

# SPECIFICATION

## HPL- H77X X 1 B A

1W LED

### Lens & Assembly Type :

N : No special Work  
S : with Star  
A : Lens 25°  
B : Lens 45°  
L : Lens 120°  
P : Lens 100°/50°  
G : Star & Lens 25°  
H : Star & Lens 45°  
F : Star & Lens 120°  
U : Star & Lens 100°/50°

### Colors :

W : Cool White  
N : Neutral White  
S : Warm White

### **Caution:**

Depends on different chips structures, the thermal pad could has a polarity as Anode. To avoid the risk of circuit-fail, **It is strongly recommended to suppose the condition (Anode – thermal pad)** while designing a circuit.

## Part Number Matrix

### Without Star:

Colors / Type	Flat Type	Lens 25°	Lens 45°	Lens 120°	Lens 100°/50°
Cool White	HPL-H77NW1BA	HPL-H77AW1BA	HPL-H77BW1BA	HPL-H77LW1BA	HPL-H77PW1BA
Neutral White	HPL-H77NN1BA	HPL-H77AN1BA	HPL-H77BN1BA	HPL-H77LN1BA	HPL-H77PN1BA
Warm White	HPL-H77NS1BA	HPL-H77AS1BA	HPL-H77BS1BA	HPL-H77LS1BA	HPL-H77PS1BA

### With Star:

Colors / Type	Star & Flat Type	Star & Lens 25°	Star & Lens 45°	Star & Lens 120°	Star & Lens 100°/50°
Cool White	HPL-H77SW1BA	HPL-H77GW1BA	HPL-H77HW1BA	HPL-H77FW1BA	HPL-H77UW1BA
Neutral White	HPL-H77SN1BA	HPL-H77GN1BA	HPL-H77HN1BA	HPL-H77FN1BA	HPL-H77UN1BA
Warm White	HPL-H77SS1BA	HPL-H77GS1BA	HPL-H77HS1BA	HPL-H77FS1BA	HPL-H77US1BA

## 1. Features

- Dimension : 7.0mm(L)×7.0mm(W)
- 1W High Flux type
- All Metal Design Cu PCB/Al reflector
- Low thermal resistance
- The InGaN Chip inside



## 2. Applications

- Signal lighting
- Backlighting
- Interior & exterior automotive lighting
- Decorative and landscape lighting
- Signage and channel letter
- Portable light source
- Decorating and entertainment lighting

### 3. Absolute Maximum Ratings

(T<sub>j</sub>=25°C)

Parameter		Symbol	Rating	Unit
Power Dissipation	Cool White	P	1.3	W
	Neutral White		1.3	
	Warm White		1.3	
Forward Current		IF	350	mA
Forward Pulse Current (1/10 Duty Cycle, 400msec Pulse Width)		IFP	500	mA
Thermal Resistance, Junction-Case		R <sub>th, J-C1</sub>	10	°C/W
Reverse Voltage		VR	5	V
LED Junction Temperature		T <sub>j</sub>	125	°C
Operating Temperature Range		Topr	-40°C to + 80°C	
Storage Temperature Range		Tstg	-40°C to + 120°C	
Soldering Condition		Tsol	260°C For 5 Seconds	

Note: 1. The thermal resistance value is measured with MCPCB (Star).

### 4. Initial Electrical/Optical Characteristics

#### • Forward Voltage

(T<sub>j</sub>=25°C)

Color	Forward Voltage					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Cool White	V <sub>F</sub>	3.03	3.70	4.23	I <sub>F</sub> = 350mA	V
Neutral White	V <sub>F</sub>	3.03	3.70	4.23	I <sub>F</sub> = 350mA	V
Warm White	V <sub>F</sub>	3.03	3.70	4.23	I <sub>F</sub> = 350mA	V

#### • Reverse Current

(T<sub>j</sub>=25°C)

Color	Reverse Current					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Cool White	I <sub>R</sub>	-	-	100	V <sub>R</sub> = 5V	μA
Neutral White	I <sub>R</sub>	-	-	100	V <sub>R</sub> = 5V	μA
Warm White	I <sub>R</sub>	-	-	100	V <sub>R</sub> = 5V	μA

● **Luminous Flux** (T<sub>j</sub>=25°C)

Color	Luminous Flux ( With Lens type / Flat type )					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Cool White	Φ <sub>V</sub>	-	74/60	78/63	I <sub>F</sub> = 350mA	lm
Neutral White	Φ <sub>V</sub>	-	70/57	74/60	I <sub>F</sub> = 350mA	lm
Warm White	Φ <sub>V</sub>	-	55/44	61/48	I <sub>F</sub> = 350mA	lm

● **Color Temperature** (T<sub>j</sub>=25°C)

Color	Color Temperature					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Cool White	CCT	4500	5650	10000	I <sub>F</sub> = 350mA	K
Neutral White	CCT	3500	4000	4500	I <sub>F</sub> = 350mA	K
Warm White	CCT	2670	2850	3500	I <sub>F</sub> = 350mA	K

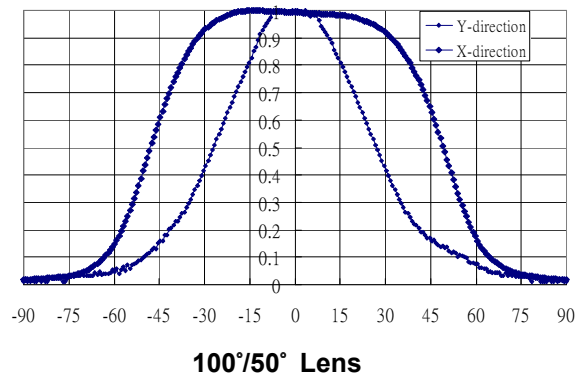
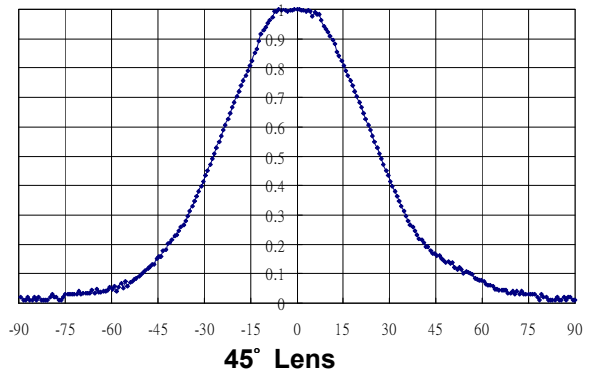
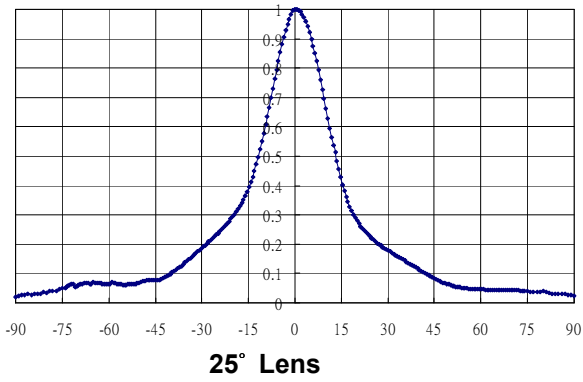
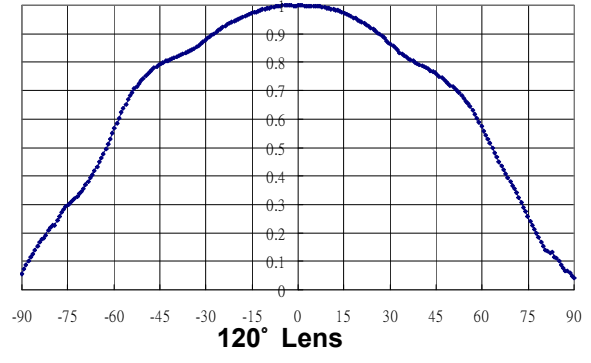
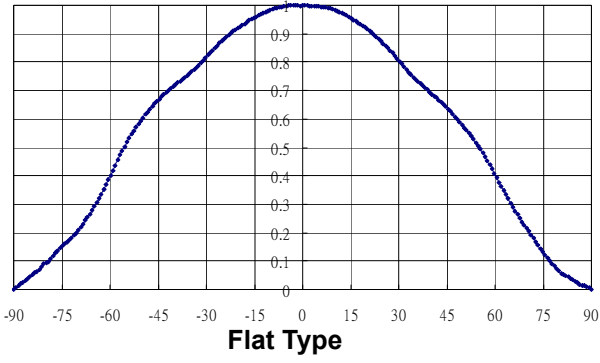
● **View Angle** (T<sub>j</sub>=25°C)

