High Power LED

Edixeon™

Ultraviolet Edixeon™

Approved By Customer	Designer	Checker	Approval

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Device No. : 3-RD-01-E0034

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Ultraviolet Edixeon™

Ultraviolet Edixeon emitters are one of the highest power LEDs in the world by Edison Opto. Ultraviolet Edixeon are designed for ultraviolet curing.

Features

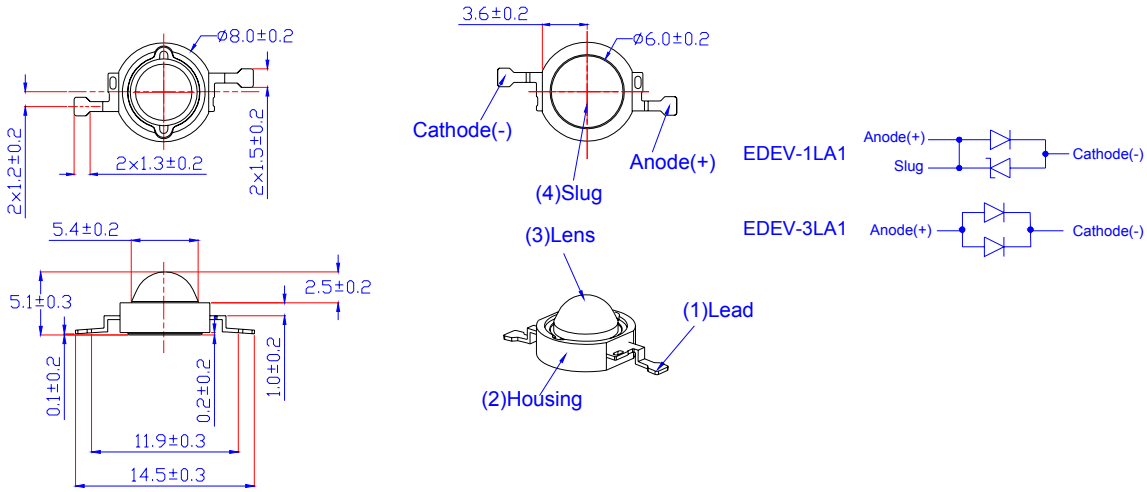
- Low voltage operated
- Long operating life

Typical Applications

- Ultraviolet curing

Package Outlines

Lambertian



Notes:

1. All dimensions are in mm.
2. Drawings are not to scale.
3. It is strongly recommended that the temperature of lead be not higher than 55℃.
4. It is important that the slug can't contact aluminum surface, It is strongly recommended that there should coat a uniform electrically isolated heat dissipation film on the aluminum surface.

Absolute Maximum Ratings

Parameter	Symbol	Rating	Units
DC Forward Current for 1W	I_F	**350**	mA
DC Forward Current for 3W	I_F	**700**	mA
1W emitter Peak pulse current;(tp≦100μs, Duty cycle=0.25)	I_{pulse}	**1000**	mA
3W emitter Peak pulse current;(tp≦100μs, Duty cycle=0.25)	I_{pulse}	**1500**	mA
Reverse Voltage	V_R	**5**	V
LED junction Temperature	T_j	**125**	℃
Operating Temperature	T_{opr}	**-30 ~ +110**	℃
Storage Temperature	T_{stg}	**-40 ~ +120**	℃
ESD Sensitivity	V_B	**500**	V
Manual Soldering Time at 260℃(Max.)	T_{sol}	**5**	*seconds*

Electric and Optical Characteristics 1W at I_F=350mA & 3W at I_F=700mA (Tj=25℃):

