Middle Power LED Series
Flip Chip Package

LM101A

LM101A 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 (1.18 x 1.18 mm)

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1. Characteristics

a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Operating Temperature	T_a	-40 ~ +85	ºC	-
Storage Temperature	T_{stg}	-40 ~ +120	ºC	-
LED Junction Temperature	T_j	125	ºC	-
Forward Current	I_F	450	mA	-
Assembly Process Temperature	-	260 <10	℃ s	-
ESD (HBM)	-	±2	kV	-

b) Electro-optical Characteristics (I$_F$ = 150 mA, T$_S$ = 85 ºC)

Item	Unit	Rank	Bin	Min.	Typ.	Max.
Forward Voltage (V_F)	V	6E	6A	2.7 (2.8)	-	2.9 (3.0)
			AE	2.9 (3.0)	-	3.1 (3.2)
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	º			-	150	-

( ): Ts = 25℃

Note:

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

c) Luminous Flux Characteristics (I$_F$ = 150 mA, T$_S$ = 85 ºC)

Item	CRI	Nominal CCT (K)	SY		SZ		SA		SB		SC		SD		SE		SF		SG	
			Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
			35	39	39	43	43	47	47	51	51	55	55	59	59	63	63	67	67	71
Luminous Flux (Φv)	70	3000											■	■	■	■	■	■		
		3500											■	■	■	■	■	■		
		4000													■	■	■	■	■	■
		5000													■	■	■	■	■	■
		5700													■	■	■	■	■	■
		6500													■	■	■	■	■	■
	80	2700							■	■	■	■	■	■						
		3000									■	■	■	■	■	■				
		3500									■	■	■	■	■	■				
		4000											■	■	■	■	■	■		
		5000											■	■	■	■	■	■		
		5700									■	■	■	■	■	■				
		6500									■	■	■	■	■	■				
	90	2700	■	■	■	■	■	■												
		3000	■	■	■	■	■	■												
		3500			■	■	■	■	■	■										

Note:

1) The LM101A is tested in pulsed condition at rated test current (10 ms pulse width)
2) Calculated flux values are for reference only
3) Samsung maintains measurement tolerance of: luminous flux = ±5 %

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	P	8	W	T	7	8	H	P	L	1	W	0	S	0	6	E

Digit	PKG Information	Code	Specification			
1 2 3	Samsung Chip	**SCP**				
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**	FCOM Square			
7 8 9	Chip Size (μm)	**78H**	780x780x170μm			
10 11 12	Product Purpose	**PL1**	PoC for Lighting			
13 14	Color Rank	**W0**	W Rank	Bin Code:		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			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:		SY, SZ, SA, SB, SC, SD, SE, SF, SG
17 18	Forward Voltage (V)	**6E**	2.7~3.1 (2.8~3.2)	Bin Code:	**6A**	2.7~2.9 (2.8~3.0)
					AE	2.9~3.1 (3.0~3.2)

( ): Ts = 25℃

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	SCP7VT78HPL1V0S06E	SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
	3500	SCP7UT78HPL1U0S06E	SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
	4000	SCP7TT78HPL1T0S06E	SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
			SG	67 ~ 71 (71 ~ 75)
	5000	SCP7RT78HPL1R0S06E	SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
			SG	67 ~ 71 (71 ~ 75)
	5700	SCP7QT78HPL1Q0S06E	SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
			SG	67 ~ 71 (71 ~ 75)
	6500	SCP7PT78HPL1P0S06E	SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
			SG	67 ~ 71 (71 ~ 75)

( ): Ts = 25℃

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)
80	2700	SCP8WT78HPL1W0S06E	SB	47 ~ 51 (50 ~ 54)
			SC	51 ~ 55 (54 ~ 59)
			SD	55 ~ 59 (59 ~ 63)
	3000	SCP8VT78HPL1V0S06E	SC	51 ~ 55 (54 ~ 59)
			SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
	3500	SCP8UT78HPL1U0S06E	SC	51 ~ 55 (54 ~ 59)
			SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
	4000	SCP8TT78HPL1T0S06E	SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
	5000	SCP8RT78HPL1R0S06E	SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
			SF	63 ~ 67 (67 ~ 71)
	5700	SCP8QT78HPL1Q0S06E	SC	51 ~ 55 (54 ~ 59)
			SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)
	6500	SCP8PT78HPL1P0S06E	SC	51 ~ 55 (54 ~ 59)
			SD	55 ~ 59 (59 ~ 63)
			SE	59 ~ 63 (63 ~ 67)

( ): Ts = 25℃

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)
90	2700	SCP9WT78HPL1W0S06E	SY	35 ~ 39 (38 ~ 42)
			SZ	39 ~ 43 (42 ~ 46)
			SA	43 ~ 47 (46 ~ 50)
	3000	SCP9VT78HPL1V0S06E	SY	35 ~ 39 (38 ~ 42)
			SZ	39 ~ 43 (42 ~ 46)
			SA	43 ~ 47 (46 ~ 50)
	3500	SCP9UT78HPL1U0S06E	SZ	39 ~ 43 (42 ~ 46)
			SA	43 ~ 47 (46 ~ 50)
			SB	47 ~ 51 (50 ~ 54)

( ): Ts = 25℃

b) Color Bins (I_F = 150 mA, T_S = 85 ºC)

