

Features

| | |
|------------------|---|
| Package | CLCC type Outer dimension: 3.0 x 2.5 x 0.77mm (L x W x H) |
| Product features | <ul style="list-style-type: none"> •Red color emitting LED (Dominant wavelength : 633 nm) •High reliability, High flux, Low thermal resistance package •Suitable light source for outer lens which is designed by customer •Lead-free soldering compatible •RoHS compliant |

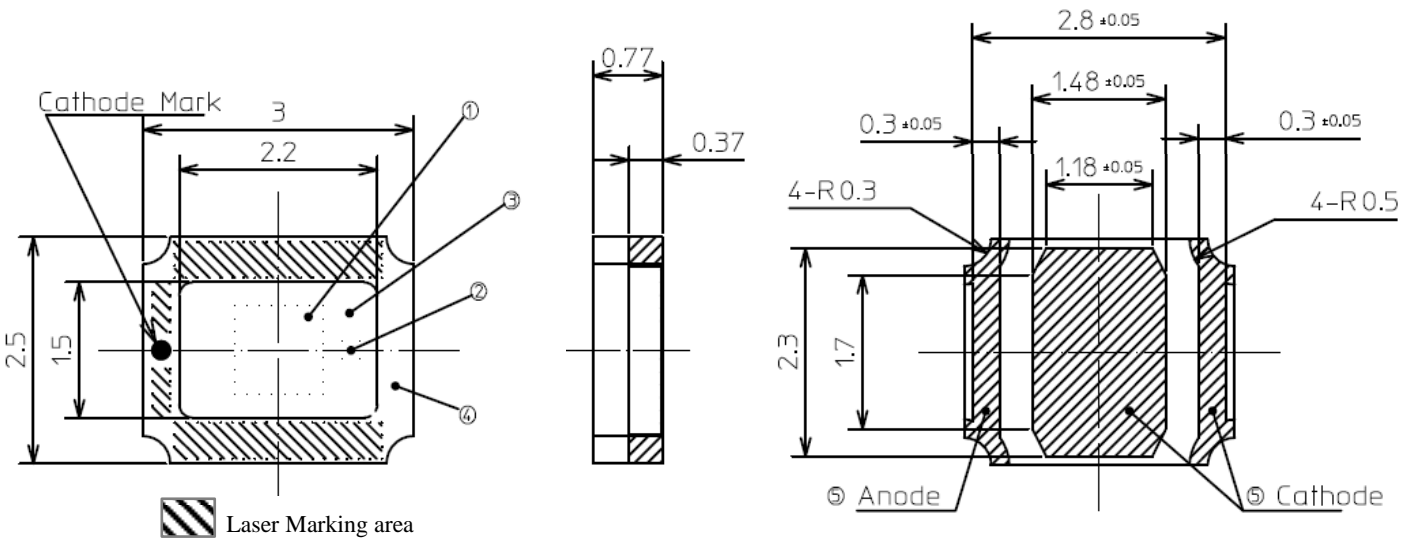
Recommended Applications

- Exterior light source for Automotive, motorcycle (Tail lamp, Stop lamp, Rear fog lamp, etc.)
- LED flood light
- Light source for other equipment requiring high luminance and high current drive

Outline Dimensions

HFZR111AJTE-TR

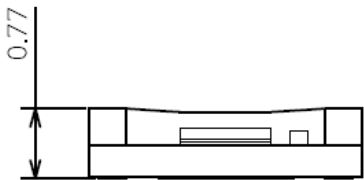
Unit : mm
Weight : 20.0mg
Tolerance : ±0.2



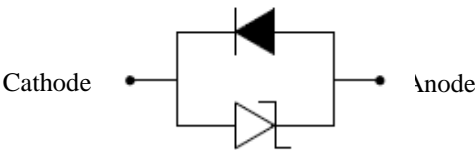
Top view

Side view

Bottom view



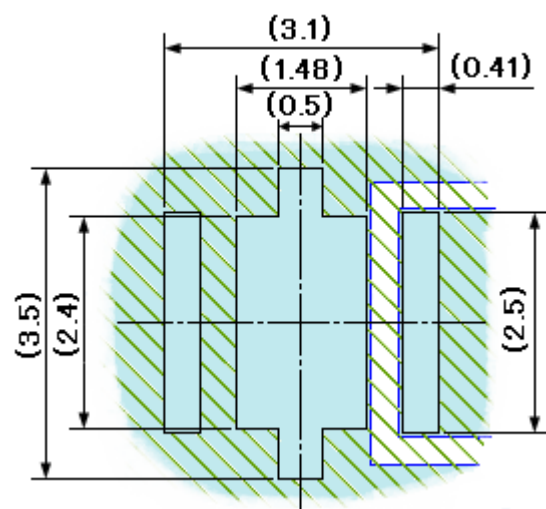
Cross section



Inside circuit

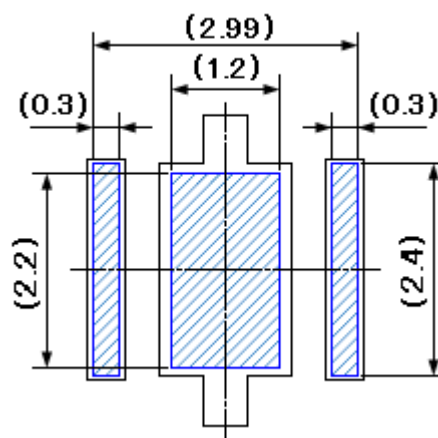
| No. | Part name | Material | Qty. |
|-----|------------------|----------------|-------------------|
| ① | LED Die | AlGaInP | 1 |
| ② | Protection Diode | Si | 1 |
| ③ | Encapsulant | Silicone resin | 1 |
| ④ | Lamp housing | Glass ceramic | 1 |
| ⑤ | Electrode | Au plating | Anode:1 Cathode:2 |


Unit : mm



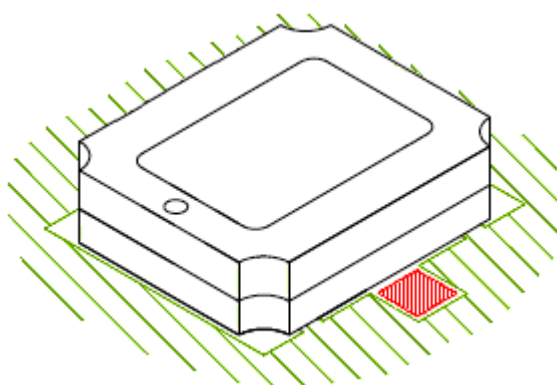
 Cu pattern


 Solder resist



 Solder stencil apertural area

Recommended solder stencil
thickness : 150μm



 Recommended solder temp.
measurement point

Specifications

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【 Product Overview 】

| | |
|---------------------|-------------|
| DIE MATERIAL | AlGaInP |
| EMITTING COLOR | Red |
| EMISSION AREA COLOR | Milky white |
| LAMP HOUSING COLOR | White |

【 Absolute Maximum Ratings 】

(Ta=25℃)

| ITEM | SYMBOL | MAXIMUM RATINGS | UNITS |
|--|-------------------|-----------------|-------|
| Forward Current | I _F | 1,000 | mA |
| Operating Temperature | T _{opr} | -40 ~ +125 | ℃ |
| Storage Temperature | T _{stg} | -40 ~ +125 | ℃ |
| Electro Static Discharge Threshold "HBM" (Ta=25℃) | ESD | ±8,000 | V |
| Junction Temperature | T _j | 150 | ℃ |
| Soldering Temperature "Reflow Soldering" | T _{slid} | 260 | ℃ |

- Notes1
- The range of operating and storage temperature are not taping condition.
- Notes2
- ESD testing method : EIAJ4701/300(304) Human Bodu Model (HBM) 1.5kΩ,100pF
- Notes3
- Please refer to page 24, "Reliability test results".
- Notes4
- Ability value when assuming overcurrent (circuit disconnection, overvoltage, etc.) in actual use is
Tj=175℃, 100 h
- Notes5
- Please refer to page 10, "Soldering Conditions".

