

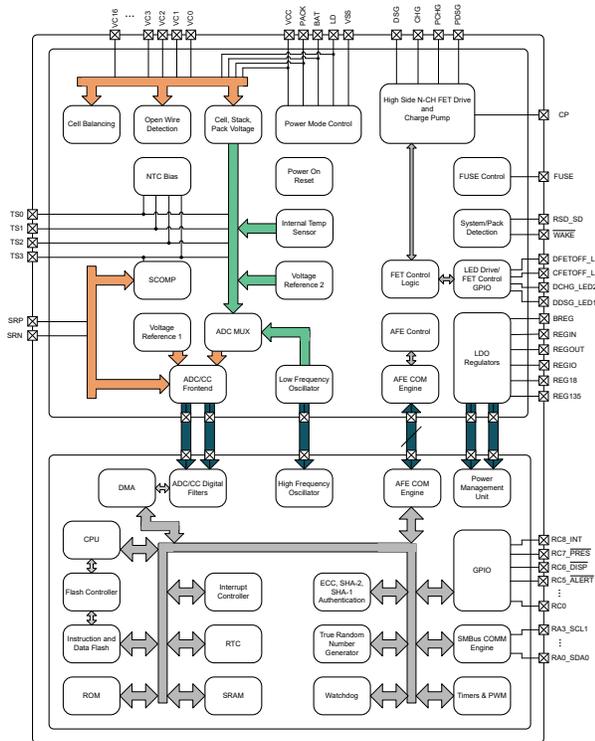
## Product Overview

# Industry-First Fully Integrated 3-16S Battery Fuel Gauge, Monitor, and Protector, with Dynamic Z-Track™

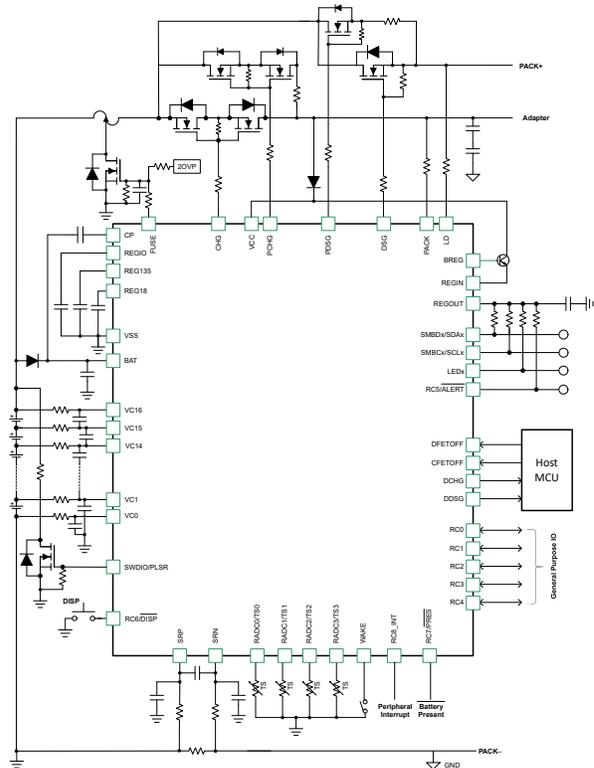


## Description

Today, everything around us is becoming wireless and battery powered. This trend extends beyond the realm of handheld and personal electronics to the industrial sector as well. From vacuum cleaners and e-bikes to lawnmowers and drones, applications that were once traditional wired electrical power or gas powered are now moving to wireless battery power. To support this trend and growth in the industrial sector, Texas Instruments has developed the industry's first fully integrated 3-16S battery fuel gauge, monitor, and protector, with Dynamic Z-Track™ technology. The market's newest battery gauge, BQ41Z90, was specifically designed to deliver a full battery pack management design in one chip to support 3-16 cells in series industrial applications. With the Dynamic Z-Track™ technology, this product provides the most accurate state of charge, state of health, and remaining capacity calculations, and was directly made to support the highly dynamic and unpredictable load profiles that industrial applications have. This precision can make all the difference for end users. Whether maintaining that there is enough power to complete a ride on an e-bike or verifying safe landing for a drone, having reliable battery pack management is essential. With Texas Instruments remarkable design, manufacturers can provide end users with peace of mind, knowing that their equipment functions as expected – and when needed.



BQ41Z90 Block Diagram



BQ41Z90 Application Schematic

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## Features

- Highly integrated battery pack manager for 3 to 16 cells in series applications
  - Ultra-low power 32-bit RISC processor
  - ADC measurements for up to 16 cells in series with 80V tolerance
  - High Accuracy SoC and SoH with Dynamic Z Track gauging algorithm
  - Certificate-based security protected flash memory
- Precision analog front end with two independent ADCs:
  - High-accuracy 18-bit integrating delta-sigma coulomb counter
  - High-accuracy 16-bit delta-sigma with input translation and multiplexer
  - Support for simultaneous current and voltage sampling
  - Supports up to eight external thermistor measurements and an internal temperature sensor
- Strong high-side NMOS FET drive with fast turn-on and turn-off time
- Charge pump support for pre-charge and pre-discharge NMOS FET drivers
- Parallel configuration support for removable battery with separate charger and system ports
- Cell balancing support up to 50mA bypass per cell
- Diagnostic lifetime data monitor and recorder
- Robust host communication support with SMBus 3.2 (up to 1MHz)
- Multiple power modes for low quiescent current operation
- SHA-1, SHA-2, or EC-KCDSA authentication for robust battery pack security

## Applications

- [Battery backup unit \(BBU\)](#)
- [E-bike, e-scooter, and LEV](#)
- [Handheld vacuum cleaners and vacuum robots](#)
- [Gardening robots and power tools](#)
- [Drones](#)
- [Medical and test equipment](#)
- [Other industrial battery pack](#)

## Learn More

- [BQ41Z90 Data sheet](#)
- [BQ41Z90 Technical Reference Manual](#)
- [BQ41Z90 EVM User's Guide](#)

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