

S P E C I F I C A T I O N S

High Power LED Series LH502F General

High efficacy and lumen makes
The LH502F suitable for Streetlight and High-bay applications



Features & Benefits

- Operates at a maximum current of up to 800mA
- Uniform light distribution under any beam angle
- Color binning @ 85℃

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1. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	H	W	H	1	L	5	N	3	0	5	Y	A	R	5	A	1

Digit	PKG Information	Code	Specification			
1 2 3	Dongbu Package High Power	SPH	High power PKG			
4 5	Color	WH	White			
6	Product Version	1	1			
7 8	Form Factor	L5	5050 Size			
9	Lens Type	N	No lens			
10	Model	3	5050 3pad series			
11	Internal Code	0				
12	CRI	4	Min. 75			
		5	Min. 80			
13 14	Forward Voltage (V)	YA	5.2~5.8	Bin Code	A0	5.2~5.4
					A1	5.4~5.6
					A2	5.6~5.8
15	CCT (K)	R	5000K			
		Q	5700K			
16	MacAdam step	3	MacAdam 3-Step			
		5	MacAdam 5-Step			
17 18	Luminous Flux (lm)	A1	502F lm Rank			

2. Characteristics

(1) Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_{opr}	-40 ~ +105	°C	Note 1)*
Storage Temperature	T_{stg}	-40 ~ +105	°C	-
LED Junction Temperature	T_j	125	°C	-
Forward Current	I_F	800	mA	-
Peak Pulsed Forward Current	I_{FP}	1200	mA	Duty 1/10, pulse width 10ms
Assembly Process Temperature	-	260<10	°C/S	-
Electrostatic Discharge Withstand Voltage(HBM)	ESD(HBM)	±8	KV	-

(2) Electro-optical Characteristics ($I_F = 180 \text{ mA}$, $T_j = 25 \text{ °C}$)

Item	Unit	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	YA	5.2	-	5.8
Color rendering Index ® / R9	-	4	-40	-	-
		5	80 / 0	-	-
Thermal Resistance (junction to solder point)	°C/W		-	2.0	-
Beam Angle	°			120	

* Note :

1) Dongbu maintains measurement tolerance of: forward voltage = $\pm 0.1 \text{ V}$, luminous flux = $\pm 7 \%$, forward voltage = $\pm 0.1 \text{ V}$, CRI = ± 1 , R9 = ± 6.5

(3) Luminous Flux Bins ($I_F = 180\text{mA}$)

CRI (Ra) Min.	Nominal CCT (K)	Flux Rank	Flux @ $T_J = 25^\circ\text{C}$ (lm)		
			Min.	Typ.	Max.
75	5000K	A1	200		
	5700K	A1	200		
80	5000K	A1	190		
	5700K	A1	190		

* Notes :

- 1) Tested in pulsed operating condition at rated test current (10 ms pulse width) and rated temperature
- 2) Dongbu maintains measurement tolerance of: Luminous flux = $\pm 7\%$, CRI = ± 1 , R9 = ± 6.5

