

Part No. E1S72-YWSH0-15	Drawn	<i>Kinji Hayashi</i>
	Engineering Div. I	<i>Shota Shimomishi</i>
	Quality Control Div.	<i>Kazuhiko Sakai</i>

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Revision	Date	Note

1. Product Name TG WHITE Hi LED

2. Luminous Element GaN

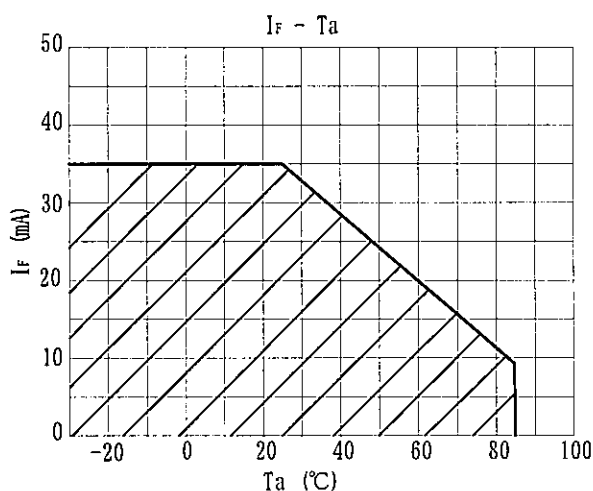
3. Application Backlight



4. Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

Item	Symbol	Value	Unit
Power Dissipation	P_D	210	mW
DC Forward Current	I_F	35	mA
DC Forward Current reduction (*1)	ΔI_F	-0.43	mA/ $^{\circ}\text{C}$
Pulsed Forward Current (*2)	I_{FP}	80	mA
Reverse Voltage	V_R	10	V
Operating Temperature	T_{opr}	-30 ~ +85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-40 ~ +100	$^{\circ}\text{C}$

(*1) $T_{opr}=25\sim 85^{\circ}\text{C}$ Use under these conditions below.



(*2) Duty 1/10, Pulse Width 10msec.

5. Electrical/Optical Characteristics ($T_a=25^{\circ}\text{C}$)

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Forward Voltage(*3)	V_F	$I_F=20\text{mA}$	5.5	—	5.8	V
Reverse Current	I_R	$V_R=10\text{V}$	—	—	2.0	μA
Luminous Intensity (*4) (Axial Direction)	I_v	$I_F=20\text{mA}$	5350	—	6250	mcd
Chromaticity (*5) (Axial Direction)	x	$I_F=20\text{mA}$	Ranking table is applied			—
	y	$I_F=20\text{mA}$				
Electro-Static (*6) Discharge Threshold	ESD (HBM)	$1500\ \Omega \cdot 100\text{pF}$ (Forward/Reverse)	2000	—	—	V

(*6) Product resistance to electric discharge (ESD) according to HBM is defined as below.
The test procedure is performed on each die under the most appropriate ESD screening test condition.

Following Forward Voltage Ranking is applied ($I_F=20\text{mA}$)

Rank	Forward Voltage (V)
1	5.5 ~ 5.6
2	5.6 ~ 5.7
3	5.7 ~ 5.8

(*3) Forward Voltage measurement tolerance is $\pm 0.05\text{V}$

Following Luminous Intensity Ranking is applied ($I_F=20\text{mA}$)

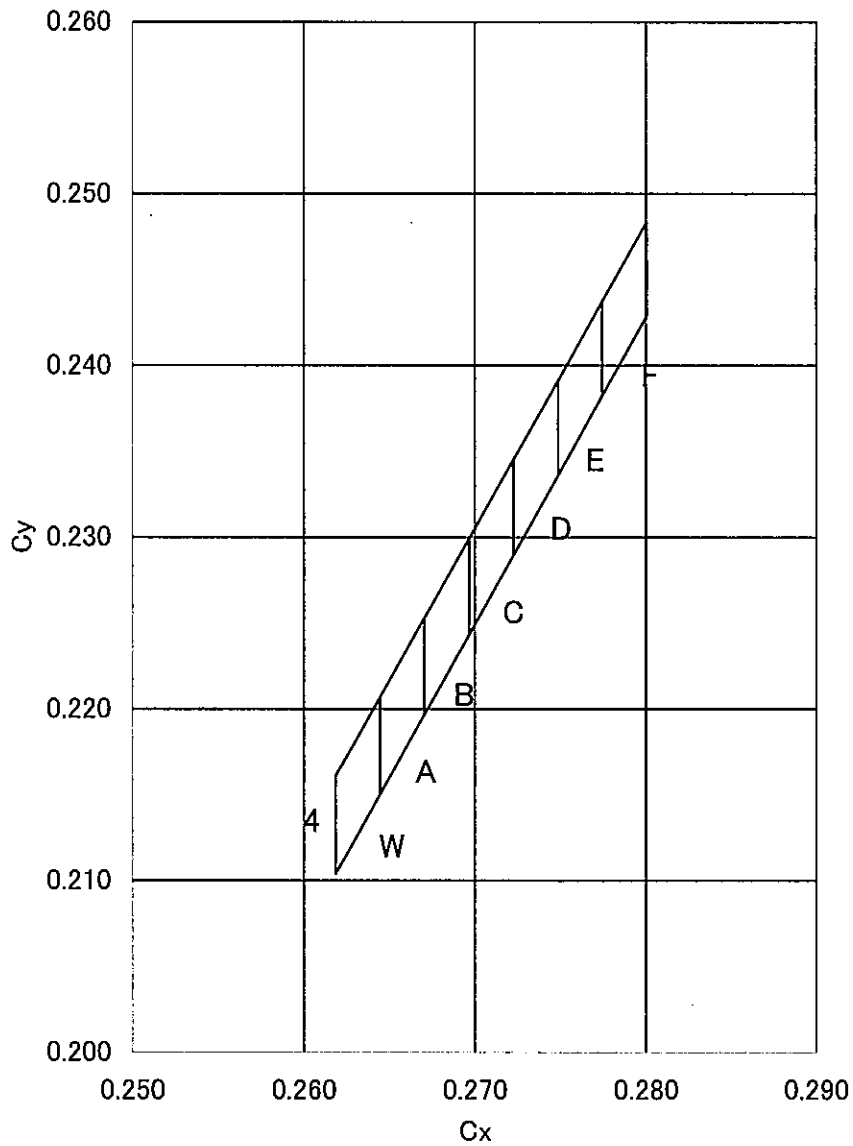
Rank	Luminous Intensity (mcd)
T	5350 ~ 5500
U	5500 ~ 5650
V	5650 ~ 5800
W	5800 ~ 5950
1	5950 ~ 6100
2	6100 ~ 6250

