

SPECIFICATIONS

Middle Power LED Series
3030
LM301B
CRI 80



Features & Benefits

- 0.3W Class middle power LED
- Mold resin for high reliability
- Standard form factor for design flexibility (3.0 × 3.0 mm)

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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	M	W	H	D	3	2	A	M	D	5	X	A	R	0	S	0

Digit	PKG Information	Code	Specification			
1 2 3	Dongbu Package Middle Power	SPM				
4 5	Color	WH	White			
6	Product Version	D	Dispensing			
7 8 9	Form Factor	32A	3.0 x 3.0 x 0.7 mm 2 pads			
10	Sorting Current (mA)	M	65 mA			
11	Chromaticity Coordinates	D	ANSI Standard, MacAdam 3 step ellipse bin, MacAdam 5 step ellipse bin			
12	CRI	5	Min. 80			
13 14	Forward Voltage (V)	XA	2.6~2.9	Bin Code	AY	2.6~2.7
				AZ	2.7~2.8	
				A1	2.8~2.9	
				4,000ea/Reel		
15 16	CCT (K)	Y●	2200	Bin Code	YA, YB, YC, YD, YE, YF, YG, YH, YJ, YK, YL, YM	
		W●	2700		WA, WB, WC, WE, WF, WG, WH, WJ, WK, WL, WM	
		V●	3000		VA, VB, VC, VE, VF, VG, VH, VJ, VK, VL, VM	
		U●	3500		UA, UB, UC, UE, UF, UG, UH, UJ, UK, UL, UM	
		T●	4000		TA, TB, TC, TE, TF, TG, TH, TJ, TK, TL, TM	
		R●	5000		RA, RB, RC, RE, RF, RG, RH, RJ, RK, RL, RM	
		Q●	5700		QA, QB, QC, QE, QF, QG, QH, QJ, QK, QL, QM	
		P●	6500		PA, PB, PC, PE, PF, PG, PH, PJ, PK, PL, PM	
		● : "0" (Whole bin) or "K" (K Kitting) or "S" (S Kitting)				
17 18	Luminous Flux	S0	Bin Code	SF, SG, SH, SJ, SK, SL, SM		
		L2		SL +SM / SM+ SM		
		SF		SF 28.0~30.0		
		SG		SG 30.0~32.0		
		SH		SH 32.0~34.0		
		SJ		SJ 34.0~36.0		
		SK		SK 36.0~38.0		
		SL		SL 38.0~40.0		
		SM		SM 40.0~42.0		

2. Characteristics

(1) Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	°C	
Storage Temperature	T_{stg}	-40 ~ +120	°C	
LED Junction Temperature	T_j	110	°C	
Forward Current	I_F	200	mA	
Peak Pulsed Forward Current	I_{FP}	300	mA	Duty 1/10, pulse width 10ms
Assembly Process Temperature	-	260<10	°C/S	
ESD (HBM)	-	5	KV	

(2) Electro-optical Characteristics ($I_F = 65 \text{ mA}$, $T_s = 25 \text{ °C}$)

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (VF)	V	XA	AY	2.6	-	2.7
			AZ	2.7	-	2.8
			A1	2.8	-	2.9
Reverse Voltage (@ 5 mA)	V			0.7	-	1.2
Color Rendering Index (Ra)	-			80	-	-
Thermal Resistance (junction to solder point)	°C/W			-	7.5	-
Beam Angle	°			-	120	-

* Note

Dongbu maintains measurement tolerance of: forward voltage = $\pm 0.1 \text{ V}$, luminous flux = $\pm 5 \%$, CRI = ± 3

(3) Electro-optical Characteristics ($T_s = 25 \text{ °C}$)

Item	CRI	Nominal CCT (K)	SF		SG		SH		SJ		SK		SL		SM	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
			28	30	30	32	32	34	34	36	36	38	38	40	40	42
Luminous Flux (Φ_v)	80	2700														
		2700														
		3000														
		3500														
		4000														
		5000														
		5700														
		6500														

* Note

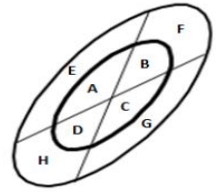
Dongbu maintains measurement tolerance of: forward voltage = $\pm 0.1 \text{ V}$, luminous flux = $\pm 5 \%$, CRI = ± 3

(4) Luminous Flux Bins ($I_F = 65 \text{ mA}$, $T_s = 25^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v , lm)
80	2200	SPMWHD32AMD5XAY●S0	SF	28.0~30.0
			SG	30.0~32.0
			SH	32.0~34.0
	2700	SPMWHD32AMD5XAW●S0	SH	32.0~34.0
			SJ	34.0~36.0
			SK	36.0~38.0
	3000	SPMWHD32AMD5XAW●SJ	SJ	34.0~36.0
			SK	36.0~38.0
			SL	38.0~40.0
	3500	SPMWHD32AMD5XAV●S0	SK	36.0~38.0
			SL	38.0~40.0
			SK	36.0~38.0
	4000	SPMWHD32AMD5XAV●SK	SJ	34.0~36.0
			SK	36.0~38.0
			SL	38.0~40.0
	4500	SPMWHD32AMD5XAU●S0	SL	38.0~40.0
			SL	38.0~40.0
			SL	38.0~40.0
	5000	SPMWHD32AMD5XAU●SL	SK	36.0~38.0
			SL	38.0~40.0
			SL	38.0~40.0
	5500	SPMWHD32AMD5XAT●S0	SK	36.0~38.0
			SL	38.0~40.0
			SL	40.0~42.0
	6000	SPMWHD32AMD5XAT●SL	SK	36.0~38.0
			SL	38.0~40.0
			SM	40.0~42.0
	6500	SPMWHD32AMD5XAR●S0	SL	38.0~40.0
			SL	38.0~40.0
			SL	38.0~40.0

* Note :

"●" can be "0" (Whole bin), "K" (K Kitting bin), "S"(S Kitting bin) of the color binning

(5) Kitting rule

a) S Kitting Bin Concept

1. Under agreement between customer and Dongbu LED, Dongbu can supply kitting bin (VF, Color, lm).
2. A forward voltage (VF) of kitting bin is combined by a pair of same VF rank such as (AY+AY), (AZ+AZ) or (A1+A1)
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)
4. A luminous flux(lm) of kitting bin is combined by a pair of IV rank such as (SJ+SJ), (SJ+SK), (SK+SK), (SK+SL),(SL+SL), (SL+SM) or (SM+SM)

[Binning Information]

