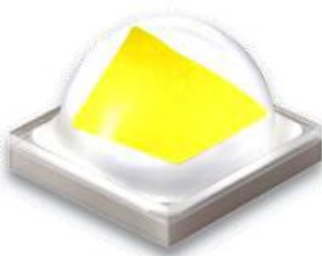


S P E C I F I C A T I O N S

Ceramic Substrate package
High brightness & High efficiency
MODEL : AP352L□PTE
(Preliminary)



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1. General Description

(1) Features

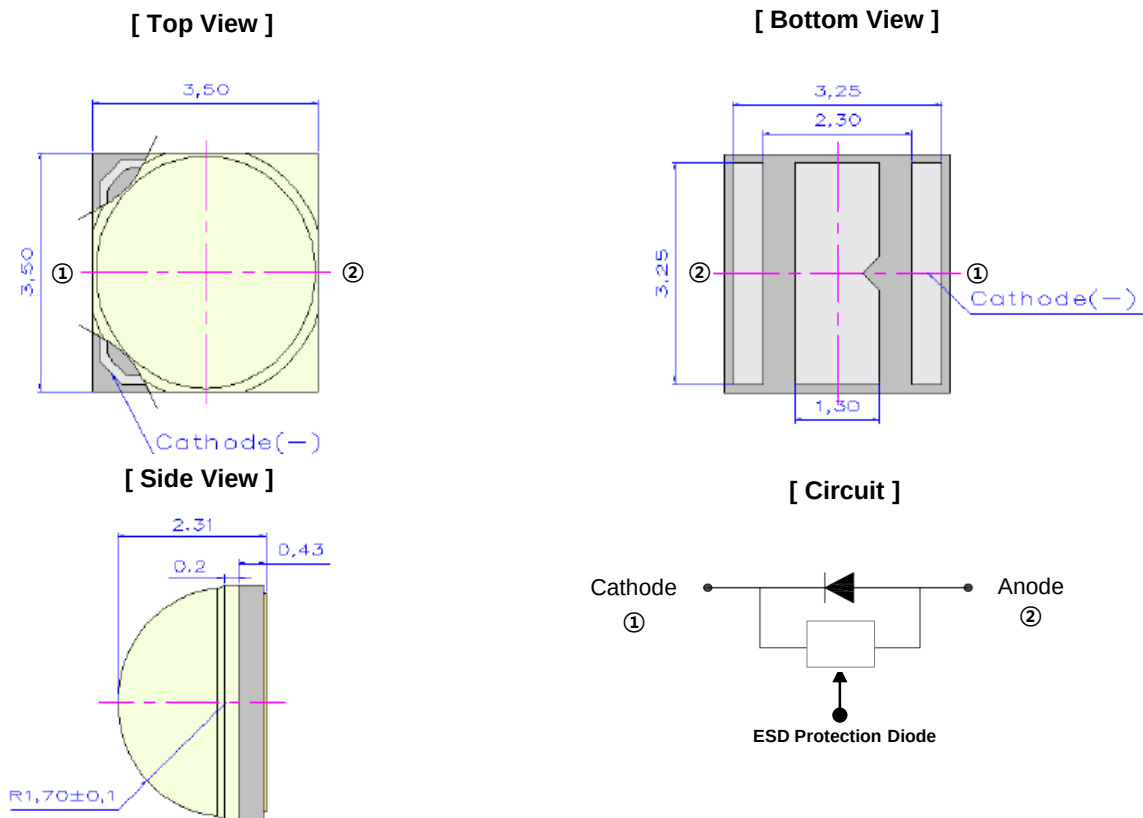
- Package size - 3.45(L) × 3.45(W) × 2.33(T) mm
- Ceramic Substrate package, High Brightness, High efficiency
- Wide beam angle ($2\theta_{1/2}=120\text{deg}$)

(2) Applications

- Architectural
- Industrial
- Commercial
- Indoor and outdoor area

(3) Outline Dimensions

[Tolerance : ± 0.1 , unit : mm]



2. Specifications

(1) Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum Rating	Unit	Remark
Forward Current	I_F	3000	mA	
Operating Temperature	T_{OPR}	-40 to + 105	°C	
Storage Temperature	T_{STG}	-40 to + 125	°C	
ESD Classification(HBM)	-	8	KV	
Junction Temperature	T_j	150	°C	

(2) Initial Electrical/Optical Characteristics

($I_F = 1050\text{mA}$, @ $T_j 85^\circ\text{C}$)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F = 1050\text{mA}$	2.5	2.8	3.1	V
Luminous Flux	Φ_V	Refer to Flux Rank Distribution				lm
Thermal Resistance	-	-	-	3.0	-	°C/W
Viewing Angle	$2\theta_{1/2}$	$I_F = 1050\text{mA}$	-	120	-	°

* Notes : (1) Initial electrical/optical characteristics data could be changeable if the user use the product in different condition besides above data.

