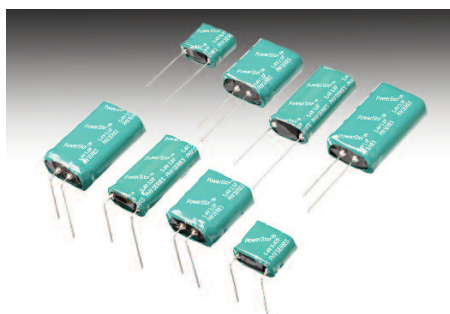


# PHV Supercapacitors

## Cylindrical pack



### Description

Eaton supercapacitors are unique, ultra-high capacitance devices utilizing electrochemical double layer capacitor (EDLC) construction combined with new, high performance materials. This combination of advanced technologies allows Eaton to offer a wide variety of capacitor solutions tailored to specific applications that range from a few micro-amps for several days to several amps for milliseconds.

### Features

- Large capacitance for high energy density
- Ultra-low ESR for high power density

### Applications

- Pulse Power
- Bridging or hold-up power

## Ratings

|                                      |                                                           |
|--------------------------------------|-----------------------------------------------------------|
| Capacitance                          | 0.5 F to 5.0 F                                            |
| Maximum working voltage              | 5.4 V                                                     |
| Surge voltage                        | 6.0 V                                                     |
| Capacitance tolerance                | -10% to +30% (+20 °C)                                     |
| Operating temperature range          | -40 °C to +65 °C                                          |
| Extended operating temperature range | -40 °C to +85 °C (with linear derating to 4.0 V @ +85 °C) |

## Specifications

| Nominal Capacitance (F) | Vertical Part Number | Horizontal Part Number | Maximum ESR (Ω) (Equivalent Series Resistance) Measured @ 1 kHz |      | Nominal leakage current (μA) after 100 hours @ 5 V, +20 °C | Nominal dimensions (mm) | Typical mass (grams/piece) |
|-------------------------|----------------------|------------------------|-----------------------------------------------------------------|------|------------------------------------------------------------|-------------------------|----------------------------|
| 0.5                     | PHV-5R4V474-R        | PHV-5R4H474-R          | 0.300                                                           | 0.40 | 13                                                         | 8.5 x 16.8 x 14.0       | 2.6                        |
| 1.5                     | PHV-5R4V155-R        | PHV-5R4H155-R          | 0.120                                                           | 0.16 | 18                                                         | 8.5 x 16.8 x 21.5       | 3.0                        |
| 2.5                     | PHV-5R4V255-R        | PHV-5R4H255-R          | 0.075                                                           | 0.08 | 24                                                         | 10.5 x 20.8 x 22.5      | 4.5                        |
| 3.0                     | PHV-5R4V305-R        | PHV-5R4H305-R          | 0.075                                                           | 0.08 | 25                                                         | 8.5 x 16.8 x 31.5       | 4.8                        |
| 5.0                     | PHV-5R4V505-R        | PHV-5R4H505-R          | 0.065                                                           | 0.07 | 28                                                         | 10.5 x 20.8 x 32        | 6.8                        |

## Performance

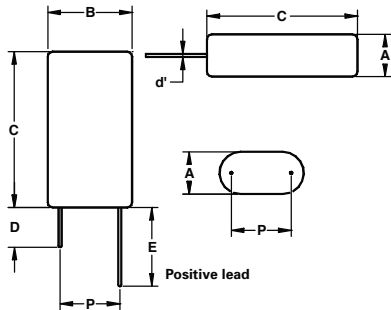
| Parameter                                                           | Capacitance change (% of initial value) | ESR (% of max. initial value) |
|---------------------------------------------------------------------|-----------------------------------------|-------------------------------|
| Life (1000 hours @ +65 °C @ 5.4 Vdc)                                | ≤ 30%                                   | ≤ 200%                        |
| Storage - Low and High Temperature (1000 hours @ -40 °C and +85 °C) | ≤ 30%                                   | ≤ 200%                        |

