



**THE DATASHEET OF  
TPS1191RB-2-TR**





## Features

Package

Reverse Mount type , Visible light cut-off resin  
 Out Dimension : 3.2 x 1.6 x 1.1mm ( L x W x H )

Product features

- Lead-free soldering compatible
- RoHS compliant

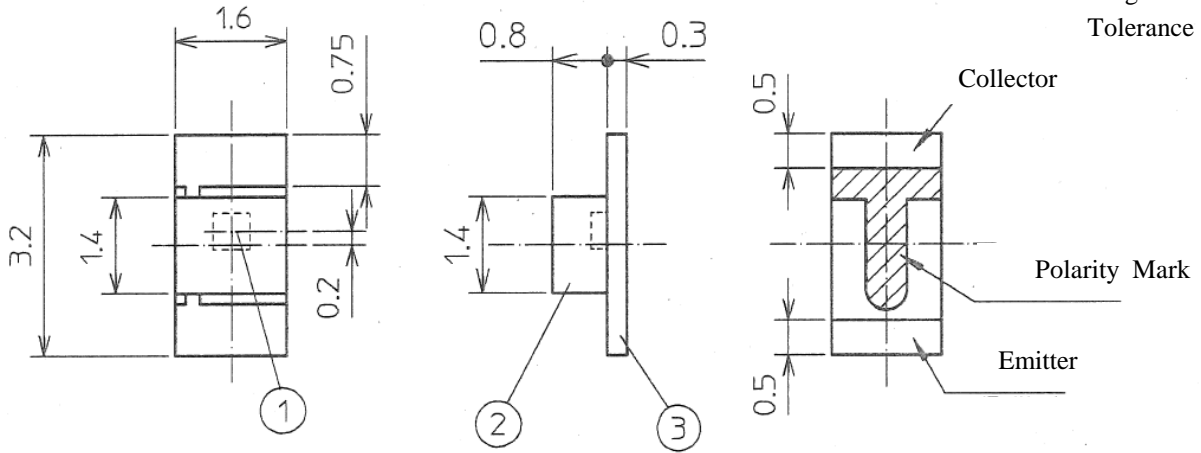
## Recommended Applications

- Car Stereo Equipment , Consumer Electrical Appliances , OA•FA,PC• Peripheral Device, Other General Applications

# Outline Dimensions

# TPS1191RB-2-TR

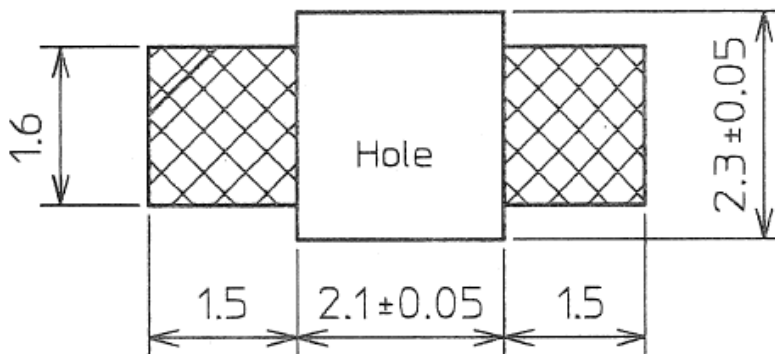
Unit : mm  
 Weight : 6.6mg  
 Tolerance : ±0.1



| SYM. | PART NAME        | MATAL.        | QTY. |
|------|------------------|---------------|------|
| ①    | Photo Transistor | Si            | 1    |
| ②    | Encapsulant      | Epoxy Resin   | 1    |
| ③    | Substrate        | Glass Fabrics | 1    |

# Recommended Pad

Unit : mm



## Absolute Maximum Ratings

(Ta=25°C)

| Item                      | Symbol           | Absolute Maximum Ratings | Unit |
|---------------------------|------------------|--------------------------|------|
| Power dissipation         | Pc               | 75                       | mW   |
| Collector-emitter voltage | V <sub>CEO</sub> | 30                       | V    |
| Emitter-collector voltage | V <sub>ECO</sub> | 5                        | V    |
| Collector current         | I <sub>C</sub>   | 20                       | mA   |
| Operating temperature     | T <sub>opr</sub> | -30~+85                  | °C   |
| Storage temperature       | T <sub>stg</sub> | -40~+100                 | °C   |

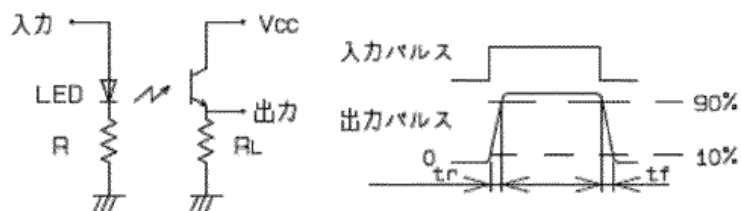
## Electro-Optical Characteristics

(Ta=25°C)

| Item                                 | Conditions  | Symbol               | Characteristics             | Unit     |                      |
|--------------------------------------|---|----------------------|-----------------------------|----------|----------------------|
| Dark current                         | V <sub>CEO</sub> = 10V  | I <sub>CEO</sub>     | MAX. 0.1                    | μA       |                      |
| Photo current                        | V <sub>CE</sub> = 5V ☆E <sub>e</sub> = 5mW/cm <sup>2</sup>              | I <sub>c</sub>       | MIN. 0.7                    | mA       |                      |
|                                      |   |                      | TYP. 1.0                    |          |                      |
|                                      |   |                      | MAX. 2.4                    |          |                      |
|                                      |   |                      | Peak sensitivity wavelength |          | V <sub>CE</sub> = 5V |
| Collector-emitter saturation voltage | I <sub>c</sub> = 0.5mA, ☆E <sub>e</sub> = 10mW/cm <sup>2</sup>          | V <sub>CE(Sat)</sub> | TYP. 0.1                    | V        |                      |
| Response time                        | ☆☆ V <sub>CE</sub> = 10V<br>I <sub>c</sub> = 2mA, R <sub>L</sub> = 100Ω |                      | tr                          | TYP. 1.8 | μs                   |
|                                      |   |                      | tf                          | TYP. 2.6 | μs                   |
| Angle of sensitivity                 | Longitudinal direction  | ∠θ                   | TYP. 110                    | deg.     |                      |
|                                      | Lateral direction   |                      | TYP. 120                    | deg.     |                      |

