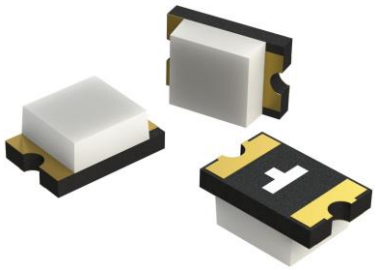
Ambient Light Sensor



Features

- Operating temperature from -40°C to +105°C
- Spectral close to human eye response.
- Very low response in infrared region.
- Very low leakage current at high temperature.
- Excellent photo current to dark current ratio.
- Excellent light ratio under different light conditions.

Description

The YC32D1 is a high performance current output ambient light sensor (ALS) which combines a photodiode, a high gain current amplifier and dark current cancellation circuit.

YC32D1 built-in an optical filter for IR rejection, and providing a spectrum which is close to the human eye's response.

YC32D1 has very low leakage current at high temperature, and it also has excellent light ratio performance under different light conditions.

Applications

- Consumer device
  - LCD TV, LCD monitor, toy
- Smart home
  - Smart lighting, smart curtain, night light
- Outdoor
  - Surveillance system, bracket light, street light

Block Diagram

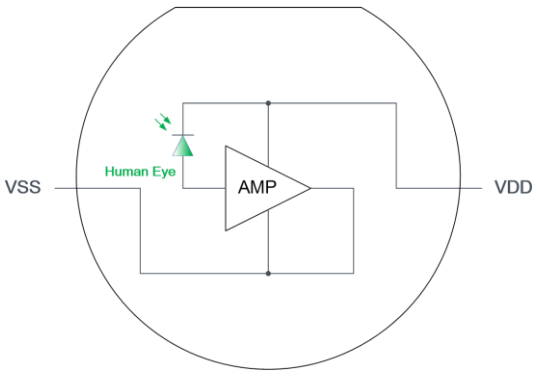


Fig. 1 Block Diagram

Ordering Information

Ordering Code	Packaging	MOQ
YC32D1	Tape and reel	4K

Pins Description

Pin	Pin Name	Description
1	VDD	Cathode node of photodiode
2	VSS	Anode node of photodiode

Absolute Maximum Ratings*

Parameter	Ratings	Unit
Supply Voltage	-0.3 to 8	V
Supply Current	Internally limited	mA
Operating Temperature	-40°C to 105°C	°C
Storage Temperature	-40°C to 125°C	°C
ESD	HBM > 2000	V

*Note: Exceeding these ratings could cause damage to the device.

Recommended Operation Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply Voltage	V_{DD}	2		5.5	V	
Operating Temperature	T_o	-40		105	˚C	

Electrical & Optical Specifications

Unless otherwise specified, the following specifications apply over the operating ambient temperature T=25˚C, VDD = 3.3V.

Parameter	Symbol	MIN	TYP	MAX	Unit	Condition
Photo Current	I_{PH}	12	16	20	uA	Ev=10 Lux
Linearity Error		1.8	2	2.2		I_{PH} 20lux / I_{PH} 10lux
Dark Current	I_{DARK}			5 nA	nA	E_V = 0, Ta = 25°C
Peak Spectral Response	λ_{PEAK}		550		nm	
Infrared Response			0.1		%	% of 940 nm peak
Angle of Half Sensitivity	θ		± 60		deg	
Saturation Voltage	V_{SAT}	1.2	1.8 1.6 1.4	2	V	R_L = 5 KΩ R_L=10 KΩ R_L=20 KΩ

Notes:

1. Light source is based on white light LED (CCT = 4000K)

Typical Electrical & Optical Characteristics Curves

Unless otherwise specified, the following specifications apply over the operating ambient temperature T = 25˚C, VDD = 3.3V.

