

**ELCS14B-KB4050J6J9283910-F4Z****Received** MASS PRODUCTION PRELIMINARY CUSTOMER DESIGN

DEVICE NO. : DHE-000XXXX

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**Revised record**

REV.	DESCRIPTION	RELEASE DATE
1	New spec	Jan.09.2017

## **Features**

- Feature of the device : small package with high efficiency
- Typical luminous flux@ 1A : 250 lm
- Optical efficiency@1A : 73.5 lm/W
- ESD protection (according to JEDEC 3b) (HBM air or contact discharge) up to 2KV
- Binning Parameters : Brightness, Forward Voltage and Chromaticity
- Grouping parameter: total luminous flux, color coordinates.
- RoHS compliant & Pb free.
- Compliance with EU REACH
- Compliance Halogen Free (Br<900 ppm, Cl<900ppm , Br+Cl<1500 ppm)

## **Applications**

- Mobile Phone Camera Flash(Camera flash light /strobe light for mobile devices )
- Torch light for DV(Digital Video) application
- Indoor lighting applications
- Signal and symbol luminaries for orientation maker lights (e.g. steps, exit ways, etc.)
- TFT backlighting
- Exterior and interior illumination applications
- Decorative and Entertainment Lighting
- Exterior and interior automotive illumination

## Device Selection Guide

Chip Materials	Emitted Color
InGaN	White

## Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
DC Forward Current (Torch Mode)	$I_F$	350	mA
Peak Pulse Current	$I_{Pulse}$	1500	mA
ESD Resistance (JEDEC 3b)	$V_B$	2	KV
Reverse Voltage	$V_R$	Note 1	V
Junction Temperature	$T_j$	150	°C
Operating Temperature	$T_{Opr}$	-40 ~ +85	°C
Storage Temperature	$T_{Stg}$	-40 ~ +100	°C
Soldering Temperature	$T_{Sol}$	260	°C
Allowable Reflow Cycles	n/a	2	Cycles
Substrate Temperature	$T_s$	70( $I_F=1000\text{mA}$ )	°C
Viewing Angle <sub>(2)</sub>	$2\theta_{1/2}$	120	Deg
Power Dissipation (Pulse Mode)	$P_d$	5.9	W

### Notes:

1. The CSP series LEDs are not designed for reverse bias used.
2. View angle measurement tolerance  $\pm 5^\circ$
3. Avoid operating CSP series LEDs at maximum operating temperature exceed 1 hour.
4. All specification are assured by reliability test for 1000hr, IV degradation less than 30%.
5. All reliability item are tested under good thermal management with  $1.0 \times 1.0 \text{ cm}^2$  MCPCB
6. Peak pulse current shall be applied under conditions as max duration time 400 ms and max duty cycle 10%
7. Operate LED component at maximum rating conditions continuously will cause possible permanent damage and de-rating parameters. Exercise multiple maximum rating parameters simultaneously should not be allowed. When maximum rating parameters are applied over a long period will result potential reliability issue.

## JEDEC Moisture Sensitivity

Level	Floor Life		Soak Requirements Standard	
	Time ( hours )	Conditions	Time ( hours )	Conditions
1	Unlimited	$\leq 30^{\circ}\text{C} / 85\% \text{ RH}$	168 (+5/-0)	$85^{\circ}\text{C} / 85\% \text{ RH}$

## Electro-Optical Characteristics (Ts=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Flux <sub>(1)</sub>	I <sub>V</sub>	220	250	----	lm	
Forward Voltage <sub>(2)(3)</sub>	V <sub>F</sub>	2.85	----	3.95	V	
Color Temperature	CCT	4000	4500	5000	K	
Color Rendering Index <sub>(6)</sub>	CRI	80	83	----		

## Forward Voltage Binning

Bin	Symbol	Min.	Typ.	Max.	Unit	Condition
2832	V <sub>F</sub>	2.85	----	3.25		
3235	V <sub>F</sub>	3.25	----	3.55	V	
3539	V <sub>F</sub>	3.55	----	3.95		

