

## Metallized Polyester (PET) SMD Film Capacitors with Box Encapsulation

### Special Features

- Size codes 1812, 2220, 2824, 4030, 5040 and 6054 with PET and encapsulated
- Operating temperature up to 100° C
- Self-healing
- According to RoHS 2002/95/EC

### Typical Applications

For general DC-applications e.g.

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

### Construction

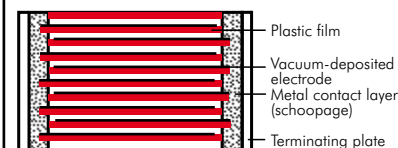
#### Dielectric:

Polyethylene-terephthalate (PET) film

#### Capacitor electrodes:

Vacuum-deposited

#### Internal construction:



#### Encapsulation:

Solvent-resistant, flame-retardant plastic case, UL 94 V-0

#### Terminations:

Tinned plates.

#### Marking:

Box colour: Black.

### Electrical Data

#### Capacitance range:

0.01  $\mu$ F to 6.8  $\mu$ F

#### Rated voltages:

63 VDC, 100 VDC, 250 VDC, 400 VDC, 630 VDC, 1000 VDC

#### Capacitance tolerances:

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

#### Operating temperature range:

$-55^{\circ}$  C to  $+100^{\circ}$  C ( $+125^{\circ}$  C available subject to special enquiry)

#### Climatic test category:

55/100/21 according to IEC

for size codes 1812 to 2824

55/100/56 according to IEC

for size codes 4030 to 6054

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

| $U_r$          | $U_{test}$ | $C \leq 0.33 \mu F$                    | $0.33 \mu F < C \leq 6.8 \mu F$                 |
|----------------|------------|----------------------------------------|-------------------------------------------------|
| 63 VDC         | 50 V       | $\geq 3.75 \times 10^3 M\Omega$        | $\geq 1250 \text{ sec } (M\Omega \times \mu F)$ |
| 100 VDC        | 100 V      | (mean value: $1 \times 10^4 M\Omega$ ) | (mean value: 3000 sec)                          |
| $\geq 250$ VDC | 100 V      | $\geq 1 \times 10^4 M\Omega$           | $\geq 3000 \text{ sec } (M\Omega \times \mu F)$ |
|                |            | (mean value: $5 \times 10^4 M\Omega$ ) | (mean value: 10000 sec)                         |

Measuring time: 1 min.

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

| at f    | $C \leq 0.1 \mu F$       | $0.1 \mu F < C \leq 1.0 \mu F$ | $C > 1.0 \mu F$          |
|---------|--------------------------|--------------------------------|--------------------------|
| 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: for pulses equal to the rated voltage

| Capacitance $\mu F$ | Pulse rise time V/ $\mu$ sec<br>max. operation/test |         |         |         |         |          |
|---------------------|-----------------------------------------------------|---------|---------|---------|---------|----------|
|                     | 63 VDC                                              | 100 VDC | 250 VDC | 400 VDC | 630 VDC | 1000 VDC |
| 0.01 ... 0.022      | 30/300                                              | 35/350  | 40/400  | 35/350  | 40/400  | 50/500   |
| 0.033 ... 0.068     | 20/200                                              | 20/200  | 40/400  | 21/210  | 25/250  | 32/320   |
| 0.1 ... 0.22        | 10/100                                              | 10/100  | 12/120  | 14/140  | 17/170  | —        |
| 0.33 ... 0.68       | 8/80                                                | 6/60    | 9/90    | 10/100  | —       | —        |
| 1.0 ... 2.2         | 3.5/35                                              | 4/40    | 7/70    | —       | —       | —        |
| 3.3 ... 6.8         | 3/30                                                | 3/30    | —       | —       | —       | —        |

### Dip Solder Test/Processing

#### Resistance to soldering heat:

Test Tb in accordance with DIN IEC

60068-2-58/DIN EN 60384-19.

Soldering bath temperature max.  $260^{\circ}$  C.

Soldering duration max. 5 sec.

Change in capacitance  $\Delta C/C < 5\%$ .

#### Soldering process:

Wave soldering and re-flow soldering  
(see temperature/time graphs page 12).

### Packing

Available taped and reeled in 12 mm blister pack.

