



# Product guide 200

# Information BCCcomp

World wide **web**

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## BCcomponents

Your active partner in passive solutions

BCcomponents is one of the world's largest manufacturers of Passive Components, with more than 70 years experience in supplying high quality, reliable products to all major industries. This unparalleled experience has resulted in an extensive portfolio that enables customers to rationalize their supply sources.

In this catalogue, you will find our current range of passive components:

- Electrolytic, ceramic, film, and variable capacitors
- Linear and non-linear resistors
- Switches and trimming potentiometers.

BCcomponents is actively involved in maintaining a dialogue with our customers, so that our mutual knowledge can be shared and solutions created that fully answer the emerging needs of each industrial sector. Our philosophy is one of continuous innovation, fully directed at the new challenges facing specific industrial sectors. For this, we have developed an organization that is fully industry-focused. Ensuring that specialists can talk with specialists and together develop solutions that go further than the supply of existing commodity products.

Certainly, this philosophy ensures that innovation - mutual innovation - extends beyond the narrow limits of supplying a component. Innovation at BCcomponents is also clearly directed at developing cutting-edge packaging technology to improve your assembly process. It is directed at providing a production planning that seamlessly integrates with your supply needs and a logistics approach that is not only reliable, but also cost-effective and time-efficient.

Today's increasingly global markets demand global solutions and global suppliers. BCcomponents is truly global - both in outlook and presence. With more than 4,000 employees active in all the major industrial areas of the world, we can truly be an active partner for your operations - wherever they may be based. Our local presence provides you with access to our global knowledge and innovation ensuring local support for global operations. We are there, wherever you need us. To provide knowledge and create solutions. An active approach in passive components.



## www.bccomponents.com

Your one-stop access to a world of passive solutions

### On-line for you

Everybody today has a website; BCcomponents is no exception. However, our website at <http://www.bccomponents.com> has been specifically designed to share our knowledge with our special customers and to help them discover the breadth of passive component solutions we can offer. For this reason, we have developed an efficient search tool that allows you to identify and locate the component that meets your specific requirements. As we constantly develop new solutions to emerging challenges, we would advise our customers to visit our website regularly, to ensure they can access the very latest data and encourage them to make any suggestions that they feel could help us improve our on-line service.

Either at our website or by email to [bcc.marcom@bccomponents.com](mailto:bcc.marcom@bccomponents.com).

### Global support to meet your global expectations

Industry-focused teams ensure that you can instantly connect with the information and support you may need. Supported by our global network of sales organizations, distributors and agents in all parts of the world, you can easily obtain the information, support and products that you require. What's more, our website provides full details of all our distributors, clearly catalogued by location. So that you can find the most convenient local access to our global expertise.

### Putting customers first

Our dedication to our customers is not only illustrated by our industry focus - ensuring that you receive the industry-specific expertise you require - but also in our determination to develop long-term partnerships that are mutually beneficial and create a win-win situation for both parties. This means that we do not simply sell our products; instead, we participate in developing the correct solution - whether in functionality, packaging, or suitability for your specific assembly requirements. It is a total service, including joint development - in which we provide our knowledge and create solutions - designing the most suitable logistics operation to meet your manufacturing requirements. This, incidentally, also extends to delivering your chosen products in convenient, environmentally friendly and cost-effective, returnable packaging.

### Striving for quality in everything we do

Of course we are certificated to the highest industry standards. You would expect nothing less. All our centres hold ISO 9001/2 quality certification and the ISO 14001 environmental certification. All centres serving the automotive industry also hold QS 9000 certification and other centres are in the process of obtaining such certification. Three of our centres hold the Philips PQA90 certificate.

However, the most valuable assessment of our constant striving for quality is the large number of business excellence awards given us by our customers. Not only for product quality, but also for the quality of every aspect of our extensive customer service. It is an area that allows no compromise and one which has - and will continue to have - our most critical attention.



## Making the most of this catalogue

### Product listings

We have divided this catalogue into clearly marked sections for each type of product. Full specifications are provided so that customers can choose the products that exactly meet the requirements of the application, whether in telecom, automotive, consumer, white goods, or industrial areas. Under each product type, we have listed the preferred types and shown which are recommended for design-in. These products are generally available with very short lead-times from either our manufacturing centres or through our franchised distributors.

### Customized products

In our determination to offer products that fully meet your specifications, we can also supply application-specific products under development. We also offer a custom-design service for special requirements. Here we aim to leverage the expertise available from the customer and within our own research departments to create solutions that give a competitive edge.

### Ordering

A clear text code or 12-digit ordering code is given for most of the preferred types of components. Information on ordering other types is available from the relevant data handbook; this is indicated at the bottom of each page in this catalogue.

### Delivery

The BCcomponents sales organization in your country or one of our franchised distributors will be delighted to supply you with additional information about minimum shipment quantities, prices, and delivery schedules. We have included contact details at the back of this catalogue. Alternatively, you can find a full list of contact details on our website: [www.bccomponents.com](http://www.bccomponents.com)



## Need a direct answer to your question?

Then contact us at the numbers below.

### Questions about passive components in:

- |                        |                  |
|------------------------|------------------|
| • Telecom              | +32 2 724 08 20  |
| • Industrial           | +31 40 259 07 28 |
| • Automotive           | +49 40 24822 107 |
| • Consumer electronics | +44 1483 467002  |
| • Others               | +31 40 259 07 67 |

### Questions about capacitors:

- |                |                         |
|----------------|-------------------------|
| • Electrolytic | +43 463 3834 213 or 212 |
| • Ceramic      | +65 6483 2811           |
| • Film         | +32 51 23 32 07         |

### Questions about resistors:

- |                |                 |
|----------------|-----------------|
| • MFC and MELF | +49 481 95 315  |
| • Leaded       | +49 481 95 341  |
| • NTC and MLV  | +32 2 724 08 27 |
| • PTC/VDR      | +32 2 724 09 33 |

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	2222 338 4	Film capacitor interference suppression	82		2252 556 ...4	Ceramic disc capacitor N750 100 V +2%	35
	2222 338 6	Film capacitor interference suppression	78		2252 558 ...4	Ceramic disc capacitor N750 500 V +2%	35
	2222 347	Film capacitor general purpose, special	72		2252 586 ...4	Ceramic disc capacitor N1500 100 V +2%	35
	2222 365	Film capacitor general purpose dipped	68		2252 588 ...4	Ceramic disc capacitor N1500 500 V +2%	35
	2222 366	Film capacitor general purpose dipped	68		2252 561	Ceramic disc capacitor SL 1000 V	37
	2222 367	Film capacitor general purpose dipped	68		2252 561 ...9	Ceramic disc capacitor SL 1000 V +5%	37
	2222 370	Film capacitor general purpose boxed	63		2252 562	Ceramic disc capacitor SL 2000 V	37
	2222 371	Film capacitor general purpose boxed	63		2252 562 ...9	Ceramic disc capacitor SL 2000 V +5%	37
	2222 372	Film capacitor general purpose boxed	63		2252 563	Ceramic disc capacitor SL 3000 V	37
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	2222 374	Film capacitor, AC & Pulse	100		2252 565	Ceramic disc capacitor SL 50 V	32
	2222 375	Film capacitor, AC & Pulse	88		2252 566	Ceramic disc capacitor SL 100 V	32
	2222 383	Film capacitor, AC & Pulse	94		2252 568	Ceramic disc capacitor SL 500 V	32
	2222 416	Film capacitor, precision	73		2252 574	Ceramic disc capacitor S3N 6000 V	37
	2222 417	Film capacitor, precision	73		2252 596 ...4	Ceramic disc capacitor P100 100 V +2%	35
	2222 418	Film capacitor, precision	73		2252 598 ...4	Ceramic disc capacitor P100 500 V +2%	35
	2222 419	Film capacitor, precision	73		2252 601	Ceramic disc capacitor X7R 1000 V	37
	2222 420	Film capacitor, precision	73		2252 602	Ceramic disc capacitor X7R 2000 V	37



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2252 611	Ceramic disc capacitor Y5P 1000 V	37	2312 90. 1	Leaded professional resistor	197
2252 612	Ceramic disc capacitor Y5P 2000 V	37	2312 90. 5	Leaded professional resistor	197
2252 613	Ceramic disc capacitor Y5P 3000 V	37	2312 90. 6	Leaded precision resistor	198
2252 615	Ceramic disc capacitor Y5P 50 V	32	2312 90. 7	Leaded precision resistor	198
2252 616	Ceramic disc capacitor Y5P 100 V	32	2312 903 0	Leaded high frequency resistor	201
2252 618	Ceramic disc capacitor Y5P 500 V	32	2312 905 3	Leaded professional resistor	197
2252 631	Ceramic disc capacitor Y5V 1000 V	37	2312 91. 1	Leaded professional resistor	197
2252 632	Ceramic disc capacitor Y5V 2000 V	37	2312 91. 5	Leaded professional resistor	197
2252 633	Ceramic disc capacitor Y5V 3000 V	37	2312 91. 6	Leaded precision resistor	198
2252 635	Ceramic disc capacitor Y5V 50 V	32	2312 91. 7	Leaded precision resistor	198
2252 636	Ceramic disc capacitor Y5V 100 V	32	2312 915 3	Leaded professional resistor	197
2252 638	Ceramic disc capacitor Y5V 500 V	32	2312 92. 1	Leaded professional resistor	197
2252 641	Ceramic disc capacitor Z5U 1000 V	37	2312 92. 5	Leaded professional resistor	197
2252 642	Ceramic disc capacitor Z5U 2000 V	37	2312 92. 6	Leaded precision resistor	198
2252 643	Ceramic disc capacitor Z5U 3000 V	37	2312 92. 7	Leaded precision resistor	198
2252 644	Ceramic disc capacitor Z5U 6000 V	37	2312 920 3	Leaded professional resistor	197
2252 645	Ceramic disc capacitor Z5U 50 V	32	2312 950 2	Leaded high pulse load resistor	201
2252 646	Ceramic disc capacitor Z5U 100 V	32	2322 156 2	Leaded gen. purpose & precision resistors	196
2252 648	Ceramic disc capacitor Z5U 500 V	32	2322 157 2	Leaded gen. purpose & precision resistors	196
2252 655	Ceramic disc capacitor Z5V 50 V	32	2322 181 43	Leaded gen. purpose & precision resistors	196
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2252 708	Ceramic disc capacitor, 500 V low loss 0.5%	41	2322 197 1	Linear resistor, leaded	202
2252 711	Ceramic disc capacitor, 1000 V low loss 0.2%	41	2322 205 33	Leaded fusible resistor	200
2252 712	Ceramic disc capacitor, 2000 V low loss 0.2%	41	2322 207 33	Leaded fusible resistor	200
2252 713	Ceramic disc capacitor, 3000 V low loss 0.2%	41	2322 241 13	Leaded high ohmic/high voltage resistor	200
2252 718	Ceramic disc capacitor, 500 V low loss 0.2%	41	2322 242 13	Leaded high ohmic/high voltage resistor	200
2252 811 .....6	Ceramic disc capacitor, safety X1/Y1 4 kVAc, +10%	44	2322 244 13	Leaded high ohmic/high voltage resistor	200
2252 811 .....7	Ceramic disc capacitor, safety X1/Y1 4 kVAc, +20%	44	2322 245 11	Leaded high voltage surge resistor	200
2252 812 .....6	Ceramic disc capacitor, safety X1/Y2 2.5 kVAc, +10%	44	2322 25	Leaded power resistor	205
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2306 327	Leaded power precision resistor	203	2322 592	Varistor ZnO / MOV, Ø7 mm, 2e pitch	222
2306 328 33	Leaded power resistor	202	2322 593	Varistor ZnO / MOV, Ø9 mm, 2e pitch	222
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2312 2312 10.	SMD ultra precision	194	2322 595	Varistor ZnO / MOV, Ø17 mm, 3e pitch	222
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**Ceramic co**

The image features a large, abstract graphic design. The background is primarily a vibrant green color with a fine halftone dot pattern. A large, white, irregular shape, resembling a stylized profile of a head or a modern architectural form, is positioned on the right side. This white shape overlaps the green background and contains the text 'Ceramic co'. The text is rendered in a bold, black, sans-serif font. The overall composition is clean and modern, with a focus on geometric forms and color contrast.



# Capacitors

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# Surface Mount Multilayer Chip Capacitors

BCcomponents **Multilayer chip capacitors** offer the most complete range of electrical characteristics and mechanical configurations available in the industry.

## • Feature

- Superior volumetric efficiency
- Excellent for high speed automated assembly
- Voltage range: **10 V, 16 V, 25 V, 50 V, 100 V, 200 V, 500 V, 1 kV, 2 kV, 3 kV, 4 kV**
- Standard dielectric material: **NPO, X7R, Y5V**
- Available in size: **0402, 0603, 0805, 1206, 1210, 1808, 1812**

## • Applications

### • Automotive

- fan control
- seat control
- instrumentation
- airbag control
- ABS controller
- car alarm
- printers

### • Computer hardware & peripherals

- motherboards
- hard-disc drivers
- monitors
- keyboards
- CD-ROM
- modems

### • Communication devices

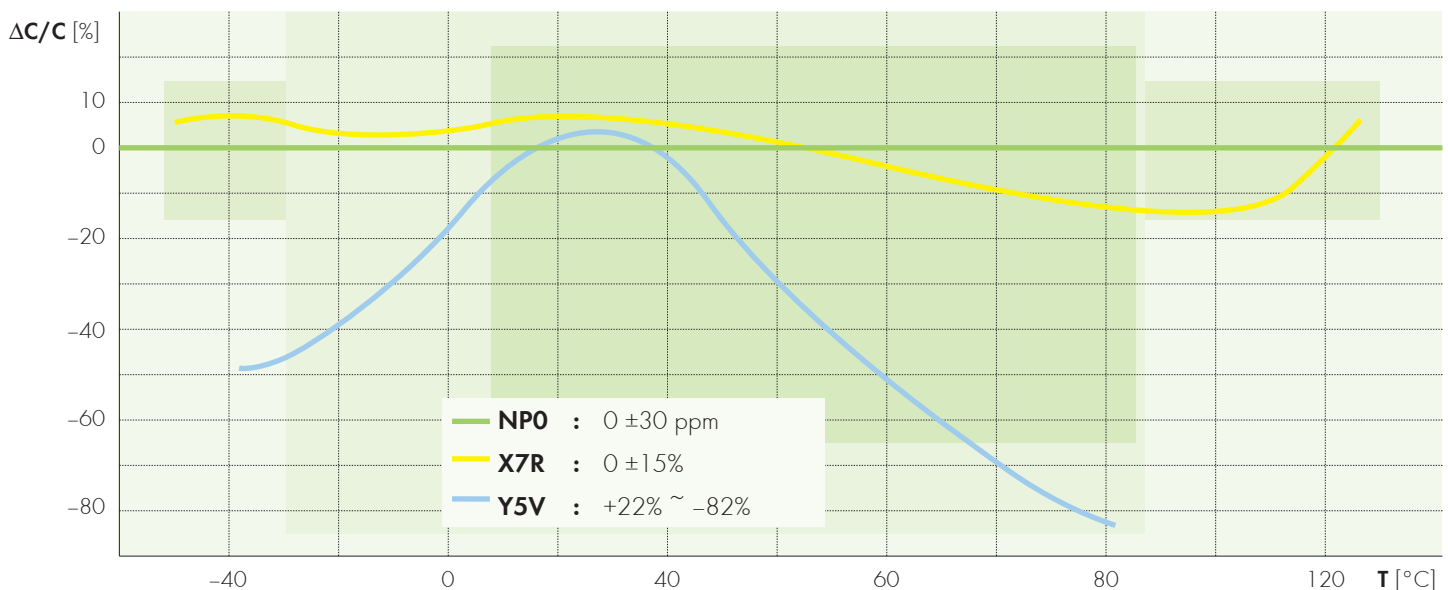
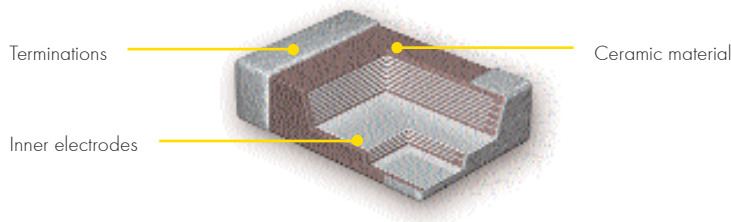
- mobile phones
- electronic exchange devices
- paggers

### • Domestic appliance

- motor control
- de-frost control
- touch panels
- displays

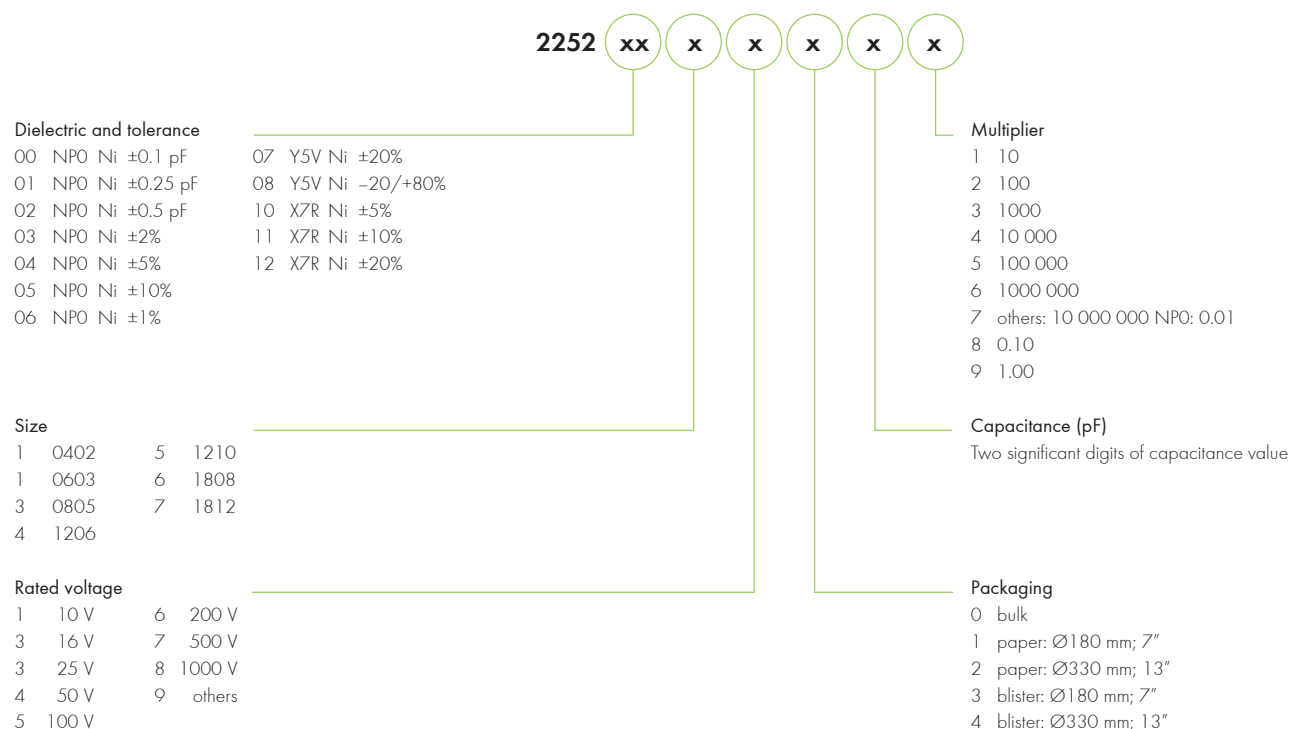
### • Consumer products

- VCRs
- data banks
- remote controls





• 12 Digit code\* [12NC]



• Capacitance and tolerance

Capacitance & tolerance	NPO	X7R	Y5V
1R0 = 1.0 pF 100 = 10 pF 101 = 100 pF 102 = 1000 pF = 1 nF 103 = 10000 pF = 10 nF 104 = 100 nF 105 = 1000 nF = 1 µF 106 = 10000 nF = 10 µF	1R0-103	101-105	103-106
B: ±0.1 pF (C ≤ 5 pF) C: ±0.25 pF (C ≤ 5 pF) D: ±0.5 pF (5 pF < C < 10 pF) F: ±1% G: ±2% J: ±5% K: ±10% M: ±20% Z: -20%/+80%	B, C, D, F, G, J, K	J, K, M	M, Z

• Length, width and MB

[unit: mm]

L, W, MB	0402	0603	0805	1206	1210	1808	1812
Length	0.040 ±0.0002 (1.00 ±0.05)	0.063 ±0.004 (1.60 ±0.10)	0.080 ±0.006 (2.00 ±0.15)	0.125 ±0.006 (3.20 ±0.15)	0.125 ±0.012 (3.20 ±0.30)	0.180 ±0.015 (4.50 ±0.40)	0.180 ±0.015 (4.50 ±0.40)
Width	0.020 ±0.002 (0.50 ±0.05)	0.030 ±0.004 (0.80 ±0.10)	0.050 ±0.006 (1.25 ±0.15)	0.063 ±0.006 (1.60 ±0.15)	0.100 ±0.008 (2.50 ±0.20)	0.081 ±0.010 (2.03 ±0.25)	0.125 ±0.012 (3.20 ±0.30)
MB	0.010 +0.002/-0.004 (0.25 +0.05/-0.10)	0.015 ±0.006 (0.40 ±0.15)	0.020 ±0.008 (0.50 ±0.20)	0.025 ±0.008 (0.60 ±0.20)	0.030 ±0.010 (0.75 ±0.25)	0.030 ±0.010 (0.75 ±0.25)	0.030 ±0.010 (0.75 ±0.25)



DIELECTRIC		NPO low voltage																							
EIA CAP	SIZE	0402				0603				0805				1206				1210				1812			
CODE	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
0R5	0.5 pF	N	N	N	N	S	S	S	S	A	A	A	A												
1R0	1	N	N	N	N	S	S	S	S	A	A	A	A												
1R2	1.2	N	N	N	N	S	S	S	S	A	A	A	A												
1R5	1.5	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
1R8	1.8	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
2R2	2.2	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
2R7	2.7	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
3R3	3.3	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
3R9	3.9	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
4R7	4.7	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
5R6	5.6	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
6R8	6.8	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
8R2	8.2	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
100	10 pF	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
120	12	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
150	15	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
180	18	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
220	22	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
270	27	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
330	33	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
390	39	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
470	47	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
560	56	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
680	68	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
820	82	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
101	100 pF	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
121	120	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
151	150	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
181	180	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
221	220	N	N	N		S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
271	270					S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
331	330					S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C				
391	390					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C				
471	470					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C				
561	560					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C				
681	680					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C				
821	820					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C				
102	1000 pF					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	
122	1200									B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	
152	1500									B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	
182	1800									B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	
222	2200									B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	
272	2700									D	D	D	D	B	B	B	B	C	C	C	C	D	D	D	
332	3300									D	D	D	D	B	B	B	B	C	C	C	C	D	D	D	
392	3900									D	D	D	D	B	B	B	B	C	C	C	C	D	D	D	
472	4700									D	D	D		B	B	B	B	C	C	C	C	D	D	D	
562	5600													B	B	B	B	C	C	C	C	D	D	D	
682	6800													C	C	C	C					D	D	D	
822	8200													C	C	C	C					D	D	D	
103	.010 μF																					D	D	D	

Other sizes, capacitance, voltage, and a 13" reel are available on request.

TAPE AND REEL	NPO low voltage						
SIZE	0402	0603	0805	1206	1210	1808	1812
A = 0.65 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
B = 0.85 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
C = 1.00 +0.05/-0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	
D = 1.2 ±0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel
G = 1.60 +0.05/-0.15 mm			blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel	blister 1 Kpcs/reel
K = 2.00 ±0.2 mm						blister 1 Kpcs/reel	blister 1 Kpcs/reel
S = 0.8 ±0.07 mm	paper 4 Kpcs/reel	paper 4 Kpcs/reel					
N = 0.50 ±0.05 mm	paper 10 Kpcs/reel	paper 10 Kpcs/reel					





DIELECTRIC		NPO high voltage																												
EIA CAP	SIZE	0603					0805					1206					1210					1808				1812				
		[V]					[V]					[V]					[V]					[V]				[V]				
CODE	VDCW	100	100	200	250	500	100	200	250	500	1000	2000	100	200	250	500	1000	2000	1000	2000	3000	4000	100	200	250	500	1000	2000	3000	4000
0R5	0.5 pF	S	A	A	A	A																								
1R0	1	S	A	A	A	A																								
1R2	1.2	S	A	A	A	A																								
1R5	1.5	S	A	A	A	A	B	B	B	B	B	B																		
1R8	1.8	S	A	A	A	A	B	B	B	B	B	B																		
2R2	2.2	S	A	A	A	A	B	B	B	B	B	B																		
2R7	2.7	S	A	A	A	A	B	B	B	B	B	B																		
3R3	3.3	S	A	A	A	A	B	B	B	B	B	B																		
3R9	3.9	S	A	A	A	A	B	B	B	B	B	B																		
4R7	4.7	S	A	A	A	A	B	B	B	B	B	B																		
5R6	5.6	S	A	A	A	A	B	B	B	B	B	B																		
6R8	6.8	S	A	A	A	A	B	B	B	B	B	B																		
8R2	8.2	S	A	A	A	A	B	B	B	B	B	B																		
100	10 pF	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	
120	12	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	
150	15	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	
180	18	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	
220	22	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	
270	27	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	
330	33	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	
390	39	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	
470	47	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	
560	56	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	
680	68	S	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	K	
820	82	S	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	K	
101	100 pF	S	A	A	A	B	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	K	
121	120	S	A	A	A	D	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	
151	150	S	A	B	B	D	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	
181	180	S	A	B	B	D	B	B	B	B	B	C	C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	D	
221	220	S	A	D	D		B	B	B	B	D	D	C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	D	
271	270	S	A	D	D		B	B	B	B	D		C	C	C	C	C	C	D	D	D	K	D	D	D	D	D	D	K	
331	330	S	A				B	B	B	B			C	C	C	C	D			D	D		D	D	D	D	D	D	K	
391	390	S	B				B	B	B	B			C	C	C	C	D			D	D	K	D	D	D	D	D	D	K	
471	470	S	B				B	B	B	C			C	C	C	C	D			D	D	K	D	D	D	D	D	D	K	
561	560	S	B				B						C	C	C	C				K	K		D	D	D	D	D	D		
681	680	S	B				B						C	C	C	C				K	K		D	D	D	D	D	D	K	
821	820	S	B				B						C	C	C	C				K			D	D	D	D	D	D	K	
102	1000 pF	S	B				B						C	C	C	C				K			D	D	D	D	K	K		
122	1200		B				B						C	D	D								D	D	D	D	K			
152	1500		B				B						C	D	D								D	D	D	D	K			
182	1800		B				B						C	D	D								D	D	D	D				
222	2200		B				B						C	D	D								D	D	D					
272	2700		D				B						C	D	D								D	D	D					
332	3300		D				B						C										D							
392	3900		D				B																D							
472	4700						B																D							
562	5600						B																							
682	6800						C																							
822	8200						C																							
103	.010 µF																													
123	0.012																													
153	0.015																													
183	0.018																													
223	0.022																													

Other sizes, capacitance, voltage, and a 13" reel are available on request.

TAPE AND REEL	NPO high voltage						
SIZE	0402	0603	0805	1206	1210	1808	1812
A = 0.65 +0.05/-0.15 mm		paper 4 Kpcs/reel	paper 4 Kpcs/reel	paper 4 Kpcs/reel			
B = 0.85 +0.05/-0.15 mm		paper 4 Kpcs/reel	paper 4 Kpcs/reel	paper 4 Kpcs/reel			
C = 1.00 +0.05/-0.15 mm		blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	
D = 1.2 ±0.15 mm		blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel
G = 1.60 +0.05/-0.15 mm		blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel	blister 1 Kpcs/reel
K = 2.00 ±0.2 mm						blister 1 Kpcs/reel	blister 1 Kpcs/reel
S = 0.8 ±0.07 mm		paper 4 Kpcs/reel	paper 4 Kpcs/reel	paper 4 Kpcs/reel			
N = 0.50 ±0.05 mm							



DIELECTRIC		X7R low voltage																							
EIA CAP	SIZE	0402				0603				0805				1206				1210				1812			
CODE	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
101	100 pF	N	N	N	N	S	S	S	S	B	B	B	B												
121	120	N	N	N	N	S	S	S	S	B	B	B	B												
151	150	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
181	180	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
221	220	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
271	270	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
331	330	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
391	390	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
471	470	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
561	560	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
681	680	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
821	820	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B								
102	1000 pF	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
122	1200	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
152	1500	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
182	1800	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
222	2200	N	N	N	N	S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
272	2700	N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
332	3300	N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
392	3900	N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
472	4700	N	N	N		S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
562	5600	N	N			S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
682	6800	N	N			S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
822	8200	N	N			S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
103	0.01 μF	N	N			S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
123	0.012	N	N			S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
153	0.015	N	N			S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
183	0.018					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
223	0.022					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
273	0.027					S	S	S	S	B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
333	0.033					S	S	S		B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
393	0.039					S	S	S		B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
473	0.047					S	S	S		B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
563	0.056					S	S	S		B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
683	0.068					S	S	S		B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
823	0.082					S	S			B	B	B	D	B	B	B	B	C	C	C	C	D	D	D	D
104	0.1 μF					S	S			B	B	B	D	B	B	B	B	C	C	C	C	D	D	D	D
124	0.12					S				B	B	B		B	B	B	B	C	C	C	C	D	D	D	D
154	0.15					S				D	D	D		C	C	C	C	C	C	C	C	D	D	D	D
184	0.18					S				D	D	D		C	C	C	C	C	C	C	C	D	D	D	D
224	0.22					S				D	D	D		C	C	C	C	C	C	C	C	D	D	D	D
274	0.27									D	D			C	C	C		C	C	C	C	D	D	D	D
334	0.33									D	D			C	C	C		C	C	C	C	D	D	D	D
394	0.39									D	D			C	C			C	C	C	C	D	D	D	D
474	0.47									D	D			D	D			C	C	C		D	D	D	D
564	0.56									D	D			D	D							D	D	D	D
684	0.68									D				D	D							D	D	D	K
824	0.82									D				D	D							D	D	D	K
105	1 μF									D				D	D							D	D	D	K

Other sizes, capacitance, voltage, and a 13" reel are available on request.

TAPE AND REEL	X7R low voltage						
SIZE	0402	0603	0805	1206	1210	1808	1812
A = 0.65 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
B = 0.85 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
C = 1.00 +0.05/-0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	
D = 1.2 ±0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel
G = 1.60 +0.05/-0.15 mm			blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel	blister 1 Kpcs/reel
K = 2.00 ±0.2 mm							
S = 0.8 ±0.07 mm	paper 4 Kpcs/reel	paper 4 Kpcs/reel					
N = 0.50 ±0.05 mm	paper 10 Kpcs/reel	paper 10 Kpcs/reel					



DIELECTRIC		X7R high voltage																									
EIA CAP	SIZE	0603	0805				1206						1210				1808			1812							
CODE	VDCW	(V)	(V)				(V)						(V)				(V)			(V)							
		100	100	200	250	500	100	200	250	500	1000	1500	2000	100	200	250	500	1000	1000	1500	2000	100	200	250	500	1000	2000
101	100 pF	S	B	B	B	B																					
121	120	S	B	B	B	B																					
151	150	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D						
181	180	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D						
221	220	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D						
271	270	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D					D	D
331	330	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D					D	D
391	390	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D					D	D
471	470	S	B	B	B	B	B	B	B	B	B	B	B						D	D	D					D	D
561	560	S	B	B	B	B	B	B	B	B	B	C	C						D	D	D					D	D
681	680	S	B	B	B	B	B	B	B	B	B	C	C						D	D	D					D	D
821	820	S	B	B	B	B	B	B	B	B	B	C	G						D	D	D					D	D
102	1000 pF	S	B	B	B	B	B	B	B	B	B	G	G	C	C	C	C	C	D	D	K	D	D	D	D	D	D
122	1200	S	B	B	B	B	B	B	B	B	B	G	G	C	C	C	C	C	D	D	K	D	D	D	D	D	D
152	1500	S	B	B	B	B	B	B	B	B	B	G		C	C	C	C	C	D	D		D	D	D	D	D	D
182	1800	S	B	B	B	B	B	B	B	B	B	G		C	C	C	C	C	D	D		D	D	D	D	D	D
222	2200	S	B	B	B	B	B	B	B	B	C	G		C	C	C	C	C	D	D		D	D	D	D	D	D
272	2700	S	B	B	B		B	B	B	B	D			C	C	C	C	C	D	D		D	D	D	D	D	D
332	3300	S	B	B	B		B	B	B	B	G			C	C	C	C	D	D			D	D	D	D	D	D
392	3900	S	B	B	B		B	B	B	B	G			C	C	C	C	D				D	D	D	D	D	D
472	4700	S	B	B	B		B	B	B	B	G			C	C	C	C	D				D	D	D	D	D	K
562	5600	S	B				B	B	B	B				C	C	C	C	D				D	D	D	D	D	K
682	6800	S	B				B	B	B	B				C	C	C	C	D				D	D	D	D	D	D
822	8200	S	B				B	B	B	C				C	C	C	C	K				D	D	D	D	D	D
103	0.01 µF	S	B				B	B	B	C				C	C	C	C	K				D	D	D	D	D	D
123	0.012	S	B				B	B	B					C	C	C	C	K				D	D	D	D	K	
153	0.015	S	B				B	C	C					C	C	C	C					D	D	D	D	K	
183	0.018		B				B	C	C					C	C	C	C					D	D	D	D		
223	0.022		B				B	C	C					C	C	C	D					D	D	D	D		
273	0.027		B				B	C	C					C	C	C						D	D	D	D		
333	0.033		B				B	G	G					C	C	C						D	D	D	D		
393	0.039						B	G	G					C	C	C						D	D	D	D		
473	0.047						B	G	G					C	D	D						D	D	D	D		
563	0.056						B							C	D	D						D	D	D	K		
683	0.068						B							C								D	D	D	K		
823	0.082						C							C								D	D	D	K		
104	0.1 µF						C							C								D	D	D	K		
124	0.12						D							C								D	D	D			
154	0.15						D							C								D	K	K			
184	0.18													C								D	K	K			
224	0.22													D								D	K	K			
274	0.27																					D					
334	0.33																					D					
394	0.39																					D					
474	0.47																					D					
564	0.56																					D					
684	0.68																					D					
824	0.82																					K					
105	1 µF																										

Other sizes, capacitance, voltage, and a 13" reel are available on request.

TAPE AND REEL	X7R high voltage						
SIZE	0402	0603	0805	1206	1210	1808	1812
A = 0.65 +0.05/-0.15 mm		paper 4 Kpcs/reel	paper 4 Kpcs/reel	paper 4 Kpcs/reel			
B = 0.85 +0.05/-0.15 mm		paper 4 Kpcs/reel	paper 4 Kpcs/reel	paper 4 Kpcs/reel			
C = 1.00 +0.05/-0.15 mm		blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	
D = 1.2 ±0.15 mm		blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel
G = 1.60 +0.05/-0.15 mm		blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel	blister 1 Kpcs/reel
K = 2.00 ±0.2 mm						blister 1 Kpcs/reel	blister 1 Kpcs/reel
S = 0.8 ±0.07 mm		paper 4 Kpcs/reel	paper 4 Kpcs/reel	paper 4 Kpcs/reel			
N = 0.50 ±0.05 mm							



DIELECTRIC		Y5V BME low voltage																							
EIA CAP	SIZE	0402				0603				0805				1206				1210				1812			
CODE	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V	10V	16V	25V	50V
102	1000 pF																								
122	1200																								
152	1500																								
182	1800																								
222	2200																								
272	2700																								
332	3300																								
392	3900																								
472	4700																								
562	5600																								
682	6800																								
822	8200																								
103	0.01 µF	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
123	0.012	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
153	0.015	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
183	0.018	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
223	0.022	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
273	0.027	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
333	0.033	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
393	0.039	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
473	0.047	N	N	N	N	S	S	S	S	A	A	A	A	B	B	B	B								
563	0.056	N	N			S	S	S	S	A	A	A	A	B	B	B	B								
683	0.068	N	N			S	S	S	S	A	A	A	A	B	B	B	B								
823	0.082	N	N			S	S	S	S	A	A	A	A	B	B	B	B								
104	0.1 µF	N	N			S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
154	0.15	N				S	S	S	S	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
224	0.22	N				S	S	S		A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D
334	0.33					S	S	S		B	B	B	B	B	B	B	B	C	C	C	C	D	D	D	D
474	0.47					S	S			B	B	B		B	B	B	B	C	C	C	C	D	D	D	D
684	0.68					S				B	B	D		B	B	B	B	C	C	C	C	D	D	D	D
0105	1 µF					S				B	B	D		C	C	C	C	C	C	C	C	D	D	D	D
155	1.5									D	D			C	C	C		C	C	C		D	D	D	D
225	2.2									D	D			C	C	C		C	C	C		D	D	D	D
335	3.3									D				D	D	D		C	C	C		D	D	D	D
475	4.7									D				D	D			C	C	D		D	D	D	D
685	6.8													D				C	C			D	D	D	D
106	10 µF													D								D	D	D	

E12 series capacitance, voltage, and a 13" reel are available on request.

TAPE AND REEL	Y5V BME low voltage						
SIZE	0402	0603	0805	1206	1210	1808	1812
A = 0.65 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
B = 0.85 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
C = 1.00 +0.05/-0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	
D = 1.2 ±0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 2 Kpcs/reel	
G = 1.60 +0.05/-0.15 mm			blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 1 Kpcs/reel	blister 1 Kpcs/reel
K = 2.00 ±0.2 mm							
S = 0.8 ±0.07 mm	paper 4 Kpcs/reel	paper 4 Kpcs/reel					
N = 0.50 ±0.05 mm	paper 10 Kpcs/reel	paper 10 Kpcs/reel					



DIELECTRIC		Y5V BME high voltage											
EIA CAP	SIZE	0805			1206			1210			1812		
CODE	VDCW	100 V	200 V	250 V	100 V	200 V	250 V	100 V	200 V	250 V	100 V	200 V	250 V
103	0.01 $\mu$ F	B	B	B	B	B	B	C	C	C	D	D	D
123	0.012	B	B	B	B	B	B	C	C	C	D	D	D
153	0.015	B	B	B	B	B	B	C	C	C	D	D	D
183	0.018	B	B	B	B	B	B	C	C	C	D	D	D
223	0.022	B	B	B	B	B	B	C	C	C	D	D	D
273	0.027	B	B	B	B	B	B	C	C	C	D	D	D
333	0.033	B	B	B	B	B	B	C	C	C	D	D	D
393	0.039	B	B	B	B	B	B	C	C	C	D	D	D
473	0.047	B	B	B	B	B	B	C	C	C	D	D	D
563	0.056	B	B	B	B	B	B	C	C	C	D	D	D
683	0.068	B	B	B	B	B	B	C	C	C	D	D	D
823	0.082	B			B	B	B	C	C	C	D	D	D
104	0.1 $\mu$ F	B			B	B	B	C	C	C	D	D	D
154	0.15				C	C	C	C	C	C	D	D	D
224	0.22				C			C			D	D	D
334	0.33							C			D	D	D
474	0.47										D	D	D
684	0.68										D	D	D
105	1 $\mu$ F										D		

E12 series capacitance, voltage, and a 13" reel are available on request

TAPE AND REEL	Y5V BME high voltage						
SIZE	0402	0603	0805	1206	1210	1808	1812
A = 0.65 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
B = 0.85 +0.05/-0.15 mm			paper 4 Kpcs/reel	paper 4 Kpcs/reel			
C = 1.00 +0.05/-0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel		
D = 1.2 $\pm$ 0.15 mm			blister 3 Kpcs/reel	blister 3 Kpcs/reel	blister 3 Kpcs/reel		blister 1 Kpcs/reel
G = 1.60 +0.05/-0.15 mm			blister 2 Kpcs/reel	blister 2 Kpcs/reel	blister 2 Kpcs/reel		blister 1 Kpcs/reel
K = 2.00 $\pm$ 0.2 mm							
S = 0.8 $\pm$ 0.07 mm							
N = 0.50 $\pm$ 0.05 mm							



• **Designer's** sample boxes

A wide selection of designer's sample boxes is available for quick design-in.

To order this and other support material, please contact your nearest BCcomponents sales office or one of our franchised distributors.

Type	Designer's sample boxes		
	Description	Total pieces	Ordering code
Multilayer Ceramic Capacitors	0402 size	3400	2252 198 90011
	0603 size	2350	2252 198 90012
	0805 size	2850	2252 198 90013
	1206 size	2150	2252 198 90014
	1210 size	1050	2252 198 90015
	1812 size	900	2252 198 90016
	2 size series in 1 folder		2252 198 90021
	3 size series in 1 folder		2252 198 90022
	4 size series in 1 folder		2252 198 90023
	5 size series in 1 folder		2252 198 90024
	6 size series in 1 folder		2252 198 90025

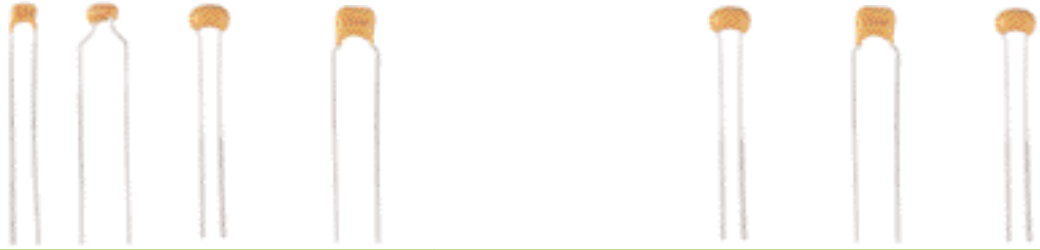


2522 198 90011 .. 0402			2252 198 90012 .. 0603		
clear text code	catalogue number 12NC	packaging quantity	clear text code	catalogue number 12NC	packaging quantity
<b>NPO E6 series</b>			<b>X7R E6 series</b>		
2252 011 41108	0402N1R0C500NT	100	2252 112 41153	0603B153K500BT	50
2252 011 41158	0402N1R5C500NT	100	2252 112 41223	0603B223K500BT	50
2252 011 41228	0402N2R2C500NT	100	2252 112 31333	0603B333K250BT	50
2252 011 41338	0402N3R3C500NT	100	2252 112 31473	0603B473K250BT	50
2252 011 41478	0402N4R7C500NT	100	2252 112 31683	0603B683K250BT	50
2252 021 41688	0402N6R8D500NT	100	2252 112 21104	0603B104K160BT	50
2252 041 41109	0402N100J500NT	100	2252 112 11154	0603B154K100BT	50
2252 041 41159	0402N150J500NT	100	2252 112 11224	0603B224K100BT	50
2252 041 41229	0402N220J500NT	100	<b>Y5V E3 series</b>		
2252 041 41339	0402N330J500NT	100	2252 082 41103	0603F103Z500BT	50
2252 041 41479	0402N470J500NT	100	2252 082 41223	0603F223Z500BT	50
2252 041 41689	0402N680J500NT	100	2252 082 41473	0603F473Z500BT	50
2252 041 41101	0402N101J500NT	100	2252 082 41104	0603F104Z500BT	50
2252 041 41151	0402N151J500NT	100	2252 082 31224	0603F224Z250BT	50
2252 041 31221	0402N221J250NT	100	2252 082 21474	0603F474Z160BT	50
<b>X7R E6 series</b>			2252 082 11105	0603F105Z100BT	50
2252 111 41101	0402B101K500BT	100	<b>2252 198 90013 .. 0805</b>		
2252 111 41151	0402B151K500BT	100	clear text code	catalogue number 12NC	packaging quantity
2252 111 41221	0402B221K500BT	100	<b>NPO E6 series</b>		
2252 111 41331	0402B331K500BT	100	2252 013 41108	0805N1R0C500NT	50
2252 111 41471	0402B471K500BT	100	2252 013 41158	0805N1R5C500NT	50
2252 111 41681	0402B681K500BT	100	2252 013 41228	0805N2R2C500NT	50
2252 111 41102	0402B102K500BT	100	2252 013 41338	0805N3R3C500NT	50
2252 111 41152	0402B152K500BT	100	2252 013 41378	0805N4R7C500NT	50
2252 111 41222	0402B222K500BT	100	2252 023 41688	0805N6R8D500NT	50
2252 111 31332	0402B332K250BT	100	2252 043 41109	0805N100J500NT	50
2252 111 31472	0402B472K250BT	100	2252 043 41159	0805N150J500NT	50
2252 111 21682	0402B682K160BT	100	2252 043 41229	0805N220J500NT	50
2252 111 21103	0402B103K160BT	100	2252 043 41339	0805N330J500NT	50
2252 111 21153	0402B153K160BT	100	2252 043 41479	0805N470J500NT	50
<b>Y5V E3 series</b>			2252 043 41689	0805N680J500NT	50
2252 081 41103	0402F103Z500BT	100	2252 043 41101	0805N101J500NT	50
2252 081 41223	0402F223Z500BT	100	2252 043 41151	0805N151J500NT	50
2252 081 31473	0402F473Z250BT	100	2252 043 41221	0805N221J500NT	50
2252 081 21104	0402F104Z160BT	100	2252 043 41331	0805N331J500NT	50
2252 081 11224	0402F224Z100BT	100	2252 043 41471	0805N471J500NT	50
<b>2252 198 90012 .. 0603</b>			2252 043 41681	0805N681J500NT	50
clear text code	catalogue number 12NC	packaging quantity	2252 043 41102	0805N102J500NT	50
<b>NPO E6 series</b>			2252 043 41152	0805N152J500NT	50
2252 012 41108	0603N1R0C500NT	50	2252 043 41222	0805N222J500NT	50
2252 012 41158	0603N1R5C500NT	50	2252 043 43332	0805N332J500NP	50
2252 012 41228	0603N2R2C500NT	50	2252 043 33472	0805N472J250NP	50
2252 012 41338	0603N3R3C500NT	50	<b>X7R E6 series</b>		
2252 012 41478	0603N4R7C500NT	50	2252 113 41101	0805B101K500BT	50
2252 022 41688	0603N6R8D500NT	50	2252 113 41151	0805B151K500BT	50
2252 042 41109	0603N100J500NT	50	2252 113 41221	0805B221K500BT	50
2252 042 41159	0603N150J500NT	50	2252 113 41331	0805B331K500BT	50
2252 042 41229	0603N220J500NT	50	2252 113 41471	0805B471K500BT	50
2252 042 41339	0603N330J500NT	50	2252 113 41681	0805B681K500BT	50
2252 042 41479	0603N470J500NT	50	2252 113 41102	0805B102K500BT	50
2252 042 41689	0603N680J500NT	50	2252 113 41152	0805B152K500BT	50
2252 042 41101	0603N101J500NT	50	2252 113 41222	0805B222K500BT	50
2252 042 41151	0603N151J500NT	50	2252 113 41332	0805B332K500BT	50
2252 042 41221	0603N221J500NT	50	2252 113 41472	0805B472K500BT	50
2252 042 41331	0603N331J500NT	50	2252 113 41682	0805B682K500BT	50
2252 042 41471	0603N471J500NT	50	2252 113 41103	0805B103K500BT	50
2252 042 41681	0603N681J500NT	50	2252 113 41153	0805B153K500BT	50
2252 042 41102	0603N102J500NT	50	2252 113 41223	0805B223K500BT	50
<b>X7R E6 series</b>			2252 113 41333	0805B333K500BT	50
2252 112 41101	0603B101K500BT	50	2252 113 41473	0805B473K500BT	50
2252 112 41151	0603B151K500BT	50	2252 113 41683	0805B683K500BT	50
2252 112 41221	0603B221K500BT	50	2252 113 43104	0805B104K500BP	50
2252 112 41331	0603B331K500BT	50	2252 113 33154	0805B154K250BP	50
2252 112 41471	0603B471K500BT	50	2252 113 33224	0805B224K250BP	50
2252 112 41681	0603B681K500BT	50	2252 113 23334	0805B334K160BP	50
2252 112 41102	0603B102K500BT	50	2252 113 23474	0805B474K160BP	50
2252 112 41152	0603B152K500BT	50	2252 113 13684	0805B684K100BP	50
2252 112 41222	0603B222K500BT	50	2252 113 13105	0805B105K100BP	50
2252 112 41332	0603B332K500BT	50			
2252 112 41472	0603B472K500BT	50			
2252 112 41682	0603B682K500BT	50			
2252 112 41103	0603B103K500BT	50			



2252 198 90013 .. 0805			2252 198 90015 .. 1210		
clear text code	catalogue number 12NC	packaging quantity	clear text code	catalogue number 12NC	packaging quantity
<b>Y5V E3 series</b>			<b>NPO E3 series</b>		
2252 083 41103	0805F103Z500BT	50	2252 045 43229	1210N220J500NP	50
2252 083 41223	0805F223Z500BT	50	2252 045 43479	1210N470J500NP	50
2252 083 41473	0805F473Z500BT	50	2252 045 43101	1210N101J500NP	50
2252 083 41104	0805F104Z500BT	50	2252 045 43221	1210N221J500NP	50
2252 083 41224	0805F224Z500BT	50	2252 045 43471	1210N471J500NP	50
2252 083 31474	0805F474Z250BT	50	2252 045 43102	1210N102J500NP	50
2252 083 33105	0805F105Z250BP	50	2252 045 43222	1210N222J500NP	50
2252 083 23225	0805F225Z160BP	50	2252 045 43472	1210N472J500NP	50
2252 083 13475	0805F475Z100BP	50	<b>X7R E3 series</b>		
<b>2252 198 90014 .. 1206</b>			2252 115 43103	1210B103K500BP	50
clear text code	catalogue number 12NC	packaging quantity	2252 115 43223	1210B223K500BP	50
<b>NPO E6 series</b>			2252 115 43473	1210B473K500BP	50
2252 014 41158	1206N1R5C500NT	50	2252 115 43104	1210B104K500BP	50
2252 014 41228	1206N2R2C500NT	50	2252 115 43224	1210B224K500BP	50
2252 014 41338	1206N3R3C500NT	50	2252 115 33474	1210B474K250BP	50
2252 014 41478	1206N4R7C500NT	50	<b>Y5V E3 series</b>		
2252 024 41688	1206N6R8D500NT	50	2252 085 43104	1210F104Z500BP	50
2252 044 41109	1206N100J500NT	50	2252 085 43224	1210F224Z500BP	50
2252 044 41159	1206N150J500NT	50	2252 085 43474	1210F474Z500BP	50
2252 044 41229	1206N220J500NT	50	2252 085 43105	1210F105Z500BP	50
2252 044 41339	1206N330J500NT	50	2252 085 33225	1210F225Z250BP	50
2252 044 41479	1206N470J500NT	50	2252 085 33475	1210F475Z250BP	50
2252 044 41689	1206N680J500NT	50	2252 085 23106	1210F106Z160BP	50
2252 044 41101	1206N101J500NT	50	<b>2252 198 90016 .. 1812</b>		
2252 044 41151	1206N151J500NT	50	clear text code	catalogue number 12NC	packaging quantity
2252 044 41221	1206N221J500NT	50	<b>NPO E3 series</b>		
2252 044 41331	1206N331J500NT	50	2252 047 43102	1812N102J500NP	50
2252 044 41471	1206N471J500NT	50	2252 047 43222	1812N222J500NP	50
2252 044 41681	1206N681J500NT	50	2252 047 43472	1812N472J500NP	50
2252 044 41102	1206N102J500NT	50	2252 047 43103	1812N103J500NP	50
2252 044 41152	1206N152J500NT	50	<b>X7R E3 series</b>		
2252 044 41222	1206N222J500NT	50	2252 117 43103	1812B103K500NP	50
2252 044 41332	1206N332J500NT	50	2252 117 43223	1812B223K500NP	50
2252 044 41472	1206N472J500NT	50	2252 117 43473	1812B473K500NP	50
2252 044 43682	1206N682J500NP	50	2252 117 43104	1812B104K500BP	50
<b>X7R E3 series</b>			2252 117 43224	1812B224K500BP	50
2252 114 41102	1206B102K500BT	50	2252 117 43474	1812B474K500BP	50
2252 114 41222	1206B222K500BT	50	2252 117 43105		
2252 114 41472	1206B472K500BT	50	<b>Y5V E3 series</b>		
2252 114 41103	1206B103K500BT	50	2252 087 43104	1812F104Z500BP	50
2252 114 41223	1206B223K500BT	50	2252 087 43224	1812F224Z500BP	50
2252 114 41473	1206B473K500BT	50	2252 087 43474	1812F474Z500BP	50
2252 114 41104	1206B104K500BT	50	2252 087 43105	1812F105Z500BP	50
2252 114 43224	1206B224K500BP	50	2252 087 43225	1812F225Z500BP	50
2252 114 23474	1206B474K160BP	50	2252 087 43475	1812F475Z500BP	50
2252 114 23105	1206B105K160BP	50	2252 087 33106	1812F106Z250BP	50
<b>Y5V E3 series</b>					
2252 084 41103	1206F103Z500BT	50			
2252 084 41223	1206F223Z500BT	50			
2252 084 41473	1206F473Z500BT	50			
2252 084 41104	1206F104Z500BT	50			
2252 084 41224	1206F224Z500BT	50			
2252 084 41474	1206F474Z500BT	50			
2252 084 33105	1206F105Z250BP	50			
2252 084 33225	1206F225Z250BP	50			
2252 084 23475	1206F475Z160BP	50			
2252 084 13106	1206F106Z100BP	50			





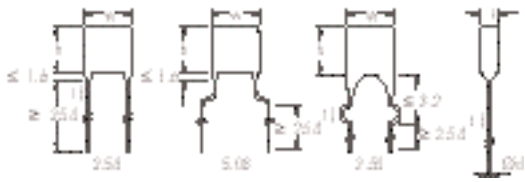
Dielectric	NP0 (COG)		X7R		Z5U		Dielectric	X7R		Z5U		Y5V	
Rated DC voltage	50 V	100 V	50 V	100 V	50 V	100 V	Rated DC voltage	50 V	100 V	50 V	100 V	25 V	50 V
Operating temp. range	-55 to +125 °C		-55 to +125 °C		+10 to +85 °C		Operating temp. range	-55 to +125 °C		+10 to -85 °C		-30 to -85 °C	
Tolerance on capacitance	± 5%, ±10%		±10%, ±20%		±20%, +80/-20%			±10%, ±20%		±20%, +80/-20%		+80/-20%	
Capacitance (pF)	10	15	15				Capacitance (pF)	8200	15	15	15	15	
	12	15	15				10000	15	15	15	15	15	15
	15	15	15				12000	15	15	15	15	15	15
	18	15	15				15000	15	15	15	15	15	15
	22	15	15				18000	15	15	15	15	15	15
	27	15	15				22000	15	15	15	15	15	15
	33	15	15				27000	15	20	15	20	15	15
	39	15	15				33000	15	20	15	20	15	15
	47	15	15				39000	15	20	15	20	15	15
	56	15	15				47000	15	20	15	20	15	15
	68	15	15				56000	15	20	15	20	15	15
	82	15	15				68000	15	20	15	20	15	15
	100	15	15	15	15		82000	15	20	15	20	15	15
	120	15	15	15	15		100000	15	20	15	20	15	15
	150	15	15	15	15		120000	20		15	20	15	15
	180	15	15	15	15		150000	20		15	20	15	15
	220	15	15	15	15		180000	20		15		15	15
	270	15	15	15	15		220000	20		15		15	15
	330	15	15	15	15		270000	20		20		15	15
	390	15	15	15	15		330000	20		20		20	20
	470	15	15	15	15		390000	20		20		20	20
	560	15	15	15	15		470000	20		20		20	20
	680	15	15	15	15		560000	20		20		20	20
	820	15	15	15	15		680000	20		20		20	20
	1000	15	20	15	15	15	820000	20		20		20	20
	1200	15	20	15	15	15	1000000	20		20		20	20
	1500	15	20	15	15	15							
	1800	15	20	15	15	15							
	2200	15	20	15	15	15							
	2700	20	20	15	15	15							
	3300	20	20	15	15	15							
	3900	20	20	15	15	15							
	4700	20	20	15	15	15							
	5600	20		15	15	15							
	6800	20		15	15	15							

preferred

Size code and dimensions in mm

Size code	w <sub>max</sub>	h <sub>max</sub>	t <sub>max</sub>	pitch	d
15	4.0	4.0	2.5	2.5/5.0	0.5
20	5.0	5.0	3.2	2.5/5.0	0.5

<sup>1)</sup> indication of lead length for bulk packing version



Packing

loose, reel, ammpack

Tol. on temp. coefficient at -55 to +125 °C

±30 × 10<sup>-6</sup>/K

Maximum capacitance variation with respect to capacitance value at 25 °C

	±15%	+22/-56%		±15%	+22/-56%	+22/-82%
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Dissipation factor

≤1.5 × 10 <sup>-3</sup>	≤25 × 10 <sup>-3</sup>	≤40 × 10 <sup>-3</sup>		≤25 × 10 <sup>-3</sup>	≤40 × 10 <sup>-3</sup>	≤50 × 10 <sup>-3</sup>
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Insulation resistance

≥10 <sup>11</sup> Ω	≥10 <sup>11</sup> Ω	≥10 <sup>11</sup> Ω		≥10 <sup>11</sup> Ω	≥10 <sup>11</sup> Ω	≥10 <sup>11</sup> Ω
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Features

very high capacitance per unit volume, good HF behaviour, non-flammable epoxy housing, suitable for automatic insertion equipment

Applications

telecom, automotive, EDP, test & measurement equipment, medical systems



NP0 (COG) ±5% tolerance				X7R ±10% tolerance			
C (µF)	F (mm)	clear text code*	catalogue number I2NC	C (µF)	F (mm)	clear text code*	catalogue number I2NC
<b>U<sub>RD</sub>C = 50 V</b>				<b>U<sub>RD</sub>C = 50 V</b>			
10	5.0	K100J15C0GF5 . H5	2252 305 .. 109	220 pF	5.0	K221K15X7RF5 . H5	2252 325 .. 221
12	5.0	K120J15C0GF5 . H5	2252 305 .. 129	330	5.0	K331K15X7RF5 . H5	2252 325 .. 331
15	5.0	K150J15C0GF5 . H5	2252 305 .. 159	470	5.0	K471K15X7RF5 . H5	2252 325 .. 471
18	5.0	K180J15C0GF5 . H5	2252 305 .. 189	680	5.0	K681K15X7RF5 . H5	2252 325 .. 681
22	5.0	K220J15C0GF5 . H5	2252 305 .. 229	1000	5.0	K102K15X7RF5 . H5	2252 325 .. 102
27	5.0	K270J15C0GF5 . H5	2252 305 .. 279	1500	5.0	K152K15X7RF5 . H5	2252 325 .. 152
33	5.0	K330J15C0GF5 . H5	2252 305 .. 339	2200	5.0	K222K15X7RF5 . H5	2252 325 .. 222
39	5.0	K390J15C0GF5 . H5	2252 305 .. 399	3300	5.0	K332K15X7RF5 . H5	2252 325 .. 332
47	5.0	K470J15C0GF5 . H5	2252 305 .. 479	4700	5.0	K472K15X7RF5 . H5	2252 325 .. 472
56	5.0	K560J15C0GF5 . H5	2252 305 .. 569	6800	5.0	K682K15X7RF5 . H5	2252 325 .. 682
68	5.0	K680J15C0GF5 . H5	2252 305 .. 689	0.01 µF	5.0	K103K15X7RF5 . H5	2252 325 .. 103
82	5.0	K820J15C0GF5 . H5	2252 305 .. 829	0.015	5.0	K153K15X7RF5 . H5	2252 325 .. 153
100	5.0	K101J15C0GF5 . H5	2252 305 .. 101	0.022	5.0	K223K15X7RF5 . H5	2252 325 .. 223
150	5.0	K151J15C0GF5 . H5	2252 305 .. 151	0.033	5.0	K333K15X7RF5 . H5	2252 325 .. 333
220	5.0	K221J15C0GF5 . H5	2252 305 .. 221	0.047	5.0	K473K15X7RF5 . H5	2252 325 .. 473
330	5.0	K331J15C0GF5 . H5	2252 305 .. 331	0.068	5.0	K683K15X7RF5 . H5	2252 325 .. 683
470	5.0	K471J15C0GF5 . H5	2252 305 .. 471	0.1	5.0	K104K15X7RF5 . H5	2252 325 .. 104
680	5.0	K681J15C0GF5 . H5	2252 305 .. 681	0.15	5.0	K154K20X7RF5 . H5	2252 325 .. 154 4)
1000	5.0	K102J15C0GF5 . H5	2252 305 .. 102	0.22	5.0	K224K20X7RF5 . H5	2252 325 .. 224 4)
1500	5.0	K152J15C0GF5 . H5	2252 305 .. 152	0.33	5.0	K334K20X7RF5 . H5	2252 325 .. 334 4)
2200	5.0	K222J15C0GF5 . H5	2252 305 .. 222	0.47	5.0	K474K20X7RF5 . H5	2252 325 .. 474 4)
3300	5.0	K332J20C0GF5 . H5	2252 305 .. 332 4)	<b>U<sub>RD</sub>C = 50 V</b>			
4700	5.0	K472J20C0GF5 . H5	2252 305 .. 472 4)	220 pF	2.5	K221K15X7RF5 . L2	2252 325 .. 221
6800	5.0	K682J20C0GF5 . H5	2252 305 .. 682 4)	330	2.5	K331K15X7RF5 . L2	2252 325 .. 331
<b>U<sub>RD</sub>C = 50 V</b>				470	2.5	K471K15X7RF5 . L2	2252 325 .. 471
10	2.5	K100J15C0GF5 . L2	2252 305 .. 109	680	2.5	K681K15X7RF5 . L2	2252 325 .. 681
12	2.5	K120J15C0GF5 . L2	2252 305 .. 129	1000	2.5	K102K15X7RF5 . L2	2252 325 .. 102
15	2.5	K150J15C0GF5 . L2	2252 305 .. 159	1500	2.5	K152K15X7RF5 . L2	2252 325 .. 152
18	2.5	K180J15C0GF5 . L2	2252 305 .. 189	2200	2.5	K222K15X7RF5 . L2	2252 325 .. 222
22	2.5	K220J15C0GF5 . L2	2252 305 .. 229	3300	2.5	K332K15X7RF5 . L2	2252 325 .. 332
27	2.5	K270J15C0GF5 . L2	2252 305 .. 279	4700	2.5	K472K15X7RF5 . L2	2252 325 .. 472
33	2.5	K330J15C0GF5 . L2	2252 305 .. 339	6800	2.5	K682K15X7RF5 . L2	2252 325 .. 682
39	2.5	K390J15C0GF5 . L2	2252 305 .. 399	0.01 µF	2.5	K103K15X7RF5 . L2	2252 325 .. 103
47	2.5	K470J15C0GF5 . L2	2252 305 .. 479	0.015	2.5	K153K15X7RF5 . L2	2252 325 .. 153
56	2.5	K560J15C0GF5 . L2	2252 305 .. 569	0.022	2.5	K223K15X7RF5 . L2	2252 325 .. 223
68	2.5	K680J15C0GF5 . L2	2252 305 .. 689	0.033	2.5	K333K15X7RF5 . L2	2252 325 .. 333
82	2.5	K820J15C0GF5 . L2	2252 305 .. 829	0.047	2.5	K473K15X7RF5 . L2	2252 325 .. 473
100	2.5	K101J15C0GF5 . L2	2252 305 .. 101	0.068	2.5	K683K15X7RF5 . L2	2252 325 .. 683
150	2.5	K151J15C0GF5 . L2	2252 305 .. 151	0.1	2.5	K104K15X7RF5 . L2	2252 325 .. 104
220	2.5	K221J15C0GF5 . L2	2252 305 .. 221	<b>U<sub>RD</sub>C = 100 V</b>			
330	2.5	K331J15C0GF5 . L2	2252 305 .. 331	220 pF	5.0	K221K15X7RH5 . H5	2252 326 .. 221
470	2.5	K471J15C0GF5 . L2	2252 305 .. 471	470	5.0	K471K15X7RH5 . H5	2252 326 .. 471
680	2.5	K681J15C0GF5 . L2	2252 305 .. 681	1000	5.0	K102K15X7RH5 . H5	2252 326 .. 102
1000	2.5	K102J15C0GF5 . L2	2252 305 .. 102	2200	5.0	K222K15X7RH5 . H5	2252 326 .. 222
<b>U<sub>RD</sub>C = 100 V</b>				4700	5.0	K472K15X7RH5 . H5	2252 326 .. 472
10	5.0	K100J15C0GH5 . H5	2252 306 .. 109	0.01 µF	5.0	K103K15X7RH5 . H5	2252 326 .. 103
22	5.0	K220J15C0GH5 . H5	2252 306 .. 229	0.022	5.0	K223K15X7RH5 . H5	2252 326 .. 223 4)
47	5.0	K470J15C0GH5 . H5	2252 306 .. 479	0.047	5.0	K473K20X7RH5 . H5	2252 326 .. 473 4)
100	5.0	K101J15C0GH5 . H5	2252 306 .. 101	0.1	5.0	K104K20X7RH5 . H5	2252 326 .. 104 4)
220	5.0	K221J15C0GH5 . H5	2252 306 .. 221	<b>U<sub>RD</sub>C = 50 V</b>			
470	5.0	K471J15C0GH5 . H5	2252 306 .. 471	220 pF	2.5	K221K15X7RH5 . L2	2252 326 .. 221
1000	5.0	K102J20C0GH5 . H5	2252 306 .. 102 4)	470	2.5	K471K15X7RH5 . L2	2252 326 .. 471
<b>U<sub>RD</sub>C = 100 V</b>				1000	2.5	K102K15X7RH5 . L2	2252 326 .. 102
10	2.5	K100J15C0GH5 . L2	2252 306 .. 109	2200	2.5	K222K15X7RH5 . L2	2252 326 .. 222
22	2.5	K220J15C0GH5 . L2	2252 306 .. 229	4700	2.5	K472K15X7RH5 . L2	2252 326 .. 472
47	2.5	K470J15C0GH5 . L2	2252 306 .. 479	0.01 µF	2.5	K103K15X7RH5 . L2	2252 326 .. 103
100	2.5	K101J15C0GH5 . L2	2252 306 .. 101	0.022	2.5	K223K15X7RH5 . L2	2252 326 .. 223
220	2.5	K221J15C0GH5 . L2	2252 306 .. 221	0.047	2.5	K473K20X7RH5 . L2	2252 326 .. 473 5)
470	2.5	K471J15C0GH5 . L2	2252 306 .. 471	0.1	2.5	K104K20X7RH5 . L2	2252 326 .. 104 5)
1000	2.5	K102J20C0GH5 . L2	2252 306 .. 102 5)				

1) T = reel  
U = ammo  
3 = bulk

2) 10 = reel  
12 = ammo  
08 = bulk

3) 02 = reel  
03 = ammo  
00 = bulk

4) 24 = reel  
26 = ammo  
22 = bulk

5) 16 = reel  
17 = ammo  
14 = bulk

\* preferred E6 series ammpack



Z5U ±20% tolerance				Y5V +80%/−20% tolerance			
C (µF)	F (mm)	clear text code*	catalogue number 12NC	C (µF)	F (mm)	clear text code*	catalogue number 12NC
<b>U<sub>RDC</sub> = 50 V</b> ↓ <sup>1)</sup> ↓ <sup>2)</sup>				<b>U<sub>RDC</sub> = 25 V</b> ↓ <sup>1)</sup> ↓ <sup>2)</sup>			
0.01	5.0	K103M15Z5UF5 . H5	2252 345 .. 103	0.1	5.0	K104Z15Y5VE5 . H5	2252 362 .. 104
0.022	5.0	K223M15Z5UF5 . H5	2252 345 .. 223	0.22	5.0	K224Z15Y5VE5 . H5	2252 362 .. 224
0.047	5.0	K473M15Z5UF5 . H5	2252 345 .. 473	0.47	5.0	K474Z20Y5VE5 . H5	2252 362 .. 474 <sup>4)</sup>
0.1	5.0	K104M15Z5UF5 . H5	2252 345 .. 104	1.0	5.0	K105Z20Y5VE5 . H5	2252 362 .. 105 <sup>4)</sup>
0.15	5.0	K154M15Z5UF5 . H5	2252 345 .. 154	<b>U<sub>RDC</sub> = 25 V</b> ↓ <sup>1)</sup> ↓ <sup>3)</sup>			
0.22	5.0	K224M15Z5UF5 . H5	2252 345 .. 224	0.1	2.5	K104Z15Y5VE5 . L2	2252 362 .. 104
0.33	5.0	K334M20Z5UF5 . H5	2252 345 .. 334 <sup>4)</sup>	0.22	2.5	K224Z15Y5VE5 . L2	2252 362 .. 224
0.47	5.0	K474M20Z5UF5 . H5	2252 345 .. 474 <sup>4)</sup>	0.47	2.5	K474Z20Y5VE5 . L2	2252 362 .. 474 <sup>5)</sup>
0.68	5.0	K684M20Z5UF5 . H5	2252 345 .. 684 <sup>4)</sup>	1.0	2.5	K105Z20Y5VE5 . L2	2252 362 .. 105 <sup>5)</sup>
1.0	5.0	K105M20Z5UF5 . H5	2252 345 .. 105 <sup>4)</sup>	<b>U<sub>RDC</sub> = 50 V</b> ↓ <sup>1)</sup> ↓ <sup>2)</sup>			
<b>U<sub>RDC</sub> = 50 V</b> ↓ <sup>1)</sup> ↓ <sup>3)</sup>				<b>U<sub>RDC</sub> = 50 V</b> ↓ <sup>1)</sup> ↓ <sup>2)</sup>			
0.01	2.5	K103M15Z5UF5 . L2	2252 345 .. 103	0.1	5.0	K104Z15Y5VF5 . H5	2252 365 .. 104
0.022	2.5	K223M15Z5UF5 . L2	2252 345 .. 223	0.22	5.0	K224Z15Y5VF5 . H5	2252 365 .. 224
0.047	2.5	K473M15Z5UF5 . L2	2252 345 .. 473	0.47	5.0	K474Z20Y5VF5 . H5	2252 365 .. 474 <sup>4)</sup>
0.1	2.5	K104M15Z5UF5 . L2	2252 345 .. 104	1.0	5.0	K105Z20Y5VF5 . H5	2252 365 .. 105 <sup>4)</sup>
0.15	2.5	K154M15Z5UF5 . L2	2252 345 .. 154	<b>U<sub>RDC</sub> = 50 V</b> ↓ <sup>1)</sup> ↓ <sup>3)</sup>			
0.22	2.5	K224M15Z5UF5 . L2	2252 345 .. 224	0.1	2.5	K104Z15Y5VF5 . L2	2252 365 .. 104
<b>U<sub>RDC</sub> = 100 V</b> ↓ <sup>1)</sup> ↓ <sup>2)</sup>				0.22	2.5	K224Z15Y5VF5 . L2	2252 365 .. 224
0.01	5.0	K103M15Z5UH5 . H5	2252 346 .. 103	0.47	2.5	K474Z20Y5VF5 . L2	2252 365 .. 474 <sup>5)</sup>
0.1	5.0	K104M20Z5UH5 . H5	2252 346 .. 104 <sup>4)</sup>	1.0	2.5	K105Z20Y5VF5 . L2	2252 365 .. 105 <sup>5)</sup>
<b>U<sub>RDC</sub> = 100 V</b> ↓ <sup>1)</sup> ↓ <sup>3)</sup>							
0.01	2.5	K103M15Z5UH5 . L2	2252 346 .. 103				
0.1	2.5	K104M20Z5UH5 . L2	2252 346 .. 104 <sup>5)</sup>				

1) T = reel  
U = ammo  
3 = bulk

2) 10 = reel  
12 = ammo  
08 = bulk

3) 02 = reel  
03 = ammo  
00 = bulk

4) 24 = reel  
26 = ammo  
22 = bulk

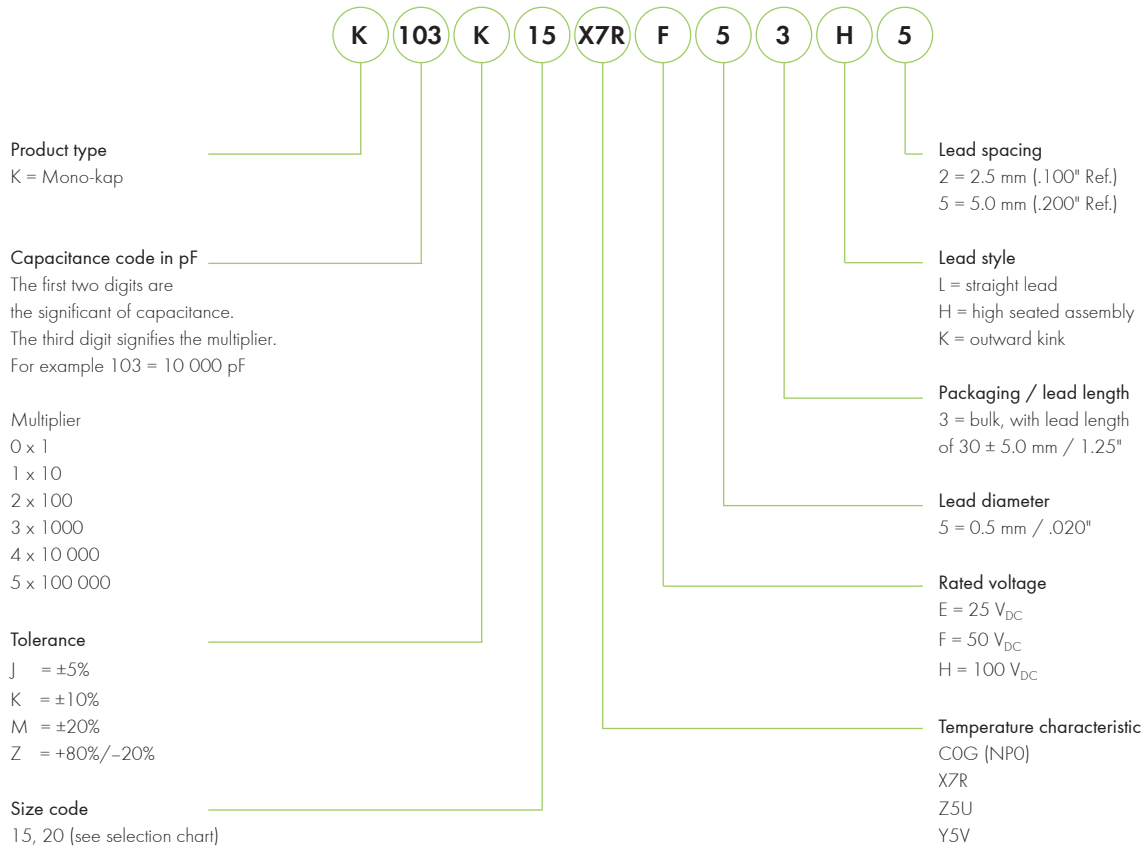
5) 16 = reel  
17 = ammo  
14 = bulk

\* preferred E6 series ammpack

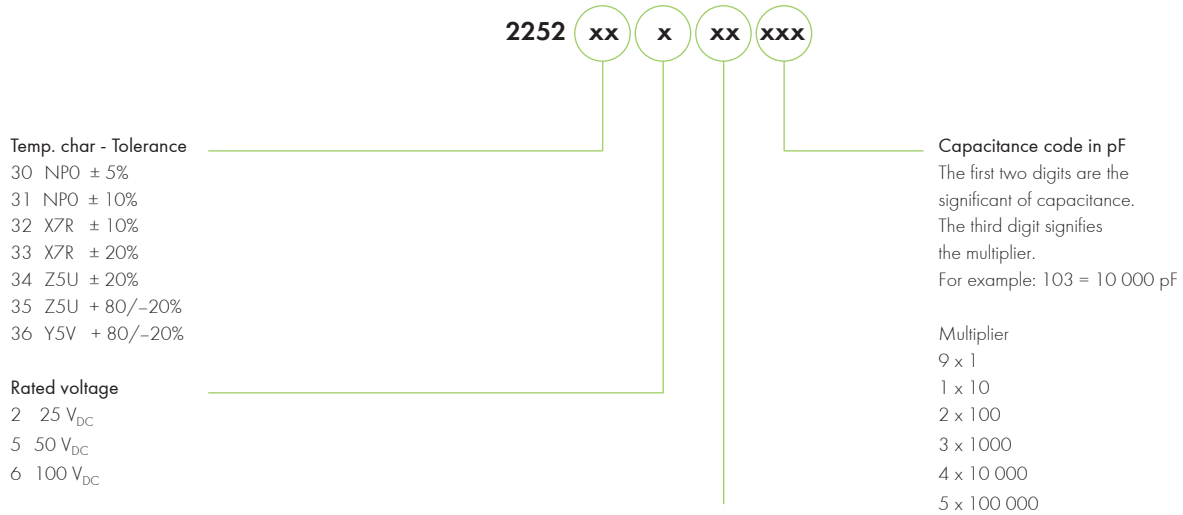


• **Clear text code** (preferred)

**K103K15X7RF53H5** (example)



• **12-digit code** (12NC)



Size, lead style & packaging

Size	Lead spacing mm (inch)	Lead style	Bulk*	Reel	Ammo
			digit 8 and 9		
15	2.5 (.100 Ref.)	straight lead	00	02	03
		outward kink	04	06	07
	5.0 (.200 Ref.)	high seated assembly	08	10	12
20	2.5 (.100 Ref.)	straight lead	14	16	17
		outward kink	18	20	21
	5.0 (.200 Ref.)	high seated assembly	22	24	26

\* Lead length 30 ± 5 mm (1.25" Ref.) for Bulk package



Dielectric	NP0 (COG)		X7R		Z5U		Dielectric	X7R			Z5U		Y5V	
Rated DC voltage	50 V	100 V	50 V	100 V	50 V	100 V	Rated DC voltage	25 V	50 V	100 V	50 V	100 V	25 V	50 V
Operating temp. range	-55 to +125 °C		-55 to +125 °C		+10 to +85 °C		Operating temp. range	-55 to +125 °C			+10 to +85 °C		-30 to +85 °C	
Tolerance on capacitance	±5%, ±10%		±10%, ±20%		±20%, +80/-20%			±10%, ±20%			±20%, +80/-20%		+80/-20%	
Capacitance (pF)	10	15	15				Capacitance (pF)	8200		15	15	15	15	
	12	15	15				10000		15	15	15	15	15	15
	15	15	15				12000		15	15	15	15	15	15
	18	15	15				15000		15	15	15	15	15	15
	22	15	15				18000		15	15	15	15	15	15
	27	15	15				22000		15	15	15	15	15	15
	33	15	15				27000		15	20	15	15	15	15
	39	15	15				33000		15	20	15	15	15	15
	47	15	15				39000	15	15	20	15	20	15	15
	56	15	15				47000	15	15	20	15	20	15	15
	68	15	15				56000	15	15	20	15	20	15	15
	82	15	15				68000	15	15	20	15	20	15	15
	100	15	15	15	15		82000	15	15	20	15	20	15	15
	120	15	15	15	15		100000	15	15	20	15	20	15	15
	150	15	15	15	15		120000	15	20		15	20	15	15
	180	15	15	15	15		150000	20	20		15	20	15	15
	220	15	15	15	15		180000	20	20		15		15	15
	270	15	15	15	15		220000	20	20		15		15	15
	330	15	15	15	15		270000				15		20	20
	390	15	15	15	15		330000		20		20		20	20
	470	15	15	15	15		390000				20		20	20
	560	15	15	15	15		470000		20		20		20	20
	680	15	15	15	15		560000				20		20	20
	820	15	15	15	15		680000		20		20		20	20
	1000	15	20	15	15	15	820000				20		20	20
	1200	15	20	15	15	15	1000000		20		20		20	20
	1500	15	20	15	15	15								
	1800	15	20	15	15	15								
	2200	15	20	15	15	15								
	2700	20	20	15	15	15								
	3300	20	20	15	15	15								
	3900	20		15	15	15								
	4700	20		15	15	15								
	5600	20		15	15	15								
	6800	20		15	15	15								

preferred E6 series, ammpack

Size code and dimensions in mm

Size code	diameter (max)	length (max)
15	2.5	3.8
20	3.0	5.0



Tolerance on temperature coefficient -55 to +125 °C

±30 × 10<sup>-6</sup>/K

Maximum capacitance variation with respect to capacitance value at 25 °C

±15 %	+22 / -56%	±15 %	+22 / -56%	+22 / -82%
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Dissipation factor  
Insulation resistance

≤ 1.5 × 10 <sup>-3</sup>	≤ 25 × 10 <sup>-3</sup>	≤ 40 × 10 <sup>-3</sup>	≤ 25 × 10 <sup>-3</sup>	≤ 40 × 10 <sup>-3</sup>	≤ 50 × 10 <sup>-3</sup>
≥ 10 <sup>11</sup> Ω	≥ 10 <sup>11</sup> Ω	≥ 10 <sup>11</sup> Ω	≥ 10 <sup>11</sup> Ω	≥ 10 <sup>11</sup> Ω	≥ 10 <sup>11</sup> Ω

Features

non-flammable epoxy housing, excellent HF behaviour, low ESR, suitable for automatic insertion equipment

Applications

telecom, automotive, EDP, test & measurement equipment, medical systems

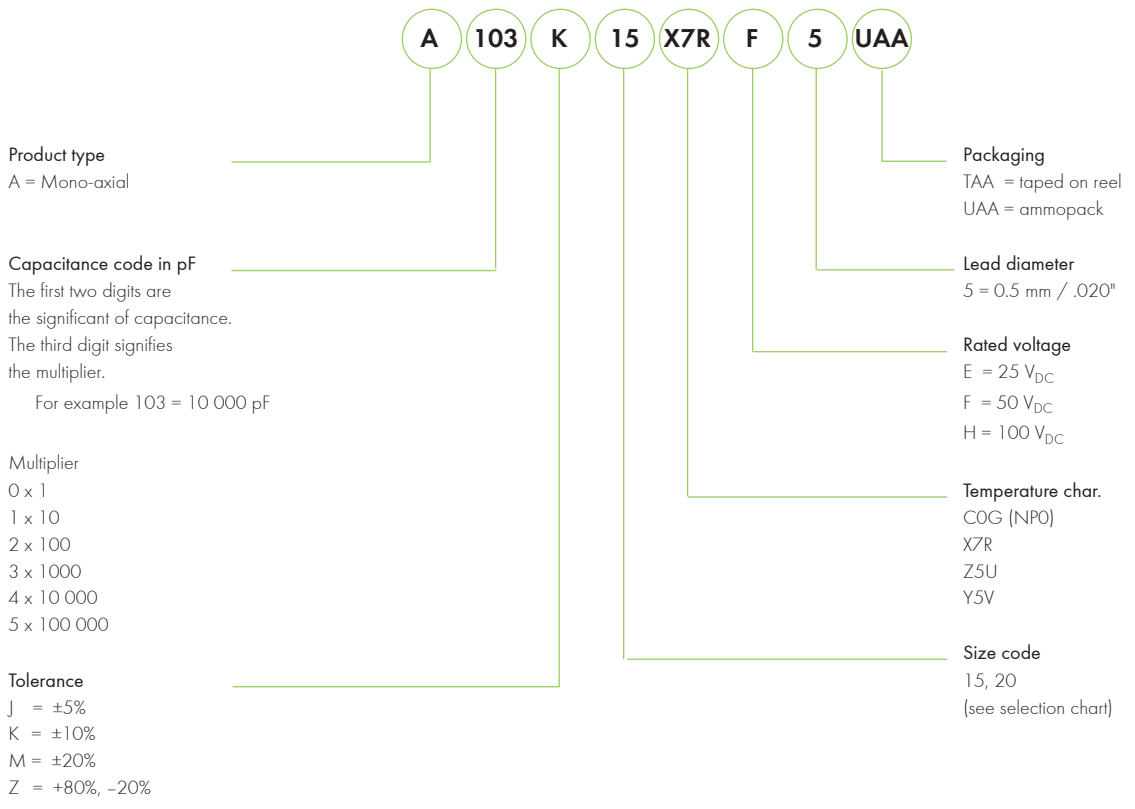


NPO (COG) ±5% tolerance			X7R ±10% tolerance		
C	clear text code*	catalogue number 12NC	C	clear text code*	catalogue number 12NC
<b>U<sub>RD</sub>C = 50 V</b>			<b>U<sub>RD</sub>C = 100 V</b>		
10 pF	A100J15C0GF5UAA	2252 205 21109	220 pF	A221K15X7RH5UAA	2252 226 21221
12	A120J15C0GF5UAA	2252 205 21129	470	A471K15X7RH5UAA	2252 226 21471
15	A150J15C0GF5UAA	2252 205 21159	1000	A102K15X7RH5UAA	2252 226 21102
18	A180J15C0GF5UAA	2252 205 21189	2200	A222K15X7RH5UAA	2252 226 21222
22	A220J15C0GF5UAA	2252 205 21229	4700	A472K15X7RH5UAA	2252 226 21472
27	A270J15C0GF5UAA	2252 205 21279	0.01 µF	A103K15X7RH5UAA	2252 226 21103
33	A330J15C0GF5UAA	2252 205 21339	0.022	A223K15X7RH5UAA	2252 226 21223
39	A390J15C0GF5UAA	2252 205 21399	0.047	A473K20X7RH5UAA	2252 226 41473
47	A470J15C0GF5UAA	2252 205 21479	0.1	A104K20X7RH5UAA	2252 226 41104
56	A560J15C0GF5UAA	2252 205 21569	<b>Z5U ±20% tolerance</b>		
68	A680J15C0GF5UAA	2252 205 21689			
82	A820J15C0GF5UAA	2252 205 21829			
100	A101J15C0GF5UAA	2252 205 21101			
150	A151J15C0GF5UAA	2252 205 21151			
220	A221J15C0GF5UAA	2252 205 21221			
330	A331J15C0GF5UAA	2252 205 21331			
470	A471J15C0GF5UAA	2252 205 21471			
680	A681J15C0GF5UAA	2252 205 21681			
1000	A102J15C0GF5UAA	2252 205 21102			
1500	A152J15C0GF5UAA	2252 205 21152	<b>U<sub>RD</sub>C = 25 V</b>		
2200	A222J15C0GF5UAA	2252 205 21222	0.1 µF	A104M15Z5UE5UAA	2252 242 21104
3300	A332J20C0GF5UAA	2252 205 41332	<b>U<sub>RD</sub>C = 50 V</b>		
<b>U<sub>RD</sub>C = 50 V</b>			1000 pF	A102M15Z5UF5UAA	2252 245 21102
10 pF	A100J15C0GH5UAA	2252 206 21109	2200	A222M15Z5UF5UAA	2252 245 21222
22	A220J15C0GH5UAA	2252 206 21229	4700	A472M15Z5UF5UAA	2252 245 21472
47	A470J15C0GH5UAA	2252 206 21479	0.01 µF	A103M15Z5UF5UAA	2252 245 21103
100	A101J15C0GH5UAA	2252 206 21101	0.022	A223M15Z5UF5UAA	2252 245 21223
220	A221J15C0GH5UAA	2252 206 21221	0.047	A473M15Z5UF5UAA	2252 245 21473
470	A471J15C0GH5UAA	2252 206 21471	0.1	A104M15Z5UF5UAA	2252 245 21104
1000	A102J20C0GH5UAA	2252 206 41102	0.22	A224M15Z5UF5UAA	2252 245 21224
<b>X7R ±10% tolerance</b>			0.47	A474M20Z5UF5UAA	2252 245 41474
C	clear text code*	catalogue number 12NC	<b>U<sub>RD</sub>C = 100 V</b>		
<b>U<sub>RD</sub>C = 25 V</b>			1000 pF	A102M15Z5UH5UAA	2252 246 21102
0.1 µF	A104K15X7RE5UAA	2252 222 21104	0.01 µF	A103M15Z5UH5UAA	2252 246 21103
0.15	A154K20X7RE5UAA	2252 222 41154	0.1	A104M20Z5UH5UAA	2252 246 41104
0.22	A224K20X7RE5UAA	2252 222 41224	<b>Y5V +80 / -20% tolerance</b>		
<b>U<sub>RD</sub>C = 50 V</b>			C	clear text code*	catalogue number 12NC
220 pF	A221K15X7RF5UAA	2252 225 21221	<b>U<sub>RD</sub>C = 25 V</b>		
330	A331K15X7RF5UAA	2252 225 21331	0.1 µF	A104Z15Y5VE5UAA	2252 262 21104
470	A471K15X7RF5UAA	2252 225 21471	0.22	A224Z20Y5VE5UAA	2252 262 41224
680	A681K15X7RF5UAA	2252 225 21681	0.47	A474Z20Y5VE5UAA	2252 262 41474
1000	A102K15X7RF5UAA	2252 225 21102	1.0	A105Z20Y5VE5UAA	2252 262 41105
1500	A152K15X7RF5UAA	2252 225 21152	<b>U<sub>RD</sub>C = 50 V</b>		
2200	A222K15X7RF5UAA	2252 225 21222	0.01 µF	A103Z15Y5VF5UAA	2252 265 21103
3300	A332K15X7RF5UAA	2252 225 21332	0.22	A223Z15Y5VF5UAA	2252 265 21223
4700	A472K15X7RF5UAA	2252 225 21472	0.047	A473Z15Y5VF5UAA	2252 265 21473
6800	A682K15X7RF5UAA	2252 225 21682	0.1	A104Z15Y5VF5UAA	2252 265 21104
0.01 µF	A103K15X7RF5UAA	2252 225 21103	0.22	A224Z20Y5VF5UAA	2252 265 41224
0.015	A153K15X7RF5UAA	2252 225 21153	0.47	A474Z20Y5VF5UAA	2252 265 41474
0.022	A223K15X7RF5UAA	2252 225 21223	*preferred ordering method		
0.033	A333K15X7RF5UAA	2252 225 21333			
0.047	A473K15X7RF5UAA	2252 225 21473			
0.068	A683K15X7RF5UAA	2252 225 21683			
0.1	A104K15X7RF5UAA	2252 225 21104			

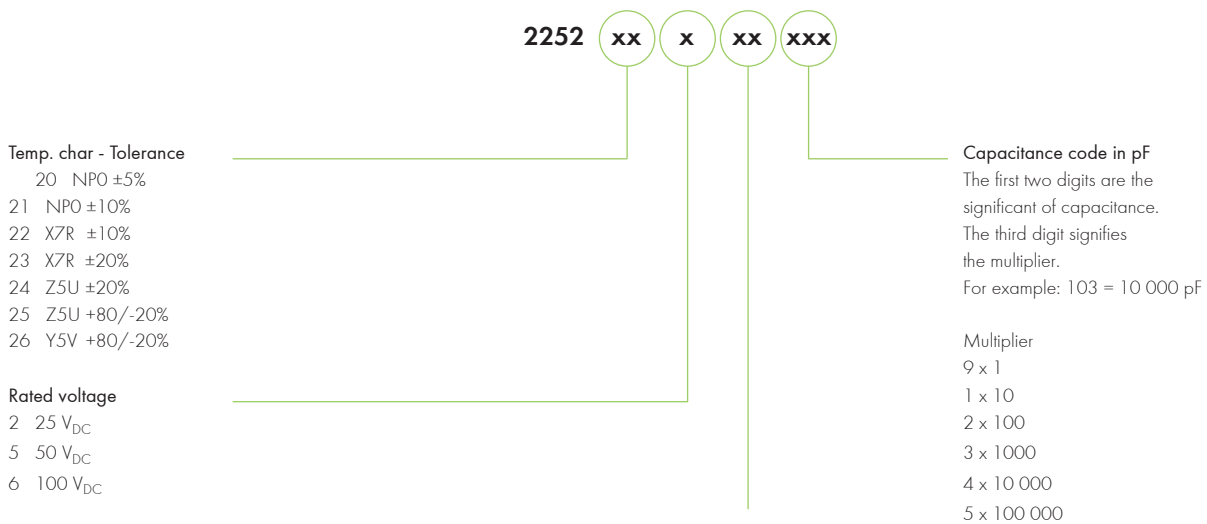


• Clear text code (preferred)

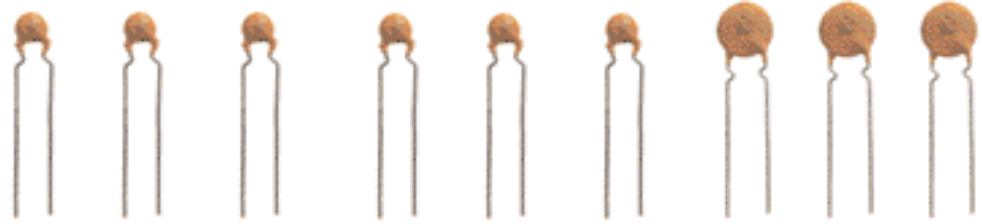
A103K15X7RF5UAA (example)



• 12-digit code [12NC]



Size Code	packaging
20 15	taped on reel
21 15	ammopack
40 20	taped on reel
41 20	ammopack



Dielectric	Class 1		Class 2				Class 1		Class 2				Class 1		Class 2			
	NPO	SLO	Y5P	Z5U	Y5V	Z5V	NPO	SLO	Y5P	Z5U	Y5V	Z5V	NPO	SLO	Y5P	Y5V	Z5U	
Rated DC voltage	50 V						100 V						500 V					
Tolerance on capacitance	±0.25 pF /±5%	±5%	±10%	±20%	+80% /-20%	+80% /-20%	±0.25 pF /±5%	±5%	±10%	±20%	+80% /-20%	+80% /-20%	±5%	±5%	±10%	+80% /-20%	±20%	
Capacitance (pF)	1.0	5.0					5.0											
	1.5	5.0					5.0											
	2.2	5.0					5.0											
	3.3	5.0					5.0											
	4.7	5.0					5.0											
	6.8	5.0					5.0											
	10	5.0					5.0						5.0					
	12	5.0					5.0						5.0					
	15	5.0					5.0						5.0					
	18	5.0					5.0						5.0					
	22	5.0					5.0						6.5					
	27	5.0					5.0						6.5					
	33	5.0					5.0							5.0				
	39	5.0					6.5							5.0				
	47	5.0					6.5							5.0				
	56		5.0					5.0						5.0				
	68		5.0					5.0						6.5				
	82		5.0					5.0						6.5				
	100		5.0					5.0							5.0			
	150			5.0					5.0						5.0			
	180			5.0					5.0						5.0			
	220			5.0					5.0						5.0			
	330			5.0					5.0						5.0			
	470			5.0					5.0						5.0			
	680			5.0					5.0						6.5			
	1000			5.0	5.0	5.0			5.0	5.0	5.0				6.5	5.0	5.0	
	1500			5.0	5.0	5.0			6.5	5.0	5.0				7.5	5.0	6.5	
	1800			6.5	5.0	5.0			6.5	5.0	5.0							
	2200			6.5	5.0	5.0			6.5	5.0	5.0				8.5	6.5	6.5	
	3300			6.5	5.0	5.0			7.5	5.0	5.0				10.0	6.5	7.5	
	4700			7.5	5.0	5.0	5.0		8.5	6.5	6.5	5.0			11.0	7.5	8.5	
	6800			8.5	6.5	6.5			10.0	6.5	6.5				13.5	8.5	10.0	
	10000			10.0	7.5	7.5	6.5		11.0	7.5	7.5	6.5			17.5	10.0	11.0	
	15000				8.5	8.5				8.5	8.5					11.0	13.5	
	22000				10.0	10.0	7.5			10.0	10.0	8.5				13.5	15.0	
	33000															17.5		
	47000						10.0					11.0						

preferred, ammpack, E6 series

Dissipation factor:	Class 1, C ≤ 30 pF: ≤ 20 × (10/C + 0.7) × 10 <sup>-4</sup> max C > 30 pF: ≤ 20 × 10 <sup>-4</sup> Class 2, ≤ 3.0%: Y5P, X7R ≤ 5.0%: Z5U, Z5V, Y5V		
Insulation resistance	≥10000 MΩ at 50 V <sub>DC</sub>	≥10000 MΩ at 100 V <sub>DC</sub>	≥10000 MΩ at 500 V <sub>DC</sub>
Climatic category	55/125/21	10/85/21 (Z5U, Z5V) 30/85/21 (Y5P, Y5V)	55/125/21
Dielectric strength	250% of rated voltage		
Reference specification	IEC 60384-8, IEC 60384-9, EIA 198		
Features	low losses, high stability		
Applications	bypass, coupling, resonant circuit		
Max. thickness	3.5 mm		





