CUSTOMER :

DATE : 2010.11.05 .

PRELIMINARY

SPECIFICATIONS FOR APPROVAL

PRODUCT NAME : High Power LED (WLP : White)

MODEL NAME : LEMWW35V80LZ00

CUSTOMER P/N :

APPROVAL	REMARK

APPENDIX
1.Revision1 : Reliability test Item added, 85℃/85% storage test

Designed	Checked	Approved	LG Innotek Co., Ltd.	
			DOCUMENT No.	
			PAGE	1 / 15

LG Innotek	DOCUMENT No :	
REG. DATE : 2010. 03. 08	**SPECIFICATION**	REV.NO : 1
REV. DATE : 2010. 07. 05	**MODEL NAME : LEMWW35X80LZ00**	PAGE : 2 / 15

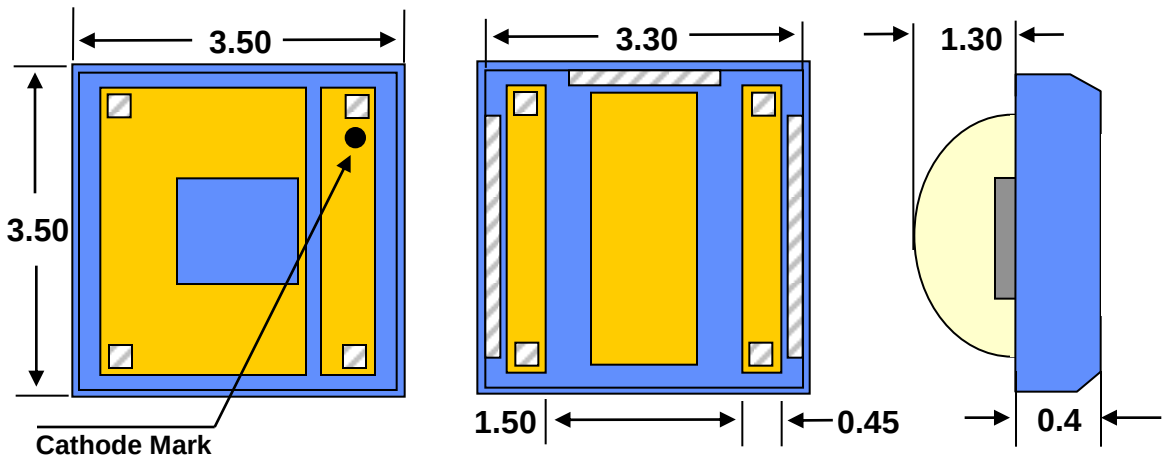
CONTENTS

1. Features

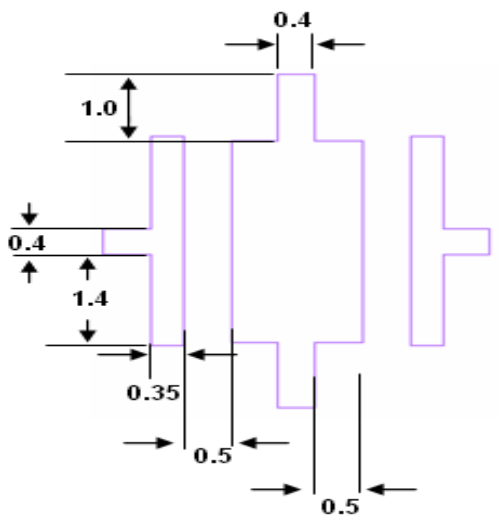
- Available in white (2,600 K to 9,000 K CCT)
- Equivalent to 3535 Package Outline, 1.7 mm Thickness Slim Type SMD
- Silicon Chip-Carrier (SiCC), Thermal Conductive Silicon Frame PKG
- Wafer Level Package (WLP) type : 3.5×3.5×1.7 mm (L×W×H)
- Compatible to Pb-free IR reflow soldering
- ESD-withstand voltage : up to 2kV acc. to JESD22-A 114-B

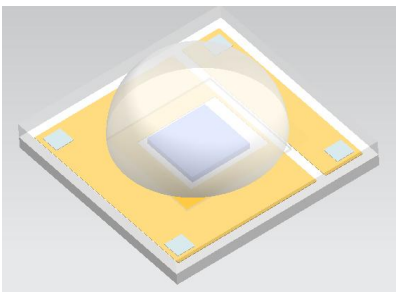
2. Outline Dimensions

(Unit : mm)

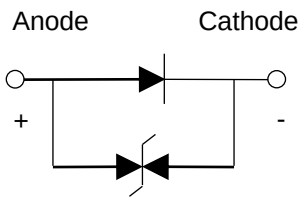


RECOMMENDED PCB SOLDER PAD





POLARITY



◆Tolerances Unless Dimension ±0.2mm

3. Applications

- Portable and Personal Lighting
- Outdoor, Indoor-directional Lighting
- High Power-consuming Lighting Products

