# Middle Power LED Series
Flip Chip Package

LM102A

LM102A opens up a new world of lighting design with its high output and small form factors

Features & Benefits

- Greater freedom of design with compact package size

- High degree of reliability with plastic-free structure

- Low thermal resistance

- High efficiency providing optimized solution

- Compact footprint (1.34 x 1.34 mm)

Applications

Indoor Lighting:

- Downlight

- LED Bulbs

- LED Tubes

- MR / PAR

- Ambient Light

- Ceiling Light

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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_a	-40 ~ +85	°C	-
Storage Temperature	T_{stg}	-40 ~ +120	°C	-
LED Junction Temperature	T_j	125	°C	-
Forward Current	I_F	250	mA	-
Assembly Process Temperature	-	260 <10	°C s	-
ESD (HBM)	-	2	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	3F	-	-	5.89	-
Reverse Voltage (@ -10 µA)	V			-10.0	-	-
Color Rendering Index (R$_a$)	-	8		80	-	-
Special CRI (R9)	-			0	-	-
Thermal Resistance (junction to chip point)	K/W			-	2	-
Beam Angle	°			-	145	-

Note:

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

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c) Luminous Flux Characteristics (T$_s$ = 85 °C)

Item	CRI	Nominal CCT (K)	SA		SB		SC		SD		SE		SF		Current
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
			79	87	87	95	95	103	103	111	111	119	119	127	150mA
Luminous Flux (Φ$_v$)	70	3000													
		3500													
		4000													
		5000													
		5700													
		6500													
	80	2700													
		3000													
		3500													
		4000													
		5000													
		5700													
		6500													
	90	2700													
		3000													
		3500													

Note:

1) The LM102A is tested in pulsed condition at rated test current (10 ms pulse width)

2) Samsung maintains measurement tolerance of: luminous flux = ±5 %

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2. Product Code Information (I_F = 150 mA, T_s = 85 °C)

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

Digit	PKG Information	Code	Specification		
1 2 3	Samsung Chip	SCS			
4	CRI	7	Min. 70		
		8	Min. 80		
		9	Min. 90		
5	CCT (K)	W	2700		
		V	3000		
		U	3500		
		T	4000		
		R	5000		
		Q	5700		
		P	6500		
6	Chip Shape	T	Square		
7 8 9	Chip Size (µm)	93H	930x930x170µm		
10 11 12	Product Purpose	PL2	PoC for Lighting		
13 14	Color Rank	W0	W Rank		W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
		V0	V Rank		V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
		U0	U Rank		U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
		T0	T Rank	Bin Code:	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
		R0	R Rank		R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG
		Q0	Q Rank		Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG
		P0	P Rank		P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
15 16	Luminous Flux (lm)	S0		Bin Code:	SA, SB, SC, SD, SE, SF
17 18	Forward Voltage (V)	3F	5.6~6.2	Bin Code:	39 5.6~5.9 9F 5.9~6.2

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

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v, lm)
70	3000	SCS7VT93HPL2V0S03F	SD	103 ~ 111
			SE	111 ~ 119
	3500	SCS7UT93HPL2U0S03F	SD	103 ~ 111
			SE	111 ~ 119
	4000	SCS7TT93HPL2T0S03F	SE	111 ~ 119
			SF	119 ~ 127
	5000	SCS7RT93HPL2R0S03F	SE	111 ~ 119
			SF	119 ~ 127
	5700	SCS7QT93HPL2Q0S03F	SE	111 ~ 119
			SF	119 ~ 127
	6500	SCS7PT93HPL2P0S03F	SE	111 ~ 119
			SF	119 ~ 127

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

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v, lm)
80	2700	SCS8WT93HPL2W0S03F	SC	95 ~ 103
			SD	103 ~ 111
	3000	SCS8VT93HPL2V0S03F	SC	95 ~ 103
			SD	103 ~ 111
	3500	SCS8UT93HPL2U0S03F	SD	103 ~ 111
			SE	111 ~ 119
	4000	SCS8TT93HPL2T0S03F	SD	103 ~ 111
			SE	111 ~ 119
	5000	SCS8RT93HPL2R0S03F	SE	111 ~ 119
			SF	119 ~ 127
	5700	SCS8QT93HPL2Q0S03F	SD	103 ~ 111
			SE	111 ~ 119
	6500	SCS8PT93HPL2P0S03F	SD	103 ~ 111
			SE	111 ~ 119

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

CRI (R_a) Min.	Nominal CCT (K)	Product Code	Flux Bin	Flux Range (Φ_v, lm)
90	2700	SCS9WT93HPL2W0S03F	SA	79 ~ 87
			SB	87 ~ 95
	3000	SCS9VT93HPL2V0S03F	SA	79 ~ 87
			SB	87 ~ 95
	3500	SCS9UT93HPL2U0S03F	SA	79 ~ 87
			SB	87 ~ 95

