

# SPECIFICATION

## FOR PRELIMINARY

ISSUED DATE : 5th. Apr. 2017

DOCUMENT NO : 240060-08

CUSTOMER :

DESCRIPTION : Photo Interrupter

MODEL NO. : KIT3035S

### [ AUK CORP. ]

| ISSUE DEPT. |        |        | PRODUCTION |        | Q/A    |        |
|-------------|--------|--------|------------|--------|--------|--------|
| ISSUE       | REVIEW | APPR'L | REVIEW     | APPR'L | REVIEW | APPR'L |
| SJ.Kim      |        | CH.Cho |            |        |        |        |

### [ CUSTOMER APPROVAL ]

| ISSUE | REVIEW |  |  |  |  |  |
|-------|--------|--|--|--|--|--|
|       |        |  |  |  |  |  |

### [ REVISION]

| NO | DATE     | REVISION ITEMS | ISSUED BY | APPR'D BY |
|----|----------|----------------|-----------|-----------|
| 0  | 17.04.05 | Issued         | SJ.Kim    | CH.Cho    |
|    |          |                |           |           |
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**AUE CORP. takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet.**

Please obey the instructions mentioned below for actual use of this device.

This device is designed for general electronic equipment.  
Main use of this device are as follows;

- \* Computer \* OA equipment \* Telecommunication equipment(Terminal)
- \* Measuring instrument \* Machine tool \* Industrial robot
- \* AV equipment \* Home appliance,etc.

Please take proper steps in order to maintain reliability and safety, in case this device is used for the uses mentioned below which require high reliability.

- \* Unit concerning control and safety of a vehicle (air plane,train,automobile, etc.)
- \* Traffic signal \* Gas leak detection breaker
- \* Fire box and burglar alarm box \* Other safety equipment,etc.

Please don't use for the uses mentioned below which require extremely high reliability.

- \* Space equipment \* Telecommunication equipment(Trunk)
- \* Nuclear control equipment \* Medical equipment(relating to any fatal element),etc.

1. Description

The KIT3035S is a compact transmission type photointerrupter, which combine high-output GaAs IRED with high sensitive photo transistors.

