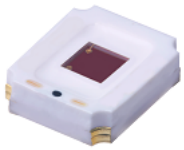
Data sheet

Part number : GFZR1109JTE-TR



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

Lead-free solder heat resistant product

Package	SMD Top view Package, Red color emitting LED Outer dimension 3.0 x 2.5 x 0.77mm (L x W x H)
Product features	・Product moisture resistance level (moisture sensitivity level/MSL): 2a ・Operating temperature : -40 to +125℃ ・RoHS:2011/65/EU, (EU)2015/863 compliant ・Lead-free soldering compatible

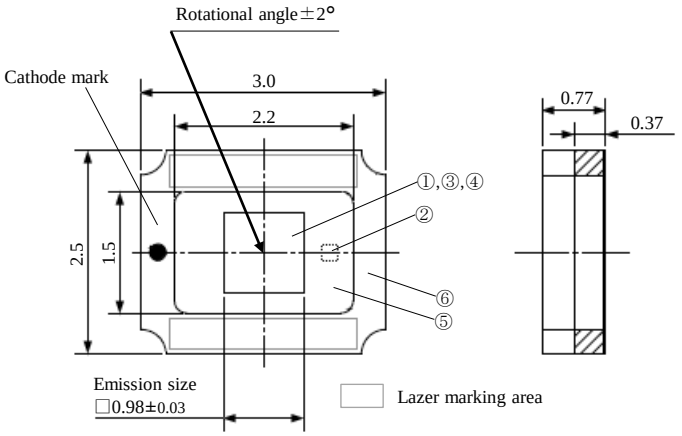
Recommended applications

・Light source for signage, illumination, backlight for signage, decorative lighting, etc.

Outline dimensions

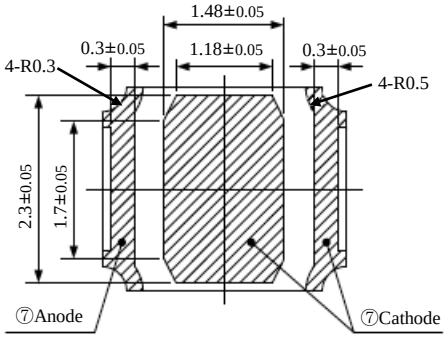
GFZR1109JTE-TR

Unit : mm
Weight : 19.7mg
Tolerance : ±0.1

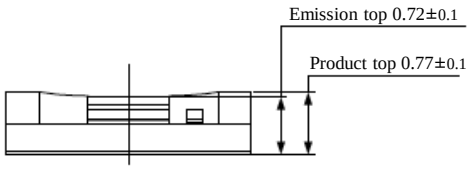


Top view

Side view

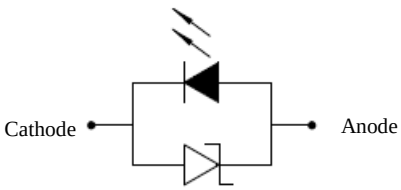


Bottom view



Cross section

※Cutting burr size of lamp housing and electrode aren't contained in the size of product.

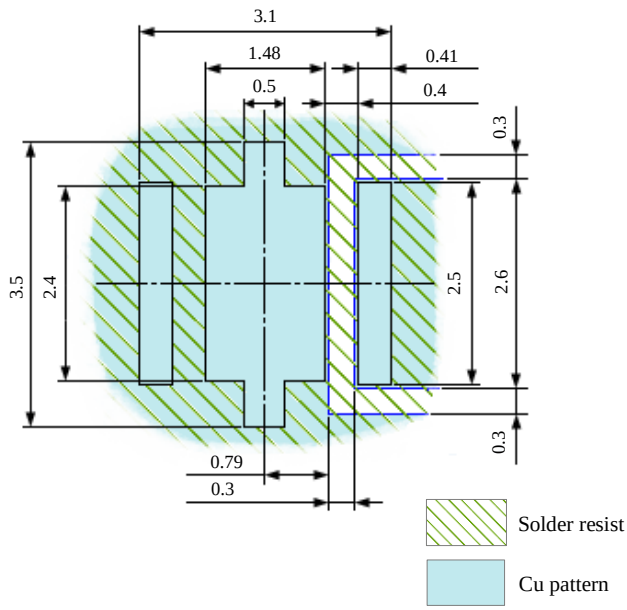


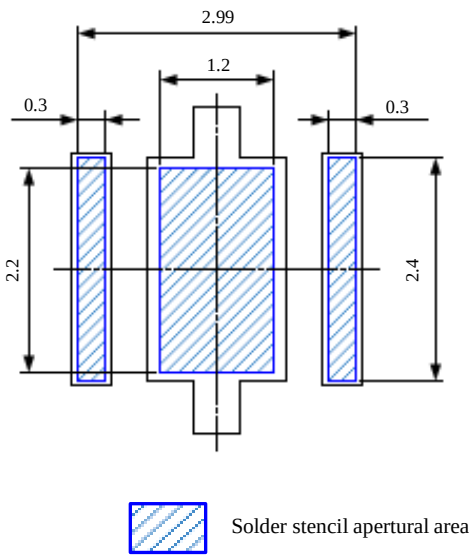
Inside circuit

No.	Part name	Materials	Qty.
①	LED die	AlGaInP	1
②	Protectiom diode	Si	1
③	Encapslant (emitting area)	Silicone resin + glass	-
④	Glass plate	Silicon dioxide	1
⑤	Encapslant	Silicone resin	-
⑥	Lamp housing	Glass ceramic	1
⑦	Electrode	Au plating	Anode : 1 Cathode : 2

Recommended soldering pattern

Unit : mm





Specifications GFZR1109JTE-TR

【 Product overview 】

Die material	AlGaInP
Emisson color	Red
Emisson area color	Colorless and Transparent
Lamp housing color	White

