EOI
EXCELLENCE OPTO. INC.



Spec No.	Date	Page	Ver.
A-L-138-00	2005/9/20	1/11	C-00

LED SPECIFICATION

PART NO. : EOL-H9BTDD0-EG

PART DESCRIPTION:

4 Ø 105°/45° Blue LED Lamp

EOI			CUSTOMER APPROVED
ACTION	NAME	DATE	
PREPARED	Cathy Huang	2005/9/20	
CHECKED	Amy Lin	2005/9/20	
APPROVED	Ader Wu	2005/9/20	

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PART NO. : EOL-H9BTDD0-EG

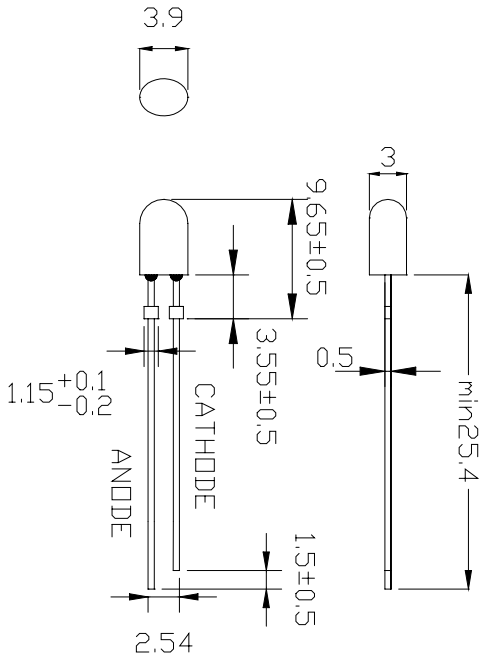
Features

- Oval Shape Package
- Viewing Angle:
  major axis 105°
  minor axis 45°
- High brightness AlInGaN LED
- Wide Viewing Angle
- Pb free & RoHS Compliant Product

Applications

- Indoor/Outdoor Applications
- Full Color Signs
- Variable Message Signs

Package Dimension

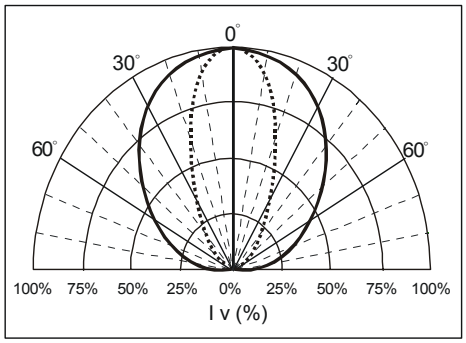


Notes:

1. All dimensions are in millimeter.
2. Tolerance is ±0.20mm unless otherwise noted.
3. Protruded resin under flange is 1.5mm max.
4. Lead spacing is measured where the leads emerge from the package.

Lens Color	Beam Color	Lead Frame Material	Stand Off	Flange
Blue Diffused	Blue	Copper base	Yes	No

Beam Pattern



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Absolute Maximum Ratings at T_A=25℃

Parameter	MAX.	Unit
Power Dissipation	80	mW
Peak Forward Current[a] (I_{FP})	50	mA
DC Forward Current[b] (I_F)	20	mA
Current Linearity vs. Ambient Temperature	- 0.2	mA/℃
Reverse Voltage (V_R)	5	V
LED Junction Temperature	125	℃
Operating Temperature Range[c]	-40℃ to +85℃	
Storage Temperature Range	-40℃ to +100℃	
Lead Soldering Condition [4mm(.157") away from epoxy]	260±5℃ for 5 Seconds	

Note: [a] Duty Ratio=1/10,Pulse Width=0.1ms.
[b] Design of heat dissipation should be considered.
[c] The allowable operating current see page 4 Fig 4.