【 Thermal Characteristics 】

| ITEM | SYMBOL | TYP. | MAX. | UNITS |
|--|----------------------|------|------|-------|
| Thermal resistance 【Junction - Solder point】 | R _{th(j-s)} | 4.0 | 5.5 | ℃/W |

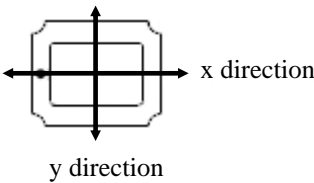
Specifications

HFZR111AJTE-TR

【 Electro-Optical Characteristics 】

| (Ta=25℃) | | | | | | | |
|--------------------------|-------------------|------------------------------------|------|------------|------|-------|--------|
| ITEM | SYMBOL | CONDITIONS | MIN. | TYP. | MAX. | UNITS | |
| Forward Voltage | V _F | I _F = 350mA | 1.85 | 2.10 | 2.60 | V | Notes5 |
| Reverse Voltage | V _R | Not designed for reverse operation | | | | | Notes6 |
| Luminous Flux | Φ _v | I _F = 350mA | 15 | 32 | 60 | lm | Notes5 |
| Peak Wavelength | λ _P | I _F = 350mA | - | 648 | - | nm | |
| Dominant Wavelength | λ _D | I _F = 350mA | 627 | 633 | 638 | nm | Notes5 |
| Spectral Line Half Width | △λ | I _F = 350mA | - | 20 | - | nm | |
| Half Intensity Angle | 2θ _{1/2} | I _F = 350mA | - | 114(x-dir) | - | deg. | Notes7 |
| | | | - | 114(y-dir) | - | | |

- Note5 Refer to the attached sheets for each sorting chart.
- Note6 Do not input reverse voltage and reverse current to prevent the destruction.
- Note7 Full width of viewing angle at half maximum of I_v. X-dir and Y-dir are as shown in the figure below.
※I_v=Luminous Intensity



【 Sorting Chart For Luminous Flux : Φ_V 】

LEDs shall be sorted out into the following chart and each rank shall be packed separately for shipping.

| Rank | Luminous Flux Φ_V (lm) | | Conditions |
|------|--------------------------------|------|--|
| | MIN. | MAX. | |
| A | 15 | 30 | $I_F=350\text{mA}$ $T_a=25^{\circ}\text{C}$ |
| B | 30 | 35 | |
| C | 35 | 40 | |
| D | 40 | 45 | |
| E | 45 | 60 | |

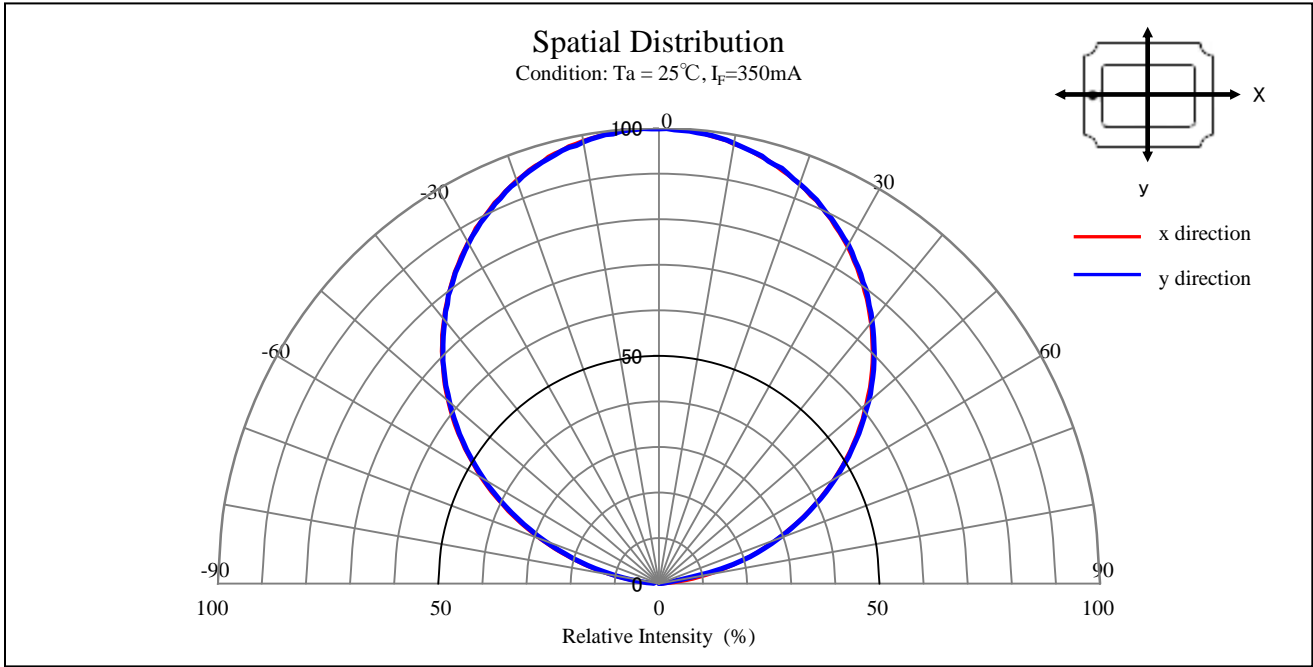
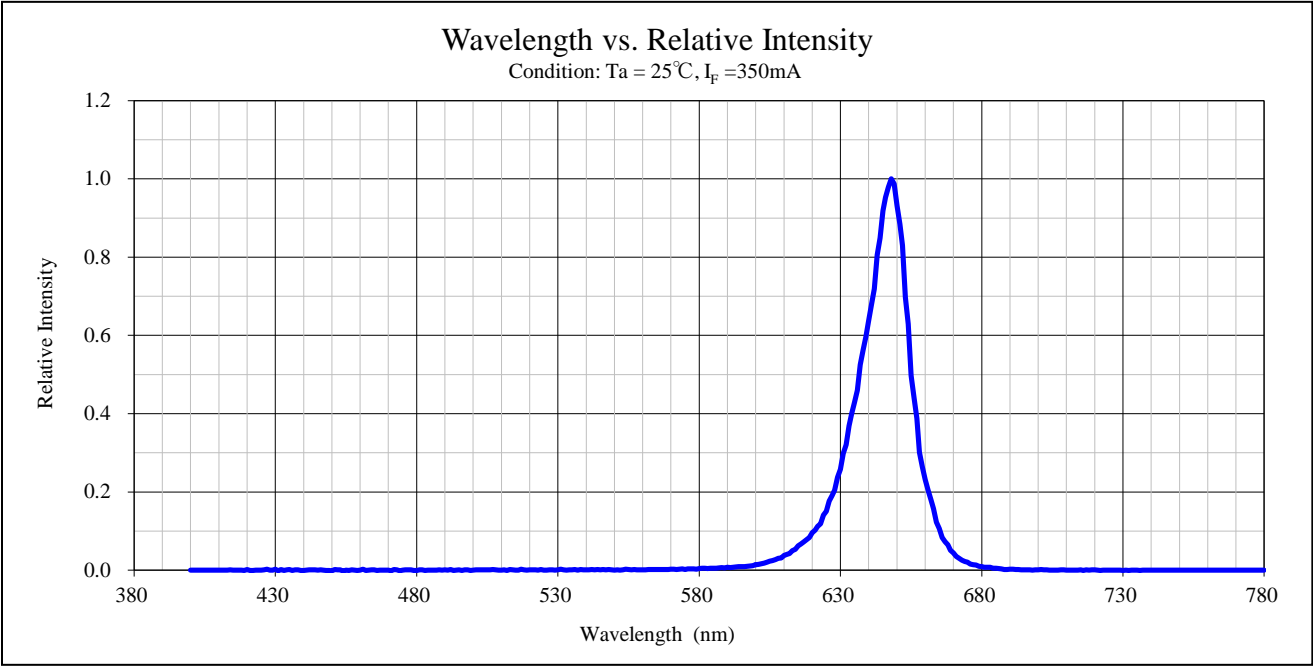
Notes
 Tolerance On Luminous Flux : $\pm 7\%$
 Measurement Timing : Instantly After Lighting

