

SPECIFICATIONS

Middle Power LED Series
2835 18V Hot temp CIE
LM286B+
SA Rank



Designed for better lm/\$ (Lamps)

Features & Benefits

- 0.9W High-Voltage 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	4	5	Q	5	W	8	R	0	S	A

Digit	PKG Information	Code	Specification
1 2 3	Dongbu Package Middle Power	SPM	Middle power
4 5	Color	WH	White
6	Product Version	1	1 st version
7 8 9	Form Factor	224	2.8 x 3.5 x 0.7 mm; 2 pads
10	Sorting Current (mA)	5	50 mA
11	Chromaticity Coordinates	Q	ANSI Standard
12	CRI	5	Min. 80
		7	Min. 90
13 14	Forward Voltage (V)	W8 or WK	16~20
		Bin Code	A2 16 ~ 17
			A3 17 ~ 18
			A4 18 ~ 19
			A5 19 ~ 20
			W8 : 4,000ea, WK : 16,000ea per reel
15 16	CCT (K)	W☆	2700 W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
		V☆	3000 V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		U☆	3500 U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		T☆	4000 Bin Code T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		R☆	5000 R1, R2, R3, R4, R5, R6, R7, R8, R9, RA, RB, RC, RD, RE, RF, RG
		Q☆	5700 Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QD, QE, QF, QG,
		P☆	6500 P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
			☆ : "0" (Whole bin), "M" (Quarter bin), "K" (K Kitting bin), "Y"(Y Kitting bin) or "U" (Mac3 only)
17 18	Luminous Flux	SA	Bin Code SA

2. Characteristics

(1) Absolute Maximum Ratings

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	°C	
Storage Temperature	T_{stg}	-40 ~ +85	°C	
LED Junction Temperature	T_j	125	°C	
Forward Current	I_F	60	mA	
Peak Pulsed Forward Current	I_{Fp}	120	mA	Duty 1/10, pulse width 10ms
Assembly Process Temperature		260<10	°C/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 ($I_F = 50 \text{ mA}$, $T_s = 25 \text{ °C}$)

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (VF)	V	W8 or WK	A2	16		17
			A3	17		18
			A4	18		19
			A5	19		20
Color Rendering Index (Ra)		5		80	-	-
		7		90	-	-
Special CRI (R9)	For Ra 90			50		
Thermal Resistance (junction to solder point)	°C/W			-	20	-
Beam Angle				-	120	-

* Note

Dongbu maintains measurement tolerance of: forward voltage = $\pm 0.1 \text{ V}$, CRI = ± 3 , R9 = ± 6.5

(3) Luminous Flux Bins ($I_F = 50 \text{ mA}$, $T_a = 25^\circ\text{C}$)

Item	CRI (Ra) Min.	Normal	Bin	Sorting @ 50mA	
		CCT(K)		Min.	Max.
Luminous Flux (Φ_v)	80	2700	SA	110.0	120.0
		3000	SA	113.0	123.0
		3500	SA	117.0	127.0
		4000	SA	121.0	131.0
		5000	SA	124.0	134.0
		5700	SA	122.0	132.0
		6500	SA	121.0	131.0
	90	2700	SA	90.0	100.0
		3000	SA	98.0	108.0
		3500	SA	101.0	111.0
		4000	SA	105.0	115.0
		5000	SA	107.0	117.0
		5700	SA	106.0	116.0
		6500	SA	105.0	115.0

* Note :

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

(4) Luminous Flux Bins ($I_F = 50 \text{ mA}$, $T_a = 25^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v , lm)
80	2700	SPMWH12245Q5W8W☆SB	SA	110.0 ~ 120.0
	3000	SPMWH12245Q5W8V☆SB	SA	113.0 ~ 123.0
	3500	SPMWH12245Q5W8U☆SB	SA	117.0 ~ 127.0
	4000	SPMWH12245Q5W8T☆SB	SA	121.0 ~ 131.0
	5000	SPMWH12245Q5W8Q☆SB	SA	124.0 ~ 134.0
	5700	SPMWH12245Q5W8R☆SB	SA	122.0 ~ 132.0
	6500	SPMWH12245Q5W8P☆SB	SA	121.0 ~ 131.0
90	2700	SPMWH12245Q7W8W☆SB	SA	90.0 ~ 100.0
	3000	SPMWH12245Q7W8V☆SB	SA	98.0 ~ 108.0
	3500	SPMWH12245Q7W8U☆SB	SA	101.0 ~ 111.0
	4000	SPMWH12245Q7W8T☆SB	SA	105.0 ~ 115.0
	5000	SPMWH12245Q7W8Q☆SB	SA	107.0 ~ 117.0
	5700	SPMWH12245Q7W8R☆SB	SA	106.0 ~ 116.0
	6500	SPMWH12245Q7W8P☆SB	SA	105.0 ~ 115.0

* 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 ($I_F = 50 \text{ mA}$, $T_a = 25 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
			W8 or WK	A2	16 ~ 17
				A3	17 ~ 18
				A4	18 ~ 19
				A5	19 ~ 20

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]

D	E	F	G
9	A	B	C
5	6	7	8
1	2	3	4

[Binning Information]

Bin #1		Bin #2
VF	A2	A2
	A3	A3
	A4	A4
	A5	A5
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

