

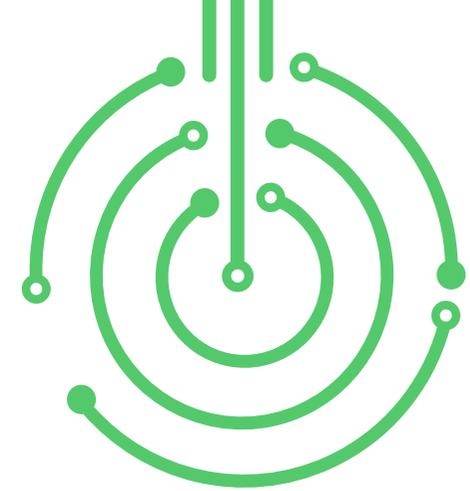
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Closed Loop Constant LED Light Source Using OPT101 Light Sensor and OPA569 Power OPAMP



SKU: EL130523

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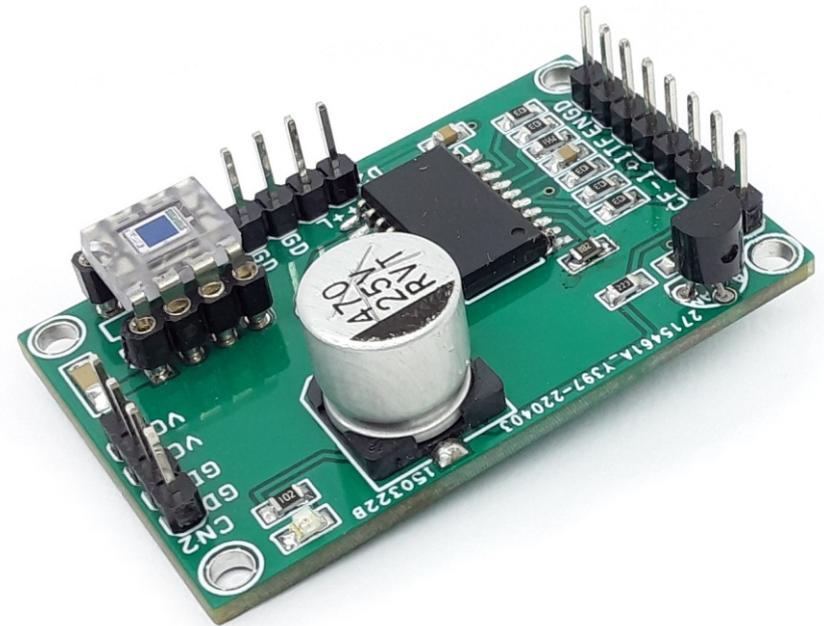
The project presented here is a precision closed-loop LED driver that provides very accurate constant light and can be used for photography, scientific research, and other applications that require an accurate light source. The project consists of light sensor OPT101 and OPA569 power OPAMP. OPT101 converts light into voltage, and OPA569 is used as an adjustable linear current source that controls the flow of current through the power LED. Installation of the Power LED and OPT101 Sensor is shown in the figure below. The overcurrent limit of LED is set to 1A using resistor R4. LM336 provides an accurate voltage reference to OPAMP which is 0.5V. The circuit works in a closed loop.

Features

- Operating Power Supply 5V DC @ 1Amps
- Load (LED) up to 700mA
- Very Accurate LED Light Source
- Copper Area provided for heat management of OPA569
- Header Connector for LED and Power Input
- On Board Optional Power LED
- PCB Dimensions 46.83 x 29.53mm
- 4 x 2.5mm Mounting Holes

Connections

- **CN1:** Pin 1 = VCC 5V DC, Pin 2 = IMO Current Monitor Output, Pin 3 = Over Current Flag, Pin 4 = Op-Amp -IN, Pin5 = Op-Amp +IN, Pin 6 = Over Temp Flag, Pin 7 = Enable, Pin 8 GND
- **Enable Pin 7 CN1** = High Enable, Low Disable the output
- **CN1:** Pin 2, Pin 3, Pin 4, Pin 5 Pin 6 are optional and can be used for microcontroller interface.
- **D2:** Power LED Pin 1 = +LED, Pin 2 = +LED, Pin 3 = -LED, Pin 4 = -LED
- **CN2:** Pin 1 = VCC +5V DC, Pin 2 = VCC +5V DC, Pin 3 = GND, Pin 4 = GND

