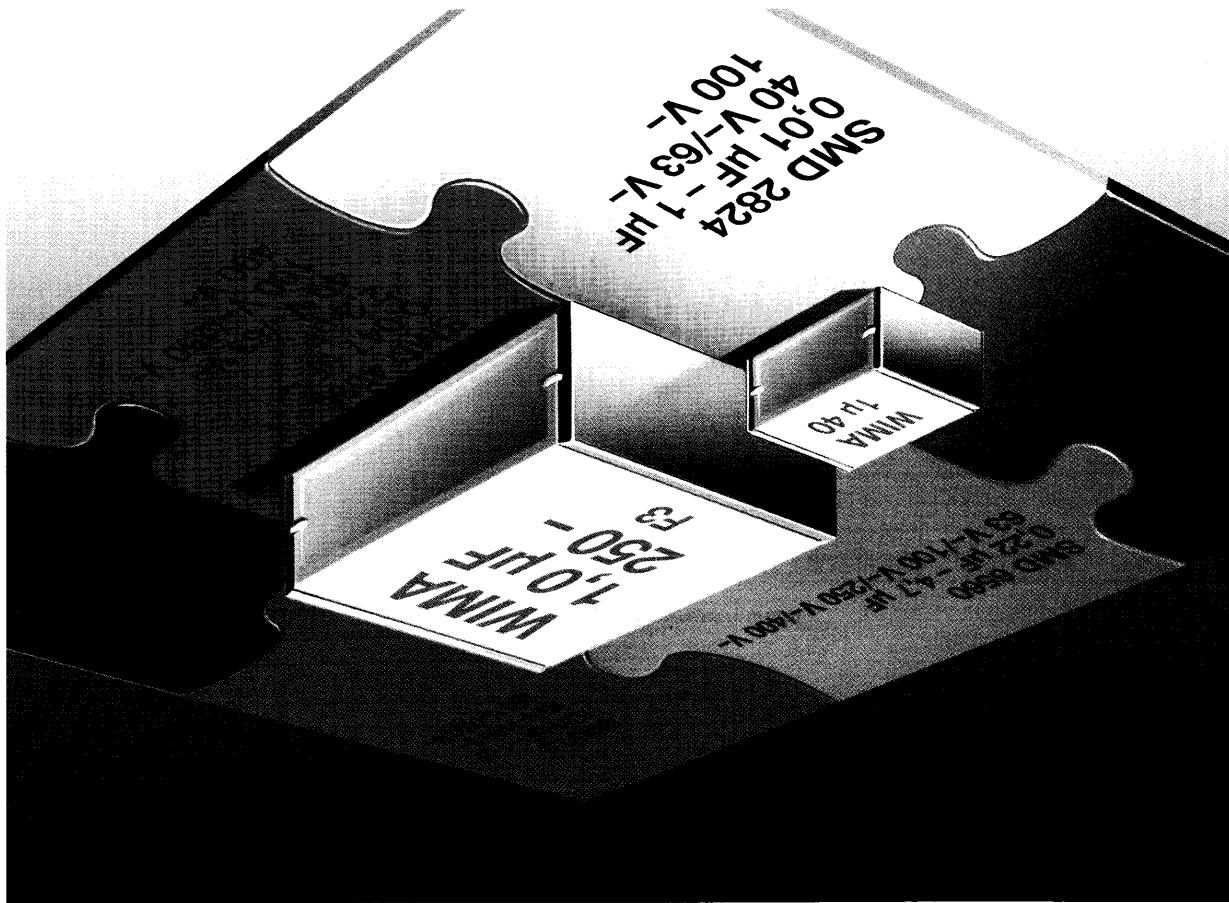


The SMD component you can rely on



Based on international size codes used worldwide,

WIMA has developed a new generation of polyester SMD

capacitors with capacitance values from 1000 pF to

4.7 μ F and voltages ranging from 40 VDC to 400 VDC.

The new SMDs are available in the size codes 2220, 2824,

4036, 5045 and 6560. For the first time, plastic film SMD

capacitors are now available to the user for a wide

spectrum of applications which could so far only be covered

by leaded components.