(3) Characteristics Rank

■ Forward Voltage Rank

($I_F = 1050\text{mA}$, @ $T_j 85^\circ\text{C}$)

Symbol	Rank	Min.	Max.	Unit
V_F	X25	2.5	2.7	V
	X27	2.7	2.9	
	V29	2.9	3.1	

* Notes : Forward voltage measurement tolerance is $\pm 0.1\text{V}$.
Based on the measuring instruments of Dongbu LED

■ Luminous Flux Binning

 (I_F = 1050mA, @85℃)

Bin	Symbol	Min.	Max.	Unit
G35	Φ _V	350	370	lm
G37	Φ _V	370	390	
G38	Φ _V	380	400	
G40	Φ _V	400	420	
G42	Φ _V	420	440	
G44	Φ _V	440	460	
G46	Φ _V	460	480	
G48	Φ _V	480	500	
G50	Φ _V	500	520	
G52	Φ _V	520	550	
G55	Φ _V	550	580	
G58	Φ _V	580	610	

* Notes : Luminous flux measurement tolerance is ± 10%.

Based on the measuring instruments of Dongbu LED

■ Color Rendering Index Rank

 (I_F = 1050mA, @85℃)

Symbol	Rank	Min.	Max.	R9
CRI	070	70	80	-
	080	80	90	-

* Notes : Color Rendering Index measurement tolerance is ± 3.

Based on the measuring instruments of Dongbu LED

■ Flux Rank Distribution

CRI 70

■ Available Rank

CCT	CIE	Flux Rank						
6500	D	G42	G44	G46	G48	G50	G52	G55
5700	E	G42	G44	G46	G48	G50	G52	G55
5000	F	G42	G44	G46	G48	G50	G52	G55
4000	G	G42	G44	G46	G48	G50	G52	G55
3500	I	G42	G44	G46	G48	G50	G52	G55
3000	J	G42	G44	G46	G48	G50	G52	G55
2700	K	G42	G44	G46	G48	G50	G52	G55

CRI 80

■ Available Rank

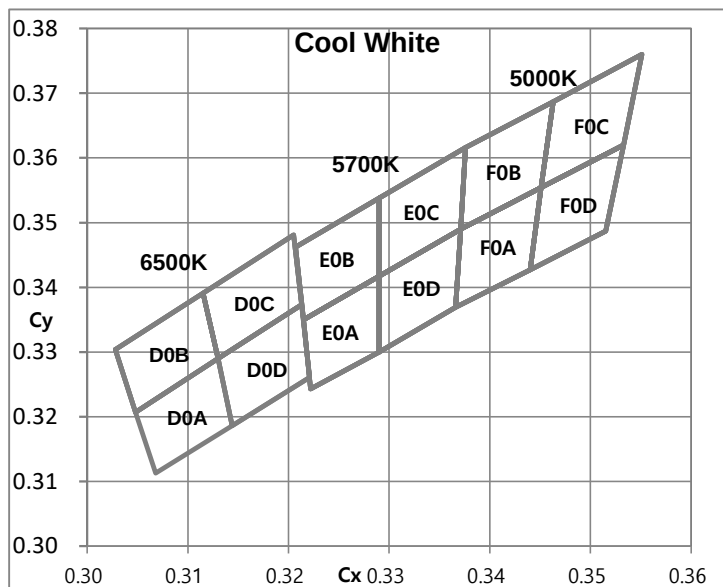
CCT	CIE	Flux Rank						
6500	D	G40	G42	G44	G46	G48	G50	G52
5700	E	G40	G42	G44	G46	G48	G50	G52
5000	F	G40	G42	G44	G46	G48	G50	G52
4000	G	G40	G42	G44	G46	G48	G50	G52
3500	I	G40	G42	G44	G46	G48	G50	G52
3000	J	G40	G42	G44	G46	G48	G50	G52
2700	K	G40	G42	G44	G46	G48	G50	G52

