KODENSHI GROUP Products Introduction

Total Solution for OPTO Electronics and Power Semiconductor

SINCE 1972

TABLE OF CONTENTS

Photo Interrupter

Photo Interrupter Line-up

※T-Type : Transmissive Type

Category	P/N	Value		P/N	Value		P/N	Value		P/N	Value
T-Type PWB Direct	P/N	SG298		P/N	LG209		P/N	SG288		P/N	KIT8002A
	Gap	2mm		Gap	2.4mm		Gap	5mm		Gap	8mm
	Slit	0.3mm	Logic	Slit	0.5mm		Slit	0.5mm		Slit	0.5mm
T-Type Screw Mount	P/N	SG23FF		P/N	LG2A02		P/N	LG217		P/N	LG214
	Gap	3mm		Gap	5mm		Gap	5mm		Gap	3.6mm
	Slit	0.5mm	Logic	Slit	0.5mm	Logic	Slit	0.5mm	Logic	Slit	0.5mm
T-Type Snap-In Mount	P/N	KIT5015C		P/N	KIT5011C		P/N	KIT5033C		P/N	SG2481
	Gap	5mm		Gap	5mm		Gap	5mm		Gap	5mm
Logic	Slit	0.5mm		Slit	0.5mm		Slit	0.5mm		Slit	0.5mm
Reflective Type	P/N	SG105F3		P/N	SG112		P/N	SG113		P/N	SG128IR
	Detection Distance	0.8mm		Detection Distance	2mm	Logic	Detection Distance	5mm		Detection Distance	8mm
Actuator Type	P/N	LG413		P/N	SG402		P/N	SG405		P/N	KIA0002C
	Logic										
Separate Type	Logic		P/N	PIE310 / PID310			P/N	KIS9010C / KIS9011C			
	Emitter / Detector		Detection Distance	Typ. 200cm		Emitter / Detector	Detection Distance	100Cm			

Photo Interrupter Line-up

PWB Direct Mount Type

P/N	SG298
Gap	2mm
Slit	0.3mm

 Logic

P/N	LG209
Gap	2.4mm
Slit	0.5mm

P/N	SG288
Gap	5mm
Slit	0.5mm

P/N	KIT8002A
Gap	8mm
Slit	0.5mm

Screw Mount Type

P/N	SG23FF
Gap	3mm
Slit	0.5mm

 Logic

P/N	LG2A02
Gap	5mm
Slit	0.5mm

 Logic

P/N	LG217
Gap	5mm
Slit	0.5mm

 Logic

P/N	LG214
Gap	3.6mm
Slit	0.5mm

Snap – In Mount Type

 Logic

P/N	KIT5015C
Gap	5mm
Slit	0.5mm

P/N	KIT5011C
Gap	5mm
Slit	0.5mm

P/N	KIT5033C
Gap	5mm
Slit	0.5mm

P/N	SG2481
Gap	5mm
Slit	0.5mm

AUE

Photo Interrupter Line-up

Reflective Sensor

P/N	SG105F3
Detection Distance	0.8mm

P/N	SG112
Detection Distance	2mm

Logic

P/N	SG113
Detection Distance	5mm

P/N	SG128IR
Detection Distance	8mm

Actuator Sensor

Logic

P/N	LG413

P/N	SG402

P/N	SG405

P/N	KIA0002C

Paper Sensor

Logic

Logic

P/N	PS122TL5-A/ KPS1001C/3C/4C/5C/6C/7C
Detection Distance	1mm ~ 10mm(Kodak 90%) 3mm ~ 7mm(Kodak 18%)

P/N	KPS1002C/8C
Detection Distance	7mm ~ 25mm(Kodak 90%) 10mm ~ 16mm(Kodak 18%)

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Photo Interrupter Line-up

Dustproof Type

P/N	KIT5038C
Gap	5mm
Slit	0.5mm

P/N	KIT5039C
Gap	5mm
Slit	0.5mm

P/N	KIT3018H
Gap	3.18mm
Slit	0.5mm

P/N	SG2A01-A
Gap	5mm
Slit	0.5mm

P/N	KIT5040A
Gap	5mm
Slit	0.5mm

P/N	KIR3006H
Detection Distance	3.81mm

Separated Type
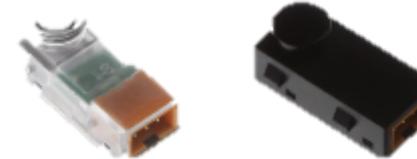
Logic

P/N	PIE310 / PID310
Detection Distance	Typ. 200cm

P/N	KIS9010C / KIS9011C
Detection Distance	100Cm

Customized Product

P/N	KIS9012H / KIS9013H
Detection Distance	10M

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ENCODER

Encoder Line-up

Thick Type

P/N	KE 2109		P/N	KE 2108		P/N	KE 2107
Gap	1.7 mm		Gap	1.7 mm		Gap	1.7 mm
LPI	150, 180, 300		LPI	150, 180, 300		LPI	150, 180, 300

P/N	KE 204		P/N	KE203		P/N	KE-2B10
Gap	3.0 mm		Gap	3.5 mm		Gap	0.5 mm
LPI	90-120		LPI	0.5mm pitch		LPI	150, 180, 300, 360

Slim Type

P/N	KE-2E10		P/N	KE-2H10		P/N	KE-2E10F
Gap	0.5 mm		Gap	0.5 mm		Gap	0.5 mm
LPI	150, 180, 300, 360		LPI	150, 180, 300, 360		LPI	150, 180, 300, 360

P/N	KE-2B10F		P/N	KE-2E12		P/N	KE-2B12
Gap	0.5 mm		Gap	0.8 mm		Gap	0.8 mm
LPI	150, 180, 300, 360		LPI	150, 180, 300		LPI	150, 180, 300

P/N	KE-2B12F		P/N	KE-2E12F		P/N	KE-2E13
Gap	0.8 mm		Gap	0.8 mm		Gap	0.8 mm
LPI	150, 180, 300		LPI	150, 180, 300		LPI	150, 180, 300

P/N	KE-2E18		P/N	KE-2H18		P/N	KE2H21
Gap	2 mm		Gap	2 mm		Gap	1 mm
LPI	150, 180		LPI	150, 180		LPI	150, 180

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Encoder Line-up

Digital Encoder Line up

Hight(mm)	6.55			6.85	7.55		7.40	6.55
Gap(mm)	0.5	0.8	1	1.2	1.7	2.0		
Resolution (LPI)	150,180, 300,360, 600,1200	150,180,300			18,45,90,150, 180			
PIN	Straight/Forming						Straight	Straight/Forming
Wing Type	KE-2△10	KE-2△13	KE-2△21		KE-2△20	KE-2△18		
No Wing Type				KE-2△17	KE-2△19		KE2△22	KE2△23

Gap

Hight

※**LPI: Line Per Inch**　※1200LPI is the products which multiplied 150LPI eight times.

※　**We also have a various customized Analog Encoder**

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Encoder Line-up

FA Encoder

1. Description

-. 6ch output Encoder Module for brushless DC motor control.

2. Features

-. Operating supply voltage 3.5V ~ 5.5V

-. 2500CPR (φ34mm rotary disk used)

-. x2 interpolated (5000CPR)

-. LED Power Feedback control circuit

-. Maximum Output frequency 400kHz(9600RPM)

3. Application

-. Industrial encoder

-. Brushless DC motor
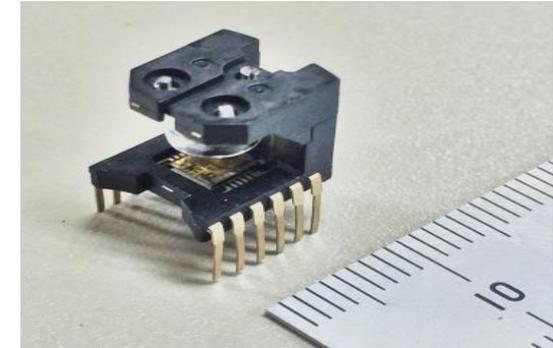
KEF251250CA / KEF302500CA

Digital output signals

A

B

Z

ABZ signals

Z

U

V

W

Z and U,V,W signals

AUE
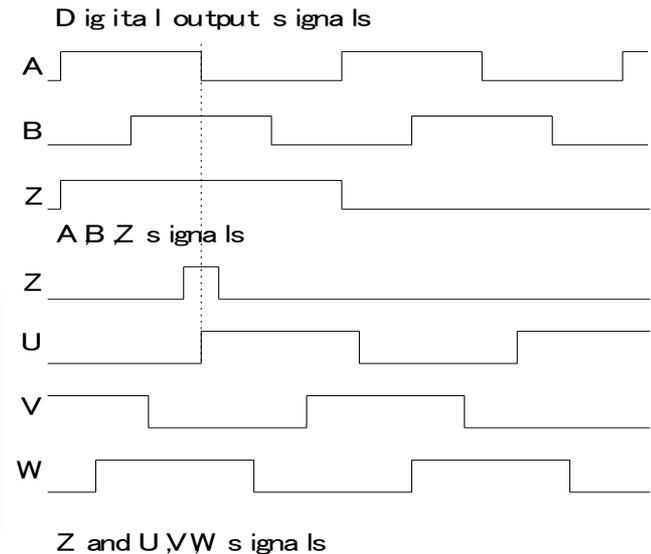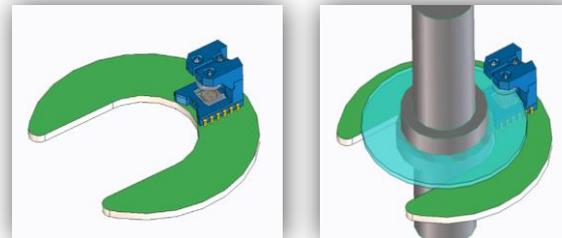
Encoder Module

1. The Merit of this Encoder Module product

No Need Soldering
→ It contributes to reduction of environmental related substances

Dust does not come out
→ It contributes to a clean product without concerns about dust adhesion to the circumferences, such as an optical system

Parts count reduction

→ It contributes to funding cost reduction and consistent production.

Time reduction for Assembly working

→ It contributes to shortening of a lead time, and reduction of process

control and assembly cost.

KEM-101   Back
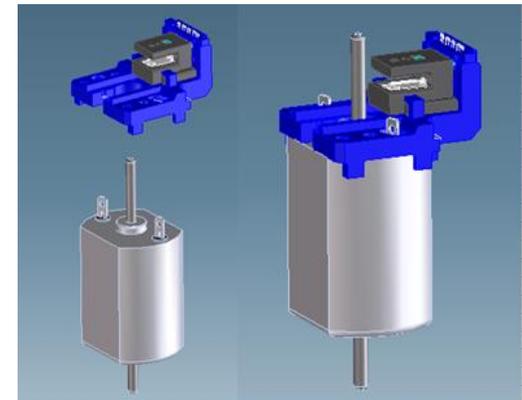
Resolution	45	90	150	180	LPI
Pulse	60	120	200	240	CPR
FFC or FPC	1mm pitch 7 pins				-

IR Receiver Module

IR Receiver Line-up

3D Glasses
Small PKG

COB Type
Small PKG

Dual Lens
Small PKG

2IN1 Type
[RC-M + LED]

Slim PKG

SMD
Type

Low Cost

Dip
Type

AUE

Product Overview
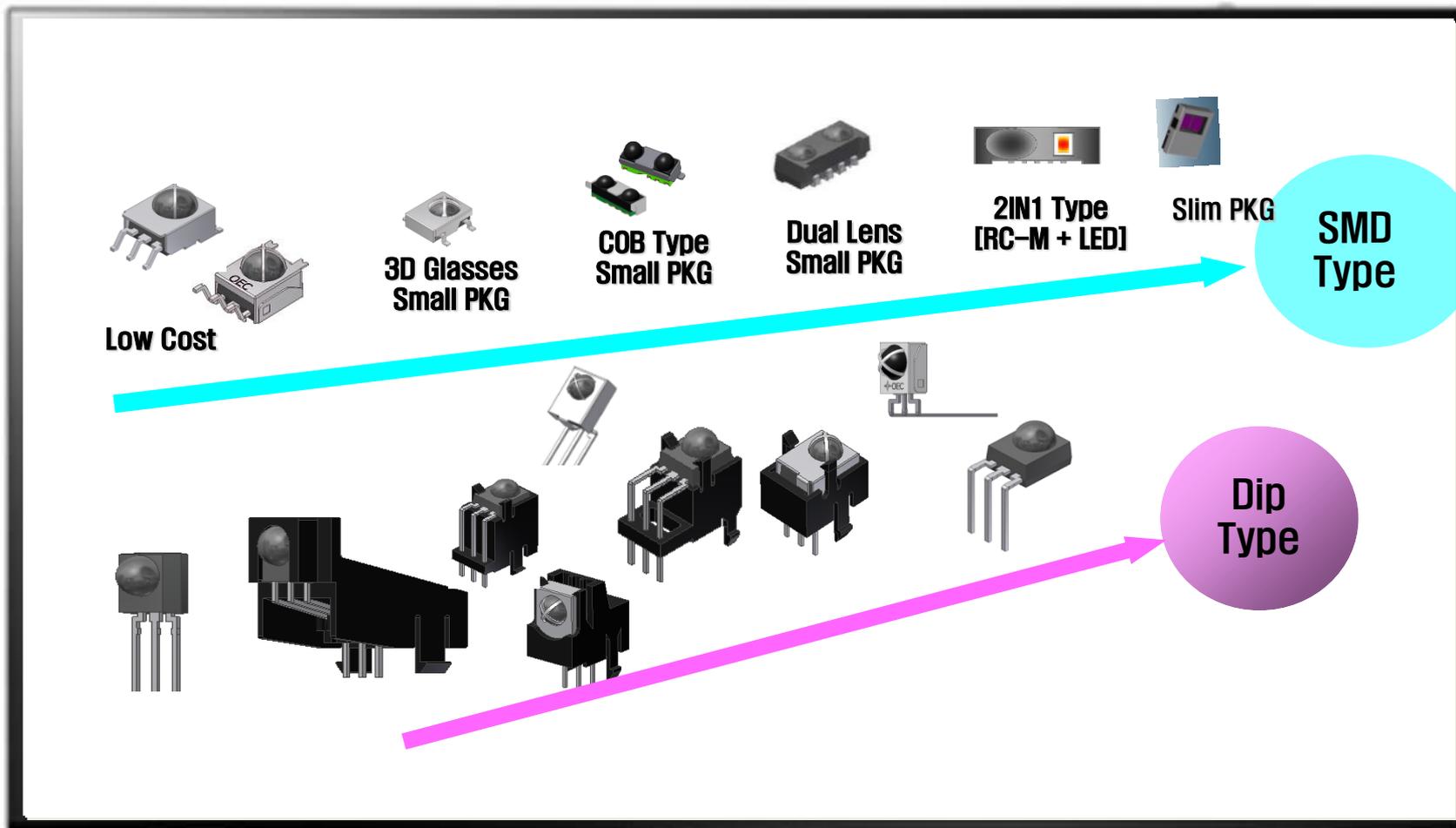
IR Receiver Line-up

Product Configuration for Dip Type Series

R21☐☐LM	R21☐☐TM	R21☐☐MS	R21☐☐TC	R21☐☐TH	R21☐☐TE

R3☐☐V1	R3☐☐H1	R3☐☐S1	R3☐☐S2	R3☐☐S3	R3☐☐S4	R3☐☐S5

R8☐☐SV9	R8☐☐SH6	R8☐☐SB6

R9☐☐V1	R9☐☐H1	R9☐☐T1	R9☐☐T2

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IR Receiver Line-up

Product Dimension for Dip Type Series

No.	View	Holder	Height(H)	Lens axis(X)	Width(W)	Depth	Package
R21□□LM	Side	No Holder	33.05	5.65	5.40	5.70	
R21□□TM	Top	No Holder	5.70	5.70	5.40	10.30	
R21□□MS	Side	Holder	12.30	6.00	6.00	8.60	[Side View]
R21□□TC	Top	Holder	7.20	7.20	5.40	9.80	
R21□□TH	Top	Holder	12.40	12.40	5.40	9.80	
R21□□TE	Top	Holder	16.40	16.40	5.40	9.80	
R3□□V1	Side	No Holder	25.80	6.10	6.80	7.60	
R3□□H1	Top	No Holder	5.50	5.50	6.80	8.80	
R3□□S1	Top	Holder	6.50	6.50	7.30	12.40	
R3□□S2	Top	Holder	12.40	12.40	7.30	12.40	
R3□□S3	Top	Holder	16.40	16.40	7.30	12.40	
R3□□S4	Side	Holder	16.00	9.60	7.30	15.70	
R3□□S5	Side	Holder	21.40	15.00	7.30	15.70	[Top View]
R8□□SV9	Side	Holder	8.95	6.15	7.00	5.50	
R8□□SH6	Top	Holder	6.10	6.10	6.70	12.00	
R8□□SB6	Top	Holder	5.90	5.90	6.45	12.00	
R9□□V1	Side	No Holder	36.15	5.55	6.00	5.25	
R9□□H1	Top	No Holder	5.25	5.25	6.00	10.20	
R9□□T1	Side	Holder	12.65	9.50	7.50	14.90	
R9□□T2	Top	Holder	12.40	12.40	7.50	13.95	
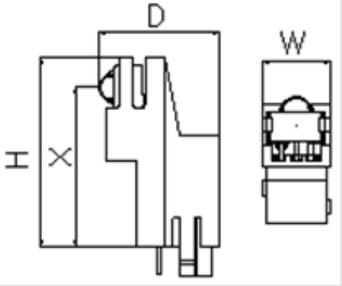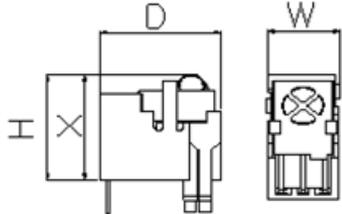
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IR Receiver Line-up

