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

Middle Power LED Series
2835 6V Hot temp CIE
LM282B+
SA SB rank



Designed for better lm/$ (Lamps)

Features & Benefits

- **0.9W Class mid power LED**
- **Standard form factor for design flexibility (2.8 × 3.5 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	1	2	2	1	F	Q	5	G	B	R	0	S	B

Digit	PKG Information	Code	Specification			
1 2 3	Dongbu Package Middle Power	SPM	Mddle power			
4 5	Color	WH	White			
6	Product Version	1	1st verison			
7 8 9	Form Factor	221	2.8 x 3.5 x 0.7 mm; 2 pads; 2chip;			
10	Sorting Current (mA)	F	150 mA			
11	Chromaticity Coordinates	Q	Hot Bin			
12	CRI	5	Min. 80			
		7	Min. 90			
13 14	Forward Voltage (V)	GB or GK	5.7 ~ 6.9	Bin Code	G1	5.7 ~ 6.0
					G2	6.0 ~ 6.3
					G3	6.3 ~ 6.6
					G4	6.6 ~ 6.9
			GB : 4,000ea, GK : 16,000ea per reel			
15 16	CCT (K)	W☆	2700	Bin Code	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG, WN, WP, WQ, WW, WS, WT, WU	
		V☆	3000		V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC VD, VE, VF, VG, VN, VP, VQ, VR, VS, VT, VU	
		U☆	3500		U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC UD, UE, UF, UG, UN, UP, UQ, UR, US, UT, UU	
		T☆	4000		T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC TD, TE, TF, TG, TN, TP, TQ, TR, TS, TT, TU	
		R☆	5000		R1, R2, R3, R4, R5, R6, R7, R8, R9, RA, RB, RC RD, RE, RF, RG, RN, RP, RQ, RR, RS, RT, RU	
		Q☆	5700		Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC QD, QE, QF, QG, QN, QP, QQ, QQ, QS, QT, QU	
		P☆	6500		P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC PD, PE, PF, PG, PN, PP, PQ, PP, PS, PT, PU	
			☆ : "0" (Whole bin), "M" (Quarter bin), “K” (K Kitting bin), “Y”(Y Kitting bin) or “U” (Mac3 only)			
17 18	Luminous Flux	SA SB		Bin Code	SA SB	

2. Characteristics

(1) Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	ºC	
Storage Temperature	T_{stg}	-40 ~ +85	℃	
LED Junction Temperature	T_j	115	℃	
Forward Current	I_F	160	mA	
Peak Pulsed Forward Current	I_{Fp}	320	mA	Duty 1/10, pulse width 10ms
Assembly Process Temperature		260<10	℃/S	
ESD (HBM)		2	KV	

* Note

Proper current derating must be observed to maintain junction temperature below the maximum at all time.

It is recommended minimum current 10mA in order to avoid un-even brightness, and may vary depending on circuit configuration

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

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (VF)	V	GB or GK	G1	5.7		6.0
			G2	6.0		6.3
			G3	6.3		6.6
			G4	6.6		6.9
Color Rendering Index (Ra)		5		80	-	-
		7		90	-	-
Special CRI (R9)	For Ra 90			50		
Thermal Resistance (junction to solder point)	ºC/W			-	15	-
Beam Angle				-	120	-

* Note

Dongbu maintains measurement tolerance of: forward voltage = ±0.1 V, CRI = ±3, R9 = ±6.5

(3) Luminous Flux Bins (I_F = 150 mA, T_a = 25ºC)

Item	CRI (Ra) Min.	Norminal CCT(K)	Bin	150mA Min.	150mA Max.
Luminous Flux (Φv)	80	2700	SA	111.0	121.0
			SB	121.0	131.0
		3000	SA	115.0	125.0
			SB	125.0	135.0
		3500	SA	117.0	127.0
			SB	127.0	137.0
		4000	SA	121.0	131.0
			SB	131.0	141.0
		5000	SA	123.0	133.0
			SB	133.0	143.0
		5700	SA	122.0	132.0
			SB	132.0	142.0
		6500	SA	121.0	131.0
			SB	131.0	141.0
	90	2700	SA	92.5	102.5
			SB	102.5	112.5
		3000	SA	96.5	106.5
			SB	106.5	116.5
		3500	SA	97.5	107.5
			SB	107.5	117.5
		4000	SA	101.5	111.5
			SB	111.5	121.5
		5000	SA	103.0	113.0
			SB	113.0	123.0
		5700	SA	102.0	112.0
			SB	112.0	122.0
		6500	SA	101.5	111.5
			SB	111.5	121.5

* Note :

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

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

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v, lm)
80	2700	SPMWH1221FQ5GBW☆SA	SA	111.0 ~ 121.0
		SPMWH1221FQ5GBW☆SB	SB	121.0 ~ 131.0
	3000	SPMWH1221FQ5GBV☆SA	SA	115.0 ~ 125.0
		SPMWH1221FQ5GBV☆SB	SB	125.0 ~ 135.0
	3500	SPMWH1221FQ5GBU☆SA	SA	117.0 ~ 127.0
		SPMWH1221FQ5GBU☆SB	SB	127.0 ~ 137.0
	4000	SPMWH1221FQ5GBT☆SA	SA	121.0 ~ 131.0
		SPMWH1221FQ5GBT☆SB	SB	131.0 ~ 141.0
	5000	SPMWH1221FQ5GBR☆SA	SA	123.0 ~ 133.0
		SPMWH1221FQ5GBR☆SB	SB	133.0 ~ 143.0
	5700	SPMWH1221FQ5GBQ☆SA	SA	122.0 ~ 132.0
		SPMWH1221FQ5GBQ☆SB	SB	132.0 ~ 142.0
	6500	SPMWH1221FQ5GBP☆SA	SA	121.0 ~ 131.0
		SPMWH1221FQ5GBP☆SB	SB	131.0 ~ 141.0
90	2700	SPMWH1221FQ7GBW☆SA	SA	92.5 ~ 102.5
		SPMWH1221FQ7GBW☆SB	SB	102.5 ~ 112.5
	3000	SPMWH1221FQ7GBV☆SA	SA	96.5 ~ 106.5
		SPMWH1221FQ7GBV☆SB	SB	106.5 ~ 116.5
	3500	SPMWH1221FQ7GBU☆SA	SA	97.5 ~ 107.5
		SPMWH1221FQ7GBU☆SB	SB	107.5 ~ 117.5
	4000	SPMWH1221FQ7GBT☆SA	SA	101.5 ~ 111.5
		SPMWH1221FQ7GBT☆SB	SB	111.5 ~ 121.5
	5000	SPMWH1221FQ7GBR☆SA	SA	103.0 ~ 113.0
		SPMWH1221FQ7GBR☆SB	SB	113.0 ~ 123.0
	5700	SPMWH1221FQ7GBQ☆SA	SA	102.0 ~ 112.0
		SPMWH1221FQ7GBQ☆SB	SB	112.0 ~ 122.0
	6500	SPMWH1221FQ7GBP☆SA	SA	101.5 ~ 111.5
		SPMWH1221FQ7GBP☆SB	SB	111.5 ~ 121.5

* Note :

"☆" can be "0" (Whole bin), "M" (Quarter bin), “K” (K Kitting bin), “Y”(Y Kitting bin) or “U” (Mac3 only) of the color binning

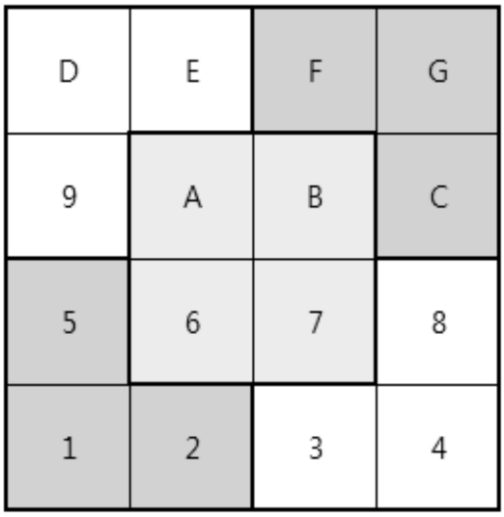
(5) Voltage Bins (I_F = 150 mA, T_a = 25 ºC)

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
			WA or WK	G1	5.7 ~ 6.0
				G2	6.0 ~ 6.3
				G3	6.3 ~ 6.6
				G4	6.6 ~ 6.9

a) 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 (A1+A1), (A2+A2), (A3+A3) or (A4+A4)
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)

[Kitting example]



[Binning Information]

	Bin #1	Bin #2
VF	G1	G1
	G2	G2
	G3	G3
	G4	G4
CIE	1, 2, 5 bin	C, F, G bin
	6, 7, A, B bin	6, 7, A, B bin
	3, 4, 8 bin	9, D, E bin

(6) Kitting rule

b) Y Kitting bin Concept

4. Under agreement between customer and Dongbu LED, Dongbu can supply kitting bin (VF, Color, lm).
5. A forward voltage (VF) of kitting bin is combined by a pair of same VF rank such as (A1+A1), (A2+A2), (A3+A3) or (A4+A4)
6. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)

[Kitting example]



[Binning Information]

	Bin #1	Bin #2
VF	G1	G1
	G2	G2
	G3	G3
	G4	G4
CIE	U	U
	N	R
	P	S
	Q	T

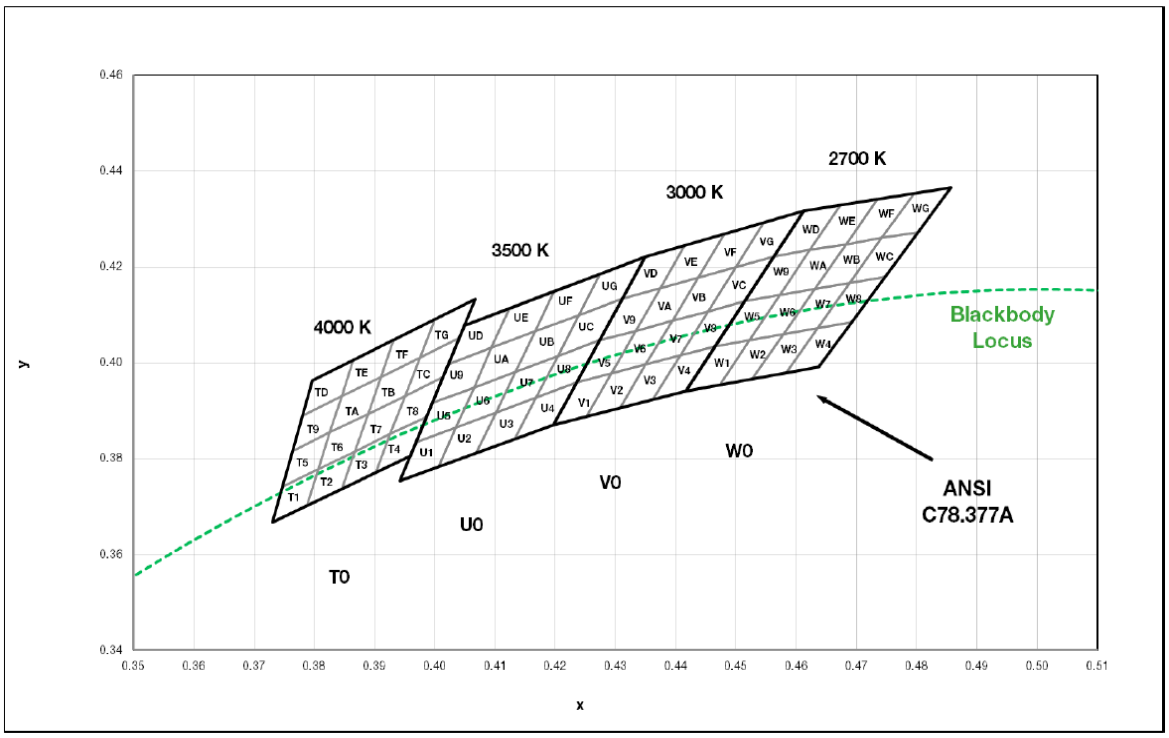
(7) Color Bins (I_F = 150 mA, T_a = 25 ºC)

