

Brief Description

The ZSSC1956 IC is a dual-channel analog-to-digital converter (ADC) with an embedded microcontroller for battery sensing/management in automotive, industrial, and medical systems.

One of the two input channels measures the battery current I_{BAT} via the voltage drop at the external shunt resistor. The second input channel measures the battery voltage V_{BAT} and the temperature. An integrated flash memory is provided for customer-specific software; e.g., dedicated algorithms for calculating the battery state.

During Sleep Mode (e.g., engine is off), the system makes periodic measurements to monitor the discharge of the battery. Measurement cycles are controlled by the software and include various wake-up conditions. The ZSSC1956 is optimized for ultra-low power consumption and draws only 100 μ A or less in Low-Power Mode.

Features

- High-precision 24-bit sigma-delta ADC (18-bit with no missing codes); sample rate: 1Hz – 16kHz
- On-chip voltage reference (5ppm/K typical)
- Current channel
 - I_{BAT} offset error: ≤ 10 mA
 - I_{BAT} resolution: ≤ 1 mA
 - Programmable gain: 4 to 512
 - Differential input stage input range: ± 300 mV
- Voltage channel
 - Input range: 4 to 28.8V
 - Voltage accuracy: better than ± 2 mV
- Temperature channel
 - Internal temperature sensor: $\pm 2^{\circ}$ C
 - External temperature sensor (NTC)
- On-chip precision oscillator (1%) and on-chip low-power oscillator
- ARM[®] Cortex[™]-M0* microcontroller: 32-bit core, 10MHz to 20MHz
- 96kB Flash/EE Memory with ECC, 8kB SRAM
- LIN2.2 / SAE J2602-2 compliant
- Directly connected to 12V battery supply
- Normal Mode current consumption: 10mA to 20mA
- Low-Power Mode current consumption: $\leq 100\mu$ A

Benefits

- Integrated, precision measurement solution for accurate prediction of battery state of health (SOH), state of charge (SOC) or state of function (SOF)
- Flexible wake-up modes allow minimum power consumption without sacrificing performance
- No temperature calibration or external trimming components required
- Optimized code density through small instruction set architecture Thumb[®]-2 *
- Robust power-on-reset (POR) concept for harsh automotive environments
- Industry's smallest footprint allows minimal module size and cost
- AEC-Q100 qualified solution

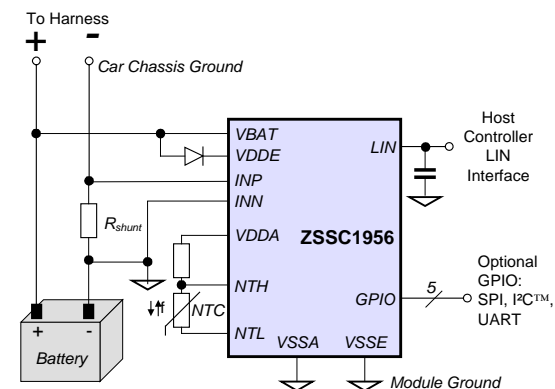
Available Support

- Evaluation Kit
- Application Notes

Physical Characteristics

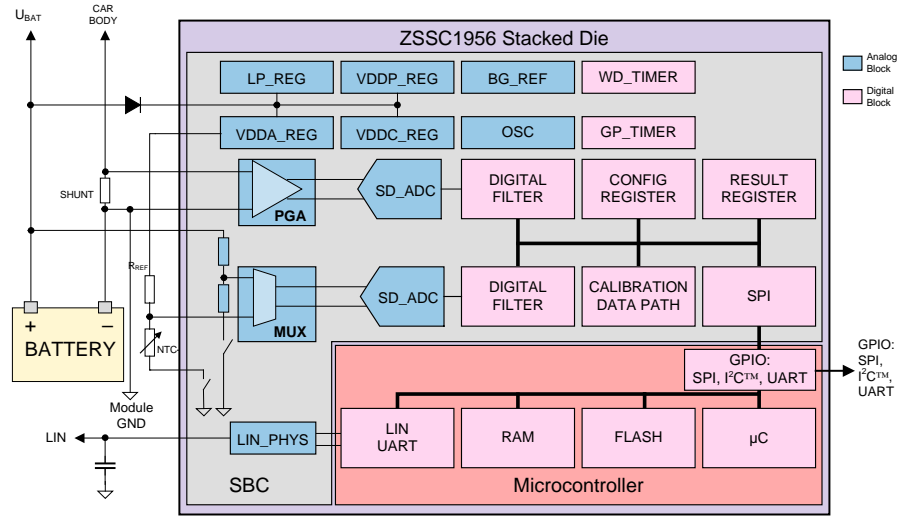
- Wide operation temperature: -40° C to $+125^{\circ}$ C
- Supply voltage: 4.2 to 18V
- Small footprint package: PQFN32 5x5 mm

Basic ZSSC1956 Application Circuit

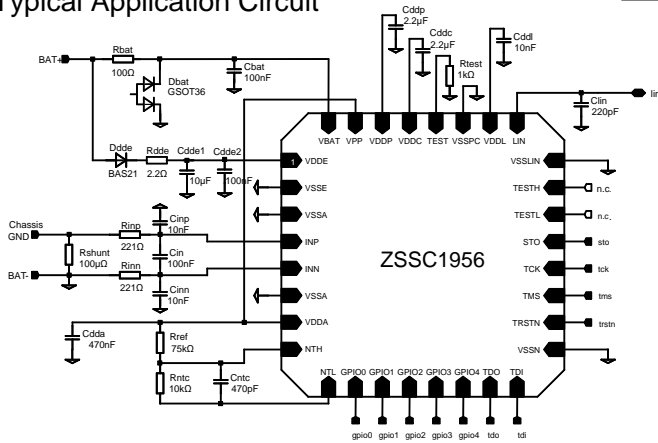


* The ARM[®], Cortex[™], and Thumb[®]-2 trademarks are owned by ARM, Ltd. The I²C[™] trademark is owned by NXP.

**ZSSC1956
Block Diagram**



Typical Application Circuit



Applications

- Intelligent battery sensing for automotive applications; e.g., start/stop systems, e-bikes, scooters, and e-carts
- Industrial and medical applications requiring precise battery SOC, SOH and SOF monitoring; e.g., emergency lighting, uninterruptable power supplies, hospital equipment, alarm systems, and more

Ordering Information

Product Sales Code	Description	Package
ZSSC1956BA3R	ZSSC1956 battery sensing IC – temperature range -40°C to +125°C	PQFN32 5x5 mm (reel)
ZSSC1956KIT V1.0	ZSSC1956 Evaluation Kit: modular evaluation and development board for ZSSC1956, IC samples, and USB cable, (software and documentation can be downloaded from the product page at www.IDT.com/ZSSC1956)	



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