

### General Description

The SY22304AS22-J10 is an analog output ambient light sensor (ALS) with ultra-high infrared rejection, specifically designed for security camera applications. Its spectral response closely matches that of human eyes. The SY22304AS22-J10 provides a linear output current in proportion to ambient light illumination, adjustable to the user-defined sensing range.

The device is available in a 2.0mmx1.5mm molded optical package.

### Features

- Wide Supply Voltage Range: 2V to 5V
- Ultra-High Infrared Rejection
- Good Output Linearity
- Guaranteed Temperature Performance: -40°C to 85°C
- ESD Protection:  $\pm 2\text{kV}$  (HBM)
- Package Information:
  - Size: 2.0mmx1.5mmx0.6mm
  - Type: SMD BT with Transparent Molding Compound

### Applications

- Infrared Illuminator for Security Cameras
- Dawn/Dusk or Brightness/Darkness Sensing
- Ambient Light Detection for Display Backlight Control
- Automatic Residential and Commercial Lighting Management

### Application Schematic

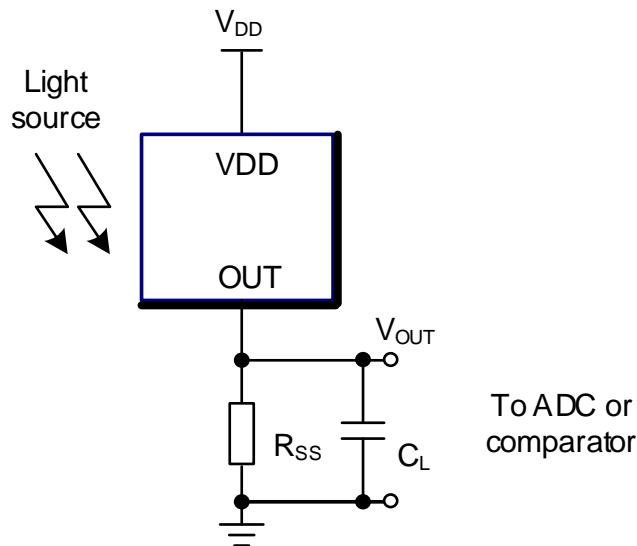


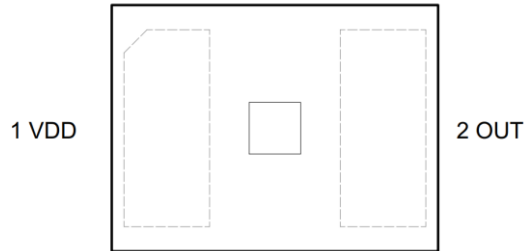
Figure 1. Typical Application Schematic



## Ordering Information

Part Number	Package Type	Top Mark	MSL	Delivery Quantity
SY22304AS22-J10	LGA2x1.5-2 RoHS-Compliant and Halogen-Free	N/A	3	3000 pcs/reel

## Device Pinout (Top View)



## Pin Description

No.	Name	Description
1	VDD	Positive power supply
2	OUT	Light current output

## Block Diagram

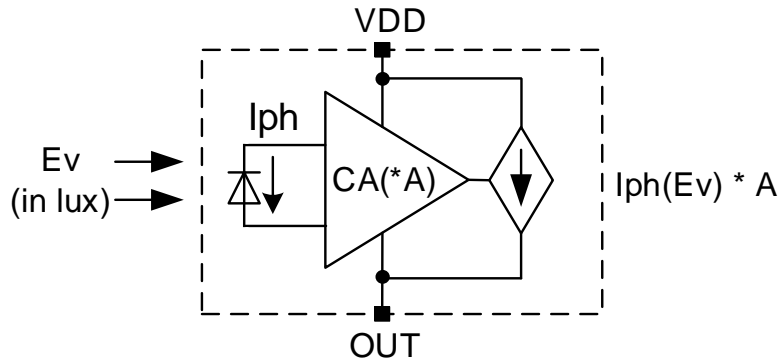


Figure 2. Functional Block Diagram

## Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T <sub>STG</sub>	-40	+100	°C
Supply Voltage (V <sub>VDD</sub> -V <sub>OUT</sub> )	V <sub>SUPPLY</sub>	-0.3	5.5	V
Output Current [Note 5]	I <sub>OUT</sub>		5	mA
Human Body Model	ESD	±2k		V

