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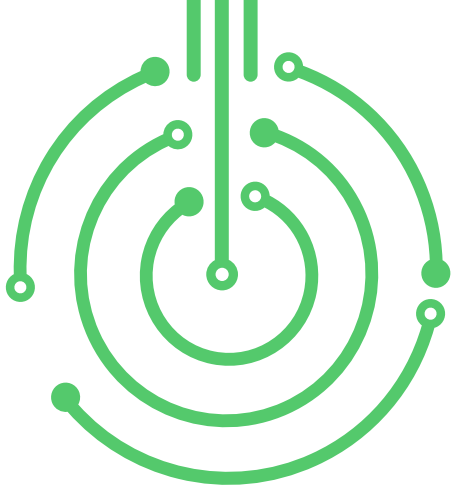


Photo Diode Amplifier

SKU: EL143555

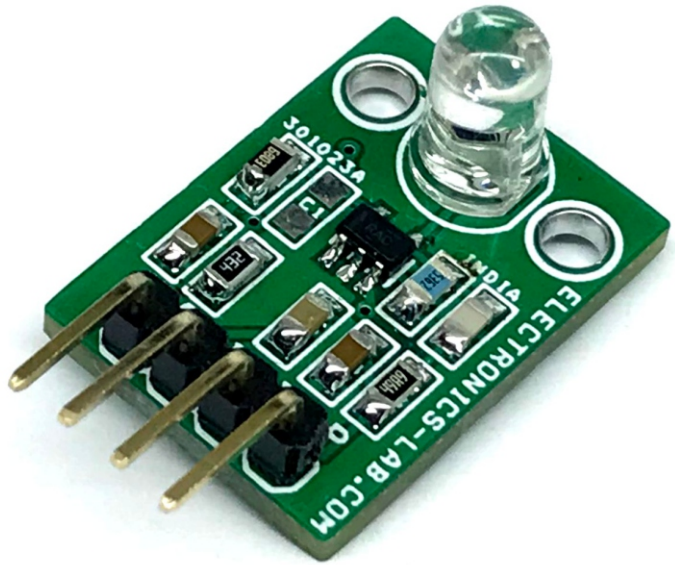
SENSOR

Photo Diode Amplifier

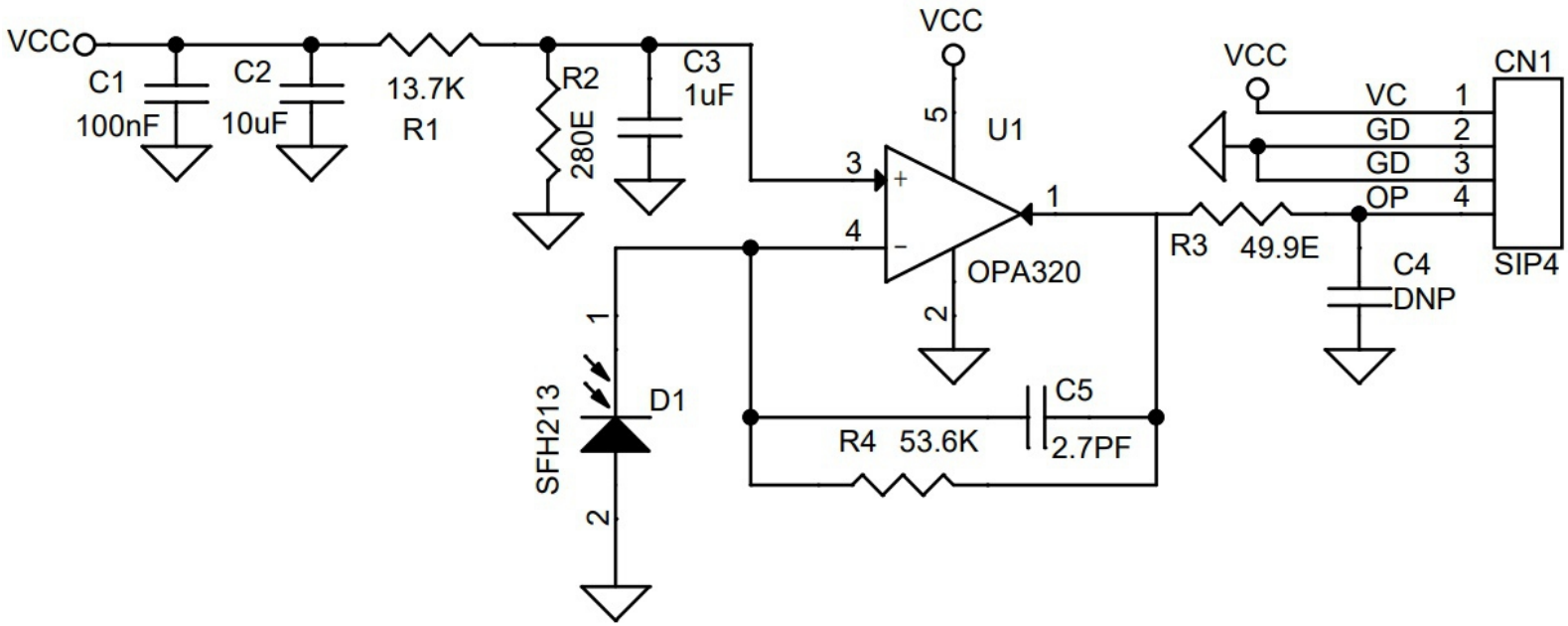
This small module is a photodiode amplifier. The circuit consists of an OPAMP configured as a transimpedance amplifier for amplifying the light-dependent current of the photodiode. A small bias voltage is derived from the positive supply and applied to the op amp's non-inverting input. This prevents the output from saturating at the negative supply rail in the absence of input current. For this design, the photodiode operates in photoconductive mode: exposure to light will cause a reverse current through the photodiode. The diode is connected such that this current causes the OPAMP output voltage to increase. The feedback capacitor C5 helps to maintain stability. This capacitor compensates for the photodiode capacitance at the inverting input of the OPAMP. Finally, in the absence of any photodiode current, the amplifier output will attempt to settle at the voltage applied to the non-inverting input. If the non-inverting input is grounded, the output voltage would ideally be 0V. However, the output voltage can never reach 0V because this is also the value of the negative power supply. Therefore, the OPAMP output will "saturate" near its negative power supply. This condition is undesirable and can delay the amplifier's response to an input signal. To avoid saturation, a resistor divider R1 and R2 from the positive supply is used to bias the amplifier input above ground. The output swing of this amplifier is from 0.1V to 4.9V. The project was built using OPA320 OPAMP which is a new generation of precision, low-voltage CMOS operational amplifiers optimized for very low noise and wide bandwidth while operating on a low quiescent current of only 1.45 mA.