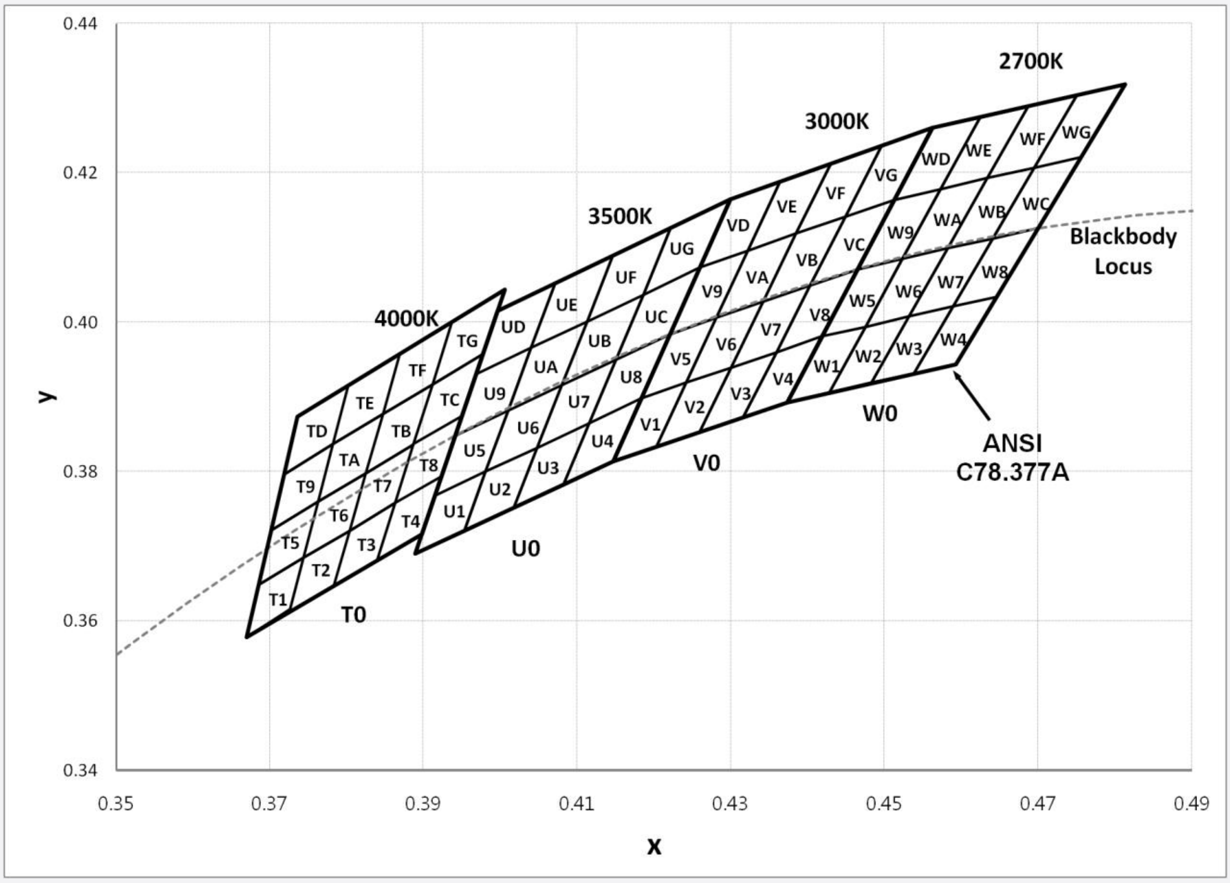
CRI Min.	Nominal CCT (K)	Product Code	Color Rank	Chromaticity Bins
70	3000	SCP7VT78HPL1V0S06E	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	SCP7UT78HPL1U0S06E	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
	4000	SCP7TT78HPL1T0S06E	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
	5000	SCP7RT78HPL1R0S06E	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG
	5700	SCP7QT78HPL1Q0S06E	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG
	6500	SCP7PT78HPL1P0S06E	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
80	2700	SCP8WT78HPL1W0S06E	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
	3000	SCP8VT78HPL1V0S06E	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	SCP8UT78HPL1U0S06E	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
	4000	SCP8TT78HPL1T0S06E	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
	5000	SCP8RT78HPL1R0S06E	R0 (Whole bin)	R1, R2, R3, R4, R5, R6, R7, R8, R9,RA,RB,RC,RD,RE,RF,RG
	5700	SCP8QT78HPL1Q0S06E	Q0 (Whole bin)	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9,QA,QB,QC,QD,QE,QF,QG
	6500	SCP8PT78HPL1P0S06E	P0 (Whole bin)	P1, P2, P3, P4, P5, P6, P7, P8, P9, PA, PB, PC, PD, PE, PF, PG
90	2700	SCP9WT78HPL1W0S06E	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
	3000	SCP9VT78HPL1V0S06E	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	SCP9UT78HPL1U0S06E	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG

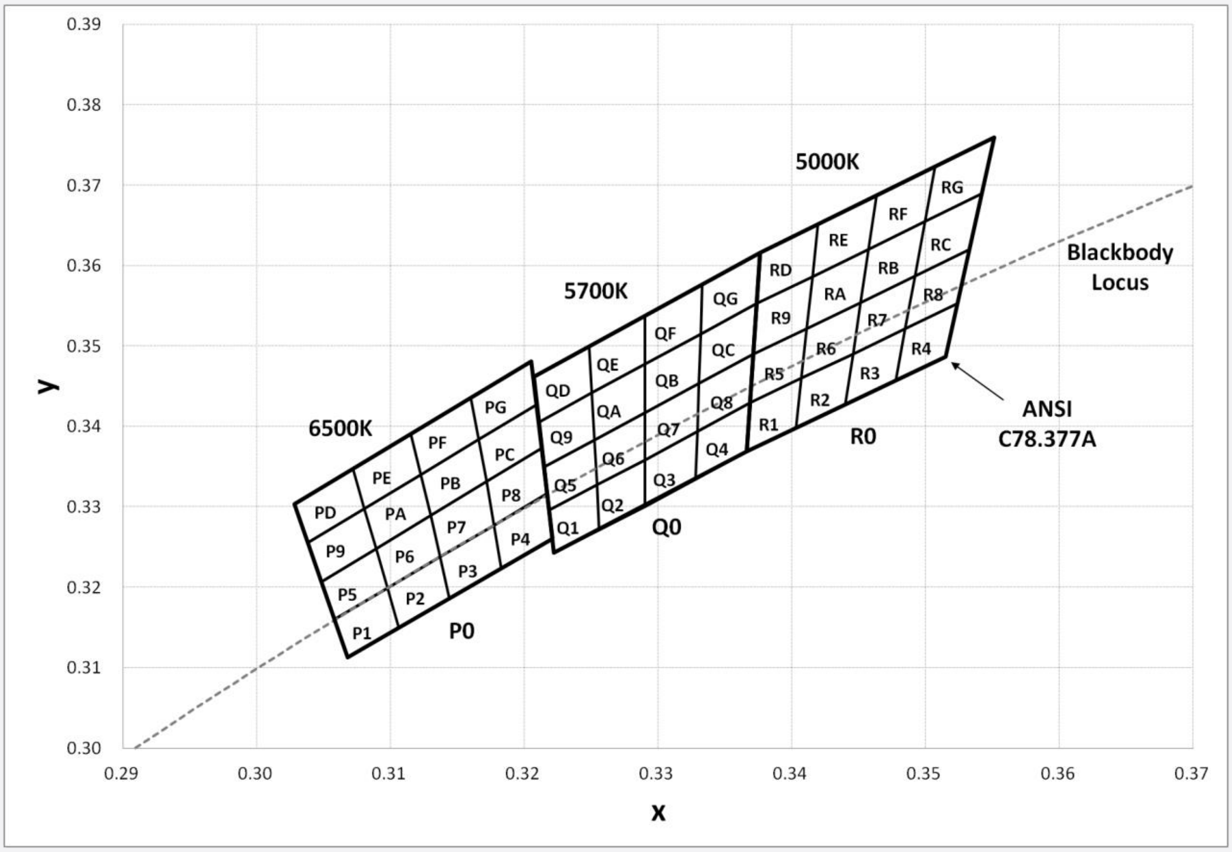
c) Voltage Bins (I_F = 150 mA, T_S = 85 ºC)

