

Snubber FKP Capacitors for High Pulse Applications with Metal Foil Electrodes, Schoopage Contacts and Self-Healing Internal Series Connection

Special Features

- High pulse duty
- Self-healing
- Particularly reliable contact-configurations: 4-pin versions and screwable plate connections
- Internal series connection
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2002/95/EC

Typical Applications

- For high pulse and high frequency applications requiring extremely reliable contacts e.g.
- IGBT-applications

Construction

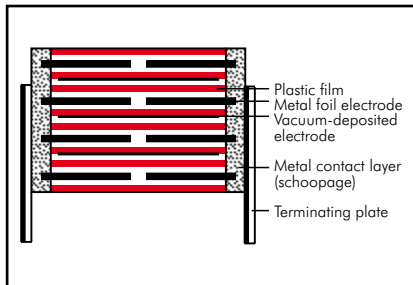
Dielectric:

Polypropylene (PP) film

Capacitor electrodes:

Aluminium foil and single-sided metallized plastic film

Internal construction:



Encapsulation:

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

Terminations:

Tinned wire or plates.

Marking:

Colour: Red. Marking: Black.
Epoxy resin seal: Red

Electrical Data

Capacitance range:

0.01 μF to 2.2 μF

Rated voltages:

630 VDC, 1000 VDC, 1600 VDC, 2000 VDC, 3000 VDC, 4000 VDC

Capacitance tolerances:

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

Operating temperature range:

-55°C to $+100^\circ\text{C}$

Climatic test category:

55/100/56 in accordance with IEC

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

$C \leq 0.33 \mu\text{F}$: $\geq 1 \times 10^5 \text{ M}\Omega$

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

$C > 0.33 \mu\text{F}$: $\geq 30\,000 \text{ sec (M}\Omega \times \mu\text{F)}$

(mean value: 100 000 sec)

Measuring voltage: 100 V/1 min.

Test voltage:

$L < 41.5$: $1.6 U_r$, 2 sec

$L = 41.5$: $1.4 U_r$, 2 sec

$L = 56$: $1.2 U_r$, 2 sec

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	$\leq 3 \times 10^{-4}$	$\leq 3 \times 10^{-4}$	$\leq 3 \times 10^{-4}$
10 kHz	$\leq 4 \times 10^{-4}$	$\leq 6 \times 10^{-4}$	-
100 kHz	$\leq 15 \times 10^{-4}$	-	-

Maximum pulse rise time:

Capacitance μF	max. pulse rise time V/ μsec at $T_A < 40^\circ\text{C}$					
	630 VDC	1000 VDC	1600 VDC	2000 VDC	3000 VDC	4000 VDC
0.01 ... 0.022	-	11000	11000	11000	11000	11000
0.033 ... 0.068	9000	9000	9000	9000	9000	9000
0.1 ... 0.22	9000	9000	9000	9000	9000	9000
0.33 ... 0.68	5000	5000	5000	5000	5000	5000
1.0 ... 2.2	1600	2000	-	-	-	-

for pulses equal to the rated voltage

Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the plates the screw torque is to be limited to max. 5 Nm.

For further details and graphs please refer to Technical Information.

Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from $+85^\circ\text{C}$ for DC voltages and from $+75^\circ\text{C}$ for AC voltages

Reliability:

Operational life $> 300\,000$ hours
Failure rate $< 1 \text{ fit (} 0.5 \times U_r \text{ and } 40^\circ\text{C)}$

Specific dissipation:

Box size* WxHxL in mm	Specific dissipation in Watts per K above the ambient temperature
19x31x56	0.068
23x34x56	0.079
27x37.5x56	0.092
33x48x56	0.122
37x54x56	0.142

* other box sizes see page 10.

Packing

Transportation-safe packing in cardboard boxes.

Packing units:

