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

Middle Power LED Series
5630
LM561C
CRI85

LM561C is highest performance and lm/W for fluorescent replacement



Features & Benefits

- **0.3W Class middle power LED**
- **Mold resin for high reliability**
- **Standard form factor for design flexibility (5.6 × 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	T	5	4	1	M	L	6	X	A	Q	0	S	0

Digit	PKG Information	Code	Specification		
1 2 3	Dongbu Package Middle Power	SPM	Mddle power		
4 5	Color	WH	White		
6	Product Version	T			
7 8 9	Form Factor	541	5.6 x 3.0 x 0.7 mm 4 pads LM561C		
10	Sorting Current (mA)	M	65 mA		
11	Chromaticity Coordinates	L	L : General		
12	CRI	6	Min. 85		
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
15 16	CCT (K)	Q0	5700	Bin Code	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QD, QE, QF, QG
			"0" (Whole bin)		
17 18	Luminous Flux	S0	Bin Code		S3, S4, S5

2. Characteristics

(1) Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	ºC	-
Storage Temperature	T_{stg}	-40 ~ +120	℃	-
LED Junction Temperature	T_j	110	℃	-
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 = 65 mA, T_s = 25 ºC)

Item	Unit	CRI(Ra) Min.	Norminal CCT(K)	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
Luminous Flux (Φv)	lm	85	5700		S3	30.5		32.5
					S4	32.5		34.5
					S5	34.5		36.5
Reverse Voltage(@ 5 mA)	V					0.7	-	1.2
Color Rendering Index (R_a)	-					85	-	-
Thermal Resistance (junction to solder point)	ºC/W					-	12	-
Beam Angle	º					-	120	-

* Note :

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

(3) Luminous Flux Bins (I_F = 65 mA, T_s = 25ºC)

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v, lm)
85	5700	SPMWHT541ML6XAQ0S0	S3	30.5 ~ 32.5
			S4	32.5 ~ 34.5
			S5	34.5 ~ 36.5

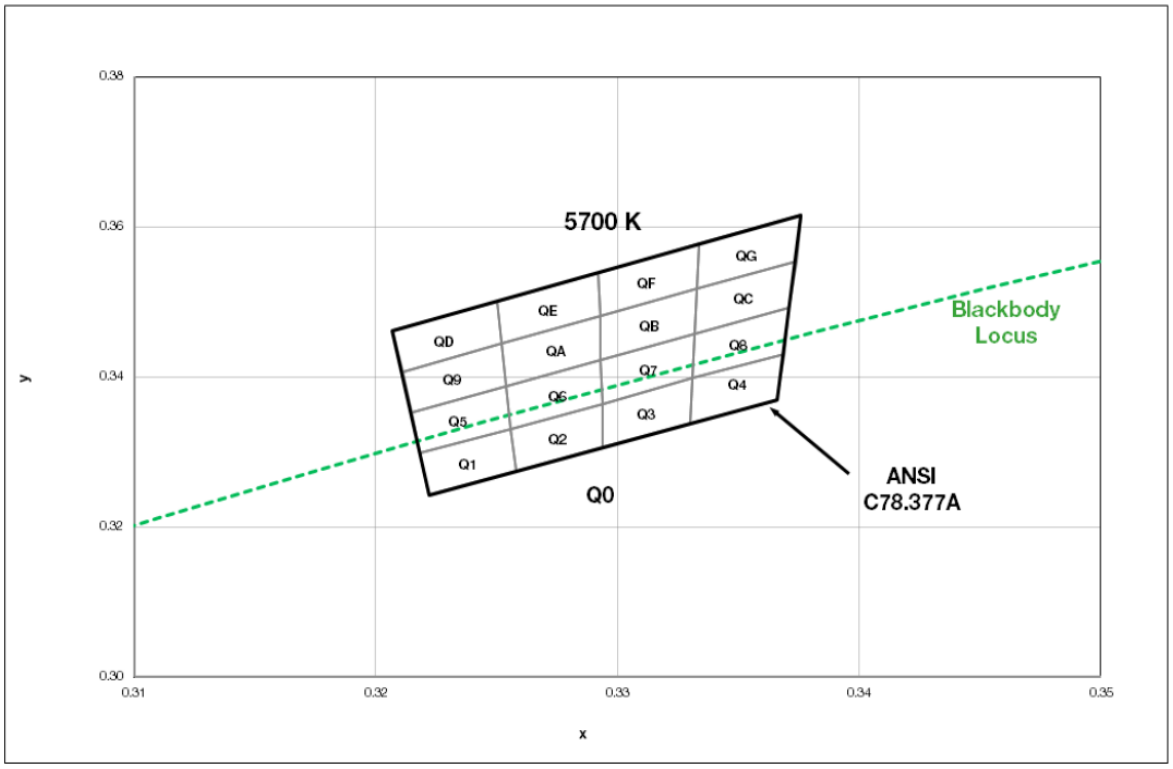
(4) Color Bins (I_F = 65 mA, T_s = 25 ºC)