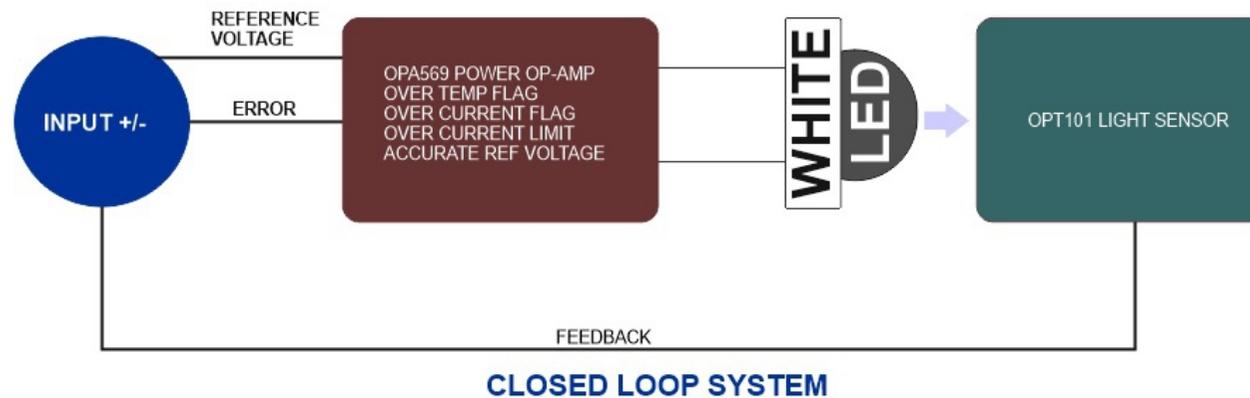


At power ON, the LED light reflects to the sensor, and OPT101 provides the voltage output as the light level falls on the sensor, this voltage is fed to power op-amp, and op-amp compares the input voltage from OPT101 and reference voltage 0.5V. If there is an error, the op-amp controls the current of the LED to match the disparity between the output and input. This way light level is maintained and this is constant. It is important to have proper housing for the sensor so external/ambient light should not fall on the sensor, otherwise constant light will not be maintained.

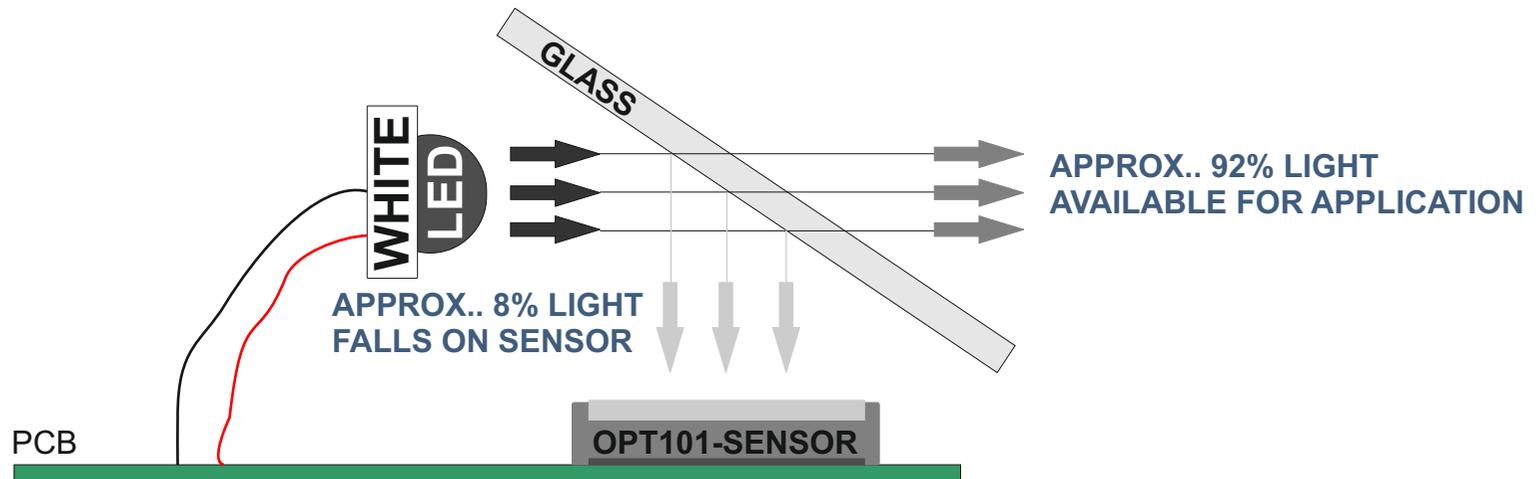
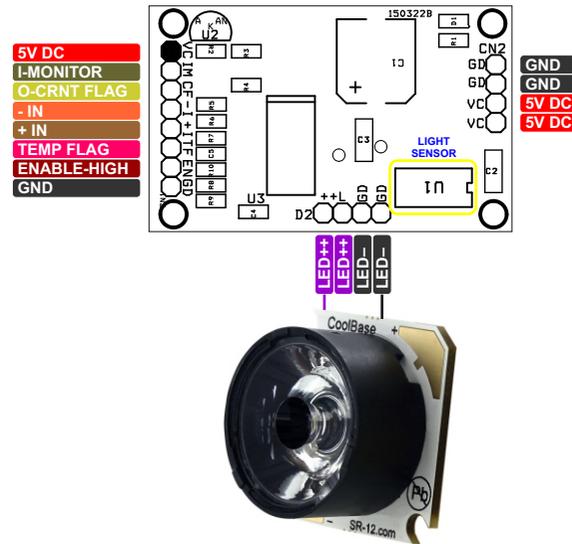


Note: OPT101 sensor chip mounted horizontally on the PCB, 90-degree socket is available for easy mount.