Color	Viewing Angle							Test Condition	Unit
	Symbol	Without Lens	Lens 120°	Lens 25°	Lens 45°	Lens 100°/50°			
WNS	2θ <sub>1/2</sub>	110°	120°	25°	45°	100°/50°	I <sub>F</sub> = 350mA	degree	

● **Chromaticity Coordinates / Dominate Wavelength** (T<sub>j</sub>=25°C)

Color	Chromaticity Coordinates / Spectra half-width					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Cool White	x	-	0.33	-	I <sub>F</sub> = 350mA	-
	y	-	0.34	-		
Neutral White	x	-	0.38	-	I <sub>F</sub> = 350mA	-
	y	-	0.38	-		
Warm White	x	-	0.43	-	I <sub>F</sub> = 350mA	-
	y	-	0.40	-		

● Optical Radiation Pattern



• **Bin Code List for Reference**

(T<sub>j</sub>=25°C)

**Forward Voltage Bins**

Item	Bin Code	Symbol	Condition	Min.	Max.	Unit
Forward Voltage <sup>1</sup>	G	V <sub>F</sub>	I <sub>F</sub> = 350 [mA]	2.79	3.03	V
	H			3.03	3.27	
	J			3.27	3.51	
	K			3.51	3.75	
	L			3.75	3.99	
	M			3.99	4.23	

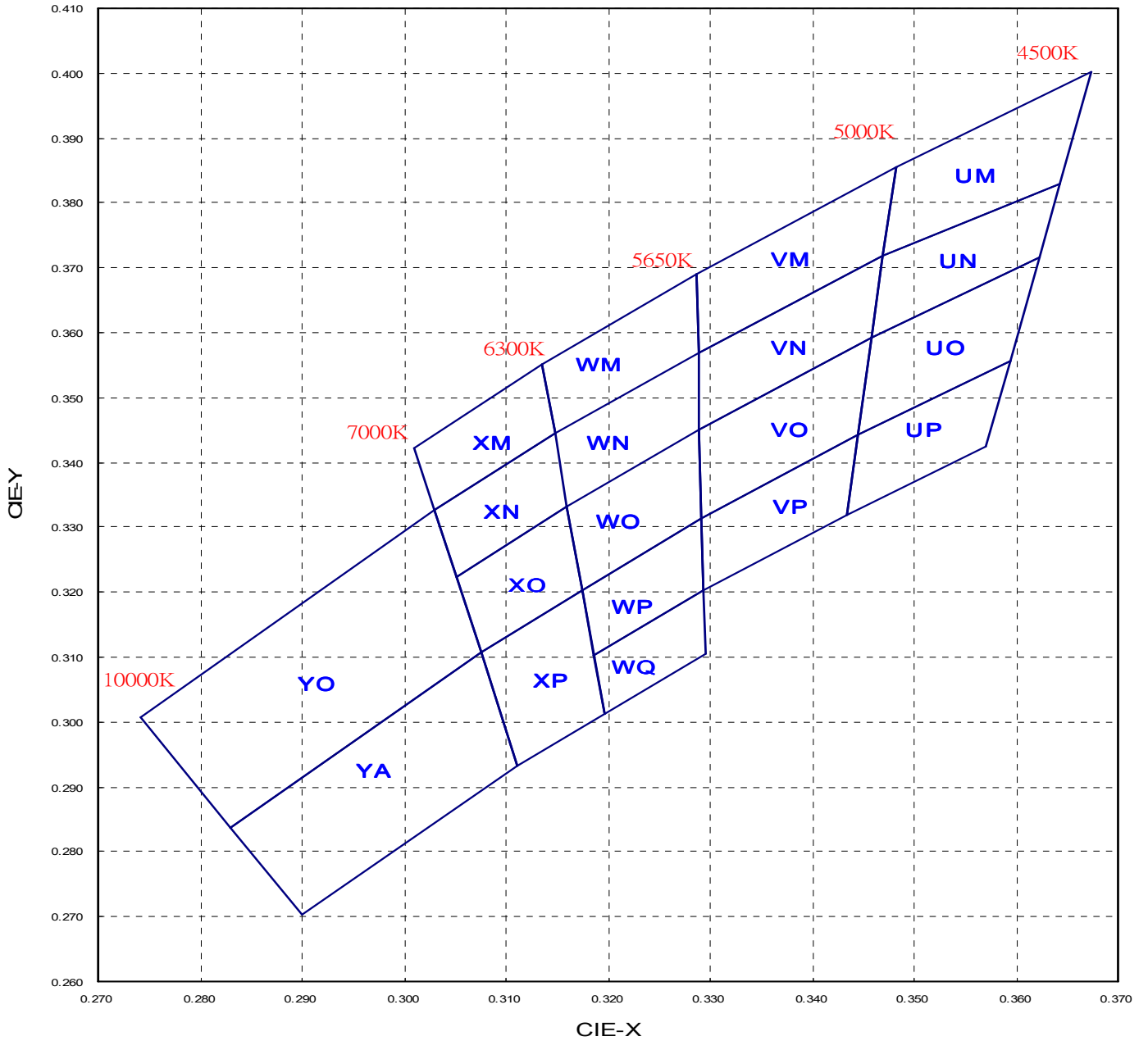
**Luminous Flux Bins**

Item	Bin Code	Symbol	Condition	Min.	Max.	Unit
Luminous Flux <sup>2</sup>	A	Φ <sub>V</sub>	I <sub>F</sub> = 350 [mA]	8.2	10.7	lm
	B			10.7	13.9	
	C			13.9	18.1	
	D			18.1	23.5	
	E			23.5	30	
	F			30	40	
	G			40	50	
	H			50	60	
	J			60	70	
	K			70	80	
	L			80	90	
	M			90	100	
	N			100	120	
	P			120	140	
	Q			140	160	
	R			160	180	
S	180	200				

Note: 1. Forward voltage measurement allowance is ± 0.1V.

