

## I/O Pins Configuration

Pin	Name	Type	Description
1	SDA	I/O	I <sup>2</sup> C serial data I/O terminal - serial data I/O for I <sup>2</sup> C-bus
2	INT	O	Interrupt - open drain (active low)
3	LDR		LED driver input for proximity IR LED, constant current source LED driver
4	LEDK		LED Cathode, connect to LDR pin when using internal LED driver circuit
5	LEDA		LED Anode, connect to V <sub>BATT</sub> on PCB
6	GND		Power supply ground. All voltages are referenced to GND
7	SCL	I	I <sup>2</sup> C serial clock input terminal - clock signal for I <sup>2</sup> C serial data
8	V <sub>DD</sub>		Power supply voltage

## Absolute Maximum Ratings over operating free-air temperature range (unless otherwise noted)\*

Parameter	Symbol	Min	Max	Units	Conditions
Power supply voltage [1]	V <sub>DD</sub>		3.8	V	
Input voltage range	V <sub>IN</sub>	-0.5	3.8	V	
Output voltage range	V <sub>OUT</sub>	-0.3	3.8	V	
Storage temperature range	T <sub>stg</sub>	-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 <sub>A</sub>	-30		85	°C
Power supply voltage	V <sub>DD</sub>	2.5		3.5	V
Supply voltage accuracy, V <sub>DD</sub> total error including transients		-3		+3	%
LED supply voltage	V <sub>BATT</sub>	2.5		4.5	V

## Operating Characteristics, V<sub>DD</sub> = 3 V, T<sub>A</sub> = 25 °C (unless otherwise noted)

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
I <sub>DD</sub> supply current	I <sub>DD</sub>		235	330	μA	Active – LDR pulses off
			85			Wait State
			2.5	10		Sleep Mode – No I <sup>2</sup> C activity
V <sub>OL</sub> INT, SDA output low voltage	V <sub>OL</sub>	0		0.4	V	3 mA sink current
I <sub>LEAK</sub> leakage current, SDA, SCL, INT pins	I <sub>LEAK</sub>	-5		5	μA	
I <sub>LEAK</sub> leakage current, LDR P\pin	I <sub>LEAK</sub>	-10		10	μA	
SCL, SDA input high voltage, V <sub>IH</sub>	V <sub>IH</sub>	1.25		V <sub>DD</sub>	V	
SCL, SDA input low voltage, V <sub>IL</sub>	V <sub>IL</sub>			0.54	V	

**Optical Characteristics,  $V_{DD} = 3\text{ V}$ ,  $T_A = 25\text{ }^\circ\text{C}$ ,  $A_{GAIN} = 16\times$ ,  $AEN = 1$  (unless otherwise noted) [1]**

Parameter	Red Channel			Green Channel			Blue Channel			Clear Channel			Units	Test Conditions
	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
Irradiance responsivity	0%		15%	10%		42%	60%		95%	14	17.5	21	counts / $\mu\text{W}$ / $\text{cm}^2$	$\lambda_D = 465\text{ nm}$ [2]
	4%		25%	55%		85%	8%		45%	14.96	18.7	22.44		$\lambda_D = 525\text{ nm}$ [3]
	75%		110%	0%		14%	3%		24%	16	20	24		$\lambda_D = 625\text{ nm}$ [4]

Notes:

- The percentage shown represents the ratio of the respective red, green, or blue channel value to the clear channel value.
- The 465 nm input irradiance is supplied by an InGaN light-emitting diode with the following characteristics: dominant wavelength  $\lambda_D = 465\text{ nm}$ , spectral halfwidth  $\Delta\lambda_{1/2} = 22\text{ nm}$ .
- The 525 nm input irradiance is supplied by an InGaN light-emitting diode with the following characteristics: dominant wavelength  $\lambda_D = 525\text{ nm}$ , spectral halfwidth  $\Delta\lambda_{1/2} = 35\text{ nm}$ .
- The 625 nm input irradiance is supplied by a AlInGaP light-emitting diode with the following characteristics: dominant wavelength  $\lambda_D = 625\text{ nm}$ , spectral halfwidth  $\Delta\lambda_{1/2} = 15\text{ nm}$ .

**RGBC Characteristics,  $V_{DD} = 3\text{ V}$ ,  $T_A = 25\text{ }^\circ\text{C}$ ,  $A_{GAIN} = 16\times$ ,  $AEN = 1$  (unless otherwise noted)**

Parameter	Min	Typ	Max	Units	Test Conditions
Dark ALS count value		0	5	counts	$E_e = 0$ , $A_{GAIN} = 60\times$ , $A_{TIME} = 0\times D6$ (100 ms)
ADC integration time step size	2.27	2.4	2.56	ms	$A_{TIME} = 0\times FF$
ADC number of integration steps	1		256	steps	
Full scale ADC counts per step			1023	counts	
Full scale ADC count value			65535	counts	$A_{TIME} = 0\times C0$ (153.6 ms)
Gain scaling, relative to $1\times$ gain setting	3.6	4	4.4		$4\times$
	14.4	16	17.6		$16\times$
	54	60	66		$60\times$

**Proximity Characteristics,  $V_{DD} = 3\text{ V}$ ,  $T_A = 25\text{ }^\circ\text{C}$ ,  $PEN = 1$  (unless otherwise noted)**

Parameter	Min	Typ	Max	Units	Test Conditions
$I_{DD}$ supply current – LDR Pulse On		3		mA	
ADC conversion time step size	2.27	2.4	2.56	ms	
ADC number of integration steps		1		steps	
Full scale ADC counts			1023	counts	
LED pulse count	0		255	pulses	
LED pulse period		14.0		$\mu\text{s}$	
LED pulse width – LED on time		6.3		$\mu\text{s}$	
LED drive current		100		mA	$P_{DRIVE} = 0$
		50			$P_{DRIVE} = 1$
		25			$P_{DRIVE} = 2$
		12.5			$P_{DRIVE} = 3$
Proximity ADC count value, no object		125	250	counts	Dedicated power supply $V_{BATT} = 3\text{ V}$ LED driving 8 pulses, $P_{DRIVE} = 00$ , $P_{GAIN} = 00$ , open view (no glass) and no reflective object above the module.
Proximity ADC count value, 100 mm distance object	350	440	530	counts	Reflecting object – 73 mm $\times$ 83 mm Kodak 90% grey card, 100 mm distance, LED driving 8 pulses, $P_{DRIVE} = 00$ , $P_{GAIN} = 00$ , open view (no glass) above the module.