

# MC33771C-MC33772C BATTERY CELL CONTROLLER IC

Robust, reliable analog solutions



Battery cell controller solution enabling reliable and safe low-cost Li-ion cell control applications with affordable, robust and high-speed isolated communication.

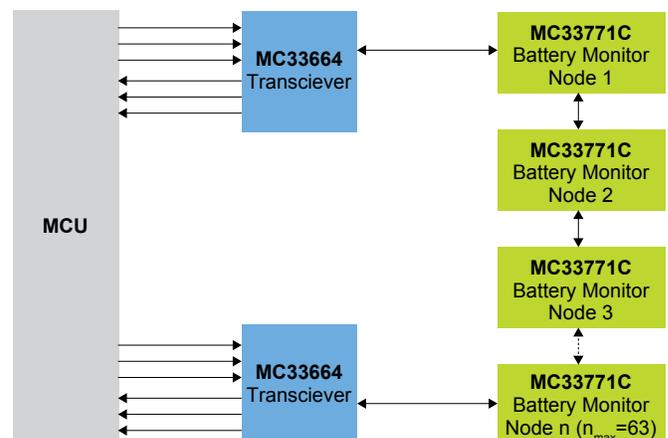
The MC33771C and MC33772C Li-Ion battery cell controller ICs are designed for automotive and industrial applications such as HEV, EV, ESS and UPS systems. They feature ADC conversions on the differential cell voltages with averaging up to 256 samples and current and temperature measurements as well as coulomb counting. Embedded balancing transistors and diagnostics simplify various applications. The devices communicate either via standard SPI or a transformer isolated daisy chain with up to 63 nodes and loopback functionality.

## KEY GENERAL FEATURES

- Isolated 2 Mbps differential communication or 4 Mbps SPI
- Bi-directional transceiver to support up to 63 nodes in daisy chain with loopback
- Up to 6/14 differential cells voltage and stack voltage measurements

- Configurable averaging of cell voltage measurement up to 256 samples
- Synchronized cell voltage/current measurement with coulomb counter
- High accuracy of synchronized coulomb counter & current measurement at  $\pm 0.5\%$  ( $\pm 1500$  A)
- 7 ADC/GPIO/temperature sensor inputs
- Onboard 300 mA passive cell balancing with diagnostics

## MAIN APPLICATION BLOCK DIAGRAM



## TARGET APPLICATIONS

- Battery Management
- Automotive
  - 12 V BMS (MC33772C)
  - 48 V BMS (MC33771C)
  - HV BMS
- Industrial
  - Energy Storage Systems (ESS)
  - Uninterrupted Power Supply (UPS)
- E-bikes, E-scooters, forklifts

## ENABLEMENT TOOLS

### Development Hardware:

- Evaluation Boards:
  - RD33771CDSTEBV
  - RD33771CNTREVM
  - FRDM33771CSPEVB
  - KIT33772CTPLEVB
  - FRDM33772CSPEVB
  - FRDMDUAL33664EVB

### Software drivers:

- Lite version – downloadable on [nxp.com](http://nxp.com)
- Full version – downloadable on Docstore.

Parameter	MC33772C	MC33771C
Voltage Channels	3–6	7–14
Supply VRange (Max)	6 V–30 V (40 V)	9.6 V–61.6V (75 V)
Cell Input Voltage Range	-0.3 V to 5 V	
Measurement Error	± 0.8 mV (V <sub>cell</sub> = 3.3 v Ta = 25°C)	
Total Measurement Error after ageing	± 3.9 mV	
	V <sub>pwr</sub> = 6 V–30 V, V <sub>cell</sub> = 1.5 V–4.3 V, -40~85 °C	V <sub>pwr</sub> = 9.6 V–61.6 V, V <sub>cell</sub> = 1.5 V–4.3 V, -40 °C–85 °C
Measurement averaging	Configurable Averaging Samples 2n n=0–8, (1,2,4–256)	
Functional Safety	ASIL C / ASIL D Compliance	
Isolated communication Speed	2 Mbps	
Communication Isolation	Inductive, Capacitive	
Max Nodes per Daisy Chain	63	
CRC Bit	8	
Comms bit	48	
Integrated Balancing	<300 mA, Timer	
Balancing sleep mode	Yes	
GPIO / Analog measurement inputs	7	
I2C Master	EEPROM Only	
Current Channels	1	
Coulomb counter	1	
Package	48-pin LQFP-EP (-40~105 °C)	64-pin LQFP-EP (-40~105 °C)

## ORDERABLE SAMPLES

Part Number	Temp Range	Number of channels	Current Channel & Coulomb Counter	Package
MC33771CTP1AE	-40 to 105 °C	14	Yes	64-pin LQFP-EP
MC33771CTP2AE	-40 to 105 °C	8	Yes	64-pin LQFP-EP
MC33771CTA1AE	-40 to 105 °C	14	No	64-pin LQFP-EP
MC33771CTA2AE	-40 to 105 °C	8	No	64-pin LQFP-EP
MC33772CTP1AE	-40 to 105 °C	6	Yes	48-pin LQFP-EP
MC33772CTP2AE	-40 to 105 °C	4	Yes	48-pin LQFP-EP
MC33772CTA1AE	-40 to 105 °C	6	No	48-pin LQFP-EP
MC33772CTA2AE	-40 to 105 °C	4	No	48-pin LQFP-EP
MC33772CTC1AE	-40 to 105 °C	1	Yes	48-pin LQFP-EP
MC33772CTC0AE	-40 to 105 °C	0	Yes	48-pin LQFP-EP

[www.NXP.com/PRODUCTLINK](http://www.NXP.com/PRODUCTLINK)

NXP and the NXP logo are trademarks of NXP B.V. All other product or service names are the property of their respective owners.  
© 2021 NXP B.V.

Document Number: MC33771C2CFS REV 0