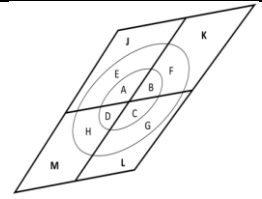
	Bin #1	Bin #2	Remark
VF	AY	AY	
	AZ	AZ	
	A1	A1	
CIE	A	G	
	C	E	
	D	F	
	B	H	
	E	G	
	F	H	
	MacA. 3step (A, B, C, D)	MacA. 3step 3 (A, B, C, D)	
IV	SF	SF	
	SF	SG	
	SG	SG	
	SG	SH	
	SH	SH	
	SH	SJ	
	SJ	SJ	
	SJ	SK	
	SK	SK	
	SK	SL	
	SL	SL	
	SL	SM	
	SM	SM	L2

(5) Kitting rule
b) K Kitting bin Concept

1. Under agreement between customer and Dongbu LED, Dongbu can supply kitting bin (VF, Color, lm).
2. A forward voltage (VF) of kitting bin is combined by a pair of same VF rank such as (AY+AY), (AY+AZ), (AZ+AZ), (AZ+A1) or (A1+A1)
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)
4. A luminous flux(lm) of kitting bin is combined by a pair of IV rank such as (SE+SE), (SE+SF), (SF+SF), (SF+SG), (SG+SG)

[Binning Information]

	Bin #1	Bin #2	Remark
VF	AY	AY	
	AY	AY	
	AZ	AZ	
	AZ	AZ	
	A1	A1	
CIE	H	K	
	F	M	
	E	L	
	G	J	
	E	G	
	F	H	
	MacA. 3step 3 (A, B, C, D)	MacA. 3step 3 (A, B, C, D)	
IV	SF	SF	
	SF	SG	
	SG	SG	
	SG	SH	
	SH	SH	
	SH	SJ	
	SJ	SJ	
	SJ	SK	
	SK	SK	
	SK	SL	
	SL	SL	
	SL	SM	L2
	SM	SM	



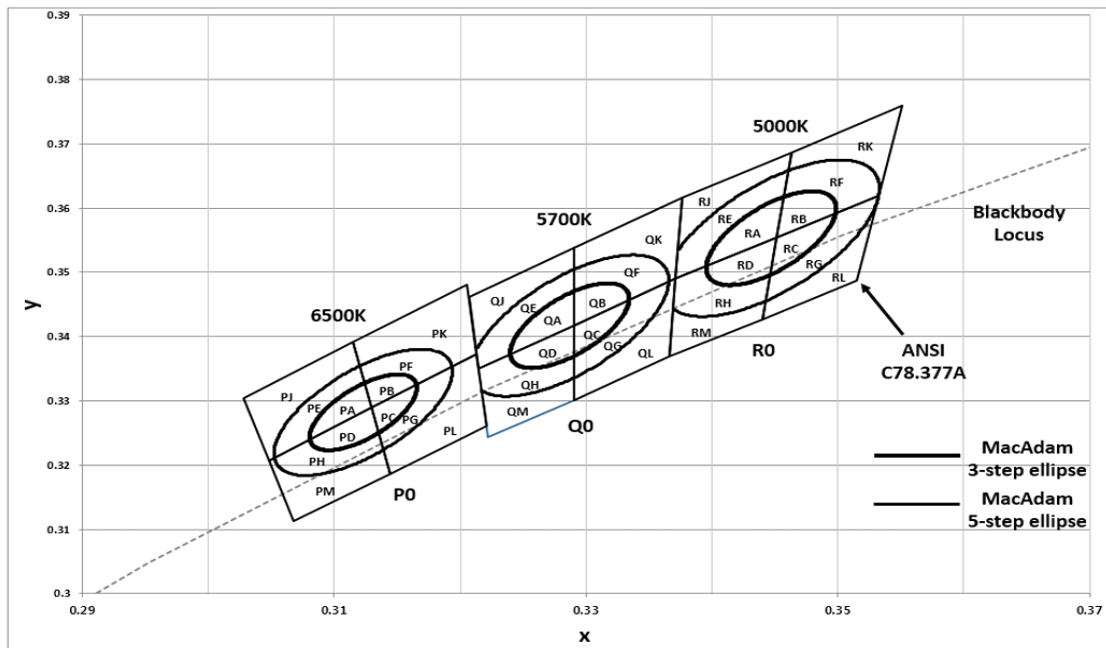
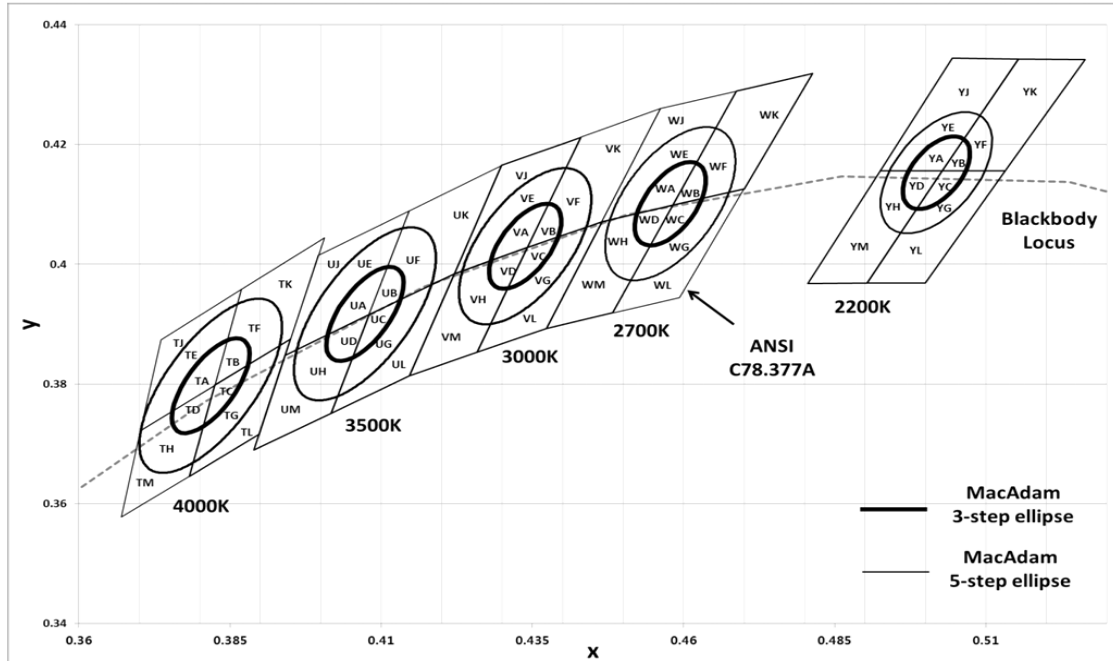
(6) Color Bins ($I_F = 65 \text{ mA}$, $T_s = 25^\circ \text{C}$)

