



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Middle Power LED Series
5630

LM561C
CRI90



LM561C is highest performance and lm/W for fluorescent replacement



Features & Benefits

- 0.3 W class middle power LED
- Mold resin for high reliability
- Standard form factor for design flexibility (5.6 × 3.0 mm)

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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	°C	-
Storage Temperature	T_{stg}	-40 ~ +120	°C	-
LED Junction Temperature	T_j	110	°C	-
Forward Current	I_F	200	mA	-
Peak Pulsed Forward Current	I_{p}	300	mA	Duty 1/10, pulse width 10 ms
Assembly Process Temperature	-	260 <10	°C s	-
ESD (HBM)	-	±5	kV	-

b) Electro-optical Characteristics ($I_F = 65 \text{ mA}$, $T_s = 25 \text{ °C}$)

Item	Unit	CRI (R ₉) Min.	Nominal CCT (K)	Rank	Bin	Min.	Typ.	Max.	
Forward Voltage (V _F)	V			XA	AY	2.6	-	2.7	
					AZ	2.7	-	2.8	
					A1	2.8	-	2.9	
					2700	S1	24.0	-	26.0
						S2	26.0	-	28.0
						S3	28.0	-	30.0
					3000	S1	24.5	-	26.5
						S2	26.5	-	28.5
						S3	28.5	-	30.5
					3500	S1	25.0	-	27.0
						S2	27.0	-	29.0
						S3	29.0	-	31.0
Luminous Flux (Φ _v)	lm	90			S1	26.0	-	28.0	
					4000	S2	28.0	-	30.0
						S3	30.0	-	32.0
						5000	S1	27.0	-
					S2		29.0	-	31.0
					S3		31.0	-	33.0
					5700	S1	26.5	-	28.5
						S2	28.5	-	30.5
						S3	30.5	-	32.5
					6500	S1	26.0	-	28.0
						S2	28.0	-	30.0
						S3	30.0	-	32.0
Reverse Voltage (@ 5 mA)	V					0.7	-	1.2	
Color Rendering Index (R _a)	-					90	-	-	
Special CRI (R9)	-					50	-	-	
Thermal Resistance (junction to solder point)	°C/W					-	12	-	
Beam Angle	°					-	120	-	

Note:

Samsung maintains measurement tolerance of: forward voltage = $\pm 0.1 \text{ V}$, luminous flux = $\pm 5 \%$, CRI = ± 3 , R9 = ± 6.5

2. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	M	W	H	T	5	4	1	M	L	7	X	A	R	S	S	0

Digit	PKG Information	Code	Specification																					
1 2 3	Samsung Package Middle Power	SPM																						
4 5	Color	WH	White																					
6	Product Version	T																						
7 8 9	Form Factor	541	5.6 x 3.0 x 0.7 mm; 4 pads; LM561C																					
10	Sorting Current (mA)	M	65 mA																					
11	Chromaticity Coordinates	L	ANSI Standard																					
12	CRI	7	Min. 90																					
13 14	Forward Voltage (V)	XA	<table border="0"> <tr> <td></td><td>AY</td><td>2.6~2.7</td> </tr> <tr> <td>Bin Code:</td><td>AZ</td><td>2.7~2.8</td> </tr> <tr> <td></td><td>A1</td><td>2.8~2.9</td> </tr> </table>		AY	2.6~2.7	Bin Code:	AZ	2.7~2.8		A1	2.8~2.9												
	AY	2.6~2.7																						
Bin Code:	AZ	2.7~2.8																						
	A1	2.8~2.9																						
15 16	CCT (K)	<table border="0"> <tr> <td>W☆</td><td>2700</td><td>W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG</td> </tr> <tr> <td>V☆</td><td>3000</td><td>V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG</td> </tr> <tr> <td>U☆</td><td>3500</td><td>U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG</td> </tr> <tr> <td>T☆</td><td>4000</td><td>Bin Code: T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG</td> </tr> <tr> <td>R☆</td><td>5000</td><td>R1, R2, R3, R4, R5, R6, R7, R8, R9, RA, RB, RC, RD, RE, RF, RG</td> </tr> <tr> <td>Q☆</td><td>5700</td><td>Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QD, QE, QF, QG</td> </tr> <tr> <td>P☆</td><td>6500</td><td>P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG</td> </tr> </table> <p>☆ "0" (Whole bin) "M" (Quarter bin) "K" (K Kitting) or "S" (S Kitting)</p>	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	
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																						
17 18	Luminous Flux	S0	Bin Code: S1, S2, S3																					

a) Luminous Flux Bins ($I_F = 65 \text{ mA}$, $T_s = 25^\circ\text{C}$)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v , lm)
90	2700	SPMWHT541ML7XAW☆S0	S1	24.0 ~ 26.0
			S2	26.0 ~ 28.0
			S3	28.0 ~ 30.0
	3000	SPMWHT541ML7XAV☆S0	S1	24.5 ~ 26.5
			S2	26.5 ~ 28.5
			S3	28.5 ~ 30.5
	3500	SPMWHT541ML7XAU☆S0	S1	25.0 ~ 27.0
			S2	27.0 ~ 29.0
			S3	29.0 ~ 31.0
	4000	SPMWHT541ML7XAT☆S0	S1	26.0 ~ 28.0
			S2	28.0 ~ 30.0
			S3	30.0 ~ 32.0
	5000	SPMWHT541ML7XAR☆S0	S1	27.0 ~ 29.0
			S2	29.0 ~ 31.0
			S3	31.0 ~ 33.0
	5700	SPMWHT541ML7XAQ☆S0	S1	26.5 ~ 28.5
			S2	28.5 ~ 30.5
			S3	30.5 ~ 32.5
6500	SPMWHT541ML7XAP☆S0	S1	26.0 ~ 28.0	
		S2	28.0 ~ 30.0	
		S3	30.0 ~ 32.0	

Note:

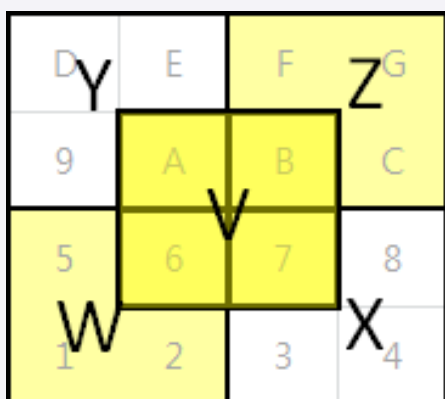
"☆" can be "0" (Whole bin), "M" (Quarter bin), "K" (K Kitting) or "S" (S Kitting) of the color binning

b) Kitting rule

1) K Kitting bin Concept

1. Under agreement between customer and SAMSUNG ELECTRONICS, SAMSUNG can supply kitting bin (VF, Color, Im).
2. A forward voltage (VF) of kitting bin is combined by a pair of same VF rank such as (A1+A1), (AY+AY) or (AZ+AZ).
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)
4. A luminous flux(Im) of kitting bin is combined by a pair of IV rank such as (S1+S1), (S2+S2) or (S3+S3).

[Kitting example]



[Binning Information]

	Bin #1	Bin #2	Priority
VF	AY	AY	
	AZ	AZ	
	A1	A1	
CIE	W (1, 2, 5, 6)	Z (B, C, F, G)	
	V (6, 7, A, B)	V (6, 7, A, B)	
	X (3, 4, 7, 8)	Y (9, A, D, E)	
IV	S1	S1	
	S2	S2	
	S3	S3	

※ Each of V,W,X,Y and Z can be one bin without details division.

