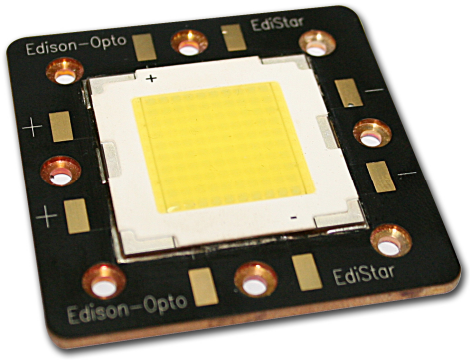
EdiStar Series



EdiStar series is the brightness LEDs in the world by Edison Opto. EdiStar series emitters are designed to satisfy more and more Solid-State lighting High Power LED applications for brilliant world such as general lighting, street light and projector light engine. EdiStar series emitters are designed by particular package for High Power LED. 50W and 100W EdiStar series white has typical 4,000 and 7,000 lumens at 2,400mA and 3,000mA. Unlike the fluorescent sources, EdiStar series contains no mercury and has more energy efficient than other incandescent light source.

Features

- Outstanding thermal performance
- LED lighting engine
- Ultra high power LED

Table of Contents

Product Nomenclature

The following table describes the available color, power, and lens type. For more information on luminous flux and color, please refer to the Bin Group document.

< Table 1 EdiStar series nomenclature >

E N	E	W	-	0 5	-	07	07	-	A	A	-	1
X1				**X2**			**X3**					
				X4			**X5**			**X6**		
									X7	**X8**		**X9**

X1 LED Item		X2 Type		X3 Emitter Color	
Code	Type	Code	Type	Code	Type
EN	EdiStar	E	Emitter	W	White
		P	Emitter + Driver	H	Neutral White
		S	Emitter + Cu Star	X	Warm White
		C	Emitter + Cu Star + Driver		

X4 Power		X5 Circuit Series		X6 Circuit Parallel	
Code	Type	Code	Type	Code	Type
0 5	50W	1~10	1~10 Series	1~10	1~10 Parallel
1 0	100W				

X7 Material		X8 Phosphor		X9 Substrate	
Code	Type	Code	Type	Code	Type
--	--	--	--	1	--

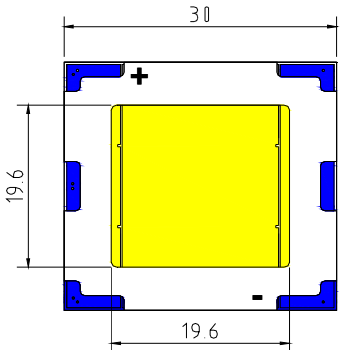
Environmental Compliance

EdiStar series is 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 EdiStar series to provide an environmentally friendly product to the customers.

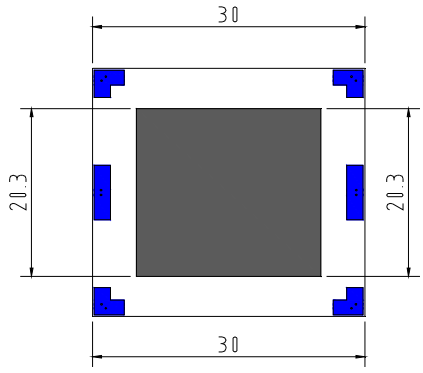
LED Package Dimensions and Polarity

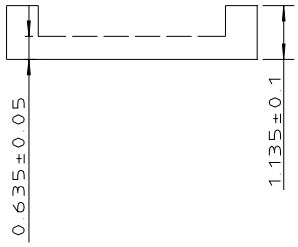
ENEW-05-0707-EB-1

Top View



Bottom View

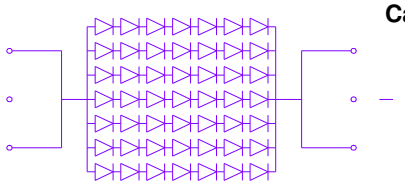




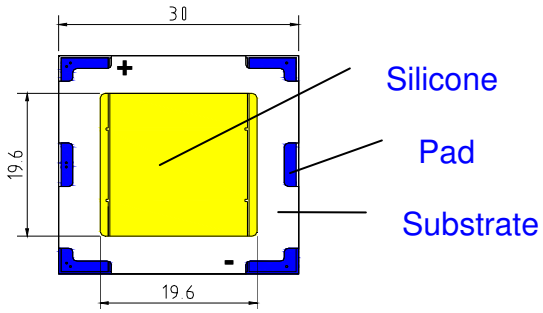
Side View

Positive Anode (+)

Negative Cathode (-)



Circuitry

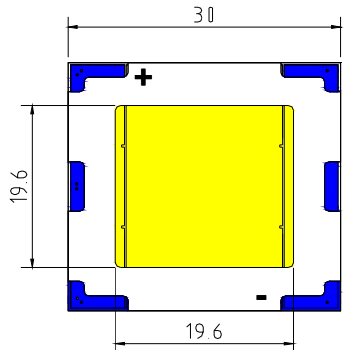


< Figure 1 EdiStar 50W series dimensions >

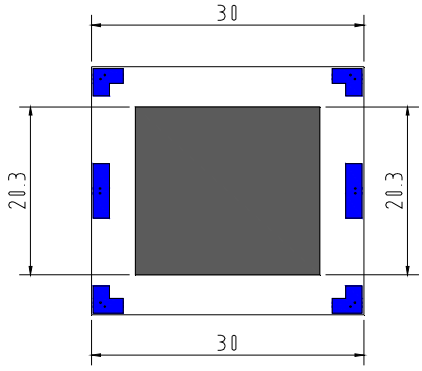
Notes:

1. All dimensions are in mm.
2. The tolerance is ±0.35 mm
3. It is strongly recommended that the temperature of substrate dose not exceed 55℃.

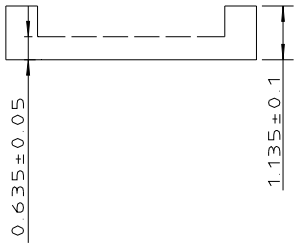
ENEW-10-1010-EB-1



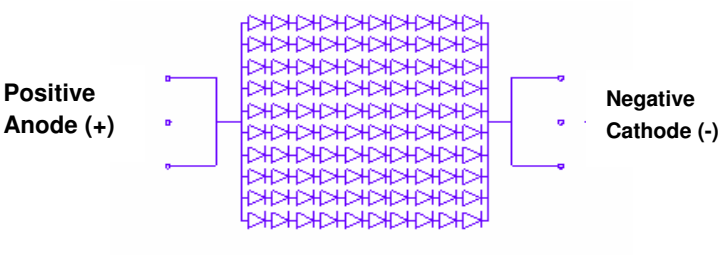
Top View



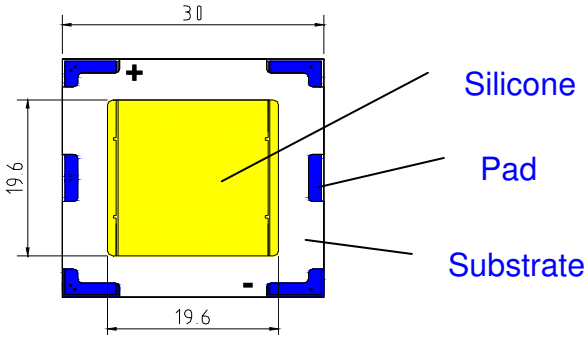
Bottom View



Side View



Circuitry



< Figure 2 EdiStar 100W series dimensions >

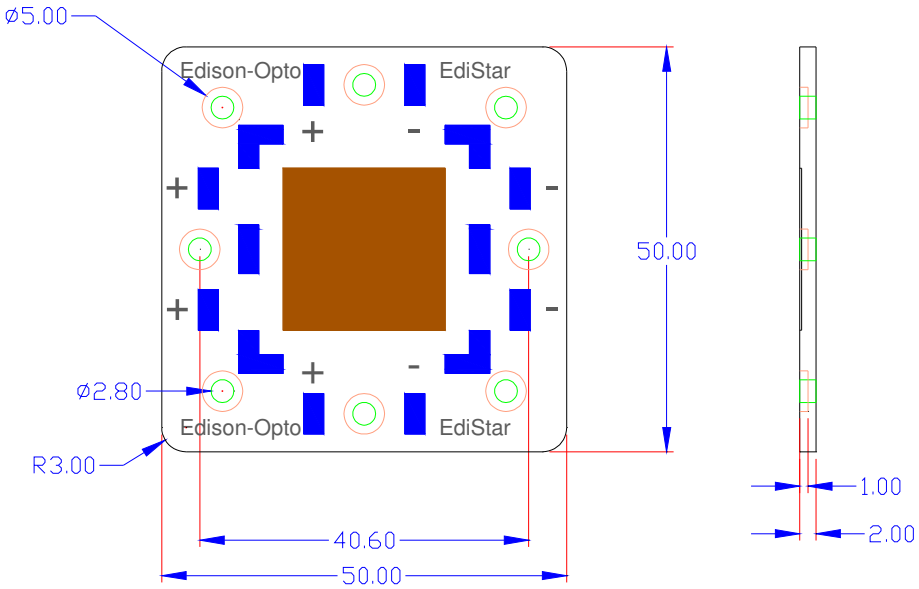
Notes:

1. All dimensions are in mm.
2. The tolerance is ±0.35 mm
3. It is strongly recommended that the temperature of substrate dose not exceed 55℃.

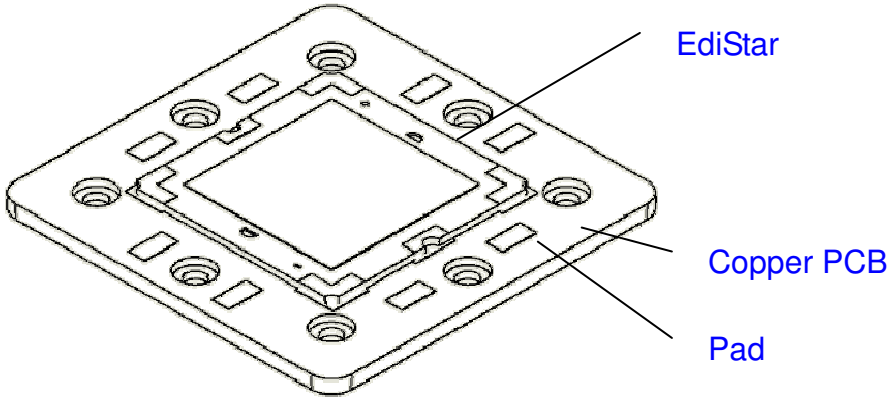
LED Package with Star Dimension and Polarity

Copper Core PCB for SMT Type of EdiStar series

ENSW-10-1010-EB-1



Top View **Side View**



<Figure 3 EdiStar series with copper PCB dimensions>

Notes:

1. All dimensions are in mm.
2. The tolerance is ±0.35 mm
3. It is strongly recommended that the temperature of substrate does not exceed 55℃.

Absolute Maximum Ratings

The following table describes characteristics of EdiStar series.

< Table 2 Absolute maximum ratings for EdiStar 50W and 100W series >

Parameter	Rating(50W)	Unit	Symbol
DC Forward Current	2,400	mA	I_F
Peak pulse current;(tp≦100μs, Duty cycle=0.25)	5,000	mA	
Reverse Voltage	35	V	V_R
Forward Voltage	35	V	V_F
Junction Temperature	125	℃	T_j
Substrate Temperature	100	℃	
Operating Temperature	-30 ~ +60	℃	
Storage Temperature	-40 ~ +60	V	
ESD Sensitivity	500	V	
Manual Soldering Time at 400℃(Max.)	5	Sec.	

Parameter	Rating(100W)	Unit	Symbol
DC Forward Current	3,000	mA	I_F
Peak pulse current;(tp≦100μs, Duty cycle=0.25)	5,000	mA	
Reverse Voltage	35	V	V_R
Forward Voltage	35	V	V_F
Junction Temperature	125	℃	T_j
Substrate Temperature	100	℃	
Operating Temperature	-30 ~ +60	℃	
Storage Temperature	-40 ~ +60	V	
ESD Sensitivity	500	V	
Manual Soldering Time at 400℃(Max.)	5	Sec.	

Notes:

1. Proper current rating 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

The following table describes thermal resistance of EdiStar series.

< Table 3 Temperature Coefficient of Forward Voltage & Thermal Resistance Junction to Case Characteristics at T_J=25℃ for EdiStar series >

Part Name	Color	$\triangle V_F/\triangle T$		$R\theta_{J-B}$	
		Typ.	Unit	Typ.	Unit
ENEW-05-0707-EB-1	Cool White	-2	mV/℃	0.75	℃/W
ENEH-05-0707- EE-1	Neutral White	-2	mV/℃	0.75	℃/W
ENEX-05-0707- EE-1	Warm White	-2	mV/℃	0.75	℃/W
ENEW-10-1010-EB-1	Cool White	-2	mV/℃	0.75	℃/W
ENEH-10-1010- EE-1	Neutral White	-2	mV/℃	0.75	℃/W
ENEX-10-1010- EE-1	Warm White	-2	mV/℃	0.75	℃/W

Luminous Flux Characteristics

The following table describes flux of EdiStar series emitters.

< Table 4 Luminous flux characteristics at I_F=2,400mA/3,000mA and T_J=25℃ for EdiStar series >

Part Name	Color	Flux			Unit
		Min.	Typ.	Max.	
ENEW-05-0707-EB-1	Cool White	--	4,000	--	lm
ENEH-05-0707-EE-1	Neutral White	--	3,200	--	lm
ENEX-05-0707-EE-1	Warm White	--	2,800	--	lm
ENEW-10-1010-EB-1	Cool White	--	7,000	--	lm
ENEH-10-1010-EE-1	Neutral White	--	5,600	--	lm
ENEX-10-1010-EE-1	Warm White	--	4,900	--	lm

Note:

Flux is measured with an accuracy of ± 10%.

Forward Voltage Characteristics

The following table describes forward voltage of EdiStar series.

< Table 5 Forward voltage characteristics at I_F=2,400mA/3,000mA and T_J=25℃ for EdiStar series >

Part Name	Color	V_F			Unit
		Min.	Typ.	Max.	
ENEW-05-0707-EB-1	Cool White	22.0	24.5	27.5	V
ENEH-05-0707-EE-1	Neutral White	22.0	24.5	27.5	V
ENEX-05-0707-EE-1	Warm White	22.0	24.5	27.5	V
ENEW-10-1010-EB-1	Cool White	30.0	33.0	36.0	V
ENEH-10-1010-EE-1	Neutral White	30.0	33.0	36.0	V
ENEX-10-1010-EE-1	Warm White	30.0	33.0	36.0	V

Note:

Forward Voltage is measured with an accuracy of ± 0.1V

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. EdiStar series is certified at level 4. This means EdiStar series has a floor life of 72 hours before EdiStar series emitters need to re-baked.

< Table 6 JEDEC characteristics at T_J=25℃ for EdiStar series >

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
4	72hours	≦30℃ / 60% RH	96 +5/-0	30℃ / 60% RH	20 +0.5/-0	60℃ / 60% RH

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Equivalent	
	Time	Condition	Time(hours)	Condition	Time(hours)	Condition
1	*Unlimited*	*≦ 30 ℃/85% RH*	*168 +5/-0*	*85 ℃/85% RH*		
2	*1 year*	*≦ 30 ℃/60% RH*	*168 +5/-0*	*85 ℃/60% RH*		
2a	*4 weeks*	*≦ 30 ℃/60% RH*	*696[1] +5/-0*	*30 ℃/60% RH*	*120 +1/-0*	*60 ℃/60% RH*
3	*168 hours*	*≦ 30 ℃/60% RH*	*192[1] +5/-0*	*30 ℃/60% RH*	*40 +5/-0*	*60 ℃/60% RH*
4	*72 hours*	*≦ 30 ℃/60% RH*	*96[1] +5/-0*	*30 ℃/60% RH*	*20 +5/-0*	*60 ℃/60% RH*
5	*48 hours*	*≦ 30 ℃/60% RH*	*72[1] +5/-0*	*30 ℃/60% RH*	*15 +5/-0*	*60 ℃/60% RH*
5a	*24 hours*	*≦ 30 ℃/60% RH*	*48[1] +5/-0*	*30 ℃/60% RH*	*10 +5/-0*	*60 ℃/60% RH*
6	*Time on tabel (TOL)*	*≦ 30 ℃/60% RH*	*TOL*	*30 ℃/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 EdiStar series package.

