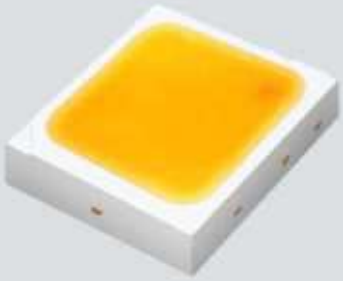
Middle Power LED Series
3030

LM302A



LM302A leads lighting design trend with high performance and efficacy

Features & Benefits

- 1 W class middle-high power LED
- EMC resin for high reliability
- Standard form factor for design flexibility
- High performance and efficacy

Table of Contents

Characteristics

Product Code Information

Typical Characteristics Graphs

Outline Drawing & Dimension

Reliability Test Items & Conditions

Soldering Conditions

Tape & Reel

Label Structure

Packing Structure

Precautions in Handling & Use

1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_{op}	-40 ~ +85	°C	-
Storage Temperature	T_{stg}	-40 ~ +100	°C	-
LED Junction Temperature	T_j	[illegible]	°C	-
Forward Current	I_F	[illegible]	[illegible]	-
Peak Pulsed Forward Current	I_{FP}	[illegible]	[illegible]	Duty 1/10, pulse width 10 ms
Assembly Process Temperature	-	[illegible]	°C s	-
ESD (HBM)	-	[illegible]	[illegible]	-

b) Electro-optical Characteristics (I_F = 150 mA, T_s = 25 °C)

Item	Nominal CCT (K)	Rank	Bin	Min.	Typ.	Max.	Unit
Forward Voltage (V)					-		V
					-		
					-		
					-		
					-		
Luminous Flux (Φ_v)					-		lm
					-		
			S4				
					-		
					-		
			S4				
					-		
					-		
			S4				
					-		
					-		
			S4				
					-		
					-		
			S4				
					-		
					-		
			S4				
Reverse Voltage (@ 5 mA)					-		V
Color Rendering Index (R_a)					-	-	-
Special CRI (R9)					-	-	-
Thermal Resistance (junction to solder point)				-		-	°C/W
Beam Angle				-		-	°

Samsung maintains measurement tolerance of: forward voltage = ±0.1 V, luminous flux = ±5 %, CRI = ±3, R9 = ±6.5

2. Product Code Information

Digit	PKG Information	Code	Specification
	Samsung Package Middle Power		
	Product Version		
	Form Factor		3.0 x 3.0 x 0.65 mm; 2 pads; LM302
	Sorting Current		150 mA
	Chromaticity Coordinates		ANSI Standard
			Min. 80
	Forward Voltage (V)		5.8~6.8
	CCT (K)	☆	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF,
		☆	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		☆	3500 U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		☆	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		☆	R1, R2, R3, R4, R5, R6, R7, R8, R9, RA
		☆	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, QA
		☆	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA
			☆ : "□" (Whole bin) or "M" (Quarter bin)
	Luminous Flux (lm)		

a) Luminous Flux Bins (I_F = 150 mA, T_s = 25 °C)

Nominal CCT (K)	CRI Min.	Product Code	Flux Bin	Flux Range (Φ_v, lm)
		SPMWHT327FD5GBW☆S0		102 ~ 110
				110 ~ 118
				118 ~ 126
		SPMWHT327FD5GBW☆S2		102 ~ 110
		SPMWHT327FD5GBW☆S3		110 ~ 118
		SPMWHT327FD5GBW☆S4	S4	118 ~ 126
		SPMWHT327FD5GBV☆S0		104 ~ 112
				112 ~ 120
				120 ~
		SPMWHT327FD5GBV☆S2		104 ~ 112
		SPMWHT327FD5GBV☆S3		112 ~ 120
		SPMWHT327FD5GBV☆S4		120 ~
		SPMWHT327FD5GBU☆S0		107 ~ 115
				115 ~ 123
				~ 131
		SPMWHT327FD5GBU☆S2		107 ~ 115
		SPMWHT327FD5GBU☆S3		115 ~ 123
		SPMWHT327FD5GBU☆S4		~ 131
		SPMWHT327FD5GBT☆S0		109 ~ 117
				117 ~ 125
				125 ~ 133
		SPMWHT327FD5GBT☆S2		109 ~ 117
		SPMWHT327FD5GBT☆S3		117 ~ 125
		SPMWHT327FD5GBT☆S4		125 ~ 133

Note:

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

a) Luminous Flux Bins (I_F = 150 mA, T_s = 25 °C)

Nominal CCT (K)	CRI Min.	Product Code	Flux Bin	Flux Range (Φ_v, lm)
5000		SPMWHT327FD5GBR☆		113 ~ 121
				121 ~ 129
		SPMWHT327FD5GBR☆		113 ~ 121
		SPMWHT327FD5GBR☆		121 ~ 129
		SPMWHT327FD5GBR☆S4		
		SPMWHT327FD5GBQ☆		111 ~ 119
				119 ~ 127
				127 ~ 135
		SPMWHT327FD5GBQ☆		111 ~ 119
		SPMWHT327FD5GBQ☆		119 ~ 127
		SPMWHT327FD5GBQ☆S4		127 ~ 135
		SPMWHT327FD5GBP☆		109 ~ 117
				117 ~ 125
				125 ~ 133
		SPMWHT327FD5GBP☆		109 ~ 117
		SPMWHT327FD5GBP☆		117 ~ 125
		SPMWHT327FD5GBP☆S4		125 ~ 133

Note:

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

b) Color Bins (I_F = 150 mA, T_s = 25 ℃)

Nominal CCT (K)	CRI Min.	Product Code	Color Rank	Chromaticity Bins
[illegible]	[illegible]	SPMWHT327FD5GBW0S★	[illegible] (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
		SPMWHT327FD5GBWMS★	WM (Quarter [illegible]	W6, W7, WA, WB
[illegible]	[illegible]	SPMWHT327FD5GBV0S★	[illegible] (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		SPMWHT327FD5GBVMS★	[illegible] (Quarter [illegible]	V6, V7, VA, VB
[illegible]	[illegible]	[illegible]WHT327FD5GBU0S★	[illegible] (Whole [illegible]	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		[illegible]WHT327FD5GBUMS★	[illegible] (Quarter [illegible]	U6, U7, UA, UB
[illegible]	[illegible]	[illegible]WHT327FD5GBT0S★	[illegible] (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		[illegible]WHT327FD5GBTMS★	[illegible] (Quarter [illegible]	[illegible], TA, TB
[illegible]	[illegible]	[illegible]WHT327FD5GBR0S★	[illegible] (Whole bin)	R1, R2, R3, R4, R5 R6, R7, R8, R9, [illegible]
		[illegible]WHT327FD5GBRMS★	RM (Quarter [illegible]	R1, R2, R3, R4, R5, R6
[illegible]	[illegible]	[illegible]WHT327FD5GBQ0S★	[illegible] (Whole bin)	Q1, Q2, Q3, Q4, Q5 Q6, Q7, Q8, Q9, QA
		[illegible]WHT327FD5GBQMS★	[illegible] (Quarter [illegible]	Q1, Q2, Q3, Q4, Q5, Q6
[illegible]	[illegible]	[illegible]WHT327FD5GBP0S★	[illegible] (Whole bin)	P1, P2, P3, P4, P5 P6, P7, P8, P9, PA
		[illegible]WHT327FD5GBPMS★	[illegible] ([illegible]arter [illegible]	P1, P2, P3, P4, P5, P6

