
Overview

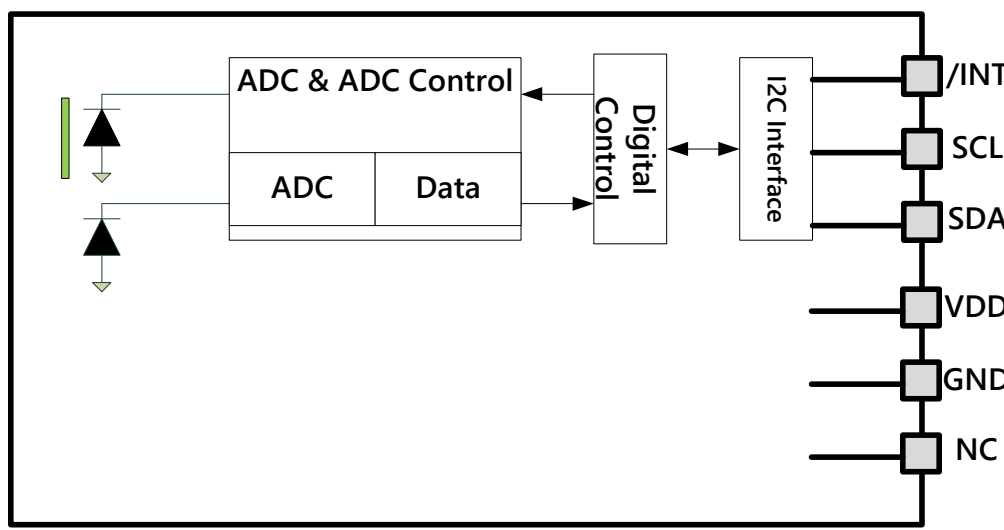
Feature

- Integrated Photopic ALS, ALS_IR Photodiodes
- With ambient light cancellation scheme, with receiver offset design, Automatic rejection for 50Hz/60Hz lighting flicker
- With Low power design scheme
- Build in Temperature compensation
- Support 16bits effective resolution and programmable gain setting
- I²C Interface application
- Operation Conditions:
 - VDD: 1.7~3.6V; typical: 3.0 V
 - Temperature Range: -30C ~ 85C

Application

- Environment sensing
- Control brightness in panel display management
- Wearable ambient light measurement