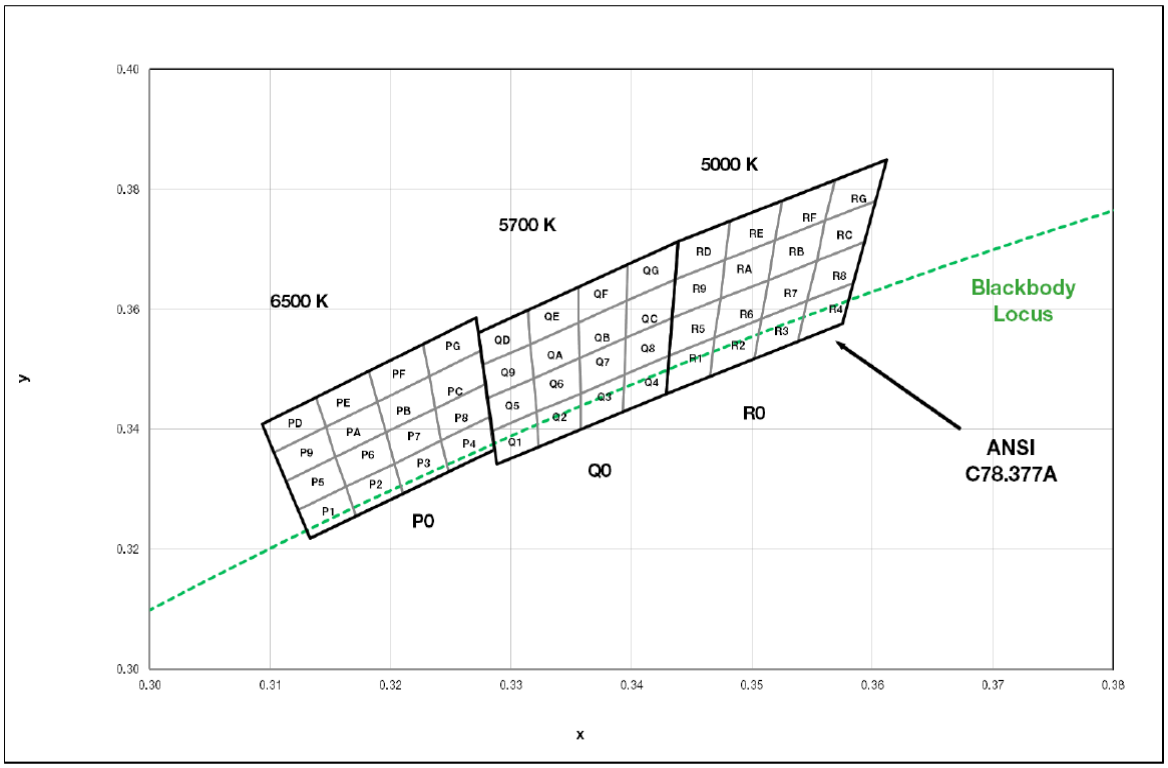
CRI (Ra) Min.	Norminal CCT (K)	Product Code	Code Rank	Chromaticity Bins
80 or 90	2700	SPMWH1221FQ☆SGW0S★	W0 (Whole bin)	W1,W2,W3,W4,W5,W6,W7,W8,W9,WA,WB,WC,WD,WE,WF,WG
		SPMWH1221FQ☆SGWMS★	WM (Quarter bin)	W6, W7, WA, WB
		SPMWH1221FQ☆SGWKS★	WK (K Kitting bin)	W1,W2,W3,W4,W5,W6,W7,W8,W9,WA,WB,WC,WD,WE,WF,WG
		SPMWH1221FQ☆SGWYS★	WY (Y Kitting bin)	WN, WP, WQ, WR, WS, WT, WU
		SPMWH1221FQ☆SGWUS★	WU (Mac3 only)	WU
	3000	SPMWH1221FQ☆SGV0S★	V0 (Whole bin)	V1,V2,V3,V4,V5,V6,V7,V8,V9,VA,VB,VC,VD,VE,VF,VG
		SPMWH1221FQ☆SGVMS★	VM (Quarter bin)	V6, V7, VA, VB
		SPMWH1221FQ☆SGVKS★	VK (K Kitting bin)	V1,V2,V3,V4,V5,V6,V7,V8,V9,VA,VB,VC,VD,VE,VF,VG
		SPMWH1221FQ☆SGVYS★	VY (Y Kitting bin)	VN, VP, VQ, VR, VS, VT, VU
		SPMWH1221FQ☆SGVUS★	VU (Mac3 only)	VU
	3500	SPMWH1221FQ☆SGU0S★	U0 (Whole bin)	U1,U2,U3,U4,U5,U6,U7,U8,U9,UA,UB,UC,UD,UE,UF,UG
		SPMWH1221FQ☆SGUMS★	UM (Quarter bin)	U6, U7, UA, UB
		SPMWH1221FQ☆SGUKS★	UK (K Kitting bin)	U1,U2,U3,U4,U5,U6,U7,U8,U9,UA,UB,UC,UD,UE,UF,UG
		SPMWH1221FQ☆SGUYS★	UY (Y Kitting bin)	UN, UP, UQ, UR, US, UT, UU
		SPMWH1221FQ☆SGUUS★	UU (Mac3 only)	UU
	4000	SPMWH1221FQ☆SGT0S★	T0 (Whole bin)	T1,T2,T3,T4,T5,T6,T7,T8,T9,TA,TB,TC,TD,TE,TF,TG
		SPMWH1221FQ☆SGTMS★	TM (Quarter bin)	T6, T7, TA, TB
		SPMWH1221FQ☆SGTKS★	TK (K Kitting bin)	T1,T2,T3,T4,T5,T6,T7,T8,T9,TA,TB,TC,TD,TE,TF,TG
		SPMWH1221FQ☆SGTYS★	TY (Y Kitting bin)	TN, TP, TQ, TR, TS, TT, TU
		SPMWH1221FQ☆SGTUS★	TU (Mac3 only)	TT
	5000	SPMWH1221FQ☆SGR0S★	R0 (Whole bin)	R1,R2,R3,R4,R5,R6,R7,R8,R9,RA,RB,RC,RD,RE,RF,RG
		SPMWH1221FQ☆SGRMS★	RM (Quarter bin)	R6, R7, RA, RB
		SPMWH1221FQ☆SGRKS★	RK (K Kitting bin)	R1,R2,R3,R4,R5,R6,R7,R8,R9,RA,RB,RC,RD,RE,RF,RG
		SPMWH1221FQ☆SGRYS★	RY (Y Kitting bin)	RN, RP, RQ, RR, RS, RR, RU
		SPMWH1221FQ☆SGRUS★	RU (Mac3 only)	RR
	5700	SPMWH1221FQ☆SGQ0S★	Q0 (Whole bin)	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8,Q9,QA,QB,QC,QD,QE,QF,QG
		SPMWH1221FQ☆SGQMS★	QM (Quarter bin)	Q6, Q7, QA, QB
		SPMWH1221FQ☆SGQKS★	QK (K Kitting bin)	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8,Q9,QA,QB,QC,QD,QE,QF,QG
		SPMWH1221FQ☆SGQYS★	QY (Y Kitting bin)	QN, QP, QQ, QQ, QS, QQ, QU
		SPMWH1221FQ☆SGQUS★	QU (Mac3 only)	QU
	6500	SPMWH1221FQ☆SGP0S★	P0 (Whole bin)	P1,P2,P3,P4,P5,P6,P7,P8,P9,PA,PB,PC,PD,PE,PF,PG
		SPMWH1221FQ☆SGPMS★	PM (Quarter bin)	P6, P7, PA, PB
		SPMWH1221FQ☆SGPKS★	PK (K Kitting bin)	P1,P2,P3,P4,P5,P6,P7,P8,P9,PA,PB,PC,PD,PE,PF,PG
		SPMWH1221FQ☆SGPYS★	PY (Y Kitting bin)	PN, PP, PP, PP, PS, PP, PU
		SPMWH1221FQ☆SGPUS★	PU (Mac3 only)	PU

* Note :

"☆"can be “5”(Ra 80) or “7”(Ra 90) ,"★" can be "SA" or “SB” of luminous flux bin

(8) Chromaticity Region & Coordinates for whole bin or quarter bin or K kitting bin (I_F = 150 mA, T_a = 25 ºC)





