

Metallized Polyester (PET) Capacitors PCM 7.5 mm to 37.5 mm

Special Features

- High volume/capacitance ratio
- Self-healing
- According to RoHS 2011/65/EU

Typical Applications

For general DC-applications e.g.

- By-pass
- Blocking
- Coupling and decoupling
- Timing

Construction

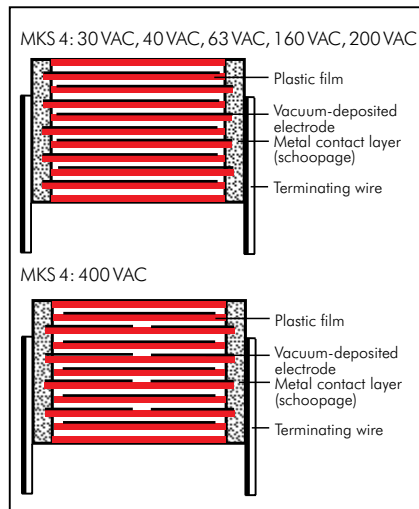
Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Vacuum-deposited

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 220 μ F (E12-values on request)

Rated voltages:

50 VDC, 63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC, 1500 VDC, 2000 VDC

Capacitance tolerances:

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

Operating temperature range:

-55° C to $+100^{\circ}$ C ($+125^{\circ}$ C available subject to special enquiry)

Climatic test category:

55/100/56 in accordance with IEC

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

U_r	U_{test}	$C \leq 0.33 \mu F$	$0.33 \mu F < C \leq 220 \mu F$
50 VDC	10V	$\geq 5 \times 10^3 M\Omega$ (mean value: $3 \times 10^4 M\Omega$)	≥ 1500 sec ($M\Omega \times \mu F$) (mean value: 4500 sec)
63 VDC	50V	$\geq 1 \times 10^4 M\Omega$ (mean value: $5 \times 10^4 M\Omega$)	≥ 3000 sec ($M\Omega \times \mu F$) (mean value: 6000 sec)
100 VDC	100V	$\geq 1.5 \times 10^4 M\Omega$ (mean value: $5 \times 10^4 M\Omega$)	≥ 5000 sec ($M\Omega \times \mu F$) (mean value: 15000 sec)
≥ 250 VDC	100V	$\geq 3 \times 10^4 M\Omega$ (mean value: $1 \times 10^5 M\Omega$)	≥ 10000 sec ($M\Omega \times \mu F$) (mean value: 40000 sec)

Measuring time: 1 min.

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

at f	$C \leq 0.1 \mu F$	$0.1 \mu F < C \leq 1.0 \mu F$	$C > 1.0 \mu F$
1 kHz	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$	$\leq 10 \times 10^{-3}$
10 kHz	$\leq 15 \times 10^{-3}$	$\leq 15 \times 10^{-3}$	-
100 kHz	$\leq 30 \times 10^{-3}$	-	-

Maximum pulse rise time:

Capacitance pF/ μ F	Pulse rise time V/ μ sec max. operation/test									
	50VDC	63VDC	100VDC	250VDC	400VDC	630VDC	1000VDC	1500VDC	2000VDC	
1000 ... 6800	-	-	-	-	-	-	70/700	90/900	100/1000	
0.01 ... 0.022	-	30/300	30/300	35/350	38/380	40/400	50/500	50/500	60/600	
0.033 ... 0.068	-	15/150	15/150	20/200	25/250	32/320	26/260	35/350	40/400	
0.1 ... 0.22	10/100	10/100	12/120	15/150	15/150	17/170	20/200	35/350	40/400	
0.33 ... 0.68	9/90	9/90	9/90	10/100	10/100	13/130	20/200	20/200	38/380	
1.0 ... 2.2	6/60	6/60	5/50	6/60	9/90	13/130	14/140	15/150	15/150	
3.3 ... 6.8	2.5/25	3/30	3/30	6/60	6/60	9/90	12/120	-	-	
10 ... 220	2.5/25	2.5/25	2.5/25	3/30	6/60	6/60	-	-	-	

for pulses equal to the rated voltage

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:

