CUSTOMER : .

DATE : Nov. 11, 2015 .

REV : REV. 8.0 .

PRODUCT FAMILY DATA SHEET

3030N 2Chip

Top View Type White SMD LED

MODEL NAME : LEMWS36X Series

RoHS Compliant

LG Innotek

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Appendix. Product Nomenclature ---------- 30

1. Features

- Light Color : White
- Lead Frame Type LED Package : 3.0×3.0×0.6 mm (L×W×H)
- Viewing Angle : 120˚
- Chip Material : InGaN
- Soldering Method : Reflow Soldering
- Taping : 8 mm conductive black carrier tape and antistatic clear cover tape.

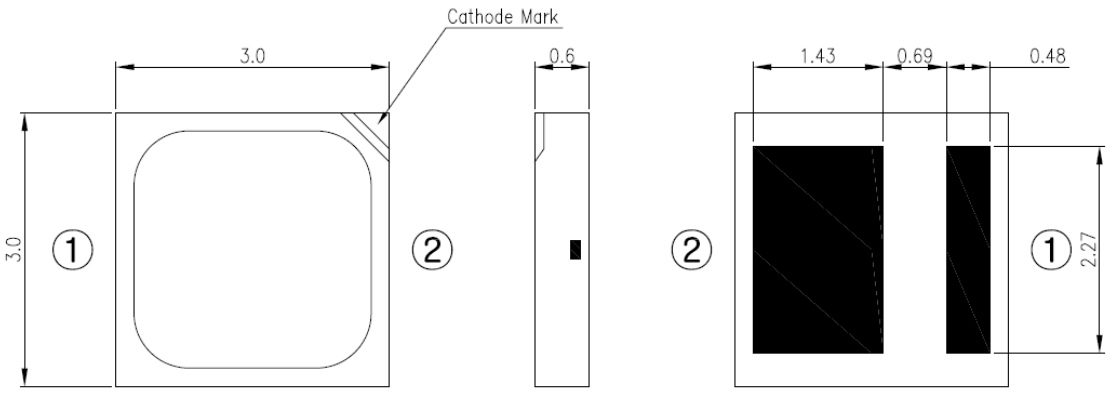
  4,000pcs/reel, Φ178mm wheel
- UL-recognized Component (E356829)
- RoHS Compliant

2. Applications

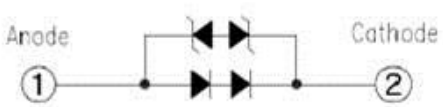
- Interior and Exterior Illumination

3. Outline Dimensions

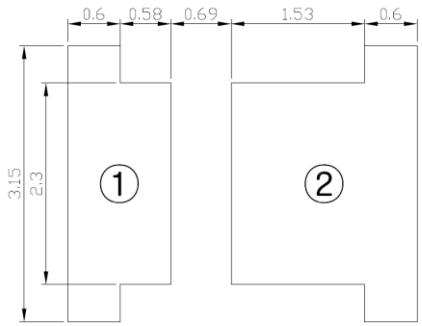
(Unit : mm)



< Internal Circuit >



Recommended Soldering Pattern (for Reflow Soldering)



▪ Tolerance unless otherwise mentioned are ±0.1 mm

4. Absolute Maximum Ratings

(Ta = 25℃)

Item	Symbol	Rating	Unit
Forward Current	If	200	mA
Peak Pulse Forward Current*1)	Ifp	400	mA
Operating Temperature	Topr	-40 ~ +100	℃
Storage Temperature	Tstg	-40 ~ +100	℃
Junction Temperature	Tj	125	℃
Soldering Temperature	JEDEC-J-STD-020D		
ESD Classification	Class 2 (JESD22-A114)		

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

※ These values are provided for informational purposes only, not any warranty or quarantee. Regarding any kinds of warranty or guarantee, consult your sales representative.

※ 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℃, If = 150mA)

Nominal CCTs	Min CRI	Product Code	Flux Code		Luminous Flux (lm)		
			Flux Class1)	Flux Bin2)	Min	Typ	Max
6500K (F)	80	LEMWS36X80FZ22A0	2	X1	97.6	101.4	105.3
				X2	105.3	109.4	113.5
				X3	113.5	117.7	122.0
		LEMWS36X80FZ2AA0	A	X4	122.6	125.3	128.0
				X5	128.0	130.5	133.0
				X6	133.0	136.0	139.0
5700K (G)	80	LEMWS36X80GZ22A0	2	X1	97.6	101.4	105.3
				X2	105.3	109.4	113.5
				X3	113.5	117.7	122.0
		LEMWS36X80GZ2AA0	A	X4	123.8	125.9	128.0
				X5	128.0	130.5	133.0
				X6	133.0	136.0	139.0
5000K (H)	80	LEMWS36X80HZ22A0	2	X1	97.6	101.4	105.3
				X2	105.3	109.4	113.5
				X3	113.5	117.7	122.0
		LEMWS36X80HZ2AA0	A	X4	123.8	125.9	128.0
				X5	128.0	130.5	133.0
				X6	133.0	136.0	139.0

*1) “Flux Class” is the 14th digit in the Product Code which is used for ordering 3030 LED’s

*2) “Flux Bin” is the flux as referenced on the product label (refer to 10-4 in section 10)

5. Electro - Optical Characteristics (Continued)

(Ta = 25℃, If = 150mA)

Nominal CCTs	Min CRI	Product Code	Flux Code		Luminous Flux (lm)		
			Flux Class[1)]	Flux Bin[2)]	Min	Typ	Max
4000K (J)	80	LEMWS36X80JZ32A0	2	X1	94.2	97.8	101.5
				X2	101.5	105.4	109.4
				X3	109.4	113.5	117.7
		LEMWS36X80JZ3AA0	A	X4	120.1	122.5	125.0
				X5	125.0	128.5	132.0
				X6	132.0	135.0	138.0
3500K (K)	80	LEMWS36X80KZ32A0	2	X1	89.7	93.2	96.7
				X2	96.7	100.5	104.3
				X3	104.3	108.3	112.3
		LEMWS36X80KZ3AA0	A	X4	113.9	118.1	122.4
				X5	122.4	125.2	128.0
				X6	128.0	131.5	135.0
3000K (L)	80	LEMWS36X80LZ32A0	2	X1	89.7	93.2	96.7
				X2	96.7	100.5	104.3
				X3	104.3	108.3	112.3
		LEMWS36X80LZ3AA0	A	X4	113.9	118.1	122.4
				X5	122.4	125.2	128.0
				X6	128.0	131.5	135.0
2700K (M)	80	LEMWS36X80MZ32A0	2	X1	87.9	91.3	94.8
				X2	94.8	98.4	102.1
				X3	102.1	105.9	109.8
		LEMWS36X80MZ3AA0	A	X4	110.2	113.6	117.0
				X5	117.0	119.5	122.0
				X6	122.0	125.0	128.0

*1) “Flux Class” is the 14th digit in the Product Code which is used for ordering 3030 LED’s

*2) “Flux Bin” is the flux as referenced on the product label (refer to 10-4 in section 10)

5. Electro - Optical Characteristics (Continued)

(Ta = 25℃, If = 150mA)

Nominal CCTs	Min CRI	Product Code	Flux Code		Luminous Flux (lm)		
			Flux Class[1)]	Flux Bin[2)]	Min	Typ	Max
5000K (H)	70	LEMWS36X70HZ2AA0	A	L2	135	137.5	140
				L3	140	142.5	145
				L4	145	147.5	150
4000K (J)	70	LEMWS36X70JZ3AA0	A	L2	135	137.5	140
				L3	140	142.5	145
				L4	145	147.5	150
3000K (L)	70	LEMWS36X70LZ3AA0	A	L1	130	132.5	135
				L2	135	137.5	140
				L3	140	142.5	145
5000K (H)	90	LEMWS36X90HZ2AA0	A	H2	105	107.5	110
				H3	110	112.5	115
				H4	115	117.5	120
4000K (J)	90	LEMWS36X90JZ3AA0	A	H2	105	107.5	110
				H3	110	112.5	115
				H4	115	117.5	120
3000K (L)	90	LEMWS36X90LZ3AA0	A	H1	100	102.5	105
				H2	105	107.5	110
				H3	110	112.5	115
2700K (M)	90	LEMWS36X90MZ3AA0	A	H1	100	102.5	105
				H2	105	107.5	110
				H3	110	112.5	115

*1) “Flux Class” is the 14th digit in the Product Code which is used for ordering 3030 LED’s
*2) “Flux Bin” is the flux as referenced on the product label (refer to 10-4 in section 10)

5. Electro - Optical Characteristics (Continued)

(Ta = 25℃, If = 150mA)

Item	Symbol	Flux Code	CCT	Min.	Typ.	Max.	Unit
Forward Voltage (Vf) (@150mA, Ta=25℃)	Vf	2	All	5.80	6.36	6.60	V
		A		5.80	6.20	6.60	
Color	Cx / Cy	All	All	Refer to 'Chromaticity Bins'			-
Viewing Angle	2Θ1/2	All	All	-	120	-	deg
Color Rendering Index (Ra)	Ra	All	All	80	-	-	-
Thermal Resistance, Junction to Solder Point	Rth j-s	All	All	-	7.5	-	℃/W
Typical Temperature Coefficient of Forward Voltage*1)	ΔVf / ΔTj	All	All	-1.0	-	-3.0	mV/℃

*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.

6. Forward Voltage Bins

(Ta = 25℃, If = 150mA)

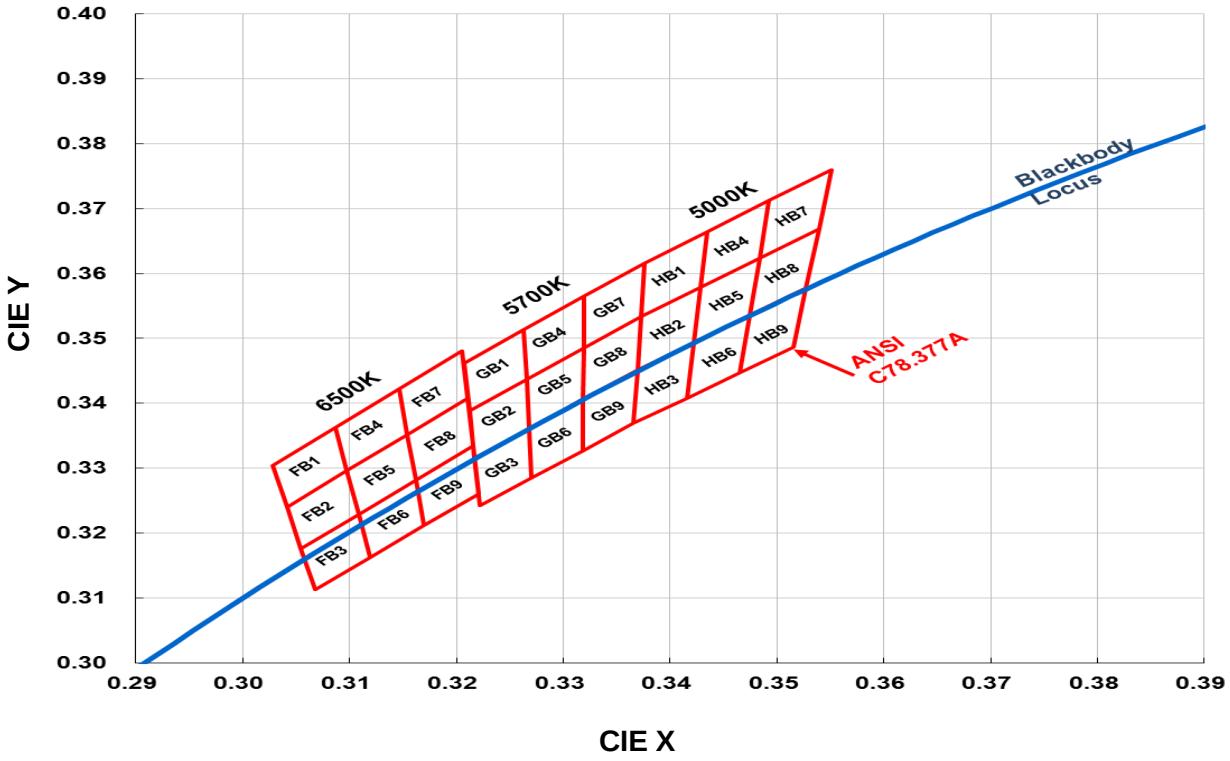
Bin Code / Ranks by Flux Code	0 (5.80~6.00)	1 (6.00~6.20)	2 (6.20~6.40)	3 (6.40~6.60)
3030N Series				