☆ Tungsten filament lamp (color temperature: 2865K) is used.

☆☆ Circuit for measuring response time

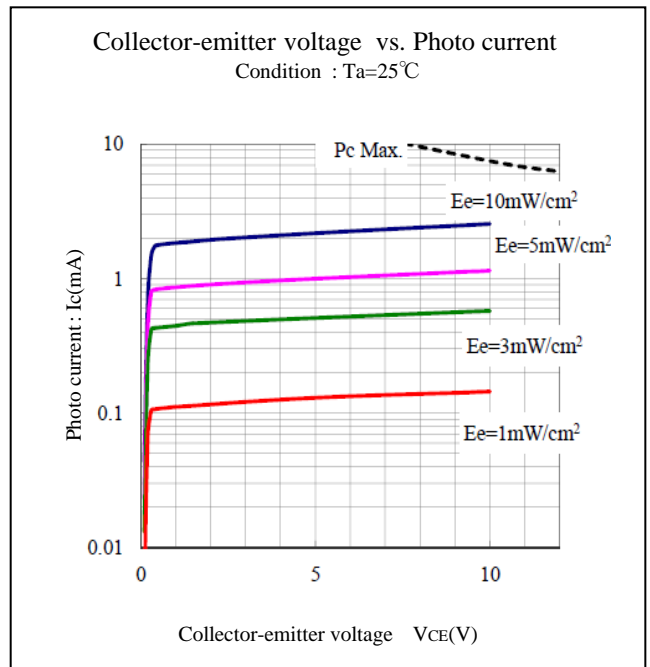
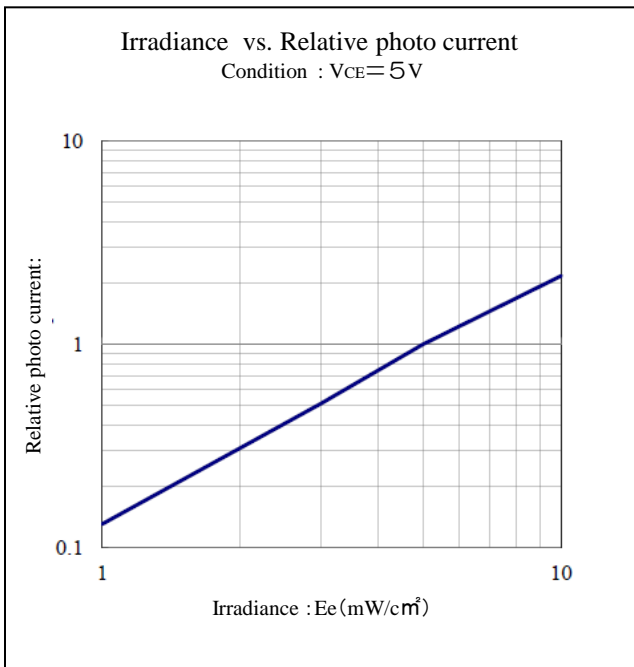
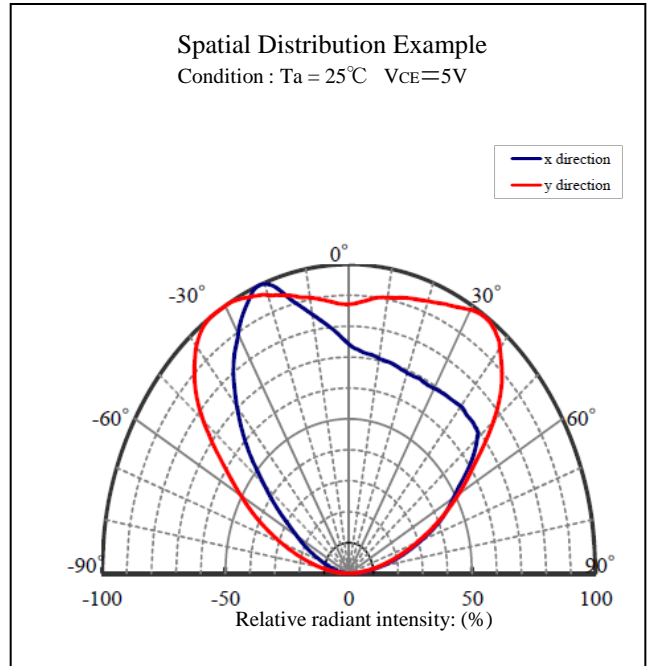
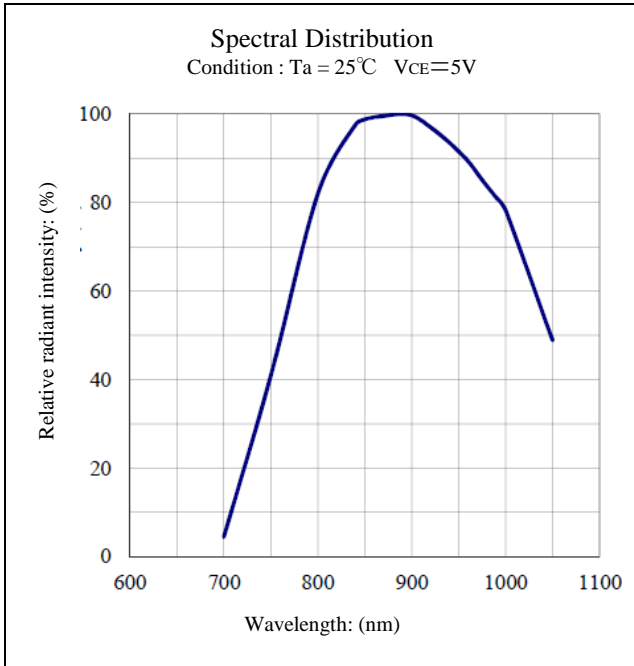