< Table 7 Reliability Items and Conditions >

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life	25℃, I_F = I_F Max DC current	1000 hours	Note 1
High Temperature High Humidity Storage Life	85℃ / 85%RH	1000 hours	Note 1
Non-Operating Temperature Cycle	-40℃/100℃ ,30 min dwell /＜5min transfer	200 cycles	Note 1
High Temperature Storage Life	85℃	1000 hours	Note 1
Low Temperature Storage Life	-40℃	1000 hours	Note 1
Non-Operating Thermal Shock	-40 / 125℃, 15 min dwell /＜10 sec transfer	300 cycles	Note 1

Notes:

1. A failure is a LED that is not fully lit, or less than 70% of its initial luminous flux.
2. All results of the above stress tests are 0 failures.

Failure Types

Catastrophic failures are failures that result in the LED emitting no light or very little light at normal current levels. Catastrophic failures are not expected for EdiStar series emitters that are handled and operated within the limits specified in EdiStar series documentation. Please refer to Absolute Maximum Ratings for more information on design limits.

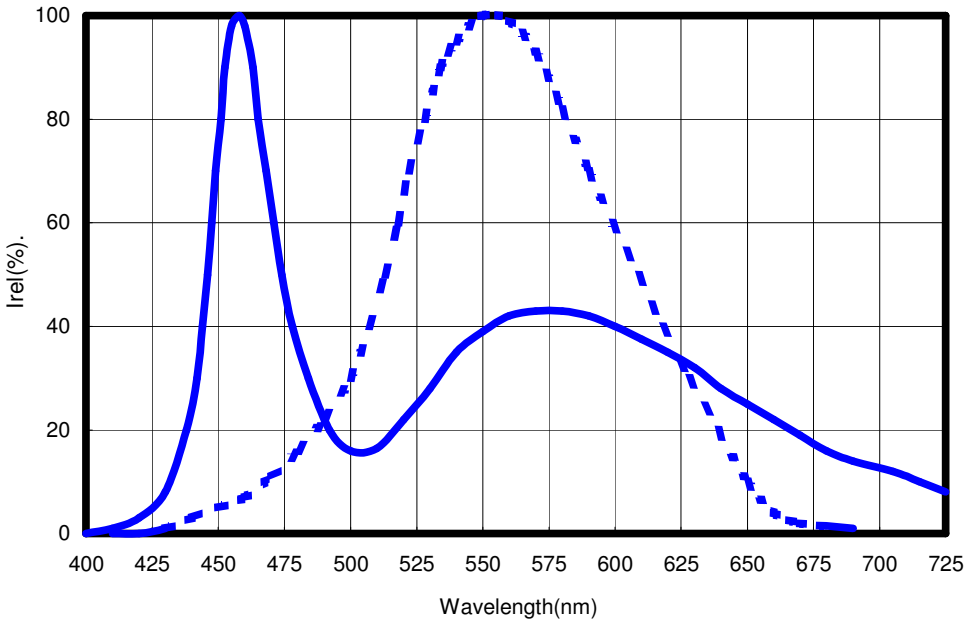
Parametric failures are failures that cause key characteristics to shift outside of acceptable bounds. The most common parametric failure, for a high-power LED, is permanent light output degradation over operating life. Most other light sources experience catastrophic failure at the end of their useful life, providing a clear indication that the light source must be replaced. For instance, the filament of an incandescent light bulb breaks and the bulb ceases to create light. In contrast, high-power LEDs generally do not experience catastrophic failure but simply become too dim to be useful in the intended application. Further discussion of this matter can be found in the Long-Term Lumen Maintenance Testing section of this document.

Another parametric failure common to white LEDs is a large and permanent shift in the exact color of white light output, called the white point or color point. A shift in white point may not be detectable in one LED by itself, but would be obvious in a

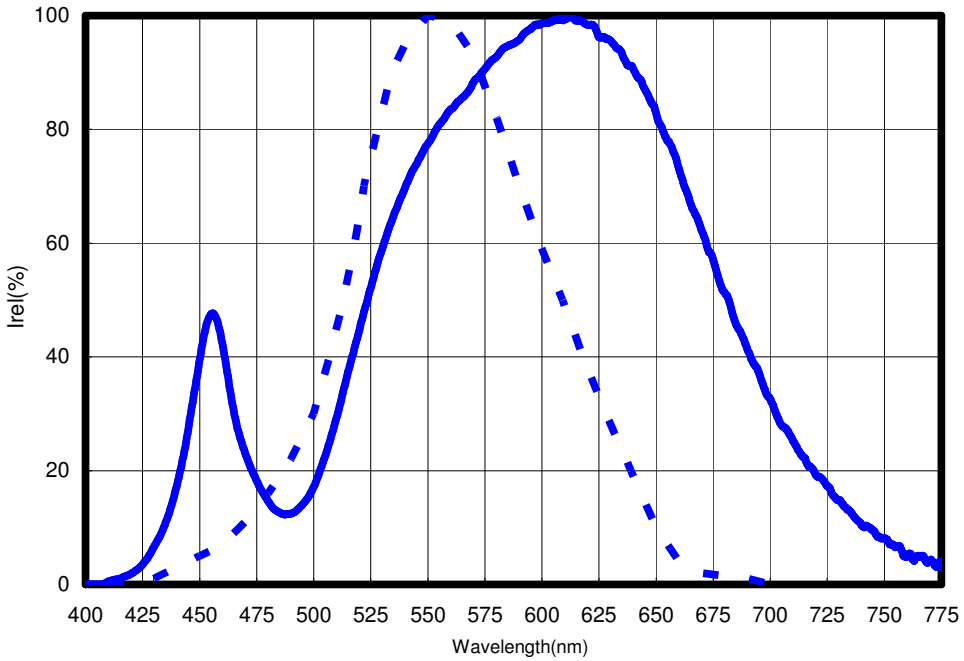
side-by-side comparison of multiple LEDs. Since each lighting installation commonly uses many high-power LEDs, white point stability is a point of concern for lighting designers. Typically, white high-power LEDs, created by combining blue LEDs with yellow (and sometimes red) phosphor, will shift towards blue over operational life. This shift can be accelerated by high temperatures and high drive currents. For example, a cool white (e.g., 6500K CCT) LED with a white point failure will typically appear light blue instead of white. In some high-power LEDs, this failure mode can occur after just 1,000 hours of operational life.

Just as with fluorescent light sources, all white high-power LEDs will experience shifts in white point over their operating lives. It is possible for the design of the phosphor and packaging systems to minimize these shifts and contain the shifts to be less than what is detectable by the human eye. As with catastrophic failures, parametric failures can be minimized by adhering to limits specified in EdiStar series documentation.

