Backup Power Solutions

Supercapacitor, Capacitor and Battery Backup ICs

These do the hard stuff, with their simple and full-featured solutions, providing backup power if the main supply rail should fail. When a system rail is powered, our ICs can charge and balance multiple supercaps, capacitors or a battery, for backup energy storage. Should the system power fail, these ICs can immediately use their stored energy to power the downstream load. We have a broad range of device topologies, with wide input voltage ranges and high charge currents, so it’s easy to select the right product for your system’s backup power needs.

LTC3643: 2A Bidirectional Power Backup Supply and Capacitor Charger
- Bidirectional Synchronous Boost Capacitor Charger/Buck Regulator for System Backup
- Wide Input Voltage Range: 3V to 17V
- Up to 40V Capacitor Voltage Storage for High Energy Backup
- 2A Maximum CAP Charge Current
- Integrated Power N-Channel MOSFETs (150mΩ Top and 75mΩ Bottom)
- Integrated Power N-Channel MOSFET for Output/CAP Disconnect (50mΩ)
- Input Current Limit During Charging

LTC4040: 2.5A Battery Backup Power Manager
- Step-Up Backup Supply and Step-Down Battery Charger
- 6.5A Switches for 2.5A Backup from 3.2V Battery
- Input Current Limit Prioritizes Load Over Charge Current
- Input Disconnect Switch Isolates Input During Backup
- Automatic Seamless Switchover to Backup Mode
- Input Power Loss Indicator
- System Power Loss Indicator
- Pin-Selectable Battery: Li-lon (3.95V/4.0V/4.05V/4.1V) or LiFePO4 (3.45V/3.5V/3.55V/3.6V)

LTC3128: 3A Monolithic Buck-Boost Supercapacitor Charger and Balancer with Accurate Input Current Limit
- ±2% Accurate Average Input Current Limit Programmable Up to 3A
- Programmable Maximum Capacitor Voltage Limit
- Active Charge Balancing for Fast Charging of Unmatched Capacitors
- Charges Single or Stacked Capacitors
- VIN Range: 1.73V to 5.5V
- VOUT Range: 1.8V to 5.5V
- <2μA Quiescent Current from VOUT When Charged
Supercapacitor/Capacitor Chargers and Backup Power ICs

Supercapacitors, which are capacitors with up to 100s of farads in value, are emerging as an alternative to batteries in applications where power delivery supercedes total energy storage. Supercapacitors have several advantages over batteries that make them a superior solution when short-term high power is needed, such as in power ride-through applications. These advantages include lower effective series resistance (ESR) and enhanced durability in the face of repeated charging.

Linear Technology offers a portfolio of linear, switching and switched-capacitor ICs designed to charge supercapacitors (also known as ultracapacitors) as well as capacitors or batteries. These devices offer input or output current limiting, automatic cell balancing and a range of protection features that make them uniquely suited for backup applications.

**LTC3350: High Current Supercapacitor Backup Controller and System Monitor**

**Features**
- High Efficiency Synchronous Step-Down CC/CV Charging of One to Four Series Supercapacitors
- Step-Up Mode in Backup Provides Greater Utilization of Stored Energy in Supercapacitors
- 14-Bit ADC for Monitoring System Voltages/Currents, Capacitance and ESR
- Active Overvoltage Protection Shunts
- Internal Active Balancers—No Balance Resistors
- Programmable Input Current Limit Prioritizes System Load Over Capacitor Charge Current
- Dual Ideal Diode PowerPath™ Controller
- All NFET Charger Controller and PowerPath Controller
- Compact 38-Lead 5mm × 7mm QFN Package

**Applications**
- High Current 12V Ride-Through UPS
- Servers/Mass Storage/High Availability Systems

---

**Part Number**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Topology</th>
<th>Input Voltage (V)</th>
<th>VCAP (Max) (V)</th>
<th>Storage Element</th>
<th>Quiescent Current (µA)</th>
<th>Charge Current</th>
<th>PowerPath Control</th>
<th>Automatic Balancing</th>
<th>Overvoltage Protection</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC3225/-1</td>
<td>Charge Pump - Boost</td>
<td>2.8-5.5</td>
<td>5.5</td>
<td>2 SCaps</td>
<td>20</td>
<td>150mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>2x3 DFN-10</td>
</tr>
<tr>
<td>LTC3226</td>
<td>Charge Pump - Boost + 2 LDGs</td>
<td>2.5-5.5</td>
<td>5.5</td>
<td>2 SCaps</td>
<td>20</td>
<td>360mA</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>3x3 QFN-16</td>
</tr>
<tr>
<td>LTC3625/-1</td>
<td>Switching Buck &amp; Boost</td>
<td>2.7-5.5</td>
<td>5.5</td>
<td>2 SCaps</td>
<td>23</td>
<td>1A*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>3x3 DFN-12</td>
</tr>
<tr>
<td>LTC4225</td>
<td>Linear</td>
<td>2.7-5.5</td>
<td>5.5</td>
<td>2 SCaps</td>
<td>20</td>
<td>1A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>3x3 QFN-12 MSOP-12</td>
</tr>
<tr>
<td>LTC3355</td>
<td>Buck + LDO + Charger + Boost</td>
<td>3-20</td>
<td>5</td>
<td>1 Cap</td>
<td>120</td>
<td>1A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4x4 QFN-20</td>
</tr>
<tr>
<td>LTC3110</td>
<td>Bi-Dir Buck-Boost</td>
<td>1.71-5.25</td>
<td>5.5</td>
<td>1-2 SCaps</td>
<td>48</td>
<td>2A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4x4 QFN-20, TSSOP-24</td>
</tr>
<tr>
<td>LTC3128</td>
<td>Buck-Boost</td>
<td>1.73-5.5</td>
<td>5.5</td>
<td>1-2 SCaps</td>
<td>600</td>
<td>3A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4x4 QFN-20, TSSOP-24</td>
</tr>
<tr>
<td>LTC3355</td>
<td>Buck Charger, Boost</td>
<td>4.5-35</td>
<td>VIN</td>
<td>1-4 SCaps</td>
<td>4mA</td>
<td>10A+</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>5x7 QFN-38</td>
</tr>
<tr>
<td>LTC3643</td>
<td>Bi-Dir Boost Charger/Buck</td>
<td>3-17</td>
<td>40V Cap</td>
<td>5V Battery</td>
<td>Electrical Cap</td>
<td>2A</td>
<td>n/a</td>
<td>–</td>
<td>–</td>
<td>3x5 QFN-24</td>
</tr>
<tr>
<td>LTC4040</td>
<td>Buck Charger + Boost</td>
<td>3.5-5.5</td>
<td>5V Battery</td>
<td>40</td>
<td>Li-Ion LiFePO₄</td>
<td>2.5A</td>
<td>n/a</td>
<td>–</td>
<td>–</td>
<td>4x5 QFN-24</td>
</tr>
</tbody>
</table>

* in 2-inductor circuit; 500mA in 1-inductor configuration  ** ideal diode VIN to VOUT  *** while charging