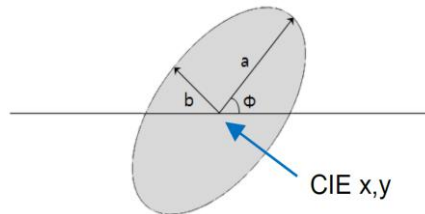
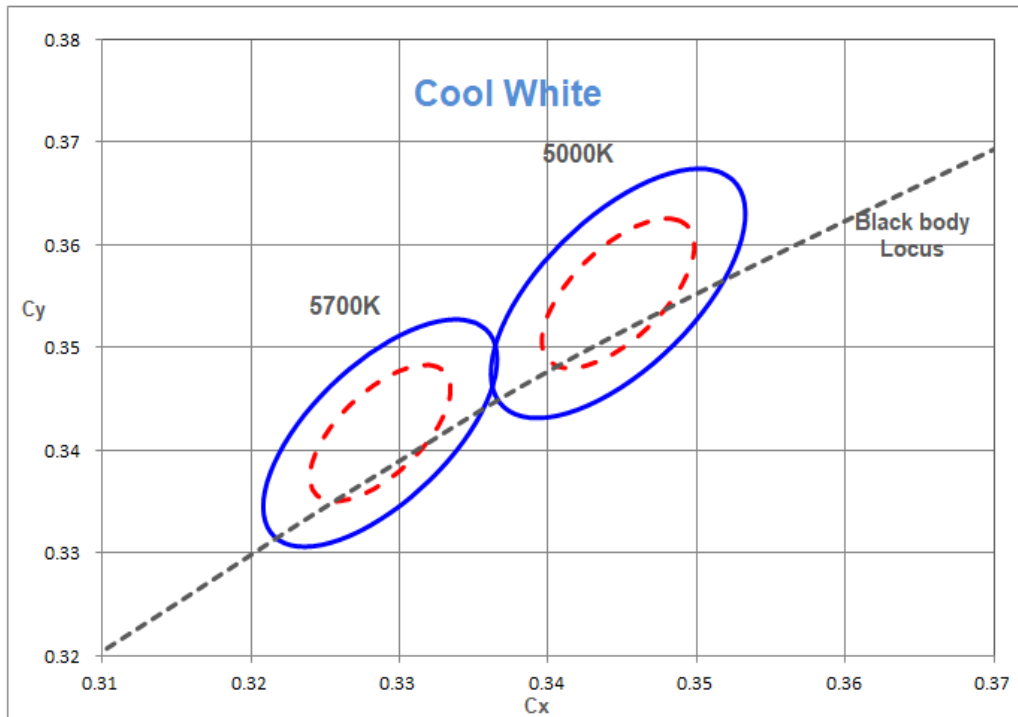
(4) Luminous Flux Rank ($I_F=180\text{mA}$, $T_J = 25^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT(K)	Product Code	VF Rank	Chrom Rank (Bins)	Flux		Flux Range (Φ_v , lm)
					Rank	Bins	
75	5000	SPHWH1L5N304YAR3A1		R3, R5		20	200~220
		SPHWH1L5N304YAR5A1				22	220~240
	5700	SPHWH1L5N304YAQ3A1		Q3, Q5		20	200~220
		SPHWH1L5N304YAQ5A1				22	220~240
80	5000	SPHWH1L5N305YAR3A1		R3, R5		19	190~210
		SPHWH1L5N305YAR5A1				21	210~230
	5700	SPHWH1L5N305YAQ3A1		Q3, Q5		19	190~210
		SPHWH1L5N305YAQ5A1				21	210~230

(6) Voltage Bins ($I_F = 180\text{ mA}$, $T_J = 25^\circ\text{C}$)

Nominal CCT (K)	CRI (Ra) Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-	YA	A0	5.2~5.4
				A1	5.4~5.6
				A2	5.6~5.8

(7) Chromaticity Region & Coordinates ($I_F = 180 \text{ mA}$, $T_j = 85^\circ\text{C}$)



CRI	CCT	Rank	CIE x	CIE y	Φ	A	B
75 80	5000K	R3	0.3447	0.3553	59.6	0.0082	0.0035
		R5				0.0137	0.0058
	5700K	Q3	0.3287	0.3417	59.1	0.0075	0.0032
		Q5				0.0125	0.0053

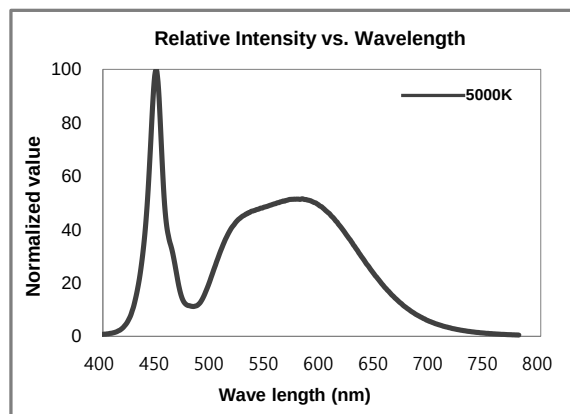
* Note :