2. Luminous flux measurement allowance is ± 10%.

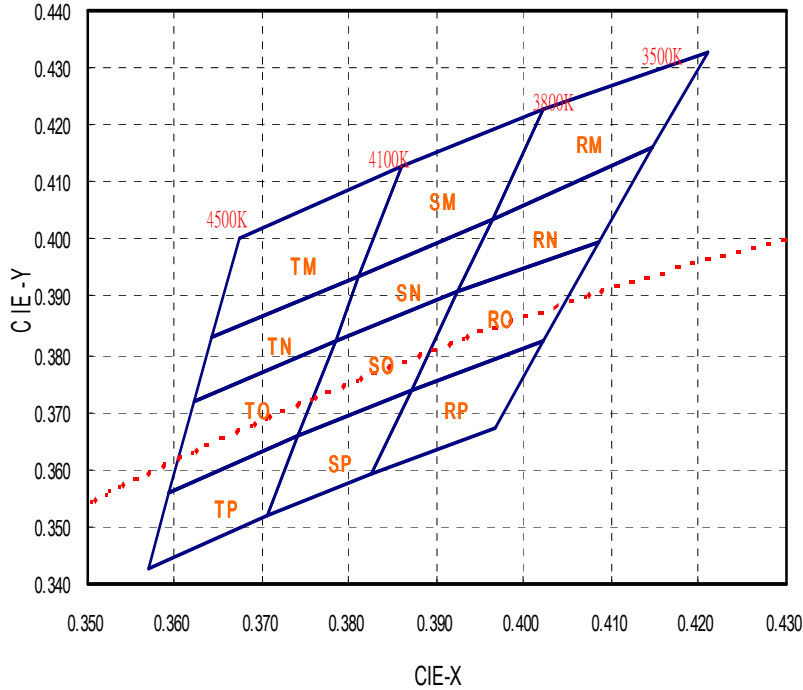
**CIE Diagram Hue Bin Specification for Cool white →W Color**



Bin Code	X	Y	CCT	Bin Code	X	Y	CCT	Bin Code	X	Y	CCT
YO	0.2742	0.3007	7000~10000	WN	0.3148	0.3444	5650~6300	VP	0.3292	0.3313	5000~5650
	0.3031	0.3327			0.3288	0.3569			0.3444	0.3442	
	0.3076	0.3108			0.3290	0.3451			0.3434	0.3320	
	0.2830	0.2838			0.3160	0.3332			0.3294	0.3202	
YA	0.2830	0.2838	7000~10000	WO	0.3160	0.3332	5650~6300	UM	0.3481	0.3856	4500~5000
	0.3076	0.3108			0.3290	0.3451			0.3673	0.4003	
	0.3112	0.2932			0.3292	0.3313			0.3642	0.3829	
	0.2899	0.2703			0.3175	0.3204			0.3469	0.3717	
XM	0.3011	0.3422	6300~7000	WP	0.3175	0.3204	5650~6300	UN	0.3469	0.3717	4500~5000
	0.3136	0.3550			0.3292	0.3313			0.3642	0.3829	
	0.3148	0.3444			0.3294	0.3202			0.3622	0.3716	
	0.3031	0.3327			0.3186	0.3102			0.3458	0.3592	
XN	0.3031	0.3327	6300~7000	WQ	0.3186	0.3102	5650~6300	UO	0.3458	0.3592	4500~5000
	0.3148	0.3444			0.3294	0.3202			0.3622	0.3716	
	0.3160	0.3332			0.3295	0.3105			0.3594	0.3557	
	0.3052	0.3224			0.3196	0.3013			0.3444	0.3442	
XO	0.3052	0.3224	6300~7000	VM	0.3286	0.3690	5000~5650	UP	0.3444	0.3442	4500~5000
	0.3160	0.3332			0.3481	0.3856			0.3594	0.3557	
	0.3175	0.3204			0.3469	0.3717			0.3571	0.3426	
	0.3076	0.3108			0.3288	0.3569			0.3434	0.3320	
XP	0.3076	0.3108	6300~7000	VN	0.3288	0.3569	5000~5650	VO	0.3290	0.3451	5000~5650
	0.3175	0.3204			0.3469	0.3717			0.3458	0.3592	
	0.3196	0.3013			0.3458	0.3592			0.3444	0.3442	
	0.3112	0.2932			0.3290	0.3451			0.3292	0.3313	
WM	0.3136	0.3550	5650~6300	VO	0.3290	0.3451	5000~5650	VO	0.3290	0.3451	5000~5650
	0.3286	0.3690			0.3458	0.3592			0.3458	0.3592	
	0.3288	0.3569			0.3444	0.3442			0.3444	0.3442	
	0.3148	0.3444			0.3292	0.3313			0.3292	0.3313	

Note: . The CIE x, y color coordinates measurement allowance is  $\pm 0.01$ .

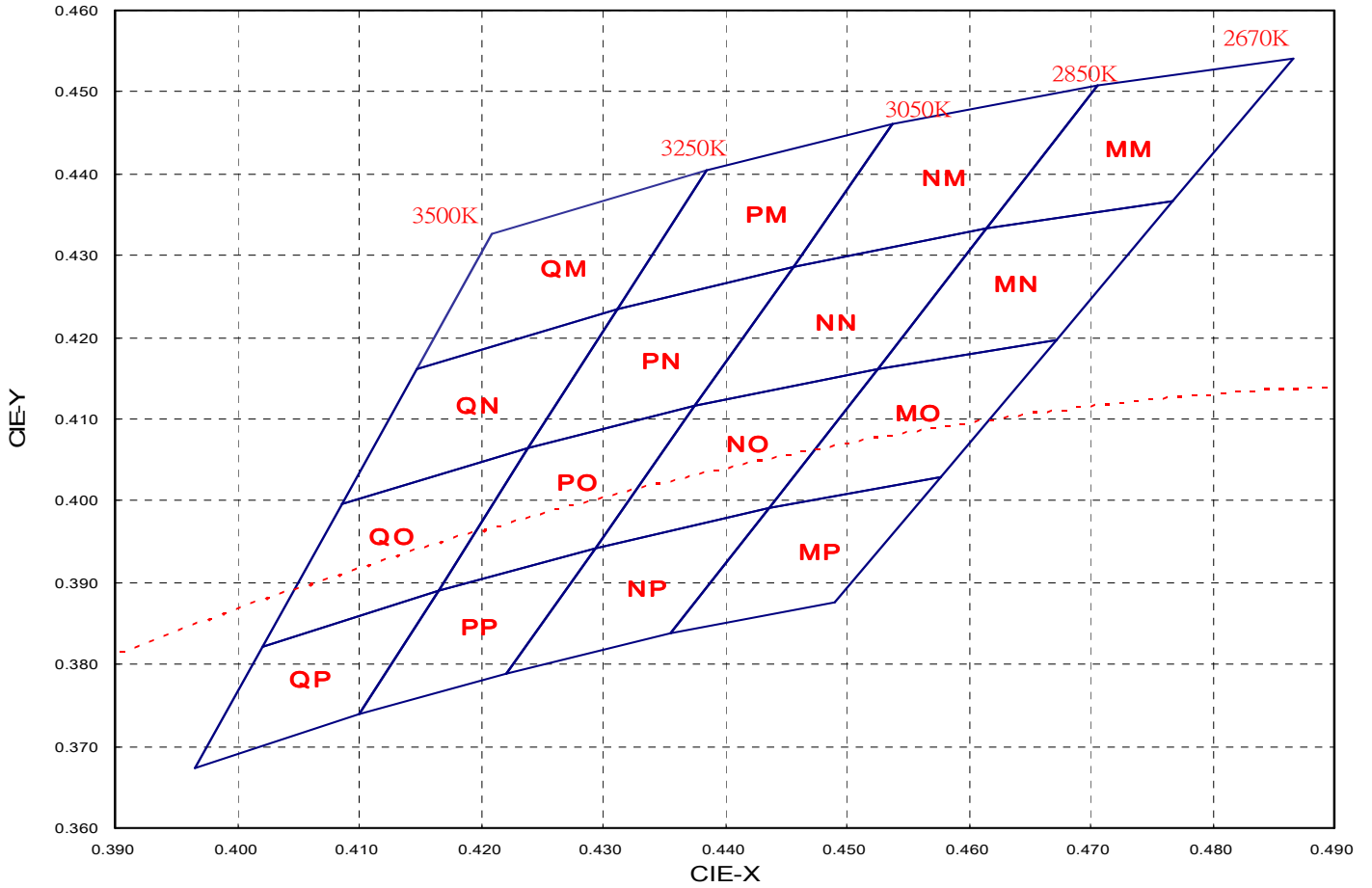
CIE Diagram Hue Bin Specification for Neutral white → N Color