Electrical and Optical Characteristics at T_A =25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	Iv	150	240	---	mcd	I_F=20mA
Viewing Angle	$2\theta_{1/2}$	---	105/45	---	Deg	I_F=20mA
Dominant Wavelength	λ d	---	470	---	nm	I_F=20mA
Spectra Half width	$\triangle\lambda$	---	25	---	nm	I_F=20mA
Forward Voltage	V_F	---	3.4	4.0	V	I_F=20mA
Reverse Current	I_R	---	---	50	μA	V_R=5V

Ranks Combination

Dominant Wavelength λ_D (nm) @I_F=20mA			Luminous Intensity Iv (mcd) @I_F=20mA			Forward Voltage V_F (v) @I_F=20mA		
Code	**min**	**max**	**Code**	**min**	**max**	**Code**	**min**	**max**
BJ	465	470	**0L**	150	210	**H**	2.6	3.0
BM	470	475	**0M**	210	295	**J**	3.0	3.3
-			**0N**	295	415	**K**	3.3	3.6
-	-	-	-	-	-	**L**	3.6	4.0

Note:

1. All ranks of total luminous Intensity will be included in every shipment.
2. Measurement Uncertainty of the Luminous Intensity: ±15%
3. Measurement Uncertainty of the Dominant Wavelength: ±1nm
4. Measurement Uncertainty of the Voltage: ±0.05V

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Typical Electrical / Optical Characteristics Curves

(25℃ Ambient Temperature Unless Otherwise Noted)