Product Introduction for SMD Type Series

1. Description

The R12□ Series consist of a PIN Photodiode of high speed and a preamplifier IC in the package as an receiver for Infrared remote control systems

2. Features

- -. Dual Lens SMD Package
- -. High sensitivity performance, improved arrival distance
- -. 2.7~5.5 Volt supply voltage, Low power consumption
- -. Shielded against electrical field disturbance
- -. High immunity against ambient light
- -. Easy interface with the main board
- -. TTL and CMOS compatibility
- -. RoHS Compliance

1,4=GND 2=VCC 3=OUT

3. Application

- -. Display, Set Top Box, Sound Bar, Audio system, Computers,
   Interior controlling application and appliances that require remote controlling

4. State : Mass Production
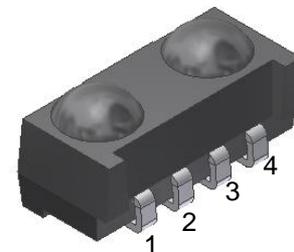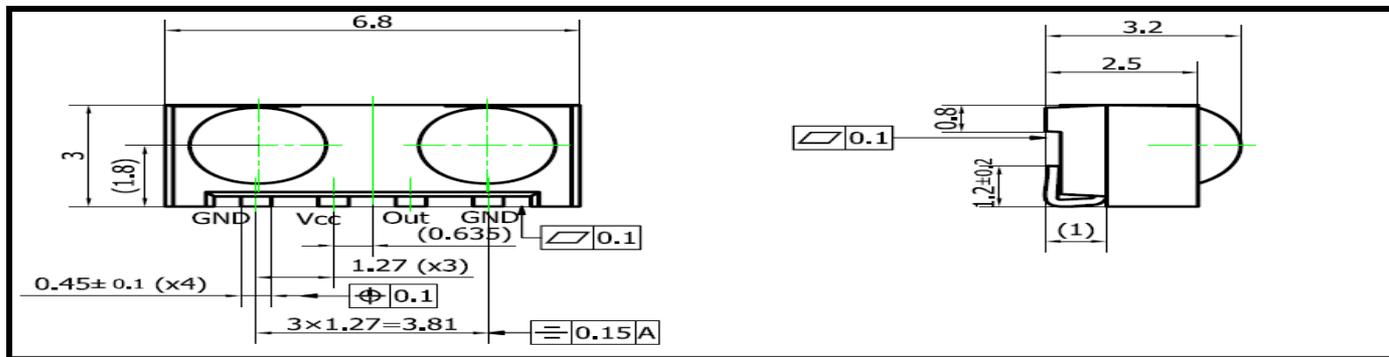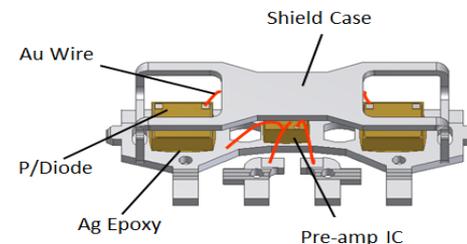
IR Receiver Line-up

Product Introduction for SMD Type Series

1. Description

The R2IN1 Series consist of Infrared receiver for remote control system and LED for Indicator
The R2IN1 Series can be applied for the remote control and LED applications at the same time such a Display.

2. Features

-. 2 IN 1 Package (Receiver Modules & LED)
-. High sensitivity performance, improved arrival distance
-. 2.7~5.5 Volt supply voltage, Low power consumption
-. Shielded against electrical field disturbance
-. High immunity against ambient light
-. Easy interface with the main board
-. TTL and CMOS compatibility
-. RoHS Compliance

IR Receiver + LED
(for Remote control & Indicator LED)
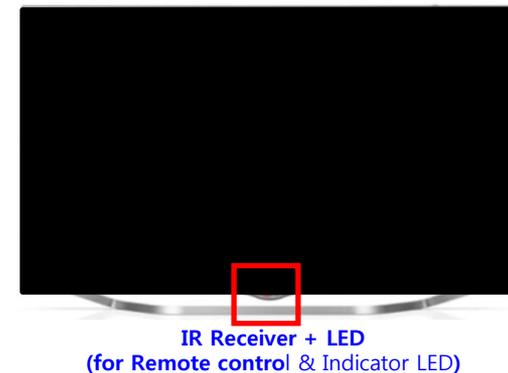
3. Application

-. Display, Set Top Box, Sound Bar, Audio system, Computers, Interior controlling application and appliances that require remote controlling and indicator LED

4. State : Mass Production

① : GND
② : IR GND
③ : RM Vout
④ : RM Vcc
⑤ : LED Anode
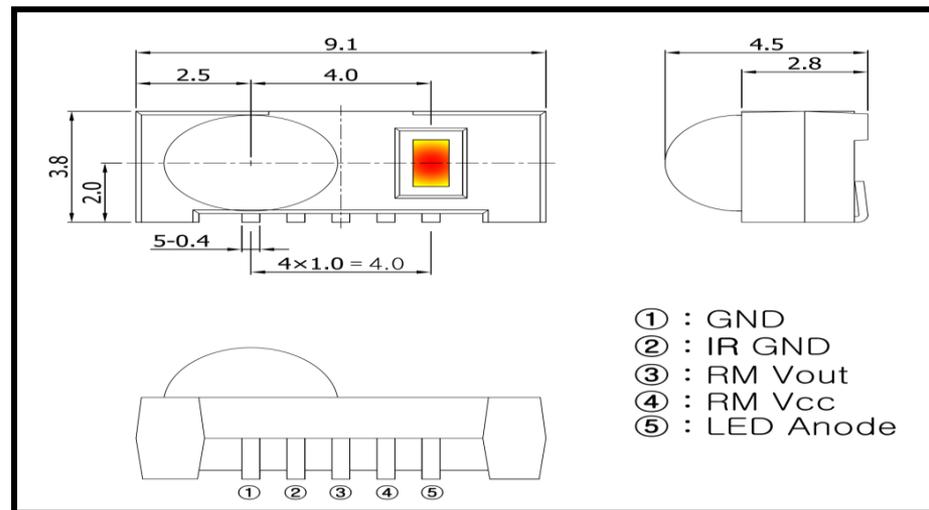
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-. Encoder
-. IR Receiver Module

Part 2

Application Overview
-. Automotive
-. Home Appliance
-. Industrial
-. Medical & Health Care
-. Office Automation
-. Financial Equipment
-. Biometrics & New Products

Automotive

Automotive

Dimming function on side mirrors
- ST-1CL3H

Sun Sensor
- KMEE001A
- KMEE002A
- HP5F
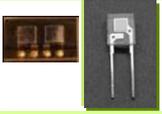
Auto Light Sensor
- KHP2032

Auto Light & Sun Sensor
- KOE1108S/D
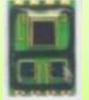
LED for Control Panel/ Audio/Air conditioner Backlight
- KLP-3528

Dimming of a Liquid crystal Panel
- PIC89601
- PIC96601

Optic Receiver Module
- PIC79603
- PIC95603

White LED for Interior Lighting
- KLP-5450

Rotary Type Switch
- KIT3025S (2ch)
- KIT2011S (1ch)

Handle Steering angle detection
- IR LED
- Photo Tr.
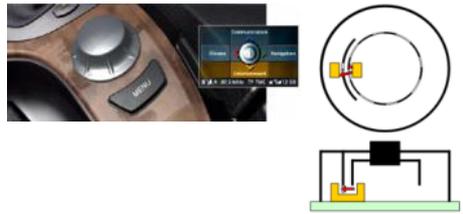
Crank Angle
- CL-1KL3-MT
- SP-1KL-MT

LED for Signal
- KLP-3528

Automotive

Rotary type switch

<AEC-Q101 Compliant>

1. Description

-. The KIT3032S is a compact transmission type photo interrupter, which combine high-output GaAs IRED with high sensitive dual photo transistors.

2. Features

-. Surface mount package

-. Operating Temp : -40℃ ~ 105℃

-. Moisture Sensitive Level(MSL) 2.

-. AEC-Q101 release

-. Gap Width : 2.9mm

[KIT3032S]   [KIT3025S]

3. Application

-. Automotive / Motor Control

Temperature Controller   **Navigation Controller**   **Control Panels**

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Automotive

Power Outlet switch

1. Product Introduction

◆ The KIT9011A is a high-performance type of photo interrupter, which combines high-output GaAs IRED with high sensitive photo transistor.

2. Features

◆ PWB direct mount type

◆ Operating Temp : -40℃ ~ 95℃

◆ AEC-Q101 Compliance

◆ Gap Width : 10mm

◆ Slit Width : 0.8mm X 4
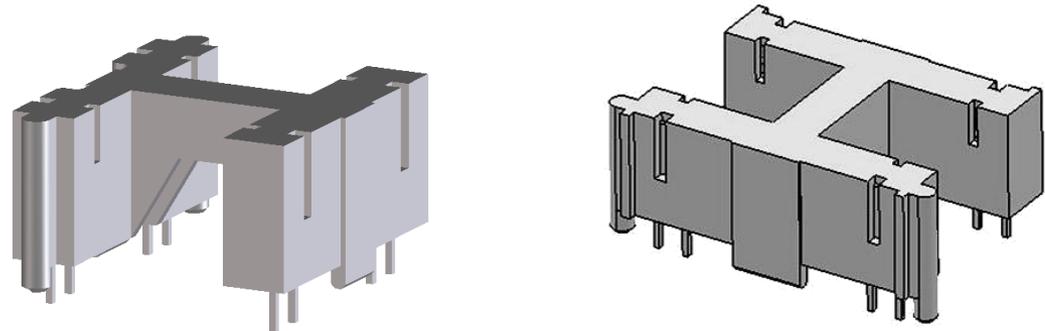
3. Application

◆ Automotive

  - Power Outlet 220V / 115V

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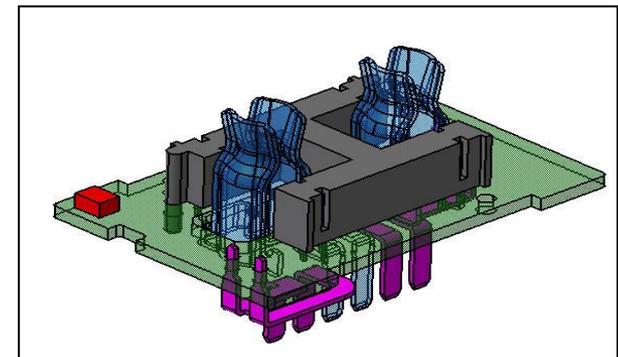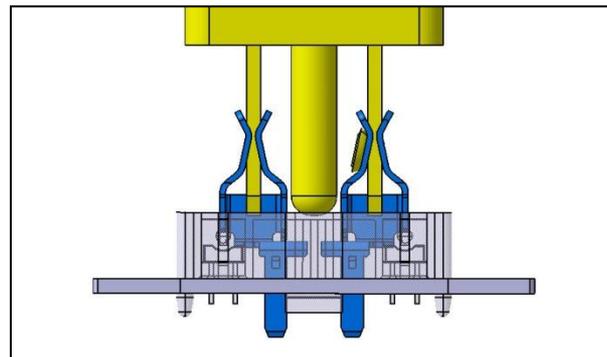
Automotive

Auto light & Sun sensor

1. Description

-. The Sensor which turn on or off automatically headlight and taillight by detecting the ambient brightness.

-. The sensor that controls air conditioner and heater according to a mount of solar radiation.

2. Features

-. High speed response

-. 9.5mm X 7.4mm x t=1.3mm (KOE1108D)

-. 7.8mm X 5.5mm x t=1.3mm (KOE1108HA/HS)

3. Application

-. Auto Light & Sun sensor controller
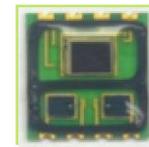
❖ **KOE1108D**
① Auto light & Sun sensor
② Light to Voltage sensor & Pin photo diode
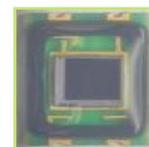
❖ **KOE1108HA**
① Auto light sensor
② Light to Voltage sensor in a COB package
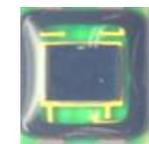
❖ **KOE1108HS**
① Sun sensor
② Dual Pin photo diode in a COB package

Auto Light sensor on the crash board

AUE

Automotive

Active Hood lift system

1. Description

-. This product is applied to Active hood lift system, which consists of LED & PD.