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 | 63 VDC/40 VAC* |            |                     | 100 VDC/63 VAC* |            |                     | 250 VDC/160 VAC* |            |                     |
|-------------|----------------|------------|---------------------|-----------------|------------|---------------------|------------------|------------|---------------------|
|             | Size code      | H<br>± 0.3 | Part number         | Size code       | H<br>± 0.3 | Part number         | Size code        | H<br>± 0.3 | Part number         |
| 0.01 µF     | 1812           | 3.0        | SMDTC02100KA00_____ | 1812            | 3.0        | SMDTD02100KA00_____ | 1812             | 4.0        | SMDTF02100KB00_____ |
|             | 2220           | 3.5        | SMDTC02100QA00_____ | 2220            | 3.5        | SMDTD02100QA00_____ | 2220             | 3.5        | SMDTF02100QA00_____ |
|             | 2824           | 3.0        | SMDTC02100TA00_____ | 2824            | 3.0        | SMDTD02100TA00_____ | 2824             | 3.0        | SMDTF02100TA00_____ |
| 0.015 "     | 1812           | 3.0        | SMDTC02150KA00_____ | 1812            | 3.0        | SMDTD02150KA00_____ | 1812             | 4.0        | SMDTF02150KB00_____ |
|             | 2220           | 3.5        | SMDTC02150QA00_____ | 2220            | 3.5        | SMDTD02150QA00_____ | 2220             | 3.5        | SMDTF02150QA00_____ |
|             | 2824           | 3.0        | SMDTC02150TA00_____ | 2824            | 3.0        | SMDTD02150TA00_____ | 2824             | 3.0        | SMDTF02150TA00_____ |
| 0.022 "     | 1812           | 3.0        | SMDTC02220KA00_____ | 1812            | 3.0        | SMDTD02220KA00_____ | 1812             | 4.0        | SMDTF02220KB00_____ |
|             | 2220           | 3.5        | SMDTC02220QA00_____ | 2220            | 3.5        | SMDTD02220QA00_____ | 2220             | 3.5        | SMDTF02220QA00_____ |
|             | 2824           | 3.0        | SMDTC02220TA00_____ | 2824            | 3.0        | SMDTD02220TA00_____ | 2824             | 3.0        | SMDTF02220TA00_____ |
| 0.033 "     | 1812           | 3.0        | SMDTC02330KA00_____ | 1812            | 3.0        | SMDTD02330KA00_____ | 2220             | 3.5        | SMDTF02330QA00_____ |
|             | 2220           | 3.5        | SMDTC02330QA00_____ | 2220            | 3.5        | SMDTD02330QA00_____ | 2824             | 3.0        | SMDTF02330TA00_____ |
|             | 2824           | 3.0        | SMDTC02330TA00_____ | 2824            | 3.0        | SMDTD02330TA00_____ | 4030             | 5.0        | SMDTF02330VA00_____ |
| 0.047 "     | 1812           | 3.0        | SMDTC02470KA00_____ | 1812            | 3.0        | SMDTD02470KA00_____ | 2220             | 3.5        | SMDTF02470QA00_____ |
|             | 2220           | 3.5        | SMDTC02470QA00_____ | 2220            | 3.5        | SMDTD02470QA00_____ | 2824             | 3.0        | SMDTF02470TA00_____ |
|             | 2824           | 3.0        | SMDTC02470TA00_____ | 2824            | 3.0        | SMDTD02470TA00_____ | 4030             | 5.0        | SMDTF02470VA00_____ |
| 0.068 "     | 1812           | 3.0        | SMDTC02680KA00_____ | 1812            | 3.0        | SMDTD02680KA00_____ | 2220             | 3.5        | SMDTF02680QA00_____ |
|             | 2220           | 3.5        | SMDTC02680QA00_____ | 2220            | 3.5        | SMDTD02680QA00_____ | 2824             | 3.0        | SMDTF02680TA00_____ |
|             | 2824           | 3.0        | SMDTC02680TA00_____ | 2824            | 3.0        | SMDTD02680TA00_____ | 4030             | 5.0        | SMDTF02680VA00_____ |
| 0.1 µF      | 1812           | 3.0        | SMDTC03100KA00_____ | 1812            | 3.0        | SMDTD03100KA00_____ | 2220             | 3.5        | SMDTF03100QA00_____ |
|             | 2220           | 3.5        | SMDTC03100QA00_____ | 2220            | 3.5        | SMDTD03100QA00_____ | 2824             | 5.0        | SMDTF03100TB00_____ |
|             | 2824           | 3.0        | SMDTC03100TA00_____ | 2824            | 3.0        | SMDTD03100TA00_____ | 4030             | 5.0        | SMDTF03100VA00_____ |
| 0.15 "      | 1812           | 3.0        | SMDTC03150KA00_____ | 1812            | 4.0        | SMDTD03150KB00_____ | 2220             | 4.5        | SMDTF03150QB00_____ |
|             | 2220           | 3.5        | SMDTC03150QA00_____ | 2220            | 3.5        | SMDTD03150QA00_____ | 2824             | 5.0        | SMDTF03150TB00_____ |
|             | 2824           | 3.0        | SMDTC03150TA00_____ | 2824            | 3.0        | SMDTD03150TA00_____ | 4030             | 5.0        | SMDTF03150VA00_____ |
| 0.22 "      | 1812           | 3.0        | SMDTC03220KA00_____ | 1812            | 4.0        | SMDTD03220KB00_____ | 2220             | 4.5        | SMDTF03220QB00_____ |
|             | 2220           | 3.5        | SMDTC03220QA00_____ | 2220            | 3.5        | SMDTD03220QA00_____ | 2824             | 5.0        | SMDTF03220TB00_____ |
|             | 2824           | 3.0        | SMDTC03220TA00_____ | 2824            | 3.0        | SMDTD03220TA00_____ | 4030             | 5.0        | SMDTF03220VA00_____ |
| 0.33 "      | 1812           | 4.0        | SMDTC03330KB00_____ | 2220            | 4.5        | SMDTD03330QB00_____ | 2824             | 5.0        | SMDTF03330TB00_____ |
|             | 2220           | 3.5        | SMDTC03330QA00_____ | 2824            | 5.0        | SMDTD03330TB00_____ | 4030             | 5.0        | SMDTF03330VA00_____ |
|             | 2824           | 3.0        | SMDTC03330TA00_____ | 4030            | 5.0        | SMDTD03330VA00_____ | 5040             | 6.0        | SMDTF03330XA00_____ |
| 0.47 "      | 1812           | 4.0        | SMDTC03470KB00_____ | 2220            | 4.5        | SMDTD03470QB00_____ | 4030             | 5.0        | SMDTF03470VA00_____ |
|             | 2220           | 3.5        | SMDTC03470QA00_____ | 2824            | 5.0        | SMDTD03470TB00_____ | 5040             | 6.0        | SMDTF03470XA00_____ |
|             | 2824           | 3.0        | SMDTC03470TA00_____ | 4030            | 5.0        | SMDTD03470VA00_____ |                  |            |                     |
| 0.68 "      | 2220           | 4.5        | SMDTC03680QB00_____ | 2824            | 5.0        | SMDTD03680TB00_____ | 5040             | 6.0        | SMDTF03680XA00_____ |
|             | 2824           | 3.0        | SMDTC03680TA00_____ | 4030            | 5.0        | SMDTD03680VA00_____ |                  |            |                     |
|             | 4030           | 5.0        | SMDTC03680VA00_____ | 5040            | 6.0        | SMDTD03680XA00_____ |                  |            |                     |
| 1.0 µF      | 2220           | 4.5        | SMDTC04100QB00_____ | 2824            | 5.0        | SMDTD04100TB00_____ | 6054             | 7.0        | SMDTF04100YA00_____ |
|             | 2824           | 3.0        | SMDTC04100TA00_____ | 4030            | 5.0        | SMDTD04100VA00_____ |                  |            |                     |
|             | 4030           | 5.0        | SMDTC04100VA00_____ | 5040            | 6.0        | SMDTD04100XA00_____ |                  |            |                     |
| 1.5 "       | 2824           | 5.0        | SMDTC04150TB00_____ | 4030            | 5.0        | SMDTD04150VA00_____ |                  |            |                     |
|             | 4030           | 5.0        | SMDTC04150VA00_____ | 5040            | 6.0        | SMDTD04150XA00_____ |                  |            |                     |
| 2.2 "       | 2824           | 5.0        | SMDTC04220TB00_____ | 5040            | 6.0        | SMDTD04220XA00_____ |                  |            |                     |
|             | 4030           | 5.0        | SMDTC04220VA00_____ |                 |            |                     |                  |            |                     |
| 3.3 "       | 4030           | 5.0        | SMDTC04330VA00_____ | 5040            | 6.0        | SMDTD04330XA00_____ |                  |            |                     |
| 4.7 "       | 5040           | 6.0        | SMDTC04470XA00_____ | 6054            | 7.0        | SMDTD04470YA00_____ |                  |            |                     |
| 6.8 "       | 6054           | 7.0        | SMDTC04680YA00_____ |                 |            |                     |                  |            |                     |

