

COBP PHOTO REFLECTOR

■ GENERAL DESCRIPTION

NJL5901R is the compact surface mount type photo reflector in which Lead(Pb) – free reflow soldering is possible. It is possible to perform reflow soldering temperature 260°C and 2 times. NJL5901R has realized the high output current and the high S/N ratio combining a high output infrared LED and a high sensitivity Si photo-transister.

■ FEATURES

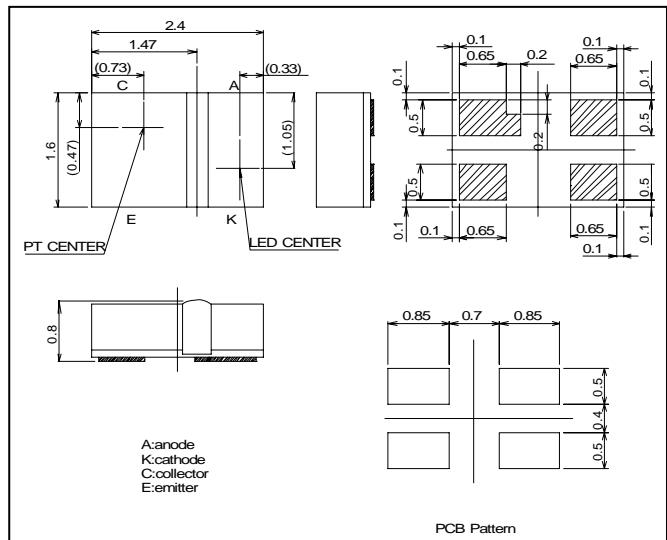
- Pb free solder re-flowing permitted(260°C, 2times)
- Miniature, thin, surface mount 1.6mm × 2.4mm × 0.8mm
- Built-in visible light cut-off filter
- High output, high S/N ratio

■ APPLICATIONS

- Detecting the location of CD/DVD optical pickup head
- Detecting the location of lens for DSC and Cellular Phone's camera module
- End detection of VCR tape
- Rotation detection of various motors

■ OUTLINE (typ.)

Unit : mm



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|------------------------------|--------|------------|------|
| Emitter | | | |
| Forward Current (Continuous) | IF | 30 | mA |
| Reverse Voltage (Continuous) | VR | 6 | V |
| Power Dissipation | PD | 45 | mW |
| Detector | | | |
| Collector-Emitter Voltage | VCEO | 16 | V |
| Emitter-Collector Voltage | VECO | 6 | V |
| Collector Current | IC | 10 | mA |
| Collector Power Dissipation | PC | 25 | mW |
| Coupled | | | |
| Total Power Dissipation | Ptot | 60 | mW |
| Operating Temperature | Topr | -20 to +85 | °C |
| Storage Temperature | Tstg | -40 to +85 | °C |
| Reflow Soldering Temperature | Tsol | 260 | °C |

■ ELECTRO-OPTICAL CHARACTERISTICS (Ta=25°C)