2) S Kitting bin Concept

1. Under agreement between customer and SAMSUNG ELECTRONICS, SAMSUNG can supply kitting bin (VF, Color, Im).
2. A forward voltage (VF) of kitting bin is combined by a pair of VF rank such as (A1+A1), (AY+AY) or (AZ+AZ).
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)
4. A luminous flux(Im) of kitting bin is combined by a pair of IV rank such as (S1+S1), (S2+S2) or (S3+S3).

[Kitting example]

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

[Binning Information]

	Bin #1	Bin #2
VF	AY	AY
	AZ	AZ
	A1	A1
CIE	W (1, 2, 5)	B
	X (3, 4, 8)	A
	Y (9, D, E)	7
	Z (C, F, G)	6
	V (6, 7, A, B)	V (6, 7, A, B)
IV	S1	S1
	S2	S2
	S3	S3

※ Each of V,W,X,Y and Z can be one bin without details division.

c) Color Bins ($I_f = 65 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

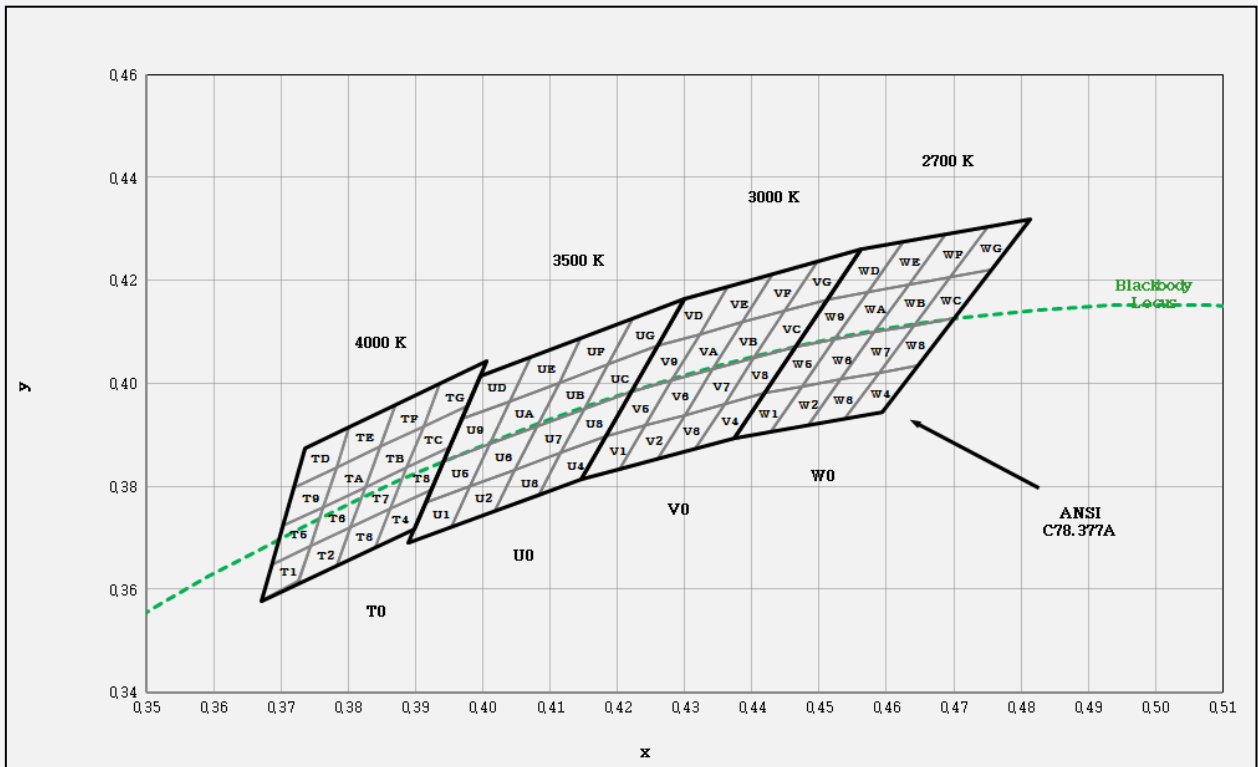
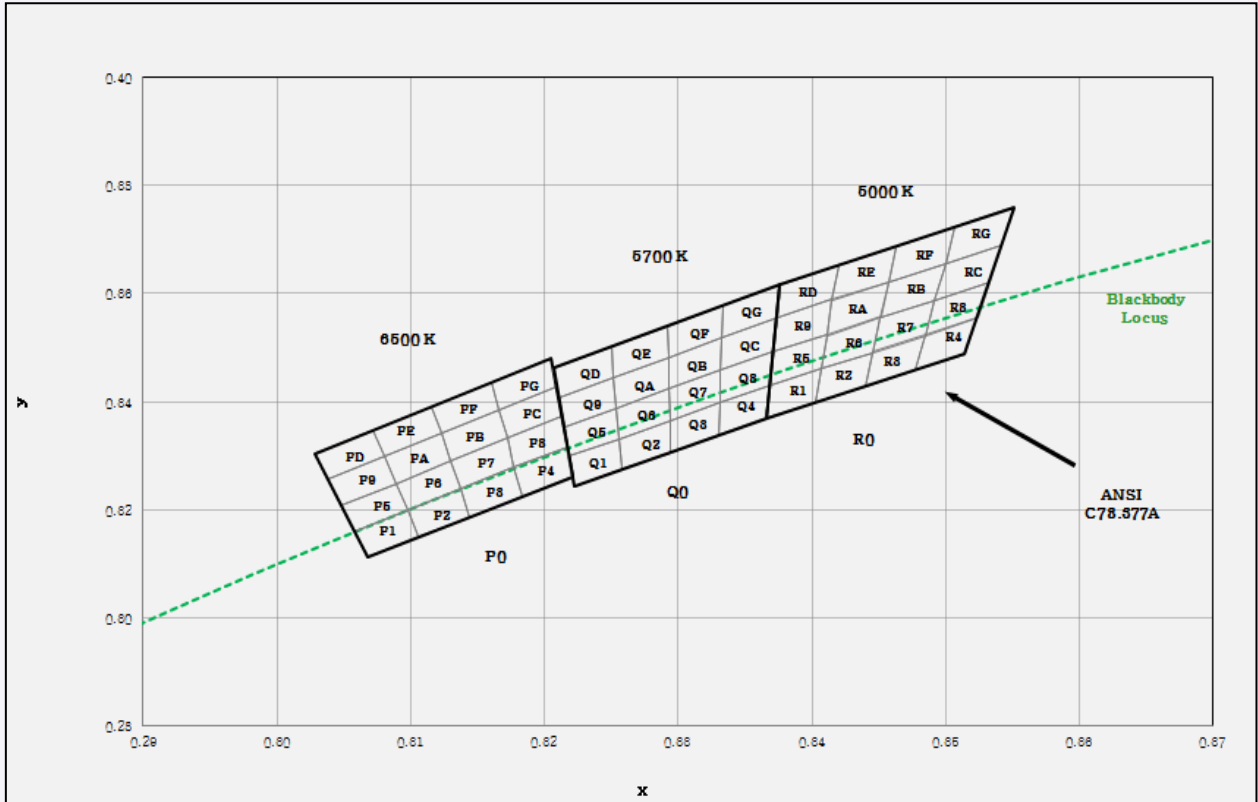
CRI (R _a) Min.	Nominal CCT (K)	Product Code	Color Rank	Chromaticity Bins
80	2700	SPMWHT541ML7XAW0S0	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
		SPMWHT541ML7XAWM0	WM (Quarter bin)	W6, W7, WA, WB
		SPMWHT541ML7XAWSS0	WS (S Kitting)	W6, W7, WA, WB, WV, WW, WX, WY, WZ
		SPMWHT541ML7XAWK0	WK (K Kitting)	WV, WW, WX, WY, WZ
	3000	SPMWHT541ML7XAV0S0	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		SPMWHT541ML7XAVMS0	VM (Quarter bin)	V6, V7, VA, VB
		SPMWHT541ML7XAVSS0	VS (S Kitting)	V6, V7, VA, VB, , WV, VW, VX, VY, VZ
		SPMWHT541ML7XAVKS0	VK (K Kitting)	VV, VW, VX, VY, VZ
	3500	SPMWHT541ML7XAU0S0	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		SPMWHT541ML7XAUMS0	UM (Quarter bin)	U6, U7, UA, UB
		SPMWHT541ML7XAUSS0	US (S Kitting)	U6, U7, UA, UB, , UV, UW, UX, UY, UZ
		SPMWHT541ML7XAUKS0	UK (K Kitting)	UV, UW, UX, UY, UZ
	4000	SPMWHT541ML7XAT0S0	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		SPMWHT541ML7XATMS0	TM (Quarter bin)	T6, T7, TA, TB
		SPMWHT541ML7XATSS0	TS (S Kitting)	T6, T7, TA, TB, , TV, TW, TX, TY, TZ
		SPMWHT541ML7XATKS0	TK (K Kitting)	TV, TW, TX, TY, TZ
	5000	SPMWHT541ML7XAR0S0	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9, RA, RB, RC, RD, RE, RF, RG
		SPMWHT541ML7XARMS0	RM (Quarter bin)	R6, R7, RA, RB
		SPMWHT541ML7XARSS0	RS (S Kitting)	R6, R7, RA, RB, RV, RW, RX, RY, RZ
		SPMWHT541ML7XARKS0	RK (K Kitting)	RV, RW, RX, RY, RZ
	5700	SPMWHT541ML7XAQ0S0	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QD, QE, QF, QG
		SPMWHT541ML7XAQMS0	QM (Quarter bin)	Q6, Q7, QA, QB
		SPMWHT541ML7XAQSS0	QS (S Kitting)	Q6, Q7, QA, QB, QV, QW, QX, QY, QZ
		SPMWHT541ML7XAQKS0	QK (K Kitting)	QV, QW, QX, QY, QZ
6500	SPMWHT541ML7XAP0S0	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG	
	SPMWHT541ML7XAPMS0	PM (Quarter bin)	P6, P7, PA, PB	

