

I/O Pins Configuration

Pin	Name	Type	Description
1	SDA	I/O	I ² C serial data I/O terminal - serial data I/O for I ² 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 _{LEDA} on PCB
6	GND		Power supply ground. All voltages are referenced to GND
7	SCL	I	I ² C serial clock input terminal - clock signal for I ² C 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	Conditions
Power supply voltage ^[1]	V _{DD}		3.8	V	
Input voltage range	V _{IN}	-0.5	3.8	V	
Output voltage range	V _{OUT}	-0.3	3.8	V	
Storage temperature range	T _{stg}	-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
Power supply voltage	V _{DD}	2.4	3.0	3.6	V
Supply voltage accuracy, V _{DD} total error including transients		-3		+3	%
LED supply voltage	V _{LEDA}	3.0		4.5	V

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

Parameter	Symbol	Min	Typ	Max	Units	Test Conditions
IDD supply current ^[1]	I _{DD}		200	250	μA	Active ALS state PON = AEN = 1, PEN = 0
			790			Proximity, LDR pulse ON, PPulse = 8 (I _{LDR} not included)
			790			Gesture, LDR pulse ON, GPulse = 8 (I _{LDR} not included)
			38			Wait state PON = 1, AEN = PEN = 0
			1.0	10.0		Sleep state ^[2]
V _{OL} INT, SDA output low voltage	V _{OL}	0		0.4	V	3 mA sink current
I _{LEAK} leakage current, SDA, SCL, INT pins	I _{LEAK}	-5		5	μA	
I _{LEAK} leakage current, LDR P\pin	I _{LEAK}	-10		10	μA	
SCL, SDA input high voltage, V _{IH}	V _{IH}	1.26		V _{DD}	V	
SCL, SDA input low voltage, V _{IL}	V _{IL}			0.54	V	

Notes

- Values are shown at the V_{DD} pin and do not include current through the IR LED.
- Sleep state occurs when PON = 0 and I²C bus is idle. If Sleep state has been entered as the result of operational flow, SAI = 1, PON will be high.

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

Parameter	Red Channel		Green Channel		Blue Channel		Units	Test Conditions
	Min	Max	Min	Max	Min	Max		
Irradiance responsivity [1]	0	15	10	42	57	100	%	$\lambda_D = 465\text{ nm}$ [2]
	4	25	54	85	10	45		$\lambda_D = 525\text{ nm}$ [3]
	64	120	0	14	3	29		$\lambda_D = 625\text{ nm}$ [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, $V_{DD} = 3\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, $\text{AGAIN} = 16\times$, $\text{AEN} = 1$ (unless otherwise noted)

Parameter	Min	Typ	Max	Units	Test Conditions
Dark ALS count value		0	3	counts	$E_e = 0$, $\text{AGAIN} = 64\times$, $\text{ATIME} = 0\times\text{DB}$ (100 ms)
ADC integration time step size		2.78		ms	$\text{ATIME} = 0\times\text{FF}$
ADC number of integration steps	1		256	steps	
Full scale ADC counts per step			1025	counts	
Full scale ADC count value			65535	counts	$\text{ATIME} = 0\times\text{C0}$ (175 ms)
Gain scaling, relative to $1\times$ gain setting	3.6	4	4.4		4x
	14.4	16	17.6		16x
	57.6	64	70.4		64x
Clear channel irradiance responsivity	18.88	23.60	28.32	counts/ $(\mu\text{W}/\text{cm}^2)$	Neutral white LED, $\lambda = 560\text{ nm}$

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

Parameter	Min	Typ	Max	Units	Test Conditions
ADC conversion time step size		696.6		μs	
ADC number of integration steps		1		steps	
Full scale ADC counts			255	counts	
LED pulse count [1]	1		64	pulses	
LED pulse width – LED on time [2]		4		μs	$\text{PPLEN} = 0$
		8			$\text{PPLEN} = 1$
		16			$\text{PPLEN} = 2$
		32			$\text{PPLEN} = 3$
LED drive current [3]		100		mA	$\text{LDRIVE} = 0$
		50			$\text{LDRIVE} = 1$
		25			$\text{LDRIVE} = 2$
		12.5			$\text{LDRIVE} = 3$
LED boost [3]		100		%	$\text{LED_BOOST} = 0$
		150			$\text{LED_BOOST} = 1$
		200			$\text{LED_BOOST} = 2$
		300			$\text{LED_BOOST} = 3$
Proximity ADC count value, no object [4]		10	25	counts	$V_{\text{LEDA}} = 3\text{ V}$, $\text{LDRIVE} = 100\text{ mA}$, $\text{PPULSE} = 8$, $\text{PGAIN} = 4\times$, $\text{PPLEN} = 8\text{ } \mu\text{s}$, $\text{LED_BOOST} = 100\%$, open view (no glass) and no reflective object above the module.

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