



Ledman Optoelectronic Co.,Ltd.

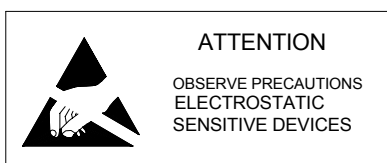
SPECIFICATIONS FOR LEDMAN LAMP LED

Model No. : LL1506HGWR1-A01-A
Document No. : LML-15-177
Revision No. : 01

Description:

- 5mm Round lamp
- Lens Color: Water Transparent
- Emission Color: Warm White
- Viewing Angle :100°
- No Stopper

Dice Material: InGaN

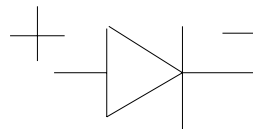
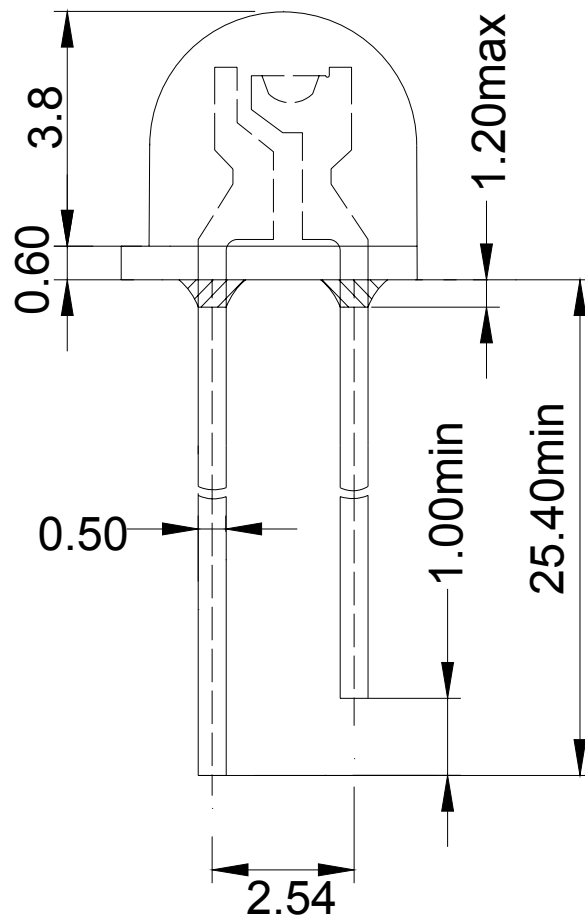


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Outline Drawing



NOTES:

1. All dimensions area in mm tolerance is $\pm 0.25\text{mm}$ unless otherwise noted.
2. An epoxy meniscus may extend about 1.5mm down the leads.
3. Burr around bottom of epoxy may be 0.5mm max.



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Applications:

1	Indicators
2	Illuminations
3	Automobile's Applications

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Items	Symbol	Absolute maximum Rating	Unit
DC Forward Current	I_F	30	mA
Peak Forward Current*	I_{FP}	100	mA
Reverse Voltage	V_R	5	V
Power Dissipation	P_D	108	mW
Operation Temperature	T_{opr}	-20 ~ +75	$^\circ\text{C}$
Storage Temperature	T_{stg}	-30 ~ +80	$^\circ\text{C}$
Lead Soldering Temperature	T_{sol}	Max.260 $^\circ\text{C}$ for 5 sec Max. (3mm from the base of the epoxy bulb)	