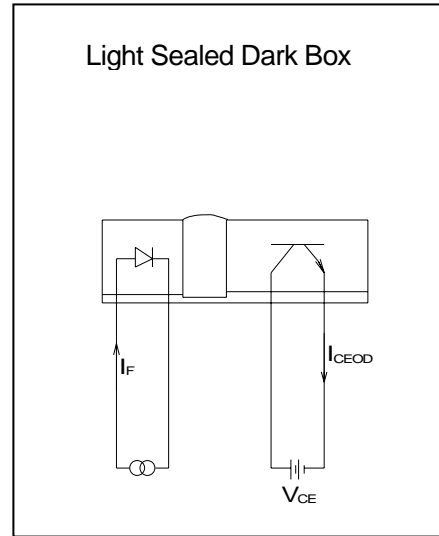
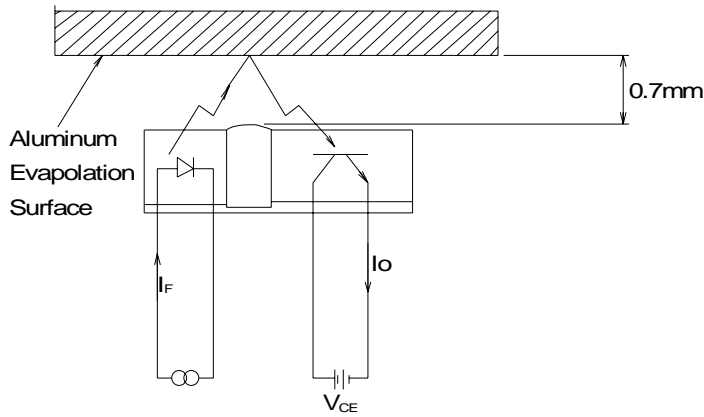
| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---------------------------|--------|--------------------------------|-----|-----|-----|------|
| Emitter | | | | | | |
| Forward Voltage | VF | IF=4mA | — | — | 1.4 | V |
| Reverse Current | IR | VR=6V | — | — | 10 | μA |
| Capacitance | Ct | VR=0V,f=1MHz | — | 25 | — | pF |
| Detector | | | | | | |
| Dark Current | ICEO | VCE=10V | — | — | 0.2 | μA |
| Collector-Emitter Voltage | VCEO | IC=100μA | 16 | — | — | V |
| Coupled | | | | | | |
| Output Current | IO | IF=4mA,VCE=2V,d=0.7mm | 120 | — | 380 | μA |
| Operating Dark Current *1 | ICEOD | IF=4mA,VCE=2V | — | — | 2 | μA |
| Rise Time | tr | IO=100μA,VCE=2V,RL=1KΩ,d=0.7mm | — | 30 | — | μs |
| Fall Time | tf | IO=100μA,VCE=2V,RL=1KΩ,d=0.7mm | — | 30 | — | μs |

*1 Icoed may increase according to the periphery situation of the surface mounted product.

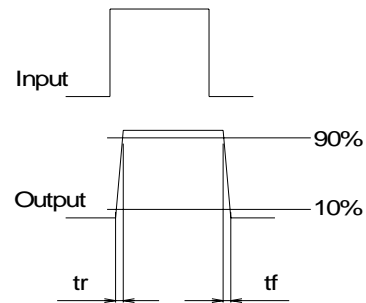
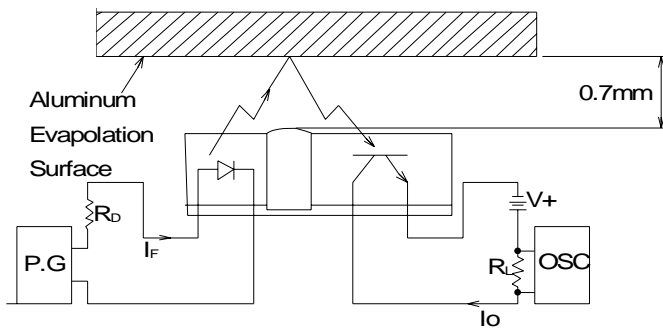
■ OUTPUT CURRENT TEST CONDITION

■ DARK CURRENT TEST CONDITION

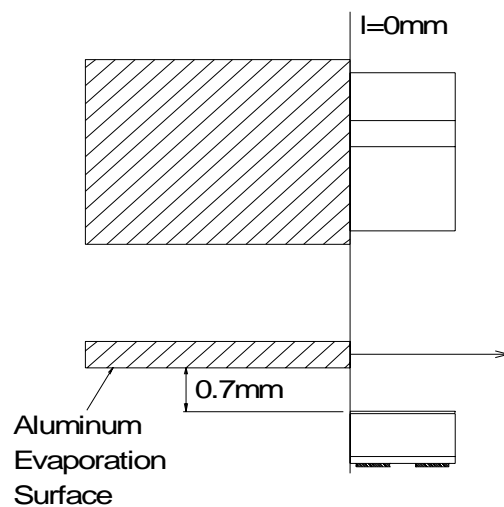
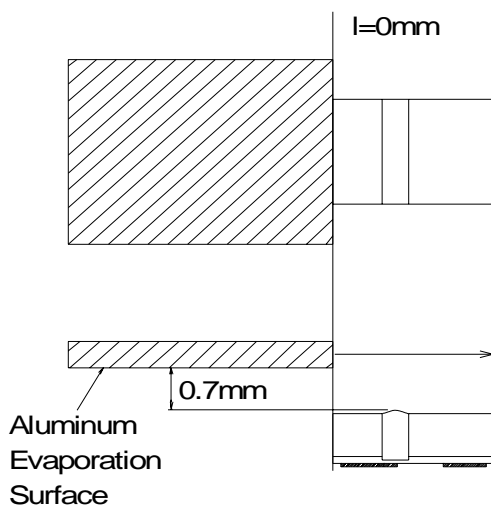
The infrared signal from LED is reflected at the aluminum surface.