(*4) Luminous Intensity Measurement tolerance is $\pm 5\%$.

Following Ranking is applied ($I_F=20mA$)

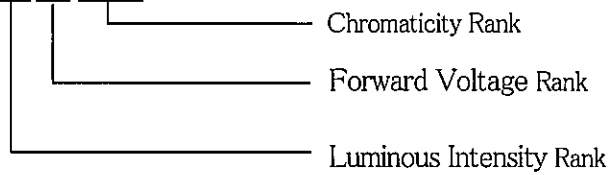
	W		A		B		C		D		E		F	
	x	y	x	y	x	y	x	y	x	y	x	y	x	y
4	0.2619	0.2161	0.2645	0.2207	0.2671	0.2253	0.2697	0.2299	0.2723	0.2345	0.2749	0.2391	0.2775	0.2437
	0.2619	0.2104	0.2645	0.2150	0.2671	0.2197	0.2697	0.2243	0.2723	0.2290	0.2749	0.2336	0.2775	0.2382
	0.2645	0.2150	0.2671	0.2197	0.2697	0.2243	0.2723	0.2290	0.2749	0.2336	0.2775	0.2382	0.2801	0.2429
	0.2645	0.2207	0.2671	0.2253	0.2697	0.2299	0.2723	0.2345	0.2749	0.2391	0.2775	0.2437	0.2801	0.2483

(*5) Color Coordinates Measurement tolerance is ± 0.005 .



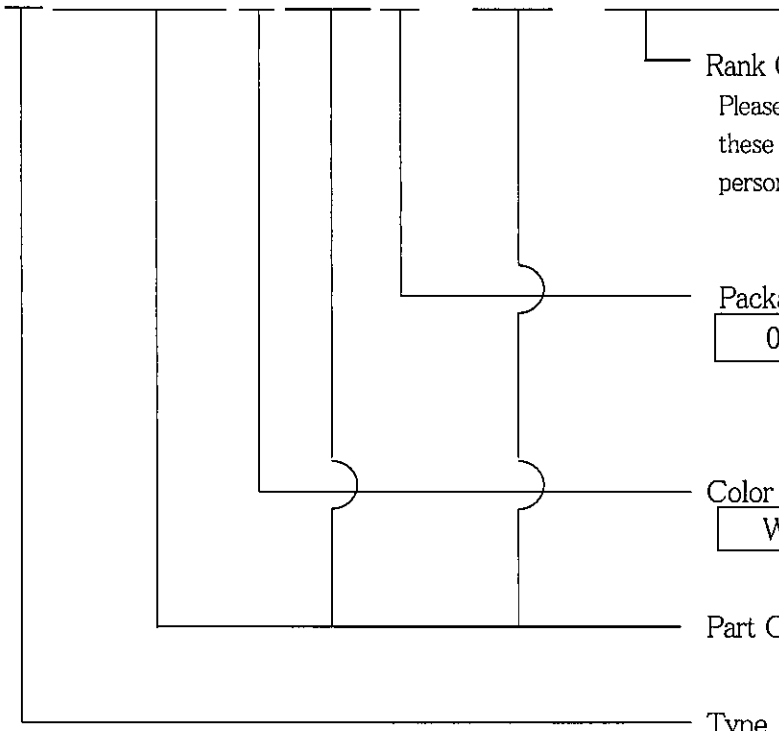
Rank Code

U 1 4 C



6. Part Number Formation

E 1 S 7 2 - Y W S H 0 - 1 5 U 1 4 C



Rank Code
Please refer to page 3 and 4, section 5 for these Rank codes. Please contact sales person, if you request to designable ranks.

