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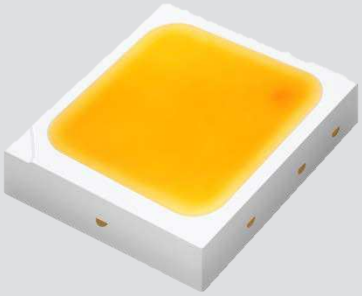
Middle Power LED Series
3030

LM302B

CRI 90



Features & Benefits

- Superior mid power LED with wide over-drive range up to 1.5W
- Mold resin for high reliability
- Standard form factor for design flexibility (3.0 × 3.0 mm)

Table of Contents

1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	T_a	-40 ~ +85	ºC	-
Storage Temperature	T_{stg}	-40 ~ +100	ºC	-
LED Junction Temperature	T_j	125	ºC	-
Forward Current	I_F	250	mA	-
Assembly Process Temperature	-	260 <10	ºC s	-
ESD (HBM)	-	5	kV	-

b) Electro-optical Characteristics (I_F = 150 mA, T_s = 85 °C)

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (V_F)	V	YB	AY	5.4	-	5.6
			AZ	5.6	-	5.8
			A1	5.8	-	6.0
			A2	6.0	-	6.2
			A3	6.2	-	6.4
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			-	8	-
Beam Angle	°			-	115	-

Note:

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

b) Electro-optical Characteristics (T_s = 85 °C)

Item	CRI	Nominal	SZ		SA		SB		SC		SD		Current
		CCT (K)	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
			70	79	79	88	88	97	97	106	106	115	150mA
Luminous Flux (Φ_v)	90	2700											
		3000											
		3500											
		4000											
		5000											
		5700											
		6500											

Note:

Samsung maintains measurement tolerance of: forward voltage = ±0.1V, luminous flux = ±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	3	2	9	F	D	7	Y	B	R	0	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	329	3.0 x 3.0 x 0.7 mm; 2 pads; 1chip;		
10	Sorting Current (mA)	F	150 mA		
11	Chromaticity Coordinates	D	ANSI Standard		
12	CRI	7	Min. 90		
13 14	Forward Voltage (V)	YB	5.4~6.4V		
15 16	CCT (K)	W★	2700	Bin Code	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		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, RH, RJ, RK, RL
		Q★	5700		Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA, QB, QC, QH, QJ, QK, QL
		P★	6500		P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PH, PJ, PK, PL
		★ : Cool white: "0" (Whole bin) or "K" (Kitting bin)			
17 18	Luminous Flux	S0	Bin Code		SZ, SA, SB, SC

a) Luminous Flux Bins (I_F = 150 mA, T_s= 85ºC)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v, lm)
90	2700	SPMWHT329FD7YBW★S0	SZ	70 ~ 79
			SA	79 ~ 88
	3000	SPMWHT329FD7YBV★S0	SA	79 ~ 88
			SB	88 ~ 97
	3500	SPMWHT329FD7YBU★S0	SB	88 ~ 97
			SC	97 ~ 106
	4000	SPMWHT329FD7YBT★S0	SB	88 ~ 97
			SC	97 ~ 106
	5000	SPMWHT329FD7YBR★S0	SB	88 ~ 97
			SC	97 ~ 106
	5700	SPMWHT329FD7YBQ★S0	SA	79 ~ 88
			SB	88 ~ 97
	6500	SPMWHT329FD7YBP★S0	SA	79 ~ 88
			SB	88 ~ 97

Note:

"★" can be "0" (Whole bin) or “K” (Kitting bin) of the color binning

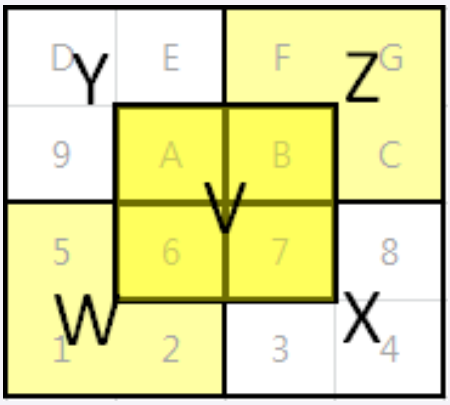
b) Kitting rule

1) Kitting bin Concept

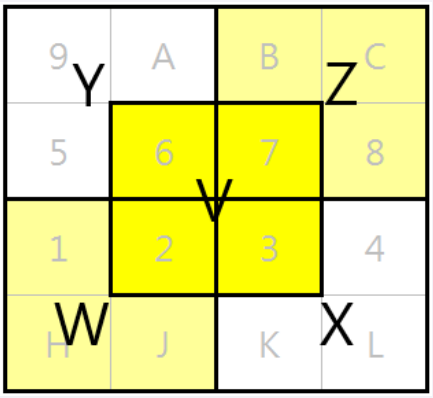
1. Under agreement between customer and SAMSUNG ELECTRONICS, SAMSUNG can supply kitting bin (VF, Color, lm).
2. A forward voltage (VF) of kitting bin is combined by a pair of same VF rank such as (AY+AY), (AZ+AZ), (A1+A1), (A2+A2) or (A3+A3).
3. A Chromaticity Coordinates of kitting bin is mixed by kitting procedure.(below kitting simulation)

[Kitting example]

[2700K ~ 4000K]



[5000K ~ 6500K]



[Binning Information]

Item	CCT	Bin #1	Bin #2
VF	-	AY	AY
		AZ	AZ
		A1	A1
		A2	A2
		A3	A3
CIE	2700K ~ 4000K	W (1, 2, 5, 6 bin)	Z (B, C, F, G bin)
		V (6, 7, A, B bin)	V (6, 7, A, B bin)
		X (3, 4, 7, 8 bin)	Y (9, A, D, E bin)
	5000K ~ 6500K	W (H, J, 1, 2 bin)	Z (7, 8, B, C bin)
		V (2, 3, 6, 7 bin)	V (2, 3, 6, 7 bin)
		X (K, L, 3, 4 bin)	Y (5, 6, 9, A bin)
IV	-	SZ	SZ
		SA	SA
		SB	SB