CRI (Ra) Min.	Norminal CCT (K)	Product Code	Code Rank	Chromaticity Bins
85	5700	SPMWHT541ML6XAQ0S0	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QD, QE, QF QG

(5) Voltage Bins (I_F = 65 mA, T_s = 25 ºC)

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

(8) Chromaticity Region & Coordinates (I_F = 65 mA, T_s = 25 ºC)



* Note :

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

(9) Chromaticity Region & Coordinates (I_F = 65 mA, T_s = 25 ºC)

Region	CIE x	CIE y	Region	CIE x	CIE y
Q Rank (5700K)					
Q1	0.3218	0.3298	Q9	0.3211	0.3407
	0.3222	0.3243		0.3215	0.3353
	0.3258	0.3275		0.3254	0.3388
	0.3256	0.3331		0.3252	0.3444
Q2	0.3256	0.3331	QA	0.3252	0.3444
	0.3258	0.3275		0.3254	0.3388
	0.3294	0.3306		0.3293	0.3423
	0.3294	0.3364		0.3293	0.3481
Q3	0.3294	0.3364	QB	0.3293	0.3481
	0.3294	0.3306		0.3293	0.3423
	0.3330	0.3338		0.3332	0.3458
	0.3331	0.3398		0.3333	0.3518
Q4	0.3331	0.3398	QC	0.3333	0.3518
	0.3330	0.3338		0.3332	0.3458
	0.3366	0.3369		0.3371	0.3493
	0.3369	0.3431		0.3374	0.3554
Q5	0.3215	0.3353	QD	0.3207	0.3462
	0.3218	0.3298		0.3211	0.3407
	0.3256	0.3331		0.3252	0.3444
	0.3254	0.3388		0.3250	0.3501
Q6	0.3254	0.3388	QE	0.3250	0.3501
	0.3256	0.3331		0.3252	0.3444
	0.3294	0.3364		0.3293	0.3481
	0.3293	0.3423		0.3292	0.3539
Q7	0.3293	0.3423	QF	0.3292	0.3539
	0.3294	0.3364		0.3293	0.3481
	0.3331	0.3398		0.3333	0.3518
	0.3332	0.3458		0.3334	0.3578
Q8	0.3332	0.3458	QG	0.3334	0.3578
	0.3331	0.3398		0.3333	0.3518
	0.3369	0.3431		0.3374	0.3554
	0.3371	0.3493		0.3376	0.3616

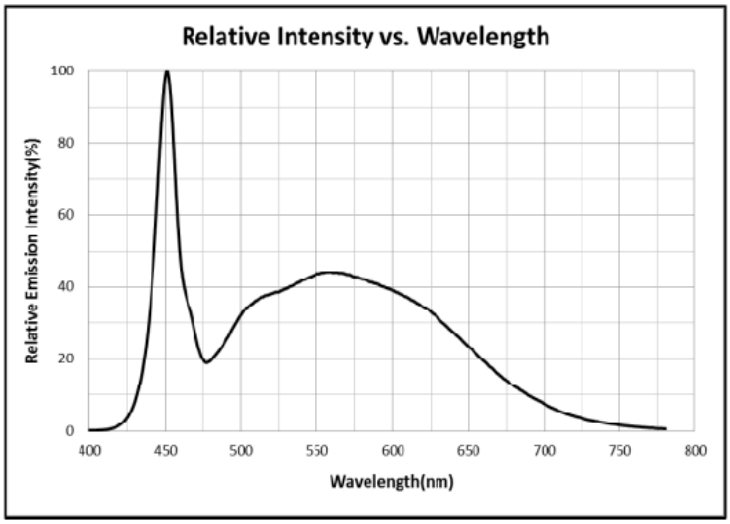
* Note :

