SY6301 Battery Gas Gauge for 1-Series Cell Li-Ion Battery Packs

1   Description

The SY6301 is an ultra-low power battery gauge for 1-series Li-ion battery packs.

The IC integrates a flash-programmable 32-bit CPU, enabling both battery parameters and firmware to be upgraded online via I2C.

It provides precision measurements of current, voltage, and temperature, and can accurately predict the battery capacity. It supports both high-side and low-side current sensing. The temperature of the battery pack is measured using an internal temperature sensor or an external thermistor.

The algorithm implemented by the SY6301 combines the short-term accuracy and linearity of a coulomb counter with the long-term stability of a voltage-based fuel gauge, along with temperature and load compensation, to provide industry- leading accuracy.

The SY6301 is available in packages of 2mm x 3mm DFN8 and 1.43mm x 1.43mm CSP9 (0.5mm pitch).
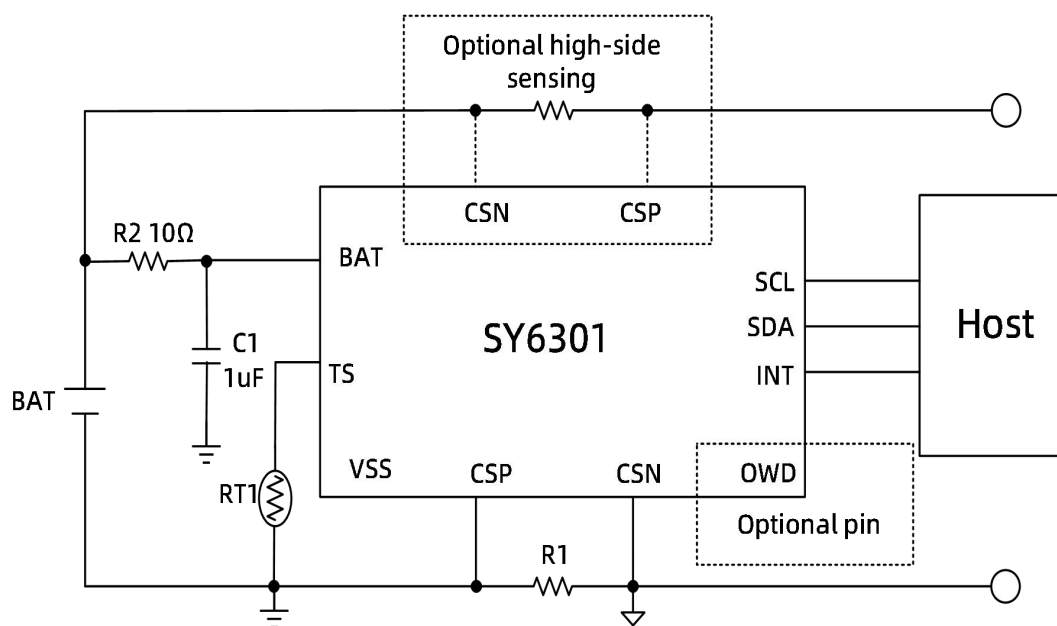
2   Applications

Mobile phone, tablet

Smart watch

Portable devices and accessory

3   Features

- Precision Measurements
  - Two independent 16-bit ADC
  - Supports current sense resistors down to 1mΩ for wide-range current applications
- Low power consumption
  - Typical shutdown current:0.5uA
  - Typical normal current:16uA
  - Flexible ADC and MCU running period configurations
- Low-voltage(2V) operation
- Algorithm with patented technology
  - Temperature and load compensation
  - Battery characteristics self-learning
  - Smoothing feature to avoid SOC jumps
  - Supports batteries with different chemistries
- Ultra-small package and PCB solution size
  - Supports 1.43mm x 1.43mm CSP9 package
  - Internal temperature sensor with factory calibration
  - Only one capacitor and sensor resistor are necessary
- Flash-programmable 32-bit MCU
  - Supports parameter and FW upgrade
  - Diagnostic lifetime data monitor and black box recorder
  - Authentication for battery pack security
  - Supports user-programmable data
- Unique identification number
- Active high or low pulse or level interrupt pin

4 Typical Application Circuit

Figure 4- 1. Typical Application Circuit