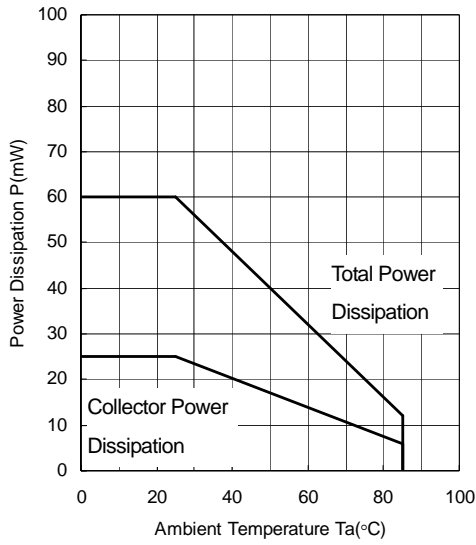
■ RESPONSE TIME TEST CONDITION



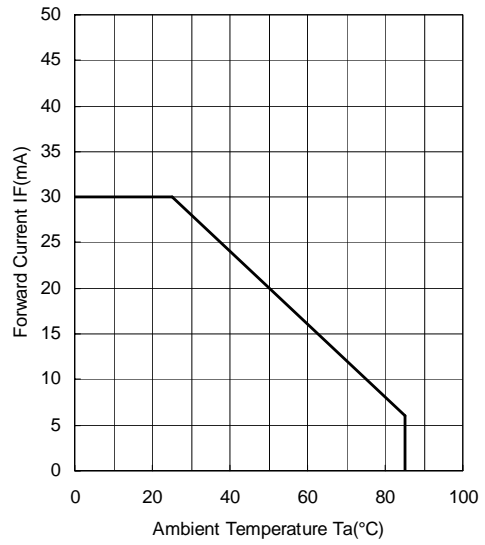
■ EDGE RESPONSE TEST CONDITION



Power Dissipation vs. Temperature

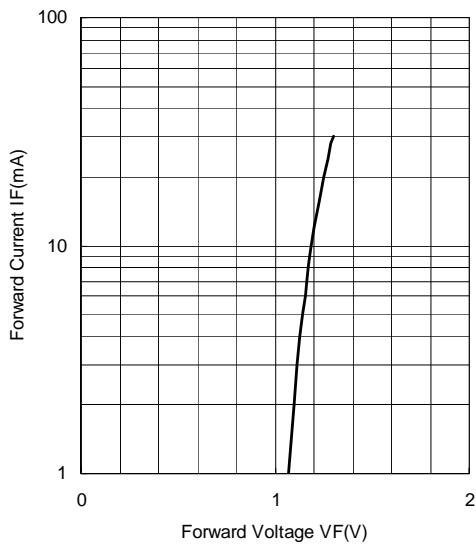


Forward Current vs. Temperature

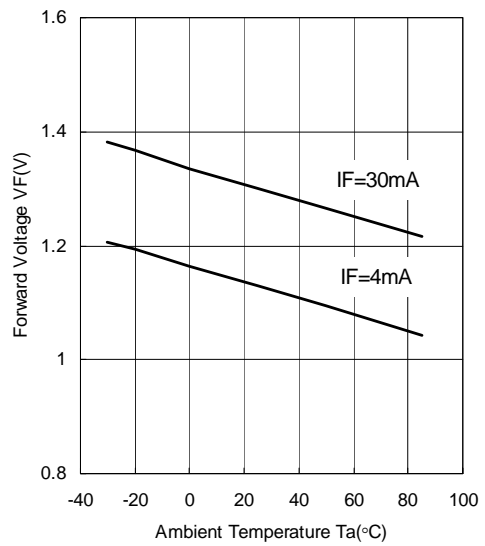


■ TYPICAL CHARACTERISTICS

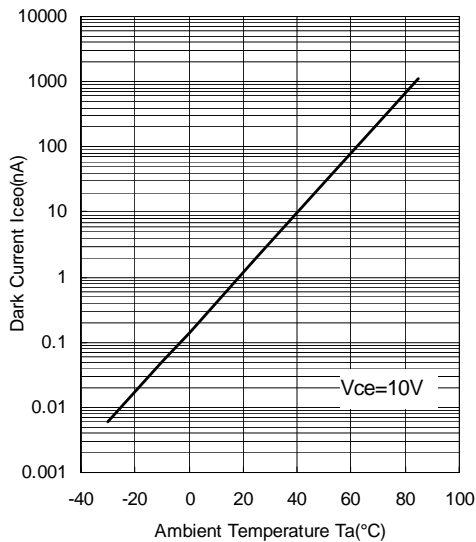