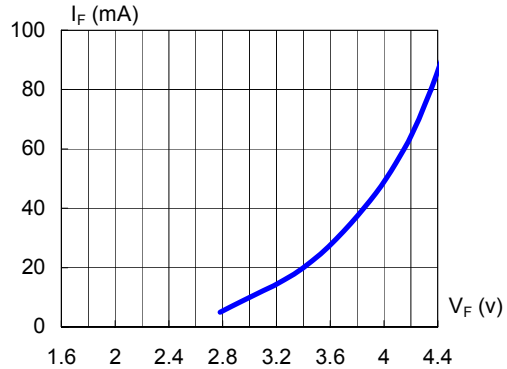


Fig.1 Forward Current vs. Forward Voltage

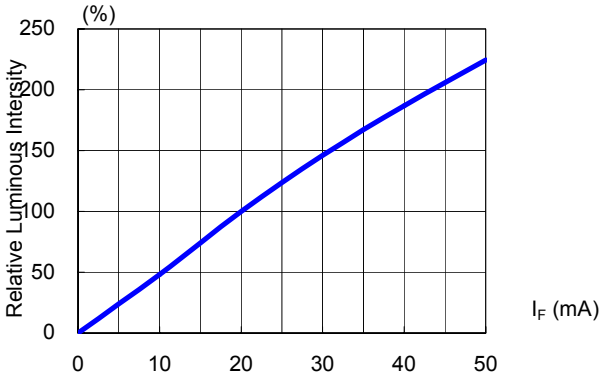


Fig.2 Luminous Intensity vs. Forward Current

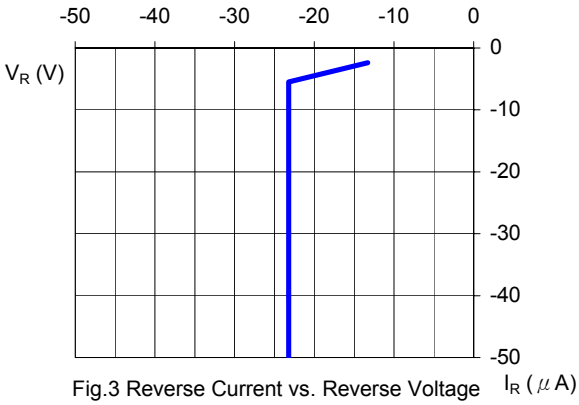


Fig.3 Reverse Current vs. Reverse Voltage

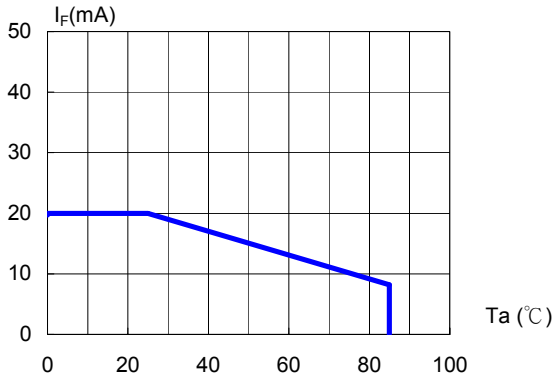


Fig.4 Allowable Forward Current vs. Ambient Temperature

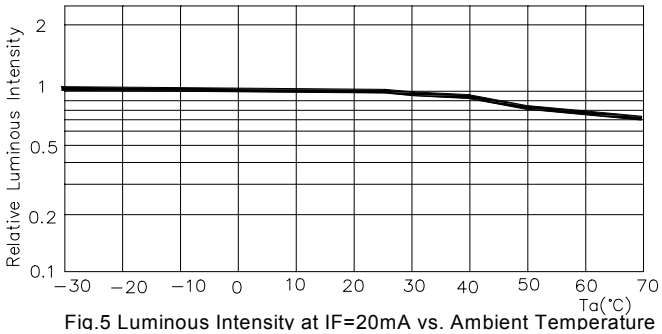


Fig.5 Luminous Intensity at IF=20mA vs. Ambient Temperature

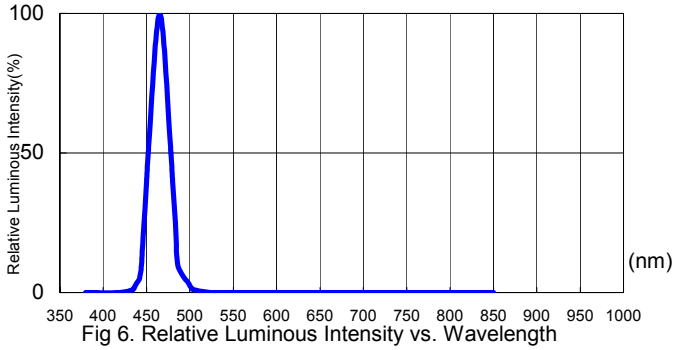


Fig 6. Relative Luminous Intensity vs. Wavelength

***Note: The data shown above are typical curves. Every LED component may have some variations of characteristics.**

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Reliability Criteria & Results

EOI'S LED lamps are checked by reliability test based on MIL standards.

1. Test Conditions, Accept Criteria & Results:

Classi-fication	Test Item	Standard Test Method	Test Conditions	Duration	Units Tested	Acc/Rej Criteria
Life Test	Operating Life Test (OLT)	MIL-STD-750D Method 1026.3	Ta=25℃ ; I_F=30mA(*)	1000hrs	100 pcs	0/1
Environment Test	High Temperature Storage (HTS)	MIL-STD-750D Method 1032.1	Ta=100℃	1000hrs	100 pcs	0/1
	Low Temperature Storage (LTS)	MIL-STD-750D Method 1032.1	Ta= -40℃	1000hrs	100 pcs	0/1
	Temp. & Humidity with Bias (THB)	MIL-STD-750D Method 103B	Ta=85℃ ; Rh=85% ; I_F=20mA (**)	500hrs	100 pcs	0/1
	Thermal Shock Test (TST)	MIL-STD-750D Method 1056.1	0 ℃ ~ 100℃ 2min 2 min	100 cycles	100 pcs	0/1
	Temperature Cycling Test (TCT)	MIL-STD-750D Method 1051.5	-40℃~ 25℃~ 100℃~ 25℃ 30min 5min 30min 5min	100 cycles	100	0/1
Mechanical Test	Solderability	MIL-STD-750D Method 2026.4	235±5℃ ; 5sec	1 time	20 pcs	0/1
	Resistance to Soldering Heat	MIL-STD-750D Method 2031.1	260±5℃ ; 10sec	1 time	20 pcs	0/1
	Lead Integrity	MIL-STD-750D Method 2036.3	Load 2.5N (0.25kgf) 0°~90°~0° bend	3 times	20 pcs	0/1

Remark:

(*) I_F = 30 mA for AlInGaP chip ; I_F = 20 mA for InGaN chip

(**) I_F = 20 mA for AlInGaP chip ; I_F = 10 mA for InGaN chip

2. Failure Criteria (Ta =25℃):

Test Item	Symbol	Test Conditions	Criteria for Judgement	
			Min.	Max.
Luminous Intensity	I_V	I_F = 20mA	LSL×0.7**	
Voltage (Forward)	V_F	I_F = 20mA		USL × 1.1*

*USL : Upper Standard Level

**LSL : Low Standard Level

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Bulk Package

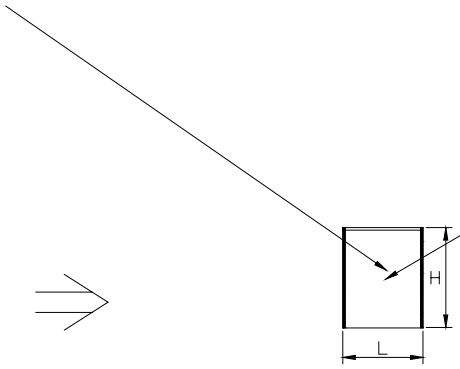
EOI EXCELLENCE OPTO. INC.		
PART NO.		
LOT NO.		QC:
Code		
DATE		
QUANTITY	pcs	

