

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

Special Features

- High volume/capacitance ratio
- Self-healing
- According to RoHS 2002/95/EC

Typical Applications

For general DC-applications e.g.

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

Construction

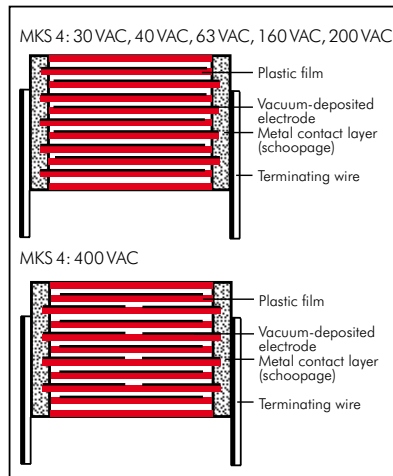
Dielectric:

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 $+100^{\circ}\text{C}$

Climatic test category:

55/100/56 in accordance with IEC

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

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

Measuring time: 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	$\leq 8 \times 10^{-3}$	$\leq 8 \times 10^{-3}$	$\leq 10 \times 10^{-3}$
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	—
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	—	—	—	—

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

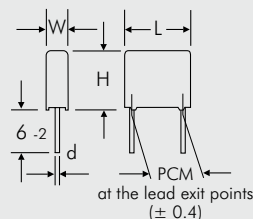
Capacitance	50 VDC/30 VAC*					63 VDC/40 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
0.01 μF						2.5	7	10	7.5	MKS4C021002A00_____
0.015 "						4	9	13	10	MKS4C021003C00_____
0.022 "						2.5	7	10	7.5	MKS4C021502A00_____
0.033 "						4	9	13	10	MKS4C021503C00_____
0.047 "						2.5	7	10	7.5	MKS4C022202A00_____
0.068 "						4	9	13	10	MKS4C022203C00_____
						2.5	7	10	7.5	MKS4C023302A00_____
						4	9	13	10	MKS4C023303C00_____
						2.5	7	10	7.5	MKS4C024702A00_____
						4	9	13	10	MKS4C024703C00_____
						2.5	7	10	7.5	MKS4C026802A00_____
						4	9	13	10	MKS4C026803C00_____
0.1 μF	2.5	7	10	7.5	MKS4B031002A00_____	2.5	7	10	7.5	MKS4C031002A00_____
0.15 "	2.5	7	10	7.5	MKS4B031502A00_____	4	9	13	10	MKS4C031003C00_____
0.22 "	2.5	7	10	7.5	MKS4B032202A00_____	2.5	7	10	7.5	MKS4C031502A00_____
0.33 "	2.5	7	10	7.5	MKS4B033302A00_____	4	9	13	10	MKS4C031503C00_____
0.47 "	3	8.5	10	7.5	MKS4B034702B00_____	3	8.5	10	7.5	MKS4C032202B00_____
0.68 "	4	9	10	7.5	MKS4B036802C00_____	4	9	13	10	MKS4C032203C00_____
						4	9	13	7.5	MKS4C033302C00_____
						4	9	13	10	MKS4C033303C00_____
						4	9	10	7.5	MKS4C034702C00_____
						4	9	13	10	MKS4C034703C00_____
						5	10.5	10.3	7.5	MKS4C036802E00_____
						4	9	13	10	MKS4C036803C00_____
1.0 μF	4	9	10	7.5	MKS4B041002C00_____	5	10.5	10.3	7.5	MKS4C041002E00_____
1.5 "	5	10.5	10.3	7.5	MKS4B041502E00_____	4	9	13	10	MKS4C041003C00_____
2.2 "	5.7	12.5	10.3	7.5	MKS4B042202F00_____	5.7	12.5	10.3	7.5	MKS4C041502F00_____
3.3 "	5.7	12.5	10.3	7.5	MKS4B043302F00_____	5	11	13	10	MKS4C041503F00_____
4.7 "	7.2	12.5	10.3	7.5	MKS4B044702G00_____	5	11	13	10	MKS4C042203F00_____
6.8 "	6	12	13	10	MKS4B044703G00_____	6	12.5	18	15	MKS4C042204C00_____
	7.2	12.5	10.3	7.5	MKS4B046802G00_____	6	12	13	10	MKS4C043303G00_____
	6	12	13	10	MKS4B046803G00_____	7	14	18	15	MKS4C043304D00_____
						7	14	18	15	MKS4C044704D00_____
						6	15	26.5	22.5	MKS4C044705B00_____
						8	15	18	15	MKS4C046804F00_____
						7	16.5	26.5	22.5	MKS4C046805D00_____
10 μF	9	16	18	15	MKS4B051004J00_____	8.5	18.5	26.5	22.5	MKS4C051005F00_____
15 "	11	21	26.5	22.5	MKS4B051505I00_____	11	21	31.5	27.5	MKS4C051006B00_____
22 "	11	21	31.5	27.5	MKS4B052206B00_____	11	21	26.5	22.5	MKS4C051505I00_____
33 "	13	24	31.5	27.5	MKS4B053306D00_____	11	21	31.5	27.5	MKS4C051506B00_____
47 "	15	26	31.5	27.5	MKS4B054706F00_____	13	24	31.5	27.5	MKS4C052206D00_____
68 "	13	24	41.5	37.5	MKS4B054707C00_____	15	26	31.5	27.5	MKS4C053306F00_____
	20	39.5	31.5	27.5	MKS4B056806J00_____	17	29	31.5	27.5	MKS4C054706G00_____
	17	29	41.5	37.5	MKS4B056807E00_____	17	29	41.5	37.5	MKS4C054707E00_____
						20	39.5	31.5	27.5	MKS4C056806J00_____
						19	32	41.5	37.5	MKS4C056807F00_____
100 μF	19	32	41.5	37.5	MKS4B061007F00_____	20	39.5	41.5	37.5	MKS4C061007G00_____
150 "	20	39.5	41.5	37.5	MKS4B061507G00_____	24	45.5	41.5	37.5	MKS4C061507H00_____
220 "	24	45.5	41.5	37.5	MKS4B062207H00_____					