【 Absolute maximum ratings 】

Item	Symbol	Maximum ratings	Units	
Power dissipation	P_d	3,710	mW	
Forward current	I_F	1,050	mA	Notes1
I_F max derate linearly from Ts=100℃	$\triangle I_F$	26.25	mA/℃	
Repetitive peak forward current "1ms, 1/20duty"	I_{FRM}	2,000	mA	
Operating temperature	T_{opr}	-40 to +125	℃	Notes2
Storage temperature	T_{stg}	-40 to +125	℃	Notes2
【HBM】(Ta=25℃) Electrostatic Discharge Threshold "HBM"	ESD	±8,000	V	Notes3
Junction temperature (1,000Hr)	Tj	150	℃	Notes4
Soldering temperature "Reflow soldering"	T_{sld}	260	℃	Notes5

Notes1 This LED device is recommended for use with standard current and is not guaranteed at 100mA or less
Notes2 The range of operating and storage temperature is not taping condition.
Notes3 ESD testing method : EIAJ4701/300(304) Human Body Model (HBM) 1.5kΩ,100pF
Notes4 Please refer to the attached sheets, page 23 Reliability testing result.
Notes5 Please refer to the attached sheets, page 8 Soldering conditions.

【 Thermal characteristics 】

(Ts=25℃)

Item	Symbol	Min.	Typ.	Max.	Units
Thermal resistance【Junction - solder point】	$R_{th(j-s)}$	—	4.5	5.5	℃/W

Specifications GFZR1109JTE-TR

【 Electro-optical characteristics 】

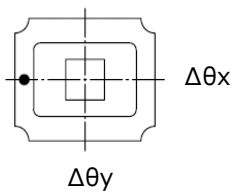
(Ta=25℃)

Item	Symbol	Conditions	Min.	Typ.	Max.	Units	
Forward voltage	V_F	I_F = 350mA	1.8	2.2	2.6	V	Notes6
Reverse voltage	V_R	not desiged for reverse operation				V	Notes7
Luminous flux	Φv	I_F = 350mA	20	43	65	lm	Notes6
Dominant wavelength	λd	I_F = 350mA	626	634	641	nm	Notes6
Peak wavelength	λp	I_F = 350mA	−	650	−	nm	
Spectral line half width	Δλ	I_F = 350mA	−	21	−	nm	
Half intensity angle	Δθx	I_F = 350mA	−	117	−	deg.	Notes8
	Δθy		−	117	−		

Notes6 Please refer to the attached sheets for each sorting chart.

Notes7 Please do not input reverse voltage and reverse current for prevent the destruction.

Notes8 Viewing Angle at 50% Iv, Δθx, Δθy, as shown in the figure below.



Specifications GFZR1109JTE-TR

【 Sorting chart For Luminous Flux,Φv 】

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

(Ta=25℃)

Rank	Luminous flux Φ_V (lm)		Conditions
	MIN.	MAX.	
C	20	30	I_F=350mA
D	30	50	
E	50	60	

Notes
Luminous flux tolerance
Measurement time : lighting at moment. (20msec)

【 Sorting chart For Dominant Wavelength 】

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

(Ta=25℃)

Rank	Dominant wavelength λd (nm)		Conditions
	MIN.	MAX.	
CA	626	631	I_F=350mA
CB	631	636	
CC	636	641	

Notes
Luminous flux tolerance each rank;±1nm
Measurement time : Lighting at moment.(20msec)

【 Sorting chart for forward voltage characteristics, V_F 】

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

(Ta=25℃)

Rank	Forward voltage V_F (V)		Conditions
	MIN.	MAX.	
A	1.80	2.00	I_F=350mA
B	2.00	2.20	
C	2.20	2.40	
D	2.40	2.60	

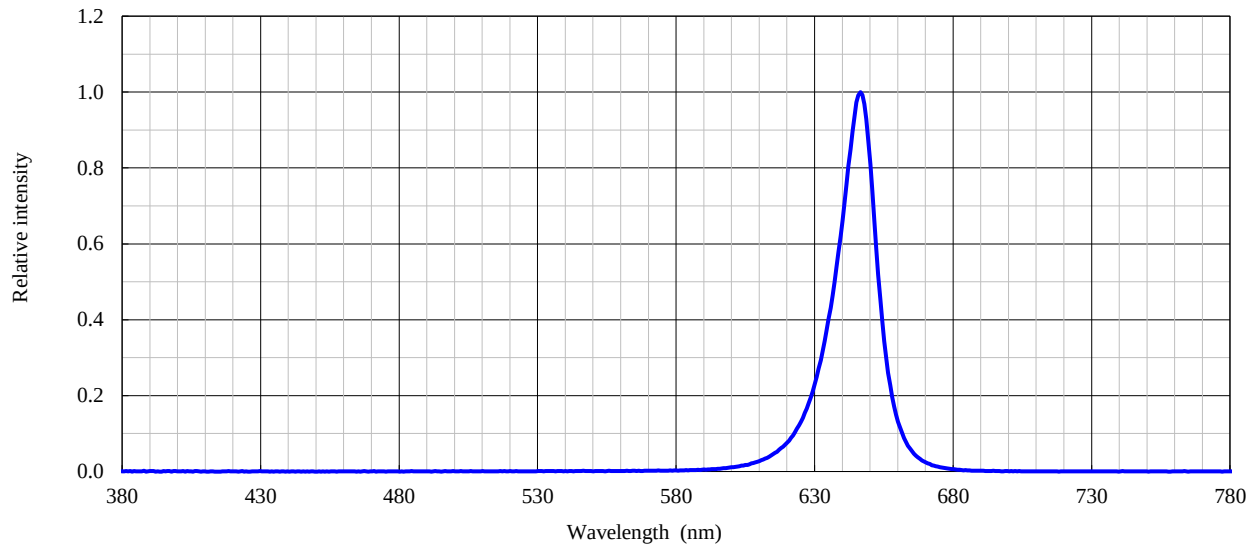
Notes
Forward voltage tolerance each rank ; ±0.1V
Measurement time : Lighting at moment.(20msec)

