Data sheet

Part number : TAN110EF-TR

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

Lead-free solder heat resistant product

Package	sideview type IRLED Peak wavelength : 940nm, Half intensity angle 35deg. Outer dimension 3.0 x 2.55 x 1.6 mm(L x W x H)
Product features	・Conventional dome lens products in a side-view package to support mounting diversification ・Radiant intensity : 4.0mW/sr (TYP.) @I_F=20mA ・Operating temperature : -40 to +85 deg. ・Lead–free soldering compliant ・RoHS : 2011/65/EU, (EU)2015/863 compliant

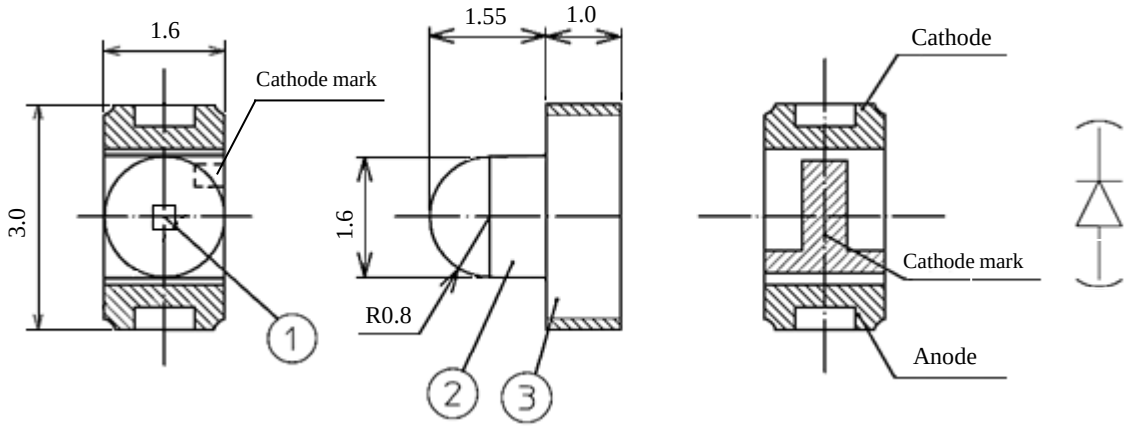
Recommended applications

・Infrared data communication, Home appliances, OA/FA, Other general data communication etc.

TAN110EF-TR

Outline dimensions

Unit : mm
Weight : 41.2mg
Tolerance : ±0.150

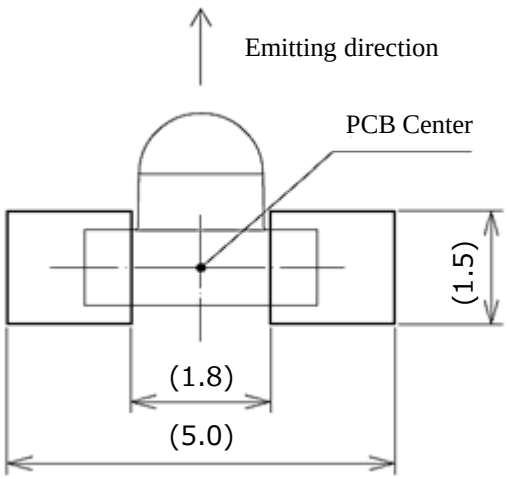


Top view Side view Bottom view

No.	Part name	Materials	Qty.
①	LED die	−	1
②	Lens	Epoxy resin	1
③	Substrate	Glass fabrics	1

Recommended pad

Unit : mm



Recommended solder mask thickness : 0.15

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Specifications

【 Absolute maximum ratings 】

Item	Symbol	Maximum ratings	Units	
Operating temperature	T_{opr}	-40 to + 85	℃	Note 1
Storage temperature	T_{stg}	-40 to +100	℃	Note 1
Forward current	I_F	50	mA	
Forward current derateing factor from 25℃	ΔI_F	0.67	mA/℃	
Peak forward current (0.1msec pulse 1/100duty)	I_{FRM}	300	mA	
Peak forward current derateing factor from 25℃ (0.1msec pulse 1/100duty)	ΔI_{FRM}	4	mA/°C	
Reverse voltage	V_R	5	V	

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

【 Electro and optical characteristics 】

(Ta=25℃)

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
Forward voltage	V_F	I_F = 20mA	1.08	1.22	1.37	V
Reverse current	I_R	V_R = 5V	-	-	10	μA
Capacitance	C_O	V = 0V, f = 1MHz	-	16	-	pF
Radiant intensity	I_E	I_F = 20mA	2.7	4.0	5.7	mW/sr
Radiant flux	Φ_E	I_F = 20mA	-	5.0	-	mW
Peak wavelength	λp	I_F = 20mA	927	940	954	nm
Spectral line half width	Δλ	I_F = 20mA	-	50	-	nm
Half intensity angle	$2\theta_{1/2}$	I_F = 20mA	-	35	-	deg.
Response time (rise)	tr	I_F = 20mA	-	1	-	μs
Response time (fall)	tf	I_F = 20mA	-	1	-	μs
Cut-off frequency	fc	$I_F = 20mA_{DC} + 10mA_{p-p}$ -3dB from 0.1MHz	-	0.5	-	MHz

Specifications

【 Sorting chart for radiant intensity 】

LEDs shall be sorted out into the following two ranks of Radiant intensity .