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

** PCM = Printed circuit module
= lead spacing

Dims. in mm.

ϕd	PCM	W
0.5	7.5	≤ 3
0.6	7.5	≥ 4
0.6	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.

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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	MKS4D021002A00_	3	8.5	10	7.5	MKS4F021002B00_
	4	9	13	10	MKS4D021003C00_	4	9	13	10	MKS4F021003C00_
0.015 "	2.5	7	10	7.5	MKS4D021502A00_	3	8.5	10	7.5	MKS4F021502B00_
	4	9	13	10	MKS4D021503C00_	4	9	13	10	MKS4F021503C00_
0.022 "	2.5	7	10	7.5	MKS4D022202A00_	3	8.5	10	7.5	MKS4F022202B00_
	4	9	13	10	MKS4D022203C00_	4	9	13	10	MKS4F022203C00_
0.033 "	2.5	7	10	7.5	MKS4D023302A00_	3	8.5	10	7.5	MKS4F023302B00_
	4	9	13	10	MKS4D023303C00_	4	9	13	10	MKS4F023303C00_
0.047 "	2.5	7	10	7.5	MKS4D024702A00_	3	8.5	10	7.5	MKS4F024702B00_
	4	9	13	10	MKS4D024703C00_	4	9	13	10	MKS4F024703C00_
0.068 "	2.5	7	10	7.5	MKS4D026802A00_	4	9	10	7.5	MKS4F026802C00_
	4	9	13	10	MKS4D026803C00_	4	9	13	10	MKS4F026803C00_
0.1 μF	2.5	7	10	7.5	MKS4D031002A00_	4	9	10	7.5	MKS4F031002C00_
	4	9	13	10	MKS4D031003C00_	4	9	13	10	MKS4F031003C00_
0.15 "	3	8.5	10	7.5	MKS4D031502B00_	5	10.5	10.3	7.5	MKS4F031502E00_
	4	9	13	10	MKS4D031503C00_	4	9	13	10	MKS4F031503C00_
0.22 "	3	8.5	10	7.5	MKS4D032202B00_	5	10.5	10.3	7.5	MKS4F032202E00_
	4	9	13	10	MKS4D032203C00_	5	11	13	10	MKS4F032203F00_
0.33 "	4	9	10	7.5	MKS4D033302C00_	5.7	12.5	10.3	7.5	MKS4F033302F00_
	4	9	13	10	MKS4D033303C00_	5	11	13	10	MKS4F033303F00_
0.47 "	4.5	9.5	10.3	7.5	MKS4D034702D00_	6	12	13	10	MKS4F034703G00_
	4	9	13	10	MKS4D034703C00_	6	12.5	18	15	MKS4F034704C00_
0.68 "	5	10.5	10.3	7.5	MKS4D036802E00_	7	14	18	15	MKS4F036804D00_
	4	9	13	10	MKS4D036803C00_					
1.0 μF	5.7	12.5	10.3	7.5	MKS4D041002F00_	8	15	18	15	MKS4F041004F00_
	5	11	13	10	MKS4D041003F00_	6	15	26.5	22.5	MKS4F041005B00_
1.5 "	6	12	13	10	MKS4D041503G00_	9	16	18	15	MKS4F041504J00_
	7	14	18	15	MKS4D041504D00_	7	16.5	26.5	22.5	MKS4F041505D00_
2.2 "	8	15	18	15	MKS4D042204F00_	10.5	19	26.5	22.5	MKS4F042205G00_
	6	15	26.5	22.5	MKS4D042205B00_	9	19	31.5	27.5	MKS4F042206A00_
3.3 "	9	16	18	15	MKS4D043304J00_	11	21	26.5	22.5	MKS4F043305I00_
	7	16.5	26.5	22.5	MKS4D043305D00_	11	21	31.5	27.5	MKS4F043306B00_
4.7 "	10.5	19	26.5	22.5	MKS4D044705G00_	11	21	31.5	27.5	MKS4F044706B00_
	9	19	31.5	27.5	MKS4D044706A00_					
6.8 "	10.5	19	26.5	22.5	MKS4D046805G00_	13	24	31.5	27.5	MKS4F046806D00_
	11	21	31.5	27.5	MKS4D046806B00_					
10 μF	13	24	31.5	27.5	MKS4D051006D00_	17	29	31.5	27.5	MKS4F051006G00_
15 "	13	24	31.5	27.5	MKS4D051506D00_	17	34.5	31.5	27.5	MKS4F051506I00_
						17	29	41.5	37.5	MKS4F051507E00_
22 "	15	26	31.5	27.5	MKS4D052206F00_	19	32	41.5	37.5	MKS4F052207F00_
33 "	17	29	31.5	27.5	MKS4D053306G00_	24	45.5	41.5	37.5	MKS4F053307H00_
	13	24	41.5	37.5	MKS4D053307C00_					
47 "	17	29	41.5	37.5	MKS4D054707E00_					
68 "	20	39.5	41.5	37.5	MKS4D056807G00_					
100 μF	24	45.5	41.5	37.5	MKS4D061007H00_					

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

**PCM = Printed circuit module = lead spacing

Dims. in mm.

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Lead length: 6-2 = SD

Taped version see page 127.

