

**Digital Output Ambient Light Sensor  
(REFERENCE)**

**KOE1023A**

**Description**

The KOE1023A is an Ambient Light Sensor with I<sup>2</sup>C interface which converts light intensity into digital output in controllable time periods and gains.

The KOE1023A incorporates photodiodes, low noise amplifiers, and ADCs(Analog to Digital Converter) in a single chip.

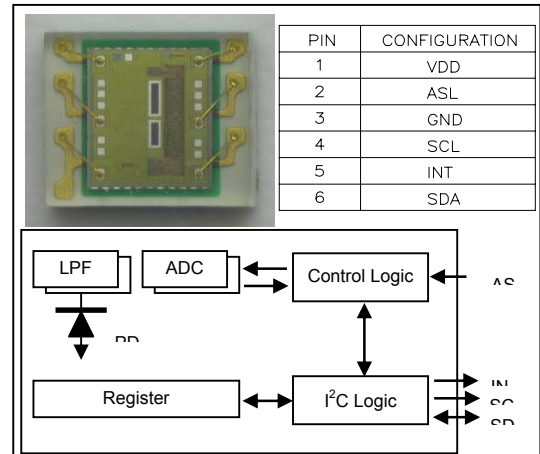
The photo diode has the different spectrum response each other. ADC has the 16 bit resolution from 0 to 65,535 for representing light intensity.

**Features**

- Converters light intensity to digital data format
- 16 bits resolution of light intensity
- Close to Human eye response
- Programmable interrupt function
- 50/60Hz ripple rejection
- I<sup>2</sup>C protocol interface up to 400 kHz (fast mode)
- Package : COB 6Pin, 2.2 x 2.0 x 0.7 mm<sup>3</sup>

**Applications**

- Mobile Devices : Smart phone, PDA, and GPS
- Computing devices : Notebook, UMPC web pod, Monitor
- Consumer devices : LCD TV, digital picture frame, digital camera
- Other devices : Industrial and medical light sensing



**Absolute Maximum Ratings** [T<sub>A</sub> = 25°C ]

Parameter	Symbol	Min.	Max.	Max.
Supply Voltage	V <sub>DD</sub>	-	3.8	V
Operating Temperature	T <sub>opr.</sub>	-30	85	°C
Storage Temperature	T <sub>stg.</sub>	-30	85	°C
Peak Reflow Soldering Temperature *1	T <sub>sol</sub>	-	260	°C

\*1. Relfow Soldering Temp. 260°C (Max 10sec)

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## Recommended Operating Conditions

[T<sub>A</sub> = 25°C]

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Supply voltage	V <sub>DD</sub>		2.7	3.0	3.3	V
I <sup>2</sup> C input low voltage	V <sub>IL</sub>	V <sub>DD</sub> =3.0V			0.8	V
I <sup>2</sup> C input high voltage	V <sub>IH</sub>	V <sub>DD</sub> =3.0V	2.1			V
I <sup>2</sup> C operating frequency	f <sub>scl</sub>		10		400	kHz

## Electrical & Optical Specifications

[T<sub>A</sub> = 25°C]

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit.
Peak Sensitivity Wavelength	λ <sub>p</sub>			550		nm
I <sup>2</sup> C Signal Input	Logic High		0.7*V <sub>DD</sub>			V
	Logic Low		0		0.3*V <sub>DD</sub>	V
Output Current	With Load				6	mA
ADC Count Value	Ch0	Fluorescent Lamp V <sub>DD</sub> =3V, Ev=1,000lux		1886		Counts
	Ch1			505		
	Ch0	Tungsten Lamp (2856K, d=30cm) V <sub>DD</sub> =3V, Ev=1,000lux		15,970		
	Ch1			10,189		
Gain Scaling(relative to 1X)		16X	15	16	17	X
Illuminance Responsivity	Ch0	R <sub>v</sub>	V <sub>DD</sub> =3.0V, Fluorescent Lamp		1.89	Counts/ Lux
	Ch1				0.51	
Maximum Detectable Intensity					40,000	Lux
Oscillator	f <sub>OSC</sub>		690	735	780	kHz
Supply Current	I <sub>DD</sub>	V <sub>DD</sub> =3.0V	100	200	600	μA
Shutdown Current	I <sub>DD(SD)</sub>	NO Light, V <sub>DD</sub> =3V, V <sub>I(SD)</sub> > (V <sub>DD</sub> -0.5)		3	10	μA

## I<sup>2</sup>C Timing Characteristics

[T<sub>A</sub>=25°C]