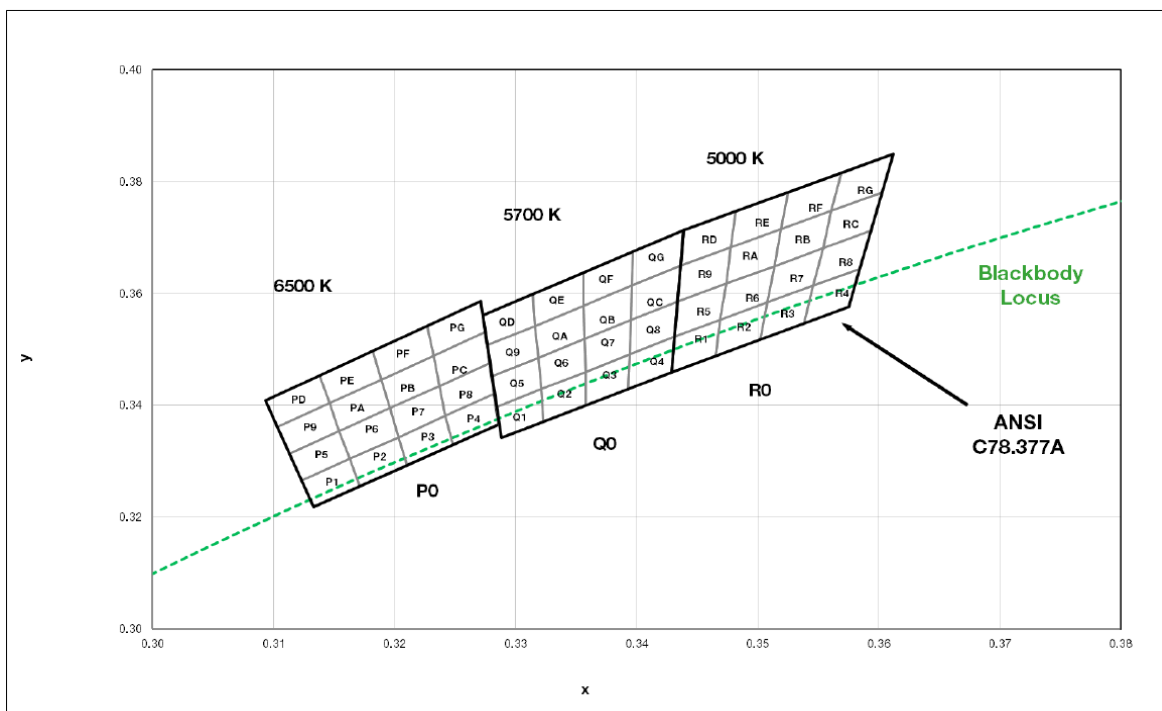
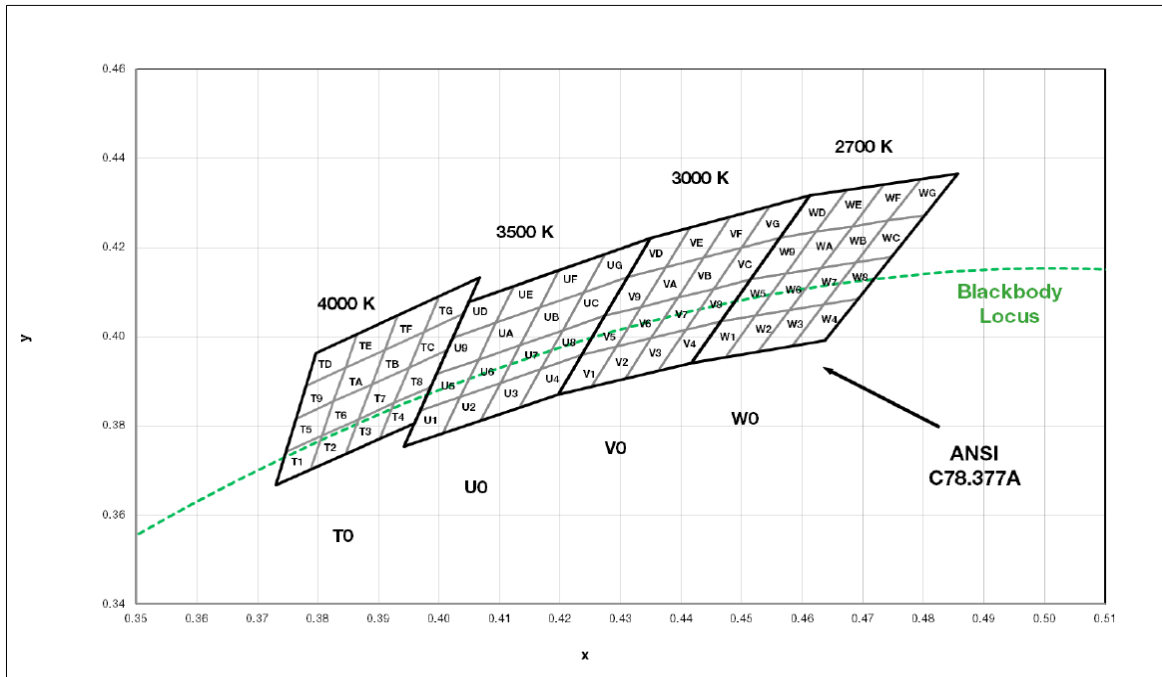
(7) Color Bins ($I_F = 50 \text{ mA}$, $T_a = 25 \text{ }^\circ\text{C}$)

CRI (Ra) Min.	Normal CCT (K)	Product Code	Code Rank	Chromaticity Bins
80 or 90	2700	SPMWH12245Q☆W8W0SA	W0 (Whole bin)	W1,W2,W3,W4,W5,W6,W7,W8,W9,WA,WB,WC,WD,WE,WF,WG
		SPMWH12245Q☆W8WMSA	WM (Quarter bin)	W6, W7, WA, WB
		SPMWH12245Q☆W8WKSA	WK (K Kitting bin)	W1,W2,W3,W4,W5,W6,W7,W8,W9,WA,WB,WC,WD,WE,WF,WG
	3000	SPMWH12245Q☆W8V0SA	V0 (Whole bin)	V1,V2,V3,V4,V5,V6,V7,V8,V9,VA,VB,VC,VD,VE,VF,VG
		SPMWH12245Q☆W8VMSA	VM (Quarter bin)	V6, V7, VA, VB
		SPMWH12245Q☆W8VKSA	VK (K Kitting bin)	V1,V2,V3,V4,V5,V6,V7,V8,V9,VA,VB,VC,VD,VE,VF,VG
	3500	SPMWH12245Q☆W8U0SA	U0 (Whole bin)	U1,U2,U3,U4,U5,U6,U7,U8,U9,UA,UB,UC,UD,UE,UF,UG
		SPMWH12245Q☆W8UMSA	UM (Quarter bin)	U6, U7, UA, UB
		SPMWH12245Q☆W8UKSA	UK (K Kitting bin)	U1,U2,U3,U4,U5,U6,U7,U8,U9,UA,UB,UC,UD,UE,UF,UG
	4000	SPMWH12245Q☆W8T0SA	T0 (Whole bin)	T1,T2,T3,T4,T5,T6,T7,T8,T9,TA,TB,TC,TD,TE,TF,TG
		SPMWH12245Q☆W8TMSA	TM (Quarter bin)	T6, T7, TA, TB
		SPMWH12245Q☆W8TKSA	TK (K Kitting bin)	T1,T2,T3,T4,T5,T6,T7,T8,T9,TA,TB,TC,TD,TE,TF,TG
	5000	SPMWH12245Q☆W8R0SA	R0 (Whole bin)	R1,R2,R3,R4,R5,R6,R7,R8,R9,RA,RB,RC,RD,RE,RF,RG
		SPMWH12245Q☆W8RMSA	RM (Quarter bin)	R6, R7, RA, RB
		SPMWH12245Q☆W8RKSA	RK (K Kitting bin)	R1,R2,R3,R4,R5,R6,R7,R8,R9,RA,RB,RC,RD,RE,RF,RG
	5700	SPMWH12245Q☆W8Q0SA	Q0 (Whole bin)	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8,Q9,QA,QB,QC,QD,QE,QF,QG
		SPMWH12245Q☆W8QMSA	QM (Quarter bin)	Q6, Q7, QA, QB
		SPMWH12245Q☆W8QKSA	QK (K Kitting bin)	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8,Q9,QA,QB,QC,QD,QE,QF,QG
	6500	SPMWH12245Q☆W8P0SA	P0 (Whole bin)	P1,P2,P3,P4,P5,P6,P7,P8,P9,PA,PB,PC,PD,PE,PF,PG
		SPMWH12245Q☆W8PMSA	PM (Quarter bin)	P6, P7, PA, PB
		SPMWH12245Q☆W8PKSA	PK (K Kitting bin)	P1,P2,P3,P4,P5,P6,P7,P8,P9,PA,PB,PC,PD,PE,PF,PG

* Note :

"☆" can be "5(Ra 80)" or "7(Ra 90)"

(8) Chromaticity Region & Coordinates for whole bin or quarter bin or K kitting bin ($I_F = 50 \text{ mA}$, $T_a = 25^\circ\text{C}$)



(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

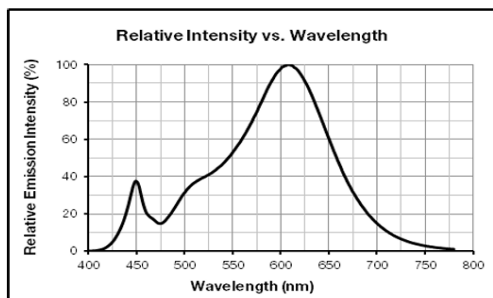
* Note :