(9) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y
W Rank (2700K)						V Rank (3000K)					
W1	0.4417	0.3940	W9	0.4515	0.4128	V1	0.4197	0.3870	V9	0.4273	0.4046
	0.4472	0.3953		0.4573	0.4141		0.4252	0.3888		0.4333	0.4066
	0.4522	0.4047		0.4623	0.4235		0.4293	0.3977		0.4374	0.4155
	0.4466	0.4034		0.4563	0.4222		0.4235	0.3958		0.4311	0.4133
W2	0.4472	0.3953	WA	0.4573	0.4141	V2	0.4252	0.3888	VA	0.4333	0.4066
	0.4527	0.3966		0.4631	0.4153		0.4307	0.3905		0.4394	0.4087
	0.4579	0.4059		0.4683	0.4247		0.4350	0.3996		0.4437	0.4178
	0.4522	0.4047		0.4623	0.4235		0.4293	0.3977		0.4374	0.4155
W3	0.4527	0.3966	WB	0.4631	0.4153	V3	0.4307	0.3905	VB	0.4394	0.4087
	0.4582	0.3978		0.4689	0.4166		0.4362	0.3923		0.4454	0.4107
	0.4635	0.4072		0.4742	0.4260		0.4408	0.4015		0.4500	0.4200
	0.4579	0.4059		0.4683	0.4247		0.4350	0.3996		0.4437	0.4178
W4	0.4582	0.3978	WC	0.4689	0.4166	V4	0.4362	0.3923	VC	0.4454	0.4107
	0.4637	0.3991		0.4747	0.4179		0.4417	0.3940		0.4515	0.4128
	0.4692	0.4085		0.4802	0.4272		0.4466	0.4034		0.4563	0.4222
	0.4635	0.4072		0.4742	0.4260		0.4408	0.4015		0.4500	0.4200
W5	0.4466	0.4034	WD	0.4563	0.4222	V5	0.4235	0.3958	VD	0.4311	0.4133
	0.4522	0.4047		0.4623	0.4235		0.4293	0.3977		0.4374	0.4155
	0.4573	0.4141		0.4673	0.4329		0.4333	0.4066		0.4415	0.4245
	0.4515	0.4128		0.4612	0.4316		0.4273	0.4046		0.4349	0.4221
W6	0.4522	0.4047	WE	0.4623	0.4235	V6	0.4293	0.3977	VE	0.4374	0.4155
	0.4579	0.4059		0.4683	0.4247		0.4350	0.3996		0.4437	0.4178
	0.4631	0.4153		0.4735	0.4341		0.4394	0.4087		0.4481	0.4269
	0.4573	0.4141		0.4673	0.4329		0.4333	0.4066		0.4415	0.4245
W7	0.4579	0.4059	WF	0.4683	0.4247	V7	0.4350	0.3996	VF	0.4437	0.4178
	0.4635	0.4072		0.4742	0.4260		0.4408	0.4015		0.4500	0.4200
	0.4689	0.4166		0.4796	0.4354		0.4454	0.4107		0.4546	0.4292
	0.4631	0.4153		0.4735	0.4341		0.4394	0.4087		0.4481	0.4269
W8	0.4635	0.4072	WG	0.4742	0.4260	V8	0.4408	0.4015	VG	0.4500	0.4200
	0.4692	0.4085		0.4802	0.4272		0.4466	0.4034		0.4563	0.4222
	0.4747	0.4179		0.4857	0.4366		0.4515	0.4128		0.4612	0.4316
	0.4689	0.4166		0.4796	0.4354		0.4454	0.4107		0.4546	0.4292

(9) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y
U Rank (3500K)						T Rank (4000K)					
U1	0.3942	0.3753	U9	0.3995	0.3916	T1	0.3731	0.3667	T9	0.3764	0.3815
	0.4006	0.3782		0.4065	0.3948		0.3788	0.3702		0.3826	0.3854
	0.4035	0.3865		0.4094	0.4031		0.3807	0.3778		0.3845	0.3930
	0.3969	0.3834		0.4022	0.3997		0.3748	0.3741		0.3781	0.3889
U2	0.4006	0.3782	UA	0.4065	0.3948	T2	0.3788	0.3702	TA	0.3826	0.3854
	0.4069	0.3812		0.4134	0.3981		0.3845	0.3736		0.3889	0.3892
	0.4102	0.3896		0.4167	0.4065		0.3867	0.3814		0.3910	0.3970
	0.4035	0.3865		0.4094	0.4031		0.3807	0.3778		0.3845	0.3930
U3	0.4069	0.3812	UB	0.4134	0.3981	T3	0.3845	0.3736	TB	0.3889	0.3892
	0.4133	0.3841		0.4204	0.4013		0.3902	0.3771		0.3951	0.3931
	0.4168	0.3927		0.4239	0.4099		0.3926	0.3851		0.3975	0.4011
	0.4102	0.3896		0.4167	0.4065		0.3867	0.3814		0.3910	0.3970
U4	0.4133	0.3841	UC	0.4204	0.4013	T4	0.3902	0.3771	TC	0.3951	0.3931
	0.4197	0.3870		0.4273	0.4046		0.3959	0.3805		0.4013	0.3969
	0.4235	0.3958		0.4311	0.4133		0.3986	0.3887		0.4040	0.4051
	0.4168	0.3927		0.4239	0.4099		0.3926	0.3851		0.3975	0.4011
U5	0.3969	0.3834	UD	0.4022	0.3997	T5	0.3748	0.3741	TD	0.3781	0.3889
	0.4035	0.3865		0.4094	0.4031		0.3807	0.3778		0.3845	0.3930
	0.4065	0.3948		0.4124	0.4114		0.3826	0.3854		0.3865	0.4006
	0.3995	0.3916		0.4049	0.4078		0.3764	0.3815		0.3797	0.3963
U6	0.4035	0.3865	UE	0.4094	0.4031	T6	0.3807	0.3778	TE	0.3845	0.3930
	0.4102	0.3896		0.4167	0.4065		0.3867	0.3814		0.3910	0.3970
	0.4134	0.3981		0.4199	0.4150		0.3889	0.3892		0.3932	0.4048
	0.4065	0.3948		0.4124	0.4114		0.3826	0.3854		0.3865	0.4006
U7	0.4102	0.3896	UF	0.4167	0.4065	T7	0.3867	0.3814	TF	0.3910	0.3970
	0.4168	0.3927		0.4239	0.4099		0.3926	0.3851		0.3975	0.4011
	0.4204	0.4013		0.4274	0.4185		0.3951	0.3931		0.4000	0.4091
	0.4134	0.3981		0.4199	0.4150		0.3889	0.3892		0.3932	0.4048
U8	0.4168	0.3927	UG	0.4239	0.4099	T8	0.3926	0.3851	TG	0.3975	0.4011
	0.4235	0.3958		0.4311	0.4133		0.3986	0.3887		0.4040	0.4051
	0.4273	0.4046		0.4349	0.4221		0.4013	0.3969		0.4067	0.4133
	0.4204	0.4013		0.4274	0.4185		0.3951	0.3931		0.4000	0.4091

(9) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y
R Rank (5000K)						Q Rank (5700K)					
R1	0.3429	0.3459	R9	0.3434	0.3586	Q1	0.3288	0.3342	Q9	0.3280	0.3452
	0.3465	0.3489		0.3474	0.3618		0.3323	0.3372		0.3319	0.3485
	0.3469	0.3553		0.3478	0.3682		0.3321	0.3429		0.3316	0.3542
	0.3431	0.3523		0.3436	0.3650		0.3284	0.3397		0.3276	0.3507
R2	0.3465	0.3489	RA	0.3474	0.3618	Q2	0.3323	0.3372	QA	0.3319	0.3485
	0.3502	0.3518		0.3514	0.3649		0.3358	0.3401		0.3357	0.3519
	0.3508	0.3584		0.3519	0.3715		0.3358	0.3460		0.3356	0.3578
	0.3469	0.3553		0.3478	0.3682		0.3321	0.3429		0.3316	0.3542
R3	0.3502	0.3518	RB	0.3514	0.3649	Q3	0.3358	0.3401	QB	0.3357	0.3519
	0.3538	0.3547		0.3554	0.3681		0.3393	0.3430		0.3395	0.3553
	0.3546	0.3614		0.3561	0.3748		0.3394	0.3491		0.3396	0.3614
	0.3508	0.3584		0.3519	0.3715		0.3358	0.3460		0.3356	0.3578
R4	0.3538	0.3547	RC	0.3554	0.3681	Q4	0.3393	0.3430	QC	0.3395	0.3553
	0.3575	0.3576		0.3594	0.3713		0.3429	0.3459		0.3434	0.3586
	0.3584	0.3644		0.3603	0.3781		0.3431	0.3523		0.3436	0.3650
	0.3546	0.3614		0.3561	0.3748		0.3394	0.3491		0.3396	0.3614
R5	0.3431	0.3523	RD	0.3436	0.3650	Q5	0.3284	0.3397	QD	0.3276	0.3507
	0.3469	0.3553		0.3478	0.3682		0.3321	0.3429		0.3316	0.3542
	0.3474	0.3618		0.3482	0.3747		0.3319	0.3485		0.3314	0.3599
	0.3434	0.3586		0.3439	0.3713		0.3280	0.3452		0.3273	0.3561
R6	0.3469	0.3553	RE	0.3478	0.3682	Q6	0.3321	0.3429	QE	0.3316	0.3542
	0.3508	0.3584		0.3519	0.3715		0.3358	0.3460		0.3356	0.3578
	0.3514	0.3649		0.3525	0.3781		0.3357	0.3519		0.3356	0.3637
	0.3474	0.3618		0.3482	0.3747		0.3319	0.3485		0.3314	0.3599
R7	0.3508	0.3584	RF	0.3519	0.3715	Q7	0.3358	0.3460	QF	0.3356	0.3578
	0.3546	0.3614		0.3561	0.3748		0.3394	0.3491		0.3396	0.3614
	0.3554	0.3681		0.3569	0.3815		0.3395	0.3553		0.3397	0.3675
	0.3514	0.3649		0.3525	0.3781		0.3357	0.3519		0.3356	0.3637
R8	0.3546	0.3614	RG	0.3561	0.3748	Q8	0.3394	0.3491	QG	0.3396	0.3614
	0.3584	0.3644		0.3603	0.3781		0.3431	0.3523		0.3436	0.3650
	0.3594	0.3713		0.3612	0.3849		0.3434	0.3586		0.3439	0.3713
	0.3554	0.3681		0.3569	0.3815		0.3395	0.3553		0.3397	0.3675

