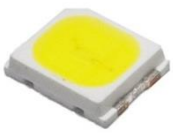
CUSTOMER : .

DATE : Mar. 12, 2018 .

REV : REV. 5.0 .

SPECIFICATIONS FOR APPROVAL



3528 B101 Series

MODEL NAME : LEMWS28U80◇SZ200 Series

RoHS Compliant

APPROVAL	REMARK	APPENDIX

DESIGNED	CHECKED	APPROVED
2018.03.12	2018.03.12	2018.03.12
I. J. Woo	D. H. Yu	J. H. Kim

LG Innotek

CONTENTS

1. Features

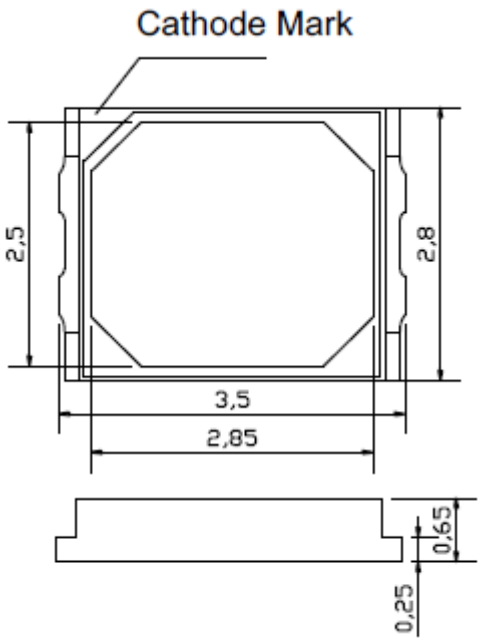
- Lighting Color : White
- Lead Frame Type LED Package : 2.8 x 3.5 x 0.70 (L x W x H) [Unit : mm]
- Viewing Angle : 120˚
- Chip Material : InGaN
- Soldering Methods : Reflow soldering
- Taping : 8 mm conductive black carrier tape and antistatic clear cover tape
  4,000 pcs/reel, Φ178 mm reel

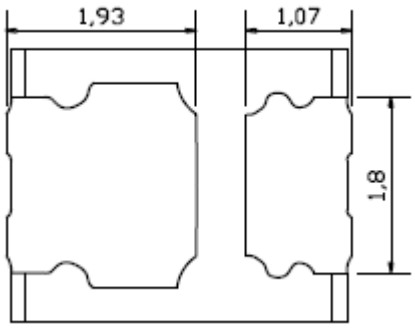
2. Application

- Interior Illumination

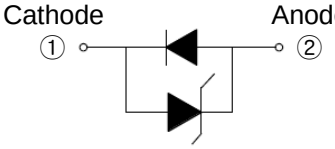
3. Outline Dimensions

(Unit : mm)





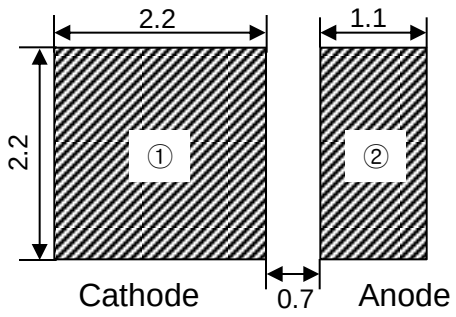
Internal circuit



Pad Configuration

① Cathode Pad
② Anode Pad

Recommendable soldering pattern
(For reflow soldering)



Tolerances unless otherwise mentioned are ± 0.10 mm

4. Absolute Maximum Ratings

(Ta=25℃)

Item	Symbol	Rating	Unit
Forward Current	If	180	mA
Pulse Forward Current*1)	Ifp	400	mA
Operating Temperature	Topr	-40 ~ +85	℃
Storage Temperature	Tstg	-40 ~ +100	℃
Junction Temperature	Tj	110	℃
Soldering Temperature	JEDEC-J-STD-020D		
ESD Classification	Class 2 (ANSI/ESDA/JEDEC JS-001)		

*1) Pulse width ≤10ms and duty cycle ≤10%

※ Operating the LED beyond the listed maximum ratings may affect device reliability and cause permanent damage. These or any other conditions beyond those indicated under recommended operating conditions are not implied. The exposure to the absolute maximum rated conditions may affect device reliability.

※ The LEDs are not designed to be driven in reverse bias.

5. Electro - Optical Characteristics

(Ta=25℃)

Item	Symbol	CCT	Luminous Flux @150mA			Unit
			Min.	Typ.	Max.	
Luminous Flux	Φv	6500 (F)	54.0	58.0	62.0	lm
		5700 (G)	54.0	58.2	62.0	
		5000 (H)	54.0	58.0	62.0	
		4000 (J)	54.0	58.2	62.0	
		3500 (K)	52.0	56.5	60.0	
		3000 (L)	50.0	54.7	58.0	
		2700 (M)	48.0	53.1	56.0	
Forward Voltage	Vf	All	3.0	3.2	3.4	V
Color Coordinate	Cx / Cy	All	Refer to '6. Bin Structures			-
Viewing Angle	2Θ1/2	All	-	120	-	deg
Color Rendering Index (CRI)	-	All	80.0	-	-	-
Thermal Resistance, Junction to Solder Point	Rth j-s	All	-	20	-	℃/W

*1) Measured at Ta between 25℃ and 85℃.

※ These values are measured by the LG Innotek optical spectrum analyzer within the following tolerances. Luminous Flux (Φv) : ±7%, Forward Voltage (Vf) : ±0.1V, Color Value : ±0.005, CRI Value : ±2,

※ Although all LEDs are tested by LG Innotek equipment, some values may vary slightly depending on the conditions of the test equipment.

5. Electro - Optical Characteristics

(Ta=25℃)

CCT	If (mA)	Vf (V)	Power (W)	Φv (lm)	lm/W
6500K (F)	120	3.12	0.374	48.6	130
	150 (Typ.)	3.20	0.481	58.0	120
	160	3.23	0.516	61.2	119
	170	3.26	0.554	64.0	116
	180	3.28	0.591	66.7	113
5700K (G)	120	3.12	0.374	48.6	130
	150 (Typ.)	3.20	0.481	58.2	121
	160	3.23	0.516	61.3	119
	170	3.26	0.554	64.3	116
	180	3.28	0.591	66.8	113
5000K (H)	120	3.12	0.374	48.6	130
	150 (Typ.)	3.20	0.481	58.0	120
	160	3.23	0.516	61.2	119
	170	3.26	0.554	64.0	116
	180	3.28	0.591	66.7	113
4000K (J)	120	3.12	0.374	48.9	131
	150 (Typ.)	3.20	0.481	58.2	121
	160	3.23	0.516	61.3	119
	170	3.26	0.554	64.4	116
	180	3.28	0.591	67.0	113
3500K (K)	120	3.12	0.374	47.1	126
	150 (Typ.)	3.20	0.481	56.5	117
	160	3.23	0.516	59.2	115
	170	3.26	0.554	62.0	112
	180	3.28	0.591	64.4	109
3000K (L)	120	3.12	0.374	45.9	122
	150 (Typ.)	3.20	0.481	54.7	114
	160	3.23	0.516	57.9	112
	170	3.26	0.554	60.3	109
	180	3.28	0.591	62.9	106
2700K (M)	120	3.12	0.374	44.2	118
	150 (Typ.)	3.20	0.481	53.1	110
	160	3.23	0.516	55.8	108
	170	3.26	0.554	58.1	105
	180	3.28	0.591	60.6	103