2. Features

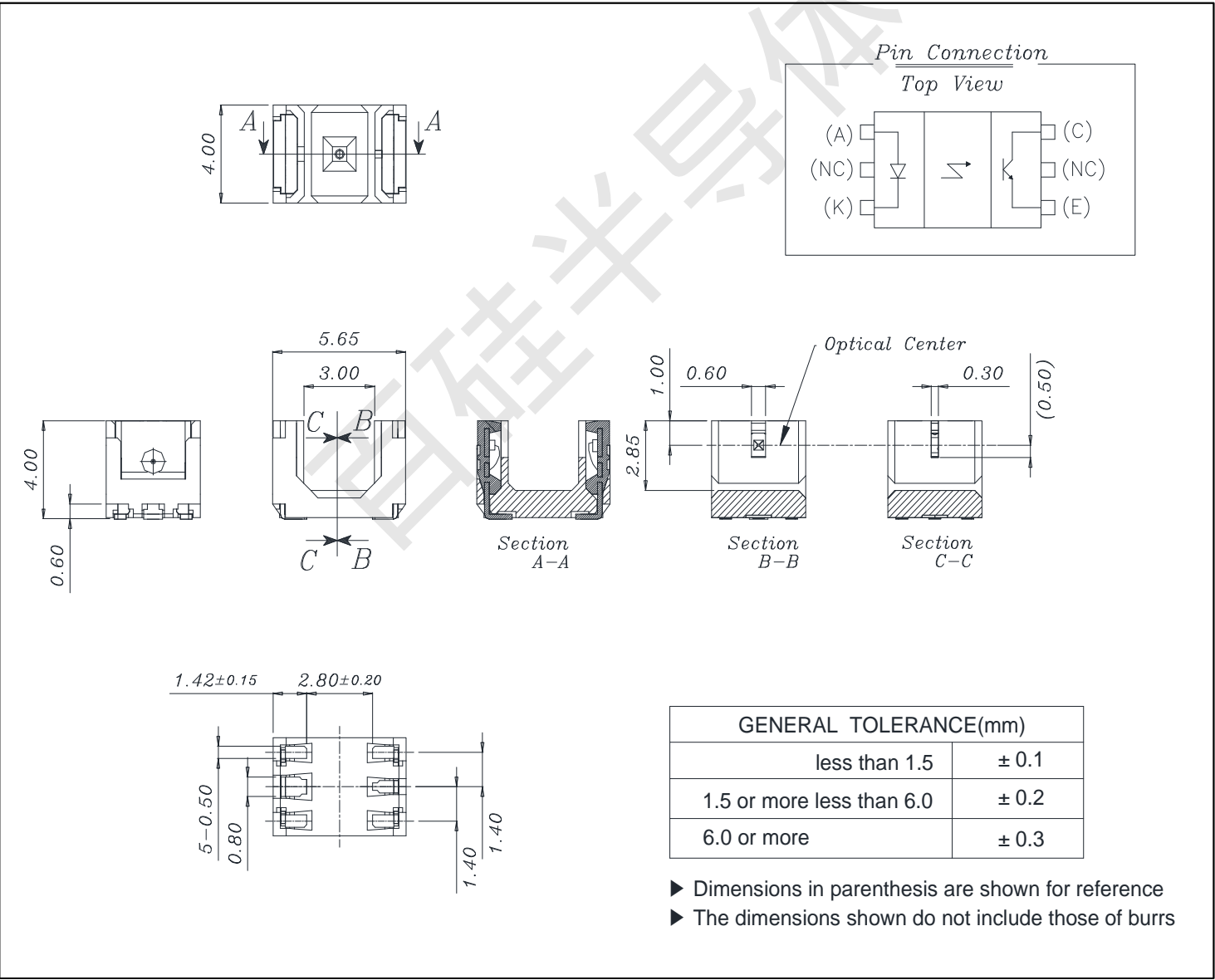
- Surface mount package
  - Aperture : 0.3mm
  - Moisture Sensitive Level(MSL) 2
- GAP : 3.0mm
  - RoHS Compliance
  - AEC-Q101 Qualified

3. Applications

- Motor Control
  - Printers
- Position Encoder
  - Ticket Vending Machines

4. Outline Dimensions

(ALL DIMENSIONS IN MILLIMETERS)



## 5. Absolute Maximum Ratings

(Ta=25 °C)

| Item                         |                           | Symbol    | Ratings    | Unit |
|------------------------------|---------------------------|-----------|------------|------|
| Input                        | Power Dissipation         | $P_D$     | 75         | mW   |
|                              | Forward Current           | $I_F$     | 50         | mA   |
|                              | Reverse Voltage           | $V_R$     | 5          | V    |
|                              | Pulse Forward Current *1  | $I_{FP}$  | 0.5        | A    |
| Output                       | Collector Dissipation     | $P_C$     | 75         | mW   |
|                              | Collector Current         | $I_C$     | 20         | mA   |
|                              | Collector-Emitter Voltage | $V_{CEO}$ | 35         | V    |
|                              | Emitter-Collector Voltage | $V_{ECO}$ | 6          | V    |
| Operating Temperature *2     |                           | $T_{opr}$ | -40 ~ +105 |      |
| Storage Temperature *2       |                           | $T_{stg}$ | -40 ~ +105 |      |
| Soldering Temperature *3     |                           | $T_{sol}$ | 260        |      |
| Reflow Soldering Temperature |                           | $T_{sol}$ | 255        |      |

\* 1. Pulse width (tw) 100 $\mu$ s, Period (T) = 10msec.

\* 2. No icebound or dew.