label

ATTENTION

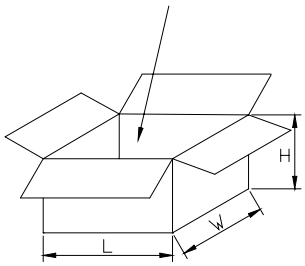
OBSERVE PRECAUTIONS
FORHANDLING
ELECTROSTATIC
SENSITIVE DEVICES

Anti-static/anti-corrosion bag
H : 200mm
L : 180mm
PCS/BAG
3.0/4.0/5.0mm: 500pcs
>7.5mm : 400pcs



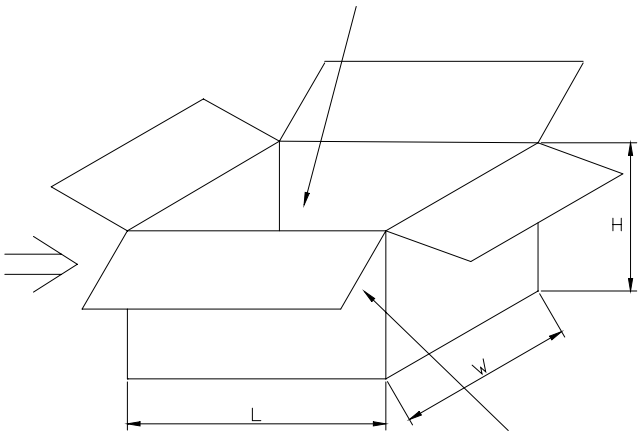
Bag

Corrugated paper box(3 layers)
H : 140mm
L : 350mm
W : 260mm
PCS/INNER BOX
3.0/4.0/5.0mm:10,000pcs
>7.5mm : 4,000pcs



Inner Box

Corrugated paper box(5 layers)
H : 320mm
L : 380mm
W : 280mm
PCS/OUTER BOX
3.0/4.0/5.0mm:20,000pcs
>7.5mm : 8,000pcs



Outer Box

label

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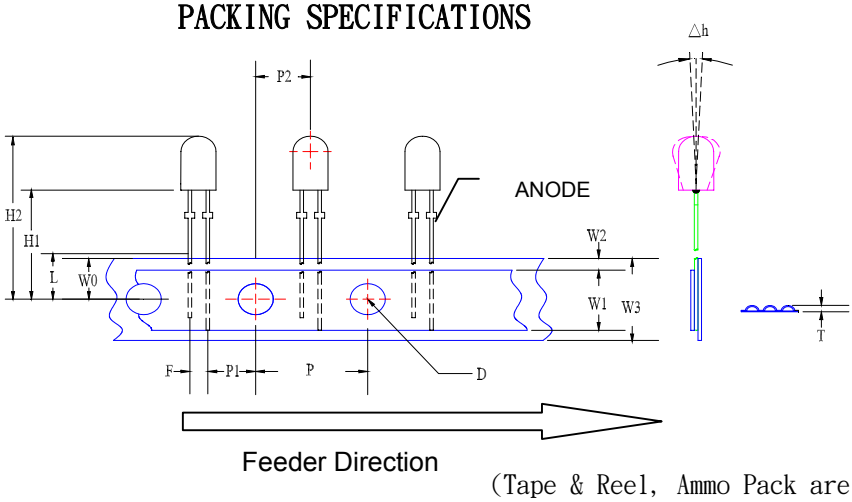
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Taping Package

(TT-0001)