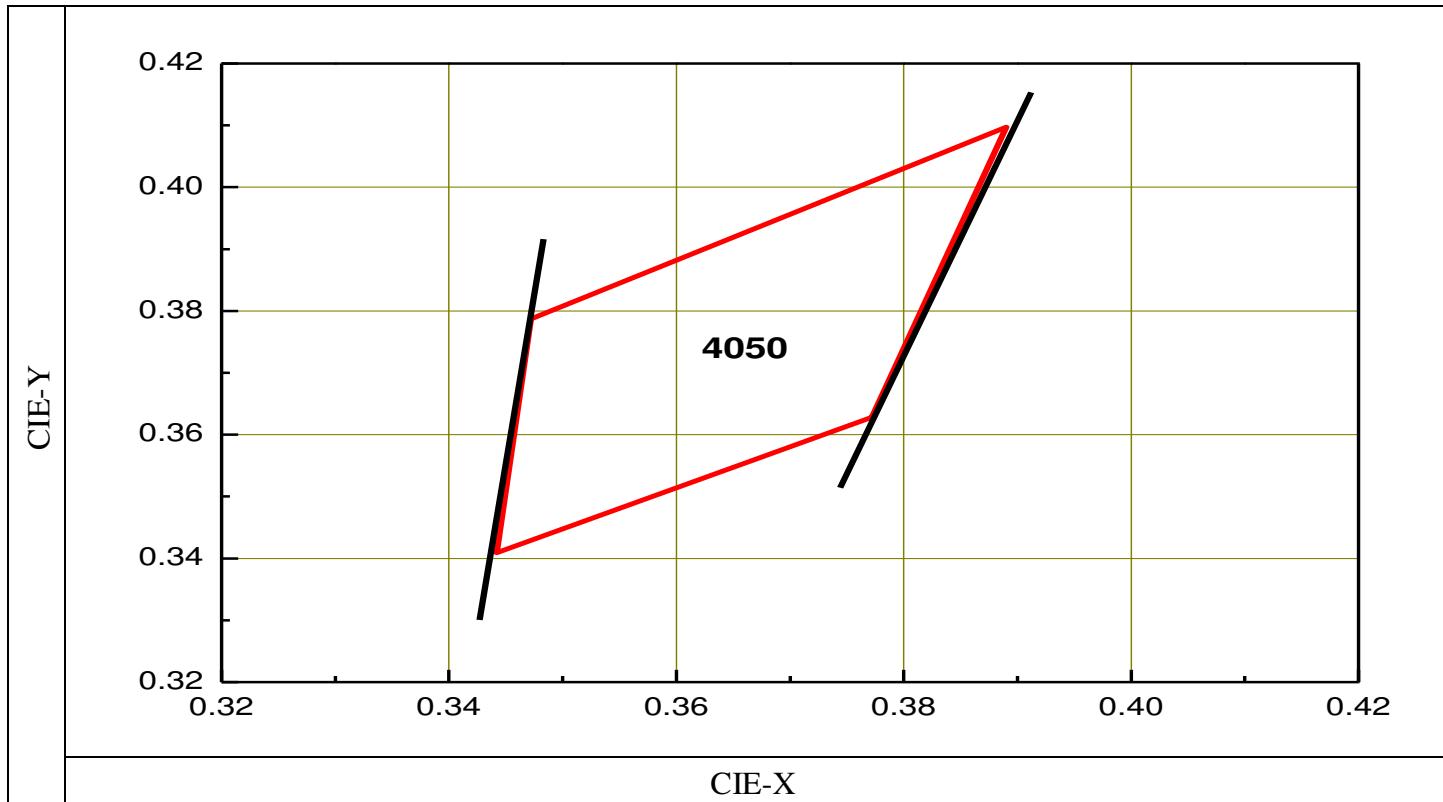
## Luminous Flux Binning

Bin	Symbol	Min.	Typ.	Max.	Unit	Condition
J6	I <sub>V</sub>	220	----	250		
J7	I <sub>V</sub>	250	----	300		
J8	I <sub>V</sub>	300	----	330		
J9	I <sub>V</sub>	330	----	360		