Technical Data

GFZR1109JTE-TR

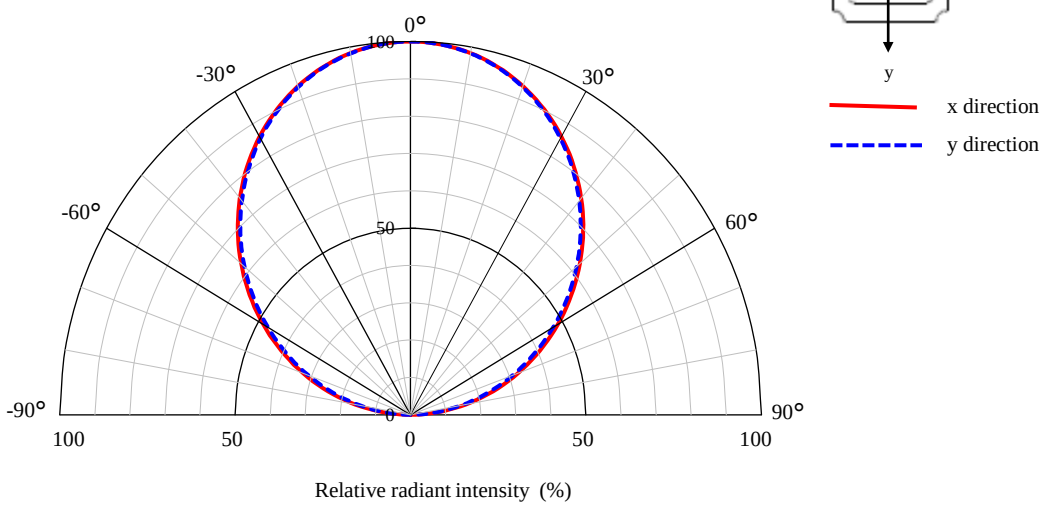
Relative intensity vs. Wavelength

Condition: I_F = 350mA, Ta = 25℃



Spatial distribution

Condition: I_F = 350mA, Ta = 25℃

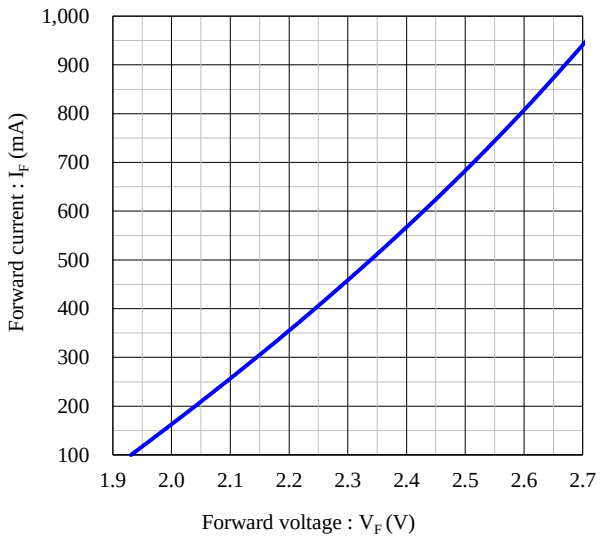


Technical Data

GFZR1109JTE-TR

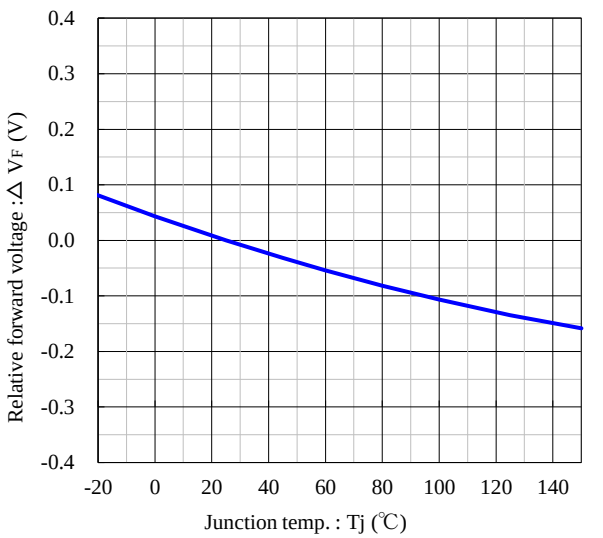
Forward voltage vs. Forward current

Condition: Ta = 25℃



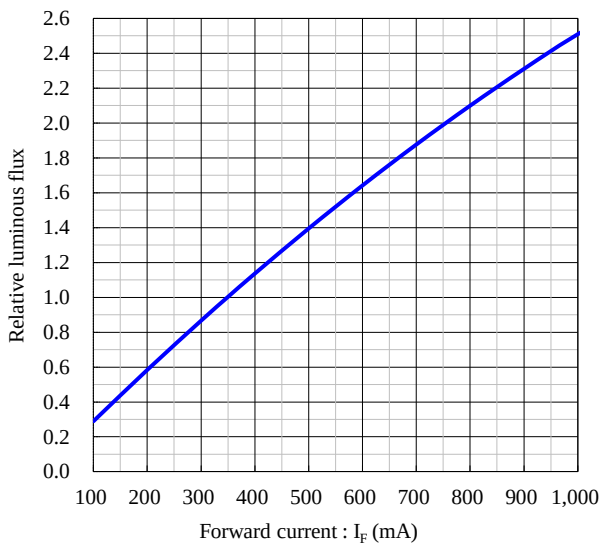
Junction temp. vs. Relative forward voltage