Part number completion:

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

Pin length: none = 00

Taped version see page 126.

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

Dims. in mm.

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## Continuation

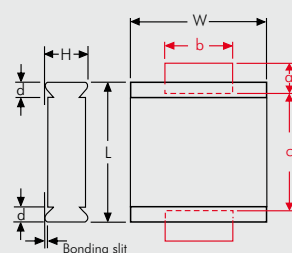
### General Data

| Capacitance | 400 VDC/200 VAC* |            |                                                                                          | 630 VDC/300 VAC* |            |                                                                   | 1000 VDC/400 VAC* |            |                                            |
|-------------|------------------|------------|------------------------------------------------------------------------------------------|------------------|------------|-------------------------------------------------------------------|-------------------|------------|--------------------------------------------|
|             | Size code        | H<br>± 0.3 | Part number                                                                              | Size code        | H<br>± 0.3 | Part number                                                       | Size code         | H<br>± 0.3 | Part number                                |
| 0.01 µF     | 2824<br>4030     | 3.0<br>5.0 | SMDTG02100TA00_____<br>SMDTG02100VA00_____<br>SMDTG02100XA00_____<br>SMDTG02100YA00_____ | 4030             | 5.0        | SMDTJ02100VA00_____<br>SMDTJ02100XA00_____<br>SMDTJ02100YA00_____ |                   |            |                                            |
| 0.015 "     | 2824<br>4030     | 3.0<br>5.0 | SMDTG02150TA00_____<br>SMDTG02150VA00_____<br>SMDTG02150XA00_____<br>SMDTG02150YA00_____ | 4030             | 5.0        | SMDTJ02150VA00_____<br>SMDTJ02150XA00_____<br>SMDTJ02150YA00_____ | 5040              | 6.0        | SMDTO12150XA00_____<br>SMDTO12150YA00_____ |
| 0.022 "     | 2824<br>4030     | 3.0<br>5.0 | SMDTG02220TA00_____<br>SMDTG02220VA00_____<br>SMDTG02220XA00_____<br>SMDTG02220YA00_____ | 5040             | 6.0        | SMDTJ02220XA00_____<br>SMDTJ02220YA00_____                        | 5040              | 6.0        | SMDTO12220XA00_____<br>SMDTO12220YA00_____ |
| 0.033 "     | 2824<br>4030     | 5.0<br>5.0 | SMDTG02330TB00_____<br>SMDTG02330VA00_____<br>SMDTG02330XA00_____<br>SMDTG02330YA00_____ | 5040             | 6.0        | SMDTJ02330XA00_____<br>SMDTJ02330YA00_____                        | 5040              | 6.0        | SMDTO12330XA00_____<br>SMDTO12330YA00_____ |
| 0.047 "     | 2824<br>4030     | 5.0<br>5.0 | SMDTG02470TB00_____<br>SMDTG02470VA00_____<br>SMDTG02470XA00_____<br>SMDTG02470YA00_____ | 5040             | 6.0        | SMDTJ02470XA00_____<br>SMDTJ02470YA00_____                        | 6054              | 7.0        | SMDTO12470YA00_____                        |
| 0.068 "     | 4030<br>5040     | 5.0<br>6.0 | SMDTG02680VA00_____<br>SMDTG02680XA00_____<br>SMDTG02680YA00_____                        | 5040             | 6.0        | SMDTJ02680XA00_____<br>SMDTJ02680YA00_____                        |                   |            |                                            |
| 0.1 µF      | 4030<br>5040     | 5.0<br>6.0 | SMDTG03100VA00_____<br>SMDTG03100XA00_____<br>SMDTG03100YA00_____                        | 6054             | 7.0        | SMDTJ03100YA00_____                                               |                   |            |                                            |
| 0.15 "      | 4030<br>5040     | 5.0<br>6.0 | SMDTG03150VA00_____<br>SMDTG03150XA00_____<br>SMDTG03150YA00_____                        | 6054             | 7.0        | SMDTJ03150YA00_____                                               |                   |            |                                            |
| 0.22 "      | 5040             | 6.0        | SMDTG03220XA00_____<br>SMDTG03220YA00_____                                               | 6054             | 7.0        | SMDTJ03220YA00_____                                               |                   |            |                                            |
| 0.33 "      | 5040             | 6.0        | SMDTG03330XA00_____<br>SMDTG03330YA00_____                                               |                  |            |                                                                   |                   |            |                                            |
| 0.47 "      | 6054             | 7.0        | SMDTG03470YA00_____                                                                      |                  |            |                                                                   |                   |            |                                            |