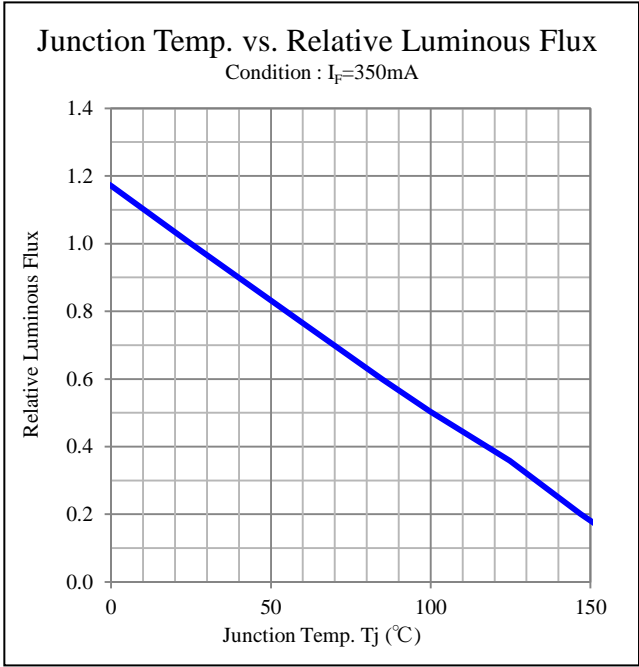
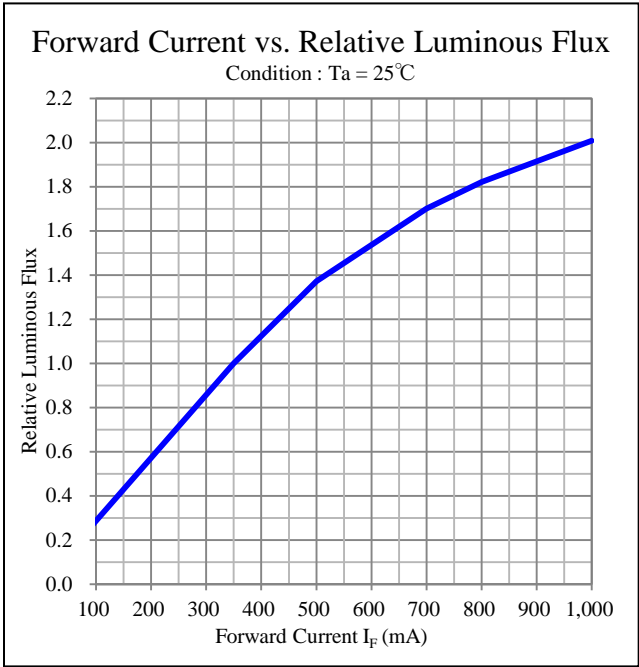
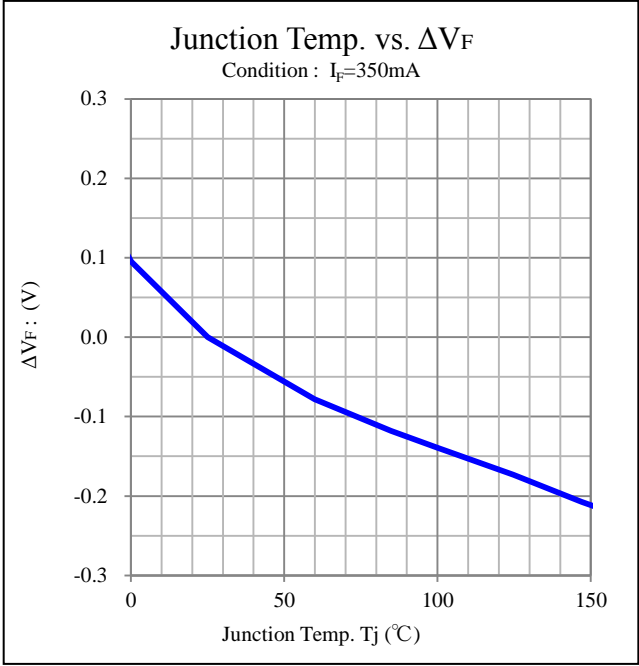
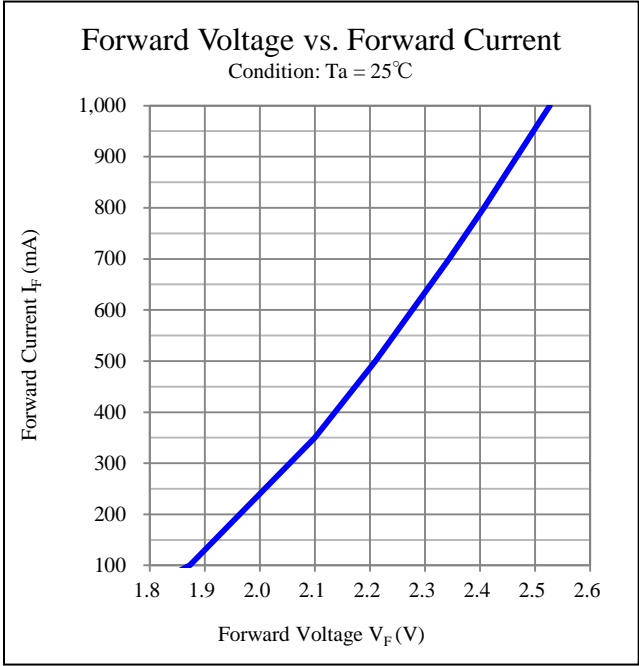
【 Sorting Chart For Forward Voltage : V_F 】