Nominal CCT (K)	CRI Min.	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
			6E	6A	2.7 ~ 2.9 (2.8~3.0)
				AE	2.9 ~ 3.1 (3.0~3.2)

( ): Ts = 25℃

d) Chromaticity Region & Coordinates (I$_F$ = 150 mA, T$_S$ = 85 ºC)





d) Chromaticity Region & Coordinates (I$_F$ = 150 mA, T$_S$ = 85 ºC)

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

d) 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

d) 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	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

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	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

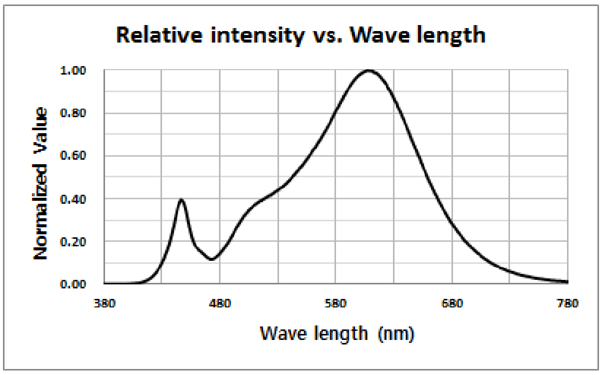
Region	CIE x	CIE y	Region	CIE x	CIE y
P rank (6500 K)					
P1	0.3068	0.3113	P9	0.3048	0.3207
	0.3106	0.3150		0.3089	0.3249
	0.3098	0.3199		0.3080	0.3298
	0.3058	0.3160		0.3038	0.3256
P2	0.3106	0.3150	PA	0.3089	0.3249
	0.3144	0.3186		0.3130	0.3290
	0.3137	0.3238		0.3123	0.3341
	0.3098	0.3199		0.3080	0.3298
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

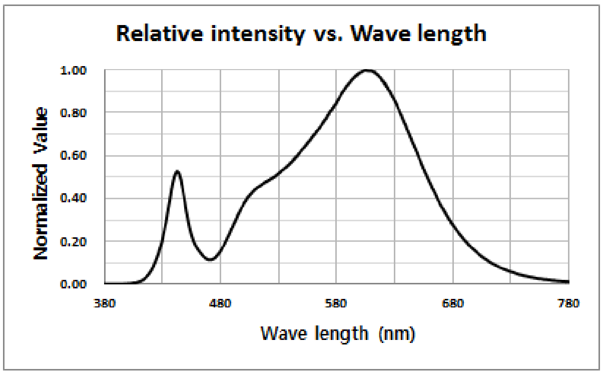
3. Typical Characteristics Graphs

a) Spectrum Distribution (I$_F$ = 150 mA, T$_S$ = 25 ºC)

