

## Instrumentation Amplifier For Pressure Sensor

General purpose differential amplifier project has been designed for various pressure sensor amplifier applications, circuit provided with multiple resistors capacitors, dual sensor options and 4 pin Header connector to interface other external sensors. Schematic is an example from NXP application AN1318 Figure 2.

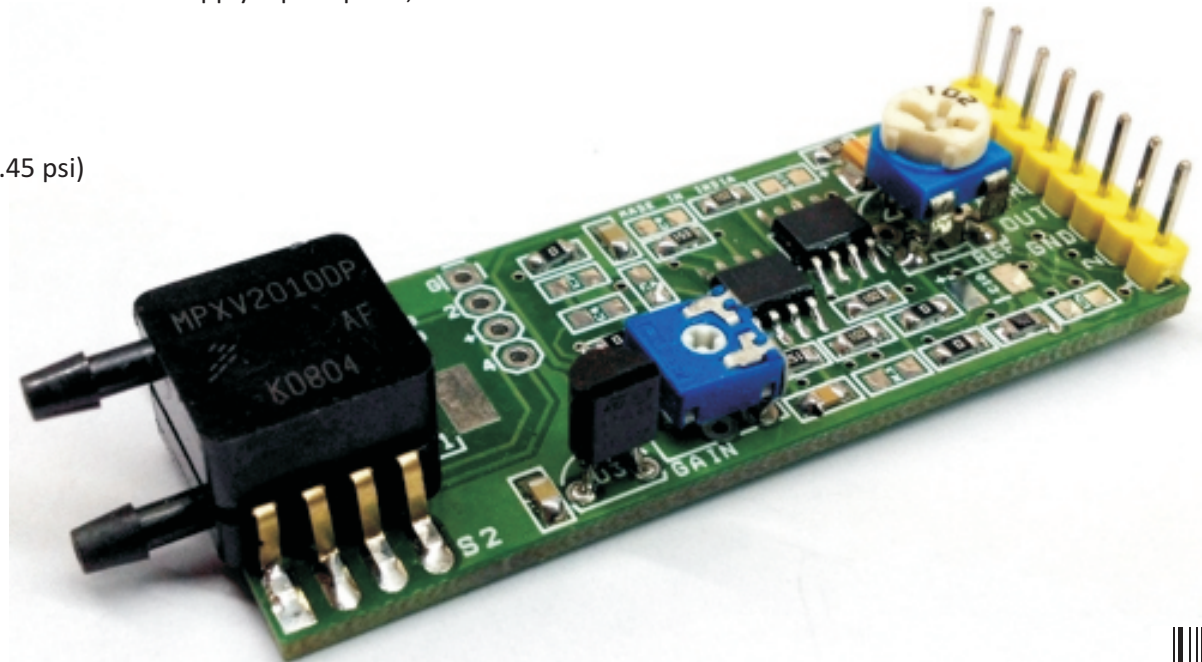
The most popular silicon pressure sensors are piezo-resistive bridges that produce a differential output Voltage in response to pressure applied to a thin silicon diaphragm. Output voltage for these sensors is generally 25 to 50 mV full scales. Interface to microcomputers, therefore, generally involves gaining up the relatively small output voltage, performing a differential to single ended conversion, and scaling the analog signal into a range appropriate for analog to digital conversion. The circuit published here is simple solution which amplify low voltage differential signal and provide single output voltage which can be directly feed to ADC of micro-controller. Instrumentation amplifiers are by far the most common interface circuits that are used with pressure sensors. An example of an inexpensive instrumentation amplifier based interface circuit uses an LM358 dual operational amplifier and several resistors that are configured as a classic instrumentation amplifier with one important exception. PR2 Trimmer potentiometer provided to set the offset voltage 0.75V. Setting the offset voltage to 0.75 V results in a 0.75 V to 4.75 V output that is directly compatible with microprocessor A/D inputs. Over a zero to 50° C temperature range, combined accuracy for an MPX2000 series sensor and this interface is on the order of  $\pm 10\%$ . Trimmer potentiometer PR1 helps to set the gain. PCB provided with MPXM2010GS and MPXV2010DP dual footprint options, for testing purpose MPXV2010DP sensors has been used.