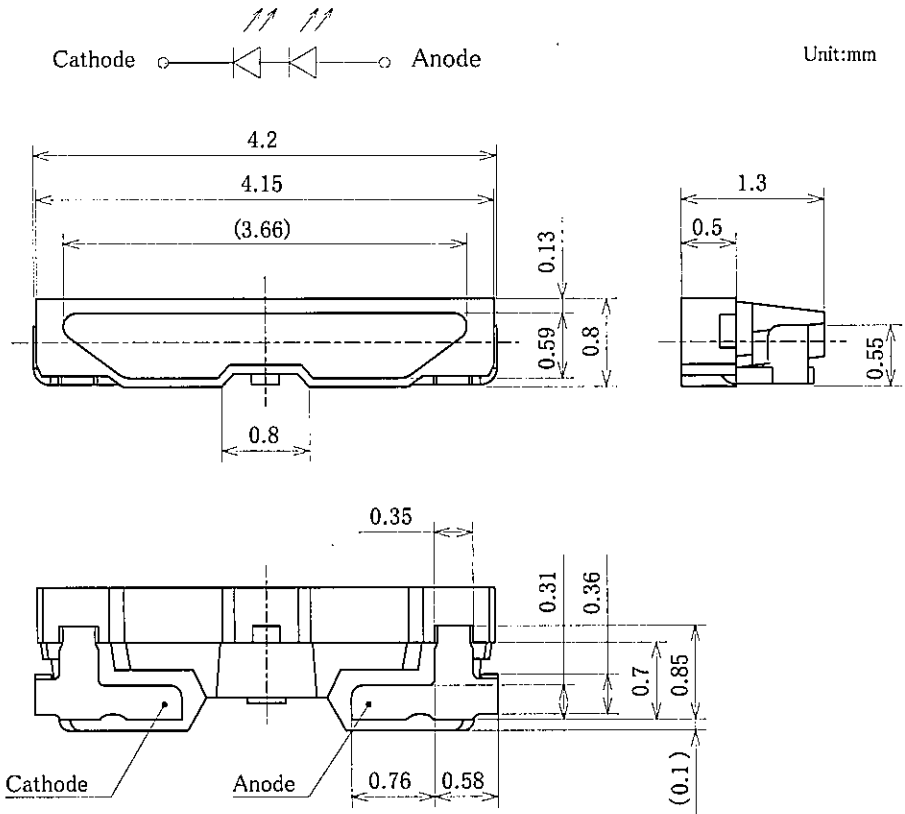
Package of Products
0 4000 pieces Taping

Color
W White

Part Code

Type
S CHIP LED

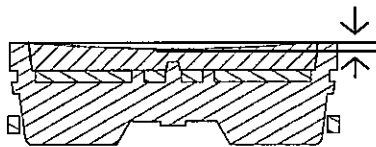
7. Outline Dimensions



Unit:mm

tem	Material
Package	Heat-Resistant polymer
Encapsulating resin	Silicone resin + phosphor
Lead frame	Cu Alloy + Ag Plating

(*9)



(*7) Reference value is given in parenthesis.

(*8) General tolerance : ± 0.1

The LED may have flash/flange which exceeds the tolerance of this print.

(*9) Emitting surface does not exceed the package. ($A > 0 \mu m$)

8. Results of Reliability Test

Test Item	Standard Test Method (*10)	Test Conditions	Result (*11)
Operation Test	—	$T_a=25^{\circ}\text{C}$, $I_F=35\text{mA}$, DC $t=1000\text{hrs.}$	0/20
Operation Test	—	$T_a=25^{\circ}\text{C}$, $I_F=20\text{mA}$, DC $t=1000\text{hrs.}$	0/20
High Temperature Operation Test	—	$T_a=85^{\circ}\text{C}$, $I_F=9\text{mA}$, DC $t=1000\text{hrs.}$	0/20
High Temperature and High Humidity Operation Test	—	$T_a=60^{\circ}\text{C}$, $\text{RH}=90\%$, $I_F=20\text{mA}$, DC $t=1000\text{hrs.}$	0/20
High Temperature Storage Test	ED-4701 200 201	$T_a=100^{\circ}\text{C}$, $t=1000\text{hrs.}$	0/20
Low Temperature Storage Test	ED-4701 200 202	$T_a=-40^{\circ}\text{C}$, $t=1000\text{hrs.}$	0/20
Temperature Cycle	ED-4701 100 105	$T_a=(-40^{\circ}\text{C}, 30\text{min.} \sim 25^{\circ}\text{C}, 5\text{min.}$ $\sim 100^{\circ}\text{C}, 30\text{min.} \sim 25^{\circ}\text{C}, 5\text{min.})$ $\times 100\text{Cy.}$	0/20
Thermal Shock Test	ED-4701 300 307	$T_a=(100^{\circ}\text{C}, 5\text{min.} \sim -40^{\circ}\text{C}, 5\text{min.})$ $\times 100\text{Cy.}$	0/20

(*10) Number : JEITA("The Japan Electronics and Information Technology Industries Association")standard methods are used.

