

# MC13892

## Power Management and User Interface IC

### Applications

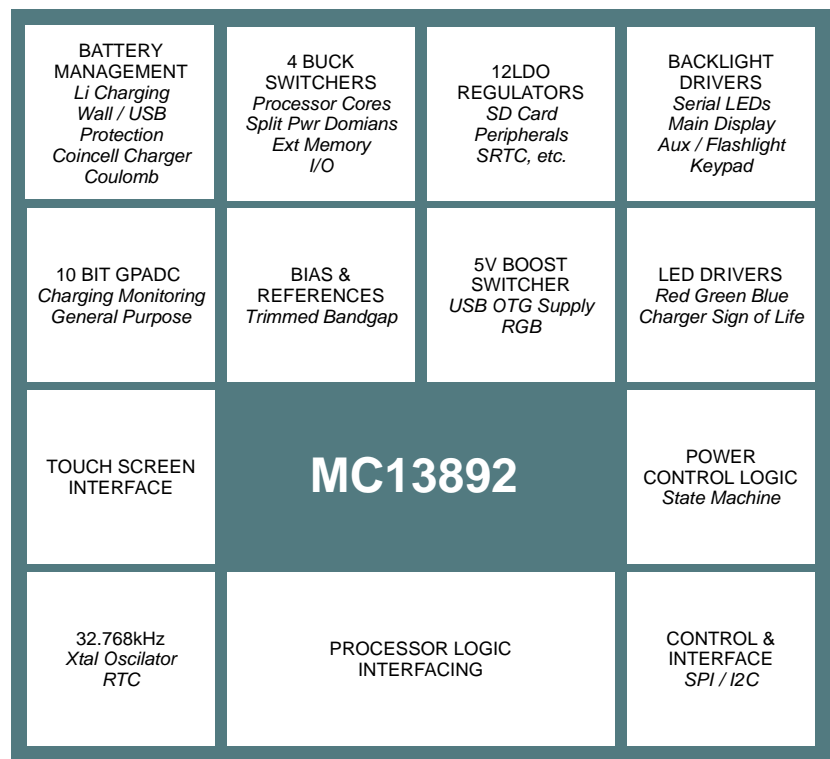
- Freescale i.MX Processors
- Smartbook Tablets
- eBooks
- Smartphones
- Portable Navigation Devices
- Media Phones
- Ultrasound Medical Equipment
- Other Embedded Hand-held Devices

### Overview

The MC13892 is a highly integrated Power Management IC for the i.MX 51, 37, 35 and 27 application processors. It integrates many discrete functions into a single IC. These functions include a battery charging system for USB and wall charging, a 10 Bit ADC with a Coulomb counter module for monitoring battery charge, four adjustable buck converters for powering the processor core and memory, 12 adjustable LDOs with internal/external pass devices and a boost converter for RGB LED drivers.

MC13892 also incorporates power control logic with processor interfacing and event detection. A real Time Clock (RTC) function is provided including time and day counters as well as an alarm function. This utilizes a 32 kHz clock, either the RC oscillator or the 32.768 kHz crystal oscillator as a time base, and is powered by the coin cell backup supply. Support is also provided for an external Secure Real Time Clock (SRTC) which may be integrated on a companion system processor IC. MC13892 provides all the circuitry for a resistive touch screen interface and supports both SPI and I<sup>2</sup>C interface. All of these functions have been incorporated into a highly integrated mixed signal IC, bidirectional power management, I/O, and communications device.