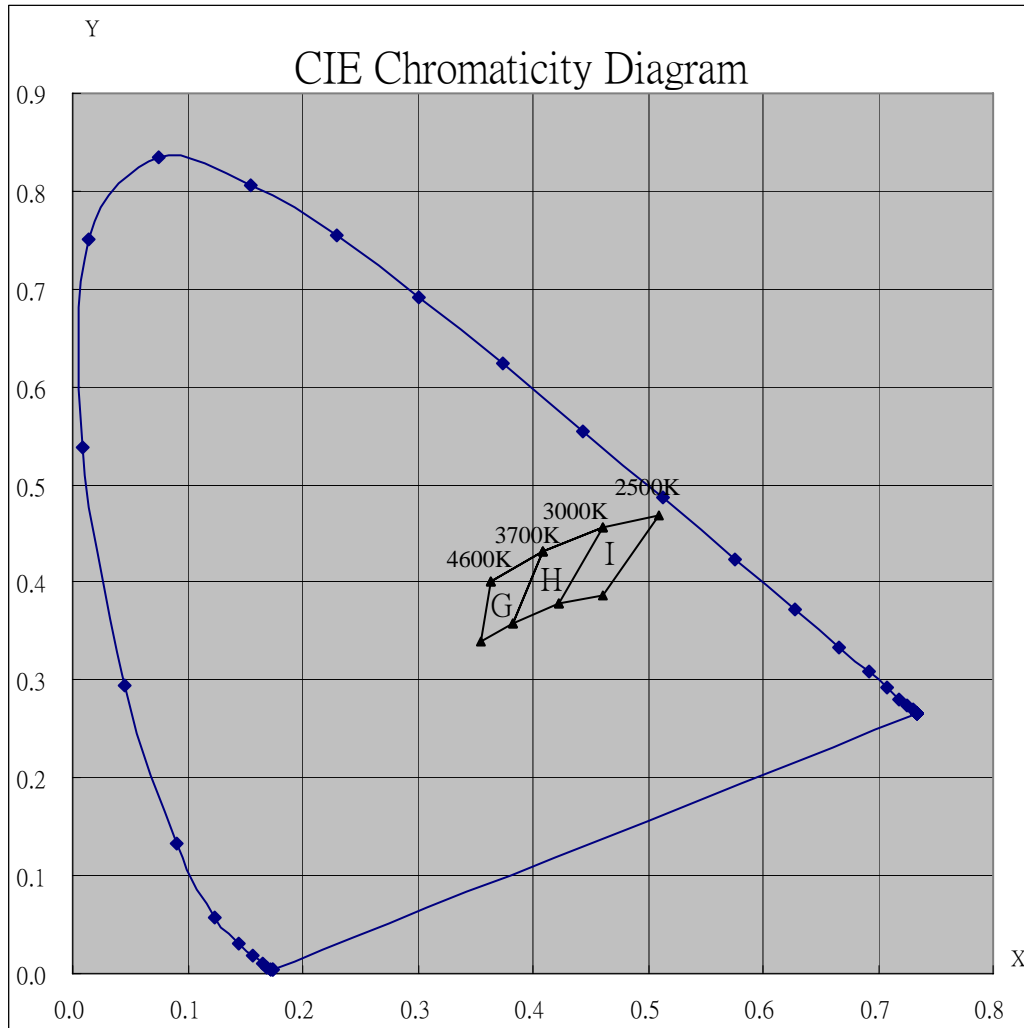
*pulse width $\leq 0.1\text{msec}$ duty $\leq 1/10$

Typical Electrical & Optical Characteristics ($T_a = 25^\circ\text{C}$)

Items	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F = 20\text{mA}$	---	3.2	3.6	V
Reverse Current	I_R	$V_R = 5\text{V}$	---	---	10	μA
Color Temperature	CCT	$I_F = 20\text{mA}$	---	3200	---	K
Chromaticity Coordinates	X	$I_F = 20\text{mA}$	---	0.4280	---	---
	Y	$I_F = 20\text{mA}$	---	0.4090	---	---
Luminous Intensity	I_v	$I_F = 20\text{mA}$	---	1700	---	mcd
50% power Angle	$2\theta_{\frac{1}{2}\text{H-H}}$	$I_F = 20\text{mA}$	---	100	---	deg
	$2\theta_{\frac{1}{2}\text{V-V}}$	$I_F = 20\text{mA}$	---	---	---	deg

Important Notes:

- 1) All ranks will be included per delivery, rank ratio will be determined by Ledman.
- 2) Tolerance of measurement of luminous intensity is $\pm 15\%$.
- 3) Tolerance of measurement of V_F is $\pm 0.05\text{ V}$.
- 4) Color Coordinates Measurement allowance is ± 0.015 .
- 5) For reliability test conditions and data, Please refer to “**Reliability Test**” section on page 6.
- 6) For how to use Ledman LED product safely, Please refer to “**Application Notes**” section on page 8 and 9.
- 7) Packaging methods are available to be chosen , please refer to “**Packaging**” section on page 10 and 11 .
- 8) As we are making continuous efforts to improve the performance of LED, Specifications are subject to change without notice.
- 9) Information is tentative and subject to change without notice.