## Radiant Intensity Rank

(Ta=25°C)

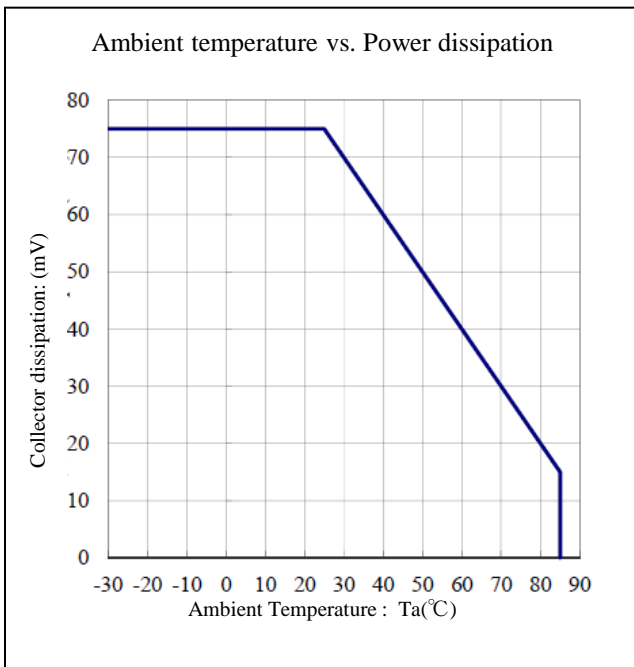
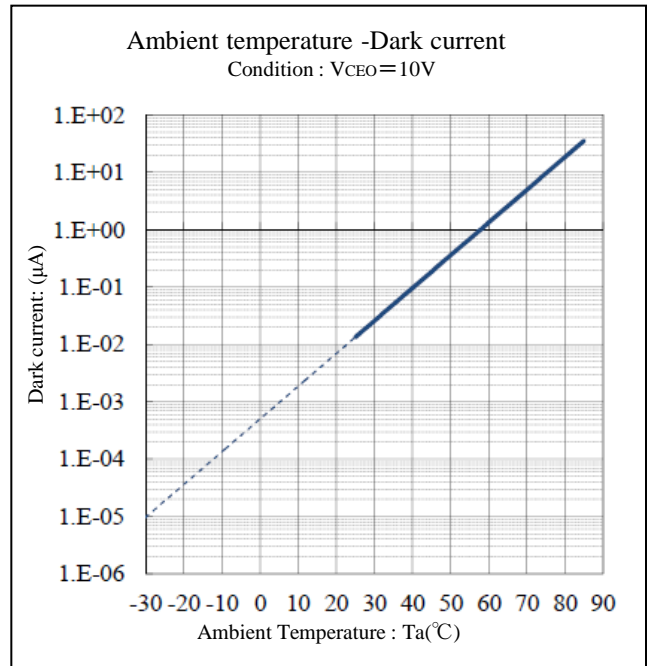
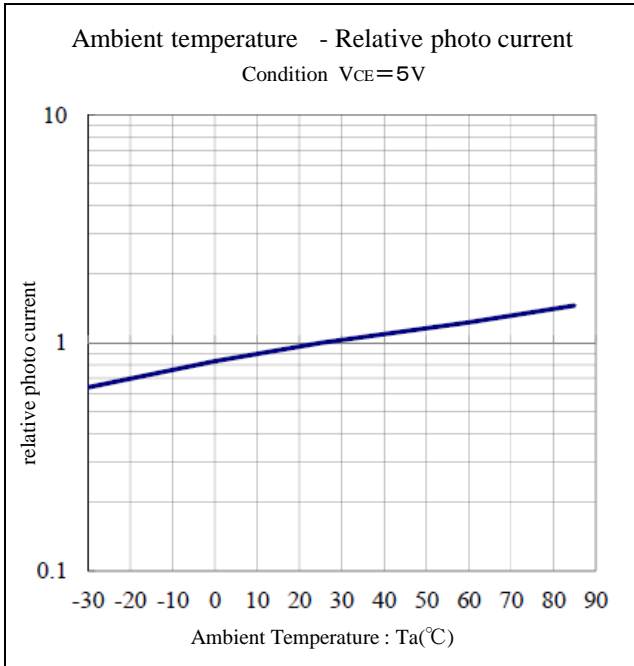
| Ranks | Ic(mA) |      | Conditions   |
|-------|--------|------|--|
|       | MIN.   | MAX. |  |
| B     | 0.7    | 1.4  | V <sub>CE</sub> =5V<br>E <sub>e</sub> =5mW/cm <sup>2</sup><br>T <sub>a</sub> =25°C |
| C     | 1.2    | 2.4  |  |

Radiant Intensity rank of shipped device might be any rank of above 2 ranks(B,C).