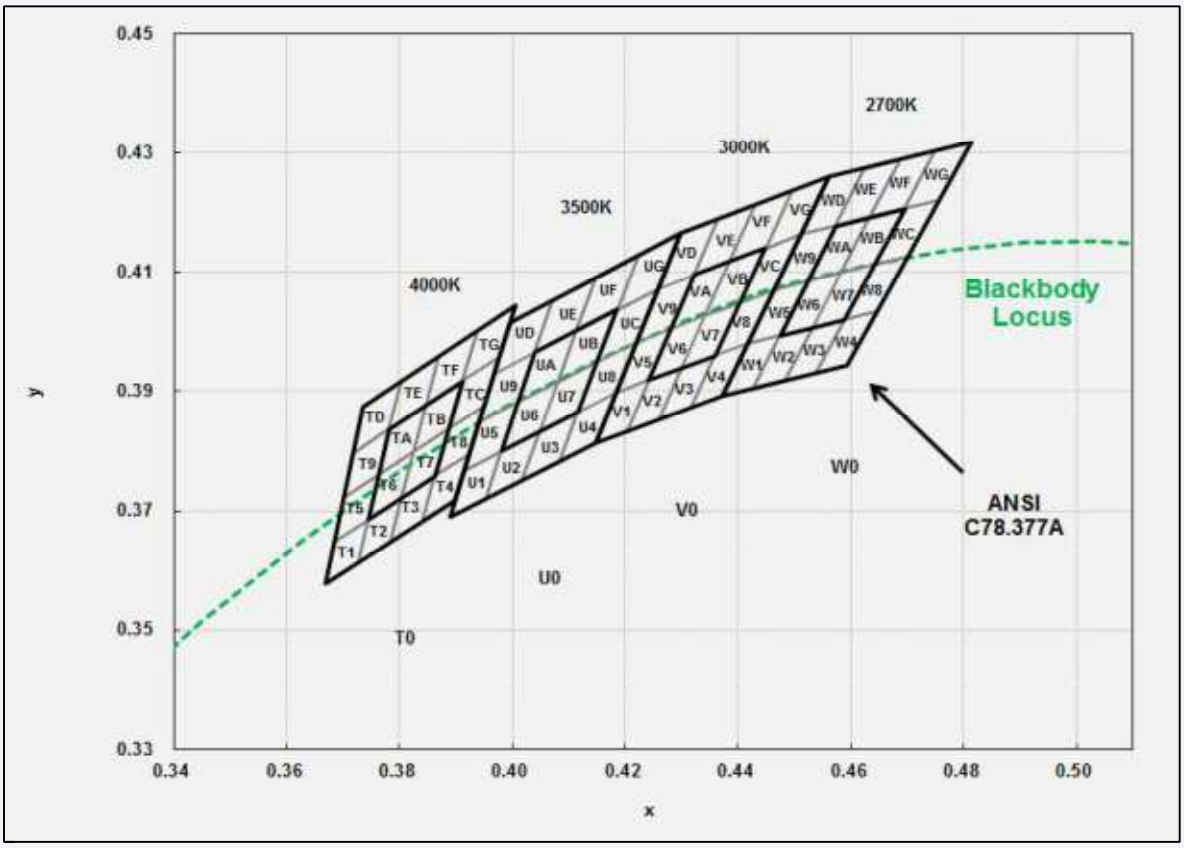
Note:

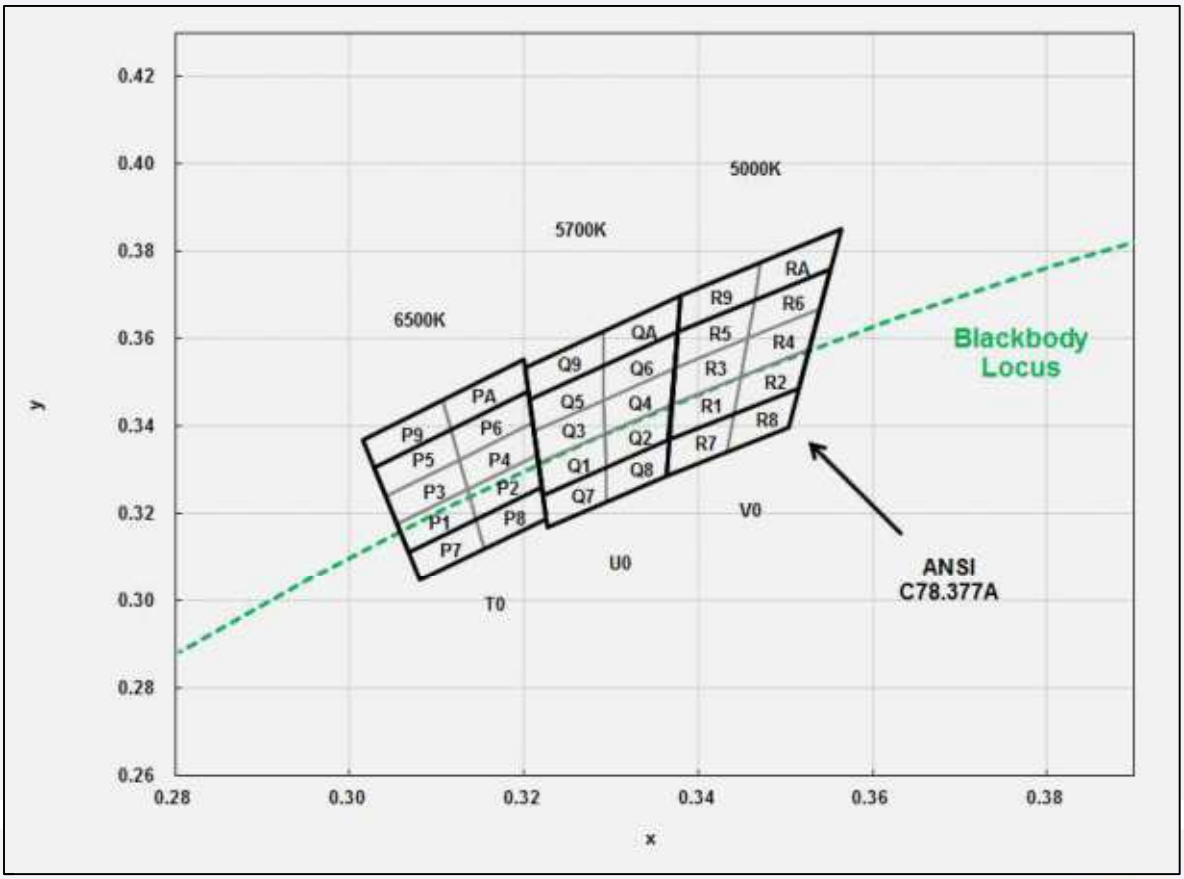
"★" can be "0", "2", "3" [illegible] "4" of the luminous flux binning

c) Voltage Bins (I[illegible] = 150 mA, T[illegible] = 25 °C)

Nominal CCT (K)	CRI Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
-	-	-	[illegible]	[illegible]	[illegible]
				[illegible]	[illegible]
				[illegible]	[illegible]
				[illegible]	[illegible]
				[illegible]	[illegible]

c) Chromaticity Region & Coordinates (I_F = 150 mA, T_s = 25 °C)





c) Chromaticity Region & Coordinates (I_F = 150 mA, T_s = 25 °C)

