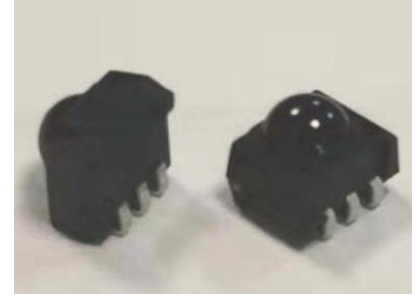




## ZIRM-5042B-42-Z2

### Infrared Remote Control

### Receiver Module



### Descriptions

The ZIRM-5042B-42-Z2 is miniaturized infrared receivers for remote control and other applications requiring improved ambient light rejection.

The separate PIN diode and preamplifier IC are assembled on a single lead frame.

The epoxy package contains a special IR filter.

This module has excellent performance even in disturbed ambient light applications and provides protection against uncontrolled output pulses.

### Features

- Supply voltage range: 2.7V ~ 5.5 V
- TTL and CMOS compatibility
- No external components except PIN diode
- Available for carrier frequencies between 32.7kHz to 40kHz,( Adjusted by zener-diode fusing, 32.7kHz,36.7kHz,37.9kHz,40kHz)
- Internal filter for PCM frequency
- Enhanced immunity against all kinds of disturbance light and power noise (Built-in Filter & AGC Circuit)
- No occurrence of disturbance pulses at output pin within nominal conditions.
- Open collector output & Output active low (Built-in Pull-up resistor 50 k $\Omega$ )
- The output pulse width is very stable (Optimized for a narrow margin of the decoding)

### Applications

1. Optical switch
  2. Light detecting protion of remote contol
    - AV instruments such as Audio,TV,VCR,CD,MD,DVD,etc.
    - Home appliances such as Air-conditioner,Fan,etc.
    - CATV set top boxes
    - Multi-media Equipment
-



## Cautions

- store and use where there is no force causing transformation or change in quality
- store and use where there is no extreme humidity
- in order to prevent damage from static electricity make sure that the human body and the Soldering iron are connected to ground before using
- the ripple noise from power supply lines may shorten detecting distance of IT receiver module Thus in order to ensure more reliable operating please add RC filter (R=100 C=47) between Vcc and GND
- when a disturbance signal is applied to the series it can still receive the data signal However the sensitivity is reduced to the level that no unexpected pulses will occur Some examples of such disturbance signals which can be suppressed pulses by the series
  - A DC light(ex from tungsten lamp or sunlight)
  - B Continuous signal at center frequency or any other frequency
  - C Signals from fluorescent lamps with electronic ballast with high or low modulation



## Absolute Maximum Ratings(Ta=25°C)

Exposure to absolute maximum rating conditions for extended periods may affect device reliability

| Parameter (Ta=25°C)                          | Symbol           | Value            | Unit |   |
|--|------------------|------------------|------|---|
| Supply voltage                               | VS               | -0.3 to +6       | V    |   |
| Supply current                               | IS               | 2                | mA   |   |
| Input voltage                                | V <sub>IN</sub>  | -0.3 to VS       | V    |   |
| Output voltage                               | V <sub>O</sub>   | -0.3 to VS       | V    |   |
| Output sink current                          | I <sub>O</sub>   | 30               | mA   |   |
| Operating temperature                        | T <sub>amb</sub> | -25 to +85       | ° C  |   |
| Storage temperature                          | T <sub>stg</sub> | -40to +125       | ° C  |   |
| Power dissipation at T <sub>amb</sub> = 25°C | P <sub>tot</sub> | 30               | mW   |   |
| ESD stress HBM                               | VS, OUT          | V <sub>ESD</sub> | 8000 | V |
|  | IN               | V <sub>ESD</sub> | 300  | V |
| ESD stress MM                                | VS, OUT          | V <sub>ESD</sub> | 400  | V |
|  | IN               | V <sub>ESD</sub> | 100  | V |



## Electrical And Optical Characteristics(Ta=25°C)

Tamb = -25°C to +85°C, VS =5V unless otherwise specified.