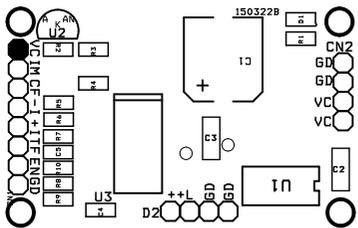
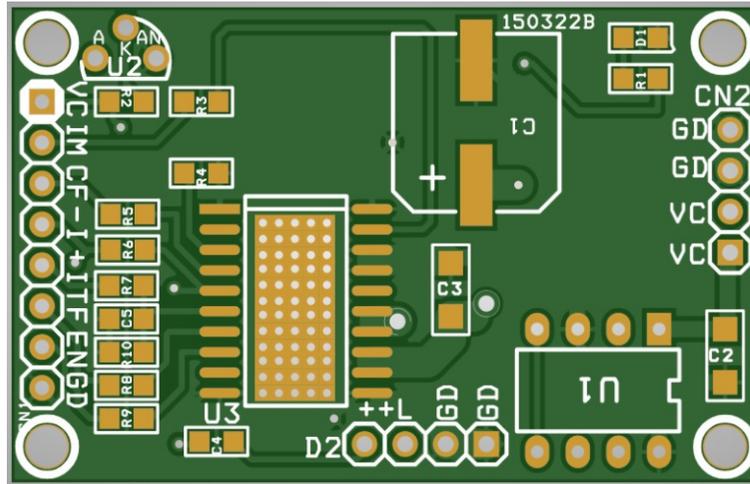
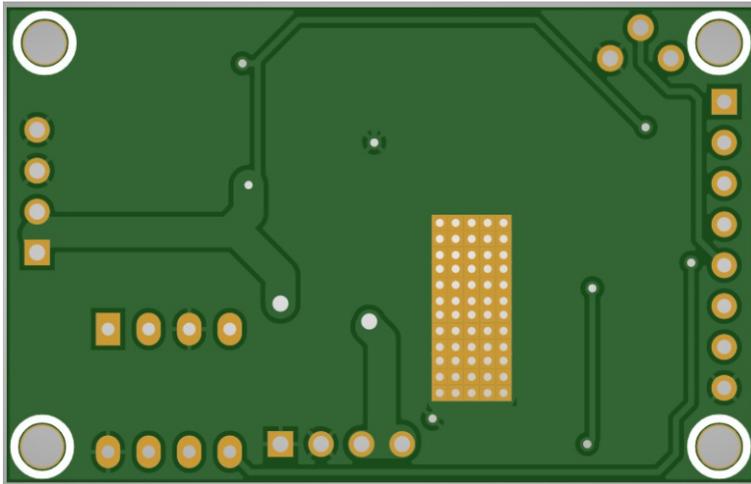
Control Loop Control



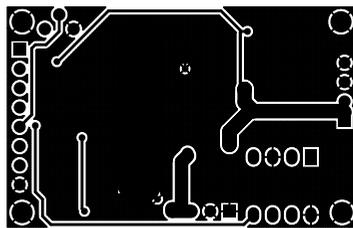
Connections



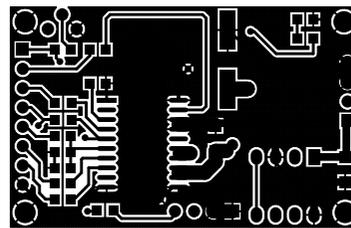
PCB



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 46.83MM X 29.53MM

Parts List

BOM						
NO.	QNTY.	REF.	DESC	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	8 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5321-ND
2	1	C1	470uF/25V OR 220uF/16V SMD ELECTROLYTIC	PANASONIC	DIGIKEY	PCE4605CT-ND
3	1	C2	0.1uF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
4	1	C3	4.7uF/10V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	1	C4	3.3KPF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	1	C5	10KPF/50V SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	2	R1,D1	DO NOT INSTALL			
8	1	D2	4 PIN MALE HEADER PITCH 2.54MM FOR LED	WURTH	DIGIKEY	732-5317-ND
9	1	R2	1K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
10	1	R3	22.6K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
11	1	R4	11.8K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	5	R5,R6,R7,R8,R9	10K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	R10	2.5K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
14	1	U1	OPT101 DIP8	TI	DIGIKEY	296-23090-5-ND
15	1	U2	LM336-2.5V TO92	ON SEMI	DIGIKEY	2156-LM336Z25-ND
16	1	U3	OPA569 SO SMD	TI	DIGIKEY	296-26292-1-ND
17	1	CN2	4 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5317-ND

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