## Recommended Operating Conditions (T<sub>A</sub>=25°C unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature	T <sub>OPR</sub>	-40		+85	°C
Operating Voltage	V <sub>VDD</sub>	2		5	V

## Electrical and Optical Characteristics

(Typical values are measured at V<sub>VDD</sub>=5V, V<sub>OUT</sub>=0V and T<sub>A</sub>=25°C, unless otherwise specified (Note 2))

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Light Current	I <sub>OUT1</sub>	Ev=10 lux (Note 5)	9.1	10.1	11.1	µA
Dark Current	I <sub>Dark</sub>	Ev=0 lux			20	nA
Central Spectral Response	λ <sub>c</sub>	(Note 3)		552		nm
Power Supply Rejection Ratio	PSRR(Note 6)	Ev=10 lux (Note5) , V <sub>VDD</sub> =2V~5V			10	%/V

**Note 1:** Stresses beyond the “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**Note 2:** Unless otherwise stated, limits are 100% production tested under pulsed load conditions such that T<sub>A</sub> ≈ T<sub>J</sub> = 25°C Limits over the operating temperature range (see recommended operating conditions) and relevant voltage range(s) are guaranteed by design, test, or statistical correlation.

**Note 3:** Guaranteed by design or statistical correlation and not production tested.

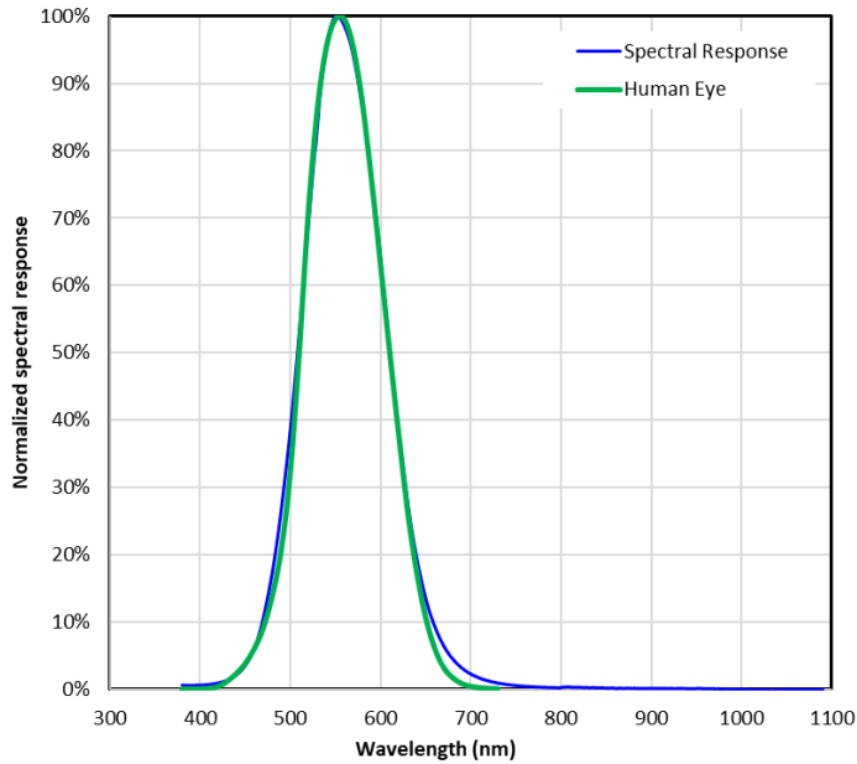
**Note 4:** The maximum output current is limited with supply voltage and depends on the series resistor R<sub>SS</sub>.