### Notes:

1. Luminous Flux, illuminance measurement tolerance :  $\pm 10\%$
2. Forward voltage measurement tolerance :  $\pm 0.1\text{V}$
3. Electric and optical data is tested at 50 ms pulse condition.
4. Temperature of solder pad :  $25^{\circ}\text{C}$
5. Color Rendering Index measurement tolerance:  $\pm 2$

## White Bin Structure

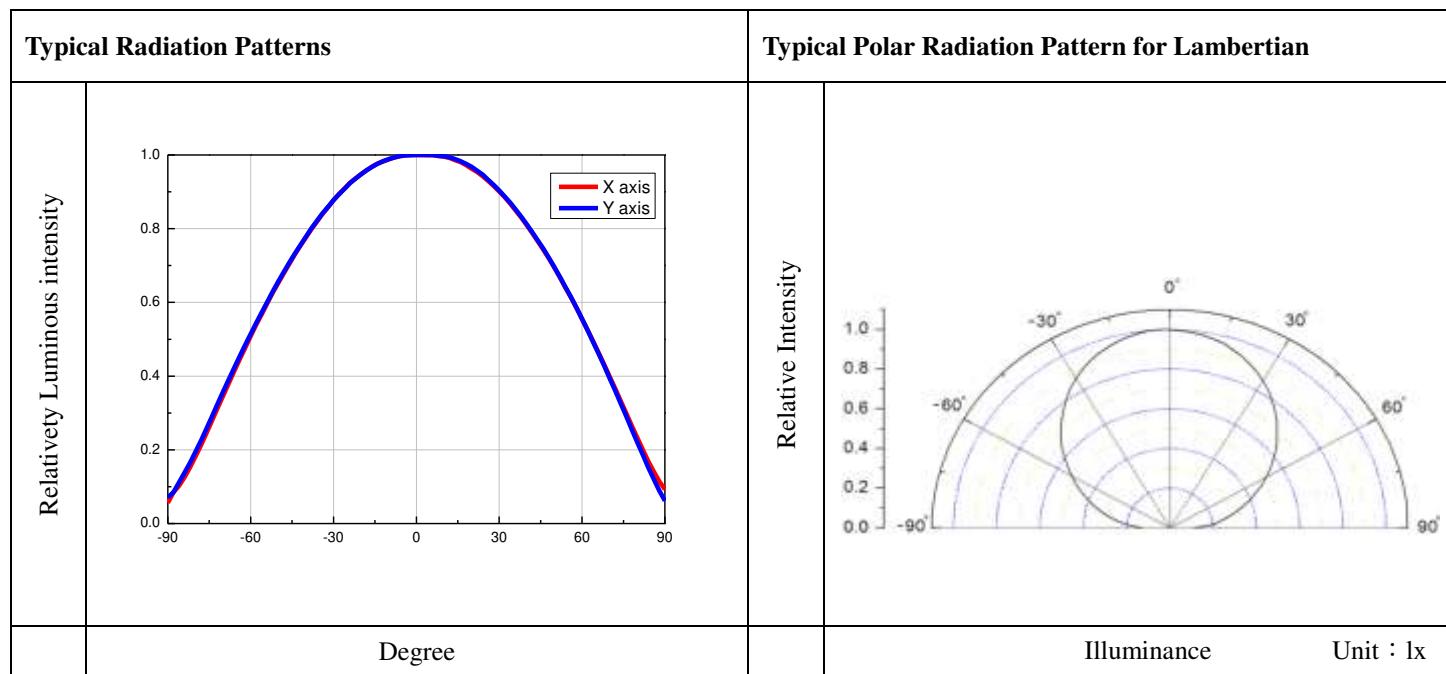
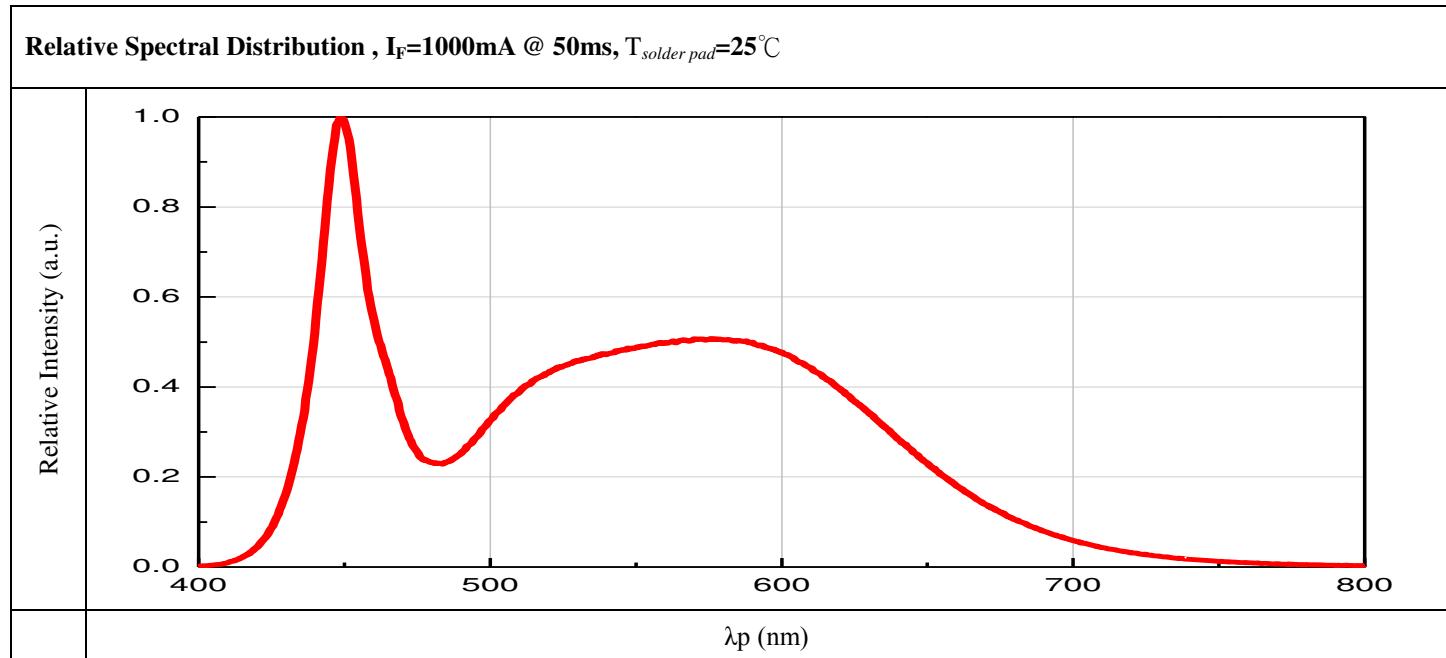