L	pcs. per packing unit
18	100
26.5	100
31.5	100
41.5	100
56	50

Continuation

General Data

Capacitance	630 VDC/400 VAC*				1000 VDC/600 VAC*				1600 VDC/650 VAC*				
	W	H	L	Part number	W	H	L	Part number	W	H	L	Part number	
0.01 µF										7	16.5	26.5	SNFPT021005D_____
0.015 "										8.5	18.5	26.5	SNFPT021505F_____
0.022 "					7	16.5	26.5	SNFPO122205D_____	10.5	20.5	26.5	SNFPT022205H_____	
0.033 "					8.5	18.5	26.5	SNFPO123305F_____	11	21	31.5	SNFPT023306B_____	
0.047 "	7	16.5	26.5	SNFPJ024705D_____	10.5	20.5	26.5	SNFPO124705H_____	11	22	41.5	SNFPT024707B_____	
0.068 "	8.5	18.5	26.5	SNFPJ026805F_____	11	21	31.5	SNFPO126806B_____	15	26	41.5	SNFPT026807D_____	
0.1 µF	10.5	20.5	26.5	SNFPJ031005H_____	11	22	41.5	SNFPO131007B_____	17	29	41.5	SNFPT031007E_____	
0.15 "	11	21	26.5	SNFPJ031505I_____	15	26	41.5	SNFPO131507D_____	19	32	41.5	SNFPT031507F_____	
0.22 "	13	24	31.5	SNFPJ032206D_____	17	29	41.5	SNFPO132207E_____	20	39.5	41.5	SNFPT032207G_____	
0.33 "	15	26	31.5	SNFPJ033306F_____	19	32	41.5	SNFPO133307F_____	24	45.5	41.5	SNFPT033307H_____	
0.47 "	17	29	41.5	SNFPJ034707E_____	20	39.5	41.5	SNFPO134707G_____	27	37.5	56	SNFPT034708H_____	
0.68 "	19	32	41.5	SNFPJ036807F_____	23	34	56	SNFPO136808E_____	27	37.5	56	SNFPT036808H_____	
1.0 µF	20	39.5	41.5	SNFPJ041007G_____	27	37.5	56	SNFPO141008H_____					
1.5 "	24	45.5	41.5	SNFPJ041507H_____									
2.2 "	27	37.5	56	SNFPJ042208H_____									

Capacitance	2000 VDC/700 VAC*				3000 VDC/700 VAC*				4000 VDC/700 VAC*			
	W	H	L	Part number	W	H	L	Part number	W	H	L	Part number
0.01 µF	10.5	20.5	26.5	SNFPU021005H_____	11	21	26.5	SNFPW021005I_____	11	21	31.5	SNFPX021006B_____
0.015 "	11	21	26.5	SNFPU021505I_____	11	21	31.5	SNFPW021506B_____	11	22	41.5	SNFPX021507B_____
0.022 "	11	21	31.5	SNFPU022206B_____	13	24	31.5	SNFPW022206D_____	13	24	41.5	SNFPX022207C_____
			41.5	SNFPU022207B_____								
0.033 "	13	24	41.5	SNFPU023307C_____	13	24	41.5	SNFPW023307C_____	15	26	41.5	SNFPX023307D_____
0.047 "	15	26	41.5	SNFPU024707D_____	15	26	41.5	SNFPW024707D_____	17	29	41.5	SNFPX024707E_____
0.068 "	17	29	41.5	SNFPU026807E_____	17	29	41.5	SNFPW026807E_____	19	32	41.5	SNFPX026807F_____
0.1 µF	17	29	41.5	SNFPU031007E_____	19	32	41.5	SNFPW031007F_____	20	39.5	41.5	SNFPX031007G_____
0.15 "	20	39.5	41.5	SNFPU031507G_____	20	39.5	41.5	SNFPW031507G_____	24	45.5	41.5	SNFPX031507H_____
0.22 "	24	45.5	41.5	SNFPU032207H_____	24	45.5	41.5	SNFPW032207H_____	27	37.5	56	SNFPX032208H_____
0.33 "	27	37.5	56	SNFPU033308H_____	27	37.5	56	SNFPW033308H_____	33	48	56	SNFPX033308J_____
0.47 "	27	37.5	56	SNFPU034708H_____	33	48	56	SNFPW034708J_____				

* AC voltage: $f \leq 1000 \text{ Hz}$; $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Dims. in mm.

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Versions and dimensional drawings see page 91.

Part number completion:

Version codes see page 94.