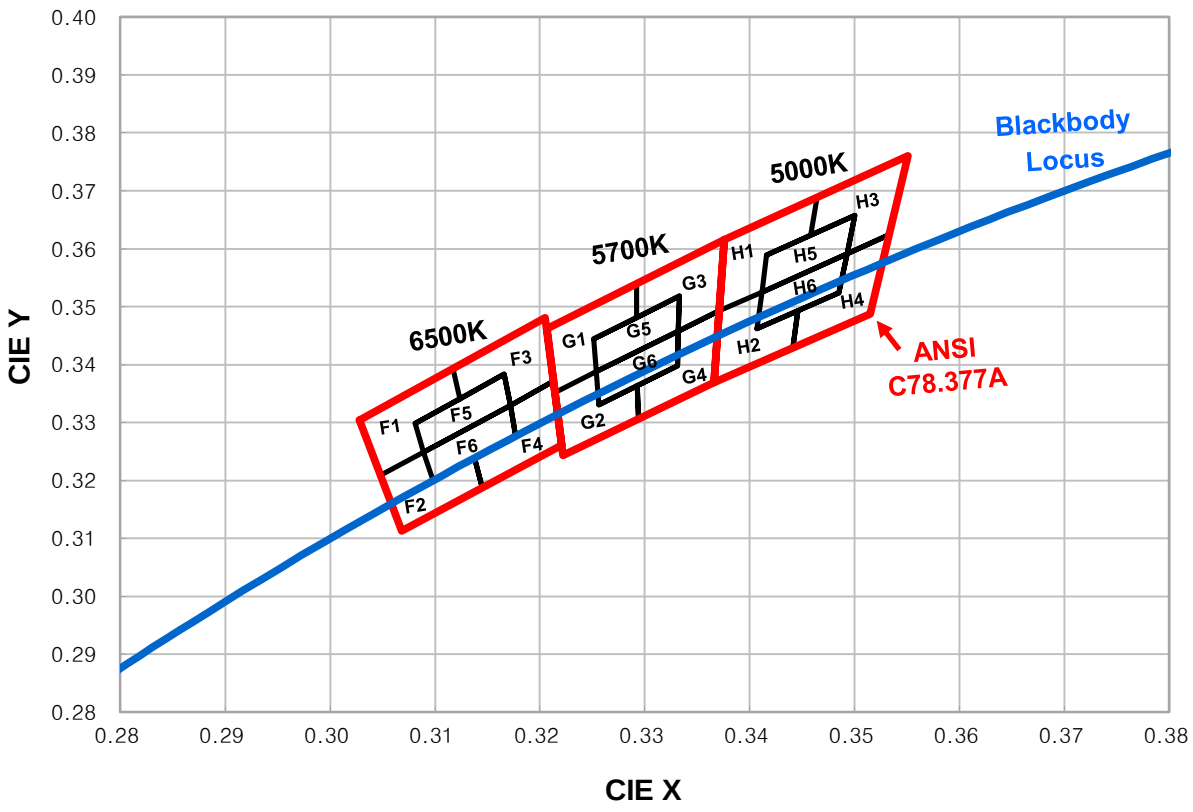
6. Flux Characteristics and Order Code

Color	CRI	CCT	Vf @ 150mA [V]	Luminous Flux [lm] @ 150mA			Order Code
				Bin Code	Min.	Max.	
Cool	80	6500 (F)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	54.0	62.0	LEMWS28U80MSZ200
Cool	80	5700 (G)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	54.0	62.0	LEMWS28U80LSZ200
Cool	80	5000 (H)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	54.0	62.0	LEMWS28U80KSZ200
Neutral	80	4000 (J)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	54.0	62.0	LEMWS28U80JSZ200
Warm	80	3500 (K)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	52.0	60.0	LEMWS28U80HSZ200
Warm	80	3000 (L)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	50.0	58.0	LEMWS28U80GSZ200
Warm	80	2700 (M)	3.00 ~ 3.10 (1) 3.10 ~ 3.20 (2) 3.20 ~ 3.30 (3) 3.30 ~ 3.40 (4)	U	48.0	56.0	LEMWS28U80FSZ200

※ Φv values are for representative references only.

7. Chromaticity Bins (Cool White)

LG Innotek complies with the ANSI C78.377A standard for its chromaticity bin structure. For each ANSI quadrangle for the CCT range of 2700K to 6500K, LG Innotek provides 6 micro bins at 150mA, Ta 25℃.

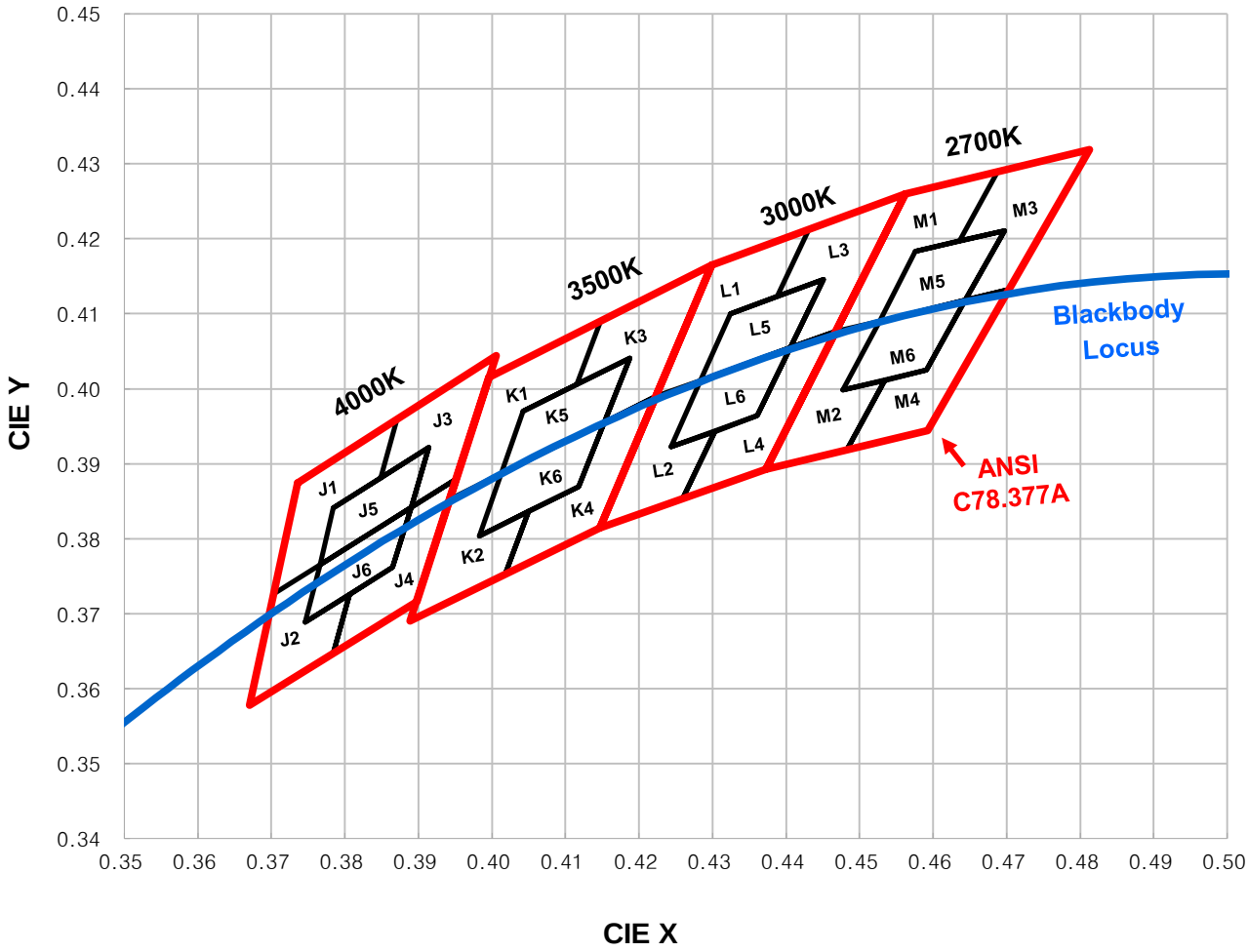


Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
F1	0.3048	0.3209	G1	0.3215	0.3353	H1	0.3371	0.3493
	0.3028	0.3304		0.3207	0.3462		0.3376	0.3616
	0.3117	0.3393		0.3292	0.3539		0.3464	0.3688
	0.3124	0.3341		0.3292	0.3481		0.3458	0.3623
	0.3081	0.3299		0.3251	0.3444		0.3416	0.3589
	0.3089	0.3249		0.3254	0.3388		0.3412	0.3525
F2	0.3068	0.3113	G2	0.3222	0.3243	H2	0.3366	0.3369
	0.3048	0.3209		0.3215	0.3353		0.3371	0.3493
	0.3089	0.3249		0.3254	0.3388		0.3412	0.3525
	0.3098	0.3200		0.3256	0.3331		0.3407	0.3462
	0.3138	0.3238		0.3293	0.3364		0.3446	0.3493
	0.3145	0.3187		0.3294	0.3306		0.3441	0.3428

7. Chromaticity Bins (Continued)

Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
F3	0.3117	0.3393	G3	0.3292	0.3539	H3	0.3464	0.3688
	0.3205	0.3481		0.3376	0.3616		0.3551	0.3760
	0.3213	0.3371		0.3371	0.3493		0.3533	0.3624
	0.3172	0.3330		0.3332	0.3458		0.3493	0.3591
	0.3166	0.3384		0.3333	0.3518		0.3500	0.3657
	0.3124	0.3341		0.3292	0.3481		0.3458	0.3623
F4	0.3145	0.3187	G4	0.3294	0.3306	H4	0.3441	0.3428
	0.3138	0.3238		0.3293	0.3364		0.3446	0.3493
	0.3177	0.3277		0.3331	0.3398		0.3485	0.3524
	0.3172	0.3330		0.3332	0.3458		0.3493	0.3591
	0.3213	0.3371		0.3371	0.3493		0.3533	0.3624
	0.3221	0.3261		0.3366	0.3369		0.3515	0.3487
F5	0.3081	0.3299	G5	0.3251	0.3444	H5	0.3416	0.3589
	0.3166	0.3384		0.3333	0.3518		0.3500	0.3657
	0.3172	0.3330		0.3332	0.3458		0.3493	0.3591
	0.3089	0.3249		0.3254	0.3388		0.3412	0.3525
F6	0.3089	0.3249	G6	0.3254	0.3388	H6	0.3412	0.3525
	0.3172	0.3330		0.3332	0.3458		0.3493	0.3591
	0.3177	0.3277		0.3331	0.3398		0.3485	0.3524
	0.3098	0.3200		0.3256	0.3331		0.3407	0.3462