Color Ranks(IF=20mA,Ta=25°C)

Color Ranks		CIE				CCT
G	X	0.3638	0.4087	0.3820	0.3540	3700K-4600K
	Y	0.4001	0.4322	0.3580	0.3400	
H	X	0.4087	0.4608	0.4226	0.3820	3000K-3700K
	Y	0.4322	0.4570	0.3775	0.3580	
I	X	0.4608	0.5090	0.4600	0.4226	2500K-3000K
	Y	0.4570	0.4689	0.3864	0.3775	

Measurement uncertainty of the color coordinates:±0.015



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Typical Optical-Electronic Characteristic Curves:

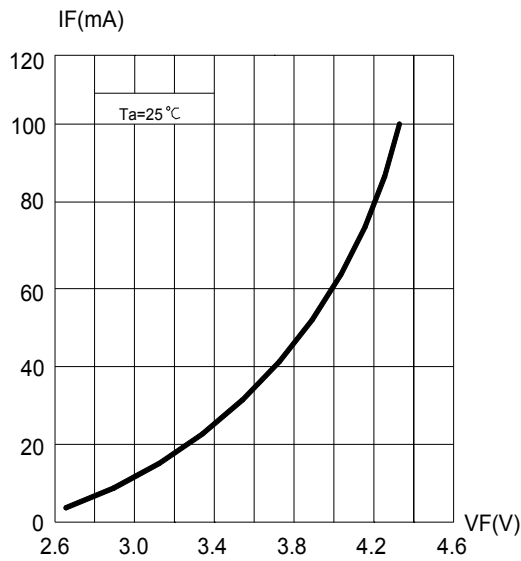


Fig.1 Forward Current vs. Forward Voltage

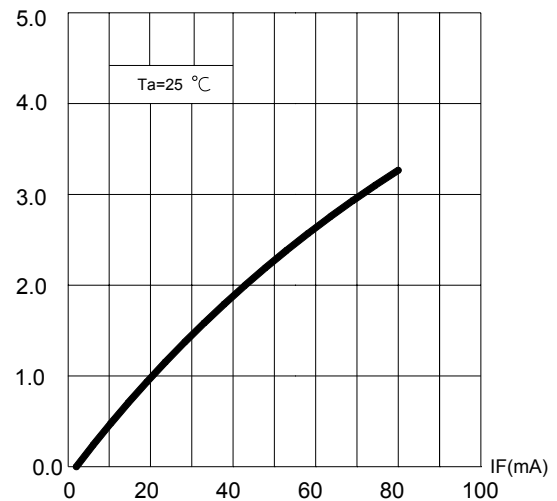


Fig.2 Relative Luminous Intensity vs. Forward Current

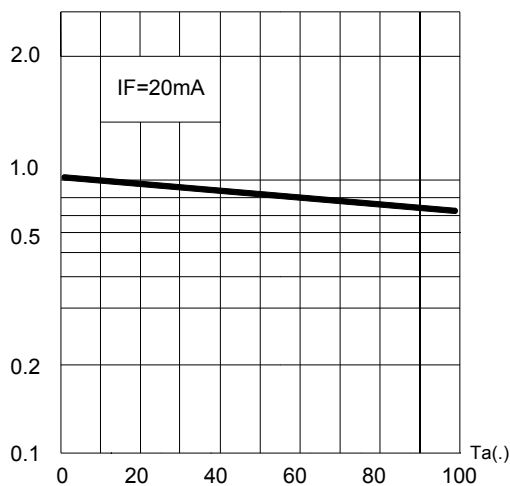


Fig.3 Relative Luminous Intensity vs. Ambient Temperature

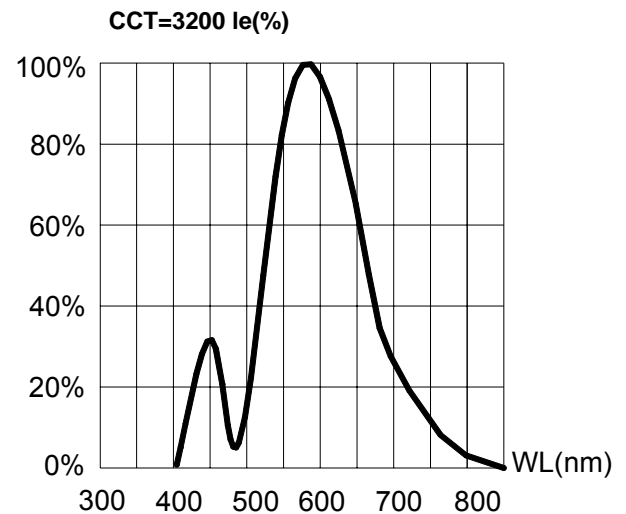


Fig.4 Intensity vs. Wavelength.

