

	HL-470R3511	Spec. No.	HP-M508
	3mm ROUND ,COLORED TRANSPARENT	Part	LED

# SPECIFICATION

**CUSTOMER** : \_\_\_\_\_

**DEVICE NAME** : \_\_\_\_\_

**MODEL NO.** : \_\_\_\_\_


**ISSUED DATE** : \_\_\_\_\_

**[ CUSTOMER APPROVAL ]**

APPROVAL NO.				
APPROVAL DATE				
APPROVAL	INSPECTER	CHECK	APPROVAL	COMMENT

**[ SUPPLIER ]**

ISSUED DEPT.	ISSUE	REVIEW	REVIEW	APPR'D


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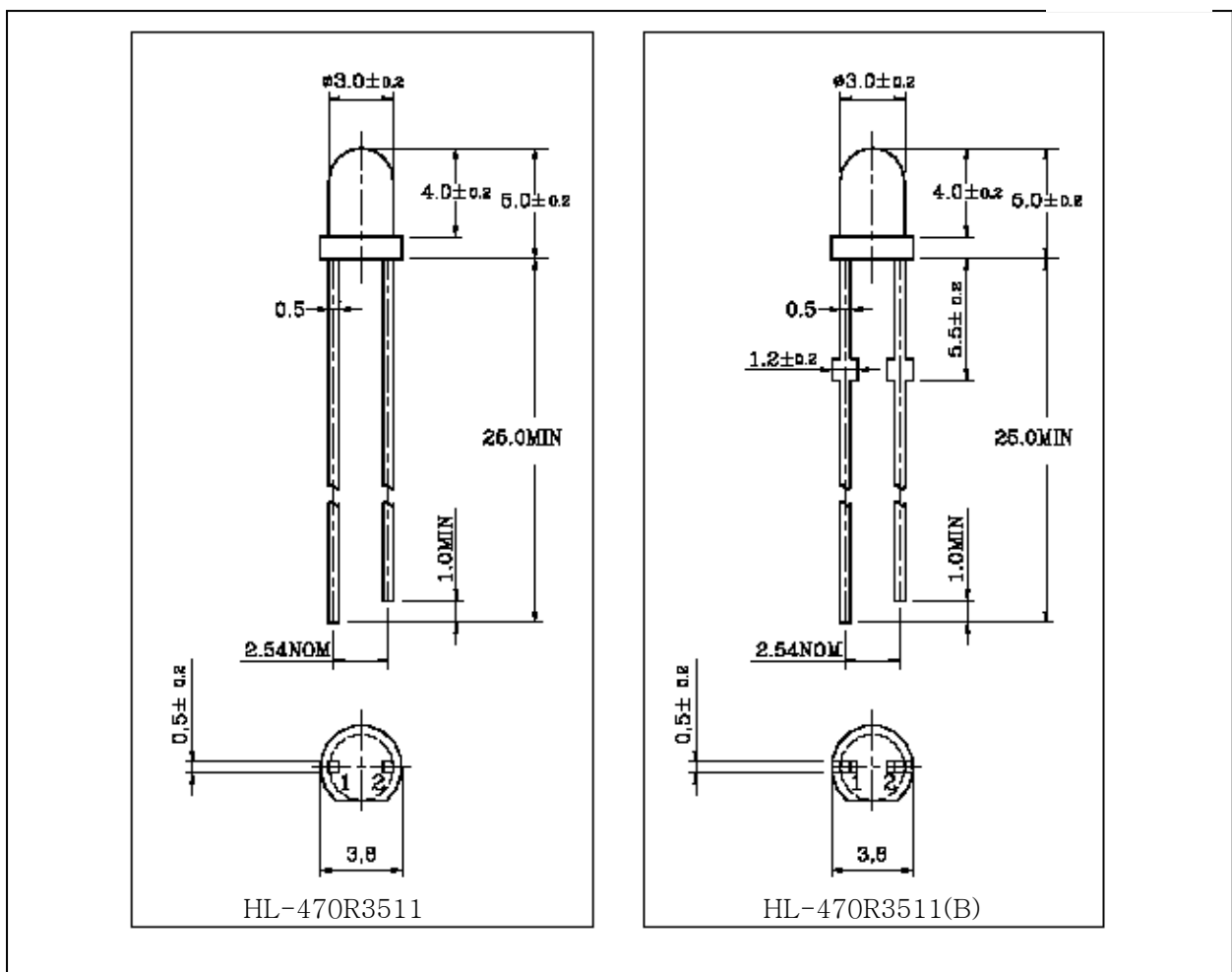
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### 1. FEATURES