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

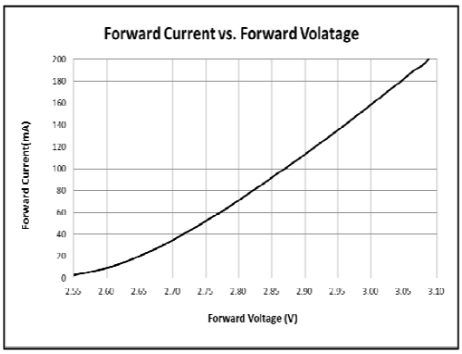
3. Typical Characteristics Graphs

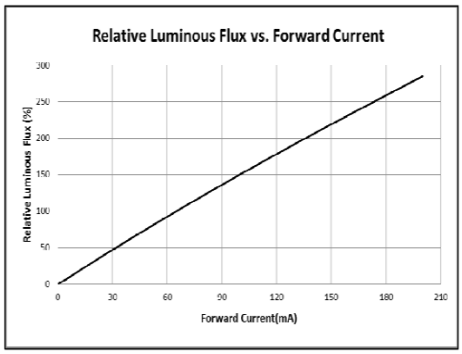
(1) Spectrum Distribution (I_F = 65 mA, T_s = 25 ºC)

CCT : 5700K (CRI Ra 85+)



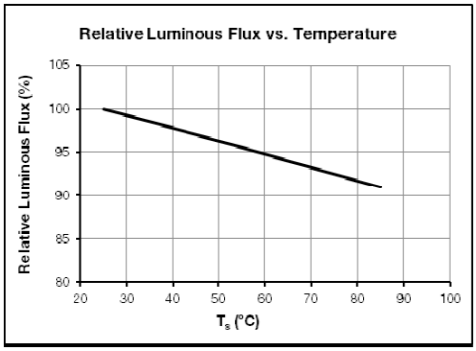
(2) Forward Current Characteristics (T_s=25 ºC)

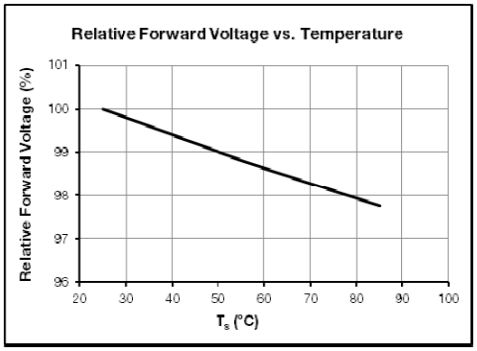




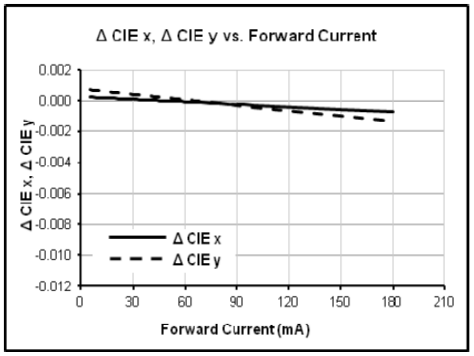
3. Typical Characteristics Graphs

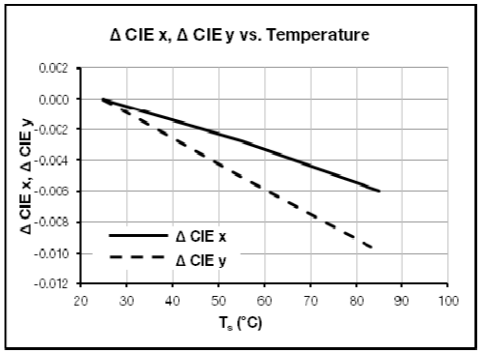
(3)Temperature Characteristics (I_F=65 mA)