Region	CIE x	CIE y	Region	CIE x	CIE y
W rank (2700 K)					
[illegible]	0.4373	0.3893	[illegible]	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
[illegible]	0.4428	0.3906	[illegible]	0.4523	0.4085
	0.4475	0.3994		0.4573	0.4178
	0.4532	[illegible]		0.4634	0.4193
	0.4483	0.3919		0.4582	0.4099
[illegible]	0.4483	[illegible]	[illegible]	0.4582	0.4099
	0.4532	0.4008		0.4634	0.4193
	0.4589	[illegible]		0.4695	0.4207
	0.4538	0.3931		0.4641	0.4112
[illegible]	0.4538	0.3931	[illegible]	0.4641	0.4112
	0.4589	[illegible]		0.4695	0.4207
	0.4646	[illegible]		0.4756	0.4221
	0.4593	0.3944		0.4700	0.4126
[illegible]	0.4418	0.3981	[illegible]	0.4513	0.4164
	0.4465	[illegible]		0.4562	0.4260
	0.4523	0.4085		0.4624	0.4274
	0.4475	0.3994		0.4573	0.4178
[illegible]	0.4475	0.3994	[illegible]	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
[illegible]	0.4532	[illegible]	[illegible]	0.4634	0.4193
	0.4582	0.4099		0.4687	0.4289
	0.4641	[illegible]		0.4750	0.4304
	0.4589	[illegible]		0.4695	0.4207
[illegible]	0.4589	[illegible]	[illegible]	0.4695	0.4207
	0.4641	[illegible]		0.4750	0.4304
	0.4700	[illegible]		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)					
[illegible]	0.4147	[illegible]	[illegible]	[illegible]	0.3984
	0.4183	[illegible]		0.4259	0.4073
	0.4242	0.3919		0.4322	0.4096
	0.4203	0.3833		[illegible]	0.4006
[illegible]	0.4203	0.3833	[illegible]	[illegible]	0.4006
	0.4242	0.3919		0.4322	0.4096
	0.4300	0.3939		[illegible]	0.4119
	0.4259	0.3853		0.4342	0.4028
[illegible]	0.4259	0.3853	[illegible]	[illegible]	0.4028
	0.4300	0.3939		0.4385	0.4119
	0.4359	0.3960		[illegible]	0.4141
	0.4316	0.3873		0.4403	0.4049
[illegible]	0.4316	0.3873	[illegible]	0.4403	0.4049
	0.4359	0.3960		[illegible]	0.4141
	0.4418	0.3981		[illegible]	0.4164
	0.4373	0.3893		0.4465	0.4071
[illegible]	0.4183	0.3898	[illegible]	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
[illegible]	0.4242	0.3919	[illegible]	0.4322	0.4096
	0.4281	0.4006		0.4364	0.4188
	0.4342	[illegible]		[illegible]	0.4212
	0.4300	0.3939		0.4385	0.4119
[illegible]	0.4300	0.3939	[illegible]	0.4385	0.4119
	0.4342	[illegible]		[illegible]	0.4212
	0.4403	0.4049		0.4496	0.4236
	0.4359	0.3960		[illegible]	[illegible]
[illegible]	0.4359	0.3960	[illegible]	[illegible]	0.4141
	0.4403	[illegible]		0.4496	0.4236
	0.4465	[illegible]		0.4562	0.4260
	0.4418	0.3981		0.4513	0.4164

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c) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
U region (3500 K)					
[illegible]	0.3889	0.3690	[illegible]	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
[illegible]	0.3953	0.3720	[illegible]	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
[illegible]	0.4017	[illegible]	[illegible]	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
[illegible]	0.4082	0.3782	[illegible]	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
[illegible]	0.3915	0.3768	[illegible]	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
[illegible]	0.3981	0.3800	[illegible]	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
[illegible]	0.4048	0.3832	[illegible]	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
[illegible]	0.4116	0.3865	[illegible]	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 region (4000 K)					
[illegible]	[illegible]0	0.3578	[illegible]	0.3702	0.3722
	0.3726	0.3612		0.3763	0.3760
	0.3744	0.3685		0.3782	0.3837
	0.3686	0.3649		[illegible]	0.3797
[illegible]	0.3726	0.3612	[illegible]	0.3763	0.3760
	0.3783	0.3646		0.3825	0.3798
	0.3804	[illegible]		[illegible]	0.3877
	0.3744	0.3685		0.3782	0.3837
[illegible]	0.3783	0.3646	[illegible]	0.3825	0.3798
	0.3840	[illegible]		0.3887	0.3836
	0.3863	0.3758		0.3912	0.3917
	0.3804	[illegible]		0.3847	0.3877
[illegible]	[illegible]0	0.3681	[illegible]	0.3887	0.3837
	0.3898	0.3716		0.3950	0.3875
	0.3924	0.3794		[illegible]	0.3958
	0.3863	0.3758		0.3912	0.3917
[illegible]	0.3686	0.3649	[illegible]	[illegible]	0.3797
	0.3744	0.3685		0.3782	0.3837
	0.3763	[illegible]0		0.3802	0.3916
	0.3702	0.3722		0.3736	0.3874
[illegible]	0.3744	0.3685	[illegible]	0.3782	0.3837
	0.3804	[illegible]		0.3847	0.3877
	0.3825	[illegible]		0.3869	0.3958
	0.3763	0.376		0.3802	0.3916
[illegible]	0.3804	[illegible]	[illegible]	[illegible]	0.3877
	0.3863	0.3758		0.3912	0.3917
	0.3887	0.3836		0.3937	0.4001
	0.3825	[illegible]		[illegible]	0.3958
[illegible]	0.3863	[illegible]	[illegible]	[illegible]	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

c) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
[illegible] (5000 K)					
[illegible]	0.3366	0.3369	[illegible]	0.3456	0.3601
	0.3441	0.3428		0.3539	0.3669
	0.3449	0.3515		0.3551	0.3760
	0.3369	0.3451		0.3464	0.3688
[illegible]	0.3441	0.3428	[illegible]	0.3363	0.3287
	0.3515	0.3487		0.3433	0.3341
	0.3527	0.3578		0.3441	0.3428
	0.3449	0.3515		0.3366	0.3369
[illegible]	0.3369	0.3451	[illegible]	0.3433	0.3341
	0.3449	0.3515		0.3503	0.3396
	0.3456	0.3601		0.3515	0.3487
	0.3373	0.3534		0.3441	0.3428
[illegible]	0.3449	0.3515	[illegible]	0.3376	0.3616
	0.3527	0.3578		0.3464	0.3688
	0.3539	0.3669		0.3471	0.3775
	0.3456	0.3601		0.3379	0.3698
[illegible]	0.3373	0.3534	[illegible]	0.3464	0.3688
	0.3456	0.3601		0.3551	0.3760
	0.3464	0.3688		0.3564	0.3851
	0.3376	0.3616		0.3471	0.3775

Region	CIE x	CIE y	Region	CIE x	CIE y
[illegible] (5700 K)					
[illegible]	0.3222	0.3243	[illegible]	0.3292	0.3461
	0.3294	0.3306		0.3373	0.3534
	0.3293	0.3384		[illegible]	0.3616
	0.3217	0.3316		0.3292	0.3539
[illegible]	0.3294	0.3306	[illegible]	0.3227	0.3170
	0.3366	0.3369		0.3295	0.3228
	0.3369	0.3451		0.3294	0.3306
	0.3293	0.3384		0.3222	0.3243
[illegible]	0.3217	0.3316	[illegible]	0.3295	0.3228
	0.3293	0.3384		0.3363	0.3287
	0.3292	[illegible]		0.3366	0.3369
	0.3212	0.3389		0.3294	0.3306
[illegible]	0.3293	0.3384	[illegible]	0.3207	0.3462
	0.3369	0.3451		0.3292	0.3539
	0.3373	0.3534		0.3291	0.3617
	0.3292	[illegible]		0.3202	0.3535
[illegible]	0.3212	0.3389	[illegible]	0.3292	0.3539
	0.3292	[illegible]		0.3376	0.3616
	0.3292	0.3539		[illegible]	0.3698
	0.3207	0.3462		[illegible]	0.3617

c) Chromaticity Region & Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
P [illegible] (6500 K)					
[illegible]	0.3068	[illegible]	[illegible]	0.3126	0.3324
	0.3145	0.3187		0.3210	0.3408
	0.3135	0.3256		0.3205	0.3481
	0.3055	[illegible]		0.3117	0.3393
[illegible]	0.3145	[illegible]	[illegible]	0.3081	0.3049
	0.3221	0.3261		0.3154	0.3119
	0.3216	0.3334		0.3145	0.3187
	0.3135	0.3256		0.3068	0.3113
[illegible]	0.3055	[illegible]	[illegible]	0.3154	0.3119
	0.3135	0.3256		0.3226	0.3188
	0.3126	0.3324		0.3221	0.3261
	0.3041	0.3240		0.3145	0.3187
[illegible]	0.3135	0.3256	[illegible]	0.3028	0.3304
	0.3216	0.3334		0.3117	0.3393
	0.3210	0.3408		0.3107	0.3461
	0.3126	0.3324		0.3015	0.3368
[illegible]	0.3041	0.3240	[illegible]	0.3117	0.3393
	0.3126	0.3324		0.3205	0.3481
	0.3117	0.3393		0.3200	0.3554
	0.3028	0.3304		0.3107	0.3461

