1F032204D00_
0.47 "	9	16	18	15	MKP1D034704J00_	6	15	26.5	22.5	MKP1F032205B00_
0.68 "	7	16.5	26.5	22.5	MKP1D034705D00_	8	15	18	15	MKP1F033304F00_
	8.5	18.5	26.5	22.5	MKP1D036805F00_	6	15	26.5	22.5	MKP1F033305B00_
						9	16	18	15	MKP1F034704J00_
1.0 µF	10.5	19	26.5	22.5	MKP1D041005G00_	7	16.5	26.5	22.5	MKP1F034705D00_
1.5 "	11	21	31.5	27.5	MKP1D041506B00_	8.5	18.5	26.5	22.5	MKP1F036805F00_
2.2 "	13	24	31.5	27.5	MKP1D042206D00_	9	19	31.5	27.5	MKP1F036806A00_
3.3 "	17	29	31.5	27.5	MKP1D043306G00_	11	21	26.5	22.5	MKP1F041005I00_
4.7 "	20	39.5	31.5	27.5	MKP1D044706J00_	11	21	31.5	27.5	MKP1F041006B00_
6.8 "	17	29	41.5	37.5	MKP1D044707E00_	13	24	31.5	27.5	MKP1F041506D00_
	19	32	41.5	37.5	MKP1D046807F00_	13	24	41.5	37.5	MKP1F041507C00_
10 µF	20	39.5	41.5	37.5	MKP1D051007G00_	15	26	31.5	27.5	MKP1F042206F00_
15 "	24	45.5	41.5	37.5	MKP1D051507H00_	13	24	41.5	37.5	MKP1F042207C00_
						17	34.5	31.5	27.5	MKP1F043306I00_
						17	29	41.5	37.5	MKP1F043307E00_
						20	39.5	31.5	27.5	MKP1F044706J00_
						19	32	41.5	37.5	MKP1F044707F00_
						20	39.5	41.5	37.5	MKP1F046807G00_
										MKP1F051007H00_

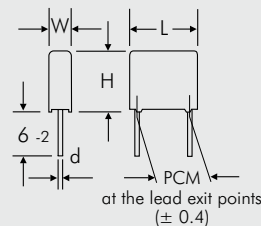
* AC voltage: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

** PCM = Printed circuit module = lead spacing

Dims. in mm.

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

∅ 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
Lead length: 6-2 = SD

Taped version see page 127.

Rights reserved to amend design data without prior notification.

Continuation page 58

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	MKP1J033307H00_
4.7 "	20	39.5	41.5	37.5	MKP1G044707G00_					
6.8 "	24	45.5	41.5	37.5	MKP1G046807H00_					

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

** PCM = Printed circuit module = lead 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

Lead length: 6-2 = SD

Taped version see page 127.

Rights reserved to amend design data without prior notification.

Continuation page 59

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

** PCM = Printed circuit module = lead 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

Lead length: 6-2 = SD

Taped version see page 127.

Rights reserved to amend design data without prior notification.

Continuation page 60

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_
1500 "	4	9	13	10	MKP1U011503C00_	6	15	26.5	22.5	MKP1V011005B00_
2200 "	5	11	13	10	MKP1U012203F00_	6	15	26.5	22.5	MKP1V011504B00_
3300 "	5	11	18	15	MKP1U012204B00_	5	11	18	15	MKP1V011505B00_
4700 "	5	11	18	15	MKP1U013304B00_	6	15	26.5	22.5	MKP1V012204B00_
6800 "	5	11	18	15	MKP1U014704B00_	5	11	18	15	MKP1V012205B00_
	6	15	26.5	22.5	MKP1U014705B00_	6	15	26.5	22.5	MKP1V013304B00_
	6	12.5	18	15	MKP1U016804C00_	6	15	26.5	22.5	MKP1V013305B00_
	6	15	26.5	22.5	MKP1U016805B00_	7	14	18	15	MKP1V014704C00_
						7	16.5	26.5	22.5	MKP1V014705B00_
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: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