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

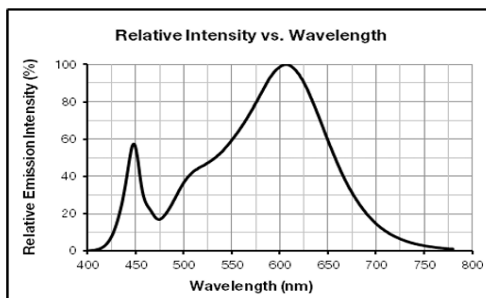
3. Typical Characteristics Graphs

(1) Spectrum Distribution ($I_F = 50 \text{ mA}$, $T_a = 25^\circ \text{C}$)

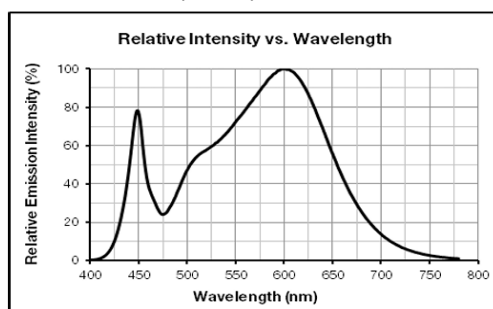
CCT : 2700 K (80 CRI)



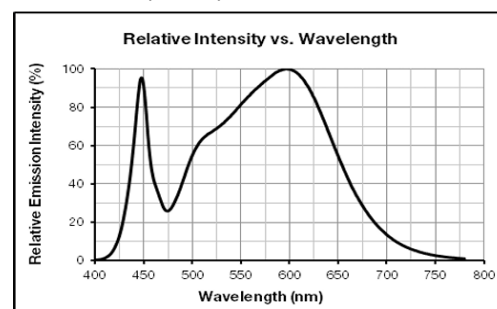
CCT : 3000 K (80 CRI)



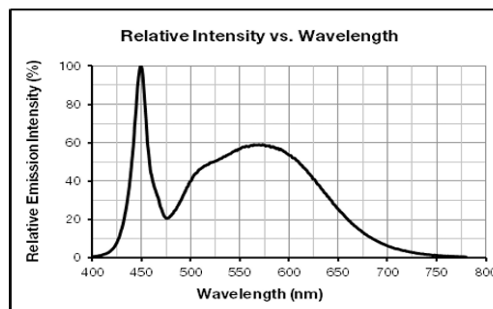
CCT : 3500 K (80 CRI)



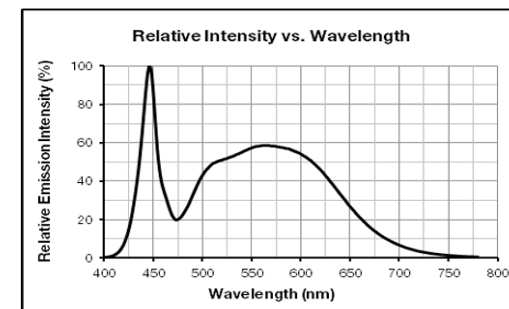
CCT : 4000 K (80 CRI)



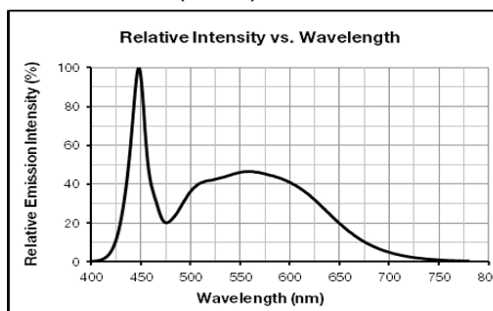
CCT : 5000 K (80 CRI)



CCT : 5700 K (80 CRI)



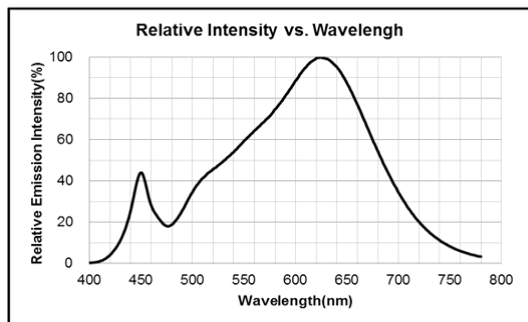
CCT : 6500 K (80 CRI)



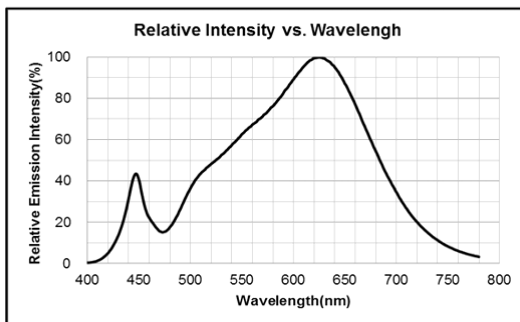
3. Typical Characteristics Graphs

(1) Spectrum Distribution ($I_F = 50 \text{ mA}$, $T_a = 25^\circ \text{C}$)

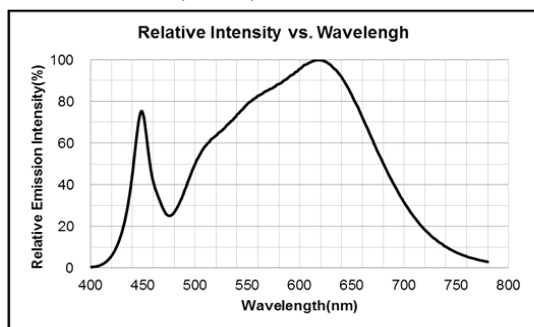
CCT : 2700 K (90 CRI)



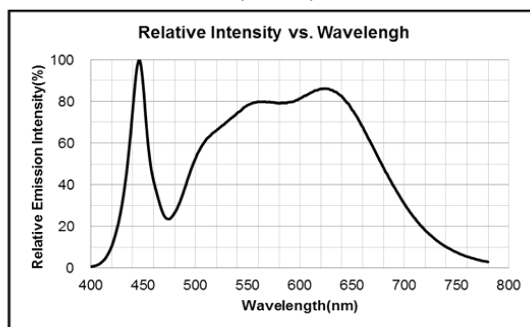
CCT : 3000 K (90 CRI)



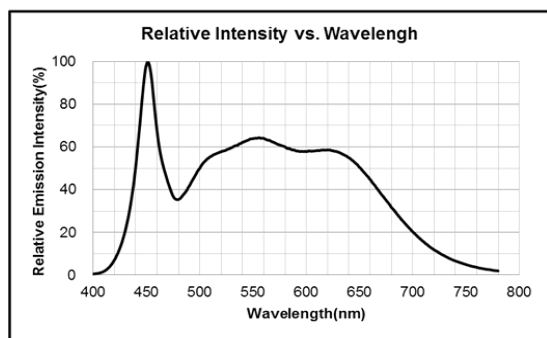
CCT : 3500 K (90 CRI)