■ Color Rank

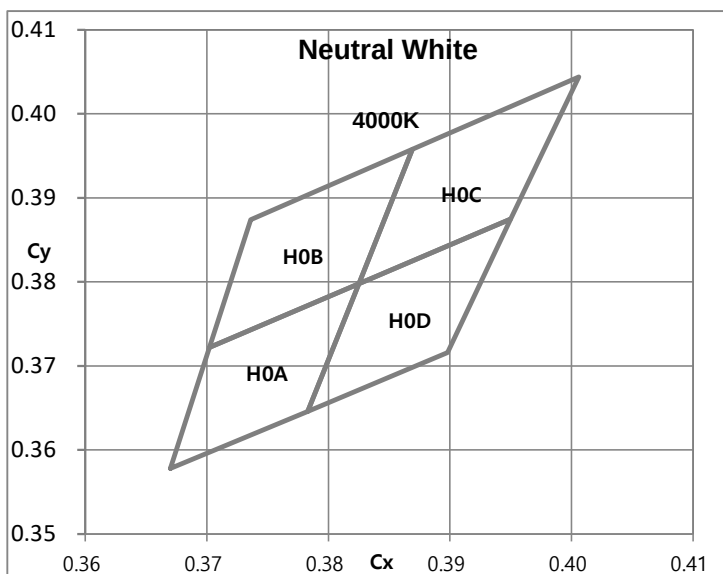
6500K			5700K			5000K			4000K		
Rank	Cx	Cy	Rank	Cx	Cy	Rank	Cx	Cy	Rank	Cx	Cy
D0A	0.3048	0.3207	E0A	0.3215	0.3350	F0A	0.3371	0.3490	H0A	0.3670	0.3578
	0.3130	0.3290		0.3290	0.3417		0.3451	0.3554		0.3702	0.3722
	0.3144	0.3186		0.3290	0.3300		0.3440	0.3427		0.3825	0.3798
	0.3068	0.3113		0.3222	0.3243		0.3366	0.3369		0.3783	0.3646
D0B	0.3028	0.3304	E0B	0.3207	0.3462	F0B	0.3376	0.3616	H0B	0.3702	0.3722
	0.3115	0.3391		0.3290	0.3538		0.3463	0.3687		0.3736	0.3874
	0.3130	0.3290		0.3290	0.3417		0.3451	0.3554		0.3869	0.3958
	0.3048	0.3207		0.3215	0.3350		0.3371	0.3490		0.3825	0.3798
D0C	0.3115	0.3391	E0C	0.3290	0.3538	F0C	0.3463	0.3687	H0C	0.3825	0.3798
	0.3205	0.3481		0.3376	0.3616		0.3551	0.3760		0.3869	0.3958
	0.3213	0.3373		0.3371	0.3490		0.3533	0.3620		0.4006	0.4044
	0.3130	0.3290		0.3290	0.3417		0.3451	0.3554		0.3950	0.3875
D0D	0.3130	0.3290	E0D	0.3290	0.3417	F0D	0.3451	0.3554	H0D	0.3783	0.3646
	0.3213	0.3373		0.3371	0.3490		0.3533	0.3620		0.3825	0.3798
	0.3221	0.3261		0.3366	0.3369		0.3515	0.3487		0.3950	0.3875
	0.3144	0.3186		0.3290	0.3300		0.3440	0.3427		0.3898	0.3716