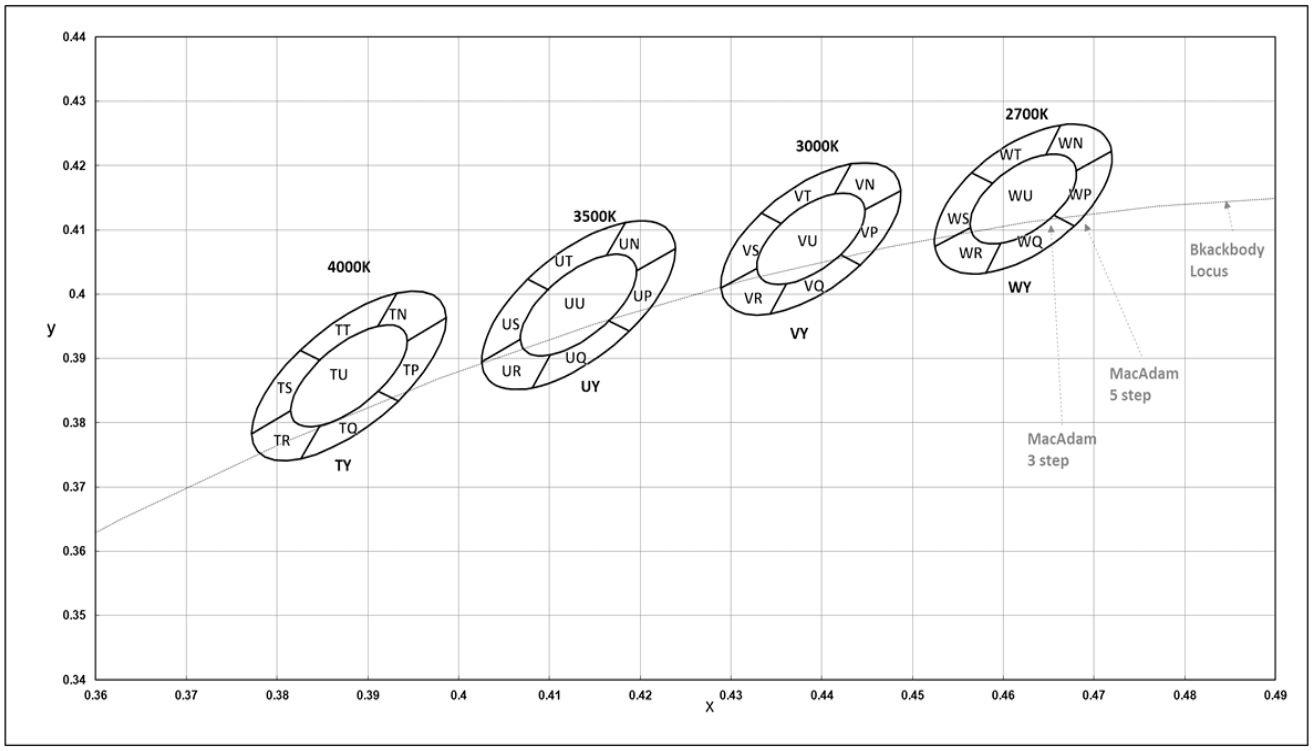
(9) Chromaticity Region & Coordinates

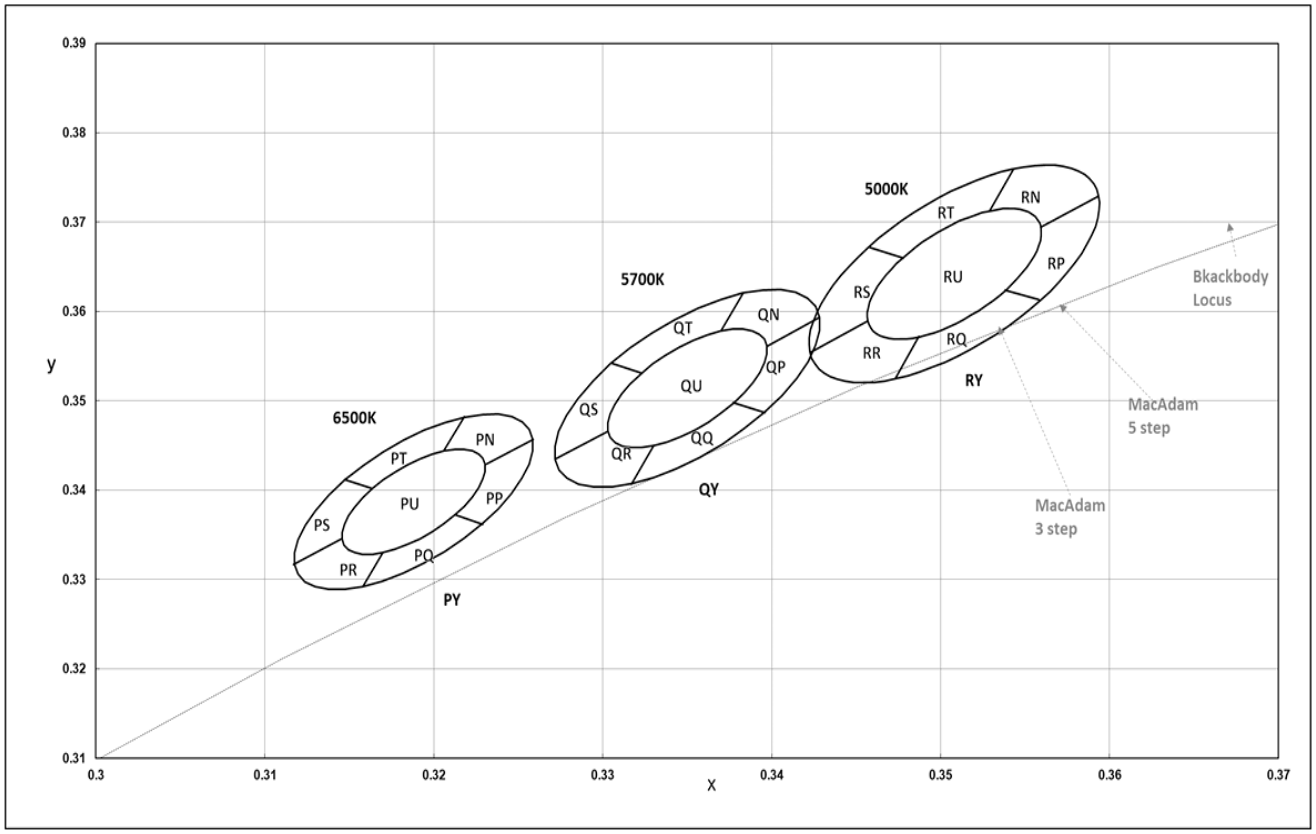
Region	CIE x	CIE y	Region	CIE x	CIE y
P Rank (6500K)					
P1	0.3133	0.3218	P9	0.3113	0.3314
	0.3171	0.3255		0.3154	0.3354
	0.3163	0.3305		0.3146	0.3404
	0.3123	0.3266		0.3103	0.3361
P2	0.3171	0.3255	PA	0.3154	0.3354
	0.3210	0.3292		0.3196	0.3395
	0.3203	0.3343		0.3189	0.3446
	0.3163	0.3305		0.3146	0.3404
P3	0.3210	0.3292	PB	0.3196	0.3395
	0.3248	0.3329		0.3237	0.3435
	0.3242	0.3382		0.3232	0.3489
	0.3203	0.3343		0.3189	0.3446
P4	0.3248	0.3329	PC	0.3237	0.3435
	0.3286	0.3366		0.3279	0.3476
	0.3282	0.3421		0.3275	0.3531
	0.3242	0.3382		0.3232	0.3489
P5	0.3123	0.3266	PD	0.3103	0.3361
	0.3163	0.3305		0.3146	0.3404
	0.3154	0.3354		0.3138	0.3453
	0.3113	0.3314		0.3093	0.3409
P6	0.3163	0.3305	PE	0.3146	0.3404
	0.3203	0.3343		0.3189	0.3446
	0.3196	0.3395		0.3182	0.3498
	0.3154	0.3354		0.3138	0.3453
P7	0.3203	0.3343	PF	0.3189	0.3446
	0.3242	0.3382		0.3232	0.3489
	0.3237	0.3435		0.3227	0.3542
	0.3196	0.3395		0.3182	0.3498
P8	0.3242	0.3382	PG	0.3232	0.3489
	0.3282	0.3421		0.3275	0.3531
	0.3279	0.3476		0.3271	0.3586
	0.3237	0.3435		0.3227	0.3542

* Note :

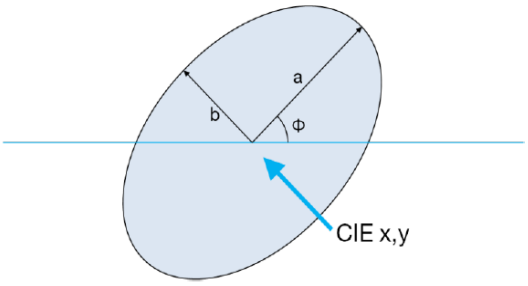
Dongbu maintains measurement tolerance of: Cx, Cy = ±0.005

(10) Chromaticity Region & Coordinates for Y kitting bin or mac3 only bin (I_F = 150 mA, T_a = 25 ºC)





(10) Chromaticity Region & Coordinates

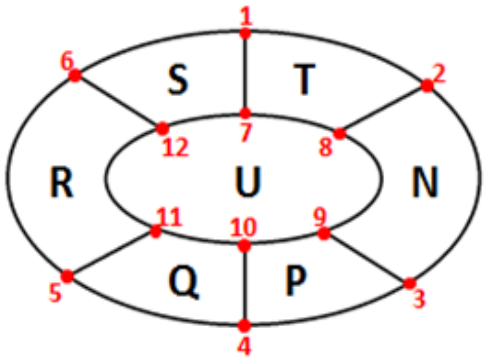


MacAdam	CCT (K)	Center point		Major-axis	Minor-axis	Rotation
		CIE x	CIE y	a	b	Φ
3 step	2700	0.4622	0.4148	0.0081	0.0042	53.70
	3000	0.4388	0.4086	0.0083	0.0041	53.22
	3500	0.4132	0.3983	0.0093	0.0041	54.00
	4000	0.3879	0.3873	0.0094	0.0040	53.72
	5000	0.3508	0.3642	0.0082	0.0035	59.62
	5700	0.335	0.3514	0.0075	0.0032	59.10
	6500	0.3188	0.3387	0.0067	0.0029	58.57
5 step	2700	0.4622	0.4148	0.0135	0.0070	53.70
	3000	0.4388	0.4086	0.0138	0.0068	53.22
	3500	0.4132	0.3983	0.0155	0.0068	54.00
	4000	0.3879	0.3873	0.0157	0.0067	53.72
	5000	0.3508	0.3642	0.0137	0.0058	59.62
	5700	0.3350	0.3514	0.0125	0.0053	59.10
	6500	0.3180	0.3387	0.0112	0.0048	58.57

* Note :

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

(10) Chromaticity Region & Coordinates



CCT	Region	CIE X	CIE Y	CCT	Region	CIE X	CIE Y	CCT	Region	CIE X	CIE Y	CCT	Region	CIE X	CIE Y	CCT	Region	CIE X	CIE Y
2700K	1	0.4618	0.4241	3000K	1	0.4389	0.4184	3500K	1	0.4318	0.4087	4000K	1	0.3888	0.4008	5000K	1	0.3525	0.3768
	2	0.4716	0.4315		2	0.4488	0.4259		2	0.4245	0.4176		2	0.3995	0.4097		2	0.3610	0.3855
	3	0.4772	0.4274		3	0.4543	0.4218		3	0.4300	0.4135		3	0.4049	0.4058		3	0.3660	0.3825
	4	0.4731	0.4158		4	0.4499	0.4102		4	0.4248	0.4007		4	0.3996	0.3929		4	0.3625	0.3709
	5	0.4634	0.4085		5	0.4399	0.4026		5	0.4142	0.3918		5	0.3889	0.3839		5	0.3540	0.3621
	6	0.4578	0.4127		6	0.4345	0.4067		6	0.4086	0.3958		6	0.3835	0.3878		6	0.3490	0.3650
	7	0.4641	0.4225		7	0.4411	0.4167		7	0.4160	0.4071		7	0.3910	0.3992		7	0.3545	0.3756
	8	0.4700	0.4269		8	0.4470	0.4213		8	0.4224	0.4124		8	0.3974	0.4045		8	0.3596	0.3808
	9	0.4733	0.4244		9	0.4503	0.4188		9	0.4257	0.4100		9	0.4006	0.4022		9	0.3626	0.3790
	10	0.4709	0.4175		10	0.4477	0.4118		10	0.4226	0.4023		10	0.3974	0.3944		10	0.3605	0.3720
	11	0.4650	0.4131		11	0.4417	0.4073		11	0.4162	0.3970		11	0.3910	0.3891		11	0.3554	0.3668
	12	0.4617	0.4156		12	0.4385	0.4097		12	0.4129	0.3994		12	0.3878	0.3914		12	0.3524	0.3685

