Draft Specification For Color Series

HPL-H40DX1B4



Features

- Dimension : 4.0mm(L)×4.0mm(W)
- High Radiant Flux type
- All Metal Design Cu Substrate with Silicone Lens
- Narrow beam angle 40°~ 45°
- Low thermal resistance
- The InGaN or AllnGaP Chip inside

Applications

- Signal lighting
- Interior & exterior automotive lighting
- Decorating and entertainment lighting
- Grow lighting

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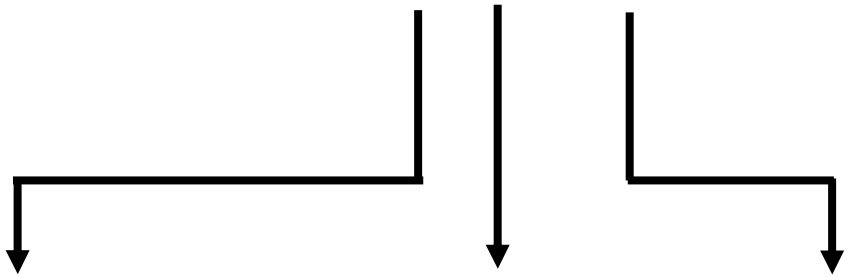
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General Information

HPL – H40DX1B4



Beam Angle-

Narrow beam angle 40 ~ 45D

Color-

R : Red
G : Green
B : Blue
A : Amber
O : Orange
D : Royal Blue
H : Deep Red

Power-

B : 1W

Part Number Matrix

Type / Color	45°Lens	45°Lens & Star
Red	HPL-H40DR1B4	HPL-H40XR1B4
Green	HPL-H40DG1B4	HPL-H40XG1B4
Blue	HPL-H40DB1B4	HPL-H40XB1B4
Amber	HPL-H40DA1B4	HPL-H40XA1B4
Orange	HPL-H40DO1B4	HPL-H40XO1B4
Royal Blue	HPL-H40DD1B4	HPL-H40XD1B4
Deep Red	HPL-H40DH1B4	HPL-H40XH1B4

Absolute Maximum Ratings

(Tj=25℃)

Parameter		Symbol	Rating	Unit
Power Dissipation	Red	P	1.05	W
	Green		1.5	
	Blue		1.5	
	Amber		1.05	
	Orange		1.05	
	Royal Blue		1.5	
	Deep Red		1.05	
Forward Current		I_F	350	mA
Forward Pulse Current (1/10 Duty Cycle, 400msec Pulse Width)		I_{FP}	500	mA
Thermal Resistance, Junction-Case		R_{th}, J-C1	5	°C/W
Reverse Voltage		V_R	5	V
LED Junction Temperature		T_j	125	°C
Operating Temperature Range		T_{opr}	-40°C to + 80°C	
Storage Temperature Range		T_{stg}	-40°C to + 120°C	
Soldering Condition		T_{sol}	260°C For 10 Seconds	

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

Initial Electrical/Optical Characteristics

• Forward Voltage

(Tj=25℃)

Color	Forward Voltage					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Red→R	V_F	1.83	2.3	3.03	I_F= 350mA	V
Green→G	V_F	3.03	3.4	4.23	I_F= 350mA	V
Blue→B	V_F	2.79	3.2	4.23	I_F= 350mA	V
Amber→A	V_F	1.83	2.4	3.03	I_F= 350mA	V
Orange→O	V_F	1.83	2.3	3.03	I_F= 350mA	V
Royal Blue→D	V_F	2.79	3.2	4.23	I_F= 350mA	V
Deep Red→H	V_F	1.83	2.3	3.03	I_F= 350mA	V

• Reverse Current

(Tj=25℃)

Color	Reverse Current					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Red→R	I_R	-	-	100	V_R = 5V	μA
Green→G	I_R	-	-	100	V_R = 5V	μA
Blue→B	I_R	-	-	100	V_R = 5V	μA
Amber→A	I_R	-	-	100	V_R = 5V	μA
Orange→O	I_R	-	-	100	V_R = 5V	μA
Royal Blue→D	I_R	-	-	100	V_R = 5V	μA
Deep Red→H	I_R	-	-	100	V_R = 5V	μA

• Luminous Flux or Radiant Flux

(Tj=25℃)

Color	Luminous Flux / Radiant Flux					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Red→R	Φ_V	-	50	-	I_F = 350mA	lm
Green→G	Φ_V	-	90	-	I_F = 350mA	lm
Blue→B	Φ_V	-	20	-	I_F = 350mA	lm
Amber→A	Φ_V	-	40	-	I_F = 350mA	lm
Orange→O	Φ_V	-	60	-	I_F = 350mA	lm
Royal Blue→D	Φ_e	-	400	-	I_F = 350mA	mW
Deep Red→H	Φ_e	-	300	-	I_F = 350mA	mW

• Dominate Wavelength or Peak Wavelength

(Tj=25℃)

Color	Dominate Wavelength or Peak Wavelength					
	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Red→R	λd	620	-	630	I_F = 350mA	nm
Green→G	λd	520	-	535	I_F = 350mA	nm
Blue→B	λd	460	-	475	I_F = 350mA	nm
Amber→A	λd	585	-	595	I_F = 350mA	nm
Orange→O	λd	610	-	620	I_F = 350mA	nm
Royal Blue→D	λp	440	-	460	I_F = 350mA	nm
Deep Red→H	λp	650	-	670	I_F = 350mA	nm

Note : Royal Blue and Deep Red LEDs are binned by Radiant Flux and Peak Wavelength.

- **Typical Radiation Pattern**

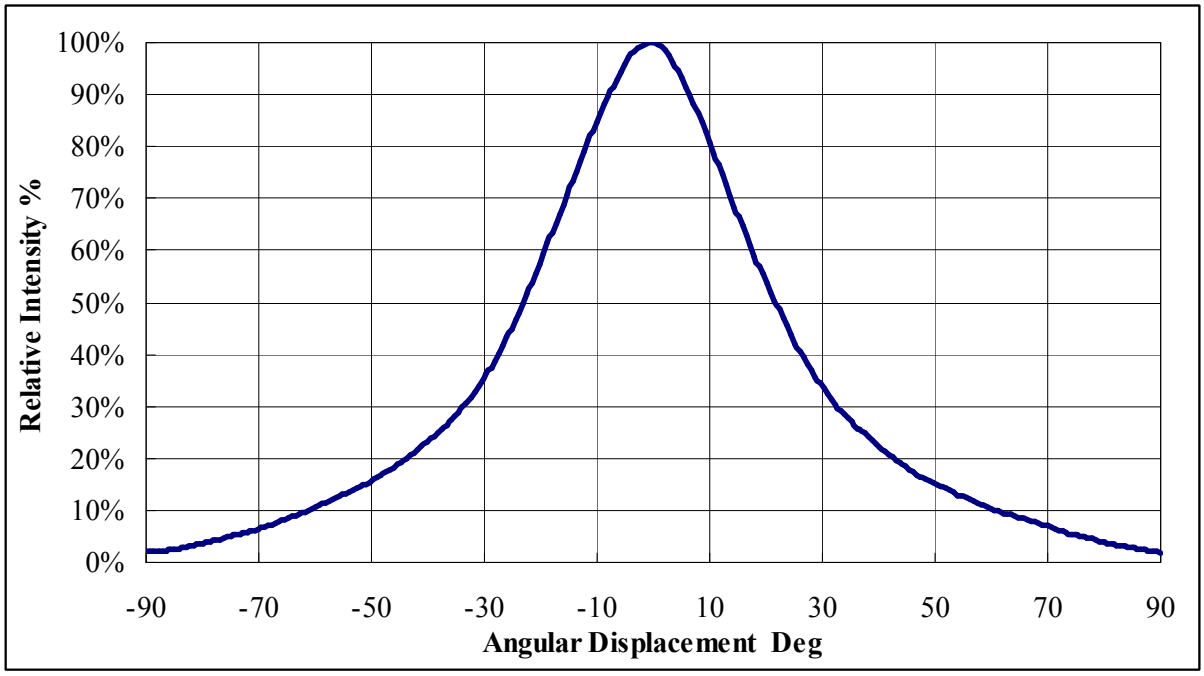


Fig. Typical Representative Spatial Radiation Pattern : 45 degree

• Bin Code List for Reference

(Tj=25℃)

Item	Bin Code	Symbol	Condition	Min.	Max.	Unit
Forward Voltage[1]	C	V_F	I_F = 350 [mA]	1.83	2.07	**V**
	D			2.07	2.31	
	E			2.31	2.55	
	F			2.55	2.79	
	G			2.79	3.03	
	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[2]	B	Φ_V	I_F = 350 [mA]	10.7	13.9	**lm**
	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	
Radiant Flux[2]	A	Φe	I_F = 350 [mA]	175	225	**mW**
	B			225	275	
	C			275	350	
	D			350	425	
	E			425	500	

Note:

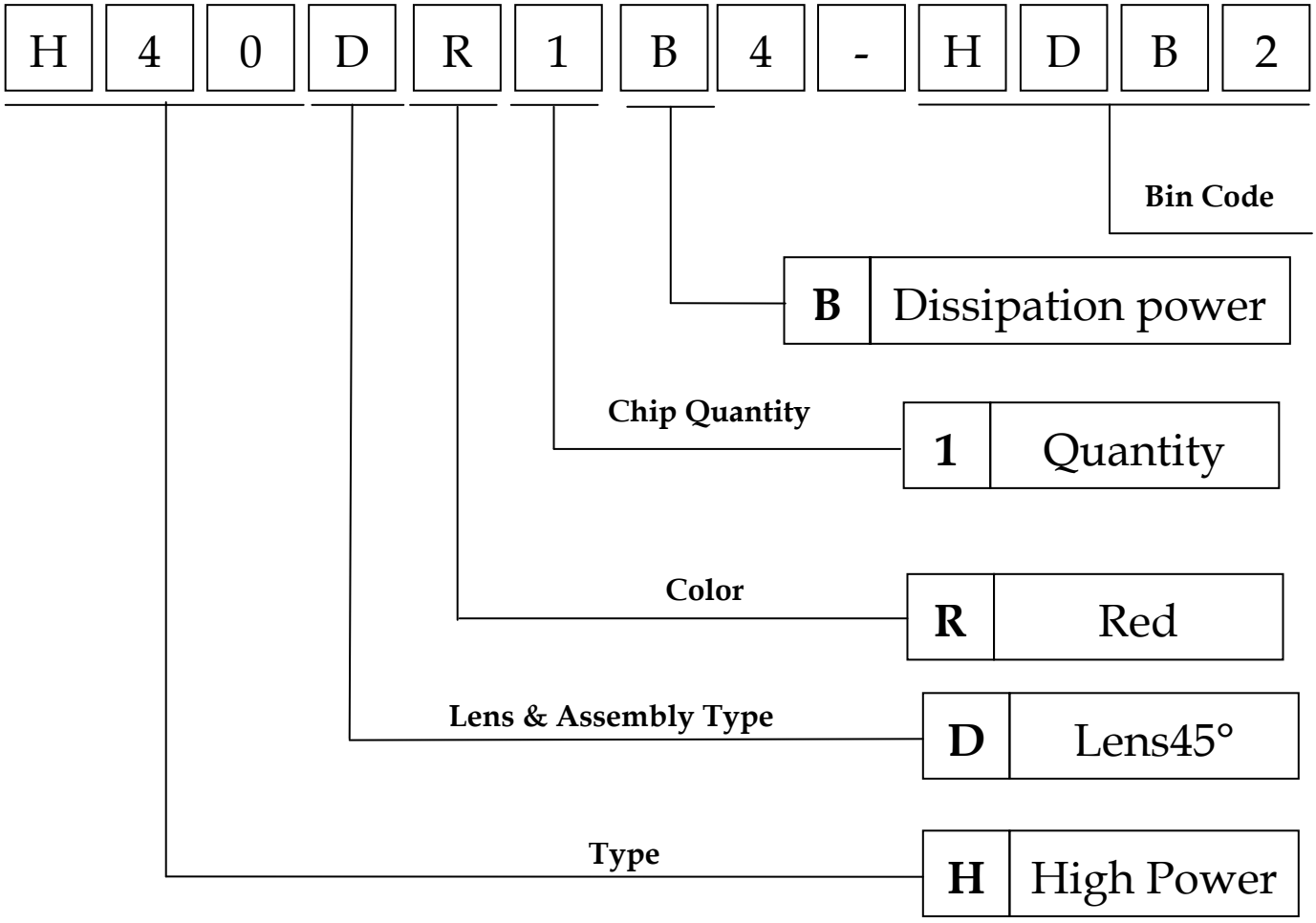
1. Forward voltage measurement allowance is ± 0.1V.
2. Luminous flux and Radiant Flux measurement allowance is ± 10%.

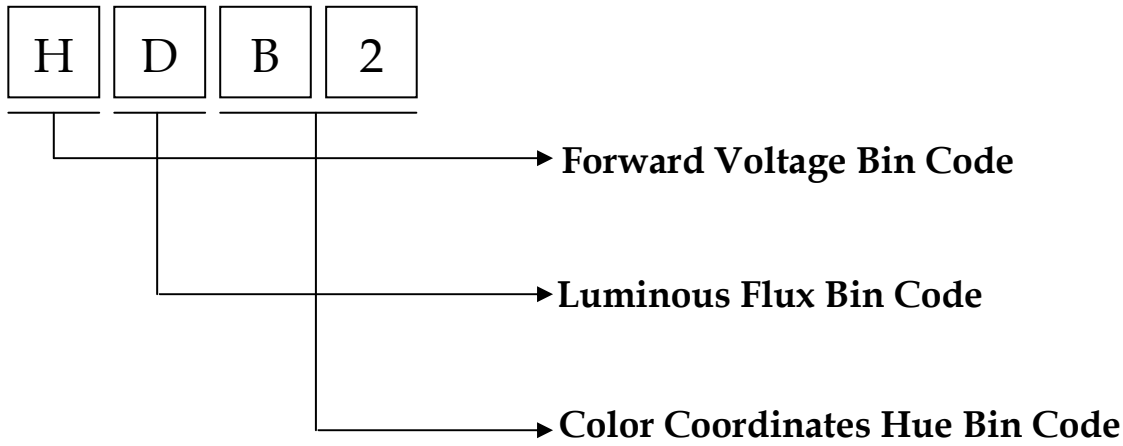
● Hue Bin Code List for Reference

Name	Code	λ Min (nm)	λ Max (nm)
Blue	B1	460	465
	B2	465	470
	B3	470	475
Green	G2	520	525
	G3	525	530
	G4	530	535
Amber	A2	587	589.5
	A4	589.5	592
	A6	592	594.5
Red & Orange	R2	610	615
	R3	615	620
	R4	620	625
	R5	625	630
Royal Blue	D0	440	445
	D1	445	450
	D2	450	455

Note: Wavelength measurement allowance is ± 2nm

Part Number Formation





Characteristic Diagram

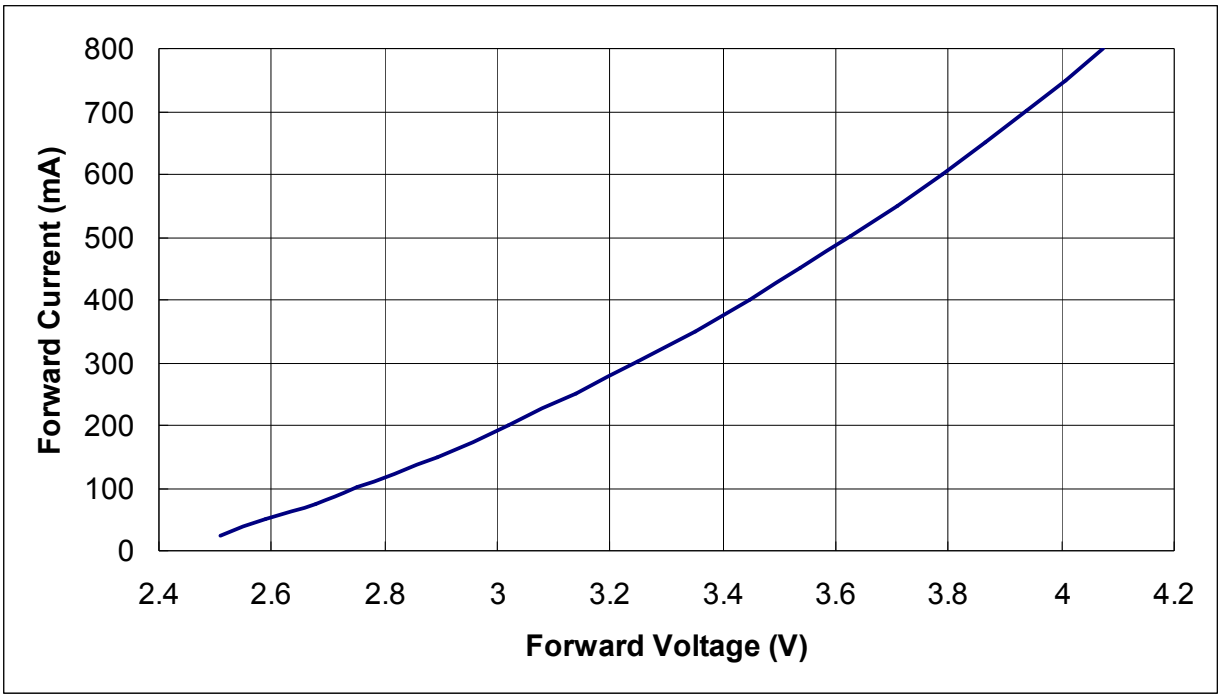


Fig. Forward Current vs. Forward Voltage: Blue/Green/Royal Blue color.