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

CRI Min.	Nominal CCT (K)	Product Code	Color Rank	Chromaticity Bins
70	3000	SCS7VT93HPL2V0S03F	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	SCS7UT93HPL2U0S03F	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
	4000	SCS7TT93HPL2T0S03F	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
	5000	SCS7RT93HPL2R0S03F	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG
	5700	SCS7QT93HPL2Q0S03F	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG
	6500	SCS7PT93HPL2P0S03F	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
80	2700	SCS8WT93HPL2W0S03F	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
	3000	SCS8VT93HPL2V0S03F	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	SCS8UT93HPL2U0S03F	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
	4000	SCS8TT93HPL2T0S03F	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
	5000	SCS8RT93HPL2R0S03F	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG
	5700	SCS8QT93HPL2Q0S03F	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG
	6500	SCS8PT93HPL2P0S03F	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
90	2700	SCS8WT93HPL2W0S03F	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
	3000	SCS8VT93HPL2V0S03F	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	SCS8UT93HPL2U0S03F	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG

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

Nominal CCT (K)	CRI Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
			3F	39	5.6 ~ 5.9
				9F	5.9 ~ 6.2

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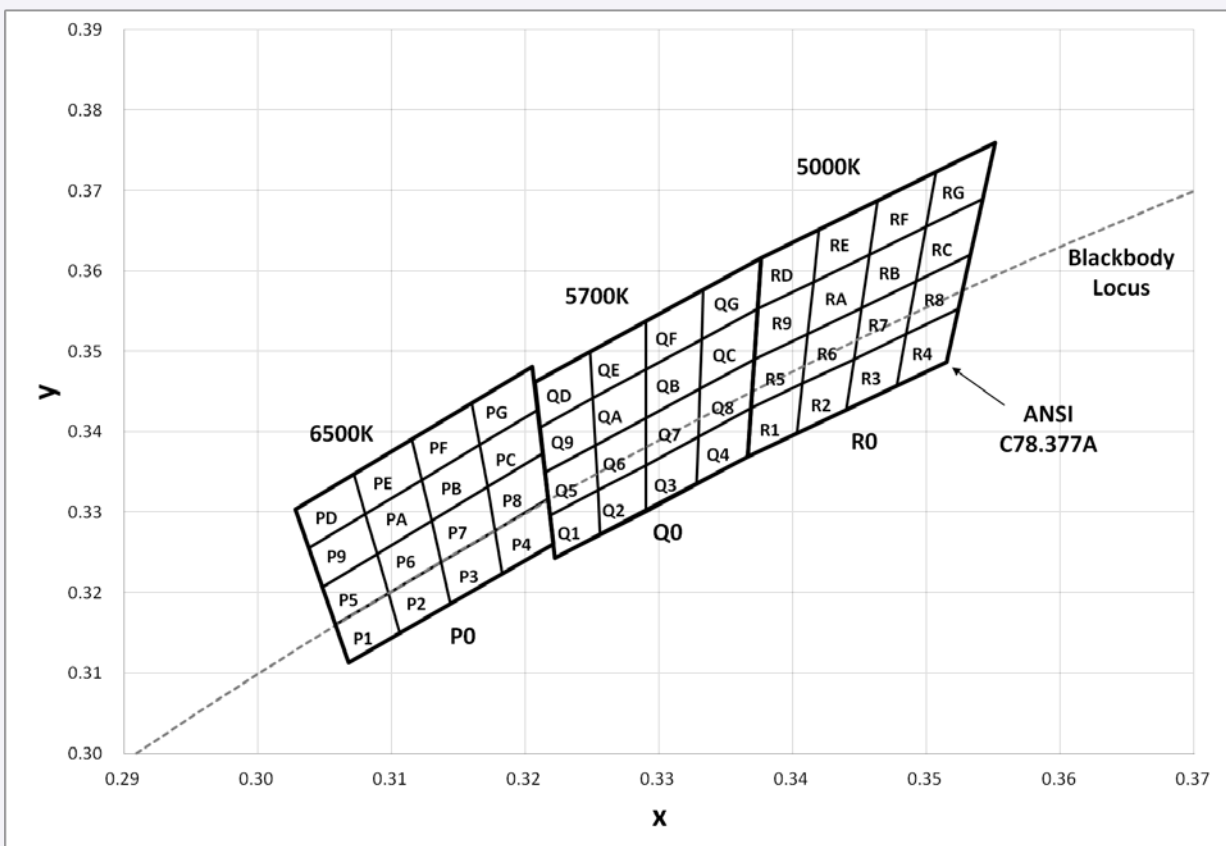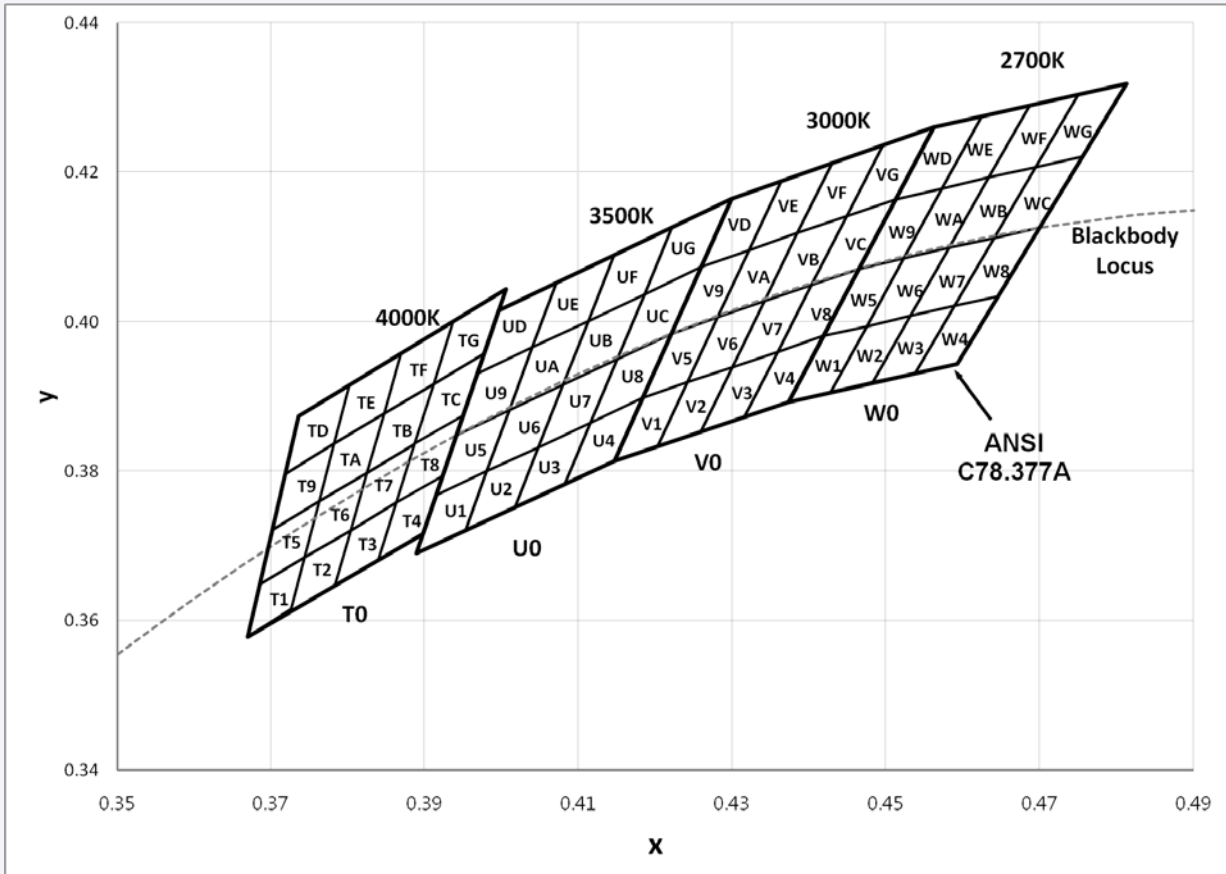
d) Chromaticity Region & Coordinates   (I_F = 150 mA, T_s = 85 °C)