Dongbu maintains measurement tolerance of: $C_x, C_y = \pm 0.005$

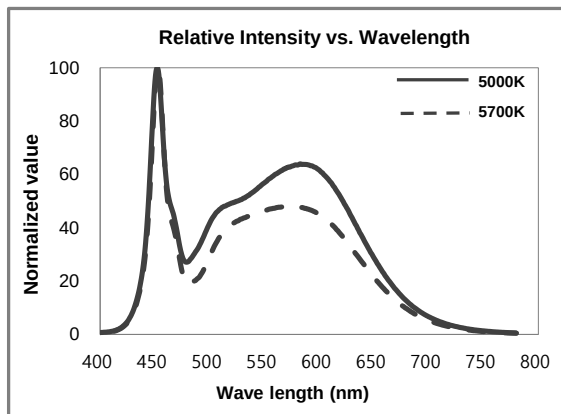
3. Typical Characteristics Graphs

(1) Spectrum Distribution ($I_F = 180 \text{ mA}$, $T_j = 25^\circ\text{C}$)

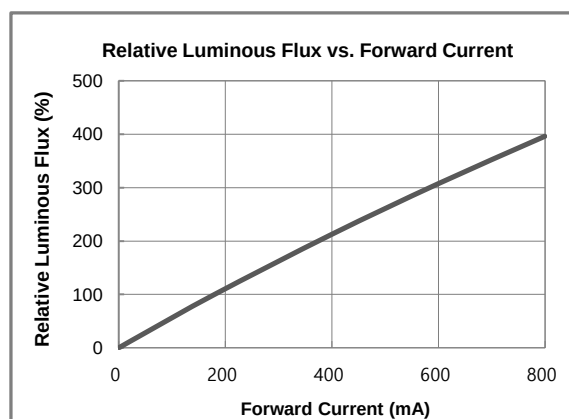
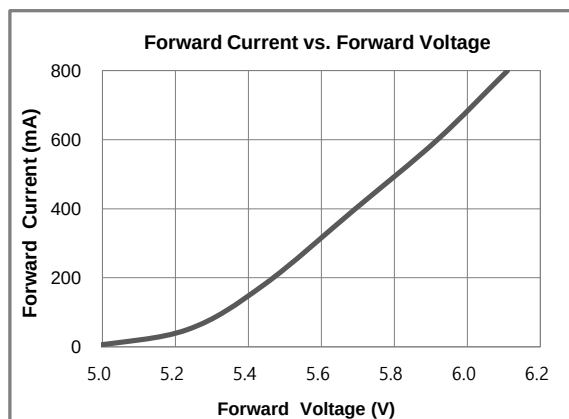
CRI75



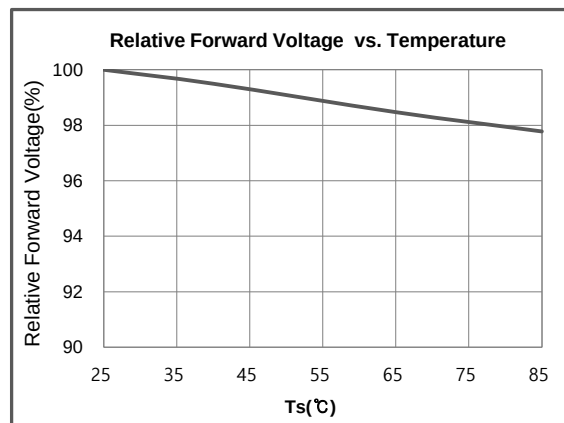
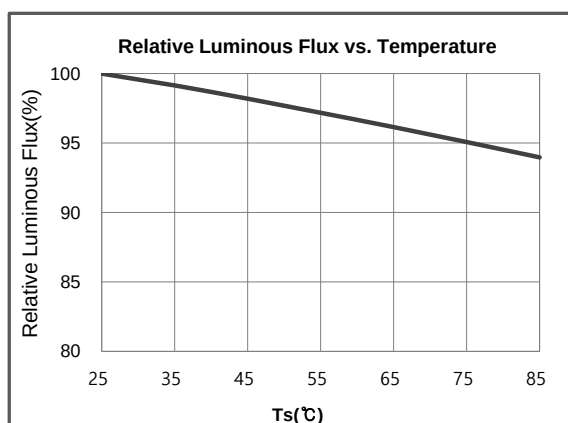
CRI80



(2) Forward Current Characteristics ($T_j = 25^\circ\text{C}$)