CCT	Region	CIE X	CIE Y	CCT	Region	CIE X	CIE Y
5700K	1	0.3373	0.3644	6500K	1	0.3213	0.3514
	2	0.3451	0.3723		2	0.3284	0.3584
	3	0.3496	0.3695		3	0.3325	0.3559
	4	0.3464	0.3589		4	0.3295	0.3464
	5	0.3385	0.3509		5	0.3224	0.3394
	6	0.3340	0.3537		6	0.3183	0.3419
	7	0.3391	0.3633		7	0.3229	0.3504
	8	0.3438	0.3680		8	0.3272	0.3546
	9	0.3465	0.3663		9	0.3297	0.3531
	10	0.3445	0.3600		10	0.3279	0.3474
	11	0.3398	0.3552		11	0.3236	0.3432
	12	0.3371	0.3568		12	0.3211	0.3447

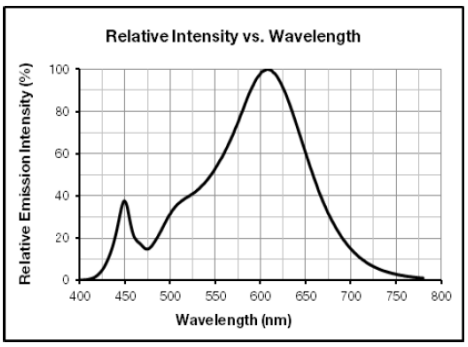
* Note :

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

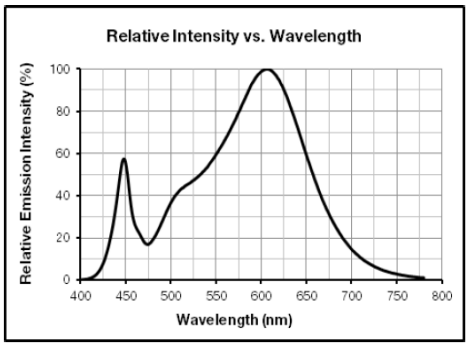
3. Typical Characteristics Graphs

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

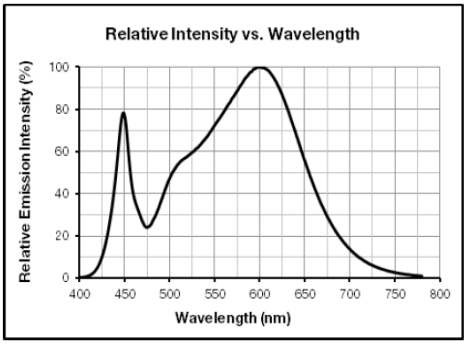
CCT : 2700 K (80 CRI)



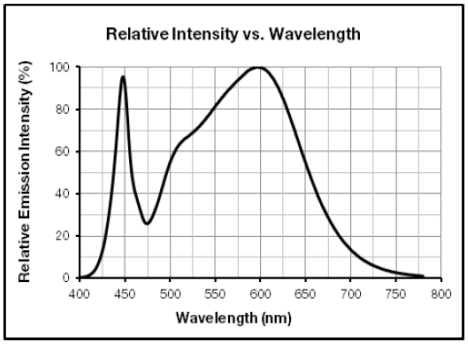
CCT : 3000 K (80 CRI)



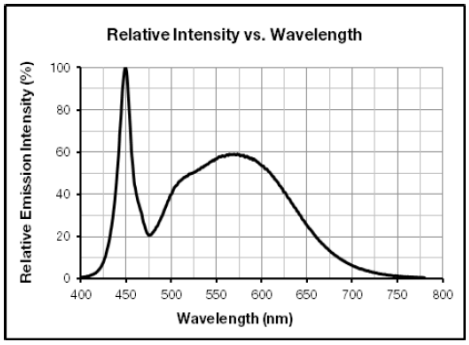
CCT : 3500 K (80 CRI)



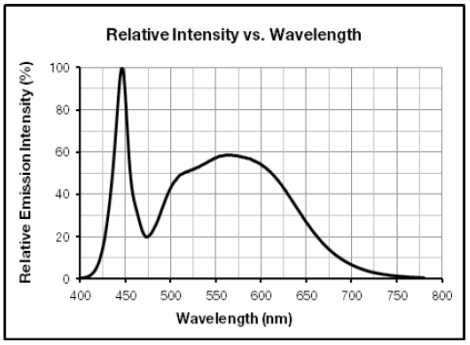
CCT : 4000 K (80 CRI)



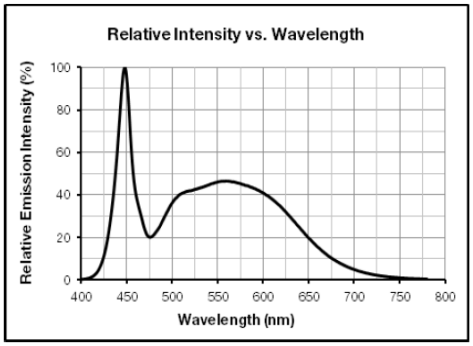
CCT : 5000 K (80 CRI)



CCT : 5700 K (80 CRI)



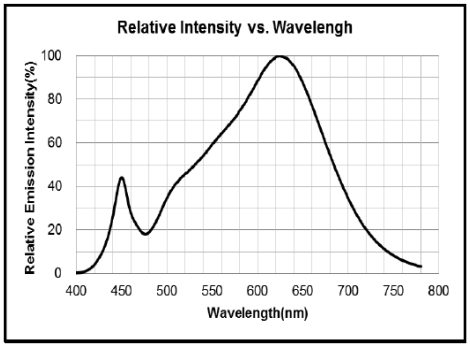
CCT : 6500 K (80 CRI)



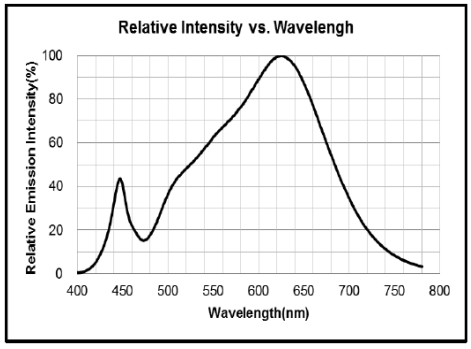
3. Typical Characteristics Graphs

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

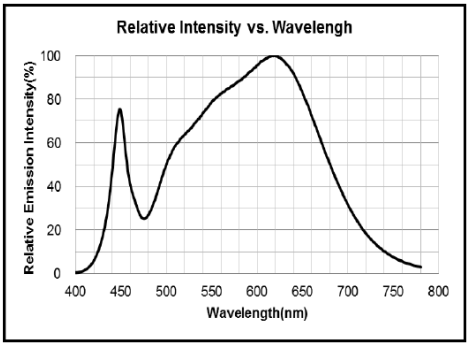
CCT : 2700 K (90 CRI)



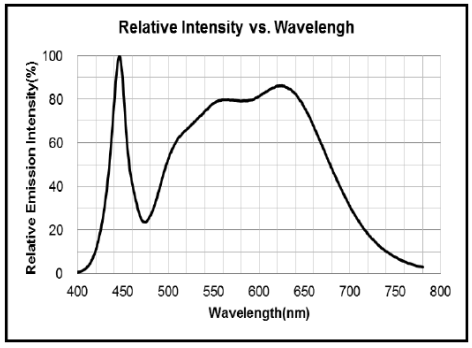
CCT : 3000 K (90 CRI)



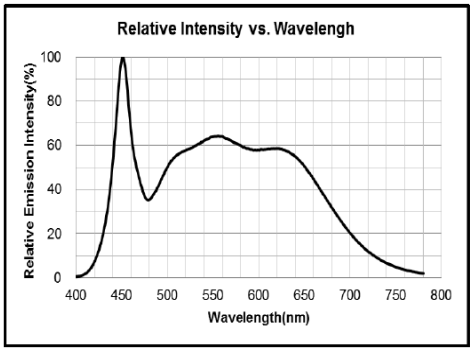
CCT : 3500 K (90 CRI)



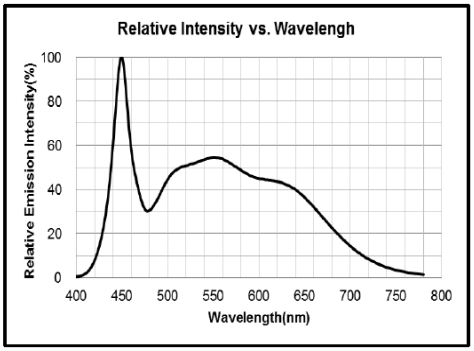
CCT : 4000 K (90 CRI)



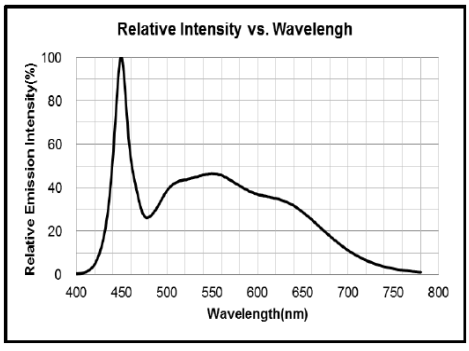
CCT : 5000 K (90 CRI)



CCT : 5700 K (90 CRI)

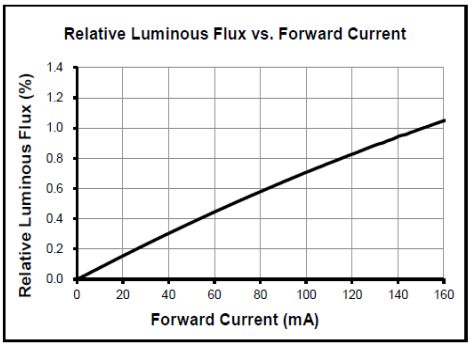


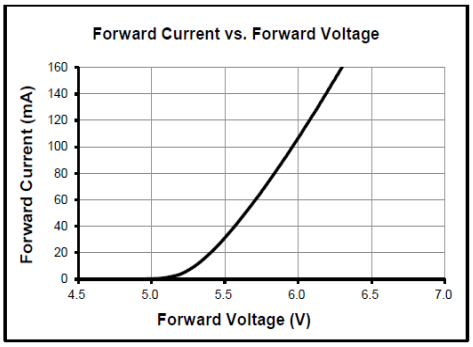
CCT : 6500 K (90 CRI)