(*11) Result above are obtained without damage by static electricity.

Criteria for Judging The Damage

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	V_F	$I_F=20\text{mA}$	—	U.S.L. $\times 1.2$ (* 12)
Reverse Current	I_R	$V_R=10\text{V}$	—	U.S.L. $\times 2.0$ (* 12)
Luminous Intensity	I_V	$I_F=20\text{mA}$	L.S.L. $\times 0.7$ (* 13)	—

(* 12) U.S.L. : Upper Standard Level

(* 13) L.S.L. : Lower Standard Level

9. Estimated lifetime

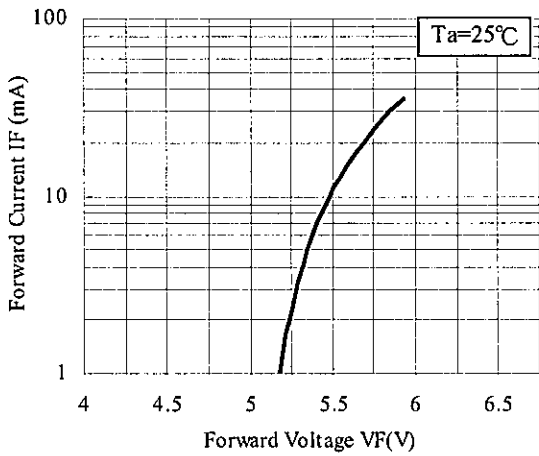
Item	Test Condition	Min.	Typ.	Max.	Unit
Life time (*14)	$T_a=60^{\circ}\text{C}$ $I_F=20\text{mA}$ $T_j \leq 70^{\circ}\text{C}$ (*15)	15000	—	—	hrs

(*14) Lifetime means that estimated time to 50% degradation to initial luminous intensity based on E1S72-YWSH0-15 in TOYODA GOSEI internal test results.

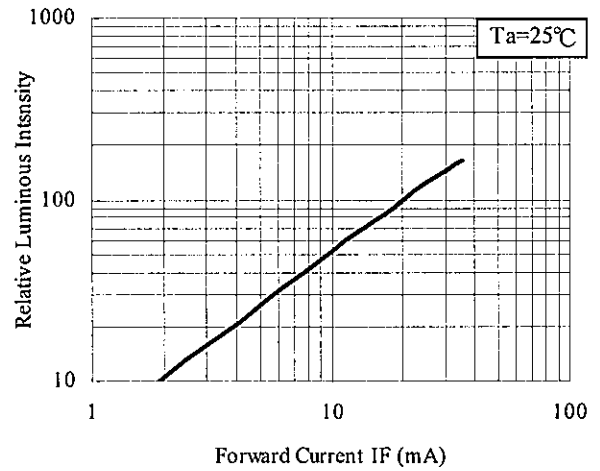
(*15) Estimated lifetime is based on a data with the test circuit board for E1S72-YWSH0-15.

10. Typical Characteristics

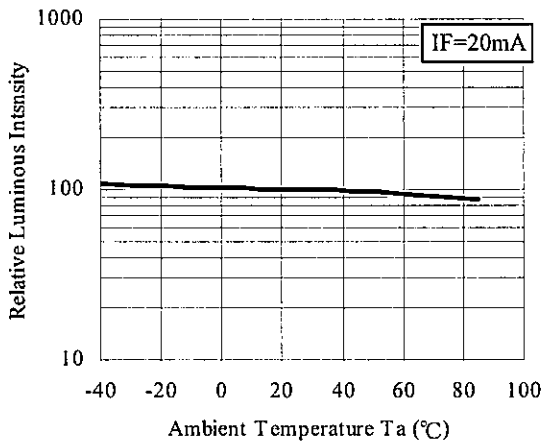
Forward Current vs. Forward Voltage



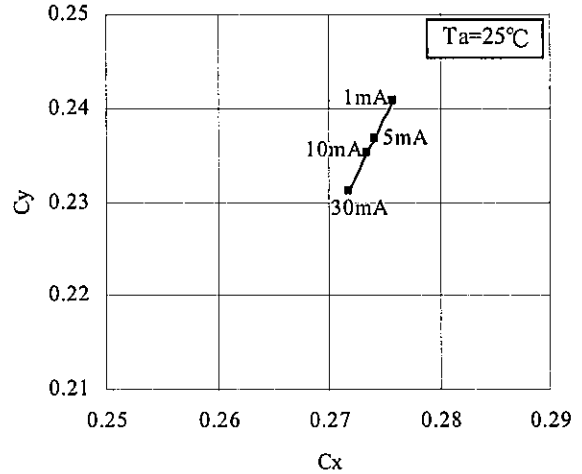
Relative Luminous Intensity vs. Forward Current