Forward Voltage vs. Forward Current



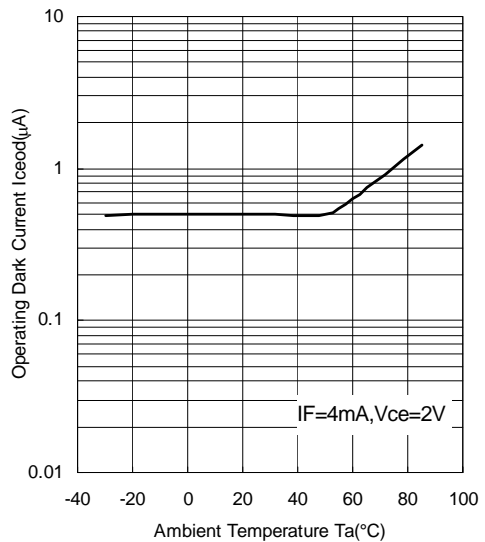
Forward Voltage vs. Temperature



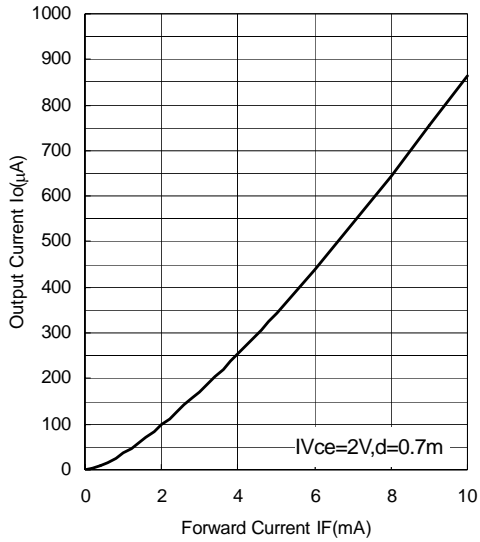
Dark Current vs. Temperature



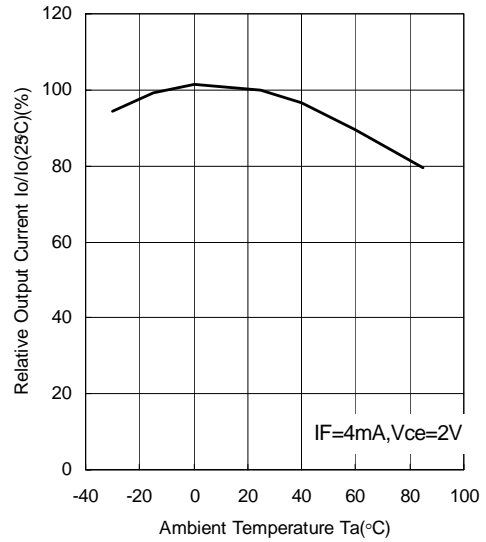
Operating Dark Current vs. Temperature



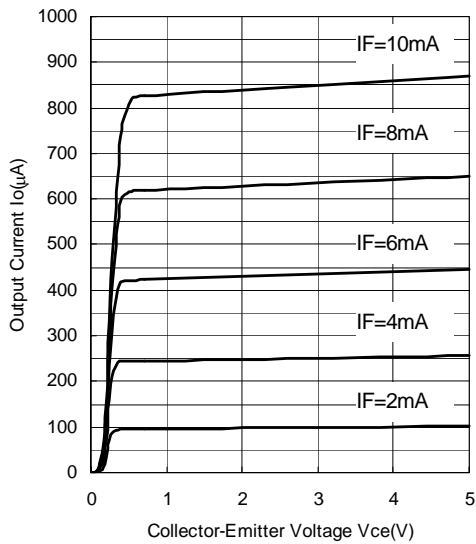
Output Current vs. Forward Current (Ta=25°C)



