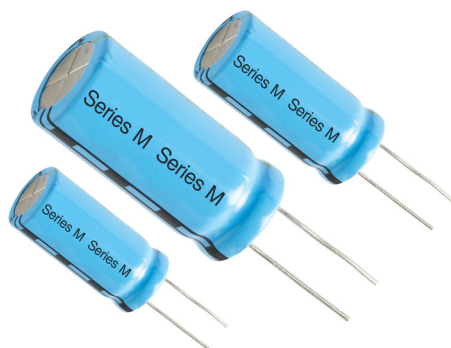


# M Supercapacitors

## Cylindrical cells



### Features

- 2.5 Volts
- Low ESR
- High capacitance long cycle life
- Low ESR with high energy density
- Low leakage current
- UL recognized

### Applications

- Pulse Power
- Bridge or hold-up power

### 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.



*Powering Business Worldwide*

## Ratings

|                             |                                                  |
|-----------------------------|--------------------------------------------------|
| Capacitance                 | 1.0 F to 9.0 F                                   |
| Maximum working voltage     | 2.5 V                                            |
| Surge voltage               | 3.0 V                                            |
| Capacitance tolerance       | -20% to +80% (+20 °C)                            |
| Operating temperature range | -40 °C to +60 °C                                 |
| Extended temperature range  | -40 °C to +85 °C (Maximum working voltage 2.0 V) |

## Specifications

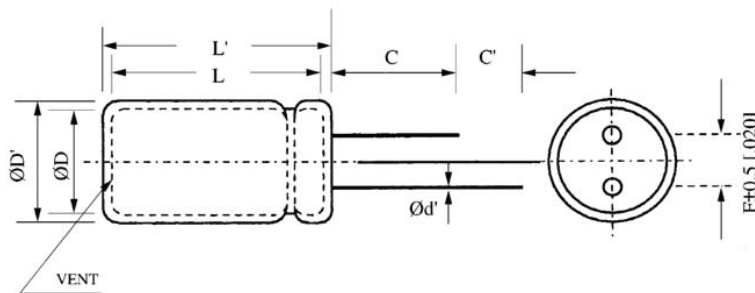
| Capacitance (F) | Part Number    | Nominal ESR ( $\Omega$ )<br>(Equivalent Series Resistance)<br>Measured @ |        | Nominal dimensions (mm)<br>(diameter x length) |      | Typical Mass<br>(grams/piece) |
|-----------------|----------------|--------------------------------------------------------------------------|--------|------------------------------------------------|------|-------------------------------|
|                 |                | 1 kHz                                                                    | 100 Hz |                                                |      |                               |
| 1               | M0810-2R5105-R | 0.210                                                                    | 0.250  | 8                                              | 13   | 1.2                           |
| 2               | M0820-2R5205-R | 0.075                                                                    | 0.100  | 8                                              | 20   | 1.5                           |
| 3               | M1020-2R5305-R | 0.035                                                                    | 0.050  | 10                                             | 20.5 | 2.8                           |
| 6               | M1030-2R5605-R | 0.025                                                                    | 0.035  | 10                                             | 30   | 3.9                           |
| 9               | M1325-2R5905-R | 0.020                                                                    | 0.030  | 13                                             | 26   | 5.6                           |

## Performance

| Parameter                                                           | Capacitance change<br>(% of initial value) | ESR<br>(% of max. initial value) |
|---------------------------------------------------------------------|--------------------------------------------|----------------------------------|
| Life (1000 hours @ +60 °C @ 2.5 Vdc)                                | $\leq 30\%$                                | $\leq 200\%$                     |
| Storage - Low and High Temperature (1000 hours @ -40 °C and +60 °C) | $\leq 30\%$                                | $\leq 200\%$                     |

## Dimensions (mm)

| Part Number       | D              | D'   | L    | L'   | F                           | d'                           | C              | C'  |
|-------------------|----------------|------|------|------|-----------------------------|------------------------------|----------------|-----|
| M0810-2R5105-R    | 8.0            | 8.5  | 13.0 | 13.5 | 3.5                         | 0.50                         | 20.0           | 5.0 |
| M0820-2R5205-R    | 8.0            | 8.5  | 20.5 | 21.0 | 3.5                         | 0.50                         | 20.0           | 5.0 |
| M1020-2R5305-R    | 10.0           | 10.5 | 21.8 | 22.3 | 5.0                         | 0.60                         | 20.0           | 5.0 |
| M1030-2R5605-R    | 10.0           | 10.5 | 31.0 | 31.5 | 5.0                         | 0.60                         | 20.0           | 5.0 |
| M1325-2R5905-R    | 13.0           | 13.5 | 27.9 | 28.4 | 5.0                         | 0.60                         | 20.0           | 5.0 |
| <b>Tolerances</b> | <b>Maximum</b> |      |      |      | <b><math>\pm 0.5</math></b> | <b><math>\pm 0.02</math></b> | <b>Minimum</b> |     |



## Part marking

- Manufacturer
- Capacitance (F)
- Nominal working voltage (V)
- Family code (or part number)
- Polarity

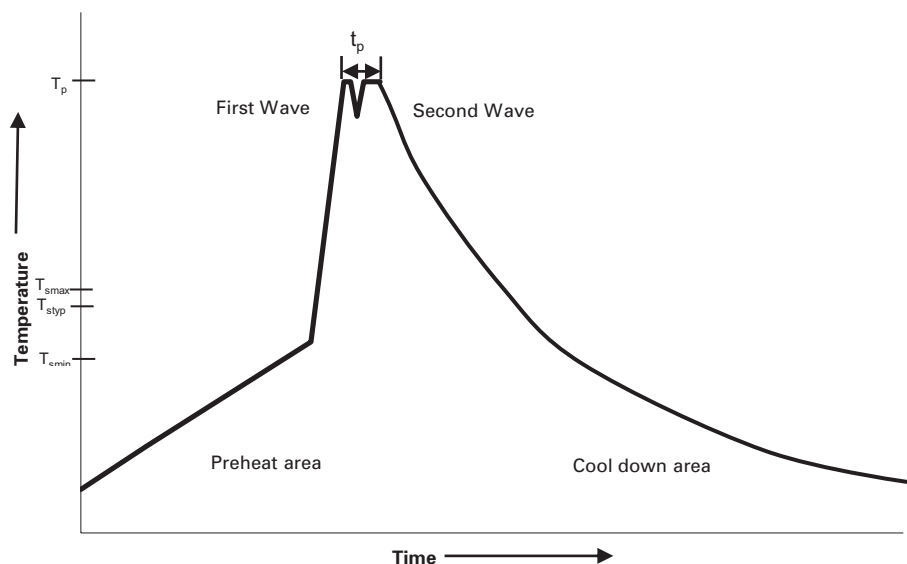
## Part numbering system

| M           | 1325                |             | — | 2R5                     | 90                                             | 5          | -R               |
|-------------|---------------------|-------------|---|-------------------------|------------------------------------------------|------------|------------------|
| Family Code | Size reference (mm) |             |   | Voltage (V) R = Decimal | Capacitance (μF)                               |            | Standard product |
|             |                     |             |   |                         | Value                                          | Multiplier |                  |
| M Family    | Diameter = 13       | Length = 25 |   | 2R5 = 2.5 V             | Example: 905 = 9 x 10 <sup>5</sup> μF or 9.0 F |            |                  |

## Packaging information

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

## 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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