※ Bin Structure : Please refer to the following example as below;

Example#1) Bin Code : X2-L11-0 (Flux Bin Code = X2, Color Coordinate Bin Code = L11, Vf Bin Code = 0)

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 4500K to 6500K, LG Innotek provides 9 micro bins.



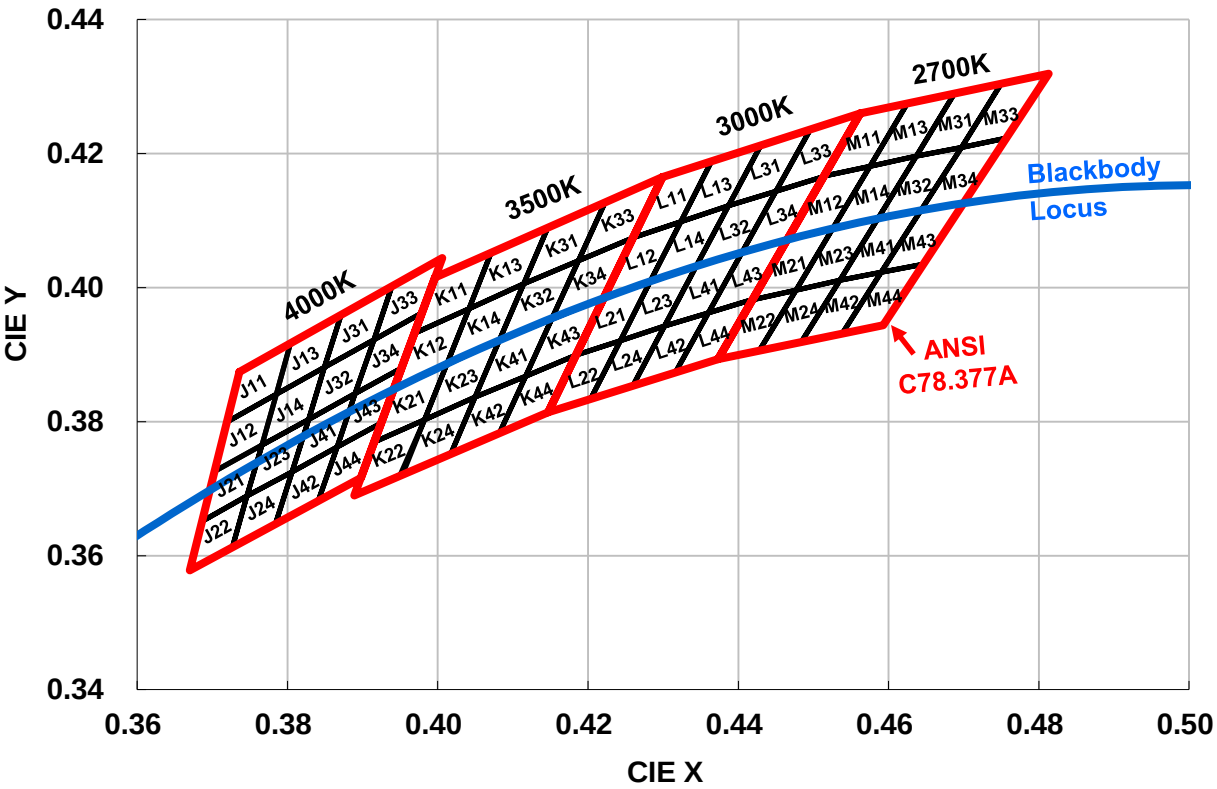
Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
FB1	0.3028	0.3304	GB1	0.3207	0.3462	HB1	0.3376	0.3616
	0.3087	0.3363		0.3263	0.3513		0.3434	0.3664
	0.3098	0.3296		0.3266	0.3437		0.3428	0.3579
	0.3041	0.3240		0.3212	0.3389		0.3373	0.3534
FB2	0.3041	0.3240	GB2	0.3212	0.3389	HB2	0.3373	0.3534
	0.3098	0.3296		0.3266	0.3437		0.3428	0.3579
	0.3108	0.3229		0.3268	0.3361		0.3422	0.3494
	0.3055	0.3177		0.3217	0.3316		0.3369	0.3451
FB3	0.3055	0.3177	GB3	0.3217	0.3316	HB3	0.3369	0.3451
	0.3108	0.3229		0.3268	0.3361		0.3422	0.3494
	0.3119	0.3162		0.3270	0.3285		0.3416	0.3408
	0.3068	0.3113		0.3222	0.3243		0.3366	0.3369
FB4	0.3087	0.3363	GB4	0.3263	0.3513	HB4	0.3434	0.3664
	0.3146	0.3422		0.3320	0.3565		0.3493	0.3712
	0.3154	0.3352		0.3319	0.3485		0.3484	0.3624
	0.3098	0.3296		0.3266	0.3437		0.3428	0.3579

7. Chromaticity Bins (Continued)

Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
FB5	0.3098	0.3296	GB5	0.3266	0.3437	HB5	0.3428	0.3579
	0.3154	0.3352		0.3319	0.3485		0.3484	0.3624
	0.3162	0.3282		0.3319	0.3406		0.3474	0.3536
	0.3108	0.3229		0.3268	0.3361		0.3422	0.3494
FB6	0.3108	0.3229	GB6	0.3268	0.3361	HB6	0.3422	0.3494
	0.3162	0.3282		0.3319	0.3406		0.3474	0.3536
	0.3170	0.3212		0.3318	0.3327		0.3465	0.3448
	0.3119	0.3162		0.3270	0.3285		0.3416	0.3408
FB7	0.3146	0.3422	GB7	0.3320	0.3565	HB7	0.3493	0.3712
	0.3205	0.3481		0.3376	0.3616		0.3551	0.3760
	0.3210	0.3408		0.3373	0.3534		0.3539	0.3669
	0.3154	0.3352		0.3319	0.3485		0.3484	0.3624
FB8	0.3154	0.3352	GB8	0.3319	0.3485	HB8	0.3484	0.3624
	0.3210	0.3408		0.3373	0.3534		0.3539	0.3669
	0.3216	0.3334		0.3369	0.3451		0.3527	0.3578
	0.3162	0.3282		0.3319	0.3406		0.3474	0.3536
FB9	0.3162	0.3282	GB9	0.3319	0.3406	HB9	0.3474	0.3536
	0.3216	0.3334		0.3369	0.3451		0.3527	0.3578
	0.3221	0.3261		0.3366	0.3369		0.3515	0.3487
	0.3170	0.3212		0.3318	0.3327		0.3465	0.3448

7. Chromaticity Bins (Neutral & Warm 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 4000K, LG Innotek provides 16 micro bins.



Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
	0.3736	0.3874		0.3996	0.4015		0.4299	0.4165		0.4562	0.4260
J11	0.3804	0.3917	K11	0.4071	0.4052	L11	0.4364	0.4189	M11	0.4625	0.4275
	0.3785	0.3841		0.4041	0.3969		0.4323	0.4098		0.4575	0.4181
	0.3720	0.3800		0.3969	0.3932		0.4260	0.4075		0.4513	0.4166
	0.3720	0.3800		0.3969	0.3932		0.4260	0.4075		0.4513	0.4166
J12	0.3785	0.3841	K12	0.4041	0.3969	L12	0.4323	0.4098	M12	0.4575	0.4181
	0.3766	0.3765		0.4012	0.3885		0.4282	0.4008		0.4525	0.4087
	0.3703	0.3726		0.3941	0.3848		0.4221	0.3984		0.4465	0.4071
	0.3804	0.3917		0.4071	0.4052		0.4364	0.4189		0.4625	0.4275
J13	0.3871	0.3959	K13	0.4146	0.4089	L13	0.4430	0.4212	M13	0.4687	0.4289
	0.3849	0.3881		0.4114	0.4005		0.4387	0.4122		0.4637	0.4196
	0.3785	0.3841		0.4041	0.3969		0.4323	0.4098		0.4575	0.4181
	0.3785	0.3841		0.4041	0.3969		0.4323	0.4098		0.4575	0.4181
J14	0.3849	0.3881	K14	0.4114	0.4005	L14	0.4387	0.4122	M14	0.4637	0.4196
	0.3828	0.3803		0.4082	0.3922		0.4344	0.4032		0.4586	0.4103
	0.3766	0.3765		0.4012	0.3885		0.4282	0.4008		0.4525	0.4087

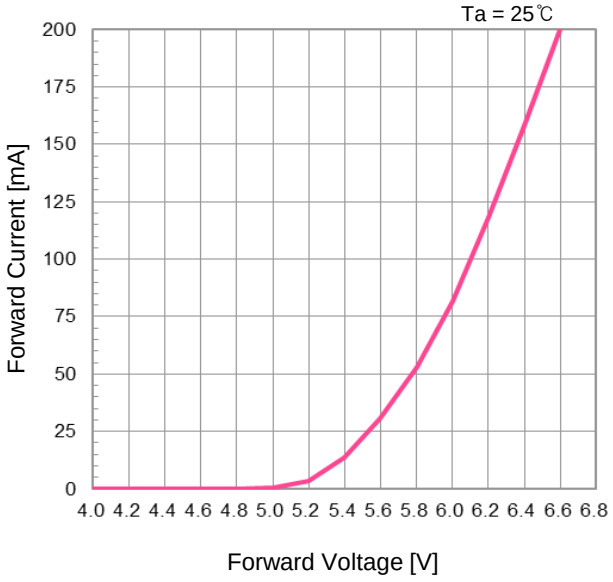
7. Chromaticity Bins (Continued)

Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y	Bin	CIE X	CIE Y
J21	0.3703	0.3726	K21	0.3941	0.3848	L21	0.4221	0.3984	M21	0.4465	0.4071
	0.3766	0.3765		0.4012	0.3885		0.4282	0.4008		0.4525	0.4087
	0.3746	0.3689		0.3982	0.3803		0.4243	0.3921		0.4477	0.3996
	0.3687	0.3652		0.3915	0.3769		0.4184	0.3899		0.4419	0.3982
J22	0.3687	0.3652	K22	0.3915	0.3769	L22	0.4184	0.3899	M22	0.4419	0.3982
	0.3746	0.3689		0.3982	0.3803		0.4243	0.3921		0.4477	0.3996
	0.3727	0.3613		0.3950	0.3721		0.4203	0.3834		0.4428	0.3906
	0.3670	0.3578		0.3889	0.3690		0.4147	0.3814		0.4373	0.3893
J23	0.3766	0.3765	K23	0.4012	0.3885	L23	0.4282	0.4008	M23	0.4525	0.4087
	0.3828	0.3803		0.4082	0.3922		0.4344	0.4032		0.4586	0.4103
	0.3806	0.3725		0.4050	0.3837		0.4302	0.3943		0.4535	0.4011
	0.3746	0.3689		0.3982	0.3803		0.4243	0.3921		0.4477	0.3996
J24	0.3746	0.3689	K24	0.3982	0.3803	L24	0.4243	0.3921	M24	0.4477	0.3996
	0.3806	0.3725		0.4050	0.3837		0.4302	0.3943		0.4535	0.4011
	0.3784	0.3647		0.4017	0.3752		0.4260	0.3853		0.4483	0.3918
	0.3727	0.3613		0.3953	0.3721		0.4203	0.3834		0.4428	0.3906
J31	0.3871	0.3959	K31	0.4146	0.4089	L31	0.4430	0.4212	M31	0.4687	0.4289
	0.3939	0.4002		0.4223	0.4127		0.4496	0.4236		0.4750	0.4304
	0.3915	0.3922		0.4187	0.4040		0.4450	0.4144		0.4697	0.4209
	0.3849	0.3881		0.4114	0.4005		0.4387	0.4122		0.4637	0.4196
J32	0.3849	0.3881	K32	0.4114	0.4005	L32	0.4387	0.4122	M32	0.4637	0.4196
	0.3915	0.3922		0.4187	0.4040		0.4450	0.4144		0.4697	0.4209
	0.3890	0.3842		0.4151	0.3953		0.4404	0.4052		0.4643	0.4115
	0.3828	0.3803		0.4082	0.3922		0.4344	0.4032		0.4586	0.4103
J33	0.3939	0.4002	K33	0.4223	0.4127	L33	0.4496	0.4236	M33	0.4750	0.4304
	0.4006	0.4044		0.4299	0.4165		0.4562	0.4260		0.4813	0.4319
	0.3979	0.3962		0.4260	0.4075		0.4513	0.4166		0.4756	0.4223
	0.3915	0.3922		0.4187	0.4040		0.4450	0.4144		0.4697	0.4209
J34	0.3915	0.3922	K34	0.4187	0.4040	L34	0.4450	0.4144	M34	0.4697	0.4209
	0.3979	0.3962		0.4260	0.4075		0.4513	0.4166		0.4756	0.4223
	0.3952	0.3880		0.4221	0.3984		0.4465	0.4071		0.4700	0.4126
	0.3890	0.3842		0.4151	0.3953		0.4404	0.4052		0.4643	0.4115
J41	0.3828	0.3803	K41	0.4082	0.3922	L41	0.4344	0.4032	M41	0.4586	0.4103
	0.3890	0.3842		0.4151	0.3953		0.4404	0.4052		0.4643	0.4115
	0.3866	0.3762		0.4117	0.3868		0.4360	0.3962		0.4590	0.4023
	0.3806	0.3725		0.4050	0.3837		0.4302	0.3943		0.4535	0.4011
J42	0.3806	0.3725	K42	0.4050	0.3837	L42	0.4302	0.3943	M42	0.4535	0.4011
	0.3866	0.3762		0.4117	0.3868		0.4360	0.3962		0.4590	0.4023
	0.3841	0.3682		0.4082	0.3783		0.4316	0.3873		0.4538	0.3931
	0.3784	0.3647		0.4017	0.3752		0.4260	0.3853		0.4483	0.3918
J43	0.3890	0.3842	K43	0.4151	0.3953	L43	0.4404	0.4052	M43	0.4643	0.4115
	0.3952	0.3880		0.4221	0.3984		0.4465	0.4071		0.4700	0.4126
	0.3925	0.3798		0.4184	0.3899		0.4419	0.3982		0.4646	0.4035
	0.3866	0.3762		0.4117	0.3868		0.4360	0.3962		0.4590	0.4023
J44	0.3866	0.3762	K44	0.4117	0.3868	L44	0.4360	0.3962	M44	0.4590	0.4023
	0.3925	0.3798		0.4184	0.3899		0.4419	0.3982		0.4646	0.4035
	0.3898	0.3716		0.4147	0.3814		0.4373	0.3893		0.4593	0.3944
	0.3841	0.3682		0.4082	0.3783		0.4316	0.3873		0.4538	0.3931

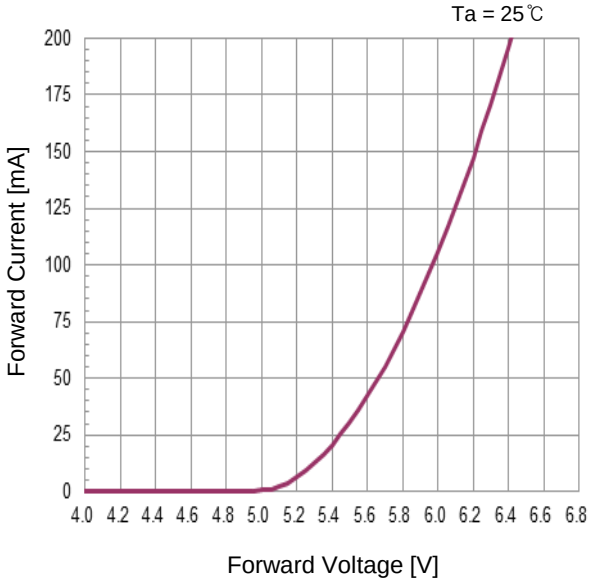
8. Typical Characteristic Curves

▪ Forward Current vs. Forward Voltage

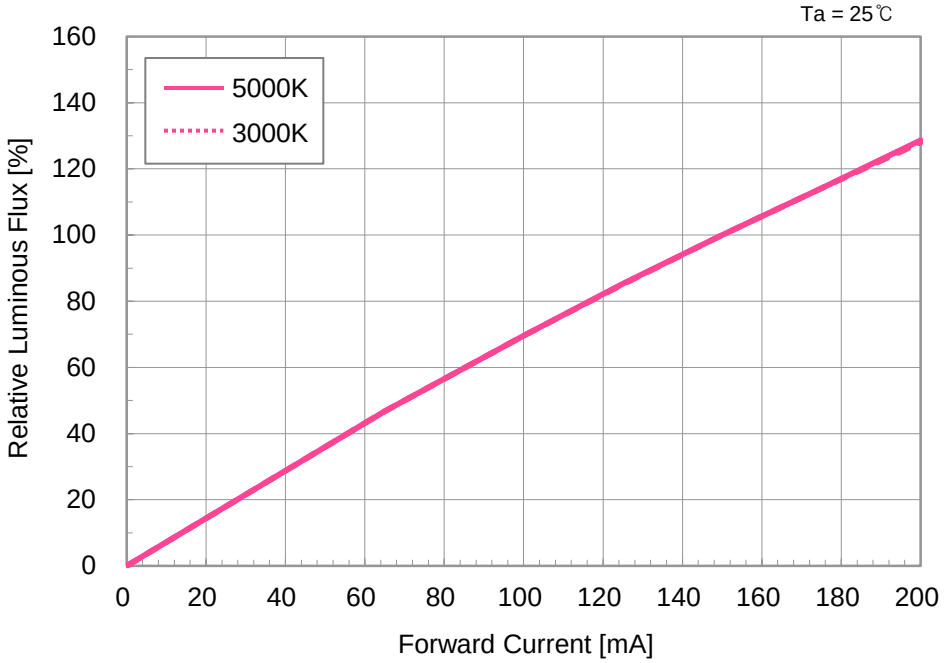
Flux Class "2"



Flux Class "A"



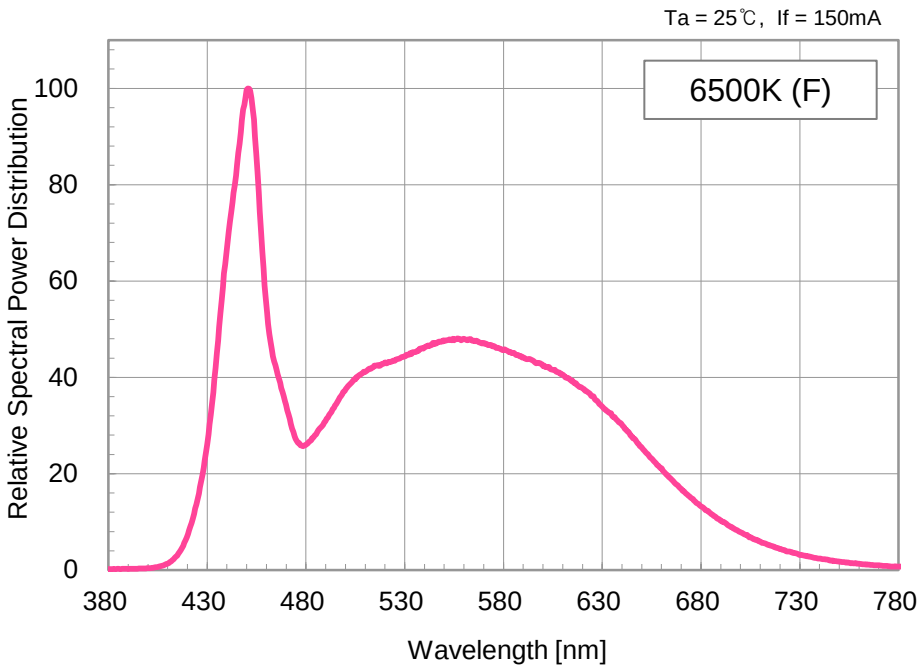
▪ Relative Luminous Flux vs. Forward Current

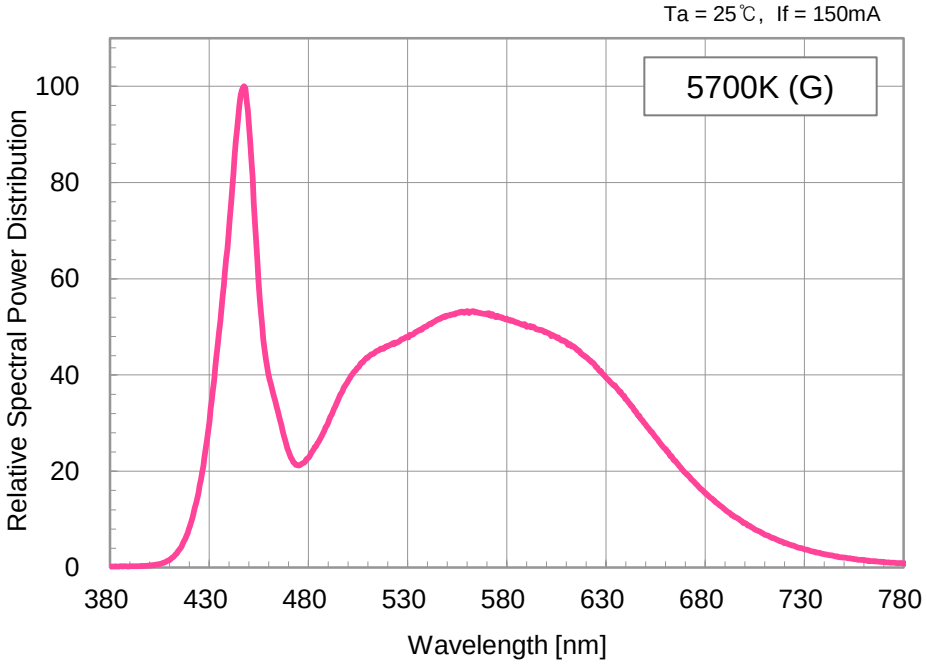


※ 5000K CCT data also applies to 5700K and 6500K CCTs and 3000K data also applies to 2700K, 3500K and 4000K CCTs.

