## FEATURES

- **0...4 "$H_2O$**
- **Accurate low pressure readings**
- **Low cost**
- **High impedance bridge**
- **Low noise**
- **Low power consumption for battery operation**

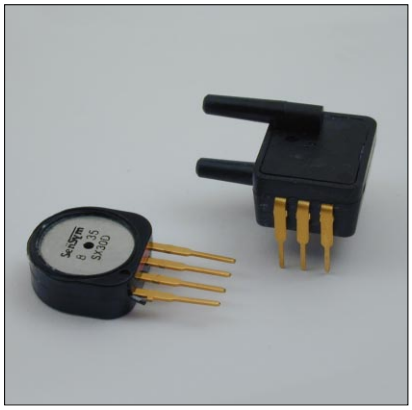
## APPLICATIONS

- **Medical instrumentation**
- **Portable and battery powered equipment**
- **Air flow monitoring**
- **HVAC**
- **Industrial controls**

## GENERAL DESCRIPTION

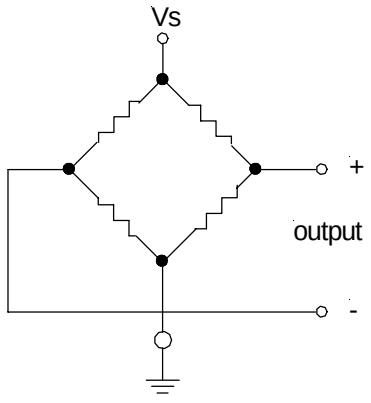
The SLP series of pressure sensors provides low cost measuring for very low pressures. These devices were specifically designed to accurately measure differential and gage pressures of 0 to 4 "$H_2O$. They are compatible for use with non-corrosive and non-ionic media, such as air and dry gases.

The devices allow application of pressure to either side of the diaphragm and can be used for gage or differential pressure measurements.



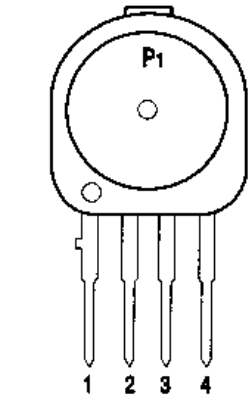
Scale: 1 cm
½ inch

## EQUIVALENT CIRCUIT




Note: Polarity applies for positive pressure applied to port P2 (backward gage)

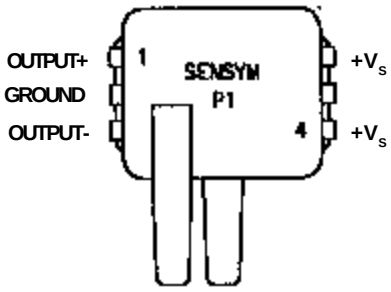
## ELECTRICAL CONNECTION




1) $+V_S$ 2) + OUTPUT
3) GROUND 4) – OUTPUT

**BUTTON PACKAGE**

**DIFFERENTIAL/GAGE**




**"D4" DIP PACKAGE**

## ABSOLUTE MAXIMUM RATINGS

| | |
|---|---|
| Supply voltage, $V_S$ | 7.5 $V_{DC}$ |
| Temperature range | |
| Operating | 0 to 50°C |
| Storage | 0 to 70°C |
| Common-mode pressure | 150 "$H_2O$ |
| Lead temperature (soldering 4 sec.) | 250°C |
| Proof pressure | 10 "$H_2O$ |
| Burst pressure[1] | 5 psi or 150 "$H_2O$ |