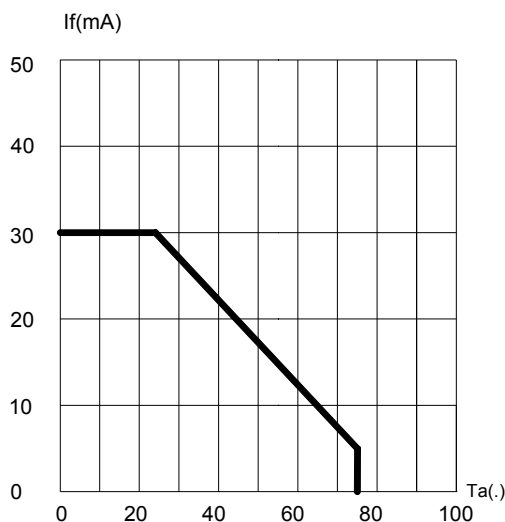


Fig.5 Maximum Forward Current vs. Ambient Temperature

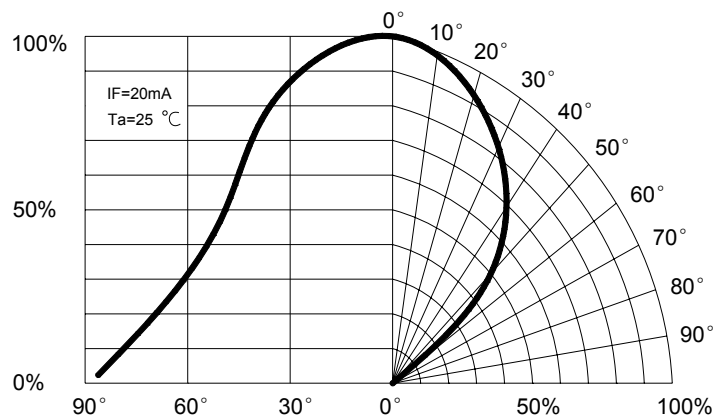


Fig.6 Relative Luminous Intensity vs. Radiation Angle



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Reliability Test Standards

Type	Test item	Applicable standard	Test condition	Duration	Sampling number	Accept criteria
environment test	Temperature cycles	JEITA ED-4701 100 105	-40℃~25℃~100℃~25℃ 30min 5min 30min 5min	100cycles	100	0/100
	Thermal shock	MIL-STD-202G	-40℃~100℃ 15min 15min	300cycles	100	0/100
	High humidity heat cycles	JEITA ED-4701 200 203	30℃~65℃ RH=90% 24hrs/1 cycle	50cycles	100	0/100
	High temperature storage	JEITA ED-4701 200 201	T _a =100℃	1000hrs	100	0/100
	Low temperature storage	JEITA ED-4701 200 202	T _a =-40℃	1000hrs	100	0/100
	High temperature & high humidity storage	JEITA ED-4701 100 103	T _a =60℃ RH=90%	1000hrs	100	0/100
life test	Normal temperature life test		T _a =25℃ I _F =30mA(R,G,Y)/20mA(W,B)	1000hrs	100	0/100