7. Chromaticity Bins (Continued)



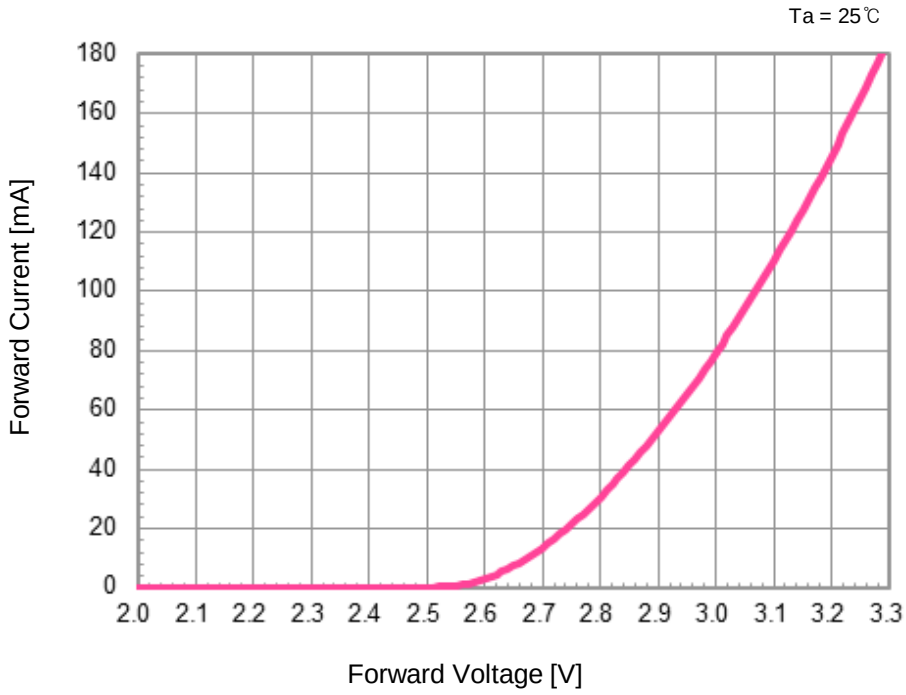
Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
J1	0.3703	0.3726	K1	0.3943	0.3853	L1	0.4223	0.3990	M1	0.4468	0.4077
	0.3736	0.3874		0.3996	0.4015		0.4299	0.4165		0.4562	0.4260
	0.3871	0.3959		0.4148	0.4090		0.4431	0.4213		0.4688	0.4290
	0.3849	0.3881		0.4115	0.4006		0.4388	0.4123		0.4636	0.4197
	0.3784	0.3841		0.4042	0.3970		0.4324	0.410		0.4576	0.4183
	0.3766	0.3765		0.4013	0.3887		0.4284	0.4011		0.4527	0.4090
J2	0.3670	0.3578	K2	0.3889	0.369	L2	0.4147	0.3814	M2	0.4373	0.3893
	0.3703	0.3726		0.3943	0.3853		0.4223	0.3990		0.4468	0.4077
	0.3766	0.3765		0.4013	0.3887		0.4284	0.4011		0.4527	0.4090
	0.3746	0.3689		0.3983	0.3804		0.4244	0.3923		0.4477	0.3998
	0.3806	0.3725		0.4050	0.3837		0.4303	0.3943		0.4534	0.4011
	0.3784	0.3647		0.4018	0.3752		0.4260	0.3854		0.4483	0.3919

7. Chromaticity Bins (Continued)

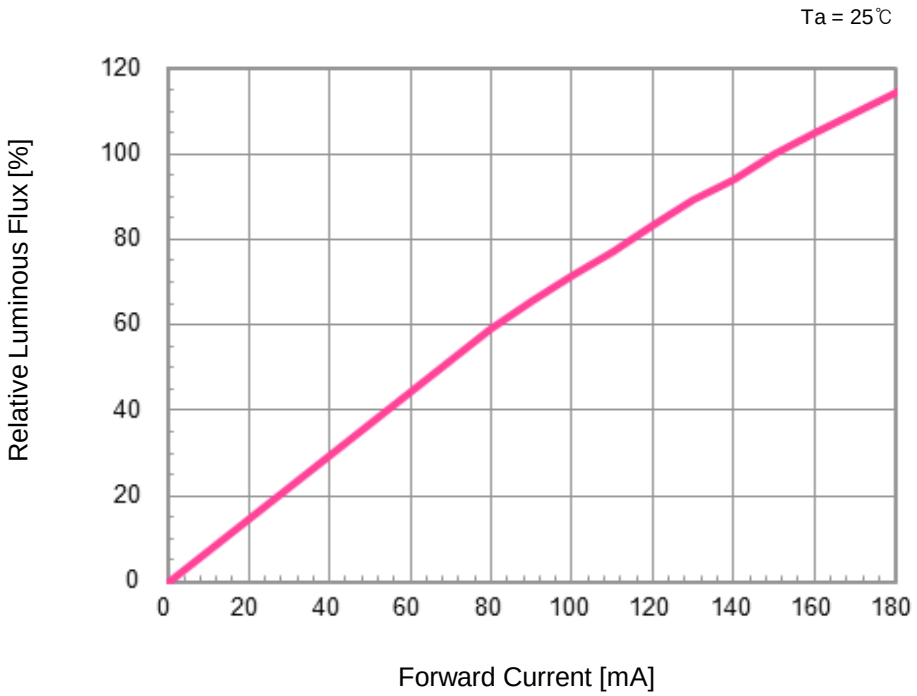
Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
J3	0.3871	0.3959	K3	0.4148	0.409	L3	0.4431	0.4213	M3	0.4688	0.4290
	0.4006	0.4044		0.4299	0.4165		0.4562	0.4260		0.4813	0.4319
	0.3952	0.3880		0.4223	0.3990		0.4468	0.4077		0.4703	0.4132
	0.3890	0.3842		0.4153	0.3955		0.4406	0.4055		0.4644	0.4118
	0.3914	0.3922		0.4188	0.4041		0.4451	0.4146		0.4697	0.4211
	0.3849	0.3881		0.4115	0.4006		0.4388	0.4123		0.4636	0.4197
J4	0.3784	0.3647	K4	0.4018	0.3752	L4	0.4260	0.3854	M4	0.4483	0.3919
	0.3806	0.3725		0.4050	0.3837		0.4303	0.3943		0.4534	0.4011
	0.3865	0.3762		0.4118	0.3869		0.4361	0.3964		0.4591	0.4025
	0.3890	0.3842		0.4153	0.3955		0.4406	0.4055		0.4644	0.4118
	0.3952	0.3880		0.4223	0.3990		0.4468	0.4077		0.4703	0.4132
	0.3898	0.3716		0.4147	0.3814		0.4373	0.3893		0.4593	0.3944
J5	0.3784	0.3841	K5	0.4042	0.3970	L5	0.4324	0.4100	M5	0.4576	0.4183
	0.3914	0.3922		0.4188	0.4041		0.4451	0.4146		0.4697	0.4211
	0.3890	0.3842		0.4153	0.3955		0.4406	0.4055		0.4644	0.4118
	0.3766	0.3765		0.4013	0.3887		0.4284	0.4011		0.4527	0.4090
J6	0.3766	0.3765	K6	0.4013	0.3887	L6	0.4284	0.4011	M6	0.4527	0.4090
	0.3890	0.3842		0.4153	0.3955		0.4406	0.4055		0.4644	0.4118
	0.3865	0.3762		0.4118	0.3869		0.4361	0.3964		0.4591	0.4025
	0.3746	0.3689		0.3983	0.3804		0.4244	0.3923		0.4477	0.3998

8. Typical Characteristic Curves

▪ Forward Current vs. Forward Voltage

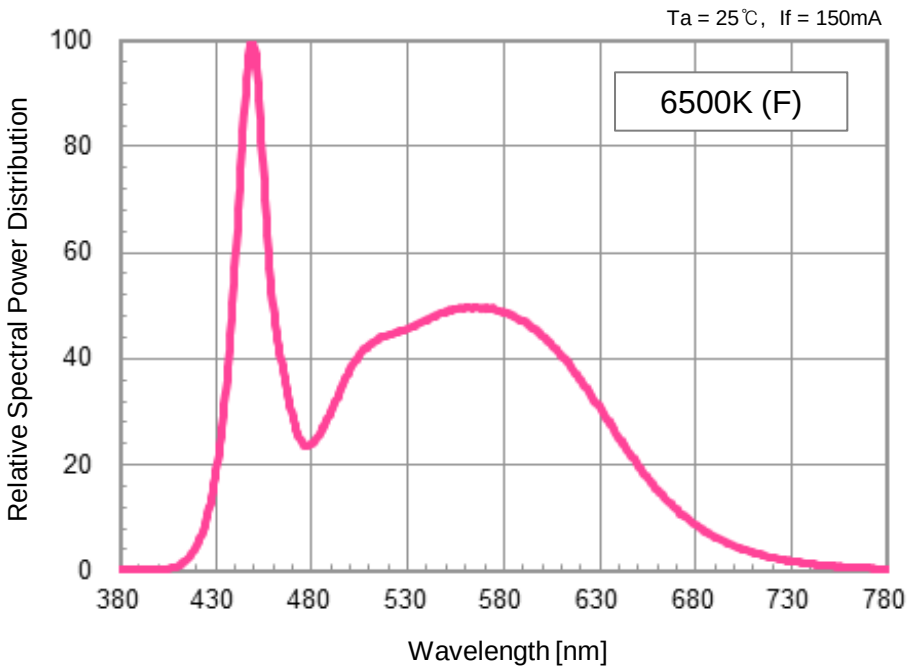


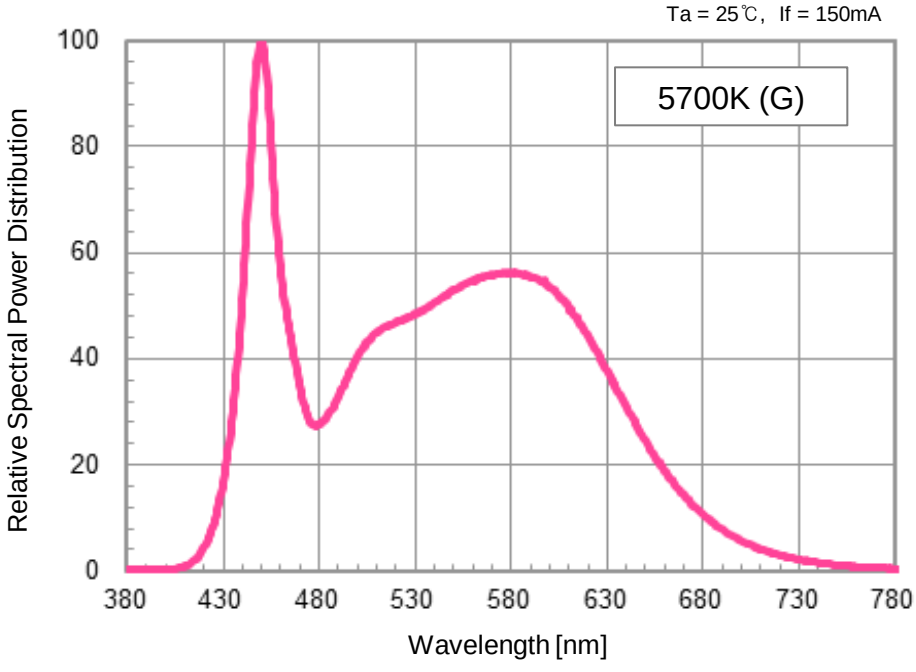
▪ Relative Luminous Flux vs. Forward Current