**Note 5:** White LED (6500K) is used as light source.

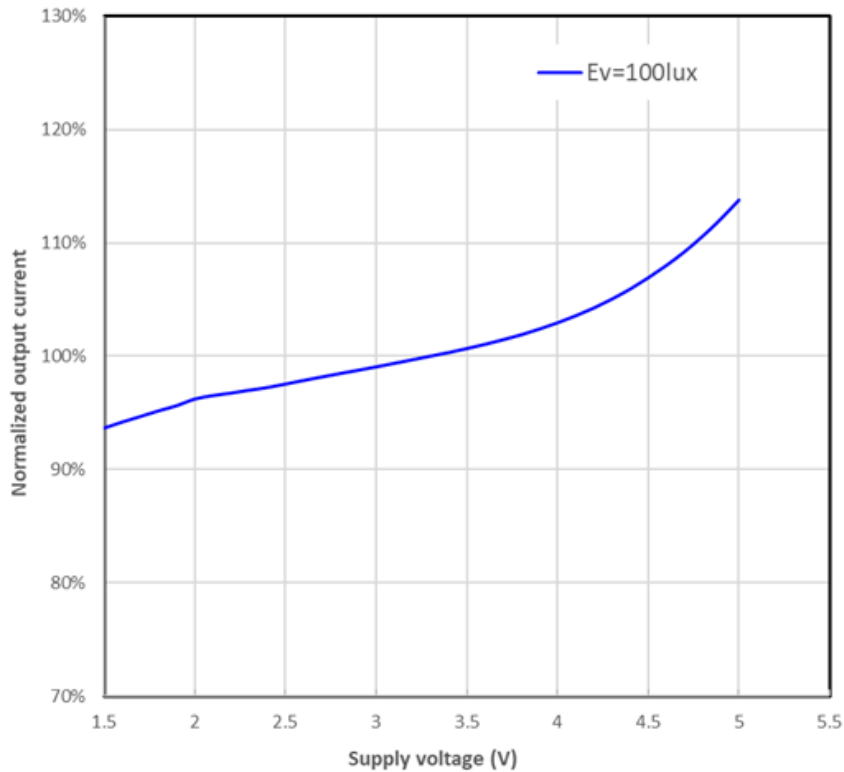
**Note 6:** The ratio of light current change to supply voltage change.