FEATURES

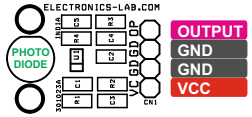
- Supply Voltage 5V DC
- Supply Current 2mA
- Input current 0 - 90µA
- Output: 100mV – 4.9V
- PCB Dimensions 21.11 X 15.24MM



Schematic


VCC
C1
100nF
C2
10uF
13.7K
R1
R2
280E
C3
1uF
VCC
5
U1
3
4
1
2
OPA320
VCC
CN1
VC 1
GD 2
GD 3
OP 4
SIP4
R3
49.9E
C4
DNP
1
D1
SFH213
2
C5
2.7PF
R4 53.6K

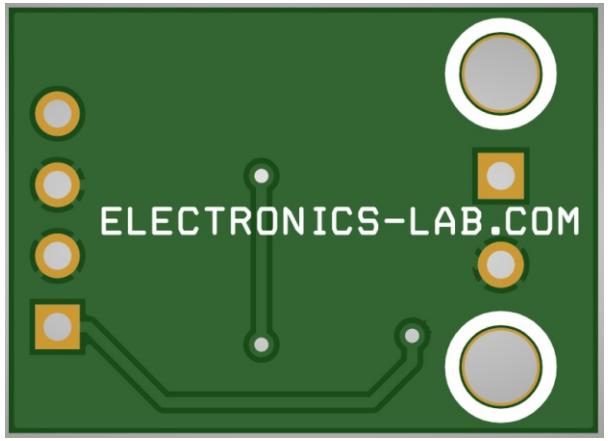
Connections

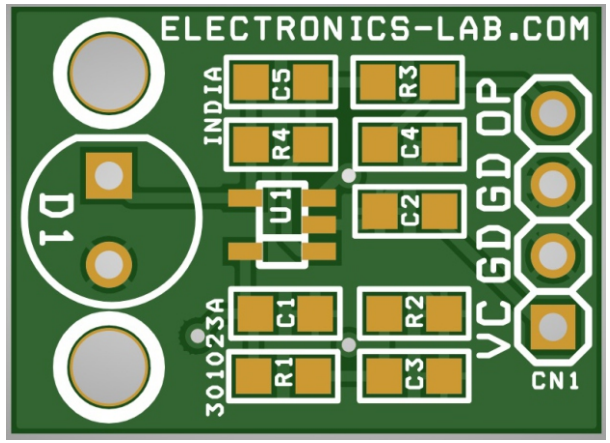


Connections

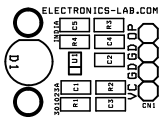
- Cn1: Pin 1 = VCC, Pin 2 = GND, Pin 3 = GND, Pin 4 = Output
- D1: Photo Diode

PCB

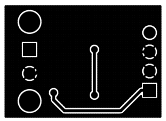




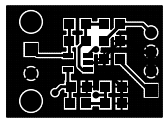
PCB GERBER FILES AVAILABLE



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 21.11 X 15.24MM

Parts List

BOM						
NO	QNTY.	DESC.	REF.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	4 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5317-ND
2	1	C1	100nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
3	1	C2	10uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
4	1	C3	1uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	1	C4	DNP			
6	1	C5	2.7PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	1	D1	SFH213 PHOTODIODE	OSRAM	DIGIKEY	475-SFH213-ND
8	1	R1	13.7K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
9	1	R2	280E 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
10	1	R3	49.9E 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
11	1	R4	53.6K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	1	U1	OPA320 SOT223	TI	DIGIKEY	296-45320-1-ND

Notes

APP

Android App

DOWNLOAD

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