High Power LEDs

Edixeon® A Series Datasheet

Edixeon® A series emitters are one of the highest flux LEDs in the world by Edison Opto. Edixeon® A series emitters are designed to satisfy more and more Solid-State lighting High Power LED applications for brilliant world such as flash light, indoor and outdoor decoration light. Edixeon® A series emitters are designed by particular package for High Power LED. 1W Edixeon® white has typical 100 lumens @350mA. Unlike most fluorescent sources, Edixeon® contains no mercury and has more energy efficient than other incandescent light source.

Features :

- Various colors
- More energy efficient than incandescent and most halogen lamps
- Low voltage operation
- Instant light
- Long operating life

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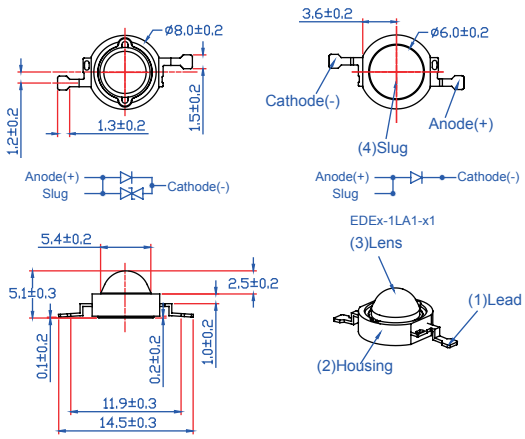
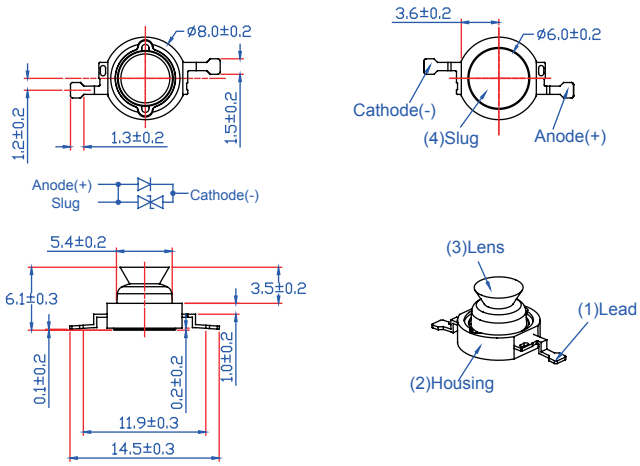
LED Package Dimensions and Polarity

Lambertian, Side Emitting, Batwing, and Focusing Emitter Type

Lambertian



Side Emitting



Batwing

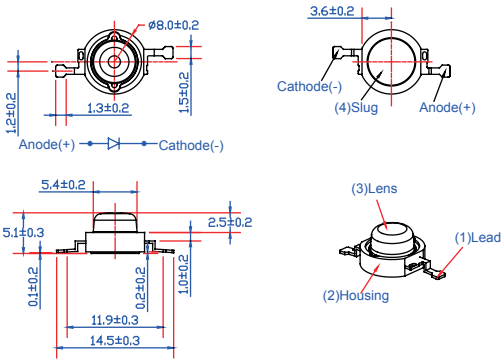


Figure 2. Edixeon® A series dimensions

Notes:
1. All dimensions are in mm.
2. It is strongly recommended that the temperature of lead dose exceed 55°C.
3. Lambertian and side emitting series slug has polarity as anode.
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.

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Absolute Maximum Ratings

The following tables describe flux of Edixeon® A series under various current and different colors.

Table 1. Absolute maximum ratings for Edixeon® A series

Parameter	Rating(1W)	Rating(3W)	Unit	Symbol
DC Forward Current	350	700	mA	I_F
Peak pulse current;(tp≤100μs, Duty cycle=0.25)	700	1,000	mA	
Reverse Voltage	5	5	V	V_R
Forward Voltage	5	5	V	V_F
LED junction Temperature (at DC Forward Current)	125	125	°C	T_J
Operating Temperature	-30 ~ +110	-30 ~ +110	°C	
Storage Temperature	-40 ~ +120	-40 ~ +120	°C	
ESD Sensitivity (Lambertian & Side Emitting)	4,000	4,000	V	
ESD Sensitivity (Amber)	--	500	V	
ESD Sensitivity (Batwing & Focusing)	500	--	V	
Manual Soldering Time at 260°C(Max.)	5	5	Sec.	

Notes:
1. Proper current derating must be observed to maintain junction temperature below the maximum at all time.
2. LEDs are not designed to be driven in reverse bias.
3. tp: Pulse width time

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The following tables describe thermal resistance of Edixeon® A series under various current and different color.

Table 2. Temperature coefficient of forward voltage & thermal resistance junction to case characteristics at T_J=25˚C for Edixeon® A series

Lens Item	Part Name	Color	$\Delta V_F/\Delta T$		$R\theta_{J-B}$	
			Typ.	Units	Typ.	Unit
Lambertian	EDEW-1LAx	Cool White	-2	mV/˚C	11	˚C/W
	EDEH-1LAx-E1	Neutral White	-2	mV/˚C	11	˚C/W
	EDEX-1LAx-x1	Warm White	-2	mV/˚C	11	˚C/W
	EDER-1LA3	Red	-2	mV/˚C	11	˚C/W
	EDEA-1LA3	Amber	-2	mV/˚C	11	˚C/W
	EDET-1LA2	True Green	-2	mV/˚C	11	˚C/W
	EDEB-1LA5	Blue	-2	mV/˚C	11	˚C/W

Lens Item	Part Name	Color	$\Delta V_F/\Delta T$		$R\theta_{J-B}$	
			Typ.	Units	Typ.	Unit
Side Emitting Batwing Focusing	EDEW-1xA5	Cool White	-2	mV/˚C	15	˚C/W

Table 3. Temperature coefficient of forward voltage & thermal resistance junction to case characteristics at T_J=25˚C for Edixeon® A series

Lens Item	Part Name	Color	$\Delta V_F/\Delta T$		$R\theta_{J-B}$	
			Typ.	Units	Typ.	Unit
Lambertian	EDEW-3LA1-1	Cool White	-2	mV/˚C	11	˚C/W
	EDEH-3LA1-E3	Neutral White	-2	mV/˚C	11	˚C/W
	EDEX-3LA1-x3	Warm White	-2	mV/˚C	11	˚C/W
	EDER-3LA3-1	Red	-2	mV/˚C	11	˚C/W
	EDEA-3LA3-1	Amber	-2	mV/˚C	11	˚C/W
	EDET-3LA1-1	True Green	-2	mV/˚C	11	˚C/W
	EDEB-3LA1-1	Blue	-2	mV/˚C	11	˚C/W

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Luminous Flux Characteristics

The following tables describe flux of Edixeon® A series under various current and different color.

Table 4. Luminous flux characteristics at I_F=350mA and T_J=25˚C: for 1W Edixeon® A series

Lens Item	Part Name	Color	Flux	Unit
			Typ.	
Lambertian	EDEW-1LA1-F1	Cool White	100.0	lm
	EDEW-1LA5	Cool White	100.0	lm
	EDEW-1LA5-F1	Cool White	110.0	lm
	EDEH-1LA5-E1	Neutral White	85.0	lm
	EDEX-1LA1	Warm White	70.0	lm
	EDEX-1LA1-F1	Warm White	75.0	lm
	EDEX-1LA5-E1	Warm White	75.0	lm
	EDEX-1LA5-F1	Warm White	80.0	lm
	EDET-1LA2	True Green	70.0	lm
	EDER-1LA3	Red	50.0	lm
	EDEA-1LA3	Amber	45.0	lm
	EDEB-1LA5	Blue	20.0	lm
	EDEB-1LA5	Blue	20.0	lm

Lens Item	Part Name	Color	Flux	Unit
			Typ.	
Side emitting Batwing Focusing	EDEW-1xA5	Cool White	75.0	lm

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Table 5. Luminous flux characteristics at I_F=700mA and T_J=25˚C: for 3W Edixeon® A series

Lens Item	Part Name	Color	Flux	Unit
			Typ.	
Lambertian	EDEW-3LA1-1	Cool White	170.0	lm
	EDEH-3LA1-E3	Neutral White	150.0	lm
	EDEX-3LA1-E3	Warm White	130.0	lm
	EDEX-3LA1-F3	Warm White	140.0	lm
	EDER-3LA3-1	Red	90.0	lm
	EDEA-3LA3-1	Amber	85.0	lm
	EDET-3LA1-1	True Green	120.0	lm
	EDEB-3LA1-1	Blue	34.0	lm

Notes:
1. Flux is measured with an accuracy of ± 10%.
2. All cool white, neutral white, warm white, true green and blue emitters are built with InGaN
3. All red emitters are built with AlGaInP

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Forward Voltage Characteristics

The following table describes forward voltage of Edixeon® A series under various current.