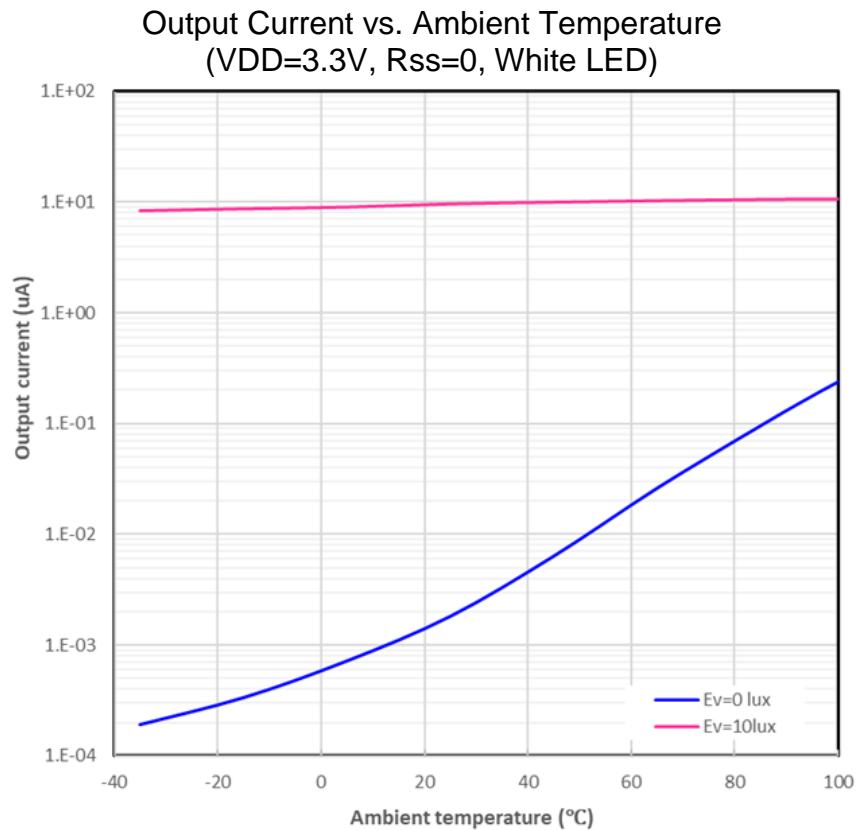
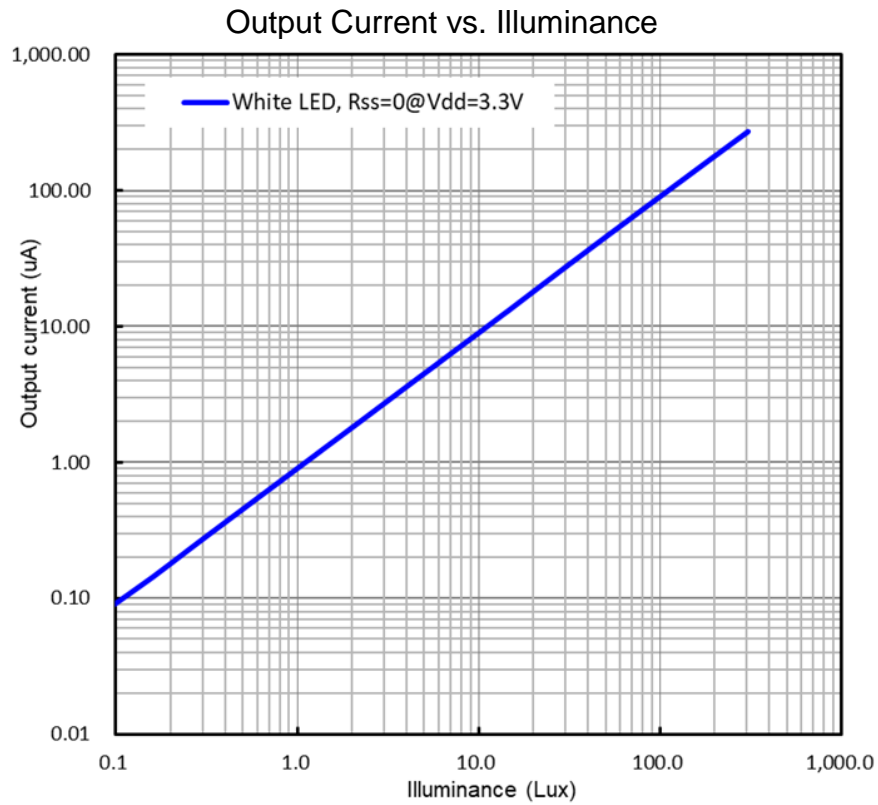
**Typical Performance Characteristics**