Rank	Radiant intensity (mW/sr)		Conditions
	Min.	Max.	
A	2.7	3.4	I_F =20mA Ta=25℃
B	3.4	5.7	

Measurement tolerance : ±10%

【 Shipment 】

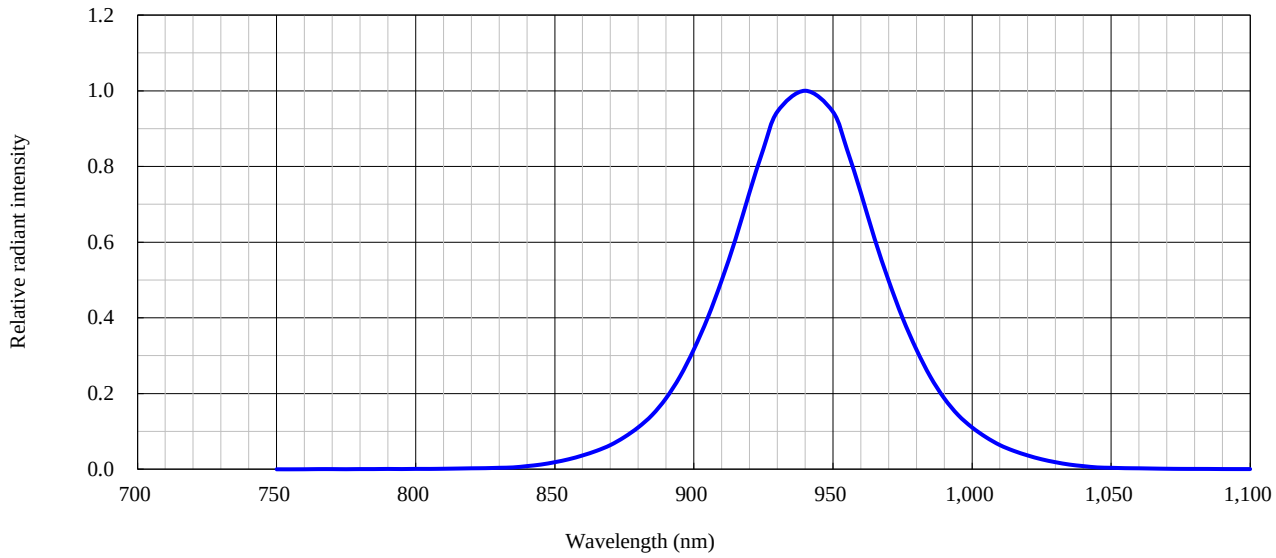
The each shipping lot shall consist of mixed rank (A, B) and the quantity of LEDs in each rank can not be specified.

Technical data

TAN110EF-TR

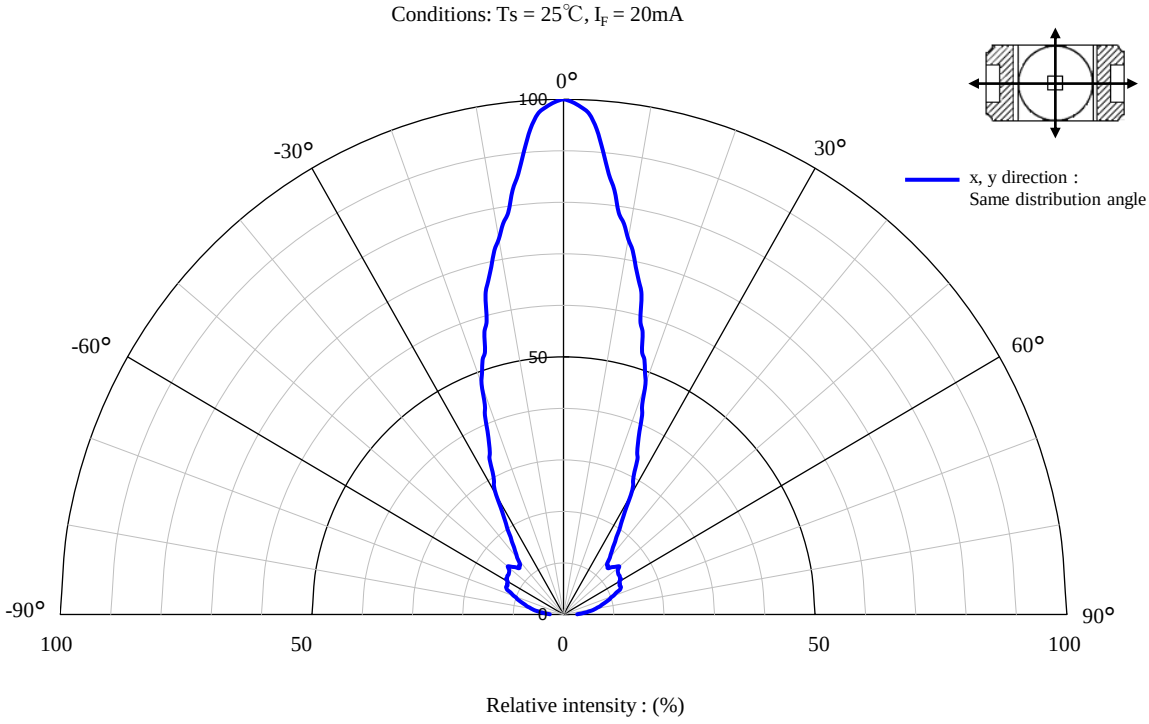
Relative radiant intensity vs. Wavelength