8. Typical Characteristic Curves

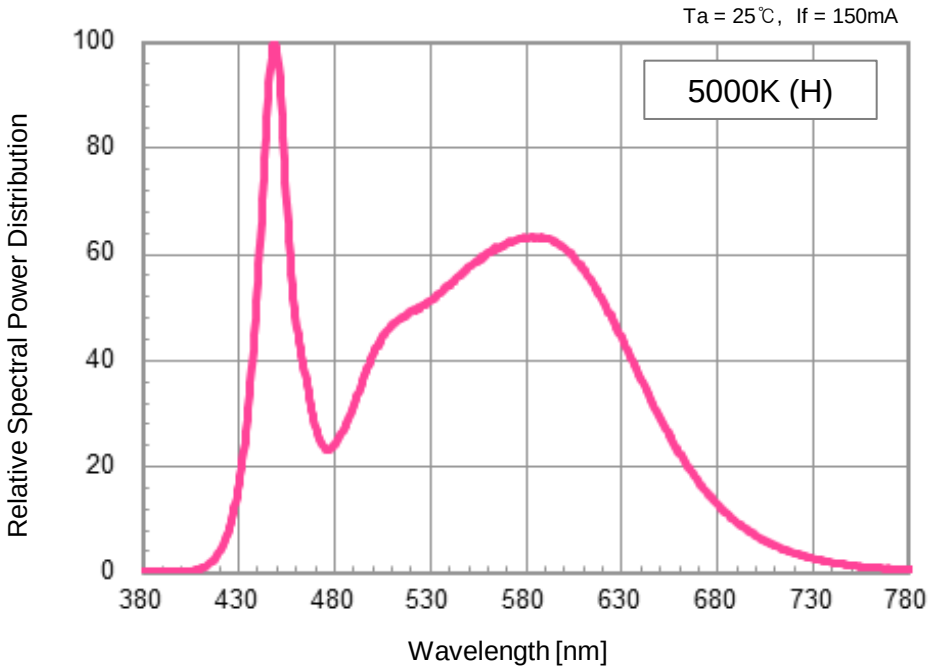
▪ Spectrum

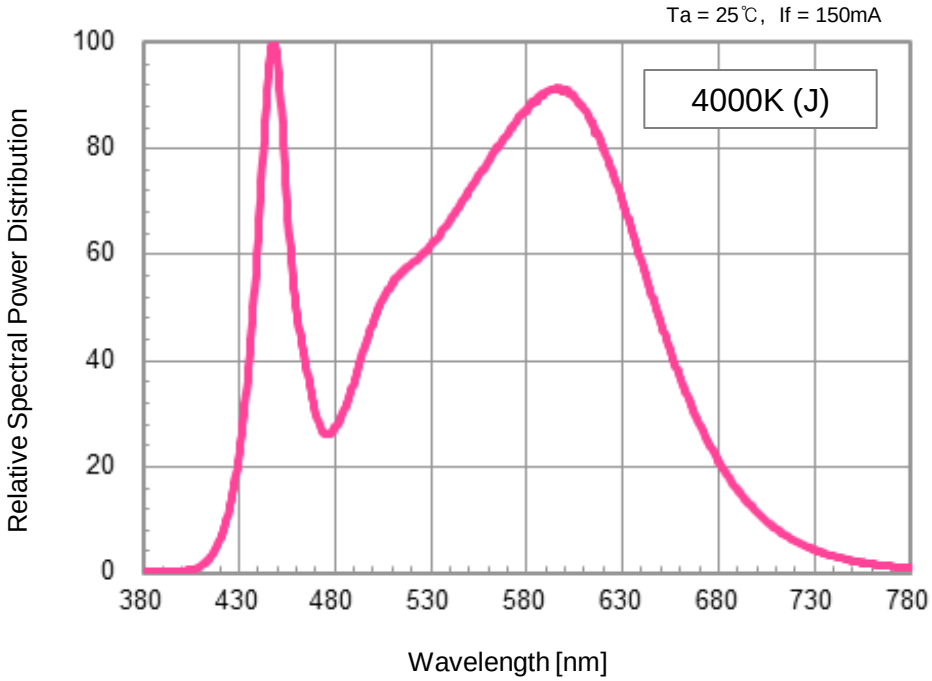




8. Typical Characteristic Curves

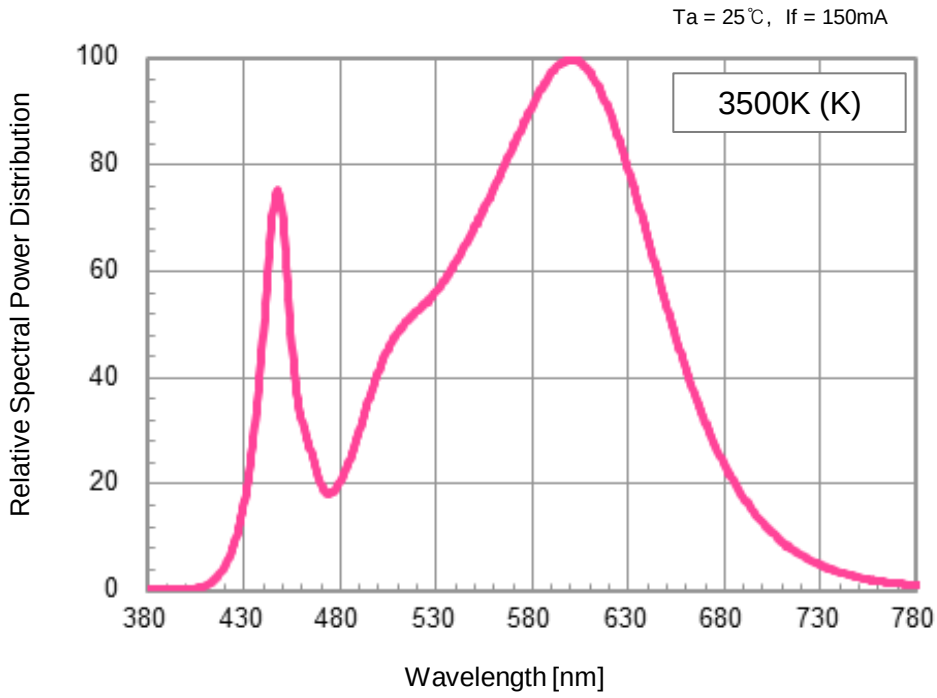
▪ Spectrum

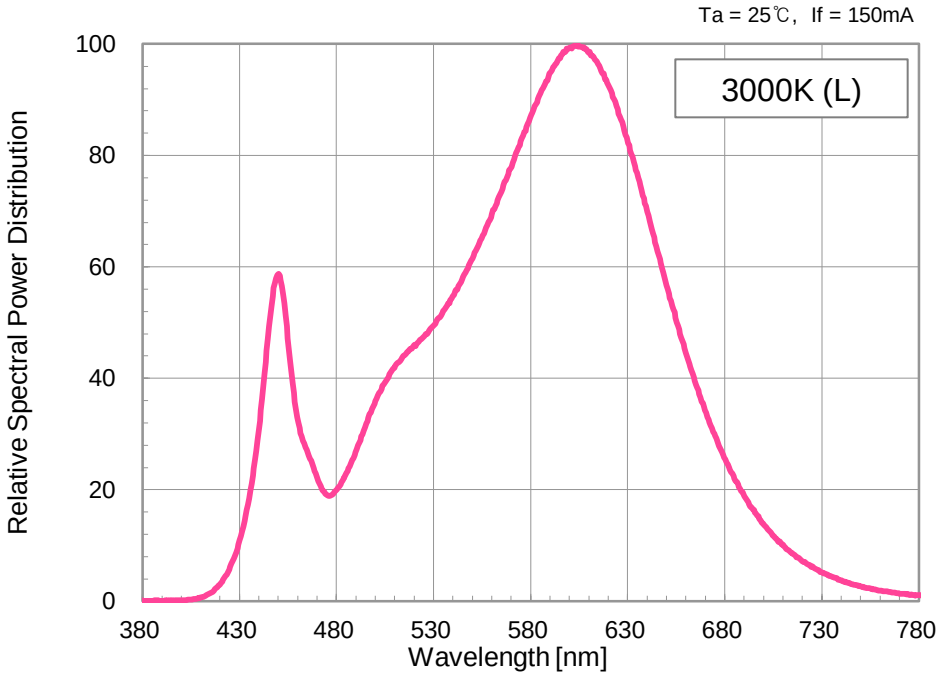




8. Typical Characteristic Curves

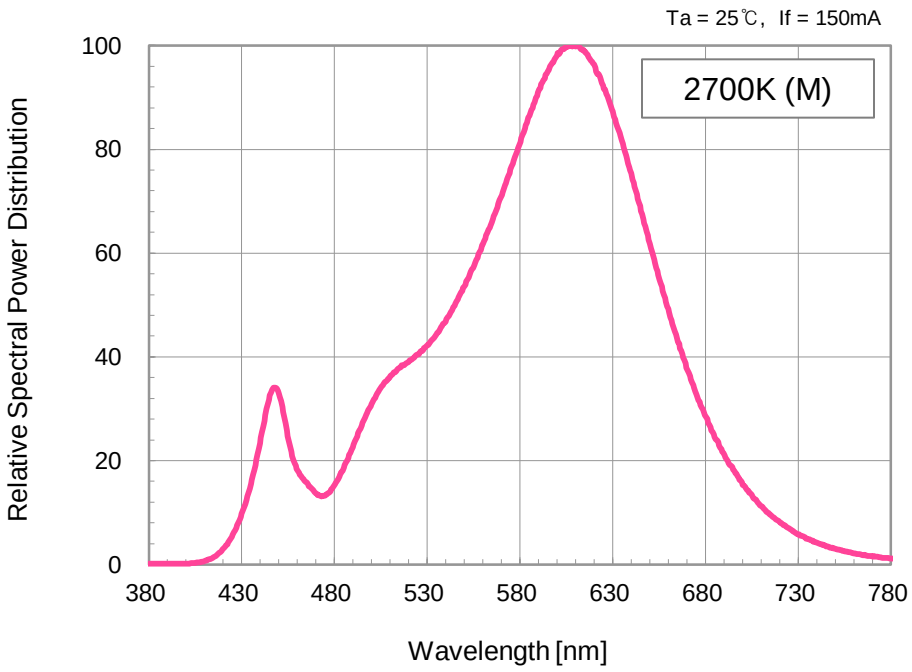
▪ Spectrum





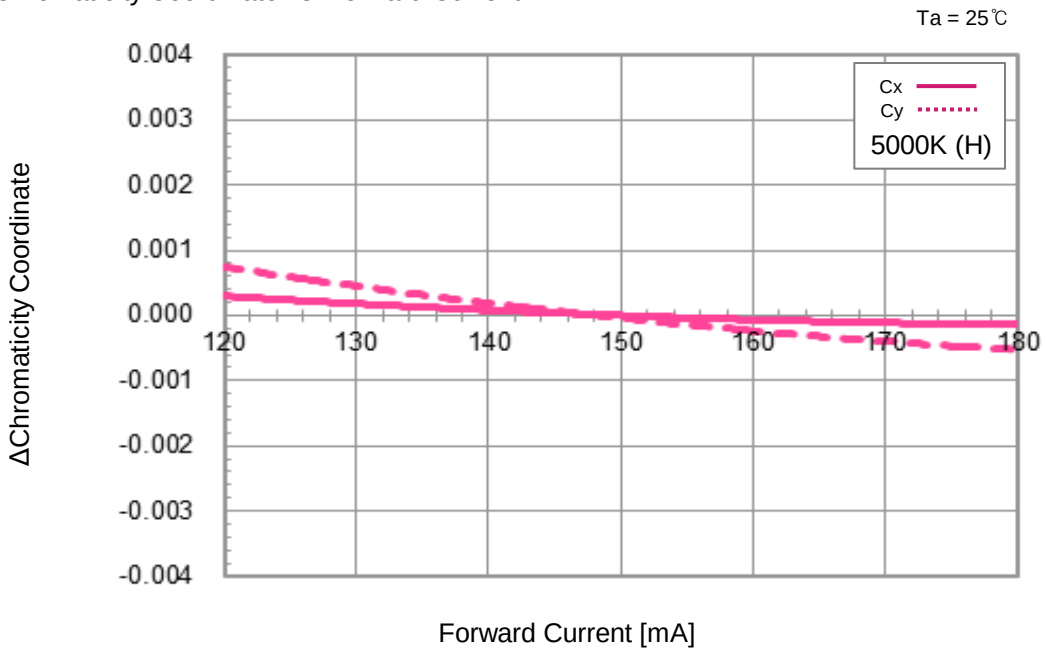
8. Typical Characteristic Curves

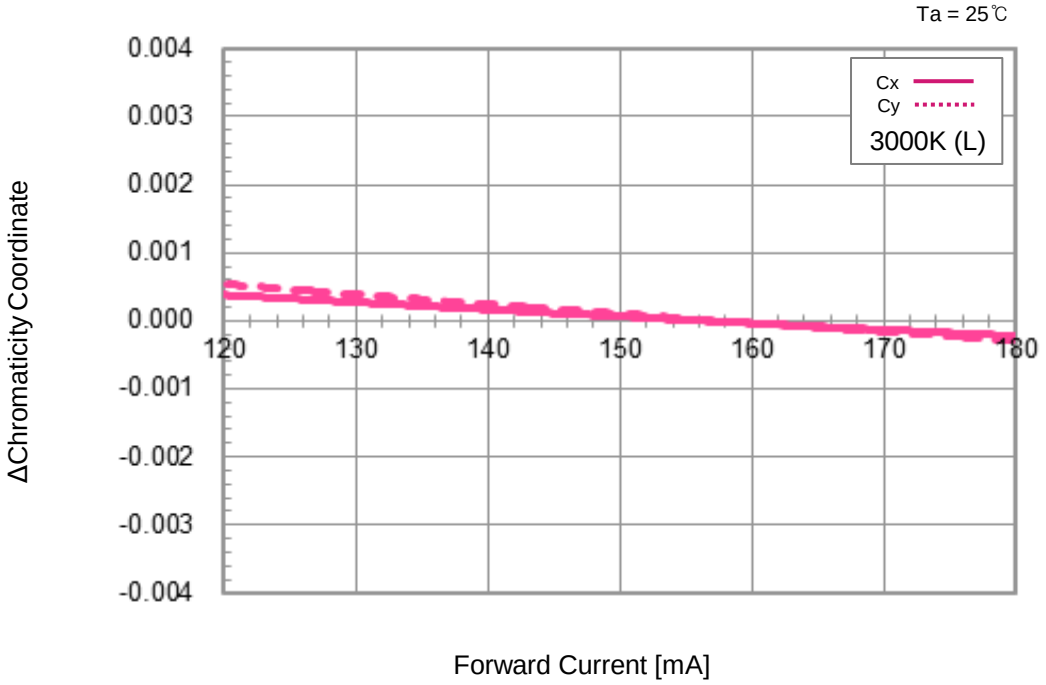
▪ Spectrum



8. Typical Characteristic Curves

▪ Chromaticity Coordinate vs. Forward Current

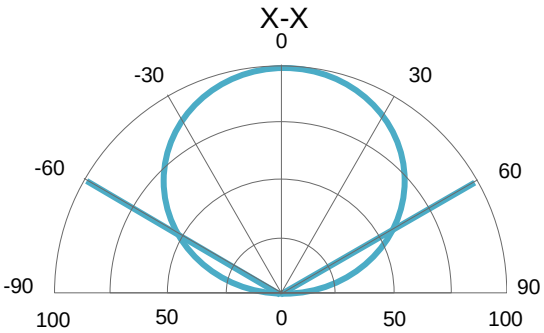




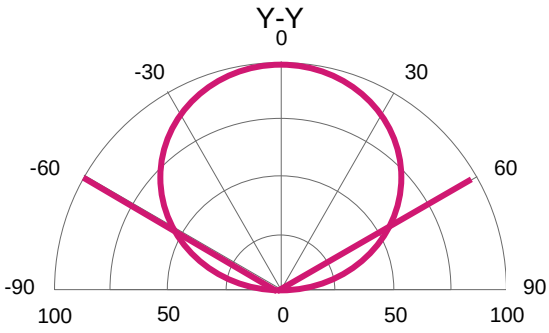
8. Typical Characteristic Curves

▪ Radiation Characteristics

Ta=25℃, If = 150mA

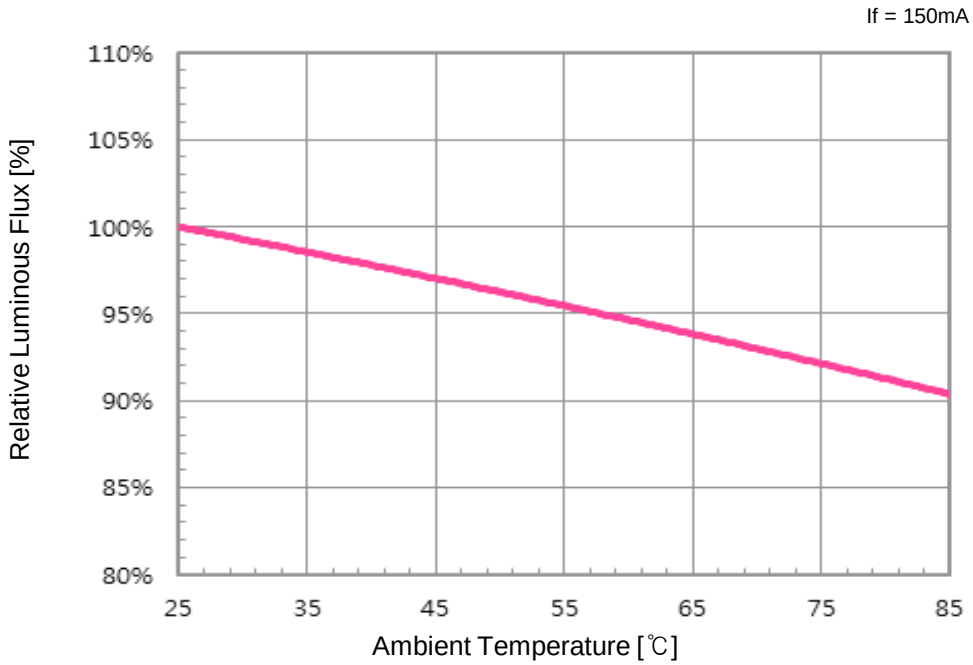


Ta=25℃, If = 150mA



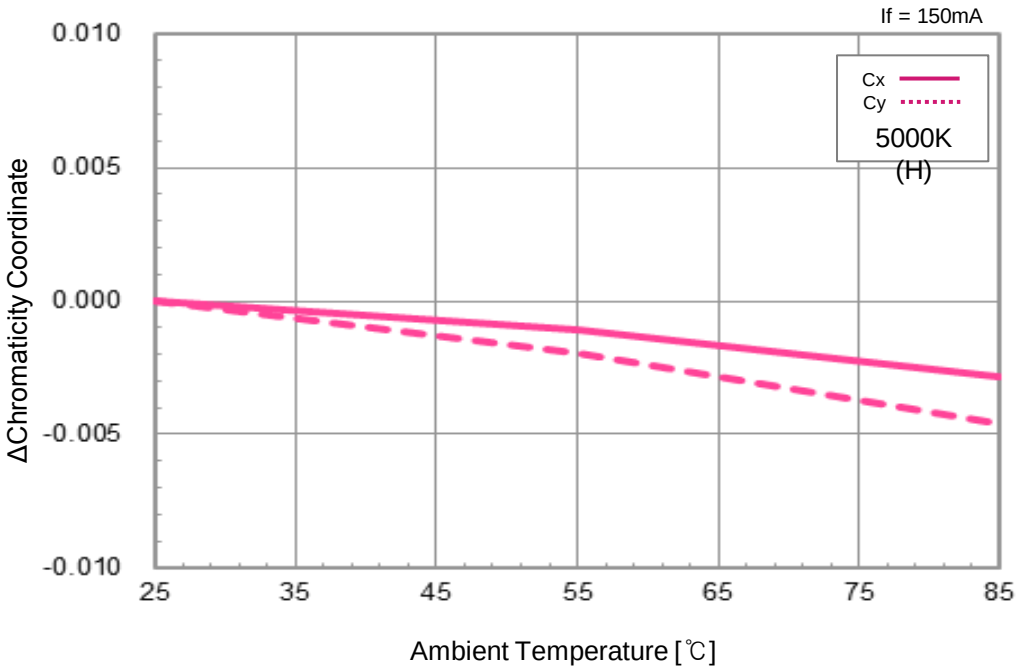
▪ Luminous Flux vs. Temperature