Tolerance: 20 % = M

10 % = K

5 % = J

Packing: bulk = S

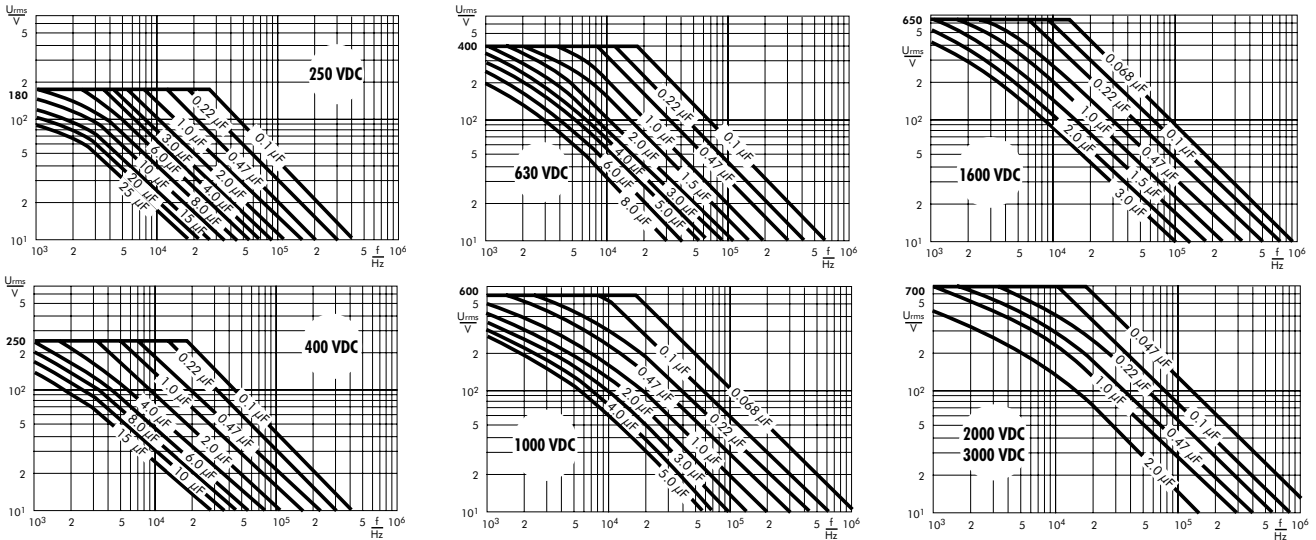
Pin length: none = 00

Rights reserved to amend design data without prior notification.

AC voltage graphs see page 88.

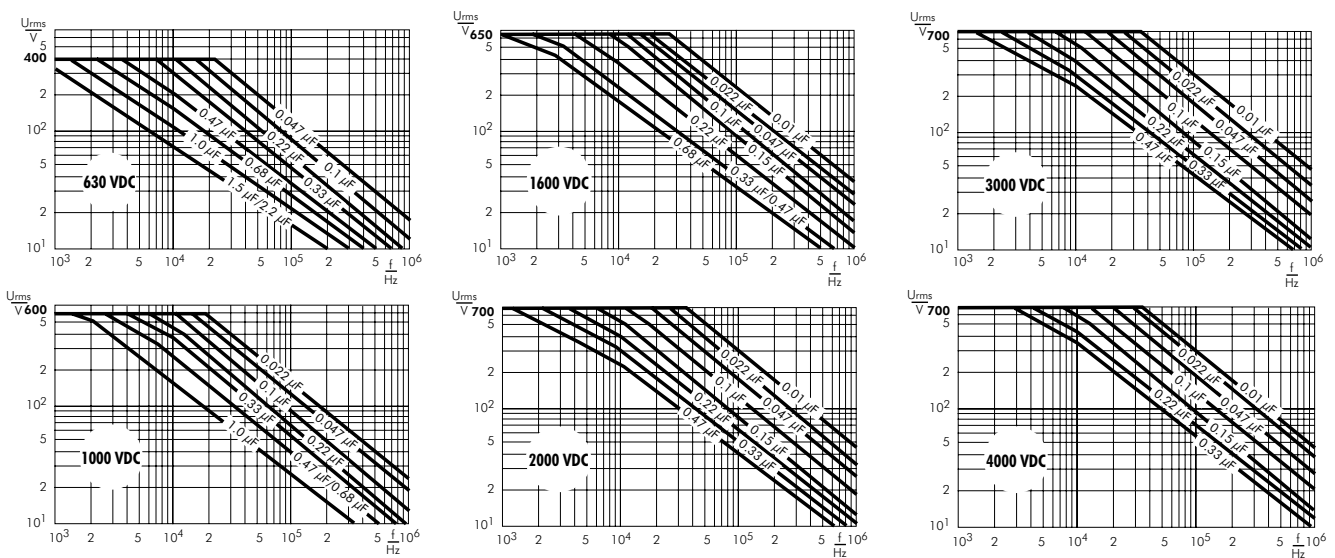
Continuation

Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).



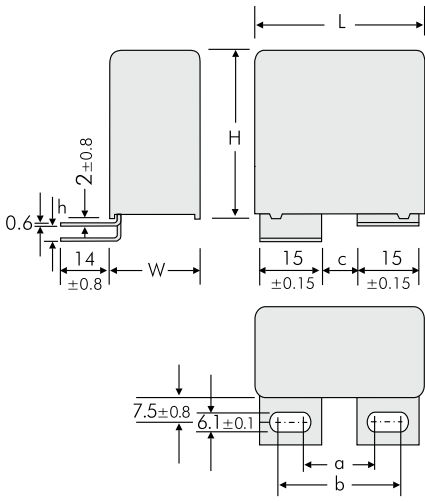
WIMA Snubber FKP

Permissible AC voltage in relation to frequency at 10° C internal temperature rise (general guide).

