

## Features

- COMPLETE DATA ACQUISITION SYSTEM IN A TINY SOT23-6 PACKAGE
- 16-BITS NO MISSING CODES
- INL: 0.0125% of FSR MAX
- CONTINUOUS SELF-CALIBRATION
- SINGLE-CYCLE CONVERSION
- PROGRAMMABLE GAIN AMPLIFIER  
GAIN = 1, 2, 4, OR 8
- LOW NOISE: 4 $\mu$ Vp-p
- PROGRAMMABLE DATA RATE: 8SPS to 128SPS
- INTERNAL SYSTEM CLOCK
- I<sup>2</sup>C™ INTERFACE
- POWER SUPPLY: 2.7V to 5.5V
- LOW CURRENT CONSUMPTION: 90 $\mu$ A
- AVAILABLE IN EIGHT DIFFERENT ADDRESSES

## General Description

The TP9100 is a precision, continuously self-calibrating Analog-to-Digital (A/D) converter with differential inputs and up to 16 bits of resolution in a small SOT23-6 package. Conversions are performed ratiometrically, using the power supply as the reference voltage. The TP9100 uses an I<sup>2</sup>C-compatible serial interface and operates from a single power supply ranging from 2.7V to 5.5V.

smaller signals to be measured with high resolution. In single-conversion mode, the TP9100 automatically powers down after a conversion, greatly reducing current consumption during idle periods.

The TP9100 can perform conversions at rates of 8, 16, 32, or 128 samples per second. The onboard Programmable Gain Amplifier (PGA), which offers gains of up to 8, allows

The TP9100 is designed for applications requiring high-resolution measurement, where space and power consumption are major considerations. Typical applications include portable instrumentation, industrial process control, and smart transmitters.

## Applications

- PORTABLE INSTRUMENTATION
- INDUSTRIAL PROCESS CONTROL
- SMART TRANSMITTERS
- CONSUMER GOODS
- FACTORY AUTOMATION
- TEMPERATURE MEASUREMENT

## Ordering Information

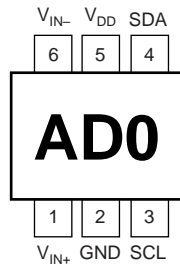
### TP9100A0S6

S6:SOT23-6 Package

I<sup>2</sup>C ADDRESS:

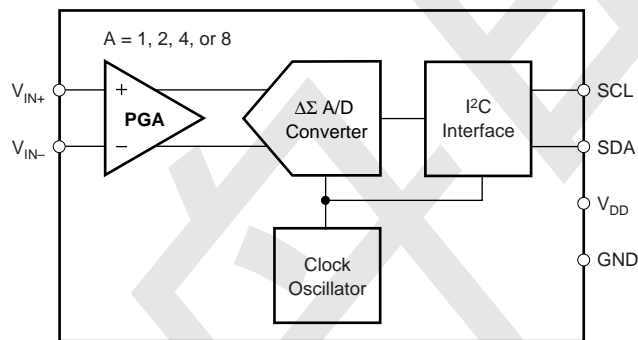
A0:	1001 000
A2:	1001 001
A3:	1001 010
A4:	1001 011
A5:	1001 100
A6:	1001 101
A7:	1001 110
A8:	1001 111

**PIN CONFIGURATION**



**SOT23-6**

**BLOCK DIAGRAM**



### Absolute Maximum Rating (T<sub>A</sub>=25°C unless otherwise noted)

V <sub>DD</sub> to GND .....	-0.3V to +6V
Input Current .....	100mA, Momentary
Input Current .....	10mA, Continuous
Voltage to GND, V <sub>IN+</sub> , V <sub>IN-</sub> .....	-0.3V to V <sub>DD</sub> + 0.3V
Voltage to GND, SDA, SCL .....	-0.5V to 6V
Maximum Junction Temperature .....	+150°C
Operating Temperature .....	-40°C to +125°C
Storage Temperature .....	-60°C to +150°C
Lead Temperature (soldering, 10s) .....	+300°C

