

Technical Data Sheet

Ambient Light Sensor: ALS-PDIC5510C

■ Features

- . Near human eye photopic response
- . High IR rejection w/ embedded optical filter
- . Good output linearity across wide illumination range
- . Operation temperature performance $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- . Integrated photo-current amplifier
- . Excellent dark current performance
- . Wide supply voltage range 3V to 12V
- . Lower cost
- . 5mm Lamp (Flat lens)
- . Pb free
- . The product itself will remain within RoHS compliant version.



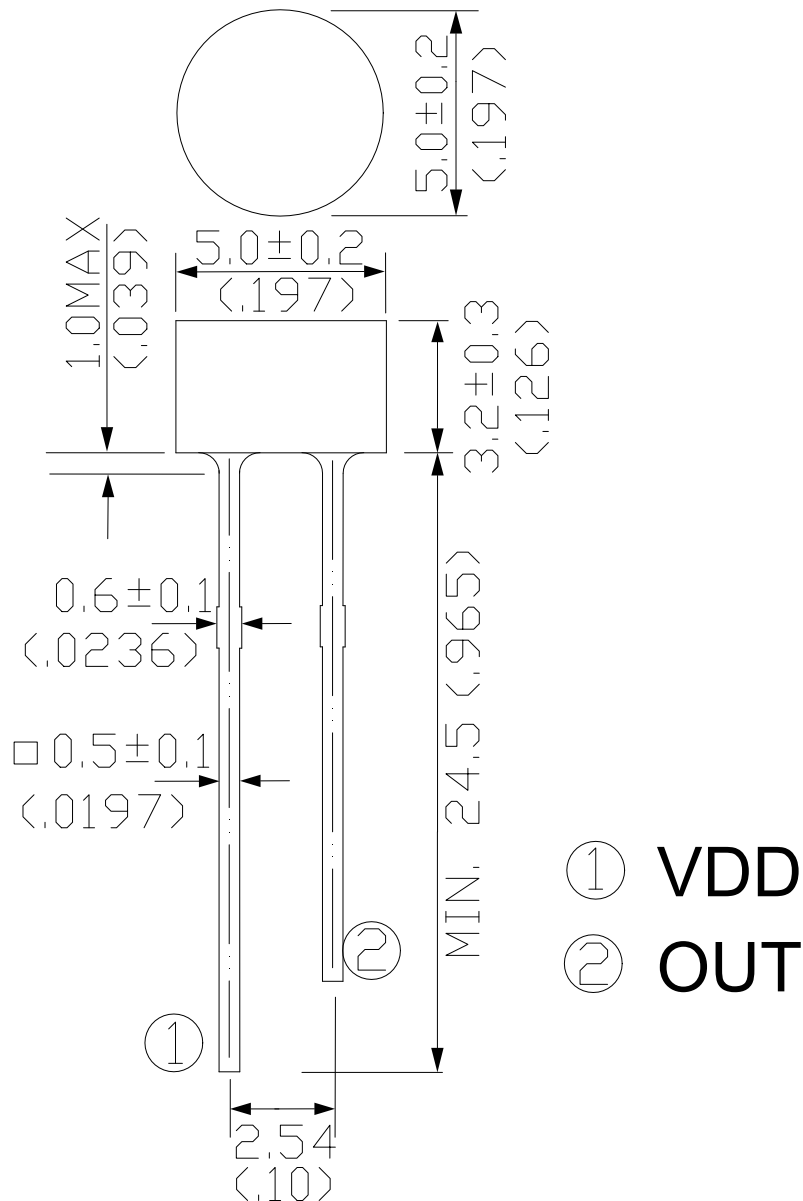
■ Descriptions

The ALS-PDIC5510C is a low cost visible light sensor, with a current output which is directly proportional to the ambient light level. It has a built in optical filter to provide a response which is close to human eye, or “photopic”. The output current can be converted to a voltage by connecting it in serial with a resistor. The dynamic range is determined by the external resistor and power supply (10K and 5V gives a range of 0 to 200 lux, but can be over 800 lux with a 1K resistor). The internal dark current cancellation circuit enables a stable accuracy over the full temperature range, even at low light levels.