4. Characteristics, Ta = 25℃

Characteristics	Unit	Minimum	Typical	Maximum
Thermal Resistance, junction to solder point[1)]	℃/W	-	5	-
Viewing Angle (FWHM)	degrees	-	115	-
ESD[2)]	kV	-	2	-
DC Forward Current	mA	-	350	500
Power Dissipation	mW	-	1155	1800
Reverse Voltage	V_R	-	-	5
Forward Voltage (@350 mA)	V	3.0	3.3	3.8
Color Rendering Index-Cool/Neutral white	Ra	70		
Color Rendering Index-Warm white	Ra	80		
Storage Temperature	℃	-30	-	85
LED Junction Temperature	℃	-	-	120

※ These values measured by Optical Spectrum Analyzer of LG Innotek Co., LTD and tolerances are followings as below
- Forward Voltage (V_F) : ±0.1 and Color Rendering Index : ±2

*1) $R_{th\text{-}js}$ results from mounting on Metal Core PC (board size ≥ 1 inch^2)
2) These value is according to the JESD22-A 114-B

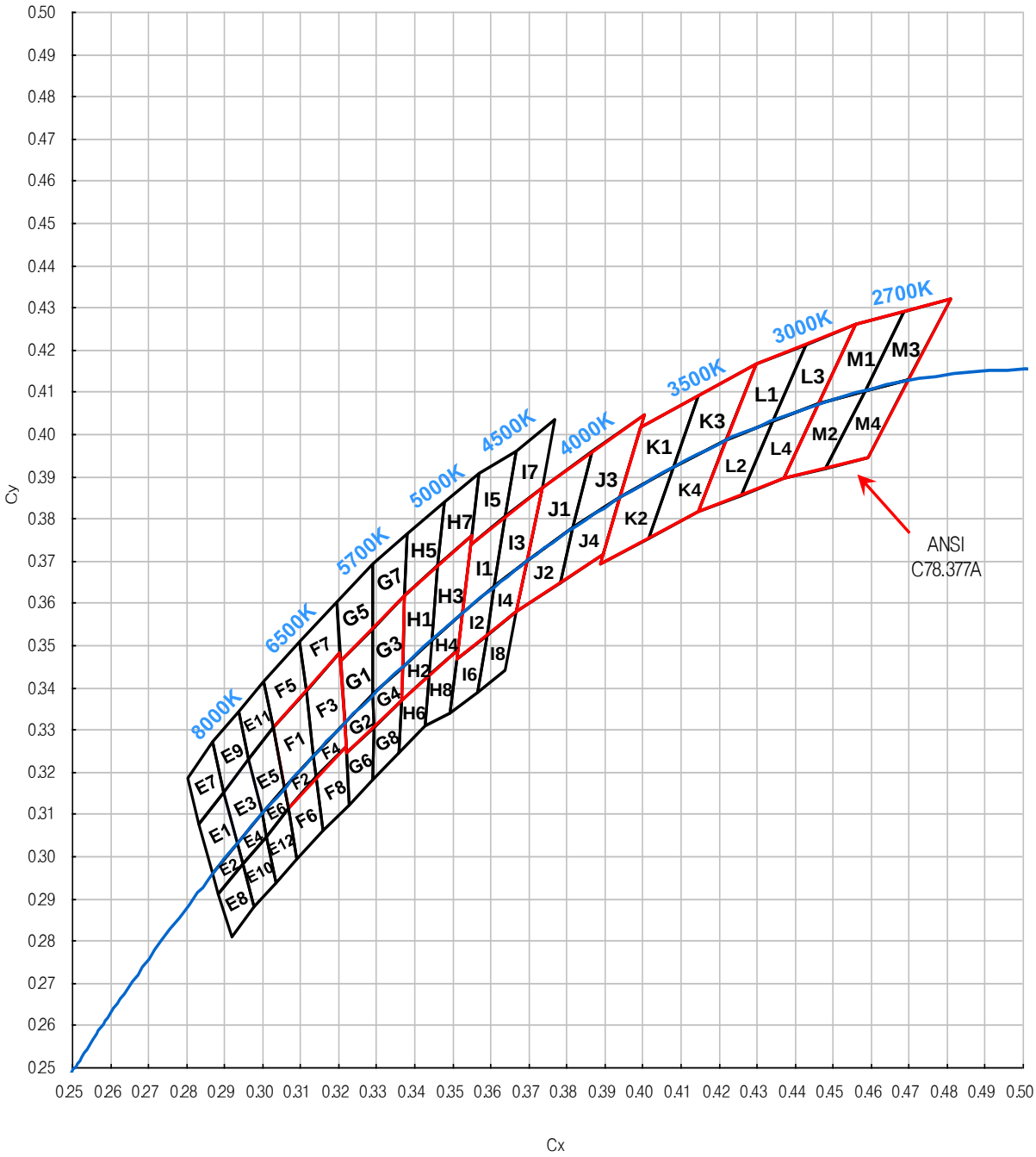
5. Flux Characteristics (Ta = 25℃, IF=350mA) - White

Color	CCT Range		Min Luminous Flux (lm)		Order Code
	Min.	Max.	Group	Flux (lm)	
Cool White	5,000 K	9,000 K	W1	80	
			W2	90	
			X1	100	
			X2	110	
			X3	120	
Neutral White	3,700 K	5,000 K	V1	60	
			V2	65	
			V3	70	
			W1	80	
			W2	90	
Warm White	2,600 K	3,700 K	U1	50	
			U2	55	
			V1	60	
			V2	65	
			V3	70	
			W1	80	

Notes :

- LGIT maintains a tolerance of ±10% on flux and power measurements
- Typical CRI for Cool White & Neutral White (3,700 K – 9,000 K CCT) is 70.
- Typical CRI for Warm White (2,600 K – 3,700 K CCT) is 80.