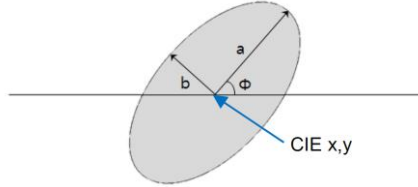
CRI (Ra) Min.	Normal CCT (K)	Product Code	Color Rank	Chromaticity Bins
80	2200	SPMWHD32AMD5XAY0S ★ Y0	Whole bin	YA, YB, YC, YD, YE, YF, YH, YJ, YK, YL, YM
		SPMWHD32AMD5XAY3S ★ Y3	3-step bin	YA, YB, YC, YD
		SPMWHD32AMD5XAYSS ★ YS	S Kitting	YA, YB, YC, YD, YE, YF, YH
		SPMWHD32AMD5XAYKS ★ YK	K Kitting	YA, YB, YC, YD, YE, YF, YH, YJ, YK, YL, YM
	2700	SPMWHD32AMD5XAW0S ★ W0	Whole bin	WA, WB, WC, WD, WE, WF, WG, WH, WJ, WK, WL, WM
		SPMWHD32AMD5XAW3S ★ W3	3-step bin	WA, WB, WC, WD
		SPMWHD32AMD5XAWSS ★ WS	S Kitting	WA, WB, WC, WD, WE, WF, WG, WH
		SPMWHD32AMD5XAWKS ★ WK	K Kitting	WA, WB, WC, WD, WE, WF, WG, WH, WJ, WK, WL, WM
	3000	SPMWHD32AMD5XAV0S ★ V0	Whole bin	VA, VB, VC, VD, VE, VF, VG, VH, VJ, VK, VL, VM
		SPMWHD32AMD5XAV3S ★ V3	3-step bin	VA, VB, VC, VD
		SPMWHD32AMD5XAVSS ★ VS	S Kitting	VA, VB, VC, VD, VE, VF, VG, VH
		SPMWHD32AMD5XAVKS ★ VK	K Kitting	VA, VB, VC, VD, VE, VF, VG, VH, VJ, VK, VL, VM
	3500	SPMWHD32AMD5XAU0S ★ U0	Whole bin	UA, UB, UC, UD, UE, UF, UG, UH, UJ, UK, UL, UM
		SPMWHD32AMD5XAU3S ★ U3	3-step bin	UA, UB, UC, UD
		SPMWHD32AMD5XAUS ★ US	S Kitting	UA, UB, UC, UD, UE, UF, UG, UH
		SPMWHD32AMD5XAUKS ★ UK	K Kitting	UA, UB, UC, UD, UE, UF, UG, UH, UJ, UK, UL, UM
	4000	SPMWHD32AMD5XAT0S ★ T0	Whole bin	TA, TB, TC, TD, TE, TF, TG, TH, TJ, TK, TL, TM
		SPMWHD32AMD5XAT3S ★ T3	3-step bin	TA, TB, TC, TD
		SPMWHD32AMD5XATSS ★ TS	S Kitting	TA, TB, TC, TD, TE, TF, TG, TH
		SPMWHD32AMD5XATKS ★ TK	K Kitting	TA, TB, TC, TD, TE, TF, TG, TH, TJ, TK, TL, TM
	5000	SPMWHD32AMD5XAR0 ★ R0	Whole bin	RA, RB, RC, RD, RE, RF, RG, RH, RJ, RK, RL, RM
		SPMWHD32AMD5XAR3S ★ R3	3-step bin	RA, RB, RC, RD
		SPMWHD32AMD5XARS ★ RS	S Kitting	RA, RB, RC, RD, RE, RF, RG, RH
		SPMWHD32AMD5XARK ★ RK	K Kitting	RA, RB, RC, RD, RE, RF, RG, RH, RJ, RK, RL, RM
	5700	SPMWHD32AMD5XAQ0S ★ Q0	Whole bin	QA, QB, QC, QD, QE, QF, QG, QH, QJ, QK, QL, QM
		SPMWHD32AMD5XAQ3S ★ Q3	3-step bin	QA, QB, QC, QD
		SPMWHD32AMD5XAQSS ★ QS	S Kitting	QA, QB, QC, QD, QE, QF, QG, QH
		SPMWHD32AMD5XAQKS ★ QK	K Kitting	QA, QB, QC, QD, QE, QF, QG, QH, QJ, QK, QL, QM
	6500	SPMWHD32AMD5XAP0S ★ P0	Whole bin	PA, PB, PC, PD, PE, PF, PH, PJ, PK, PL, PM
		SPMWHD32AMD5XAP3S ★ P3	3-step bin	PA, PB, PC, PD
		SPMWHD32AMD5XAPSS ★ PS	S Kitting	PA, PB, PC, PD, PE, PF, PH
		SPMWHD32AMD5XAPKS ★ PK	K Kitting	PA, PB, PC, PD, PE, PF, PH, PJ, PK, PL, PM

(7) Voltage Bins ($I_F = 65 \text{ mA}$, $T_a = 25 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
80	-	-	XA	AY	2.6 ~ 2.7
				AZ	2.7 ~ 2.8
				A1	2.8 ~ 2.9

(8) Chromaticity Region & Coordinates ($I_F = 65 \text{ mA}$, $T_s = 25^\circ\text{C}$)



(9) Chromaticity Region & Coordinates ($I_F = 65 \text{ mA}$, $T_s = 25^\circ\text{C}$)


MacAdam Ellipse (Y3, Y5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.5018	0.4153	-39.89	0.004	0.00720
5-Step	0.5018	0.4153	-39.89	0.00667	0.01201

MacAdam Ellipse (W3, W5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.4578	0.4101	53.70	0.0081	0.0042
5-Step	0.4578	0.4101	53.70	0.0135	0.00700

MacAdam Ellipse (V3, V5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.4338	0.4030	53.22	0.0083	0.00410
5-Step	0.4338	0.4030	53.22	0.0139	0.00680

MacAdam Ellipse (U3, U5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.4073	0.3917	54.00	0.00927	0.00414
5-Step	0.4073	0.3917	54.00	0.01545	0.00690

