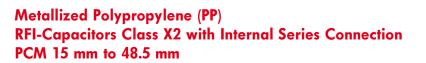
WIMA MKP-X2 R



Special Features

- Reliable self-healing
- Increased corona inception level due to internal series connection
- High degree of interference suppression due to good attenuation and low ESR
- According to RoHS 2002/95/EC

Typical Applications

Class X2 RFI applications to meet EMC regulations

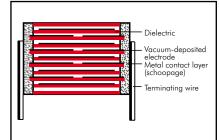
- Capacitors connected to the mains between phase and neutral or phase conductors
- Installation category II in accordance with IEC 60664, pulse peak voltage ≤ 2.5 kV

As capacitor voltage divider in applications requiring a high capacitance stability over time

Construction

Dielectric:

Polypropylene (PP) film Capacitor electrodes: Vacuum-deposited Internal construction:



Encapsulation:

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

Tinned wire.

Marking: Colour: Red. Marking: Black.

Electrical Data

Capacitance range: 0.033 µF to 10 µF Rated voltage: 400 VAC Continuous DC voltage* (general guide): ≤ 1000 V Capacitance tolerances: ±20%, ±10% (±5% available subject to special enquiry) Operating temperature range: -55° C to +105° C Climatic test category:

55/105/56/C in accordance with IEC **Insulation resistance** at +20° C: $C \le 0.33 \ \mu\text{F} \ge 15 \ \text{x} 10^3 \ \text{M}\Omega$

C > 0.33 μ F: \geq 5000 sec (M $\Omega \times \mu$ F) Measuring voltage: 100 V/1 min. **Dissipation factors** at +20° C: tan δ

Test specifications:

In accordance with IEC 60384-14 **Maximum pulse rise time:** 100 V/µsec for pulses equal to a voltage amplitude with $\sqrt{2} \times 400$ VAC = 565 V according to IEC 60384-14

Test voltage:

C \leq 1.0 $\mu F:$ 2260 VDC, 2sec. C > 1.0 $\mu F:$ 1800 VDC, 2sec.

Reliability:

Operational life > 300 000 hours Failure rate < 2 fit (0.5 x Ur and 40° C)

at f	C ≤ 0.1 µF	0.1 µF < C ≤ 1.0 µF	C > 1.0 µF
1 kHz 10 kHz	≤ 8 x 10 ⁻⁴ ≤ 12 x 10 ⁻⁴	$\leq 8 \times 10^{-4}$ $\leq 12 \times 10^{-4}$	\leq 10 x 10 ⁻⁴
10 kHz 100 kHz	≤ 12 x 10 4 ≤ 25 x 10-4	₹ 12 X 10 + -	_

Mechanical Tests

Pull test on pins:

10 N in direction of pins according to IEC 60068-2-21 **Vibration:**

6 hours at 10...2000 Hz and 0.75 mm displacement amplitude or 10 g in accordance with IEC 60068-2-6

Low air density:

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

Bump test: 4000 bumps at 390 m/sec² in accordance with IEC 60068-2-29

 * The permissible pulse rise time du/dt (Fmax.) will be subject to a reduction according to

 $F_{max.} = F_r \times \sqrt{2} \times UAC / UDC$

if the DC operating voltage UDC is higher than $\sqrt{2}\ x$ UAC

Packing

Available taped and reeled up to and including case size 15 x 26 x 31.5 / PCM 27.5 mm.

Detailed taping information and graphs at the end of the catalogue.

For further details and graphs please refer to Technical Information.