Relative Spectral Response

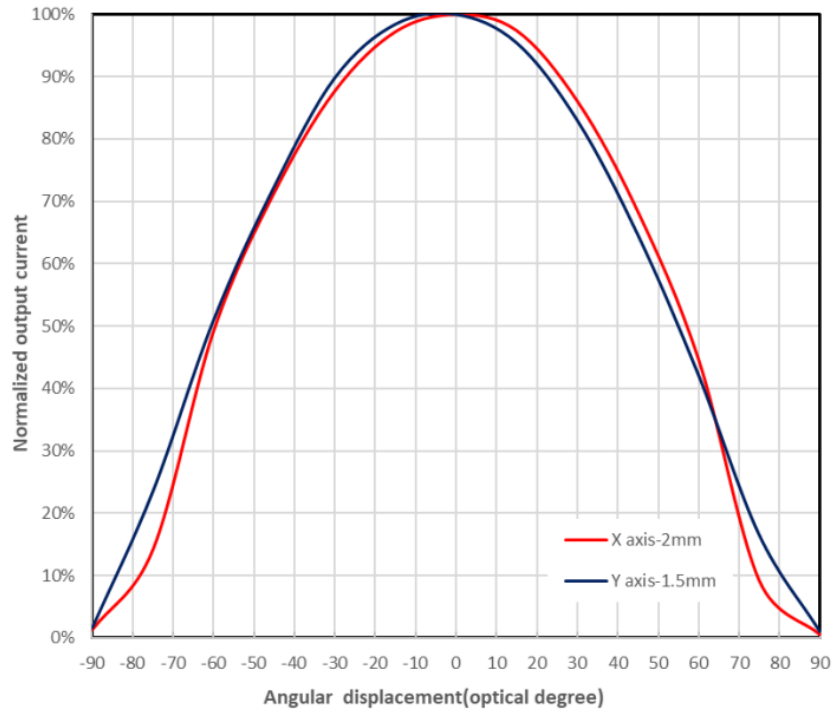


Normalized Output Current vs. Supply Voltage



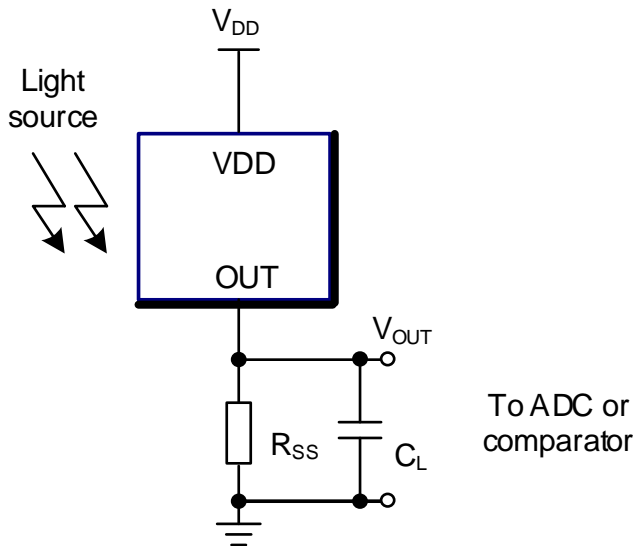


### Normalized Output Current vs. Angular Displacement





### Application Information

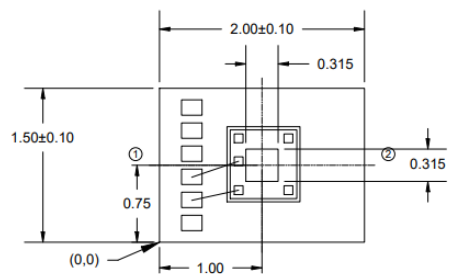


Follow these guidelines for optimal performance:

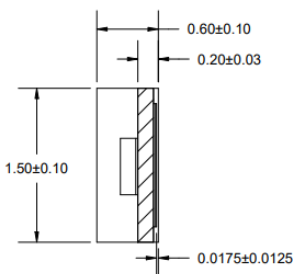
- The output voltage ( $V_{OUT}$ ) is the product of photocurrent ( $I_{OUT}$ ) and loading resistor ( $R_{SS}$ ).
- Select a suitable load resistor to meet the maximum ambient light requirement and ensure output saturation voltage compliance:  $V_{OUT(max)} = I_{OUT(max)} \times R_{SS} < V_{sat}$ .
- To minimize 60Hz ripple from fluorescent lamps, the time constant must be greater than 0.5 seconds:  $R_{SS} \times C_L > 0.5s$  (based on empirical data).