$U_{RDC} = 50 V$ , kinked				$U_{RDC} = 100 V$ , kinked			
C (pF)	F (mm)	clear text code*	catalogue number 12NC	C (pF)	F (mm)	clear text code*	catalogue number 12NC
<b>Class 1 NPO</b>				<b>Class 1 NPO</b>			
1.0	5.0	D109C20C0KF6 . J5	2252 505 .. 044	1.0	5.0	D109C20C0KH6 . J5	2252 506 .. 044
1.5	5.0	D159C20C0KF6 . J5	2252 505 .. 144	1.5	5.0	D159C20C0KH6 . J5	2252 506 .. 144
2.2	5.0	D229C20C0JF6 . J5	2252 505 .. 244	2.2	5.0	D229C20C0KH6 . J5	2252 506 .. 244
3.3	5.0	D339C20C0JF6 . J5	2252 505 .. 344	3.3	5.0	D339C20C0KH6 . J5	2252 506 .. 344
4.7	5.0	D479C20C0HF6 . J5	2252 505 .. 444	4.7	5.0	D479C20C0KH6 . J5	2252 506 .. 444
6.8	5.0	D689D20C0HF6 . J5	2252 505 .. 645	6.8	5.0	D689D20C0HH6 . J5	2252 506 .. 645
10	5.0	D100J20C0GF6 . J5	2252 505 .. 005	10	5.0	D100J20C0GH6 . J5	2252 506 .. 005
12	5.0	D120J20C0GF6 . J5	2252 505 .. 055	12	5.0	D120J20C0GH6 . J5	2252 506 .. 055
15	5.0	D150J20C0GF6 . J5	2252 505 .. 105	15	5.0	D150J20C0GH6 . J5	2252 506 .. 105
18	5.0	D180J20C0GF6 . J5	2252 505 .. 155	18	5.0	D180J20C0GH6 . J5	2252 506 .. 155
22	5.0	D220J20C0GF6 . J5	2252 505 .. 205	22	5.0	D220J20C0GH6 . J5	2252 506 .. 205
27	5.0	D270J20C0GF6 . J5	2252 505 .. 255	27	5.0	D270J20C0GH6 . J5	2252 506 .. 255
33	5.0	D330J20C0GF6 . J5	2252 505 .. 305	33	5.0	D330J20C0GH6 . J5	2252 506 .. 305
39	5.0	D390J20C0GF6 . J5	2252 505 .. 355	39	5.0	D390J25C0GH6 . J5	2252 506 .. 355
47	5.0	D470J20C0GF6 . J5	2252 505 .. 405	47	5.0	D470J25C0GH6 . J5	2252 506 .. 405
<b>Class 1 SLO</b>				<b>Class 1 SLO</b>			
56	5.0	D560J20SLOF6 . J5	2252 565 .. 505	56	5.0	D560J20SLOH6 . J5	2252 566 .. 505
68	5.0	D680J20SLOF6 . J5	2252 565 .. 605	68	5.0	D680J20SLOH6 . J5	2252 566 .. 605
82	5.0	D820J20SLOF6 . J5	2252 565 .. 805	82	5.0	D820J20SLOH6 . J5	2252 566 .. 805
100	5.0	D101J20SLOF6 . J5	2252 565 .. 015	100	5.0	D101J20SLOH6 . J5	2252 566 .. 015
<b>Class 2 Y5P</b>				<b>Class 2 Y5P</b>			
150	5.0	D151K20Y5PF6 . J5	2252 615 .. 111	150	5.0	D151K20Y5PH6 . J5	2252 616 .. 111
180	5.0	D181K20Y5PF6 . J5	2252 615 .. 165	180	5.0	D181K20Y5PH6 . J5	2252 616 .. 161
220	5.0	D221K20Y5PF6 . J5	2252 615 .. 215	220	5.0	D221K20Y5PH6 . J5	2252 616 .. 211
330	5.0	D331K20Y5PF6 . J5	2252 615 .. 311	330	5.0	D331K20Y5PH6 . J5	2252 616 .. 311
470	5.0	D471K20Y5PF6 . J5	2252 615 .. 411	470	5.0	D471K20Y5PH6 . J5	2252 616 .. 411
680	5.0	D681K20Y5PF6 . J5	2252 615 .. 611	680	5.0	D681K20Y5PH6 . J5	2252 616 .. 611
1000	5.0	D102K20Y5PF6 . J5	2252 615 .. 021	1000	5.0	D102K20Y5PH6 . J5	2252 616 .. 021
1500	5.0	D152K25Y5PF6 . J5	2252 615 .. 121	1500	5.0	D152K25Y5PH6 . J5	2252 616 .. 121
1800	5.0	D182K25Y5PF6 . J5	2252 615 .. 171	1800	5.0	D182K25Y5PH6 . J5	2252 616 .. 171
2200	5.0	D222K25Y5PF6 . J5	2252 615 .. 221	2200	5.0	D222K25Y5PH6 . J5	2252 616 .. 221
3300	5.0	D332K25Y5PF6 . J5	2252 615 .. 321	3300	5.0	D332K29Y5PH6 . J5	2252 616 .. 321
4700	5.0	D472K29Y5PF6 . J5	2252 615 .. 421	4700	5.0	D472K33Y5PH6 . J5	2252 616 .. 421
6800	5.0	D682K33Y5PF6 . J5	2252 615 .. 621	6800	5.0	D682K39Y5PH6 . J5	2252 616 .. 621
10000	5.0	D103K39Y5PF6 . J5	2252 615 .. 031	10000	5.0	D103K43Y5PH6 . J5	2252 616 .. 031
<b>Class 2 Z5U</b>				<b>Class 2 Z5U</b>			
1000	5.0	D102M20Z5UF6 . J5	2252 645 .. 022	1000	5.0	D102M20Z5UH6 . J5	2252 646 .. 022
1500	5.0	D152M20Z5UF6 . J5	2252 645 .. 122	1500	5.0	D152M20Z5UH6 . J5	2252 646 .. 122
2200	5.0	D222M20Z5UF6 . J5	2252 645 .. 222	2200	5.0	D222M20Z5UH6 . J5	2252 646 .. 222
3300	5.0	D332M20Z5UF6 . J5	2252 645 .. 322	3300	5.0	D332M20Z5UH6 . J5	2252 646 .. 322
4700	5.0	D472M20Z5UF6 . J5	2252 645 .. 322	4700	5.0	D472M25Z5UH6 . J5	2252 646 .. 422
6800	5.0	D682M25Z5UF6 . J5	2252 645 .. 622	6800	5.0	D682M25Z5UH6 . J5	2252 646 .. 622
10000	5.0	D103M29Z5UF6 . J5	2252 645 .. 032	10000	5.0	D103M29Z5UH6 . J5	2252 646 .. 032
15000	5.0	D153M33Z5UF6 . J5	2252 645 .. 132	15000	5.0	D153M33Z5UH6 . J5	2252 646 .. 132
22000	5.0	D223M39Z5UF6 . J5	2252 645 .. 232	22000	5.0	D223M39Z5UH6 . J5	2252 646 .. 232
<b>Class 2 Y5V</b>				<b>Class 2 Y5V</b>			
1000	5.0	D102Z20Y5VF6 . J5	2252 635 .. 023	1000	5.0	D102Z20Y5VH6 . J5	2252 636 .. 023
1500	5.0	D152Z20Y5VF6 . J5	2252 635 .. 123	1500	5.0	D152Z20Y5VH6 . J5	2252 636 .. 123
2200	5.0	D222Z20Y5VF6 . J5	2252 635 .. 223	2200	5.0	D222Z20Y5VH6 . J5	2252 636 .. 223
3300	5.0	D322Z20Y5VF6 . J5	2252 635 .. 323	3300	5.0	D322Z20Y5VH6 . J5	2252 636 .. 323
4700	5.0	D472Z20Y5VF6 . J5	2252 635 .. 423	4700	5.0	D472Z25Y5VH6 . J5	2252 636 .. 423
6800	5.0	D682Z25Y5VF6 . J5	2252 635 .. 623	6800	5.0	D682Z25Y5VH6 . J5	2252 636 .. 623
10000	5.0	D103Z29Y5VF6 . J5	2252 635 .. 033	10000	5.0	D103Z29Y5VH6 . J5	2252 636 .. 033
15000	5.0	D153Z33Y5VF6 . J5	2252 635 .. 133	15000	5.0	D153Z33Y5VH6 . J5	2252 636 .. 133
22000	5.0	D223Z39Y5VF6 . J5	2252 635 .. 233	22000	5.0	D223Z39Y5VH6 . J5	2252 636 .. 233
<b>Class 2 Z5V</b>				<b>Class 2 Z5V</b>			
4700	5.0	D472Z20Z5VF6 . J5	2252 655 .. 423	4700	5.0	D472Z20Z5VH6 . J5	2252 656 .. 423
10000	5.0	D103Z25Z5VF6 . J5	2252 655 .. 033	10000	5.0	D103Z25Z5VH6 . J5	2252 656 .. 033
22000	5.0	D223Z33Z5VF6 . J5	2252 655 .. 233	22000	5.0	D223Z33Z5VH6 . J5	2252 656 .. 233
47000	5.0	D473Z43Z5VF6 . J5	2252 655 .. 433	47000	5.0	D473Z43Z5VH6 . J5	2252 656 .. 433

1) T = reel  
U = ammo  
3 = bulk

2) 06 = reel  
08 = ammo  
10 = bulk

3) bulk

\* preferred E6 series ammopack



$U_{RDC} = 500 V$ , kinked			
C (pF)	F (mm)	clear text code*	catalogue number 12NC
<b>Class 1 NPO</b> ↓1) ↓2)			
10	5.0	D100J20C0GL6 . J5	2252 508 .. 005
12	5.0	D120J20C0GL6 . J5	2252 508 .. 055
15	5.0	D150J20C0GL6 . J5	2252 508 .. 105
18	5.0	D180J20C0GL6 . J5	2252 508 .. 155
22	5.0	D220J25C0GL6 . J5	2252 508 .. 205
27	5.0	D270J25C0GL6 . J5	2252 508 .. 255
<b>Class 1 SLO</b> ↓1) ↓2)			
33	5.0	D330J20SL0L6 . J5	2252 568 .. 305
39	5.0	D390J20SL0L6 . J5	2252 568 .. 355
47	5.0	D470J20SL0L6 . J5	2252 568 .. 405
56	5.0	D560J20SL0L6 . J5	2252 568 .. 505
68	5.0	D680J25SL0L6 . J5	2252 568 .. 605
82	5.0	D820J25SL0L6 . J5	2252 568 .. 805
<b>Class 2 Y5P</b> ↓1) ↓2)			
100	5.0	D101K20Y5PL6 . J5	2252 618 .. 011
150	5.0	D151K20Y5PL6 . J5	2252 618 .. 111
220	5.0	D221K20Y5PL6 . J5	2252 618 .. 211
330	5.0	D331K20Y5PL6 . J5	2252 618 .. 311
470	5.0	D471K20Y5PL6 . J5	2252 618 .. 411
680	5.0	D681K25Y5PL6 . J5	2252 618 .. 611
1000	5.0	D102K25Y5PL6 . J5	2252 618 .. 021
1500	5.0	D152K29Y5PL6 . J5	2252 618 .. 121
2200	5.0	D222K33Y5PL6 . J5	2252 618 .. 221
3300	5.0	D332K39Y5PL6 . J5	2252 618 .. 321
4700	5.0	D472K43Y5PL6 . J7	2252 618 .. 421
6800	7.5	D682K53Y5PL6 3J7	2252 618 31621
10000	7.5	D103K69Y5PL6 3J7	2252 618 31031
<b>Class 2 Z5U</b> ↓1) ↓2)			
1000	5.0	D102M20Z5UL6 . J5	2252 648 .. 022
1500	5.0	D152M25Z5UL6 . J5	2252 648 .. 122
2200	5.0	D222M25Z5UL6 . J5	2252 648 .. 222
3300	5.0	D332M29Z5UL6 . J5	2252 648 .. 322
4700	5.0	D472M33Z5UL6 . J5	2252 648 .. 422
6800	5.0	D682M39Z5UL6 . J5	2252 648 .. 622
10000	5.0	D103M43Z5UL6 . J5	2252 648 .. 032
15000	7.5	D153M53Z5UL6 . J7	2252 648 31132 <sup>3)</sup>
22000	7.5	D223M59Z5UL6 . J7	2252 648 31232 <sup>3)</sup>
<b>Class 2 Y5V</b> ↓1) ↓2)			
1000	5.0	D102Z20Y5VL6 . J5	2252 638 .. 023
1500	5.0	D152Z20Y5VL6 . J5	2252 638 .. 123
2200	5.0	D222Z25Y5VL6 . J5	2252 638 .. 223
3300	5.0	D322Z25Y5VL6 . J5	2252 638 .. 323
4700	5.0	D472Z29Y5VL6 . J5	2252 638 .. 423
6800	5.0	D682Z33Y5VL6 . J5	2252 638 .. 623
10000	5.0	D103Z39Y5VL6 . J5	2252 638 .. 033
15000	5.0	D153Z43Y5VL6 . J5	2252 638 .. 133
22000	7.5	D223Z53Y5VL6 3J7	2252 638 51233 <sup>3)</sup>
33000	7.5	D333Z69Y5VL6 3J7	2252 638 51333 <sup>3)</sup>
<b>Packaging quantities</b>			
Dmax (mm/inches)	quantities		
	bulk	reel	ammo
5.0 (0.20")	1000	2000 <sup>4)</sup>	2000
6.5 (0.25")	1000	2000 <sup>4)</sup>	2000
7.5 (0.29")	1000	2000 <sup>4)</sup>	2000
8.5 (0.33")	1000	2000 <sup>4)</sup>	2000
10.0 (0.39")	1000	2000 <sup>4)</sup>	2000
11.0 (0.43")	1000	2000 <sup>4)</sup>	2000
12.0 (0.47")	1000	2000 <sup>4)</sup>	2000
13.5 (0.53")	500	-	-
15.0 (0.59")	500	-	-
17.5 (0.69")	500	-	-



- |                                     |  |         |                                 |
|-------------------------------------|--|---------|---------------------------------|
| 1) T = reel<br>U = ammo<br>3 = bulk | 2) 06 = reel<br>08 = ammo<br>10 = bulk | 3) bulk | 4) for 50 V-100 V<br>qty = 2500 |
|-------------------------------------|--|---------|---------------------------------|

\* preferred E6 series ammpack



U <sub>RDC</sub>	100 V					500 V				
Dielectric	NPO	P100	N150	N750	N1500	NPO	P100	N150	N750	N1500
U <sub>RDC</sub> , lead form	inside kink (preferred)					inside kink (preferred)				
Operating temp. range	-55 to +125 °C					-55 to +125 °C				
Tolerance on capacitance	±0.25 pF /±2%	±0.25 pF /±2%	±0.25 pF /±2%	±0.25 pF /±2%	±2%	±0.25 pF /±2%	±0.25 pF /±2%	±0.25 pF /±2%	±0.25 pF /±2%	±2%
Capacitance (pF) 0.47										
0.56										
0.68										
0.82						5.0				
1.0						5.0				
1.5	5.0	5.0				5.0	5.0			
1.8	5.0	5.0								
2.2	5.0	5.0				5.0	5.0	5.0		
3.3	5.0	5.0				5.0	5.0	5.0		
3.9	5.0	5.0	5.0							
4.7	5.0	5.0	5.0			5.0	5.0	5.0		
6.8	5.0	5.0	5.0	5.0		5.0	6.5	5.0	5.0	
8.2	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
10	5.0	6.5	5.0	5.0		5.0	7.5	5.0	5.0	5.0
15	5.0	7.5	5.0	5.0		5.0	8.5	5.0	5.0	5.0
18	5.0	7.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
22	5.0	8.5	5.0	5.0	5.0	6.5	10.0	6.5	5.0	5.0
33	5.0	10.0	5.0	5.0	5.0	6.5	12.0	6.5	6.5	5.0
47	6.5	11.0	6.5	5.0	5.0	7.5		7.5	7.5	6.5
68	6.5		6.5	6.5	5.0	8.5		8.5	8.5	7.5
100	7.5		7.5	7.5	6.5	10.0		11.0	10.0	8.5
150	8.5		10.0	8.5	7.5	12.0		13.5	12.0	10.0
220	11.0		11.0	10.0	8.5					11.0
330				12.0	10.0					12.0
470					11.0					
560					12.0					
	preferred									
Case dimensions	in columns; diameter D max (mm)									
Max. thickness	3.5 mm									
Packing	reel, ammo, bulk									
Dissipation factor:	C ≤ 30 pF: ≤ 20 × (10/C + 0.7) × 10 <sup>-4</sup> max C > 30 pF: ≤ 20 × 10 <sup>-4</sup>									
Insulation resistance at rated voltage	≥ 10 000 MΩ									
Climatic category	55/125/56									
Dielectric strength	250% of rated voltage									
Reference specification	IEC 60 384-8, IEC 60 384-9, EIA 198									
Features	low losses, high stability, high capacitance in small size									
Applications	bypassing, coupling, resonant circuit									
Notes	other leadstyles available on request E12 capacitance values available on request									



UR <sub>DC</sub> = 100 V				UR <sub>DC</sub> = 500 V			
C (pF)	F (mm)	clear text code*	catalogue number 12NC	C (pF)	F (mm)	clear text code*	catalogue number 12NC
<b>Class 1 NPO</b> ↓1) ↓2)				<b>Class 1 NPO</b> ↓1) ↓2)			
1.5	5.0	D159C20C0KH6 . J5	2252 506 .. 144	0.82	5.0	D828C20C0KL6 3 J5 5)	2252 508 95 123 5)
1.8	5.0	D189C20C0KH6 . J5	2252 506 .. 194	0.82	5.0	D828C20C0KL6 U J5 4)	2252 508 95 122 4)
2.2	5.0	D229C20C0JH6 . J5	2252 506 .. 244	0.82	5.0	D828C20C0KL6 T J5 3)	2252 508 95 121 3)
3.3	5.0	D339C20C0JH6 . J5	2252 506 .. 344	1.0	5.0	D109C20C0GL6 . J5	2252 508 .. 044
4.7	5.0	D479C20C0HH6 . J5	2252 506 .. 444	1.5	5.0	D159C20C0GL6 . J5	2252 508 .. 144
6.8	5.0	D689C20C0HH6 . J5	2252 506 .. 644	2.2	5.0	D229C20C0GL6 . J5	2252 508 .. 244
10	5.0	D100G20C0GH6 . J5	2252 506 .. 004	3.3	5.0	D339C20C0GL6 . J5	2252 508 .. 344
15	5.0	D150G20C0GH6 . J5	2252 506 .. 104	4.7	5.0	D479C20C0GL6 . J5	2252 508 .. 444
22	5.0	D220G20C0GH6 . J5	2252 506 .. 204	6.8	5.0	D689C20C0GL6 . J5	2252 508 .. 644
33	5.0	D330G20C0GH6 . J5	2252 506 .. 304	10	5.0	D100G20C0GL6 . J5	2252 508 .. 004
47	5.0	D470G25C0GH6 . J5	2252 506 .. 404	15	5.0	D150G20C0GL6 . J5	2252 508 .. 104
68	5.0	D680G25C0GH6 . J5	2252 506 .. 604	22	5.0	D220G25C0GL6 . J5	2252 508 .. 204
100	5.0	D101G29C0GH6 . J5	2252 506 .. 014	33	5.0	D330G25C0GL6 . J5	2252 508 .. 304
150	5.0	D151G33C0GH6 . J5	2252 506 .. 114	47	5.0	D470G29C0GL6 . J5	2252 508 .. 404
220	5.0	D221G43C0GH6 . J5	2252 506 .. 214	68	5.0	D680G33C0GL6 . J5	2252 508 .. 604
				100	5.0	D101G39C0GL6 . J5	2252 508 .. 014
				150	5.0	D151G47C0GL6 . J5	2252 508 .. 114
<b>Class 1 P100</b> ↓1) ↓2)				<b>Class 1 P100</b> ↓1) ↓2)			
1.5	5.0	D159C20M7GH6 . J5	2252 596 .. 144	1.5	5.0	D159C20M7GL6 . J5	2252 598 .. 144
2.2	5.0	D229C20M7GH6 . J5	2252 596 .. 244	2.2	5.0	D229C20M7GL6 . J5	2252 598 .. 244
3.3	5.0	D339C20M7GH6 . J5	2252 596 .. 344	3.3	5.0	D339C20M7GL6 . J5	2252 598 .. 344
4.7	5.0	D479C20M7GH6 . J5	2252 596 .. 444	4.7	5.0	D479C20M7GL6 . J5	2252 598 .. 444
6.8	5.0	D689C20M7GH6 . J5	2252 596 .. 644	6.8	5.0	D689C25M7GL6 . J5	2252 598 .. 644
10	5.0	D100G25M7GH6 . J5	2252 596 .. 004	10	5.0	D100G29M7GL6 . J5	2252 598 .. 004
15	5.0	D150G29M7GH6 . J5	2252 596 .. 104	15	5.0	D150G33M7GL6 . J5	2252 598 .. 104
22	5.0	D220G33M7GH6 . J5	2252 596 .. 204	22	5.0	D220G39M7GL6 . J5	2252 598 .. 204
33	5.0	D330G39M7GH6 . J5	2252 596 .. 304	33	5.0	D330G47M7GL6 . J5	2252 598 .. 304
47	5.0	D470G43M7GH6 . J5	2252 596 .. 404				
<b>Class 1 N150</b> ↓1) ↓2)				<b>Class 1 N150</b> ↓1) ↓2)			
3.9	5.0	D399C20P2JH6 . J5	2252 516 .. 394	2.2	5.0	D229C20P2JL6 . J5	2252 518 .. 244
4.7	5.0	D479C20P2HH6 . J5	2252 516 .. 444	3.3	5.0	D339C20P2JL6 . J5	2252 518 .. 344
6.8	5.0	D689C20P2HH6 . J5	2252 516 .. 644	4.7	5.0	D479C20P2GL6 . J5	2252 518 .. 444
10	5.0	D100G20P2GH6 . J5	2252 516 .. 004	6.8	5.0	D689C20P2GL6 . J5	2252 518 .. 644
15	5.0	D150G20P2GH6 . J5	2252 516 .. 104	10	5.0	D100G20P2GL6 . J5	2252 518 .. 004
22	5.0	D220G20P2GH6 . J5	2252 516 .. 204	15	5.0	D150G20P2GL6 . J5	2252 518 .. 104
33	5.0	D330G20P2GH6 . J5	2252 516 .. 304	22	5.0	D220G25P2GL6 . J5	2252 518 .. 204
47	5.0	D470G25P2GH6 . J5	2252 516 .. 404	33	5.0	D330G25P2GL6 . J5	2252 518 .. 304
68	5.0	D680G25P2GH6 . J5	2252 516 .. 604	47	5.0	D470G29P2GL6 . J5	2252 518 .. 404
100	5.0	D101G29P2GH6 . J5	2252 516 .. 014	68	5.0	D680G33P2GL6 . J5	2252 518 .. 604
150	5.0	D151G39P2GH6 . J5	2252 516 .. 114	100	5.0	D101G43P2GL6 . J5	2252 518 .. 014
220	5.0	D221G43P2GH6 . J5	2252 516 .. 214	150	7.5	D151G53P2GL6 . J7	2252 518 .. 114
<b>Class 1 N750</b> ↓1) ↓2)				<b>Class 1 N750</b> ↓1) ↓2)			
6.8	5.0	D689C20U2JH6 . J5	2252 556 .. 644	6.8	5.0	D689C20U2JL6 . J5	2252 558 .. 644
10	5.0	D100G20U2JH6 . J5	2252 556 .. 004	10	5.0	D100G20U2JL6 . J5	2252 558 .. 004
15	5.0	D150G20U2JH6 . J5	2252 556 .. 104	15	5.0	D150G20U2JL6 . J5	2252 558 .. 104
22	5.0	D220G20U2JH6 . J5	2252 556 .. 204	22	5.0	D220G20U2JL6 . J5	2252 558 .. 204
33	5.0	D330G20U2JH6 . J5	2252 556 .. 304	33	5.0	D330G25U2JL6 . J5	2252 558 .. 304
47	5.0	D470G20U2JH6 . J5	2252 556 .. 404	47	5.0	D470G29U2JL6 . J5	2252 558 .. 404
68	5.0	D680G25U2JH6 . J5	2252 556 .. 604	68	5.0	D680G33U2JL6 . J5	2252 558 .. 604
100	5.0	D101G29U2JH6 . J5	2252 556 .. 014	100	5.0	D101G39U2JL6 . J5	2252 558 .. 014
150	5.0	D151G33U2JH6 . J5	2252 556 .. 114	150	5.0	D151G47U2JL6 . J5	2252 558 .. 114
220	5.0	D221G39U2JH6 . J5	2252 556 .. 214				
330	5.0	D331G47U2JH6 . J5	2252 556 .. 314				
<b>Class 1 N1500</b> ↓1) ↓2)				<b>Class 1 N1500</b> ↓1) ↓2)			
18	5.0	D180G20P3KH6 . J5	2252 586 .. 154	8.2	5.0	D829C20P3KL6 . J5	2252 588 .. 844
22	5.0	D220G20P3KH6 . J5	2252 586 .. 204	10	5.0	D100G20P3KL6 . J5	2252 588 .. 004
33	5.0	D330G20P3KH6 . J5	2252 586 .. 304	15	5.0	D150G20P3KL6 . J5	2252 588 .. 104
47	5.0	D470G20P3KH6 . J5	2252 586 .. 404	22	5.0	D220G20P3KL6 . J5	2252 588 .. 204
68	5.0	D680G20P3KH6 . J5	2252 586 .. 604	33	5.0	D330G20P3KL6 . J5	2252 588 .. 304
100	5.0	D101G25P3KH6 . J5	2252 586 .. 014	47	5.0	D470G20P3KL6 . J5	2252 588 .. 404
150	5.0	D151G29P3KH6 . J5	2252 586 .. 114	68	5.0	D680G25P3KL6 . J5	2252 588 .. 604
220	5.0	D221G33P3KH6 . J5	2252 586 .. 214	100	5.0	D101G29P3KL6 . J5	2252 588 .. 014
330	5.0	D331G39P3KH6 . J5	2252 586 .. 314	150	5.0	D151G33P3KL6 . J5	2252 588 .. 114
470	5.0	D471G43P3KH6 . J5	2252 586 .. 414	220	5.0	D221G39P3KL6 . J5	2252 588 .. 214
560	5.0	D561G47P3KH6 . J5	2252 586 .. 514	330	5.0	D331G47P3KL6 . J5	2252 588 .. 314

\* other lead styles available on request  
\* preferred E6 values

- |             |              |         |         |         |
|-------------|--------------|---------|---------|---------|
| 1) T = reel | 2) O6 = reel | 3) reel | 4) ammo | 5) bulk |
| U = ammo    | 08 = ammo    |         |         |         |
| 3 = bulk    | 10 = bulk    |         |         |         |



U <sub>RDC</sub>	1 kV					2 kV					3 kV					6 kV		
Dielectric	class 1		class 2			class 1		class 2			class 1		class 2			class 1	class 2	
	SLO	X7R	Y5P	Y5V	Z5U	SLO	X7R	Y5P	Y5V	Z5U	SLO	X7R	Y5P	Y5V	Z5U	SLO	S3N	Z5U
U <sub>RDC</sub> , lead form	1000 V, kinked					2000 V, kinked					3000 V, kinked					6000 V, straight		
Tolerance	±5% /±10%	±10%	±10%	+80% /-20%	±20%	±5% /±10%	±10%	±10%	+80% /-20%	±20%	±10%	±10%	±10%	+80% /-20%	±20%	±20%	±20%	±20%
Capacitance (pF)	10	6.5				6.5					8.5					10.0		
	12	6.5				6.5					8.5					11.0		
	15	6.5				6.5					8.5					11.0		
	18	6.5				6.5					8.5					11.0		
	22	6.5				6.5					8.5					11.0		
	27	6.5				6.5					8.5					11.0		
	33	6.5				7.5					8.5					13.5		
	39	6.5				7.5					8.5					11.0		
	47	6.5				7.5					8.5					11.0		
	56	7.5				7.5					8.5					13.5		
	68	7.5				8.5					10.0					13.5		
	82	7.5				8.5					10.0					15.0		
	100	7.5	6.5	6.5		10.0	6.5	6.5			8.5	8.5				15.0		
	120	8.5				10.0					8.5	8.5				15.0		
	150	8.5	6.5	6.5		11.0	6.5	6.5			8.5	8.5				15.0		
	180																	
	220	10.0	6.5	6.5			6.5	6.5			8.5	8.5				10.0		
	270																	
	330		6.5	6.5			6.5	6.5			8.5	8.5				11.0		
	390																	
	470		7.5	6.5			7.5	7.5			8.5	8.5		8.5		12.0		
	560																	
	680		7.5	7.5			8.5	7.5			10.0	8.5		8.5		13.5		
	820																	
	1000		8.5	7.5	6.5	6.5		10.0	8.5	7.5	7.5		11.0	11.0	8.5	8.5		15.0
	1200																	
	1500		10.0	8.5	6.5	7.5		11.0	10.0	7.5	8.5		13.5	12.0	8.5	10.0		17.5
	1800																	
	2200		11.0	10.0	7.5	7.5		13.5	11.0	8.5	8.5		17.5	15.0	10.0	11.0		19.0
	2700																	
	3300		12.0	11.0	7.5	8.5		15.0	13.5	10.0	11.0		19.0	11.0	13.5			
	3900																	
	4700		15.0	13.5	8.5	10.0		17.5	11.0	12.0			12.0	17.5				
	5600																	
	6800			15.0	10.0	11.0			12.0	13.5			15.0					
	8200																	
	10000			19.0	11.0	12.0			15.0	17.5								
	15000				13.5	15.0												
	22000				15.0	19.0												
	33000				19.0													

preferred

Case dimensions	in columns: diameter D <sub>max</sub> (mm)			
Max. thickness	4.0 mm		4.5 mm	
Packing	reel, ammo, loose		reel, ammo, loose	
Dissipation factor	class 1, C ≤ 30 pF: ≤ 20 × (10/c + 0.7) × 10 <sup>-4</sup> max		class 2, ≤ 3.0%: Y5P, X7R	
	C > 30 pF: ≤ 20 × 10 <sup>-4</sup>		≤ 5.0%: Z5U, Y5V	
Insulation resistance at 500 V (DC)	≥ 10 000 MΩ			
Climatic category	class 1: 55/125/21			
	class 2: 55/125/21 (X7R), -30/85/21 (Y5P, Y5V) and 10/85/21 (Z5U)			
Dielectric strength	200% of rated voltage			
Reference specification	IEC 60 384-8, IEC 60 384-9, EIA 198			
Features	low losses, high stability, high capacitance in small size			
Applications	DC high voltage, pulse high voltage, SMPS, HV power supply, HF ballast			



UR <sub>DC</sub> = 1000 V, kinked				UR <sub>DC</sub> = 1000 V, kinked			
C (pF)	F (mm)	clear text code*	catalogue number 12NC	C (pF)	F (mm)	clear text code*	catalogue number 12NC
<b>Class 1 SLO ± 5%</b> ↓1) ↓2)				<b>Class 2 Y5V +80/-20%</b> ↓1) ↓2)			
10	5.0	S100J25SL0N6 . K5	2252 561 .. 009	1000	5.0	S102Z25Y5VN6 . K5	2252 631 .. 028
12	5.0	S120J25SL0N6 . K5	2252 561 .. 059	1500	5.0	S152Z25Y5VN6 . K5	2252 631 .. 128
15	5.0	S150J25SL0N6 . K5	2252 561 .. 109	2200	5.0	S222Z29Y5VN6 . K5	2252 631 .. 228
18	5.0	S180J25SL0N6 . K5	2252 561 .. 159	3300	5.0	S322Z29Y5VN6 . K5	2252 631 .. 328
22	5.0	S220J25SL0N6 . K5	2252 561 .. 209	4700	5.0	S472Z33Y5VN6 . K5	2252 631 .. 428
27	5.0	S270J25SL0N6 . K5	2252 561 .. 259	6800	5.0	S682Z39Y5VN6 . K5	2252 631 .. 628
33	5.0	S330J25SL0N6 . K5	2252 561 .. 309	10000	5.0	S103Z43Y5VN6 . K5	2252 631 .. 038
39	5.0	S390J25SL0N6 . K5	2252 561 .. 359	15000	7.5	S153Z53Y5VN6 3 K7	2252 631 37 138 3)
47	5.0	S470J25SL0N6 . K5	2252 561 .. 409	22000	7.5	S223Z59Y5VN6 3 K7	2252 631 37 238 3)
56	5.0	S560J29SL0N6 . K5	2252 561 .. 509	33000	10.0	S333Z75Y5VN6 3 K0	2252 631 48 338 3)
68	5.0	S680J29SL0N6 . K5	2252 561 .. 609	<b>Class 2 Z5U ± 20%</b> ↓1) ↓2)			
82	5.0	S820J29SL0N6 . K5	2252 561 .. 809	1000	5.0	S102M25Z5UN6 . K5	2252 641 .. 027
100	5.0	S101J29SL0N6 . K5	2252 561 .. 019	1500	5.0	S152M29Z5UN6 . K5	2252 641 .. 127
120	5.0	S121J33SL0N6 . K5	2252 561 .. 069	2200	5.0	S222M29Z5UN6 . K5	2252 641 .. 227
<b>Class 1 SLO ± 10%</b> ↓1) ↓2)				3300	5.0	S332M33Z5UN6 . K5	2252 641 .. 327
10	5.0	S100K25SL0N6 . K5	2252 561 .. 006	4700	5.0	S472M39Z5UN6 . K5	2252 641 .. 427
12	5.0	S120K25SL0N6 . K5	2252 561 .. 056	6800	5.0	S682M43Z5UN6 . K5	2252 641 .. 627
15	5.0	S150K25SL0N6 . K5	2252 561 .. 106	10000	7.5	S103M47Z5UN6 3 K7	2252 641 37 037 3)
18	5.0	S180K25SL0N6 . K5	2252 561 .. 156	15000	7.5	S153M59Z5UN6 3 K7	2252 641 37 137 3)
22	5.0	S220K25SL0N6 . K5	2252 561 .. 206	22000	10.0	S223M75Z5UN6 3 K0	2252 641 48 237 3)
27	5.0	S270K25SL0N6 . K5	2252 561 .. 256				
33	5.0	S330K25SL0N6 . K5	2252 561 .. 306				
39	5.0	S390K25SL0N6 . K5	2252 561 .. 356				
47	5.0	S470K25SL0N6 . K5	2252 561 .. 406				
56	5.0	S560K29SL0N6 . K5	2252 561 .. 506				
68	5.0	S680K29SL0N6 . K5	2252 561 .. 606				
82	5.0	S820K29SL0N6 . K5	2252 561 .. 806				
100	5.0	S101K29SL0N6 . K5	2252 561 .. 016				
120	5.0	S121K33SL0N6 . K5	2252 561 .. 066				
150	5.0	S151K39SL0N6 . K5	2252 561 .. 116				
220	5.0	S221K39SL0N6 . K5	2252 561 .. 216				
<b>Class 2 X7R ± 10%</b> ↓1) ↓2)							
100	5.0	S101K25X7RN6 . K5	2252 601 .. 016				
150	5.0	S151K25X7RN6 . K5	2252 601 .. 116				
220	5.0	S221K25X7RN6 . K5	2252 601 .. 216				
330	5.0	S331K25X7RN6 . K5	2252 601 .. 316				
470	5.0	S471K29X7RN6 . K5	2252 601 .. 416				
680	5.0	S681K29X7RN6 . K5	2252 601 .. 616				
1000	5.0	S102K33X7RN6 . K5	2252 601 .. 026				
1500	5.0	S152K39X7RN6 . K5	2252 601 .. 126				
2200	5.0	S222K43X7RN6 . K5	2252 601 .. 226				
3300	7.5	S332K47X7RN6 3 K7	2252 601 37 326 3)				
4700	7.5	S472K59X7RN6 3 K7	2252 601 37 426 3)				
<b>Class 2 Y5P ± 10%</b> ↓1) ↓2)							
100	5.0	S101K25Y5PN6 . K5	2252 611 .. 016				
150	5.0	S151K25Y5PN6 . K5	2252 611 .. 116				
220	5.0	S221K25Y5PN6 . K5	2252 611 .. 216				
330	5.0	S331K25Y5PN6 . K5	2252 611 .. 316				
470	5.0	S471K25Y5PN6 . K5	2252 611 .. 416				
680	5.0	S681K29Y5PN6 . K5	2252 611 .. 616				
1000	5.0	S102K29Y5PN6 . K5	2252 611 .. 026				
1500	5.0	S152K33Y5PN6 . K5	2252 611 .. 126				
2200	5.0	S222K39Y5PN6 . K5	2252 611 .. 226				
3300	5.0	S332K43Y5PN6 . K5	2252 611 .. 326				
4700	7.5	S472K53Y5PN6 3 K7	2252 611 37 426 3)				
6800	7.5	S682K59Y5PN6 3 K7	2252 611 37 626 3)				
10000	10.0	S103K75Y5PN6 3 K0	2252 611 48 036 3)				

1) T = reel U = ammo 3 = bulk	2) 13 = reel 14 = ammo 15 = bulk	3) bulk
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\* preferred E6 series ammpack



UR <sub>DC</sub> = 2000 V, kinked				UR <sub>DC</sub> = 2000 V, kinked			
C (pF)	F (mm)	clear text code*	catalogue number 12NC	C (pF)	F (mm)	clear text code*	catalogue number 12NC
<b>Class 1 SLO ± 5%</b>				<b>Class 2 Y5V +80/-20%</b>			
↓1) ↓2)				↓1) ↓2)			
10	5.0	S100J25SLOP6 . K5	2252 562 .. 009	1000	5.0	S102Z29Y5VP6 . K5	2252 632 .. 028
12	5.0	S120J25SLOP6 . K5	2252 562 .. 059	1500	5.0	S152Z29Y5VP6 . K5	2252 632 .. 128
15	5.0	S150J25SLOP6 . K5	2252 562 .. 109	2200	5.0	S222Z33Y5VP6 . K5	2252 632 .. 228
18	5.0	S180J25SLOP6 . K5	2252 562 .. 159	3300	5.0	S322Z39Y5VP6 . K5	2252 632 .. 328
22	5.0	S220J25SLOP6 . K5	2252 562 .. 209	4700	5.0	S472Z43Y5VP6 . K5	2252 632 .. 428
27	5.0	S270J25SLOP6 . K5	2252 562 .. 259	6800	7.5	S682Z47Y5VP6 3 K7 3)	2252 632 37 628 3)
33	5.0	S330J29SLOP6 . K5	2252 562 .. 309	10000	7.5	S103Z59Y5VP6 3 K7 3)	2252 632 37 038 3)
39	5.0	S390J29SLOP6 . K5	2252 562 .. 359	<b>Class 2 Z5U ± 20%</b>			
47	5.0	S470J29SLOP6 . K5	2252 562 .. 409	↓1) ↓2)			
56	5.0	S560J29SLOP6 . K5	2252 562 .. 509	1000	5.0	S102M29Z5UP6 . K5	2252 642 .. 027
68	5.0	S680J33SLOP6 . K5	2252 562 .. 609	1500	5.0	S152M33Z5UP6 . K5	2252 642 .. 127
82	5.0	S820J33SLOP6 . K5	2252 562 .. 809	2200	5.0	S222M33Z5UP6 . K5	2252 642 .. 227
100	5.0	S101J39SLOP6 . K5	2252 562 .. 019	3300	5.0	S332M43Z5UP6 . K5	2252 642 .. 327
120	5.0	S121J39SLOP6 . K5	2252 562 .. 069	4700	7.5	S472M47Z5UP6 3 K7 3)	2252 642 37 427 3)
<b>Class 1 SLO ± 10%</b>				6800	7.5	S682M53Z5UP6 3 K7 3)	2252 642 37 627 3)
↓1) ↓2)				10000	7.5	S103M69Z5UP6 3 K7 3)	2252 642 37 037 3)
10	5.0	S100K25SLOP6 . K5	2252 562 .. 006				
12	5.0	S120K25SLOP6 . K5	2252 562 .. 056				
15	5.0	S150K25SLOP6 . K5	2252 562 .. 106				
18	5.0	S180K25SLOP6 . K5	2252 562 .. 156				
22	5.0	S220K25SLOP6 . K5	2252 562 .. 206				
27	5.0	S270K25SLOP6 . K5	2252 562 .. 256				
33	5.0	S330K29SLOP6 . K5	2252 562 .. 306				
39	5.0	S390K29SLOP6 . K5	2252 562 .. 356				
47	5.0	S470K29SLOP6 . K5	2252 562 .. 406				
56	5.0	S560K29SLOP6 . K5	2252 562 .. 506				
68	5.0	S680K33SLOP6 . K5	2252 562 .. 606				
82	5.0	S820K33SLOP6 . K5	2252 562 .. 806				
100	5.0	S101K39SLOP6 . K5	2252 562 .. 016				
120	5.0	S121K39SLOP6 . K5	2252 562 .. 066				
150	5.0	S151K43SLOP6 . K5	2252 562 .. 116				
<b>Class 2 X7R ± 10%</b>							
↓1) ↓2)							
100	5.0	S101K25X7RP6 . K5	2252 602 .. 016				
150	5.0	S151K25X7RP6 . K5	2252 602 .. 116				
220	5.0	S221K25X7RP6 . K5	2252 602 .. 216				
330	5.0	S331K25X7RP6 . K5	2252 602 .. 316				
470	5.0	S471K29X7RP6 . K5	2252 602 .. 416				
680	5.0	S681K33X7RP6 . K5	2252 602 .. 616				
1000	5.0	S102K39X7RP6 . K5	2252 602 .. 026				
1500	5.0	S152K43X7RP6 . K5	2252 602 .. 126				
2200	7.5	S222K53X7RP6 3 K7 3)	2252 602 37 226 3)				
3300	7.5	S332K59X7RP6 3 K7 3)	2252 602 37 326 3)				
<b>Class 2 Y5P ± 10%</b>							
↓1) ↓2)							
100	5.0	S101K25Y5PP6 . K5	2252 612 .. 016				
150	5.0	S151K25Y5PP6 . K5	2252 612 .. 116				
220	5.0	S221K25Y5PP6 . K5	2252 612 .. 216				
330	5.0	S331K25Y5PP6 . K5	2252 612 .. 316				
470	5.0	S471K29Y5PP6 . K5	2252 612 .. 416				
680	5.0	S681K29Y5PP6 . K5	2252 612 .. 616				
1000	5.0	S102K33Y5PP6 . K5	2252 612 .. 026				
1500	5.0	S152K39Y5PP6 . K5	2252 612 .. 126				
2200	5.0	S222K43Y5PP6 . K5	2252 612 .. 226				
3300	7.5	S332K53Y5PP6 3 K7 3)	2252 612 37 326 3)				
4700	7.5	S472K69Y5PP6 3 K7 3)	2252 612 37 426 3)				

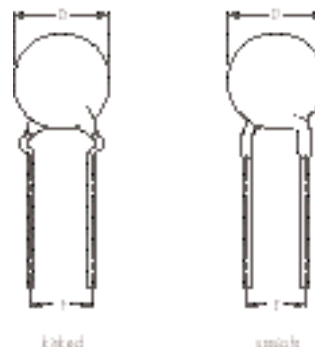
- |                                     |  |         |
|-------------------------------------|--|---------|
| 1) T = reel<br>U = ammo<br>3 = bulk | 2) 13 = reel<br>14 = ammo<br>15 = bulk | 3) bulk |
|-------------------------------------|--|---------|

\* preferred E6 series ammpack



UR <sub>DC</sub> = 3000 V, kinked				UR <sub>DC</sub> = 6000 V, kinked			
C (µF)	F (mm)	clear text code*	catalogue number 12NC	C (µF)	F (mm)	clear text code*	catalogue number 12NC
<b>Class 1 S10 ± 10%</b>				<b>Class 1 S10 ± 20%</b>			
10	7.5	S100K33S10R63K7	2252 563 37006	10	10.0	S100M39S10U83L0	2252 564 52007
15	7.5	S150K33S10R63K7	2252 563 37106	15	10.0	S150M43S10U83L0	2252 564 52107
22	7.5	S220K33S10R63K7	2252 563 37206	22	10.0	S220M43S10U83L0	2252 564 52207
33	7.5	S330K33S10R63K7	2252 563 37306	33	10.0	S330M53S10U83L0	2252 564 52307
47	7.5	S470K33S10R63K7	2252 563 37406	<b>Class 2 S3N ± 20%</b>			
68	7.5	S680K39S10R63K7	2252 563 37606	47	10.0	S470M43S3NU83L0	2252 574 52307
<b>Class 2 X7R ± 10%</b>				68	10.0	S680M53S3NU83L0	2252 574 52607
100	7.5	S101K33X7RR63K7	2252 603 37016	100	10.0	S101M59S3NU83L0	2252 574 52017
150	7.5	S151K33X7RR63K7	2252 603 37116	150	10.0	S151M59S3NU83L0	2252 574 52117
220	7.5	S221K33X7RR63K7	2252 603 37216	<b>Class 2 Z5U ± 20%</b>			
330	7.5	S331K33X7RR63K7	2252 603 37316	220	10.0	S221M39Z5UU83L0	2252 644 52217
470	7.5	S471K33X7RR63K7	2252 603 37416	330	10.0	S331M43Z5UU83L0	2252 644 52317
680	7.5	S681K39X7RR63K7	2252 603 37616	470	10.0	S471M47Z5UU83L0	2252 644 52417
1000	7.5	S102K43X7RR63K7	2252 603 37026	680	10.0	S681M53Z5UU83L0	2252 644 52617
1500	7.5	S152K53X7RR63K7	2252 603 37126	1000	10.0	S102M59Z5UU83L0	2252 644 52027
2200	7.5	S222K69X7RR83K7	2252 603 38226	1500	10.0	S152M69Z5UU83L0	2252 644 52127
<b>Class 2 Y5P ± 10%</b>				2200	10.0	S222M75Z5UU83L0	2252 644 52227
100	7.5	S101K33Y5PR63K7	2252 613 37016	<b>Packaging quantities</b>			
150	7.5	S150K33Y5PR63K7	2252 613 37116	Kinked leads D <sub>max</sub> (mm/inches)	bulk	reel <sup>(4)</sup>	ammo <sup>(5)</sup>
220	7.5	S221K33Y5PR63K7	2252 613 37216				
330	7.5	S331K33Y5PR63K7	2252 613 37316	5.0/0.20"	1000	2000	1 kV 2000
470	7.5	S471K33Y5PR63K7	2252 613 37416	6.5/0.25"	1000	2000	
680	7.5	S681K33Y5PR63K7	2252 613 37616	7.5/0.29"	1000	2000	
1000	7.5	S102K43Y5PR63K7	2252 613 37026	8.5/0.33"	1000	2000	2 kV 1500
1500	7.5	S152K47Y5PR63K7	2252 613 37126	10.0/0.39"	1000	2000	
2200	7.5	S222K59Y5PR63K7	2252 613 37226	11.0/0.43"	1000	2000	
3300	10.0	S332K75Y5PR83K0	2252 613 48326	12.0/0.47"	1000	2000	-
<b>Class 2 Y5V +80/-20%</b>				13.5/0.53"	500	-	
1000	7.5	S102Z33Y5VR63K7	2252 633 37028	15.0/0.59"	500	-	
1500	7.5	S152Z33Y5VR63K7	2252 633 37128	17.5/0.69"	500	-	-
2200	7.5	S222Z39Y5VR63K7	2252 633 37228	19.0/0.75"	500	-	
3300	7.5	S322Z43Y5VR63K7	2252 633 37328	<b>Class 2 Z5U ± 20%</b>			
4700	7.5	S472Z47Y5VR63K7	2252 633 37428	470	7.5	S471M33Z5UR63K7	2252 643 37417
6800	7.5	S682Z59Y5VR63K7	2252 633 37628	680	7.5	S681M33Z5UR63K7	2252 643 37617
<b>Class 2 Z5U ± 20%</b>				1000	7.5	S102M33Z5UR63K7	2252 643 37027
470	7.5	S471M33Z5UR63K7	2252 643 37417	1500	7.5	S152M39Z5UR63K7	2252 643 37127
680	7.5	S681M33Z5UR63K7	2252 643 37617	2200	7.5	S222M43Z5UR63K7	2252 643 37227
1000	7.5	S102M33Z5UR63K7	2252 643 37027	3300	7.5	S332M53Z5UR63K7	2252 643 37327
1500	7.5	S152M39Z5UR63K7	2252 643 37127	4700	7.5	S472M69Z5UR83K7	2252 643 38427
2200	7.5	S222M43Z5UR63K7	2252 643 37227				
3300	7.5	S332M53Z5UR63K7	2252 643 37327				
4700	7.5	S472M69Z5UR83K7	2252 643 38427				

Kinked leads D <sub>max</sub> (mm/inches)	bulk	reel <sup>(4)</sup>	ammo <sup>(5)</sup>
5.0/0.20"	1000	2000	1 kV 2000
6.5/0.25"	1000	2000	
7.5/0.29"	1000	2000	
8.5/0.33"	1000	2000	2 kV 1500
10.0/0.39"	1000	2000	
11.0/0.43"	1000	2000	
12.0/0.47"	1000	2000	-
13.5/0.53"	500	-	
15.0/0.59"	500	-	
17.5/0.69"	500	-	-
19.0/0.75"	500	-	-



1) T = reel  
U = ammo  
3 = bulk

2) 13 = reel  
14 = ammo  
15 = bulk

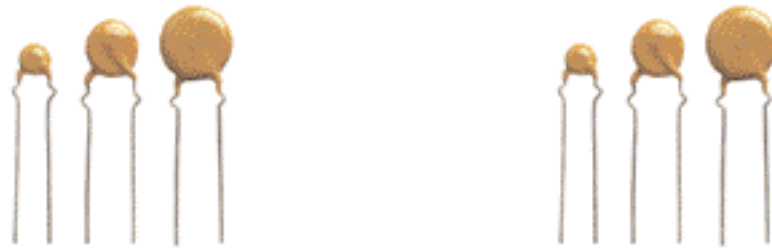
3) bulk

4) F = 7.5 qty = 1000

5) F = 7.5 qty = 1500

\* preferred E6 series ammpack



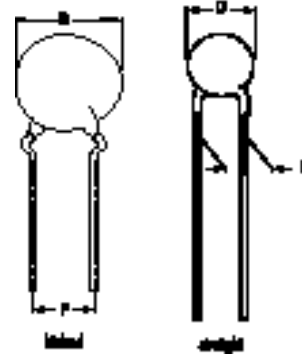


Low loss ( $\leq 0.5\%$ )					Low loss ( $\leq 0.2\%$ )				
$U_{RDC}$	500 V	1 kV	2 kV	3 kV	500 V	1 kV	2 kV	3 kV	
Dielectric	<b>Class 2 Y5P</b>				<b>Y5R / low dissipation series</b>				
Lead form	kinked				kinked				
Operating temp. range	-30 to +85 °C				-30 to +125 °C				
Tolerance	$\pm 10\%$				$\pm 10\%$				
Capacitance (pF)	100	5.0	6.5	6.5	8.5	5.0	6.5	6.5	8.5
	120	5.0	6.5	6.5	8.5	5.0	6.5	6.5	8.5
	150	5.0	6.5	6.5	8.5	5.0	6.5	6.5	8.5
	180	5.0	6.5	6.5	8.5	5.0	6.5	7.5	8.5
	220	5.0	6.5	6.5	8.5	5.0	6.5	7.5	8.5
	270	5.0	6.5	7.5	8.5	5.0	7.5	7.5	8.5
	330	5.0	6.5	7.5	8.5	5.0	7.5	7.5	8.5
	390	5.0	6.5	7.5	8.5	6.5	7.5	8.5	10.0
	470	6.5	6.5	7.5	8.5	6.5	7.5	8.5	10.0
	560	6.5	7.5	8.5	8.5	6.5	8.5	10.0	11.0
	680	6.5	7.5	8.5	10.0	6.5	8.5	10.0	11.0
	820	6.5	8.5	11.0	11.0	7.5	10.0	11.0	13.5
	1000	7.5	8.5	11.0	12.0	7.5	10.0	11.0	13.5
	1200	8.5	10.0	11.0	13.5	8.5	11.0	12.0	15.0
	1500	8.5	10.0	12.0	15.0	8.5	11.0	13.5	15.0
	1800	10.0	10.0	15.0	15.0	10.0	12.5	13.5	19.0
	2200	10.0	11.0	15.0	17.5	10.0	13.5	17.5	19.0
	2700	11.0	13.5	17.5	19.0	12.0	13.5	19.0	21.5
	3300	12.0	15.0	17.5		13.5	17.5	19.0	
	3900	13.5	15.0	19.0		13.5	17.5	24.5	
	4700	13.5	17.5	19.0		13.5	19.0	24.5	
Case dimensions	preferred <span style="background-color: #c8e6c9; padding: 2px;">        </span> in columns: diameter $D_{max}$ (mm)								
Max. thickness	3.5 mm	4.5 mm	5.0 mm	6.0 mm	3.5 mm	4.5 mm	5.0 mm	6.0 mm	
Dissipation factor	$\leq 0.5\%$ at $1.0 \pm 0.2 V_{RMS}$ , 1 kHz				$\leq 0.2\%$ at $1.0 \pm 0.2 V_{RMS}$ , 1 kHz				
Insulation resistance at 500 V (DC)	$\geq 10000 M\Omega$				$\geq 10\ 000 M\Omega$				
Climatic category	30/085/21				30/125/21				
Dielectric strength	200% of rated voltage				200% of rated voltage				
Reference specification	IEC 60 384-9, EIA 198				IEC 60 384-9, EIA 198				
Features	high reliability, low losses, high capacitance in small size				high reliability, low losses, high capacitance in small size				
Applications	SMPS, HF ballast, snubber and high voltage circuits				SMPS, HF ballast, snubber and high voltage circuits				



Low loss (0.5% max), kinked				Low loss (0.5% max), kinked				
C (pF)	F (mm)	clear text code*	catalogue number 12NC	C (pF)	F (mm)	clear text code*	catalogue number 12NC	
<b>U<sub>RDC</sub> = 500 V</b>				<b>U<sub>RDC</sub> = 3 kV</b>				
100	5.0	F101K25Y5PL6.J5	2252 708..016	100	7.5	F101K33Y5PR6.K7	2252 703..016	
120	5.0	F121K25Y5PL6.J5	2252 708..066	120	7.5	F121K33Y5PR6.K7	2252 703..066	
150	5.0	F151K25Y5PL6.J5	2252 708..116	150	7.5	F151K33Y5PR6.K7	2252 703..116	
180	5.0	F181K25Y5PL6.J5	2252 708..166	180	7.5	F181K33Y5PR6.K7	2252 703..166	
220	5.0	F221K25Y5PL6.J5	2252 708..216	220	7.5	F221K33Y5PR6.K7	2252 703..216	
270	5.0	F271K25Y5PL6.J5	2252 708..266	270	7.5	F271K33Y5PR6.K7	2252 703..266	
330	5.0	F331K25Y5PL6.J5	2252 708..316	330	7.5	F331K33Y5PR6.K7	2252 703..316	
390	5.0	F391K25Y5PL6.J5	2252 708..366	390	7.5	F391K33Y5PR6.K7	2252 703..366	
470	5.0	F471K25Y5PL6.J5	2252 708..416	470	7.5	F471K33Y5PR6.K7	2252 703..416	
560	5.0	F561K25Y5PL6.J5	2252 708..516	560	7.5	F561K33Y5PR6.K7	2252 703..516	
680	5.0	F681K25Y5PL6.J5	2252 708..616	680	7.5	F681K43Y5PR6.K7	2252 703..616	
820	5.0	F821K25Y5PL6.J5	2252 708..816	820	7.5	F821K43Y5PR6.K7	2252 703..816	
1000	5.0	F102K39Y5PL6.J5	2252 708..026	1000	7.5	F102K47Y5PR6.K7	2252 703..026	
1200	5.0	F122K33Y5PL6.J5	2252 708..076	1200	7.5	F122K53Y5PR6.K7	2252 703..076	
1500	5.0	F152K33Y5PL6.J5	2252 708..126	1500	7.5	F152K59Y5PR6.K7	2252 703..126	
1800	5.0	F182K39Y5PL6.J5	2252 708..176	1800	7.5	F182K59Y5PR6.K7	2252 703..176	
2200	5.0	F222K39Y5PL6.J5	2252 708..226	2200	7.5	F222K69Y5PR6.K7	2252 70337226 <sup>3)</sup>	
2700	5.0	F272K43Y5PL6.J5	2252 708..276	2700	10.0	F272K75Y5PR83K0	2252 70348276 <sup>3)</sup>	
3300	7.5	F332K47Y5PL63J7 <sup>3)</sup>	2252 70831326 <sup>3)</sup>	<b>Packaging quantities: high voltage low loss</b>				
3900	7.5	F392K53Y5PL63J7 <sup>3)</sup>	2252 70831376 <sup>3)</sup>	Kinked leads				
4700	7.5	F472K69Y5PN63K7 <sup>3)</sup>	2252 70137426 <sup>3)</sup>	D <sub>max</sub> (mm/inches)				
<b>U<sub>RDC</sub> = 1 kV</b>				bulk				
100	5.0	F101K25Y5PN6.K5	2252 701..016	reel				
120	5.0	F121K25Y5PN6.K5	2252 701..066	ammo				
150	5.0	F151K25Y5PN6.K5	2252 701..116	5.0 to 12.0	500 V	1000	2500	2000
180	5.0	F181K25Y5PN6.K5	2252 701..166	13.5	500 V	500	1000	1500
220	5.0	F221K25Y5PN6.K5	2252 701..216	6.5 to 12.0	1 kV	1000	2000	2000
270	5.0	F271K25Y5PN6.K5	2252 701..266	6.5 to 12.0	2 kV	1000	2000	1500
330	5.0	F331K25Y5PN6.K5	2252 701..316	13.5 to 24.5	1 kV, 2 kV	500	1000	1500
390	5.0	F391K25Y5PN6.K5	2252 701..366	8.5 to 11.0	3 kV	500	1000	1500
470	5.0	F471K25Y5PN6.K5	2252 701..416	13.5 to 21.0	3 kV	250	1000	1500
560	5.0	F561K29Y5PN6.K5	2252 701..516					
680	5.0	F681K29Y5PN6.K5	2252 701..616					
820	5.0	F821K33Y5PN6.K5	2252 701..816					
1000	5.0	F102K33Y5PN6.K5	2252 701..026					
1200	5.0	F122K39Y5PN6.K5	2252 701..076					
1500	5.0	F152K39Y5PN6.K5	2252 701..126					
1800	5.0	F182K39Y5PN6.K5	2252 701..176					
2200	5.0	F222K43Y5PN6.K5	2252 701..226					
2700	7.5	F272K53Y5PN6.K7	2252 701..276					
3300	7.5	F332K59Y5PN63K7	2252 70137326 <sup>3)</sup>					
3900	7.5	F392K59Y5PN63K7	2252 70137376 <sup>3)</sup>					
4700	10.0	F472K75Y5RN83K0	2252 71148426 <sup>3)</sup>					
<b>U<sub>RDC</sub> = 2 kV</b>								
100	5.0	F101K25Y5PP6.K5	2252 702..016					
120	5.0	F121K25Y5PP6.K5	2252 702..066					
150	5.0	F151K25Y5PP6.K5	2252 702..116					
180	5.0	F181K25Y5PP6.K5	2252 702..166					
220	5.0	F221K25Y5PP6.K5	2252 702..216					
270	5.0	F271K29Y5PP6.K5	2252 702..266					
330	5.0	F331K29Y5PP6.K5	2252 702..316					
390	5.0	F391K29Y5PP6.K5	2252 702..366					
470	5.0	F471K29Y5PP6.K5	2252 702..416					
560	5.0	F561K33Y5PP6.K5	2252 702..516					
680	5.0	F681K33Y5PP6.K5	2252 702..616					
820	5.0	F821K43Y5PP6.K5	2252 702..816					
1000	5.0	F102K43Y5PP6.K5	2252 702..026					
1200	5.0	F122K43Y5PP6.K5	2252 702..076					
1500	7.5	F152K47Y5PP63K7	2252 702..126					
1800	7.5	F182K59Y5PP63K7	2252 70248176 <sup>3)</sup>					
2200	7.5	F222K59Y5PP63K7	2252 70248226 <sup>3)</sup>					
2700	7.5	F272K69Y5PP63K7	2252 70248276 <sup>3)</sup>					
3300	7.5	F332K69Y5PP63K7	2252 70248326 <sup>3)</sup>					
3900	10.0	F392K75Y5PP83K0	2252 70248376 <sup>3)</sup>					
4700	10.0	F472K75Y5PP83K0	2252 70248426 <sup>3)</sup>					

D <sub>max</sub> (mm/inches)	bulk	reel	ammo
5.0 to 12.0	500 V	1000	2500
13.5	500 V	500	1000
6.5 to 12.0	1 kV	1000	2000
6.5 to 12.0	2 kV	1000	2000
13.5 to 24.5	1 kV, 2 kV	500	1000
8.5 to 11.0	3 kV	500	1000
13.5 to 21.0	3 kV	250	1000



1) T = reel  
U = ammo  
3 = bulk

2) 10 = reel  
12 = ammo  
08 = bulk

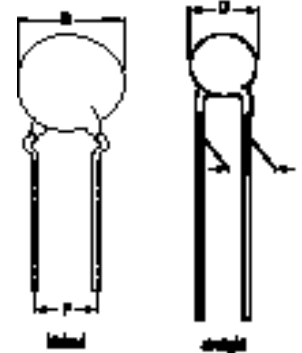
3) bulk

4) 35 = reel  
36 = ammo  
37 = bulk

\* preferred E6 series ammpack



Low loss (0.2% max), kinked				Low loss (0.2% max), kinked				
C (pF)	F (mm)	clear text code*	catalogue number 12NC	C (pF)	F (mm)	clear text code*	catalogue number 12NC	
<b>U<sub>RDC</sub> = 500 V</b>				<b>U<sub>RDC</sub> = 3 kV</b>				
100	5.0	F101K20Y5RL6.J5	2252 718 ..016	100	7.5	F101K33Y5RR6.K7	2252 713 ..016	
120	5.0	F121K20Y5RL6.J5	2252 718 ..066	120	7.5	F121K33Y5RR6.K7	2252 713 ..066	
150	5.0	F151K20Y5RL6.J5	2252 718 ..116	150	7.5	F151K33Y5RR6.K7	2252 713 ..116	
180	5.0	F181K20Y5RL6.J5	2252 718 ..166	180	7.5	F181K33Y5RR6.K7	2252 713 ..166	
220	5.0	F221K20Y5RL6.J5	2252 718 ..216	220	7.5	F221K33Y5RR6.K7	2252 713 ..216	
270	5.0	F271K20Y5RL6.J5	2252 718 ..266	270	7.5	F271K33Y5RR6.K7	2252 713 ..266	
330	5.0	F331K20Y5RL6.J5	2252 718 ..316	330	7.5	F331K33Y5RR6.K7	2252 713 ..316	
390	5.0	F391K25Y5RL6.J5	2252 718 ..366	390	7.5	F391K39Y5RR6.K7	2252 713 ..366	
470	5.0	F471K25Y5RL6.J5	2252 718 ..416	470	7.5	F471K39Y5RR6.K7	2252 713 ..416	
560	5.0	F561K25Y5RL6.J5	2252 718 ..516	560	7.5	F561K43Y5RR6.K7	2252 713 ..516	
680	5.0	F681K25Y5RL6.J5	2252 718 ..616	680	7.5	F681K43Y5RR6.K7	2252 713 ..616	
820	5.0	F821K29Y5RL6.J5	2252 718 ..816	820	7.5	F821K53Y5RR6K7	2252 713 ..816	
1000	5.0	F102K29Y5RL6.J5	2252 718 ..026	1000	7.5	F102K53Y5RR6K7	2252 713 ..026	
1200	5.0	F122K33Y5RL6.J5	2252 718 ..076	1200	7.5	F122K59Y5RR6K7	2252 713 ..076	
1500	5.0	F152K33Y5RL6.J5	2252 718 ..126	1500	7.5	F152K59Y5RR6K7	2252 713 ..126	
1800	5.0	F182K39Y5RL6.J5	2252 718 ..176	1800	10.0	F182K75Y5RR83K0 3)	2252 71348176 3)	
2200	5.0	F222K39Y5RL6.J5	2252 718 ..226	2200	10.0	F222K75Y5RR83K0 3)	2252 71348226 3)	
2700	7.5	F272K47Y5RL6J7 3)	2252 71831276 3)	2700	10.0	F272K84Y5RR83K0 3)	2252 71348276 3)	
3300	7.5	F332K53Y5RL6J7 3)	2252 71831326 3)	<b>Packaging quantities: high voltage low loss</b>				
3900	7.5	F392K53Y5RL6J7 3)	2252 71831376 3)	Kinked leads				
4700	7.5	F472K53Y5RL6J7 3)	2252 71831426 3)	D <sub>max</sub> (mm/inches)				
<b>U<sub>RDC</sub> = 1 kV</b>				bulk				
100	5.0	F101K25Y5RN6.K5	2252 711 ..016	reel				
120	5.0	F121K25Y5RN6.K5	2252 711 ..066	ammo				
150	5.0	F151K25Y5RN6.K5	2252 711 ..116	5.0 to 12.0	500 V	1000	2500	2000
180	5.0	F181K25Y5RN6.K5	2252 711 ..166	13.5	500 V	500	1000	1500
220	5.0	F221K25Y5RN6.K5	2252 711 ..216	6.5 to 12.0	1 kV	1000	2000	2000
270	5.0	F271K29Y5RN6.K5	2252 711 ..266	6.5 to 12.0	2 kV	1000	2000	1500
330	5.0	F331K29Y5RN6.K5	2252 711 ..316	13.5 to 24.5	1 kV, 2 kV	500	1000	1500
390	5.0	F391K29Y5RN6.K5	2252 711 ..366	8.5 to 11.0	3 kV	500	1000	1500
470	5.0	F471K29Y5RN6.K5	2252 711 ..416	13.5 to 21.0	3 kV	250	1000	1500
560	5.0	F561K33Y5RN6.K5	2252 711 ..516	Kinked leads				
680	5.0	F681K33Y5RN6.K5	2252 711 ..616	D <sub>max</sub> (mm/inches)				
820	5.0	F821K39Y5RN6.K5	2252 711 ..816	bulk				
1000	5.0	F102K39Y5RN6.K5	2252 711 ..026	reel				
1200	5.0	F122K43Y5RN6.K5	2252 711 ..076	ammo				
1500	5.0	F152K43Y5RN6.K5	2252 711 ..126	5.0 to 12.0	500 V	1000	2500	2000
1800	7.5	F182K47Y5RN6K7 3)	2252 71137176 3)	13.5	500 V	500	1000	1500
2200	7.5	F222K53Y5RN6K7 3)	2252 71137226 3)	6.5 to 12.0	1 kV	1000	2000	2000
2700	7.5	F272K53Y5RN6K7 3)	2252 71137276 3)	6.5 to 12.0	2 kV	1000	2000	1500
3300	7.5	F332K69Y5RN6K7 3)	2252 71137326 3)	13.5 to 24.5	1 kV, 2 kV	500	1000	1500
3900	7.5	F392K69Y5RN6K7 3)	2252 71137376 3)	8.5 to 11.0	3 kV	500	1000	1500
4700	10.0	F472K75Y5RN83K0 3)	2252 71148426 3)	13.5 to 21.0	3 kV	250	1000	1500
<b>U<sub>RDC</sub> = 2 kV</b>				Kinked leads				
100	5.0	F101K25Y5RP6.K5	2252 712 ..016	D <sub>max</sub> (mm/inches)				
120	5.0	F121K25Y5RP6.K5	2252 712 ..066	bulk				
150	5.0	F151K25Y5RP6.K5	2252 712 ..116	reel				
180	5.0	F181K29Y5RP6.K5	2252 712 ..166	ammo				
220	5.0	F221K29Y5RP6.K5	2252 712 ..216	5.0 to 12.0	500 V	1000	2500	2000
270	5.0	F271K29Y5RP6.K5	2252 712 ..266	13.5	500 V	500	1000	1500
330	5.0	F331K29Y5RP6.K5	2252 712 ..316	6.5 to 12.0	1 kV	1000	2000	2000
390	5.0	F391K33Y5RP6.K5	2252 712 ..366	6.5 to 12.0	2 kV	1000	2000	1500
470	5.0	F471K33Y5RP6.K5	2252 712 ..416	13.5 to 24.5	1 kV, 2 kV	500	1000	1500
560	5.0	F561K39Y5RP6.K5	2252 712 ..516	8.5 to 11.0	3 kV	500	1000	1500
680	5.0	F681K39Y5RP6.K5	2252 712 ..616	13.5 to 21.0	3 kV	250	1000	1500
820	5.0	F821K43Y5RP6.K5	2252 712 ..816	Kinked leads				
1000	5.0	F102K43Y5RP6.K5	2252 712 ..026	D <sub>max</sub> (mm/inches)				
1200	7.5	F122K47Y5RP6K7 3)	2252 71237076 3)	bulk				
1500	7.5	F152K53Y5RP6K7 3)	2252 71237126 3)	reel				
1800	7.5	F182K53Y5RP6K7 3)	2252 71237176 3)	ammo				
2200	7.5	F222K69Y5RP6K7 3)	2252 71237226 3)	5.0 to 12.0	500 V	1000	2500	2000
2700	10.0	F272K75Y5RP83K0 3)	2252 71248276 3)	13.5	500 V	500	1000	1500
3300	10.0	F332K75Y5RP83K0 3)	2252 71248326 3)	6.5 to 12.0	1 kV	1000	2000	2000
3900	10.0	F392K75Y5RP83K0 3)	2252 71848376 3)	6.5 to 12.0	2 kV	1000	2000	1500
4700	10.0	F472K96Y5RP83K0 3)	2252 71248426 3)	13.5 to 24.5	1 kV, 2 kV	500	1000	1500



1) T = reel  
U = ammo  
3 = bulk

2) 10 = reel  
12 = ammo  
08 = bulk

3) bulk

4) 35 = reel  
36 = ammo  
37 = bulk

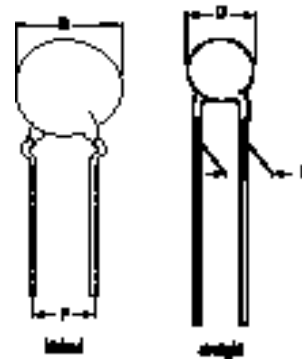
\* preferred E6 series ammopack



	Class X1 / Y2				Class X1 / Y2					Class X1/Y1	
Series	DS series				DN series					DP series	
	2252815				2252812	2252813				2252811	
Rated AC voltage	440 V/250 V				400 V/250 V					440 V/250 V	
Dielectric	U2M	Y5P	Y5U	Y5V	Y5P	Z5U	U2M	Y5U	Y5V	Y5U	Y5P
Lead form	kinked				kinked					kinked	
Operating temp. range	-30 °C to +125 °C				-30 °C to +125 °C; +10 °C to +125 °C					-30 °C to +125 °C	
Tolerance	±10%	±10%	±20%	+80% /-20%	±10%	±20%	±10%	±20%	+80% /-20%	±10%	±20%
Capacitance (pF)	10	6.5					6.5				
	15	6.5					6.5				
	22	6.5					6.5				
	33	6.5					6.5				
	47	7.5					7.5				
	68	8.5					8.5				
	100		6.5		7.5						8.5
	150		6.5		7.5						8.5
	220		7.5		7.5						8.5
	330		7.5		7.5						8.5
	470		7.5		7.5						8.5
	680		7.5		10.0					8.5	10.0
	1000			7.5	11.0	8.5		7.5		8.5	
	1500			7.5		10.0		8.5		10.0	
	2200			8.5	8.5	11.0		10.0	8.5	11.0	
	3300			10.0	10.0	13.5		12.0		13.5	
	3900					13.5		13.5		15.0	
	4700			12.0	11.0	15.0		13.5	12.0	16.0	
	6800					17.5					
	10000			15.0		21.5			16.0		
Case dimensions	preferred <span style="background-color: #d9ead3; padding: 2px;"> </span> in columns: diameter $D_{max}$ (mm)										
Max. thickness	4.5 mm				6.0 mm					6.0 mm	
Dissipation factor at 1 kHz; 1 V (RMS)	≤2.5%										
Insulation resistance at 500 V (DC)	≥10000 MΩ										
Climatic category	25/125/56 or 25/85/21				25/125/56 or 25/85/21					25/125/56 or 25/85/21	
Dielectric strength	1500 V (AC) for 60 s				2500 V (AC) for 60 s					4000 V (AC) for 60 s	
Approvals	ENEC, UL CSA				UL					ENEC UL CSA	
Features	high reliability, complying with EN 132 400, IEC 60 384-14 (2nd edition) X1: 400 V <sub>AC</sub> Y2: 250 V <sub>AC</sub>										
Applications	interference suppression across the line, line bypass, antenna coupling										



Safety, Class X1 / Y2, DS series				Safety, Class X1 / Y1, DP series							
C (µF)	F (mm)	clear text code*	catalogue number 12NC	C (µF)	F (mm)	clear text code*	catalogue number 12NC				
<b>U2M, kinked</b> ↓1) ↓2)				<b>Y5P, kinked</b> ↓1) ↓5)							
10	5.0	S100K25U2MY6.K5	2252 815 . . 006	100	10.0	S101K33Y5PQ6.V0	2252 811 . . 016				
15	5.0	S150K25U2MY6.K5	2252 815 . . 106	150	10.0	S151K33Y5PQ6.V0	2252 811 . . 116				
22	5.0	S220K25U2MY6.K5	2252 815 . . 206	220	10.0	S221K33Y5PQ6.V0	2252 811 . . 216				
33	5.0	S330K25U2MY6.K5	2252 815 . . 306	330	10.0	S331K33Y5PQ6.V0	2252 811 . . 316				
47	5.0	S470K29U2MY6.K5	2252 815 . . 406	470	10.0	S471K33Y5PQ6.V0	2252 811 . . 416				
68	5.0	S680K33U2MY6.K5	2252 815 . . 606	680	10.0	S681K39Y5PQ6.V0	2252 811 . . 616				
<b>Y5P, kinked</b> ↓1) ↓2)				<b>Y5U, kinked</b> ↓1) ↓5)							
100	5.0	S101K25Y5PY6.K5	2252 815 . . 016	680	10.0	S681M33Y5UQ6.V0	2252 811 . . 617				
150	5.0	S151K25Y5PY6.K5	2252 815 . . 116	1000	10.0	S102M33Y5UQ6.V0	2252 811 . . 027				
220	5.0	S221K29Y5PY6.K5	2252 815 . . 216	1500	10.0	S152M39Y5UQ6.V0	2252 811 . . 127				
330	5.0	S331K29Y5PY6.K5	2252 815 . . 316	2200	10.0	S222M43Y5UQ6.V0	2252 811 . . 227				
470	5.0	S471K29Y5PY6.K5	2252 815 . . 416	3300	10.0	S332M53Y5UQ6.V0	2252 811 . . 327				
680	5.0	S681K29Y5PY6.K5	2252 815 . . 616	3900	10.0	S392M59Y5UQ6.V0	2252 811 . . 377				
<b>Y5U, kinked</b> ↓1) ↓2)				<b>4700</b>				10.0	S472M63Y5UQ83V0	2252 811 73 427 <sup>3)</sup>	
1000	5.0	S102M29Y5UY6.K5	2252 815 . . 027	<b>Packaging quantities: Safety Capacitors</b>							
1500	5.0	S152M29Y5UY6.K5	2252 815 . . 127	Kinked leads D <sub>max</sub> (mm/inches)	bulk	reel	ammo				
2200	5.0	S222M33Y5UY6.K5	2252 815 . . 227								
3300	5.0	S332M39Y5UY6.K5	2252 815 . . 327								
4700	5.0	S472M47Y5UY6.K5	2252 815 . . 427								
<b>Y5V, kinked</b> ↓1) ↓2)								6.5/0.25"	1000	1000	1500
2200	5.0	S222Z33Y5VY6.K5	2252 815 . . 228					7.5/0.29"	1000	1000	1500
3300	5.0	S332Z39Y5VY6.K5	2252 815 . . 328					8.5/0.33"	1000	1000	1500
4700	5.0	S472Z43Y5VY6.K5	2252 815 . . 428					10.0/0.39"	1000	1000	1500
10000	7.5	S103Z59Y5VY6.K7	2252 815 . . 038 <sup>4)</sup>					11.0/0.43"	1000	1000	1500
<b>Safety, Class X1 / Y2, DN series</b>								12.0/0.47"	1000	1000	1500
C (µF)	F (mm)	clear text code*	catalogue number 12NC					13.5/0.53"	500	1000	1500
<b>U2M, kinked</b> ↓1) ↓4)								15.0/0.59"	500	500	750
10	5.0	S100K25U2MS6.K7	2252 813 . . 006					17.5/0.69"	500	500	750
15	5.0	S150K25U2MS6.K7	2252 813 . . 106	19.0/0.75"	500	500	750				
22	5.0	S220K25U2MS6.K7	2252 813 . . 206	21.5/0.85"	500	500	750				
33	5.0	S330K25U2MS6.K7	2252 813 . . 306								
47	5.0	S470K29U2MS6.K7	2252 813 . . 406								
68	5.0	S680K33U2MS6.K7	2252 813 . . 606								
<b>Y5P, kinked</b> ↓1) ↓4)											
100	7.5	S101K29Y5PS6 .K7	2252 812 . . 016								
150	7.5	S151K29Y5PS6 .K7	2252 812 . . 116								
220	7.5	S221K29Y5PS6 .K7	2252 812 . . 216								
330	7.5	S331K29Y5PS6 .K7	2252 812 . . 316								
470	7.5	S471K29Y5PS6 .K7	2252 812 . . 416								
680	7.5	S681K33Y5PS6 .K7	2252 812 . . 616								
1000	7.5	S102K43Y5PS6 .K7	2252 812 . . 026								
<b>Z5U, kinked</b> ↓1) ↓4)											
1000	7.5	S102M33Z5US6 .K7	2252 812 . . 027								
1500	7.5	S152M39Z5US6 .K7	2252 812 . . 127								
2200	7.5	S222M43Z5US6 .K7	2252 812 . . 227								
3300	7.5	S332M53Z5US6 .K7	2252 812 . . 327								
3900	7.5	S392M53Z5US6 .K7	2252 812 . . 377								
4700	7.5	S472M59Z5US63K7 <sup>3)</sup>	2252 812 37 427 <sup>3)</sup>								
6800	10.0	S682M69Z5US83K0 <sup>3)</sup>	2252 812 48 627 <sup>3)</sup>								
10000	10.0	S103M84Z5US83K0 <sup>3)</sup>	2252 812 48 037 <sup>3)</sup>								
<b>Y5U, kinked</b> ↓1) ↓4)											
1000	7.5	S102M29Y5US6.K7	2252 813 . . 027								
1500	7.5	S152M33Y5US6.K7	2252 813 . . 127								
2200	7.5	S222M39Y5US6.K7	2252 813 . . 227								
3300	7.5	S332M47Y5US6.K7	2252 813 . . 327								
3900	7.5	S392M53Y5US6.K7	2252 813 . . 377								
4700	7.5	S472M53Y5US6.K7	2252 813 . . 427								
<b>Y5V, kinked</b> ↓1) ↓4)											
2200	7.5	S222Z33Y5VS6.K7	2252 813 . . 228								
4700	7.5	S472Z47Y5VS6.K7	2252 813 . . 428								
10000	7.5	S103Z63Y5VS83K7 <sup>3)</sup>	2252 813 38 038 <sup>3)</sup>								



1) T = reel | 2) 06 = reel | 3) bulk | 4) 35 = reel | 5) 70 = reel  
 U = ammo | 08 = ammo | | 36 = ammo | 71 = ammo  
 3 = bulk | 10 = bulk | | 37 = bulk | 72 = bulk

\* preferred E6 series ammopack



• **Clear text code** [preferred]

**D471K20Y5PL63J5** [example]



**Product type**

D = general type ceramic disc capacitor with Phenolic resin coated

S = safety recognised  
Cap-Kap or general type, heavy duty disc capacitor with Epoxy resin coated

U = semiconductor type ceramic disc capacitor

F = low dissipation type ceramic disc capacitor

**Lead Spacing**

2 = 2.5 (.100 Ref)

5 = 5.0 (.200 Ref)

6 = 6.4 (.250 Ref)

7 = 7.5 (.300 Ref)

0 = 10.0 (.375 Ref)

**Lead Style**

J = inside kink leads

K = outside kink leads

L = straight leads

**Capacitance code in pF**

The first two digits are the significant of capacitance.

The third digit signifies the multiplier.

**Multiplier**

0 x 1

1 x 10

2 x 100

3 x 1000

4 x 10 000

8 x 0.01

9 x 0.1

**Lead Length / Packing Method**

3 = 30 ± 5.0 (1.18 ± .197)

bulk package

5\* = 5.0 ± 0.8 (.179 ± .031)

bulk package

T = tape & Reel

U = ammo pack

\* Please consult factory for non-standard lead length

**Lead diameter**

5 = 0.5 ± 0.05 (.020 Ref)

6 = 0.6 ± 0.05 (.024 Ref)

8 = 0.8 ± 0.05 (.031 Ref)

**Working (rating) Voltage**

C = 16 V<sub>DC</sub>

E = 25 V<sub>DC</sub>

F = 50 V<sub>DC</sub>

L = 500 V<sub>DC</sub>

N = 1 kV<sub>DC</sub>

P = 2 kV<sub>DC</sub>

R = 3 kV<sub>DC</sub>

U = 6 kV<sub>DC</sub>

Y = X1/Y2 250 V<sub>AC</sub> ( type DS )

S = X1/Y2 250 V<sub>AC</sub> ( type DN )

Q = X1/Y1 250 V<sub>AC</sub> (type DP)

**Capacitance Tolerance**

C = ±0.25 pF

D = ±0.5 pF

G = ±2%

J = ±5%

K = ±10%

M = ±20%

Z = + 80%, -20%

**Temperature char.**

Please see datahandbook BC06

Size Code	
	Please see individual capacitance range chart

• **12-digit code** [12 NC]



**Product group code**

**Product families code**  
(see table 1)

**Working (rating) voltage**  
(see table 2)

**Capacitance on tolerance**  
(see table 3)

**Capacitance**  
(see table 4)

**Lead style & packaging**  
(see table 5)



Table 1		Table 2				Table 3	
Product families code		Working voltage code				Capacitance tolerance	
						Phenolic resin coated	
Code No.	Product Families	Code No.	General and low dissipation type	Semiconductor type	Safety recognised	Code No.	Capacitance tolerance
50	NPO	0		12 V <sub>DC</sub>		0	N/A
51	N150	1	1 kV <sub>DC</sub>	16 V <sub>DC</sub>	X1/Y1 250 V <sub>AC</sub> (DP type)	1	±10%
55	N750					2	±20%
56	SLO	2	2 kV <sub>DC</sub>	25 V <sub>DC</sub>	X1/Y2 250 V <sub>AC</sub> (DN type)	3	+80%, -20%
57	S3N					4 1)	±25 pF, for C < 10 pF ±2% for ≥10 pF
58	N1500	3	3 kV <sub>DC</sub>		X1/Y2 250 V <sub>AC</sub> (DN type)	5	±5%, for ≥10 pF ±0.5 pF, for C < 10 pF
59	P100						
60	X7R	4	6 kV <sub>DC</sub>			1) Only for NPO, N150, N750 and N1500	
61	Y5P						
63	Y5V	5	50 V <sub>DC</sub>	50 V <sub>DC</sub>	X1/Y2 250 V <sub>AC</sub> (DS type)	Epoxy resin coated	
64	Z5V						
65	Z5V	6	100 V <sub>DC</sub>			Code No.	Capacitance tolerance
70	Y5P	7	250 V <sub>DC</sub>			6	±10%
71	Y5R	8	500 V <sub>DC</sub>			7	±20%
76	Y5P	9	non-codable			8	+80%, -20%
77	Y5R					9	±5%, for ≥10 pF ±0.5 pF, for C < 10 pF
78	Y5U						
79	Y5V						
81							
88							
89							

Table 4											
Capacitance code											
Code No.	Capacitance (pF)	Code No.	Capacitance (pF)	Code No.	Capacitance (pF)	Code No.	Capacitance (pF)	Code No.	Capacitance (pF)	Code No.	Capacitance (pF)
0	10	10	15	20	22	30	33	40	47	60	68
1	100	11	150	21	220	31	330	41	470	61	680
2	1	12	1500	22	2200	32	3300	42	4700	62	6800
3	10	13	15000	23	22000	33	33000	43	47000	63	68000
4	1.0	14	1.5	24	2.2	34	3.3	44	4.7	64	6.8
5	12	15	18	25	27	35	39	50	56	80	82
6	120	16	180	26	270	36	390	51	560	81	820
7	1.2	17	1800	27	2700	37	3900	52	5600	82	8200
8	12	18	18000	28	27000	38	39000	53	56000	83	82000
9	1.2	19	1.8	29	2.7	39	3.9	54	5.6	84	8.2

Table 5											
Lead style & packaging code											
Lead Spacing  mm (inch-Ref.)	Packaging and Lead Length		T&R	AMMO	Bulk-Long Lead (L=30± 5.0 mm)			Bulk-Long Lead (L=5.0± 0.5 mm)			
	Lead Dia. (mm)	Lead Style	0.6	0.6	0.5	0.6	0.8	0.5	0.6	0.8	
			Code Number								
2.5	Outward Kink (K)		00	01			02			03	
(.100)	Straight Lead (L)				04						
5.0	Inward Kink (J)		06	08	09	10		11		12	
(.200)	Outward Kink (K)		13	14		15				16	
	Straight Lead (L)				17	18					
6.4	Inward Kink (J)		19	20		21				22	
(.250)	Outward Kink (K)		23	24		25				26	
	Straight Lead (L)					27					
7.5	Inward Kink (J)		29	30		31	32			33	
(.300)	Outward Kink (K)		35	36		37	38			39	
	Straight Lead (L)					41	42				
10.0	Inward Kink (J)					43	44			45	
(.375)	Outward Kink (K)					47	48			49	
	Straight Lead (L)					51	52			50	
	Vertical kink (V)		70	71		72	73			74	



- **Designer's** sample boxes

A wide selection of designer's sample boxes is available for quick design-in.

To order this and other support material, please contact your nearest BCcomponents sales office or one of our franchised distributors.

