

High Voltage LED Series Chip on Board

LC026B



High efficacy COB LED package
well-suited for use in spotlight applications

Features & Benefits

- Chip on Board (COB) solution makes it easy to design in
- Simple assembly reduces manufacturing cost
- Low thermal resistance
- InGaN/GaN MQW LED with long time reliability
- Completed 6,000 hours of LM-80 Testing
- ENEC certified: Integral LED Module

Applications

- Spotlight / Downlight
- LED Retrofit Bulbs
- Outdoor Illumination



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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +105	°C	-
Storage Temperature	T_{slg}	-40 ~ +120	°C	-
LED Junction Temperature	T_j	150	°C	-
Case Temperature	T_c	105	°C	*Note
Forward Current	I_F	1300	mA	-
Power Dissipation	P_D	48.1	W	-
ESD (HBM)	-	±2	kV	-
ESD (MM)	-	±0.5	kV	-

b) Electro-optical Characteristics ($I_F = 720 \text{ mA}$, $T_a = 25 \text{ °C}$)

Item	Unit	Rank	Min.	Typ.	Max.
Forward Voltage (V_F)	V	YH	32.5	35.5	38.5
Color Rendering Index (R_a)	-	3	70	-	-
		5	80	-	-
		7	90	-	-
		8	95	-	-
Thermal Resistance (junction to chip point)	°C/W		-	0.9	-
Beam Angle	°		-	115	-
Working Voltage for Insulation	V				50
Nominal Power	W			25.6	
Eye Protection		Risk 1	-		-

Notes:

- 1) The COB is tested in pulsed condition at rated test current (10 ms pulse width) and rated temperature ($T_j = T_c = T_a = 25 \text{ °C}$)
- 2) Samsung maintains measurement tolerance of: forward voltage = $\pm 5 \%$, CRI = ± 1
- 3) Max $T_c = 105 \text{ °C}$ (at max current) is for ENEC condition. Refer to the derating curve, '3. Typical Characteristics Graph' designed within the range.



c) Luminous Flux Characteristics ($I_F = 720 \text{ mA}$)

CRI (R_a) Min.	Nominal CCT (K)	Flux Rank	Flux Bin	Sorting ¹⁾ @ $T_c = 25^\circ\text{C}$ (lm)		Calculated Flux ²⁾ @ $T_c = 85^\circ\text{C}$ (lm)	
				Min.	Max.	Min.	Max.
70	3000	3F	31	3266	3711	2939	3340
			32	3711	4157	3340	3741
	4000	3F	31	3429	3897	3086	3507
			32	3897	4365	3507	3928
	5000	3F	31	3462	3934	3116	3541
			32	3934	4406	3541	3965
	2700	2F	28	2710	2920	2466	2657
			29	2920	3130	2657	2848
			30	3130	3340	2848	3039
			31	3340	3550	3039	3231
			32	3550	3760	3231	3422
		2G	31	3340	3550	3039	3231
			32	3550	3760	3231	3422
			28	2890	3110	2630	2830
			29	3110	3330	2830	3030
			30	3330	3550	3030	3231
80	3000	2F	31	3550	3770	3231	3431
			32	3770	3990	3431	3631
			31	3550	3770	3231	3431
			32	3770	3990	3431	3631
		2G	28	3000	3220	2730	2930
			29	3220	3440	2930	3130
			30	3440	3660	3130	3331
			31	3660	3880	3331	3531
			30	3440	3660	3130	3331
			31	3660	3880	3331	3531
	3500	2F	28	3080	3310	2803	3012
			29	3310	3540	3012	3221
			30	3540	3770	3221	3431
			31	3770	4000	3431	3640
		2G	30	3540	3770	3221	3431
			31	3770	4000	3431	3640
	4000	2F	28	3080	3310	2803	3012
			29	3310	3540	3012	3221
			30	3540	3770	3221	3431
			31	3770	4000	3431	3640
		2G	30	3540	3770	3221	3431
			31	3770	4000	3431	3640



c) Luminous Flux Characteristics (I_F = 720 mA)

CRI (R _a) Min.	Nominal CCT (K)	Flux Rank	Flux Bin	Sorting ¹⁾ @ T _c = 25 °C (lm)		Calculated Flux ²⁾ @ T _c = 85 °C (lm)	
				Min.	Max.	Min.	Max.
80	5000	3F	32	3130	3360	2848	3058
			33	3360	3590	3058	3267
			34	3590	3820	3267	3476
			35	3820	4050	3476	3686
		2G	34	3590	3820	3267	3476
			35	3820	4050	3476	3686
	5700	3F	32	3130	3360	2848	3058
			33	3360	3590	3058	3267
			34	3590	3820	3267	3476
			35	3820	4050	3476	3686
		2G	34	3590	3820	3267	3476
			35	3820	4050	3476	3686
90	2700	2F	21	2110	2345	1920	2134
			22	2345	2580	2134	2348
			23	2580	2815	2348	2562
			24	2815	3050	2562	2776
	3000	2F	21	2150	2390	1957	2175
			22	2390	2630	2175	2393
			23	2630	2870	2393	2612
			24	2870	3110	2612	2830
	3500	2F	21	2220	2465	2020	2243
			22	2465	2710	2243	2466
			23	2710	2955	2466	2689
			24	2955	3200	2689	2912
	4000	2F	21	2285	2535	2079	2307
			22	2535	2785	2307	2534
			23	2785	3035	2534	2762
			24	3035	3285	2762	2989
95	2700	2F	21	2321	2578	2112	2346
			22	2578	2836	2346	2581
	3000	2F	21	2392	2658	2177	2419
			22	2658	2924	2419	2661
	3500	2F	21	2440	2711	2221	2467
			22	2711	2983	2467	2714

Notes:

- 1) The COB is tested in pulsed condition at rated test current (10 ms pulse width) and rated temperature (T_J = T_c = T_a = 25 °C)
- 2) Calculated flux values are for reference only
- 3) Samsung maintains measurement tolerance of: luminous flux = ±7 %, CRI = ±1



2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	H	C	W	1	H	D	N	C	2	5	Y	H	R	T	3	F

Digit	PKG Information	Code	Specification
1 2 3	Samsung Package High Power	SPH	
4 5	Color	WW CW	Warm White (T/U/V/W Ranks) Cool White (Q/R Ranks)
6	Product Version	1	
7 8	Form Factor	HD	COB
9	Lens Type	N	No lens
10	Internal Code	C	LC026
11	Chip Type	2	
12	CRI & Sorting Temperature	3 5 7 8	Min. 70 Min. 80 25 °C Min. 90 Min 95
13 14	Forward Voltage (V)	YH	32.5~38.5
15	CCT (K)	W V U T R Q	2700 K WA, WB (MacAdam Ellipse) 3000 K VA, VB (MacAdam Ellipse) VW, VX, VY, VZ (ANSI bin) 3500 K UA, UB (MacAdam Ellipse) 4000 K TA, TB (MacAdam Ellipse) TW, TX, TY, TZ (ANSI bin) 5000 K RA (MacAdam Ellipse) RW, RX, RY, RZ (ANSI bin) 5700 K QW, QX, QY, QZ (ANSI bin)
16	MacAdam / ANSI	2 3 T	MacAdam 2-step MacAdam 3-step ANSI bin
17 18	Luminous Flux	2F 2G 3F	21, 22 (95 CRI) 21, 22, 23, 24 (90 CRI); 28, 29, 30, 31, 32 (80 CRI), Bin Code: 31, 32 (80 CRI) 30, 31 (80 CRI) 34, 35 (80 CRI), 32, 33, 34, 35 (80 CRI); 31, 32 (70 CRI)



a) Binning Structure ($I_F = 720 \text{ mA}$, $T_c = 25^\circ\text{C}$)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	V_f Rank	Color Rank	Chrom. Bin	Flux Rank	Flux Bin	Flux Range (Φ_v , lm)
70	3000	SPHWW1HDNC23YHVT3F	YH	VT	VW, VX VY, VZ	3F	31	3266 ~ 3711
							32	3711 ~ 4157
	4000	SPHWW1HDNC23YHTT3F	YH	TT	TW, TX TY, TZ	3F	31	3429 ~ 3897
							32	3897 ~ 4365
	5000	SPHCW1HDNC23YHRT3F	YH	RT	RW, RX RY, RZ	3F	31	3462 ~ 3934
							32	3934 ~ 4406
	2700	SPHWW1HDNC25YHW22F	YH	W2	WB	2F	28	2710 ~ 2920
							29	2920 ~ 3130
							30	3130 ~ 3340
							31	3340 ~ 3550
							32	3550 ~ 3760
							28	2710 ~ 2920
		SPHWW1HDNC25YHW32F	YH	W3	WA, WB	2F	29	2920 ~ 3130
							30	3130 ~ 3340
							31	3340 ~ 3550
							32	3550 ~ 3760
		SPHWW1HDNC25YHW22G	YH	W2	WB	2G	31	3340 ~ 3550
							32	3550 ~ 3760
80	3000	SPHWW1HDNC25YHW32G	YH	W3	WA, WB	2G	31	3340 ~ 3550
							32	3550 ~ 3760
		SPHWW1HDNC25YHV22F	YH	V2	VB	2F	28	2890 ~ 3110
							29	3110 ~ 3330
							30	3330 ~ 3550
							31	3550 ~ 3770
							32	3770 ~ 3990
		SPHWW1HDNC25YHV32F	YH	V3	VA, VB	2F	28	2890 ~ 3110
							29	3110 ~ 3330
							30	3330 ~ 3550
							31	3550 ~ 3770
							32	3770 ~ 3990
		SPHWW1HDNC25YHV22G	YH	V2	VB	2G	31	3550 ~ 3770
							32	3770 ~ 3990
		SPHWW1HDNC25YHV32G	YH	V3	VA, VB	2G	31	3550 ~ 3770
							32	3770 ~ 3990