1kPa = 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	50 VDC/30 VAC*					63 VDC/40 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 µF						2.5	7	10	7.5	MKS4C021002A
0.015 "						4	9	13	10	MKS4C021003C
0.022 "						2.5	7	10	7.5	MKS4C021502A
0.033 "						4	9	13	10	MKS4C021503C
0.047 "						2.5	7	10	7.5	MKS4C022202A
0.068 "						4	9	13	10	MKS4C022203C
						2.5	7	10	7.5	MKS4C023302A
						4	9	13	10	MKS4C023303C
						2.5	7	10	7.5	MKS4C024702A
						4	9	13	10	MKS4C024703C
						2.5	7	10	7.5	MKS4C026802A
						4	9	13	10	MKS4C026803C
0.1 µF	2.5	7	10	7.5	MKS4B031002A	2.5	7	10	7.5	MKS4C031002A
0.15 "	2.5	7	10	7.5	MKS4B031502A	4	9	13	10	MKS4C031003C
0.22 "	2.5	7	10	7.5	MKS4B032202A	2.5	7	10	7.5	MKS4C031502A
0.33 "	2.5	7	10	7.5	MKS4B033302A	4	9	13	10	MKS4C031503C
0.47 "	3	8.5	10	7.5	MKS4B034702B	3	8.5	10	7.5	MKS4C032202B
0.68 "	4	9	10	7.5	MKS4B036802C	4	9	13	10	MKS4C032203C
						4	9	10	7.5	MKS4C033302C
						4	9	13	10	MKS4C033303C
						4	9	10	7.5	MKS4C034702C
						4	9	13	10	MKS4C034703C
						5	10.5	10.3	7.5	MKS4C036802E
						4	9	13	10	MKS4C036803C
1.0 µF	4	9	10	7.5	MKS4B041002C	5	10.5	10.3	7.5	MKS4C041002E
1.5 "	5	10.5	10.3	7.5	MKS4B041502E	4	9	13	10	MKS4C041003C
2.2 "	5.7	12.5	10.3	7.5	MKS4B042202F	5.7	12.5	10.3	7.5	MKS4C041502F
3.3 "	5.7	12.5	10.3	7.5	MKS4B043302F	5	11	13	10	MKS4C041503F
4.7 "	7.2	12.5	10.3	7.5	MKS4B044702G	5	11	13	10	MKS4C042203F
6.8 "	6	12	13	10	MKS4B044703G	6	12.5	18	15	MKS4C042204C
	7.2	12.5	10.3	7.5	MKS4B046802G	6	12	13	10	MKS4C043303G
	6	12	13	10	MKS4B046803G	7	14	18	15	MKS4C043304D
						7	14	18	15	MKS4C044704D
						6	15	26.5	22.5	MKS4C044705B
						8	15	18	15	MKS4C046804F
						7	16.5	26.5	22.5	MKS4C046805D
10 µF	9	16	18	15	MKS4B051004J	8.5	18.5	26.5	22.5	MKS4C051005F
15 "	11	21	26.5	22.5	MKS4B051505I	11	21	31.5	27.5	MKS4C051006B
22 "	11	21	31.5	27.5	MKS4B052206B	11	21	26.5	22.5	MKS4C051505I
33 "	13	24	31.5	27.5	MKS4B053306D	11	21	31.5	27.5	MKS4C051506B
47 "	15	26	31.5	27.5	MKS4B054706F	13	24	31.5	27.5	MKS4C052206D
68 "	13	24	41.5	37.5	MKS4B054707C	15	26	31.5	27.5	MKS4C053306F
	20	39.5	31.5	27.5	MKS4B056806J	17	29	31.5	27.5	MKS4C054706G
	17	29	41.5	37.5	MKS4B056807E	17	29	41.5	37.5	MKS4C054707E
						20	39.5	31.5	27.5	MKS4C056806J
						19	32	41.5	37.5	MKS4C056807F
100 µF	19	32	41.5	37.5	MKS4B061007F	20	39.5	41.5	37.5	MKS4C061007G
150 "	20	39.5	41.5	37.5	MKS4B061507G	24	45.5	41.5	37.5	MKS4C061507H
220 "	24	45.5	41.5	37.5	MKS4B062207H	40	55	41.5	37.5	MKS4C062207K

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

 New values

**PCM = Printed circuit module
= pin spacing

Dims. in mm.

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 128.