W rank (2700 K)

Region	CIE x	CIE y	Region	CIE x	CIE y
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

V rank (3000 K)

Region	CIE x	CIE y	Region	CIE x	CIE y
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

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d) Chromaticity Region & Coordinates

U rank (3500 K)

Region	CIE x	CIE y	Region	CIE x	CIE y
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

T rank (4000 K)

Region	CIE x	CIE y	Region	CIE x	CIE y
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

d) Chromaticity Region & Coordinates

R rank (5000 K)

Region	CIE x	CIE y	Region	CIE x	CIE y
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	RD	0.3374	0.3553
	0.3371	0.3490		0.3376	0.3616
	0.3411	0.3522		0.3420	0.3652
	0.3407	0.3460		0.3415	0.3587
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

Q rank (5700 K)

Region	CIE x	CIE y	Region	CIE x	CIE y
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	QD	0.3211	0.3406
	0.3215	0.3350		0.3207	0.3462
	0.3253	0.3384		0.3249	0.3500
	0.3254	0.3328		0.3251	0.3442
Q6	0.3254	0.3328	QE	0.3251	0.3442
	0.3253	0.3384		0.3249	0.3500
	0.3290	0.3417		0.3290	0.3538
	0.3290	0.3359		0.3290	0.3478
Q7	0.3290	0.3359	QF	0.3290	0.3478
	0.3290	0.3417		0.3290	0.3538
	0.3331	0.3454		0.3333	0.3577
	0.3329	0.3394		0.3332	0.3515
Q8	0.3329	0.3394	QG	0.3332	0.3515
	0.3331	0.3454		0.3333	0.3577
	0.3371	0.3490		0.3376	0.3616
	0.3369	0.3430		0.3374	0.3553

d) 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	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
	0.3130	0.3290		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
	0.3130	0.3290		0.3115	0.3391
P8	0.3177	0.3278	PG	0.3166	0.3384
	0.3217	0.3317		0.3209	0.3427
	0.3213	0.3373		0.3205	0.3481
	0.3172	0.3332		0.3160	0.3436

