2.7V 100F ULTRACAPACITOR CELL

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
• UPS System

PRODUCT SPECIFICATIONS

ELECTRICAL
- Rated Voltage, V_r: 2.7 VDC
- Surge Voltage: 2.85 VDC
- Rated Capacitance, C: 100 F
- Min. / Max. Capacitance, Initial: 100 F / 120 F
- Typical Capacitance, Initial: 106 F
- Rated (Max.) ESR_{DC}, Initial: 12 mΩ
- Typical ESR_{DC}, Initial: 8 mΩ
- Typical ESR_{DC}, Initial, 5 sec: 11 mΩ
- Maximum Leakage Current: 0.26 mA
- Maximum Peak Current, Non-repetitive: 61 A

PHYSICAL
- Nominal Mass: 21.1 g

POWER & ENERGY
- Operating Temp. Range: Standard (-40°C to 65°C) at 2.7 V
  - Maximum Stored Energy, E_{max} 6,9: 0.10 Wh
  - Gravimetric Specific Energy: 4.8 Wh/kg
  - Usable Specific Power: 3.4 kW/kg
  - Impedance Match Specific Power: 7.2 kW/kg
- Extended (-40°C to 85°C) at 2.3 V
  - Maximum Stored Energy, E_{max} 6,9: 0.07 Wh
  - Gravimetric Specific Energy: 3.4 Wh/kg
  - Usable Specific Power: 2.5 kW/kg
  - Impedance Match Specific Power: 5.2 kW/kg

THERMAL
- Typical Thermal Resistance (R_{Th, Housing}) 8: 11.6°C/W
- Typical Thermal Capacitance (C_{Th}): 34.5 J°C
- Usable Continuous Current (BOL) (ΔT = 15 °C): 10 A
- Usable Continuous Current (BOL) (ΔT = 40 °C): 17 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): 1,000 hours
- Projected Cycle Life at Room Temperature (Constant current charge-discharge from V_r to 1/2V_r at 25°C, EOL 10): 500,000 cycles
- Shelf Life (Stored uncharged at 25°C, ≤ 50% RH): 4 years

SAFETY
- Certifications: RoHS, REACH, UL 810A

*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 100F ULTRACAPACITOR CELL

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

2. “Typical” values represent mean values of production sample.

3. Rated Capacitance & ESRDC (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 100F cell, 10 * 100 = 1,000 mA
   • ESRDC: 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 100F cell, charge with 10 * 100 = 1,000 mA and discharge with 40 * 100 * 2.7 = 10,800 mA

4. 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.

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

\[
I = \frac{1}{2} \Delta V \frac{t_2 - t_1}{C}
\]

where \(C\) is the capacitance (F);
\(I\) is the average value of the discharge current (A);
\(V_r\) is the rated voltage (V);
\(t_1\) is the time from start of discharge to reach \(V_1\) (s);
\(t_2\) is the time from start of discharge to reach \(V_2\) (s);
\(\Delta V\) is the voltage drop during first 10ms of discharge (V).


6. Energy & Power (Based on IEC 62391-2)
   • Maximum Stored Energy, \(E_{max}\) (Wh) = \(\frac{1}{2} C V_r^2\)
   • Gravimetric Specific Energy (Wh/kg) = \(\frac{E_{max}}{mass}\)
   • Usable Specific Power (W/kg) = \(\frac{IRMS}{ESRDC x mass}\)
   • Impedance Match Specific Power (W/kg) = \(\frac{0.25V_r^2}{ESRDC x mass}\)
   • Present Power and Energy values are calculated based on Rated Capacitance & Rated (Max.) ESRDC, Initial values.

7. Cycle Life Test Profile
   Cycle life varies depending upon application-specific characteristics. Actual results will vary.

8. Temperature Rise at Constant Current
   • \(\Delta T = I (\frac{1}{ESRDC} + R_{th})\)
   where \(\Delta T\): Temperature rise over ambient (°C)

9. Per United Nations material classification UN3499, all Maxwell 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 Maxwell can be transported without being treated as dangerous goods (hazardous materials) under transportation regulations.

10. BOL: Beginning of Life, rated initial product performance
    EOL: End of Life criteria.
    • Capacitance: 80% of min. BOL rating
    • ESRDC: 2x max. BOL rating

BCAP0100 P270 S07

![Recommended PCB pattern hole size: 2.0±0.1(mm)]

When ordering, please reference the Maxwell Model Number below.

Maxwell Model Number: BCAP0100 P270 S07
Maxwell Part Number: 133522
Alternate Model Number: ESHSR-0100C0-002R7

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