Led and Photo Diode elements are connected to the optical fiber and when a collision is detected, the hood of the vehicle pops up.
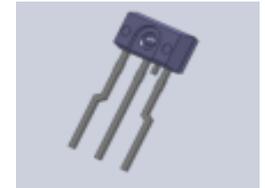
[KER-1101AH]   [KER-1102AH]

2. Features

-. Operating Temp : -40℃ ~ 125℃

-. Operating Current : 15㎃

3. Application

-. AUTOMOTIVE – Active hood life system

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Automotive

Visible LED for Indicator

<AEC-Q101 Compliant>
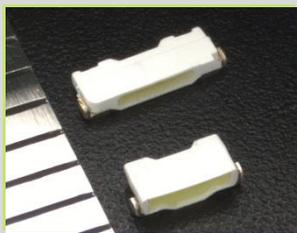
· Lighting
· 0.1w ~
· Package type
· Side View
· 3.8×1.2mm, 2.8×1.2mm
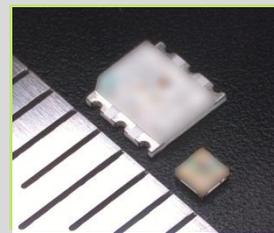
· Indicator
· 3in1　LED（Red、Green、Blue）
· Size
  2.7×3.0　t=0.9mm
  1.1×1.1　t=0.45mm
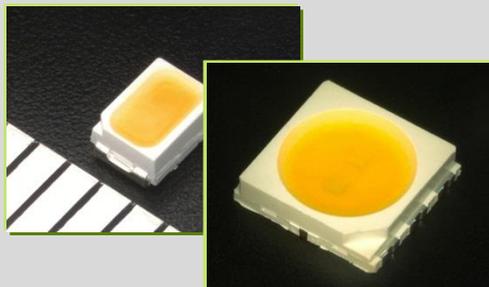
· Lighting
· 0.1w ~
· Package type
  3014 , 3020
  3528 , 5050
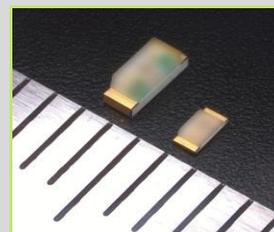
· Indicator
· 2.7 ×1.0mm、 1.6×0.8mm
· White/Blue/Green/Red/
  Yellow/Orange···
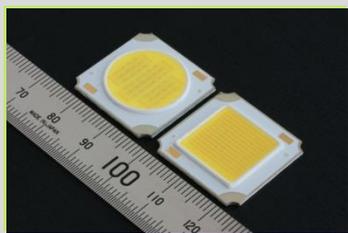
· Downlight,
· LED light bulb
· 3W ~
· COM　Type
· 100lm/W ~

· Indicator
· Φ5mm、Φ3mm
· White/Blue/Green/Red/
  Yellow/Orange···

AUE

Home Appliance

Home Appliance

TV / Moniter

Optical Touch Screen
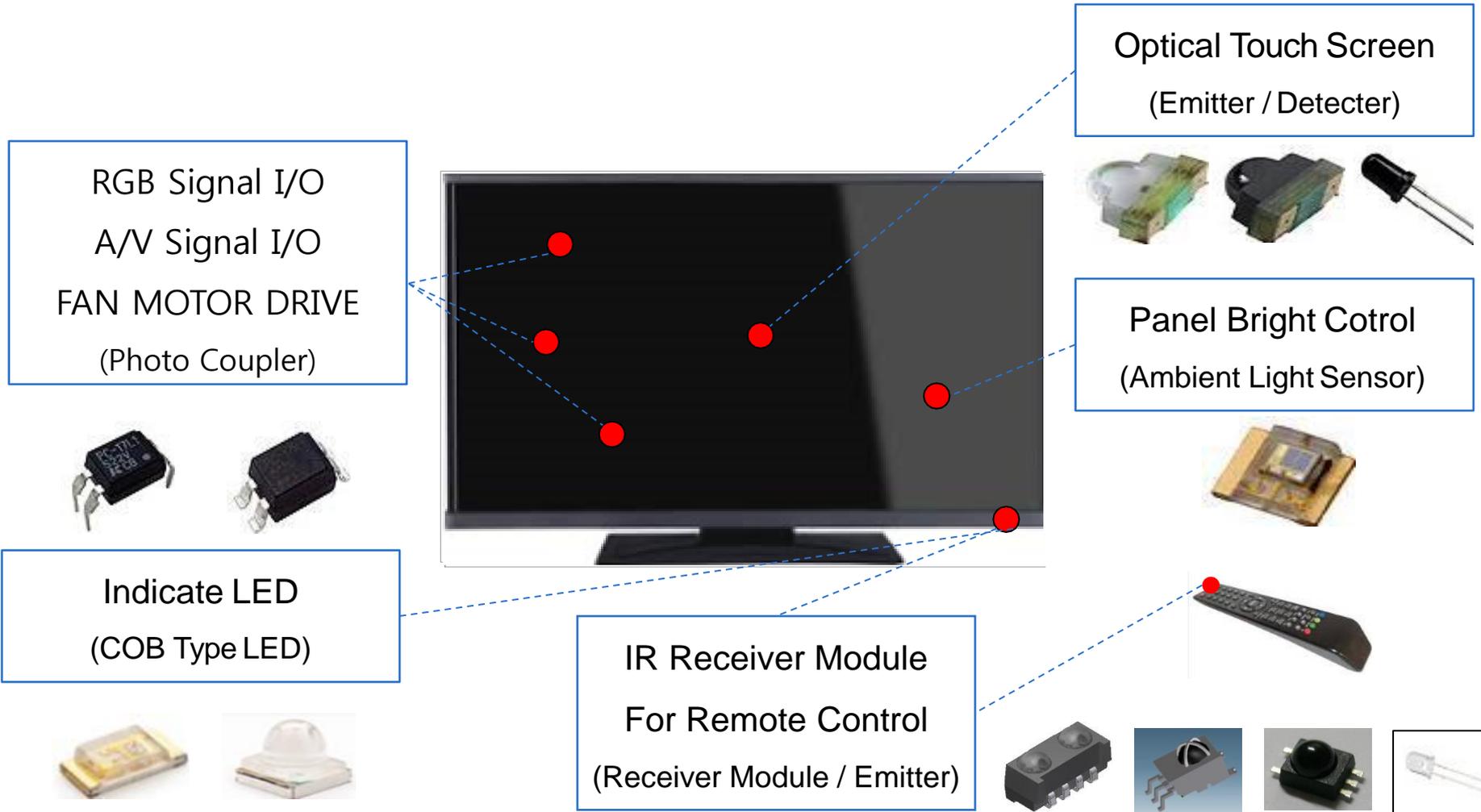
(Emitter / Detecter)

RGB Signal I/O

A/V Signal I/O

FAN MOTOR DRIVE

(Photo Coupler)

Panel Bright Cotrol

(Ambient Light Sensor)

Indicate LED

(COB Type LED)

IR Receiver Module

For Remote Control

(Receiver Module / Emitter)

AUE
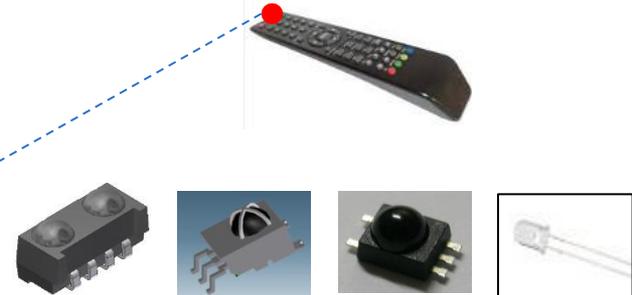
Home Appliance

SMD IR LED

1. Product Introduction

-. This sensor is a surface-mount infrared light emitting device

2.Features

-. Small surface mount PKG (3.4 X 1.5 X 2.7㎜)
-. Reflow possible (Side view & Top View)
-. Pulse forward current : 0.5A
-. Peak light emitting wavelength : 940㎚

3. Application

-. ATM用 Touch screen (Infrared Beam Touch Screen)
-. Remote controller

4.Dimension
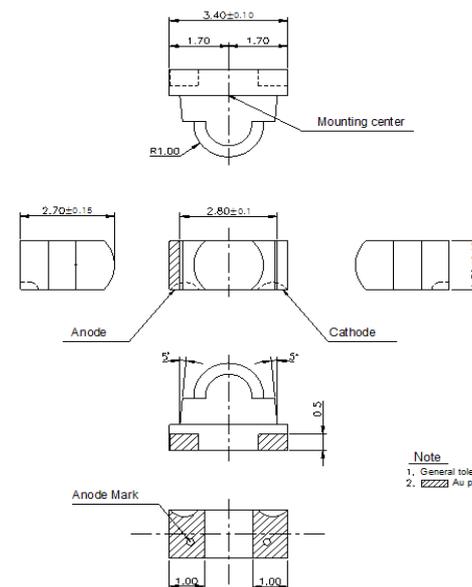
Home Appliance

SET TOP BOX / DVD

Voltage Interface

(Photo Coupler)

Indicate LED

(COB Type LED)
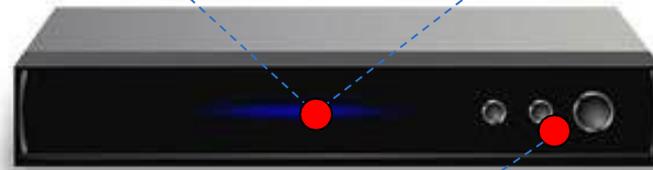
IR Receiver Module For

Remote Control

(Receiver Module / Emitter
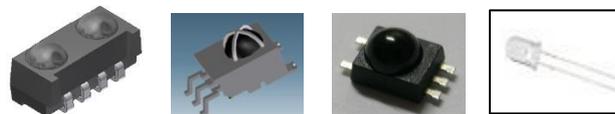
Home Appliance

ROBOT CLEANER

Trash Box Sensor

(Sensor Module)

(UNDER DEVELOPMENT)

Docking Sensor

(IR Receiver Module)

Cliff Sensor

(Photo Interrupter)

Customized Product

Indicate LED

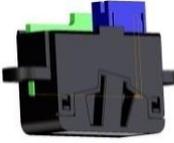(PLCC Type LED)

Floor Material Sensor
(Sensor Module)

Distance Sensor
(Sensor Module)

Detection of Obstruction

(Photo Interrupter)

Customized Product

Home Appliance

Distance Sensor

1. Product Introduction

-.This sensor is a near distance measure photointerrupter.

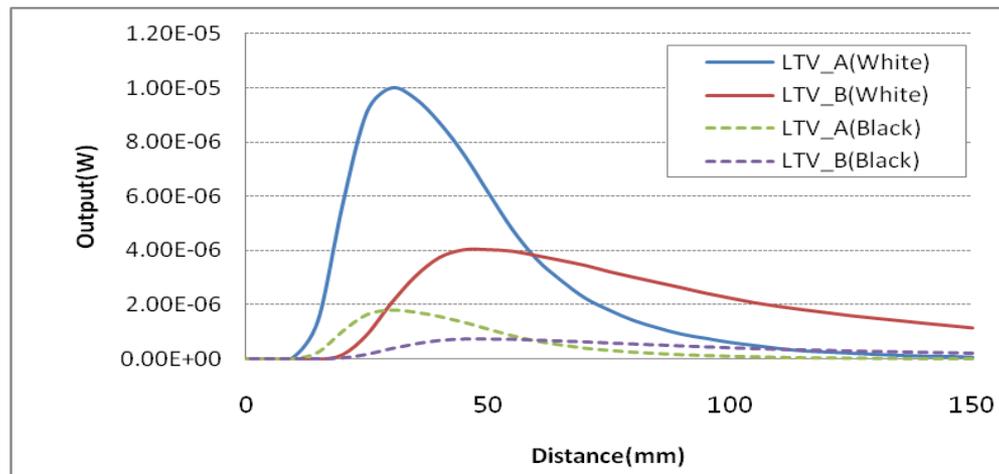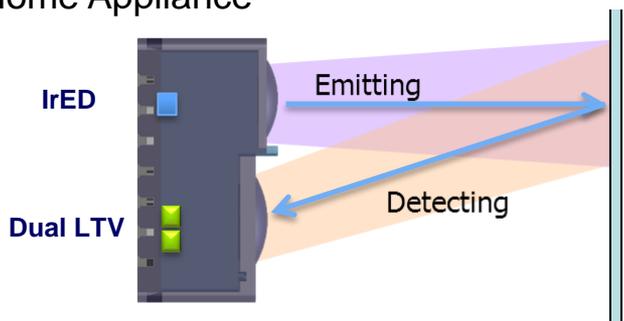-. It is combines high-output GaAs IRED and high sensitive LTV with amplifier.
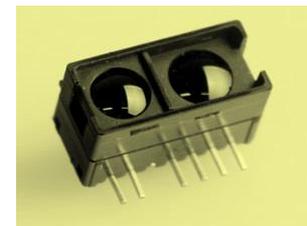
2.Features

-. Application : Auto Robot Cleaner

-. It is detectable without being affected by reflectance by 2ch LTV use

-.Small Package Type
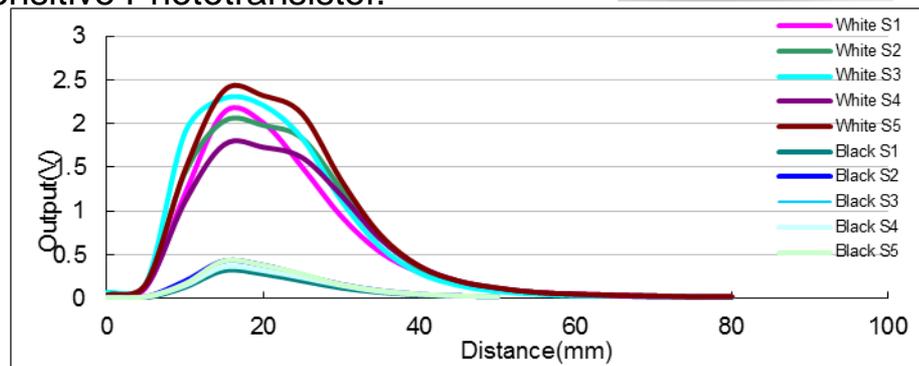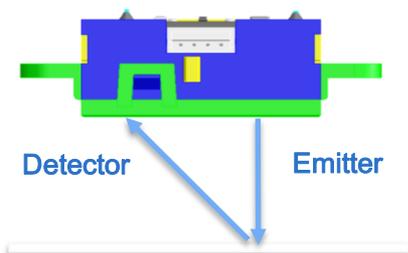
3. Application

-. Robot Cleaner

-. Home Appliance

IrED
Emitting
Dual LTV
Detecting

Output(W) vs Distance(mm)

- LTV_A(White)
- LTV_B(White)
- LTV_A(Black)
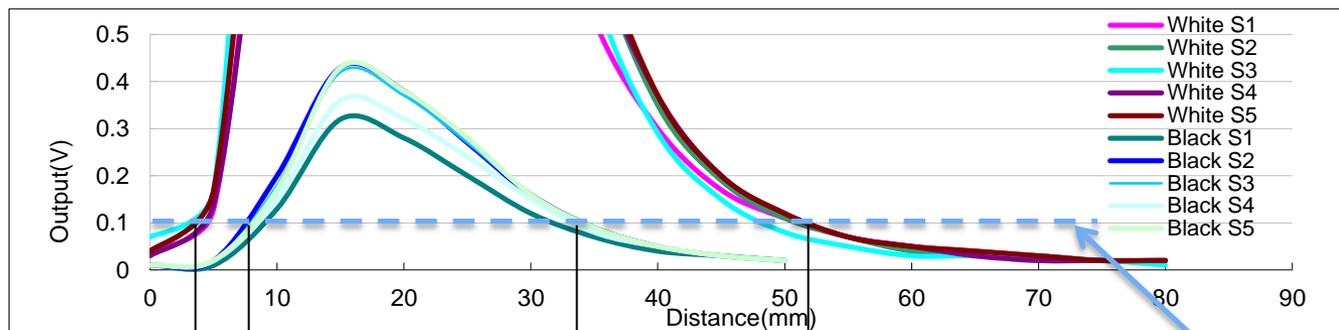- LTV_B(Black)

Home Appliance

Cliff Sensor

1. Product Introduction

- -. This sensor is a near distance measure photointerrupter.

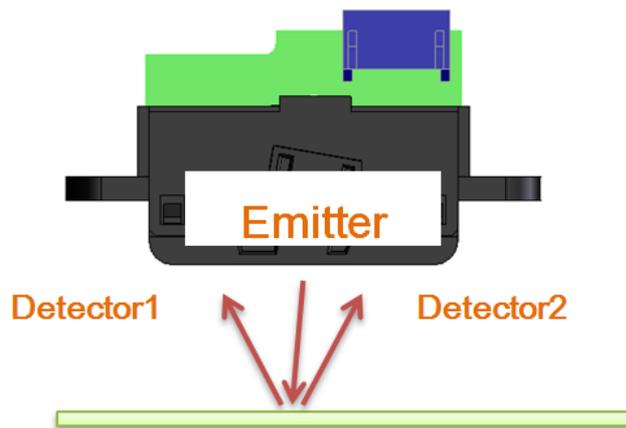- -. It is combines high-output GaAs IRED and high sensitive Phototransistor.