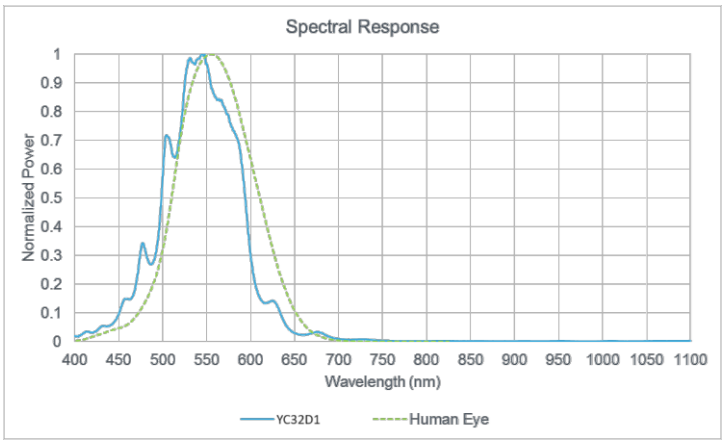


Fig. 2 Spectral Response

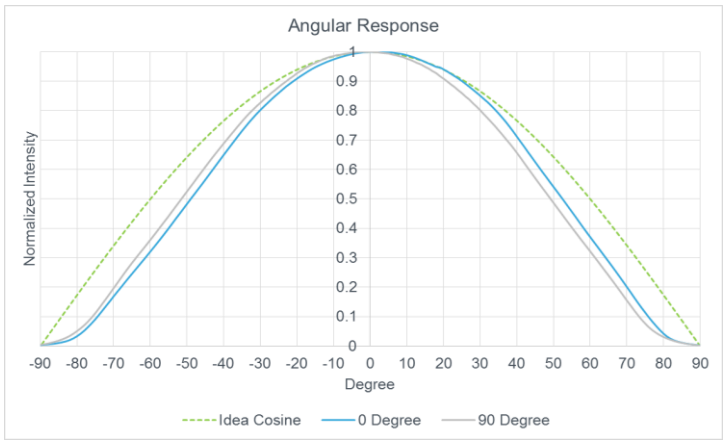


Fig. 3 Angular Response

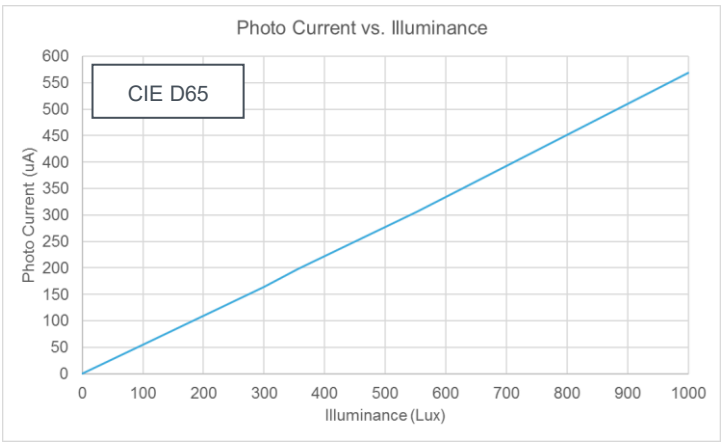


Fig. 4 Photo current vs. illuminance

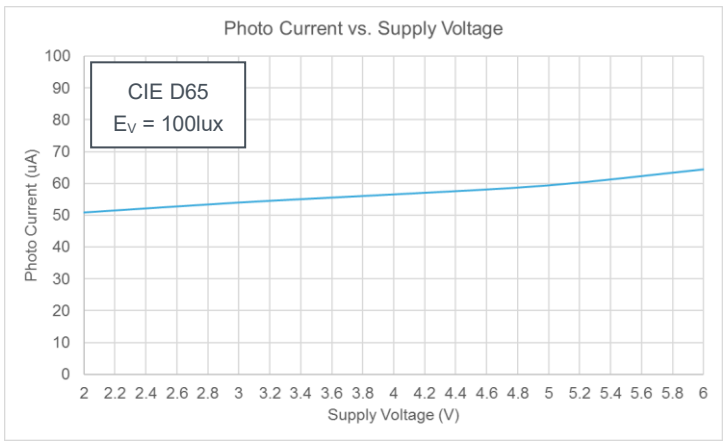


Fig. 5 Photo current vs. supply voltage