## Dimensions (mm)

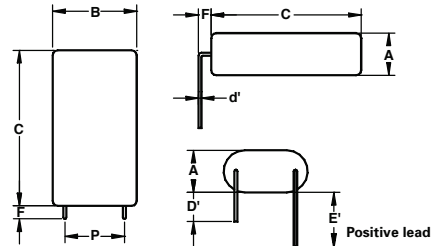
| Vertical Part Number | Horizontal Part Number | A              | B    | C    | d'     | D              | D' | E  | E' | F     | P    |
|----------------------|------------------------|----------------|------|------|--------|----------------|----|----|----|-------|------|
| PHV-5R4V474-R        | PHV-5R4H474-R          | 9.0            | 17.3 | 14.5 | 0.5    | 20             | 15 | 25 | 20 | 2.0   | 11.8 |
| PHV-5R4V155-R        | PHV-5R4H155-R          | 9.0            | 17.3 | 22.0 | 0.5    | 20             | 15 | 25 | 20 | 2.0   | 11.8 |
| PHV-5R4V255-R        | PHV-5R4H255-R          | 11.0           | 21.3 | 23.0 | 0.6    | 20             | 15 | 25 | 20 | 2.0   | 5.3  |
| PHV-5R4V305-R        | PHV-5R4H305-R          | 9.0            | 17.3 | 32.5 | 0.5    | 20             | 15 | 25 | 20 | 2.0   | 11.8 |
| PHV-5R4V505-R        | PHV-5R4H505-R          | 11.0           | 21.3 | 32.5 | 0.6    | 20             | 15 | 25 | 20 | 2.0   | 5.3  |
| <b>Tolerances</b>    |                        | <b>Maximum</b> |      |      | ± 0.02 | <b>Minimum</b> |    |    |    | ± 0.5 |      |

Note: Longer lead is positive.

### Vertical



### Horizontal



## Part numbering system

| P           | HV      | — | 5R4                     | V                              | 15                                           | 5          | -R               |
|-------------|---------|---|-------------------------|--------------------------------|----------------------------------------------|------------|------------------|
| Family Code | Version |   | Voltage (V) R = Decimal | Configuration                  | Capacitance (μF)                             |            |                  |
|             |         |   |                         |                                | Value                                        | Multiplier | Standard product |
| P= Pack     |         |   | 5R4 = 5.4 V             | V = Vertical<br>H = Horizontal | Example: 155 = 15 x 10 <sup>5</sup> or 1.5 F |            |                  |

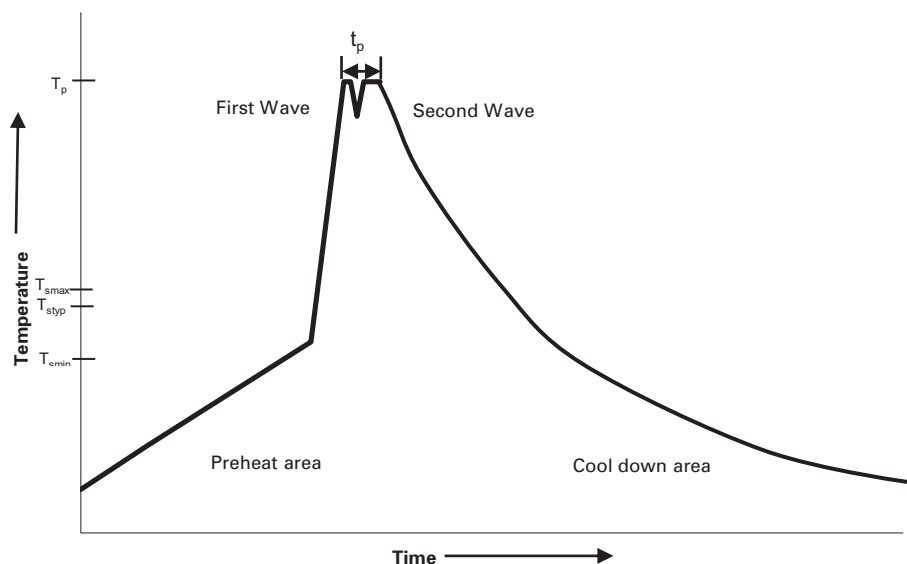
## Packaging information

- Standard packaging: Bulk, 100 units per bag
- Larger bulk packages available on request

## Part marking

- Manufacturer
- Capacitance (F)
- Maximum operating voltage (V)
- Family code (or part number)
- Polarity marking

## 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 ( $T_p$ )*         | 220 °C – 260 °C                           | 250 °C – 260 °C                           |
| Time at peak temperature ( $t_p$ )  | 10 seconds max<br>5 seconds max each wave | 10 seconds max<br>5 seconds max each wave |
| Ramp-down rate                      | ~ 2 K/s min<br>~3.5 K/s typ<br>~5 K/s max | ~ 2 K/s min<br>~3.5 K/s typ<br>~5 K/s max |
| Time 25 °C to 25 °C                 | 4 minutes                                 | 4 minutes                                 |

## Manual solder

+350 °C, 4-5 seconds. (by soldering iron), generally manual, hand soldering is not recommended.

## 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.

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**Eaton**  
**Electronics Division**  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
[www.eaton.com/electronics](http://www.eaton.com/electronics)

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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)

[www.lifeelectronics.ru](http://www.lifeelectronics.ru)