EnerChip™ CC CCBC3112 & CCBC3150 Evaluation Kit

Overview

The EnerChip™ CC EVAL-05 Evaluation Kit is used to demonstrate the capabilities of the EnerChip ™ Thin Film Batteries and the EnerChip™ CC with Integrated Battery Management capabilities.

The kit can be used to demonstrate:

1) either EnerChip™ battery

2) either EnerChip™ CC device

3) the EnerChipTM CC in parallel with the other EnerChipTM battery.

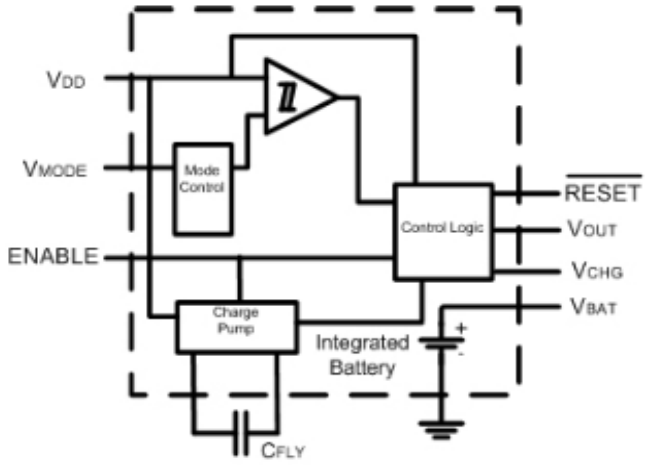


Figure 1. EnerChip CC Block Diagram

Applications

- Standby Supply
- Wireless sensors and RFID tags
- Localized Power Source
- Power Bridging
- Consumer Appliances
- Business and Industrial Systems
- Energy Harvesting

Part Numbering Example: CCBC-EVAL-05

CCBC-EVAL-05

SERIES	ADDED FEATURES	PACKAGE STYLE	OPERATING TEMP.	SHIPPING PKG

Figure 2: EnerChip™ CC Evaluation Module

Evaluation Kit Description

The EnerChip™ CC is the world's first Intelligent Thin Film Battery. It is an integrated solution that provides battery backup and power management for systems requiring power bridging and/or secondary power. A single EnerChip™ CC can charge up to 10 additional EnerChips™ connected in parallel.

Two EnerChip™ CC devices are on the EVAL-05, a CCBC3112 and a CCBC3150, with battery capacities of 12µAh and 50µAh, respectively. The CCBC-EVAL-05 evaluation board utilizes a 24-pin DIP format that mates with a 24-pin DIP socket on a target board.

During normal operation, the EnerChip™ CC charges itself with a controlled voltage using an internal charge pump that operates from 2.5V to 5.5V. An ENABLE pin allows the designer to activate and deactivate the charge pump using an external control line in order to minimize current consumption and take advantage of the fast recharge time of the EnerChip™.

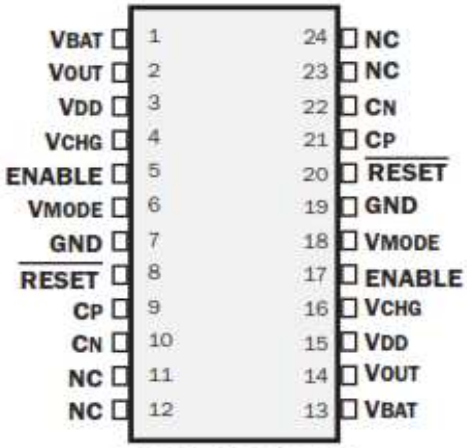
When the primary power supply dips below a user defined threshold voltage, the EnerChip™ CC will signal this event and route the battery voltage to VOUT. The EnerChip™ CC also has battery protection circuitry to enable thousands of recharge cycles.

The CCBC3112 and CCBC3150 data sheets contain complete specifications and application circuits.

CCBC-EVAL-05 Input/Ouput Descriptions and Pin-outs

Pin Number	Label	Description
1	VBAT	Positive Battery Terminal - Tie to Pin 4 (1)
2	VOUT	System Voltage
3	VDD	Input Voltage
4	VCHG	Battery Charge Voltage - Tie to Pin 1 and/or Optional EnerChip(s)
5	ENABLE	Charge Pump Enable
6	VMODE	Mode Select for Battery Switchover Threshold
7	GND	System Ground
8	$\overline{\text{RESET}}$	Reset Signal (Active Low)
9	CP	Flying Capacitor Positive
10	CN	Flying Capacitor Negative
11	No Connect	No Connection
12	No Connect	No Connection
13	VBAT	Positive Battery Terminal - Tie to Pin 16 (1)
14	VOUT	System Voltage
15	VDD	Input Voltage
16	VCHG	Battery Charge Voltage - Tie to Pin 13 and/or Optional EnerChip(s)
17	ENABLE	Charge Pump Enable
18	VMODE	Mode Select for Battery Switchover Threshold
19	GND	System Ground
20	$\overline{\text{RESET}}$	Reset Signal (Active Low)
21	CP	Flying Capacitor Positive
22	CN	Flying Capacitor Negative
23	No Connect	No Connection
24	No Connect	No Connection

(1) See EVAL-05 Operational Modes on page 4 for optional connections to VBAT.