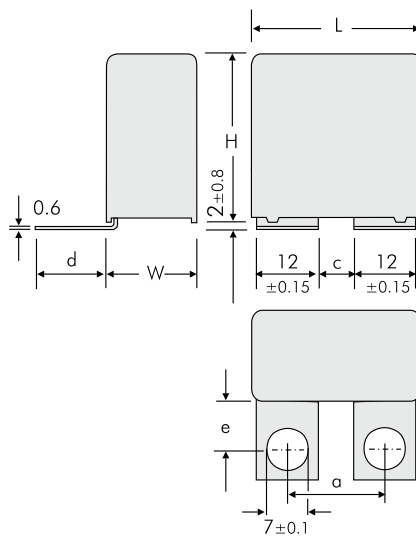


Technical information and general data see page 89.

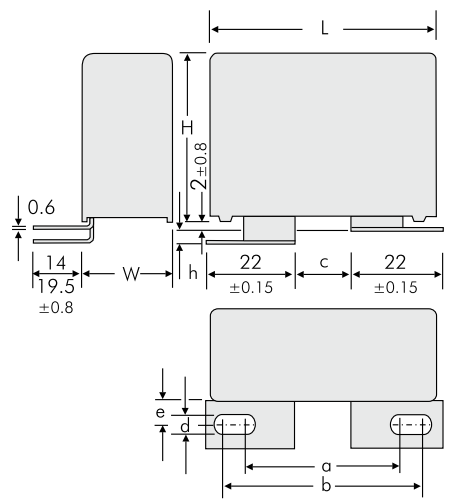
Versions of WIMA Snubber-Capacitors



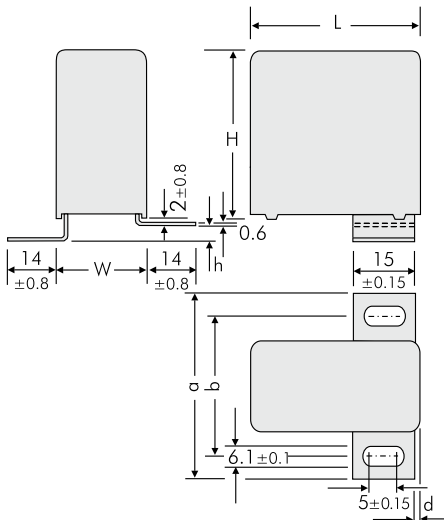
Version	L	a ±0.5	b ±0.5	c ±0.5	h ±0.8
A1	41.5	17.5	27.5	7.5	0
A1.5	41.5	17.5	27.5	7.5	3.5
A1	56	20	30	10	0
A1.1.1	56	28	38	18	0
A1.4	56	20	30	10	3.5
A1.4.1	56	28	38	18	3.5



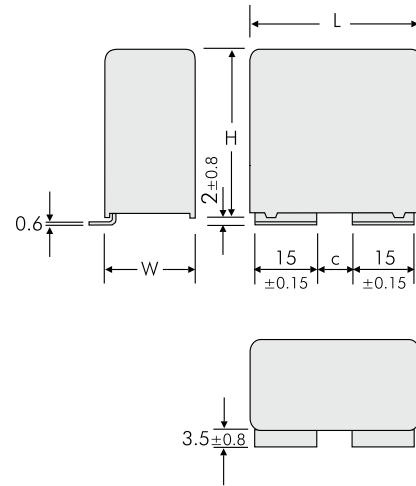
Version	L	a ±0.5	c ±0.5	d ±0.8	e ±0.8
A1.6	41.5	18	6	21.5	16
A1.6.1	41.5	22	10	18.5	13
A1.6	56	29	17	21.5	16



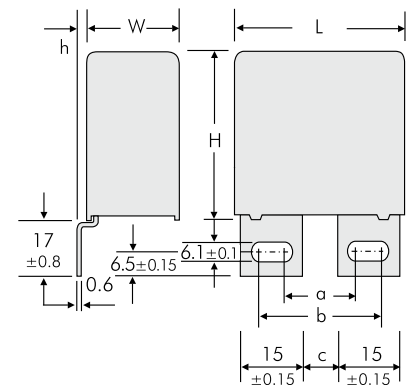
Version	L	a ±0.5	b ±0.5	c ±0.5	d ±0.1	e ±0.8	h ±0.8
A2	41.5	40.5	46.5	14.5	8.4	7.5	0
A2.2	41.5	31	37	5	8.4	7.5	3.5
A2.3	41.5	31	37	5	8.4	13	3.5
A2.4	41.5	33.5	39.5	7.5	8.4	13	3.5
A2.4.1	41.5	33.5	39.5	7.5	8.4	13	0
A2.5	41.5	29.5	39.5	5.5	6.1	7.5	3.5
A2.6	41.5	31.5	41.5	7.5	6.1	13	3.5
A2.6.1	41.5	31.5	41.5	14	6.1	13	3.5
A2.6.2	41.5	31.5	41.5	14	6.1	13	0
A2.8	41.5	40.5	46.5	14.5	8.4	7.5	3.5
A2.1	56	39.5	45.5	13.5	8.4	7.5	0
A2.7	56	39.5	45.5	13.5	8.4	7.5	3.5