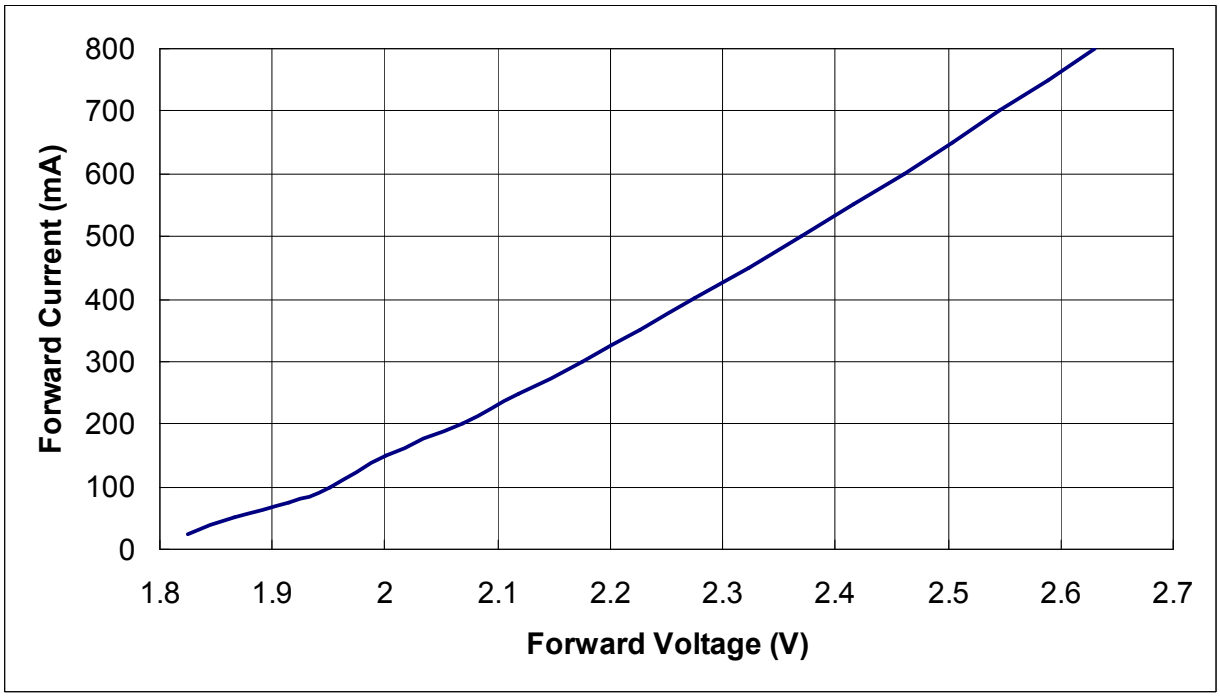


Fig. Forward Current vs. Forward Voltage: Red/Amber/Orange/Deep Red color.

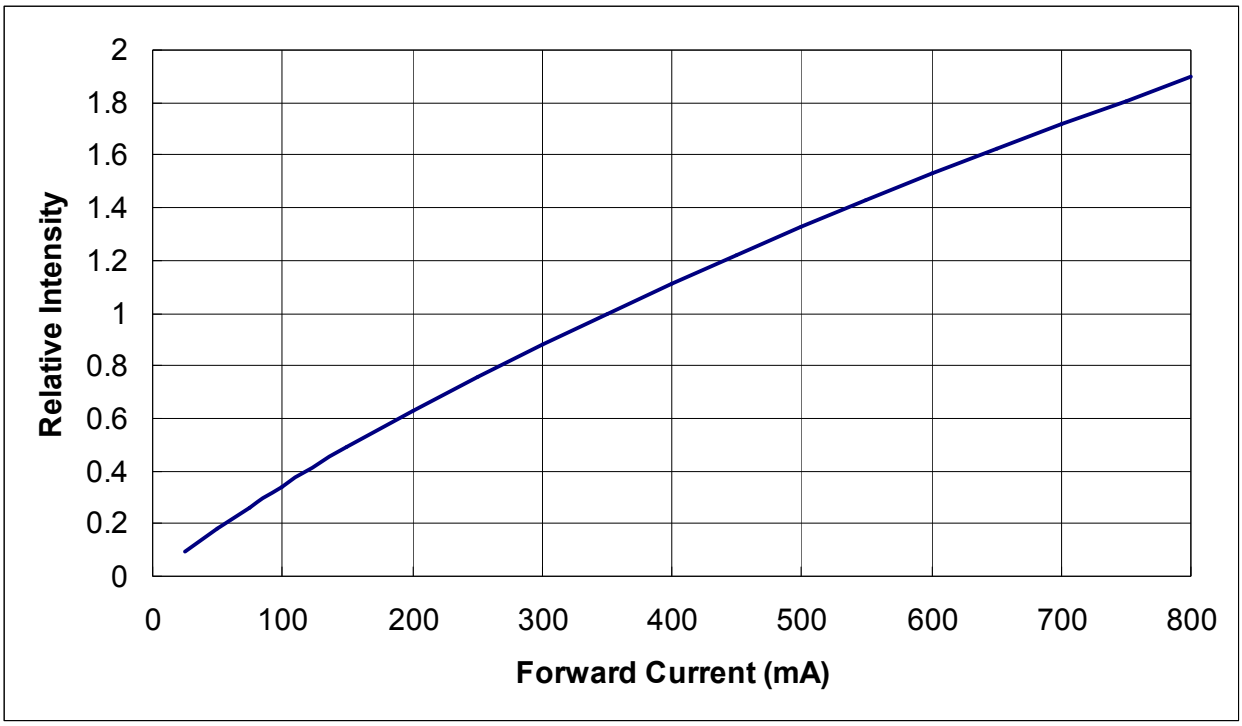


Fig. Relative Intensity vs. Forward Current: Blue/Green/Royal Blue color.

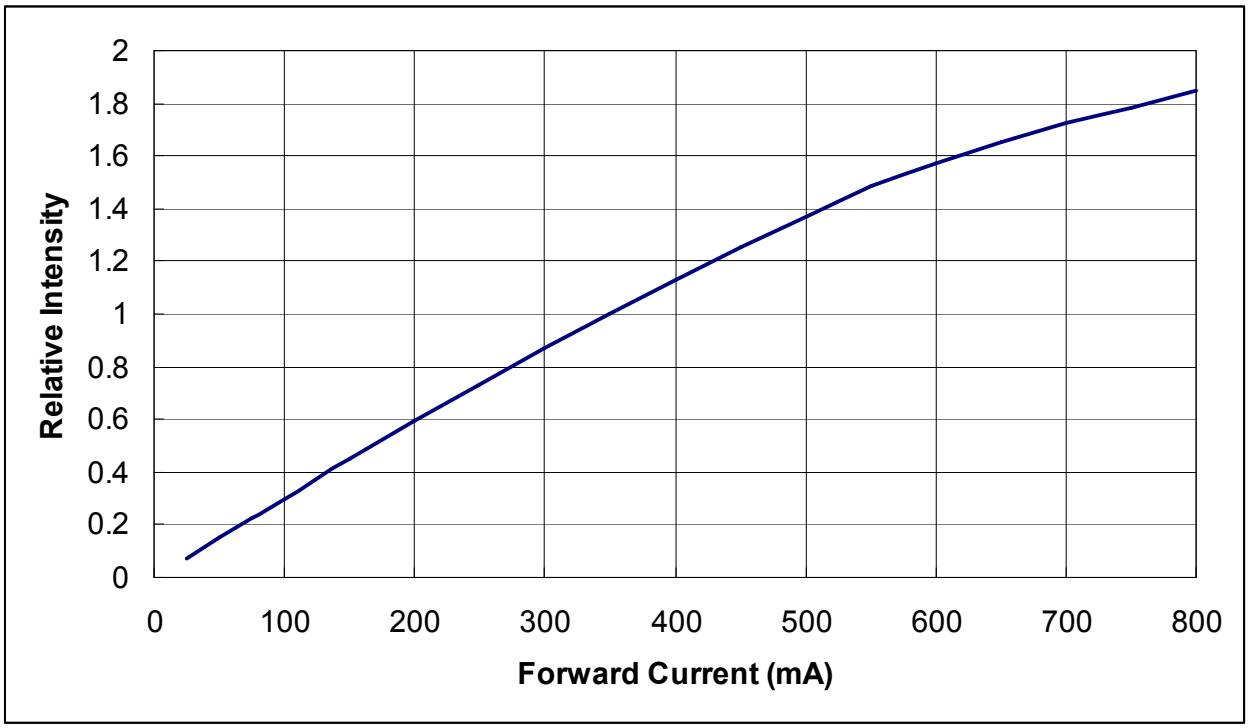


Fig. Relative Intensity vs. Forward Current: Red/Amber/Orange/Deep Red color.