Bin Code	X	Y	CCT	Bin Code	X	Y	CCT	Bin Code	X	Y	CCT
TM	0.3673	0.4003	4100~4500	SM	0.3860	0.4130	3800~4100	RM	0.4023	0.4228	3500~3800
	0.3860	0.4130			0.4023	0.4326					
	0.3811	0.3937			0.4148	0.4161					
	0.3642	0.3829			0.3963	0.4035					
TN	0.3642	0.3829	4100~4500	SN	0.3811	0.3937	3800~4100	RN	0.3963	0.4035	3500~3800
	0.3811	0.3937			0.4148	0.4161					
	0.3783	0.3825			0.4086	0.3995					
	0.3622	0.3716			0.3924	0.3909					
TO	0.3622	0.3716	4100~4500	SO	0.3783	0.3825	3800~4100	RO	0.3924	0.3909	3500~3800
	0.3783	0.3825			0.4086	0.3995					
	0.3741	0.3658			0.4021	0.3822					
	0.3594	0.3557			0.3871	0.3739					
TP	0.3594	0.3557	4100~4500	SP	0.3741	0.3658	3800~4100	RP	0.3871	0.3739	3500~3800
	0.3741	0.3658			0.4021	0.3822					
	0.3706	0.3520			0.3966	0.3673					
	0.3571	0.3426			0.3826	0.3595					

Note: . The CIE x, y color coordinates measurement allowance is ± 0.01.

