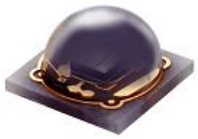
Data sheet

Part number : LZU4E365-500-TR



2011/65/EU, (EU)2015/863
10 Substances regulation compliant

Lead-free solder heat resistant product

Package	Near-UV LED (UVA)　Peak wavelength 365nm Wide distribution angle, middle power type Outer dimension　3.5 x 3.5 x 2.05mm (L x W x H)
Product features	・Total power : 660mW (TYP.) @ I_F = 350mA ・Operating temperature : -40 to +85 deg. ・Lead–free soldering compliant ・RoHS : 2011/65/EU, (EU)2015/863　compliant

Recommended applications

UV resin curing equipment, UV printing machines, banknote detection, light source for photocatalyst, etc.

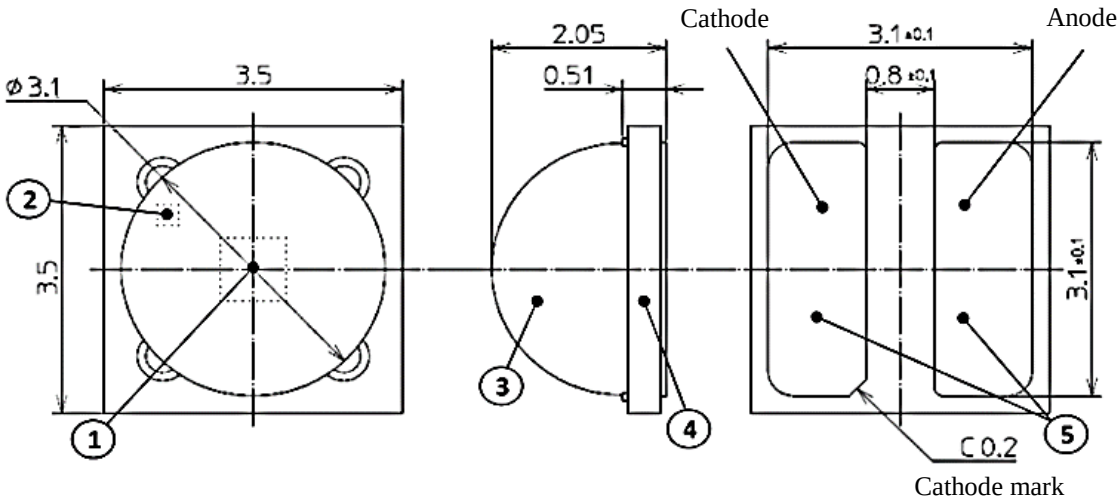
WARNING

- **UV LEDs emit high intensity UV (ultraviolet) light.**
- **Do not look directly into the UV light source ; this can be harmful to your eyes and skin.**
- **Wear protective eyewear to avoid exposure to UV light, as well as protective masks and gloves, etc. in order not to expose your skin to the light.**
- **Attach warning labels to your products which contain UV LEDs.**
- **keep out of reach of children.**

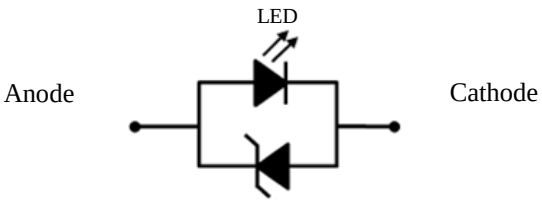
LZU4E365-500-TR

Outline dimensions

Unit : mm
Weight : 31mg
Tolerance : ±0.2



Top view　　Side view　　Back view



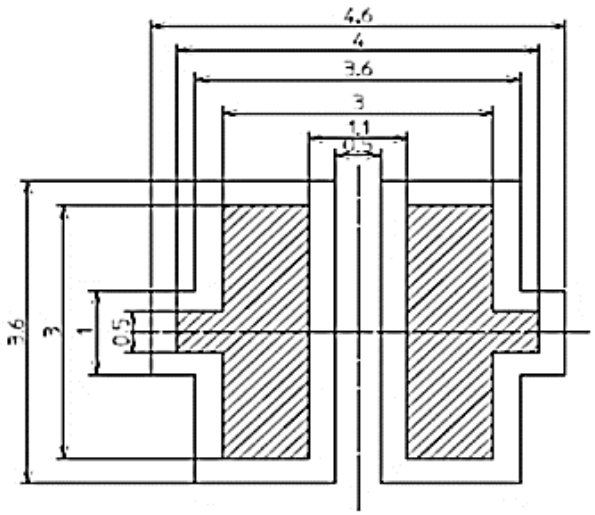
Protection diode

Internal circuit

No.	Part name	Materials	Qty.
①	LED die	InGaN	1
②	Protection diode	Si	1
③	Encapsulant	Silicone resin	1
④	Substrate	Ceramic	1
⑤	Electrode	Au plating	Anode : 1 Cathode : 1

Recommended pad

Unit : mm
Tolerance : ±0.2



Recommended pad

Recommended stencil pattern

Recommended thickness of stencil : 120 to 150μm

Specifications

【 Product overview 】

Die material	InGaN
Resin color	Transparent and colorless

【 Absolute maximum ratings 】

Item	Symbol	Maximum ratings	Units	
Power dissipation	P_d	2.3	W	
Forward current	I_F	100 to 500	mA	
Repetitive peak forward current (1ms, 1/10duty)	I_{FRM}	1,000	mA	
I_F max. derate linearly from "Ts=35℃"	ΔI_F	6.0	mA/℃	
I_{FRM} max. derate linearly from "Ts=35℃"	ΔI_{FRM}	12.0	mA/℃	
Operating temperature	T_{opr}	-40 to +85	℃	Note 1
Storage temperature	T_{stg}	-40 to +100	℃	Note 1
Electrostatic discharge threshold "HBM" (Ta=25℃)	V_{ESD}	2	kV	Note 2
Junction temperature	Tj	100	℃	
Peak temperature of reflow soldering	T_{sld}	260	℃	Note 3

Note 1 The ranges of operating and storage temperature are not applied to taping condition.

Note 2 ESD testing method : EIAJ4701/300(304) Human Body Model (HBM) 1.5kΩ, 100pF

Note 3 Please refer to page.8 "Soldering Conditions".

【 Thermal characteristics 】

(Ta=25℃)

Item	Symbol	Typ.	Max.	Units	
Thermal resistance (Junction - Soldering point)	$R_{th(j-s)}$	5.0	7.0	℃/W	Note4

Specifications

【 Electro-Optical characteristics 】

(Ta=25℃)

Item	Symbol	Conditions	Min.	Typ.	Max.	Units	
Total power	Po	I_F = 350mA	500	660	800	mW	Note 4
Peak wavelength	λp	I_F = 350mA	360	365	370	nm	Note 5
Spectral half width	Δλ	I_F = 350mA	-	12	-	nm	
Half intensity angle	$2\theta_{1/2}$	I_F = 350mA	-	130	-	deg.	
Forward voltage	V_F	I_F = 350mA	2.8	3.4	4.0	V	Note 6

Note 4 Total power is measured by integrating sphere, and the tolerance is ±10%.

