PAC1811

Single-Channel Power Monitor with Accumulator, 42V Full Scale Range

Features

- 140 µA Active Current when Sampling at 1,024 sps
- High-Side Current Monitor with a Single Channel:
  - 100 mV Full Scale Range (FSR) for Sense Input Voltage (V_{SENSE}) with 16-bit Resolution
  - Selectable Bipolar Current Sense Capability:
    - -100 mV to + 100 mV FSR
    - -50 mV to +50 mV Programmable FSR/2
  - Very Low V_{BUS}/V_{SENSE} Input Current Simplifies Routing
- Voltage Monitor with Wide Bus Voltage Range:
  - 42V FSR for V_{BUS} with 16-bit Resolution
  - Selectable Bipolar Bus Voltage (V_{BUS}) Capability:
    - -42V to +42V FSR
    - -21V to +21V Programmable FSR/2
- Real Time Auto-calibration of Offset Error for Voltage and Current; No User Adjustment
- 1% Power Measurement Accuracy over a Wide Dynamic Range
- On-Chip Accumulation of 24-bit Results for Power Measurement:
  - 56-bit Power Accumulator Register for Recording Accumulated Power Data
  - 32-bit Accumulator Count Register
- User Programmable Sample Rates (f_S) of 8, 64, 256, 1024, 4096 and 8192 sps
  - User Programmable f_S = 16,384 sps for V_{BUS} or V_{SENSE} (only one signal at a time)
  - Single-Shot Modes using Refresh Commands or General Purpose Input/Output (GPIO)
- SLOW Pin for Improved Low Power Mode
- 2.7V to 5.5V Supply Operation:
  - 1.62V to 5.5V Capable I^2C/SMBus and Digital I/O
  - SMBus 3.1 and I^2C Fast-Mode Plus (1 MHz)
  - I^2C High-Speed Mode (3.4 MHz)
- SMBus Address – 16 Options
- A0/A1 Pins can Function as $\overline{\text{ALERT}}$ Pins for Specific Addresses
- No Input Filters Required
- Step Limit for Average Variation Detection
- Patent Pending Addressing Alert Scheme
- Alerts Can Be Enabled for Accumulator Overflow, Conversion Cycle Complete and Limit Excursions, such as Under/Overvoltage or Current
- AEC-Q100 Qualified (Automotive Applications)
  - Footprint Compatible with INA219, INA232, and INA236
- Available Packages:
  - 3x3 mm 8-Lead VDFN with Multiple Exposed Pads and Stepped Wettable Flanks
    - Footprint Compatible with 8-Lead SOT23-8
  - 3x3 mm 10-Lead VDFN
- **10-Lead VDFN Only Features:**
  - Hardware Controlled Power-down Mode
  - Low-Side Power Monitor

Applications

- Low Current General Purpose Applications
- Battery Powered Applications
- Portable and Embedded Computing
- Smart Home and Smart City Applications
- USB Type-A, Type-B and Type-C Connectivity
- Networking
- Automotive
- Internet of Things (IoT)

Description

PAC1811 is a single-channel power monitor with a bus voltage monitor and current sense amplifier that feed into a 16-bit resolution Analog-to-Digital Converter (ADC). Designed for High/Low-side current sensing, its digital circuitry performs power calculations and energy accumulation. This enables the device to monitor power with integration periods up to one year or longer.

The device stores bus voltage (V_{BUS}), shunt resistor voltage (V_{SENSE}) and accumulated proportional power (V_{POWER}) data. The embedded controller or system host can read the PAC1811 registers and retrieve the stored data.

PAC1811 includes a configurable alert system that can trigger alerts when the device detects voltage, current or power excursions.

Configure the sample rate, power integration period, one-shot measurement settings and other controls using SMBus or I^2C communication.

PAC1811 uses real-time calibration to minimize offset error. No input filters are required for this device. The built-in adjustable averaging function produces very low noise, high resolution measurement results.

The 10-Lead VDFN PAC1811 package has a VBUS+ pin that enables low-side power monitoring. This allows additional power savings using a Power-down feature not available for the 8-Lead VDFN package.