Bin	CIE-X	CIE-Y	Reference Range
4050	0.3472	0.3787	
	0.3890	0.4097	
	0.3772	0.3628	4000 ~ 5000K
	0.3442	0.3409	

### Notes:

1. Color coordinates measurement allowance :  $\pm 0.01$
2. Color bins are defined at  $I_F=1000\text{mA}$  operation.

## Typical Electro-Optical Characteristics Curves



### Notes:

1.  $2\theta_{1/2}$  is the off axis from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is  $\pm 5^\circ$

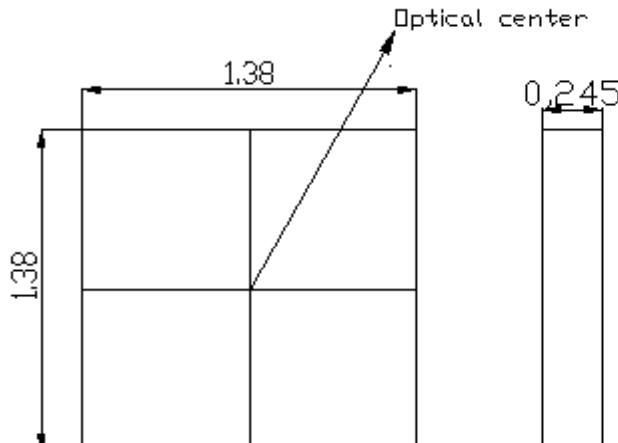
Forward Voltage vs. Forward Current ( $T_{solder\ pad}=25^{\circ}\text{C}$ )		Relative Luminous Flux vs. Forward Current ( $T_{solder\ pad}=25^{\circ}\text{C}$ )	
Forward Voltage (V)		Relative Luminous Flux	
	<b>TBD</b>		<b>TBD</b>
Forward Current (mA @ 50ms)		Forward Current (mA @ 50ms)	

CCT vs. Forward Current ( $T_{soldering\ pad}=25^{\circ}\text{C}$ )	
Corelated Color Temperature(K)	
	<b>TBD</b>
Forward Current (mA @ 50ms)	

