



# 3F | 1.6V | CABLE-BASED CAPACITOR

## CBC-3-A-0016-120

### OVERVIEW

The Cable-Based Capacitor (CBC) is a flexible, wire-shape supercapacitor. Its unique form factor offers space and aesthetic advantages through its ability to be used as a part of a product or system's wiring infrastructure to add redundancy, or to offset components from printed circuit boards.

### FEATURES AND BENEFITS

- Flexible & wire-shape form factor
- Use as part of wiring infrastructure
- Cable-based backup power
- Cable-based boost power
- Size, space, aesthetic advantages
- Electronics miniaturization

### TYPICAL APPLICATIONS

- Peak Power Complement
- Emergency Lighting
- Renewable Energy Systems
- Automotive Systems
- IoT, Automation, & Security Devices
- Backup System
- Energy Harvesting
- Advanced and Smart Metering

### SAFETY

Pending Certifications

UL 810A

### PHYSICAL

Nominal Mass

7.5g



### PRODUCT SPECIFICATIONS

#### ELECTRICAL

Rated Voltage, $V_R$	1.6 VDC
Surge Voltage, Non-repetitive	2.0 VDC
Rated Capacitance, C	3 F
Min. / Max. Capacitance	2.4 / 6 F
Current Rating	1.25A
Absolute Max Current Rating, Non-repetitive	2A
Equivalent Series Resistance ( $ESR_{DC}$ )	0.25 $\Omega$
Leakage Current	0.7mA

#### POWER & ENERGY

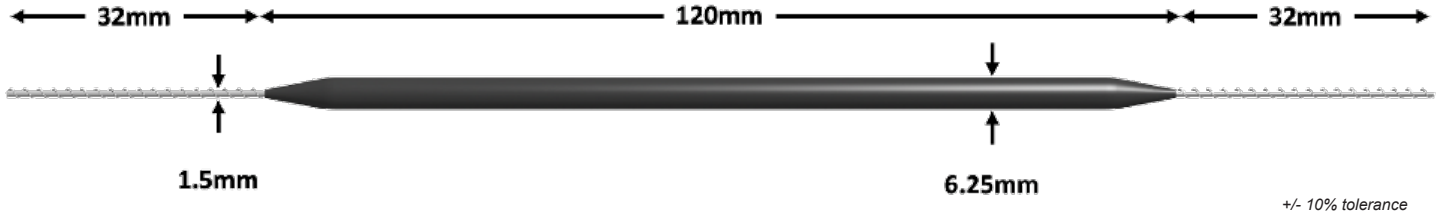
Stored Energy, $E_{max}$	1.07 mWh
Energy Density	0.14 Wh/kg
Power Density	164 W/kg
Impedance Match Specific Power	341 W/kg

#### LIFE

Cycle Life (0.1V to 1.6V) at room temperature	100,000 cycles
Expected Shelf Life (Stored uncharged at 25°C)	4 years
Temperature Range	0C to 70C
Capacitance end of life value	>1.9F
$ESR_{DC}$ end of life value	<0.4 $\Omega$

Results may vary depending on testing/application conditions. Specifications listed are initial, beginning of life performance values. Additional terms and conditions, including the limited warranty, apply at the time of purchase. See the warranty details for applicable operating and use requirements.

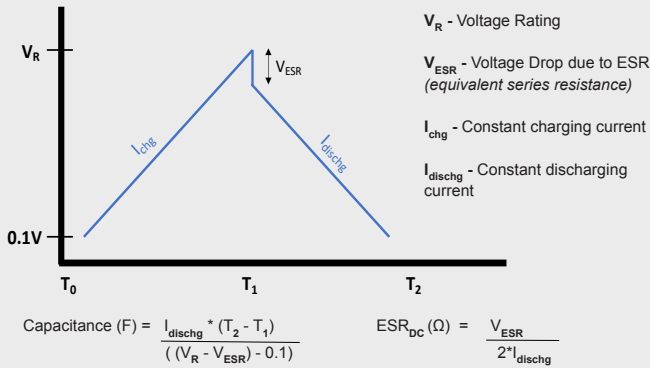
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## Rated Capacitance & ESR<sub>DC</sub> (measure method)

- Capacitance: Constant current charge of 1.25A from 0.1V to  $V_R$ , constant current discharge of 1.25A from  $V_R$  to 0.1V.
- ESR<sub>DC</sub>: Constant current charge of 1.25A from 0.1V to  $V_R$  and constant current discharge of 1.25A from  $V_R$  to 0.1V.

- Lower charge and discharge current will increase capacitance and ESR values.