Conditions: Ts = 25℃, I_F = 20mA



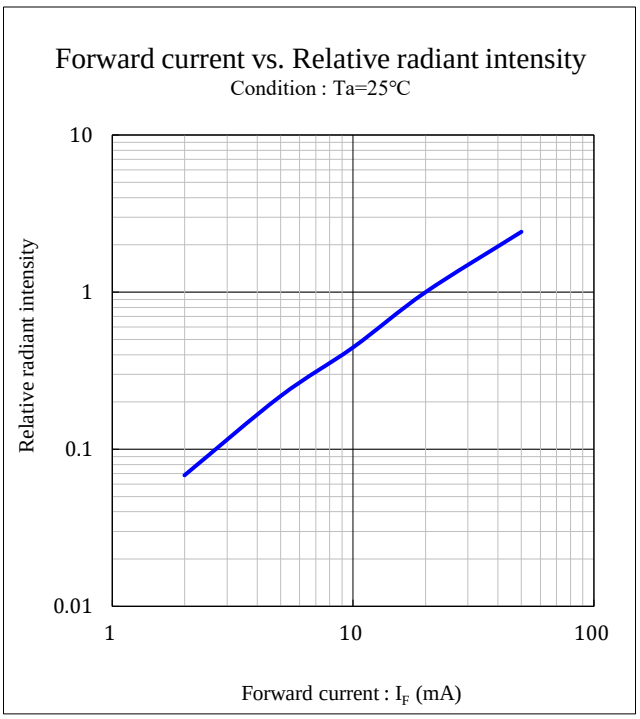
Spatial distribution

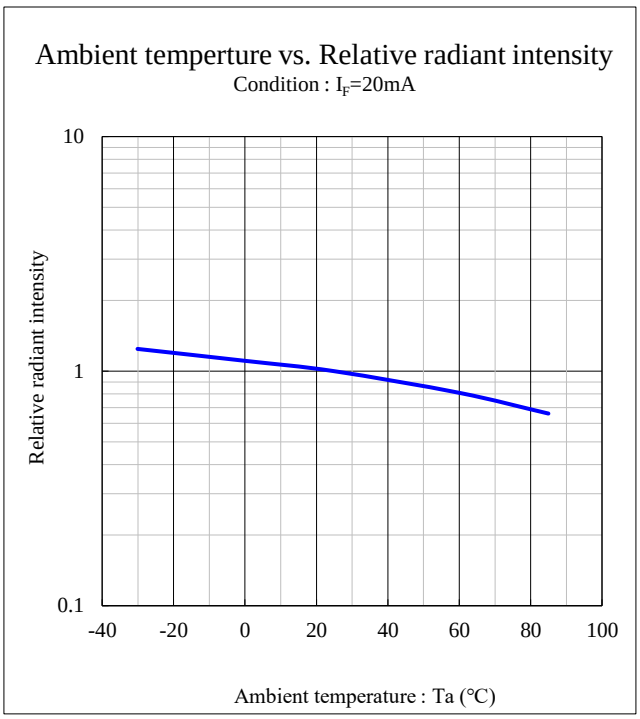
Conditions: Ts = 25℃, I_F = 20mA

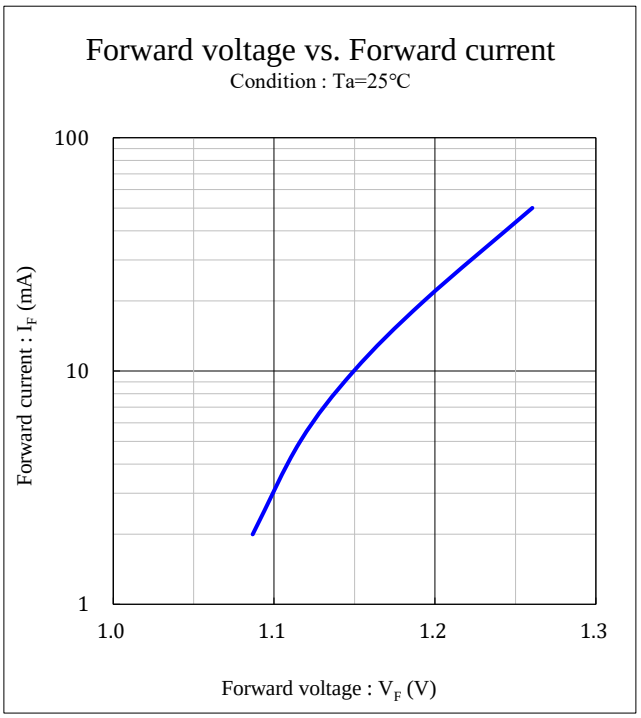


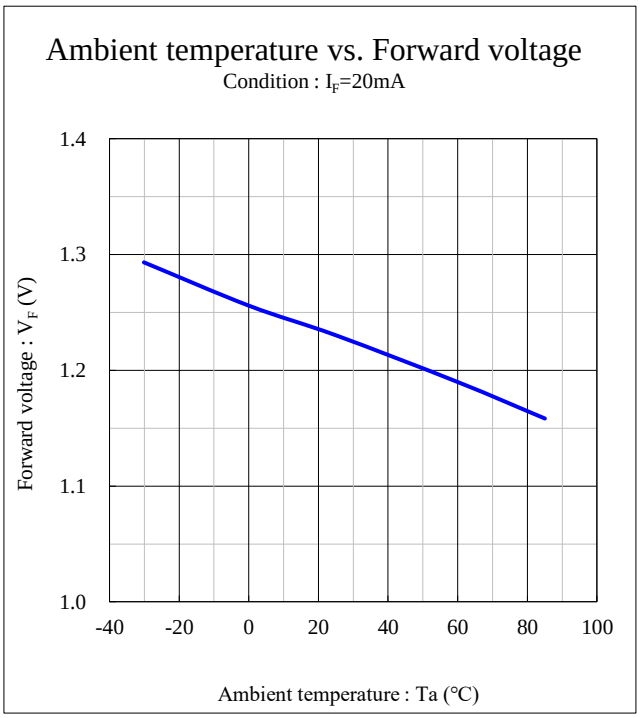
Technical data

TAN110EF-TR









Technical data

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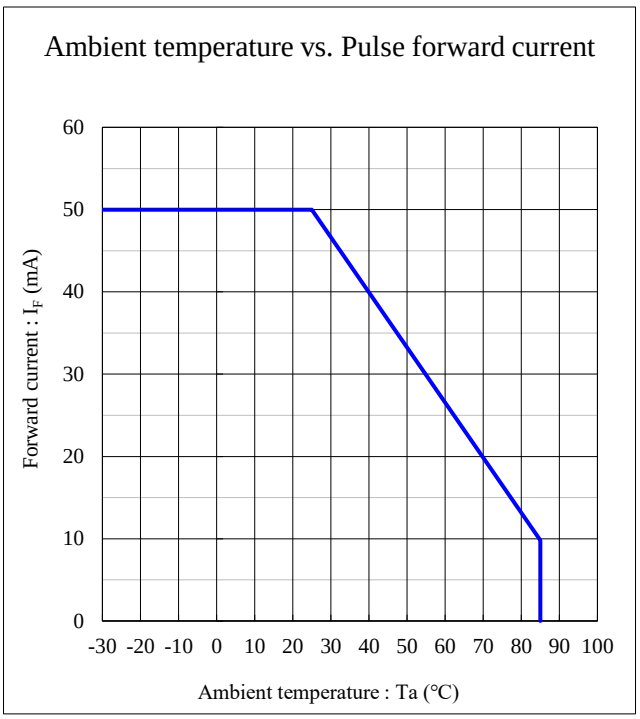

