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

Middle Power LED Series
3030
LM302D
CRI 90

Features & Benefits

- **0.9 W 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	3	3	2	7	F	S	7	G	A	V	Y	S	F

Digit	PKG Information	Code	Specification			
1 2 3	Dongbu Package Middle Power	SPM	Mddle power			
4 5	Color	WH	White			
6	Product Version	3	Zener-in			
7 8 9	Form Factor	327	3.0 x 3.0 x 0.65 mm 2 pads			
10	Sorting Current (mA)	F	150 mA			
11	Chromaticity Coordinates	S	MacAdam			
12	CRI	7	Min. 90			
13 14	Forward Voltage (V)	GA	6.0~6.4	Bin Code	AZ	6.0~6.1
					A1	6.1~6.2
					A2	6.2~6.3
					A3	6.3~6.4
15 16	CCT (K)	W☆	2700	Bin Code	WN, WP, WQ, WR, WS, WT, WU	
		V☆	3000		VN, VP, VQ, VR, VS, VT, VU	
		U☆	3500		UN, UP, UQ, UR, US, UT, UU	
		T☆	4000		TN, TP, TQ, TR, TS, TT, TU	
		R☆	5000		RN, RP, RQ, RR, RS, RT, RU	
		Q☆	5700		QN, QP, QQ, QR, QS, QT, QU	
		P☆	6500		PN, PP, PQ, PR, PS, PT, PU	
			☆ : "0" (Whole Bin) or "Y"(Y Kitting) or "3"(MacAdam 3 step)			
17 18	Luminous Flux	SF	Bin Code	SF		

2. Characteristics

(1) Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	ºC	
Storage Temperature	T_{stg}	-40 ~ +100	℃	
LED Junction Temperature	T_j	125	℃	
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	℃/S	
ESD (HBM)	-	5	KV	

(2) Electro-optical Characteristics (I_F = 150 mA, T_s = 25 ºC)

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (VF)	V	GA	AZ	6.0	-	6.1
			A1	6.1	-	6.2
			A2	6.2	-	6.3
			A3	6.3	-	6.4
Reverse Voltage (@ 5 mA)	V			0.7	-	1.2
Color Rendering Index (Ra)	-	7		90	-	-
R9	-			50	-	-
Thermal Resistance (junction to solder point)	ºC/W			-	12	-
Beam Angle	°			-	120	-

* Note

Dongbu maintains measurement tolerance of: forward voltage = ±0.1 V, luminous flux = ±5 %, CRI = ±3

(4) Luminous Flux Bins (I_F = 150 mA, T_s = 25ºC)

Nominal CCT (K)	CRI Min.	Product Code	Flux Bin	Flux Range (Φ_v, lm)
2700	90	SPMWH3327FS7GAW☆SF	SF	110 ~ 120
3000	90	SPMWH3327FS7GAV☆SF	SF	114 ~ 124
3500	90	SPMWH3327FS7GAU☆SF	SF	118 ~ 128
4000	90	SPMWH3327FS7GAT☆SF	SF	121 ~ 131
5000	90	SPMWH3327FS7GAR☆SF	SF	123 ~ 133
5700	90	SPMWH3327FS7GAQ☆SF	SF	122 ~ 132
6500	90	SPMWH3327FS7GAP☆SF	SF	121 ~ 131

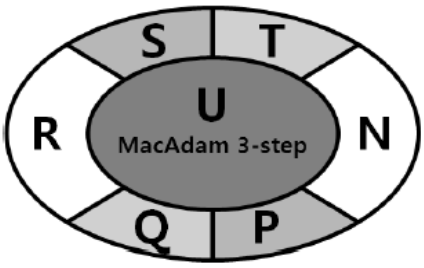
* Note :

"☆" can be "0" (Whole bin), "3" (MacAdam 3-step), "Y" (Kitting).

(5) Kitting rule

1. Under agreement between customer and Dongbu LED, Dongbu can supply kitting bin (VF, Color, lm).
2. A luminous flux of kitting bin is combined by a pair of IV rank such as (SL+SM) or (SM+SM).

[Binning Information]



[Binning Information]