Table 6. Forward voltage characteristics at I_F=350mA and T_J=25°C for 1W Edixeon® A series

Lens Item	Part Name	Color	V_F		Unit
			Min.	Max.	
Lambertian	EDEW-1LA5	Cool White	3.1	4.0	V
	EDEW-1LA1	Cool White	3.1	4.0	V
	EDEW-1LA5-x1	Cool White	3.1	4.0	V
	EDEH-1LA5-x1	Neutral White	3.1	4.0	V
	EDEX-1LA5-x1	Warm White	3.1	4.0	V
	EDER-1LA3	Red	2.0	3.0	V
	EDEA-1LA3	Amber	2.0	3.0	V
	EDET-1LA2	True Green	3.1	4.0	V
	EDEB-1LA5	Blue	3.1	4.0	V

Lens Item	Part Name	Color	V_F		Unit
			Min.	Max.	
Side emitting Batwing Focusing	EDEW-1xA5	Cool White	3.1	4.0	V

Table 7. Forward voltage characteristics at I_F=700mA and T_J=25°C for 3W Edixeon® A series

Lens Item	Part Name	Color	V_F		Unit
			Min.	Max.	
Lambertian	EDEW-3LA1-1	Cool White	3.4	4.3	V
	EDEW-3LA1-D3	Cool White	3.4	4.3	V
	EDEH-3LA1-x3	Neutral White	3.4	4.3	V
	EDEX-3LA1-x3	Warm White	3.4	4.3	V
	EDER-3LA3-1	Red	2.0	3.0	V
	EDEA-3LA3-1	Amber	2.0	3.0	V
	EDET-3LA1-1	True Green	3.4	4.3	V
	EDEB-3LA1-1	Blue	3.4	4.3	V

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JEDEC Information

JEDEC is used to determine what classification level should be used for initial reliability qualification. Once identified, the LEDs can be properly packaged, stored and handled to avoid subsequent thermal and mechanical damage during the assembly solder attachment and/or repair operation. The present moisture sensitivity standard contains six levels, the lower the level, the longer the devices floor life. Edixeon® A series are certified at level 4. This means Edixeon® A series have a floor life of 72 hours before Edixeon® A series need to re-baked. If the package has been opened more than 1 week or the color of desicant changes, componenets should be dried for 20 hours at 60±5°C

Table 8. JEDEC characteristics at T_J=25°C for Edixeon® A series

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
4	72 hours	≤30˚C /60% RH	96[1] +5/-0	30˚C/60% RH	20 +5/-0	60˚C/60% RH

Leve	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Condition	Time (hours)	Condition	Time (hours)	Condition
1	Unlimited	≤30˚C /85% RH	168 +5/-0	85˚C/85% RH		
2	1 year	≤30˚C /60% RH	168 +5/-0	85˚C/60% RH		
2a	4 weeks	≤30˚C /60% RH	696[1] +5/-0	30˚C/60% RH	120 +1/-0	60˚C/60% RH
3	168 hours	≤30˚C /60% RH	192[1] +5/-0	30˚C/60% RH	40 +5/-0	60˚C/60% RH
4	72 hours	≤30˚C /60% RH	96[1] +5/-0	30˚C/60% RH	20 +5/-0	60˚C/60% RH
5	48 hours	≤30˚C /60% RH	72[1] +5/-0	30˚C/60% RH	15 +5/-0	60˚C/60% RH
5a	24 hours	≤30˚C /60% RH	48[1] +5/-0	30˚C/60% RH	10 +5/-0V	60˚C/60% RH
6	Time on tabel (TOL)	≤30˚C /60% RH	TOL	30˚C/60% RH		

Note:
The standard soak time includes a default value of 24 hours for semiconductor manufacturer's exposure time (MET) between bake and bag, and includes the maximum time allowed out of the bag at the distributor's facility.

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Reliability Items and Failure Measures

Reliability test

The following table describes operating life, mechanical, and environmental tests performed on Edixeon® A series package.

Table 9. Operating life, mechanical, and environmental characteristics and T_J=25˚C for Edixeon® A series

Stress Tes	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life	25˚C, I_F =I_F Max DC (Note 1)	1,000 hours	Note 2
High Temperature High Humidity	85˚C / 85%RH	1,000 hours	Note 2
Temperature Cycle	-40˚C/100˚C ,30 min dwell /<5min transfer	500 cycles	Note 2
High Temperature Storage Life	110˚C	1,000 hours	Note 2
Low Temperature Storage Life	-40˚C	1,000 hours	Note 2
Thermal Shock	-40˚C / 125˚C 15 min dwell /<10 sec transfer	2,00 cycles	No catastrophics
Mechanical Shock	1500 G, 0.5 msec pulse, 5 shocks each of 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˚C ± 5˚C, 10 sec		No catastrophics

Notes:
1. Depending on the maximum derating curve.
2. Failure Criteria:
   Electrical failures
   V_F shift >=10%
   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

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Color Spectrum and Radiation Pattern

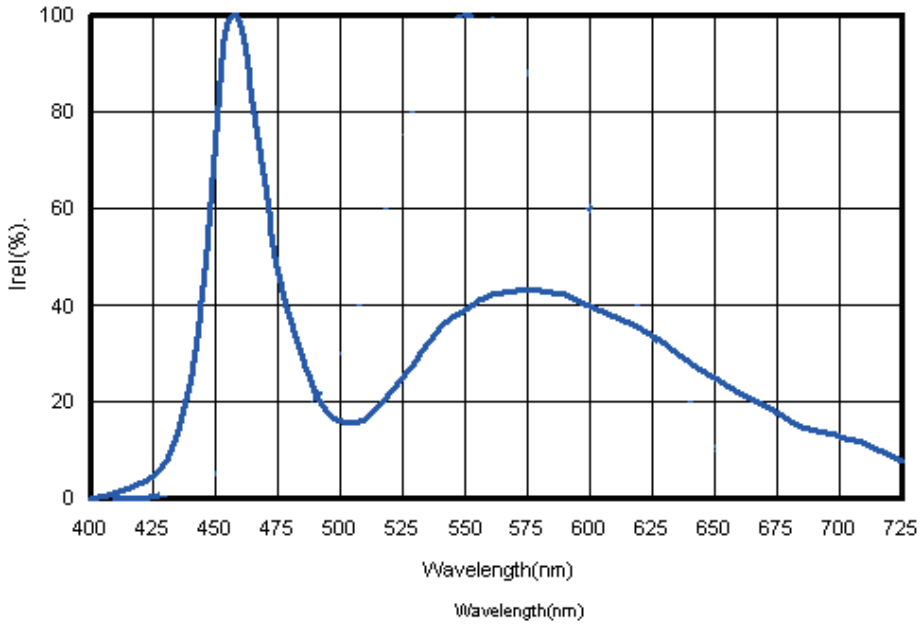

Figure 4. Cool White color spectrum at T_J=25˚C.for Edixeon® A series

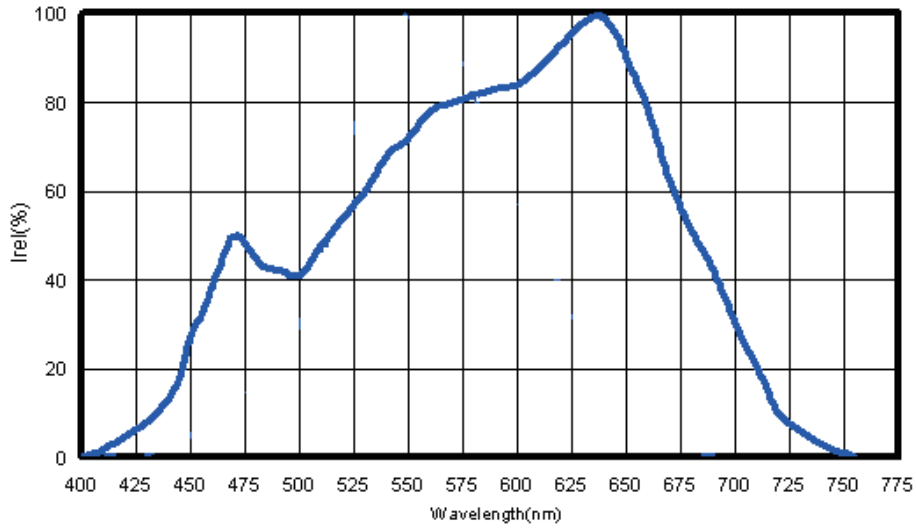

Figure 5. Neutral White and Warm White color spectrum at T_J=25˚C for 1LC6˚C1GA1 and 1LA1 Edixeon® A series

