



Lighting Design Manufacturing Service

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High Power LEDs

Edixeon® S7 Series Datasheet

Edixeon® S7 Series emitters are one of the highest flux and lux LEDs in the world by Edison Opto. Edixeon® S7 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® S7 Series emitters are designed by particular package for reflow process application. 1W Edixeon® S7 Series white has typical 130 lumens @350mA. Unlike most fluorescent sources, Edixeon® S7 Series contains no mercury and has more energy efficient than other incandescent light sources.



Features :

- More energy efficient than incandescent and most halogen lamps
- Low voltage operation
- Instant light
- Long operating life
- Reflow process compatible

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Product Nomenclature

The following table describes the available color, power, and lens type. For more flux and forward voltage information, please consult the Bin Group document.

Table 1. Edixeon® S7 series nomenclature

E D E W - 1 L S 7 - F R - A B 16

X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12

X1 LED Item		X2 Module		X3 Emitting Color		X4 Power		X5 Lens Item	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
ED	Edixeon®	E	Emitter	W	Cool White	1	1W/3W	L	Lambertan
		S	Star	H	Neutral White				
				X	Warm White				

X6~X9 Serial No.		X10 AI PCB Color		X11 AI PCB Color		X12 Shape Item	
		Code	Type	Code	Type	Code	Type
		A	Star	B	Black	10	1.0mm
		B	Square(25x25mm)			16	1.6mm
		C	Square(30x30mm)			20	2.0mm

Environmental Compliance

Edixeon® S7 Series are compliant to the Restriction of Hazardous Substances Directive or RoHS. The restricted materials including lead, mercury cadmium hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE) are not used in Edixeon® S7 Series to provide an environmentally friendly product to the customers.

LED Package Dimensions and Polarity

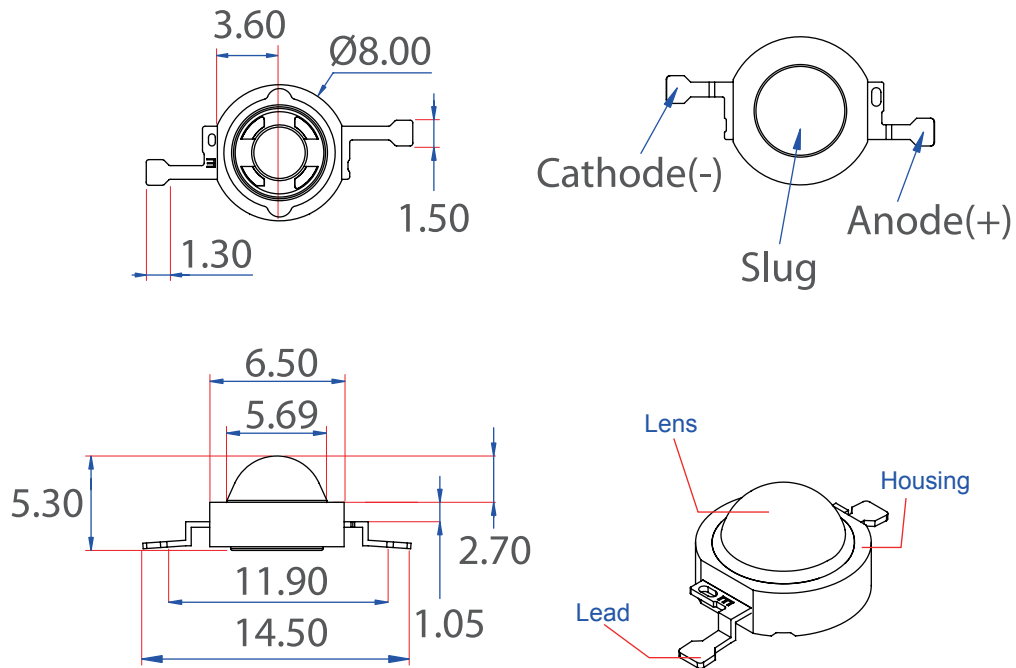


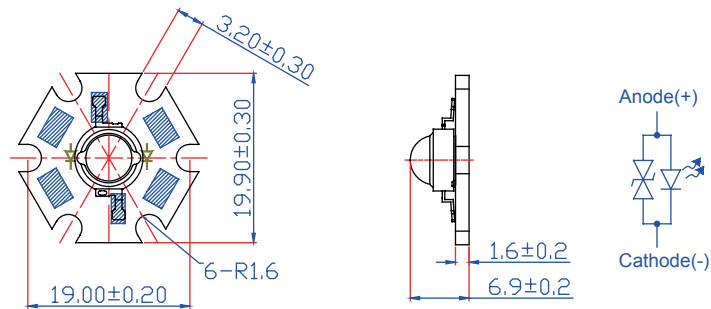
Figure 1. Edixeon® S7 series dimensions

Notes:

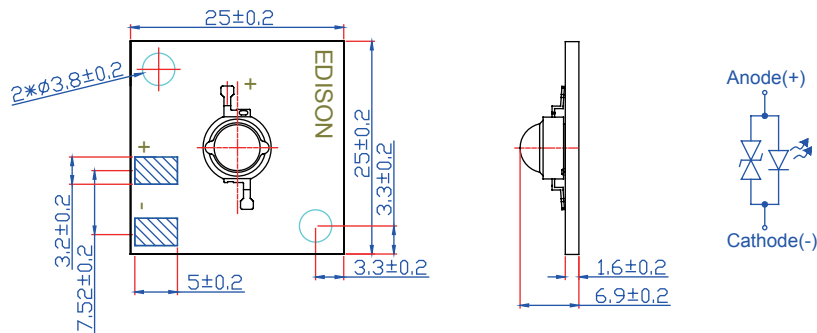
1. All dimensions are in mm.
2. Drawings are not to scale.
3. It is strongly recommended to apply an electrically isolated heat conducting film between the slug and contact surfaces.

LED Package with Star Dimensions and Polarity

EDSx-1LSx-xx-Ax16



EDSx-1LSx-xx-Bx16



EDSx-1LSx-xx-Cx16

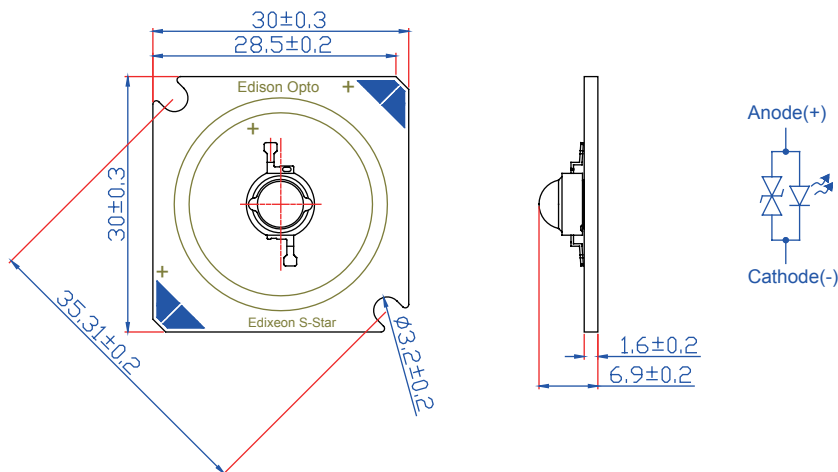


Figure 2. Edixeon® star dimensions

Note:

All dimensions are in mm.