** PCM = Printed circuit module = lead 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

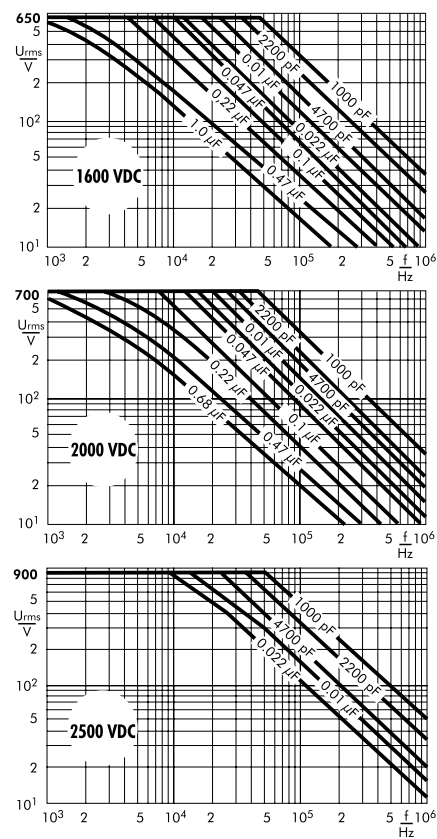
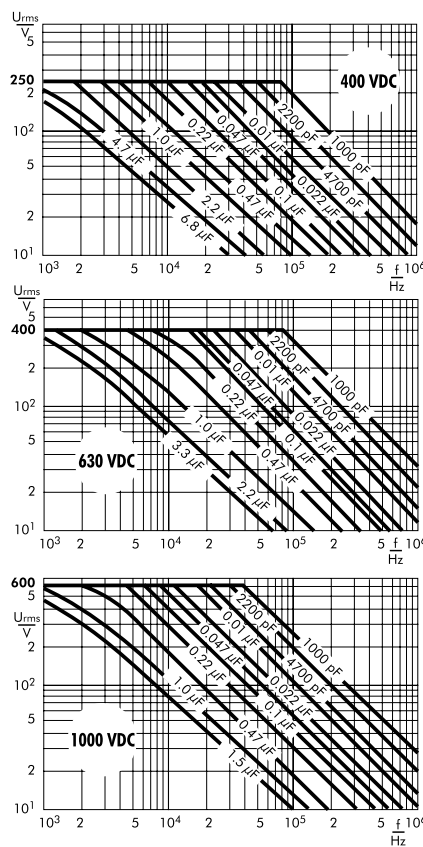
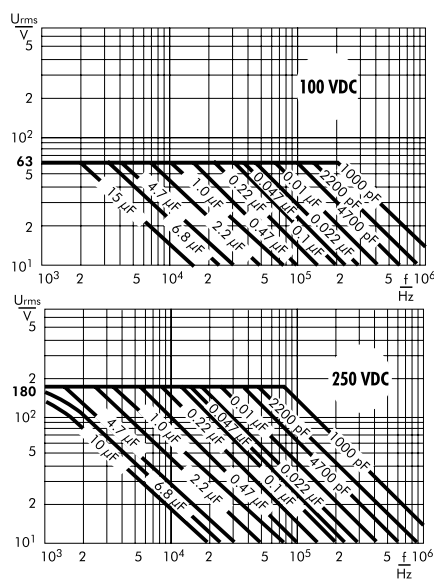
Lead length: 6-2 = SD

Taped version see page 127.