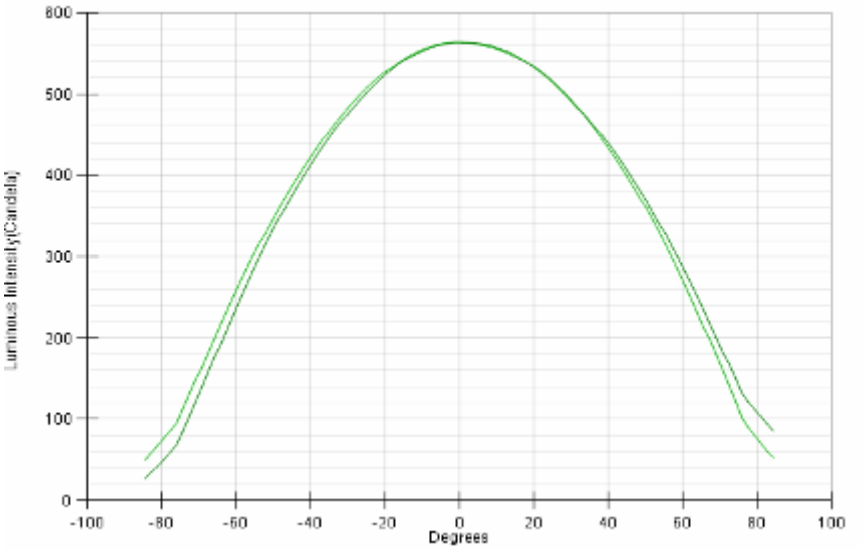
Color Spectrum and Radiation Pattern



< Figure 4 Cool White Color spectrum at T_J =25℃.for EdiStar series >



< Figure 5 Neutral White 、Warm White Color spectrum at T_J =25℃.for EdiStar series >



< Figure 6 Angular at T_J=25℃ for EdiStar series >

Emission Angle Characteristics

< Table 8 Emission angle characteristics at Tj=25℃ for EdiStar series>

Part Name	Color	2Θ½(Typ.) Lambertian	Unit
ENEW-05-0707-EB-1	Cool White	120	Deg.
ENEH-05-0707-EE-1	Neutral White	120	Deg.
ENEX-05-0707-EE-1	Warm White	120	Deg.
ENEW-10-1010-EB-1	Cool White	120	Deg.
ENEH-10-1010-EE-1	Neutral White	120	Deg.
ENEX-10-1010-EE-1	Warm White	120	Deg.

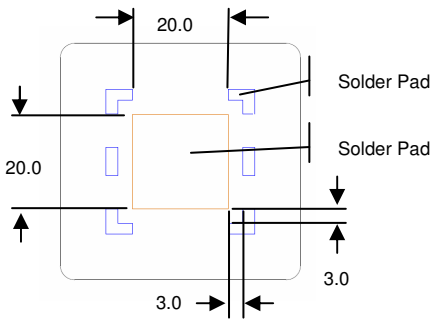
Correlated Color Temperature Characteristics T_J=25℃

< Table 9 Correlated Color Temperature Characteristics at T_J=25℃ for EdiStar series >

Part Name	Color	CCT		Unit
		Min.	Max.	
ENEW-05-0707-EB-1	Cool White	5,000	10,000	K
ENEH-05-0707-EE-1	Neutral White	3,800	5,000	K
ENEX-05-0707-EE-1	Warm White	2,670	3,800	K
ENEW-10-1010-EB-1	Cool White	5,000	10,000	K
ENEH-10-1010-EE-1	Neutral White	3,800	5,000	K
ENEX-10-1010-EE-1	Warm White	2,670	3,800	K

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 heatsink (heatsink contact).



< Figure 7 Pad dimensions >

Notes:

1. All dimensions are measured in mm.
2. MCPCB material with a thermal conductivity greater than 3.0 W/mK.
3. Please avoid touching the EdiStar center area during assembly processes .This may cause pollution or scratch on the EdiStar.

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 EdiStar series emitters are an electrically neutral heat path that is separate from the LED's electrical contacts. This electrically isolated thermal pad makes EdiStar series emitters perfect for use with either FR4 circuit boards with thermal via or with metal-core printed circuit boards (MCPCB).

Recommend Solder Steps

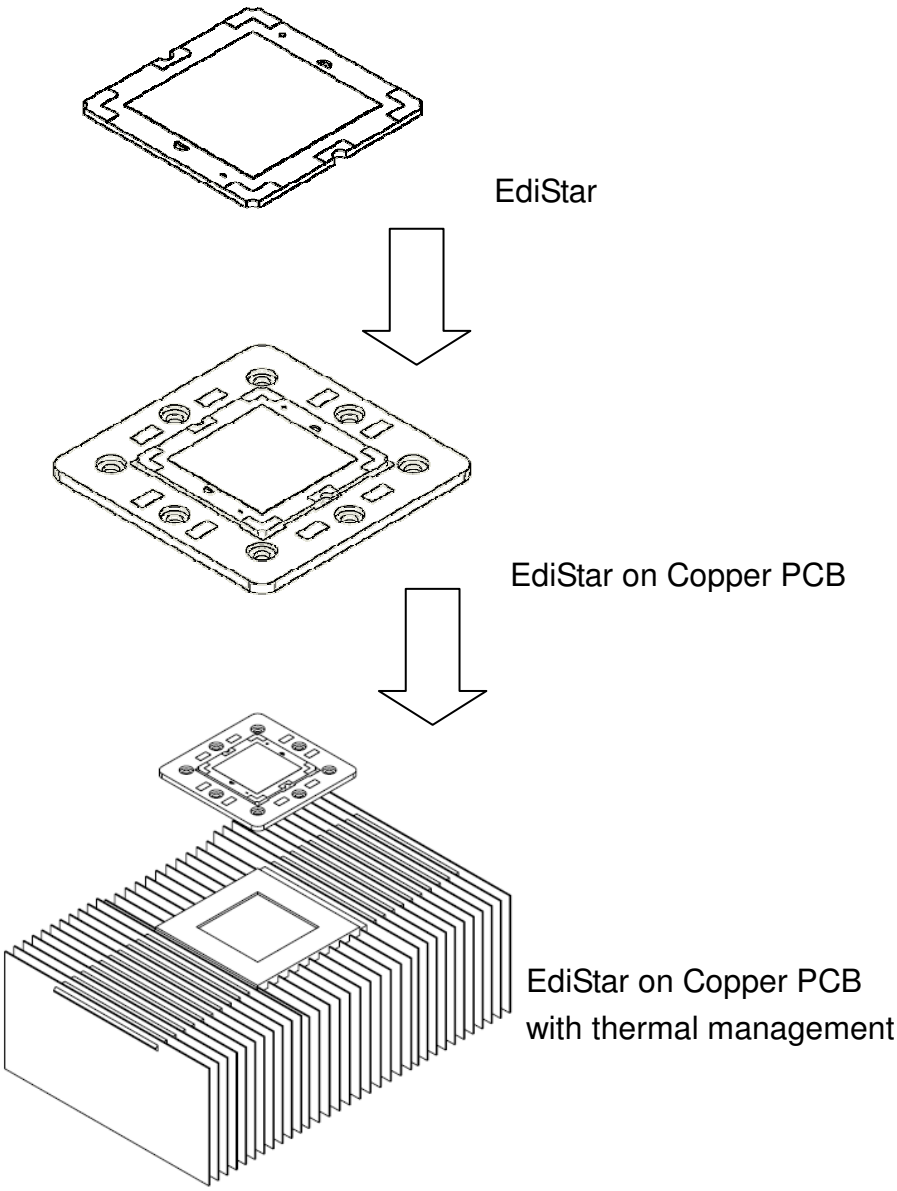
To prevent mechanical failure of LEDs in the soldering process, a carefully controlled pre-heat and post-cooling sequence is necessary. The heating rate in an IR furnace depends on the absorption coefficients of the material surfaces and on the ratio of the component's mass to its irradiated surface. 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 EdiStar series emitters on MCPCB this is very important)
- 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.

Product Thermal Application Information

Thermal grease should be evenly speeded with a thickness <100um.
When assembling on Copper PCB and heatsink carrier.



< Figure 8 EdiStar series heatsink application >

Note:

EdiStar series emitter will generate ultra high thermal power, therefore its need a great-design heatsink to dissipate heat.