Item	Bin #1	Bin #2
VF	AZ	AZ
	A1	A1
	A2	A2
	A3	A3
CIE	U	U
	N	R
	P	S
	Q	T
IV	SF	SF

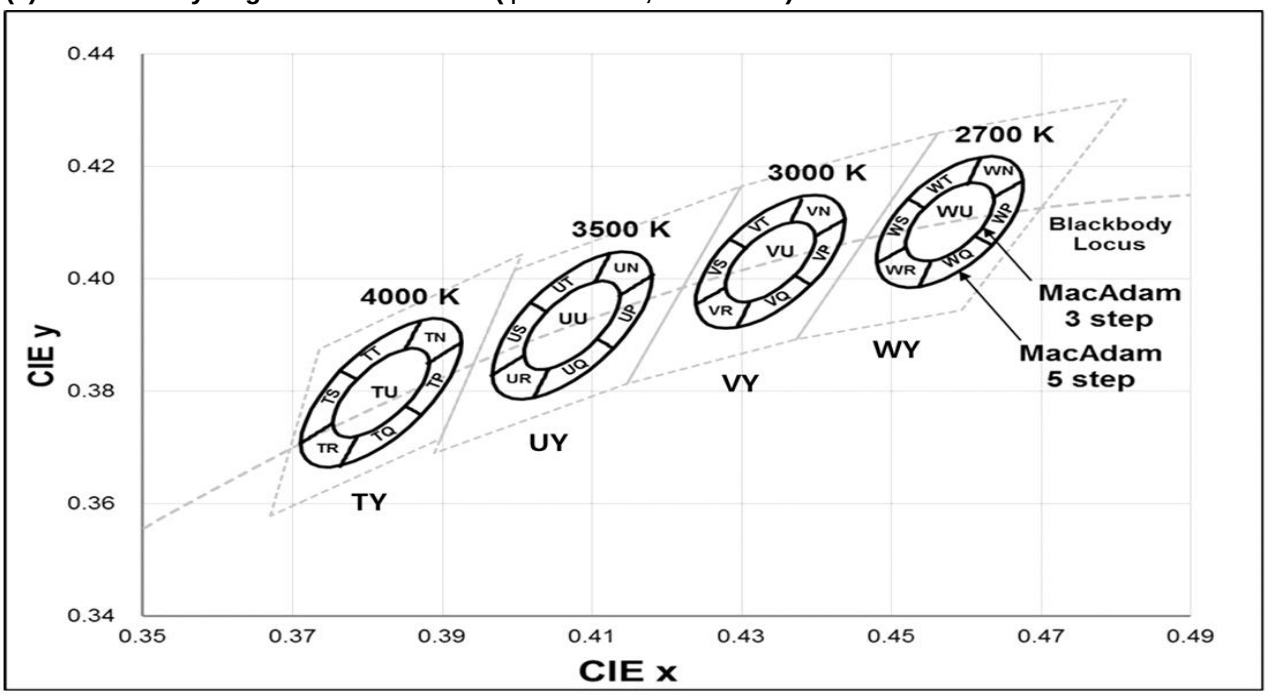
(6) Color Bins (I_F = 150 mA, Ts = 25 ºC)

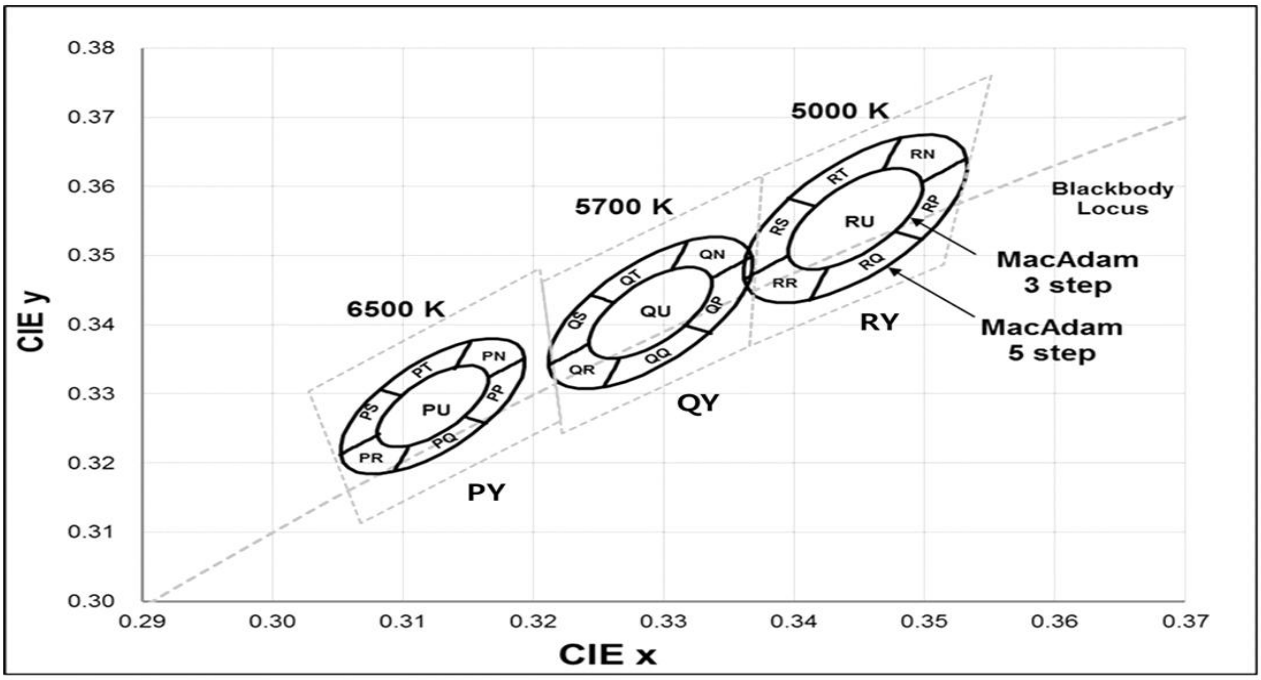
CRI (Ra) Min.	Norminal CCT (K)	Product Code	Color Rank		Chromaticity Bins
90	2700	SPMWH3327FS7GAV0SF	W0	Whole bin	WN, WP, WQ, WR, WS, WT, WU
		SPMWH3327FS7GAV3SF	W3	3 step ellipse bin	WU
		SPMWH3327FS7GAVYSF	WY	Y Kitting	WN, WP, WQ, WR, WS, WT, WU
	3000	SPMWH3327FS7GAV0SF	V0	Whole bin	VN, VP, VQ, VR, VS, VT, VU
		SPMWH3327FS7GAV3SF	V3	3 step ellipse bin	VU
		SPMWH3327FS7GAVYSF	VY	Y Kitting	VN, VP, VQ, VR, VS, VT, VU
	3500	SPMWH3327FS7GAU0SF	U0	Whole bin	UN, UP, UQ, UR, US, UT, UU
		SPMWH3327FS7GAU3SF	U3	3 step ellipse bin	UU
		SPMWH3327FS7GAUYSF	UY	Y Kitting	UN, UP, UQ, UR, US, UT, UU
	4000	SPMWH3327FS7GAT0SF	T0	Whole bin	TN, TP, TQ, TR, TS, TT, TU
		SPMWH3327FS7GAT3SF	T3	3 step ellipse bin	TU
		SPMWH3327FS7GATYSF	TY	Y Kitting	TN, TP, TQ, TR, TS, TT, TU
	5000	SPMWH3327FS7GAR0SF	R0	Whole bin	RN, RP, RQ, RR, RS, RT, RU
		SPMWH3327FS7GAR3SF	R3	3 step ellipse bin	RU
		SPMWH3327FS7GARYSF	RY	Y Kitting	RN, RP, RQ, RR, RS, RT, RU
	5700	SPMWH3327FS7GAQ0SF	Q0	Whole bin	QN, QP, QQ, QR, QS, QT, QU
		SPMWH3327FS7GAQ3SF	Q3	3 step ellipse bin	QU
		SPMWH3327FS7GAQYSF	QY	Y Kitting	QN, QP, QQ, QR, QS, QT, QU
	6500	SPMWH3327FS7GAP0SF	P0	Whole bin	PN, PP, PQ, PR, PS, PT, PU
		SPMWH3327FS7GAP3SF	P3	3 step ellipse bin	PU
		SPMWH3327FS7GAPYSF	PY	Y Kitting	PN, PP, PQ, PR, PS, PT, PU

