

# APDS-9960

Digital Proximity, Ambient Light, RGB and Gesture Sensor



## Data Sheet



Lead (Pb) Free  
RoHS 6 fully  
compliant



### Description

The APDS-9960 device features advanced Gesture detection, Proximity detection, Digital Ambient Light Sense (ALS) and Color Sense (RGBC). The slim modular package, L 3.94 × W 2.36 × H 1.35 mm, incorporates an IR LED and factory calibrated LED driver for drop-in compatibility with existing footprints.

#### Gesture detection

Gesture detection utilizes four directional photodiodes to sense reflected IR energy (sourced by the integrated LED) to convert physical motion information (i.e. velocity, direction and distance) to a digital information. The architecture of the gesture engine features automatic activation (based on Proximity engine results), ambient light subtraction, cross-talk cancelation, dual 8-bit data converters, power saving inter-conversion delay, 32-dataset FIFO, and interrupt-driven I<sup>2</sup>C-bus communication. The gesture engine accommodates a wide range of mobile device gesturing requirements: simple UP-DOWN-RIGHT-LEFT gestures or more complex gestures can be accurately sensed. Power consumption and noise are minimized with adjustable IR LED timing.

Description continued on next page...

### Applications

- Gesture Detection
- Color Sense
- Ambient Light Sensing
- Cell Phone Touch Screen Disable
- Mechanical Switch Replacement

### Ordering Information

Part Number	Packaging	Quantity
APDS-9960	Tape & Reel	5000 per reel

### Features

- Ambient Light and RGB Color Sensing, Proximity Sensing, and Gesture Detection in an Optical Module
- Ambient Light and RGB Color Sensing
  - UV and IR blocking filters
  - Programmable gain and integration time
  - Very high sensitivity – Ideally suited for operation behind dark glass
- Proximity Sensing
  - Trimmed to provide consistent reading
  - Ambient light rejection
  - Offset compensation
  - Programmable driver for IR LED current
  - Saturation indicator bit
- Complex Gesture Sensing
  - Four separate diodes sensitive to different directions
  - Ambient light rejection
  - Offset compensation
  - Programmable driver for IR LED current
  - 32 dataset storage FIFO
  - Interrupt driven I<sup>2</sup>C-bus communication
- I<sup>2</sup>C-bus Fast Mode Compatible Interface
  - Data Rates up to 400 kHz
  - Dedicated Interrupt Pin
- Small Package L 3.94 × W 2.36 × H 1.35 mm

## Description (Cont.)

### Proximity detection

The Proximity detection feature provides distance measurement (E.g. mobile device screen to user's ear) by photodiode detection of reflected IR energy (sourced by the integrated LED). Detect/release events are interrupt driven, and occur whenever proximity result crosses upper and/or lower threshold settings. The proximity engine features offset adjustment registers to compensate for system offset caused by unwanted IR energy reflections appearing at the sensor. The IR LED intensity is factory trimmed to eliminate the need for end-equipment calibration due to component variations. Proximity results are further improved by automatic ambient light subtraction.

### Color and ALS detection

The Color and ALS detection feature provides red, green, blue and clear light intensity data. Each of the R, G, B, C channels have a UV and IR blocking filter and a dedicated data converter producing 16-bit data simultaneously. This architecture allows applications to accurately measure ambient light and sense color which enables devices to calculate color temperature and control display backlight.

## Functional Block Diagram

