



Metallized Polyester (PET) Capacitors for Low Noise Applications PCM 22.5 mm and 27.5 mm

Special Features

- High volume/capacitance ratio
- Self-healing
- Low noise emission due to special construction
- According to RoHS 2002/95/EC

Typical Applications

For applications in sound sensitive surroundings e.g.

- Audio/video equipment
- Communication and data processing systems
- Lighting
- Medical equipment

Construction

Dielectric:

Polyethylene-terephthalate (PET) film

Capacitor electrodes:

Vacuum-deposited

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:

0.33 μ F to 15 μ F (E12-values on request)

Rated voltages:

250 VDC, 400 VDC, 630 VDC

Capacitance tolerances:

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

Operating temperature range:

-55° C to $+100^{\circ}$ C

Test specifications:

In accordance with IEC 60384-2 and EN 130400

Climatic test category:

55/100/56 in accordance with IEC

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

$C = 0.33 \mu\text{F}$: $\geq 3 \times 10^4 \text{ M}\Omega$

(mean value: $1 \times 10^5 \text{ M}\Omega$)

$C > 0.33 \mu\text{F}$: $\geq 10000 \text{ sec (M}\Omega \times \mu\text{F)}$

(mean value: 40000 sec)

Measuring voltage: 100 V/1 min.

Test voltage:

$1.6 U_r$, 2 sec.

Maximum pulse rise time:

| Capacitance μF | Pulse rise time V/ μsec max. operation/test | | |
|------------------------------|---|---------|---------|
| | 250 VDC | 400 VDC | 630 VDC |
| 0.33 ... 0.68 | 10/100 | 10/100 | 13/130 |
| 1.0 ... 2.2 | 6/60 | 9/90 | 13/130 |
| 3.3 ... 6.8 | 6/60 | 6/60 | – |
| 10 ... 15 | 3/30 | – | – |

for pulses equal to the rated voltage

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

| at f | $C \leq 1.0 \mu\text{F}$ | $1.0 \mu\text{F} < C \leq 15 \mu\text{F}$ |
|--------|--------------------------|---|
| 1 kHz | $\leq 8 \times 10^{-3}$ | $\leq 10 \times 10^{-3}$ |
| 10 kHz | $\leq 15 \times 10^{-3}$ | – |

Voltage derating:

A voltage derating factor of 1.25 % per K must be applied from $+85^{\circ}$ C for DC voltages and from $+75^{\circ}$ C for AC voltages.

Reliability:

Operational life > 300000 hours

Failure rate $< 2 \text{ fit (} 0.5 \times U_r \text{ and } 40^{\circ} \text{ C)}$

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/sec^2

in accordance with IEC 60068-2-29

Packing

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

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

For further details and graphs please refer to Technical Information.

Continuation

General Data

| Capacitance | 250 VDC/160 VAC* | | | | 400 VDC/200 VAC* | | | | 630 VDC/300 VAC* | | | |
|--------------------|------------------|------|------|-------|------------------|------|------|-------|------------------|------|------|-------|
| | W | H | L | PCM** | W | H | L | PCM** | W | H | L | PCM** |
| 0.33 μF | 6 | 15 | 26.5 | 22.5 | 6 | 15 | 26.5 | 22.5 | 7 | 16.5 | 26.5 | 22.5 |
| 0.47 " | 6 | 15 | 26.5 | 22.5 | 7 | 16.5 | 26.5 | 22.5 | 8.5 | 18.5 | 26.5 | 22.5 |
| 0.68 " | 6 | 15 | 26.5 | 22.5 | 8.5 | 18.5 | 26.5 | 22.5 | 11 | 21 | 26.5 | 22.5 |
| 1.0 μF | 7 | 16.5 | 26.5 | 22.5 | 11 | 21 | 26.5 | 22.5 | 11 | 21 | 31.5 | 27.5 |
| 1.5 " | 7 | 16.5 | 26.5 | 22.5 | 11 | 21 | 31.5 | 27.5 | 13 | 24 | 31.5 | 27.5 |
| 2.2 " | 10.5 | 19 | 26.5 | 22.5 | 13 | 24 | 31.5 | 27.5 | 17 | 29 | 31.5 | 27.5 |
| 3.3 " | 11 | 21 | 26.5 | 22.5 | 17 | 29 | 31.5 | 27.5 | | | | |
| 4.7 " | 13 | 24 | 31.5 | 27.5 | | | | | | | | |
| 6.8 " | 15 | 26 | 31.5 | 27.5 | | | | | | | | |
| 10 μF | 17 | 29 | 31.5 | 27.5 | | | | | | | | |
| 15 " | 20 | 39.5 | 31.5 | 27.5 | | | | | | | | |

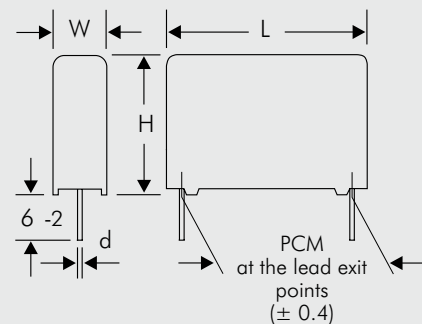
* AC voltage: $f = 50 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

** PCM = Printed circuit module = lead spacing

Dims. in mm.

Taped version see page 121.