(7) Voltage Bins (I_F = 150 mA, T_a = 25 ºC)

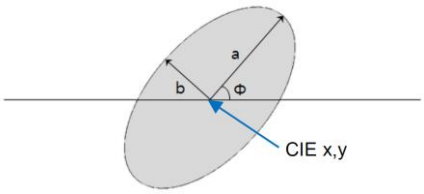
CRI (Ra) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-	GA	AZ	6.0 ~ 6.1
				A1	6.1 ~ 6.2
				A2	6.2 ~ 6.3
				A3	6.3 ~ 6.4

(8) Chromaticity Region & Coordinates (I_F = 150 mA, Ts = 25 ºC)





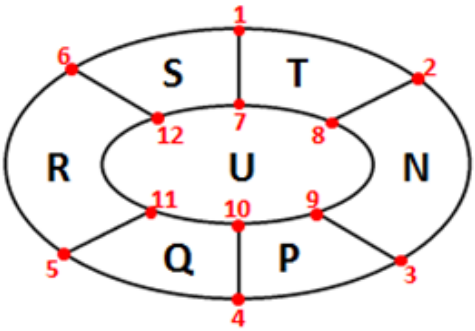
(9) Chromaticity Region & Coordinates (I_F = 150 mA, Ts = 25 ºC)



MacAdam	CCT (K)	Center point		Major-axis	Minor-axis	Rotation
		CIE x	CIE y	a	b	Φ
3 step	2700	0.4578	0.4101	0.0081	0.0042	53.70
	3000	0.4338	0.4030	0.0083	0.0041	53.22
	3500	0.4073	0.3917	0.0093	0.0041	54.00
	4000	0.3818	0.3797	0.0094	0.0040	53.72
	5000	0.3447	0.3553	0.0082	0.0035	59.62
	5700	0.3287	0.3417	0.0075	0.0032	59.10
	6500	0.3123	0.3282	0.0067	0.0029	58.57
5 step	2700	0.4578	0.4101	0.0135	0.0070	53.70
	3000	0.4338	0.4030	0.0138	0.0068	53.22
	3500	0.4073	0.3917	0.0155	0.0068	54.00
	4000	0.3818	0.3797	0.0157	0.0067	53.72
	5000	0.3447	0.3553	0.0137	0.0058	59.62
	5700	0.3287	0.3417	0.0125	0.0053	59.10
	6500	0.3123	0.3282	0.0112	0.0048	58.57

Dongbu maintains measurement tolerance of: Cx, Cy = ±0.005

(10) Chromaticity Region & Coordinates



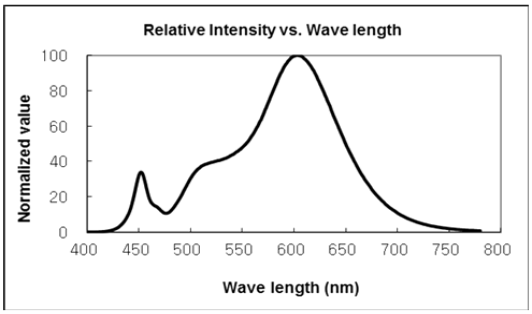
Region	2700K		3000K		3500K		4000K	
	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y
1	0.4521	0.4142	0.4283	0.4071	0.4018	0.4283	0.4071	0.4018
2	0.4619	0.4216	0.4382	0.4146	0.4125	0.4382	0.4146	0.4125
3	0.4675	0.4175	0.4437	0.4105	0.4180	0.4437	0.4105	0.4180
4	0.4634	0.4059	0.4393	0.3989	0.4128	0.4393	0.3989	0.4128
5	0.4537	0.3986	0.4293	0.3913	0.4022	0.4293	0.3913	0.4022
6	0.4481	0.4028	0.4239	0.3954	0.3966	0.4239	0.3954	0.3966
7	0.4544	0.4126	0.4305	0.4054	0.4040	0.4305	0.4054	0.4040
8	0.4603	0.4170	0.4364	0.4100	0.4104	0.4364	0.4100	0.4104
9	0.4636	0.4145	0.4397	0.4075	0.4137	0.4397	0.4075	0.4137
10	0.4612	0.4076	0.4371	0.4005	0.4106	0.4371	0.4005	0.4106
11	0.4553	0.4032	0.4311	0.3960	0.4042	0.4311	0.3960	0.4042
12	0.4520	0.4057	0.4279	0.3984	0.4009	0.4279	0.3984	0.4009