| Parameters                          | Test Conditions                                 | Symbol    | Min.    | Typ. | Max. | Unit |
|-------------------------------------|---|-----------|---------|------|------|------|
| <b>Supply</b>                       |   |           |         |      |      |      |
| Supply-voltage range                |   | VS        | 2.7     |      | 5.5  | V    |
| Supply current                      | IIN =0  | IS        | 165     | 220  | 290  | uA   |
| <b>Output</b>                       |   |           |         |      |      |      |
| Internal pull-upresistor            | Tamb=25°C, See Figure 3                         | RPU       |         | 57   |      | kΩ   |
| Output voltage low                  | R2=2.4 kΩ, See Figure 3                         | VOL       |         |      | 250  | mV   |
| Output voltage high                 |   | VOH       | VS-0.25 |      | VS   | V    |
| Output current clamping             | R2=0, See Figure 3                              | IOCL      |         | 15   |      | mA   |
| Output pulse width                  | Fin=37.9kHz, burst wave<br>Vin=500uVp-p, Note 1 | tPW1      |         | 422  |      | uS   |
|                                     | Fin=37.9kHz, burst wave<br>Vin=50mVp-p, Note 1  | tPW2      |         | 422  |      | uS   |
| <b>Input</b>                        |   |           |         |      |      |      |
| Input DC current                    | VIN=0, See Figure 3                             | IIN-DCMAX | -50     |      |      | μA   |
| Minimum detection threshold current | IIN_DC =0                                       | IIN-ACMIN |         | 800  |      | pA   |
| <b>Variable Amplifier</b>           |   |           |         |      |      |      |
| Maximum value of variable gain      |   | GVARMAX   |         | 20   |      | dB   |
| Minimum value of variable gain      |   | GVARMIN   |         | -30  |      | dB   |
| Total internal amplification        |   | GMAX      |         | 72   |      | dB   |

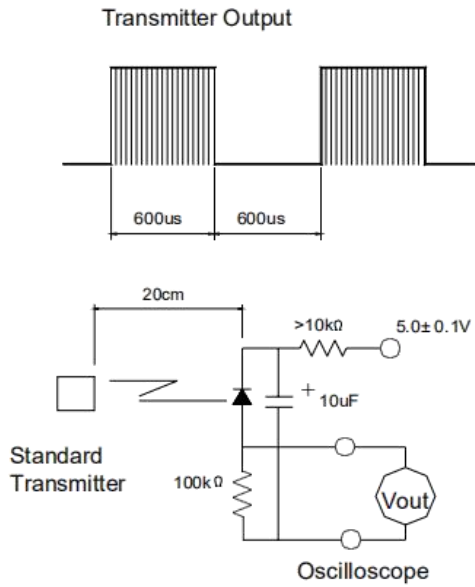
\*1: The ray receiving surface at a vertex and relation to the ray axis in the range of  $\theta=0^\circ$  and  $\theta=45^\circ$ .

\*2: A range from 30cm to the arrival distance. Average value of 50 pulses.