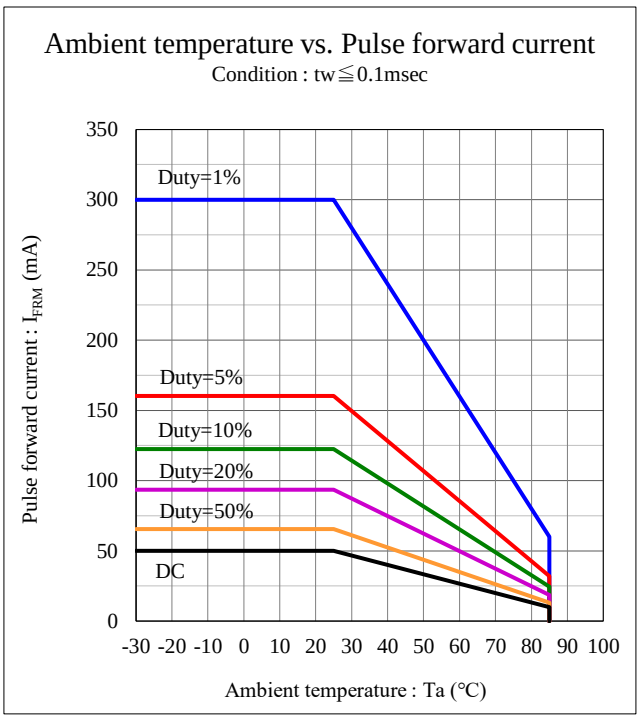

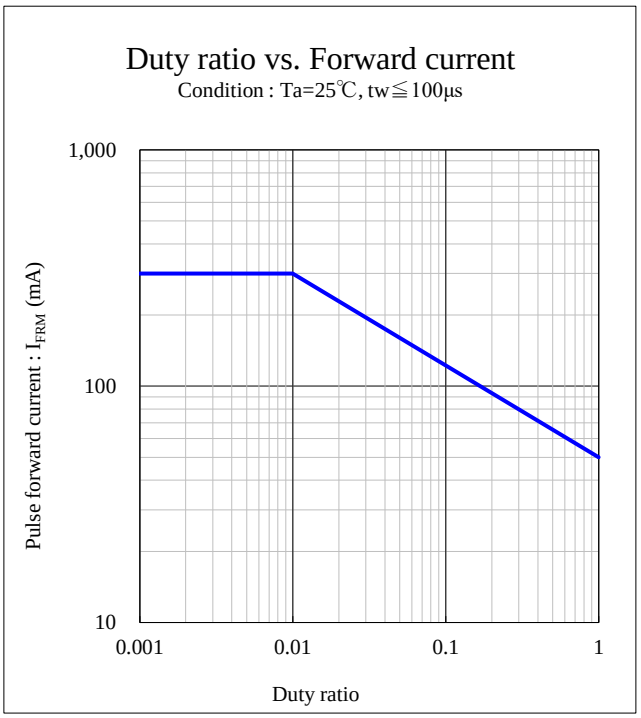

Technical data

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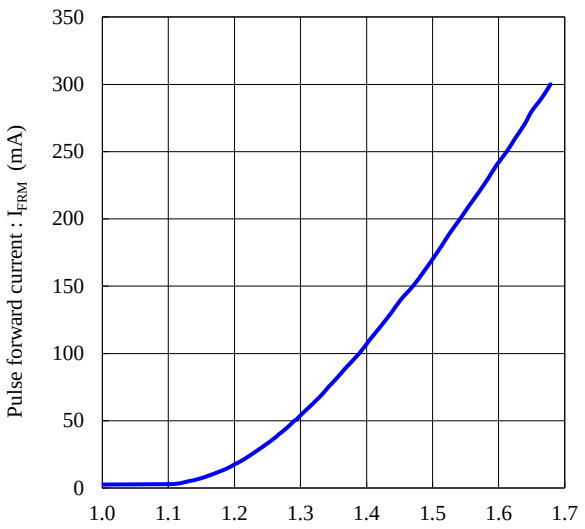
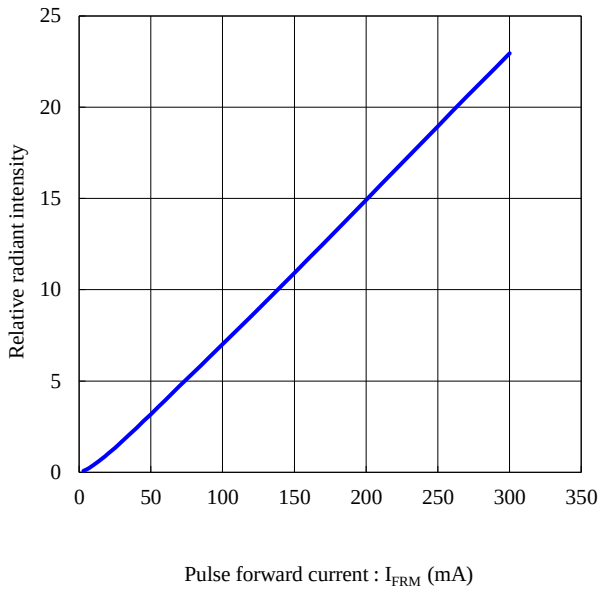
Pulse forward voltage vs. Pulse forward current

Condition:Ta=25℃, tw≦100μs, Duty≦1/100



Pulse forward current vs. Relative radiant intensity

Condition : tw≦100μs, Duty≦1/100, Ta=25℃



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Soldering condition

【Soldering precaution】

(acc.to EIAJ-4701/300)