Region	5000K		5700K		6500K	
	CIE x	CIE y	CIE x	CIE y	CIE x	CIE y
1	0.3397	0.3583	0.3242	0.3445	0.3082	0.3307
2	0.3482	0.3670	0.3320	0.3524	0.3153	0.3377
3	0.3532	0.3640	0.3365	0.3496	0.3194	0.3352
4	0.3497	0.3524	0.3333	0.3390	0.3164	0.3257
5	0.3412	0.3436	0.3254	0.3310	0.3093	0.3187
6	0.3362	0.3465	0.3209	0.3338	0.3052	0.3212
7	0.3417	0.3571	0.3260	0.3434	0.3098	0.3297
8	0.3468	0.3623	0.3307	0.3481	0.3141	0.3339
9	0.3498	0.3605	0.3334	0.3464	0.3166	0.3324
10	0.3477	0.3535	0.3314	0.3401	0.3148	0.3267
11	0.3426	0.3483	0.3267	0.3353	0.3105	0.3225
12	0.3396	0.3500	0.3240	0.3369	0.3080	0.3240

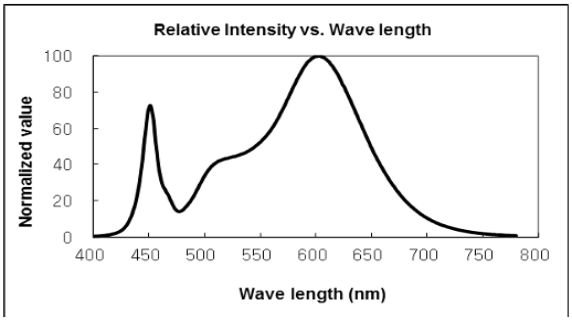
3. Typical Characteristics Graphs

(1) Spectrum Distribution (I_F = 150 mA, T_s = 25 ºC)

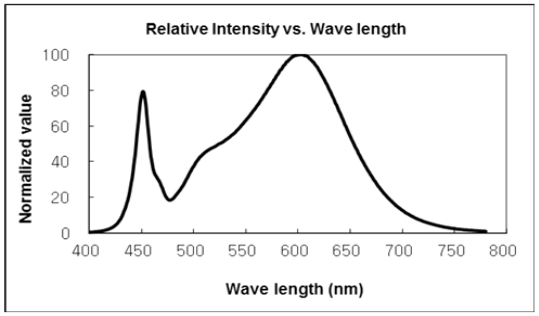
CCT : 2700 K (90 CRI)



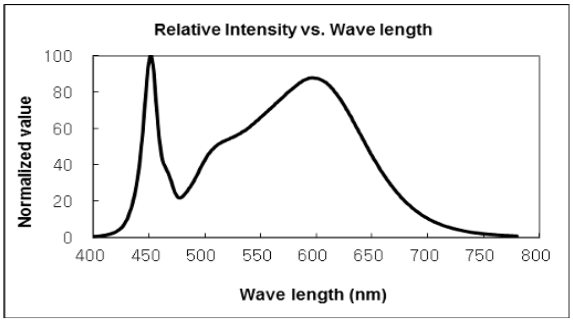
CCT : 3000 K (90 CRI)



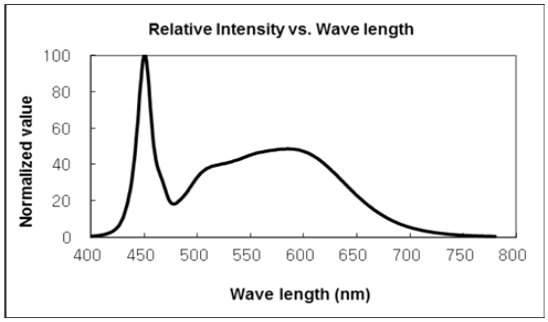
CCT : 3500 K (90 CRI)



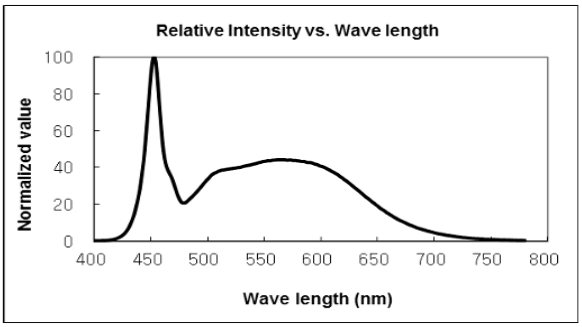
CCT : 4000 K (90 CRI)



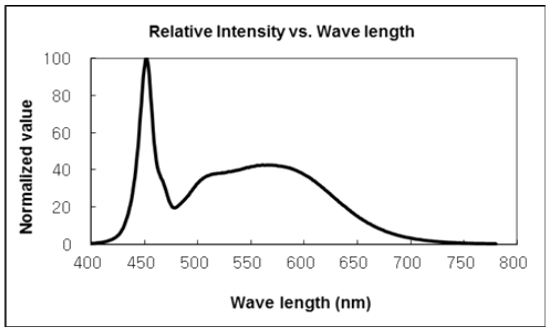
CCT : 5000 K (90 CRI)



CCT : 5700 K (90 CRI)