Note 5 Peak wavelength tolerance is ±3nm.

Note 6 Forward voltage tolerance is ±3%.

【 Sorting chart for total power 】

LEDs shall be sorted out "Total power" into the following chart and each rank parts shall be packed separately when shipping.

Rank	Total power (mW)		Conditions
	Min.	Max.	
A	500	650	I_F = 350mA Ta = 25℃
B	650	800	

【 Sorting chart for forward voltage 】

LEDs shall be sorted out "Forward voltage" into the following chart and each rank parts shall be packed separately when shipping

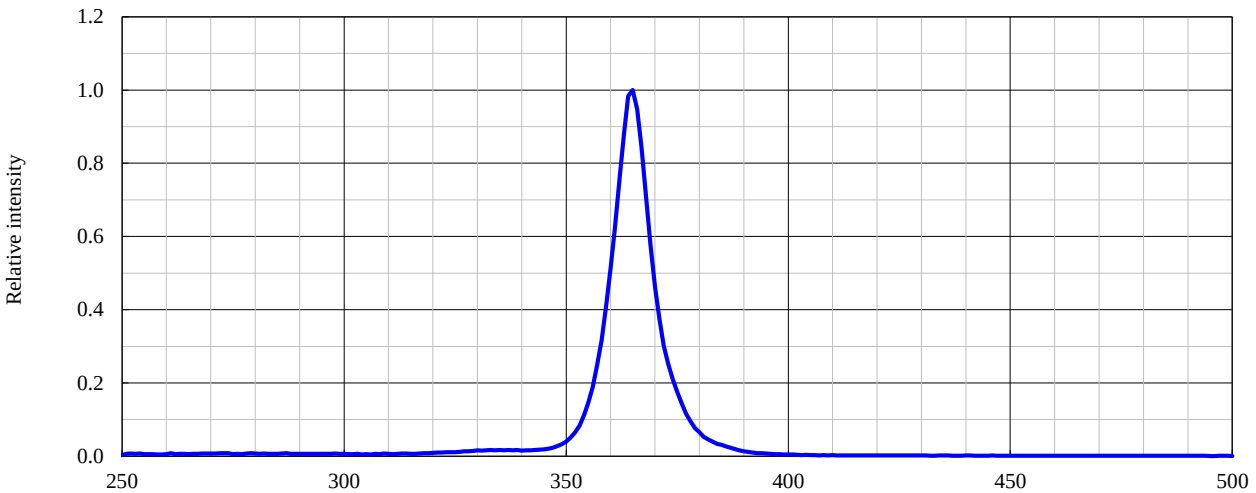
Rank	Wavelength (nm)		Conditions
	Min.	Max.	
A	2.8	3.4	I_F = 350mA Ta = 25℃
B	3.4	4.0	

