SINGLE-SUPPLY, AUTO-ZERO SENSOR AMPLIFIER WITH PROGRAMMABLE GAIN AND OFFSET

Check for Samples: PGA308-DIE

FEATURES

- **Digital Calibration for Bridge Sensors**
- **Offset Select: Coarse and Fine**
- **Gain Select: Coarse and Fine**
- **Bridge Fault Monitor**
- **Input Mux for Lead Swap**
- **Over/Under Scale Limits**
- **D_{OUT}/ V_{OUT} Clamp Function**
- **Seven Banks OTP Memory**
- **One-Wire Digital UART Interface**
- **Operating Voltage: 2.7 V to 5.5 V**

APPLICATIONS

- **Bridge Sensors**
- **Remote Transmitters**
- **Strain, Load, Weigh Scales**
- **Automotive Sensors**

DESCRIPTION

The PGA308 is a programmable analog sensor signal conditioner. The analog signal path amplifies the sensor signal and provides digital calibration for offset and gain. Calibration is done via the 1W pin, a digital One-Wire, UART-compatible interface. For three-terminal sensor modules, 1W may be connected to V_{OUT} and the assembly programmed through the V_{OUT} pin. Gain and offset calibration parameters are stored onboard in seven banks of one-time programmable (OTP) memory. The power-on reset (POR) OTP bank may be programmed a total of four times.

The all-analog signal path contains a 2×2 input multiplexer (mux) to allow electronic sensor lead swapping, a coarse offset adjust, an auto-zero programmable gain instrumentation amplifier (PGA), a fine gain adjust, a fine offset adjust, and a programmable gain output amplifier. Fault monitor circuitry detects and signals sensor burnout, overload, and system fault conditions. Over/under-scale limits provide additional means for system level diagnostics. The dual-use D_{OUT}/V_{CLAMP} pin can be used as a programmable digital output or as a V_{OUT} over-voltage clamp.

ORDERING INFORMATION(1)

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
PGA308	TD	Bare die in waffle pack(2)	PGA308TDD1	100
			PGA308TDD2	10

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

(2) Processing is per the Texas Instruments commercial production baseline and is in compliance with the Texas Instruments Quality Control System in effect at the time of manufacture. Electrical screening consists of DC parametric and functional testing at room temperature only. Unless otherwise specified by Texas Instruments AC performance and performance over temperature is not warranted. Visual Inspection is performed in accordance with MIL-STD-883 Test Method 2010 Condition B at 75X minimum.