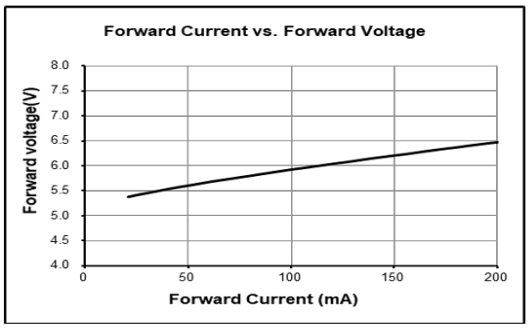


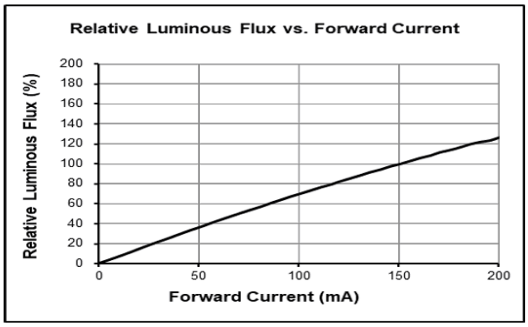
CCT : 6500 K (90 CRI)



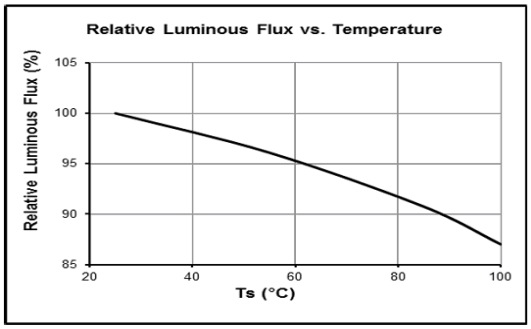
3. Typical Characteristics Graphs

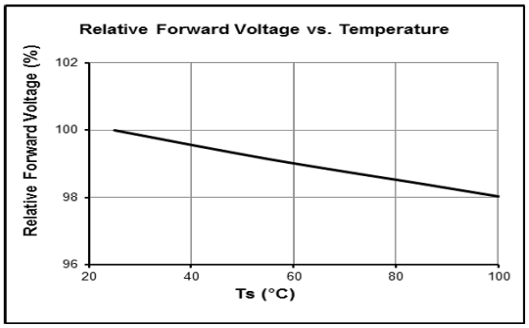
(2) Forward Current Characteristics (T_s=25 ºC)



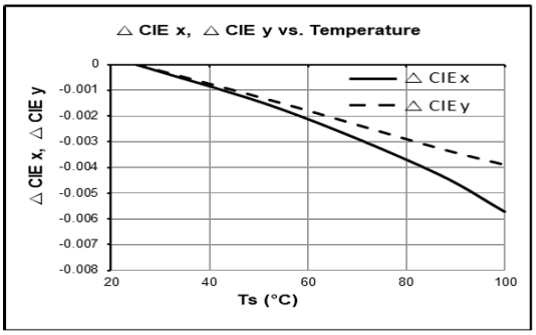


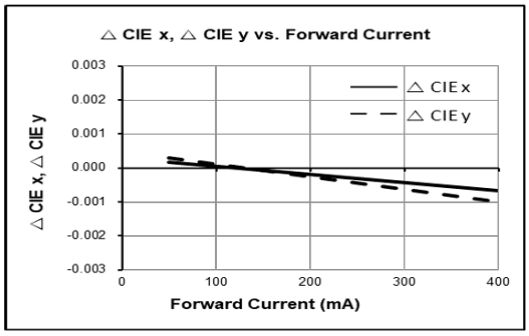
(3)Temperature Characteristics (I_F=65 mA)



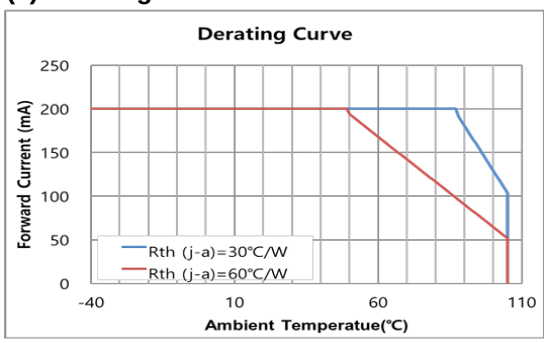


(4) Color Shift Characteristics (I_F=150 mA, T_a=25 ºC)

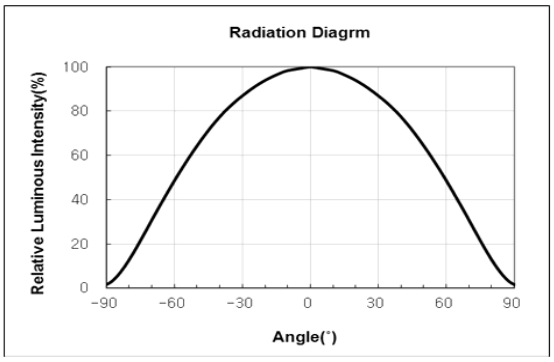




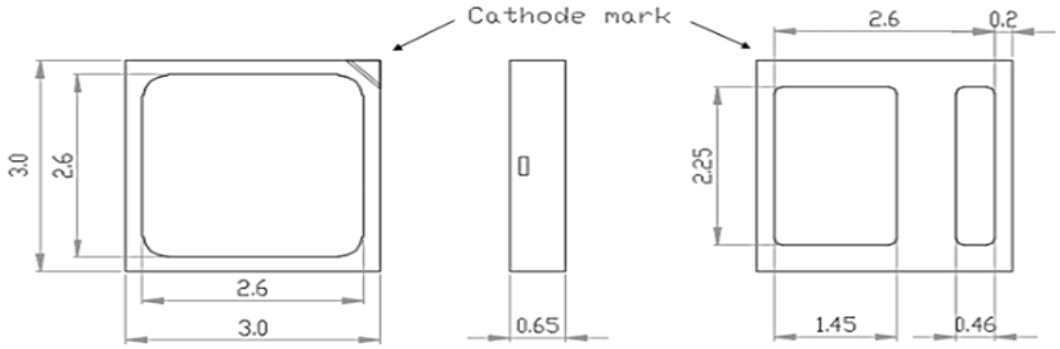
(5) Derating Curve



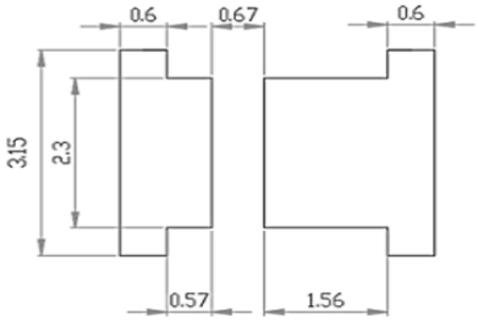
(6) Beam Angle Characteristics (I_F=150 mA, T_a=25 ºC)