Absolute Maximum Ratings

The following tables describe the characteristics of Edixeon® S7 Series under various current.

Table 2. Absolute maximum ratings for Edixeon® S7 series

Parameter	Rating(1W)	Rating(3W)	Unit	Symbol
DC Forward Current(1W)	350	700	mA	I_F
Peak pulse current; (tp°C100μs, Duty cycle=0.25)	500	1000	mA	
Reverse Voltage	5	5	V	V_R
Drive Voltage	5	5	V	
LED junction Temperature	125	125	°C	T_J
Operating Temperature	-30 ~ +110	-30 ~ +110	°C	
Storage Temperature	-40 ~ +120	-40 ~ +120	°C	
Soldering Temperature	260	260	°C	
ESD Sensitivity	4,000	4,000	V	
Manual Soldering Time at 360°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. Allowable reflow cycles are 3 times for each LED.
4. tp: Pulse width time

The following tables describe thermal resistance of Edixeon® S7 series under various current and different color.

Table 3. Thermal Resistance Junction to Case Characteristics at $T_J=25^{\circ}\text{C}$

Lens Item	Part Name	Color	$R\theta_{J-B}$	
			Typ.	Unit
Lambertian	EDEX-1LS7-xR	--	9	°C/W

Luminous Flux Characteristics

The following tables describe flux of Edixeon® S7 Series under various current and different color.

Table 4. Luminous flux characteristics at $I_F=350\text{mA}$, $I_F=700\text{mA}$ and $T_J=25^\circ\text{C}$

Power Item	Part Name	Color	Flux			Unit
			Min.	Typ.	Max.	
1W (350mA)	EDEW-1LS7-FR	Cool White	--	130	--	lm
	EDEH-1LS7-ER	Neutral White	--	100	--	lm
	EDEX-1LS7-ER	Warm White	--	85	--	lm
3W (700mA)	EDEW-1LS7-FR	Cool White	--	230	--	lm
	EDEH-1LS7-ER	Neutral White	--	170	--	lm
	EDEX-1LS7-ER	Warm White	--	150	--	lm

Table 5. Luminous flux range for different emitting color $T_J=25^\circ\text{C}$

Group	Min.	Max.	Group	Min.	Max.
S1	51.2	58.8	U3	100.0	112.5
S2	58.8	66.5	V1	112.5	129.4
T1	66.5	70.0	V2	129.4	146.2
T2	70.0	80.0	W1	146.2	168.1
T3	80.0	86.5	W2	168.1	190.0
U1	86.5	90.0	X	190.0	247.1
U2	90.0	100.0			

Note:

Flux is measured with an accuracy of $\pm 10\%$

Forward Voltage Characteristics

The following tables describe forward voltage of Edixeon® S7 Series emitter under various current.

Table 6. Forward voltage characteristics at $I_F=350\text{mA}$, $I_F=700\text{mA}$ and $T_J=25^\circ\text{C}$

Power Item	Part Name	Color	Flux			Unit
			Min.	Typ.	Max.	
1W (350mA)	EDEW-1LS7-xR	Cool White	-	3.3	3.7	V
	EDEH-1LS7-xR	Neutral White	-	3.3	3.7	V
	EDEX-1LS7-xR	Warm White	-	3.3	3.7	V
3W (700mA)	EDEW-1LS7-xR	Cool White	-	3.7	4	V
	EDEH-1LS7-xR	Neutral White	-	3.7	4	V
	EDEX-1LS7-xR	Warm White	-	3.7	4	V

Note:

Forward voltage is measured with an accuracy of $\pm 0.1\text{V}$

Table 7. Forward voltage Rank

$V_F(\text{V})$			
V01	2.8-3.1	V10	6.0-6.5
V02	3.1-3.4	V11	6.5-7.0
V03	3.4-3.7	V12	7.0-7.5
V04	3.7-4.0	V13	7.5-8.0
V05	4.0-4.3	V14	8.0-8.5
V06	4.3-4.6	V15	8.5-9.0
V07	4.6-4.9	V16	9.0-9.5
V08	4.9-5.2	V17	9.5-10.0

Color Rand Index Characteristics

The following tables describe Color Rand Index of Edixeon® S7 Series emitter under various current.

Table 8. Color Rand Index characteristics at $I_f=350\text{mA}$, $I_f=700\text{mA}$ and $T_j=25^\circ\text{C}$

Power Item	Part Name	Color	Typ. CRI
1W / 3W (350mA/700mA)	EDEW-1LS7-FR	Cool White	68
	EDEH-1LS7-ER	Neutral White	75
	EDEX-1LS7-ER	Warm White	80

Note:

CRI is measured with an accuracy of ± 5

JEDEC Information

JEDEC moisture sensitivity classification 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 reflow attachment and/or repair operation. The present moisture sensitivity standard contains six levels, the lower the level, the longer the devices floor life. Edixeon® S7 Series are certified at level 2a. This means Edixeon® S7 Series have a floor life of 4 weeks before Edixeon® S7 Series need to re-baked. If the package has been opened more than 4 weeks or the color of desicant changes, componenets should be dried for 10-12 hours at 60±5°C

Table 9. JEDEC characteristics

Level	Floor Life		Soak Requirements			
	Time	Conditions	Standard		Accelerated Environment	
			Time (hours)	Conditions	Time (hours)	Conditions
2a	4 weeks	≤30°C /60% RH	696 ¹ +5/-0	30°C/60% RH	120 +1/-0	60°C/60% RH

Leve	Floor Life		Soak Requirements			
	Time	Condition	Standard		Accelerated Environment	
			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.

Reliability Items and Failure Measures

Reliability test

The following table describes operating life, mechanical, and environmental tests performed on Edixeon® S7 series package.