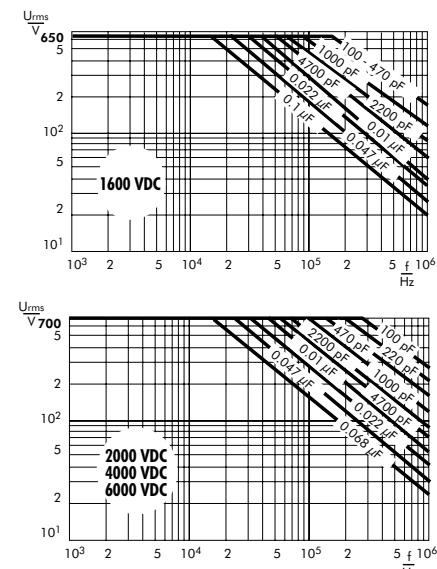
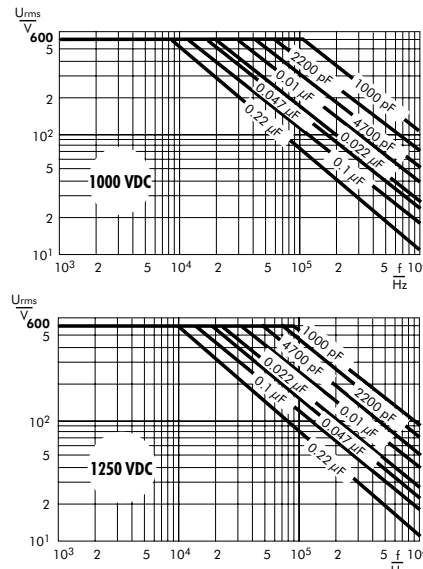
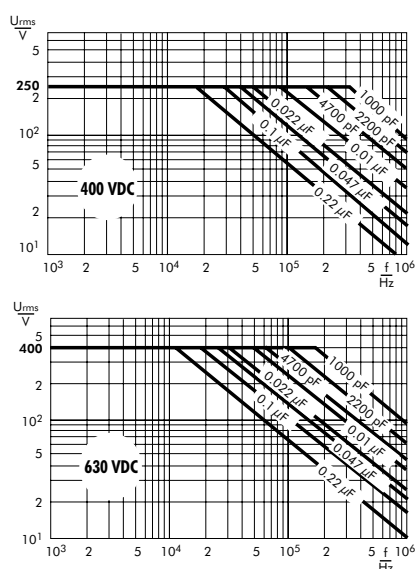
Rights reserved to amend design data without prior notification.

Continuation page 61

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



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 $T_{\max} < 100^{\circ}\text{C}$. In practice a preheating duration of $t < 5$ min. has been proven to be best.

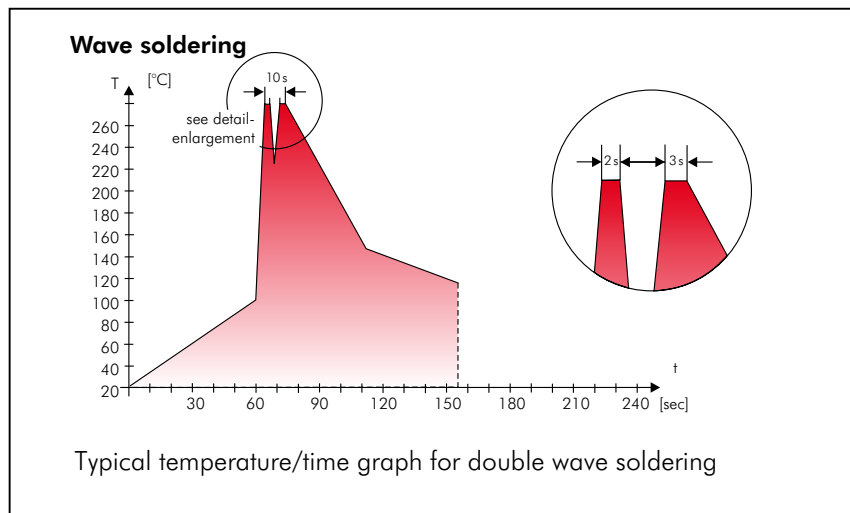
Single wave soldering

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 9001:2000 Certification

ISO 9001:2000 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2000 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
- lead 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 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 refrained from using such substances since years already.



