Overview
The NBM5100A/B, NBM7100A/B devices are integrated power management circuits containing 2 stages of high efficiency DC/DC conversion and an intelligent learning algorithm. The devices overcome voltage drop and battery life limitations associated with extracting high pulse currents from lithium primary batteries such as 3.6 V lithium thionyl chloride (Li-SOCl₂) or 3 V lithium manganese dioxide (LiMnO₂) batteries.

The first stage DC/DC conversion transfers energy from the lithium battery at a low constant current to a capacitive storage element. Once charged, a second DC/DC conversion cycle utilizes this stored energy to supply a regulated voltage output capable of high pulse current loads. The battery is never directly subjected to large pulse currents, resulting in a longer, predictable battery lifetime.

NBM5100B and NBM7100B include a SPI serial port interface. NBM5100A and NBM7100A are offered with I₂C serial interface as well as an autonomous mode which minimizes communication requirements on the I²C bus. This is useful for applications where no ‘smart microcontrollers’ are present.

While more energy dense (Wh/kg) versus other primary battery chemistries (e.g. alkaline), it is difficult to extract more than a few 10s of mW from a coin cell before its capacity starts to degrade. During a transmission cycle, a typical IoT sensor requires 100s of mW and is expected to last for thousands of transmission cycles before its battery reaches end of life.

Nexperia’s coin cell battery life boosters are designed to overcome the challenges of lithium primary batteries operating under burst load conditions as found in IoT sensors thereby extending the useful lifetime between replacement by typically 4-10 times. The NBM devices are suitable for use with LiMnO₂ (coin) and Li-SOCl₂ (lithium thionyl chloride) type batteries up to 3.6 V.

NBM5100A/B, NBM7100A/B
Lithium primary coin cell batteries (e.g. CR2032) are small, low-leakage, energy dense sources routinely used to supply low power wireless IoT sensor electronics utilizing interfaces like Bluetooth, Zigbee, NB-IoT and other wireless protocols. IoT sensors are often size/space constrained and are frequently placed in hard to access locations making battery replacement difficult.

Coin cell battery life booster with adaptive power optimization
Improves lithium coin cell performance and battery life

Nexperia
E f f i c i e n c y W i n s.
Applications

› Battery powered wireless microcontroller applications:
  Bluetooth®, LoRaWAN®, Sigfox™, LTE-M, NB-IoT, Zigbee

› Industrial: temperature, occupancy, e-metering, electronic shelf label, asset tracking, irrigation monitoring

› Consumer/wearable: location tags, heart rate monitor, blood glucose meter

Features and benefits

› Programmable constant battery load current: 2 to 16 mA

› Protection against battery voltage dips (Brown-out)

› Pulse load output current: ≤ 200 mA

› Regulated programmable output voltage VDH: 1.8 V to 3.6 V

› Ultra-low standby current: < 50 nA

› Typical conversion efficiency of > 90% with adaptive optimization

› 63 adaptive load optimization settings

› Integrated fuel gauge

› Small 16 pin lead-free package (SOT763-1/DHVQFN16; 2.5 mm × 3.5 mm × 0.85 mm)

› Specified from -40 °C to +85 °C

Block diagrams

Product Family

<table>
<thead>
<tr>
<th>Device part Number</th>
<th>Bus Interface</th>
<th>Autonomous Start Mode</th>
<th>Storage Cap Charge Balance Function</th>
<th>Max Storage Cap Voltage</th>
<th>Max Load Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBM7100A</td>
<td>I2C</td>
<td>Supported</td>
<td>Not Supported</td>
<td>11 V</td>
<td>200 mA</td>
</tr>
<tr>
<td>NBM5100A</td>
<td>I2C</td>
<td>Supported</td>
<td>Supported</td>
<td>5.5 V</td>
<td>150 mA</td>
</tr>
<tr>
<td>Nbm7100B</td>
<td>SPI</td>
<td>Not Supported</td>
<td>Not Supported</td>
<td>11 V</td>
<td>200 mA</td>
</tr>
<tr>
<td>NBMS100B</td>
<td>SPI</td>
<td>Not supported</td>
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</tr>
</tbody>
</table>

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Date of release: June 2023
Printed: In the Netherlands