\* 3. For 5s or less

## 6. Electro-Optical Characteristics

(Ta=25 °C)

| Item                                 |                 | Symbol        | Min | Typ | Max | Unit          | Conditions   |
|--------------------------------------|-----------------|---------------|-----|-----|-----|---------------|--|
| Input                                | Forward Voltage | $V_F$         | -   | 1.2 | 1.4 | V             | $I_F = 15\text{mA}$  |
|                                      | Reverse Current | $I_R$         | -   | -   | 10  | $\mu\text{A}$ | $V_R = 5\text{V}$  |
|                                      | Peak Wavelength | $\lambda_p$   | -   | 940 | -   | nm            | $I_F = 15\text{mA}$  |
| Output                               | Dark Current    | $I_{CEO}$     | -   | 1   | 100 | nA            | $V_{CE} = 20\text{V}$ , 0 Lux                                      |
| Collector Current                    |                 | $I_C$         | 0.7 | -   | -   | mA            | $I_F = 15\text{mA}$ , $V_{CE} = 5\text{V}$                         |
| Collector-Emitter Saturation Voltage |                 | $V_{CE(sat)}$ | -   | -   | 0.4 | V             | $I_F = 15\text{mA}$ , $I_C = 0.2\text{mA}$                         |
| Time                                 | Rise Time       | $t_r$         | -   | 5   | 20  | $\mu\text{s}$ | $V_{CC} = 5\text{V}$ , $I_C = 0.3\text{mA}$ ,<br>$R_L = 100\Omega$ |
|                                      | Fall Time       | $t_f$         | -   | 6   | 25  | $\mu\text{s}$ |  |

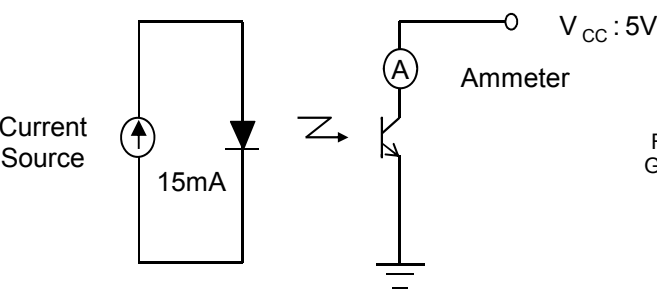


Fig 1. Test Circuit for  $I_C$

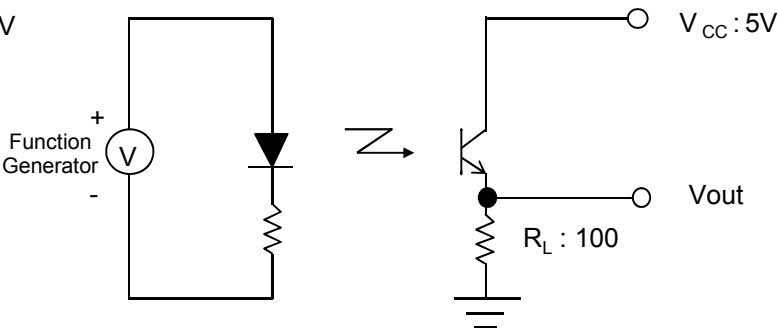


Fig 2. Test Circuit for Rise and Fall Time

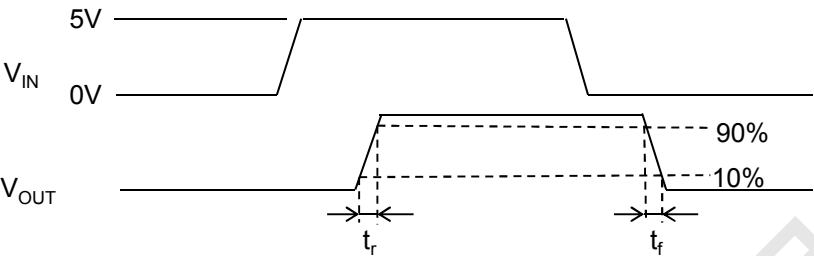


Fig 3. Definitions for Response Times

7. Quality Assurance Inspection

7-1. Inspection Form

MIL-STD-105D, Normal Inspection, Single sampling inspection.

