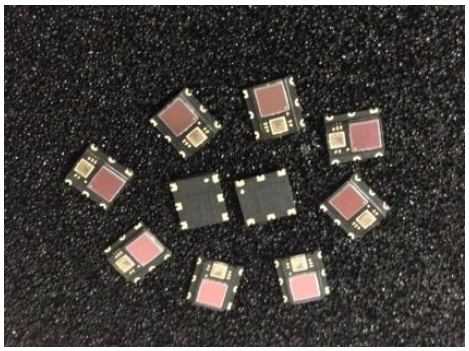
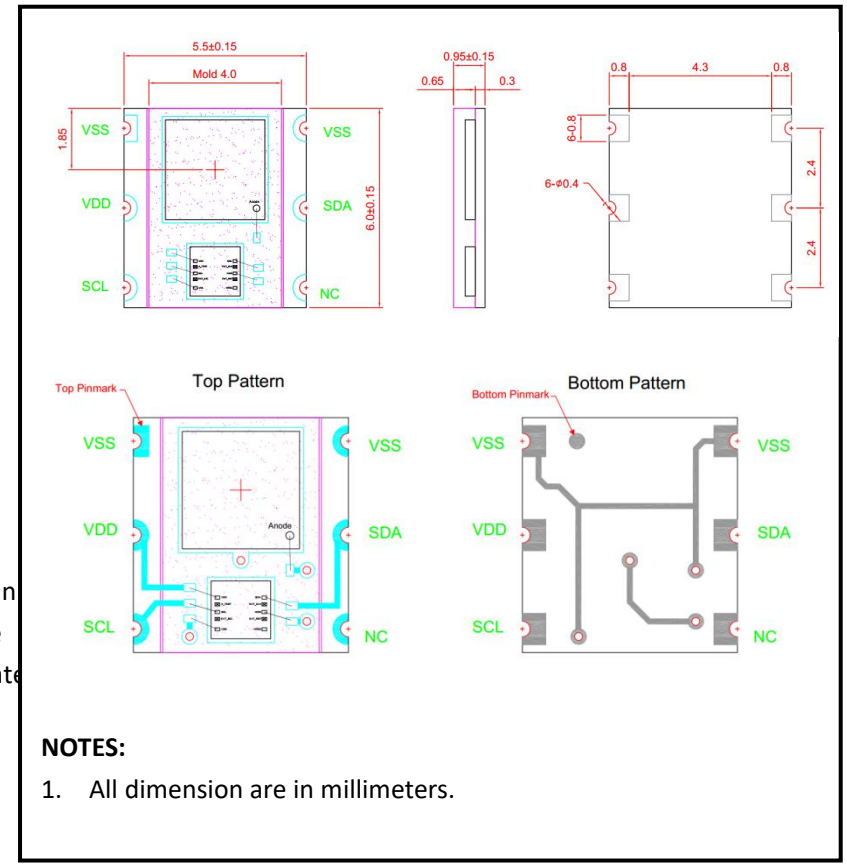
LIGHT-Digital CONVERTER





NOTES:

1. All dimension are in millimeters.

Description

The OSC216 light to digital converter combine human Eye response photodiode with I²C protocol interface and designed by the CMOS process. It is easily operate Simple I²C command.

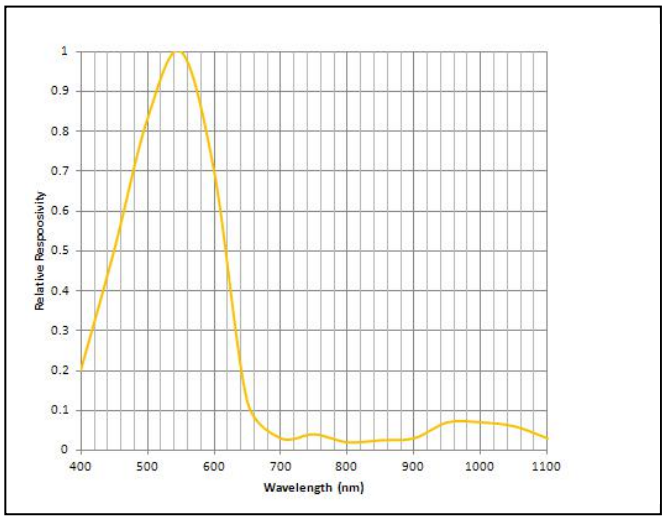
OSC216 incorporates a photodiode, amplifiers, and analog / digital circuits into a single package.