SPMWHT541ML7XAPSS0	PS (S Kitting)	P6, P7, PA, PB, PV, PW, PX, PY, PZ
SPMWHT541ML7XAPKS0	PK (K Kitting)	PV, PW, PX, PY, PZ

d) Voltage Bins ($I_F = 65 \text{ mA}$, $T_s = 25 \text{ °C}$)

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

e) Chromaticity Region & Coordinates ($I_F = 65 \text{ mA}$, $T_s = 25^\circ\text{C}$)



e) Chromaticity Region & Coordinates ($I_F = 65 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

Region	CIE x	CIE y	Region	CIE x	CIE y
W rank (2700 K)					
W1	0.4373	0.3893	W9	0.4465	0.4071
	0.4418	0.3981		0.4513	0.4164
	0.4475	0.3994		0.4573	0.4178
	0.4428	0.3906		0.4523	0.4085
W2	0.4428	0.3906	WA	0.4523	0.4085
	0.4475	0.3994		0.4573	0.4178
	0.4532	0.4008		0.4634	0.4193
	0.4483	0.3919		0.4582	0.4099
W3	0.4483	0.3919	WB	0.4582	0.4099
	0.4532	0.4008		0.4634	0.4193
	0.4589	0.4021		0.4695	0.4207
	0.4538	0.3931		0.4641	0.4112
W4	0.4538	0.3931	WC	0.4641	0.4112
	0.4589	0.4021		0.4695	0.4207
	0.4646	0.4034		0.4756	0.4221
	0.4593	0.3944		0.4700	0.4126
W5	0.4418	0.3981	WD	0.4513	0.4164
	0.4465	0.4071		0.4562	0.4260
	0.4523	0.4085		0.4624	0.4274
	0.4475	0.3994		0.4573	0.4178
W6	0.4475	0.3994	WE	0.4573	0.4178
	0.4523	0.4085		0.4624	0.4274
	0.4582	0.4099		0.4687	0.4289
	0.4532	0.4008		0.4634	0.4193
W7	0.4532	0.4008	WF	0.4634	0.4193
	0.4582	0.4099		0.4687	0.4289
	0.4641	0.4112		0.4750	0.4304
	0.4589	0.4021		0.4695	0.4207
W8	0.4589	0.4021	WG	0.4695	0.4207
	0.4641	0.4112		0.4750	0.4304
	0.4700	0.4126		0.4813	0.4319
	0.4646	0.4034		0.4756	0.4221

Region	CIE x	CIE y	Region	CIE x	CIE y
V rank (3000 K)					
V1	0.4147	0.3814	V9	0.4221	0.3984
	0.4183	0.3898		0.4259	0.4073
	0.4242	0.3919		0.4322	0.4096
	0.4203	0.3833		0.4281	0.4006
V2	0.4203	0.3833	VA	0.4281	0.4006
	0.4242	0.3919		0.4322	0.4096
	0.4300	0.3939		0.4385	0.4119
	0.4259	0.3853		0.4342	0.4028
V3	0.4259	0.3853	VB	0.4342	0.4028
	0.4300	0.3939		0.4385	0.4119
	0.4359	0.3960		0.4449	0.4141
	0.4316	0.3873		0.4403	0.4049
V4	0.4316	0.3873	VC	0.4403	0.4049
	0.4359	0.3960		0.4449	0.4141
	0.4418	0.3981		0.4513	0.4164
	0.4373	0.3893		0.4465	0.4071
V5	0.4183	0.3898	VD	0.4259	0.4073
	0.4221	0.3984		0.4299	0.4165
	0.4281	0.4006		0.4364	0.4188
	0.4242	0.3919		0.4322	0.4096
V6	0.4242	0.3919	VE	0.4322	0.4096
	0.4281	0.4006		0.4364	0.4188
	0.4342	0.4028		0.4430	0.4212
	0.4300	0.3939		0.4385	0.4119
V7	0.4300	0.3939	VF	0.4385	0.4119
	0.4342	0.4028		0.4430	0.4212
	0.4403	0.4049		0.4496	0.4236
	0.4359	0.3960		0.4449	0.4141
V8	0.4359	0.3960	VG	0.4449	0.4141
	0.4403	0.4049		0.4496	0.4236
	0.4465	0.4071		0.4562	0.4260
	0.4418	0.3981		0.4513	0.4164

e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
U rank (3500 K)					
U1	0.3889	0.3690	U9	0.3941	0.3848
	0.3915	0.3768		0.3968	0.3930
	0.3981	0.3800		0.4040	0.3966
	0.3953	0.3720		0.4010	0.3882
U2	0.3953	0.3720	UA	0.4010	0.3882
	0.3981	0.3800		0.4040	0.3966
	0.4048	0.3832		0.4113	0.4001
	0.4017	0.3751		0.4080	0.3916
U3	0.4017	0.3751	UB	0.4080	0.3916
	0.4048	0.3832		0.4113	0.4001
	0.4116	0.3865		0.4186	0.4037
	0.4082	0.3782		0.4150	0.3950
U4	0.4082	0.3782	UC	0.4150	0.3950
	0.4116	0.3865		0.4186	0.4037
	0.4183	0.3898		0.4259	0.4073
	0.4147	0.3814		0.4221	0.3984
U5	0.3915	0.3768	UD	0.3968	0.3930
	0.3941	0.3848		0.3996	0.4015
	0.4010	0.3882		0.4071	0.4052
	0.3981	0.3800		0.4040	0.3966
U6	0.3981	0.3800	UE	0.4040	0.3966
	0.4010	0.3882		0.4071	0.4052
	0.4080	0.3916		0.4146	0.4089
	0.4048	0.3832		0.4113	0.4001
U7	0.4048	0.3832	UF	0.4113	0.4001
	0.4080	0.3916		0.4146	0.4089
	0.4150	0.3950		0.4222	0.4127
	0.4116	0.3865		0.4186	0.4037
U8	0.4116	0.3865	UG	0.4186	0.4037
	0.4150	0.3950		0.4222	0.4127
	0.4221	0.3984		0.4299	0.4165
	0.4183	0.3898		0.4259	0.4073

