

# KR Supercapacitors

## Coin cells



### Description

Eaton supercapacitors are high reliability, high power, ultra-high capacitance energy storage devices utilizing electric double layer capacitor (EDLC) construction combined with proprietary materials and processes. This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to applications for backup power, pulse power and hybrid power systems. They can be applied as the sole energy storage or in combination with batteries to optimize cost, life time and run time. System requirements can range from a few microwatts to megawatts. All products feature low ESR for high power density with environmentally friendly materials for a green power solution. Eaton supercapacitors are maintenance-free with design lifetimes up to 20 years\* and operating temperatures down to -40 °C and up to +85 °C.

### Features and benefits

- High specific capacitance
- Low leakage current
- Long cycle life
- Eco-friendly

### Applications

- Computers and peripherals
- Network switches and routers
- Utility meters
- HVAC Controls
- Appliances and white goods
- Real-time clock backup
- Office equipment

\*Supercapacitor lifetimes vary based on charge voltage and temperature. See Eaton's application guidelines or contact your local Eaton sales representative for more information on lifetime estimates



Powering Business Worldwide

## Specifications<sup>1</sup>

Capacitance	0.1 F to 1.5 F
Maximum working voltage	5.5 V
Surge voltage	6.3 V
Capacitance tolerance	-20% to +80% +20 °C
Operating temperature range <sup>2</sup>	-25 °C to +70 °C
Extended operating temperature range <sup>2</sup>	-25 °C to +85 °C (with voltage derating to 3.6 V @ +85 °C)

## Standard Product

Capacitance (F)	Part number	Type	Lead length	Maximum initial ESR ( $\Omega$ ) (Equivalent series resistance) measured @ 1 kHz	Typical mass (g)
0.1	KR-5R5V104-R	Vertical	Standard	75	1.4
0.1	KR-5R5H104-R	Horizontal	Standard	75	1.4
0.1	KR-5R5C104-R	Cylindrical	Standard	75	3.3
0.1	KR-5R5C104H-R	Cylindrical	Short	75	3.3
0.22	KR-5R5V224-R	Vertical	Standard	75	1.4
0.22	KR-5R5H224-R	Horizontal	Standard	75	1.4
0.22	KR-5R5C224-R	Cylindrical	Standard	75	3.3
0.22	KR-5R5C224H-R	Cylindrical	Short	75	3.3
0.33	KR-5R5V334-R	Vertical	Standard	50	1.4
0.33	KR-5R5H334-R	Horizontal	Standard	50	1.4
0.33	KR-5R5C334-R	Cylindrical	Standard	50	3.3
0.33	KR-5R5C334H-R	Cylindrical	Short	50	3.3
0.47	KR-5R5V474-R	Vertical	Standard	50	1.4
0.47	KR-5R5H474-R	Horizontal	Standard	50	1.4
0.47	KR-5R5C474-R	Cylindrical	Standard	50	3.3
0.47	KR-5R5C474H-R	Cylindrical	Short	50	3.3
1.0	KR-5R5V105-R	Vertical	Standard	30	4.2
1.0	KR-5R5H105-R	Horizontal	Standard	30	4.2
1.0	KR-5R5C105-R	Cylindrical	Standard	30	9.1
1.0	KR-5R5C105H-R	Cylindrical	Short	30	9.1
1.5	KR-5R5V155-R	Vertical	Standard	30	4.2
1.5	KR-5R5H155-R	Horizontal	Standard	30	4.2
1.5	KR-5R5C155-R	Cylindrical	Standard	30	9.1
1.5	KR-5R5C155H-R	Cylindrical	Short	30	9.1

## Performance

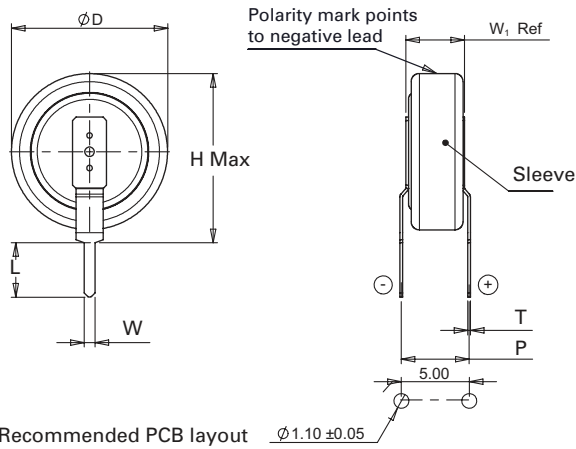
Parameter	Capacitance change (% of initial value)	ESR (% of maximum initial value)
Life — +70 °C @ 5.5 Vdc, 1000 hours	≤ 30%	≤ 400%
Life — +85 °C @ 3.6 Vdc, 2000 hours	≤ 30%	≤ 400%
Storage Life — -25 °C to +70 °C, 1000 hours	≤ 30%	≤ 400%

