



# **General Description**

The EM8504 is an integrated power management solution for low power applications. It is specifically designed for efficient operation with Dye-Sensitized Solar Cells (DSSC) in the  $\mu W$  to mW range.

To optimize harvesting efficiency, the EM8504 incorporates a maximum power point tracking (MPPT) controller based on a fixed Voltage at Maximum Power Point (VMPP).

The EM8504 is capable of operating with a variety of elements as secondary energy storage, namely rechargeable batteries, super-capacitors or conventional capacitors.

Using a non-rechargeable primary battery, the EM8504's on chip PMU offers a mechanism to extend battery life when assisted by a harvesting element.

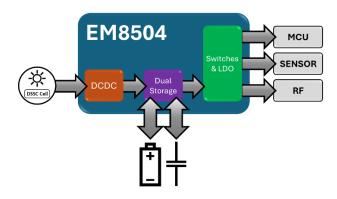
To perform granular power management of multiple application components, the EM8504 provides four independent supply outputs: one power supply (VSUP) and three auxiliary supplies (VAUX).

The EM8504 is delivered in a standard QFN24 package.

### **Applications**

I Energy harvesting equipped platforms

- · Solar charging
- I Wearable systems
- I Beacons and wireless sensor networks
- I Industrial and environmental monitoring
- I Battery operated platforms



# Power Management Controller with Energy Harvesting Interface

#### **Main Features**

I Smart Power Management

- · Ultra-low quiescent current regulator (25nA)
- · 3 auxiliary supplies with high current drive capability
- · Programmable battery output voltage level up to 4.2V

I Ultra-low input voltage and power

- · Cold-start: 0.3V / 3µW
- · Operating: 0.1V / 1µW

I Ultra-low power solution

- · 15 nA in battery protection mode
- · 125 nA when supplying low power applications

I Fast cold-start

- $\cdot$  Fast start-up using dual storage elements
- · Short Term Storage (STS) and Long-Term Storage (LTS)
- · Maintain STS in configurable voltage window when LTS is lower than minimum application voltage

# **I** MPPT

· Fully embedded Maximum Power Point Tacking (MPPT), optimized for DSSC with fixed Voltage at Maximum Power Point (VMPP)

## I Primary Cell Life Time Extension

- $\cdot$  Lifetime of non-rechargeable battery on LTS (harvester assisted)
- I Flexible interface
- · SPI or I2C configuration interfaces

I Configuration stored in E<sup>2</sup>PROM

- · No external passive components required
- · Default configuration values stored in E2PROM

# I Power Control

Extensive configurability of user scenarios:

- · Battery under and over voltage protection
- · Harvesting start/stop (through input pin)
- · STS and LTS voltage status registers
- · Charging start/stop as a function of harvester power