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

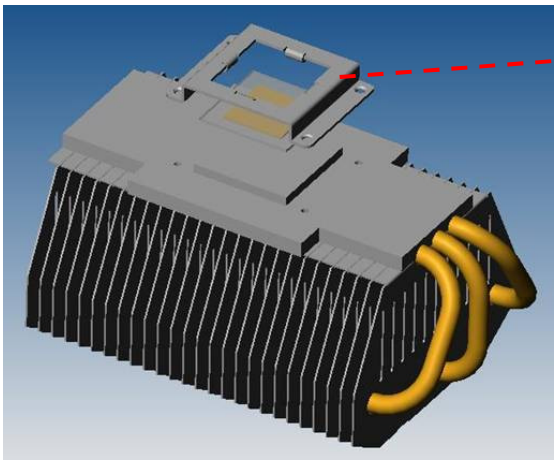
- Excellent thermal stability and cold resistance

  Cured rubber provides wide service temperature range

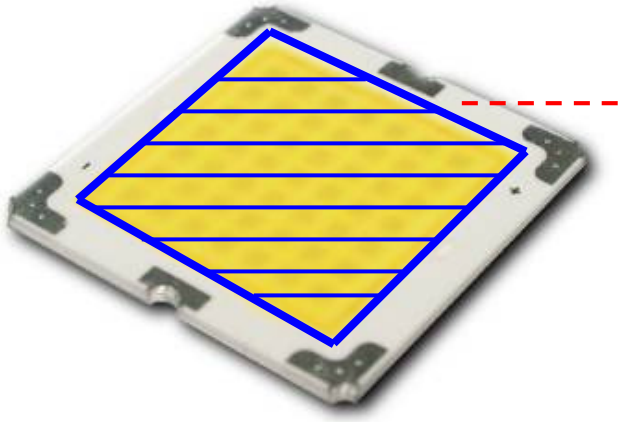
< Table 10 Specification for adhesive properties >

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

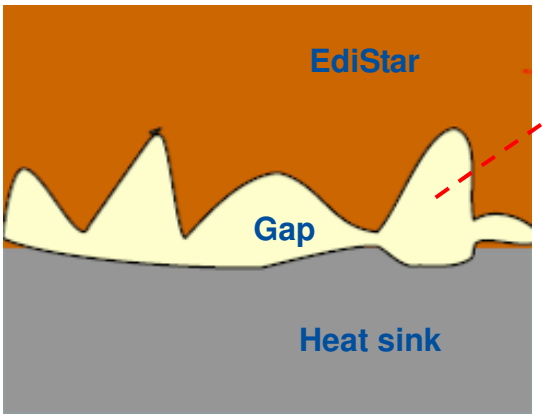
Recommended heat sink and attachment



The function of cover (clip) is used to fix and force EdiStar and heatsink to prevent the small gaps generate between the bottom surface of EdiStar and the top surface of heat sink.



The forced area is the edge of the EdiStar (outside the shaded emitting area).
The applied force on the EdiStar should not exceed 3kgf/cm^2.



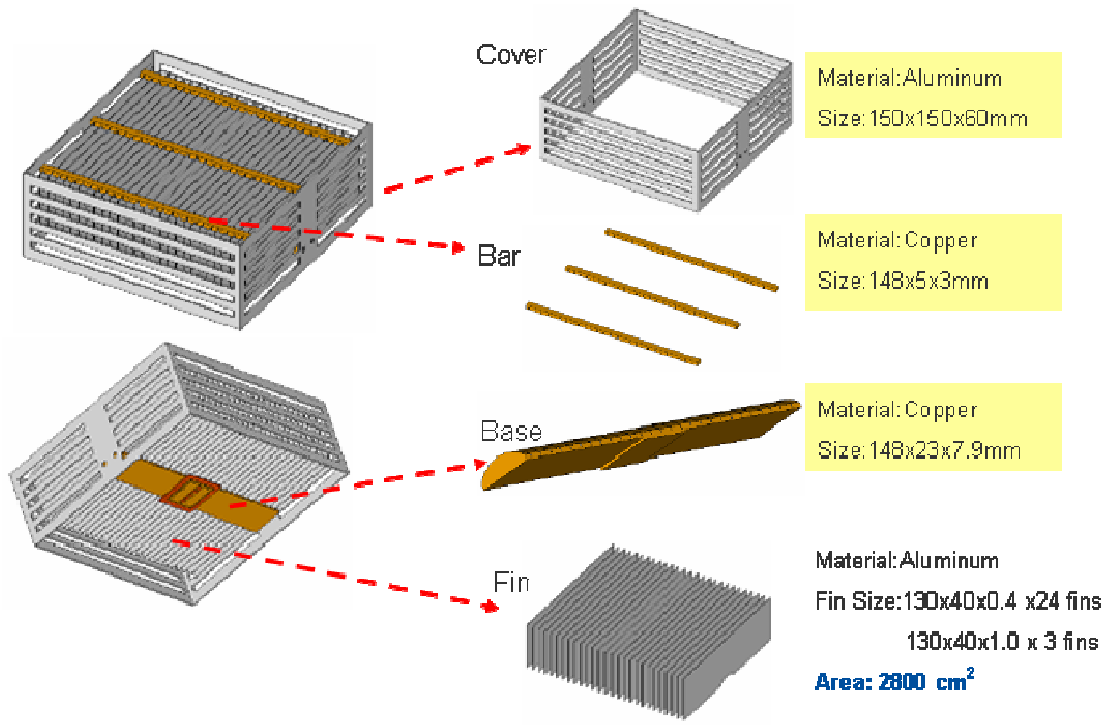
Without the applied force on EdiStar, the gap between EdiStar and heat sink will be filled with air. The thermal path would be affected such that the thermal resistance between the medium will increase.

< Figure 9 Heatsink and attachment >

Example for Thermal Management

Example 1

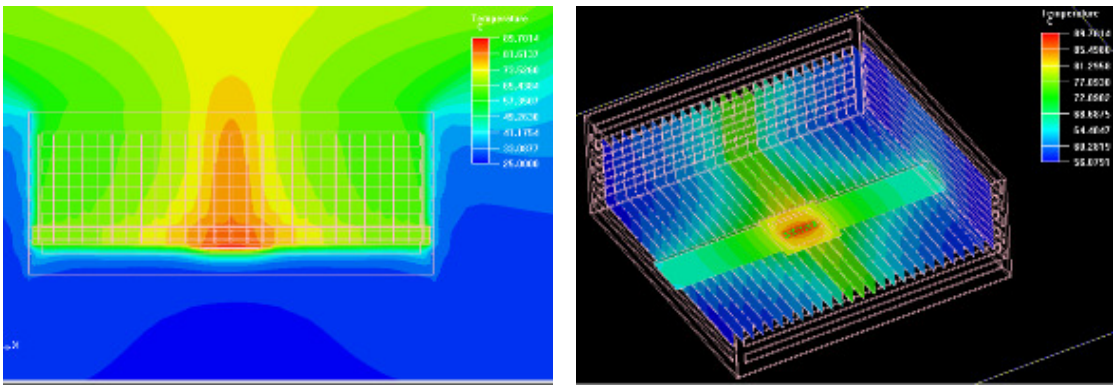
Mechanical Design



< Figure 10 Thermal heatsink design example 1 >

Thermal simulation data

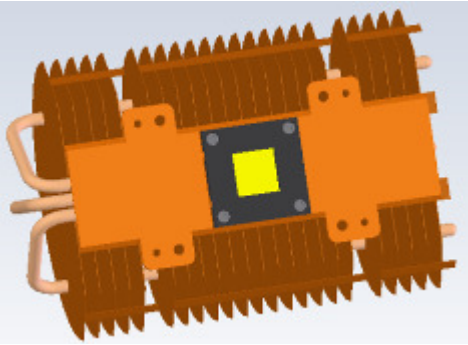
	Tmin (℃)	Tmax (℃)	Tavg (℃)
Chip	85.9	90.5	88.36
Slug	81.4	89.7	84.5
Base	65.8	88.1	73.8
Fin	56.1	84.8	66



< Figure 11 50W Thermal simulation temperature example 1 >

Example 2

Mechanical Design



Dimension: 170x130x100 mm

Surface area: 4,800cm^2

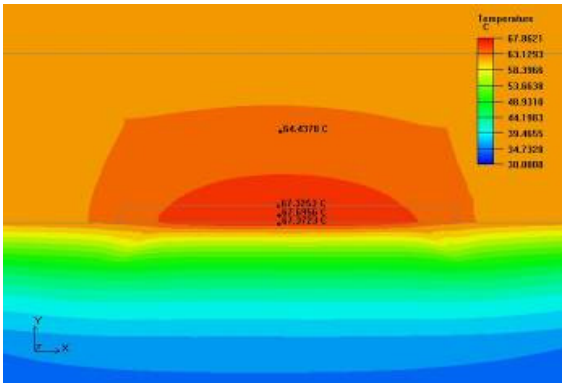
Use copper plate, heat pipe and fin for the thermal module.