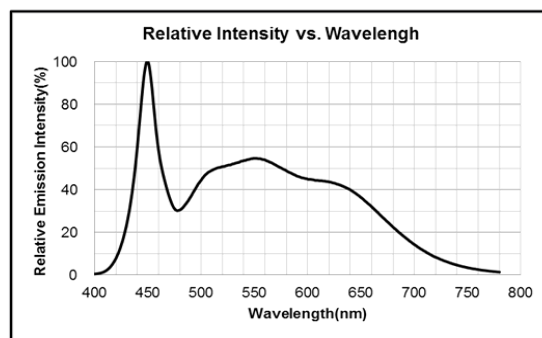
CCT : 4000 K (90 CRI)



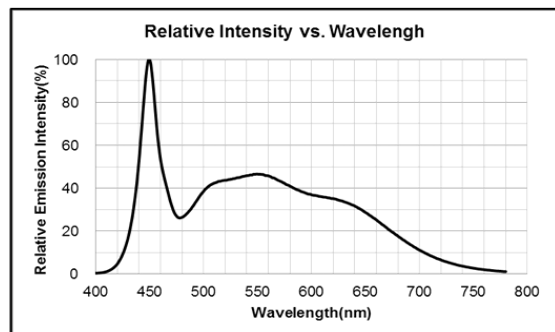
CCT : 5000 K (90 CRI)



CCT : 5700 K (90 CRI)

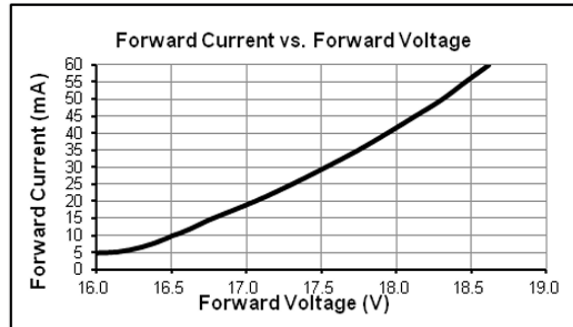
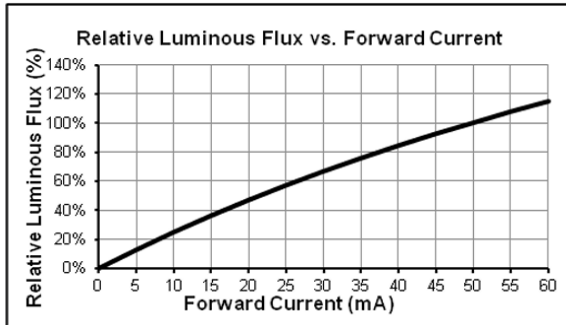


CCT : 6500 K (90 CRI)

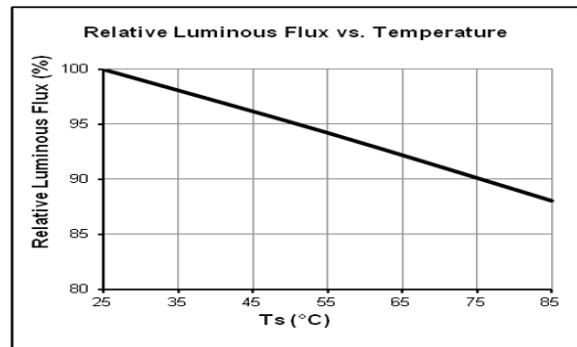
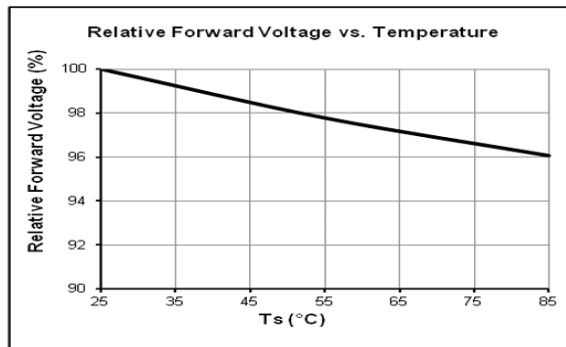


3. Typical Characteristics Graphs

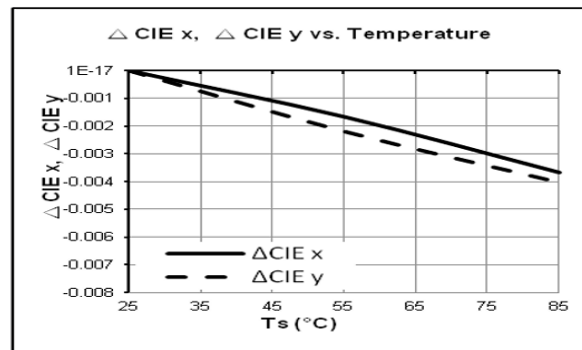
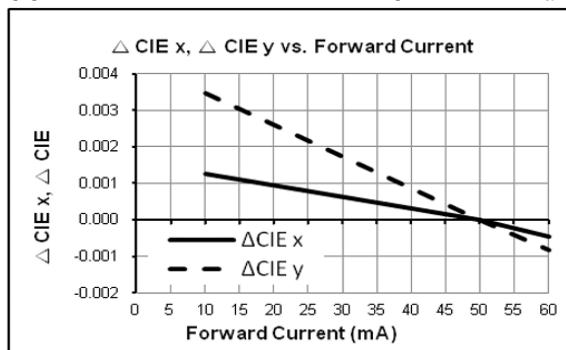
(2) Forward Current Characteristics ($T_a=25^\circ\text{C}$)



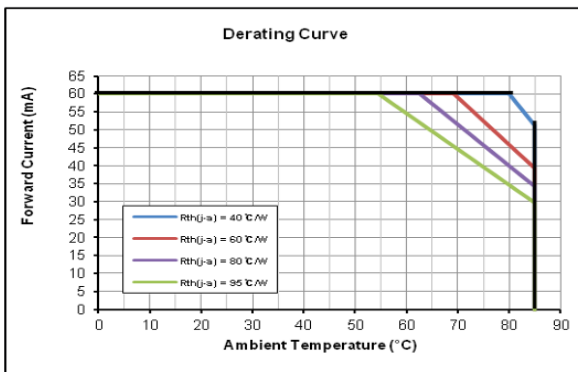
(3) Temperature Characteristics ($I_F=50\text{ mA}$)



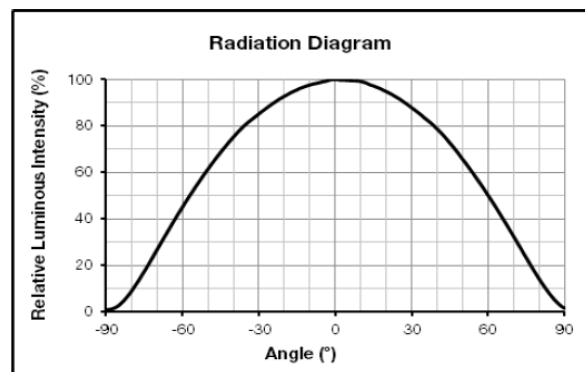
(4) Color Shift Characteristics ($I_F=50\text{ mA}$, $T_a=25^\circ\text{C}$)