Table 10. Operating life, mechanical, and environmental characteristics and $T_j=25^{\circ}\text{C}$ for Edixeon® S7 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	$-40^{\circ}\text{C}/100^{\circ}\text{C}$, 30 min dwell / <5min transfer	1,000 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	$-40 / 125^{\circ}\text{C}$ 15 min dwell / <10 sec transfer	300 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)	$260^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 10 sec		No catastrophics

Notes:

1. Depending on the maximum derating curve.

2. Failure Criteria:

Electrical failures

VF shift $\geq 10\%$

Light Output Degradation

% I_v shift $\geq 30\%$ @ 1,000hrs or 200cycle

Visual failures

Broken or damaged package or lead

Solderability < 95% wetting

Dimension out of tolerance

Color Spectrum and Radiation Pattern

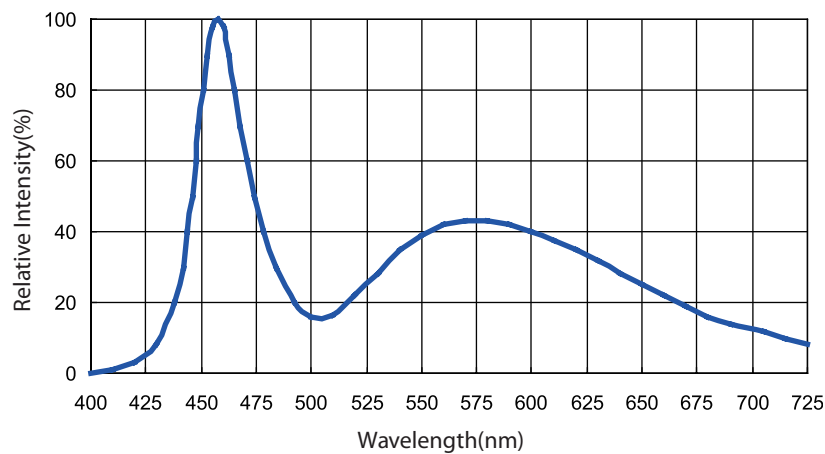
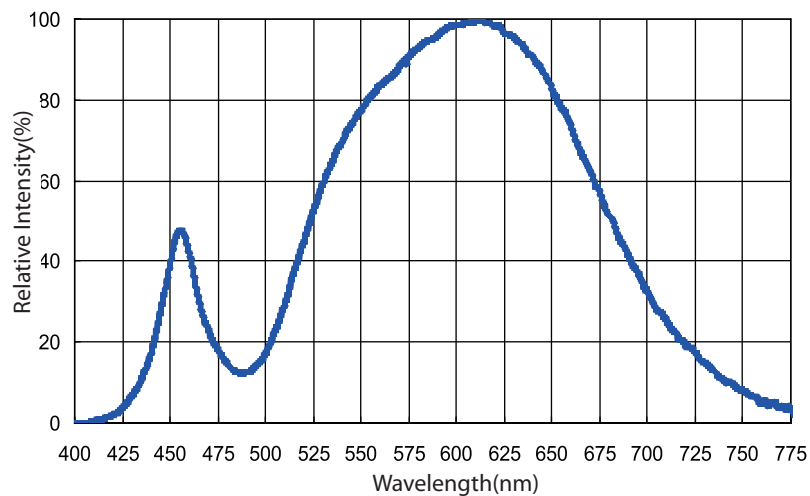
Color Spectrum

Table 11. Color Temperature Characteristics at $T_j = 25^\circ\text{C}$

Lens Item	Part Name	Color	Flux		Unit
			Min.	Max.	
Lambertian	EDEW-xLS7-xR	Cool White	5,000	10,000	K
	EDEH-xLS7-xR	Neutral White	3,800	5,000	K
	EDEX-xLS7-xR	Warm White	2,670	3,800	K

Note:

CCT is measured with an accuracy of $\pm 5\%$


Figure 3. Cool white color spectrum at $T_j = 25^\circ\text{C}$

Figure 4. Neutral White, Warm white color spectrum at $T_j = 25^\circ\text{C}$

Radiation Pattern Characteristics

Table12. Emission angle Characteristics

Part Name	Color	2 Θ $\frac{1}{2}$ (Typ.)	Unit
		Min.	
EDEW-xLS7-xR	Cool White	130	Deg.
EDEH-xLS7-xR	Neutral White	130	Deg.
EDEX-xLS7-xR	Warm White	130	Deg.

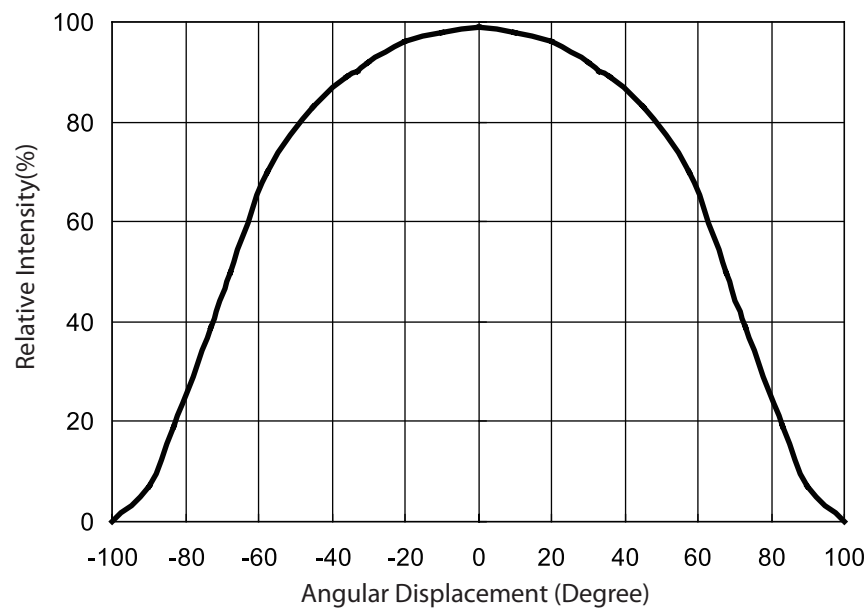


Figure 5. Emission angle

Notes:

Emission angle is measured with an accuracy of ± 10 degree

Optical & Electrical Characteristics

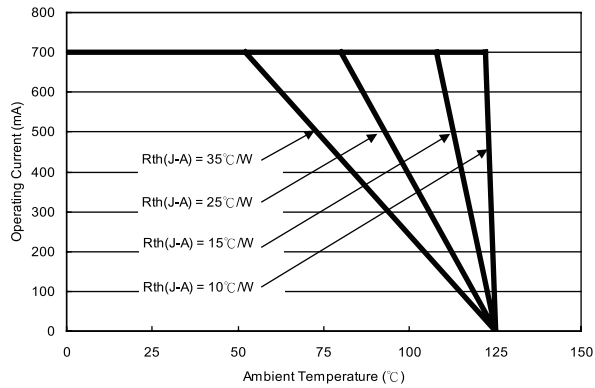


Figure 6. Operating Current with respect to Ambient Temperature for 3W Edixeon

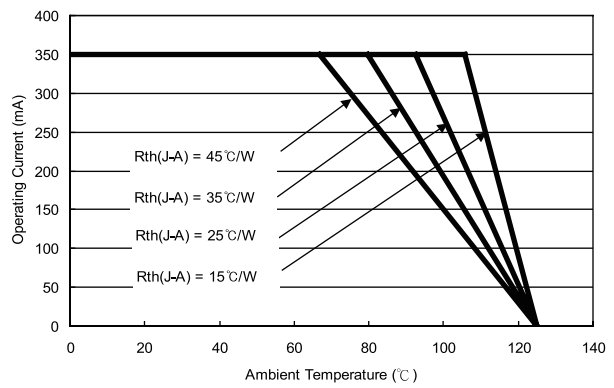


Figure 7. Operating Current & Ambient Temperature for 1W Edixeon

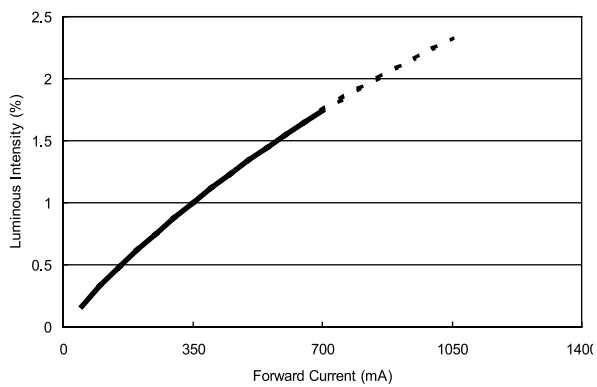


Figure 8. Forward Current & Luminous Intensity at $T_j=25^{\circ}\text{C}$

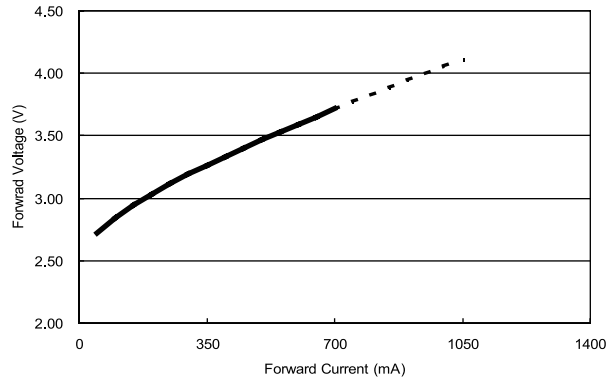


Figure 9. Forward Current & Forward Voltage at $T_j=25^{\circ}\text{C}$

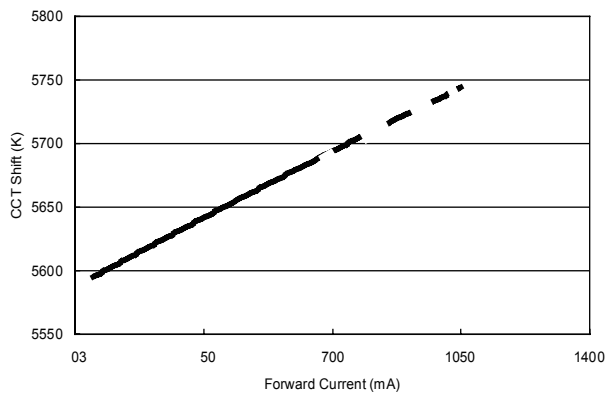


Figure 10. Forward Current & CCT at $T_j=25^{\circ}\text{C}$ for Cool White

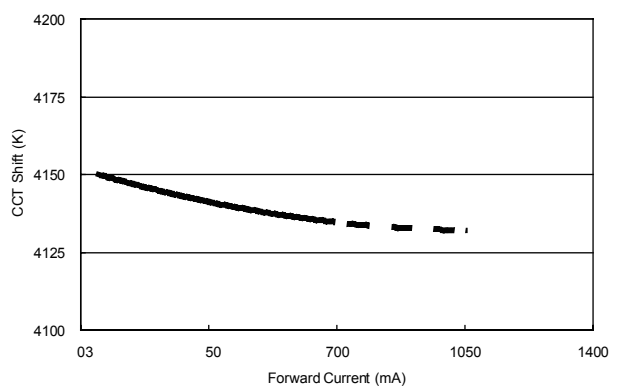


Figure 11. Forward Current & CCT at $T_j=25^{\circ}\text{C}$ for Neutral White

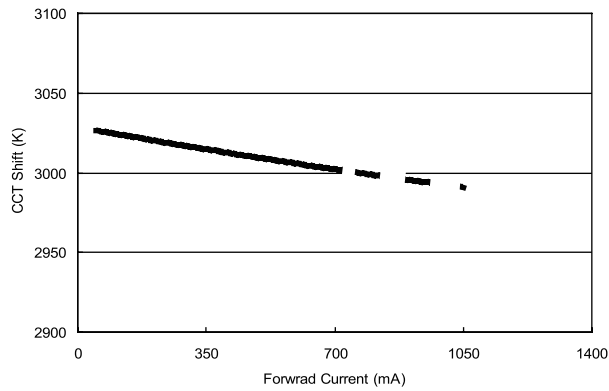


Figure 12. Forward Current & CCT at $T_j=25^{\circ}\text{C}$ for Warm White

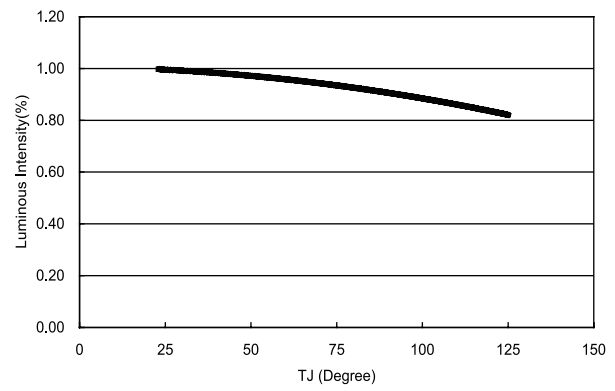


Figure 13. Junction temperature & lumens intensity for Cool White, Neutral White, Warm White