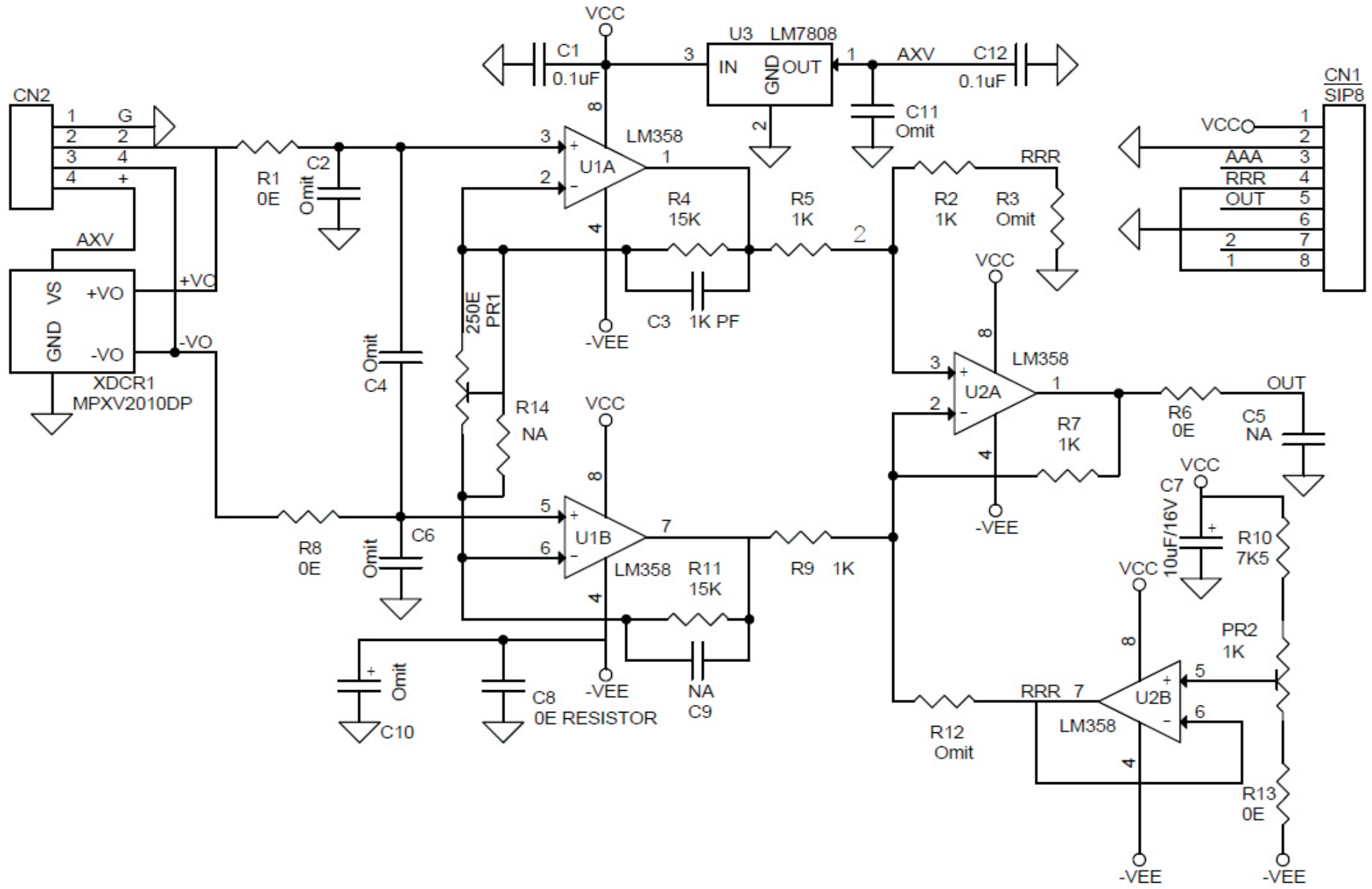
The MPXV2010 series silicon Piezo-Resistive pressure sensors provide a very accurate and linear voltage output directly proportional to the applied pressure. These sensors house a single monolithic silicon die with the strain gauge and thin film resistor network integrated. The sensor is laser trimmed for precise span, offset calibration and temperature compensation.