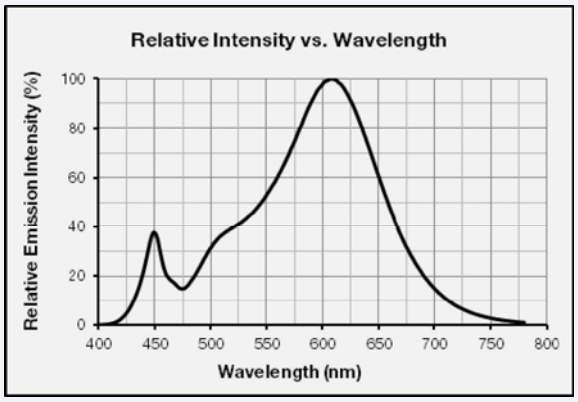
Note:

Samsung maintains measurement tolerance [illegible] Cx, Cy = ±0.005

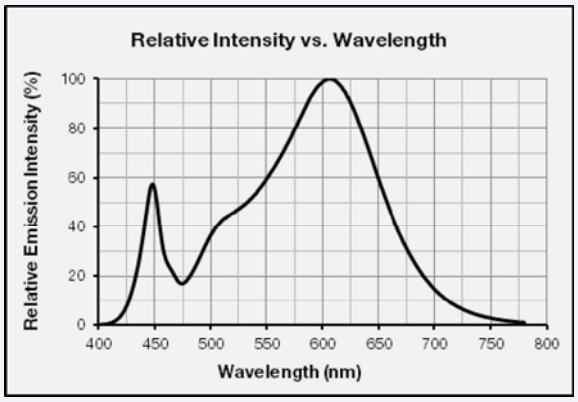
3. Typical Characteristics Graphs

a) Spectrum Distribution (I_F = 150 mA, T_s = 25 °C)