WIMA MKP-X2 R



Continuation

General Data

Cara a citara ao			400 VAC*	ĸ	
Capacitance	W	Н	L	PCM**	Part number
0.033 µF	5	11	18	15	MKXR3W23304B00
0.047 "	5	11	18	15	MKXR3VV24704B00
0.068 "	6	12.5	18	15	MKXR3W26804C00
0.1 µF	8	15	18	15	MKXR3VV31004F00
	6	15	26.5	22.5	MKXR3VV31005B00
0.15 "	9	16	18	15	MKXR3W31504J00
	7	16.5	26.5	22.5	MKXR3W31505D00
0.22 "	8.5	18.5	26.5	22.5	MKXR3VV32205F00
0.33 "	10.5	19	26.5	22.5	MKXR3W33305G00
0.47 "	11	21	26.5	22.5	MKXR3W34705100
0.68 "	13	24	31.5	27.5	MKXR3W36806D00
1.0 µF	15	26	31.5	27.5	MKXR3VV41006F00
1.5 "	17	29	31.5	27.5	MKXR3W41506G00
2.2 "	20	39.5	31.5	27.5	MKXR3W42206J00
3.3 "	20	39.5	41.5	37.5	MKXR3W43307G00
4.7 "	24	45.5	41.5	37.5	MKXR3W44707H00
6.8 "	31	46	41.5	37.5*	MKXR3W4680SND4
10 µF	33	48	56	48.5*	MKXR3W5100SRD4

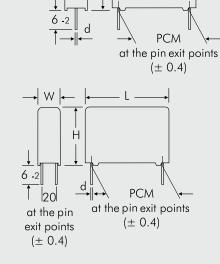
* f = 50/60 Hz

New values

** PCM = Printed circuit module = pin spacing

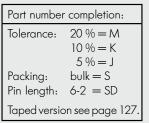
* Values with case size 31 x 46 x 41.5 mm and larger are provided in 4-pin version.

Dims. in mm.



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d = 0.8 Ø if PCM \leq 27.5

d = 1.0 Ø if PCM \ge 37.5

Recommendation for Processing and Application of **Through-Hole Capacitors**

Soldering Process

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

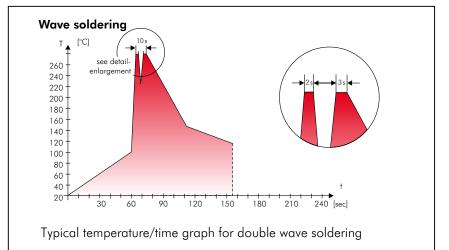
Single wave soldering

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

Double wave soldering

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

Due to different soldering processes and heat requirements the graphs are to be regarded as a recommendation only.



WIMA Quality and Environmental Philosophy

ISO 9001:2008 Certification

ISO 9001:2008 is an international basic standard of quality assurance systems for all branches of industry. The approval according to ISO 9001:2008 of our factories by the VDE inspectorate certifies that organisation, equipment and monitoring of quality assurance in our factories correspond to internationally recognized standards.

WIMA WPCS

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

- incoming material inspection
- metallization
- film inspection
- schoopage
- pre-healing
- pin attachment cast resin preparation/ encapsulation
- 100% final inspection
- AQL check

WIMA Environmental Policy

All WIMA capacitors, irrespective of whether through-hole devices or SMD, are made of environmentally friendly materials. Neither during manufacture nor in the product itself any toxic substances are used, e.g.

- PBB/PBDE

- Arsenic

- Mercurv

- etc.

– Lead

- PCB
- CFC
- Hydrocarbon chloride
- Chromium 6+

We merely use pure, recyclable materials for packing our components, such as:

- carton
- cardboard
- adhesive tape made of paper
- polystyrene

We almost completely refrain from using packing materials such as:

- foamed polystyrene (Styropor®)
- adhesive tapes made of plastic
- metal clips

RoHS Compliance

According to the RoHS Directive 2002/95/EC certain hazardous substances like e.g. lead, cadmium, mercury must not be used any longer in electronic equipment as of July 1st, 2006. For the sake of the environment WIMA has refraind from using such substances since years already.



Tape for lead-free WIMA capacitors

DIN EN ISO 14001:2004

WIMA's environmental management has been established in accordance with the auidelines of DIN EN ISO 14001:2004 to optimize the production processes with regard to energy and resources.