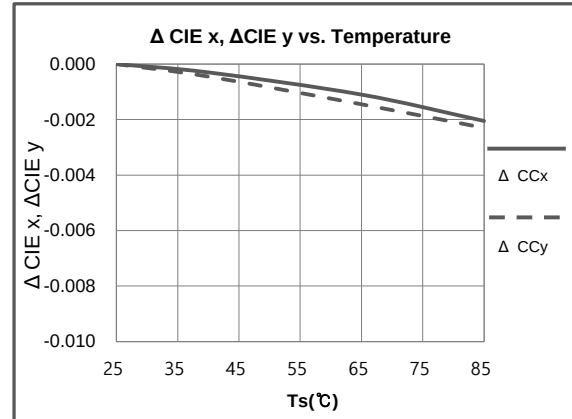
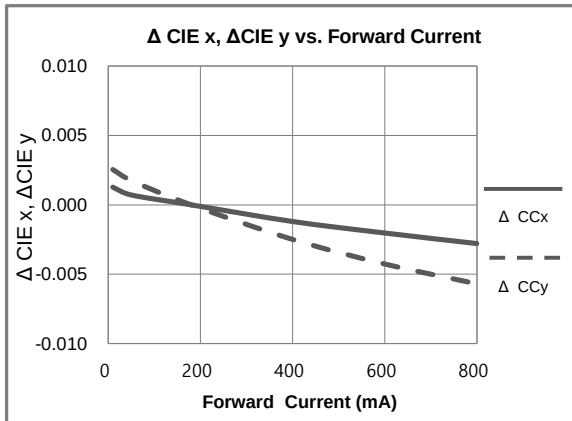


(3) Temperature Characteristics ($I_F = 180 \text{ mA}$)

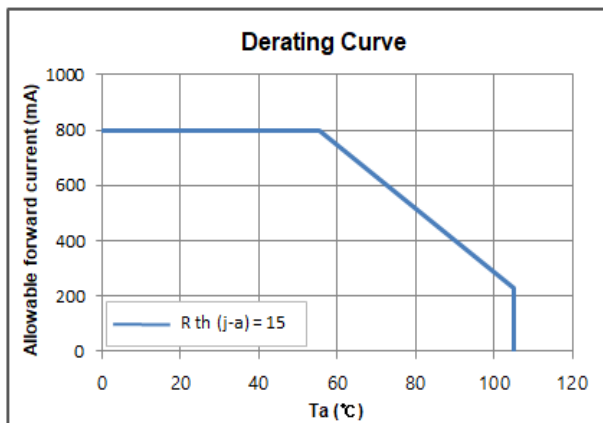


3. Typical Characteristics Graphs

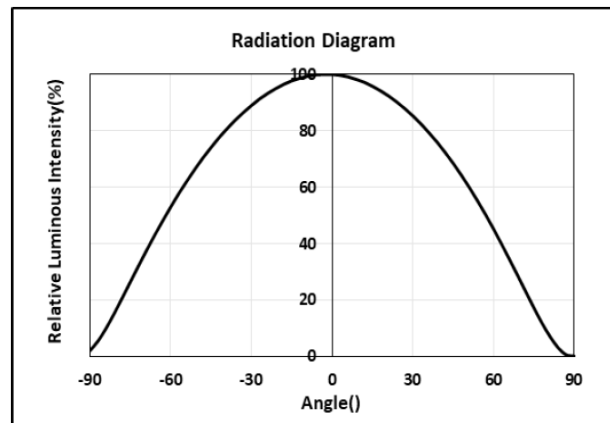
(3) Color Shift Characteristics ($I_F=180\text{ mA}$, $T_j=25\text{ }^\circ\text{C}$)



(5) Derating Curve

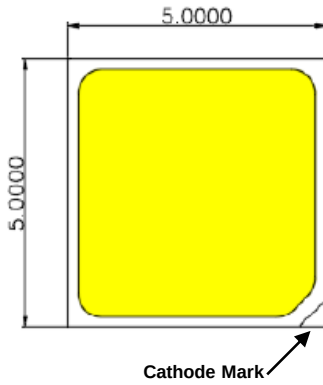


(6) Beam Angle Characteristics ($I_F=180\text{ mA}$, $T_j=25\text{ }^\circ\text{C}$)