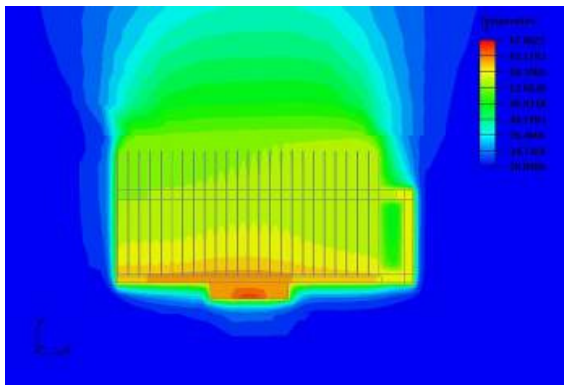
It can be more efficient to dissipate the LED generated heat

< Figure 12 Thermal heatsink design example 2>

Thermal simulation data

	Tmax (℃)	Tavg (℃)
Chip	68	65
Base	64	62
Fin	60	50



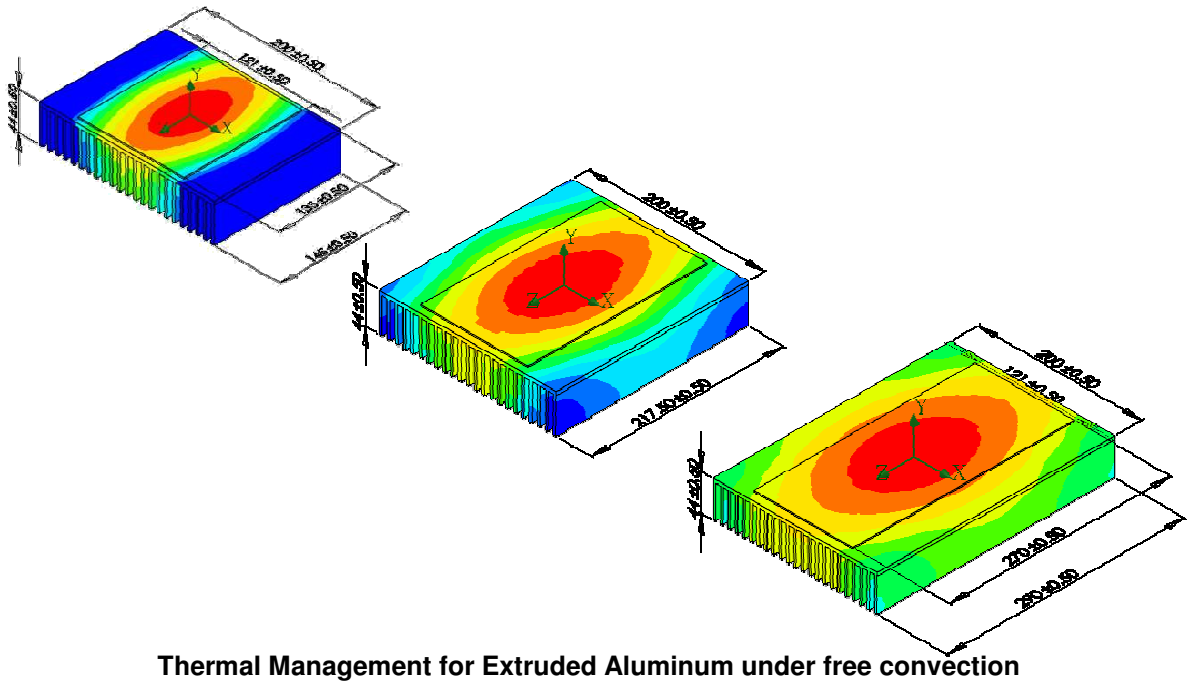


< Figure 13 50W Thermal simulation temperature example 2>

Example 3

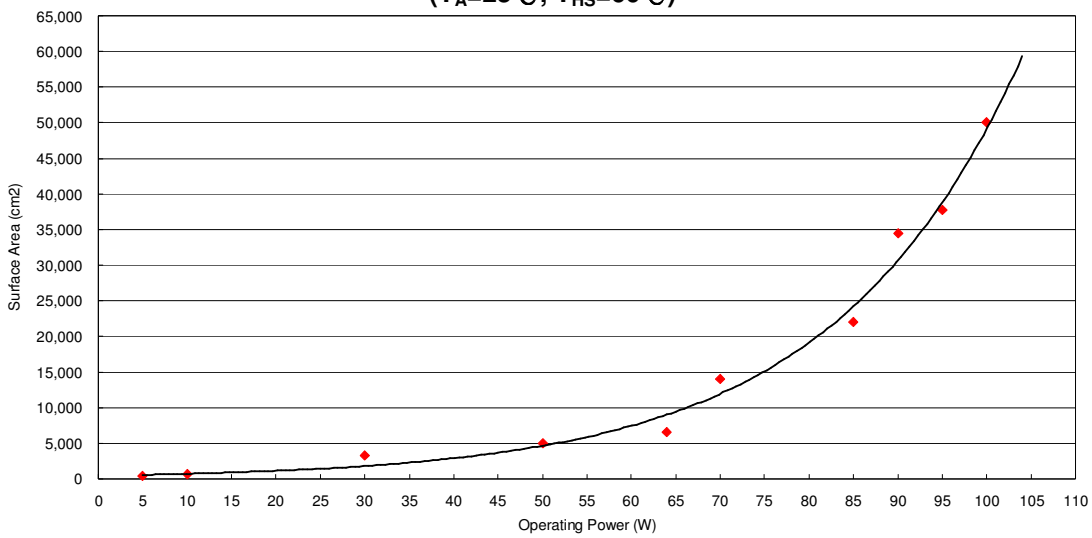
Design using extruded heatsink

Aluminum alloy 6063 is used for the thermal simulation. It is the common material used for extrusion heatsink. The specifications and parameters serve as design reference and are conditioned in the most ideally free convection environment. Result would vary if the extruded heatsink is placed in an enclosed environment under different ambient temperature.



Thermal Management for Extruded Aluminum under free convection

(T_A=25℃; T_{HS}=60℃)



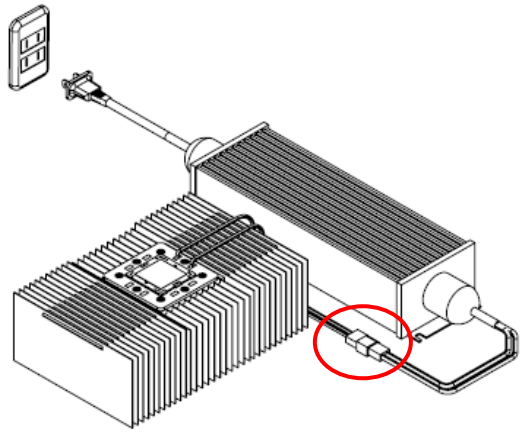
< Figure 14 Min. surface area for extrusion heatsink>

Product Electrical Application Information

Electrical Application

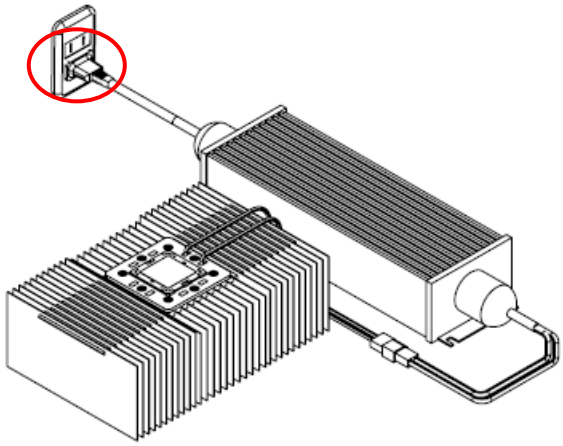
Following graphs and descriptions show how to connect LED or LED module and plug to AC outlet.

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



<Figure 15 LED Module connect to the DC output of the driver>

Step2: Plug the driver to AC outlet.



<Figure 16 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.