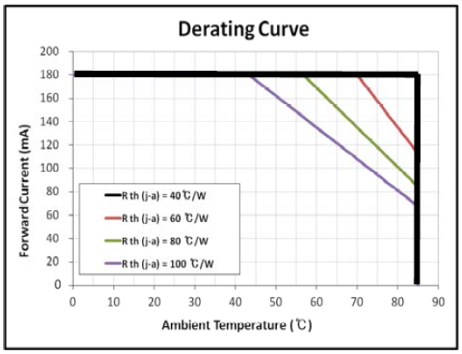


(4) Color Shift Characteristics (I_F=65 mA, T_S=25 ºC)

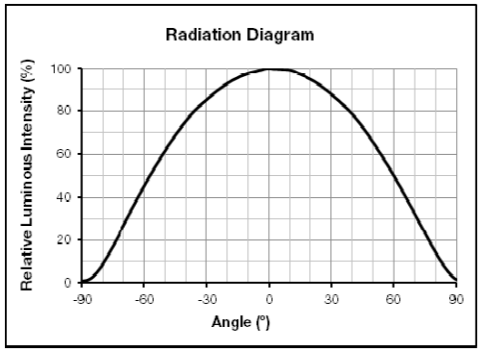




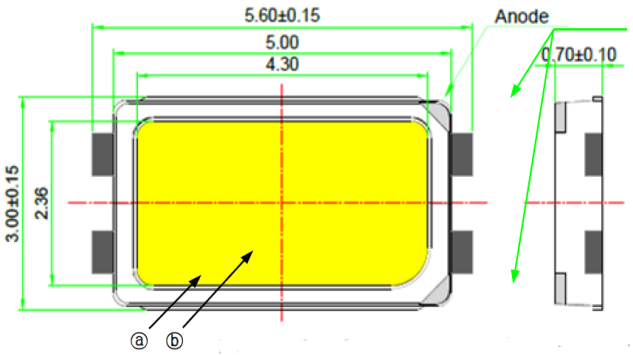
(5) Derating Curve



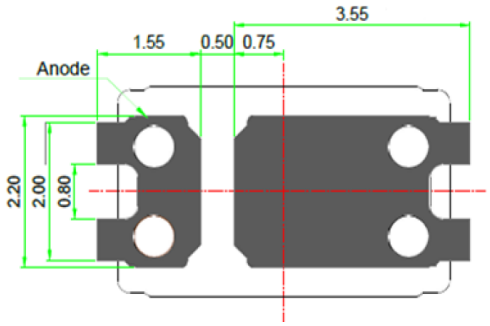
(6) Beam Angle Characteristics (I_F=65 mA, T_S=25 ºC)



4. Outline Drawing & Dimension



[Top View] [Side View]

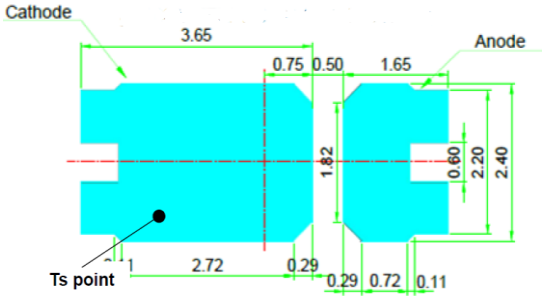


[Bottom View]



[Recommended PCB Solder Pad]

- Measurement unit : mm
- Tolerance : ± 0.1mm
- Maximum compressing force is 15 N on the body ⓐ
- Do not place pressure on the encapsulation resin ⓑ



* 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.

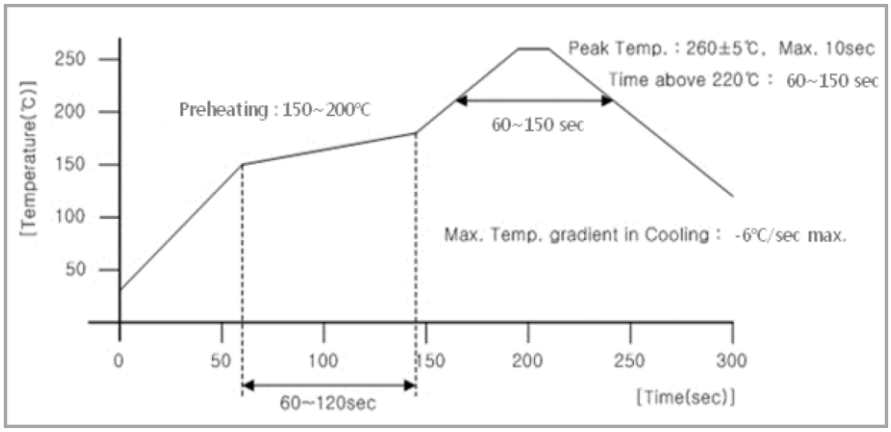
2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked before and after such repair.