■ Applications

- . Dawn/Dusk sensing
- . Surveillance Camera
- . Display backlighting in laptops, Mobile Phones, LCD TVs
- . Night-lights
- . Automobile head light system

■ Package Dimensions



- Note: 1. All dimensions are in millimeters(inches)
2. Tolerances unless dimensions $\pm 0.25\text{mm}(.01\text{'})$

■ Absolute Maximum Ratings ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Rating	Units
Input Supply Voltage	V_{in}	-0.3~13	V
Supply current	I	Internally limited	mA
Lead Soldering Temperature	T_{sol}	260	$^\circ\text{C}$
Operating Temperature	T_{opr}	-40 ~ +85	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +125	$^\circ\text{C}$

■ Recommended Operation Condition

Parameter	Symbol	Rating	Units
Input Supply Voltage	V _{in}	5	V
Junction Temperature	T _{jun}	-40 ~ +85	°C
Ambient Temperature	T _{opr}	-40 ~ +85	°C

■ Electro-Optical Characteristics (T_a=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Range of Spectral Bandwidth	$\lambda_{0.5}$	----	430	----	620	nm
Wavelength of Peak Sensitivity	λ_p	----	----	550	----	nm
Infrared response		900 nm			5	%
Output Current	I _o	VDD=5V E _v =10 Lux	----	11	----	μA
		VDD=5V E _v =100 Lux	----	115	----	μA
		VDD=3V E _v =10 Lux	----	10.5	----	μA
		VDD=3V E _v =100 Lux	----	105	----	μA
Min. Operating voltage		VDD-VSS			2.5	V
Dark Current	I _d	25°C		0.2		nA
		85°C		0.5		nA
		125°C		100		nA
Gain linearity			-10		+10	%
Angle of half sensitivity	2θ _{1/2}		----	90	----	Deg.
Rise/Fall Time	t _r /t _f	VDD=5V R _L =1K Ω		100		μS

Note:

1. White fluorescent light (color temperature =6500K) is used as light source. However, White LED is substituted in mass production.
2. Illuminance by CIE standard illuminant-A/2856K, incandescent lamp.