a) Binning Structure ($I_F = 720 \text{ mA}$, $T_c = 25^\circ\text{C}$)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	V_f Rank	Color Rank	Chrom. Bin	Flux Rank	Flux Bin	Flux Range (Φ_v , lm)
80	3500	SPHWW1HDNC25YHU22F	YH	U2	UB	2F	28	3000 ~ 3220
							29	3220 ~ 3440
							30	3440 ~ 3660
							31	3660 ~ 3880
		SPHWW1HDNC25YHU32F	YH	U3	UA, UB	2F	28	3000 ~ 3220
							29	3220 ~ 3440
							30	3440 ~ 3660
							31	3660 ~ 3880
		SPHWW1HDNC25YHU22G	YH	U2	UB	2G	30	3440 ~ 3660
							31	3660 ~ 3880
		SPHWW1HDNC25YHU32G	YH	U3	UA, UB	2G	30	3440 ~ 3660
							31	3660 ~ 3880
	4000	SPHWW1HDNC25YHT22F	YH	T2	TB	2F	28	3080 ~ 3310
							29	3310 ~ 3540
							30	3540 ~ 3770
							31	3770 ~ 4000
		SPHWW1HDNC25YHT32F	YH	T3	TA, TB	2F	28	3080 ~ 3310
							29	3310 ~ 3540
							30	3540 ~ 3770
							31	3770 ~ 4000
		SPHWW1HDNC25YHT22G	YH	T2	TB	2G	30	3540 ~ 3770
							31	3770 ~ 4000
		SPHWW1HDNC25YHT32G	YH	T3	TA, TB	2G	30	3540 ~ 3770
							31	3770 ~ 4000
	5000	SPHCW1HDNC25YHR33F	YH	R3	RA	3F	32	3130 ~ 3360
							33	3360 ~ 3590
							34	3590 ~ 3820
							35	3820 ~ 4050
		SPHCW1HDNC25YHRT3F	YH	RT	RW, RX, RY, RZ	3F	32	3130 ~ 3360
							33	3360 ~ 3590
							34	3590 ~ 3820
							35	3820 ~ 4050
		SPHCW1HDNC25YHR32G	YH	R3	RA	2G	34	3590 ~ 3820
							35	3820 ~ 4050
		SPHCW1HDNC25YHRT2G	YH	RT	RW, RX, RY, RZ	2G	34	3590 ~ 3820
							35	3820 ~ 4050
	5700	SPHCW1HDNC25YHQT3F	YH	QT	QW, QX QY, QZ	3F	32	3130 ~ 3360
							33	3360 ~ 3590
							34	3590 ~ 3820
							35	3820 ~ 4050
		SPHCW1HDNC25YHQT2G	YH	QT	QW, QX QY, QZ	2G	34	3590 ~ 3820
							35	3820 ~ 4050



a) Binning Structure ($I_f = 720 \text{ mA}$, $T_c = 25^\circ\text{C}$)

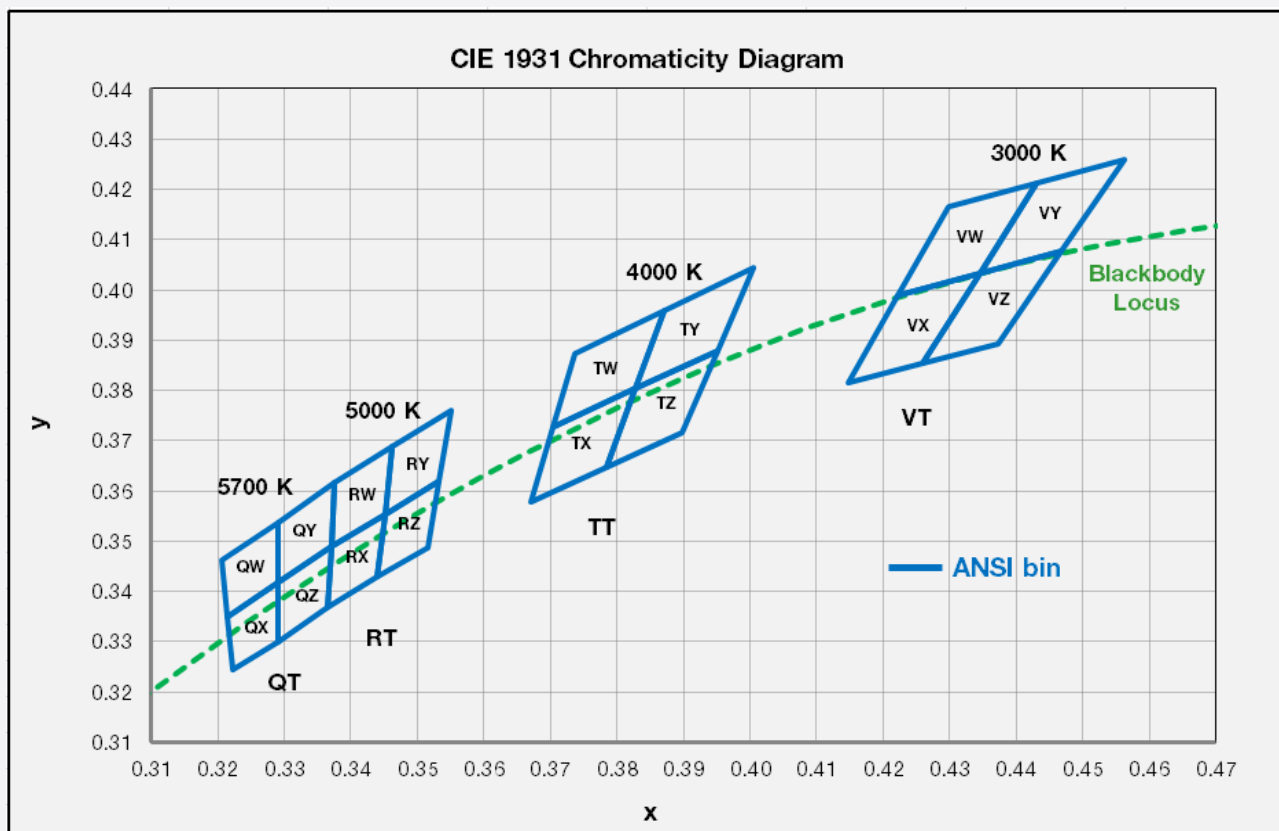
CRI (R_a) Min.	Nominal CCT (K)	Product Code	V_f Rank	Color Rank	Chrom. Bin	Flux Rank	Flux Bin	Flux Range (Φ_v , lm)
90	2700	SPHWW1HDNC27YHW22F	YH	W2	WB	2F	21	2110 ~ 2345
							22	2345 ~ 2580
							23	2580 ~ 2815
							24	2815 ~ 3050
		SPHWW1HDNC27YHW32F	YH	W3	WA, WB	2F	21	2110 ~ 2345
							22	2345 ~ 2580
							23	2580 ~ 2815
							24	2815 ~ 3050
	3000	SPHWW1HDNC27YHV22F	YH	V2	VB	2F	21	2150 ~ 2390
							22	2390 ~ 2630
							23	2630 ~ 2870
							24	2870 ~ 3110
		SPHWW1HDNC27YHV32F	YH	V3	VA, VB	2F	21	2150 ~ 2390
							22	2390 ~ 2630
							23	2630 ~ 2870
							24	2870 ~ 3110
	3500	SPHWW1HDNC27YHU22F	YH	U2	UB	2F	21	2220 ~ 2465
							22	2465 ~ 2710
							23	2710 ~ 2955
							24	2955 ~ 3200
		SPHWW1HDNC27YHU32F	YH	U3	UA, UB	2F	21	2220 ~ 2465
							22	2465 ~ 2710
							23	2710 ~ 2955
							24	2955 ~ 3200
	4000	SPHWW1HDNC27YHT22F	YH	T2	TB	2F	21	2285 ~ 2535
							22	2535 ~ 2785
							23	2785 ~ 3035
							24	3035 ~ 3285
		SPHWW1HDNC27YHT32F	YH	T3	TA, TB	2F	21	2285 ~ 2535
							22	2535 ~ 2785
							23	2785 ~ 3035
							24	3035 ~ 3285



a) Binning Structure ($I_f = 720 \text{ mA}$, $T_c = 25 \text{ }^\circ\text{C}$)