MacAdam Ellipse (T3, T5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.3818	0.3797	53.72	0.00939	0.00402
5-Step	0.3818	0.3797	53.72	0.01565	0.00670

MacAdam Ellipse (R3, R5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.3447	0.3553	59.62	0.00820	0.00350
5-Step	0.3447	0.3553	59.62	0.01370	0.00590

MacAdam Ellipse (Q3, Q5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.3287	0.3417	59.09	0.00746	0.00320
5-Step	0.3287	0.3417	59.09	0.01243	0.00533

MacAdam Ellipse (P3, P5)					
Step	CIE x	CIE y	θ	a	b
3-Step	0.3123	0.3282	58.57	0.00669	0.00285
5-Step	0.3123	0.3282	58.57	0.01115	0.00475

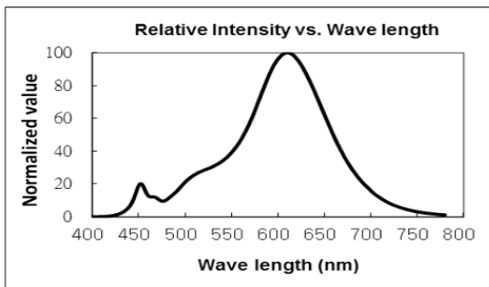
* Note :

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

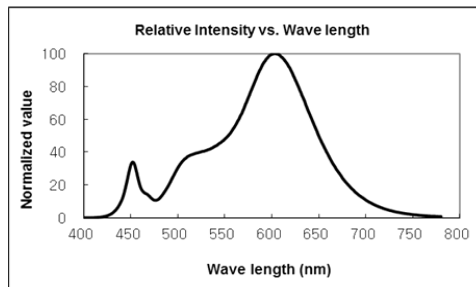
3. Typical Characteristics Graphs

(1) Spectrum Distribution ($I_F = 65 \text{ mA}$, $T_s = 25^\circ\text{C}$)

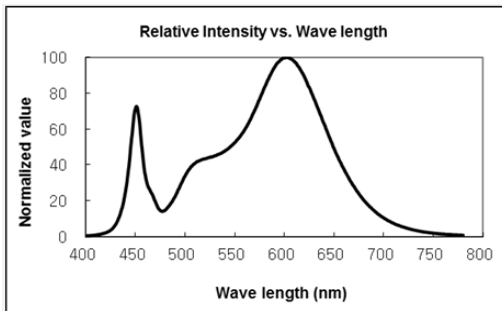
CCT : 2200 K (80 CRI)



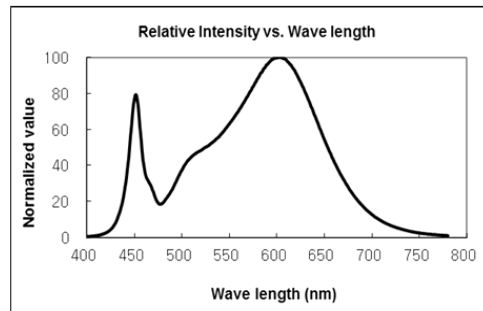
CCT : 2700 K (80 CRI)



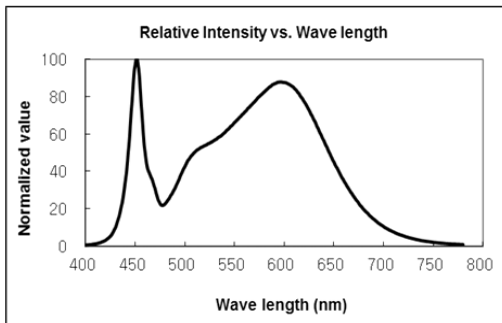
CCT : 3000 K (80 CRI)



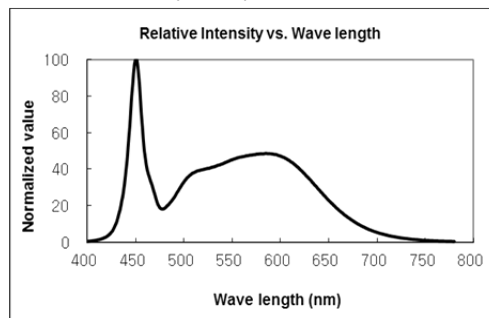
CCT : 3500 K (80 CRI)



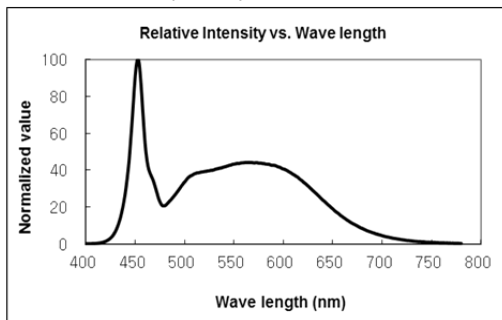
CCT : 4000 K (80 CRI)



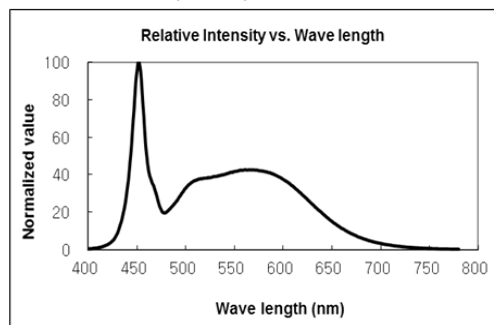
CCT : 5000 K (80 CRI)



CCT : 5700 K (80 CRI)

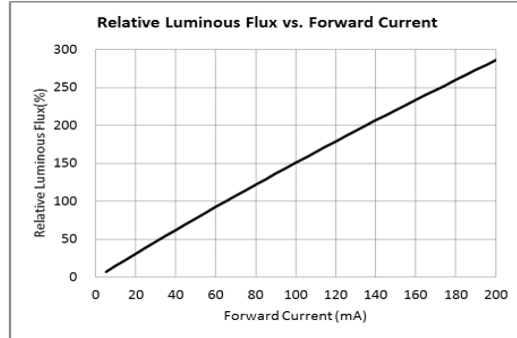
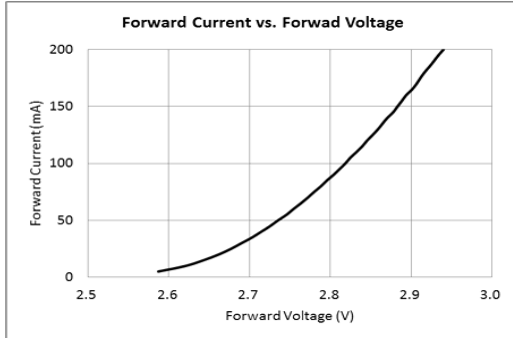