- 3mm all epoxy resin mold type
- Colored Diffused Lens.
- Chip technology : InGaN
- Very High luminous Intensity
- Lambertian emitter( $\pm 35^\circ$ )
- Package size :  $\Phi 3 \times 5$
- Reliability test completion
- Through-Hole type

### 2. OUTLINE DIMENSIONS

(Unit : mm)



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### 3. SPECIFICATIONS

#### ■ Absolute Maximum Rating

(Ta=25°C)

Parameter	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	110	mW
Peak Forward Current ▶ <sup>1</sup>	I <sub>FP</sub>	80	mA
Reverse Voltage	V <sub>R</sub>	5	V
Forward Current	I <sub>F</sub>	30	mA
Operating Temperature	T <sub>opr</sub>	-25 to + 85	°C
Storage Temperature	T <sub>stg</sub>	-30 to + 90	°C
Soldering temperature	T <sub>sol</sub>	Dip soldering : 260°C, 5 sec Hand Soldering : 300°C, 3 sec	


▶ 1 : Duty Ratio ≤ 1/10, Pulse Width ≤ 10 msec

#### ■ Electro-Optical Characteristics

(Ta=25°C)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> =20 mA	-	3.0	-	V
Reverse Current	I <sub>R</sub>	V <sub>R</sub> =5V	-	-	10	μA
Luminous Intensity ▶ <sup>2</sup>	I <sub>V</sub>	I <sub>F</sub> =20 mA	-	900	-	mcd
Viewing Angle ▶ <sup>3</sup>	2θ <sub>1/2</sub>	I <sub>F</sub> =20 mA	-	±35	-	deg.
Wavelength	λ	I <sub>F</sub> =20 mA	465	-	475	nm

▶ 2 : Luminous intensity is measured with a light sensor and CIE eye-response curve filter combination. *Please refer to rank table.*▶ 3 : θ<sub>1/2</sub> is the off-axis angle at which the luminous intensity is half the peak intensity.

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#### 4. RANK TABLE

##### ■ Luminous Intensity( $I_V$ ) Ranks

(Ta=25°C)

Iv Rank	Condition	Min	Typ	Max	Unit
A	$I_F = 20\text{mA}$	900	-	1200	mcd

※ Measurement Uncertainty of the Luminous Intensity :  $\pm 10\%$

※ It can be changeable depend on customer's demand.


##### ■ Forward Voltage( $V_F$ ) Ranks

(Ta=25°C)

$V_F$ Rank	Condition	Min	Typ	Max	Unit
A	$I_F = 20\text{mA}$	2.8	-	3.0	V
B		3.0	-	3.2	
C		3.2	-	3.4	
D		3.4	-	3.6	

※ Measurement Uncertainty of the Forward Voltage :  $\pm 0.1\text{V}$

※ It can be changeable depend on customer's demand.