Type	Designer's sample boxes	
	Description	Ordering code
Ceramic disc capacitor	50 V	2252 898 90001
	500 V	2252 898 90002
	1 kV	2252 898 90003
	2 kV	2252 898 90004
	3 kV	2252 898 90005
	6 kV	2252 898 90006
	Low DF 0.2% 1 kV	2252 898 90008
	Low DF 0.2% 2 kV	2252 898 90009
	Low DF 0.2% 1-2 kV	2252 898 90018
Safety disc capacitor	Safety Y1/Y2 (DP/DN)	2252 898 90019
	Safety Y2 (DN) series 812	2500 V <sub>AC</sub> 2252 898 90007
Mono-kap	COG	2252 398 90001
	X7R	2252 398 90002
	Z5U & Y5V	2252 398 90003
Mono-axial	COG	2252 298 90001
	X7R	2252 298 90002
	Z5U & Y5V	2252 298 90003





Rated DC voltage $U_R$	100 V					500 V					1000 V <sup>3)</sup>
Temp. coefficient TC(10 <sup>-6</sup> /K)	P100	NP0	N150	N750	N1500	P100	NP0	N150	N750	N1500	SL
	+100	0	-150	-750	-1500	+100	0	-150	-750	-1500	+150/ -1500
Operating temp. range	-55°C to +85°C for N150 and N750, -55°C to +125°C for P100, NP0 and N1500										-55°C to +150°C
Tolerance	for all TC values C < 10 pF: ±0.25 pF C ≥ 10 pF: ±2% for NP0 precision C < 10 pF: ±0.1 pF C ≥ 10 pF: ±1%										5%
Capacitance (pF)	0.47										I
	0.56										I
	0.68										I
	0.82										I
	1.0										I
	1.2										I
	1.5										I
	1.8										I
	2.2										I
	2.7										I
	3.3										I
	3.9										I
	4.7										I
	5.6										I
	6.8										I
	8.2										I
	10										I
	12										I
	15										I
	18										I
	22										I
	27										I
	33										I
	39										I
	47										I
	56										I
	68										I
	82										I
	100										I
	120										I
	150										I
	180										I
	220										I
	270										I
	330										I
	390										I
	470										I
	560										I
	680										I
Dissipation factor	≤50 pF	preferred									
	>50 pF	≤15 (15/C + 0.7) <sup>5</sup> 10 <sup>-4</sup> ; max. 55 <sup>5</sup> 10 <sup>-4</sup>									
Insulation resistance	≥10 <sup>10</sup> W										
Climatic category (IEC 68)	55/085/21 for N150 and N750, 55/125/56 for P100, NP0 and N1500										55/150/56
Proof voltage	for $U_R = 100$ V: 300 V $U_R = 500$ V: 1250 V $U_R = 1000$ V: 2000 V										
Reference specification	IEC 60 384-8										
Features	linear change of capacitance with temperature, copper leads, high stability, space saving										high reliability, high temp circuits
Applications	tuning, filtering, temperature compensation, coupling										
Notes	all types have thickness classification of ≤2.3 mm except for: note <sup>1)</sup> ≤2.5 mm note <sup>2)</sup> ≤2.7 mm note <sup>3)</sup> ≤3.0 mm										
	for ordering information see pages 51 and 52										



Rated DC voltage $U_R$	63 V	100 V		500 V	1000 V		
Dielectric material	K 14 000	K 2000	K 5000	K 2000	K 2000 <sup>3)</sup>	K 5000 <sup>3)</sup>	
	<b>Z5V</b>	<b>Y5P <sup>4)</sup></b>	<b>X5U</b>	<b>Y5P <sup>4)</sup></b>	<b>Y5P <sup>4)</sup></b>	<b>X5U</b>	
Operating temp. range	-10 °C to +85 °C	-55 °C to +125 °C	-55 °C to +105 °C	-55 °C to +150 °C	-55 °C to +150 °C	-55 °C to +105 °C	
Tolerance	±80/-20%	±10%	±50/-20%	±10%	±10%	±20%	
Capacitance (pF)	100			I <sup>2)</sup>	I		
	120			I <sup>1)</sup>	I		
	150			I	I		
	180		I <sup>1)</sup>	I	IIA		
	220		I	I	IIA		
	270		I	I	IIA	I	
	330		I	I	IIB	I	
	390		I	IIA	IIB	IIA	
	470		I	IIA	IIB	IIA	
	560		I	IIA	III	IIA	
	680		I	IIB	III	IIB	
	820		I	IIB	IV	IIB	
	1000	I	I	I	IIB	IV	III
	1200		IIA		III	IV	III
	1500		IIA	I	III	V	III
	1800		IIB		III	V	IV
	2200	I	IIB	I	IV	V	IV
	2700		III		IV		V
	3300		III	IIA	V		V
	3900		IV		V		
	4700	I	IV	IIB	V		
	5600		V				
	6800		V	III			
	8200						
	10000	IIB		IV			
	12000						
	15000			V			
	18000						
	22000	IV					
	27000						
	33000						
	39000						
	47000	V					
	preferred						
Dissipation factor	$\leq 35 \times 10^{-3}$	$\leq 35 \times 10^{-3}$	$\leq 35 \times 10^{-3}$	$\leq 35 \times 10^{-3}$	$\leq 35 \times 10^{-3}$	$\leq 10 \times 10^{-3}$	
Insulation resistance	$\geq 4000 \text{ M}\Omega$	$\geq 4000 \text{ M}\Omega$	$\geq 4000 \text{ M}\Omega$	$\geq 4000 \text{ M}\Omega$	$\geq 6000 \text{ M}\Omega$	$\geq 6000 \text{ M}\Omega$	
Climatic category (IEC 68)	10/085/21	55/125/56	55/105/21	55/150/56	55/150/56	55/105/56	
Proof voltage	200 V	300 V	300 V	1250 V	2000 V	2000 V	
Features	non-linear change of capacitance with temperature, voltage and frequency, copper leads, space saving			high reliability, high temperature circuits			
Reference specification	IEC 60 384-9						
Applications	coupling, filtering						
Notes	all types have thickness classification of $\leq 2.3 \text{ mm}$ except for: note <sup>1)</sup> : $\leq 2.5 \text{ mm}$ note <sup>2)</sup> : $\leq 2.7 \text{ mm}$ note <sup>3)</sup> : $\leq 3.0 \text{ mm}$ note <sup>4)</sup> : meet also X55 and X7T specifications						



Capacitance range <b>P100</b> (M7G)					Capacitance range <b>P150</b> (P2G)				
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
<b>U<sub>RDC</sub> = 100 V</b>					<b>U<sub>RDC</sub> = 100 V</b>				
0.47	±0.25 pF	I <sup>(2)</sup>	R478C13M7GH .. AP	2222 ... 03477	3.3	±0.25 pF	I <sup>(1)</sup>	R339C13P2GH .. AP	2222 ... 33338
0.56	±0.25 pF	I <sup>(2)</sup>	R568C13M7GH .. AP	2222 ... 03567	3.9	±0.25 pF	I	R399C13P2GH .. AP	2222 ... 33398
0.68	±0.25 pF	I <sup>(2)</sup>	R688C13M7GH .. AP	2222 ... 03687	4.7	±0.25 pF	I	R479C13P2GH .. AP	2222 ... 33478
0.82	±0.25 pF	I <sup>(2)</sup>	R828C13M7GH .. AP	2222 ... 03827	5.6	±0.25 pF	I	R569C13P2GH .. AP	2222 ... 33568
1.0	±0.25 pF	I <sup>(1)</sup>	R109C13M7GH .. AP	2222 ... 03108	6.8	±0.25 pF	I	R689C13P2GH .. AP	2222 ... 33688
1.2	±0.25 pF	I	R129C13M7GH .. AP	2222 ... 03128	8.2	±0.25 pF	I	R829C13P2GH .. AP	2222 ... 33828
1.5	±0.25 pF	I	R159C13M7GH .. AP	2222 ... 03158	10	±2%	I	R100G13P2GH .. AP	2222 ... 34109
1.8	±0.25 pF	I	R189C13M7GH .. AP	2222 ... 03188	12	±2%	I	R120G13P2GH .. AP	2222 ... 34129
2.2	±0.25 pF	I	R229C13M7GH .. AP	2222 ... 03228	15	±2%	I	R150G13P2GH .. AP	2222 ... 34159
2.7	±0.25 pF	I	R279C13M7GH .. AP	2222 ... 03278	18	±2%	I	R180G13P2GH .. AP	2222 ... 34189
3.3	±0.25 pF	I	R339C13M7GH .. AP	2222 ... 03338	22	±2%	I	R220G13P2GH .. AP	2222 ... 34229
3.9	±0.25 pF	I	R399C13M7GH .. AP	2222 ... 03398	27	±2%	I	R270G13P2GH .. AP	2222 ... 34279
4.7	±0.25 pF	I	R479C13M7GH .. AP	2222 ... 03478	33	±2%	I	R330G13P2GH .. AP	2222 ... 34339
5.6	±0.25 pF	I	R569C13M7GH .. AP	2222 ... 03568	39	±2%	IIA	R390G13P2GH .. AP	2222 ... 34399
6.8	±0.25 pF	I	R689C13M7GH .. AP	2222 ... 03688	47	±2%	IIA	R470G13P2GH .. AP	2222 ... 34479
8.2	±0.25 pF	IIA	R829G13M7GH .. AP	2222 ... 03828	56	±2%	IIB	R560G23P2GH .. AP	2222 ... 34569
10	±2%	IIA	R100G13M7GH .. AP	2222 ... 04109	68	±2%	IIB	R680G23P2GH .. AP	2222 ... 34689
12	±2%	IIB	R120G23M7GH .. AP	2222 ... 04129	82	±2%	III	R820G33P2GH .. AP	2222 ... 34829
15	±2%	IIB	R150G23M7GH .. AP	2222 ... 04159	100	±2%	III	R101G33P2GH .. AP	2222 ... 34101
18	±2%	III	R180G33M7GH .. AP	2222 ... 04189	120	±2%	IV	R121G43P2GH .. AP	2222 ... 34121
22	±2%	III	R220G33M7GH .. AP	2222 ... 04229	150	±2%	IV	R151G43P2GH .. AP	2222 ... 34151
27	±2%	IV	R270G43M7GH .. AP	2222 ... 04279	180	±2%	IV	R181G43P2GH .. AP	2222 ... 34181
33	±2%	IV	R330G43M7GH .. AP	2222 ... 04339	220	±2%	V	R221G53P2GH .. AP	2222 ... 34221
39	±2%	V	R390G53M7GH .. AP	2222 ... 04399	270	±2%	VI	R271G63P2GH .. AP	2222 ... 34271
47	±2%	V	R470G53M7GH .. AP	2222 ... 04479	330	±2%	VI	R331G63P2GH .. AP	2222 ... 34331

Capacitance range <b>NPO</b> (C0G)					Capacitance range <b>N750</b> (UJ2)				
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
<b>U<sub>RDC</sub> = 100 V</b>					<b>U<sub>RDC</sub> = 100 V</b>				
1.5	±0.25 pF	I <sup>(1)</sup>	R159C13C0GH .. AP	2222 ... 09158	3.3	±0.25 pF	I <sup>(1)</sup>	R339C13U2JH .. AP	2222 ... 57338
1.8	±0.25 pF	I <sup>(1)</sup>	R189C13C0GH .. AP	2222 ... 09188	3.9	±0.25 pF	I <sup>(1)</sup>	R399C13U2JH .. AP	2222 ... 57398
2.2	±0.25 pF	I	R229C13C0GH .. AP	2222 ... 09228	4.7	±0.25 pF	I	R479C13U2JH .. AP	2222 ... 57478
2.7	±0.25 pF	I	R279C13C0GH .. AP	2222 ... 09278	5.6	±0.25 pF	I	R569C13U2JH .. AP	2222 ... 57568
3.3	±0.25 pF	I	R339C13C0GH .. AP	2222 ... 09338	6.8	±0.25 pF	I	R689C13U2JH .. AP	2222 ... 57688
3.9	±0.25 pF	I	R399C13C0GH .. AP	2222 ... 09398	8.2	±0.25 pF	I	R829C13U2JH .. AP	2222 ... 57828
4.7	±0.25 pF	I	R479C13C0GH .. AP	2222 ... 09478	10	±2%	I	R100G13U2JH .. AP	2222 ... 58109
5.6	±0.25 pF	I	R569C13C0GH .. AP	2222 ... 09568	12	±2%	I	R120G13U2JH .. AP	2222 ... 58129
6.8	±0.25 pF	I	R689C13C0GH .. AP	2222 ... 09688	15	±2%	I	R150G13U2JH .. AP	2222 ... 58159
8.2	±0.25 pF	I	R829C13C0GH .. AP	2222 ... 09828	18	±2%	I	R180G13U2JH .. AP	2222 ... 58189
10	±2%	I	R100G13C0GH .. AP	2222 ... 10109	22	±2%	I	R220G13U2JH .. AP	2222 ... 58229
12	±2%	I	R120G13C0GH .. AP	2222 ... 10129	27	±2%	I	R270G13U2JH .. AP	2222 ... 58279
15	±2%	I	R150G13C0GH .. AP	2222 ... 10159	33	±2%	I	R330G13U2JH .. AP	2222 ... 58579
18	±2%	I	R180G13C0GH .. AP	2222 ... 10189	39	±2%	I	R390G13U2JH .. AP	2222 ... 58399
22	±2%	I	R220G13C0GH .. AP	2222 ... 10229	47	±2%	I	R470G13U2JH .. AP	2222 ... 58479
27	±2%	I	R270G13C0GH .. AP	2222 ... 10279	56	±2%	IIA	R560G13U2JH .. AP	2222 ... 58569
33	±2%	I	R330G13C0GH .. AP	2222 ... 10339	68	±2%	IIA	R680G13U2JH .. AP	2222 ... 58689
39	±2%	IIA	R390G13C0GH .. AP	2222 ... 10399	82	±2%	IIB	R820G23U2JH .. AP	2222 ... 58829
47	±2%	IIA	R470G13C0GH .. AP	2222 ... 10479	100	±2%	IIB	R101G33U2JH .. AP	2222 ... 58101
56	±2%	IIA	R560G13C0GH .. AP	2222 ... 10569	120	±2%	III	R121G33U2JH .. AP	2222 ... 58121
68	±2%	IIB	R680G23C0GH .. AP	2222 ... 10689	150	±2%	III	R151G33U2JH .. AP	2222 ... 58151
82	±2%	IIB	R820G23C0GH .. AP	2222 ... 10829	180	±2%	IV	R181G43U2JH .. AP	2222 ... 58181
100	±2%	III	R101G33C0GH .. AP	2222 ... 10101	220	±2%	IV	R221G43U2JH .. AP	2222 ... 58221
120	±2%	III	R121G33C0GH .. AP	2222 ... 10121	270	±2%	V	R271G53U2JH .. AP	2222 ... 58271
150	±2%	IV	R151G43C0GH .. AP	2222 ... 10151	330	±2%	V	R331G53U2JH .. AP	2222 ... 58331
180	±2%	IV	R181G43C0GH .. AP	2222 ... 10181	390	±2%	V	R391G53U2JH .. AP	2222 ... 58391
220	±2%	V	R221G53C0GH .. AP	2222 ... 10221					
270	±2%	VI	R271G63C0GH .. AP	2222 ... 10271					
330	±2%	VI	R331G63C0GH .. AP	2222 ... 10331					

1. Other capacitance values and tolerances are available on request  
 2. 5th - 6th - 7th digit of the catalogue number to be completed with the packaging code

Table 1

all types have thickness classification of ≤2.3 mm except for:  
 note 1) ≤2.5 mm  
 note 2) ≤2.7 mm  
 note 3) ≤3.0 mm

1) WF = bulk  
 WG = reel  
 WJ = ammo

2) 681 = bulk  
 679 = reel  
 689 = ammo



Capacitance range <b>N1500</b> (P3K)					Capacitance range <b>NPO</b> (COG)				
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
<b>U<sub>RD</sub> = 100 V</b>					<b>U<sub>RD</sub> = 500 V</b>				
15	±2%	I <sup>(1)</sup>	R150G13P3KH .. AP	2222 ... 70159	0.82	±0.25 pF	I <sup>(2)</sup>	R828C13COGL...AP	2222 ... 09827
18	±2%	I <sup>(1)</sup>	R180G13P3KH .. AP	2222 ... 70189	1.0	±0.25 pF	I <sup>(1)</sup>	R109C13COGL...AP	2222 ... 09108
22	±2%	I	R220G13P3KH .. AP	2222 ... 70229	1.2	±0.25 pF	I <sup>(1)</sup>	R129C13COGL...AP	2222 ... 09128
27	±2%	I	R270G13P3KH .. AP	2222 ... 70279	1.5	±0.25 pF	I	R159C13COGL...AP	2222 ... 09158
33	±2%	I	R330G13P3KH .. AP	2222 ... 70579	1.8	±0.25 pF	I	R189C13COGL...AP	2222 ... 09188
39	±2%	I	R390G13P3KH .. AP	2222 ... 70399	2.2	±0.25 pF	I	R229C13COGL...AP	2222 ... 09228
47	±2%	I	R470G13P3KH .. AP	2222 ... 70479	2.7	±0.25 pF	I	R279C13COGL...AP	2222 ... 09278
56	±2%	I	R560G13P3KH .. AP	2222 ... 70569	3.3	±0.25 pF	I	R339C13COGL...AP	2222 ... 09338
68	±2%	I	R680G13P3KH .. AP	2222 ... 70689	3.9	±0.25 pF	I	R399C13COGL...AP	2222 ... 09398
82	±2%	I	R820G13P3KH .. AP	2222 ... 70829	4.7	±0.25 pF	I	R479C13COGL...AP	2222 ... 09478
100	±2%	IIA	R101G13P3KH .. AP	2222 ... 70101	5.6	±0.25 pF	I	R569C13COGL...AP	2222 ... 09568
120	±2%	IIA	R121G13P3KH .. AP	2222 ... 70121	6.8	±0.25 pF	I	R689C13COGL...AP	2222 ... 09688
150	±2%	IIB	R151G23P3KH .. AP	2222 ... 70151	8.2	±0.25 pF	I	R829C13COGL...AP	2222 ... 09828
180	±2%	IIB	R181G23P3KH .. AP	2222 ... 70181	10	±2%	I	R100G13COGL...AP	2222 ... 10109
220	±2%	III	R221G33P3KH .. AP	2222 ... 70221	12	±2%	I	R120G13COGL...AP	2222 ... 10129
270	±2%	III	R271G43P3KH .. AP	2222 ... 70271	15	±2%	IIA	R150G13COGL...AP	2222 ... 10159
330	±2%	IV	R331G43P3KH .. AP	2222 ... 70331	18	±2%	IIA	R180G13COGL...AP	2222 ... 10189
390	±2%	IV	R391G43P3KH .. AP	2222 ... 70391	22	±2%	IIA	R220G13COGL...AP	2222 ... 10229
470	±2%	V	R471G53P3KH .. AP	2222 ... 70471	27	±2%	IIB	R270G23COGL...AP	2222 ... 10279
560	±2%	V	R561G53P3KH .. AP	2222 ... 70561	33	±2%	IIB	R330G23COGL...AP	2222 ... 10339
680	±2%	VI	R681G63P3KH .. AP	2222 ... 70681	39	±2%	IIB	R390G23COGL...AP	2222 ... 10399
<b>Capacitance range <b>P100</b> (M7G)</b>					47	±2%	III	R470G33COGL...AP	2222 ... 10479
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	56	±2%	III	R560G33COGL...AP	2222 ... 10569
<b>U<sub>RD</sub> = 500 V</b>					68	±2%	IV	R680G43COGL...AP	2222 ... 10689
0.47	±0.25 pF	I <sup>(1)</sup>	R478C13M7GL .. AP	2222 ... 03477	82	±2%	IV	R820G43COGL...AP	2222 ... 10829
0.56	±0.25 pF	I <sup>(1)</sup>	R568C13M7GL .. AP	2222 ... 03567	100	±2%	IV	R101G43COGL...AP	2222 ... 10101
0.68	±0.25 pF	I <sup>(1)</sup>	R688C13M7GL .. AP	2222 ... 03687	120	±2%	V	R121G53COGL...AP	2222 ... 10121
0.82	±0.25 pF	I	R828C13M7GL .. AP	2222 ... 03827	150	±2%	V	R151G53COGL...AP	2222 ... 10151
1.0	±0.25 pF	I	R109C13M7GL .. AP	2222 ... 03108	<b>Capacitance range <b>N150</b> (P2G)</b>				
1.2	±0.25 pF	I	R129C13M7GL .. AP	2222 ... 03128	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
1.5	±0.25 pF	I <sup>(1)</sup>	R159C13M7GL .. AP	2222 ... 03158	<b>U<sub>RD</sub> = 500 V</b>				
1.8	±0.25 pF	I	R189C13M7GL .. AP	2222 ... 03188	2.2	±0.25 pF	I <sup>(1)</sup>	R229C13P2GL .. AP	2222 ... 33228
2.2	±0.25 pF	I	R229C13M7GL .. AP	2222 ... 03228	2.7	±0.25 pF	I <sup>(1)</sup>	R279C13P2GL .. AP	2222 ... 33278
2.7	±0.25 pF	I	R279C13M7GL .. AP	2222 ... 03278	3.3	±0.25 pF	I	R339C13P2GL .. AP	2222 ... 33338
3.3	±0.25 pF	I	R339C13M7GL .. AP	2222 ... 03338	3.9	±0.25 pF	I	R399C13P2GL .. AP	2222 ... 33398
3.9	±0.25 pF	I	R399C13M7GL .. AP	2222 ... 03398	4.7	±0.25 pF	I	R479C13P2GL .. AP	2222 ... 33478
4.7	±0.25 pF	IIA	R479C13M7GL .. AP	2222 ... 03478	5.6	±0.25 pF	I	R569C13P2GL .. AP	2222 ... 33568
5.6	±0.25 pF	IIA	R569C13M7GL .. AP	2222 ... 03568	6.8	±0.25 pF	I	R689C13P2GL .. AP	2222 ... 33688
6.8	±0.25 pF	IIB	R689C23M7GL .. AP	2222 ... 03688	8.2	±0.25 pF	I	R829C13P2GL .. AP	2222 ... 33828
8.2	±0.25 pF	IIB	R829C23M7GL .. AP	2222 ... 03828	10	±2%	I	R100G13P2GL .. AP	2222 ... 34109
10	±2%	III	R100G33M7GL .. AP	2222 ... 04109	12	±2%	I	R120G13P2GL .. AP	2222 ... 34129
12	±2%	III	R120G33M7GL .. AP	2222 ... 04129	15	±2%	IIA	R150G13P2GL .. AP	2222 ... 34159
15	±2%	III	R150G33M7GL .. AP	2222 ... 04159	18	±2%	IIA	R180G13P2GL .. AP	2222 ... 34189
18	±2%	IV	R180G43M7GL .. AP	2222 ... 04189	22	±2%	IIA	R220G13P2GL .. AP	2222 ... 34229
22	±2%	IV	R220G43M7GL .. AP	2222 ... 04229	27	±2%	IIB	R270G23P2GL .. AP	2222 ... 34279
27	±2%	V	R270G53M7GL .. AP	2222 ... 04279	33	±2%	IIB	R330G23P2GL .. AP	2222 ... 34339
33	±2%	V	R330G53M7GL .. AP	2222 ... 04339	39	±2%	IIB	R390G23P2GL .. AP	2222 ... 34399
1) WF = bulk WG = reel WJ = ammo					2) 652 = bulk 654 = reel 691 = ammo				
1. Other capacitance values and tolerances are available on request 2. 5th - 6th - 7th digit of the catalogue number to be completed with the packaging code					<b>Table 1</b> all types have thickness classification of ≤2.3 mm except for: note <sup>1)</sup> ≤2.5 mm note <sup>2)</sup> ≤2.7 mm note <sup>3)</sup> ≤3.0 mm				



**Class 1**, flanged type

• **12-digit code** (12NC)

2222 **xxx** **xx** **xx** **x**

Packing/leads	Pitch	Voltage	
bulk/long	1e	100 V	680
bulk/short	1e	100 V	682
bulk/long	2e	100 V	681
bulk/short	2e	100 V	683
reel	1e	100 V	678
reel	2e	100 V	679
ammopack	1e	100 V	688
ammopack	2e	100 V	652
bulk/long	2e	500 V	653
bulk/short	2e	500 V	654
reel	2e	500 V	691
ammopack	2e	500 V	694
for SL types, see TC	2e	1000 V	

Temperature coefficient (TC)	C < 10 pF	C ≥ 10 pF
P100	03	04
NPO	09	10
NPO precision	90	90
N150	33	34
N750	57	58
N1500	69	70
SL, bulk/long	09	09
SL, bulk/short	19	19
SL, reel	53	53
SL, ammopack	63	63

Capacitance (numerically)	Multiplier (pF)
10	7 × 0.01
12	8 × 0.1
15	9 × 1
18	1 × 10
22	2 × 100
27	3 × 1000
33	
39	
47	
56	
68	
82	

**Class 1**, flanged type

• **12-digit code** (12NC)

2222 **xxx** **xx** **xx** **x**

Packing/leads	Pitch	Voltage	
bulk/long	1e	100 V	680
bulk/short	1e	100 V	682
bulk/long	2e	100 V	681
bulk/short	2e	100 V	683
reel	1e	100 V	678
reel	2e	100 V	679
ammopack	1e	100 V	688
ammopack	2e	100 V	652
bulk/long	2e	500 V	653
bulk/short	2e	500 V	654
reel	2e	500 V	691
ammopack	2e	500 V	694
for SL types, see TC	2e	1000 V	

Temperature coefficient (TC)	C < 10 pF	C ≥ 10 pF
P100	03	04
NPO	09	10
NPO precision	90	90
N150	33	34
N750	57	58
N1500	69	70
SL, bulk/long	09	09
SL, bulk/short	19	19
SL, reel	53	53
SL, ammopack	63	63

Capacitance (numerically)	Multiplier (pF)
10	7 × 0.01
12	8 × 0.1
15	9 × 1
18	1 × 10
22	2 × 100
27	3 × 1000
33	
39	
47	
56	
68	
82	



Capacitance range <b>2F6</b> (Y5V)					Capacitance range <b>2C2/2D1</b> (Y5P/X5S/X7T)				
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
<b>U<sub>RD</sub> = 63 V</b>					<b>U<sub>RD</sub> = 500 V</b>				
1000	-20 /+80%	I	R102Z13Z5VF..SP	2222 629 ..102	100	±10%	I <sup>(2)</sup>	R101K13Y5PL .. SP	2222 655 ..101
2200	-20 /+80%	I	R22Z13Z5VF..SP	2222 629 ..222	120	±10%	I <sup>(1)</sup>	R121K13Y5PL .. SP	2222 655 ..121
4700	-20 /+80%	I	R47Z13Z5VF..SP	2222 629 ..472	150	±10%	I	R151K13Y5PL .. SP	2222 655 ..151
10000	-20 /+80%	IIB	R103Z23Z5VF..SP	2222 629 ..103	180	±10%	I	R181K13Y5PL .. SP	2222 655 ..181
22000	-20 /+80%	IV	R223Z43Z5VF..SP	2222 629 ..223	220	±10%	I	R221K13Y5PL .. SP	2222 655 ..221
47000	-20 /+80%	V	R473Z53Z5VF..SP	2222 629 ..473	270	±10%	I	R271K13Y5PL .. SP	2222 655 ..271

Capacitance range <b>2C2/2D1</b> (Y5P/X5S/X7T)					Capacitance range <b>2C2/2D1</b> (Y5P/X5S/X8U)				
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
<b>U<sub>RD</sub> = 100 V</b>					<b>U<sub>RD</sub> = 1000 V</b>				
180	±10%	I <sup>(1)</sup>	R181K13Y5PH .. SP	2222 630 ..181	100	±10%	I	R101K13Y5PN..SP	2222 693 ..101
220	±10%	I <sup>(1)</sup>	R221K13Y5PH .. SP	2222 630 ..221	120	±10%	I	R121K13Y5PN..SP	2222 693 ..121
270	±10%	I	R271K13Y5PH .. SP	2222 630 ..271	150	±10%	I	R151K13Y5PN..SP	2222 693 ..151
330	±10%	I	R331K13Y5PH .. SP	2222 630 ..331	180	±10%	I	R181K13Y5PN..SP	2222 693 ..181
390	±10%	I	R391K13Y5PH .. SP	2222 630 ..391	220	±10%	I	R221K13Y5PN..SP	2222 693 ..221
470	±10%	I	R471K13Y5PH .. SP	2222 630 ..471	270	±10%	I	R271K13Y5PN..SP	2222 693 ..271
560	±10%	I	R561K13Y5PH .. SP	2222 630 ..561	330	±10%	I	R331K13Y5PN..SP	2222 693 ..331
680	±10%	I	R681K13Y5PH .. SP	2222 630 ..681	390	±10%	I	R391K13Y5PN..SP	2222 693 ..391
820	±10%	I	R821K13Y5PH .. SP	2222 630 ..821	470	±10%	I	R471K13Y5PN..SP	2222 693 ..471
1000	±10%	I	R102K13Y5PH .. SP	2222 630 ..102	560	±10%	I	R561K13Y5PN..SP	2222 693 ..561
1200	±10%	IIA	R122K13Y5PH .. SP	2222 630 ..122	680	±10%	I	R681K13Y5PN..SP	2222 693 ..681
1500	±10%	IIA	R152K13Y5PH .. SP	2222 630 ..152	820	±10%	I	R821K13Y5PN..SP	2222 693 ..821
1800	±10%	IIB	R182K13Y5PH .. SP	2222 630 ..182	1000	±10%	I	R102K13Y5PN..SP	2222 693 ..102
2200	±10%	IIB	R222K13Y5PH .. SP	2222 630 ..222	1200	±10%	I	R122K13Y5PN..SP	2222 693 ..122
2700	±10%	III	R272K13Y5PH .. SP	2222 630 ..272	1500	±10%	I	R152K13Y5PN..SP	2222 693 ..152
3300	±10%	III	R332K13Y5PH .. SP	2222 630 ..332	1800	±10%	I	R182K13Y5PN..SP	2222 693 ..182
3900	±10%	IV	R392K13Y5PH .. SP	2222 630 ..392	2200	±10%	I	R222K13Y5PN..SP	2222 693 ..222
4700	±10%	IV	R472K13Y5PH .. SP	2222 630 ..472	2700	±10%	I	R272K13Y5PN..SP	2222 693 ..272
5600	±10%	V	R562K13Y5PH .. SP	2222 630 ..562	3300	±10%	I	R332K13Y5PN..SP	2222 693 ..332
6800	±10%	V	R682K13Y5PH .. SP	2222 630 ..682	3900	±10%	I	R392K13Y5PN..SP	2222 693 ..392

Capacitance range <b>2E2</b> (X5U)					Capacitance range <b>2E2</b> (X5U)				
C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC	C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
<b>U<sub>RD</sub> = 100 V</b>					<b>U<sub>RD</sub> = 1000 V</b>				
1000	±20%	I	R102M13X5UH..SP	2222 640 ..102	270	±20%	I	R271M13X5UN..SP	2222 695 ..271
1500	±20%	I	R152M13X5UH..SP	2222 640 ..152	330	±20%	I	R331M13X5UN..SP	2222 695 ..331
2200	±20%	I	R222M13X5UH..SP	2222 640 ..222	390	±20%	IIA	R391M13X5UN..SP	2222 695 ..391
3300	±20%	IIA	R332M13X5UH..SP	2222 640 ..332	470	±20%	IIA	R471M13X5UN..SP	2222 695 ..471
4700	±20%	IIB	R472M13X5UH..SP	2222 640 ..472	560	±20%	IIA	R561M13X5UN..SP	2222 695 ..561
6800	±20%	III	R682M13X5UH..SP	2222 640 ..682	680	±20%	IIB	R681M13X5UN..SP	2222 695 ..681
10000	±20%	IV	R103M13X5UH..SP	2222 640 ..103	820	±20%	IIB	R821M13X5UN..SP	2222 695 ..821
15000	±20%	V	R153M13X5UH..SP	2222 640 ..153	2000	±20%	III	R102M33X5UN..SP	2222 695 ..202

1. Other capacitance values and tolerances are available on request  
 2. 8th - 9th digit of the catalogue number to be completed with the packaging code

Table 1					<b>U<sub>RD</sub> = 1000 V</b>				
all types have thickness classification of ≤2.3 mm except for:					C <sup>1</sup> (pF)	TOL (pF or %)	Size (see table 1)	clear text code* 12th and 13th digit	catalogue number 12NC
note 1) ≤2.5 mm					270	±20%	I	R271M13X5UN..SP	2222 695 ..271
note 2) ≤2.7 mm					330	±20%	I	R331M13X5UN..SP	2222 695 ..331
note 3) ≤3.0 mm					390	±20%	IIA	R391M13X5UN..SP	2222 695 ..391
1) WF = bulk					470	±20%	IIA	R471M13X5UN..SP	2222 695 ..471
WG = geel					560	±20%	IIA	R561M13X5UN..SP	2222 695 ..561
WJ = ammo					680	±20%	IIB	R681M13X5UN..SP	2222 695 ..681
2) 09 = bulk					820	±20%	IIB	R821M13X5UN..SP	2222 695 ..821
53 = reel					2000	±20%	III	R102M33X5UN..SP	2222 695 ..202
63 = ammo					1200	±20%	III	R122M33X5UN..SP	2222 695 ..122
					1500	±20%	III	R152M33X5UN..SP	2222 695 ..152
					1800	±20%	IV	R182M33X5UN..SP	2222 695 ..182
					2200	±20%	IV	R222M33X5UN..SP	2222 695 ..222
					2700	±20%	V	R272M33X5UN..SP	2222 695 ..272
					3300	±20%	V	R332M33X5UN..SP	2222 695 ..332



Class 1 & 2, flanged type

- Clear text code [preferred]

R101G33COGHWGAP [example]



Product type

R = plate capacitor

Class code

AP = class 1  
SP = class 2

Capacitance (pF)

The first two digits are the significant figures of capacitance and the last digit is a multiplier as follows:

- 8 × 0.01
- 9 × 0.1
- 0 × 10
- 2 × 100
- 3 × 1000

Packaging

	Space	Length	Leadform	Packaging
WC	0.100"	0.500" min.	flange	bulk
WD	0.200"	0.167 ±0.020"	flange	bulk
WE	0.100"	0.167 ±0.020"	flange	bulk
WF	0.200"	0.500" min.	flange	bulk
WG	0.200"	H0 = 18 mm	flange	tape on reel
WH	0.100"	H0 = 18 mm	flange	tape on reel
WJ	0.200"	H0 = 18 mm	flange	ammopack
WK	0.100"	H0 = 18 mm	flange	ammopack

Capacitance tolerance

- B = ±0.1 pF (NPO precision cap. < 10 pF)
- C = ±0.25 pF (cap. < 10 pF)
- G = ±2% (class 1 for cap. ≥ 10 pF)
- F = ±1% (NPO precision cap. ≥ 10 pF)
- J = ±5% (class 1 for cap. ≥ 10 pF)
- K = ±10% (class 2, Y5P)
- M = ±20% (class 2, X5U)
- Z = +80% /-20% (class 2, Z5V)

Rated voltage (DC)

- F = 50 V
- H = 100 V
- L = 500 V
- N = 1000 V

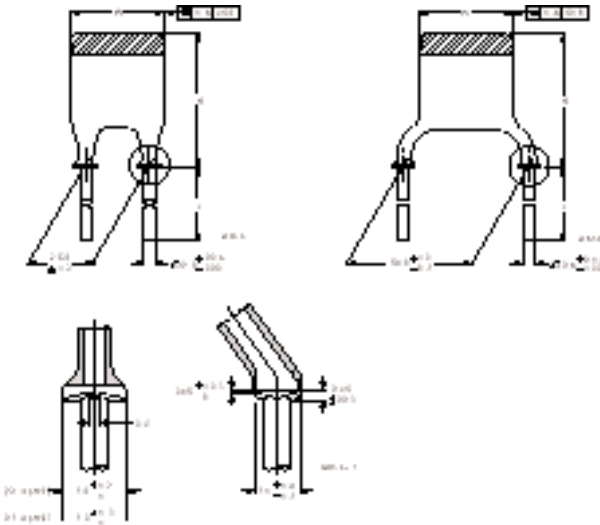
TC codes (EIA)

	Temperature coefficient		Marking
M7J	P100 ±30 ppm	class 1	red/violet
COG	NPO ±30 ppm	class 1	black
P2G	N150 ±30 ppm	class 1	orange
U2J	N750 ±120 ppm	class 1	violet
P8K	N1500 +500/-0 ppm	class 1	orange/orange
SLO	+150 to -1500 ppm	class 1	nil
Y5P	±10%; -30 to +85 °C	class 2	yellow
X5U	+22/-58%; -55 to +85 °C	class 2	blue
Z5V	+22/-82%; -10 to +85 °C	class 2	green

Size code

Size code		W <sub>max</sub>	H <sub>max</sub>
19	IIA	3.9 mm (0.152")	6.7 mm (0.254")
29	IIB	4.5 mm (0.177")	7.3 mm (0.288")
33	III	5.3 mm (0.208")	8.1 mm (0.319")
43	IV	6.2 mm (0.244")	9.0 mm (0.354")
53	V	6.2 mm (0.244")	11.2 mm (0.441")
63	VI	6.5 mm (0.255")	13.2 mm (0.520")

• Mechanical overview



Dimensions in mm

Size	W <sub>max</sub>	H <sub>max</sub>
I	3.6 (-1.1)	6.3 (-1.8)
IIA	3.9 (-1.4)	6.7 (-2.0)
IIB	4.5 (-1.8)	7.3 (-2.4)
III	5.3 (-1.8)	8.1 (-2.6)
IV	6.2 (-2.0)	9.0 (-2.7)
V	6.2 (-2.0)	11.2 (-3.1)
VI	6.5 (-2.3)	13.2 (-3.8)

Packing

Pitch	bulk				reel		ammo	
	2e	1e	2e	1e	2e	1e	2e	1e
U <sub>R</sub> 63 V								
100 V								
500 V								
1000 V								

1e pitch = 2.54 mm  
2e pitch = 5.08 mm



**Class 1, flanged type**

• **12-digit code** (12NC)

2222



Packing/leads	Pitch	Voltage	
bulk/long	1e	100 V	680
bulk/short	1e	100 V	682
bulk/long	2e	100 V	681
bulk/short	2e	100 V	683
reel	1e	100 V	678
reel	2e	100 V	679
ammopack	1e	100 V	688
ammopack	2e	100 V	652
bulk/long	2e	500 V	653
bulk/short	2e	500 V	654
reel	2e	500 V	691
ammopack	2e	500 V	694
for SL types, see TC	2e	1000 V	

Temperature coefficient (TC)	C < 10 pF	C ≥ 10 pF
P100	03	04
NPO	09	10
NPO precision	90	90
N150	33	34
N750	57	58
N1500	69	70
SL, bulk/long	09	09
SL, bulk/short	19	19
SL, reel	53	53
SL, ammopack	63	63

Capacitance (numerically)	Multiplier (pF)
10	7 × 0.01
12	8 × 0.1
15	9 × 1
18	1 × 10
22	2 × 100
27	3 × 1000
33	
39	
47	
56	
68	
82	

**Class 1, flanged type**

• **12-digit code** (12NC)

2222



Packing/leads	Pitch	Voltage	
bulk/long	1e	100 V	680
bulk/short	1e	100 V	682
bulk/long	2e	100 V	681
bulk/short	2e	100 V	683
reel	1e	100 V	678
reel	2e	100 V	679
ammopack	1e	100 V	688
ammopack	2e	100 V	652
bulk/long	2e	500 V	653
bulk/short	2e	500 V	654
reel	2e	500 V	691
ammopack	2e	500 V	694
for SL types, see TC	2e	1000 V	

Temperature coefficient (TC)	C < 10 pF	C ≥ 10 pF
P100	03	04
NPO	09	10
NPO precision	90	90
N150	33	34
N750	57	58
N1500	69	70
SL, bulk/long	09	09
SL, bulk/short	19	19
SL, reel	53	53
SL, ammopack	63	63

Capacitance (numerically)	Multiplier (pF)
10	7 × 0.01
12	8 × 0.1
15	9 × 1
18	1 × 10
22	2 × 100
27	3 × 1000
33	
39	
47	
56	
68	
82	





**Film co**



# capacitors

	Page
General purpose	<b>60</b>
Starter capacitor	<b>72</b>
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AC & Pulse	<b>86</b>

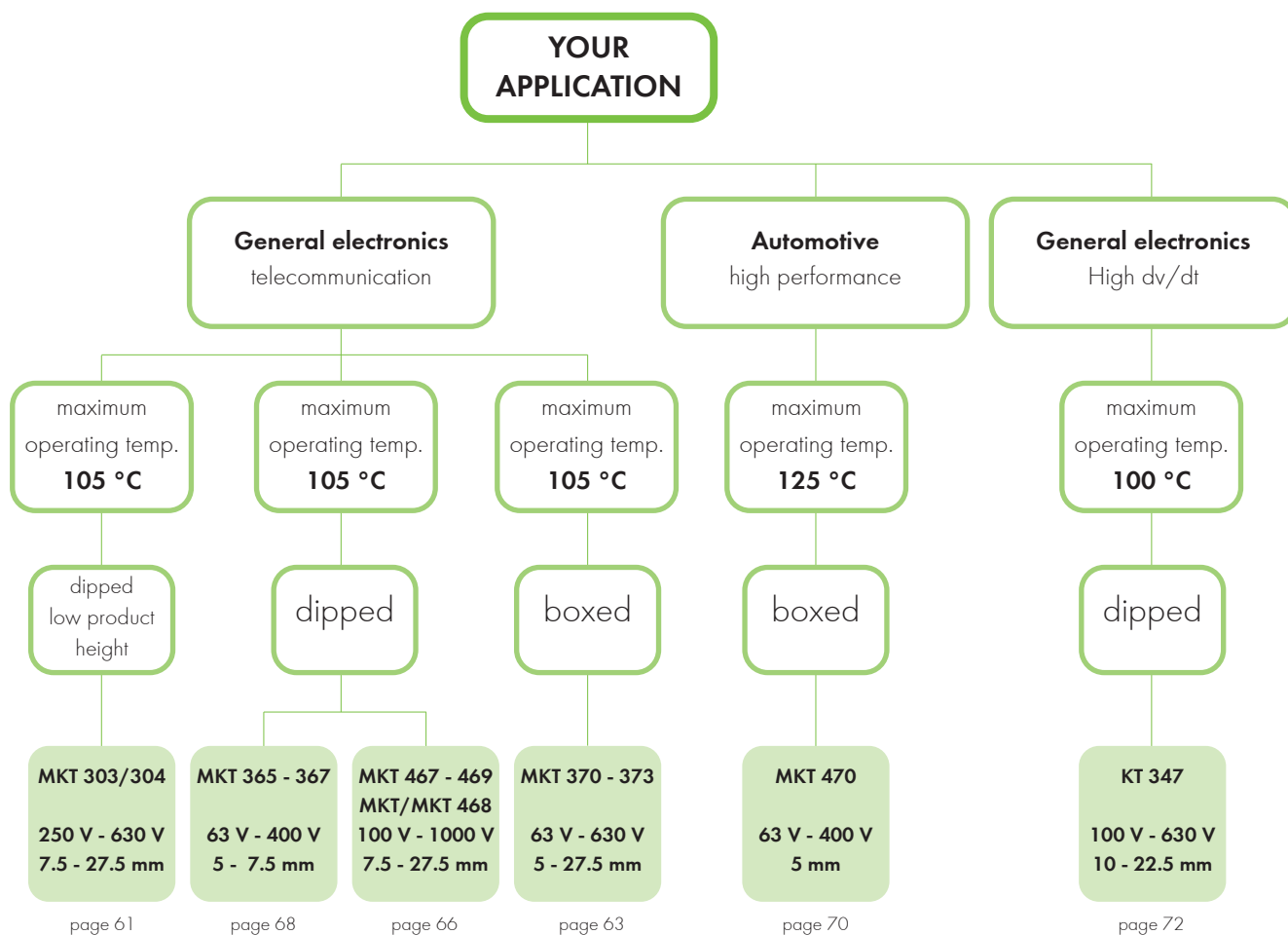


• **Broad** range

In general-purpose capacitors we offer a broad range of products for general applications mostly for coupling and de-coupling functions including boxed and dipped capacitors. The range has recently been extended by high performance, high temperature products for automotive and industrial applications.

To help you with optimum solutions in your circuit designs, we can also offer products for specific applications (for example capacitor size and lead configuration).

• **How to** select





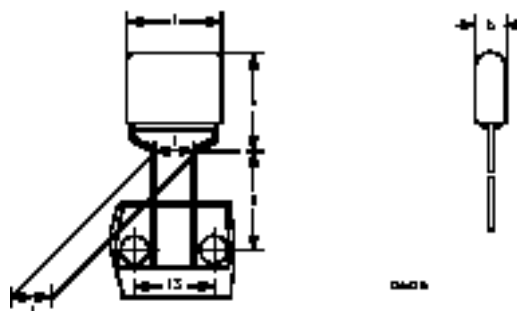
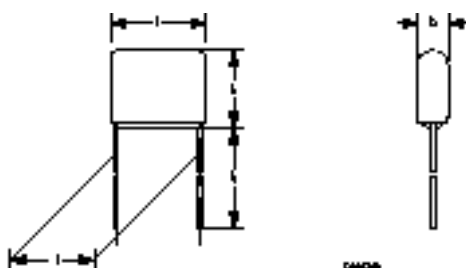
Series	MKT 303						MKT 304		
Dielectric	metallized polyester						metallized polyester		
Tolerance / E-series	±5%, ±10% / E12						±5%, ±10% / E12		
U <sub>R</sub> (V <sub>DC</sub> )	250		400		630		250	400	630
capacitance									
0.01 μF									
0.015 μF									
0.022 μF									
0.033 μF									
0.047 μF									
0.068 μF									
0.1 μF									
0.15 μF									
0.22 μF									
0.33 μF									
0.47 μF									
0.68 μF									
1 μF									
1.5 μF									
2.2 μF									
3.3 μF									
4.7 μF									
6.8 μF									
10 μF									
	preferred E6								
Case dimensions	in columns: pitch size in mm								
Climat category	55/100/56								
Tan δ (10 kHz)	≤120 × 10 <sup>-4</sup>								
Refer. specification	IEC 60 384-2								
Insulation resist.	C < 0.33 μF > 30000 MΩ								
	C > 0.33 μF > 10000 s								
Applications	blocking, coupling and bypass capacitor								
Packing	loose						reel, bent back		
Note:	for ordering non-preferred types see our film capacitor data handbook BC05, 2001/2002 edition								

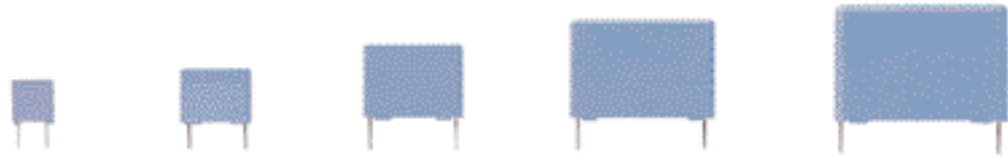


capacitors

Film

MKT 303 series						MKT 304 series					
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 303 .....		smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 304 .....		smallest packing quantity
			±10%	±5%					±10%	±5%	
<b>U<sub>RD</sub>C = 250 V</b>						<b>U<sub>RD</sub>C = 250 V</b>					
0.1	10.0	4.7 x 9.4 x 12.5	41104	42104	2000	0.1	7.5	4.7 x 15.2 x 12.5	43104	44104	2000
0.15	10.0	4.8 x 9.5 x 12.5	41154	42154	2000	0.15	7.5	4.8 x 15.3 x 12.5	43154	44154	2000
0.22	10.0	4.5 x 9.3 x 12.5	41224	42224	2000	0.22	7.5	4.5 x 15.0 x 12.5	43224	44224	2000
0.33	10.0	4.6 x 9.3 x 12.5	41334	42334	2000	0.33	7.5	4.6 x 15.1 x 12.5	43334	44334	2000
0.47	10.0	5.4 x 10.1 x 12.5	41474	42474	2000	0.47	7.5	5.4 x 15.9 x 12.5	43474	44474	1750
0.68	15.0	6.0 x 10.7 x 17.5	41684	42684	1500	0.68	7.5	6.0 x 16.5 x 17.5	43684	44684	800
1	15.0	6.0 x 10.7 x 17.5	41105	42105	1500	1	7.5	6.0 x 16.5 x 17.5	43105	44105	800
1.5	15.0	7.3 x 12.0 x 17.5	41115	42155	1250	1.5	7.5	7.3 x 17.8 x 17.5	43155	44155	600
2.2	22.5	9.7 x 17.5 x 26.0	41225	42225	700	<b>U<sub>RD</sub>C = 400 V</b>					
3.3	22.5	9.2 x 17.1 x 26.0	41335	42335	750	0.15	7.5	4.8 x 15.3 x 12.5	53154	54154	2000
4.7	22.5	9.0 x 16.9 x 26.0	41475	42475	750	0.22	7.5	5.7 x 16.2 x 12.5	53224	54224	1500
6.8	27.5	10.0 x 17.9 x 30.0	41685	42685	500	0.33	7.5	5.4 x 15.9 x 17.5	53334	54334	900
10	27.5	12.3 x 20.2 x 30.0	41106	42106	400	0.47	7.5	6.4 x 16.9 x 17.5	53474	54474	700
<b>U<sub>RD</sub>C = 400 V</b>						0.68	7.5	7.6 x 18.1 x 17.5	53684	54684	600
0.1	10.0	4.7 x 9.4 x 12.5	51104	52104	2000	<b>U<sub>RD</sub>C = 630 V</b>					
0.15	10.0	4.8 x 9.5 x 12.5	51154	52152	2000	0.01	7.5	4.1 x 14.6 x 12.5	63103	64103	2000
0.22	10.0	5.7 x 10.4 x 12.5	51224	52224	2000	0.015	7.5	4.9 x 15.4 x 12.5	63153	64153	2000
0.33	15.0	5.4 x 10.1 x 17.5	51334	52334	2000	0.022	7.5	4.8 x 15.3 x 12.5	63223	64223	2000
0.47	15.0	6.4 x 11.1 x 17.5	51474	52474	1500	0.033	7.5	4.0 x 14.5 x 12.5	63333	64333	2000
0.68	15.0	7.6 x 12.3 x 17.5	51684	52684	1250	0.047	7.5	4.7 x 15.2 x 12.5	63473	64473	2000
1	22.5	7.7 x 15.5 x 26.0	51105	52105	900	0.068	7.5	5.5 x 16.0 x 12.5	63683	64683	1750
1.5	22.5	7.9 x 15.8 x 26.0	51155	52155	900	0.1	7.5	5.2 x 15.7 x 17.5	63104	64104	900
2.2	22.5	9.7 x 17.5 x 26.0	51225	52225	700	0.15	7.5	6.3 x 16.8 x 17.5	63154	64154	700
3.3	27.5	11.0 x 18.8 x 30.0	51335	52335	500	0.22	7.5	7.6 x 18.1 x 17.5	63224	643224	600
<b>U<sub>RD</sub>C = 630 V</b>											
0.01	10.0	4.1 x 8.8 x 12.5	61103	62103	2000						
0.15	10.0	4.9 x 9.6 x 12.5	61153	62153	2000						
0.022	10.0	4.8 x 9.5 x 12.5	61223	62223	2000						
0.033	10.0	4.0 x 8.7 x 12.5	61333	62333	2000						
0.047	10.0	4.7 x 9.4 x 12.5	61473	62473	2000						
0.068	10.0	5.5 x 10.3 x 12.5	61683	62683	2000						
0.1	15.0	5.2 x 9.9 x 12.5	61104	62104	2000						
0.15	15.0	6.3 x 11.0 x 17.5	61154	62154	1500						
0.22	15.0	7.6 x 12.3 x 17.5	61224	62224	1250						
0.33	22.5	9.9 x 17.8 x 26.0	61334	62334	600						
0.47	22.5	7.7 x 15.6 x 26.0	61474	62474	900						
0.68	22.5	9.4 x 17.2 x 26.0	61684	62684	700						
1	27.5	10.5 x 18.4 x 30.0	61105	62105	500						





Series	MKT 370				MKT 371				MKT 372				MKT 373			
Dielectric	metallized polyester								metallized polyester							
Tolerance / E-series	±5%, ±10% / E12				±5%, ±10% / E12				±5%, ±10% / E12				±5%, ±10% / E12			
U <sub>R</sub> (V <sub>DC</sub> )	63	100	250	400	63	100	250	400	100	250	400	630	100	250	400	630
Capacitance																
100 pF																
150 pF																
220 pF																
330 pF																
470 pF																
680 pF																
1000 pF																
1500 pF																
2200 pF																
3300 pF																
4700 pF																
6800 pF																
0.01 μF																
0.015 μF																
0.022 μF																
0.033 μF																
0.047 μF																
0.068 μF																
0.10 μF																
0.15 μF																
0.22 μF																
0.33 μF																
0.47 μF																
0.68 μF																
1.0 μF																
1.5 μF	1)															
2.2 μF																
3.3 μF																
4.7 μF																
6.8 μF																
10 μF																
15 μF																
	preferred															E6
Case dimensions	in columns: pitch size (mm)															
Climatic category	55 / 100 / 56															
Tan δ (10 kHz)	≤ 150 X 10 <sup>-4</sup>															
Reference spec.	IEC 60 384-2															
Insulation resist.									U <sub>R</sub> ≤ 100 V <sub>DC</sub>				U <sub>R</sub> > 100 V <sub>DC</sub>			
	R between leads for C ≤ 330 nF								> 15000 MΩ				> 30000 MΩ			
	RC between leads for C > 330 nF								> 5000 s				> 10000 s			
Pulse rise time at U <sub>R</sub>	18 to 60 V/μs at U <sub>R</sub> = 63 V															
	4 to 110 V/μs at U <sub>R</sub> = 100 V															
	6 to 330 V/μs at U <sub>R</sub> = 250 V															
	12 to 630 V/μs at U <sub>R</sub> = 400 V															
Applications	blocking, coupling and bypass capacitor															
Packing	ammopack				ammopack, loose				loose				loose			
Note	For ordering of non-preferred types see our Film Capacitor data handbook BC05, 2001/2002 edition. 1) for C = 1.5 μF: U <sub>RDC</sub> = 50 V															





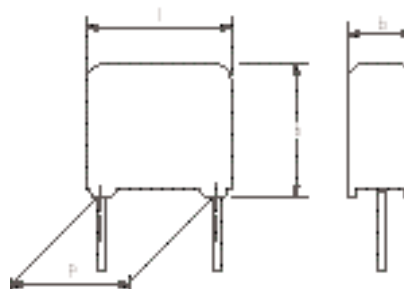
capacitors

Film

MKT 370 series, tol. 10%*, ammpack					MKT 371 series, tol. 10%** , ammpack				
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 370 .....	smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 371 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 63 V</b>					<b>U<sub>RDC</sub> = 63 V</b>				
0.1	5.08	2.5 x 6.5 x 7.2	75104	2000	0.068	7.62	2.5 x 6.5 x 10.0	38683	2000
0.15	5.08	2.5 x 6.5 x 7.2	75154	2000	0.1	7.62	2.5 x 6.5 x 10.0	38104	2000
0.22	5.08	3.5 x 8.0 x 7.2	75224	1500	0.15	7.62	3.0 x 8.0 x 10.0	38154	1500
0.33	5.08	3.5 x 8.0 x 7.2	75334	1500	0.22	7.62	3.0 x 8.0 x 10.0	38224	1500
0.47	5.08	3.5 x 8.0 x 7.2	75474	1500	0.33	7.62	4.0 x 9.0 x 10.0	38334	1000
0.68	5.08	4.5 x 9.0 x 7.2	75684	1000	0.47	7.62	4.0 x 9.0 x 10.0	38474	1000
1.0	5.08	6.0 x 11.0 x 7.2	75105	750	0.68	7.62	4.0 x 9.0 x 10.0	38684	1000
1.5**	5.08	6.0 x 11.0 x 7.2	75125	750	1.0	7.62	5.0 x 10.5 x 10.0	38105	1000
<b>U<sub>RDC</sub> = 100 V</b>					<b>U<sub>RDC</sub> = 100 V</b>				
0.022	5.08	2.5 x 6.5 x 7.2	85223	2000	0.022	7.62	2.5 x 6.5 x 10.0	68223	2000
0.033	5.08	2.5 x 6.5 x 7.2	85333	2000	0.033	7.62	2.5 x 6.5 x 10.0	68333	2000
0.047	5.08	2.5 x 6.5 x 7.2	85473	2000	0.047	7.62	2.5 x 6.5 x 10.0	68473	2000
0.068	5.08	2.5 x 6.5 x 7.2	85683	2000	0.068	7.62	3.0 x 8.0 x 10.0	68683	1500
0.10	5.08	3.5 x 8.0 x 7.2	85104	1500	0.10	7.62	3.0 x 8.0 x 10.0	68104	1500
0.15	5.08	3.5 x 8.0 x 7.2	85154	1500	0.15	7.62	4.0 x 9.0 x 10.0	68154	1000
0.22	5.08	4.5 x 9.0 x 7.2	85224	1000	0.22	7.62	4.0 x 9.0 x 10.0	68224	1000
0.33	5.08	4.5 x 9.0 x 7.2	85334	1000	0.33	7.62	5.0 x 10.5 x 10.0	68334	1000
0.47	5.08	6.0 x 11.0 x 7.2	85474	750	0.47	7.62	5.0 x 10.5 x 10.0	68474	1000
<b>U<sub>RDC</sub> = 250 V</b>					<b>U<sub>RDC</sub> = 250 V</b>				
0.01	5.08	2.5 x 6.5 x 7.2	35103	2000	0.01	7.62	2.5 x 6.5 x 10.0	78103	2000
0.015	5.08	2.5 x 6.5 x 7.2	35153	2000	0.015	7.62	2.5 x 6.5 x 10.0	78153	2000
0.022	5.08	3.5 x 8.0 x 7.2	35223	1500	0.022	7.62	3.0 x 8.0 x 10.0	78223	1500
0.033	5.08	3.5 x 8.0 x 7.2	35333	1500	0.033	7.62	3.0 x 8.0 x 10.0	78333	1500
0.047	5.08	4.5 x 9.0 x 7.2	35473	1000	0.047	7.62	3.0 x 8.0 x 10.0	78473	1500
0.068	5.08	6.0 x 11.0 x 7.2	35683	1000	0.068	7.62	4.0 x 9.0 x 10.0	78683	1000
0.1	5.08	6.0 x 11.0 x 7.2	35104	750	0.1	7.62	4.0 x 9.0 x 10.0	78104	1000
<b>U<sub>RDC</sub> = 400 V</b>					<b>U<sub>RDC</sub> = 400 V</b>				
0.001	5.08	2.5 x 6.5 x 7.2	65102	2000	0.0047	7.62	2.5 x 6.5 x 10.0	88472	2000
0.0015	5.08	2.5 x 6.5 x 7.2	65152	2000	0.068	7.62	2.5 x 6.5 x 10.0	88682	2000
0.0022	5.08	2.5 x 6.5 x 7.2	65222	2000	0.01	7.62	3.0 x 8.0 x 10.0	88103	1500
0.0033	5.08	2.5 x 6.5 x 7.2	65332	2000	0.015	7.62	4.0 x 9.0 x 10.0	88153	1000
0.0047	5.08	2.5 x 6.5 x 7.2	65472	2000	0.022	7.62	5.0 x 10.5 x 10.0	88223	1000
0.0068	5.08	2.5 x 6.5 x 7.2	65682	2000	0.033	7.62	5.0 x 10.5 x 10.0	88333	1000
0.01	5.08	3.5 x 8.0 x 7.2	65103	1500	** 5% tolerance also preferred. Change digit 9 from 8 to 9 Example: 0.01 µF, 250 V, 10% → 2222 371 78103 Example: 0.01 µF, 250 V, 5% → 2222 371 79103				
0.015	5.08	3.5 x 8.0 x 7.2	65153	1500					
0.022	5.08	4.5 x 9.0 x 7.2	65223	1000					
0.033	5.08	6.0 x 11.0 x 7.2	65333	750					
0.047	5.08	6.0 x 11.0 x 7.2	65473	750					

\* 5% tolerance also preferred  
 Change digit 9 from 5 to 6  
 Example: 0.1 µF, 63 V, 10% → 2222 370 75104  
 Example: 0.1 µF, 63 V, 5% → 2222 370 76104

\*\* 50 V<sub>DC</sub>







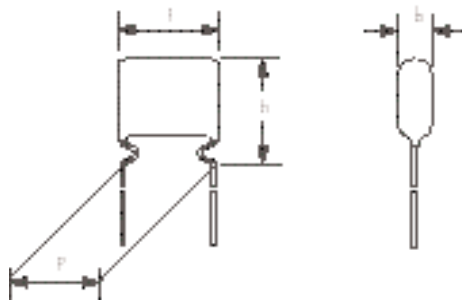
MKT 372 series, tolerance 10%, loose in box					MKT 373 series, tolerance 10%, loose in box				
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 372 .....	smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 373 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 100 V</b>					<b>U<sub>RDC</sub> = 100 V</b>				
0.1	10.0	4.0 x 9.0 x 12.5	21104	1000	0.33	15.0	5.0 x 11.0 x 17.5	23334	1000
0.15	10.0	4.0 x 9.0 x 12.5	21154	1000	0.47	15.0	5.0 x 11.0 x 17.5	23474	1000
0.22	10.0	4.0 x 9.0 x 12.5	21224	1000	0.68	15.0	5.0 x 11.0 x 17.5	23684	1000
0.33	10.0	4.0 x 10.0 x 12.5	21334	1000	1.0	15.0	5.0 x 11.0 x 17.5	23105	1000
0.47	10.0	5.0 x 11.0 x 12.5	21474	1000	1.5	15.0	5.0 x 11.0 x 17.5	23155	1000
0.68	10.0	6.0 x 12.0 x 12.5	21564	1000	2.2	15.0	6.0 x 12.0 x 17.5	23225	1000
<b>U<sub>RDC</sub> = 250 V</b>					<b>U<sub>RDC</sub> = 250 V</b>				
0.047	10.0	4.0 x 9.0 x 12.5	41473	1000	0.15	15.0	5.0 x 11.0 x 17.5	43154	1000
0.068	10.0	4.0 x 9.0 x 12.5	41683	1000	0.22	15.0	5.0 x 11.0 x 17.5	43224	1000
0.1	10.0	4.0 x 10.0 x 12.5	41104	1000	0.33	15.0	5.0 x 11.0 x 17.5	43334	1000
0.15	10.0	5.0 x 11.0 x 12.5	41154	1000	0.47	15.0	6.0 x 12.0 x 17.5	43474	1000
0.22	10.0	6.0 x 12.0 x 12.5	41224	1000	0.68	15.0	7.0 x 13.5 x 17.5	43684	1000
<b>U<sub>RDC</sub> = 400 V</b>					<b>U<sub>RDC</sub> = 400 V</b>				
0.0047	10.0	4.0 x 9.0 x 12.5	51472	1000	1.0	15.0	8.5 x 15.0 x 17.5	43105	1000
0.0068	10.0	4.0 x 9.0 x 12.5	51682	1000	1.5	22.5	8.5 x 18.0 x 26.0	43155	200
0.01	10.0	4.0 x 9.0 x 12.5	51103	1000	2.2	22.5	10.0 x 19.5 x 26.0	43225	200
0.015	10.0	4.0 x 9.0 x 12.5	51153	1000	3.3	27.5	11.0 x 21.0 x 31.0	43335	100
0.022	10.0	4.0 x 9.0 x 12.5	51223	1000	4.7	27.5	13.0 x 23.0 x 31.0	43475	100
0.033	10.0	4.0 x 10.0 x 12.5	51333	1000	<b>U<sub>RDC</sub> = 400 V</b>				
0.047	10.0	5.0 x 11.0 x 12.5	51473	1000	0.047	15.0	5.0 x 11.0 x 17.5	53473	1000
0.068	10.0	6.0 x 12.0 x 12.5	51683	1000	0.068	15.0	5.0 x 11.0 x 17.5	53683	1000
<b>U<sub>RDC</sub> = 630 V</b>					<b>U<sub>RDC</sub> = 630 V</b>				
0.01	10.0	4.0 x 10.0 x 12.5	61103	1000	0.1	15.0	5.0 x 11.0 x 17.5	53104	1000
0.015	10.0	4.0 x 10.0 x 12.5	61153	1000	0.15	15.0	5.0 x 11.0 x 17.5	53154	1000
0.022	10.0	4.0 x 10.0 x 12.5	61223	1000	0.22	15.0	6.0 x 12.0 x 17.5	53224	1000
0.033	10.0	5.0 x 10.0 x 12.5	61333	1000	0.33	15.0	7.0 x 13.5 x 17.5	53334	1000
0.047	10.0	6.0 x 12.0 x 12.5	61473	1000	0.47	15.0	8.5 x 15.0 x 17.5	53474	1000
					0.68	22.5	8.5 x 15.0 x 26.0	53684	200
					1.0	22.5	8.5 x 18.0 x 26.0	53105	200
					1.5	27.5	11.0 x 21.0 x 31.0	53155	100
					<b>U<sub>RDC</sub> = 630 V</b>				
					0.068	15.0	6.0 x 12.0 x 17.5	63683	1000
					0.1	15.0	7.0 x 13.5 x 17.5	63104	1000
					0.15	15.0	8.5 x 15.0 x 17.5	63154	1000
					0.22	15.0	10.0 x 16.5 x 17.5	63224	500
					0.33	22.5	8.5 x 18.0 x 26.0	63334	200
					0.47	22.5	10.0 x 19.5 x 26.0	63474	200
					0.68	27.5	13.0 x 23.0 x 31.0	63684	100
					1.0	27.5	15.0 x 25.0 x 31.0	63105	100



Series	MKT 467				MKT 468					MKT 469			
Dielectric	metallized polyester				metallized polyester					metallized polyester			
Tolerance / E-series	±5%, ±10% / E12				±5%, ±10% / E12					±5%, ±10% / E12			
U <sub>R</sub> (V <sub>DC</sub> )	100	250	400	630	100	250	400	630	1000	100	250	400	630
Capacitance													
100 pF													
150 pF													
220 pF													
330 pF													
470 pF													
680 pF													
0.001 μF													
0.0015 μF													
0.0022 μF													
0.0033 μF													
0.0047 μF													
0.0068 μF													
0.01 μF			10										
0.015 μF				10									
0.022 μF													
0.033 μF													
0.047 μF													
0.068 μF													
0.10 μF		10											
0.15 μF													
0.22 μF													
0.33 μF	10												
0.47 μF													
0.68 μF													
1.0 μF													
1.5 μF													
2.2 μF													
3.3 μF													
4.7 μF													
6.8 μF													
10 μF													
15 μF													
	preferred			E6									
Case dimensions	in columns: pitch (mm)												
Climatic category	55 / 100 / 56												
Tan δ (10 kHz)	≤120 X 10 <sup>-4</sup>												
Reference spec.	IEC 60 384 -2												
Insulation resist.													
R: C ≤ 0.33 μF	>15000 MΩ												
R x C: C > 0.33 μF	> 5000 s												
Applications	blocking, coupling and bypass capacitor												
Packing	ammopack, loose				loose, reel					loose, reel			
Note	For ordering of non-preferred types see our Film Capacitor data handbook BC05, 2001/2002 edition. For ordering of 6E 3E bent back taped products see our film capacitor datahandbook BC05, 2001/2002 edition.												



MKT 467, loose in box						MKT 468, loose in box					
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 467 .....		smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 468 .....		smallest packing quantity
			±10%	±5%					±10%	±5%	
<b>U<sub>RDC</sub> = 100 V</b>						<b>U<sub>RDC</sub> = 100 V</b>					
0.068	10.0	4.0 x 13.0 x 12.5	4683	5683	2000	1.5	15.0	6.0 x 15.0 x 17.5	4155	5155	2000
0.1	10.0	4.0 x 13.0 x 12.5	4104	5104	2000	2.2	15.0	7.0 x 16.0 x 17.5	4225	5225	1250
0.15	10.0	4.0 x 13.0 x 12.5	4154	5154	2000	3.3	15.0	8.5 x 17.5 x 17.5	4335	5335	1000
0.22	10.0	4.5 x 13.6 x 12.5	4224	5224	2000	4.7	22.5	7.0 x 19.5 x 26.0	4475	5475	900
0.33	10.0	4.6 x 13.6 x 12.5	4334	5334	2000	6.8	22.5	8.5 x 21.0 x 26.0	4685	5685	750
0.47	10.0	4.2 x 13.2 x 12.5	4474	5474	2000	10.0	22.5	10.5 x 23.5 x 26.0	4106	5106	500
0.68	10.0	5.0 x 14.0 x 12.5	4684	5684	1500	<b>U<sub>RDC</sub> = 250 V</b>					
1	10.0	6.0 x 15.0 x 12.5	1105	5105	1250	0.33	15.0	5.5 x 14.5 x 17.5	16334	17334	2000
<b>U<sub>RDC</sub> = 250 V</b>						<b>U<sub>RDC</sub> = 250 V</b>					
0.033	10.0	4.6 x 13.6 x 12.5	16333	17333	2000	0.47	15.0	6.5 x 15.5 x 17.5	16474	17474	1500
0.047	10.0	4.1 x 13.1 x 12.5	16473	17473	2000	0.68	15.0	8.0 x 17.0 x 17.5	16684	17684	1000
0.068	10.0	4.1 x 13.1 x 12.5	16683	17683	2000	1.0	15.0	8.0 x 20.0 x 17.5	16105	17105	1000
0.1	10.0	4.0 x 13.0 x 12.5	16104	17104	2000	1.5	22.5	8.0 x 21.0 x 26.0	16155	17155	750
0.15	10.0	4.8 x 13.8 x 12.5	16154	17154	2000	2.2	22.5	9.5 x 23.0 x 26.0	16225	17225	750
0.22	10.0	5.8 x 14.8 x 12.5	16224	17224	1500	3.3	22.5	12.0 x 25.5 x 26.0	16335	17335	500
<b>U<sub>RDC</sub> = 400 V</b>						<b>U<sub>RDC</sub> = 400 V</b>					
0.001	10.0	4.5 x 13.5 x 12.5	28102	29102	2000	0.15	15.0	6.0 x 15.0 x 17.5	28154	29154	1750
0.0015	10.0	4.5 x 13.5 x 12.5	28152	29152	2000	0.22	15.0	7.0 x 15.5 x 17.5	28224	29224	1500
0.0022	10.0	4.0 x 13.0 x 12.5	28222	29222	2000	0.33	15.0	8.5 x 17.5 x 17.5	28334	29334	1000
0.0033	10.0	4.6 x 13.6 x 12.5	28332	29332	2000	0.47	15.0	8.5 x 20.5 x 17.5	28474	29474	750
0.0047	10.0	4.1 x 13.2 x 12.5	28472	29472	2000	0.68	22.5	8.0 x 21.0 x 26.0	28684	29684	750
0.0068	10.0	4.2 x 13.2 x 12.5	28682	29682	2000	1.0	22.5	9.9 x 23.0 x 26.0	28105	29105	750
0.01	10.0	4.1 x 13.1 x 12.5	28103	29103	2000	1.5	27.5	11.5 x 24.5 x 30.0	28155	29155	450
0.015	10.0	4.1 x 13.1 x 12.5	28153	29153	2000	2.2	27.5	14.0 x 27.0 x 30.0	28225	29225	300
0.022	10.0	4.0 x 13.0 x 12.5	28223	29223	2000	<b>U<sub>RDC</sub> = 630 V</b>					
0.033	10.0	4.6 x 13.7 x 12.5	28333	29333	2000	0.047	15.0	5.5 x 14.5 x 17.5	40473	41473	2000
0.047	10.0	4.1 x 13.1 x 12.5	28473	29473	2000	0.068	15.0	6.5 x 16.0 x 17.5	40683	41683	1500
0.068	10.0	4.8 x 13.8 x 12.5	28683	29683	2000	0.1	15.0	7.9 x 17.0 x 17.5	40104	41104	1250
0.1	10.0	5.7 x 14.7 x 12.5	28104	29104	1500	0.15	15.0	8.5 x 20.5 x 17.5	40154	41154	1000
<b>U<sub>RDC</sub> = 630 V</b>						<b>U<sub>RDC</sub> = 630 V</b>					
0.01	10.0	4.1 x 13.1 x 12.5	40103	41103	2000	0.22	22.5	8.0 x 21.0 x 26.0	40224	41224	750
0.015	10.0	4.9 x 13.9 x 12.5	40153	41153	2000	0.33	22.5	10.0 x 23.0 x 26.0	40334	41334	700
0.022	10.0	4.8 x 13.8 x 12.5	40223	41223	2000	0.47	22.5	12.5 x 25.5 x 26.0	40474	41474	500
0.033	10.0	5.9 x 14.9 x 12.5	40333	41333	1500	0.68	22.5	15.0 x 28.0 x 26.0	40684	41684	400
<b>U<sub>RDC</sub> = 1000 V</b>						<b>U<sub>RDC</sub> = 1000 V</b>					
0.015	15.0	6.0 x 15.0 x 17.5	60153	61153	2000	0.015	15.0	6.0 x 15.0 x 17.5	60153	61153	2000
0.022	15.0	7.2 x 16.2 x 17.5	60223	61223	1500	0.022	15.0	7.2 x 16.2 x 17.5	60223	61223	1500
0.033	15.0	8.8 x 17.8 x 17.5	60333	61333	1000	0.033	15.0	8.8 x 17.8 x 17.5	60333	61333	1000
0.047	15.0	10.6 x 19.6 x 17.5	60473	61473	900	0.047	15.0	10.6 x 19.6 x 17.5	60473	61473	900
0.068	22.5	8.0 x 21.0 x 26.0	60683	61683	750	0.068	22.5	8.0 x 21.0 x 26.0	60683	61683	750
0.1	22.5	9.5 x 22.5 x 26.0	60104	61104	700	0.1	22.5	9.5 x 22.5 x 26.0	60104	61104	700
0.15	27.5	10.5 x 23.5 x 30.0	60154	61154	500	0.15	27.5	10.5 x 23.5 x 30.0	60154	61154	500
0.22	27.5	13.0 x 26.0 x 30.0	60224	61224	350	0.22	27.5	13.0 x 26.0 x 30.0	60224	61224	350





capacitors

Film

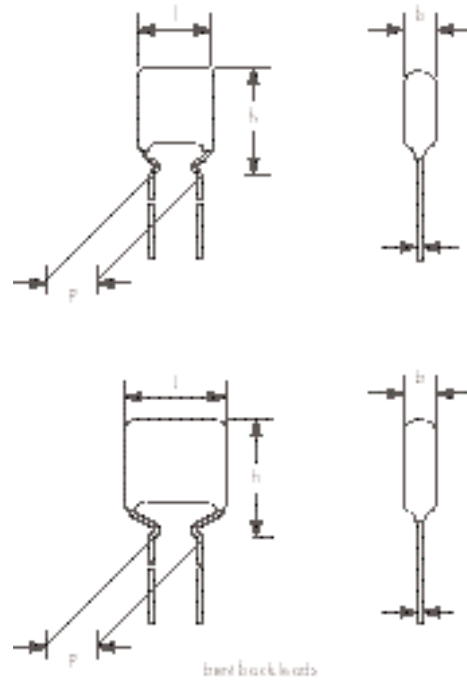
Series	MKT 365				MKT 366				MKT 367			
Dielectric	metallized polyester				metallized polyester				metallized polyester			
Tolerance / E-series	±5%, ±10% / E12				±5%, ±10% / E12				±5%, ±10% / E12			
$U_R$ (V <sub>DC</sub> )	63	100	250	400	63	100	250	400	63	100	250	400
Capacitance												
100 pF												
150 pF												
220 pF												
330 pF												
470 pF												
680 pF												
1000 pF												
1500 pF												
2200 pF												
3300 pF												
4700 pF												
6800 pF												
0.01 μF												
0.015 μF												
0.022 μF												
0.033 μF												
0.047 μF												
0.068 μF												
0.10 μF												
0.15 μF												
0.22 μF												
0.33 μF												
0.47 μF												
0.68 μF												
1.0 μF												
1.5 μF												
2.2 μF												
3.3 μF												
4.7 μF												
6.8 μF												
10 μF												
15 μF												
	preferred E6											
Case dimensions	in columns: pitch size (mm)											
Climatic category	55 / 100 / 56											
Tan δ (10 kHz)	≤150 X 10 <sup>-4</sup>											
Reference spec.	IEC 60 384-2											
Insulation resist.					$U_R \leq 100 V_{DC}$				$U_R > 100 V_{DC}$			
	R between leads for C ≤ 330 nF				> 15000 MΩ				> 30000 MΩ			
	RC between leads for C > 330 nF				> 5000 s				> 10000 s			
Pulse rise time at $U_R$	18 to 60 V/μs at $U_R = 63 V$											
	4 to 110 V/μs at $U_R = 100 V$											
	6 to 330 V/μs at $U_R = 250 V$											
	12 to 630 V/μs at $U_R = 400 V$											
Applications	blocking, coupling and bypass capacitor											
Packing	ammopack, reel				ammopack, loose				ammopack, loose			
Note	for ordering of non-preferred types see our Film Capacitor data handbook BC05, 2001/2002 edition.											

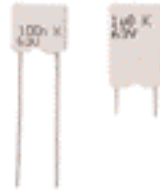


**MKT 365 series, ammpack**

C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 365 .....		smallest packing quantity
			±10%	±5%	
<b>U<sub>RDC</sub> = 63 V</b>					
0.047	5.0	4.0 x 12.5 x 7.3	75473	76473	1500
0.068	5.0	4.0 x 12.5 x 7.3	75683	76683	1500
0.1	5.0	4.0 x 12.5 x 7.3	75104	76104	1500
0.15	5.0	4.0 x 13.0 x 7.3	75154	76154	1500
	5.0	4.0 x 13.5 x 10.0	15154*	16154*	1500
0.22	5.0	4.2 x 13.5 x 7.3	75224	76224	1000
	5.0	4.0 x 13.5 x 10.0	15224*	16224*	1500
0.33	5.0	4.5 x 14.5 x 7.3	75334	76334	1000
	5.0	5.0 x 14.5 x 10.0	15334*	16334*	1000
0.47	5.0	4.5 x 15.5 x 7.3	75474	76474	1000
	5.0	5.5 x 15.0 x 10.0	15474*	16474*	1000
0.68	5.0	5.5 x 14.5 x 7.3	75684	76684	1000
	5.0	5.5 x 15.0 x 10.0	15684*	16684*	1000
1.0	5.0	5.5 x 15.5 x 7.3	75105	76105	1000
	5.0	5.5 x 15.0 x 10.0	15105*	16105*	1000
<b>U<sub>RDC</sub> = 100 V</b>					
0.01	5.0	3.7 x 12.5 x 7.3	85103	86103	1500
0.015	5.0	3.7 x 12.5 x 7.3	85153	86153	1500
0.022	5.0	3.7 x 12.5 x 7.3	85223	86223	1500
0.033	5.0	3.7 x 12.5 x 7.3	85333	86333	1500
0.047	5.0	4.0 x 12.5 x 7.3	85473	86473	1500
	5.0	4.0 x 13.5 x 10.0	25473*	26473*	1500
0.068	5.0	4.0 x 12.5 x 7.3	85683	86683	1500
	5.0	4.0 x 13.5 x 10.0	25683*	26683*	1500
0.1	5.0	4.0 x 13.5 x 7.3	85104	86104	1000
	5.0	4.0 x 13.5 x 10.0	25104*	26104*	1500
0.15	5.0	4.0 x 13.5 x 7.3	85154	86154	1000
	5.0	5.0 x 14.5 x 10.5	25154*	26154*	1000
0.22	5.0	4.2 x 13.5 x 7.3	85224	86224	1000
	5.0	5.5 x 15.0 x 10.5	25224*	26224*	1000
0.33	5.0	6.0 x 15.5 x 10.5	25334*	26334*	1000
0.47	5.0	6.0 x 15.5 x 10.5	25474*	26474*	1000
<b>U<sub>RDC</sub> = 250 V (bent back leads)</b>					
0.022	5.0	4.0 x 13.5 x 10.0	45223	46223	1500
0.033	5.0	4.0 x 13.5 x 10.0	45333	46333	1500
0.047	5.0	4.0 x 13.5 x 10.0	45473	46473	1500
0.68	5.0	4.5 x 13.0 x 10.0	45683	46683	1500
0.1	5.0	5.0 x 13.5 x 10.0	45104	46104	1500
0.15	5.0	5.5 x 15.5 x 10.0	45154	46154	1500
<b>U<sub>RDC</sub> = 400 V (bent back leads)</b>					
0.0033	5.0	4.0 x 13.5 x 10.0	55332	56332	1500
0.0047	5.0	4.0 x 13.5 x 10.0	55472	56472	1500
0.0068	5.0	4.0 x 13.5 x 10.0	55682	56682	1500
0.01	5.0	4.0 x 13.5 x 10.0	55103	56103	1500
0.015	5.0	4.0 x 13.5 x 10.0	55153	56153	1500
0.022	5.0	5.0 x 13.5 x 10.0	55223	56233	1500
0.033	5.0	4.5 x 13.0 x 10.0	55333	56333	1500
0.047	5.0	5.0 x 13.5 x 10.0	55473	56473	1500

\* bent back leads to 5 mm pitch



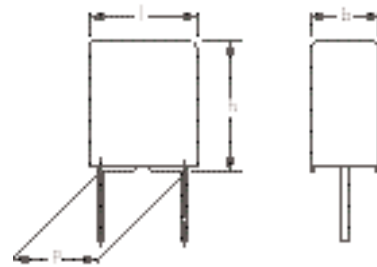


Series	<b>MKT 470</b>			
Dielectric	metallized polyester			
Tolerance / E-series	±5%, ±10% / E12			
U <sub>R</sub> (V <sub>DC</sub> )	63	100	250	400
Capacitance				
150 pF				
220 pF				
330 pF				
470 pF				
680 pF				
1000 pF				
1500 pF				
2200 pF				
3300 pF				
4700 pF				
6800 pF				
0.01 μF				5.0
0.015 μF				
0.022 μF				
0.033 μF				
0.047 μF				
0.068 μF				
0.10 μF				
0.15 μF				
0.22 μF				
0.33 μF				
0.47 μF				
0.68 μF				
1.0 μF				
1.5 μF				
2.2 μF				
3.3 μF				
4.7 μF				
	preferred			E6
Case dimensions	in columns: pitch size (mm)			
Climatic category	55 / 125 / 56			
Tan δ (10 kHz)	≤120 X 10 <sup>-4</sup>			
Reference spec.	IEC 60 384 -2			
Insulation resist.				
R: C ≤ 330 μF	> 15 000 MΩ			
R x C: C > 330 μF	> 5 000 s			
Pulse rise time at UR	100 to 800 V/μs			
Applications	blocking, coupling, bypass and energy reservoir, filter networks, pulse circuits, automotive			
Features	low inductance, high temp stability, harsh environments			
Packing	loose, reel, ammpack			
Lead length	-			
Note				



## MKT 470, ammopack

C (μF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 470 .....		smallest packing quantity
			±10%	±5%	
<b>U<sub>RDC</sub> = 63 V</b>					
0.068	5.08	2.5 x 6.5 x 7.2	75683	76683	2000
0.1	5.08	2.5 x 6.5 x 7.2	75104	76104	2000
0.15	5.08	3.5 x 8.0 x 7.2	75154	76154	1500
0.22	5.08	3.5 x 8.0 x 7.2	75224	76224	1500
0.33	5.08	3.5 x 8.0 x 7.2	75334	76334	1500
0.47	5.08	4.5 x 9.5 x 7.2	75474	76474	1000
0.68	5.08	4.5 x 9.5 x 7.2	75684	76684	1000
1.0	5.08	6.0 x 11.0 x 7.2	75105	76105	750
<b>U<sub>RDC</sub> = 100 V</b>					
0.022	5.08	2.5 x 6.5 x 7.2	85223	86223	2000
0.033	5.08	2.5 x 6.5 x 7.2	85333	86333	2000
0.047	5.08	2.5 x 6.5 x 7.2	85473	86473	2000
0.068	5.08	3.5 x 8.0 x 7.2	85683	86683	1500
0.1	5.08	3.5 x 8.0 x 7.2	85104	86104	1500
0.15	5.08	4.5 x 9.5 x 7.2	85154	86154	1000
0.22	5.08	4.5 x 9.5 x 7.2	85224	86224	1000
0.33	5.08	6.0 x 11.0 x 7.2	85334	86334	750
0.47	5.08	6.0 x 11.0 x 7.2	85474	86474	750
<b>U<sub>RDC</sub> = 250 V</b>					
0.01	5.08	2.5 x 6.5 x 7.2	35103	36103	2000
0.015	5.08	2.5 x 6.5 x 7.2	35153	36153	2000
0.022	5.08	3.5 x 8.0 x 7.2	35223	36223	1500
0.033	5.08	3.5 x 8.0 x 7.2	35333	36333	1500
0.047	5.08	4.5 x 9.5 x 7.2	35473	36473	1000
0.068	5.08	4.5 x 9.5 x 7.2	35683	36683	1000
0.1	5.08	6.0 x 11.0 x 7.2	35104	36104	750
<b>U<sub>RDC</sub> = 400 V</b>					
0.001	5.08	2.5 x 6.5 x 7.2	65102	66102	2000
0.0015	5.08	2.5 x 6.5 x 7.2	65152	66152	2000
0.0022	5.08	2.5 x 6.5 x 7.2	65222	66222	2000
0.0033	5.08	2.5 x 6.5 x 7.2	65332	66332	2000
0.0047	5.08	2.5 x 6.5 x 7.2	65472	66372	2000
0.0068	5.08	2.5 x 6.5 x 7.2	65682	66682	2000
0.01	5.08	3.5 x 8.0 x 7.2	65103	66103	1500
0.015	5.08	3.5 x 8.0 x 7.2	65153	66153	1500
0.022	5.08	4.5 x 9.5 x 7.2	65223	66223	1000
0.033	5.08	6.0 x 11.0 x 7.2	65333	66333	750
0.047	5.08	6.0 x 11.0 x 7.2	65473	66473	750





capacitors  
Film



Series	KT 347				Series	KT 90028	KT 90049 KT 90051																				
Dielectric	polyester				Dielectric	polyester	polyester																				
Tolerance / E-series	±10% / E12				Tolerance	-10, + 25%	±20%																				
$U_R$ (V <sub>DC</sub> )	100	250	400	630	$U_R$ (V <sub>DC</sub> )	250	250																				
Capacitance																											
47 pF							7.5																				
68 pF																											
100 pF																											
150 pF																											
220 pF																											
330 pF																											
470 pF																											
680 pF																											
1000 pF																											
1500 pF																											
2200 pF																											
3300 pF																											
4700 pF																											
6800 pF																											
0.01 µF																											
0.015 µF																											
0.022 µF	10.0	10.0	10.0	10.0																							
0.033 µF																											
0.047 µF																											
0.068 µF																											
0.10 µF	15.0	15.0	15.0	15.0																							
0.15 µF																											
0.22 µF																											
0.33 µF	22.5	22.5	22.5	22.5																							
0.47 µF																											
0.68 µF																											
1.0 µF																											
1.5 µF																											
2.2 µF																											
3.3 µF																											
4.7 µF																											
6.8 µF																											
	preferred																										
Case dimensions	columns: pitch size in mm				Case dimensions	in columns: pitch size in mm																					
Encapsulation	dipped				Encapsulation	non	non																				
Climatic category	40 / 100 / 21				Temperature range	-40 °C to +100 °C	-40 °C to +125 °C																				
Tan δ (10 kHz)	≤110 × 10 <sup>-4</sup>				Reference spec.	IEC 601 55	IEC 11 99																				
Reference spec.	IEC 60 384 - 11				Applications	fluorescent lamp starter capacitor	fluorescent lamp starter capacitor																				
Insulation resist.					Packing	loose	loose																				
R : C ≤ 330 nF	>50000 MΩ				<b>Ordering information Starter capacitors</b> <table border="1"> <thead> <tr> <th>Series</th> <th>C (µF)</th> <th>dimensions b x h x l (mm)</th> <th>catalogue number 2222 311 .....</th> <th>smallest packing quantity</th> </tr> </thead> <tbody> <tr> <td>0.0056</td> <td>3.6</td> <td>9.0 x 14.2</td> <td>90028</td> <td>5000</td> </tr> <tr> <td>0.0012</td> <td>4.5</td> <td>8.5 x 10.0</td> <td>90049</td> <td>5000</td> </tr> <tr> <td>0.0030</td> <td>4.5</td> <td>8.5 x 10.0</td> <td>90051</td> <td>5000</td> </tr> </tbody> </table>			Series	C (µF)	dimensions b x h x l (mm)	catalogue number 2222 311 .....	smallest packing quantity	0.0056	3.6	9.0 x 14.2	90028	5000	0.0012	4.5	8.5 x 10.0	90049	5000	0.0030	4.5	8.5 x 10.0	90051	5000
Series	C (µF)	dimensions b x h x l (mm)	catalogue number 2222 311 .....	smallest packing quantity																							
0.0056	3.6	9.0 x 14.2	90028	5000																							
0.0012	4.5	8.5 x 10.0	90049	5000																							
0.0030	4.5	8.5 x 10.0	90051	5000																							
R × C: C > 330 nF	>16500 s																										
Pulse rise time at $U_R$	10000 V/µs																										
Applications	consumer and industrial, where high currents and/or steep pulses occur																										
Packing	loose																										
Lead length	4 mm																										
Note	information for ordering our film capacitor see data handbook BC05																										





Series	MKP 416/420					KP 460/464				
Dielectric	metallized polypropylene					polypropylene				
Tolerance / E-series	±2%, ±5%/E96					±1%, ±2%, ±5%/E96				
U <sub>R</sub> (V <sub>DC</sub> )	63	160	250	400	630	63	160	250	400	630
Capacitance										
47 pF										
68 pF										
100 pF										
150 pF										
220 pF										
330 pF										
470 pF										
680 pF										
1000 pF										
1500 pF										
2200 pF										
3300 pF										
4700 pF		5.0		5.0	5.0					
6800 pF										
0.01 μF										
0.015 μF		10.0								
0.022 μF			5.0							
0.033 μF										
0.047 μF										
0.068 μF	5.0									
0.10 μF										
0.15 μF										
0.22 μF	10.0	15.0								
0.33 μF										
0.47 μF										
0.68 μF	15.0									
1.0 μF										
1.5 μF										
2.2 μF										
3.3 μF										
4.7 μF										
6.8 μF										
Preferred tol./E-series	5%/E24, 2%/E96					2%/E12, 1%/E96				
Encapsulation	boxed with epoxy resin					epoxy dipped				
Climatic category	55 / 085 / 56					40 / 100 / 56				
Tan δ (10 kHz)	≤10 to 10 <sup>-4</sup>					≤10 to 40 × 10 <sup>-4</sup>				
Insulation resist.										
R: C≤330 nF	>100000 MΩ					>100000 MΩ				
R x C: C>330 nF	-					-				
Pulse rise time at UR	20 to 50 V/μs					10 000 V/μs				
Reference spec.	IEC 60 384 - 16					IEC 60 384 - 13				
Applications	tuned circuits, filter networks, timing networks					tuned circuits, filter networks, timing networks				
Packing	loose, ammpack					loose, reel				
Lead length	4 mm - 3,5 mm									
Note	for ordering information see data handbook BC05									

**ADST  
APPLICATIONS**



capacitors

Film

MKP 416/420 ammpack

C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number ±2%	smallest packing quantity	C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number ±2%	smallest packing quantity
<b>UR<sub>DC</sub> = 63 V</b>					<b>UR<sub>DC</sub> = 250 V</b>				
39	5.0	4.5 x 9.0 x 7.2	2222 416 13903	1000	150	15.0	5.0 x 11.0 x 17.5	2222 418 11504	1100
47	5.0	4.5 x 9.0 x 7.2	2222 416 14703	1000	180	15.0	6.0 x 12.0 x 17.5	2222 418 11804	900
56	5.0	6.0 x 11.0 x 7.2	2222 416 15603	750	220	15.0	6.0 x 12.0 x 17.5	2222 418 12204	900
68	5.0	6.0 x 11.0 x 7.2	2222 416 16803	750	270	15.0	7.0 x 13.5 x 17.5	2222 418 12704	800
82	5.0	6.0 x 11.0 x 7.2	2222 416 18203	750	330	15.0	7.0 x 13.5 x 17.5	2222 418 13304	800
100	5.0	6.0 x 11.0 x 7.2	2222 416 11004	750	390	15.0	8.5 x 15.0 x 17.5	2222 418 13904	650
120	5.0	6.0 x 11.0 x 7.2	2222 416 11204	750	470	15.0	8.5 x 15.0 x 17.5	2222 418 14704	650
<b>UR<sub>DC</sub> = 63 V</b>					<b>UR<sub>DC</sub> = 400 V</b>				
150	10.0	5.0 x 11.0 x 12.5	2222 416 11504	600	1.0	5.0	3.5 x 8.0 x 7.2	2222 419 11002	1500
180	10.0	6.0 x 12.0 x 12.5	2222 416 11804	500	1.5	5.0	3.5 x 8.0 x 7.2	2222 419 11502	1500
220	10.0	6.0 x 12.0 x 12.5	2222 416 12204	500	1.8	5.0	3.5 x 8.0 x 7.2	2222 419 11802	1500
270	10.0	6.0 x 12.0 x 12.5	2222 416 12704	500	2.2	5.0	3.5 x 8.0 x 7.2	2222 419 12202	1500
<b>UR<sub>DC</sub> = 63 V</b>					<b>UR<sub>DC</sub> = 400 V</b>				
330	15.0	6.0 x 12.0 x 17.5	2222 416 13304	900	2.7	5.0	3.5 x 8.0 x 7.2	2222 419 12702	1500
390	15.0	6.0 x 12.0 x 17.5	2222 416 13904	900	3.3	5.0	3.5 x 8.0 x 7.2	2222 419 13302	1500
470	15.0	7.0 x 13.5 x 17.5	2222 416 14704	800	3.9	5.0	3.5 x 8.0 x 7.2	2222 419 13902	1500
560	15.0	7.0 x 13.5 x 17.5	2222 416 15604	800	4.0	5.0	3.5 x 8.0 x 7.2	2222 419 11002	1500
680	15.0	8.5 x 15.0 x 17.5	2222 416 16804	650	4.7	5.0	4.5 x 9.0 x 7.2	2222 419 14702	1000
820	15.0	8.5 x 15.0 x 17.5	2222 416 18204	650	5.6	5.0	4.5 x 9.0 x 7.2	2222 419 15602	1000
1000	15.0	10.0 x 16.5 x 17.5	2222 416 11005	600	6.8	5.0	4.5 x 9.0 x 7.2	2222 419 16802	1000
<b>UR<sub>DC</sub> = 160 V</b>					<b>UR<sub>DC</sub> = 400 V</b>				
27	5.0	4.5 x 9.0 x 7.2	2222 417 12703	1000	8.2	5.0	4.5 x 9.0 x 7.2	2222 419 18202	1000
33	5.0	4.5 x 9.0 x 7.2	2222 417 13303	1000	10	5.0	4.5 x 9.0 x 7.2	2222 419 11003	1000
39	5.0	6.0 x 11.0 x 7.2	2222 417 13903	750	12	5.0	4.5 x 9.0 x 7.2	2222 419 11203	1000
47	5.0	6.0 x 11.0 x 7.2	2222 417 14703	750	15	5.0	6.0 x 11.0 x 7.2	2222 419 11503	750
56	5.0	6.0 x 11.0 x 7.2	2222 417 15603	750	18	5.0	6.0 x 11.0 x 7.2	2222 419 11803	750
68	5.0	6.0 x 11.0 x 7.2	2222 417 16803	750	<b>UR<sub>DC</sub> = 400 V</b>				
<b>UR<sub>DC</sub> = 160 V</b>					<b>UR<sub>DC</sub> = 400 V</b>				
82	10.0	4.0 x 10.0 x 12.5	2222 417 18203	750	22	10.0	4.0 x 10.0 x 12.5	2222 419 12203	750
100	10.0	4.0 x 10.0 x 12.5	2222 417 11004	750	27	10.0	4.0 x 10.0 x 12.5	2222 419 12703	750
120	10.0	5.0 x 11.0 x 12.5	2222 417 11204	600	33	10.0	4.0 x 10.0 x 12.5	2222 419 13303	750
150	10.0	5.0 x 11.0 x 12.5	2222 417 11504	600	39	10.0	5.0 x 11.0 x 12.5	2222 419 13903	600
180	10.0	6.0 x 12.0 x 12.5	2222 417 11804	500	47	10.0	6.0 x 12.0 x 12.5	2222 419 14703	500
220	10.0	6.0 x 12.0 x 12.5	2222 417 12204	500	56	10.0	6.0 x 12.0 x 12.5	2222 419 15603	500
<b>UR<sub>DC</sub> = 160 V</b>					<b>UR<sub>DC</sub> = 400 V</b>				
270	15.0	5.0 x 11.0 x 17.5	2222 417 12704	1100	68	10.0	6.0 x 12.0 x 12.5	2222 419 16803	500
330	15.0	6.0 x 12.0 x 17.5	2222 417 13304	900	<b>UR<sub>DC</sub> = 400 V</b>				
390	15.0	6.0 x 12.0 x 17.5	2222 417 13904	900	82	15.0	5.0 x 11.0 x 17.5	2222 419 18203	1100
470	15.0	7.0 x 13.5 x 17.5	2222 417 14704	800	100	15.0	6.0 x 12.0 x 17.5	2222 419 11004	900
560	15.0	7.0 x 13.5 x 17.5	2222 417 15604	800	120	15.0	6.0 x 12.0 x 17.5	2222 419 11204	900
680	15.0	8.5 x 15.0 x 17.5	2222 417 16804	650	150	15.0	6.0 x 12.0 x 17.5	2222 419 11504	900
820	15.0	8.5 x 15.0 x 17.5	2222 417 18204	650	180	15.0	7.0 x 13.5 x 17.5	2222 419 11804	800
1000	15.0	10.0 x 16.5 x 17.5	2222 417 11005	650	220	15.0	8.5 x 15.0 x 17.5	2222 419 12204	650
<b>UR<sub>DC</sub> = 250 V</b>					<b>UR<sub>DC</sub> = 630 V</b>				
10	5.0	3.5 x 8.0 x 7.2	2222 418 11003	1500	1.5	5.0	3.5 x 8.0 x 7.2	2222 420 11502	1500
12	5.0	3.5 x 8.0 x 7.2	2222 418 11203	1500	1.8	5.0	3.5 x 8.0 x 7.2	2222 420 11802	1500
15	5.0	3.5 x 8.0 x 7.2	2222 418 11503	1500	2.2	5.0	3.5 x 8.0 x 7.2	2222 420 12202	1500
18	5.0	4.5 x 9.0 x 7.2	2222 418 11803	1000	2.7	5.0	3.5 x 8.0 x 7.2	2222 420 12702	1500
22	5.0	4.5 x 9.0 x 7.2	2222 418 12203	1000	3.3	5.0	4.5 x 9.0 x 7.2	2222 420 13302	1000
27	5.0	6.0 x 11.0 x 7.2	2222 418 12703	750	3.9	5.0	4.5 x 9.0 x 7.2	2222 420 13902	1000
33	5.0	6.0 x 11.0 x 7.2	2222 418 13303	750	4.7	5.0	6.0 x 11.0 x 7.2	2222 420 14702	750
39	5.0	6.0 x 11.0 x 7.2	2222 418 13903	750	5.6	5.0	6.0 x 11.0 x 7.2	2222 420 15602	750
<b>UR<sub>DC</sub> = 250 V</b>					<b>UR<sub>DC</sub> = 630 V</b>				
47	10.0	4.0 x 10.0 x 12.5	2222 418 14703	750	6.8	5.0	6.0 x 11.0 x 7.2	2222 420 16802	750
56	10.0	4.0 x 10.0 x 12.5	2222 418 15603	750	8.2	5.0	6.0 x 11.0 x 7.2	2222 420 18202	750
68	10.0	4.0 x 10.0 x 12.5	2222 418 16803	750	<b>UR<sub>DC</sub> = 630 V</b>				
82	10.0	5.0 x 11.0 x 12.5	2222 418 18203	600	10	10.0	4.0 x 10.0 x 12.5	2222 420 11003	750
100	10.0	6.0 x 12.0 x 12.5	2222 418 11004	500	12	10.0	4.0 x 10.0 x 12.5	2222 420 11203	750
120	10.0	6.0 x 12.0 x 12.5	2222 418 11204	500	15	10.0	4.0 x 10.0 x 12.5	2222 420 11503	750
<b>UR<sub>DC</sub> = 250 V</b>					<b>UR<sub>DC</sub> = 630 V</b>				
47	10.0	4.0 x 10.0 x 12.5	2222 418 14703	750	18	10.0	5.0 x 11.0 x 12.5	2222 420 11803	600
56	10.0	4.0 x 10.0 x 12.5	2222 418 15603	750	22	10.0	5.0 x 11.0 x 12.5	2222 420 12203	600
68	10.0	4.0 x 10.0 x 12.5	2222 418 16803	750	27	10.0	6.0 x 12.0 x 12.5	2222 420 12703	500
82	10.0	5.0 x 11.0 x 12.5	2222 418 18203	600	33	10.0	6.0 x 12.0 x 12.5	2222 420 13303	500
100	10.0	6.0 x 12.0 x 12.5	2222 418 11004	500	39	10.0	6.0 x 12.0 x 12.5	2222 420 13903	500
120	10.0	6.0 x 12.0 x 12.5	2222 418 11204	500	47	10.0	6.0 x 12.0 x 12.5	2222 420 14703	500
<b>UR<sub>DC</sub> = 250 V</b>					<b>UR<sub>DC</sub> = 630 V</b>				
47	10.0	4.0 x 10.0 x 12.5	2222 418 14703	750	56	15.0	6.0 x 12.0 x 17.5	2222 420 15603	900
56	10.0	4.0 x 10.0 x 12.5	2222 418 15603	750	68	15.0	6.0 x 12.0 x 17.5	2222 420 16803	800
68	10.0	4.0 x 10.0 x 12.5	2222 418 16803	750	82	15.0	7.0 x 13.5 x 17.5	2222 420 18203	800
82	10.0	5.0 x 11.0 x 12.5	2222 418 18203	600	100	15.0	7.0 x 13.5 x 17.5	2222 420 11004	650
100	10.0	6.0 x 12.0 x 12.5	2222 418 11004	500	120	15.0	8.5 x 15.0 x 17.5	2222 420 11204	650
120	10.0	6.0 x 12.0 x 12.5	2222 418 11204	500	150	15.0	8.5 x 15.0 x 17.5	2222 420 11504	600



**KP 460/464** reelpack

C (nF)	dimensions d x l (mm)	catalogue number ±1%	smallest packing quantity	C (nF)	dimensions d x l (mm)	catalogue number ±1%	smallest packing quantity
<b>U<sub>RD</sub> = 63 V</b>				<b>U<sub>RD</sub> = 250 V</b>			
6.8	5 x 11	2222 460 86802	2500	22	8.5 x 15	2222 462 82203	1000
7.5	5 x 11	2222 460 87502	2500				
8.2	5 x 11	2222 460 88202	2500				
9.1	5 x 11	2222 460 89102	2500				
10	6 x 15	2222 460 81003	1500	<b>U<sub>RD</sub> = 400 V</b>			
11	6 x 15	2222 460 81103	1500	0.62	5 x 11	2222 463 86201	2500
12	6 x 15	2222 460 81203	1500	0.68	5 x 11	2222 463 86801	2500
13	6 x 15	2222 460 81303	1500	0.75	5 x 11	2222 463 87501	2500
15	6 x 15	2222 460 81503	1500	0.82	5 x 11	2222 463 88201	2500
16	6 x 15	2222 460 81603	1500	0.91	5 x 11	2222 463 89101	2500
18	6 x 15	2222 460 81803	1500	1	5 x 11	2222 463 81002	2500
20	6 x 15	2222 460 82003	1500	1.1	5 x 11	2222 463 81102	2500
22	6 x 15	2222 460 82203	1500	1.2	6 x 15	2222 463 81202	1500
24	6.5 x 15	2222 460 82403	1500	1.3	6 x 15	2222 463 81302	1500
27	6.5 x 15	2222 460 82703	1500	1.5	6 x 15	2222 463 81502	1500
30	7 x 15	2222 460 83003	1500	1.6	6 x 15	2222 463 81602	1500
33	7 x 15	2222 460 83303	1000	1.8	6 x 15	2222 463 81802	1500
36	7 x 15	2222 460 83603	1000	2	6 x 15	2222 463 82002	1500
39	7.5 x 15	2222 460 83903	1000	2.2	6.5 x 15	2222 463 82202	1500
43	7.5 x 15	2222 460 84303	1000	2.4	6.5 x 15	2222 463 82402	1500
47	8 x 15	2222 460 84703	1000	2.7	6.5 x 15	2222 463 82702	1500
51	8 x 15	2222 460 85103	1000	3	6.5 x 15	2222 463 83002	1500
56	8.5 x 15	2222 460 85603	1000	3.3	7 x 15	2222 463 83302	1000
62	8.5 x 15	2222 460 86203	1000	3.6	7 x 15	2222 463 83602	1000
<b>U<sub>RD</sub> = 160 V</b>				3.9	7 x 15	2222 463 83902	1000
3.6	5 x 11	2222 461 83602	2500	4.3	7.5 x 15	2222 463 84302	1000
3.9	5 x 11	2222 461 83902	2500	4.7	7.5 x 15	2222 463 84702	1000
4.3	5 x 11	2222 461 84302	2500	5.1	7.5 x 15	2222 463 85102	1000
4.7	5 x 11	2222 461 84702	2500	5.6	8 x 15	2222 463 85602	1000
5.1	5 x 11	2222 461 85102	2500	6.2	8 x 15	2222 463 86202	1000
5.6	5 x 11	2222 461 85602	2500	6.8	8.5 x 15	2222 463 86802	1000
6.2	5 x 11	2222 461 86202	2500	7.5	8.5 x 15	2222 463 87502	1000
6.8	6 x 15	2222 461 86802	1500	8.2	8.5 x 15	2222 463 88202	1000
7.5	6 x 15	2222 461 87502	1500	<b>U<sub>RD</sub> = 630 V</b>			
8.2	6 x 15	2222 461 88202	1500	0.047	5 x 11	2222 464 84709	2500
9.1	6 x 15	2222 461 89102	1500	0.051	5 x 11	2222 464 85109	2500
10	6 x 15	2222 461 88003	1500	0.056	5 x 11	2222 464 85609	2500
11	6 x 15	2222 461 81003	1500	0.062	5 x 11	2222 464 86209	2500
12	6 x 15	2222 461 81103	1500	0.68	5 x 11	2222 464 86809	2500
13	6 x 15	2222 461 81203	1500	0.075	5 x 11	2222 464 87509	2500
15	6 x 15	2222 461 81303	1500	0.082	5 x 11	2222 464 88209	2500
16	6.5 x 15	2222 461 81503	1500	0.091	5 x 11	2222 464 89109	2500
18	6.5 x 15	2222 461 81603	1500	0.1	5 x 11	2222 464 81001	2500
20	6.5 x 15	2222 461 81803	1500	0.11	5 x 11	2222 464 81101	2500
22	7 x 15	2222 461 82003	1000	0.12	5 x 11	2222 464 81201	2500
24	7 x 15	2222 461 82203	1000	0.13	5 x 11	2222 464 81301	2500
27	7.5 x 15	2222 461 82403	1000	0.15	5 x 11	2222 464 81501	2500
30	8 x 15	2222 461 82703	1000	0.16	5 x 11	2222 464 81601	2500
33	8 x 15	2222 461 83003	1000	0.18	5 x 11	2222 464 81801	2500
36	8.5 x 15	2222 461 83303	1000	0.2	5 x 11	2222 464 82001	2500
39	8.5 x 15	2222 461 83903	1000	0.22	5 x 11	2222 464 82201	2500
<b>U<sub>RD</sub> = 250 V</b>				0.24	5 x 11	2222 464 82401	2500
1.2	5 x 11	2222 462 81202	2500	0.27	5 x 11	2222 464 82701	2500
1.3	5 x 11	2222 462 81302	2500	0.3	5 x 11	2222 464 83001	2500
1.5	5 x 11	2222 462 81502	2500	0.33	5 x 11	2222 464 83301	2500
1.6	5 x 11	2222 462 81602	2500	0.36	5 x 11	2222 464 83601	2500
1.8	5 x 11	2222 462 81802	2500	0.39	5 x 11	2222 464 83901	2500
2	5 x 11	2222 462 82002	2500	0.43	5 x 11	2222 462 84301	2500
2.2	5 x 11	2222 462 82202	2500	0.47	5 x 11	2222 464 84701	2500
2.4	5 x 11	2222 462 82402	2500	0.51	5 x 11	2222 464 85101	2500
2.7	5 x 11	2222 462 82702	2500	0.56	5 x 11	2222 464 85601	2500
3	5 x 11	2222 462 83002	2500	0.62	6 x 15	2222 464 86201	1500
3.3	5 x 11	2222 462 83302	2500	0.68	6 x 15	2222 464 86801	1500
3.6	6 x 15	2222 462 83602	1500	0.75	6 x 15	2222 464 87501	1500
3.9	6 x 15	2222 462 83902	1500	0.82	6 x 15	2222 464 88201	1500
4.3	6 x 15	2222 462 84302	1500	0.91	6 x 15	2222 464 89101	1500
4.7	6 x 15	2222 462 84702	1500	1	6 x 15	2222 464 81002	1500
5.1	6 x 15	2222 462 85102	1500	1.1	6 x 15	2222 464 81102	1500
5.6	6 x 15	2222 462 85602	1500	1.2	6 x 15	2222 464 81202	1500
6.2	6 x 15	2222 462 86202	1500	1.3	6.5 x 15	2222 464 81302	1500
6.8	6 x 15	2222 462 86802	1500	1.5	6.5 x 15	2222 464 81502	1500
7.5	6 x 15	2222 462 87502	1500	1.6	6.5 x 15	2222 464 81602	1500
8.2	6.5 x 15	2222 462 88202	1500	1.8	6.5 x 15	2222 464 81802	1500
9.1	6.5 x 15	2222 462 89102	1500	2	7 x 15	2222 464 82002	1000
10	6.5 x 15	2222 462 81003	1500	2.2	7 x 15	2222 464 82202	1000
11	7 x 15	2222 462 81103	1000	2.4	7 x 15	2222 464 82402	1000
12	7 x 15	2222 462 81203	1000	2.7	7.5 x 15	2222 464 82702	1000
13	7 x 15	2222 462 81303	1000	3	7.5 x 15	2222 464 83002	1000
15	7.5 x 15	2222 462 81503	1000	3.3	8 x 15	2222 464 83302	1000
16	7.5 x 15	2222 462 81603	1000	3.6	8 x 15	2222 464 83602	1000
18	8 x 15	2222 462 81803	1000	3.9	8 x 15	2222 464 83902	1000
20	8.5 x 15	2222 462 82003	1000	4.3	8.5 x 15	2222 464 84302	1000
				4.7	8.5 x 15	2222 464 84702	1000

capacitors

Film



### Overview of safety approvals

							EN 60384-14 2 <sup>nd</sup> edition / EN132400 275V <sub>AC</sub>	
	V <sub>AC</sub>	Class	UL1414 250 V <sub>AC</sub>	UL1283	CSA C22-2 no 1	CSA C22-2 no8	CCEE 	ENEC 
<b>Y2 class</b>								
MKP 338 6	300	Y2	•	pending	•	pending		•
MKP 336 6	250	Y2	•	•	•			•
<b>X1 class</b>								
MKP 338 1	440	X1	•					•
MKP 336 1	275	X1	•	•	•			•
<b>X2 class</b>								
MKP 338 2	275	X2	•	•	•	•	•	•
MKP 336 2	275	X2	•	•	•	•	•	•
MKP 335 5	275	X2	•		•		•	•
MKP 338 4	300	X2		•		•		•
<b>X2 class insulated leads</b>								
MKP 435	275	X2						•

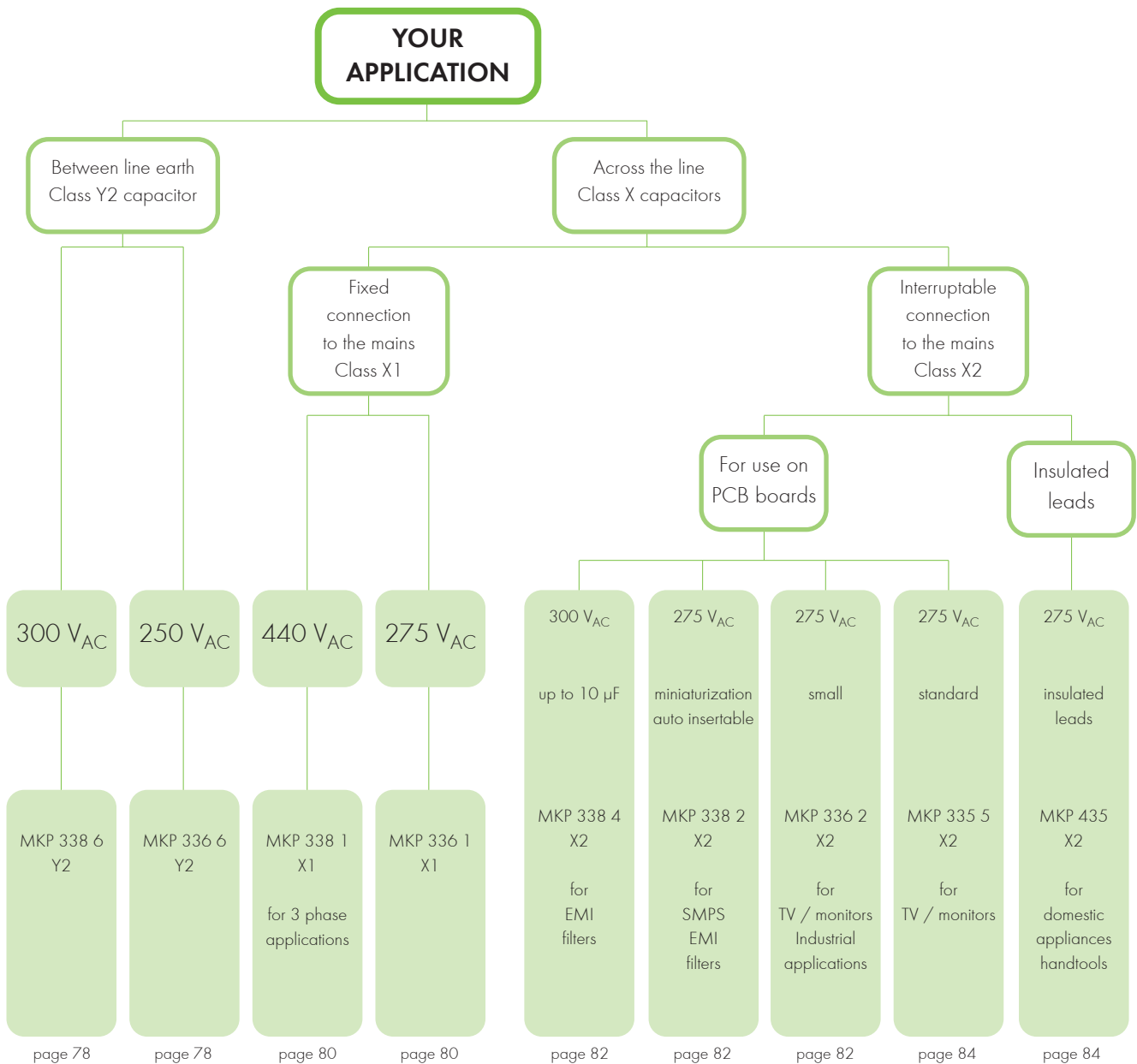


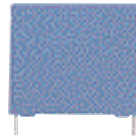
• **Broad** range supplied by BCcomponents

BCcomponents not only offers the benefit of being the technology leader in interference suppression film capacitors with the 338 and 336 MKP series, but has now broadened the range for interference suppression with new and extended series covering all possible needs for interference applications.

