

Photodiode Amplifier for Visible Light

The project presented here is a photodiode amplifier for visible light. Output voltage of the circuit increases linearly with light intensity. Low cost BPW34 photo diode used as light sensor and OPA381 op-amp as amplifier. OPA381 is a transimpedance amplifier which converts photodiode current flow in to voltage. Operating voltage of this circuit is 5V DC, and output swing almost 0V to 4.5V DC. The project can be used to make LUX meter and other photo lab equipment. Analog output of the project is withing range of micro-controller's ADC for easy interface with micro-controllers. By combining this project with Arduino and LCD, you can create a light meter for photography. It is advisable to use filter in front of the sensor to stop infra-red noise as sensitivity of BPW34 is near to infrared. Half cut table tennis ball will help as a filter.

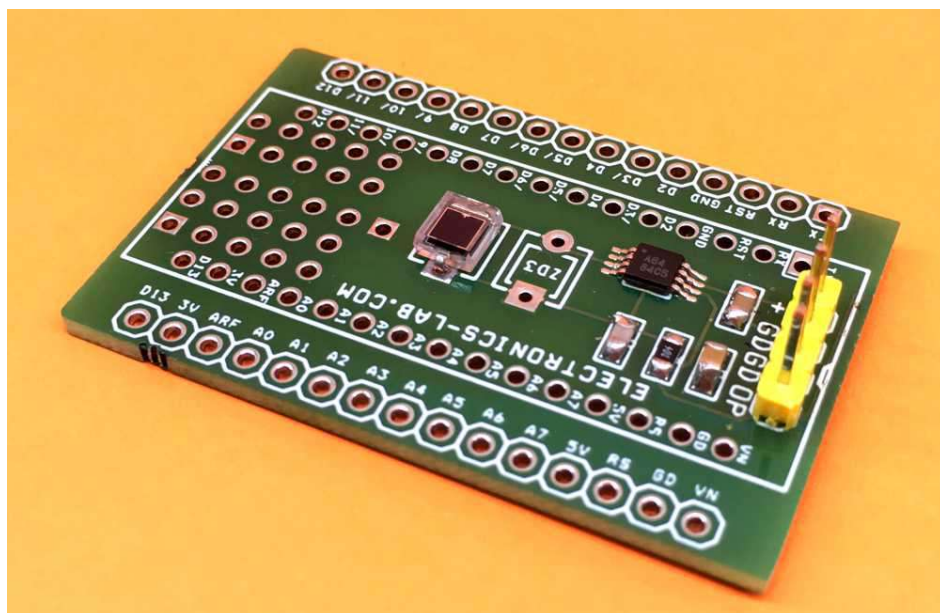
BPW34 Photo Diode: BPW34 is a PIN photodiode with high speed and high radiant sensitivity in miniature, flat, top view, clear plastic package. It is sensitive to visible and near infrared radiation.