■ Typical Electrical and Optical Characteristics Curves

Fig.1 Photocurrent vs. Illuminance

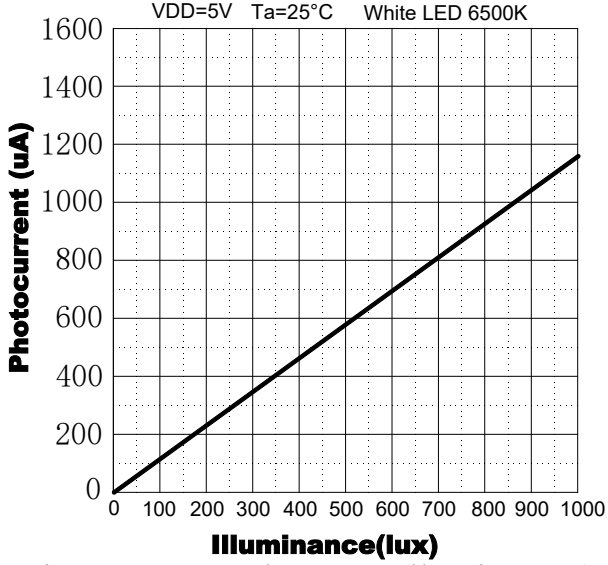


Fig.2 Spectral Response

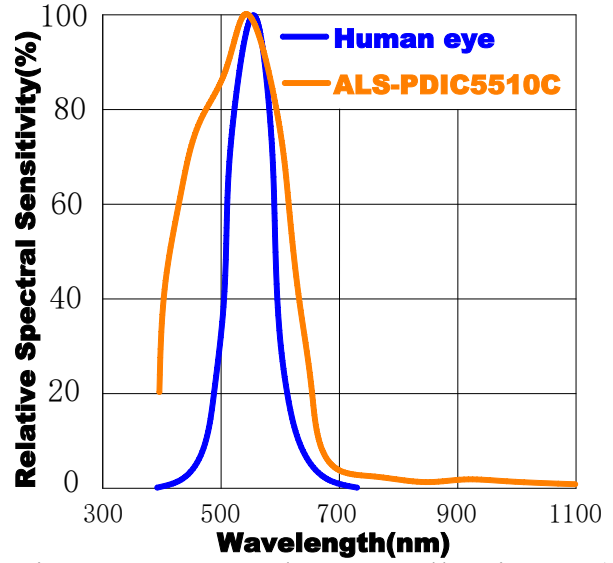


Fig.3 Output Voltage vs. Illuminance(5V)

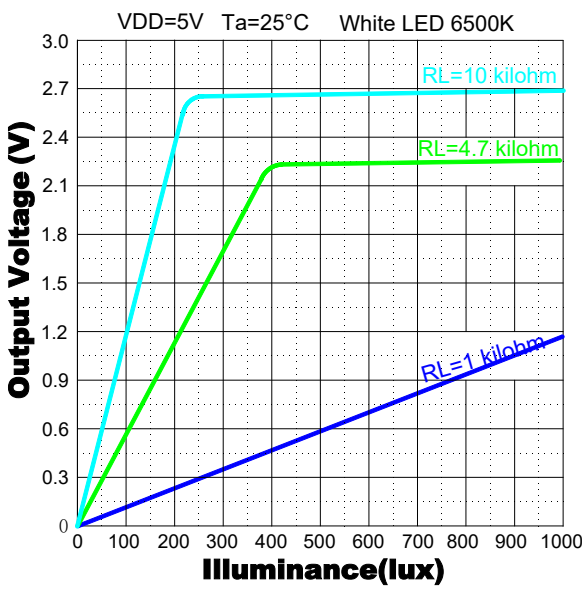


Fig.4 Output Voltage vs. Illuminance(3V)