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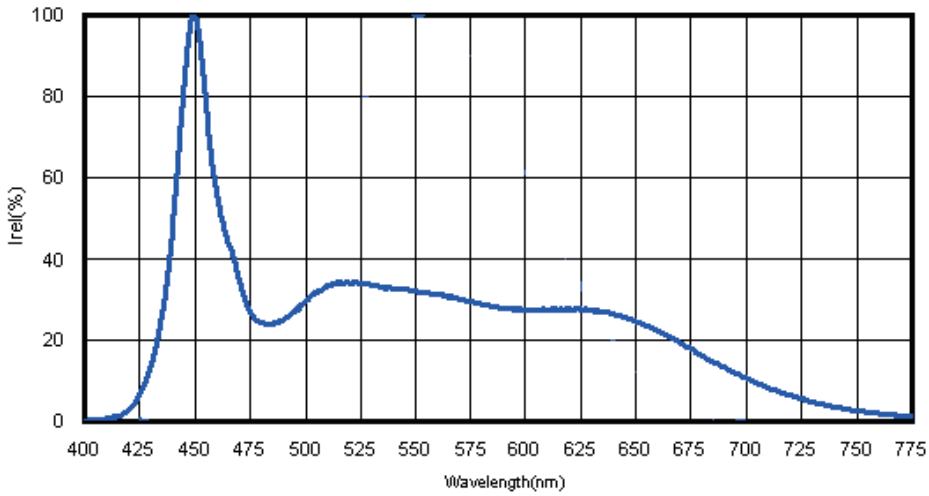

Figure 6. Color spectrum of typical CCT, standard eyes response to dotted curve line at T_J =25˚C for xLA5-Dx Edixeon® A series Cool White

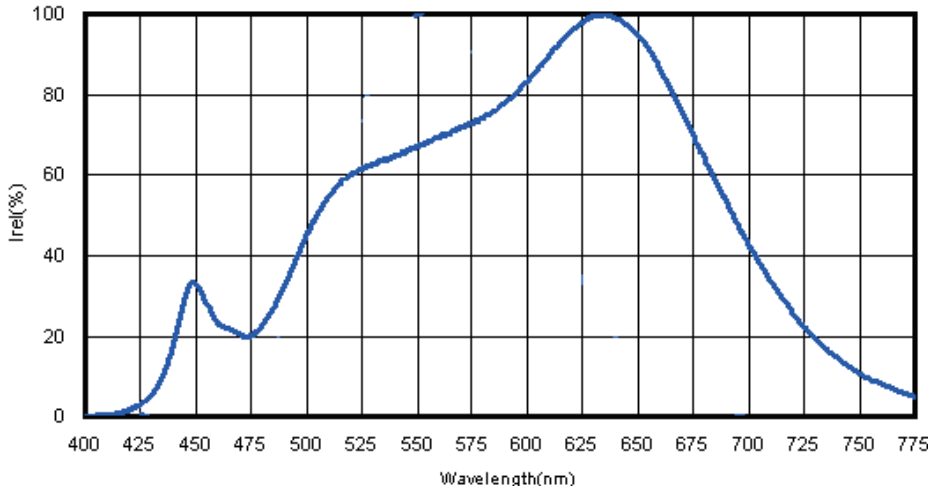

Figure 7. Color spectrum of typical CCT, standard eyes response to dotted curve line at T_J =25˚C for xLA5-Dx Edixeon® A series Neutral White ,and Warm White

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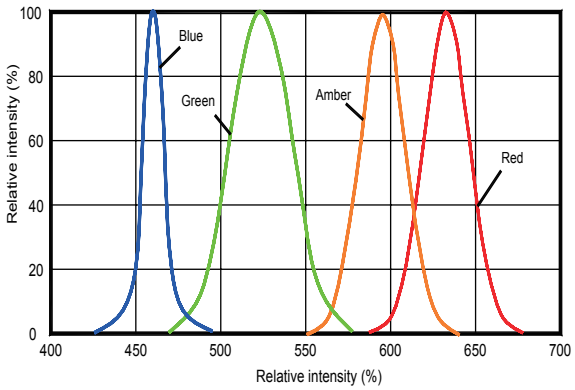

Figure 8. Red, Amber, True Green, Blue color spectrum at T_J=25˚C for Edixeon® A series

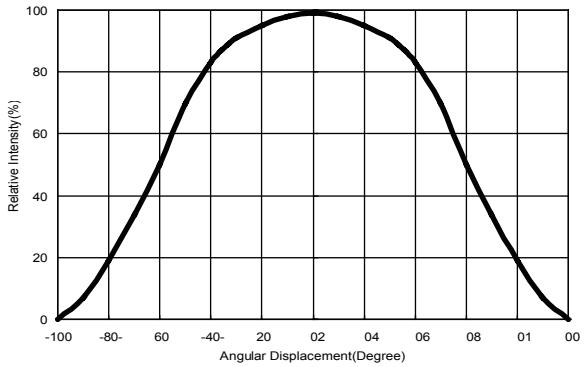

Figure 9. Lambertain at T_J =25˚C for Red and Amber

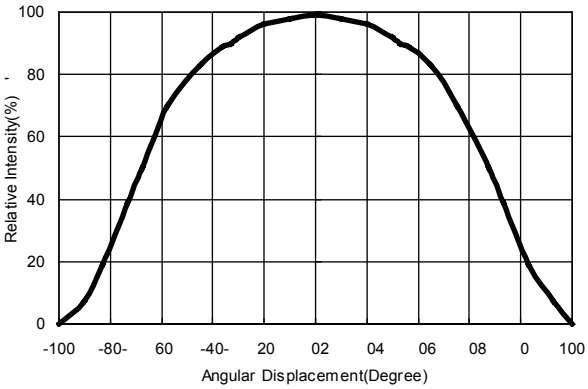

Figure 10. Lambertain at T_J =25˚C for Cool White, Neutral White, and Warm White

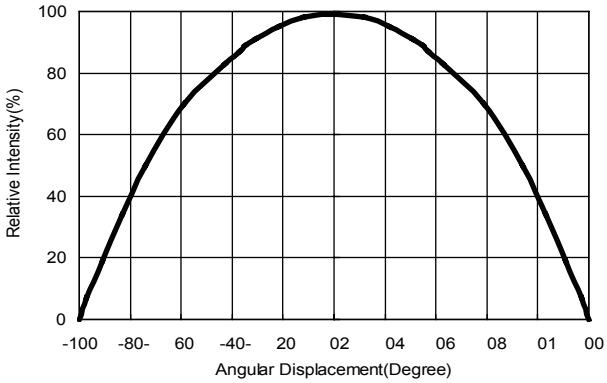

Figure 11. Lambertain at T_J =25˚C for Blue and True Green

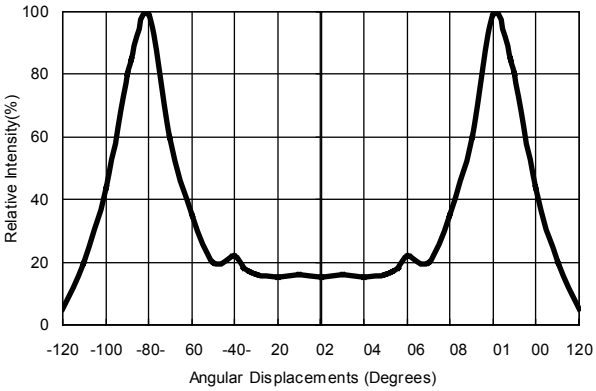

Figure12. Side emitting at T_J =25˚C for Cool White

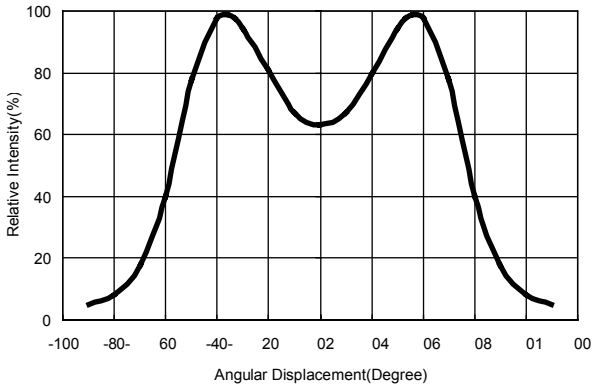

Figure 13. Batwing at T_J=25˚C for Cool White

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Dominant Wavelength Characteristics

Table10. Dominant Wavelength or color temperature Characteristics at T_J=25˚C for 1W Edixeon® A series

Lens Item	Part Name	Color	λd/CCT		Unit
			Min.	Max.	
Lambertian	EDEW-1LA5	Cool White	5,000	10,000	K
	EDEW-1LA1	Cool White	5,000	10,000	K
	EDEW-1LA5-x1	Cool White	5,000	10,000	K
	EDEH-1LA5-x1	Neutral White	3,800	5,000	K
	EDEX-1LA5-x1	Warm White	2,670	3,800	K
	EDER-1LAx	Red	620	630	nm
	EDEA-1LAx	Amber	585	595	nm
	EDET-1LAx	True Green	515	535	nm
	EDEB-1LAx	Blue	455	475	nm
Lens Item	Part Name	Color	CCT		Unit
			Min.	Max.	
Side Emitting Batwing Focusing	EDEW-1xA5	Cool White	5,000	10,000	K