CCT : 6500 K (80 CRI)

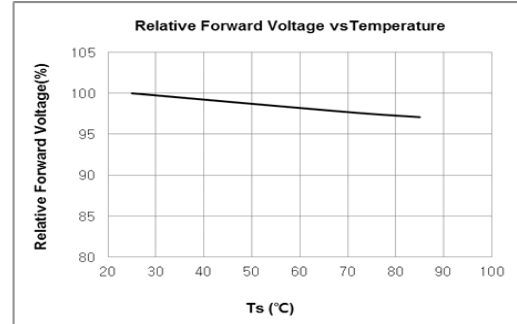
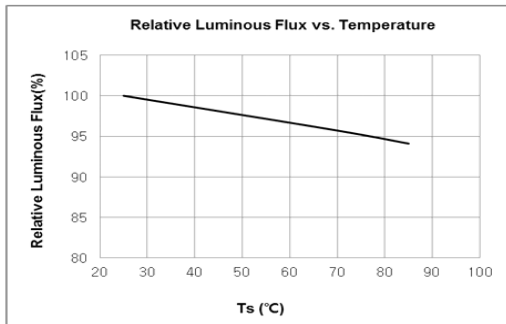


3. Typical Characteristics Graphs

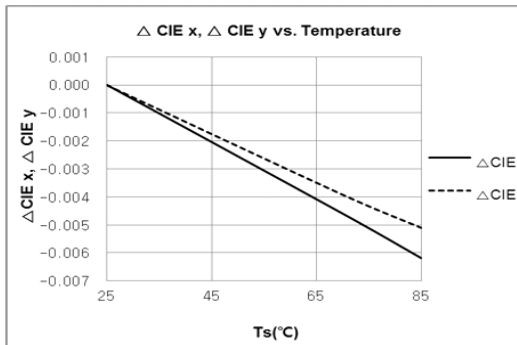
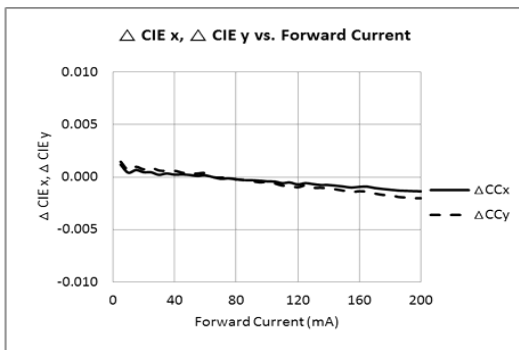
(2) Forward Current Characteristics ($T_s=25\text{ }^{\circ}\text{C}$)



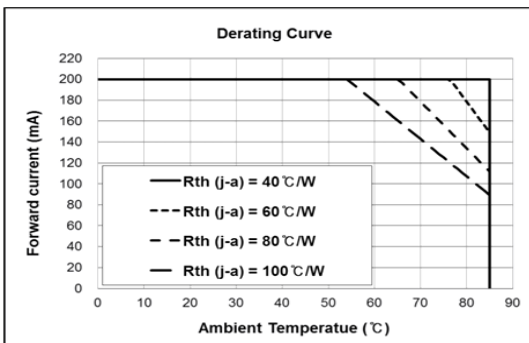
(3) Temperature Characteristics ($I_F=65\text{ mA}$)



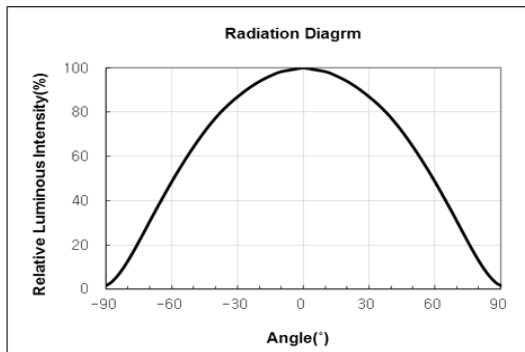
(4) Color Shift Characteristics ($I_F=65\text{ mA}$, $T_a=25\text{ }^{\circ}\text{C}$)



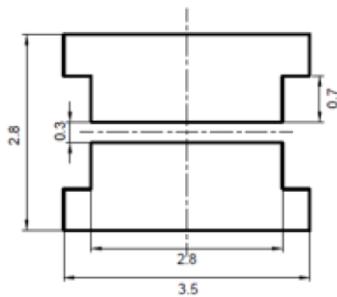
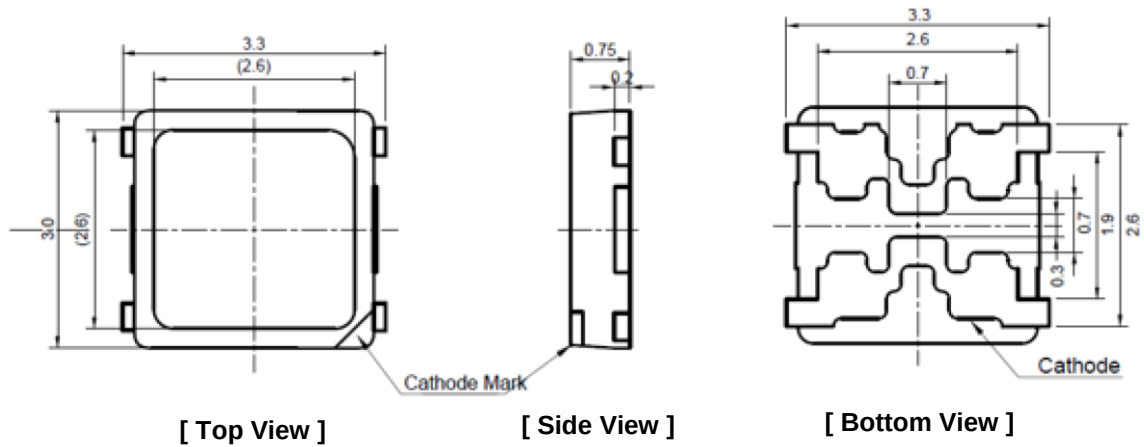
(5) Derating Curve



(6) Beam Angle Characteristics ($I_F=65\text{ mA}$, $T_a=25\text{ }^{\circ}\text{C}$)



4. Outline Drawing & Dimension



[Recommended PCB Solder Pad]