Part No.	Item	Symbol	Value			Units
			Min.	Typ.	Max.	
EDEV-1LA1	**Radiometric Power**	Φ_V	***113.9***	***180***	**--**	*mW*
EDEV-3LA1			***256.3***	***350***	**--**	*mW*
EDEV-1LA1	**Peak Wavelength**	λP	***395***	**--**	***410***	*nm*
EDEV-3LA1			***395***	**--**	***410***	*nm*
EDEV-1LA1	**Forward Voltage**	V_F	***2.8***	***3.5***	***4.0***	*V*
EDEV-3LA1			***2.8***	***3.5***	***4.0***	*V*
EDEV-1LA1	**Emission Angle**	2Θ½	**--**	***140***	**--**	*Degree*
EDEV-3LA1			**--**	***140***	**--**	*Degree*
EDEV-1LA1	**Thermal Resistance**	$R\theta_{J-B}$	**--**	***20***	**--**	*℃/W*
EDEV-3LA1			**--**	***10***	**--**	*℃/W*

Note

1. **Radiometric power is measured with an accuracy of ± 10%.**
2. **Forward Voltage is measured with an accuracy of ± 0.1V**
3. **Wavelength is measured with an accuracy of ± 0.5nm**
4. **All emitters are built with InGaN**

JEDEC Moisture Sensitivity:

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
4	**72hours**	**≦30℃ / 60% RH**	**96 +2/-0**	**30℃ / 60% RH**	**20 +0.5/-0**	**60℃ / 60% RH**

Operating life, mechanical, and environmental tests performed on Edixeon package:

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life	25℃, I_F = max DC (Note 1)	1000 hours	Note 2
High Temperature High Humidity Operating Life	85℃ / 85%RH, I_F = max DC	1000 hours	Note 2
Temperature Cycle	-40℃/100℃ ,30 min dwell /＜5min transfer	200 cycles	Note 2
High Temperature Storage Life	110℃	1000 hours	Note 2
Low Temperature Storage Life	-55℃	1000 hours	Note 2
Thermal Shock	-40 / 120℃, 20 min dwell /＜20 sec transfer	200 cycles	No catastrophics
Mechanical Shock	1500 G, 0.5 msec pulse, 5 shocks each 6 axis		No catastrophics
Natural Drop	On concrete from 1.2 m, 3X		No catastrophics
Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate, 20 G about 1 min, 1.5 mm, 3X/axis		No catastrophics
Solder Heat Resistance (SHR)	260℃ ± 5℃, 10 sec		No catastrophics
Solderability	Steam age for 16 hr, then solder dip at 260℃ for 5 sec		Solder coverage on lead

Notes:

1. **Depending on the maximum derating curve.**
2. **Failure Criteria:**

Electrical failures

V_F shift >=10%

I_R<50uA @Vr=5V

Light Output Degradation

% Iv shift >= 30% @1,000hrs or 200cycle

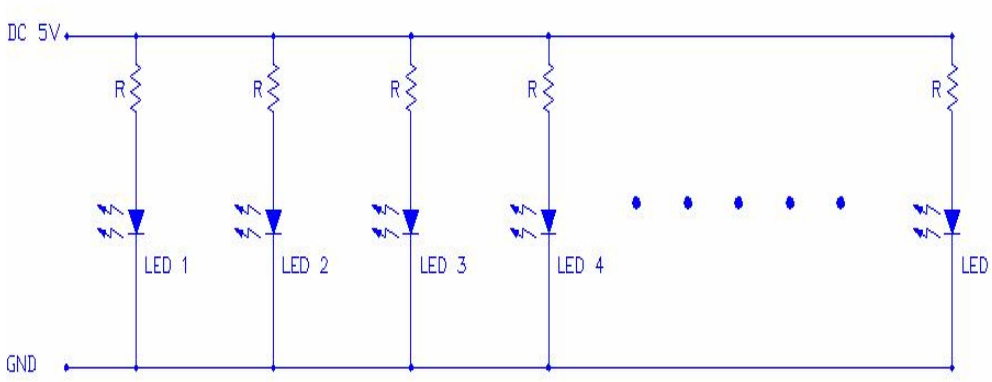
Visual failures

Broken or damaged package or lead

Solderability < 95% wetting

Dimension out of tolerance

Burn-in Condition Edixeon Reliability



When we talk about MTBF of Edixeon, we can provide a formula for customers.