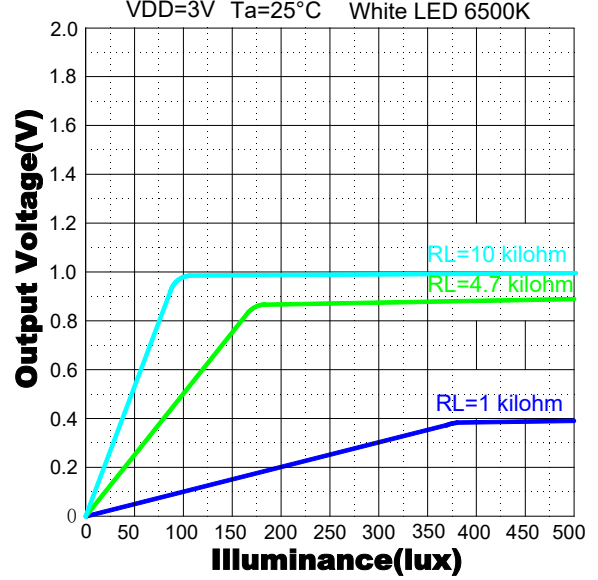


Fig.5 Photocurrent vs. Supply Voltage

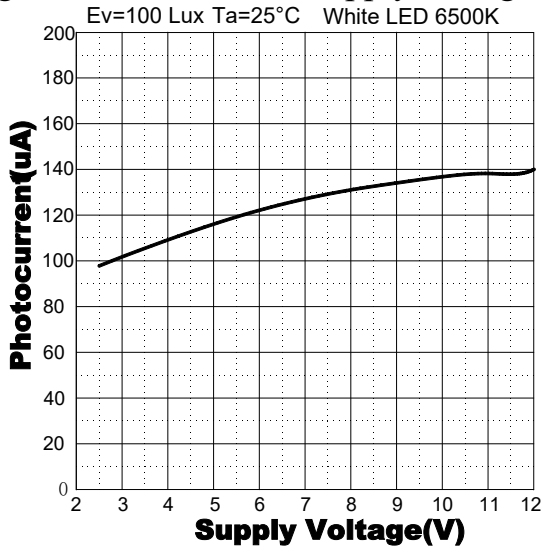


Fig.6 Photocurrent vs. Temperature

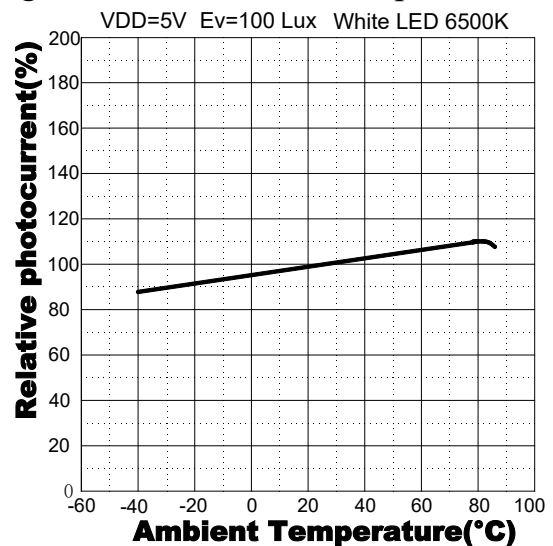


Fig.7 Dark Current vs. Temperature

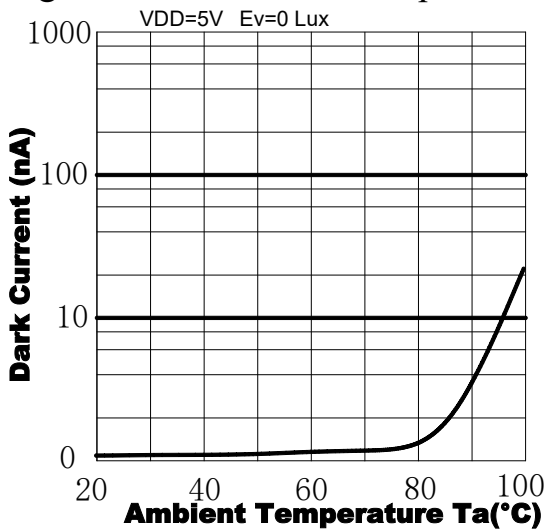
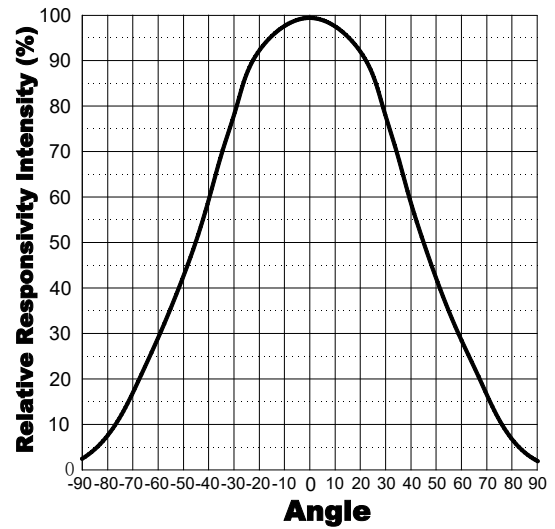
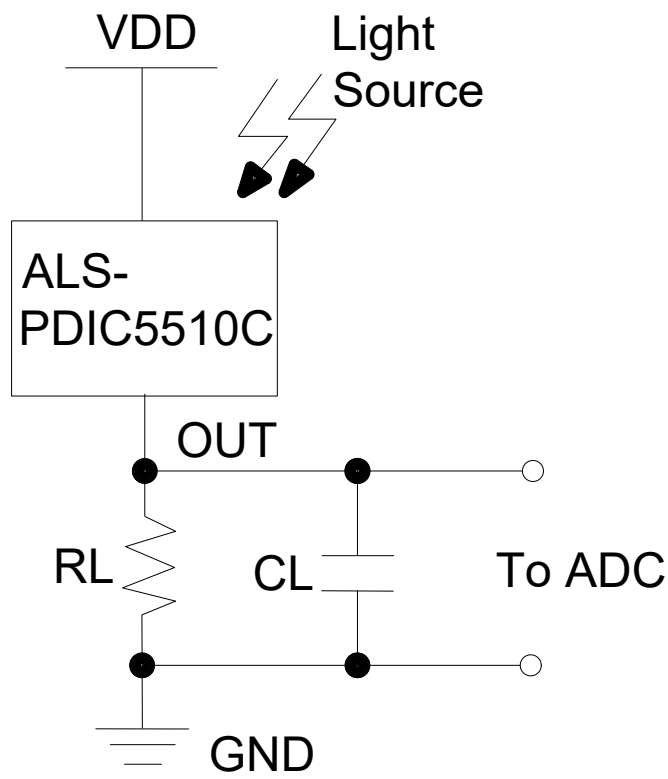