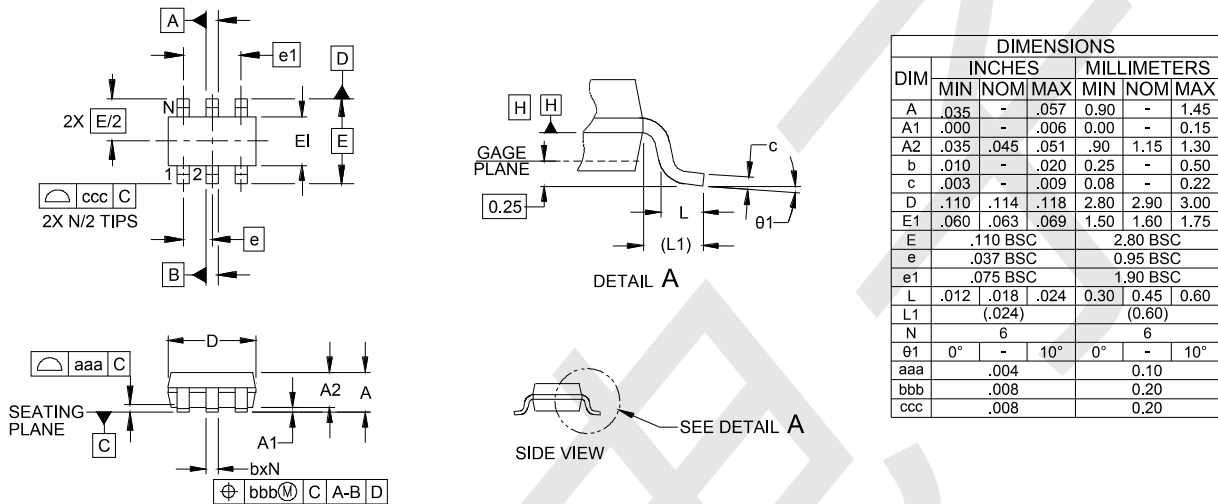
### Electrical Characteristics

All specifications at -40°C to +85°C, V<sub>DD</sub> = 5V, GND = 0V, and all PGAs, unless otherwise noted.

PARAMETER	CONDITIONS	ADS1100			UNITS
		MIN	TYP	MAX	
<b>ANALOG INPUT</b>					
Full-Scale Input Voltage	(V <sub>IN+</sub> ) - (V <sub>IN-</sub> )		±V <sub>DD</sub> /PGA		V
Analog Input Voltage	V <sub>IN+</sub> , V <sub>IN-</sub> to GND	GND - 0.2		V <sub>DD</sub> + 0.2	V
Differential Input Impedance			2.4/PGA		MΩ
Common-Mode Input Impedance			8		MΩ
<b>SYSTEM PERFORMANCE</b>					
Resolution and No Missing Codes	DR = 00	12		12	Bits
	DR = 01	14		14	Bits
	DR = 10	15		15	Bits
	DR = 11	16		16	Bits
Conversion Rate	DR = 00	104	128	184	SPS
	DR = 01	26	32	46	SPS
	DR = 10	13	16	23	SPS
	DR = 11	6.5	8	11.5	SPS
Output Noise	See Typical Characteristic Curves				
Integral Nonlinearity	DR = 11, PGA = 1, End Point Fit <sup>(1)</sup>		±0.003	±0.0125	% of FSR <sup>(2)</sup>
Offset Error			±2.5/PGA	±5/PGA	mV
Offset Drift	PGA = 1		1.5	8	μV/°C
	PGA = 2		1.0	4	μV/°C
	PGA = 4		0.7	2	μV/°C
	PGA = 8		0.6	2	μV/°C
Gain Error			0.01	0.1	%
Gain Error Drift			2		ppm/°C
Common-Mode Rejection	At DC, PGA = 8	94	100		dB
	At DC, PGA = 1		85		dB
<b>DIGITAL INPUT/OUTPUT</b>					
Logic Level					
V <sub>IH</sub>		0.7 • V <sub>DD</sub>		6	V
V <sub>IL</sub>		GND - 0.5		0.3 • V <sub>DD</sub>	V
V <sub>OL</sub>		GND		0.4	V
Input Leakage	I <sub>OL</sub> = 3mA				
I <sub>IH</sub>	V <sub>IH</sub> = 5.5V			10	μA
I <sub>IL</sub>	V <sub>IL</sub> = GND	-10			μA
<b>POWER-SUPPLY REQUIREMENTS</b>					
Power-Supply Voltage	V <sub>DD</sub>	2.7		5.5	V
Supply Current	Power Down		0.05	2	μA
	Active Mode		90	150	μA
Power Dissipation	V <sub>DD</sub> = 5.0V		450	750	μW
	V <sub>DD</sub> = 3.0V		210		μW

NOTES: (1) 99% of full-scale. (2) FSR = Full-Scale Range = 2 • V<sub>DD</sub>/PGA.

**Outline Drawing - SOT23-6**



**Land Pattern - SOT23-6**