Table 11. Color temperature Characteristics at T_J=25˚C for 3W Edixeon® A series

Lens Item	Part Name	Color	CCT		Unit
			Min.	Max.	
Lambertian	EDEW-3LA1-1	Cool White	5,000	10,000	K
	EDEW-3LA5-F3	Cool White	5,000	10,000	K
	EDEW-3LA1-x3	Cool White	5,000	10,000	K
	EDEH-3LA1-x3	Neutral White	3,800	5,000	K
	EDEX-3LA1-x3	Warm White	2,670	3,800	K
	EDER-3LA3-1	Red	620	630	nm
	EDEA-3LA3-1	Amber	585	595	nm
	EDET-3LA1-1	True Green	515	535	nm
	EDEB-3LA1-1	Blue	455	475	nm

Notes:

1. Wavelength is measured with an accuracy of ± 0.5nm
2. CCT is measured with an accuracy of ± 5%

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Emission Angle Characteristics

Table 12. Emission angle Characteristics at T_J=25˚C for 1W Edixeon® A series

Part Name	Color	2Θ½(Typ.)			Unit
		Lambertian	Batwing	Focusing	
EDEW-1xA5	Cool White	135	110	80	Deg.
EDEW-1LA1	Cool White	135	--	--	Deg
EDEW-1LA5-x1	Cool White	135	--	--	Deg.
EDEH-1LA5-x1	Neutral White	135	--	--	Deg.
EDEX-1LA5-x1	Warm White	135	--	--	Deg.
EDER-1LA3	Red	120	--	--	Deg.
EDEA-1LA3	Amber	120	--	--	Deg.
EDET-1LA2	True Green	150	--	--	Deg.
EDEB-1LA5	Blue	150	--	--	Deg.

Part Name	Color	ΘPEAK(Typ.)		Unit
		Batwing	Side emitting	
EDEW-1xAx	Cool White	±40	±80	Deg.

Table 13. Emission angle Characteristics at T_J=25˚C for 3W Edixeon® A series

Part Name	Color	2Θ½			Unit
		Max.	Typ.	Min.	
EDEW-3LA1-1	Cool White	--	135	--	Deg.
EDEW-3LA5-x3	Cool White	--	135	--	Deg.
EDEW-3LA1-x3	Cool White	--	135	--	Deg.
EDEH-3LA1-x3	Neutral White	--	135	--	Deg.
EDEX-3LA1-x3	Warm White	--	135	--	Deg.
EDER-3LA3-1	Red	--	120	--	Deg.
EDEA-3LA3-1	Amber	--	120	--	Deg.
EDET-3LA1-1	True Green	--	150	--	Deg.
EDEB-3LA1-1	Blue	--	150	--	Deg.

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Optical & Electrical Characteristics

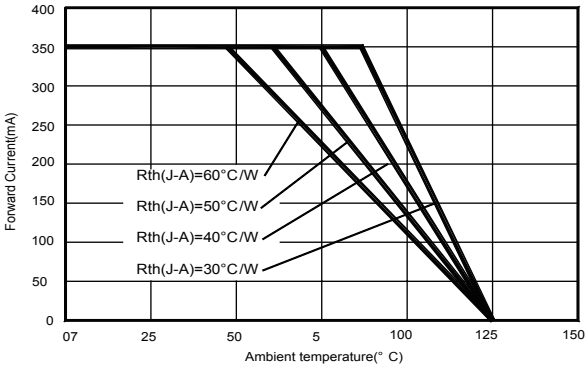

Figure 14. Operating current & ambient temperature for 1W Edixeon® A series

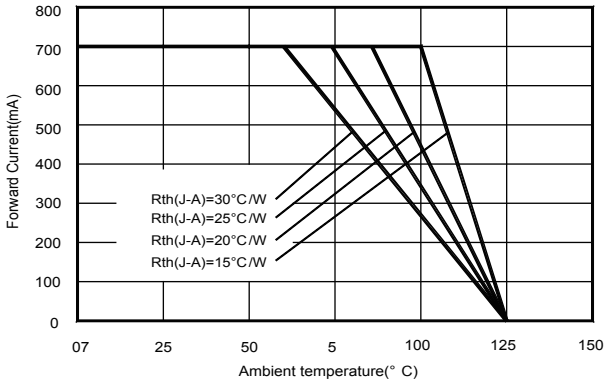

Figure 15. Operating current & ambient temperature for 3W Edixeon® A series

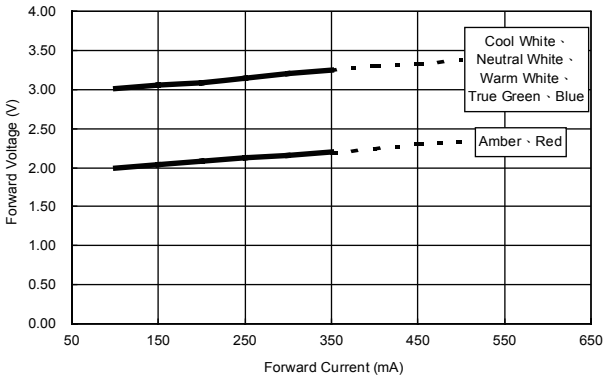

Figure 16. Forward current & forward voltage for 1W Edixeon® A series

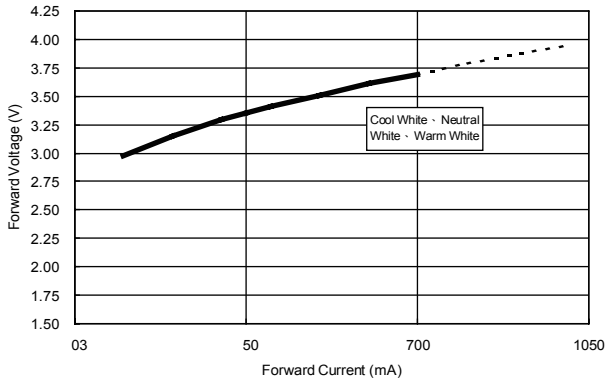

Figure 17. Forward current & forward voltage for 3W Edixeon® A series

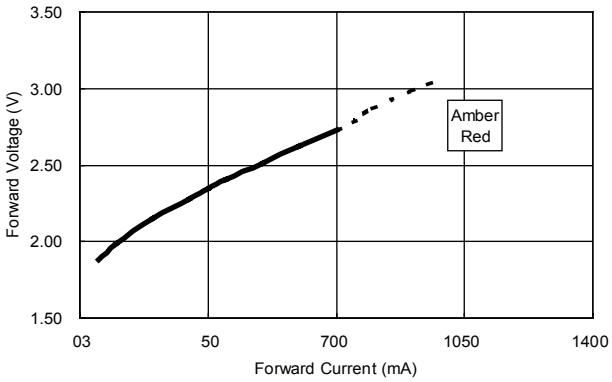

Figure 18. Forward current & forward voltage for 3W Edixeon® A series at T_J=25°C

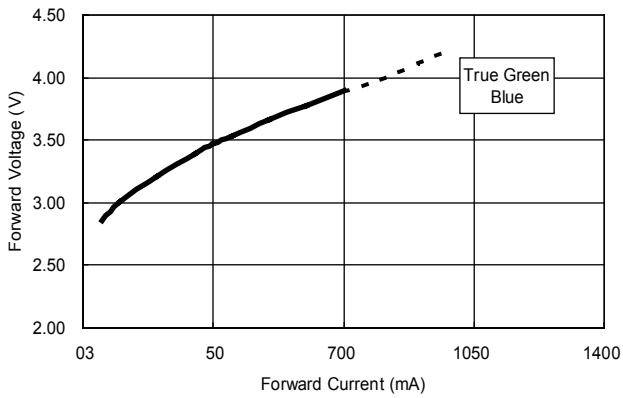

Figure 19. Forward current & forward voltage for 3W Edixeon® A series at T_J=25°C

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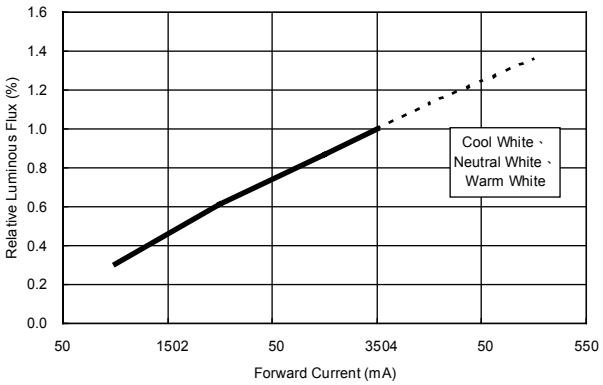

Figure 20. Forward current & relative luminous at T_J=25°C for 1W Edixeon® A series

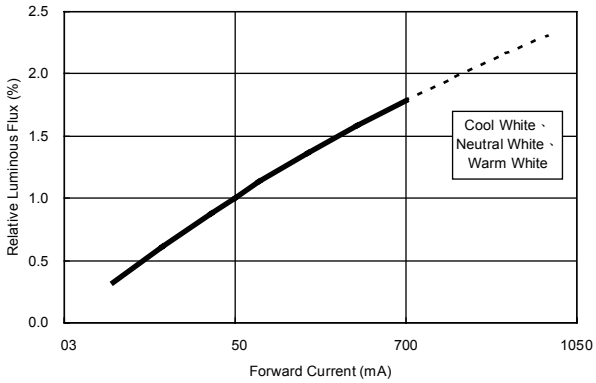

Figure 21. Forward current & relative luminous at T_J=25°C for 3W Edixeon® A series