Fig.8 View Angle

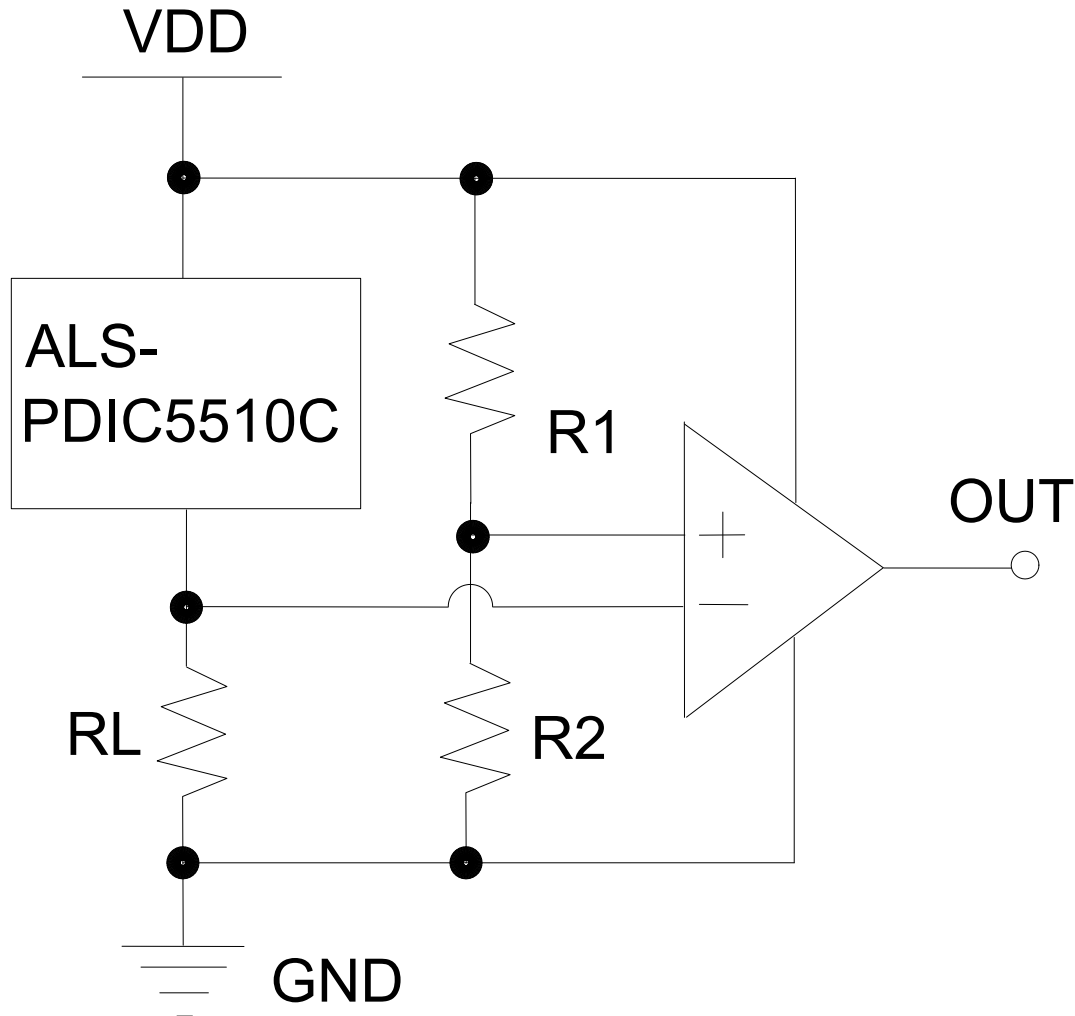


■ Typical Application Diagram

1. In the figure below, the voltage on RL varies linearly with the light intensity of the sensor. The microprocessor can read the voltage value to calculate the current brightness, which is used to control indoor ambient lighting or the backlight of TVs, computers, and mobile phones. It can also be used for the automatic switching of night lights, street lights, and infrared lamp panels of infrared cameras.



2. The following figure shows the output of the comparator. When the voltage on RL is less than $V_{DD} \cdot R_2 / (R_1 + R_2)$, VOUT will be high. Can be used for automatic switches of night lights, street lights, infrared camera infrared light panels, etc.



Note:

1. The output voltage is equal to the product of the photocurrent and the load resistance.
2. Please select a right loading resistor to meet the requirements of maximum light intensity and dynamic range, please refer to it in Figures 1, 3 and 4, note that different supply voltages and load resistors have different saturation voltages and the most dynamic range.

The product of the photocurrent multiplied by the load resistance at high illuminance should be less than the saturation voltage.

$$V_{OUT_amb_max} = I_{OUT_amb_max} \times R_L \leq V_{OUT_saturation}$$

■ Packing Quantity Specification

1. 1000 PCS/ 1Bag

■ Notes

1. Above specification may be changed without notice. SHUGUAN will reserve authority on material change for above specification.
2. Before using this product, be sure to test it. The use and storage conditions must not exceed the limit parameters specified in this manual. The company will not be responsible for any damage to the product caused by the use of the product beyond the limit parameters.
3. Stored at a temperature not higher than 30° C and humidity not higher than 60%RH, the product shelf life is 6 months. Keeping the product in an airtight container with a desiccant can extend the shelf life of the product to some extent. Poor storage conditions can cause corrosion of product leads or changes in product performance.