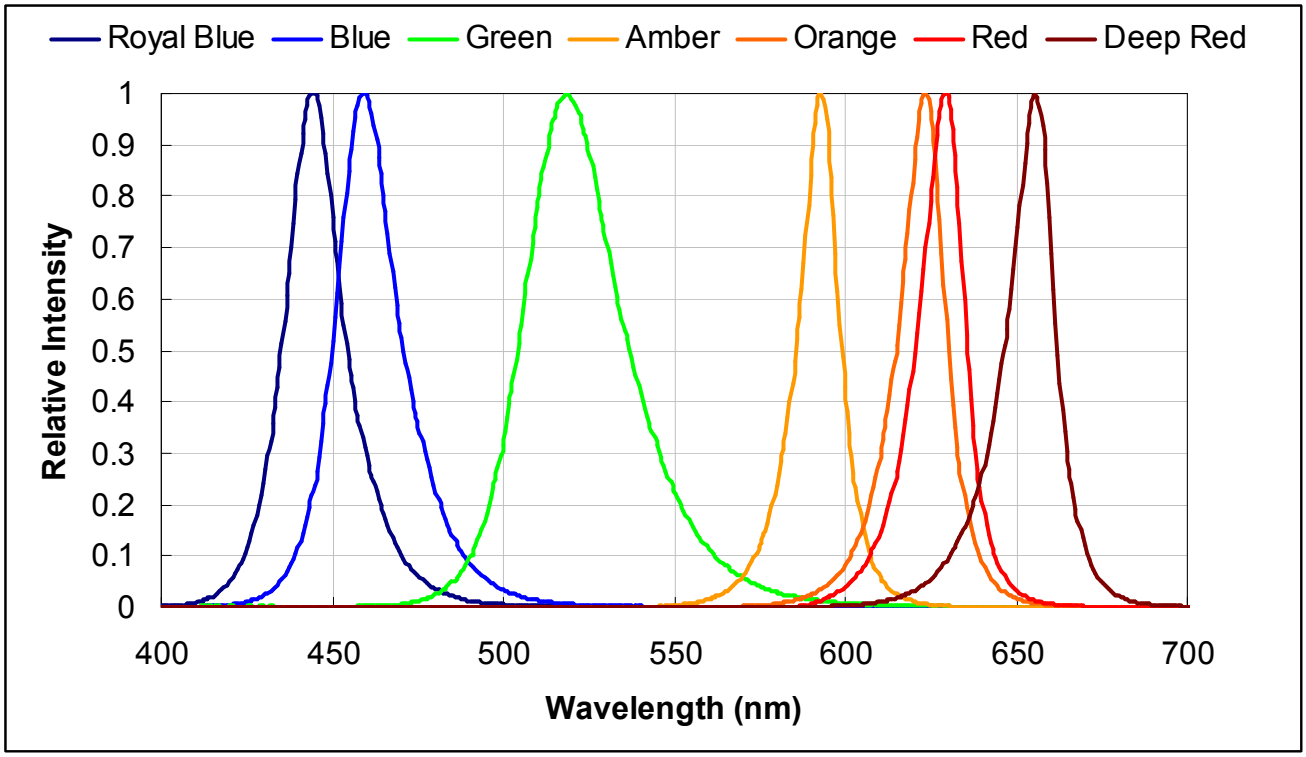


Fig. Relative Intensity vs. Wavelength.

Outline Dimension

Unit : mm

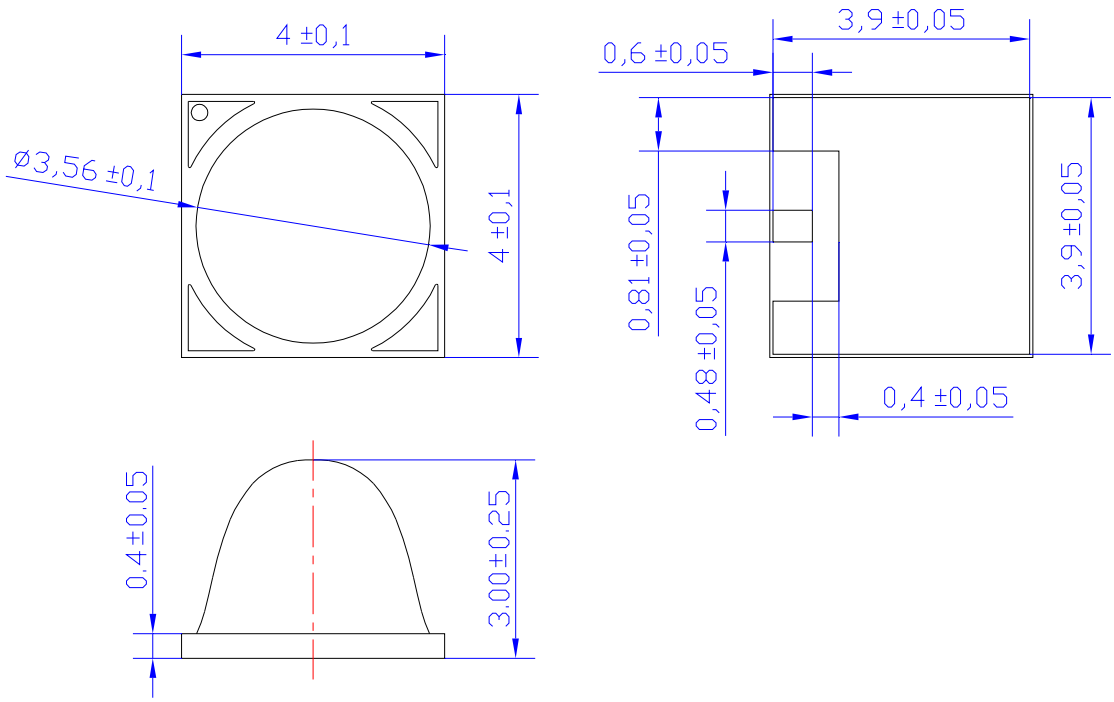
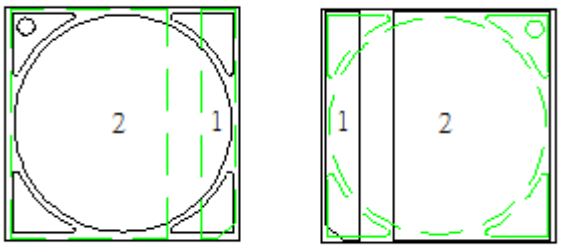


Fig. Package Outline Drawing.

● Pad Configuration



TOP **BOTTOM**

PAD	Function
1	Cathode
2	Anode、 Thermal

Fig. Pad configuration.

Note: Please don't put conductive material on the top surface of LEDs.