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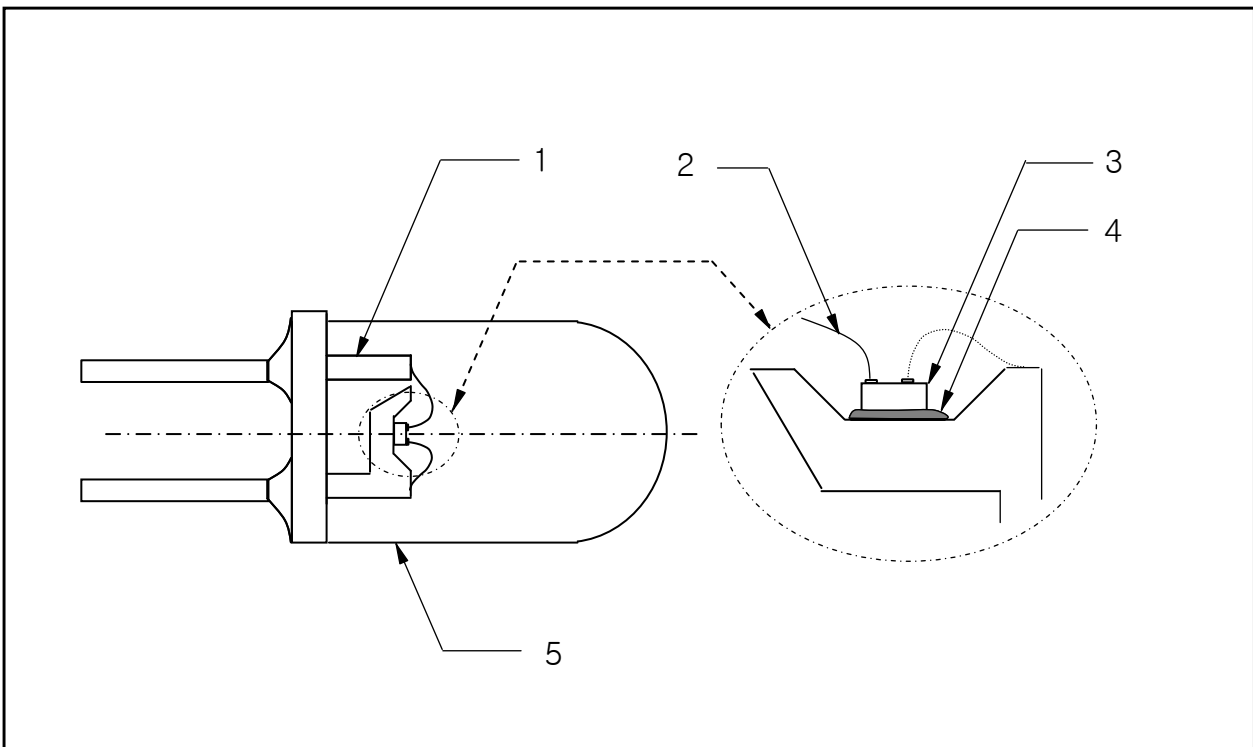
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## 5. COMPOSITION OF DEVICE

### A. MATERIALS OF PACKAGE

Number	Item	Material
1	Electrodes	Ag Plating Fe Alloy
2	Au Wire	1.0mil
3	LED Chip	InGaN
4	Die adhesive	Ag Epoxy
5	Mold epoxy	Epoxy Resin