Region	CIE x	CIE y	Region	CIE x	CIE y
T rank (4000 K)					
T1	0.3670	0.3578	T9	0.3702	0.3722
	0.3726	0.3612		0.3763	0.3760
	0.3744	0.3685		0.3782	0.3837
	0.3686	0.3649		0.3719	0.3797
T2	0.3726	0.3612	TA	0.3763	0.3760
	0.3783	0.3646		0.3825	0.3798
	0.3804	0.3721		0.3847	0.3877
	0.3744	0.3685		0.3782	0.3837
T3	0.3783	0.3646	TB	0.3825	0.3798
	0.3840	0.3681		0.3887	0.3836
	0.3863	0.3758		0.3912	0.3917
	0.3804	0.3721		0.3847	0.3877
T4	0.3840	0.3681	TC	0.3887	0.3837
	0.3898	0.3716		0.3950	0.3875
	0.3924	0.3794		0.3978	0.3958
	0.3863	0.3758		0.3912	0.3917
T5	0.3686	0.3649	TD	0.3719	0.3797
	0.3744	0.3685		0.3782	0.3837
	0.3763	0.3760		0.3802	0.3916
	0.3702	0.3722		0.3736	0.3874
T6	0.3744	0.3685	TE	0.3782	0.3837
	0.3804	0.3721		0.3847	0.3877
	0.3825	0.3798		0.3869	0.3958
	0.3763	0.376		0.3802	0.3916
T7	0.3804	0.3721	TF	0.3847	0.3877
	0.3863	0.3758		0.3912	0.3917
	0.3887	0.3836		0.3937	0.4001
	0.3825	0.3798		0.3869	0.3958
T8	0.3863	0.3758	TG	0.3912	0.3917
	0.3924	0.3794		0.3978	0.3958
	0.3950	0.3875		0.4006	0.4044
	0.3887	0.3836		0.3937	0.4001

e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
R rank (5000 K)					
R1	0.3366	0.3369	R9	0.3374	0.3554
	0.3369	0.3431		0.3371	0.3493
	0.3407	0.3460		0.3411	0.3522
	0.3403	0.3398		0.3415	0.3587
R2	0.3403	0.3398	RA	0.3415	0.3587
	0.3407	0.3460		0.3411	0.3522
	0.3446	0.3491		0.3451	0.3554
	0.3440	0.3427		0.3457	0.3621
R3	0.3446	0.3491	RB	0.3451	0.3554
	0.3440	0.3427		0.3457	0.3621
	0.3477	0.3458		0.3500	0.3655
	0.3485	0.3522		0.3492	0.3587
R4	0.3485	0.3522	RC	0.3492	0.3587
	0.3477	0.3458		0.3500	0.3655
	0.3514	0.3487		0.3542	0.3690
	0.3524	0.3554		0.3533	0.3620
R5	0.3371	0.3493	RD	0.3376	0.3616
	0.3369	0.3431		0.3374	0.3554
	0.3407	0.3460		0.3415	0.3587
	0.3411	0.3522		0.3420	0.3652
R6	0.3407	0.3460	RE	0.3415	0.3587
	0.3411	0.3522		0.3420	0.3652
	0.3451	0.3554		0.3463	0.3687
	0.3446	0.3491		0.3457	0.3621
R7	0.3446	0.3491	RF	0.3457	0.3621
	0.3451	0.3554		0.3463	0.3687
	0.3492	0.3587		0.3507	0.3724
	0.3485	0.3522		0.3500	0.3655
R8	0.3485	0.3522	RG	0.3500	0.3655
	0.3492	0.3587		0.3507	0.3724
	0.3533	0.3620		0.3551	0.3760
	0.3524	0.3554		0.3542	0.3690