All WIMA series are manufactured in proven resin-potted

case technology, which has substantial advantages in

comparison with non-encapsulated or moulded SMD

capacitor versions.

■ No danger of delamination. Safe protection of the

capacitor element against mechanical stress which occurs

during processing when assembling, soldering or washing.

■ No danger of internal cracks or tearing away of the

contacts due to similar expansion coefficients and the

elasticity of the construction.

■ Excellent protection against environmental influences

during processing and operation.

■ Flame-retardent plastic case in accordance with UL 94-0.

The use of polyester as a dielectric also provides a number of

further advantages in comparison to PEN or PPS films.

■ Polyester is easily available as a standard film and is

thus well suited for widescale serial production.

■ Statements about reliability can be made based on an

enormous number of component hours, since there

have been decades of experience in production and

application of leaded components.

■ Advantageous cost/performance ratio.

Due to these positive qualities and the wide range of

products, WIMA SMDs have a good chance of substituting

other capacitor techniques and establishing themselves

as the de facto standard in future electronic developments.

WIMA SMD 4036

WIMA SMD 5045

WIMA SMD 6560

■ Capacitance values from 0.047 μF through 4.7 μF with rated voltages from 40 VDC through 400 VDC. The entire range is spread over the three size codes 4036, 5045 and 6560 allowing to realize SMD plastic film capacitors with higher capacitances and rated voltages. ■ The entire surface of the end sides being used as soldering surface results in excellent soldering quality. ■ The excellent electrical properties open up applications where quality and reliability are of importance. ■ Available taped and reeled.

Technical Data

Dielectric: Polyethylene terephthalate film.

Encapsulation: Flame-retardant plastic case, UL 94 V-0, with epoxy resin seal. Colour: White or Black. Marking: Silver.

Temperature range: -55° C to +100° C.

and IEC 37200.
Test category: 55/100/56 in accordance with IEC.

Insulation resistance at +20°C:

V'	V_{test}	$C \leq 0.33 \mu F$	$\geq 3.75 \times 10^3 M\Omega$	$\geq 1 \times 10^4 M\Omega$	$\geq 1 \times 10^4 M\Omega$	Mean value: $5 \times 10^4 M\Omega$	Mean value: $10\ 000\ sec$
40 VDC	10 V						
63 VDC	50 V						
100 VDC	100 V						
$\geq 250\ VDC$	$100\ V$						
		$0.33 \mu F < C \leq 47 \mu F$	$\geq 1250\ sec\ (M\Omega \times \mu F)$	$\geq 3000\ sec$	$\geq 3000\ sec$	Mean value: $10\ 000\ sec$	

In accordance with IEC 384-19 and CECC 32 200.

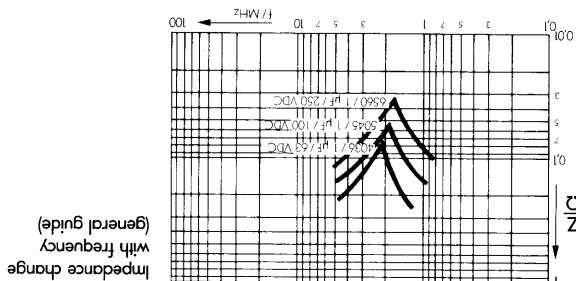
Measuring time: 1 min.

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

α f	$C \leq 0,1 \mu F$	$8 \times 10^{-3} \leq$ $15 \times 10^{-3} \leq$ $30 \times 10^{-3} \leq$	$8 \times 10^{-3} \leq$ $15 \times 10^{-3} \leq$ $30 \times 10^{-3} \leq$	1 KHz 10 KHz 100 KHz
	$0,1 \mu F < C \leq 1,0 \mu F$	$8 \times 10^{-3} \leq$ $15 \times 10^{-3} \leq$ $30 \times 10^{-3} \leq$	$8 \times 10^{-3} \leq$ $15 \times 10^{-3} \leq$ $30 \times 10^{-3} \leq$	
	$C > 1,0 \mu F$	$8 \times 10^{-3} \leq$ $15 \times 10^{-3} \leq$ $30 \times 10^{-3} \leq$	$8 \times 10^{-3} \leq$ $15 \times 10^{-3} \leq$ $30 \times 10^{-3} \leq$	

Capacitance tolerances: $\pm 20\%$ (closer tolerances are available subject to special enquiry).