Typical Dimensions for Taping Configuration

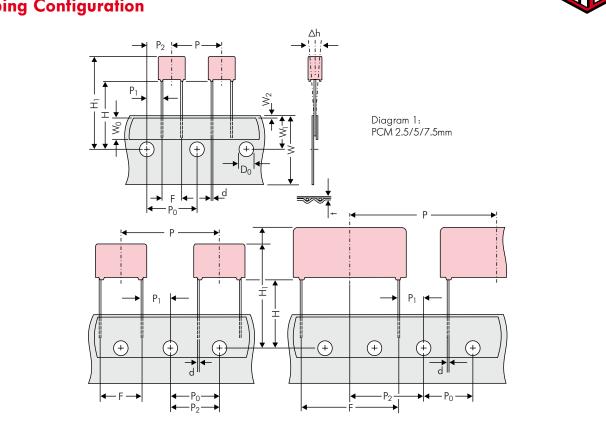


Diagram 2: PCM 10/15 mm

Diagram 3: PCM 22.5 and 27.5*mm *PCM 27.5 taping possible with two feed holes between components

				Dimen	sions for Radial	Taping					
Designation	Symbol	PCM 2.5 taping	PCM 5 taping	PCM 7.5 taping	PCM 10 taping*	PCM 15 taping*	PCM 22.5 taping	PCM 27.5 taping			
Carrier tape width	W	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5	18.0 ±0.5			
Hold-down tape width	W ₀	6.0 for hot-sealing adhesive tape	6.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape	12.0 for hot-sealing adhesive tape			
Hole position	W1	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5	9.0 ±0.5			
Hold-down tape position	W2	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.	0.5 to 3.0 max.			
Feed hole diameter	D ₀	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2	4.0 ±0.2			
Pitch of component	Р	12.7 ±1.0	12.7 ±1.0	12.7 ±1.0	25.4 ±1.0	25.4 ±1.0	38.1 ±1.5	38.1 ±1.5 or 50.8 ±1.5			
Feed hole pitch	Po	cumulative pitch 12.7 ±0.3 error max. 1.0 mm/20 pitch	cumulative pitch 12.7 ±0.3 error max. 1.0 mm/20 pitch	cumulative pitch 12.7 ±0.3 error max. 1.0 mm/20 pitch	12.7 ±0.3 cumulative pitch error max. 1.0 mm/20 pitch	cumulative pitch 12.7 ±0.3 error max. 1.0 mm/20 pitch	cumulative pitch 12.7 ±0.3 error max. 1.0 mm/20 pitch	cumulative pitch 12.7 ±0.3 error max. 1.0 mm/20 pitch			
Feed hole centre to pin	P ₁	5.1 ±0.5	3.85 ±0.7	2.6 ±0.7	7.7 ±0.7	5.2 ±0.7	7.8 ±0.7	5.3 ±0.7			
Hole centre to component centre	P ₂	6.35 ±1.3	6.35 ±1.3	6.35 ±1.3	12.7 ±1.3	12.7 ±1.3	19.05 ±1.3	19.05 ±1.3			
Feed hole centre to bottom	н	16.5 ±0.3	16.5 ±0.3	16.5 ±0.5	16.5 ±0.5	16.5 ±0.5	16.5 ±0.5	16.5 ±0.5			
edge of the component		18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±0.5	18.5 ±0.5			
Feed hole centre to top edge of the component	Hı	H+H _{component} < H ₁ 32.25 max.	H+H _{component} < H ₁ 32.25 max.	H+H _{component} < H ₁ 24.5 to 31.5	H+H _{component} < H ₁ 25.0 to 31.5	H+H _{component} < H ₁ 26.0 to 37.0	H+H _{component} < H ₁ 30.0 to 43.0	H+H _{component} < H ₁ 35.0 to 45.0			
Pin spacing at upper edge of carrier tape	F	2.5 ±0.5	5.0 ^{+0.8} _{-0.2}	7.5 ±0.8	10.0 ±0.8	15 ±0.8	22.5 ±0.8	27.5 ±0.8			
Pin diameter	d	0.4 ±0.05	0.5 ±0.05	$^{\circ}0.5 \pm 0.05 \text{ or } 0.6 + 0.06 \\ -0.05 $	$^{\circ}0.5 \pm 0.05 \text{ or } 0.6 + 0.06 \\ -0.05 $	0.8 +0,08	0.8 +0,08	0.8 +0.08 -0.05			
Component alignment	Δh	± 2.0 max.	± 2.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.	± 3.0 max.			
Total tape thickness	t	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2	0.7 ±0.2			
		ROLL//	AMMO	AMMO							
Package Isee also page 128)		REEL Ø 360 max. Ø 30 ±1	$\left. \begin{array}{c} 52\pm2\\58\pm2 \end{array} ight\}$ depending on comp. dimensions	$\begin{array}{cccccccccccccccccccccccccccccccccccc$							
Unit					see details page 130.						