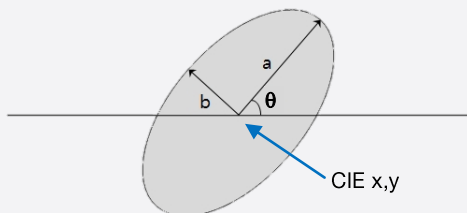
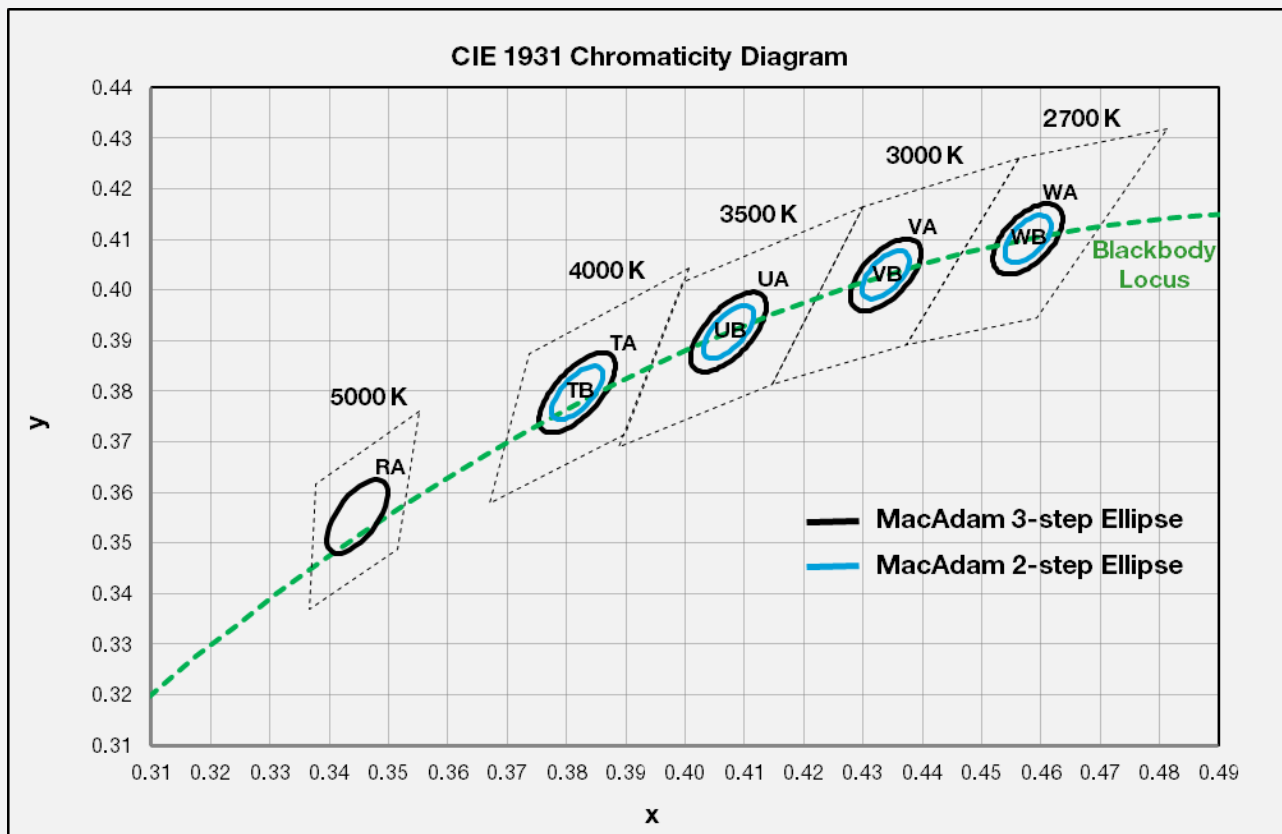
CRI (Ra) Min.	Nominal CCT (K)	Product Code	V _F Rank	Color Rank	Chrom. Bin	Flux Rank	Flux Bin	Flux Range (Φ _v , lm)
95	2700	SPHWW1HDNC28YHW22F	YH	W2	WB	2F	21	2321 ~ 2578
							22	2578 ~ 2836
		SPHWW1HDNC28YHW32F	YH	W3	WA, WB	2F	21	2321 ~ 2578
							22	2578 ~ 2836
	3000	SPHWW1HDNC28YHV22F	YH	V2	VB	2F	21	2392 ~ 2658
							22	2658 ~ 2924
		SPHWW1HDNC28YHV32F	YH	V3	VA, VB	2F	21	2392 ~ 2658
							22	2658 ~ 2924
	3500	SPHWW1HDNC28YHU22F	YH	U2	UB	2F	21	2440 ~ 2711
							22	2711 ~ 2983
		SPHWW1HDNC28YHU32F	YH	U3	UA, UB	2F	21	2440 ~ 2711
							22	2711 ~ 2983



b) Chromaticity Region & Coordinates ($I_F = 720 \text{ mA}$, $T_a = 25^\circ\text{C}$)


Region	CIE x	CIE y	Region	CIE x	CIE y
V rank (3000 K)					
VW	0.4223	0.399	VY	0.4345	0.4033
	0.4345	0.4033		0.4468	0.4077
	0.4431	0.4213		0.4562	0.4260
	0.4299	0.4165		0.4431	0.4213
VX	0.4223	0.399	VZ	0.4260	0.3854
	0.4147	0.3814		0.4373	0.3893
	0.4260	0.3854		0.4468	0.4077
	0.4345	0.4033		0.4345	0.4033
R rank (5000 K)					
RW	0.3376	0.3616	RY	0.3463	0.3687
	0.3463	0.3687		0.3551	0.3760
	0.3451	0.3554		0.3533	0.3620
	0.3371	0.3490		0.3451	0.3554
RX	0.3371	0.3490	RZ	0.3451	0.3554
	0.3451	0.3554		0.3533	0.3620
	0.3440	0.3428		0.3515	0.3487
	0.3366	0.3369		0.3440	0.3428

Region	CIE x	CIE y	Region	CIE x	CIE y
T rank (4000 K)					
TW	0.3736	0.3874	TY	0.3871	0.3959
	0.3871	0.3959		0.4006	0.4044
	0.3828	0.3803		0.3952	0.388
	0.3703	0.3726		0.3828	0.3803
TX	0.3703	0.3726	TZ	0.3828	0.3803
	0.3828	0.3803		0.3952	0.388
	0.3784	0.3647		0.3898	0.3716
	0.367	0.3578		0.3784	0.3647
Q rank (5700 K)					
QW	0.3207	0.3462	QY	0.3290	0.3538
	0.3290	0.3538		0.3376	0.3616
	0.3290	0.3417		0.3371	0.3490
	0.3215	0.3350		0.3290	0.3417
QX	0.3215	0.3350	QZ	0.3290	0.3417
	0.3290	0.3417		0.3371	0.3490
	0.3290	0.3300		0.3366	0.3369
	0.3222	0.3243		0.3290	0.3300

b) Chromaticity Region & Coordinates ($I_F = 720 \text{ mA}$, $T_a = 25^\circ\text{C}$)


MacAdam Ellipse (WA, WB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4578	0.4101	53.70	0.0054	0.0028
3-step	0.4578	0.4101	53.70	0.0081	0.0042

MacAdam Ellipse (VA, VB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4338	0.403	53.22	0.0056	0.0027
3-step	0.4338	0.4030	53.22	0.0083	0.0041

MacAdam Ellipse (UA, UB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.4073	0.3917	54.00	0.0062	0.0028
3-step	0.4073	0.3917	54.00	0.0093	0.0041

MacAdam Ellipse (TA, TB)					
Step	CIE x	CIE y	θ	a	b
2-step	0.3818	0.3797	53.72	0.0063	0.0027
3-step	0.3818	0.3797	53.72	0.0094	0.0040

MacAdam Ellipse (RA)					
Step	CIE x	CIE y	θ	a	b
3-step	0.3447	0.3553	59.62	0.0082	0.0035

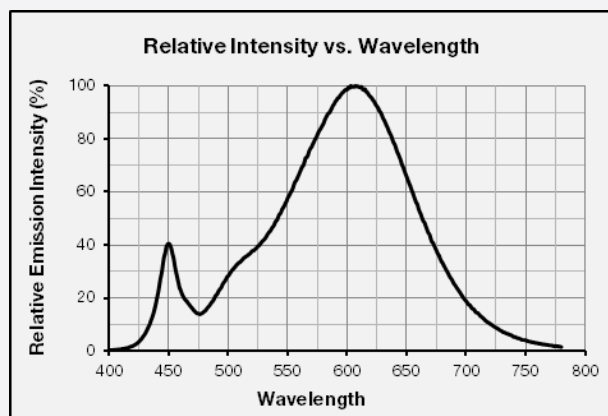
Note:

Samsung maintains measurement tolerance of: $C_x, C_y = \pm 0.005$

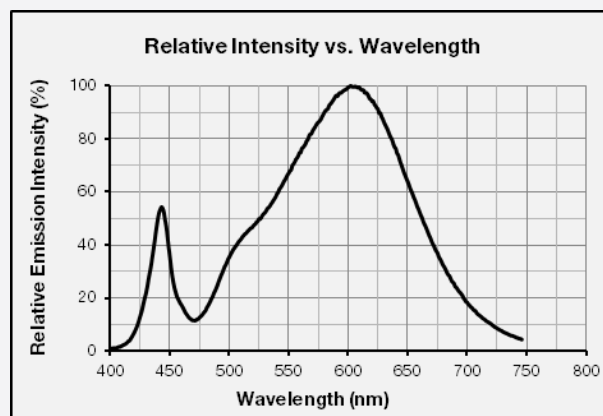
3. Typical Characteristics Graphs

a) Spectrum Distribution ($I_f = 720 \text{ mA}$, $T_a = 25^\circ\text{C}$)

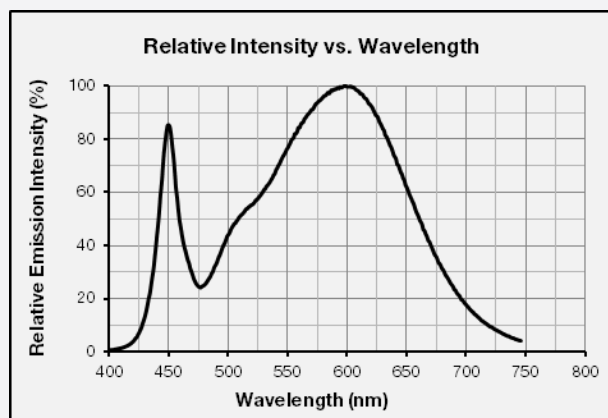
CCT: 2700 K (80 CRI)



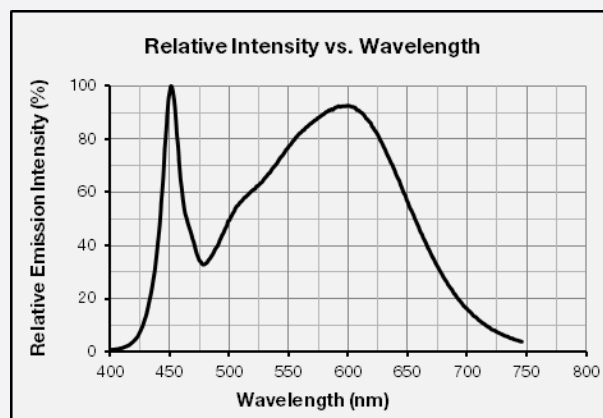
CCT: 3000 K (80 CRI)



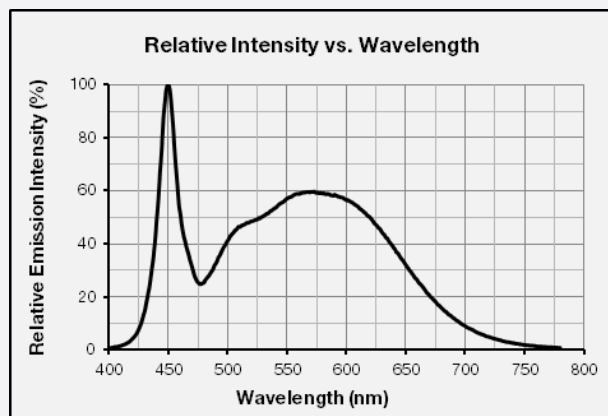
CCT: 3500 K (80 CRI)



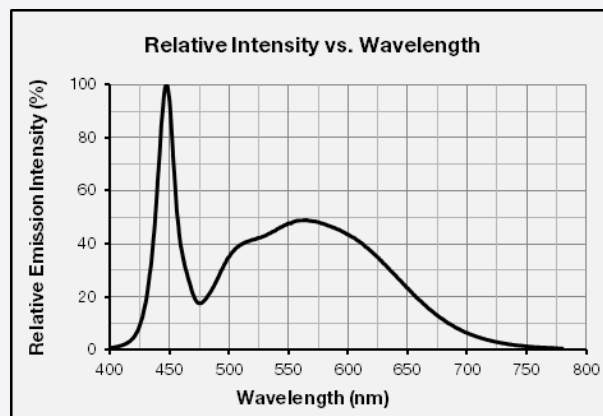
CCT: 4000 K (80 CRI)



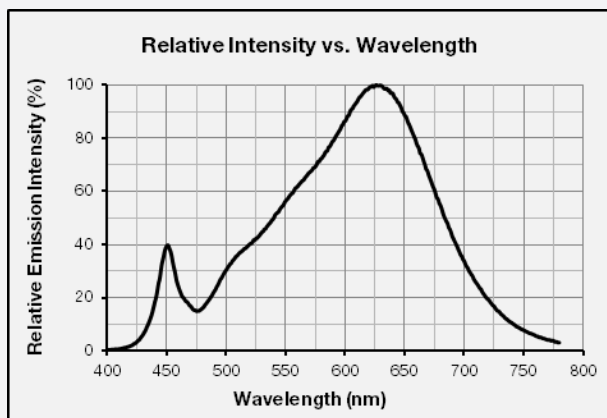
CCT: 5000 K (80 CRI)



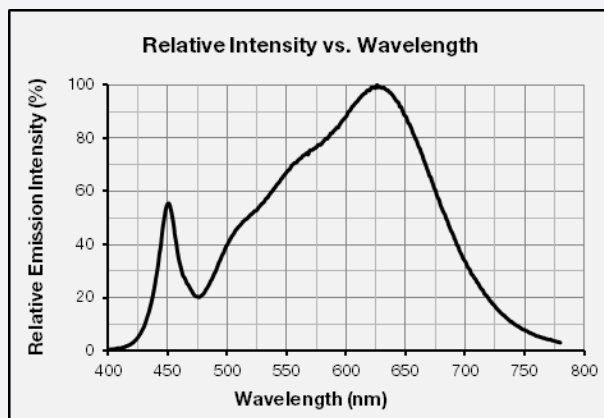
CCT: 5700 K (80 CRI)



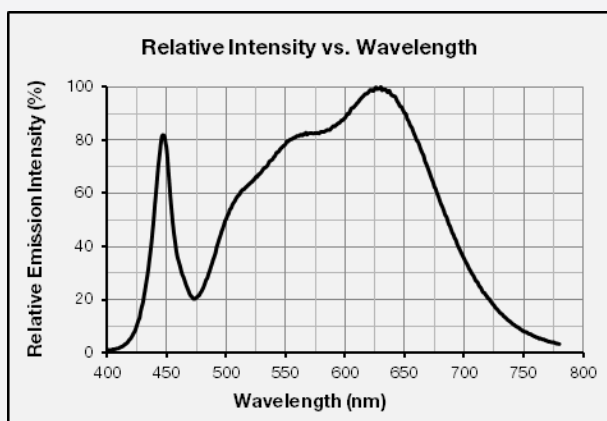
CCT: 2700 K (90 CRI)



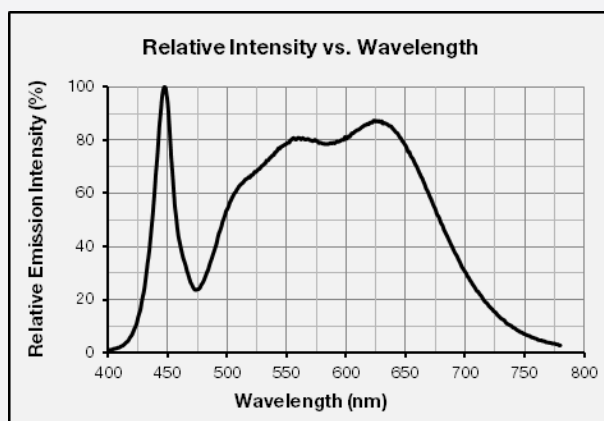
CCT: 3000 K (90 CRI)



CCT: 3500 K (90 CRI)