General Data



Soldering process: Wave soldering and re-flow soldering.

$$\left| \frac{C}{C_0} \right| \leq 3\%$$

Solder bath temperature max. 260°C.
Soldering duration max. 5 sec. | ACI

Resistance to soldering heat:

Test voltage: 1.6 Vr, 2 sec.

3.3	- 4.7	3/30	3/30
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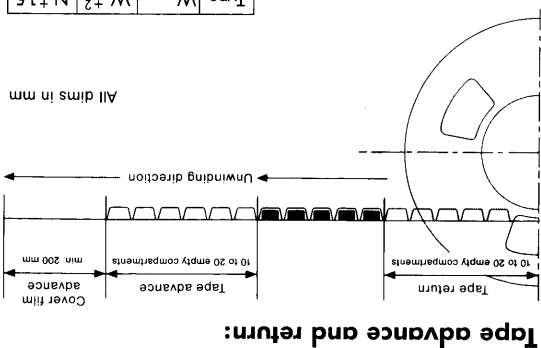
Capacitance μF	40 VDC	63 VDC max. operation	100 VDC	150 VDC test	200 VDC	250 VDC test	400 VDC
0.047 - 0.068	5/50	6/60	5/50	6/60	15/150	20/200	32/320
0.1 - 0.15	5/50	6/60	5/50	6/60	15/150	20/200	26/260
0.22 - 0.33	5/50	6/60	5/50	6/60	15/150	20/200	26/260
0.47 - 1.0	5/50	6/60	5/50	6/60	15/150	20/200	26/260
1.5 - 2.2	5/50	6/60	5/50	6/60	15/150	20/200	26/260
3.3 - 4.7	5/50	6/60	5/50	6/60	15/150	20/200	26/260

Maximum pulse rise time:

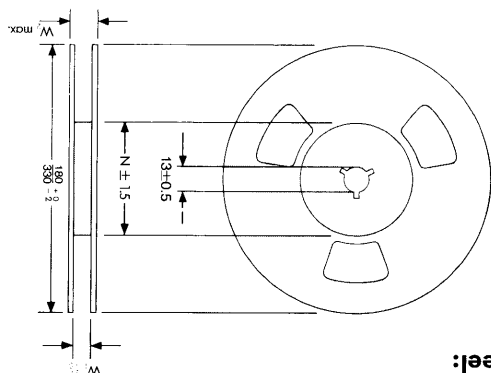
Low air density: 1 kPa = 10 mbar in accordance with IEC 68-2-13.
Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 68-2-29.

Metalized polyester capacitors

WIMA SMD



Tape advance and return:



Tape reel:

Type	$W_2^{\max}$	$W_1 + \frac{1}{2}$	$N + 1.5$
22220	19	12.4	62
2824	19	12.4	62
4036	22.4	16.4	60
5045	30.4	24.4	90
6560	30.4	24.4	90
7.3	19	12.4	62

Packing units

SMD 2220		Box size	5.7×5×2.5	5.7×5×3	5.7×5×4
A ₀	±0.1	6.1	5.7	5.7	6.1
A ₁		5.7	5.6	5.6	5.7
B ₀	±0.1	5.6	5	5	5.6
B ₁		5	5	5	5
D ₀	+0.1 -0	5	5	5	5
D ₁	+0.1 -0	5	5	5	5
P	±0.1	8	8	8	8
P ₀ *	±0.1	8	8	8	8
P ₂	±0.05	2	2	2	2
E	±0.1	1.75	1.75	1.75	1.75
F	±0.05	5.5	5.5	5.5	5.5
G		1.95	1.95	1.95	1.95
W	±0.3	12	12	12	12
W ₀	±0.2	9.5	9.5	9.5	9.5
K	±0.1	4.3	3.3	0.3	0.3
T	±0.1	0.3	0.3	0.3	0.3