Relative Luminous Intensity vs. Ambient Temperature



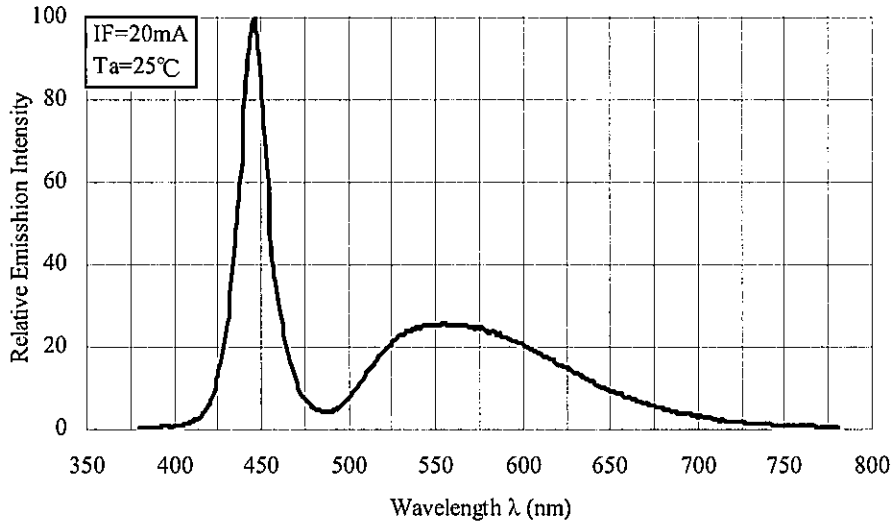
Chromaticity vs. Forward Current



The data shown above are example only and are not guaranteed value.

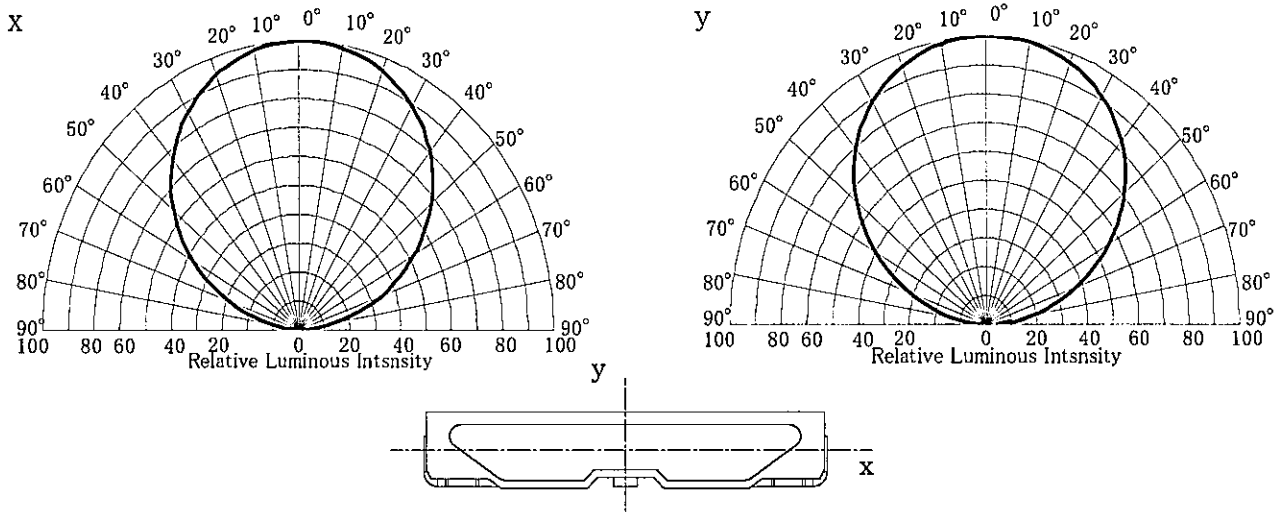
Part No. : E1S72-YWSH0-15

Spectrum



Directive Characteristics

Ta=25°C



The data shown above are example only and are not guaranteed value.