6. Chromaticity on the 1931 CIE Curve



- Chromaticity coordinate groups are tested at a current pulse duration of 3000 ms and a tolerance of ±0.01.
- ANSI Cool/Neutral/Warm white

7. Performance Groups – Chromaticity

CCT	Rank	CIE X	CIE Y	CCT	Rank	CIE X	CIE Y	CCT	Rank	CIE X	CIE Y
2700K (2725K ±145K)	M1	0.4562	0.4260	4500K (4503K ±243K)	I1	0.3548	0.3736	5700K (5665K ±355K)	G1	0.3207	0.3462
		0.4687	0.4289			0.3641	0.3804			0.3291	0.3538
		0.4586	0.4103			0.3611	0.3638			0.3292	0.3382
		0.4465	0.4071			0.3526	0.3575			0.3217	0.3314
	M2	0.4465	0.4071		I2	0.3526	0.3575		G2	0.3217	0.3314
		0.4586	0.4103			0.3611	0.3638			0.3292	0.3382
		0.4483	0.3918			0.3590	0.3521			0.3293	0.3305
		0.4373	0.3893			0.3512	0.3465			0.3222	0.3243
	M3	0.4687	0.4289		I3	0.3641	0.3804		G3	0.3291	0.3538
		0.4813	0.4319			0.3736	0.3874			0.3376	0.3616
		0.4700	0.4126			0.3697	0.3697			0.3369	0.3449
		0.4586	0.4103			0.3611	0.3638			0.3292	0.3382
	M4	0.4586	0.4103		I4	0.3611	0.3638		G4	0.3292	0.3382
		0.4700	0.4126			0.3697	0.3697			0.3369	0.3449
		0.4593	0.3944			0.3670	0.3578			0.3366	0.3369
		0.4483	0.3918			0.3590	0.3521			0.3293	0.3305
3000K (3045K ±175K)	L1	0.4299	0.4165		I5	0.3571	0.3907		G5	0.3196	0.3602
		0.4430	0.4212			0.3668	0.3957			0.3290	0.3690
		0.4344	0.4032			0.3641	0.3804			0.3291	0.3538
		0.4221	0.3984			0.3548	0.3736			0.3207	0.3462
	L2	0.4221	0.3984		I6	0.3512	0.3465		G6	0.3222	0.3243
		0.4344	0.4032			0.3590	0.3521			0.3293	0.3305
		0.4260	0.3853			0.3567	0.3389			0.3290	0.3180
		0.4147	0.3814			0.3495	0.3339			0.3231	0.3120
	L3	0.4430	0.4212		I7	0.3668	0.3957		G7	0.3290	0.3690
		0.4562	0.4260			0.3771	0.4034			0.3381	0.3762
		0.4465	0.4071			0.3736	0.3874			0.3376	0.3616
		0.4344	0.4032			0.3641	0.3804			0.3291	0.3538
	L4	0.4344	0.4032		I8	0.3590	0.3521		G8	0.3293	0.3305
		0.4465	0.4071			0.3670	0.3578			0.3366	0.3369
		0.4373	0.3893			0.3640	0.3440			0.3361	0.3245
		0.4260	0.3853			0.3567	0.3389			0.3290	0.3180
3500K (3465K ±245K)	K1	0.3996	0.4015	5000K (5028K ±283K)	H1	0.3376	0.3616	6500K (6530K ±510K)	F1	0.3028	0.3304
		0.4146	0.4089			0.3463	0.3687			0.3115	0.3391
		0.4082	0.3922			0.3447	0.3513			0.3136	0.3237
		0.3941	0.3848			0.3369	0.3449			0.3059	0.3160
	K2	0.3941	0.3848		H2	0.3369	0.3449		F2	0.3059	0.3160
		0.4082	0.3922			0.3447	0.3513			0.3136	0.3237
		0.4017	0.3752			0.3440	0.3427			0.3144	0.3186
		0.3889	0.3690			0.3366	0.3369			0.3068	0.3113
	K3	0.4146	0.4089		H3	0.3463	0.3687		F3	0.3115	0.3391
		0.4299	0.4165			0.3551	0.3760			0.3205	0.3481
		0.4221	0.3984			0.3526	0.3575			0.3217	0.3314
		0.4082	0.3922			0.3447	0.3513			0.3136	0.3237
	K4	0.4082	0.3922		H4	0.3447	0.3513		F4	0.3136	0.3237
		0.4221	0.3984			0.3526	0.3575			0.3217	0.3314
		0.4147	0.3814			0.3515	0.3487			0.3221	0.3261
		0.4017	0.3752			0.3440	0.3427			0.3144	0.3186
4000K (3985K ±275K)	J1	0.3736	0.3874		H5	0.3381	0.3762		F5	0.3005	0.3415
		0.3870	0.3958			0.3480	0.3840			0.3099	0.3509
		0.3819	0.3776			0.3463	0.3687			0.3115	0.3391
		0.3697	0.3697			0.3376	0.3616			0.3028	0.3304
	J2	0.3697	0.3697		H6	0.3366	0.3369		F6	0.3068	0.3113
		0.3819	0.3776			0.3440	0.3427			0.3144	0.3186
		0.3783	0.3646			0.3429	0.3307			0.3161	0.3059
		0.3670	0.3578			0.3361	0.3245			0.3093	0.2993
	J3	0.3870	0.3958		H7	0.3480	0.3840		F7	0.3099	0.3509
		0.4006	0.4044			0.3571	0.3907			0.3196	0.3602
		0.3941	0.3848			0.3551	0.3760			0.3205	0.3481
		0.3819	0.3776			0.3463	0.3687			0.3115	0.3391
	J4	0.3819	0.3776		H8	0.3440	0.3427		F8	0.3144	0.3186
		0.3941	0.3848			0.3515	0.3487			0.3221	0.3261
		0.3898	0.3716			0.3495	0.3339			0.3231	0.3120
		0.3783	0.3646			0.3429	0.3307			0.3161	0.3059