8. Typical Characteristic Curves

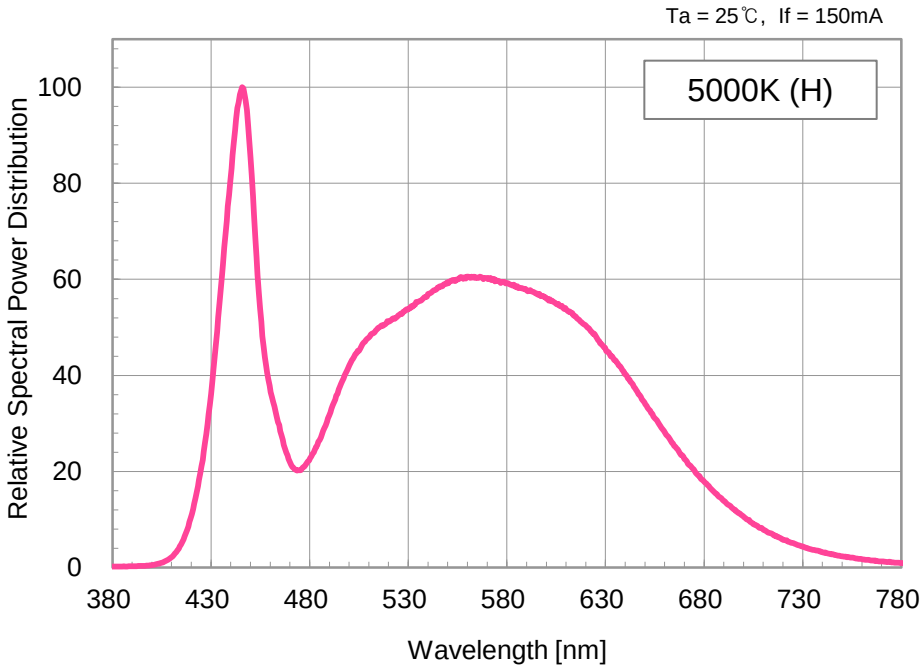
▪ Spectrum

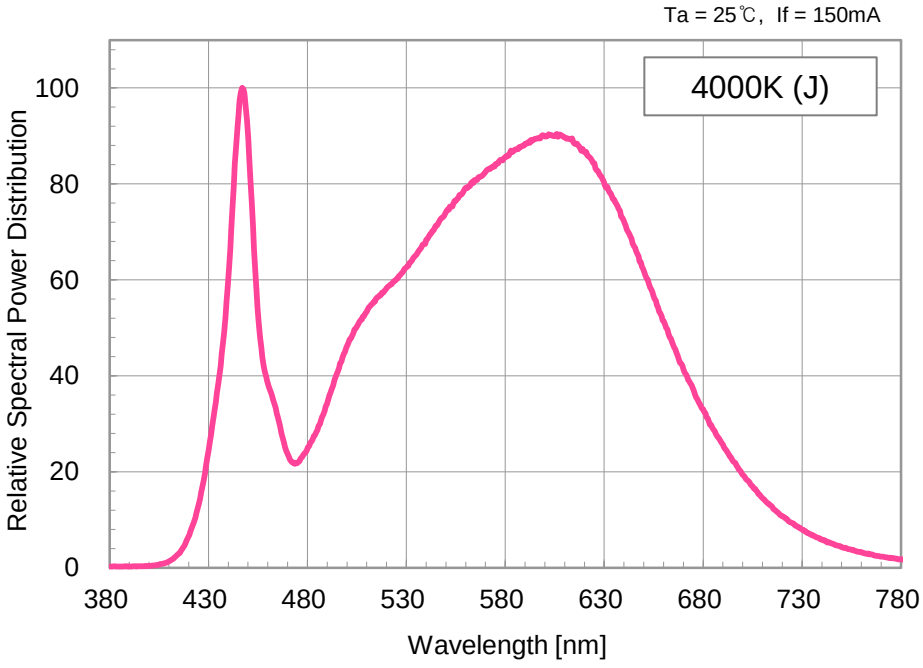




8. Typical Characteristic Curves

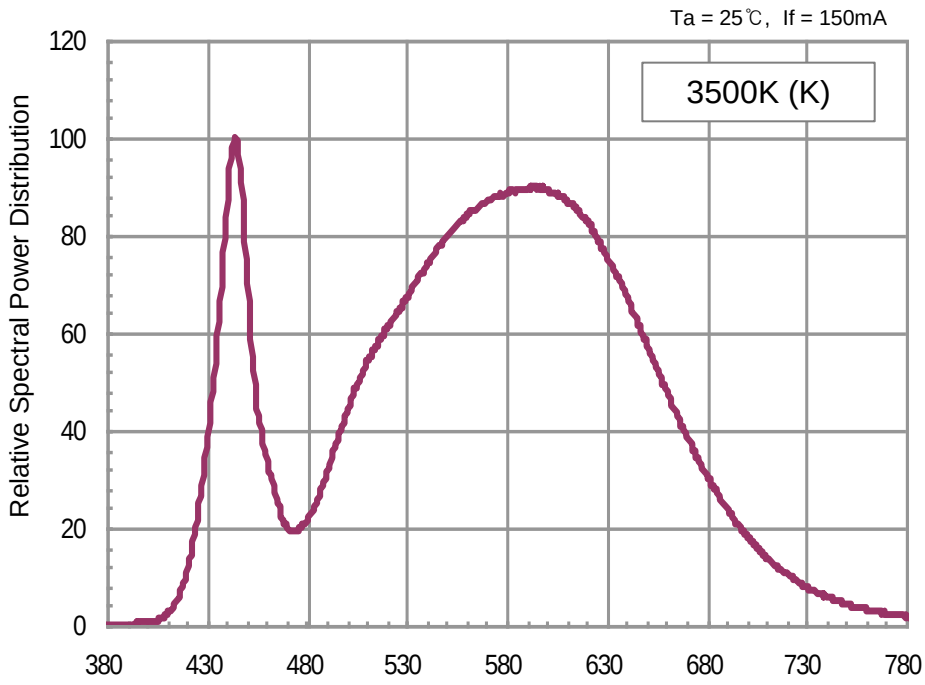
▪ Spectrum

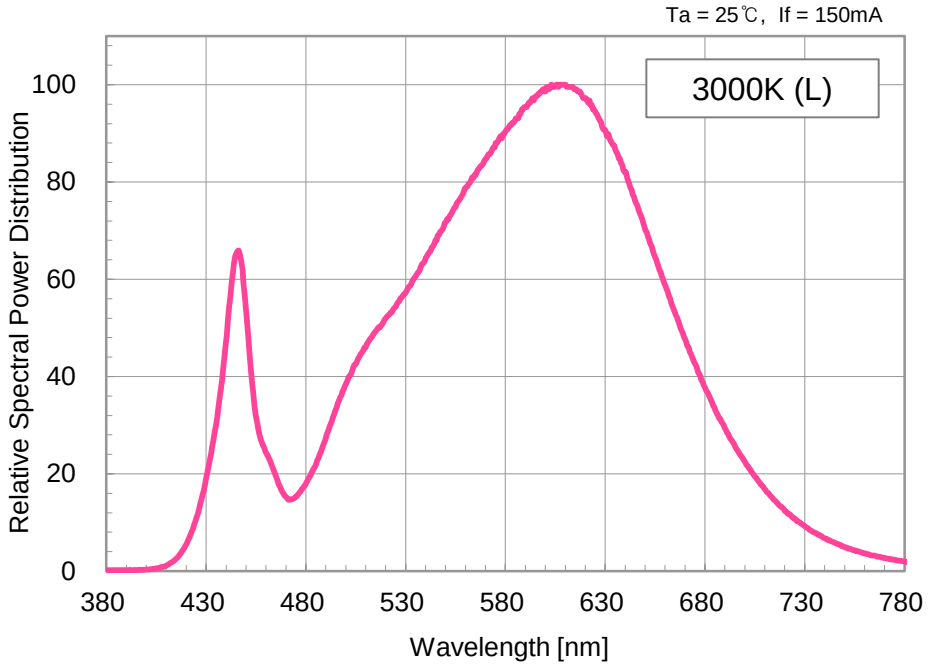




8. Typical Characteristic Curves

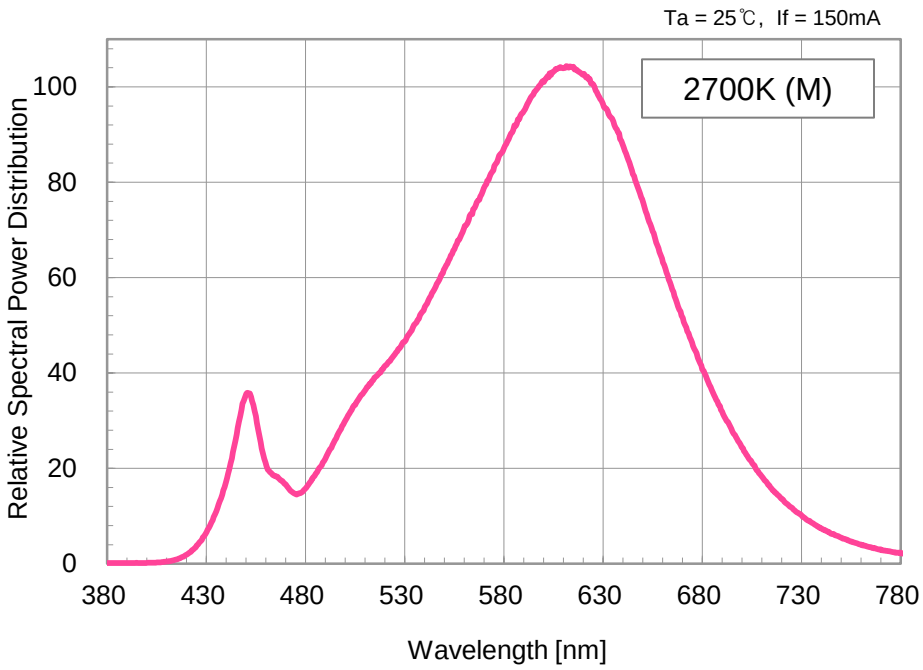
▪ Spectrum





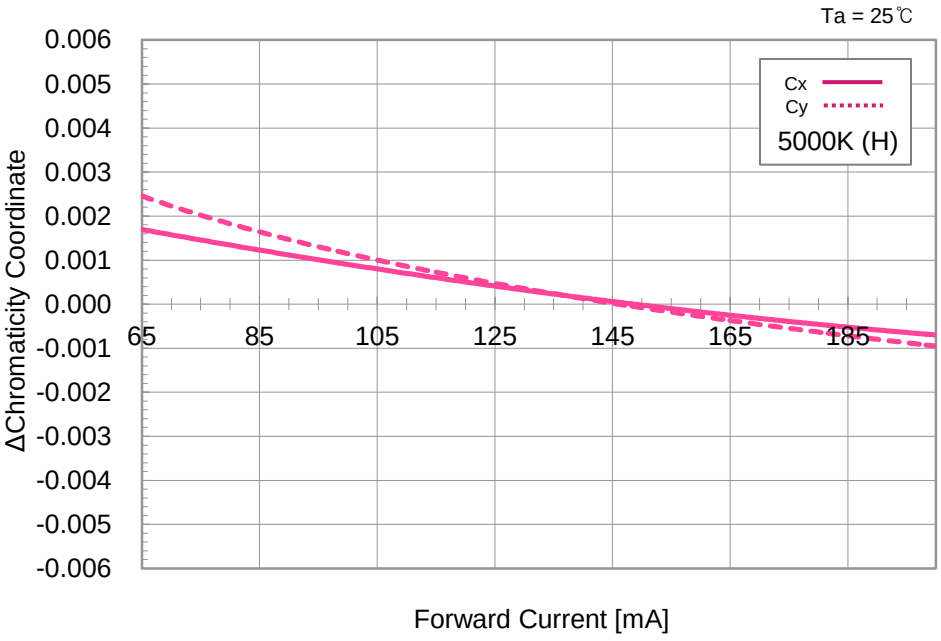