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

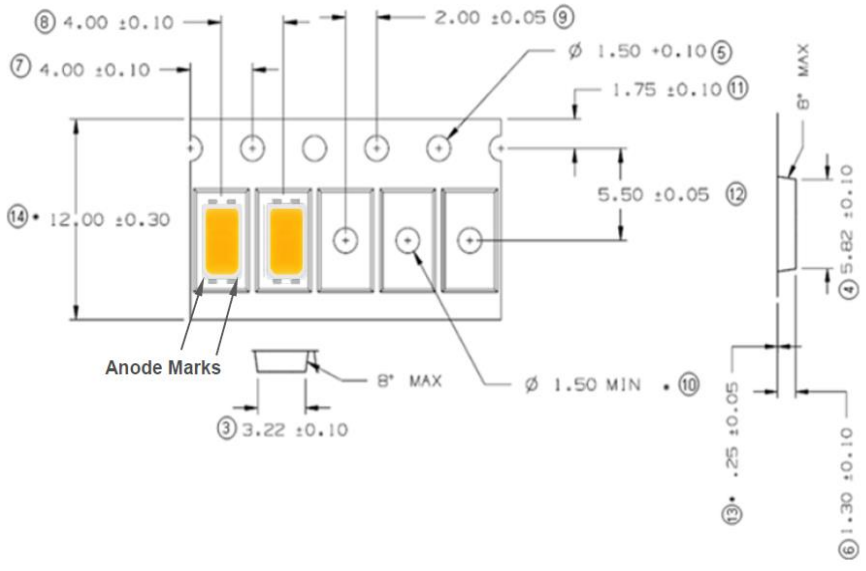
Not more than 5 seconds @ max. 300 ºC, under soldering iron.

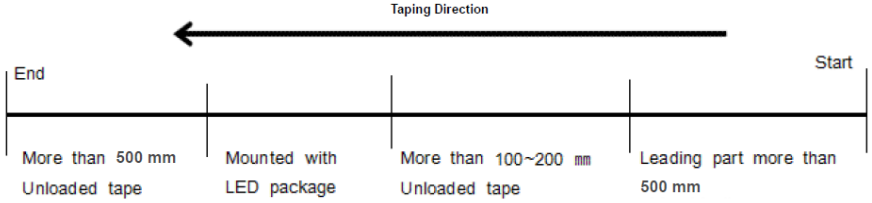
6. Tape & Reel

nm

(1) Taping Dimension

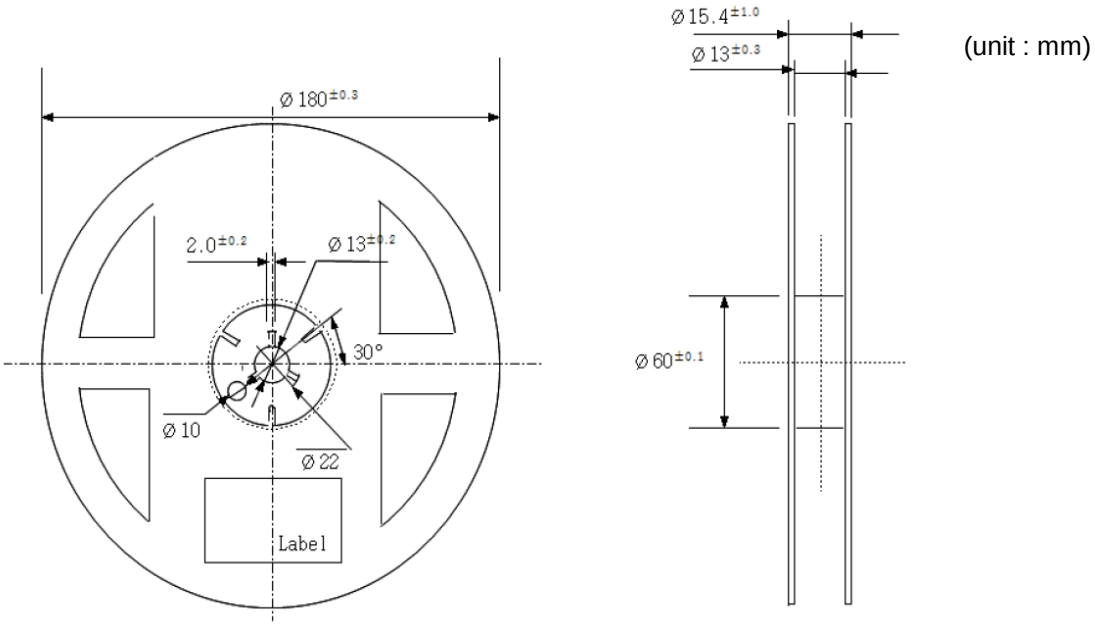
(unit : mm)