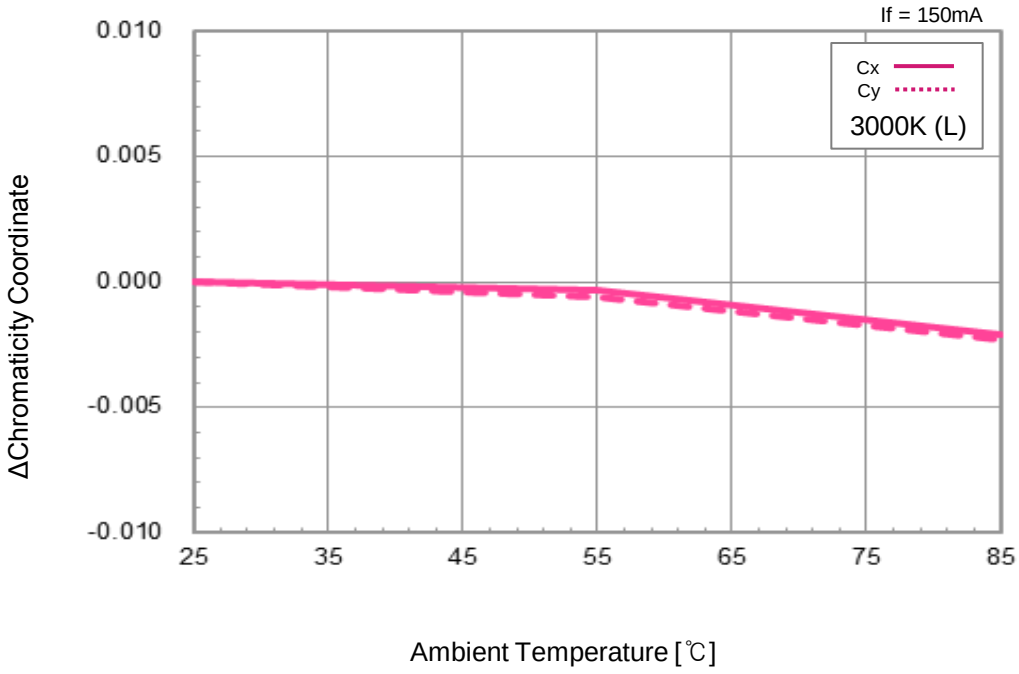
If = 150mA



8. Typical Characteristic Curves

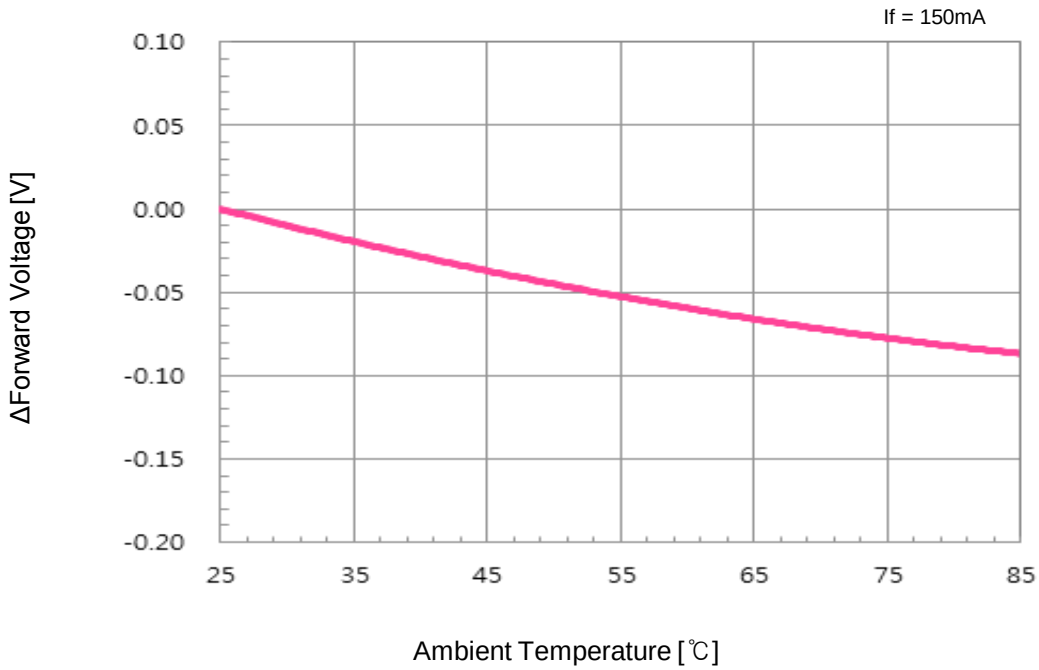
▪ Chromaticity Coordinate vs. Temperature





8. Typical Characteristic Curves

▪ Forward Voltage vs. Temperature



※ The ambient temperature values for each graph are obtained with LG Innotek equipment.

9. Reliability Test Items and Conditions

9-1. Failure Criteria

Items	Symbol	Test Conditions	Criteria	
			Min.	Max.
Forward Voltage	Vf	If = 150mA	-	Initial Value × 1.1
Luminous Flux	Φv	If = 150mA	Initial Value × 0.7	-

9-2. Reliability Tests

No	Items	Test Conditions	Test Hours /Cycles	Sample Size	Ac/Re
1	Room Temperature Operating Life (RTOL)	Ta = 25℃, If = 180mA	1,000 Hours	20 pcs	0/1
2	Wet High Temperature Operating Life (WHTOL)	Ta = 60℃, RH = 90% If = 180mA	1,000 Hours	20 pcs	0/1