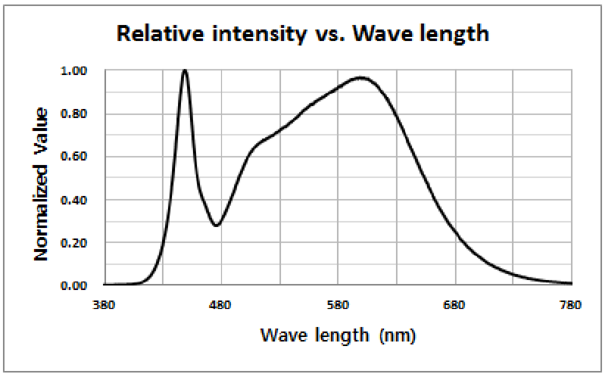
CCT: 2700 K



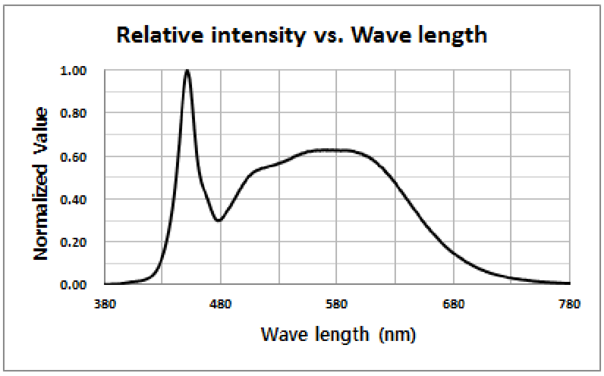
CCT: 3000 K



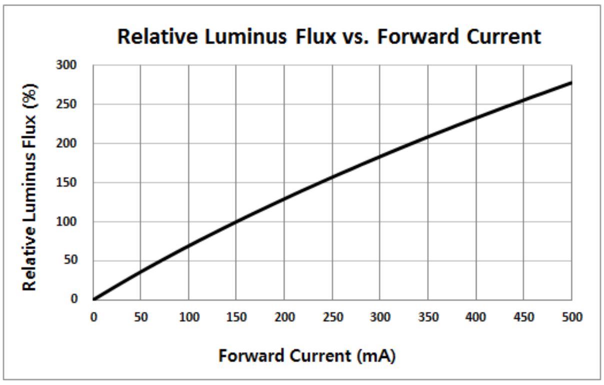
CCT: 4000 K

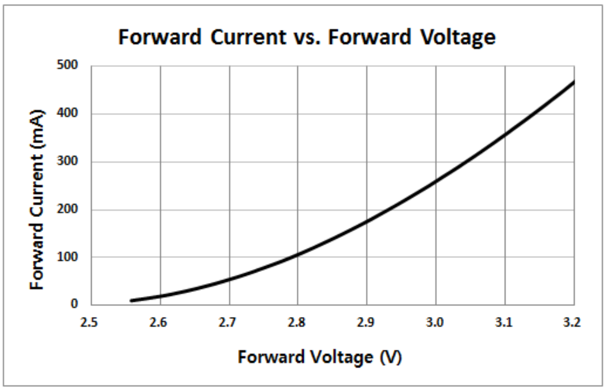


CCT: 5000 K

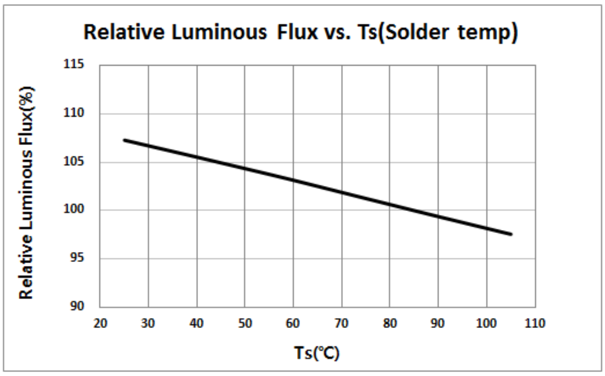


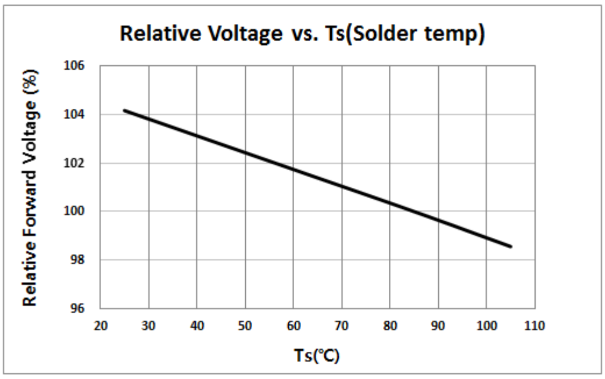
b) Forward Current Characteristics (T$_S$ = 25 ºC)





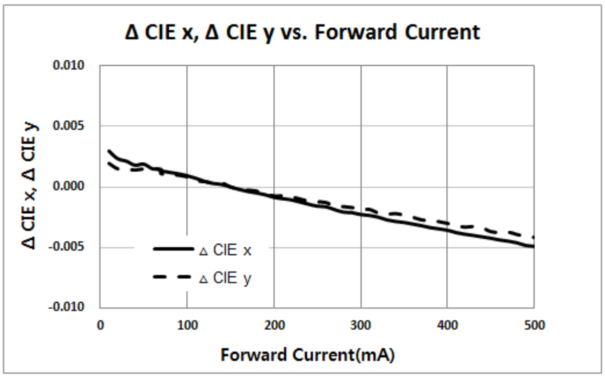
c) Temperature Characteristics (I$_F$ = 150 mA)



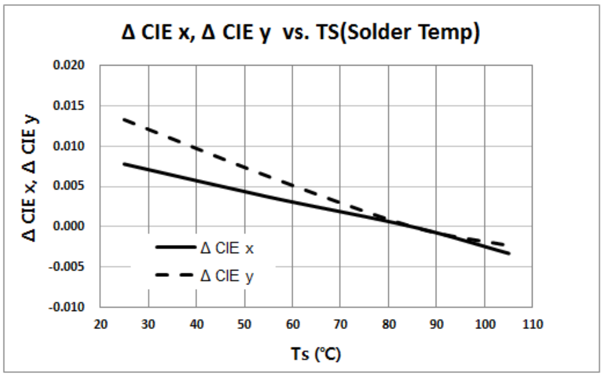


d) Color Shift Characteristics

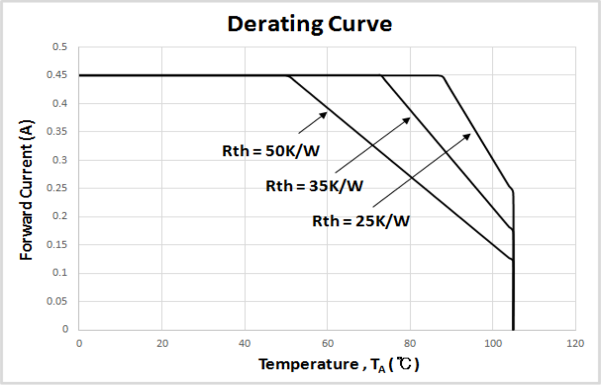
T$_S$ = 25 ºC



I$_F$ = 150 mA



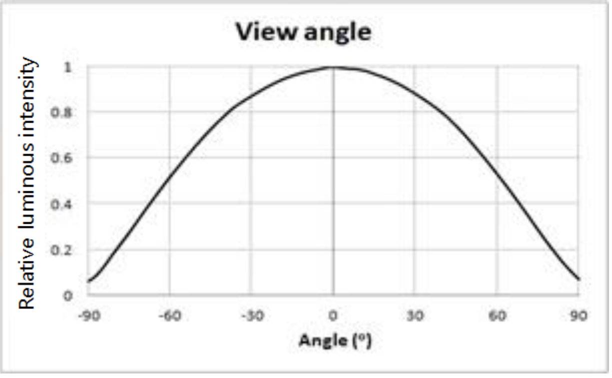
e) Derating Curve



R$_{th}$ is measured after soldering of LED chip on the metal based substrate.

*metal: aluminum (refer to page 17)

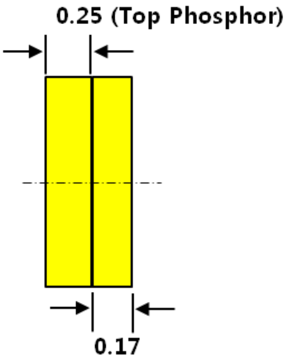
f) Beam Angle Characteristics (I$_F$ = 150 mA)



