

2.7V 10F ULTRACAPACITOR CELL

BCAP0010 P270 S01 | BCAP0010 P270 S12
ESHSR-0010C0-002R7 |

FEATURES AND BENEFITS

- High performance product with low ESR
- Exceptional shock and vibration resistance
- Long lifetimes with up to 500,000 duty cycles*
- Compliant with UL, RoHS and REACH requirements

TYPICAL APPLICATIONS

- Actuators
- Emergency Lighting
- Telematics
- Automotive
- Security Equipment
- Backup System
- Smoke Detectors
- Advanced Metering



PRODUCT SPECIFICATIONS

ELECTRICAL

Rated Voltage, V_R	2.7 VDC
Surge Voltage ¹	2.85 VDC
Rated Capacitance, C^3	10 F
Min. / Max. Capacitance, Initial	9 F / 12 F
Typical Capacitance, Initial ^{2,3}	10.6 F
Rated (Max.) ESR _{DC} , Initial ³	30 mΩ
Typical ESR _{DC} , Initial ^{2,3}	25 mΩ
Typical ESR _{DC} , Initial, 5 sec ^{2,3}	46 mΩ
Maximum Leakage Current ⁴	23 μA
Maximum Peak Current, Non-repetitive ⁵	10 A

PHYSICAL

Nominal Mass	3.1 g
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POWER & ENERGY

Operating Temp. Range	Standard (-40°C to 65°C) at 2.7 V	Extended (-40°C to 85°C) at 2.3 V
Maximum Stored Energy, $E_{max}^{6,9}$	10.1 mWh	7.3 mWh
Gravimetric Specific Energy ⁶	3.2 Wh/kg	2.3 Wh/kg
Usable Specific Power ⁶	9.4 kW/kg	6.8 kW/kg
Impedance Match Specific Power ⁶	19.5 kW/kg	14.2 kW/kg

SAFETY

Certifications	RoHS, REACH, UL 810A
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TYPICAL CHARACTERISTICS

THERMAL

Typical Thermal Resistance (R_{th} , Housing) ⁸	42°C/W
Typical Thermal Capacitance (C_{th})	2.7 J/°C
Usable Continuous Current (BOL) ($\Delta T = 15^\circ C$) ^{8,10}	3.4 A
Usable Continuous Current (BOL) ($\Delta T = 40^\circ C$) ^{8,10}	5.6 A

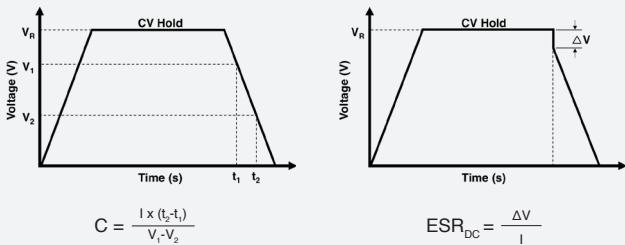
LIFE*

Projected DC Life at Room Temperature (At rated voltage and 25°C, EOL ¹⁰)	10 years
DC Life at High Temperature (At rated voltage and 65°C, EOL ¹⁰)	1,500 hours
DC Life at De-rated Voltage & Higher Temperature (At 2.3V and 85°C, EOL ¹⁰)	1,500 hours
Projected Cycle Life at Room Temperature ⁷ (Constant current charge-discharge from V_R to 1/2 V_R at 25°C, EOL ¹⁰)	500,000 cycles
Shelf Life (Stored uncharged at 25°C, ≤ 50% RH)	4 years

*Results may vary. Additional terms and conditions, including the limited warranty, apply at the time of purchase. See the warranty details for applicable operating and use requirements.

Datasheet: 2.7V 10F ULTRACAPACITOR CELL

- Surge Voltage
Absolute maximum voltage, non-repetitive. Duration not to exceed 1 second.
- "Typical" values represent mean values of production sample.
- Rated Capacitance & ESR_{DC} (measure method)
 - Capacitance: Constant current charge (10 mA/F) to V_R, 5 min hold at V_R, constant current discharge 10 mA/F to 0.1V.
e.g. in case of 2.7V 10F cell, 10 * 10 = 100 mA
 - ESR_{DC}: Constant current charge (10 mA/F) to V_R, 5 min hold at V_R, constant current discharge (40 * C * V_R[mA]) to 0.1 V.
e.g. in case of 2.7V 10F cell, charge with 10 * 10 = 100 mA and discharge with 40 * 10 * 2.7 = 1,080 mA

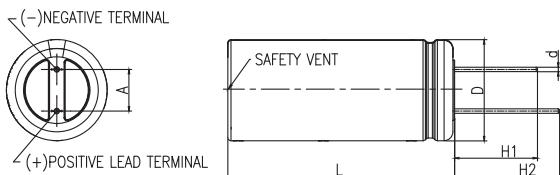


where C is the capacitance (F);
 I is the absolute value of the discharge current (A);
 V_R is the rated voltage (V);
 V₁ is the measurement start voltage, 0.8xV_R (V);
 V₂ is the measurement end voltage, 0.4xV_R (V);
 t₁ is the time from start of discharge to reach V₁ (s);
 t₂ is the time from start of discharge to reach V₂ (s);
 ESR_{DC} is the DC-ESR (Ω);
 ΔV is the voltage drop during first 10ms of discharge (V).

Typical ESR_{DC} Initial, 5 sec tested per Maxwell Application Note, "Test Procedures for Capacitance, ESR, Leakage Current and Self-Discharge Characterizations of Ultracapacitors" available at www.maxwell.com.

- Maximum Leakage Current
 - Current measured after 72 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.
- Maximum Peak Current
 - Current needed to discharge cell/module from rated voltage to half-rated voltage in 1 second.

BCAP00010 P270 S01



When ordering, please reference the Maxwell Model Number below.

Maxwell Model Number:	Maxwell Part Number:	Alternate Model Number:
BCAP0010 P270 S01	133516	ESHSR-0010C0-002R7
BCAP0010 P270 S12	134092	-

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