

## FEATURES

- Π Sensor (APDS 9960):
  - Proximity Detection. (Up to a distance of 30 cm.)
  - RGB Color Detection.
  - Ambient Light Detection.
  - Object Motion Direction Detection.
  - I2C Communication.
- Π LEDs:
  - Adjustable Brightness with PWM.
  - 4000K Natural White and High Color Quality.
  - Best in Medium Power Class 1m/W.
  - Light Intensity: 16 cd
  - Luminous Flux: 46 lm

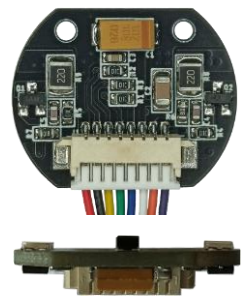
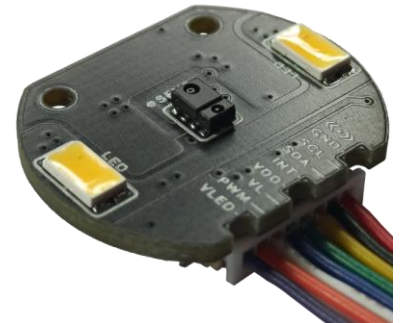
## APPLICATIONS

- Π Object Proximity, Motion Direction, Color Detection Applications.
- Π Motor Control Applications.
- Π Lighting Control Applications.
- Π Relay Control Applications.
- Π Control and Automation Applications.
- Π Battery Based Applications.

## GENERAL DESCRIPTION

The APDS-9960 can detect the movement direction and proximity of the object in the field of view with its IR LED. It performs ambient light sensing and red, green, blue and white light dyeing processes with its photodiodes.

APDS-9960 uses the I2C communication protocol. The address is set to 0x39 and cannot be changed.



## PORT OUTPUTS

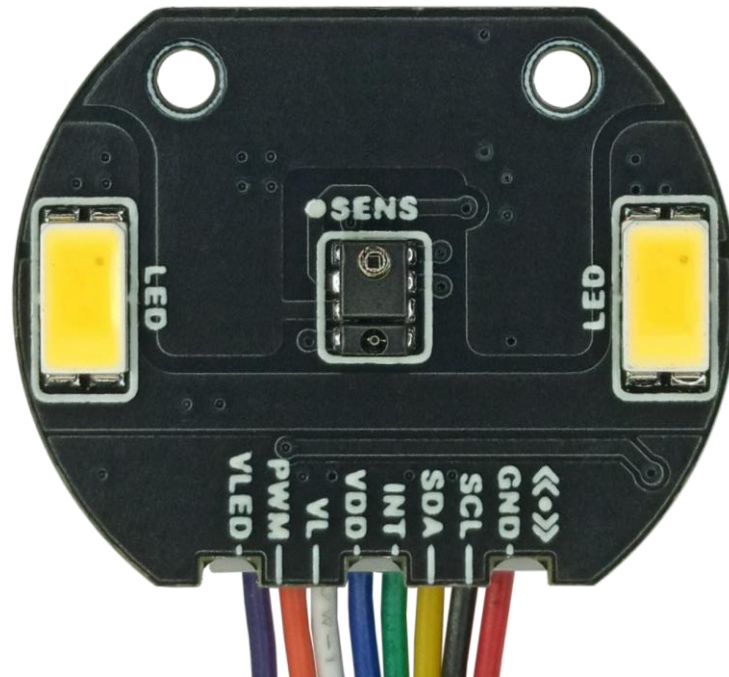


Figure 1: Display of pinouts.

## PORT DESCRIPTIONS

Ports	Descriptions	Notes	Scheme
VLED	It is the port reserved for the feeding of two SMD LEDs on the top surface of the board.	For technical specifications of LEDs, see <b>Electrical Characteristics</b> .	<p style="text-align: center;">SENSOR DIAGRAM</p> <p style="text-align: center;">LED DIAGRAM</p> <p style="text-align: center;"><b>Figure 2: Connection diagram.</b></p>
PWM	It is the port reserved for the brightness adjustment of the two SMD LEDs on the top surface of the card.		
VL	It is the port reserved for the feeding of the IR LED of the APDS 9960 sensor.	For the technical specifications of the IR LED, see <b>Electrical Characteristics</b> .	
VDD	It is the port reserved for the supply of the circuit structure of the APDS 9960 sensor.		
INT	It is the interrupt output connected to the INT terminal of the APDS 9960 sensor.	It is open drain (Active low) output with pull-up added.	
SDA	It is the data input/output port reserved for the I2C comms.		
SCL	It is the CLK input port reserved for the I2C comms.		
GND	GND level input.	-	

Table 1: Port descriptions.