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

3. Typical Characteristics Graphs

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

CCT : 2700K
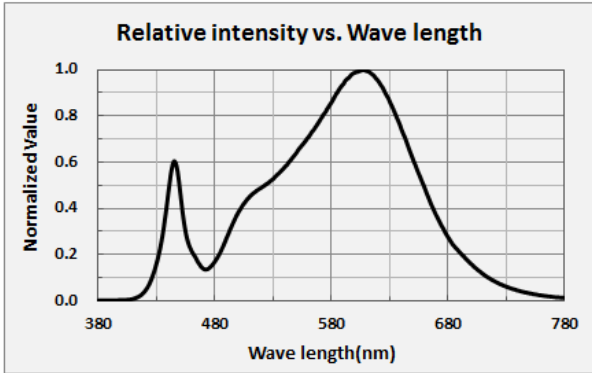
CCT : 5000K
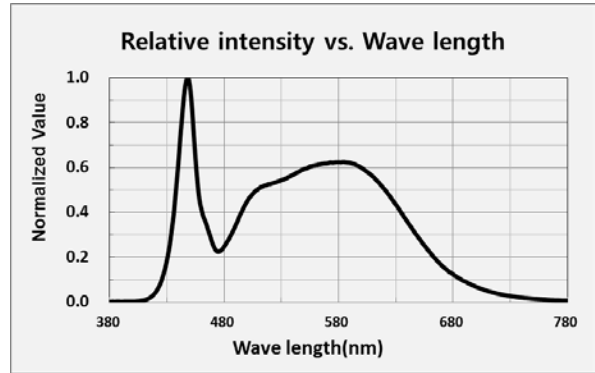
b) Forward Current Characteristics (T_s = 25 °C)
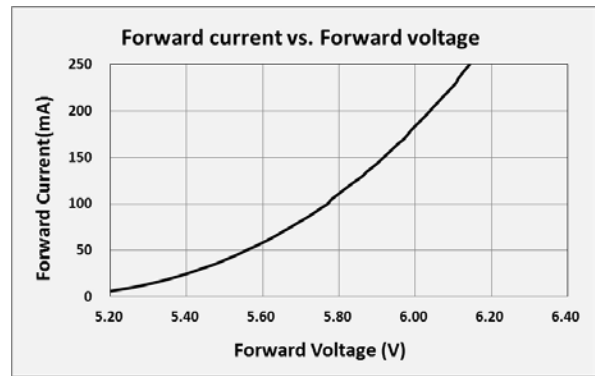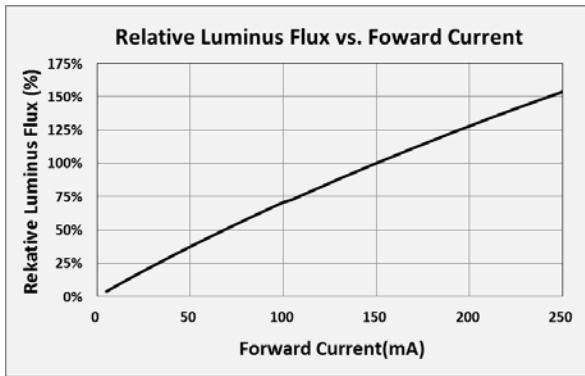
c) Temperature Characteristics   (I_F = 150 mA)
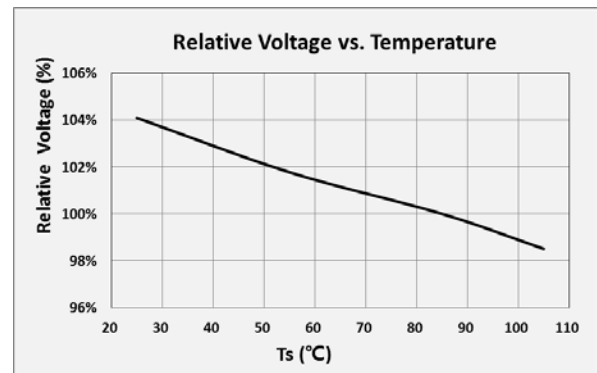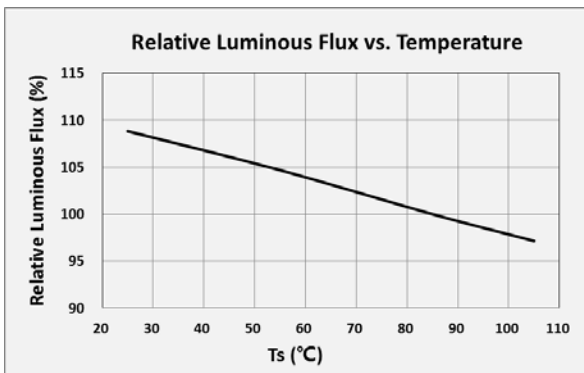
d) Color Shift Characteristics T_s = 25 ºC I_F = 150 mA

Δ CIE x, Δ CIE y vs. Forward Current

(Left chart) Δ CIE x, Δ CIE y vs. Forward Current(A); y-axis Δ CIE x, Δ CIE y from -0.010 to 0.020; x-axis Forward Current(A) from 0.00 to 250.00. Legend: Δ CIE x, Δ CIE y.