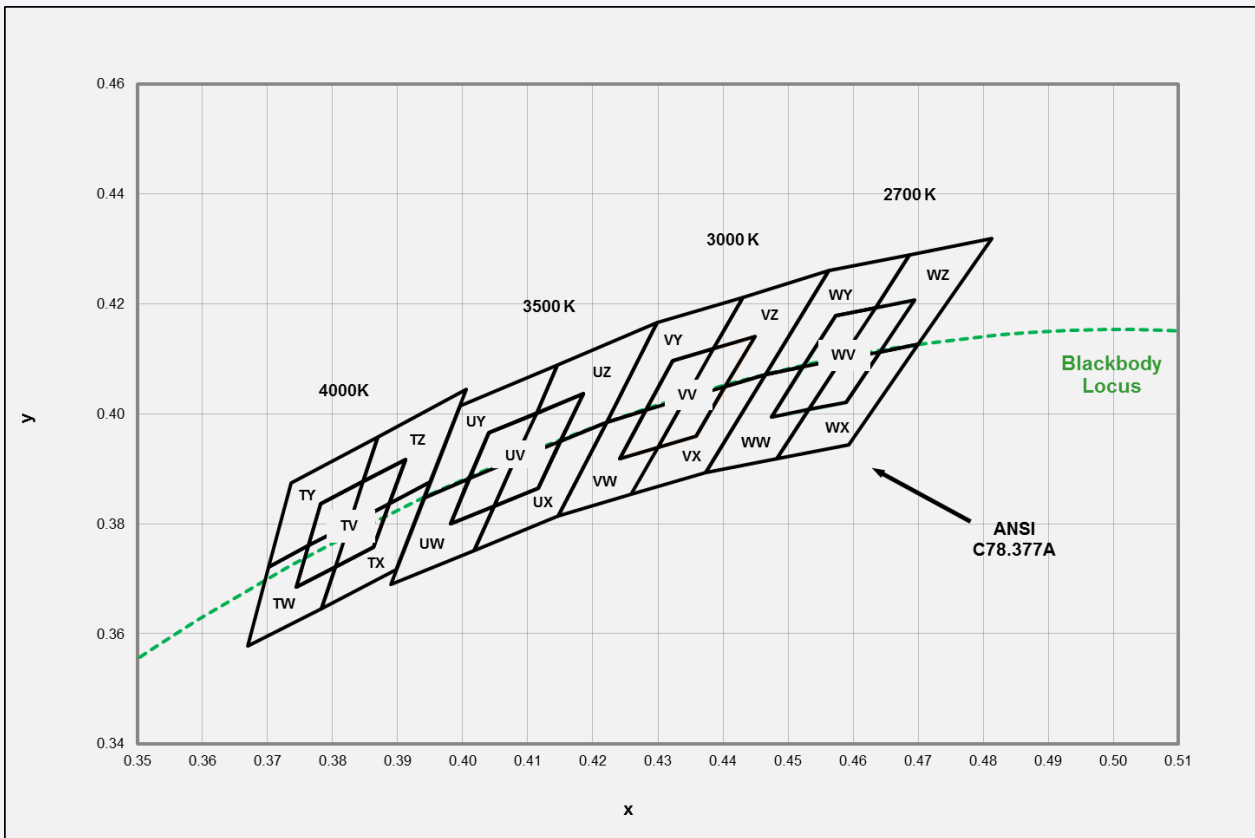
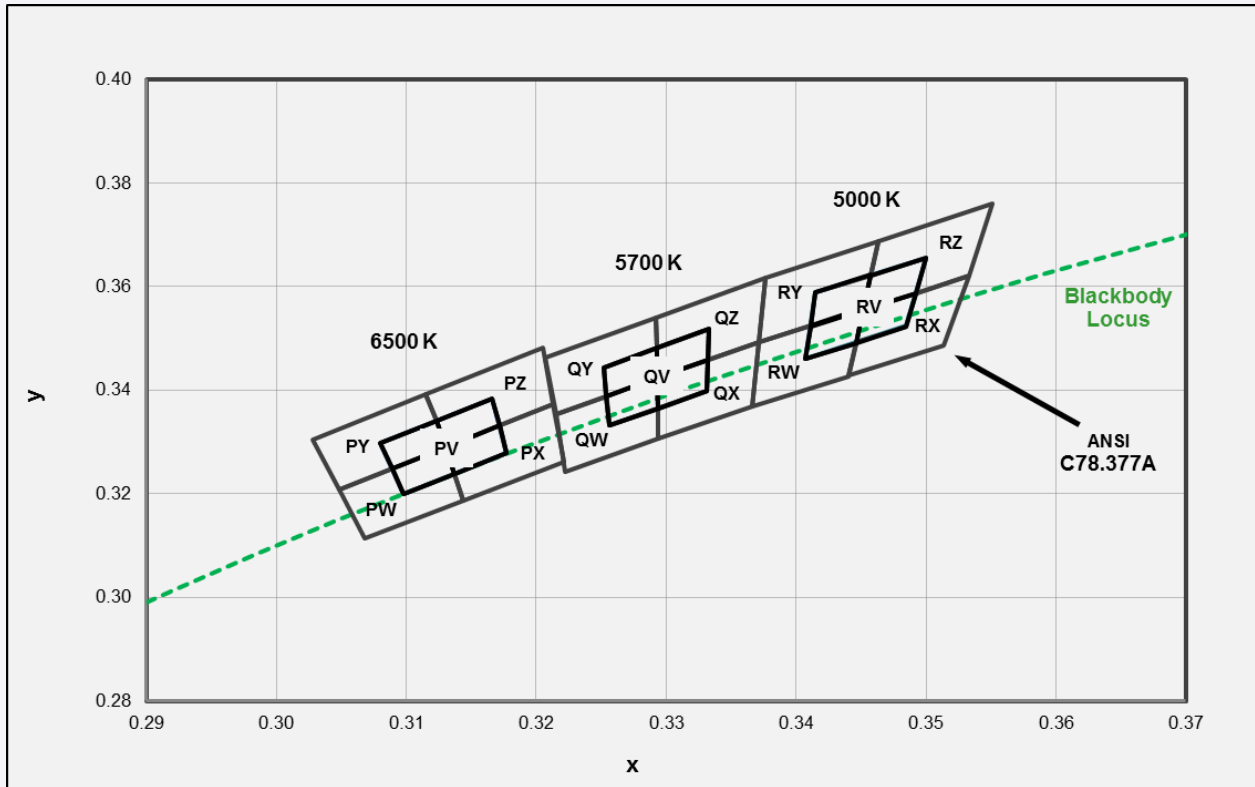
Region	CIE x	CIE y	Region	CIE x	CIE y
Q rank (5700 K)					
Q1	0.3218	0.3298	Q9	0.3211	0.3407
	0.3222	0.3243		0.3215	0.3353
	0.3258	0.3275		0.3254	0.3388
	0.3256	0.3331		0.3252	0.3444
Q2	0.3256	0.3331	QA	0.3252	0.3444
	0.3258	0.3275		0.3254	0.3388
	0.3294	0.3306		0.3293	0.3423
	0.3294	0.3364		0.3293	0.3481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

e) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
P rank (6500 K)					
P1	0.3068	0.3113	P9	0.3048	0.3207
	0.3106	0.315		0.3089	0.3249
	0.3098	0.3199		0.3080	0.3298
	0.3058	0.316		0.3038	0.3256
P2	0.3106	0.315	PA	0.3089	0.3249
	0.3144	0.3186		0.3130	0.3290
	0.3137	0.3238		0.3123	0.3341
	0.3098	0.3199		0.3080	0.3298
P3	0.3144	0.3186	PB	0.3130	0.3290
	0.3183	0.3224		0.3172	0.3332
	0.3177	0.3278		0.3166	0.3384
	0.3137	0.3238		0.3123	0.3341
P4	0.3183	0.3224	PC	0.3172	0.3332
	0.3221	0.3261		0.3214	0.3373
	0.3217	0.3317		0.3210	0.3427
	0.3177	0.3278		0.3166	0.3384
P5	0.3058	0.316	PD	0.3038	0.3256
	0.3098	0.3199		0.3080	0.3298
	0.3089	0.3249		0.3072	0.3348
	0.3048	0.3207		0.3028	0.3304
P6	0.3098	0.3199	PE	0.3080	0.3298
	0.3137	0.3238		0.3123	0.3341
	0.313	0.329		0.3115	0.3391
	0.3089	0.3249		0.3072	0.3348
P7	0.3137	0.3238	PF	0.3123	0.3341
	0.3177	0.3278		0.3166	0.3384
	0.3172	0.3332		0.3160	0.3436
	0.313	0.329		0.3115	0.3391
P8	0.3177	0.3278	PG	0.3166	0.3384
	0.3217	0.3317		0.3210	0.3427
	0.3213	0.3373		0.3206	0.3481
	0.3172	0.3332		0.3160	0.3436

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

f) Kitting Chromaticity Region & Coordinates ($I_F = 65 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)



f) Kitting Chromaticity Region & Coordinates ($I_F = 65 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

Region	CIE x	CIE y	Region	CIE x	CIE y
W rank (2700 K)					
WW	0.4475	0.3994			
	0.4589	0.4021			
	0.4695	0.4207			
	0.4573	0.4178			
WW	0.4373	0.3893	WY	0.4465	0.4071
	0.4483	0.3919		0.4582	0.4099
	0.4582	0.4099		0.4687	0.4289
	0.4465	0.4071		0.4562	0.4260
WX	0.4483	0.3919	WZ	0.4582	0.4099
	0.4593	0.3944		0.4700	0.4126
	0.4700	0.4126		0.4813	0.4319
	0.4582	0.4099		0.4687	0.4289

Region	CIE x	CIE y	Region	CIE x	CIE y
V rank (3000 K)					
VV	0.4242	0.3919			
	0.4359	0.3960			
	0.4449	0.4141			
	0.4322	0.4096			
VV	0.4147	0.3814	VY	0.4221	0.3984
	0.4259	0.3853		0.4342	0.4028
	0.4342	0.4028		0.4430	0.4212
	0.4221	0.3984		0.4299	0.4165
VX	0.4259	0.3853	VZ	0.4342	0.4028
	0.4373	0.3893		0.4465	0.4071
	0.4465	0.4071		0.4562	0.4260
	0.4342	0.4028		0.4430	0.4212

f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
U rank (3500 K)					
UV	0.3981	0.3800			
	0.4116	0.3865			
	0.4186	0.4037			
	0.4040	0.3966			
UW	0.3889	0.3690	UY	0.3941	0.3848
	0.4017	0.3751		0.4080	0.3916
	0.4080	0.3916		0.4146	0.4089
	0.3941	0.3848		0.3996	0.4015
UX	0.4017	0.3751	UZ	0.4080	0.3916
	0.4147	0.3814		0.4221	0.3984
	0.4221	0.3984		0.4299	0.4165
	0.4080	0.3916		0.4146	0.4089