Standard:  $E_e = 5 \text{ mW}/\text{cm}^2$   
 Standard tungsten (2,856K) lamp used.

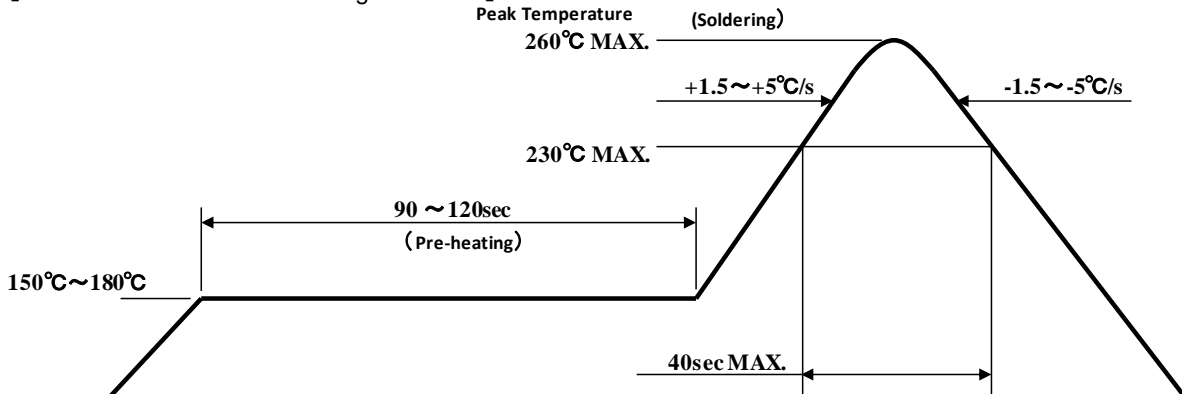
Standard tungsten (2,856K) lamp used.



## 【Soldering Precaution】

### 1. Reflow Soldering

#### 【Recommended Reflow Soldering Condition.】



- ※ Above temperature profile for the reflow soldering is listed as the temperature of the resin surface of light receiving device.
- ※ The reflow soldering process should be done up to twice(2 times Max). When second process is performed, interval between first and second process should be as short as possible to prevent absorption of moisture to resin of device. The second soldering process should not be done until devices have returned to room temperature (by nature-cooling) after first soldering process.
- ※ Temperature fluctuation to device at pre-heat process shall be minimized. (6°C MAX.)

### 2. Dip soldering

Not recommended for this product.

### 3. Manual Soldering (Soldering iron)

#### Recommended Manual Soldering Condition

|                          |                    |
|--------------------------|--------------------|
| Temperature of Iron Tip  | 350°C MAX.         |
| Soldering Duration, Time | 3sec. Max., 1 time |

### 4. Other Caution

- ① During the actual soldering process, make sure that the soldering iron never touch the device (especially the resin part).
- ② When using adhesive material for tentative fixatives, thermosetting resin or Ultraviolet radiation (UV) setting resin with heat shall be recommended.  
《The curing condition, Temperature:150°C Max./Time:120sec. Max.》
- ③ Please avoid any mechanical stress or any excess vibration after soldering ( when they are not at room temperature) .

- ④ When device need to repair, please choose any of the 3 methods below.  
Any mechanical stress or any excess vibration should be avoided no matter which method is used.

a) Replace with new device

b) Repair immediately after soldering

To avoid moisture absorption repair should be finished within 3 hours after soldering under following conditions. Repair should be done only once.

Temperature: +5~+30°C Humidity:70% MAX.

Please note that device should be left at room temperature for natural cooling after soldering. Rapid cooling should be avoided.

c) Repair over 3 hours after soldering

Baking should be done first before repair.

Repair should be done only once under following conditions.

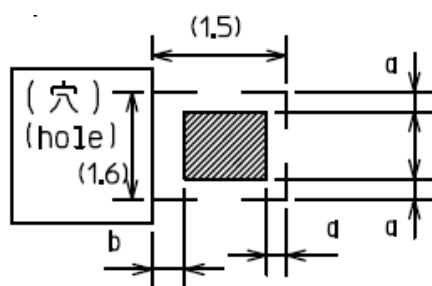
Temperature:+60±5°C 23h MIN. 48h MAX.

## 【Solder paste】

Apply correct amount of solder paste to soldering pad to prevent device from getting out of position. (See the diagram below)Especially, please take special care not to let solder paste infiltrate into the insert hole of the light receiving device.

※The proper solder paste thickness is 200 ~ 300 $\mu$  by stencil printing method .  
2~3mg for 1 place by dispense method. However, stencil printing is recommended for its precision paste amount and apply position.

Recommended mask shape (dispense method)



a : 0.05mm  
b : 0.15mm

(Dash line: recommended soldering pad)

## 【Mounting】

During mounting process, make sure the pick up nozzle will not bend the device.  
(Impact force under 4.9N is recommended.)

Electrical discharge prevention is recommended in a dry operating environment. Even though the tape use antistatic material , there is still possibility that product stick to the taping material depending on the electric charge amount.

Following precautions is recommended.

- 1) Environment: Electrical potential under 100V by humidity control
- 2) Peeling speed of tape: 10mm/s or less
- 3) Others: The use of static eliminator such as ion flow.