New series includes:

- The new 338 4 X2 300 V<sub>AC</sub> MKP series specially designed for EMI applications and includes extended capacitance range up to 10 µF.
- The 338 6 Y2 300 V<sub>AC</sub> MKP series with extended capacitance range up to 470 nF.

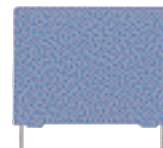










Series	MKP 338 6				MKP 336 6			
Dielectric	metallized polypropylene				metallized polypropylene			
Tolerance <sup>1)</sup> / E-series <sup>2)</sup>	±20% / ±10% / E6				±10%, ±20% / E6			
Safety approvals								
	small dimensions				for standard application			
Rated Voltage U <sub>R</sub>	300 V <sub>AC</sub>				250 V <sub>AC</sub>			
Capacitance								
0.001 μF								
0.0015 μF	7.5							
0.0022 μF								
0.0033 μF								
0.0047 μF								
0.0068 μF								
0.010 μF		10						
0.015 μF								
0.022 μF			15.0					15.0
0.033 μF								
0.047 μF								
0.068 μF								
0.10 μF								
0.15 μF				22.5				
0.22 μF								
0.33 μF								
0.47 μF								
0.68 μF								
1.0 μF								
1.5 μF								
2.2 μF								
3.3 μF								
	preferred		E6					
Case dimensions	in columns 1, pitch size (mm)							
Climatic category	55 / 105 / 56 / B				55 / 100 / 21 / B			
Tan δ (10 kHz)	≤20 × 10 <sup>-4</sup>				≤10 × 10 <sup>-4</sup>			
Insulation resistance								
R: C ≤ 330 nF	>15000 MΩ				>15000 MΩ			
R × C: C > 330 nF	-				-			
Pulse rise time at U <sub>R</sub>	100 V/μs				200 V/μs			
Reference specification	IEC 60 384-14 2nd edition, EN 132400							
Applications	Class Y2				Class Y2			
Packing	loose, taped on reel or ammpack				loose, taped on reel (ammpack available on request)			
Lead length	3.5 mm, 5 mm and 25 mm standard available				3.5 mm and 25 mm (lead lengths between 3.2 and 35 mm are available on request)			
Note	<sup>1)</sup> 5% tolerance available on request, <sup>2)</sup> E12 capacitance values available on request							



MKP 338 6 series, Class Y2, 20%				MKP 336 6 series, Class Y2, 20%			
C (μF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 338 .....	C (μF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 336 .....
<b>U<sub>R</sub> = 300 V<sub>AC</sub></b>				<b>U<sub>R</sub> = 250 V<sub>AC</sub></b>			
0.001	7.5	3.0 x 8.0 x 10.0	60102	0.001	10.0	4.0 x 10.0 x 12.5	60102
0.0015	7.5	3.0 x 8.0 x 10.0	60152	0.0015	10.0	4.0 x 10.0 x 12.5	60152
0.0022	7.5	4.0 x 9.0 x 10.0	60222	0.0022	10.0	4.0 x 10.0 x 12.5	60222
0.0033	7.5	4.0 x 9.0 x 10.0	60332	0.0033	10.0	5.0 x 11.0 x 12.5	60332
0.0047	7.5	5.0 x 10.5 x 10.0	60472	0.0047	10.0	6.0 x 12.0 x 12.5	60472
0.0068	15.0	5.0 x 11.0 x 17.5	60682	0.0068	10.0	6.0 x 12.0 x 12.5	60682
0.01	15.0	5.0 x 11.0 x 17.5	60103	0.01	15.0	5.0 x 11.0 x 17.5	60103
0.015	15.0	6.0 x 12.0 x 17.5	60153	0.015	15.0	6.0 x 12.0 x 17.5	60153
0.022	15.0	7.0 x 13.5 x 17.5	60223	0.022	15.0	7.0 x 13.5 x 17.5	60223
0.033	15.0	8.5 x 15.0 x 17.5	60333	0.033	15.0	8.5 x 15.0 x 17.5	60333
0.047	15.0	10.0 x 16.5 x 17.5	60473	0.047	15.0	10.0 x 16.5 x 17.5	60473
0.068	22.5	8.5 x 18.0 x 26.0	60683				
0.1	22.5	10.0 x 19.5 x 26.0	60104				
0.15	22.5	12.0 x 22.0 x 26.0	60154				
0.22	27.5	13.0 x 23.0 x 31.0	60224				
0.33	27.5	18.0 x 28.0 x 31.0	60334				
0.47	27.5	21.0 x 31.0 x 31.0	60474				

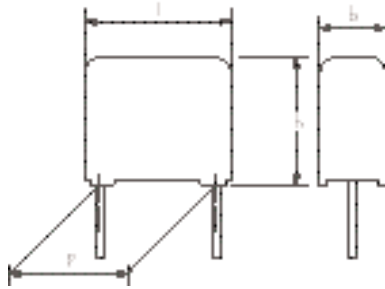


Series	MKP 338 1			MKP 336 1		
Dielectric	metallized polypropylene			metallized polypropylene		
Tolerance <sup>1)</sup> / E-series <sup>2)</sup>	+20% / ±10% / E6			±10%, ±20% / E6		
Safety approvals	  			  		
	3 phase applications			for standard application		
Rated Voltage U <sub>R</sub>	440 V <sub>AC</sub>			275 V <sub>AC</sub>		
Capacitance						
0.001 μF				10.0		
0.0015 μF						
0.0022 μF						
0.0033 μF						
0.0047 μF						
0.0068 μF						
0.010 μF	15.0					
0.015 μF						
0.022 μF						
0.033 μF						
0.047 μF						
0.068 μF						
0.10 μF						
0.15 μF		22.5				
0.22 μF		22.5				
0.33 μF			27.5			
0.47 μF						
0.68 μF		<b>X1</b>	27.5		<b>X1</b>	
1.0 μF						
1.5 μF						
2.2 μF						
3.3 μF						
	preferred	E6				
Case dimensions	in columns e (mm)					
Climatic category	55 / 105 / 56 / B			55 / 100 / 21 / B		
Tan δ (10 kHz)	≤70 × 10 <sup>-4</sup>			≤70 × 10 <sup>-4</sup>		
Insulation resist.						
R: C ≤ 330 nF	>15 000 MΩ			>15 000 MΩ		
R × C: C > 330 nF	>5000 s			>5000 s		
Pulse rise time at U <sub>R</sub>	100 V/μs			200 V/μs		
Reference specification	IEC 60 384-14 2nd edition, EN 132400			IEC 60 384-14 2nd edition, EN 132400		
Applications	Class X1			Class X1		
Packing	loose, taped on reel or ammpack			loose, taped on reel (ammpack available on request)		
Lead length	3.5 mm, 25 mm (lead lengths between 3.2 and 35 mm are available on request)					
Note	<sup>1)</sup> 5% tolerance available on request, <sup>2)</sup> E12 capacitance values available on request					



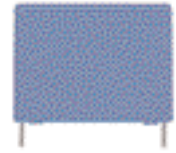


MKP 338 1 series, Class X1, 20 %				MKP 336 1 series, Class X1, 20 %			
C (μF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 338 .....	C (μF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 336 .....
<b>U<sub>R</sub> = 440 V<sub>AC</sub></b>				<b>U<sub>R</sub> = 275 V<sub>AC</sub></b>			
0.01	15.0	5.0 x 11.0 x 17.5	10103	0.001	10.0	4.0 x 10.0 x 12.5	10102
0.015	15.0	5.0 x 11.0 x 17.5	10153	0.0015	10.0	4.0 x 10.0 x 12.5	10152
0.022	15.0	5.0 x 11.0 x 17.5	10223	0.0022	10.0	4.0 x 10.0 x 12.5	10222
0.033	15.0	6.0 x 12.0 x 17.5	10333	0.0033	10.0	5.0 x 11.0 x 12.5	10332
0.047	15.0	7.0 x 13.5 x 17.5	10473	0.0047	10.0	5.0 x 11.0 x 12.5	10472
0.068	15.0	8.5 x 15.0 x 17.5	10683	0.0068	10.0	5.0 x 11.0 x 12.5	10682
0.1	15.0	10.0 x 16.5 x 17.5	10104	0.01	10.0	6.0 x 12.0 x 12.5	10103
0.15	22.5	8.5 x 18.0 x 26.0	10154	0.015	15.0	5.0 x 11.0 x 17.5	10153
0.22	22.5	10.0 x 19.5 x 26.0	10224	0.022	15.0	5.0 x 11.0 x 17.5	10223
0.33	27.5	13.0 x 23.0 x 31.0	10334	0.033	15.0	6.0 x 12.0 x 17.5	10333
0.47	27.5	15.0 x 25.0 x 31.0	10474	0.047	15.0	7.0 x 13.5 x 17.5	10473
0.68	27.5	18.0 x 28.0 x 31.0	10684	0.068	15.0	8.5 x 15.0 x 17.5	10683
1	27.5	21.0 x 31.0 x 31.0	10105	0.1	15.0	10.0 x 16.5 x 17.5	10104
				0.15	22.5	8.5 x 18.0 x 26.0	10154
				0.22	22.5	10.0 x 19.5 x 26.0	10224
				0.33	27.5	13.0 x 23.0 x 31.0	10334
				0.47	27.5	15.0 x 25.0 x 31.0	10474
				0.68	27.5	18.0 x 28.0 x 31.0	10684
				1.0	27.5	21.0 x 31.0 x 31.0	10105





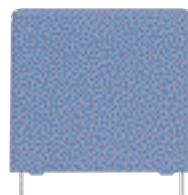
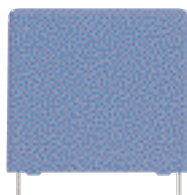
capacitors  
Film







Series	MKP 338 4			MKP 338 2			MKP 336 2		
Dielectric	metallized polypropylene			metallized polypropylene			metallized polypropylene		
Tolerance <sup>1)</sup> / E-series <sup>2)</sup>	±10%, ±20% / E6			±10%, ±20% / E6			±10%, ±20% / E6		
Safety approvals									
	for SPMS and EMI filters			for SPMS and EMI filters			for standard application		
Rated Voltage $U_R$	300 V <sub>AC</sub>			275 V <sub>AC</sub>			250 V <sub>AC</sub>		
Capacitance									
0.001 μF									
0.0015 μF									
0.0022 μF									
0.0033 μF									
0.0047 μF									
0.0068 μF				7.5			10.0		
0.010 μF	15.0						10.0		
0.015 μF									
0.022 μF									
0.033 μF	<del>X2</del>								
0.047 μF									
0.068 μF									
0.10 μF									
0.15 μF				15.0					
0.22 μF									
0.33 μF									
0.47 μF									
0.68 μF	22.5								
1.0 μF									
1.5 μF									
2.2 μF							22.5		
3.3 μF	27.5								
4.7 μF									
6.8 μF				37.5					
10 μF				55					
	preferred E6								
Case dimensions	in columns: pitch size (mm)								
Climatic category	55 / 105 / 56 / B								
Tan δ (10 kHz)	≤70 × 10 <sup>-4</sup>								
Insulation resist.									
R: C ≤ 330 nF	>15000 MΩ								
R × C: C > 330 nF	>5000 s								
Pulse rise time at $U_R$	100 V/μs								
Reference specification	IEC 60 384-14 2nd edition, EN 132400								
Applications	Class X2								
Packing	loose, taped on ammpack or reel			loose, taped on reel (ammpack available on request)			loose, taped on ammpack or reel		
Lead length	3.5 mm, 5 mm, 25 mm standard available			3.5 mm, 5 mm, 25 mm standard available			3.5 mm, 5 mm, 25 mm standard available		
Note	1) 5% tolerance available on request, 2) E12 capacitance values available on request								



MKP 338 4 series, Class X2, 20% tolerance				MKP 336 2 series, Class X2, 20% tolerance			
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 338 .....	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 336 .....
<b>U<sub>R</sub> = 300 V<sub>AC</sub></b>				<b>U<sub>R</sub> = 275 V<sub>AC</sub></b>			
0.01	15.0	5.0 x 11.0 x 17.5	40103	0.001	10.0	4.0 x 10.0 x 12.5	20102
0.015	15.0	5.0 x 11.0 x 17.5	40153	0.0015	10.0	4.0 x 10.0 x 12.5	20152
0.022	15.0	5.0 x 11.0 x 17.5	40223	0.0022	10.0	4.0 x 10.0 x 12.5	20222
0.033	15.0	5.0 x 11.0 x 17.5	40333	0.0033	10.0	5.0 x 11.0 x 12.5	20332
0.047	15.0	5.0 x 11.0 x 17.5	40473	0.0047	10.0	5.0 x 11.0 x 12.5	20472
0.068	15.0	5.0 x 11.0 x 17.5	40683	0.0068	10.0	5.0 x 11.0 x 12.5	20682
0.1	15.0	6.0 x 12.0 x 17.5	40104	0.01	10.0	5.0 x 11.0 x 12.5	20103
0.15	15.0	7.0 x 13.5 x 17.5	40154	0.015	10.0	5.0 x 11.0 x 12.5	20153
0.22	15.0	8.5 x 15.0 x 17.5	40224	0.022	10.0	5.0 x 11.0 x 12.5	20223
0.33	15.0	10.0 x 16.5 x 17.5	40334	0.033	10.0	6.0 x 12.0 x 12.5	20333
0.47	22.5	8.5 x 18.0 x 26.0	40474	0.047	15.0	5.0 x 11.0 x 17.5	20473
0.68	22.5	10.0 x 19.5 x 26.0	40684	0.068	15.0	5.0 x 11.0 x 17.5	20683
1.0	22.5	12.0 x 22.0 x 26.0	40105	0.1	15.0	6.0 x 12.0 x 17.5	20104
1.5	27.5	15.0 x 25.0 x 31.0	40155	0.15	15.0	8.5 x 15.0 x 17.5	20154
2.2	27.5	18.0 x 28.0 x 31.0	40225	0.22	15.0	10.0 x 16.5 x 17.5	20224
3.3	27.5	21.0 x 31.0 x 31.0	40335	0.33	22.5	8.5 x 18.0 x 26.0	20334
4.7	37.5	18.0 x 35.0 x 42.0	40475	0.47	22.5	10.0 x 19.5 x 26.0	20474
6.8	37.5	21.0 x 38.0 x 42.0	40685	0.68	27.5	11.0 x 21.0 x 31.0	20684
10.0	55.0	21.0 x 38.0 x 59.5	40106	1.0	27.5	13.0 x 23.0 x 31.0	20105
				1.5	27.5	18.0 x 28.0 x 31.0	20155
				2.2	27.5	21.0 x 31.0 x 31.0	20225
MKP 338 2 series, Class X2, 20% tolerance							
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 338 .....				
<b>U<sub>R</sub> = 275 V<sub>AC</sub></b>							
0.001	7.5	4.0 x 9.0 x 10.0	20102				
0.0015	7.5	4.0 x 9.0 x 10.0	20152				
0.0022	7.5	4.0 x 9.0 x 10.0	20222				
0.0033	7.5	4.0 x 9.0 x 10.0	20332				
0.0047	7.5	4.0 x 9.0 x 10.0	20472				
0.0068	7.5	4.0 x 9.0 x 10.0	20682				
0.01	7.5	4.0 x 9.0 x 10.0	20103				
0.015	7.5	4.0 x 9.0 x 10.0	20153				
0.022	7.5	4.0 x 9.0 x 10.0	20223				
0.033	7.5	5.0 x 10.5 x 10.0	20333				
0.047	7.5	6.0 x 11.5 x 10.0	20473				
0.068	10.0	6.0 x 12.0 x 12.5	20683				
0.1	10.0	6.0 x 12.0 x 12.5	20104				
0.15	15.0	7.0 x 13.5 x 17.5	20154				
0.22	15.0	8.5 x 15.0 x 17.5	20224				
0.33	15.0	10.0 x 16.5 x 17.5	20334				
0.47	22.5	8.5 x 18.0 x 2.0	20474				
0.68	22.5	10.0 x 19.5 x 26.0	20684				
1.0	22.5	12.0 x 22.0 x 26.0	20105				
1.5	27.5	15.0 x 25.0 x 31.0	20155				
2.2	27.5	18.0 x 28.0 x 31.0	20225				
3.3	27.5	21.0 x 31.0 x 31.0	20335				



Series	MKP 335 5			MKP 435			
Dielectric	metallized polypropylene			metallized polypropylene			
Tolerance <sup>1)</sup> / E-series <sup>2)</sup>	±10%, ±20% / E6			±10%, ±20% / ±5% / E6			
Safety approvals	  						
	for TV and monitors			insulated leads for domestic appliances and handtools			
Rated Voltage $U_R$	275 V <sub>AC</sub>			275 V <sub>AC</sub>			
Capacitance							
0.001 μF							
0.0015 μF							
0.0022 μF							
0.0033 μF							
0.0047 μF							
0.0068 μF							
0.010 μF		X2			X2		
0.015 μF	15.0			15.0			
0.022 μF							
0.033 μF							
0.047 μF							
0.068 μF							
0.10 μF							
0.15 μF					22.5		
0.22 μF		22.5			22.5		
0.33 μF							
0.47 μF		22.5					
0.68 μF			27.5			27.5	
1.0 μF							
1.5 μF			27.5				
2.2 μF							
3.3 μF							
	preferred						
Case dimensions	in columns <span style="background-color: #c6e0b4; padding: 2px;"> </span> e (mm)						
Climatic category	55 / 100 / 56 / B			40 / 100 / 56 / C			
Tan δ (10 kHz)	≤70 × 10 <sup>-4</sup>			≤70 × 10 <sup>-4</sup>			
Insulation resistance							
R: C ≤ 330 nF	>15 000 MΩ			> 60 000 MΩ			
R × C: C > 330 nF	> 5000 s			> 10 000 s			
Pulse rise time at $U_R$	100 V/μs			100 V/μs			
Reference specification	IEC 60 384-14 2nd edition, EN 132400			IEC 60 384-14 2nd edition, EN 132400			
Applications	Class X2			Class X2			
Packing	loose			loose			
Lead length	3.5 mm, 5 mm and 25 mm			35 mm, 40 mm, 45 mm other lead lengths on request			
Note	<sup>1)</sup> 5% tolerance available on request <sup>2)</sup> E12 capacitance values available on request			solid wire / stranded wire			



MKP 335 5 series, Class X2, 20% tolerance				MKP 435 series, Class X2 insulated leads			
C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 335 .....	C (µF)	pitch* (mm)	dimensions b x h x l (mm)	catalogue number 2222 435 .....
<b>U<sub>R</sub> = 275 V<sub>AC</sub></b>				<b>U<sub>R</sub> = 275 V<sub>AC</sub></b>			
0.01	15.0	5.0 x 11.0 x 17.5	50103	0.01	15.0	5.5 x 10.5 x 18	20103
0.015	15.0	5.0 x 11.0 x 17.5	50153	0.015	15.0	5.5 x 10.5 x 18	20153
0.022	15.0	5.0 x 11.0 x 17.5	50223	0.022	15.0	5.5 x 10.5 x 18	20223
0.033	15.0	5.0 x 11.0 x 17.5	50333	0.033	15.0	5.5 x 10.5 x 18	20333
0.047	15.0	6.0 x 12.0 x 17.5	50473	0.047	15.0	6.5 x 12.5 x 18	20473
0.068	15.0	7.0 x 13.5 x 17.5	50683	0.068	15.0	7.5 x 13.5 x 18	20683
0.1	15.0	8.5 x 15.0 x 17.5	50104	0.1	15.0	8.5 x 14.5 x 18	20104
0.15	15.0	10.0 x 16.5 x 17.5	50154	0.15	22.5	7.5 x 15.5 x 26.5	20154
0.22	22.5	8.5 x 18.0 x 26.0	50124	0.22	22.5	8.5 x 16.5 x 26.5	20224
0.33	22.5	10.0 x 19.5 x 26.0	50334	0.33	22.5	10.5 x 18.5 x 26.5	20334
0.47	22.5	12.0 x 22.0 x 26.0	50474	0.47	27.5	11.5 x 20.5 x 31.5	20474
0.68	27.5	15.0 x 25.0 x 31.0	50684	0.68	27.5	13.5 x 23.5 x 31.5	20684
1.0	27.5	18.0 x 28.0 x 31.0	50105	1.0	27.5	15.0 x 24.5 x 31.5	20105
1.5	27.5	21.0 x 31.0 x 31.0	50155				

\* = body size pitch



## 383 – Product features

## Customer benefits

Market needs in  
AC & Pulse capacitors

metallized technology  
boxed lay-out

upgraded materials  
up to 105 °C

double sided metallized  
electronic design

polypropylene material

serial construction  
(2, 3 and 4-section)

taped versions  
(bent back pitches to 7.5 mm)

small design  
(low component height)

high temperature

high dv/dt  
up to 13 000 V/μsec

low loss factor

voltage  
up to 2500 Vdc

autoinsertion

miniaturisation, low profile  
design with electronic ballasts

higher temperature

high pulseload  
high current

high frequency use

high voltage

to avoid manual insertion  
(cost saving)



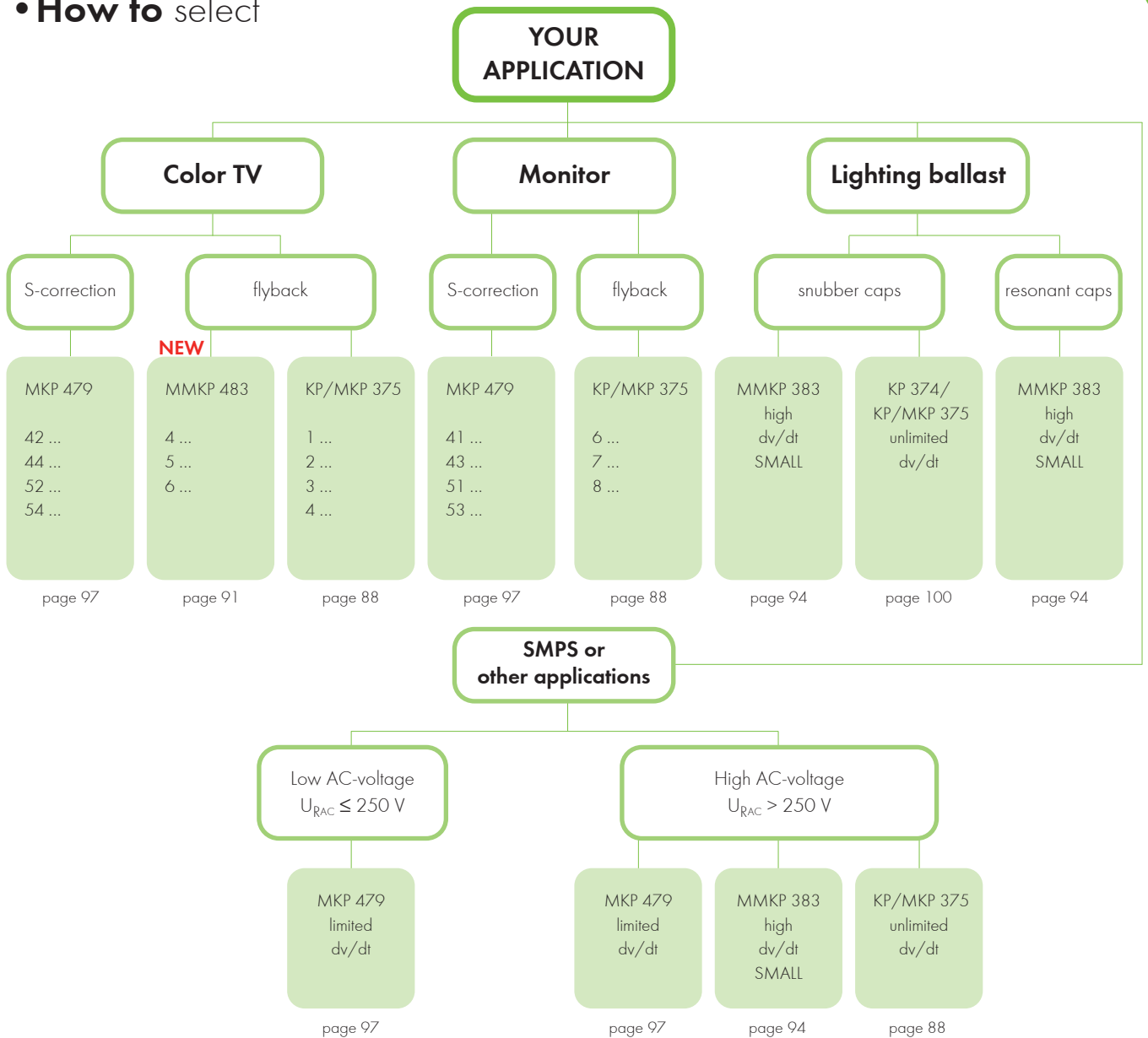
## • Power applications

BCcomponents' specialist experience in AC & Pulse capacitors for electronic ballast and TV/Monitor power control means that we can provide a unique service to manufacturers of power supplies and motor-control circuits. Not only do we offer an extensive standard range of polypropylene film capacitors tailored specifically to power applications, we also provide custom-designed products for manufacturers with special requirements.

The range comprises products offering:

- High pulse-load capability
- Low dissipation factor at high frequencies
- Small dimensions
- High voltage

## • How to select





Series	KP/MKP 375															
Dielectric	polypropylene															
Tolerance / E-series <sup>1)</sup>	3.5%, 5% / E24															
U <sub>R</sub> (V <sub>DC</sub> )	630		1000		1600		1600 monitor		2000		2000 monitor		2500 monitor			
U <sub>R</sub> (V <sub>AC</sub> )	300		400		500		500		600		600		600			
U <sub>R</sub> (V <sub>PP</sub> )	850		1100		1400		1400		1700		1700		1700			
Capacitance																
0.10 nF																
0.12 nF																
0.15 nF																
0.18 nF																
0.22 nF																
0.27 nF																
0.33 nF																
0.39 nF																
0.47 nF																
0.56 nF																
0.68 nF																
0.82 nF																
1 nF																
1.2 nF																
1.5 nF																
1.8 nF																
2.2 nF																
2.7 nF																
3.3 nF																
3.9 nF																
4.7 nF																
5.6 nF																
6.8 nF																
8.2 nF																
10 nF																
12 nF																
15 nF																
18 nF																
22 nF																
27 nF																
33 nF																
39 nF																
47 nF																
56 nF																
68 nF																
82 nF																
100 nF																
120 nF																
150 nF																
180 nF																
220 nF																
270 nF																
	preferred															
Climatic category	55 / 105 / 56															
Reference specification	IEC 60 384-17															
Tan δ (10 kHz) (x 10 <sup>-4</sup> )	≤6	≤6	≤8	≤8	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6
Tan δ (100 kHz) (x 10 <sup>-4</sup> )	≤10	≤10	≤15	≤20	≤10	≤10	≤10	≤15	≤10	≤10	≤15	≤6	≤10	≤10	≤10	≤15
Pulse slope at U <sub>R</sub> (V <sub>DC</sub> ) (V/μsec)	15000	8000	2800	1900	27000	15000	5000	3300	21000	7000	4700	21000	7000	30000	10000	6700
Packing	loose	(*)	loose	loose	loose	(*)	loose	loose	(*)	loose	loose	(*)	loose	(*)	loose	loose
	taped		taped		taped		taped		taped		taped		taped		taped	taped
Insulation resistance	>100000 MΩ															
Note	(*) loose, taped on reel, taped on reel bent back pitch 7.5 mm for ordering non-preferred types see our data handbook BC05, 2001 / 2002 edition															

TUNING

FLYBACK

IGNITION  
CIRCUITS





KP/MKP 375 series, 5%, loose in box

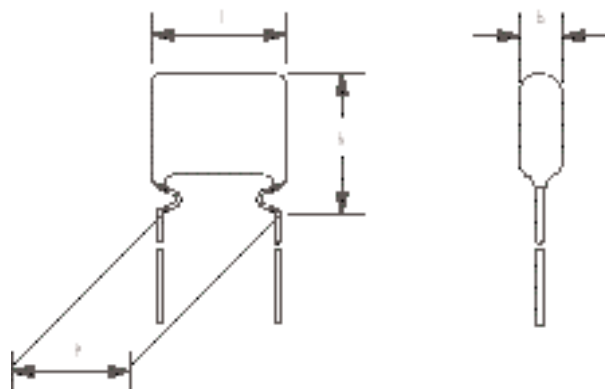
C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 375 .....	smallest packing quantity	C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 375 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 630 V</b>					<b>U<sub>RDC</sub> = 1600 V</b>				
0.68	10.0	5.0 x 13.0 x 14.5	14681	2000	0.68	15.0	5.5 x 14.5 x 18.5	34681	2000
0.82	10.0	5.5 x 13.5 x 14.5	14821	2000	0.82	15.0	5.5 x 14.5 x 18.5	34821	2000
1.0	10.0	5.5 x 13.5 x 14.5	14102	2000	1	15.0	6.0 x 15.0 x 18.5	34102	2000
1.2	10.0	5.5 x 13.5 x 14.5	14122	2000	1.2	15.0	6.0 x 15.0 x 18.5	34122	2000
1.5	10.0	5.5 x 13.5 x 14.5	14152	2000	1.5	15.0	5.5 x 14.5 x 18.5	34152	2000
1.8	10.0	6.0 x 14.0 x 14.5	14182	1750	1.8	15.0	6.0 x 15.0 x 18.5	34182	2000
2.2	10.0	6.0 x 14.0 x 14.5	14222	1750	2.2	15.0	6.5 x 15.5 x 18.5	34222	1500
2.7	10.0	6.0 x 14.0 x 14.5	14272	1750	2.7	15.0	7.5 x 16.5 x 18.5	34272	1250
3.3	15.0	5.0 x 14.0 x 18.5	14332	2000	3.3	15.0	8.0 x 17.0 x 18.5	34332	1250
3.9	15.0	5.5 x 14.5 x 18.5	14392	2000	3.9	15.0	9.0 x 18.0 x 18.5	34392	1000
4.7	15.0	5.5 x 14.5 x 18.5	14472	2000	4.7	22.5	6.0 x 19.0 x 26.0	34472	800
5.6	15.0	5.5 x 14.5 x 18.5	14562	2000	5.6	22.5	6.0 x 19.0 x 26.0	34562	800
6.8	15.0	6.0 x 15.0 x 18.5	14682	2000	6.8	22.5	6.5 x 19.5 x 26.0	34682	750
8.2	15.0	6.0 x 15.0 x 18.5	14822	2000	8.2	22.5	7.0 x 20.0 x 26.0	34822	650
10	15.0	6.0 x 15.0 x 18.5	14103	2000	10	22.5	8.0 x 21.0 x 26.0	34103	550
12	15.0	6.0 x 15.0 x 18.5	14123	2000	12	22.5	8.5 x 21.5 x 26.0	34123	500
15	15.0	6.0 x 15.0 x 18.5	14153	2000	15	22.5	9.5 x 22.5 x 26.0	34153	400
18	15.0	6.5 x 15.5 x 18.0	14183	1500	18	22.5	10.5 x 23.5 x 26.0	34183	350
22	15.0	7.0 x 16.0 x 18.5	14223	1500	22	27.5	9.5 x 22.5 x 30.0	34223	500
27	15.0	8.0 x 17.0 x 18.5	14273	1250	27	27.5	10.5 x 23.5 x 30.0	34273	450
33	15.0	8.5 x 17.5 x 18.5	14333	1000	33	27.5	11.5 x 24.5 x 30.0	34333	400
39	22.5	7.0 x 20.0 x 26.0	14393	650	39	27.5	12.5 x 25.5 x 30.0	34393	350
47	22.5	7.0 x 20.0 x 26.0	14473	650	<b>U<sub>RDC</sub> = 1600 V monitor</b>				
56	22.5	7.0 x 20.0 x 26.0	14563	650	1	15.0	7.5 x 16.5 x 18.5	64102	1250
68	22.5	7.5 x 20.5 x 26.0	14683	600	1.2	15.0	8.0 x 17.0 x 18.5	64122	1250
82	22.5	8.0 x 21.0 x 26.0	14823	550	1.5	15.0	9.0 x 18.0 x 18.5	64152	1000
100	22.5	9.0 x 22.0 x 26.0	14104	450	1.8	22.5	6.0 x 19.0 x 26.0	64182	800
120	22.5	10.0 x 23.0 x 26.0	14124	400	2.2	22.5	6.5 x 19.5 x 26.0	64222	750
150	27.5	10.0 x 23.0 x 30.0	14154	500	2.7	22.5	7.0 x 20.0 x 26.0	64272	650
180	27.5	11.0 x 24.0 x 30.0	14184	400	3.3	22.5	8.0 x 21.0 x 26.0	64332	550
220	27.5	12.5 x 25.5 x 30.0	14224	350	3.9	22.5	8.0 x 21.0 x 26.0	64392	550
270	27.5	13.5 x 26.5 x 30.0	14274	300	4.7	22.5	8.5 x 21.5 x 26.0	64472	500
<b>U<sub>RDC</sub> = 1000 V</b>					5.6	22.5	8.5 x 21.5 x 26.0	64562	500
0.1	10.0	5.0 x 13.0 x 14.5	24101	2000	6.8	22.5	9.5 x 22.5 x 26.0	64682	450
0.12	10.0	5.0 x 13.0 x 14.5	24121	2000	8.2	22.5	10.5 x 23.5 x 26.0	64822	350
0.15	10.0	5.5 x 13.5 x 14.5	24151	2000	<b>U<sub>RDC</sub> = 2000 V</b>				
0.18	10.0	5.5 x 13.5 x 14.5	24181	2000	1.0	15.0	6.0 x 15.0 x 18.5	44102	2000
0.22	10.0	5.5 x 13.5 x 14.5	24221	2000	1.2	15.0	6.0 x 15.0 x 18.5	44122	2000
0.27	10.0	5.5 x 13.5 x 14.5	24271	2000	1.5	15.0	7.0 x 16.0 x 18.5	44152	1500
0.33	10.0	5.5 x 13.5 x 14.5	24331	2000	1.8	15.0	7.5 x 16.5 x 18.5	44182	1250
0.39	10.0	5.5 x 13.5 x 14.5	24391	2000	2.2	15.0	8.5 x 17.5 x 18.5	44222	1000
0.47	10.0	5.5 x 13.5 x 14.5	24471	2000	2.7	15.0	9.5 x 18.5 x 18.5	44272	900
0.56	10.0	5.5 x 13.5 x 14.5	24561	2000	3.3	22.5	6.0 x 19.0 x 26.0	44332	800
0.68	10.0	5.5 x 13.5 x 14.5	24681	2000	3.9	22.5	6.0 x 19.0 x 26.0	44392	800
0.82	10.0	5.5 x 13.5 x 14.5	24821	2000	4.7	22.5	6.5 x 19.5 x 26.0	44472	750
1.0	10.0	6.0 x 14.0 x 14.5	24102	1750	5.6	22.5	8.0 x 21.0 x 26.0	44682	550
1.2	10.0	6.0 x 14.0 x 14.5	24122	1750	6.8	22.5	8.0 x 21.0 x 26.0	44682	550
1.5	10.0	6.0 x 14.0 x 14.5	24152	2000	8.2	22.5	8.5 x 21.5 x 26.0	44822	500
1.8	15.0	5.5 x 14.5 x 18.5	24182	2000	10	22.5	9.5 x 22.5 x 26.0	44103	400
2.2	15.0	5.5 x 14.5 x 18.5	24222	2000	12	27.5	9.5 x 22.5 x 30.0	44123	500
2.7	15.0	6.0 x 15.0 x 18.5	24272	2000	15	27.5	10.5 x 23.5 x 30.0	44153	450
3.3	15.0	6.0 x 15.0 x 18.5	24332	2000	18	27.5	11.5 x 24.5 x 30.0	44183	400
3.9	15.0	6.0 x 15.0 x 18.5	24392	2000	22	27.5	13.0 x 26.0 x 30.0	44223	300
4.7	15.0	6.0 x 15.0 x 18.5	24472	2000					
5.6	15.0	6.0 x 15.0 x 18.5	24562	2000					
6.8	15.0	6.0 x 15.0 x 18.5	24682	2000					
8.2	15.0	7.0 x 16.0 x 18.5	24822	1500					
10	15.0	7.5 x 16.5 x 18.5	24103	1250					
12	15.0	8.0 x 17.0 x 18.5	24123	1250					
15	15.0	9.0 x 18.0 x 18.5	24153	1000					
18	22.5	6.0 x 19.0 x 26.0	24183	800					
22	22.5	6.5 x 19.5 x 26.0	24223	750					
27	22.5	7.5 x 20.5 x 26.0	24273	600					
33	22.5	8.0 x 21.0 x 26.0	24333	550					
39	22.5	8.5 x 21.5 x 26.0	24393	500					
47	27.5	7.0 x 20.0 x 30.0	24473	1000					
56	27.5	7.5 x 20.5 x 30.0	24563	750					
68	27.5	8.5 x 21.5 x 30.0	24683	550					
82	27.5	9.5 x 22.5 x 30.0	24823	500					
100	27.5	10.5 x 23.5 x 30.0	24104	450					
120	27.5	11.5 x 24.5 x 30.0	24124	400					
150	27.5	12.5 x 25.5 x 30.0	24154	350					

capacitors

Film


**KP/MKP 375 series, 5%, loose in box**

C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 375 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 2000 V monitor</b>				
1	22.5	6.0 x 19.0 x 26.0	74102	800
1.2	22.5	6.5 x 19.5 x 26.0	74122	750
1.5	22.5	7.0 x 20.0 x 26.0	74152	650
1.8	22.5	7.5 x 20.5 x 26.0	74182	600
2.2	22.5	8.5 x 21.5 x 26.0	74222	500
2.7	22.5	9.5 x 22.5 x 26.0	74272	450
3.3	22.5	10.5 x 23.5 x 26.0	74332	350
3.9	22.5	11.0 x 24.0 x 26.0	74392	350
4.7	22.5	11.5 x 24.5 x 26.0	74472	350
<b>U<sub>RDC</sub> = 2500 V monitor</b>				
1.0	22.5	6.0 x 19.0 x 26.0	84102	800
1.2	22.5	6.5 x 19.5 x 26.0	84122	750
1.5	22.5	7.0 x 20.0 x 26.0	84152	650
1.8	22.5	7.5 x 20.5 x 26.0	84182	600
2.2	22.5	8.5 x 21.5 x 26.0	84222	550
2.7	22.5	9.5 x 22.5 x 26.0	84272	450
3.3	22.5	10.5 x 23.5 x 26.0	84332	350
3.9	22.5	11.0 x 24.0 x 26.0	84392	350
4.7	22.5	11.5 x 24.5 x 26.0	84472	350





Series	MMKP 483																			
Dielectric	double metallized polypropylene																			
Tolerance / E-series <sup>1)</sup>	3 %, 5% / E24																			
U <sub>R</sub> (V <sub>DC</sub> )	250	400	630	1000	1400	1600	2000													
U <sub>R</sub> (V <sub>AC</sub> )	125	200	220	350	425	460	530													
U <sub>R</sub> (V <sub>pp</sub> )	350	560	630	1000	1200	1300	1500													
Capacitance																				
0.001 μF																				
0.0012 μF																				
0.0015 μF																				
0.0018 μF																				
0.0022 μF																				
0.0027 μF																				
0.0033 μF																				
0.0039 μF																				
0.0047 μF																				
0.0056 μF																				
0.0068 μF																				
0.0082 μF																				
0.01 μF																				
0.012 μF																				
0.015 μF																				
0.018 μF																				
0.022 μF																				
0.027 μF																				
0.033 μF																				
0.039 μF																				
0.047 μF																				
0.056 μF																				
0.068 μF																				
0.082 μF																				
0.1 μF																				
0.12 μF																				
0.15 μF																				
0.18 μF																				
0.22 μF																				
0.27 μF																				
0.33 μF																				
0.39 μF																				
0.47 μF																				
0.56 μF																				
0.68 μF																				
0.82 μF																				
1 μF																				
1.2 μF																				
1.5 μF																				
2.2 μF																				
	preferred																			
Climatic category	55 / 105 / 56																			
Reference specification	IEC 60 384-17																			
Tan δ (10 kHz) (x 10 <sup>-4</sup> )	≤5	≤10	≤15	≤5	≤10	≤10	≤5	≤8	≤10	≤5	≤6	≤8	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Tan δ (100 kHz) (x 10 <sup>-4</sup> )	≤25	≤50	≤85	≤20	≤40	≤60	≤15	≤30	≤45	≤15	≤20	≤30	≤10	≤12	≤15	≤10	≤10	≤12	≤10	≤10
Pulse slope at U <sub>R</sub> (V <sub>DC</sub> ) (V/μsec)	450 to 900	290	190	600 to 1200	410	260	700 to 1400	470	300	1700 to 3300	1200	700	8000 to 15000	4000	2100	11000 to 20000	6000	3000	20000	10000
Packing	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose
Insulation resistance	C ≤ 1 μF ≥ 100000 MΩ C > μF ≥ 100000 s																			
Note	For ordering non-preferred types see our Film Capacitor data handbook BC05, 2001/2002 edition (* Loose) taped on reel, taped on reel bent back pitch 7,5 mm																			

**FLYBACK**



**MMKP 483 series, 5%, loose in box**

C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 483 .....	smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 483 .....	smallest packing quantity
<b>U<sub>RD</sub> = 250 V</b>					<b>U<sub>RD</sub> = 1000 V</b>				
0.082	15.0	6.0 x 15.0 x 18.0	01823	2000	0.0047	15.0	6.0 x 15.0 x 18.0	31472	2000
0.1	15.0	6.0 x 15.0 x 18.0	01104	2000	0.0056	15.0	6.0 x 15.0 x 18.0	31562	2000
0.12	15.0	6.5 x 15.5 x 18.0	01124	1500	0.0068	15.0	6.0 x 15.0 x 18.0	31682	2000
0.15	15.0	7.0 x 16.0 x 18.0	01154	1500	0.0082	15.0	6.0 x 15.0 x 18.0	31822	2000
0.18	15.0	7.5 x 16.5 x 18.0	01184	1250	0.01	15.0	6.0 x 15.0 x 18.0	31103	2000
0.22	15.0	8.0 x 17.0 x 18.0	01224	1250	0.012	15.0	6.0 x 15.0 x 18.0	31123	2000
0.27	15.0	9.0 x 18.0 x 18.0	01274	900	0.015	15.0	6.0 x 15.0 x 18.0	31153	2000
0.33	15.0	10.0 x 19.0 x 18.0	01334	800	0.018	15.0	6.5 x 15.5 x 18.0	31183	1500
0.39	15.0	10.5 x 19.5 x 18.0	01394	800	0.022	15.0	7.0 x 16.0 x 18.0	31223	1500
0.47	22.5	8.5 x 21.5 x 26.0	01474	500	0.027	15.0	7.5 x 16.5 x 18.0	31273	1250
0.56	22.5	9.0 x 22.0 x 26.0	01564	450	0.033	15.0	8.0 x 17.0 x 18.0	31333	1250
0.68	22.5	10.0 x 23.0 x 26.0	01684	400	0.039	15.0	8.5 x 17.5 x 18.0	31393	1000
0.82	22.5	11.0 x 24.0 x 26.0	01824	350	0.047	15.0	9.5 x 18.5 x 18.0	31473	900
1	27.5	10.5 x 23.5 x 31.0	01105	450	0.056	15.0	10.0 x 19.0 x 18.0	31563	800
1.2	27.5	11.5 x 24.5 x 31.0	01125	400	0.068	22.5	8.0 x 21.0 x 26.0	31683	550
1.5	27.5	13.0 x 26.0 x 31.0	01155	300	0.082	22.5	9.0 x 22.0 x 26.0	31823	450
1.8	27.5	14.0 x 27.0 x 31.0	01185	300	0.1	22.5	9.5 x 22.5 x 26.0	31104	450
2.2	27.5	15.5 x 28.5 x 31.0	01225	250	0.12	22.5	10.5 x 23.5 x 26.0	31124	350
<b>U<sub>RD</sub> = 400 V</b>					0.15	27.5	10.0 x 23.0 x 31.0	31154	500
0.047	15.0	6.0 x 15.0 x 18.0	11473	2000	0.18	27.5	11.0 x 24.0 x 31.0	31184	400
0.056	15.0	6.0 x 15.0 x 18.0	11563	2000	0.22	27.5	12.0 x 25.0 x 31.0	31224	350
0.068	15.0	6.5 x 15.5 x 18.0	11683	1500	0.27	27.5	13.5 x 26.5 x 31.0	31274	300
0.082	15.0	7.0 x 16.0 x 18.0	11823	1500	0.33	27.5	15.0 x 28.0 x 31.0	31334	250
0.1	15.0	7.5 x 16.5 x 18.0	11104	1250	<b>U<sub>RD</sub> = 1400 V</b>				
0.12	15.0	8.5 x 17.5 x 18.0	11124	1000	0.0022	15.0	6.0 x 15.0 x 18.0	41222	2000
0.15	15.0	9.0 x 18.0 x 18.0	11154	900	0.0027	15.0	6.0 x 15.0 x 18.0	41272	2000
0.18	15.0	10.0 x 19.0 x 18.0	11184	800	0.0033	15.0	6.0 x 15.0 x 18.0	41332	2000
0.22	15.0	10.5 x 19.5 x 18.0	11224	800	0.0039	15.0	6.5 x 15.5 x 18.0	41392	1500
0.27	22.5	8.5 x 21.5 x 26.0	11274	500	0.0047	15.0	7.0 x 16.0 x 18.0	41472	1500
0.33	22.5	9.5 x 22.5 x 26.0	11334	450	0.0056	15.0	7.0 x 16.0 x 18.0	41562	1500
0.39	22.5	10.0 x 23.0 x 26.0	11394	400	0.0068	15.0	7.5 x 16.5 x 18.0	41682	1250
0.47	27.5	10.0 x 23.0 x 31.0	11474	500	0.0082	15.0	8.5 x 17.5 x 18.0	41822	1000
0.56	27.5	11.0 x 24.0 x 31.0	11564	400	0.01	15.0	9.0 x 18.0 x 18.0	41103	900
0.68	27.5	12.0 x 25.0 x 31.0	11684	350	0.012	15.0	10.0 x 19.0 x 18.0	41123	800
0.82	27.5	13.0 x 26.0 x 31.0	11824	300	0.015	15.0	11.0 x 20.0 x 18.0	41153	800
1	27.5	14.0 x 27.0 x 31.0	11105	300	0.018	22.5	8.0 x 21.0 x 26.0	41183	550
1.2	27.5	15.5 x 28.5 x 31.0	11125	250	0.022	22.5	9.0 x 22.0 x 26.0	41223	450
<b>U<sub>RD</sub> = 630 V</b>					0.027	22.5	9.5 x 22.5 x 26.0	41273	450
0.033	15.0	6.0 x 15.0 x 18.0	21333	2000	0.033	22.5	10.5 x 23.5 x 26.0	41333	350
0.039	15.0	6.5 x 15.5 x 18.0	21393	1500	0.039	22.5	11.5 x 24.5 x 26.0	41393	350
0.047	15.0	7.0 x 16.0 x 18.0	21473	1500	0.047	27.5	10.5 x 23.5 x 31.0	41473	450
0.056	15.0	7.5 x 16.5 x 18.0	21563	1250	0.056	27.5	11.5 x 24.5 x 31.0	41563	400
0.068	15.0	8.0 x 17.0 x 18.0	21683	1250	0.068	27.5	12.5 x 25.5 x 31.0	41683	350
0.082	15.0	8.5 x 17.5 x 18.0	21823	1000	0.082	27.5	14.0 x 24.0 x 31.0	41823	300
0.1	15.0	9.5 x 18.5 x 18.0	21104	900	0.1	27.5	15.5 x 28.5 x 31.0	41104	250
0.12	15.0	10.0 x 19.0 x 18.0	21124	800					
0.15	15.0	11.0 x 20.0 x 18.0	21154	800					
0.18	22.5	9.0 x 22.0 x 26.0	21184	450					
0.22	22.5	9.5 x 22.5 x 26.0	21224	450					
0.27	22.5	10.5 x 23.5 x 26.0	21274	350					
0.33	27.5	10.5 x 23.5 x 31.0	21334	450					
0.39	27.5	11.0 x 24.0 x 31.0	21394	400					
0.47	27.5	12.0 x 25.0 x 31.0	21473	350					
0.56	27.5	13.5 x 26.5 x 31.0	21564	300					
0.68	27.5	14.5 x 27.5 x 31.0	21684	250					



## MMKP 483 series, 5%, loose in box

C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 483 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 1600 V</b>				
0.0018	15.0	6.0 x 15.0 x 18.0	51182	2000
0.0022	15.0	6.0 x 15.0 x 18.0	51222	2000
0.0027	15.0	6.5 x 15.5 x 18.0	51272	1500
0.0033	15.0	7.0 x 16.0 x 18.0	51332	1500
0.0039	15.0	7.5 x 16.5 x 18.0	51392	1250
0.0047	15.0	8.0 x 17.0 x 18.0	51472	1250
0.0056	15.0	8.5 x 17.5 x 18.0	51562	1000
0.0068	15.0	9.5 x 18.5 x 18.0	51682	900
0.0082	15.0	10.0 x 19.0 x 18.0	51822	800
0.01	15.0	11.0 x 20.0 x 18.0	51103	800
0.012	22.5	8.5 x 21.5 x 26.0	51123	500
0.015	22.5	9.0 x 22.0 x 26.0	51153	450
0.018	22.5	10.0 x 23.0 x 26.0	51183	400
0.022	22.5	10.5 x 23.5 x 26.0	51223	350
0.027	22.5	11.5 x 24.5 x 26.0	51273	350
0.033	22.5	13.0 x 26.0 x 26.0	51333	300
0.039	27.5	12.0 x 25.0 x 31.0	51393	350
0.047	27.5	13.0 x 26.0 x 31.0	51473	300
0.056	27.5	14.5 x 27.5 x 31.0	51563	250
<b>U<sub>RDC</sub> = 2000 V</b>				
0.001	15.0	6.0 x 15.0 x 18.0	61102	2000
0.0012	15.0	6.5 x 15.5 x 18.0	61122	1500
0.0015	15.0	7.0 x 16.0 x 18.0	61152	1500
0.0018	15.0	7.5 x 16.5 x 18.0	61182	1250
0.0022	15.0	8.0 x 17.0 x 18.0	61222	1250
0.0027	15.0	8.5 x 17.5 x 18.0	61272	1000
0.0033	15.0	9.5 x 18.5 x 18.0	61332	900
0.0039	15.0	10.0 x 19.0 x 18.0	61392	800
0.0047	15.0	10.5 x 19.5 x 18.0	61472	800
0.0056	22.5	8.5 x 21.5 x 26.0	61562	500
0.0068	22.5	9.0 x 22.0 x 26.0	61682	450
0.0082	22.5	9.5 x 22.5 x 26.0	61822	450
0.01	22.5	10.5 x 23.5 x 26.0	61103	350
0.012	22.5	11.5 x 24.5 x 26.0	61123	350
0.015	22.5	12.5 x 25.5 x 26.0	61153	300
0.018	27.5	11.5 x 24.5 x 31.0	61183	400
0.022	27.5	13.0 x 27.0 x 31.0	61223	300
0.027	27.5	14.0 x 27.0 x 31.0	61273	300
0.033	27.5	15.5 x 28.5 x 31.5	61333	250



capacitors

Film

Series	MMKP 383																	
Dielectric	double metallized polypropylene																	
Tolerance / E-series <sup>1)</sup>	5% / E24																	
U <sub>R</sub> (V <sub>DC</sub> )	250	400	630	1000	1400	1600	2000	2500										
U <sub>R</sub> (V <sub>AC</sub> )	125	200	220	350	500	550	700	900										
U <sub>R</sub> (V <sub>PP</sub> )	350	560	630	1000	1400	1600	2000	2500										
Capacitance																		
0.001 μF																		
0.0012 μF																		
0.0015 μF																		
0.0018 μF																		
0.0022 μF																		
0.0027 μF																		
0.0033 μF																		
0.0039 μF																		
0.0047 μF																		
0.0056 μF																		
0.0068 μF																		
0.0082 μF																		
0.01 μF																		
0.012 μF																		
0.015 μF																		
0.018 μF																		
0.022 μF																		
0.027 μF																		
0.033 μF																		
0.039 μF																		
0.047 μF																		
0.056 μF																		
0.068 μF																		
0.082 μF																		
0.1 μF																		
0.12 μF																		
0.15 μF																		
0.18 μF																		
0.22 μF																		
0.27 μF																		
0.33 μF																		
0.39 μF																		
0.47 μF																		
0.56 μF																		
0.68 μF																		
0.82 μF																		
1 μF																		
1.2 μF																		
1.5 μF																		
2.2 μF																		
2.7 μF																		
Climatic category	preferred E12																	
Reference specification	IEC 60384-17																	
Tan δ (10 kHz) (x 10 <sup>-4</sup> )	≤5	≤10	≤15	≤5	≤10	≤10	≤5	≤8	≤10	≤5	≤6	≤8	≤5	≤5	≤5	≤5	≤5	≤5
Tan δ (100 kHz) (x 10 <sup>-4</sup> )	≤25	≤50	≤95	≤20	≤40	≤60	≤15	≤30	≤50	≤15	≤20	≤35	≤10	≤15	≤20	≤10	≤20	≤20
Pulse slope at U <sub>R</sub> (V <sub>DC</sub> ) (V/μsec)	450 to 900	130 to 190	600 to 1200	410 to 260	180 to 1400	700 to 300	210 to 3300	470 to 700	1700 to 15000	1200 to 4000	470 to 15000	8000 to 4000	1500 to 15000	8000 to 1800	3100 to 20000	1200 to 2500	11000 to 20000	4400 to 2500
Packing	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose	(*) loose	loose	loose
Insulation resistance	C ≤ 1 mF ≥ 100000 MΩ C > mF ≥ 100000 s																	
Note	For ordering non-preferred types see our Film Capacitor data handbook BC05, 2001/2002 edition (*) loose; taped on reel; taped on reel bent back pitch 7,5 mm																	

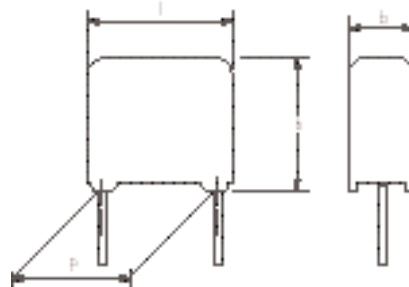
**EL LIGHT BALLAST**

**POWER SUPPLIES**



**MMKP 383** series, 5%, loose in box

C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 383 .....	smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 383 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 250 V</b>					<b>U<sub>RDC</sub> = 1000 V</b>				
0.082	15.0	5.0 x 11.0 x 17.5	00823	1250	0.0047	15.0	5.0 x 11.0 x 17.5	30472	1250
0.1	15.0	5.0 x 11.0 x 17.5	00104	1250	0.0056	15.0	5.0 x 11.0 x 17.5	30562	1250
0.12	15.0	6.0 x 12.0 x 17.5	00124	1000	0.0068	15.0	5.0 x 11.0 x 17.5	30682	1250
0.15	15.0	6.0 x 12.0 x 17.5	00154	1000	0.008	15.0	5.0 x 11.0 x 17.5	30822	1250
0.18	15.0	7.0 x 13.5 x 17.5	00184	750	0.01	15.0	5.0 x 11.0 x 17.5	30103	1250
0.22	15.0	8.5 x 15.0 x 17.5	00224	750	0.012	15.0	5.0 x 11.0 x 17.5	30123	1250
0.27	15.0	8.5 x 15.0 x 17.5	00274	750	0.015	15.0	5.0 x 11.0 x 17.5	30153	1250
0.33	15.0	10.0 x 16.5 x 17.5	00334	500	0.018	15.0	6.0 x 12.0 x 17.5	30183	1000
0.39	15.0	10.0 x 16.5 x 17.5	00394	500	0.022	15.0	6.0 x 12.0 x 17.5	30223	1000
0.47	22.5	8.5 x 18.0 x 26.0	00474	200	0.027	15.0	7.0 x 13.5 x 17.5	30273	750
0.56	22.5	8.5 x 18.0 x 26.0	00564	200	0.033	15.0	7.0 x 13.5 x 17.5	30333	750
0.68	22.5	10.0 x 19.5 x 26.0	00684	200	0.039	15.0	8.5 x 15.0 x 17.5	30393	750
0.82	22.5	10.0 x 19.5 x 26.0	00824	200	0.047	15.0	8.5 x 15.0 x 17.5	30473	750
1	27.5	11.0 x 21.0 x 31.0	00105	100	0.056	15.0	10.0 x 16.5 x 17.5	30563	500
1.2	27.5	11.0 x 21.0 x 31.0	00125	100	0.068	22.5	7.0 x 16.5 x 26.0	30683	200
1.5	27.5	13.0 x 23.0 x 31.0	00155	100	0.082	22.5	8.5 x 18.0 x 26.0	30823	200
1.8	27.5	15.0 x 25.0 x 31.0	00185	100	0.1	22.5	10.0 x 19.5 x 26.0	30104	200
2.2	27.5	18.0 x 28.0 x 31.0	00225	100	0.12	22.5	10.0 x 19.5 x 26.0	30124	200
2.7	27.5	18.0 x 28.0 x 31.0	00275	100	0.15	27.5	11.0 x 21.0 x 31.0	30154	100
					0.18	27.5	11.0 x 21.0 x 31.0	30184	100
					0.22	27.5	13.0 x 23.0 x 31.0	30224	100
					0.27	27.5	15.0 x 25.0 x 31.0	30274	100
					0.33	27.5	15.0 x 25.0 x 31.0	30334	100
					0.39	27.5	18.0 x 28.0 x 31.0	30394	100
					0.47	27.5	18.0 x 28.0 x 31.0	30474	100
<b>U<sub>RDC</sub> = 400 V</b>					<b>U<sub>RDC</sub> = 1400 V</b>				
0.047	15.0	5.0 x 11.0 x 17.5	10473	1250	0.0022	15.0	5.0 x 11.0 x 17.5	40222	1250
0.056	15.0	5.0 x 11.0 x 17.5	10563	1250	0.0027	15.0	5.0 x 11.0 x 17.5	40272	1250
0.068	15.0	6.0 x 12.0 x 17.5	10683	1000	0.0033	15.0	5.0 x 11.0 x 17.5	40332	1250
0.082	15.0	6.0 x 12.0 x 17.5	10823	1000	0.0039	15.0	5.0 x 11.0 x 17.5	40392	1250
0.1	15.0	7.0 x 13.5 x 17.5	10104	750	0.0047	15.0	6.0 x 12.0 x 17.5	40472	1000
0.12	15.0	8.5 x 15.0 x 17.5	10124	750	0.0056	15.0	6.0 x 12.0 x 17.5	40562	1000
0.15	15.0	8.5 x 15.0 x 17.5	10154	750	0.0068	15.0	7.0 x 13.5 x 17.5	40682	750
0.18	15.0	10.0 x 16.5 x 17.5	10184	500	0.0082	15.0	7.0 x 13.5 x 17.5	40822	750
0.22	15.0	10.0 x 16.5 x 17.5	10224	500	0.1	15.0	8.5 x 15.0 x 17.5	40103	750
0.27	22.5	8.5 x 18.0 x 26.0	10274	200	0.012	15.0	8.5 x 15.0 x 17.5	40123	750
0.33	22.5	8.5 x 18.0 x 26.0	10334	200	0.015	15.0	10.0 x 16.5 x 17.5	40153	500
0.39	22.5	10.0 x 19.5 x 26.0	10394	200	0.018	22.5	7.0 x 16.5 x 26.0	40183	200
0.47	27.5	11.0 x 21.0 x 31.0	10474	100	0.022	22.5	8.5 x 18.0 x 26.0	40223	200
0.56	27.5	11.0 x 21.0 x 31.0	10564	100	0.027	22.5	8.5 x 18.0 x 26.0	40273	200
0.68	27.5	13.0 x 23.0 x 31.0	10684	100	0.033	22.5	10.0 x 19.5 x 26.0	40333	200
0.82	27.5	13.0 x 23.0 x 31.0	10824	100	0.039	22.5	10.0 x 19.5 x 26.0	40393	200
1	27.5	15.0 x 25.0 x 31.0	10105	100	0.047	27.5	11.0 x 21.0 x 31.0	40473	100
1.2	27.5	18.0 x 28.0 x 31.0	10125	100	0.056	27.5	11.0 x 21.0 x 31.0	40563	100
1.5	27.5	18.0 x 28.0 x 31.0	10155	100	0.068	27.5	13.0 x 23.0 x 31.0	40683	100
					0.082	27.5	15.0 x 25.0 x 31.0	40823	100
					0.1	27.5	15.0 x 25.0 x 31.0	40104	100
					0.12	27.5	18.0 x 28.0 x 31.0	40124	100



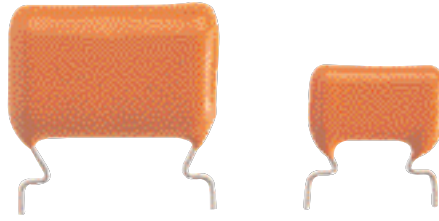
capacitors

Film

**MMKP 383 series, 5%, loose in box**

C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 383 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 1600 V</b>				
0.0027	15.0	5.0 x 11.0 x 17.5	50272	1250
0.0033	15.0	5.0 x 11.0 x 17.5	50332	1250
0.0039	15.0	5.0 x 11.0 x 17.5	50392	1250
0.0047	15.0	6.0 x 12.0 x 17.5	50472	1000
0.0056	15.0	6.0 x 12.0 x 17.5	50562	1000
0.0068	15.0	7.0 x 13.5 x 17.5	50682	750
0.0082	15.0	8.5 x 15.0 x 17.5	50822	750
0.01	15.0	8.5 x 15.0 x 17.5	50103	750
0.012	15.0	10.0 x 16.5 x 17.5	50123	500
0.015	15.0	10.0 x 16.5 x 17.5	50153	500
0.018	22.5	7.0 x 16.5 x 26.0	50183	200
0.022	22.5	8.5 x 18.0 x 26.0	50223	200
0.027	22.5	8.5 x 18.0 x 26.0	50273	200
0.033	22.5	10.0 x 19.5 x 26.0	50333	200
0.039	22.5	10.0 x 19.5 x 26.0	50393	200
0.047	27.5	11.0 x 21.0 x 31.0	50473	100
0.056	27.5	11.0 x 21.0 x 31.0	50563	100
0.068	27.5	13.0 x 23.0 x 31.0	50683	100
0.082	27.5	15.0 x 25.0 x 31.0	50823	100
0.1	27.5	15.0 x 25.0 x 31.0	50104	100
0.12	27.5	18.0 x 28.0 x 31.0	50124	100
0.15	27.5	18.0 x 28.0 x 31.0	50154	100
<b>U<sub>RDC</sub> = 2000 V</b>				
0.001	15.0	5.0 x 11.0 x 17.5	60102	1250
0.0012	15.0	5.0 x 11.0 x 17.5	60122	1250
0.0015	15.0	5.0 x 11.0 x 17.5	60152	1250
0.0018	15.0	5.0 x 11.0 x 17.5	60182	1250
0.0022	15.0	5.0 x 11.0 x 17.5	60222	1250
0.0027	15.0	6.0 x 12.0 x 17.5	60272	1000
0.0033	15.0	6.0 x 12.0 x 17.5	60332	1000
0.0039	15.0	7.0 x 13.5 x 17.5	60392	750
0.0047	15.0	7.0 x 13.5 x 17.5	60472	750
0.0056	15.0	8.5 x 15.0 x 17.5	60562	750
0.0068	15.0	8.5 x 15.0 x 17.5	60682	750
0.0082	15.0	10.0 x 16.5 x 17.5	60822	500
0.01	15.0	10.0 x 16.5 x 17.5	60103	500
0.012	22.5	7.0 x 16.5 x 26.0	60123	200
0.015	22.5	8.5 x 18.0 x 26.0	60153	200
0.018	22.5	8.5 x 18.0 x 26.0	60183	200
0.022	22.5	10.0 x 19.5 x 26.0	60223	200
0.027	27.5	11.0 x 21.0 x 31.0	60273	100
0.033	27.5	11.0 x 21.0 x 31.0	60333	100
0.039	27.5	11.0 x 21.0 x 31.0	60393	100
0.047	27.5	13.0 x 23.0 x 31.0	60473	100
0.056	27.5	15.0 x 25.0 x 31.0	60563	100
0.068	27.5	15.0 x 25.0 x 31.0	60683	100
0.082	27.5	18.0 x 28.0 x 31.0	60823	100
0.1	27.5	18.0 x 28.0 x 31.0	60104	100
<b>U<sub>RDC</sub> = 2500 V</b>				
0.001	22.5	6.0 x 15.5 x 26.0	70102	200
0.0012	22.5	6.0 x 15.5 x 26.0	70122	200
0.0015	22.5	6.0 x 15.5 x 26.0	70152	200
0.0018	22.5	6.0 x 15.5 x 26.0	70182	200
0.0022	22.5	6.0 x 15.5 x 26.0	70222	200
0.0027	22.5	6.0 x 15.5 x 26.0	70272	200
0.0033	22.5	6.0 x 15.5 x 26.0	70332	200
0.0039	22.5	6.0 x 15.5 x 26.0	70392	200
0.0047	22.5	6.0 x 15.5 x 26.0	70472	200
0.0056	22.5	6.0 x 15.5 x 26.0	70562	200
0.0068	22.5	7.0 x 16.5 x 26.0	70682	200
0.0082	22.5	8.5 x 18.0 x 26.0	70822	200
0.01	22.5	8.5 x 18.0 x 26.0	70103	200
0.012	22.5	10.0 x 19.5 x 26.0	70123	200
0.015	22.5	10.0 x 19.5 x 26.0	70153	200
0.018	22.5	11.0 x 21.0 x 31.0	70183	100
0.022	22.5	11.0 x 21.0 x 31.0	70223	100
0.027	22.5	13.0 x 23.0 x 31.0	70273	100
0.033	22.5	13.0 x 23.0 x 31.0	70333	100
0.039	22.5	15.0 x 25.0 x 31.0	70393	100
0.047	22.5	18.0 x 28.0 x 31.0	70473	100
0.056	22.5	18.0 x 28.0 x 31.0	70563	100





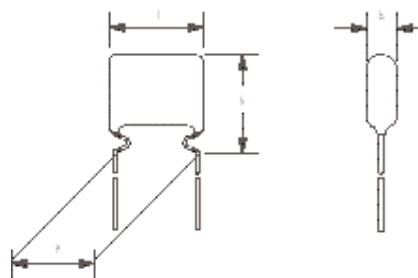
Series	MKP 479																							
Dielectric	metallized polypropylene																							
Tolerance / E-series <sup>1)</sup>	5% / E24																							
U <sub>R</sub> (V <sub>DC</sub> )	160	250	250	400	400	630	250	250	400	400	630	250	250	400	400	630	250	250	400	400	630			
U <sub>R</sub> (V <sub>AC</sub> )	100	160	160	200	200	200	160	160	200	200	200	160	160	200	200	200	160	160	200	200	200			
U <sub>R</sub> (V <sub>pp</sub> )	280	450	450	560	560	560	450	450	560	560	560	450	450	560	560	560	450	450	560	560	560			
Capacitance																								
0.01 μF																								
0.012 μF																								
0.015 μF																								
0.018 μF																								
0.022 μF																								
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0.047 μF																								
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0.068 μF																								
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0.39 μF																								
0.47 μF																								
0.56 μF																								
0.68 μF																								
0.82 μF																								
1 μF																								
1.2 μF																								
1.5 μF																								
1.8 μF																								
2.2 μF																								
2.7 μF																								
3.3 μF																								
3.9 μF																								
	preferred E12																							
Climatic category	55 / 105 / 56																							
Reference specification	IEC 60384-17																							
Tan δ (10 kHz) (x 10 <sup>-4</sup> )	≤10	≤10	≤10	≤15	≤5	≤10	≤10	≤15	≤5	≤10	≤10	≤10	≤10	≤10	≤10	≤5	≤5	≤10	≤10	≤5	≤5	≤10	≤10	
Tan δ (100 kHz) (x 10 <sup>-4</sup> )	≤30	≤55	≤90	≤135	≤25	≤45	≤75	≤115	≤20	≤35	≤50	≤70	≤20	≤35	≤50	≤70	≤15	≤25	≤35	≤50	≤15	≤25	≤35	≤50
Pulse slope at U <sub>R</sub> (V <sub>DC</sub> ) (V/μsec)	60	50	25	15	70	60	30	20	160	140	70	50	80	70	35	25	200	180	90	60	100	90	45	30
Packing	loose	(*)	loose	loose	loose	(*)	loose	loose	loose	(*)	loose	loose	loose	(*)	loose	loose	loose	(*)	loose	loose	loose	(*)	loose	loose
	taped		taped	taped	taped		taped	taped	taped		taped	taped	taped		taped	taped	taped		taped	taped	taped		taped	taped
Insulation resistance	>100000 MΩ																							
Note	For ordering non-preferred types see our film capacitors handbook BC05. 2001-2002 edition (* ) loose, taped on reel, taped on reel bent back pitch 7.5 mm																							

**S-CORRECTION**



**MKP 479 series, 5%, loose in box**

C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 479 .....	smallest packing quantity	C (µF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 479 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 160 V</b>					<b>U<sub>RDC</sub> = 250 V monitor</b>				
0.082	10.0	6.0 x 15.0 x 12.5	32823	1000	0.022	10.0	6.0 x 15.0 x 12.5	41223	1000
0.1	10.0	6.0 x 15.0 x 12.5	32104	1000	0.027	10.0	6.0 x 15.0 x 12.5	41237	1000
0.12	10.0	6.0 x 15.0 x 12.5	32124	1000	0.033	10.0	6.0 x 15.0 x 12.5	41333	1000
0.15	10.0	6.5 x 15.5 x 12.5	32154	1000	0.039	10.0	6.0 x 15.0 x 12.5	41393	1000
0.18	15.0	6.0 x 15.0 x 18.5	32184	2000	0.047	10.0	6.0 x 15.0 x 12.5	41473	1000
0.22	15.0	6.5 x 15.5 x 18.5	32224	1500	0.056	15.0	6.5 x 15.5 x 18.5	41563	1500
0.27	15.0	7.0 x 16.0 x 18.5	32274	1250	0.068	15.0	6.5 x 15.5 x 18.5	41683	1500
0.33	15.0	7.0 x 16.0 x 18.5	32334	1250	0.082	15.0	6.5 x 15.5 x 18.5	41823	1500
0.39	15.0	7.0 x 16.0 x 18.5	32394	1250	0.1	15.0	7.0 x 16.0 x 18.5	41104	1250
0.47	15.0	7.5 x 16.5 x 18.5	32474	1250	0.12	15.0	7.0 x 16.0 x 18.5	41124	1250
0.56	15.0	8.0 x 17.0 x 18.5	32564	1250	0.15	15.0	7.5 x 16.5 x 18.5	41154	1250
0.68	15.0	9.0 x 18.0 x 18.5	32684	1000	0.18	15.0	8.5 x 17.5 x 18.5	41184	1000
0.82	22.5	7.0 x 20.0 x 26.0	32824	650	0.22	15.0	9.0 x 18.0 x 18.5	41224	1000
1	22.5	7.5 x 20.5 x 26.0	32105	600	0.27	22.5	7.0 x 20.0 x 26.0	41274	650
1.2	22.5	8.5 x 21.5 x 26.0	32125	500	0.33	22.5	7.5 x 20.5 x 26.0	41334	600
1.5	22.5	9.5 x 22.5 x 26.0	32155	450	0.39	22.5	8.5 x 21.5 x 26.0	41394	500
1.8	22.5	10.0 x 23.0 x 26.0	32185	400	0.47	22.5	9.0 x 22.0 x 26.0	41474	450
2.2	27.5	10.5 x 23.5 x 30.0	32225	450	0.56	22.5	10.0 x 23.0 x 26.0	41564	400
2.7	27.5	11.5 x 24.5 x 30.0	32275	400	0.68	27.5	10.0 x 23.0 x 30.0	41684	450
3.3	27.5	13.0 x 26.0 x 30.0	32335	300	0.82	27.5	11.0 x 24.0 x 30.0	41824	400
3.9	27.5	14.0 x 27.0 x 30.0	32395	300	1	27.5	12.0 x 25.0 x 30.0	41105	350
<b>U<sub>RDC</sub> = 250 V</b>					<b>U<sub>RDC</sub> = 400 V</b>				
0.047	10.0	6.0 x 15.0 x 12.5	42473	1000	0.022	10.0	6.0 x 15.0 x 12.5	52223	1000
0.056	10.0	6.0 x 15.0 x 12.5	42563	1000	0.027	10.0	6.0 x 15.0 x 12.5	52273	1000
0.068	10.0	6.0 x 15.0 x 12.5	42683	1000	0.033	10.0	6.0 x 15.0 x 12.5	52333	1000
0.082	10.0	6.0 x 15.0 x 12.5	42823	1000	0.039	10.0	6.0 x 15.0 x 12.5	52393	1000
0.1	10.0	6.5 x 15.5 x 12.5	42104	1000	0.047	10.0	6.0 x 15.0 x 12.5	52473	1000
0.12	15.0	6.5 x 15.5 x 18.5	42124	1500	0.056	15.0	6.5 x 15.5 x 18.5	52563	1500
0.15	15.0	6.5 x 15.5 x 18.5	42154	1500	0.068	15.0	6.5 x 15.5 x 18.5	52683	1500
0.18	15.0	6.5 x 15.5 x 18.5	42184	1500	0.082	15.0	6.5 x 15.5 x 18.5	52823	1500
0.22	15.0	6.5 x 15.5 x 18.5	42224	500	0.1	15.0	7.0 x 16.0 x 18.5	52104	1250
0.27	15.0	7.5 x 16.5 x 18.5	42274	1250	0.12	15.0	7.0 x 16.0 x 18.5	52124	1250
0.33	15.0	8.0 x 17.0 x 18.5	42334	1250	0.15	15.0	7.5 x 16.5 x 18.5	52154	1250
0.39	15.0	8.5 x 17.5 x 18.5	42394	1000	0.18	15.0	8.5 x 17.5 x 18.5	52184	1000
0.47	15.0	9.5 x 18.5 x 18.5	42474	900	0.22	15.0	9.0 x 18.0 x 18.5	52224	1000
0.56	22.5	7.0 x 20.0 x 26.0	42564	650	0.27	22.5	7.0 x 20.0 x 26.0	52274	650
0.68	22.5	7.5 x 20.5 x 26.0	42684	600	0.33	22.5	7.5 x 20.5 x 26.0	52334	600
0.82	22.5	8.5 x 21.5 x 26.0	42824	500	0.39	22.5	8.5 x 21.5 x 26.0	52394	500
1	22.5	9.5 x 22.5 x 26.0	42105	450	0.47	22.5	9.0 x 22.0 x 26.0	52474	450
1.2	22.5	10.5 x 23.5 x 26.0	42125	350	0.56	22.5	10.0 x 23.0 x 26.0	52564	400
1.5	27.5	10.5 x 23.5 x 30.0	42155	450	0.68	27.5	10.0 x 23.0 x 30.0	52684	450
1.8	27.5	11.5 x 24.5 x 30.0	42185	400	0.82	27.5	11.0 x 24.0 x 30.0	52824	400
2.2	27.5	13.0 x 26.0 x 30.0	42225	300	1	27.5	12.0 x 25.0 x 30.0	52105	350
2.7	27.5	14.0 x 27.0 x 30.0	42275	300	1.2	27.5	13.0 x 26.0 x 30.0	52125	300





MKP 479 series, 5%, loose in box				
C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 479 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 400 V monitor</b>				
0.01	10.0	6.0 x 15.0 x 12.5	51103	1000
0.012	10.0	6.0 x 15.0 x 12.5	51123	1000
0.015	10.0	6.0 x 15.0 x 12.5	51153	1000
0.018	10.0	6.0 x 15.0 x 12.5	51183	1000
0.022	10.0	6.0 x 15.0 x 12.5	51223	1000
0.027	10.0	6.5 x 15.5 x 12.5	51273	1000
0.033	15.0	6.5 x 15.5 x 18.5	51333	1500
0.039	15.0	6.5 x 15.5 x 18.5	51393	1500
0.047	15.0	6.5 x 15.5 x 18.5	51473	1500
0.056	15.0	6.5 x 15.8 x 18.5	51563	1500
0.068	15.0	7.5 x 16.5 x 18.5	51683	1250
0.082	15.0	8.0 x 17.0 x 18.5	51823	1250
0.1	15.0	9.0 x 18.0 x 18.5	51104	1000
0.12	22.5	6.5 x 19.5 x 26.0	51124	750
0.15	22.5	6.5 x 20.5 x 26.0	51154	600
0.18	22.5	8.0 x 21.0 x 26.0	51184	550
0.22	22.5	9.0 x 22.0 x 26.0	51224	450
0.27	22.5	9.5 x 22.5 x 26.0	51274	450
0.33	27.5	9.5 x 22.5 x 30.0	51334	550
0.39	27.5	10.5 x 23.0 x 30.0	51394	450
0.47	27.5	11.5 x 24.5 x 30.0	51474	400
0.56	27.5	13.0 x 26.0 x 30.0	51564	300
0.68	27.5	14.0 x 27.0 x 30.0	51684	300
<b>U<sub>RDC</sub> = 630 V</b>				
0.01	10.0	6.0 x 15.0 x 12.5	62103	1000
0.012	10.0	6.0 x 15.0 x 12.5	62123	1000
0.015	10.0	6.0 x 15.0 x 12.5	62153	1000
0.018	10.0	6.0 x 15.0 x 12.5	62183	1000
0.022	10.0	6.0 x 15.0 x 12.5	62223	1000
0.027	10.0	6.5 x 15.5 x 12.5	62273	1000
0.033	15.0	6.5 x 15.5 x 18.5	62333	1500
0.039	15.0	6.5 x 15.5 x 18.5	62393	1500
0.047	15.0	6.5 x 15.5 x 18.5	62473	1500
0.056	15.0	6.5 x 15.5 x 18.5	62563	1500
0.068	15.0	7.5 x 16.5 x 18.5	62683	1250
0.082	15.0	8.0 x 17.0 x 18.5	62823	1250
0.1	15.0	9.0 x 18.0 x 18.5	62104	1000
0.12	22.5	6.5 x 19.5 x 26.0	62124	750
0.15	22.5	7.5 x 20.5 x 26.0	62154	600
0.18	22.5	8.0 x 21.0 x 26.0	62184	550
0.22	22.5	9.0 x 22.0 x 26.0	62224	450
0.27	22.5	9.5 x 22.5 x 26.0	62274	450
0.33	27.5	9.5 x 22.5 x 30.0	62334	550
0.39	27.5	10.5 x 23.0 x 30.0	62394	450
0.47	27.5	11.5 x 24.5 x 30.0	62474	400
0.56	27.5	13.0 x 26.0 x 30.0	62564	300
0.68	27.5	14.0 x 27.0 x 30.0	62684	300



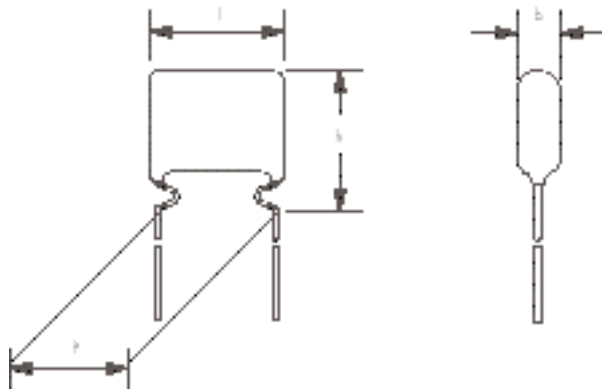
Series	<b>KP 374</b>						
Dielectric	polypropylene						
Tolerance / E-series <sup>1)</sup>	10%, 5% / E24						
U <sub>R</sub> (V <sub>DC</sub> )	250		400		630		
U <sub>R</sub> (V <sub>AC</sub> )	125		160		200		
U <sub>R</sub> (V <sub>PP</sub> )	350		450		560		
Capacitance							
0.68 nF							
1 nF							
1.5 nF						7.5	
2.2 nF	7.5			7.5			10.0
3.3 nF							
4.7 nF					10.0		
6.8 nF							
10 nF							
15 nF		10.0					
22 nF							
33 nF			15.0				
47 nF							
68 nF							
	preferred		E12				
Climatic category	55 / 105 / 56						
Reference specification	IEC 60 384-17						
Tan δ (10 kHz) [x 10 <sup>-4</sup> ]	≤5						
Tan δ (100 kHz) [x 10 <sup>-4</sup> ]	≤10						
Pulse slope at U <sub>R</sub> (Vdc)	<10000 V/μs						
Insulation resistance	>100000 MΩ						
Packing	loose, ammo, reel reel bent back pitch 5 ammo bent back pitch 5	loose, reel reel bent back pitch 7.5 reel bent back pitch 5	loose, reel	loose, ammo, reel reel bent back pitch 5 ammo bent back pitch 5	loose, reel reel bent back pitch 7.5 reel bent back pitch 5	loose, ammo, reel reel bent back pitch 5, ammo bent back pitch 5	loose, reel reel bent back pitch 7.5 reel bent back pitch 5
Note							

**SNUBBER**



**KP 374 series, 10%, loose in box**

C (nF)	pitch (mm)	dimensions b x h x l (mm)	catalogue number 2222 374 .....	smallest packing quantity
<b>U<sub>RDC</sub> = 250 V</b>				
1.5	7.5	5.0 x 13.5 x 11.0	40152	2000
2.2	7.5	5.0 x 13.5 x 11.0	40222	2000
3.3	7.5	5.0 x 13.5 x 11.0	40332	2000
4.7	7.5	5.0 x 13.5 x 11.0	40472	2000
6.8	7.5	5.0 x 13.5 x 11.0	40682	2000
1	7.5	6.0 x 14.5 x 11.0	40103	1500
15	10	5.5 x 15.0 x 13.5	40153	2000
22	10	6.5 x 16.0 x 13.5	40223	1500
33	15	5.5 x 14.5 x 19.0	40333	2000
47	15	6.5 x 15.5 x 19.0	40473	1500
68	15	7.5 x 16.5 x 19.0	40683	1250
<b>U<sub>RDC</sub> = 400 V</b>				
1.5	7.5	5.0 x 13.5 x 11.0	50152	2000
2.2	7.5	5.0 x 13.5 x 11.0	50222	2000
3.3	7.5	6.0 x 14.5 x 11.0	50332	1500
4.7	10	5.5 x 15.0 x 13.5	50472	2000
6.8	10	6.5 x 16.0 x 13.5	50682	1500
<b>U<sub>RDC</sub> = 630 V</b>				
0.68	7.5	4.5 x 12.5 x 11.0	60681	2000
1	7.5	5.0 x 13.0 x 11.0	60102	2000
1.5	10	4.5 x 12.5 x 13.5	60152	2000
2.2	10	5.5 x 13.5 x 13.5	60222	2000
3.3	10	6.5 x 14.5 x 13.5	60332	1750





## • Designer's sample boxes

A wide selection of designer's sample boxes is available for quick design-in of a Film capacitor into your application.

To order this and other support material, please contact your nearest BCcomponents sales office or one of our franchised distributors.