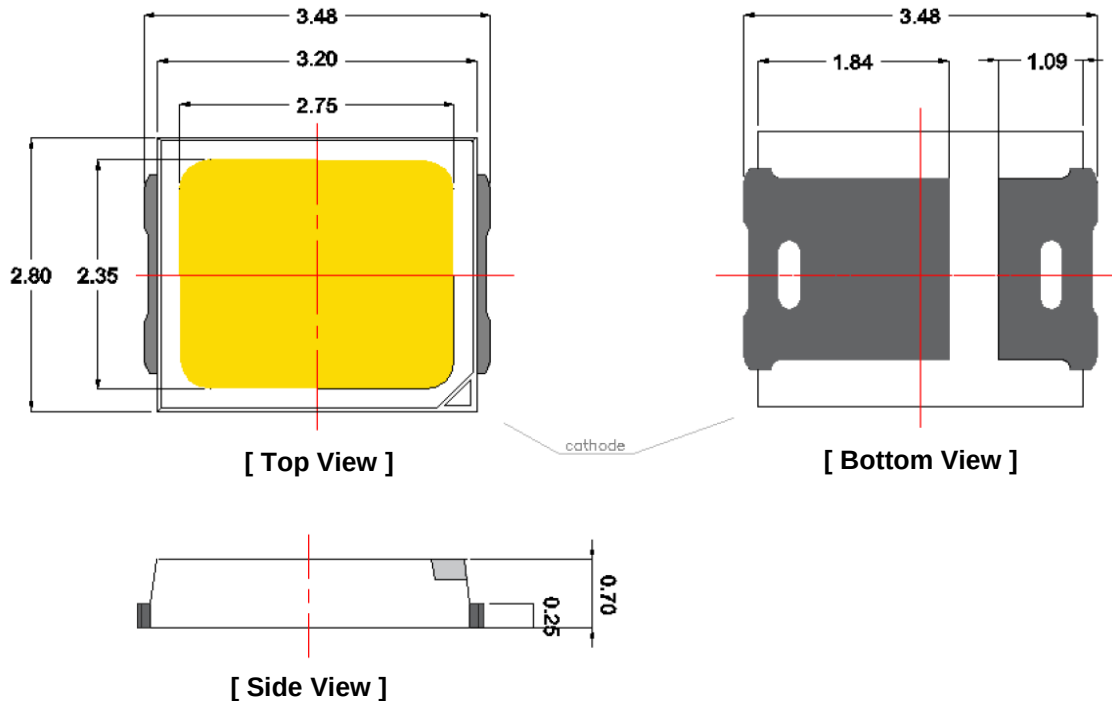
(5) Derating Curve



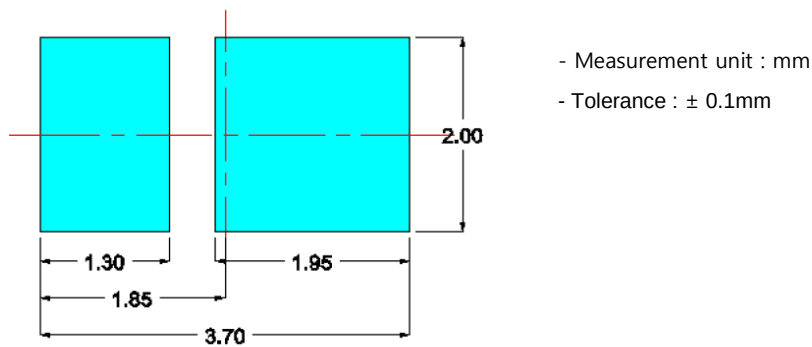
(6) Beam Angle Characteristics ($I_F=50\text{ mA}$, $T_a=25^\circ\text{C}$)



4. Outline Drawing & Dimension



[Recommended PCB Solder Pad]



* 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

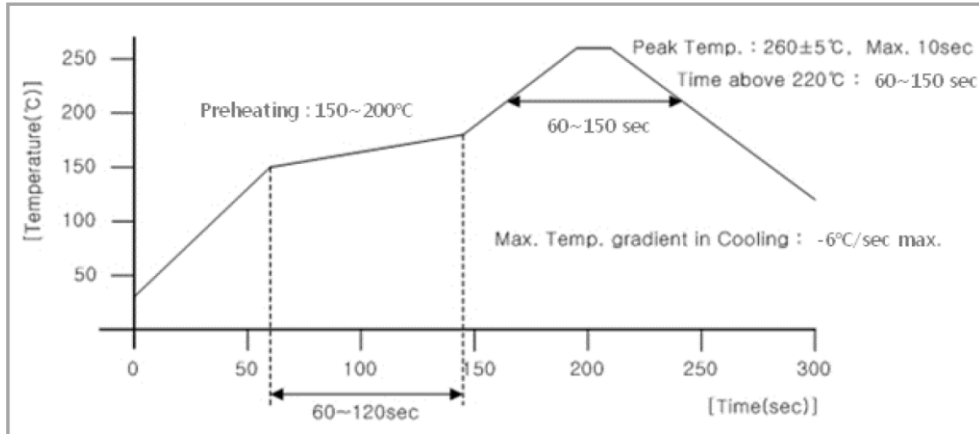
Precautions:

- 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

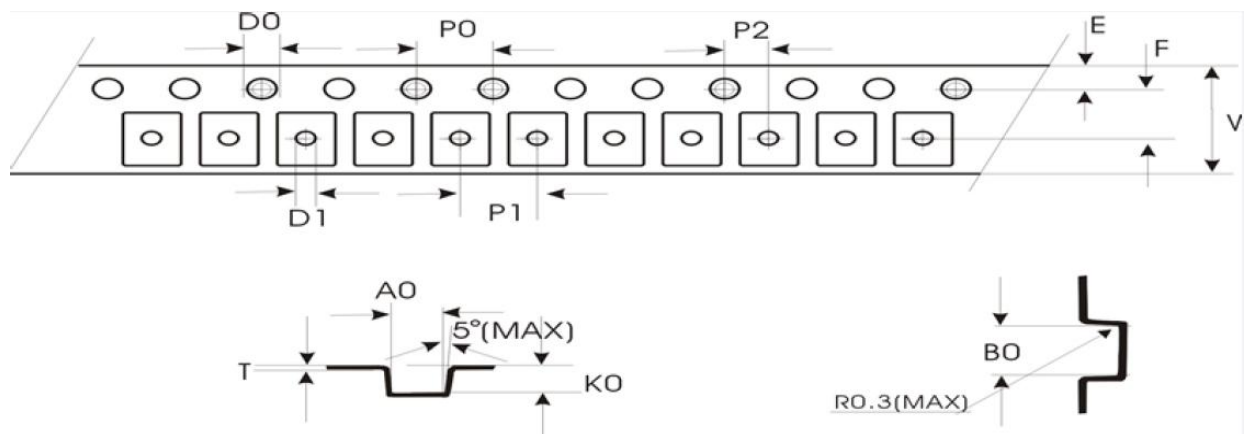
Not more than 5 seconds @ max. 300 °C, under soldering iron.

