

## AB-GES-C14124Wxx1N2

### Features:

- 24W small size(140mm) circular AC LED light engine
- SimpleDrive® - 120V AC drive technology
- Driver on Board structure
- Long life - No Electrolytic capacitors
- Easily integrated
- UL Recognized – E361187

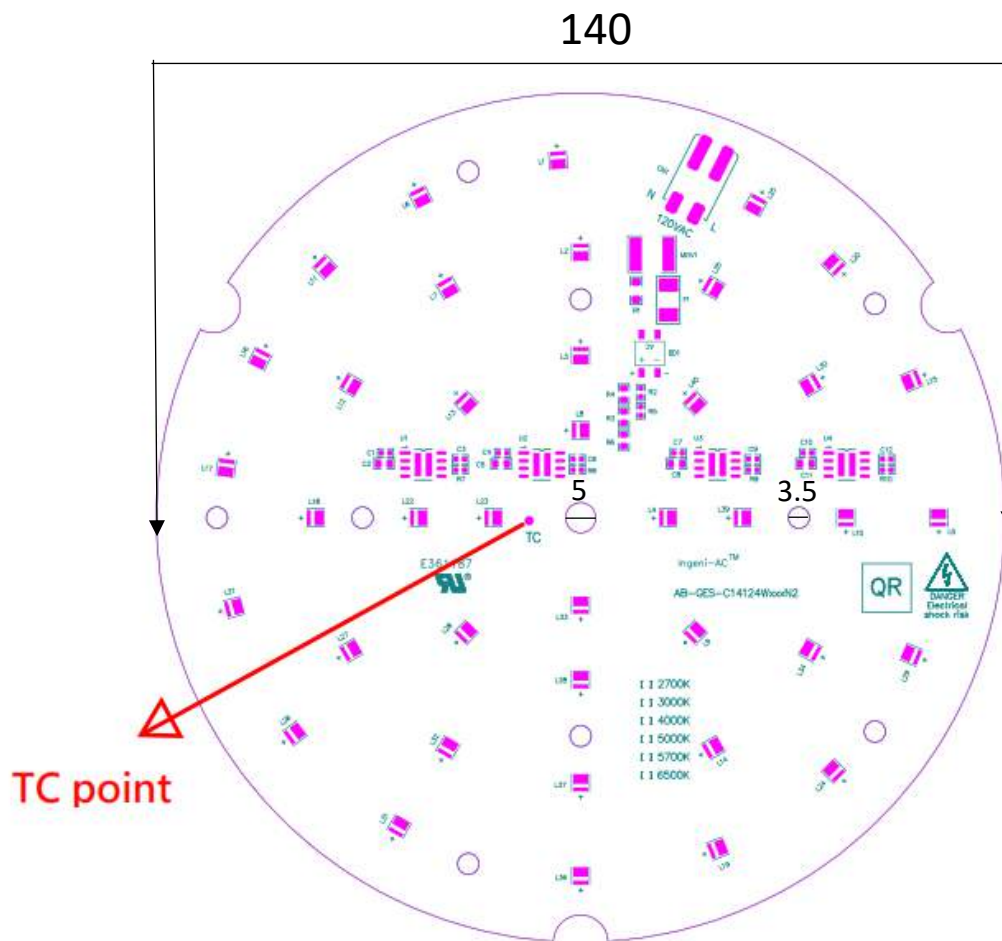


Figure: AC Module

### Applications:

- Downlight (Diffused type)
- Can Lights
- Track Lights
- Wall Sconces
- In Ground Lights
- Spot Lights
- Vandal Proof Lights
- Ceiling Lights

## Outline Dimensions



40 LEDs

Units: mm

### Notes:

1. Terminal block is used and No wire connected.
2. Thickness of PCB is 1.2mm, there's the thermal tape in the back side of module.
3. Tolerance of dimension is  $\pm 0.1\text{mm}$
4. IMPORTANT: In order to pass UL1598, add an insulating thermal pad with at least 1.0mm thickness to the module.
5. Screw hole diameter: 3.5mm x 9; 5mm x1



## Characteristics

### Absolute Maximum Ratings

| Parameter                               | Symbol           | Rating       | Unit |
|-----------------------------------------|------------------|--------------|------|
| Input Voltage                           | V <sub>in</sub>  | 130          | Vac  |
| LED Junction Temperature <sup>[2]</sup> | T <sub>J</sub>   | 115          | °C   |
| Storage Temperature                     | T <sub>stg</sub> | -40 ~ 100 °C | °C   |
| Operation Temperature                   | T <sub>opr</sub> | -40 ~ 85 °C  | °C   |

- Proper current rating must be observed to maintain junction temperature below maximum at all time. For this product, we suggest to keep the Temperature of TC point under 75°C, and the temperature of Top IC surface under 110°C. After passing the maximum temperature of IC, the rating current will be lower automatically for protecting the whole circuit.