## ELECTRICAL CHARACTERISTICS

Π Forcing the device to operate above the “Maximum” levels in the table below may cause the device to overheat and cause permanent damage. Functional operation of the device outside the operating limits specified in this technical document is unthinkable. Prolonged exposure to operating under “Maximum” rating conditions can affect device reliability.

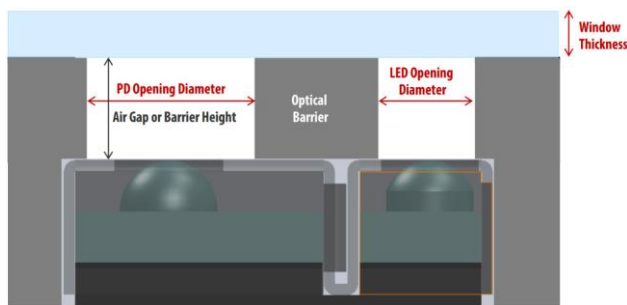
**Table 2:** Electrical characteristics.

Conditions: Unless Otherwise Indicated, $T_o = +25^{\circ}C$ , $V_{LED} = 5,0V$ , $V_L = 3,3V$ ve $V_{DD} = 3,3V$ .						
Parameters	Symbols	Minimum	Norm.	Maximum	Unit	Test Cond.
<b>LED</b>						
LED Supply Voltage	$V_{LED}$	3.3	4.5	5.5	V	DC
LED Forward Voltage	$V_{LED,F}$	2.60 2.90 3.18	2.65 2.95 3.19	2.70 3.00 3.2	V	$I_{LED,F} = 10mA$ $I_{LED,F} = 50mA$ $I_{LED,F} = 100mA$
PWM Digital High Voltage	$V_{PWMH}$	–	3.3	5.5	V	
PWM Digital Low Voltage	$V_{PWML}$	0	0.1	–	V	
PWM Frequency	$f_{PWM}$	0	–	30	kHz	
<b>Sensor</b>						
Sensor IR LED Supply Voltage	$V_L$	3	–	4.5	V	
Sensor Supply Voltage	$V_{DD}$	2.6	–	3,6	V	
Total Input Current [Sleep]	$I_{T,SLP}$	–	1	15	$\mu A$	LED: OFF
SCL, SDA Input High Voltage	$V_{IH}$	1.26	–	$V_{DD}$	V	
SCL, SDA Input Low Voltage	$V_{IL}$	0	–	0.54	V	
Sensor Detection Distance [1]		2	100	300	mm	
IR LED Peak Wavelength	$\lambda_p$	–	950	–	nm	$I_{IRLED}=20mA$
Spectrum Width, Half Power	$\Delta\lambda$	–	30	–	nm	$I_{IRLED}=20mA$
Optical Rise Time	$t_R$	–	20	–	nm	$I_{IRLED}=100mA$
Optical Fall Time	$t_F$	–	20	–	nm	$I_{IRLED}=100mA$

[1] : The sensing distance of the sensor is determined by the sensor configuration parameters. With these parameters, values such as how many pulses the IRLED of the sensor will work, the duration of these pulses, the repetition time of the operation, the working current are determined. These values directly affect the sensing distance of the sensor and the energy it consumes.

## SENSOR DETAIL INFORMATION

The physical properties required for the guard window design are shown in **Figure 3**.



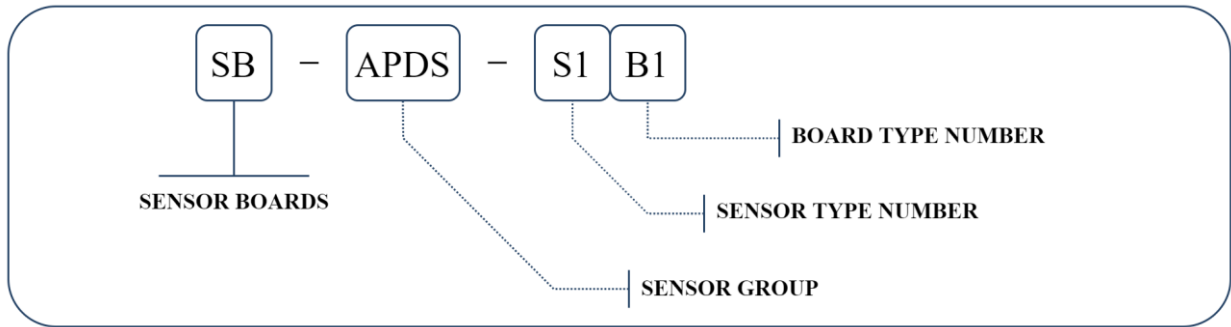
- **Window Thickness:**  $\leq 1$  mm
- **Air Gap:** 1mm
- **PD Opening Diameter:** 2 mm
- **LED Opening Diameter:** 1,5 mm