	Designer's sample boxes					
	Technology series	U <sub>DC</sub> (V)	contents of box			ordering code
			tolerance	range	E-series	
General purpose, boxed	MKT 370/371/372	63 / 100 / 250 / 400	10%	1 - 2200 nF	E12	8204 110 64211
	MKT 373	100	10%	0.47 - 15 µF	E6	8204 110 64231
	MKT 373	250	10%	0.15 - 4.7 µF	E6	8204 110 64241
	MKT 373	400	10%	0.047 - 1.5 µF	E6	8204 110 64251
Precision	KP 460/464	63 V - 630 V	2%	47 - 62 000 pF	E12	8204 110 64201
Interference suppression	338 6 Y2	300 V <sub>AC</sub>	20%	1 nF - 100 nF	E6	8204 110 64881
	338 1 X1	440 V <sub>AC</sub>	20%	1 nF - 1 µF	E6	8204 110 64901
	338 2 X2	275 V <sub>AC</sub>	20%	1 nF - 3.3 µF	E6	8204 110 64491
	336 2 X1, X2, Y2	275 V <sub>AC</sub>	20%	1 nF - 2.2 µF	E6	8204 110 64431
	335 5 X2	275 V <sub>AC</sub>	20%	10 nF - 470 nF	E6	8204 110 64481
AC & Pulse	KP/MKP 375 1	630	5%	0.68 nF to 270 nF	E12	8204 110 64441
	KP/MKP 375 2	1000	5%	0.10 nF to 150 nF	E12	8204 110 64451
	KP/MKP 375 3	1600	5%	0.68 nF to 39 nF	E12	8204 110 64461
	KP/MKP 375 4	2000	5%	0.10 nF to 22 nF	E12	8204 110 64471
	MMKP 383	250-400-360 V	5%	47 mF to 2.7 µF	E12	8204 110 64701
	MMKP 383	1000-1400 V	5%	12 mF to 470 µF	E12	8204 110 64711
	MMKP 383	1600-2000-2500 V	5%	1.0 mF to 150 µF	E12	8204 110 64721
Application sample kits	TV-kit (AC&P)					8204 110 64731
	monitor-kit (AC&P)					8204 110 64741
	ADSL-kit					8204 110 64771
	light applications					8204 110 64781



# Electrolytic



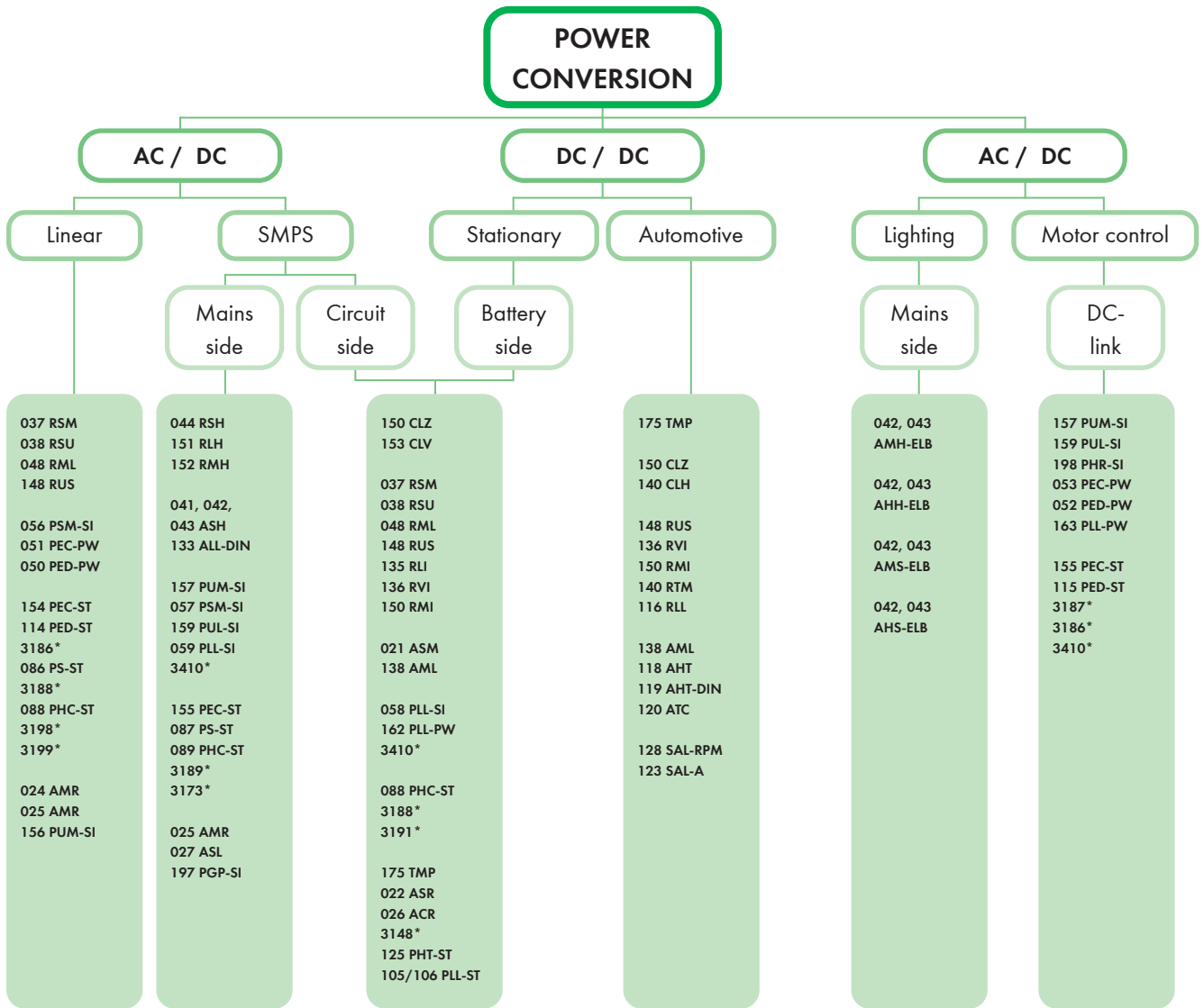


# capacitors

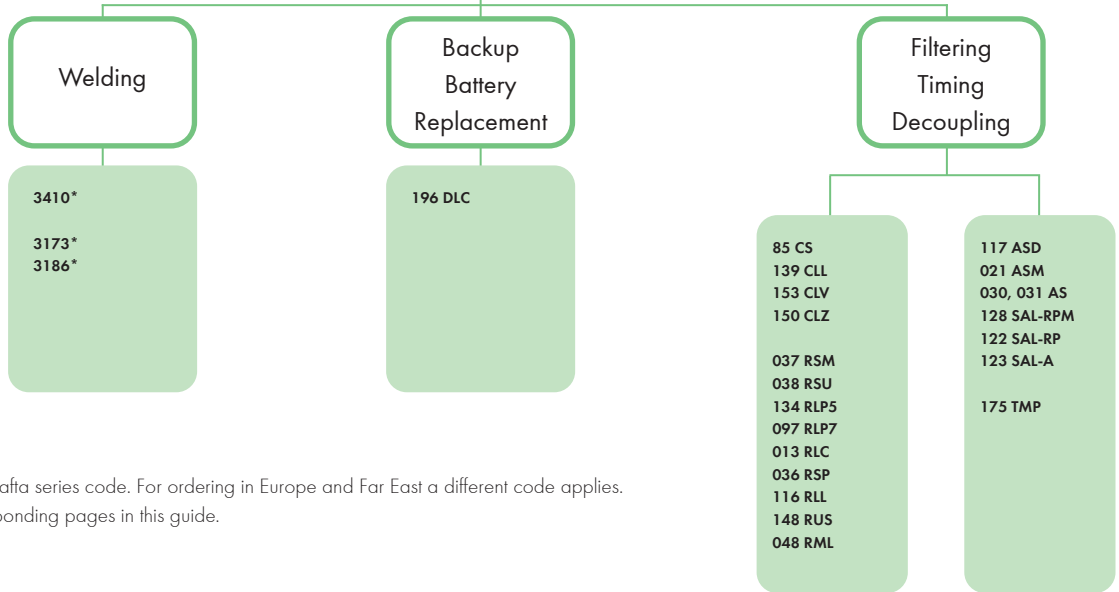
	page
SMD	<b>110</b>
Radial	<b>116</b>
Axial	<b>126</b>
Solid Aluminum (SAL)	<b>142</b>
Snap-in and printed wiring	<b>146</b>
Screw terminal	<b>159</b>
Energy storage (double layer)	<b>175</b>



Electrolytic capacitors

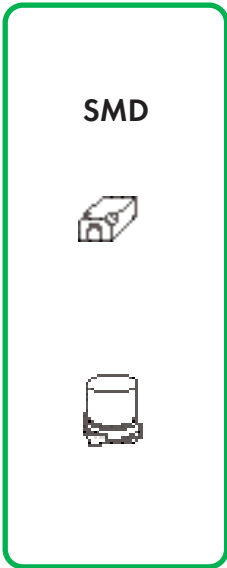


**OTHER**



\* indicates Nafta series code. For ordering in Europe and Far East a different code applies. See corresponding pages in this guide.

**Note:** see program survey for page numbers.



**SMD**



Standard  
1500 h/85 °C

Industrial  
2000 to 3000 h/105 °C

**085 CS**  
low profile  
page 110

**139 CLL**  
moulded  
page 110

Professional  
2.5 to 3000 h/105 °C  
1500 h/125 °C

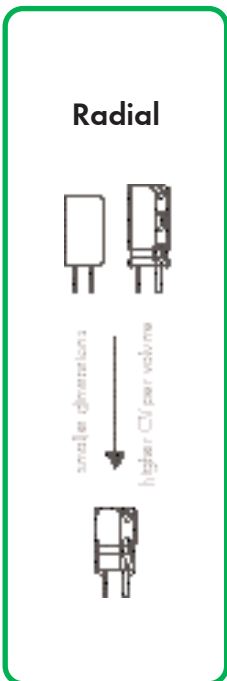
Solid aluminum  
HiTMP  
2000 h/175 °C

**153 CLV**  
low CV  
page 110

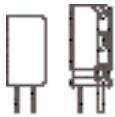
**150 CLZ**  
low impedance  
page 112

**140 CLH**  
125 °C  
page 112

**175 TMP**  
175 °C  
page 114



**Radial**



smaller dimensions  
↓  
higher CV per volume



Standard and  
miniature  
1500 to 3000 h/85 °C

Semi-professional  
750 to 2500 h/105 °C

Long life  
2000 to 4000 h/105 °C

Extra long-life or  
high temperature  
≥2500 h/125 °C  
≥4000 h/105 °C

**044 RSH**  
high voltage  
page 116

**037 RSM**  
low voltage  
page 116

**038 RSU**  
low voltage  
page 116

page 116  
**097 RLP 7** H: 7 mm  
**134 RLP 5** H: 5 mm  
page 116

**013 RLC**  
low leakage  
page 119

**135 RLI**  
maintenance type  
page 124

page 119  
**036 RSP**  
**047 RMS**  
maintenance type  
page 121

**151 RLH**  
maintenance type  
page 121

**152 RMH**  
high voltage  
page 121

page 119  
**116 RLL**  
**048 RML**  
page 121

**148 RUS**  
miniature  
page 121

**140 RTM**  
125 °C  
page 124

**136 RVI**  
105 °C  
very low Z  
page 124

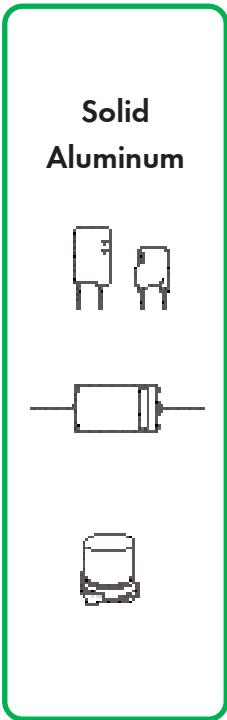
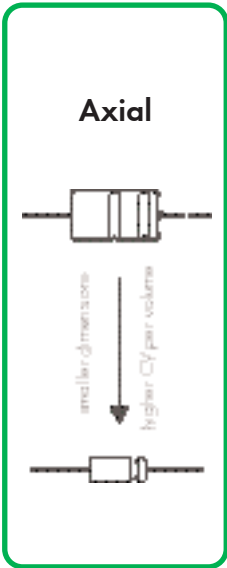
**150 RMI**  
105 °C  
very low Z  
page 124

capacitors

Electrolytic

NEW

products



Miniature 1500 to 8000 h/85 °C 750 to 1500 h/105 °C	Standard and semi-professional 5000 to 15000 h/85 °C 2000 h/105 °C	Long life 2000 to 10000 h/105 °C	Extra long-life or high temperature 4000 to 8000 h/125 °C
<b>041/042/043 ASH</b> page 126	<b>042/043 AMH-ELB</b> lighting ballast page 129	<b>042/043 AHH-ELB</b> lighting ballast page 129	
<b>030/031 AS</b> page 126	<b>042/043 AMS-ELB</b> lighting ballast page 129	<b>042/043 AHS-ELB</b> lighting ballast page 129	<b>119 AHT-DIN</b> page 133
<b>117 ASD</b> page 126	<b>132/133 ALL-DIN</b> page 131		<b>118 AHT</b> page 133
<b>024/025 AMR</b> page 138	<b>022/023 ASR</b> page 136	<b>026/027 ACR</b> page 140	<b>120 ATC</b> page 133
<b>021 ASM</b> page 126		<b>138 AML</b> page 131	

Leaded professional 20000 h/125 °C 2000 h/175 °C	SMD professional 20000 h/125 °C 2000 h/175 °C
<b>122 SAL-RP</b> H: 12 mm page 142	
<b>128 SAL-RPM</b> H: 9 mm page 142	
<b>123 SAL-A</b> page 142	<b>175 TMP</b> 175 °C page 144

**NEW**

products



### Snap-In/ DIN-PW

Higher C/F per volume

### Screw Terminal

Higher ripple current

### Energy storage (double layer)

Form A Form B

Economy	Long-life	Long-life	High-ripple current series
1000 to 5000 h/85 °C	5000 to 15000 h/85 °C	3000 to 10000 h/105 °C	85 °C
<b>NAFTA 3410</b> <b>2251 064 MP-SI</b> page 152	<b>050-052</b> <b>PED-PW</b> page 156		<b>198</b> <b>PHR-SI</b> 85 °C page 146
<b>156/157</b> <b>PUM-SI</b> page 146/148	<b>051-053</b> <b>PEC-PW</b> page 156	<b>162/163</b> <b>PLL-PW</b> page 156	
<b>197</b> <b>PGP-SI</b> page 150	<b>056/057</b> <b>PSM-SI</b> page 148	<b>058/059</b> <b>PLL-SI</b> page 154	
		<b>159</b> <b>PUL-SI</b> page 146	

Standard	Long-life	Economy/ euro-din	High temperature long-life
2000 to 5000 h/85 °C	5000 to 24000 h/85 °C	5000 to 20000 h/85 °C 3000 h/125 °C	2000 to 5000 h/105 °C
<b>NAFTA 3191</b> <b>2251 004 9,,,,</b> <b>POC-ST</b> page 167	<b>NAFTA 3198</b> <b>2251 005 9,,,,</b> <b>PLV-ST</b> page 174		<b>NAFTA 3148</b> <b>2251 008</b> <b>PHCT-ST</b> page 170
<b>NAFTA 3186</b> <b>2222 086/087</b> <b>PS-ST</b> page 165/172	<b>NAFTA 3199</b> <b>2251 006 9,,,,</b> <b>PPS-ST</b> page 167	<b>111/112</b> <b>PER-ST/STB</b> page 159	<b>105/106</b> <b>PLL-ST</b> <b>PED-STB</b> page 163
<b>NAFTA 3188</b> <b>2222 088/089</b> <b>PHC-ST</b> page 173	<b>NAFTA 3173</b> <b>2251 007</b> <b>PRL-ST/STB</b> page 170	<b>114/115</b> <b>PED-ST</b> <b>PED-STB</b> page 161	<b>125</b> <b>PHT-ST</b> <b>PHT-STB</b> page 163
		<b>154/155</b> <b>PEC-ST</b> <b>PEC-STB</b> page 161	

Energy storage

<b>196 DLC</b> page 175
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Electrolytic capacitors

**NEW**  
products



Series	<b>085 CS</b> Chip standard						<b>139 CLL</b> Chip long life								<b>153 CLV</b> Chip long life vertical												
Useful life	<b>1500 h/85 °C</b>						<b>2000 h/105 °C</b> or 6000 h/85 °C								<b>2000 h/105 °C</b> for case sizes 0405 to 0605 <b>3000 h/105 °C</b> for case sizes 0807 to 1014												
Temp. range	-40 to +85 °C						-55 to +105 °C								-55 to +105 °C												
Tolerance	-10% to +50%, ±20% on request						±20%								±20%												
C <sub>R</sub> (µF)	U <sub>R</sub> (V)						U <sub>R</sub> (V)								U <sub>R</sub> (V)												
	6.3	10	16	25	40	63	6.3	10	16	25	40	50	63	100	6.3	10	16	25	35	50	63	100					
0.47						1a															0405						
0.68																											
1						1a								2							0405						
1.5																											
2.2					1a	1							2	2								0405					
3.3				1a		1							2	3								0405					
4.7			1a		1								2	3						0405	0505						
6.8		1a		1																							
10	1a		1								2		2	3						0405		0505	0605	1012			
15		1										2	3														
22	1										2		3						0405		0505		0605	0807	1012		
33											2	3									0505		0605	0810	0810	1014	
47											2	3									0505		0605	0807		0810	1012
68											2																
100											2		3								0605		0807	0810		1010	1014
150											3															1012	
220											3											0810	1010	1012	1012		
330																						0810	1010	1012	1014		
470																						1010	1012	1014			
680																						1012	1014				
1000																						1014					
	preferred type																										
Case dimensions	case code / nominal dimensions L × W × H (mm)																										
	1a	8.8 × 3.7 × 3.9	2	14.3 × 6.2 × 6.9	0405:	4.0 × 4.0 × 5.3	0807:	8.0 × 8.0 × 6.5	1010:	10.0 × 10.0 × 10.0																	
	1	11.9 × 3.7 × 3.9	3	14.3 × 7.6 × 8.2	0505:	5.0 × 5.0 × 5.3	0810:	8.0 × 8.0 × 10.0	1012:	10.0 × 10.0 × 12.0																	
					0605:	6.3 × 6.3 × 5.3			1014:	10.0 × 10.0 × 14.0																	
Endurance IEC	1000 h/85 °C						1000 h/105 °C						1000 h/105 °C for case sizes 0405 mm to 0605 2000 h/105 °C for case sizes 0807 to 1014														
Technology	non-solid aluminum						non-solid aluminum, moulded						non-solid aluminum, with base plate														
Applications	general, consumer						telecom, automotive, professional						telecom, EDP, automotive, general industrial														
Remark	reflow and wave solderable						reflow and wave solderable						reflow solderable														
Pref. packing	blister tape on reel						blister tape on reel						blister tape on reel														
Note																											



085 CS series (tolerance -10 to +50%)							153 CLV series						
$U_R$	$C_R$ 100 Hz	case code	$I_R$ 100 Hz 85 °C (mA)	Z 10 kHz ( $\Omega$ )	catalogue number	smallest packing quantity	$U_R$	$C_R$ 100 Hz	case code	$I_R$ 100 Hz 105 °C (mA)	ESR 100 kHz ( $\Omega$ )	catalogue number	smallest packing quantity
(V)	( $\mu$ F)				2222 ... ..		(V)	( $\mu$ F)			( $\Omega$ )	2222 ... ..	
6.3	10	1a	11	20.0	085 23109	2000	6.3	100	0605	61	2.0	153 63101	1000
16	4.7	1a	9	26.0	085 25478	2000	10	220	0810	180	0.5	153 64221	500
	10	1	16	12.0	085 25109	2000	16	10	0405	16	8.0	153 65109	2000
40	2.2	1a	7	32.0	085 27228	2000	16	47	0605	47	2.2	153 65479	1000
	4.7	1	13	15.0	085 27478	2000		470	1014	370	0.25	153 65471	250
63	1	1a	6	55.0	085 28108	2000	25	100	0810	180	0.5	153 66101	500
							35	4.7	0405	14	8.0	153 60478	2000
139 CLL series							22	220	0605	50	2.2	153 60229	1000
							220	1025	270	0.29	153 60221	250	
6.3	100	2	79	3.0	139 63101	700	50	1.0	0405	7	12.0	153 61108	2000
	220	3	120	1.4	139 63221	700		4.7	0505	17	6.0	153 61478	1000
16	47	2	66	3.4	139 65479	700	10	0605	26	3.0	153 61109	1000	
	100	3	100	1.6	139 65101	700	47	0810	180	0.5	153 61479	500	
25	22	2	48	5.5	139 66229	700	100	1010	320	0.3	153 61101	500	
	33	2	59	3.7	139 66339	700	63	100	1014	240	0.41	153 68101	250
	47	3	79	2.6	139 66479	700							
40	33	3	75	2.7	139 67339	700							
50	10	2	40	7.0	139 61109	700							
	22	3	67	3.2	139 61229	700							
63	4.7	2	28	17.0	139 68478	700							
100	1	2	12	55.0	139 69108	700							
	2.2	2	19	29.0	139 69228	700							
	4.7	3	33	11.0	139 69478	700							

capacitors

Electrolytic



085 CS / 139 CLL series



153 CLV series



Series	150 CLZ							140 CLH						
Useful life	2500 h/ 105 °C for case size 0810 and 1010 3000 h/ 105 °C for case size 0814							1500 h/ 125 °C						
Temp. range	-55 to +105 °C							-55 to +125 °C						
Tolerance	±20%							±20%						
C <sub>R</sub> (μF)	U <sub>R</sub> (V)							U <sub>R</sub> (V)						
	6.3	10	16	25	35	50	63	6.3	10	16	25	35	50	63
22														0810
33							0810							0810
47							0810						0810	1010
							1010							
68						0810	1010					0810	1010	1014
100					0810	1010	1014				0810	1010	1014	
150				0810						0810		1014		
220			0810	0810	1010	1014			0810		1010			
330		0810	0810	1010	1014			0810	1010	1014				
470	0810	0810	1010	1014				1010	1014					
680		1010	1014					1014						
1000	1010	1014												
	preferred types													
Endurance	2000 h/105 °C							1000h/ 125 °C						
Features	very low impedance/ESR for excellent filtering or smoothing applications							high temperature, very long lifetime						
Case dimensions	case code / nominal dimensions L × W × H (mm)													
	0810: 8.0 x 8.0 x 10.0			1010: 10.0 x 10.0 x 10.0				1014: 10.0 x 10.0 x 14.0						





150 CLZ series							140 CLH series						
U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 kHz 105 °C (mA)	Z 100 kHz (W)	catalogue number 2222 150 .....	smallest packaging quantity	U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 kHz 125 °C (mA)	Z 100 kHz (W)	catalogue number 2222 140 .....	smallest packaging quantity
(V)	(μF)						(V)	(μF)					
10	470	0810	435	0.25	95412	500	6.3	470	1010	300	0.17	95301	500
	1000	1014	850	0.10	95402	250		10	220	0810	180	0.65	95403
16	330	0810	435	0.25	95512	500	25	330	1010	300	0.17	95401	500
	470	1010	670	0.13	95501	500		100	0810	180	0.65	95602	500
25	220	0810	420	0.28	95612	500	35	220	1010	300	0.19	95601	500
	470	1014	820	0.11	95602	250		100	1010	255	0.40	95001	500
35	100	0810	405	0.30	95011	500	50	47	0810	145	1.00	95103	500
	220	1010	630	0.15	95001	500		100	1014	255	0.42	95102	250
50	100	1010	490	0.24	95101	500	63	22	0810	145	1.00	95803	500
	220	1014	620	0.19	95102	250		47	1010	205	0.56	95801	500
63	47	0810	270	0.65	95811	500							
	47	1010	390	0.38	95801	500							

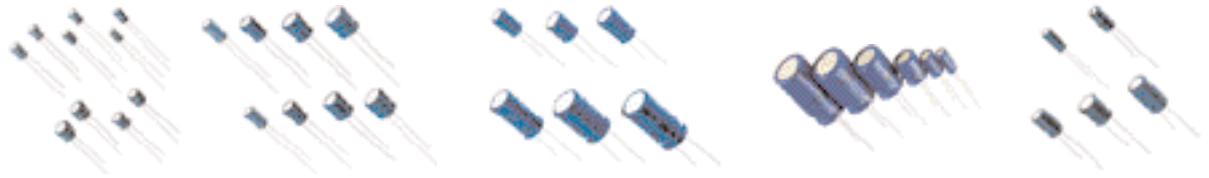


Series	<b>175 TMP</b>						
Useful life	20 000 h/125 °C 2000 h/175 °C						
Temp. range	U <sub>C1</sub> = 4 to 25 V: -55 to +125 °C U <sub>C2</sub> = 4 to 16 V: -55 to 175 °C						
Tolerance	±20%						
C <sub>R</sub> (μF)	U <sub>R</sub> (V) at T <sub>amb</sub> = 85 °C						
	4	6.3	10	16	20	25	40
	U <sub>C1</sub> (V) at T <sub>amb</sub> = 125 °C						
	4	6.3	10	16	20	25	25
	U <sub>C2</sub> (V) at T <sub>amb</sub> = 175 °C						
	4	6.3	10	16	16	16	16
1							808 810
2.2							808 810
3.3						808 810	1012
4.7						808 810	1012
6.8					808 810	808 810	1012
10				808 810		808 810	1012
15			808		note 1		1012
22			808 810	note 1		1012	1212
33		808 810	note 1			1012	1212
47		808 810	note 1			1012	1214
68	808 810	note 1		1012	1212		
100		1012	1212	1212			
150	1012	1212	1214				
220	1012						
330	1214	1212					
	preferred <span style="background-color: #c8e6c9; border: 1px solid #000; padding: 2px;">808</span>						
Case dimensions	808 = 8.0 × 8.0 × 8.0						
Endurance	10 000 h/125 °C						
Features	solid aluminum low voltage series for demanding applications in professional systems; extended values have preliminary specifications						
Note	note 1: Case code 0810 with U <sub>C1</sub> , T <sub>amb</sub> = 125 °C, available on request.						



## 175 TMP series

$U_R$ (V)	$U_{C1}$ 125 °C (V)	$U_{C2}$ 175 °C (V)	$C_R$ (V) ( $\mu$ F)	nominal case size L × W × H (mm)	$I_R$ 100 Hz 40 °C (mA)	$I_{15}$ 5 min (mA)	ESR TYP. 100 kHz (W)	catalogue number 2222 ... ..
4	4	4	68	8 × 8 × 8	2410	5	0.15	175 52689
6.3	6.3	6.3	47	8 × 8 × 8	2330	5	0.16	175 53479
10	10	10	22	8 × 8 × 8	1700	3	0.31	175 54229
16	16	16	10	8 × 8 × 8	1050	3	0.79	175 55109
25	25	16	4.7	8 × 8 × 8	620	2	1.6	175 56478
			6.8	8 × 8 × 8	780	4	1.33	175 58688
40	25	16	1.0	8 × 8 × 8	530	2	3.12	175 57108
			2.2	8 × 8 × 8	640	2	2.16	175 57228



Series	<b>134 RLP 5</b> Radial low profile	<b>097 RLP 7</b> Radial low profile	<b>037 RSM</b> Radial standard miniature	<b>038 RSU</b> Radial standard ultra miniature	<b>044 RSH</b> Radial standard high voltage
Useful life	1500 h/85 °C	1500 h/85 °C	2500 h/85 °C	2500 h/85 °C (∅ ≤ 8 mm) 3500 h/85 °C (∅ ≥ 10 mm)	3000 h/85 °C
Temp. range	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C	≤ 400 V: -40 °C to +85 °C 450 V: -25 °C to +85 °C
Tolerance	±20%	±20%	±20%	±20%	±20%
C <sub>R</sub> (μF)	U <sub>R</sub> (V)	U <sub>R</sub> (V)	U <sub>R</sub> (V)	U <sub>R</sub> (V)	U <sub>R</sub> (V)
	6.3 10 16 25 35 50	6.3 10 16 25 35 50 63	6.3 10 16 25 35 40 50 63 100	6.3 10 16 25 35 50 63 100	160 200 250 350 400 450
0.1			71		11
0.22			71		11
0.33					11
0.47			71	11 11	11 11
1		51	71	11 11	11 11
2.2		51 52	71	11 11	11 11
3.3		51 53	71 72	11 11	11 11
4.7		52 53 54	71 72 73	11 11	11 11
10		52 54 55	71 72 73 73	11 11 12	11 12
22	53	54 55	71 72 73 73	11 12 13	11 12 13
33	54	55	72 73 73	11	11 11 13
47	54	55	72 73 73	11	11 12 12 14
68				11 12	11 12 12 14
100	55		73 73	11 12 12	11 12 12 14
150				12 13 14	11 11 12 12 13 14 16
220		73		12 13 13 14	11 11 12 13 13 14 15 18
330				12 13 14 15	12 12 13 13 14 15 16 18
470				13 14 15 16 17 17 18 20	12 12 13 14 15 16 17 19
680				15 17 18 18 19	
1000				14 15 16 17 18 19 19 20	13 14 15 16 17 18 19 23
1500				16 17 18 19	
2200				17 17 18 19 20	15 16 17 18 19 20 22
3300				17 18 19 20	16 17 18 19 21 22
4700				19 20	17 18 19 20 22
6800				20	18 19 20 22
10000				20	19 21 22
22000				23	
Case dimensions	preferred type <span style="background-color: #c8e6c9;"> </span> case size / nominal dimensions ∅ × L (mm)				
	51 ∅3.0 × 5.0	71 ∅4.0 × 7.0	11 ∅5.0 × 11 14 ∅10 × 12	17 ∅13.0 × 20	21 ∅16 × 35
	52 ∅3.5 × 5.0	72 ∅5.0 × 7.0	12 ∅6.3 × 11 15 ∅10 × 16	18 ∅13.0 × 25	22 ∅18 × 35
	53 ∅4.0 × 5.0	73 ∅6.3 × 7.0	13 ∅8.0 × 12 16 ∅10 × 20	19 ∅16.0 × 25	23 ∅18 × 40
	54 ∅5.0 × 5.0			20 ∅16.0 × 31	
	55 ∅6.3 × 5.0				
Endurance IEC	1000 h/85 °C	1000 h/85 °C	2000 h/85 °C	2000 h/85 °C (∅ ≤ 8 mm) 3000 h/85 °C (∅ ≥ 10 mm)	2000 h/85 °C
Features	low profile (5 mm)	low profile (7 mm)	high CV product per unit volume, small dimensions	miniaturized, high CV-product per unit volume	standard high voltage type
Applications	general purpose portable equipment	general purpose portable equipment	general purpose audio / video	general purpose, industrial, automotive, audio-video	general purpose, industrial, mains, lighting



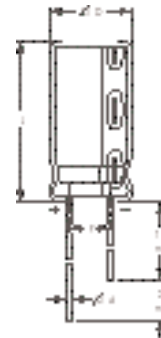
134 RLP 5 series							037 RSM series						
U <sub>R</sub>	C <sub>R</sub> 120 Hz	case code	form	F	catalogue number	smallest packing quantity	U <sub>R</sub>	C <sub>R</sub> 120 Hz	case code	form	F	catalogue number	smallest packing quantity
(V)	(µF)			(mm)	2222 ... ..		(V)	(µF)			(mm)	2222 ... ..	
6.3	47	54	CA	2.0	134 53479	2000	10	100	11	CA	2.0	037 54101	3000
			TFA	5.0	134 33479	2000				TFA	5.0	037 34101	2000
	100	55	CA	2.5	134 53101	2000		470	13	CA	3.5	037 54471	1000
			TFA	5.0	134 33101	2000				TFA	5.0	037 34471	1000
16	10	52	CA	1.0	134 55109	3000		1000	15	CB	5.0	037 64102	1000
			TFA	2.5	134 35109	3000				TFA	5.0	037 34102	500
	22	54	CA	2.0	134 55229	2000		4700	19	CB	7.5	037 64472	1000
			TFA	5.0	134 35229	2000				TFA	7.5	037 34472	250
	47	55	CA	2.5	134 55479	2000	16	470	14	CB	5.0	037 65471	1000
			TFA	5.0	134 35479	2000				TFA	5.0	037 35471	500
25	3.3	51	CA	1.0	134 56338	3000		1000	16	CB	5.0	037 65102	500
			TFA	2.5	134 36338	3000				TFA	5.0	037 35102	500
	4.7	52	CA	1.0	134 56478	3000		2200	18	CB	5.0	037 65222	2000
			TFA	2.5	134 36478	3000				TFA	5.0	037 35222	500
35	4.7	53	CA	1.5	134 50478	2000	25	47	11	CA	2.0	037 56479	3000
			TFA	5.0	134 30478	2000				TFA	5.0	037 36479	2000
	10	54	CA	2.0	134 50109	2000		100	12	CA	2.5	037 90047	2000
			TFA	5.0	134 30109	2000				TFA	5.0	037 90054	2000
	22	55	CA	2.5	134 50229	2000		220	13	CA	3.5	037 56221	1000
			TFA	5.0	134 30229	2000				TFA	5.0	037 36221	1000
50	1	51	CA	1.0	134 51108	3000		470	15	CB	5.0	037 66471	1000
			TFA	2.5	134 31108	3000				TFA	5.0	037 36471	500
	2.2	52	CA	1.0	134 51228	3000		1000	17	CB	5.0	037 66102	2000
			TFA	2.5	134 31228	3000				TFA	5.0	037 36102	500
	4.7	54	CA	2.0	134 51478	2000		2200	19	CB	7.5	037 66222	1000
			TFA	5.0	134 31478	2000				TFA	7.5	037 36222	250
<b>097 RLP 7 series</b>							35	220	14	CB	5.0	037 60221	1000
										TFA	5.0	037 30221	500
								470	16	CB	5.0	037 60471	500
										TFA	5.0	037 30471	500
								1000	18	CB	5.0	037 60102	2000
										TFA	5.0	037 30102	500
								2200	20	CB	7.5	037 60222	1000
										TFA	7.5	037 30222	250
10	100	73	CA	2.5	097 54101	1000	50	10	11	CA	2.0	037 51109	3000
			TFA	5.0	097 34101	2000				TFA	5.0	037 31109	2000
16	10	71	CA	1.5	097 55109	2000		22	11	CA	2.0	037 90056	3000
			TFA	5.0	097 35109	2000				TFA	5.0	037 90063	2000
	22	72	CA	2.0	097 55229	1000		47	12	CA	2.5	037 90065	2000
			TFA	5.0	097 35229	2000				TFA	5.0	037 90072	2000
	47	73	CA	2.5	097 55479	1000		100	13	CA	3.5	037 51101	1000
			TFA	5.0	097 35479	2000				TFA	5.0	037 31101	1000
	100	73	CA	2.5	097 55101	1000		220	15	CB	5.0	037 61221	1000
			TFA	5.0	097 35101	2000				TFA	5.0	037 31221	500
25	33	73	CA	2.5	097 56339	1000		470	17	CB	5.0	037 61471	2000
			TFA	5.0	097 36339	2000				TFA	5.0	037 31471	500
	47	73	CA	2.5	097 56479	1000		1000	19	CB	7.5	037 61102	1000
			TFA	5.0	097 36479	2000				TFA	7.5	037 31102	250
35	4.7	71	CA	1.5	097 50478	2000	63	1	11	CA	2.0	037 58108	3000
			TFA	5.0	097 30478	2000				TFA	5.0	037 38108	2000
	10	72	CA	2.0	097 50109	1000		2.2	11	CA	2.0	037 58228	3000
			TFA	5.0	097 30109	2000				TFA	5.0	037 38228	2000
	22	73	CA	2.5	097 50229	1000		4.7	11	CA	2.0	037 58478	3000
			TFA	5.0	097 30229	2000				TFA	5.0	037 38478	2000
50	3.3	71	CA	1.5	097 51338	2000		10	11	CA	2.0	037 58109	3000
			TFA	5.0	097 31338	2000				TFA	5.0	037 38109	2000
	4.7	72	CA	2.0	097 51478	1000		22	12	CA	2.5	037 58229	2000
			TFA	5.0	097 31478	2000				TFA	5.0	037 38229	2000
63	1	71	CA	1.5	097 58108	2000		47	13	CA	3.5	037 58479	1000
			TFA	5.0	097 38108	2000				TFA	5.0	037 38479	1000
	2.2	71	CA	1.5	097 58228	2000		100	14	CB	5.0	037 68101	1000
			TFA	5.0	097 38228	2000				TFA	5.0	037 38101	500
	4.7	73	CA	2.5	097 58478	1000		220	16	CB	5.0	037 68221	500
			TFA	5.0	097 38478	2000				TFA	5.0	037 38221	500
	10	73	CA	2.5	097 58109	1000		470	18	CB	5.0	037 68471	2000
			TFA	5.0	097 38109	2000				TFA	5.0	037 38471	500
			CA	2.5	097 58109	1000		1000	20	CB	7.5	037 68102	1000
			TFA	5.0	097 38109	2000				TFA	7.5	037 38102	250
			CB	2.0	037 59108	3000	100	1	11	CB	2.0	037 59108	3000
			TFA	5.0	037 39108	2000				TFA	5.0	037 39108	2000
			CA	2.5	037 59109	2000		10	12	CA	2.5	037 59109	2000
			TFA	5.0	037 39109	2000				TFA	5.0	037 39109	2000
			CA	3.5	037 59229	1000		22	13	CA	3.5	037 59229	1000
			TFA	5.0	037 39229	1000				TFA	5.0	037 39229	1000

Note: information about form see next page

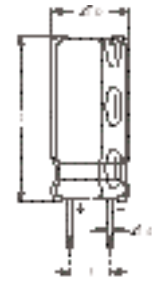
Electrolytic capacitors



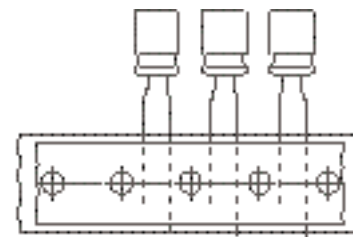
038 RSU series							044 RSH series								
U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	form	F	catalogue number	smallest packing quantity	U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	form	F	catalogue number	smallest packing quantity		
(V)	(μF)			(mm)	2222 ... ..		(V)	(μF)			(mm)	2222 ... ..			
10	100	11	CA	2.0	038 54101	5000	200	22	16	CB	5.0	044 62229	1500		
			TFA	5.0	038 34101	2000				TFA	5.0	044 32229	800		
	470	12	CA	2.5	038 54471	5000		250	100	20	CB	7.5	044 62101	500	
			TFA	5.0	038 34471	2000					CA	2.5	044 90501	2000	
	1000	14	CB	5.0	038 64102	1000		250	1	12	TFA	5.0	044 90506	2000	
			TFA	5.0	038 34102	500					CA	3.5	044 90015	1000	
	4700	18	CB	5.0	038 64472	400		250	2.2	13	TFA	5.0	044 90019	1000	
			TFA	5.0	038 34472	300					CB	5.0	044 63109	1500	
	16	470	13	CA	3.5	038 55471		5000	350	10	16	TFA	5.0	044 33109	800
				TFA	5.0	038 35471		1000				CB	7.5	044 63479	500
1000		15	CB	5.0	038 65102	1000	2.2	14		CB	5.0	044 65228	1500		
			TFA	5.0	038 35102	500				TFA	5.0	044 35228	800		
2200		17	CB	5.0	038 65222	400	4.7	15		CB	5.0	044 65478	1500		
			TFA	5.0	038 35222	300				TFA	5.0	044 35478	800		
25	100	12	CA	2.5	038 56101	5000	400	22	18	CB	5.0	044 90526	1500		
			TFA	5.0	038 36101	2000				TFA	5.0	044 90528	500		
	220	13	CA	3.5	038 56221	5000		1	13	CA	3.5	044 56108	1000		
			TFA	5.0	038 36221	1000				TFA	5.0	044 36108	1000		
	470	14	CB	5.0	038 66471	1000		2.2	14	CB	5.0	044 66228	1500		
			TFA	5.0	038 36471	5000				TFA	5.0	044 36228	800		
	1000	16	CB	5.0	038 66102	8000		4.7	16	CB	5.0	044 66478	1500		
			TFA	5.0	038 36102	500				TFA	5.0	044 36478	800		
	2200	18	CB	5.0	038 66222	400		10	17	CB	5.0	044 66109	1500		
			TFA	5.0	038 36222	300				TFA	5.0	044 36109	500		
3300	19	CB	7.5	038 66332	200	22	19	CB	7.5	044 66229	500				
		TFA	7.5	038 36332	200										
35	47	11	CA	2.0	038 50479	5000									
			TFA	5.0	038 30479	2000									
	220	13	CA	3.5	038 50221	5000									
			TFA	5.0	038 30221	1000									
	470	15	CB	5.0	038 60471	1000									
			TFA	5.0	038 30471	5000									
	1000	17	CB	5.0	038 60102	400									
			TFA	5.0	038 30102	300									
	2200	19	CB	7.5	038 60222	200									
			TFA	7.5	038 30222	200									
50	47	12	CA	2.5	038 51479	5000									
			TFA	5.0	038 31479	2000									
	100	13	CA	3.5	038 51101	5000									
			TFA	5.0	038 31101	1000									
	220	14	CB	5.0	038 61221	1000									
			TFA	5.0	038 31221	500									
470	16	CB	5.0	038 61471	800										
		TFA	5.0	038 31471	500										
1000	18	CB	5.0	038 61102	400										
		TFA	5.0	038 31102	300										
63	1	11	CA	2.0	038 58102	5000									
			TFA	5.0	038 38108	2000									
	2.2	11	CA	2.0	038 58228	5000									
			TFA	5.0	038 38226	2000									
	4.7	11	CA	2.0	038 58478	5000									
			TFA	5.0	038 38479	2000									
	10	11	CA	2.0	038 58109	5000									
			TFA	5.0	038 38109	2000									
	22	11	CA	2.0	038 58229	5000									
			TFA	5.0	038 38229	2000									
	47	12	CA	2.5	038 58479	5000									
			TFA	5.0	038 38479	2000									
	100	14	CB	5.0	038 68101	1000									
			TFA	5.0	038 38101	500									
	220	15	CB	5.0	038 68221	1000									
			TFA	5.0	038 38221	500									
	470	17	CB	5.0	038 68471	400									
			TFA	5.0	038 38471	300									
1000		CB	7.5	038 68102	200										
		TFA	7.5	038 38102	200										
100	1	11	CA	2.0	038 59108	5000									
			TFA	5.0	038 39108	2000									
	10	12	CA	2.5	038 59109	5000									
			TFA	5.0	038 39109	2000									
	22	12	CA	2.5	038 59229	5000									
			TFA	5.0	038 39229	2000									



Form CA: long leads



Form CB: cut leads



Form TFA: taped in box [arrmpack], trimmed



Series	013 RLC						036 RSP									116 RLL													
	Radial, low leakage current						Radial semi-professional									Radial long life													
Useful life	3000 h/85 °C, 750 h/ 105 °C						3000 h/85 °C, 750 h/ 105 °C									2000 h/105 °C													
Temp. range	-40 °C to +85 °C						-55 °C to +85 °C									-55 °C to +105 °C													
Tolerance	±20%, ±10% on request						±20%, ±10% on request									±20%													
C <sub>R</sub> (µF)	U <sub>R</sub> (V)						U <sub>R</sub> (V)									U <sub>R</sub> (V)													
	6.3	10	16	25	35	50	6.3	10	16	25	35	40	50	63	100	160	6.3	10	16	25	35	40	50	63	100				
0.1																													
0.22																													
0.47						11								11													11		
1					11	11								11													11		
1.5																											11		
2.2					11	11								11		13											11	13	
3.3					11	11								11													11		
4.7					11	11								11		13											11	13	
6.8														11													11		
10					11	11							11	11	13	13											11	13	
15												11		11													11		
22					11	11					11			11	13	13											11	13	
33					11	11	13				11			11	13												11	11	13
47					11	11	13				11			11	13	13										11		13	
68					11	11	13				11			13	13											11		13	
100					11	13	13				11			11	13	13										11		13	13
150											11	13	13	13											11		13		
220												13	13	13											13				
330																										13			
470																										13			
680																													
1000																													
1500																													
2200																													
3300																													
4700																													
6800																													
10000																													
preferred type	[shaded box]																												
Case dimensions	11 Ø5 × 11						13 Ø8.2 × 11																						
Endurance IEC	2000 h/85 °C						2000 h/85 °C									1500 h/105 °C or 5000 h/85 °C													
Features	low leakage current, e-pitch 2.5/5 mm, aluminum case all-insulated						high CV per unit volume, e-pitch 2.5/5 mm, aluminum case all-insulated									105 °C high CV product, e-pitch: 2.5/5 mm, aluminum case all-insulated													
Applications	coupling, timing						general industrial, telecom, automotive									telecom, EDP, automotive, general industrial													
Pref. packing	ampopack and loose in box (long leads for Ø < 10 mm, short leads for Ø ≥ 10 mm)																												

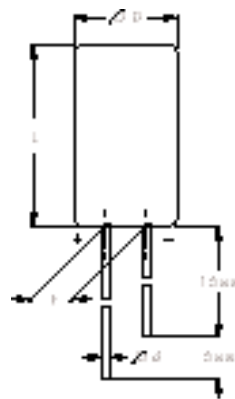
Electrolytic capacitors



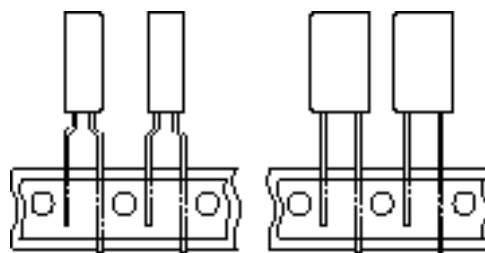
013 RLC series									116 RLL series								
$U_R$	$C_R$	case code	$I_{l2}$	Z	form	F	catalogue number	smallest packing quantity	$U_R$	$C_R$	case code	$I_R$	Z	form	F	catalogue number	smallest packing quantity
(V)	( $\mu$ F)		2 min	10 kHz		(mm)	2222 ... ..		(V)	( $\mu$ F)		100 kHz	100 kHz		(mm)	2222 ... ..	
			( $\mu$ A)	( $\Omega$ )								105 °C	( $\Omega$ )				
												(mA)					
10	220	13	4.4	0.9	CA	5.0	013 54221	1000	10	100	11	130	1.4	CA	2.5	116 54101	1000
					TFA	5.0	013 34221	1000						TFA	5.0	116 34101	2000
16	100	13	3.2	1.0	CA	5.0	013 55101	1000	16	220	13	280	0.5	CA	5.0	116 55221	1000
					TFA	5.0	013 35101	1000						TFA	5.0	116 35221	1000
25	4.7	11	0.7	8.5	CA	2.5	013 56478	1000	25	47	11	120	1.6	CA	2.5	116 56479	1000
					TFA	5.0	013 36478	2000						TFA	5.0	116 36479	2000
	22	11	1.1	2.7	CA	2.5	013 56229	1000	35	100	13	240	0.55	CA	5.0	116 50101	1000
					TFA	5.0	013 36229	2000						TFA	5.0	116 30101	1000
50	1	11	1.1	40.0	CA	2.5	013 51108	1000	50	1	11	40	6.0	CA	2.5	116 51108	1000
					TFA	5.0	013 31108	2000						TFA	5.0	116 31108	2000
	2.2	11	1.2	18.0	CA	2.5	013 51228	1000	2.2	11	60	3.5	CA	2.5	116 51228	1000	
					TFA	5.0	013 31228	2000					TFA	5.0	116 31228	2000	
	4.7	11	1.5	8.5	CA	2.5	013 51478	1000	4.7	11	70	2.8	CA	2.5	116 51478	1000	
					TFA	5.0	013 31478	2000					TFA	5.0	116 31478	2000	
	10	11	2.0	4.0	CA	2.5	013 51109	1000	10	11	80	2.2	CA	2.5	116 51109	1000	
					TFA	5.0	013 31109	2000					TFA	5.0	116 31109	2000	
22	11	110	1.9	190	CA	2.5	013 51229	1000	22	13	190	0.9	CA	5.0	116 90025	1000	
					TFA	5.0	013 31229	2000					TFA	5.0	116 90039	1000	
47	13	210	0.65	210	CA	5.0	013 51479	1000	47	13	210	0.65	CA	5.0	116 51479	1000	
					TFA	5.0	013 31479	1000					TFA	5.0	116 31479	1000	

036 RSP series								
$U_R$	$C_R$	case code	$I_R$	Z	form	F	catalogue number	smallest packing quantity
(V)	( $\mu$ F)		85 °C	10 kHz		(mm)	2222 ... ..	
			100 Hz	( $\Omega$ )				
			(mA)					
10	47	11	95	2.8	CA	2.5	036 54479	1000
					TFA	5.0	036 34479	2000
470	13	400	0.43	0.43	CA	5.0	036 54471	1000
					TFA	5.0	036 34471	1000
16	100	11	160	1.6	CA	2.5	036 55101	1000
					TFA	5.0	036 35101	2000
	220	13	280	0.55	CA	5.0	036 55221	1000
					TFA	5.0	036 35221	1000
330	13	390	0.48	CA	5.0	036 55331	1000	
				TFA	5.0	036 35331	1000	
25	100	13	210	0.7	CA	5.0	036 56101	1000
					TFA	5.0	036 36101	1000
220	13	310	0.55	CA	5.0	036 56221	1000	
				TFA	5.0	036 36221	1000	
35	47	11	130	1.9	CA	2.5	036 90094	1000
					TFA	5.0	036 90098	2000
50	100	13	250	0.7	CA	5.0	036 90109	1000
					TFA	5.0	036 90113	1000
63	1	11	11	40.0	CA	2.5	036 58108	1000
					TFA	5.0	036 38108	2000
	2.2	11	25	18.0	CA	2.5	036 58228	1000
					TFA	5.0	036 38228	2000
	4.7	11	45	8.5	CA	2.5	036 58478	1000
					TFA	5.0	036 38478	2000
	10	11	70	4.0	CA	2.5	036 58109	1000
					TFA	5.0	036 38109	2000
	22	11	100	2.7	CA	2.5	036 58229	1000
					TFA	5.0	036 38229	2000
	47	13	190	1.0	CA	5.0	036 58479	1000
					TFA	5.0	036 38479	1000



Form CA: long leads



Form TFA: tapered in box (compact), straight and formed



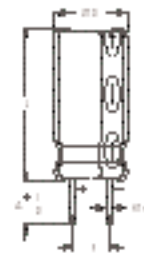


Series	<b>047 RMS</b> Radial miniature semi-professional	<b>048 RML</b> Radial miniature long life	<b>148 RUS</b> Radial ultra high CV per volume semi-professional	<b>151 RLH</b> Radial long life, high voltage	<b>152 RMH</b> Radial miniature, high voltage	
Useful life	1500 h/105 °C	3000 h/105 °C (∅ ≤ 12.5 mm) 4000 h/105 °C (∅ ≥ 16.0 mm)	2000 h/105 °C (∅ = 10 mm) 3000 h/105 °C (∅ ≥ 12.5 mm)	3000 h/105 °C (∅ ≤ 12.5 mm) 4000 h/105 °C (∅ ≥ 16.0 mm)	3000 h/105°C(∅≤12,5mm) 4000 h/105°C(∅≥16 mm)	
Temp. range	-40 °C to +105 °C	-40 °C to +105 °C	-40 °C to +105 °C	-40 °C to +105 °C	-40°C to +105 °C	
Tolerance	±20%	±20%	±20%	±20%	±20%	
$C_R$ ( $\mu$ F)	$U_R$ (V)					
	16 25 35 40 50 63	6.3 10 16 25 35 40 50 63	6.3 10 16 25 35 50 63 100	160 200 250 350 400 450	200 250 400 450	
1.0					14	
2.2					14 15	
3.3					14 15 16	
4.7				14 14 15 16 17	15 16	
6.8					15 17	
10				15 15 16 17 17 19a	14 15 16 17	
22				16 16 18 18 19 20 1820 1825	15 17 18 19 1820 21	
33				17 17 18 19 20 1825 22	16 17 19a 21 1825	
47				14 18 18 19 21 1831 1831	17 18 19 22	
68				15	18 21	
100		14	14	14 16 19 20 20 1825	19a 19 22	
150				17		
220	14 15 16	15 16	14 15 16	14 15 18 19a	21	
330						
470	14 15 16	17 18	14 15 16	17 18		
680				14 15 16 17 18		
1000	16 17 18	19 20	15 16 17 18	19 20	14 15 16 17 18 19a	
1500				15 16 17 18 19a	19 20	
2200	18 19 20 21 22 22	17 18 19 20 21 22 22	15 16 17 18 19a	19 20 22		
3300	19 20 22 22 22	18 19 20 22 22 22	17 18 19a	19 20 22		
4700	20 22 22	19 20 22 22	17 18 19a	19 20 22		
6800	21 22	19 20 21	19a 19 20 22			
10000	22	21 22 22	19 20 22			
15000			20 22			
22000			22			
	preferred type <span style="background-color: #90EE90; padding: 2px;">        </span>					
Case dimensions	case size / nominal dimensions ∅ × L (mm)					
	14 ∅10 × 12	17 ∅12.5 × 20	19 ∅16 × 25	1820 ∅18 × 20	22 ∅18 × 35	
	15 ∅10 × 16	18 ∅12.5 × 25	20 ∅16 × 31	1825 ∅18 × 25		
	16 ∅10 × 20	19a ∅16 × 20	21 ∅16 × 35	1831 ∅18 × 31		
Endurance IEC	1000 h/105 °C	2000 h/105 °C	1000 h/105 °C (∅ = 10 mm) 2000 h/105 °C (∅ ≥ 12.5 mm)	2000 h/105 °C	2000 h/105 °C	
Features	high CV product, small, 105 °C	miniaturized long life product, 105 °C	105 °C, miniaturized, ultra high CV-product per unit volume	long life product, 105 °C, high voltage, high ripple current	105 °C, miniaturized ultra high CV-product per unit volume	
Applications	SMPS, DC/DC converters telecom, automotive	SMPS, DC/DC converters, automotive, telecom, EDP	industrial, SMPS, telecommunication, automotive, audio-video	SMPS, AC/DC converters, mains, TV, monitors, industrial	industrial, lighting, monitors, SMPS, AC/DC converters	
Pref. packing	ampopack and loose in box (long leads for ∅ < 10 mm, short leads for ∅ ≥ 10 mm)					

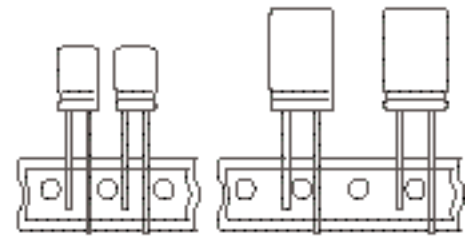
Electrolytic capacitors



047 RMS series									148 RUS series										
U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 105 °C (mA)	Z 100 kHz (mΩ)	form	F (mm)	catalogue number	smallest packing quantity	U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 105 °C (mA)	Z 100 kHz (mΩ)	form	F (mm)	catalogue number	smallest packing quantity		
(V)	(μF)						2222 ... ..		(V)	(μF)						2222 ... ..			
25	470	15	360	250	CB	5.0	047 66471	500	16	1000	15	570	180	CB	5.0	148 65102	500		
					TFA	5.0	047 36471	800						TFA	5.0	148 35102	800		
	1000	17	630	130	CB	5.0	047 66102	500		2200	17	930	90	CB	5.0	148 65222	500		
					TFA	5.0	047 36102	500						TFA	5.0	148 35222	500		
	2200	19	990	80	CB	7.5	047 66222	250		4700	19	1480	45	CB	7.5	148 65472	250		
					TFA	7.5	047 36222	250						TFA	7.5	148 35472	250		
35	220	14	270	380	CB	5.0	047 60221	500	25	470	14	410	260	CB	5.0	148 66471	500		
					TFA	5.0	047 30221	800						TFA	5.0	148 36471	800		
40	2200	21	1200	60	CB	7.5	047 67222	100		1000	16	690	130	CB	5.0	148 66102	500		
					TFA	7.5	047 67332	100						TFA	5.0	148 36102	800		
50	470	17	540	170	CB	5.0	047 61471	500		3300	19	1420	45	CB	7.5	148 66332	250		
					TFA	5.0	047 31471	500						TFA	7.5	148 36332	250		
63	100	14	210	650	CB	5.0	047 68101	500	35	470	15	480	190	CB	5.0	148 60471	500		
					TFA	5.0	047 31102	250						TFA	5.0	148 30471	800		
	220	16	350	320	CB	5.0	047 68221	500		2200	19	1270	45	CB	7.5	148 60222	250		
					TFA	5.0	047 38101	800						TFA	7.5	148 30222	250		
	470	18	620	160	CB	5.0	047 68471	250		50	220	14	330	280	CB	5.0	148 61221	500	
					TFA	5.0	047 38221	800							TFA	5.0	148 31221	800	
2200	22	1500	40	CB	5.0	047 38471	500	470	16		530	140	CB	5.0	148 61471	500			
				TFA	5.0	047 38471	500						TFA	5.0	148 31471	800			
048 RML series	16	470	14	360	250	CB	5.0	048 65471	500		63	100	14	230	320	CB	5.0	148 68101	500
						TFA	5.0	048 35471	800							TFA	5.0	148 38101	800
	1000	16	600	140	CB	5.0	048 65102	500	100	220		15	350	240	CB	5.0	148 68221	500	
					TFA	5.0	048 35102	800							TFA	5.0	148 38221	800	
	2200	18	1000	70	CB	5.0	048 65222	250		470		17	540	130	CB	5.0	148 68471	500	
					TFA	5.0	048 35222	500							TFA	5.0	148 38471	500	
4700	20	1500	45	CB	7.5	048 65472	100	100		100	16	260	380	CB	5.0	148 68101	500		
				TFA	7.5	048 35472	250							TFA	5.0	148 39101	800		
25	1000	17	720	100	CB	5.0	048 66102	500	220	18	440	170	CB	5.0	148 69221	250			
					TFA	5.0	048 36102	500					TFA	5.0	148 39221	500			
3300	20	1450	45	CB	7.5	048 66332	100	470	20	750	100	CB	7.5	148 69471	100				
				TFA	7.5	048 36332	250					TFA	7.5	148 39471	250				
35	220	14	310	280	CB	5.0	048 60221	500	048 RML series	16	470	14	360	250	CB	5.0	048 65471	500	
					TFA	5.0	048 30221	800							TFA	5.0	048 31471	500	
470	16	500	150	CB	5.0	048 60471	500	1000		19	1030	60	CB	7.5	048 61102	250			
				TFA	5.0	048 30471	800						TFA	7.5	048 31102	250			
2200	20	1340	45	CB	7.5	048 60222	100	2200		22	1500	50	CB	7.5	048 61222	100			
				TFA	7.5	048 30222	250						TFA	7.5	048 61222	100			
50	470	17	620	110	CB	5.0	048 61471	500	63	100	14	240	310	CB	5.0	048 68101	500		
					TFA	5.0	048 31471	500						TFA	5.0	048 38101	800		
1000	19	1030	60	CB	7.5	048 61102	250	220	16	400	200	CB	5.0	048 68221	500				
				TFA	7.5	048 31102	250					TFA	5.0	048 38221	800				
2200	22	1500	50	CB	7.5	048 61222	100	470	18	700	80	CB	5.0	048 68471	250				
				TFA	7.5	048 61222	100					TFA	5.0	048 38471	500				



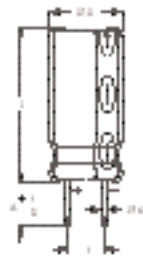
Form CB: cut leads



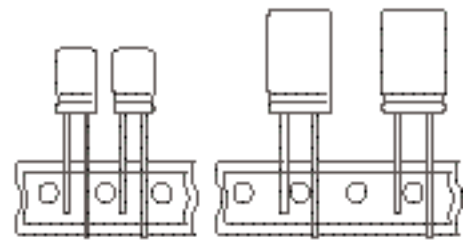
Form TFA: taped in box (arranged)



151 RLH series									152 RMH series																							
$U_R$	$C_R$	case code	$I_R$	Z	form	F	catalogue number	smallest packing quantity	$U_R$	$C_R$	case code	$I_R$	Z	form	F	catalogue number	smallest packing quantity															
(V)	( $\mu$ F)		100 Hz 105 °C (mA)	10 kHz ( $\Omega$ )		(mm)	2222 ... ..		(V)	( $\mu$ F)		100 Hz 105 °C (mA)	10 kHz ( $\Omega$ )		(mm)	2222 ... ..																
160	100	19	380	1.1	CB	7.5	151 61101	250	200	10	14	85	6.3	CB	5.0	152 62109	500															
					TFA	7.5	151 31101	250						TFA	5.0	152 32109	800															
200	10	15	95	6.3	CB	5.0	151 62109	500						22	15		120	3.2	CB	5.0	152 62229	500										
					TFA	5.0	151 32109	800											TFA	5.0	152 32229	800										
	22	16	145	3.2	CB	5.0	151 62229	500						47	17		240	0.9	CB	5.0	152 62479	500										
					TFA	5.0	151 32229	800											TFA	5.0	152 32479	500										
47	18	280	1.7	CB	5.0	151 62479	250	100						19a		340	0.4	CB	7.5	152 62101	250											
				TFA	5.0	151 32479	500											TFA	7.5	152 32101	250											
250	4.7	14	60	13.0	CB	5.0	151 63478	500						250	47	18		310	0.9	CB	5.0	152 63479	250									
					TFA	7.5	151 32101	250												TFA	5.0	152 33479	500									
	22	19a	180	3.2	CB	7.5	151 93226	250						400	4.7	15	65	18.0	CB	5.0	152 66478	500										
					TFA	7.5	151 93223	250											TFA	5.0	152 36478	800										
47	19	300	1.7	CB	7.5	151 63479	250	10											16		80	9.0	CB	5.0	152 66109	500						
				TFA	7.5	151 33479	250																TFA	5.0	152 36109	800						
100	1825	410	1.1	CB	7.5	151 93106	100	22											18		150	3.8	CB	5.0	152 66229	250						
				TFA	7.5	151 33479	250																TFA	5.0	152 36229	500						
350	4.7	15	65	16.0	CB	5.0	151 65478	500											47	19		240	2.0	CB	7.5	152 66479	250					
					TFA	5.0	151 35478	800																TFA	7.5	152 36479	250					
	22	18	180	3.8	CB	5.0	151 65229	250											450	10	17	90	10.0	CB	5.0	152 67109	500					
					TFA	5.0	151 35229	500																TFA	5.0	152 37109	500					
400	2.2	14	40	33.0	CB	5.0	151 66228	500	22	19		150	4.6											CB	7.5	152 67229	250					
					TFA	5.0	151 36228	800																TFA	7.5	152 37229	250					
	4.7	16	70	16.0	CB	5.0	151 66478	500	400	4.7	15	65	18.0											CB	5.0	152 66478	500					
					TFA	5.0	151 36478	800																TFA	5.0	152 36478	800					
22	19	200	3.8	CB	7.5	151 66229	250	10																16		80	9.0	CB	5.0	152 66109	500	
				TFA	7.5	151 36229	250																					TFA	5.0	152 36109	800	
47	1831	300	2.0	CB	7.5	151 66479	100	22																18		150	3.8	CB	5.0	152 66229	250	
				TFA	7.5	151 36229	250																					TFA	5.0	152 36229	500	
450	10	19a	140	10.0	CB	7.5	151 67109	250																450	10	17	90	10.0	CB	5.0	152 67109	500
					TFA	7.5	151 37109	250																					TFA	5.0	152 37109	500
	22	1825	220	4.6	CB	7.5	151 97226	100						22	19		150	4.6											CB	7.5	152 67229	250



Form CB: cut leads



Form TFA: taped in box [antropack]



Series	140 RTM							135 RLI							136 RVI							150 RMI												
	Radial high temperature miniature							Radial low impedance							Radial very low impedance							Radial miniature, low impedance												
Useful life	2500 - 4000 h/125 °C dependent on case size							2500 h/105 °C (Ø ≥ 10 mm), 1500 h/105 °C (Ø = 8 mm)							4000 - 10 000 h/105 °C dependent on case size							4000 - 10 000 h/105 °C dependent on case size												
Temp. range	-55 °C to +125 °C							-55 °C to +105 °C							-55 °C to +105 °C							-55 °C to +105 °C												
Tolerance	±20%							±20%							±20%							±20%												
C <sub>R</sub> (µF)	U <sub>R</sub> (V)							U <sub>R</sub> (V)							U <sub>R</sub> (V)							U <sub>R</sub> (V)												
	6.3	10	16	25	35	50	63	6.3	10	16	25	35	50	63	100	10	16	25	35	50	63	100	10	16	25	35	50	63						
22							14							13											14									
33																									14									
47						14	14							13											14	15								
56																									14									
68																									15	16								
82																									14									
100					14	15	16						13	15	17									14	15	17					14			
120																								14	15	16	17a							
150																								14	16	16L	19a				14	15		
180																							14	16	16LL									
220			14	15	15	17	19a			13	13L	13LL	16L	17	19								14	15	16L	17	19			14	15	16		
270																							14			18								
330		14	15	16		17	19a			13L		16	17		20							14	15	16	16LL	17	19a	20		14	15	16	17	
390																								16L		18L								
470		15	15	16	17	19a	18	19	14	13L	13LL	16	16LL	18	19	21L	14	15	16	17	18	19	1831			21		14	15	16	17	18	19a	
560																								17a	16L	16LL	17	18L						
680									15		16		18		20	23	15	16	17a		18	19a	20	1825	22	14	15	16	17	18	19a	19		
820																							16L	16LL	17	19	21							
1000		16	17	19a	19	20	1831			17a	16LL	18	18L	19a	20	21L		16	17a	17	18	18L	19a	20	1831		15	16	17	18	19	20		
1200	15																							16L	16LL	17	19	21						
1500										16LL	18	18L	1240	21L									16LL	17	18L	19a	1831	22		17	18	19a	20	
1800																							17	19	20									
2200	16	19a	19	20	1831			17	18	18L	1240	21	23										18	18L	20	21	22		17	18	19a	20		
2700										13L	19a	13LL	1831											19a	19	21	22							
3300		19	20	1831						18LL	19a	21	23										19a	19	21	22			18	19a	20			
3900																																		
4700		20	1831							20	1825	21	23											19	20									
5600																								20										
6800									20	21	22													20	22			20	21					
8200																																		
10 000								1831	23															22										
Case dimensions	preferred type																																	
Endurance IEC	2000 h/125 °C							Ø = 8 mm: 1000 h/105 °C Ø ≥ 10 mm: 2000 h/105 °C							3000 -5000 h/105 °C dependent on case size							3000 -5000 h/105 °C dependent on case size												
Features	high temperature 125 °C, high reliability, high ripple current							105 °C, low impedance, high ripple current							105 °C, very low impedance, extra long life, high ripple current							105 °C, very low impedance, extra long life, high ripple current												
Applications	SMPS, DC/DC converters, automotive, industrial							industrial, SMPS, DC/DC converters							industrial, automotive, telecom, EDP, SMPS, DC/DC converters							industrial, automotive, telecom, EDP, SMPS, DC/DC converters												
Pref. packing	ammopack and loose in box (long leads for Ø < 10 mm, short leads for Ø ≥ 10 mm)																																	



140 RTM series									135 RLI series								
U <sub>R</sub>	C <sub>R</sub>	case code	I <sub>R</sub>	Z	form	F	catalogue number	smallest packing quantity	U <sub>R</sub>	C <sub>R</sub>	case code	I <sub>R</sub>	Z	form	F	catalogue number	smallest packing quantity
(V)	(μF)		100 kHz 125 °C (mA)	100 kHz (mΩ)		(mm)	2222 ... ..		(V)	(μF)		100 kHz 105 °C (mA)	100 kHz (mΩ)		(mm)	2222 ... ..	
10	470	15	760	150	CB	5.0	140 64471	500	10	1000	17a	970	120	CB	5.0	135 64102	1500
					TFA	5.0	140 34471	800						TFA	5.0	135 34102	500
16	2200	19	1900	34	CB	7.5	140 65222	250	16	2200	18	1300	73	CB	5.0	135 64222	250
					TFA	7.5	140 35222	250						TFA	5.0	135 34222	500
25	220	15	750	150	CB	5.0	140 66221	500	25	2200	19a	1400	73	CB	7.5	135 90008	250
					TFA	5.0	140 36221	800						TFA	7.5	135 90043	250
35	470	16	850	120	CB	5.0	140 66471	500	35	470	16	860	140	CB	5.0	135 66471	500
					TFA	5.0	140 36471	800						TFA	5.0	135 36471	800
50	100	14	480	200	CB	5.0	140 60101	500	50	1000	18	1300	71	CB	5.0	135 66102	250
					TFA	5.0	140 30101	800						TFA	5.0	135 36102	500
50	100	15	380	200	CB	5.0	140 61101	500	50	3300	22	2000	45	CB	7.5	135 66332	100
					TFA	5.0	140 36101	800						CB	5.0	135 60102	750
63	47	14	380	300	CB	5.0	140 61221	500	63	1000	18L	1500	61	CB	5.0	135 60102	750
					TFA	5.0	140 31102	500						TFA	7.5	135 90017	250
63	470	19	1500	55	CB	7.5	140 61102	100	63	2200	22	2000	44	CB	7.5	135 60222	100
					TFA	7.5	140 31102	250						CB	5.0	135 61101	500
63	47	14	380	300	CB	5.0	140 68479	500	63	470	18	1300	68	CB	5.0	135 61471	250
					TFA	5.0	140 38479	800						TFA	5.0	135 31471	500
63	470	19	1500	55	CB	7.5	140 68471	250	63	1000	20	1800	50	CB	7.5	135 61102	100
					TFA	7.5	140 38471	250						CB	5.0	135 68221	500
63	47	14	380	300	CB	5.0	140 68471	250	63	470	19	1400	91	CB	7.5	135 68471	250
					TFA	5.0	140 38471	250						TFA	7.5	135 38471	250
63	470	19	1500	55	CB	7.5	140 68471	250	63	1000	17	890	150	CB	5.0	135 69101	500
					TFA	7.5	140 38471	250						TFA	5.0	135 39101	500

136 RVI series								
U <sub>R</sub>	C <sub>R</sub>	case code	I <sub>R</sub>	Z	form	F	catalogue number	smallest packing quantity
(V)	(μF)		100 kHz 105 °C (mA)	100 kHz (mΩ)		(mm)	2222 ... ..	
10	1000	16	1000	62	CB	5.0	136 64102	500
					TFA	5.0	136 34102	800
16	470	15	830	84	CB	5.0	136 65471	500
					TFA	5.0	136 35471	800
16	2200	19a	1600	38	CB	7.5	136 65222	250
					TFA	7.5	136 35222	250
25	4700	22	2600	22	CB	7.5	136 65472	100
					TFA	5.0	136 66471	500
25	470	16	1000	62	CB	5.0	136 66471	500
					TFA	5.0	136 36471	800
35	1000	18	1700	34	CB	5.0	136 66102	250
					TFA	5.0	136 36102	500
35	3300	22	2600	22	CB	7.5	136 66332	100
					TFA	5.0	136 60221	500
35	220	15	830	84	CB	5.0	136 60221	500
					TFA	5.0	136 30221	800
50	1000	19a	1700	38	CB	7.5	136 60102	250
					TFA	7.5	136 30102	250
50	2200	22	2600	22	CB	7.5	136 60222	100
					TFA	5.0	136 61101	500
50	100	14	480	200	CB	5.0	136 61101	500
					TFA	5.0	136 31101	800
63	470	18	1500	44	CB	5.0	136 61471	250
					TFA	5.0	136 31471	500
63	1000	20	2200	30	CB	7.5	136 61102	100
					TFA	7.5	136 31102	250
63	47	14	380	300	CB	5.0	136 68479	500
					TFA	5.0	136 38479	800
63	100	15	580	190	CB	5.0	136 68101	500
					TFA	5.0	136 38101	800
63	220	17	870	110	CB	5.0	136 68221	500
					TFA	5.0	136 38221	500
63	470	19	1500	55	CB	7.5	136 68471	250
					TFA	7.5	136 38471	250
100	47	15	450	320	CB	5.0	136 69479	500
					TFA	5.0	136 39479	800
100	100	17	800	150	CB	5.0	136 69101	500
					TFA	5.0	136 39101	500
100	220	19	1300	81	CB	7.5	136 69221	250
					TFA	7.5	136 39221	250

150 RMI series								
U <sub>R</sub>	C <sub>R</sub>	case code	I <sub>R</sub>	Z	form	F	catalogue number	smallest packing quantity
(V)	(μF)		100 kHz 105 °C (mA)	100 kHz (mΩ)		(mm)	2222 ... ..	
10	1000	15	950	66	CB	5.0	150 64102	500
					TFA	5.0	150 34102	800
16	2200	17	1460	37	CB	5.0	150 64222	500
					TFA	5.0	150 34222	500
16	470	14	730	97	CB	5.0	150 65471	500
					TFA	5.0	150 35471	800
25	2200	18	1950	29	CB	5.0	150 65222	250
					TFA	5.0	150 35222	500
25	470	15	950	66	CB	5.0	150 66471	500
					TFA	5.0	150 36471	800
35	1000	17	1460	37	CB	5.0	150 66102	500
					TFA	5.0	150 36102	500
35	220	14	730	97	CB	5.0	150 60221	500
					TFA	5.0	150 30221	800
50	470	16	1180	49	CB	5.0	150 60471	500
					TFA	5.0	150 30471	800
50	2200	20	2890	19	CB	7.5	150 60222	100
					TFA	7.5	150 30222	250
50	470	17	1100	62	CB	5.0	150 61471	500
					TFA	5.0	150 31471	500
63	1000	19	1800	34	CB	7.5	150 61102	250
					TFA	7.5	150 31102	250
63	100	14	420	270	CB	5.0	150 68101	500
					TFA	5.0	150 38101	800
63	470	118	1200	67	CB	5.0	150 68471	250
					TFA	5.0	150 38471	500

Electrolytic capacitors



Series	<b>021 ASM, 117 ASD</b> Axial standard miniature Axial smallest diameter							<b>030, 031 AS</b> Axial standard							<b>041, 042, 043 ASH</b> Axial standard high voltage						
Useful life	8000 h/85 °C (case sizes 00–05) 2500 h/85 °C (case sizes 2–7) 2000 h/85 °C (case sizes 1a, 1)							3000 h/85 °C (case sizes 2–7) 1500 h/85 °C (case size 1)							15 000 h/85 °C (case sizes 00–05) 10 000 h/85 °C (450 V range) 5000 h/85 °C (case sizes 4–7)						
Temp. range	–40 °C to +85 °C							–40 °C to +85 °C							–40 °C to +85 °C (–25 °C to +85 °C for 450 V range)						
Tolerance	±20% (021 ASM), –10 to +50% (117 ASD) (±20% 117 ASD to special order)							–10 to +50%							–10 to +50%						
C <sub>R</sub> (µF)	U <sub>R</sub> (V)							U <sub>R</sub> (V)							U <sub>R</sub> (V)						
	6.3	10	16	25	40	63	100	6.3	10	16	25	40	63	100	160	250	350	385	400	450	
0.22																					
0.33																					
0.47						1a/2								2							
1.0						1a	2	2					1	2	2				4		
1.5														2							
2.2					1a	1	2	2				1	2		4			5			
3.3				1a		1/2							2	2							
4.7			1a		1	2	2			1			2	3	4	5	6	7			
6.8		1a		1									2	3			00	00	00	00	
10	1a		1			2	3	1			2	2	3	4/5a	5	7/00	01	01	01	01	
15						2	4/5a					2	3			01	01	02	02	01	
22	1					2	3	4/5a			2	3	4/5a	5	7	00	01	02	03	02	
33						3	4			2		3		6	01	02	03	04	04	03	
47				2	3	4	5a	5		2	3	4	5a	5	7	02	03	04	04	04	
68			2			4/5a	6	2		3			6		02	04	05	05	05	05	
100		2		3	4	5a	5	7	00		3		4	5a	5	7	03	05			
150			3	4/5a	5	6	01	3		4/5a	5	6			04						
220		3	5a	4	6	7	00	01		4	5a	5	6	7		05					
330		5a	4	5	7	01	02			5	6	7									
470	5a	4	5	6	7	00	01	03		5	6	7									
680		5	6	7/00	01	02	04	6	7												
1000	5	6	7/00	01	01	03	05	7													
1500		7/00	01	01	02	04															
2200	7	01	01	02	03	05															
3300		01	02	03	04																
4700		02	03	04	05																
6800		03	04	05																	
10000		04	05																		
15000		05																			
	preferred type																				
Case dimensions	case size / nominal dimensions Ø x L (mm)																				
	1a Ø3.3 x 8					4 Ø6.5 x 18					7 Ø10 x 25					03 Ø18 x 30					
	1 Ø3.3 x 11					5a Ø8.0 x 11					00 Ø10 x 30					04 Ø18 x 38					
	2 Ø4.5 x 10					5 Ø8.0 x 18					01 Ø12.5 x 30					05 Ø21 x 38					
	3 Ø6.0 x 10					6 Ø10 x 18					02 Ø15 x 30										
Endurance IEC	case sizes 00–05: 5000 h/85 °C case sizes 00–05: 1500 h/105 °C case sizes 2–7: 1000 – 2000 h/85 °C case sizes 1a, 1: 1500 h/85 °C							case sizes 2–7: 2000 h/85 °C case size 1: 1000 h/85 °C							case sizes 00–05: 8000 h/85 °C 450 V range: 5000 h/85 °C case sizes 4–7: 2000 h/85 °C						
Features	high CV product per unit volume, small dimensions, low mass							standard types, low voltage							standard types, high voltage						
Applications	general purpose, industrial, automotive							general industrial, telecom							general industrial, mains, power supplies, lighting						
Pref. packing	see ordering information next page																				



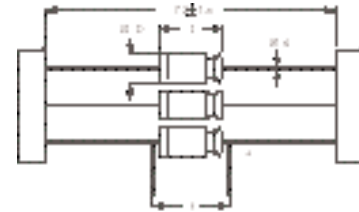
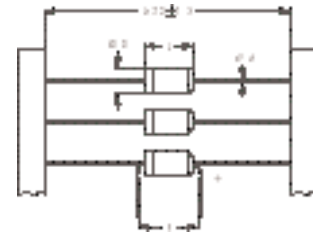
021 ASM series								030, 031 AS series								
U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 85 °C (mA)	ESR 100 Hz (Ω)	Z 10 kHz (Ω)	form	catalogue number 2222 ... ..	U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 85 °C (mA)	Z 10 kHz (Ω)	catalogue number 2222 ... .. form BA			
(V)	(μF)							(V)	(μF)							
6.3	470	5a	260	0.85	0.64	BA	021 33471	6.3	470	5	330	0.43	031 33471			
10	100	2	100	3.2	2.0	BA	021 34101	10	1000	7	560	0.20	031 33102			
	220	3	160	1.5	0.91	BA	021 34221		47	2	70	3.4	030 34479			
	470	4	310	0.68	0.43	BA	021 34471		100	3	110	1.6	030 34101			
	1000	6	550	0.32	0.20	BA	021 34102		220	4	210	0.73	031 34221			
	2200	01	980	0.177	0.095	AA	021 14222		470	6	410	0.34	031 34471			
	16	4700	02	1320	0.100	0.07	BR	021 24222	16	33	2	65	3.6	030 35339		
							AA	021 14472		68	3	110	1.8	030 35689		
							BR	021 24472		330	6	410	0.36	031 35331		
		MR	021 44472	470	7	480	0.26	031 35471								
		AA	021 14103	10	2	50	9	030 36109								
25		10000	04	2090	0.064	0.04	MR	021 44103	25	22	2	60	4.1	030 36229		
							AA	021 44103		47	3	100	1.9	030 36479		
							BA	021 90518		100	5a	160	0.90	030 36101		
		AA	021 15102	220	6	350	0.41	031 36221								
		BR	021 25102	22	3	75	3.2	030 37229								
	40	2200	01	1040	0.150	0.095	BR	021 25222	40	47	5a	150	1.5	030 37479		
							AA	021 15222		100	5	220	0.70	031 37101		
							BR	021 25222		220	7	430	0.32	031 37221		
		AA	021 15472	1.0	2	13	55	030 38108								
		MR	021 45472	2.2	2	25	25	030 38228								
25		10000	05	2170	0.058	0.035	AA	021 15103	63	4.7	2	40	12	030 38478		
							MR	021 45103		10	3	70	5.5	030 38109		
							BA	021 36479		47	5	190	1.2	031 38479		
		BA	021 36101	100	7	300	0.55	031 38101								
		BA	021 36221	22	5	120	2.1	031 39229								
	100	470	6	450	0.48	0.26	BA	021 36471	100	22	5	120	2.1	031 39229		
							AA	021 16102		BR	021 26102	AA	021 16222	BR	021 26222	
							BR	021 26102		MR	021 46222	MR	021 46222			
		AA	021 16472	AA	021 16472	MR	021 46472									
		MR	021 46472	BA	021 37229	BA	021 37479									
40		220	02	1180	0.132	0.07	BA	021 36479	40	100	4	190	1.8	0.70	BA	021 37101
							BA	021 36101		220	6	330	0.8	0.32	BA	021 37221
							BA	021 36221		470	00	590	0.404	0.175	AA	021 17471
		AA	021 16102	BR	021 27471	BR	021 27102	AA		021 17102						
		BR	021 26102	BR	021 27102	BR	021 27102	BR		021 27102						
	63	4700	04	1920	0.079	0.04	AA	021 16472	63	2200	03	1390	0.118	0.065	AA	021 17222
							MR	021 46472		MR	021 47222	MR	021 47222			
							AA	021 17472		AA	021 17472	MR	021 47472			
		MR	021 47472	AA	021 17472	MR	021 47472									
		BA	021 37229	BA	021 37229	BA	021 38108									
100		100	00	340	1.150	1.0	BA	021 38108	100	2.2	2	21	65	25	BA	021 38228
							BA	021 38228		4.7	2	31	31	12	BA	021 38478
							BA	021 38478		10	2	50	13	5.5	BA	021 38109
		BA	021 38109	22	3	90	5.8	2.5		BA	021 38229					
		BA	021 38229	47	4	150	2.7	1.2		BA	021 38479					
	100	100	00	340	1.150	1.0	BA	021 38101	100	100	5	250	1.3	0.55	BA	021 38101
							AA	021 18221		220	00	480	0.614	0.20	AA	021 18221
							BR	021 28221		BR	021 28221	BR	021 28221			
		AA	021 18471	470	01	700	0.287	0.10		AA	021 18471					
		BR	021 28471	BR	021 28471	BR	021 28471									
100		100	00	340	1.150	1.0	AA	021 18102	100	1000	03	1170	0.135	0.065	AA	021 18102
							MR	021 48102		MR	021 48102	MR	021 48102			
							AA	021 18222		2200	05	1780	0.099	0.035	AA	021 18222
		MR	021 48222	MR	021 48222	MR	021 48222									
		AA	021 19101	AA	021 19101	AA	021 19101									
	100	220	01	560	0.610	0.56	BR	021 29101	100	220	01	560	0.610	0.56	AA	021 19221
							AA	021 19221		BR	021 29221	BR	021 29221			
							AA	021 19471		AA	021 19471	AA	021 19471			
		MR	021 49471	MR	021 49471	MR	021 49471									
		AA	021 19102	AA	021 19102	AA	021 19102									
100		470	03	980	0.310	0.29	MR	021 49471	100	1000	05	1470	0.160	0.15	AA	021 19102
							AA	021 19102		MR	021 49102	MR	021 49102			
							MR	021 49102		MR	021 49102					
		AA	021 19102	AA	021 19102	AA	021 19102									
		MR	021 49102	MR	021 49102											

Note: information about form see next page

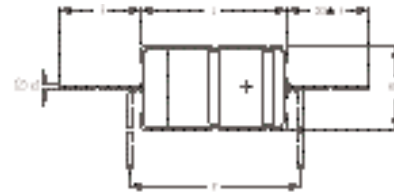


**041, 042, 043 ASH series**

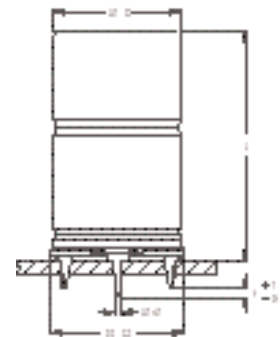
U <sub>R</sub> (V)	C <sub>R</sub> 100 Hz (µF)	case code	I <sub>R</sub> 100 Hz 85 °C (mA)	ESR 100 Hz (Ω)	Z 10 kHz (Ω)	form	catalogue number  2222 ... ..
160	22	00	190	6.8	5.5	AA	042 11229
						BR	042 21229
	47	02	350	3.2	2.1	AA	042 11479
						BR	042 21479
						MR	042 41479
	100	03	580	1.5	1.0	AA	042 11101
						MR	042 41101
	220	05	940	0.7	0.5	AA	043 11221
MR						043 41221	
250	2.2	4	35	72	50	BA	041 33228
						BA	041 33109
	10	7	90	16	11	AA	042 13109
						BR	042 23109
	22	01	220	6.8	5.0	AA	042 13229
						BR	042 23229
	47	03	400	3.2	2.3	AA	042 13479
						MR	042 43479
100	05	650	1.5	1.1	AA	043 13101	
					MR	043 43101	
350	4.7	6	60	34	22	BA	041 35478
						AA	042 15109
	10	01	150	15	10	BR	042 25109
						AA	042 15229
	22	02	250	6.8	4.5	BR	042 25229
						MR	042 45229
47	04	450	3.2	2.1	AA	043 15479	
					MR	043 45479	
385	1	4	20	160	100	BA	041 38108
						BA	041 38228
	2.2	5	40	72	45	BA	041 38478
						AA	042 18109
	10	01	150	15	10	BR	042 28109
						AA	042 18229
22	03	290	6.8	4.1	MR	042 48229	
					AA	043 18479	
47	04	450	3.2	2.1	MR	043 48479	
					AA	042 16109	
400	10	01	150	7.5	4.6	BR	042 26109
						AA	042 16229
	22	03	290	3.5	2.1	MR	042 46229
						AA	043 16479
47	04	450	1.7	1.1	MR	043 46479	
					AA	042 17109	
450	10	01	150	15	10	BR	042 27109
						AA	042 17229
	22	02	240	6.8	4.1	BR	042 27229
						MR	042 47229
	47	04	440	3.2	2.1	AA	043 17479
						MR	043 47479



Form BA: taped in box [amropack]  
Form BR: taped on reel

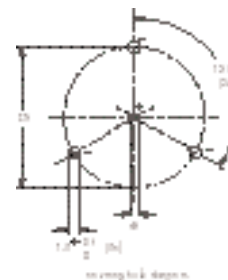


Form AA: axial in box



Form MB: single ended with  
mounting ring and pins

Case not insulated  
[insulation available on request]







			NEW	SUPERMINI'S	NEW
Series	<b>042, 043 AMH-ELB</b> Electronic lighting ballast	<b>042, 043 AHH-ELB</b> Electronic lighting ballast	<b>042, 043 AMS-ELB</b> Electronic lighting ballast	<b>042, 043 AHS-ELB</b> Electronic lighting ballast	
Useful life	20 000 h/85 °C 100 000 h/70 °C	10 000 h/105 °C 100 000 h/85 °C	20 000 h/85 °C 100 000 h/70 °C	10 000 h/105 °C 100 000 h/85 °C	
Temp. range	-25 °C to +85 °C	-25 °C to +105 °C	-25 °C to +85 °C	-25 °C to +105 °C	
Tolerance	-10 to +50%	-10 to +50%	-10 to +50%	-10 to +50%	
C <sub>R</sub> (µF)	U <sub>R</sub> (V)	U <sub>R</sub> (V)	U <sub>R</sub> (V)	U <sub>R</sub> (V)	
	450	450	450	450	
0.22					
0.33					
0.47					
1.0					
1.5					
2.2					
3.3					
4.7					
6.8	12.5 x 30	12.5 x 30	10.0 x 30	10.0 x 30	
8.2			10.0 x 30	10.0 x 30	
10	12.5 x 30	12.5 x 30	12.5 x 30	12.5 x 30	
15	15.0 x 30	15.0 x 30	12.5 x 30	12.5 x 30	
22	18.0 x 30	18.0 x 30	15.0 x 30	15.0 x 30	
33	18.0 x 38	18.0 x 38	18.0 x 30	18.0 x 30	
47			18.0 x 38	18.0 x 38	
68					
100					
150					
220					
330					
470					
680					
1000					
1500					
2200					
3300					
4700					
6800					
10000					
15000					
	preferred type <span style="background-color: #c8e6c9; border: 1px solid #000; padding: 2px;">10</span>				
Case dimensions	case size / nominal dimensions Ø x L (mm)				
Endurance IEC	8000 h/85 °C	5000 h/105 °C	8000 h/85 °C	5000 h/105 °C	
Features	withstands 550 V for 24 h at 85 °C, high ripple current		smallest dimensions, high ripple current		
Applications	electronic lighting ballast power supplies		electronic lighting ballast power supplies		
Pref. packing	see ordering information next page				



042, 043 AMH-ELB series								042, 043 AMS-ELB series <b>NEW</b>							
U <sub>R</sub>	C <sub>R</sub>	case dimensions	I <sub>R</sub>	ESR	Z	form	catalogue number	U <sub>R</sub>	C <sub>R</sub>	case dimensions	I <sub>R</sub>	ESR	Z	form	catalogue number
(V)	(μF)	∅D x L (mm)	10 kHz 85 °C (mA)	100 Hz (Ω)	10 kHz (Ω)		2222 ... ..	(V)	(μF)	∅D x L (mm)	10 kHz 85 °C (mA)	100 Hz (Ω)	10 kHz (Ω)		2222 ... ..
450	10	12.5 x 30	710	5.6	3.1	AA	042 81109	450	10	12.5 x 30	550	7.9	4.7	AA	042 61109
						BR	042 82109							BR	042 62109
	15	15.0 x 30	910	3.7	2.1	AA	042 81159		15	12.5 x 30	665	5.4	3.2	AA	042 61159
						BR	042 82159							BR	042 62159
	22	18.0 x 30	1190	2.4	1.4	AA	042 81229		22	15.0 x 30	880	3.7	2.2	AA	042 61229
33	18.0 x 38	1610	1.7	1.0	AA	043 81339	BR	042 62229	33	18.0 x 30	1205	2.5	1.5	AA	042 67339
								47	18.0 x 38	1550	1.7	1.0	AA	043 61479	

042, 043 AHH-ELB series								042, 043 AHS-ELB series <b>NEW</b>							
U <sub>R</sub>	C <sub>R</sub>	case dimensions	I <sub>R</sub>	ESR	Z	form	catalogue number	U <sub>R</sub>	C <sub>R</sub>	case dimensions	I <sub>R</sub>	ESR	Z	form	catalogue number
(V)	(μF)	∅D x L (mm)	10 kHz 105 °C (mA)	100 Hz (Ω)	10 kHz (Ω)		2222 ... ..	(V)	(μF)	∅D x L (mm)	10 kHz 105 °C (mA)	100 Hz (Ω)	10 kHz (Ω)		2222 ... ..
450	10	12.5 x 30	470	5.9	3.3	AA	042 71109	450	10	12.5 x 30	390	8.7	5.2	AA	042 51109
						BR	042 72109							BR	042 52109
	15	15.0 x 30	600	3.9	2.3	AA	042 71159		15	12.5 x 30	470	6.0	3.5	AA	042 51159
						BR	042 72159							BR	042 52159
	22	18.0 x 30	750	2.5	1.5	AA	042 71229		22	15.0 x 30	620	4.1	2.4	AA	042 51229
33	18.0 x 38	120	1.8	1.1	AA	043 71339	BR	042 52229	33	18.0 x 30	850	2.8	1.7	AA	042 51339
								47	18.0 x 38	1100	1.9	1.1	AA	043 51479	



Series	<b>138 AML</b> Axial miniature long life									<b>132, 133 ALL-DIN</b> Axial long life – DIN 45910 – T123									
Useful life	10 000 h/105 °C (case sizes 00–05), 2000 h/105 °C (case sizes 2*–7)									15 000 h/85 °C (case sizes 6–05), 10 000 h/85 °C (case sizes 4 and 5) or 3000 h/105 °C (case sizes 4–7),									
Temp. range	–40 °C to +105 °C									–40 °C to +105 °C									
Tolerance	±20%									–10% to +50%									
C <sub>R</sub> (µF)	U <sub>R</sub> (V)									U <sub>R</sub> (V)									
	6.3	10	16	25	40	50	63	100	10	16	25	40	63	100	160	250	350	385	400
0.22																			
0.33																			
0.47																			
1								2*						4			4		
1.5																			
2.2								2*						4	4	5	5		
3.3																			
4.7							2*	3**					4	4	5	6	6		
6.8																			
10				2*		2*	3**	4				4	5	6	7				
15																			
22			2*	2*		3**	4	5			4		5	6	7				
33				2*	3**														
47			2*	3**	4		5	7		4		5	6	7/00					
68								00					00	01					
100	2*		3**	4	5	6	7	01		5		6	00	02					
150		3**					00	02					01	02	03				
220	3**	4	5	6	7		01	02	5	6	7/01	01	02	03	04				
330					00		01	03		7/01	01	02	03	04					
470	4	5	6	7	01		02	04	01	7 01	01	02	04	05					
680				00	01		03	05	01	02	03	03	05						
1000	6	7	00	01	02		04		02	02	03	04	05						
1500		00	01	02	03		05		03	03	04	05							
2200	7	01	02	03	04				03	04	05	05							
3300		02	03	04	05				04	05									
4700		03	03	04					05	05									
6800		04	04	05															
10 000		04	05																
15 000		05																	
	preferred type <span style="background-color: #d9ead3; padding: 2px;"> </span>																		
Case dimensions	case size / nominal dimensions Ø x L (mm)																		
	2	Ø4.5 x 10	4	Ø6.5 x 18	7	Ø10 x 25	03	Ø18 x 30											
	2*	Ø6.3 x 12.7	5a	Ø8.0 x 11	00	Ø10 x 30	04	Ø18 x 38											
	3	Ø6.0 x 10	5	Ø8.0 x 18	01	Ø12.5 x 30	05	Ø21 x 38											
	3**	Ø7.7 x 12.7	6	Ø10 x 18	02	Ø15 x 30													
Endurance IEC	case sizes 00–05: 5000 h/105 °C case sizes 2*–7: 1000 h/105 °C									case sizes 6–05: 8000 h/85 °C case sizes 4–5: 6000 h/85 °C case sizes 4–7: 2000 h/105 °C									
Features	105 °C, high CV product per unit volume									industrial standard, LV and HV									
Applications	industrial, telecom, automotive, SMPS									industrial, telecom, EDP									
Pref. packing	ammopack for case sizes 2* to 7																		