4. Outline Drawing & Dimension

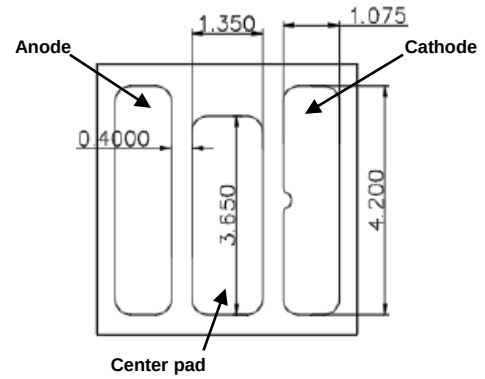
[Top View]



[Side View]



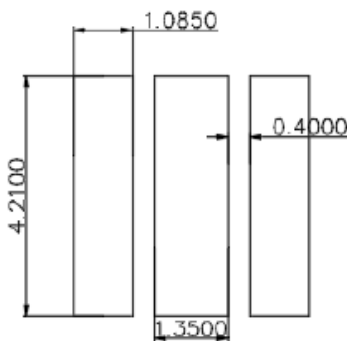
[Bottom View]



This electrically active pad shall remain electrically isolated and shall not be connected to either the cathode or the anode.

* Notes :

- 1) Mark for the Cathode
- 2) Unit : mm
- 3) Tolerance : $\pm 0.1\text{mm}$

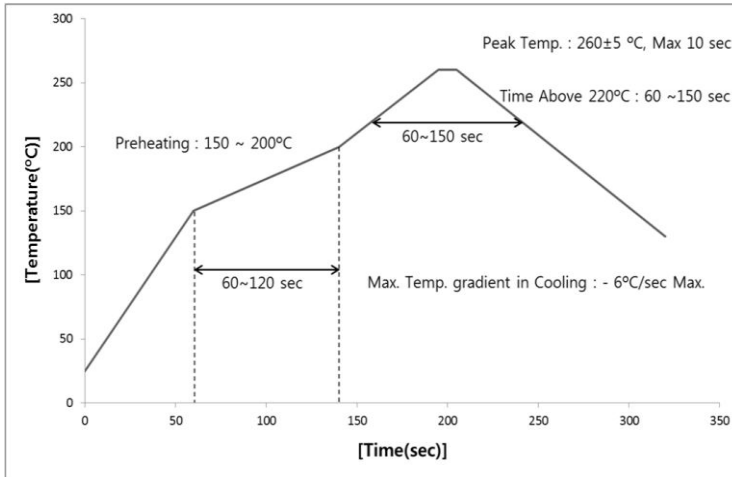


[Recommended PCB Solder Pad]

5. Soldering Conditions

(1) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



(2) Manual Soldering Conditions

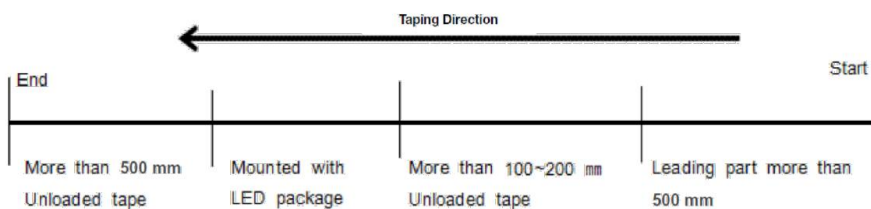
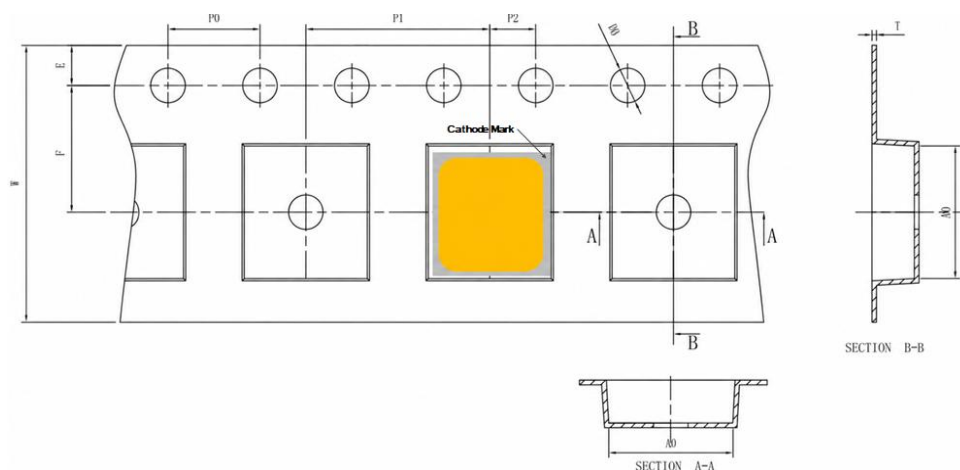
Not more than 5 seconds @ max. 300 °C, under soldering iron.