- Measurement unit : mm
- Tolerance : $\pm 0.1\text{mm}$

*** Note :**

- 1) This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).
- 2) T_s point and measurement method:
 - ① Measure one point at the cathode pad, if necessary remove PSR of PCB to reach T_s point.
 - ② All pads must be soldered to the PCB to dissipate heat properly, otherwise the LED can be damaged

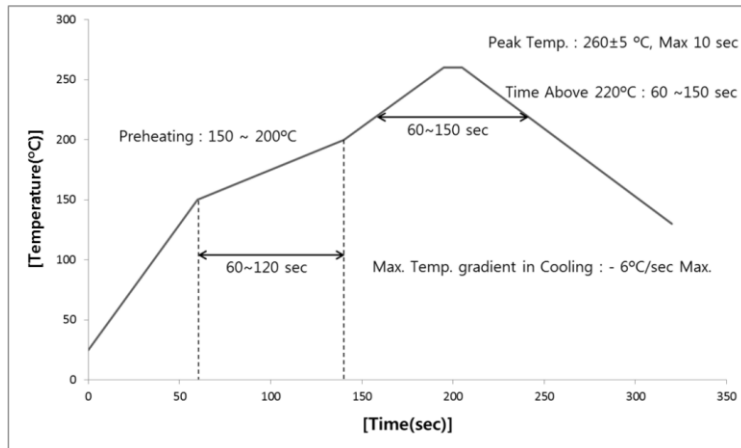
Precautions:

- 1) Pressure on the LEDs will influence to the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the LEDs. Do not put stress on the LEDs during heating.
- 2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED's characteristics should be carefully checked before and after such repair.
- 3) Do not stack assembled PCBs together. Since materials of LEDs is soft, abrasion between two PCB assembled with LED might cause catastrophic failure of the LEDs.

5. Soldering Conditions

(1) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



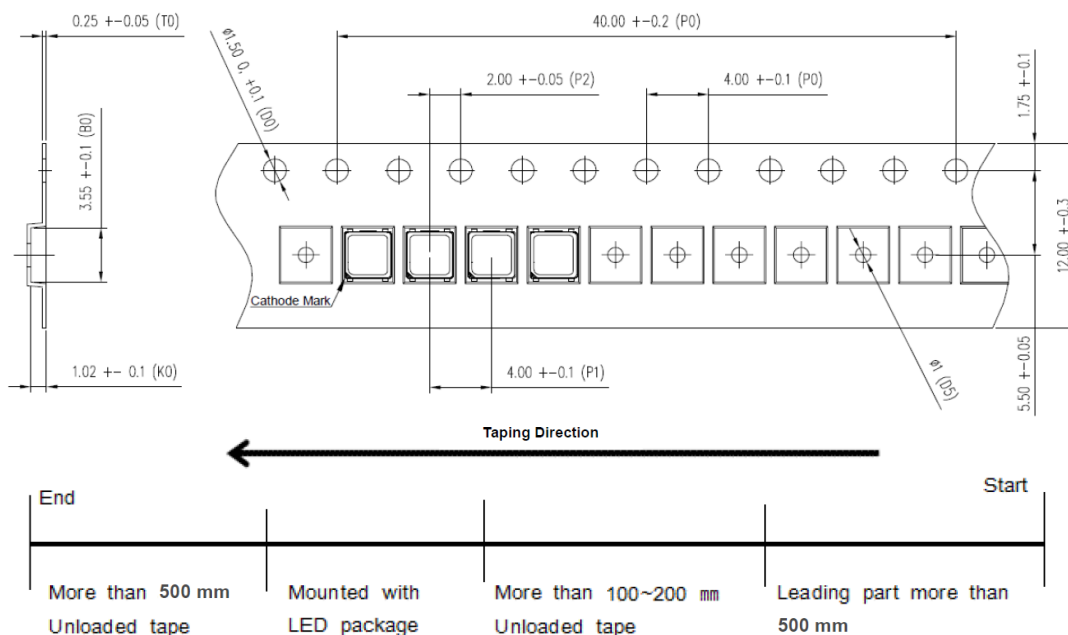
(2) Manual Soldering Conditions

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

6. Tape & Reel

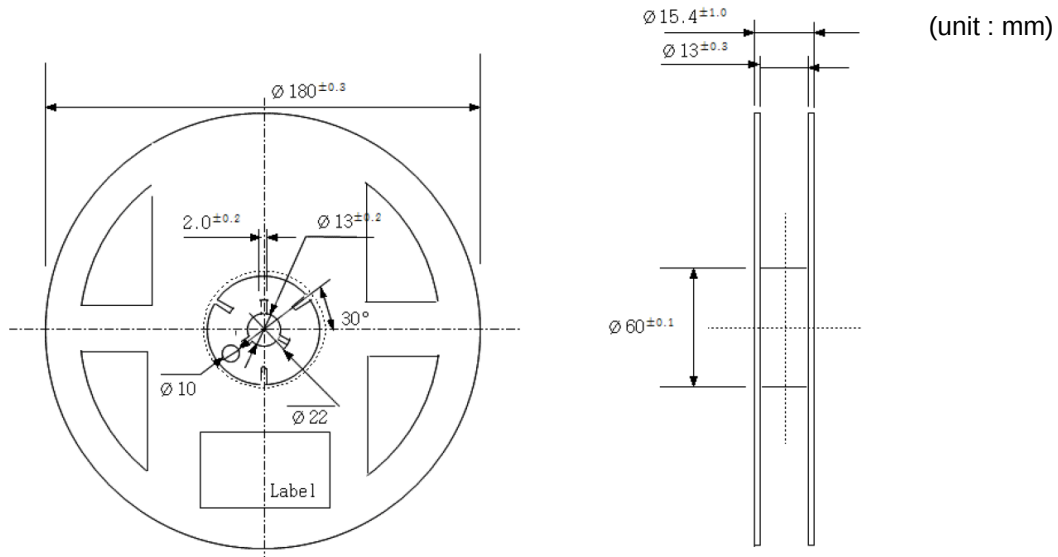
(1) Taping Dimension

(unit : mm)



6. Tape & Reel

(2) Reel Dimension (Max 4,000 pcs)