(Right chart) Δ CIE x, Δ CIE y vs. Forward Current(A); y-axis Δ CIE x, Δ CIE y from -0.010 to 0.020; x-axis Forward Current(A) from 0.00 to 250.00. Legend: Δ CIE x, Δ CIE y.

e) Derating Curve

Derating Curve

y-axis Forward Current (A) from 0.00 to 0.30; x-axis Ambient Temperature (℃) from 0 to 100. Curves labeled Rth=20K/W, Rth=30K/W, Rth=40K/W.

f) Beam Angle Characteristics   (I_F = 150 mA)

View angle

y-axis Relative luminous intensity from 0 to 1; x-axis Angle (º) from -90 to 90.
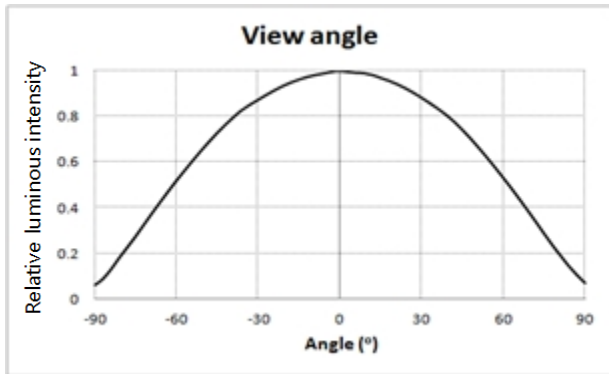
4. Outline Drawing & Dimension

1. Tolerance is ±0.10 mm

2. Do not place LEDs with pressure
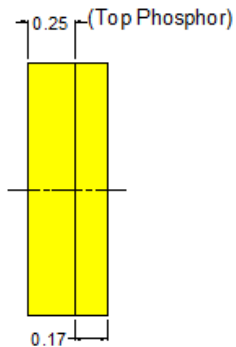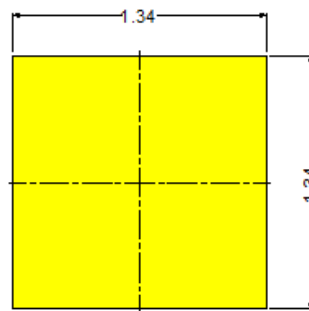
< Side View >   < Top View >   < Bottom View >
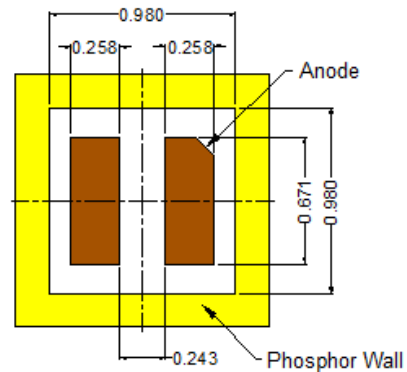
T_s Point & Measurement Method:

Measure nearest point from the center of LED chip (δ) as shown below.

Distance between chip center and T_s point (δ) = 3.5 mm

$T_j = T_s$ + Power x Thermal resistance at T_s (R_{j-s})
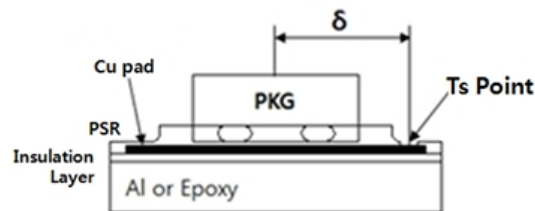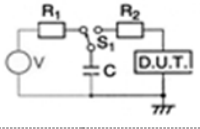
Precautions:

1) This LED chip PKG does not contain built-in ESD protection device.

2) 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.

3) 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.

4) 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 Size
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 / 20 min ↔ 85 °C / 20 min, sweep 100 min cycle on/off: each 5 min, DC 250 mA	100 cycles	22
Thermal Shock	-45 °C / 15 min ↔ 125 °C / 15 min → Hot plate 180 °C	800 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	5
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	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

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.
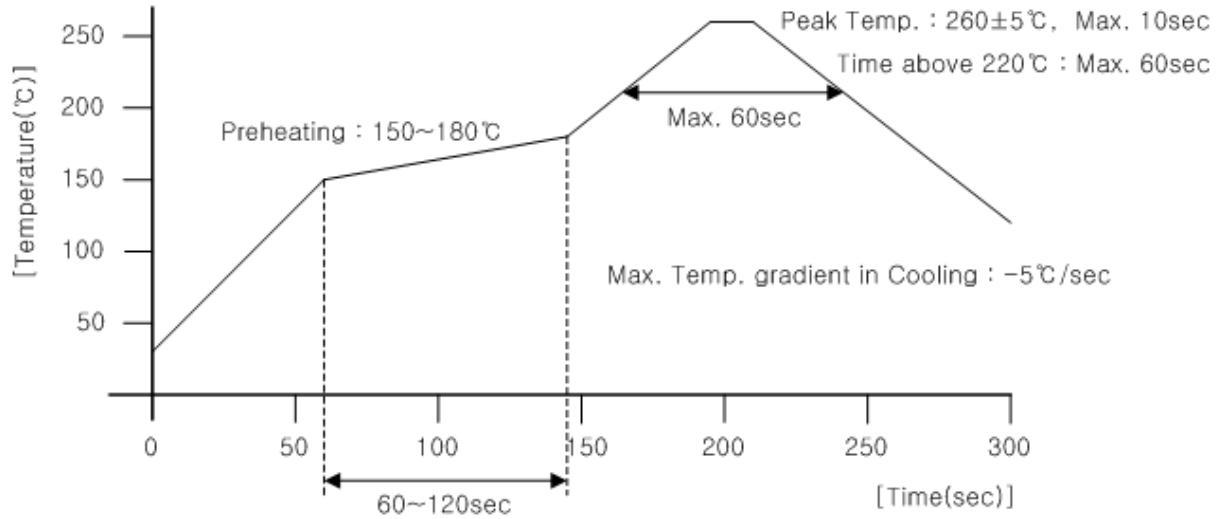