Recommended driver

Part No.: EP-C50C-2400

DC Output Forward Voltage: 18~36V

Output Current: 2.4A (constant current)

Made by High Perfection

Safety standard Compliance	Safety Certifications	
UL1310,Class 2 (Recognized) UL48 LVD EMI Stantards : FCC 47 CFR PART 15 Class A CE EN55022,EN61000-3-2,-3 CE EN61000-4-2,3,4,5,6,8,11	**E249377** c UL us FC CE IP66	SAFETY

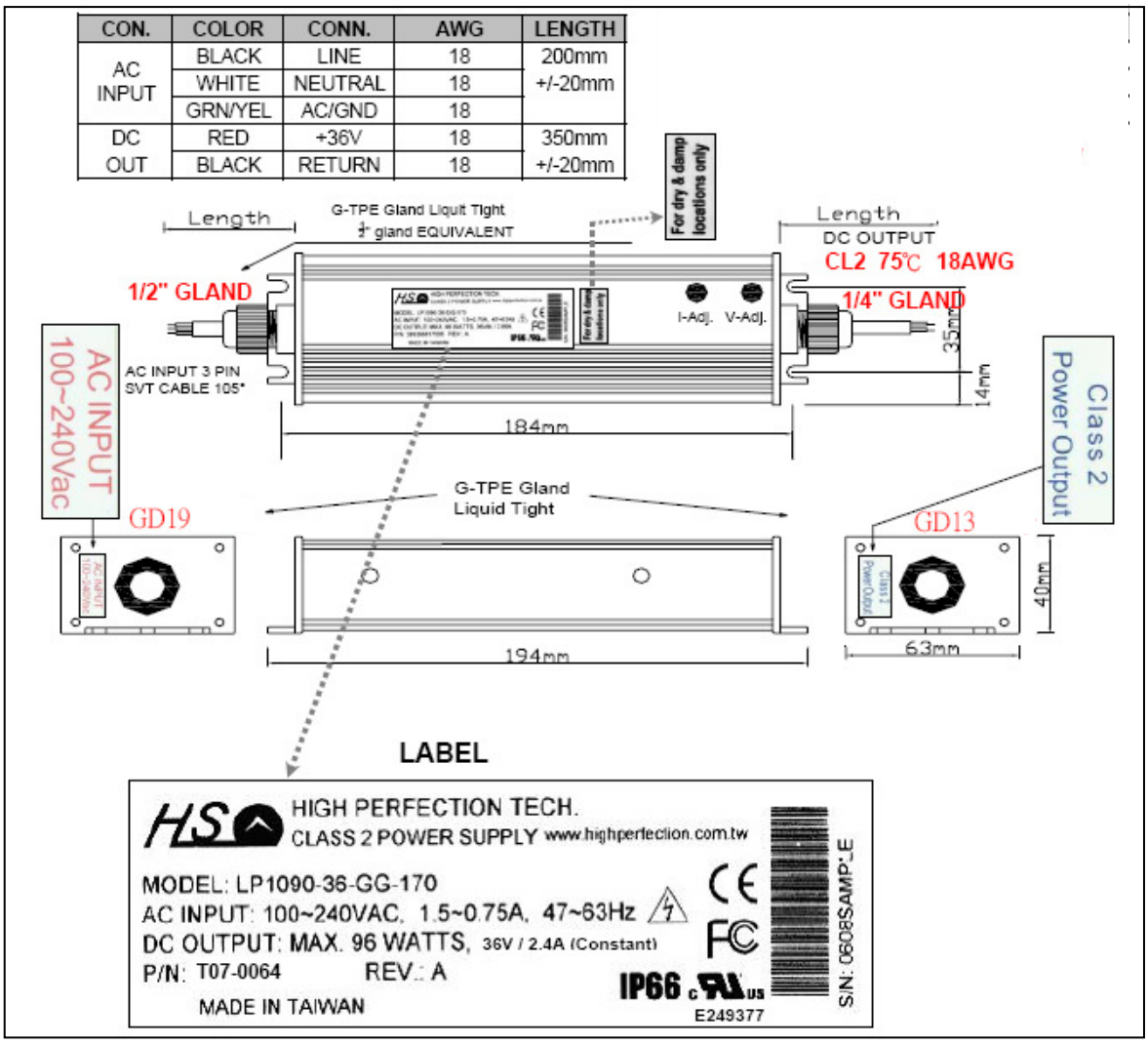
INPUT RANGE : 90~263VAC,1.5~0.75A@FULL LOAD FREQUENCY : 47~63Hz POWER FACTOR : >0.92 @115VAC @230VAC TOTAL HARMONIC DISTORTION : < 20% EFFICIENCY : 85% TYP. PEAK INRUSH : <20A@115VAC,40A@230VAC **LEAKAGE CURRENT : <0.7mA/230Vac**	INPUT

LOAD CAPACITY : 96 Watts DC OUTPUT MIN. MAX. LOAD REG. 36V 0.1Amps 2.66Amps +/-5% CALIBRATION SET : CONSTANT CURRENT MODE - **2.4A** 36 ~ 18 V +/- 3% CREST FACTOR : 1.5 MAX.	OUTPUT

PROTECTION : OCP,SCP - AUTO RECOVERY COOLING : CONVECTION , ALUMINUM HOUSING OPERATION TEMPERTURE : -30 ~ 70℃ TEMP. DE-RATING 1% PER℃ FROM 50℃ TO 70℃ RELATIVE HUMIDITY : 5 ~ 95% STORAGE TEMP. : -40℃ ~ 85℃ RELIABILITY(MTBF) : >100,000Hours @25℃ FULL LOAD (MIL-HDBK-217E) 3 YEARS WARANTY : PART AND LABOR APPLIABLE LOCATION : DRY OR DAMP,WET, IP66 Weight : 600g (Typical)	MISCELLANEOUS

< Figure 17 Recommended driver specifications >

Product Outlines (HS LP1090 series)



< Figure 18 Recommended driver dimensions >

Recommended driver

Part No.: CLG-150-36-A

DC Output Forward Voltage: 27~36V

Output Current: 4.2A (constant current)