	High temperature & high humidity life test		T _a =60℃ RH=90% I _F =20mA(R,G,Y)/15mA(W,B)	1000hrs	100	0/100
	Low temperature life test		T _a =-30℃ I _F =20mA(R,G,Y)/15mA(W,B)	1000hrs	100	0/100
destructive experiment	Resistance to soldering heat	JEITA ED-4701 300 302	T _{sol} =260℃±5℃, 10sec 3mm from the base of the epoxy bulb	one time	20	0/20
	Solderability	JEITA ED-4701 300 303	T _{sol} =235℃±5℃, 5sec using flux	one time	20	0/20
ESD	Electrostatic discharge test	JEITA ED-4701 300 304	Human body model 1000V forward and reverse	each 3 times	10	0/10
physical experiment	Vibration	JEITA ED-4701 400 403	20G 20-2000HZ 4mins X,Y,Z 3directions	each 4cycles	10	0/10
	Drop		75CM	3 times	10	0/10

Failure Criteria:

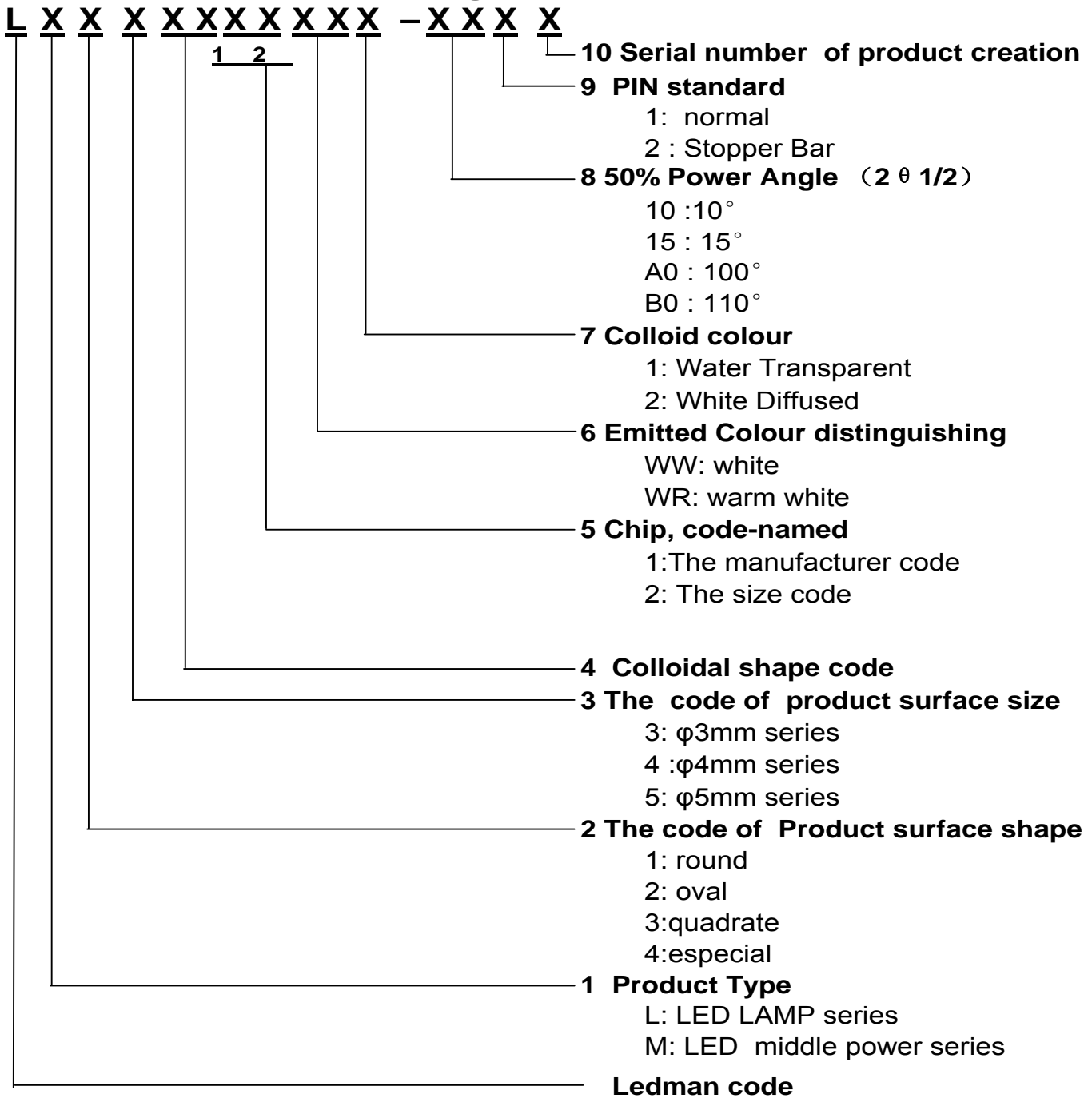
Item	Symbol	Test Condition	Criteria for Judgment
Forward Voltage	V _F	I _F =20mA	Initial Data±10%
Reverse Current	I _R	V _R =5V	≦ 10μA
Luminous Intensity	I _V	I _F =20mA	Single led degradation ≦ 50% and Average degradation ≦ 30%
Solderability			Over 95%
Vibration		I _F =20mA	No dead lamps or visual damage
Drop		I _F =20mA	No dead lamps or visual damage