Version	L	d ±1.0	h ±0.8	a ±0.8	b ±0.8	W
A1.3.1	31.5	2	0	47	34	19
A1.3.2	31.5	2	3.5	47	34	19
A1.8	41.5	2	0	47	34	19

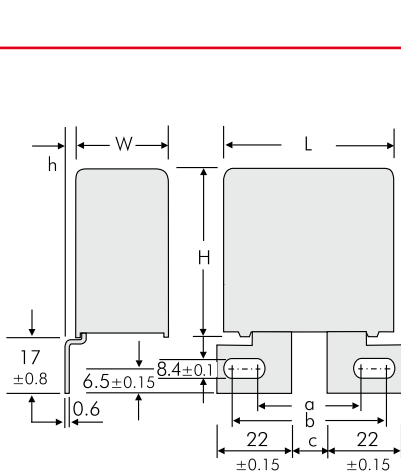


Version	L	c ±0.5
A1.7	41.5	7.5
A1.7	56	10
A1.7.1	56	18

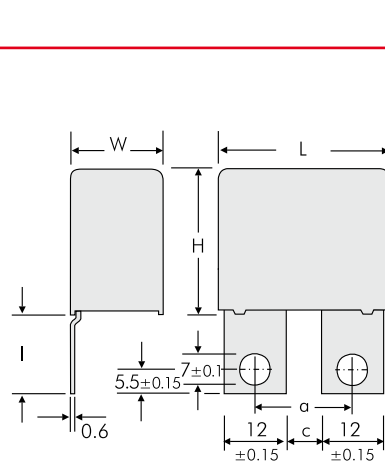


Version	L	a ±0.5	b ±0.5	c ±0.5	h ±0.8
A3	41.5	17.5	27.5	7.5	0
A3.5	41.5	17.5	27.5	7.5	3
A3	56	20	30	10	0
A3.1	56	28	38	18	0
A3.5	56	20	30	10	3
A3.10	56	28	38	18	3

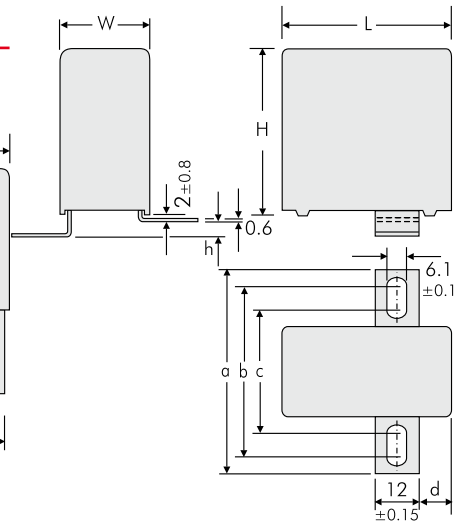
Versions of WIMA Snubber-Capacitors



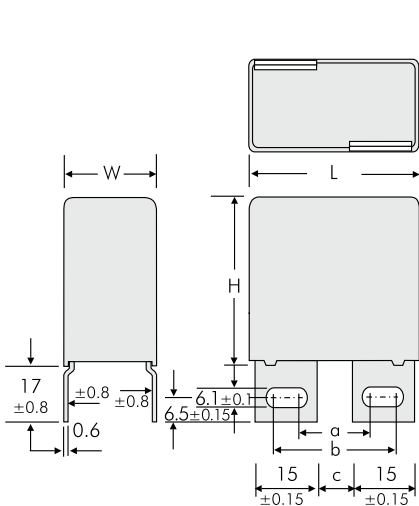
Version	L	a ±0.5	b ±0.5	c ±0.5	h ±0.8
A3.9	41.5	40.5	46.5	14.5	0
A3.11	41.5	40.5	46.5	14.5	3
A3.2	56	40.5	46.5	14.5	0
A3.3	56	40.5	46.5	14.5	3



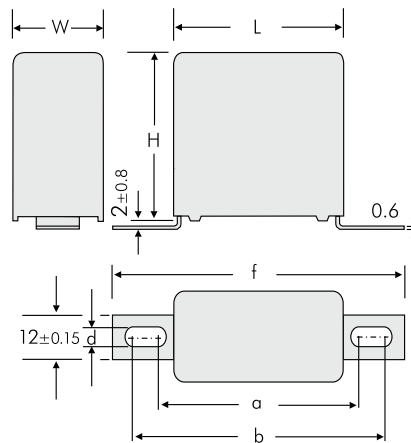
Version	L	a ±0.5	c ±0.5	l ±0.8
A3.8	41.5 W ≥ 17	18	6	23
A3.8.1	41.5 W ≥ 17	22	10	17.5