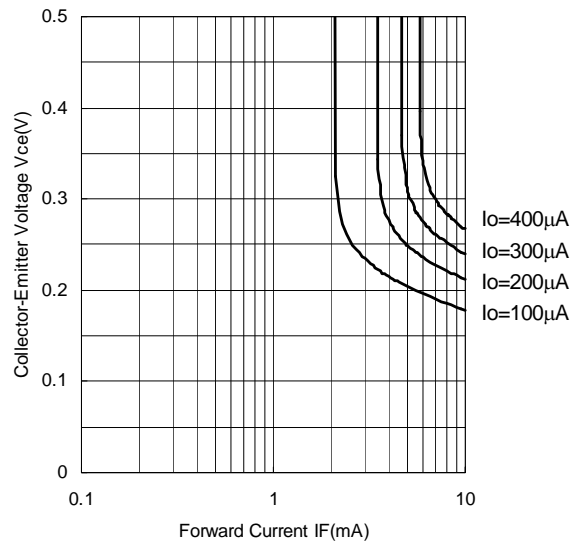
Output Current vs. Temperature



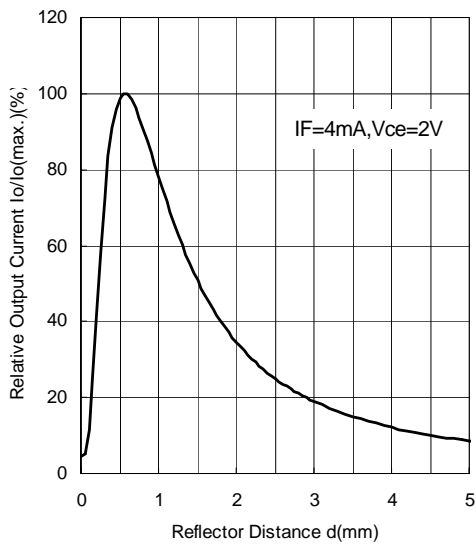
Output Characteristics (Ta=25°C)



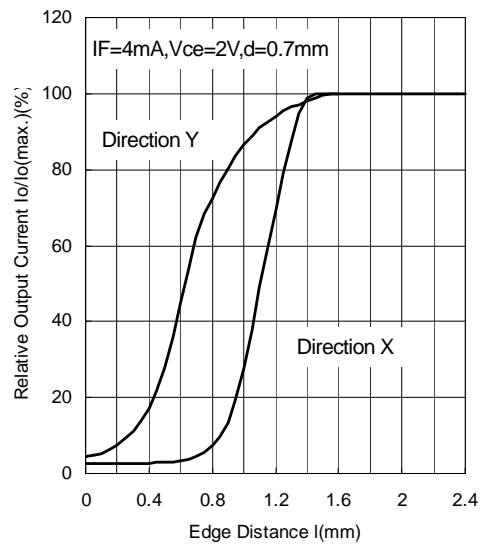
Vce Saturation (Ta=25°C)



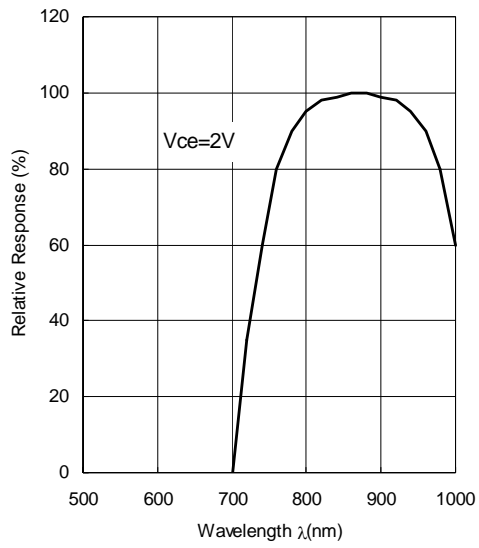
Output Current vs. Distance (Ta=25°C)



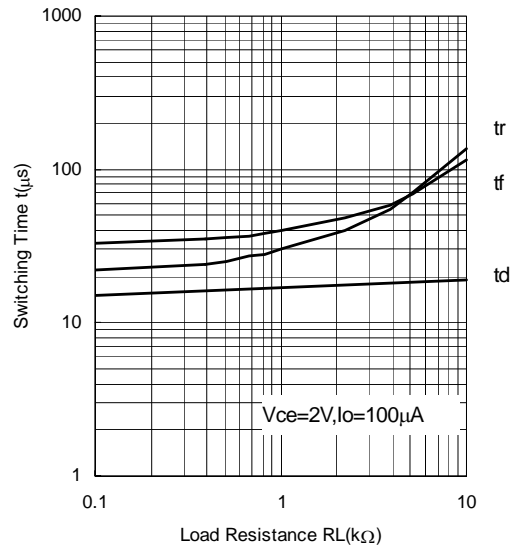
Output Current vs. Edge Distance (Ta=25°C)