7-2. Inspected Items and Standards

| Item   | Class | Judgement factor  | AQL    |
|--|-------|---|--------|
| Collector Current ( $I_C$ )<br>Dark Current( $I_{CEO}$ ) | Major | Satisfies the 5th item of the Electro-Optical Characteristics.                      | 0.065% |
| Exterior<br>(Crack, Chip, Dirt, etc.)                    | Minor | Those that effect the 5th item of the Electro-Optical Characteristics are not good. | 0.25%  |

8. Cautions in Usage

- 8-1. Store product where there is no exterior force causing product to be deformed or change in quality.
- 8-2. Store and use where there is no hydrogen sulfide gas etc, causing corrosion.
- 8-3. Use active area where there is no direct light. Sunlight and tungsten lamp light.
- 8-4. Do not allow dirt or dust to fill in the slit part.
- 8-5. Design the gobo so that it covers the slit.
- 8-6. Take into consideration the drop in the emitting diode's output on continuous use.
- 8-7. Solder the lead pin under the rating conditions. Do not apply any unnecessary force to the lead pin during and after soldering.

- 8-8. Use ethyl alcohol, methyl alcohol, iso-propylene alcohol for cleansing and do not place product in the mentioned three alcohols for more than threeminutes.  
Be sure that there is no flux on the active area the emitting area or it may cause the light quantity to reduce.

## **9. Guarantee Period and Scope**

### **9-1. Period of Guarantee**

1 year after delivery to designated place.

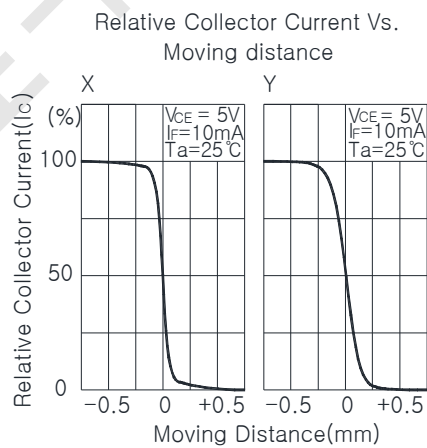
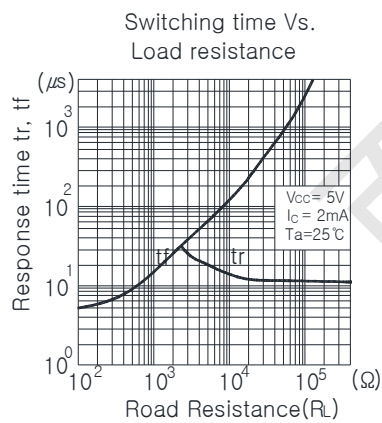
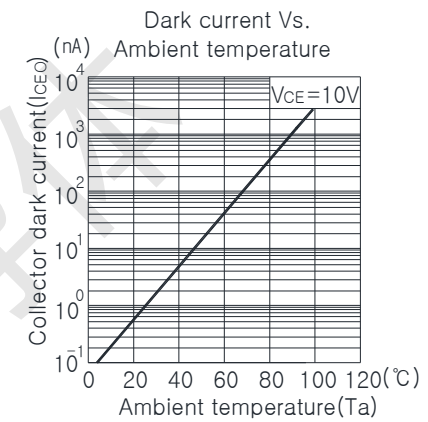
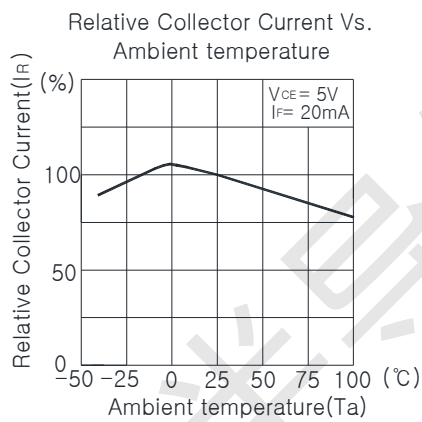
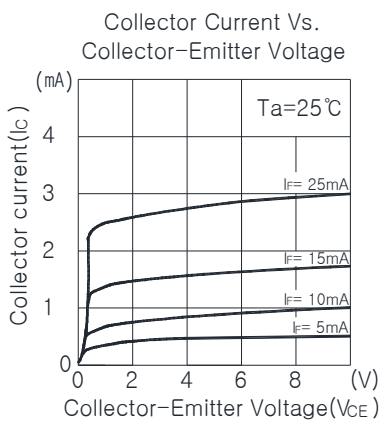
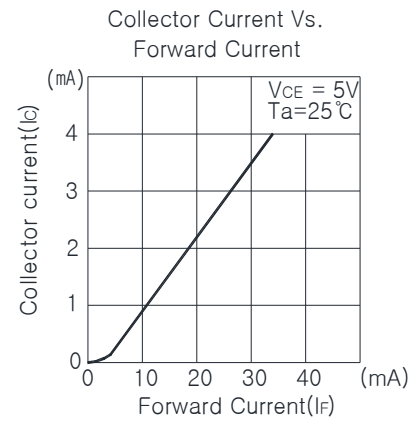
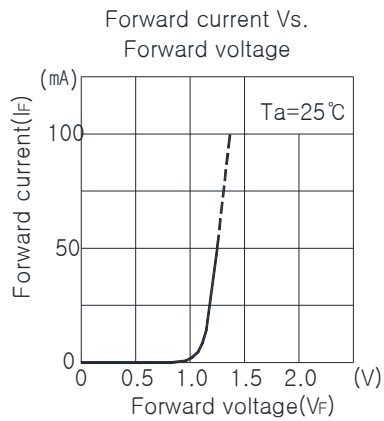
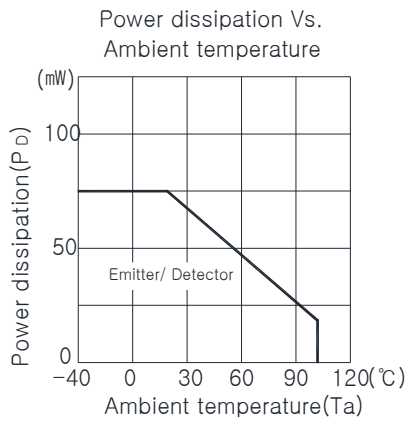
### **9-2. Scope**

