

## 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 2002/95/EC

### Typical Applications

#### For general DC-applications e.g.

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

### Construction

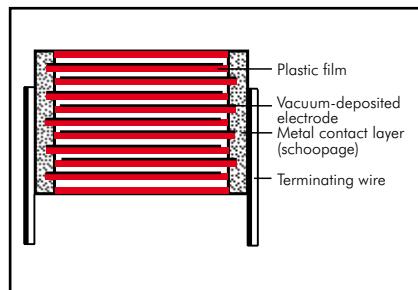
#### Dielectric:

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: Silver.

Epoxy resin seal: Yellow

### Electrical Data

#### Capacitance range:

1000 pF to 1.0  $\mu$ F (E12-values on request)

#### Rated voltages:

50 VDC, 63 VDC, 100 VDC, 250 VDC

#### Capacitance tolerances:

$\pm 20\%$ ,  $\pm 10\%$  ( $\pm 5\%$  available subject to special enquiry)

#### Operating temperature range:

-55° C to +100° C

#### Test specifications:

In accordance with IEC 60384-2 and EN 130400

#### Climatic test category:

55/100/21 in accordance with IEC

#### Insulation resistance at +20° C:

#### Dissipation factors at + 20° C: $\tan \delta$

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

#### 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 ( $0.5 \times U_r$  and 40° C)

Measuring time: 1 min.

**Test voltage:**  $1.6 U_r$ , 2 sec.

#### Maximum pulse rise time:

| Capacitance<br>pF/ $\mu$ F | Pulse rise time V/ $\mu$ sec<br>max. operation/test |
|----------------------------|---|
| 1000 ... 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

### 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 bumps at 390 m/sec<sup>2</sup> 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

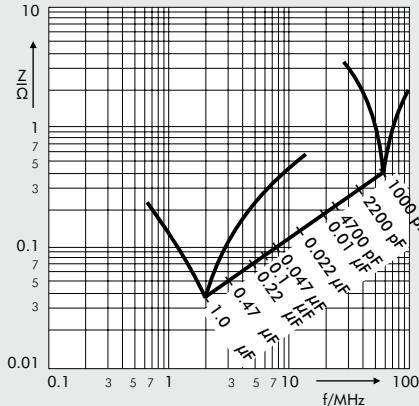
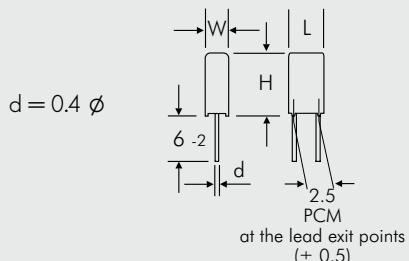
| Capacitance  | 50 VDC/30 VAC* |    |     |            | 63 VDC/40 VAC* |     |     |            | 100 VDC/63 VAC* |     |     |            | 250 VDC/160 VAC* |     |     |            |
|--------------|----------------|----|-----|------------|----------------|-----|-----|------------|-----------------|-----|-----|------------|------------------|-----|-----|------------|
|              | W              | H  | L   | PCM**      | W              | H   | L   | PCM**      | W               | H   | L   | PCM**      | W                | H   | L   | PCM**      |
| 1000 pF      |                |    |     |            |                |     |     |            |                 |     |     |            | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 1500 "       |                |    |     |            |                |     |     |            |                 |     |     |            | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 2200 "       |                |    |     |            |                |     |     |            |                 |     |     |            | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 3300 "       |                |    |     |            |                |     |     |            |                 |     |     |            | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 4700 "       |                |    |     |            |                |     |     |            |                 |     |     |            | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 6800 "       |                |    |     |            |                |     |     |            |                 |     |     |            | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 0.01 $\mu$ F |                |    |     |            | 2.5            | 7   | 4.6 | <b>2.5</b> | 2.5             | 7   | 4.6 | <b>2.5</b> | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 0.015 "      |                |    |     |            | 2.5            | 7   | 4.6 | <b>2.5</b> | 2.5             | 7   | 4.6 | <b>2.5</b> | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 0.022 "      |                |    |     |            | 2.5            | 7   | 4.6 | <b>2.5</b> | 2.5             | 7   | 4.6 | <b>2.5</b> | 2.5              | 7   | 4.6 | <b>2.5</b> |
| 0.033 "      |                |    |     |            | 2.5            | 7   | 4.6 | <b>2.5</b> | 2.5             | 7   | 4.6 | <b>2.5</b> | 3                | 7.5 | 4.6 | <b>2.5</b> |
| 0.047 "      |                |    |     |            | 2.5            | 7   | 4.6 | <b>2.5</b> | 2.5             | 7   | 4.6 | <b>2.5</b> | 3.8              | 8.5 | 4.6 | <b>2.5</b> |
| 0.068 "      |                |    |     |            | 3              | 7.5 | 4.6 | <b>2.5</b> | 3               | 7.5 | 4.6 | <b>2.5</b> | 4.6              | 9   | 4.6 | <b>2.5</b> |
| 0.1 $\mu$ F  |                |    |     |            | 3              | 7.5 | 4.6 | <b>2.5</b> | 3               | 7.5 | 4.6 | <b>2.5</b> | 5.5              | 10  | 4.6 | <b>2.5</b> |
| 0.15 "       |                |    |     |            | 3              | 7.5 | 4.6 | <b>2.5</b> | 3.8             | 8.5 | 4.6 | <b>2.5</b> |                  |     |     |            |
| 0.22 "       |                |    |     |            | 3              | 7.5 | 4.6 | <b>2.5</b> | 4.6             | 9   | 4.6 | <b>2.5</b> |                  |     |     |            |
| 0.33 "       |                |    |     |            | 3.8            | 8.5 | 4.6 | <b>2.5</b> | 5.5             | 10  | 4.6 | <b>2.5</b> |                  |     |     |            |
| 0.47 "       |                |    |     |            | 4.6            | 9   | 4.6 | <b>2.5</b> |                 |     |     |            |                  |     |     |            |
| 0.68 "       |                |    |     |            | 5.5            | 10  | 4.6 | <b>2.5</b> |                 |     |     |            |                  |     |     |            |
| 1.0 $\mu$ F  | 5.5            | 10 | 4.6 | <b>2.5</b> |                |     |     |            |                 |     |     |            |                  |     |     |            |