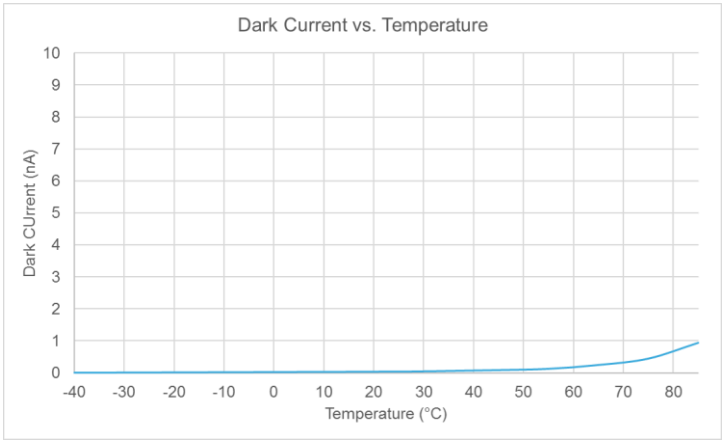


Fig. 6 Dark current vs. temperature

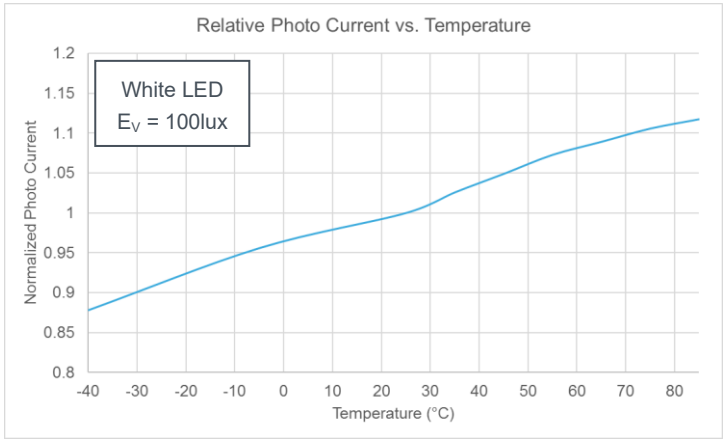


Fig. 7 Relative photo current vs. temperature

Application Circuit

Interface Circuit - Basic

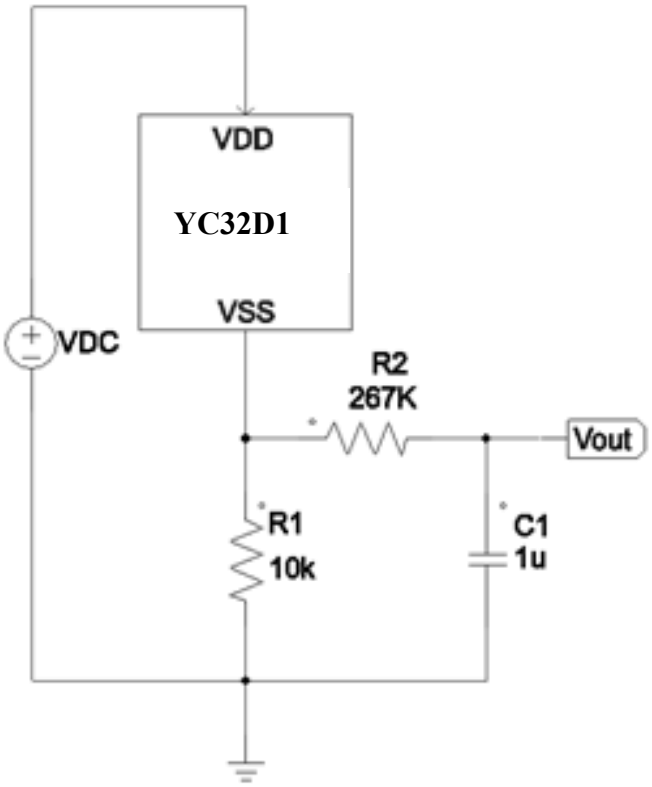


Fig. 8 Interface circuit - basic