3	High Temperature Operating Life (HTOL)	Ta = 85℃, If = 180mA	1,000 Hours	20 pcs	0/1
4	Low Temperature Operating Life (LTOL)	Ta = -40℃, If = 180mA	1,000 Hours	20 pcs	0/1
5	High Temperature Storage Life (HTSL)	Ta = 100℃	1,000 Hours	20 pcs	0/1
6	Low Temperature Storage Life (LTSL)	Ta = -40℃	1,000 Hours	20 pcs	0/1
7	Wet High Temperature Storage Life (WHTSL)	Ta = 85℃, RH = 85%	1,000 Hours	20 pcs	0/1
8	Temperature Cycle (TC)	-40℃(30min) ~ 100℃(30min)	100 Cycles	20 pcs	0/1
9	Moisture Sensitivity Level (MSL)	Tsld = 260℃ (Pre treatment 60℃,60% 168 hours)	3 Times	20 pcs	0/1
10	Vibration	100~2000~100Hz Sweep 4min. 200m/s², 3 directions	48 Minutes	20 pcs	0/1

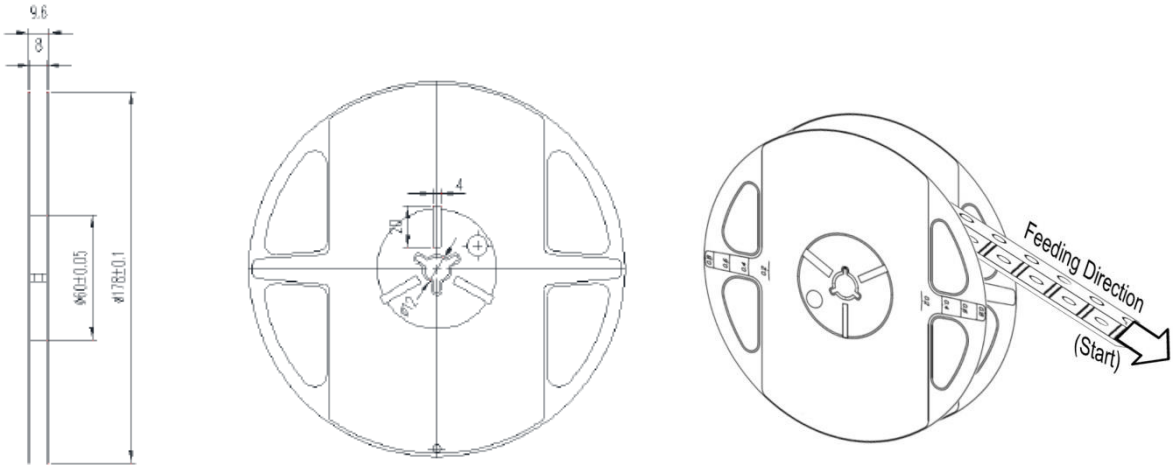
※ All samples are tested using LG Innotek Standard Metal PCB (25x25x1.6 mm^3(L×W×H)) except MSL test .
※ All samples must pass each test item and all test items must be satisfied.