WIMA Kondensatoren sind bleifrei
konform RoHS 2002/95/EG

WIMA capacitors are lead free
in accordance with RoHS 2002/95/EC

Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2005

WIMA's environmental management has been established in accordance with the guidelines of DIN EN ISO 14001:2005. The certification has been granted in June 2006.

Typical Dimensions for Taping Configuration

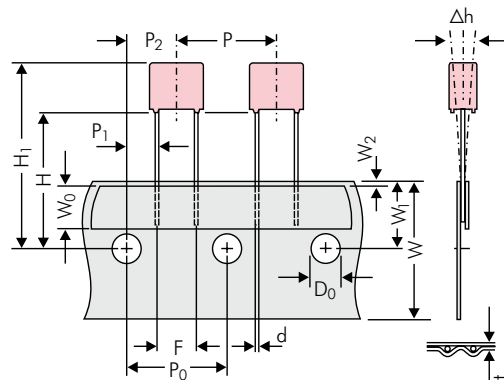


Diagram 1:
PCM 2.5/5/7.5mm

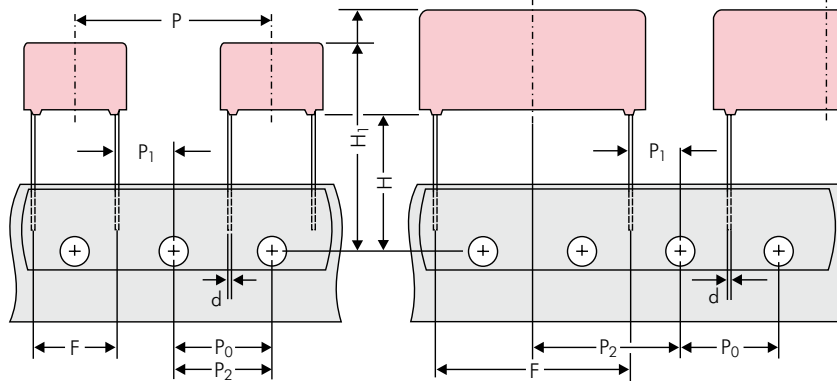


Diagram 2: PCM 10/15 mm

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

Dims in mm.

* Diameter of leads 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.