Interface Circuit –OP Amplifier

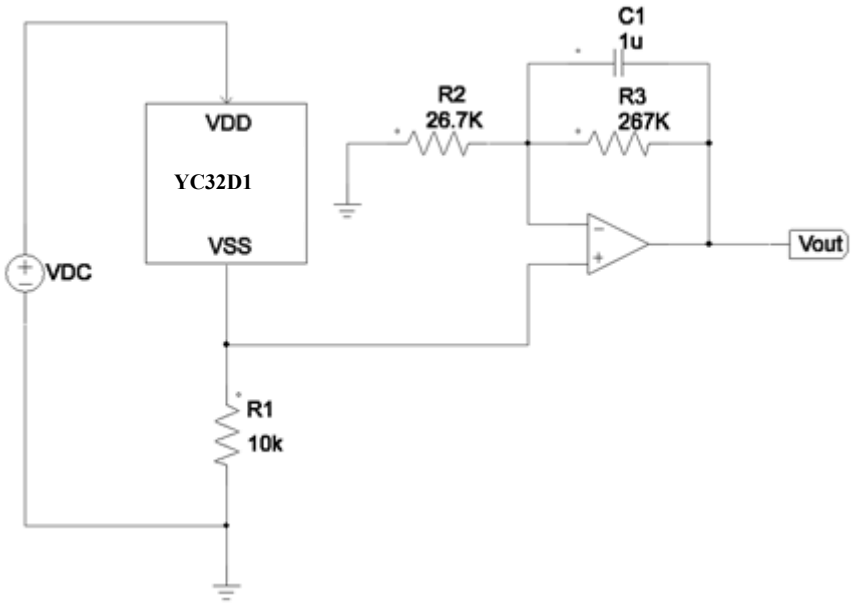


Fig. 9 Interface circuit - OP amplifier

LED Driver - Linear

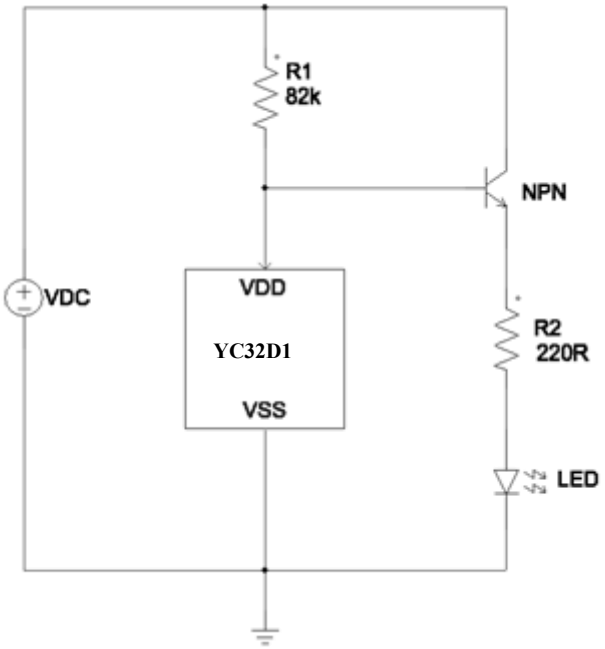


Fig. 10 LED driver - linear

LED Driver – One Threshold

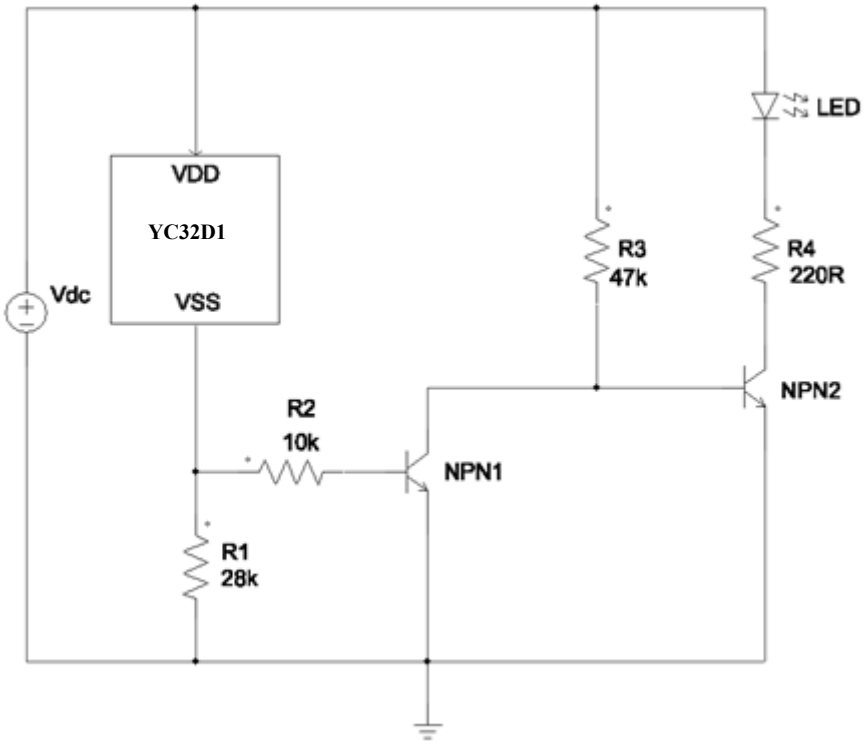