## 1. Cleaning

- ① Some chemicals, including Freon substitute detergent could corrode the lens or the casing surface, which cause discoloration, cloud, crack and so on. Please review the reference chart below for cleaning.

| Cleaning agents   | Recommended / Not recommended |
|-------------------|-------------------------------|
| Isopropyl alcohol | ✓ Recommended                 |
| Ethyl alcohol     | ✓ Recommended                 |
| Pure water        | ✓ Recommended                 |
| Trichloroethylene | x Not recommended             |
| Chloroethene      | x Not recommended             |
| Acetone           | x Not recommended             |
| Thinner           | x Not recommended             |

- ※ Dipping time: 3 minutes MAX. (at room temp.)
- ※ In case of pure water, please refer to section ④ below.

- ② The effect of ultrasonic cleaning on the device varies on factors such as the oscillator output, size of PCB and device mounting method. So It is strongly recommended to confirm the practical condition before cleaning.
- ③ Freon substitute detergent may cause discoloration, cloud or crack on the device surface. So prior confirmation on the practical condition is strongly recommended.
- Freon substitute detergent
- Clean through – 750H
  - Pine alpha ST-100S
- ④ In case of water-washing, ensure to use pure water(not city water), and after the washing, immediately apply forced drying to remove the moisture completely from device.

## 2. Warrant period

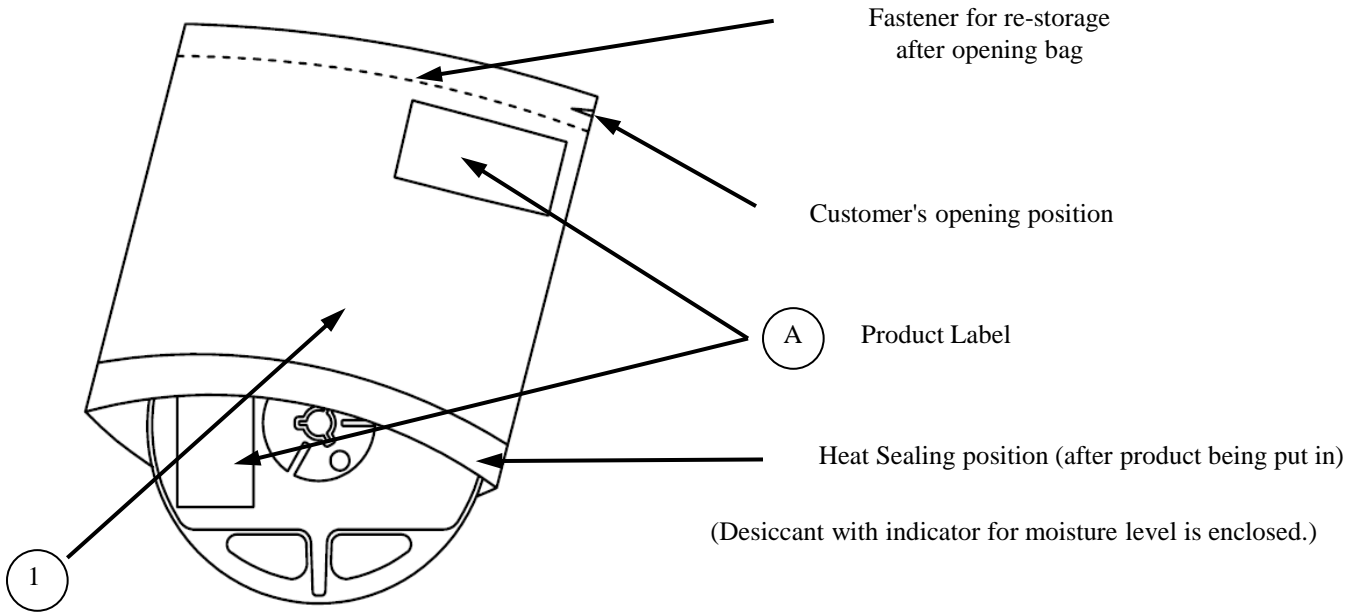
Within 6 months under the following conditions.

- un-opened, +5 ~ +30°C / 70 % MAX.

## 3. Handling after opened

- ① If any device should remain unused temporary or in process, please put it back into moisture-proof packaging, reseal the package and store it under the following conditions to prevent moisture absorption.
- +5 ~ +30°C / 70 % MAX.
- ② Unpacked devices should be stored under the following conditions. Soldering must be finished within 72h whether they have been restored in moisture-proof bag or not.
- +5 ~ +30°C / 70 % MAX.
- ③ Should 72h pass after packaging being opened, or should the desiccant (silica gel) change color (Blue→Pink), please perform baking before use under the following conditions.
- +60±5°C, 23h MIN. 48h MAX.

【Moisture-proof Packaging Specification】



| SYM. | PART NAME                              | MATERIAL  | REMARKS             |
|------|--|-----------|---------------------|
| ①    | Moisture-proof bag with Aluminum layer | PET+Al+PE | with ESD protection |

