

## High Power LED Series Chip Scale Package

# LH181A



Use of Samsung's Chip Scale Package technology  
provide high performance and energy conserving



### Features & Benefits

- Utilizes Samsung TF chip technology
- Suitable for use in indoor and outdoor lighting
- Compact footprint (1.91 x 1.91 mm)

### Applications

- Indoor Lighting: Spotlight, Downlight, MR, PAR
- Outdoor Lighting: Street Light, Tunnel Light, Security Light, Parking Lot Light
- Industrial Lighting: High Bay Light, Low Bay Light
- Consumer Lighting: Torch Light

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## 1. Characteristics

### a) Absolute Maximum Rating

Item	Symbol	Rating	Unit	Condition
Ambient / Operating Temperature	$T_a$	-40 ~ +105	°C	Note 1)
Storage Temperature	$T_{stg}$	-40 ~ +125	°C	-
LED Junction Temperature	$T_j$	150	°C	-
Forward Current	$I_F$	1500	mA	-
Peak Pulse Forward Current	$I_{FP}$	2000	mA	Duty 1/10 pulse width 10ms
Assembly Process Temperature	-	260 <10	°C s	-
ESD (HBM)	-	±2	kV	-

#### Note:

- 1) Refer to the derating curve, '3. Typical Characteristics Graph', for proper driving current that maintained below maximum junction temperature.

## b) Electro-optical Characteristics

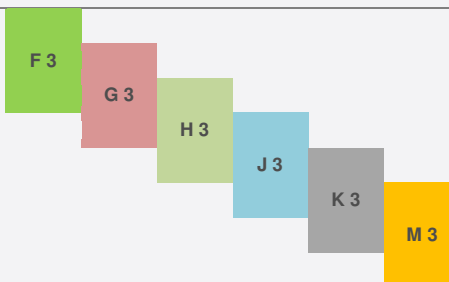
Item	Unit	Nominal CCT (K)	Condition		Value Typ.
			I <sub>F</sub> (mA)	T <sub>J</sub> (°C)	
Luminous Flux (Φ <sub>v</sub> )	lm	5000 (70 CRI)	350	25	172
			350	85	160
			700	85	290
			1000	85	383
			1500	85	489
Forward Voltage (V <sub>F</sub> )	V		350	25	2.92
			350	85	2.82
			700	85	2.97
			1000	85	3.08
			1500	85	3.15
Thermal Resistance (junction to solder point)	°C/W				3
Beam Angle	°				140

**Note:**

Samsung maintains measurement tolerance of: luminous flux = ±7%, forward voltage = ±0.1 V

## 2. Product Code Information

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>
S	C	P	7	R	T	F	1	H	P	L	A	R	T	M	3	4	E

Digit	PKG Information	Code	Specification	
1 2 3	Samsung Chip Scale Package	<b>SCP</b>		
4	CRI	<b>7</b> <b>8</b> <b>9</b>	Min. 70 Min. 80 Min. 90	
5	CCT	<b>W</b> <b>V</b> <b>U</b> <b>T</b> <b>S</b> <b>R</b> <b>Q</b> <b>P</b>	2700K 3000K 3500K 4000K 4500K 5000K 5700K 6500K	
6	Chip Shape	<b>T</b>	Square type	
7 8 9	Product	<b>F1H</b>	Chip version	
10 11	CSP type	<b>PL</b>	PoC for lighting	
12	Product Purpose	<b>A</b>	PKG single product	
13 14	CCT (K)	<b>W0</b> <b>V0</b> <b>U0</b> <b>T0</b> <b>S0</b> <b>RT</b> <b>QT</b> <b>PT</b>	2700 3000 3500 4000 4500 5000 5700 6500	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG 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 S1, S2, S3, S4, S5, S6, S7, S8, S9, SA, SB, SC, SD, SE, SF, SG R1, R2, R3, R4 Q1, Q2, Q3, Q4 P1, P2, P3, P4
15 16	Luminous Flux	<b>F3</b> <b>G3</b> <b>H3</b> <b>J3</b> <b>K3</b> <b>M3</b> <b>N3</b> <b>P3</b>	90~120 100~130 110~140 120~150 130~160 140~170 150~180 160~190	<b>F1</b> 90~100 <b>G1</b> 100~110 <b>H1</b> 110~120 <b>J1</b> 120~130 <b>K1</b> 130~140 <b>M1</b> 140~150 <b>N1</b> 150~160 <b>P1</b> 160~170 
			Digit 15: Min. spec Digit 16: The number of higher bin(s) from min. spec. e.g.: K1 = 130~140 lm, K3 = 130~160 lm	
17 18	Forward Voltage (Vf)	<b>4E</b>	2.7 ~ 3.1 V	Bin Cdoe <b>49</b> 2.7~2.91 <b>9E</b> 2.91~3.1

a) Luminous Flux Bins and Characteristics ( $I_f = 350 \text{ mA}$ ,  $T_s = 85^\circ\text{C}$ )

CRI ( $R_a$ ) Min. <sup>1)</sup>	Nominal CCT (K)	Product Code	Sorting @ 350 mA (lm)		Calculated Minimum Flux <sup>2)</sup> (lm)	
			Flux Rank	Flux Range <sup>1)</sup>	@ 700 mA	@ 1000 mA
70	2700	<i>SCP7WTF1HPLAW0J34E</i>	M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
			J1	120 ~ 130	220	291
	3000	<i>SCP7VTF1HPLAV0K34E</i>	N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
	3500	<i>SCP7UTF1HPLAU0K34E</i>	N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
	4000	<i>SCP7TTF1HPLAT0M34E</i>	P1	160 ~ 170	293	388
			N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
	5000	<i>SCP7RTF1HPLARTM34E</i>	P1	160 ~ 170	293	388
			N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
	5700	<i>SCP7QTF1HPLAQTM34E</i>	P1	160 ~ 170	293	388
			N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
6500	<i>SCP7PTF1HPLAPT M34E</i>	P1	160 ~ 170	293	388	
		N1	150 ~ 160	275	363	
		M1	140 ~ 150	257	339	