LZU4E365-500-TR

Technical data

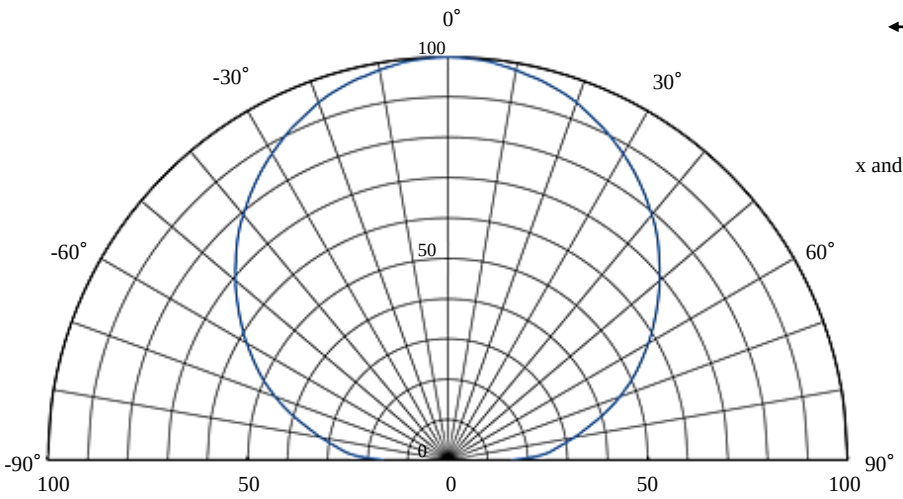
Relative intensity vs. Wavelength

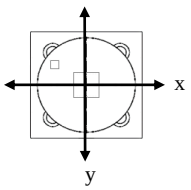
Conditions: Ts = 25℃, I_F =350mA



Spatial Distribution

Condition: Ts = 25℃, I_F = 350mA



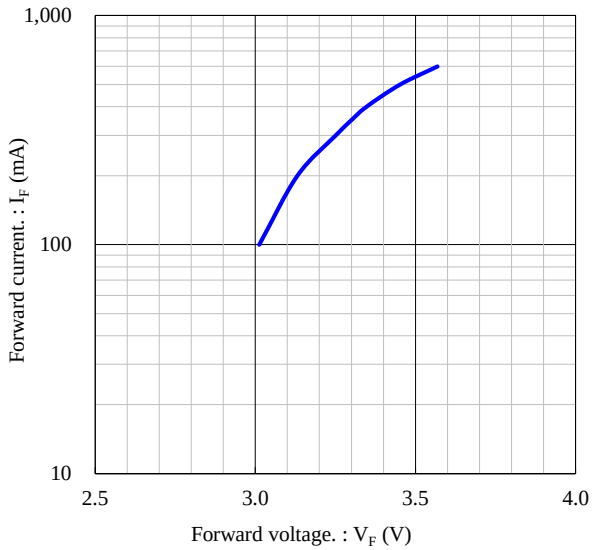


x and y direction : same shape

Technical data

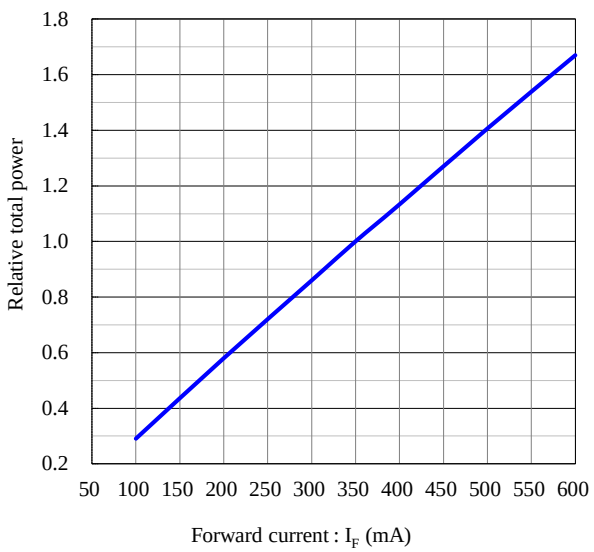
Forward voltage vs. Forward current

Condition : Ts = 25℃



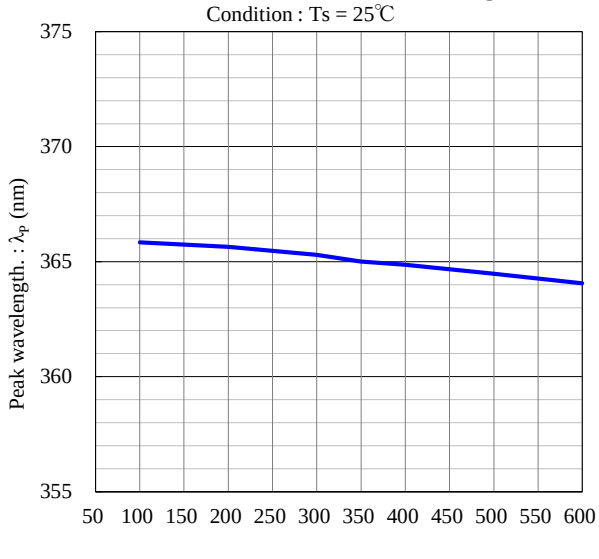
Forward current vs. Relative total power

Condition : Ts = 25℃



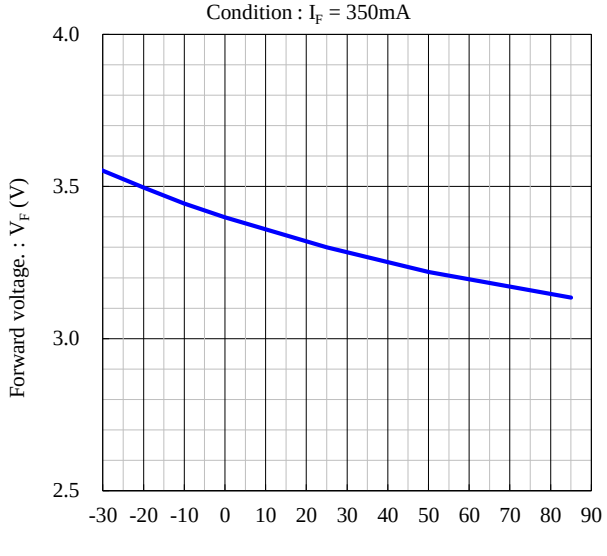
Forward current vs. Peak wavelength

Condition : Ts = 25℃



Soldering point temp. vs. Forward voltage

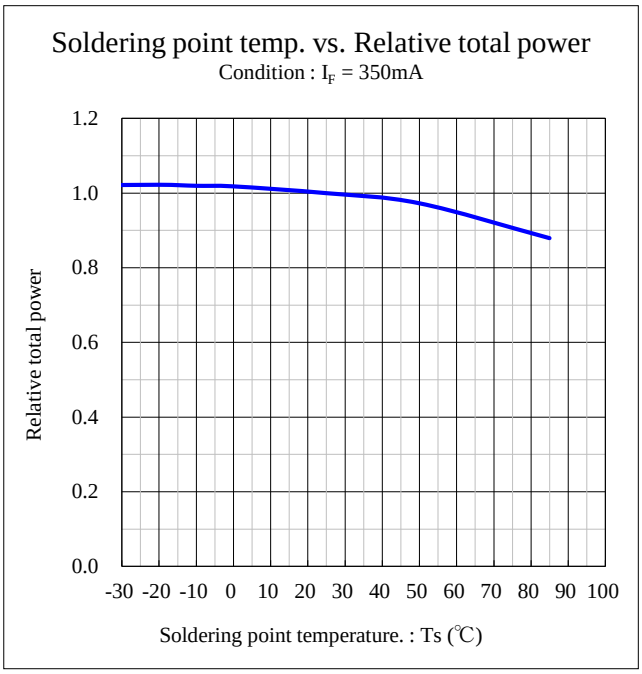
Condition : I_F = 350mA

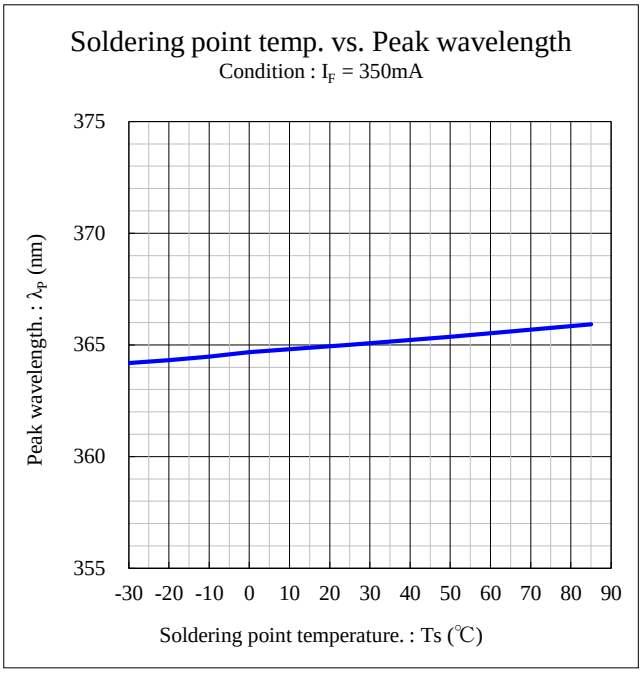


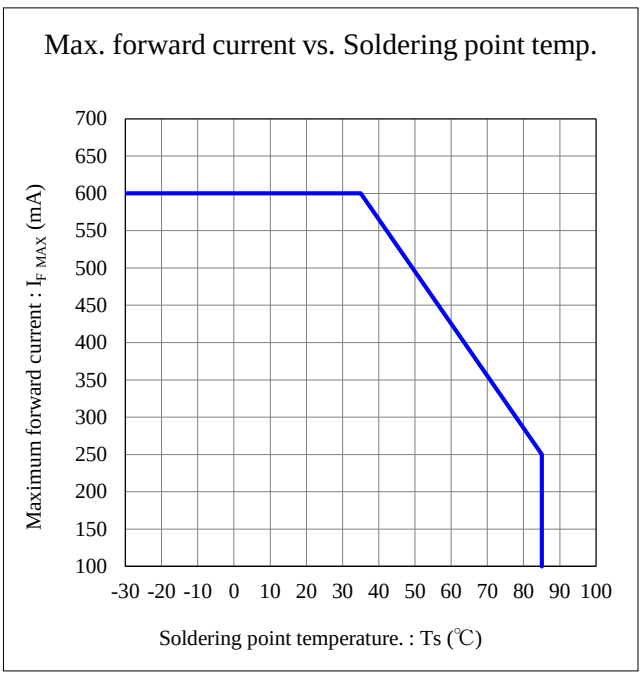
※ Do not use under 100mA to avoid the instability of the reliability/function.