Fig. 11 LED driver - one threshold

LED Driver - Hysteresis Threshold

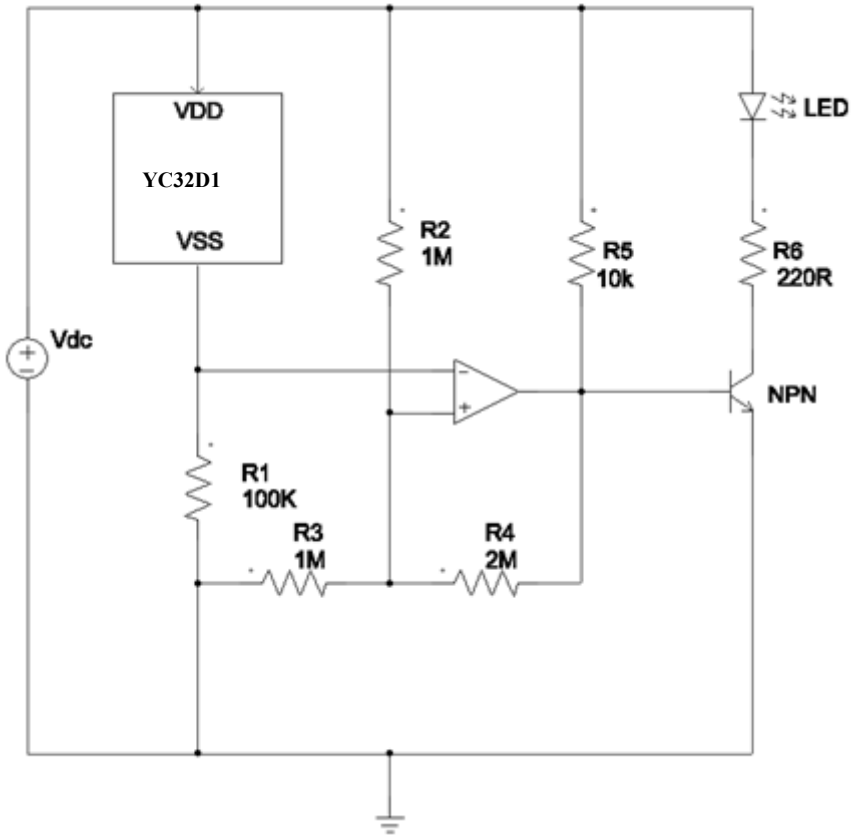
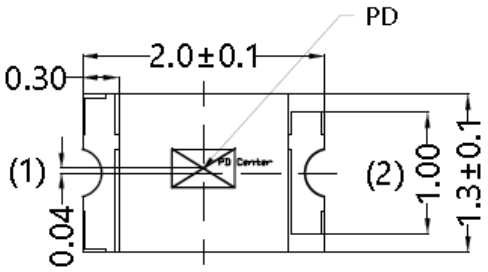


Fig. 12 LED driver - hysteresis threshold

Package Outline Dimensions

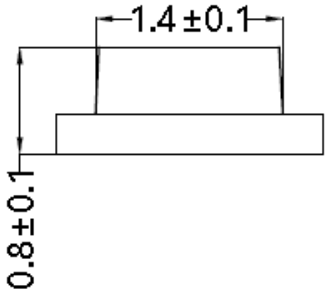
YC32D1 light sensor package.