Remark: RH:Environment humidity; T_a:Environment temperature; T_{sol}:Tin temperature; I_F:Forward current; V_R:Reverse voltage.



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Lamp LED Product Naming Rule





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Application Note

- 1.Storage condition : 10℃-26℃ , 40%-65% RH. Store the product in sealed package.
2. It is recommended to use a wrist band or an antistatic glove when handling the LEDs. Operation tables must be earthed, and in order to avoid the oxidizing of the Lamp leads make sure you will seal the package soon after it is opened.
3. Please pay attention to antistatic steps during Insertation Procedure:
 - A : The equipments should be properly earthed.
 - B : The wrist bands are OK ,make sure the metal on the wrist band contacts closely with the skin.
 - C : It is recommended that workers wear antistatic gloves when inserting LEDs.
 - D : The operation table needs to be covered by antistatic rubberized fabric which is earthed.
 - E : LEDs should be used within 24 hours after opening the package. Otherwise the lamp leads might be oxidized.
4. Four methods to solder LED lamp: hand soldering, dip soldering and wave soldering.
 - A : Hand soldering: in general, the temperature of soldering iron can be set at around 315℃. Ideally the soldering time is within 3 seconds, and it must be no longer than 5 seconds .Soldering should be less than 3 times for a LED. The temperature of the soldering iron which might vary, is generally set according to the ingredients of the tin soldering wire.
 - B : Dip soldering: the temperature is set according to the ingredients of the tin soldering wire. Set the soldering time to be 3 seconds or less.
 - C : Wave soldering: it is a more advanced soldering technology. The choice of flux is very important as different types of flux have different requirement as to cleanness of the soldering point. The pre-heating time can also have effect on the soldering quality. Normally, the liquid tin needs to be regularly checked and replaced. The temperature of the oven needs to be adjusted according to the ingredients of tin, but it can not be higher than 260℃± 5℃, and the soldering time should be less than 5 seconds.

All the equipments/operation tables need to be earthed while soldering.

The static electricity of equipments/operation tables should not exceed 30 V, and of the human body no more than 50 V. Recommend to choose constant temperature soldering iron for manual soldering.

In the cold and dry seasons, you need minimize personnel moving in workshops in order to avoid generating static electricity.
5. With increase on forward current and temperature, LED's life time will decrease .The electricity leakage will increase significantly as a result of temperature increase, and result in a quick degradation of the LED's life time. Please refer to Ledman's specification sheets.
6. A grounding circuit is necessary in the design of PCB. Pay special attention to the environment: -20℃ to 70℃,50%RH to 80%RH, otherwise electro-static discharge might break down the LEDs and large current might cause the invalidation of the LEDs.
when Ta = 25℃, blue and green LEDs with 12 mil chip:



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The maximum value of the constant current should not exceed 30 mA, with 9mil chip should not exceed 15 mA.