**Notes:**

- 1) Samsung maintains measurement tolerance of: luminous flux =  $\pm 7\%$ , CRI =  $\pm 3$
- 2) Calculated minimum and maximum flux values are for reference only

a) Luminous Flux Bins and Characteristics ( $I_f = 350 \text{ mA}$ ,  $T_s = 85^\circ\text{C}$ )

CRI ( $R_a$ ) Min. <sup>1)</sup>	Nominal CCT (K)	Product Code	Sorting @ 350 mA (lm)		Calculated Minimum Flux <sup>2)</sup> (lm)	
			Flux Rank	Flux Range <sup>1)</sup>	@ 700 mA	@ 1000 mA
80	2700	<i>SCP8WTF1HPLAW0J34E</i>	M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
			J1	120 ~ 130	220	291
	3000	<i>SCP8VTF1HPLAV0K34E</i>	N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
	3500	<i>SCP8UTF1HPLAU0K34E</i>	N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
	4000	<i>SCP8TTF1HPLAT0K34E</i>	N1	150 ~ 160	275	363
			M1	140 ~ 150	257	339
			K1	130 ~ 140	238	315
5000	<i>SCP8RTF1HPLARTK34E</i>	N1	150 ~ 160	275	363	
		M1	140 ~ 150	257	339	
		K1	130 ~ 140	238	315	
5700	<i>SCP8QTF1HPLAQTK34E</i>	N1	150 ~ 160	275	363	
		M1	140 ~ 150	257	339	
		K1	130 ~ 140	238	315	
6500	<i>SCP8PTF1HPLAPTK34E</i>	N1	150 ~ 160	275	363	
		M1	140 ~ 150	257	339	
		K1	130 ~ 140	238	315	
90	3000	<i>SCP9VTF1HPLAV0G34E</i>	J1	120 ~ 130	220	291
			H1	110 ~ 120	201	266
			G1	100 ~ 110	184	243
	4000	<i>SCP9TTF1HPLAT0G34E</i>	J1	120 ~ 130	220	291
			H1	110 ~ 120	201	266
			G1	100 ~ 110	184	243

**Notes:**

- 1) Samsung maintains measurement tolerance of: luminous flux =  $\pm 7\%$ , CRI =  $\pm 3$
- 2) Calculated minimum and maximum flux values are for reference only

b) Color Bins ( $I_F = 350 \text{ mA}$ ,  $T_s = 85 \text{ }^\circ\text{C}$ )