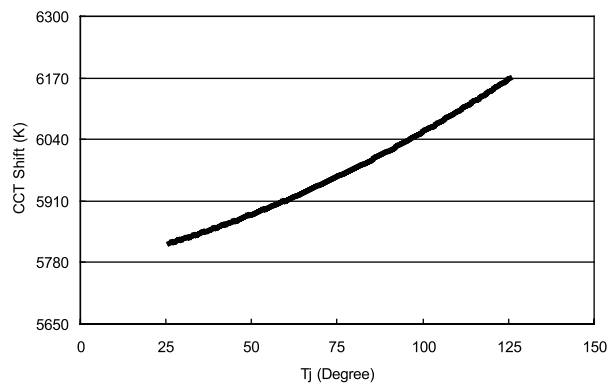


Figure 14. Junction temperature & CCT Shift for Cool White

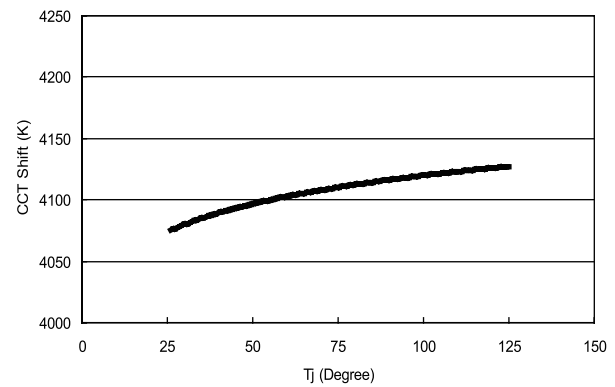


Figure 15. Junction temperature & CCT Shift for Neutral White

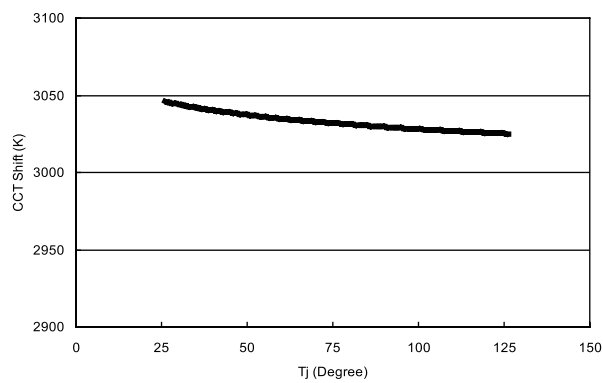
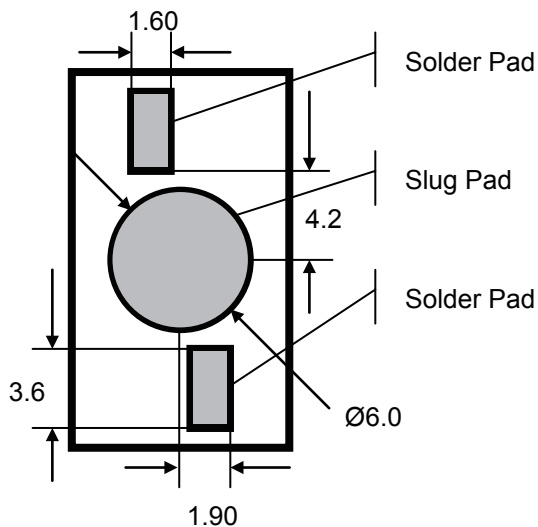


Figure 16. Junction temperature & CCT Shift for Warm White

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® lens during assembly processes. This may cause pollution or scratch on the surface of lens.

Figure 17. 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 devices and reflow completed in a single step. Automated pick-and-place tools are recommended.

The central slug at the bottom face of the package provides the main path for heat dissipation from the LED to the heat sink (heat sink contact). A key feature of Edixeon® S7 Series is an electrically neutral heat path that is separate from the LED's electrical contacts. This electrically isolated thermal pad makes Edixeon® S7 Series perfect for use with either FR4 circuit boards with thermal via or with metal-core printed circuit boards (MCPCB).

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® S7 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.

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

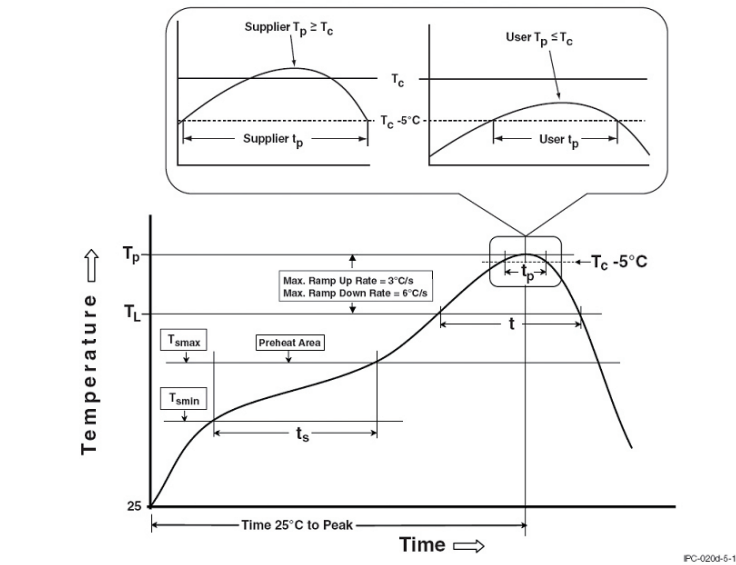


Figure 18. Reflow Profiles

Table 13. Table of Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T _{smin})	100°C	150 °C
Temperature max (T _{smax})	150°C	200 °C
Time (T _{smin} to T _{smax}) (t _s)	60-120 seconds	60-120 seconds
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3 °C/second max.
Liquidous temperature (T _L)	183 °C	217 °C
Time at liquidous (t _L)	60-150 seconds	60-150 seconds
Peak package body temperature (T _p)*	230 °C ~235°C *	255 °C ~260 °C *
Classification temperature (T _c)	235°C	260 °C
Time (t _p)** within 5 °C of the specified classification temperature (T _c)	20** seconds	30** seconds
Average ramp-down rate (T _p to T _{smax})	6°C/second max.	6°C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.

Notes:

* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

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

Product Thermal Application Information

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

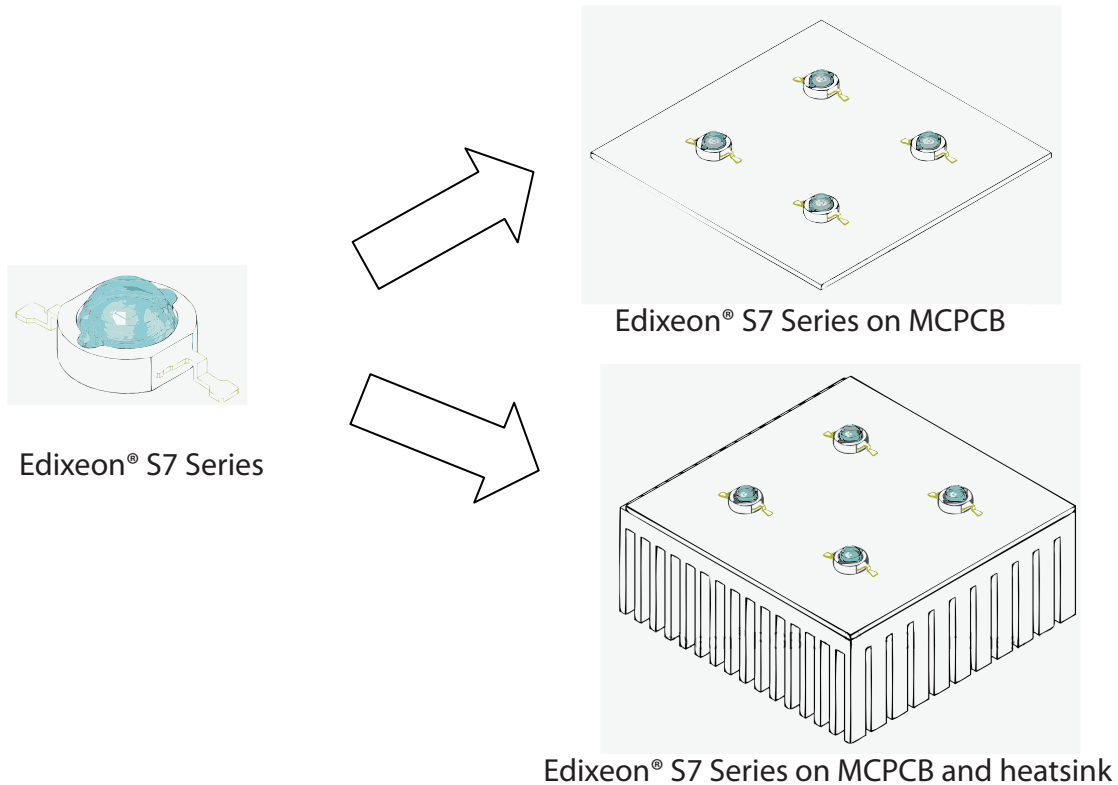
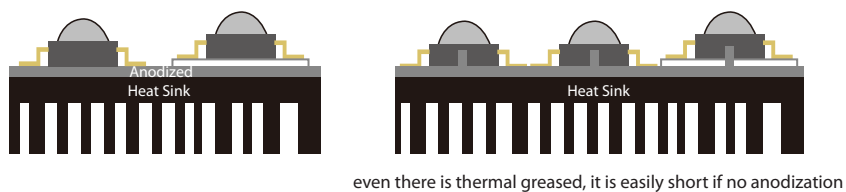


Figure 19. Edixeon® S7 series heat sink application

It is strongly recommended the heat sink should be anodized



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

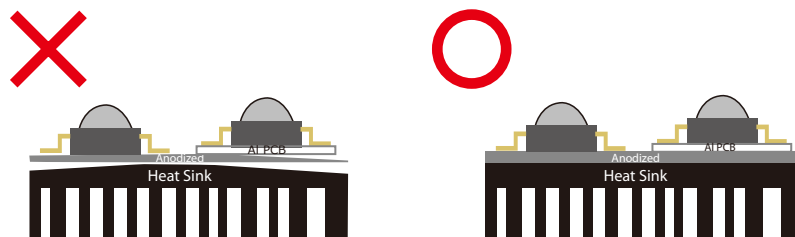


Figure 20. Edixeon® S7 series assemble with heat sink

Table 14. 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

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.

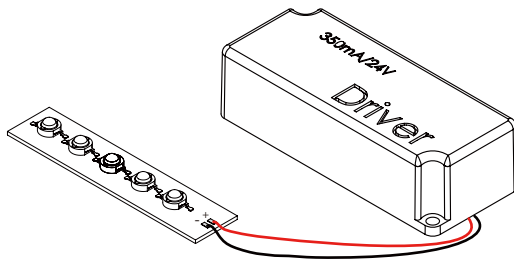


Figure 21. LED Module connect to the DC output of the driver

Step2 : Plug the driver to AC outlet.

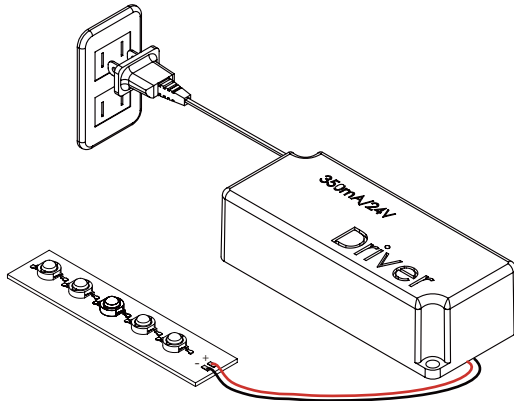
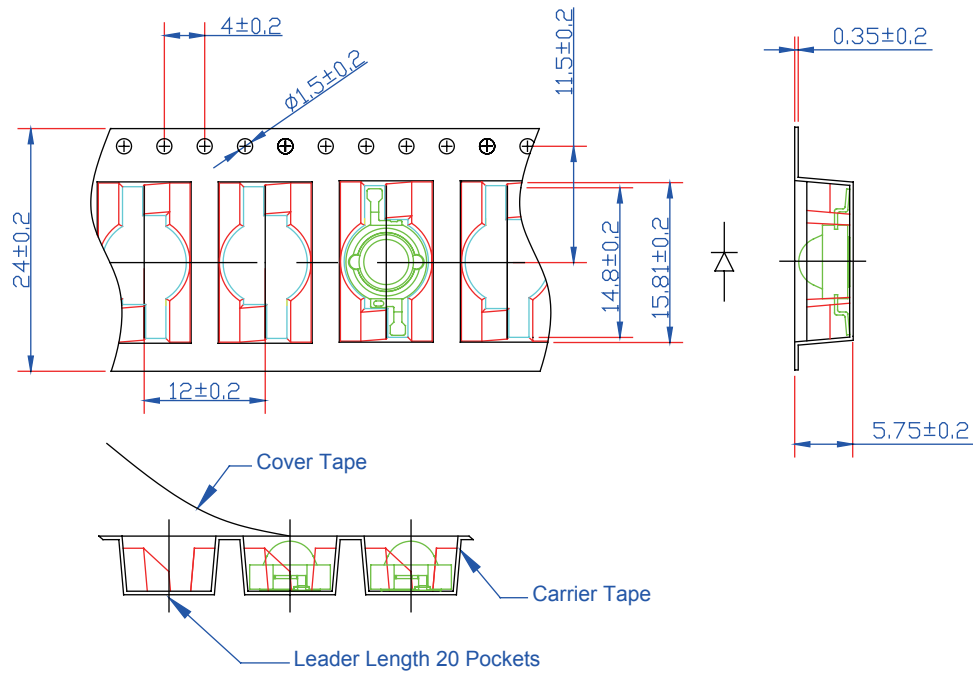


Figure 22. Plug the AC output of the driver to AC outlet

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.