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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	MKS4G021002B00_	3	8.5	10	7.5*	MKS4J021002B00_
	4	9	13	10	MKS4G021003C00_	4	9	13	10	MKS4J021003C00_
0.015 "	3	8.5	10	7.5	MKS4G021502B00_	4	9	10	7.5*	MKS4J021502C00_
	4	9	13	10	MKS4G021503C00_	4	9	13	10	MKS4J021503C00_
0.022 "	4	9	10	7.5	MKS4G022202C00_	4.5	9.5	10.3	7.5*	MKS4J022202D00_
	4	9	13	10	MKS4G022203C00_	4	9	13	10	MKS4J022203C00_
0.033 "	4	9	10	7.5	MKS4G023302C00_	5	10.5	10.3	7.5*	MKS4J023302E00_
	4	9	13	10	MKS4G023303C00_	5	11	13	10	MKS4J023303F00_
0.047 "	5	10.5	10.3	7.5	MKS4G024702E00_	5.7	12.5	10.3	7.5*	MKS4J024702F00_
	4	9	13	10	MKS4G024703C00_	6	12	13	10	MKS4J024703G00_
0.068 "	5	10.5	10.3	7.5	MKS4G026802E00_	6	12	13	10	MKS4J026803G00_
	4	9	13	10	MKS4G026803C00_	5	11	18	15	MKS4J026804B00_
0.1 μF	5	10.5	10.3	7.5	MKS4G031002E00_	6	12.5	18	15	MKS4J031004C00_
	5	11	13	10	MKS4G031003F00_	6	15	26.5	22.5	MKS4J031005B00_
0.15 "	5.7	12.5	10.3	7.5	MKS4G031502F00_	7	14	18	15	MKS4J031504D00_
	6	12	13	10	MKS4G031503G00_	6	15	26.5	22.5	MKS4J031505B00_
0.22 "	6	12	13	10	MKS4G032203G00_	8	15	18	15	MKS4J032204F00_
	6	12.5	18	15	MKS4G032204C00_	6	15	26.5	22.5	MKS4J032205B00_
0.33 "	8	15	18	15	MKS4G033304F00_	7	16.5	26.5	22.5	MKS4J033305D00_
						9	19	31.5	27.5	MKS4J033306A00_
0.47 "	8	15	18	15	MKS4G034704F00_	10.5	19	26.5	22.5	MKS4J034705G00_
	6	15	26.5	22.5	MKS4G034705B00_	9	19	31.5	27.5	MKS4J034706A00_
0.68 "	7	16.5	26.5	22.5	MKS4G036805D00_	11	21	26.5	22.5	MKS4J036805I00_
						11	21	31.5	27.5	MKS4J036806B00_
1.0 μF	10.5	19	26.5	22.5	MKS4G041005G00_	11	21	31.5	27.5	MKS4J041006B00_
	11	21	31.5	27.5	MKS4G041006B00_					
1.5 "	11	21	26.5	22.5	MKS4G041505I00_	15	26	31.5	27.5	MKS4J041506F00_
	11	21	31.5	27.5	MKS4G041506B00_					
2.2 "	11	21	31.5	27.5	MKS4G042206B00_	17	34.5	31.5	27.5	MKS4J042206I00_
						15	26	41.5	37.5	MKS4J042207D00_
3.3 "	13	24	31.5	27.5	MKS4G043306D00_	20	39.5	31.5	27.5	MKS4J043306J00_
						19	32	41.5	37.5	MKS4J043307F00_
4.7 "	17	29	31.5	27.5	MKS4G044706G00_	20	39.5	41.5	37.5	MKS4J044707G00_
6.8 "	17	34.5	31.5	27.5	MKS4G046806I00_	24	45.5	41.5	37.5	MKS4J046807H00_
	15	26	41.5	37.5	MKS4G046807D00_					
10 μF	19	32	41.5	37.5	MKS4G051007F00_					
15 "	20	39.5	41.5	37.5	MKS4G051507G00_					

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

** PCM = Printed circuit module = lead spacing

* Admissible AC voltage 250 VAC max.

Dims. in mm.

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Lead length: 6-2 = SD

Taped version see page 127.