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

Dims. in mm.

Solder pad recommendation



Part number completion:

Tolerance: 20 % = M  
10 % = K  
5 % = J

Packing: bulk = S

Pin length: none = 00

Taped version see page 126.

The values of the WIMA SMD-PEN range according to the main catalogue 2009 are still available on request.

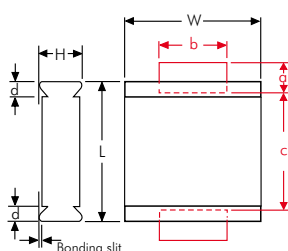
| Size code | L<br>±0.3 | W<br>±0.3 | d   | a<br>min. | b<br>min. | c<br>max. |
|-----------|-----------|-----------|-----|-----------|-----------|-----------|
| 1812      | 4.8       | 3.3       | 0.5 | 1.2       | 3.5       | 3.5       |
| 2220      | 5.7       | 5.1       | 0.5 | 1.2       | 4         | 4.5       |
| 2824      | 7.2       | 6.1       | 0.5 | 1.2       | 4         | 6.5       |
| 4030      | 10.2      | 7.6       | 0.5 | 2.5       | 6         | 9         |
| 5040      | 12.7      | 10.2      | 0.7 | 2.5       | 6         | 11.5      |
| 6054      | 15.3      | 13.7      | 0.7 | 2.5       | 6         | 14        |

# Recommendation for Processing and Application of SMD Capacitors

## Layout Form

The components can generally be positioned on the carrier material as desired. In order to prevent soldering shadows or ensure regular temperature distribution, extreme concentration of the components should be avoided. In practice, it has proven best to keep a minimum distance of the soldering surfaces between two WIMA SMDs of twice the height of the components.

## Solder Pad Recommendation



| Size code | L<br>± 0.3 | W<br>± 0.3 | d   | a<br>min. | b<br>min. | c<br>max. |
|-----------|------------|------------|-----|-----------|-----------|-----------|
| 1812      | 4.8        | 3.3        | 0.5 | 1.2       | 3.5       | 3.5       |
| 2220      | 5.7        | 5.1        | 0.5 | 1.2       | 4         | 4.5       |
| 2824      | 7.2        | 6.1        | 0.5 | 1.2       | 4         | 6.5       |
| 4030      | 10.2       | 7.6        | 0.5 | 2.5       | 6         | 9         |
| 5040      | 12.7       | 10.2       | 0.7 | 2.5       | 6         | 11.5      |
| 6054      | 15.3       | 13.7       | 0.7 | 2.5       | 6         | 14        |

The solder pad size recommendations given for each individual series are to be understood as minimum dimensions which can at any time be adjusted to the layout form.

## Processing

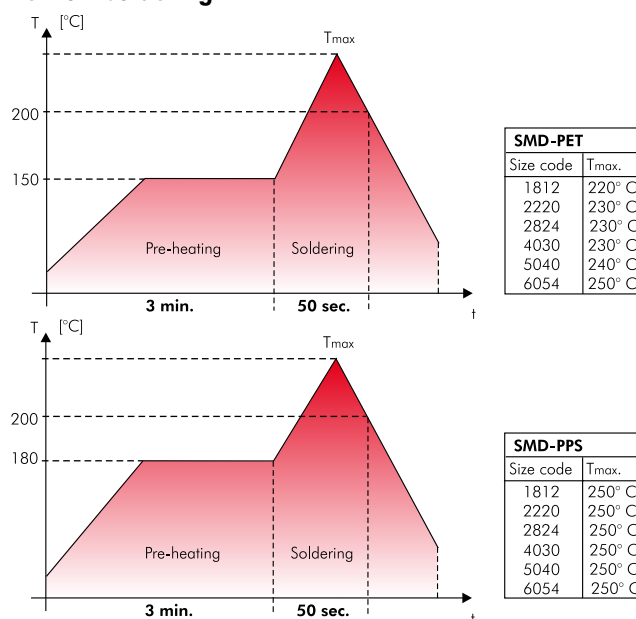
The processing of SMD components

- assembling
- soldering
- electrical final inspection/ calibrating

must be regarded as a complete process. The soldering of the printed circuit board, for example, can constitute considerable stress on all the electronic components. The manufacturer's instructions on the processing of the components are mandatory.

## Soldering Process

### Re-flow soldering



Temperature/time graph for the permissible processing temperature of the WIMA SMD film capacitor for typical convection soldering processes.

Due to the diverse procedures and the varying heat requirements of the different types of components, an exact processing temperature for re-flow soldering processes cannot be specified. The graph shows the upper limits of temperature and time which

must not be exceeded when establishing the solder profile according to your actual requirements.

A max. temperature of T = 210° C inside the component should not be exceeded when processing WIMA SMD capacitors.