24-Pin DIP Module

CCBC-Eval-05 Dimensions

Attribute	Size
width	0.7 in [17.18mm]
length	1.2in [30.48mm]
height	0.9in [5.00mm]

The EVAL05 module is sensitive to electrostatic discharge (ESD) and must be handled accordingly. In cases where the EVAL-05 module is removed from its original packaging, it is a requirement to maintain the same type of anti-static, non-conductive packaging to prevent discharge of the on-board EnerChips. Do not store the EVAL-05 in conductive black foam, as it will discharge and destroy the EnerChips on the module.

Evaluation Kit Schematic

The CCBC-EVAL-05 board is configured symmetrically so that a single external circuit can be used to evaluate the CCBC3150 when the board is plugged into the DIP socket in the pin 1 to pin 1 orientation, and the CCBC3112 when the board is rotated 180 degrees. Pins 1-12 pertain to the CCBC3150. Pins 13-24 pertain to the CCBC3112. A circuit schematic of CCBC-EVAL-05 is shown in Figure 3. Figure 4 is a typical application circuit.

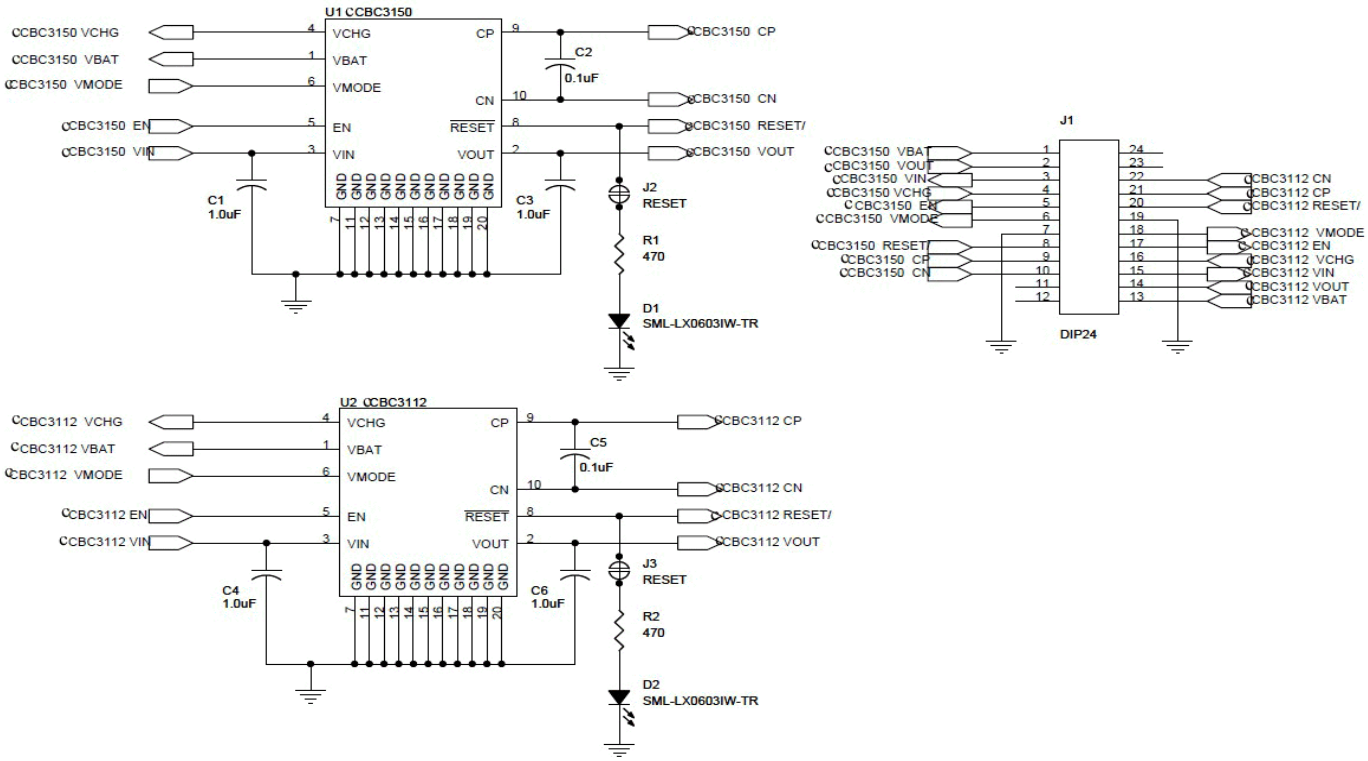


Figure 3: CCBC-EVAL-05 Circuit Schematic

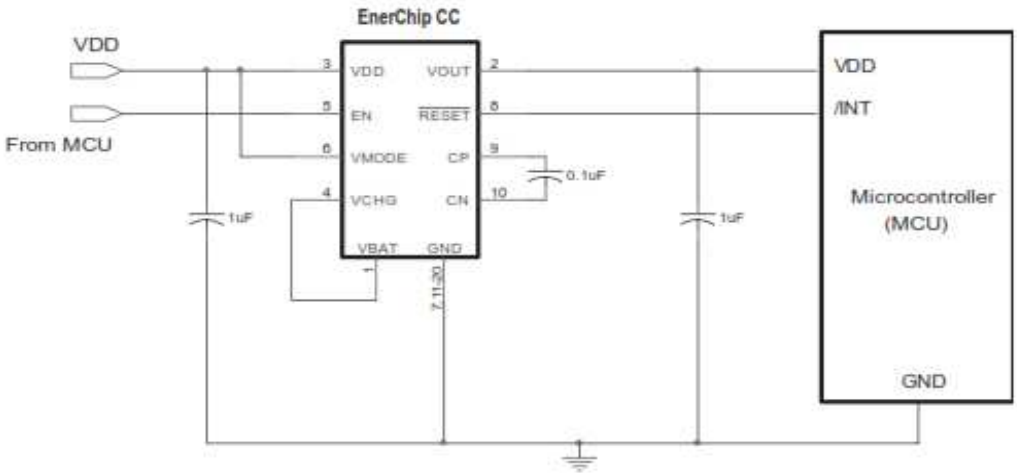


Figure 4: Typical EnerChip™ CC Application Circuit

EVAL-05 Operational Modes

The CBC-EVAL-05 board can be used in seven different ways:

1. CCBC3150 only - Connect to pins 1-12.

2. CCBC3112 only - Connect to pins 13-24 or rotate the EVAL-05 so that pin 13 is inserted into socket pin 1 and connect to pins 1-12 on EVAL-05.

3. CCBC050 only - the EnerChip™ 50µAh battery is tested alone. Do not connect pins 1 and 4 together; pin 1 is the positive EnerChip™ terminal and can be charged and discharged independently of the integrated battery management circuitry. See the CCBC050 data sheet for EnerChip™ operating and use conditions.

4. CCBC012 only - the EnerChip™ 12µAh battery is tested alone. Do not connect pins 13 and 16 together; pin 13 is the positive EnerChip™ terminal and can be charged and discharged independently of the integrated battery management circuitry. See the CCBC012 data sheet for EnerChip™ operating and use conditions.