Packing Quantities for Bulk Capacitors and TPS*



PCM	Size				pcs. per packaging unit bulk			pcs. per packaging unit/TPS*	
	W	H	L	Codes	Mini	Standard	Maxi	Mini	Standard
2.5 mm	2.5	7	4.6	0B	1000	5000	10 000	–	–
	3	7.5	4.6	0C	1000	5000	10 000	–	–
	3.8	8.5	4.6	0D	1000	5000	10 000	–	–
	4.6	9	4.6	0E	1000	5000	10 000	–	–
	5.5	10	4.6	0F	1000	5000	10 000	–	–
5 mm	2.5	6.5	7.2	1A	2000	5000	10 000	–	–
	3	7.5	7.2	1B	1000	5000	–	–	–
	3.5	8.5	7.2	1C	1000	5000	–	–	–
	4.5	6	7.2	1D	1000	6000	–	–	–
	4.5	9.5	7.2	1E	1000	4000	–	–	–
	5	10	7.2	1F	1000	3500	–	–	–
	5.5	7	7.2	1G	1000	4000	–	–	–
	5.5	11.5	7.2	1H	500	2500	–	–	–
	6.5	8	7.2	1I	1000	2500	–	–	–
	7.2	8.5	7.2	1J	500	2500	–	–	–
	7.2	13	7.2	1K	500	2000	–	–	–
	8.5	10	7.2	1L	500	2000	–	–	–
	8.5	14	7.2	1M	500	1500	–	–	–
	11	16	7.2	1N	250	1000	–	–	–
7.5 mm	2.5	7	10	2A	1000	5000	–	–	–
	3	8.5	10	2B	1000	5000	–	–	–
	4	9	10	2C	1000	4000	–	–	–
	4.5	9.5	10.3	2D	1000	3500	–	–	–
	5	10.5	10.3	2E	1000	3000	–	–	–
	5.7	12.5	10.3	2F	500	2000	–	–	–
	7.2	12.5	10.3	2G	500	1500	–	–	–
10 mm	3	9	13	3A	1000	3000	–	–	–
	4	8.5	13.5	FA	500	3000	–	–	–
	4	9	13	3C	1000	3000	–	–	–
	4	9.5	13	3D	1000	3000	–	–	–
	5	10	13.5	FB	500	2000	–	–	–
	5	11	13	3F	1000	3000	–	–	–
	6	12	13	3G	800	2400	–	–	–
	6	12.5	13	3H	800	2400	–	–	–
15 mm	8	12	13	3I	500	2000	–	–	–
	5	11	18	4B	800	2400	–	–	–
	5	13	19	FC	200	1000	–	–	–
	6	12.5	18	4C	500	2000	–	–	–
	6	14	19	FD	250	1000	–	–	–
	7	14	18	4D	400	1600	–	–	–
	7	15	19	FE	250	1000	–	–	–
	8	15	18	4F	400	1200	–	–	–
	8	17	19	FF	100	500	–	–	–
	9	14	18	4H	400	1200	–	–	–
	9	16	18	4J	300	900	–	–	–
22.5 mm	10	18	19	FG	100	500	–	–	–
	11	14	18	4M	300	1000	–	–	–
	5	14	26.5	5A	300	1200	–	–	–
	6	15	26.5	5B	250	1000	–	–	–
	7	16.5	26.5	5D	190	760	–	–	–
	8	20	28	5H	125	500	–	–	–
	8.5	18.5	26.5	5F	125	500	–	–	–
27.5 mm	10	22	28	FI	–	–	–	90	540
	10.5	19	26.5	5G	–	–	–	170	680
	10.5	20.5	26.5	5H	–	–	–	170	680
	11	21	26.5	5I	–	–	–	170	680
	12	24	28	5J	–	–	–	75	450
	9	19	31.5	6A	–	–	–	160	640
	11	21	31.5	6B	–	–	–	136	544
	13	24	31.5	6D	–	–	–	112	448
37.5 mm	13	25	33	6K	–	–	–	56	336
	15	26	31.5	6F	–	–	–	96	384
	15	26	33	6L	–	–	–	48	288
	17	29	31.5	6G	–	–	–	88	176
	17	34.5	31.5	6I	–	–	–	88	176
	20	32	33	6M	–	–	–	36	216
	20	39.5	31.5	6J	–	–	–	36	144
	9	19	41.5	7A	–	–	–	60	480
37.5 mm	11	22	41.5	7B	–	–	–	51	408
	13	24	41.5	7C	–	–	–	84	252
	15	26	41.5	7D	–	–	–	72	144
	17	29	41.5	7E	–	–	–	66	132
	19	32	41.5	7F	–	–	–	54	108
	20	39.5	41.5	7G	–	–	–	27	108
	24	45.5	41.5	7H	–	–	–	21	84

Rights reserved to amend design data without prior notification.
Samples and pre-production needs on request.

Moulded versions.