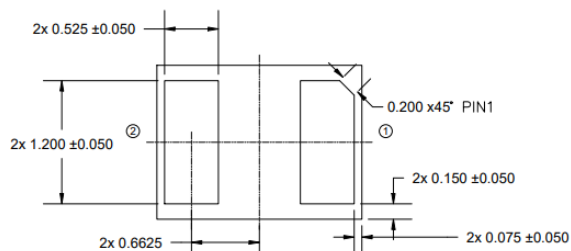
## Package Outline Drawing



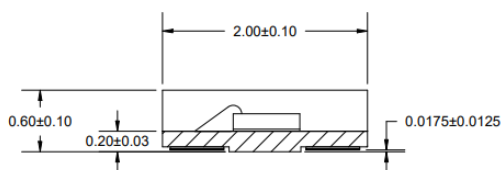
Top View



Edge View



Bottom View



Side View

### PIN Information

Name	PIN Assignmnet
PIN 1	VDD
PIN 2	VSS

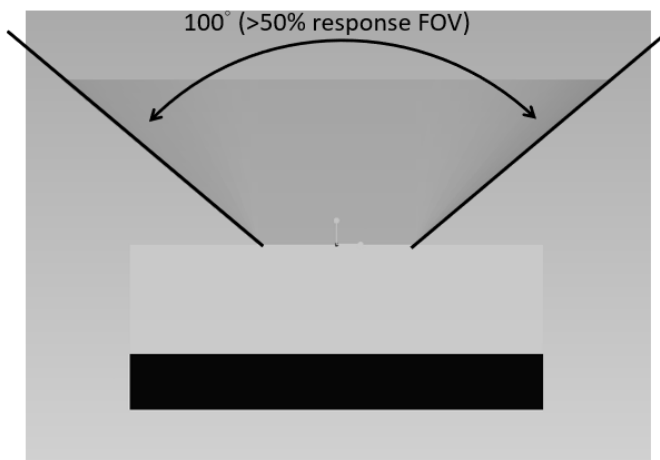
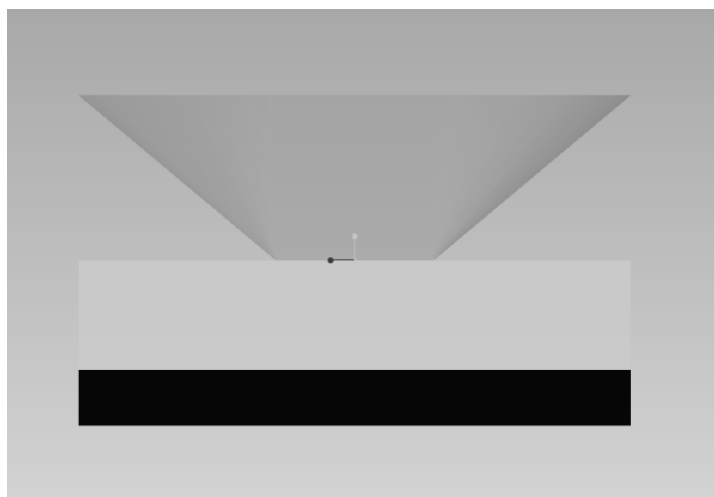
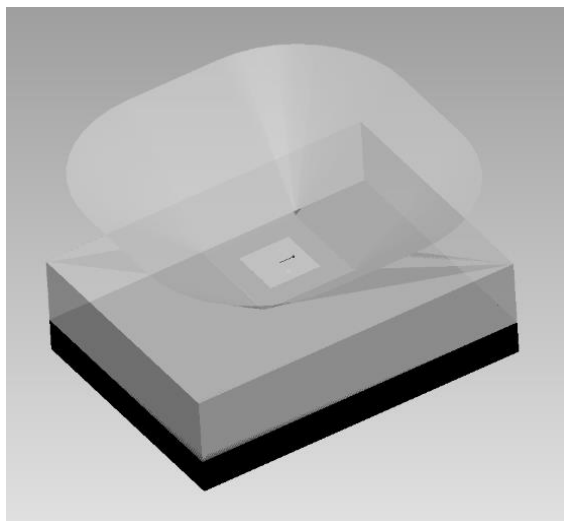
Note:

- All tolerances are  $\pm 0.1\text{mm}$  unless otherwise specified
- ALS Sensor center is at Point A,  $(X, Y) = (1.00, 0.75)$
- ALS PD sensing size is  $315\mu\text{m} \times 315\mu\text{m}$
- BT substrate thickness is  $0.2\text{mm}$
- Die bond tolerances are  $\pm 0.03\text{mm}$