Electrolytic capacitors



138 AML series								132, 133 ALL-DIN series									
U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 105 °C	ESR 100 Hz	Z 10 kHz	form	catalogue number	U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 85 °C	ESR 100 Hz	Z 10 kHz	form	catalogue number		
(V)	(µF)		(mA)	(Ω)	(Ω)		2222 ... ..	(V)	(µF)		(mA)	(Ω)	(Ω)		2222 ... ..		
10	470	5	300	0.68	0.43	BA	138 34471	10	470	01	350	0.61	0.26	AA	132 14471		
	2200	01	890	0.19	0.14	AA	138 14222		BR	132 24471							
	4700	03	1450	0.105	0.083	BR	138 24222		AA	132 14102							
						AA	138 14472		BR	132 24102							
	10000	04	1980	0.059	0.048	MR	138 44472		MR	132 44102							
						AA	138 14103		AA	132 14222							
						MR	138 44103		MR	132 44222							
	16	47	2*	83	5.4	3.4	BA		138 35479	16	4700	05	1800	0.09	0.05	AA	132 14472
		100	3**	130	2.5	1.6	BA		138 35101		MR	132 44472					
		220	5	230	1.2	0.73	BA		138 35221		100	5	150	2.2	1.2	BA	132 35101
470		6	360	0.54	0.34	BA	138 35471	6	250			1.0	0.55	BA	132 35221		
1000		00	630	0.29	0.20	AA	138 15102	470	01		450	0.47	0.26	AA	132 15471		
						BR	138 25102	BR	132 25471								
2200		02	1090	0.15	0.105	AA	138 15222	1000	02		780	0.22	0.12	AA	132 15102		
						BR	138 25222							BR	132 25102		
						MR	138 45222	MR	132 45102								
4700		03	1480	0.093	0.073	AA	138 15472	2200	04		1300	0.11	0.06	AA	132 15222		
	MR					138 45472	MR			132 45222							
10000	05	2100	0.055	0.044	AA	138 15103	4700	05	2300	0.05	0.05	AA	132 15472				
					MR	138 45103						MR	132 45472				
25	22	2*	61	10	5.5	BA	138 36229	25	220	7	340	0.8	0.40	BA	132 90504		
	33	2*	74	6.8	3.6	BA	138 36339		220	01	340	0.8	0.40	AA	132 16221		
	47	3**	96	4.7	2.6	BA	138 36479		470	01	560	0.37	0.20	BR	132 26221		
	100	4	160	2.1	1.2	BA	138 36101							AA	132 16471		
	220	6	270	0.94	0.55	BA	138 36221		BR	132 26471							
	470	7	440	0.44	0.26	BA	138 36471		1000	03	1000	0.17	0.10	AA	132 16102		
	1000	01	790	0.22	0.14	AA	138 16102							MR	132 46102		
						BR	138 26102		2200	05	1850	0.09	0.05	AA	132 16222		
	2200	03	1320	0.12	0.083	AA	138 16222							MR	132 46222		
						MR	138 46222		40	47	5	120	3.0	1.6	BA	132 37479	
4700	04	1840	0.067	0.049	AA	138 16472	100	6							210	1.4	0.75
					MR	138 46472	220	01	410	0.65	0.34	AA	132 17221				
40	100	5	180	1.6	0.9	BA	138 37101	40	470	02	700	0.30	0.16	BR	132 27221		
	220	7	350	0.72	0.41	BA	138 37221							AA	132 17471		
	470	01	650	0.33	0.18	AA	138 17471		BR	132 27471							
	1000	02	970	0.17	0.105	BR	138 27471		1000	04	1200	0.14	0.08	AA	132 17102		
						AA	138 17102							MR	132 47102		
						BR	138 27102		2200	05	1900	0.07	0.05	AA	132 17222		
	2200	04	1640	0.09	0.055	AA	138 17222							MR	132 47222		
						MR	138 47222		63	10	4	64	11	5.5	BA	132 38109	
	50	10	2*	51	14	7	BA			138 31109	22	5	100	5.1	2.5	BA	132 38229
							BA			138 31229	47	6	170	2.4	1.2	BA	132 38479
63	4.7	2*	35	30	17	BA	138 38478	100		00	300	1.1	0.60	AA	132 18101		
	22	4	100	5.1	3.6	BA	138 38229							BR	132 28101		
	47	5	150	2.4	1.7	BA	138 38479	220		02	520	0.50	0.25	AA	132 18221		
	100	7	280	1.1	0.8	BA	138 38101							BR	132 28221		
	220	01	560	0.50	0.28	AA	138 18221	470		04	970	0.24	0.12	MR	132 48221		
						BR	138 28221							AA	132 18471		
	470	02	860	0.26	0.15	AA	138 18471	1000		05	1600	0.11	0.06	MR	132 48471		
						BR	138 28471		AA					132 18102			
						MR	138 48471	MR	132 48102								
	1000	04	1460	0.13	0.08	AA	138 18102	100	4.7	4	48	20	9.6	BA	132 39478		
MR						138 48102	10		5	73	9.5	4.5	BA	132 39109			
100	1.0	2*	16	140	55	BA	138 39108		22	6	130	4.3	2	BA	132 39229		
						BA	138 39228		47	7	220	2.0	1	BA	132 90506		
2.2	2*	24	65	25	25	AA	138 19101		47	00	220	2.0	1	AA	132 19479		
						BR	138 29101							BR	132 29479		
100	100	01	410	1.1	0.77	AA	138 19101		100	02	380	0.95	0.50	AA	132 19101		
						BR	138 29101							BR	132 29101		
220	02	650	0.54	0.37	AA	138 19221	220		04	660	0.43	0.20	MR	132 49101			
					BR	138 29221							AA	132 19221			
					MR	138 49221	470	05	1200	0.20	0.10	MR	132 49221				
470	04	1130	0.27	0.19	AA	138 19471						AA	132 19471				
					MR	138 49471	MR	132 49471									
160	2.2	4	22	72	55	BA	133 31228	350	4.7	6	43	34	21	BA	133 90509		



																	for automotive							
Series	<b>118 AHT</b> Axial high temperature								<b>119 AHT-DIN</b> Axial high temperature – DIN 45910 – T123 based								<b>120 ATC</b> Axial high temperature – High ripple current							
Useful life	case sizes 4–7: 4 000 h/125 °C or 10 000 h/105 °C or 32 000 h/85°C case sizes 00–05: 8 000 h/125 °C or 20 000 h/105 °C or 64 000 h/85 °C								case sizes 4–7: 4 000 h/125 °C or 10 000 h/105 °C or 32 000 h/85°C case sizes 00–05: 8000 h/125 °C or 20000 h/105 °C or 64 000 h/85 °C								8000 h/125 °C or 20 000 h/105 °C or 64 000 h/85 °C							
Temp. range	case sizes 4–7 : –40 to +125 °C case sizes 00–05 : –55 to +125 °C								–55 °C to +125 °C								–40 °C to +125 °C							
Tolerance	±20%								–10% to +50%								±20%							
C <sub>R</sub> (µF)	U <sub>R</sub> (V)								U <sub>R</sub> (V)								U <sub>R</sub> (V)							
	6.3	10	16	25	40	63	100	200	10	16	25	40	63	100	200	16	25	40	63	100				
0.22																								
0.33																								
0.47																								
1							4																	
1.5																								
2.2							4				4													
3.3																								
4.7							4	4	5						4	6								
6.8																								
10							4	4	7					4	5	7								
15									00															
22							4	5	01		4			5	6									
33								7	02															
47						4	5	7/00	03		4		5	6	7 00						00			
68								01	04					00	01						01			
100				4	5	7/00	01	05	4	5	6	7	00	02						00	01			
150					6	01	02						01	02	02						01	02		
220		4	5	6	7 00	01	03		6	7	7/01	01	02	03					00	01	03			
330		5	6	7	01	02	04			01	01	02	03	04					01	02	04			
470		5	6	7/00	01	03	05		7/01	01	01	02	04	05				00	01	03	05			
680			00	01	02	04			01	02	03	03	05			00	01	02	04					
1000	6	7 00	01	01	03	05			02	02	03	04	05			01	01	03	05					
1500	7	01	01	02	04				03	03	04	05				01	02	04						
2200		01	02	03	05				03	04	05	05				02	03	05						
3300		02	03	04					04	05						03	04							
4700		03	04	05					05	05						04	05							
6800		04	05													05								
10000		05																						
15000																								
	preferred type <span style="background-color: #c8e6c9; padding: 2px;"> </span>																							
Case dimensions	case size / nominal dimensions Ø × L (mm)																							
	4	Ø6.5 × 18								7	Ø10 × 25								03	Ø18 × 30				
	5a	Ø8.0 × 11								00	Ø10 × 30								04	Ø18 × 38				
	5	Ø8.0 × 18								01	Ø12.5 × 30								05	Ø21 × 38				
	6	Ø10 × 18								02	Ø15 × 30													
Endurance IEC	case sizes 00–05 : 3000 h/125 °C; 500 h/150 °C (6.3 to 100 V) 4–7 : 2000 h/125 °C								case sizes: 00–05 : 4000 h/125 °C 4–7 : 2000 h/125°C; 500 h/150 °C								case sizes: 4000 h/125 °C 1000 h/150 °C							
Features	125 °C, high CV product per unit volume								125 °C, high ripple								125 °C high CV/Volume, very low ESR, very high ripple, high shock and vibration capability, 1000 h at 150 °C							
Applications	professional, automotive, military								professional, telecom, SMPS								automotive, professional, telecom							
Pref. packing	ammpack for case sizes 4 to 7																							

Electrolytic capacitors



118 AHT series								119 AHT-DIN series							
U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 125 °C	ESR 100 Hz	Z 10 kHz	form	catalogue number	U <sub>R</sub>	C <sub>R</sub> 100 Hz	case code	I <sub>R</sub> 100 Hz 125 °C	ESR 100 Hz	Z 10 kHz	form	catalogue number
(V)	(µF)		(mA)	(Ω)	(Ω)		2222 ... ..	(V)	(µF)		(mA)	(Ω)	(Ω)		2222 ... ..
10	470	5	179	1.19	1.0	BA	118 34471	10	470	7	380	0.61	0.49	BA	119 90502
	1000	00	550	0.505	0.45	AA	118 14102		470	01	550	0.54	0.38	AA	119 14471
						BR	118 24102							BR	119 24471
	2200	01	830	0.290	0.27	AA	118 14222		1000	02	830	0.32	0.24	AA	119 14102
						BR	118 24222							BR	119 24102
	4700	03	1350	0.155	0.15	AA	118 14472							MR	119 44102
						MR	118 44472		2200	03	1190	0.19	0.17	AA	119 14222
	10000	05	1860	0.084	0.10	AA	118 14103							MR	119 44222
						MR	118 44103		4700	05	1700	0.10	0.09	AA	119 14472
															MR
16	470	6	243	0.85	0.83	BA	118 35471	16	47	4	110	4.4	2.2	BA	119 35479
	1000	01	720	0.345	0.28	AA	118 15102		470	01	570	0.51	0.38	AA	119 15471
						BR	118 25102							BR	119 25471
	2200	02	1010	0.205	0.18	AA	118 15222		1000	02	850	0.30	0.24	AA	119 15102
						BR	118 25222							BR	119 25102
	4700	04	1670	0.105	0.10	AA	118 15472							MR	119 45102
					MR	118 45472	2200	04	1440	0.14	0.10	AA	119 15222		
25	100	4	102	2.86	2.3	BA	118 36101	25	4700	05	1710	0.09	0.09	AA	119 15472
	220	6	196	1.30	1.25	BA	118 36221							MR	119 45222
	470	7	327	0.61	0.57	BA	118 90509		220	01	500	0.65	0.38	AA	119 16221
	470	00	490	0.61	0.50	AA	118 16471							BR	119 26221
						BR	118 26471		470	01	630	0.44	0.38	AA	119 16471
	1000	01	760	0.375	0.28	AA	118 16102							BR	119 26471
					BR	118 26102	1000	03	1090	0.21	0.17	AA	119 16102		
					MR	118 46222						MR	119 46102		
40	47	4	89.8	3.72	2.8	BA	118 37479	40	2200	05	1550	0.11	0.09	AA	119 16222
	100	5	147	1.75	1.3	BA	118 37101							MR	119 46222
	220	00	390	0.70	0.55	AA	118 17221		220	01	500	0.65	0.48	AA	119 17221
						BR	118 27221							BR	119 27221
	470	01	620	0.38	0.30	AA	118 17471		470	02	720	0.41	0.37	AA	119 17471
						BR	118 27471							BR	119 27471
1000	03	1070	0.205	0.18	AA	118 17102	1000	04	1250	0.19	0.14	AA	119 17102		
					MR	118 47102						MR	119 47102		
63	2200	05	1540	0.105	0.10	AA	118 17222	63	2200	05	1550	0.13	0.11	AA	119 17222
						MR	118 47222							MR	119 47222
	10	4	51.9	11	5.6	BA	118 38109		10	4	68	11	5.6	BA	119 38109
	22	4	77.0	5.1	3.2	BA	118 38229		22	5	110	5.1	2.8	BA	119 38229
	47	5	126	2.4	1.5	BA	118 38479		47	6	180	2.4	1.3	BA	119 38479
	100	00	340	1.91	1.62	AA	118 18101		100	00	360	1.3	0.75	AA	119 18101
					BR	118 28101						BR	119 28101		
220	01	550	0.94	0.82	AA	118 18221	220	02	640	0.58	0.37	AA	119 18221		
					BR	118 28221						BR	119 28221		
470	03	970	0.44	0.39	AA	118 18471	470	04	1130	0.30	0.15	AA	119 18471		
					MR	118 48471						MR	119 48221		
1000	05	1400	0.16	0.20	AA	118 18102	1000	05	1430	0.16	0.11	AA	119 18102		
					MR	118 48102						MR	119 48102		
100	47	00	240	2.6	2.0	AA	118 19479	100	47	00	240	2.7	2.0	AA	119 19479
						BR	118 29479							BR	119 29479
	100	01	380	1.4	1.15	AA	118 19101		100	02	440	1.4	0.96	AA	119 19101
						BR	118 29101							BR	119 29101
	220	03	690	0.66	0.55	AA	118 19221		220	03	710	0.72	0.55	AA	119 19221
						MR	118 49221							MR	119 49221
470	05	1050	0.33	0.28	AA	118 19471	470	05	1070	0.34	0.28	AA	119 19471		
					MR	118 49471						MR	119 49471		
200	22	01	210	3.17	2.22	AA	118 92229	200	220	03	710	0.72	0.55	AA	119 19221
						BR	118 90013							MR	119 49221
	47	03	390	1.48	0.60	AA	118 92479		470	05	1070	0.34	0.28	AA	119 19471
						MR	118 90003							MR	119 49471
	100	05	610	0.96	0.39	AA	118 92101								
						MR	118 90005								



120 ATC series for automotive							
$U_R$	$C_R$	case	$I_R$	ESR	Z	form	catalogue
(V)	100 Hz ( $\mu\text{F}$ )	code	100 Hz 125 °C (mA)	100 Hz ( $\Omega$ )	10 kHz ( $\Omega$ )		number 2222 ... ..
16	1000	01	2550	35	61	AA	120 15102
						BR	120 25102
	2200	02	2940	28	46	AA	120 15222
						BR	120 25222
25	4700	04	4350	18	29	AA	120 15472
						BR	120 25472
	470	00	2100	45	84	AA	120 16471
						BR	120 26471
	1000	01	2600	32	55	AA	120 16102
						BR	120 26102
40	2200	03	3310	27	44	AA	120 16222
						BR	120 26222
	4700	05	4470	18	29	AA	120 16472
						BR	120 26472
	220	00	1990	52	124	AA	120 17221
						BR	120 27221
	470	01	2550	35	70	AA	120 17471
						BR	120 27471
1000	03	3150	28	49	AA	120 17102	
					BR	120 27102	
2200	05	4170	19	31	AA	120 17222	
					BR	120 27222	
63	100	00	1560	92	249	AA	120 18102
						BR	120 28101
	220	01	2150	55	126	AA	120 18221
						BR	120 28221
	470	03	2860	38	74	AA	120 18471
						BR	120 28471
1000	05	3780	25	73	AA	120 18102	
					BR	120 28102	
100	47	00	760	349	720	AA	120 19479
						BR	120 29479
	100	01	1140	196	381	AA	120 19109
						BR	120 29109
	220	04	1960	95	179	AA	120 19221
						BR	120 29221
470	05	2800	52	94	AA	120 19471	
					BR	120 29471	



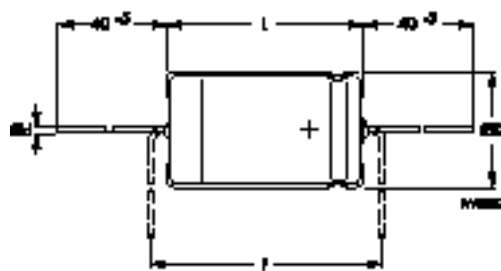
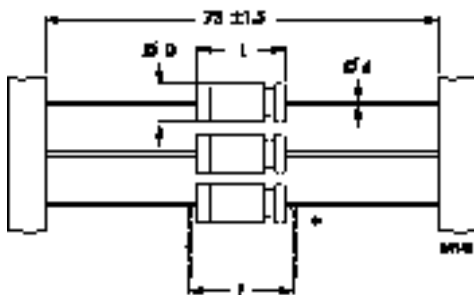
Series	022 ASR Axial standard range								023 ASR Axial standard range							
Useful life	2000 h/105 °C 6000 h/85 °C								5000 h/ 85 °C							
Temp. range	-40 to +105 °C								-40 to +85 °C							
Tolerance	-10 to +50%								-10 to +50%							
C <sub>R</sub> (μF)	U <sub>R</sub> (V)								U <sub>R</sub> (V)							
	6.3	10	16	25	40	50	63	100	160	250	350	385	400	450	500	
10												1225		1225	1230	
15												1225	1225	1230	1630	
22										1225		1230	1630	1630	1640	
33										1225		1630	1630	1830	1840	
47									1225	1630	1830	1640	1640	1840	2140	
68									1230	1830		1840	1840	2140	2540	
100								1225	1830	1840	2140	2140	2140	2540	2545	
150								1225	1840	2140	2540	2540	2540	3040	3045	
220		for smaller capacitance values, see series <b>030/031 AS</b>						1225	1630	2140	2540	3040	3040	3040	3050	
330						1225	1230	1640		2540	2550	3050				
470					1225	1230	1630	1840		2545	3045					
680				1225	1230	1630	1640	2140		3045						
1000				1230	1630	1640	1840	2540								
1500		1225	1230	1630	1640	1840	2140	2550								
2200	1225	1230	1630	1640	1840	2140	2540	3050								
3300	1230	1640	1640	1840	2140	2540	2550									
							3045									
4700	1640	1640	1840	2140	2540	2550	3050									
6800	1840		2140	2540	2550	3050										
10000	2140	2540	2540	2550	3050											
				3040												
15000	2540	2545	3040	3050												
22000	2550	3045	3050													
33000	3050															
	preferred type <span style="background-color: #90EE90; border: 1px solid black; padding: 2px;"> </span>															
Case dimensions	case size / nominal dimensions Ø × L (mm)															
Endurance IEC	1000 h/105 °C								2000 h/85 °C							
Features	standard capacitors for high ripple to 500 V															
Technology	non-solid aluminum															
Applications	general, consumer															
Pref. packing	tape on reel															





022 ASR series								023 ASR series								
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size Ø D x L (mm)	I <sub>R</sub> 100 Hz 105 °C (A)	ESR MAX. 100 Hz (Ω)	Z MAX. 10 kHz (Ω)	form	catalogue number	U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size Ø D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR MAX. 100 Hz (Ω)	Z MAX. 10 kHz (Ω)	form	catalogue number	
(V)	(μF)						2222 ... ..	(V)	(μF)						2222 ... ..	
6.3	2200	12 x 25	1.0	0.200	0.100	BA	022 33222	160	47	12 x 25	0.29	2.37	0.730	BA	023 31479	
	4700	16 x 40	1.8	0.110	0.050	AA	022 13472		100	18 x 30	0.56	1.12	0.350	AA	023 11101	
	10000	21 x 40	2.4	0.055	<0.050	AA	022 13103		220	21 x 40	0.97	0.505	0.165	AA	023 11221	
	22000	25 x 50	3.0	<0.050	<0.050	AA	022 13223		470	25 x 45	1.6	235	0.085	AA	023 11471	
10	2200	12 x 30	1.3	0.160	0.080	BA	022 34222	250	22	12 x 25	0.20	5.07	1.84	BA	023 33229	
	4700	16 x 40	2.2	0.090	<0.050	AA	022 14472		47	16 x 30	0.38	2.37	0.865	BA	023 33479	
	10000	25 x 40	2.7	0.060	<0.050	AA	022 14103		100	18 x 40	0.63	1.12	0.410	AA	023 13101	
	22000	30 x 45	2.9	<0.050	<0.050	AA	022 14223		220	25 x 40	1.1	0.505	0.195	AA	023 13221	
16	2200	16 x 30	1.6	0.130	0.060	BA	022 35222	350	470	30 x 45	1.8	0.235	0.105	AA	023 13471	
	4700	18 x 40	2.4	0.080	<0.050	AA	022 15472		47	18 x 30	0.41	2.67	1.62	AA	023 15479	
	10000	25 x 40	2.6	0.050	<0.050	AA	022 15103		100	21 x 40	0.69	1.26	0.765	AA	023 15101	
	22000	30 x 50	3.0	<0.500	<0.050	AA	022 15223		220	30 x 40	1.26	0.595	0.370	AA	023 15221	
25	1000	12 x 30	1.1	0.220	0.090	BA	022 36102	385	10	12 x 25	0.13	16	6.85	BA	023 38109	
	2200	16 x 40	1.9	0.120	<0.050	AA	022 16222		22	12 x 30	0.21	7.24	3.12	BA	023 38229	
	4700	21 x 40	2.4	0.070	<0.050	AA	022 16472		47	16 x 40	0.39	3.39	1.73	AA	023 18479	
	10000	25 x 40	2.9	0.050	<0.050	AA	022 16103		100	21 x 40	0.70	1.59	0.825	AA	023 18101	
40	470	12 x 25	0.75	0.410	0.150	BA	022 37471	400	220	30 x 40	1.26	0.725	0.340	AA	023 18221	
	1000	16 x 30	1.3	0.190	0.080	BA	022 37102		22	16 x 30	0.28	3.74	2.080	BA	023 36229	
	2200	18 x 40	2.0	0.100	<0.050	AA	022 17222		47	16 x 40	0.45	1.755	0.975	AA	023 16479	
	4700	25 x 40	2.4	0.070	<0.050	AA	022 17472		100	21 x 40	0.78	1.840	0.470	AA	023 16101	
	10000	30 x 50	2.9	<0.050	<0.050	AA	022 17103		220	30 x 40	1.40	0.410	0.235	AA	023 16221	
50	470	12 x 30	0.78	0.340	0.140	BA	022 31471	450	10	12 x 25	0.13	24	6.21	BA	023 37109	
	1000	16 x 40	1.4	0.160	0.070	AA	022 11102		22	16 x 30	0.24	11	2.83	BA	023 37229	
	2200	21 x 40	2.1	0.090	<0.050	AA	022 11222		47	18 x 40	0.42	5.08	1.33	AA	023 17479	
	4700	25 x 50	2.8	0.060	<0.050	AA	022 11472		100	25 x 40	0.76	2.39	0.635	AA	023 17101	
63	220	12 x 25	0.52	0.580	0.250	BA	022 38221	500	220	30 x 50	1.31	1.09	0.300	AA	023 17221	
	470	16 x 30	0.92	0.270	0.120	BA	022 38471		10	12 x 30	0.15	10.845	6.650	BA	023 39109	
	1000	18 x 40	1.5	0.130	0.060	AA	022 18102		22	16 x 40	0.30	4.795	2.945	AA	023 19229	
	2200	25 x 40	2.2	0.070	<0.050	AA	022 18222		47	21 x 40	0.52	2.255	1.385	AA	023 19479	
100	4700	30 x 50	2.8	0.050	<0.050	AA	022 18472	1000	100	25 x 45	0.88	1.075	0.665	AA	023 19101	
	100	12 x 25	0.31	1.110	0.500	BA	022 39101									
	220	16 x 30	0.54	0.510	0.200	BA	022 39221									
	470	18 x 40	0.90	0.240	0.090	AA	022 19471									
	1000	25 x 40	1.5	0.110	0.050	AA	022 19102									
	2200	30 x 50	2.3	0.070	<0.050	AA	022 19222									

Electrolytic capacitors



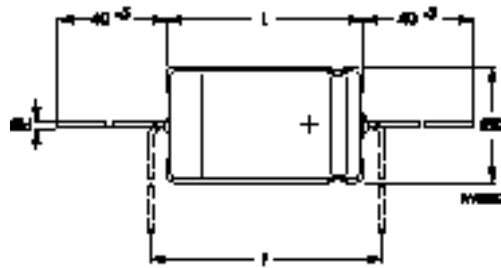
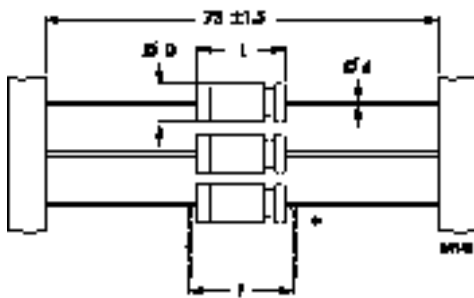


Series	024 AMR								025 AMR							
	Axial miniature range								Axial miniature range							
Useful life	1500 h/105 °C 4500 h/85 °C								3000 h/ 85 °C							
Temp. range	-40 to +105 °C								-40 to +85 °C							
Tolerance	+20%								+20%							
C <sub>R</sub> (μF)	U <sub>R</sub> (V)								U <sub>R</sub> (V)							
	6.3	10	16	25	40	50	63	100	160	200	250	350	385	400	450	500
10																1225
22													1225	1230	1230	1630
33												1230		1630	1830	1640
47											1225	1630	1830	1640	1640	1840
100									1230	1630	1640	1840	2140	2140	2140	2540
150									1630	1640	1840	2140	2540	2540	2550	2550
220								1230	1640	1840	2140	2540	2545	2550	3045	3050
330							1225	1630		1840	2140	2540	3040	3045	3050	
470							1225	1640	2140	2540	2545					
680				1225	1230	1630	1840	2540	2550	3045						
1000				1225	1230	1630	1640	2140	3040	3050						
					1830											
1500				1225	1630	1640	1840	2540								
2200		1225	1230	1630	1640	1840	2140	2550								
							1830									
3300	1225	1230	1630	1640	1840	2140	2540	3050								
4700	1230	1630	1640	1840	2140	2540	2545									
6800	1630	1640	1840	2140	2540	2550	3045									
10000	1640	1840	2140	2540	2550	3050										
			3040													
15000	1840	2140	2540	2545	3050											
22000	2140	2540	2550	3045												
33000	2545	2550	3045													
47000	3040	3050														
	preferred type <span style="background-color: #c6e0b4;"> </span>															
Case dimensions	case size / nominal dimensions Ø × L (mm)															
Endurance IEC	1000 h/105 °C								2000 h/85 °C							
Features	miniaturized series with high capacitance to 500 V															
Technology	non-solid aluminum															
Applications	telecom, automotive, professional															
Pref. packing	tape on reel															



024 AMR series								025 AMR series							
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅ D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR MAX. 100 Hz (Ω)	Z MAX. 10 kHz (Ω)	form	catalogue number	U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅ D x L (mm)	I <sub>R</sub> 100 Hz 105 °C (A)	ESR MAX. 100 Hz (Ω)	Z MAX. 10 kHz (Ω)	form	catalogue number
(V)	(μF)						2222 ... ..	(V)	(μF)						2222 ... ..
6.3	4700	12 x 30	1.40	0.120	0.085	BA	024 33472	160	100	12 x 30	0.42	1.120	0.485	BA	025 31101
	10000	16 x 40	2.20	0.065	<0.050	AA	024 13103		220	16 x 40	0.77	0.505	0.225	AA	025 11221
	22000	21 x 40	2.40	0.045	<0.050	AA	024 13223		470	21 x 40	1.30	0.270	0.115	AA	025 11471
	47000	30 x 40	3.20	0.030	<0.050	AA	024 13473		1000	30 x 40	2.10	0.145	0.075	AA	025 11102
10	2200	12 x 25	1.00	0.205	0.140	BA	024 34222	200	100	16 x 30	0.50	1.440	0.725	BA	025 32101
	4700	16 x 30	1.60	0.105	0.070	BA	024 34472		220	18 x 40	0.86	0.650	0.335	AA	025 12221
	10000	18 x 40	2.30	0.055	<0.050	AA	024 14103		470	25 x 40	1.50	0.305	0.170	AA	025 12471
	22000	25 x 40	2.50	0.045	<0.050	AA	024 14223		1000	30 x 50	2.30	0.160	0.095	AA	025 12102
16	47000	30 x 50	3.20	0.030	<0.050	AA	024 14473	250	47	12 x 25	0.29	3.050	1.230	BA	025 33479
	2200	12 x 30	1.10	0.160	0.105	BA	024 35222		100	16 x 40	0.53	1.440	0.580	AA	025 13101
	4700	16 x 40	1.90	0.080	0.050	AA	024 15472		220	21 x 40	0.97	0.650	0.270	AA	025 13221
	10000	21 x 40	2.40	0.050	<0.050	AA	024 15103		470	25 x 45	1.60	0.305	0.140	AA	025 13471
25	22000	25 x 50	3.00	0.035	<0.050	AA	024 15223	350	47	16 x 30	0.35	3.390	2.150	BA	025 35479
	1000	12 x 25	0.65	0.220	0.130	BA	024 36102		100	18 x 40	0.59	1.590	1.020	AA	025 15101
	2200	16 x 30	1.20	0.213	0.075	BA	024 36222		220	25 x 40	1.10	0.725	0.475	AA	025 15221
	4700	18 x 40	2.10	0.065	<0.050	AA	024 16472		22	12 x 25	0.19	6.520	4.000	BA	025 38229
40	10000	25 x 40	2.50	0.045	<0.050	AA	024 16103	385	47	18 x 30	0.38	3.050	1.880	AA	025 18479
	22000	30 x 45	2.90	0.035	<0.050	AA	024 16223		100	21 x 40	0.64	1.440	0.890	AA	025 18101
	1000	12 x 30	0.86	0.195	0.105	BA	024 37102		220	25 x 45	1.10	0.650	0.415	AA	025 18221
	2200	16 x 40	1.60	0.090	0.050	AA	024 17222		22	12 x 30	0.19	8.690	6.110	BA	025 36229
50	4700	21 x 40	2.20	0.055	<0.050	AA	024 17472	400	47	16 x 40	0.35	4.070	2.860	AA	025 16479
	10000	25 x 50	2.80	0.030	<0.050	AA	024 17103		100	21 x 40	0.63	1.191	1.360	AA	025 16101
	1000	16 x 30	1.10	0.185	0.105	BA	024 31102		220	25 x 50	1.10	0.870	0.625	AA	025 16221
	2200	18 x 40	1.70	0.090	0.055	AA	024 11222		22	12 x 30	0.20	7.240	3.510	BA	025 37229
63	4700	25 x 40	2.30	0.060	<0.050	AA	024 11472	450	47	16 x 40	0.37	3.390	1.650	AA	025 17479
	10000	30 x 50	2.80	0.045	<0.050	AA	024 11103		100	21 x 40	0.65	1.590	0.785	AA	025 17101
	470	12 x 25	0.60	0.340	0.160	BA	024 38471		220	30 x 45	1.20	0.725	0.370	AA	025 17221
	1000	16 x 40	1.10	0.165	0.080	AA	024 18102		10	12 x 25	0.14	14.080	9.305	BA	025 39109
100	2200	21 x 40	1.80	0.085	<0.050	AA	024 18222	500	22	16 x 30	0.26	6.210	4.105	BA	025 39229
	4700	25 x 45	2.40	0.055	<0.050	AA	024 18472		47	18 x 40	0.45	2.915	1.925	AA	025 19479
	220	12 x 30	0.37	1.655	0.205	BA	024 39221		100	25 x 40	0.81	1.385	0.920	AA	025 19101
	470	16 x 40	0.70	0.310	0.100	AA	024 19471		220	30 x 50	1.40	0.645	0.435	AA	025 19221
	1000	21 x 40	1.20	0.155	0.055	AA	024 19102								
	2200	25 x 50	1.90	0.080	<0.050	BA	024 19222								

Electrolytic capacitors



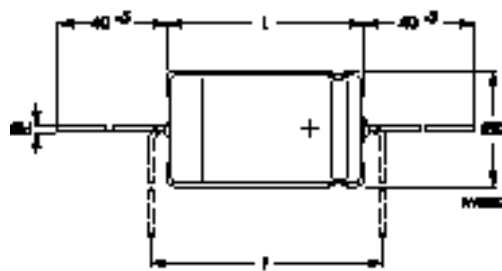
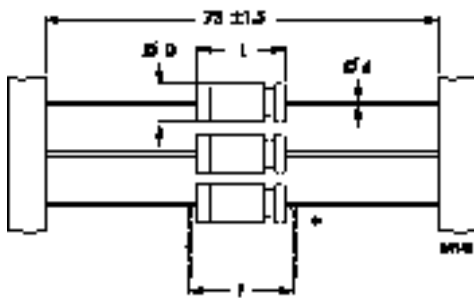


Series	<b>026 ACR</b> Axial high current range					<b>027 ACR</b> Axial high current range			
Useful life	5 000 h/ 105 °C					4 000 h/ 105 °C			
Temp. range	-40 to +105 °C					-40 to +105 °C			
Tolerance	-10 to +50%					-10 to +50%			
$C_R(\mu\text{F})$	$U_R(\text{V})$					$U_R(\text{V})$			
	16	25	40	63	100	160	250	385	400
10								1225	1225
22							1225	1230	1230
47						1230	1630	1640	1840
100				1225	1230	1640	1840	2140	2540
220			1225	1230	1840	2140	2540	3045	3045
470		1225	1630	1640	2540	2545	3045		
1000	1230	1630	1840	2140	2550				
2200	1640	2140	2540	3040					
4700	2140	2545	3045						
6800	2545	3040							
10000	3040								
	preferred type <span style="background-color: #c8e6c9; border: 1px solid #000; padding: 2px;"> </span>								
Case dimensions	case size / nominal dimensions $\varnothing \times L$ (mm)								
Endurance IEC	2000 h/105 °C								
Technology	non-solid aluminum, with base plate								
Applications	telecom, EDP, automotive, general industrial								
Pref. packing	tape on reel								



026 AMR series								027 AMR series							
$U_R$	$C_R$	nominal case size	$I_R$	ESR MAX.	Z MAX.	form	catalogue number	$U_R$	$C_R$	nominal case size	$I_R$	ESR MAX.	Z MAX.	form	catalogue number
(V)	( $\mu$ F)	$\varnothing D \times L$ (mm)	105 °C (A)	100 Hz ( $\Omega$ )	10 kHz ( $\Omega$ )		2222 ... ..	(V)	( $\mu$ F)	$\varnothing D \times L$ (mm)	105 °C (A)	100 Hz ( $\Omega$ )	10 kHz ( $\Omega$ )		2222 ... ..
16	1000	12 x 30	0.89	0.210	0.140	BA	026 35102	160	47	12 x 30	0.23	3.26	2.13	BA	027 31479
	2200	16 x 40	1.6	0.100	0.055	AA	026 15222		100	18 x 40	0.42	1.54	1.01	AA	027 11101
	4700	21 x 40	2.2	0.050	0.040	AA	026 15472		220	25 x 40	0.77	0.705	0.465	AA	027 11221
	10000	30 x 40	2.5	0.050	0.035	AA	026 15103		470	25 x 50	1.3	0.340	0.225	AA	027 11471
25	470	12 x 25	0.64	0.330	0.205	BA	026 36471	250	22	12 x 25	0.16	4.86	2.76	BA	027 33229
	1000	16 x 30	1.1	0.160	0.100	BA	026 36102		47	16 x 30	0.30	2.28	1.30	BA	027 33479
	2200	21 x 40	1.9	0.080	0.050	AA	026 16222		100	18 x 40	0.50	1.08	0.615	AA	027 13101
	4700	25 x 45	2.6	0.050	0.035	AA	026 16472		220	25 x 40	0.92	0.505	0.290	AA	027 13221
40	220	12 x 25	0.46	0.520	0.280	BA	026 37221	470	470	30 x 45	1.4	0.255	0.150	AA	027 13471
	470	16 x 30	0.83	0.250	0.135	BA	026 37471		470	30 x 45	1.4	0.255	0.150	AA	027 13471
	1000	18 x 40	1.3	0.120	0.065	AA	026 17102								
	2200	25 x 40	2.1	0.070	0.040	AA	026 17222								
63	4700	30 x 45	2.6	0.050	0.030	AA	026 17472								
	100	12 x 25	0.29	1.01	0.445	BA	026 38101								
	220	12 x 30	0.48	0.465	0.205	BA	026 38221								
	470	16 x 40	0.88	0.220	0.100	AA	026 18471								
100	1000	21 x 40	1.4	0.110	0.055	AA	026 18102								
	2200	30 x 40	2.0	0.075	0.045	AA	026 18222								
	100	12 x 30	0.28	0.955	0.415	BA	026 39101								
	220	18 x 40	0.54	0.435	0.195	AA	026 19221								
100	470	25 x 40	0.98	0.205	0.100	AA	026 19471								
	1000	25 x 50	1.4	0.155	0.065	AA	026 19102								

Electrolytic capacitors





Series	128 SAL-RPM						122 SAL-RP						123 SAL-A					
	Solid aluminum Radial pearl miniature						Solid aluminum Radial pearl						Solid aluminum Axial					
Useful life	20000 h/125 °C 2000 h/175 °C						20000 h/125 °C 2000 h/175 °C						20000 h/125 °C 2000 h/175 °C					
Temp. range	-55 °C to +175 °C						-55 °C to +175 °C						-80 °C to +200 °C					
Tolerance	±20%						±20%						±20%					
C <sub>R</sub> (μF)	U <sub>R</sub> (V)						U <sub>R</sub> (V)						U <sub>R</sub> (V)					
	6.3	10	16	25	35	40	6.3	10	16	25	35	40	6.3	10	16	25	35	40
0.1						10												
0.15						10												
0.22						20												
0.33					20	30												
0.47					30	40												
0.68				20	30	40												
1				20	40	50											1	
1.5				20	50	60											1	
2.2			20	30	60	60											1	
3.3			20	40	60												1	
4.7		20	30	50													1	
6.8		20	30	60													1	
10	20	30	40	60			1	2	3	4					1	1	2a	
15		30	50				2	2	4						1	1	2a	
22	30	40	60				2	3							1	2a	2a	
33	40	50					3	4							2a	2a	4	
47	50	60					4								2a	2a	4	
68	60						4								2a	4	5	
100															4	4	6	
150															4	5	6	
220															5	6		
330															5	6		
470															6			
680															6			
1000															6			
1500															6			

preferred type 10

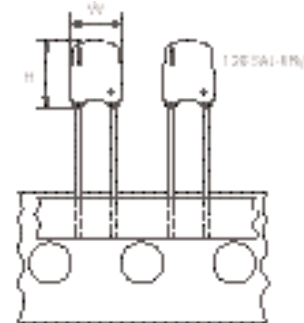
Case dimensions	case size H × W × T (mm)		case size Ø × L (mm)		
	10	Ø10 × 7 × 3	1	Ø12.5 × 8 × 3.5	1
20	Ø10 × 7 × 3.5	2	Ø12.5 × 8 × 4.5	2a	Ø7.6 × 20.4
30	Ø10 × 7 × 4	3	Ø12.5 × 8 × 5	4	Ø9.4 × 23.3
40	Ø10 × 7 × 5	4	Ø12.5 × 8 × 6	5	Ø10.3 × 32.0
50	Ø10 × 8 × 5			6	Ø12.9 × 32.0
60	Ø10 × 8 × 6				

Endurance IEC	10000 h/125 °C	10000 h/125 °C	8000 h/125 °C
Features	no derating, high reliability, small version of SAL-RP 122	no derating, high reliability, very low failure rate	can withstand extreme environmental conditions (-80 °C to +200 °C)
Applications	automotive, telecommunications, SMPS	automotive, telecommunications, SMPS	military, aerospace, automotive
Pref. packing	ammopack	ammopack	ammopack

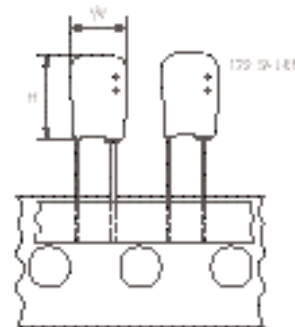


128 SAL-RPM series									123 SAL-A series							
U <sub>C</sub>	U <sub>R</sub>	C <sub>R</sub> 100 Hz	max. case size H x W x T (mm)	I <sub>R</sub> 100 Hz 125 °C (mA)	I <sub>R</sub> 100 kHz 40 °C (mA)	ESR MAX. 100 Hz (Ω)	Z MAX. 100 kHz (Ω)	catalogue number 2222 ... .. form TFA ammo	U <sub>C</sub>	C <sub>R</sub> 100 Hz	max. case size ∅ D x L (mm)	I <sub>R</sub> 100 Hz 125 °C (mA)	I <sub>R</sub> 100 kHz 40 °C (mA)	ESR MAX. 100 Hz (Ω)	Z MAX. 100 kHz (Ω)	catalogue number 2222 ... .. form TFA ammo
(V)	(V)	(μF)							(V)	(μF)						
6.3	6.3	10	10 x 7 x 3.5	22.4	595	20	2	128 33109	6.3	47	6.7 x 15.3	58	640	7.6	1.2	123 13479
		22	10 x 7 x 4.0	32.9	870	9	1	128 33229		1000	12.9 x 32.0	940	4640	0.36	0.2	123 13102
		47	10 x 8 x 5.0	118.4	1360	4.3	0.5	128 33479		47	6.7 x 15.3	83	640	7.6	1.2	123 14479
10	10	4.7	10 x 7 x 3.5	16.1	425	43	3	128 34478	10	100	7.6 x 20.4	160	1040	3.6	1.0	123 14101
		10	10 x 7 x 4.0	21.7	573	20	1.7	128 34109		220	9.4 x 23.3	350	1720	1.7	0.4	123 14221
		22	10 x 7 x 5.0	51.7	870	9	0.9	128 34229		470	10.3 x 32.0	570	2830	0.8	0.3	123 14471
		47	10 x 8 x 6.0	105.4	1140	4.3	0.4	128 34479		1000	12.9 x 32.0	1000	4920	0.36	0.2	123 14102
16	16	2.2	10 x 7 x 3.5	14.0	370	91	4.5	128 35228	16	10	6.7 x 15.3	31	330	28	2.5	123 15109
		4.7	10 x 7 x 4.0	18.9	500	43	2.3	128 35478		22	6.7 x 15.3	63	490	13	2.5	123 15229
		10	10 x 7 x 5.0	42.9	720	20	1.1	128 35109		47	7.6 x 20.4	120	810	5.9	2.0	123 15479
		22	10 x 8 x 6.0	86.7	940	9	0.65	128 35229		100	9.4 x 23.3	260	1340	2.8	0.8	123 15101
25	25	1	10 x 7 x 3.5	9.1	240	200	12.5	128 36108	25	220	10.3 x 32.0	420	2060	1.5	0.6	123 15221
		2.2	10 x 7 x 4.0	13.6	360	91	7	128 36228		470	12.9 x 32.0	680	3330	0.7	0.4	123 15471
		4.7	10 x 8 x 5.0	25.3	500	43	3.5	128 36478		10	6.7 x 15.3	43	330	28	5.0	123 16109
25	35	0.47	10 x 7 x 4.0	6.3	165	430	20	128 30477	25	22	7.6 x 20.4	88	550	13	2.5	123 16229
		1	10 x 7 x 4.0	13.7	230	200	10	128 30108		47	7.6 x 20.4	160	810	5.9	2.5	123 16479
		2.2	10 x 8 x 6.0	33.1	360	91	4.5	128 30228		100	9.4 x 23.3	250	1250	3.2	1.0	123 16101
25	40	0.1	10 x 7 x 3.0	2.0	75	1990	45	128 37107	35	220	12.9 x 32.0	460	2270	1.5	0.6	123 16221
		0.22	10 x 7 x 3.5	4.2	115	910	27	128 37227		1	6.7 x 15.3	4	80	240	16.5	123 10108
		0.47	10 x 7 x 5.0	10.4	175	430	15	128 37477		2.2	6.7 x 15.3	10	120	109	7.5	123 10228
		1	10 x 8 x 5.0	20.0	230	200	7	128 37108		4.7	6.7 x 15.3	20	170	51	7.5	123 10478
		2.2	10 x 8 x 6.0	33.1	360	91	4.2	128 37228		10	7.6 x 20.4	37	280	24	2.5	123 10109
25	40	0.1	10 x 7 x 3.0	2.0	75	1990	45	128 37107	40	22	7.6 x 20.4	78	420	11	2.5	123 10229
		0.22	10 x 7 x 3.5	4.2	115	910	27	128 37227		47	9.4 x 23.3	140	700	5.1	1.0	123 10479
		0.47	10 x 7 x 5.0	10.4	175	430	15	128 37477		100	12.9 x 32.0	220	1100	3.2	0.6	123 10101
		1	10 x 8 x 5.0	20.0	230	200	7	128 37108		2.2	6.7 x 15.3	11	120	109	7.5	123 17228
		2.2	10 x 8 x 6.0	33.1	360	91	4.2	128 37228		4.7	6.7 x 15.3	22	170	51	7.5	123 17478
		0.1	10 x 7 x 3.0	2.0	75	1990	45	128 37107		10	7.6 x 20.4	41	280	24	2.5	123 17109
		0.22	10 x 7 x 3.5	4.2	115	910	27	128 37227		22	9.4 x 23.3	89	480	11	1.5	123 17229
		0.47	10 x 7 x 5.0	10.4	175	430	15	128 37477		47	10.3 x 32.0	160	790	5.1	1.0	123 17479
		1	10 x 8 x 5.0	20.0	230	200	7	128 37108		100	12.9 x 32.0	220	1100	3.2	0.6	123 17101
		2.2	10 x 8 x 6.0	33.1	360	91	4.2	128 37228								

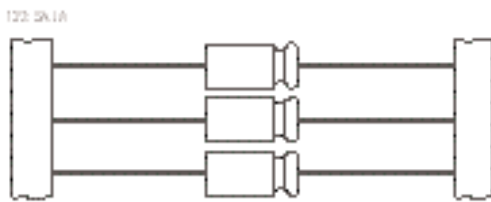
122 SAL-RP series								
U <sub>C</sub>	U <sub>R</sub>	C <sub>R</sub> 100 Hz	max. case size H x W x T (mm)	I <sub>R</sub> 100 Hz 125 °C (mA)	I <sub>R</sub> 100 kHz 40 °C (mA)	ESR MAX. 100 Hz (Ω)	Z MAX. 100 kHz (Ω)	catalogue number 2222 ... .. form TFA ammo
(V)	(V)	(μF)						
6.3	6.3	10	12.5 x 8 x 3.5	9	211	30	5.0	122 33109
		22	12.5 x 8 x 4.5	20	317	14	1.3	122 33229
		47	12.5 x 8 x 6.0	42	502	6.4	0.7	122 33479
10	10	4.7	12.5 x 8 x 3.5	7	158	64	7.0	122 34478
		10	12.5 x 8 x 4.5	14	211	30	1.5	122 34109
		22	12.5 x 8 x 5.0	31	317	14	0.7	122 34229
16	16	2.2	12.5 x 8 x 3.5	5	132	91	10.0	122 35228
		4.7	12.5 x 8 x 4.5	11	185	43	2.0	122 35478
		10	12.5 x 8 x 5.0	23	164	20	1.0	122 35109
25	25	1	12.5 x 8 x 3.5	4	85	200	20.0	122 36108
		2.2	12.5 x 8 x 4.5	8	132	91	10.0	122 36228
		4.7	12.5 x 8 x 5.0	17	185	43	5.0	122 36478
25	35	1	12.5 x 8 x 6.0	35	230	20	2.0	122 36109
		1	12.5 x 8 x 4.5	3	85	200	15.0	122 30108
		1	12.5 x 8 x 5.0	4	85	200	10.0	122 37108
25	40	0.47	12.5 x 8 x 4.5	2	63	430	20.0	122 37477
		1	12.5 x 8 x 5.0	4	85	200	10.0	122 37108
25	40	2.2	12.5 x 8 x 6.0	8	132	91	5.0	122 37228



Form TFA: taped in box [ammopack]



Form TFA: taped in box [ammopack]



Form BA: taped in box [ammopack]



Series	<b>175 TMP</b>						
Useful life	20 000 h/125 °C 2000 h/175 °C						
Temp. range	U <sub>C1</sub> = 4 to 25 V: -55 to +125 °C U <sub>C2</sub> = 4 to 16 V: -55 to 175 °C						
Tolerance	±20%						
C <sub>R</sub> (µF)	U <sub>R</sub> (V) at T <sub>amb</sub> = 85 °C						
	4	6.3	10	16	20	25	40
	U <sub>C1</sub> (V) at T <sub>amb</sub> = 125 °C						
	4	6.3	10	16	20	25	25
	U <sub>C2</sub> (V) at T <sub>amb</sub> = 175 °C						
	4	6.3	10	16	16	16	16
1							808
							810
2.2							808
							810
3.3						808	1012
						810	
4.7						808	1012
						810	
6.8					808	808	1012
					810	810	
10				808		808	1012
				810		810	
15			808		note 1		1012
				810			
22			808	note 1		1012	1212
			810				
33		808	note 1			1012	1212
		810					
47		808	note 1			1012	1214
		810					
68	808	note 1		1012	1212		
	810						
100		1012	1212	1212			
150	1012	1212	1214				
220	1012						
330	1214	1212					
	preferred						
Case dimensions	808 = 8.0 × 8.0 × 8.0						
Endurance	10 000 h/125 °C						
Features	solid aluminum low voltage series for demanding applications in professional systems; extended values have preliminary specifications						
Note	note 1: Case code 0810 with U <sub>C1</sub> , T <sub>amb</sub> = 125 °C, available on request.						





## 175 TMP series

U <sub>R</sub> (V)	U <sub>C1</sub> 125 °C (V)	U <sub>C2</sub> 175 °C (V)	C <sub>R</sub> (V) (μF)	nominal case size L × W × H (mm)	I <sub>R</sub> 100 Hz 40 °C (mA)	I <sub>15</sub> 5 min (mA)	ESR TYP. 100 kHz (W)	catalogue number 2222 ... ..
4	4	4	68	8 × 8 × 8	2410	5	0.15	175 52689
6.3	6.3	6.3	47	8 × 8 × 8	2330	5	0.16	175 53479
10	10	10	22	8 × 8 × 8	1700	3	0.31	175 54229
16	16	16	10	8 × 8 × 8	1050	3	0.79	175 55109
25	25	16	4.7	8 × 8 × 8	620	2	1.6	175 56478
			6.8	8 × 8 × 8	780	4	1.33	175 58688
40	25	16	1.0	8 × 8 × 8	530	2	3.12	175 57108
			2.2	8 × 8 × 8	640	2	2.16	175 57228



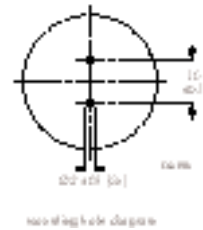
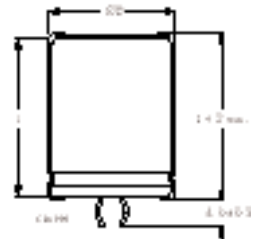
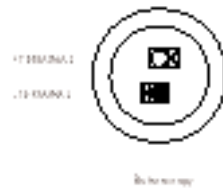
Series	157 PUM-SI Power ultra miniature snap-in				159 PUL-SI Power ultra long life snap-in				198 PHR-SI Power high ripple current snap-in	
Useful life	5000 h/85 °C				5000 h/105 °C				15 000 h/85 °C	
Temp. range	-25 °C to +85 °C				-25 °C to +105 °C				-25 °C to +85 °C	
Tolerance	±20%				±20%				±20%	
C <sub>R</sub> (µF)	U <sub>R</sub> (V)				U <sub>R</sub> (V)				U <sub>R</sub> (V)	
	200	250	400	450	200	250	400	450	400	450
56				2225				2225	2225	2225
68			2225	2230			2225	2230/2525	2225	2230
82			2225	2230 2525			2230 2525	2235		2230 2525
100			2230	2235 2530			2235 2530	2240 2530/3025	2230	2235 2530
120			2230	2240 2530 3025			2235 2530 3025	2535	2235 2530	2240 2530 3025
150			2235	2540 2535 3030			2240 2535 3030	2540 3030 3525	2240 2535	2540 3030
180			2240	2540 3035 3525			2540 3030 3525	2545 3035	2540 3030 3525	2540 3035 3525
220		2230	2540 3030 3525	2550 3040 3530		2230 2525	2545 3035 3530	3040	2545 3035 3530	2550 3040 3530
270	2225	2230 2525	2545 3035 3530	3045 3535		2235 2530 3025	2550 3040 3530	3045 3535	3040 3550	3045 3535
330	2230	2235 2530	3040 3530 3540	3050 3540	2230	2240 2530/3025	3045 3535 3540	3050 3540	3045 3535	3050 3540
390	2230	2240 3025	3045 3535	3545	2235 2530	2535 3030	3050 3540	3545	3050 3540	3545
470	2235	2535 3030	3050 3540	3550	2240 3025	2540 3030/3525	3545	3550	3545	3550
560	2240 2535 3025	2540 3030 3525	3545			2545 3035 3030	3550	3560	3550	3560
680	2540 3030 3525	2545 3035 3530	3550	3560	2545 3030 3525	3045 3535	3560		3560	3560
820	2545 3035 3530	3040 3535	3560		2550 3035 3530	3045 3535 3540				
1000	3040 3530	3045 3540			3045 3535	3540 3545				
1200	3045 3535	3545			3050 3535	3545 3550				
1500	3050 3540	3550			3545 3550					
1800	3545									
2200	3550									
case dimensions	preferred type <span style="background-color: #c8e6c9; border: 1px solid #000; padding: 2px;">2230</span> explanation of case sizes: 2230 means Ø22 mm × L 30 mm									
Endurance IEC	3000 h/85 °C				2000 h/105 °C				7000 h/85 °C	
Features	small dimensions keyed polarity type with 3 terminals available				small dimensions, long life, low ESR, keyed polarity type with 3 terminals available				very high ripple current capability keyed polarity type with 3 terminals available on request	
Applications	general purpose, industrial systems, SMPS				general purpose, industrial systems, SMPS				motor control, industrial systems	



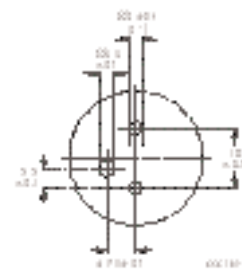
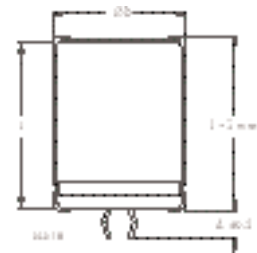
157 PUM-SI series							198 PHR-SI series						
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅ D x L (mm)	I <sub>R</sub> 120 Hz 85 °C (A)	ESR TYP. 100 Hz (mΩ)	Z MAX. 10 kHz (mΩ)	catalogue number 2222 ... .. 2-terminal	U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅ D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR TYP. 100 Hz (mΩ)	Z MAX. 10 kHz (mΩ)	catalogue number 2222 ... .. 2-terminal
(V)	(μF)						(V)	(μF)					
200	330	22 x 30	1.36	430	500	157 52331	400	100	22 x 30	1.00	866	1220	198 56101
	470	22 x 35	1.68	350	400	157 32471		150	22 x 35	1.33	580	725	198 66151
	680	25 x 40	2.18	210	340	157 42681		220	25 x 40	1.75	402	560	198 36221
	1000	30 x 40	2.66	140	225	157 52102		330	30 x 45	2.22	282	420	198 36331
	1500	30 x 50	3.31	110	155	157 42152		470	30 x 50	2.72	215	305	198 36471
	2200	35 x 50	3.68	90	105	157 52222		680	35 x 50	3.53	151	220	198 46681
250	220	22 x 30	1.23	600	700	157 53221	450	68	22 x 30	0.82	1182	1530	198 57689
	330	22 x 35	1.53	400	430	157 33331		100	22 x 35	1.02	809	1050	198 47101
	470	25 x 35	1.87	280	320	157 33471		150	25 x 40	1.36	547	705	198 47151
	680	25 x 45	2.29	200	260	157 63681		220	30 x 40	1.75	387	525	198 57221
	1000	30 x 45	2.88	140	180	157 33102		330	30 x 50	2.22	264	390	198 47331
	1500	35 x 50	3.49	90	140	157 53152		470	35 x 50	2.73	200	290	198 57471
400	100	22 x 30	0.94	1125	1220	157 56101	680	35 x 60	3.30	147	220	198 57681	
	150	22 x 35	1.13	750	900	157 36151							
	220	25 x 40	1.54	520	590	157 46221							
	330	30 x 40	1.97	350	525	157 56331							
	470	30 x 50	2.40	250	350	157 46471							
	680	35 x 50	2.79	190	265	157 56681							
450	68	22 x 30	0.80	1400	1530	157 57689							
	100	22 x 35	1.00	1000	1050	157 37101							
	150	25 x 40	1.35	650	705	157 47151							
	220	25 x 50	1.73	450	525	157 47221							
	330	30 x 50	2.19	300	390	157 47331							
	470	35 x 50	2.60	210	290	157 57471							

159 PUL-SI series						
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅ D x L (mm)	I <sub>R</sub> 120 Hz 105 °C (A)	ESR TYP. 100 Hz (mΩ)	Z MAX. 10 kHz (mΩ)	catalogue number 2222 ... .. 2-terminal
(V)	(μF)					
200	330	22 x 30	1.08	450	500	159 52331
	470	22 x 40	1.37	300	400	159 32471
	680	25 x 45	1.82	210	340	159 42681
	1000	30 x 45	2.23	150	225	159 42102
	1500	35 x 45	2.56	100	155	159 52152
250	220	22 x 30	1.00	540	700	159 43221
	330	22 x 40	1.20	360	430	159 33331
	470	25 x 40	1.58	270	400	159 33471
	680	30 x 40	1.93	210	260	159 43681
	1000	35 x 40	2.22	140	180	159 53102
400	100	22 x 35	0.69	990	1240	159 46101
	150	22 x 40	0.86	700	860	159 36151
	220	25 x 45	1.15	470	590	159 46221
	330	30 x 45	1.47	320	450	159 56331
	470	35 x 45	1.72	230	330	159 56471
450	68	22 x 30	0.56	1200	1530	159 47689
	100	22 x 40	0.74	900	1050	159 37101
	150	25 x 40	0.95	600	705	159 47151
	220	30 x 40	1.21	370	525	159 47221
	330	30 x 50	1.54	300	390	159 47331
	470	35 x 50	1.72	210	290	159 57471

Two terminal Snap-In



Three terminal Snap-In



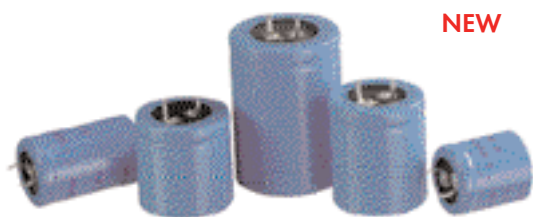


NEW

Electrolytic capacitors

Series	<b>056, 057 PSM-SI</b> Power standard miniature snap-in												<b>156 PUM-SI</b> Power ultra miniature snap-in								
	Useful life: 12 000 h/85 °C (for 450 V, 5000 h/85 °C)												5000 h/85 °C								
Temp. range	-40 °C to +85 °C												-40 °C to +85 °C								
Tolerance	±20%												±20%								
C <sub>R</sub> (µF)	U <sub>R</sub> (V)												U <sub>R</sub> (V)								
	10	16	25	40	50	63	100	200	250	385	400	450	10	16	25	40	50	63	80	100	
47										2225	2225	2230									
68										2230	2230	2230									
100										2225	2235	2235	2535								
150								2225	2230	3030	3030	3030									
220								2230	2240	2550	2550	3045									
330								2240	3030	3045	3540	3545									
470								2225	3030	2550	3545	3550									
680								2230	2550	3540										2225	
820									3040	3050										2225	
1000							2225	2530	3540	3550									2225	2525	
1200								2240	3050											2225	
1500					2225	2230	3030	3550											2225	2235	
1800								2540											2525	2530	
2200				2225	2230	2530	3040									2225	2230	2235	2250	2545	
2700							2240	2550							2225	2525	2235	2245	2545	2545	
3300			2225	2230	2530	3030	3540								2525	2230	2240	2250	3040	3530	
3900					2240	2540	3050									3025	3030	3525	3525	3525	
4700		2225	2230	2530	3030	3040	3550								2225	2235	2240	2250	3040	3050	
5600															2525	2535	2545	3030	3530	3540	
6800	2225	2230	2530	3030	3040	3540									2225	2235	2245	2545	3040	3050	
8200			2240	2540	2550	3050									2535	3030	3530	3540	3540	3550	
10000	2230	2530	3030	3040	3540	3550									2225	2230	2240	3040	3540	3550	
12000		2240	2540	2550	3050										2230	2235	2250	3040	3550	3560	
15000	2530	3030	3040	3540	3550										2525	2530	2540	3030	3535		
18000	2240	2540	2550	3050											3025	3030	3525	3525			
22000	3030	3040	3540	3550											2245	2545	3045	3545	3560		
27000	2540	2550													3025	3035	3535				
33000	3040	3540	3550												2240	2250	3040	3540			
39000	2550	3050													2540	2550	3030	3540			
47000	3540	3550													3030	3030	3525				
5600	3550														3535	3535					
68000															3050	3550					
82000															3545	3560					
100000															3550						
															3560						
case	preferred type																				
dimension	explanation of case sizes: 2225 means Ø22 mm × L 25 mm																				
Endurance	5000 h/85 °C (for 450 V, 2000 h/85 °C)												2000 h/85 °C								
IEC																					
Features	very high CV per unit volume, long life keyed polarity type with 3 terminals available												small dimensions keyed polarity type with 3 terminals available								
Applications	general purpose, SMPS												general purpose, industrial systems, SMPS								





Series	<b>197 PGP-SI</b>				
	Power general purpose snap-in				
Useful life	2 000 h/ 85 °C, 25 000 h/ 40 °C and $1.4 \times I_R$ applied				
Temp. range	-25 °C to +85 °C				
Tolerance	±20%				
$C_R(\mu\text{F})$	$U_R(\text{V})$				
	160	200	250	400	450
56					22 x 25
68				22 x 25	22 x 25
82				22 x 25	22 x 30
					25 x 25
100				22 x 30	22 x 35
				25 x 25	25 x 30
120				22 x 35	22 x 40
				25 x 35	25 x 30
				30 x 25	30 x 25
150	22 x 25	22 x 25	22 x 25	22 x 35	22 x 45
				25 x 30	25 x 35
				30 x 25	30 x 30
180	22 x 25	22 x 25	22 x 25	22 x 40	22 x 50
				25 x 35	25 x 40
				30 x 25	30 x 30
				35 x 25	35 x 30
220	22 x 25	22 x 25	22 x 30	22 x 50	25 x 45
			25 x 25	25 x 40	30 x 35
				30 x 30	35 x 30
				35 x 25	
270	22 x 25	22 x 25	22 x 30	25 x 45	30 x 40
			25 x 25	30 x 35	35 x 35
				35 x 30	
330	22 x 25	22 x 30	22 x 35	25 x 50	30 x 50
		25 x 25	25 x 30	30 x 40	35 x 40
			30 x 25	35 x 30	
390	22 x 30	22 x 30	22 x 40	30 x 45	30 x 50
		25 x 25	25 x 35	35 x 35	35 x 50
			30 x 25		
470	22 x 30	22 x 35	22 x 45	30 x 50	35 x 50
	25 x 25	25 x 30	25 x 40	35 x 40	
		30 x 25	30 x 30		
560	25 x 25	22 x 40	22 x 50	35 x 45	
	30 x 25	25 x 35	25 x 45		
		30 x 25	30 x 35		
			35 x 25		
680	25 x 30	25 x 40	25 x 50	35 x 50	
	30 x 25	30 x 30	30 x 40		
		35 x 25	35 x 30		
820	25 x 35	25 x 45	30 x 45		
	35 x 25	30 x 35	35 x 35		
		35 x 30			
1000	25 x 40	30 x 40	30 x 50		
	30 x 30	35 x 35	35 x 40		
	35 x 25				
1200	30 x 35	30 x 45	35 x 50		
	35 x 30	35 x 35			
1500	35 x 35	35 x 50			
1800	30 x 50				
	35 x 40				
	preferred type				
IEC	IEC 60384-4				
Features	polarized aluminum electrolytic capacitors, non-solid electrolyte, large types, very small dimensions, cylindrical aluminum case, insulated with a blue sleeve.				
Applications	general purpose, suitable for electronic equipment, consumer electronics.				



197 PGP-SI						
$U_R$	$C_R$	nominal	$I_R$	$I_{L5}$	ESR 1)	catalogue
(V)	120 Hz	case size	120 Hz	5 min.	MAX.	number
(V)	( $\mu$ F)	$\varnothing D \times L$	85 °C	(mA)	120 Hz	2222 ... ..
		(mm)	(A)		( $\Omega$ )	
160	390	22 x 30	1.62	1.25	0.43	197 11391
	470	22 x 30	1.73	1.50	0.35	197 11471
	1 000	25 x 40	2.62	1.50	0.17	197 21102
	1 800	30 x 50	4.12	1.50	0.09	197 11182
200	330	22 x 30	1.43	1.32	0.50	197 12331
	470	22 x 35	1.71	1.50	0.35	197 12471
	680	25 x 40	2.27	1.50	0.24	197 22681
	1 000	30 x 40	2.90	1.50	0.17	197 22102
	1 500	35 x 50	4.04	1.50	0.17	197 22152
250	220	22 x 30	1.16	1.10	0.75	197 13221
	330	22 x 35	1.40	1.50	0.50	197 13331
	470	25 x 40	1.86	1.50	0.35	197 23471
	680	30 x 40	2.42	1.50	0.24	197 23681
	1 200	35 x 50	3.71	1.50	0.21	197 13122
400	100	22 x 30	0.71	0.80	2.49	197 16101
	120	22 x 35	0.83	0.96	2.07	197 16121
	150	22 x 35	0.84	1.20	1.66	197 16151
	220	25 x 40	1.12	1.50	1.13	197 26221
	330	30 x 40	1.44	1.50	0.75	197 26331
	470	30 x 50	1.91	1.50	0.53	197 16471
450	680	35 x 50	2.29	1.50	0.37	197 16681
	82	22 x 30	0.64	0.41	3.03	197 17829
	100	22 x 35	0.72	0.50	2.49	197 17101
	180	25 x 40	1.02	0.90	1.38	197 27181
	270	30 x 40	1.32	1.35	0.92	197 17271
	330	30 x 50	1.63	1.50	0.75	197 17331
	390	35 x 50	1.91	1.50	0.64	197 27391
470	35 x 50	2.13	1.50	0.53	197 17471	

1) ESR at 100 Hz is approximately  $1.05 \times$  ESR 120 Hz.



multi-pin snap-in					
Series	<b>3410 (2251 064 MP-SI)</b> Multi-pin snap-in				
Useful life	<100 V: 5000 h/85 °C ≥100 V: 3000 h/85 °C				
Temp. range	-40 °C to +85 °C				
Tolerance	±20%				
C <sub>R</sub> (μF)	U <sub>R</sub> (V)				
	100	250	350	400	450
330					35 x 50
390					40 x 50
470				35 x 50	35 x 63
560					45 x 50
			35 x 50	40 x 50	35 x 80
			50 x 50		40 x 63
					50 x 50
680				35 x 63	35 x 105
				45 x 50	40 x 80
					45 x 63
820			35 x 63	35 x 80	40 x 105
			45 x 50	40 x 63	45 x 80
			35 x 80	50 x 50	50 x 63
1000				35 x 105	45 x 105
			40 x 63	40 x 80	50 x 80
			50 x 50	45 x 63	
1200		35 x 50	35 x 105	40 x 105	50 x 105
			40 x 80	45 x 80	
			45 x 63	50 x 63	
1400		40 x 50	40 x 105	45 x 105	
			45 x 80	50 x 80	
			50 x 63		
1600		45 x 50	45 x 105	50 x 105	
			50 x 80		
1800		35 x 63			
1900		50 x 50	50 x 105		
2100		40 x 63			
2200		35 x 80			
2500		45 x 63			
2600		40 x 80			
2700		35 x 105			
3000		50 x 63			
3100		45 x 80			
3300		40 x 105			
3700		50 x 80			
3900		45 x 105			
4700	35 x 50	50 x 105			
5600	40 x 50				
6800	35 x 63				
	45 x 50				
8200	35 x 80				
	40 x 63				
	50 x 50				
9800	40 x 80				
	45 x 63				
10000	35 x 105				
11000	45 x 80				
	50 x 63				
12000	40 x 105				
13000	50 x 80				
14000	45 x 105				
16000	50 x 105				
	preferred type <span style="background-color: #c8e6c9; border: 1px solid #ccc; padding: 2px;">35 x 50</span>				
Endurance IEC	5000 h/85 °C (for 450 V, 2000 h/85 °C)				
Features	keyed polarity, long life, high ripple current				
Applications	general purpose, capacitor banks, SMPS, UPS				





**3410 (2251 064 MP-SI)**

U <sub>R</sub> (V)	C <sub>R</sub> 100 Hz (µF)	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR MAX. 100 Hz (mΩ)	Z MAX. 10 kHz (mΩ)	catalogue number 2222 ... ..	U <sub>R</sub> (V)	C <sub>R</sub> 100 Hz (µF)	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR MAX. 100 Hz (mΩ)	Z MAX. 10 kHz (mΩ)	catalogue number 2222 ... ..
100	4700	35 x 50	7.7	36		on request	400	470	35 x 50	3.2	182		on request
	6800	35 x 63	9.5	27				680	35 x 63	4.1	138		
	8200	35 x 80	11.1	23				820	35 x 80	4.6	115		
	10000	35 x 105	12.5	21				1000	35 x 105	5.5	95		
	5600	40 x 50	7.5	34				560	40 x 50	3.4	114		
	8200	40 x 63	10.4	26				820	40 x 63	5.3	97		
	10000	40 x 80	11.1	22				1000	40 x 80	5.8	88		
	12000	40 x 105	12.5	21				1200	40 x 105	6.3	81		
	6800	45 x 50	9.7	24				680	45 x 50	3.9	133		
	10000	45 x 63	12.0	19				1000	45 x 63	5.6	92		
	11000	45 x 80	12.5	18				1200	45 x 80	6.8	77		
	14000	45 x 105	14.3	15				1400	45 x 105	8.2	61		
	8200	50 x 50	11.2	23				820	50 x 50	5.2	98		
	11000	50 x 63	13.6	18				1200	50 x 63	6.6	77		
	13000	50 x 80	14.1	17				1400	50 x 80	7.7	63		
	16000	50 x 105	15.3	15				1600	50 x 105	8.3	40		
250	1200	35 x 50	5.2	80			450	330	35 x 50	2.8	223		
	1800	35 x 63	6.6	55				470	35 x 63	3.3	191		
	2200	35 x 80	7.8	46				560	35 x 80	3.9	160		
	2700	35 x 105	9.4	38				680	35 x 105	4.6	133		
	1400	40 x 50	5.8	62				390	40 x 50	2.6	210		
	2100	40 x 63	7.3	51				560	40 x 63	3.9	164		
	2600	40 x 80	8.6	43				680	40 x 80	4.6	122		
	3300	40 x 105	10.4	33				820	40 x 105	6.8	82		
	1600	45 x 50	6.7	59				470	45 x 50	3.5	161		
	2500	45 x 63	8.4	42				680	45 x 63	4.4	140		
	3100	45 x 80	9.9	36				820	45 x 80	5.1	115		
	3900	45 x 105	11.5	28				1000	45 x 105	7.4	62		
	1900	50 x 50	7.7	47				560	50 x 50	4.6	143		
	3000	50 x 63	9.2	38				820	50 x 63	5.1	118		
	3700	50 x 80	11.1	29				1000	50 x 80	6.2	81		
	4700	50 x 105	12.3	26				1200	50 x 105	7.6	65		
350	560	35 x 50	2.7	180									
	820	35 x 63	4.5	122									
	1000	35 x 80	5.1	98									
	1200	35 x 105	5.7	86									
	680	40 x 50	3.6	141									
	1000	40 x 63	5.1	103									
	1200	40 x 80	5.6	88									
	1400	40 x 105	6.4	79									
	820	45 x 50	4.7	121									
	1200	45 x 63	5.9	89									
	1400	45 x 80	6.6	69									
	1600	45 x 105	7.4	61									
	1000	50 x 50	5.4	99									
	1400	50 x 63	6.8	81									
	1600	50 x 80	7.6	64									
	1900	50 x 105	9.1	52									

Electrolytic capacitors



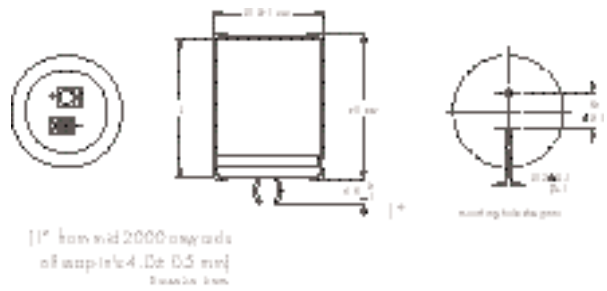
Series	<b>058, 059 PLL-SI</b> Power long life snap-in										
Useful life	≤50 V: 5 000 h/105 °C ≥63 V: 10 000 h/105 °C										
Temp. range	-40 °C to +105 °C										
Tolerance	±20%										
C <sub>R</sub> (μF)	U <sub>R</sub> (V)										
	10	16	25	40	50	63	100	200	250	385	400
33										2225	
47										2230	2230
68									2225	2235	2235
										2530	2530
100								2225	2230	3030	3030
										2540	2540
150								2230	2235	2550	3035
									2530	3040	2550
220								2235	2535	3540	3050
								2530	3030	3050	3540
330							2225	3030	3035	3550	3550
								2540	2550		
470							2230	3035	3045		
								2550	3535		
680						2225	2240	3045	3545		
							2530	3535			
1000					2225	2230	3030	3550			
							2540				
1500				2225	2230	2530	3040				
						2240	2550				
2200			2225	2230	2530	3030	3540				
					2240	2540	3050				
3300		2225	2230	2530	3030	3040	3550				
				2240	2540	2550					
4700	2225	2230	2530	3030	3040	3540					
			2240	2540	2550	3050					
6800	2230	2530	3030	3040	3540	3550					
		2240	2540	2550	3050						
10000	2530	3030	3040	3540	3550						
	2240	2540	2550	3050							
15000	3030	3040	3540	3550							
	2540	2550	3050								
22000	3040	3540	3550								
	2550	3050									
33000	3540	3550									
	3050										
47000	3550										
68000											
	preferred type <span style="background-color: #c8e6c9; padding: 2px;"> </span>										
case dimensions	explanation of case sizes: 2225 means Ø22 mm × L 25 mm										
Endurance IEC	≤50 V: 2000 h/105 °C										
Features	high temperature, long life, high ripple, low ESR keyed polarity type with 3 terminals available										
Applications	industrial, SMPS										
Note											



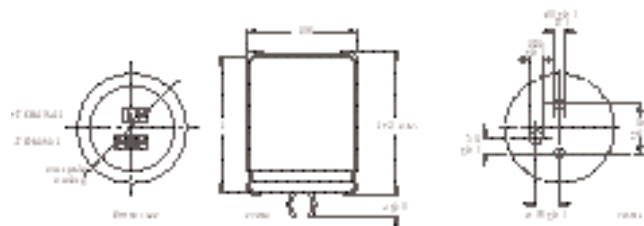
058, 059 PLL-SI series

U <sub>R</sub> (V)	C <sub>R</sub> 100 Hz (µF)	nominal case size ØD x L (mm)	I <sub>R</sub> 100 Hz 105 °C (A)	ESR MAX. 100 Hz (mΩ)	Z MAX. 10 kHz (mΩ)	catalogue number 2222 ... ..
10	6800	22 x 30	2.44	61	44	058 54682
	10 000	25 x 30	2.81	54	42	058 54103
	15 000	25 x 40	3.78	38	30	058 44153
	22 000	30 x 40	4.62	31	25	058 54223
	33 000	30 x 50	5.70	24	21	058 44333
	47 000	35 x 50	6.23	24	21	058 54473
16	4700	22 x 30	2.36	65	44	058 55472
	6800	25 x 30	2.75	56	42	058 55682
	10 000	25 x 40	3.66	40	30	058 45103
	15 000	30 x 40	4.55	32	25	058 55153
	22 000	30 x 50	5.67	25	21	058 45223
	33 000	35 x 50	6.23	25	21	058 55333
25	3300	22 x 30	2.23	73	44	058 56332
	4700	25 x 30	2.60	62	42	058 56472
	6800	25 x 40	3.49	44	30	058 46682
	10 000	30 x 40	4.37	35	25	058 56103
	15 000	30 x 50	5.43	27	21	058 46153
	22 000	35 x 50	6.07	27	21	058 56223
40	2200	22 x 30	2.04	87	50	058 57222
	3300	25 x 30	2.43	71	45	058 57332
	4700	25 x 40	3.26	51	32	058 47472
	6800	30 x 40	3.94	42	29	058 57682
	10 000	30 x 50	4.98	36	24	058 47103
	15 000	35 x 50	5.21	36	24	058 57153
50	1500	22 x 30	1.88	102	54	058 51152
	2200	25 x 30	2.27	82	47	058 51222
	3300	25 x 40	3.07	57	33	058 41332
	4700	30 x 40	3.77	47	30	058 51472
	6800	35 x 40	4.01	49	30	058 51682
	10 000	35 x 50	5.04	38	24	058 51103
63	1000	22 x 30	1.46	170	115	058 58102
	1500	25 x 30	1.76	137	85	058 58152
	2200	25 x 40	2.40	94	70	058 48222
	3300	30 x 40	3.07	70	50	058 58332
	4700	30 x 50	3.88	63	45	058 48472
	6800	35 x 50	4.58	46	35	058 58682
100	470	22 x 30	1.14	280	190	058 59471
	680	25 x 30	1.35	232	140	058 59681
	1000	25 x 40	1.85	158	115	058 49102
	1500	30 x 40	2.45	111	85	058 59152
	2200	30 x 50	3.13	82	65	058 49222
	3300	35 x 50	3.84	64	50	058 59332
200	150	22 x 30	0.67	850	540	059 52151
	220	25 x 30	0.87	610	430	059 52221
	330	25 x 40	1.12	435	300	059 42331
	470	25 x 50	1.25	335	225	059 42471
	680	30 x 45	1.87	235	155	059 32681
	1000	35 x 50	2.45	160	125	059 52102
250	100	22 x 30	0.62	1110	570	059 53101
	150	25 x 30	0.82	795	440	059 53151
	220	25 x 35	1.03	540	300	059 33221
	330	25 x 50	1.40	385	225	059 43331
	470	30 x 45	1.79	270	155	059 33471
	680	35 x 45	2.25	190	125	059 43681
385	47	22 x 30	0.41	2710	2100	059 58479
	68	25 x 30	0.52	1870	1460	059 58689
	100	25 x 40	0.72	1270	1010	059 48101
	150	30 x 40	0.99	850	675	059 58151
	220	30 x 50	1.31	580	465	059 48221
	330	35 x 50	1.75	390	320	059 58331
400	47	22 x 30	0.30	4260	3490	059 56479
	68	25 x 30	0.41	2950	2420	059 56689
	100	25 x 40	0.55	2020	1660	059 46101
	150	25 x 50	0.78	1350	1110	059 46151
	220	30 x 50	0.94	930	760	059 46221
	330	35 x 50	1.25	620	510	059 56331

Two terminal Snap-In



Three terminal Snap-In





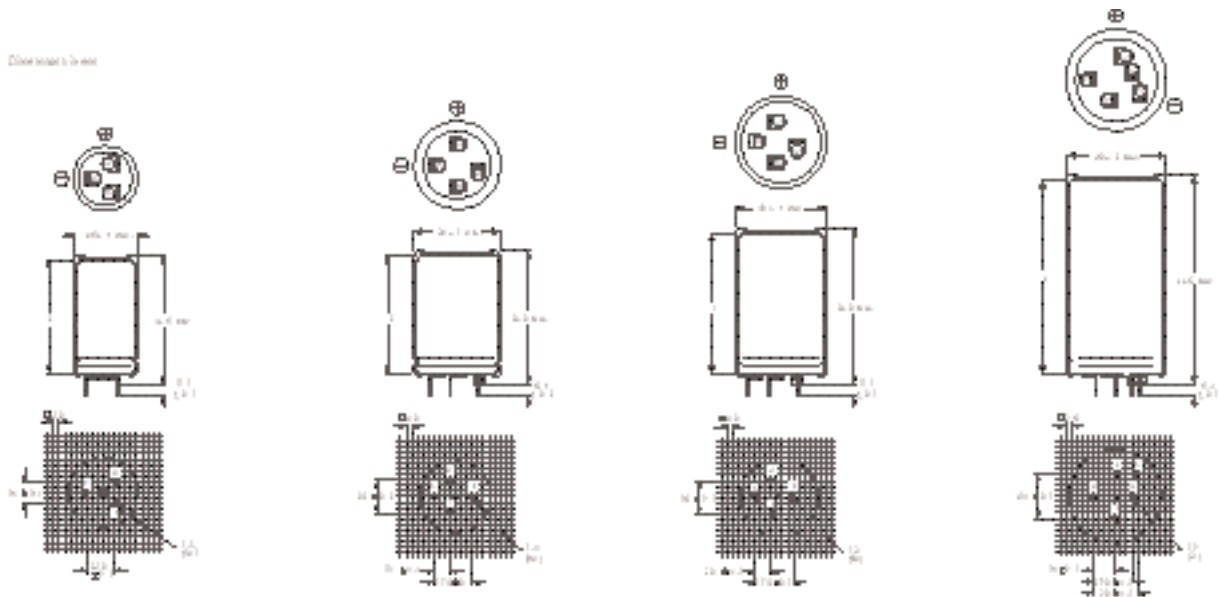
Electrolytic capacitors

Series	051, 053 PEC-PW									050, 052 PED-PW									162, 163 PLL-PW											
	Power economic PW terminals									Power EURODIN PW terminals									Power long life PW terminals											
Useful life	12 000 h/85 °C,									15 000 h/85 °C									5 000 h/105 °C											
Temp. range	-40 °C to +85 °C									-40 °C to +85 °C									-40 °C to +105 °C											
Tolerance	±20%									-10% to +30%									±20%											
C <sub>R</sub> (µF)	U <sub>R</sub> (V)									U <sub>R</sub> (V)									U <sub>R</sub> (V)											
	10	16	25	40	63	100	200	385	400	10	16	25	40	63	100	250	385	400	10	16	25	40	63	100	200	250	385	400		
33																														
47																1	1													
68								1	1							2	2									1	1			
100								2	2						1	3	3								1	2	2			
150								1	3	3						2	4	4						1	2	3	3			
220								2	4	4						3	5	6	5	6				2	3	4	4			
330								3	5/6	5/6						4	7	7						3	4	5/6	5/6			
470								4	7	7					1	5	6	8	8					1	4	5	6	7	7	
680							1	5/6	8	8					2	7	9							2	5/6	7	8	8		
1000							2	7	9	9					1	3	8							1	3	7	8	9	9	
1500							3	8						1	2	4								2	4	8	9			
2200							1	4	9					1	2	3	5	6						1	3	5	6	9		
3300					1	2	5/6							1	2	3	4	7						2	4	7				
4700				1	2	3	7							1	2	3	4	5	6	8				1	3	5	6	8		
6800		1	2	3	4	8								2	3	4	5/6	7	9				1	2	4	7	9			
10000	1	2	3	4	5/6	9								3	4	5	6	7	8				1	2	3	5	6	8		
15000	2	3	4	5/6	8									4	5/6	7	8	9					2	3	4	7	9			
22000	3	4	5	6	7	9								5	6	7	8	9					3	4	5	6	8			
33000	4	5/6	7	8										7	8	9							4	5/6	7	9				
47000	5	6	7	8	9									8	9								5	6	7	8				
68000	7	8	9											9									7	8	9					
100000	8	9																					8	9						
150000	9																						9							
220000																														
330000																														
470000																														
	preferred type <span style="background-color: #d9ead3; padding: 2px;"> </span>																													
Case dimensions	case size / nominal dimensions Ø × L (mm)																													
	1	Ø25 × 30									4	Ø35 × 40									7	Ø40 × 50								
	2	Ø25 × 40									5	Ø35 × 50									8	Ø40 × 70								
	3	Ø30 × 40									6	Ø40 × 40									9	Ø40 × 100								
Endurance IEC	5000 h/85 °C									5000 h/85 °C									2000 h/105 °C											
Features	high ripple, long life, high CV per volume									high ripple, low ESR/ESL									low ESR, high ripple current, long life											
Applications	general industrial, telecom, SMPS									industrial, telecom, SMPS									industrial, telecom, computer											



051, 053 PEC-PW series					050, 052 PED-PW series				
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	catalogue number	U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	catalogue number
(V)	(μF)			2222 ... .....	(V)	(μF)			2222 ... .....
10	10 000	25 x 30	3.10	051 54103	10	4700	25 x 30	2.40	050 54472
	22 000	30 x 40	5.00	051 54223		10 000	30 x 40	3.80	050 54103
	47 000	35 x 50	6.80	051 54473		22 000	35 x 50	5.00	050 54223
	100 000	40 x 70	9.20	051 54104		47 000	40 x 70	6.80	050 54473
16	10 000	25 x 40	4.00	051 55103	16	4700	25 x 40	3.10	050 55472
	22 000	35 x 40	5.50	051 55223		10 000	35 x 40	4.10	050 55103
	47 000	40 x 50	7.00	051 55473		22 000	40 x 50	5.00	050 55223
	100 000	40 x 100	12.00	051 55104		47 000	40 x 100	9.10	050 55473
25	4700	25 x 30	2.90	051 56472	25	2200	25 x 30	2.30	050 56222
	10 000	30 x 40	4.80	051 56103		4700	30 x 40	3.70	050 56472
	22 000	35 x 50	6.50	051 56223		10 000	35 x 50	5.00	050 56103
	47 000	40 x 70	9.20	051 56473		22 000	40 x 70	6.80	050 56223
40	4700	25 x 40	3.80	051 57472	40	2200	25 x 40	2.70	050 57222
	10 000	35 x 40	5.20	051 57103		4700	35 x 40	3.80	050 57472
	22 000	40 x 50	5.80	051 57223		10 000	40 x 50	4.90	050 57103
	47 000	40 x 100	10.40	051 57473		22 000	40 x 100	9.00	050 57223
63	2200	25 x 30	2.50	051 58222	63	1000	25 x 30	1.80	050 58102
	4700	30 x 40	4.10	051 58472		2200	30 x 40	3.10	050 58222
	10 000	35 x 50	5.40	051 58103		4700	35 x 50	4.40	050 58472
	22 000	40 x 100	10.00	051 58223		10 000	40 x 70	6.20	050 58103
100	1000	25 x 40	2.34	051 59102	100	470	25 x 30	1.40	050 59471
	2200	35 x 40	3.69	051 59222		1000	30 x 40	2.50	050 59102
	4700	40 x 50	5.21	051 59472		2200	35 x 50	3.90	050 59222
	10 000	40 x 100	9.50	051 59103		4700	40 x 70	6.20	050 59472
200	220	25 x 40	0.94	053 52221	250	100	25 x 30	0.60	052 53101
	470	35 x 40	1.68	053 52471		220	30 x 40	1.00	052 53221
	1000	40 x 50	2.86	053 52102		470	35 x 50	1.80	052 53471
	2200	40 x 100	5.20	053 52222		1000	40 x 70	3.00	052 53102
385	100	25 x 40	0.84	053 58101	385	47	25 x 30	0.50	052 58479
	220	35 x 40	1.15	053 58221		100	30 x 40	0.84	052 58101
	470	40 x 50	1.96	053 58471		220	35 x 50	1.48	052 58221
	1000	40 x 100	3.70	053 58102		470	40 x 70	2.70	052 58471
400	100	25 x 40	0.73	053 56101	400	47	25 x 30	0.47	052 56479
	220	35 x 40	1.28	053 56221		100	30 x 40	0.84	052 56101
	470	40 x 50	2.12	053 56471		220	35 x 50	1.41	052 56221
	1000	40 x 100	4.05	053 56102		470	40 x 70	2.54	052 56471

Dimension in mm

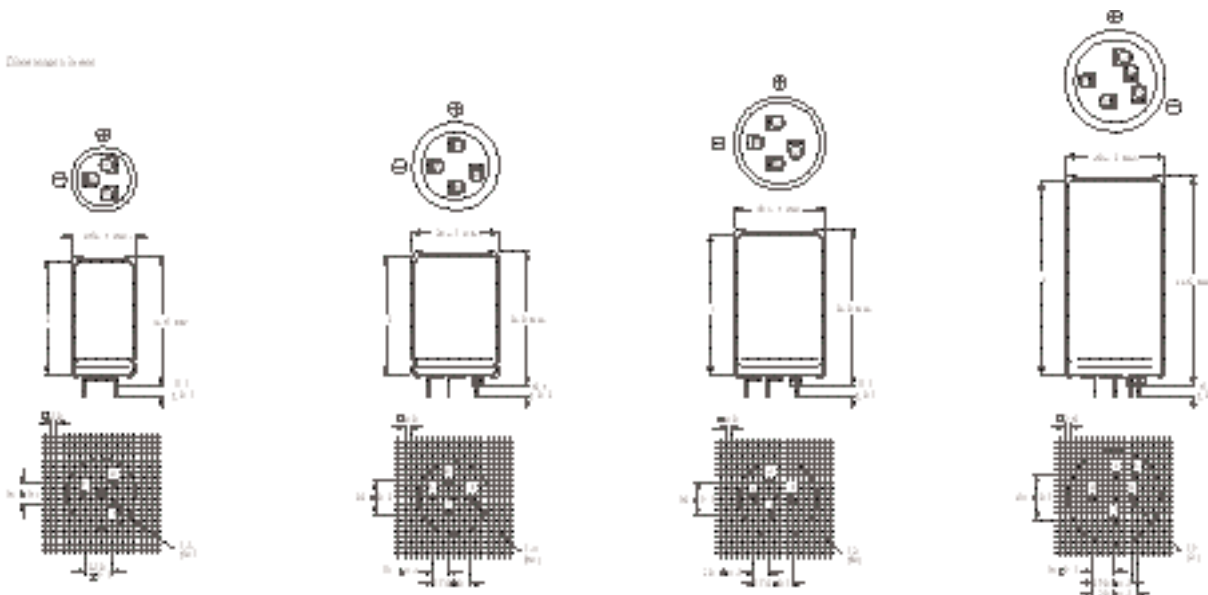


Technical drawing details of the capacitor terminals and the printed wiring terminals



162, 163 PLL-PW series				
$U_R$	$C_R$ 100 Hz	nominal case size $\varnothing D \times L$ (mm)	$I_R$ 100 Hz 105 °C (A)	catalogue number
(V)	( $\mu F$ )			2222 ... ..
10	10 000	25 x 30	3.17	162 54103
	22 000	30 x 40	5.05	162 54223
	47 000	35 x 50	6.19	162 54473
	100 000	40 x 70	10.0	162 54104
16	10 000	25 x 40	4.09	162 55103
	22 000	35 x 40	5.53	162 55223
	47 000	40 x 50	7.46	162 55473
	100 000	40 x 100	12.90	162 55104
25	4700	25 x 30	2.94	162 56472
	10 000	30 x 40	4.81	162 56103
	22 000	35 x 50	5.98	162 56223
	47 000	40 x 70	9.43	162 56473
40	2200	25 x 30	2.36	162 57222
	4700	30 x 40	3.93	162 57472
	10 000	35 x 50	5.03	162 57103
	22 000	40 x 70	8.34	162 57223
63	1000	25 x 30	1.55	162 58102
	2200	30 x 40	2.72	162 58222
	4700	35 x 50	4.09	162 58472
	10 000	40 x 70	6.86	162 58103
100	470	25 x 30	1.42	162 59471
	1000	30 x 40	2.48	162 59102
	2200	35 x 50	3.79	162 59222
	4700	40 x 70	6.49	162 59472
200	220	25 x 40	0.96	163 52221
	470	35 x 40	1.66	163 52471
	1000	40 x 50	2.71	163 52102
	2200	40 x 100	5.24	163 52222
250	100	25 x 30	0.67	163 53101
	220	30 x 40	1.28	163 53221
	470	35 x 50	2.01	163 53471
	1000	40 x 70	3.58	163 53102
385	100	25 x 30	0.82	163 58101
	220	35 x 40	1.44	163 58221
	470	40 x 50	2.37	163 58471
	1000	40 x 100	4.54	163 58102
400	100	25 x 40	0.53	163 56101
	220	35 x 40	0.94	163 56221
	470	40 x 50	1.59	163 56471
	1000	40 x 100	3.07	163 56102

Dimension in mm



mounting hole diameter is 1.5 mm



Series	111 PER-ST							112 PER-ST						
Useful life	10000 h/85°C							5000 h/85 °C						
Temp. range	-40 to +85 °C							-40 to +85 °C						
Tolerance	-10 to +30%							-10 to +30%						
C <sub>R</sub> (µF)	U <sub>R</sub> (V)							U <sub>R</sub> (V)						
	10	16	25	40	50	63	100	160	200	250	350	385	400	450
150														35 x 50
220											35 x 50	35 x 50	35 x 50	35 x 60
330										35 x 50	35 x 60	35 x 60	35 x 80	35 x 80
470								35 x 50	35 x 50	35 x 60	35 x 80	35 x 105	35 x 105	35 x 105
680								35 x 60	35 x 60	35 x 80	35 x 105	35 x 114	50 x 80	50 x 80
1000								35 x 80	35 x 105	35 x 105	50 x 80	50 x 80	50 x 105	50 x 105
1500								35 x 105	50 x 80	50 x 80	50 x 105	50 x 105	50 x 114	65 x 80
2200							35 x 50	50 x 80	50 x 80	50 x 105	65 x 80	65 x 105	65 x 105	65 x 105
3300						35 x 50	35 x 80	50 x 105	50 x 114	65 x 105	65 x 114	76 x 105	76 x 105	76 x 114
4700					35 x 50	35 x 60	35 x 105		65 x 80	65 x 105	65 x 114	76 x 144	76 x 144	76 x 144
6800				35 x 50	35 x 60	35 x 80	50 x 80	65 x 105	76 x 105	76 x 144				
10000			35 x 50	35 x 60	35 x 80	35 x 105	50 x 105		76 x 114	76 x 144				
15000	35 x 50	35 x 50	35 x 60	35 x 105	35 x 105	50 x 80	65 x 80							
22000	35 x 60	35 x 80	35 x 105	50 x 80	50 x 80	50 x 105	65 x 114							
33000	35 x 80	35 x 105	50 x 80	50 x 105	50 x 105	65 x 105	76 x 114							
47000	35 x 105	35 x 114	50 x 80	50 x 114	65 x 105	65 x 114	76 x 144							
68000	50 x 80	50 x 80	50 x 105	65 x 105	65 x 114	76 x 144								
100000	50 x 105	50 x 114	65 x 105	76 x 105	76 x 144									
150000	65 x 80	65 x 105	76 x 105	76 x 144										
220000	65 x 105	76 x 105	76 x 144											
330000	76 x 114	76 x 144												
Features	power, output (filter) current							power, output (filter) current						
Applications	industrial systems and audio power supplies							industrial systems and audio power supplies						