Product Packaging Information

Tape Reel Package for Emitter



The Label

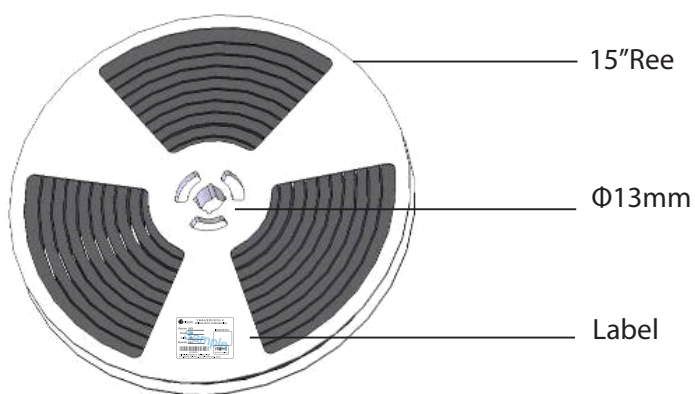


Figure 23. Taping reel dimensions

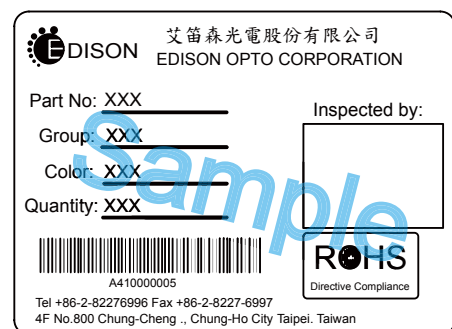


Figure 24. Label on taping reel

Tube Package for Emitter

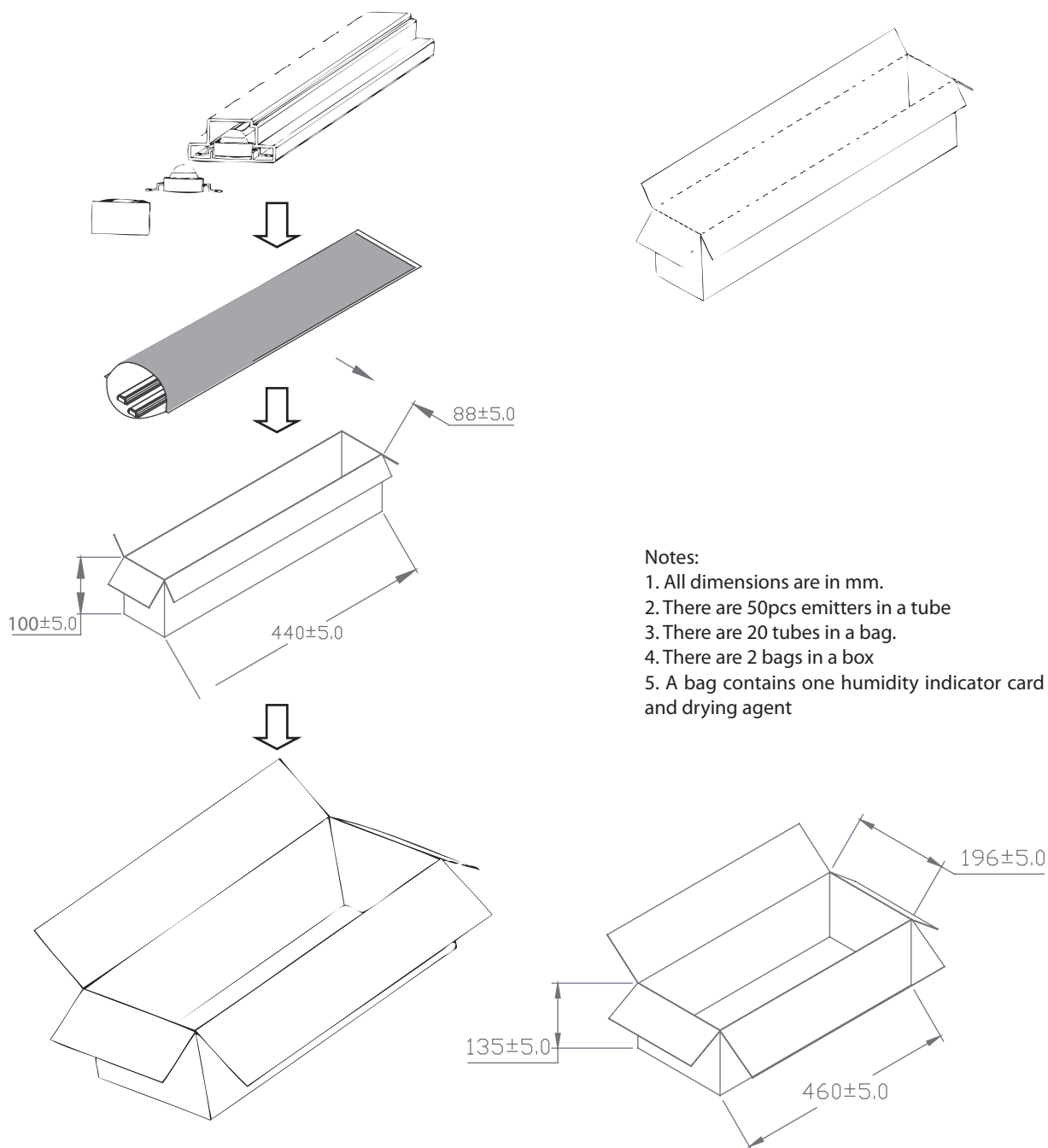


Figure 25. Packaging steps and dimensions

The Label :