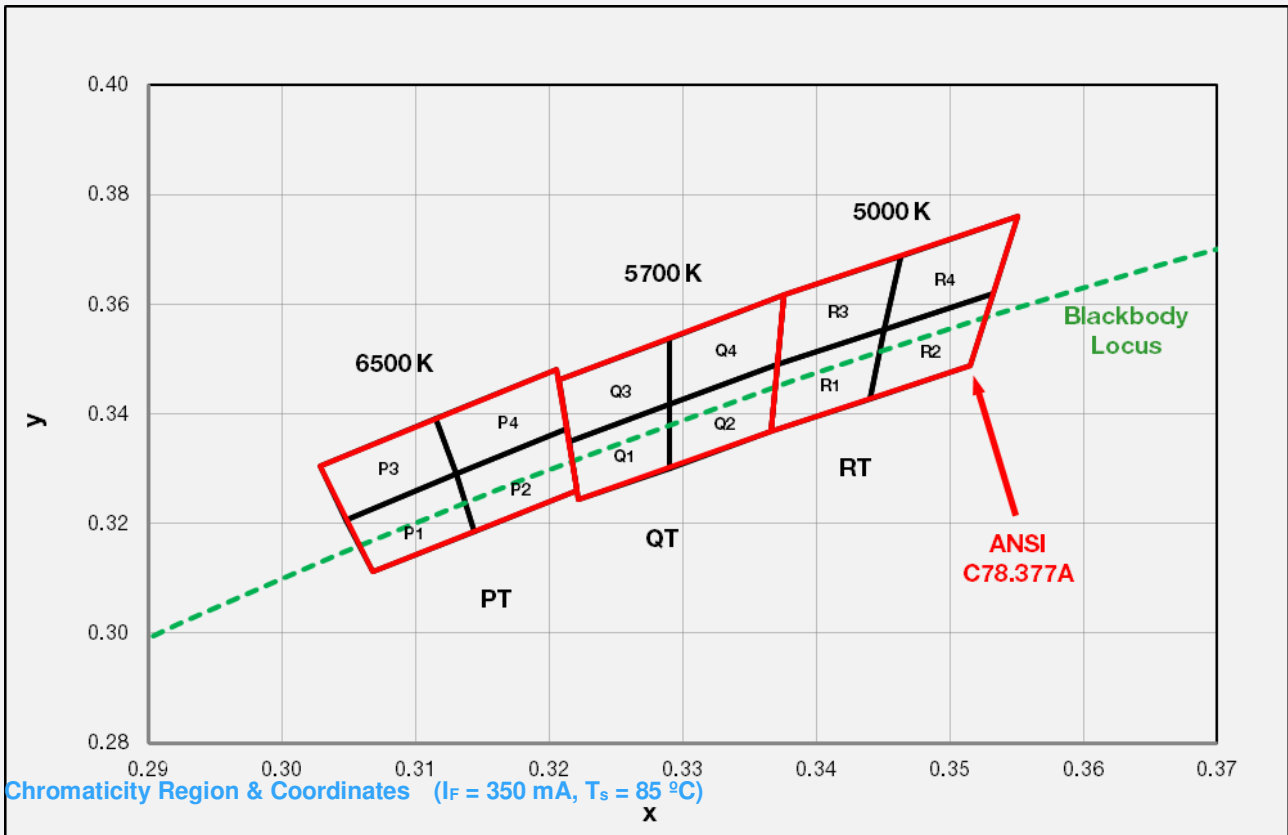
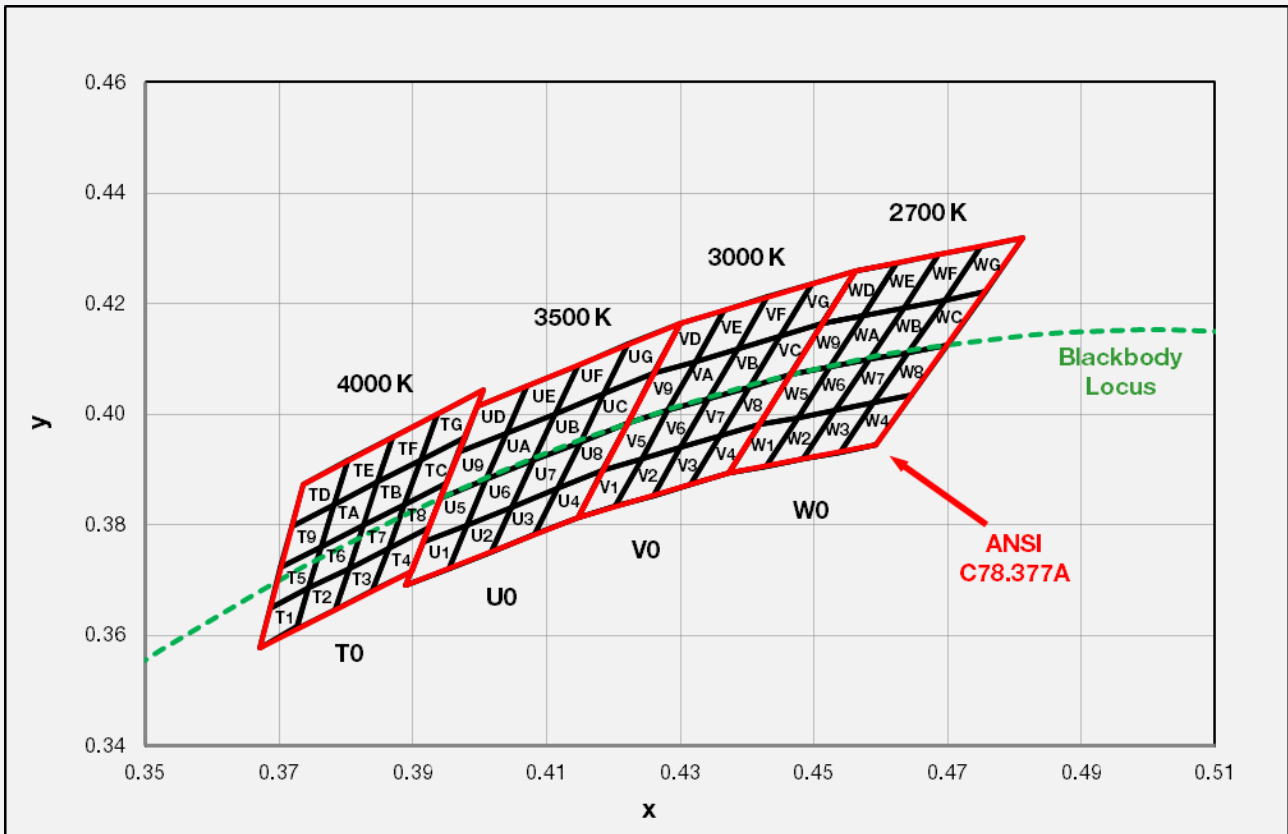
CRI (Ra) Min.	Nominal CCT (K)	Product Code	Color Rank	Chromaticity Bins
70	2700	<i>SCP7WTF1HPLAW0J34E</i>	W0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3000	<i>SCP7VTF1HPLAV0K34E</i>	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	<i>SCP7UTF1HPLAU0K34E</i>	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
	4000	<i>SCP7TTF1HPLAT0M34E</i>	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
	5000	<i>SCP7RTF1HPLARTM34E</i>	RT (ANSI bin)	R1, R2, R3, R4
	5700	<i>SCP7QTF1HPLAQTM34E</i>	QT (ANSI bin)	Q1, Q2, Q3, Q4
	6500	<i>SCP7PTF1HPLAPTM34E</i>	PT (ANSI bin)	P1, P2, P3, P4
80	2700	<i>SCP8WTF1HPLAW0J34E</i>	W0 (Whole bin)	W1, W2, W3, W4, W5, W6, W7, W8, W9, WA, WB, WC, WD, WE, WF, WG
	3000	<i>SCP8VTF1HPLAV0K34E</i>	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	3500	<i>SCP8UTF1HPLAU0K34E</i>	U0 (Whole bin)	U1, U2, U3, U4, U5, U6, U7, U8, U9, UA, UB, UC, UD, UE, UF, UG
	4000	<i>SCP8TTF1HPLAT0K34E</i>	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG
	5000	<i>SCP8RTF1HPLARTK34E</i>	RT (ANSI bin)	R1, R2, R3, R4
	5700	<i>SCP8QTF1HPLAQTK34E</i>	QT (ANSI bin)	Q1, Q2, Q3, Q4
	6500	<i>SCP8PTF1HPLAPTK34E</i>	PT (ANSI bin)	P1, P2, P3, P4
90	3000	<i>SCP9VTF1HPLAV0G34E</i>	V0 (Whole bin)	V1, V2, V3, V4, V5, V6, V7, V8, V9, VA, VB, VC, VD, VE, VF, VG
	4000	<i>SCP9TTF1HPLAV0G34E</i>	T0 (Whole bin)	T1, T2, T3, T4, T5, T6, T7, T8, T9, TA, TB, TC, TD, TE, TF, TG



**c) Voltage Bins ( $I_F = 350 \text{ mA}$ ,  $T_s = 85 \text{ }^\circ\text{C}$ )**

CRI (Ra) Min.	Nominal CCT (K)	Product Code	Voltage Rank	Voltage Bin	Voltage Range (V)
			4E	49	2.7 ~ 2.91
				9E	2.91 ~ 3.1

d) Chromaticity Region & Coordinates ( $I_f = 350 \text{ mA}$ ,  $T_s = 85 \text{ }^\circ\text{C}$ )



d) Chromaticity Region & Coordinates ( $I_f = 350 \text{ mA}$ ,  $T_s = 85 \text{ }^\circ\text{C}$ )