3500K			3000K			2700K		
Rank	Cx	Cy	Rank	Cx	Cy	Rank	Cx	Cy
I0A	0.3889	0.3690	J0A	0.4147	0.3814	K0A	0.4373	0.3893
	0.3941	0.3848		0.4221	0.3984		0.4465	0.4071
	0.4080	0.3916		0.4342	0.4028		0.4582	0.4099
	0.4017	0.3751		0.4259	0.3853		0.4483	0.3919
I0B	0.3941	0.3848	J0B	0.4221	0.3984	K0B	0.4465	0.4071
	0.3996	0.4015		0.4299	0.4165		0.4562	0.4260
	0.4146	0.4089		0.4430	0.4212		0.4687	0.4289
	0.4080	0.3916		0.4342	0.4028		0.4582	0.4099
I0C	0.4080	0.3916	J0C	0.4342	0.4028	K0C	0.4582	0.4099
	0.4146	0.4089		0.4430	0.4212		0.4687	0.4289
	0.4299	0.4165		0.4562	0.4260		0.4813	0.4319
	0.4221	0.3984		0.4465	0.4071		0.4700	0.4126
I0D	0.4017	0.3751	J0D	0.4259	0.3853	K0D	0.4483	0.3919
	0.4080	0.3916		0.4342	0.4028		0.4582	0.4099
	0.4221	0.3984		0.4465	0.4071		0.4700	0.4126
	0.4147	0.3814		0.4373	0.3893		0.4593	0.3944

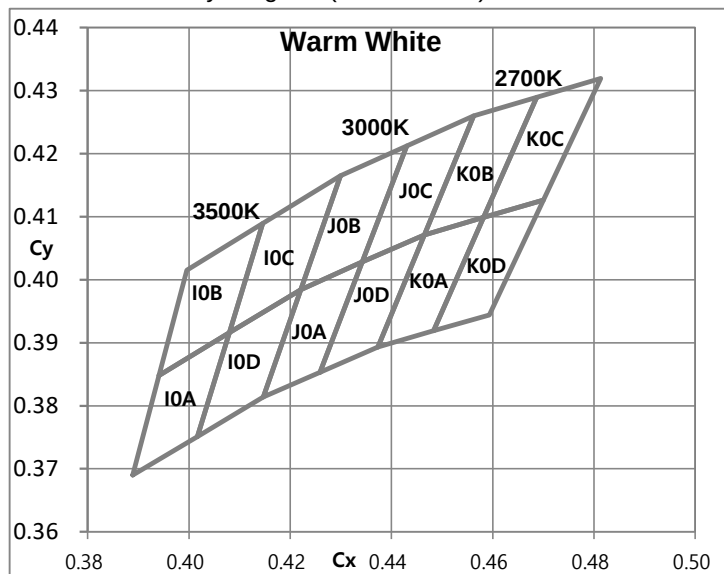
■ CIE Chromaticity Diagram (Cool White)



■ CIE Chromaticity Diagram (Neutral White)



■ CIE Chromaticity Diagram (Warm White)



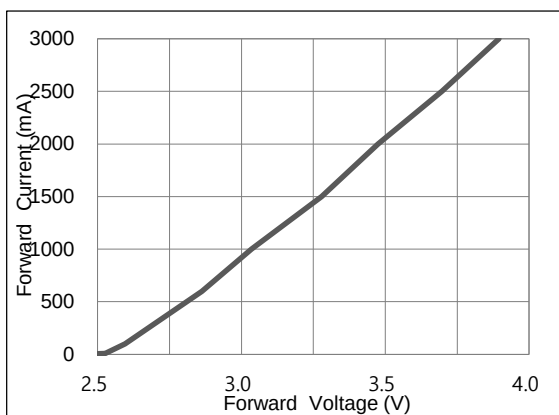
- * Notes : (1) The color coordinates measurement tolerance is ± 0.01 .
Based on the measuring instruments of Dongbu LED
(2) The chromaticity coordinates refer to CIE 1931 chromaticity diagram.

3. Rank Code

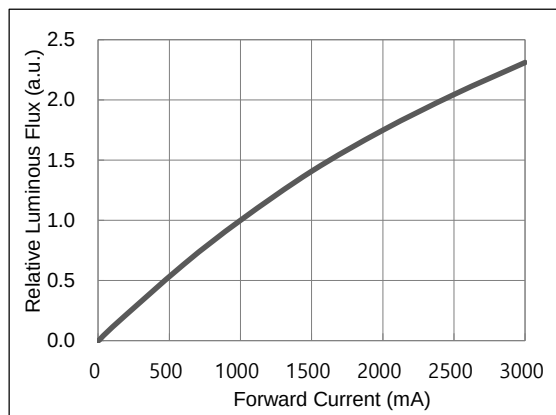
The rank inscription is composed of the follow method.