Block Diagram



Pin Description

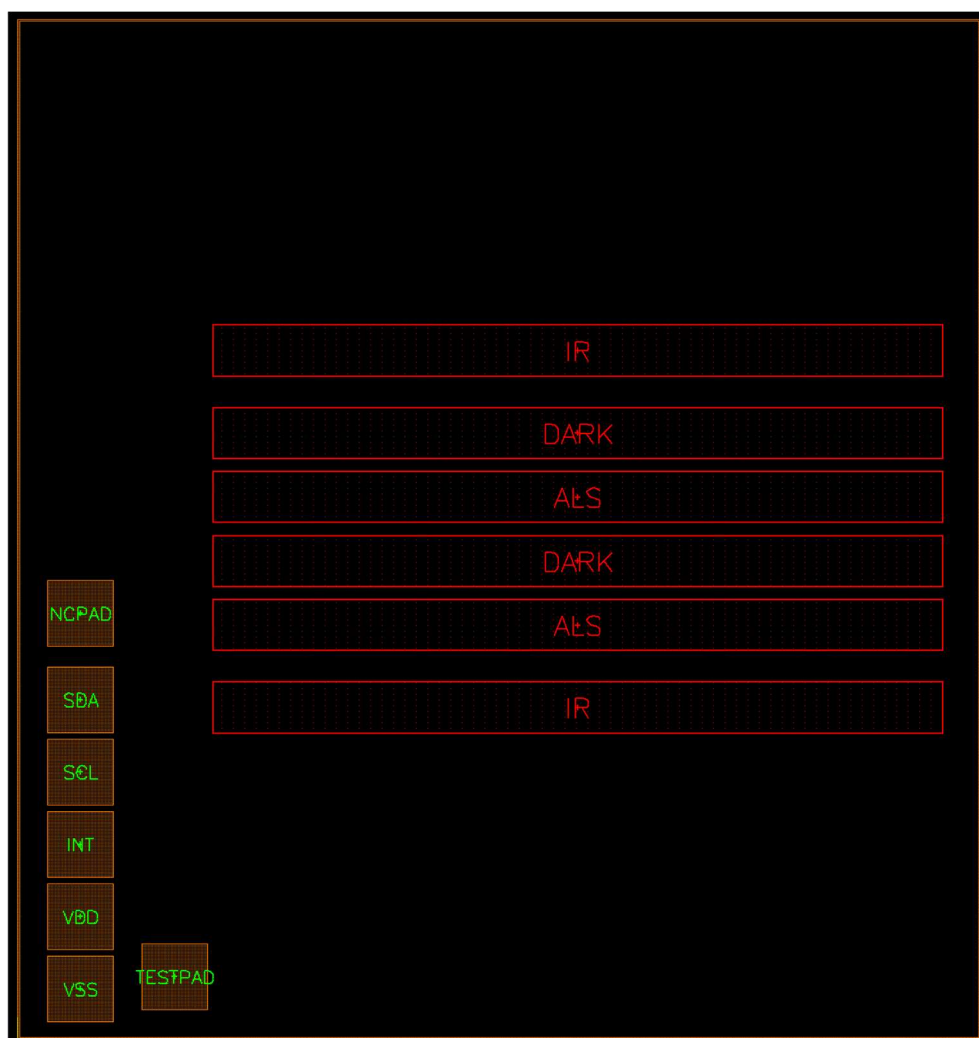
Description

Name	Pin No.	IO	Description
SCL	1	I	IIC clock
INT	2	IO	Interrupt pin (open drain)
GND	3	G	Ground
NC	4	P	NC
VDD	5	P	Power Supply for sensor module
SDA	6	IO	IIC data (open drain)

Die Information

■ Chip Size (X x Y x Z)

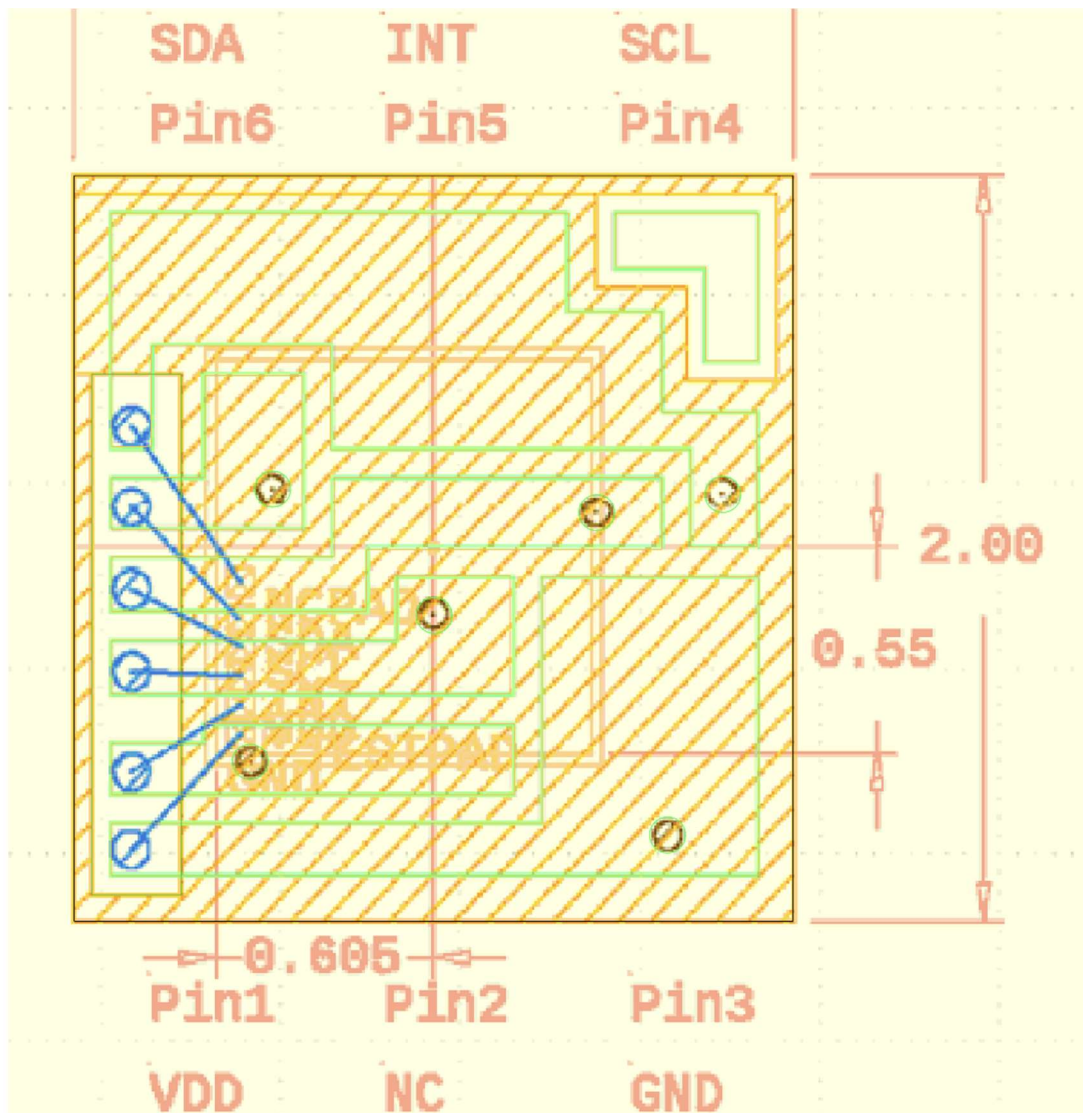
1100um x 1120um x 150um (w/ 60um scribe line, 150um thickness)