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

\*\* PCM = Printed circuit module = lead spacing

Dims. in mm.

Taped version see page 121.



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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

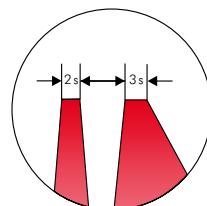
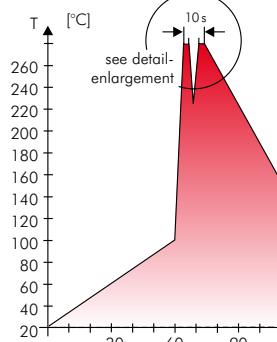
Soldering bath temperature:  $T < 260^{\circ}\text{C}$   
Immersion time:  $t < 5$  sec

#### Double wave soldering

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

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 9001:2000 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 WPSCS

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

|  |  |
|--|--|
| <ul style="list-style-type: none"> <li>– <b>Lead</b></li> <li>– <b>PCB</b></li> <li>– <b>CFC</b></li> <li>– <b>Hydrocarbon chloride</b></li> <li>– <b>Chromium 6+</b></li> </ul> | <ul style="list-style-type: none"> <li>– <b>PBB/PBDE</b></li> <li>– <b>Arsenic</b></li> <li>– <b>Cadmium</b></li> <li>– <b>Mercury</b></li> <li>– <b>etc.</b></li> </ul> |
|--|--|