4. Outline Drawing & Dimension



[Top View] **[Side View]** **[Bottom View]**



- Measurement unit : mm
- Tolerance : ± 0.1mm

[Recommended PCB Solder Pad]

* Note :

1) This LED has built 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.

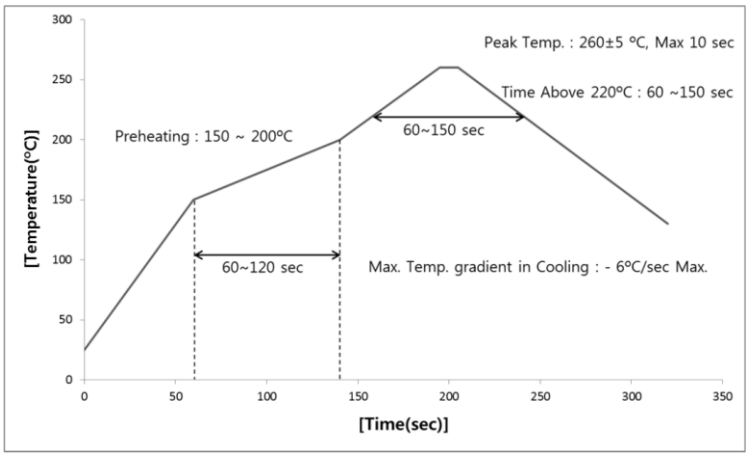
2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked before and after such repair.

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.

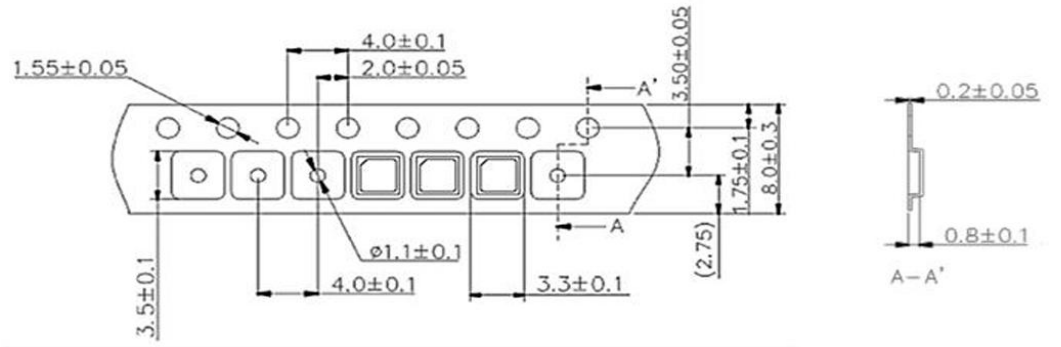


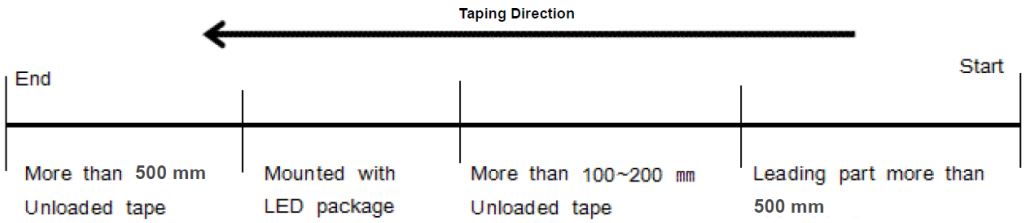
(2) Manual Soldering Conditions

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

6. Tape & Reel

(1) Taping Dimension (unit : mm)

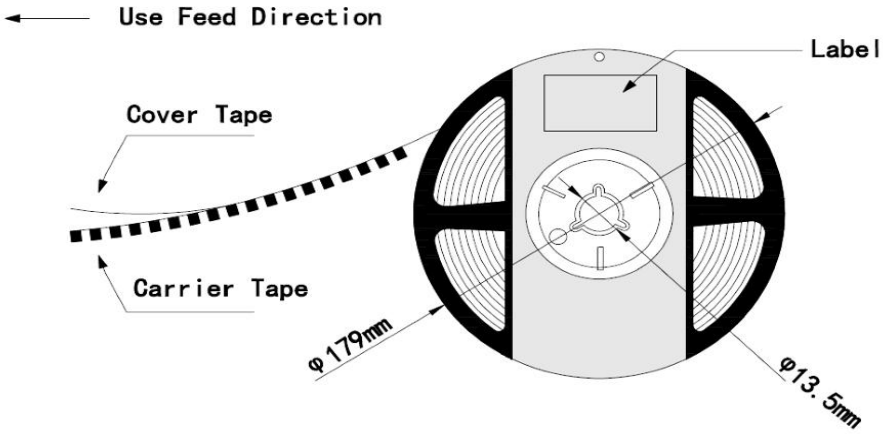




6. Tape & Reel

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

(unit : mm)