7. Performance Groups – Chromaticity (Continued)

CCT	Rank	CIE X	CIE Y	CCT	Rank	CIE X	CIE Y	CCT	Rank	CIE X	CIE Y
8000K (8020K ±980K)	E1	0.2835	0.3075	8000K (8020K ±980K)	E7	0.2803	0.3185				
		0.2772	0.2992			0.2735	0.3100				
		0.2807	0.2884			0.2772	0.2992				
		0.2870	0.2957			0.2835	0.3075				
	E2	0.2870	0.2957		E8	0.2885	0.2910				
		0.2807	0.2884			0.2824	0.2840				
		0.2824	0.2840			0.2860	0.2740				
		0.2885	0.2910			0.2920	0.2810				
	E3	0.2900	0.3150		E9	0.2870	0.3270				
		0.2835	0.3075			0.2803	0.3185				
		0.2870	0.2957			0.2835	0.3075				
		0.2935	0.3029			0.2900	0.3150				
	E4	0.2935	0.3029		E10	0.2950	0.2980				
		0.2870	0.2957			0.2885	0.2910				
		0.2885	0.2910			0.2920	0.2810				
		0.2950	0.2980			0.2980	0.2880				
	E5	0.2965	0.3230		E11	0.2938	0.3343				
		0.2900	0.3150			0.2870	0.3270				
		0.2935	0.3029			0.2900	0.3150				
		0.3000	0.3100			0.2965	0.3230				
	E6	0.3000	0.3100		E12	0.3010	0.3045				
		0.2935	0.3029			0.2950	0.2980				
		0.2950	0.2980			0.2980	0.2880				
		0.3010	0.3045			0.3037	0.2937				

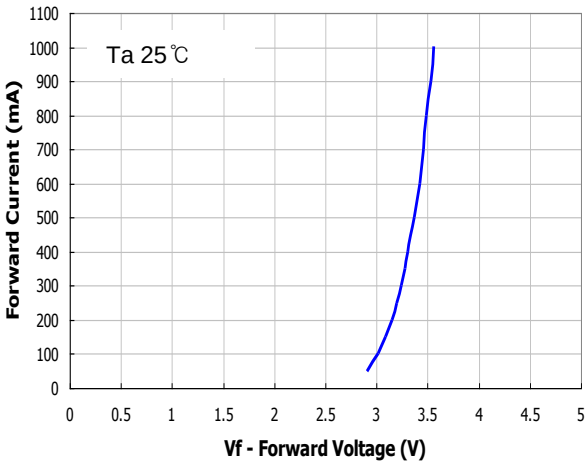
※ Model name method: Please refer to the following

example Model Name : LEMWW35N 70 R Z00

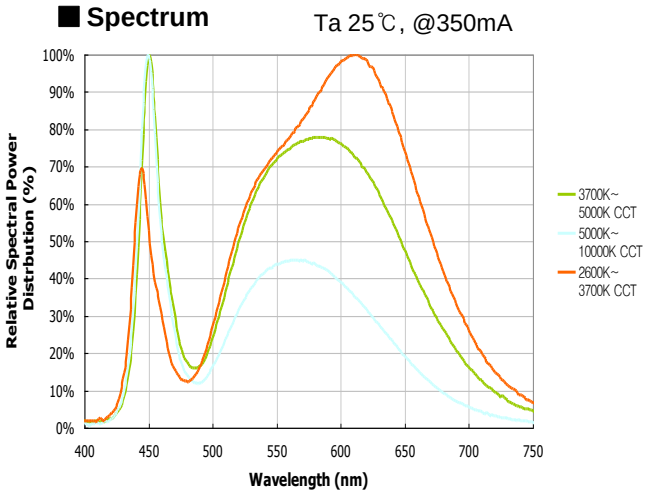
- Spec of Luminous Flux
- Spec of CRI
- Spec of CIE