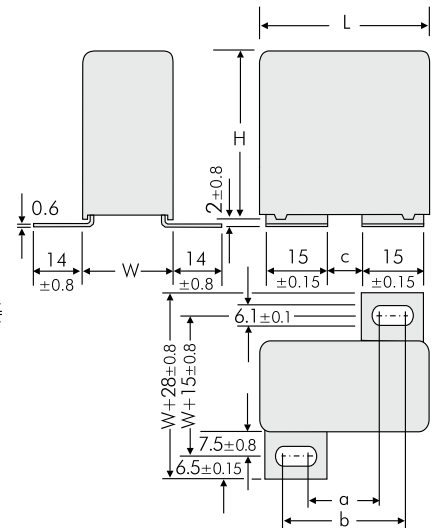
Version	L	a ±0.8	b ±0.8	c ±0.8	d ±1.0	h ±0.8	W
A4.3	31.5	57	47	31	1	3.5	19
A4.4	31.5	57	47	31	1	0	19
A4.6	31.5	44.6	34.6	31.6	1	3.5	19
A4.8	31.5	44.6	34.6	31.6	1	0	19
A4.1	41.5	57	47	31	6	3.5	19
A4.5	41.5	57	47	31	6	0	19



Version	L	a ±0.5	b ±0.5	c ±0.5
A3.6	41.5	17.5	27.5	7.5
A3.7	56	20	30	10

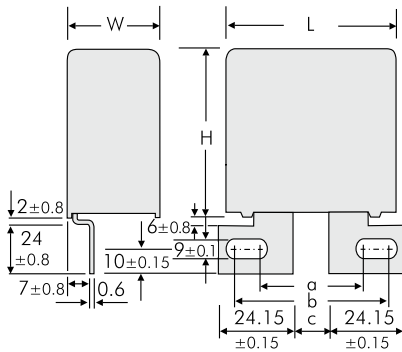


Version	L	a ±0.8	b ±0.8	f ±0.8	d ±0.1
A4.9	31.5 W ≥ 15	44	47	57	4.5
A4.10	31.5 W ≥ 15	43	59	69	6.1
A4.2	41.5 W ≥ 15	54	57	67	4.5
A4	41.5 W ≥ 15	53	69	79	6.1
A4.7	56	65	68	78	4.5
A4	56	64	80	90	6.1

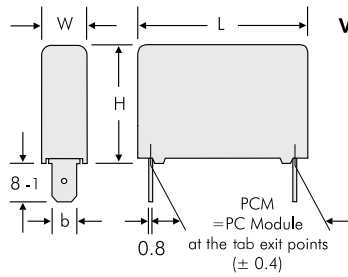


Version	L	a ±0.5	b ±0.5	c ±0.5
A5	41.5	17.5	27.5	7.5
A5	56	20	30	10

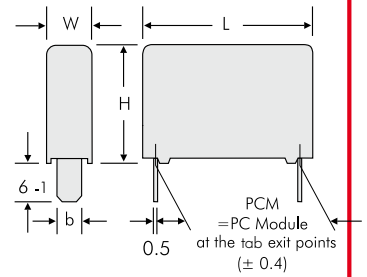
Versions of WIMA Snubber-Capacitors



Version FS 6.3
with slip-on terminals according to DIN 46244



Version B

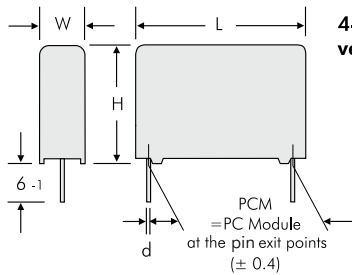


Version	L	a ±0.5	b ±0.5	c ±0.5
A6	56 W ≥ 23	41.5	45.5	15.5

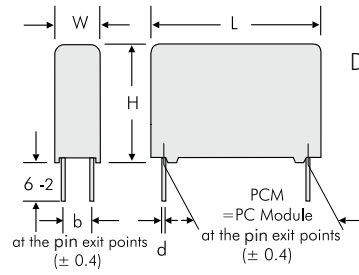
L	W	PCM	b ±0.15
26.5	≥ 11	23.5	6.3
31.5	≥ 11	28.5	6.3
41.5	≥ 11	38.5	6.3
56	≥ 11	49.5	6.3

L	PCM	b ±0.15
18	16	5
26.5	23.5	5
31.5	28.5	8
41.5	38.5	8
56	49.5	8

2-pin version



4-pin version



Dims. in mm.

