

Metallized Polypropylene (PP) RFI-Capacitors Class X2 PCM 7.5 mm to 27.5 mm

Special Features

- Reliable self-healing
- High degree of interference suppression due to good attenuation and low ESR
- According to RoHS 2002/95/EC

Typical Applications

Class X2 RFI applications to meet EMC regulations

- Capacitors connected to the mains between phase and neutral or phase conductors
- Installation category II in accordance with IEC 60664, pulse peak voltage ≤ 2.5 kV

Construction

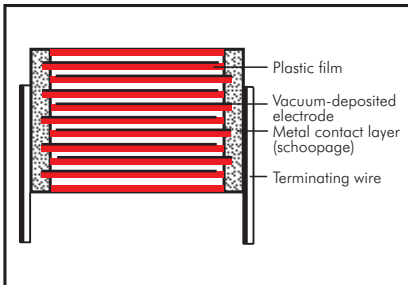
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Vacuum-deposited

Internal construction:



Encapsulation:

Solvent-resistant, flame-retardent plastic case with epoxy resin seal, UL 94 V-0

Terminations:

Tinned wire.

Marking:

Colour: Red. Marking: Black.

Electrical Data

Capacitance range:

1000 pF to 2.2 μ F

Rated voltages:

275 VAC

Capacitance tolerances:

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

Operating temperature range:

-55°C to $+105^\circ\text{C}$

Climatic test category:

55/105/56/B in accordance with IEC

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

$C \leq 0.33 \mu\text{F}$: $\geq 15 \times 10^3 \text{ M}\Omega$

$C > 0.33 \mu\text{F}$: $\geq 5000 \text{ sec (M}\Omega \times \mu\text{F)}$

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 | $\leq 10 \times 10^{-4}$ | $\leq 20 \times 10^{-4}$ | $\leq 30 \times 10^{-4}$ |
| 10 kHz | $\leq 20 \times 10^{-4}$ | $\leq 60 \times 10^{-4}$ | - |
| 100 kHz | $\leq 90 \times 10^{-4}$ | - | - |

Test specifications:

In accordance with DIN EN 132400

Maximum pulse rise time:

100 V/ μsec at $U_{pp} = 390 \text{ V}$

Test voltage:

$C \leq 1.0 \mu\text{F}$: 2200 VDC, 2 sec.

$C > 1.0 \mu\text{F}$: 1800 VDC, 2 sec.

Reliability:

Operational life $> 300\,000$ hours

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

Approvals:

| Country | Authority | Specification | Symbol | Approval-No. |
|------------|-----------|---|--------|--------------|
| Germany | VDE | DIN EN 132400 IEC 60384-14/2 | | 40003472 |
| USA/Canada | UL | UL 1414 (250 VAC) C 22.2 No. 1 (250 VAC) | | E 134915 |
| USA/Canada | UL | UL 1283 (305 VAC) C 22.2 No. 8 (305 VAC) | | E 100438 |

Mechanical Tests

Pull test on leads:

10 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:

1kPa = 10 mbar in accordance with IEC 60068-2-13

Bump test:

4000 bumpst 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 | 275 VAC* | | | PCM** |
|-------------|----------|------|------|--------------|
| | W | H | L | |
| 1000 pF | 4 | 9 | 10 | 7.5 |
| 1500 " | 4 | 9 | 10 | 7.5 |
| 2200 " | 4 | 9 | 10 | 7.5 |
| 3300 " | 4 | 9 | 10 | 7.5 |
| 4700 " | 4 | 9 | 10 | 7.5 |
| 6800 " | 4 | 9 | 10 | 7.5 |
| 0.01 μF | 4 | 9 | 10 | 7.5* |
| | 5 | 11 | 13 | 10* |
| 0.015 " | 4 | 9 | 10 | 7.5* |
| | 5 | 11 | 13 | 10*▲ |
| 0.022 " | 4 | 9 | 10 | 7.5* |
| | 5 | 11 | 13 | 10▲ |
| 0.033 " | 5 | 10.5 | 10.3 | 7.5*▲ |
| | 5 | 11 | 13 | 10*▲ |
| 0.047 " | 5.7 | 12.5 | 10.3 | 7.5*▲ |
| | 6 | 12.5 | 13 | 10*▲ |
| 0.068 " | 6 | 12.5 | 13 | 10▲ |
| 0.1 μF | 8 | 12 | 13 | 10*▲ |
| | 5 | 11 | 18 | 15*▲ |
| | 6 | 12.5 | 18 | 15*▲ |
| 0.15 " | 6 | 12.5 | 18 | 15*▲ |
| | 7 | 14 | 18 | 15*▲ |
| 0.22 " | 9 | 14 | 18 | 15* |
| | 8 | 15 | 18 | 15*▲ |
| 0.33 " | 11 | 14 | 18 | 15* |
| | 9 | 16 | 18 | 15*▲ |
| 0.47 " | 8.5 | 18.5 | 26.5 | 22.5*▲ |
| | 10.5 | 19 | 26.5 | 22.5*▲ |
| 0.68 " | 10.5 | 19 | 26.5 | 22.5*▲ |
| | 11 | 21 | 26.5 | 22.5*▲ |
| 1.0 μF | 11 | 21 | 26.5 | 22.5*▲ |
| | 13 | 24 | 31.5 | 27.5*▲ |
| 1.5 " | 15 | 26 | 31.5 | 27.5▲ |
| 2.2 " | 17 | 29 | 31.5 | 27.5 |

* f = 50/60 Hz

** PCM = Printed circuit module = lead spacing

■ Certified for 250 VAC in accordance with UL/CSA.