Replacement of products will be done, if any problems lie in out company's products.  
However, we are not liable for your damage by lack of caution.

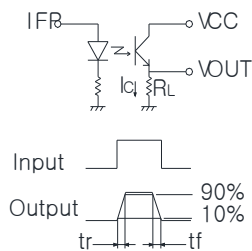
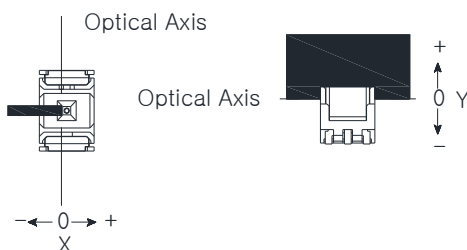
## **10. Others**

- 10-1. This product is not designed against radiative rays, electro-magnetic waves or rays that have heavily charged particles.  
10-2. Synthetic resin is used in the package.  
10-3. Electricity is used for input and output.  
10-4. If any doubts concernig on this specification will be discussed and solved by both parties concerned.

## CHARACTERISTICS

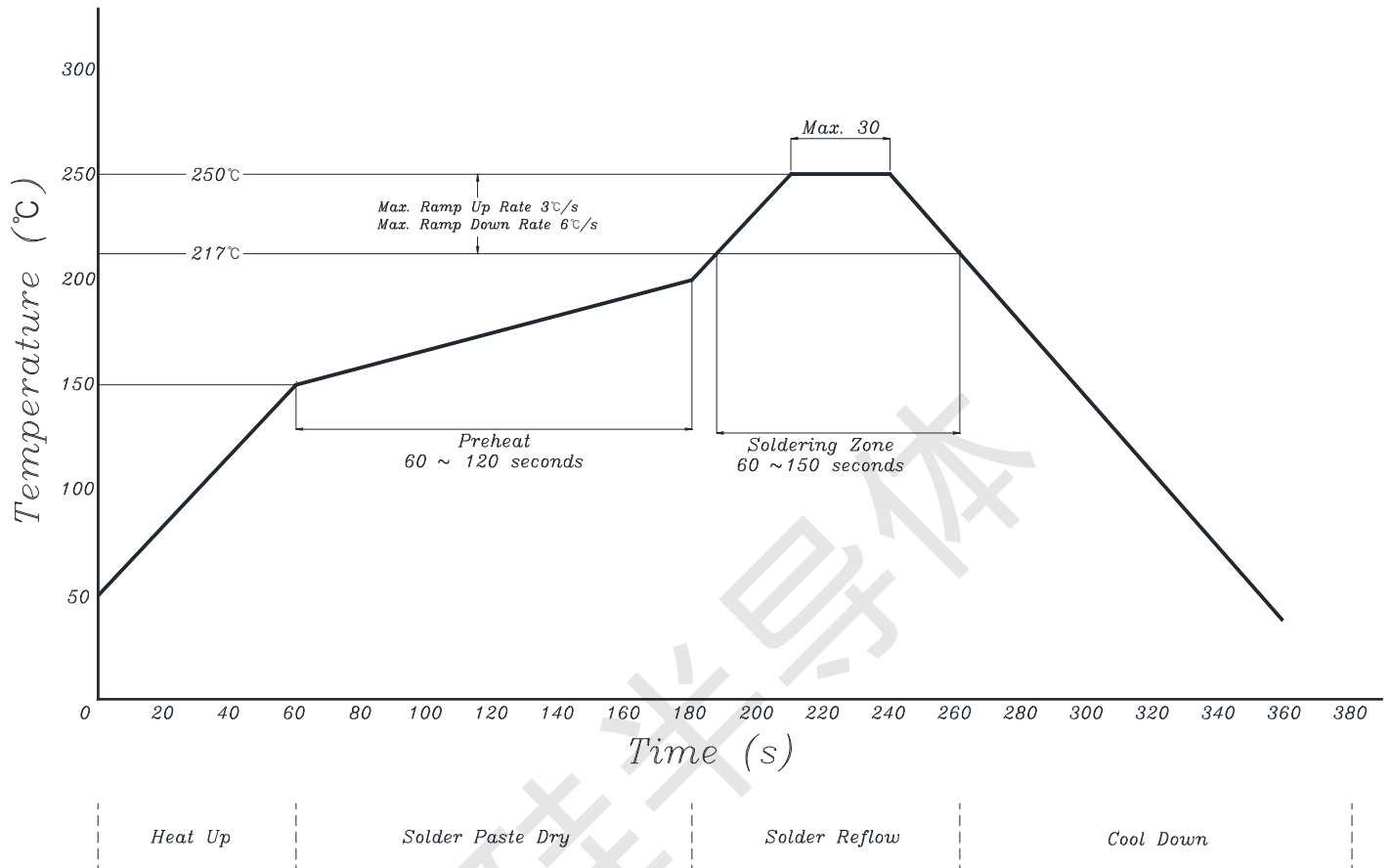


Switching time measurement circuit

Method of measuring position  
detection characteristic