Dims in mm.

• Diameter of pins see General Data.

PCM 10 and PCM 15 can be crimped to PCM 7.5. Position of components according to PCM 7.5 (sketch 1). $P_0 = 12.7$ or 15.0 is possible

Please clarify customer-specific deviations with the manufacturer.

Packing Quantities for Capacitors with Radial Pins in PCM 2.5 mm to 22.5 mm

					pcs. per packing unit									
		Si	ze			ROLL	RE	EL	AM					
PCM		01.	20		bulk		ø 360	Ø 500	340 × 340	490 × 370				
	W			Carlas	S		H16.5 H18.5							
	2.5	<u>Н</u> 7	4.6	Codes 0B	5000	N O 2200	2500	H J	A C 2800	B D				
	3	7.5	4.0	0C	5000	2200	2300	-	2300	-				
2.5 mm	3.8	8.5	4.6	0D	5000	1500	1800	_	1800	_				
	4.6	9	4.6	0E	5000	1200	1500	-	1500	-				
	5.5	10	4.6	0F	5000	900	1200	-	1200	-				
	2.5	6.5	7.2	1A	5000	2200	2500	_	2800	_				
	3	7.5	7.2	1B	5000	2000	2300	-	2300	-				
	3.5	8.5	7.2	1C	5000	1600	2000	-	2000	-				
	4.5	6	7.2	1D	6000	1300	1500	-	1500	-				
	4.5	9.5	7.2	1E	4000	1300	1500	-	1500	-				
_	5	10	7.2	1F	3500	1100	1400	-	1400	-				
5 mm	5.5 5.5	7 11.5	7.2 7.2	1G 1H	4000 2500	1000 1000	1200 1200	-	1200 1200	-				
	5.5 6.5	8	7.2	11	2500	800	1200	_	1200	-				
	7.2	8.5	7.2	ij	2500	700	1000	_	1000	_				
	7.2	13	7.2	iĸ	2000	700	950	_	1000	-				
	8.5	10	7.2	1L	2000	600	800	-	800	-				
	8.5	14	7.2	1M	1500	600	800	-	800	-				
	11	16	7.2	1N	1000	500	700	-	700	-				
	2,5	7	10	2A	5000	-	2500	4400	2500	-				
	3	8.5	10	2B	5000	-	2200	4300	2300	4150				
7 5	4	9	10	2C	4000	-	1700	3200	1700	3100				
7.5 mm	4.5	9.5	10.3	2D	3500	-	1500	2900	1400	2800				
	5 5.7	10.5 12.5	10.3 10.3	2E 2F	3000 2000	-	1300	2500 2200	1300 1100	-				
	5.7 7.2	12.5	10.3	2F 2G	1500	-	1000 900	1800	1000	-				
	3	9	10.5	3A	3000	_	1100	2200	-					
	4	8.5	13.5	FA	3000	_	900	1600	-	1900 1450				
	4	9	13	3C	3000	_	900	1600	_	1450				
	4	9.5	13	3D	3000	-	900	1600	-	1400				
10 mm	5	10	13.5	FB	2000	-	700	1300	-	1200				
	5	11	13	3F	3000	-	700	1300	-	1200				
	6	12	13	3G	2400	-	550	1100	-	1000				
	6	12.5	13	3H	2400	-	550 400	1100 800	-	1000 740				
	8	12	13	31	2000	-			-					
	5 5	11	18	4B	2400	-	600	1200	-	1150				
	5 6	13 12.5	19 18	FC 4C	1000 2000	-	600 500	1200 1000	-	1200 1000				
	6	12.5	10	4C FD	1000	_	500	1000	_	1000				
	7	14	18	4D	1600	_	450	900	-	850				
	7	15	19	FE	1000	-	450	900	-	850				
15 mm	8	15	18	4F	1200	-	400	800	-	740				
	8	17	19	FF	500	-	400	800	-	740				
	9	14	18	4H	1200	-	350	700	-	650				
	9 10	16 18	18 19	4J	900	-	350 300	700	-	650 590				
	10	18	19	FG 4M	500 1000	-	300	650 600	-	590 540				
	5	14	26.5	5A	1200	_	-	800	_	770				
	6	14	26.5	5A 5B	1200	_	_	700	_	640				
	7	16.5	26.5	5D	760	_	_	600	_	550				
	8	20	28	FH	500	-	-	500	-	480				
22.5 mm	8.5	18.5	26.5	5F	500	-	-	480	-	450				
22.5 1111	10	22	28	FI	540*	-	-	420	-	380				
	10.5	19	26.5	5G	680*	-	-	400	-	360				
	10.5	20.5	26.5	5H	680*	-	-	400	-	360				
	11	21	26.5	51	680*	-	-	380	-	350				
	12	24	28	FJ	450*	-	-	350	-	310				