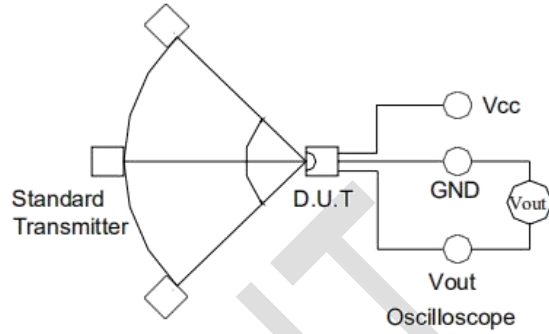


## Test Method

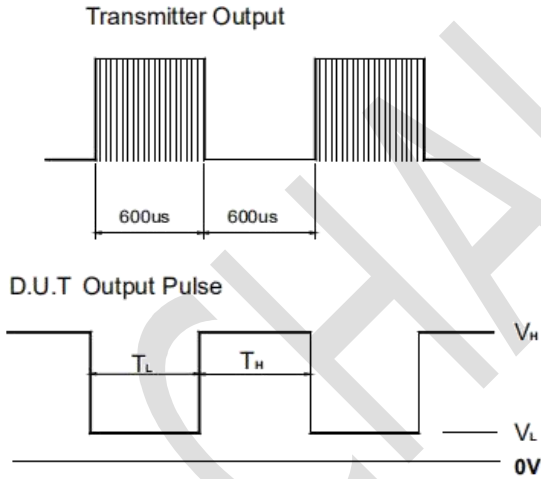
### A. Standard Transmitter



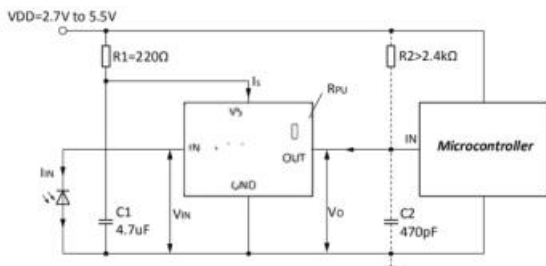
### B. Detection Length Test



### C. Pulse Width Test

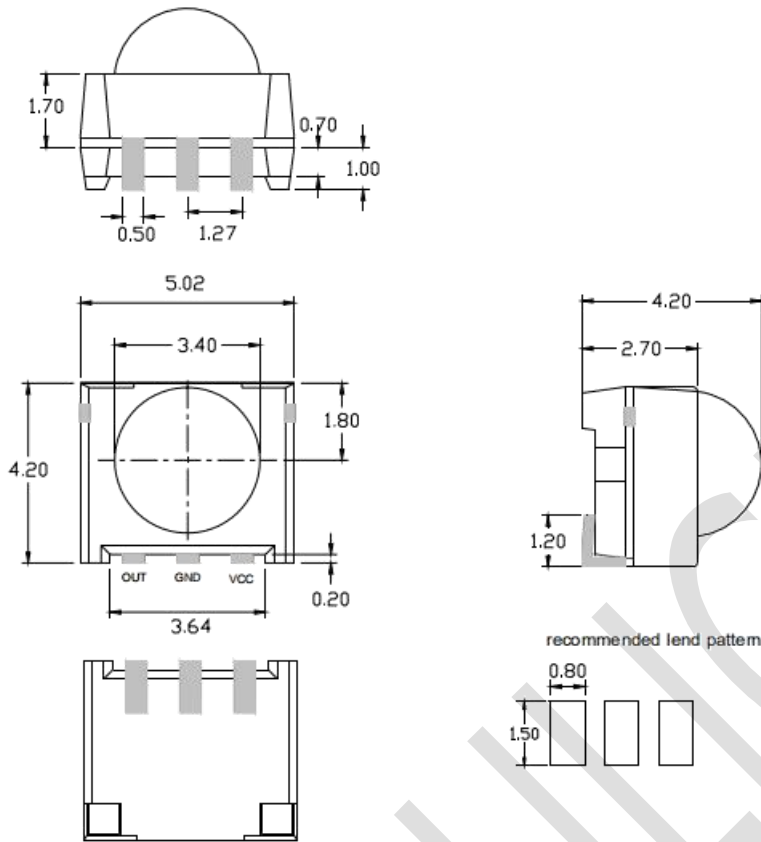


## Application Circuit





## Package Dimension

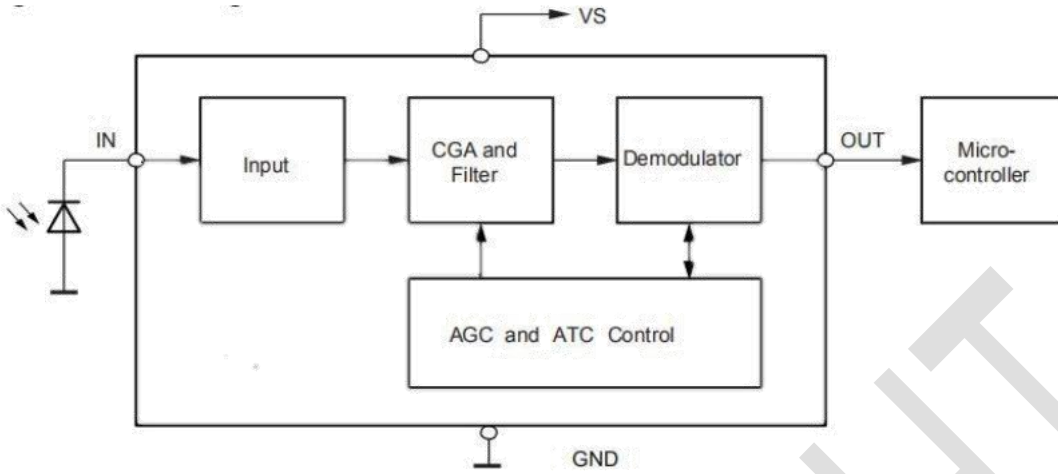


### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.30\text{mm}$  ( $0.012''$ ) unless otherwise specified.
3. Specifications are subject to change without notice.