It has an excellent temperature compensation and a Robust refresh rate setting that does not use an external RC low pass filter.

OSC216 has linear sensitivity to 400-700nm light and is easily adjusted by an external resistor.

Features

* Photodiode size: 3*3mm
*10-bit digital data output
*High dynamic detection resolution
* I²C Interface (400KHz), support 1.8V to 2.8V-CMOS level input
*Re-writable EEPROM (32Byte) integrated
*Package type: surface mount
*Wide operating temperature range: -40 °C to +80 °C



Application：

*Illuminance meter
* Intelligent lamps
* Glossness meter
* Densitometer

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Block Diagram

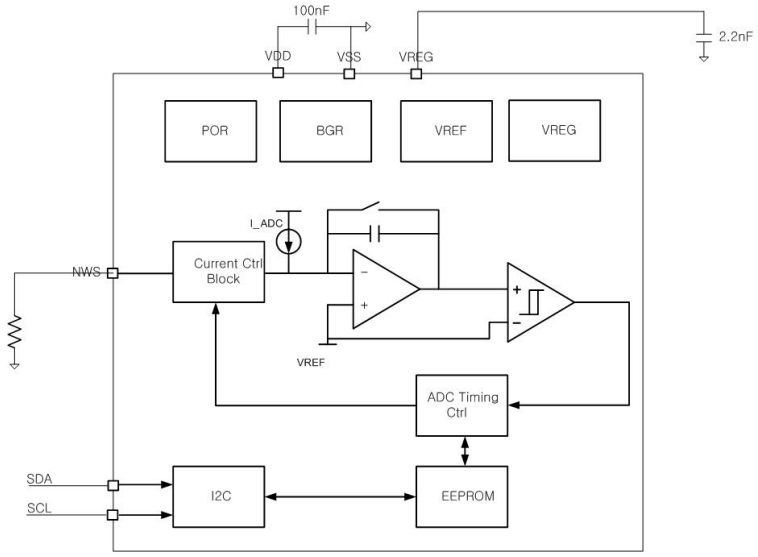


Figure 1. Block Diagram and Typical Application Circuit

Pin Configuration

PIN NO.	PIN NAME	I/O	PIN DESCRIPTIONS
1	GND/VSS	G	Analog, Digital Ground
2	SDA	I/O	I^2C data
3	VREG	O	Analog Reference Voltage
4	SCL	I	I^2C Clock
5	VDD	P	Analog, Digital Power
6	GND/VSS	G	Analog, Digital Ground

Recommended Operating Conditions

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS
VDD	Supply Voltage	3	3.3	3.6	V
TA	Operating Ambient Temperature	-40		85	℃

Absolute Maximum Ratings

SYMBOL	PARAMETER(NOTE 1)	MIN	MAX	UNITS
Vhbm	Static Discharge (HBM)		2	kV
Vmm	Static Discharge (MM)		200	V
Tj	Junction Temperature	-55	85	℃
Ts	Soldering reflow temperature(Note 2)		TBD(260)	℃

+ 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.

Note1 : All voltage values are with respect to GND.

Note2 : The device should be soldered using the recommended solder reflow profile.

Electrical Specification

Electrical Characteristics over recommended operating conditions.

Typical values at 25℃, VDD =3.3V.

Operation Characteristics

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS
VDD	Supply Voltage	3	3.3	3.6	V
F_ADC	Full scale ADC counts			1024	
D_ADC	Dark ADC count value		1	10	counts

I^2C Interface

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IH}	Input High level		1.8			V
V_{IL}	Input Low level				0.8	V
V_{OL}	Output Low level(SDA)	IOL=4mA			0.5	V
f_{SCLK}	SCLK Operating Frequency				400	kHz
t_{BUF}	Bus Free Time Between STOP and START Condition		1.3			us
$t_{HD;STA}$	Hole Time After Repeated START Conditions After this period, the first clock is generated		0.6			us
t_{LOW}	SCLK Clock Low Period		1.3			us
t_{HIGH}	SCLK Clock High Period		0.6			us
$t_{SU;STA}$	Repeated START Condition Setup Time		0.6			us
$t_{HD;DAT}$	Data Hold Time		0		0.9	us
$t_{SU;DAT}$	Data Setup Time		100			ns
t_F	Clock/Data Fall Time				300	ns
t_R	Clock/Data Rise Time				300	ns
$t_{SU;STO}$	Stop Condition Setup time		0.6			us