bulk	taped Reel 180 mm ϕ 330 mm ϕ	800	1000
		650	1000
		500	1800
			1000

SMD 2824	Box size	A ₀ ±0.1															
		A ₀	A ₁	B ₀	B ₁	D ₀	D ₁	P	P ₀ *	P ₂	E	F	G	W	W ₀	K	T
7.3×6×2.5	6.4	6	7.7	7.3	∅ 1.5	8	4	2	1.75	5.5	0.9	12	9.5	2.8	0.3		
7.3×6×3	6.4	6	7.7	7.3	∅ 1.5	12	4	2	1.75	5.5	0.9	12	9.5	3.3	0.3		
7.3×6×3.5	6.4	6	7.7	7.3	∅ 1.5	12	4	2	1.75	5.5	0.9	12	9.5	3.8	0.3		
7.3×6×4.5	6.4	6	7.7	7.3	∅ 1.5	12	4	2	1.75	5.5	0.9	12	9.5	4.8	0.3		

1000	1000
1000	1200
1000	1500
1000	3000
bulk	Reel 330 mm $\varnothing$ taped

	A ₀ ±0.2	10.7	10.2	9.7	9.1	∅ 1.5	∅ 1.5	16	4	2	1.75	7.5	1.9	16	13.3	5.9	0.3
SMD 4036	A ₁	12.7	12.1	11.5	∅ 1.5	∅ 1.5	16	4	2	1.75	11.5	4.7	24	21.3	7.0	0.3	
SMD 5045	B ₀ ±0.2	16.5	15.6	15.0	∅ 1.5	∅ 1.5	20	4	2	1.75	11.5	2.95	24	21.3	7.5	0.3	
SMD 6560	B ₁	17.0			D ₀ ±0.1 -0	D ₁ ±0.1	P ±0.1	P ₀ * ±0.1	P ₂ ±0.1	E ±0.1	F ±0.1	G -0.2	W ±0.3	W ₀ ±0.2	K ±0.2	T ±0.1	

taped Reel 330 mm $\varnothing$	775
	600
	450
bulk	500
	200
	200

SMD 7.3		Box size	7.3 × 7 × 3	7.3 × 9 × 3.5	7.3 × 10 × 4.5
A ₀	+0.2 -0	7.5	7.5	9.5	10.5
A ₁	+0.2 -0	7	7.5	9	10
B ₀	+0.1 -0	7.3	7.3	7.5	7.5
B ₁	+0.1 -0	7.3	7.3	7.3	7.3
D ₀	+0.1 -0	1.5	1.5	1.5	1.5
D ₁	+0.1 -0	1.5	1.5	1.5	1.5
P	+0.1 -0	12	12	12	12
P ₀ *	+0.1 -0	4	4	4	4
P ₂	+0.05 -0	2	2	2	2
E	+0.1 -0	1.75	1.75	1.75	1.75
F	+0.05 -0	5.5	5.5	5.5	5.5
G	+0.2 -0	0.9	0.9	0.9	0.9
W	+0.3 -0	12	12	12	12
W ₀	+0.2 -0	9.5	9.5	9.5	9.5
K	max.	3.5	3.5	4	5
T	+0.1 -0	0.4	0.4	0.4	0.4
			1000	1000	1000
			1500	1200	1000
Reel 330 mm ø			1000	1000	1000
bulk			1000	1000	1000

*cumulative after 10 steps ± 0.2 mm max.

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 proved best to keep a minimum distance of the soldering surfaces between two WIMA SMDs of twice the height of the components.

As a basic principle, the aligning of the soldering surfaces in accordance with the transport direction of the printed circuit board through the soldering wave is recommended for wave soldering.

For solder pad recommendation – see SMD series concerned. The solder pad sizes given for each individual series are to be understood as minimum measurements which can at any time be suited to the layout form.

