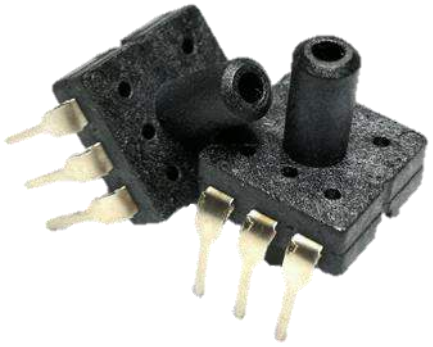
PPS34 Series



- Back Side Die for Harsh Environment
- Temperature Measurement
- -40°C - 85°C Operating Temperature
- Compact Size – 6 Pin DIP
- ± 0.5% Linearity FS
- Digital Output – SPI/I2C
- Pressure Range: 0-150 PSI
- Stability: ± .25% per year
- Accuracy: ± .5 %

DESCRIPTION

The PPS34 is an amplified digitally compensated pressure sensor in a compact 6-pin package. This state-of-the-art MEMS based pressure sensor was designed for applications where size and cost are important but where the media is harsh.

The PPS34 series utilizes MEMS piezo-resistive sensors and a 14-bit sigma delta ADC ASIC. It provides pressure of the media with a response time up to 1.5 ms. Isolation from the media with a SS cap enables long term stability of the sensor in various liquid media.

Please contact the factory for Custom design availability.

APPLICATIONS

- Weather Station
- Small Water Pumps
- Sports Watches
- Aviation
- Industrial Applications

Maximum Environmental Ratings

Operating Temperature ..... -40°C to 85°C
Storage Temperature Range .....-40°C to 125°C

Proof pressure ..... 1.5 x full scale pressure
Burst pressure ..... 2 x full scale pressure

Application Information

Package

The PPS34 is housed in an 6 PIN Nylon package. The Nylon cover allows for .120" tubing to seal the sensor.

Stability

The silicon MEMS pressure sensor has a SiO2 base and is mounted to a nylon base with RTV and is sealed with a plastic cover. The special die attach material helps reduce the mechanical stress which results in greater stability over time and temperature.

Additional stability is gained from factory stabilization of all sensors.

Media

The pressure port is tolerant to most media including but not limited to air, gas, and most non-corrosive media.

Wetted parts

The wetted surfaces are SiO2, Nylon, and Pyrex.

Pressure port

The PPS34 has a long cylindrical port with an engineered RTV to protect against water ingress.

Application Examples

Dive Watch

Satellite Balloon

Skydiving

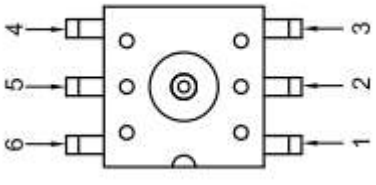
PPS34 Operational Characteristics

V_+ = 5V, V_- = 0V, Temperature = 25°C

PARAMETER	SYMBOL	Min	Typ	Max	UNITS
Supply Voltage	V_{DC}	2.5	3.0	3.6	V
Operating Temperature	T_S	-40		85	ºC
Supply Current (Note 1)	I_{DD}		< 3		mA
Digital Output			I2C		Counts
Accuracy					
Total Error Band		-1.5		1.5	%Full Scan
Update Rate	ms		1.5		ms
Stability		-0.25		0.25	% per year
Analog-to-Digital					
Resolution			14 Bit		Full Scale
Temperature Resolution			0.1		ºC
I2C & SPI Interface					
Input Low Level	V_{in_low}	0		20	Vdd%
Input High Level	V_{in_high}	80		100	Vdd%
Output Low Level	V_{o_low}			.1	Vdd%
Capacitor (Vdd – GND)	CL			4.7	uF
Pull-Up Resistor	R_{I2C_PU}	1K			Ω

Electrical Pin Configuration

No.	Function	No.	Function
1	GND	4	SDA
2	VDD	5	SCL
3	SS (see note 1)	6	OUT



Digital Output (SPI, I2C) Communication

1.1. Pressure Measuring Command

The command is 0xAAHEX (Force Mode), and the PPS34 will receive this command and will wake up and start measuring pressure. After the pressure measurement is completed it will switch back to sleep mode automatically.

Note: There must be at least 10mS delay time between the two readings to allow ADC conversion time as shown below.

Command_1 (0xAA)	ADC conversion delay 10mS	Read Status and Pressure Data	Command_2 (0xAA)	ADC conversion delay 10mS	Read Status and Pressure Data	....	Command_N (0xAA)

1.2. Status Register

Bit	Description	Attr	Default
7	Reserved	R	0
6	Power Supply for ADC Ref. Voltage: 1: Power On 0: Power Off	R	0
5	Busy: 1: Pressure Measurement Active 0: Sleep Mode. (This bit will auto set to ZERO once a measurement is completed)	R	0
4	Reserved	R	0
3	Reserved	R	0
2	Reserved	R	0
1	Reserved	R	0
0	Reserved	R	0

I2C Parameters and Format

2.1. I2C Parameters

SS pin must be set to “High” after power on. Once it is being set to high the first command must be the I2C command, and then the I2C application will be selected.