Top View

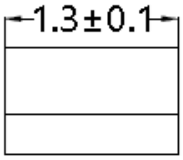


Pin-out	Name
(1)	VDD
(2)	VSS

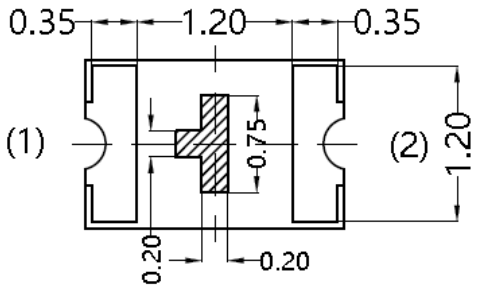
Front View



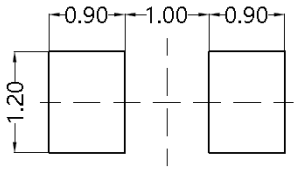
Right Side View



Bottom View



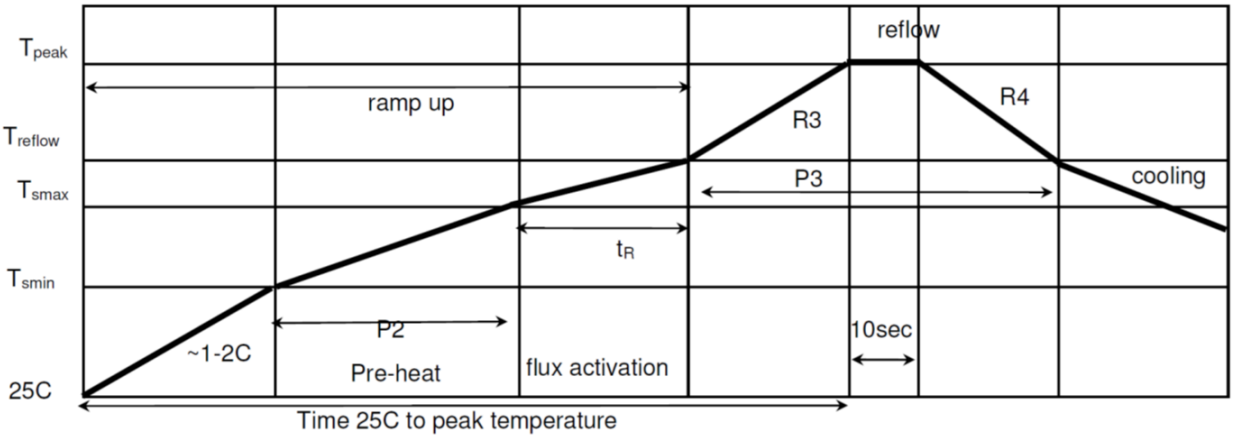
RECOMMENDED LAND PATTERN



Notes:

1. All dimensions in millimeters.
2. Dimension tolerance is ± 100 μm unless otherwise noted.

Recommended Reflow Profile



	Peak temperature (Tpeak)	255-260C (max) ; 10sec
Pre-Heat	Temperature min (Tsmin) Temperature max (Tsmax) P2: (Ts min to Ts max)	150C 2C/sec 150C-217C 100s to 180s 90-110s
Time maintain above	Temperature (T_{reflow}) Time (P3) R3 slope (from 217C -> peak) R4 slope (from peak -> 217C)	217C 60-90sec 2C/sec [typ] -> 2.5C/sec (max) -1.5C/sec [typ]-> -4C/sec (max)
	Time to peak temperature	480s max
	Cooling down slope (peak to 217C)	2-4C/ sec