LZU4E365-500-TR

Technical data







Soldering condition

【Soldering Precaution】

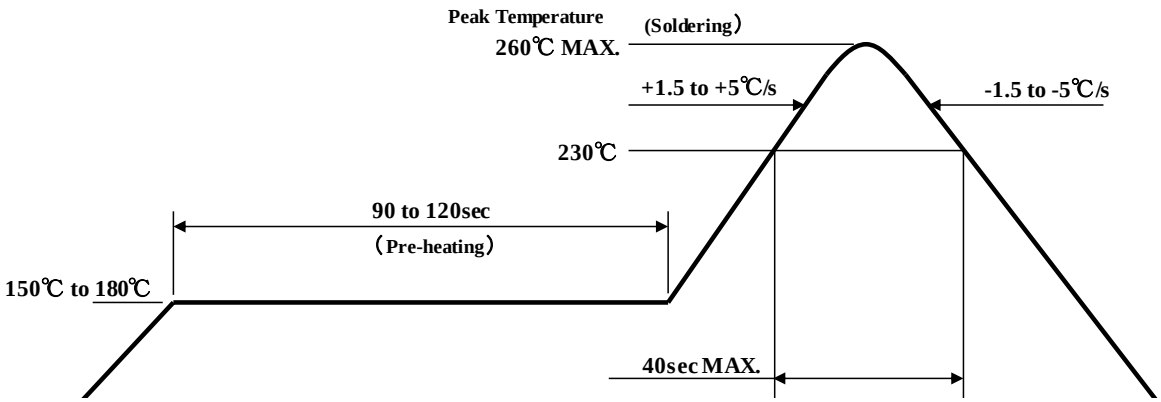
(acc.to EIAJ-4701/300)

1. Heat stress during soldering will influence the reliability of LEDs, however that effect will vary with heating method. Also, if components with different shapes need to be mounted together, it is recommended to set the soldering pad temperature according to the component most vulnerable to heat stress (ex. chip type LED).

2. The LEDs constituent parts, including the resin, do not stabilize immediately after the soldering. Any mechanical stress may cause damage to the products. Please avoid stacking the PCBs, or any other storage method which may cause the PCBs to bend, also prevent contact of LED with any materials.

3. The recommended temperature profile for reflow soldering is listed as the pad temperature of soldering point. This is due to the fact that temperature distribution varies on heating method, PCB material, other components in the assembly, and concentration of the parts mounted. Please do not repeat the heating process during reflow more than two times.

【Recommended reflow soldering condition 】



Note 1 Temperature Profile for the reflow should be set to LED top surface temperature, which is 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 max 2 times. The interval between first and second process should be as short as possible to prevent absorption of moisture to LED resin. Please cool down the LED temperature at room temperature after soldering, then start the second process.

Soldering condition

4. 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.

5. The products can not be used for hand soldering and dipping (Through the Wave) soldering.

6. When cleaning, using isopropyl alcohol is recommended. Some chemicals, including freon substitute detergent could corrode the surface or the products, which cause discoloration, clouding, 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 LED before using.
   Cleaning with ultrasonic is not recommended.

Cleaning agents	Recommended / Not recommended
Ethyl alcohol	✓ **Recommended**
Isopropyl alcohol	✓ **Recommended**
Pure water	✓ **Recommended**
Trichloroethylene	x **Not recommended**
Chlorothene	x **Not recommended**
Acetone	x **Not recommended**
Thinner	x **Not recommended**

Handling precaution

【For Electric Static Discharge (ESD)】

This type of LED lamp is highly sensitive to surge voltage generated by the On/Off status change and discharges of static electricity through frictions 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, or a decrease of forward rise voltage, deteriorating its optical characteristic.
Stanley products and are packed with anti-static components. However, the following precautions and measures are vital in ensuring product quality during shipment.

1. Electrification/Static electricity protection

Stanley recommends the following precautions in order to avoid product (die) damage from static electricity , when an operator and other materials electrified by friction coming in contact with the product.

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 150V, which is the same value as integrated circuits (which are sensitive to static electricity).

Handling precaution

【Other precautions】

1. The products are designed to achieve the highest 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.).
   Usage conditions must never go above the ratings, nor the factors reach the rating level simultaneously.

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 in series into the circuit in order to stabilize LED operations and to prevent the device from overheating. The power supply should be such that there is no overcurrent due to surges when it is switched on and off, and no voltage in either the forward or reverse direction when it is switched off.

5. Please avoid using the products with materials and products that contain sulfur and chlorine elements because the reliability may be decreased. Please keep in desiccator before and after mounting, to prevent the products from being affected by corrosive gas.
   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 material because molding resin in the products has adhesiveness.
   And please don't touch lens portion.

7. Supersonic wave welding is not recommended because wire open circuit may occur.
   ex) bonding outer lens to this product or housing

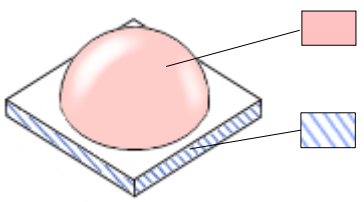
8 Please check the actual life time performance in the actual product use at your company because the specification sheets describe the characteristics of only the LED itself.

9. When there is a process of supersonic wave welding etc. after mounting the product,
   there is a possibility of affecting on the reliability of junction part in package
   (junction part of die bonding and wire bonding). Please make sure there is no problem before using.

10. The products are designed to perform without failure in the recommended usage conditions.
    However, please take the necessary precautions to prevent fire, injury, and other damage from these unexpected failures.

11. The products are manufactured to be used for ordinary electronic equipment. Please contact our sales staff in advance when exceptional quality and reliability are required, when 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. Please avoid overload to the product when using tweezers to pick up LEDs.
    Overload might cause deformation, disconnection, chip-outs and consequently lead to lighting failure.
    Tweezers with flat tips is recommended, please avoid using tweezers with sharp tips.



Do not pick up by this area.
(Lens part)

Pick up point : substrate part.

Handling precaution

【Other precautions】

13. Low hardness resin is used for lens. Please avoid overload to the surface of lens which might cause chip-outs, encapsulant delamination, and deformation, nicks, wire disconnection and decreasing reliability. Be careful when dealing with the products and pay attention to following points.

a) During mounting process, keep lens from coming in contact with absorbing nozzle and refer to precautions on next page.

b) Pay attention to handling and storage of LEDs even after mounting, because overload caused by stacking PCBs and shock due to dropping and crashing might also lead to deformation, disconnection, and chip-outs.

c) In the processes of water pressure during cleaning, air pressure, drying and other processes after mounting, overload to lends should be avoided.

14. This product emits strong ultraviolet rays when it is lit up.
Please do not look directly into the light source, for it could damage your eyes.
Should it be necessary to observe the product while it is being lit, always use protective glasses that cut ultraviolet rays, as well as protective masks and gloves etc. in order not to expose your skin to the light.
Please also take sufficient safety measures against light leakage etc., in order to avoid any influence on the human body.