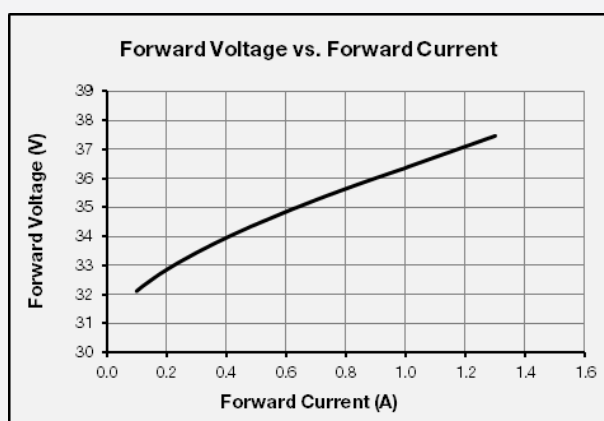
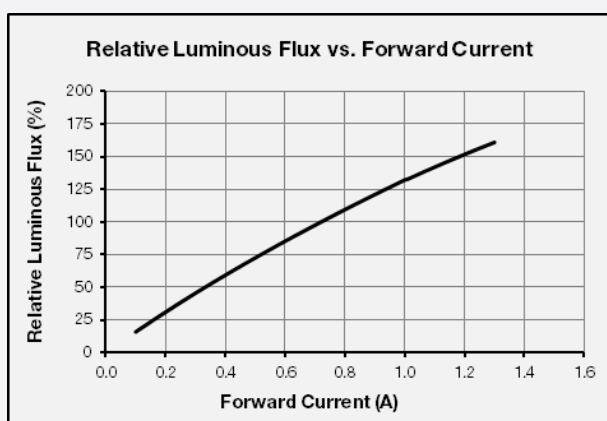


CCT: 4000 K (90 CRI)

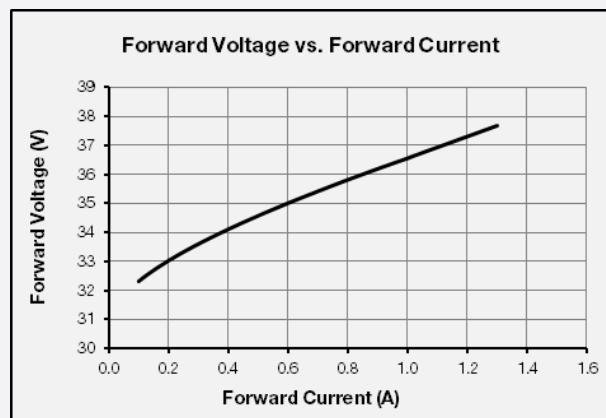
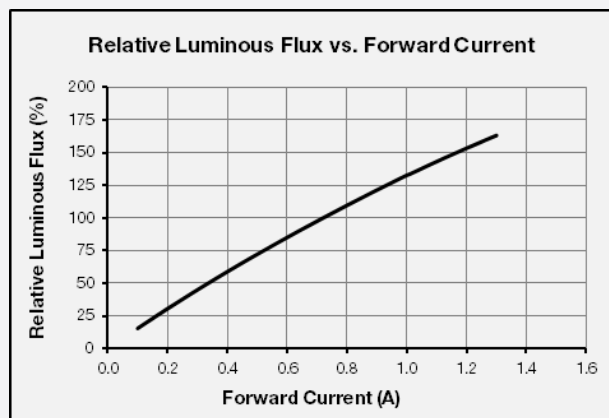


b) Forward Current Characteristics ($T_a = 25^\circ\text{C}$)

80 CRI

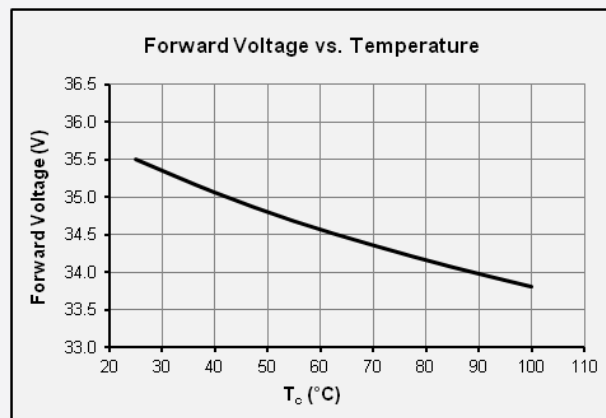
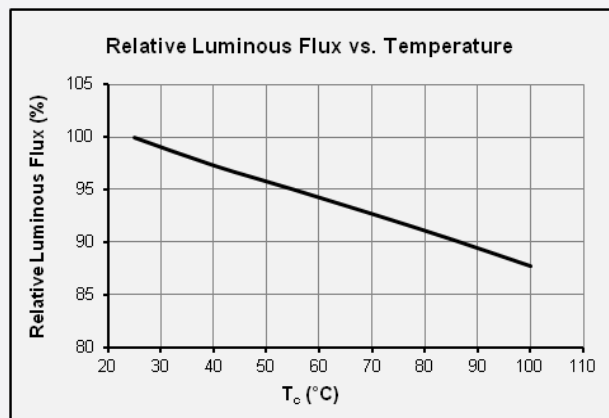


90 CRI

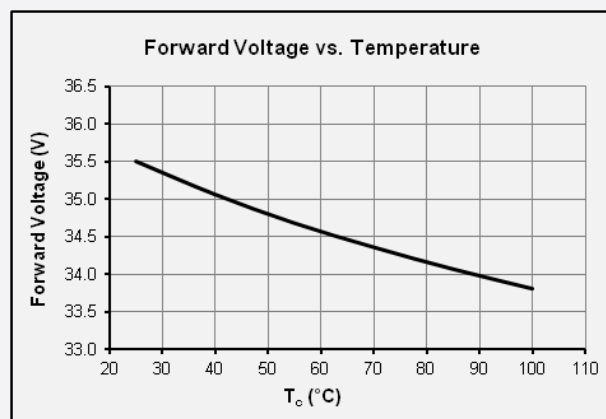
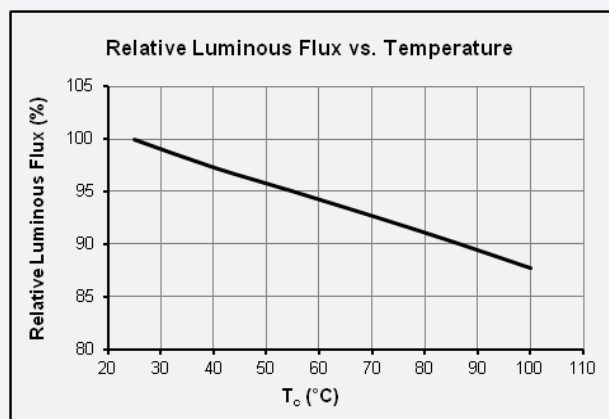


c) Temperature Characteristics ($I_F = 720 \text{ mA}$)

80 CRI



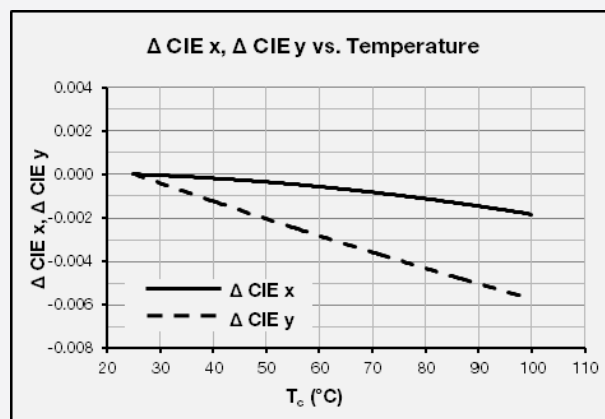
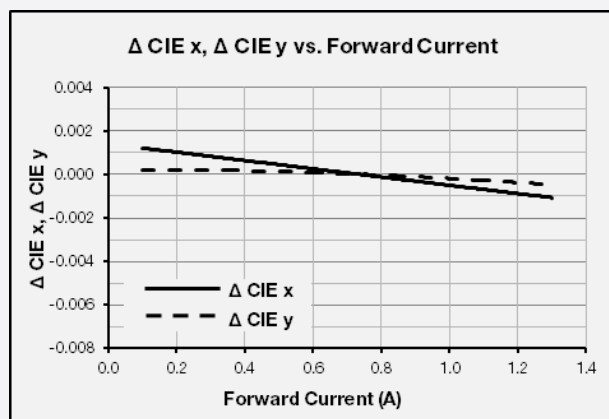
90 CRI



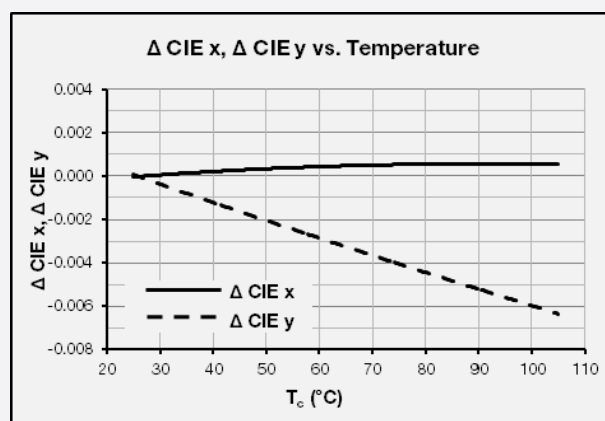
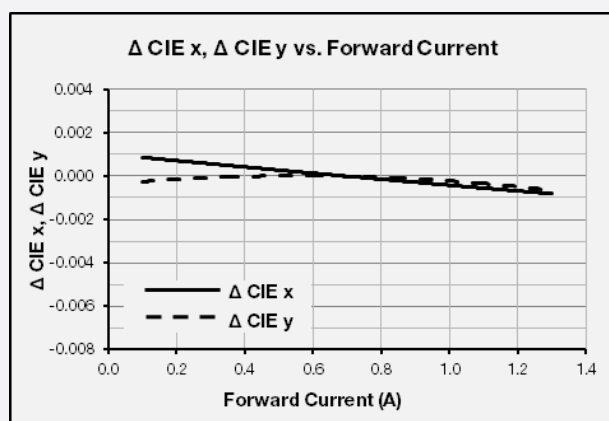
d) Color Shift Characteristics