**CIE Diagram Hue Bin Specification for Warm white →S Color**

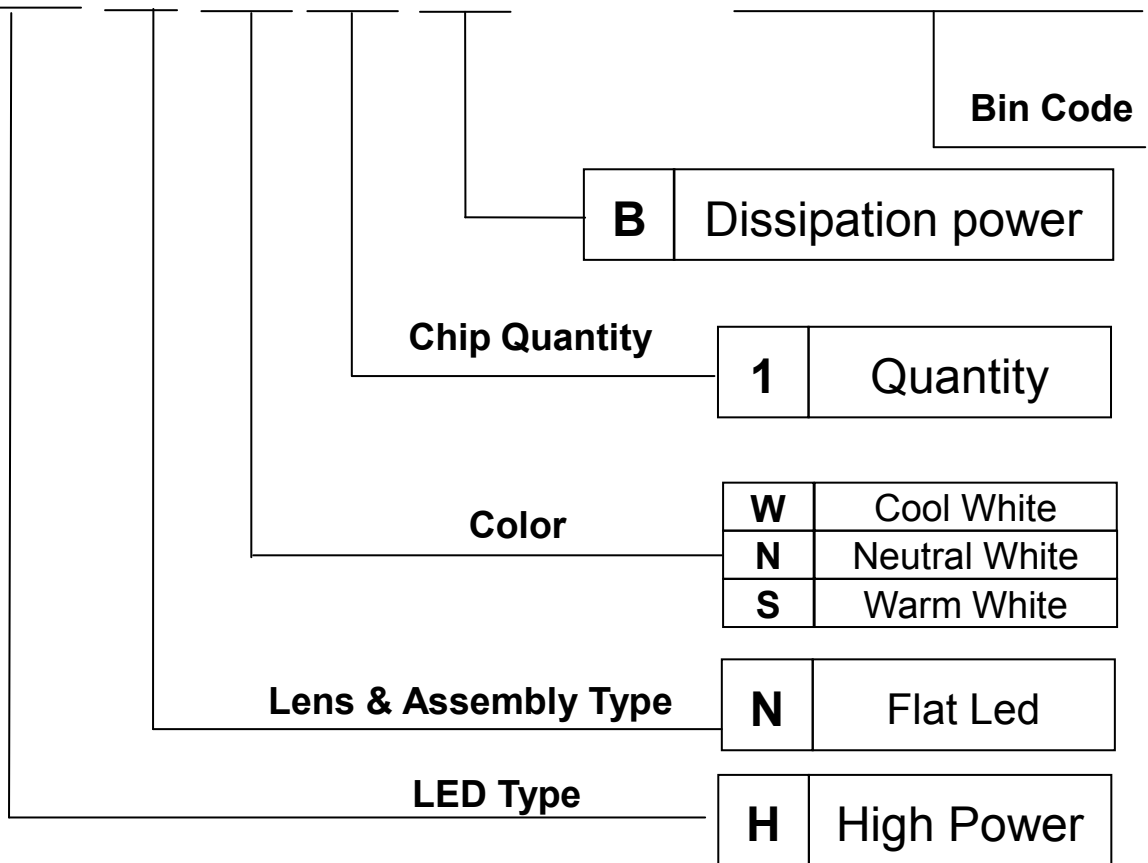


Bin Code	X	Y	CCT	Bin Code	X	Y	CCT	Bin Code	X	Y	CCT
QM	0.4209	0.4326	3250~3500	PO	0.4240	0.4065	3000~3250	MM	0.4705	0.4508	2670~2850
	0.4385	0.4404			0.4376	0.4116			0.4866	0.4542	
	0.4312	0.4234			0.4294	0.3943			0.4767	0.4366	
	0.4148	0.4161			0.4165	0.3890			0.4614	0.4333	
QN	0.4148	0.4161	3250~3500	PP	0.4165	0.3890	3000~3250	MN	0.4614	0.4333	2670~2850
	0.4312	0.4234			0.4294	0.3943			0.4767	0.4366	
	0.4240	0.4065			0.4221	0.3790			0.4671	0.4196	
	0.4086	0.3995			0.4100	0.3738			0.4525	0.4162	
QO	0.4086	0.3995	3250~3500	NM	0.4538	0.4460	2850~3000	MO	0.4525	0.4162	2670~2850
	0.4240	0.4065			0.4705	0.4508			0.4671	0.4196	
	0.4165	0.3890			0.4614	0.4333			0.4577	0.4029	
	0.4021	0.3822			0.4456	0.4287			0.4436	0.3991	
QP	0.4021	0.3822	3250~3500	NN	0.4456	0.4287	2850~3000	MP	0.4436	0.3991	2670~2850
	0.4165	0.3890			0.4614	0.4333			0.4577	0.4029	
	0.4100	0.3738			0.4525	0.4162			0.4490	0.3875	
	0.3966	0.3673			0.4376	0.4116			0.4356	0.3837	
PM	0.4385	0.4404	3000~3250	NO	0.4376	0.4116	2850~3000				
	0.4538	0.4460			0.4525	0.4162					
	0.4456	0.4287			0.4436	0.3991					
	0.4312	0.4234			0.4294	0.3943					
PN	0.4312	0.4234	3000~3250	NP	0.4294	0.3943	2850~3000				
	0.4456	0.4287			0.4436	0.3991					
	0.4376	0.4116			0.4356	0.3837					
	0.4240	0.4065			0.4221	0.3790					

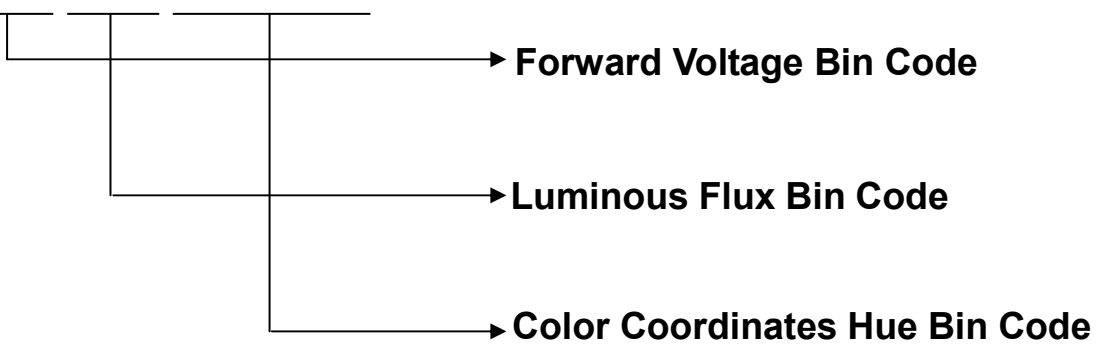
Note: . The CIE x, y color coordinates measurement allowance is  $\pm 0.01$ .

5. Part Number

H	7	7	N	W	1	B	A	-	K	R	W	O
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K	R	W	O
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## 6. Characteristic Diagram (Tj=25°C)

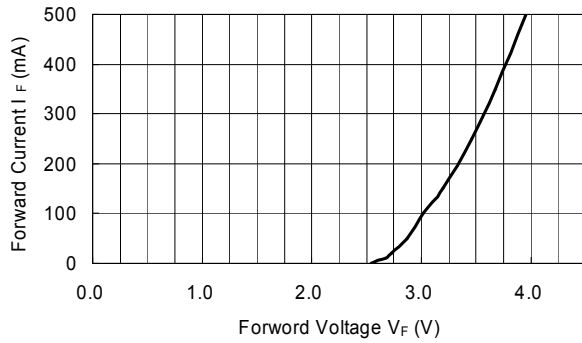


Fig. 1 Forward Current vs. Forward Voltage: Cool White/ Neutral White / Warm White

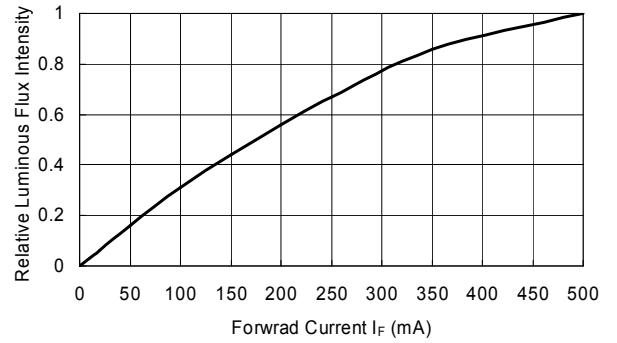


Fig. 2 Relative Intensity VS Forward Current

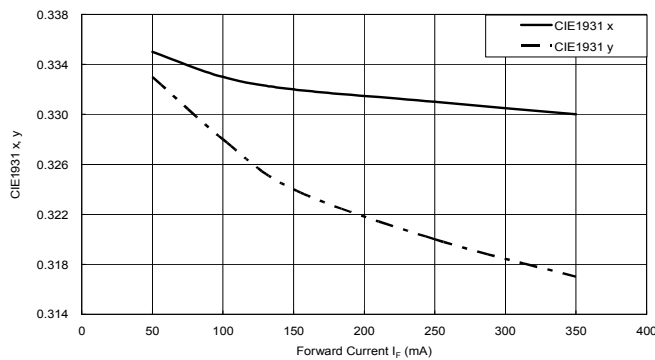


Fig. 3 Forward Current VS CIE1931 x, y

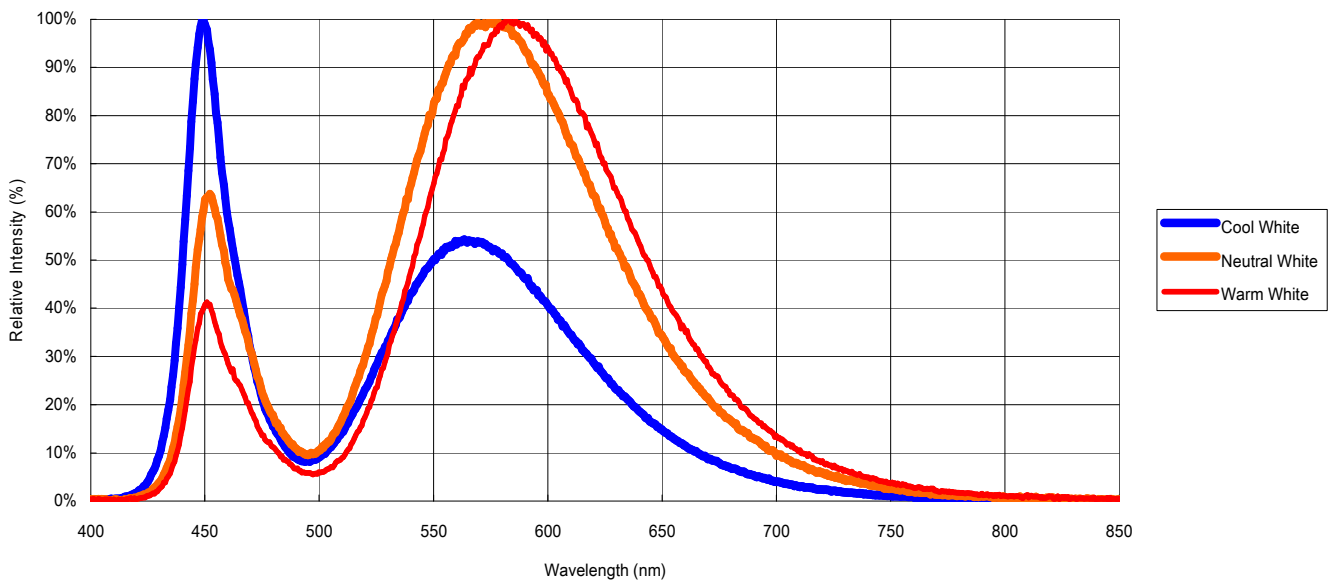
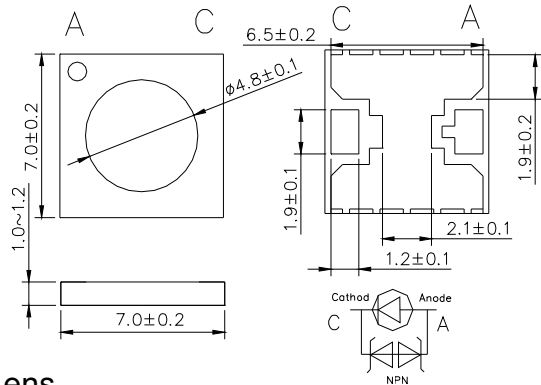