$d = 0.8 \varnothing$

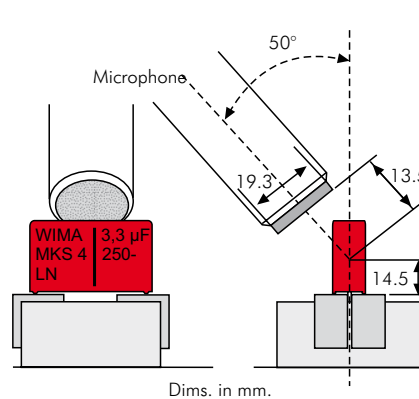


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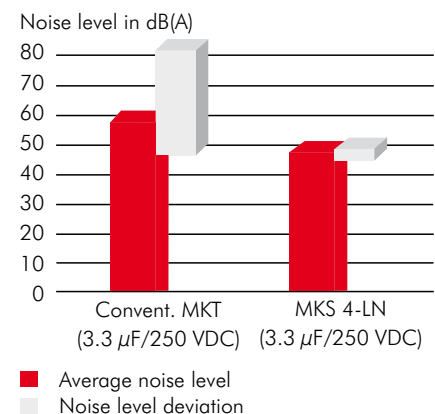
LN capacitors are up to 20dB(A) less noisy than conventional Polyester capacitors, e.g.:

- With $\Delta = 10\text{dB(A)}$:
1 conventional capacitor creates the same noise as 10 LN capacitors!
- With $\Delta = 20\text{dB(A)}$:
1 conventional capacitor creates the same noise as 100 LN capacitors!

In comparison to conventional Polyester capacitors LN capacitors feature a considerably lower variation of the noise level values and considerably lower deviation of capacitance and dissipation factor versus temperature.



Set-up to measure sound level in dB(A).



Range of sound level values.

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.

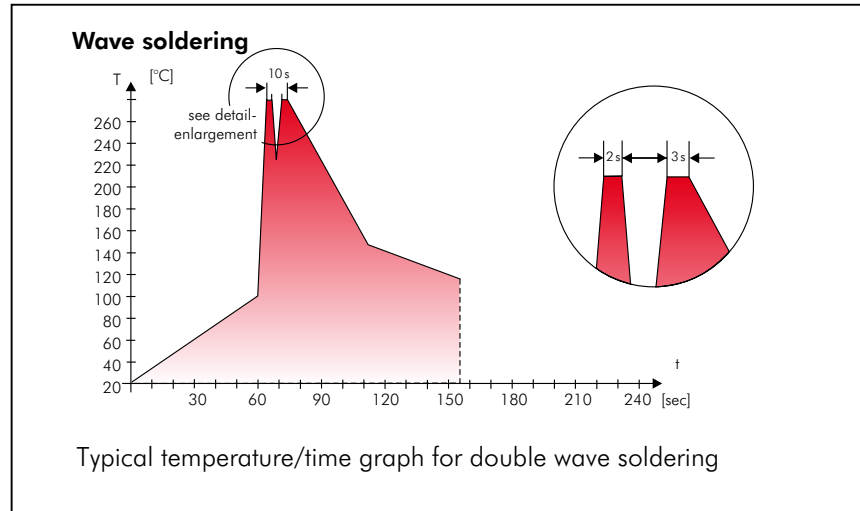
Single wave soldering

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
- 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

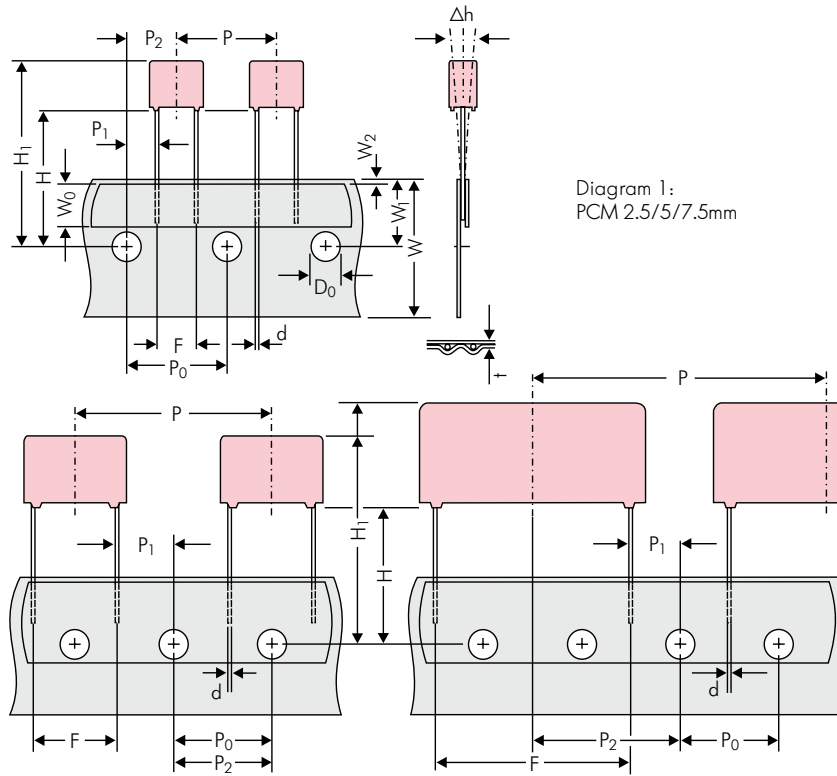


Diagram 1:
PCM 2.5/5/7.5mm

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 122) | ▲ | ROLL/AMMO | | | AMMO | | | | |
| | | REEL | 52 ±2 58 ±2 | } depending on comp. dimensions | REEL | 360 max. 30 ±1 | 52 ±2 58 ±2 or 66 ±2 | REEL | 500 max. 25 ±1 |
| Unit | see details page 124. | | | | | | | | |

▲ Please give „H“ dimensions and desired packaging type when ordering.

• 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

Dims in mm.

Please clarify customer-specific deviations with the manufacturer.