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

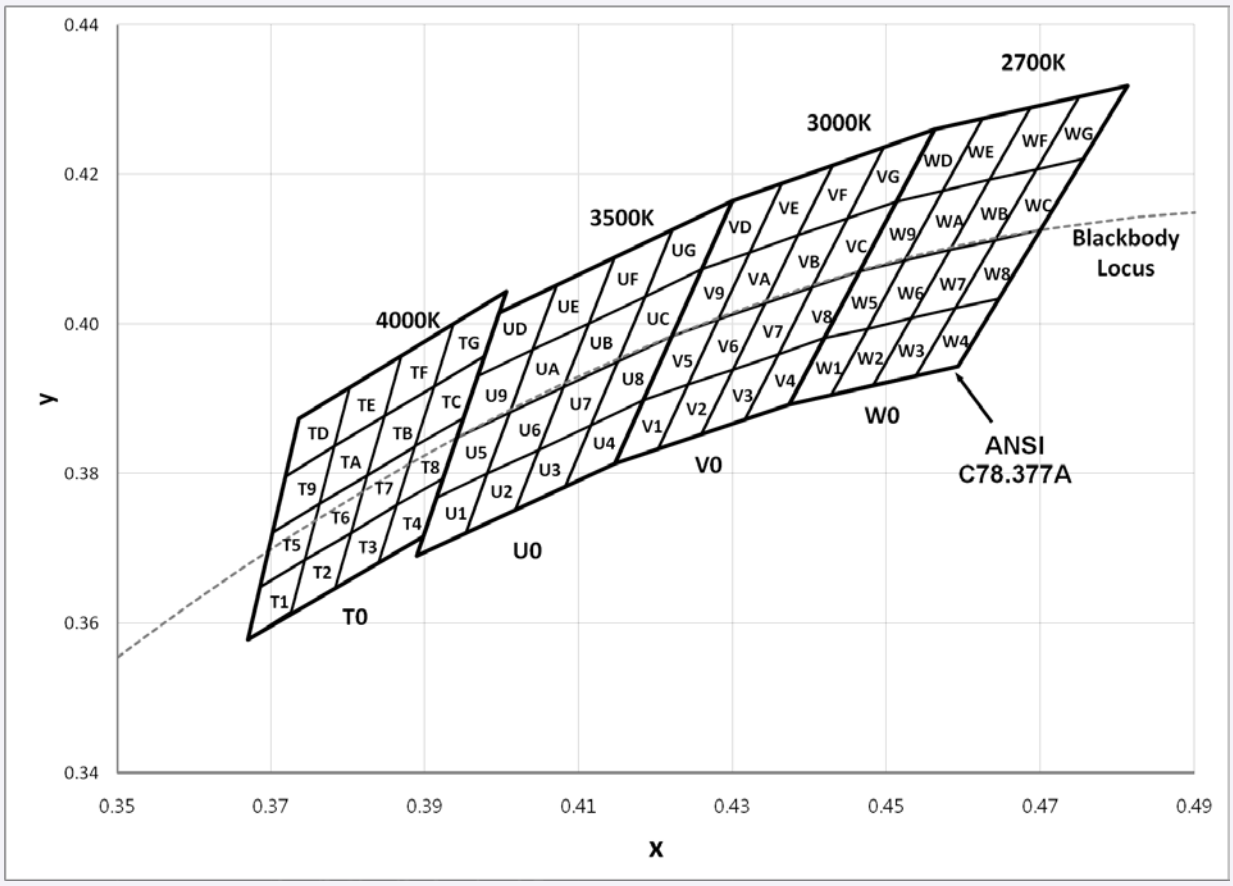
c) Color Bins (I_F = 150 mA, T_s= 85 °C)

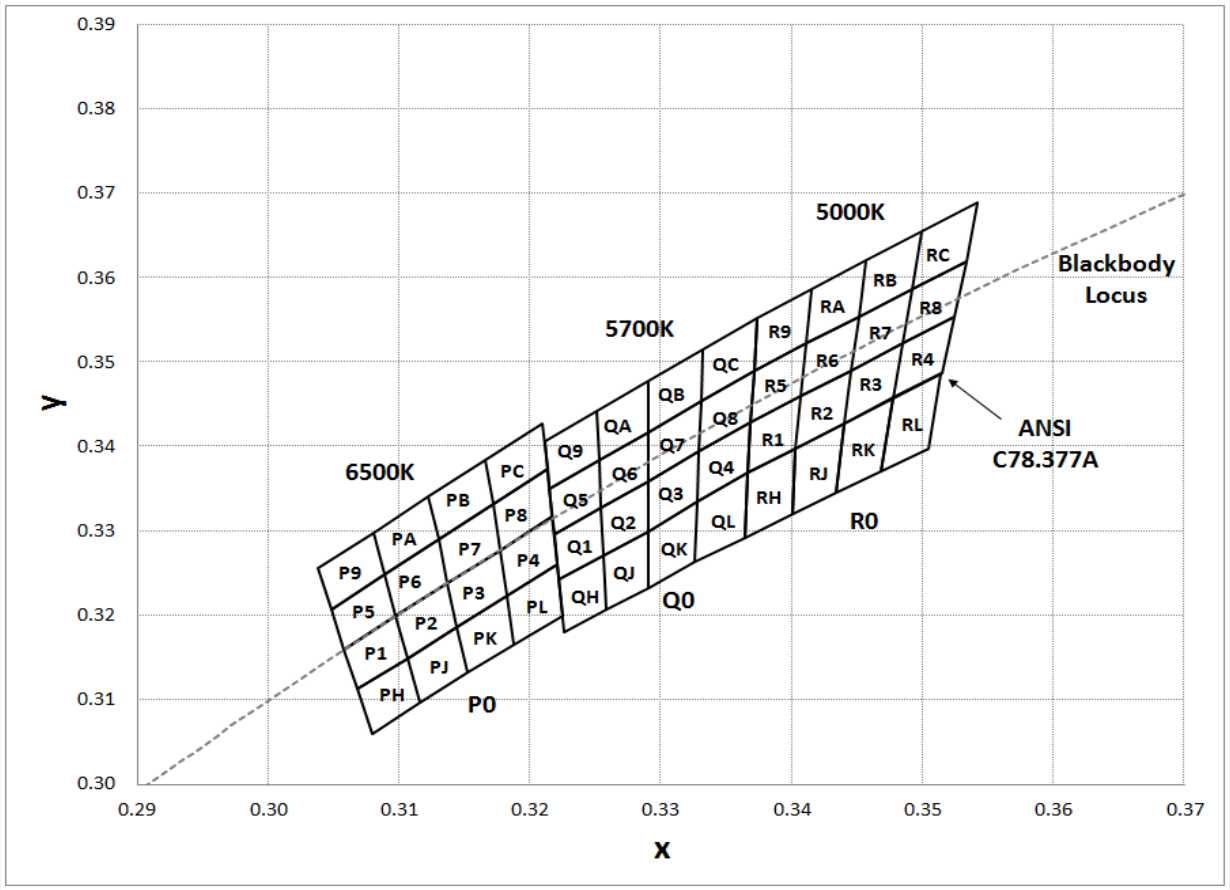
CRI (R_a) Min.	Nominal CCT (K)	Product Code	Color Rank	Chromaticity Bins
90	2700	SPMWHT329FD7YBW0S0	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
		SPMWHT329FD7YBWKS0	WK (Kitting bin)	WV, WW, WX, WY, WZ
	3000	SPMWHT329FD7YBV0S0	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		SPMWHT329FD7YBVKS0	VK (Kitting bin)	VV, VW, VX, VY, VZ
	3500	SPMWHT329FD7YBU0S0	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		SPMWHT329FD7YBUKS0	UK (Kitting bin)	UV, UW, UX, UY, UZ
	4000	SPMWHT329FD7YBT0S0	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		SPMWHT329FD7YBTKS0	TK (Kitting bin)	TV, TW, TX, TY, TZ
	5000	SPMWHT329FD7YBR0S0	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9 RA,RB,RC,RH,RJ,RK,RL
		SPMWHT329FD7YBRKS0	RK (Kitting bin)	RV, RW, RX, RY, RZ
	5700	SPMWHT329FD7YBQ0S0	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9 QA,QB,QC,QH,QJ,QK,QL
		SPMWHT329FD7YBQKS0	QK (Kitting bin)	QV, QW, QX, QY, QZ
	6500	SPMWHT329FD7YBP0S0	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9 PA,PB,PC,PH,PJ,PK,PL
		SPMWHT329FD7YBPKS0	PK (Kitting bin)	PV, PW, PX, PY, PZ