10. Packing and Labeling of Products

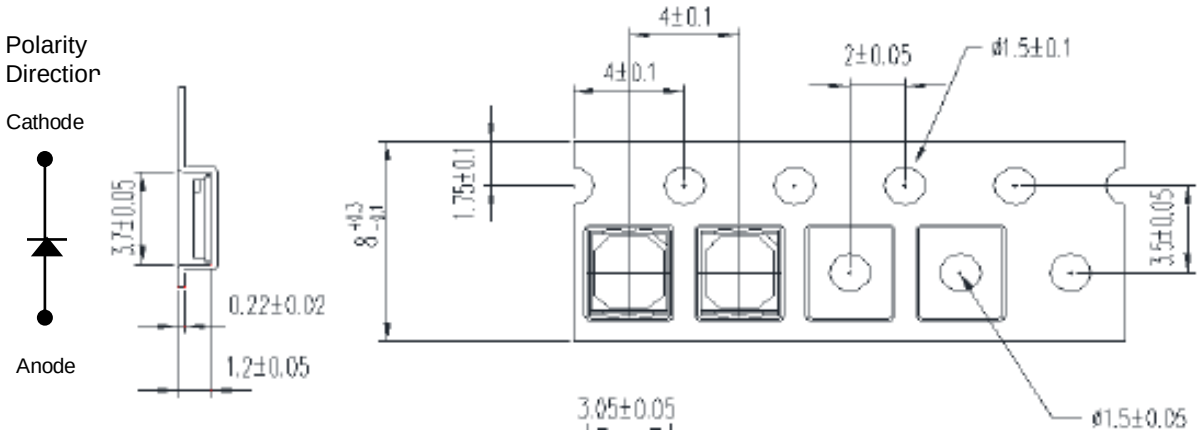
10-1. Taping Outline Dimension

▪ Reel

(Unit : mm)



▪ Tape

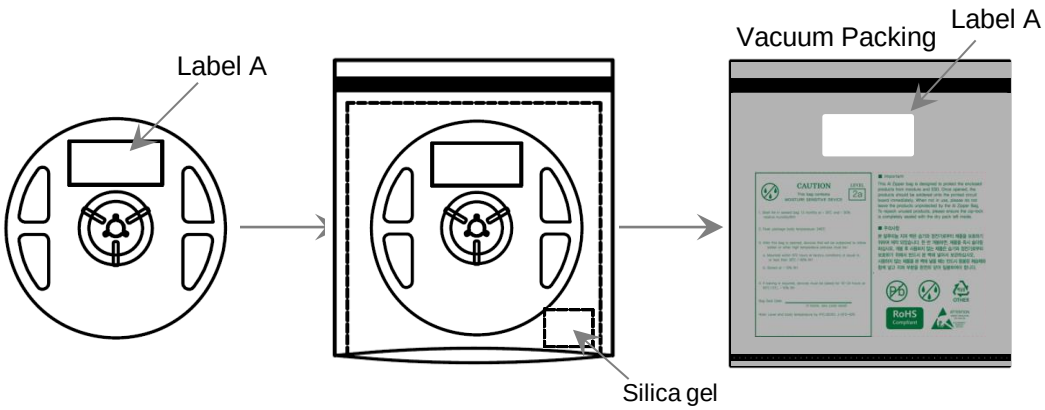


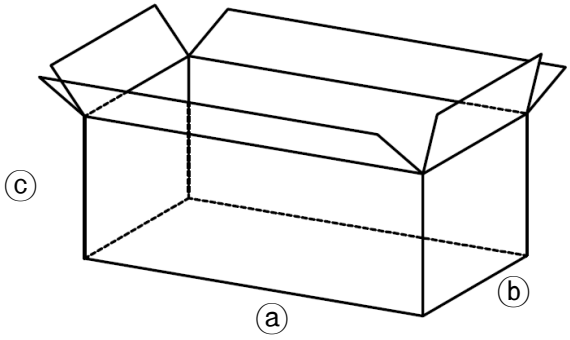
▪ Taping Arrangement

10. Packing and Labeling of Products

10-2. Packing Structures

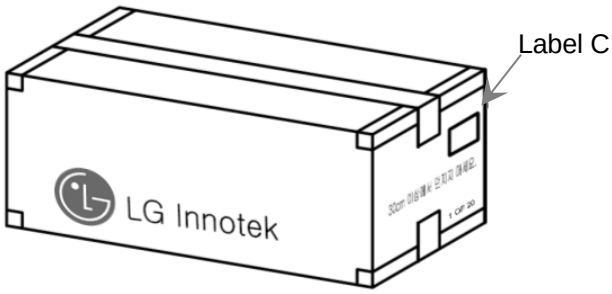
Reeled products are packed in a sealed-off and moisture-proof aluminum bag with desiccants (silica gel).





Types	Sizes (mm)		
	ⓐ	ⓑ	ⓒ
Outer Box	450	235	265

Tolerance : ±20mm



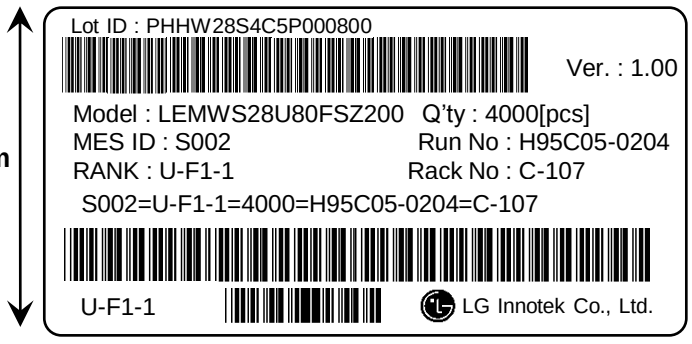
10. Packing and Labeling of Product

10-3. MES Label Structure

※ Label A

Specifying Lot ID, ‘Model Name’, ‘MES ID’, ‘RANK’, ‘Q’ty’, ‘Run No.’, ‘Rack No.’

<Example>



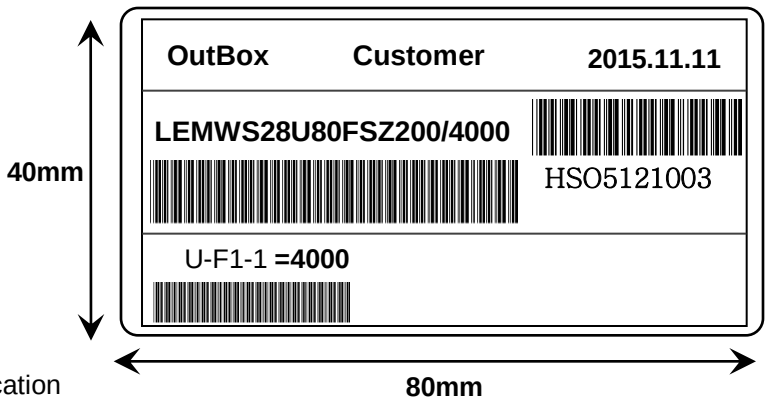
▪ Run No. indication

1	2	3	4	5	6	—	7	8	9	10
Code	Manufactured Site	Manufactured Year	Manufactured Month	Manufactured Date			TH #		Serial No	
	Paju : 1 Huizhou : 9	2016 : 6 2017 : 7 … 2020 : 0 2021 : 1	1~9 : 1~9 10 : A 11 : B 12 : C	(01~31)			(00 ~ 99)		(00 ~ ZZ)	

※ Label C

Specifying ‘Customer’, ‘Date’, ‘Model Name’, ‘Quantity’, ‘Customer Part no.’, ‘Outbox ID’, ‘Rank/Rank Q’ty’

<Example>



▪ Box ID. indication

1	2	3	4	5	6	7	8	9	10
Manufactured Site	PKG Site	Box	Year	Month	Date		Serial No		
Paju : P Huizhou : H	PKG : S, P	Inner Box : I Outer Box : O	2016 : 6 2017 : 7 … 2020 : 0 2021 : 1	1~9 : 1~9 10 : A 11 : B 12 : C	(01 ~ 31)		(001 ~ 999)		

11. Cautions on Use

11-1. Moisture-Proof Package

-. The moisture in the SMD package may vaporize and expand during soldering.

-. The moisture can damage the optical characteristics of the LEDs due to the encapsulation.

11-2. During Storage

Conditions		Temperature	Humidity	Time
Storage	Before Opening Aluminum Bag	5℃ ~ 30℃	< 50%RH	Within 1 Year from the Delivery Date
	After Opening Aluminum Bag	5℃ ~ 30℃	< 60%RH	≤ 672 hours
Baking		65 ± 5℃	< 10%RH	10 ~ 24 hours

-. The LEDs should be stored in a clean environment. If the LEDs are stored for 3 months or more after being shipped from LGIT, a sealed container with a nitrogen gas should be used for storage.

-. When storing the LEDs after opening aluminum bag, reseal with a moisture absorbent material inside.