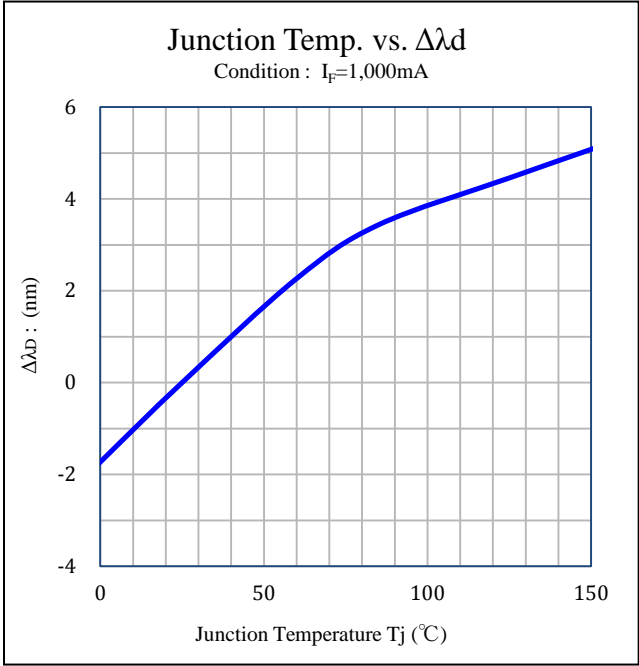
LEDs shall be sorted out into the following chart and each rank shall be packed separately for shipping.

| Rank | Forward Voltage V_F (V) | | Conditions |
|------|------------------------------|------|--|
| | MIN. | MAX. | |
| A | 1.85 | 2.00 | $I_F=350\text{mA}$ $T_a=25^{\circ}\text{C}$ |
| B | 2.00 | 2.15 | |
| C | 2.15 | 2.30 | |
| D | 2.30 | 2.45 | |
| E | 2.45 | 2.60 | |

Notes
 Tolerance On Forward Voltage : $\pm 0.1\text{V}$
 Measurement Timing : Instantly After Lighting





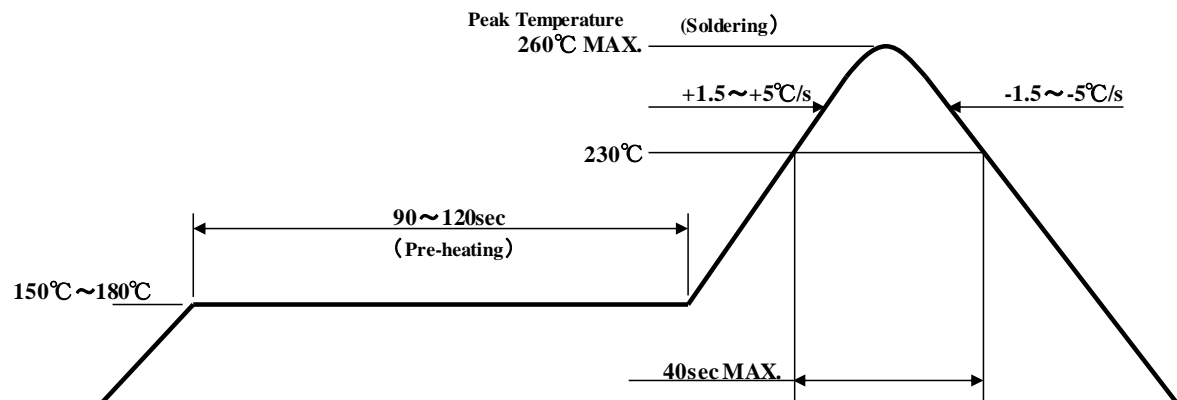


【Soldering Precaution】

(acc.to EIAJ-4701/300)

- Heat stress during soldering will influence the reliability of LEDs, however that effect will vary on heating method. Also, if components of varying shape are soldered together, it is recommended to set the soldering pad temperature according to the component most vulnerable to heat (e.g., surface mount LED).
- LED parts including the resin are not stable immediately after soldering (when they are not at room temperature), any mechanical stress may cause damage to the product. Please avoid such stress after soldering, especially stacking of the boards which may cause the boards to warp and any other types of friction with hard materials.
- Recommended temperature profile for the Reflow soldering is listed as the temperature on the top surface. This is due to the fact that temperature distribution varies on heating method, PCB material, other components in the assembly, and concentration other parts mounted. Typically, when FR-4 PCB is mounted with one with component, and heated via Far infrared and Heated Air, the temperature difference between PCB and device resin will be around 5~10℃.
Please do not repeat the heating process in Reflow process more than twice.
- When using a metal PCB, the solder may crack and problems may occur due to major stress on the soldered portion caused by thermal shock. Please carry out a thorough advance verification before use. For the metal PCB's insulation, it is recommended to use stress-reducing materials.

【Recommended Reflow Soldering Condition 】



- Note 1 Temperature Profile for the reflow should be set to the surface temperature of resin which is on the top of LED. This should be the maximum temperature for soldering. Lowering the heating temperature and decreasing heating time is very effective in achieving higher reliability.
- Note 2 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 LED. The second soldering process should not be done until LEDs have returned to room temperature (by nature-cooling) after first soldering process.

Soldering condition

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5. These products can not be used for hand soldering and dipping (Through the Wave) soldering.
6. Isopropyl alcohol is recommended for cleaning. 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. If water is used to clean (including the final cleaning process), please use pure water (not tap water), and completely dry the component before using.

| Cleaning agents | Recommended / Not recommended |
|-------------------|-------------------------------|
| Isopropyl Alcohol | ✓ Recommended |
| Ethyl Alcohol | ✓ Recommended |
| Pure water | ✓ Recommended |
| Trichloroethylene | x Not recommended |
| Chlorothene | x Not recommended |
| Acetone | x Not recommended |
| Thinner | x Not recommended |
| Hexane | x Not recommended |

【For Electric Static Discharge (ESD)】

This product is sensitive to voltage surges generated by On/Off status change and friction with synthetic materials, which may cause severe damage to the die or undermine its reliability. Damaged products may experience conditions such as extremely high reverse voltage, decrease of forward rise voltage, deterioration in optical characteristics.

Stanley InGaN products are packed with anti-static components. However, following precautions must be taken into account upon product shipment.

1. Electrification/Static Electricity protection

In order to avoid product (die) damage from static electricity caused by unprotected handling by operator and other charged materials coming in contact with the product, Stanley recommends taking the following precautions.

- ① Do not place electrified non-conductive materials near the LED product.
Avoid LED products from coming into contact with metallic materials.(Should the metallic material be electrified , the sudden surge voltage will most likely damage the product.)
- ② Avoid a working process which may cause the LED product to rub against other materials.
- ③ Install ground wires for any equipment, where they can be installed, with measures to avoid static electricity surges.
- ④ Prepare a ESD protective area by placing a Conductive Mattress (1MΩ MAX.) and Ionizer to remove any static electricity.
- ⑤ Operators should wear a protective wrist-strap.
- ⑥ Operators should wear conductive work-clothes and shoes.
- ⑦ To handle the products directly, Stanley recommends the use of ceramic, and not metallic, tweezers.