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

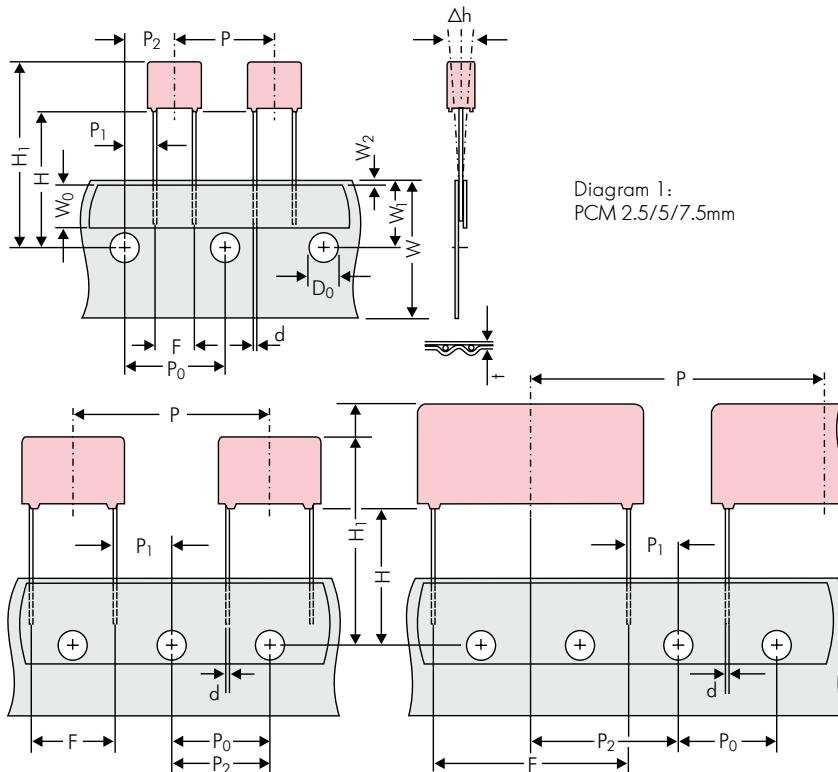
WIMA capacitors are lead free  
in accordance with RoHS 2002/95/EC