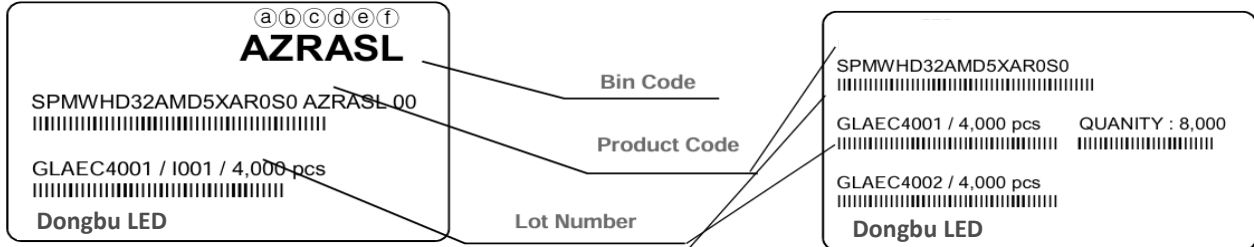


* Note :

- 1) Quantity: The quantity/reel is 4,000 pcs
- 2) Cumulative Tolerance: Cumulative tolerance / 10 pitches is ± 0.2 mm
- 3) Adhesion Strength of Cover Tape: Adhesion strength is 0.1-0.7 N when the cover tape is turned off from the carrier tape at 10° angle to the carrier tape
- 4) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

7. Label Structure

(1) Label Structure



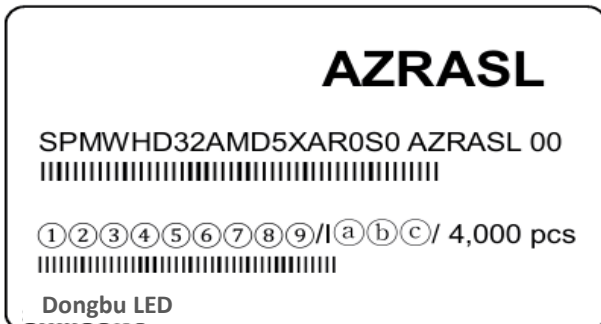
* Note : Denoted bin code and product code above is only an example (see description on page 3)

Bin Code

- ⒶⒷ: Forward Voltage bin (refer to page 4)
- ⒸⒹ: Chromaticity bin (refer to page 9)
- ⒺⒻ: Luminous Flux bin (refer to page 4, 5)

(2) Lot Number

The lot number is composed of the following characters:



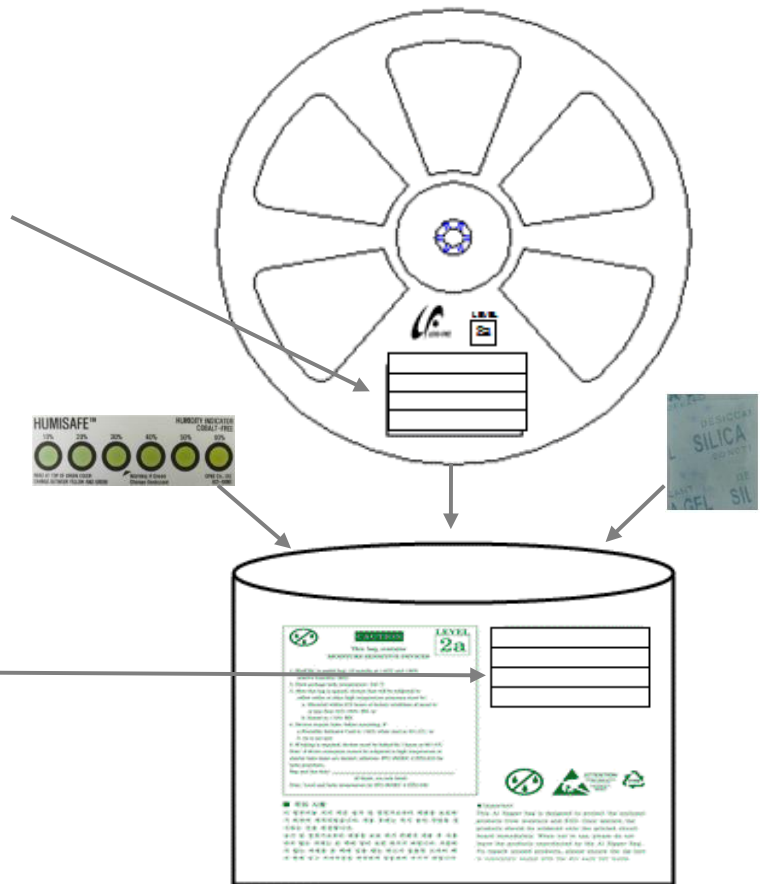
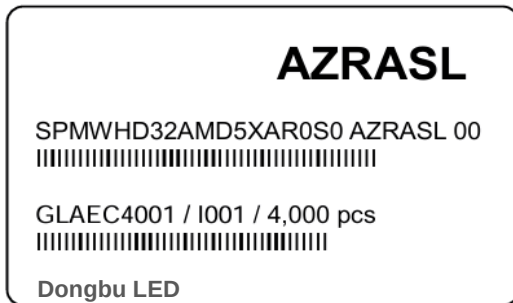
①②③④⑤⑥⑦⑧⑨ / I ⒶⒷⒸ / 4,000 pcs

- ①② : Production site (GL: Tianjin, China , G4: Guangzhou, China, E EH : HanoiHanoi, Vietnam)
- ③ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
- ④ : Year (C: 2018, D: 2019, E: 2020, F: 2021, G: 2022...)
- ⑤ : Month (1~9, A, B, C)
- ⑥ : Day (1~9, A, B~V)
- ⑦⑧⑨ : Serial number (001 ~ 999)
- ⒶⒷⒸ : Reel number (001 ~ 999)

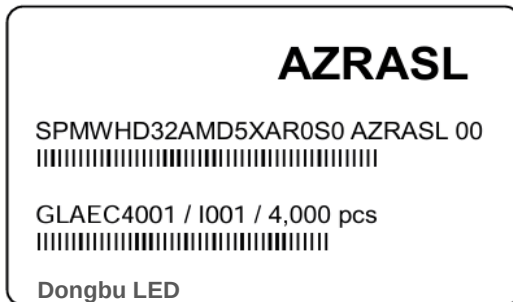
8. Packing Structure

(1) Packing Process (The quantity of PKG on the Reel to be Max 4,000 pcs)