6. Tape & Reel

nm

(1) Taping Dimension

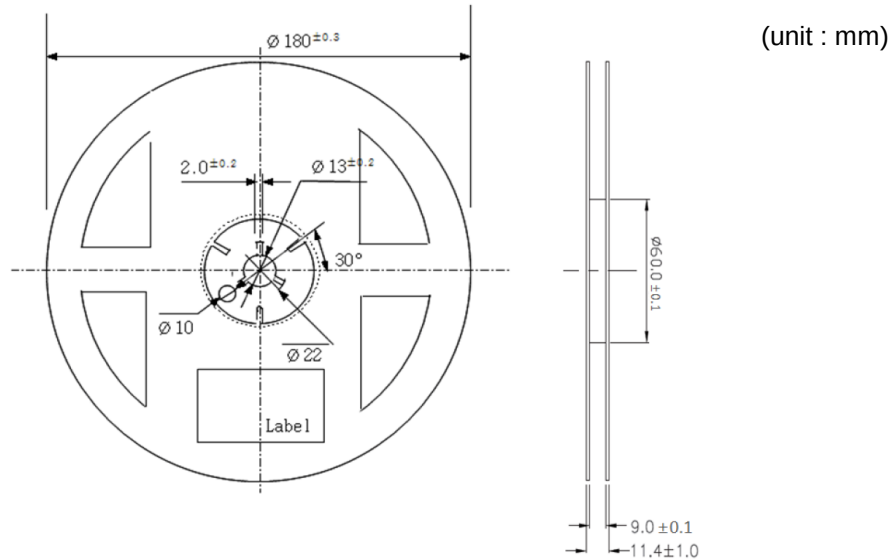
(unit : mm)



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

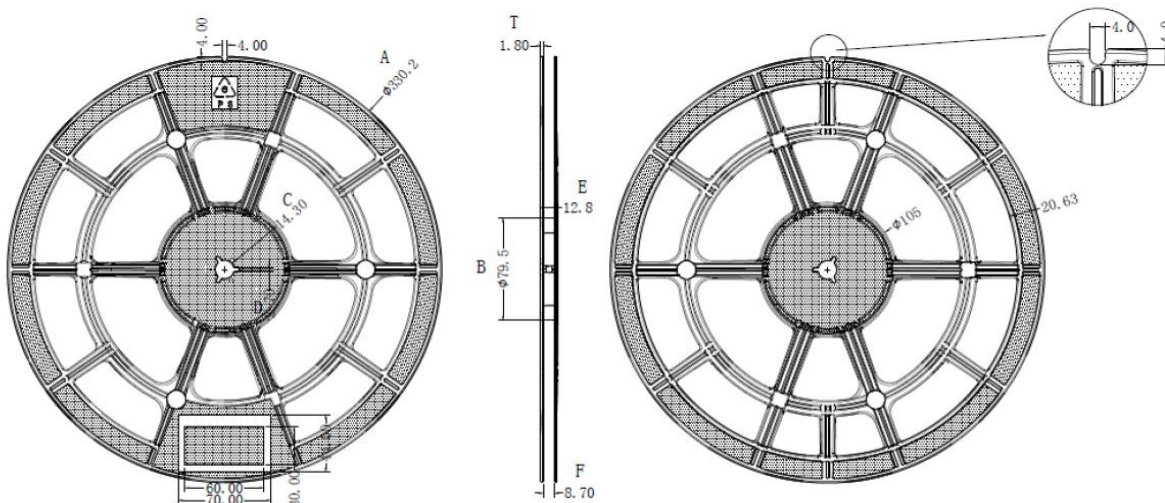
(2) Reel Dimension (Max 4,000 pcs)



* Note :

- 1) Quantity: The quantity/reel is 4,000 pcs
- 2) All dimensions are millimeters (tolerance : $\pm 0.2\text{mm}$)
- 3) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

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

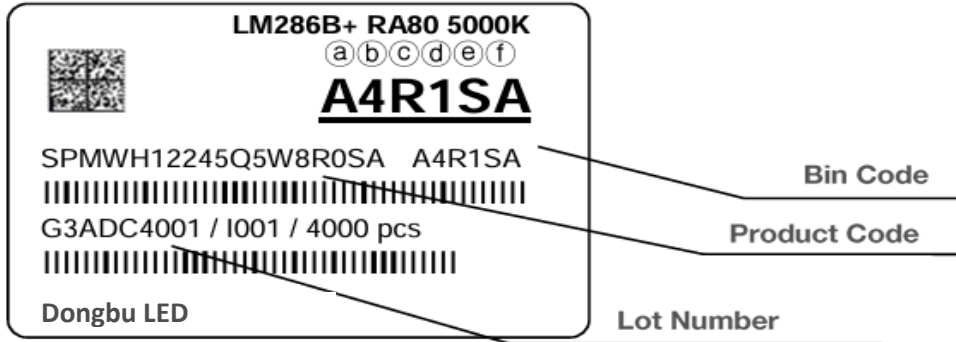


A ± 2	B ± 0.5	C ± 0.2	D ± 0.2	E ± 0.5	F ± 0.3	T ± 0.2
330.2	79.5	14.3	2.7	12.8	8.7	1.8

- 1) Quantity: The quantity/reel is 16,000 pcs
- 2) All dimensions are millimeters (tolerance : $\pm 0.2\text{mm}$)
- 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:



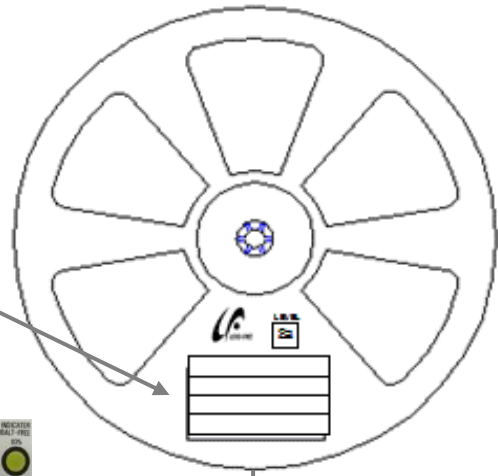
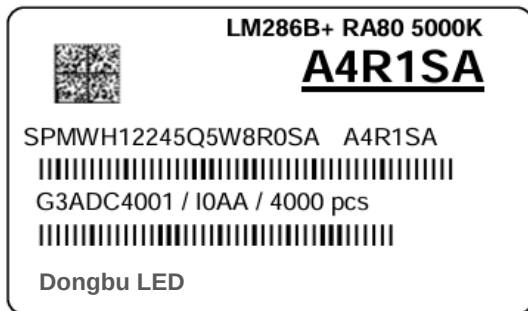
①②③④⑤⑥⑦⑧⑨ / IⒶⒷⒸ / 4,000 pcs

- 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

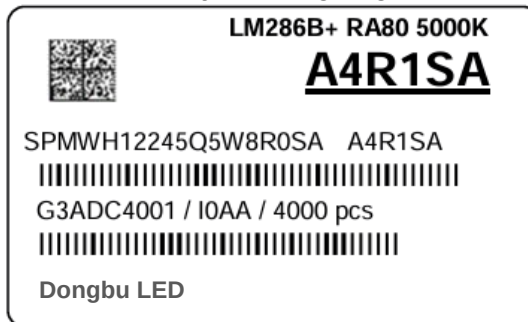
8. Packing Structure

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

Reel



Aluminum Vinyl Packing Bag

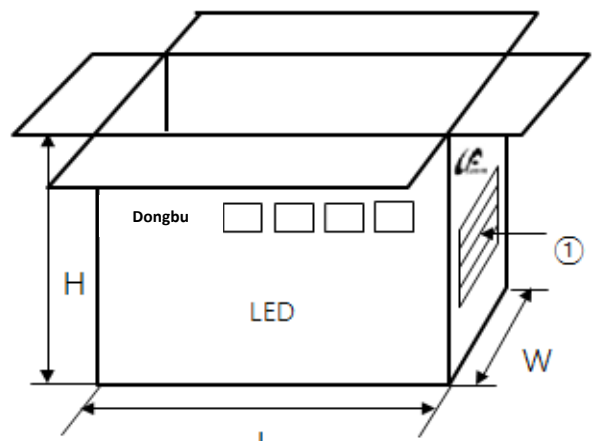


Outer Box

Material: Paper (SW3B(B))