Region	CIE x	CIE y	Region	CIE x	CIE y
<b>W rank (2700 K)</b>					
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

<b>V rank (3000 K)</b>					
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
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
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
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
V5	0.4373	0.3893	VD	0.4465	0.4071
	0.4183	0.3898		0.4259	0.4073
	0.4221	0.3984		0.4299	0.4165
V6	0.4281	0.4006	VE	0.4364	0.4188
	0.4242	0.3919		0.4322	0.4096
	0.4342	0.4028		0.4364	0.4188
V7	0.4300	0.3939	VF	0.4430	0.4212
	0.4342	0.4028		0.4385	0.4119
	0.4403	0.4049		0.4430	0.4212
V8	0.4359	0.3960	VG	0.4496	0.4236
	0.4359	0.3960		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

Region	CIE x	CIE y	Region	CIE x	CIE y
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## d) Chromaticity Region &amp; Coordinates

Region	CIE x	CIE y	Region	CIE x	CIE y
<b>U rank (3500 K)</b>					
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
<b>T rank (4000 K)</b>					
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

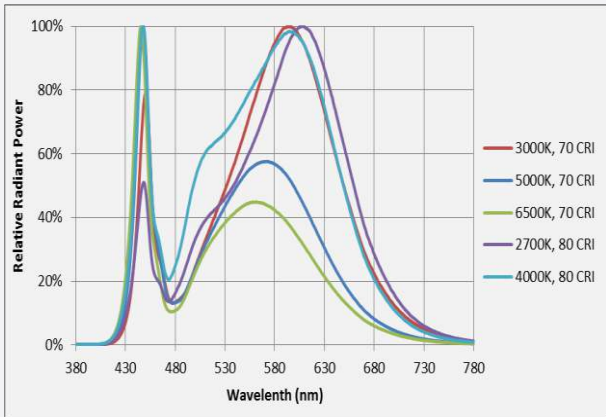
Region	CIE x	CIE y	Region	CIE x	CIE y	Region	CIE x	CIE y
<b>R rank (5000 K)</b>			<b>Q rank (5700 K)</b>			<b>P rank (6500 K)</b>		
R1	0.3371	0.3490	Q1	0.3215	0.3350	P1	0.3068	0.3113
	0.3451	0.3554		0.3290	0.3417		0.3144	0.3186
	0.3440	0.3427		0.3290	0.3300		0.3130	0.3290
	0.3366	0.3369		0.3222	0.3243		0.3048	0.3207
R2	0.3451	0.3554	Q2	0.3290	0.3417	P2	0.3144	0.3186
	0.3533	0.3620		0.3371	0.3490		0.3221	0.3261
	0.3515	0.3487		0.3366	0.3369		0.3213	0.3373
	0.3440	0.3427		0.3290	0.3300		0.3130	0.3290
R3	0.3376	0.3616	Q3	0.3207	0.3462	P3	0.3048	0.3207
	0.3463	0.3687		0.3290	0.3538		0.3130	0.3290
	0.3451	0.3554		0.3290	0.3417		0.3115	0.3391
	0.3371	0.3490		0.3215	0.3350		0.3028	0.3304
R4	0.3463	0.3687	Q4	0.3290	0.3538	P4	0.3130	0.3290
	0.3551	0.3760		0.3376	0.3616		0.3213	0.3373
	0.3533	0.3620		0.3371	0.3490		0.3205	0.3481
	0.3451	0.3554		0.3290	0.3417		0.3115	0.3391

**Note:**

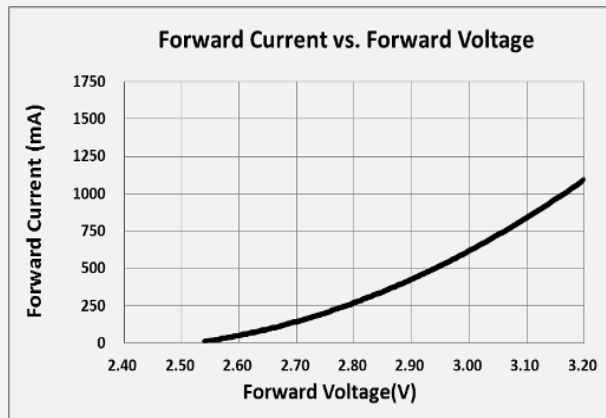
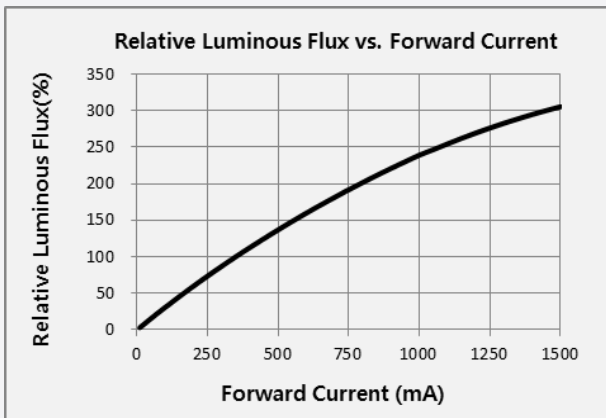
Samsung maintains measurement tolerance of:  $C_x, C_y = \pm 0.005$