15. This product generates heat when it is lit up.
Since there is a risk of adverse effects on the human body and surrounding parts, please take sufficient safety measures against smoke, ignition and deterioration of parts.

16. Attach caution labels to your products which contain UV LEDs.

17. Keep out of reach of children.

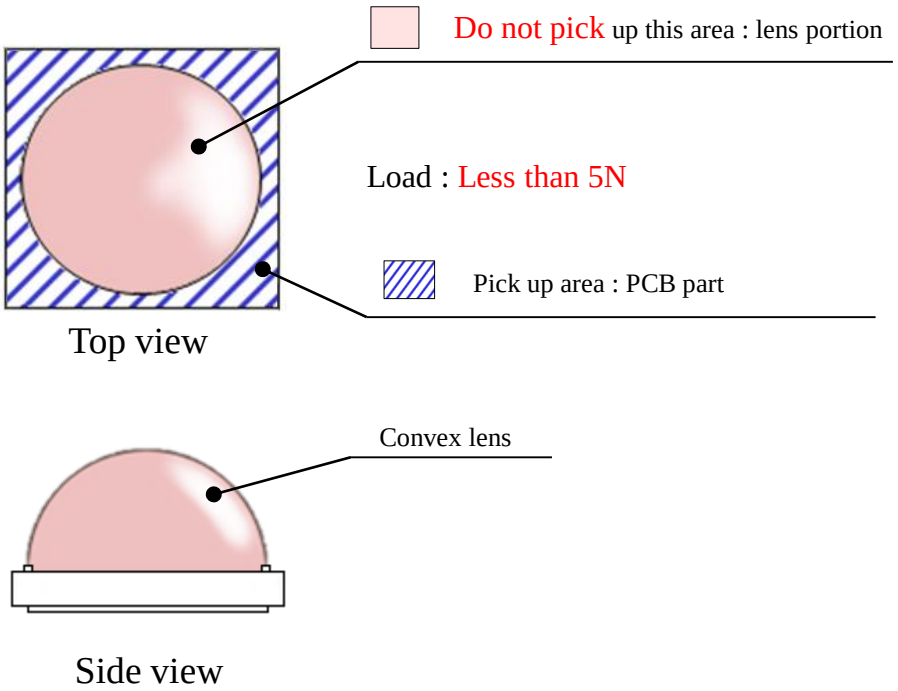
18. The formal specification sheets should be exchanged and signed by both parties.

Handling precaution

【Handling precautions for product mounting】

＜Recommended conditions＞

Pick up point : Substrate area of LED (area) (Shown below)



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

Recommendation of nozzle
・Internal diameter of nozzle : φ3.45mm ・External diameter of nozzle : φ3.75mm
・Pick-up position of nozzle : From the top of emboss tape
・If nozzle size is larger than opening part of emboss tape, pick-up should be done 0.1mm upper from emboss tape, or you can set holes (so that air can leak) on nozzle.

Packaging specifications

This product is shipped in moisture-proof packaging (as shown below) to minimize moisture absorption during shipping.
However, in regards to storing the products, 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 to 30℃
Humidity	Under 60%rh

In the case of the package unopened , 6 months under【 Recommended storage condition 】.
However, rapid temperature change from low temperature to high temperature (and vice versa),
avoid places where corrosive gas is generated or where there is a lot of dust.

【Time elapsed after package opening】

This product is equivalent to IPC/JEDEC J-STD-020D MSL 2a. (672h = 4 weeks)

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 】.

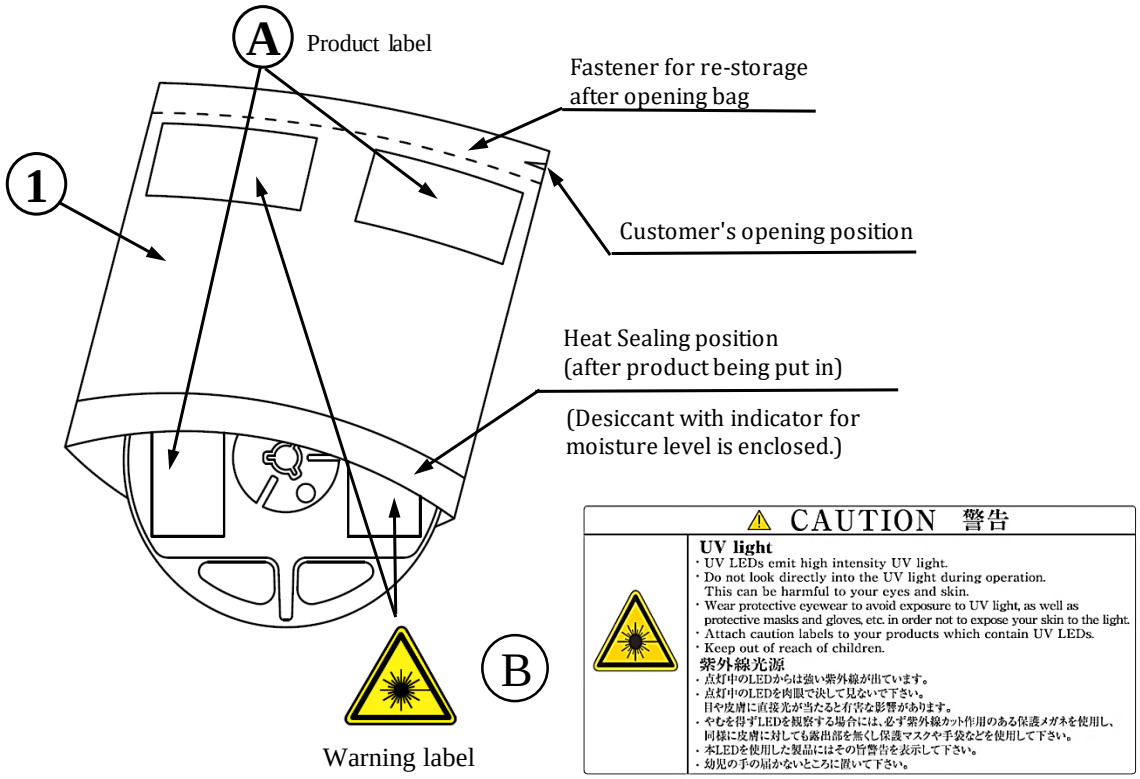
Baking process should be performed after putting out from package.
Please keep the time frame between package opening and soldering which is【maximum 672h.】

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.