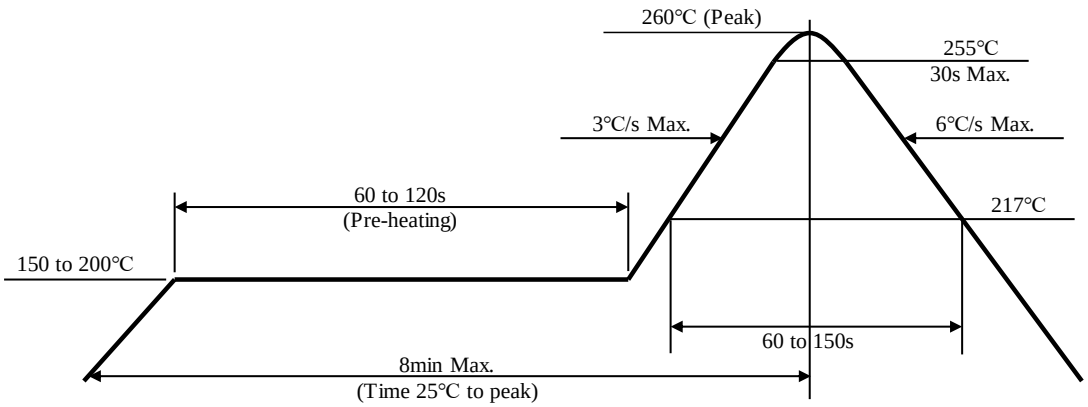
1. Heat stress during soldering will influence the reliability of LEDs, however that effect will vary on heating method. Also, if components of varying shape are soldered together, it is recommended to set the soldering pad temperature according to the component most vulnerable to heat (e.g., chip type LED).

2. The LEDs constituent parts, including the resin, do not stabilize immediately after 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. Temperature profile for the Reflow soldering is listed as the temperature of the resin surface. Temperature distribution varies on heating method, PCB material, other components in the assembly, and mounting density. Typically, when FR-4 PCB is mounted with one LED and heated via far infrared and hot air, the difference in temperature between PCB and LED resin will be around 5 to 10℃. Please do not repeat the heating process in Reflow process more than two times.

This product is equipment to MSL4 according to IPC/JEDEC J-STD-020F.

【 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

4. As manual soldering. Please heat the solder pad, should not contact a tip of iron to a product (especially resin). After soldering, any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temp. Mounting with the flow solder is not applied and do not execute it.

【Manual soldering condition】

Temperature of Iron tip	350℃ Max.
Soldering duration, time	3sec.Max.,1 time

5. When using adhesive material for tentative fixatives, thermosetting resin or Ultraviolet radiation(UV) setting resin with heat shall be recommended.《The curing condition, Temperature:150℃Max./Time:120sec.Max.》

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. 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

【For electrostatic discharge (ESD)】

LED with an InGaN 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 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 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 precaution

【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 failing due to excess 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 igniting due to excess current.

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

7. Please check the actual performance in the assembly because the Specification Sheets are described for LED device only.

8. 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.

9. 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.

10. 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).

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Packaging specifications

Product is shipped in moisture-proof packaging 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 70%

In the case of the package unopened , 12 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-020F MSL 4. (72 hours)

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: 23h(Min.) 48h(Max.), 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.

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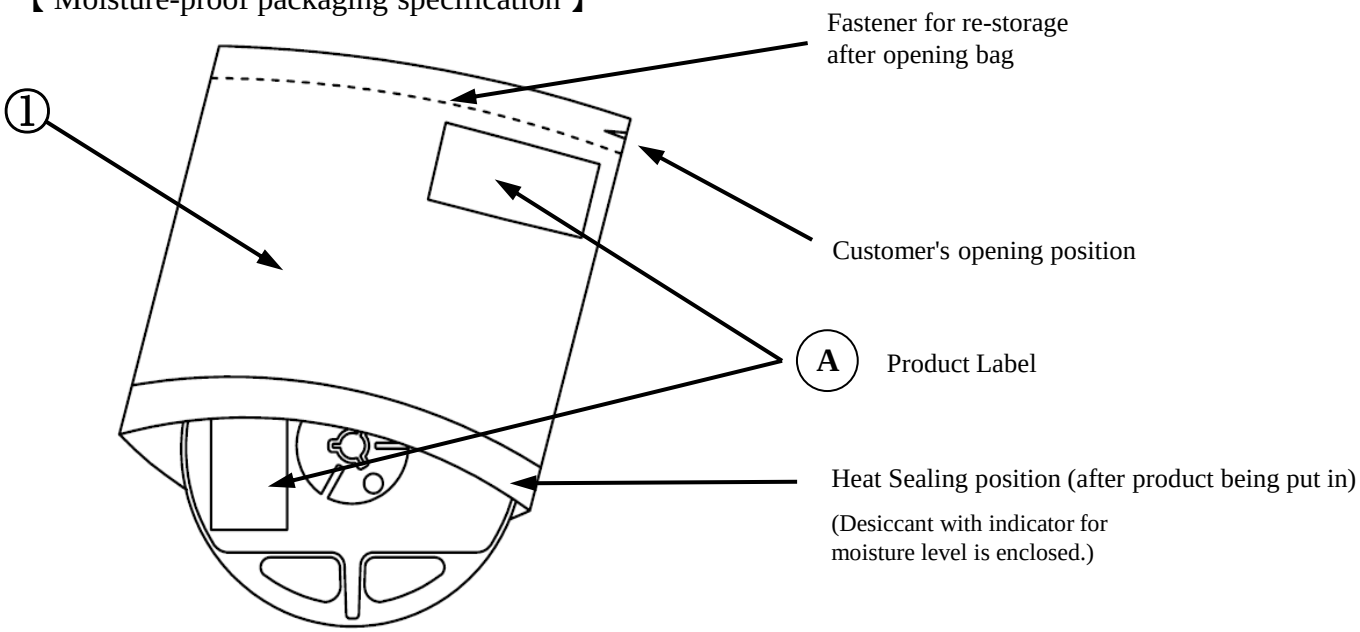
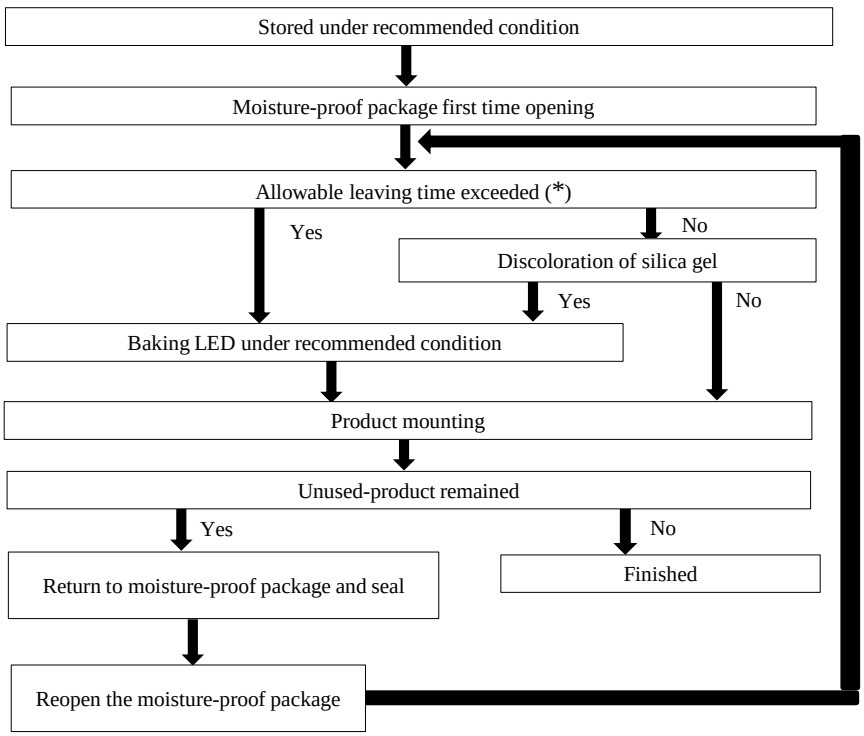
Packaging specifications

