

### Overview

Cardinal Components offers smart rechargeable solid-state batteries, with integrated power management in a single chip EnerChip™. Solid State Batteries (SSBs) are the world's first component packaged battery available in a surface-mount technology (SMT) package that can be used like any SMT device with lead free reflow tolerance and automated pick-and-place compatibility. Solid state batteries eliminate the need for unreliable coin-cell holders or leaky super-caps and provide easy and cost-effective primary or back-up power. Superior recharge performance enables SSBs to achieve thousands of charge-discharge cycles while maintaining the lowest self-discharge and fastest recharge times in the industry. Best-in-class specifications allow SSBs to be used as a permanent power solution in a variety of applications and systems. With the environmentally friendly EnerChip™ solid state batteries, you get reliable, low-profile, cost-effective, RoHS and safe batteries that provide power when you need it, exactly where you want it.

### CCBC050 - 50µAh (25mAh Lifecycle Capacity) Solid State Battery CCBC3150 - 50µAh with Integrated Battery Management

The CCBC3150 is a smart solid state battery that integrates battery backup and power management for systems requiring power bridging and/or secondary power. A single CCBC3150 can charge up to an additional 10 solid state batteries connected in parallel. It is packaged in a 20-pin 9 x 9 mm DFN package for SMT and is lead free reflow tolerant.



| Specification  |            |
|----------------|------------|
| Output Voltage | 3.8V, 3.3V |
| Capacity       | 50µAh      |
| Recharge Time  | 30 min     |
| Charge Cycles  | >5000      |

### CCBC012 - 12µAh (6 mAh Lifecycle Capacity) Solid State Battery CCBC3112 - 12µAh with Integrated Battery Management

The CCBC3112 is a smart solid state battery that integrates battery backup and power management for systems requiring power bridging and/or secondary power. A single CCBC3112 can charge up to an additional 10 solid state batteries connected in parallel. It is packaged in a 20-pin 7 x 7 mm DFN package for SMT and is lead free reflow tolerant.



| Specification  |            |
|----------------|------------|
| Output Voltage | 3.8V, 3.3V |
| Capacity       | 12µAh      |
| Recharge Time  | 20 min     |
| Charge Cycles  | >5000      |

### CCBC3105 - 5µAh with Integrated Battery Management

The EnerChip CCBC3105 is a smart solid state battery that integrates battery backup and power management for systems requiring power bridging and/or secondary power. A single CCBC3105 can charge up to an additional 10 solid state batteries connected in parallel. It is packaged in a 16-pin 4 x 5 mm DFN package for SMT and is lead free reflow tolerant.



| Specification  |        |
|----------------|--------|
| Output Voltage | 3.3V   |
| Capacity       | 5µAh   |
| Recharge Time  | 11 min |
| Charge Cycles  | >5000  |

### CCBC-EVAL- 05 Solid State Battery CC Evaluation Kit

The EVAL-05 evaluation kit contains both a CCBC3112 and a CCBC3150. Either solid state battery can be tested standalone, either internal Enerchip™ battery may be tested alone, or either CCBC31XX can control itself and the thin film battery in the other CCBC31XX. The EVAL-05 is packaged as a 24-pin dip that can be socketed on a test board.



| Specification  |               |
|----------------|---------------|
| Output Voltage | 3.3V          |
| Capacity       | 12, 50, 62µAh |
| Recharge Time  | 30 min        |
| Charge Cycles  | >5000         |

# EnerChip™ Compared to SuperCaps and Coin Cells

| Feature                    | Cardinal EnerChip | SuperCap | Coin Cell |
|----------------------------|-------------------|----------|-----------|
| High-Cycle life (>5000)    | ✓                 | ✓        | X         |
| No external charge circuit | ✓                 | ✓        | X         |
| No sockets/holders         | ✓                 | ✓        | X         |
| SMT Assembly               | ✓                 | -        | -         |
| Low self discharge         | ✓                 | X        | ✓         |
| Stable output voltage      | ✓                 | X        | ✓         |
| Smaller area               | ✓                 | X        | X         |
| No hazardous chemicals     | ✓                 | X        | X         |
| Internal Supply Supervisor | ✓                 | X        | X         |
| Power Fail Indicator       | ✓                 | X        | X         |
| Integrated DC-DC Converter | ✓                 | X        | X         |

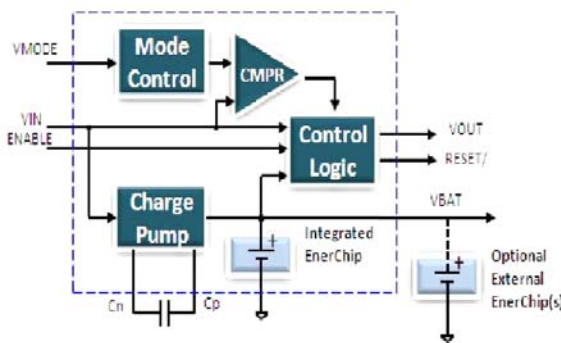
## Industry Awards and Recognition



## Eco-Friendly Environmental Compliance



## Solid State Battery Applications



Cardinal Solid State Battery CCBC31XX Block Diagram

- **Standby supply** for non-volatile SRAM, Real-time clocks, controllers, supply supervisors, and other system-critical components.
- **Wireless sensors and RFID tags** and other powered, low duty cycle applications.
- **Localized power source** to keep microcontrollers and other devices alert in standby mode.
- **Power bridging** to provide back-up power to system during exchange of primary batteries.
- **Medical devices** can utilize SSB permanent power features for monitoring and wearables.
- **SmartCard Power** applications can leverage the small size of the Solid State Battery.
- **Energy Harvesting** is enabled by the thousands of charge cycles available on the SSB.
- **Works with Cardinal Components' line of Real Time Clocks** as well as industry Real Time Clocks.

## Cardinal Authorized Distributors



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