Processing

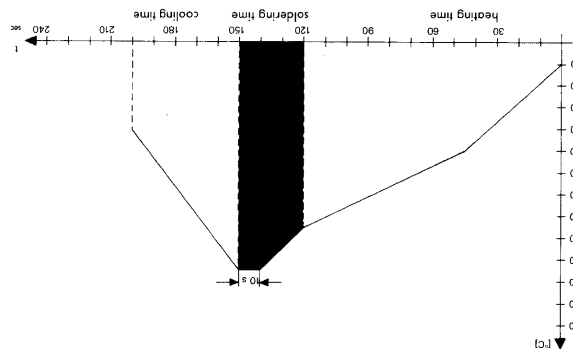
The processing of SMD components:

- assembling
- soldering
- washing
- electr. 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 maximal permissible internal temperature of the WIMA SMD film capacitor for typical infrared 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 manufacturer can only take as a guideline the internal temperature of the component which is reached during the soldering process. Accordingly the given temperature / time profile represents the permissible internal temperature of the WIMA SMD series during a typical infrared soldering process.

Washing

Basically, all plastic encapsulated components, regardless of which manufacturer cannot be considered as being hermetically sealed. They are therefore only suitable for industrial washing processes to a limited extent. During the washing process, washing agents can penetrate the interior of the component by capillary action through microcracks which might have occurred.

This is dependent on a number of parameters e. g.

- washing agents
- viscosity of the washing solution
- temperature / time of the washing process
- mechanical washing aids such as ultrasound
- water pressure
- rinsing and spraying pressure

The type of washing agent to be used is largely specific to the individual user or is often laid down by the manufacturer of the washing equipment. The aggressiveness of the washing agent to be used can thus only be judged in appropriate test series relating to each individual washing process. By and large, the basic rule is that the washing process should be carried out as gently as possible.

Drying

During the washing process, watery solutions can seep into the component. This can lead to changes in the electric parameters. Suitable drying measures should ensure that no remaining moisture or traces of washing substances is left in the component.

Initial operation / calibration of the device

Due to the stress which the components are subjected to during processing, reversible parameter changes occur in almost all electronic components. In accordance with CEC 32200 specifications the capacitance recovery accuracy to be expected with careful processing is in the region of $\Delta C/C \leq 3\%$.

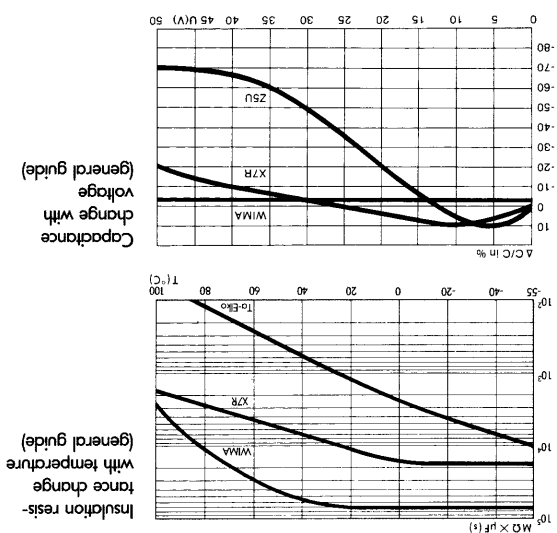
Apart from the advantages shown in the diagrams, WIMA SMD capacitors have a number of other outstanding qualities compared to ceramic or tantalum dielectrics:

- favorable pulse rise time
- low ESR
- outstanding self-healing properties
- 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 the quality and reliability of the WIMA SMD series, it is possible to substitute practically all ceramic and tantalum applications. Furthermore, the WIMA SMD series can now be used for all the demanding capacitor applications for which, in the past, the use of wired components was mandatory:

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

With the WIMA SMD programme available today, 70% of all MKT capacitor applications can be covered with 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, and to use in telecommunications e.g. the well-known telephone capacitor 1 μF / 250 V.



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

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

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

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

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.

Reliability

Taking account of the manufacturer's guidelines and compatible processing, the WIMA SMD series stand out for the same high quality and reliability as the analogous leaded WIMA series. The technology of metallized polyester film capacitors used in WIMA SMD 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 9000 as well as the guidelines for component specifications set out by CECC quality assessment standards for electronic components.

Electrical characteristics and fields of application

Basically the WIMA SMD series have the same electrical characteristics as leaded metallized polyester capacitors.

The diagrams show the course of the most important electrical parameters in comparison with X7R and Z5U ceramic capacitors.