▲ Additionally certified for 305 VAC in accordance with UL/CSA.

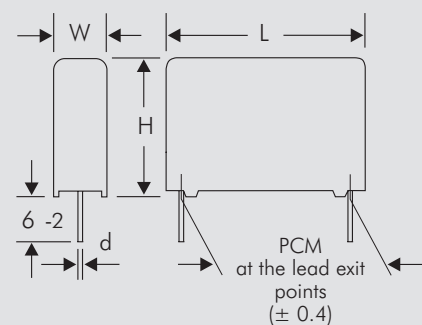
* On ordering please state the required **PCM** and **box size**.
If not specified, smaller PCM or box size will be booked.

Dims. in mm.

d = 0.7 ∅ if PCM < 15
d = 0.8 ∅ if PCM ≥ 15

Taped version see page 100.

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Recommendation for Processing and Application of Through-Hole Capacitors

Soldering Process

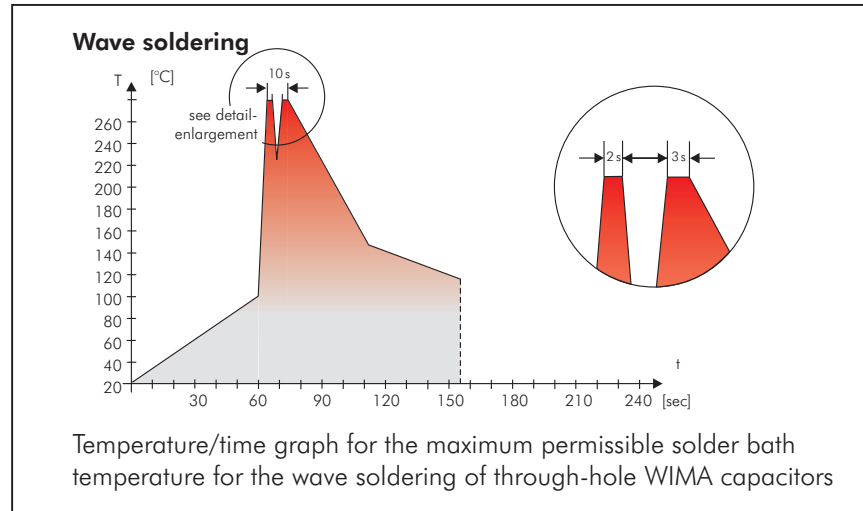
A preheating of through-hole WIMA capacitors is allowed for temperatures $T_{\max} < 100^{\circ}\text{C}$.
In practice a preheating duration of $t < 5$ min. has been proven to be best.

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



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

ISO 14001:2005

WIMA's environmental management has been established in accordance with the guidelines of ISO 14001. The certification is under preparation and is expected to be accomplished by June 2006.

Typical Dimensions for Taping Configuration

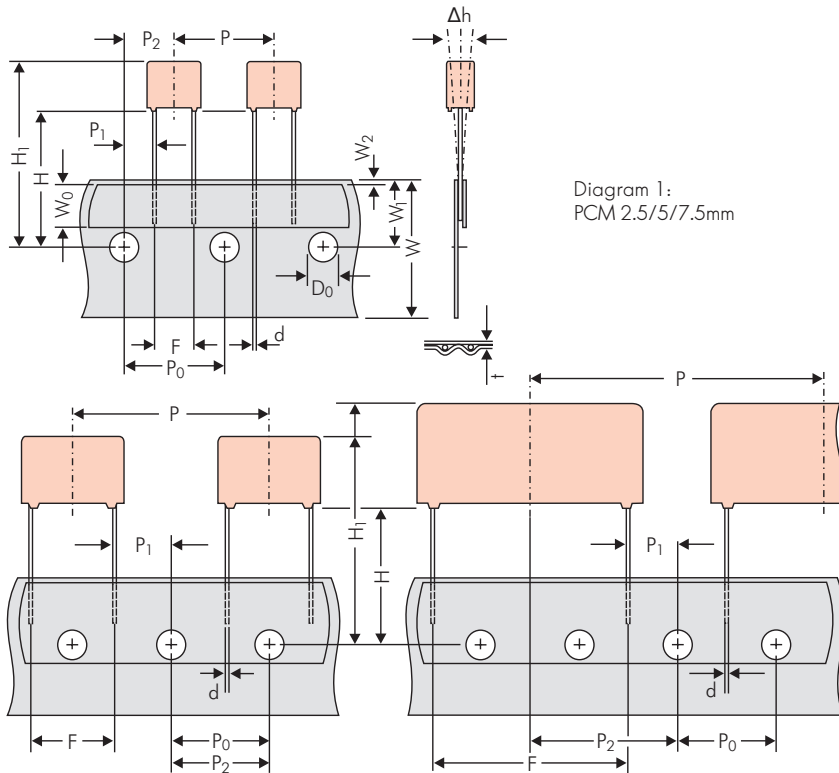


Diagram 2: PCM 10/15 mm

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 0.7 ^{+0.07} _{-0.05} | 0.5 ±0.05 or 0.7 ^{+0.07} _{-0.05} | 0.8 ^{+0.08} _{-0.05} | 0.8 ^{+0.08} _{-0.05} | 0.8 ^{+0.08} _{-0.05} or 1.0 ^{+0.1} _{-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 1011) | ▲ | 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 or 66 ±2 | REEL ø 500 max. ø 25 ±1 | B 60 ±2 68 ±2 } depending on PCM and component dimensions | |
| Unit | | see details page 103. | | | | | | | |

▲ 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.