* Tray-Packing-System



Packing Units for Taped Capacitors with Radial Leads

PCM	Size				ROLL		REEL				AMMO			
					H16.5	H18.5	ø 360		ø 500		340 × 340		490 × 370	
	W	H	L	Codes	N	O	F	I	H	J	A	C	B	D
2.5 mm	2.5	7	4.6	0B	2200		2500		–		2800		–	
	3	7.5	4.6	0C	2000		2300		–		2300		–	
	3.8	8.5	4.6	0D	1500		1800		–		1800		–	
	4.6	9	4.6	0E	1200		1500		–		1500		–	
	5.5	10	4.6	0F	900		1200		–		1200		–	
5 mm	2.5	6.5	7.2	1A	2200		2500		–		2800		–	
	3	7.5	7.2	1B	2000		2300		–		2300		–	
	3.5	8.5	7.2	1C	1600		2000		–		2000		–	
	4.5	6	7.2	1D	1300		1500		–		1500		–	
	4.5	9.5	7.2	1E	1300		1500		–		1500		–	
	5	10	7.2	1F	1100		1400		–		1400		–	
	5.5	7	7.2	1G	1000		1200		–		1200		–	
	5.5	11.5	7.2	1H	1000		1200		–		1200		–	
	6.5	8	7.2	1I	800		1000		–		1000		–	
	7.2	8.5	7.2	1J	700		1000		–		1000		–	
	7.2	13	7.2	1K	700		950		–		1000		–	
	8.5	10	7.2	1L	600		800		–		800		–	
	8.5	14	7.2	1M	600		800		–		800		–	
	11	16	7.2	1N	500		700		–		700		–	
7.5 mm	2.5	7	10	2A	–		2500		4400		2500		–	
	3	8.5	10	2B	–		2200		4300		2300		4150	
	4	9	10	2C	–		1700		3200		1700		3100	
	4.5	9.5	10.3	2D	–		1500		2900		1400		2800	
	5	10.5	10.3	2E	–		1300		2500		1300		–	
	5.7	12.5	10.3	2F	–		1000		2200		1100		–	
	7.2	12.5	10.3	2G	–		900		1800		1000		–	
10 mm	3	9	13	3A	–		1100		2200		–		1900	
	4	8.5	13.5	FA	–		900		1600		–		1450	
	4	9	13	3C	–		900		1600		–		1450	
	4	9.5	13	3D	–		900		1600		–		1400	
	5	10	13.5	FB	–		700		1300		–		1200	
	5	11	13	3F	–		700		1300		–		1200	
	6	12	13	3G	–		550		1100		–		1000	
	6	12.5	13	3H	–		550		1100		–		1000	
15 mm	8	12	13	3I	–		400		800		–		740	
	5	11	18	4B	–		600		1200		–		1150	
	5	13	19	FC	–		600		1200		–		1200	
	6	12.5	18	4C	–		500		1000		–		1000	
	6	14	19	FD	–		500		1000		–		1000	
	7	14	18	4D	–		450		900		–		850	
	7	15	19	FE	–		450		900		–		850	
	8	15	18	4F	–		400		800		–		740	
	8	17	19	FF	–		400		800		–		740	
	9	14	18	4H	–		350		700		–		650	
	9	16	18	4J	–		350		700		–		650	
22.5 mm	10	18	19	FG	–		300		650		–		590	
	11	14	18	4M	–		300		600		–		540	
	5	14	26.5	5A	–		–		800		–		770	
	6	15	26.5	5B	–		–		700		–		640	
	7	16.5	26.5	5D	–		–		600		–		550	
	8	20	28	FH	–		–		500		–		480	
	8.5	18.5	26.5	5F	–		–		480		–		450	
27.5 mm	10.5	22	28	FI	–		–		420		–		380	
	10.5	19	26.5	5G	–		–		400		–		360	
	10.5	20.5	26.5	5H	–		–		400		–		360	
	11	21	26.5	5I	–		–		380		–		350	
	12	24	28	FJ	–		–		350		–		310	
	9	19	31.5	6A	–		–		460/340*		–		420	
	11	21	31.5	6B	–		–		380/280*		–		350	
27.5 mm	13	24	31.5	6D	–		–		300		–		290	
	15	26	31.5	6F	–		–		270		–		250	

* for 2-inch transport pitches.

Samples and pre-production needs 1 packing unit minimum.

■ Moulded versions.

Rights reserved to amend design data without prior notification.