6. Tape & Reel

(1) Taping Dimension

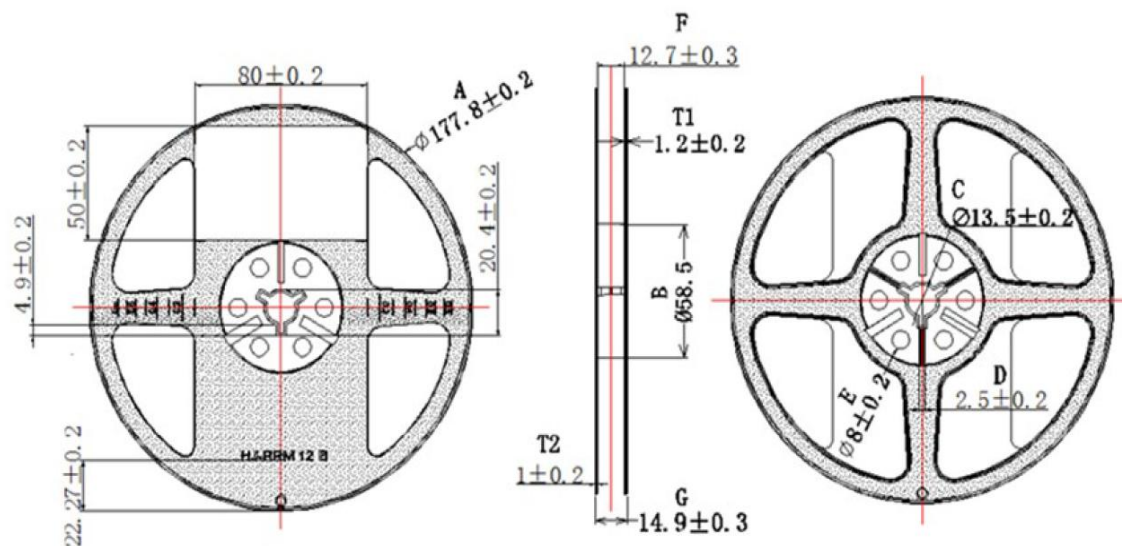
(unit : mm)

ITEM	W	A0	B0	K0	E	F	D0	D1	P0	P1	P2	T	LENGTH	PCS/REEL
DIM	12.00	5.40	5.20	0.95	1.75	5.50	1.50	1.50	4.00	4.00	2.00	0.20		
5.35	+0.10	+0.05	+0.05	+0.05	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.05		
	-0.10	-0.05	-0.05	-0.05	-0.10	0.00	0.00	0.00	0.00	-0.10	-0.10	-0.05		



6. Tape & Reel

(2) Reel Dimension



(unit : mm)

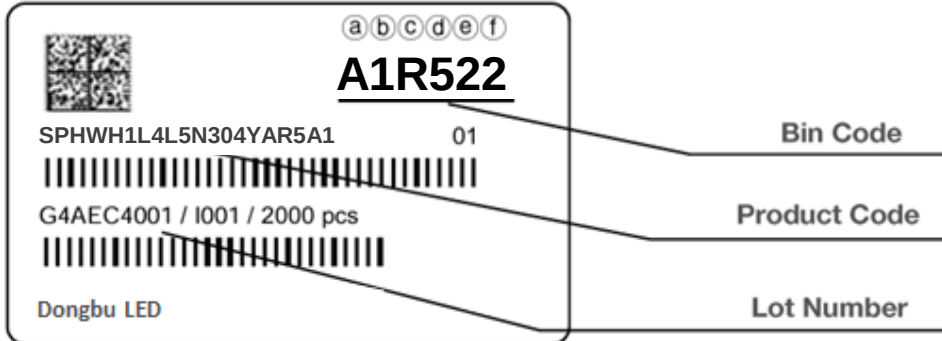
A ± 0.2	B ± 0.2	C ± 0.2	D ± 0.2	E ± 0.2	F ± 0.3	G ± 0.3	T1 ± 0.2	T2 ± 0.2
$\varnothing 177.8$	$\varnothing 58.5$	$\varnothing 13.5$	2.5	$\varnothing 8$	12.7	14.9	1.2	1