## Soldering Method

### Recommended Lead-Free Reflow Soldering Temperature Profile



#### Hand soldering

Hand soldering should be completed within 3 s when the point of solder iron is below 350 .  
 Please solder within one time.  
 Please don't touch the terminals directly by soldering iron.  
 Soldered product shall treat at normal temperature.

#### Other notice

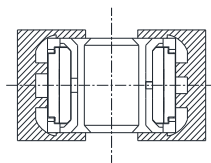
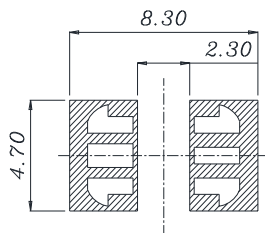
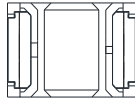
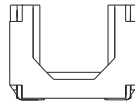
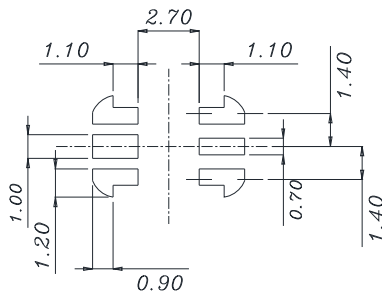
Please take care not to let any external force exert on lead pins.  
 Please test the soldering method in actual condition and make sure the soldering works fine, since the impact on the junction between the device and PCB varies depending on the cooling and soldering conditions.