Recommended Solder Pattern

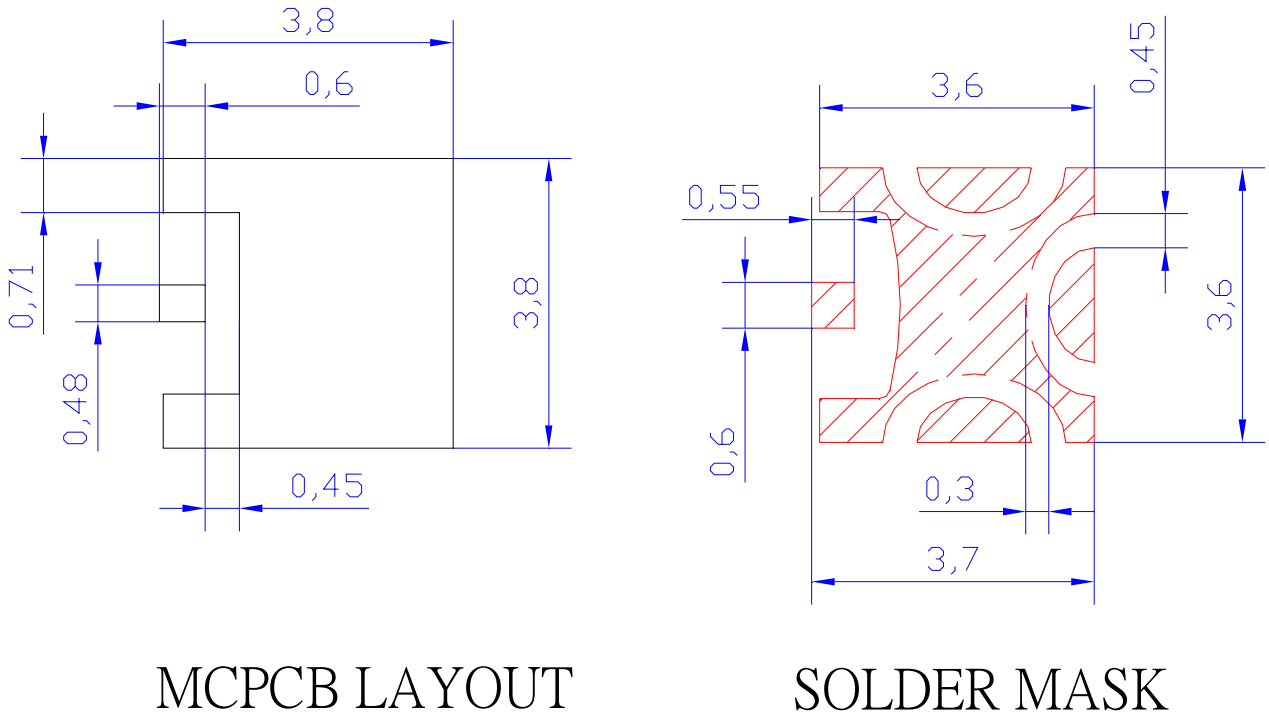


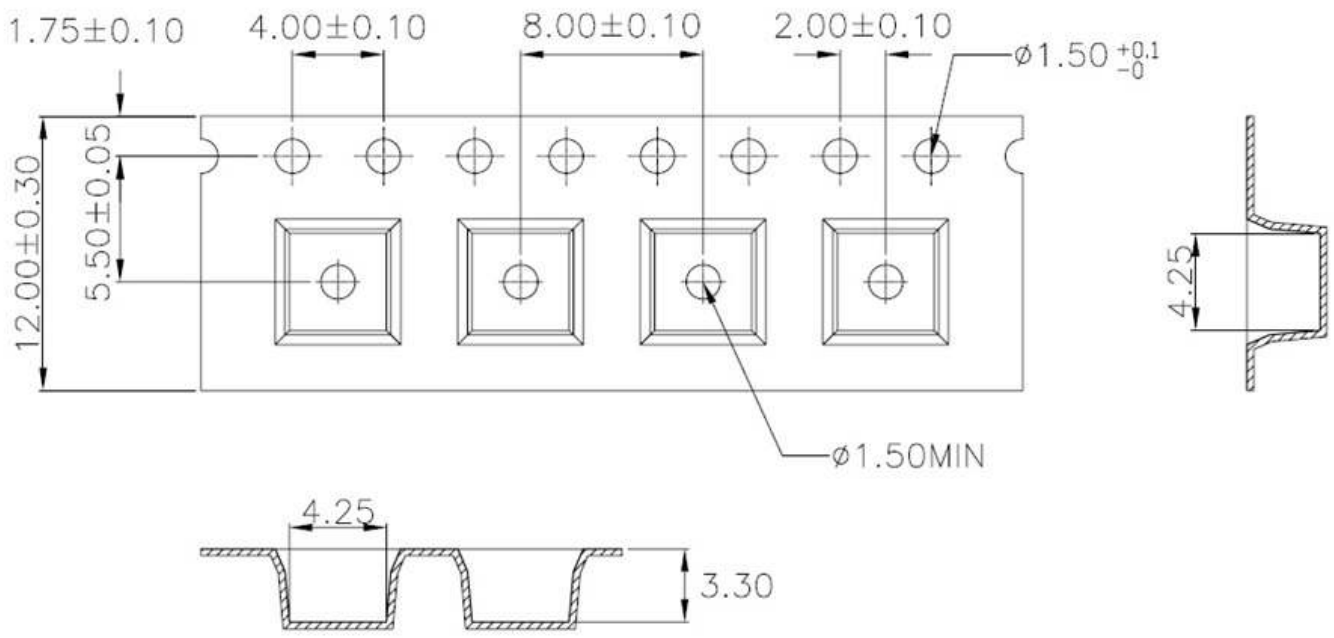
Fig. Solder Pad Layout.

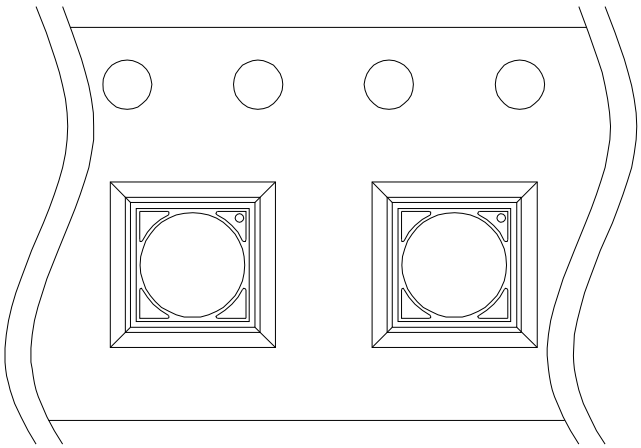
Shipping Package Style

Tapping Dimension Packaging Specification

- Moisture proof bag.
- 1 Reel/bag.
- Q'ty : 1000(MAX) / 7 inch Reel
- Q'ty : 2500(MAX) / 13 inch Reel

Unit : mm





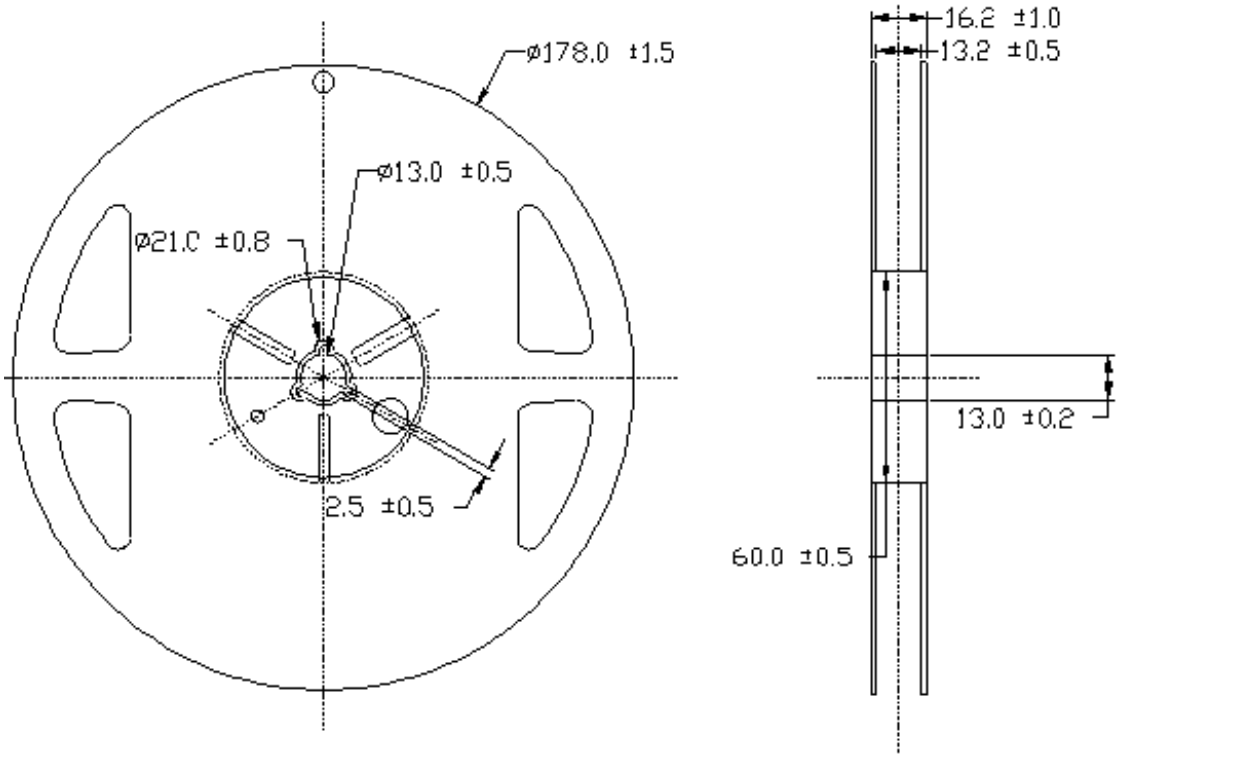
7 inch Reel Package

Box Type	Dimension (mm)	Reel/Box	40°Lens Type (Pcs)
Small Box(S)	230x85x265	5 Reel/Box	5000
Middle Box(M)	470x265x270	30 Reel/Box	30000
Large Box(L)	470x435x270	50 Reel/Box	50000

Reel Packaging :

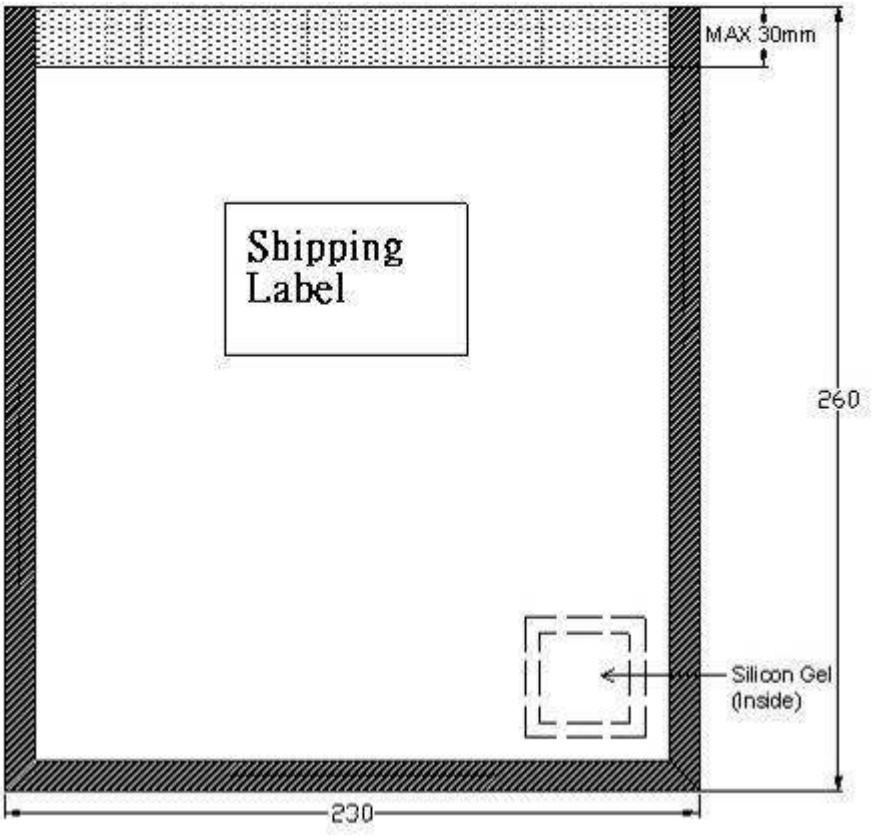
Reel Part :