**Figure 3:** Protection window design.

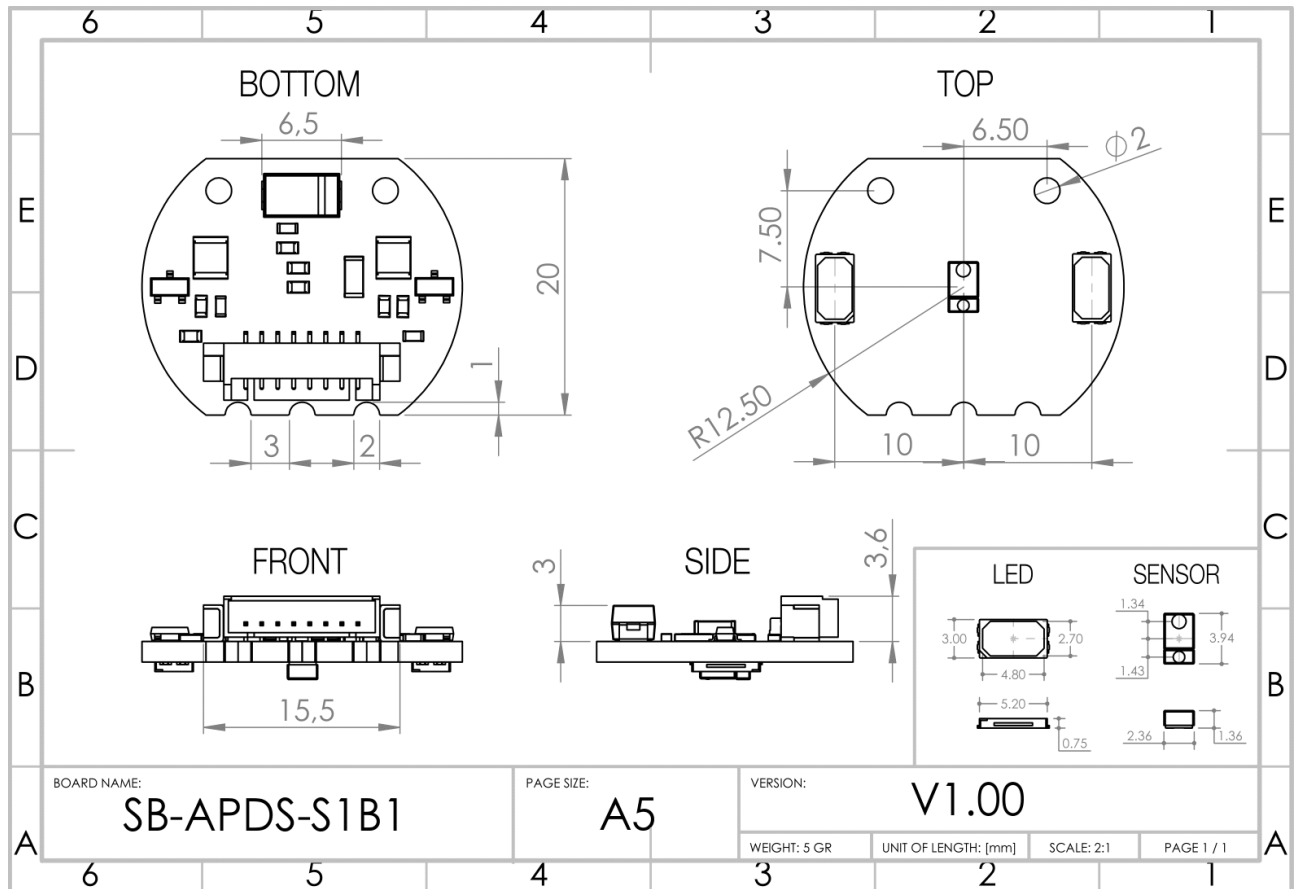
The I2C command list required for communication with the APDS-9960 can be accessed from the link below:

[https://www.lentark.com/download.php?filename=BoardCOM\\_APDS9960.pdf](https://www.lentark.com/download.php?filename=BoardCOM_APDS9960.pdf)

## PRODUCT CODE



## TECHNICAL DRAWING



## CONTACT INFORMATION

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