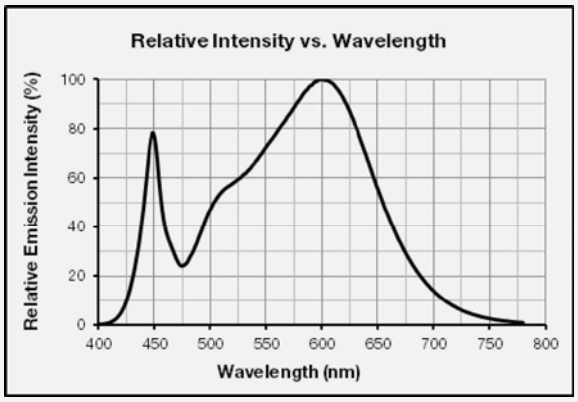
CCT: 2700 K



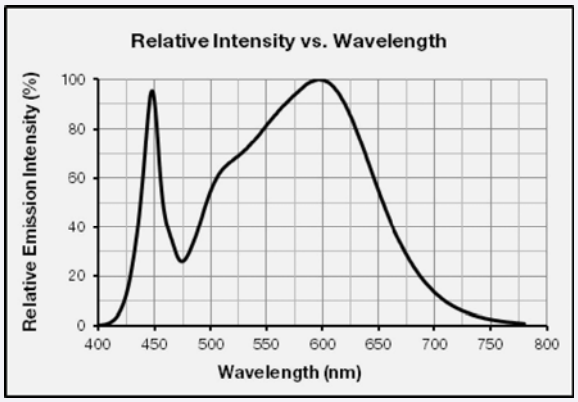
CCT: 3000 K



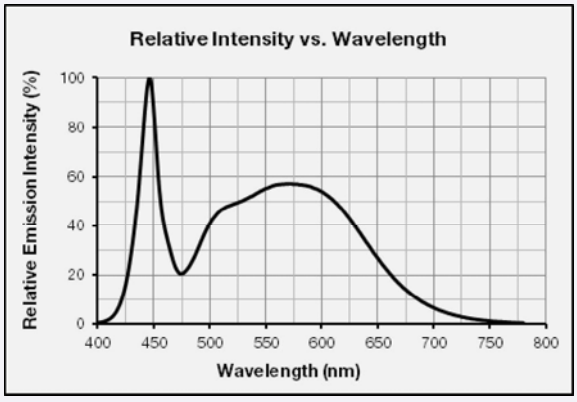
CCT: 3500 K



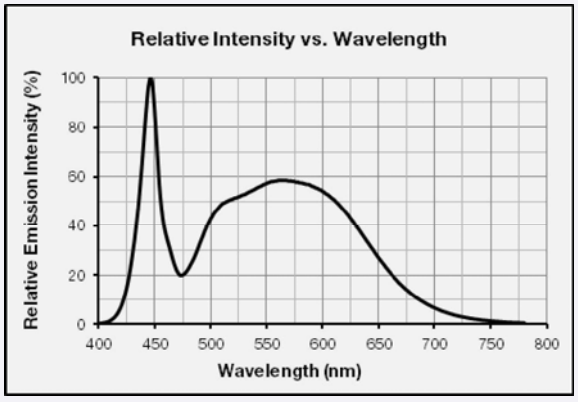
CCT: 4000 K



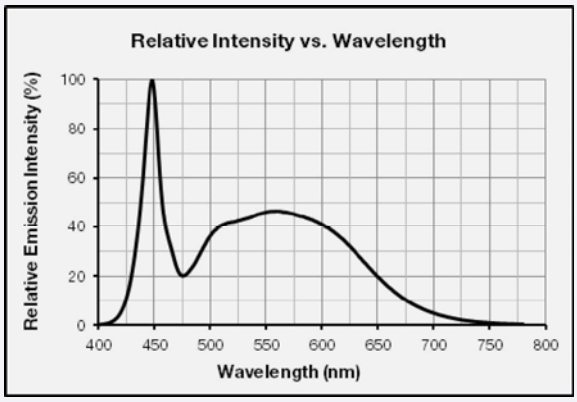
CCT: 5000 K



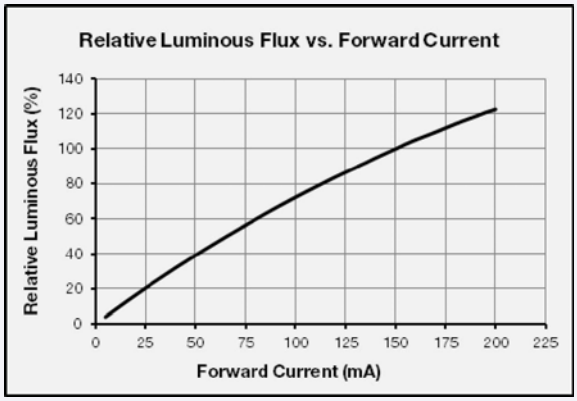
CCT: 5700 K

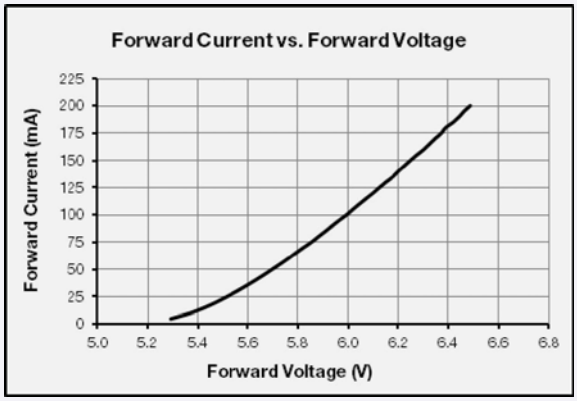


CCT: 6500 K

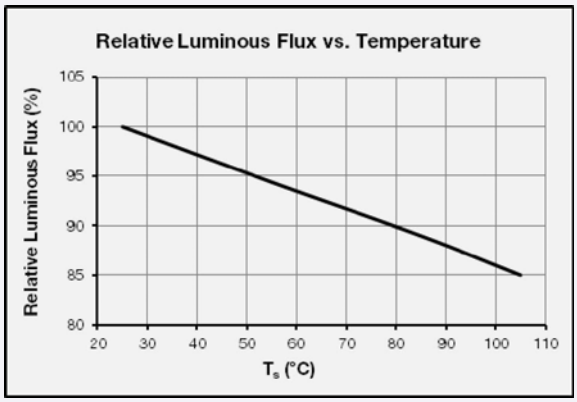


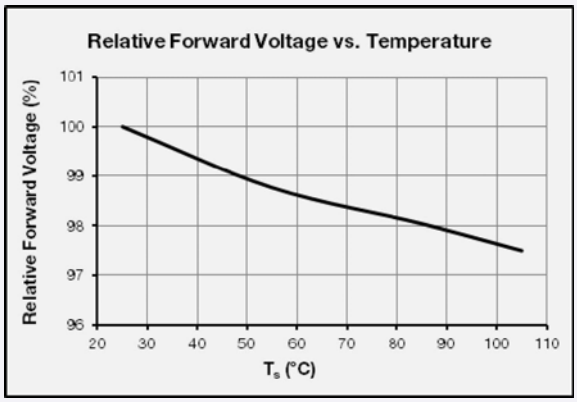
b) Forward Current Characteristics (T_s = 25 °C)



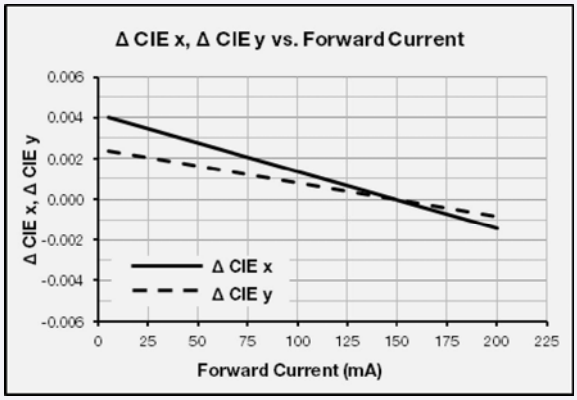


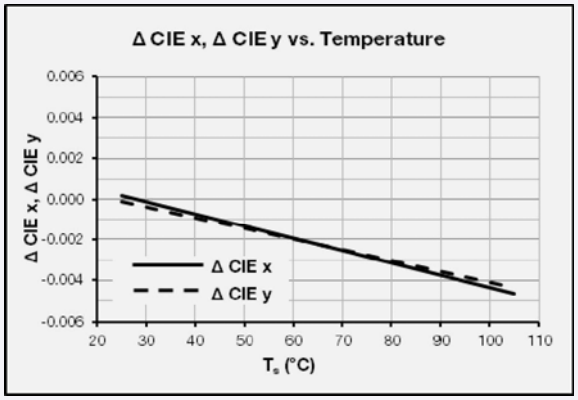
c) Temperature Characteristics (I_F = 150 mA)