8. Typical Characteristic Curves

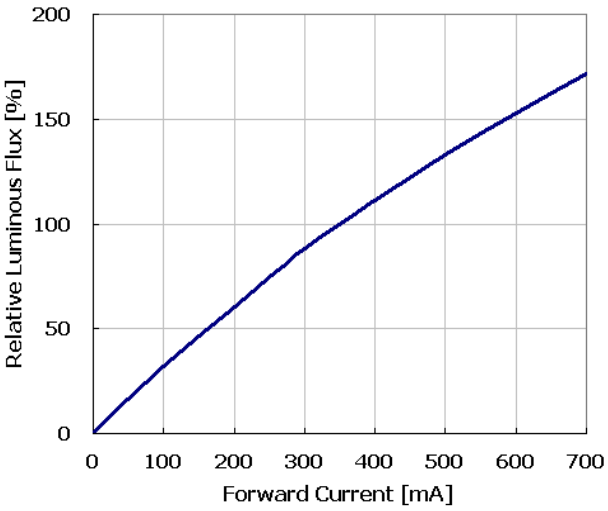
■ Forward Voltage vs. Forward Current



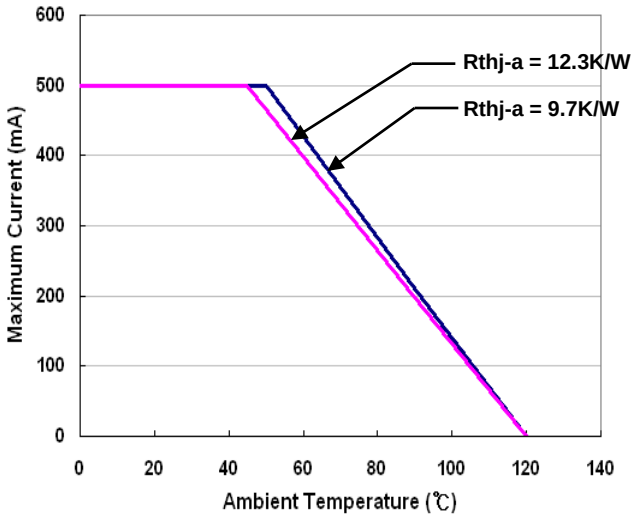
■ Spectrum



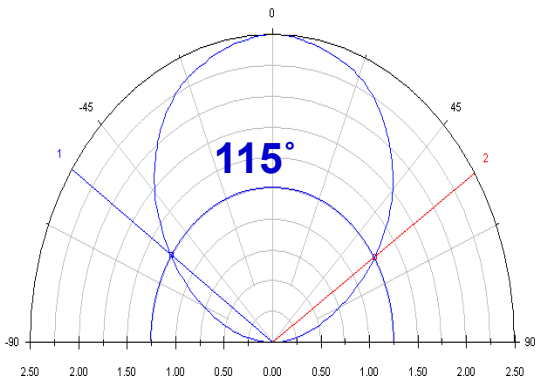
■ Forward Current vs. Luminous Flux



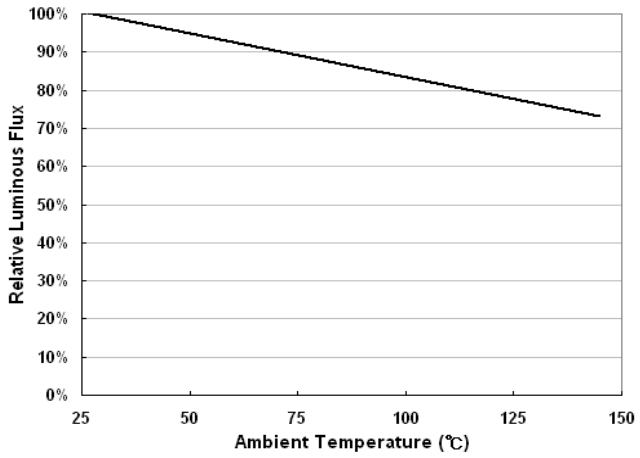
■ Max. Permissible Forward Current



■ Radiation Characteristics



■ Relative Flux vs Ambient Temperature



9. Reliability Test Items and Conditions

9-1. Items and Results of Reliability Test

No	Item	Test Condition	Test Hours/ Cycles	Sample No	Ac/Re
1	Steady State Operating Life	Ta=25℃, I_F=350 [mA]	1000hr	11 pcs	0 / 1
2	High Temp. Humidity Life	Ta=60℃,90% RH,I_F=350 [mA]	1000hr	11 pcs	0 / 1
3	Steady State Operating Life of High Temperature	Ta=85℃, I_F=250 [mA]	1000hr	11 pcs	0 / 1
4	Steady State Operating Life of Low Temperature	Ta= -30℃, I_F=350 [mA]	1000hr	11 pcs	0 / 1
5	High Temp. Storage	100℃	1000hr	11 pcs	0 / 1
6	Low Temp. Storage	-40℃	1000hr	11 pcs	0 / 1
7	High Temp. Humidity storage	Ta=85℃,85% RH	1000hr	11 pcs	0 / 1
8	Temperature Cycle	-40℃(30min) ~ 25℃(5min) ~ 100℃(30min) ~ 25℃(5min)	100cycle	11 pcs	0 / 1
