TEXAS INSTRUMENTS

PGA900

SLDS258 – APRIL 2019

PGA900 Programmable Resistive Sensing Conditioner With Digital and Analog Outputs

1 Features

- High accuracy, low noise, low power, small size resistive sensing signal conditioner
- User-programmable temperature and nonlinearity compensation
- On-chip ARM® Cortex® M0 microprocessor allows users to develop and implement calibration software
- One-wire interface enables the communication through power supply pin without using additional lines
- On-chip power management accepts wide power supply voltage from 3.3 V to 30 V
- Operating temperature range: –40°C to +150°C
- Memory:
  - 8-kB software memory
  - 128 bytes EEPROM
  - 1-kB data SRAM
- Accommodates sensor sensitivities from 1 mV/V to 135 mV/V
- Two individual analog-front end (AFE) chains, each including:
  - Low-noise programmable gain amplifier
  - 24-bit sigma-delta analog-to-digital converter
- Built-in internal temperature sensor with option to use external temperature sensor
- 14-bit DAC with programmable gain amplifier
- Output options:
  - Ratiometric and absolute voltage output
  - 4- to 20-mA current loop interface
  - One-wire interface (OWI) over power line
  - PWM output
  - Serial peripheral interface (SPI)
  - Inter-integrated circuit (I^2C)
- Depletion MOSFET gate driver
- Diagnostic functions

2 Applications

- Pressure sensor transmitters and transducers
- Liquid level meters and flow meters
- Weight scales, load meters, and strain gauges
- Thermocouples, thermistors, and 2-wire resistance thermometers (RTD)
- Resistive field transmitters

3 Description

The PGA900 is a signal conditioner for resistive sensing applications. It can accommodate various sensing element types. The PGA900 conditions its input signals by amplification and digitization through two analog front end channels. With the user programmed software in the on-chip ARM Cortex M0 processor, the PGA900 can perform linearization, temperature compensation, and other user defined compensation algorithms. The conditioned signal can be output as ratiometric voltage, absolute voltage, 4- to 20-mA current loop or PWM. The data and configuration registers can also be accessed through SPI, I^2C, UART, and two GPIO ports. In addition, the unique OWI allows communication and configuration through the power supply pin without using additional lines. The PGA900 operating voltage is from 3.3 V to 30 V and it can operate in temperatures from –40°C to +150°C.

Device Information[1]

NUMBER	PACKAGE	BODY SIZE (NOM)
PGA900	VQFN (36)	6.00 mm × 6.00 mm
	DSBGA (36)	3.66 mm × 3.66 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

PGA900 Simplified Block Diagram
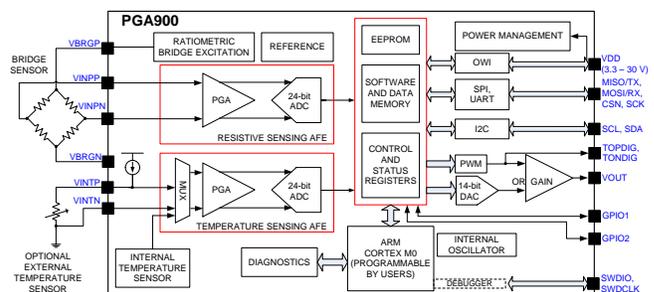
4 Device and Documentation Support

4.1 Documentation Support

4.1.1 Related Documentation

For related documentation see the following:
- Texas Instruments, *PGA900 as a Capacitive Load Driver* application note
- Texas Instruments, *PGA900 as a 4- to 20-mA Current Loop Transmitter* application note
- Texas Instruments, *Understanding Open Loop Gain of the PGA900 DAC Gain Amplifier* application note
- Texas Instruments, *Connecting PGA900 Instrumentation Amplifier to Resistive Bridge Sensor* application note
- Texas Instruments, *Understanding Open Loop Output Impedance of the PGA900 DAC Gain Amplifier* application note
- Texas Instruments, *System Noise Analysis of a Resistive Bridge Pressure Sensor Connected to the PGA900* application note
- Texas Instruments, *PGAxxxEVM-034* user's guide
- Texas Instruments, *PGA900 Software* user's guide
- Texas Instruments, *PGA900 Pressure and Temperature Sensor Signal Conditioner* user's guide

4.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. In the upper right corner, click on *Alert me* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

4.3 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

TI E2E™ Online Community *TI's Engineer-to-Engineer (E2E) Community.* Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support *TI's Design Support* Quickly find helpful E2E forums along with design support tools and contact information for technical support.

4.4 Trademarks

E2E is a trademark of Texas Instruments.
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4.5 Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

4.6 Glossary

SLYZ022 — *TI Glossary*.
This glossary lists and explains terms, acronyms, and definitions.

5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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