

Automotive Resistive Pressure Sensor Interface

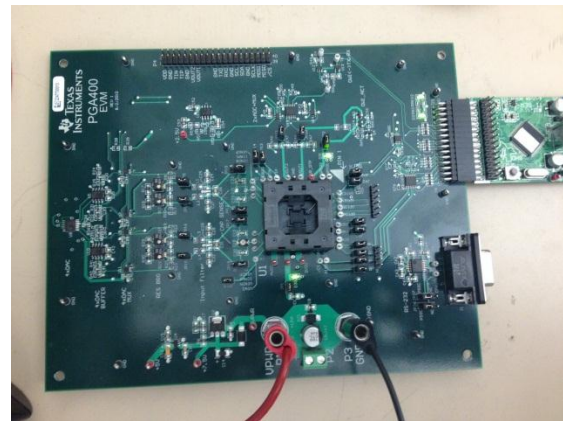


System Description

This design provides reference documentation on the PGA400-Q1 which will allow customers to quickly evaluate the automotive qualified PGA400-Q1 System on Chip (SoC) as an interface for their automotive resistive pressure sensor applications. The PGA400-Q1 has a built-in configurable Analog Front-End (AFE) with diagnostics, Sigma-Delta ADC, DACs, SPI, I2C, and a One-Wire Interface (OWI). Also with an integrated 8051 MCU and OTP memory, this chip enables a fully configurable system that can be easily matched to multiple automotive resistive pressure sensor applications.

- Includes resistive test data from PGA400-Q1 to enable quick evaluation of product's performance
- AEC-Q100 Qualified

Design Photo



Applications

- Engine Oil Pressure
- Intake Manifold Air Pressure
- EGR Pressure
- Transmission Oil Pressure
- HVAC Compressor Pressure
- Occupant Weight
- In-cylinder Pressure
- Pedal Force

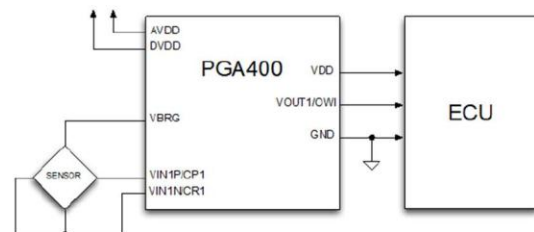
Design Resources

- Block Diagram and Schematic
- Test Data
- Design Files
- Bill of Materials
- User's Guide

Design Features

- Full SoC with Chopper-stabilized AFE for Resistive Bridge Sensors and integrated 8051 core allowing high level of customization and reduced system complexity
- Can serve multiple automotive pressure sensor applications as a platform product
- Algorithms for compensating the sensor's non-idealities can easily be implemented in software
- On chip temperature sensor with 10 bit ADC allows for direct signal conditioning and compensation for the sensor's actual temperature environment

Block Diagram



Jump start system design and speed time to market

Comprehensive designs include schematics or block diagrams, BOMs, design files and test reports by experts with deep system and product knowledge. Designs span TI's portfolio of analog, embedded processor and connectivity products and supports a board range of applications including industrial, automotive, medical, consumer, and more. To explore the designs, go to <http://www.ti.com/tidesigns>

Automotive Resistive Pressure Sensor Interface



Associated Part Numbers

<u>Part Number</u>	<u>Part Description</u>	<u>EVM Link</u>
PGA400-Q1	Automotive Programmable Sensor Signal Conditioner w/ MCU	EVM

Design Considerations:

- The PGA400-Q1 is a highly integrated signal conditioner that can linearize resistive pressure sense elements.
- The system-on-chip contains integrated reverse protection, a complete signal chain (including data converters and core), and a temp sensor. The integration also allows the PGA400-Q1 to support applications outside of pressure sensing.
- The PGA400-Q1 does not contain an integrated sense element and therefore allows user to choose sense element.
- Most pressure sensing applications do not offer much real estate. The PGA400-Q1 comes in an efficient, small WCSP package. This product is also offered in a QFN package under the product name PGA400-EP.

Quick Start Guide

What's needed:

1. 12V power supply
2. PGA400-Q1 EVM GUI installed on PC
3. PGA400-Q1 EVM + board that interfaces with PC (TI-ger board)

Before the system is powered up, please make sure all hardware is configured properly. Check that all jumpers and headers are connected appropriately. For a detailed description of configurations, see EVM user's guide.

To power the board:

4. The PGA400-Q1 EVM is shipped with a TI-ger USB communication board that provides a link from the PC controlled GUI to the EVM. Connect the TI-ger board to the PGA400-Q1 EVM.
5. Connect 12V from a power supply to the EVM. The 12V bucks down to 5V to power the PGA400-Q1.
6. Connect the TI-ger board to the PC.

To get more information on specific PGA400-Q1 EVM GUI settings, see PGA400-Q1 EVM user's guide and TI Designs Test Data document.



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