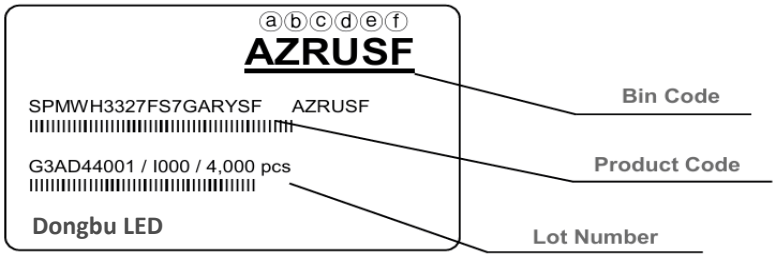


*** Note :**

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

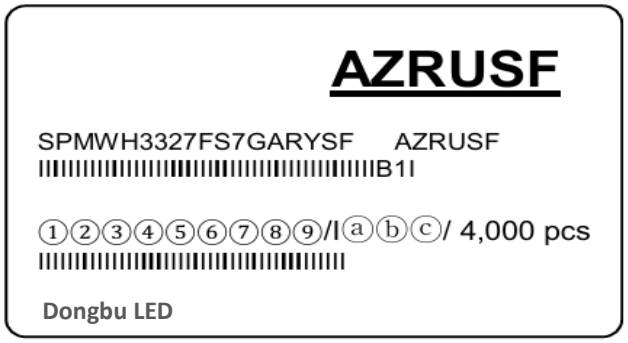
ⓐⓑ: Forward Voltage bin (refer to page 4)

ⓒⓓ: 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:



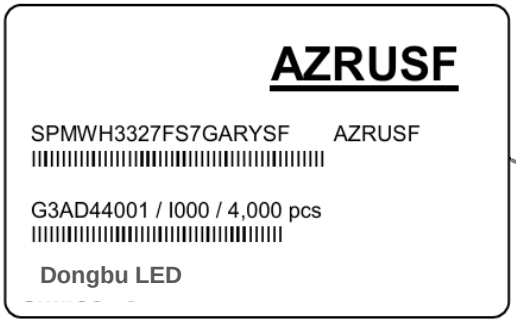
①②③④⑤⑥⑦⑧⑨ / Iⓐⓑⓒ / 4,000 pcs

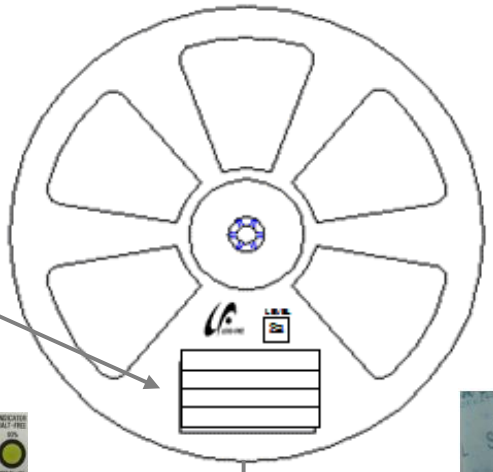
①②	: Production site (GL: Tianjin, China , G4: Guangzhou, China, E EH : HanoiHanoi, Vietnam)
③	: Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
④	: Year (C: 2018, D: 2019, E: 2020, F: 2021, G: 2022…)
⑤	: Month (1~9, A, B, C)
⑥	: Day (1~9, A, B~V)
⑦⑧⑨	: Serial number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

8. Packing Structure

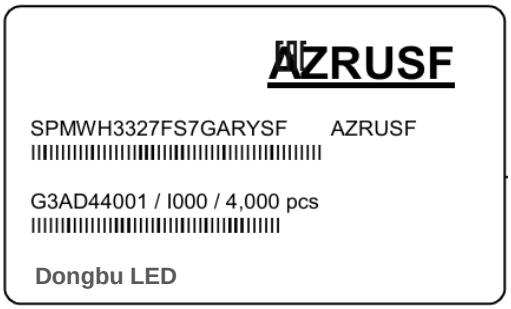
(1) Packing Process (The quantity of PKG on the Reel to be Max 4,000 pcs)

Reel





Aluminum Vinyl Packing Bag

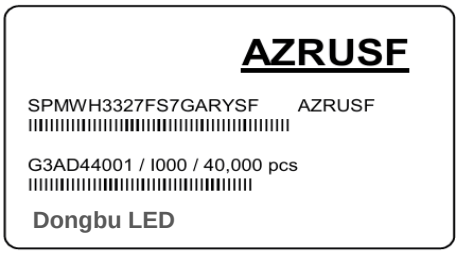


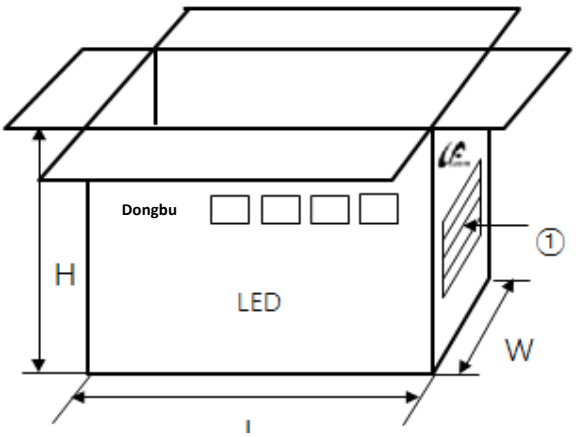
Outer Box

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



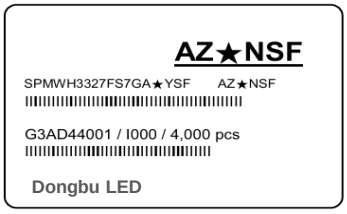


8. Packing Structure

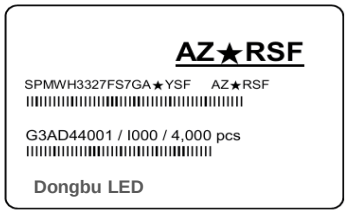
(3) Packing Process for kitting (The quantity of PKG on the Reel to be Max 4,000 pcs)