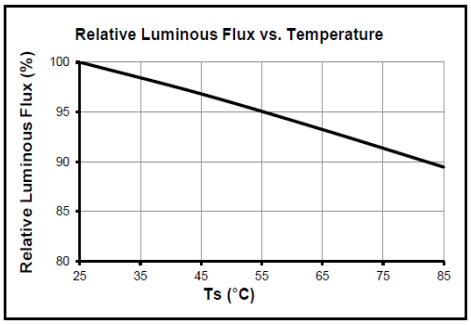
3. Typical Characteristics Graphs

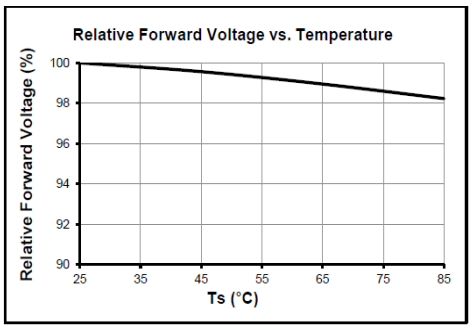
(2) Forward Current Characteristics (T_a=25 ºC)



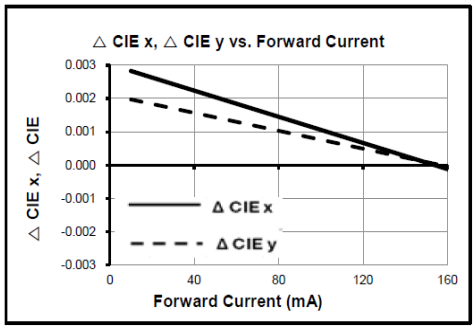


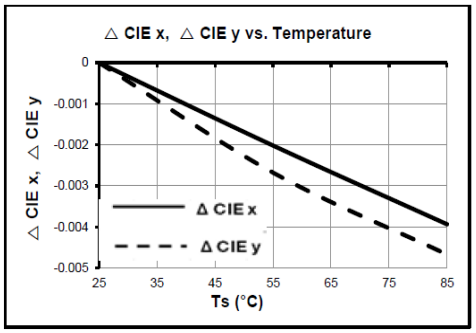
(3)Temperature Characteristics (I_F=150 mA)



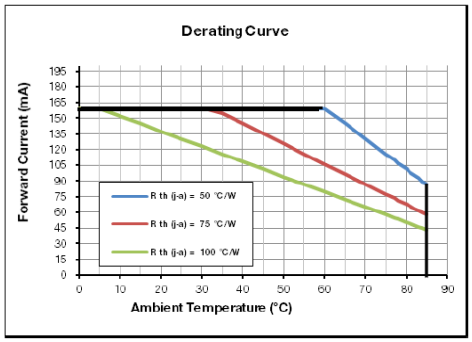


(4) Color Shift Characteristics (I_F=150 mA, T_a=25 ºC)

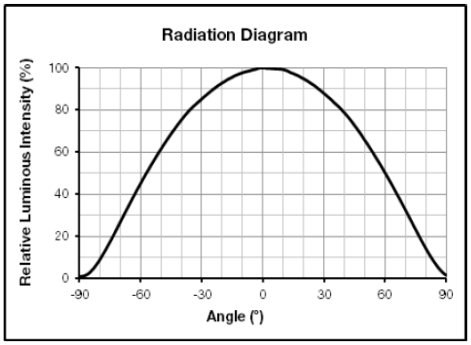




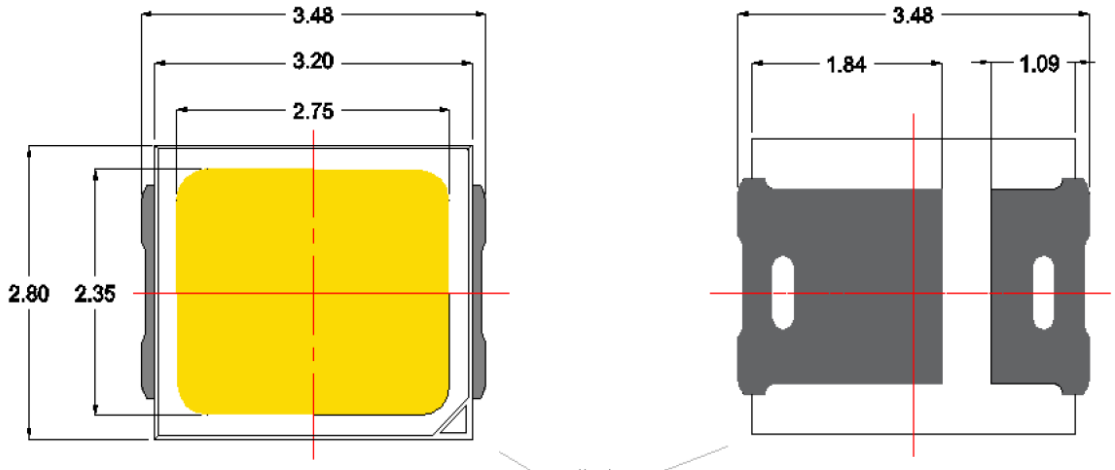
(5) Derating Curve



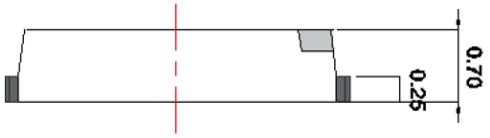
(6) Beam Angle Characteristics (I_F=150 mA, T_a=25 ºC)



4. Outline Drawing & Dimension

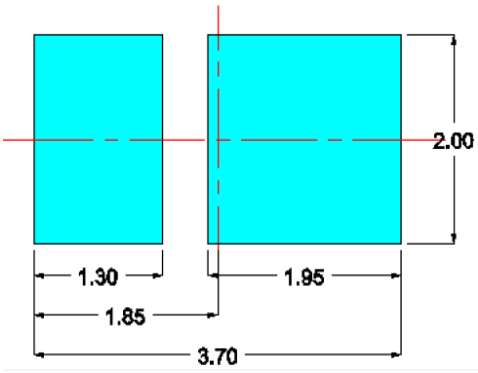


[Top View] [Bottom View]



[Side View]

[Recommended PCB Solder Pad]



- Measurement unit : mm
- Tolerance : ± 0.1mm

* Note :

1) 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.

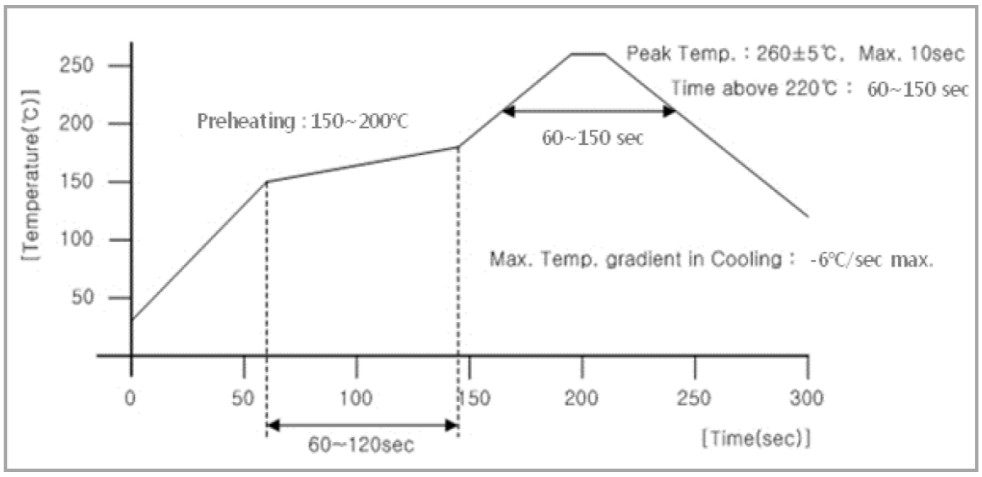
2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED`s characteristics should be carefully checked before and after such repair.

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.



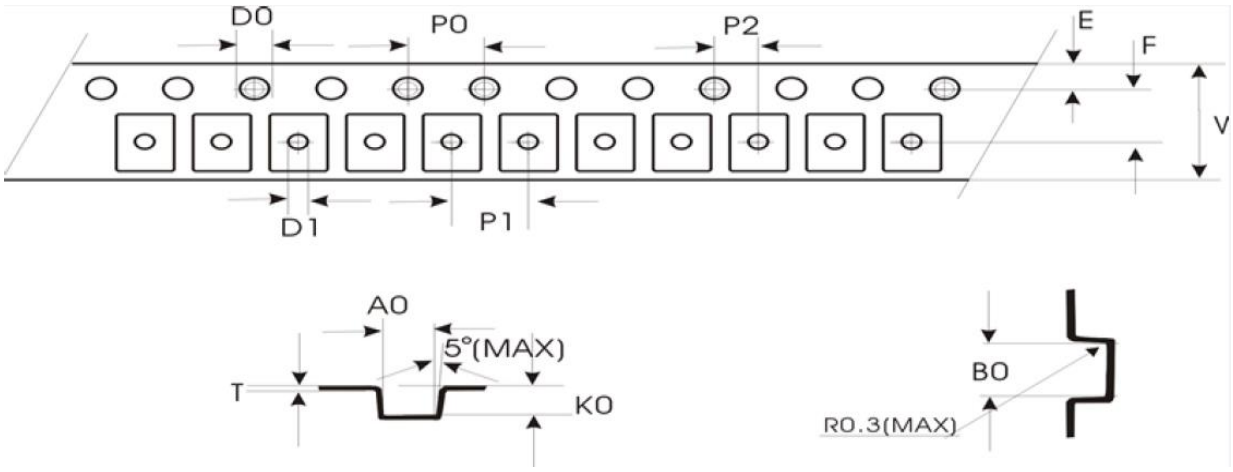
(2) Manual Soldering Conditions

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

6. Tape & Reel

(1) Taping Dimension

(unit : mm)

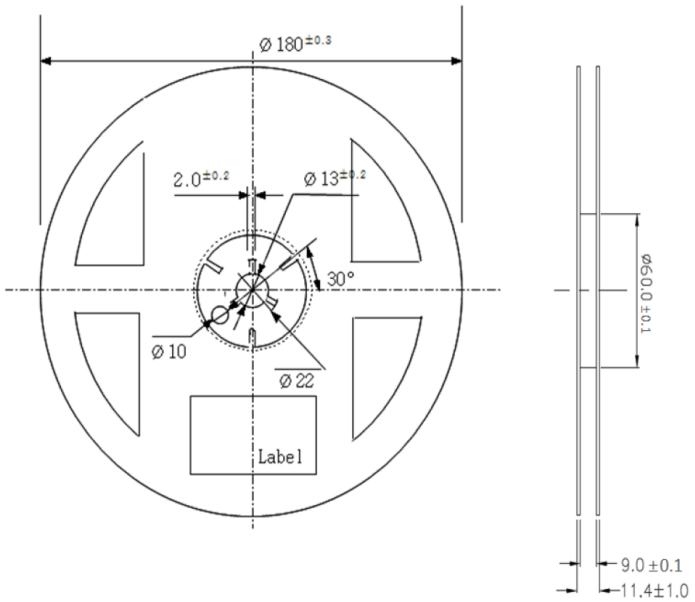


A0	3.10±0.1	P0	4.00±0.1	T	0.20±0.05	D0	1.60(MAX)
B0	3.70±0.1	P1	4.00±0.1	E	1.75±0.1	D1	1.05(MIN)
K0	1.00±0.1	P2	2.00±0.1	F	3.50±0.05	V	8.00±0.1

