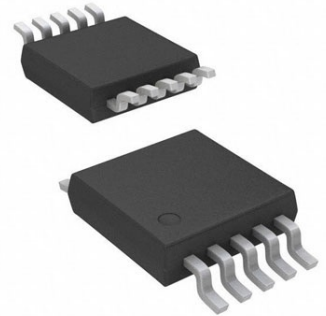


Ultraprecise, SPI Output Current/Voltage/Power/Energy/Charge Monitor



Images are for reference only

[Inquiry](#)

Manufacturer: [Texas Instruments, Inc](#)

Package/Case: VSSOP10

Product Type: Power Management ICs

Lifecycle: Active

General Description

The INA229-Q1 is an ultra-precise digital power monitor with a 20-bit delta-sigma ADC specifically designed for current-sensing applications. The device can measure a full-scale differential input of ± 163.84 mV or ± 40.96 mV across a resistive shunt sense element with common-mode voltage support from -0.3 V to $+85$ V.

The INA229-Q1 reports current, bus voltage, temperature, power, energy and charge accumulation while employing a precision $\pm 0.5\%$ integrated oscillator, all while performing the needed calculations in the background. The integrated temperature sensor is $\pm 1^\circ\text{C}$ accurate for die temperature measurement and is useful in monitoring the system ambient temperature.

The low offset and gain drift design of the INA229-Q1 allows the device to be used in precise systems that do not undergo multi-temperature calibration during manufacturing. Further, the very low offset voltage and noise allow for use in mA to kA sensing applications and provide a wide dynamic range without significant power dissipation losses on the sensing shunt element. The low input bias current of the device permits the use of larger current-sense resistors, thus providing accurate current measurements in the micro-amp range.

The device allows for selectable ADC conversion times from $50\ \mu\text{s}$ to 4.12 ms as well as sample averaging from 1x to 1024x, which further helps reduce the noise of the measured data.

Key Features

AEC-Q100 qualified for automotive applications:
Temperature grade 1: -40°C to $+125^{\circ}\text{C}$, T_{A}

Functional Safety-Capable
Documentation available to aid functional safety system design

High-resolution, 20-bit delta-sigma ADC

Current monitoring accuracy:
Offset voltage: $\pm 1 \mu\text{V}$ (maximum)

Offset drift: $\pm 0.01 \mu\text{V}/^{\circ}\text{C}$ (maximum)

Gain error: $\pm 0.05\%$ (maximum)

Gain error drift: $\pm 20 \text{ppm}/^{\circ}\text{C}$ (maximum)

Common mode rejection: 154 dB (minimum)

Power monitoring accuracy:
0.5% full scale, -40°C to $+125^{\circ}\text{C}$ (maximum)

Energy and charge accuracy:
1.0% full scale (maximum)

Fast alert response: 75 μs

Wide common-mode range: -0.3V to $+85 \text{V}$

Bus voltage sense input: 0 V to 85 V

Shunt full-scale differential range: $\pm 163.84 \text{mV} / \pm 40.96 \text{mV}$

Input bias current: 2.5 nA (maximum)

Temperature sensor: $\pm 1^{\circ}\text{C}$ (maximum at 25°C)

Programmable resistor temperature compensation

Programmable conversion time and averaging

10-MHz SPI communication interface

Operates from a 2.7-V to 5.5-V supply:
Operational current: 640 μA (typical)

Shutdown current: 5 μA (maximum)

Recommended For You

INA3221AIRGVR

Texas Instruments, Inc
VQFN16

INA200AQDGKRQ1

Texas Instruments, Inc
MSOP8

INA196AIDBVT

Texas Instruments, Inc
SOT23-5

INA220AIDGSR

Texas Instruments, Inc
MSOP10

INA198AQDBVRQ1

Texas Instruments, Inc
SOT23-5

INA228AQDGSRQ1

Texas Instruments, Inc
VSSOP-10

INA237AQDGSRQ1

Texas Instruments, Inc
VSSOP10

INA168QDBVRQ1

Texas Instruments, Inc
SOT23-5

INA226AQDGSRQ1

Texas Instruments, Inc
VSSOP10

INA3221AQRGVRQ1

Texas Instruments, Inc
QFN16

INA195AIDBVR

Texas Instruments, Inc
SOT23-5

INA197AIDBVT

Texas Instruments, Inc
SOT23-5

INA213AQDCKRQ1

Texas Instruments, Inc
SC70-6

INA300AQDGSRQ1

Texas Instruments, Inc
VSSOP-10

INA196AIDBVR

Texas Instruments, Inc
SOT23-5