d) Voltage Bins (I_F = 150 mA, T_s = 85 °C)

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-	YB	AY	5.4 ~ 5.6
				AZ	5.6 ~ 5.8
				A1	5.8 ~ 6.0
				A2	6.0 ~ 6.2
				A3	6.2 ~ 6.4

e) Chromaticity Region & Coordinates (I_F = 150 mA, T_s = 85 °C)





e) Chromaticity Region & Coordinates

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	0.3371	0.3490
	0.3369	0.3430		0.3374	0.3553
	0.3407	0.3460		0.3415	0.3587
	0.3403	0.3398		0.3411	0.3522
R2	0.3403	0.3398	RA	0.3411	0.3522
	0.3407	0.3460		0.3415	0.3587
	0.3446	0.3491		0.3457	0.3621
	0.3440	0.3427		0.3451	0.3554
R3	0.3440	0.3427	RB	0.3451	0.3554
	0.3446	0.3491		0.3457	0.3621
	0.3485	0.3522		0.3500	0.3655
	0.3478	0.3457		0.3492	0.3587
R4	0.3478	0.3457	RC	0.3492	0.3587
	0.3485	0.3522		0.3500	0.3655
	0.3524	0.3554		0.3542	0.3690
	0.3515	0.3487		0.3533	0.3620
R5	0.3369	0.3430	RH	0.3364	0.3292
	0.3371	0.3490		0.3400	0.3320
	0.3411	0.3522		0.3403	0.3398
	0.3407	0.3460		0.3366	0.3369
R6	0.3407	0.3460	RJ	0.3400	0.3320
	0.3411	0.3522		0.3434	0.3345
	0.3451	0.3554		0.3440	0.3427
	0.3446	0.3491		0.3403	0.3398
R7	0.3446	0.3491	RK	0.3434	0.3345
	0.3451	0.3554		0.3468	0.3371
	0.3492	0.3587		0.3477	0.3458
	0.3485	0.3522		0.3440	0.3427
R8	0.3485	0.3522	RL	0.3468	0.3371
	0.3492	0.3587		0.3504	0.3398
	0.3533	0.3620		0.3514	0.3487
	0.3524	0.3554		0.3477	0.3458