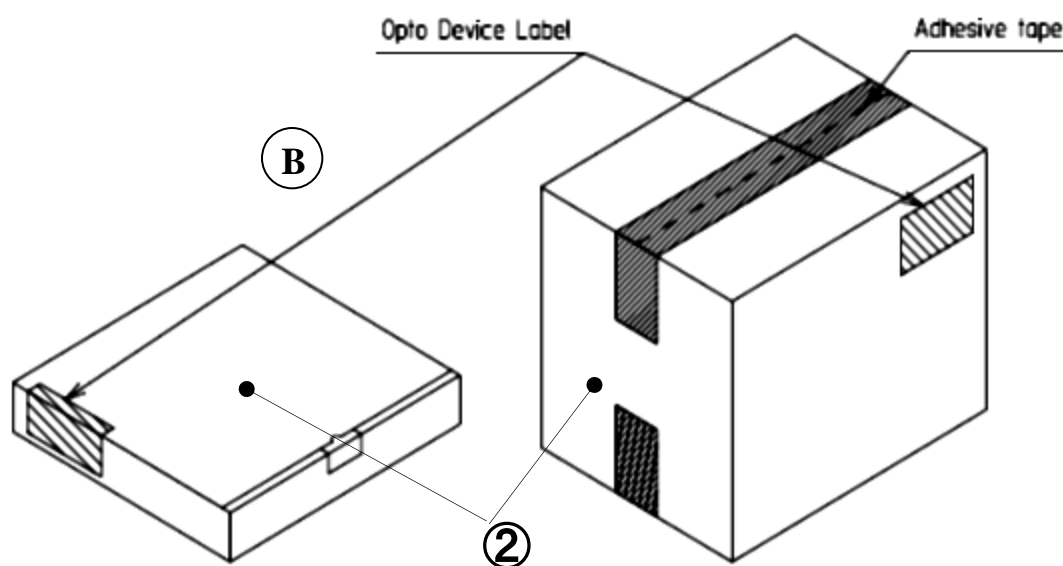
## 【Packing box】

( RoHS • ELV Compliant )

| Box TYPE | Outline dimension<br>L × W × H (mm) | Capacity of the box |
|----------|-------------------------------------|---------------------|
| Type A   | 280 × 265 × 45                      | 3 reels             |
| Type B   | 310 × 235 × 265                     | 15 reels            |
| Type C   | 440 × 310 × 265                     | 30 reels            |

Note1:The above measure is all the reference value.

Note2:Shipping box is selected out of the above table by shipping quantity.



Type A

Material / box : Cardboard C5BF

Type B,C

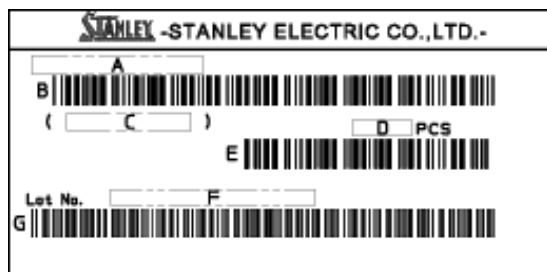
Material / box : Cardboard K5AF  
Partition : Cardboard K5BF

| No. | PART NAME   | MATERIAL                | REMARKS                   |
|-----|-------------|-------------------------|---------------------------|
| ②   | Packing Box | Corrugated<br>Cardboard | without ESD<br>protection |

【Label Specification】

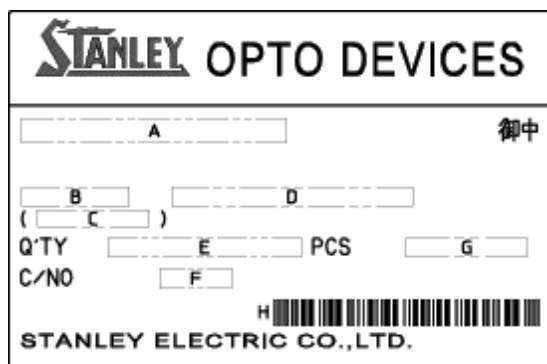
( acc.to JIS-X0503(Code-39))

A Product Label



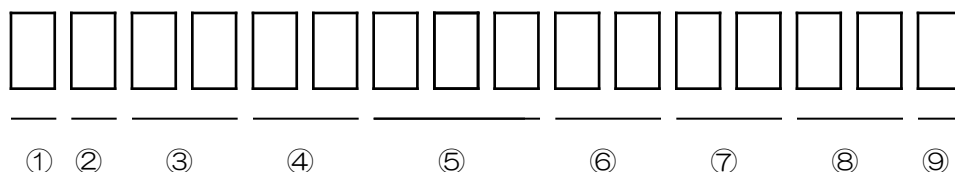
- A. Parts number
- B. Bar-code for parts number
- C. Parts code (In-house identification code for each parts number)
- D. Packed parts quantity
- E. Bar-Code for packed parts quantity
- F. Lot number & Rank (16 digits)
- G. Bar-Code for Lot number & Rank

B Opto Device Label



- A. Customer Name
- B. Parts Type
- C. Parts Code
- D. Parts Number
- E. Packed Parts Quantity
- F. Carton Number
- G. Shipping Date
- H. Bar-Code for In-house identification Number