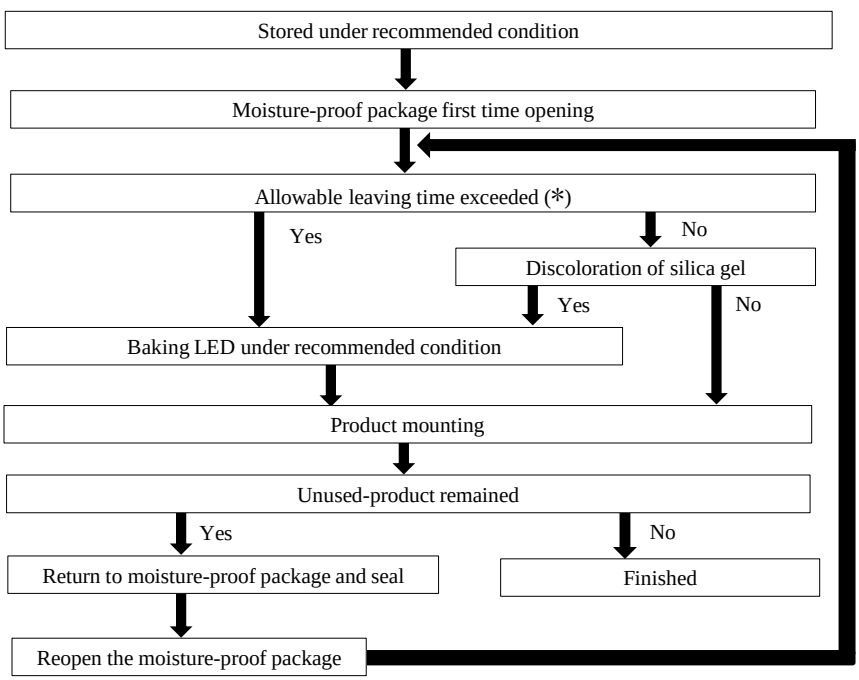
Packaging specifications

【Moisture-proof packaging specification】



No.	Part name	Material	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.

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Packaging specifications

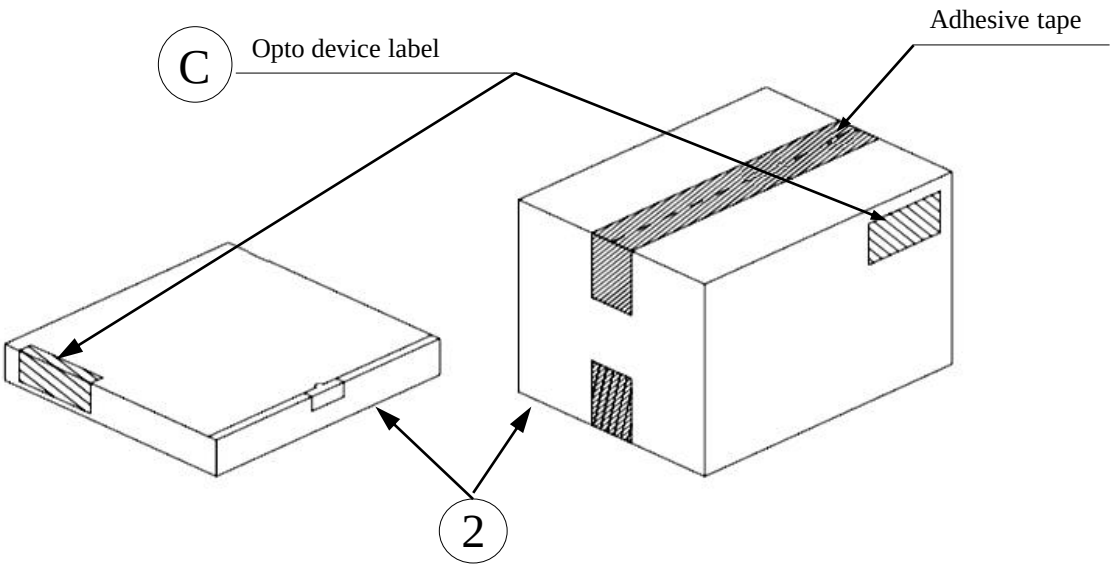
【Packing box】

(RoHS / ELV Compliant)

Box type	Outline dimension L × W × H (mm)	Capacity of the box
Type A	280 × 265 × 45 (mm)	2 reels
Type B	310 × 235 × 265 (mm)	10 reels
Type C	440 × 310 × 265 (mm)	20 reels

The above measures are all the reference values.

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 K5AF

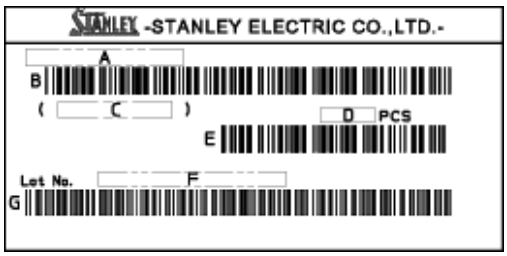
NO.	Part name	Material	Remarks
②	Packing box	Corrugated cardbord	without ESD protection

LZU4E365-500-TR

Packaging specifications

【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

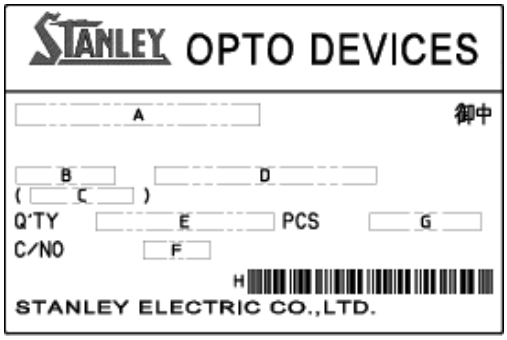
E. Bar-code for packed parts quantity

F. Lot number & rank

(refer to Lot number notational system for details)