Electrolytic capacitors



111 PER-ST series							112 PER-ST series								
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅D x L	I <sub>R</sub> 100 Hz 85 °C	ESR 100 Hz	Z MAX. 10 kHz	catalogue number (note1)	U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅D x L	I <sub>R</sub> 100 Hz 85 °C	I <sub>L5</sub> 5 min	ESR 100 Hz	tan δ MAX. 100 Hz	Z MAX. 10 kHz	catalogue number (note1)
(V)	(μF)	(mm)	(A)	(mΩ)	(mΩ)	2222 ... ..	(V)	(μF)	(mm)	(A)	(mA)	(mΩ)		(mΩ)	2251 ... ..
10	33000	35 x 80	5.9	35	30	111 14333	250	680	35 x 80	2.7	2.55	235	0.10	95	112 13681
	47000	35 x 105	7.3	25	25	111 14473		1000	35 x 105	3.4	3.75	160	0.10	65	112 13102
	68000	50 x 80	9.6	20	20	111 14683		1500	50 x 80	5.1	5.63	105	0.10	45	112 13152
16	22000	35 x 80	6.0	40	35	111 15223	250	6800	76 x 144	15.1	25.50	25	0.10	10	112 13682
	33000	35 x 105	7.4	25	25	111 15333		350	470	35 x 80	2.3	2.47	375	0.11	190
	68000	50 x 80	9.2	20	15	111 15683	680		35 x 105	2.8	3.57	260	0.11	130	112 15681
	220000	76 x 105	21.5	10	10	111 15224	4700		76 x 144	12.0	24.68	35	0.11	25	112 15472
	330000	76 x 144	26.6	10	10	111 15334	400	330	35 x 80	1.8	1.98	580	0.12	360	112 16331
25	22000	35 x 105	7.3	30	25	111 16223		470	35 x 105	2.2	2.82	405	0.12	255	112 16471
	47000	50 x 80	9.0	20	15	111 16473		680	50 x 80	3.4	4.08	280	0.12	180	112 16681
	150000	76 x 105	20.7	10	10	111 16154		3300	76 x 105	10.3	19.80	65	0.13	40	112 16332
220000	76 x 144	25.5	10	10	111 16224	4700		76 x 144	12.8	28.20	45	0.13	30	112 16472	
40	15000	35 x 105	7.0	30	25	111 17153	450	330	35 x 80	1.9	2.23	485	0.10	200	112 17331
	22000	50 x 80	9.3	25	20	111 17223		470	35 x 105	2.3	3.17	340	0.10	140	112 17471
	100000	76 x 105	19.9	10	10	111 17104		680	50 x 80	3.4	4.59	235	0.10	100	112 17681
	150000	76 x 144	24.5	10	10	111 17154		3300	76 x 144	10.6	22.28	50	0.10	25	112 17332
63	6800	35 x 80	5.1	45	30	111 18682	Note 1: Catalogue number applies to the ST version; for STB version (not preferred) replace 8th digit by '5' (2222 111/112 5...).								
	10000	35 x 105	6.3	30	25	111 18103									
	15000	50 x 80	8.4	25	15	111 18153									
	68000	76 x 144	23.4	10	10	111 18683									
100	3300	35 x 80	3.9	60	35	111 19332									
	4700	35 x 105	4.8	45	25	111 19472									
	6800	50 x 80	6.8	35	20	111 19682									
	47000	76 x 144	21.0	10	10	111 19473									



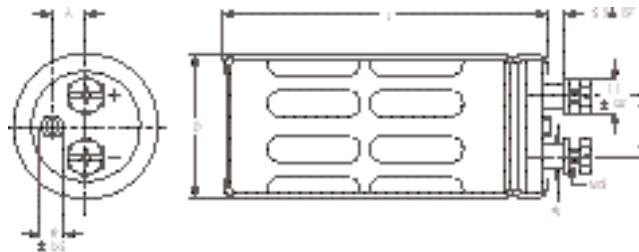


Series	<b>154,155 PEC-ST/STB</b> Power Economic ST/STB terminals										<b>114,115 PED-ST/STB</b> Power EURODIN ST/STB terminals									
Useful life	12000 h/85 °C										20000 h/85 °C (400 V: 12 000 h/85 °C)									
Temp. range	-40 °C to +85 °C										-40 °C to +85 °C									
Tolerance	±20%										-10% to +30%									
C <sub>R</sub> (µF)	U <sub>R</sub> (V)										U <sub>R</sub> (V)									
	10	16	25	40	63	100	250	350	385	400	10	16	25	40	63	100	250	350	385	400
400																				
33																				
47																				
68																				
100																				
150																			10	10
220									10	10								10	11	11
330									10	11	11						10	11	12a	12a
470									10	11	11	11					11	12a	14	14
680									11	12a	12a	12a					12a	14	15a	15a
1000									12a	14	14	14				10	14	15a	16a	16a
1500									14	15a	15a	15a				10	15a	16a	16a	16a
2200									15a	16a	16a	16a				10	11	16a	16a	17
3300						10	16a	16a	17	17					10	10	12a	16a	17	
4700						11	16a								10	10	11	14	17	
6800					10	12a	17								10	11	12a	15a		
10000					11	14								10	11	12a	14	16a		
15000				10	12a	15a							10	11	12a	14	15a	16a		
22000			10	11	14	16a							11	12a	14	15a	16a	17		
33000		10	11	14	15a	17							12a	14	15a	16a	16a			
47000	10	11	12a	14	16a								14	15a	16a	16a	17			
68000	11	12a	14	15a	17								15a	16a	16a	17				
100000	12a	14	15a	16a									16a	16a	17					
150000	14	15a	16a	17									16a	17						
220000	15a	16a	17										17							
330000	16a	17																		
470000	17																			
Case dimensions	preferred type <span style="background-color: #d9ead3;"> </span> case size / nominal dimensions Ø × L (mm)																			
	10 Ø35 × 60					12a Ø35 × 105					15a Ø50 × 105									
	11 Ø35 × 80					14 Ø50 × 80					16a Ø65 × 105									
											17 Ø75 × 105									
Endurance IEC	5000 h/85 °C										8000 h/85 °C (400 V: 5000 h/85 °C)									
Features	high ripple, high CV per volume										extremely low ESR, high ripple									
Applications	industrial, SMPS										industrial, SMPS									
Note	explanation of terms: ST = Screw terminal STB = Screw terminal, Bolt																			

Electrolytic capacitors



154, 155 PEC-ST series							114, 115 PED-ST series						
U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR TYP. 100 Hz (mΩ)	Z MAX. 20 kHz (mΩ)	catalogue number 2222 ... ..	U <sub>R</sub>	C <sub>R</sub> 100 Hz	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR TYP. 100 Hz (mΩ)	Z MAX. 20 kHz (mΩ)	catalogue number 2222 ... ..
(V)	(μF)						(V)	(μF)					
10	47000	35 x 60	8.4	14	16.5	154 14473	10	22000	35 x 60	7.5	14.0	14	114 14223
	100000	35 x 105	10.7	10.5	12	154 14104		47000	50 x 80	14.0	7.5	9.5	114 14473
	220000	50 x 105	16.5	6.5	10.5	154 14224		100000	65 x 105	30.0	3.5	5	114 14104
	470000	75 x 105	22.6	5.5	10.5	154 14474		220000	75 x 105	37.0	2.0	4	114 14224
16	47000	35 x 80	8.7	11	13.5	154 15473	16	10000	35 x 60	6.0	22.0	20	114 15103
	100000	50 x 80	13.2	8	12	154 15104		22000	35 x 105	10.0	11.0	10	114 15223
	220000	65 x 105	20.8	5.5	10.5	154 15224		47000	50 x 105	18.0	5.5	8	114 15473
25	22000	35 x 60	8.1	12	15	154 16223	25	100000	65 x 105	28.0	3.0	5	114 15104
	47000	35 x 105	12.2	8	12	154 16473		4700	35 x 60	5.2	30.0	23	114 16472
	100000	50 x 105	15.9	7	12	154 16104		10000	35 x 80	6.7	18.0	15	114 16103
	220000	75 x 105	22.6	5.5	10.5	154 16224		22000	50 x 80	12.5	8.5	9.5	114 16223
40	22000	35 x 80	9.8	11	13.5	154 17223	40	47000	65 x 105	27.0	4.0	5	114 16473
	47000	50 x 80	11.8	10	13.5	154 17473		100000	75 x 105	37.0	2.5	4	114 16104
	100000	65 x 105	17.3	9	12	154 17104		4700	35 x 60	4.5	35.0	33	114 17472
63	10000	35 x 80	8.6	12.5	15	154 18103	63	10000	35 x 105	7.5	17.0	17	114 17103
	22000	50 x 80	11.8	10	13.5	154 18223		22000	50 x 105	15.0	8.0	10.5	114 17223
	47000	65 x 105	17.3	9	12	154 18473		47000	65 x 105	22.0	4.5	6	114 17473
100	4700	35 x 80	5.3	35	40	154 19472	100	2200	35 x 60	3.7	39.0	33	114 18222
	10000	50 x 80	8.9	18	20	154 19103		4700	35 x 80	5.2	23.0	21	114 18472
	22000	65 x 105	18.2	7.5	9	154 19223		10000	50 x 80	9.5	12.0	14	114 18103
250	470	35 x 60	1.6	360	450	155 13471	250	22000	65 x 105	21.0	5.0	6	114 18223
	1000	35 x 105	2.9	175	210	155 13102		47000	75 x 105	30.0	3.0	4.5	114 18473
	2200	50 x 105	5.3	80	105	155 13222		1000	35 x 60	3.0	85.0	67	114 19102
	4700	65 x 105	8.2	44	60	155 13472		2200	35 x 60	4.6	45.0	42	114 19222
350	470	35 x 80	2.1	260	335	155 15471	350	4700	50 x 80	7.4	27.0	25	114 19472
	1000	50 x 80	3.7	125	170	155 15102		10000	65 x 105	15.0	11.0	11	114 19103
	2200	65 x 105	6.5	70	95	155 15222		22000	75 x 105	20.5	7.0	8	114 19223
385	220	35 x 60	1.0	650	955	155 18221	385	470	35 x 80	2.5	250.0	375	115 13471
	470	35 x 80	1.8	300	445	155 18471		1000	50 x 80	4.2	110.0	130	115 13102
	1000	50 x 80	3.4	125	210	155 18102		2200	65 x 105	8.8	45.0	60	115 13222
	2200	65 x 105	6.5	58	95	155 18222		4700	75 x 105	14.0	25.0	40	115 13472
400	220	35 x 60	1.0	650	995	155 16221	400	220	35 x 60	1.6	400.0	550	115 15221
	470	35 x 80	1.8	300	445	155 16471		470	35 x 105	3.1	200.0	260	115 15471
	1000	50 x 80	3.4	125	210	155 16102		10000	50 x 105	5.4	65.0	100	115 15102
	2200	65 x 105	6.5	58	95	155 16222		2200	65 x 105	8.1	55.0	80	115 15222
400	220	35 x 80	1.4	520.0	630	115 18221	400	470	50 x 80	2.7	200.0	300	115 18471
	470	50 x 80	2.7	200.0	300	115 18471		1000	65 x 105	5.1	95.0	125	115 18102
	1000	65 x 105	5.1	95.0	125	115 18102		2200	75 x 105	7.3	55.0	75	115 18222
	2200	75 x 105	7.3	55.0	75	115 18222		220	35 x 80	1.4	520.0	630	115 16221
400	470	50 x 80	2.7	200.0	300	115 16471	400	470	50 x 80	2.7	200.0	300	115 16471
	1000	65 x 105	5.1	95.0	125	115 16102		1000	65 x 105	5.1	95.0	125	115 16102
	2200	75 x 105	7.3	55.0	75	115 16222		2200	75 x 105	7.3	55.0	75	115 16222





Series	105 PLL-ST						125 PHT-ST				
Useful life	5000 h/105 °C (100 V = 3500 hours)						3000 h/125 °C				
Temp. range	-40 TO +105 °C						-40 TO +125 °C				
Tolerance	±20%						±20%				
C <sub>R</sub> (µF)	U <sub>R</sub> (V)						U <sub>R</sub> (V)				
	10	16	25	40	63	100	16	25	40	63	
2200						35 x 60				35 x 60	
3300					35 x 60	35 x 80				35 x 80	
4700					35 x 60	35 x 105			35 x 60	35 x 80	
6800					35 x 60	50 x 80		35 x 60	35 x 80	35 x 105	
10000				35 x 60	35 x 80	50 x 80	35 x 60	35 x 80	35 x 80	50 x 80	
15000			35 x 60	35 x 80	50 x 80	65 x 105	35 x 80	35 x 80	35 x 105	50 x 105	
22000			35 x 80	35 x 105	50 x 80	65 x 105	35 x 80	35 x 105	50 x 80	76 x 105	
33000		35 x 60	35 x 105	50 x 80	65 x 105	75 x 105	35 x 105	50 x 80	50 x 105	76 x 105	
47000	35 x 60	35 x 80	50 x 80	50 x 105	65 x 105		50 x 80	50 x 105	76 x 105	76 x 144	
68000	35 x 80	50 x 80	50 x 80	65 x 105	75 x 105		50 x 105	76 x 105	76 x 105		
100000	50 x 80	50 x 80	65 x 105	65 x 105			76 x 105	76 x 105	76 x 144		
150000	50 x 80	65 x 105	65 x 105	75 x 105			76 x 105	76 x 144			
220000	65 x 105	65 x 105	75 x 105				76 x 144				
330000	65 x 105	75 x 105									
470000	75 x 105										
	preferred type										
Features	power, performance style						power, low voltage				
Applications	industrial systems and audio power supplies						industrial systems and audio power supplies				

Electrolytic capacitors



## 105 PLL-ST series

$U_R$ (V)	$C_R$ 100 Hz ( $\mu\text{F}$ )	nominal case size $\varnothing D \times L$ (mm)	$I_R$ 100 Hz 105 °C (A)	$I_{L5}$ 5 min (mA)	ESR Typ. 100 Hz (m $\Omega$ )	ESR MAX. 100 Hz (m $\Omega$ )	$\tan \delta$ MAX. 100 Hz	$Z$ MAX. 20 Hz (m $\Omega$ )	catalogue number (note1) 2222 ... ..
10	68000	35 x 80	8.3	1.2	14	22	0.78	22	105 14683
	150000	50 x 80	10.2	2.7	10	14	1.15	14	105 14154
	330000	65 x 105	23	6	3	5	0.85	5	105 14334
	470000	75 x 105	31	8.4	2	4	0.9	4	105 14474
16	47000	35 x 80	8.2	1.35	15	22	0.57	22	105 15473
	100000	50 x 80	10.1	3	10	14	0.77	14	105 15104
	220000	65 x 105	23	6.3	3	5	0.56	5	105 15224
	330000	75 x 105	31	9.6	2	4	0.63	4	105 15334
25	33000	35 x 105	9.2	1.5	14	20	0.36	18	105 16333
	68000	50 x 80	9.8	3	10	16	0.57	14	105 16683
	150000	65 x 105	22	6.9	3	5	0.38	5	105 16154
	220000	75 x 105	30	9.9	2	4	0.42	4	105 16224
40	22000	35 x 105	9.1	1.5	13	19	0.23	17	105 17223
	33000	50 x 80	9.3	2.4	11	17	0.3	16	105 17333
	100000	65 x 105	21	7.2	4	6	0.32	5	105 17104
	150000	75 x 105	29	10.8	2	4	0.29	4	105 17154
63	10000	35 x 80	7.3	1.2	17	25	0.13	22	105 18103
	22000	50 x 80	9.1	2.4	11	17	0.2	14	105 18223
	47000	65 x 105	20	5.4	4	6	0.15	5	105 18473
	68000	75 x 105	27	7.8	2	4	0.13	4	105 18683
100	4700	35 x 105	6.5	0.9	26	40	0.1	31	105 19472
	10000	50 x 80	7.8	1.8	17	25	0.13	20	105 19103
	22000	65 x 105	17	3.9	6	10	0.11	8	105 19223
	33000	75 x 105	23.0	6	4	6	0.11	5	105 19333

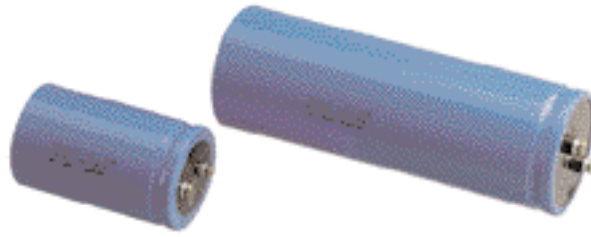
Note 1: Catalogue number applies to the ST version; for STB version (not preferred) replace 8th digit by '5' (2222 105/106 5....).

## 125 PHT-ST series

$U_R$ (V)	$C_R$ 100 Hz ( $\mu\text{F}$ )	nominal case size $\varnothing D \times L$ (mm)	$I_R$ 100 Hz 125 °C (A)	$I_R$ >2 Hz 85 °C (A)	$I_{L5}$ 5 min (mA)	ESR 100 Hz (m $\Omega$ )	$\tan \delta$ MAX. 100 Hz	$Z$ MAX. 100 Hz (m $\Omega$ )	catalogue number 20 Hz (note1) 2222 ... ..
16	33000	35 x 105	8.2	28	1.06	11	0.20	9	note 2
	47000	50 x 80	8.7	31	1.51	12	0.30	9	note 2
	68000	50 x 105	14.1	49	2.18	6	0.24	6	note 2
25	22000	35 x 105	9.0	27	1.10	13	0.15	10	note 2
	33000	50 x 80	8.3	30	1.65	12	0.21	9	note 2
	47000	50 x 105	13.7	47	2.35	6	0.16	5	note 2
40	15000	35 x 105	8.2	25	1.20	14	0.11	9	note 2
	33000	50 x 105	12.3	43	2.64	7	0.13	6	note 2
	47000	76 x 105	16.0	50	3.78	6	0.14	4	note 2
63	6800	35 x 105	7.4	23	0.86	17	0.06	9	note 2
	10000	50 x 80	7.7	25	1.26	16	0.08	10	note 2
	15000	50 x 105	11.4	39	1.89	8	0.07	6	note 2

Note 1: Catalogue number applies to the ST version; for STB version (not preferred) replace 8th digit by '5' (2222 125 5....).

Note 2: Types in development, for current status please check our website: [www.bccomponents.com](http://www.bccomponents.com)



Extended voltage													
Series	<b>086, 087 PS-ST</b> Power standard screw terminal. Also see 3186 series page 172												
Useful life	< 100 V: 5000 h/85 °C			100 V: 3000 h/85 °C									
Temp. range	-40 °C to +85 °C												
Tolerance	-10% to +30%; -10% to +50%; ±20%												
C <sub>R</sub> (µF)	U <sub>R</sub> (V)												
	16	25	40	50	63	75	100	200	250	350	400	450	500
220													35 x 54
270													
330											35 x 54		
390										35 x 54		35 x 80	
470													
560											35 x 80	35 x 105	
680									35 x 54	35 x 80			
820											35 x 105	50 x 80	50 x 105
1000								35 x 54		35 x 105			
1200									35 x 80		50 x 80	50 x 105	50 x 130
1500								35 x 80		50 x 80		50 x 130	
1800									35 x 105		50 x 105	50 x 143	
2200								35 x 105		50 x 105	50 x 130	63.5 x 105	63.5 x 130
2700							35 x 54		50 x 80	63.5 x 105	63.5 x 105	63.5 x 130	
3300							35 x 80			50 x 143	63.5 x 130	76 x 105	76 x 143
3900						35 x 54		50 x 80	50 x 105	63.5 x 130	76 x 105	76 x 118	
4700					35 x 54				50 x 130	76 x 105	76 x 118	76 x 143	
5600							35 x 105	50 x 105	50 x 143	76 x 118	76 x 143		
6800						35 x 80		50 x 130	63.5 x 105	76 x 143			
8200				35 x 54	35 x 80			50 x 143	63.5 x 130			76 x 220	
10000			35 x 54			35 x 105	50 x 80	63.5 x 105	76 x 105		76 x 220		
12000				35 x 80	35 x 105			76 x 105	76 x 118	76 x 220			
15000			35 x 80			50 x 80	50 x 105	76 x 118	76 x 143				
18000		35 x 54		35 x 105	50 x 80		50 x 130						
22000	35 x 54		35 x 105			50 x 105	63.5 x 105	76 x 143	76 x 220				
27000		35 x 80		50 x 80	50 x 105	50 x 118	63.5 x 130						
33000					50 x 118	63.5 x 105	76 x 105	76 x 220					
39000	35 x 80	35 x 105	50 x 80		50 x 143	63.5 x 118	76 x 118						
47000				50 x 105	63.5 x 105	76 x 105							
56000	35 x 105		50 x 105	50 x 118	63.5 x 118	76 x 118	76 x 143						
68000		50 x 80	50 x 118	63.5 x 105	76 x 105								
82000	50 x 80		50 x 143	63.5 x 118	76 x 118	76 x 143	76 x 220						
100000		50 x 105	63.5 x 105	76 x 105	76 x 143								
120000	50 x 105	50 x 118	63.5 x 118	76 x 118		76 x 220							
150000	50 x 118	63.5 x 105	76 x 105	76 x 143	76 x 220								
180000	50 x 143	63.5 x 118	76 x 118										
220000	63.5 x 105	76 x 105	76 x 143	76 x 220									
270000	63.5 x 118	76 x 118											
330000	76 x 105	76 x 143	76 x 220										
390000	76 x 118												
470000	76 x 143												
560000		76 x 220											
820000	76 x 220												
Endurance IEC	preferred type <span style="background-color: #c8e6c9;">        </span> 1000 h/85 °C												
Features	high ripple current capability, very high CV per volume												
Applications	industrial, welding, motor control devices, uninterruptable power supplies												

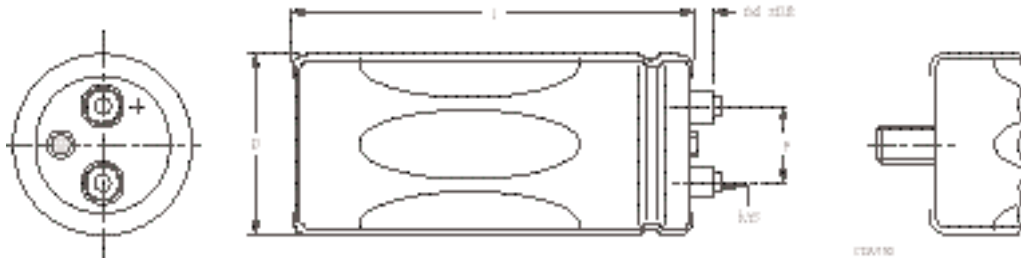
Electrolytic capacitors



**086, 087 PS-ST series**

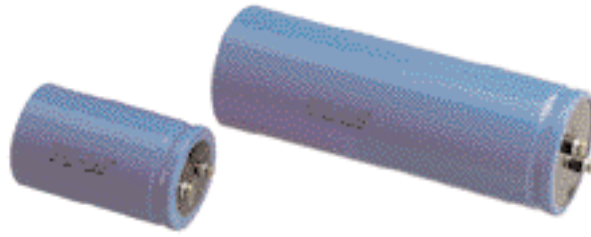
U <sub>R</sub> (V)	C <sub>R</sub> 100 Hz (µF)	nominal case size ∅D x L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	ESR MAX. 100 Hz (mΩ)	catalogue number 2222 ... ..
16	82 000	50 x 80	17.0	6	086 15823
	120 000	50 x 150	21.0	5	086 15124
	220 000	63.5 x 105	27.0	4	086 15224
	330 000	76 x 105	32.0	4	086 25334
	470 000	76 x 143	40.0	3	086 15474
40	39 000	50 x 80	15.0	7	086 17393
	56 000	50 x 105	19.0	6	086 17563
	100 000	63.5 x 105	24.0	5	086 17104
	150 000	76 x 105	29.0	4	086 27154
	220 000	76 x 143	37.0	3	086 17224
63	18 000	50 x 80	10.0	15	086 18183
	27 000	50 x 105	13.0	11	086 18273
	47 000	63.5 x 105	18.0	8	086 18473
	68 000	76 x 105	23.0	6	086 28683
	100 000	76 x 143	30.0	5	086 18104
100	10 000	50 x 80	5.5	52	086 19103
	15 000	50 x 105	7.3	37	086 19153
	22 000	63.5 x 105	11.0	19	086 29223
	33 000	76 x 105	14.0	14	086 29333
	56 000	76 x 143	22.0	8	086 19563
250	2700	50 x 80	4.4	67	087 13272
	3900	50 x 105	7.9	27	087 13392
	6800	63.5 x 105	10.0	24	087 13682
	10 000	76 x 105	11.0	25	087 23103
	15 000	76 x 143	14.0	19	087 13153
400	1200	50 x 80	3.7	95	087 16152
	1800	50 x 105	5.5	59	087 16182
	2700	63.5 x 105	7.3	48	087 26272
	3900	76 x 105	9.4	37	087 26392
	5600	76 x 143	11.0	28	087 16562
450	820	50 x 80	3.0	145	087 17821
	1200	50 x 105	4.6	85	087 17122
	2200	63.5 x 105	6.7	53	087 17222
	3300	76 x 105	9.5	35	087 27332
	4700	76 x 143	11.0	31	087 17472
500	820	50 x 105	3.4	132	087 18821
	1200	50 x 130	4.6	90	087 18122
	2200	63.5 x 130	6.6	59	087 18222
	3300	76 x 143	8.6	43	087 18332

capacitors  
Electrolytic





Series	<b>NAFTA 3199, 2251 006 PPS-VST</b> Power performance style								<b>NAFTA 3191, 2251 004 POC-ST</b> Output capacitors						
Useful life	see tables in technical notes section of BC01								see tables in technical notes section of BC01						
Temp. range	-55 °C to 85 °C								-40 °C to 85 °C						
Tolerance	-10% to +50%; -10% to +30%;								±20%						
Case codes	REPRESENTATIVE CAPACITANCE RATINGS BY CASE SIZE AT RATED WORKING VOLTAGE (µF)														
Case size (*)	7.5 VDC	10 VDC	16.5 VDC	25 VDC	40 VDC	50 VDC	63 VDC	75 VDC	7.5 VDC	10 VDC	16 VDC	20 VDC	28 VDC	35 VDC	55 VDC
BA (1.375x2.125)	39000	33000	22000	18000	10000	8200	4700	3900	15000	16000	10000	8800	6300	4500	2800
BB (1.375x2.625)	47000	39000	27000		12000	10000	5600	4700	21000	19000	14000	12000	8800	6300	3900
BC (1.375x3.125)	56000	56000	39000	27000	15000	12000	8200	6800	27000	25000	18000	16000	11000	8100	5000
BD (1.375x3.625)	82000	68000	47000	33000	18000	15000	10000	8200	33000	31000	22000	20000	14000	10000	6200
BE (1.375x4.125)		82000	56000	39000	22000	18000	12000	10000	39000	38000	26000	22000	16000	12000	7300
BF (1.375x4.625)	100000			47000	27000	22000			45000	44000	30000	27000	19000	14000	8400
BG (1.375x5.125)	120000	100000	68000	47000			15000	12000	51000	51000	34000	30000	22000	16000	9500
BH (1.375x5.625)			82000	56000	33000	27000	18000	12000	57000	57000	38000	34000	24000	17000	10000
DA (1.750x2.125)	68000	56000	39000	33000	18000	15000	8200	6800							
DB (1.750x2.625)	82000	68000	47000	39000	22000	18000	10000	8200							
DC (1.750x3.125)	120000	100000	68000	47000	27000	22000	15000	12000							
DD (1.750x3.625)	150000	120000	82000	56000	39000	27000	18000	15000							
DE (1.750x4.125)	180000	150000	100000	68000	47000	33000	22000	18000							
DF (1.750x4.625)			120000	82000		39000									
DG (1.750x5.125)	220000	180000		100000	56000	47000	27000	22000							
DH (1.750x5.625)		220000	150000		68000		33000	22000							
EA (2.000x2.125)	100000	82000	56000	39000	22000	18000	12000	10000	48000	38000	26000	23000	15000	11000	7300
EB (2.000x2.625)	120000	100000	68000	47000	27000	22000	15000	12000	58000	46000	32000	27000	18000	13000	8800
EC (2.000x3.125)	150000	120000	82000	68000	39000	27000	18000	15000	76000	61000	43000	37000	24000	17000	11000
ED (2.000x3.625)	180000	150000	100000	82000	47000	39000	22000	18000	95000	76000	53000	46000	30000	22000	14000
EE (2.000x4.125)	220000	180000	120000	100000	56000	47000	27000	22000	110000	92000	64000	55000	36000	26000	17000
EF (2.000x4.625)	270000	220000	150000	120000	68000	56000	33000	27000	130000	10000	75000	64000	42000	31000	20000
EG (2.000x5.125)		270000	180000		82000		39000		150000	120000	86000	74000	48000	35000	23000
EH (2.000x5.625)	330000			150000		68000		33000	170000	130000	96000	83000	54000	40000	26000
FB (2.500x2.625)	180000	150000	100000	82000	47000	33000	22000	18000							
FC (2.500x3.125)	220000	220000	150000	100000	68000	47000	27000	22000							
FD (2.500x3.625)	330000	270000	180000	120000	82000	56000	39000	27000							
FE (2.500x4.125)	390000	330000	220000	150000	100000	68000	47000	33000							
FF (2.500x4.625)		390000	270000	180000	120000	82000	56000	39000							
FG (2.500x5.125)	470000			220000				47000							
FH (2.500x5.625)	560000	470000	330000		150000	100000	68000	56000							
GC (3.000x3.125)	390000	330000	220000	150000	100000	68000	47000	33000							
GD (3.000x3.625)	470000	390000	270000	180000	120000	82000	56000	39000							
GE (3.000x4.125)	560000	470000	330000	220000	150000	100000	68000	47000							
GF (3.000x4.625)	680000	560000	390000	270000		120000	82000	56000							
GG (3.000x5.125)				330000	180000			68000							
GH (3.000x5.625)	820000	680000	470000		220000	150000	100000	82000							
GN (3.000x8.625)	1200000	1200000	820000	560000	330000	220000	150000	120000							
	preferred type														
Endurance	5000 h / 85 °C								1500 h / 85 °C						
Features	very long life, low ESR								symmetrical ESR						
Applications	industrial, audio power supplies								power supplies						

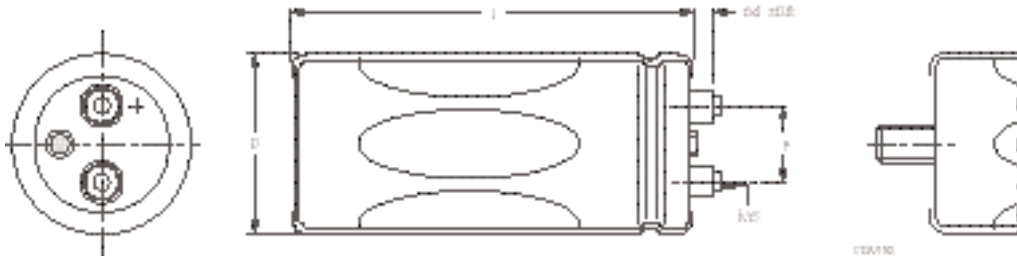


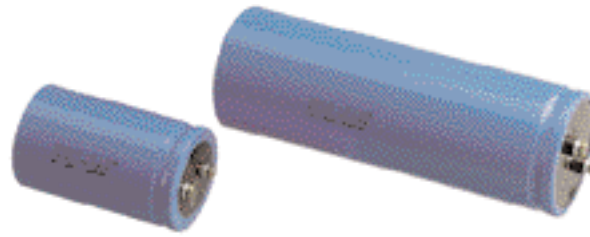
Extended voltage												
Series	<b>088, 089 PHC-ST</b> Power high current screw terminal. Also see 3188 series page 119											
Useful life	< 250 V: 5000 h/105 °C ≥250 V: 4000 h/85 °C											
Temp. range	< 250 V: -40 °C to +105 °C; ≥ 250 V: -40 °C to +85 °C											
Tolerance	-10% to +30%; -10% to +50%; ±20%											
C <sub>R</sub> (µF)	U <sub>R</sub> (V)											
	16	25	40	50	63	75	100	200	250	350	400	450
220												
270											35 x 54	
330										35 x 54		
390												
470									35 x 54		35 x 80	
560										35 x 80		
680								35 x 54			35 x 105	
820									35 x 80	35 x 105		
1000											50 x 80	50 x 105
1200								35 x 80	35 x 105	50 x 80		
1500											50 x 105	50 x 130
1800							35 x 54	35 x 105	50 x 80	50 x 105	50 x 118	
2200										50 x 118	63.5 x 105	63.5 x 118
2700						35 x 54	35 x 80	50 x 80	50 x 105	63.5 x 105	63.5 x 130	
3300										50 x 118	63.5 x 130	76 x 105
3900							35 x 105	50 x 105	50 x 143	76 x 105	76 x 118	
4700					35 x 54	35 x 80		50 x 118	63.5 x 105	76 x 118	76 x 143	76 x 143
5600								50 x 143	63.5 x 130	76 x 143		
6800				35 x 54	35 x 80	35 x 105	50 x 80	63.5 x 105	76 x 105			
8200			35 x 54					63.5 x 130	76 x 118		76 x 220	
10 000				35 x 80	35 x 105		50 x 105	76 x 105	76 x 143	76 x 220		
12 000		35 x 54	35 x 80				50 x 80	50 x 118	76 x 118	76 x 220		
15 000				35 x 105				50 x 143	76 x 143			
18 000				35 x 105	50 x 80	50 x 105	63.5 x 105	76 x 220				
22 000	35 x 54	35 x 80					50 x 130	76 x 105				
27 000			50 x 80	50 x 80	50 x 105	63.5 x 105	63.5 x 143					
33 000		35 x 105				50 x 130	63.5 x 118					
39 000	35 x 80			50 x 105	50 x 130	63.5 x 105	76 x 105	76 x 143				
47 000			50 x 105	50 x 130	63.5 x 118	76 x 118						
56 000	35 x 105	50 x 80	50 x 130	50 x 143	76 x 105	76 x 143	76 x 220					
68 000			63.5 x 105	63.5 x 118	76 x 118							
82 000	50 x 80	50 x 105	63.5 x 118	76 x 105	76 x 143							
100 000		50 x 130	76 x 105	76 x 118			76 x 220					
120 000	50 x 105	63.5 x 105	76 x 118	76 x 143								
150 000	50 x 143	63.5 x 118	76 x 143		76 x 220							
180 000		76 x 105										
220 000	63.5 x 105	76 x 118		76 x 220								
270 000	63.5 x 118	76 x 143	76 x 220									
330 000	76 x 105											
390 000	76 x 118											
470 000	76 x 143	76 x 220										
820 000	76 x 220											
	preferred type											
Endurance IEC	2000 h/85 °C											
Features	high ripple current capability, up to 105 °C ambient temperature											
Applications	industrial, welding, motor control devices, uninterruptable power supplies											





088, 089 PHC-ST series					
$U_R$	$C_R$	nominal case size	$I_R$	ESR	catalogue number
(V)	100 Hz ( $\mu\text{F}$ )	$\varnothing D \times L$ (mm)	100 Hz 85 °C (A)	MAX. 100 Hz (m $\Omega$ )	2222 ... ..
16	82000	50 x 80	24.0	6	088 15823
	120000	50 x 105	30.0	6	088 15124
	220000	63.5 x 105	44.0	3	088 15224
	330000	76 x 105	50.0	3	088 25334
	470000	76 x 143	50.0	2	088 15474
40	27000	50 x 80	19.0	9	088 17273
	47000	50 x 105	25.0	6	088 17473
	68000	63.5 x 105	32.0	5	088 27683
	100000	76 x 105	38.0	5	088 27104
	150000	76 x 143	46.0	4	088 17154
63	18000	50 x 80	14.0	15	088 18183
	27000	50 x 105	19.0	11	088 18273
	39000	63.5 x 105	26.0	8	088 28393
	56000	76 x 105	32.0	7	088 28563
	82000	76 x 143	39.0	5	088 18823
100	6800	50 x 80	6.8	64	088 19682
	10000	50 x 105	10.0	38	088 19103
	18000	63.5 x 105	17.0	18	088 19183
	27000	76 x 105	22.0	13	088 19273
	39000	76 x 143	21.0	16	088 19393
250	1800	50 x 80	6.9	76	089 13182
	2700	50 x 105	8.4	52	089 13272
	4700	63.5 x 105	14.0	25	089 13472
	6800	76 x 105	18.0	17	089 23682
	10000	76 x 143	21.0	18	089 13103
400	1000	50 x 80	4.8	127	089 16102
	1500	50 x 105	7.8	63	089 16152
	2200	63.5 x 105	9.8	45	089 26222
	3300	76 x 105	13.0	35	089 26332
	4700	76 x 143	15.0	31	089 16472
450	1000	50 x 105	5.5	102	089 17102
	1500	50 x 130	7.4	70	089 17152
	2200	63.5 x 118	10.5	46	089 17222
	3300	76 x 118	13.8	34	089 17332
	4700	76 x 143	19.1	22	089 17472





	Extreme long life								
Series	<b>NAFTA 3173</b> power, high ripple current long life, screw terminals			<b>NAFTA 3148</b>					
Useful life	24000 h/85 °C			2000 h/105 °C					
Temp. range	-40 °C to +85 °C			-10 °C to +105 °C					
Tolerance	±20%			-10% to +30%; -10% to +50%; ±20%					
C <sub>R</sub> (µF)	U <sub>R</sub> (V)			U <sub>R</sub> (V)					
	400	450	500	16	25	40	50	63	75
680			50 x 80						
820		50 x 80							
1000			50 x 105						
1200	50 x 80	50 x 105							
1500			63.5 x 105						
1800	50 x 105								
2200		63.5 x 105	76 x 105						
2700	63.5 x 105								35 x 54
3300		76 x 105	76 x 143						
3900	76 x 105								
4700		76 x 143						35 x 54	35 x 80
5600	76 x 143								
6800							35 x 54	35 x 80	35 x 105
8200						35 x 54			
10000							35 x 80	35 x 105	
12000					35 x 54	35 x 80			50 x 80
15000							35 x 105		
18000						35 x 105		50 x 80	50 x 105
22000				35 x 54	35 x 80				50 x 130
27000						50 x 80	50 x 80	50 x 105	50 x 143
									65 x 105
33000					35 x 105			50 x 130	65 x 118
39000				35 x 80			50 x 105	50 x 143	65 x 143
								65 x 105	76 x 105
47000						50 x 105	50 x 130	65 x 118	76 x 118
56000				35 x 105	50 x 80	50 x 130	50 x 143	65 x 143	76 x 143
							65 x 105	76 x 105	
68000						50 x 143	65 x 118	76 x 118	
						65 x 105			
82000				50 x 80	50 x 105	65 x 118	65 x 143	76 x 143	
							76 x 105		
100000					50 x 130	65 x 143	76 x 118		76 x 220
						76 x 105			
120000				50 x 105	50 x 143	76 x 118	76 x 143		
					65 x 105				
150000				50 x 130	65 x 118	76 x 143		76 x 220	
				50 x 143					
180000					65 x 143				
					76 x 105				
220000					65 x 105	76 x 118		76 x 220	
270000					65 x 118	76 x 143	76 x 220		
330000					65 x 143				
					76 x 105				
390000					76 x 118				
470000					76 x 143	76 x 220			
560000									
820000					76 x 220				
1000000					76 x 220				
	preferred type								
Endurance IEC	8000 h/85 °C								
Features	high ripple current for uninterruptable power supplies								
Applications	standard SMPS, welding, motor control devices			audio power supplies and low voltage industrial systems power high current screw terminals					



NAFTA 3173 series										NAFTA 3148 series									
U <sub>r</sub>	C <sub>R</sub>	nominal case size	case code	I <sub>r</sub>	I <sub>15</sub>	ESR Typ.	tan δ	catalogue number		U <sub>r</sub>	C <sub>R</sub>	nominal case size	case code	I <sub>r</sub>	I <sub>15</sub>	ESR Typ.	tan δ	catalogue number	
(V)	(μF)	∅D x L (mm)		100/120 Hz 85 °C (A)	5 min (mA)	100/120Hz (Ω)	100/120 Hz (mΩ)	(note1) 2251 ... ..		(V)	(μF)	∅D x L (mm)		100/120 Hz 105 °C (A)	5 min (mA)	100/120Hz (Ω)	100/120 Hz (mΩ)	(note1) 2251 ... ..	
400	1000	50 x 80	EC	4.9	4.16	95	0.09	007	16102	16	82000	50 x 80	EC	24	3.44	6	0.40	008	15823
	1200	50 x 105	EE	5.1	4.55	82	0.09	007	16122		120000	50 x 105	EE	30	4.16	6	0.49	008	15124
	1800	50 x 105	EE	8.0	5.09	59	0.09	007	16182		220000	65 x 105	FE	44	5.63	3	0.54	008	15224
	2700	65 x 105	FE	10.1	6.24	39	0.09	007	16272		330000	76 x 105	GE	50	6.00	3	0.81	008	25334
	3900	76 x 105	GE	13	7.49	37	0.12	007	16392		470000	76 x 143	GH	50	6.00	2	0.77	008	15474
	5600	76 x 143	GH	14.6	8.98	28	0.13	007	16562		27000	50 x 80	EC	19	3.12	9	0.20	008	17273
450	820	50 x 80	EC	5	3.64	145	0.10	007	17821	40	47000	50 x 105	EE	25	4.11	6	0.23	008	17473
	1200	50 x 105	EE	7.4	4.41	85	0.10	007	17122		68000	65 x 105	FE	32	4.95	5	0.28	008	27683
	2200	65 x 105	FE	9.8	5.97	63	0.10	007	17222		100000	76 x 105	GE	38	6.00	5	0.41	008	27104
	3300	76 x 105	GE	12.7	7.31	35	0.10	007	17332		150000	76 x 143	GH	46	6.00	4	0.49	008	17154
	4700	76 x 143	GH	14.2	8.73	31	0.12	007	17472		63	18000	50 x 80	EC	14	3.19	15	0.22	008
500	680	50 x 80	EC	5.1	3.50	132	0.09	007	18681	27000		50 x 105	EE	19	3.91	11	0.24	008	18273
	1000	50 x 105	EE	6.7	4.24	90	0.09	007	18102	39000		50 x 143	EH	25	4.70	9	0.29	008	18393
	1500	65 x 105	FE	9	5.20	59	0.09	007	18152	39000		65 x 105	FE	26	4.70	8	0.25	008	28393
	2200	76 x 105	GE	11.1	6.21	43	0.10	007	18222	56000		76 x 105	GE	32	5.63	7	0.32	008	28563
	3300	76 x 143	GH	14.4	7.71	30	0.10	007	18332	82000	76 x 143	GH	39	6.00	5	0.33	008	18823	

Note 1: Catalogue type applies to the terminal style "M", high post (see Table 3); the insulation type "P", 0.2 mm polymeric (see Table 4); tolerance ±20% and to the ST version; for STB version (not preferred) replace 8th digit by '5' if ST version is '1' (2251 007 5....).



Electrolytic capacitors

Series	<b>3186</b> Power Standard Screw Terminal (also see 2222 086 / 087 series)																
Useful life	<100 V: 5000 h/85 °C    ≥100 V: 3000 h/85 °C																
Temp. range	-40 °C to +85 °C																
Tolerance	-10% to +50%; -10% to +30%; ± 20%																
Case codes	REPRESENTATIVE CAPACITANCE RATINGS BY CASE SIZE AT RATED WORKING VOLTAGE (µF)																
Case size (")	6.5 VDC	10 VDC	15 VDC	25 VDC	40 VDC	50 VDC	63 VDC	75 VDC	100 VDC	150 VDC	200 VDC	250 VDC	300 VDC	350 VDC	400 VDC	450 VDC	500 VDC
BA (1.375x2.125)	57000	44000	32000	20000	12000	9900	6800	5300	2700	1600	1000	790	520	430	350	250	150
BB (1.375x2.625)	68000	53000	38000	24000	15000	11000	8200	6400	3300	1900	1300	940	630	510	420	300	190
BC (1.375x3.125)	91000	71000	51000	33000	20000	15000	10000	8500	4400	2600	1700	1200	840	680	570	410	260
BD (1.375x3.625)	110000	89000	64000	41000	25000	19000	13000	10000	5500	3200	2100	1500	1000	860	710	510	320
BE (1.375x4.125)	130000	100000	76000	49000	31000	23000	16000	12000	6600	3900	2600	1800	1200	1000	850	610	400
BF (1.375x4.625)	160000	120000	89000	57000	36000	27000	19000	14000	7700	4500	3000	2200	1400	1200	900	710	480
BG (1.375x5.125)	180000	140000	100000	66000	41000	31000	21000	17000	8800	5200	3400	2500	1600	1300	1100	820	560
BH (1.375x5.625)	200000	160000	110000	74000	46000	35000	24000	19000	9900	5900	3900	2800	1800	1500	1200	920	630
DA (1.750x2.125)	100000	79000	56000	36000	22000	17000	12000	9400	4900	2900	1900	1400	930	760	630	460	300
DB (1.750x2.625)	120000	95000	68000	44000	27000	21000	14000	11000	5900	3500	2300	1600	1100	920	760	550	360
DC (1.750x3.125)	160000	120000	91000	58000	36000	28000	19000	15000	7800	4600	3000	2200	1400	1200	1000	730	480
DD (1.750x3.625)	200000	150000	110000	73000	45000	35000	24000	18000	9800	5800	3800	2800	1800	1500	1200	920	630
DE (1.750x4.125)	240000	190000	130000	88000	55000	42000	29000	22000	11000	7000	4600	3300	2200	1800	1500	1100	730
DF (1.750x4.625)	280000	220000	150000	100000	64000	49000	34000	26000	13000	8100	5400	3900	2600	2100	1700	1200	770
DG (1.750x5.125)	320000	250000	180000	110000	73000	56000	39000	30000	15000	9300	6100	4500	2900	2400	2000	1400	860
DH (1.750x5.625)	360000	280000	200000	130000	82000	63000	43000	34000	17000	10000	6900	5000	3300	2700	2200	1600	1000
EA (2.000x2.125)	130000	100000	73000	47000	29000	22000	15000	12000	6300	3700	2500	1800	1200	990	820	590	380
EB (2.000x2.625)	150000	120000	88000	57000	35000	27000	18000	14000	7600	4500	3000	2100	1400	1100	980	710	480
EC (2.000x3.125)	210000	160000	110000	76000	47000	36000	25000	19000	10000	6000	4000	2900	1900	1500	1300	950	630
ED (2.000x3.625)	260000	200000	140000	95000	59000	45000	31000	24000	12000	7500	5000	3600	2400	1900	1600	1100	660
EE (2.000x4.125)	310000	240000	170000	110000	71000	54000	37000	29000	15000	9000	6000	4300	2900	2300	1900	1400	930
EF (2.000x4.625)	370000	280000	200000	130000	83000	64000	44000	34000	17000	10000	7000	5100	3300	2700	2300	1600	1000
EG (2.000x5.125)	420000	330000	230000	150000	95000	73000	50000	39000	20000	12000	8000	5800	3800	3100	2600	1900	1200
EH (2.000x5.625)	470000	370000	260000	170000	100000	82000	56000	44000	22000	13000	9000	6500	4300	3500	2900	2100	1300
FB (2.500x2.625)	260000	200000	140000	95000	59000	45000	27000	21000	12000	7500	5000	3600	2400	1600	1300	1200	1000
FC (2.500x3.125)	350000	270000	190000	120000	79000	61000	37000	28000	17000	10000	6700	4800	3200	2100	1800	1600	1300
FD (2.500x3.625)	440000	340000	240000	150000	99000	76000	46000	35000	21000	12000	8300	6000	4000	2700	2200	2000	1700
FE (2.500x4.125)	530000	410000	290000	190000	110000	91000	55000	42000	25000	15000	10000	7300	4800	3200	2700	2400	2000
FF (2.500x4.625)	610000	480000	340000	220000	130000	100000	64000	50000	29000	17000	11000	8500	5600	3800	3100	2800	2300
FG (2.500x5.125)	700000	550000	390000	250000	150000	120000	74000	57000	34000	20000	13000	9700	6400	4300	2600	3200	3000
FH (2.500x5.625)	790000	620000	440000	280000	170000	130000	83000	64000	38000	22000	15000	10000	7300	4900	4000	3600	3100
GC (3.000x3.125)	520000	400000	290000	180000	110000	90000	54000	42000	25000	14000	9800	7100	4700	3200	2600	2300	1900
GD (3.000x3.625)	650000	500000	360000	230000	140000	110000	68000	52000	31000	18000	12000	8900	5900	4000	3300	2900	2400
GE (3.000x4.125)	780000	610000	430000	280000	170000	130000	82000	63000	37000	22000	14000	10000	7100	4800	4000	3500	2900
GF (3.000x4.625)	910000	710000	500000	320000	200000	150000	95000	73000	44000	26000	17000	12000	8300	5600	4700	4100	3400
GG (3.000x5.125)	1000000	810000	580000	370000	230000	180000	100000	84000	50000	29000	19000	14000	9500	6400	5300	4700	3900
GH (3.000x5.625)	1100000	910000	650000	420000	260000	200000	120000	95000	56000	33000	22000	16000	10000	7300	6000	5300	4000
GN (3.000x8.625)	1900000	1500000	1000000	700000	430000	330000	200000	150000	94000	55000	37000	26000	14000	12000	10000	8800	7300
Endurance	preferred type 1000 h / 85 °C																
Features	high ripple current capability, very high CV per volume																
Applications	industrial, welding, motor control devices, uninterruptable power supplies																



	Extended voltage															
Series	<b>3188</b> Power long life screw terminal (also see 2222 088 / 089 series)															
Useful life	<250 V: 5000 h/105 °C ≥250 V: 4000 h/85 °C															
Temp. range	< 250 V: -40 °C to +105 °C; ≥250 V: -40 °C to +85 °C															
Tolerance	-10% to +50%; -10% to +30%; ±20%															
Case codes	REPRESENTATIVE CAPACITANCE RATINGS BY CASE SIZE AT RATED WORKING VOLTAGE (µF)															
Case size (")	7.5 VDC	10 VDC	15 VDC	25 VDC	35 VDC	50 VDC	60 VDC	75 VDC	100 VDC	150 VDC	200 VDC	250 VDC	300 VDC	350 VDC	400 VDC	450VDC
BA (1.375x2.125)	45000	38000	28000	17000	12000	8300	6000	4000	1900	1200	790	520	430	350	310	250
BB (1.375x2.625)	54000	46000	33000	20000	15000	9900	7200	4800	2300	1400	940	630	510	420	370	300
BC (1.375x3.125)	72000	61000	45000	27000	20000	13000	9600	6400	3100	1900	1200	840	680	570	500	410
BD (1.375x3.625)	91000	76000	56000	34000	25000	16000	12000	8000	3900	2400	1500	1000	860	710	620	500
BE (1.375x4.125)	100000	92000	67000	40000	31000	19000	14000	9700	4700	2900	1800	1200	1000	850	750	620
BF (1.375x4.625)	120000	100000	79000	47000	36000	23000	16000	11000	5500	3400	2200	1400	1200	900	870	740
BG (1.375x5.125)	140000	120000	90000	54000	41000	26000	19000	12000	6300	3800	2500	1600	1300	1100	1000	860
BH (1.375x5.625)	160000	130000	100000	61000	46000	29000	21000	14000	7100	4300	2800	1800	1500	1200	1100	920
DA (1.750x2.125)	81000	68000	50000	30000	22000	14000	10000	7100	3500	2100	1400	930	760	630	550	440
DB (1.750x2.625)	97000	81000	60000	36000	27000	17000	12000	8600	4200	2500	1600	1100	920	760	670	550
DC (1.750x3.125)	120000	100000	80000	48000	36000	23000	17000	11000	5600	3400	2200	1400	1200	1000	890	740
DD (1.750x3.625)	160000	130000	100000	60000	45000	29000	21000	14000	7000	4300	2800	1800	1500	1200	1100	920
DE (1.750x4.125)	190000	160000	120000	72000	55000	35000	25000	17000	8400	5100	3300	2200	1800	1500	1300	1000
DF (1.750x4.625)	220000	190000	140000	84000	64000	41000	30000	20000	9800	6000	3900	2600	2100	1700	1500	1200
DG (1.750x5.125)	250000	210000	160000	96000	73000	47000	34000	22000	11000	6900	4500	2900	2400	2000	1700	1300
DH (1.750x5.625)	290000	240000	180000	100000	82000	53000	38000	25000	12000	7700	5000	3300	2700	2200	2000	1700
EA (2.000x2.125)	100000	88000	65000	39000	29000	19000	13000	9300	4500	2800	1800	1200	990	820	720	590
EB (2.000x2.625)	120000	100000	78000	47000	35000	22000	16000	11000	5400	3300	2100	1400	1100	980	860	730
EC (2.000x3.125)	160000	140000	100000	62000	47000	30000	22000	14000	7200	4400	2900	1900	1500	1300	1100	890
ED (2.000x3.625)	210000	170000	130000	78000	59000	38000	27000	18000	9100	5600	3600	2400	1900	1600	1400	1100
EE (2.000x4.125)	250000	210000	150000	94000	71000	45000	33000	22000	10000	6700	4300	2900	2300	1900	1700	1400
EF (2.000x4.625)	290000	240000	180000	100000	83000	53000	38000	26000	12000	7800	5100	3300	2700	2300	2000	1600
EG (2.000x5.125)	330000	280000	200000	120000	95000	61000	44000	29000	14000	8900	5800	3800	3100	2600	2300	1900
EH (2.000x5.625)	370000	310000	230000	140000	100000	68000	50000	33000	16000	10000	6500	4300	3500	2900	2600	2100
FB (2.500x2.625)	210000	170000	130000	78000	59000	38000	24000	16000	9100	5600	3600	2400	1900	1300	1200	920
FC (2.500x3.125)	280000	230000	170000	100000	79000	51000	32000	21000	12000	7400	4800	3200	2600	1800	1600	1100
FD (2.500x3.625)	350000	290000	210000	130000	99000	63000	40000	27000	15000	9300	6000	4000	3300	2200	2000	1400
FE (2.500x4.125)	420000	350000	260000	150000	110000	76000	48000	32000	18000	11000	7300	4800	3900	2700	2400	1700
FF (2.500x4.625)	490000	410000	300000	180000	130000	89000	56000	38000	21000	13000	8500	5600	4600	3100	2800	2000
FG (2.500x5.125)	560000	470000	340000	200000	150000	100000	64000	43000	24000	14000	9700	6400	5300	3600	3200	2300
FH (2.500x5.625)	630000	530000	390000	230000	170000	110000	73000	48000	27000	16000	10000	7300	5900	4000	3600	2600
GC (3.000x3.125)	410000	340000	250000	150000	110000	75000	47000	32000	17000	11000	7100	4700	3900	2600	2300	1600
GD (3.000x3.625)	510000	430000	320000	190000	140000	94000	59000	40000	22000	13000	8900	5900	4900	3300	2900	2000
GE (3.000x4.125)	620000	520000	380000	230000	170000	110000	71000	48000	26000	16000	10000	7100	5800	4000	3500	2500
GF (3.000x4.625)	720000	610000	440000	260000	200000	130000	83000	56000	31000	19000	12000	8300	6800	4700	4100	2900
GG (3.000x5.125)	820000	690000	510000	300000	230000	150000	95000	64000	35000	22000	14000	9500	7800	5300	4700	3400
GH (3.000x5.625)	930000	780000	570000	340000	260000	160000	100000	72000	40000	24000	16000	10000	8800	6000	5300	3800
GN (3.000x8.625)	1500000	1300000	960000	570000	430000	280000	170000	120000	67000	41000	26000	14000	11000	10000	8800	7600
	preferred type															
Endurance	2000 h / 85 °C															
Features	high ripple current, long life, up to 105 °C ambient															
Applications	power applications, industrial, welding, motor control devices, uninterruptable power supplies															



Series	<b>NAFTA 3198, 2251 005 PLV-ST</b> Power, low volt, -55 °C											
Useful life	see tables in technical notes section of BC01											
Temp. range	-55 °C to 105 °C											
Tolerance	-10% to +50%; -10% to +30%; ±20%											
Case codes	REPRESENTATIVE CAPACITANCE RATINGS BY CASE SIZE AT RATED WORKING VOLTAGE (µF)											
Case size (")	6.5 VDC	10 VDC	15 VDC	16 VDC	20 VDC	25 VDC	35 VDC	40 VDC	50 VDC	60 VDC	63 VDC	75 VDC
BA (1.375X2.125)	33000	27000	22000	22000	18000	12000	10000	8200	6800	4700	3300	2700
BB (1.375X2.625)	39000	33000	27000	27000	22000	15000	12000	10000	8200	5600	4700	3900
BC (1.375X3.125)	56000	47000	39000	39000	27000	22000	15000	12000	10000	6800	6800	4700
BD (1.375X3.625)	68000	56000	47000	47000	39000	27000	18000	15000	12000	8200	8200	5600
BE (1.375X4.125)	82000	68000	56000	56000	47000	33000	22000	18000	15000	10000	10000	6800
BF (1.375X4.625)							27000		18000	12000	12000	8200
BG (1.375X5.125)	100000	82000	68000	68000	56000	39000		22000				
BH (1.375X5.625)		100000				47000	33000	27000	22000	15000	15000	10000
DA (1.750X2.125)	56000	56000	39000	39000	33000	27000	18000	15000	12000	8200	6800	5600
DB (1.750X2.625)	68000	68000	47000	47000	39000		22000	18000	15000	10000	8200	6800
DC (1.750X3.125)	100000	82000	68000		56000	39000	27000	22000	18000	12000	12000	8200
DD (1.750X3.625)	120000	100000	82000	82000	68000	47000	39000	27000	22000	15000	15000	10000
DE (1.750X4.125)	150000	120000	100000	100000	82000	56000	47000	33000	27000	18000	18000	12000
DF (1.750X4.625)		150000	120000			68000		39000	33000	22000		15000
DG (1.750X5.125)	180000			120000	100000	82000	56000	47000	39000		22000	
DH (1.750X5.625)	220000	180000	150000	150000	120000		68000			27000	27000	18000
EA (2.000X2.125)	82000	68000	56000	56000	39000	33000	22000	18000	15000	10000	10000	6800
EB (2.000X2.625)	100000	82000	68000	68000	56000	39000	27000	22000	18000	12000	12000	8200
EC (2.000X3.125)	120000	120000	82000	82000	68000	56000	39000	27000	27000	18000	15000	12000
ED (2.000X3.625)	150000	150000	100000	100000	82000	68000	47000	39000	33000	22000	18000	15000
EE (2.000X4.125)	180000	180000	120000	120000	100000	82000	56000	47000	39000	27000	22000	18000
EF (2.000X4.625)	220000		150000	150000	120000		68000		47000		27000	
EG (2.000X5.125)	270000	220000	180000	180000		100000	82000	56000		33000	33000	22000
EH (2.000X5.625)		270000			150000	120000		68000	56000	39000		27000
FB (2.500X2.625)	150000	120000	100000	100000	82000	68000	47000	39000	27000	18000	18000	12000
FC (2.500X3.125)	220000	180000	150000	150000	120000	82000	68000	47000	39000	27000	22000	18000
FD (2.500X3.625)	270000	220000	180000	180000	150000	100000	82000	56000	47000	33000	27000	22000
FE (2.500X4.125)	330000	270000	220000	220000	180000	120000	100000	68000	56000	39000	33000	27000
FF (2.500X4.625)	390000	330000	270000			150000	120000	82000	68000	47000	39000	33000
FG (2.500X5.125)		390000		270000	220000	180000		100000		56000	47000	
FH (2.500X5.625)	470000		330000	330000	270000		150000		82000			39000
GC (3.000X3.125)	330000	270000	220000	220000	180000	120000	100000	68000	56000	39000	33000	27000
GD (3.000X3.625)	390000	330000	270000	270000	220000	150000	120000	82000	68000	47000	39000	33000
GE (3.000X4.125)	470000	390000	330000	330000	270000	180000	150000	100000	82000	56000	47000	39000
GF (3.000X4.625)	560000	470000	390000			220000		120000	100000	68000	56000	47000
GG (3.000X5.125)	680000	560000		390000	330000	270000	180000	150000	120000	82000	68000	
GH (3.000X5.625)			470000	470000	390000		220000					56000
GN (3.000X8.625)	1200000	1000000	820000	680000	680000	470000	330000	270000	220000	150000	120000	100000
	preferred type <span style="background-color: #c6e0b4; padding: 2px;"> </span>											
Endurance	3000 h / 105 °C											
Features	very long life, low ESR											
Applications	industrial, power supplies, audio											
Note												



Form A



Form B

Series		<b>196 DLC</b> Double Layer Capacitor		
Useful life		1000 h at upper category temperature		
Temp. range		-25 °C to +85 °C	-25 °C to +70 °C	-25 °C to +70 °C
Tolerance		-20 to +80%	-20 to +80%	-20 to +80%
Rated voltage $U_R$		5.5 V	5.5 V	6.3 V
Upper category temp.		85 °C	70 °C	70 °C
$C_R$ (F)	Form			
0.047	A	13 × 9	13 × 7	13 × 9
	B		11.5 × 13	
0.1	A	13 × 9	13 × 7	13 × 9
	B		11.5 × 13	
0.22	A		13 × 7	in columns: ØD × L in mm
	B		11.5 × 13	
0.33	A		13 × 7	
	B		11.5 × 13	
0.47	A	21 × 9	21 × 7.5	21 × 9
	B			
0.68	A	21 × 9		21 × 9
	B			
1.0	A		21 × 7.5	
	B		19 × 20.5	
		preferred type		
Pref. packing		bulk		
Features		polarized capacitor with high charge density, unlimited number of charge and discharge cycles, no charge/discharge control circuitry necessary, ecologically beneficial (no Cd, no Li)		
Applications		energy storage, for backup of semiconductor memories (CMOS) in all fields of electronics		

Ordering information preferred types						Technical drawing
$U_R$ (V)	$C_R$ (F)	nominal case size ØD × L (mm)	form	catalogue number 2222 ... ..	smallest packing quantity	<p>Form A</p>
5.5	0.047	13 × 7	A	196 12473	1000	
	0.1	13 × 7	A	196 12104	1000	
	0.22	13 × 7	A	196 12224	1000	
	0.33	13 × 7	A	196 12334	1000	
	0.47	21 × 7.5	A	196 12474	500	
	1.0	21 × 7.5	A	196 12105	500	

**Variable c**



# Capacitors

General purpose & consumer, 808 series

Page

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Professional, teflon foil, 809 series

**179**

General purpose & consumer SMD, 813/814 series

**180**



808 series	Case size Pitch size  (mm)	C <sub>min</sub> - C <sub>max</sub> at 200 kHz  (pF)	Tan δ at C <sub>max</sub>  (1 MHz) (×10 <sup>-4</sup> )	TC <sub>c</sub>  (×10 <sup>-6</sup> /K)	Dielectric <sup>1)</sup>	Colour of housing	Catalogue number preferred types  2222 808 . . . . .
	5 Ø 5.6	1.5 - 5	≤10	-200 ±550	PP	grey	23508
		3 - 10	≤10	-250 ±550	PP	yellow	23109
		3 - 15	≤10	-250 ±550	PP	blue	23159
		4 - 20	≤10	-250 ±400	PP	green	23209
		4 - 27	≤10	-250 ±400	PP	red	23279
	7.5 Ø 3.5/7.1 (DIN)	1.5 - 7	≤70	-50 ±550	PC	grey	20126
		1.6 - 15	≤70	-50 ±550	PC	blue	20127
		3 - 20	≤70	-50 ±550	PC	green	20123
		3.5 - 27	≤70	-100 ±400	PC	red	20128
		7.5 Ø 2.5/7.5	1.4 - 5.5	≤10	-250 ±350	PE	grey
2 - 10	≤10		-250 ±800	PP	yellow	11109	
2.0 - 15	≤10		-250 ±600	PP	blue	11159	
2.5 - 22	≤10		-200 ±500	PP	green	11229	
2.5 - 27	≤70		-50 ±500	PC	red	11279	
3 - 33	≤10		-250 ±350	PP	brown	11339	
3 - 40	≤70		-50 ±400	PC	violet	11409	
3 - 50	≤70		-50 ±500	PC	black	11509	
10 Ø 7.5/5 (DIN) not for design-in	1.4 - 5.5	≤10	-250 ±350	PE	grey	51558	
	2 - 10	≤10	-250 ±800	PP	yellow	51109	
	2.5 - 22	≤10	-200 ±500	PP	green	51229	
	2.5 - 27	≤70	-50 ±500	PC	red	51279	
	3 - 40	≤70	-50 ±400	PC	violet	51409	
	3 - 50	≤70	-50 ±500	PC	black	51509	
	10 Ø 5/10 (DIN)	2.5 - 15	≤10	-200 ±700	PP	blue	32159
		3 - 22.5	≤10	-200 ±700	PP	green	32229
5.5 - 40		≤10	-200 ±400	PP	grey	32409	
5.5 - 65		≤10	-200 ±500	PP	yellow	32659	
6 - 80		≤70	-50 ±400	PC	red	32809	
7 - 105		≤70	-50 ±400	PC	violet	32101	
6 - 120		≤70	-50 ±400	PC	violet	31121	
10 Ø 5/10 (DIN)	2.5 - 15	≤10	-200 ±700	PP	blue	61159	
	3 - 22.5	≤10	-200 ±700	PP	green	61229	
	5.5 - 40	≤10	-200 ±400	PP	grey	61409	
	5.5 - 65	≤10	-200 ±500	PP	yellow	61659	
	6 - 80	≤70	-50 ±400	PC	red	61809	
	7 - 105	≤70	-50 ±400	PC	violet	61101	
	6 - 120	≤70	-50 ±400	PC	violet	61121	

Note: All trimmer capacitors can be supplied with hexagonal head for automatic trimming.

<sup>1)</sup> PP: polypropylene PC: polycarbonate PE: polyethylene





809 series	Case size Pitch size	$C_{min} - C_{max}$ at 200 kHz (pF)	Tan $\delta$ at $C_{max}$		$TC_C$ ( $\times 10^{-6}/K$ )	Dielectric <sup>3)</sup>	Colour of housing	Catalogue number preferred types	
	(mm)		(1 MHz) ( $\times 10^{-4}$ )	(100 MHz) ( $\times 10^{-4}$ )				2222 809 . . . . .	
	6 x 8	0.5 – 2	$\leq 10$	$\leq 20$	-250 $\pm$ 350	PTFE	–	hex. head	round head
	5.08	1.2 – 3.5	$\leq 10$	$\leq 20$	-250 $\pm$ 350	PTFE	orange	05021	05011
		1.8 – 10	$\leq 10$	$\leq 20$	-250 $\pm$ 350	PTFE	white	05225	05215
		2 – 18	$\leq 10$	$\leq 25$	-250 $\pm$ 350	PTFE	red	05226	05216
	2) 8 x 9	1.4 – 5.5	$\leq 10$	$\leq 15$	-250 $\pm$ 350	PTFE	green	–	09004
	7.64	2 – 9	$\leq 10$	$\leq 15$	-250 $\pm$ 350	PTFE	white	–	09005
	2-tags	3 – 18	$\leq 10$	$\leq 15$	-250 $\pm$ 350	PTFE	red	–	09006
	8 x 9	1.4 – 5.5	$\leq 10$	$\leq 15$	-250 $\pm$ 350	PTFE	green	–	09001
	5.08/5.08	2 – 9	$\leq 10$	$\leq 15$	-250 $\pm$ 350	PTFE	white	–	09002
	3-tags	3 – 18	$\leq 10$	$\leq 15$	-250 $\pm$ 350	PTFE	red	–	09003
	2) 10 x 11	4 – 38	$\leq 10$	$\leq 25$	-200 $\pm$ 250	PTFE	yellow	–	08002
	7.62/5.08	5 – 57	$\leq 10$	$\leq 25$	-200 $\pm$ 250	PTFE	blue	–	08003
	11 x 14 x 9 5.08/7.62/5.08	single stator type							
		2.5 – 20	$\leq 10$	$\leq 17$	0 $\pm$ 200	PTFE	print marking	–	07004
		4 – 40	$\leq 10$	$\leq 17$	0 $\pm$ 200	PTFE		–	07008
		5 – 60	$\leq 10$	$\leq 25$	0 $\pm$ 200	PTFE		–	07011
		6 – 80	$\leq 10$	$\leq 25$	0 $\pm$ 200	PTFE		–	07013
		7 – 100	$\leq 10$	$\leq 25$	0 $\pm$ 200	PTFE		–	07015
		differential type							
		2 – 12	$\leq 10$	$\leq 17$	0 $\pm$ 200	PTFE	print marking	–	07018
		2.5 – 20	$\leq 10$	$\leq 17$	0 $\pm$ 200	PTFE		–	07006
		4 – 40	$\leq 10$	$\leq 17$	0 $\pm$ 200	PTFE		–	07009
	5 – 60	$\leq 10$	$\leq 25$	0 $\pm$ 200	PTFE		–	07012	
	6 – 80	$\leq 10$	$\leq 25$	0 $\pm$ 200	PTFE		–	07014	
	7 – 100	$\leq 10$	$\leq 25$	0 $\pm$ 200	PTFE		–	07016	
	7 – 150	$\leq 50$		0 $\pm$ 200	PC		–	07107	

Note: <sup>2)</sup> Trimmer capacitors can be supplied with hexagonal head for automatic trimming.

<sup>3)</sup> PTFE: polytetrafluorethylene PC: polycarbonate



813 series	Case size	$C_{min} - C_{max}$	Temp. Coefficient	Q value	Colour of housing	Catalogue number
	(mm)	(pF)	$\emptyset(\times 10^{-6}/K)$	(1 MHz, $C_{max}$ )		12NC 2222 813 . . . .
	3.2 mm (W)	1.7 - 3	NPO $\pm 300$	500	brown	11032
	4.5 mm (L)	2.5 - 6	NPO $\pm 300$	500	blue	11062
	1.7 mm (H)	3 - 10	N400 $\pm 400$	500	white	11102
		5 - 20	N900 $\pm 400$	300	red	11202
	3 mm version	6 - 30	N1200 $\pm 500$	300	green	11302

814 series	Case size	$C_{min} - C_{max}$	Temp. Coefficient	Q value	Colour of housing	Catalogue number
	(mm)	(pF)	$\emptyset(\times 10^{-6}/K)$	(1 MHz, $C_{max}$ )		12NC 2222 814 . . . . <sup>1)</sup> ↓
	4.0 mm (W)	1.7 - 3	NPO $\pm 200$	300	white	2.031
	4.5 mm (L)	2 - 6	NPO $\pm 200$	500	blue	2.061
	2.6 mm (H)	3 - 10	NPO $\pm 300$	500	white	2.101
		5 - 20	N900 $\pm 350$	500	red	2.201
	4 mm version	6.5 - 30	N1100 $\pm 450$	300	green	2.301
15 - 50		N1700 $\pm 600$	200	orange	2.501	

Note: <sup>1)</sup> 1 = A type  
 2 = B type  
 3 = C type



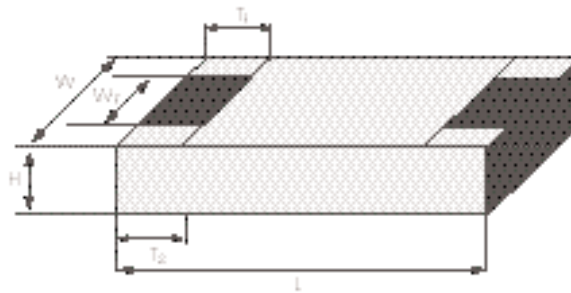
# Linear re





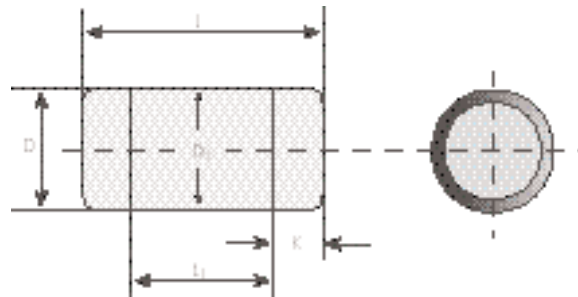
# Resistors

	page
Dimensions	<b>184</b>
General information	<b>186</b>
Quick selection guide	<b>187</b>
SMD	<b>188</b>
Leaded	<b>196</b>



**Flatchip case size dimensions**

Series	Size code	H (mm)	L (mm)	W (mm)	W <sub>T</sub> (mm)	T <sub>1</sub> (mm)	T <sub>2</sub> (mm)	Mass (mg)	Page nr
_CS 0402	0402	0.32 ±0.05	1.0 ±0.05	0.5 ±0.05	>75% of W	0.2 +0.1/-0.15	0.2 ±0.1	0.8	188/189
_CT 0603	0603	0.45 +0.1/-0.05	1.55 ±0.05	0.85 ±0.1	>75% of W	0.3 +0.15/-0.2	0.3 +0.15/-0.2	1.5	188/189
_CU 0805	0805	0.45 +0.1/-0.05	2.0 ±0.1	1.25 ±0.15	>75% of W	0.4 +0.1/-0.2	0.4 +0.1/-0.2	3.2	188/189
_CA 1206	1206	0.55 ±0.1	3.2 +0.1/-0.2	1.6 ±0.15	>75% of W	0.5 ±0.25	0.5 ±0.25	10.0	188/189
DCW 1210	1210	0.55 ±0.1	3.05 ±0.1	2.55 ±0.1	-	0.5 ±0.2	0.5 ±0.2	15.4	189
DCY 1218	1218	0.55 ±0.1	4.6 ±0.2	3.05 ±0.15	-	0.45 ±0.25	0.5 ±0.25	8.9	189
DCZ 2010	2010	0.55 ±0.1	5.0 ±0.2	2.5 ±0.2	-	0.65 ±0.25	0.6 ±0.25	22.6	189
DCB 2512	2512	0.6 ±0.1	6.4 ±0.2	3.2 ±0.2	-	0.65 ±0.25	0.9 ±0.25	36.8	189

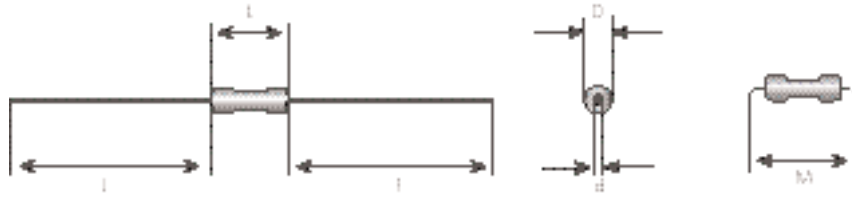


**MELF case size dimensions**

Series	Size code	L (mm)	D (mm)	L <sub>1 min</sub> (mm)	D <sub>1</sub> (mm)	K (mm)	Mass (mg)	Page nr
MMU 0102	RC 2211	2.2 +0/-0.1	1.1 +0/-0.1	1.2	D +0/-0.05	0.4 ±0.05	7	193/194/195
_MA 0204	RC 3715	3.6 +0/-0.2	1.4 +0/-0.1	1.8	D +0/-0.1	0.8 ±0.1	19	193/194/195
MMB 0207	RC 6123	5.8 +0/-0.2	2.2 +0/-0.2	2.8	D +0/-0.2	1.2 ±0.2	79	193/194/195

Note: \_ = underscore is a wild card character





Leaded case size dimensions							
Series	$D_{max}$ (mm)	$L_{max}$ (mm)	$d$ (mm)	$l_{min}$ (mm)	$M_{min}$ (mm)	Mass (g)	Page nr
MBA 0204	1.6	3.6	0.5	29.0	5.0	0.13	197
UXA 0204	1.6	3.6	0.5	29.0	5.0	0.13	199
MBB 0207	2.5	6.3	0.6	28.0	7.5	0.22	197
UXB 0207	2.5	6.3	0.6	28.0	7.5	0.22	199
MPR24	2.5	6.3	0.6	28.0	7.5	0.22	198
MBE 0414	4.0	11.9	0.8	31.0	15.0	0.7	198
VR25	2.5	7.5	0.58	27.0	8.0	0.25	200
VR37	4.0	10.0	0.7	27.0	11.0	0.48	200
VR68	6.8	18.0	0.8	28.0	19.0	1.48	200
LSR37	4.0	10.0	0.7	26.0	10.0	0.48	200
PR01	2.5	8.5	0.58	26.0	8.5	0.29	202
PR02	3.9	12.0	0.8	26.0	12.0	0.63	202
PR03	5.2	19.5	0.8	26.0	19.5	1.10	202
SFR16S	1.9	3.4	0.45	28.0	3.4	0.125	196
SFR25	2.5	7.0	0.58	28.0	7.0	0.25	196
SFR25H	2.5	7.0	0.58	28.0	7.0	0.25	196
NFR25	2.5	7.5	0.58	28.0	7.5	0.25	200
NFR25H	2.5	7.5	0.58	28.0	7.5	0.25	200
AC01	4.3	10.0	0.8	-	-	0.55	202
AC03	5.5	13.0	0.8	-	25.4	1.10	202
AC04	5.7	17.0	0.8	-	25.4	1.40	202
AC05	7.5	17.0	0.8	-	25.4	2.20	202
AC07	7.5	25.0	0.8	-	33.0	3.00	202
AC10	8.0	44.0	0.8	-	-	5.30	202
AC15	10.0	51.0	0.8	-	-	8.40	202
AC20	10.0	67.0	0.8	-	-	10.9	202
PAC01	4.3	10.0	0.8	-	14.0	0.55	203
PAC02	5.5	13.0	0.8	-	17.0	0.80	203
PAC03	5.5	17.0	0.8	-	21.0	1.00	203
PAC04	7.5	17.0	0.8	-	21.0	1.75	203
PAC05	7.5	23.0	0.8	-	27.0	2.15	203
PAC06	7.5	25.0	0.8	-	29.0	2.25	203



General information		Linear resistors																						
Standard series of values in a decade according to IEC 60 063																								
E6 series	10	15	22	33	47	68																		
E12 series	10	12	15	18	22	27	33	39	47	56	68	82												
E24 series	10	11	12	13	15	16	18	20	22	24	27	30												
	33	36	39	43	47	51	56	62	68	75	82	91												
E48*/	<b>100</b>	102	<b>105</b>	107	<b>110</b>	113	<b>115</b>	118	<b>121</b>	124	<b>127</b>	130												
E96 series	<b>133</b>	137	<b>140</b>	143	<b>147</b>	150	<b>154</b>	158	<b>162</b>	165	<b>169</b>	174												
	<b>178</b>	182	<b>187</b>	191	<b>196</b>	200	<b>205</b>	210	<b>215</b>	221	<b>226</b>	232												
	<b>237</b>	243	<b>249</b>	255	<b>261</b>	267	<b>274</b>	280	<b>287</b>	294	<b>301</b>	309												
	<b>316</b>	324	<b>332</b>	340	<b>348</b>	357	<b>365</b>	374	<b>383</b>	392	<b>402</b>	412												
	<b>422</b>	432	<b>442</b>	453	<b>464</b>	475	<b>487</b>	499	<b>511</b>	523	<b>536</b>	549												
	<b>652</b>	576	<b>590</b>	604	<b>619</b>	634	<b>649</b>	665	<b>681</b>	698	<b>715</b>	732												
	<b>750</b>	768	<b>787</b>	806	<b>825</b>	845	<b>866</b>	887	<b>909</b>	931	<b>953</b>	976												
E192 series	100	101	102	104	105	106	107	109	110	111	113	114	115	117	118	120	121	123	124	126	127	129	130	132
	133	135	137	138	140	142	143	145	147	149	150	152	154	156	158	160	162	164	165	167	169	172	174	176
	178	180	182	184	187	189	191	193	196	198	200	203	205	208	210	213	215	218	221	223	226	229	232	234
	237	240	243	246	249	252	255	258	261	264	267	271	274	277	280	284	287	291	294	298	301	305	309	312
	316	320	324	328	332	336	340	344	348	352	357	361	365	370	374	379	383	388	392	397	402	407	412	417
	422	427	432	437	442	448	453	459	464	470	475	481	487	493	499	505	511	517	523	530	536	542	549	556
	562	569	576	583	590	597	604	612	619	626	634	642	649	657	665	673	681	690	698	706	715	723	732	741
	750	759	768	777	787	796	806	816	825	835	845	856	866	876	887	898	909	920	931	942	953	965	976	988

\* E48 values in **bold** are the alternate values of E96

Ordering information		12 NC									
		Last digit of 12 NC									
<ul style="list-style-type: none"> <li>The first 8 or 9 digits of the 12 digit catalogue number are given under "Ordering information preferred types" (see following pages). The remaining 4 or 3 digits represent the resistance value with the last digit indicating the multiplier as shown in the table.</li> <li>Example:  <math>1\ \Omega = 1008</math> or <math>108</math>  <math>33\ k\Omega = 3303</math> or <math>333</math>  <math>10\ M\Omega = 1006</math> or <math>106</math> </li> </ul>											
Resistance	0.1 $\Omega$ to 0.999 $\Omega$	1 $\Omega$ to 9.99 $\Omega$	10 $\Omega$ to 99.9 $\Omega$	100 $\Omega$ to 999 $\Omega$	1 k $\Omega$ to 9.99 k $\Omega$	10 k $\Omega$ to 99.9 k $\Omega$	100 k $\Omega$ to 999 k $\Omega$	1 M $\Omega$ to 9.99 M $\Omega$	10 M $\Omega$ to 99.9 M $\Omega$		
Last digit	7	8	9	1	2	3	4	5	6		

resistors

Linear



Commodity / Professional resistors											
Max. size (SMD: 1/10 inch leaded : mm)	SMD								Leaded		
Tolerance	1218	1210	2512	2010	1206	0805	0603	0402	4.0 x 11.9	2.5 x 6.5	1.9 x 3.6
±5% / ±1% standard	DCY 1218	DCW 1210	DCB 2512	DCZ 2010	DCA 1206	DCU 0805	DCT 0603	DCS 0402		SFR25 SFR25H	SFR16S
±1% / ±0.5% professional			MMB 0207	MMB 0207	MMA 0204	MCU 0805 MMU 0102	MCT 0603	MCS 0402	MBE 0414	MBB 0207/ MRS 25*	MBA 0204/ MRS 16*

\* MRS25; MRS16 only in ±1% tolerance

Application specific resistors			Power resistors				
	SMD	Leaded	Wirewound		Stand up	Radial mount	Metal film
High frequency	MCT 0603 HF	MBA 0204 HF					
	MMU 0102 HF		±5%	±1%	±5%		±1%/±5%
	MMA 0204 HF		AC	PAC	SMW SMF	RMW RMF	PR
	MMB 0207 HF		(40 °C)	(25 °C)	(70 °C)	(70 °C)	(70 °C)
High ohmic/ high voltage	OCT 0603	VR25	1 Watt	01	01		01
	OCU 0805	VR37	2 Watt		02	02	02
		VR68					
Low ohmic	NCT 0603	MBA 0204	3 Watt	03	03	03	03
	NCU 0805	MBB 0207	4 Watt	04	04		
	MMU 0102	MBE 0414	5 Watt	05	05	05	05
	MMA 0204		6 Watt		06		
	MMB 0207	LVR05	7 Watt	07			07
Fusible - (non- flammable) Laser trimmable		NFR25	10 Watt	10			10
		NFR25H	15 Watt	15			15*
	TCT 0603		20 Watt	20			20*
	TCU 0805						
	TCA 1206						
High voltage surge		LSR37					

\* RMW only

Precision / Ultra precision resistors																
SMD						Leaded										
Size	TC	Precision			Ultra precision		Size	TC	Precision			Ultra precision				
		±0.5%	±0.25%	±0.1%	±0.05%	±0.02%			±0.5%	±0.25%	±0.1%	±0.05%	±0.02%	±0.01%		
0603	TC25	-	MCT 0603			-	-	1.6 x 3.6	TC25	MBA 0204 (0.25 W)			-	-	-	
	TC15	-				-	-		TC15				-	-	-	
	TC10	-				-	-		TC10	-	-	-	UXA 0204 (0.05 W)			
0805	TC25	-	MMU 0102 MCU 0805			-	-	2.5 x 6.5	TC 5	-	-	-				
	TC15	MMU 0102				-	-		TC 2	-	-	-				
	TC10	-	MCU 0805			-	-		TC25	MPR24 (0.25 W)			MPR24 (0.125 W)			
1206	TC25	-	MMA 0204	MMA 0204 MCA 1206	-	-	4 x 11.9	TC10	MPR24 (0.25 W)			MPR24 (0.125 W) UXB 0207 (0.125 W)				
	TC15	MMA 0204	MMA 0204			-		-	TC 5							
	TC10	-	UMA 0204			-		-	TC 2	-	UXB 0207 (0.125 W)					
	TC 5	-				-		-	TC25	MBE 0414 (0.65 W)			-	-	-	
2512	TC25	-	MMB 0207			-	-	TC15				-	-	-		
2010	TC15	-				-	-					-	-	-		



	Standard							
Technology	Thick film							
Series	DCS 0402		DCT 0603		DCU 0805		DCA 1206	
Body size (mm)	0.5 x 1.0		0.85 x 1.6		1.25 x 2.0		1.6 x 3.15	
Case size	0402		0603		0805		1206	
Standard P <sub>70</sub>	0.063 W		0.063 W		0.125 W		0.25 W	
Temperature range	-55 to +125 °C		-55 to +125 °C		-55 to +125 °C		-55 to +125 °C	
U <sub>max</sub>	50 V		50 V		150 V		200 V	
Tolerance	±5%	±1%	±5%	±1%	±5%	±1%	±5%	±1%
E-series	E24	E24 and E96	E24	E24 and E96	E24	E24 and E96	E24	E24 and E96
Resistance range including temperature coefficient (TC)								
0 Ω	jumper	jumper	jumper	jumper	jumper	jumper	jumper	jumper
0.1 Ω								
1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω
10 Ω	TC -300/+500	TC -200/+500	TC -300/+500	TC -300/+500	TC -300/+500	TC -300/+500	TC -300/+500	TC -300/+500
100 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω
1 kΩ	TC 200	TC 200						
10 kΩ	1 kΩ	1 kΩ						
100 kΩ	TC 300	TC 300	TC 200	TC 100	TC 200	TC 100	TC 200	TC 100
1 MΩ								
10 MΩ	3.3 MΩ	1 MΩ		1 MΩ		1 MΩ		1 MΩ
22 MΩ			10 MΩ	TC 400	10 MΩ	TC 400	10 MΩ	TC 400
			22 MΩ		22 MΩ		22 MΩ	
Remarks								

## Ordering information preferred types

Series	DCS 0402		DCT 0603		DCU 0805		DCA 1206	
Quantity	10 000		5 000		5 000		5 000	
Packaging	paper tape		paper tape		paper tape		paper tape	
Cat. Number	2312 3641 ...	2312 3643 ...	2312 3041 ...	2312 3047 ...	2312 3241 ...	2312 3247 ...	2312 3441 ...	2312 3447 ...
Note	see page 185 and 186 for E24 and E96 values, body dimensions and last 4 digits of the catalogue number							



	Standard							
Technology	Thick film							
Series	DCW 1210		DCY 1218		DCZ 2010		DCB 2512	
Body size (mm)	2.6 x 3.05		3.05 x 4.6		2.5 x 5.0		3.2 x 6.4	
Case size	1210		1218		2010		2512	
Standard P <sub>70</sub>	0.33 W		1 W		0.5 W		1 W	
Temperature range	-55 to +125 °C		-55 to +155 °C		-55 to +155 °C		-55 to +155 °C	
U <sub>max</sub>	200 V		200 V		200 V		250 V	
Tolerance	5%	1%	5%	1%	5%	1%	5%	1%
E-series	E24	E24 and E96	E24	E24 and E96	E24	E24 and E96	E24	E24 and E96
Resistance range including temperature coefficient (TC)								
0 Ω	jumper	jumper	jumper	jumper	jumper	jumper	jumper	jumper
0.1 Ω								
1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω	1 Ω
	TC 400	TC 400	TC 200	TC 200	TC 300	TC 300	TC 300	TC 300
10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω	10 Ω
100 Ω								
1 kΩ	TC 200	TC 100	TC 100	TC 100	TC 200	TC 200	TC 200	TC 200
10 kΩ								
100 kΩ								
1 MΩ		1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ	1 MΩ
		TC 200	TC 200	TC 200	TC 300	TC 300	TC 300	TC 300
10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ	10 MΩ

Remarks

Ordering information preferred types								
Series	DCW 1210		DCY 1218		DCZ 2010		DCB 2512	
Quantity	5 000		3 000		4 000		4 000	
Packaging	paper tape		blister tape		blister tape		blister tape	
Cat. Number	2390 105 3....	2390 105 1....	2390 106 3....	2390 106 1....	2390 107 3....	2390 107 1....	2390 108 3....	2390 108 1....
Note	See page 185 and 186 for E42, E96 and values, body dimensions and last 4 or 3 digits of the catalogue number							

Linear resistors



	Professional				Precision					
Technology	Thin film				Thin film					
Series	MCS 0402		MCT 0603		MCU 0805		MCT 0603	MCU 0805	MCA 1206	
Body size (mm)	0.5 x 1.0		0.8 x 1.6		1.25 x 2.0		0.8 x 1.6	1.25 x 2.0	1.6 x 3.15	
Case Size	0402 (1005)		0603 (1608)		0805 (2012)		0603 (1608)	0805 (2012)	1206 (3216)	
Standard P <sub>70</sub>	0.063 W		0.1 W		0.125 W		0.1 W	0.125 W	0.125 W	
Temp. range	-55 to +125 °C		-55 to +125 °C		-55 to +125 °C		-55 to +125 °C	-55 to +125 °C	-55 to +125 °C	
Power P <sub>70</sub>	0.1 W		0.125 W		0.2 W		-	-	-	
Temp. range	-55 to +155 °C		-55 to +155 °C		-55 to +155 °C		-	-	-	
Precision P <sub>70</sub>	-		-		-		0.032 W	0.05 W	-	
Temp. range	-		-		-		-10 to +85 °C	-10 to +85 °C	-	
U <sub>max</sub>	50 V		75 V		150 V		75 V	150 V	150 V	
Tolerance	±1%	±0.5%	±1%	±0.5%	±0.5%	±0.25%	±0.1%	±0.25%	±0.1%	
E-Series	E24 and E96	E24 and E96	E24 and E96	E24 and E96	E24 and E96	E96 and E192	E96 and E192	E96 and E192	E96 and E192	
Resistance range including temperature coefficient (TC)										
0 Ω	jumper		jumper		jumper					
0.1 Ω										
1 Ω										
10 Ω	10 Ω		1 Ω		10 Ω		47 Ω	10 Ω	47 Ω	
100 Ω	100 Ω		47 Ω		100 Ω		47 Ω	100 Ω	47 Ω	
1 kΩ	TC 50		TC 50		TC 50		TC 25/15/10	TC 25/15/10	TC 25	
10 kΩ	TC 50/25		TC 50/25		TC 25		TC 25/15	TC 25/15	TC 25	
100 kΩ	100 kΩ		221 kΩ		332 kΩ		20 kΩ	20 kΩ	36 kΩ	
1 MΩ	4.99 MΩ		10 MΩ				TC 25/15	TC 25/15	36 kΩ	
10 MΩ							150 kΩ	150 kΩ	100 kΩ	
							100 kΩ	100 kΩ	100 kΩ	
							TC 25	TC 25	TC 25	
							221 kΩ	221 kΩ	221 kΩ	
							332 kΩ	332 kΩ	332 kΩ	

Remarks other values are available on request

Ordering information preferred types									
Series	MCS 0402		MCT 0603		MCU 0805		MCT 0603	MCU 0805	MCA 1206
Quantity	10 000		5000		5000		5000	5000	5000
Packing	paper tape		paper tape		paper tape		paper tape	paper tape	paper tape
Cat. number	2312	2312	2312	2312	2312 256 5...		2312	2312	2312 396 7....
	275 1....	276 5....	21. 1....	21. 5....			21. 6....	21. 7....	25. 6....
Note	See page 185 and 186 for E42, E96 and values, body dimensions and last 4 or 3 digits of the catalogue number								

Linear resistors



	High ohmic		Low ohmic		Laser trimmable					
Technology	Cermet film		Cermet film		Cermet film					
Series	OCT 0603	OCU 0805	NCT 0603	NCU 0805	TCT 0603			TCU 0805		TCA 1206
Body size (mm)	0.8 x 1.6	1.25 x 2.0	0.8 x 1.6	1.25 x 2.0	0.8 x 1.6			1.25 x 2.0		1.6 x 3.15
Case Size	0603 (1608)	0805 (2012)	0603 (1608)	0805 (2012)	0603 (1608)			0805 (2012)		1206 (3216)
Standard P <sub>70</sub>	limited by U <sub>max</sub>		0.1 W	0.125 W	0.1 W			0.125 W		0.25 W
Temp. range	-55 to +125 °C		-55 to +125 °C		-25 to +125 °C			-55 to +125 °C		
Power P <sub>70</sub>	limited by U <sub>max</sub>		0.125 W	0.2 W	0.125 W			0.2 W		-
Temp. range	-55 to +155 °C		-55 to +155 °C		-55 to +155 °C			-55 to +155 °C		-
U <sub>max</sub>	150 V	200 V	limited by P <sub>70</sub>		75 V			150 V		200 V
Tolerance	±5%	±5%	±5%	±5%	+0/-30%	+0/-20%	+0/-10%	+0/-30%	+0/-20%	+0/-10%
E-Series	E24	E24	E24	E24	E12			E12		E12
Resistance range including temperature coefficient (TC)										
0 Ω										
0.1 Ω			0.22 Ω	0.22 Ω						
1 Ω			TC 100	TC 100						
10 Ω			<1 Ω	<1 Ω	10 Ω			10 Ω		10 Ω
100 Ω					TC 100			TC 100		
1 kΩ					100 Ω			100 Ω		
10 kΩ					TC 100/50			TC 100/50		TC 100
100 kΩ										
1 MΩ										
10 MΩ	>10 MΩ	>10 MΩ			1 MΩ			1 MΩ		1 MΩ
100 MΩ	TC 100 ≥51 MΩ	TC 100 ≥51 MΩ								
1 GΩ	TC 250 130 MΩ	TC 250 130 MΩ								
Remarks					other values are available on request					

Ordering information preferred types											
Series	OCT 0603	OCU 0805	NCT 0603	NCU 0805	TCT 0603			TCU 0805		TCA 1206	
Quantity	5000	5000	5000	5000	5000			5000		5000	
Packing	paper tape	paper tape	paper tape	paper tape	paper tape			paper tape		paper tape	
Cat. number	2312 219 3....	2312 259 3....	2312 219 3....	2312 259 3....	2312 30. 1....	2312 30. 2....	2312 30. 3....	2312 32. 1....	2312 32. 2....	2312 32. 3....	312 340 2....
Note	See page 185 and 186 for E24, E96 and E192 values, body dimensions and last 4 or 3 digits of the catalogue number										



	High frequency
Technology	Thin film
Series	<b>MCT 0603 HF</b>
Body size (mm)	0.8 x 1.6
Case Size	0603 (1608)
Standard P <sub>70</sub>	0.1 W
Power P <sub>70</sub>	-55 to +125 °C
Temp. range	0.125 W
U <sub>max</sub>	-55 to +155 °C
Tolerance	75 V
E-Series	±2%
Resistance range including temperature coefficient (TC)	E24
0 Ω	
0.1 Ω	
1 Ω	
10 Ω	6.8 Ω
100 Ω	TC 50
1 kΩ	470 Ω
10 kΩ	
100 kΩ	
1 MΩ	
10 MΩ	
100 MΩ	
1 GΩ	
Remarks	+50 Ω
<b>Ordering information preferred types</b>	
Series	<b>MCT 0603 HF</b>
Quantity	5000
Packing	paper tape
Cat. number	2312 2180....
Note	See page 185 and 186 for E24 values, body dimensions and last 4 or 3 digits of the catalogue number





Professional												
Thin film												
Series	MMU 0102				MMA 0204				MMB 0207			
Body size (mm)	Ø1.1 x 2.2				Ø1.4 x 3.6				Ø2.2 x 5.8			
Case Size	0102 (RC 2211)				0204 (RC 3715)				0207 (RC 6123)			
Standard P <sub>70</sub>	0.2 W				0.25 W				0.4 W			
Temp. range	-55 to +125 °C				-55 to +125 °C				-55 to +125 °C			
Power P <sub>70</sub>	0.3 W				0.4 W				1.0 W			
Temp. range	-55 to +155 °C				-55 to +155 °C				-55 to +155 °C			
U <sub>max</sub>	150 V				200 V				300 V			
Tolerance	±5%	±2%	±1%	±0.5%	±5%	±1%	±0.5%	±5%	±2%	±1%	±0.5%	
E-Series	E24	E24	E24 and E96	E24 and E192	E24	E24 and E96	E24 and E192	E24	E24 and E96	E24 and E192	E24 and E192	
Resistance range including temperature coefficient (TC)												
0 Ω	jumper											
0.1 Ω												
1 Ω	0.22 Ω TC 50	1 Ω	10 Ω	47 Ω	0.22 Ω TC 50	1 Ω	10 Ω	0.1 Ω TC 100 0.2 Ω	0.22 Ω TC 50	1 Ω	10 Ω	
10 Ω	<1 Ω	TC 50	10 Ω	47 Ω	<1 Ω	TC 50	10 Ω	<1 Ω	<1 Ω	1 Ω	10 Ω	
100 Ω			TC 50/25	TC 50/25			TC 50/25			TC 50		
1 kΩ			TC 50/25	TC 50/25			TC 50/25			TC 50		
10 kΩ			TC 50/25	TC 50/25			TC 50/25			TC 50		
100 kΩ			TC 50/25	TC 50/25			TC 50/25			TC 50		
1 MΩ			221 kΩ TC 50	221 kΩ			475 kΩ TC 50	475 kΩ			1 MΩ	
10 MΩ			2.21 MΩ				10 MΩ			8.2 MΩ		
Remarks									available on request			