9	Thermal Shock	100℃(30min) ~ -40℃(30min)	100cycle	11 pcs	0 / 1
10	Resistance to Soldering Heat (Reflow Soldering)	Tsld = 260℃, 10s (pre treat. 30℃, 70%, 168hr)	1 times*1)	11 pcs	0 / 1
11	Vibration	200m/s^2,100~2000Hz(sweep 4min) 48min, 3 directions	4 times	11 pcs	0 / 1
12	Electrostatic Discharge	R=1.5kΩ, C=100pF, Test Voltage 2kV	3times Negative/ Positive	11 pcs	0 / 1

*1) soldering heat test time is restricted to one time

9-2. Criteria for Judging the Damage

(U.S.L : Upper Spec. Limit, S : Initial Value)

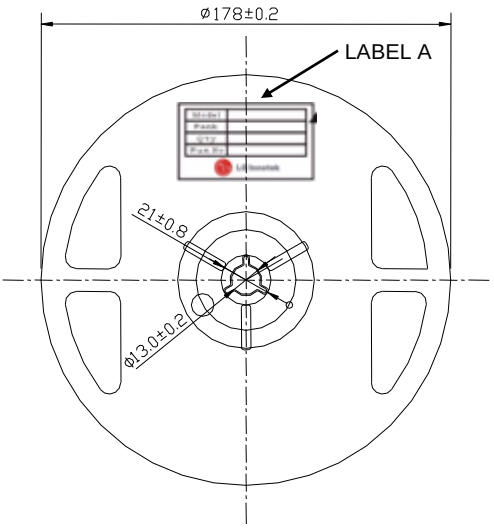
Item	Symbol	Test Condition	Limit	
			Min.	Max.
Forward Voltage	V_F	I_F = 350mA	-	U.S.L.× 1.2
Luminous Flux	P_O	I_F = 350mA	S × 0.7	-

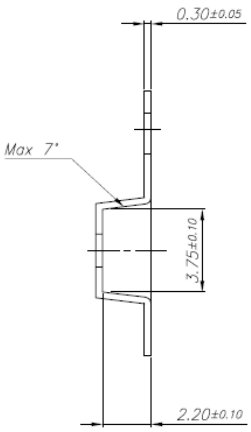
10. Package and Marking of Products

10-1. Taping Outline Dimension

Dimension of Reel

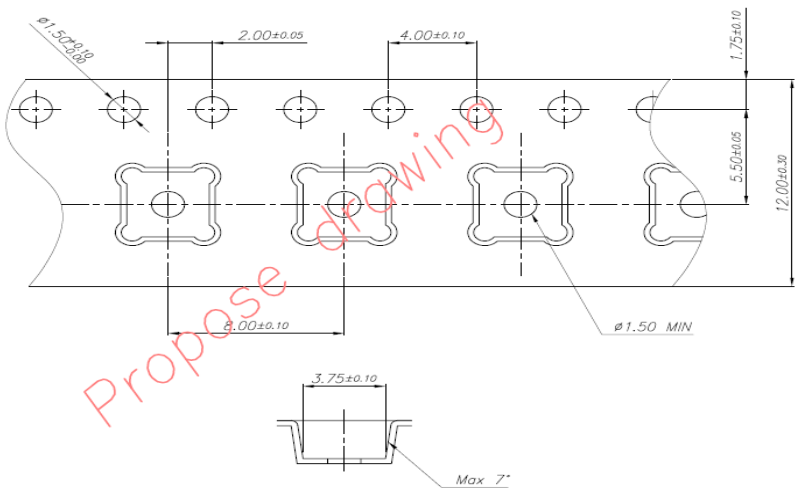
(Unit : mm)



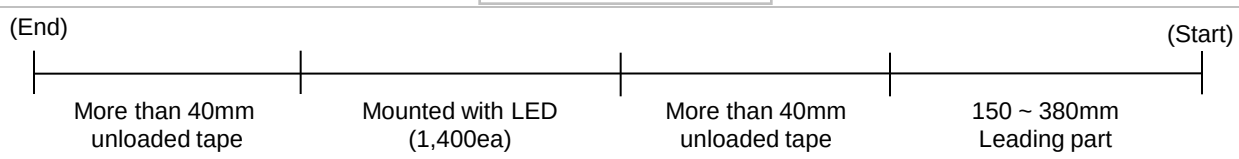


◆ Packing Materials :
- Reel : Conductive PS (black)
- Emboss Tape : Conductive PS (black)
- Cover Tap : Conductive PET base