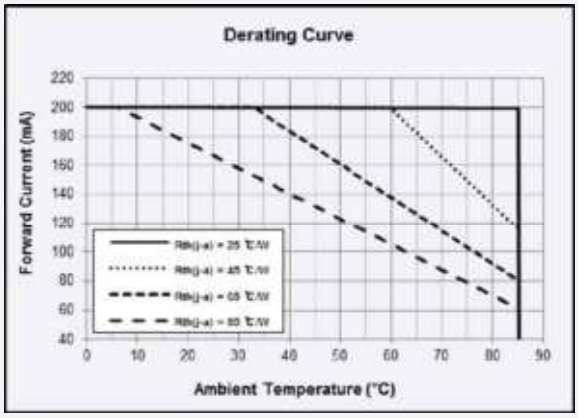


d) Color Shift Characteristics T_s = 25 ℃ I_F = 150 mA

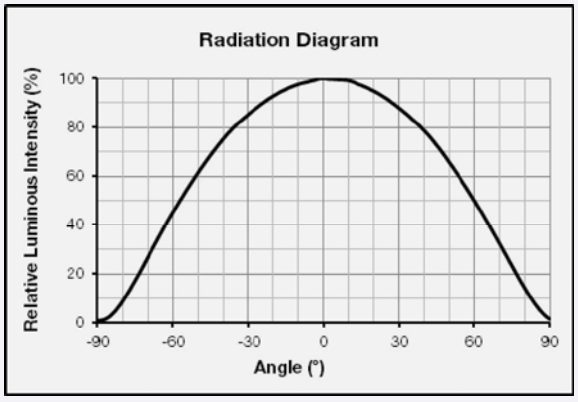




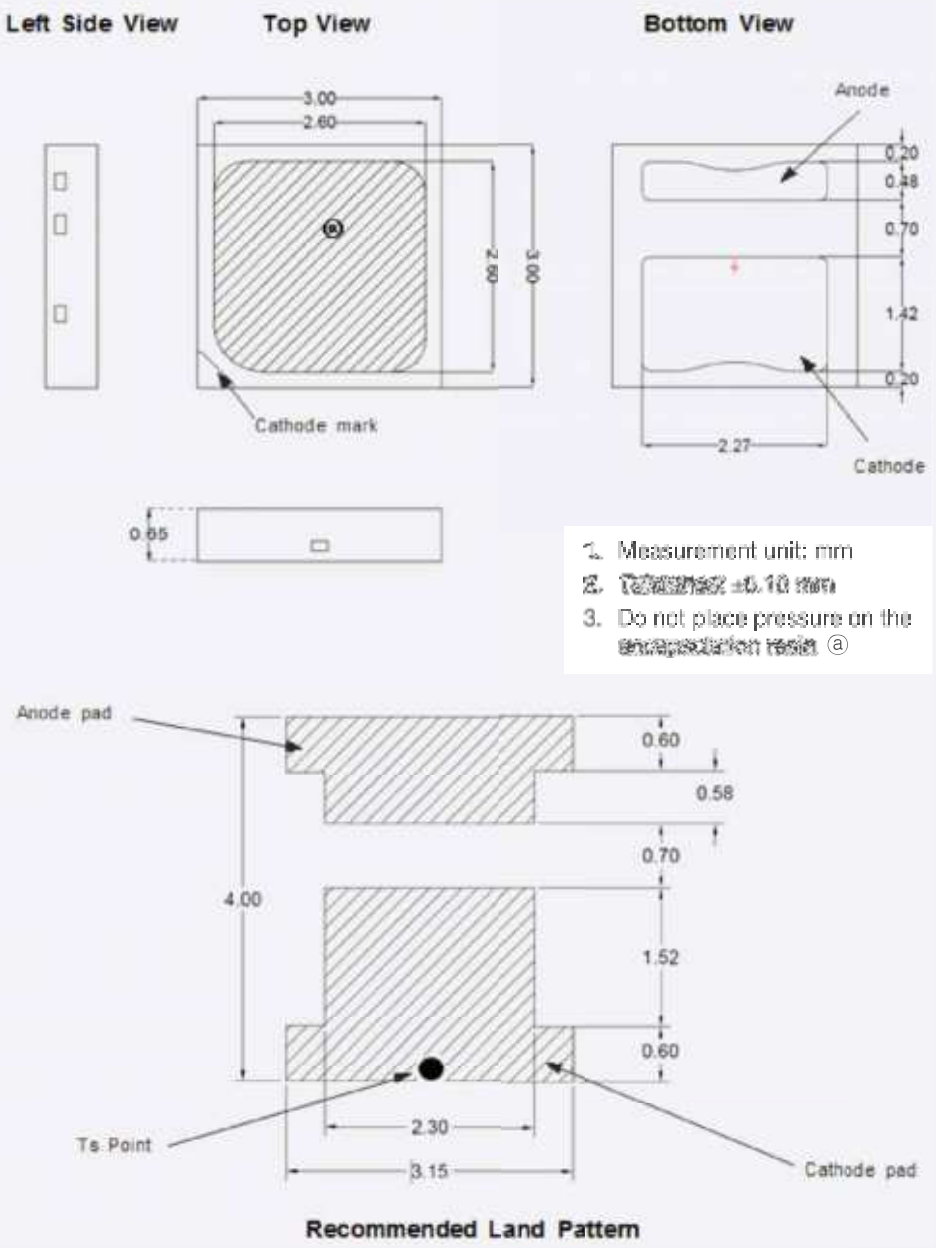
e) Derating Curve



f) Beam Angle Characteristics (I_F = 150 mA, T_s = 25 ℃)



4. Outline Drawing & Dimension



Recommended Land Pattern

Notes:

※ This LED has built-in ESD protection device(s) connected in parallel to LED chip(s).

※ 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.

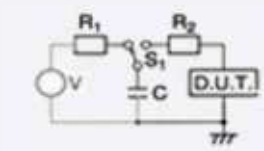
② All pads must be soldered to the PCB to dissipate heat properly, otherwise the LED can be damaged.

Precautions:

- 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.
- 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.
- 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 and Conditions

a) Test Items

Test Item	Test Condition	Test Hour / Cycle	Sample Size
Room Temperature Life Test	°C, DC 200 mA		
High Temperature Life Test	°C, DC 200 mA		
High Temperature Humidity Life Test	°C, 85 % RH, DC 200 mA		
Low Temperature	°C, DC 200 mA		
Powered Temperature Cycle Test	-45 °C / 20 min ↔ °C / 20 min, sweep 100 min cycle on/off: each 5 min, DC 200 mA	100 cycles	
	-45 °C / 15 min ↔ °C / 15 min → Hot plate 180 °C	500 cycles	
Temperature Storage	°C		
Low Temperature Storage	°C		
ESD (HBM)	 R1: MΩ R2: kΩ C: 100 pF V: ±5 kV	5 times	
ESD (MM)		R1: MΩ R2: C: 200 pF V: ±0.5 kV	5 times	
Vibration Test	20~2000~20 Hz, 200 m/s², sweep 4 min X, Y, Z 3 direction, each 1 cycle	4 cycles	
Mechanical Shock Test	1500 g, 0.5 ms 3 shocks each X-Y-Z	5 cycles	

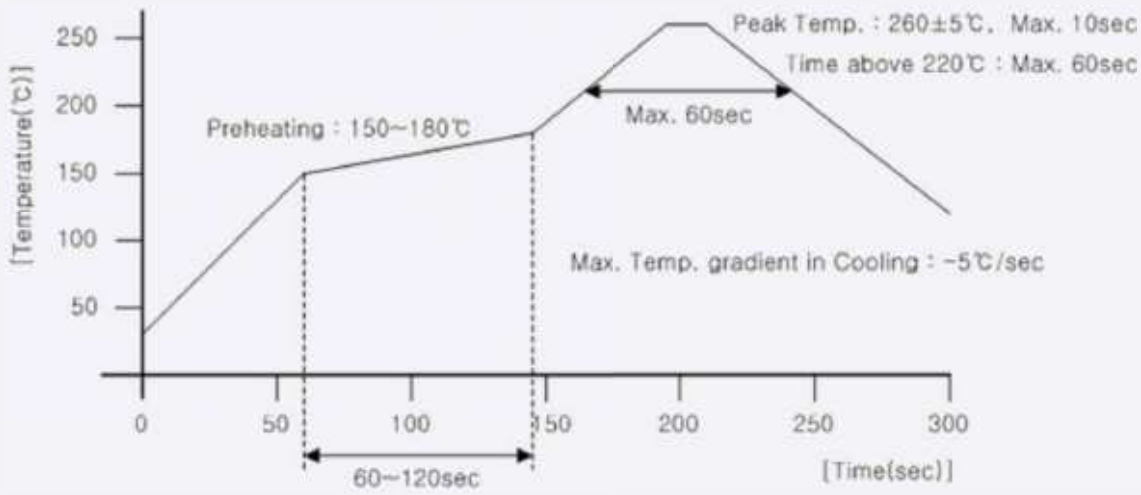
b) Criteria for Judging the Damage

Item	Symbol	Test Condition (T_s = 25 °C)	Limit	
			Min.	Max.
Forward Voltage	V_F	I_F = 150 mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ_v	I_F = 150 mA	Init. Value * 0.7	Init. Value * 1.1