2. Working Environment

- ① A dry environment is more likely to cause static electricity. Although a dry environment is ideal for storage state of LED products, Stanley recommends an environment with approximately 50% humidity after the soldering process.
- ② Recommended static electricity level in the working environment is less than 150V, which is the same value as Integrated Circuits (which are sensitive to static electricity).

【Other Precautions】

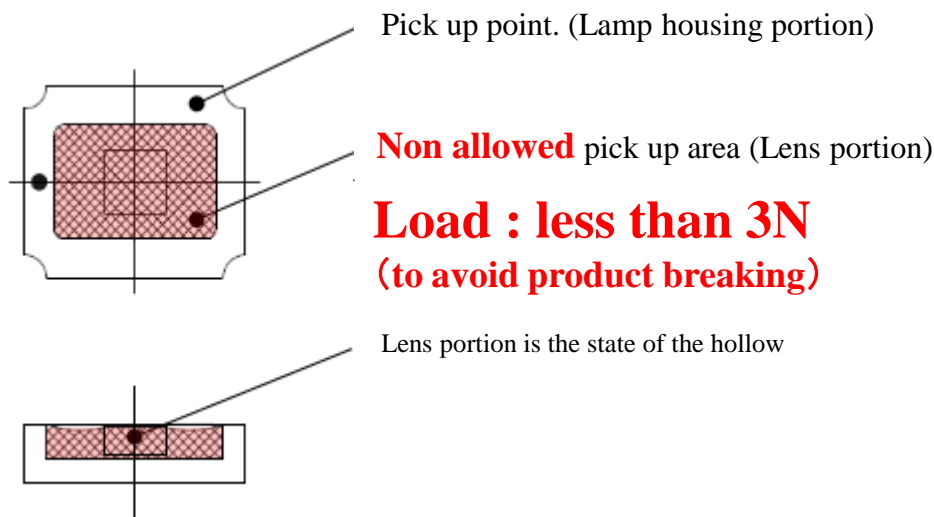
1. The products are designed to achieve higher performance reliability, however, they can be influenced by usage conditions.
2. Absolute maximum ratings are set to prevent LED products from breaking due to extreme stress (temperature, current, voltage, etc.). These ratings must never be overrun even for a moment.
3. To achieve the highest performance reliability, it is necessary to take into account, factors such as forward voltage adjusted to the usage temperature condition, derating of the power consumption, and other variable factors.
4. Please insert Straight Protective Resistors into the circuit in order to stabilize LED operation and to prevent the device from overheating.
5. Also please make sure there isn't any gas in the surrounding area or entering from outside when using the products.
6. Please avoid to stick foreign materials because molding resin in the products has adhesiveness. And please do not touch emission area..
7. Supersonic wave welding is not recommended because wire open circuit may occur.
ex) bonding outer lens to this product or housing
8. Please check the actual performance in the assembly because the specification sheets are described only for LED device.
9. Please refrain from looking directly at the light source of the LED at high output, as it may harm your vision.
10. The products are designed to perform without failure in the recommended usage conditions.
However, please take the necessary precautions to prevent from a fire, injury, and other unexpected failures.
11. The products are manufactured to be used for ordinary electronic equipment. Please contact our sales staff beforehand when exceptional quality and reliability are required, and the failure or malfunction of the products might directly jeopardize life or health (such as for airplanes, aerospace, medical applications, nuclear reactor control systems and so on).
12. The formal specification sheets shall be exchanged and signed by both parties.

【Handling Precautions for Product Mounting】

<Recommendation>

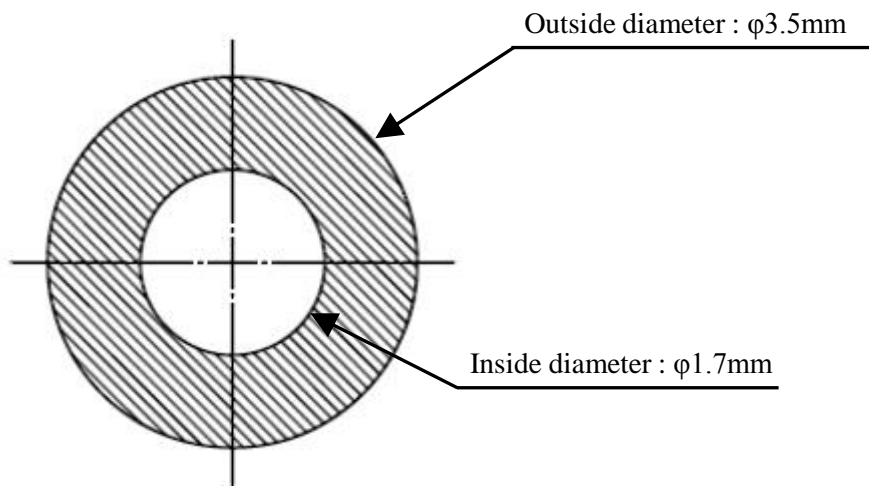
1. Picking up point with nozzle: Lamp housing of the product (Shown below)

The picking up point should be within lamp housing portion, because the silicone resin used for the lens is soft.
(If the nozzle makes contact with the lens, the products might be destroyed)



Please adjust the load, the pick up point, the nozzle diameter, etc. before mounting because the over load can cause the breakage of the lamp housing.

2. Recommended Nozzle Shape



Packaging Specifications

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This product is baked (moisture removal) before packaging, and is shipped in moisture-proof packaging (as shown below) to minimize moisture absorption during transportation and storage. However, with regard to storing the products, Stanley recommends the use of dry-box under the following conditions is recommended. Moisture-proof bag as the packaging is made of anti-static material but packaging box is not.

【Recommended Storage Condition / Products Warranty Period 】

| | |
|-------------|-----------|
| Temperature | +5～30℃ |
| Humidity | Under 70% |

In the case of the package unopened , 6 months under 【 Recommended Storage Condition 】.
Please avoid rapid transition from low temp. condition to high temp. condition
and storage in corroding and dusty environment.

【Time elapsed after Package Opening】

This product is **equivalent to IPC/JEDEC J-STD-020D MSL 2.**
Please keep the time frame between package opening and soldering which is **【maximum 1 year.】**
If the device needs to be soldered twice, both soldering must be completed within the 1 year.

The package should not be opened until immediately prior to its use.