Detector   Emitter

- **Standard of Judgment [Floor or Drop]**

Black Detection Range   Detection Gap

White Detection Range

Threshold Voltage

Always Floor   Floor or Drop   Always Drop

- PWM : 1KHz , Duty 40

AUE

Home Appliance

Floor Material Sensor

- **Basic Principle(Optical System)**

Emitter

Detector1   Detector2
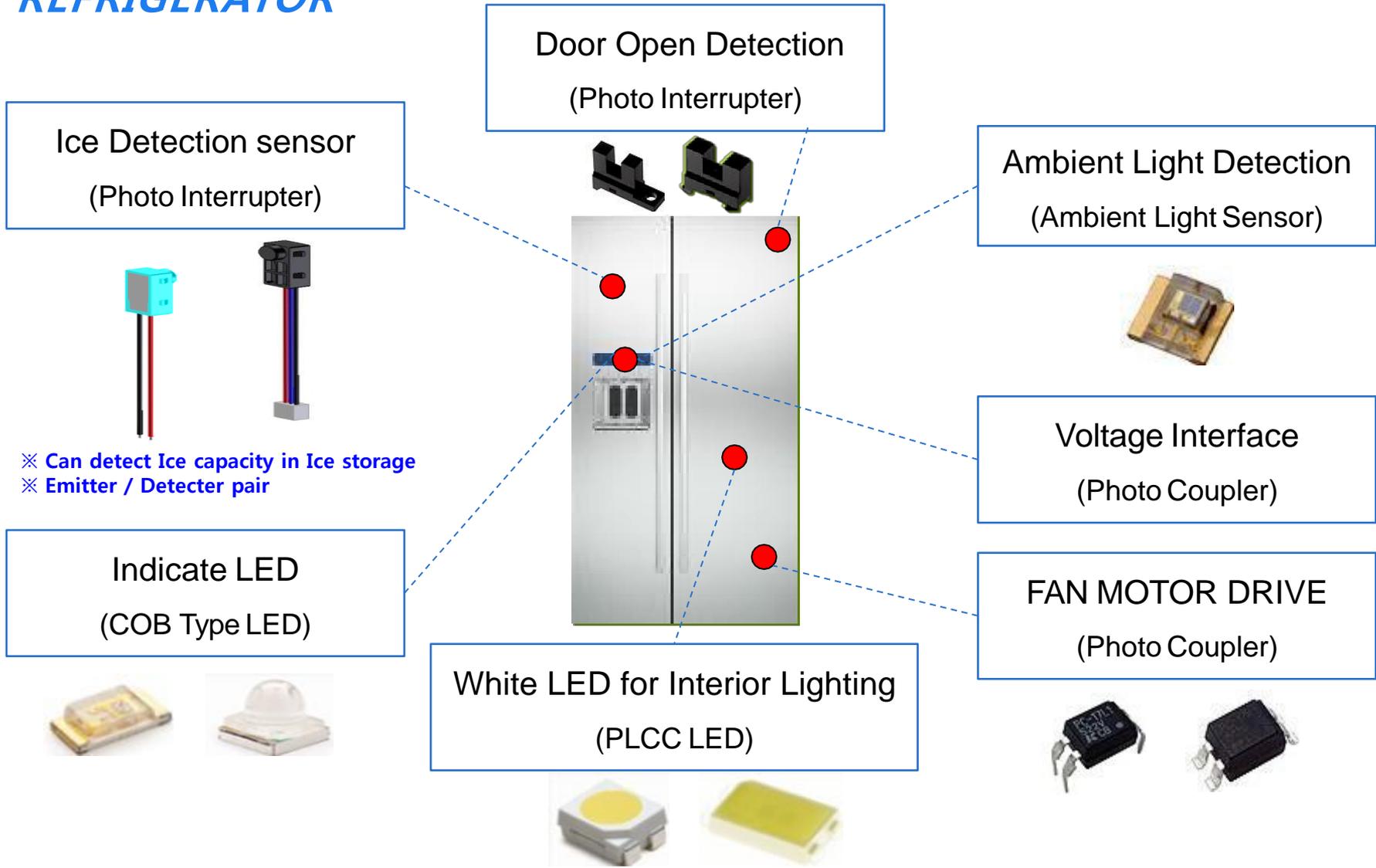
- **Output Signal**
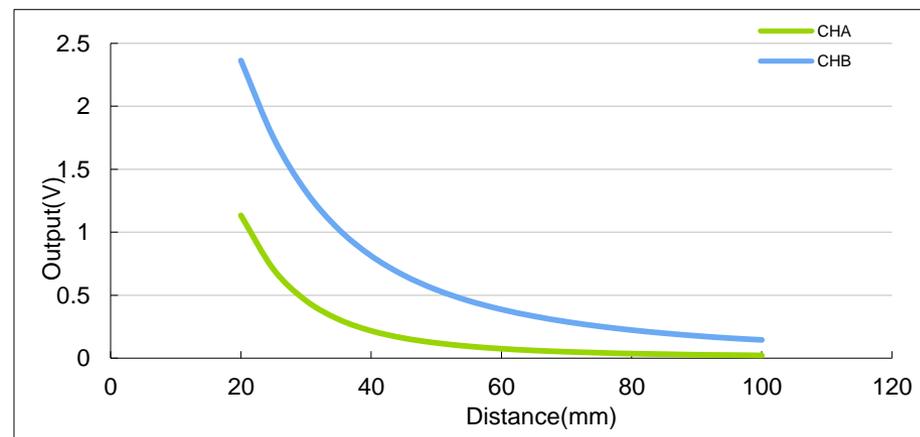
- **Standard of Judgment [Floor material]**

→ This sensor can detect floor material by Ratio difference of ChA, ChB.
→ This sensor can be used as a cliff detection sensor as well

AUE

Home Appliance

REFRIGERATOR

Door Open Detection

(Photo Interrupter)

Ice Detection sensor

(Photo Interrupter)

Ambient Light Detection

(Ambient Light Sensor)

※ **Can detect Ice capacity in Ice storage**
※ **Emitter / Detecter pair**

Voltage Interface

(Photo Coupler)

Indicate LED

(COB Type LED)

FAN MOTOR DRIVE

(Photo Coupler)

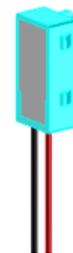**White LED for Interior Lighting**

(PLCC LED)

AUE

Home Appliance

ICE Detection

1.Product Introduction
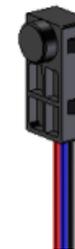
-. Ice Detection Sensor KIS9021H, KIS9022H are high reliability
   LED Ass'y and PTr Ass'y.

-. It can be used as a Ice Detection Sensor.

[Ice]

[KIS9021H]   [KIS9022H]

2. Features

-. Waterproof & Dustproof

-.Sensing Gap : 400mm

-. Voltage Output : Directly connect to a MCU

[Ice Maker]

3. Application

-. Refrigerator

-. Water Purifier

-. Ice Maker

[Ice Box]

Home Appliance

WASHING MACHINE

Ambient Light Detection

(Ambient Light Sensor)

Control Knob

(Photo Interrupter)

Indicate LED

(COB Type LED)

Micro computer Interface

(Photo Coupler)

IGBT Control

(Photo Coupler)

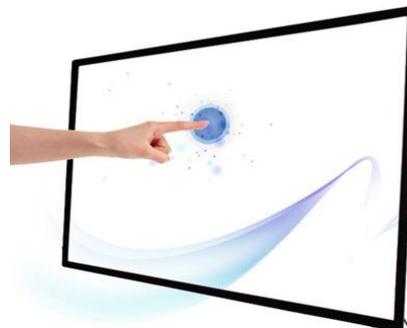Sensing for Motor Rotation

(ENCODER)

AUE

Home Appliance

AIR CONDITIONER

Ambient Light Detection

(Ambient Light Sensor)

IR Receiver Module For Remote Control

(Receiver Module / Emitter)

Shutter Open Sensor

(Photo Interrupter)

Indicate LED

(COB Type LED)

Micro Computer Interface

(Photo Coupler)

IGBT Control

(Photo Coupler)

AUE
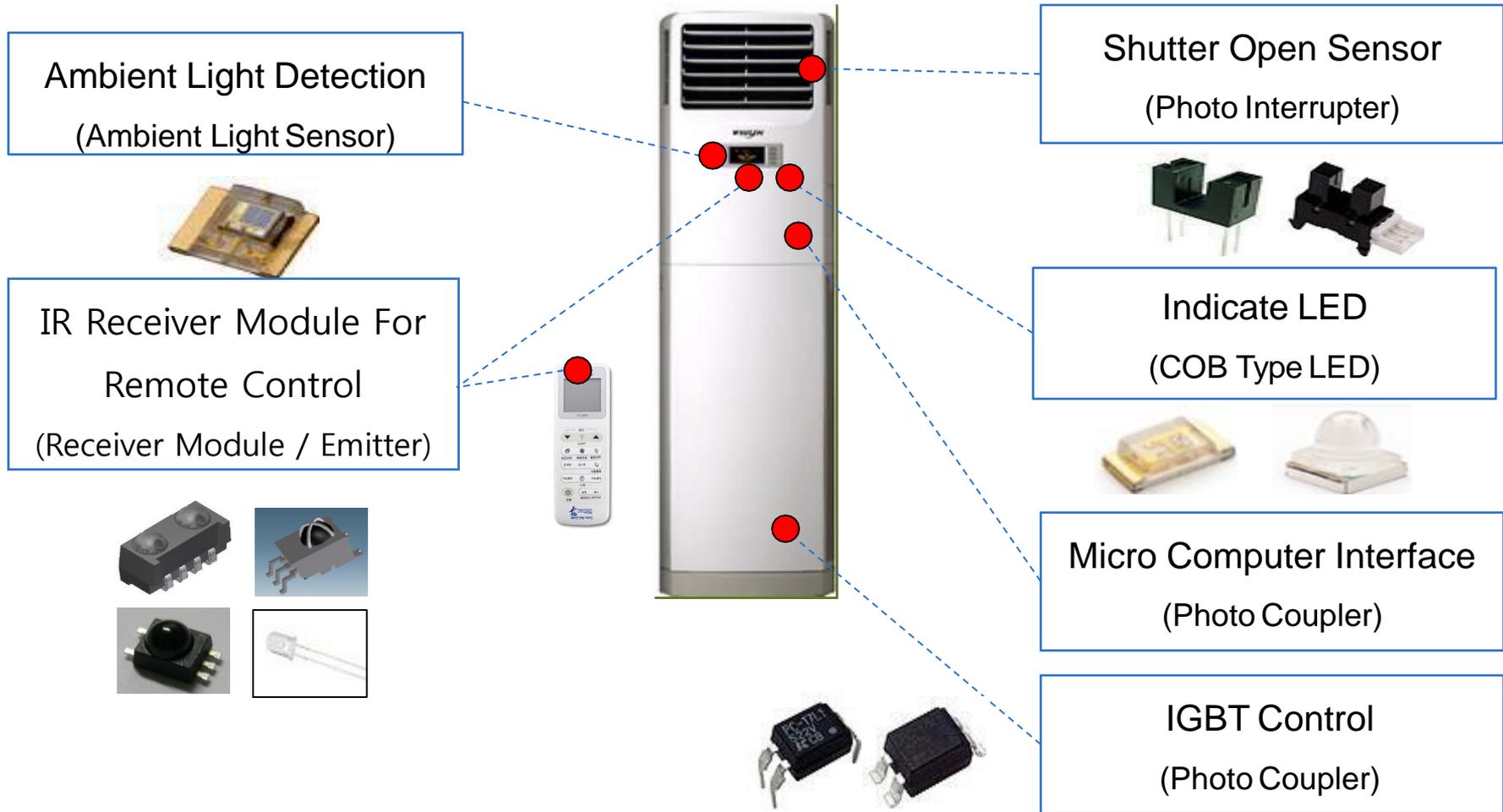
Home Appliance

Touch Panel

(Touch Monitor)

(Touch Board)

NO.	TOUCH PANEL SIZE	AUK LINE UP				etc
		EMITTER	DETECTOR	PHOTO_E	PHOTO_D	
1 **NEW**	SMALL ~ 20 Inch	KEL5315C (940nm)	KDT6315BE			SMD PACKAGE _ COB
2	MIDDLE 20 ~ 70 Inch	KEL5037A (940nm)	KDT5037A			DIP PACKAGE _ OVAL
3	BIG 70 Inch ↑	SI5315DS (870nm)	ST5811			DIP PACKAGE - ROUND

AUE

Home Appliance

PC / Laptop

Ambient Light Detection

ALS : KOE1615

Iris Sensor

Iris Module

BLU LED

LED : KP2812W, KP3810W

Optical Touch Screen

Emitter : KEL5315C
Detector : KDT6315BE

Battery Backup Circuit

Photo Coupler :
PC17K1, PC17L1, PC17K1C

Indicate LED

LED : KLB-16 Series

LAN Connection

Photo Coupler :
PC17K1, PC17L1, PC17K1C

**Sensor for
Wireless Keyboard & Mouse**

Emitter : KEL5002A
IR Receiver Module : KSM-20x Series

Fingerprint Sensor

SS-FS01, SS-FS03, SS-FS05

Encoding Sensors for Mouse

Detector : KST312

AUE

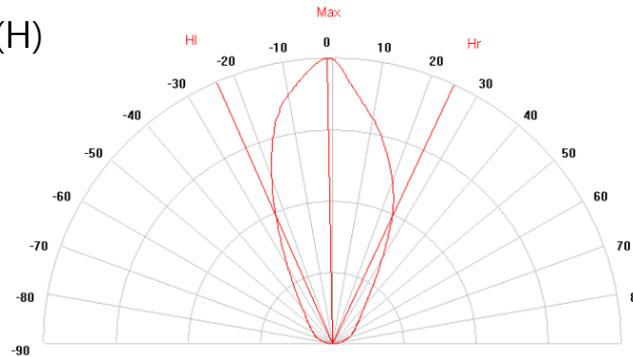# Home Appliance

PLCC IR LED

1. Product Introduction

-. Even with its small package without LENS, it is LED which gave a narrow directivity.

You can implement the product space is limited, such as Mobile equipment.

2. Feature

-. PKG Size : 1.9mm(W) x 2.3mm(L) x 0.9mm(H)

-. 770nm/870nm/940nm

-. Top View

-. SMD Package

3. Application

-. IR Communication

-. Optical Switch

-. Light Source for biometrics

AUE

INDUSTRIAL

INDUSTRIAL

Precision Measurement of Photo Diode

1. Product Introduction

-. This product is ideal for high sensitivity and

low-noise photodiode of the precise light measurement.

2. Features

-. Short wavelength (UV) is also high sensitivity

-. Low dark current

-. Low capacitance

3. Application

-. Optical measurement equipment
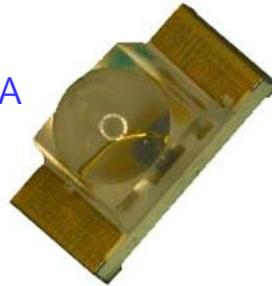
-. Analytical instrument

-. Industrial equipment

Spectral sensitivity

Ta=25℃ Typ.

Type B

Type A

Sensitivity [A/W]
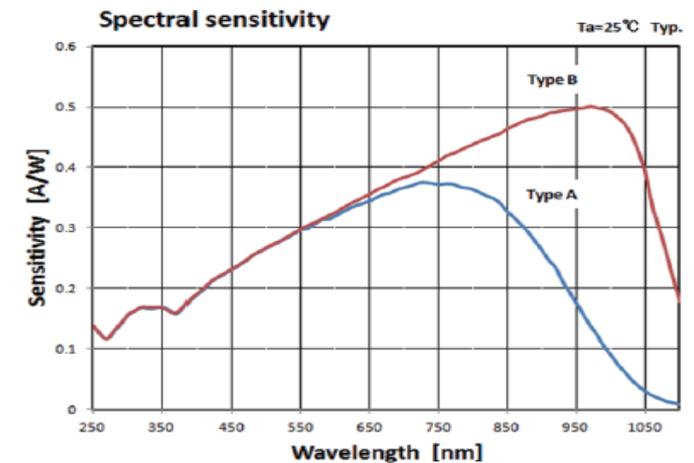
Wavelength [nm]

INDUSTRIAL
High Power IrED

1. Features

-. SMT package with lens

-. High power output 25mW @IF=20mA

-. Peak wavelength 850nm

-. Half angle ±30deg.

1. Features

-. Φ5mm top view leaded

-. High power output 25mW @IF=20mA

-. Peak wavelength 850nm

-. Half angle ±30deg.