8. Typical Characteristic Curves

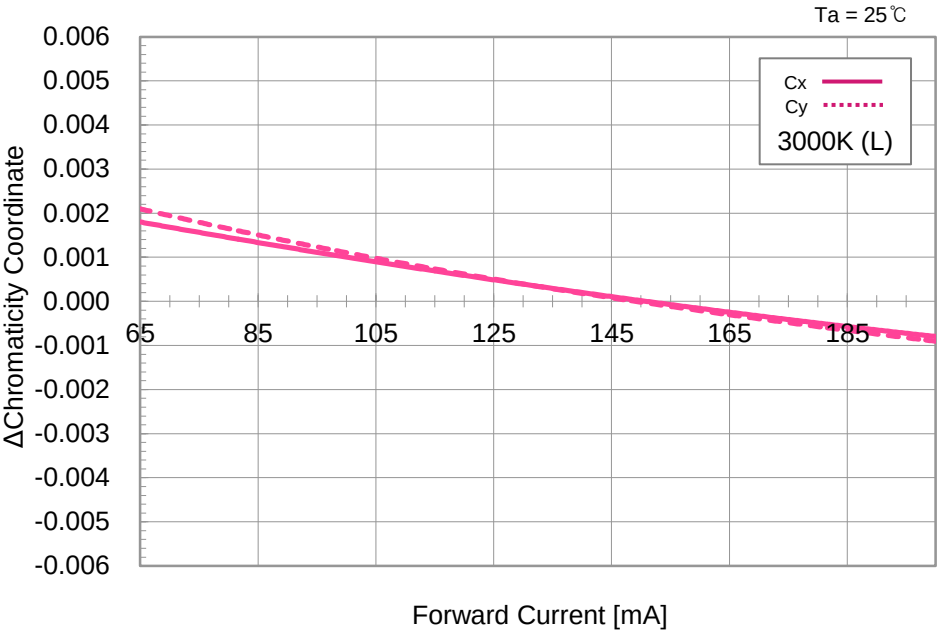
▪ Spectrum



8. Typical Characteristic Curves

▪ Chromaticity Coordinate vs. Forward Current

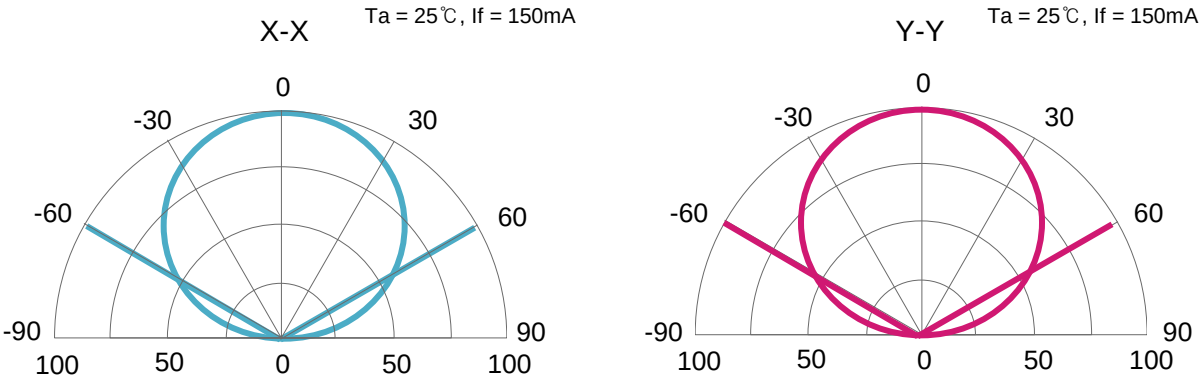




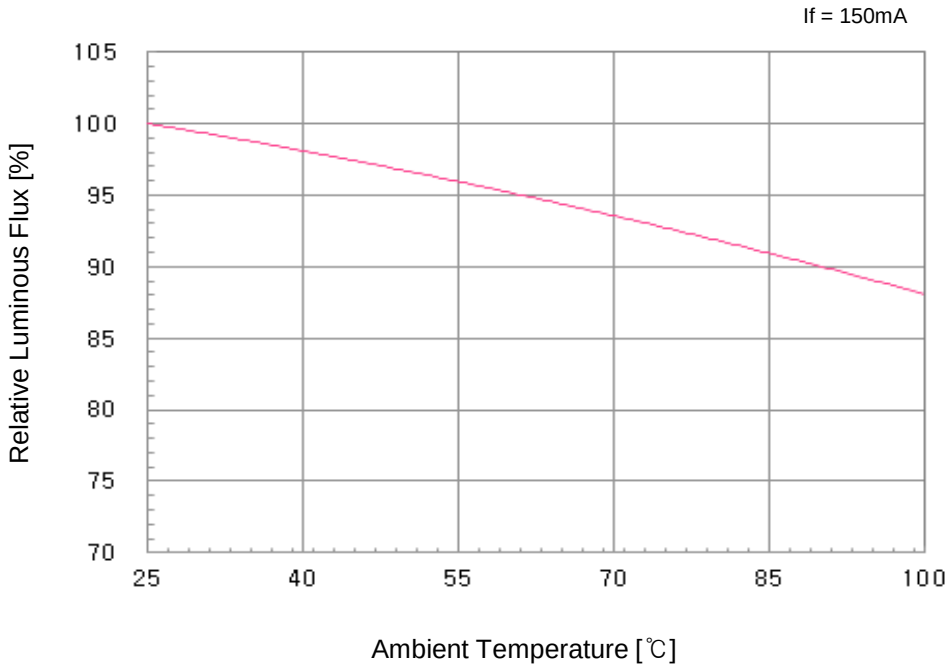
※ 5000K CCT data also applies to 5700K and 6500K CCTs and 3000K data also applies to 2700K, 3500K and 4000K CCTs.