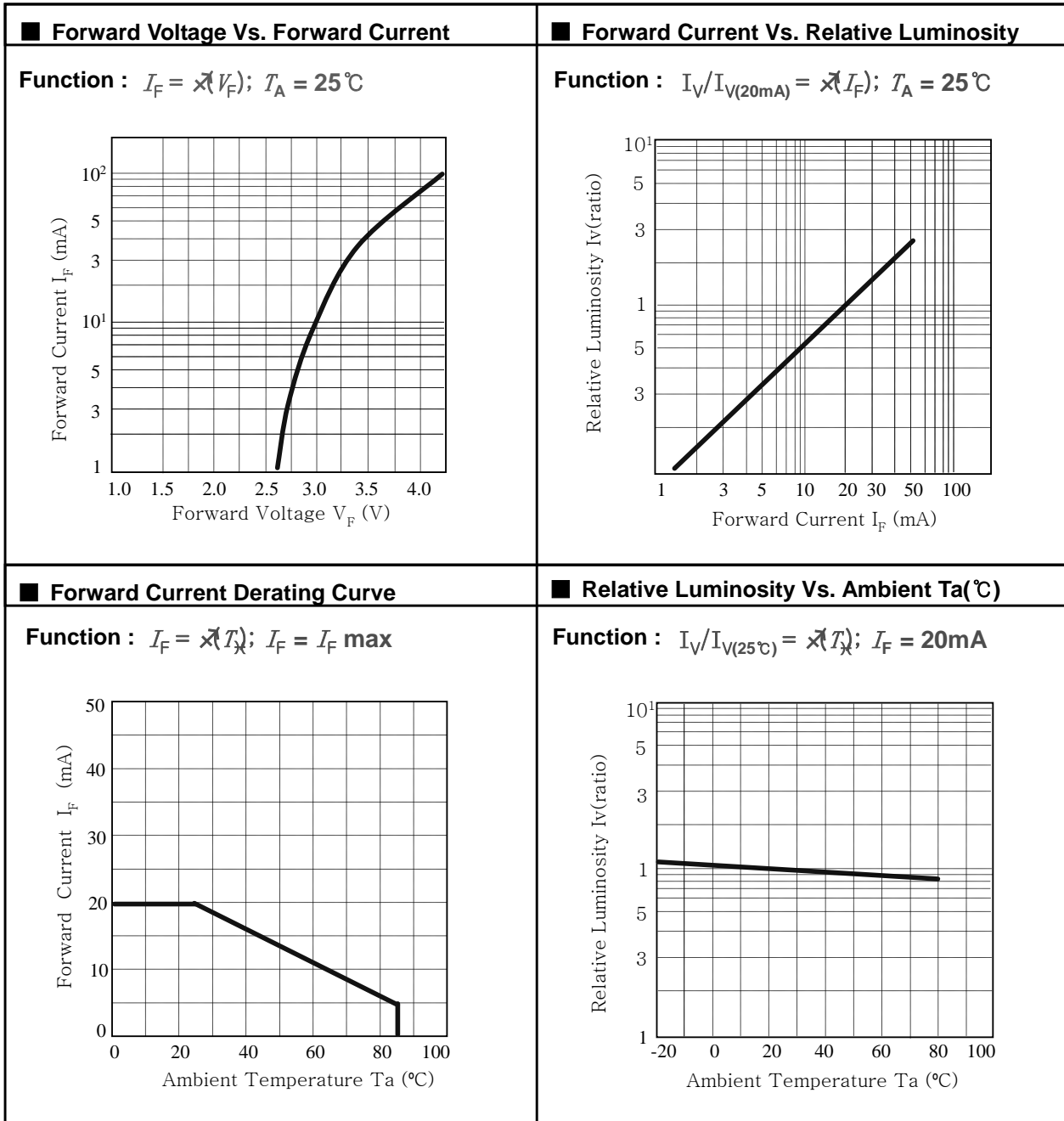
### B. DIAGRAM OF COMPOSITION




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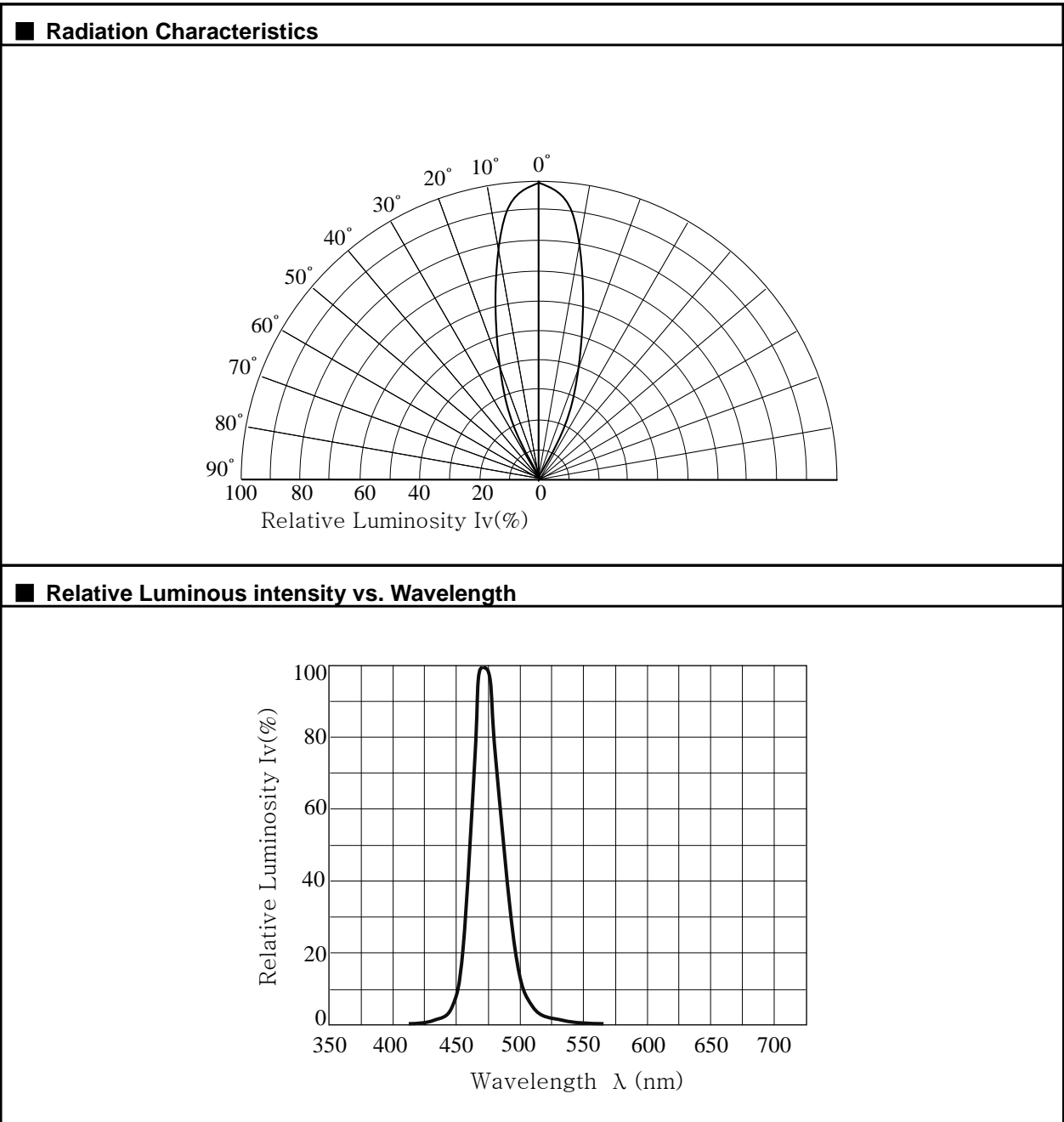
## 6. ELECTRO-OPTICAL CHARACTERISTICS CURVES




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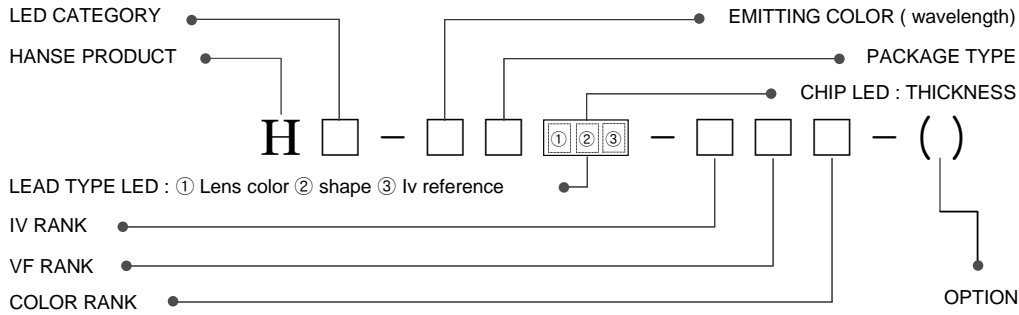
## 6. ELECTRO-OPTICAL CHARACTERISTICS CURVES





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**LED CATEGORY**

C : Chip LED                      L : Lead type LED

**EMITTING COLOR (wavelength)**

460, 465, 470, 475, 480 : Blue	595, 600, 605 : Orange	RB1- : Red+Blue(Dual color)
500 : Cyan	610, 615, 620, 625 : Amber	RB3- : Red+Blue(Another color)
510, 515, 520, 565 : Pure Green	630, 640, 660 : Red	RGB1- : R+G+B(Full color)
570, 575 : Yellow Green	W : White ( <b>WF : WHITE FOR FLASH</b> )	RGB3- : R+G+B(Another color)
580, 585, 590 : Yellow	BW : Bluish White	RM1- : Red+Yellow Green