### 3. Typical Characteristics Graphs

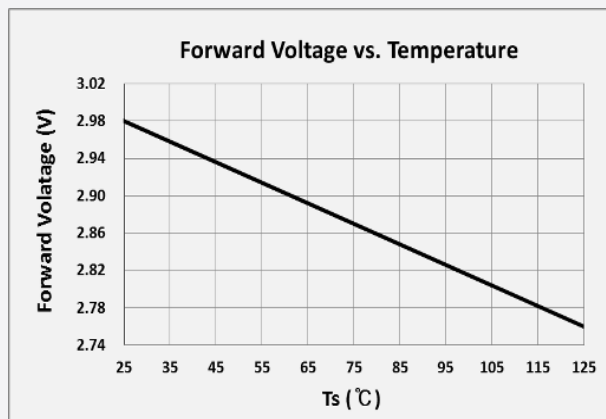
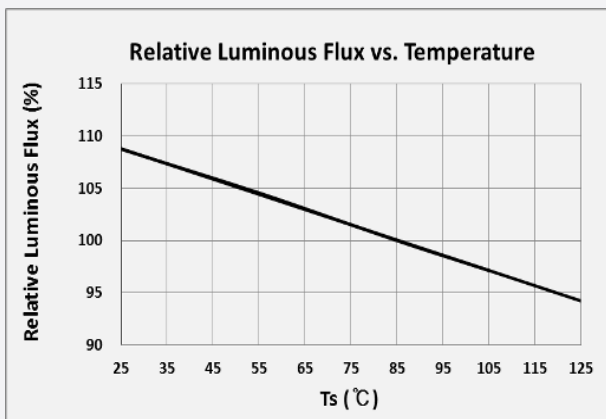
#### a) Spectrum Distribution ( $I_F = 350 \text{ mA}$ , $T_s = 85 \text{ }^\circ\text{C}$ )



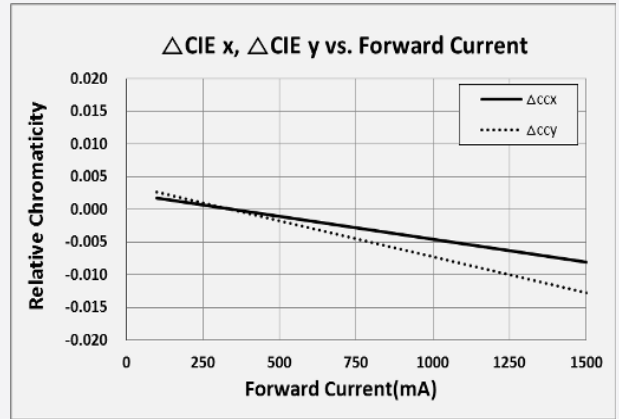
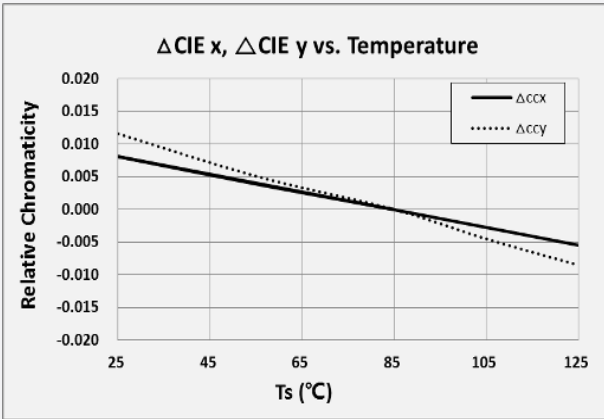
#### b) Forward Current Characteristics ( $T_s = 85 \text{ }^\circ\text{C}$ )



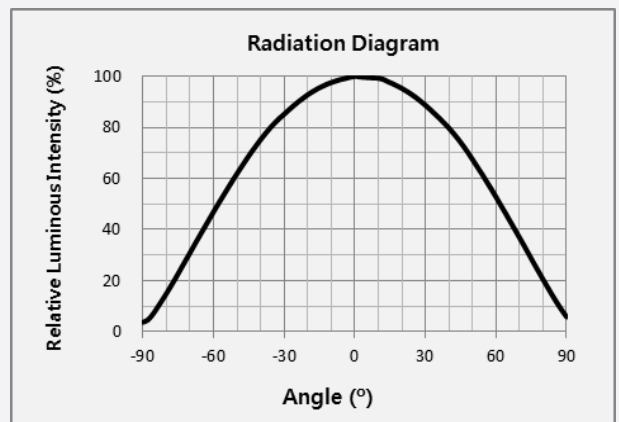
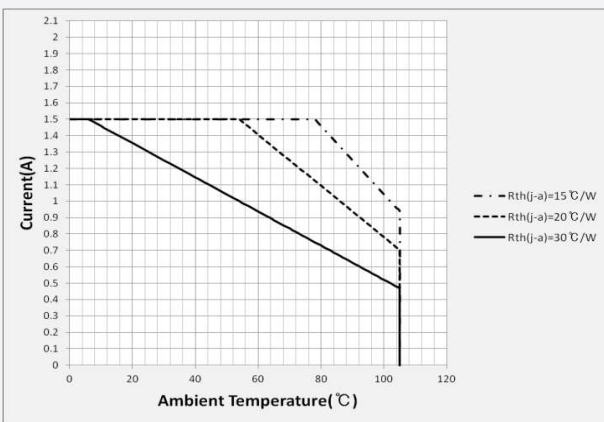
#### c) Temperature Characteristics ( $I_F = 350 \text{ mA}$ )



d) Color Shift Characteristics ( $I_F = 350 \text{ mA}$ ,  $T_s = 85 \text{ }^\circ\text{C}$ )