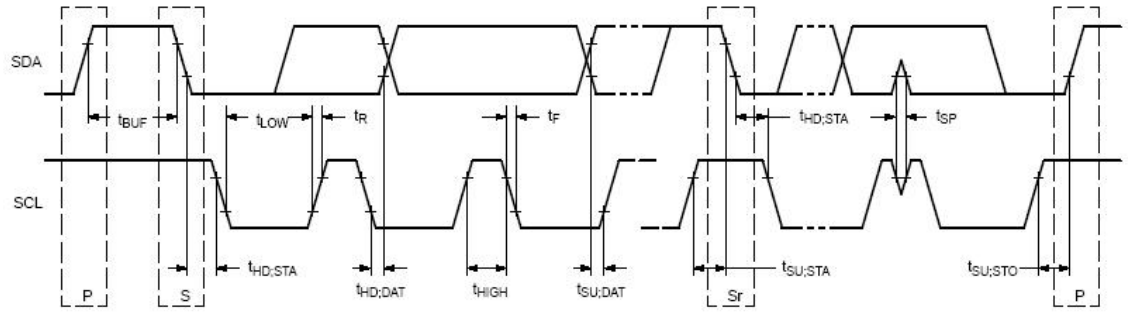


Figure 2. I²C communication protocol

Mode Condition

After VDD is supplied, IC is set as STANDBY mode as default.

The sequence of STANDBY/EXECUTION mode is as Figure 3 :

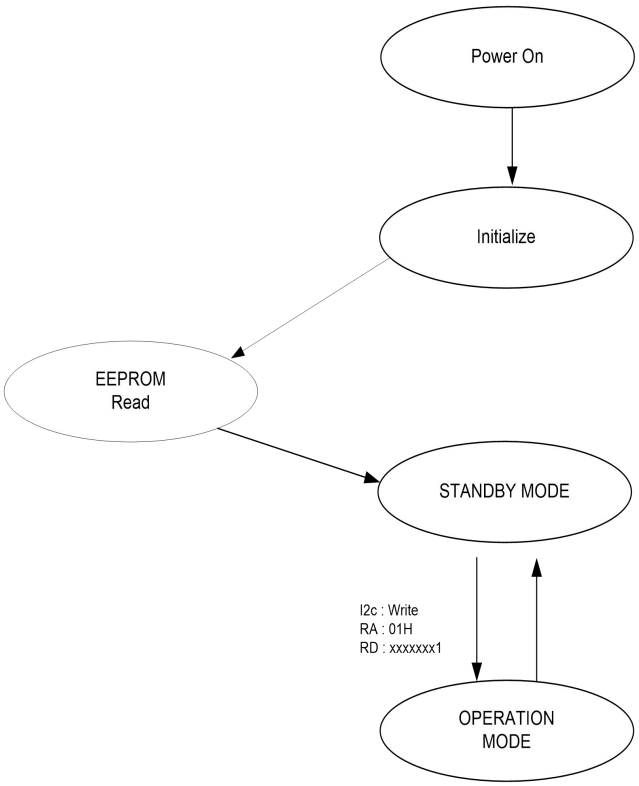


Figure 3. the sequence of STANDBY/EXECUTION mode

Data Read

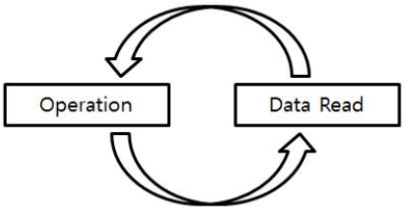
OSC213 has 10-bit resolution. 1023 is saturation.

Register address is 07h~08h. (MSB : 07h, LSB : 08h)

RA	RD7	RD6	RD5	RD4	RD3	RD2	RD1	RD0	Def	Type
07h	-	-	-	-	-	-	ADC Data [9]	ADC Data [8]	-	R
08h	ADC Data [7]	ADC Data [6]	ADC Data [5]	ADC Data [4]	ADC Data [3]	ADC Data [2]	ADC Data [1]	ADC Data [0]	-	R

You can read ADC data olny 1 time per 1 operation.

To you can read ADC data continuously, you need to repeat operation and ADC data reading.



[Example Code]

```
int read_adc( )
{
I2C_Write (0x1A, 0x01, 0x01);        // write operation bit “1”
delay(2);                                  //the delay is changed by charge time setting
adcdata = I2C_ReadWord (0x1A, 0x07);    // read adc data
return adcdata;
}
```

Demo Program