8. Typical Characteristic Curves

▪ Radiation Characteristics

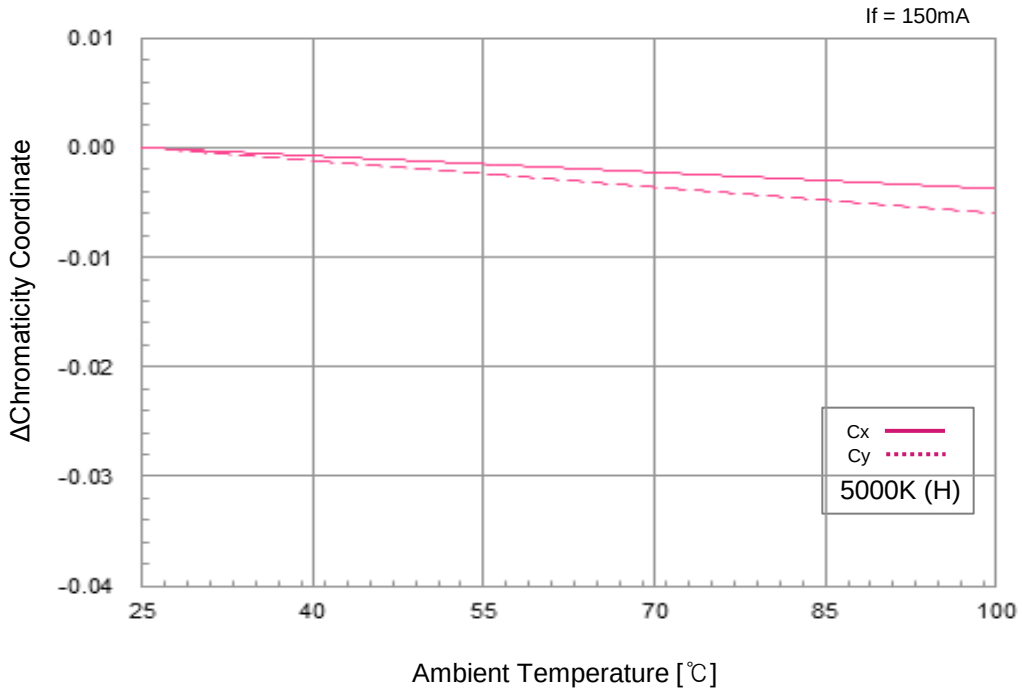


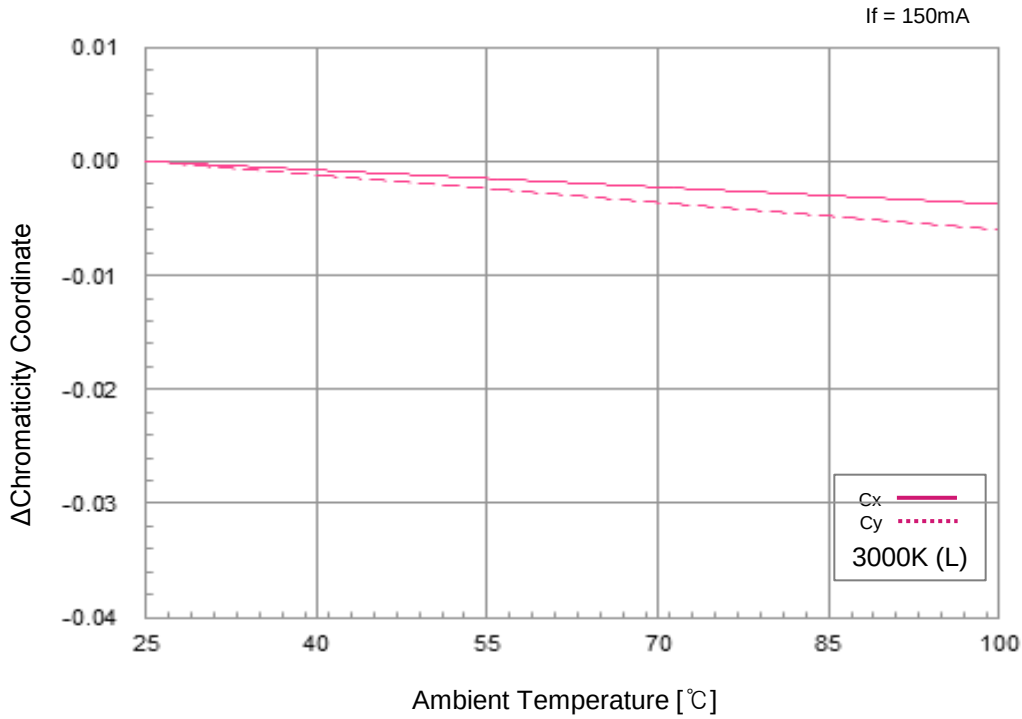
▪ Luminous Flux vs. Temperature



8. Typical Characteristic Curves

▪ Chromaticity Coordinate vs. Temperature



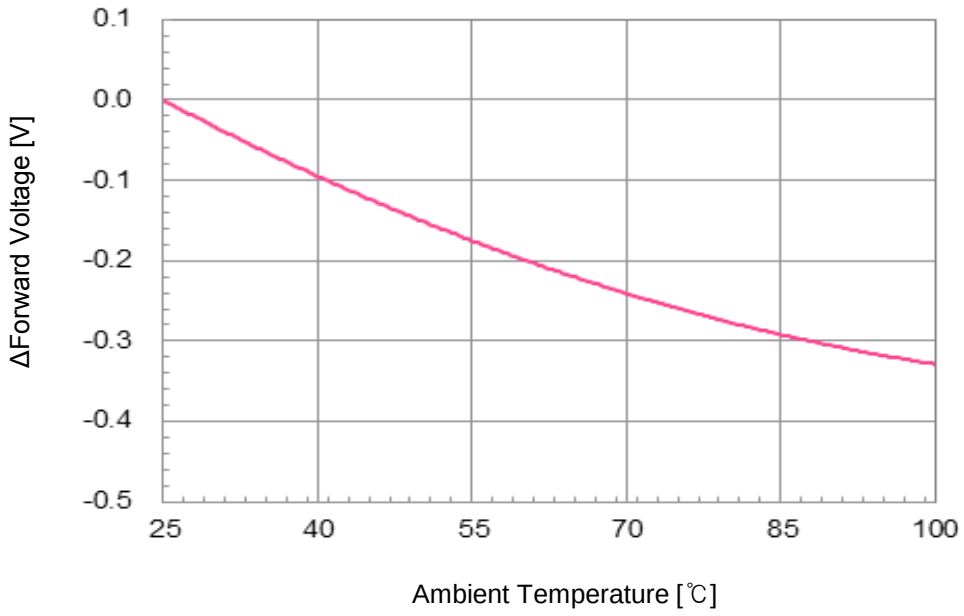


※ 5000K CCT data also applies to 5700K and 6500K CCTs and 3000K data also applies to 2700K, 3500K and 4000K CCTs.

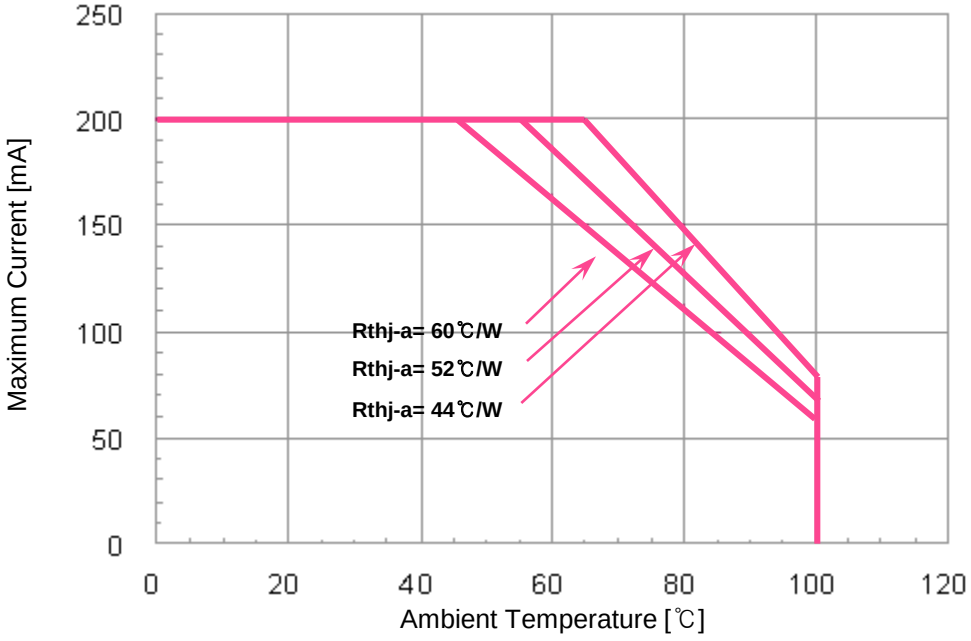
8. Typical Characteristic Curves

▪ Forward Voltage vs. Temperature

If = 150mA



▪ Derating Curve



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

9. Reliability Test Items and Conditions

9-1. Failure Criteria

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

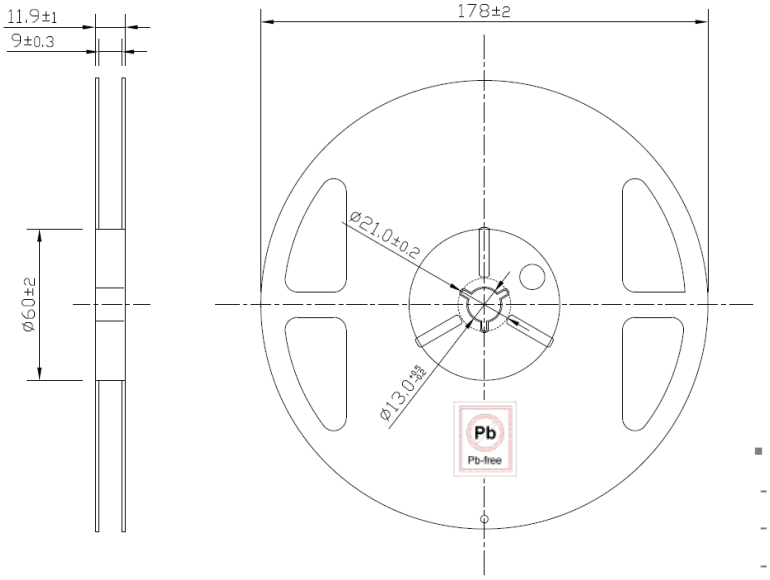
9-2. Reliability Tests

No	Items	Test Conditions	Test Hours / Cycles
1	Room Temperature Operating Life (RTOL)	Ta = 25℃, If = 200mA	1,000 Hours
2	Wet High Temperature Operating Life (WHTOL)	Ta = 60℃, RH = 90%, If = 200mA	1,000 Hours
3	High Temperature Operating Life (HTOL)	Ta = 85℃, If = 200mA	1,000 Hours
4	Low Temperature Operating Life (LTOL)	Ta = -40℃, If = 200mA	1,000 Hours
5	High Temperature Storage Life (HTSL)	Ta = 100℃	1,000 Hours
6	Low Temperature Storage Life (LTSL)	Ta = -40℃	1,000 Hours
7	Wet High Temperature Storage Life (WHTSL)	Ta = 85℃, RH = 85%	1,000 Hours
8	Thermal Shock (TMSK)	100℃ ~ -40℃ Dwell : 15 min., Transfer : 10 sec.	200 Cycles
9	Moisture Sensitivity Level (MSL)	Tsld = 260℃ (Pre treatment 60℃,60%,168 hours)	3 Times
10	Vibration	100~2000~100Hz Sweep 4 min. 200m/s², 3 dierection	48 Minutes

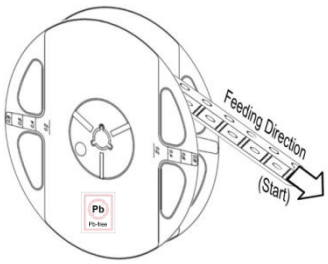
※ All samples are tested using LG Innotek Standard Metal PCB (25x25x1.6 mm^3 (L×W×H)) except MSL test .
※ All samples must pass each test item and all test items must be satisfied.

10. Packing and Labeling of Product

10-1. Taping Outline Dimensions

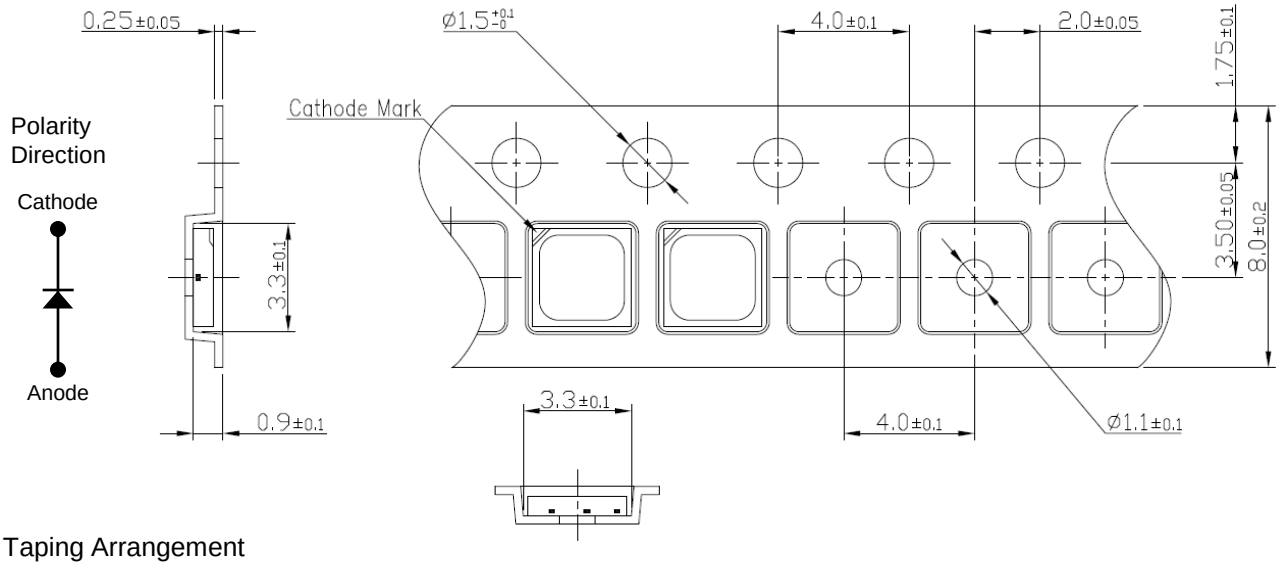


(Unit : mm)