## SMD Handsoldering

WIMA SMD capacitors with plastic film dielectric are generally suitable for hand-soldering with a soldering iron where, however, similar to automated soldering processes, a certain duration and temperature should not be exceeded. These parameters are dependent on the physical size of the components and the relevant heat absorption involved.

The below data are to be regarded as guideline values and should serve to avoid damage to the dielectric caused by excessive heat during the soldering process. The soldering quality depends on the tool used and on the skill and experience of the person with the soldering iron in hand.

| Size code | Temperature °C / °F | Time duration                             |
|-----------|---------------------|-------------------------------------------|
| 1812      | 225 / 437           | 2 sec plate 1 / 5 sec off / 2 sec plate 2 |
| 2220      | 225 / 437           | 3 sec plate 1 / 5 sec off / 3 sec plate 2 |
| 2824      | 250 / 482           | 3 sec plate 1 / 5 sec off / 3 sec plate 2 |
| 4030      | 260 / 500           | 5 sec plate 1 / 5 sec off / 5 sec plate 2 |
| 5040      | 260 / 500           | 5 sec plate 1 / 5 sec off / 5 sec plate 2 |
| 6054      | 260 / 500           | 5 sec plate 1 / 5 sec off / 5 sec plate 2 |

## Recommendation for Processing and Application of SMD Capacitors (Continuation)

### Solder Paste

To obtain the best soldering performance we suggest the use of following solder paste alloy:

#### Lead free solder paste

Sn - Bi  
Sn - Zn (Bi)  
Sn - Ag - Cu

#### Solder paste with lead

Sn - Pb - Ag (Sn60-Pb40-A, Sn63-Pb37-A)

### Initial Operation/Calibration

Due to the stress which the components are subjected to during processing, reversible parameter changes occur in almost all electronic components. The capacitance recovery accuracy to be expected with careful processing is within a scope of

$$|\Delta C/C| \leq 5 \%$$

For the initial operation of the device a minimum storage time of

$$t \geq 24 \text{ hours}$$

is to be taken into account. With calibrated devices or when the application is largely dependent on capacitance it is advisable to prolong the storage time to

$$t \geq 10 \text{ days}$$

In this way ageing effects of the capacitor structure can be anticipated. Parameter changes due to processing are not to be expected after this period of time

### Humidity Protection Bags

Taped WIMA SMD capacitors are shipped in humidity protection bags according to JEDEC standard, level 1 (EMI/static-shielding bags conforming to MIL-B 81705, Type 1, Class 1). Under controlled conditions the components can be stored two years

and more in the originally sealed bag. Opened packing units should be consumed instantly or resealed for specific storage under controlled conditions.

### Reliability

Taking account of the manufacturer's guidelines and compatible processing, the WIMA SMD stand out for the same high quality and reliability as the analogous through-hole WIMA series. The technology of metallized film capacitors used e.g. in WIMA SMD-PET achieves the best values for all fields of application. The expected value is about:

$$\lambda_0 \leq 2 \text{ fit}$$

Furthermore the production of all WIMA components is subject to the regulations laid down by ISO 9001:2008 as well as the guidelines for component specifications set out by IEC quality assessment system (IECQ-CECC) for electronic components.

### Electrical Characteristics and Fields of Application

Basically the WIMA SMD series have the same electrical characteristics as the analogous through-hole WIMA capacitors. Compared to ceramic or tantalum dielectrics WIMA SMD capacitors have a number of other outstanding qualities:

- favourable pulse rise time
- low ESR
- low dielectric absorption
- available in high voltage series
- large capacitance spectrum
- stand up to high mechanical stress
- good long-term stability

As regards technical performance as well as quality and reliability, the WIMA SMD series offer the possibility to cover nearly all applications of conventionally through-hole film capacitors with SMD components. Furthermore, the WIMA SMD series can

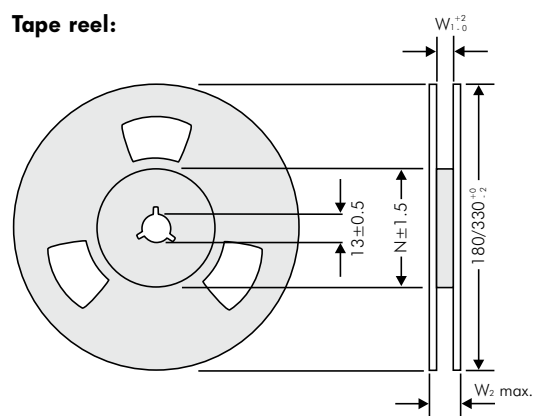
now be used for all the demanding capacitor applications for which, in the past, the use of through-hole components was mandatory:

- measuring techniques
- oscillator circuits
- differentiating and integrating circuits
- A/D or D/A transformers
- sample and hold circuits
- automotive electronics

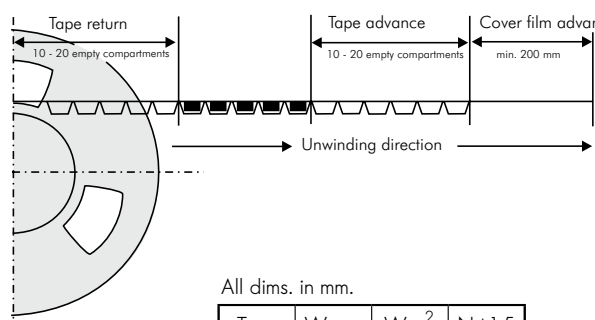
With the WIMA SMD programme available today, the major part of all plastic film capacitors can be replaced by WIMA SMD components. The field of application ranges from standard coupling capacitors to use in switch-mode power supplies as filter or charging capacitors with high voltage and capacitance values, as well as in telecommunications e.g. the well-known telephone capacitor  $1 \mu\text{F}/250\text{VDC}$ .