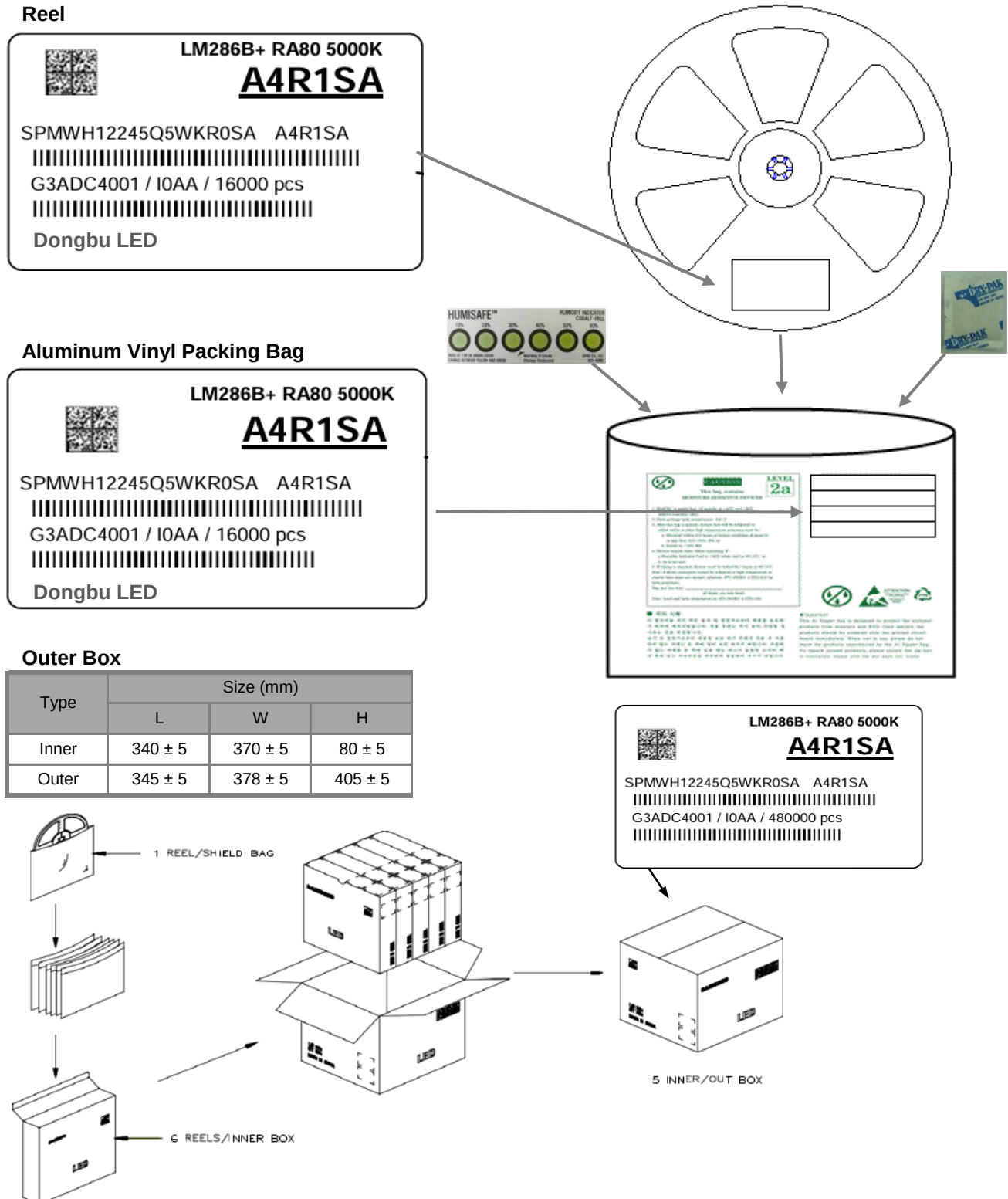
Type	Size (mm)			Note
	L	W	H	
7 inch L	245 ± 5	220 ± 5	182 ± 5	Up to 10 reels
7 inch S	245 ± 5	220 ± 5	86 ± 5	Up to 5 reels

① Side Label



8. Packing Structure

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



8. Packing Structure

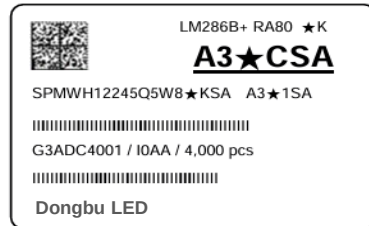
(3) Packing Process for kitting (The quantity of PKG on the Reel to be Max 4,000 pcs)

Reel

Kitting 'A'

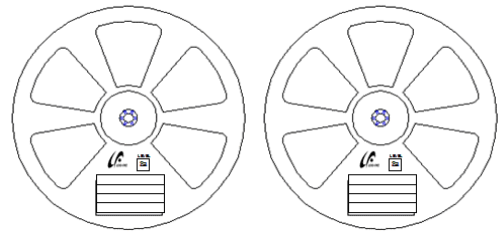


Kitting 'B'



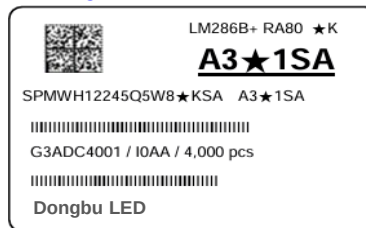
Kitting 'A'

Kitting 'B'

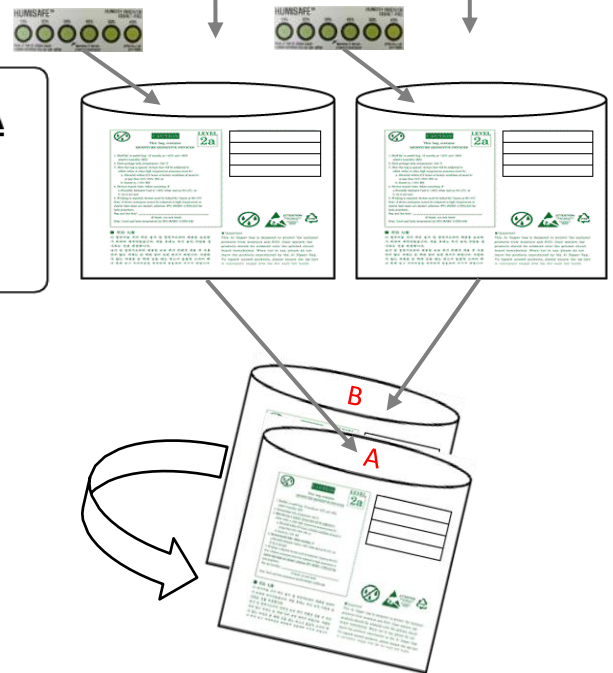


Aluminum Vinyl Packing Bag

Kitting 'A'

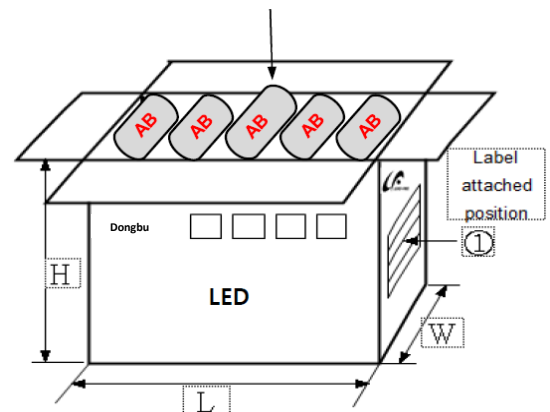


Kitting 'B'