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Continuation

General Data

Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 µF	2.5	7	10	7.5	MKS4D021002A	3	8.5	10	7.5	MKS4F021002B
	4	9	13	10	MKS4D021003C	4	9	13	10	MKS4F021003C
0.015 "	2.5	7	10	7.5	MKS4D021502A	3	8.5	10	7.5	MKS4F021502B
	4	9	13	10	MKS4D021503C	4	9	13	10	MKS4F021503C
0.022 "	2.5	7	10	7.5	MKS4D022202A	3	8.5	10	7.5	MKS4F022202B
	4	9	13	10	MKS4D022203C	4	9	13	10	MKS4F022203C
0.033 "	2.5	7	10	7.5	MKS4D023302A	3	8.5	10	7.5	MKS4F023302B
	4	9	13	10	MKS4D023303C	4	9	13	10	MKS4F023303C
0.047 "	2.5	7	10	7.5	MKS4D024702A	3	8.5	10	7.5	MKS4F024702B
	4	9	13	10	MKS4D024703C	4	9	13	10	MKS4F024703C
0.068 "	2.5	7	10	7.5	MKS4D026802A	4	9	10	7.5	MKS4F026802C
	4	9	13	10	MKS4D026803C	4	9	13	10	MKS4F026803C
0.1 µF	2.5	7	10	7.5	MKS4D031002A	4	9	10	7.5	MKS4F031002C
	4	9	13	10	MKS4D031003C	4	9	13	10	MKS4F031003C
0.15 "	3	8.5	10	7.5	MKS4D031502B	5	10.5	10.3	7.5	MKS4F031502E
	4	9	13	10	MKS4D031503C	4	9	13	10	MKS4F031503C
0.22 "	3	8.5	10	7.5	MKS4D032202B	5	10.5	10.3	7.5	MKS4F032202E
	4	9	13	10	MKS4D032203C	5	11	13	10	MKS4F032203F
0.33 "	4	9	10	7.5	MKS4D033302C	5.7	12.5	10.3	7.5	MKS4F033302F
	4	9	13	10	MKS4D033303C	5	11	13	10	MKS4F033303F
0.47 "	4.5	9.5	10.3	7.5	MKS4D034702D	6	12	13	10	MKS4F034703G
	4	9	13	10	MKS4D034703C	6	12.5	18	15	MKS4F034704C
0.68 "	5	10.5	10.3	7.5	MKS4D036802E	7	14	18	15	MKS4F036804D
	4	9	13	10	MKS4D036803C					
1.0 µF	5.7	12.5	10.3	7.5	MKS4D041002F	8	15	18	15	MKS4F041004F
	5	11	13	10	MKS4D041003F	6	15	26.5	22.5	MKS4F041005B
1.5 "	6	12	13	10	MKS4D041503G	9	16	18	15	MKS4F041504J
	7	14	18	15	MKS4D041504D	7	16.5	26.5	22.5	MKS4F041505D
2.2 "	8	15	18	15	MKS4D042204F	10.5	19	26.5	22.5	MKS4F042205G
	6	15	26.5	22.5	MKS4D042205B	9	19	31.5	27.5	MKS4F042206A
3.3 "	9	16	18	15	MKS4D043304J	11	21	26.5	22.5	MKS4F043305I
	7	16.5	26.5	22.5	MKS4D043305D	11	21	31.5	27.5	MKS4F043306B
4.7 "	10.5	19	26.5	22.5	MKS4D044705G	11	21	31.5	27.5	MKS4F044706B
	9	19	31.5	27.5	MKS4D044706A					
6.8 "	10.5	19	26.5	22.5	MKS4D046805G	13	24	31.5	27.5	MKS4F046806D
	11	21	31.5	27.5	MKS4D046806B					
10 µF	13	24	31.5	27.5	MKS4D051006D	17	29	31.5	27.5	MKS4F051006G
	13	24	31.5	27.5	MKS4D051506D	17	34.5	31.5	27.5	MKS4F051506I
22 "	15	26	31.5	27.5	MKS4D052206F	17	29	41.5	37.5	MKS4F051507E
	17	29	31.5	27.5	MKS4D053306G	19	32	41.5	37.5	MKS4F052207F
33 "	13	24	41.5	37.5	MKS4D053307C	24	45.5	41.5	37.5	MKS4F053307H
	17	29	41.5	37.5	MKS4D054707E	31	46	41.5	37.5	MKS4F054707I
47 "	17	29	41.5	37.5	MKS4D054707E	31	46	41.5	37.5	MKS4F054707I
	20	39.5	41.5	37.5	MKS4D056807G	40	55	41.5	37.5	MKS4F056807K
100 µF	24	45.5	41.5	37.5	MKS4D061007H					
	31	46	41.5	37.5	MKS4D061507I					
150 "	31	46	41.5	37.5	MKS4D061507I					
220 "	40	55	41.5	37.5	MKS4D062207K					

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

■ New values

**PCM = Printed circuit module = pin spacing

Dims. in mm.

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 128.	

Continuation

General Data

Capacitance	400 VDC/200 VAC*					630 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF	3	8.5	10	7.5	MKS4G021002B	3	8.5	10	7.5*	MKS4J021002B
	4	9	13	10	MKS4G021003C	4	9	13	10	MKS4J021003C
0.015 "	3	8.5	10	7.5	MKS4G021502B	4	9	10	7.5*	MKS4J021502C
	4	9	13	10	MKS4G021503C	4	9	13	10	MKS4J021503C
0.022 "	4	9	10	7.5	MKS4G022202C	4.5	9.5	10.3	7.5*	MKS4J022202D
	4	9	13	10	MKS4G022203C	4	9	13	10	MKS4J022203C
0.033 "	4	9	10	7.5	MKS4G023302C	5	10.5	10.3	7.5*	MKS4J023302E
	4	9	13	10	MKS4G023303C	5	11	13	10	MKS4J023303F
0.047 "	5	10.5	10.3	7.5	MKS4G024702E	5.7	12.5	10.3	7.5*	MKS4J024702F
	4	9	13	10	MKS4G024703C	6	12	13	10	MKS4J024703G
0.068 "	5	10.5	10.3	7.5	MKS4G026802E	6	12	13	10	MKS4J026803G
	4	9	13	10	MKS4G026803C	5	11	18	15	MKS4J026804B
0.1 μF	5	10.5	10.3	7.5	MKS4G031002E	6	12.5	18	15	MKS4J031004C
	5	11	13	10	MKS4G031003F	6	15	26.5	22.5	MKS4J031005B
0.15 "	5.7	12.5	10.3	7.5	MKS4G031502F	7	14	18	15	MKS4J031504D
	6	12	13	10	MKS4G031503G	6	15	26.5	22.5	MKS4J031505B
0.22 "	6	12	13	10	MKS4G032203G	8	15	18	15	MKS4J032204F
	6	12.5	18	15	MKS4G032204C	6	15	26.5	22.5	MKS4J032205B
0.33 "	8	15	18	15	MKS4G033304F	7	16.5	26.5	22.5	MKS4J033305D
						9	19	31.5	27.5	MKS4J033306A
0.47 "	8	15	18	15	MKS4G034704F	10.5	19	26.5	22.5	MKS4J034705G
	6	15	26.5	22.5	MKS4G034705B	9	19	31.5	27.5	MKS4J034706A
0.68 "	7	16.5	26.5	22.5	MKS4G036805D	11	21	26.5	22.5	MKS4J036805I
						11	21	31.5	27.5	MKS4J036806B
1.0 μF	10.5	19	26.5	22.5	MKS4G041005G	11	21	31.5	27.5	MKS4J041006B
	11	21	31.5	27.5	MKS4G041006B					
1.5 "	11	21	26.5	22.5	MKS4G041505I	15	26	31.5	27.5	MKS4J041506F
	11	21	31.5	27.5	MKS4G041506B					
2.2 "	11	21	31.5	27.5	MKS4G042206B	17	34.5	31.5	27.5	MKS4J042206I
						15	26	41.5	37.5	MKS4J042207D
3.3 "	13	24	31.5	27.5	MKS4G043306D	20	39.5	31.5	27.5	MKS4J043306J
						19	32	41.5	37.5	MKS4J043307F
4.7 "	17	29	31.5	27.5	MKS4G044706G	20	39.5	41.5	37.5	MKS4J044707G
6.8 "	17	34.5	31.5	27.5	MKS4G046806I	24	45.5	41.5	37.5	MKS4J046807H
	15	26	41.5	37.5	MKS4G046807D					
10 μF	19	32	41.5	37.5	MKS4G051007F	35	50	41.5	37.5	MKS4J051007J
15 "	20	39.5	41.5	37.5	MKS4G051507G	40	55	41.5	37.5	MKS4J051507K
22 "	31	46	41.5	37.5	MKS4G052207I					
33 "	35	50	41.5	37.5	MKS4G053307J					

* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

New values

** PCM = Printed circuit module = pin spacing

* Admissible AC voltage 250 VAC max.

Dims. in mm.

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 128.		

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Continuation

General Data

Capacitance	1000 VDC/400 VAC*					1500 VDC/400 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
1000 pF	3	8.5	10	7.5	MKS4O111002B	4	9	13	10	MKS4S011003C
	4	9	13	10	MKS4O111003C					
1500 "	3	8.5	10	7.5	MKS4O111502B	4	9	13	10	MKS4S011503C
	4	9	13	10	MKS4O111503C					
2200 "	3	8.5	10	7.5	MKS4O112202B	4	9	13	10	MKS4S012203C
	4	9	13	10	MKS4O112203C					
3300 "	4	9	10	7.5	MKS4O113302C	4	9	13	10	MKS4S013303C
	4	9	13	10	MKS4O113303C					
4700 "	4	9	10	7.5	MKS4O114702C	4	9	13	10	MKS4S014703C
	4	9	13	10	MKS4O114703C					
6800 "	4.5	9.5	10.3	7.5	MKS4O116802D	5	11	13	10	MKS4S016803F
	4	9	13	10	MKS4O116803C					
0.01 µF	5	10.5	10.3	7.5	MKS4O121002E	6	12	13	10	MKS4S021003G
	5	11	13	10	MKS4O121003F					
0.015 "	5.7	12.5	10.3	7.5	MKS4O121502F	6	12.5	18	15	MKS4S021504C
	6	12	13	10	MKS4O121503G					
0.022 "	5	11	18	15	MKS4O122204B	7	14	18	15	MKS4S022204D
0.033 "	6	12.5	18	15	MKS4O123304C	8	15	18	15	MKS4S023304F
	6	15	26.5	22.5	MKS4O123305B					
0.047 "	7	14	18	15	MKS4O124704D	7	16.5	26.5	22.5	MKS4S024705D
	6	15	26.5	22.5	MKS4O124705B					
0.068 "	8	15	18	15	MKS4O126804F	8.5	18.5	26.5	22.5	MKS4S026805F
	6	15	26.5	22.5	MKS4O126805B					
0.1 µF	9	16	18	15	MKS4O131004J	10.5	19	26.5	22.5	MKS4S031005G
	7	16.5	26.5	22.5	MKS4O131005D					
0.15 "	8.5	18.5	26.5	22.5	MKS4O131505F	11	21	31.5	27.5	MKS4S031506B
0.22 "	10.5	19	26.5	22.5	MKS4O132205G					
0.33 "	11	21	26.5	22.5	MKS4O133305I	17	34.5	31.5	27.5	MKS4S033306I
	11	21	31.5	27.5	MKS4O133306B					
0.47 "	13	24	31.5	27.5	MKS4O134706D	20	39.5	31.5	27.5	MKS4S034706J
0.68 "	15	26	31.5	27.5	MKS4O136806F	20	39.5	41.5	37.5	MKS4S036807G
1.0 µF	17	29	31.5	27.5	MKS4O141006G	24	45.5	41.5	37.5	MKS4S041007H
	17	29	41.5	37.5	MKS4O141007E					
1.5 "	19	32	41.5	37.5	MKS4O141507F	35	50	41.5	37.5	MKS4S041507J
2.2 "	20	39.5	41.5	37.5	MKS4O142207G					
3.3 "	24	45.5	41.5	37.5	MKS4O143307H	40	55	41.5	37.5	MKS4S042207K
4.7 "	31	46	41.5	37.5	MKS4O144707I					
6.8 "	40	55	41.5	37.5	MKS4O146807K					

* AC voltage: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

 New values

** PCM = Printed circuit module = pin spacing

Dims. in mm.