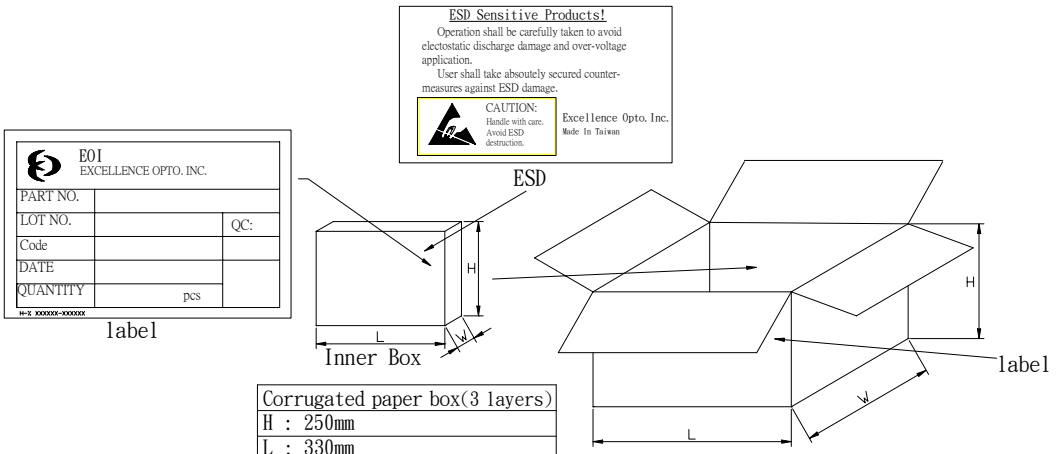
PACKING SPECIFICATIONS



(Tape & Reel, Ammo Pack are available)

(Maximum 10 inner boxes in one outer box)

ITEM	SYMBOL	SPECIFICATION			
		MINIMUM		MAXIMUM	
		MM	INCH	MM	INCH
• Tape Feed Hole Diameter	D	3.8	0.149	4.2	0.165
• Component Lead Pitch	F	2.34	0.092	2.74	0.108
• Front To Rear Deflection	△ h	--	--	2.0	0.078
• Feed Hole To Bottom Of Component	H1	19.0	0.709	21.0	0.787
• Feed Hole To Overall Component Height	H2	--	--	32.00	1.260
• Lead Length After Component Height	L	W0		11.0	0.433
• Feed Hole Pitch	P	12.4	0.488	13.0	0.511
• Lead Location	P1	4.4	0.173	5.8	0.228
• Center Of Component Location	P2	5.05	0.198	7.65	0.301
• Total Tape Thickness	T	--	--	1.4	0.056
• Feed Hole Location	W0	8.5	0.334	9.50	0.374
• Adhesive Tape Width	W1	12.0	0.472	14.0	0.551
• Adhewive Tape Position	W2	--	--	4.0	0.157
• Tape Width	W3	17.5	0.689	19.0	0.748



Corrugated paper box(3 layers)
H : 250mm
L : 330mm
W : 50mm
PCS/INNER BOX
3.0/4mm :2,500pcs
5.0mm :2,000pcs
>7.5mm :1,000pcs

Corrugated paper box(5 layers)
H : 290mm
L : 520mm
W : 360mm
PCS/OUTER BOX
3/4mm :25,000pcs
5.0mm :20,000pcs
>7.5mm :10,000pcs

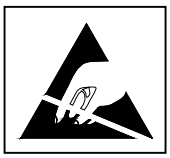
Precaution of Application

1. Circuit layout

Due to the circuit design is not available, assuming the LED are used in parallel and one resistor that is put in series in the circuit, it may not provide and effective current-limiting function to the LEDs due to each LED has own inherent resistance, maybe the resistance each other is different. Different inherent resistance will cause different current; the LED on the different path would be driven at different power. If one LED with a higher resistance, it would be dimmer than the others.

To solve this situation, a suitable resistor is put in series with each LED to limit her current disparity through the LED will be very useful.

2. Electric Static Discharge (ESD) Protection



ESD protection for GaP and AlGaAs chips are still necessary even though they are safety in low static-electric discharge. Material in AlInGaP, GaN, or/and InGaN chips are STATIC SENSITIVE device. ESD protection shall be considered and taken in the initial design stage.

If manual work/process is needed, please ensure the device is well protective from ESD within all the process.

3. Lead Froming

The leads should not be bent at the point of 3mm or above from the base of the epoxy bulb while forming the leads.

Do not apply any bending stress to the base of the lead, and don't cause any stress after mounting the LED lamp on PCB. The stress to the base may damage the LED's characteristics, or cause deterioration of the epoxy resin. This will hurt and degrade the LEDs.

4. Storage

It's recommended to store the products in the following conditions:

Humidity: 60%RH Max.

Temperature:5℃ ~30℃ (41℉ ~86℉)

Shelf life in sealed bag: 12month at<40℃ and <30%RH.(Base on aluminum laminated moisture barrier bag.) If the LEDs are stored for 3 months or more, the nitrogen atmosphere storage environment is recommended.

Although the leads of LED lamp is platted with pure tin to protect leads from corrosion, devices should be subjected to wave soldering, or equivalent process as soon as possible, after the bag is opened.