Ex)	G50	F0A	X27	080	01A	→	①	Φ_V Rank
	①	②	③	④	⑤		②	Color Rank
							③	V_F Rank
							④	CRI Rank (080 : 80Ra~)
							⑤	I_F (1050mA)

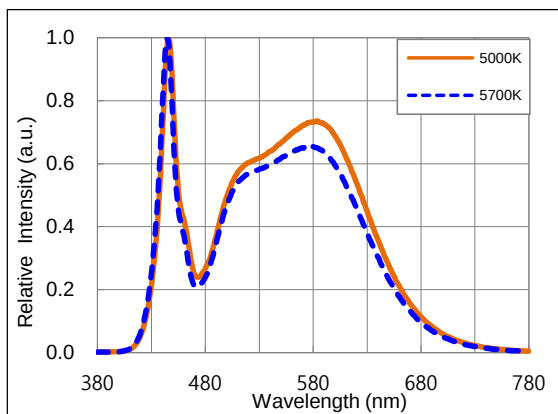
4. Characteristics Diagrams



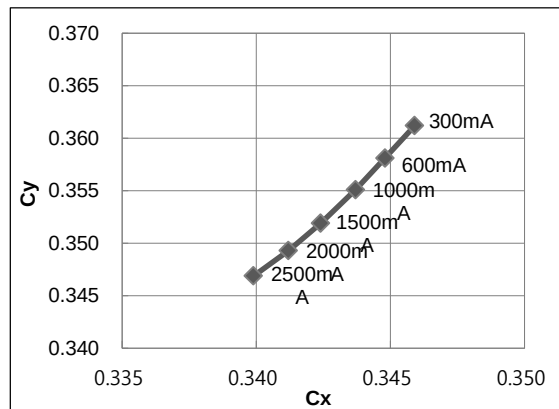
Forward Voltage vs Forward Current, $T_j=85^{\circ}\text{C}$



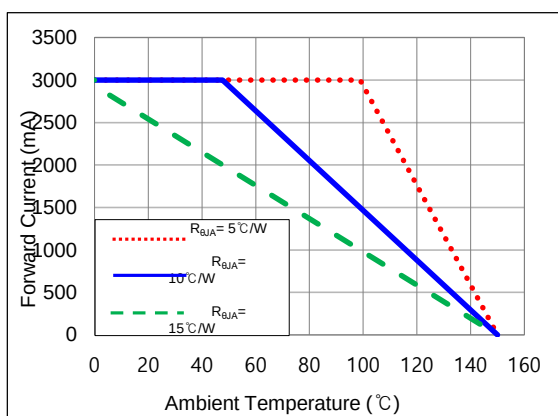
Forward Current vs Relative Luminous Flux, $T_j=85^{\circ}\text{C}$



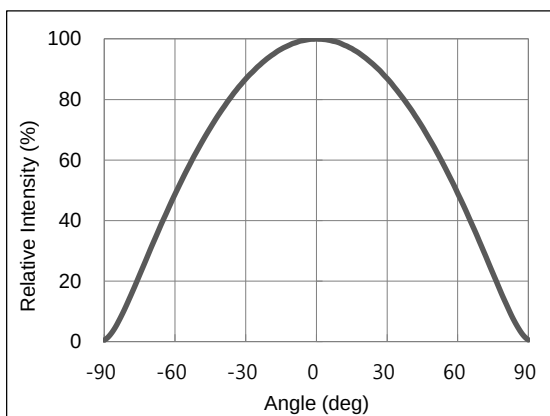
Spectrum, $T_j=85^{\circ}\text{C}$



Forward Current vs Chromaticity Coordinate, $T_j=85^{\circ}\text{C}$



Derating Curve



Beam Angle, $T_j=25^{\circ}\text{C}$, $I_F=1050\text{mA}$

* Note : The graph of characteristics is the sampling data for the reference.