Spectral Response (Ta=25°C)



Switching Time vs. Load Resistance (Ta=25°C)



PRECAUTION FOR HANDLING

1. Soldering to actual circuit board

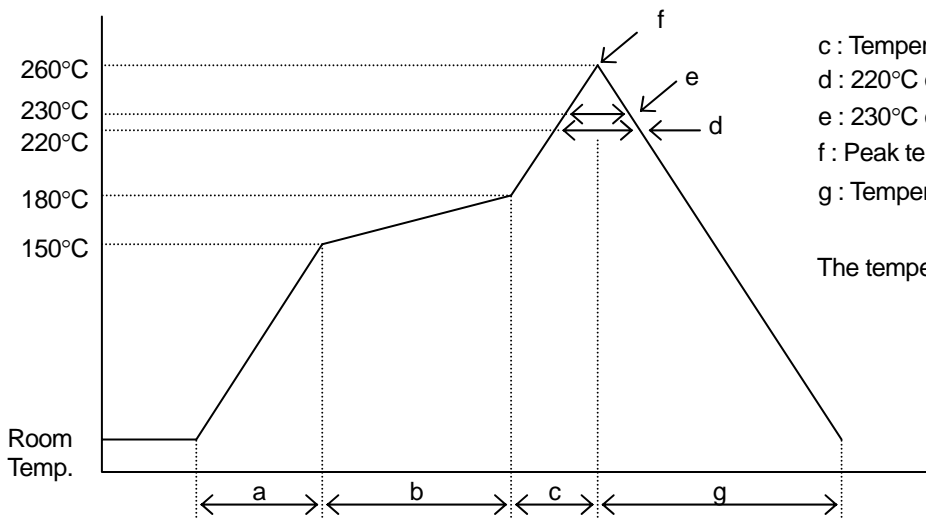
Soldering condition

The surface temperature of plastic package is lower than 260 °C.

Soldering Method

1) Reflow Method

Soldering to be done within twice under the recommended condition mentioned below



| | |
|------------------------------|--------------------|
| a : Temperature ramping rate | : 1 to 4°C/s |
| b : Pre-heating temperature | : 150 to 180°C |
| time | : 60 to 120s |
| c : Temperature ramping rate | : 1 to 4°C /s |
| d : 220°C or higher time | : Shorter than 60s |
| e : 230°C or higher time | : Shorter than 40s |
| f : Peak temperature | : Lower than 260°C |
| g : Temperature ramping rate | : 1 to 6°C /s |

The temperature of the surface of mold package

2) Reflow Method (In case of infrared heating)

The temperature profile is same as the above

Avoid direct irradiation to the plastic package because it may absorb the Infrared Radiation and its surface temperature will be higher than the lead.

3) The other method

Avoid rapid heating up like dipping the devices directly into the melting solder or vapor phase method (VPS).

Solder the device in short time as soon as possible.

If the device is heated and kept in high temperature for longer time, its reliability would be affected.

2. Cleaning

Avoid washing the device after soldering by reflow method.

3. Attention in handling

1) Treat not to touch the lens surface.