 $T_a = 25^\circ\text{C}$ $I_F = 720\text{ mA}$

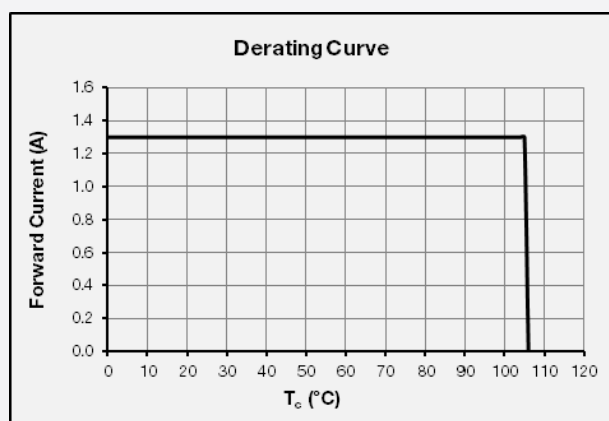
80 CRI



90 CRI

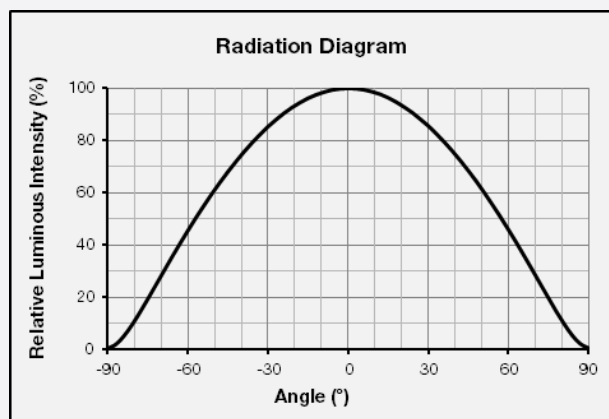


e) Derating Curve

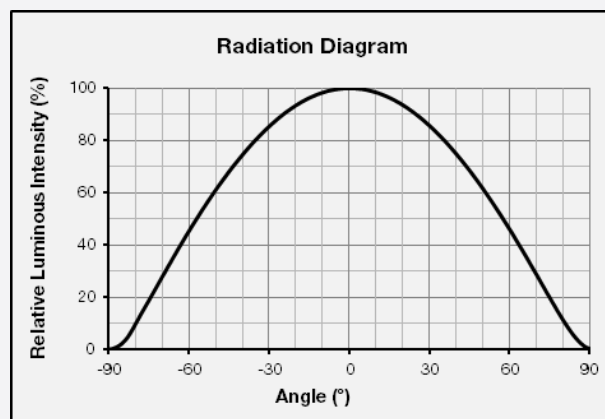


f) Beam Angle Characteristics ($I_F = 720 \text{ mA}$, $T_a = 25^\circ\text{C}$)

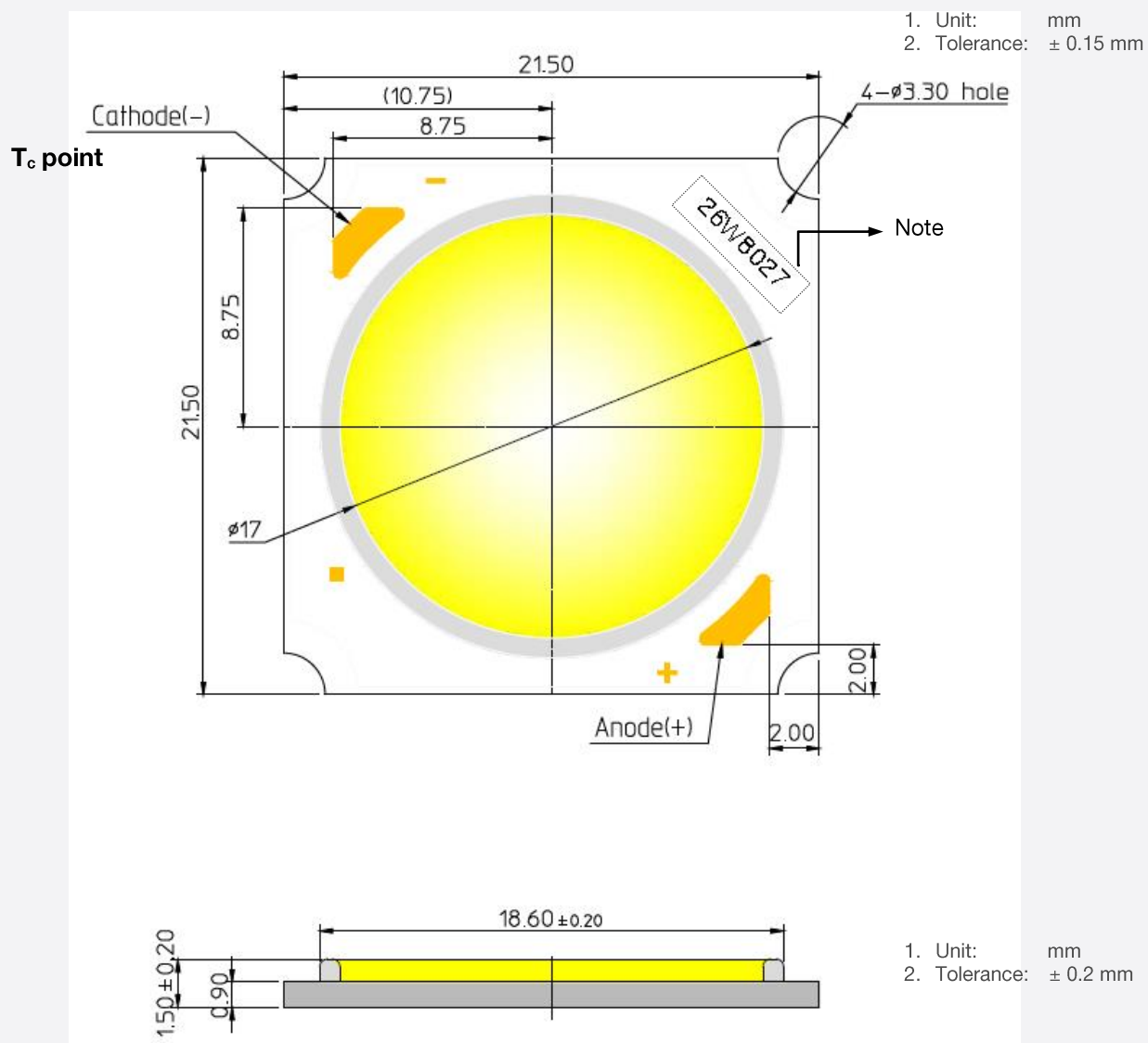
80 CRI



90 CRI



4. Outline Drawing & Dimension



Item	Dimension	Tolerance	Unit
Length	21.50	± 0.15	mm
Width	21.50	± 0.15	mm
Height	1.50	± 0.20	mm
Light Emitting Surface (LES) Diameter	17	± 0.15	mm

Note: Denoted product information above is only an example
(26W8027 : 26W, CRI80+, 2700K)

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle
Room Temperature Life Test	25 °C, $I_F = \text{max}$	1000 h
High Temperature Humidity Life Test	85 °C, 85 % RH, DC Derating, $I_F = \text{max}$	1000 h
High Temperature Life Test	105 °C, DC Derating, $I_F = \text{max}$	1000 h
Low Temperature Life Test	-40 °C, DC 1300 mA	1000 h
High Temperature Storage	120 °C	1000 h
Low Temperature Storage	-40 °C	1000 h
Thermal Shock	-45 °C / 15 min ↔ 125 °C / 15 min temperature change in 5 min	200 cycles
Temperature Cycle On/Off Test	-40 °C / 85 °C each 20 min, 100 min transfer power on/off each 5 min, DC 720 mA	100 cycles
Temperature Humidity Storage Test	-10 °C ↔ 25 °C, 95 % RH ↔ 85 °C, 95 % RH (24 h / cycle)	100 cycles
ESD (HBM)	R_1 : 10 MΩ R_2 : 1.5 kΩ C: 100 pF V: ±2 kV	5 times
ESD (MM)	R_1 : 10 MΩ R_2 : 0 kΩ C: 200 pF V: ±0.5 kV	5 times
Vibration Test	20 ~ 80 Hz (displacement: 0.06 inch, max. 20 g) 80 ~ 2 kHz (max. 20 g) min. frequency ↔ max. frequency 4 min transfer	4 times
Mechanical Shock Test	1500 g, 0.5 ms each of the 6 surfaces (3 axis x 2 sides)	5 times
Salt Spray Test	35 °C, 5 % salt water 8 h spray, 16 h dwell	2 cycles