Region	CIE x	CIE y	Region	CIE x	CIE y
T rank (4000 K)					
TV	0.3744	0.3685			
	0.3863	0.3758			
	0.3912	0.3917			
	0.3782	0.3837			
TW	0.3670	0.3578	TY	0.3702	0.3722
	0.3783	0.3646		0.3825	0.3798
	0.3825	0.3798		0.3869	0.3958
	0.3702	0.3722		0.3736	0.3874
TX	0.3783	0.3646	TZ	0.3825	0.3798
	0.3898	0.3716		0.3950	0.3875
	0.3950	0.3875		0.4006	0.4044
	0.3825	0.3798		0.3869	0.3958

f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
R rank (5000 K)					
RV	0.3407	0.3460			
	0.3485	0.3524			
	0.3500	0.3655			
	0.3415	0.3588			
RW	0.3366	0.3369	RY	0.3371	0.3493
	0.3440	0.3427		0.3411	0.3525
	0.3446	0.3491		0.3415	0.3588
	0.3407	0.3460		0.3457	0.3621
RX	0.3440	0.3428	RZ	0.3457	0.3621
	0.3514	0.3487		0.3500	0.3655
	0.3533	0.3620		0.3492	0.3587
	0.3492	0.3587		0.3533	0.3620

Region	CIE x	CIE y	Region	CIE x	CIE y
Q rank (5700 K)					
QV	0.3256	0.3331			
	0.3331	0.3398			
	0.3333	0.3518			
	0.3252	0.3444			
QW	0.3222	0.3243	QY	0.3215	0.3353
	0.3294	0.3306		0.3293	0.3423
	0.3293	0.3423		0.3292	0.3539
	0.3215	0.3353		0.3207	0.3462
	0.3294	0.3306		0.3293	0.3423
QX	0.3366	0.3369	QZ	0.3371	0.3493
	0.3371	0.3493		0.3376	0.3616
	0.3293	0.3423		0.3292	0.3539

f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
P rank (6500 K)					
PV	0.3098	0.3199			
	0.3177	0.3278			
	0.3166	0.3384			
	0.3080	0.3298			
PW	0.3068	0.3113	PY	0.3048	0.3207
	0.3144	0.3186		0.3130	0.3290
	0.3130	0.3290		0.3115	0.3391
	0.3089	0.3249		0.3028	0.3304
PX	0.3144	0.3186	PZ	0.3130	0.3290
	0.3221	0.3261		0.3213	0.3373
	0.3213	0.3373		0.3205	0.3481
	0.3130	0.3290		0.3115	0.3391

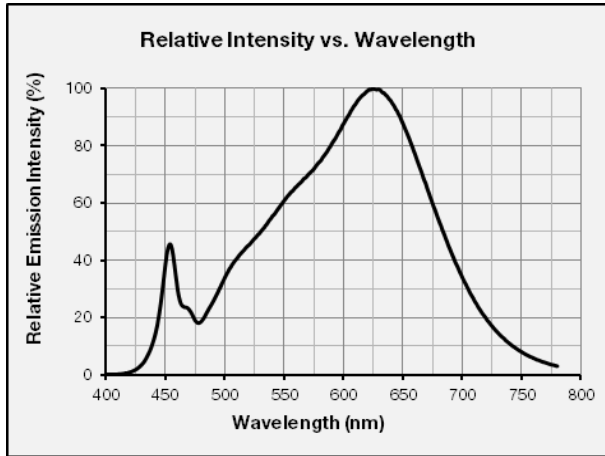
Note:

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

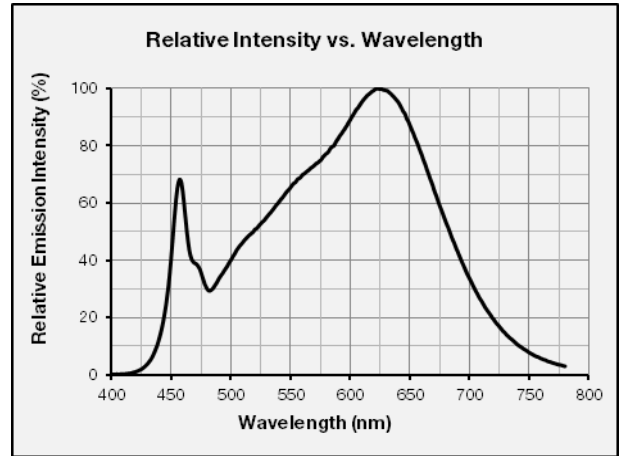
3. Typical Characteristics Graphs

a) Spectrum Distribution ($I_f = 65 \text{ mA}$, $T_s = 25 \text{ }^\circ\text{C}$)

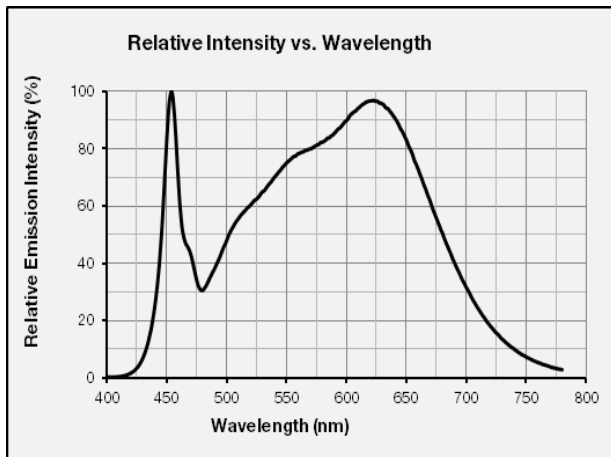
CCT: 2700 K (90 CRI)



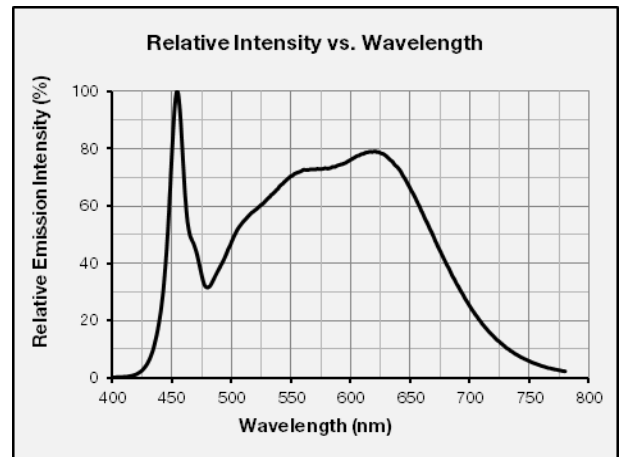
CCT: 3000 K (90 CRI)



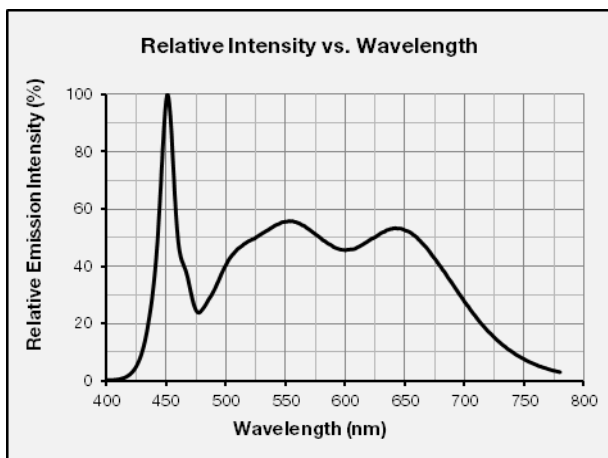
CCT: 3500 K (90 CRI)