## Function block diagram



## Electrical And Optical Curves(Ta=25°C)

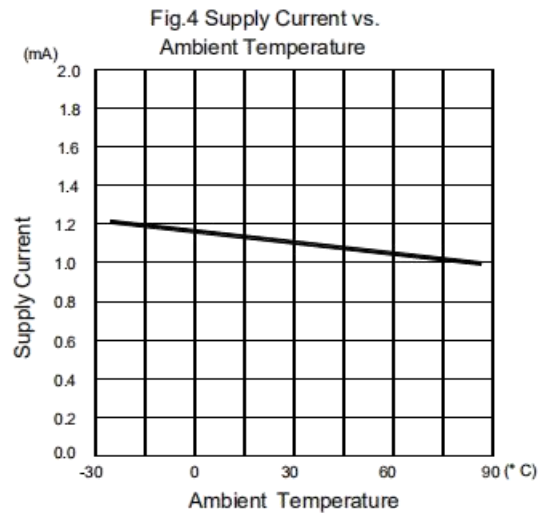
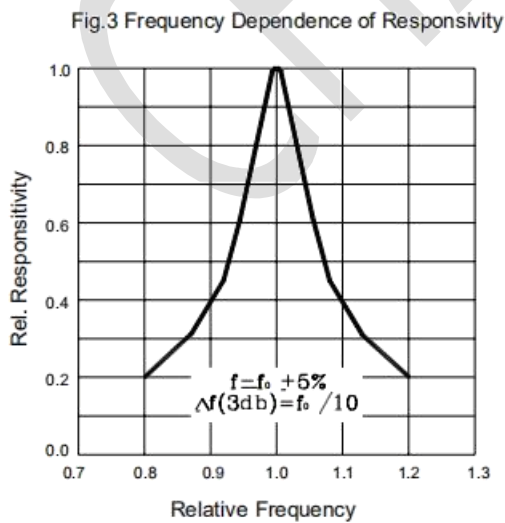
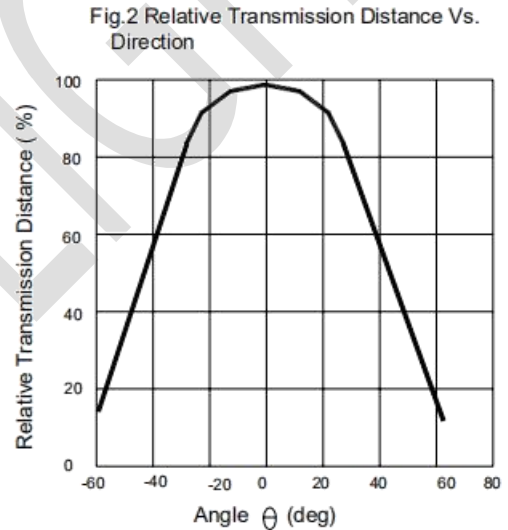
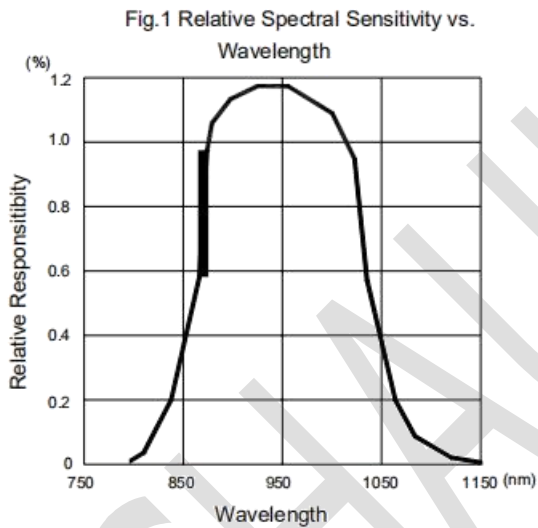
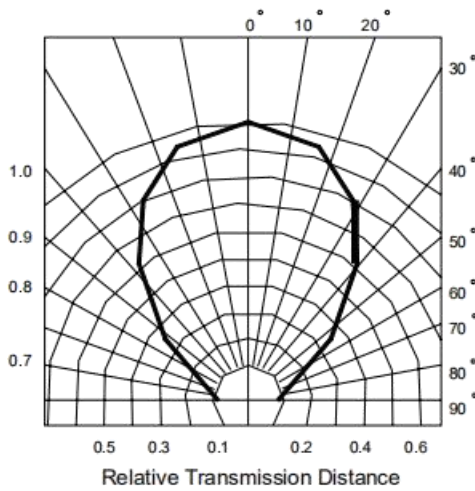