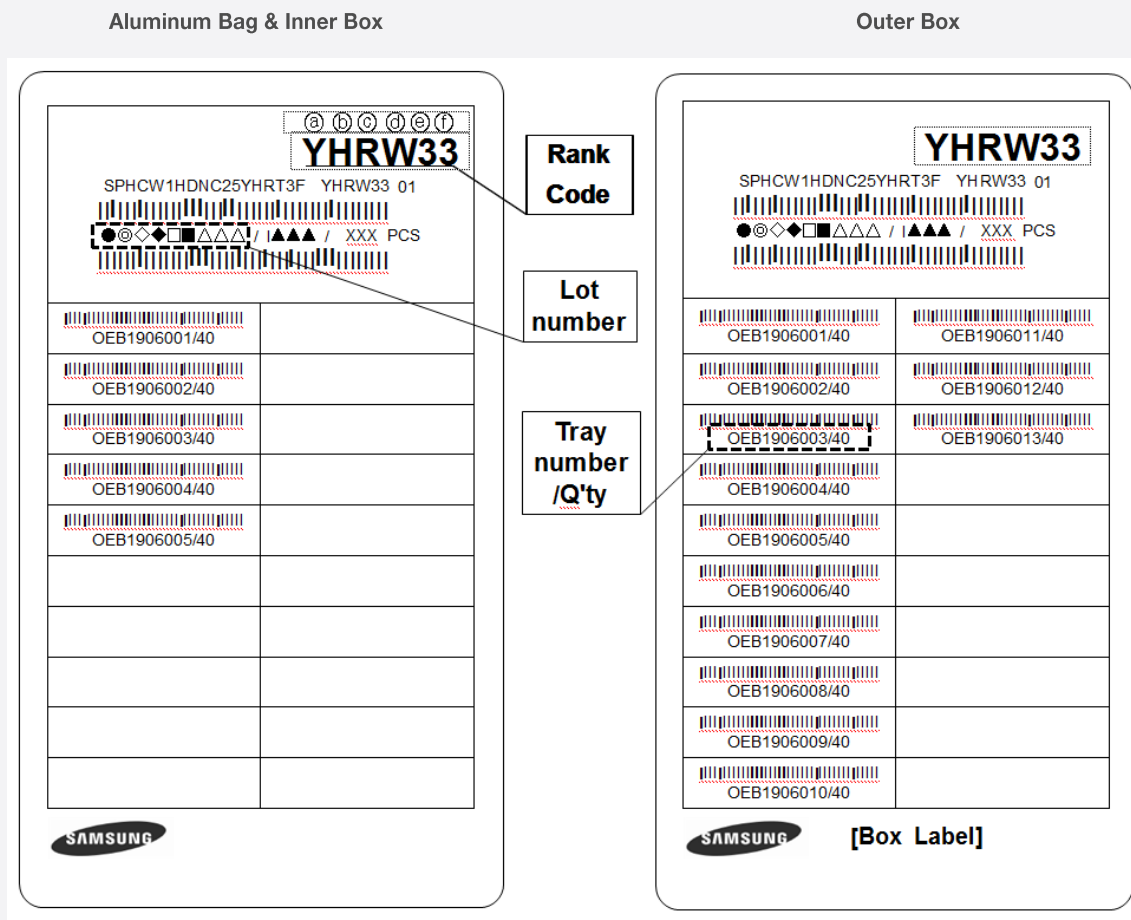
b) Criteria for Judging the Damage

Item	Symbol	Test Condition ($T_c = 25\text{ °C}$)	Limit	
			Min.	Max.
Forward Voltage	V_F	$I_F = 720\text{ mA}$	L.S.L. * 0.9	U.S.L. * 1.1
Luminous Flux	Φ_v	$I_F = 720\text{ mA}$	L.S.L. * 0.7	U.S.L. * 1.3



6. Label Structure

a) Label Structure



Note: Denoted rank code and product code above is only an example (see description on page 6)

Rank Code:

- ⒶⒷ: Forward Voltage rank (refer to page 7-10)
- ⒸⒹ: Chromaticity bin (refer to page 12-12)
- ⒺⒻ: Luminous Flux bin (refer to page 7-10)

b) Lot Number

The lot number is composed of the following characters:

● ◎ ◇ ◆ □ ■ △ △ △ / 1 ▲ ▲ ▲ / xxx PCS

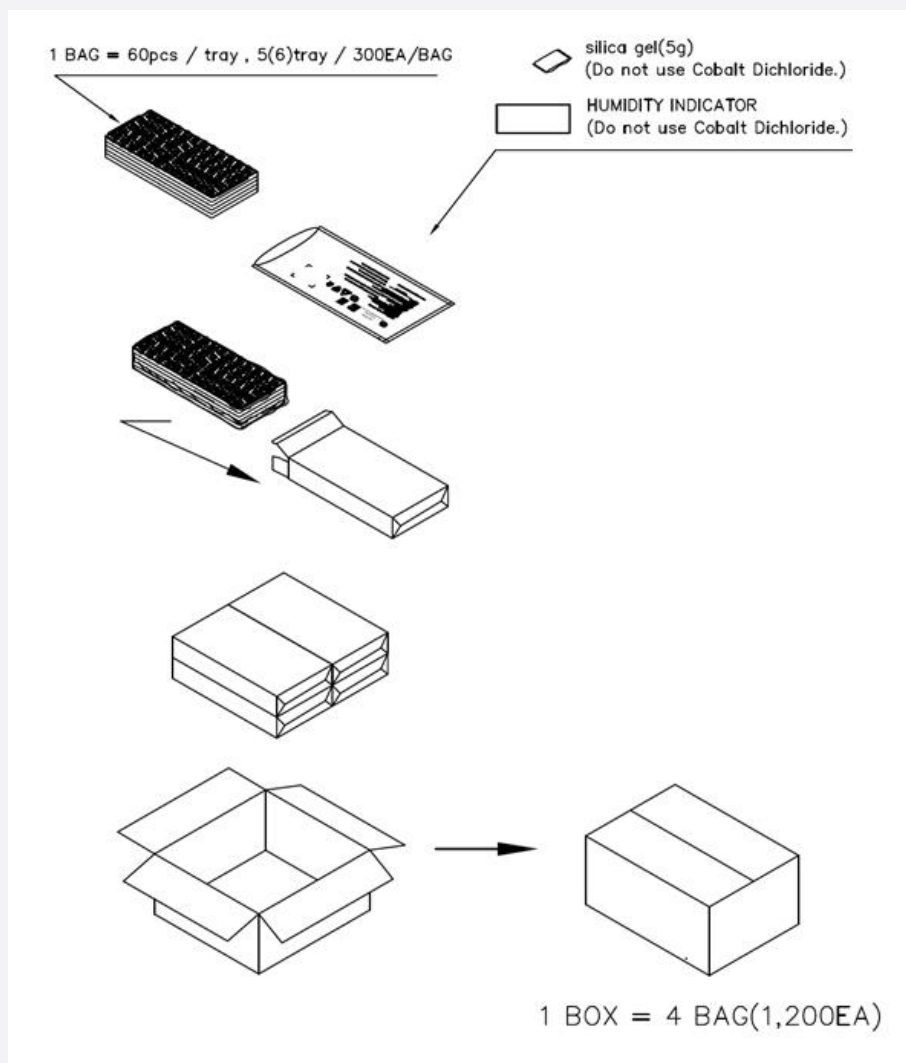
- : Production site (S: Giheung, Korea, G: Tianjin, China)
- ◎ : L (LED)
- ◇ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)
- ◆ : Year (Y: 2014, Z: 2015, A: 2016, ...)
- : Month (1~9, A, B, C)
- : Day (1~9, A, B~V)
- △ △ △ : Product serial number (001 ~ 009)
- ▲ ▲ ▲ : Tray number (001 ~ 999)