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 128.		

Rights reserved to amend design data without prior notification.

Continuation page 50

Continuation

General Data

Capacitance	2000 VDC/400 VAC*				
	W	H	L	PCM**	Part number
1000 pF	4	9	13	10	MKS4U011003C
1500 "	4	9	13	10	MKS4U011503C
2200 "	5	11	13	10	MKS4U012203F
3300 "	6	12	13	10	MKS4U013303H
	5	11	18	15	MKS4U013304B
4700 "	5	11	18	15	MKS4U014704B
6800 "	6	12.5	18	15	MKS4U016804C
0.01 μF	7	14	18	15	MKS4U021004D
	6	15	26.5	22.5	MKS4U021005B
0.015 "	6	15	26.5	22.5	MKS4U021505B
0.022 "	7	16.5	26.5	22.5	MKS4U022205D
0.033 "	10.5	19	26.5	22.5	MKS4U023305G
0.047 "	11	21	26.5	22.5	MKS4U024705I
	11	21	31.5	27.5	MKS4U024706B
0.068 "	11	21	31.5	27.5	MKS4U026806B
0.1 μF	13	24	31.5	27.5	MKS4U031006D
0.15 "	17	29	31.5	27.5	MKS4U031506G
	13	24	41.5	37.5	MKS4U031507C
0.22 "	17	29	41.5	37.5	MKS4U032207E
0.33 "	20	39.5	41.5	37.5	MKS4U033307G
0.47 "	24	45.5	41.5	37.5	MKS4U034707H
0.68 "	31	46	41.5	37.5	MKS4U036807I
1.0 μF	40	55	41.5	37.5	MKS4U041007K

* AC voltage: $f = 50 \text{ Hz}; 1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

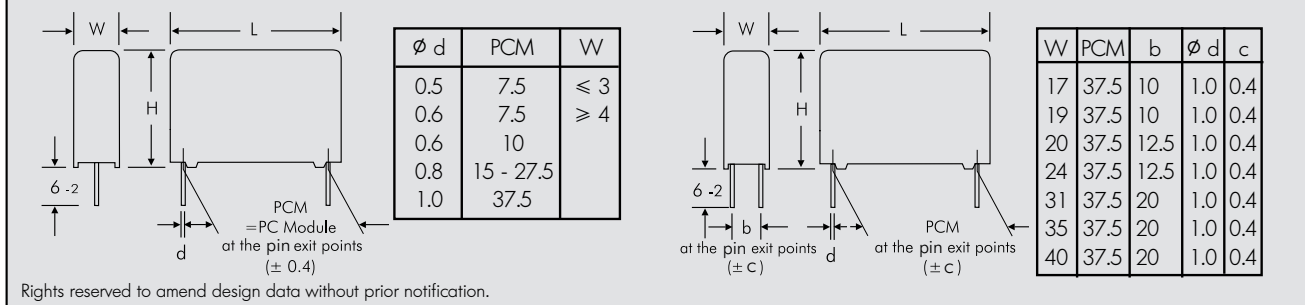
■ New values

** PCM = Printed circuit module = pin spacing

Dims. in mm.

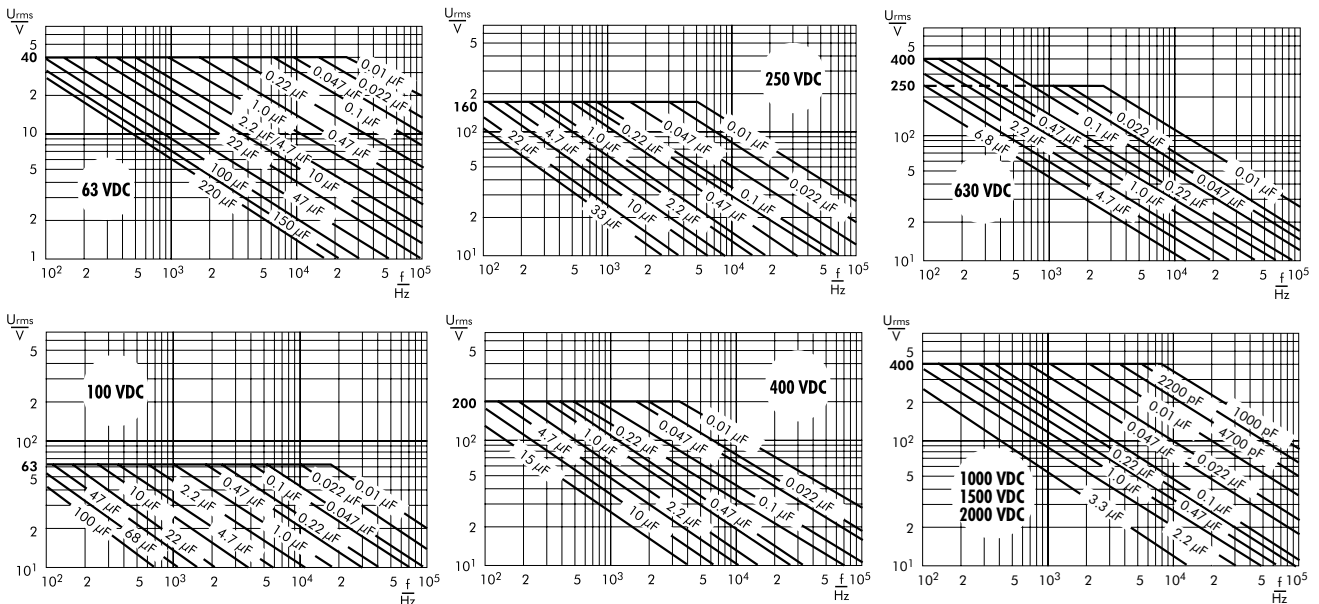
The values of the WIMA MKM 4 ranges according to the main catalogue 2009 are still available on request.