# Blister Tape Packaging and Packing Units of the WIMA SMD Capacitors

Tape reel:

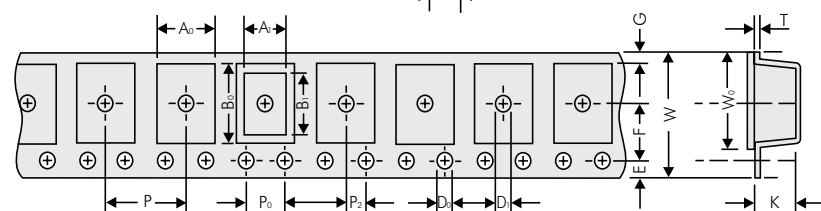


Tape advance and return:



All dims. in mm.

| Type | W <sub>2max</sub> | W <sub>1</sub> ± 0.2 | N ± 1.5 |
|------|-------------------|----------------------|---------|
| 1812 | 19                | 12.4                 | 62      |
| 2220 | 19                | 12.4                 | 62      |
| 2824 | 19                | 12.4                 | 62      |
| 4030 | 22.4              | 16.4                 | 60      |
| 5040 | 30.4              | 24.4                 | 90      |
| 6054 | 30.4              | 24.4                 | 90      |



Packing units

| Size Code 1812 |      | A <sub>0</sub> ± 0.1 | A <sub>1</sub> | B <sub>0</sub> ± 0.1 | B <sub>1</sub> | D <sub>0</sub> +0.1 -0 | D <sub>1</sub> +0.1 -0 | P ± 0.1 | P <sub>0</sub> * ± 0.1 | P <sub>2</sub> ± 0.05 | E ± 0.1 | F ± 0.05 | G   | W ± 0.3 | W <sub>0</sub> ± 0.2 | K ± 0.1 | T ± 0.1 |
|----------------|------|----------------------|----------------|----------------------|----------------|------------------------|------------------------|---------|------------------------|-----------------------|---------|----------|-----|---------|----------------------|---------|---------|
| Box size       | Code |                      |                |                      |                |                        |                        |         |                        |                       |         |          |     |         |                      |         |         |
| 4.8x3.3x3      | KA   | 3.55                 | 3.3            | 5.1                  | 4.8            | Ø1.5                   | Ø1.5                   | 8       | 4                      | 2                     | 1.75    | 5.5      | 2.2 | 12      | 9.5                  | 3.4     | 0.3     |
| 4.8x3.3x4      | KB   | 3.55                 | 3.3            | 5.1                  | 4.8            | Ø1.5                   | Ø1.5                   | 8       | 4                      | 2                     | 1.75    | 5.5      | 2.2 | 12      | 9.5                  | 4.4     | 0.3     |

| taped Reel 180 mm Ø | taped Reel 330 mm Ø | bulk |          |
|---------------------|---------------------|------|----------|
|                     |                     | Mini | Standard |
| 750                 | 2500                | 1000 | 3000     |
| 500                 | 2000                | 1000 | 3000     |

| Size Code 2220 |      | A <sub>0</sub> ± 0.1 | A <sub>1</sub> | B <sub>0</sub> ± 0.1 | B <sub>1</sub> | D <sub>0</sub> +0.1 -0 | D <sub>1</sub> +0.1 -0 | P ± 0.1 | P <sub>0</sub> * ± 0.1 | P <sub>2</sub> ± 0.05 | E ± 0.1 | F ± 0.05 | G    | W ± 0.3 | W <sub>0</sub> ± 0.2 | K ± 0.1 | T ± 0.1 |
|----------------|------|----------------------|----------------|----------------------|----------------|------------------------|------------------------|---------|------------------------|-----------------------|---------|----------|------|---------|----------------------|---------|---------|
| Box size       | Code |                      |                |                      |                |                        |                        |         |                        |                       |         |          |      |         |                      |         |         |
| 5.7x5.1x3.5    | QA   | 6.3                  | 5.7            | 5.6                  | 5.1            | Ø1.5                   | Ø1.5                   | 8       | 4                      | 2                     | 1.75    | 5.5      | 1.95 | 12      | 9.5                  | 3.7     | 0.3     |
| 5.7x5.1x4.5    | QB   | 6.3                  | 5.7            | 5.6                  | 5.1            | Ø1.5                   | Ø1.5                   | 8       | 4                      | 2                     | 1.75    | 5.5      | 1.95 | 12      | 9.5                  | 4.7     | 0.3     |

| taped Reel 180 mm Ø | taped Reel 330 mm Ø | bulk |          |
|---------------------|---------------------|------|----------|
|                     |                     | Mini | Standard |
| 500                 | 1800                | 1000 | 3000     |
| 400                 | 1500                | 1000 | 3000     |

| Size Code 2824 |      | A <sub>0</sub> ± 0.1 | A <sub>1</sub> | B <sub>0</sub> ± 0.1 | B <sub>1</sub> | D <sub>0</sub> +0.1 -0 | D <sub>1</sub> +0.1 -0 | P ± 0.1 | P <sub>0</sub> * ± 0.1 | P <sub>2</sub> ± 0.05 | E ± 0.1 | F ± 0.05 | G   | W ± 0.3 | W <sub>0</sub> ± 0.2 | K ± 0.1 | T ± 0.1 |
|----------------|------|----------------------|----------------|----------------------|----------------|------------------------|------------------------|---------|------------------------|-----------------------|---------|----------|-----|---------|----------------------|---------|---------|
| Box size       | Code |                      |                |                      |                |                        |                        |         |                        |                       |         |          |     |         |                      |         |         |
| 7.2x6.1x3      | TA   | 6.6                  | 6.1            | 7.7                  | 7.2            | Ø1.5                   | Ø1.5                   | 12      | 4                      | 2                     | 1.75    | 5.5      | 0.9 | 12      | 9.5                  | 3.4     | 0.3     |
| 7.2x6.1x5      | TB   | 6.6                  | 6.1            | 7.7                  | 7.2            | Ø1.5                   | Ø1.5                   | 12      | 4                      | 2                     | 1.75    | 5.5      | 0.9 | 12      | 9.5                  | 5.4     | 0.4     |