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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	MKS4O111002B00_____	4	9	13	10	MKS4S0111003C00_____
	4	9	13	10	MKS4O111003C00_____					
1500 "	3	8.5	10	7.5	MKS4O111502B00_____	4	9	13	10	MKS4S011503C00_____
	4	9	13	10	MKS4O111503C00_____					
2200 "	3	8.5	10	7.5	MKS4O112202B00_____	4	9	13	10	MKS4S012203C00_____
	4	9	13	10	MKS4O112203C00_____					
3300 "	4	9	10	7.5	MKS4O113302C00_____	4	9	13	10	MKS4S013303C00_____
	4	9	13	10	MKS4O113303C00_____					
4700 "	4	9	10	7.5	MKS4O114702C00_____	4	9	13	10	MKS4S014703C00_____
	4	9	13	10	MKS4O114703C00_____	5	11	18	15	MKS4S014704B00_____
6800 "	4.5	9.5	10.3	7.5	MKS4O116802D00_____	5	11	13	10	MKS4S016803F00_____
	4	9	13	10	MKS4O116803C00_____	5	11	18	15	MKS4S016804B00_____
0.01 µF	5	10.5	10.3	7.5	MKS4O121002E00_____	6	12	13	10	MKS4S021003G00_____
	5	11	13	10	MKS4O121003F00_____	5	11	18	15	MKS4S021004B00_____
0.015 "	5.7	12.5	10.3	7.5	MKS4O121502F00_____	6	12.5	18	15	MKS4S021504C00_____
	6	12	13	10	MKS4O121503G00_____					
0.022 "	5	11	18	15	MKS4O122204B00_____	7	14	18	15	MKS4S022204D00_____
						6	15	26.5	22.5	MKS4S022205B00_____
0.033 "	6	12.5	18	15	MKS4O123304C00_____	8	15	18	15	MKS4S023304F00_____
	6	15	26.5	22.5	MKS4O123305B00_____	6	15	26.5	22.5	MKS4S023305B00_____
0.047 "	7	14	18	15	MKS4O124704D00_____	7	16.5	26.5	22.5	MKS4S024705D00_____
	6	15	26.5	22.5	MKS4O124705B00_____					
0.068 "	8	15	18	15	MKS4O126804F00_____	8.5	18.5	26.5	22.5	MKS4S026805F00_____
	6	15	26.5	22.5	MKS4O126805B00_____					
0.1 µF	9	16	18	15	MKS4O131004J00_____	10.5	19	26.5	22.5	MKS4S031005G00_____
	7	16.5	26.5	22.5	MKS4O131005D00_____	9	19	31.5	27.5	MKS4S031006A00_____
0.15 "	8.5	18.5	26.5	22.5	MKS4O131505F00_____	11	21	31.5	27.5	MKS4S031506B00_____
0.22 "	10.5	19	26.5	22.5	MKS4O132205G00_____	13	24	31.5	27.5	MKS4S032206D00_____
0.33 "	11	21	26.5	22.5	MKS4O133305I00_____	17	34.5	31.5	27.5	MKS4S033306I00_____
	11	21	31.5	27.5	MKS4O133306B00_____	17	29	41.5	37.5	MKS4S033307E00_____
0.47 "	13	24	31.5	27.5	MKS4O134706D00_____	20	39.5	31.5	27.5	MKS4S034706J00_____
						17	29	41.5	37.5	MKS4S034707E00_____
0.68 "	15	26	31.5	27.5	MKS4O136806F00_____	20	39.5	41.5	37.5	MKS4S036807G00_____
1.0 µF	17	29	31.5	27.5	MKS4O141006G00_____	24	45.5	41.5	37.5	MKS4S041007H00_____
	17	29	41.5	37.5	MKS4O141007E00_____					
1.5 "	19	32	41.5	37.5	MKS4O141507F00_____					
2.2 "	20	39.5	41.5	37.5	MKS4O142207G00_____					
3.3 "	24	45.5	41.5	37.5	MKS4O143307H00_____					

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

** PCM = Printed circuit module = lead spacing

Dims. in mm.

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 50

Continuation

General Data

Capacitance	2000 VDC/400 VAC*					Part number
	W	H	L	PCM**		
1000 pF	4	9	13	10	MKS4U011003C00_____	
1500 "	4	9	13	10	MKS4U011503C00_____	
2200 "	5	11	13	10	MKS4U012203F00_____	
3300 "	6	12	13	10	MKS4U013303H00_____	
	5	11	18	15	MKS4U013304B00_____	
4700 "	5	11	18	15	MKS4U014704B00_____	
6800 "	6	12.5	18	15	MKS4U016804C00_____	
0.01 µF	7	14	18	15	MKS4U021004D00_____	
	6	15	26.5	22.5	MKS4U021005B00_____	
0.015 "	6	15	26.5	22.5	MKS4U021505B00_____	
0.022 "	7	16.5	26.5	22.5	MKS4U022205D00_____	
0.033 "	10.5	19	26.5	22.5	MKS4U023305G00_____	
0.047 "	11	21	26.5	22.5	MKS4U024705I00_____	
	11	21	31.5	27.5	MKS4U024706B00_____	
0.068 "	11	21	31.5	27.5	MKS4U026806B00_____	
0.1 µF	13	24	31.5	27.5	MKS4U031006D00_____	
0.15 "	17	29	31.5	27.5	MKS4U031506G00_____	
	13	24	41.5	37.5	MKS4U031507C00_____	
0.22 "	17	29	41.5	37.5	MKS4U032207E00_____	
0.33 "	20	39.5	41.5	37.5	MKS4U033307G00_____	
0.47 "	24	45.5	41.5	37.5	MKS4U034707H00_____	