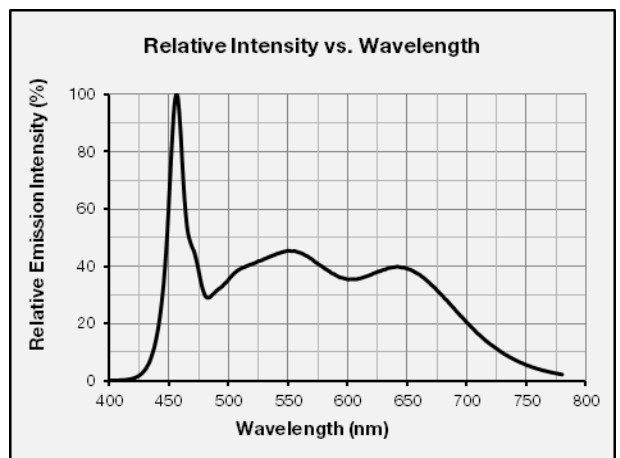
CCT: 4000 K (90 CRI)



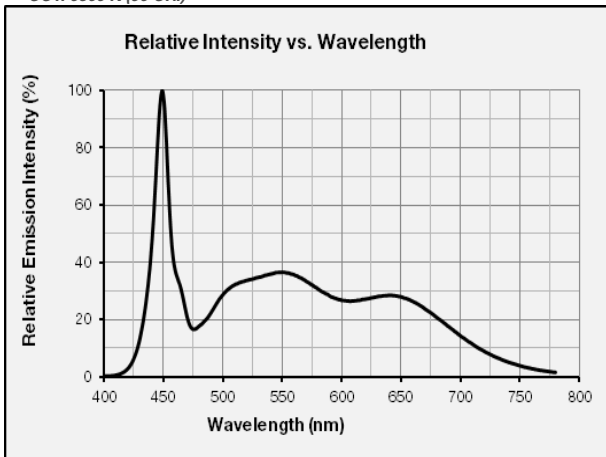
CCT: 5000 K (90 CRI)



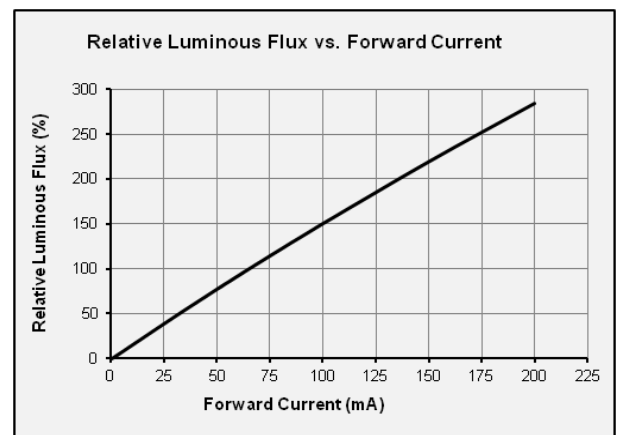
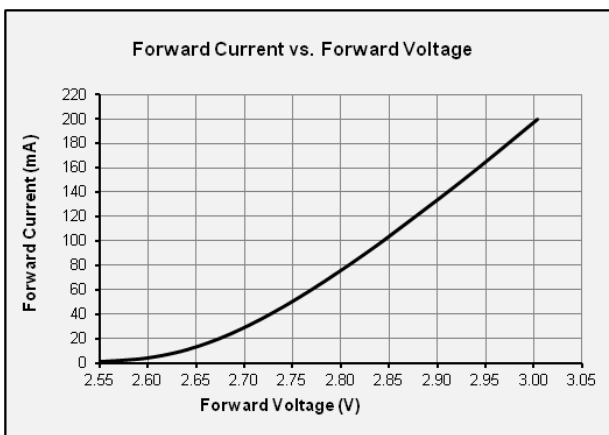
CCT: 5700 K (90 CRI)



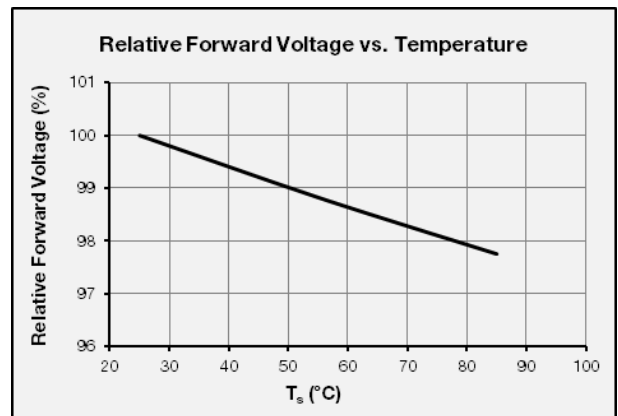
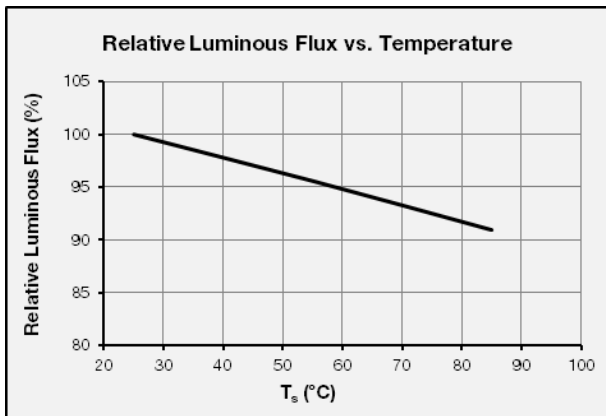
CCT: 6500 K (90 CRI)



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



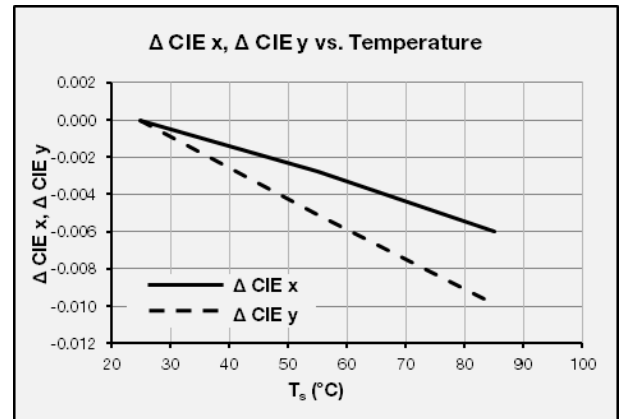
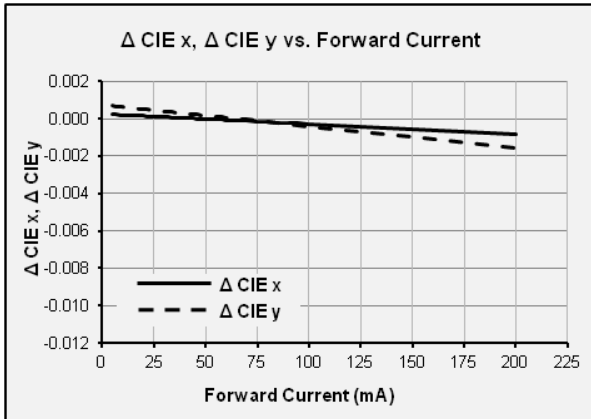
c) Temperature Characteristics ($I_f = 65\text{ mA}$)



