

## 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 2x2 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<sup>(1)</sup>

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
PGA308	TD	Bare die in waffle pack <sup>(2)</sup>	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](http://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.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

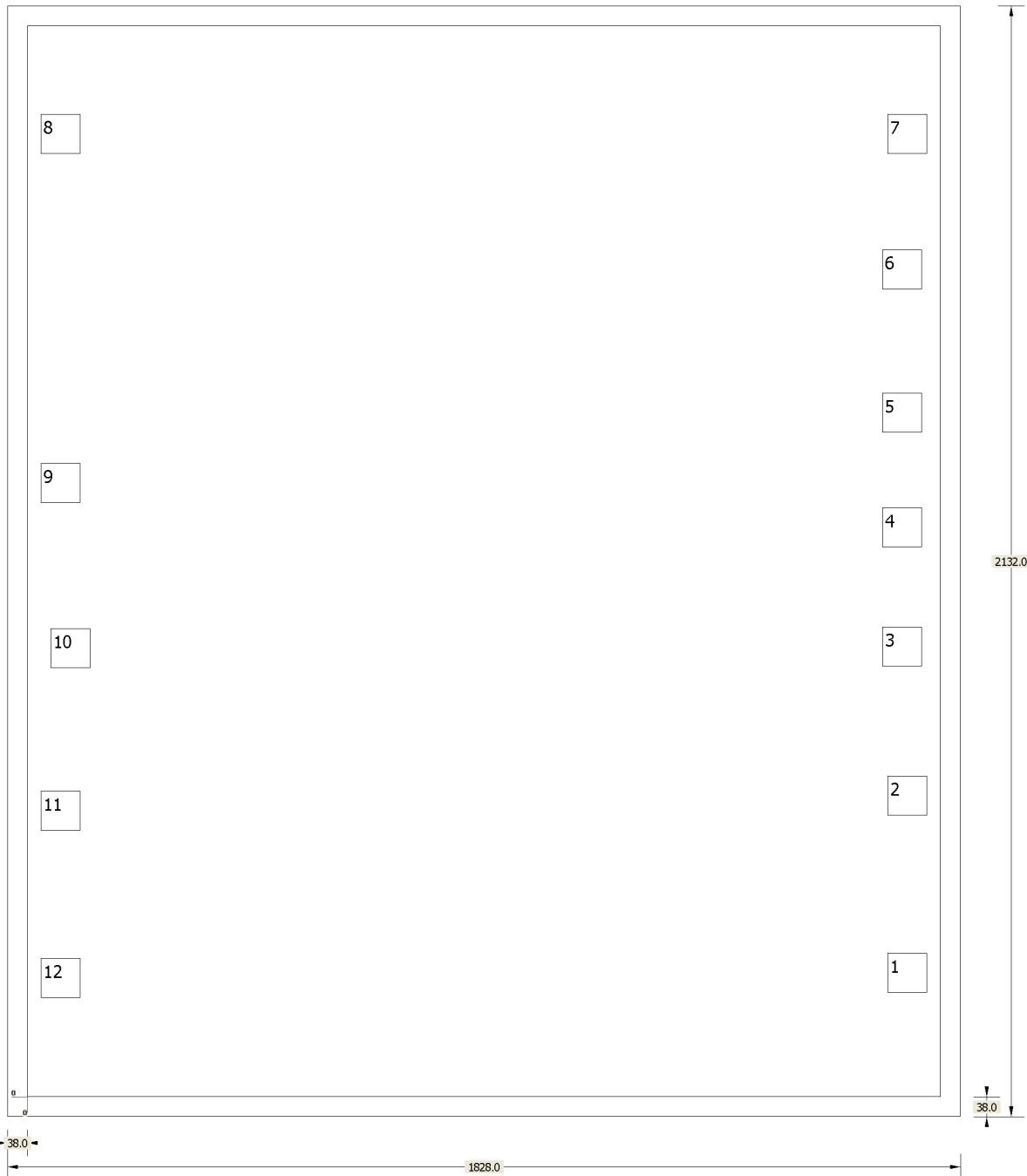


This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

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



**Table 1. Bond Pad Coordinates in Microns<sup>(1)</sup>**

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.

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>	Samples (Requires Login)
PGA308TDD1	ACTIVE			0	100	TBD	Call TI	N / A for Pkg Type	
PGA308TDD2	ACTIVE			0	10	TBD	Call TI	N / A for Pkg Type	

<sup>(1)</sup> 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.

**OBSELETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

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**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

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