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



| Dimensions for Radial Taping   |                |  |  |  |   |   |  |  |  |  |  |  |  |
|--|----------------|--|--|--|---|---|--|--|--|--|--|--|--|
| Designation  | Symbol         | PCM 2.5 taping   | PCM 5 taping   | PCM 7.5 taping   | PCM 10 taping*  | PCM 15 taping*  | PCM 22.5 taping  |  |  |  |  |  |  |
| Carrier tape width   | W              | 18.0 $\pm 0.5$   | 18.0 $\pm 0.5$   | 18.0 $\pm 0.5$   | 18.0 $\pm 0.5$  | 18.0 $\pm 0.5$  | 18.0 $\pm 0.5$   |  |  |  |  |  |  |
| Hold-down tape width   | W <sub>0</sub> | 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                         |  |  |  |  |  |  |
| Hole position  | W <sub>1</sub> | 9.0 $\pm 0.5$  | 9.0 $\pm 0.5$  | 9.0 $\pm 0.5$  | 9.0 $\pm 0.5$   | 9.0 $\pm 0.5$   | 9.0 $\pm 0.5$  |  |  |  |  |  |  |
| Hold-down tape position  | W <sub>2</sub> | 0.5 to 3.0 max.   | 0.5 to 3.0 max.   | 0.5 to 3.0 max.  |  |  |  |  |  |  |
| Feed hole diameter   | D <sub>0</sub> | 4.0 $\pm 0.2$  | 4.0 $\pm 0.2$  | 4.0 $\pm 0.2$  | 4.0 $\pm 0.2$   | 4.0 $\pm 0.2$   | 4.0 $\pm 0.2$  |  |  |  |  |  |  |
| Pitch of component   | P              | 12.7 $\pm 1.0$   | 12.7 $\pm 1.0$   | 12.7 $\pm 1.0$   | 25.4 $\pm 1.0$  | 25.4 $\pm 1.0$  | 38.1 $\pm 1.5$ or 50.8 $\pm 1.5$                           |  |  |  |  |  |  |
| Feed hole pitch  | P <sub>0</sub> | 12.7 $\pm 0.3$ cumulative pitch error max. 1.0 mm/20 pitch | 12.7 $\pm 0.3$ cumulative pitch error max. 1.0 mm/20 pitch | 12.7 $\pm 0.3$ cumulative pitch error max. 1.0 mm/20 pitch | 12.7 $\pm 0.3$ cumulative pitch error max. 1.0 mm/20 pitch            | 12.7 $\pm 0.3$ cumulative pitch error max. 1.0 mm/20 pitch              | 12.7 $\pm 0.3$ cumulative pitch error max. 1.0 mm/20 pitch |  |  |  |  |  |  |
| Feed hole centre to lead   | P <sub>1</sub> | 5.1 $\pm 0.5$  | 3.85 $\pm 0.7$   | 2.6 $\pm 0.7$  | 7.7 $\pm 0.7$   | 5.2 $\pm 0.7$   | 7.8 $\pm 0.7$  |  |  |  |  |  |  |
| Hole centre to component centre  | P <sub>2</sub> | 6.35 $\pm 1.3$   | 6.35 $\pm 1.3$   | 6.35 $\pm 1.3$   | 12.7 $\pm 1.3$  | 12.7 $\pm 1.3$  | 19.05 $\pm 1.3$  |  |  |  |  |  |  |
| Feed hole centre to bottom edge of the component   | H <sub>1</sub> | 16.5 $\pm 0.3$<br>18.5 $\pm 0.5$                           | 16.5 $\pm 0.3$<br>18.5 $\pm 0.5$                           | 16.5 $\pm 0.5$<br>18.5 $\pm 0.5$                           | 16.5 $\pm 0.5$<br>18.5 $\pm 0.5$                                      | 16.5 $\pm 0.5$<br>18.5 $\pm 0.5$  | 16.5 $\pm 0.5$<br>18.5 $\pm 0.5$                           |  |  |  |  |  |  |
| Feed hole centre to top edge of the component  | H <sub>2</sub> | H+H <sub>component</sub> < H <sub>1</sub><br>32.25 max.    | H+H <sub>component</sub> < H <sub>1</sub><br>32.25 max.    | H+H <sub>component</sub> < H <sub>1</sub><br>24.5 to 31.5  | H+H <sub>component</sub> < H <sub>1</sub><br>25.0 to 31.5             | H+H <sub>component</sub> < H <sub>1</sub><br>26.0 to 37.0               | H+H <sub>component</sub> < H <sub>1</sub><br>30.0 to 43.0  |  |  |  |  |  |  |
| Lead spacing at upper edge of carrier tape   | F              | 2.5 $\pm 0.5$  | 5.0 $^{+0.8}_{-0.2}$                                       | 7.5 $\pm 0.8$  | 10.0 $\pm 0.8$  | 15 $\pm 0.8$  | 22.5 $\pm 0.8$   |  |  |  |  |  |  |
| Lead diameter  | d              | 0.4 $\pm 0.05$   | 0.5 $\pm 0.05$   | *0.5 $\pm 0.05$ or 0.6 $^{+0.06}_{-0.05}$                  | *0.5 $\pm 0.05$ or 0.6 $^{+0.06}_{-0.05}$                             | 0.8 $^{+0.08}_{-0.05}$  | 0.8 $^{+0.08}_{-0.05}$                                     |  |  |  |  |  |  |
| Component alignment  | $\Delta h$     | $\pm 2.0$ max.   | $\pm 2.0$ max.   | $\pm 3.0$ max.   | $\pm 3.0$ max.  | $\pm 3.0$ max.  | $\pm 3.0$ max.   |  |  |  |  |  |  |
| Total tape thickness   | t              | 0.7 $\pm 0.2$  | 0.7 $\pm 0.2$  | 0.7 $\pm 0.2$  | 0.7 $\pm 0.2$   | 0.7 $\pm 0.2$   | 0.7 $\pm 0.2$  |  |  |  |  |  |  |
| ROLL/AMMO  |                | AMMO   |  |  |   |   |  |  |  |  |  |  |  |
| Package<br>(see also page 122)   | ▲              | REEL $\phi 360$ max.<br>$\phi 30 \pm 1$                    | B 52 $\pm 2$<br>depending on comp. dimensions              | REEL $\phi 360$ max.<br>$\phi 30 \pm 1$                    | 52 $\pm 2$<br>B 58 $\pm 2$ or REEL $\phi 500$ max.<br>$\phi 25 \pm 1$ | 54 $\pm 2$<br>B 60 $\pm 2$<br>depending on PCM and component dimensions |  |  |  |  |  |  |  |
| Unit   |                | see details page 124.                                      |  |  |   |   |  |  |  |  |  |  |  |
| <p>▲ Please give „H“ dimensions and desired packaging type when ordering.</p> <p>* Diameter of leads see General Data.</p> <p>* PCM 10 and PCM 15 can be crimped to PCM 7.5.</p> <p>Position of components according to PCM 7.5 Isketch 11. P<sub>0</sub> = 12.7 or 15.0 is possible</p> |                |  |  |  |   |   |  |  |  |  |  |  |  |
| Dims in mm.  |                |  |  |  |   |   |  |  |  |  |  |  |  |
| Please clarify customer-specific deviations with the manufacturer.   |                |  |  |  |   |   |  |  |  |  |  |  |  |