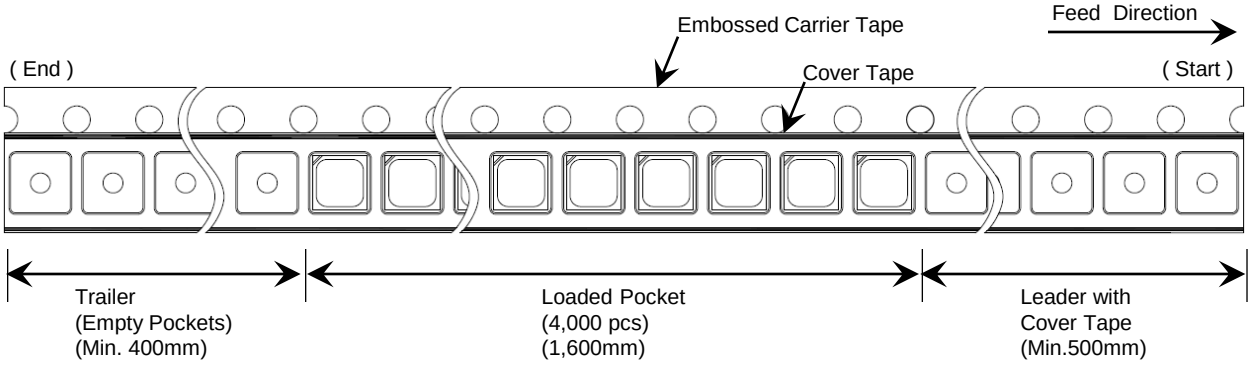


▪ Packing Materials :

- Reel : Conductive PS (Black)
- Embossed Carrier Tape : Conductive PS (Black)
- Cover Tape : Conductive PET Base



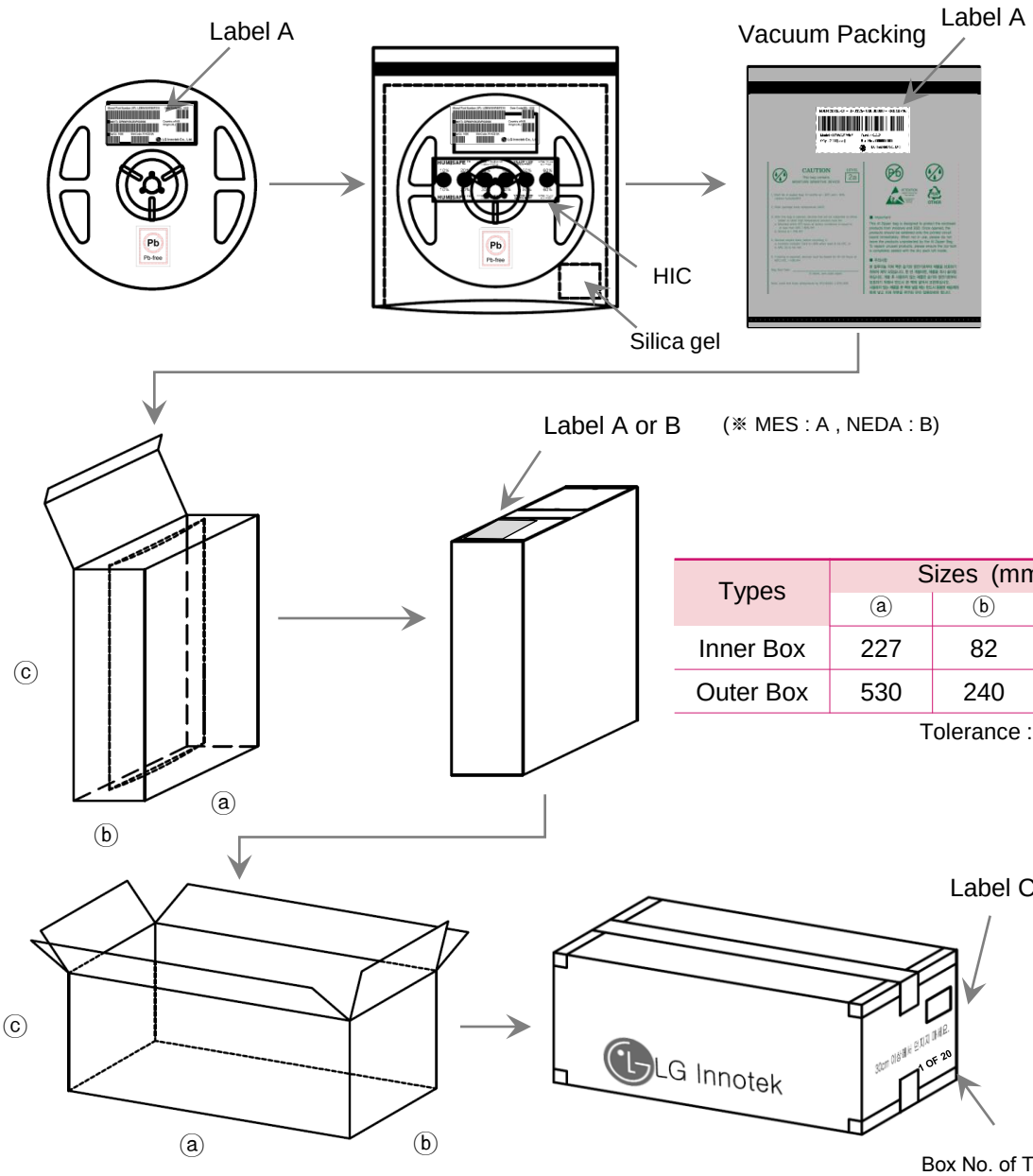
Taping Arrangement



10. Packing and Labeling of Product

10-2. Packing Structures

Reeled products are packed in a sealed-off and moisture-proof aluminum bag with desiccants (silica gel) and HIC (Humidity Indicator Card). A maximum of four aluminum bags are packed in an inner box and six inner boxes are packed in an outer box.



Types	Sizes (mm)		
	ⓐ	ⓑ	ⓒ
Inner Box	227	82	258
Outer Box	530	240	280

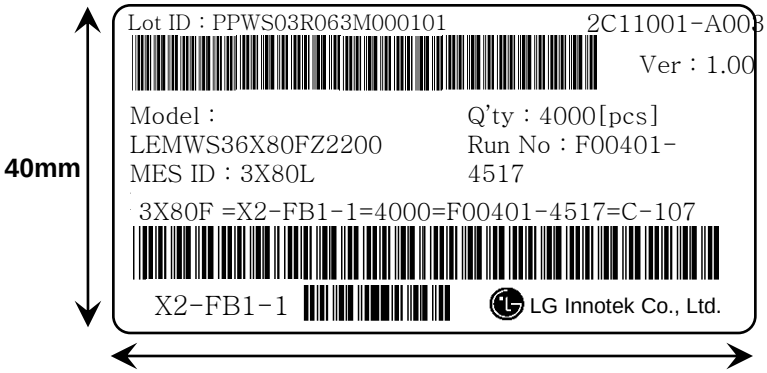
Tolerance : ±10 mm

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.’

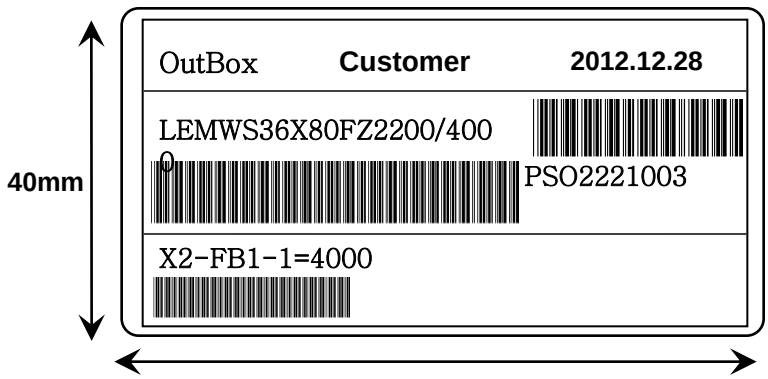


▪ Run No. indication

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	2013 : 3 2014 : 4 … 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’, ‘LGIT internal Model name’



▪ Box ID. indication

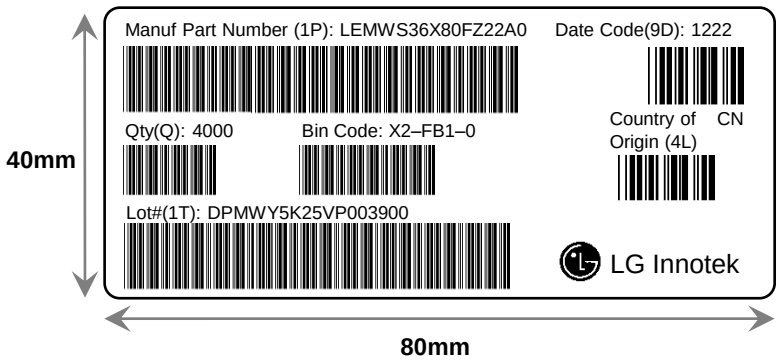
1	2	3	4	5	6	7	8	9	10
Manufactured Site	PKG Site	Box	Year	Month	Date		Serial No		
Paju : P Huizhou : H	PKG : S, P	Inner Box : I Outer Box : O	2013 : 3 2014 : 4 … 2020 : 0 2021 : 1	1~9 : 1~9 10 : A 11 : B 12 : C	(01 ~ 31)		(001 ~ 999)		

10. Packing and Labeling of Product

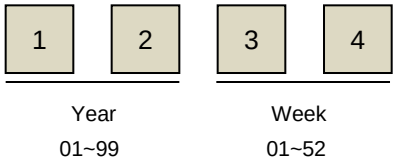
10-4. NEDA Label Structure

※ Label A

Specifying ‘Manufacturing Part Number’, ‘Quantity’, ‘Bin Code’, ‘Lot’, ‘Date Code’ and ‘Country of Origin’



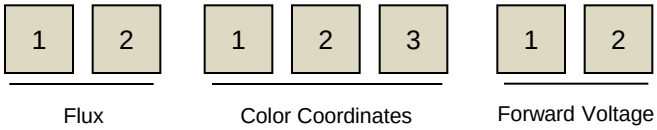
▪ Date Code(9D)



▪ Lot#(1T)