Condition : I_F = 350mA



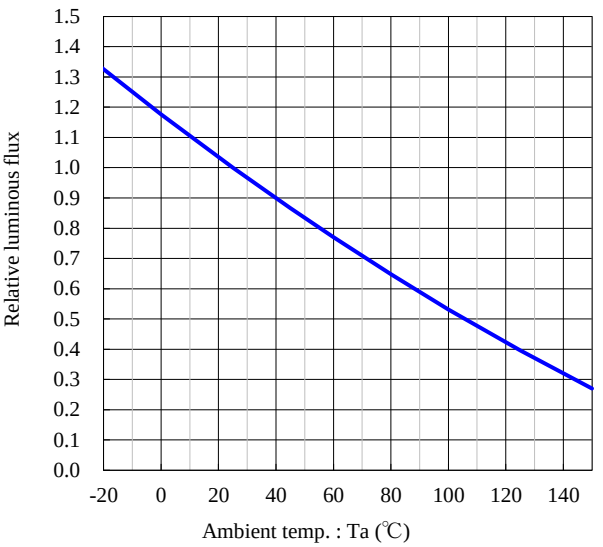
Forward current vs. Relative luminous flux

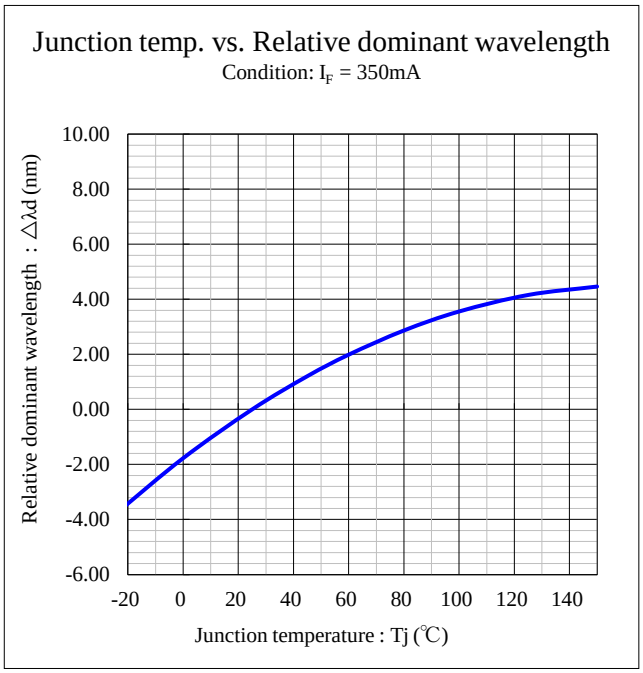
Condition : Ta = 25℃



Junction temp. vs. Relative luminous flux

Condition : I_F = 350mA




Junction temp. vs. Relative dominant wavelength
Condition: I_F = 350mA
Relative dominant wavelength : △λd (nm)
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-20
0
20
40
60
80
100
120
140
Junction temperature : Tj (℃)

Soldering condition

GFZR1109JTE-TR

【Soldering Precaution】

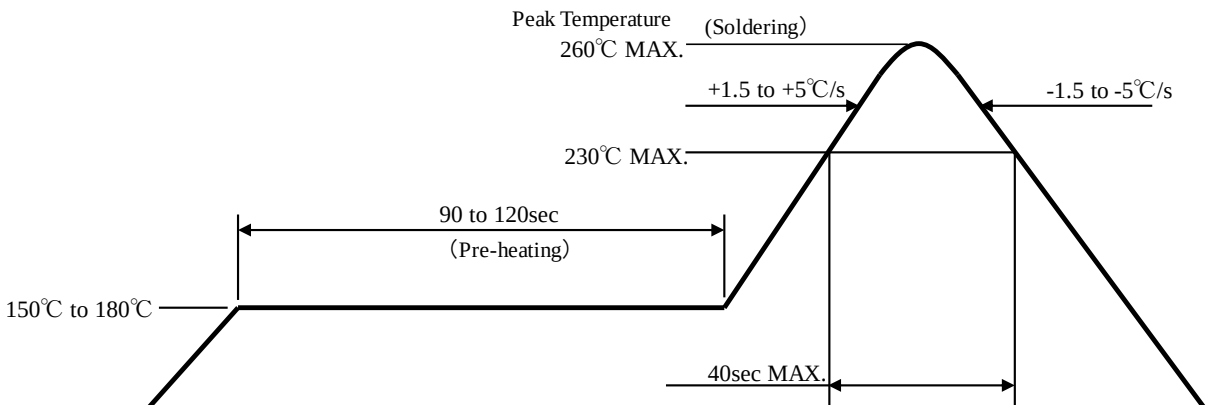
(acc.to EIAJ-4701/300)

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. LED parts including the resin has not stabilized immediately after the soldering. Any mechanical stress may cause damage to the product. Please avoid these stresses, especially stacking the boards, or any other storage method which may cause the boards to warp. Also please avoid the boards from sliding against hard materials.

3. 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 of the parts mounted. Typically, when a 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 to 10℃. Please do not repeat the heating process in Reflow process more than twice.

【Recommended reflow soldering condition 】



Note 1 Temperature Profile for the reflow should be set to pad temperature of soldering point, 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 max2 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

GFZR1109JTE-TR

4. When using a metal substrate, the solder may crack and problems may occur due to major stress on the soldered portion caused by thermal shock. When using a metal substrate, please carry out a thorough advance verification, check for any problems and then use.
   For the metal circuit board's insulation, we humbly recommend stress reducing material.

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 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 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**
Hexane	x **Not recommended**

Handling precautions GFZR1109JTE-TR

【For electrostatic discharge (ESD)】

LED die 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 characteristic.
Stanley LED 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 form coming in contact with metallic materials, should the metallic material be charged, sudden surge voltage will most likely damaged 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).

Handling precautions GFZR1109JTE-TR

【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.). 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 into the circuit in order to stabilize LED operation and to prevent the device from overheating.

5. Please avoid to use the products with materials and products that contain sulfur and chlorine element because the reliability may be decreased. Please keep in dessicator regardless of before or after mounting not to be affected by corrosive gas when keeping products. Also please make sure if there is any gas which occur in surrounding area or enter from outside when using products.