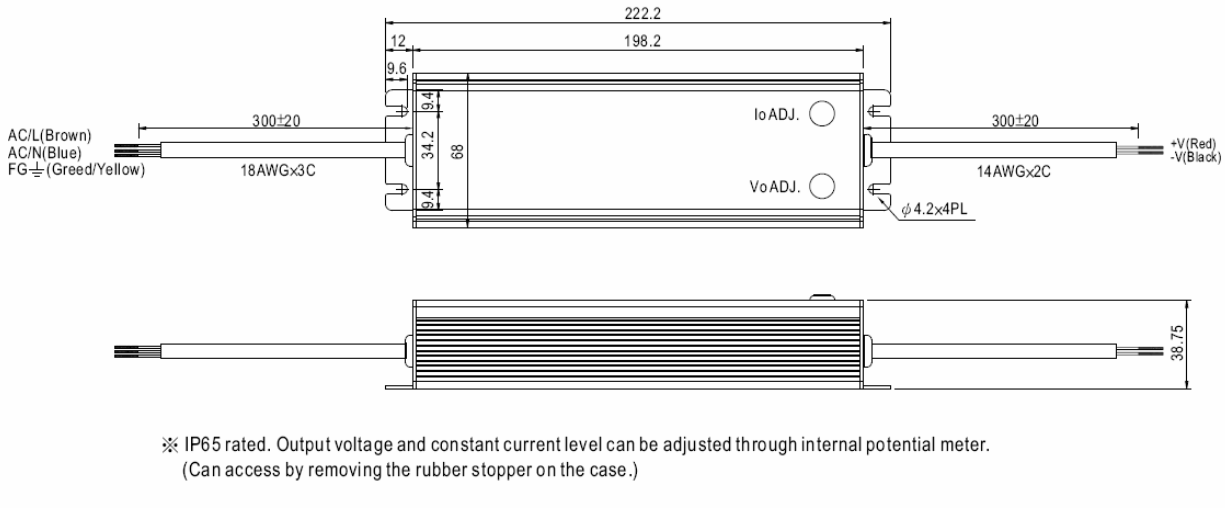
SPECIFICATION

MODEL		CLG-150-12☐	CLG-150-15☐	CLG-150-20☐	CLG-150-24☐	CLG-150-30☐	CLG-150-36☐	CLG-150-48☐
OUTPUT	DC VOLTAGE	12V	15V	20V	24V	30V	36V	48V
	CONSTANT CURRENT REGION Note.4	9 ~ 12V	11.25 ~ 15V	15 ~ 20V	18 ~ 24V	22.5 ~ 30V	27 ~ 36V	36 ~ 48V
	RATED CURRENT	11A	9.5A	7.5A	6.3A	5A	4.2A	3.2A
	RATED POWER	132W	142.5W	150W	151.2W	150W	151.2W	153.6W
	RIPPLE & NOISE (max.) Note.2	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE Note.6	9 ~ 13V	13 ~ 17V	17 ~ 22V	22 ~ 27V	26 ~ 32V	31 ~ 41V	40 ~ 56V
	CURRENT ADJ. RANGE	Can be adjusted by internal potential meter or through output cable						
		5.5 ~ 11A	4.75 ~ 9.5A	3.75 ~ 7.5A	3.15 ~ 6.3A	2.5 ~ 5A	2.1 ~ 4.2A	1.6 ~ 3.2A
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION	±1.0%	±1.0%	±1.0%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	3000ms, 80ms at full load 230VAC / 115VAC						
	HOLD UP TIME (Typ.)	50ms / 230VAC 16ms / 115VAC at full load						
INPUT	VOLTAGE RANGE Note.5	90 ~ 280VAC 127 ~ 396VDC						
	FREQUENCY RANGE	47 ~ 63Hz						
	POWER FACTOR	PF ≥ 0.95/230VAC PF ≥ 0.98/115VAC at full load and rated output voltage PF ≥ 0.9 at 75 ~ 100% load						
	EFFICIENCY (Typ.)	88%	88%	90%	90%	90%	89%	90%
	AC CURRENT	2A / 115VAC 1A / 230VAC						
	INRUSH CURRENT (max.)	COLD START 65A/230VAC						
	LEAKAGE CURRENT	<1mA / 240VAC						
PROTECTION	OVER CURRENT (Typ.) Note.4	95 ~ 108%						
		Protection type : Constant current limiting, recovers automatically after fault condition is removed						
	SHORT CIRCUIT Note.8	Hiccup mode, recovers automatically after fault condition is removed						
	OVER VOLTAGE	13.5 ~ 16V	18 ~ 20V	23 ~ 27V	28 ~ 34V	33 ~ 36V	42 ~ 48V	57 ~ 65V
		Protection type : Shut down and latch off o/p voltage, re-power on to recover						
	OVER TEMPERATURE	100℃ ±10℃ (RTH2)						
		Protection type : Shut down o/p voltage, re-power on to recover						
ENVIRONMENT	WORKING TEMP. Note.7	-30 ~ +55℃ @ full load ; +70℃ @ 60% load						
	WORKING HUMIDITY	20 ~ 95% RH non-condensing						
	STORAGE TEMP., HUMIDITY	-40 ~ +80℃, 10 ~ 95% RH						
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)						
	VIBRATION	10 ~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes						
SAFETY & EMC	SAFETY STANDARDS Note.9	UL1012 ; EN61347-1, EN61347-2-13 independent ; UL60950-1, TUV EN60950-1 (TBD)						
	WITHSTAND VOLTAGE	I/P-O/P:3.75KVAC I/P-FG:1.88KVAC O/P-FG:0.5KVAC						
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH						
	EMI CONDUCTION & RADIATION	Compliance to EN55015, EN55022 (CISPR22) Class B						
	HARMONIC CURRENT	Compliance to EN61000-3-2 Class C (≥75% load) ; EN61000-3-3						
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN61547, EN55024, light industry level (surge 4KV), criteria A						
OTHERS	MTBF	303.7Khrs min. MIL-HDBK-217F (25℃)						
	DIMENSION	222*68*39mm (L*W*H)						
	PACKING	1.0Kg; 12pcs/13Kg/0.49CUFT(CLG-150-A/B) 1Kg; 12pcs/13Kg/0.96CUFT(CLG-150-C)						
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Constant current operation region is within 75% ~100% rated output voltage. This is the suitable operation region for LED related applications, but please reconfirm special electrical requirements for some specific system design. 5. Derating may be needed under low input voltages. Please check the derating curve for more details. 6. Type A and type C only. 7. Please refer to derating curve. 8. Please refer to OLP characteristics. 9. Safety and EMC design refer to EN60598-1, subject 8750(UL), CNS15233, GB7000.1, FCC part18.							

File Name:CLG-150-SPEC 2009-02-02

< Figure 19 Recommended driver specifications >

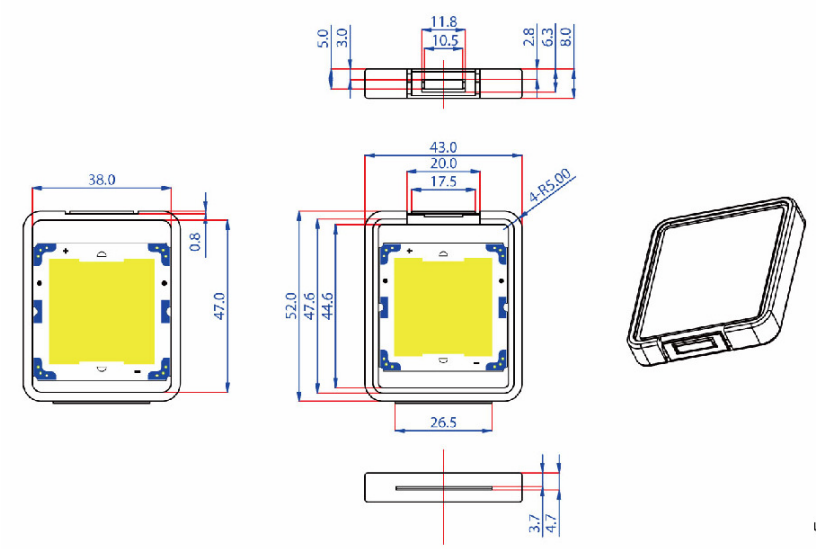
Product Outlines (CLG-150-36-A)



< Figure 20 Recommended driver dimensions >

Product Packaging Information

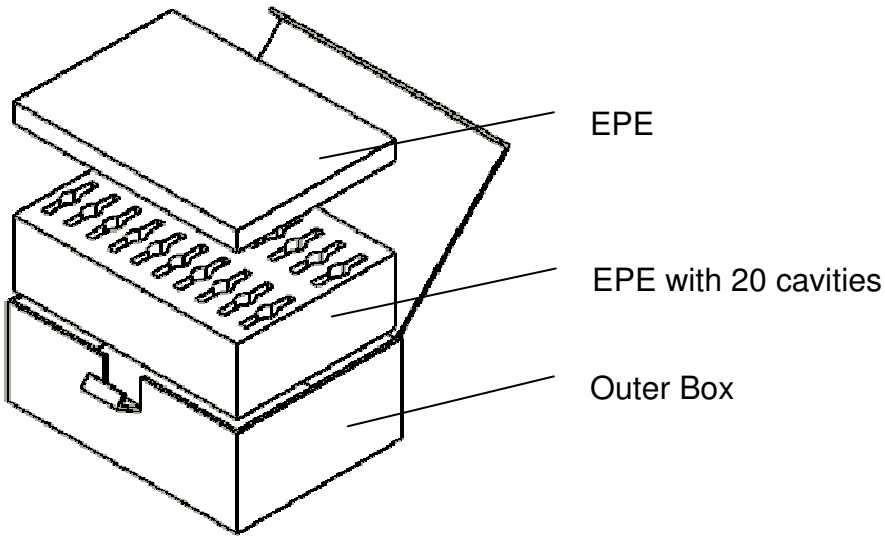
Package Specifications



< Figure 21 PP box dimensions>

Notes:

1. All dimensions are in mm.
2. Tolerance: ±0.2mm



< Figure 22 Outer box and EPE package>

< Table 11 Package dimensions and quantity >

Item	Quantity	Dimensions(mm)
PP Box	**1 pc**	**52*43*8**
Outer box	**20 PP boxes**	**240*170*90**