Unit : mm



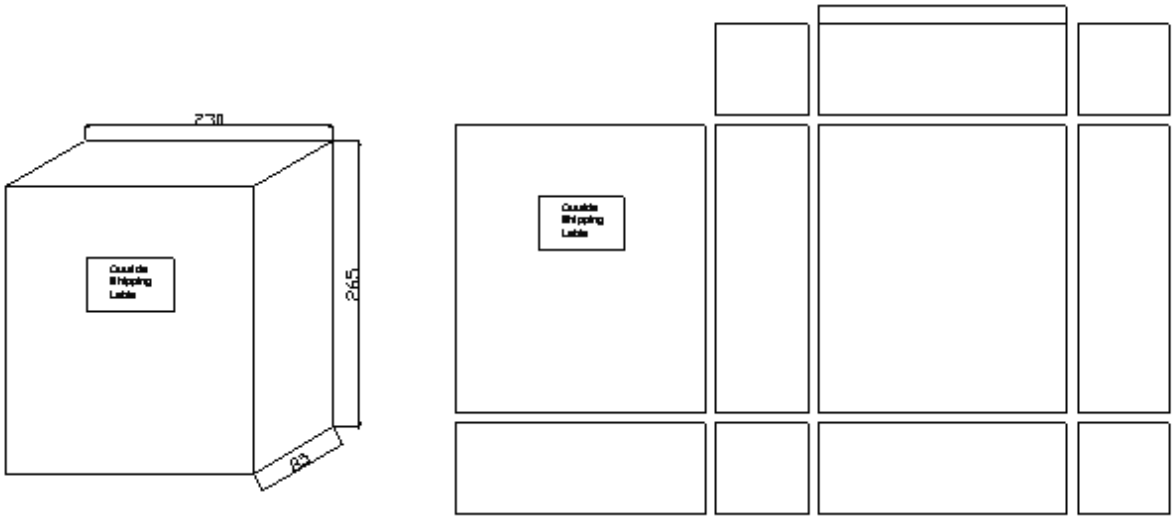
Anti Statistic Bag :