Reel



Aluminum Vinyl Packing Bag

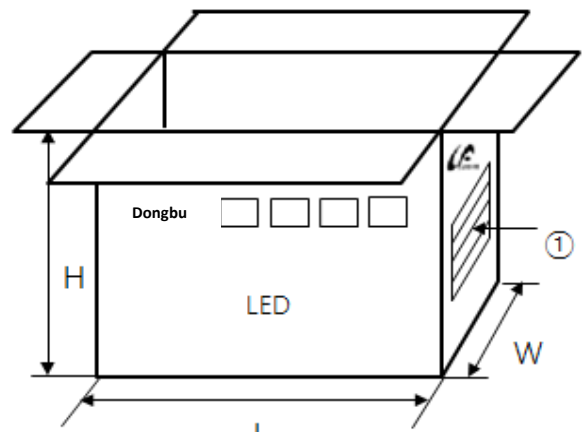
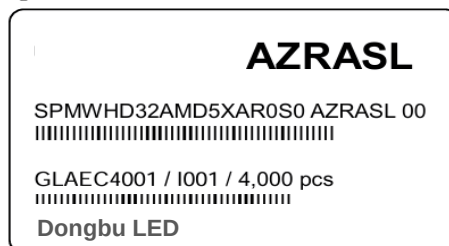


Outer Box

Material: Paper (SW3B(B))

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

① Side Label

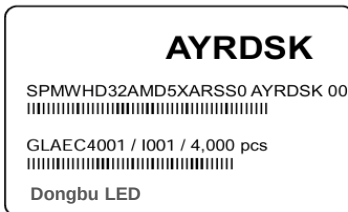


8. Packing Structure

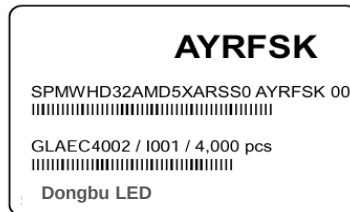
(3) Packing Process for kitting (The quantity of PKG on the Reel to be Max 4,000 pcs)

Reel

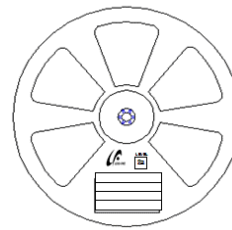
Kitting 'A'



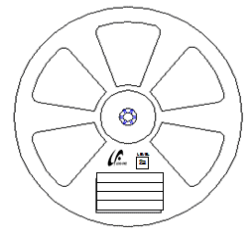
Kitting 'B'



Kitting 'A'

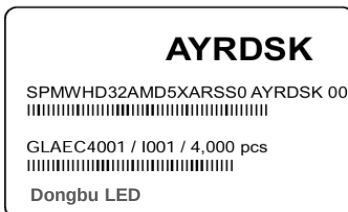


Kitting 'B'

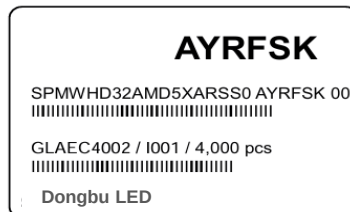


Aluminum Vinyl Packing Bag

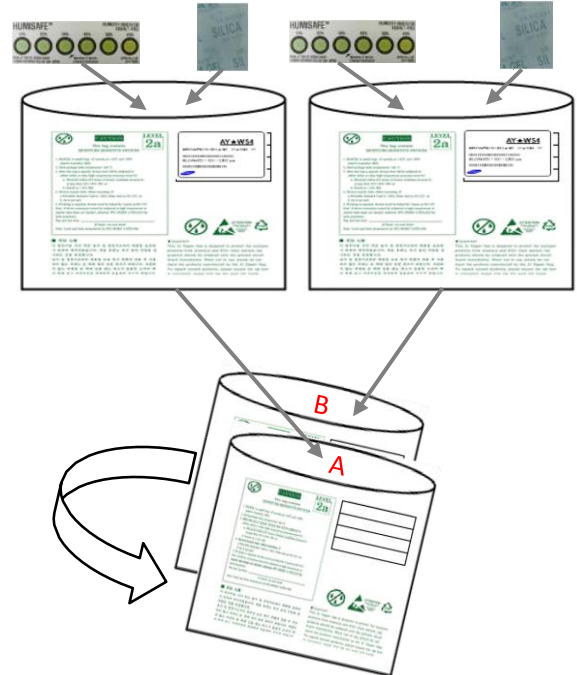
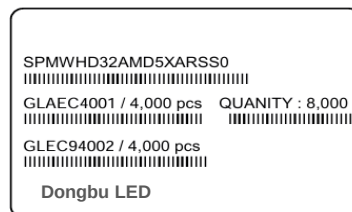
Kitting 'A'



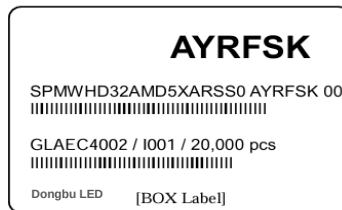
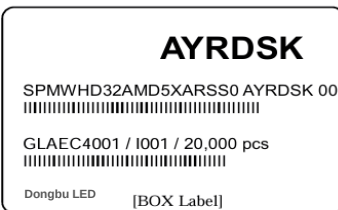
Kitting 'B'



Kitting 'B' (back Side)



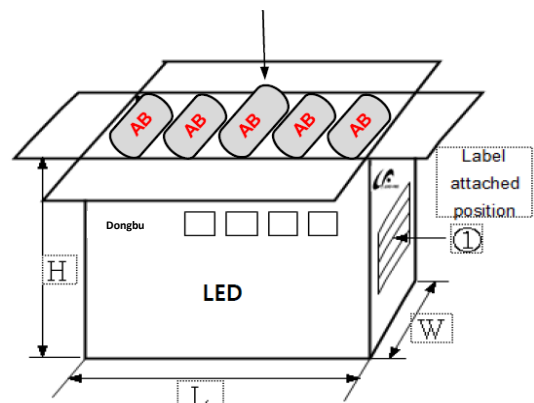
Outer Box



* Note : "★" can be Nominal CCT code.

Material : Paper (SW3B(B))

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



8. Packing Structure

(5) Aluminum Vinyl Packing Bag



(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

*Note 1, 2: IPC/JEDEC J-STD-033A, Recommended Equivalent Total Floor Life Table

Package Type and Body Thickness	Moisture Sensitivity Level	Maximum Percent Relative Humidity						Temperature
		40%	50%	60%	70%	80%	90%	
Body Thickness <2.1mm	Level2a	∞	∞	28	1	1	1	30°C
		∞	∞	∞	2	1	1	25°C
		∞	∞	∞	2	2	1	20°C

- (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 10~24 hours 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.

9. Precautions in Handling & Use

(11) Risk of sulfurization (or tarnishing)

The LED from Dongbu 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.