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 128.	



Rights reserved to amend design data without prior notification.

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



Recommendation for Processing and Application of Through-Hole Capacitors

Soldering Process

Internal temperature of the capacitor must be kept as follows:

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

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

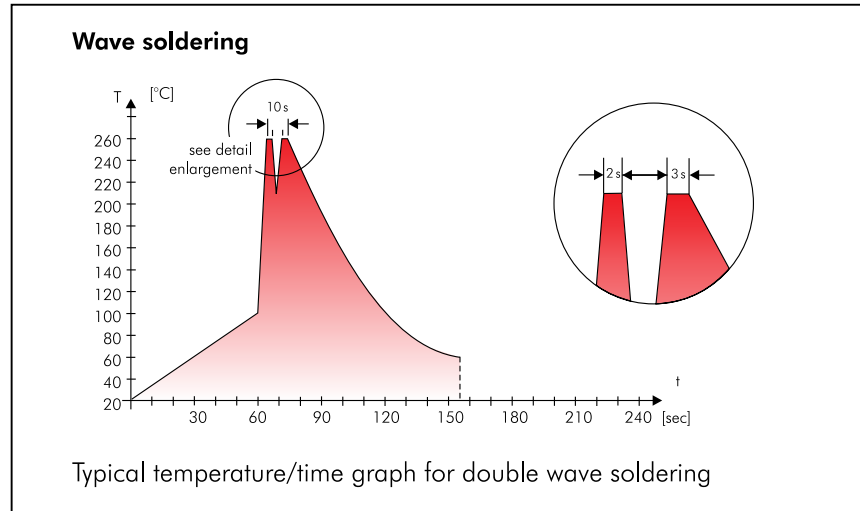
Single wave soldering

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

Double wave soldering

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

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



WIMA Quality and Environmental Philosophy

ISO 9001:2008 Certification

ISO 9001:2008 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2008 of our factories by the 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 2011/65/EU certain hazardous substances like e.g. lead, cadmium, mercury must not be used any longer in electronic equipment as of July 1st, 2006. For the sake of the environment WIMA has refrained from using such substances since years already.



WIMA Kondensatoren sind bleifrei konform RoHS 2011/65/EU

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

Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2004

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

Typical Dimensions for Taping Configuration

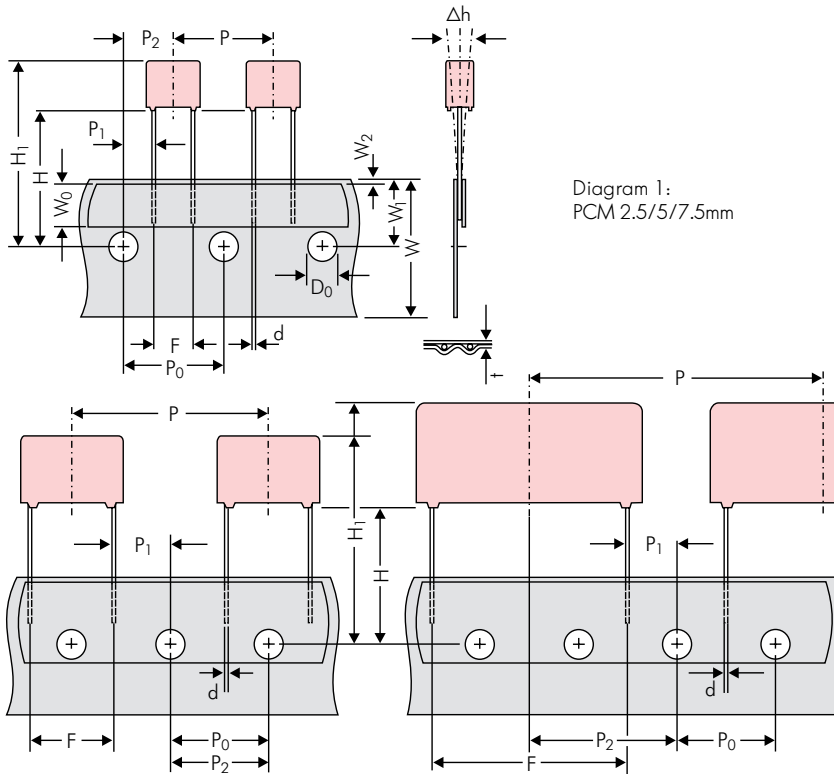


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5*mm

*PCM 27.5 tapping possible with two feed holes between components

Designation	Symbol	Dimensions for Radial Taping										
		PCM 2.5 tapping	PCM 5 tapping	PCM 7.5 tapping	PCM 10 tapping*	PCM 15 tapping*	PCM 22.5 tapping	PCM 27.5 tapping				
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 129)	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 66 ±2	REEL	φ 500 max. φ 25 ±1	B 60 ±2 68 ±2	depending on PCM and component dimensions
Unit	see details page 130.											