Reel

Kitting 'A'

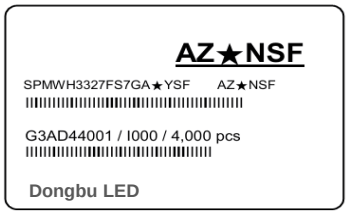


Kitting 'B'

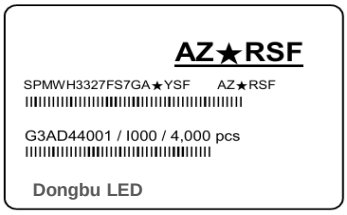


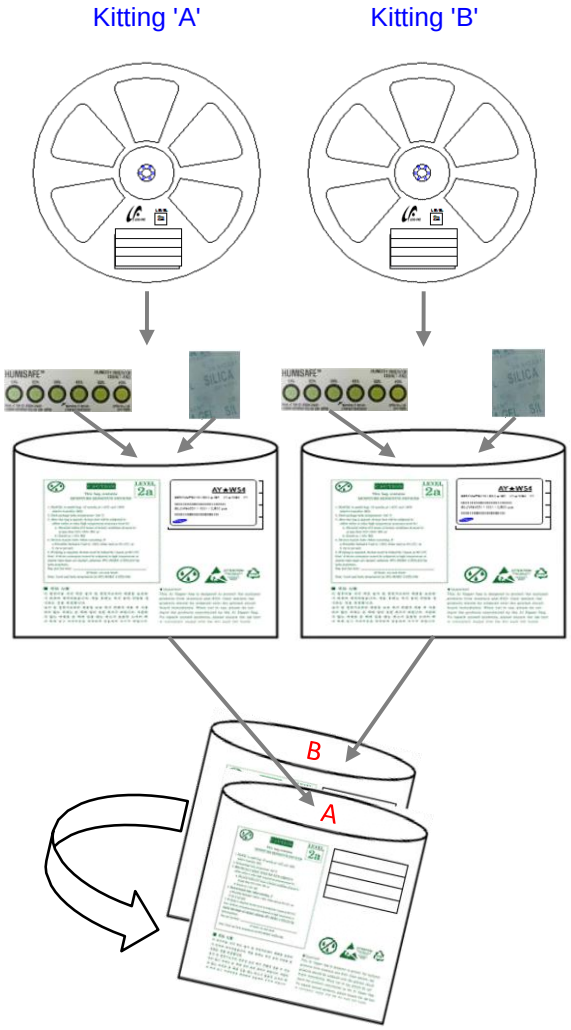
Aluminum Vinyl Packing Bag

Kitting 'A'

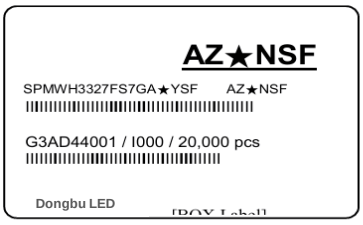


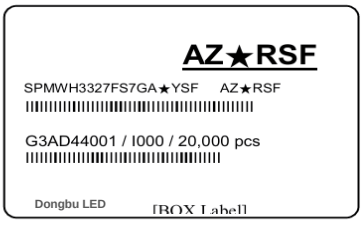
Kitting 'B'



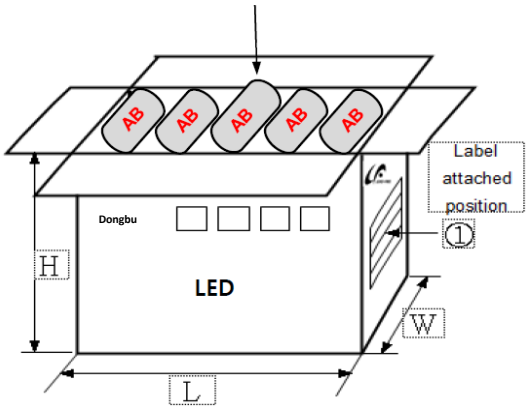


Outer Box





*** Note : "★" can be Nominal CCT code.**



Material : Paper (SW3B(B))

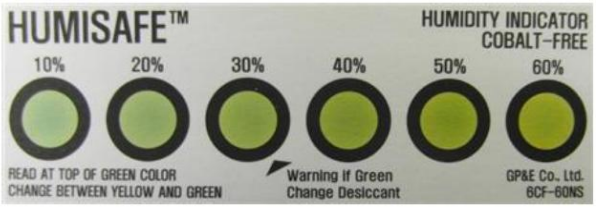
Type	Size (mm)			Note
	L	W	H	
7 inch L	245 ± 5	220 ± 5	182 ± 5	Up to 10 reels

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 ºC, 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 ºC / 60 % RH*$_{Note\ 1}$, or
b. Mounted within 24 hours (1 day) at an assembly line with a condition of more than 30 ºC / 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 Humity						Temperature
		40%	50%	60%	70%	80%	90%	
Body Thickness <2.1mm	Level2a	∞	∞	28	1	1	1	30℃
		∞	∞	∞	2	1	1	25℃
		∞	∞	∞	2	2	1	20℃

(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 ºC.

(8) Devices must be baked for 10~24 hours at 60 ± 5 ºC, 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.