**PACKAGE TYPE**

T1608 : Top View 1608	T3528 : Top View 3528	Round type : R2, R3, R4, R5,R8, R10
T1612 : Top View 16125	T5450 : Top View 5450	Flat type : F2, F3, F5
T1615 : Top View 1625	S2110 : SideView 2110 Type	Tower type : E2
T2012 : Top View 20125	S2812 : SideView 2812 Type	Oval type : O3, O4, O5
T3030 : Top View 3030	S4014 : SideView 4014 Type	Rectangular type : C4, C5
T3216 : Top View 3216	S3215 : SideView 3215 Type	Super Flux type : P7
T3530 : Top View 3530	S143 : SideView 143 Type	(Number = diameter)


**Chip LED : THICKNESS** : A : 0.3T, B : 0.4T, C : 0.55T, D : 0.6T, E : 0.8T, F : 1.0T, G : 2.0T, BLANK(Normal)

**Lead Type LED :**

① Lens Color - **2** : Milky Diffusion(M/D) / **3** : Water Clear(W/C) / **4** : Color Clear(C/C) / **5** : Colored Diffusion(C/D)  
 ② Shape – 11 / 12 / 13 / 14 / 15/ etc : *please refer to package dimension sheet*  
 ③ Iv reference : -H(High) / -V(Very) / -U(Ultra) / -SU(Super ultra)

**IV RANK, VF RANK, COLOR RANK - Refer to rank sheet**

**OPTION : OPTIONAL**

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## 8. RELIABILITY

### A. TEST ITEMS AND RESULTS


Test Item	Standard test method	Test Conditions	Note	Number of Damaged
Resistance to Soldering Heat (Reflow Soldering)	JEITA ED-4701 300 301	Tsol=240℃, 10sec. (Pre treatment 30℃, 70%, 168hrs.)	2 times	0/50
Solderability (Reflow Soldering)	JEITA ED-4701 100 105	Tsol=215±5℃, 3sec.	1 time over 95%	0/50
Heat Shock	JEITA ED-4701 100 105	0℃ ~ 100℃ 5sec. 15sec.	20 cycles	0/50
Temperature Cycle	JEITA ED-4701 100 105	-40℃ ~ 25℃ ~ 100℃ ~ 25℃ 15min. 5min. 15min. 5min.	100 cycles	0/50
High Humidity Heat Cycle	JEITA ED-4701 200 203	30℃ ~ 65℃ ~ -10℃ 90%RH 24hrs./1cycle	10 cycles	0/50
High Temperature Storage	JEITA ED-4701 200 203	Ta=100℃	1000 hrs.	0/50
Humidity Heat Load	JEITA ED-4701 100 103	Ta=60℃, RH=90%	1000 hrs.	0/50
Low Temperature Storage	JEITA ED-4701 200 202	Ta=-40℃	1000 hrs.	0/50
Life Test Condition 1		Ta=25℃, IF=20mA	1000 hrs.	0/50
High Temperature Life Test		Ta=85℃, IF=5mA	1000 hrs.	0/50
High Humidity Heat Life Test		60℃, RH=90%, IF=15mA	500 hrs.	0/50
Low Temperature Life Test		Ta=-30℃, IF=20mA	1000 hrs.	0/50

### B. CRITERIA FOR JUDGING THE DAMAGE

Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Forward Voltage	VF	IF=20mA	-	U.S.L.*) × 1.1
Reverse Current	IR	VR=5V	-	U.S.L.*) × 2.0
Luminous Intensity	IV	IF=20mA	L.S.L.**)	× 0.7
				-

\*) U.S.L. : Upper Standard Level

\*\*) L.S.L. : Lower Standard Level

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## 9. CAUTIONS

### (1) Lead Forming


- When forming leads, the leads should be bent at a point at least 3mm from the base of the lead. Do not use the base of the lead frame as a fulcrum during lead forming.
- Lead forming should be done before soldering.
- Do not apply any bending stress to the base of the lead. The stress to the base may damage the LED's characteristics or it may break the LEDs.
- When mounting the LEDs onto a printed circuit board, the holes on the circuit board should be exactly aligned with the leads of the LEDs. If the LEDs are mounted with stress at the leads, it causes deterioration of the lead and this will degrade the LEDs.