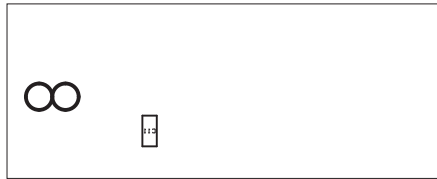
**Note :** Board is designed for multiple applications and has dual supply input option, Use 0E resistor instead of C8 or short the two terminals since circuit works on single supply.

### Features

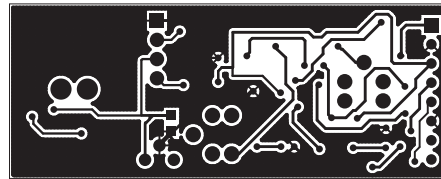
- Supply 10V DC Single Supply
- MPXV2010DP Pressure Range 0 to 10 kPa (0 to 1.45 psi)
- Output 0.75V to 4.75V Approx. (Adjustable)
- PR1 Trimmer Potentiometer Gain Adjust
- PR2 Trimmer Potentiometer Offset Adjust



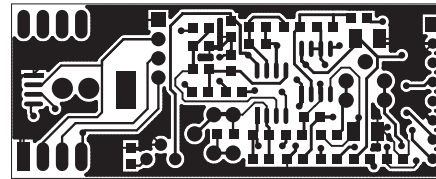




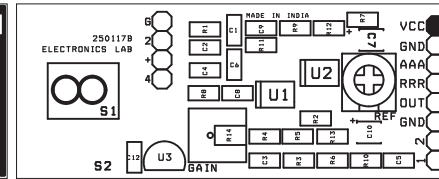
SILK SCREEN BOTTOM



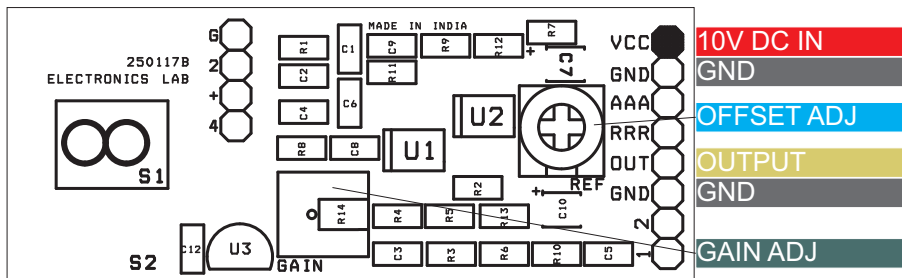
BOTTOM LAYER



TOP LAYER



SILK SCREEN TOP



BOM			
SR.	QNTY.	REF.	DESC.
1	1	CN1	8 PIN HEADER CONNECTOR
2	1	CN2	4 PIN HEADER CONNECTOR
3	2	C1,C12	0.1uF SMD 0805
4	7	C2,R3,C4,C6,C10,C11,R12	OMIT
5	1	C3	1K PF SMD 0805
6	3	C5,C9,R14	NA
7	1	C7	10uF/16V SMD 1210
8	1	C8	0E RESISTOR 0805
9	1	PR1	250E TRIMMER POT
10	5	R2,PR2,R5,R7,R9	1K SMD 0805
11	4	R1,R6,R8,R13	0E SMD 0805
12	2	R4,R11	15K SMD 0805
13	1	R10	7K5 SMD 0805
14	2	U1,U2	LM358 SMD SO8
15	1	U3	LM78L08 TO92
16	1	XDCR1	MPXV2010DP