Red and yellow LEDs with 12 mil chip:

The maximum value of the constant current should not exceed 50 mA, with 9mil chip should not exceed 30 mA.

7. Pay particular attention to the use of white-light LEDs:

A: Do not mix white-light LEDs of different Bins, specially of the Color Ranks.

B: LEDs with different forward voltages can not be used in parallel.

C: Recommend to drive with constant current.

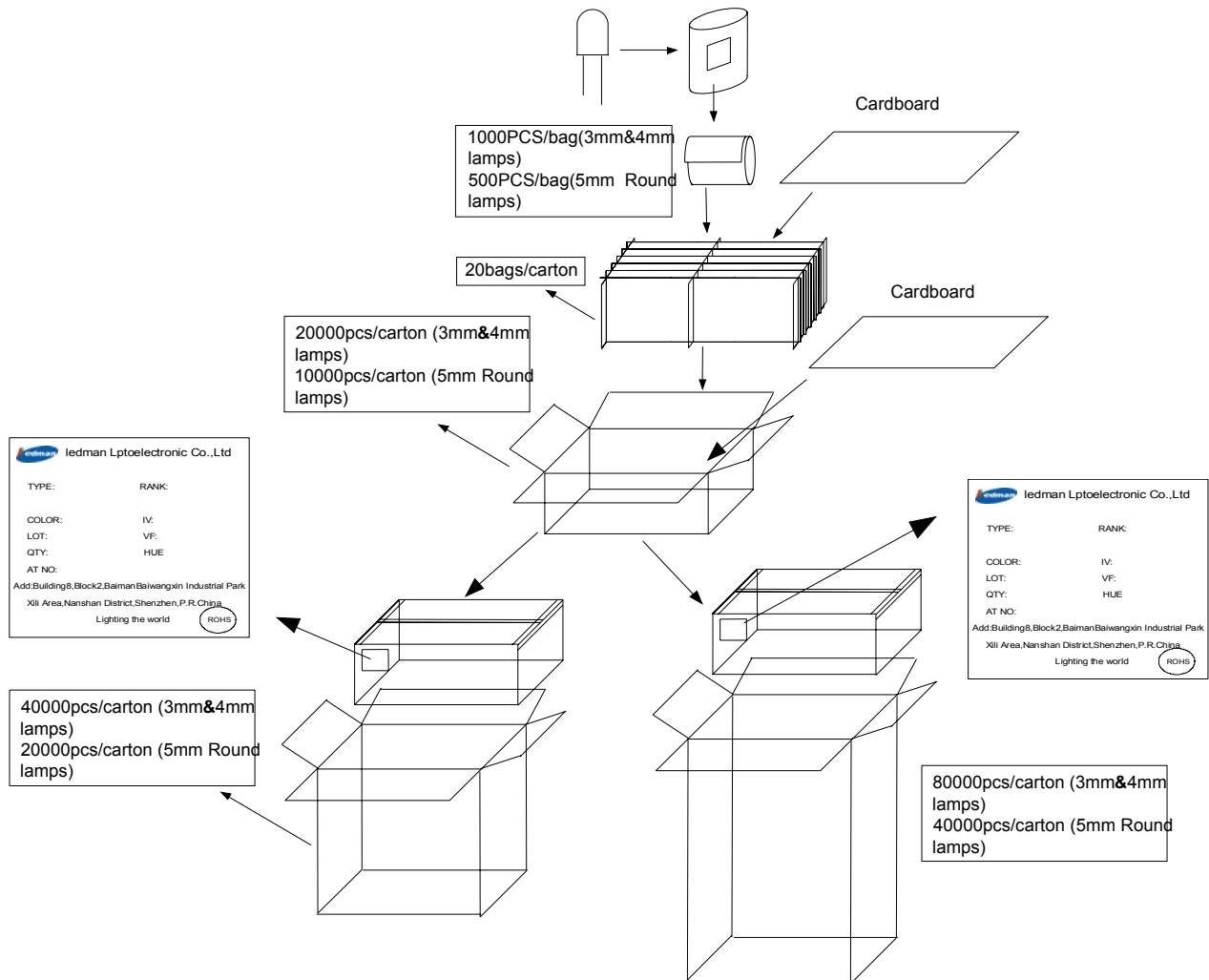
8. When the LEDs are shaping up, the distance between the bending points of the LED leads and the bottom of the lens should be at least 3 mm. Do not bend the LED leads while soldering or after soldering. If you must bend it, please do it before soldering.