| taped Reel 330 mm Ø | bulk |          |
|---------------------|------|----------|
|                     | Mini | Standard |
| 1500                | 500  | 2000     |
| 750                 | 500  | 2000     |

|                | Code | A <sub>0</sub> ± 0.1 | A <sub>1</sub> | B <sub>0</sub> ± 0.1 | B <sub>1</sub> | D <sub>0</sub> +0.1 -0 | D <sub>1</sub> +0.1 -0 | P ± 0.1 | P <sub>0</sub> * ± 0.1 | P <sub>2</sub> ± 0.05 | E ± 0.1 | F ± 0.05 | G    | W ± 0.3 | W <sub>0</sub> ± 0.2 | K ± 0.1 | T ± 0.1 |
|----------------|------|----------------------|----------------|----------------------|----------------|------------------------|------------------------|---------|------------------------|-----------------------|---------|----------|------|---------|----------------------|---------|---------|
| Size Code 4030 | VA   | 10.7                 | 10.2           | 8.1                  | 9.1            | Ø1.5                   | Ø1.5                   | 16      | 4                      | 2                     | 1.75    | 7.5      | 1.9  | 16      | 13.3                 | 5.5     | 0.3     |
| Size Code 5040 | XA   | 13.5                 | 12.7           | 11                   | 11.5           | Ø1.5                   | Ø1.5                   | 16      | 4                      | 2                     | 1.75    | 11.5     | 4.7  | 24      | 21.3                 | 6.5     | 0.3     |
| Size Code 6054 | YA   | 17.0                 | 16.5           | 15.6                 | 15.0           | Ø1.5                   | Ø1.5                   | 20      | 4                      | 2                     | 1.75    | 11.5     | 2.95 | 24      | 21.3                 | 7.5     | 0.3     |

| taped Reel 330 mm Ø | bulk |          |
|---------------------|------|----------|
|                     | Mini | Standard |
| 775                 | 500  | 2000     |
| 600                 | 200  | 1000     |
| 450                 | 100  | 500      |

\* cumulative after 10 steps ± 0.2 mm max.  
Samples and pre-production needs on request or 1 Reel minimum.

Part number codes for SMD packing

| W (Blister)   | Ø in mm | Code |
|---------------|---------|------|
| 12            | 180     | P    |
| 12            | 330     | Q    |
| 16            | 330     | R    |
| 24            | 330     | T    |
| Bulk Standard |         | S    |