2. Application

-. Security camera illumination

-. Light source for infrared sensor

AUE

Healthcare

Medical & Health care

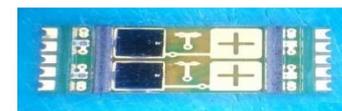## Blood Glucometers- Blood strip reader

1. Photo Diode Output

-. Products no: KIR0105T2(2ch), KIR0105T3(3ch), KIR0105T4(4ch)
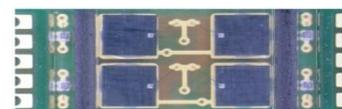
-. Features
- Consisted of high sensitive photo-diode and GaAIAs Red LED
- Compact reflective photo interrupter
- High-response speed, low optical cross-talk
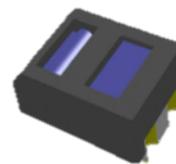- High-reliability in demanding environments
- PCB package

<2CH>

<3CH>

<4CH>

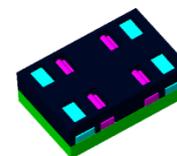### 2. Photo Transistor Output

-. Products no: KPI3020R, KPI3020R4

-. Features
- Miniature Leadfree surface Mount Package
- Optimal sensing distance : 1.0 mm
- Visible light cut resin to prevent
- Reflow Soldering
- Compact Size
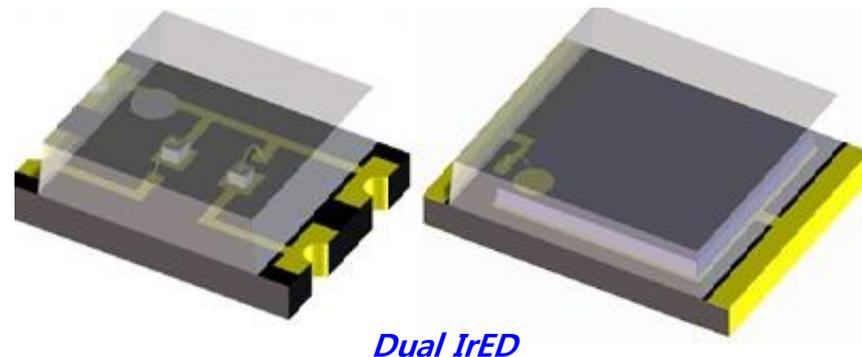- RoHS compliant and Lead free package

<1CH>

<4CH>

AUE

Medical & Health care

SpO2 Sensor

1. COB Dual IrED

-. Products no: KED5005A

-. Features
  - Peak wavelengthλp1=730nm±10nm
  - Peak wavelength λp2=810nm±10nm
  - Size 5.4(L)×4.0mm(W)×1.3(H)mm

Dual IrED

Finger Tip Pulse Oximeter

2. Photo Diode

-. Products no: KDP5004C, KDP5010C

-. Features
  - High sensitivity Si PIN Photo Diode
  - Size : 3.0mm(KDP5004C), 4.5mm(KDP5010C)
  - SMD package : 5.4×4.0×1.3mm(KDP5004C)
                6.9×5.5×1.3mm(KDP5010C)

LED's Emit Red and Infra-Red Light

Photo-Diode Measures Light Transmission

SpO2 Measure and Pulse Rate Display

Medical & Health care

Wearable Device

1. Product Description

-. Reflective Photo Interrupters for wearable devices

2. Features

-. Emission of light peak wavelength $\lambda p1=660nm\pm1.5nm, \lambda p2=940nm\pm10nm$

-. Detector Size 2mm, 1.5mm (660nm/940nm led + photodiode)

-. Miniature SMD package suitable for wearable devices

3. Applications

-. Wearable Fitness Watch

Heart Rate Monitoring

Pulse Oximeter
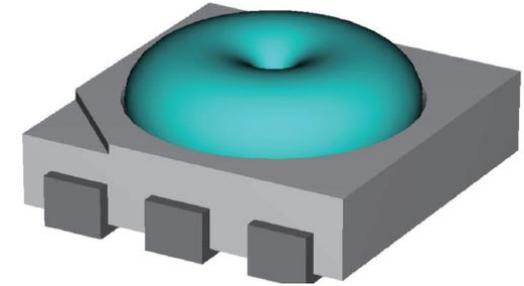
Product Overview
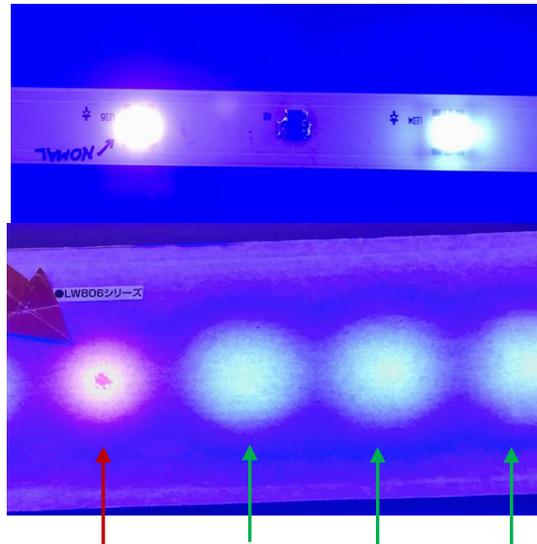
Medical & Health care

Donut Lens LED

1. Product Introduction

-. This is LED looks like donut

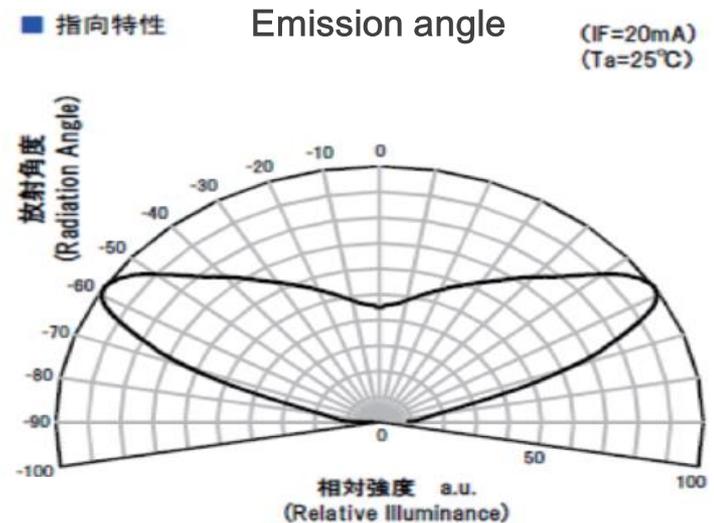 to achieve a wide range of lighting without point light.

2. Features

-. Not a point light

-. Wide light distribution

-. Low profile

3. Application

-. Indicator

-. Illumination

-. Backlight

Directional characteristics

Emission angle

■ 指向特性   (IF=20mA)
                (Ta=25°C)

放射角度
(Radiation Angle)

相対強度   a.u.
(Relative Illuminance)

Relative intensity

General LED   Donut Lens LED

●LW806シリーズ

AUE

Medical & Health care

UV LED for Sanitation

Bacterial sterilization

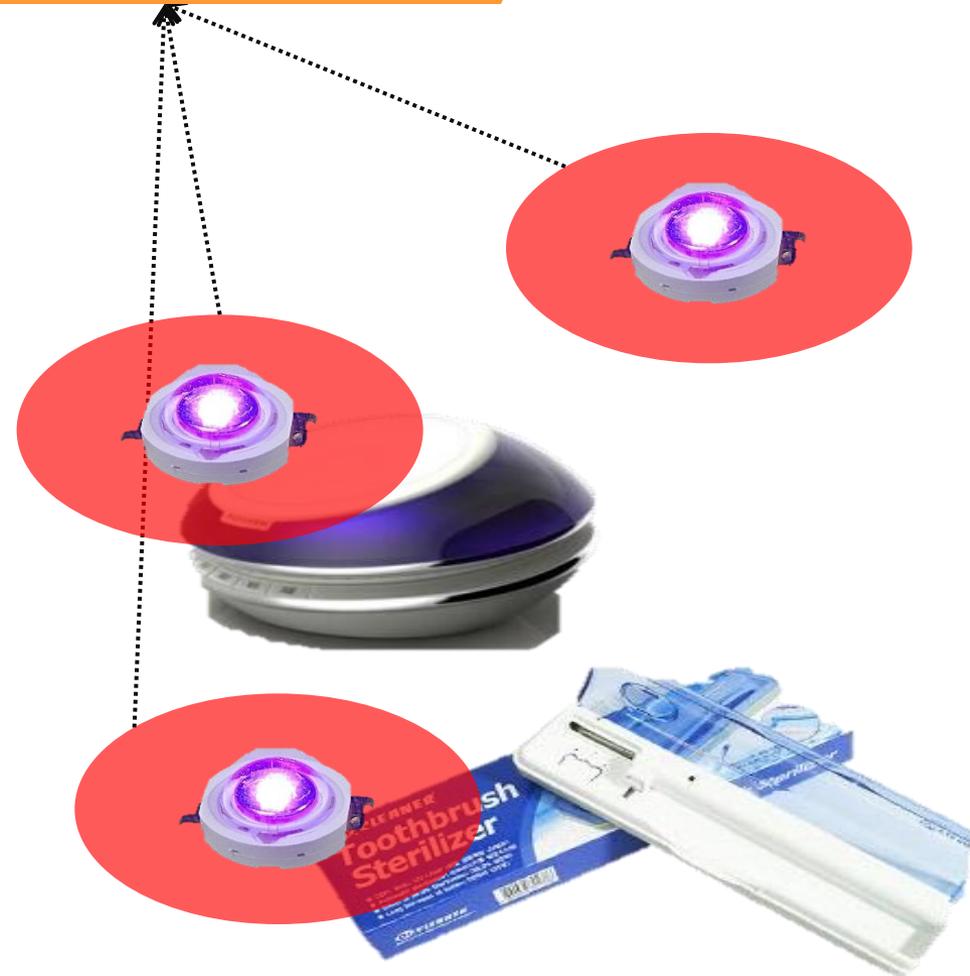**1. Product Description**

-. UV LED for bacterial sterilization

2. Features

-. UV wavelength suitable for sterilization

(400nm)

3. Applications

-. Wearable Fitness Watch

Office Automation

Office Automation

Inkjet Printer Solution (Sensor)

For highly precise turn,
operation control
Encoder

For alignment detection
Reflective Sensor

For a paper jam,
paper position detection
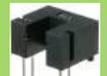Paper Sensor

For ink residual quantity
detection
Reflective Sensor

For paper edge detection
SMD Reflective Sensor

For indicator,
scanner light source
High-Brightness LED

For the detection
of the operation part
Photo Interrupter

Office Automation

Laser Printer Solution (Sensor)

For DC Motor control
Cup Disk & Encoder

For the detection of
manuscript size
Manuscript size sensor

For a paper jam,
paper position detection
Paper Sensor

For a bend of the paper,
User's body detection
Distance Sensor

For timing detection
of the laser scanning unit
Printing timing sensor

For the detection
of the operation part
Photo Interrupter

For the diselectrification
of the exposure drum
LED Eraser Lamp

For paper thickness ,
multi feeding detection
Displacement Sensor

For tilt detection of
transcription belt and paper
Edge Sensor
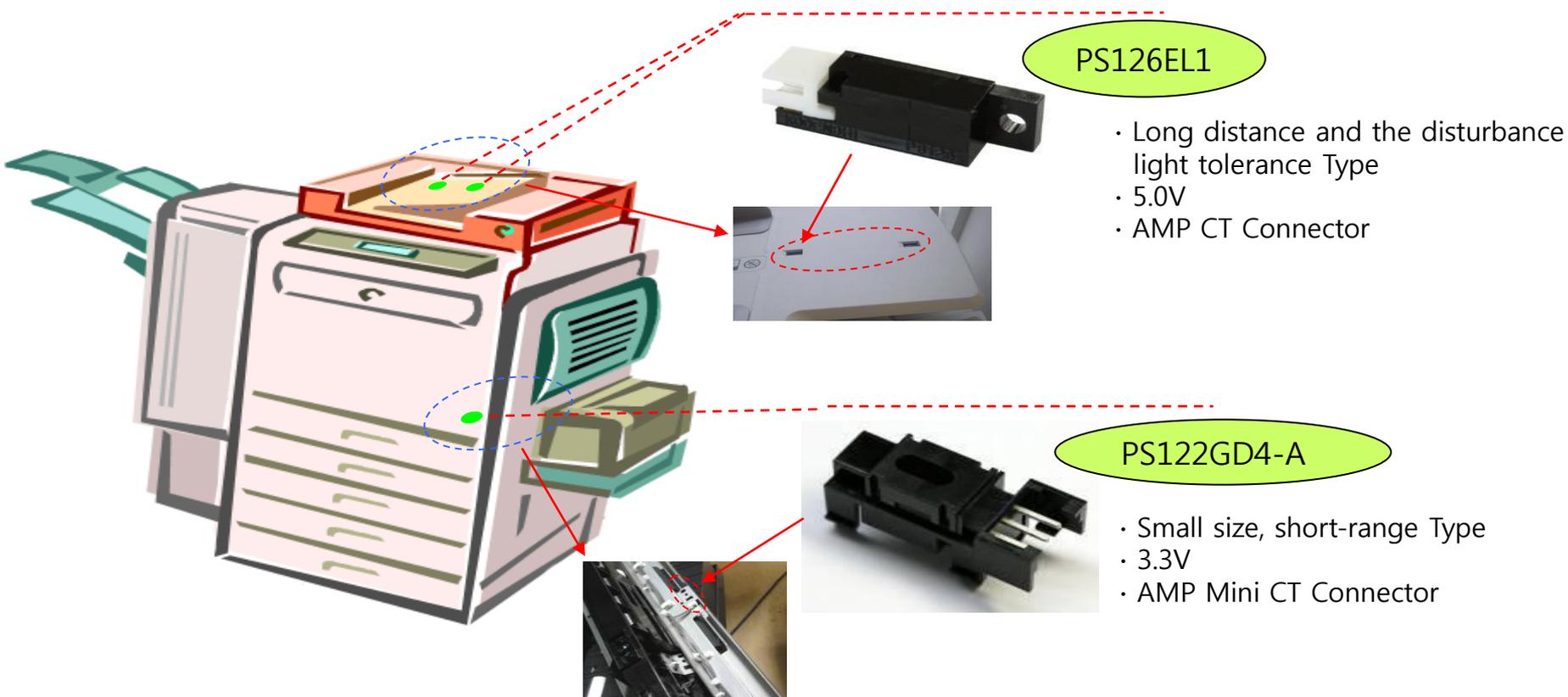
For toner density detection
CTD Sensor

For color toner position
shift detection
ACR Sensor

Office Automation

Paper sensor

- This sensor made for paper presence, JAM detection in printer and MFP
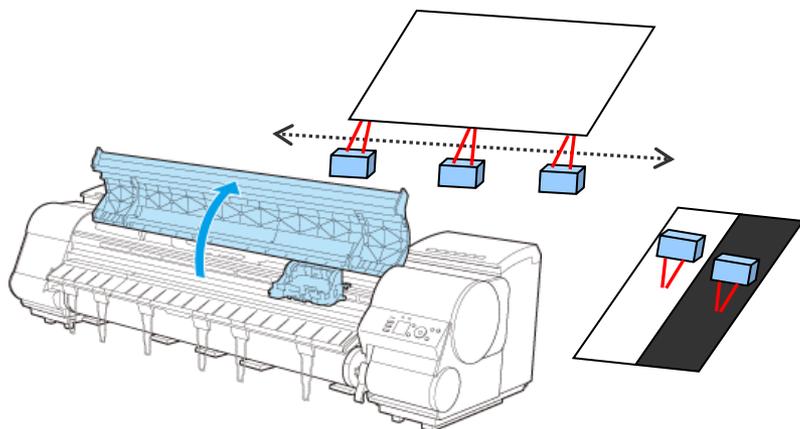- There is an abundant lineup.