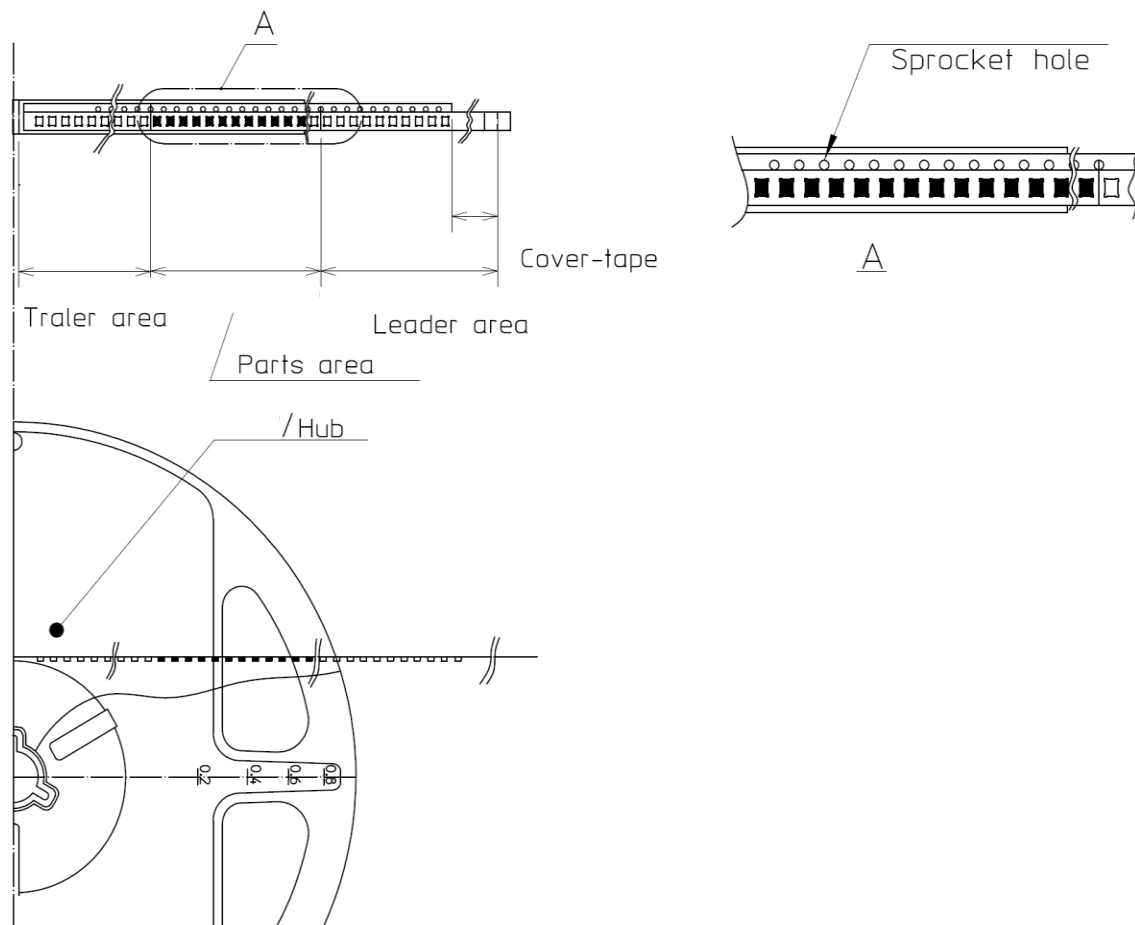
<Remark> Bar-code font : acc.to Code-39(JIX0503)



- ① - 1digit : Production Location (Mark identify alphabet)
- ② - 1digit : Production Year (Last digit of production Year 2009→9,2010→0,2011→1,···)
- ③ - 2digits : Production Month (Jan. to Sep. ,should be 01,02,03,·····)
- ④ - 2digits : Production Date
- ⑤ - 3digits : Serial Number
- ⑥ - 2digits : Tape and Reel following Number
- ⑦ - 2digits : Luminous Intensity Rank.  
(If luminous intensity rank is 1 digit, "-" shall be dashed on the place for the second digit.  
If there is no identified intensity rank, "- -" is used to indicate.)
- ⑧ - 2digits : Chromaticity Rank  
(If chromaticity rank is 1 digit, "-" shall be dashed on the place for the second digit.  
If there is no identified intensity rank, "- -" is used to indicate.)
- ⑨ - 1digit : Option Rank (Stanley normally print "-" to indicate)

(acc.to JIS-C0806-3)

【Appearance】



| Items        |              | Specifications   | Remarks  |
|--------------|--------------|--|--|
| Leader area  | Cover-tape   | Cover-tape shall be longer than 400mm without carrier-tape | The end of cover-tape shall be held with adhesive tape.          |
|              | Carrier-tape | Empty pocket shall be more than 25 pieces.                 | Please refer to the above figures for Taping & reel orientation. |
| Trailer area |              | Empty pocket shall be more than 40 pieces.                 | The end of taping shall be inserted into a slit of the hub.      |

(acc.to ; JIS-C0806-03)

## 【Qty. per Reel】

3,000parts/reel

## 【Mechanical strength】

Cover-tape adhesive strength shall be 0.1~1.0N ( The angle between carrier-tape and cover-tape shall be 165 ~ 180 deg. ) Both tapes shall be so sealed that the contained parts will not come out from the tape when it is bent at a radius of 15mm.

## 【 Packaging box】

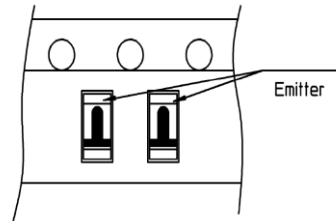
Name of Stanley Electric Co., Ltd., parts number and quantity shall be stated on the surface of box or bag.

## Note:

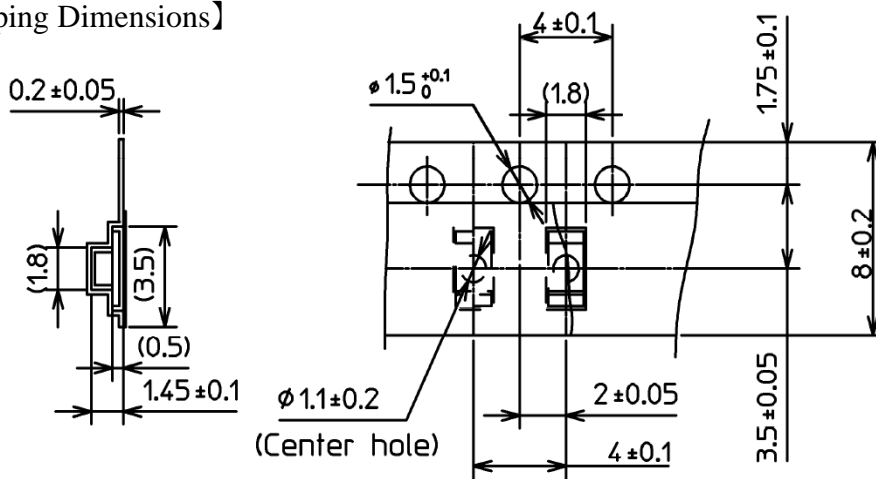
Reversed-orientation, Up-side down placing, side placing and out of spec. parts mix shall not be held.