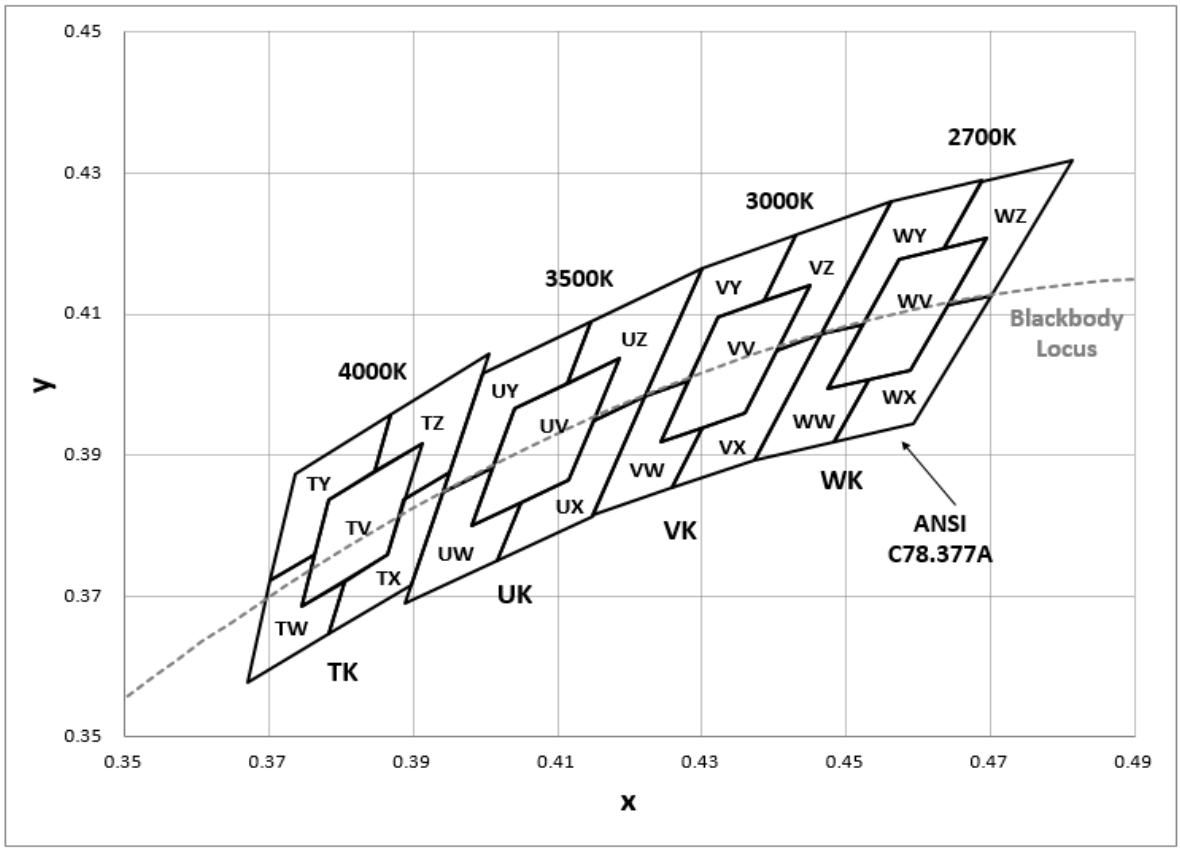
Region	CIE x	CIE y	Region	CIE x	CIE y
Q rank (5700 K)					
Q1	0.3222	0.3243	Q9	0.3215	0.3350
	0.3219	0.3297		0.3211	0.3406
	0.3254	0.3328		0.3251	0.3442
	0.3256	0.3272		0.3253	0.3384
Q2	0.3256	0.3272	QA	0.3253	0.3384
	0.3254	0.3328		0.3251	0.3442
	0.3290	0.3359		0.3290	0.3478
	0.3290	0.3300		0.3290	0.3417
Q3	0.3290	0.3300	QB	0.3290	0.3417
	0.3290	0.3359		0.3290	0.3478
	0.3329	0.3394		0.3332	0.3515
	0.3328	0.3335		0.3331	0.3454
Q4	0.3328	0.3335	QC	0.3331	0.3454
	0.3329	0.3394		0.3332	0.3515
	0.3369	0.3430		0.3374	0.3553
	0.3366	0.3369		0.3371	0.3490
Q5	0.3219	0.3297	QH	0.3226	0.3180
	0.3215	0.3350		0.3258	0.3207
	0.3253	0.3384		0.3256	0.3272
	0.3254	0.3328		0.3222	0.3243
Q6	0.3254	0.3328	QJ	0.3258	0.3207
	0.3253	0.3384		0.3290	0.3233
	0.3290	0.3417		0.3290	0.3300
	0.3290	0.3359		0.3256	0.3272
Q7	0.3290	0.3359	QK	0.3290	0.3233
	0.3290	0.3417		0.3326	0.3263
	0.3331	0.3454		0.3328	0.3335
	0.3329	0.3394		0.3290	0.3300
Q8	0.3329	0.3394	QL	0.3326	0.3263
	0.3331	0.3454		0.3364	0.3292
	0.3371	0.3490		0.3366	0.3369
	0.3369	0.3430		0.3328	0.3335