PS126EL1

- Long distance and the disturbance light tolerance Type
- 5.0V
- AMP CT Connector

PS122GD4-A

- Small size, short-range Type
- 3.3V
- AMP Mini CT Connector

AUE

Office Automation

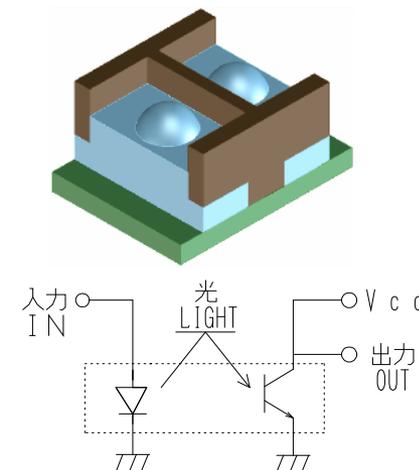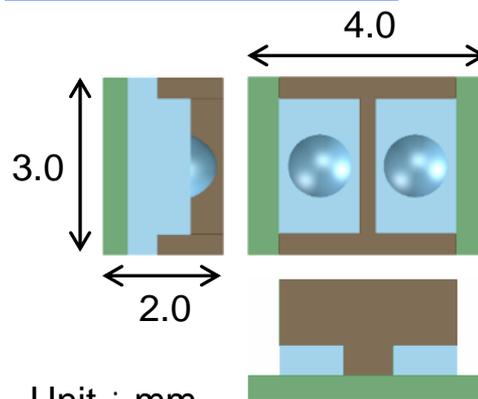## SMD sensor (Reflective sensor)

1. Feature
- -. Compact package
- -. Surface mount is possible.
- -. Photo-transistor output
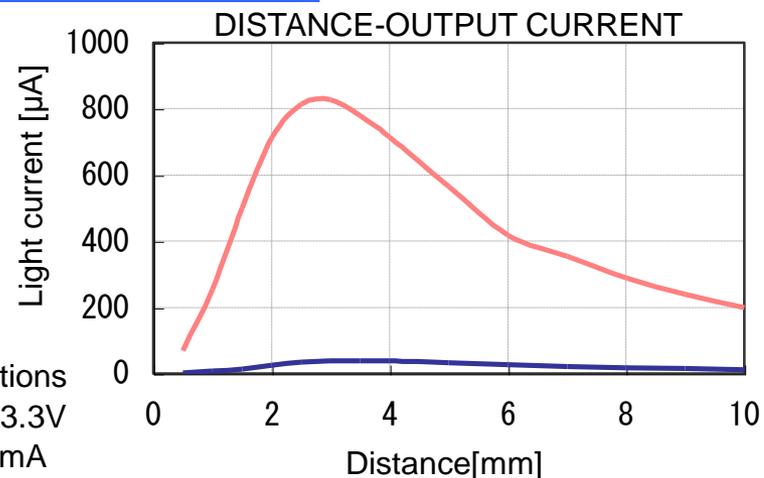- -. Output maximum is a position of 3 mm of detection distance.

2. Use
- -. Starting point detection
- -. Width of paper detection
- -. paper front and backside detection etc.

Outside dimension

4.0

3.0

2.0

入力
IN

光
LIGHT

Vcc

出力
OUT

Unit：mm

Typical characteristic

DISTANCE-OUTPUT CURRENT

Conditions
VCE=3.3V
IF=15mA

Light current [μA]

Distance[mm]

Office Automation

Distance sensor

- As a standard product about an analog output product, digital output product each three kinds of distance ranges (Long/Middle/Short) are customized product supports by a demand

	Analog Type					
Distance Range	**Short**		**Middle**		**Long**	
Flange for a screw clamp	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
Product No.	ORA1S01	-	ORA1M04	ORA1M05	ORA1L02	ORA1L03
Sensing Distance	2～18cm		5～60cm		10～150cm	

	Digital Type					
Distance Range	**Short**		**Middle**		**Long**	
Flange for a screw clamp	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
Product No.	ORD1S06	-	ORD1M13	ORD1M10	ORD1L07	ORD1L08
Sensing Distance	TBD(5cm)		25cm		TBD(40cm)	

Short
13㎜

Middle
13㎜

Long
17.5㎜
13㎜
26.5㎜

AUE
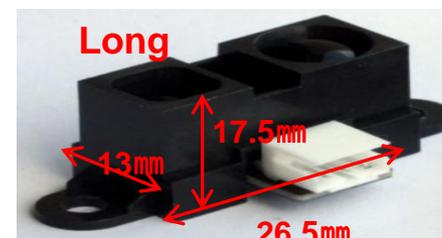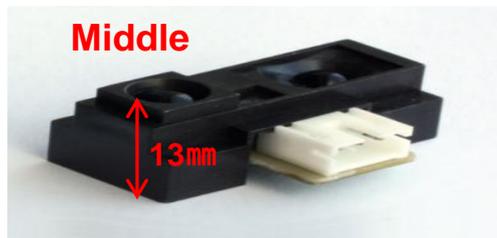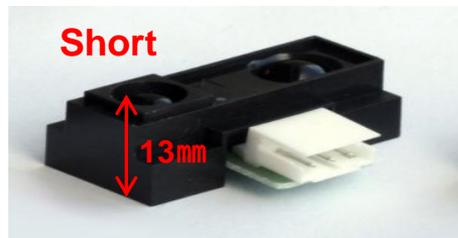
Office Automation

CTD(Color Toner Density) Sensor

1. Product Introduction

The sensor is used the principle of difference of absorption in the infrared wavelength on the color tonners.
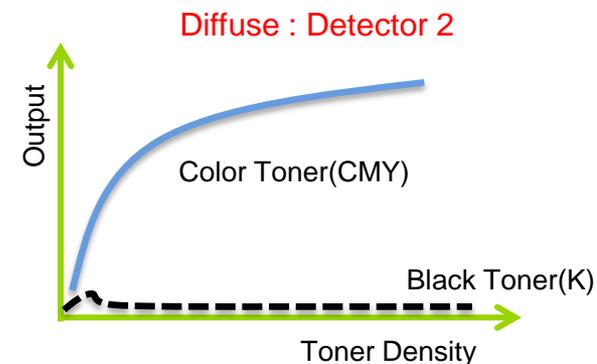
[KMEM007C] [KMEM013C-SP]

2. Features

-. Operating supply voltage : 5V

-. 2-Channel Output

-. Dimension (L x W x H in mm) : 46.4x19.0x8.1

-. Detection Distance Range : 5.5mm

Specular : Detector 1

Output

Color Toner(CMY)

Black Toner(K)

Toner Density

Diffuse : Detector 2

Output

Color Toner(CMY)

Black Toner(K)

Toner Density

3. Application

-. Copiers

-. Printers

-. Fax Machines

IrED

Detector

Detector

Color Toners

C M Y K

Drum

CTD Sensor ACR Sensor Transfer Belt

AUE
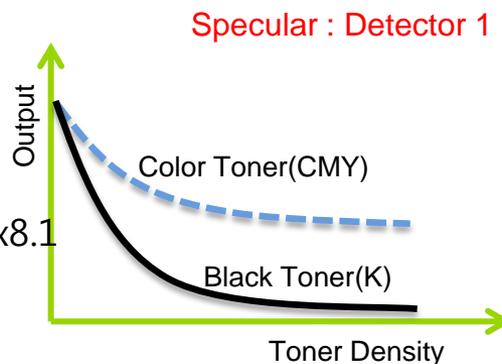
Office Automation

ACR(Auto Color Registration) Sensor

1. Product Introduction

-. The ACR sensor is used the principle of difference of reflective scattering due to surface roughness.
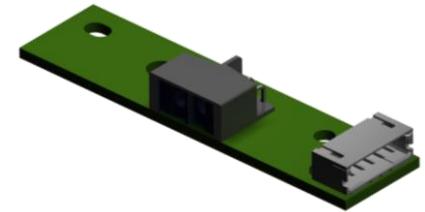
[KMEM008C]

2. Features

-. Operating supply voltage : 5V

-. High power near IR LED

-. 1 Channel Output

-. Dimension (LxWxH in mm) : 59 x 14.8 x 6

-. Detection Distance Range : 5.5mm

3. Application

-. Copiers

-. Printers

-. Fax Machines

Output

T T T

C M Y K

Time

Color Toners

C M Y K

IrED Detector

Drum

ACR Sensor Transfer Belt

AUE

Product Overview
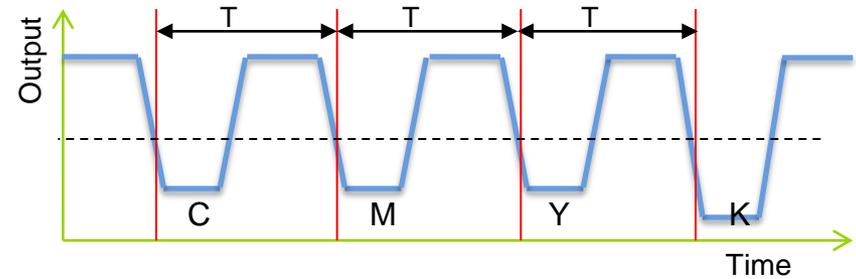
Office Automation

Media sensor

1. Product Introduction

■ A gloss presence can be distinguished.

　gloss or matt 　　⇒　　possible to judge !
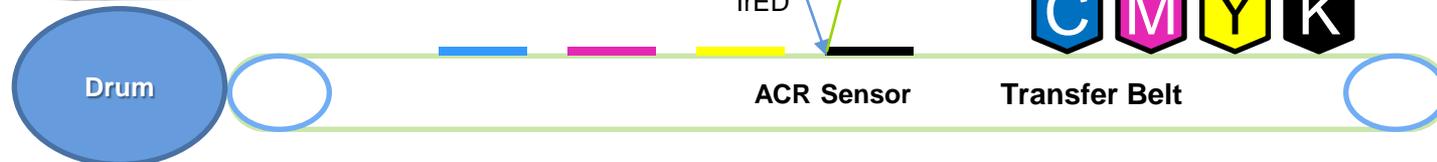
■ The distance which can be distinguished is 5mm, 10mm

Paper Name	Collector Current			Paper
	Ic1 (mA)	Ic2 (mA)	Ratio (%)	
Gloss Paper	0.196	0.097	202.1%	
Mat Paper	0.103	0.106	97.6%	
Normal Paper	0.099	0.096	103.0%	

W/D = 5 mm

/w2

W/D = 10 mm

/w2

Target
= Diffuse white (matt)

Optical axis
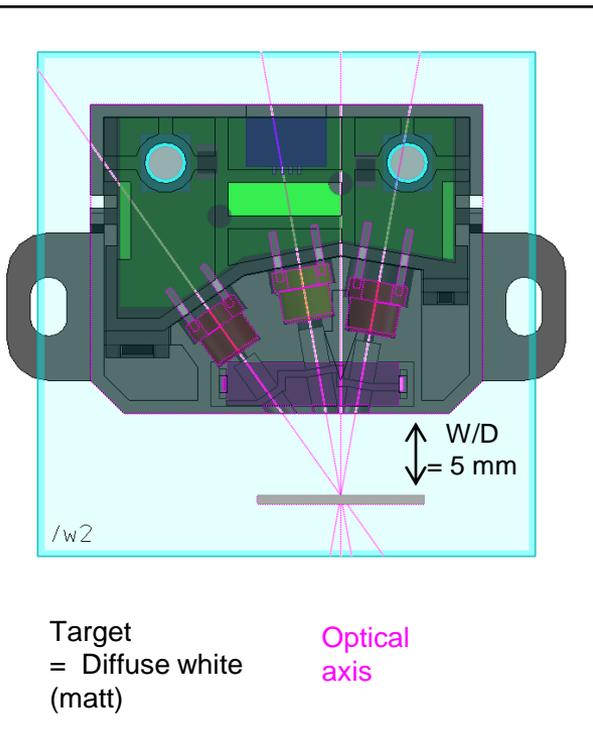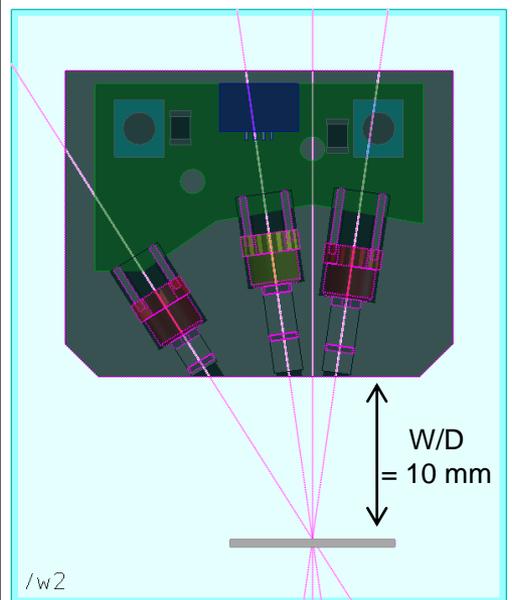
Media sensor (W/D=5 mm)	Media sensor (W/D=10 mm)

AUE
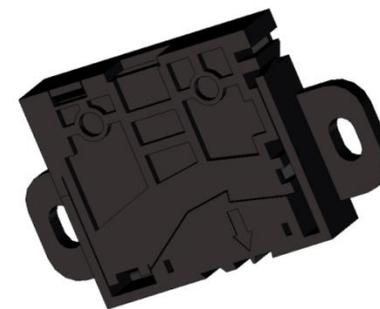
Office Automation

Small Logic Output P/I

1. Product Introduction

The LG2B04 is Transmissive type small-sized photo interrupter

combined high power GaAs IRED with Photo-IC.

Being suitable for highly accurate position detecting,

it is great help in developing an objecting

system of high performance and high reliability.
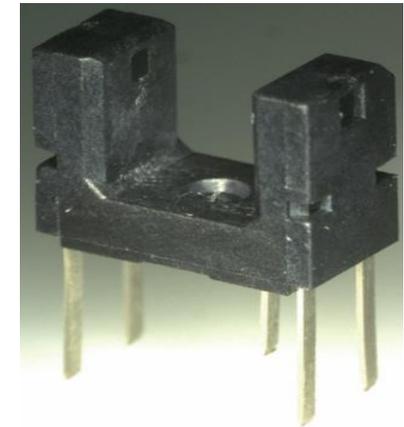
2. Features

-. Small size 3.0mm × 6.0mm × 5.0mm

-. Supply voltage 3.3 - 13.2V

-. Air gap 3.2mm

-. Slit width 0.5mm

3. Application

-. Copier, Printer, Facsimile

-. Vending machine

-. Amusement equipment

AUE

Office Automation

❖ **The example of use in a Robot cleaner**

❖ **The example of use in MFP**

used as an object for detection of an obstacle or a level difference.

detect the distance to an obstacle

A level difference is detected in the distance to a subjet.

Bending detection of a paper

Pyroelectric sensor detection area

A pyroelectric sensor detects people's existence in the wide range.

A distance sensor detects those who approach in order to use a machine.