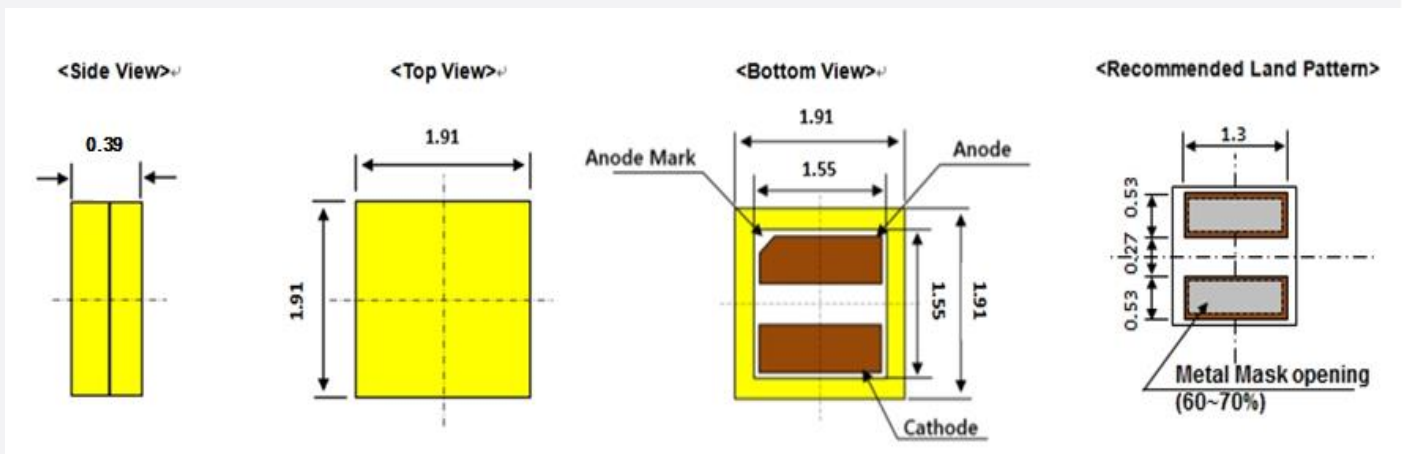


e) Derating Curve and Beam Angle Characteristics ( $I_F = 350 \text{ mA}$ ,  $T_s = 25 \text{ }^\circ\text{C}$ )



#### 4. Outline Drawing & Dimension

1. Tolerance is  $\pm 0.10$  mm
2. Do not place LEDs with pressure



#### 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 Size
Room Temperature Life Test	25 °C, Derating maximum current	1000 h	22
High Temperature Life Test	85 °C, Derating maximum current	1000 h	22
High Temperature Humidity Life Test	60 °C, 90% RH, Derating maximum current	1000 h	22
Low Temperature Life Test	-40 °C, Derating maximum current	1000 h	22
Temperature Humidity Cycle Test	-10 °C ↔ 25 °C 95 % RH ↔ 65 °C 95 % RH Derating maximum current	10 cycles	11
Powered Temperature Cycle Test	-40 °C / 85 °C each 20 min, 100 min transfer power on/off each 5 min, Derating maximum current	100 cycles	11
Thermal Shock	-45 °C / 15 min ↔ 125 °C / 15 min temperature change within 5 min	500 cycles	100
High Temperature Storage	120 °C	1000 h	11
Low Temperature Storage	-40 °C	1000 h	11
ESD (HBM)	<p>           R<sub>1</sub>: 10 MΩ            R<sub>2</sub>: 1.5 kΩ            C: 100 pF            V: ±2 kV         </p>	5 times	30
ESD (MM)		R <sub>1</sub> : 10 MΩ R <sub>2</sub> : 0 C: 200 pF V: ±0.2 kV	5 times
Vibration Test	20~2000~20 Hz, 200 m/s <sup>2</sup> , 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

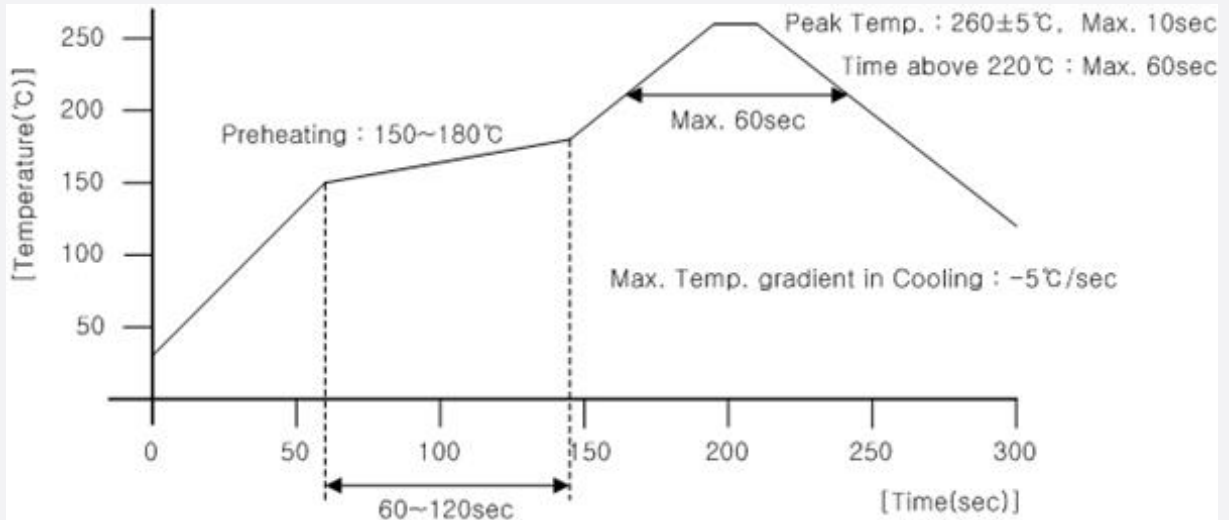
### b) Criteria for Judging the Damage

Item	Symbol	Test Condition (T <sub>s</sub> = 25 °C)	Limit	
			Min.	Max.
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 350 mA	Init. Value * 0.9	Init. Value * 1.1
Luminous Flux	Φ <sub>v</sub>	I <sub>F</sub> = 350 mA	Init. Value * 0.7	Init. Value * 1.1

## 6. Soldering Conditions

### a) Reflow Conditions (Pb free)

Reflow frequency: 2 times max.