PCM	d
15	0.8
22.5	0.8
27.5	0.8
38.5	1.2
49.5	1.2

W	H	L	PCM	b	d
10.5	19	26.5	22.5	5	0.8
10.5	20.5	26.5	22.5	5	0.8
11	21	26.5	22.5	5	0.8
11	21	31.5	27.5	5	0.8
13	24	31.5	27.5	7.5	0.8
15	26	31.5	27.5	7.5	0.8
17	29	31.5	27.5	10	0.8
19	30	31.5	27.5	10	0.8
17	34.5	31.5	27.5	10	0.8
20	39.5	31.5	27.5	12.5	0.8
22	43.5	31.5	27.5	12.5	0.8
11	22	41.5	37.5	5	1
13	24	41.5	37.5	7.5	1
15	26	41.5	37.5	7.5	1
17	29	41.5	37.5	10	1
19	32	41.5	37.5	10	1
20	39.5	41.5	37.5	12.5	1
24	45.5	41.5	37.5	12.5	1
31	46	41.5	37.5	20	1
19	31	56	48.5	12.5	1
23	34	56	48.5	15	1
27	37.5	56	48.5	15	1
33	48	56	48.5	20	1
37	54	56	48.5	20	1

Additional special versions can be realized. Please contact us with your specific needs.

Versions of WIMA Snubber and DC-LINK MKP 4 Capacitors



Version code		D2	D4	B5	B8	1A	1B	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	2A	2B	2C	2D	2E	2F	2H	2I	2J	2K	2L	2M	3A	3C	3D	3E	3G	3I	3J	3K	3L	3N	3O	3P						
W x H x L	Size Code	2-pin	4-pin	B5	B8	A1	A1.1	A1.3.1	A1.3.2	A1.4	A1.4.1	A1.5	A1.6	A1.6.1	A1.7	A1.7.1	A1.8*	A2	A2.1	A2.2	A2.3	A2.4	A2.4.1	A2.5	A2.6	A2.6.1	A2.6.2	A2.7	A2.8	A3	A3.1	A3.2	A3.3	A3.5	A3.6	A3.7	A3.8	A3.8.1	A3.9	A3.10	A3.11						
7x14x18	4D																																														
8x15x18	4F																																														
7x16.5x26.5	5D																																														
8.5x18.5x26.5	5F																																														
10.5x19x26.5	5G																																														
10.5x20.5x26.5	5H																																														
11x21x26.5	5I																																														
11x21x31.5	6B																																														
13x24x31.5	6D																																														
15x26x31.5	6F																																														
17x29x31.5	6G																																														
17x34.5x31.5	6I																																														
19x30x31.5	6L																																														
11x22x41.5	7B																																														
13x24x41.5	7C																																														
15x26x41.5	7D																																														
17x29x41.5	7E																																														
19x32x41.5	7F																																														
20x39.5x41.5	7G																																														
24x45.5x41.5	7H																																														
31x46x41.5	7I																																														
19x31x56	8D																																														
23x34x56	8E																																														
27x37.5x56	8H																																														
33x48x56	8J																																														
37x54x56	8L																																														

Version code		4A	4B	4C	4D	4E	4F	4I	4J	4K	4L	4M	5A	6A	FS
W x H x L	Size Code	A4	A4.1*	A4.2	A4.3*	A4.4*	A4.5*	A4.6*	A4.7	A4.8*	A4.9	A4.10	A5	A6	FS 6.3
11x21x26.5	5I														
11x21x31.5	6B														
13x24x31.5	6D														
15x26x31.5	6F														
17x29x31.5	6G														
17x34.5x31.5	6I														
19x30x31.5	6L														
11x22x41.5	7B														
13x24x41.5	7C														
15x26x41.5	7D														
17x29x41.5	7E														
19x32x41.5	7F														
20x39.5x41.5	7G														
24x45.5x41.5	7H														
31x46x41.5	7I														
19x31x56	8D														
23x34x56	8E														
27x37.5x56	8H														
33x48x56	8J														
37x54x56	8L														

Possible connecting respective plate versions - depending on box size.

