FEATURES AND BENEFITS
- High performance product with low ESR
- Exceptional shock and vibration resistance
- Long lifetimes with up to 100,000 duty cycles*
- Compliant with RoHS and REACH requirements

APPLICATIONS
- Flashlights
- LED
- Memory Back-Up
- Portable Hand Tools
- Solar Charger

- Off-Grid Lighting
- Automotive Subsystems (Power Windows and Door Locks)

PRODUCT SPECIFICATIONS

**ELECTRICAL**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage, $V_r$</td>
<td>2.3 VDC</td>
</tr>
<tr>
<td>Surge Voltage</td>
<td>2.5 VDC</td>
</tr>
<tr>
<td>Rated Capacitance, $C^3$</td>
<td>120 F</td>
</tr>
<tr>
<td>Min. / Max. Capacitance, Initial</td>
<td>108 F / 144 F</td>
</tr>
<tr>
<td>Typical Capacitance, Initial$^{2,3}$</td>
<td>124 F</td>
</tr>
<tr>
<td>Rated (Max.) ESR$_{dc}$, Initial$^3$</td>
<td>27 mΩ</td>
</tr>
<tr>
<td>Typical ESR$_{dc}$, Initial$^{2,3}$</td>
<td>16 mΩ</td>
</tr>
<tr>
<td>Maximum Leakage Current$^4$</td>
<td>172 μA</td>
</tr>
<tr>
<td>Maximum Peak Current, Non-repetitive$^5$</td>
<td>32 A</td>
</tr>
</tbody>
</table>

**PHYSICAL**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Mass</td>
<td>15.0 g</td>
</tr>
</tbody>
</table>

**POWER & ENERGY**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temp. Range</td>
<td>-25°C to 60°C</td>
</tr>
<tr>
<td>Maximum Stored Energy, $E_{max}^6$</td>
<td>88 mWh</td>
</tr>
<tr>
<td>Gravimetric Specific Energy$^6$</td>
<td>5.8 Wh/kg</td>
</tr>
<tr>
<td>Usable Specific Power$^6$</td>
<td>1.5 kW/kg</td>
</tr>
<tr>
<td>Impedance Match Specific Power$^6$</td>
<td>3.2 kW/kg</td>
</tr>
</tbody>
</table>

**SAFETY**

| Certification               | RoHS, REACH |

**LIFE**

- Projected DC Life at Room Temperature
  (At rated voltage and 25°C, EOL$^9$) 10 years
- DC Life at High Temperature
  (At rated voltage and 60°C, EOL$^9$) 2,000 hours
- Projected Cycle Life at Room Temperature
  (Constant current charge-discharge from $V_r$ to 1/2$V_r$ at 25°C, EOL$^9$) 100,000 cycles
- Shelf Life
  (Stored uncharged at 25°C, ≤ 50% RH) 2 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.
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 & ESR<sub>DC</sub> (measure method)
   - Capacitance: Constant current charge to V<sub>1</sub> with 100 mA, constant voltage charge at V<sub>1</sub> for 5 min., constant current discharge to 0.9 V with 100 mA.
   - ESR<sub>DC</sub>: Constant current charge to V<sub>1</sub> with 100 mA, constant voltage charge at V<sub>1</sub> for 5 min., constant current discharge with 4 * C * V<sub>1</sub> [mA] to 0.9 V. e.g. in case of 2.3V 120F pseudo cell, 4 * 120 * 2.3 = 1,100 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.
   \[ I = \frac{\Delta V}{\Delta t/C + ESR_{DC}} \]
   where \( \Delta t \) is the discharge time (sec); \( \Delta t \) = 1 sec in this case
   - The stated maximum peak current should not be used in normal operation and is only provided as a reference value.

6. Energy & Power (Based on IEC 62391-2)
   - Maximum Stored Energy, \( E_{\text{max}} \) (Wh) = \( \frac{1}{2} CV_1^2 \)
   - Gravimetric Specific Energy (Wh/kg) = \( \frac{E_{\text{max}}}{\text{mass}} \)
   - Usable Specific Power (W/kg) = \( \frac{1}{0.12V_1^2} \times \frac{1}{ESR_{DC} \times \text{mass}} \)
   - Impedance Match Specific Power (W/kg) = \( \frac{0.25V_1^2}{ESR_{DC} \times \text{mass}} \)
   - Presented Power and Energy values are calculated based on Rated Capacitance & Rated (Max.) ESR<sub>DC</sub>, Initial values.

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

8. 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.

9. BOL: Beginning of Life, rated initial product performance
   EOL: End of Life criteria.
   - Capacitance: 70% of min. BOL rating
   - ESR<sub>DC</sub>: 2x max. BOL rating

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**PCAP0120 P230 S01**

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When ordering, please reference the Maxwell Model Number below.

**Maxwell Model Number:** PCAP0120 P230 S01  
**Maxwell Part Number:** 133739  
**Alternate Model Number:** PSHLR-0120C0-002R3

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