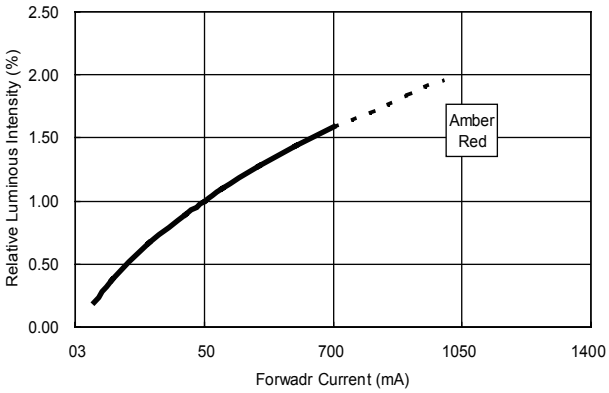

Figure 22. Forward current & relative luminous for 3W Edixeon® A series at T_J=25°C

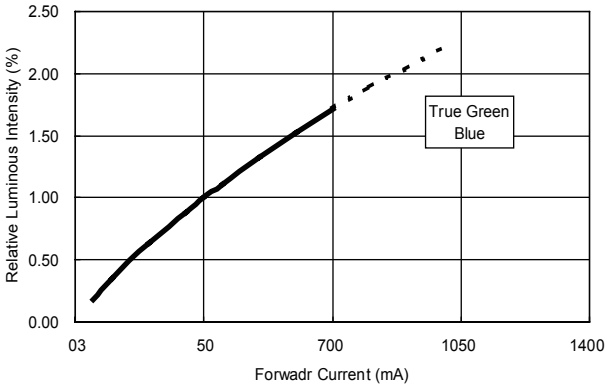

Figure 23. Forward current & relative luminous for 3W Edixeon® A series at T_J=25°C

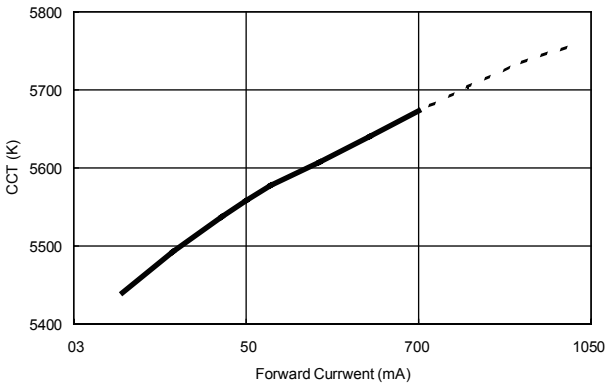

Figure 24. Forward current & CCT at T_J =25°C for Edixeon® A series Cool White

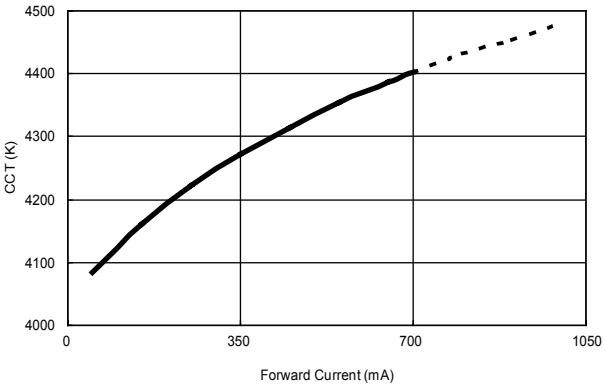

Figure 25. Forward current & CCT at T_J =25°C for Edixeon® A series Neutral White

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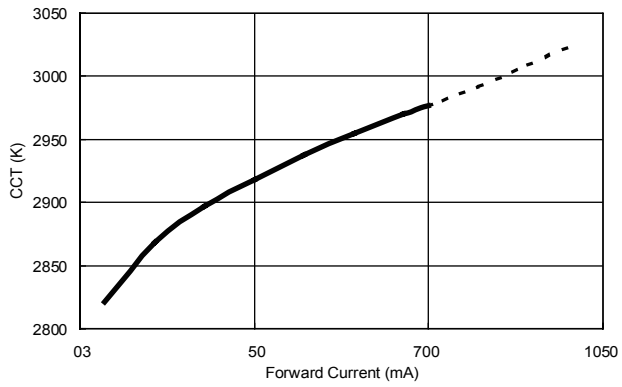

Figure 26. Forward current & CCT at T_J=25°C for Edixeon® A series Warm White

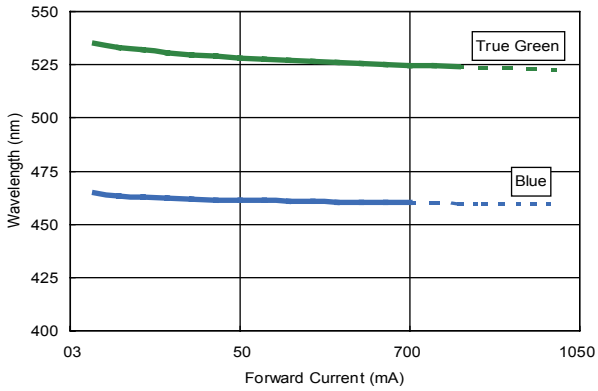

Figure 27. Forward current & wavelength at T_J=25°C for Edixeon® A series True Green and Blue

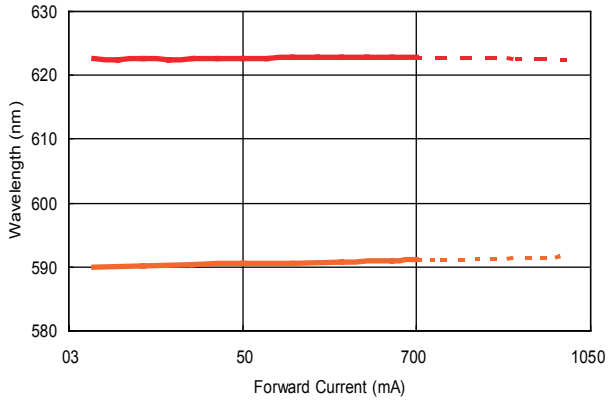

Figure 28. orward current & wavelength at T_J=25°C for Edixeon® A series Red and Amber

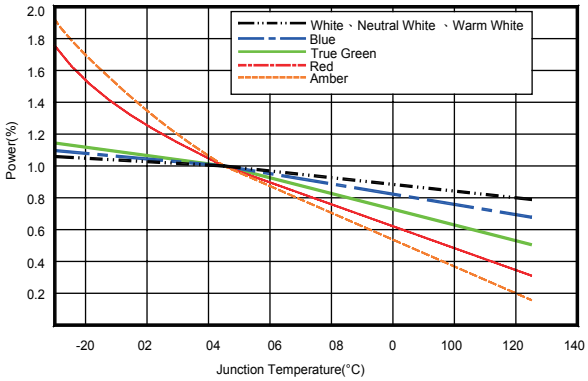

Figure 29. Junction temperature & power rate for Edixeon® A series

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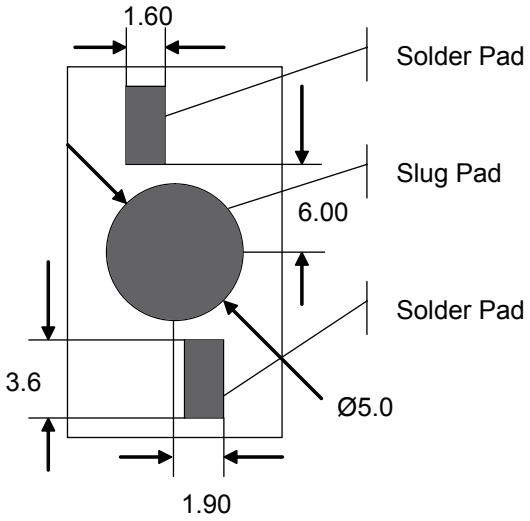
Product Soldering Instructions

The central circle pad at the bottom face of the package provides the main path for heat dissipation from the LED to the heat sink (heat sink contact).



Notes:
1. All dimensions are measured in mm.
2. Solder pad cannot be connected to slug pad.
3. MCPCB material with a thermal conductivity greater than 3.0 W/mK.
4. Please avoid touching the Edixeon® A lens during assembly processes .This may cause pollution or scratch on the surface of lens.
5. Edixeon® A series can not be heated over 150°C.

Figure 30. Pad dimensions

The choice of solder and the application method will dictate the specific amount of solder. For most consistent results, an automated dispensing system or a solder stencil printer is recommended.

Positive results will be used solder thickness that results in 50µm. The lamp can be placed on the PCB simultaneously with any other required SMD and reflow completed in a single step. Automated pick-and-place tools are recommended.

The bottom of the slug, which is electrically connected to anode(+), provides the main path for heat dissipation from LED to the heat-sink.

