I/O Pins Configuration

PIN	NAME	TYPE	DESCRIPTION
1	SDA	I/O	I^2C serial data I/O terminal – serial data I/O for I^2C.
2	INT	O	Interrupt – open drain.
3	LDR	I	LED driver for proximity emitter – up to 100 mA, open drain.
4	LEDK	O	LED Cathode, connect to LDR pin in most systems to use internal LED driver circuit
5	LEDA	I	LED Anode, connect to V_{BATT} on PCB
6	GND		Power supply ground. All voltages are referenced to GND.
7	SCL	I	I^2C serial clock input terminal – clock signal for I^2C serial data.
8	V_{DD}		Power Supply voltage.

Absolute Maximum Ratings over operating free-air temperature range (unless otherwise noted)†

Parameter	Symbol	Min	Max	Units	Test Conditions
Power Supply voltage	V_{DD}		3.8	V	[1]
Digital voltage range		-0.5	3.8	V	
Digital output current	I_O	-1	20	mA	
Storage temperature range	Tstg	-40	85	°C	

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Note:

1. All voltages are with respect to GND.

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units
Operating Ambient Temperature	T_A	-30		85	°C
Supply voltage	V_{DD}	2.5	3.0	3.6	V
Supply Voltage Accuracy, V_{DD} total error including transients		-3		+3	%
LED Supply Voltage	V_{BATT}	2.5		4.5	V

Available Options

Part Number	Interface Description
APDS-9901	I2C VBUS = VDD Interface
APDS-9900	I2C 1.8V VBUS Interface

Operating Characteristics, V_{DD} = 3 V, T_A = 25° C (unless otherwise noted)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
Supply current [1]	I_{DD}		175	250	µA	Active (ATIME=0xdb, 100ms)
			70			Wait Mode
			2.5	4.0		Sleep Mode
INT SDA output low voltage	V_{OL}	0		0.4	V	3 mA sink current
		0		0.6		6 mA sink current
Leakage current, SDA, SCL, INT pins	I_{LEAK}	-5		5	µA	
Leakage current, LDR pin	I_{LEAK}			10	µA	
SCL, SDA input high voltage	V_{IH}	0.7 V_{BUS} 1.25			V	APDS-9901 APDS-9900
SCL, SDA input low voltage,	V_{IL}			0.3 V_{BUS} 0.54	V	APDS-9901 APDS-9900
Oscillator frequency	fosc	705	750	795	kHz	PON = 1

Note:
1. The power consumption is raised by the programmed amount of Proximity LED Drive during the 8 us the LED pulse is on. The nominal and maximum values are shown under Proximity Characteristics. There the I_{DD} supply current is I_{DD} Active + Proximity LED Drive programmed value.

ALS Characteristics, V_{DD} = 3 V, T_A = 25° C, Gain = 16, AEN = 1 (unless otherwise noted)

Parameter	Channel	Min	Typ	Max	Units	Test Conditions
Dark ALS ADC count value	Ch0	0	1	5	counts	Ee = 0, AGAIN = 120x, ATIME = 0xDB(100ms)
	Ch1	0	1	5		
ALS ADC Integration Time Step Size		2.58	2.72	2.90	ms	ATIME = 0xff
ALS ADC Number of Integration Steps		1		256	steps	
Full Scale ADC Counts per Step				1023	counts	
Full scale ADC count value				65535	counts	ATIME = 0xC0
ALS ADC count value	Ch0	4000	5000	6000	counts	λp = 640 nm, Ee = 56 µW/cm2, ATIME = 0xF6 (27 ms), GAIN = 16x
	Ch1		790			
	Ch0	4000	5000	6000		λp = 850 nm, Ee = 79 µW/cm2, ATIME = 0xF6 (27 ms), GAIN = 16x
	Ch1		2800			
ALS ADC count value ratio: Ch1/Ch0		10.8	15.8	20.8	%	λp = 640 nm, ATIME = 0xF6 (27 ms)
		41	56	68		λp = 850 nm, ATIME = 0xF6 (27 ms)
Irradiance Responsivity: Re	Ch0		29.1		Counts per (µW/ cm^2)	λp = 640 nm, ATIME = 0xF6 (27 ms)
	Ch1		4.6			
	Ch0		22.8			λp = 850 nm, ATIME = 0xF6 (27 ms)
	Ch1		12.7			
Gain scaling, relative to 1x gain setting		-5		5	%	8x
		-5		5		16x
		-5		5		120x

Notes:
1. Optical measurements are made using small-angle incident radiation from light-emitting diode optical sources. Visible 640 nm LEDs and infrared 850 nm LEDs are used for final product testing for compatibility with high-volume production.
2. The 640 nm irradiance Ee is supplied by an AlInGaP light-emitting diode with the following characteristics: peak wavelength = 640 nm and spectral halfwidth ½ = 17 nm.
3. The 850 nm irradiance Ee is supplied by a GaAs light-emitting diode with the following characteristics: peak wavelength = 850 nm and spectral halfwidth ½ = 40 nm.
4. The specified light intensity is 100% modulated by the pulse output of the device so that during the pulse output low time, the light intensity is at the specified level, and zero otherwise.