Part number completion:

Tolerance: 20 % = M
10 % = K
5 % = J
Packing: bulk = S
Lead length: 6-2 = SD
Taped version see page 127.

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

** PCM = Printed circuit module = lead spacing

Dims. in mm.

Rights reserved to amend design data without prior notification.

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

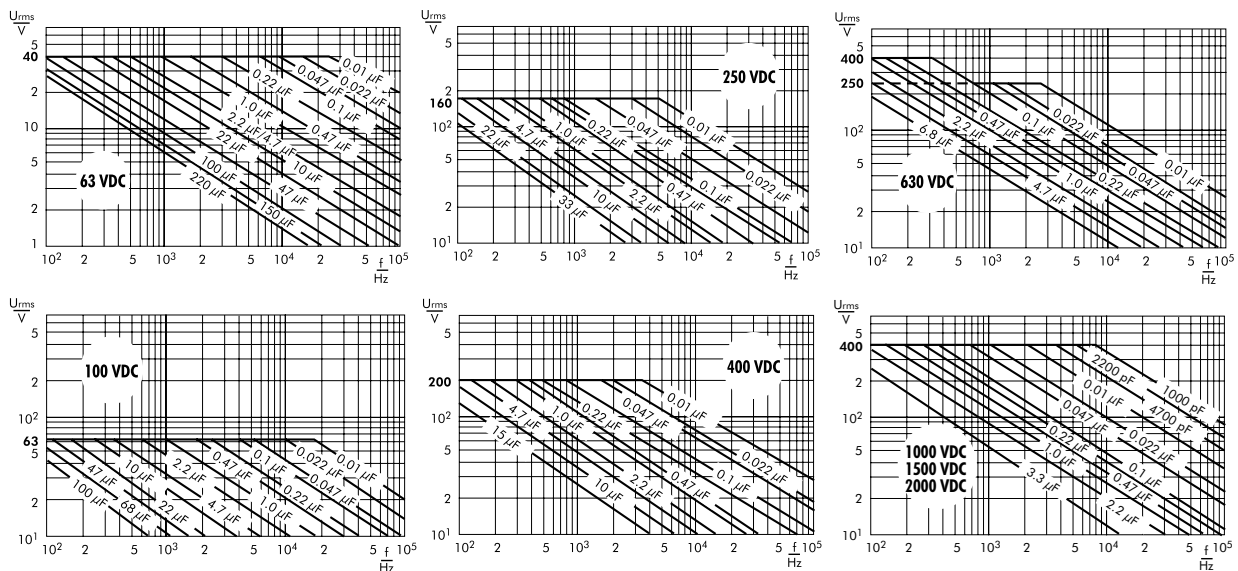
* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = lead spacing

Dims. in mm.