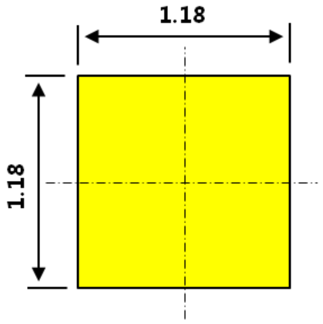
4. Outline Drawing & Dimension

1. Tolerance is ±0.10 mm
2. Do not place LEDs with pressure

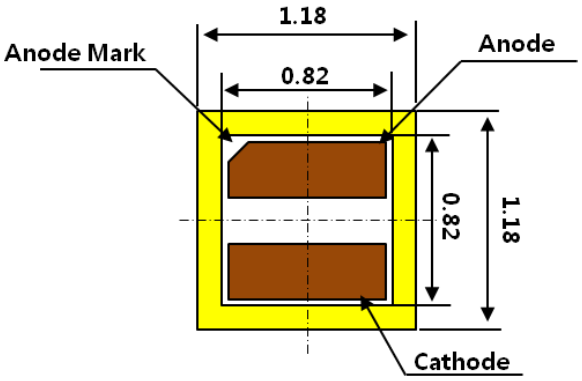
<Side View>


0.25 (Top Phosphor)
0.17

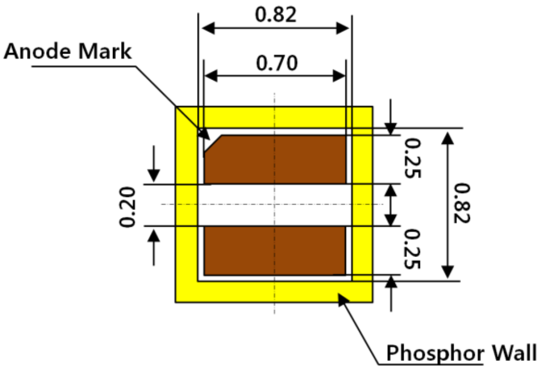
<Top View>



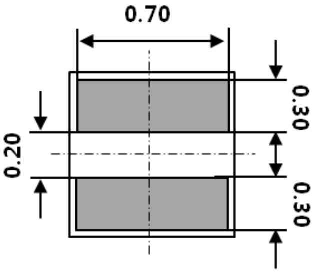
<Bottom View>


1.18
Anode Mark
Anode
0.82
0.82
1.18
Cathode

<Recommended Land Pattern>


0.82
Anode Mark
0.70
0.25
0.20
0.82
0.25
Phosphor Wall

<TF0.78 Chip Pad>


0.70
0.30
0.20
0.30

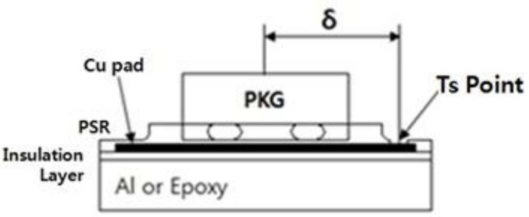
<PCB Land>

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 ($R_{j\text{-}s}$)

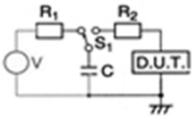

δ
Cu pad
PKG
Ts Point
PSR
Insulation Layer
Al or Epoxy

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
MSL Test	125 ºC 24 h drying → 60 ºC, 60 % RH 120 h → 260 ºC 10 sec 3 cycles	1 cycle	11
Room Temperature Life Test	25 ºC, Derated max current	1000 h	22
High Temperature Life Test	85 ºC, Derated max current	1000 h	22
High Temperature Humidity Life Test	85 ºC, 85 % RH, Derated max current	1000 h	22
Low Temperature Life Test	-40 ºC, DC Derated max current	1000 h	22
Powered Temperature Cycle Test	-45 ºC / 20 min ↔ 85 ºC / 20 min, sweep 100 min cycle on/off: each 5 min, Derated max current	100 cycles	22
Thermal Shock	-45 ºC / 15 min ↔ 125 ºC / 15 min → Hot plate 180 ºC	800 cycles	100
High Temperature Storage	120 ºC	1000 h	11
Low Temperature Storage	-40 ºC	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

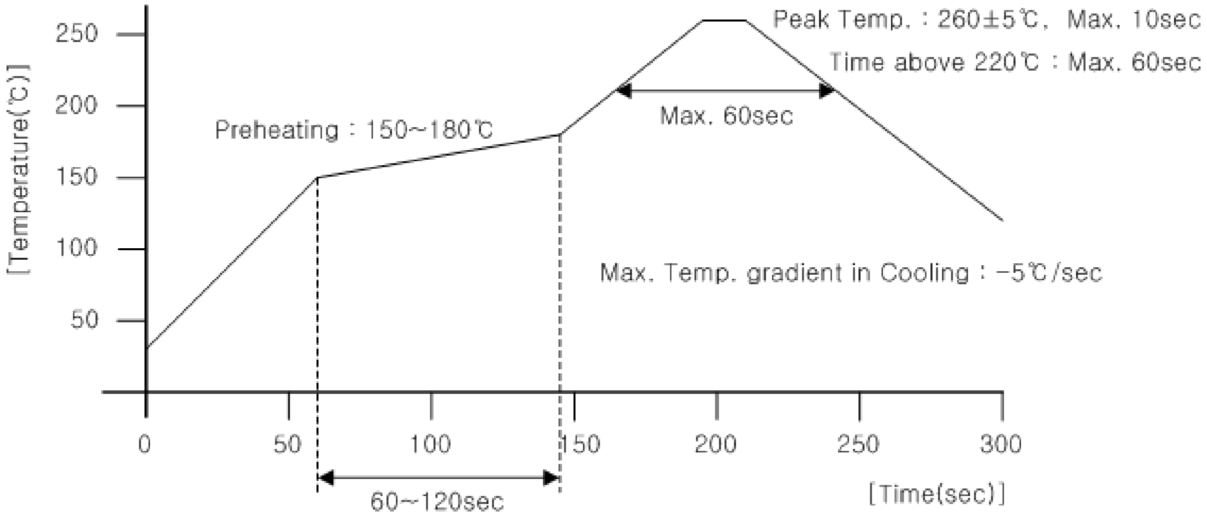
b) Criteria for Judging the Damage

Item	Symbol	Test Condition (T_s = 25 ºC)	Limit	
			Min	Max
Forward Voltage	V_F	I_F = Derated max current	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ_v	I_F = Derated max current	Init. Value * 0.7	Init. Value * 1.1

6. Soldering Conditions

a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.