Distance Sensor detection area

AUE
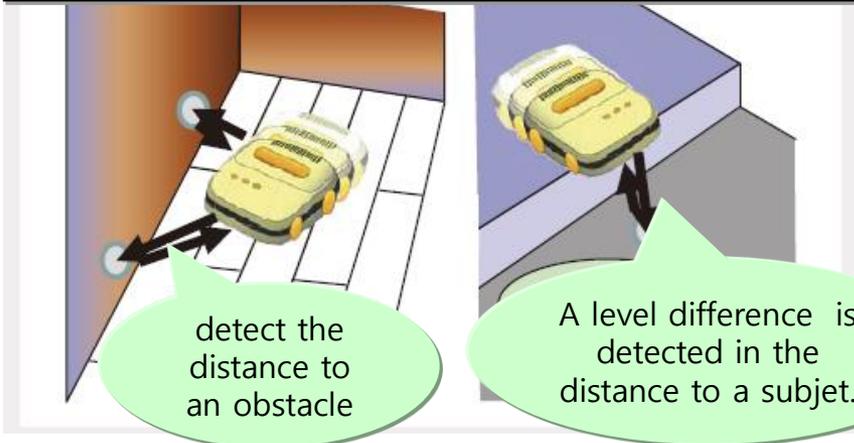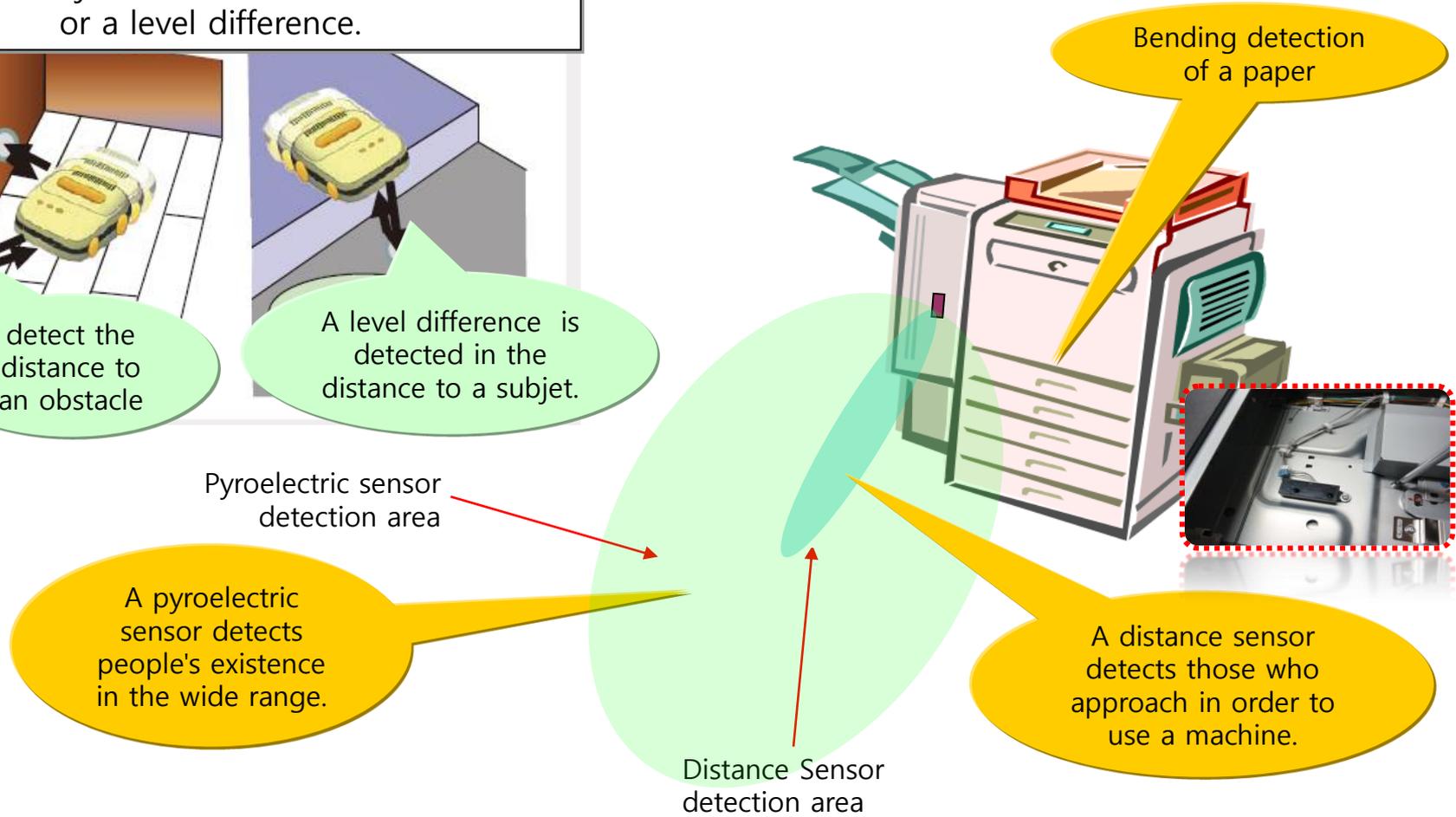
Office Automation

Cup Disk & Encoder for DC Motor

1. Application

-. For replacing motors for OA automation equipment.

-. Replacement for equipment using stepping motor.

⇒ for power saving, noise reduction, high performance, and cost saving purposes.

-. For value analysis in the market

⇒ cost reduction

❖ **Cup Disk**

Resolution	Type	Resin color	Inner Diameter	Outer Diameter
45 LPI	Slit	Black	φ 2mm~	φ 18mm~
150 LPI	Prism	Clear	φ 2mm~	φ 18mm~

Prism Type(150LPI)   Slit Type(45LPI)
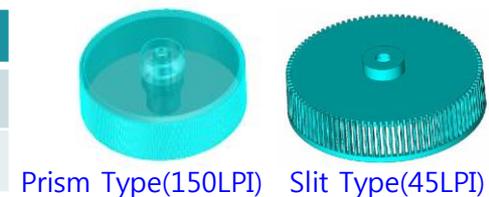
❖ **ENCODER**

Part No.	Resolution	Height	GAP	Output Ch.	Supply voltage	Frequency fmax (kHz)	
	(LPI)	(mm)	(mm)	(ch)	Vcc (V)	Max	IF (mA)
KE2K22-45	45 LPI	9.2	2	2	2.7~5.5	60	20
KE2K22-15	150 LPI	9.2	2	2	2.7~5.5	60	20

45/150 LPI Encoder

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Office Automation

＜**Assembly process comparison**＞

❖ **Cup disk method**

Soldering is easy

Assembly is easy

Assembly

process1

Soldering is easy

process2

Press fit

process3

❖ **PET disk method of conventional**

Need disk hub

Disk

HUB

Assembly

process1

Assembly

process2

process3

Press fit

process4

① ②

Assembly complex

③

process5

Soldering space is narrow risk

process6（Soldering）

AUE
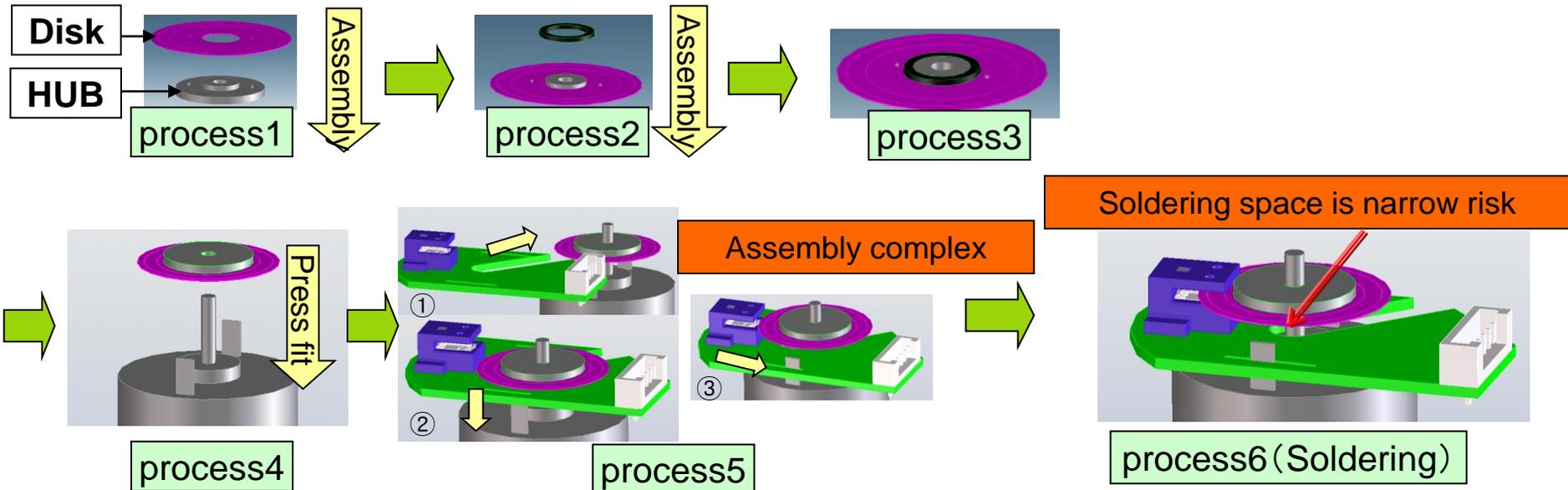
FINANCIAL

Financial equipment

Touch Screen Sensor
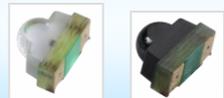
Encoder for Motor Control

UV Sensor & IR Sensor

Photo Interrupter
for Paper Money Transfer

LED for Lighting

Human Body Detector

Photo Interrupter
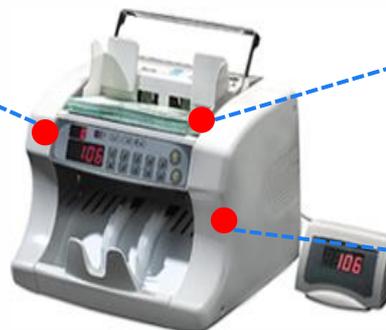For Object Detection

Photo coupler

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Product Overview

Financial equipment

Money Detection

Counterfeit money detector

Money counter

Money Counter

Money Counter

Money Detection

Counterfeit money detector

Banknote Sorter

AUE

Financial equipment

High Resolution UV Sensor

1. Features & Application

-. UV sensor combines a High UV LED with LTV Sensor,
   Lens, Band pass Filter (Peak Wavelength = 375nm)
-. High Resolution. (FOV=1.0mm)
-. High Sensitivity (With Lens)
-. Analog Voltage Output.
-. Dust Proof Type.
-. Use for Financial equipment such as
   Vending Machine and ATM

(KMEM001C)

(KMEM010C)

<Wavelength Graph comparison>

*Note : Origin and Counterfeit diffuse different wavelength light
when UV light strikes the surface of them.*

Normal Paper

FLUORESCENCE Paper

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Product Overview

Financial equipment

Dust proof Photo Interrupter

1. Features

-. Screw mount / Snap in type

-. Dustproof type

-. 5.0㎜ gap

-. RoHS compliant

-. Analog Voltage Output.

[KIT5038C]
Screw Type

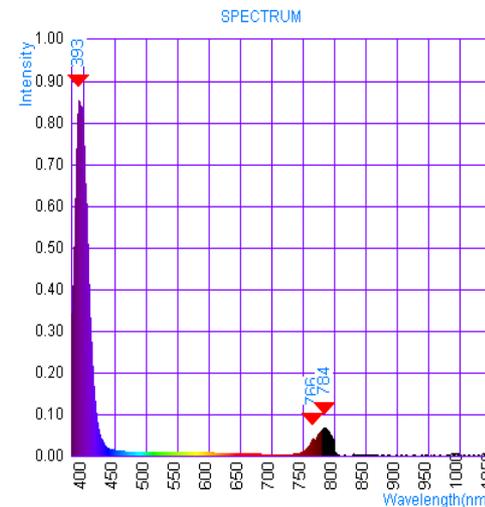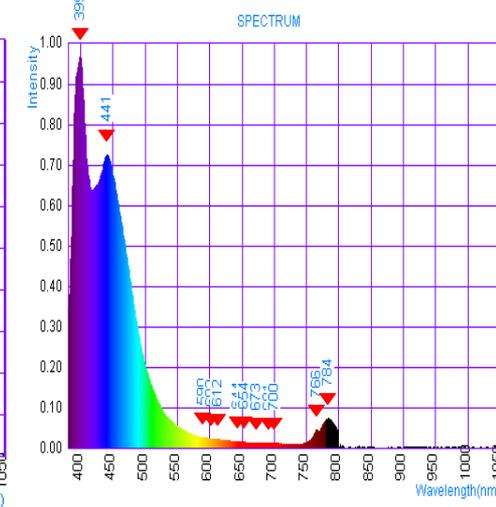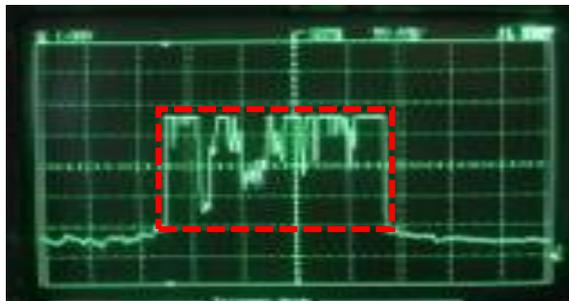[KIT5039C]
Snap in mount

2. Application

-. ATM

-. Printers

-. Copiers

-. Ticket machines

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	I_F=20mA	-	1.2	2.0	V
	Peak Wavelength	λp	I_F=20mA	-	940	-	nm
	Reverse Current	I_R	V_R=5V	-	-	100	uA
Output	Dark Current	I_{CEO}	V_{CE}=10V, E=0lux	-	1	100	nA
	Peak Wavelength	λp	-	-	880	-	nm
Transfer Charac-teristics	Collector Current	I_C	V_{CE}=5.0V, I_F=20mA	0.5	-	-	mA
	C-E Saturation Voltage	$V_{CE(sat)}$	I_C=0.5mA, I_F=20mA	-	0.15	0.4	V
Response Time	Rise Time	t_r	V_{CC}=5.0V, I_C=2mA RL=100Ω	-	4	-	usec
	Fall Time	t_f		-	5	-	usec

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New Development
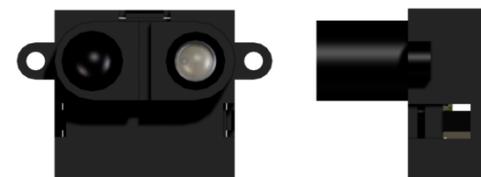
New Development

ToF (Time Of Flight) Sensor

1. Product Introduction

-.Time of Flight(ToF) based signal processing integrated circuit.

-.ToF sensor enables low power, long range optical distance.

2. Features

-. Working distance　　:　　White color 10㎝　～ 8m : White paper (Temporary)

-. Operating Temp　:　 -10℃　~　60 ℃(Temporary)

-. Output Type　　　:　　Digital output (I2C Interface)

-. Sensor Size　 : 21 mm　 X　20 mm　X　15 mm (Temporary)

-. Sleep Mode : Max 1.5㎂, Shut down : Max 1 ㎂

-. Supply voltage range of 2.7V to 3.3V

-. I2C interface supporting 1.8V and 3.3V

-. Modulation frequency of 4.5MHz
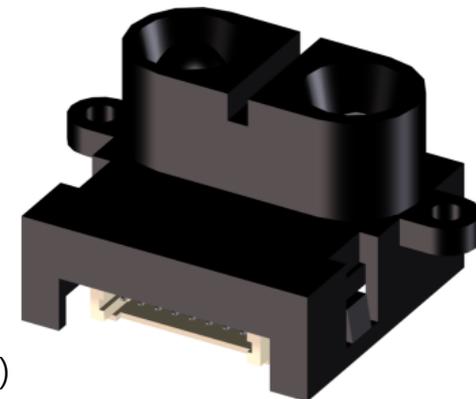
〔**Development Schedule**〕

	2015 4Q	2016 1Q	2016 2Q	2016 3Q	2016 4Q	2017 1Q	2017 2Q	2017 3Q
Development	Evaluation	Trial manufacture	Sample	⇒	⇒	⇒	⇒	⇒

AUE

New Development

ToF (Time Of Flight) Sensor

PARAMETER		TEST CONDITIONS	Min	Typ	MAX	UNIT
Modulation Frequency		Modulation frequency of emitter	4.45	4.5	4.65	MHz
Recommended Supply Voltage				3.3		V
Delay From Chip Enable to First Sample		Product characterization data		500		µs
Delay Between Sleep Mode to Start of First Sample		Product characterization data			3	µs
Quiescent Current - Sleep Mode		CE = 1; I2C disable; register values are retained; SS = SDA = SCL = VCC			1.5	µA
Quiescent Current - Shutdown		CE = 0; I2C enable; register values are retained; all other functions are disabled			1	µA
Module Average Current While Measuring(Note3)		0x10 = 06h, 0x11 = 2Ch, 0x14 = 05h, 0x15 = 06h, 0x90 = 0Eh, 0x91 = Fah	50		65	mA
Module Peak Current While Measuring(Note3)		0x10 = 06h, 0x11 = 2Ch, 0x14 = 05h, 0x15 = 06h, 0x90 = 0Eh, 0x91 = FAh	110		130	mA
Measurable Distance Range(Note2)(Note4)		0x10 = 0Bh, 0x11 = 2Ch, 0x14 = 05h, 0x15 = 09h, 0x90 = 0Eh, 0x91 = Fah	10		800	cm
Measuring Distance Deviations	(10~150cm)	0x10 = 0Bh, 0x11 = 2Ch, 0x14 = 06h, 0x15 = 09h,	1		2	cm
(Note2)(Note4)	(151~500cm)	0x90 = 0Eh, 0x91 = FAh			5	%
	(501~800cm)				10	%

* Note1 : ESD HBM passed 2kV with exception to pin IRQ and SDA which passed 1kV
* Note2 : Kodak Gray Card – white side reflects 90%