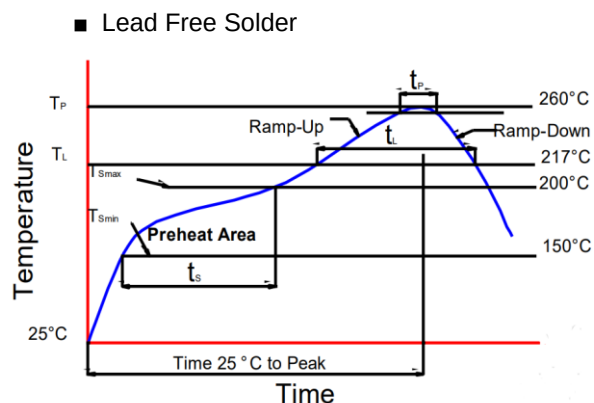
5. Soldering Conditions

(1) Recommended Soldering Conditions

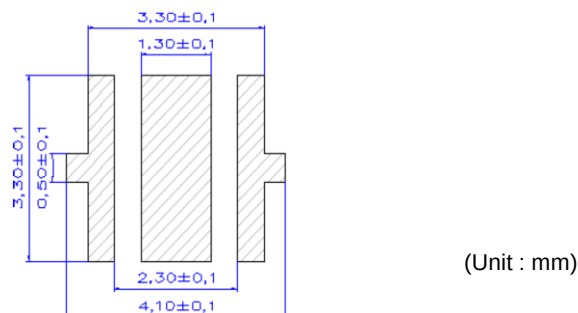
Reflow Soldering		Hand Soldering	
Conditions			
Average Ramp-Up Rate (T _{smax} to T _P)	3°C/sec max.	Temperature Soldering time	300℃ Max. 3 sec. Max. (one time only)
PreHeat:Temperature Min (T _{smin})	150		
PreHeat:Temperature Min (T _{smax})	200		
PreHeat:Time (t _{smin} to t _{smax})	60~180 secs		
Time Maintained Above : Temperature (T _L)	217℃		
Time Maintained Above : Time (t _L)	60~150 secs		
Peak/Classification Temperature (T _p)	255±5℃		
Time Within 5℃ of Actual Peak Temperature (t _p)	20~40 secs		
Ramp-Down Rate	3°C/sec max.		

* After reflow soldering, rapid cooling should be avoid.

(2) Recommended Reflow Soldering Profile



(3) Recommended Soldering Pad Pattern



(4) Soldering Cautions

- Reflow soldering should not be done more than two times.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not wrap the circuit board.

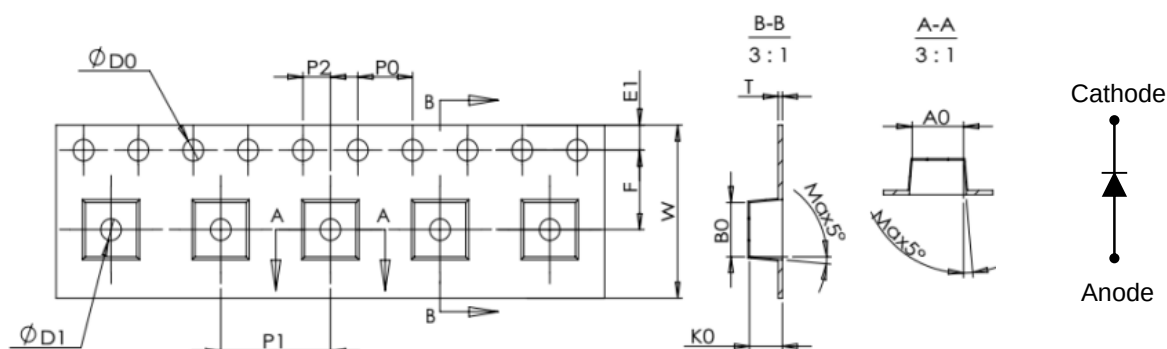
- The LEDs can be soldered on place using the reflow soldering method.
- Occasionally there is a brightness decrease cause by the influence of heat or ambient atmosphere during air reflow. It is recommend that the user use the nitrogen reflow method.
- After complete soldering, the product should be handled after cooling. (required to be handled under 60℃)