【 Moisture-proof packaging specification 】



No.	Part name	Matelrial	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

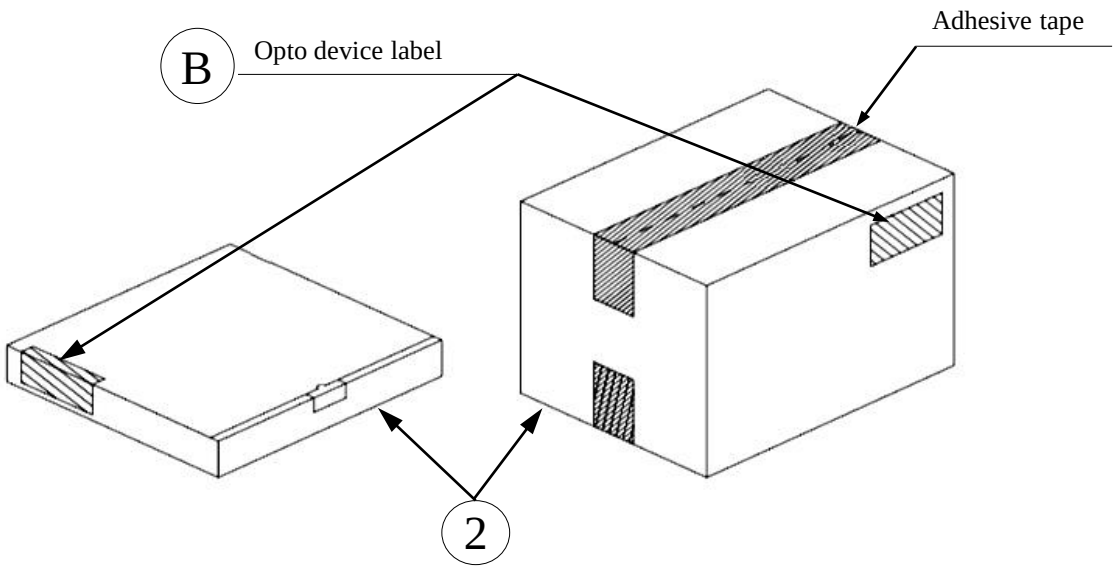
【Packing box】

(RoHS / ELV Compliant)

Box type	Outline dimension L × W × H (mm)	Capacity of the box
Type A	280 × 265 × 45 (mm)	3 reels
Type B	310 × 235 × 265 (mm)	15 reels
Type C	440 × 310 × 265 (mm)	30 reels
Type D	305 × 270 × 65 (mm)	3 reels
Type E	370 × 280 × 270 (mm)	30 reels
Type F	530 × 380 × 270 (mm)	60 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 , 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

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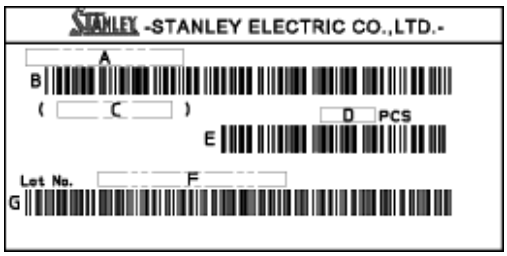
【Label specification】
(acc.to ISO/IEC 16388)

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

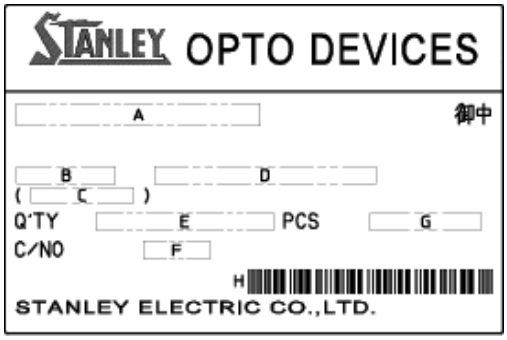
E. Bar-code for packed parts quantity

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 ISO/IEC 16388)