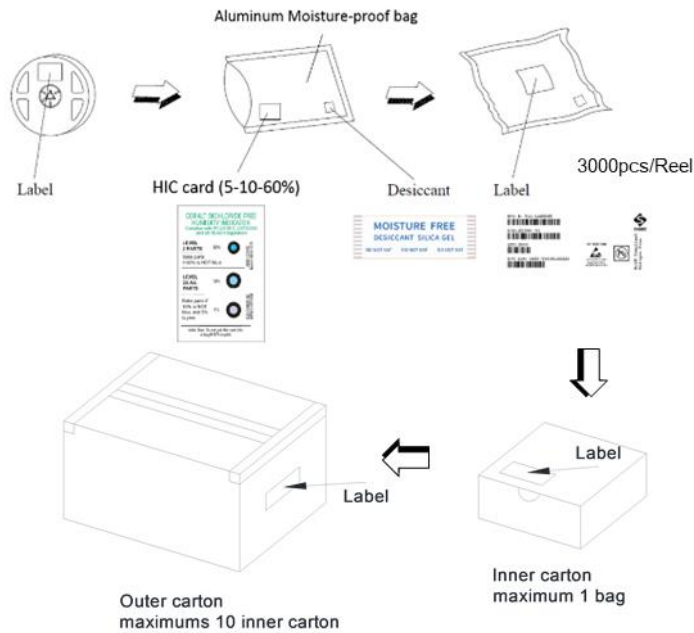
### 3D Product Drawings

Refer to the following 3D drawings of the SY22304AS22-J10: ALS PD (photodiode) FOV (field of view):



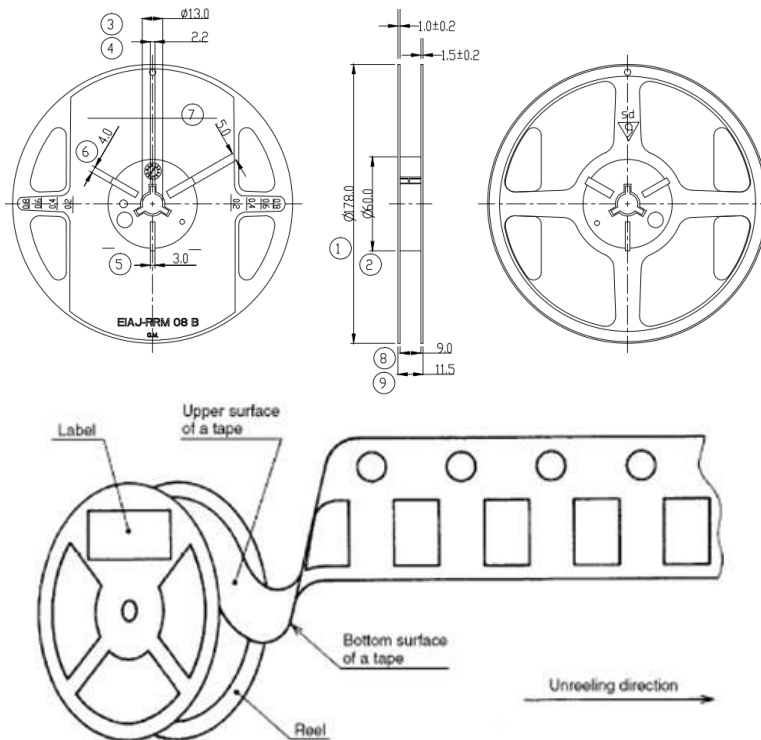
## Tape and Reel Information

### Packaging Quantity Specifications



### Reel Dimensions (Units: mm)

Width	1	2	3	4	5	6	7	8	9
7"	178±1	60±0.5	13±0.5	2.2±0.5	3 <sup>+0.5</sup> <sub>-0</sub>	4 <sup>+0.5</sup> <sub>-0</sub>	5.0 <sup>+0.5</sup> <sub>-0</sub>	9±0.5	11.5±0.5



