

Battery Management System Based on MPC574xB/C/G Series Microcontrollers

Power Architecture®-based MCU for Automotive and Industrial Applications

Application One-Sheet

Overview

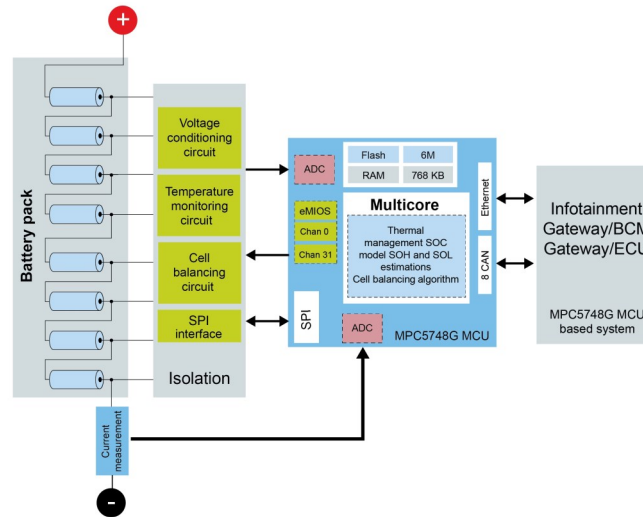
The battery management system (BMS) is a critical component of electric and hybrid electric vehicles. The purpose of the BMS is to guarantee safe and reliable battery operation.

The MPC574x family of MCUs provides a highly integrated, safe and secure single-chip solution to maintain the safety and reliability of the system, state of life (SOL), battery state of charge (SOC), and state of health (SOH).

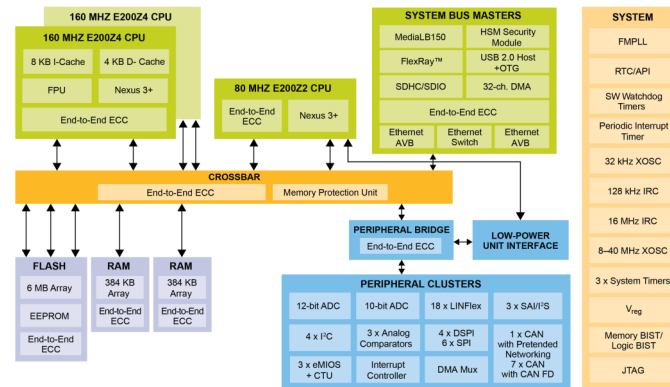
The high computational complexity for estimation and prediction methods used in battery management are met with the multi-core environment of the MPC574x MCUs.

Communication interfaces like LIN, CAN and Ethernet make it easier for the system to act as gateway between the battery monitoring sensors and the main ECU.

Application Block Diagram



MCU Block Diagram



MPC574xB/C/G Specifications

Flash	Up to 6 MB	Timer/PWM	Up to 96 ch., eMIOS
RAM	Up to 768 KB	Other Timer	Up to 16 PIT, 3 STM, 4 SWT
Core	Up to 2 x Z4, 1 x Z2	Analog	Up to 2 ADC (10 & 12 bit), 3 Comparators, CTU
Speed	2 x 160 MHz 1 x 80 MHz	Communications	Up to 4 DSPI, 6 SPI, 18 LIN, 8 CAN FD, 4 I ² C, 1xUSB, 2 x ENET, 1xSDHC
Op Range	3.3 to 5.5 V	Safety & Security	HSM, PASS and TDM, FCCU
Temp	-40 to 125 °C		
Package	176LQFP 256/324BGA	Low Power	LPU_SLEEP, LPU_STOP, LPU_STANDBY mode supported

Features

- ▶ Multi-core architecture
 - Calculations for SOH and SOL estimation
 - Cell balancing algorithm, Thermal management, data acquisition
- ▶ Connectivity—Multiple LIN (connect to slaves, up to 18 available), CAN FD, Ethernet
- ▶ 12-bit and 10-bit ADC for voltage, temperature measurements and instantaneous current measurements
- ▶ Body cross trigger unit to synchronize ADC conversions with a timer event, reducing CPU overhead for control systems.
- ▶ Functional safety support—ASIL-B (use of dual core, multiple ADCs to achieve higher ASIL levels on system)
- ▶ Security: HSM hardware-based security engine, supporting Secure Boot and secure communications compliant to SHE and EVITA-M
- ▶ High Flash/SRAM ratio with Flash blocks supporting read-while-write function

Enablement Tools

- ▶ Development hardware:
 - MPC574XG-MB family motherboard
 - MPC574XG-256DS, MPC574XG-176DS or MPC574XG-324DS daughterboard
 - DEVKIT-MPC5748G
- ▶ Runtime software: Flash and EEPROM driver,
- ▶ Compiler: Green Hills®, Wind River®, HighTec®
- ▶ Debugger: Lauterbach®, iSystem®, PLS®, Green Hills®, P&E®
- ▶ Software Enablement:
 - S32 Design Studio with SDK
 - AUTOSAR 4.0 MCAL + OS

www.nxp.com/MPC5748G

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Document Number: BCMAPPFS REV 1