Fig.5 Relative Transmission Distance vs. Direction



ESD Test Results

| Parameter            | Specification   | Results       |
|----------------------|-----------------|---------------|
| Machine Model        | Min $\pm 200V$  | $> \pm 400V$  |
| Human Body Model     | Min $\pm 2000V$ | $> \pm 4000V$ |
| Charged Device Model | Min $\pm 400V$  | $> \pm 600V$  |

## Suitable Data format

| Item                                  | Symbol           | Time       |
|---------------------------------------|------------------|------------|
| Minimum burst length                  | $t_{Burst}$      | 250us      |
| Minimum gap time after each burst     | $t_{Gap}$        | 300us      |
| Minimum pause time in the data stream | $t_{pause\_min}$ | Min. 25 ms |

$t_{Pause\_min}$  Could be changed by different data word format. Therefore, for new application on sets please refer to “Required data pause time( $t_{Pause}$ )” on above.

## Reliability Test Items

| Parameter                 | Test conditions  | Remark |
|---------------------------|--|--------|
| High Temperature          | $T_a = +85, VCC = 5.0V, t = 240h$  | ※1, ※2 |
| Low Temperature           | $T_a = -30, VCC = 5.0V, t = 240h$  | ※1, ※2 |
| High Temp./ High Humidity | $T_a = +85^{\circ}C, 85\%RH, VCC = 5.0V, t = 240h$                           | ※1, ※2 |
| Heat Cycle                | $T_a = -20^{\circ}C (0.5h) \text{ to } +85^{\circ}C (0.5h) 20 \text{ cycle}$ | ※2, ※3 |
| Fall Test                 | Height=75cm, 3 times   | ※4     |

※ 1. Supply voltage of load test is 5V.

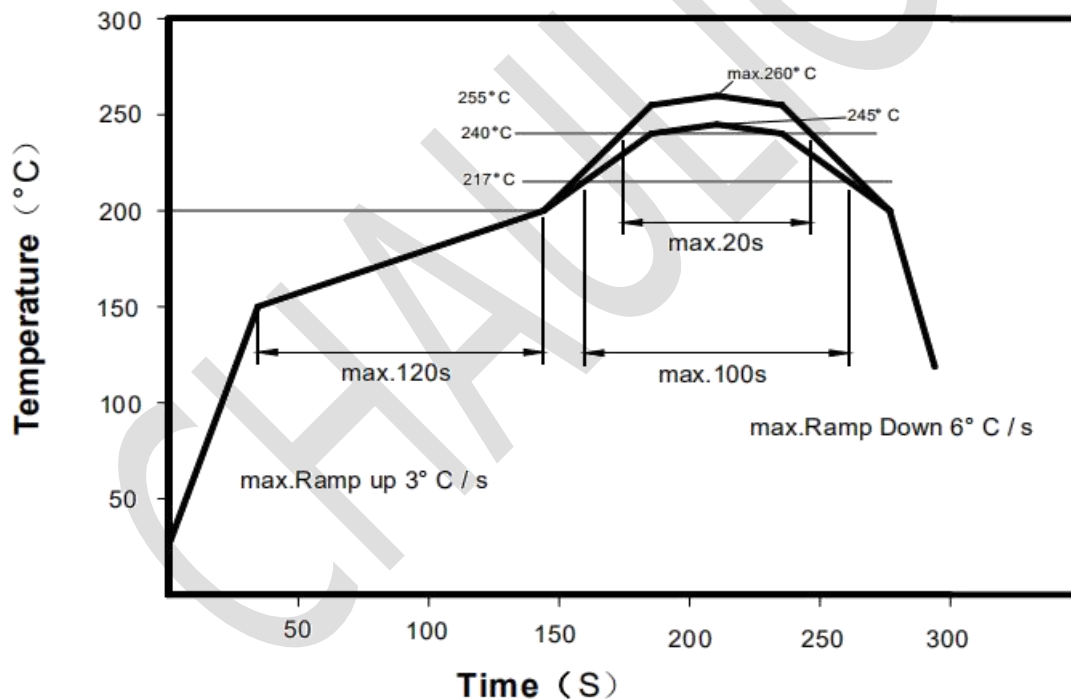


- ※ 2. Electro-optical characteristics shall be satisfied after leaving 2 hours in the normal condition.
- ※ 3. Heat cycle test shall repeat above condition 20 times under no load.
- ※ 4. The test devices shall be dropped three time on the hard wooden board from a height of 75 cm.