6. Please avoid to stick foreign material 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 occurs.
   ex) bonding outer lens to this product or housing

8. The solder crack by the heat stress might be generated when the LED is soldered with the metal plate and go enough in a prior confirmation, please.

9. Please note piling PCBs may stress LEDs. It may cause non-lighting due to deformation, crack and breaking.

10. This part does not have proof for water, humidity and salt damage.
    Please use after affirming beforehand there is no problem if using on above conditions.

11. Please keep in desiccator regardless of before or after mounting not to be affected by corrosive gas when keeping products.
    Also please make sure if there is any gas which occur in surrounding area or enter from outside when using products.

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

Handling precautions

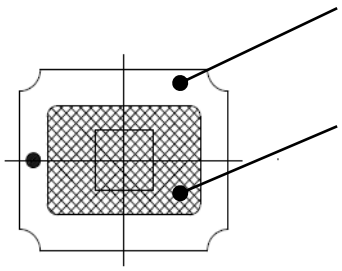
GFZR1109JTE-TR

【Handling precautions for product mounting】

＜Recommendation＞

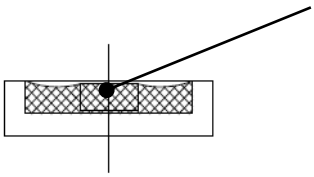
1. Pick up point : Lamp housing of the product. (See below figure)

Please pick up lamp housing area only because molding resin in this products is low hardness.
Nozzle contact with the product except Lamp housing may cause damage to the product.



Pick up point (Lamp housing portion)

Non allowed pick up area (Lens portion)

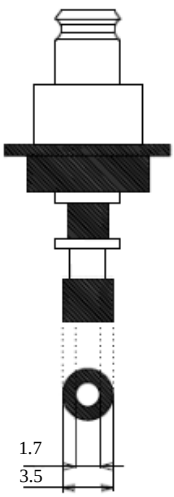


The Light-emitting part and molding resin part are lower than lamp housing.

2. Load： less than 5N

3. The recommended inner diameter for the nozzele is φ1.7, and φ3.5 for the outer diameter.

* 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 lamp housing.



Packaging specifications

GFZR1109JTE-TR

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%

In the case of the package unopened , please use within 6 months【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】

Following products correspond to IPC/JEDEC J-STD-020D MSL 2 equivalent.
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【 Recommended Storage Condition 】.

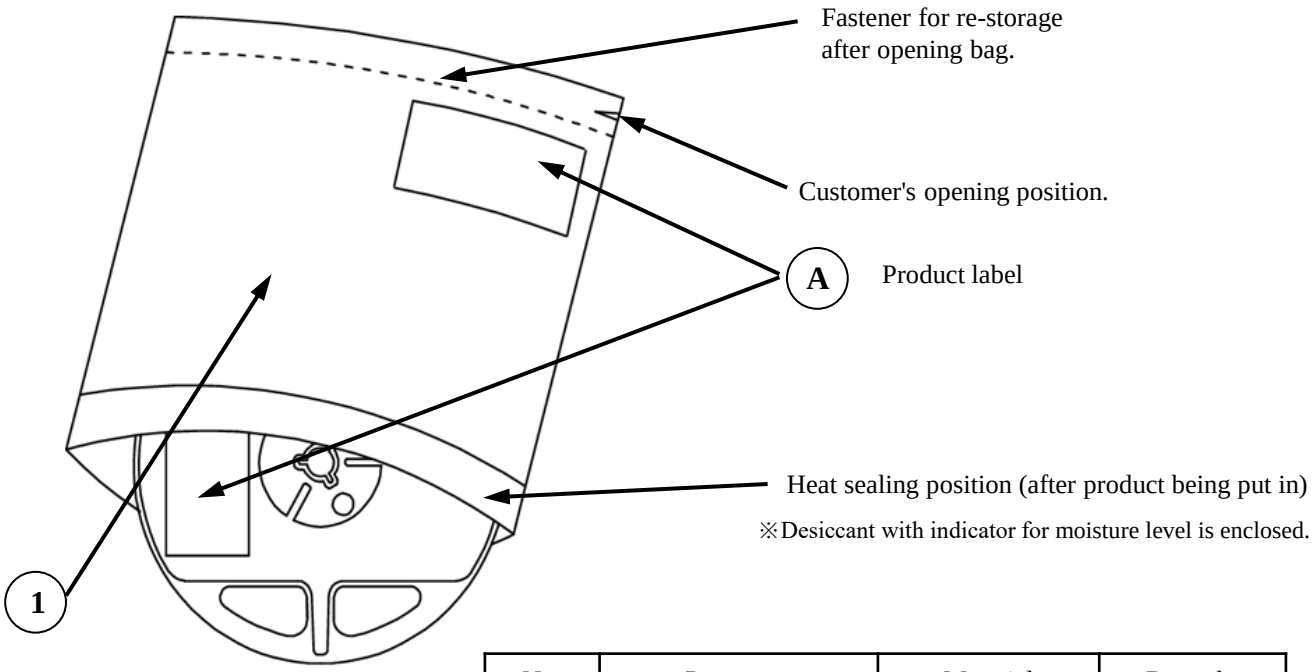
Baking process should be performed after putting out from package.
Baking conditions: Over 10h, +60±5℃ just before use

