

EnerChip™ Bare Die for Embedded Energy

Create Unique Innovative Solutions:

Cymbet EnerChip™ rechargeable solid-state energy storage devices are created using semiconductor processing techniques on silicon wafers. EnerChip devices are compatible with other semiconductor integrated circuits and passive devices and can be co-packaged together. EnerChip devices as small as 1mm x 1mm can be coupled with other ICs to create unique innovative products.



Figure 1: EnerChip Wafer with Bare Die

EnerChip Attachment Mechanisms :

Since EnerChip devices are produced like semiconductor devices, they are packaged in the same fashion as other ICs. EnerChip bare die lead attachment may be accomplished with either wire bond or solder bump techniques. The traditional method of wire bonding is what Cymbet utilizes in standard EnerChip packaged offerings as it is very reliable and cost effective. The wire bond technique is shown in Figure 3. EnerChip bare die may also be processed with solder bumps on the attach pads. Bumped EnerChip bare die can then be attached in the package as shown in Figure 2.

New Embedded Energy Applications:

EnerChip rechargeable solid-state energy storage devices became available in 2008 and are designed for direct integration at the chip level, or as an SMT component replacing current coin cell battery or supercapacitor products. The EnerChip can provide back-up power and energy management functions in a single co-package providing a simple “drop in power” solution with up to 8 weeks of permanent back-up power. Embedded Energy is useful in many industries:

- Consumer Electronics
- Industrial Controls
- Medical Devices
- Environmental Sensors
- Hand-held Devices
- Networking and Communications systems
- Security and Tamper Detection
- Military and Aerospace

Flexible Co-Packaging Options :

Given the unique structure of EnerChip devices, there are several ways to mount and attach the EnerChip bare die. Several configurations are shown below. Please contact Cymbet's Applications Team directly for assistance with your application.

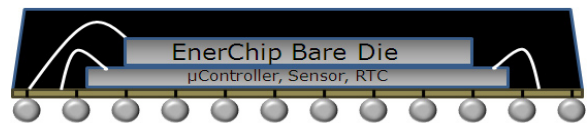


Figure 3: Stacked EnerChip bare die wire bonded

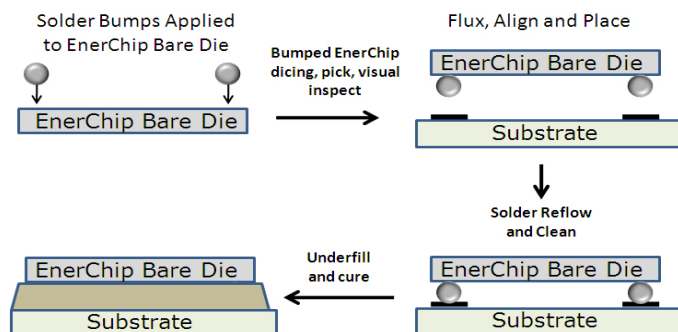


Figure 2: EnerChip Die Bumping Assembly



Figure 4: EnerChip die in System In Package

Learn how to use EnerChip Bare Die : Free White Paper

There are many ways to leverage solid-state energy storage in multi-chip module designs. Click or go to the following link: <http://www.cymbet.com/content/whitepaper.asp> to download the latest information. Advanced design tips and techniques are explained in detail that will enable innovative new products to be introduced quickly and profitably.

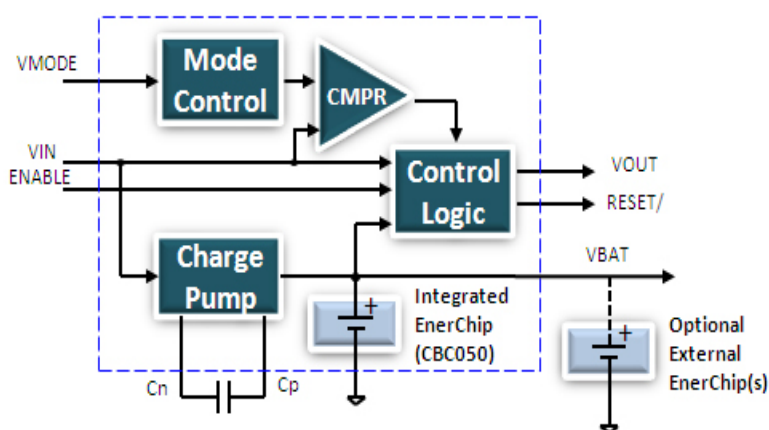
EnerChips: Compare to SuperCaps and Coin Cells

Feature	EnerChip CC	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

EnerChip Applications

- **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 EnerChip permanent power features for monitoring and wearables.
- **SmartCard Power** applications can leverage the small size of the EnerChip.
- **Energy Harvesting** is enabled by the thousands of charge cycles available on the EnerChip.

EnerChip™ CC CBC3150 Block Diagram



Cymbet Distribution Partners



Cymbet Product Solutions

Product	Description
	CBC012 – EnerChip 12uAh Rechargeable Solid State Battery - 6 pin DFN
	CBC050 – EnerChip 50uAh Rechargeable Solid State Battery - 16 pin QFN
	CBC3112 – EnerChip CC 12uAh Rechargeable Solid State Battery with Integrated Power Management -20 pin DFN
	CBC3150 – EnerChip CC 50uAh Rechargeable Solid State Battery with Integrated Power Management –20 pin DFN
	EnerChip Bare Die – 1uAh, 5uAh, 12uAh, 50uAh. Wire bond or bumped attach.
	CBC915 EnerChip Energy Processor with Maximum Peak Power Tracking
	CBC5300 - EnerChip EH Energy Harvesting Module
	CBC-EVAL-05 EnerChip Evaluation Kit with CBC3112 and CBC3150
	CBC-EVAL-08 EnerChip Solar Energy Harvesting Evaluation Kit
	CBC-EVAL-09 EnerChip Energy Processor Universal Energy Harvesting Kit
	CBC-EVAL-10 EnerChip CC Solar Energy Harvesting Evaluation Kit
	CBC-EVAL-11 EnerChip CC RF Induction Charging Evaluation Kit

Cymbet Strategic Investors



Industry Awards and Recognition



Eco-Friendly Environmental Compliance