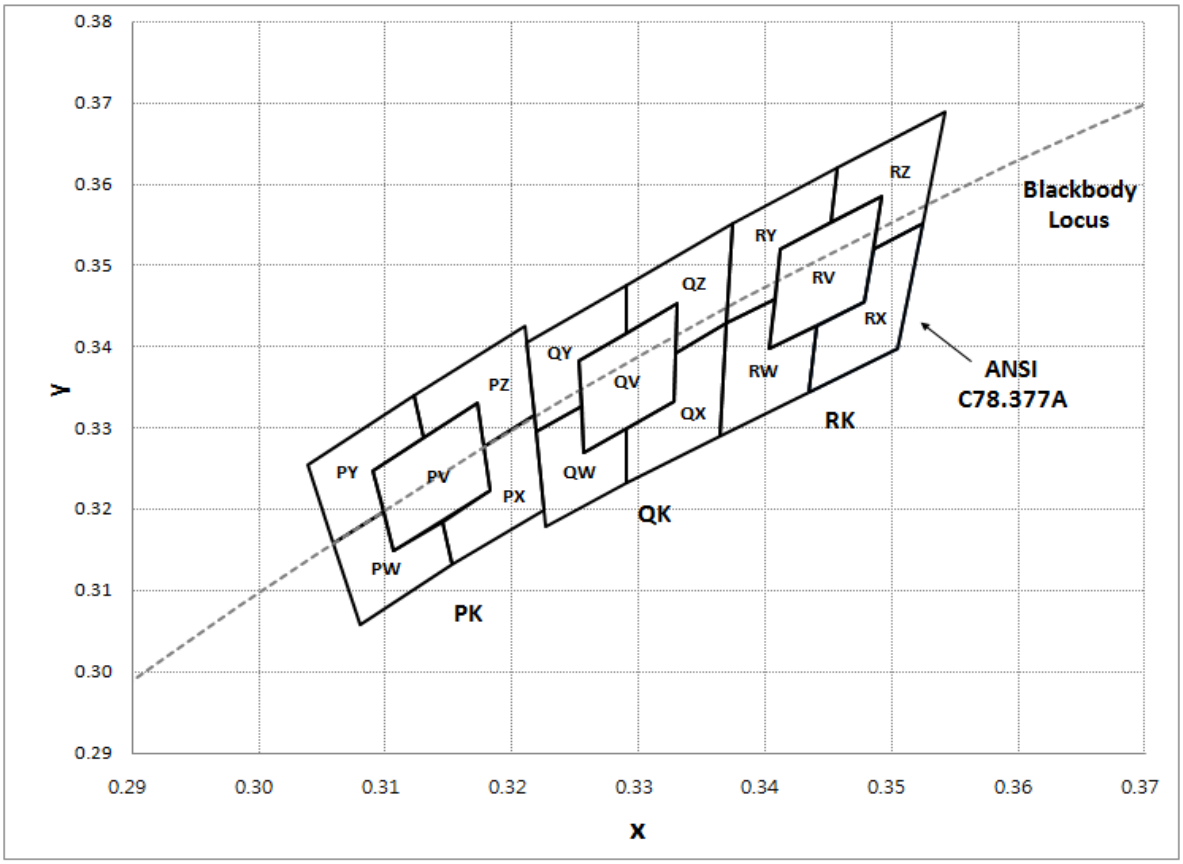
e) Chromaticity Region & Coordinates

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	0.3150		0.3089	0.3249
	0.3098	0.3199		0.3080	0.3298
	0.3058	0.3160		0.3038	0.3256
P2	0.3106	0.3150	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		0.3213	0.3373
	0.3217	0.3317		0.3209	0.3427
	0.3177	0.3278		0.3166	0.3384
P5	0.3058	0.3160	PH	0.3079	0.3060
	0.3098	0.3199		0.3115	0.3098
	0.3089	0.3249		0.3106	0.3150
	0.3048	0.3207		0.3068	0.3113
P6	0.3098	0.3199	PJ	0.3115	0.3098
	0.3137	0.3238		0.3152	0.3133
	0.3130	0.3290		0.3144	0.3186
	0.3089	0.3249		0.3106	0.3150
P7	0.3137	0.3238	PK	0.3152	0.3133
	0.3177	0.3278		0.3190	0.3170
	0.3172	0.3332		0.3183	0.3224
	0.3130	0.3290		0.3144	0.3186
P8	0.3177	0.3278	PL	0.3190	0.3170
	0.3217	0.3317		0.3225	0.3200
	0.3213	0.3373		0.3221	0.3261
	0.3172	0.3332		0.3183	0.3224

Note: Samsung maintains measurement tolerance of: Cx, Cy = ±0.005

f) Kitting Chromaticity Region & Coordinates (I_F = 150 mA, T_s = 85 °C)





f) Kitting Chromaticity Region & Coordinates (I_F = 150 mA, T_s = 85 °C)

Region	CIE x	CIE y	Region	CIE x	CIE y
W rank (2700 K)					
WV	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		0.4523	0.4085
	0.4532	0.4008		0.4573	0.4178
	0.4475	0.3994		0.4634	0.4193
	0.4523	0.4085		0.4687	0.4289
	0.4465	0.4071		0.4562	0.4260
WX	0.4483	0.3919	WZ	0.4641	0.4112
	0.4593	0.3944		0.4700	0.4126
	0.4700	0.4126		0.4813	0.4319
	0.4641	0.4112		0.4687	0.4289
	0.4589	0.4021		0.4634	0.4193
	0.4532	0.4008		0.4695	0.4207

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			
VW	0.4147	0.3814	VY	0.4221	0.3984
	0.4259	0.3853		0.4281	0.4006
	0.4300	0.3939		0.4322	0.4096
	0.4242	0.3919		0.4385	0.4119
	0.4281	0.4006		0.4430	0.4212
	0.4221	0.3984		0.4299	0.4165
VX	0.4259	0.3853	VZ	0.4403	0.4049
	0.4373	0.3893		0.4465	0.4071
	0.4465	0.4071		0.4562	0.4260
	0.4403	0.4049		0.4430	0.4212
	0.4359	0.3960		0.4385	0.4119
	0.4300	0.3939		0.4449	0.4141

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		0.4010	0.3882
	0.4048	0.3832		0.4040	0.3966
	0.3981	0.3800		0.4113	0.4001
	0.4010	0.3882		0.4146	0.4089
	0.3941	0.3848		0.3996	0.4015
UX	0.4017	0.3751	UZ	0.4150	0.3950
	0.4147	0.3814		0.4221	0.3984
	0.4221	0.3984		0.4299	0.4165
	0.4150	0.3950		0.4146	0.4089
	0.4116	0.3865		0.4113	0.4001
	0.4048	0.3832		0.4186	0.4037

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		0.3763	0.3760
	0.3804	0.3721		0.3782	0.3837
	0.3744	0.3685		0.3847	0.3877
	0.3763	0.3760		0.3869	0.3958
	0.3702	0.3722		0.3736	0.3874
TX	0.3783	0.3646	TZ	0.3887	0.3837
	0.3898	0.3716		0.3950	0.3875
	0.3950	0.3875		0.4006	0.4044
	0.3887	0.3837		0.3869	0.3958
	0.3863	0.3758		0.3847	0.3877
	0.3804	0.3721		0.3912	0.3917

f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
R rank (5000 K)					
RV	0.3403	0.3398			
	0.3478	0.3457			
	0.3492	0.3587			
	0.3411	0.3522			
RW	0.3364	0.3292	RY	0.3369	0.3430
	0.3434	0.3345		0.3407	0.3460
	0.3440	0.3427		0.3411	0.3522
	0.3403	0.3398		0.3451	0.3554
	0.3407	0.3460		0.3457	0.3621
	0.3369	0.3430		0.3374	0.3553
RX	0.3364	0.3292	RZ	0.3369	0.3430
	0.3434	0.3345		0.3485	0.3522
	0.3504	0.3398		0.3524	0.3554
	0.3524	0.3554		0.3542	0.3690
	0.3485	0.3522		0.3457	0.3621
	0.3478	0.3457		0.3451	0.3554