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New Development

ToF (Time Of Flight) Sensor
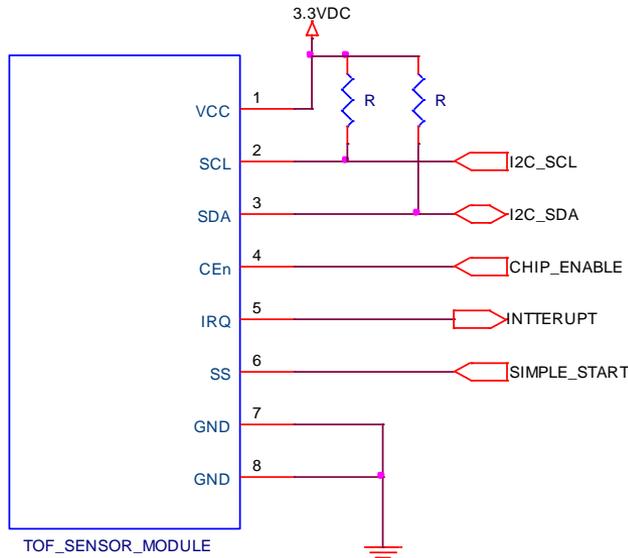
Application diagram
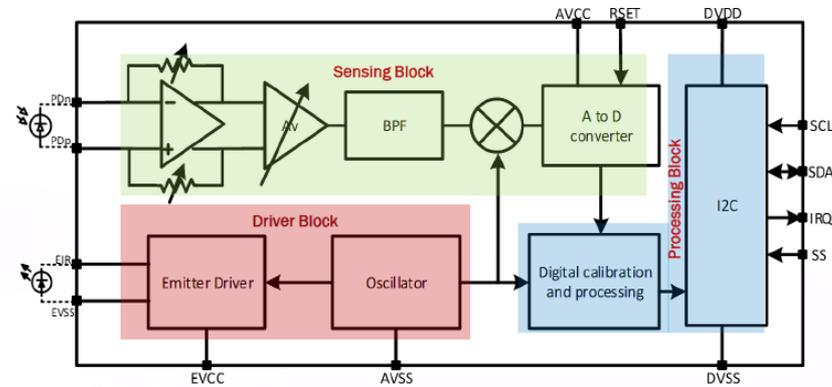
ToF IC Block diagram

IO Pin Descriptions

Pin No.	Pin Name.	Description.	Pin No.	Pin Name.	Description.
1	Vcc	3.3V VDC supply	5	IRQ	Interrupt
2	SCL	I2C clock bus	6	SS	Sample start
3	SDA	I2C data bus	7	GND	(-)Return
4	CEn	Chip Enable	8	GND	(-)Return

New Development

Dust Sensor

1. Features

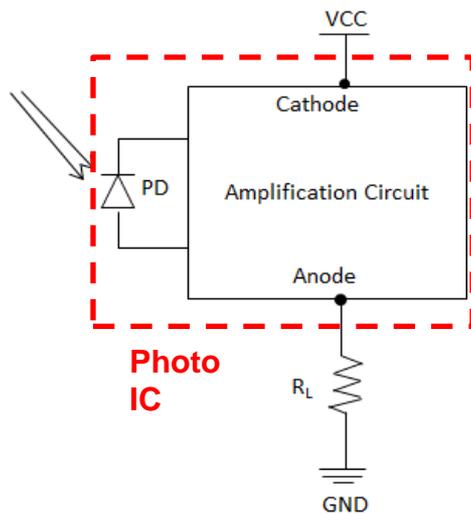-. High gain & linearity current output Photo sensor

-. Include 870nm Peak Wavelength Photo Diode

-. High Reliability for Automotive

3. Operating Circuit example

VCC

Cathode

PD

Amplification Circuit

Anode

Photo IC

R_L

GND

3. Application

-. Dust/Smoke Detector

-. Various type of light level measurement

-. Medical/Automotive Instrumentation

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New Development

Dust Sensor

-. Absolute Maximum Ratings

[Ta=25℃]

Parameter	Symbol	Rating	Unit
Reverse Voltage	V_R	20	V
Lightcurrent	I_L	35	mA
Operating Temperature	$T_{opr.}$	-30 to +85	℃
Storage Temperature	$T_{stg.}$	-40 to +100	℃
Soldering Temperature [1]	$T_{sol.}$	260	℃

*1. For Max.5seconds at the position of 2mm from the package

### -. Electro-optical Characteristics

[Ta=25℃]

Parameter	Symbol	Conditions		Typ	Unit.
Spectral sensitivity	λ	-		400 to 1000	nm
Peak Wavelength	λp	V_R=5V		870	nm
Operating reverse voltage	V_R			5	V
Dark current (Low/Medium/High gain)	I_D	V_R=5V		Max 300/600/1000	nA
Lightcurrent (Low/Medium/High gain)	I_L	V_R=5V, 2856K	5 lx	8.5 / 17.5 / 22	mA
Rise/fall times (Low/Medium/High gain)	tr	10 to 90% [1] V_R=5V, RL=150Ω λ=880nm		4	μs
	tf			400 / 800 / 1400	
Half Angle	Δθ	-		±8	deg.

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New Development

Color Sensor

1. Product Introduction

-. This sensor is a low power, high sensitivity, Red, Green and Blue color light sensor with an I²C interface.

-. Its state-of-the-art photodiode array provides an accurate RGB spectral response

and excellent light source to light source variation.
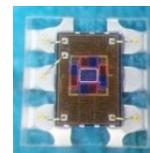
2. Features

-. RGB Color Sensor(I²C output), CCT(Correlated Color Temperature)

-. Operating Voltage : 2.25V ~ 3.63V

-. 6 lead(1.65×1.65 × 0.7mm) SMD Package

-. Two Optical Sensitivity ranges

  - Range 0 = 5.7m lux to 375 lux

  - Range 1 = 0.152 lux to 10,000 lux

-. LED Dimming Function

3. Application

-. Color distinction

-. Dimming of LED light source

| Meter(CL-200A)	Color Sensor	CCT Accuracy
2837K	2957K	4.3%
6583K	6961K	6%

Spectral Response
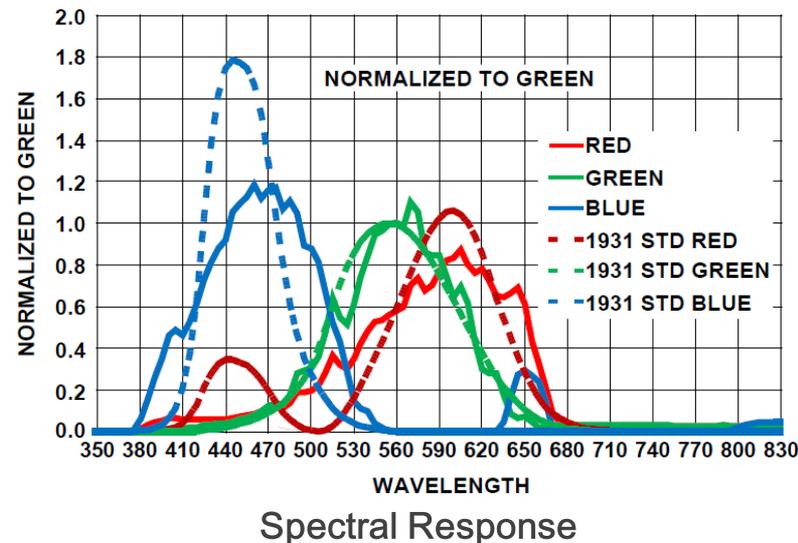
New Development

Thermopile Sensor

■ The sensor detect the far infrared rays from an object, and "takes" temperature

《Feature》 ・incorporate a sensor for temperature compensation and an amplifier
for the signal amplification
・Package with the lens which is an optical system-free
・This can measure the temperature of the object by non-contact

黒体温度 Blackbody temperature (℃)
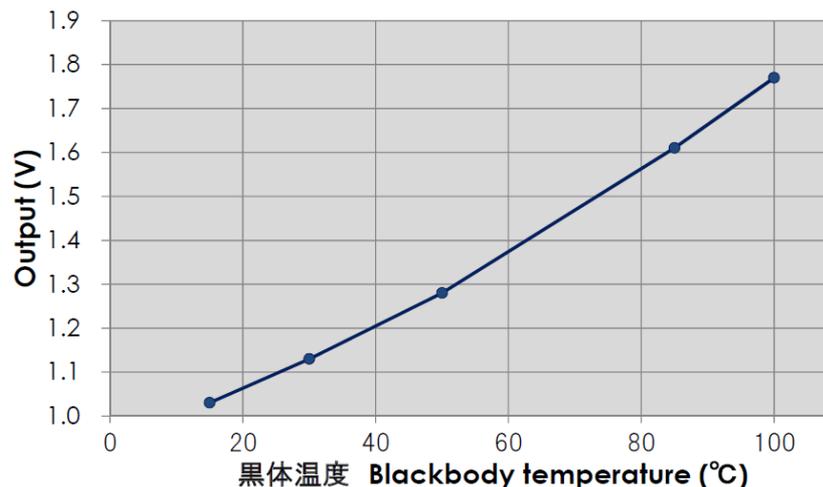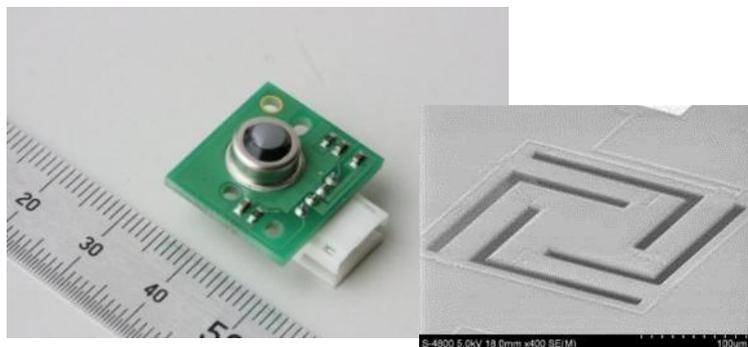
ITEM	SIGN	CONDITION	Min.	Typ.	Max.	UNIT
Current consumption	Icc	Short current	-	1.9	-	mA
Output voltage	V$_{Tobj}$	VDD = 5V	(0.3)	-	(4.7)	V
Field of view(50%)	FOV	Aperture of Blackbody furnace φ3mm、Distance L=50mm	-	3.5	-	deg.
Heat damping time constant	τ	Response to 63.2%	-	50	-	ms

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New Development

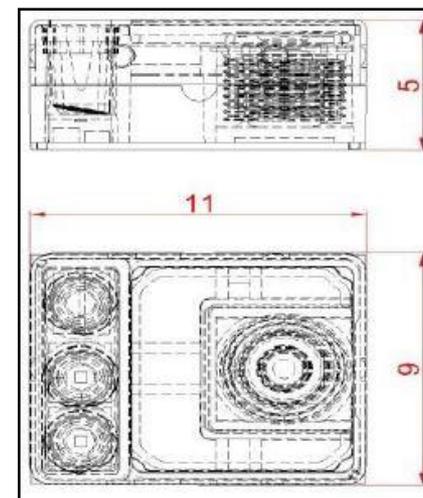## IRIS Recognition Sensor- I

1. Features

-. The smallest all-in-one Iris Authentication sensor

-. Easy to register and recognize iris with the Reflective Iris Guide Mirror

-. Identifies fast (less than a second)

-. Works on most irises regardless of iris colors

-. Low Power Consumption

-. Compact Size

2. Configuration

-. Guidance Mirror   -. Image Sensor

-. LED's (2-IR, 1-Amber, 1-Blue)   -. Lens

-. FPCB with components   -. Connector

-. Case

3. Application

-. Mobile Phone   -. Tablets

(Package Dimension /mm)

AUE

Product Overview

New Development

IRIS Recognition Sensor- I

Parameter	Conditions	Rating	Unit
Size		11(W) * 9(D) * 5(H)	mm
Focusing Distance		250 ± 12	mm
Registration Time		6 ~ 12	sec
Recognition Speed		0.3 ~ 1.0	sec
Environment of use	under shadow	100 ~ 5,000	cd
Connectivity	17x2 pins	0.4	mm
Resolution		640 x 480	Pixels
Template Size of Iris		About 3,600	Bytes
Operating Temperature		-20 ~ 60	℃
Storage Temperature		-30 ~ 85	℃
Power Consumption	Sensor, @1.8Vdc, 2.8Vdc	<100	mW
	Illumination, @2.8Vdc	<160	mA
	Stand-by	<6~7	uA
FAR		≤ 1/1,200,000	
FRR		≤ 1/10,000	

▶ FAR : False Acceptance Rate
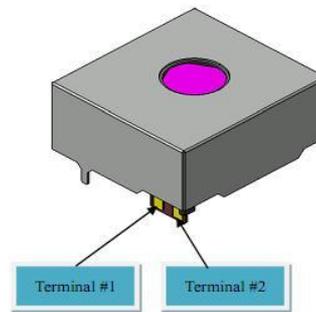▶ FRR : False Rejection Rate

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New Development

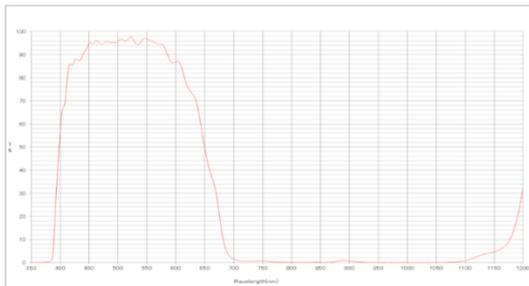## IRIS Authentication Sensor-Ⅱ

1. Product Introduction

-. This Product is very to easy to use, plug and connect to smart phone and tablet.

-. *With simple controls, such as Low / High Signal can use the iris recognition camera mode and normal mode.*
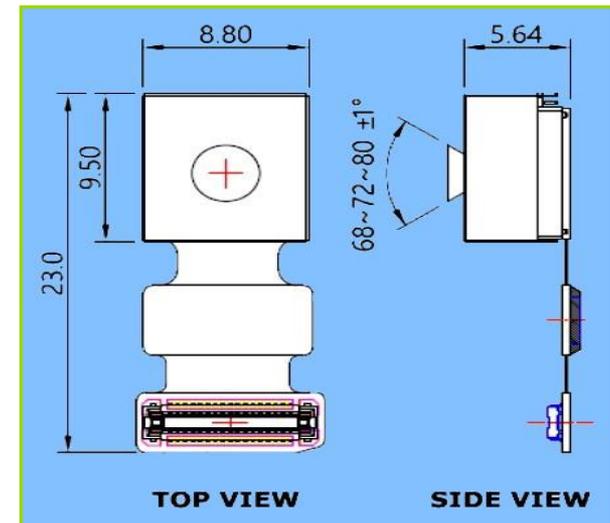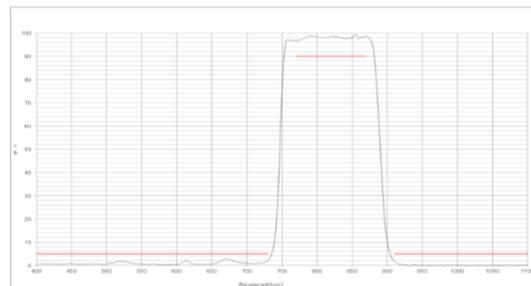
PIN	Band Pass Filter	IR Cut Filter
Terminal #1	H	L
Terminal #2	L	H

Terminal #1   Terminal #2

IR Cut Filter	Band Pass Filter

KODENSHI is developing total Iris recognition solutions for customer as well as *the iris scan* camera module.

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New Development

IRIS Authentication Sensor-Ⅱ

Parameter	Conditions	Specification
Sensor	Model	Sony Image Sensor IMX134
	Image Format	1/3 92" 8M CMOS
	Active Pixels	3280 X 2464
	Frame Rate	30fps
	Pixel Size	1.12um X 1.12um
	Output Data	MIPI 4 Lane
	Color Filter	RGB Bayer pattern
	External Clock Frequency	6~27MHz
	Scan Type	Progressive
Micro Filter Changer	IR Cut	440 ~565 nm Tave ≥ 92%, Tmin ≥ 86%
	Band Pass	770~ 870 nm Tave ≥ 92 %, Tmin ≥ 90%
Lens	Focal Length	3.32mm
	Angular field of view	68.5°(D)
	F Number/TTL	F2.4/4.29mm

AUE

THANK YOU

www.kodenshi.co.kr