11-3. During Usage

-. The LED should be avoided direct contact with hazardous materials such as sulfur, chlorine, phthalate, acid, solvent, etc. These materials(S, Cl, VOCs, etc.) may cause sulfurization of silver lead-frame or encapsulant silicone discoloration in LED.

VOCs(Volatile Organic Compounds) can be generated from adhesives glue, cleaning flux, molding hardener or organic additive which used in luminaires fixtures and they(VOCs) may cause a significant lumen degradation of LED in luminaires when they exposed to heat or light.

To prevent this phenomenon, materials used in luminaires must be carefully selected by users.

-. The metal parts(Including silver plated metal) on the LED can rust when exposed to corrosive gases. Therefore, exposure to corrosive gases must be avoided during operation and storage.

-. The metal parts(Including silver plated metal) also can be affected not only by the corrosive gases emitted inside of the end-products but by the gases penetrated from outside environment.

-. Extreme environments such as sudden ambient temperature changes or high humidity that can cause condensation must be avoided.

11-4. Cleaning

-. Do not use brushes for cleaning or organic solvents (i.e. Acetone, TCE, etc..) for washing as they may damage the resin of the LEDs.

-. Isopropyl Alcohol(IPA) is the recommended solvent for cleaning the LEDs under the following conditions.
Cleaning Condition : IPA, 25℃ max. × 60sec max.

-. Ultrasonic cleaning is not recommended.

-. Pretests should be conducted with the actual cleaning process to validate that the process will not damage the LEDs.

11. Cautions on Use

11-5. Thermal Management

-. The thermal design of the end product must be seriously considered, particularly at the beginning of the system design process.

-. The generation of heat is greatly impacted by the input power, the thermal resistance of the circuit boards and the density of the LED array combined with other components.

11-6. Static Electricity

-. Wristbands and anti-electrostatic gloves are strongly recommended and all devices, equipment and machinery must be properly grounded when handling the LEDs, which are sensitive against static electricity and surge.

-. Precautions are to be taken against surge voltage to the equipment that mounts the LEDs.

-. Unusual characteristics such as significant increase of current leakage, decrease of turn-on voltage, or non-operation at a low current can occur when the LED is damaged.

11-7. Recommended Circuit

-. The current through each LED must not exceed the absolute maximum rating when designing the circuits.

-. In general, there can be various forward voltages for LEDs. Different forward voltages in parallel via a single resistor can result in different forward currents to each LED, which also can output different luminous flux values. In the worst case, the currents can exceed the absolute maximum ratings which can stress the LEDs. Matrix circuit with a single resistor for each LED is recommended to avoid the luminous flux fluctuations.

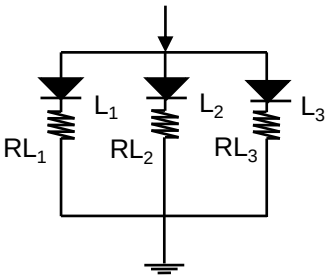


Fig.1 Recommended Circuit in Parallel Mode
: Separate resistors must be used for each LED.

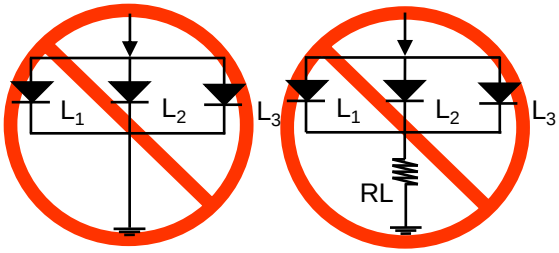


Fig.2 Abnormal Circuit
Circuits to Avoid : The current through the LEDs may vary due to the variation in LED forward voltage.

-. The driving circuits must be designed to operate the LEDs by forward bias only.

-. Reverse voltages can damage the zener diode, which can cause the LED to fail.

-. A constant current LED driver is recommended to power the LEDs.

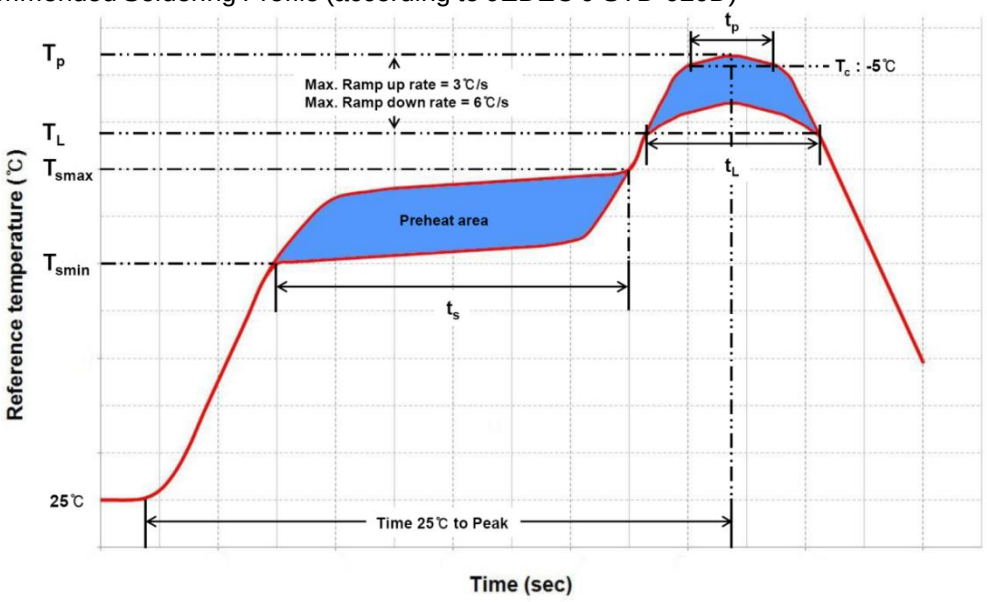
11. Cautions on Use

11-8. Soldering Conditions

-. Reflow soldering is the recommended method for assembling LEDs on a circuit board.

-. LG Innotek does not guarantee the performance of the LEDs assembled by the dip soldering method.

-. Recommended Soldering Profile (according to JEDEC J-STD-020D)



Profile Feature	Pb-Free Assembly	Pb-Based Assembly
Preheat / Soak Temperature Min (T_{smin}) Temperature Max (T_{smax}) Maximum time(t_s) from T_{smin} to T_{smax}	 150℃ 200℃ 60~120 seconds	 100℃ 150℃ 60~120 seconds
Ramp-up rate (T_L to T_p)	3℃/ second max.	3℃/ second max.
Liquidus temperature (T_L)	217℃	183℃
Time (t_L) maintained above T_L	60~150 seconds	60~150 seconds
Maximum peak package body temperature (T_p)	260℃	235℃
Time(t_p) within 5℃ of the specified temperature (T_c)	30 seconds	20 seconds
Ramp-down rate (T_p to T_L)	6℃/second max.	6℃/second max.
Maximum Time 25℃ to peak temperature	8 minutes max.	6 minutes max.

-. Reflow or hand soldering at the lowest possible temperature is desirable for the LEDs although the recommended soldering conditions are specified in the above diagrams.

-. A rapid cooling process is not recommended for the LEDs from the peak temperature.

-. The silicone encapsulant at the top of the LED package is a soft surface, which can easily be damaged by pressure. Precautions should be taken to avoid strong pressure on the silicone resin when leveraging the pick and place machines.

-. Reflow soldering should not be done more than two times.

11. Cautions on Use

11-9. Soldering Iron

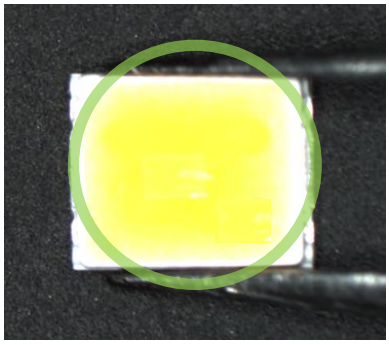
-. The recommended condition is less than 5 seconds at 260℃.
-. The time must be shorter for higher temperatures. (+10℃ → -1sec).
-. The power dissipation of the soldering iron should be lower than 15W and the surface temperature of the device should be controlled at or under 230℃.

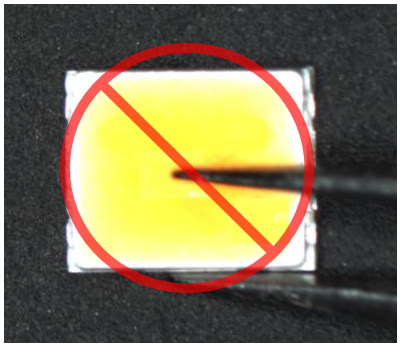
11-10. Eye Safety Guidelines

-. Do not directly look at the light when the LEDs are on.
-. Proceed with caution to avoid the risk of damage to the eyes when examining the LEDs with optical instruments.

11-11. Manual Handling

-. Use Teflon-type tweezers to grab the base of the LED and do not apply mechanical pressure on the surface of the encapsulant.





12. Disclaimers

-. LG Innotek is not responsible for any damages or accidents caused if the operating or storage. conditions exceed the absolute maximum ratings recommended in this document.
-. The LEDs described in this document are intended to be operated by ordinary electronic equipment.
-. The LEDs should not be used at any lighting products together with the other LEDs, which has a different part number. If required, please contact any sales person.
-. It is recommended to consult with LG Innotek when the environment or the LED operation is non-standard in order to avoid any possible malfunctions or damage to product or risk of life or health.
-. Disassembly of the LED products for the purpose of reverse engineering is prohibited without prior written consent from LG Innotek. All defected LEDs must be reported to LG Innotek and are not to be disassembled or analyzed.
-. The product information can be modified and upgraded without prior notice.

单击下面可查看定价，库存，交付和生命周期等信息

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