5. CCBC3150 controlling the CCBC012 - The CCBC3150 can be used to control external EnerChips ™, including the CCBC012 embedded in the CBC3112 package on board the EVAL-05. This is accomplished by connecting pin 4 (VCHG) to pin 13 (VBAT).

6. CCBC3112 controlling the CCBC050 - The CCBC3112 can be used to control external EnerChips ™, including the CCBC050 embedded in the CCBC3150 package on board the EVAL-05. This is accomplished by connecting pin 16 (VCHG) to pin 1 (VBAT).

7. CCBC3112 and CCBC3150 simultaneously - Connect the two VBAT pins (1 and 13) together and tie them to EITHER VCHG pin (not both). Leave the other VCHG disconnected from the circuit.

Using the EVAL-05

- Place the 24-pin EVAL-05 module into solderless breadboard or socket with pin 1 in pin 1.
- Note that if only one EnerChip™ CC is to be evaluated at a time, only pins 1 to 12 need to be connected on the test board. With board pin 1 in socket pin 1, the CCBC3150 is accessible. To access the CCBC3112, turn the EVAL-05 180 degrees and place EVAL-05 pin 13 in socket pin 1.
- Tie VBAT to VCHG on the test board.
- When operating under main power, LED D1 (CCBC3150) or D2 (CCBC3112) will be illuminated. When operating in battery backup mode, LED D1 (CCBC3150) and D2 (CCBC3112) will not be illuminated.
- Tie VMODE to VDD or GND depending the system voltage and the desired switchover voltage. Optionally, use a resistor divider. See the CCBC3112 or CCBC3150 datasheets for switchover voltage details.
- Tie the ENABLE pin to VDD.
- Tie VOUT to VDD of a microcontroller or any device requiring power backup.
- Tie the RESET pin to the interrupt pin of a microcontroller if desired. When operation is under battery backup mode, the LED will not be illuminated.
- Allow the EnerChip™ CC to charge for at least 30 minutes before attempting to use backup power.
- Monitor VBAT for battery voltage and monitor VOUT for output voltage to the system.
- Place current meter between VBAT and VCHG to monitor battery charging current if desired.
- Disconnect VDD and the RESET pin will go low and system will switchover to battery backup mode.

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