# 2.7V 50F 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
- Smoke Detectors
- Advanced Metering

## Typical Characteristics

### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage, $V_r$</td>
<td>2.7 VDC</td>
</tr>
<tr>
<td>Surge Voltage</td>
<td>2.85 VDC</td>
</tr>
<tr>
<td>Rated Capacitance, $C_r$</td>
<td>50 F</td>
</tr>
<tr>
<td>Min. / Max. Capacitance, Initial</td>
<td>45 F / 60 F</td>
</tr>
<tr>
<td>Typical Capacitance, Initial</td>
<td>54.5 F</td>
</tr>
<tr>
<td>Rated (Max.) ESR$_{DC}^1$, Initial</td>
<td>16 mΩ</td>
</tr>
<tr>
<td>Typical ESR$_{DC}^2$, Initial</td>
<td>10 mΩ</td>
</tr>
<tr>
<td>Typical ESR$_{DC}^3$, Initial, 5 sec</td>
<td>16 mΩ</td>
</tr>
<tr>
<td>Maximum Leakage Current$^4$</td>
<td>73 μA</td>
</tr>
<tr>
<td>Maximum Peak Current, Non-repetitive$^4$</td>
<td>37 A</td>
</tr>
</tbody>
</table>

### Physical

- Nominal Mass: 12.2 g

### Power & Energy

- Operating Temp. Range:
  - Standard (-40°C to 65°C) at 2.7 V: Maximum Stored Energy, $E_{max}^6,9$: 50.6 mWh
  - Extended (-40°C to 85°C) at 2.3 V: 36.7 mWh
- Gravimetric Specific Energy$^6$: 4.1 Wh/kg
- Usable Specific Power$^6$: 4.4 kW/kg
- Impedance Match Specific Power$^6$: 9.3 kW/kg

### 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.*
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 (measure method)
   • Capacitance: Constant current charge (10 mA/F) to \( V_{ur} \) for 5 min at \( V_{ur} \) constant current charge 10 mA/F to 0.1 V.
     e.g. in case of 2.7V 50F cell, \( 10 \times 50 = 500 \) mA
   • ESR: Constant charge current (10 mA/F) to \( V_{ur} \) for 5 min at \( V_{ur} \) constant current discharge (40 * C * \( V_{ur} \) (mA)) to 0.1 V.
     e.g. in case of 2.7V 50F cell, charge with \( 10 \times 50 = 500 \) mA and discharge with \( 40 \times 50 = 2.7 \) V, 5,400 mA

4. Maximum Leakage Current
   • Current measured after 72 hrs at rated voltage and 25°C.
     Initial leakage current
     Maximum peak current
     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.

BCAP0050 P270 S01

When ordering, please reference the Maxwell Model Number below.

Maxwell Model Number: BCAP0050 P270 S01
Maxwell Part Number: 133520
Alternate Model Number: ESHSR-0050C0-002R7

The information in this document is correct at time of printing and is subject to change without notice. Images are not to scale. Products and related processes may be covered by one or more U.S. or international patents and pending applications. Please see www.maxwell.com/patents for more information.

Maxwell Technologies, Inc.
Global Headquarters
3888 Calle Fortunada
San Diego, CA 92123
USA
Tel: +1 (858) 503-3300
Fax: +1 (858) 503-3301

Maxwell Technologies, Inc.
Maxwell Technologies SA
Route de Montena 65
CH-1728 Rossens
Switzerland
Tel: +41 (0)26 411 85 00
Fax: +41 (0)26 411 85 05

Maxwell Technologies, GmbH
Leopoldstrasse 244
80807 Munich
Germany
Tel: +49 (0)89 4161403 0
Fax: +49 (0)89 4161403 99

Maxwell Technologies
Shanghai Trading Co., Ltd.
Room 1005, 1006, and 1007
No. 1898, Gonghexin Road,
Jin An District, Shanghai 2000072,
P.R. China
Tel: +86 21 3852 4000
Fax: +86 21 3852 4099

Nesscap Co., Ltd.
17, Dongtangiheung-ro
681 Beon-gil, Giheung-gu,
Yongin-si, Gyeonggi-do 17102
Republic of Korea
Tel: +82 31 289 0721
Fax: +82 31 286 6767

MAXWELL TECHNOLOGIES, MAXWELL, MAXWELL CERTIFIED INTEGRATOR, ENABLING ENERGY’S FUTURE, DURABLE, NESSCAP, XP, BOOSTCAP, D CELL, CONDIS and their respective designs and/or logos are either trademarks or registered trademarks of Maxwell Technologies, Inc., and/or its affiliates, and may not be copied, imitated or used, in whole or in part, without the prior written permission Maxwell Technologies, Inc. All contents copyright © 2018 Maxwell Technologies, Inc. All rights reserved.
No portion of these materials may be reproduced in any form, or by any means, without prior written permission from Maxwell Technologies, Inc.

Page 2 > Document number: 3001980-EN.3 > maxwell.com