6. Packing

(1) Carrier Tape & Carrier Reel Dimensions

■ Carrier Tape

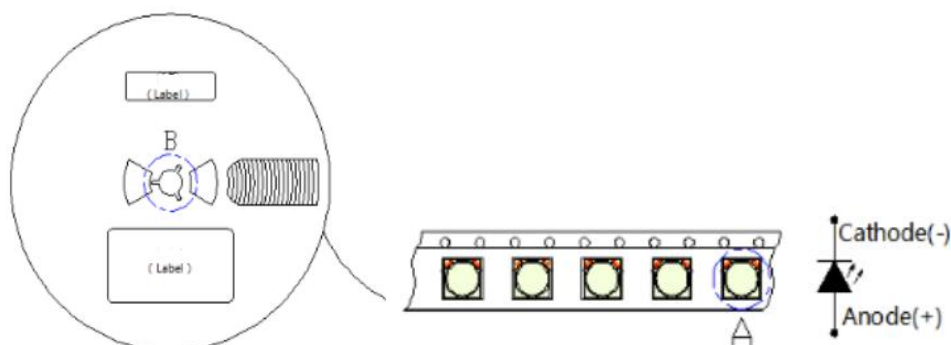
(Unit : mm)



Symbol	A0	B0	K0	P0	P1	P2
Spec.	3.72 ± 0.10	3.72 ± 0.10	2.60 ± 0.10	4.00 ± 0.10	40.00 ± 0.20	2.00 ± 0.10
Symbol	T	E1	F	D0	D1	W
Spec.	0.30 ± 0.05	1.75 ± 0.10	2.60 ± 0.10	1.50 ± 0.10	1.50 ± 0.10	12.00 ± 0.30

■ Carrier Reel

(Unit : mm)