* Note :

- 1) Quantity: The quantity/reel is 2,000 pcs
- 2) All dimensions are millimeters.
- 3) Packaging : P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag.

7. Label Structure

(1) Label Structure



* Note : Denoted bin code and product code above is only an example (see description on page 2)

Bin Code

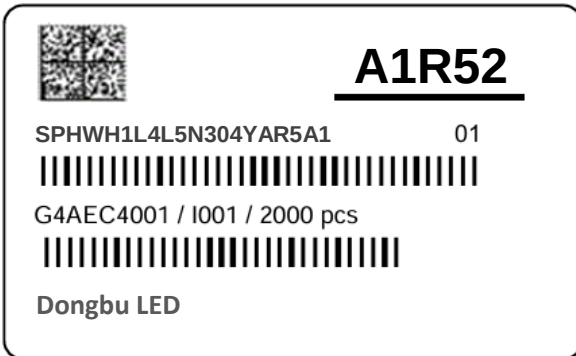
ⒶⒷ: Forward Voltage bin (refer to page 5)

ⒸⒹ: Chromaticity bin (refer to page 6)

ⒺⒻ: Luminous Flux bin (refer to page 5)

(2) Lot Number

The lot number is composed of the following characters:



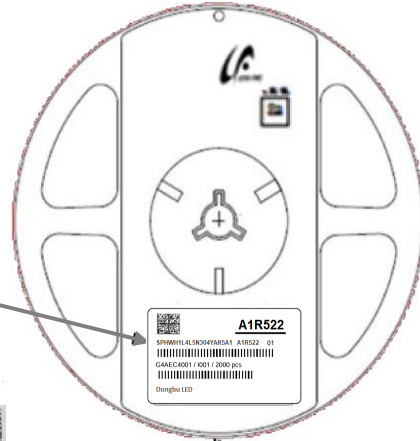
①②③④⑤⑥⑦⑧⑨ / IⒶⒷⒸ / xxxx pcs

- ①② : Production site (G4 : Guangzhou, China)
- ③ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
- ④ : Year (E: 2020, F: 2021, G: 2022, H: 2023 ...)
- ⑤ : Month (1~9, A, B, C)
- ⑥ : Day (1~9, A, B~V)
- ⑦⑧⑨ : Serial number (001 ~ 999)
- ⒶⒷⒸ : Reel number (001 ~ 999)

8. Packing Structure

(1) Packing Process

Reel



[Humidity indicator]



[Desiccant]



Aluminum Vinyl Packing Bag

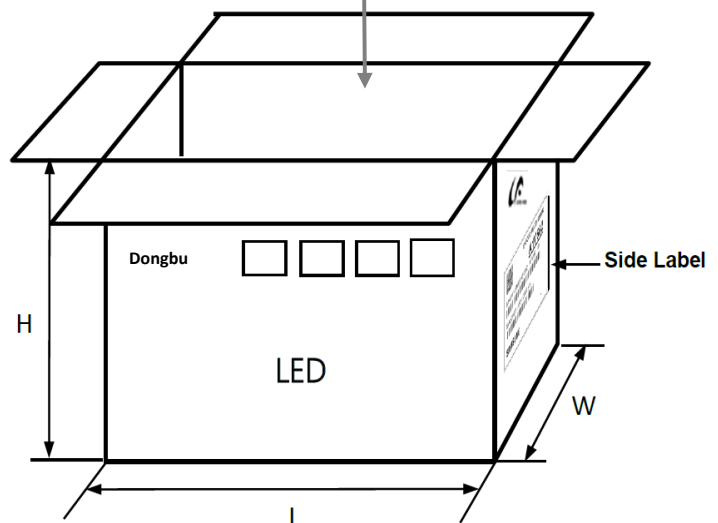


Outer Box

Material: Paper (SW3B(B))