## Leakage Current

- Current measured within 24 hrs at rated voltage and 25°C. Initial leakage current can be higher.
- If applicable, module leakage current is the sum of cell and balancing circuit leakage currents.

## Surge Voltage

Absolute maximum voltage, non-repetitive. Duration not to exceed 1 second.

## Non-Repetitive, Maximum Peak Current

- Current needed to discharge cell/module from rated voltage to half-rated voltage in 1 second.

$$I = \frac{(0.5) \cdot V_R}{1 / C + \text{ESR}_{\text{DC}}}$$

## Energy & Power (Based on ICE 62391-2)

- Maximum Stored Energy,  $E_{\text{max}}$  (Whr) =  $\frac{(0.5) \cdot C \cdot V_R^2}{3,600}$
- Energy Density (Whr/kg) =  $\frac{E_{\text{max}}}{\text{mass}}$
- Power Density (W/kg) =  $\frac{(0.12) \cdot V_R^2}{\text{ESR}_{\text{DC}} \cdot \text{mass}}$
- Impedance Match Specific Power (W/kg) =  $\frac{(0.25) \cdot V_R^2}{\text{ESR}_{\text{DC}} \cdot \text{mass}}$

- Presented power and energy values are calculated based on the rated capacitance and Max ESR initial, beginning of life, values.

## Cycle Life Test Profile

Cycle life determined by cycling from 0.1V to the rated voltage. Cycle life varies depending upon application specific characteristics. Results will vary. Cycling between smaller voltage window will extend cycle life. Maximum life 500,000 cycles.

Per United Nations material classification UN3499, all Capacitech Energy, Inc. ultracapacitors have less than 10 Wh capacity to meet the requirements of Special Provisions 361. Both individual ultracapacitors and modules composed of those ultracapacitors shipped by Capacitech Energy, Inc. can be transported without being treated as dangerous goods (hazardous materials) under transportation regulations.

When ordering, please reference the Capacitech part number below.

## Capacitech Part Number:

CBC-3-A-0016-120

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A longer cycle life can be achieved by cycling the CBC between a smaller voltage window such as 0.8V to 1.6V. Results may vary depending on testing/application conditions. Specifications listed are initial, beginning of life performance values. Additional terms and conditions, including the limited warranty, apply at the time of purchase. See the warranty details for applicable operating and use requirements.

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## MOUNTING & SAFETY INFORMATION

The CBC is compatible with hand soldering, reflow, and wave soldering processes as long as precautions are taken. When soldering the CBC, the temperature & time that the body of the CBC sees during soldering may degrade performance. We advise following these guidelines:

- Do not immerse the CBC in solder. Only the bare leads should come in contact with the solder.
- Ensure that the body of the CBC is never in contact with the molten solder.
- Excessive temperatures or excessive temperature cycling during soldering may cause the safety vent to burst or the case to shrink or crack, potentially damaging the PCB or other components, and significantly reduce the life of the capacitor.

The supercapacitor casing is an uninsulated live part and has to be enclosed and securely mounted to maintain the appropriate spacings in the end use application.

### Polarity / Reverse Voltage

It is recommended that the polarity should be used as marked. If the polarity is reversed the CBC will show signs of damage and degradation.

### Warnings

- To avoid short circuit, after usage or test, CBC voltage needs to discharge to  $\leq 0.1V$ .
- To maximize operating life, it is recommended to discharge the CBC every 4-6 hours before resuming normal operations.
- Do not apply overvoltage, reverse charge, burn or heat higher than 70°C.
- Do not press, damage, or disassemble the CBC.
- Do not bend the CBC on extreme ends of the body where the terminal meets the heatshrink. This could break the seal.
- If you observe overheating or burning smell from the capacitor disconnect power immediately, and do not touch.

### Storage

- Capacitors may be stored within the operating temperature range of the capacitor.
- Lower storage temperature is preferred as it extends the shelf life of the capacitor.
- Do not store the CBC in the following environments: high temperature / high humidity environments >40°C / 70% RH, direct sunlight, in direct contact with water, salt, oil or other chemical, in direct contact with corrosive materials, acids, alkalis, or toxic gases, dusty environment, OR in environment with shock and vibration conditions.

### Emergency Applications

In the event of bodily contact or ingestion, take the following cautions:

- Skin contact: Use soap and water thoroughly to wash the area of the skin.
- Eye contact: Flush with flowing water or saline, and immediately seek medical treatment.
- Ingestion: Immediately wash with water and seek medical treatment.

### Transportation

Not subjected to US DOT or IATA regulations  
UN3499, <10Wh, Non-Hazardous Goods

### Contact Information:

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