## SLP004D PERFORMANCE CHARACTERISTICS[1]

| Characteristics | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|
| Operating pressure | --- | --- | 4 | "$H_2O$ |
| Sensitivity $T_A$= 25°C | +1700 | +2500 | +5500 | µV/V/"$H_2O$ |
| Full-scale span 4 "$H_2O$[2] | +34 | +50 | +110 | mV |
| Temperature coefficient of span[5,8] | -2850 | -2400 | -1950 | ppm/°C |
| Zero pressure offset $T_A$= 25°C | -40 | 0 | +40 | mV |
| Temperature coefficient of offset[5] | --- | ±4 | --- | µV/V°C |
| Combined linearity and hysteresis[3] | --- | 0.5 | 1.0 | %FS |
| Long term stability of offset and sensitivity[7] | --- | 0.5 | --- | %FS |
| Response time (10 % to 90 %)[6] | --- | 0.5 | --- | ms |
| Input resistance $T_A$ = 25°C | --- | 4.65 | --- | kΩ |
| Temperature coefficient of resistance[5,8] | +2100 | +2300 | +2500 | ppm/°C |
| Output impedance | --- | 4.70 | --- | kΩ |
| Repeatability[4] | --- | 0.2 | --- | %FS |
| Position sensitivity | --- | 50 | --- | µV/V/g |

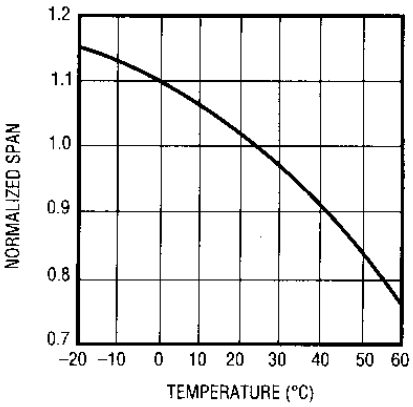
**WARNING:**
**Due to the delicate nature of these very sensitive devices, some special handling is required . Parts are sensitive to shock and vibration and must be handled with care. Dropping on any hard surface (bench top etc.) can destroy the device. Note 10 "$H_2O$ overpressure.**

### Specification notes:

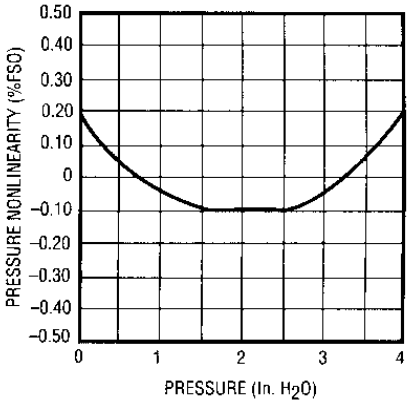
1. Reference conditions: supply voltage, $V_S$ = 5 $V_{DC}$, $T_A$ = 25°C, common-mode line pressure = 0 psig, pressure applied to P2.
2. Span is the algebraic difference between the output voltage at full scale pressure and the output at zero pressure.
3. See Definition of Terms: Hysteresis - the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
4. Maximum difference in output at any pressure with the operating pressure range an temperature within 0°C to +50°C after:
   a) 1,000 temperature cycles, 0°C to 50°C
   b) 1.5 million pressure cycles, 0 psi to full-scale span
5. Slope of the best straight line from 0°C to 50°C. For operation outside this temperature, contact factory for more specific applications information.
6. Response time for a 0 psi to full-scale span pressure step change. 10 % to 90 % rise time.
7. Long term stability over a one year period.
8. This parameter is is not 100 % tested. It is guaranteed by process design and tested on a sample basis only.
9. If the maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.

## TYPICAL PERFORMANCE CHARACTERISTICS

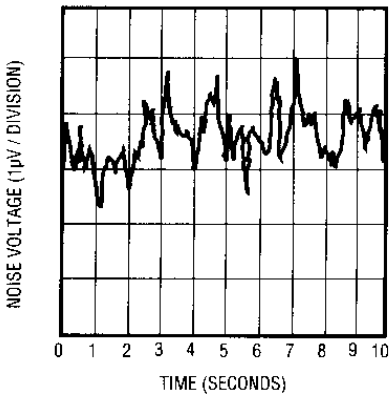
**Sensitivity vs Temperature (Constant Voltage)**




**Nonlinearity vs Pressure**




**0.1 Hz to 10 Hz Noise**




## APPLICATION INFORMATION

### General Information

The SLP family of pressure sensors function as a wheatstone bridge. When pressure applied to the device the resistors in the arms of the bridge change as shown in Figure 1.