1. Testing and verification of product under end application conditions is recommended
2. Not recommended for +85 °C/85% RH applications

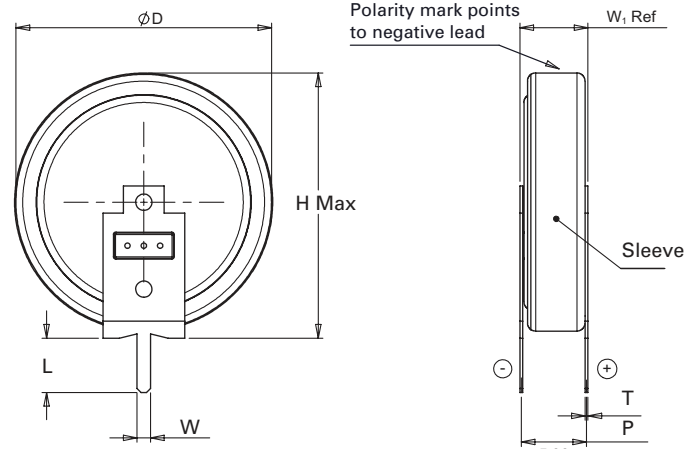
**Dimensions (mm)**

**V Type (Vertical)**

KR-5R5V104/224/334/474-R



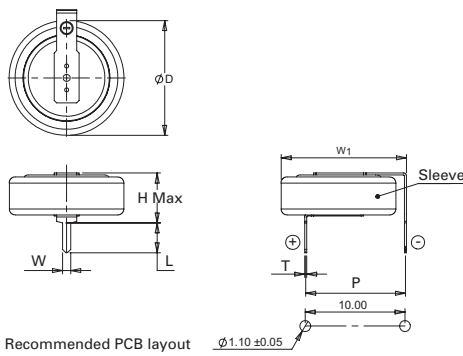
R-5R5V105/155-R



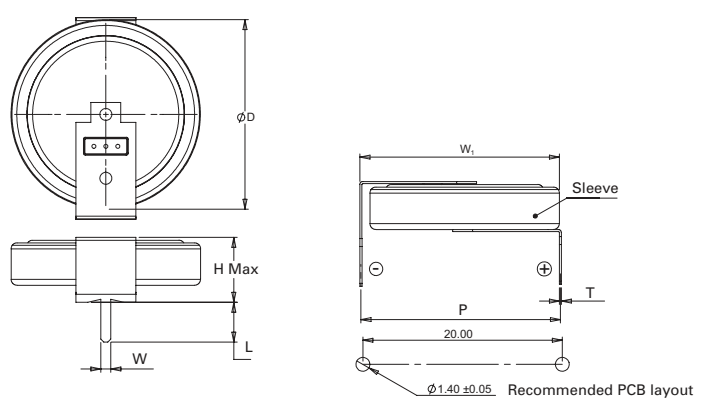
Part Number	$\varnothing D \pm 0.2$	H Max	L $\pm 0.1$	P $\pm 0.3$	T	W $\pm 0.1$	W1 Ref.
KR-5R5V104-R	11.5	12.7	4.0	5.0	0.2	0.8	4.3
KR-5R5V224-R	11.5	12.7	4.0	5.0	0.2	0.8	4.3
KR-5R5V334-R	11.5	12.7	4.0	5.0	0.2	0.8	4.3
KR-5R5V474-R	11.5	12.7	4.0	5.0	0.2	0.8	4.3
KR-5R5V105-R	19.0	19.7	4.0	5.0	0.2	1.0	5.0
KR-5R5V155-R	19.0	19.7	4.0	5.0	0.2	1.0	5.0