Linear resistors

Ordering information preferred types												
Series	MMU 0102				MMA 0204				MMB 0207			
Quantity	3000				3000				7000			
Packing	blister tape				blister tape				blister tape			
Cat. number	2312 165 1....	2312 166 5....	2312 155 1....	2312 156 5....	2312 185 1....	2312 185 5....	2312 185 1....	2312 185 5....	2312 185 1....	2312 185 5....	2312 185 5....	
Note	See page 185 and 186 for E24, E96 and E192 values, body dimensions and last 4 digits of the catalogue number											



	Precision						Ultra precision				
Technology	Thin film						Thin film				
Series	MMU 0102		MMA 0204			MMB 0207		UMA 0204			
Body size (mm)	Ø1.1 x 2.2		Ø1.4 x 3.6			Ø2.2 x 5.8		Ø1.4 x 3.6			
Case Size	0102 (RC 2211)		0204 (RC 3715)			0207 (RC 6123)		0204 (RC 3715)			
Standard P70 Temp. range	0.2 W -55 to +125 °C		0.25 W -55 to +125 °C			0.4 W -55 to +125 °C		0.25 W -55 to +125 °C			
Precision P70 Temp. range	0.06 W -55 to +85 °C		0.07 W -55 to +85 °C			0.11 W -55 to +85 °C		0.07 W -55 to +85 °C			
U <sub>max</sub>	150 V		200 V			300 V		200 V			
Tolerance	±0.25%	±0.1%	±0.5%	±0.25%	±0.1%	±0.25%	±0.1%	±0.25%	±0.1%	±0.05%	±0.02% <sup>1)</sup>
E-Series	E24 and E192	E24 and E192	E192	E192	E192	E192	E192	E192	E192	E192	E192
Resistance range including temperature coefficient (TC)											
10 Ω			10 Ω	22 Ω	43 Ω	15 Ω	33 Ω	22 Ω	43 Ω	47 Ω	
100 Ω	100 Ω	100 Ω						TC 10	TC 10	TC 15	100 Ω
1 kΩ	TC 25/15	TC 25/15	TC 15	TC 25/15	TC 25/15	TC 25	TC 25/15	TC 10/05	TC 10/05	TC 10/05	TC 05
10 kΩ											
100 kΩ	TC 25	100 kΩ						100 kΩ	100 kΩ	100 kΩ	100 kΩ
			221 kΩ	221 kΩ	221 kΩ			TC 10	TC 10	TC 15	
1 MΩ				TC 25 332 kΩ	TC 25 332 kΩ						
10 MΩ						1 MΩ	1 MΩ				
Remarks							other values are available on request <sup>1)</sup> on request				

Ordering information preferred types											
Series	MMU 0102			MMA 0204			MMB 0207			UMA 0204	
Quantity	3000			3000			2000			100/1000/3000/10000*	
Packing	blister tape			blister tape			blister tape			antistatic blister tape	
Cat. number	2312 166 6....	2312 166 7....	2312 167 7....	2312 156 6....	2312 156 7....	2312 157 7....	2312. 196 6....	2312 196 7....	2312 197 7....	2312 10.....	2312 11.....
Note	See page 185 and 186 for E24, E96 and E192 values, body dimensions and last 4 digits of the catalogue number * no preferred types										



	High pulse load	High frequency		
Technology	Carbon film	Thin film		
Series	<b>CMA 0204</b>	<b>MMU 0102 HF</b>	<b>MMA 0204 HF</b>	<b>MMB 0207 HF</b>
Body size (mm)	Ø1.4 x 3.6	Ø1.1 x 2.2	Ø1.4 x 3.6	Ø2.2 x 5.8
Case Size	0204 (RC 3715)	0102 (RC 2211)	0204 (RC 3715)	0207 (RC 6123)
Standard P70	0.25 W	0.2 W	0.25 W	0.4 W
Temp. range	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C
Power P70	0.4 W	0.3 W	0.4 W	1.0 W
Temp. range	-55 to +155 °C	-55 to +155 °C	-55 to +155 °C	-55 to +155 °C
U <sub>max</sub>	200 V	limited by P70	limited by P70	limited by P70
Tolerance	±2%	±2%	±1%	±2%
E-Series	E24	E24	E24 and E96	E24
Resistance range including temperature coefficient (TC)				
1 Ω			1.5 Ω	
10 Ω	10 Ω	6.8 Ω		6.8 Ω
100 Ω		TC 50	TC 50	TC 50
1 kΩ		470 Ω	475 Ω	470 Ω
10 kΩ				
100 kΩ				
1 MΩ	100 kΩ			
Remarks		other values typical for RF applications are also available e.g. 50 Ω		

Ordering information preferred types				
Series	<b>CMA 0204</b>	<b>MMU 0102 HF</b>	<b>MMA 0204 HF</b>	<b>MMB 0207 HF</b>
Quantity	3000	3000	3000	2000
Packing	blister tape	blister tape	blister tape	blister tape
Cat. number	2312 159 2....	2312 168 0....	2312 158 0....	2312 198 0....
Note	See page 185 and 186 for E24 and E96 values, body dimensions and last 4 digits of the catalogue number			



General purpose and precision				
Technology	Metal film			
Series	SFR16S	SFR25/ SFR25H	MRS16	MRS25
Body size (mm)	Ø1.9 x 3.2	Ø2.5 x 6.5	Ø1.9 x 3.6	Ø2.5 x 6.5
Power P70	0.5 W	0.4 W / 0.5 W	0.4 W	0.6 W
Temp. range	-55 to +155 °C	-55 to +155 °C	-55 to +155 °C	-55 to +155 °C
U <sub>max</sub>	200 V	250 V (350 V)	200 V	350 V
Tolerance	±5% ; ±1%	±5% ; ±1%	±1%	±1%
E-Series	E24 (5%) E24/E96 (1%)	E24 (5%) E24/E96 (1%)	E24/E96	E24/E96
Resistance range including temperature coefficient (TC)				
0.1 Ω		0.22 Ω		
1 Ω	1 Ω TC 250			1 Ω
4.7 Ω	4.7 Ω			
10 Ω			4.99 Ω	
100 Ω				
1 kΩ	TC 100	TC 100	TC 50	TC 50
10 kΩ				
100 kΩ	100 kΩ			
1 MΩ	TC 250	1 MΩ TC 250	1 MΩ	
3 MΩ	3 MΩ			
10 MΩ		10 MΩ		10 MΩ
Remarks			for new designs, please use types MBB0207 (MRS25 replacement) and MBA0204 (MRS16 replacement)	
Ordering information preferred types				
Series	SFR16S	SFR25/ SFR25H	MRS16	MRS25
Quantity	5000	5000	5000	5000
Packing	ammopack	ammopack	ammopack	ammopack
Cat. number	2306 187 3...	2322 188 2... / 186 76...	2322 157 2....	2322 156 2....
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number			

**maintenance type**



Professional									
Thin film									
Series	MBA 0204			MBB 0207			MBE 0414		
Body size (mm)	Ø1.6 x 3.6			Ø2.5 x 6.3			Ø4.0 x 11.9		
Case Size	0204			0207			0414		
Long term P70	0.25 W			0.4 W			0.65 W		
Temp. range	-55 to +125 °C			-55 to +125 °C			-55 to +125 °C		
Standard P70	0.4 W			0.6 W			1.0 W		
Temp. range	-65 to +155 °C			-65 to +155 °C			-65 to +155 °C		
U <sub>max</sub>	200 V			350 V			500 V		
Tolerance	±5%	±1%	±0.5%	±5%	±1%	±0.5%	±5%	±1%	±0.5%
E-Series	E24	E24	E24	E24	E24	E24	E24	E24	E24
		and E96	and E192		and E96	and E192		and E96	and E192
Resistance range including temperature coefficient (TC)									
0 Ω	jumper			jumper					
0.1 Ω	0.22 Ω			0.22 Ω			0.22 Ω		
	TC 50			TC 50			TC 50		
	< 1 Ω			< 1 Ω			< 1 Ω		
1 Ω		1 Ω			1 Ω			1 Ω	
		TC 50			TC 50			TC 50	
10 Ω		10 Ω	10 Ω		10 Ω	10 Ω		10 Ω	10 Ω
		TC 50			TC 50			TC 50	
100 Ω		10 Ω			10 Ω			10 Ω	
1 kΩ		TC 50/25	TC 50/25		TC 50/25	TC 50/25		TC 50/25	TC 50/25
10 kΩ									
100 kΩ		475 kΩ							
			475 kΩ						
1 MΩ					1 MΩ			1 MΩ	
					TC 50			TC 50	
10 MΩ		TC 50			TC 50			TC 50	
		10 MΩ			10 MΩ			10 MΩ	
100 MΩ									
					> 10 MΩ				
					TC 50				
					22 MΩ				
								2.4 MΩ	
								TC 50	
									2.4 MΩ
									22 MΩ

Remarks

Ordering information preferred types									
Series	MBA 0204			MBB 0207			MBE 0414		
Quantity	5000			5000			1000		
Packing	cardboard box			cardboard box			cardboard box		
Cat. number	2312 905 3...	2312 90. 1....	2312 90. 5....	2312 915 3...	2312 91. 1....	2312 91. 5....	2312 920 3...	2312 92. 1....	2312 92. 5....
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number								

resistors

Linear



	Precision						High and ultra precision	
Technology	Thin film						Metal film	
Series	<b>MBA 0204</b>		<b>MBB 0207</b>		<b>MBE 0414</b>		<b>MPR 24</b>	
Body size (mm)	Ø1.6 x 3.6		Ø2.5 x 6.3		Ø4.0 x 11.9		Ø2.5 x 6.3	
Case Size	2040		0207		0414			
Long term P70 Temp. range	0.25 W -55 to +125 °C		0.4 W -55 to +125 °C		0.65 W -55 to +125 °C			
Power P70 Temp. range							0.25 W -55 to +155 °C	0.125 W -55 to +125 °C
Precision P70 Temp. range	0.07 W -55 to +85 °C		0.11 W -55 to +85 °C		0.17 W -55 to +85 °C			
U <sub>max</sub>	200 V		300 V		500 V		250 V	250 V
Tolerance	±0.25%	±0.1%	±0.25%	±0.1%	±0.25%	±0.1%	±0.5% ±0.25% ±0.1%	±0.05% ±0.02% ±0.01%
E-Series	E24 and E192	E24 and E192	E24 and E192	E24 and E192	E24 and E192	E24 and E192	E192 and other values	E192 and other values
Resistance range including temperature coefficient (TC)							4.99 Ω	
1 Ω								
10 Ω	22 Ω		10 Ω	10 Ω	22 Ω			
100 Ω		43 Ω				43 Ω		
1 kΩ	TC 25/15	TC 25/15	TC 25/15	TC 25/15	TC 25/15	TC 25/15		
10 kΩ								
100 kΩ	221 kΩ	221 kΩ						100 kΩ
1 MΩ	TC 25	TC 25			1 MΩ TC 25 1.5 MΩ	1 MΩ		
10 MΩ	332 kΩ	332 kΩ	1 MΩ	1 MΩ			1 MΩ	
100 MΩ							TC 25/10/05	TC 25/10/05
Remarks							extreme long term stability, smaller tolerances and lower TC values are possible; for new designs, please use type UXB 0207 (MPR24 replacement)	

Ordering information preferred types								
Series	<b>MBA 0204</b>		<b>MBB 0207</b>		<b>MBE 0414</b>		<b>MPR 24</b>	
Quantity	1000		1000		1000		1000	
Packing	cardboard box		cardboard box		cardboard box		ammopack	
Cat. number	2312 90. 6....	2312 90. 7....	2312 91. 6....	2312 91. 7....	2312 92. 6....	2312 92. 7....	on request	on request
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number							



		Ultra precision							
Technology		Thin film							
Series		UXA 0204				UXB 0207			
Body size (mm)		Ø1.6 x 3.6				Ø2.5 x 6.3			
Case Size		0204				0207			
Precision P85		0.05 W				0.125 W			
Temp. range		-20 to +125 °C				-20 to +125 °C			
U <sub>max</sub>		200 V				250 V			
Tolerance		±0.25%	±0.1%	±0.05%	±0.01%	±0.25%	±0.1%	±0.05%	±0.01%
E-Series		any resistance value				any resistance value			
Resistance range including temperature coefficient (TC)									
10 Ω		22 Ω				10 Ω	10 Ω		
		TC 10	43 Ω					24 Ω	24 Ω
100 Ω		47 Ω	47 Ω			TC 10/05	TC 10/05	TC 10/05	TC 10/05
		TC 10/05	TC 10/05		100 Ω	100 Ω	100 Ω		
1 kΩ		100 Ω	100 Ω	100 Ω	TC 10			150 Ω	
		TC 10/05/02	TC 10/05/02	TC 10/05/02	TC 10/05/02	TC 10/05/02	TC 10/05/02	TC 10/05/02	TC 10/05/02
10 kΩ		150 kΩ	150 kΩ	150 kΩ		150 kΩ	150 kΩ	150 kΩ	150 kΩ
		TC 10	TC 10	TC 10	150 kΩ	TC 10/05	TC 10/05	TC 10/05	TC 10/05
100 kΩ		180 kΩ						221 kΩ	221 kΩ
		221 kΩ	221 kΩ					TC 10	TC 10
1 MΩ						1 MΩ	1 MΩ	301 kΩ	301 kΩ

Remarks TC 10/05 are specified over the temperature range -20 to +85 °C; TC 02 is specified over the temperature range 0 to +60 °C

Ordering information preferred types	
Series	UXA 0204 UXB 0207
Quantity	1000
Packing	cardboard box
Cat. number	2312 66. .... 2312 67. ....
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number

Linear resistors



	Fusible		High voltage surge	High ohmic / High voltage					
Technology	Metal film		Thick film	Thick film					
Series	<b>NFR25</b>	<b>NFR25H</b>	<b>LSR37</b>	<b>VR25</b>		<b>VR37</b>		<b>VR68</b>	
Body size (mm)	Ø2.5 x 6.5	Ø2.5 x 6.5	Ø4 x 9	Ø2.5 x 6.5		Ø4 x 9		Ø6.8 x 18	
Power P70	0.33 W	0.5 W	0.5 W	0.25 W		0.5 W		1 W	
Temp. range	-55 to +155 °C								
U <sub>max</sub>	250 V	350 V	U <sub>r</sub> = P <sub>x</sub> R	1.6 kV (DC), 1.15 kV (RMS)		3.5 kV (DC), 2.5 kV (RMS)		10 kV (DC), 7 kV (RMS)	
Tolerance	±5%	±5%	±10% ±20%	±5%, ±10%(>15 MΩ)	±1%	±5%	±1%	±5%	±1%
E-Series	E24	E24	E12	E24/ E12 (>1 MΩ)	E24/E96	E24	E24/E96	E24	E24/E96
Resistance range including temperature coefficient (TC)									
0 Ω	0.22 Ω	0.22 Ω							
1 Ω	TC 200	TC 200							
10 Ω		4.7 Ω							
100 Ω	15 Ω								
1 kΩ	TC 100	TC 100	220 Ω						
10 kΩ			10 kΩ						
100 kΩ	15 kΩ	15 kΩ		100 kΩ	100 kΩ	100 kΩ	100 kΩ	100 kΩ	100 kΩ
1 MΩ				TC 200	TC 200	TC 200	TC 200	TC 200	TC 200
10 MΩ					15 MΩ				
100 MΩ				22 MΩ		33 MΩ		68 MΩ	
Remarks	non flammable, specified interruption, ±1% tolerance		safety product preliminary range extension from 220 Ω to 1 kΩ	safety product		safety product VDE/BSI, UL approval for resistance range and CCEE from 510 kΩ to 11 MΩ, BSI approved			

**Ordering information preferred types**

Series	<b>NFR25</b>	<b>NFR25H</b>	<b>LSR37</b>	<b>VR25</b>	<b>VR37</b>	<b>VR68</b>
Quantity	5000	5000	1000	1000	1000	500
Packing	ammopack	ammopack	ammopack	ammopack	ammopack	ammopack
Cat. number	2322 205 33...	2322 207 33...	2322 245 11...	2322 241 13...	2322 242 13...	2322 244 13...
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number					





	High pulse load	High frequency
Technology	carbon film	thin film
Series	<b>CBB 0207</b>	<b>MBA 0204 HF</b>
Body size (mm)	Ø2.5 x 6.3	Ø1.6 x 3.6
Case Size	0207	0204
Long Term P70	0.4 W	0.25 W
Temp. range	-55 to +125 °C	-65 to +125 °C
Power P70	0.6 W	0.4 W
Temp. range	-55 to +155 °C	-65 to +155 °C
U <sub>max</sub>	350 V	limited by P70
Tolerance	±2%	±2%
E-Series	E24	E24
Resistance range including temperature coefficient (TC)		
1 Ω		1.5 Ω
10 Ω	10 Ω	TC 50
100 Ω		470 Ω
1 kΩ		
10 kΩ		
100 kΩ		
1 MΩ		
10 MΩ	1.5 MΩ	
Remarks		other values typical for RF applications are also available e.g. 50 W

Ordering information preferred types		
Series	CBB 0207	MBA 0204 HF
Quantity	1000	1000
Packing	cardboard box	cardboard box
Cat. number	2312 950 2....	2312 903 0....
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number	



	Power			Power							
Technology	Metal film			Wirewound, axial cemented							
Series	PRO1	PRO2	PRO3	AC01	AC03	AC04	AC05	AC07	AC10	AC15	AC20
Body size (mm)	Ø2.5 x 6.5	Ø3.9 x 10	Ø5.2 x 16.7	Ø4.3 x 10	Ø5.5 x 13	Ø5.7 x 17	Ø7.5 x 17	Ø7.5 x 25	Ø8 x 44	Ø10 x 51	Ø10 x 67
Power	P70 1 W ≥ 1 Ω	P70 2 W ≥ 1 Ω	P70 3 W ≥ 1 Ω	0.9 W 1 W	2.5 W 3 W	3.5 W 4 W	4.7 W 5 W	5.8 W 7 W	8.4 W 10 W	12.5 W 15 W	16 W 20 W
Temp. range	-55 to +155 °C			-40 to +200 °C							
U <sub>max</sub>	350 V	500 V	750 V	determined by maximum applicable power							
Tolerance	±1%, ±5% (±2% on request)			±5%							
E-Series	E24 / E196 (1%)			E24							
Resistance range including temperature coefficient (TC)	E24 / E196 (1%)			E24							
0.1 Ω	0.22 Ω	0.33 Ω	0.68 Ω	0.1 Ω	0.1 Ω	0.1 Ω	0.1 Ω	0.1 Ω	0.68 Ω	0.82 Ω	1.2 Ω
1 Ω				TC ±600 10 Ω	TC ±600 10 Ω	TC ±600 10 Ω	TC ±600 10 Ω	TC ±600 10 Ω	TC ±600 10 Ω	TC ±600 10 Ω	TC ±600 10 Ω
10 Ω				TC -80/+140 2.4 kΩ	TC -80/+140 5.1 kΩ	TC -80/+140 6.8 kΩ	TC -80/+140	TC -80/+140	TC -80/+140	TC -80/+140	TC -80/+140
100 Ω											
1 kΩ	TC 250	TC 250	TC 250								
10 kΩ							10 kΩ	15 kΩ	27 kΩ	39 kΩ	56 kΩ
100 kΩ											
1 MΩ	1 MΩ	1 MΩ	1 MΩ								
Remarks	values < 1 Ω have 60% of P70, high power dissipation at small case size, also usable as fusible resistor up to 560 Ω			high pulse load handling capability							

Ordering information preferred types

Series	PRO1	PRO2	PRO3	AC01	AC03	AC04	AC05	AC07	AC10	AC15	AC20
Quantity	5000	1000	500	2500	500	500	500	500	500	100	100
Packing	ammopack 52 mm	ammopack 52 mm	ammopack 63 mm	ammopack	ammopack	ammopack	ammopack	ammopack	ammopack	ammopack	ammopack
Cat. number	2322 193 14... (5%) 2322 196 1... (1%)	2322 194 54... (5%) 2322 197 1... (1%)	2322 195 14... (5%) 2306 199 6... (1%)	2306 328 90...	2322 329 03...	2322 329 04...	2322 329 05...	2322 329 07...	2322 329 10...	2322 329 15...	2322 329 20...
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number										



		Power, precision						
Technology		wirewound, axial cemented						
Series		LVR05	PAC01	PAC02	PAC03	PAC04	PAC05	PAC06
Body size (mm)		W x L x H	∅4.3 x 10	∅5.5 x 13	∅5.5 x 17	∅7.5 x 17	∅7.5 x 23	∅7.5 x 25
Case Size		22 x 8 x 8.0						
Power P25		5 W	1 W	2 W	3 W	4 W	5 W	6 W
Temp. range		-25 to +155 °C	-55 to +200 °C					
U <sub>max</sub>		determined by maximum applicable power						
Tolerance		±5%	±1% (±0.5% on request)					
E-Series		E24	E24/E96					
Resistance range including temperature coefficient (TC)								
0.01 Ω		0.01 Ω						
0.1 Ω		TC 200 0.1 Ω		0.1 Ω	0.1 Ω	0.1 Ω		
1 Ω			0.22 Ω				0.68 Ω	0.68 Ω
10 Ω								
100 Ω			TC 100	TC 100	TC 100	TC 100	TC 100	TC 100
1 kΩ			2.2 kΩ					
10 kΩ			3.6 kΩ		4.7 kΩ	8.2 kΩ		
100 kΩ						10 kΩ		
1 MΩ								
10 MΩ								12 kΩ
Remarks		high pulse load handling at narrow tolerance, lower TC values available on request						

Ordering information preferred types							
Series	LVR05	PAC01	PAC02	PAC03	PAC04	PAC05	PAC06
Quantity	250	1000	500	500	500	500	500
Packing	loose	ammopack	ammopack	ammopack	ammopack	ammopack	ammopack
Cat. number	on request	2306 327 5....	2306 327 0....	2306 327 1....	2306 327 2....	2306 327 3....	2306 327 4....
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number						



	Power					
Technology	stand-up					
Series	SMW02	SMF02	SMW03	SMF03	SMW05	SMF05
Body size (mm)	W x T x H		W x T x H		W x T x H	
Case Size	11 x 7 x 20.5		13 x 9 x 25.5		13 x 9 x 25.5	
Power P70	2 W		3 W		5 W	
Temp. range	-40 to 200 °C					
U <sub>max</sub>	determined by maximum applicable power					
Tolerance	±5%					
E-Series	E24					
Resistance range including temperature coefficient (TC)						
0.01 Ω						
0.1 Ω	0.1 Ω		0.1 Ω		0.1 Ω	
1 Ω	TC 600		TC 600		TC 600	
10 Ω	10 Ω		10 Ω		10 Ω	
100 Ω	TC -80/+140		TC -80/+140		TC -80/+140	
1 kΩ	200 Ω	220 Ω	560 Ω	620 Ω	560 Ω	620 Ω
10 kΩ		TC 250		TC 250		TC 250
100 kΩ		47 kΩ		47 kΩ		47 kΩ
1 MΩ						
10 MΩ						
Remarks	high power dissipation requiring					

Linear resistors

Ordering information preferred types						
Series	SMW02	SMF02	SMW03	SMF03	SMW05	SMF05
Quantity	500	500	500	500	500	500
Packing	loose	loose	loose	loose	loose	loose
Cat. number	2306 340 03...	2306 345 03...	2306 341 03...	2306 346 03...	2306 342 03...	2306 347 03...
Note	See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number					



		Power																	
Technology		radial mounted																	
Series		RMW03	RMF03	RMW05	RMF05	RMW07	RMF07	RMW10	RMF10	RMW15	RMW20								
Body size (mm)		W x L x H			W x L x H			W x L x H			W x L x H			W x L x H			W x L x H		
Case Size		9 x 24 x 9			9.5 x 27 x 9.5			9.5 x 35 x 9.5			9.5 x 48 x 9.5			12.5 x 48 x 12.5			12.5 x 63.5 x 12.5		
Power P70		3 W			5 W			7 W			10 W			15 W			20 W		
Temp. range		-25 to 155 °C																	
U <sub>max</sub>		determined by maximum applicable power																	
Tolerance		±5%	±10%	±5%	±5%	±10%	±5%	±5%	±10%	±10%	±5%	±10%	±10%	±5%	±10%	±5%	±10%		
E-Series		E24	E24	E24	E24	E24	E24	E24	E24	E24	E24	E24	E24	E24	E24	E24	E24		
Resistance range including temperature coefficient (TC)																			

Remarks series available with different mounting heights (10 mm and 25 mm) and termination styles

		Ordering information preferred types									
Series		RMW03	RMF03	RMW05	RMF05	RMW07	RMF07	RMW10	RMF10	RMW15	RMW20
Quantity		500	500	500	500	500	500	400	400	300	300
Packing		loose	loose	loose	loose	loose	loose	loose	loose	loose	loose
Cat. number		2322 250 .....	2322 256 .....	2322 251 .....	2322 257 .....	2322 252 .....	2322 258 .....	2322 253 .....	2322 259 .....	2306 254 12... (terminal style I, length 25 mm)	2306 255 12... (terminal style I, length 25 mm)
Note		See page 185 and 186 for E24, E96, E192 values, body dimensions and the last 4 or 3 digits of the catalogue number									

Linear resistors



**Non-linear**



# r resistors

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Applications and typical functions **208**

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Overload protection **213**

Temperature sensing SMD **217**

Picture tube degaussing **218**

Humidity sensing **220**

Overvoltage protection **221**



APPLICATION	NTC THERMISTORS		PTC THERMISTORS			VARISTORS	HUMISTORS
	Temperature sensing	Temperature compensation	Degaussing	Temperature protection	Overloaded protection	Transient protection	Humidity sensing
Telecommunications	•	•			•	•	
Automotive	•	•		•	•	•	
Small domestic appliances	•			•	•	•	•
Large domestic appliances	•			•	•	•	
Colour televisions, monitors			•			•	
Other consumer equipment		•		•	•	•	
EDP	•	•		•	•	•	•
Lighting					•	•	
General industrial	•	•		•	•	•	•
Medical	•						
SMPS	•			•	•	•	

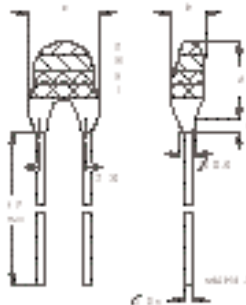




	Accuracy line			Surface mount	
Series 2322 ... ..	640 0 ...	640 6...	640 5...	615 5...	615 3...
Resistance at 25 °C	$R_{25} = 470 \Omega$ to 470 k $\Omega$	$R_{25} = 3.3 \Omega$ to 470 k $\Omega$	2 k $\Omega$ to 470 k $\Omega$	$R_{25} = 2.2 \text{ k}\Omega$ to 100 k $\Omega$	$R_{25} = 2.2 \text{ k}\Omega$ to 100 k $\Omega$
Tolerance $\Delta R/R_{25}$	±5%, ±3%, ±2%, ±1%	±5%, ±3%, ±2%	±5%, ±3%, ±2%, ±1%	±10%, ±5%, ±3%	±10%, ±5%, ±3%
B-value $B_{25/85}$	3528 to 4570 K	3528 to 4570 K	3528 to 4570 K	3500 to 4100 K	3500 to 4100 K
Max. power dissipation $P_{max}$	0.1 W - 0.2 W	0.5 W	0.1 W	0.210 W	0.125 W
Operational temperature range at $P_0$  at $P_{max}$	-40 to +125 °C (+150 °C) 0 to +55 °C	-40 to +125 °C (+150 °C) 0 to +55 °C	-40 to +125 °C (+150 °C) 0 to +55 °C	-55 to +150 °C	-55 to +150 °C
Response time	approx. 1 s	approx. 1.2 s	approx. 1.7 s	approx. 10 s	approx. 10 s
Features	<ul style="list-style-type: none"> <li>• new process technology provides resistance tolerances as good as 1%</li> <li>• high stability over a long life</li> <li>• small profile</li> <li>• excellent price/performance ratio</li> <li>• high impedance, suitable for low-current electronic switching</li> <li>• fast response time</li> </ul>			<ul style="list-style-type: none"> <li>• high sensitivity</li> <li>• suitable for wave or reflow soldering</li> <li>• available in paper tape</li> </ul>	<ul style="list-style-type: none"> <li>• high sensitivity</li> <li>• suitable for wave or reflow soldering</li> <li>• available in paper tape</li> </ul>
Applications	<ul style="list-style-type: none"> <li>• very accurate temperature sensing in domestic appliances, automotive and industrial electronics</li> </ul>			<ul style="list-style-type: none"> <li>• for temperature sensing and compensation</li> </ul>	<ul style="list-style-type: none"> <li>• for temperature sensing and compensation</li> </ul>



Outline dimensions (mm)	Series 640 6.... for temperature sensing					
	5% tolerance					
	$R_{25} \pm 5\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 640 .....	$R_{25} \pm 5\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 640 .....
1	3528	$\pm 0.5\%$	63102	22	3740 $\pm 2\%$	63223
1.5	3528	$\pm 0.5\%$	63152	33	4090 $\pm 1.5\%$	63333
2	3528	$\pm 0.5\%$	63202	47	4090 $\pm 1.5\%$	63473
2.2	3977	$\pm 0.75\%$	63222	68	4190 $\pm 1.5\%$	63683
4.7	3977	$\pm 0.75\%$	63472	100	4190 $\pm 1.5\%$	63104
6.8	3977	$\pm 0.75\%$	63682	150	4370 $\pm 2.5\%$	63154
3.3	3977	$\pm 0.75\%$	63332	220	4370 $\pm 2.5\%$	63224
10	3977	$\pm 0.75\%$	63103	330	4570 $\pm 2.5\%$	63334
12	3740	$\pm 0.75\%$	63123	470	4570 $\pm 1.5\%$	63474
15	3740	$\pm 2\%$	63153			



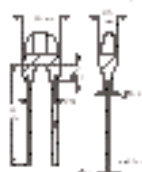
Outline dimensions (mm)

- a 3.3  $\pm 0.5$  for 330  $\Omega$  to 470 k $\Omega$
- b 3 max for 330  $\Omega$  to 470 k $\Omega$
- c 2  $\pm 1$  for 330  $\Omega$  to 470 k $\Omega$
- d 5 max for 330  $\Omega$  to 470 k $\Omega$

tinned copper leads

3% tolerance						
$R_{25} \pm 3\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 640 .....	$R_{25} \pm 3\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 640 .....	
2.7	3977	$\pm 0.75\%$	66272	47	4090 $\pm 1.5\%$	66473
4.7	3977	$\pm 0.75\%$	66472	100	4190 $\pm 1.5\%$	66104
10	3977	$\pm 0.75\%$	66103	470	4570 $\pm 1.5\%$	66474

outline dimensions (mm)

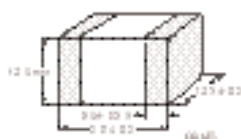


length of leads for 100  $\Omega$  to 470 k $\Omega$  through leads

Series 640 5.... for temperature sensing						
2% tolerance			1% tolerance			
$R_{25} \pm 2\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 640 .....	$R_{25} \pm 1\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 640 .....	
2.7	3977	$\pm 0.75\%$	54272	10	3977 $\pm 0.75\%$	55103
4.7	3977	$\pm 0.75\%$	54472	47	4090 $\pm 1.5\%$	55473
10	3977	$\pm 0.75\%$	54103	100	4190 $\pm 1.5\%$	55104
47	4090	$\pm 1.5\%$	54473			
100	4190	$\pm 1.5\%$	54104			

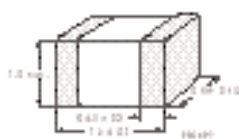
Smallest packing quantity SPQ = 500 for all preferred leaded types

outline dimensions (mm)



Series 615 5.... for temperature sensing and compensation						
5% tolerance			5% tolerance			
$R_{25} \pm 5\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 615 .....	$R_{25} \pm 5\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 615 .....	
2.2	3600	$\pm 1\%$	53222	33	3920 $\pm 1\%$	53333
4.7	3500	$\pm 1\%$	53472	47	3950 $\pm 1\%$	53473
10	3570	$\pm 1\%$	53103	68	4100 $\pm 1\%$	53683
15	3700	$\pm 1\%$	53153	100	4100 $\pm 1\%$	53104

outline dimensions (mm)



Series 615 3.... for temperature sensing and compensation						
5% tolerance			5% tolerance			
$R_{25} \pm 5\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 615 .....	$R_{25} \pm 5\%$ (k $\Omega$ )	$B_{25/85}$ (K)	catalogue number 2322 615 .....	
2.2	3510	$\pm 1\%$	33222	33	3860 $\pm 1\%$	33333
4.7	3830	$\pm 1\%$	33472	47	3960 $\pm 1\%$	33473
10	3590	$\pm 1\%$	33103	68	3985 $\pm 1\%$	33683
15	3600	$\pm 1\%$	33150	100	4090 $\pm 1\%$	53104

Packing = 4000 pcs on paper tape



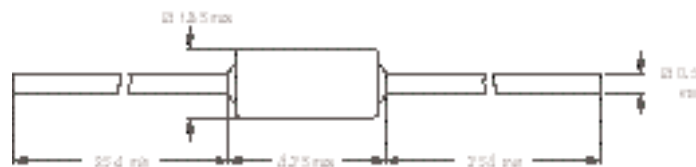
Series 2322 ... ..	<b>633 8... (bulk), 633 3... (tape and reel)</b>
Type of leads	tinned
Resistance at 25 °C	10 kΩ 20 kΩ 30 kΩ 100 kΩ 220 kΩ
Tolerance on R-value	±5%, ±10%
B-value B <sub>25/85</sub>	3977 K, 3797 K
Tolerance on B-value	±1.3%
Max. power P <sub>max</sub> dissipation	100 mW
Operational temperature range at P <sub>0</sub> at P <sub>max</sub>	-40 to +200 °C 0 to +55 °C
Temperature coefficient at 25 °C	-4.38%/K
Response time	approx. 0.9 s
Type of housing	glass SOD-27
Features	wide temperature range from -40 to +200 °C very small, available as surface-mount sensor and with leads because of their glass encapsulation they are ideal for use in corrosive atmospheres and harsh environments

**Ordering Information preferred types**

**Leaded version**

	catalogue number	R <sub>25</sub> (kΩ)	tolerance (%)	type of leads
				tinned
	2322 633 83103	10	+5	√
	2322 633 83203	20	+5	√
	2322 633 83303	30	+5	√
	2322 633 83104	100	+5	√

Outline dimensions (mm)



Packing

smallest packing quantity SPQ = 1000 , bulk



	Screw	Insulated leads	Non-insulated leads	Encapsulated, long PVC leads	Moulded
Series	2322 ... .. <b>640 7....</b>	<b>645 20 ...</b>	<b>645 10 ...</b>	<b>2322 641 2 .... / 3 .... / 4 ....</b>	<b>641 6 ....</b>
Resistance at 25 °C	R <sub>25</sub> = 100 Ω to 470 kΩ	R <sub>25</sub> = 3 kΩ, 5 kΩ and 10 kΩ	3 kΩ, 5 kΩ and 10 kΩ	R <sub>25</sub> = 2.2 kΩ to 470 kΩ	2.2 kΩ to 22 kΩ
Tolerance ΔR/R <sub>25</sub>	±5%	ΔT between 0 °C and 50 °C : ±0.5 °C		±3%	±3%
B-value B <sub>25/85</sub>	3528 to 4570 K	3977 K	3977 K	3977 to 4570 K	3740 to 4570 K
Max. power dissipation P <sub>max</sub>	0.5 W	0.1 W	0.1 W	0.2 - 0.3 W	0.25 W
Operational temperature range at P <sub>0</sub> at P <sub>max</sub>	-25 to +100 °C 0 to +55 °C	-40 to +125 °C 0 to +55 °C	-25 to +125 °C 0 to +55 °C	-40 to +80 °C 0 to +55 °C	-40 to +125 °C 0 to +55 °C
Response time	—	approx. 2.5 s	approx. 1.24 s	approx. 2.5 s	approx. 2.7 s
Features	<ul style="list-style-type: none"> <li>screw threaded sensor for optimal thermal contact</li> <li>all types of series 640 0 can be supplied on request</li> </ul>	<ul style="list-style-type: none"> <li>insulated leads</li> <li>low thermal conductivity of leads for accurate temperature sensing</li> <li>temperature accuracy of 0.5 °C from 0 °C to 50 °C</li> <li>different lead lengths available</li> </ul>	<ul style="list-style-type: none"> <li>non-insulated leads</li> </ul>	<ul style="list-style-type: none"> <li>epoxy coated NTC 641 2 .... : - epoxy coating - small size, quick response - good humidity resistance</li> <li>water resistant NTC 641 3 .... : - epoxy coating - water resistant sleeve - excellent humidity resistance</li> <li>brass pipe NTC 641 4 .... : - 2 epoxy layers - brass sensing head - rigid execution</li> </ul>	<ul style="list-style-type: none"> <li>moulded NTC thermistor with same characteristics as the ceramic chip 640 0</li> </ul>
Applications	<ul style="list-style-type: none"> <li>heatsinks, boiler flanges, vessel walls, etc.</li> </ul>	<ul style="list-style-type: none"> <li>automotive, general industrial</li> </ul>		<ul style="list-style-type: none"> <li>air conditioning, fridges, freezers, dryers, fan-heaters</li> <li>automotive</li> </ul>	<ul style="list-style-type: none"> <li>ideal where good surface contact is essential</li> </ul>

Ordering Information preferred types					
Series 641 2 .... / 3 .... / 4 .... encapsulated, long PVC leads					
	Epoxy-coated catalogue number	Water resistant catalogue number	Brass pipe catalogue number	R <sub>25</sub> (kΩ)	nominal B-value (K)
	2322 641 26222	2322 641 36222	2322 641 46222	2.2 kΩ ±3%	3977 K ±0.75%
	2322 641 26502	2322 641 36502	—	5 kΩ ±3%	3977 K ±0.75%
	2322 641 26103	2322 641 36103	2322 641 46103	10 kΩ ±3%	3977 K ±0.75%
	2322 641 26473	2322 641 36473	—	47 kΩ ±3%	4190 K ±2%
	2322 641 26104	2322 641 36104	2322 641 46104	100 kΩ ±3%	4090 K ±1.5%
Series 641 6 .... moulded					
			2322 641 66123	12 kΩ ±3%	3740 K ±2%
			2322 641 66153	15 kΩ ±3%	3740 K ±2%

resistors

Non-linear



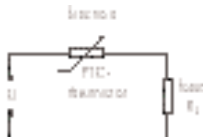
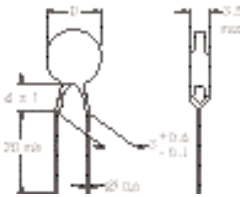
Dimensions (mm)	Catalogue number 2322 . . . . .	$I_{nt}$ 25 °C (mA)	$I_l$ 25 °C (mA)	$R_{25}$ ( $\Omega$ )	$V_{max}$ (V)	$I_{max}$ (A)	$D_{max}$ (mm)
<b>Very low voltage types (20 V)</b>							<b>NEW</b>
	660 53514	350	525	4.10	20	3.5	5.0
	660 54714	470	705	2.30	20	4.7	5.0
	661 56114	610	915	1.55	20	6.7	7.0
	661 57014	700	1050	1.20	20	7.7	7.0
	661 59014	900	1350	0.80	20	10.0	8.5
	662 51224	1200	1800	0.50	20	13.0	10.5
	662 51624	1600	2400	0.33	20	17.0	12.5
	663 52224	2200	3300	0.22	20	24.0	16.5
	664 53024	3000	4500	0.15	20	33.0	20.5
<b>Low voltage types (30 - 60 V)</b>							
	660 X9491	94	145	50	60	0.8	5.0
	660 X1311	130	195	25	60	1.2	5.0
	660 91049*	150	270	9.4	60	1.7	5.0
	660 X1811	180	270	13	30	1.7	5.0
	660 X2711	270	405	6	30	2.5	5.0
	661 X3211	320	480	5	30	3.5	7.0
	661 X4111	410	615	3	30	4.5	7.0
	661 X4711	470	705	2.5	30	5.0	8.5
	661 X5411	540	810	1.9	30	6.0	8.5
	662 X6111	610	915	1.7	30	7.0	10.5
	662 X7011	700	1050	1.3	30	8.0	10.5
	662 X8311	830	1245	1.1	30	10.0	12.5
	662 X9211	920	1380	0.9	30	11.0	12.5
	663 X1121	1170	1755	0.7	30	13.5	16.5
	663 X1321	1390	2085	0.5	30	16.0	16.5
	664 X1721	1770	2655	0.4	30	20.0	20.5
	664 X2021	2050	3075	0.3	30	23.0	20.5
		preferred					
Packing	X = 4: bulk-packed, naked disc X = 5: bulk-packed X = 6: taped on reel (not for 663 and 664 range) * = bulk-packed						
Features	<ul style="list-style-type: none"> <li>fast-acting for safe protection, time and time again</li> <li>well defined protection levels</li> <li>high current/size ratio</li> <li>UL approval pending for very low voltage types</li> <li>all other types are UL approved</li> <li>excellent long-term stability</li> <li>tolerance <math>R_{25}</math> for very low and low voltage types <math>\pm 20\%</math></li> <li>tolerance <math>R_{25}</math> for high voltage types <math>\pm 25\%</math></li> <li>protective silicone coating against harsh environment</li> </ul>						
Applications	resettable fuse overload protection for motors, transformers, SMPS, relays, loudspeakers, balast etc.						

UL 1434 compliant

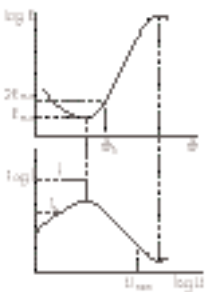


File NO: E14885

dimensions (mm)

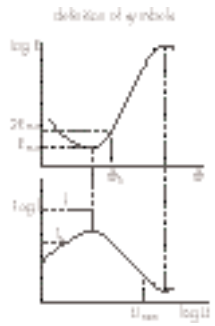
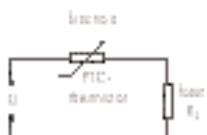
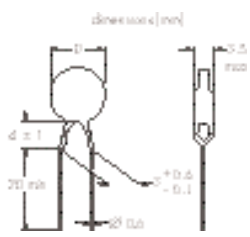


definition of symbols





Dimensions (mm)	Catalogue number 2322 . . . . .	$I_{nt}$ 25 °C (mA)	$I_t$ 25 °C (mA)	$R_{25}$ ( $\Omega$ )	$V_{max}$ (V)	$I_{max}$ (A)	$D_{max}$ (mm)
<b>Mains voltage types (145 V<sub>rms</sub>)</b>							
	660 X4792	47	70	240.0	200	0.09	7.5
	660 X6592	65	100	115.0	300	0.11	7.3
	660 X9392	93	140	55.0	450	0.13	7.3
	660 X1112	110	165	40.0	500	0.13	7.3
	660 X1312	130	195	28.0	600	0.13	7.3
	661 X1712	170	255	19.0	1000	0.15	8.3
	661 X2112	210	315	12.0	1400	0.15	8.3
	661 X2512	250	375	9.4	2000	1.6	9.0
	661 X2712	270	405	8.0	2200	1.6	9.0
	662 X3212	320	480	6.7	3000	1.9	10.5
	662 X3612	360	540	5.3	3500	1.9	10.5
	662 X4112	410	615	4.6	4500	2.2	11.7
	662 X4512	450	675	3.8	5000	2.2	11.7
<b>Mains voltage types (265 V<sub>rms</sub>)</b>							
	660 X1193	11	17	3000	265	0.08	5
	660 X1593	15	23	1900	265	0.11	5
	660 X1993	19	29	1200	265	0.14	5
	660 X2893	28	42	500	265	0.2	5
	660 X3993	39	59	260	265	0.3	5
	660 X6393	63	95	120	265	0.45	5
	660 X7693	76	115	85	265	0.55	5
	660 X9593	95	143	56	265	0.6	5
	661 X1113	110	165	48	265	0.65	7
	661 X1413	140	210	29	265	0.8	7
	661 X1713	170	255	22	265	0.9	8.5
	661 X1913	190	285	18	265	1.0	8.5
	662 X2113	210	315	17	265	1.3	10.5
	662 X2513	250	375	12	265	1.5	10.5
	662 X2813	280	420	11	265	1.8	12.5
	662 X3213	320	480	8.4	265	2.2	12.5
	663 X4013	400	600	6.6	265	3	16.5
	663 X4913	490	735	4.4	265	3.5	16.5
	664 X5913	590	855	4.0	265	4.5	20.5
	664 X7013	700	1050	2.8	265	5.5	20.5
	664 X8013	800	1200	2.1	265	5.5	20.5
	preferred						
Packing	X = 4: bulk-packed, naked disc X = 5: bulk-packed X = 6: taped on reel (not for 663 and 664 range) * = bulk-packed						
Features	<ul style="list-style-type: none"> <li>• fast-acting for safe protection, time and time again</li> <li>• no need to reset supply after overload</li> <li>• well defined protection levels</li> <li>• high current/ size ratio</li> <li>• UL approval pending for very low voltage types and 664 x 8013</li> <li>• all other types are UL approved</li> <li>• excellent long-term stability</li> <li>• tolerance <math>R_{25}</math> for very low and low voltage types <math>\pm 20\%</math></li> <li>• tolerance <math>R_{25}</math> for high voltage types <math>\pm 25\%</math></li> <li>• protective silicone coating against harsh environment</li> </ul>						
Applications	resettable fuse overload protection for motors, transformers, SMPS, relays, loudspeakers, balast etc.						



resistors

Non-linear



**Telecommunications, PTCs for secondary overcurrent protection**

Catalogue number 2322 ... ..	V <sub>max</sub> (V)	Resistance		Non-trip current		Trip current		Max. trip current		Matches pairs	D <sub>max</sub> (mm)	Compatibility
		R <sub>25</sub> (Ω)	Tol. (%)	I <sub>nt</sub> (mA)	at T (°C)	I <sub>t</sub> (mA)	at T (°C)	T <sub>t</sub> (s)	at I <sub>t</sub> (mA)			
661 91066	100	4	±25%	85	65	280	25	4.0	1000	0.5 Ω	7.0	-
661 93048	220	25	±20%	70	70	200	25	2.5	1000	1.0 Ω	8.5	K20/21
661 93147	230	10	±20%	100	70	250	25	3.0	1000	1.0 Ω	7.0	K20/21
661 93025	245	70	+10/-15%	60	70	180	25	60.0	220	no	6.7	-
661 93037	245	33	±20%	75	70	150	10	1.2	1000	1.5 Ω	7.0	-
661 93175	245	25	±15%	70	70	200	25	20.0	400	1.0 Ω	8.3	K20/21 FTCSE 131-24
661 93142	245	25	±20%	65	85	200	25	3.4	650	0.5 Ω	6.8	K20/21
662 93081	245	16	±20%	140	55	270	25	8.0	1000	no	11.0	K20/21; FTCSE 131-21
662 93074	245	10	±20%	140	55	270	25	8.0	1000	no	11.0	K20/21; FTCSE 131-21
661 93118	250	20	+10/-20%	100	40	220	25	1.0	1000	1.0 Ω	6.7	-
661 93148	250	25	±20%	70	70	175	25	1.3	1000	1.0 Ω	7.0	K20/21
663 93025	250	10	±20%	100	70	450	0	0.3	8000	no	13.6	K20/21
661 93078	285	8	±25%	135	95	400	25	6.0	1000	0.5 Ω	8.3	K20/21
661 93121	300	16	±25%	100	70	250	25	2.0	1000	no	7.0	K20/21
661 93124	350	10	±20%	100	70	270	25	4.0	1000	no	8.5	K20/21
661 93146	350	10	±20%	100	70	270	25	4.0	1000	1.0 Ω	8.5	K20/21
661 93135	600	50	±20%	50	70	140	25	1.0	1000	1.0 Ω	8.5	K20/21
661 93056	600	35	±20%	70	70	600	0	3.0	1000	3.0 Ω	8.0	K20/21
661 93139	600	25	±20%	70	70	170	25	4.0	700	0.5 Ω	8.5	K20/21
662 93129	600	25	±20%	70	70	170	25	8.0	700	0.5 Ω	10.5	K20/21
662 93114	600	10	±20%	175	25	400	25	7.0	1000	0.5 Ω	13.0	UL1459/ GR1089
662 93131	600	10	±20%	175	25	400	25	7.0	1000	no	13.0	UL1459/ GR1089

**Test and measuring equipment, PTCs for overload protection on input terminal**

Catalogue number 2322 ... ..	V <sub>max</sub> (V)	R <sub>25</sub> (Ω)	I <sub>nt</sub> at 25 °C (mA)	I <sub>t</sub> at 25 °C (mA)	D <sub>max</sub> (mm)
660 93034*	600	1600	10	20	5.0
661 93113**	600	400	1 at 55 °C	100 at -10 °C	10.0

Note

\* insulated body version

\*\* min. insulated voltage between leads and sealing: 1350 V rms

**Lighting, PTCs for electronic starting of fluorescent lamp**

Catalogue number 2322 ... ..	R <sub>min</sub> at 25 °C (Ω)	R <sub>max</sub> at 25 °C (Ω)	R <sub>max</sub> at 115 °C (Ω)	V <sub>max</sub> (peak) (V)	Typical trip time at 25 °C		D <sub>max</sub> (mm)
					t <sub>t</sub> (s)	at I <sub>t</sub> (mA)	
660 93066	75	125	-	700	0.40	200	5
660 93049	500	750	5000	700	0.50	300	5
660 93055	185	300	800	700	0.70	300	5
661 93102	225	375	-	900	0.75	300	7
661 93114	75	125	-	1000	0.85	500	7

Note: ignition time of the lamp approximately equals the tripping time



**Telecommunications, PTCs for secondary overcurrent protection**

Catalogue number 2322 ... ..	V <sub>max</sub> (V)	R <sub>25</sub>		I <sub>nt</sub> at T		I <sub>t</sub> at T		Max. trip time at I		Matches pairs available	D <sub>max</sub> (mm)
		(Ω)	(%)	(25 °C)	(25 °C)	(°C)	(°C)	T <sub>t</sub> (s)	at I <sub>t</sub> (mA)		
661 97012	245	10	20	165	100	270	3	1000	no	6.5	
661 97016 <b>NEW</b>	245	10	20	165	100	270	3	1000	0.5	6.5	
661 97005	265	25	20	120	70	220	1.3	1000	1	6.5	
661 97002	265	40	25	80	50	130	2.5	500	no	6.5	
661 97203	300	10	20	150	100	250	3	1000	0.5	7.2	
661 97004	300	15 to 20	-	150	100	250	1.5	1000	no	6.5	
661 97003	300	15 to 20	-	150	100	250	1.5	1000	0.5	6.5	
661 97018 <b>NEW</b>	300	20	20	120	70	250	1.4	1000	0.5	6.5	
661 97204	400	25	20	120	70	220	2	1000	1	7.2	
661 97009	425	35	-0.75	110	70	175	1	1000	1	6.5	
661 97019 <b>NEW</b>	425	50	20	90	60	150	0.8	1000	1	6.5	
661 97205	600	50	20	70	40	140	0.7	1000	1	7.2	

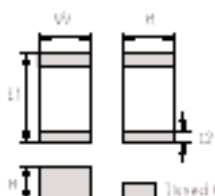
**General industrial types**

661 97013	24	3.3	25	400	25	650	6	1000	-	6.5
661 97011	60	9.4	25	150	25	300	4	600	-	6.5

Note 1. All types pass "ITU-T K20/21" telecommunication protection recommendation. (except 66197009 and 66197019)  
 2. Coating available on request



Product information



W : 1.25 ± 0.2  
 H : 0.90 ± 0.15  
 L1 : 2.00 ± 0.2  
 L2 : 0.4 ± 0.04

Temperature sensing surface mount devices



Temperature sensing surface mount devices

Catalogue number 2322 ... ..	TN (°C)	R <sub>max</sub> 4.7 kΩ at T (°C)	R <sub>min</sub> 4.7 kΩ at T (°C)
675 20707	70	65	75
675 20807	80	75	85
675 20907	90	85	95
675 21007	100	95	105
675 21107	110	105	115
675 21207	120	115	125
675 21307	130	125	135
Ratings and characteristics	<ul style="list-style-type: none"> <li>resistance at 25 °C: 470 Ω ± 50%</li> <li>maximum voltage: 25 V<sub>dc</sub> or rms</li> <li>operating temperature range at maximum voltage: -25 °C to 135 °C</li> </ul>		
Applications	<ul style="list-style-type: none"> <li>industrial Electronics</li> <li>power supplies</li> <li>electronic data processing</li> </ul>		



For temperature sensing

Nominal working temperature					Type/catalogue number				
T <sub>n</sub> (°C)	30 to 250 Ω from -20 °C to T (°C)	50 to 550 Ω at T (°C)	1.33 to 50 kΩ at T (°C)	>4 kΩ at T (°C)	leaded colour code	long leads <b>NEW</b> 2322 671 .....	normal leads 2322 671 .....	naked chip 1.7x1.7 mm 2322 671 .....	naked chip 1.0 x 1.0 mm 2322 671 .....
70	50	65	75	85	black	91152	91102	91002	91072
80	60	75	85	95	brown	-	91103	91003	91073
90	70	85	95	105	red	-	91104	91004	91074
100	80	95	105	115	orange	91155	91105	91005	91075
110	90	105	115	125	yellow	91156	91106	91006	91076
120	100	115	125	130	green	91157	91107	91007	91077
125	105	120	130	135	-	-	-	-	91078
130	110	125	135	140	blue	91159	91109	91009	91079
135	115	130	140	145	-	-	-	-	91081
140	120	135	145	150	violet	91162	91112	91012	91082
145	125	140	150	155	-	-	-	-	91083
150	130	145	155	160	grey	91164	91114	91014	91084
155	135	150	160	165	-	-	-	-	91085
160	140	155	165	170	-	-	-	91016	91086
170	150	165	175	175	-	-	-	91017	91087

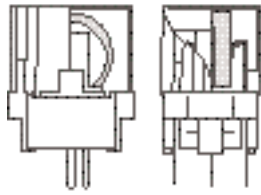
preferred

resistors

Non-linear



Pitch 4e/1e



CC664V

UL 1434 compliant



IEC 60065



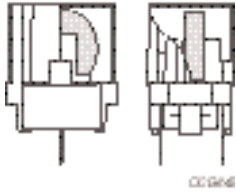
NEW

### Dual types

Catalogue number Pitch		R <sub>25</sub>		Min. I <sub>nr</sub> (2)(3)	Current attenuation maximum values (2)(4)			Rcoil (5)(6)		Typical decay performance for information only			Type (10)
4e/1e	4e/2e	R <sub>s</sub> (Ω)	Tol.(1) (%)	App	(After 5 s)	(After 30 s)	(After 180 s)	reference	minimal	Decay		Alpha max. (9) (%)	
					(mApp)	(mApp)	(mApp)	(Ω)	(Ω)	time (7) ms	cycles (8) number		
<b>Rated voltage: 220-240 V<sub>rms</sub> (U<sub>max</sub> is 276 V<sub>rms</sub>)</b>													
2322 662 96209	2322 662 96309	30	±25	11	50	5	2	25	17	60	3.0	36	
2322 662 96211	2322 662 96311	26	±25	14	50	5	2	17	14	40	2.0	43	
2322 662 96216	2322 662 96316	22	±25	16	80	8	4	17	14	40	2.0	44	
2322 662 96616	2322 662 96716	22	±25	16	80	8	2	17	10	65	3.3	33	LD
2322 662 96624	2322 662 96724	18	±25	20	80	8	2	13	10	50	2.5	38	
2322 662 96626	2322 662 96726	18	±25	18	80	15	2	17	10	75	3.8	29	LD
2322 662 96602	2322 662 96702	14	±25	25	80	10	4	10	10	40	2.0	45	
2322 662 96642	2322 662 96742	14	±25	25	80	10	4	10	10	45	2.3	40	LD
2322 662 96606	2322 662 96706	12	±20	21	80	10	5	17	10	70	3.5	36	LT
2322 662 96646	2322 662 96746	12	±20	21	100	20	5	17	10	80	4.0	30	LD/LT
2322 662 96608	2322 662 96708	9	±20	20	100	40	5	20	13	95	4.8	33	LT
2322 662 96648	2322 662 96748	9	±20	20	100	25	10	20	13	115	5.8	26	LD/LT
	2322 662 96709	7	±20	21	100	40	10	20	20	110	5.5	34	LD/LT

<b>Rated voltage: 100-120 V<sub>rms</sub> (U<sub>max</sub> is 145 V<sub>rms</sub>)</b>													
2322 662 96213	2322 662 96313	7	±20	19	200	20	10	7	5	80	4.0	31	LT
2322 662 96605	2322 662 96705	5	±20	27	200	50	14	6	5	85	4.3	30	
2322 662 96645	2322 662 96745	5	±20	30	200	20	10	5	4	85	4.3	31	LD/LT
2322 662 96643	2322 662 96743	3	±30/15	30	200	20	10	6	4	115	5.8	29	LD

Pitch 4e



CC664

UL 1434 compliant



IEC 60065



NEW

### Mono cased types

Catalogue number Pitch		R <sub>25</sub>		Min. I <sub>nr</sub> (2)(3)	Current attenuation maximum values (2)			Rcoil (4)(5)		Typical decay performance for information only			Type (9)
4e		R <sub>s</sub> (Ω)	Tol.(1) (%)	App	(After 5 s)	(After 30 s)	(After 180 s)	reference	minimal	Decay		Alpha max. (8) (%)	
					(mApp)	(mApp)	(mApp)	(Ω)	(Ω)	time (6) ms	cycles (7) number		
<b>Rated voltage: 220-240 V<sub>rms</sub> (U<sub>max</sub> is 276 V<sub>rms</sub>)</b>													
	2322 662 96281	30	±25	11	100	40	20	25	17	75	3.8	30	
	2322 662 96688	26	±25	12	50	30	20	25	14	90	4.5	30	
	2322 662 96286	22	±25	16	80	40	20	17	14	40	2.0	44	
	2322 662 96682	18	±25	20	100	50	25	13	10	50	2.5	38	
	2322 662 96683	14	±25	25	200	50	30	10	10	40	2.0	45	
	2322 662 96692	14	±25	25	200	80	30	10	10	45	2.3	40	LD
	2322 662 96684	12	±25	21	200	80	30	17	10	70	3.5	36	
	2322 662 96696	12	±25	21	200	80	30	17	10	80	4.0	30	LD
	2322 662 96687	9	±20	20	100	50	30	20	13	95	4.8	33	LT
	2322 662 96698	9	±20	20	200	50	25	20	13	115	5.8	26	LD/LT
	2322 662 96681	7	±20	21	100	50	30	20	20	110	5.5	34	LD/LT

<b>Rated voltage: 100-120 V<sub>rms</sub> (U<sub>max</sub> is 145 V<sub>rms</sub>)</b>													
	2322 662 96285	7	±20	200	70			7	5	80	4.0	31	
	2322 662 96686	5	±20	200	70			6	5	85	4.3	30	
	2322 662 96695	5	±20	200	70			5	4	85	4.3	31	LD
	2322 662 96693	3	±30/15	200	70			6	4	115	5.8	29	LD



NEW

Double mono cased types

Catalogue number Pitch (1)	R <sub>25</sub> (2)		Min. I <sub>tr</sub> (4)(5) App	Current attenuation maximum values (4)			Rcoil (6)(7)		Typical decay performance for information only			Type (11)	
	R <sub>s</sub> (Ω)	Tol.(1) (3)		(After 5 s) (mApp)	(After 30 s) (mApp)	(After 180 s) (mApp)	reference (Ω)	minimal (Ω)	Decay		Alpha max. (10) (%)		
4e/2e									time (8) ms	cycles (9) number			
<b>Rated voltage: 220-240 V<sub>rms</sub> (U<sub>max</sub> is 276 V<sub>rms</sub>)</b>													
2322 662 96754	9 (18x2)	±25	33	200	35	25	10	7	70	4.0	32	LD	
2322 662 96752	7 (14x2)	±25	34	200	35	25	10	7	80	4.0	31	LD	
2322 662 96756	6 (12x2)	±20	36	200	35	25	10	7	85	4.3	31	LD/LT	
2322 662 96758	4.5 (9x2)	±20	33	200	45	35	13	10	130	6.5	27	LD/LT	
2322 662 96759	3.5 (7x2)	±20	35	200	45	35	13	13	135	6.8	27	LD/LT	
<b>Rated voltage: 100-120 V<sub>rms</sub> (U<sub>max</sub> is 145 V<sub>rms</sub>)</b>													
2322 662 96757	3.5 (7x2)	±20	27	250	80	45	7	3	255	12.8	16	LD/LT	
2322 662 96755	2.5 (5x2)	±20	34	250	80	45	6	3	200	10.0	19	LD/LT	
2322 662 96753	1.5 (3x2)	±20	39	250	80	45	6	3	250	12.5	21	LD/LT	

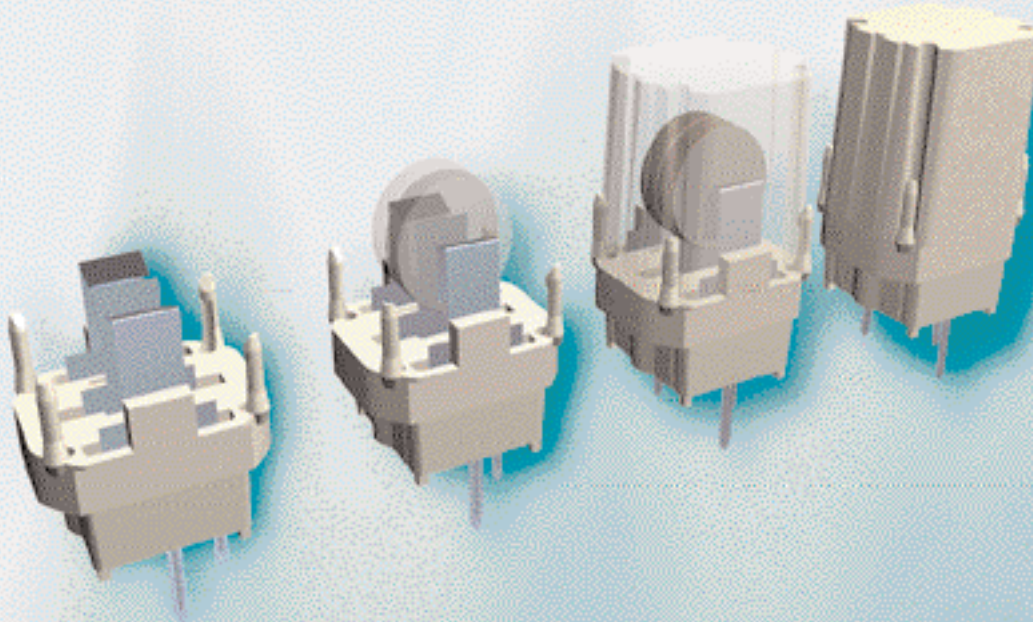
IEC 60065

UL 1434 compliant



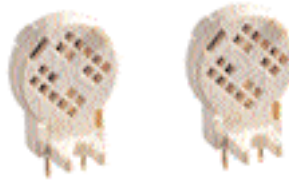
E 148855

NEW



resistors

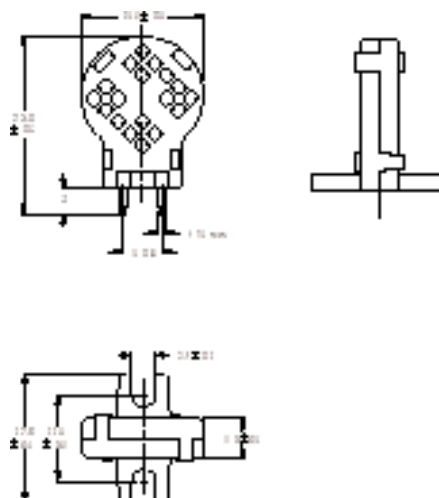
Non-linear



Humidity sensor

Type / catalogue number	2322 691 90001
Humidity range (RH)	10 to 90%
Capacitance at +25 °C, 43% RH, 100 kHz	122 pF ±15%
Sensitivity between 12 and 75% RH	0.4 pF/%RH ±0.05
Frequency range	1 to 1000 kHz
Maximum AC or DC voltage	15 V
Storage humidity range (RH)	0 to 100%
Ambient temperature range: <ul style="list-style-type: none"> <li>• operating</li> <li>• storage</li> </ul>	0 to +85 °C -25 to +85 °C
Drop test: height of free fall	1 m
Mass	≈1.3 g
Application	humidity measurements in electronic hygrometers
Typical capacitance as a function of relative humidity	

Technical drawing





NEW

MLV 0603 series									
Series	Maximum operating voltage		Voltage 1mA (varistor voltage)		Maximum clamping voltage at 1A	Maximum non-repetitive surge current (8/20 μs)	Maximum non-repetitive surge energy (10/1000 μs)	Capacitance at 1 kHz (bias 1 V)	
Catalogue number 2322 ... ..	$V_{ac}$ $V_{rms}$	$V_{dc}$ $V_{dc}$	Min V	Max V	V	A	J	Typical pF	Tolerance
573 10403	4.0	5.5	6.4	9.6	21	20	0.05	390	typical
573 11003	10.0	14	15.3	21.0	35	30	0.1	110	typical
573 11403	14.0	18	19.8	25.7	40	30	0.1	100	typical
573 11703	17.0	22	24.3	29.7	46	30	0.1	90	typical
573 12003	20.0	26	29.7	38.6	56	30	0.1	80	typical
573 12503	25.0	31	35.1	45.6	65	30	0.1	60	typical

outlines and dimensions in mm  $L_1: 1.6 \pm 0.15$  mm  $W: 0.8 \pm 0.15$  mm  $T: 1.0$  mm max.

MLV 0805 series									
Series	Maximum operating voltage		Voltage 1mA (varistor voltage)		Maximum clamping voltage at 1A	Maximum non-repetitive surge current (8/20 μs)	Maximum non-repetitive surge energy (10/1000 μs)	Capacitance at 1 kHz (bias 1 V)	
Catalogue number 2322 ... ..	$V_{ac}$ $V_{rms}$	$V_{dc}$ $V_{dc}$	Min V	Max V	V	A	J	Typical pF	Tolerance
574 10403	4.0	5.5	6.4	9.6	21	30	0.1	470	typical
574 11003	10.0	14.0	15.3	21.0	35	30	0.1	110	typical
574 11403	14.0	18.0	19.8	25.7	40	30	0.1	100	typical
574 11703	17.0	22.0	24.3	29.7	46	30	0.1	90	typical
574 12003	20.0	26.0	29.7	38.6	56	30	0.1	70	typical
574 12503	25.0	31.0	35.1	45.6	65	30	0.1	60	typical

outlines and dimensions in mm  $L_1: 2.0 \pm 0.2$  mm  $W: 1.25 \pm 0.15$  mm  $T: 1.3$  mm max.

Capability frame:	Parameter	Value	Unit
	<ul style="list-style-type: none"> <li>• DC voltage range</li> <li>• AC voltage range</li> <li>• Maximum clamping voltage at 1A</li> <li>• Capacitance</li> <li>• Transient energy</li> <li>• Peak current</li> </ul>	5.5 to 31 4 to 25 28 to 65 60 to 470 0.1 α 0.3 30 α 80	$V_{dc}$ $V_{rms}$ V pF J A

Applications:	<ul style="list-style-type: none"> <li>• Data lines and I/Q port protection</li> <li>• Protection to ESD transients</li> <li>• On-board protection of IC's and transistors</li> <li>• Modem protection</li> <li>• LCD protection</li> </ul>
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resistors

Non-linear



Series 2322 ... ..	592*	593*	594	584	595	585	596
Body diameter • with lacquer • without lacquer	7 mm 5 mm	9 mm 7 mm	13.5 mm 10 mm	13.5 mm 10 mm	17 mm 14 mm	17 mm 14 mm	23 mm 20 mm
Max. continuous AC voltage $U_{\text{eff max}}$	14 to 460 V	14 to 460 V	14 to 550 V	50 to 420	14 to 550 V	50 to 420 V	60 to 680 V
Max. continuous DC voltage $U_{\text{max}}$	18 to 615 V	18 to 615 V	18 to 745 V	170 to 560 V	18 to 745 V	170 - 560 V	85 to 895 V
Max. withstanding surge current $I_{\text{max}}$	100 to 400 A	250 to 1200 A	500 to 2500 A	3500 A	1000 to 4500 A	6 000 A	6 500 A
Max. energy (10/1000 $\mu\text{s}$ ) $E_{\text{max}}$	0.5 to 21 J	1.7 to 63 J	4.3 to 98 J	35 to 112 J	5.4 to 160 J	70 - 225 J	56 to 496 J
Voltage at 1 mA $U_{1 \text{ mA}}$	22 to 750 V	22 to 750 V	22 to 910 V	205 to 680 V	22 to 910 V	205 - 680 V	100 to 1100 V
Max. power dissipation $P_{\text{max}}$	100 mW	250 mW	400 mW	400 mW	600 mW	600 mW	1 W
Temperature range at $P_0$	-40 to +125 °C	-40 to +125 °C	-40 to +125 °C	-40 to +125 °C	-40 to +125 °C	-40 to +125 °C	-40 to +125 °C
at $P_{\text{max}}$	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C	-40 to +85 °C
	*high surges on request						
Features	the wide voltage range, extremely high energy-absorption capability, very short transient response time and long operational life under normal conditions make the ZnO varistor a reliable protection device new series can with stand higher pulse -1 time- respectively 3500 to 6000 A and absorb high energy up to 225 J						
Applications	ZnO varistors are extremely reliable protection devices against voltage transients produced, for example, by lightning or switching. They are also increasingly used for noise suppression in power lines						



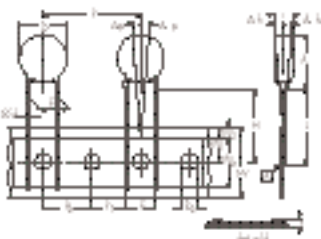


Catalogue number	Voltages			Catalogue number	Voltages		
2322 59 . . . . . 2322 58 . . . . .	$V_{rms\ max}$	$V_{DC\ max}$	$U_V\ 1\ mA$	2322 59 . . . . . 2322 58 . . . . .	$V_{rms\ max}$	$V_{DC\ max}$	$U_V\ 1\ mA$
.140.	14	18	22	.171.	175	225	275
.170.	17	22	27	.231.	230	300	360
.200.	20	26	33	.251.	250	320	390
.250.	25	31	39	.271.	275	350	430
.300.	30	38	47	.301.	300	385	470
.350.	35	45	56	.321.	320	420	510
.400.	40	56	68	.381.	385	505	620
.500.	50	65	82	.421.	420	560	680
.600.	60	85	100	.461.	460	615	750
.750.	75	100	120	.511.	510	670	820
.950.	95	125	150	.551.	550	745	910
.131.	130	170	205	.621.	625	825	1000
.141.	140	180	220	.681.	680	895	1100
.151.	150	200	240				
	preferred				preferred		

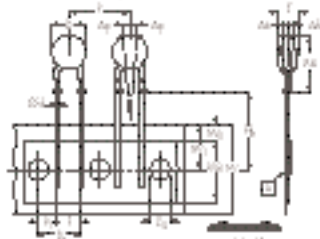
Packing and mechanical overview

	Ø7, 2e 14 - 460 V	Ø9, 2e 14 - 460 V	Ø13.5, 3e 14-550 V	Ø17, 3e 14-550 V	Ø20, 4e 60-680 V		Ø7, 2e 14 - 460 V	Ø9, 2e 14 - 460 V	Ø13.5, 3e 14-550 V	Ø17, 3e 14-550 V	Ø20, 4e 60-680 V
Catalogue number	2322 592 . . . . .	2322 593 . . . . .	2322 584/594	2322 585/595	2322 596 . . . . .	Catalogue number	2322 592 . . . . .	2322 593 . . . . .	2322 584/594	2322 585/595	2322 596 . . . . .
on tape/on reel	<ul style="list-style-type: none"> <li>• straight leads H = 20</li> <li>• straight leads with flange HO = 16</li> <li>• straight leads with flange HO = 18.25</li> <li>• kinked leads HO = 18.25</li> <li>• kinked leads HO = 16</li> </ul>					on tape/ ammo pack					
	0...6	0...6	0...6	0...6	-		0...7	0...7	0...7	0...7	-
	1...6	1...6	-	-	-		1...7	1...7	-	-	-
	2...6	2...6	-	-	-		2...7	2...7	-	-	-
	3...6	3...6	3...6	3...6	-		3...7	3...7	3...7	3...7	-
	8...6	8...6	8...6	8...6	-		8...7	8...7	8...7	8...7	-
bulk											
• straight leads	5...6	5...6	5...6	5...6	5...6						
• straight leads with flange	7...6	7...6	-	-	-						
• kinked leads	6...6	6...6	6...6	6...6	-						

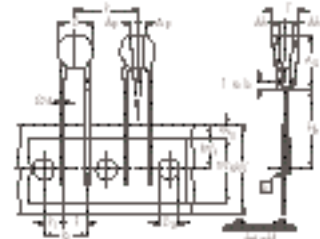
straight leads



straight leads with flange



kinked leads





# Switches and potentiometers



# and meters

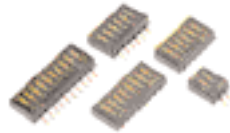
Switches

page

**226**

Trimming Potentiometers

**230**



Series	CHS	CS4	CJS	CS32
Switch type	slide dipswitch	rotary selector	jumper switch	rotary selector
Overall dimensions	5.4 mm width x variable length	4.5 x 5.0 mm	6.0 x 2.8 x 2.5 mm	3.4 x 3.4 x 2.0 mm 3.6 x 3.5 x 4.7 mm
Termination options	gull wing J-hook	gull wing J-hook through hole	gull wing J-hook	gull wing J-hook
Features	sealed and non-sealed  gold plated contacts 1 through 10 positions bulk or tape and reel packaging	sealed to allow for automatic processing with neutral detent, or without 2 or 3 positions bulk or tape and reel packaging	sealed and non-sealed  with neutral detent, or without top setting bulk or tape and reel	sealed to allow for automatic processing  top and side setting bulk or tape and reel
Contact resistance	50 mΩ max.	100 mΩ	100 mΩ max	2 Ω max
Circuit type	SPST	1 pole, 2 positions 1 pole, 3 positions 2 poles, 2 positions	1 pole, 2 contacts	1 pole, 2 contacts without neutral detent
Contact rating	non-switching: DC 50 V 100 mA switching: DC 6 V 100 mA	DC 16 V 100 mA	non switching: DC 50 V 100 mA switching: DC 6 V 100 mA DC 24 V, 25 mA	DC 16 V 100 mA
Insulation resistance	1000 MΩ min at 100 VDC	100 MΩ min at 500 V <sub>DC</sub>	100 MΩ min at 100 V <sub>DC</sub>	100 MΩ min at 500 V <sub>DC</sub>

### Ordering Information

Series	CHS	CS4	CJS	CS32
	Part Number Designation	Part Number Designation	Part Number Designation	Part Number Designation
	<p><b>CHS - 06 T A 1</b></p> <p>Series name</p> <p>No. of bits</p> <p>Structure</p> <p>Form of packaging</p> <p>Shape of terminal</p>	<p><b>CS-4 1 3 N T A</b></p> <p>Series name</p> <p>No. of poles</p> <p>Style</p> <p>No. of contacts</p> <p>Package option</p> <p>Contact Timing</p>	<p><b>CJS - 1 2 0 1 T B 1</b></p> <p>Series name</p> <p>No. of poles</p> <p>No. of contacts</p> <p>Setting position</p> <p>Neutral detent</p> <p>Shape of terminal</p> <p>Form of packaging</p>	<p><b>CS-32 1 2 Z T A</b></p> <p>Series name</p> <p>No. of poles</p> <p>No. of contacts</p> <p>Shape of terminal</p> <p>Form of packaging</p> <p>Contact timing</p>
Preferred packaging quantity	tape and reel - 500 pieces bulk - 200 pieces	tape and reel - 500 pieces bulk - 500 pieces	tape and reel - 1000 pieces	tape and reel - 500 pieces

This product is manufactured by Copal Electronics Co, Ltd. of Tokyo, Japan and is distributed by BCcomponents in North and South America only.  
This product is not available from BCcomponents outside of North and South America.



Series	CMS	CAS	S1000A/S2000A	S1200A/S2200A
Switch type	slide switch	slide jumper switch	rotary coded	rotary coded
Overall dimensions	5 x 15 mm max.	5.4 x 2.8 mm	10 x 10 mm	10 x 10 mm with translucent knob
Termination options	gull wing - surface mount J-hook - surface mount through hole	gull wing - surface mount J-hook - surface mount	through hole	through hole
Features	non-sealed  top or side adjust gold plated contacts bulk or tape & reel packaging	sealed and non-sealed  low profile of 2.5 mm gold plated contacts bulk or tape & reel packaging	sealed to allow for automatic processing top or side adjust hexidecimal or decimal to binary bulk packaging	sealed to allow for automatic processing top or side adjust hexidecimal or decimal to binary bulk packaging
Contact resistance	70 mΩ max.	50 mΩ max.	100 mΩ max.	100 mΩ max.
Circuit type	2 poles, 2 contacts 2 poles, 3 contacts 2 poles, 4 contacts	SP/DT DP/DT	10 positions - BCD S2000A 16 positions - BCH S1000A	10 positions - BCD S2200A 16 positions - BCH S1200A
Contact rating	non-switching: DC 50 V 100 mA switching: DC 12 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 6 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA
Insulation resistance	100 MΩ min at 500 V <sub>DC</sub>	1000 MΩ min at 100 V <sub>DC</sub>	1000 MΩ at 100 V <sub>DC</sub>	1000 MΩ at 100 V <sub>DC</sub>

Ordering Information

Series	CMS	CAS	S1000A/S2000A	S1200A/S2200A
	<p>Part Number Designation</p> <p><b>CMS - 2 2 0 2 T B</b></p> <p>Series name</p> <p>No. of poles: 2: 2 poles</p> <p>Shape of terminal: A: J-hook, B: gull wing, C: through hole pins</p> <p>No. of contacts: 2: 2 contacts, 3: 3 contacts, 4: 4 contacts</p> <p>Form of packaging: T: tape (reel), Blank: bulk in vinyl bags</p> <p>Setting position: 0: top setting, 1: side setting</p> <p>Knob length: 2: 2 mm, 4: 4 mm (side setting type only)</p>	<p>Part Number Designation</p> <p><b>CAS - 1 2 0 T B 1</b></p> <p>Series name</p> <p>No. of poles: 1: 1 (SPDT), 2: 2 (2PDT), D: 2 (Dual SPDT) dual</p> <p>Structure: 1: non washable type (without seal tape), 2: non-washable type (with seal tape), Blank: washable type (with seal tape)</p> <p>No. of contacts: 2: 2 contacts</p> <p>Shape of terminal: A: J-hook, B: gull wing</p> <p>Setting position: 0: top setting</p> <p>Form of packaging: T: taping (reel), Blank: bulk in vinyl bags</p> <p>Note: SPDT: single pole double throw, 2PDT: two poles double throw</p>	<p>Part Number Designation</p> <p><b>S - 1 0 1 0 A</b></p> <p>Series name</p> <p>No. of positions: 1: 16 positions, 2: 10 positions</p> <p>Setting position: 0: top setting, 1: side setting</p> <p>Code format: 1: real code, 3: complementary code</p> <p>Shape of rotor: 0: without knob, 1: with knob (extended shaft)</p>	<p>Part Number Designation</p> <p><b>S - 1 2 1 0 A</b></p> <p>Series name</p> <p>No. of positions: 1: 16 positions, 2: 10 positions</p> <p>Setting position: 1: top setting, 2: side setting</p> <p>Exterior profile: 2: translucent knob with black housing</p> <p>Code format: 1: real code, 3: complementary code</p>
Preferred packaging quantity	tape and reel: 900 pieces bulk: 200 pieces	tape and reel: 1000 pieces	bulk: 100 pieces	bulk: 100 pieces

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Series	S4000	S7000	SA 7000
Switch type	rotary coded	rotary coded	rotary coded
Overall dimensions	4.8 x 4.8 x 2.6 mm	7.2 x 7.2 mm	7.2 x 7.2 mm
Termination options	gull wing J - hook	gull wing J-hook through hole	gull wing J-hook through hole
Features	non-sealed top adjust goldplated contacts bulk or tape and reel	sealed to allow for automatic processing top or side adjust hexidecimal or decimal to binary, bulk, or tape and reel packaging	non-sealed top or side adjust with or without knob hexidecimal or decimal to binary bulk or tape and reel
Contact resistance	100 mΩ max	100 mΩ max.	100 mΩ max.
Circuit type	10 positions real code only	10 positions - BCD 16 positions - BCH	10 positions - BCD 16 positions - BCH
Contact rating	non-switching: DC 50 V 100 mA switching: DC 2.4 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA
Insulation resistance	100 MΩ at 100 V <sub>DC</sub>	100 MΩ at 100 V <sub>DC</sub>	100 MΩ at 100 V <sub>DC</sub>

### Ordering Information

Series	S4000	S7000	SA 7000
	Part Number Designation	Part Number Designation	Part Number Designation
	<b>S - 4 0 1 0 T A</b>	<b>S - 7 0 1 0 T A</b>	<b>SA - 7 0 1 0 T A</b>
	<p>Series name</p> <p>Shape of Rotor 0: without knob</p> <p>Shape of terminal A: J-hook B: gull wing</p> <p>Code format 1: 10 positions, real code</p> <p>Form of packaging T: taping (Reel) Blank: bulk in vinyl bags</p> <p>Setting position 0: top setting</p>	<p>Series name</p> <p>Shape of rotor 0: without knob</p> <p>Shape of terminal A: J-hook B: gull wing C: through hole pin (except 6 position type)</p> <p>Form of packaging 1: tape &amp; reel Blank: bulk package</p> <p>Code format 1: 10 positions, real code 3: 10 positions, complementary code 5: 16 positions, real code 6: 6 positions, real code 7: 16 positions complementary code</p> <p>Setting position 0: top setting 1: side setting (except 6 position type)</p>	<p>Series name</p> <p>Shape of rotor 0: without knob (⊖ groove) 1: with knob 2: without knob (⊕ groove)</p> <p>Shape of terminal A: J-hook B: gull wing C: through hole pin</p> <p>Code format 1: 10 positions, real code 3: 10 positions, complementary code 5: 16 positions, real code 7: 16 positions, complementary code</p> <p>Form of packaging T: tape &amp; reel Blank: bulk in vinyl bags</p> <p>Setting position 0: top setting 1: side setting</p>
Preferred packaging quantity	tape and reel - 500 pieces bulk - 200 pieces	tape and reel - 500 pieces bulk - 200 pieces	tape and reel - 500 pieces bulk - 200 pieces

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Series	SS10	S8000	SA5000
Switch type	rotary selector	rotary coded	rotary coded
Overall dimensions	10 x 10 mm	7.2 x 7.2 mm	11 x 11 mm
Termination type	through hole	through hole	through hole
Features	sealed to allow for automatic processing top or side setting flush or extended rotor positive detent action	sealed to allow for automatic processing top or side setting binary coded octal flush or extended rotor	sealed to allow for automatic processing top or side adjust hexidecimal or decimal to binary bulk packaging
Contact resistance	100 mΩ	100 mΩ	1 Ω max.
Circuit type	1 pole, 4 positions 1 pole, 5 positions 1 pole, 6 positions 2 poles, 3 positions	binary coded octal (BCO)	10 positions - BCD 16 positions - BCH
Contact rating	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA	non-switching: DC 50 V 100 mA switching: DC 5 V 100 mA

## Ordering Information

Series	SS10	S8000	SA5000
	Part Number Designation	Part Number Designation	Part Number Designation
	<b>SS-10 - 16 S P - L - A</b>	<b>S - 8 0 1 0</b>	<b>SA - 5 0 1 0 A 1</b>
	<p><b>Series name</b></p> <p><b>No. of poles</b> 1: 1 pole 2: 2 poles</p> <p><b>No. of contacts</b> 3: 3 contacts (2 poles only) 4: 4 contacts (1 pole only) 5: 5 contacts (1 pole only) 6: 6 contacts (1 pole only)</p> <p><b>Contact timing</b> N: non-shorting (1 pole 6 contacts with OFF, 2 poles 3 contacts) S: shorting (1 pole 5 contacts, 1 pole 6 contacts without OFF)</p>	<p><b>Series name</b></p> <p><b>Shape of rotor</b> 0: without knob 1: with knob</p> <p><b>Setting position</b> 0: top setting 1: side setting</p> <p><b>Code format</b> 1: real code 3: complementary code</p>	<p><b>Series name</b></p> <p><b>Shape of rotor</b> 0: without knob 1: with knob (extended shaft)</p> <p><b>Code format</b> 1: 10 positions, real code 3: 10 positions, complementary code 5: 16 positions, real code 7: 16 positions, complementary code</p> <p><b>Resistance value</b> 1: 10 kΩ 3: 3.3 kΩ</p> <p><b>Built-in circuit</b> A: resistors (housing color yellow) B: resistors and diodes (housing color red) C, D: diodes (housing color black)</p> <p><b>Setting position</b> 0: top setting 1: side setting</p>
Preferred packaging quantity	bulk: 50 pieces	bulk: 100 pieces	bulk: 50 pieces

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Series	Cermet, Single Turn, SMD		Cermet, Multiturn, SMD	
	ST-32	ST-4/ST-42	ST-5	ST-7
Dimensions (approx.)	3 mm square	4 mm square	6 mm square	7 mm square
Technology	cermet	cermet	cermet	cermet
Mounting options	surface mount	surface mount	surface mount	surface mount
Adjustment options	top adjust side adjust	top adjust side adjust	top adjust side adjust	top adjust
Features	gull wing, J-hook lead styles precious metal alloy contact sealed to allow for automatic processing tape and reel packaging	gull wing, J-hook lead styles precious metal alloy contact sealed to allow for automatic processing tape and reel or bulk packaging	vertical and horizontal mount precious metal alloy contact sealed to allow for automatic processing tape and reel or bulk packaging	gull wing, J-hook lead styles precious metal alloy contact sealed to allow for automatic processing tape and reel or bulk packaging
Resistance range	10 Ω to 1 MΩ	10 Ω to 2 MΩ	10 Ω to 2 MΩ	50 Ω to 1 MΩ
Tolerance	±20%	±20%	±10%	±20%
Maximum dissipation	0.125 W/70 °C	0.25 W/70 °C	0.25 W/85 °C	0.25 W/70 °C
Mechanical	250°	240°	14 turns	3 turns
Angle of rotation				
Temperature coefficient	±100 ppm/°C (100 Ω to 1 MΩ) ±250 ppm/°C (10 Ω to 50 Ω)	±100 ppm/°C (100 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 50 Ω)	±100 ppm/°C (100 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 50 Ω)	±100 ppm/°C (100 Ω to 1 MΩ) ±250 ppm/°C (50 Ω)
Operating temp. range	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C

### Ordering Information

Series	ST-32	ST-4/ST-42	ST-5	ST-7																																				
<b>Standard resistance values and codes</b>	Part Number Designation																																							
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Ω	codes	Ω	codes																																					
50	500	10K	103																																					
100	101	20K	203																																					
200	201	50K	503																																					
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1K	102	200K	204																																					
2K	202	500K	504																																					
5K	502	1M	105																																					
		2M	205																																					
Preferred packaging quantity	tape and reel - 500 pieces	tape and reel - 500 pieces	tape and reel - 500 pieces bulk - 200 pieces	tape and reel - 500 pieces bulk - 200 pieces																																				

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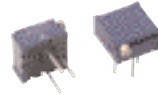


	Cermet, single turn	Cermet, multiturn	Cermet, multiturn	Cermet, multiturn
Series	CT-6	CT-9	CT-20	TM-7
Dimensions (approx.)	6 mm square	9 mm square	20 mm rectangular	7 mm round
Technology	cermet	cermet	cermet	cermet
Mounting options	through hole	through hole	through hole	through hole
Adjustment options	top adjust side adjust	top adjust side adjust	side adjust	top adjust side adjust
Features	highly automated assembly precious metal alloy contact sealed to allow for automatic processing tape and reel or bulk packaging	vertical and horizontal mount precious metal alloy contact sealed to allow for automatic processing tape and reel or bulk packaging	highly automated assembly precious metal alloy contact sealed to allow for automatic processing bulk packaging	multiturn trimmer in compact size precious metal alloy contact sealed to allow for automatic processing bulk packaging
Resistance range	10 Ω to 2 MΩ	10 Ω to 2 MΩ	10 Ω to 5 MΩ	50 Ω to 2 MΩ
Tolerance	±10%	±10%	±10%	±10%
Maximum dissipation	0.50 W/70 °C	0.50 W/70 °C	0.50 W/70 °C	0.50 W/85 °C
Mechanical angle of rotation	260°	18 turns	15 turns	3 turns
Temperature coefficient	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 20 Ω)	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 20 Ω)	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 20 Ω)	±100 ppm/°C (50 Ω to 2 MΩ)
Operating temperature	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C	-55 to +120 °C

Ordering Information

Series	CT-6	CT-9	CT-20	TM-7																																				
<b>Standard resistance values and codes</b>	Part Number Designation																																							
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Ω	codes	Ω	codes																																					
50	500	10K	103																																					
100	101	20K	203																																					
200	201	50K	503																																					
500	501	100K	104																																					
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2K	202	500K	504																																					
5K	502	1M	105																																					
		2M	205																																					
Preferred packaging quantity	tape and reel: 1000 pieces bulk: 200 pieces	tape and reel: 1000 pieces bulk: 200 pieces	bulk: 200 pieces	bulk: 200 pieces																																				

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	Cermet, single turn	Cermet, multiturn	Cermet, multiturn SMD
Series	FT-6	CT-94	SM-4
Dimensions (approx.)	6 mm square	9 mm square	4 mm square
Technology	cermet	cermet	cermet
Mounting options	through hole	through hole	surface mount
Adjustment options	top adjust side adjust	top adjust side adjust	top adjust side adjust
Features	highly automated assembly precious metal alloy contact sealed to allow for automatic processing ammo tape or bulk packaging	vertical and horizontal mount precious metal alloy contact sealed to allow for automatic processing bulk packaging five pin styles	gull wing, J-hook lead styles precious metal alloy contact sealed to allow for automatic processing tape and reel or bulk packaging
Resistance range	10 Ω to 2 MΩ	10 Ω to 2 MΩ	10 Ω to 2 MΩ
Tolerance	±15%	±10%	±10%
Maximum dissipation	0.50 W/70 °C	0.50 W/70 °C	0.25 W/85 °C
Mechanical angle of rotation	260°	18 turns	12 turns
Temperature coefficient	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 20 Ω)	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 20 Ω)	±100 ppm/°C
Operating temperature	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C

### Ordering Information

Series	FT-6	CT-94	SM-4																																				
<b>Standard resistance values and codes</b>	Part Number Designation	Part Number Designation	Part Number Designation																																				
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Ω	codes	Ω	codes																																				
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1K	102	200K	204																																				
2K	202	500K	504																																				
5K	502	1M	105																																				
		2M	205																																				
Preferred packaging quantity	ammo tape - 1000 pieces bulk - 1000 pieces	tape and reel - 1000 pieces bulk - 200 pieces	tape and reel - 500 pieces bulk - 200 pieces																																				

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	Cermet, single turn	Cermet, multiturn	Cermet, single turn	Cermet, single turn
Series	RJ-4	RJ-5	RJ-6	RJ-13
Dimensions (approx.)	5 mm round	6 mm square	7 mm round	13 mm round
Technology	cermet	cermet	cermet	cermet
Mounting options	through hole	through hole	through hole	through hole
Adjustment options	top adjust side adjust	top adjust side adjust	top adjust side adjust	top, side adjust (knob optional) panel mount
Features	precious metal alloy contact sealed to allow for automatic processing bulk packaging	precious metal alloy contact sealed to allow for automatic processing bulk packaging	precious metal alloy contact sealed to allow for automatic processing bulk packaging	precious metal alloy contact sealed to allow for automatic processing bulk packaging
Resistance range	10 Ω to 2 MΩ	10 Ω to 2 MΩ	10 Ω to 5 MΩ	10 Ω to 5 MΩ
Tolerance	±10%	±10%	±10%	±10%
Maximum dissipation	0.50 W/ 70 °C	0.25 W/ 85 °C	0.50 W/ 70 °C	0.75 W/ 70 °C
Mechanical angle of rotation	230°	14 turns	270°	270°
Temperature coefficient	±100 ppm/°C (100 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 50 Ω)	±100 ppm/°C (100 Ω to 2 MΩ) ±250 ppm/°C (10 Ω to 50 Ω)	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (Others)	±100 ppm/°C (50 Ω to 2 MΩ) ±250 ppm/°C (Others)
Operating temperature	-55 to +120 °C	-55 to +125 °C	-55 to +125 °C	-55 to +125 °C

Ordering Information

Series	RJ-4	RJ-5	RJ-6	RJ-13																																				
<b>Standard resistance values and codes</b>	Part Number Designation	Part Number Designation	Part Number Designation	Part Number Designation																																				
<table border="1"> <thead> <tr> <th>Ω</th> <th>codes</th> <th>Ω</th> <th>codes</th> </tr> </thead> <tbody> <tr><td>50</td><td>500</td><td>10K</td><td>103</td></tr> <tr><td>100</td><td>101</td><td>20K</td><td>203</td></tr> <tr><td>200</td><td>201</td><td>50K</td><td>503</td></tr> <tr><td>500</td><td>501</td><td>100K</td><td>104</td></tr> <tr><td>1K</td><td>102</td><td>200K</td><td>204</td></tr> <tr><td>2K</td><td>202</td><td>500K</td><td>504</td></tr> <tr><td>5K</td><td>502</td><td>1M</td><td>105</td></tr> <tr><td></td><td></td><td>2M</td><td>205</td></tr> </tbody> </table>	Ω	codes	Ω	codes	50	500	10K	103	100	101	20K	203	200	201	50K	503	500	501	100K	104	1K	102	200K	204	2K	202	500K	504	5K	502	1M	105			2M	205	<p><b>RJ-4 WS 202</b></p> <p>Series name</p> <p>Product shape W : top adjustment WS : side adjustment</p> <p>Resistance code</p>	<p><b>RJ-5 W 104</b></p> <p>Series name</p> <p>Product shape W : top adjustment X : side adjustment P : side adjustment</p> <p>Resistance code</p>	<p><b>RJ-6 P 103</b></p> <p>Series name</p> <p>Product shape P : top adjustment W : top adjustment F : rear adjustment S : side adjustment X : side adjustment</p> <p>Resistance code</p>	<p><b>RJ-13 P 203</b></p> <p>Series name</p> <p>Product shape P : top adjustment B : panel mount S : side adjustment PR : top adjustment with knob SR : side adjustment with knob</p> <p>Resistance code</p>
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Preferred packaging quantity	bulk - 200 pieces	bulk - 200 pieces	bulk - 200 pieces	bulk - 100 pieces																																				

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