11. Shipping Package Style

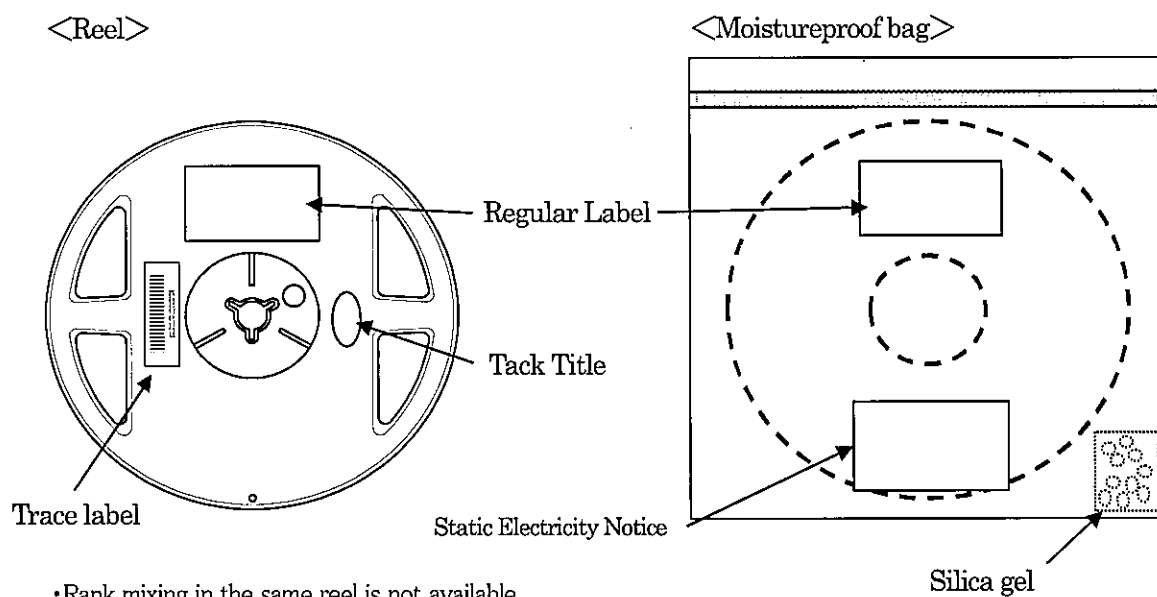
(1) Package

4000 pcs are packed in moisture proof foil bag and a label is affixed on each bag specifying Product name, Part Number, Lot Number and Quantity.

Reel packaging

Packaging : Moisture proof foil bag

Silica gel inside foil bag changes into pink when absorbing damp.

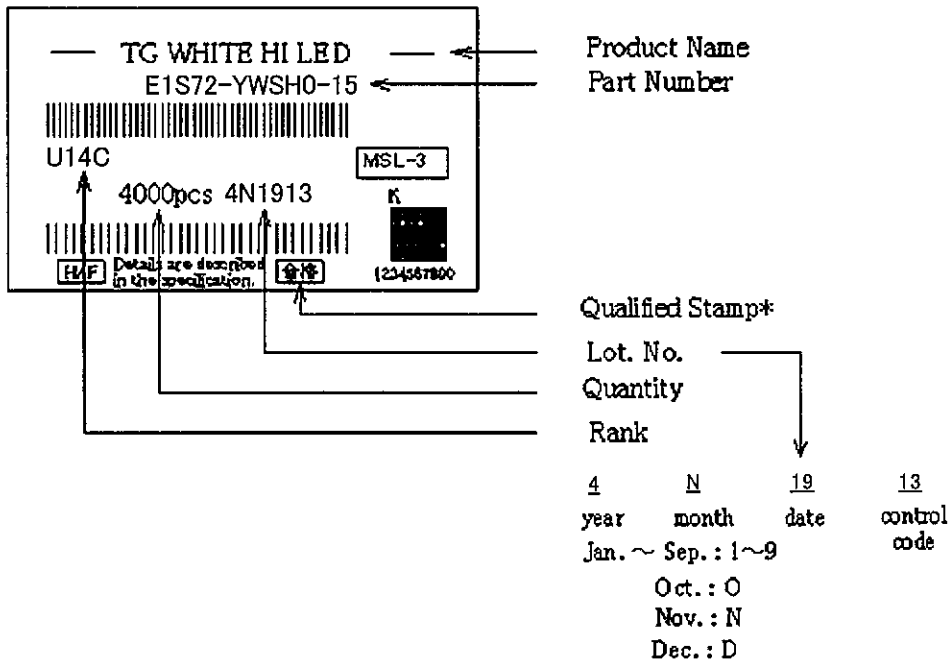


- Rank mixing in the same reel is not available.
- Fraction of reel and packing box is available.

(2) Label Formation

Regular Label

Product name, Part number, lot number, and quantity are shown as follows.



* Qualified Stamp is imprinted on a label on the bag only.

Static Electricity Notice Label

(注意)
本製品は静電気に対して敏感な製品であり、その取り扱いには十分な注意が必要です。特に、本製品に過電圧等が入った場合、そのエネルギーによって本製品にダメージ（破壊）を及ぼす場合があります。つきましては、本製品取り扱いの際は、万全なる静電気・サージ対策をおとり下さい。

(NOTICE)
This product is sensitive to static electricity and full care must be taken when handling product. In particular, if an over-voltage is applied, the energy from the over-voltage may result in damage or destruction of product. Buyer should take absolute secure countermeasures against static- and surge-electricity when handling product.
This product is covered by one or more U.S. patents.
See <http://toyodagosei-led.jp/about/>