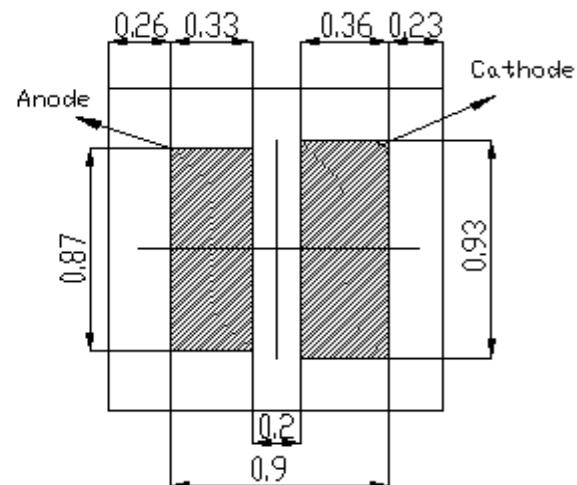
**Notes:**

1. All correlation data is tested under superior thermal management with  $1 \times 1 \text{ cm}^2$  MCPCB.

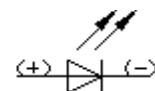
## Package Dimension



Top view



Bottom view



### Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.05$ mm

## Moisture Resistant Packing Materials

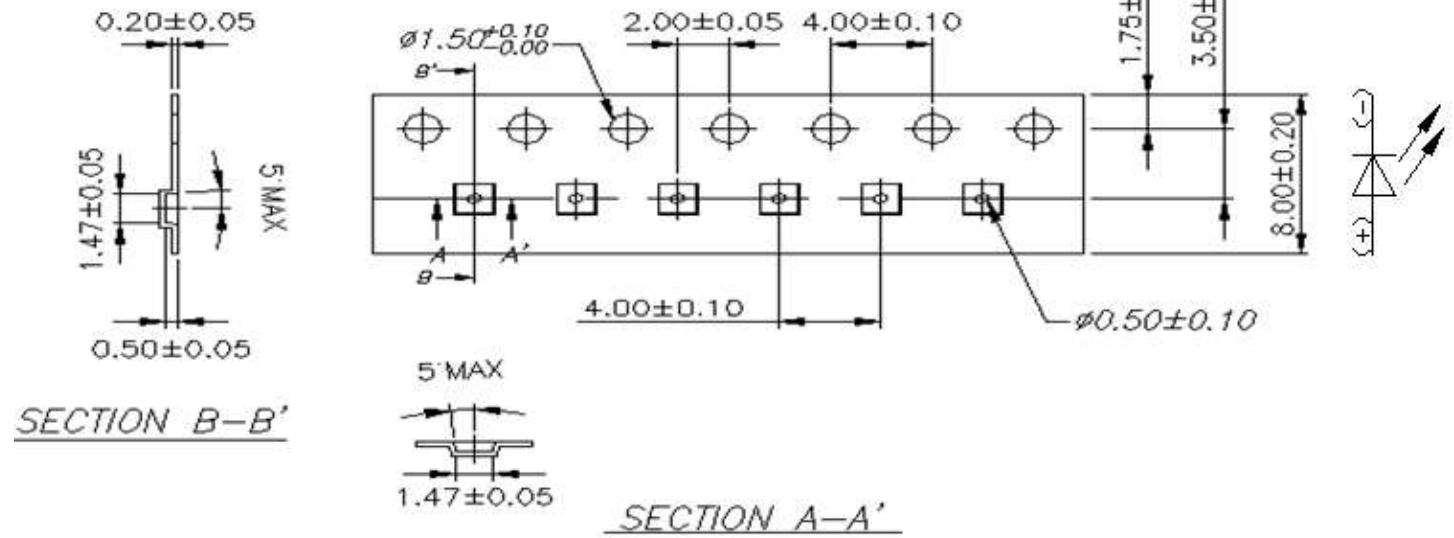
### Product Labeling



- CPN:Customer's Product Number
- P/N:Everlight Product Number
- LOT NO:Lot Number
- QTY:Packing Quantity
- CAT:Luminous Flux (Brightness) Bin
- HUE:Color Bin
- REF:Forward Voltage Bin
- REFERENCE:Reference
- MSL-X:MSL Level

## **Carrier Tape Dimensions: Loaded Quantity 2000 pcs Per Reel**

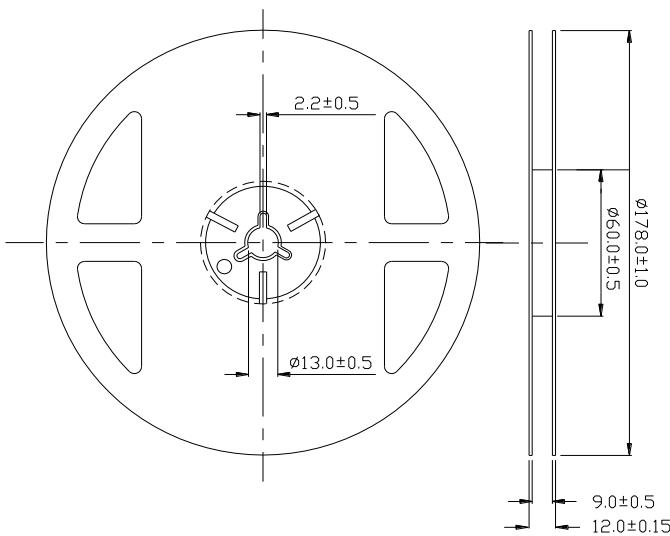
**(Minimum Package Quantity :1000 PCS)**