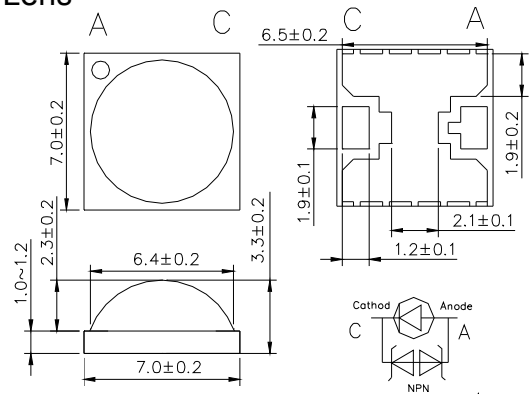
Fig. 4 Relative Intensity vs. Wavelength: Cool White/ Neutral White/ Warm White

### 7. Dimensions (Unit : mm)

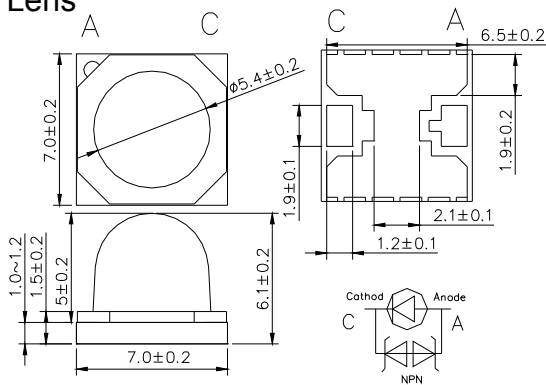
Flat Type



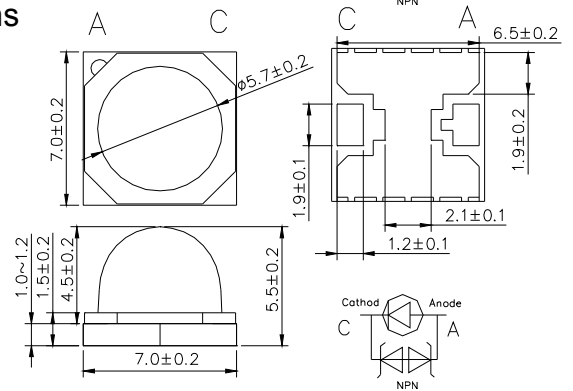
120° Lens



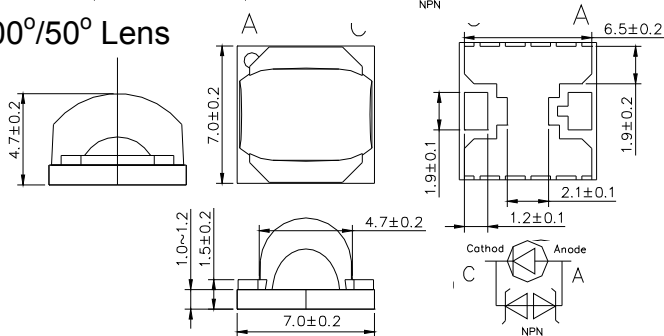
25° Lens



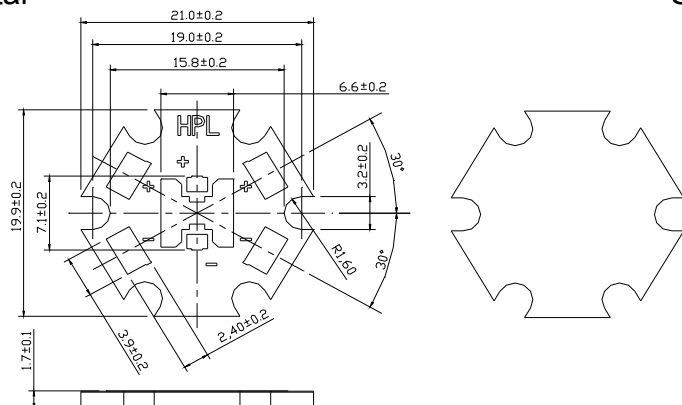
45° Lens



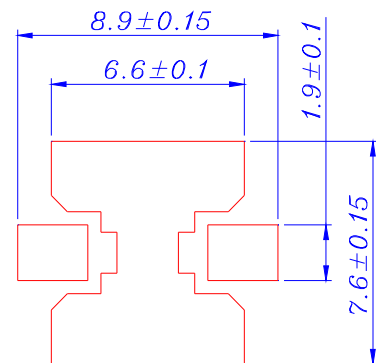
100°/50° Lens



Star



Solder Pad Note: See the caution area

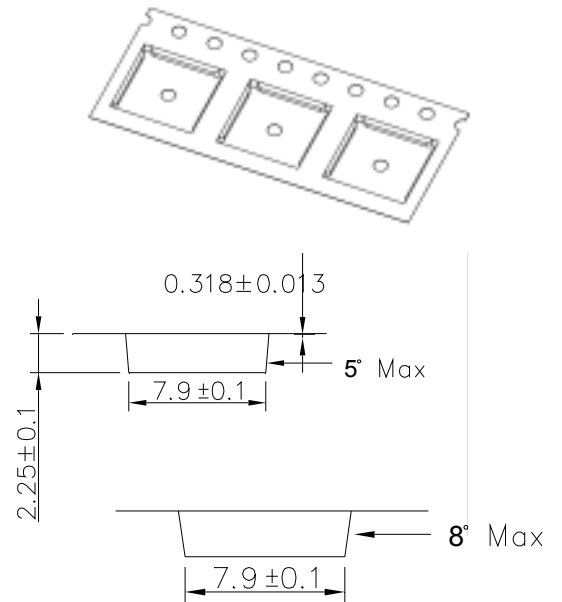
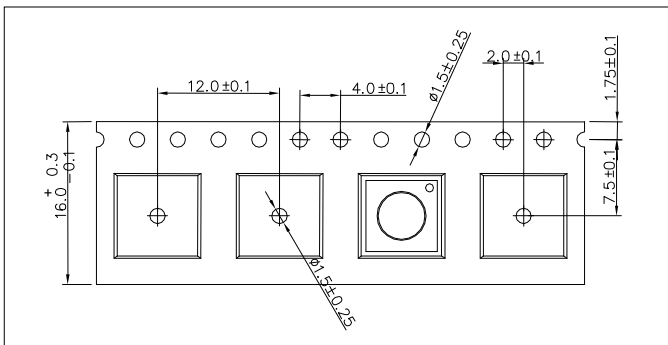