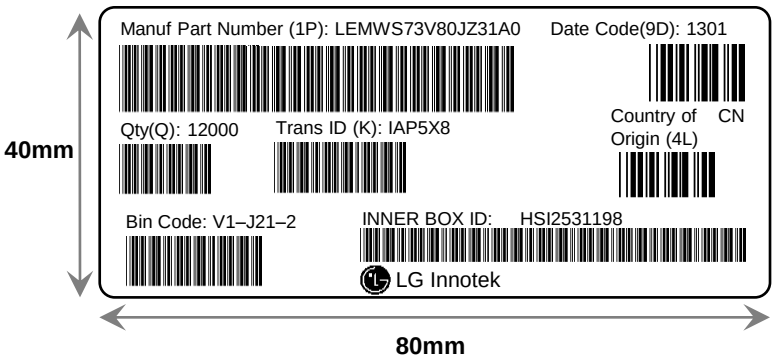
LG Innotek Trace Code

▪ Bin Code



※ Label B

Specifying ‘Manufacturing Part Number’, ‘Quantity’, ‘Bin Code’, ‘Trans ID’, ‘Date Code’, ‘Country of Origin’ and ‘Inner Box ID’

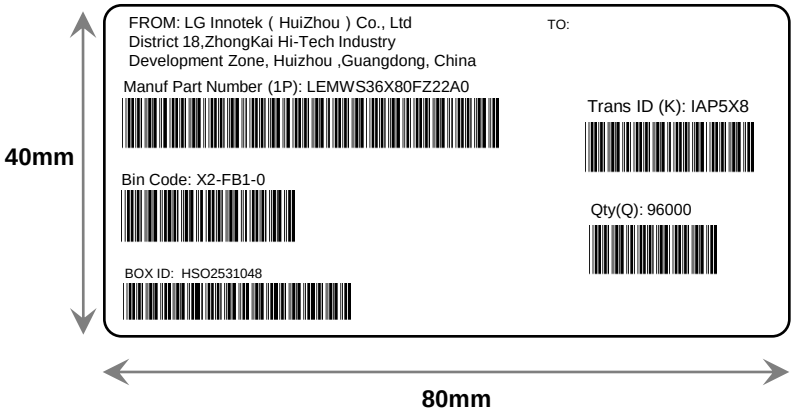


10. Packing and Labeling of Product

10-4. NEDA Label Structure

※ Label C

Specifying ‘Manufacturing Site’, ‘Customer Address’, ‘Manufacturing Part Number’, ‘Bin Code’, ‘Box ID’, ‘Trans ID’ and ‘Quantity’



▪ Box ID indication

1	2	3	4	5	6	7	8	9	10
Site	Code	Outbox	Year	Month	Date		Serial No		
Paju: P Huizhou: H	S, P	Outbox: O Inbox: I	13 : 3 14 : 4 15 : 5	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

11-3. During Usage

-. The LED should avoid direct contact with hazardous materials such as sulfur, chlorine, phthalate, etc.

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

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

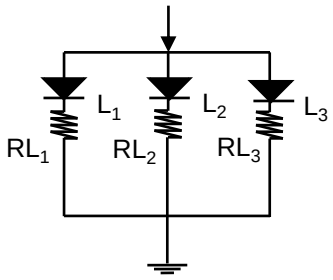


Fig.1 Recommended Circuit in Parallel Mode
: Separate resistors must be used for each LED.

-. 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.

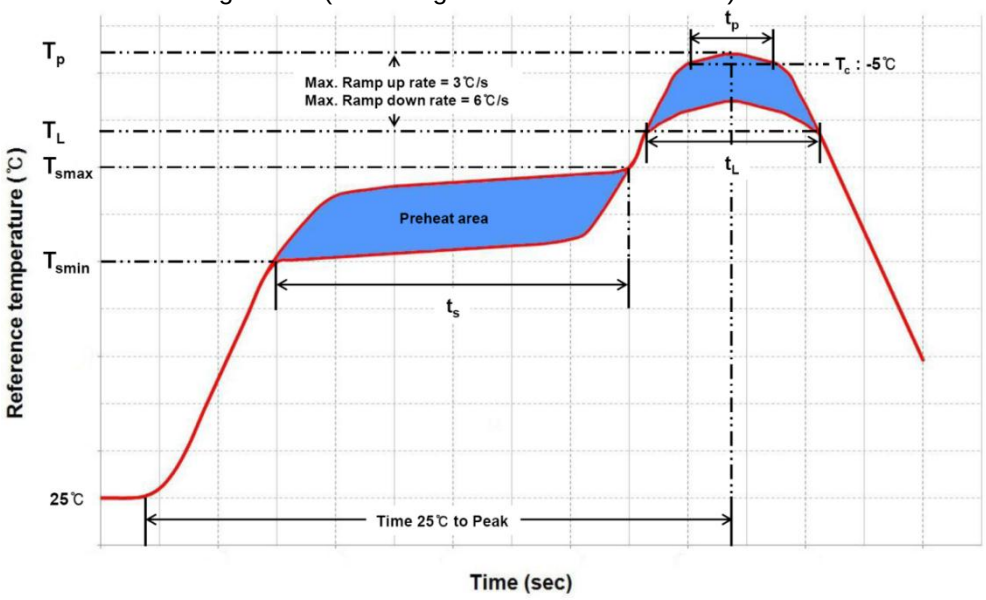
11. Cautions on Use

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.
Liquidous 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

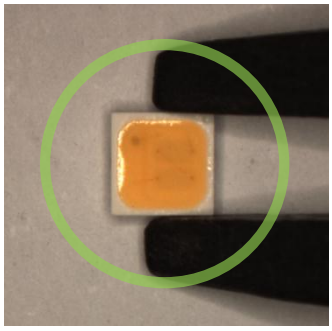
-. The recommended condition is less than 5 seconds at 260℃.
-. The time must be shorter for higher temperatures. (+10℃ → -1sec).
-. The power dissipation of the soldering iron should be lower than 15W and the surface temperature of the device should be controlled at or under 230℃.

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.



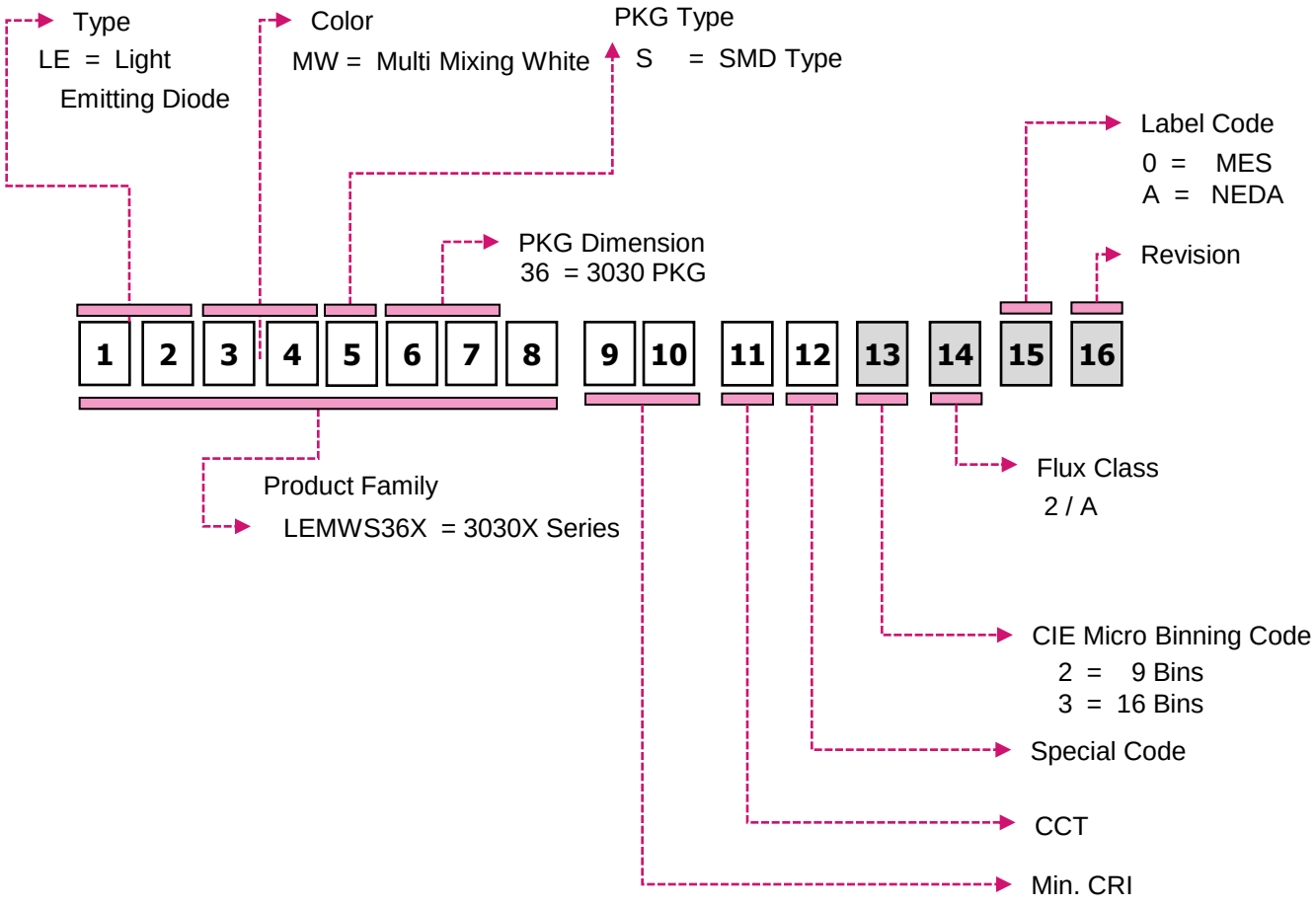
12. Disclaimers

-. 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.
-. 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.

Appendix. Product Nomenclature

All LEDs are tested and sorted by color, luminous flux and forward voltage where every LED in a tube has only a single color bin, luminous flux bin and forward voltage bin. However, the forward voltage bin information is not captured in the part number nomenclature.

A 16-digit part number is consisted as below; LG Innotek leverages the following part number nomenclature.



Example : LEMWS36X80LZ32A0 would be:

Product Family = LEMWS36X = 3030X Series
CRI = 80
CCT(Nominal) = L = 3000K
Special Code = Z = n/a
CIE Micro Bins = 3 = 16 ANSI Bin Structure
Flux Class = 2 = min 89.7 lm ~
Label Code = A = NEDA
Revision = 0

Datasheet			
MODEL	3030 2Chip	DOCUMENT No.	-
REG.DATE	2013.07.10	REV. No.	8.0
REV.DATE	2015.11.11	PAGE	-

History of Revision

Revision	Date	Contents Revision	Remark
Rev. 0.0	13.04.23	New Establishment	
Rev. 1.0	13.09.12	Add the flux rank (X3)	
Rev. 2.0	14.02.28	Change the official name	Page 1
Rev. 3.0	14.07.16	Modify the Flux Range	Page 4,5,6
Rev. 4.0	15.03.10	Add the flux class (A)	Page 4,5
Rev. 5.0	15.03.26	Add the graph "Forward Current vs. Forward Voltage" of Flux Class "A"	Page 11
Rev. 6.0	15.07.10	Separate/add the Flux bin	Page 4,5
Rev. 7.0	15.10.28	Modify Topr, Tj Add the CRI70, CRI90	Page 4 Page 6
Rev. 8.0	15.11.11	Modify Typical Characteristic Curves	Page 18,19, 20