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

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

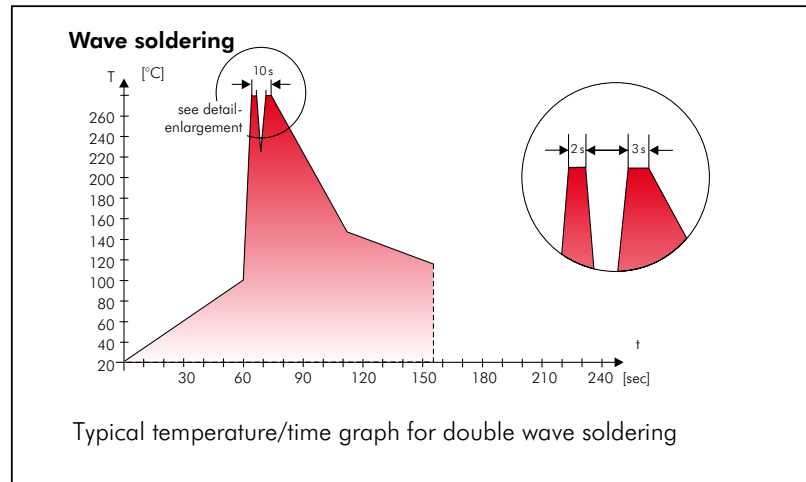
Single wave soldering

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

Double wave soldering

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

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



WIMA Quality and Environmental Philosophy

ISO 9001:2000 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
- 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 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