ATTENTION
OBSERVE PRECAUTION
FOR HANDLING
ELECTRO STATIC
SENSITIVE
DEVICES
静電気注意

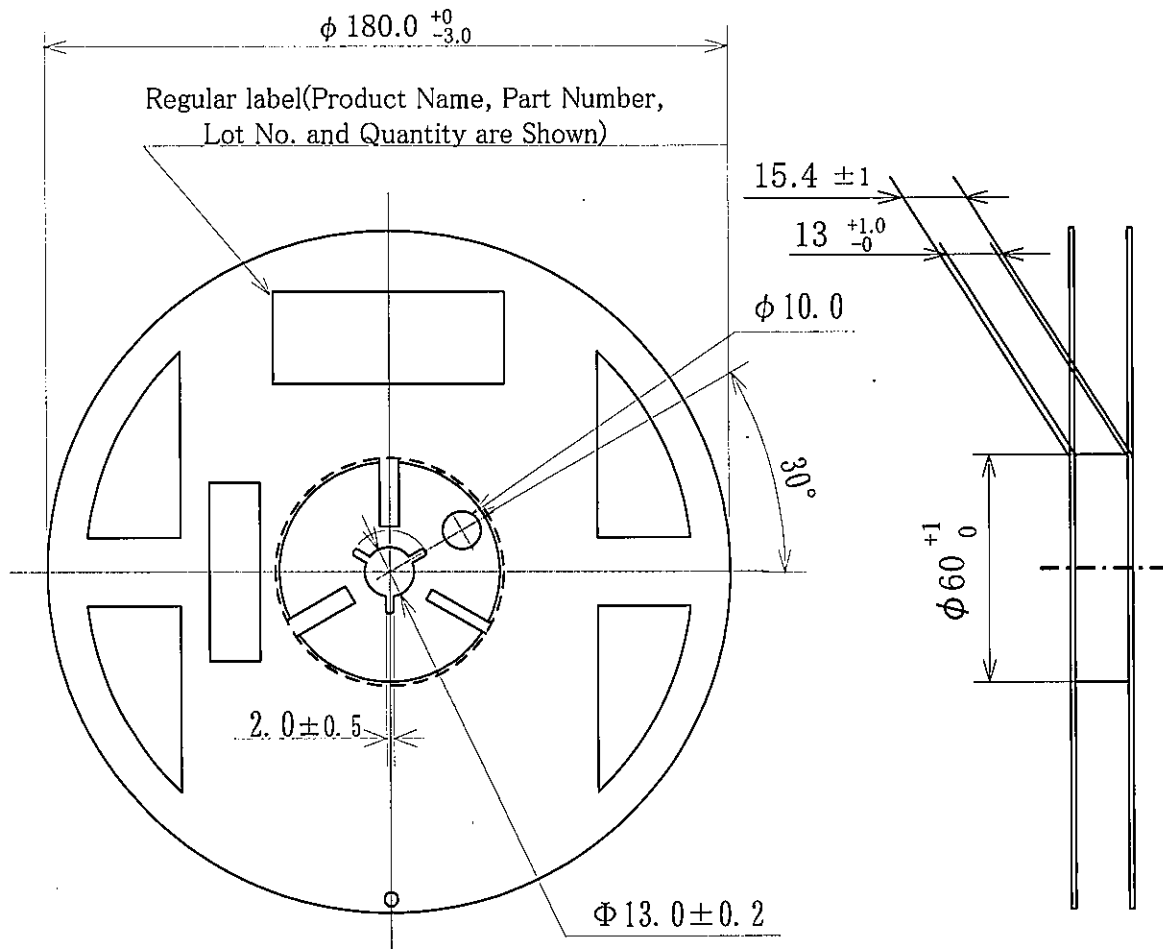
TOYODA GOSEI CO. LTD.

REV.2012/1

Part No. : E1S72-YWSH0-15

(4) Taping reel dimension

Unit : mm



(*22) Reel Standard Number: JEITA ET-7200C

12. PRECAUTIONS IN HANDLING

(1) Safety Precautions

- Do not look directly at the LED with unshielded eyes, or damage to the retina may result.

(2) Static Electricity

- These Products are sensitive to static electricity, a high standard of care must be used. Particularly if an over-current and over-voltage that exceeds the Absolute Maximum Rating of the Products is applied, the overflow in energy may cause damage to, or possibly result in destruction of, the Products. Do not touch directly any lead terminal of the Products with bare hands. Customer shall take absolutely secure countermeasures against static electricity and surge when handling Products.
- A protection device should be installed in the LED driving circuit, which does not exceed the max. rating for surge current during on/off switching.
- Proper grounding of Products (via 1 M Ω), use of conductive mat, semiconductive working uniform and shoes, and semiconductive containers are considered to be effective as countermeasures against static electricity and surge.
- A soldering iron with a grounded tip is recommended. An ionizer should also be installed where risk of static generation is high.
- If the countermeasures mentioned above are implemented, LED can work well. Customers are required to confirm those countermeasures when problems are caused by static electricity.

(3) Recommended Soldering Condition and Notice

When soldering chips LEDs, it is likely that the humidity within the resin may disturb the adherence of junction. The disturbance could influence the optical characteristics of products.