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

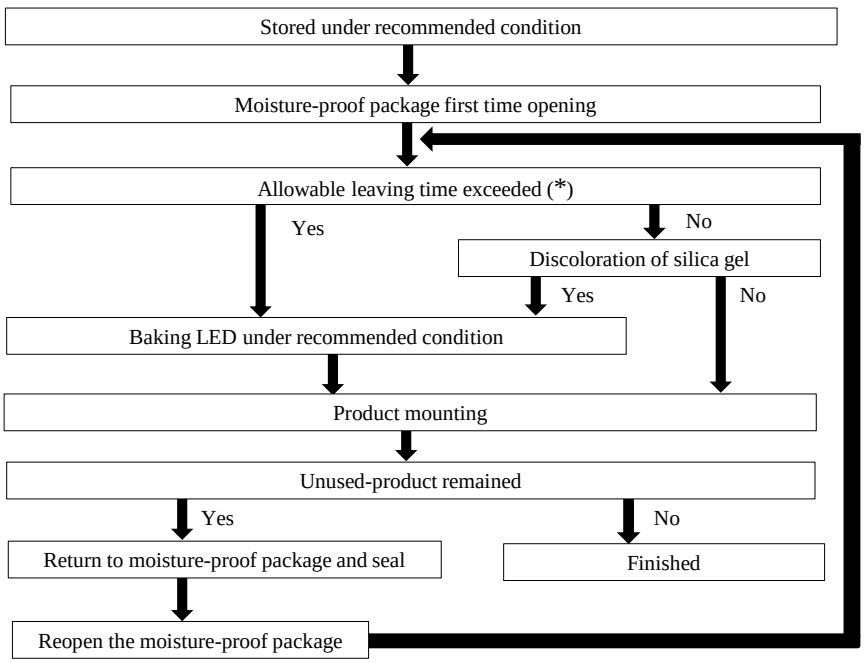
GFZR1109JTE-TR

【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.

Packaging specifications

GFZR1109JTE-TR

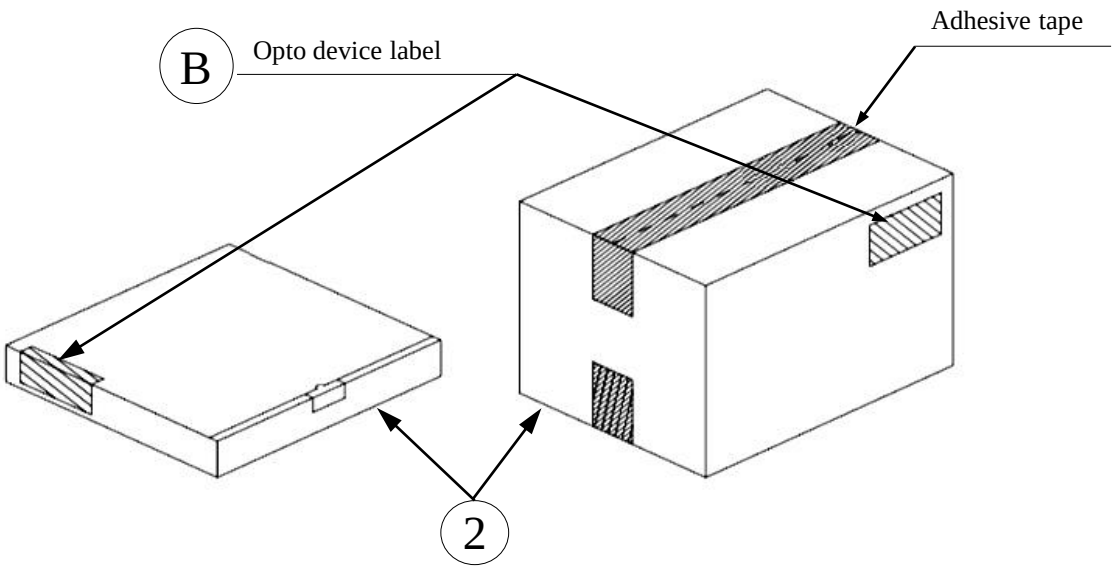
【Packing box】

(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
Type D	305 × 270 × 65 (mm)	2 reels
Type E	370 × 280 × 270 (mm)	20 reels
Type F	530 × 380 × 270 (mm)	40 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

Type B, C

Material / Box : Cardboard K5AF , Partition : Cardboard

Type D

Material / Box : Cardboard

Type E, F

Material / Box : Cardboard

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

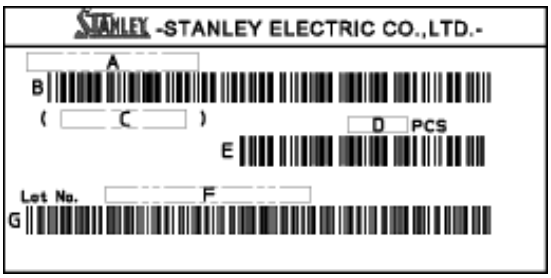
Packaging specifications

GFZR1109JTE-TR

(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

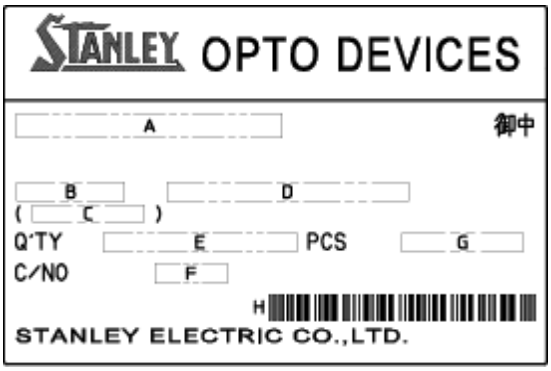
E. Bar-Code for packed parts quantity

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

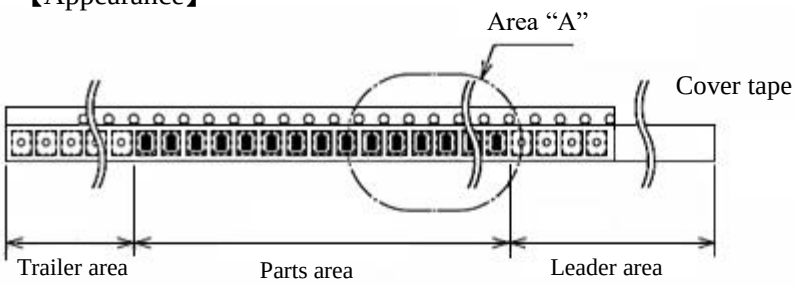
<Remarks> Bar-code font : acc.to Code-39(JIS-X0503)