**H Type (Horizontal)**

KR-5R5H104/224/334/474-R



KR-5R5H105/155-R

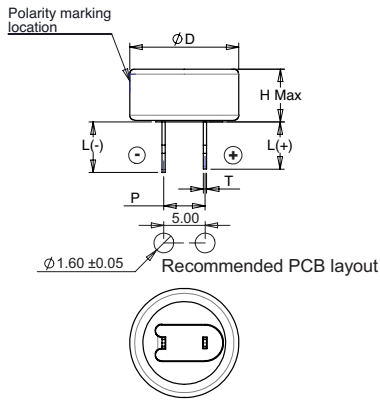


Part Number	$\varnothing D \pm 0.2$	H Max	L $\pm 0.1$	P	T	W $\pm 0.1$	W1 $\pm 0.5$
KR-5R5H104-R	11.5	5.2	3.0	10.0 $\pm$ 0.3	0.2	0.8	12.4
KR-5R5H224-R	11.5	5.2	3.0	10.0 $\pm$ 0.3	0.2	0.8	12.4
KR-5R5H334-R	11.5	5.2	3.0	10.0 $\pm$ 0.3	0.2	0.8	12.4
KR-5R5H474-R	11.5	5.2	3.0	10.0 $\pm$ 0.3	0.2	0.8	12.4
KR-5R5H105-R	19.0	6.7	4.0	20.0 $\pm$ 0.5	0.2	1.0	20.0
KR-5R5H155-R	19.0	6.7	4.0	20.0 $\pm$ 0.5	0.2	1.0	20.0

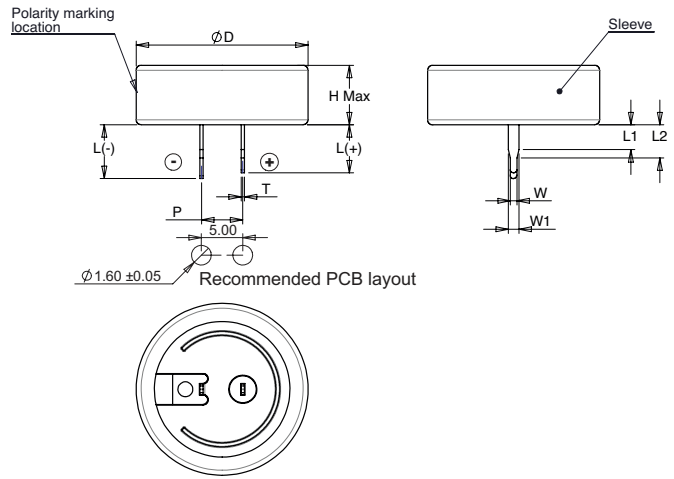
Dimensions (mm)

C Type (cylindrical)

KR-5R5C104/224/334/474-R



KR-5R5C105/155-R



Part Number	Ø D Max	H Max	L (-) ±0.2	L (+) ±0.2	P ±0.3	T ±0.05	L1 ±0.10	L2 ±0.10	W ±0.06	W1 ±0.06
KR-5R5C104-R	13.5	6.5	6.1	5.7	5.0	0.4	3.0	4.0	0.8	1.3
KR-5R5C104H-R	13.5	6.5	3.3	3.3	5.0	0.4	0.9	1.9	0.8	1.3
KR-5R5C224-R	13.5	6.5	6.1	5.7	5.0	0.4	3.0	4.0	0.8	1.3
KR-5R5C224H-R	13.5	6.5	3.3	3.3	5.0	0.4	0.9	1.9	0.8	1.3
KR-5R5C334-R	13.5	6.5	6.1	5.7	5.0	0.4	3.0	4.0	0.8	1.3
KR-5R5C334H-R	13.5	6.5	3.3	3.3	5.0	0.4	0.9	1.9	0.8	1.3
KR-5R5C474-R	13.5	6.5	6.1	5.7	5.0	0.4	3.0	4.0	0.8	1.3
KR-5R5C474H-R	13.5	6.5	3.3	3.3	5.0	0.4	0.9	1.9	0.8	1.3
KR-5R5C105-R	21.5	7.1	6.5	5.8	5.0	0.4	3.0	4.0	0.8	1.3
KR-5R5C105H-R	21.5	7.1	3.3	3.3	5.0	0.4	0.8	1.8	0.8	1.3
KR-5R5C155-R	21.5	7.1	6.5	5.8	5.0	0.4	3.0	4.0	0.8	1.3
KR-5R5C155H-R	21.5	7.1	3.3	3.3	5.0	0.4	0.8	1.8	0.8	1.3