Region	CIE x	CIE y	Region	CIE x	CIE y
Q rank (5700 K)					
QV	0.3256	0.3272			
	0.3328	0.3335			
	0.3331	0.3454			
	0.3253	0.3384			
QW	0.3256	0.3272	QY	0.3219	0.3297
	0.3226	0.3180		0.3254	0.3328
	0.3290	0.3233		0.3253	0.3384
	0.3290	0.3300		0.3290	0.3417
	0.3256	0.3272		0.3290	0.3478
	0.3254	0.3328		0.3211	0.3406
QX	0.3219	0.3297	QZ	0.3219	0.3297
	0.3226	0.3180		0.3329	0.3394
	0.3290	0.3233		0.3369	0.3430
	0.3364	0.3292		0.3374	0.3553
	0.3369	0.3430		0.3290	0.3478
	0.3329	0.3394		0.3290	0.3417

f) Kitting Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
P rank (6500 K)					
PV	0.3106	0.3150			
	0.3183	0.3224			
	0.3172	0.3332			
	0.3089	0.3249			
PW	0.3106	0.3150	PY	0.3058	0.3160
	0.3079	0.3060		0.3098	0.3199
	0.3152	0.3133		0.3089	0.3249
	0.3144	0.3186		0.3130	0.3290
	0.3106	0.3150		0.3123	0.3341
	0.3098	0.3199		0.3038	0.3256
PX	0.3058	0.3160	PZ	0.3058	0.3160
	0.3079	0.3060		0.3177	0.3278
	0.3152	0.3133		0.3217	0.3317
	0.3225	0.3200		0.3209	0.3427
	0.3217	0.3317		0.3123	0.3341
	0.3177	0.3278		0.3130	0.3290

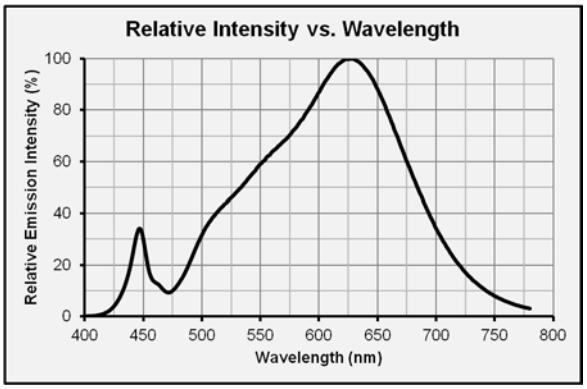
Note:

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

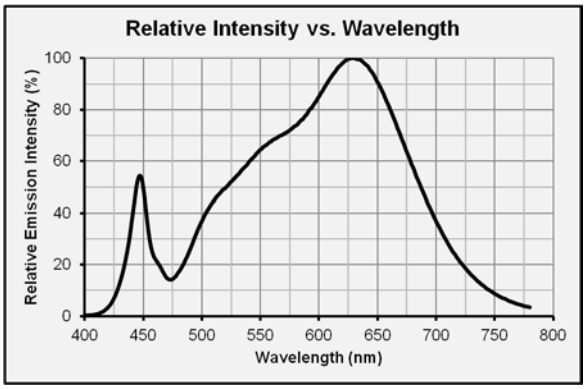
3. Typical Characteristics Graphs

a) Spectrum Distribution (I_F = 150 mA, T_s = 85 °C)

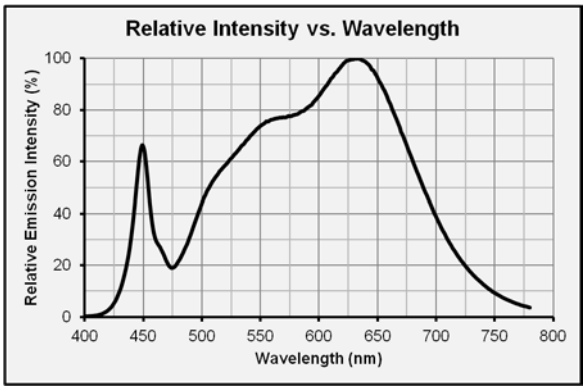
CCT: 2700K (90 CRI)



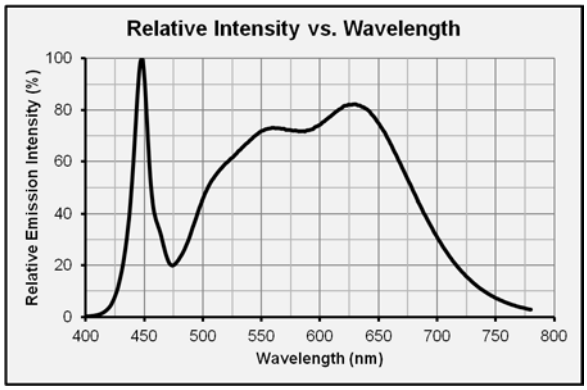
CCT: 3000K (90 CRI)



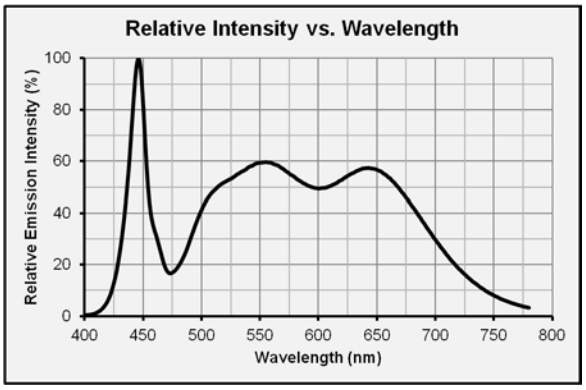
CCT: 3500K (90 CRI)



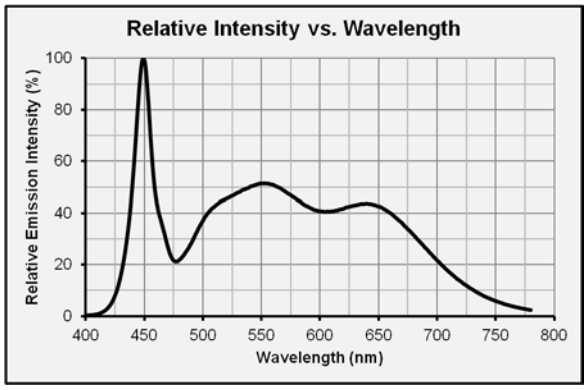
CCT: 4000K (90 CRI)