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



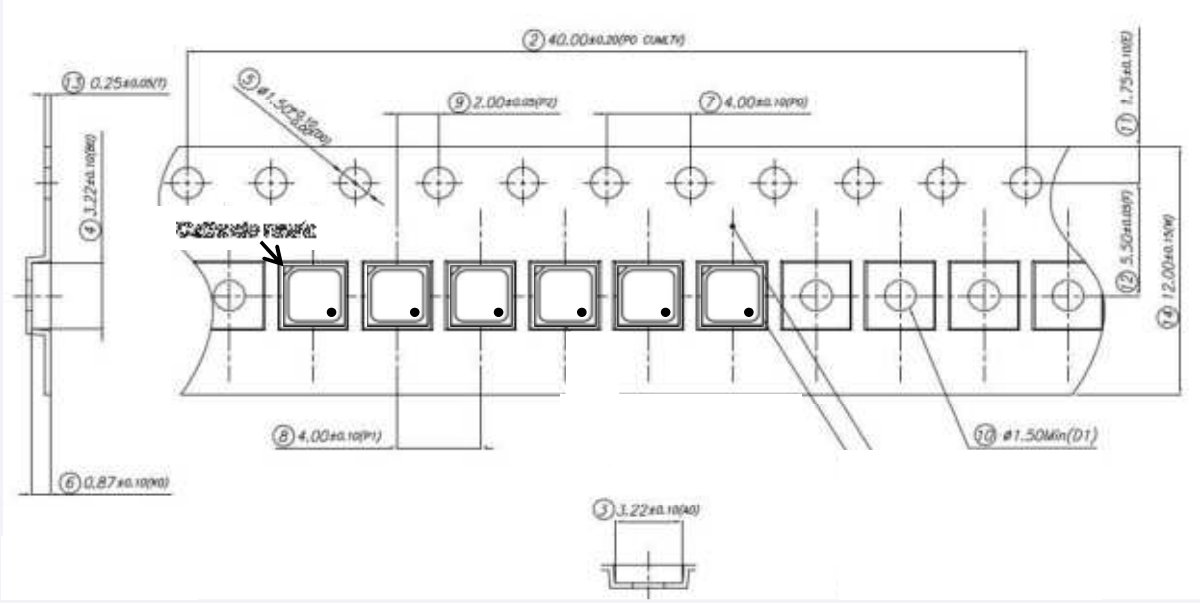
b) Manual Soldering Conditions

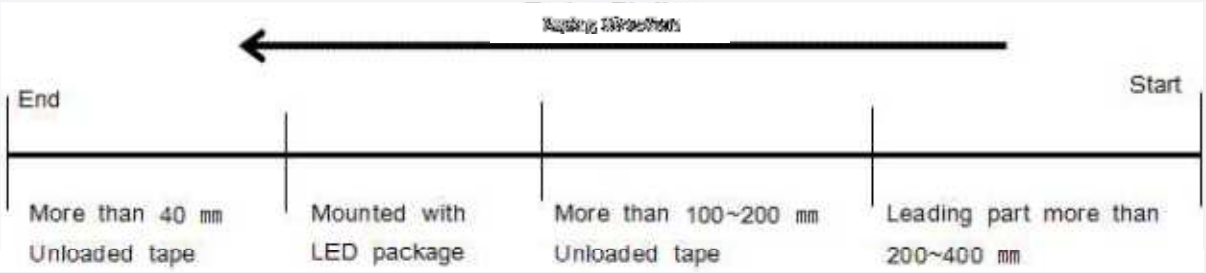
Not more than 5 seconds @ max. 300 °C, under soldering iron.

7. Tape & Reel

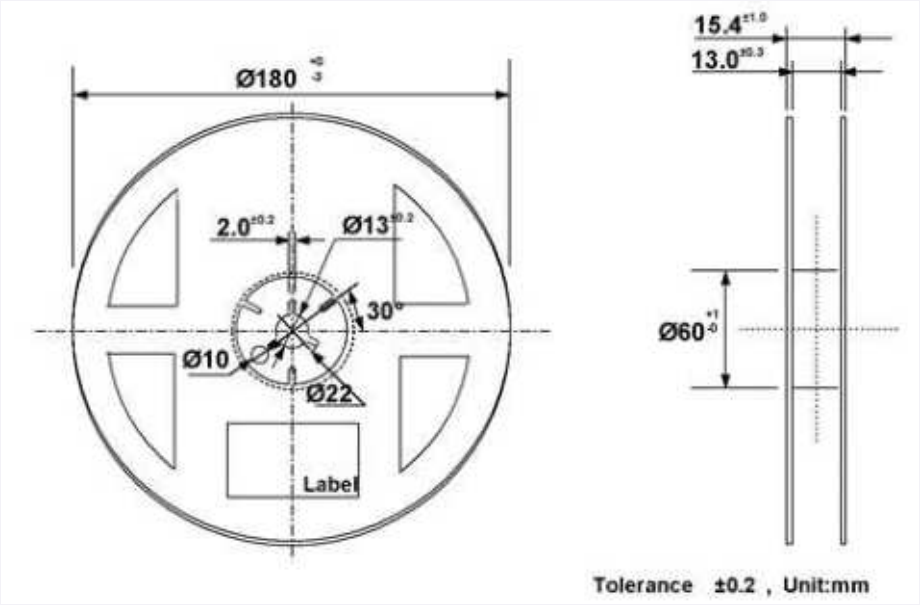
a) Taping Dimension

(unit: mm)





b) Reel Dimension

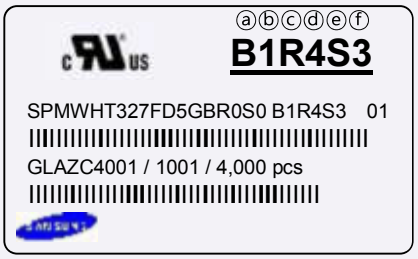


Notes:

- Quantity: The quantity/reel is 4,000 pcs
- Cumulative tolerance: Cumulative tolerance / 10 pitches is ±0.2 mm
- Adhesion strength of cover tape: Adhesion strength is 0.1-0.7 N when the cover tape is turned off from the carrier tape at 10° angle to the carrier tape
- Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

8. Label Structure

a) Label Structure



Note: Denoted bin code and product code above is only an example

'★' means all kind of Chromaticity Coordinate Ranks

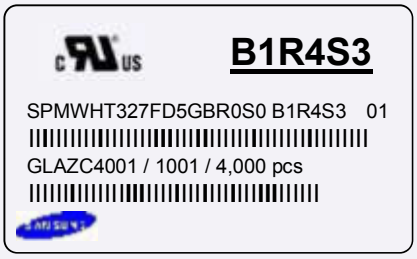
Code:

ⓐⓑ: Forward Voltage bin (refer to page 7)

ⓒⓓ: Chromaticity bin (refer to page 9~12)

ⓔⓕ: Luminous Flux bin (refer to page 4-5)

b) Lot Number



The lot number is composed of the following characters:

①②③④⑤⑥⑦⑧⑨ⓐⓑⓒ / 4,000 pcs

① : Production site (S: Giheung, Korea, G: Tianjin, China)

② : (LED)

③ : Product state (A: Normal, B: Bulk, C: First Production, R: Reproduction, S: Sample)

④ : Year (Z: 2015, A: 2016, B: 2017 ...)

⑤ : Month (1~9, A, B, C)

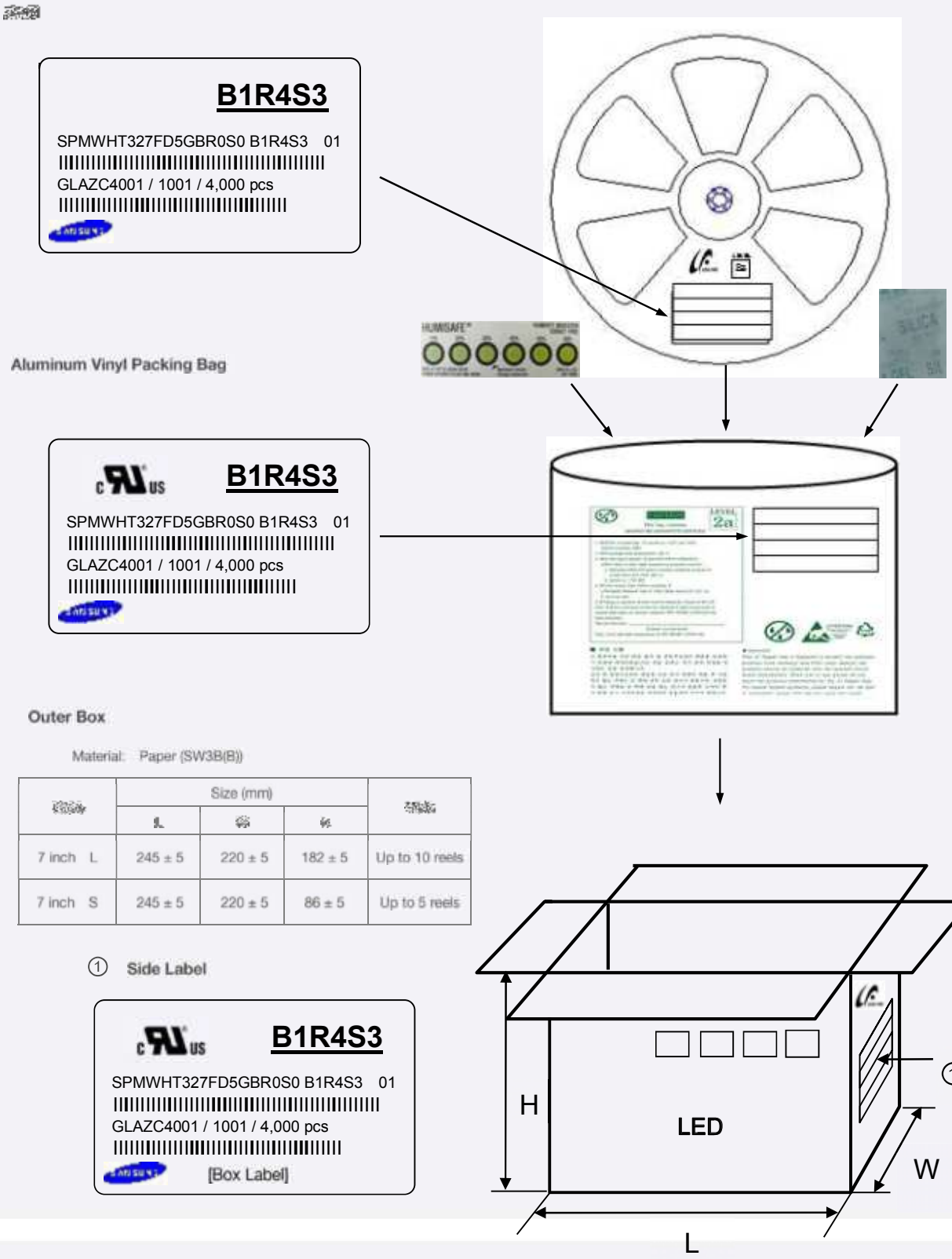
⑥ : (1~9, A, B~V)