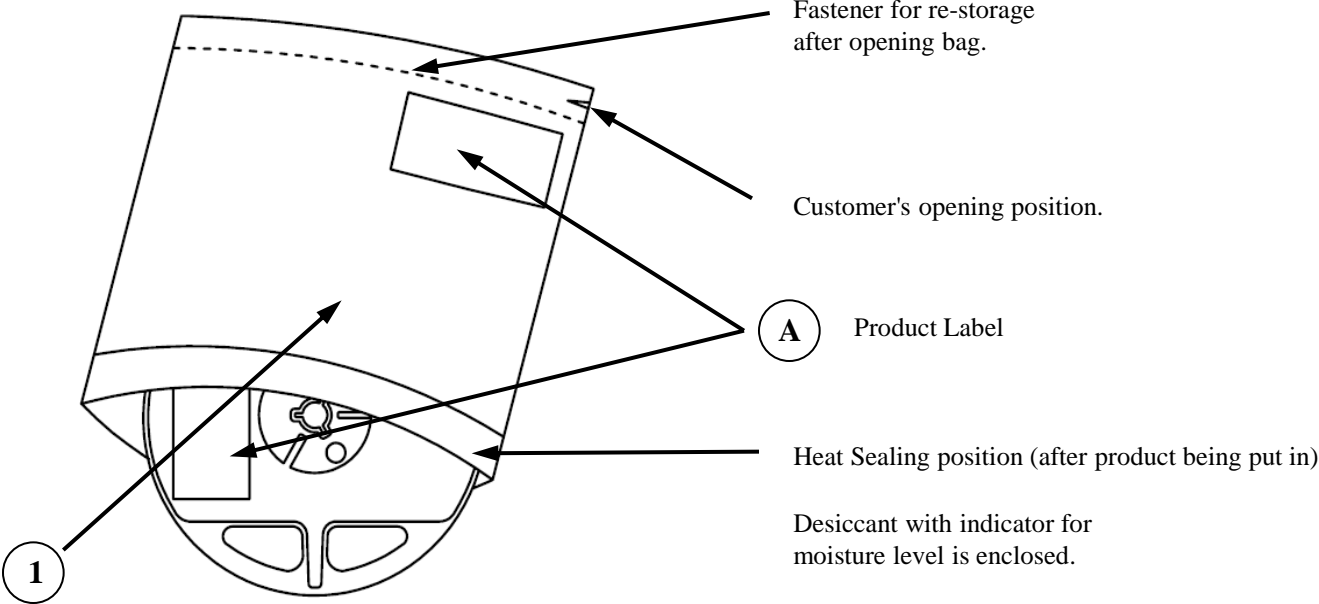
If any components should remain after their use, please seal the package and store them under the conditions described in the above 【 Recommended Storage Condition 】.

Baking process should be performed after putting out from package.

Baking conditions: **10h(min.), at +60±5℃** just before use

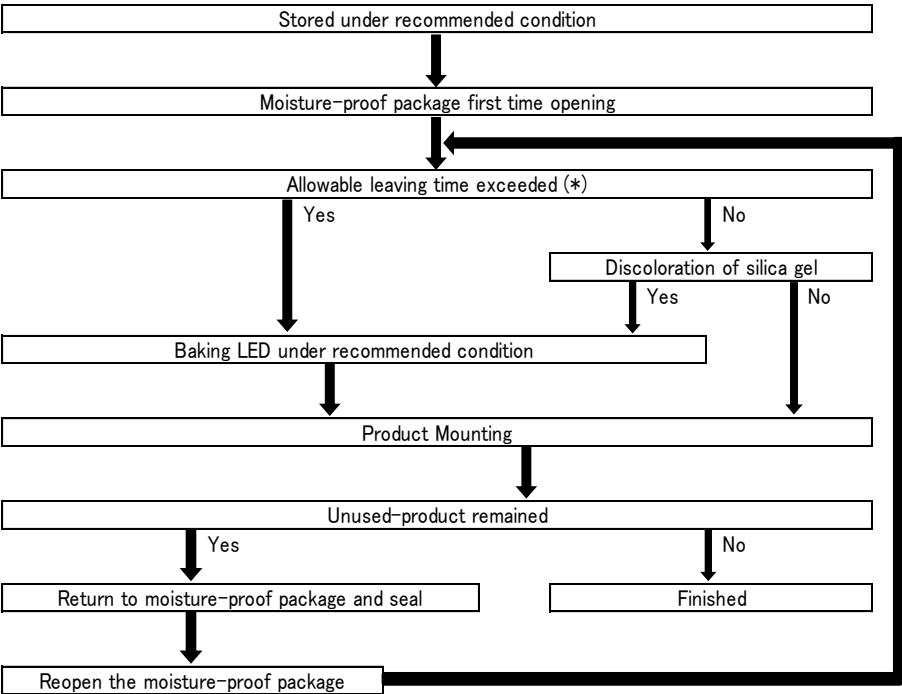
Baking may be performed in the tape-reel form, however if it is performed with the reel stacked over one another, it may case deformation
of the reels and taping materials, which may cause problems during production.
Please make sure that the product has cooled to normal temperature after performing the baking process.
Provided that, baking process shall be 2 times MAX.

【Moisture-proof Packaging Specification】



| NO. | PART NAME | MATERIALS | REMARKS |
|-----|--|-----------|---------------------|
| ① | Moisture-proof bag with Aluminum layer | PET+Al+PE | with ESD protection |

【Flow Chart-package Opening to Mounting】



Allowable leaving time means the maximum allowable leaving time after opening package, which depends on each LED type.

The allowable leaving time should be calculated form the first opening of package to the time when soldering process is finished.

When judging if the allowable leaving time has exceeded or not, please subtract the soldering time. The allowable leaving time after reopening should be calculated form the first opening of package, or from the time when baking process is finished.

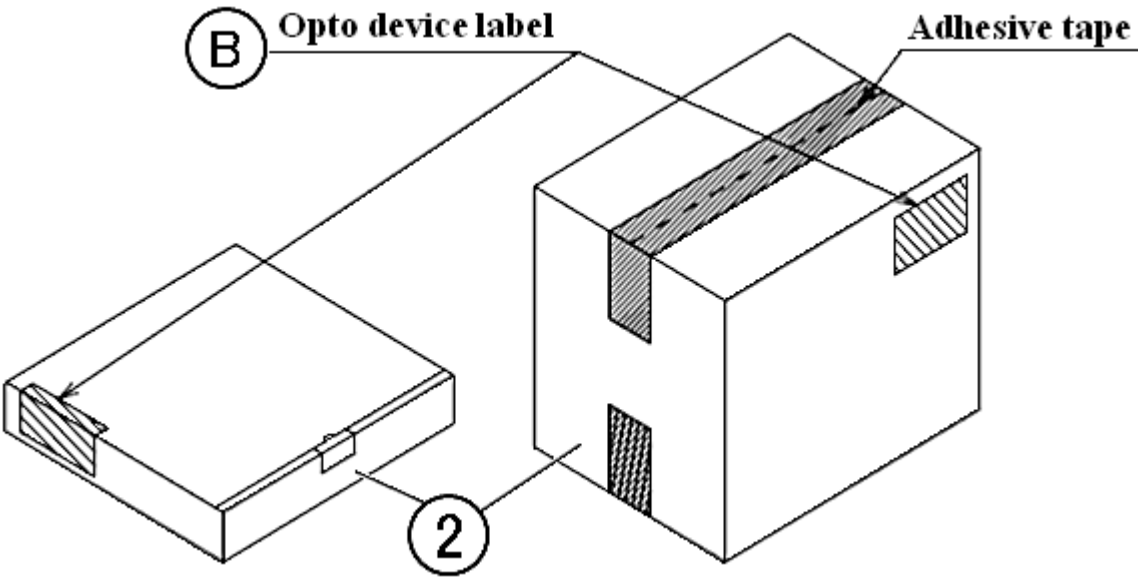
【Packing box】

(RoHS・ELV Compliant)

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

The above measure is all the reference value.

The box is selected out of the above table by shipping quantity.