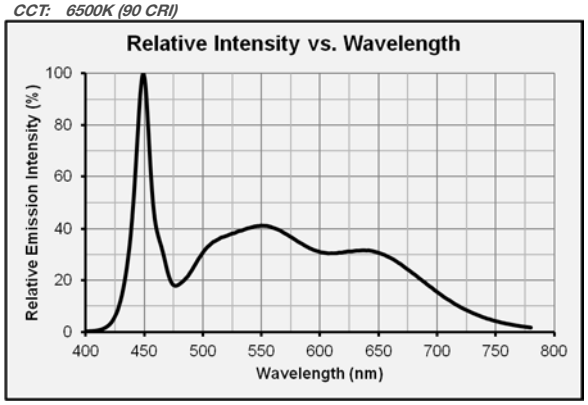
CCT: 5000K (90 CRI)



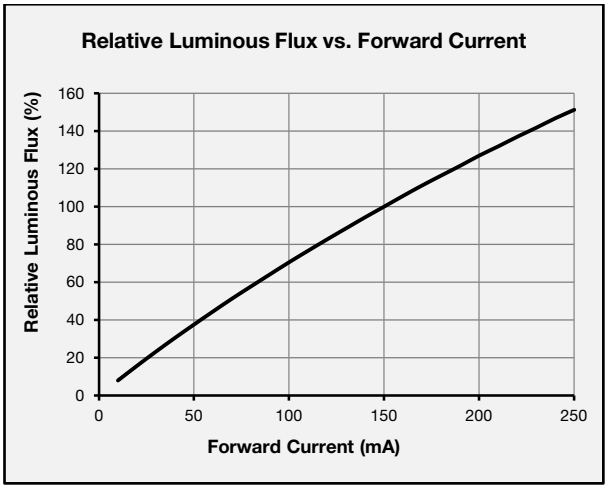
CCT: 5700K (90 CRI)

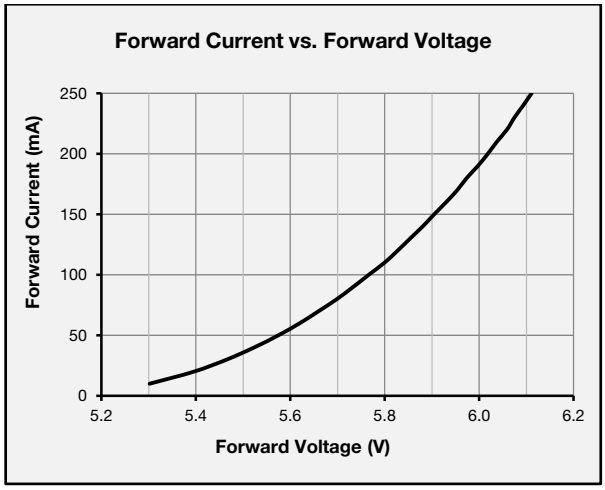


CCT: 6500K (90 CRI)

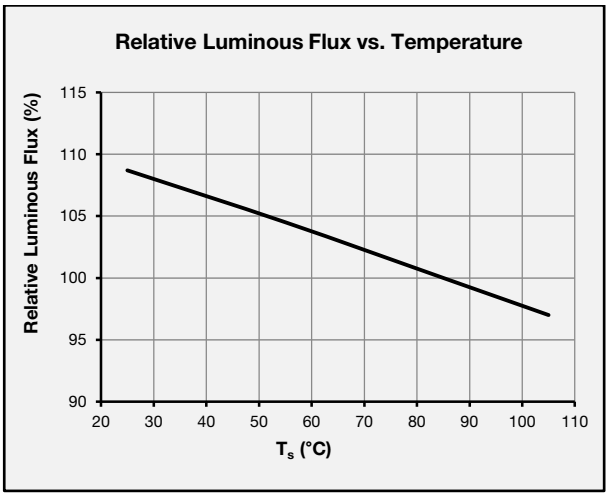


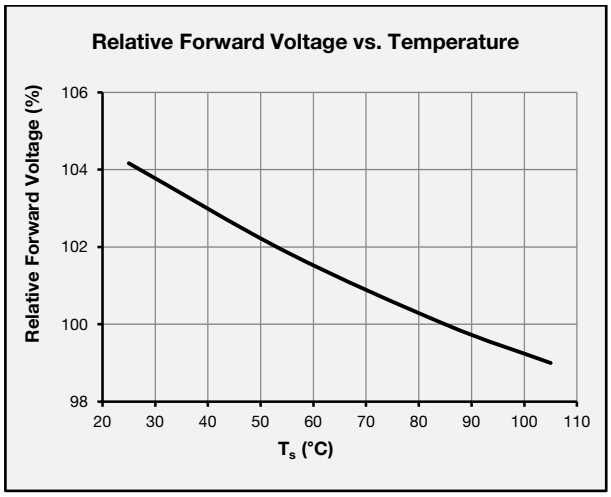
b) Forward Current Characteristics (T_s = 85 ºC)



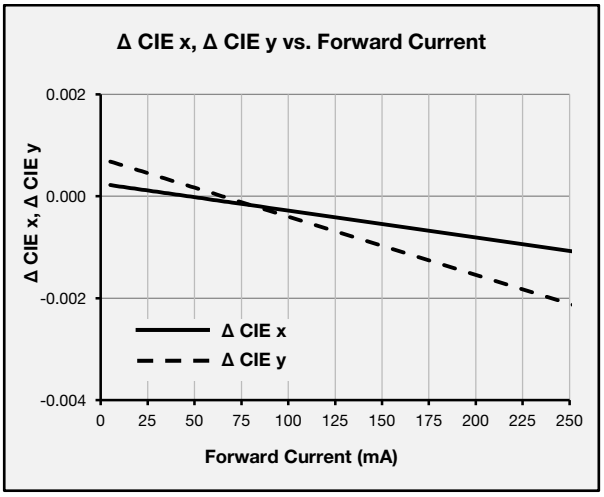


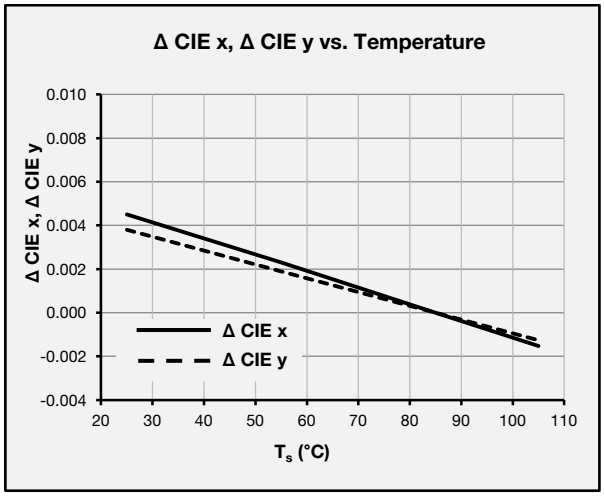
c) Temperature Characteristics (I_F = 150 mA)