$$\log(\text{Life}) = \frac{1{,}600}{Tj(^{o}C)+273}$$

Life means the time light output becomes 70%

Tj (^{o}C)	Life (hours)	Tj (^{o}C)	Life (hours)
25	*234,000*	*85*	*29,500*
30	*191,000*	*90*	*25,700*
35	*157,000*	*95*	*22,300*
40	*129,000*	*100*	*19,500*
45	*107,000*	*105*	*17,100*
50	*90,000*	*110*	*15,100*
55	*75,000*	*115*	*13,300*
60	*64,000*	*120*	*11,700*
65	*54,000*	*125*	*10,500*
70	*46,000*	*130*	*9,300*
75	*39,600*	*140*	*7,500*
80	*34,000*	*150*	*6,000*

When we talk about MTTF of Edixeon, we can provide a formula for customers_

MTTF is assumed to be 100,000,000

The failure rates at different hours and different systems(LED quantity) are as below:

if there is 1 failure of 1 emitter in a system

Tj=75℃ is giving 0.01%(100ppm) at 10,000hrs

if there is 1 failure of 10 emitters in a system

Tj=75℃ is giving 0.1%(1,000ppm) at 10,000hrs

if there is 1 failure of 1 emitter in a system

Tj=75℃ is giving 0.05%(500ppm) at 50,000hrs

if there is 1 failure of 10 emitters in a system

Tj=75℃ is giving 0.5%(5,000ppm) at 50,000hrs if there are 10 emitters

How to Know Tj in Your Application?

If it is 1W Edixeon, Rth(junction to case)=15°C/W

The thermal grease is 200um.
K(Aluminum PCB)=2.6 W/mk

Then Rth(case to board)= $\frac{200}{2.6\times(6.4/2)^2\pi}$ **=2.4 °C/W**

The Rth between board and air is mainly dependent on the total surface air.

Rth(board-air)≒ $\frac{500}{\text{Area}(cm^2)}$

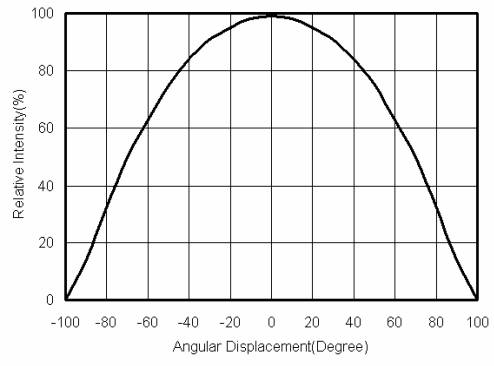
If Area is 30cm²	**Rth=16.7**	**ΔT(junction-air)=(15+2.4+16.7)x1=34.1 °C**
If Area is 60cm²	**Rth=8.3**	**ΔT (junction-air)=(15+2.4+8.3)x1=25.7 °C**
If Area is 90cm²	**Rth=5.5**	**ΔT (junction-air)=(15+2.4+5.5)x1=22.9 °C**

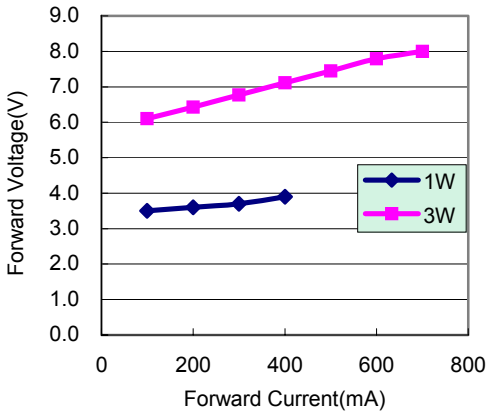
ASSIST FORM about High Power LED Reliability(1W Edixeon)