2.2. I2C Command Format

START	Slave Address							R/W	SLAK
	1	0	0	1	1	0	0	0/1	

Writing one byte to Slave:

Maser	S	SLAD+W [1001100 0]		Command		STP
Slave			SLAK		SLAK	

S: Start

STP: Stop

SLAD+W: Slave Address 1001100 + Write Bit 1

SLAD+R: Slave Address 1001100 + Read Bit 1

A: Master Acknowledge – Micro Controller sends a Low signal to PPS34

-A: Master Acknowledge – Micro Controller Sends a High signal to PPS34

SAK: Slave Acknowledge – PPS34 sends a Low signal to Micro Controller

I2C Parameters and Format (continued)

2.3. I2C Pressure Data Reading Format

Write 0xAA Command [force mode]	Conversion Time Delay	Read Pressure Data

Write 0xAA Command (force Mode)							Conversion time Delay
Master	S	SLAD+W [1001100 0]		Command [10101010]		STP	Delay > 10mS
Slave (PSC)			SLAK		SLAK		

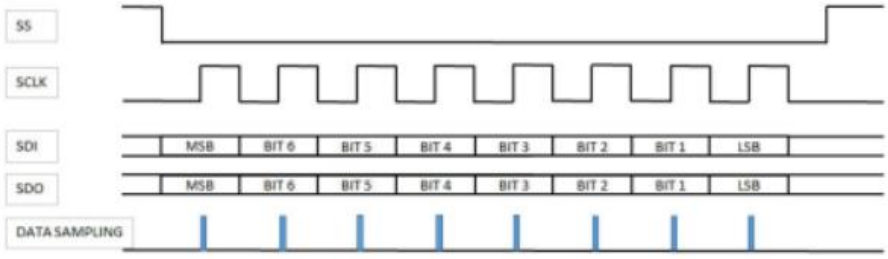
Read Pressure Data											
S	SLAD+R [1001100 1]		Status [bit 7:0]	A	Pressure Data [bit 23:16]	A	Pressure Data [bit 15:8]	A	Pressure Data [bit 7:0]	-A	STP
		SLAK									

SPI Parameters and Format

3.1. Pressure Measuring Command

SS pin must be set to “Low” to select SPI mode, and then the processor can read the data through SPI bus.

SPI sequence is as follows



SPI Command Request

SDI	Command	0x00HEX	0x00HEX
SDO	Status [bit7:0]	Data [bit15:8]	Data [bit7:0]

SPI Read Request

SDI	Command [NOP] [bit 7:0]	Command Data [bit 15:8]	Command Data [bit 7:0]
SDO	Status [bit 7:0]	Data [bit 15:8]	Data [bit 7:0]

SPI Read Sample

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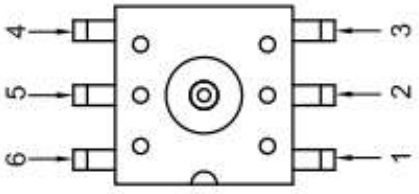
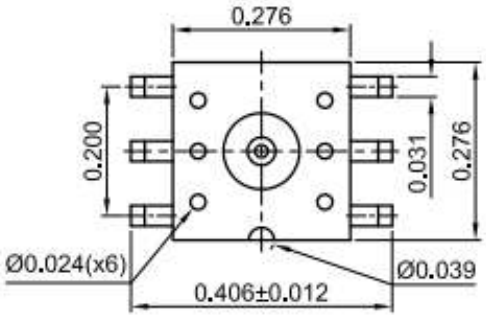
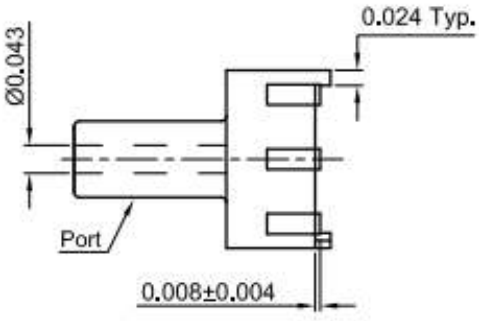
Pin	Force mode Command Format			Delay	Read Pressure Data [Bit23:0] format			
SDI	Command [0xAA]	0x00HEX	0x00HEX	>10mS	Command [NOP] [0x00]	0x00HEX	0x00HEX	0x00HEX
SDO	Status [bit7:0]	Data [bit 15:8]	Data [bit 7:0]		Status [bit 7:0]	Pressure Data [Bit 23:16]	Pressure Data [Bit 15:8]	Pressure Data [Bit 7:0]

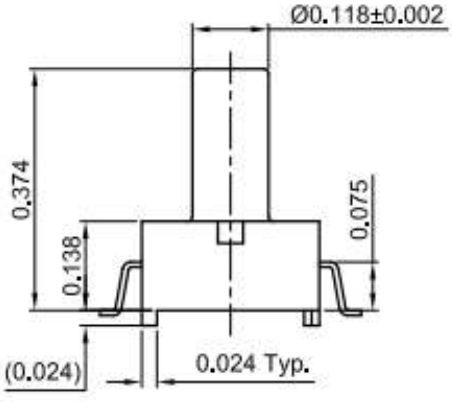
Mechanical Dimensions Inches [mm]

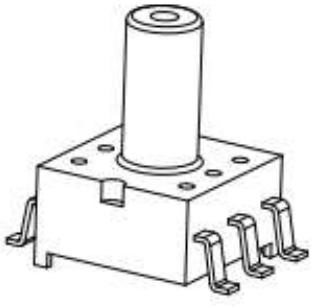


No.	Function	No.	Function
1	GND	4	SDA
2	VDD	5	SCL
3	SS (see note 1)	6	OUT









PPS34-0 - 150 G 1 0

Model

0=Ratio, 1=I2C, 2=SPI

Pressure Range 150= 150PSI

(G=Gauge)

1= Single port, 2=Custom

0=DIP, 1=SMD

Ph: (480) 462-1810 sales@PhoenixSensors.com