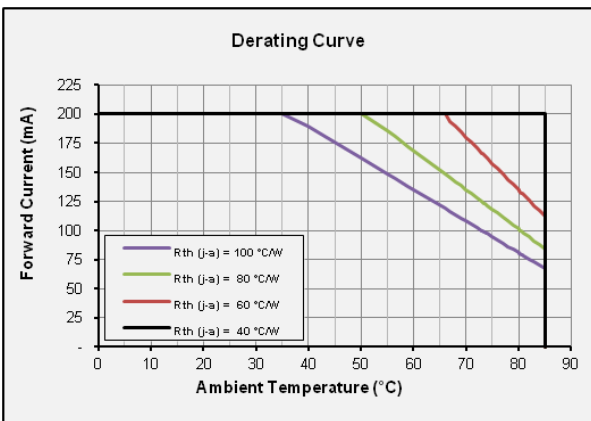
d) Color Shift Characteristics

$T_s = 25\text{ }^\circ\text{C}$

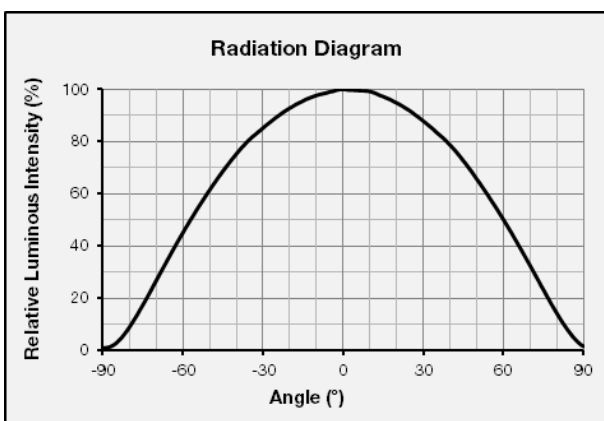
$I_f = 65\text{ mA}$



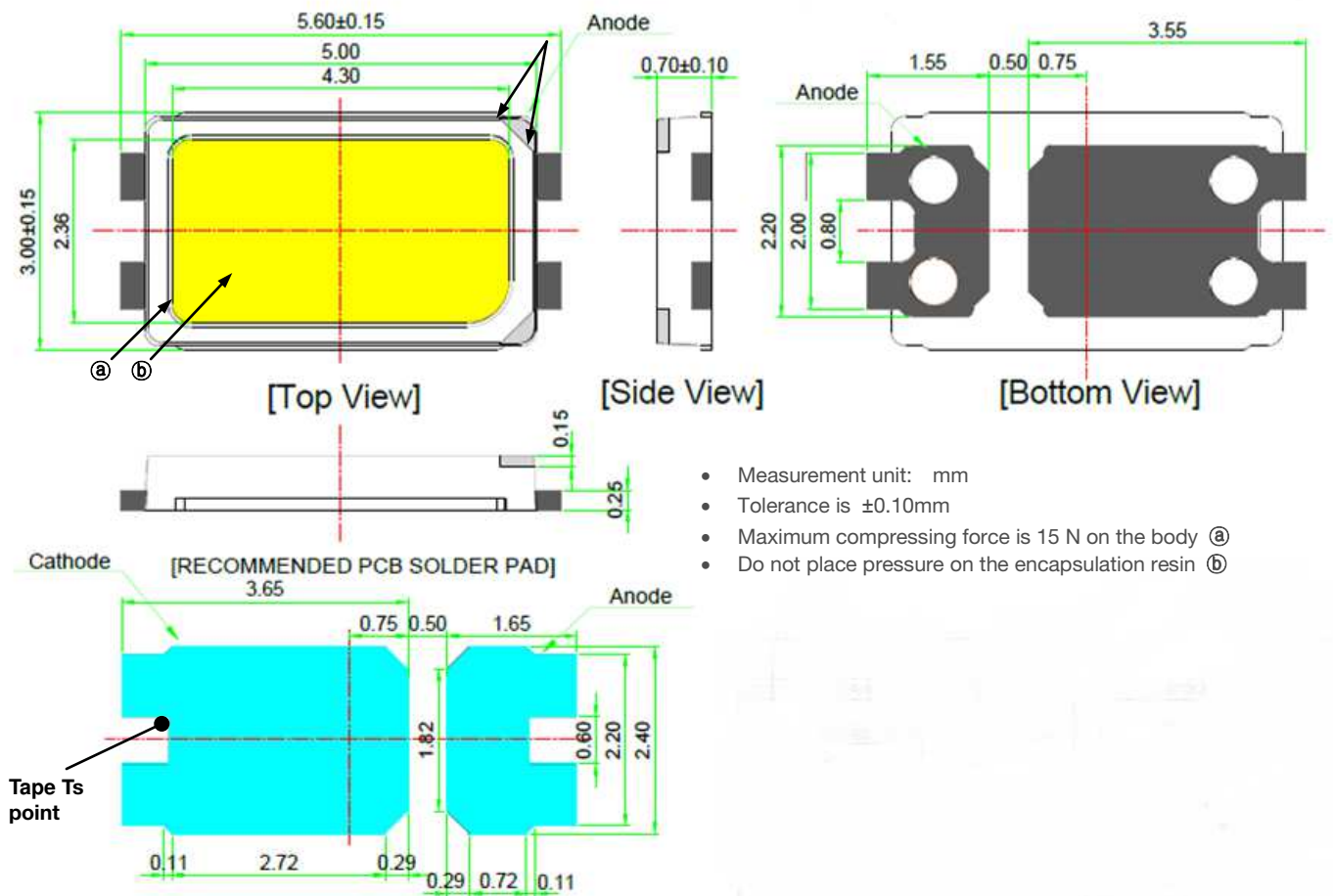
e) Derating Curve



f) Beam Angle Characteristics ($I_f = 65\text{ mA}$, $T_s = 25\text{ }^\circ\text{C}$)



4. Outline Drawing & Dimension



Notes:

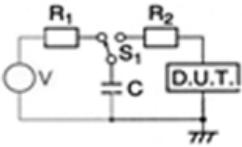
- 1) This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).
- 2) T_s point and measurement method:
 - ① Measure one point at the cathode pad, if necessary remove PSR of PCB to reach T_s point.
 - ② All pads must be soldered to the PCB to dissipate heat properly, otherwise the LED can be damaged.

Precautions:

- 1) Pressure on the LEDs will influence to the reliability of the LEDs. Precautions should be taken to avoid strong pressure on the LEDs. Do not put stress on the LEDs during heating.
- 2) Re-soldering should not be done after the LEDs have been soldered. If re-soldering is unavoidable, LED's characteristics should be carefully checked before and after such repair.
- 3) Do not stack assembled PCBs together. Since materials of LEDs is soft, abrasion between two PCB assembled with LED might cause catastrophic failure of the LEDs.

5. Reliability Test Items & Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle	Sample No.	
High Temperature Life Test	85 °C, DC 200 mA	1000 h	22	
High Temperature Humidity Life Test	60 °C, 90 % RH, DC 200 mA	1000 h	22	
Powered Temperature Cycle Test	-40 °C / 10 min ↔ 85 °C / 10 min, sweep 20 min cycle on/off: each 5 min, DC 200 mA	100 cycles	22	
Thermal Cycle	-45 °C / 15 min ↔ 125 °C / 15 min → Hot plate 180 °C	500 cycles	100	
High Temperature Storage	120 °C	1000 h	11	
Low Temperature Storage	-40 °C	1000 h	11	
ESD (HBM)		R ₁ : 10 MΩ R ₂ : 1.5 kΩ C: 100 pF V: ±5 kV	5 times	30
Vibration Test	20~2000~20 Hz, 200 m/s ² , sweep 4 min X, Y, Z 3 direction, each 1 cycle	4 cycles	11	
Mechanical Shock Test	1500 g, 0.5 ms 3 shocks each X-Y-Z axis	5 cycles	11	

b) Criteria for Judging the Damage

Item	Symbol	Test Condition (T _s = 25 °C)	Limit	
			Min	Max
Forward Voltage	V _F	I _F = 65 mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ _v	I _F = 65 mA	Init. Value * 0.7	Init. Value * 1.1