## 8. Shipping Package Unit : mm

### (1) Tapping Dimension Packaging Specification

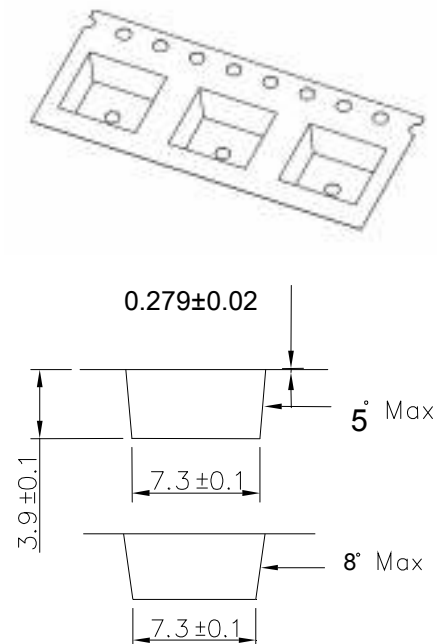
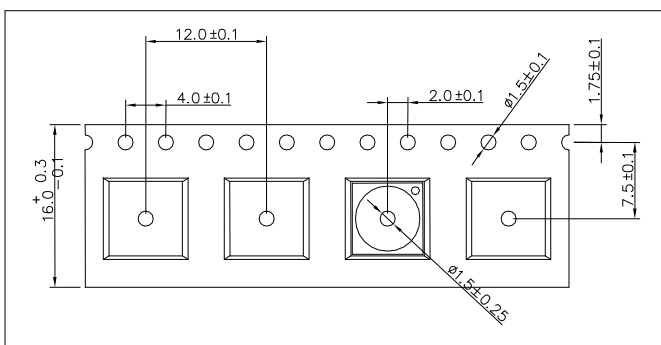
- Flat Type :

- Moisture proof bag.
- 1 Reel/bag.
- Q'ty: 500(MAX)/Reel.



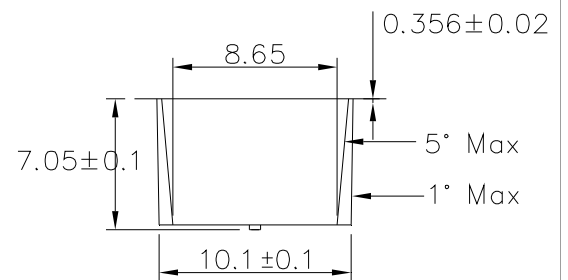
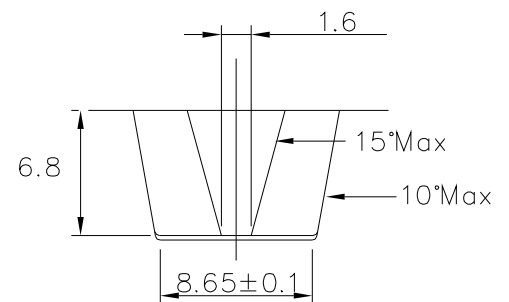
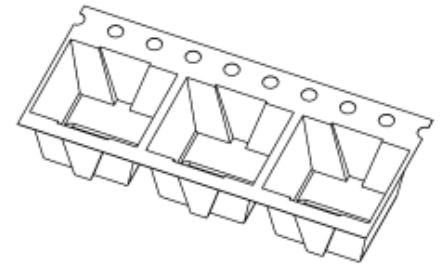
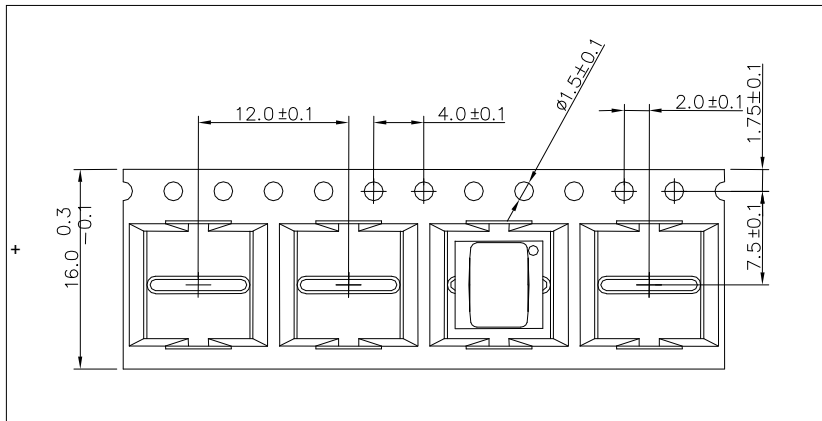
- With 120 degree Lens:

- Moisture proof bag.
- 1 Reel/bag.
- Q'ty: 200(MAX)/Reel.



● **With 45, 100/50 degree Lens:**

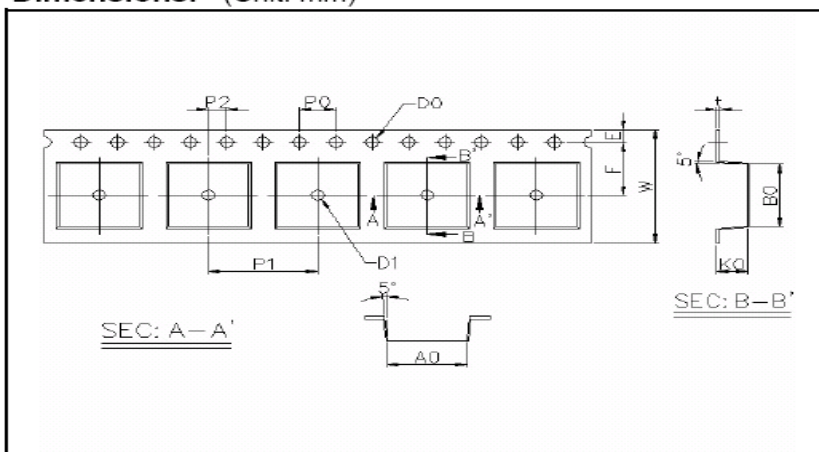
- Moisture proof bag.
- 1 Reel/bag.
- Q'ty: 150(MAX)/Reel.



● **With 25 degree Lens & Special Shipping:**

- Moisture proof bag.
- 1 Reel/bag.
- Q'ty: 150(MAX)/Reel.