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Recommend Solder Steps

To prevent mechanical failure of LEDs in the soldering process, a carefully controlled pre-heat and post-cooling sequence is necessary. The heating rate in an IR furnace depends on the absorption coefficients of the material surfaces and on the ratio of the component's mass to its irradiated surface. The temperature of parts in an IR furnace, with a mixture of radiation and convection, cannot be determined in advance. Temperature measurement may be performed by measuring the temperature of a specific component while it is being transported through the furnace. Influencing parameters on the internal temperature of the component are as follows:

- Time and power
- Mass of the component (for Edixeon® A series on MCPCB)
- Size of the component
- Size of the printed circuit board
- Absorption coefficient of the surfaces and MCPCB
- Packing density

Peak temperatures can vary greatly across the PC board during IR processes. The variables that contribute to this wide temperature range include the furnace type and the size, mass and relative location of the components on the board. Profiles must be carefully tested to determine the hottest and coolest points on the board. The hottest and coolest points should fall within the recommended temperatures. The profile of the reflow system should be based on design needs, the selected solder system and the solder-paste manufacturer's recommended reflow profile.

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Reflow Profile

The following reflow soldering profiles are provided for reference. It is recommended that users follow the recommended soldering profile provided by the manufacturer of the solder paste used

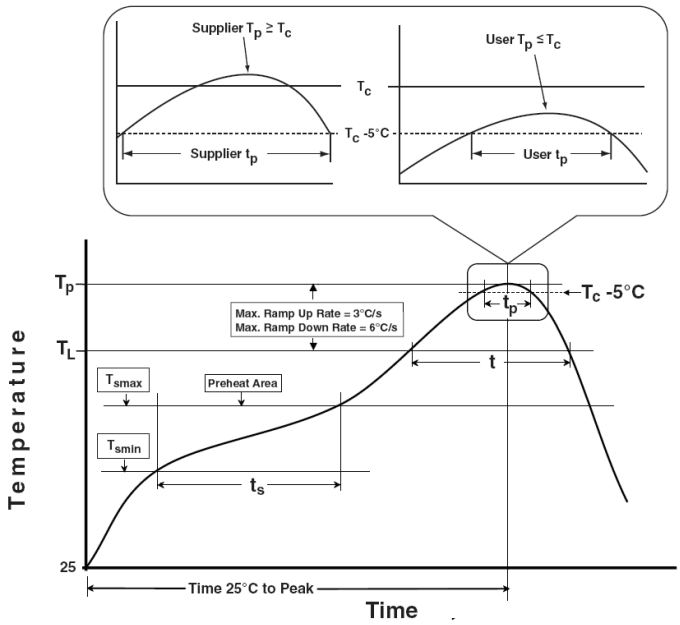

Figure 31. Reflow Profiles

Table 14. Table of Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	100 °C 120 °C 60-120 seconds
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	150 °C 20-50 seconds
Peak package body temperature (Tp)*	150 °C ~160 °C *
Classification temperature (Tc)	160 °C
Time (tp)** within 5 °C of the specified classification temperature (Tc)	30** seconds
Average ramp-down rate (Tp to Tsmax)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

Notes:
* Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.

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Product Thermal Application Information

Thermal grease should be evenly speeded with a thickness <100um.
When assembling on MCPCB or heat sink carrier.

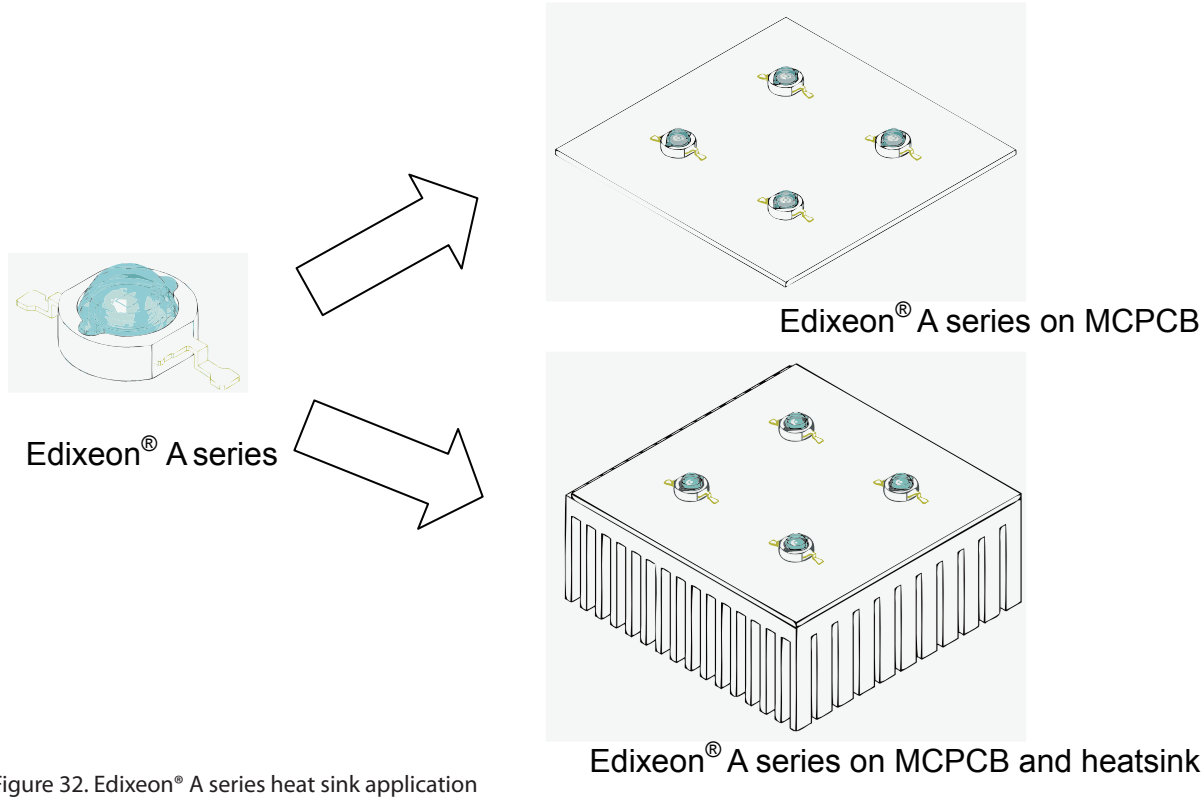
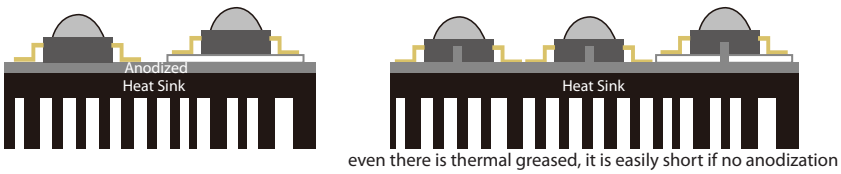


Figure 32. Edixeon® A series heat sink application

It is strongly recommanded the heat sink should be anodized



Please ensure the heat sink is flat enough to prevent the bad heat conductivity.

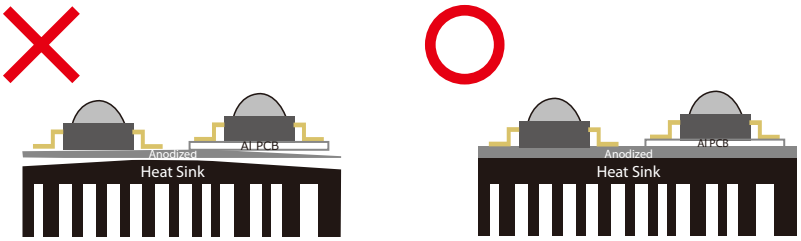


Figure 33. Edixeon® A series assemble with heat sink

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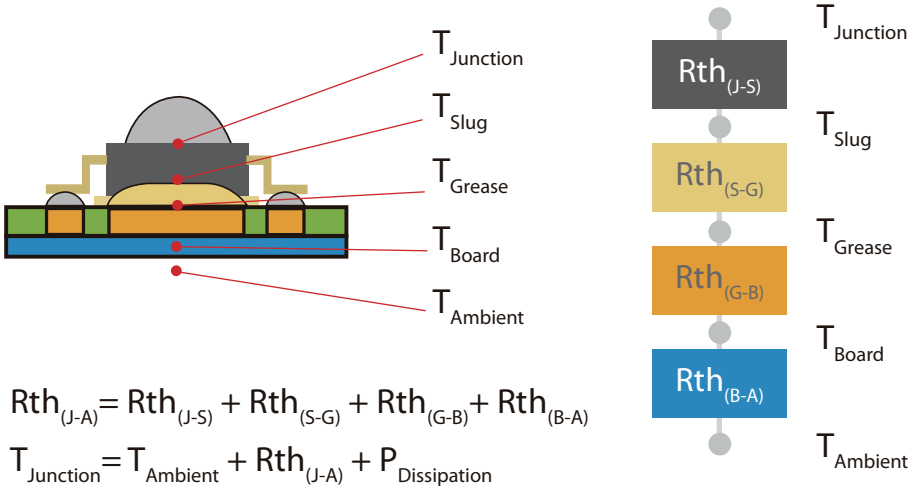
Thermal Resistance Application



$$Rth_{(J-A)} = Rth_{(J-S)} + Rth_{(S-G)} + Rth_{(G-B)} + Rth_{(B-A)}$$

$$T_{Junction} = T_{Ambient} + Rth_{(J-A)} + P_{Dissipation}$$

$$(T_J = T_A + Rth_{(J-A)} + P_{Dissipation})$$

Figure 34. Rth and T_J for Edixeon® A series

Suggested Adhesive for Selection(such as thermal grease)