	Ts=45°C	Ts=65°C	Ts=85°C
Voltage	3.5V	3.5V	3.5V
Current	350mA	350mA	350mA
Wattage	1.2W	1.2W	1.2W
Heat	1.0W	1.0W	1.0W
Rth	15 °C/W	15 °C/W	15 °C/W
Tj	60 °C	80 °C	100 °C
$L_{70\%}$	64,000hrs	34,000hrs	19,500hrs

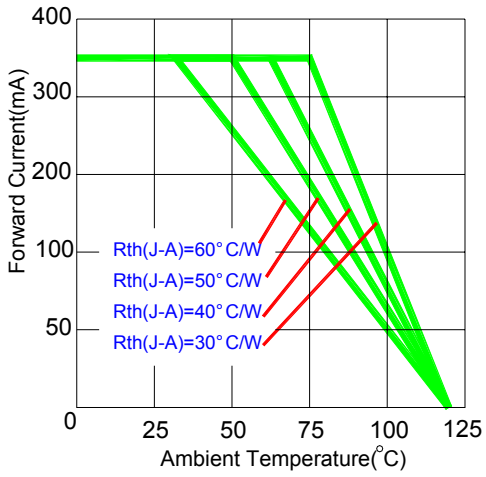
Typical Radiation Pattern

Lambertian



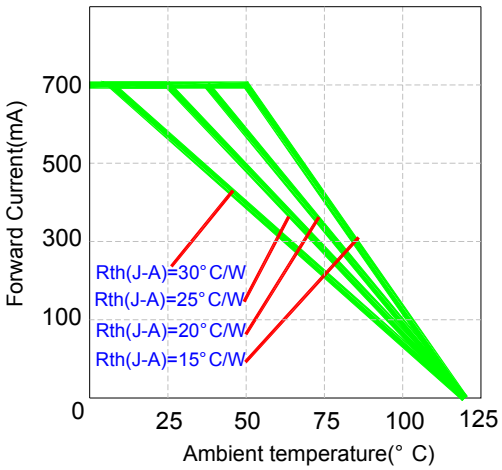


Typical Optical and Electrical Curves



Operating Current & Ambient Temperature

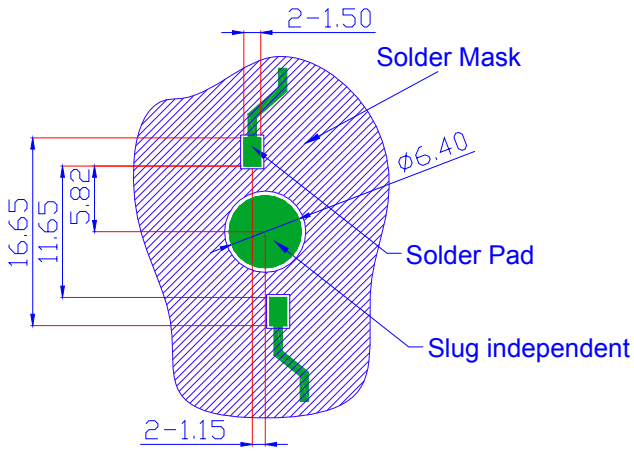
For1W emitter



Forward Current & Luminous Flux

For 3W emitter

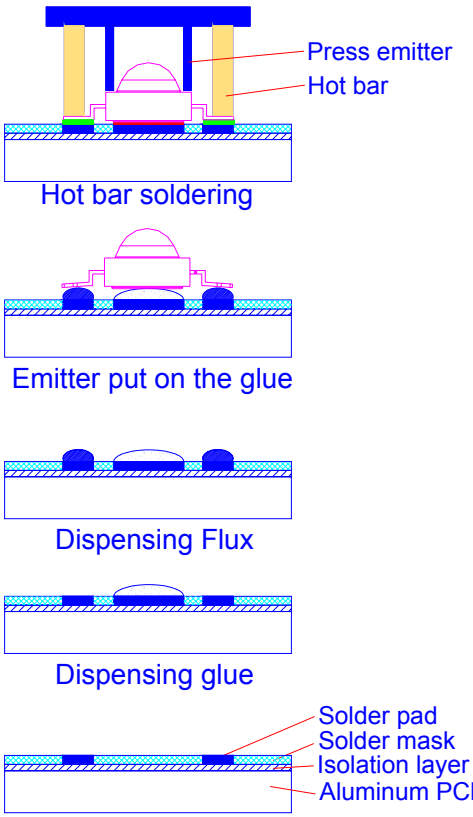
Recommended Solder Pad Design



Note:

1. All dimensions are in mm.
2. The drawings are not to scale
3. Solder pad can't be connected to slug.

Recommend Solder Steps



Notes:

1. Aluminum PCB material with a thermal conductivity greater than 2.0 W/mK.
2. Solder pad can't be connected to slug.
3. The Thermal glue should be as thin as possible for better heat conductivity.
4. During any assembly process touching lens is avoided. This will cause pollution or scratch on the surface of lens.
5. Thermal glue with a thermal conductivity greater than 2.0 W/mK and the thickness must be less than 100μm.

Adhesive for Emitter to Aluminum PCB

Suggestion:

- Ease of use

  Non-solvent, One-part
- Fast tack free

  3 minutes at 25^{o}C
- No corrosion

  Alcohol type of RTV
- Low volatility

  Low weight loss of silicone volatiles
- Adhesion

  Excellent adhesion to most materials without use of a primer
- Dielectric properties

  Cured rubber exhibits good dielectric properties
- Excellent thermal stability and cold resistance

  Cured rubber provides wide service temperature range

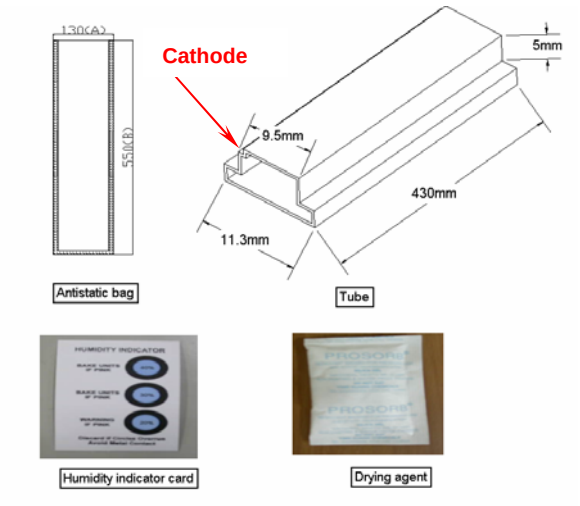
Typical Properties

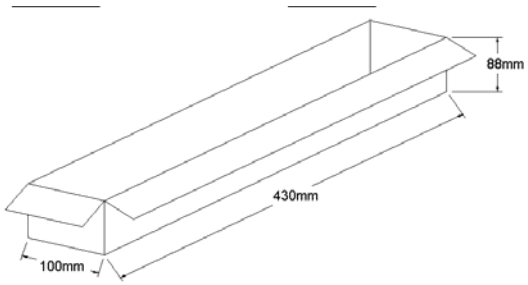
Specification	Suggested Properties
Take-free time	3~10 minutes
Specific gravity	< 3 g/cm^2
Thermal conductivity	> 2.5 W/mK
Rth in using	< 1.8 ^{o}C/W
Volume resistance	> 1x10^{14}
Lap shear adhesion strength	> 200 N/ cm^2
Tensile strength	> 4 Mpa

Thrust for Edixeon Lens

Lens Type	Typical Thrust
Lambertian Lens	5 kgf

Package Specifications





Note

1. Inner antistatic bag standard.
2. A bag contains one humidity indicator card and drying agent.
3. 50pcs emitters per tube.
4. 20 tubes per bag, 1 K pcs per bag.
5. 2 bags per inner box, 2 K pcs per inner box.

Packing Step	Type	Dimension(mm)	Emitter Q'ty(Max.)
1	Tube	430*13	50
2	Inner Box	430*100*88	1,000
3	Outer Box	460*196*135	2,000