Unit : mm



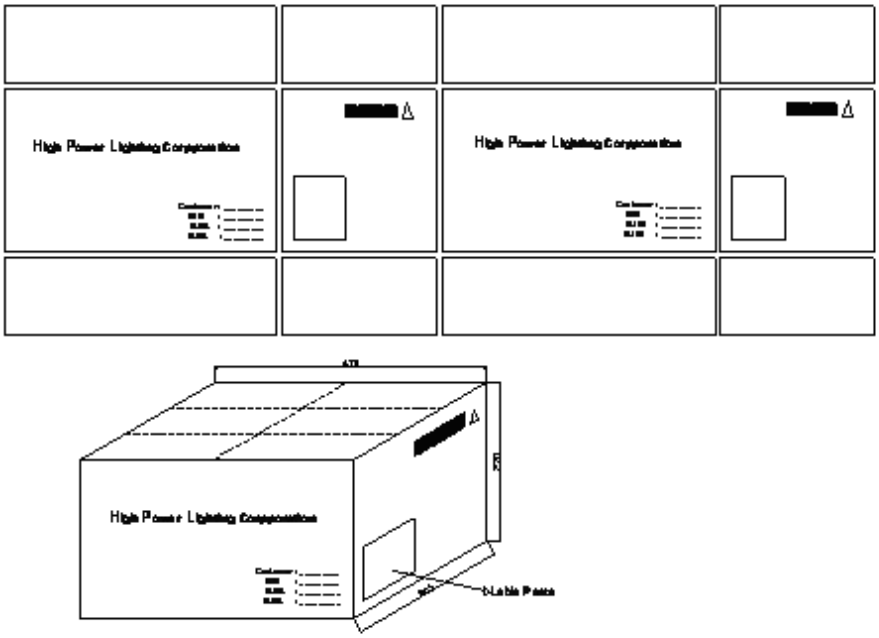
Small Box

Unit : mm



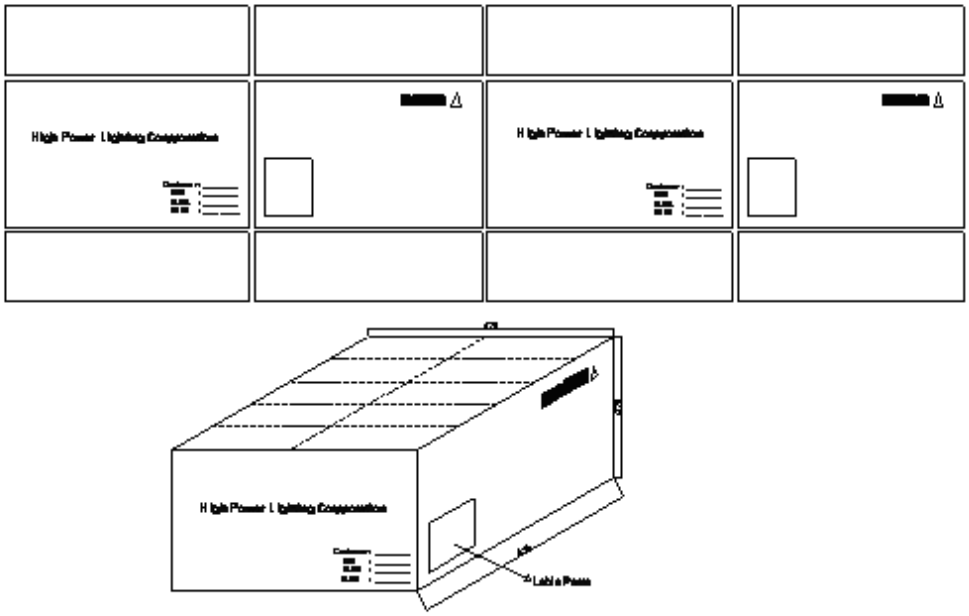
Middle Box

Unit : mm



Large Box

Unit : mm



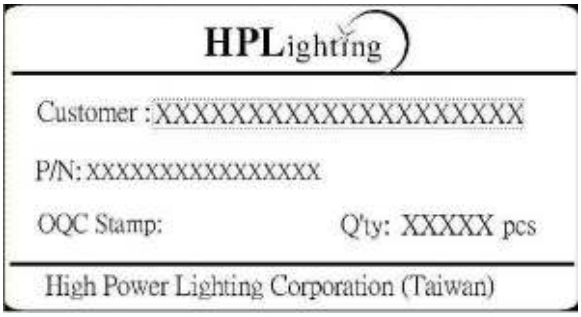
Label Formation

Unit : mm

70mm



40mm



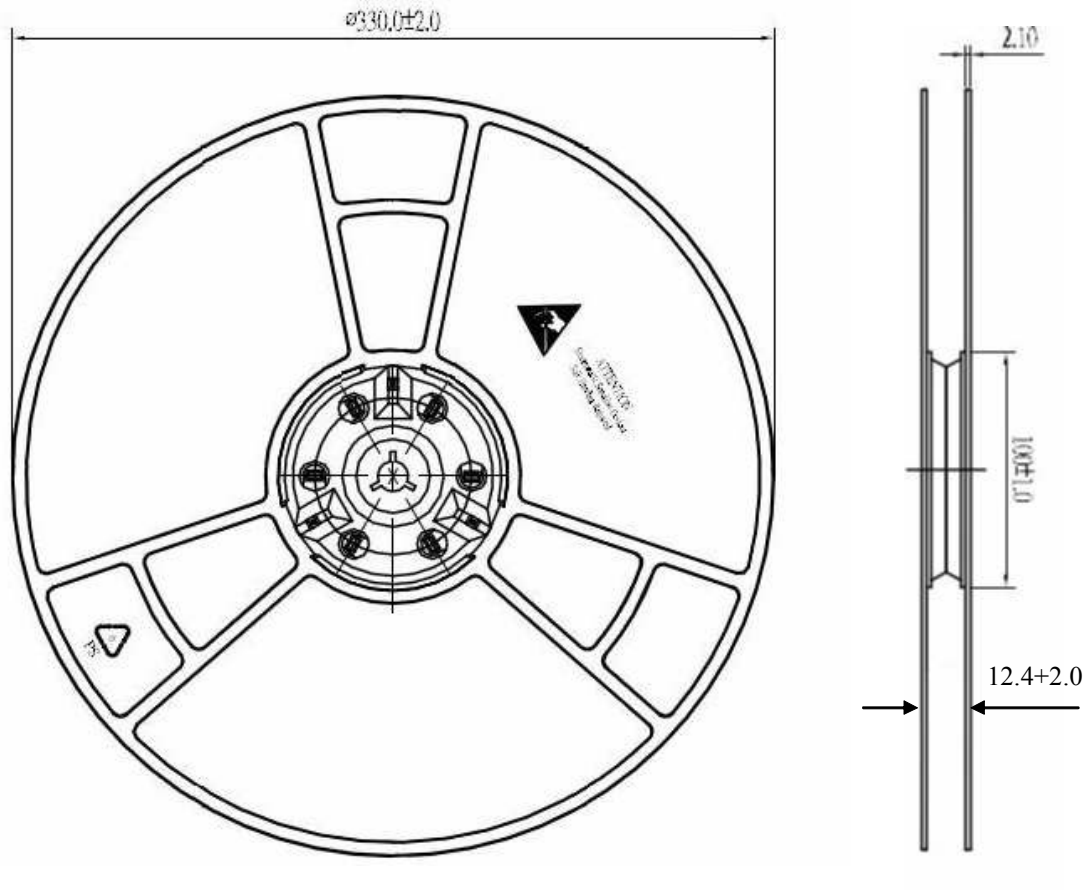
13 inch Reel Package

Box Type	Dimension (mm)	Reel/Box	40°Lens Type (Pcs)
Small Box(S)	415 x 380 x 95	5 Reel/Box	12500
Middle Box(M)	415 x 380 x 290	15 Reel/Box	37500
Large Box(L)	780 x 432 x 310	30 Reel/Box	75000

Reel Packaging :

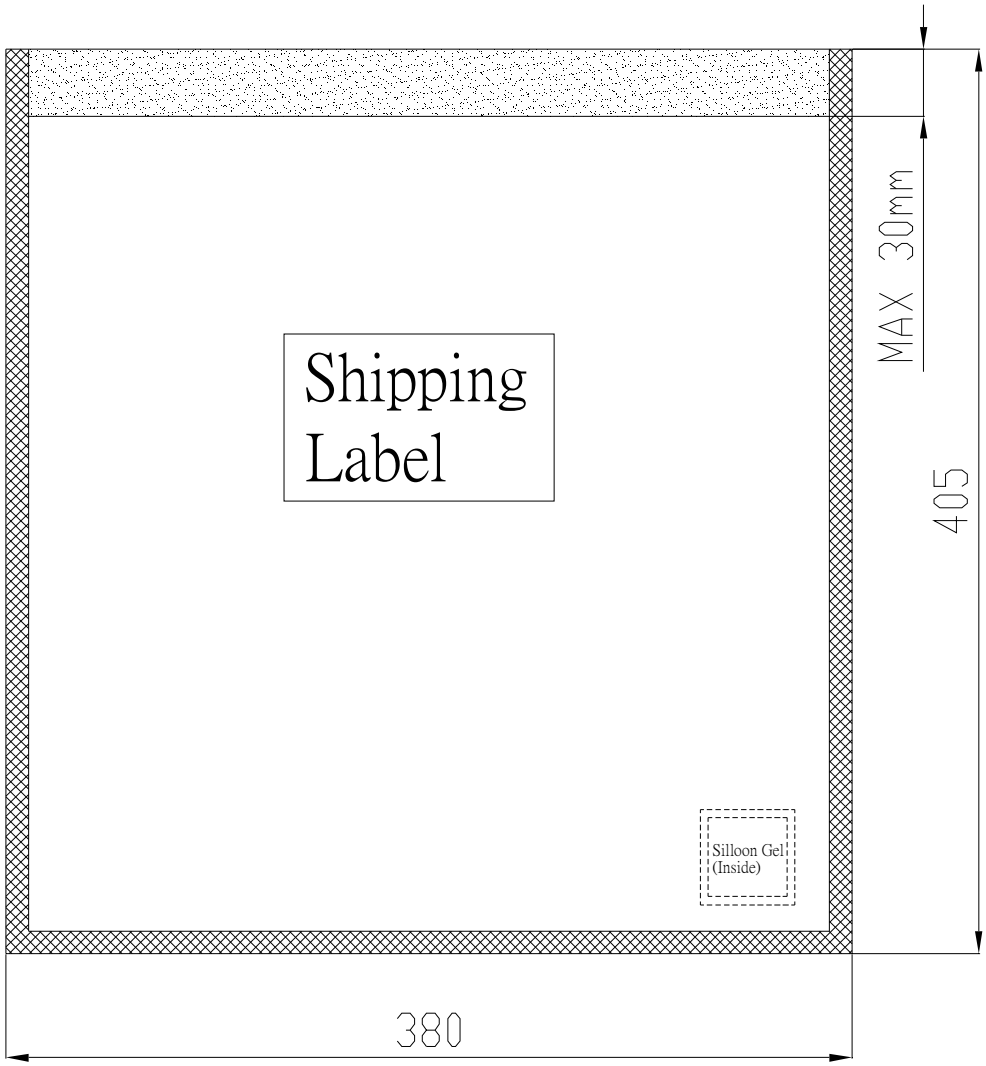
Reel Part :

Unit : mm



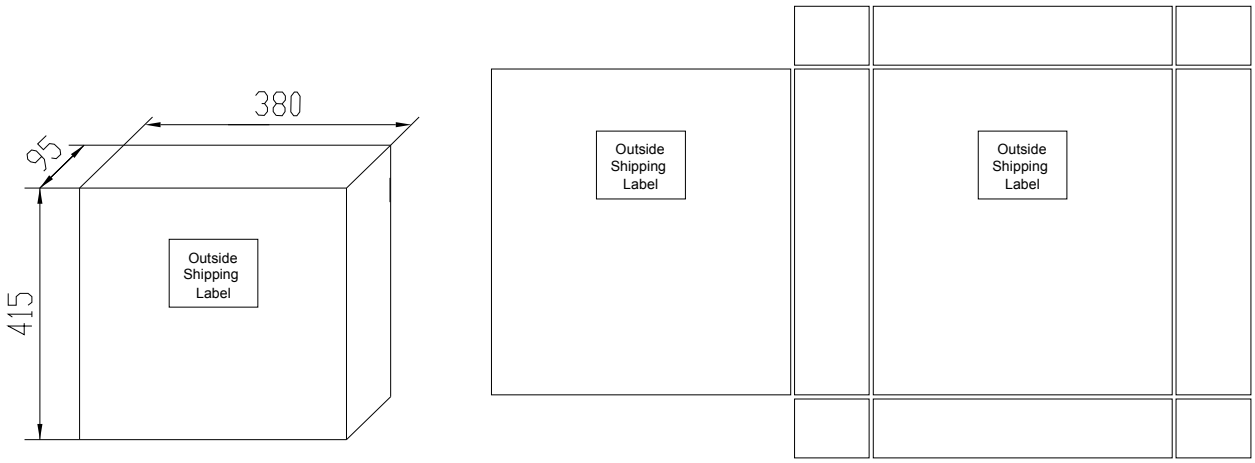
Anti Statistic Bag :