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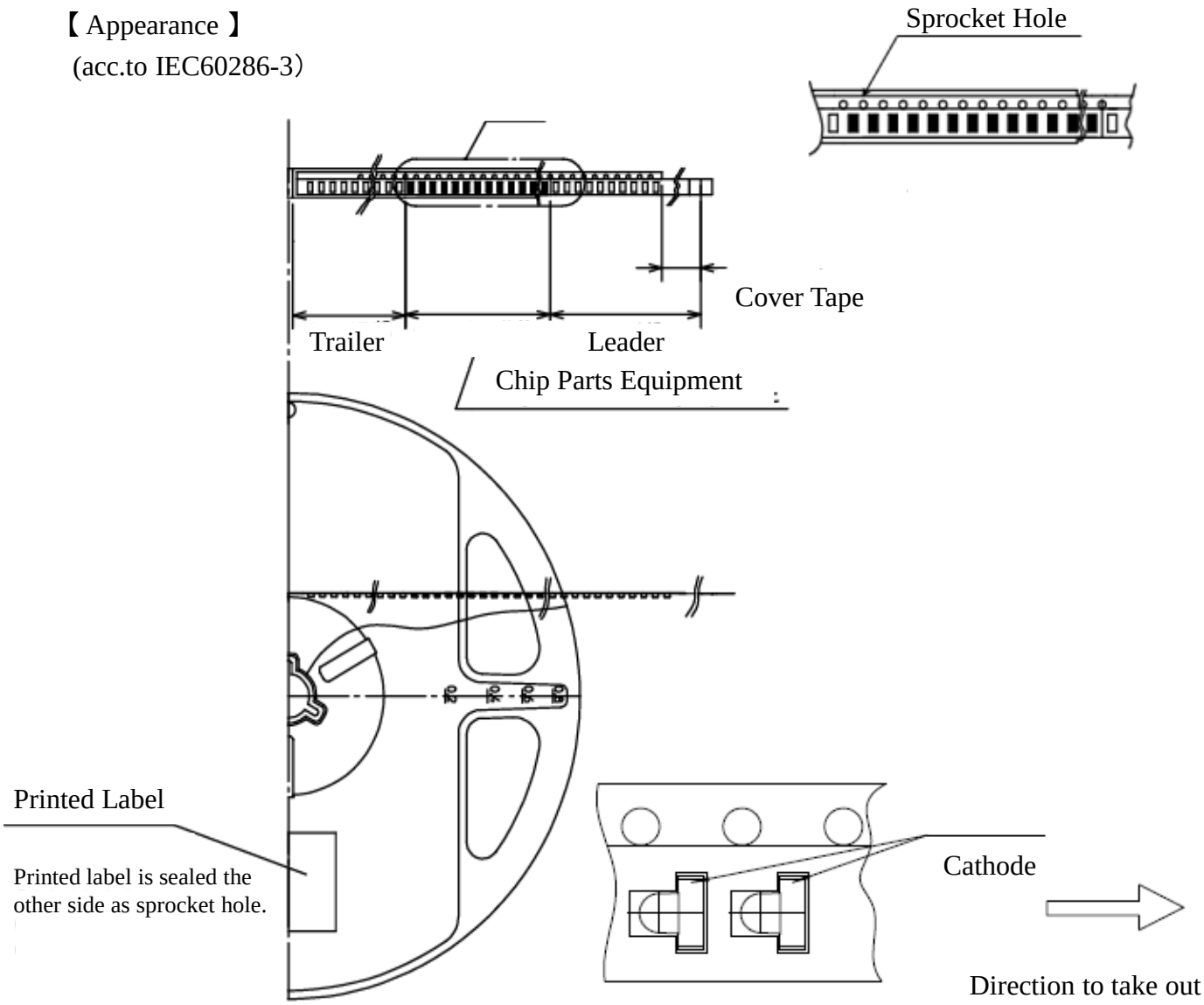
Taping and reel specifications

【Appearance】
(acc.to IEC60286-3)



"-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.

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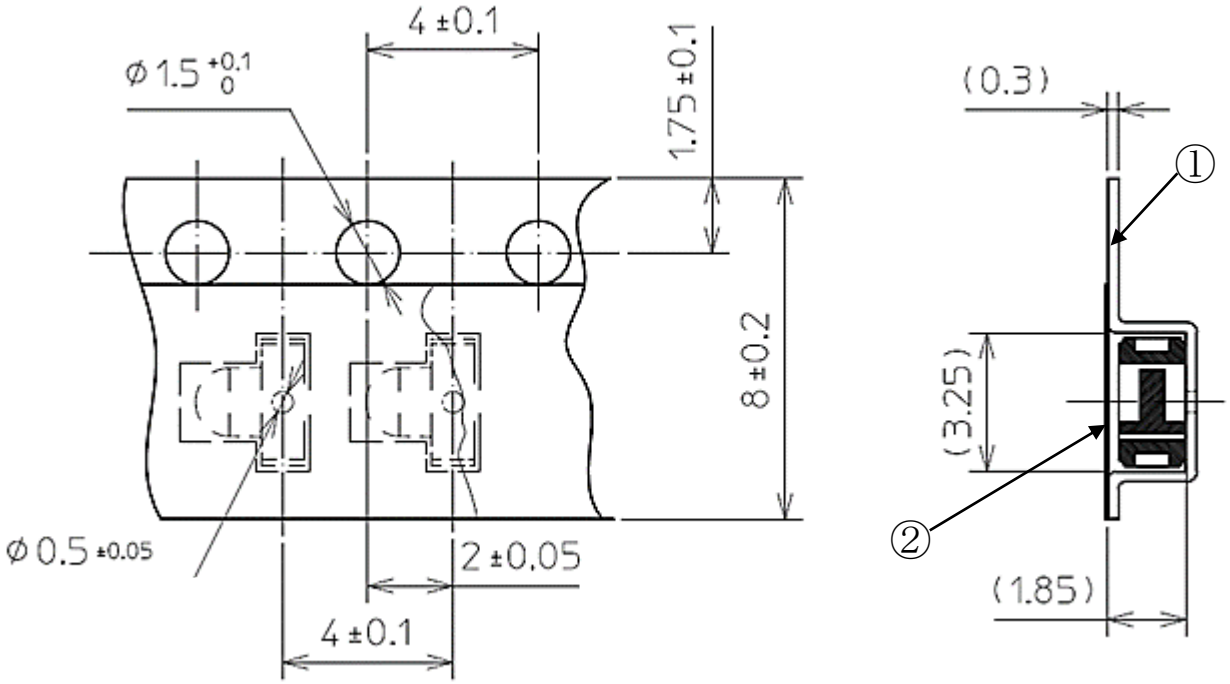
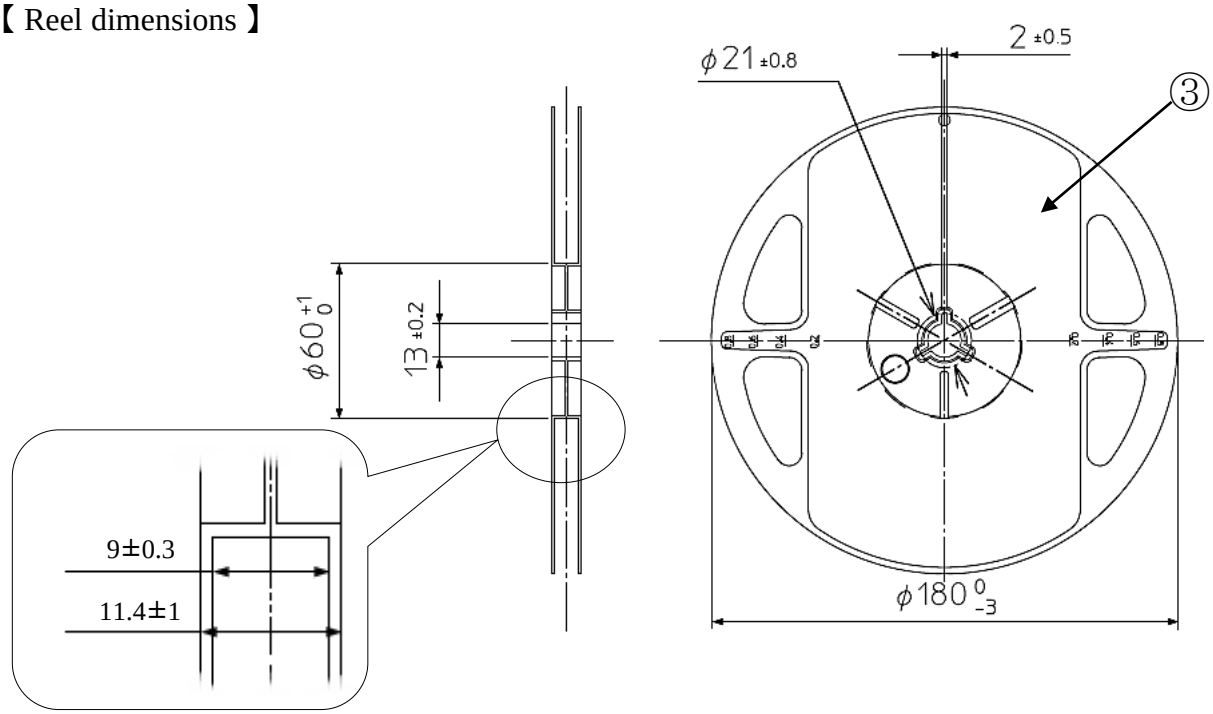
Taping and reel specifications