Type A

Material / box : Cardboard C5BF

Type B,C

Material / box : Cardboard K5AF

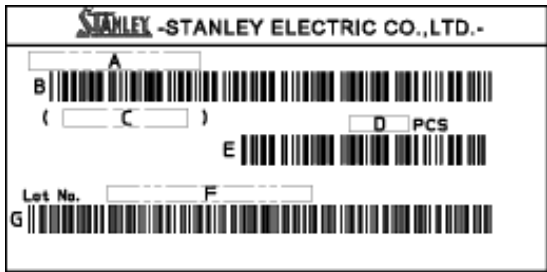
Partition : Cardboard K5BF

| NO. | PART NAME | MATERIAL | REMARKS |
|-----|-------------|----------------------|------------------------|
| ② | Packing Box | Corrugated Cardboard | without ESD protection |

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

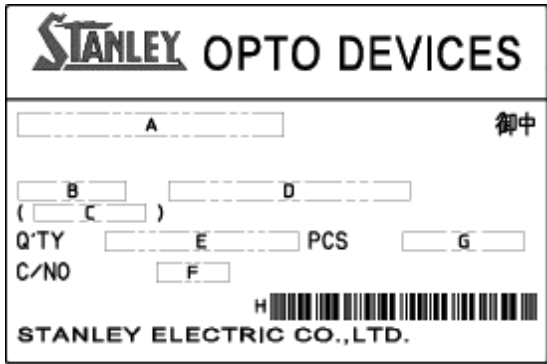
【Label Specification】

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
- (Please refer to Lot Number Notational System for details)
- 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

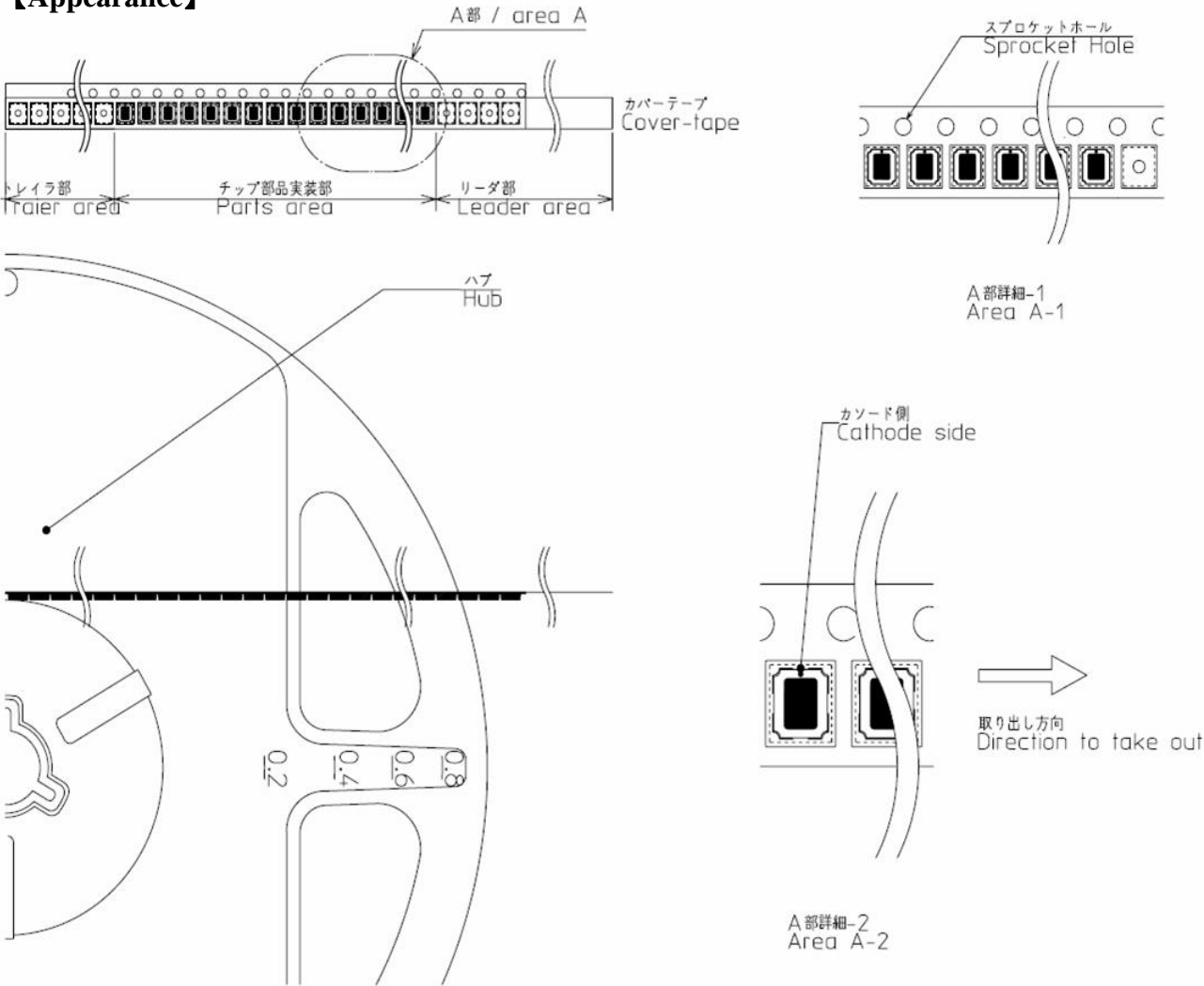
<Remark> Bar-code font : acc.to Code-39(JIX0503)

Taping and Reel Specifications

HFZR111AJTE-TR

(acc.to JIS-C0806-03)

【Appearance】



Note
"-TR" means Cathode Side of LEDs should be placed on the sprocket-hole side.

| Items | | Specifications | Remarks |
|--------------|--------------|---|--|
| Leader area | Cover-tape | Cover-tape shall be longer than 300mm without carrier-tape | The end of cover-tape shall be held with adhesive tape. |
| | Carrier-tape | Empty pocket shall be more than 25 pieces (100mm) . | Please refer to the above figure for Taping & reel orientation . |
| Trailer area | | Empty pocket shall be more than 40 pieces (160mm) . | The end of taping shall be inserted into a slit of the hub. |

Taping and Reel Specifications

HFZR111AJTE-TR

(acc.to JIS-C0806-03)

【 Qty. per Reel】

3,000parts/reel

Minimum Qty. per reel might be 500 parts when getting less than 3,000 parts. In such case, parts of 100-unit-qty. Shall be packed in a reel and the qty. shall be identified on the label.

【Mechanical strength】

Cover-tape adhesive strength shall be 0.1 ~ 1.3N (An angle between carrier-tape and cover-tape shall be 170 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.

【 Others】

Reversed-orientation, Up-side down placing, side placing and out of spec. parts mix shall not be held. Empty Pocket per reel is assumed until 1 piece.