Unit : mm



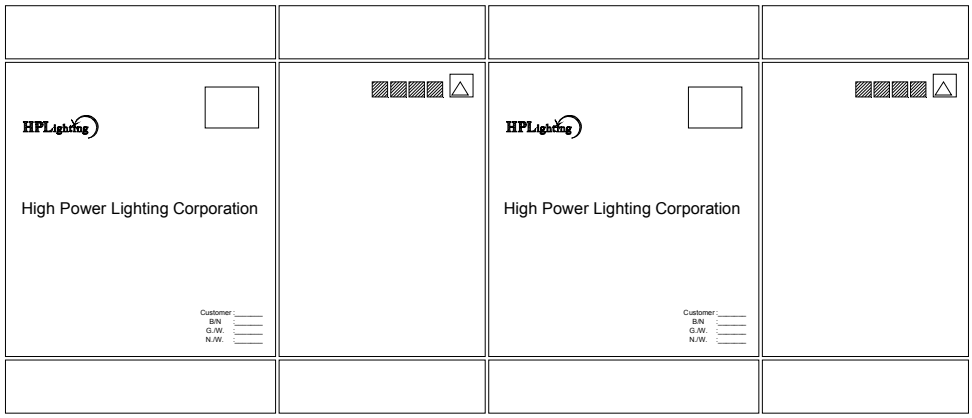
Small Box

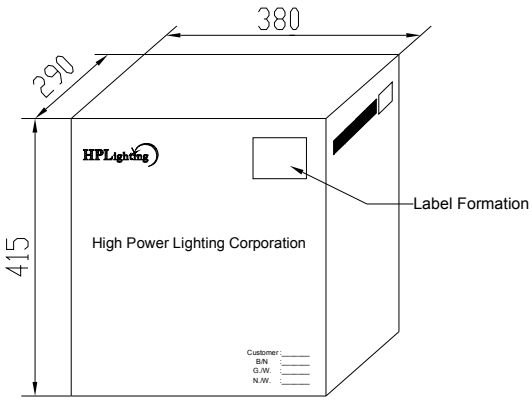
Unit : mm



Middle Box

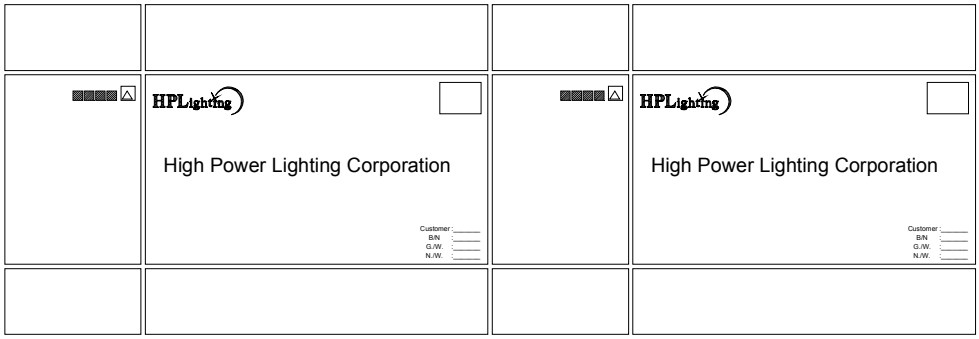
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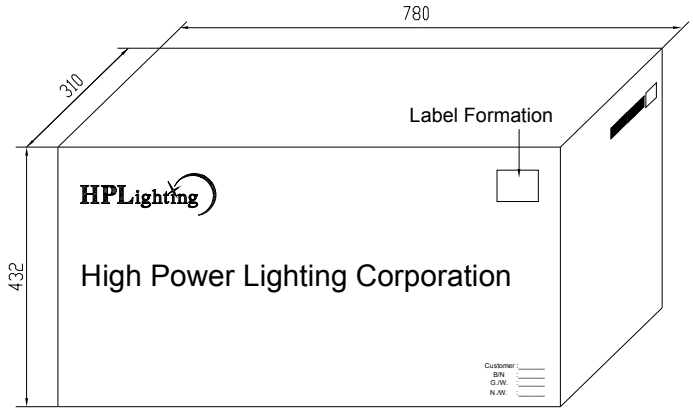




Large Box

Unit : mm



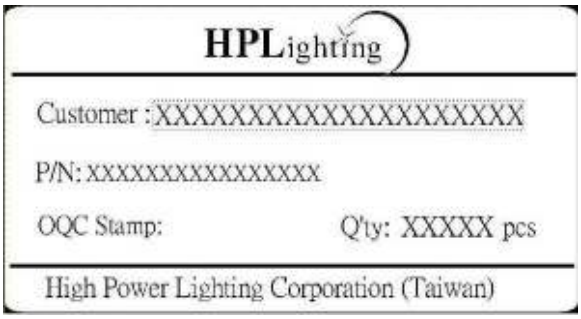


Label Formation

70mm



40mm



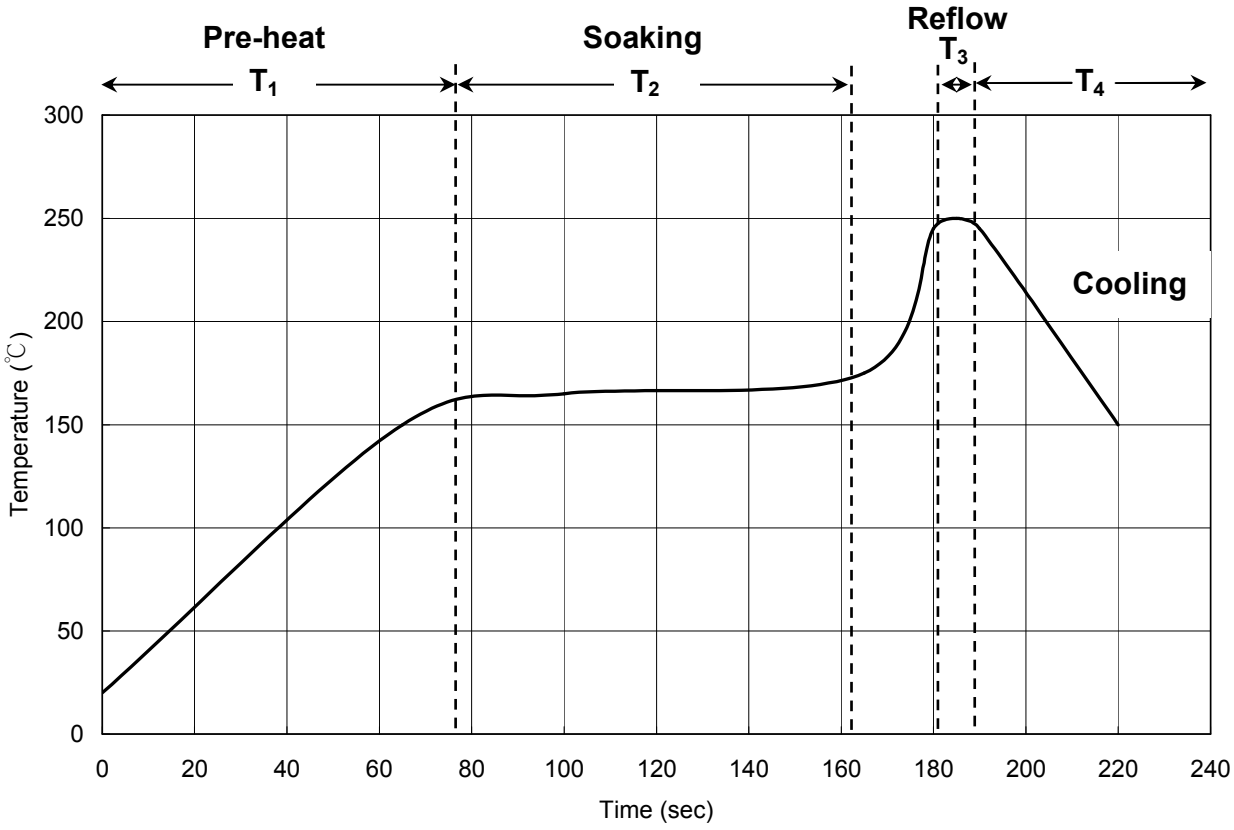
Qualification Reliability Testing

Classification	Test Item	Test conditions	Referance Standard
Endurance Test	Operation Life	I_F = 350mA Ta = 25℃ Test Duration = 1000hrs	MIL-STD-750: 1026 MIL-STD-883: 1005 JIS C 7021: B-1
	High Temperature High Humidity Storage	Ta = 85±5℃ RH = 85±5% Test Duration = 1000hrs	MIL-STD-202: 103B JIS C 7021: B-11
	High Temperature Storage	Ta = 105±5℃ Test Duration = 1000hrs	MIL-STD-202: 1008 JIS C 7021: B10
	Low Temperature Storage	Ta = -40±5℃ Test Duration = 1000hrs	JISC 7021: B-12
Environmental Test	Temperature Cycling	-30℃ ~ 25℃ ~ 105℃ ~ 25℃ 30min 5min 30min 5min Test Duration = 10 cycle	MIL-STD-202: 107D MIL-STD-750: 1051 MIL-STD-883: 1010 JIS C 7021: A-4
	Thermal Shock	-30±5℃ ~ 105±5℃ 30min 30min Test Duration = 10 cycle	MIL-STD-202: 107D MIL-STD-750: 1051 MIL-STD-883: 1011
	Solder Resistance	Tsol = 260±5℃ Dwell Time = 10sec	MIL-STD-202: 210A MIL-STD-750: 2031 JIS C 7021: A-1

Measuring Items	Symbol	Measuring Conditions	Failure Criteria
Forward voltage	V_F	I_F = 350mA	V_F shift > 10%
Luminous	Iv%	I_F = 350mA	I_v% shift > 10%

Recommended Solder Profile

Soldering Recommended soldering conditions:



T_1	Ramp up rate	1.0 ~ 3.0 ℃/sec
	Pre-heat time	50 ~ 80 sec
T_2	Soaking temperature	155 ~ 185 ℃
	Dwell time during soaking	60 ~ 120 sec
T_3	Reflow temperature	240 ~ 250 ℃
	Reflow time	Max 10 sec
	Ramp up rate during reflow	1.2 ~ 2.3 ℃/sec
T_4	Cooling	1.0 ~ 6.0 ℃/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.

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For the latest product information, call us or visit: www.hplighting.com.tw

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