* Tray Packing-System Samples and pre-production needs on request.

Moulded versions.

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Packing Quantities for Capacitors with -Radial Pins in PCM 2.5 mm to 22.5 mm

PCM							pcs. per pc		•	
		Siz	7 0			ROLL	RE		AM	
FCIVI		0.12			bulk		Ø 360	Ø 500	340 × 340	490 × 370
	<u> </u>						H16.5 H18.5			
	W	Н	L	Codes	S	N O	FI	НЈ	A C	B D
	9	19	31.5	6A	640*	-	-	460/340*	-	420
	11	21	31.5	6B	544*	-	-	380/280*	-	350
	13	24	31.5	6D	448*	-	-	300	-	290
	13	25	33	FK	336*	-	-	270	-	250
	15	26	31.5	6F	384*	-	-	-	-	-
	15	26	33	FL	288*	-	-	-	-	-
	17	29	31.5	6G	176*	-	-	-	-	-
	17	34.5	31.5	61	176*	-	-	-	-	-
	19	30	31.5	6L	50*	-	-	-	-	-
	20 20	32 39.5	33 31.5	FM 6J	216* 144*	-	-	-	-	-
	20	<u> </u>	41.5	0J 7A	480*					_
	11	22	41.5	7B	400 408*	_	_	_	_	-
	13	22	41.5	7C	252*					
	15	26	41.5	7D	144*	_	_	_	_	_
	17	29	41.5	7E	132*	_	_	_	_	_
	19	32	41.5	7F	108*	_	-	-	-	-
	20	39.5	41.5	7G	108*	-	-	-	-	-
	24	45.5	41.5	7H	84*	-	-	-	-	-
	31	46	41.5	71	72*	-	-	-	-	-
	35	50	41.5	7J	35*	-	-	-	-	-
	40	55	41.5	7K	28*	_	_	_	_	-
	19	31	56	8D	50*	-	-	-	-	-
10 E	23	34	56	8E	72*	-	-	-	-	-
	27	37.5	56	8H	60*	-	-	-	-	-
	33	48	56	8J	48*	-	-	-	-	-
	37 35	54 50	<u>56</u> 57	8L 9F	<u>25*</u> 25*		_	-	_	
	35 45	50 55	57 57	9F 9H	25*	-	-	-	-	-
52.5	45 45	აა 65	57 57	91 91	20* 20*	_	_	_	_	_

* for 2-inchl transport pitches.

* Tray Packing System Samples and pre-production needs on request.