Dimension of Tape

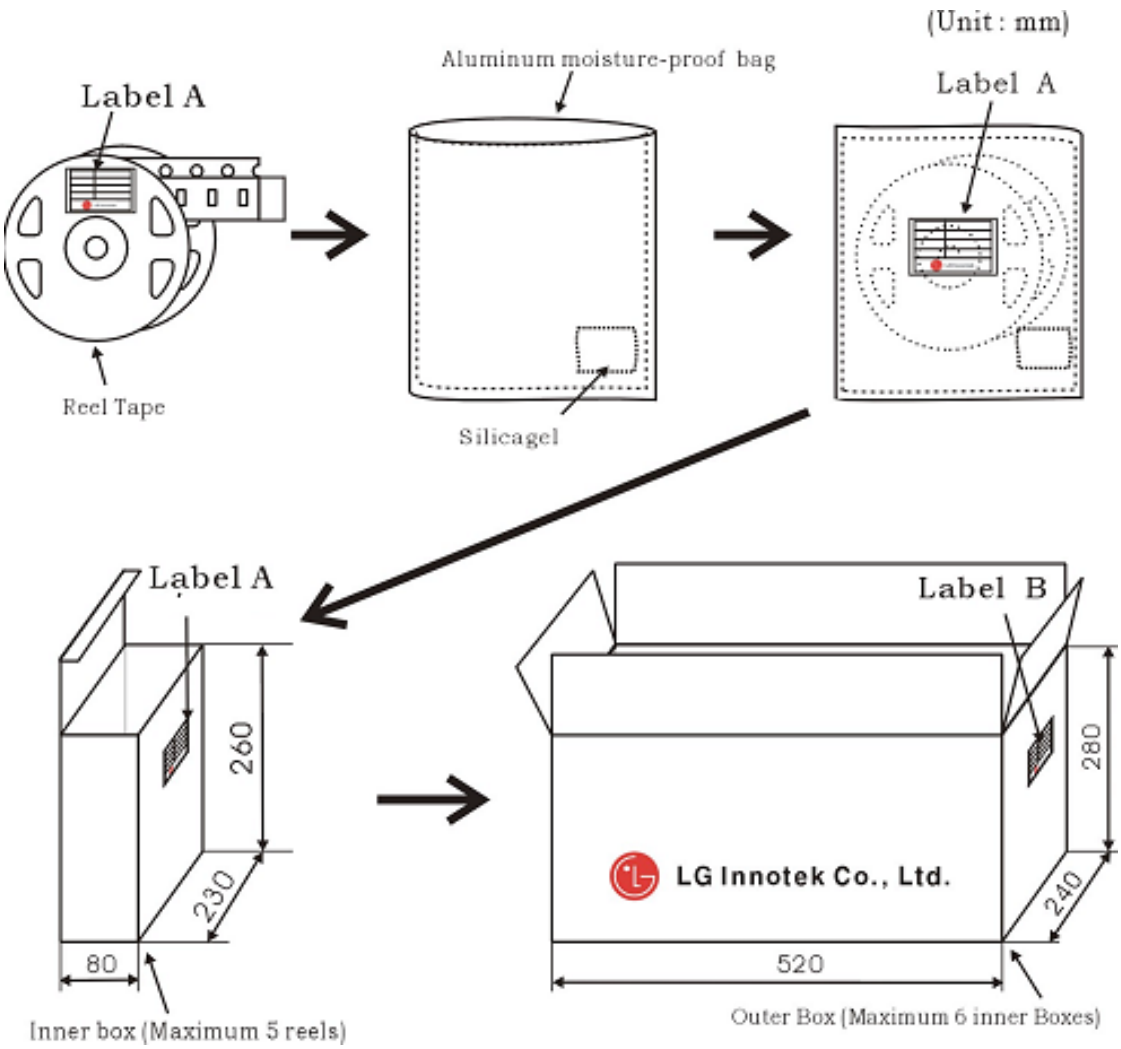


Arrangement of Tape



10-2. Packing Specifications

Reeled products (numbers of products are 1,400 pcs) packed in a seal off aluminum moisture-proof bag along with desiccants (Silica gel).
Five aluminum bags (total maximum number of products are 7,000 pcs) packed in an inner box and Six inner boxes are put into an outer box.



※ Label B

Specifying Customer, Model , Customer part no, Lot No, Quantity

◆ Lot No. indication

1	2	3	4	—	5	6
QA Inspection Year (Last number)	QA Inspection month	QA Inspection date			Serial No	
" 5 "	" 7 "	" 14 "			" 01 "	
(2005)	(1, 2, 3, 4, 5, 6 7, 8, 9, x, y, z)	(1 ~ 31)			(01 ~ 99)	

11. Cautions on use

11-1. For the Handling

- Over-current-proof

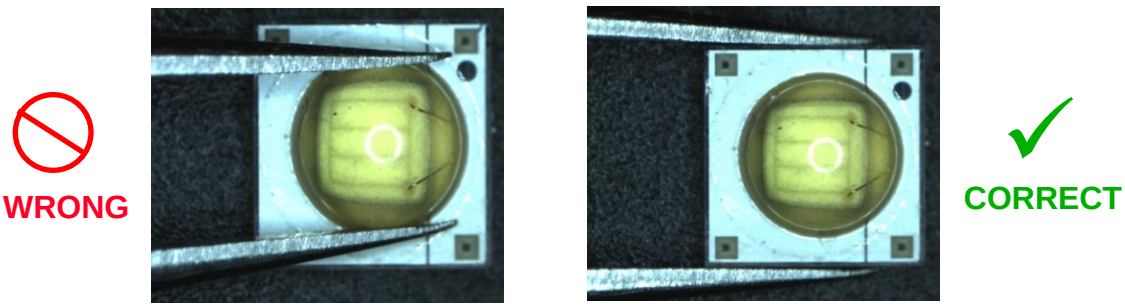
Customer must apply resistors for protection, others slight voltage shift will cause big current change (Burn out will happen).