6. Tape & Reel

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

(unit : mm)



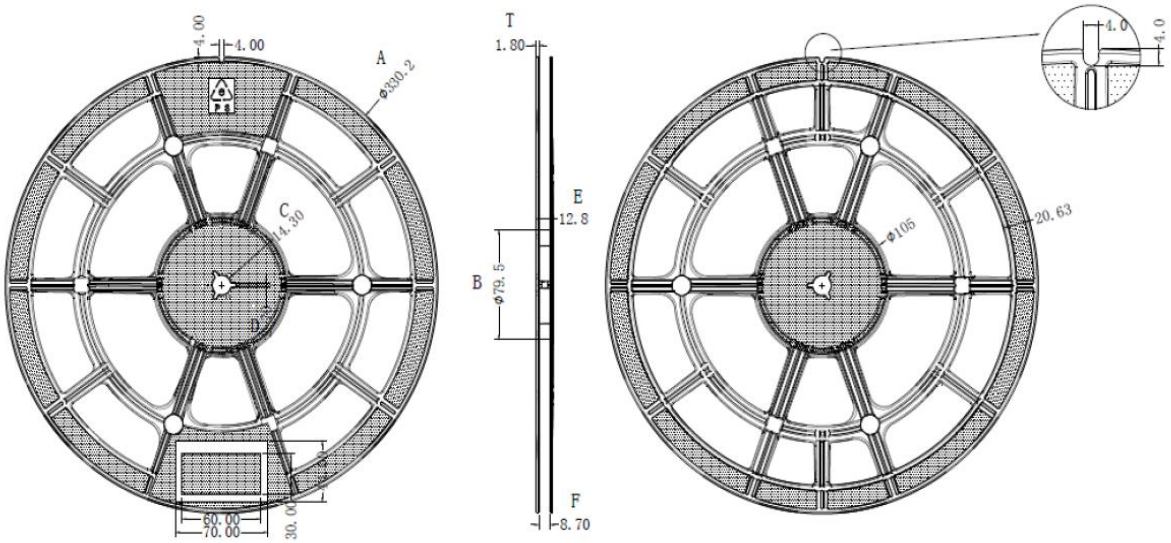
*** Note :**

1) Quantity: The quantity/reel is 4,000 pcs

2) All dimensions are millimeters (tolerance : ±0.2mm)

3) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

(3) Reel Dimension (Max 16,000 pcs)



A±2	B±0.5	C±0.2	D±0.2	E±0.5	$F^{+2}_{-0.3}$	T±0.2
Ø330.2	Ø79.5	Ø14.3	2.7	12.8	8.7	1.8

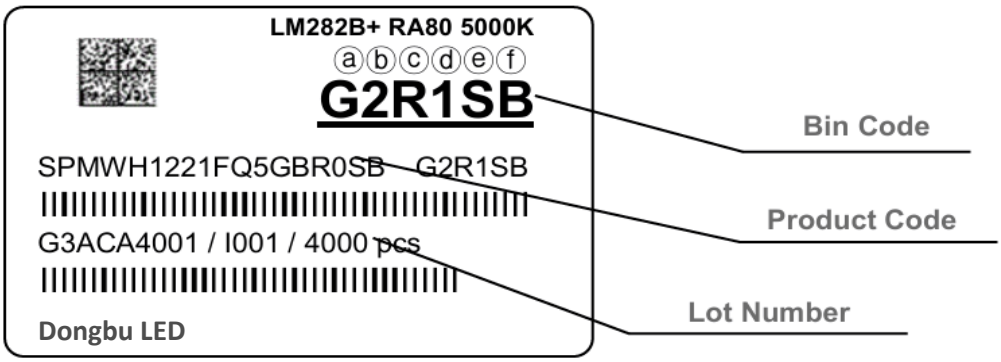
1) Quantity: The quantity/reel is 16,000 pcs

2) All dimensions are millimeters (tolerance : ±0.2mm)

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 6)**

Bin Code

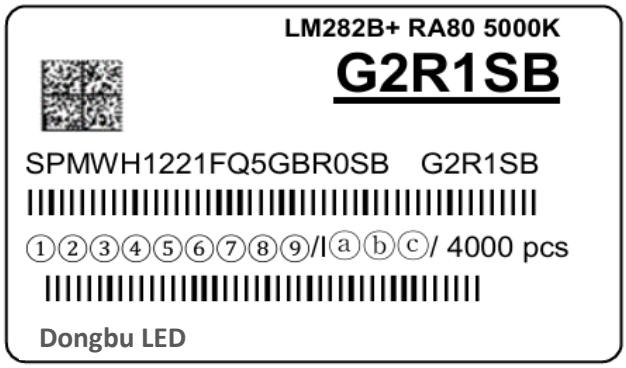
ⓐⓑ: Forward Voltage bin (refer to page 10)

ⓒⓓ: Chromaticity bin (refer to page 11-18)

ⓔⓕ: Luminous Flux bin (refer to page 7)

(2) Lot Number

The lot number is composed of the following characters:



①②③④⑤⑥⑦⑧⑨ / Ⅰⓐⓑⓒ / 4,000 pcs

①② : Production site (GP : Shenzhen, China, G3 : Nanchang, China, GD : Zhongshan, China)

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 ⓐⓑⓒ : Product serial number

8. Packing Structure

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

Reel

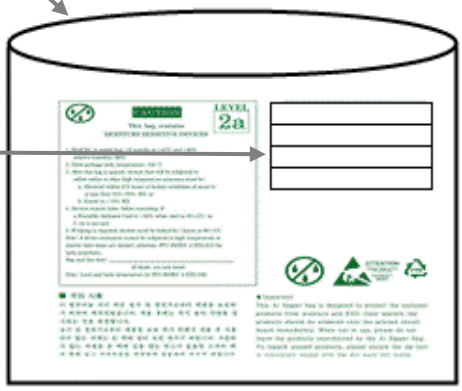
LM282B+ RA80 5000K
G2R1SB
SPMWH1221FQ5GBR0SB G2R1SB
G3ACA4001 / I001 / 4000 pcs
Dongbu LED



Aluminum Vinyl Packing Bag

LM282B+ RA80 5000K
G2R1SB
SPMWH1221FQ5GBR0SB G2R1SB
G3ACA4001 / I001 / 4000 pcs
Dongbu LED

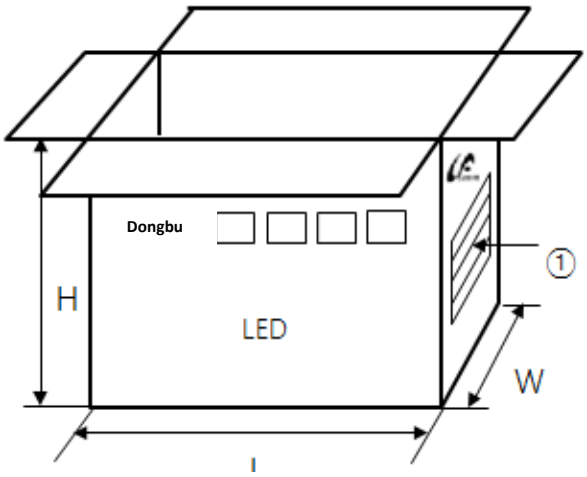




Outer Box

Material: Paper (SW3B(B))

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



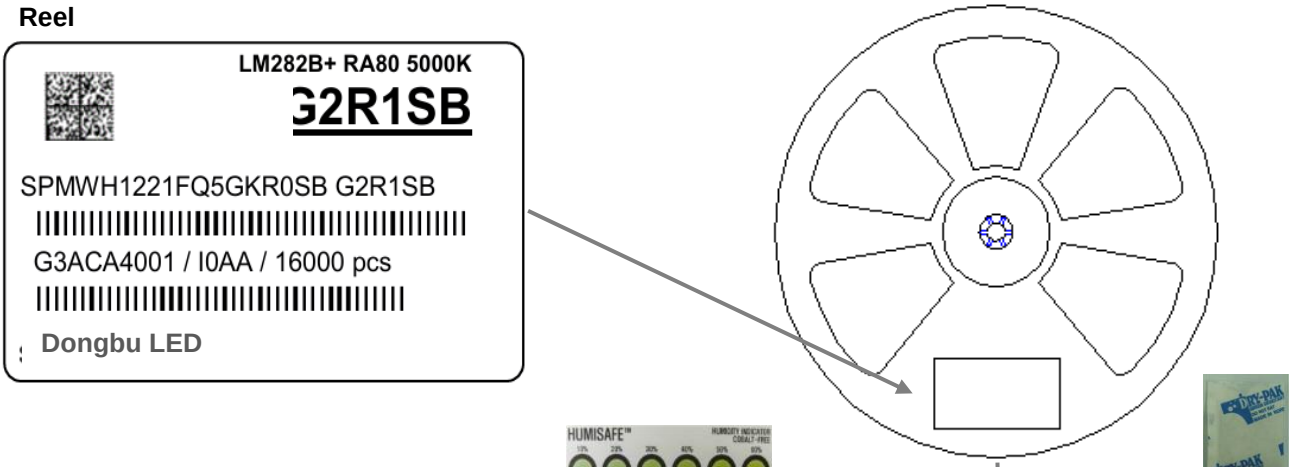
① Side Label

LM282B+ RA80 5000K
G2R1SB
SPMWH1221FQ5GBR0SB G2R1SB
G3ACA4001 / I001 / 40000 pcs
Dongbu LED

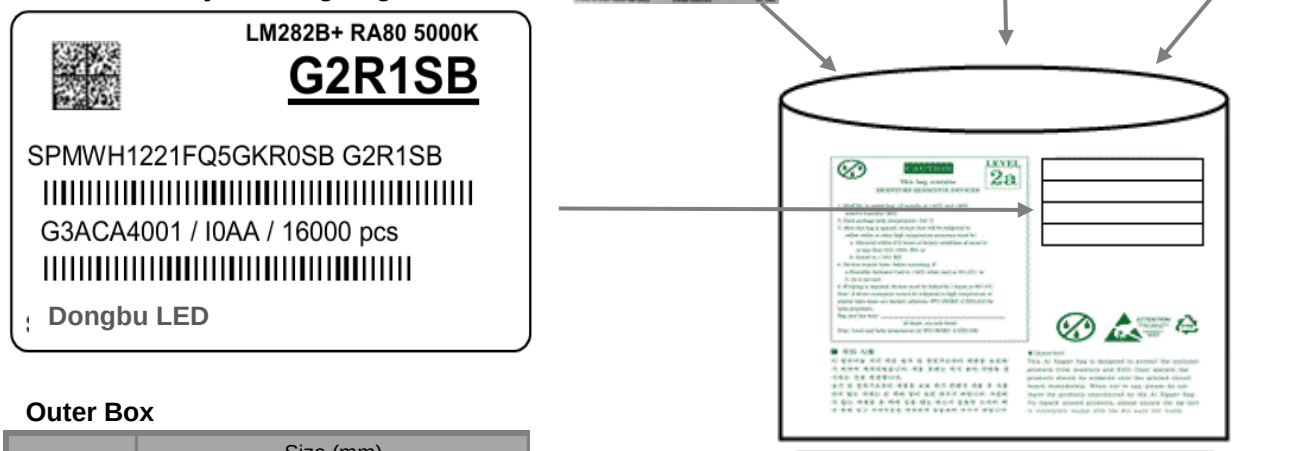
8. Packing Structure

(2) Packing Process (The quantity of PKG on the Reel to be Max 16,000 pcs)