6. Tape & Reel

(2) Reel Dimension (Max 2,500 pcs)



(unit : mm)

*** Notes :**

1) Quantity: The quantity/reel is 2,500 pcs

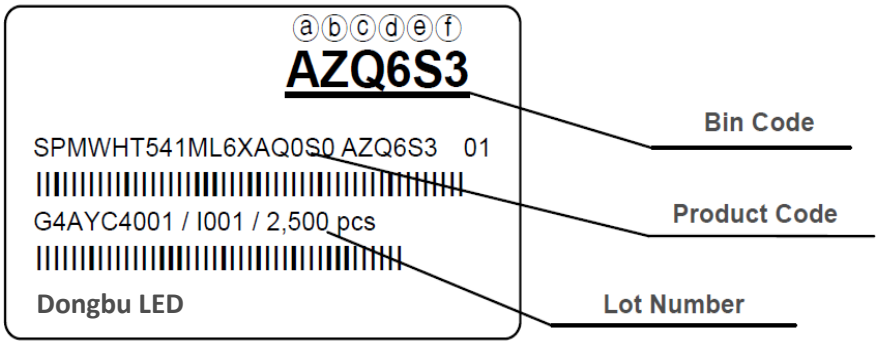
2) Cumulative Tolerance: Cumulative tolerance / 10 pitches is ±0.2 mm

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 at10° 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 5)

ⓒⓓ: Chromaticity bin (refer to page 6-7)

ⓔⓕ: Luminous Flux bin (refer to page 5)

(2) Lot Number

The lot number is composed of the following characters:



①②③④⑤⑥⑦⑧⑨ / Ⅰⓐⓑⓒ / 2,500 pcs

①② : Production site (G4 : Guangzhou, China)

③ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)

④ : Year (F: 2021, G: 2022, H:2023, I:2024...)

⑤ : Month (1~9, A, B, C)

⑥⑦⑧⑨ : Day (1~9, A, B~V)

ⓐⓑⓒ : Product serial number (001 ~ 999)