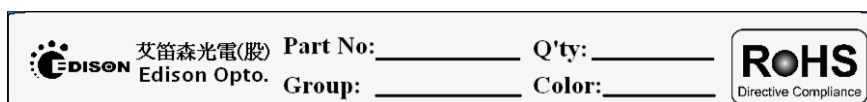
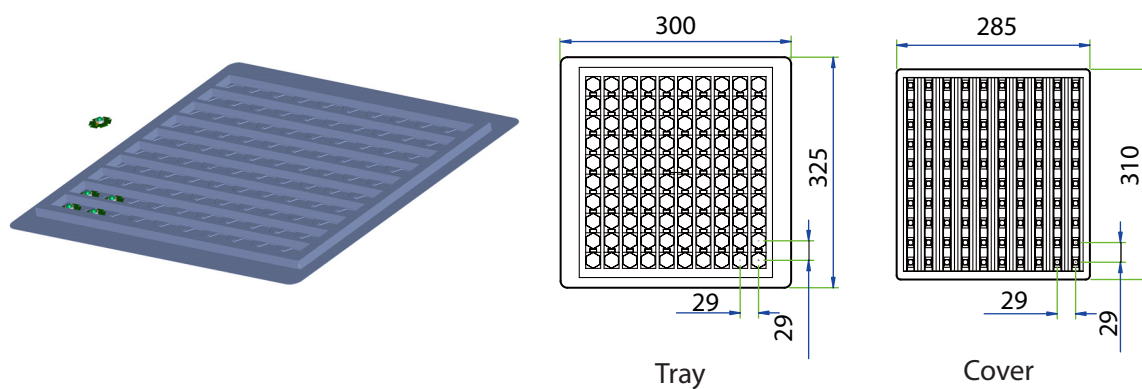
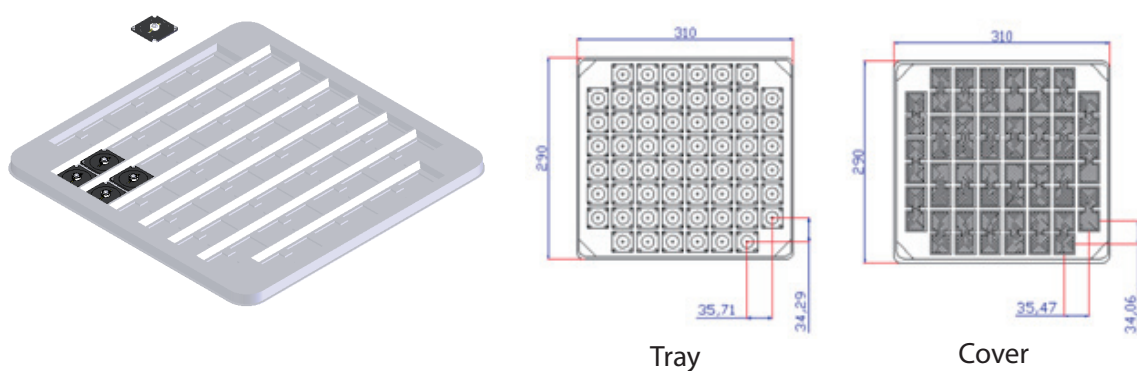


Figure 26. Label on tube

Tray Package for Star



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



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

Figure 27. Edixeon® Star Package

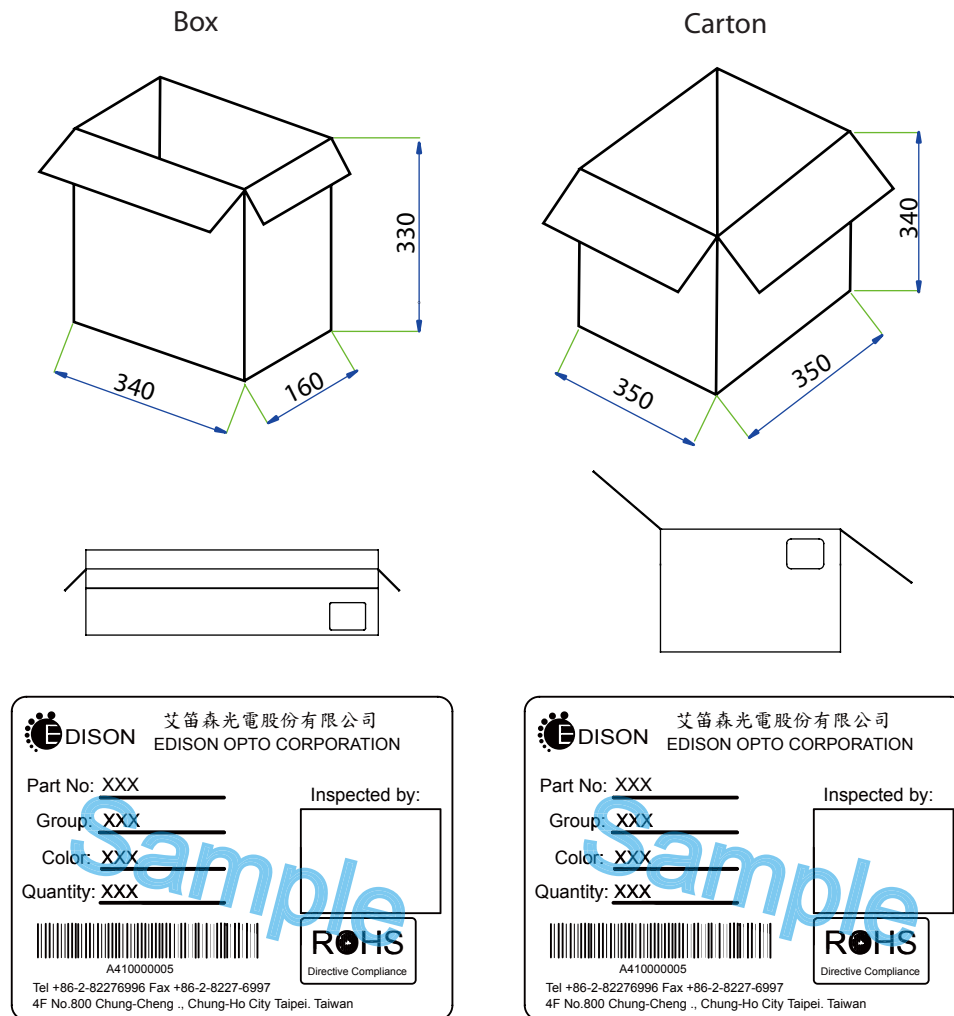
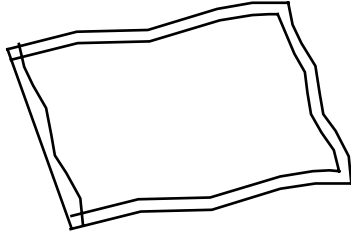


Figure 28. Edixeon® S7 atar package and dimensions

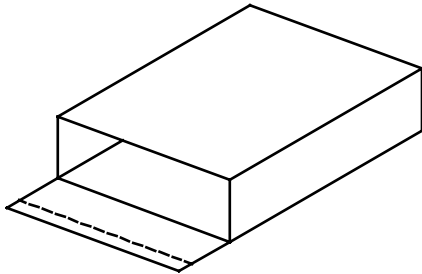
Notes:

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

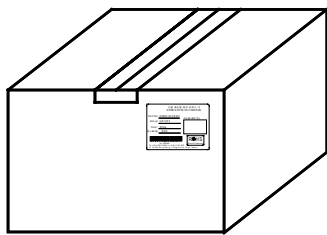
Packaging Steps



1 reel in a bag.



2 bags in a box.



2 inner boxes in a carton.

Figure 29. Packaging steps

Notes:

1. All dimensions are in mm.
2. There are 1000pcs emitters in a full reel.
3. There is one reel in a bag.
4. There are 2 bags in a box.
5. There are 2 boxes in a carton.
6. A bag contains one humidity indicator card and drying agent.