#### \*Note

Lead(Pb)-Free Reflow Solder Profile accepts. J-STD-020D.1.



### Recommended Solder Pad



Solder resist



### Design Considerations

#### Design guide

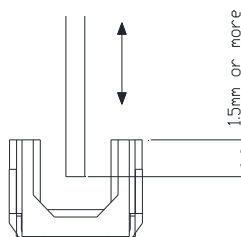
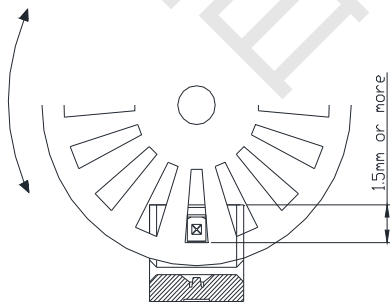
##### 1) Prevention of detection error

To prevent photointerrupter from faulty operation caused by external light, do not set the detecting face to the external light.

##### 2) Position of opaque board

Opaque board shall be installed at place 1.5mm or more from the top of elements.

(Example)



This product is not designed against irradiation and incorporates non-coherent IRED.

### Degradation

In general, the emission of the IRED used in photointerrupter will degrade over time.

In the case of long term operation, please take the general IRED degradation (50% degradation over 5 years) into the design consideration.

## Manufacturing Guidelines

### Storage and management after open

#### Storage condition

Storage temp.: 5 to 30°C, Storage humidity : 70%RH or less at regular packaging.

#### Treatment after opening the moisture-proof package

After opening, you should mount the products while keeping them on the condition of 5 to 25°C and 70%RH or less in humidity within 7 days.

After opening the bag once even if the prolonged storage is necessary, you should mount the products within two weeks.

And when you store the rest of products you should put into a DRY BOX. Otherwise after the rest of products and silicagel are sealed up again, you should keep them under the condition of 5 to 30°C and 70%RH or less in humidity.

#### Baking before mounting

When the above-mentioned storage method could not be executed, please process the baking treatment before mounting the products.

However the baking treatment is permitted within one time.

Recommended condition : 125°C, 16 to 24 hours

\*Do not process the baking treatment with the product wrapped. When the baking treatment processing, you should move the products to a metallic tray or fix temporarily the products to substrate.

#### Cleaning instructions

Solvent cleaning :

Solvent temperature should be 45°C or below. Immersion time should be 3 minutes or less.

Ultrasonic cleaning :

Do not execute ultrasonic cleaning.

Recommended solvent materials :

Ethyl alcohol, Methyl alcohol and Isopropyl alcohol.

### Reliability

The reliability of productions shall satisfy items listed below.

Confidence level : 90%

LTPD : 10 or 20

| Test item                                      | Test conditions   | Failure Judgement Criteria   | Samples ( n )  |
|--|---|--|----------------|
|  |   |  | Defective( C ) |
| Pre-Conditioning                               | MSL Level 2   | N/A  |                |
| Parametric Verification                        | -40 , 25 , 105  | -  | n = 22, C = 0  |
| Temperature Cycling                            | -40 /+ 105 , 500 Cycles   | $V_F \quad U \times 1.2$<br>$I_R \quad U \times 2$<br>$I_{CEO} \quad U \times 2$<br>$I_C \quad L \times 0.8$ | n = 22, C = 0  |
| High Temperature Reverse Bias                  | 105 , 1000h<br>Emitter : $V_R = 4V$ ,<br>Detectors : $V_{CE} = 5V$                                    |  | n = 22, C = 0  |
| High Humidity<br>High Temperature Reverse Bias | 85 /85%RH, 1000h<br>Emitter : $V_R = 4V$ ,<br>Detectors : $V_{CE} = 5V$                               |  | n = 22, C = 0  |
| Power and Temperature Cycle                    | -40 /+ 105 , 1000h<br>Emitter : $I_F = 15mA$ ,<br>Detectors : $V_{CE} = 30V$ ,<br>2min. On, 2min. Off |  | n = 22, C = 0  |
| ESD  | HBM : $\pm 2kV$ , MM : $\pm 200V$   |  | n = 22, C = 0  |

\* U : Upper specification limit, L : Lower specification limit