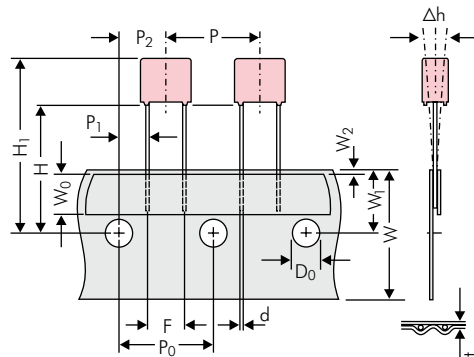


Diagram 1:
PCM 2.5/5/7.5mm

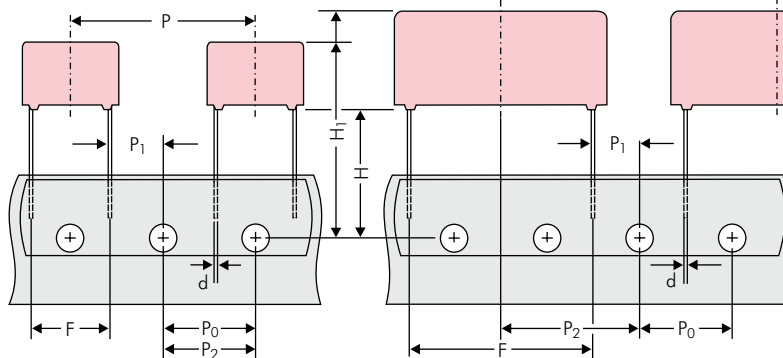


Diagram 2: PCM 10/15 mm

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 # 360 max. # 30 ±1	B 52 ±2 58 ±2 } depending on comp. dimensions		REEL # 340 max. # 30 ±1	52 ±2 58 ±2 or 66 ±2	REEL # 500 max. # 25 ±1	54 ±2 60 ±2 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 1). 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 M	Standard S	Maxi G	Mini X	Standard Y
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	-	-	-
	10	18	19	FG	100	500	-	-	-
22.5 mm	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	-	-	-
	10	22	28	FI	-	-	-	90	540
	10.5	19	26.5	5G	-	-	-	170	680
	10.5	20.5	26.5	5H	-	-	-	170	680
27.5 mm	11	21	26.5	5I	-	-	-	170	680
	12	24	28	FJ	-	-	-	75	450
	9	19	31.5	6A	-	-	-	160	640
	11	21	31.5	6B	-	-	-	136	544
	13	24	31.5	6D	-	-	-	112	448
	13	25	33	FK	-	-	-	56	336
	15	26	31.5	6F	-	-	-	96	384
	15	26	33	FL	-	-	-	48	288
	17	29	31.5	6G	-	-	-	88	176
37.5 mm	17	34.5	31.5	6I	-	-	-	88	176
	19	32	41.5	7F	-	-	-	54	108
	20	32	33	FM	-	-	-	36	216
	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	3A	–		900		1600		–		1450	
	4	9	13	3C	–		900		1600		–		1450	
	4	9.5	13	3D	–		900		1600		–		1400	
	5	10	13.5	3B	–		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	4C	–		600		1200		–		1200	
	6	12.5	18	4C	–		500		1000		–		1000	
	6	14	19	4D	–		500		1000		–		1000	
	7	14	18	4D	–		450		900		–		850	
	7	15	19	4E	–		450		900		–		850	
	8	15	18	4F	–		400		800		–		740	
	8	17	19	4F	–		400		800		–		740	
	9	14	18	4H	–		350		700		–		650	
	9	16	18	4J	–		350		700		–		650	
22.5 mm	10	18	19	4G	–		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	5H	–		–		500		–		480	
	8.5	18.5	26.5	5F	–		–		480		–		450	
	10	22	28	5I	–		–		420		–		380	
27.5 mm	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	5J	–		–		350		–		310	
	9	19	31.5	6A	–		–		460/340*		–		420	
	11	21	31.5	6B	–		–		380/280*		–		350	
	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							
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 PCM2.5 = 0B				AMMO H16.5 340x340 = A			