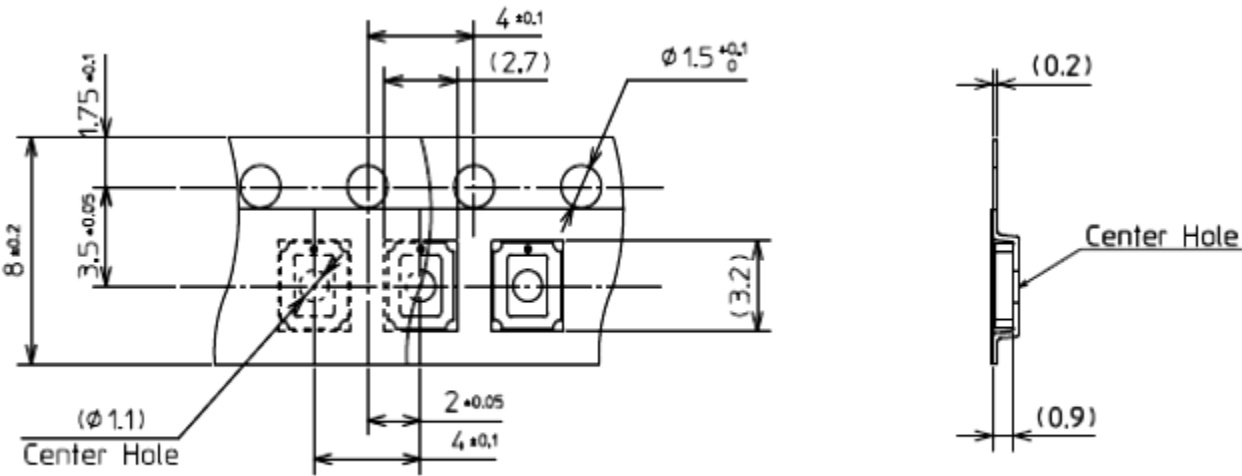
Taping and Reel Specifications

HFZR111AJTE-TR

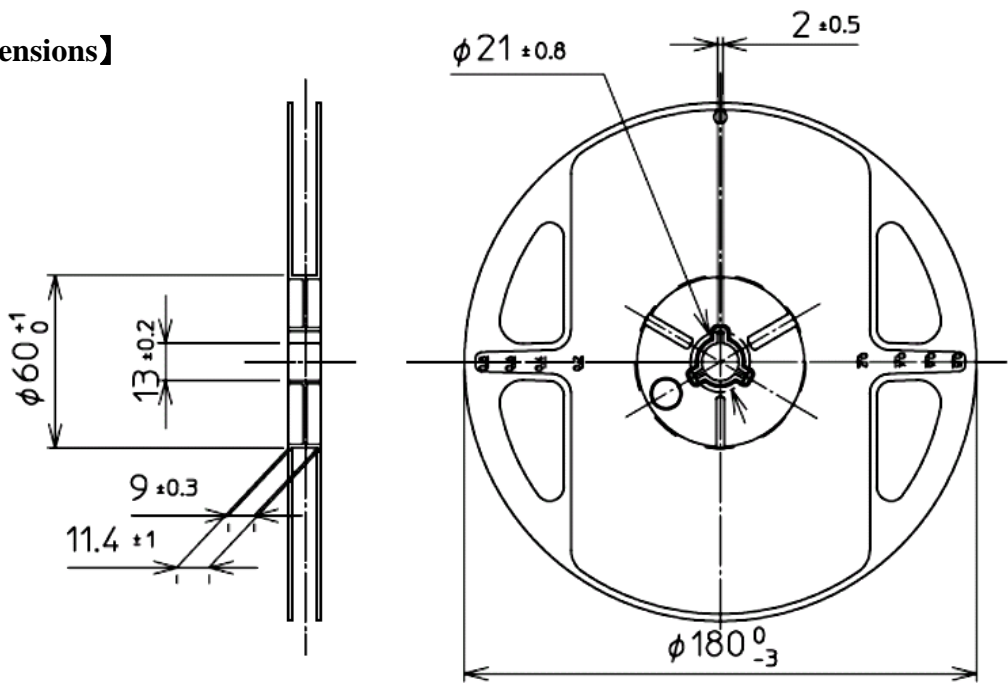
(acc.to JIS-C0806-03)

Unit :mm

【Taping Dimensions】



【Reel Dimensions】



| SYM. | PART NAME | REMARKS |
|------|--------------|---------------------|
| ① | Carrier-tape | with ESD protection |
| ② | Cover-tape | with ESD protection |
| ③ | Carrier-reel | with ESD protection |

Lot Number Notational System

HFZR111AJTE-TR

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | | | | | | | |

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: V_F rank

If there is no identified V_F rank, " - " is used to indicate.

This product is in compliance with RoHS・ELV.

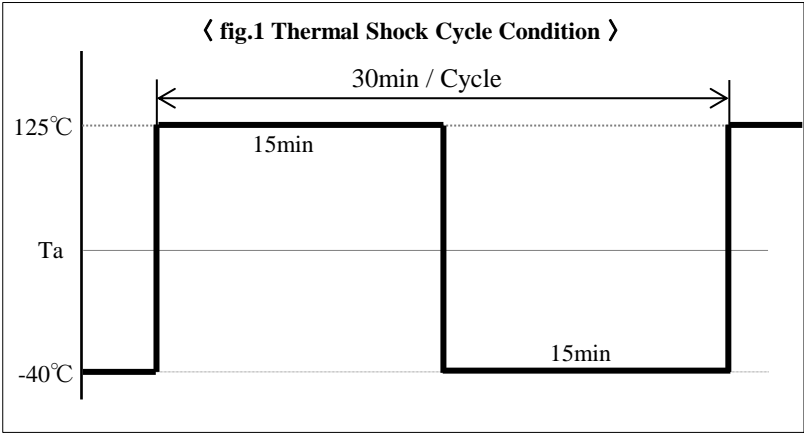
Prohibition substance and it's criteria value of RoHS・ELV are as follows.

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

| | 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

| No. | Test Item | Standard | Test Condition | Duration | Failure |
|-----|---------------------------------|------------------------|---|--------------|---------|
| 1 | High Temperature Operating Life | EIAJ ED-4701 /100(101) | Tj=150℃ I _F =1,000mA | 5,500hr | 0/18 |
| 2 | Low Temperature Operating Life | EIAJ ED-4701 /100(101) | Ta=-40℃ I _F =1,000mA | 1,000hr | 0/18 |
| 3 | High Temperature Humidity Bias | EIAJ ED-4701 /100(102) | Ta=85℃ Rh=85% I _F =1,000mA | 1,000hr | 0/18 |
| 4 | High Temperature Storage Life | EIAJ ED-4701 /200(201) | Ta=125℃ | 1,000hr | 0/18 |
| 5 | Low Temperature Storage Life | EIAJ ED-4701 /200(201) | Ta=-40℃ | 1,000hr | 0/18 |
| 6 | Thermal Shock Cycle | EIAJ ED-4701 /100(105) | Ta=-40℃(15min.)~125℃(15min.) ※As shown in the fig.1 below | 1,000 cycles | 0/18 |
| 7 | Resistance to Reflow Soldering | EIAJ ED-4701 /300(301) | Moisture Soak:Jedec Level2 Preheating:150~180℃ 90~120sec MAX. Soldering:260℃ 5sec | 2times | 0/18 |



2. Failure Criteria

| Item | Symbol | Conditions | Acceptance Criteria |
|-----------------|----------------|---------------------------------|--|
| Luminous Flux | φ _V | I _F =350mA Ta=25℃ | Initial Value × 0.8 > Testing MIN. Value Initial Value × 1.2 < Testing MAX. Value |
| Forward Voltage | V _F | I _F =350mA Ta=25℃ | Measured Value < Initial Value × 0.9 Measured Value > Initial Value × 1.1 |
| Appearance | — | — | Notable discoloration, deformation and crack |

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