* on request



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		

<p>Type description:</p> <p>SMD-PET = SMDT SMD-PPS = SMDI FKP 02 = FKP0 MKS 02 = MKS0 FKS 2 = FKS2 FKP 2 = FKP2 MKS 2 = MKS2 MKP 2 = MKP2 FKS 3 = FKS3 FKP 3 = FKP3 MKS 4 = MKS4 MKP 4 = MKP4 MKP 10 = MKP1 FKP 4 = FKP4 FKP 1 = FKP1 MKP-X2 = MKX2 MKP-X2 R = MKXR MKP-Y2 = MKY2 MP 3-X2 = MPX2 MP 3-X1 = MPX1 MP 3-Y2 = MPY2 MP 3R-Y2 = MPRY Snubber MKP = SNMP Snubber FKP = SNFP GTO MKP = GTOM DC-LINK MKP 4 = DCP4 DC-LINK MKP 5 = DCP5 DC-LINK MKP 6 = DCP6 DC-LINK HC = DCH_ SuperCap C = SCSC SuperCap MC = SCMC SuperCap R = SCSR SuperCap MR = SCMR</p>	<p>Rated voltage:</p> <p>2.5 VDC = A1 4 VDC = A2 14 VDC = A3 28 VDC = A4 40 VDC = A5 5 VDC = A6 50 VDC = B0 63 VDC = C0 100 VDC = D0 160 VDC = E0 250 VDC = F0 400 VDC = G0 450 VDC = H0 600 VDC = I0 630 VDC = J0 700 VDC = K0 800 VDC = L0 850 VDC = M0 900 VDC = N0 1000 VDC = O1 1100 VDC = P0 1200 VDC = Q0 1250 VDC = R0 1500 VDC = S0 1600 VDC = T0 2000 VDC = U0 2500 VDC = V0 3000 VDC = W0 4000 VDC = X0 6000 VDC = Y0 250 VAC = 0W 275 VAC = 1W 300 VAC = 2W 400 VAC = 3W 440 VAC = 4W 500 VAC = 5W</p>	<p>Capacitance:</p> <p>22 pF = 0022 47 pF = 0047 100 pF = 0100 150 pF = 0150 220 pF = 0220 330 pF = 0330 470 pF = 0470 680 pF = 0680 1000 pF = 1100 1500 pF = 1150 2200 pF = 1220 3300 pF = 1330 4700 pF = 1470 6800 pF = 1680 0.01 µF = 2100 0.022 µF = 2220 0.047 µF = 2470 0.1 µF = 3100 0.22 µF = 3220 0.47 µF = 3470 1 µF = 4100 2.2 µF = 4220 4.7 µF = 4470 10 µF = 5100 22 µF = 5220 47 µF = 5470 100 µF = 6100 220 µF = 6220 1 F = A010 2.5 F = A025 50 F = A500 100 F = B100 110 F = B110 600 F = B600 1200 F = C120 ...</p>	<p>Size:</p> <p>4.8x3.3x3 Size 1812 = KA 4.8x3.3x4 Size 1812 = KB 5.7x5.1x3.5 Size 2220 = QA 5.7x5.1x4.5 Size 2220 = QB 7.2x6.1x3 Size 2824 = TA 7.2x6.1x5 Size 2824 = TB 10.2x7.6x5 Size 4030 = VA 12.7x10.2x6 Size 5040 = XA 15.3x13.7x7 Size 6054 = YA 2.5x7x4.6 PCM 2.5 = 0B 3x7.5x4.6 PCM 2.5 = 0C 2.5x6.5x7.2 PCM 5 = 1A 3x7.5x7.2 PCM 5 = 1B 2.5x7x10 PCM 7.5 = 2A 3x8.5x10 PCM 7.5 = 2B 3x9x13 PCM 10 = 3A 4x9x13 PCM 10 = 3C 5x11x18 PCM 15 = 4B 6x12.5x18 PCM 15 = 4C 5x14x26.5 PCM 22.5 = 5A 6x15x26.5 PCM 22.5 = 5B 9x19x31.5 PCM 27.5 = 6A 11x21x31.5 PCM 27.5 = 6B 9x19x41.5 PCM 37.5 = 7A 11x22x41.5 PCM 37.5 = 7B 94x49x182 DCH_ = H0 94x77x182 DCH_ = H1 ...</p> <p>Special features:</p> <p>Standard = 00 Version A1 = 1A Version A1.1.1 = 1B Version A1.2 = 1C ...</p>	<p>Tolerance:</p> <p>20% = M 10% = K 5% = J 2.5% = H 1% = E ...</p> <p>Packing:</p> <p>AMMO H16.5 340x340 = A AMMO H16.5 490x370 = B AMMO H18.5 340x340 = C AMMO H18.5 490x370 = D REEL H16.5 360 = F REEL H16.5 500 = H REEL H18.5 360 = I REEL H18.5 500 = J ROLL H16.5 = N ROLL H18.5 = O BLISTER W12 180 = P BLISTER W12 330 = Q BLISTER W16 330 = R BLISTER W24 330 = T Bulk Standard = S TPS Standard = Y ...</p> <p>Lead length (untaped)</p> <p>3.5 ±0.5 = C9 6 -2 = SD 16 ±1 = P1 ...</p>
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The data on this page is not complete and serves only to explain the part number system. Part number information is listed on the pages of the respective WIMA range.