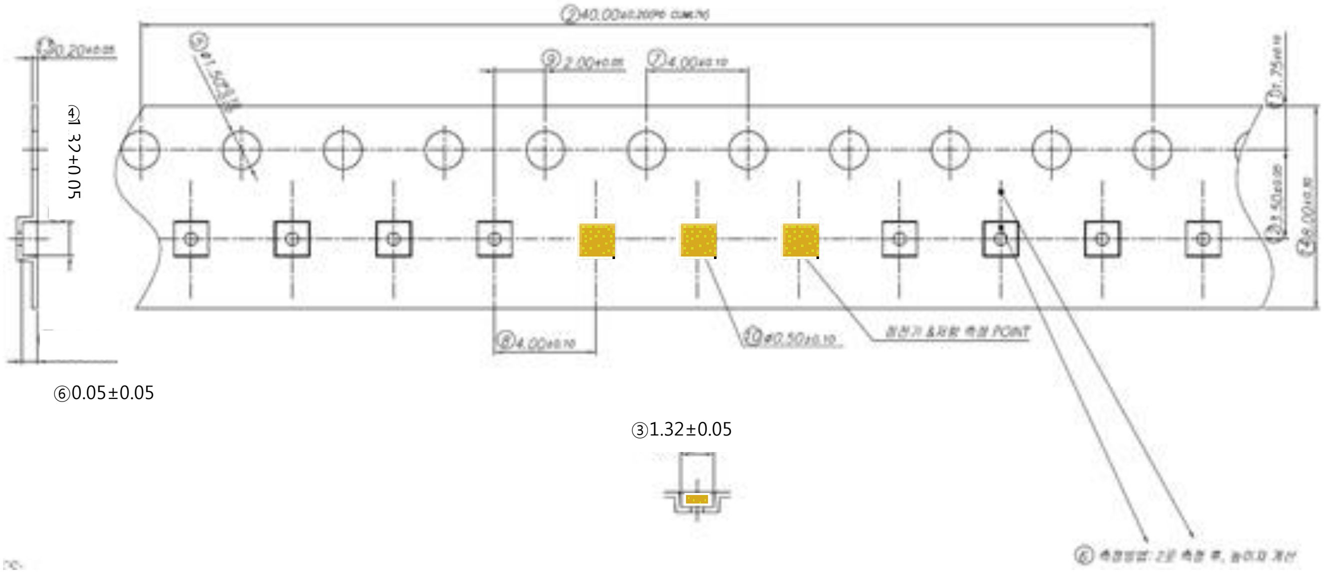
b) Manual Soldering Conditions

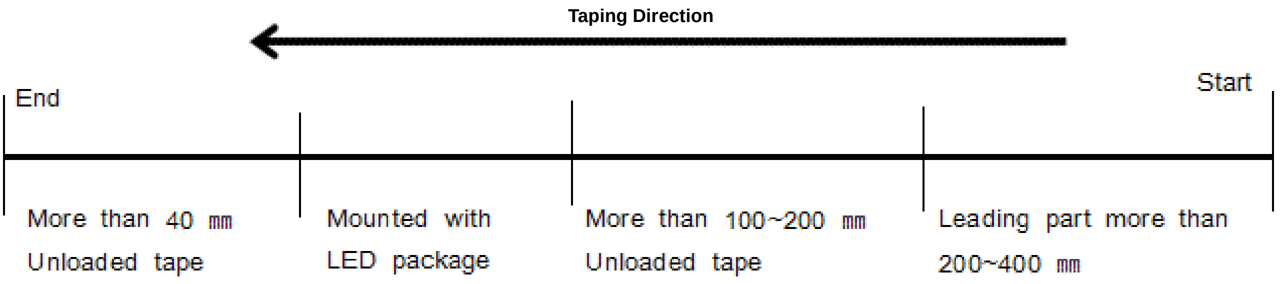
Not more than 5 seconds @ max. 300 ºC, under soldering iron

7. Tape & Reel

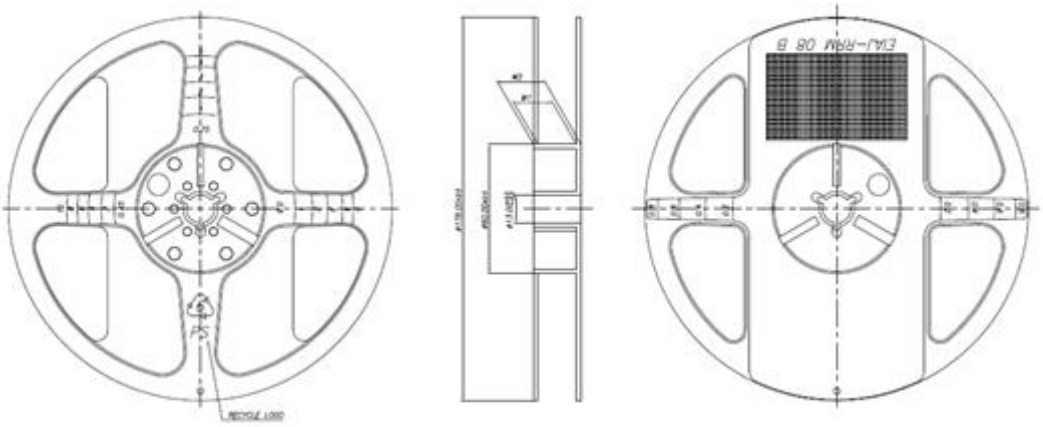
a) Taping Dimension

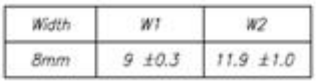
(unit: mm)


②40.00±0.20
⑬0.20±0.05
⑤Ø1.50
⑨2.00±0.05
⑦4.00±0.10
①1.75±0.10
④1.32±0.05
⑪3.50±0.05
⑫8.00±0.10
⑧4.00±0.10
⑩Ø0.50±0.10
POINT
⑥0.05±0.05
③1.32±0.05


Taping Direction
End
Start
More than 40 ㎜ Unloaded tape
Mounted with LED package
More than 100~200 ㎜ Unloaded tape
Leading part more than 200~400 ㎜

b) Reel Dimension


W2
W1
PS
RECYCLE LOGO
EIAJ-RRM 08 B



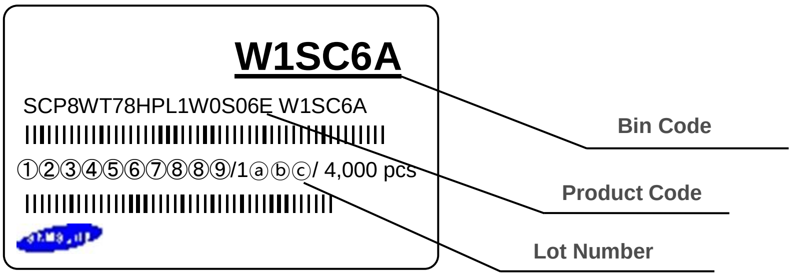
Width	W1	W2
8mm	9 ±0.3	11.9 ±1.0

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


W1SC6A
SCP8WT78HPL1W0S06E W1SC6A
①②③④⑤⑥⑦⑧⑧⑨/1ⓐⓑⓒ/ 4,000 pcs
Bin Code
Product Code
Lot Number

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

Rank Code:

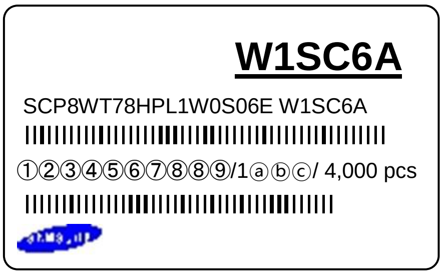
ⓐⓑ: Chromaticity bin (refer to page 9-13)

ⓒⓓ: 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:


W1SC6A
SCP8WT78HPL1W0S06E W1SC6A
①②③④⑤⑥⑦⑧⑧⑨/1ⓐⓑⓒ/ 4,000 pcs

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

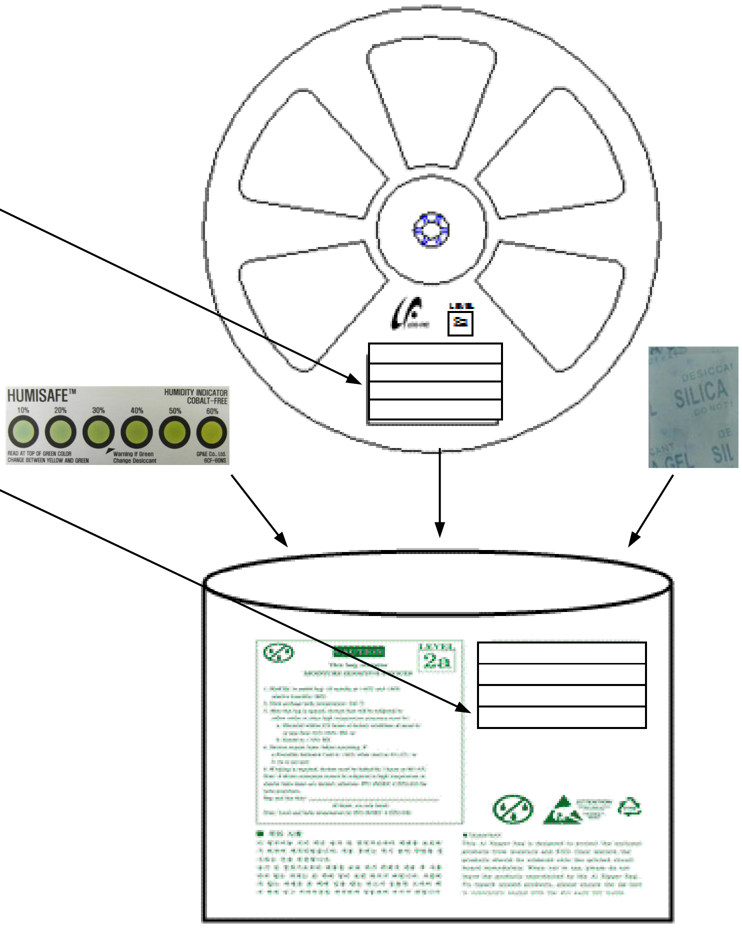
a) Packing Process

Reel

W1SC6A

SCP8WT78HPL1W0S06E W1SC6A

①②③④⑤⑥⑦⑧⑨/1ⓐⓑⓒ/ 4,000 pcs


HUMISAFE™
HUMIDITY INDICATOR COBALT-FREE
10%
20%
30%
40%
50%
60%
SILICA
LEVEL
2a

Aluminum Vinyl Bag

Outer Box

Material: Paper (SW3B(A))

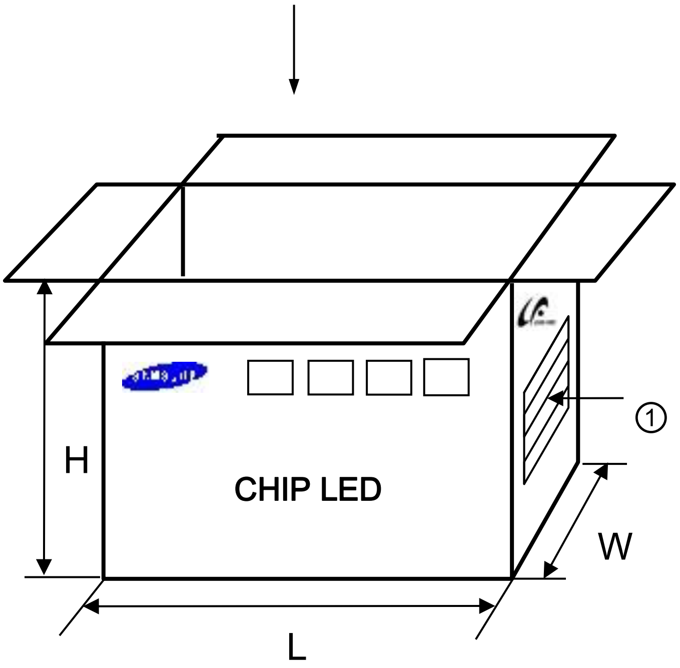
Type	Size (mm)			Note
	L	W	H	
7 inch	295 ± 5	290 ± 5	260 ± 5	Up to 7 reels max.