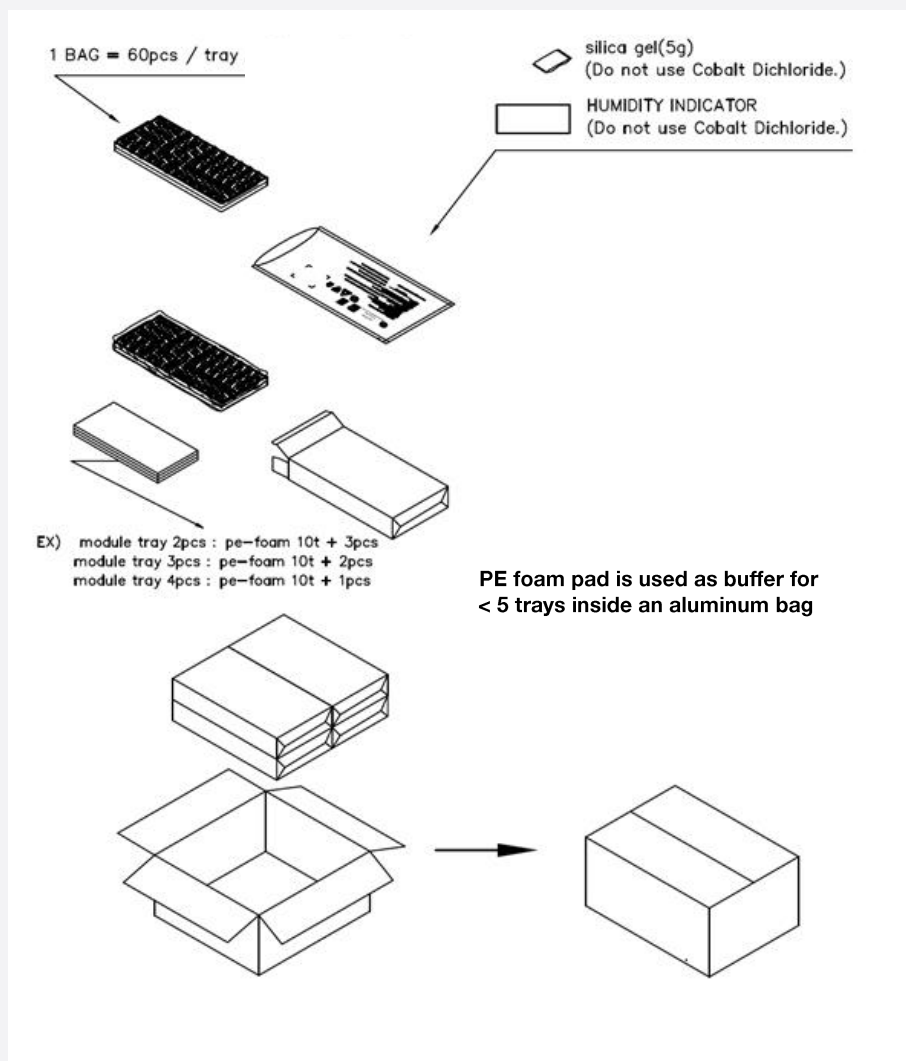
7. Packing Structure

Packing material	Max. quantity in pcs of COB	Dimension (mm)			
		Length	Width	Height	Tolerance
Tray	60	322.6	135.9	11	0.25
Aluminum Bag	300 (5 trays)	450	230	-	10
PE Foam Pad	-	280	130	10	2
Inner Box	300 (1 aluminum bag)	338	148	55	2
Outer Box	1200 (4 inner boxes)	351	308	120	5
Pallet	67,200 (56 outer boxes)	1000	1000	970	10

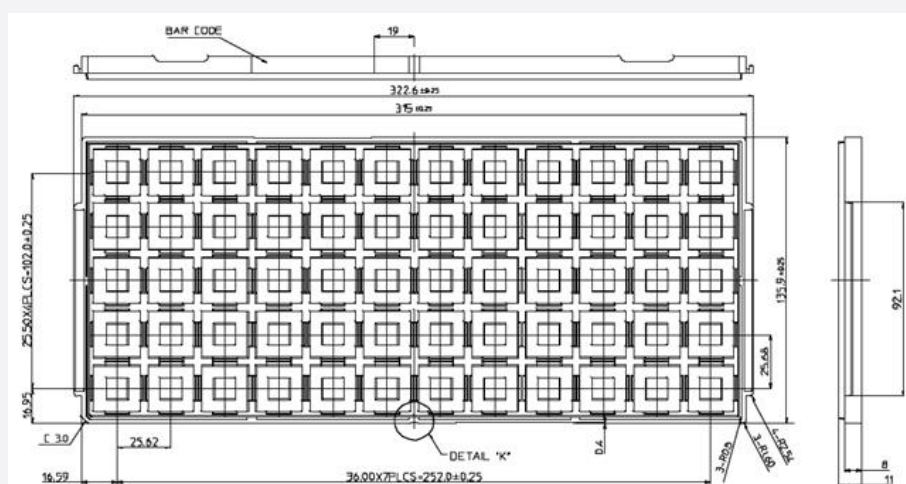
a) Packing Structure for 5 trays inside Aluminum Bag



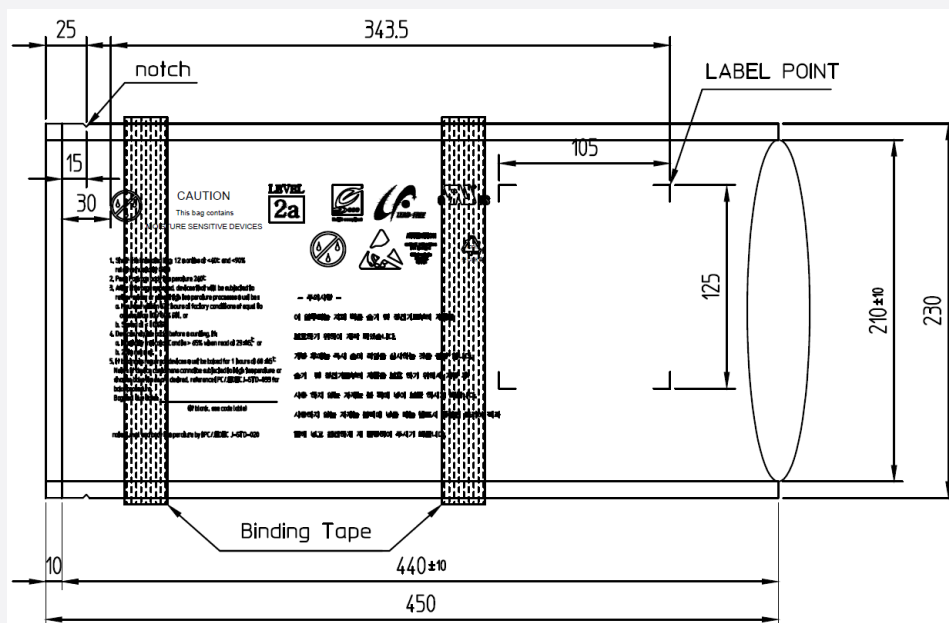
b) Packing Structure for <5 trays inside Aluminum Bag



c) Tray



d) Aluminum Vinyl Packing Bag

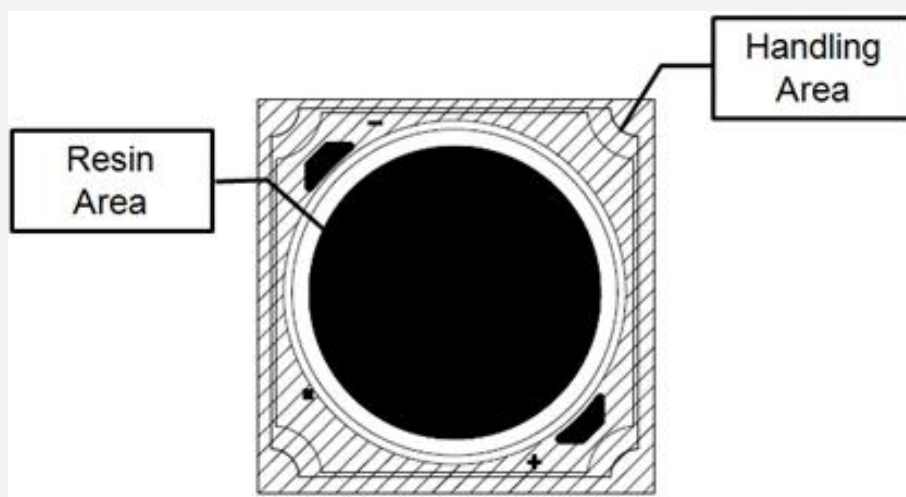


e) Silica Gel & Humidity Indicator Card inside Aluminum Vinyl Packing Bag



8. Precautions in Handling & Use

- 1) 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.
- 2) LEDs must be stored in a clean environment. If the LEDs are to be stored for three months or more after being shipped from Samsung, they should be packed with a nitrogen-filled container (shelf life of sealed bags is 12 months at temperature 0~40 °C, 0~90 % RH).
- 3) 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, or
 - b. Stored at <10 % RH
- 4) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.
- 5) Devices require baking before mounting, if humidity card reading is >60 % at 23 ± 5 °C.
- 6) Devices must be baked for 1 hour at 60 ± 5 °C, if baking is required.
- 7) 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.
- 8) 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) The resin area is very sensitive, please do not handle, press, touch, rub, clean, or pick by with tweezers on it. Instead, please pick at the handling area as indicated below.



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