(acc.to ; JIS-C0806-03)

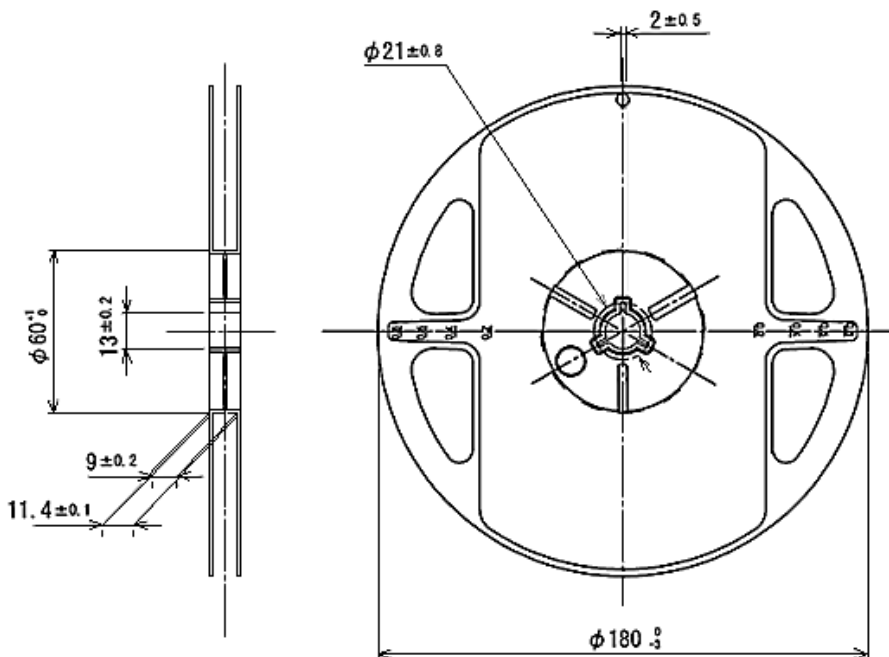
【Orientation of device on tape】



【Taping Dimensions】



【Reel Dimensions】



This product is in compliance with RoHS • ELV.

Prohibition substance and it's criteria value of RoHS • ELV are as follows.

- ELV instruction ..... Refer to following (1)~(4).
- RoHS instruction ..... Refer to following (1)~(6).

|     | Substance Group Name      | Criteria Value |
|-----|---------------------------|----------------|
| (1) | Lead and its compounds    | 1,000ppm Max   |
| (2) | Cadmium and its compounds | 100ppm Max     |
| (3) | Mercury and its compounds | 1,000ppm Max   |
| (4) | Hexavalent chromium       | 1,000ppm Max   |
| (5) | PBB                       | 1,000ppm Max   |
| (6) | PBDE                      | 1,000ppm Max   |

## 1. Reliability Testing Result

| Test Item                          | Standard              | Test Condition  | Duration | Failure |
|------------------------------------|-----------------------|---|----------|---------|
| Endurance Operating Test           | EIAJ ED-4701/100(101) | Ta=25°C P <sub>C</sub> =75mW  | 1,000h   | 0/15    |
| Humidity Resistance Operating Test | EIAJ ED-4701/100(102) | Ta=60°C RH=90% V <sub>CE</sub> =5V  | 1,000h   | 0/15    |
| High Temperature Operating Test    | EIAJ ED-4701/100(105) | Ta=85°C V <sub>CE</sub> =5V   | 1,000h   | 0/15    |
| Low Temperature Operating Test     | EIAJ ED-4701/100(103) | Ta=-30°C V <sub>CE</sub> =5V  | 1,000h   | 0/15    |
| Heat Cycle Test                    | EIAJ ED-4701/200(201) | Storage Temperature min.value (30min) ~ Ta=Storage Temperature max.value (30min)    | 5cycles  | 0/15    |
| High Temperature Shelf Test        | EIAJ ED-4701/200(202) | Ta=Storage Temperature max.value  | 1,000h   | 0/15    |
| Low Temperature Shelf Test         | EIAJ ED-4701/400(403) | Ta=Storage Temperature min.value  | 1,000h   | 0/15    |
| Reflow Resistance Test             | EIAJ ED-4701/300(301) | Preheating : 150~180°C 120sec MAX.<br>/ Soldering : 230°C,40Sec MAX. Peak 260°C MAX | 2 times  | 0/15    |

Conditions:

Each Reliability Test shall be implemented after baking (24Hr at 60°C) and reflow process ( 2 times).

Reflow process shall be done after moisture absorption for 72h at 30°C,70%

## 2. Failure Criteria



| Items               | Symbols          | Conditions   | Failure criteria   |
|---------------------|------------------|--|--|
| Photo Current       | I <sub>C</sub>   | E <sub>E</sub> Value of each product Irradiance of Photo Current<br>V <sub>CE</sub> Value of each product Collector-emitter Voltage of Photo Current | Testing Max. Value ≥ Initial Value x 1.2<br>Testing Min. Value < Initial Value x 0.8 |
| Dark Current        | I <sub>CEO</sub> | V <sub>CEO</sub> Value of each product Collector-emitter Voltage of Dark Current   | Testing Max. Value ≥ Spec. Max. Value x 2.5  |
| External Appearance | -                | -  | Occurrence of notable decoloration, deformation and cracking                         |

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