G. Bar-code for lot number & rank

C 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

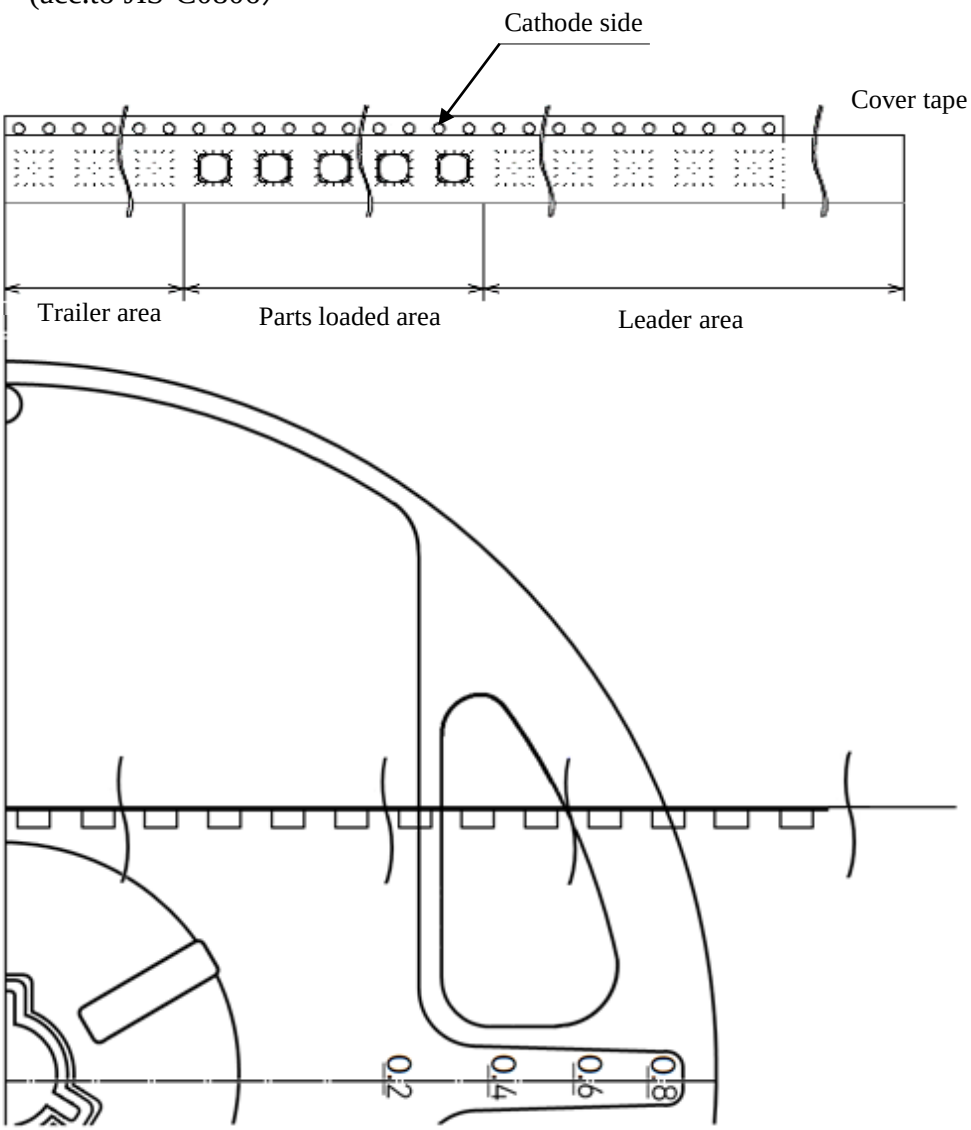
H. Bar-code for In-house identification number

<Remarks> Bar-code font : acc.to Code-39(JIS-X0503)

LZU4E365-500-TR

Taping and reel specifications

【Appearance】
(acc.to JIS-C0806)



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 13 pieces. (longer than 100mm)	Please refer to the above figure for Taping & reel orientation .
Trailer area		Empty pocket shall be more than 20 pieces. (longer than 160mm)	The end of taping shall be inserted into a slit of the hub.

LZU4E365-500-TR

Taping and reel specifications

(acc.to JIS-C0806-03）

【Qty. per reel】

500parts/reel
Minimum Qty. per reel might be 100 parts when getting less than 500 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 be170 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.

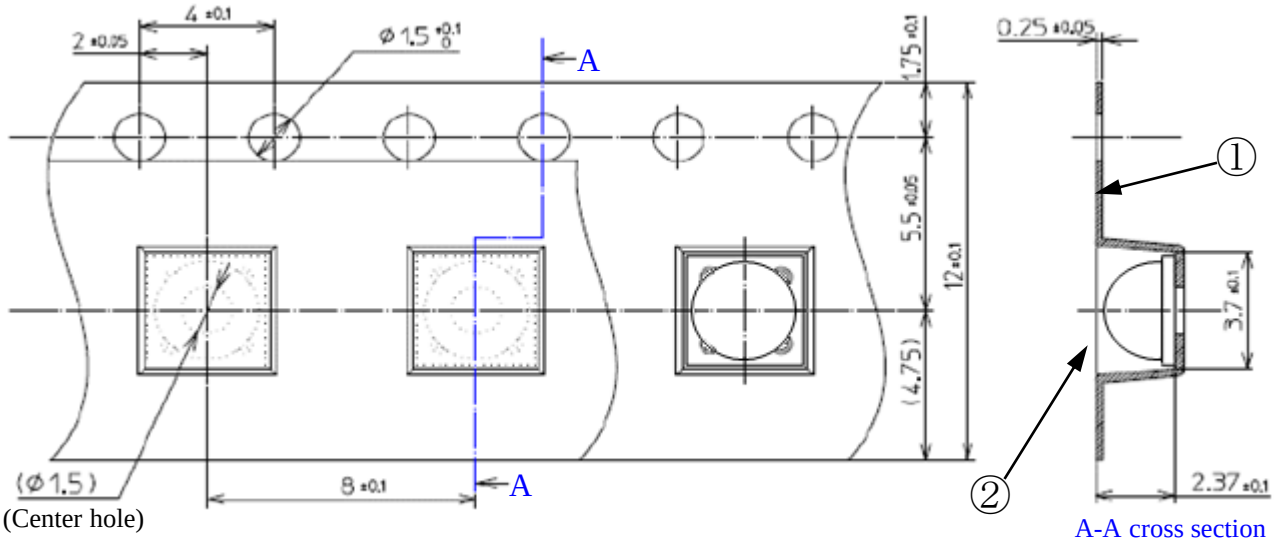
【Others】

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

LZU4E365-500-TR

Taping and reel specifications

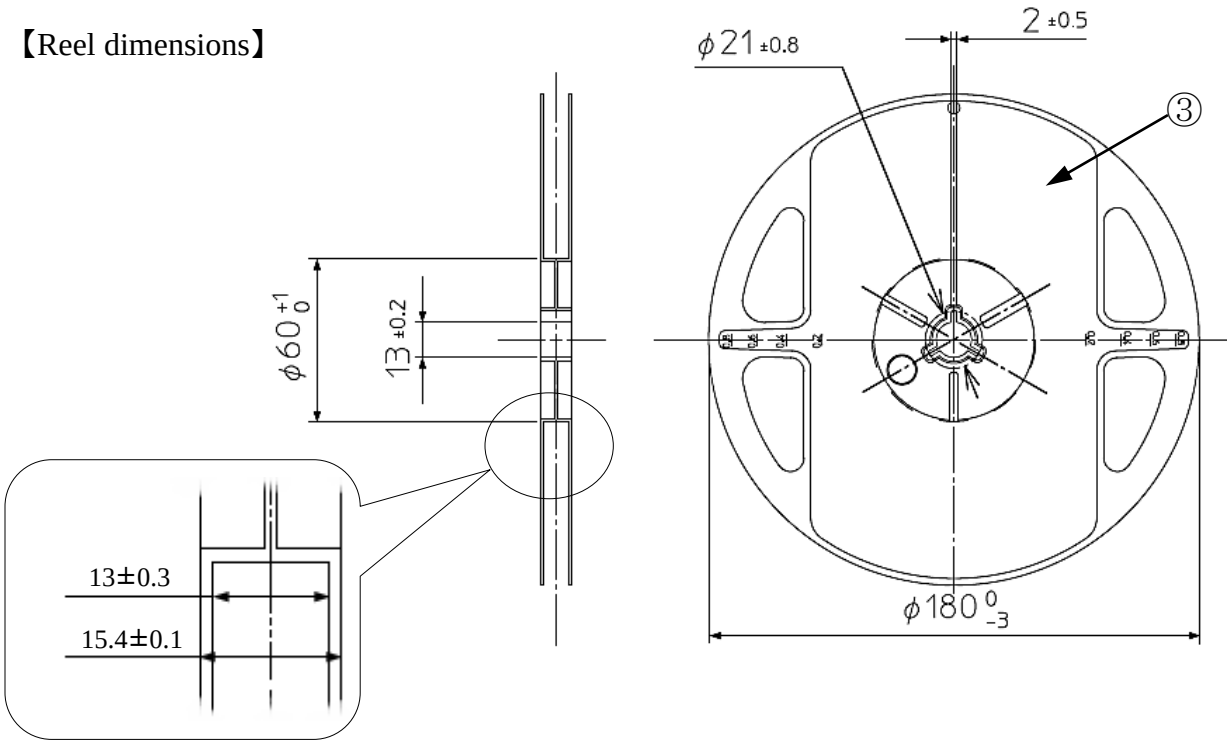
【Taping dimensions】
(acc.to JIS-C0806)



