

Visible Light Detector

FEATURES

- Near Human Eye Photopic Response
- High IR Rejection w/ embedded optical filter
- Current Output Highly Linear vs Ambient Light Level
- Temperature stable
- Integrated photo-current amplifier
- Excellent Dark-Current Performance
- Higher humidity immunity

PIN CONFIGURATION

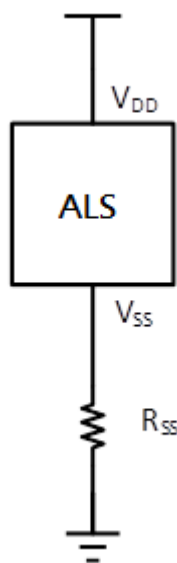


Figure 1. DIP 5mm 2pin

DESCRIPTION

The ALS-AK510 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 the human eye, or “photopic”. The output current can be converted to a voltage by connecting it in series with a resistor. The dynamic range is determined by the external resistor and power supply (10K and 5V gives a range of 0 to 160 Lux, but can be over 700 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.

ORDERING INFORMATION

Part Number	Package
ALS-AK510	PALS-L0XXX-A

APPLICATIONS

- Dawn/Dusk Sensing
- Surveillance Camera
- Display Backlighting in Laptops, Mobile Phones, LCD TVs
- Night-lights
- Automobile Head Light System

1.PIN DESCRIPTION

Number	Name	Pin Description
1	VDD	Positive terminal
2	VSS	Negative terminal

2.BLOCK DIAGRAM

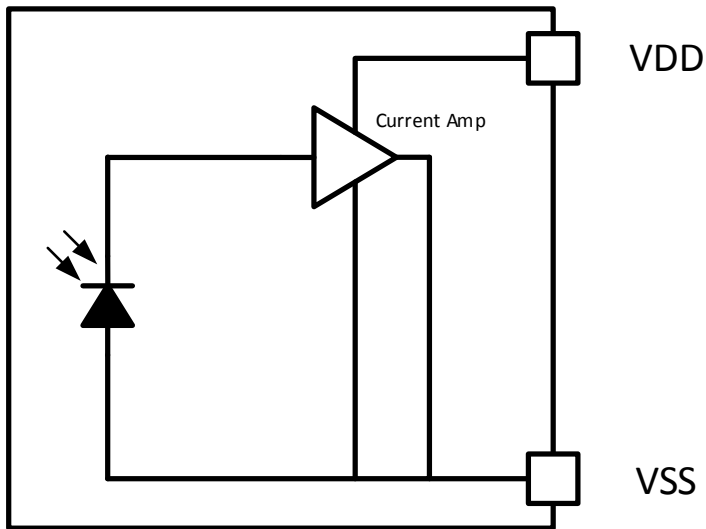


Figure 2. System Block diagram

3.TYPICAL APPLICATION DIAGRAM

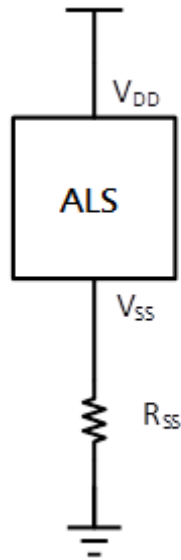


Figure 3. Typical application circuit

4.ABSOLUTE MAXIMUM RATINGS

Input Supply Voltage, VIN	-0.3V to 13V
Supply Voltage Current	Internally limited
Operating Temperature	-40°C to 125°C
Storage Temperature	-40°C to 125°C
ESD, Human body mode	> 2KV
ESD, Machine mode	> 200V

5.RECOMMENDED OPERATION CONDITIONS

Input supply voltage	5V
Junction temperature range	-40°C to 125°C
Ambient temperature range	-40°C to 125°C

6.ELECTRICAL SPECIFICATIONS

(V_{DD}=5V, TA=25°C, R_{SS}=10K, unless otherwise pecified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Infrared response		900nm			5	%
Min. Operating voltage		VDD-VSS			2.5	V
Output Current		10 Lux		12.8		μA
		100 Lux		129		μA
		200 Lux		254		μA
Dark Current		25°C		0.2		nA
		85°C		0.5		nA
		125°C		100		nA
Gain Linearity			-10		+10	%
Peak Spectral Response				550		nm
Sensitivity Area				0.09		mm ²
Useable Light Range			750	1000		Lux
Parameter	Lamp Type	Part Number	Min	Typ	Max	Units
IR Cut Rate	3mm	PALS-L0300-A		0		%
		PALS-L0308-A		8		%
		PALS-L0310-A		10		%
		PALS-L0312-A		12		%
		PALS-L0316-A		16		%
		PALS-L0320-A		20		%
	5mm	PALS-L0500-A		0		%
		PALS-L0508-A		8		%
		PALS-L0510-A		10		%
		PALS-L0512-A		12		%
		PALS-L0516-A		16		%