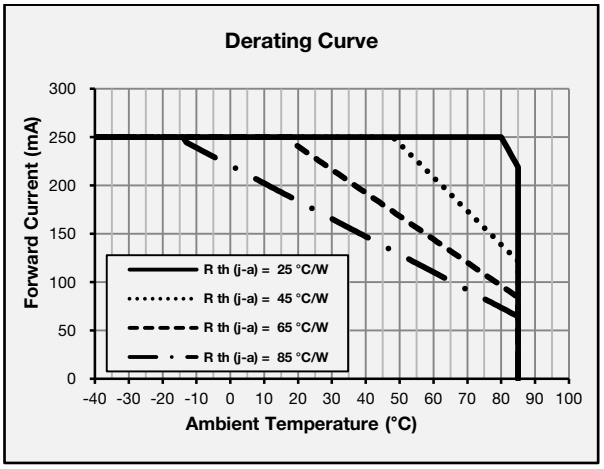


d) Color Shift Characteristics (I_F = 150 mA, T_s = 85 ºC)

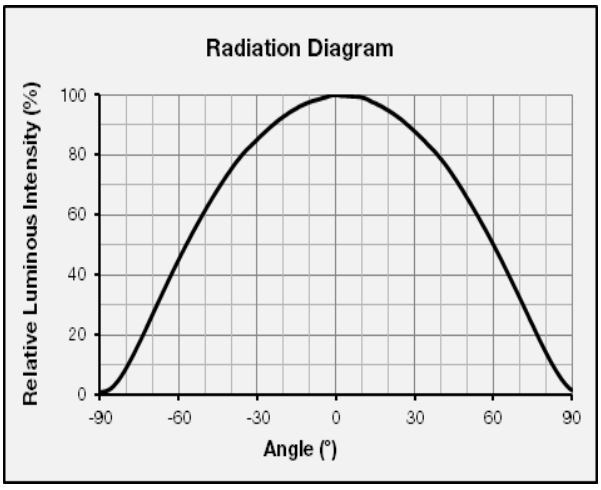




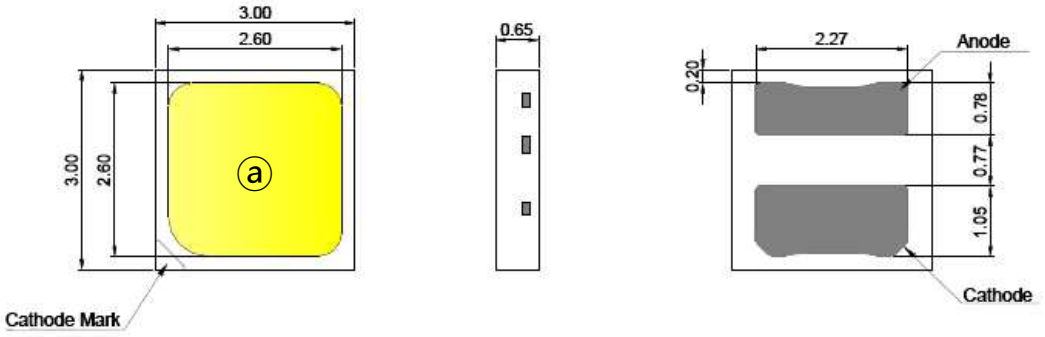
e) Derating Curve



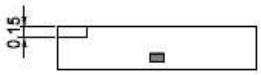
f) Beam Angle Characteristics (I_F = 150 mA, T_s = 85 ºC)



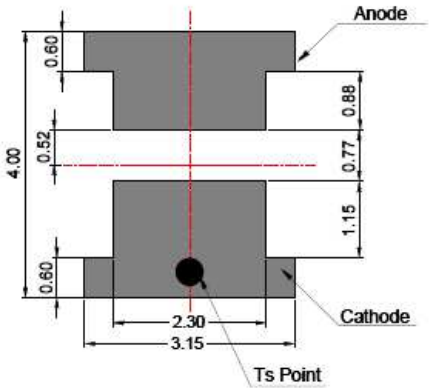
4. Outline Drawing & Dimension



[Top View] [Side View] [Bottom View]



[RECOMMENDED PCB SOLDER PAD]



- Measurement unit: mm
- Tolerance : ±0.1mm
- Do not place pressure on the encapsulation resin ⓐ

Notes:

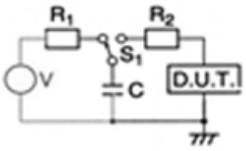
1) This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).
2) T_s point and measurement method:
   ① Measure one point at the cathode pad, if necessary remove PSR of PCB to reach T_s point.
   ② All pads must be soldered to the PCB to dissipate heat properly, otherwise the 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.
Room Temperature Life Test	25 °C, DC 250 mA	1000 h	22
High Temperature Life Test	85 °C, DC 250 mA	1000 h	22
High Temperature Humidity Life Test	85 °C, 85 % RH, DC 250 mA	1000 h	22
Low Temperature Life Test	-40 °C, DC 250 mA	1000 h	22
Powered Temperature Cycle Test	-45 °C ~ 85 °C, each 20 min, on/off 5 min Temp. Change time 100min, DC 250 mA	100 cycles	22
Temperature Cycling	-45 °C / 15 min ↔ 125 °C / 15 min	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	5 times	30
ESD (MM)	R_1: 10 MΩ R_2: 0 C: 200 pF V: ±0.5 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 = 250 mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ_v	I_F = 250 mA	Init. Value * 0.7	Init. Value * 1.1