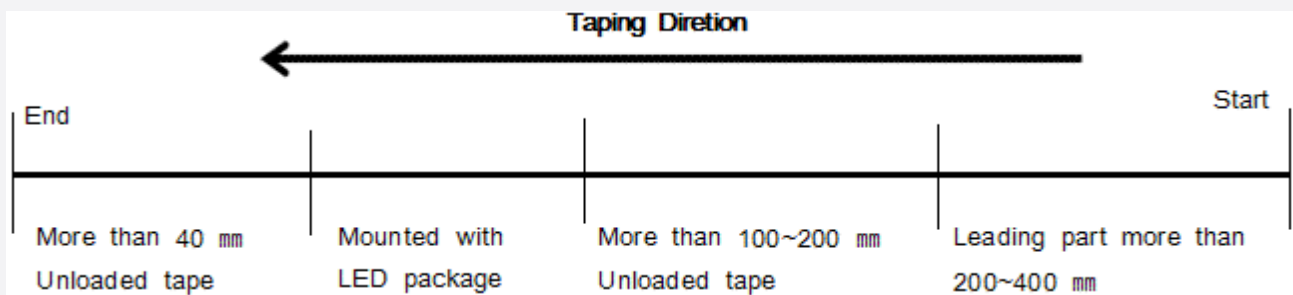
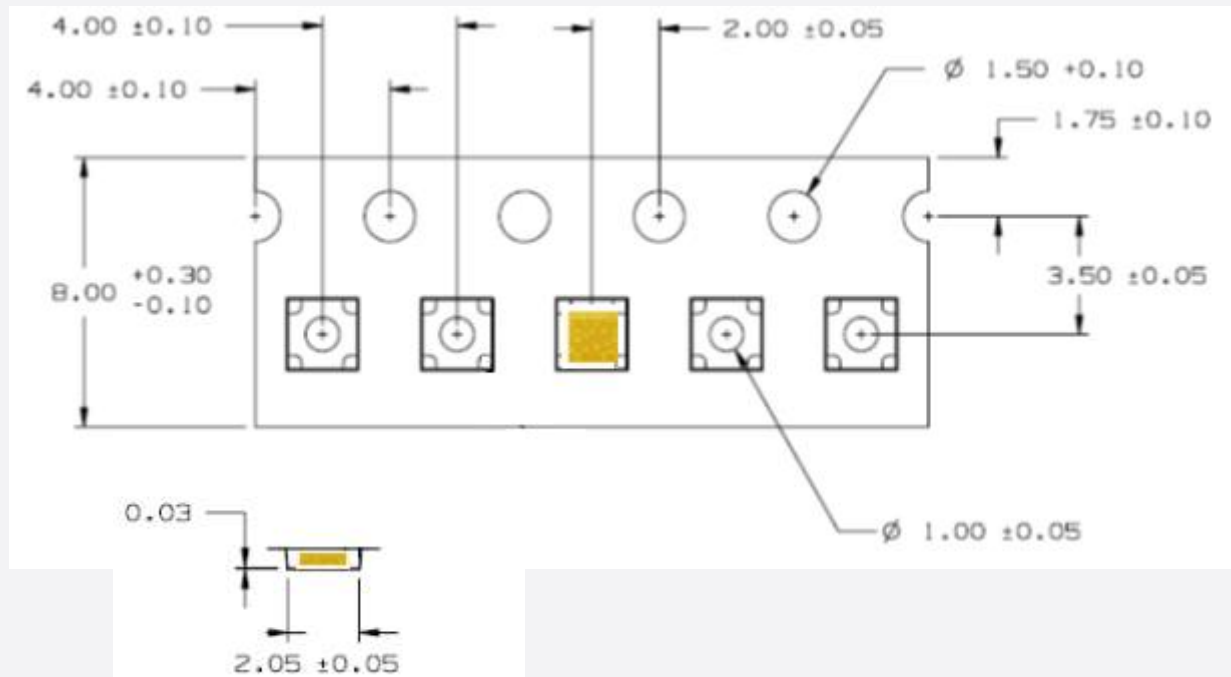


### b) Manual Soldering Conditions

No more than 5 seconds @ max. 300 °C, under soldering iron.

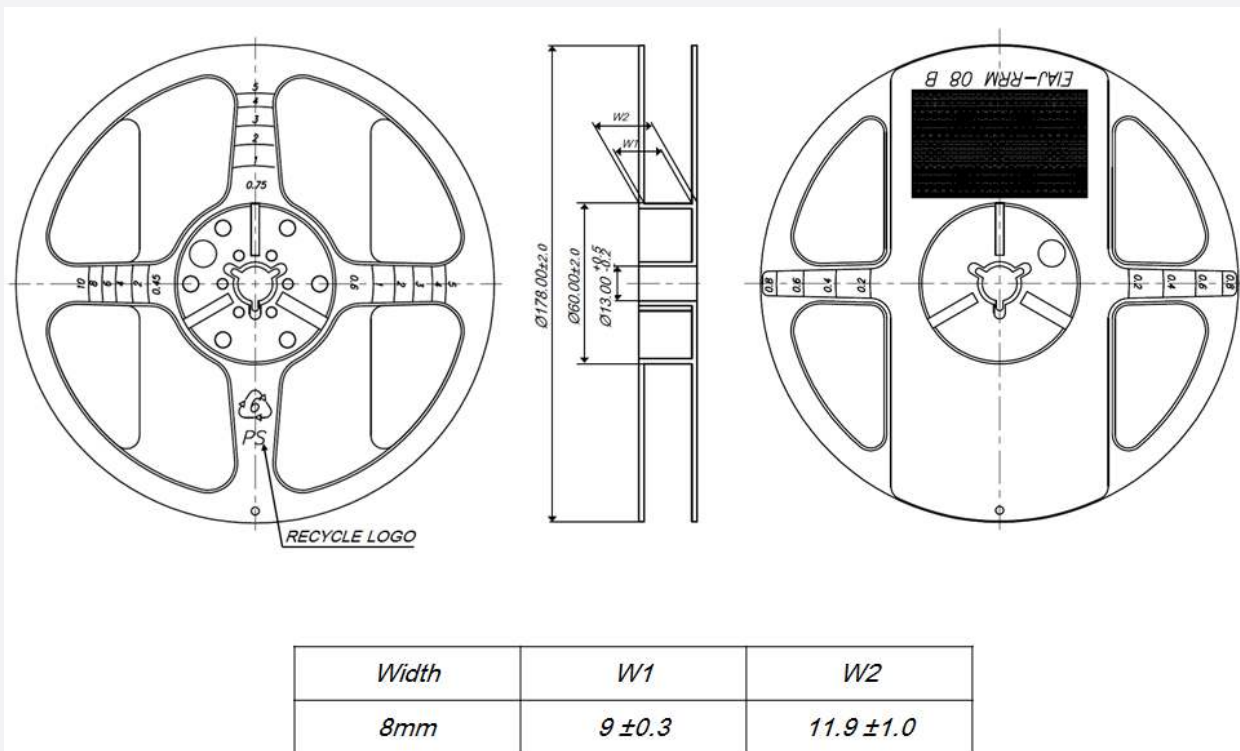
## 7. Tape & Reel

### a) Taping Dimension



## b) Reel Dimension

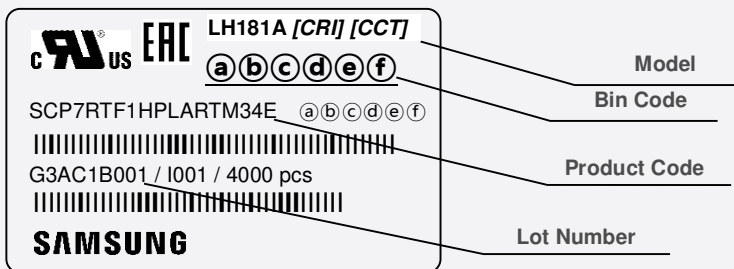
(unit: mm)