PD	X-axis	Y-axis	W	H	BBox
IR	605.0	742.5	787.94	54.94	(211.03,715.03) (998.97,769.97)
IR	605.0	357.5	787.94	54.94	(211.03,330.03) (998.97,384.97)
ALS	605.0	446.5	787.94	54.94	(211.03,419.03) (998.97,473.97)
DARK	605.0	515.5	787.94	54.94	(211.03,488.03) (998.97,542.97)
ALS	605.0	584.5	787.94	54.94	(211.03,557.03) (998.97,611.97)
DARK	605.0	653.5	787.94	54.94	(211.03,626.03) (998.97,680.97)

PAD (71x71)	X-axis	Y-axis
NCPAD	68	459
SDA	68	366
SCL	68	288
INT	68	210
VDD	68	132
VSS	68	54
TESTPAD	170	67

Bonding Drawing



Electrical Specification

■ Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Units	Comments
Electrical Parameters					
VDD	Supply Voltage to GND	-0.3	3.6	V	
V _{IO}	Digital I/O Terminal Voltage	-0.3	3.6	V	
I _{IO}	Digital Output Terminal Current	-1	20	mA	
Electrostatic Discharge					
I _{SCR}	Input Current (latch-up immunity)	± 100		mA	Class II JEDEC JESD78E
ESD _{HBM}	HBM Electrostatic Discharge	± 2000		V	JEDEC/ESDA JS-001-2017
ESD _{CDM}	CDM Electrostatic Discharge	± 500		V	JEDEC JS-002-2014

■ Recommended Operation condition

Symbol	Parameter	Min	Typ	Max	Unit
VDD	Supply Voltage to Sensor	1.7	3.0	3.6	V
f _{I2C}	Clock frequency of I ² C	-	-	400	Khz
T _A	Operating Ambient Temperature	-40		85	°C

■ Electrical characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{DD}	Supply current	Active ALS State (PON = 1) ⁽¹⁾		246		μA
		Idle State (PON=1) ⁽²⁾		23		
		Sleep State (PON = 0) ⁽³⁾		0.5		
V _{OL}	INT, SDA output low voltage	6mA sink current			0.6	V
I _{LEAK}	Leakage current, SDA, SCL, INT		-5		5	μA
V _{IH}	SCL, SDA input high voltage ⁽³⁾		1.26			V
V _{IL}	SCL, SDA input low voltage				0.54	V
T _{Active}	Time from power-on to ready to receive I ² C commands			1.5		ms

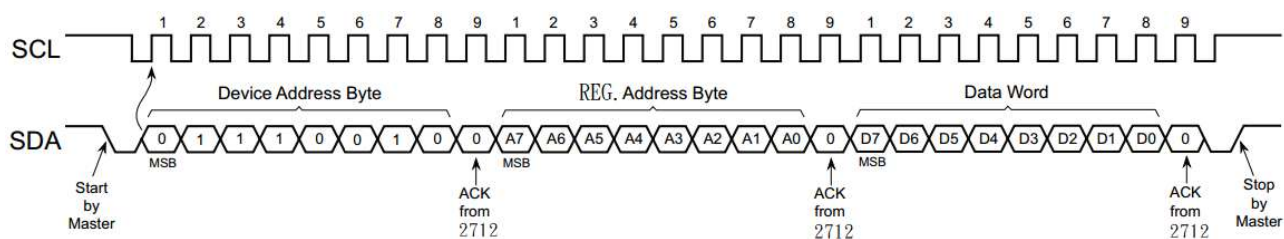
Note(s):

1. Active state occurs when PON =1 and the device is actively integrating ALS. For ALS active, this time is determined by the ALS integration time (ATIME). The conditions is 50ms INT and 50ms MRR @ VDD=3.0v
2. Idle state occurs when PON=1 and the device is not in the active state.
3. 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 remain high.
4. Digital pins: SDA, SCL, INT are tolerant to a communication voltage up to 3.6V