### (2) Storage

- The LEDs should be stored at 30°C or less and 70%RH or less after being shipped from HANSE and the storage life limits are 3 months. If the LEDs are stored for 3 months or more, they can be stored for a year in a sealed container with a nitrogen atmosphere and moisture absorbent material.
- HANSE LED leads are comprised of a silver plated metal 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 may cause difficulty during soldering operations. It is recommended that the LEDs be used as soon as possible.
- Please avoid rapid transitions in ambient temperature, especially, in high humidity environments where condensation can occur.

### (3) Soldering Conditions

- Solder the LED no closer than 3mm from the base of the lead.
- Do not apply any stress to the lead particularly when heated.
- The LEDs must not be repositioned after soldering.

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- The recommended soldering conditions are as follows:

Dip Soldering		Hand Soldering	
Pre-heat	120°C Max	Temperature	300°C Max
Pre-heat time	60sec Max	Soldering time	3sec Max
Solder Bath temperature	260°C Max		No closer than 3mm
Dipping Time	5sec Max		from the base of the lead
Dipping Position	No lower than 3mm from the base of the lead.		

- After soldering the LEDs, the lead should be protected from mechanical shock or vibration until the LEDs return to room temperature.
- Direct soldering onto a PC board should be avoided. Mechanical stress to the glass may be caused from warping of the PC board or from the clinching and cutting of the leads. When it is absolutely necessary, the LEDs may be mounted in this fashion but the User will assume responsibility for any problems. Direct soldering should only be done after testing has confirmed that no damage, such as wire bond failure or glass deterioration, will occur. HANSE's LEDs should not be soldered directly to double sided PC boards because the heat will deteriorate the glass.
- When it is necessary to clamp the LEDs to prevent soldering failure, it is important to minimize the mechanical stress on the LEDs.
- Cut the LED leads at room temperature. Cutting the leads at high temperatures may cause failure of the LEDs.

#### (4) Heat Generation

- Heat generation must be taken into design consideration when using the LEDs. The coefficient of temperature increase per input electric power is about 0.62°C/mW at the LED's active layer. This coefficient will be affected by the heat resistance of the circuit board and by dense mounting of the LEDs. At the same time, precautions must

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be taken into the design of circuitry to avoid intense heat generation. Proper designs which allow radiation of heat, etc. may be needed.

#### (5) Static Electricity


- Static Electricity and surge damages the LEDs. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
- All devices, equipment and machinery must be properly grounded.
- When inspecting own final products on which LEDs were mounted, it is recommended to check also whether the mounted LEDs are damaged by static electricity or not.
- Damaged LEDs will show some unusual characteristics such as leak current remarkably increases, starting forward voltage becomes lower, or the LEDs get unlighted at the low current.

#### (6) Cleaning

- Use Isopropyl Alcohol as a solvent for cleaning the LEDs. Using other solvents may dissolve the LED package and the epoxy. Caution is needed.  
Ultrasonic cleaning of the LEDs should not be done.

#### (7) Others

- The electrode sections are plated with silver. Those will become discolored by contact with corroded gas etc. Precautions must be taken to maintain a clean storing atmosphere.
- These LEDs described in this brochure are intended to be used for ordinary electronic equipment. Consult HANSE's sales staff in advance for information on the applications in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as airplanes, aerospace, automobiles, life support systems and safety devices).
- The appearance and specifications of the product may be modified for improvement without notice.

