WIMA MKS 02

Metallized Polyester (PET) Capacitors in PCM 2.5 mm

Special Features

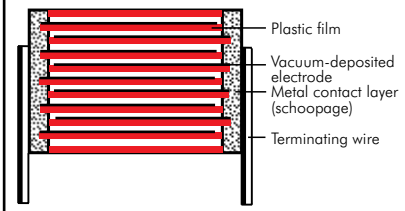
- **High volume/capacitance ratio and reduced base**
- **PCM 2.5 mm**
- **Self-healing**
- **According to RoHS 2011/65/EU**

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: Silver.
Epoxy resin seal: Yellow

Electrical Data

Capacitance range:
3300 pF to 1.0 µF (E12-values on request)
Rated voltages:
50 VDC, 63 VDC, 100 VDC, 250 VDC
Capacitance tolerances:
±20%, ± 10% (±5% available subject to special enquiry)
Operating temperature range:
–55° C to +100° C (+125° C available subject to special enquiry)
Test specifications:
In accordance with IEC 60384-2
Climatic test category:
55/100/21 in accordance with IEC
Insulation resistance at +20° C:

U_r	U_{test}	C ⩽ 0.33 µF	0.33 µF < C ⩽ 1.0 µF
50 VDC	10 V	⩾ 3.75 x 10^3 MΩ (mean value: 1 x 10^4 MΩ)	⩾ 1250 sec (MΩ x µF) (mean value: 3000 sec)
63 VDC	50 V	⩾ 3.75 x 10^3 MΩ (mean value: 1 x 10^4 MΩ)	⩾ 1250 sec (MΩ x µF) (mean value: 3000 sec)
⩾ 100 VDC	100 V	⩾ 1 x 10^4 MΩ (mean value: 2 x 10^4 MΩ)	–

Measuring time: 1 min.
Test voltage: 1.6 U_r, 2 sec.
Maximum pulse rise time:

Capacitance pF/µF	Pulse rise time V/µsec max. operation/test
3300 ... 6800	100 / 1000
0.01 ... 0.022	50 / 500
0.033 ... 0.068	30 / 300
0.1 ... 0.33	20 / 200
0.47 ... 1.0	15 / 150

for pulses equal to the rated voltage

Dissipation factors at + 20° C: tan δ

at f	C⩽0.1 µF	0.1 µF < C ⩽ 1.0 µF
1 kHz	⩽ 8 x 10^{-3}	⩽ 8 x 10^{-3}
10 kHz	⩽ 15 x 10^{-3}	⩽ 15 x 10^{-3}
100 kHz	⩽ 30 x 10^{-3}	–

Voltage derating:
A voltage derating factor of 1.25 % per K must be applied from +85° C for DC voltages and from +75° C for AC voltages.
Reliability:
Operational life > 300 000 hours
Failure rate < 2 fit (0.5 x U_r and 40° C)

Mechanical Tests

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

Packing

Available taped and reeled.

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	4.6	**2.5**	MKS0C021000B00_ _ _ _
0.015 „						2.5	7	4.6	**2.5**	MKS0C021500B00_ _ _ _
0.022 „						2.5	7	4.6	**2.5**	MKS0C022200B00_ _ _ _
0.033 „						2.5	7	4.6	**2.5**	MKS0C023300B00_ _ _ _
0.047 „						2.5	7	4.6	**2.5**	MKS0C024700B00_ _ _ _
0.068 „						3	7.5	4.6	**2.5**	MKS0C026800C00_ _ _ _
0.1 µF						3	7.5	4.6	**2.5**	MKS0C031000C00_ _ _ _
0.15 „						3	7.5	4.6	**2.5**	MKS0C031500C00_ _ _ _
0.22 „						3	7.5	4.6	**2.5**	MKS0C032200C00_ _ _ _
0.33 „						3.8	8.5	4.6	**2.5**	MKS0C033300D00_ _ _ _
0.47 „						4.6	9	4.6	**2.5**	MKS0C034700E00_ _ _ _
0.68 „						5.5	10	4.6	**2.5**	MKS0C036800F00_ _ _ _
1.0 µF	5.5	10	4.6	**2.5**	MKS0B041000F00_ _ _ _					