b) Manual Soldering Conditions

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

# 7. Tape & Reel

a) Taping Dimension

(unit: mm)

Anode

R 0.2   Ø 0.60 ±0.05

Taping Direction

End

Start

More than 40 mm
Unloaded tape

Mounted with
LED package

More than 100~200 mm
Unloaded tape

Leading part more than
200~400 mm
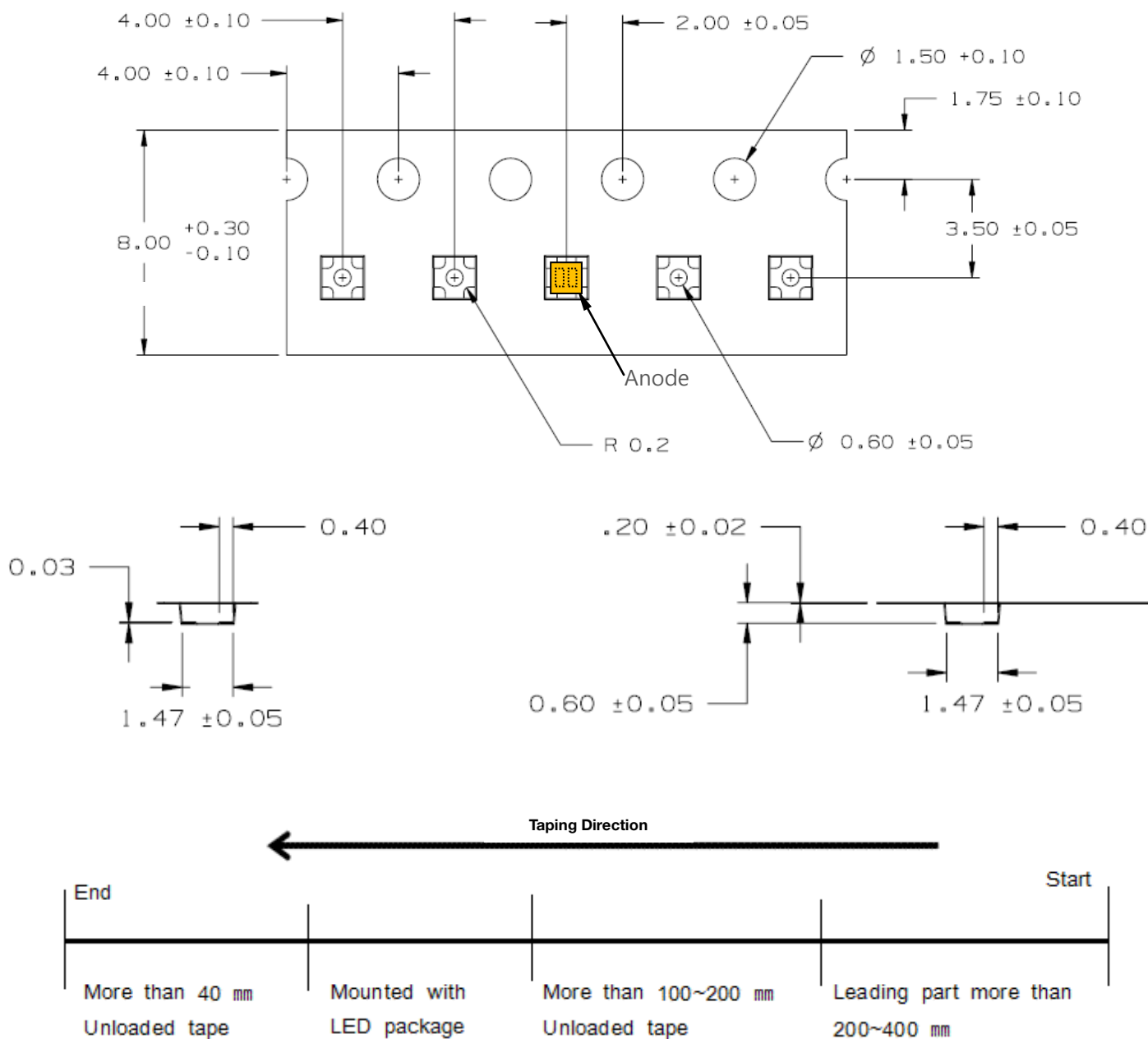
b) Reel Dimension
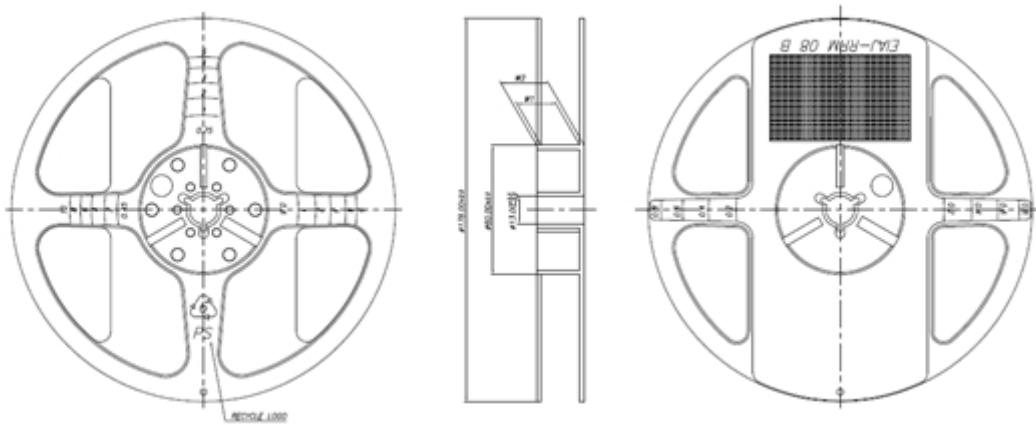
Width	W1	W2
8mm	9 ±0.3	11.9 ±1.0