Type	Size (mm)			Note
	L	W	H	
7 inch S	245 ± 5	220 ± 5	182 ± 5	Up to 5 reels
7 inch L	245 ± 5	220 ± 5	86 ± 5	Up to 10 reels

Side Label



Paper(SW3B(B))

8. Packing Structure

(5) Aluminum Vinyl Packing Bag



CAUTION
This bag contains
MOISTURE SENSITIVE DEVICES

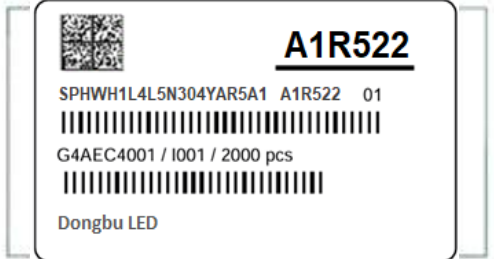
LEVEL 2a

- Shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
- Peak package body temperature: 240 °C
- After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be:
 - Mounted within 672 hours at factory conditions of equal to or less than 30°C / 60% RH, or
 - Stored at < 10% RH
- Devices require bake, before mounting, if:
 - Humidity Indicator Card is >60% when read at 23±5°C, or
 - 2a is not met.
- If baking is required, devices must be baked for 10 ~ 24 hours at 60±5°C

Note: If device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure.

Bag seal due date: _____
(If blank, see code label)

Note: Level and body temperature by IPC/JEDEC J-STD-020



A1R522

SPHWH1L4L5N304YAR5A1 A1R522 01

|||||

G4AEC4001 / I001 / 2000 pcs

|||||

Dongbu LED





■ 주의 사항

이 알루미늄 지퍼 팩은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재를 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

■ Important

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products, please ensure the zip-lock is completely sealed with the dry pack left inside.

(6) Silica Gel & Humidity Indicator Card inside Aluminum Vinyl Bag

(This image is for reference only. Silica gel and humidity indicator shapes may be different.)



9. Precautions in Handling & Use

- (1) For over-current protection, users are recommended to apply resistors connected in series with the LEDs to mitigate sudden change of the forward current caused by shift of forward voltage.
- (2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When cleaning is required, IPA is recommended as the cleaning agent. Some solvent-based cleaning agent may damage the silicone resins used in the device.
- (3) When the device is in operation, the forward current should be carefully determined considering the maximum ambient temperature and corresponding junction temperature.
- (4) LEDs must be stored in a clean environment. Shelf life of sealed bags is 12 months at temperature 0~40 °C, 0~90 % RH
- (5) After storage bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
 - a. Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30 °C / 60 % RH*_{Note 1}, or
 - b. Mounted within 24 hours (1 day) at an assembly line with a condition of more than 30 °C / 70 % RH*_{Note 2}, or
 - c. Stored at <10 % RH
- (6) Repack unused devices with anti-moisture packing, fold to close any opening and then store in a dry place.
- (7) Devices require baking before mounting, if humidity card reading is >60 % at 23 ± 5 °C.
- (8) Devices must be baked for 1 hour at 60 ± 5 °C, if baking is required.
- (9) The LEDs are sensitive to the static electricity and surge current. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices. Damaged LEDs may show some unusual characteristics such as increase in leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.
- (10) VOCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). Transparent LED silicone encapsulant is permeable to those chemicals and they may lead to a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires. In order to prevent these problems, we recommend users to know the physical properties of materials used in luminaires and they must be carefully selected
- (11) Risk of sulfurization (or tarnishing)

The LED from Dongbu LED Co., Ltd. uses a silver-plated lead frame and its surface color may change to black (or dark colored) when it is exposed to sulfur(S), chlorine(Cl) or other halogen compound. Sulfurization of lead frame may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit. It requires caution. Due to possible sulfurization of lead frame, LED should not be used and stored together with oxidizing substances made of materials such as: rubber, plain paper, lead solder cream, etc.