Reel

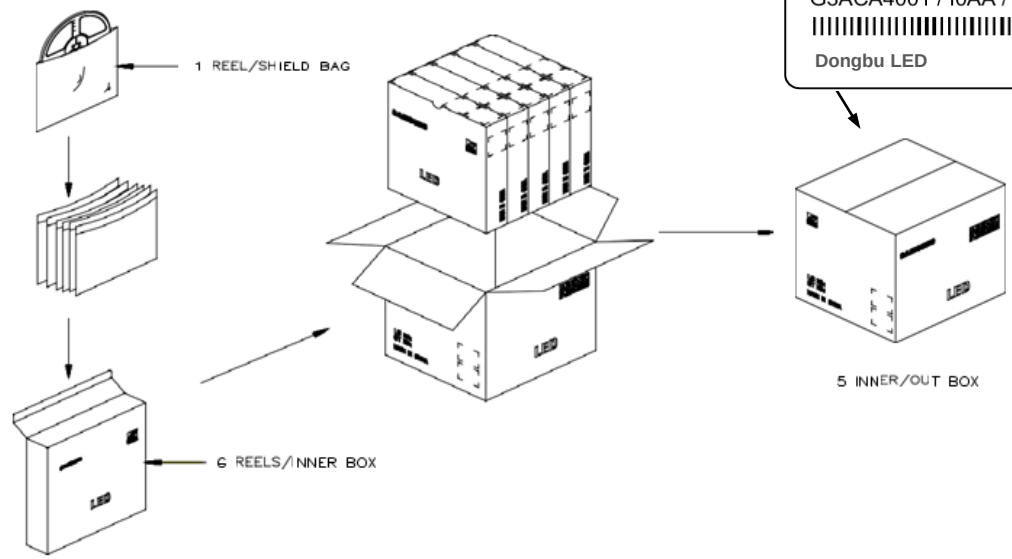


Aluminum Vinyl Packing Bag



Outer Box

Type	Size (mm)		
	L	W	H
Inner	340 ± 5	370 ± 5	80 ± 5
Outer	345 ± 5	378 ± 5	405 ± 5

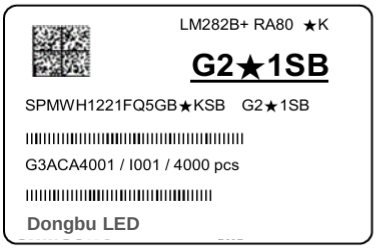


8. Packing Structure

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

Reel

Kitting 'A'

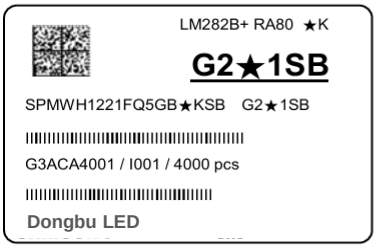


Kitting 'B'



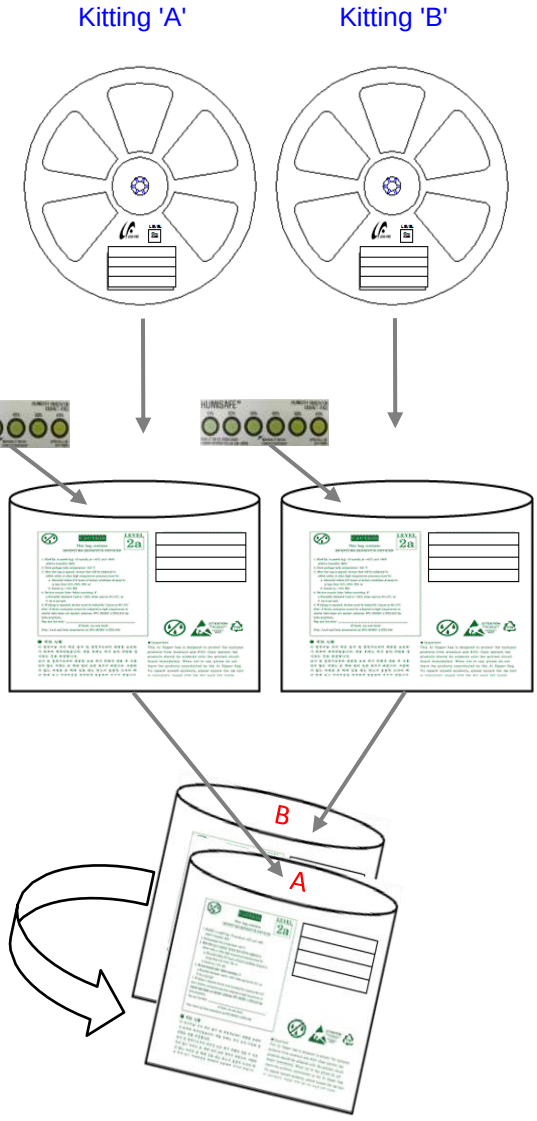
Aluminum Vinyl Packing Bag

Kitting 'A'



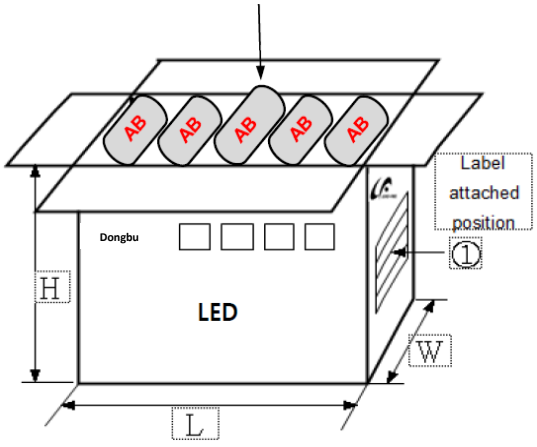
Kitting 'B'





Material : Paper (SW3B(B))

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

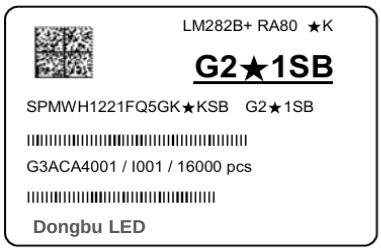


8. Packing Structure

(4) Packing Process for kitting (The quantity of PKG on the Reel to be Max 16,000 pcs)

Reel

Kitting 'A'



Kitting 'B'



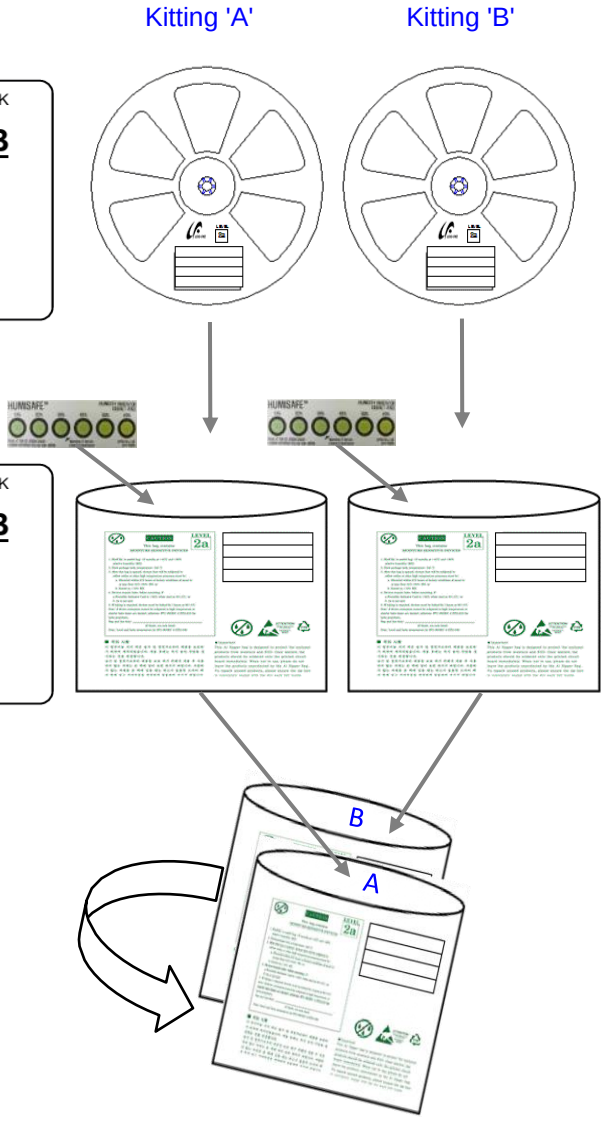
Aluminum Vinyl Packing Bag

Kitting 'A'



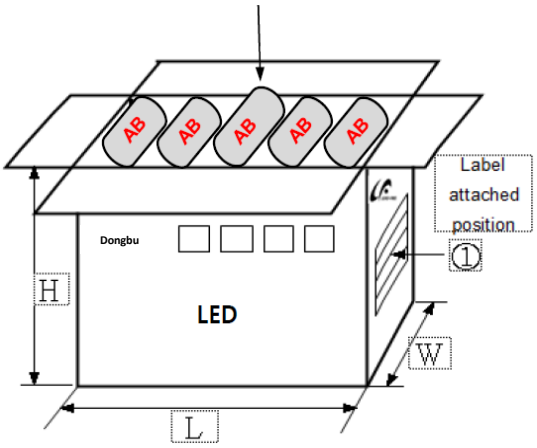
Kitting 'B'





Material : Paper (SW3B(B))

Type	Size (mm)			Note
	L	W	H	
13 inch L	378 ± 5	345 ± 5	405 ± 5	Up to 10 reels



8. Packing Structure

(5) Aluminum Vinyl Packing Bag



(6) Example of Humidity Indicator Card inside Aluminum Vinyl Bag



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.