Dims in mm.

* Diameter of pins see General Data.

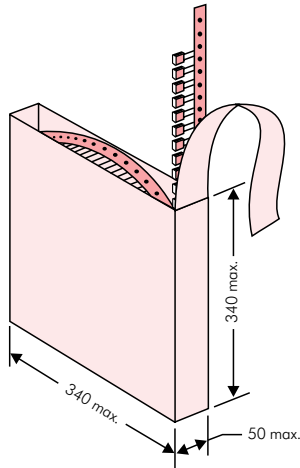
* PCM 10 and PCM 15 can be crimped to PCM 7.5.

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

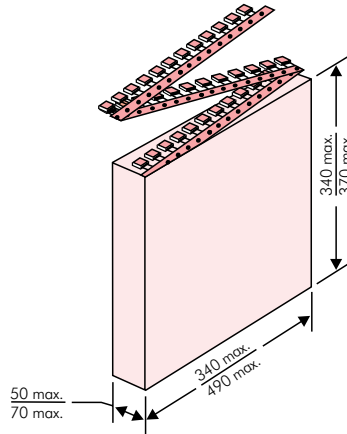
Please clarify customer-specific deviations with the manufacturer.

Types of Tape Packaging of Capacitors for Automatic Radial Insertion

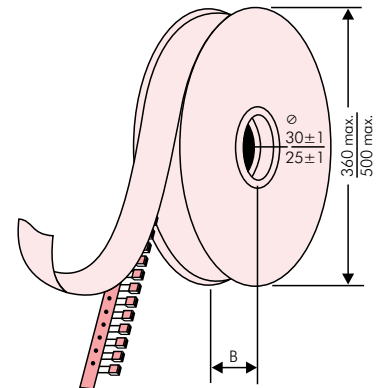
■ ROLL Packaging



■ 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	
		Gross Weight [g]: 1870	
WIMA Confirmation No.: 0001004053000100	WIMA Part No.: MKS2C034701C00K89D		
Handling Unit: MKS 2	QTY: 5.000	COO: DE	
	MKS 2 0.47 µF 63 VDC 3.5x8.5x7.2 RMS		
1000067326	Standard 10% Loss - Standard	Drahte 6-2	Week 03/2011
	Vorlage Debitor Inland		

BARCODE „Code 39“



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

PCM	Size				bulk	pcs. per packing unit								
						ROLL		REEL				AMMO		
	W	H	L	Codes		S	H16.5	H18.5	ø 360	ø 500	340 × 340	490 × 370		
					N	O	F	I	H	J	A	C	B	D
2.5 mm	2.5	7	4.6	0B	5000		2200	2500				2800		
	3	7.5	4.6	0C	5000		2000	2300				2300		
	3.8	8.5	4.6	0D	5000		1500	1800				1800		
	4.6	9	4.6	0E	5000		1200	1500				1500		
	5.5	10	4.6	0F	5000		900	1200				1200		
5 mm	2.5	6.5	7.2	1A	5000		2200	2500				2800		
	3	7.5	7.2	1B	5000		2000	2300				2300		
	3.5	8.5	7.2	1C	5000		1600	2000				2000		
	4.5	6	7.2	1D	6000		1300	1500				1500		
	4.5	9.5	7.2	1E	4000		1300	1500				1500		
	5	10	7.2	1F	3500		1100	1400				1400		
	5.5	7	7.2	1G	4000		1000	1200				1200		
	5.5	11.5	7.2	1H	2500		1000	1200				1200		
	6.5	8	7.2	1I	2500		800	1000				1000		
	7.2	8.5	7.2	1J	2500		700	1000				1000		
	7.2	13	7.2	1K	2000		700	950				1000		
	8.5	10	7.2	1L	2000		600	800				800		
	8.5	14	7.2	1M	1500		600	800				800		
11	16	7.2	1N	1000		500	600				400			
7.5 mm	2.5	7	10	2A	5000			2500	4400		2500			
	3	8.5	10	2B	5000			2200	4300		2300		4150	
	4	9	10	2C	4000			1700	3200		1700		3100	
	4.5	9.5	10.3	2D	3500			1500	2900		1400		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	

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

■ Moulded versions.

Rights reserved to amend design data without prior notification.