The resulting differential output voltage, $V_0$, is easily shown to by $V_0 = V_B \times \Delta R$. Since the change in resistance is directly proportional to pressure, $V_0$ can be written as: $V_0 = S \times P \times V_B + V_{OS}$

where:

| | |
|---|---|
| $V_0$ | is the output voltage in mV |
| S | is the sensitivity in mV/V psi |
| P | is the pressure in psi |
| $V_B$ | is the bridge voltage in volts |
| $V_{OS}$ | is the offset error (the differential output voltage when the applied pressure is zero). |

For a complete application discussion see SenSym´s SCC series datasheet.

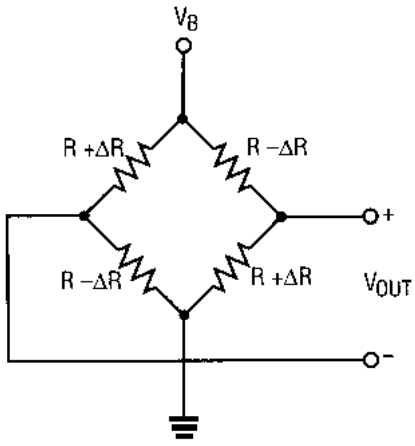
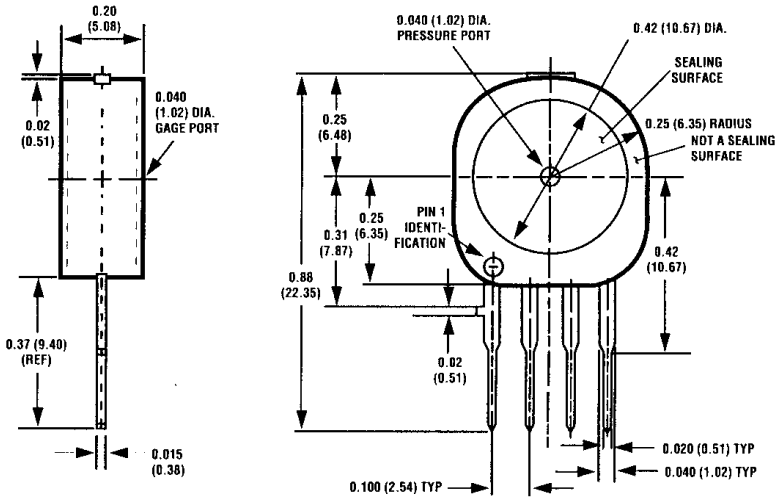



**Figure I**

## PHYSICAL DIMENSIONS

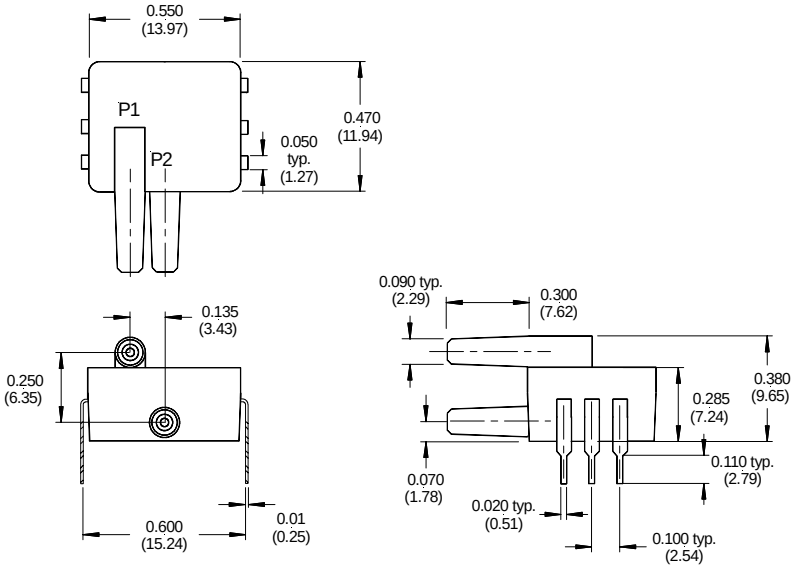
### Button package




**mass:** 1 g

dimensions in inches (mm)

### D4-housing




**mass:** 1 g

dimensions in inches (mm)

## ORDERING INFORMATION

| Pressure range | Order part number | |
|---|---|---|
| | Button package | DIP package |
| 0 to 4 "$H_2O$ | SLP004D | SLP004DD4 |