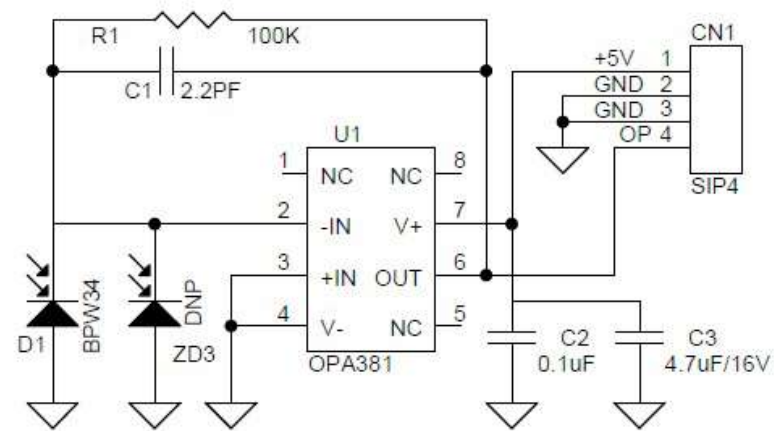
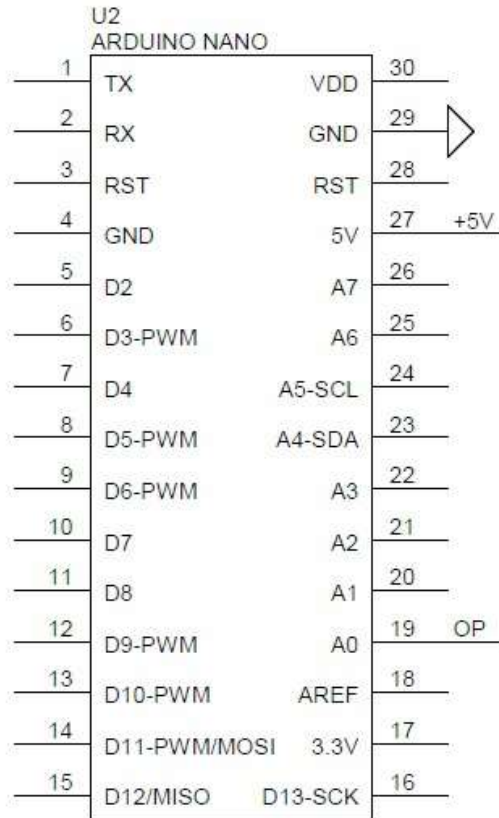
OPA381 Precision, Low Power, 18MHz Transimpedance Amplifier: The OPA381 family of transimpedance amplifiers provides 18MHz of Gain Bandwidth (GBW), with extremely high precision, excellent long-term stability, and very low 1/f noise. The OPA381 features an offset voltage of 25µV (max), offset drift of 0.1µV/°C (max), and bias current of 3pA. The OPA381 far exceeds the offset, drift, and noise performance that conventional JFET op amps provide. The signal bandwidth of a transimpedance amplifier depends largely on the GBW of the amplifier and the parasitic capacitance of the photodiode, as well as the feedback resistor. The 18MHz GBW of the OPA381 enables a transimpedance bandwidth of > 250kHz in most configurations. The OPA381 is ideally suited for fast control loops for power level measurement on an optical fibber. As a result of the high precision and low-noise characteristics of the OPA381, a dynamic range of 5 decades can be achieved. This capability allows the measurement of signal currents on the order of 10nA, and up to 1mA in a single I/V conversion stage. In contrast to logarithmic amplifiers, the OPA381 provides very wide bandwidth throughout the full dynamic range.

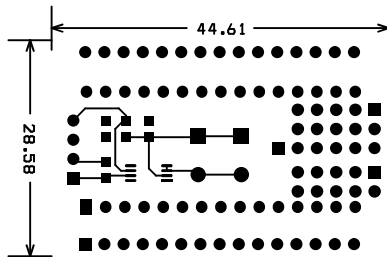
The Module also can be used as Arduino nano shield, output connected to A0 analog pin , 5V DC and GND connection power up the board from Arduino Nano.

Features

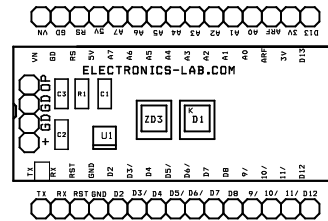
- Supply 5V DC
- Output Swings Approx. 0 to 4.5V DC
- PCB Dimensions 44.61MM X 28.58MM



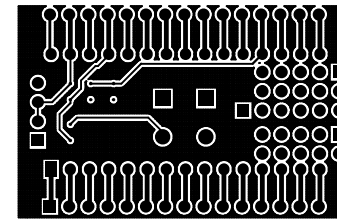




TOP LAYER

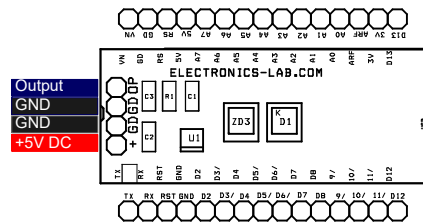


SILK SCREEN TOP



BOTTOM LAYER

PCB DIMENSIONS 44.61MM X 28.58MM



SR.	QNTY.	REF.	DESC.
1	1	CN1	4 PIN MALE HEADER CONNECTOR 2.54MM
2	1	C1	2.2PF SMD 0805
3	1	C2	0.1uF SMD 0805
4	1	C3	4.7uF/16V SMD 0805
5	1	D1	BPW34 PHOTO DIODE VISHAY
6	1	R1	100K SMD 0805
7	1	U1	OPA381 SMD MSOP-8
8	1	U2	ARDUINO NANO
9	1	ZD3	DNP