Part numbering system

KR	—	5	R	5	□	□	□	H*	-R
Family Code	Voltage (V) R = Decimal point	Configuration			Capacitance (µF)		Short lead length	Standard product	
	5R5 = 5.5 V	V = Vertical H = Horizontal C=Cylindrical	Value		Multiplier				
					Example: 474 = 47 x 10 <sup>4</sup> µF or 0.47 F				

\* Applies to cylindrical part numbers only. If ordering vertical or horizontal types, or standard lead length on cylindrical type, omit "H" from part number.

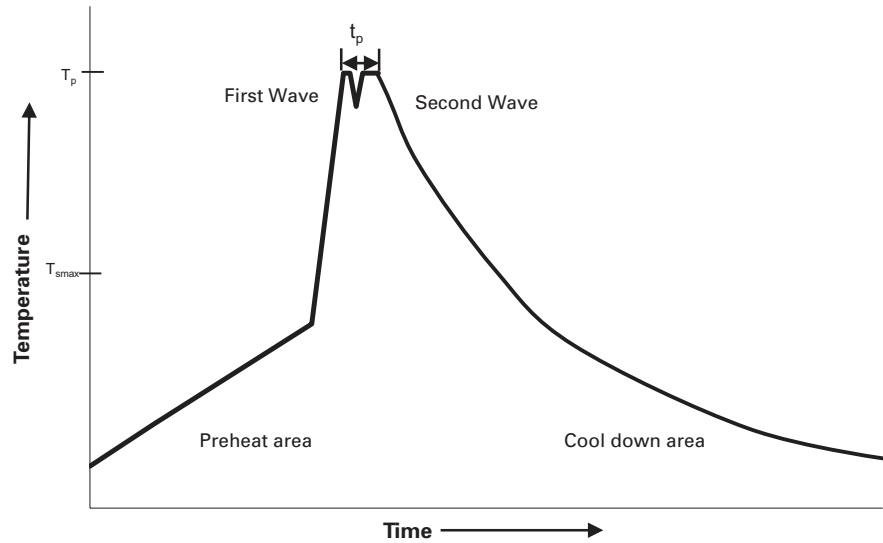
Packaging information

- Standard packaging: 500 parts per package
- For 0.1 F to 0.47 F, 500 parts per bag
- For 1.0 F to 1.5 F, 100 parts per tray, 5 trays per box

Part marking

- Manufacturer
- Capacitance (F)
- Maximum operating voltage (V)
- Polarity

### Wave solder profile



Profile feature	Standard SnPb solder	Lead (Pb) Free solder
Preheat and soak		
• Temperature max. ( $T_{smax}$ )	100 °C	100 °C
• Time max	60 seconds	60 seconds
$\Delta$ preheat to max temperature	160 °C max.	160 °C max.
Peak temperature ( $T_p$ )*	235 °C – 260 °C	250 °C – 260 °C
Time at peak temperature ( $t_p$ )	10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate	~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25 °C to 25 °C	4 minutes	4 minutes

### Manual solder

Do not touch the supercapacitor's external sleeve with the soldering rod or the sleeve will melt or crack. The recommended temperature of the soldering rod tip is less than +260 °C (maximum: +350 °C) and the soldering duration should be less than 5 seconds. Minimize the time that the soldering iron is in direct contact with the terminals of the supercapacitor as excessive heating of the leads may lead to higher equivalent series resistance (ESR).

### Reflow soldering

Do not use reflow soldering using infrared or convection oven heating methods.

### Cleaning/Washing

Avoid cleaning of circuit boards, however if the circuit board must be cleaned use static or ultrasonic immersion in a standard circuit board cleaning fluid for no more than 5 minutes and a maximum temperature of +60 °C. Afterwards thoroughly rinse and dry the circuit boards. In general, treat supercapacitors in the same manner you would an aluminum electrolytic capacitor.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
**Electronics Division**  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
Eaton.com/electronics

© 2020 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. 4327  
July 2020

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

Follow us on social media to get the latest product and support information.