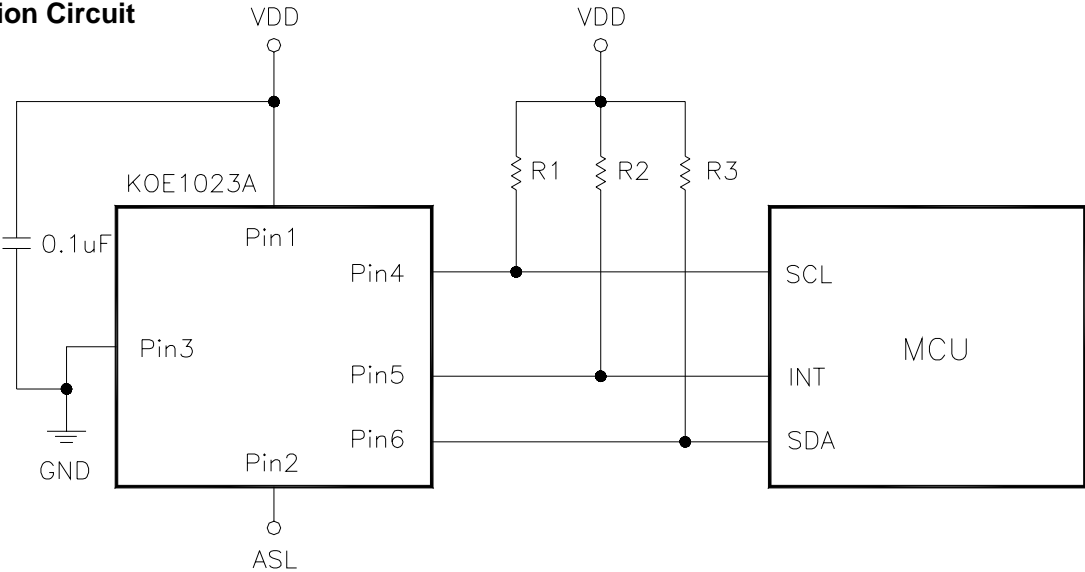
Parameter	Symbol	Min.	Typ.	Max.	Unit.
Conversion time	t <sub>(CONV)</sub>	1.2	100	400	ms
Clock frequency	f <sub>(SCL)</sub>			400	kHz
Bus free time between start and stop condition	t <sub>(BUF)</sub>	1.3			μs
Hold time after(repeated) start condition. After this period, the first clock is generated.	t <sub>(HDSTA)</sub>	0.6			μs
Repeated start condition setup time	t <sub>(SUSTA)</sub>	0.6			μs
Stop condition setup time	t <sub>(SUSTO)</sub>	0.6			μs
Data hold time	t <sub>(HDDAT)</sub>	0		0.9	μs
Data setup time	t <sub>(SUDAT)</sub>	100			ns
I <sup>2</sup> C clock(SCL) low period	t <sub>(LOW)</sub>	1.3			μs
I <sup>2</sup> C clock(SCL) high period	t <sub>(HIGH)</sub>	0.6			μs
Clock / Data fall time	t <sub>(F)</sub>			300	ns
Clock / Data rise time	t <sub>(R)</sub>			300	ns

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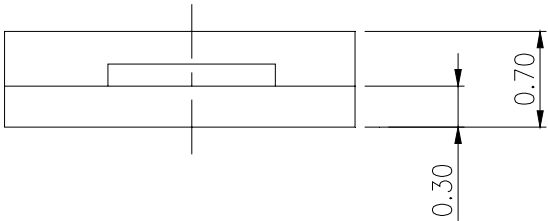
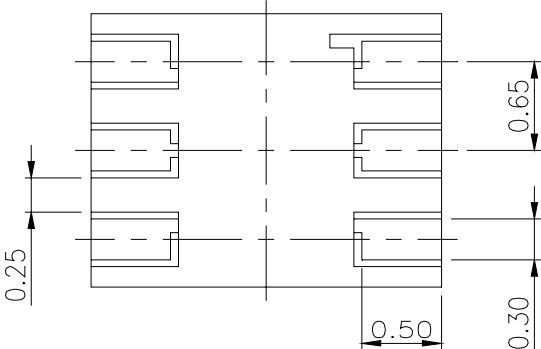
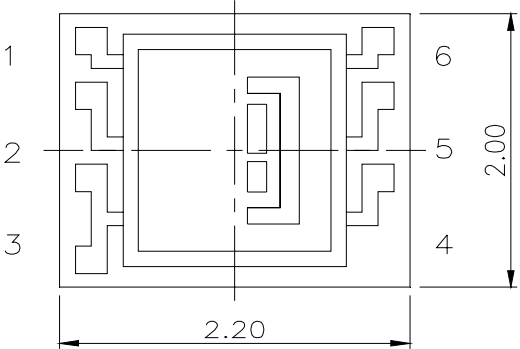
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**Application Circuit**



**Package Outline Dimensions**

(Unit : mm)



**NOTE**

- 1. GENERAL TOLERANCE : ± 0.1
- 2. PIN CONFIGURATION

PIN	CONFIGURATION
1	VDD
2	ASL
3	GND
4	SCL
5	INT
6	SDA

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