Ease of use
Non-solvent, One-part

Fast tack free
3 minutes at 25°C

No corrosion
Alcohol type of room temperature vulcanization (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

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Table 15. Specification for adhesive 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 °C/W
Volume resistance	> 1x10^{14}
Lap shear adhesion strength	> 200 N/ cm^2
Tensile strength	> 4 Mpa

Thermal Resistance Calculation

The thermal resistance between two points is defined as the ratio of the difference in temperature to the power dissipated. For calculations in the following units used are °C/W. In the case of LEDs, the resistance of two important thermal paths affects the junction temperature:

From the LED junction to the thermal contact at the bottom of the package, this thermal resistance is governed by the package design. It is referred to as the thermal resistance between junction and slug ($Rth_{(J-S)}$)

From the thermal contact to ambient conditions, this thermal resistance is defined by the path between the slug ,board ,and ambient. It is referred to as the thermal resistance between slug and board ($Rth_{(S-B)}$) and between board and ambient ($Rth_{(B-A)}$)).

The overall thermal resistance between the LED junction and ambient ($Rth_{(J-A)}$) can be modeled as the sum of the series resistances $Rth_{(J-S)}$, $Rth_{(S-B)}$.,and $Rth_{(B-A)}$.

The following will show how to calculate Rth for each part of LED module.

1. $Rth_{(J-S)}$
Assume Edixeon® $Rth_{(J-S)}$=10 °C/W

2. $Rth_{(S-G)}$
If the thickness of thermal grease is 100um and area is (6.4/2)2π mm^2.
Thermal conductivity of thermal grease is 2.6 W/mK.

The Formula of Rth is $\dfrac{\text{Thickness(um)}}{\text{Thermal Conductivity (W/mK) x Area(mm}^2\text{)}}$

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Therefore $Rth_{(S-G)} = \dfrac{100}{2.6 \times (6.4/2)^2 \pi} = 1.2\ ^{\circ}C/W$

3. $Rth_{(G-B)}$
The Rth of standard MCPCB is 1.5 °C/W

4. $Rth_{(B-A)}$
The Rth between board and air is mainly dependent on the total surface area.

Therefore $Rth_{(B-A)} \div \dfrac{500}{Area(cm)^2}$

If Area is $30cm^2$ Rth=16.7 $Rth_{(J-A)}$ =10+1.2+1.5+16.7 =29.4 °C/W
If Area is $60cm^2$ Rth=8.3 $Rth_{(J-A)}$ =10+1.2+1.5+8.3 =21°C/W
If Area is $90cm^2$ Rth=5.5 $Rth_{(J-A)}$ =10+1.2+1.5+5.5 =18.2°C/W

Junction Temperature Calculation

The total power dissipated by the LED is the product of the forward voltage (V_F) and the forward current (I_F) of the LED.

The temperature of the LED junction is the sum of the ambient temperature and the product of the thermal resistance from junction to ambient and the power dissipated.

$T_{Junction} = T_{Air} + Rth_{(J-A)} \times P_{Dissipation}$
If one white Edixeon® in room temperature (25°C) operated 350mA and V_F=3.3V,
the $P_{Dissipation}$=0.35 x 3.3=1.155W

And junction temperature is
$T_{Junction}$ = 25°C+ 18.2 x 1.155 = 46.021°C (total surface area =$90cm^2$)
$T_{Junction}$ = 25°C+ 21 x 1.155 = 49.255 °C (total surface area =$60cm^2$)
$T_{Junction}$ = 25°C+ 29.4 x 1.155 = 58.957 °C (total surface area =$30cm^2$)

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Example : Junction Temperature Calculation

One white LED is used under ambient temperature ($T_{Ambient}$) of 30°C.
This LED is soldered on MCPCB (Area=10cm^2). Calculate junction temperature.

Assuming a forward voltage of VF=3.3V at 350mA and total power dissipated is
$P_{Dissipation}$=1x 0.35 x 3.3= 1.155 W.
LED $Rth_{(J-S)}$=10 °C/W.

With good design, $Rth_{(S-G)}$ can be minimized to 1 oC/W.
$Rth_{(G-B)}$ of a standard MCPCB can be 1.5 °C/W.

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

Therefore it can be calculated in formula

$$Rth_{(B-A)} = \frac{500}{10} = 50\,°C/W.$$

Following the formula $T_{Junction} = T_{Ambient} + Rth_{(J-A)} \times P_{Dissipation}$
$T_{Junction}$=30 °C + (10 °C/W +1 °C/W +1.5 °C/W +50 °C/W) x 1.155W =102.1875 °C

That means this LED emitter is operated under good condition($T_{Junction}$<125 °C).

It's strongly recommended to keep the junction temperature under 125 ºC
Or keep the temperature of emitter lead not exceed 55 ºC

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Product Electrical Application Information

Following graphs and descriptions show how to connect LED or LED module and plug to AC outlet.

Step1: Connect the wires of LED Module to the DC output of the driver.

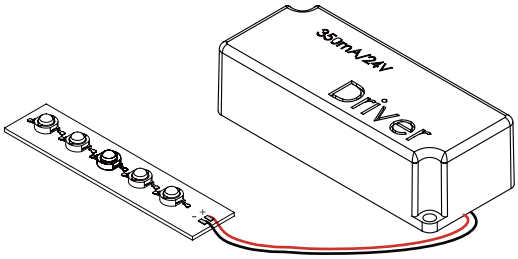

Figure 35. LED Module connect to the DC output of the driver

Step2 : Plug the driver to AC outlet.

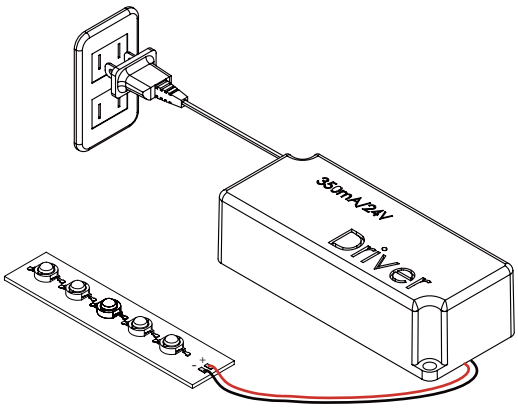

Figure 36. Plug the AC output of the driver to AC outlet

Caution: Never plug the driver to AC outlet before the LED Module is properly connected as this may generate transient voltage damage the LEDs permanently with a short or open circuit.

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Product Packaging Information