【 Taping dimensions 】

(acc.to IEC60286-3)



【 Reel dimensions 】



NO.	Part name	Remarks
①	Carrier tape	with ESD protection
②	Cover tape	with ESD protection
③	Carrier reel	with ESD protection

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Taping and reel specifications

(acc.to IEC60286-3)

【 Qty. per Reel 】

2000parts/reel
Minimum Qty. per reel might be 500 parts when getting less than 2000 parts. In such case, parts of 500-unit-qty. shall be packed in a reel and the qty. shall be identified on the label.

【 Mechanical Strength 】

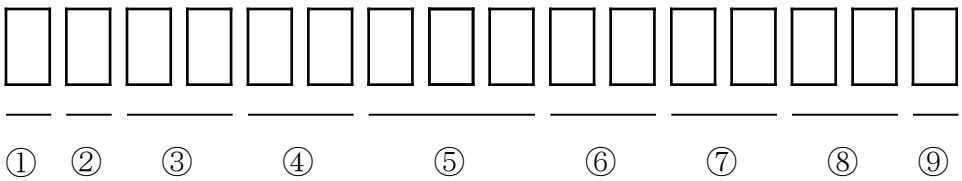
Cover-tape adhesive strength shall be 0.1～1.0N (An angle between carrier-tape and cover-tape shall be170 deg.)
Both tapes shall be so sealed that the contained parts will not come out from the tape when it is bent at a radius of 15mm.

【 Others 】

Reversed-orientation, Up-side down placing, side placing and out of spec. parts mixing shall not be held.
Max qty. of empty pocket per reel shall be defined as the following.

Qty./reel	Max. qty. of empty pocket	Remarks
500	1	-
1,000	1	-
1,500	1	-
2,000	2	No continuance

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, ･･･)

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 : Radiant intensity Ie rank

(If radiant intensity 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 : Option Rank (If rank is not defined, "-" is described.)

Correspondence to RoHS / ELV instruction

TAN110EF-TR

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	Test condition	Duration	Failure
Operating life	Ta=25℃ I_F=50mA	1,000h	0 / 20
High temperature operating life	Ta=85℃ I_F=10mA	1,000h	0 / 20
Low temperature operating life	Ta=−40℃ I_F=50mA	1,000h	0 / 20
Wet high temperature operating life	Ta=60℃ Rh=90% I_F=27mA	1,000h	0 / 20
Thermal shock	Ta=−40℃ (15min.) to 100℃ (15min.)	200 cycles	0 / 20
Resistance to reflow soldering	Moisture Soak：30℃ 70% 72h Preheating ：150 to 180℃ 120sec Max. Soldering：230℃ 40sec Max., 260℃ 5sec Max.	5times	0 / 20
Electrostatic discharge	HBM:C=100pF R2=1.5kΩ ±2,000V	3times	0 / 10
Gas exposure test	H_2S (2ppm) / NO_2 (4ppm), Ta=40℃, 75%RH	96h	0 / 40

2. Failure criteria

Item	Symbol	Condition	Failure criteria
Radiant intensity	I_E	I_F=20mA	Testing min. value ＜ Initial value × 0.5
Forward voltage	V_F	I_F=20mA	Testing max. value ≧ Initial value × 1.2
Reverse current	I_R	V_R=5V	Testing max. value ≧ Initial value × 2.5
Appearance	-	-	notable, discoloration, deformation and cracking

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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.

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7) The most updated edition of this data sheet can be obtained from the address below:
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