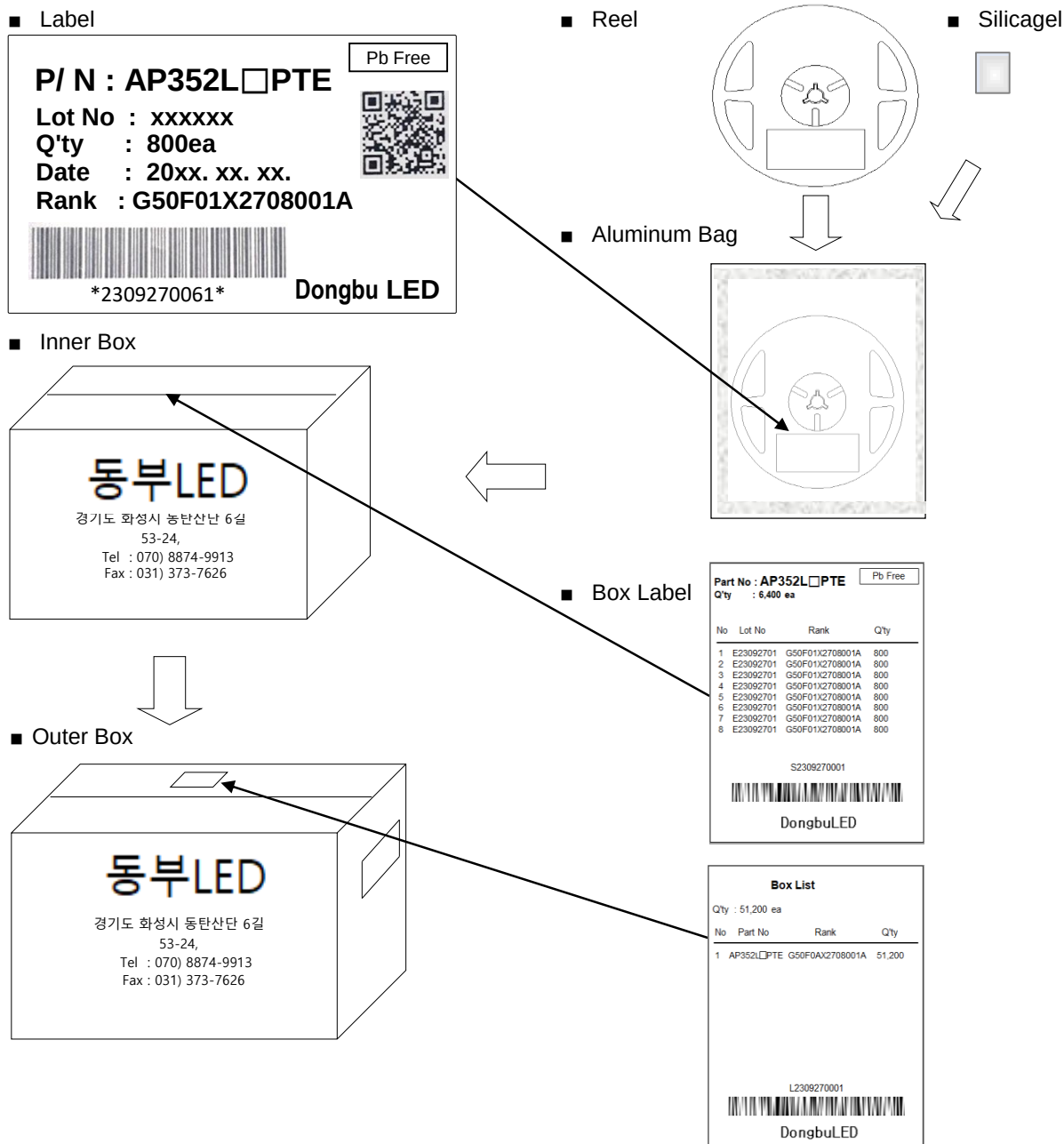


< Reel >

* Notes

- 1) Quantity : Taping of 7" reel will be 800 pcs.
- 2) The tape packing method complies with IJSC0806(Packing of Electronic Components on Continuous Tape).
- 3) When the tape is rewound due to work interruptions, no more than 10N should be applied to the embossed carrier tape.

(2) Packing and Packaging



Box Type	Inner Box	Outer Box	
		Medium	Large
Reel Max. Packing Q'ty(pcs)	6,400	25,600	51,200

- 1) The carrier tape wound on the reel are placed into an ESD protected pack with a silicagel and sealed by the thermal pressure sealer. Then this sealed pack is packaged in a cardboard box.

7. Precaution

(1) Static Electricity

These LEDs are highly susceptible to static electricity or surge voltage. So a wrist strap or an anti-electrostatic glove necessarily be used when handling the LEDs.

Do not use the equipment that surge voltage is came into existence.

All devices and equipment that measure or mount the LEDs must be properly grounded.

After being assembled LEDs, it should be ascertained a electrical characteristic whether that are damaged by static electricity or not.

(2) Packing

The moisture that is absorbed into the LED products may cause a badness and damage to the optical characteristics of the LEDs. Therefore the moisture barrier aluminum bag is used to keep moisture in the packing. And a silicagel is inserted into a moisture barrier aluminum bag that sealed by the thermal pressure sealer.

(3) Cleaning

Ethanol can be used for LED cleaning. The maximum exposure time with ethanol is 1 minute for cleaning.

Do not use ultrasonic for cleaning the LEDs or other solvents, If ultrasonic cleaning is absolutely necessary, a pre-test should be done before cleaning to see if the LED is damaged.

(4) Storage

In order to avoid the absorption of moisture, it is recommended to store LEDs in the moisture barrier aluminum bag is not opened.

Storage condition before opening the packing :

Temperature : below 30℃

Humidity : 90%RH max

The LEDs should be used within a year.

Storage condition after opening the packing :

Temperature : below 30℃

Humidity : 60%RH max

The products have to be used within one year from the date marked on label which is attached to reel or aluminium bag. After opening the packing, the LEDs should be used within 168 hours(7days). If unused LEDs remain, they should be stored in the place kept away moisture.

If the LEDs have exceeded the above storage time, it should be used after to bake using the following conditions.

Baking condition : 60±5℃, 10 ~ 24 hours

A slight amount of sulfur, chlorine or VOC from the surrounding environment may cause discoloration of the LEDs.

(5) Pick and Place

It should be avoided to rub or scratch the surface of resin by any hard material. It is possible that the LEDs are damaged to the optical characteristics.

(6) Heat

The LEDs are products that are generated heat. It must be considered the heat generation of the LEDs when it is designed the PCB. After considering the ambient temperature and the heat generation of LEDs, the operating current should be decided .

(7) Others

If the forward or reverse voltage which exceeds the absolute maximum rating is applied to the LEDs, that will cause the damage to the LEDs. It is possible that the damaged LEDs do not light on at the current.

Be careful not to look the LEDs that the output power is strongly increased in the face. It is possible that eyesight has been getting weaker.

Light emitting part should not be exposed by physical contact. It can be the reason of material desquamation and progressive disconnection.

This LED is made for in-door use only. If the user wants the LED for out-door use, it is necessary to take some additional treatment on the product after surface mounting technology(SMT).

This specification could be changed without a notice to the customer because of the inside circumstance of the company.