### MC13892 Simplified Application Diagram



### Performance

### Typical Values

Performance	Typical Values
Operating Battery Voltage	Up to 4.8 V
Operating Charger Voltage	Up to 20 V
Output Voltage Of Buck Switchers	0.6 to 1.375 V @ 1.050 A (SW1) and 0.6 to 1.850 V @ 0.8 A (SW2-4)
Accuracy of the LDOs	+/-3 %
Maximum Charging Current	1.6 A
VBUS Supply Current in OTG Mode	100 mA
ADC Resolution	10 bits
Coincell Backup Voltage	3.6 V
Internal Clock Source Frequency	32.768 kHz with 20 % accuracy
Coulomb Counter Precision	381.47 μC
Backlight LED Driver Frequency	256 Hz, 42 mA
RGB LED Driver Frequency	256 Hz, 21 mA

## Features

- Battery charger system for wall charging and USB charging
- 10 bit ADC for monitoring battery and other inputs plus Coulomb Counter support module
- 4 Adjustable Output Buck Converters for direct supply of the processor core and memory
- 12 Adjustable Output LDOs with internal and external pass devices
- Boost Converter for supplying RGB LEDs
- Serial backlight drivers for displays and keypad plus RGB LED drivers
- Power control logic with processor interface and event detection
- Real time clock and crystal oscillator circuitry, with coin cell backup and support for external secure real time clock on a companion system processor IC
- Touch screen interface
- SPI/I<sup>2</sup>C bus interface for control & register access

## Benefits

- Saves design time
- Highly integrated cost-effective solution
- Designed to interface with Freescale's i.MX family
- Reduces system costs
- Reduces board space - enables compact, small designs
- Reduces parts count

## Questions

- Are you designing with i.MX processors?
- Do you need flexible, integrated, programmable power management and I/O device in one package?
- Are you presently using or considering other PMUs? The 13892 has high performance to price value.
- Do you need a software controlled power - I/O subsystem for your design?

## Ordering Information

Part Number (Add R2 suffix for Tape & Reel)	Package	Temperature Range (T <sub>A</sub> )	Supplemental Functionality
MC13892VK <sup>(2)</sup> MC13892JVK <sup>(2)</sup>	139-PIN 7x7 mm BGA	-40 to +85 °C	Standard Part
MC13892AJVK <sup>(1)</sup>			Global Reset Function
MC13892BJVK <sup>(3)</sup>			Programmable Global Reset Function
MC13892VL <sup>(2)</sup> MC13892JVL <sup>(2)</sup>	186-PIN 12x12 mm BGA	-40 to +85 °C	Standard Part
MC13892AJVL <sup>(1)</sup>			Global Reset Function
MC13892BJVL <sup>(3)</sup>			Programmable Global Reset Function

1. Recommended for all new designs
2. Not recommended for new design
3. Backward compatible replacement part for MC13892VK, MC13892JVK, MC13892VL and MC13892JVL

## Development Tools

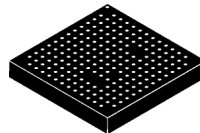
Part Number	Description
KIT13892VKEVBEJ	Evaluation Kit to demonstrate the key features of the KIT13892VKEVBEJ
KIT13892VLEVBEJ	Evaluation Kit to demonstrate the key features of the KIT13892VLEVBEJ
IMX35PDK	i.MX35 Product Development Kit (PDK)
MCIMX51EVKJ	i.MX51 Evaluation Kit
KIT13892GUI	Graphical User Interface for the KIT13892VKEVBEJ and the KIT13892VLEVBEJ

## Documentation

Part Number	Description
MC138892	Data Sheet
KT13892QSG	Quick Start Guide for the KIT13892VKEVBEJ and the KIT13892VLEVBEJ
KT13892UG	EV Kit User's Guide supporting the KIT13892VKEVBEJ and the KIT13892VLEVBEJ
AN3964	MC13892 Layout Guidelines

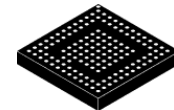
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**186 Pin PBGA**



0.8 mm Pitch  
12.0 x 12.0 mm Body  
98ASA10849D

**139 Pin PBGA**



0.5 mm Pitch  
7.0 x 7.0 mm Body  
98ASA10820D

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Document Number: MC13892FS  
Rev. 3.0