6.1 CHARACTERISTIC CURVE

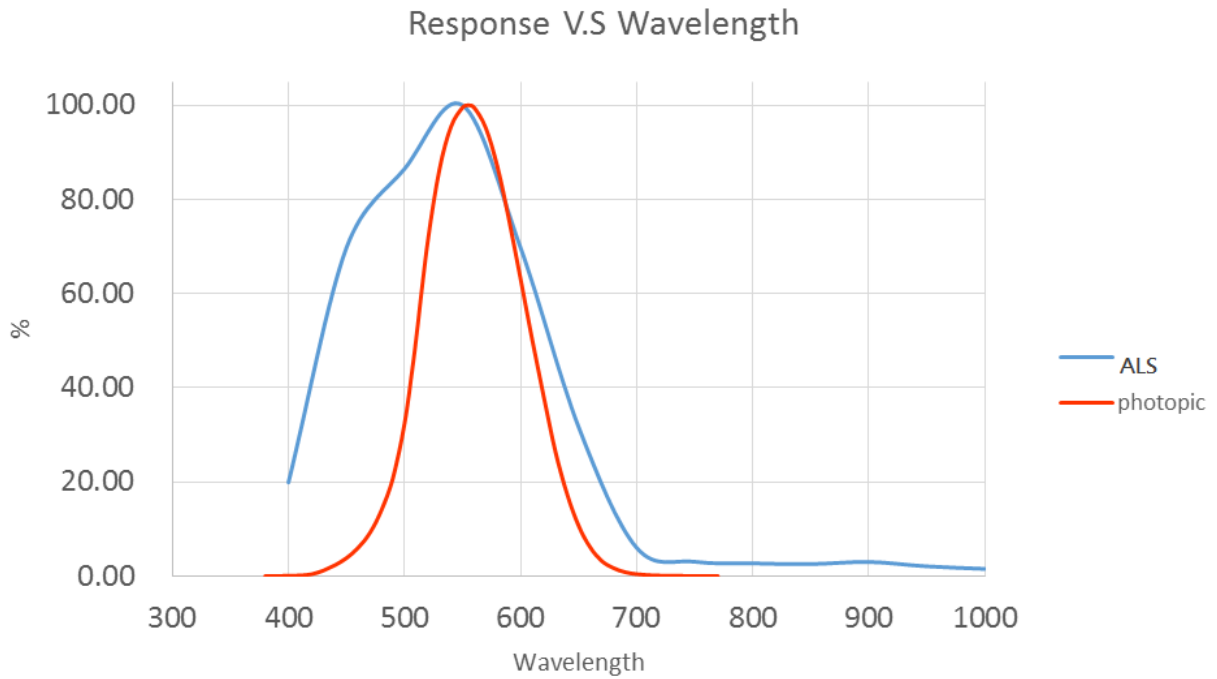


Figure 4. Response V.S Wavelength

7.APPLICATION INFORMATION

Fig. 5 The Lamp current is switched by a sensitive gate SCR. The typical gate current of the SCR should be less than $10\mu\text{A}$. When the light is above threshold, current flows ALS-AK510 which diverts current away from the gate of the SCR. The light switching threshold can be adjusted by choosing different values for R2 and R3 voltage for long term operation reliability.

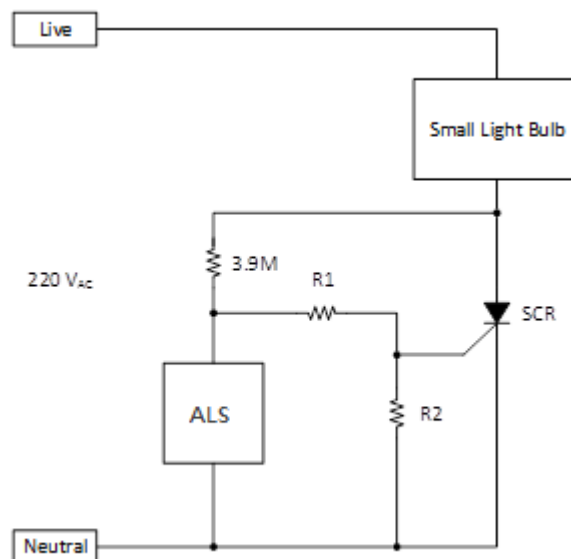


Figure 5. Night Light Application

In Fig. 6 the voltage across RSS varies linearly with the illumination of the sensor. The ALS-AK510 was designed for low lux applications and the headroom required between VDD and VSS becomes a problem at higher lux levels. These parts are not ideally suited to control room lighting applications especially if the microprocessor supply voltage is low. For higher lighting applications such as the control of room ambient lighting or backlighting applications for TVs, computers or mobile phones then the ALS-AK510 should be used.