Please read carefully about the working environment and parameters of LEDs before use.



Packaging

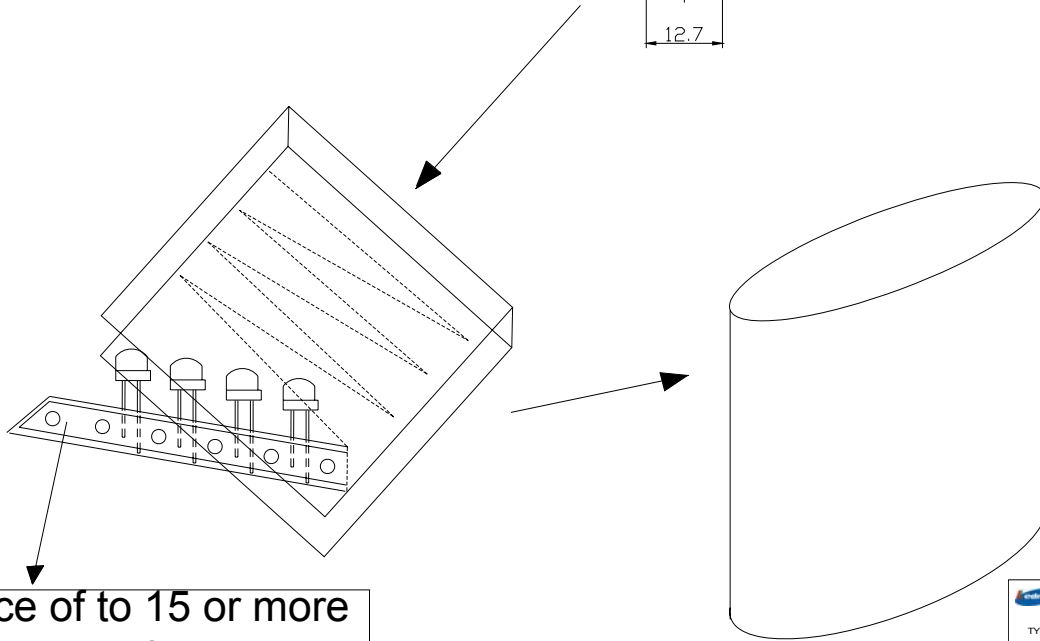
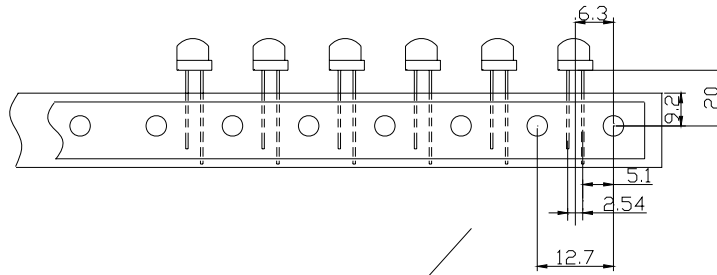
1. Antistatic bag packaging:





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2. Brede packaging:



A space of to 15 or more elements is left

3030pcs/carton(Φ 5mm Round lamp)

Ledman Optoelectronic Co.,Ltd	
TYPE:	RANK:
COLOR:	IV:
LOT:	VF:
QTY:	HUE
AT NO:	
Add: Building 8, Block 2, Baiman Baiwangxin Industrial Park	
Xili Area, Nanshan District, Shenzhen, P.R. China	
Lighting the world	
ROHS	