Hybrid Layer Capacitor (HLC)
For PulsesPlus™ batteries

**Electrical characteristics** (For batteries stored at RT for 1 year or less)

<table>
<thead>
<tr>
<th>Capacity when charge to 3.67 V</th>
<th>45 As</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity when charge to 3.90 V</td>
<td>70 As</td>
</tr>
<tr>
<td>Discharge end voltage</td>
<td>2.5 V (discharge below 2.5 V at RT may increase the HLC internal impedance). For other temperatures and discharge condition please contact Tadiran for these end voltage conditions.</td>
</tr>
</tbody>
</table>

**Mechanical characteristics**

<table>
<thead>
<tr>
<th>Length</th>
<th>21 -1 mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>10.0 +0.5/-0.0 mm.</td>
</tr>
<tr>
<td>Weight</td>
<td>4.2 gr. max</td>
</tr>
</tbody>
</table>

**Operating conditions**

- **Maximum discharge current:**
  - Continuous: 250 mA
  - Pulse: 750 mA
- **Charge (for HLC testing purpose only):**
  - Max. charge voltage: 3.95 V
  - Max. charge current: 8 mA
- **Operating & Storage temperature range:**
  - HLC in Pulse Plus™ battery: -40 °C + +85 °C
  - Storage temperature range for HLC: -40 °C + +60 °C
  - Cell impedance at RT: < 400 mΩ at 1 kHz
  - Self discharge in Pulse Plus™ battery at RT: 1 µA
  - Self discharge in Pulse Plus™ battery at 80 °C: 5 µA

**Shelf life at different storage temperature to 80% of initial capacity**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>HLC</th>
<th>HLC in Pulse Plus™ battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT</td>
<td>1 year</td>
<td>&gt;10 years</td>
</tr>
<tr>
<td>60 °C</td>
<td>2 weeks</td>
<td>10 years</td>
</tr>
<tr>
<td>80 °C</td>
<td>1 week</td>
<td>2 years</td>
</tr>
</tbody>
</table>

**Safety**

- Short circuit at RT and at +55 °C: UL, UN, IEC
- Oven at +150 °C: UL, IEC
- Over-charge & over-discharge (200 % at currents up to 80 mA): UL, UN, IEC
- Impact: UL, UN, IEC
- Compression: UL, IEC
- Shock and vibration: UL, IEC

UN Manual of Tests and Criteria, UL 1642, IEC 60086

**Technology**

- Anode: Carbon based
- Cathode: Multi metal oxides
- Electrolyte: Organic

**Key Features**

- Hermetically sealed (glass-to-metal)
- Wide operating temperature range
- Low self discharge
- End of life indication capability
- High reliability
- Lightweight
- Shut down separator
- Safe design

**Main Applications**

- Utility Meters (AMR)
- Asset, Container & Cargo Tracking
- RFID Devices
- Sonar Buoys
- Communication Equipment
- Emergency & Medical Devices

**Ordering Part No.**

- HLC-1020/S: 61102022000
- HLC-1020/T: 61102022150

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www.tadiranbatteries.com

**WARNING:**
Fire, Explosion, And Severe Burn Hazard.
Do Not Recharge, Crush, Disassemble, Heat Above 100°C, Incinerate Or Short Circuit.

Rev D, November 2009
Performance data

Voltage curves for HLC1020 at Li/\(\text{SOCl}_2\) potential (3.67 V), 60 mA

Voltage curves for HLC1020 at Li/\(\text{SO}_2\text{Cl}_2\) potential (3.90 V), 60 mA

Voltage curves for HLC1020 at Li/\(\text{SOCl}_2\) potential (3.67 V), 100 mA

Voltage curves for HLC1020 at Li/\(\text{SO}_2\text{Cl}_2\) potential (3.90 V), 100 mA

Voltage curves for HLC1020 at Li/\(\text{SOCl}_2\) potential (3.67 V), 320 mA

Voltage curves for HLC1020 at Li/\(\text{SO}_2\text{Cl}_2\) potential (3.90 V), 320 mA

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**Warning:**
- The HLC is designed for use in a PulsesPlus™ battery or in low charge current as specified only. The HLC may explode or violently vent if over-charge above 4.4V.
- Charging the HLC at above 3.95 V may lead to capacity loss and/or internal impedance rise.
- Do not charge the HLC higher than 4.1 V, over discharge, short circuit, heat above 100 °C, incinerate or expose content to water.
Lead terminations

HLC-1020/S (Standard Contacts)
Cat. # 61102022000

HLC-1020/T (Soldering Tabs)
Cat. # 61102022150

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