- Fragile

During processing, mechanical stress on the surface should be minimized as much as possible. Our product consists of ductile silicon. During SMT processing, there are basically no restrictions regarding the form of the pick and place nozzles, except that overload mechanical pressure on the package must be prevented.

- Pick and Place

Use tweezers to grab these products LEDs at the base. Do not touch the lens with the tweezers. Do not touch the lens with fingers. Do not place pressure on the encapsulating resin (lens).



- Solvent

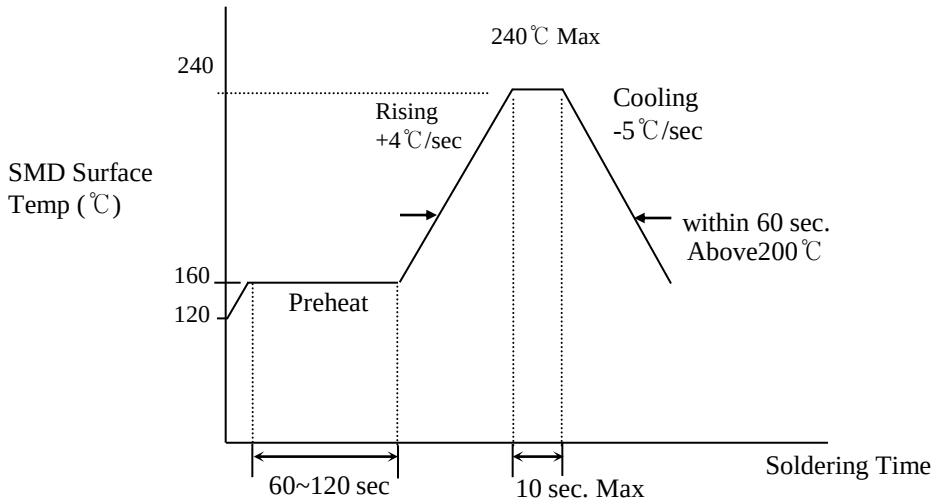
This device should not be used in any type of fluid such as water, oil, organic solvent etc, When washing is required, IPA should be used.

11-2. For the Storage

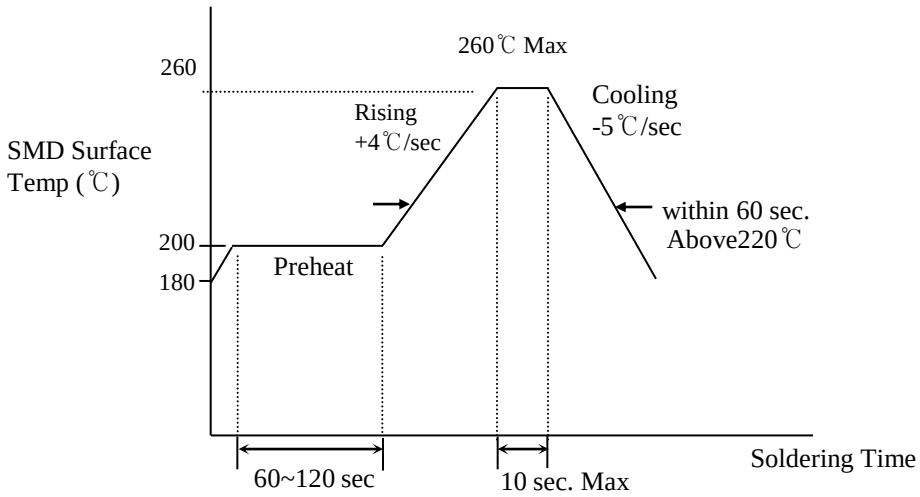
- Proper temperature and RH conditions for storage are : 5 ℃ ~35 ℃ , RH 60%.
- Do not open moisture-proof bag before the products are ready to use.
- Store products in a moisture-proof bag with a desiccant(silica gel) after open.
- These products should be used within 168 hours after opening the bag based upon storage condition.
- These products must be baked to remove moisture before using them if the Silica gel loses its blue color. Conditions for baking are 60±5℃, 20% (RH) and 24 hours maximum. (For reeled status without bag)
- Considering the tape life, we suggest our customers to use our products within a year(from production date)

12.Reflow Soldering Characteristics

12-1. Pb Solder



12-2. Pb Free Solder



12-3. Soldering Iron

Basic spec is ≤3sec when 350℃. If temperature is higher, time shorter (+10℃ → -1sec). Power dissipation of Iron should be smaller than 15W, and temperature should be controllable. Surface temperature of the device should be under 230℃.