**Dimensions.** (Unit: mm)



Item	Specification	Tol (+/-)
W	16.00	± 0.30
E	1.75	± 0.10
F	7.50	± 0.10
D0	1.50	+0.10, 0
D1	1.50	+0.10, 0
P0	4.00	± 0.10
P1	12.00	± 0.10
P2	2.00	± 0.10
P0x10	40.00	± 0.20

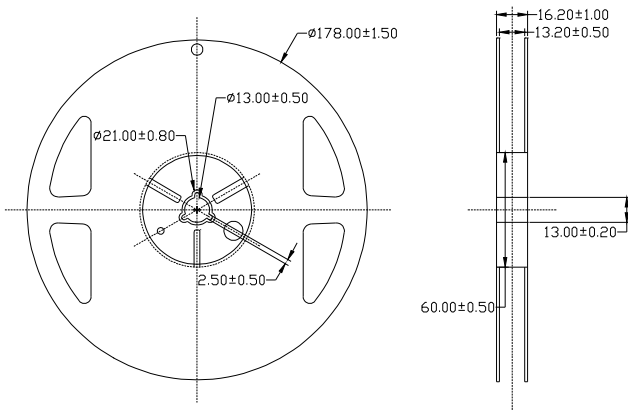
1	0.35	± 0.05
A0	7.60	± 0.10
B0	7.60	± 0.10
K0	5.30	± 0.10

## (2) Package

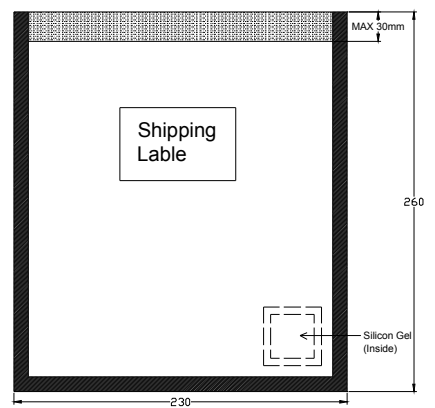
Box Type	Dimensions (mm)	Reel/Box
Small Box (S)	230 × 85 × 265	4 Reel/Box
Middle Box (M)	470 × 265 × 270	24 Reel/Box
Large Box (L)	470 × 435 × 270	40 Reel/Box

## Reel Packaging Unit: mm

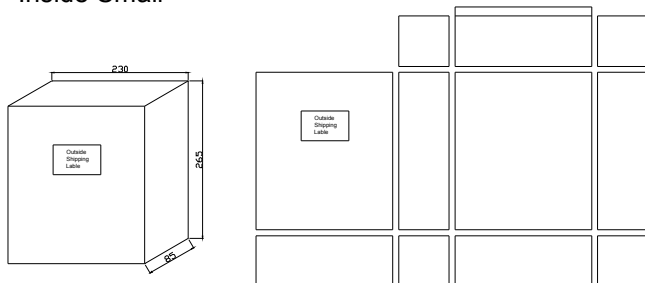
Reel



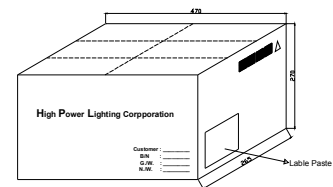
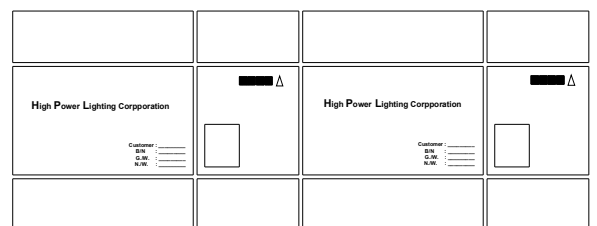
Anti Static Bag



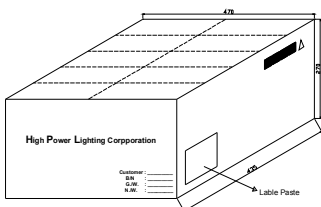
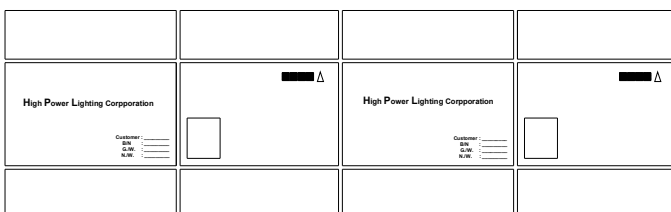
Inside Small



Middle Box




Large Box (Carton)




### (3) Label Formation

Carton Label

P/N : HPL-###-####-#		
Date : 29-11-2005		
Q'ty : 150000pcs	Reel's Q'ty : 30 reels	
Customer :	OQC Stamp :	
High Power Lighting Corporation (Taiwan)		

100mm

Reel Label

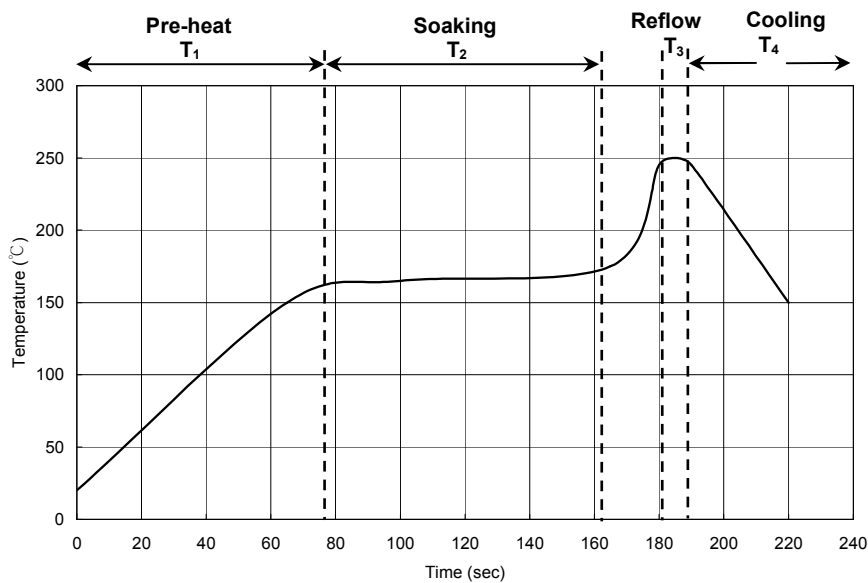
	
P/N : HPL-###-####-#	BIN Rank : A2B
Lot : T051129001	Q'ty : 5000pcs
XXX	
High Power Lighting Corporation (Taiwan)	

40mm

70mm

## 9. Recommended Solder profile

### Soldering



Recommended soldering conditions:

T <sub>1</sub>	Ramp up rate	1.0 ~ 3.0 °C/sec
	Pre-heat time	50 ~ 80 sec
T <sub>2</sub>	Soaking temperature	155 ~ 185 °C
	Dwell time during soaking	60 ~ 120 sec
T <sub>3</sub>	Reflow temperature	240 ~ 250 °C
	Reflow time	Max 10 sec
	Ramp up rate during reflow	1.2 ~ 2.3 °C/sec
T <sub>4</sub>	Cooling	1.0 ~ 6.0 °C/sec

Note: Suggest using Sn96Ag3Cu0.5 lead free solder.

### Cleaning

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED if necessary.