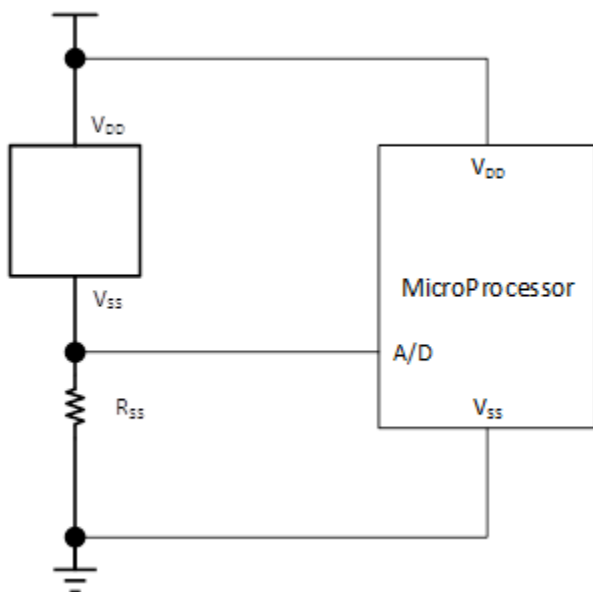


Figure 6. Night Light Application

For Fig. 7, the comparator provides a level switching interface for the ALS-AK510. V_{OUT} will be high when the voltage at V_{SS} < $V_{DD} \cdot R_2 / (R_1 + R_2)$

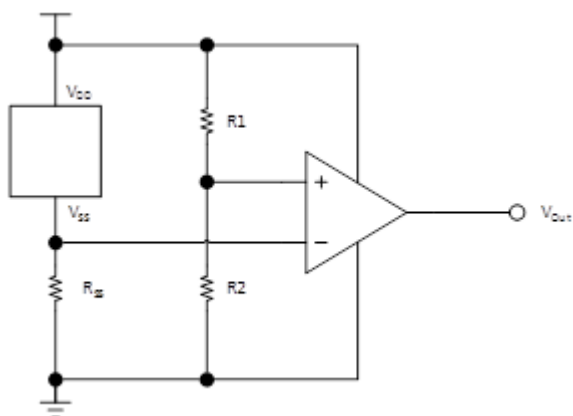


Figure 7. Night Light Application

8.PACKAGE

ALS-AK510 could be supplied as bare die or packaged form.

▪ Bare Die Information :

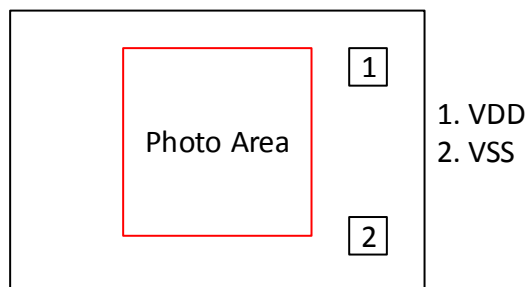


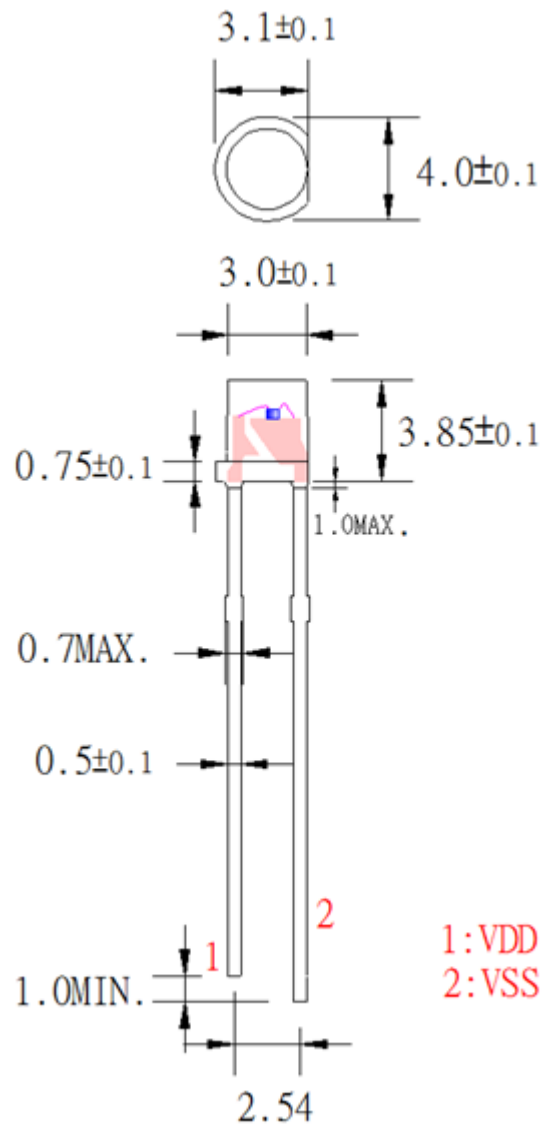
Figure 8. Pad location

Chip Size = 814 * 457 um²

Number	Name	Pin Location (Center location)
A	VDD	(681 , 324)
B	VSS	(681 , 72.5)
	Photo Area	(444.5 , 198.5)

LED Type Package:

1. PALS-L03XX-A 3mm DIP



2.PALS-L05XX-A 5mm DIP