## Material Configuration

| Parameter    | Configuration                          | Remark |
|--------------|--|--------|
| IC           | Silicon(99%)                           |        |
| Photo diode  | Silicon(99%)                           |        |
| Epoxy resin  | Resin(55.5%), Hardener(45.5%)          |        |
| Silver epoxy | Silver(80%), Resin(10%), Hardener(10%) |        |
| Bond wire    | Gold(99.99%)                           |        |

## Lead(Pb)-Free Reflow Solder Profile

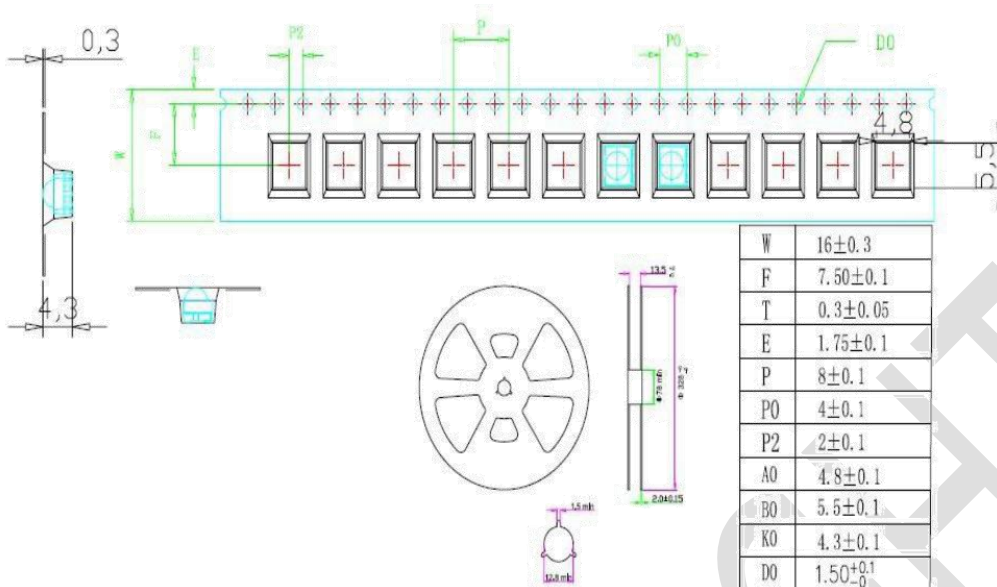


## Manual soldering

Use a soldering iron of 25W or less. Adjust the temperature of the soldering iron below 260°C.



## Taping and reel dimensions in millimeters



## acceptable code list

| data format     | code acceptable |
|-----------------|-----------------|
| NEC             | O               |
| RC5_Philips     | O               |
| RC6_Philips     | O               |
| Toshiba         | O               |
| Sharp           | X               |
| Sony 12 Bit     | O               |
| Sony 15 Bit     | O               |
| Sony 20 Bit     | O               |
| Zenith          | O               |
| JVC             | O               |
| RCMM            | X               |
| Continuous Code | X               |



## Use matters needing attention

- Supply voltage range: 2.7V ~ 5.5 V .
- store and use where there is no force causing transformation or change in quality .
- store and use where there is no extreme humidity.
- in order to prevent damage from static electricity make sure that the human body and the Soldering iron are connected to ground before using.
- Please from the bottom of the resin for welding for more than 2 mm.
- Dip soldering: please below 260 degrees, 5 seconds to complete welding.
- Soldering iron: please below 350 degrees, 3 seconds to complete welding.
- Please avoid correct position after welding.
- When welding in the lead frame please don't put pressure on the heated condition.
- When the circuit board is installed, the mounting hole distance is consistent With the lead frame.

CHAU LIGHT