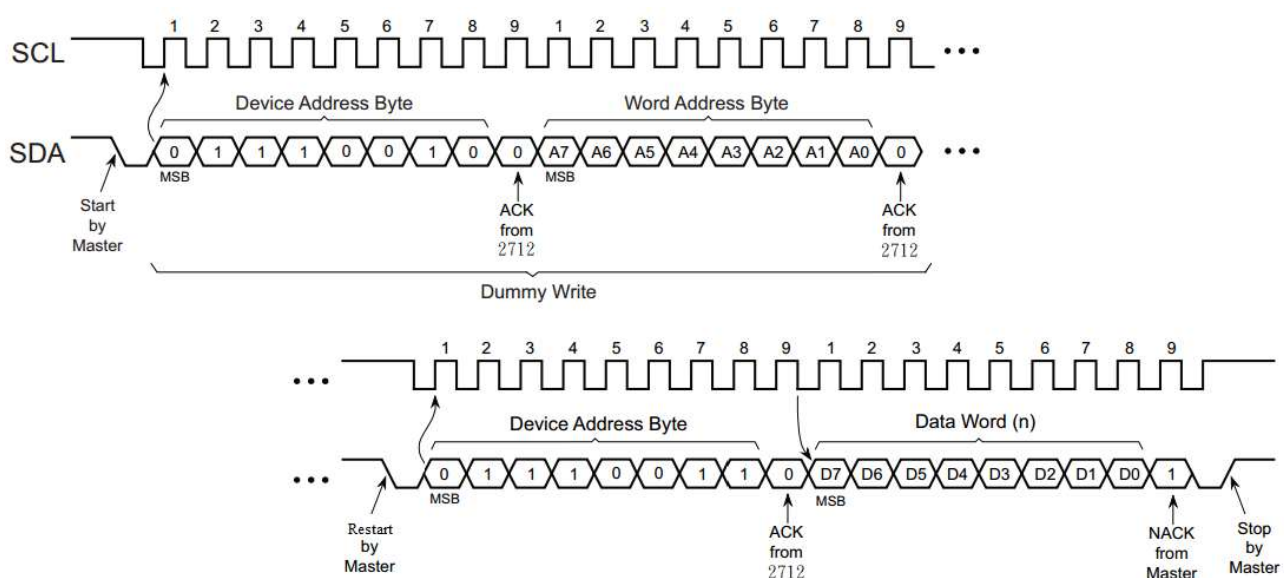
I²C Timing Diagram

IIC Communication

Write:



Read:



Register Description

■ Register table

Address	Register Name	R/W	Register Function	Reset Value
0x80	ENABLE	R/W	Enables states and AGAIN setting	0x00
0x81	RESET	R/W	IC Reset control	0x00
0x85	ATIME_STEP	R/W	ALS integrate time scale	0x0A
0x86	ATIME	R/W	ALS integrate time steps	0x3F
0x87	AWAIT	R/W	ALS measurement rate time steps	0xFF
0x88	STATUS0	R	ALS mode status 0	0x00
0x89	STATUS1	R	ALS mode status 1	0x00
0x8B	ALSDTAT0	R	ALS measurement data 0	0x00
0x8C	ALSDATA1	R	ALS measurement data 1	0x00
0x8D	ALSDATA2	R	ALS measurement data 2	0x00
0x8E	ALSDATA3	R	ALS measurement data 3	0x00
0x8F	IRDTAT0	R	ALS IR measurement data 0	0x00
0x90	IRDATA1	R	ALS IR measurement data 1	0x00
0x91	IRDATA2	R	ALS IR measurement data 2	0x00
0x92	IRDATA3	R	ALS IR measurement data 3	0x00
0x95	IREN	R/W	Enable IR channel	0x08
0x98	PDEN	R/W	Enable PD channel	0x40
0xA0	INTEN	R/W	Interrupt setting	0x00
0xA1	PERS	R	Interrupt persist setting	0x00
0xAA	AIHTL	R/W	ALS interrupt upper threshold LSB	0xFF
0xAB	AIHTH	R/W	ALS interrupt upper threshold MSB	0xFF
0xAC	AILTL	R/W	ALS interrupt lower threshold LSB	0x00
0xAD	ALLTH	R/W	ALS interrupt lower threshold MSB	0x00
0xAE	PARTID	R	Part ID	0xB0
0xAF	MANCID	R	Manufacture ID	0x05
0xB0	AGC_GAIN_HYST	R/W	Auto Gain control hysteresis setting	0x0C