- When soldering, do not put stress on the LEDs.
- Handling after soldering must be done after products are cooled down to room temperature.
- Recommended soldering conditions are:

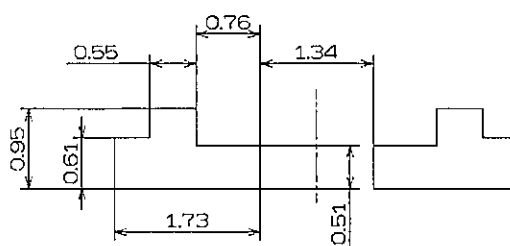
Reflow solder : Pre-heat is 175°C max., 80 sec. max.
 Peak temperature is 260°C max.,
 Reflow soldering should not be done more than two times.

Soldering iron : 350°C max., 3sec. max., one time only.

- Recommended Soldering Pattern (Reflow Soldering)

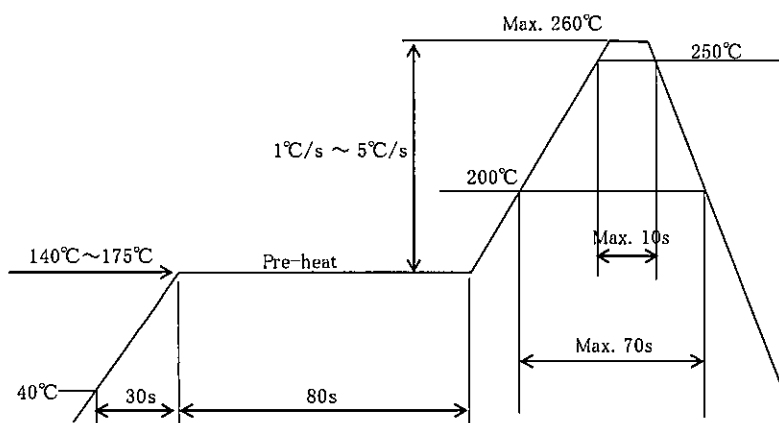
The dimension below does not warrant performance of LED placement on the board.

This dimension must be checked thoroughly before applying it to LED placement on the board.



Unit : mm

•Recommended Reflow Soldering Profile



(4) Storage

- The LEDs should be soldered within 7 days after opening the dump-proof package.
- After opening the bag once, fold the opening firmly and keep it no more than $25 \pm 5^\circ\text{C}$, 70%RH.
- Before opening the bag, the LEDs should be kept no more than $25 \pm 5^\circ\text{C}$ and 70%RH, and use within a year
- Lead frame is comprised of a silver plated copper alloy. The silver surface may be affected by environments which contain corrosive gases and so on. Please avoid conditions, which may cause the LED to corrode, tarnish or discolor. This corrosion or discoloration might lower solderability or might affect on optical characteristics.

(5) Baking

If the Product exceeded the storage time or the silica gel has changed its color from blue to pink, it is requested to make baking per following conditions.

Baking condition : $60^\circ\text{C} \times 12 \sim 24$ hours (One time only)

(6) Cleaning

- Do not wash the products in principle.
- If washing is required by a reason of the set, be sure to make it after the products are mounted (after reflowing) according to the following conditions.

(a) Please avoid to use organic solvents such as acetone. Organic solvents will damage the surface of the LED. Please refer to following solvents and conditions.

Solvent : Alcohol
 Temperature•Time : $50^\circ\text{Cmax.} \times 30$ sec. max. or
 $30^\circ\text{Cmax.} \times 180$ sec. max.

Ultrasonic : 300W max.

(b) When ultrasonic cleaning, please inspect before operation.

(c) Please avoid using a brush for cleaning.

13. MISCELLANEOUS

- (1) No license or right, expressed or implied, shall be granted.
- (2) The Products described in these Specifications are intended only for standard applications or general electronic equipment such as office equipment, communications, electronic instrumentation and household electrical appliances.

When they are used for transport equipment, disaster prevention and crime prevention equipment as well as other safety devices calling for high reliability and safety, Customers are requested to pay particular heed to the safety design of the equipment as a whole in terms of fail-safe design and redundant design to maintain the reliability safety of such equipment.

Do not use them for special applications (and such as aviation, space craft and life-sustaining equipment) which require exceptionally high reliability and safety, and if their failure or malfunction may threaten human lives or may detrimental to human bodies.

It is to be understood that the manufacturer shall not be held responsible for any damage incurred as a result of using the product for purpose which is not the standard the manufacturer has intended to be used for, unless the manufacturer articulate agrees to the no-standard use in writing.

- (3) Customers must comply with the laws and public regulations concerning safety.

The content of this Specification shall be deemed fully accepted by Customer either (1) upon execution hereof by the Customer or (2) if Customer does not advise Manufacture of any objections within two (2) weeks of the date of receipt of this Specification, whichever is the earlier. If Customer does advise Manufacturer of any objections within two (2) weeks of the date of receipt of this Specification, the parties shall negotiate an alternative acceptable to both parties, which alternative shall be deemed fully acceptable by Customer upon Customer's execution of the revised Specifications.

("Customer")

Company name

By (Signature)

Date

("Manufacture")

Company name

By (Signature)

Date

Company name

By (Signature)

Date