**Notes:**

- 1) Quantity: The quantity/reel is 4,000 pcs
- 2) Cumulative tolerance: Cumulative tolerance / 10 pitches is  $\pm 0.2$  mm
- 3) 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
- 4) 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 (see description on page -)

Bin Code:

- ⒶⒷ: Chromaticity bin (refer to page 11)
- ⒸⒹ: Luminous Flux bin (refer to page 6-7)
- ⒺⒻ: Voltage bin (refer to page 9)

### b) Lot Number

The lot number is composed of the following characters:




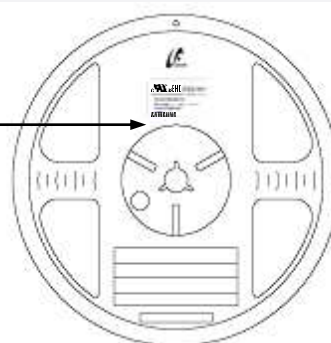
- ①② : Production site (G3 : Shenzhen, China, G4 :Guangzhou, China, GB : Nanchang, China)
- ③ : Product state (A : Normal, B : Bulk, C : First Production, R : Reproduction, S : Sample)
- ④ : Year (Y : 2014, Z : 2015, A : 2016, ...)
- ⑤ : Month (1, 2, ..., 7: July, ..., A: Oct., B: Nov., C: Dec.)
- ⑥ : Day (1~9, A: 10, ..., K: 20, ..., U: 30, V:31)
- ⑦⑧⑨ : Product serial number (001 ~ 999)
- ⒶⒷⒸ : Reel number (001~999) or (AAA~ZZZ)

## 9. Packing Structure


### a) Packing Process

Reel


**LH181A [CRI] [CCT]**  
**RTM14E**  
 SCP7RTF1HPLARTM34E RTM14E  
 G3AC1B001 / I001 / 4000 pcs  
**SAMSUNG**



Aluminum Vinyl Packing Bag



**LH181A [CRI] [CCT]**  
**RTM14E**  
 SCP7RTF1HPLARTM34E RTM14E  
 G3AC1B001 / I001 / 4000 pcs  
**SAMSUNG**

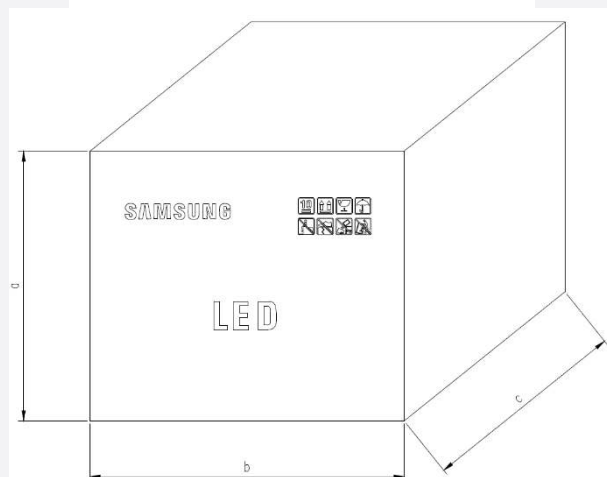


Outer Box


Material: Paper SW(B)

Type	Size (mm)			Note
	(a)	(b)	(c)	
7 inch	245 ± 5	220 ± 5	182 ± 5	Up to 10 reels


**LH181A [CRI] [CCT]**  
**RTM14E**  
 SCP7RTF1HPLARTM34E RTM14E  
 G3AC1B001 / I001 / 4000 pcs  
**SAMSUNG**



### b) Aluminum Vinyl Packing Bag



**CAUTION**

This bag contains  
**MOISTURE SENSITIVE DEVICES**

**LEVEL**

2a

1. Shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
2. Peak package body temperature: 240 °C
3. After this bag is opened, devices that will be subjected to reflow solder or other high temperature processes must be:
  - a. Mounted within 672 hours at factory conditions of equal to or less than 30°C /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°C, or
  - b. 2a is not met.
5. If baking is required, devices must be baked for 1 hours at 60±5°C

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

c

us

EAC

LH181A [CRI] [CCT]

RTM14E

SCP7RTF1HPLARTM34E RTM14E

G3AC1B001 / I001 / 4000 pcs

SAMSUNG



**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



10. Precautions in Handling & Use

- 1) For over-current protection, users are recommended to apply resistors connected in series with the LEDs to mitigate sudden change of the forward current caused by shift of forward voltage.
- 2) This device should not be used in any type of fluid such as water, oil, organic solvent, etc. When cleaning is required, IPA is recommended as the cleaning agent. Some solvent-based cleaning agent may damage the silicone resins used in the device.
- 3) When the device is in operation, the forward current should be carefully determined considering the maximum ambient temperature and corresponding junction temperature.
- 4) LEDs must be stored in a clean environment.
- 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 °C / 60 % RH, or
  - b. Stored at <10 % RH
- 6) Repack unused devices 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 °C.
- 8) Devices must be baked for 1 hour at 60 ± 5 °C, if baking is required.
- 9) The LEDs are sensitive to the static electricity and surge current. 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 leakage 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). Transparent 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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Samsung inspires the world and shapes the future with transformative ideas and technologies.

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