Package Specifications

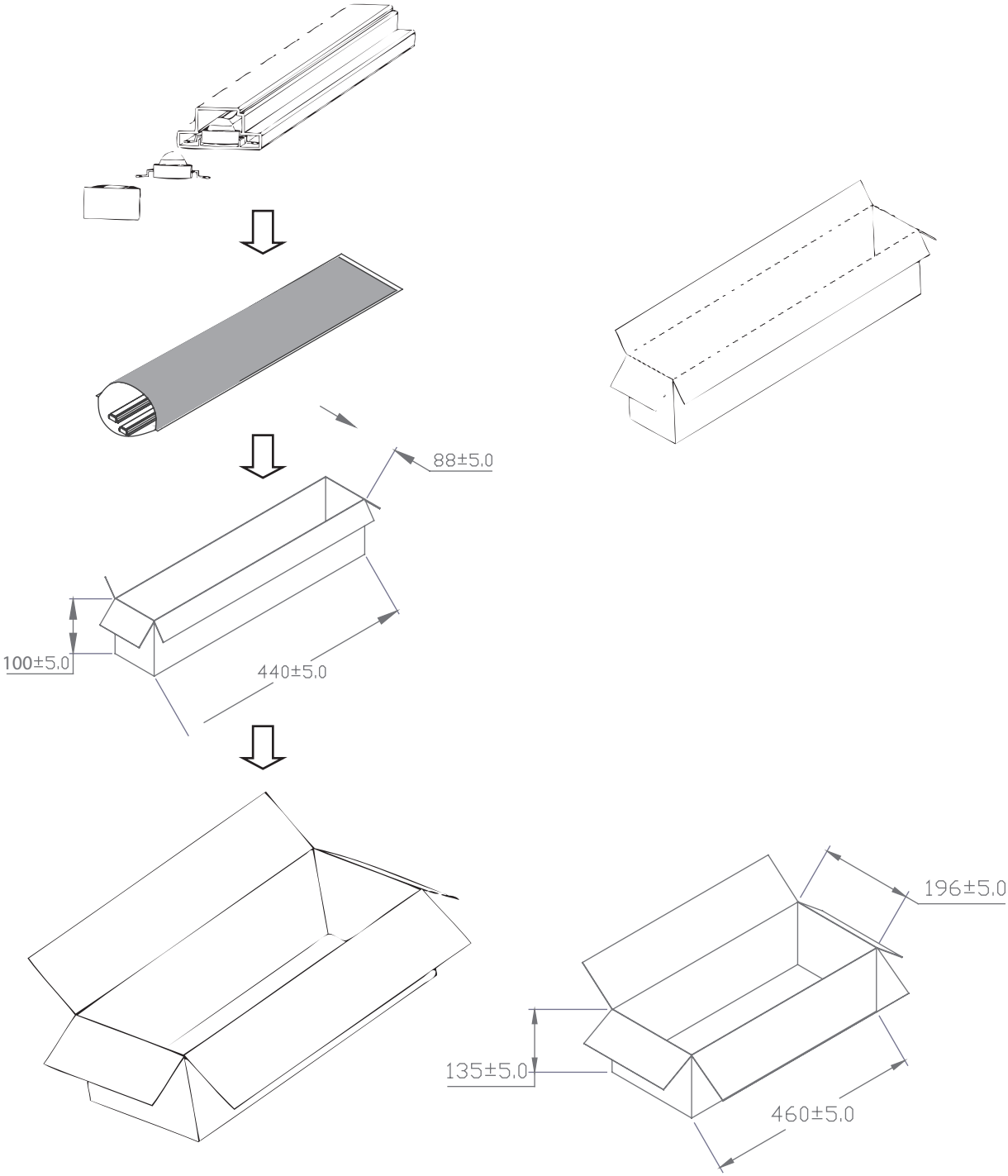

Figure 37. Packaging steps and dimensions

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The Label

Label on tube:

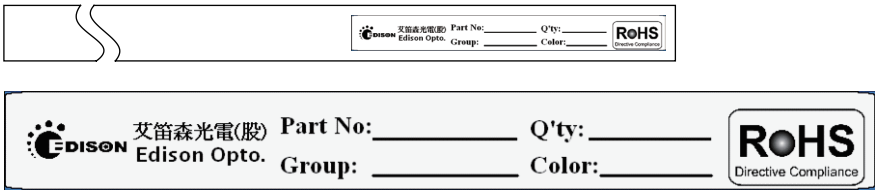

Figure 38. Label on tube

Label on box:

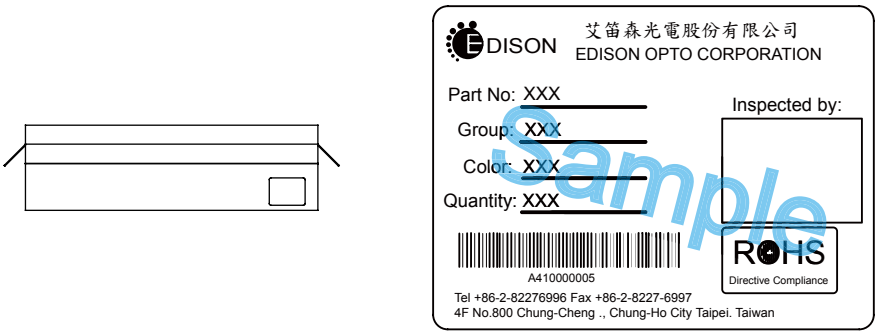

Figure 39. Label on box

Carbel on carton:

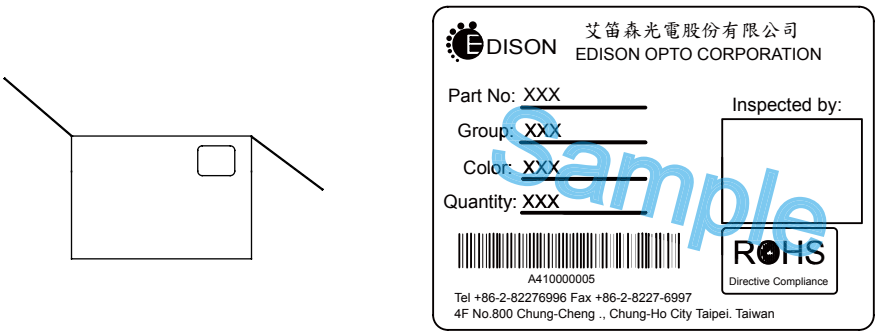

Figure 40. Label on carton

Notes:
1. All dimensions are in mm.
2. There are 50pcs emitters in a tube
3. There are 20 tubes in a bag.
4. There are 2 bags in a box
5. A bag contains one humidity indicator card and drying agent

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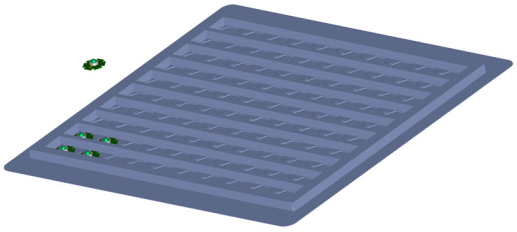
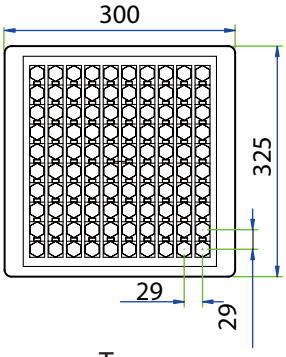
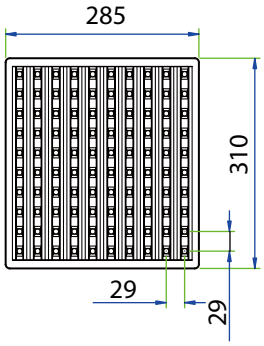


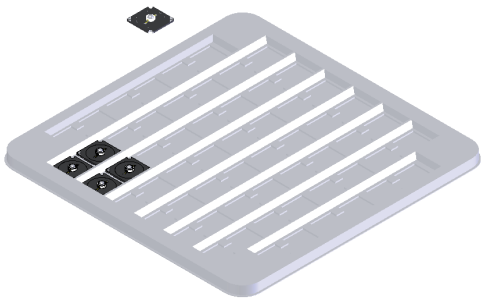


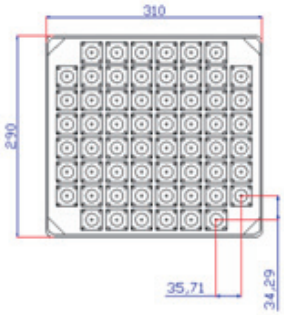
Tray



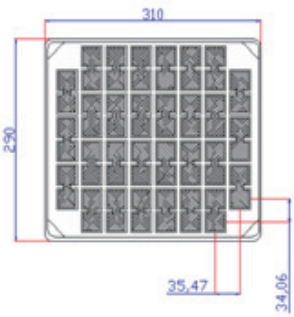
Cover

Item	Quantity	Total	Dimensions(mm)
Tray	100pcs	100pcs	325*300
Box	10 Tray	1,000pcs	340*330*160
Carton	2 boxes	2,000pcs	350*350*340





Tray



Cover

Item	Quantity	Total	Dimensions(mm)
Tray	60pcs	60pcs	310*290
Box	10 Tray	600pcs	340*330*160
Carton	2 boxes	1200pcs	350*350*340

Figure 41. Edixeon® Star Package

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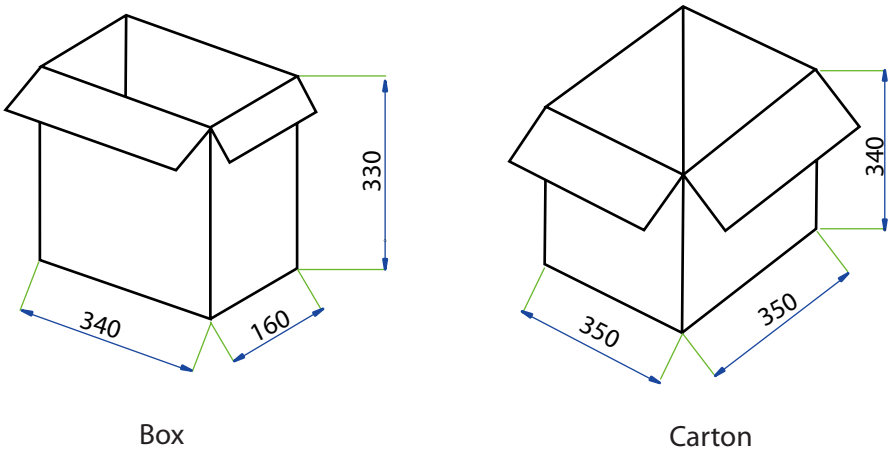

Figure 42. Edixeon® A atar package and dimensions

Notes:
1. All Dimensions are in mm.
2. There are 60 pcs stars in a tray.(Tray+Cover)
3. There are 10 trays in an box.
4. There are 2 boxes in a carton.

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