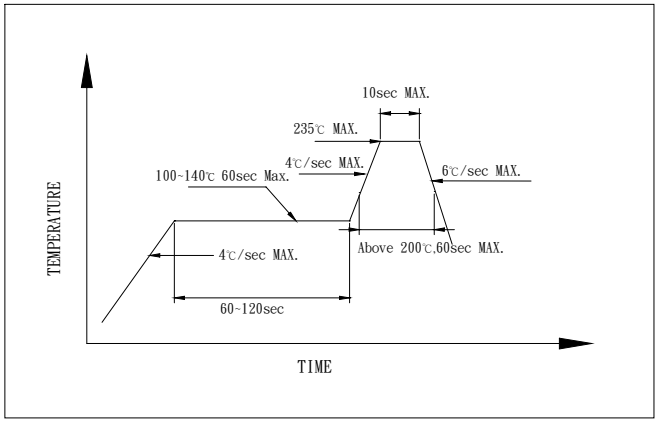
Please avoid rapid transitions in ambient temperature, especially in high humidity environment where condensation can occur.

5. Soldering

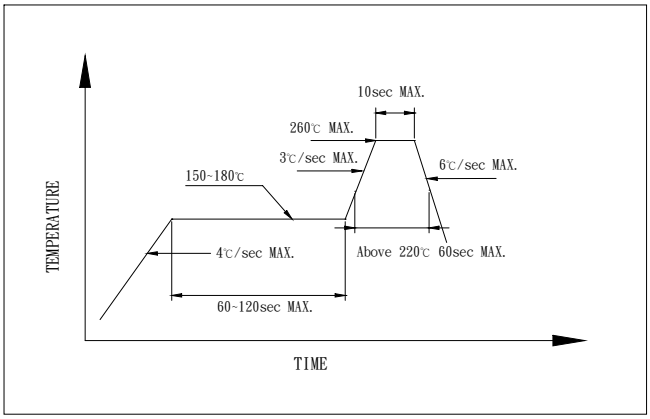
Soldering heat may damage the LED. Careful attention should be paid during soldering process.

Solder the LEDs no close than 3mm form the base of the epoxy bulb.

Recommended SnPb reflow soldering profile:



Recommended Pb free reflow soldering profile:



Never take next process until the component is cooled down to room temperature after soldering. It's banned to load any stress on the resin during soldering. If it's necessary to clamp the LED bulbs to help soldering, it is important to minimize the mechanical stress on the LEDs.

The manual soldering process is not recommended for quality consideration. When it is absolutely necessary, the LEDs may be mounted in this fashion but the user will assume responsibility for any problems.

6. Cleaning

An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended to clean the LED bulbs, after soldering process. Before cleaning, a pre-test should be done to confirm whether any damage to the LEDs will occur.

7. Others

The light output of LED might injure human eyes, directly look at the LED without protection is prohibited.

LED lamp is very sensitive to heat. Thermal design of the end product will decide the performance of LED lamps. It's necessary to avoid intense heat generation and operate within the maximum ratings given in this specification.

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Terms and Condition

1. EOI warrants all sold LEDs which conform to the specifications approved by the customers.
2. Any LED supplied by EOI is found not conform to the specifications that both parties agreed upon, customer should claim within 90days of receipt. EOI will repair or replace the LEDs at EOI's option.
3. EOI will not hold any responsibility for the failed LEDs, which are caused by mishandling or using the LEDs exceeding the operating conditions that EOI suggested.
4. EOI's LED products are designed and manufactured for general electronic equipment (such as household appliances, communication equipment, office equipment, electronic instrumentation and so on). If customer's application requires exceptional quality or reliability, which might concern human safety, it is recommended to consult with EOI in advance.
5. All the information published is considered to be reliable. However, EOI does not assume any liability arising out of the application or use of any product described herein. EOI's liability for defective LED lamps shall only be limited to replacement, in no event shall EOI be liable for consequential damages or profit lose.
6. EOI and customer shall both confirm the specifications herein, and all quality related matters will base on the specifications both parties agreed upon.
7. Any modification of the design or manufacturing process taken place, which will affect the characteristics, performance or reliability of LED, customer's approval will be required.
8. This specification approval sheet is an agreement of shipment specification. Please sign it back and keep the copies in two parties. If customers don't sign it back, it is regarded as completely agree with the terms and conditions and also approve of this approval sheet.

Company Information

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