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

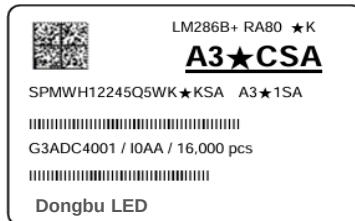
(4) Packing Process for kitting (The quantity of PKG on the Reel to be Max 16,000 pcs)

Reel

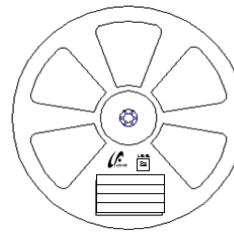
Kitting 'A'



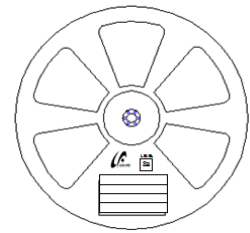
Kitting 'B'



Kitting 'A'



Kitting 'B'

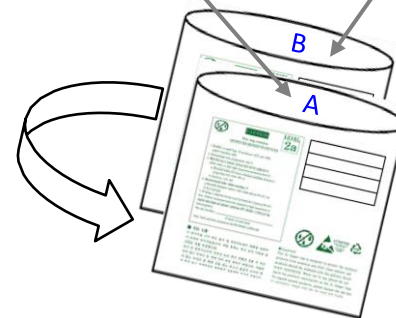
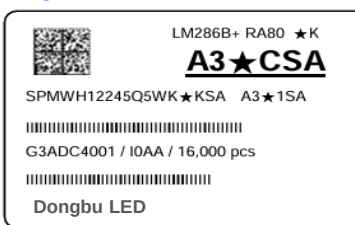


Aluminum Vinyl Packing Bag

Kitting 'A'

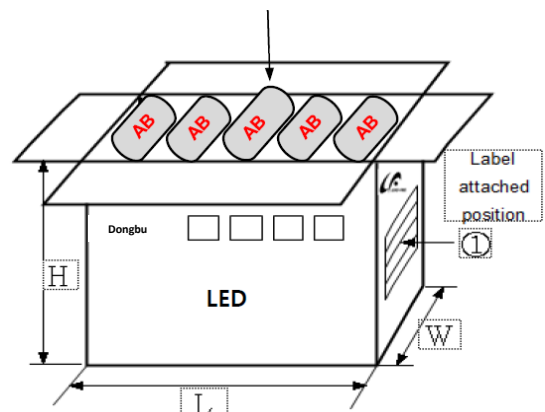


Kitting 'B'



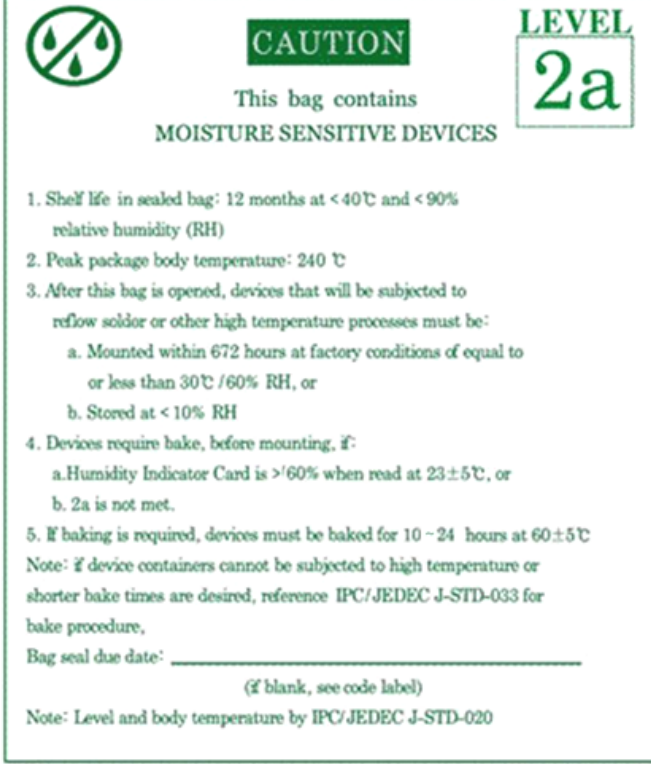
Material : Paper (SW3B(B))

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



CAUTION
This bag contains
MOISTURE SENSITIVE DEVICES

LEVEL 2a

1. Shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
2. Peak package body temperature: 240 °C
3. After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be:
 - a. Mounted within 672 hours at factory conditions of equal to or less than 30°C /60% RH, or
 - b. Stored at <10% RH
4. Devices require bake, before mounting, if:
 - a. Humidity Indicator Card is >60% when read at 23±5°C, or
 - b. 2a is not met.
5. If baking is required, devices must be baked for 10~24 hours at 60±5°C

Note: If device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure.

Bag seal due date: _____
(If blank, see code label)

Note: Level and body temperature by IPC/JEDEC J-STD-020



LM286B+ RA80 5000K
A4R1SA

SPMWH12245Q5WAR0SA A4R1SA
G3ADC4001 / IOAA / 4000 pcs
Dongbu LED






■ 주의 사항

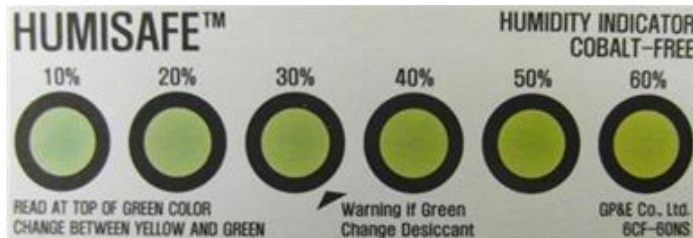
이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재는 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

■ Important

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products, please ensure the zip-lock is completely sealed with the dry pack left inside.

(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 °C, 0~90 % RH).
- (5) After storage bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
 - a. Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30 °C / 60 % RH*^{Note 1}, or
 - b. Mounted within 24 hours (1 day) at an assembly line with a condition of more than 30 °C / 70 % RH*^{Note 2}, or
 - c. Stored at <10 % RH

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

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

- (6) Repack unused devices with anti-moisture packing, fold to close any opening and then store in a dry place.
- (7) Devices require baking before mounting, if humidity card reading is >60 % at 23 ± 5 °C.
- (8) Devices must be baked for 10~24 hours at 60 ± 5 °C, if baking is required.
- (9) The LEDs are sensitive to the static electricity and surge current. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs. If voltage exceeding the absolute maximum rating is applied to LEDs, it may cause damage or even destruction to LED devices. Damaged LEDs may show some unusual characteristics such as increase in leakage current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.
- (10) VOCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). Transparent LED silicone encapsulant is permeable to those chemicals and they may lead to a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires. In order to prevent these problems, we recommend users to know the physical properties of materials used in luminaires and they must be carefully selected.

9. Precautions in Handling & Use

(11) Risk of sulfurization (or tarnishing)

The LED from Dongbu uses a silver-plated lead frame and its surface color may change to black (or dark colored) when it is exposed to sulfur (S), chlorine (Cl) or other halogen compound. Sulfurization of lead frame may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit. It requires caution. Due to possible sulfurization of lead frame, LED should not be used and stored together with oxidizing substances made of materials such as rubber, plain paper, lead solder cream, etc.