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				2.5x6.5x7.2		-		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 = X1				20% = M			
SMD-PPS = SMDI				4 VDC = A2		47 pF = 0047				4.8x3.3x4 Size 1812 = X2				10% = K			
FKP 02 = FKP0				14 VDC = A3		100 pF = 0100				5.7x5.1x3.5 Size 2220 = Y1				5% = J			
MKS 02 = MKS0				28 VDC = A4		150 pF = 0150				5.7x5.1x4.5 Size 2220 = Y2				2.5% = H			
FKS 2 = FKS2				40 VDC = A5		220 pF = 0220				7.2x6.1x3 Size 2824 = T1				1% = E			
FKP 2 = FKP2				5 VDC = A6		330 pF = 0330				7.2x6.1x5 Size 2824 = T2				...			
MKS 2 = MKS2				50 VDC = B0		470 pF = 0470				10.2x7.6x5 Size 4030 = K1				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 Mini = M Bulk Standard = S Bulk Maxi = G TPS Mini = X TPS Standard = Y ...			
MKP 2 = MKP2				63 VDC = C0		680 pF = 0680				12.7x10.2x6 Size 5040 = V1							
FKS 3 = FKS3				100 VDC = D0		1000 pF = 1100				15.3x13.7x7 Size 6054 = Q1							
FKP 3 = FKP3				160 VDC = E0		1500 pF = 1150				2.5x7x4.6 PCM 2.5 = 0B							
MKS 4 = MKS4				250 VDC = F0		2200 pF = 1220				3x7.5x4.6 PCM 2.5 = 0C							
MKP 4 = MKP4				400 VDC = G0		3300 pF = 1330				2.5x6.5x7.2 PCM 5 = 1A							
MKP 10 = MKP1				450 VDC = H0		4700 pF = 1470				3x7.5x7.2 PCM 5 = 1B							
FKP 4 = FKP4				600 VDC = I0		6800 pF = 1680				2.5x7x10 PCM 7.5 = 2A							
FKP 1 = FKP1				630 VDC = J0		0.01 µF = 2100				3x8.5x10 PCM 7.5 = 2B							
MKP-X2 = MKX2				700 VDC = K0		0.022 µF = 2220				3x9x13 PCM 10 = 3A							
MKP-X2 R = MKXR				800 VDC = L0		0.047 µF = 2470				4x9x13 PCM 10 = 3C							
MKP-Y2 = MKY2				850 VDC = M0		0.1 µF = 3100				5x11x18 PCM 15 = 4B							
MP 3-X2 = MPX2				900 VDC = N0		0.22 µF = 3220				6x12.5x18 PCM 15 = 4C							
MP 3-X1 = MPX1				1000 VDC = O1		0.47 µF = 3470				5x14x26.5 PCM 22.5 = 5A							
MP 3-Y2 = MPY2				1100 VDC = P0		1 µF = 4100				6x15x26.5 PCM 22.5 = 5B							
MP 3R-Y2 = MPRY				1200 VDC = Q0		2.2 µF = 4220				9x19x31.5 PCM 27.5 = 6A							
Snubber MKP = SNMP				1250 VDC = R0		4.7 µF = 4470				11x21x31.5 PCM 27.5 = 6B							
Snubber FKP = SNFP				1500 VDC = S0		10 µF = 5100				9x19x41.5 PCM 37.5 = 7A							
GTO MKP = GTOM				1600 VDC = T0		22 µF = 5220				11x22x41.5 PCM 37.5 = 7B							
DC-LINK MKP 4 = DCP4				2000 VDC = U0		47 µF = 5470				94x49x182 DCH_ = H0							
DC-LINK MKP C = DCPC				2500 VDC = V0		100 µF = 6100				94x77x182 DCH_ = H1							
DC-LINK HC = DCH_				3000 VDC = W0		220 µF = 6220				...							
SuperCap C = SCSC				4000 VDC = X0		1 F = A010											
SuperCap MC = SCMC				6000 VDC = Y0		2.5 F = A025											
SuperCap R = SCSR				250 VAC = 0W		50 F = A500				Special features:							
SuperCap MR = SCMR				275 VAC = 1W		100 F = B100				Standard = 00							
				300 VAC = 2W		110 F = B110				Version A1 = 1A							
				400 VAC = 3W		600 F = B600				Version A1.1.1 = 1B							
				440 VAC = 4W		1200 F = C120				Version A1.2 = 1C							
				500 VAC = 5W		...				...							