MKS 4 = MKS4				250 VDC = F0		2200 pF = 1220				3x7.5x4.6 PCM2.5 = 0C				AMMO H16.5 490x370 = B			
MKP 4 = MKP4				400 VDC = G0		3300 pF = 1330				2.5x6.5x7.2 PCM5 = 1A				AMMO H18.5 340x340 = C			
MKP 10 = MKP1				450 VDC = H0		4700 pF = 1470				3x7.5x7.2 PCM5 = 1B				AMMO H18.5 490x370 = D			
FKP 4 = FKP4				600 VDC = I0		6800 pF = 1680				2.5x7x10 PCM7.5 = 2A				REEL H16.5 360 = F			
FKP 1 = FKP1				630 VDC = J0		0.01 µF = 2100				3x8.5x10 PCM7.5 = 2B				REEL H16.5 500 = H			
MKP-X2 = MKX2				700 VDC = K0		0.022 µF = 2220				3x9x13 PCM10 = 3A				REEL H18.5 360 = I			
MKP-X2 R = MKXR				800 VDC = L0		0.047 µF = 2470				4x9x13 PCM10 = 3C				REEL H18.5 500 = J			
MKP-Y2 = MKY2				850 VDC = M0		0.1 µF = 3100				5x11x18 PCM15 = 4B				ROLL H16.5 = N			
MP 3-X2 = MPX2				900 VDC = N0		0.22 µF = 3220				6x12.5x18 PCM15 = 4C				ROLL H18.5 = O			
MP 3-X1 = MPX1				1000 VDC = O1		0.47 µF = 3470				5x14x26.5 PCM22.5 = 5A				BLISTER W12 180 = P			
MP 3-Y2 = MPY2				1100 VDC = P0		1 µF = 4100				6x15x26.5 PCM22.5 = 5B				BLISTER W12 330 = Q			
MP 3R-Y2 = MPRY				1200 VDC = Q0		2.2 µF = 4220				9x19x31.5 PCM27.5 = 6A				BLISTER W16 330 = R			
Snubber MKP = SNMP				1250 VDC = R0		4.7 µF = 4470				11x21x31.5 PCM27.5 = 6B				BLISTER W24 330 = T			
Snubber FKP = SNFP				1500 VDC = S0		10 µF = 5100				9x19x41.5 PCM37.5 = 7A				Bulk Mini = M			
GTO MKP = GTOM				1600 VDC = T0		22 µF = 5220				11x22x41.5 PCM37.5 = 7B				Bulk Standard = S			
DC-LINK MKP 4 = DCP4				2000 VDC = U0		47 µF = 5470				94x49x182 DCH_ = H0				Bulk Maxi = G			
DC-LINK MKP C = DCPC				2500 VDC = V0		100 µF = 6100				94x77x182 DCH_ = H1				TPS Mini = X			
DC-LINK HC = DCH_				3000 VDC = W0		220 µF = 6220				...				TPS Standard = Y			
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											
SuperCap MR = SCMR				275 VAC = 1W		100 F = B100											
				300 VAC = 2W		110 F = B110											
				400 VAC = 3W		600 F = B600											
				440 VAC = 4W		1200 F = C120											
				500 VAC = 5W		...											