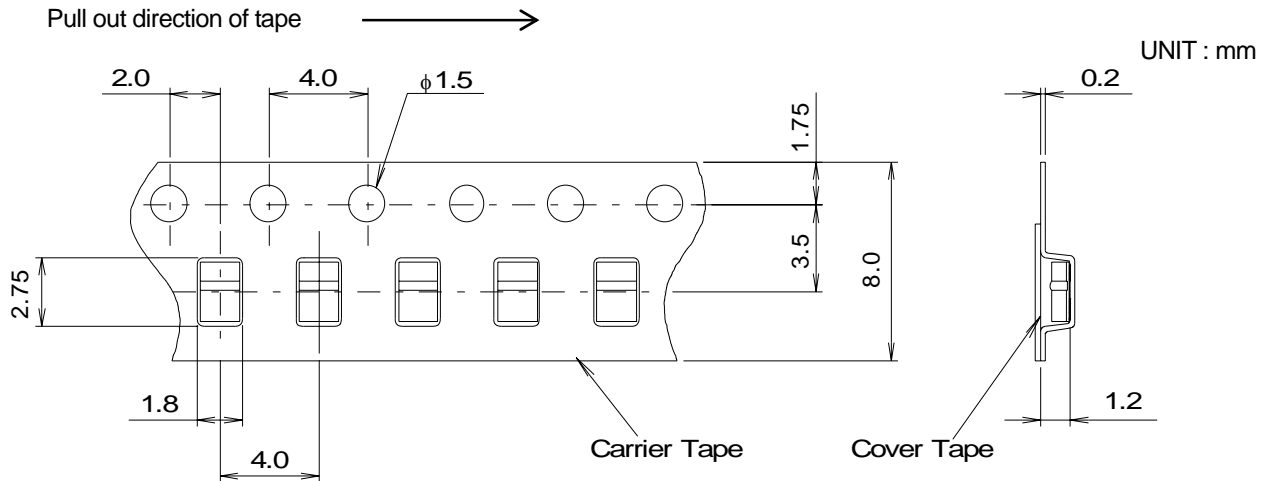
2) Avoid dust and any other foreign materials on the lens surface such as paint, bonding material, etc.

4. Storage

Mount the device as soon as possible after opening the envelope. In order to prevent from degradation by the moisture at the reflow process, the device is contained in deaeration packaging.

1. Taping Size

- 1) Carrier tape is used with Styrene type Carbonated Plastic.
- 2) Cover tape is used with electro statistically prevention treated Polyester type tape.
- 3) Product taping direction is to place the index mark against the pull out direction of the tape as in the drawing.

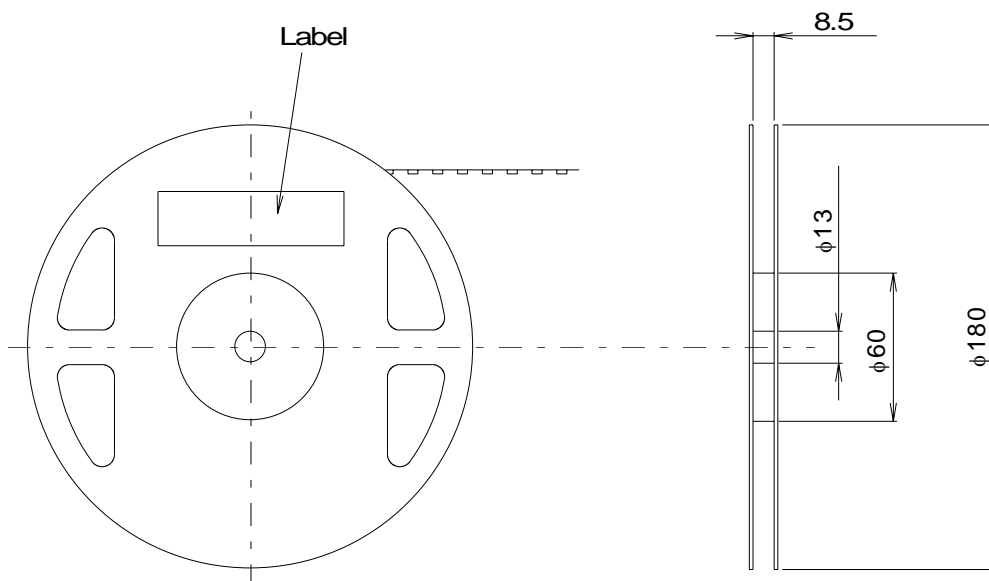


2. Taping Strength

Pull up the cover tape from the carrier tape, and when the opening angle comes around 10 to 15°, and the peeling-off strength is to be within the power of 20 to 70g.

3. Packaging

- 1) The taped products are to be rolled up on the taping reel as on the drawing.
- 2) Rolling up specification
 - 2-1) Start rolling : Carrier tape open space more than 20 Pieces.
 - 2-2) End of rolling : Carrier tape open space more than 20 Pieces, and 2 round of reel space at the cover tape only.
- 3) Taping quantity : 2,000 Pieces.
- 4) Seal off after putting each reels in a damp proof bag with silica gel (3 bags).



[CAUTION]
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