⑦⑧⑨ : Product serial number (001 ~ 999)

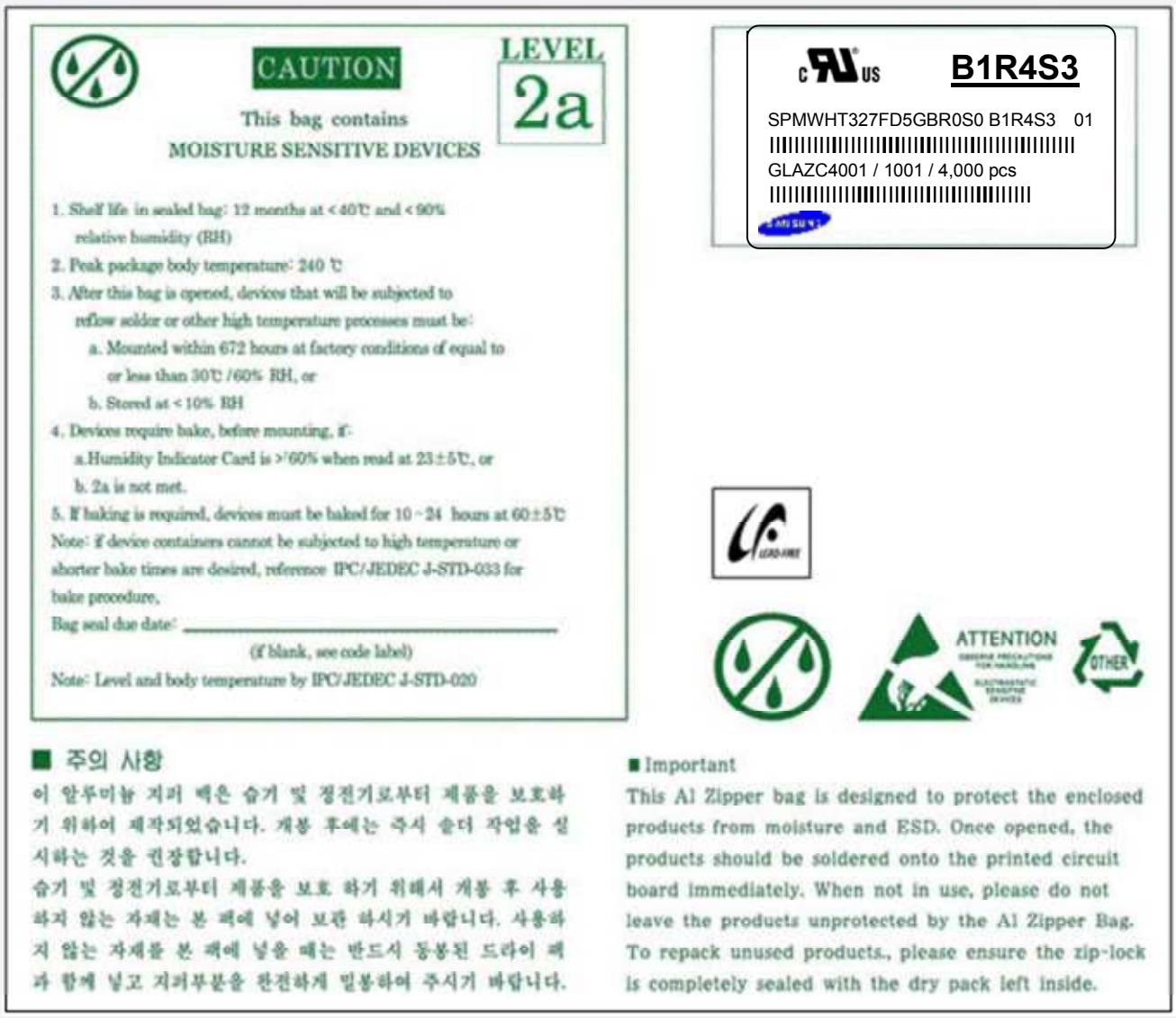
ⓐⓑⓒ : Reel number (001 ~ 999)

9. Packing Structure

a) Packing Process

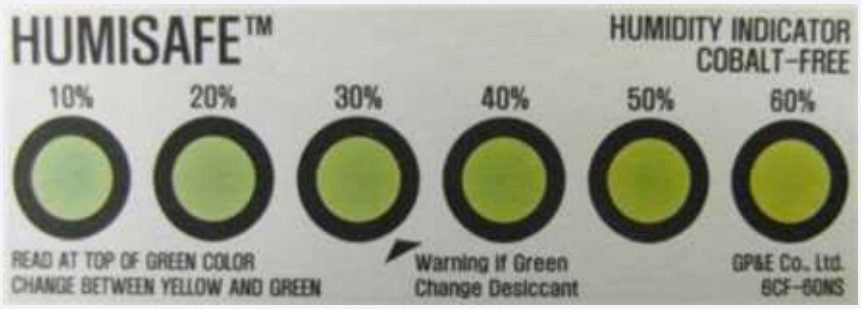


c) Aluminum Vinyl Packing Bag



c) Silica Gel & Humidity Indicator Card inside Aluminum Vinyl Bag





10. Precautions in Handling & Use

- For over-current-proof function, customers are recommended to apply resistors to prevent sudden change of the current caused by slight shift of the voltage.
- This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use.
- When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.
- 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 by a sealed container with nitrogen gas injected (shelf life of sealed bags: 12 months, temperature ~40 °C, ~90 % RH).
- After storage bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
  - Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30 °C / 60 % RH, or
  - Stored at <10 % RH
- Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.
- Devices require baking before mounting, if humidity card reading is >60 % at 23 ± 5 °C.
- Devices must be baked for 10~[illegible] hours at 60 ± 5 °C, if baking is required.
- The LEDs are sensitive to the static electricity and surge. It is recommended to use a wrist band or [illegible]-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 leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.
- 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 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 (fixtures). In order to prevent these problems, we recommend users to know the physical properties of the materials used in luminaires, and they must be selected carefully.
- Risk of sulfurization (or tarnishing)
  The LED from Samsung Electronics Co., Ltd. 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.

Legal and additional information.

About Samsung Electronics Co., Ltd.

Samsung Electronics Co., Ltd. is a global leader in technology, opening new possibilities for people everywhere. Through relentless innovation and discovery, we are transforming the worlds of [illegible] smartphones, tablets, PCs, cameras, home appliances, printers, LTE systems, medical devices, semiconductors and LED solutions. We employ 286,000 people across 80 countries with annual sales of US$216.7 billion. To discover more, please visit www.samsungled.com.

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