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 |    |
|                          |   |   |   |                       |   |                     |   |   |    |                            |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| <b>Type description:</b> |   |   |   | <b>Rated voltage:</b> |   | <b>Capacitance:</b> |   |   |    | <b>Size:</b>               |    |    |    | <b>Tolerance:</b>                                                                                                                                                                                                                                                                                                                                                                               |      |      |    |
| SMD-PET = SMDT           |   |   |   | 2.5 VDC = A1          |   | 22 pF = 0022        |   |   |    | 4.8x3.3x3 Size 1812 = KA   |    |    |    | 20% = M                                                                                                                                                                                                                                                                                                                                                                                         |      |      |    |
| SMD-PPS = SMDI           |   |   |   | 4 VDC = A2            |   | 47 pF = 0047        |   |   |    | 4.8x3.3x4 Size 1812 = KB   |    |    |    | 10% = K                                                                                                                                                                                                                                                                                                                                                                                         |      |      |    |
| FKP 02 = FKP0            |   |   |   | 14 VDC = A3           |   | 100 pF = 0100       |   |   |    | 5.7x5.1x3.5 Size 2220 = QA |    |    |    | 5% = J                                                                                                                                                                                                                                                                                                                                                                                          |      |      |    |
| MKS 02 = MKS0            |   |   |   | 28 VDC = A4           |   | 150 pF = 0150       |   |   |    | 5.7x5.1x4.5 Size 2220 = QB |    |    |    | 2.5% = H                                                                                                                                                                                                                                                                                                                                                                                        |      |      |    |
| FKS 2 = FKS2             |   |   |   | 40 VDC = A5           |   | 220 pF = 0220       |   |   |    | 7.2x6.1x3 Size 2824 = TA   |    |    |    | 1% = E                                                                                                                                                                                                                                                                                                                                                                                          |      |      |    |
| FKP 2 = FKP2             |   |   |   | 5 VDC = A6            |   | 330 pF = 0330       |   |   |    | 7.2x6.1x5 Size 2824 = TB   |    |    |    | ...                                                                                                                                                                                                                                                                                                                                                                                             |      |      |    |
| MKS 2 = MKS2             |   |   |   | 50 VDC = B0           |   | 470 pF = 0470       |   |   |    | 10.2x7.6x5 Size 4030 = VA  |    |    |    | <b>Packing:</b><br>AMMO H16.5 340x340 = A<br>AMMO H16.5 490x370 = B<br>AMMO H18.5 340x340 = C<br>AMMO H18.5 490x370 = D<br>REEL H16.5 360 = F<br>REEL H16.5 500 = H<br>REEL H18.5 360 = I<br>REEL H18.5 500 = J<br>ROLL H16.5 = N<br>ROLL H18.5 = O<br>BLISTER W12 180 = P<br>BLISTER W12 330 = Q<br>BLISTER W16 330 = R<br>BLISTER W24 330 = T<br>Bulk Standard = S<br>TPS Standard = Y<br>... |      |      |    |
| MKP 2 = MKP2             |   |   |   | 63 VDC = C0           |   | 680 pF = 0680       |   |   |    | 12.7x10.2x6 Size 5040 = XA |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| FKS 3 = FKS3             |   |   |   | 100 VDC = D0          |   | 1000 pF = 1100      |   |   |    | 15.3x13.7x7 Size 6054 = YA |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| FKP 3 = FKP3             |   |   |   | 160 VDC = E0          |   | 1500 pF = 1150      |   |   |    | 2.5x7x4.6 PCM 2.5 = 0B     |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MKS 4 = MKS4             |   |   |   | 250 VDC = F0          |   | 2200 pF = 1220      |   |   |    | 3x7.5x4.6 PCM 2.5 = 0C     |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MKP 4 = MKP4             |   |   |   | 400 VDC = G0          |   | 3300 pF = 1330      |   |   |    | 2.5x6.5x7.2 PCM 5 = 1A     |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MKP 10 = MKP1            |   |   |   | 450 VDC = H0          |   | 4700 pF = 1470      |   |   |    | 3x7.5x7.2 PCM 5 = 1B       |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| FKP 4 = FKP4             |   |   |   | 600 VDC = I0          |   | 6800 pF = 1680      |   |   |    | 2.5x7x10 PCM 7.5 = 2A      |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| FKP 1 = FKP1             |   |   |   | 630 VDC = J0          |   | 0.01 µF = 2100      |   |   |    | 3x8.5x10 PCM 7.5 = 2B      |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MKP-X2 = MKX2            |   |   |   | 700 VDC = K0          |   | 0.022 µF = 2220     |   |   |    | 3x9x13 PCM 10 = 3A         |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MKP-X2 R = MKXR          |   |   |   | 800 VDC = L0          |   | 0.047 µF = 2470     |   |   |    | 4x9x13 PCM 10 = 3C         |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MKP-Y2 = MKY2            |   |   |   | 850 VDC = M0          |   | 0.1 µF = 3100       |   |   |    | 5x11x18 PCM 15 = 4B        |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MP 3-X2 = MPX2           |   |   |   | 900 VDC = N0          |   | 0.22 µF = 3220      |   |   |    | 6x12.5x18 PCM 15 = 4C      |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MP 3-X1 = MPX1           |   |   |   | 1000 VDC = O1         |   | 0.47 µF = 3470      |   |   |    | 5x14x26.5 PCM 22.5 = 5A    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MP 3-Y2 = MPY2           |   |   |   | 1100 VDC = P0         |   | 1 µF = 4100         |   |   |    | 6x15x26.5 PCM 22.5 = 5B    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| MP 3R-Y2 = MPRY          |   |   |   | 1200 VDC = Q0         |   | 2.2 µF = 4220       |   |   |    | 9x19x31.5 PCM 27.5 = 6A    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| Snubber MKP = SNMP       |   |   |   | 1250 VDC = R0         |   | 4.7 µF = 4470       |   |   |    | 11x21x31.5 PCM 27.5 = 6B   |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| Snubber FKP = SNFP       |   |   |   | 1500 VDC = S0         |   | 10 µF = 5100        |   |   |    | 9x19x41.5 PCM 37.5 = 7A    |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| GTO MKP = GTOM           |   |   |   | 1600 VDC = T0         |   | 22 µF = 5220        |   |   |    | 11x22x41.5 PCM 37.5 = 7B   |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| DC-LINK MKP 4 = DCP4     |   |   |   | 2000 VDC = U0         |   | 47 µF = 5470        |   |   |    | 94x49x182 DCH_ = H0        |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| DC-LINK MKP 5 = DCP5     |   |   |   | 2500 VDC = V0         |   | 100 µF = 6100       |   |   |    | 94x77x182 DCH_ = H1        |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| DC-LINK MKP 6 = DCP6     |   |   |   | 3000 VDC = W0         |   | 220 µF = 6220       |   |   |    | ...                        |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| DC-LINK HC = DCH_        |   |   |   | 4000 VDC = X0         |   | 1 F = A010          |   |   |    |                            |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| SuperCap C = SCSC        |   |   |   | 6000 VDC = Y0         |   | 2.5 F = A025        |   |   |    |                            |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| SuperCap MC = SCMC       |   |   |   | 250 VAC = 0V          |   | 50 F = A500         |   |   |    | <b>Special features:</b>   |    |    |    | <b>Lead length (untaped)</b><br>3.5 ±0.5 = C9<br>6 -2 = SD<br>16 ±1 = P1<br>...                                                                                                                                                                                                                                                                                                                 |      |      |    |
| SuperCap R = SCSR        |   |   |   | 275 VAC = 1V          |   | 100 F = B100        |   |   |    | Standard = 00              |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
| SuperCap MR = SCMR       |   |   |   | 300 VAC = 2V          |   | 110 F = B110        |   |   |    | Version A1 = 1A            |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
|                          |   |   |   | 400 VAC = 3V          |   | 600 F = B600        |   |   |    | Version A1.1.1 = 1B        |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
|                          |   |   |   | 440 VAC = 4V          |   | 1200 F = C120       |   |   |    | Version A1.2 = 1C          |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |
|                          |   |   |   | 500 VAC = 5V          |   | ...                 |   |   |    | ...                        |    |    |    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |    |