Notes:

1) Quantity: The quantity/reel is 4,000 pcs

2) Cumulative Tolerance: Cumulative tolerance / 10 pitches is ±0.2 mm

3) Packaging: P/N, Manufacturing data code no. and quantity are indicated on the aluminum packing bag

8. Label Structure

a) Label Structure

W1SC39

SCS8WT93HPL2W0S03F W1SC39

①②③④⑤⑥⑦⑧⑧⑨/1ⓐⓑⓒ/ 4,000 pcs/ A

Bin Code

Product Code
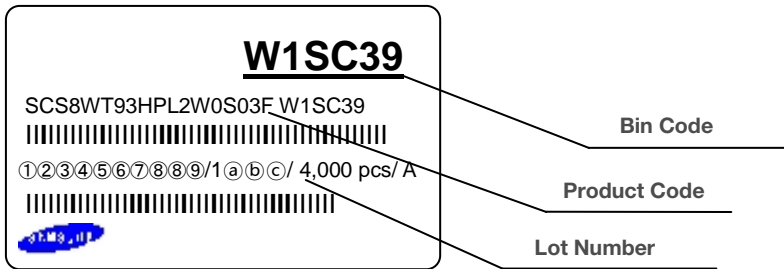
Lot Number

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

Rank Code:

ⓐⓑ:   Chromaticity bin   (refer to page 9-13)

ⓒⓓ:   Luminous Flux bin   (refer to page 7)

ⓔⓕ:   Forward Voltage bin   (refer to page 8)

b) Lot Number

The lot number is composed of the following characters:

W1SC39

SCS8WT93HPL2W0S03F W1SC39

①②③④⑤⑥⑦⑧⑧⑨/1ⓐⓑⓒ/ 4,000 pcs/ A
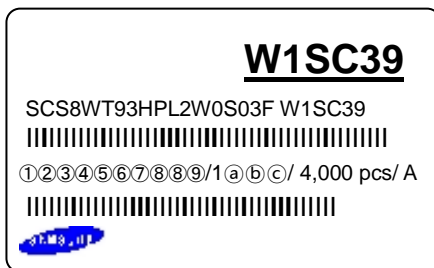
①②③④⑤⑥⑦⑧⑨ / 1ⓐⓑⓒ / 4,000 pcs

①   :   T   (Taping)

②   :   Product line   (1: KC1)

③   :   Year   (E: 2014, F: 2015, …)

④   :   Month   (1~9, A, B, C)

⑤   :   Day   (1~9, A, B~V)

⑥⑦⑧⑨   :   Product serial number   (0001 ~ 0009, A001 ~ ZZZZ)

ⓐⓑⓒ   :   Reel number   (001 ~ 999)

9. Packing Structure

a) Packing Process

Reel

W1SC39

SCS8WT93HPL2W0S03F W1SC39

①②③④⑤⑥⑦⑧⑧⑨/1ⓐⓑⓒ/ 4,000 pcs/ A
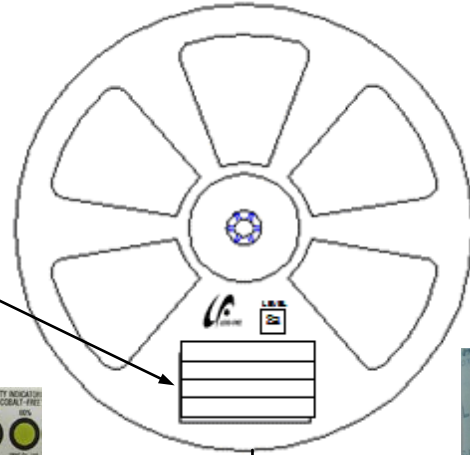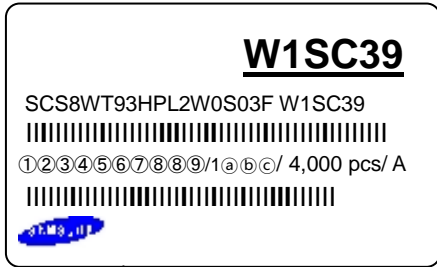
Aluminum Vinyl Bag