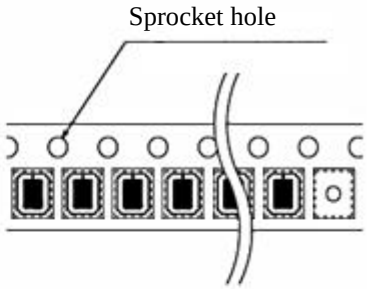
Taping and reel specifications

GFZR1109JTE-TR

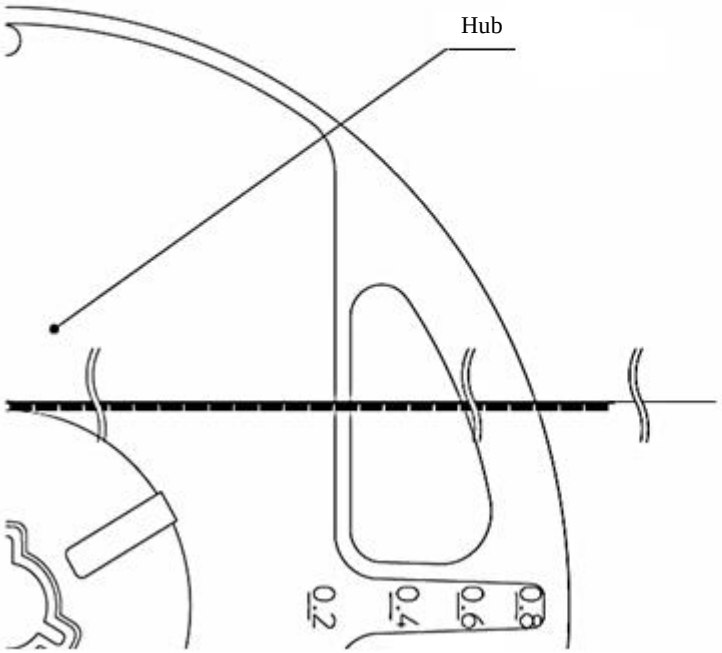
(acc.to JIS-C0806-03)

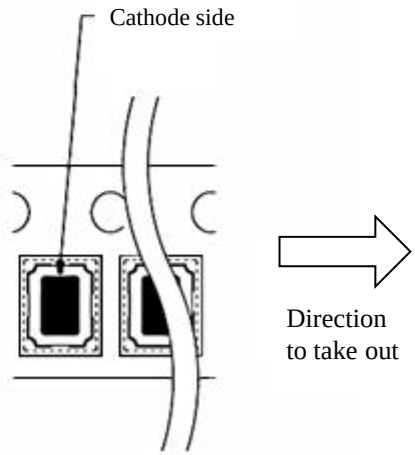
【Appearance】





Detailed area “A”-1





Detailed area “A”-2

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 (longer than 100mm) .	Please refer to the above figure for Taping & reel orientation .
Trailer area		Empty pocket shall be more than 40 pieces (longer than 160mm) .	The end of taping shall be inserted into a slit of the hub.

Taping and reel specifications

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(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 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.

Taping and reel specifications

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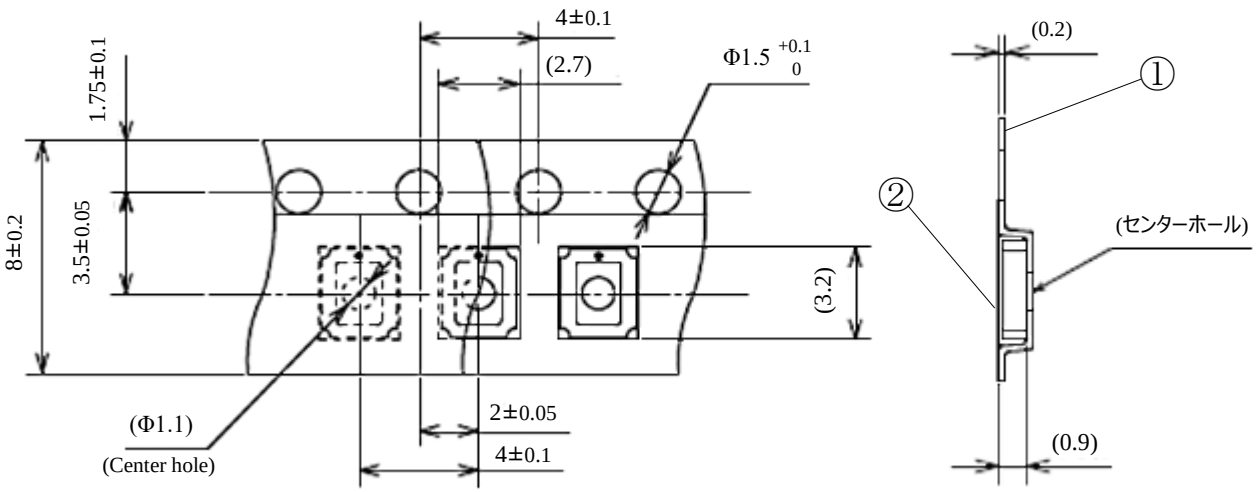
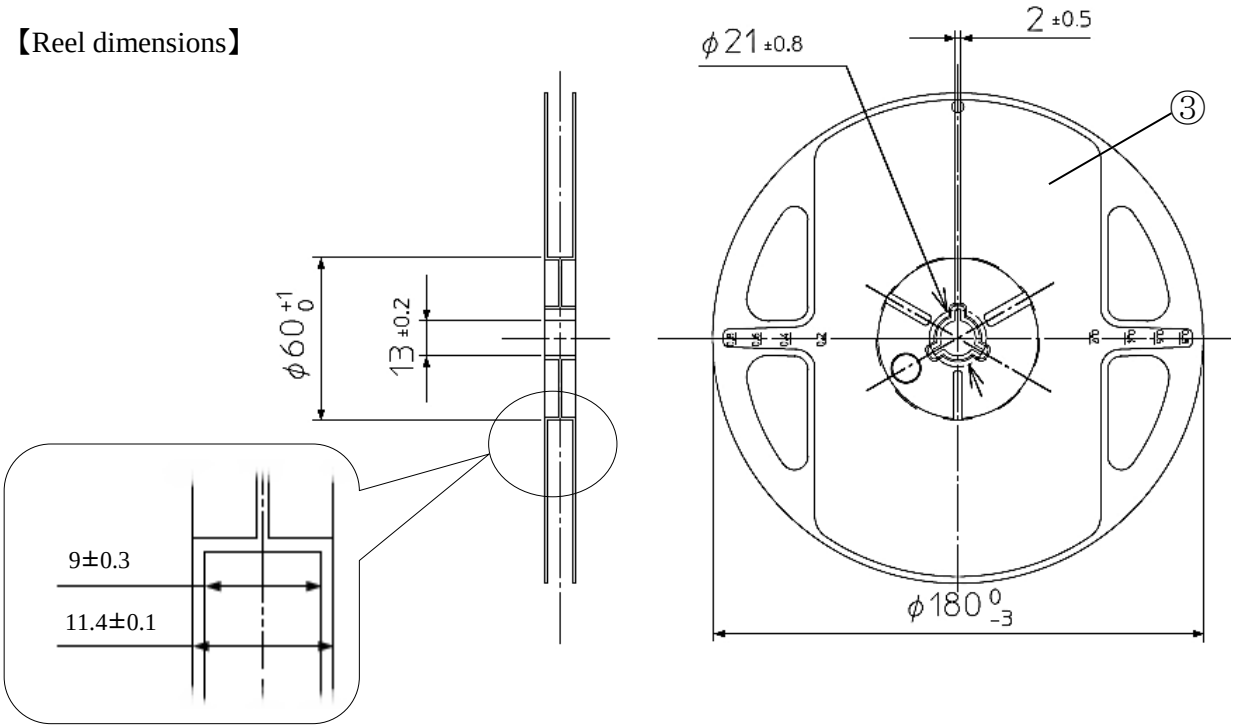
(acc.to JIS-C0806-03)