① **Side Label**

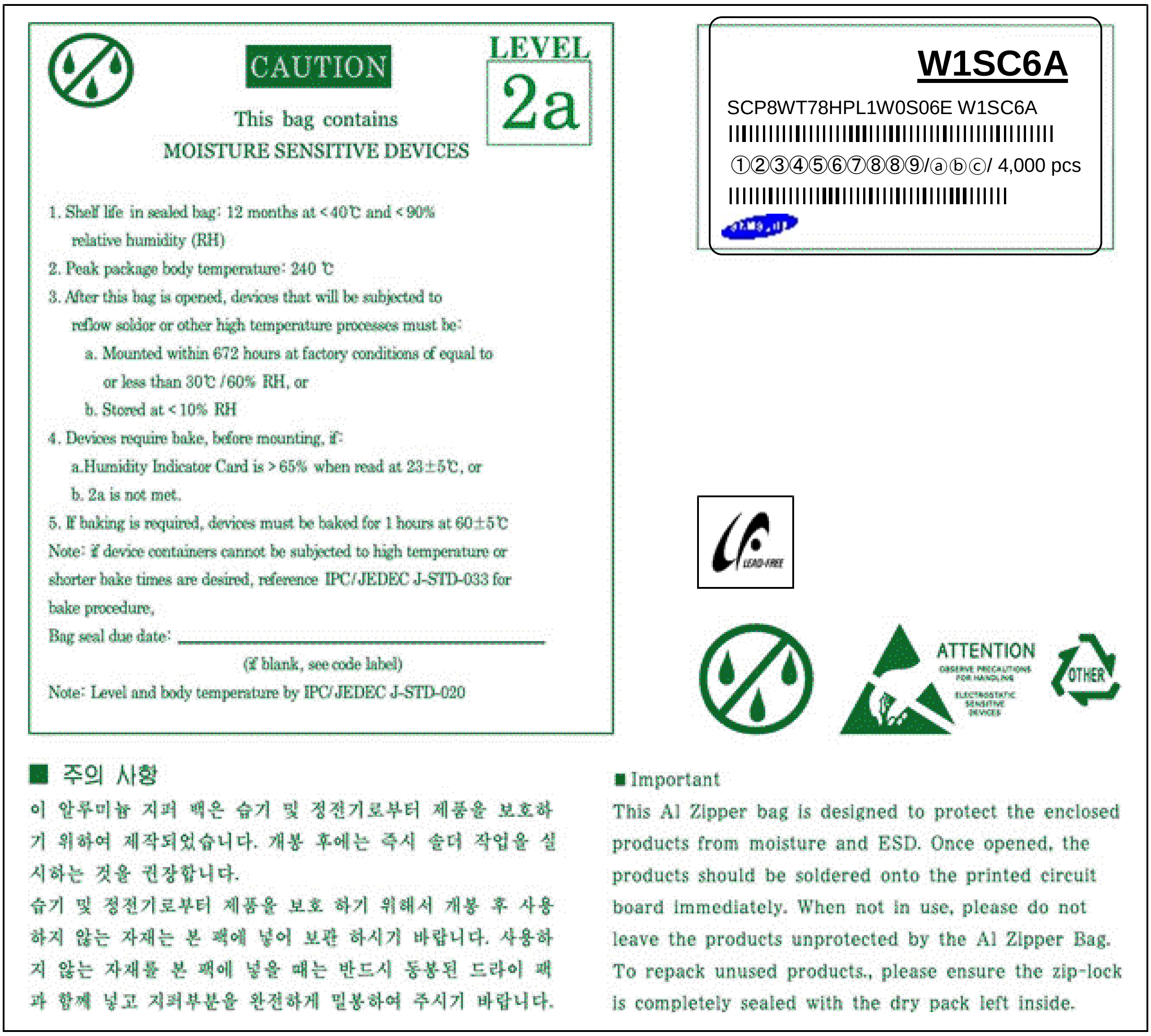
W1SC6A

SCP8WT78HPL1W0S06E W1SC6A

①②③④⑤⑥⑦⑧⑨/1ⓐⓑⓒ/ 28,000 pcs


H
CHIP LED
①
W
L

b) Aluminum Vinyl Packing Bag



CAUTION

This bag contains

MOISTURE SENSITIVE DEVICES

LEVEL

2a

1. Shelf life in sealed bag: 12 months at < 40℃ and < 90% relative humidity (RH)
2. Peak package body temperature: 240 ℃
3. After this bag is opened, devices that will be subjected to reflow soldor or other high temperature processes must be:
   a. Mounted within 672 hours at factory conditions of equal to or less than 30℃ /60% RH, or
   b. Stored at < 10% RH
4. Devices require bake, before mounting, if:
   a.Humidity Indicator Card is > 65% when read at 23±5℃, or
   b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at 60±5℃

Note: if device containers cannot be subjected to high temperature or shorter bake times are desired, reference IPC/JEDEC J-STD-033 for bake procedure,

Bag seal due date: ______________________

(if blank, see code label)

Note: Level and body temperature by IPC/JEDEC J-STD-020

W1SC6A

SCP8WT78HPL1W0S06E W1SC6A

①②③④⑤⑥⑦⑧⑨/ⓐⓑⓒ/ 4,000 pcs

LEAD-FREE
ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICES
OTHER

■ 주의 사항

이 알루미늄 지퍼 백은 습기 및 정전기로부터 제품을 보호하기 위하여 제작되었습니다. 개봉 후에는 즉시 솔더 작업을 실시하는 것을 권장합니다.

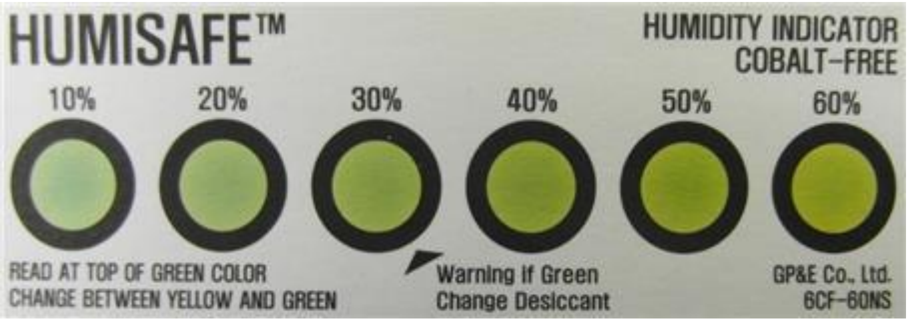
습기 및 정전기로부터 제품을 보호 하기 위해서 개봉 후 사용하지 않는 자재는 본 팩에 넣어 보관 하시기 바랍니다. 사용하지 않는 자재를 본 팩에 넣을 때는 반드시 동봉된 드라이 팩과 함께 넣고 지퍼부분을 완전하게 밀봉하여 주시기 바랍니다.

■ Important

This Al Zipper bag is designed to protect the enclosed products from moisture and ESD. Once opened, the products should be soldered onto the printed circuit board immediately. When not in use, please do not leave the products unprotected by the Al Zipper Bag. To repack unused products., please ensure the zip-lock is completely sealed with the dry pack left inside.

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

DESICCA
SILICA
DO NOT
DE
CANT
A GEL
SIL



HUMISAFE™
HUMIDITY INDICATOR
COBALT-FREE
10%
20%
30%
40%
50%
60%
READ AT TOP OF GREEN COLOR
CHANGE BETWEEN YELLOW AND GREEN
Warning If Green
Change Desiccant
GP&E Co., Ltd.
6CF-60NS

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 ºC, ~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 ºC / 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 >60 % at 23 ± 5 ºC.
8) Devices must be baked for 1 hour at 60 ± 5 ºC, 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.
10) VoCs (Volatile Organic Compounds) can be generated from adhesives, flux, hardener or organic additives used in luminaires (fixtures). LED silicone encapsulant is permeable to those chemicals and they may lead to a discoloration of encapsulant when they exposed to heat or light. This phenomenon can cause a significant loss of light emitted (output) from the luminaires. In order to prevent these problems, we recommend users to know the physical properties of materials used in luminaires and they must be carefully selected.
11) Risk of sulfurization (or tarnishing)

    The LED from Samsung does not use a silver-plated lead frame but if the LED is attached in silver-plated substrate, the surface color of substrate may change to black (or dark colored) when it is exposed to sulfur (S), chlorine (Cl) or other halogen compound. Sulfurization of substrate may cause intensity degradation, change of chromaticity coordinates and, in extreme cases, open circuit, It requires caution. Due to possible sulfurization of substrate, 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.

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