Moulded versions.

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WIMA Part Number System

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)

Field 17	′ - 18: Lec	ıd leng	th (unt	taped)													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
м	К	S	2	c	0	2	1	0	0	1	A	0	0	м	S	S	D
	MKS	2		63 \	/DC		0.0	1 µF		2.5×6	.5x7.2	-		20%	bulk	6	-2
			_														
SMD-F SMD-F FKP 02 MKS 0 FKS 2 FKP 2 MKS 2 FKP 3 MKP 2 FKS 3 FKP 3 MKP 4 FKP 1 FKP 4 FKP 1 MKP-X MKP-X MKP-Y MP 3-) MP 3-) MP 3- Snubb Snubb Snubb Snubb	PS 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	= SA $= SA$ $= FK$	ADI ADO KSO KS2 KS2 KS2 KS2 KS2 KS2 KS2 KS2 KS2 KS2	Rated v 2.5 VDC 4 VDC 28 VDC 5 VDC 5 VDC 50 VDC 50 VDC 63 VDC 63 VDC 63 VDC 400 VDC 450 VDC 600 VDC 630 VDC 630 VDC 630 VDC 630 VDC 850 VDC 850 VDC 800 VDC 1000 VD 1000 VD 1200 VD 1250 VD 12	$\begin{array}{c} = A \\ = B \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = C \\ = B \\ = D \\ = D \\ = C \\$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	pF = 0 pF = 00 pF = 01 µF = 022 µF = 047 µF = 0 µF = 0 µF =	= 0022 = 0047 = 0100 = 0150 = 0220 = 0330 = 0470 = 0680 = 1100 = 1150 = 1220 = 1330 = 1470 = 1680 = 2100 = 2220 = 2470 = 3100 = 3220	4.8x 5.7x 5.7x 7.2x 7.2x 10.2: 12.7s 15.3; 2.5x 3x7. 2.5x 3x7. 2.5x 3x8. 3x9: 4x9: 5x14 6x12 5x14 6x12 5x14 6x12 5x14 6x12 9x19 11x2 94x4	3.3 x 3 5 3.3 x 4 5 5.1 x 3.5 5.1 x 4.5 5.1 x 4.5 6.1 x 3 5 6.1 x 3 5 6.1 x 3 5 (10.2 x 6 (10.2 x 7 (10.2 x 7	CM 7.5 CM 7.5 M 10 CM 15 PCM 15 PCM 22 PCM 22 PCM 27 PCM 27 PCM 37 PCM 37 DCH_	$2 = Kl \\ 220 = C \\ 220 = C \\ 4 = TA \\ 4 = TH \\ 30 = V \\ 40 = X \\ 54 = YA \\ 40 = X \\ 54 = YA \\ 0 = 0 \\ 0 \\ 0 \\ 11 \\ 0 \\ 0 \\ 11 \\ 0 \\ 0 \\ 11 \\ 0 \\ 0$	B A B A A A A B C A B A B A B C A B A B	Toleran 20% 10% 5% 2.5% 1% Packing AMMO AMMO AMMO AMMO AMMO AMMO AMMO AMM	= M = K = J = H = E H16.5 3 H16.5 4 H18.5 3 H18.5 4 6.5 360 6.5 500 8.5 500 6.5 8.5 W12 18 W12 33 W16 33 W16 33 W16 33	90 × 37(40 × 34(90 × 37(00) = B) = C
Super(Super(Cap MC		CMC CSR	250 VAC 275 VAC 300 VAC 400 VAC 440 VAC 500 VAC	$\begin{array}{l} = 0 \\ = 1 \\ 0 \\ = 2 \\ 0 \\ = 3 \\ 0 \\ 0 \\ = 4 \end{array}$	V 50 V 10 V 11 V 60 V 12	F = 0F = 0F = 0F =	= A500 = B100 = B110 = B600 = C120	Stand Versid Versid	on Al on Al.l	= 00 = 1A			Lead le 3.5 ±0.5 6 -2 16 ±1 		ntaped)	

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.