4. After opening, the product must be used within 168 hours (recommended working environment temperature not higher than 30 °C, humidity not higher than 60%). If it is not used up, the remaining material must be stored in an environment where the temperature is not higher than 30° C and the humidity is not higher than 10%.
5. For products that have not been soldered, if the hygroscopic agent or packaging fails, or the product does not meet the above valid storage conditions, baking can play a certain performance recovery effect. Baking conditions: $65 \pm 5^{\circ}\text{C}$, duration 96H.
6. Static electricity and surges will cause changes in product characteristics, such as forward voltage reduction, etc. If the situation is serious, it will even damage the product, so effective anti-static measures must be taken during use. All related equipment and machines should be properly grounded, and other measures against static electricity and surges must be taken. The use of anti-static wristbands, anti-static mats, anti-static work clothes, work shoes, gloves, and anti-static containers are all effective measures to prevent static electricity and surges.
7. Shaping of the pins must be done before soldering. When shaping, the bending position of the lead must be at least 3mm from the bottom of the encapsulation resin, while avoiding bending the same position multiple times.
8. Use a suitable tool to hold the pins in place while shaping to avoid stressing the resin. In particular, the connection part between the pin and the resin cannot be used as a fulcrum. The stress generated in this way will directly damage the light-emitting structure inside the product, resulting in changes in product characteristics or even damage.
9. When assembling the product, the distance between the solder holes on the PCB must be strictly matched with the pin spacing of the product.
10. Welding should pay special attention to:
 - (1) Manual soldering: the tip temperature of the soldering iron (up to 30W) should not exceed 350° C; the soldering iron must be grounded, and the static electricity should not exceed the range; the soldering time should not exceed 3 seconds; the soldering position should be at least 3 mm away from the colloid.
 - (2) Dip soldering: the maximum temperature for dip soldering is 260° C; the dip soldering time does not exceed 5 seconds; the dip soldering position is at least 3 mm away from the colloid.