### **Notes:**

1. Dimensions are in millimeters.

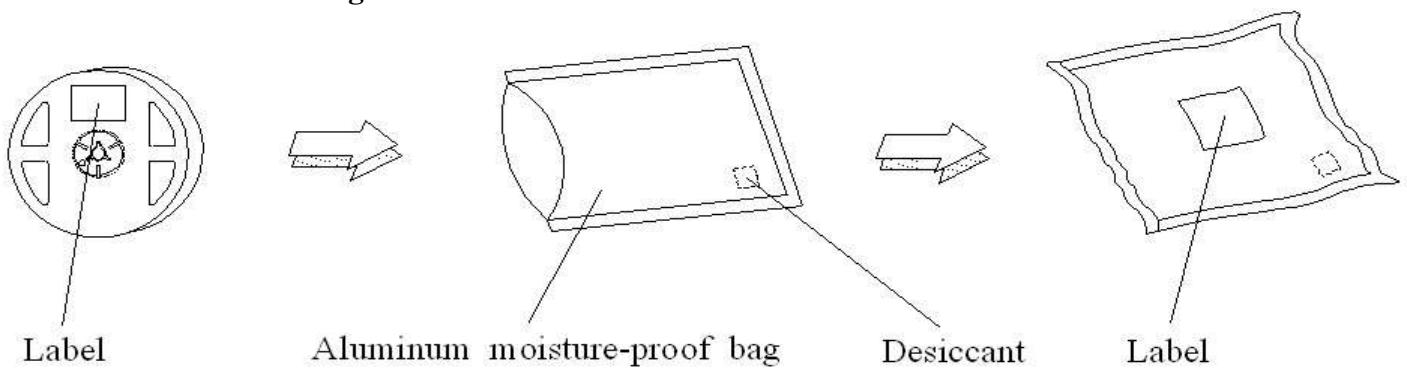
## **Emitter Reel Dimensions**



### **Notes:**

1. Dimensions are in millimeters.

## Moisture Resistant Packing Process



## Reflow Soldering Characteristics

### Soldering and Handling

#### 1. Storage

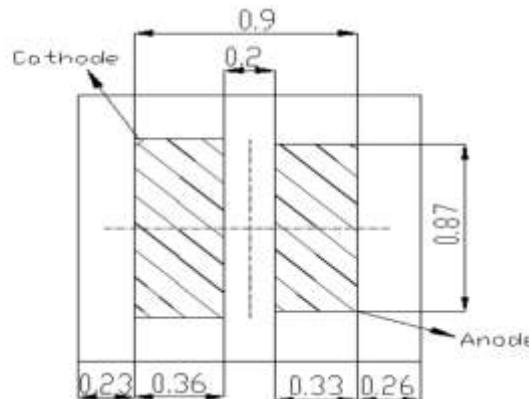
- 1.1 Do not open the moisture proof bag before the products are ready to use.
- 1.2 Before opening the package, the LEDs should be stored at temperature less than 30°C and relative humidity less than 90%
- 1.3 After opening the package, the LEDs should be stored at temperature less than 30°C and relative humidity less than 85%.
- 1.4 If the moisture absorbent material (silicone gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be implemented based on the following conditions: Pre-curing at  $60\pm5^\circ\text{C}$  for 24 hours

#### 2. Thermal Management

- 2.1 For maintaining the high flux output and achieving reliability, CSP series LEDs should be mounted on a metal core printed circuit board (MCPCB), with proper thermal connection to dissipate approximately 1W to 5W of thermal energy under normal operation.
- 2.2 Sufficient thermal management must be conducted, or the die junction temperature will be over the limit under large electronic driving and LEDs lifetime will decrease critically.
- 2.3 When operating, the solder pad temperature (or the board temperature nearby the LED) must be controlled under  $70^\circ\text{C}$ .

### 3. Soldering Condition

#### 3.1 Soldering Pad

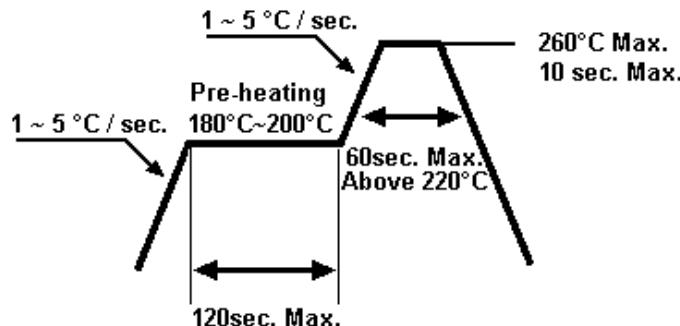


Recommended soldering pattern layout



#### 3.2 For Reflow Process

##### 3.2.1 Lead reflow soldering temperature profile



##### 3.2.2 Reflow soldering should not be done more than two times.

##### 3.2.3 While soldering, do not put stress on the LEDs during heating.

##### 3.2.4 After soldering, do not warp the circuit board.

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2. The product meets EVERLIGHT published specification for a period of twelve (12) months from date of shipment.
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