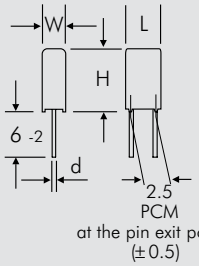
Capacitance	100 VDC/63 VAC*					250 VDC/160 VAC*				
	W	H	L	PCM**	Part number	W	H	L	PCM**	Part number
3300 pF						2.5	7	4.6	**2.5**	MKS0F013300B00_ _ _ _
4700 „						2.5	7	4.6	**2.5**	MKS0F014700B00_ _ _ _
6800 „						2.5	7	4.6	**2.5**	MKS0F016800B00_ _ _ _
0.01 µF	2.5	7	4.6	**2.5**	MKS0D021000B00_ _ _ _	2.5	7	4.6	**2.5**	MKS0F021000B00_ _ _ _
0.015 „	2.5	7	4.6	**2.5**	MKS0D021500B00_ _ _ _	2.5	7	4.6	**2.5**	MKS0F021500B00_ _ _ _
0.022 „	2.5	7	4.6	**2.5**	MKS0D022200B00_ _ _ _	2.5	7	4.6	**2.5**	MKS0F022200B00_ _ _ _
0.033 „	2.5	7	4.6	**2.5**	MKS0D023300B00_ _ _ _	3	7.5	4.6	**2.5**	MKS0F023300C00_ _ _ _
0.047 „	2.5	7	4.6	**2.5**	MKS0D024700B00_ _ _ _	3.8	8.5	4.6	**2.5**	MKS0F024700D00_ _ _ _
0.068 „	3	7.5	4.6	**2.5**	MKS0D026800C00_ _ _ _	4.6	9	4.6	**2.5**	MKS0F026800E00_ _ _ _
0.1 µF	3	7.5	4.6	**2.5**	MKS0D031000C00_ _ _ _	5.5	10	4.6	**2.5**	MKS0F031000F00_ _ _ _
0.15 „	3.8	8.5	4.6	**2.5**	MKS0D031500D00_ _ _ _					
0.22 „	4.6	9	4.6	**2.5**	MKS0D032200E00_ _ _ _					
0.33 „	5.5	10	4.6	**2.5**	MKS0D033300F00_ _ _ _					

* AC voltage: f = 50 Hz; 1.4 x U_{rms} + UDC ⩽ U_r

** PCM = Printed circuit module = pin spacing

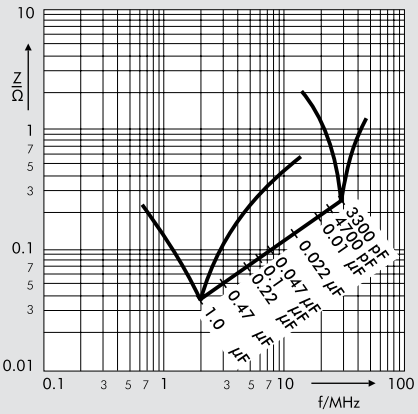
Dims. in mm.

d = 0.4 ⌀



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

Taped version see page 128.



Impedance change with frequency (general guide).

Recommendation for Processing and Application of Through-Hole Capacitors

Soldering Process

Internal temperature of the capacitor must be kept as follows:

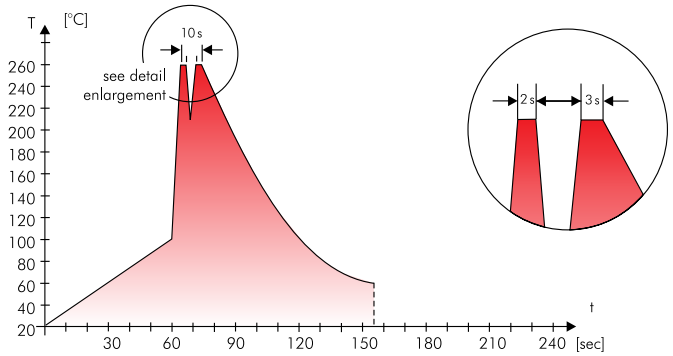
Polyester:	preheating:	$T_{max.} \leqslant 125°$ C
	soldering:	$T_{max.} \leqslant 135°$ C
Polypropylene:	preheating:	$T_{max.} \leqslant 100°$ C
	soldering:	$T_{max.} \leqslant 110°$ C

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

Double wave soldering
Soldering bath temperature: T < 260° C
Dwell time: Σt < 5 sec

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

Wave soldering



Typical temperature/time graph for double wave soldering

WIMA Quality and Environmental Philosophy

ISO 9001:2008 Certification

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

WIMA WPCS

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

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

WIMA Environmental Policy

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

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

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

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

We almost completely refrain from using packing materials such as:

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

RoHS Compliance

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

Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2004

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

Typical Dimensions for Taping Configuration

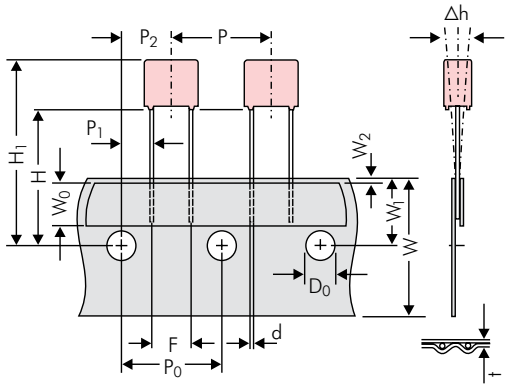


Diagram 1:
PCM 2.5/5/7.5mm

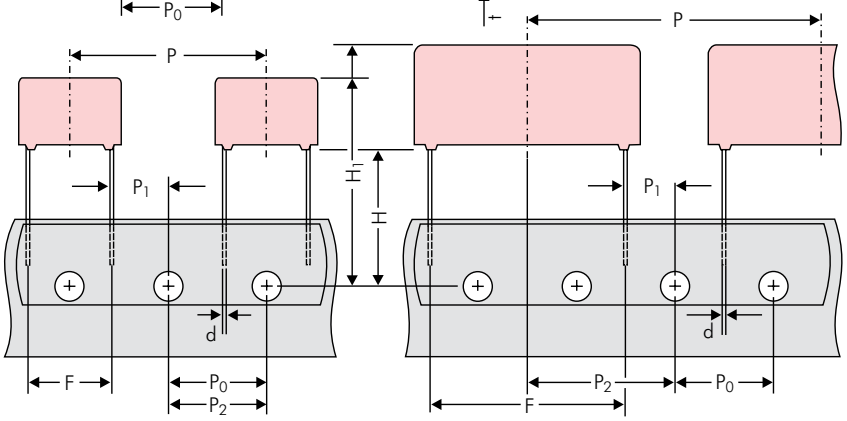


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5*mm
*PCM 27.5 taping possible with two feed holes between components

Designation	Symbol	Dimensions for Radial Taping						
		PCM 2.5 taping	**PCM 5 taping**	**PCM 7.5 taping**	**PCM 10 taping***	**PCM 15 taping***	**PCM 22.5 taping**	**PCM 27.5 taping**
Carrier tape width	W	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5
Hold-down tape width	W_0	6.0 for hot-sealing adhesive tape	6.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape
Hole position	W_1	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5
Hold-down tape position	W_2	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.
Feed hole diameter	D_0	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2
Pitch of component	P	12.7 ±1.0	12.7 ±1.0	12.7 ±1.0	25.4 ±1.0	25.4 ±1.0	38.1 ±1.5	*38.1 ±1.5 or 50.8 ±1.5
Feed hole pitch	P_0	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch
Feed hole centre to pin	P_1	5.1 ±0.5	3.85 ±0.7	2.6 ±0.7	7.7 ±0.7	5.2 ±0.7	7.8 ±0.7	5.3 ±0.7
Hole centre to component centre	P_2	6.35 ±1.3	6.35 ±1.3	6.35 ±1.3	12.7 ±1.3	12.7 ±1.3	19.05 ±1.3	19.05 ±1.3
Feed hole centre to bottom edge of the component	H	16.5 ±0.3 18.5 ±0.5	16.5 ±0.3 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5	16.5 ±0.5 18.5 ±0.5
Feed hole centre to top edge of the component	H_1	$H+H_{component} < H_1$ 32.25 max.	$H+H_{component} < H_1$ 32.25 max.	$H+H_{component} < H_1$ 24.5 to 31.5	$H+H_{component} < H_1$ 25.0 to 31.5	$H+H_{component} < H_1$ 26.0 to 37.0	$H+H_{component} < H_1$ 30.0 to 43.0	$H+H_{component} < H_1$ 35.0 to 45.0
Pin spacing at upper edge of carrier tape	F	2.5 ±0.5	5.0 $^{+0.8}_{-0.2}$	7.5 ±0.8	10.0 ±0.8	15 ±0.8	22.5 ±0.8	27.5 ±0.8
Pin diameter	d	0.4 ±0.05	0.5 ±0.05	•0.5 ±0.05 or 0.6 $^{+0.06}_{-0.05}$	•0.5 ±0.05 or 0.6 $^{+0.06}_{-0.05}$	0.8 $^{+0.08}_{-0.05}$	0.8 $^{+0.08}_{-0.05}$	0.8 $^{+0.08}_{-0.05}$
Component alignment	Δh	± 2.0 max.	± 2.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.
Total tape thickness	t	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2
Package (see also page 129)		ROLL/AMMO		AMMO				
		REEL ø 360 max. ø 30 ±1 B 52 ±2 / 58 ±2 } depending on comp. dimensions		REEL ø 360 max. ø 30 ±1 B 52 ±2 / 58 ±2 / 66 ±2 or REEL ø 500 max. ø 25 ±1 B 54 ±2 / 60 ±2 / 68 ±2 } depending on PCM and component dimensions				
Unit		see details page 130.						

Dims in mm.

• Diameter of pins see General Data.

Please clarify customer-specific deviations with the manufacturer.

* PCM 10 and PCM 15 can be crimped to PCM 7.5.
Position of components according to PCM 7.5 (sketch 1). P_0 = 12.7 or 15.0 is possible

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