8. Packing Structure

(1) Packing Process

Reel

AZQ6S3

SPMWHT541ML6XAQ0S0 AZQ6S3 01

G4AYC4001 / I001 / 2,500 pcs

Dongbu LED

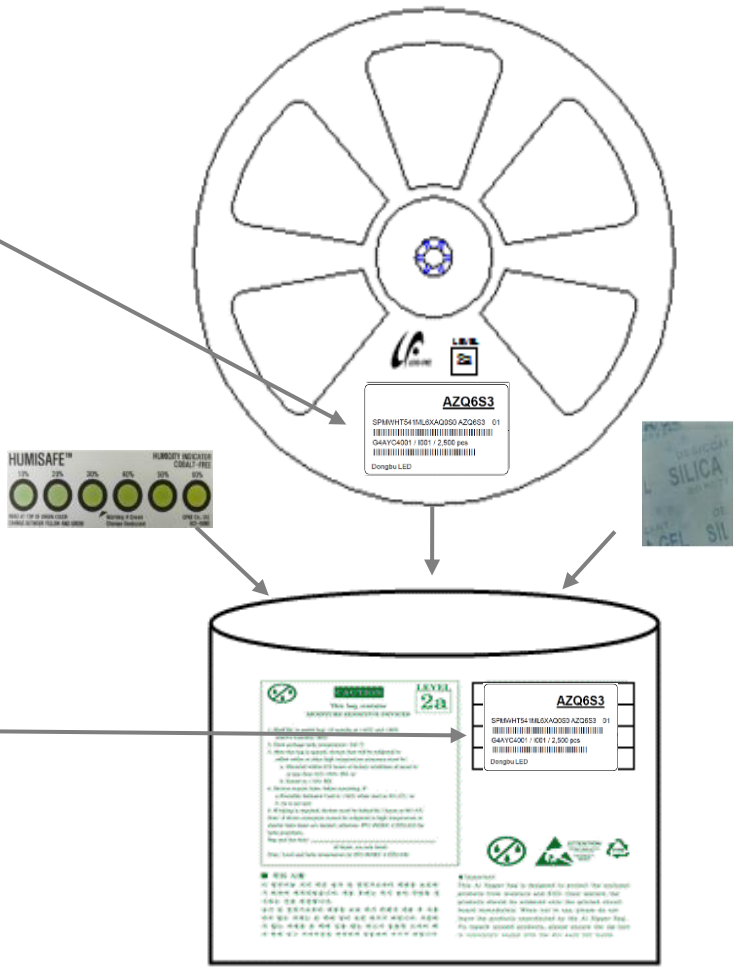
Aluminum Vinyl Packing Bag

AZQ6S3

SPMWHT541ML6XAQ0S0 AZQ6S3 01

G4AYC4001 / I001 / 2,500 pcs

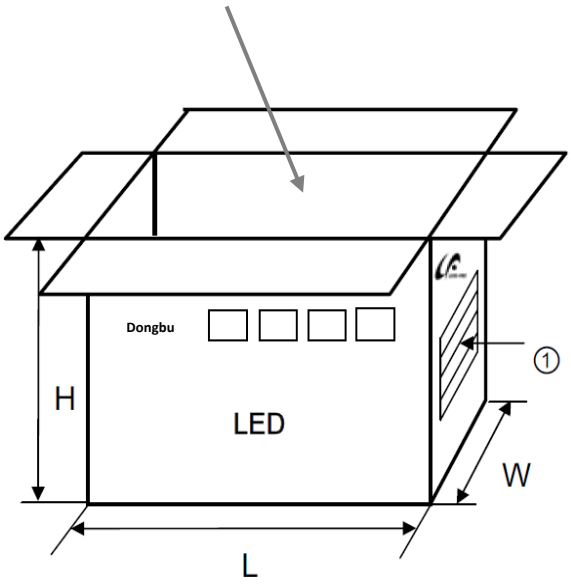
Dongbu LED



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



① Side Label

AZQ6S3

SPMWHT541ML6XAQ0S0 AZQ6S3 01

G4AYC4001 / I001 / 25,000 pcs

Dongbu LED

8. Packing Structure

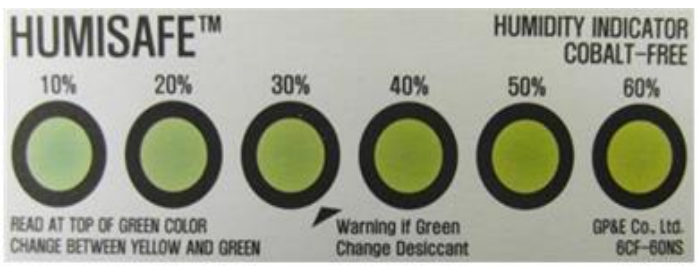
(5) Aluminum Vinyl Packing Bag



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

(This image is for reference only. silicagel 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) In order to obtain stable performance of LED, higher than 10% of the sorting current is recommended for operation.

(5) LEDs must be stored in a clean environment.
(shelf life of sealed bags is 12 months at temperature 0~40 ºC, 0~90 % RH).

(6) 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℃

(7) Repack unused devices with anti-moisture packing, fold to close any opening and then store in a dry place.

(8) Devices require baking before mounting, if humidity card reading is >60 % at 23 ± 5 ºC.

(9) Devices must be baked for 10~24 hours at 60 ± 5 ºC, if baking is required.

(10) 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.

(11) 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

(12) 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.