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

PCM	Size				bulk	pcs. per packing unit										
						ROLL		REEL				AMMO				
	W	H	L	Codes		S	N	O	ø 360		ø 500		340 × 340		490 × 370	
							H16.5	H18.5	H16.5	H18.5	H16.5	H18.5	H16.5	H18.5	H16.5	H18.5
							F	I	H	J	A	C	B	D		
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	6K	336*	–	–	–	–	–	–	–	–	–		
	15	26	31.5	6F	384*	–	–	–	–	270	–	–	–	250		
	15	26	33	6L	288*	–	–	–	–	–	–	–	–	–		
	17	29	31.5	6G	176*	–	–	–	–	–	–	–	–	–		
	17	34.5	31.5	6I	176*	–	–	–	–	–	–	–	–	–		
	20	32	33	6M	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 µF			2.5x6.5x7.2		-	20%	bulk	6-2			
Type description:				Rated voltage:		Capacitance:			Size:		Tolerance:			Packing:			
SMD-PET = SMDT				50 VDC = B0		22 pF = 0022			4.8x3.3x3 Size 1812 = KA		±20% = M			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 ...			
SMD-PPS = SMDI				63 VDC = C0		47 pF = 0047			4.8x3.3x4 Size 1812 = KB		±10% = K						
FKP 02 = FKP0				100 VDC = D0		100 pF = 0100			5.7x5.1x3.5 Size 2220 = QA		±5% = J						
MKS 02 = MKS0				250 VDC = F0		150 pF = 0150			5.7x5.1x4.5 Size 2220 = QB		±2.5% = H						
FKS 2 = FKS2				400 VDC = G0		220 pF = 0220			7.2x6.1x3 Size 2824 = TA		±1% = E						
FKP 2 = FKP2				450 VDC = H0		330 pF = 0330			7.2x6.1x5 Size 2824 = TB		...						
MKS 2 = MKS2				600 VDC = I0		470 pF = 0470			10.2x7.6x5 Size 4030 = VA		Tolerance: ±20% = M ±10% = K ±5% = J ±2.5% = H ±1% = E ...						
MKP 2 = MKP2				630 VDC = J0		680 pF = 0680			12.7x10.2x6 Size 5040 = XA								
FKS 3 = FKS3				700 VDC = K0		1000 pF = 1100			15.3x13.7x7 Size 6054 = YA								
FKP 3 = FKP3				800 VDC = L0		1500 pF = 1150			2.5x7x4.6 PCM 2.5 = 0B								
MKS 4 = MKS4				850 VDC = M0		2200 pF = 1220			3x7.5x4.6 PCM 2.5 = 0C								
MKP 4 = MKP4				900 VDC = N0		3300 pF = 1330			2.5x6.5x7.2 PCM 5 = 1A								
MKP 10 = MKP1				1000 VDC = O1		4700 pF = 1470			3x7.5x7.2 PCM 5 = 1B								
FKP 4 = FKP4				1100 VDC = P0		6800 pF = 1680			2.5x7x10 PCM 7.5 = 2A								
FKP 1 = FKP1				1200 VDC = Q0		0.01 µF = 2100			3x8.5x10 PCM 7.5 = 2B								
MKP-X2 = MKX2				1250 VDC = R0		0.022 µF = 2220			3x9x13 PCM 10 = 3A								
MKP-X2 R = MKXR				1500 VDC = S0		0.047 µF = 2470			4x9x13 PCM 10 = 3C								
MKP-Y2 = MKY2				1600 VDC = T0		0.1 µF = 3100			5x11x18 PCM 15 = 4B								
MP 3-X2 = MPX2				2000 VDC = U0		0.22 µF = 3220			6x12.5x18 PCM 15 = 4C								
MP 3-X1 = MPX1				2500 VDC = V0		0.47 µF = 3470			5x14x26.5 PCM 22.5 = 5A								
MP 3-Y2 = MPY2				3000 VDC = W0		1 µF = 4100			6x15x26.5 PCM 22.5 = 5B								
MP 3R-Y2 = MPRY				4000 VDC = X0		2.2 µF = 4220			9x19x31.5 PCM 27.5 = 6A								
Snubber MKP = SNMP				6000 VDC = Y0		4.7 µF = 4470			11x21x31.5 PCM 27.5 = 6B								
Snubber FKP = SNFP				250 VAC = 0W		10 µF = 5100			9x19x41.5 PCM 37.5 = 7A								
GTO MKP = GTOM				275 VAC = 1W		22 µF = 5220			11x22x41.5 PCM 37.5 = 7B								
DC-LINK MKP 3 = DCP3				300 VAC = 2W		47 µF = 5470			94x49x182 DCH_ = H0								
DC-LINK MKP 4 = DCP4				400 VAC = 3W		100 µF = 6100			94x77x182 DCH_ = H1								
DC-LINK MKP 4S = DCPS				440 VAC = 4W		220 µF = 6220			...								
DC-LINK MKP 5 = DCP5				500 VAC = 5W		1000 µF = 7100			...								
DC-LINK MKP 6 = DCP6											
DC-LINK HC = DCH_											
DC-LINK HY = DCHY											
									Version code:		Pin length (untaped)						
									Standard = 00		3.5 ±0.5 = C9						
									Version A1 = 1A		6-2 = SD						
									Version A1.1.1 = 1B		16 ±1 = P1						
									Version A2 = 2A		...						
														

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.