(Center hole)

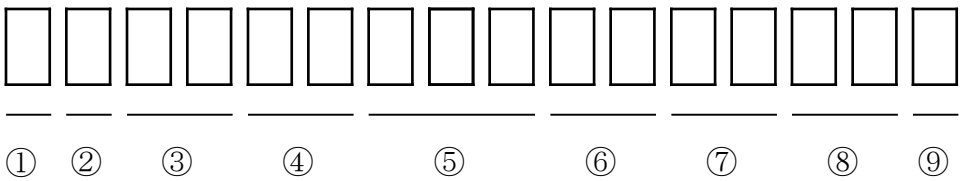
A-A cross section

【Reel dimensions】



NO.	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



① - 1digit : Production location (mark identify alphabet)

② - 1digit : Production year (The last digit of production year 2025→5, 2026→6, 2027→7, 2028→8 ･･･)

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 : Total power rank.

(If total power rank is 1 digit, "-" shall be dashed on the place for the second digit.

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

⑧ - 2digits : Wavelength rank

(If wavelength rank is 1 digit, "-" shall be dashed on the place for the second digit.

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

⑨ - 1digit : V_F Rank (If rank is not defined, "-" is described.)

LZU4E365-500-TR

Correspondence to RoHS / ELV instruction

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 to 10.
- ELV instruction … Refer to following 1 to 4.

2011/65/EU, (EU)2015/863

No.	Substance group name	Maximum permissible concentration value
1	Lead and its compounds	1,000ppm (0.1%)
2	Cadmium and its compounds	100ppm (0.01%)
3	Mercury and its compounds	1,000ppm (0.1%)
4	Hexavalent chromium compounds	1,000ppm (0.1%)
5	PBB : Polybrominated Biphenyls	1,000ppm (0.1%)
6	PBDE : Polybrominated Biphenyl Ethers	1,000ppm (0.1%)
7	DEHP : Bis (2-ethylhexyl) phthalate	1,000ppm (0.1%)
8	BBP : Butyl benzyl phthalate	1,000ppm (0.1%)
9	DBP : Dibutyl phthalate	1,000ppm (0.1%)
10	DIBP : Diisobutyl phthalate	1,000ppm (0.1%)

Reliability testing result

1. Reliability testing result

Test item	Standard	Test condition	Duration	Failure
Room temperature operating life	EIAJ ED-4701 / 100(101)	Ta=25℃ I_F=600mA	1,000h	0 / 20
High temperature operating life	EIAJ ED-4701 / 100(101)	Ta=85℃ I_F=250mA	1,000h	0 / 20
Low temperature operating life	EIAJ ED-4701 / 100(101)	Ta=-40℃ I_F=600mA	1,000h	0 / 20
Wet high temperature operating life	EIAJ ED-4701 / 100A(102)	Ta=60℃ 90% I_F=450mA	1,000h	0 / 20
High temperature storage life	EIAJ ED-4701 / 200(201)	Ta=100℃	1,000h	0 / 20
Low temperature storage life	EIAJ ED-4701 / 200(202)	Ta=-40℃	1,000h	0 / 20
Thermal shock	EIAJ ED-4701 / 100(105)	Ta=-40℃ to 100℃ (each 15min)	200 cycles	0 / 20
Resistance to reflow soldering	EIAJ ED-4701 / 300(301)	Moisture soak：30℃ 60% 4Weeks Preheating：150 to 180℃ 120sec MAX. Soldering：260℃ peak	2 times	0 / 20
Electrostatic discharge (ESD)	EIAJ ED-4701 / 300(304)	C=100pF R2=1.5kΩ ±2,000V	Once of each polarity	0 / 20

2. Failure criteria

Item	Symbol	Condition	Failure Criteria
Total power	P_O	I_F=350mA	Testing min. value ＜ Standard min. value × 0.5
Forward voltage	V_F	I_F=350mA	Testing max. value ≧ Standard max. value × 1.1
Cosmetic appearance	-	-	Notable, discoloration, deformation and cracking

Special notice to customers using the products and technical information shown in this data sheet

1) The technical information shown in the data sheets are limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license.

2) For the purpose of product improvement, the specifications, characteristics and technical data described in the data sheets are subject to change without prior notice. Therefore it is recommended that the most updated specifications be used in your design.

3) When using the products described in the data sheets, please adhere to the maximum ratings for operating voltage, heat dissipation characteristics, and other precautions for use. We are not responsible for any damage which may occur if these specifications are exceeded.

4) The products that have been described to this catalog are manufactured so that they will be used for the electrical instrument of the benchmark (OA equipment, telecommunications equipment, AV machine, home appliance and measuring instrument).
The application of aircrafts, space borne application, medical equipment and nuclear power control equipment, etc. needs a high reliability and safety, and the breakdown and the wrong operation might influence the life or the human body. Please consult us beforehand if you plan to use our product for the usages of aircrafts, space borne application, transportation equipment, medical equipment and nuclear power control equipment, etc. except OA equipment, telecommunications equipment, AV machine, home appliance and measuring instrument.

5) In order to export the products or technologies described in this data sheet which are under the "Foreign Exchange and Foreign Trade Control Law," it is necessary to first obtain an export permit from the Japanese government.

6) No part of this data sheet may be reprinted or reproduced without prior written permission from Stanley Electric Co., Ltd.

7) The most updated edition of this data sheet can be obtained from the address below:
http://www.stanley-components.com/en/

WARNING

- **UV LEDs emit high intensity UV (ultraviolet) light.**
- **Do not look directly into the UV light source ; this can be harmful to your eyes and skin.**
- **Wear protective eyewear to avoid exposure to UV light, as well as protective masks and gloves, etc. in order not to expose your skin to the light.**
- **Attach warning labels to your products which contain UV LEDs.**
- **keep out of reach of children.**