Outer Box

Material: Paper (SW3B(A))

Type	Size (mm)			Note
	L	W	H	
7 inch	295 ± 5	290 ± 5	260 ± 5	Up to 7 reels max.

① **Side Label**

W1SC39

SCS8WT93HPL2W0S03F W1SC39

①②③④⑤⑥⑦⑧⑧⑨/1ⓐⓑⓒ/ 28,000 pcs/ A

CHIP LED

H

L

W

①
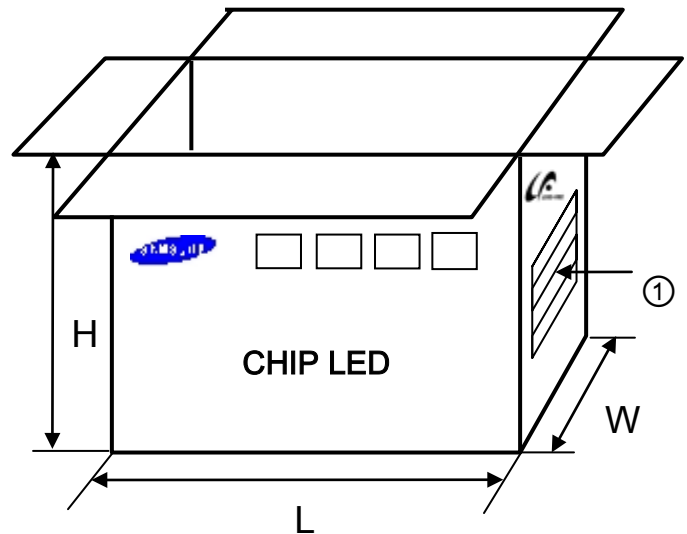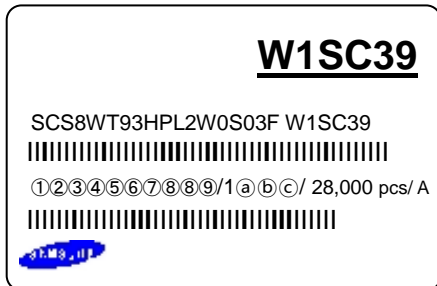
b) Aluminum Vinyl Packing Bag

c) Silica Gel & Humidity Indicator Card inside Aluminum Vinyl Bag
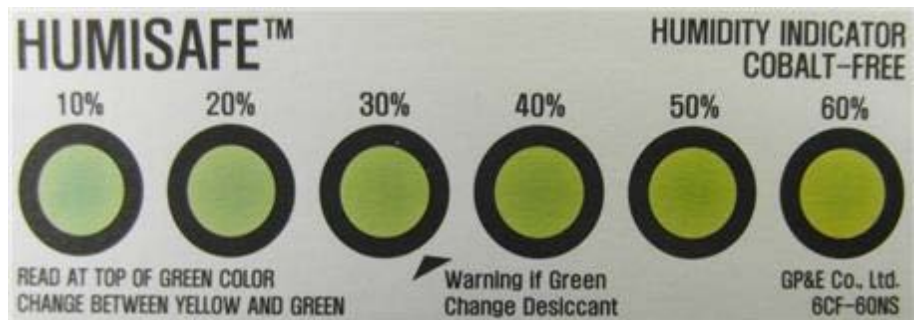
10. Precautions in Handling & Use

1) 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.

2) 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.

3) When the LEDs illuminate, operating current should be decided after considering the ambient maximum temperature.

4) 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 ℃, ~90 % RH).

5) After storage bag is opened, device subjected to soldering, solder reflow, or other high temperature processes must be:
   a. Mounted within 672 hours (28 days) at an assembly line with a condition of no more than 30 ℃ / 60 % RH, or
   b. Stored at <10 % RH

6) Repack unused products with anti-moisture packing, fold to close any opening and then store in a dry place.

7) Devices require baking before mounting, if humidity card reading is >65 % at 23 ± 5 ℃.

8) Devices must be baked for 1 hour at 60 ± 5 ℃, if baking is required.

9) The LEDs are sensitive to the static electricity and surge. 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 leak current, lowered turn-on voltage, or abnormal lighting of LEDs at low current.

Legal and additional information.

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opening new possibilities for people everywhere. Through relentless
innovation and discovery, we are transforming the worlds of
TVs, smartphones, tablets, PCs, cameras, home appliances, printers,
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We employ 286,000 people across 80 countries with annual sales of
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