Unit: mm

【Taping dimensions】



【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

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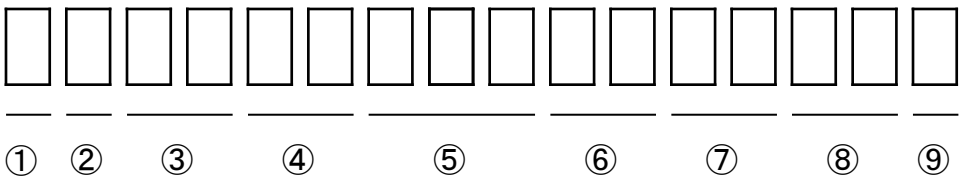

① - 1digit：Production location (mark identify alphabet)

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：Luminous flux rank.

(If total radiant flux 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：Chromaticity rank

(If only 1 digit, second digit must be dash "-"and if not identified rank, its"- -")

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

Compliance with RoHS / ELV

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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

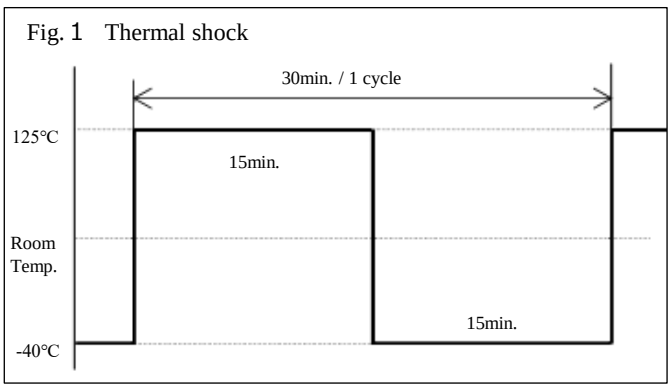
No.	Substance group name	Maximum permissible concentration value
1	Lead and its compounds	1,000ppm (0.1%)
2	Cadmium and its compounds	100ppm (0.01%)
3	Mercury and its compounds	1,000ppm (0.1%)
4	Hexavalent chromium compounds	1,000ppm (0.1%)
5	PBB : Polybrominated Biphenyls	1,000ppm (0.1%)
6	PBDE : Polybrominated 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 GFZR1109JTE-TR

1. Reliability testing result

No.	Test item	Test condition	Duration	Failure
1	Room temperature operating life	Ta=25℃ I_F=1,200mA	1,000h	0 / 5
2	High temperature humidity bias operating life	Ta=85℃, Rh=85%, I_F=1,050mA	1,000h	0 / 5
3	High temperature operating life	Ta=85℃ I_F=1,200mA	1,000h	0 / 5
4	Low temperature operating life	Ta=-40℃ I_F=1,050mA	1,000h	0 / 5
5	Thermal shock	Ta=-40℃(15min) to 125℃(15min), fig.1	1,000 cycles	0 / 18
6	Resistance to reflow soldering	Moisture Soak : Jedec Level2 Preheating : 150 to 180℃ 120sec MAX. Soldering : 260℃ 5sec	2 times	0 / 18
7	Electric static discharge(ESD) : HBM	C=100pF R2=1.5kΩ ±8kV	3 times of each polarity	0 / 10
8	Electric static discharge(ESD) : MM	C=200pF R2=0Ω ±250V	once of each polarity	0 / 10

Fig. 1 Thermal shock



2. Failure criteria

Item	Symbol	Conditions	Failure criteria
Luminous Intensity	Iv	I_F=1,000mA Ta=25℃	Initial value × 0.5 ＜Testing MIN. value & Initial value × 1.5 ＜ Testing MAX. value
Forward voltage	V_F	I_F=1,000mA Ta=25℃	Initial value × 0.9 ＞Measured value ＞ Initial value × 1.1
Appearance	–	–	Notable discoloration, deformation and crack

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