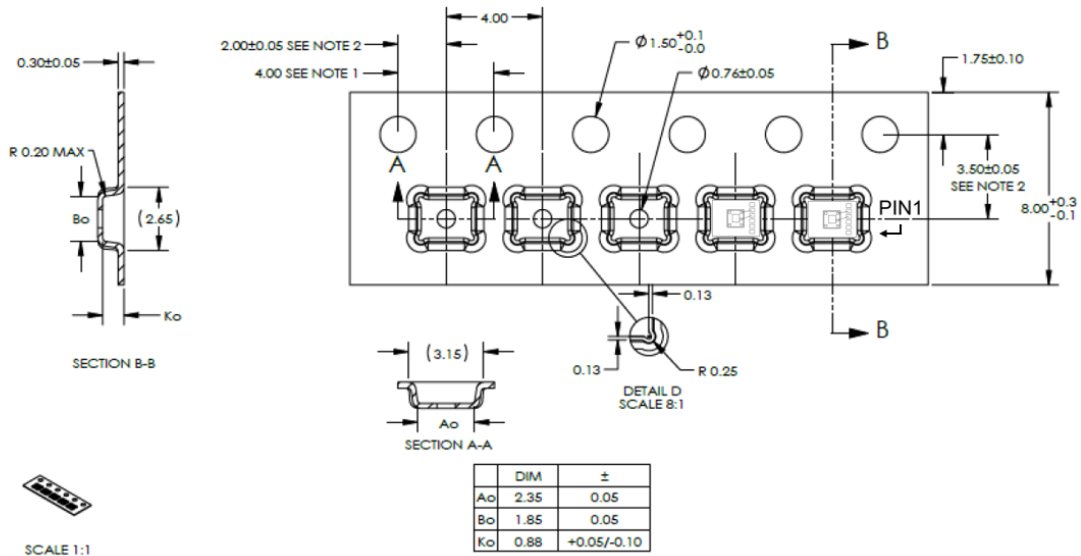
Polarity Direction and Orientation of Components on Tape  
(Leader: 40ea (160mm), Trailer: 50ea (200mm))



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# SY22304AS22-J10

## Tape Dimensions (Unit: mm)



### Note:

- 10 sprocket hole pitch cumulative tolerance is ±0.2
- Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole
- A<sub>0</sub> and B<sub>0</sub> are measured on a plane at a distance “R” above the bottom of the pocket

## Recommended Storage Method

Store immediately after opening the bag to prevent moisture absorption. If no bags are available, observe the following conditions:

- Storage temperature: 10°C to 30°C
- Storage humidity:  $\leq 60\%RH$  (max)
- Storage Time:  $\leq 168hr$  max.

## Moisture-Proof Package

To avoid moisture absorption in the resin, the product should be stored under the following conditions:

- Temperature:  $23 \pm 5^\circ C$
- Relative humidity: 60% (max)
- Baking is required if the devices have been stored unopened for more than 24 months and the HIC card is not discolored.

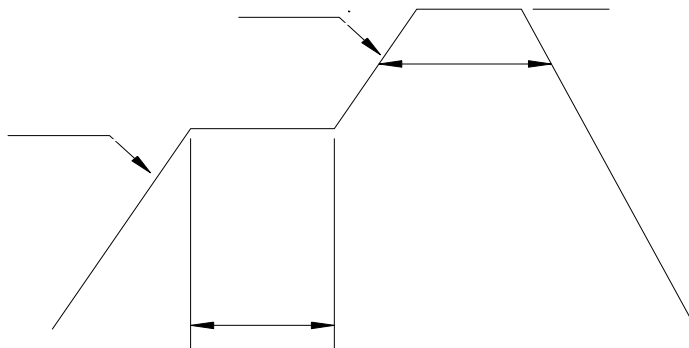
## ESD Precautions.

- Follow proper handling and storage procedures to avoid ESD damage, especially when removing devices from the anti-static bag
- Packages are labeled with “Electro-Static Sensitive Devices” warnings.

## Soldering Guidelines

- Manual soldering temperature should not exceed  $350^\circ C$  (25W for soldering iron) for a duration of no more than three seconds per pin.
- Avoid soldering any given pin more than once.

## Recommended Solder Profile



- Reflow soldering should not be done more than three times.
- Do not put stress on the devices during the heating stage while soldering.
- Do not warp the circuit board after soldering.



### Revision History

The revision history provided is for informational purposes only and is believed to be accurate; however, not warranted. Please make sure that you have the latest revision.

Revision Number	Revision Date	Description	Pages changed
1.0	Dec.31, 2024	Initial Release	

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