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10. INSPECTION RESULT

<h1>INSPECTION RESULT</h1>	INSPECTOR	APPROVAL

Date		검사 항목	검사 방식	판정기준	
Device				Acc.	Rej.
LOT NO.		외관 검사	G-II AQL= 0.065	0	1
Rank Size	pcs	특성 검사	S-4 AQL= 0.010	0	1
Customer			Inspector	LIM GWANG JIN	

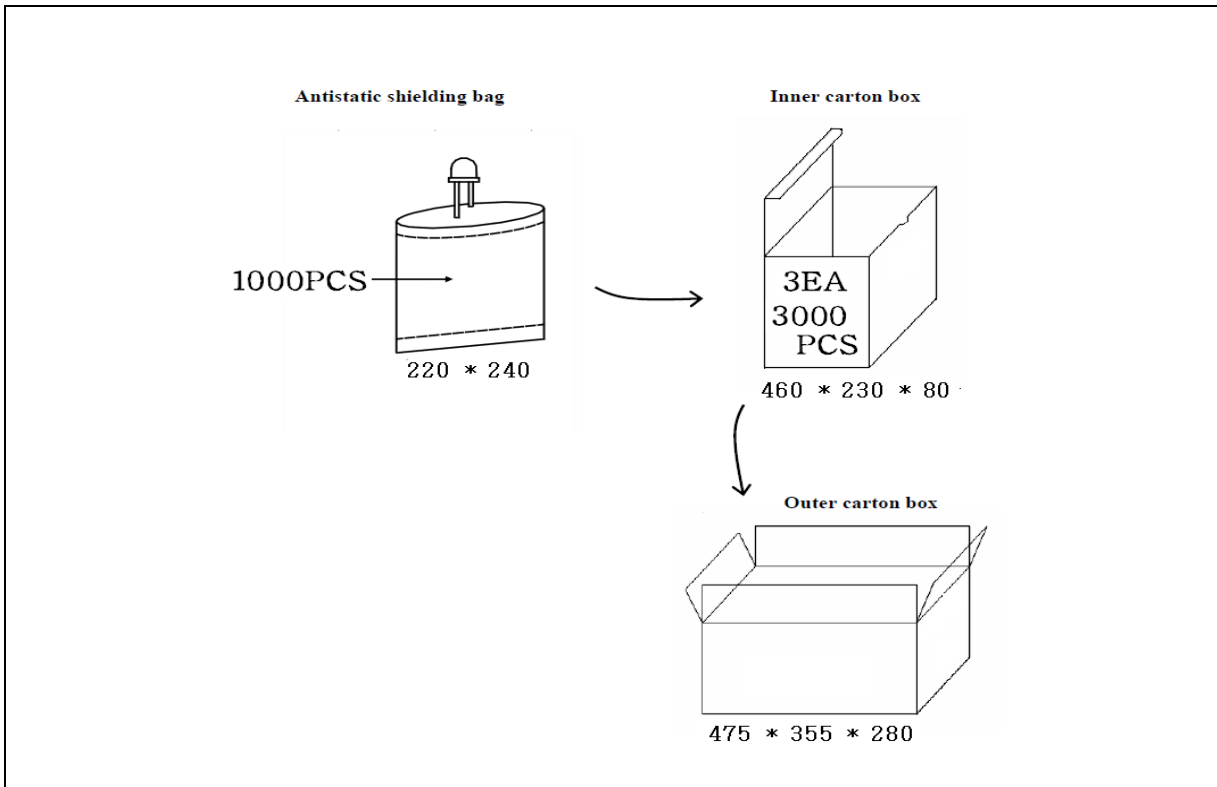
INSPECTION				
ITEM	VISUAL	VF(V)	IV(mcd)	WD(nm)
CONDITION	x 20	20 mA	20 mA	20 mA
SPEC	-			
Tolerance	-	± 0.1 V	± 10 %	± 1 nm
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
MIN				
MAX				
AVG				
JUDGMENT				
※REMARK			FINAL JUDGMENT	

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## 11. PACKING

### A. Packing diagram



### B. Precaution

- The label on the minimum packing unit shows : Part Number, Lot Number, Ranking, Quantity  
In order to protect the LEDs from mechanical shock, we pack them in cardboard boxes for transportation.
- The LEDs may be damaged if the boxes are dropped or receive a strong impact against them, so precautions must be taken to prevent any damage.
- The boxes are not water resistant and therefore must be kept away from water and moisture.  
When the LEDs are transported, we recommend that you use the same packing method as HANSE Electronics