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

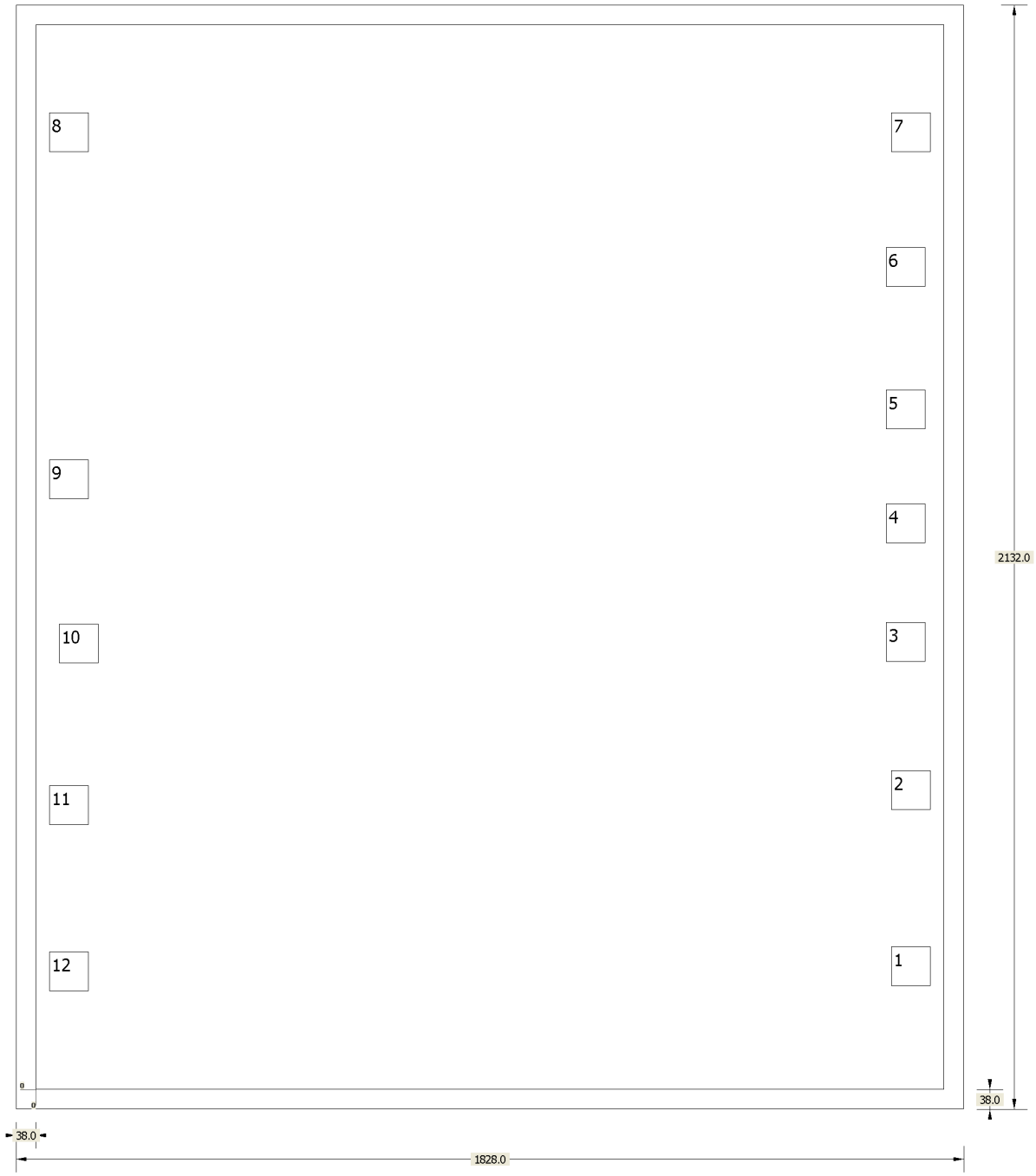
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This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

BARE DIE INFORMATION

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
15 mils.	Silicon with backgrind	Floating	Al-Cu (0.5%)	598 nm



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Table 1. Bond Pad Coordinates in Microns(1)

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
D_{out}/V_{clamp}	1	1649.8	200.1	1725.8	276.1
1W	2	1649.8	540	1725.8	616
GND	3	1639.7	826	1715.7	902
GND	4	1639.7	1055	1715.7	1131
V_S	5	1639.7	1275	1715.7	1351
V_S	6	1639.7	1550	1715.7	1626
V_{in1}	7	1649.8	1810.1	1725.8	1886.1
V_{in2}	8	26.2	1810.1	102.2	1886.1
V_{sj}	9	26.2	1140	102.2	1216
V_{fb}	10	44.55	823	120.55	899
V_{out}	11	26.2	510.85	102.2	586.85
V_{ref}	12	26.2	189.9	102.2	265.9

(1) Substrate N/C.

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
PGA308TDD1	ACTIVE			0	100	TBD	Call TI	N / A for Pkg Type	0 to 70		Samples
PGA308TDD2	ACTIVE			0	10	TBD	Call TI	N / A for Pkg Type	0 to 70		Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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OTHER QUALIFIED VERSIONS OF PGA308-DIE :

- Automotive: PGA308-Q1

NOTE: Qualified Version Definitions:

- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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