### Electrical Characteristics, Ta=25°C

| Parameter                    | Symbol          | Min.  | Typ. | Max. | Unit |
|------------------------------|-----------------|-------|------|------|------|
| Input Voltage                | V <sub>in</sub> | 110   |      | 130  | Vac  |
| Input Frequency              | Freq.           | 50/60 |      |      | Hz   |
| Power Factor                 | PF              | 0.9   |      | 0.95 | -    |
| Flicker % <sup>[1]</sup>     |                 | 100%  |      |      |      |
| Flicker Index <sup>[1]</sup> |                 | 0.3   |      |      |      |

- Surge protection is up to 0.5KV

### Optical Characteristics (V<sub>in</sub>=120V), Ta=25°C

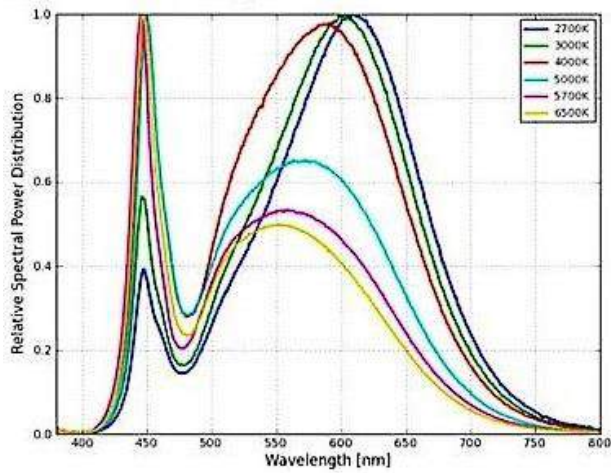
| Model name          | AC Power(W) |      |      | Color Temp | Luminous Flux(lm) |      | CRI |
|---------------------|-------------|------|------|------------|-------------------|------|-----|
|                     | Min         | Typ. | Max  | (K)        | Min               | Typ  |     |
| AB-GES-C14124W301N2 | 20.4        | 24.0 | 27.6 | 3000K      | 2260              | 2400 | >80 |
| AB-GES-C14124W401N2 | 20.4        | 24.0 | 27.6 | 4000K      | 2480              | 2700 | >80 |
| AB-GES-C14124W501N2 | 20.4        | 24.0 | 27.6 | 5000K      | 2480              | 2700 | >80 |

- Correlated color temperature is derived from the CIE 1931Chromaticity diagram.
- The luminous flux tolerance is ± 10%.
- This CRI value tolerance is ± 2.
- Calibration accuracy of CIEx and CIey : ±0.007 ;
- Calibration error CCT 3000K ±175K ; 4000K ±300K ; 6500K ±400K

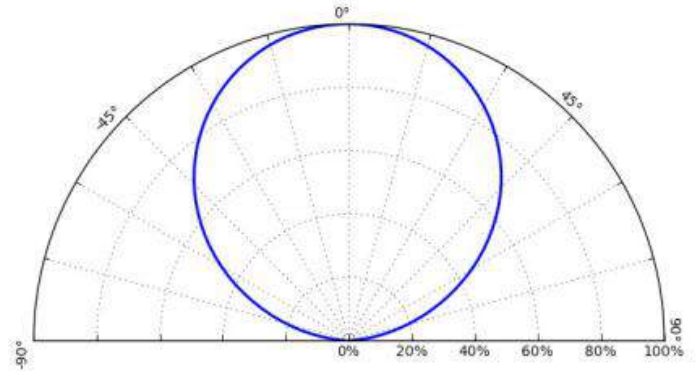
### Thermal Resistance, Ta=25°C

| Part | Min. | Typ. | Max. | Unit |
|------|------|------|------|------|
| LED  |      | 12   |      | °C/W |
| IC   | 15   |      | 20   | °C/W |

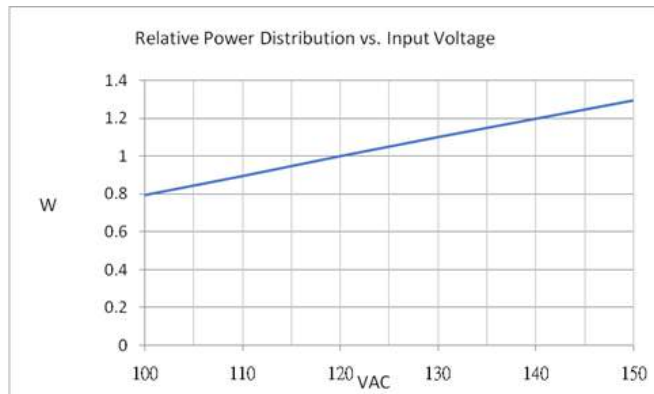
### ■ Relative Spectrum of Emission (Ta=25°C, Test current=60mA)



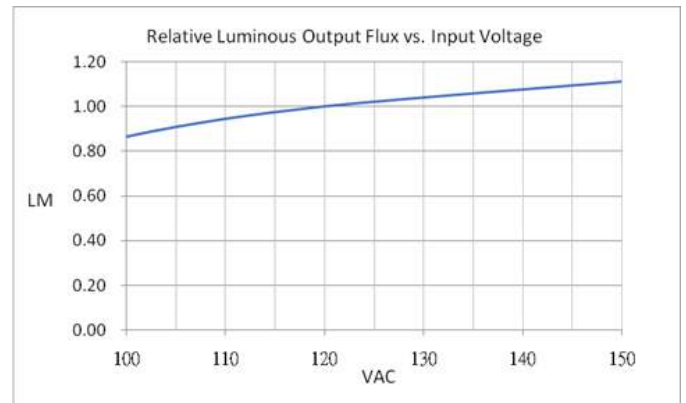
### ■ Radiation Pattern (Tj=25 °C)



### ■ Relative power distribution vs. Input voltage (Ta=25°C)

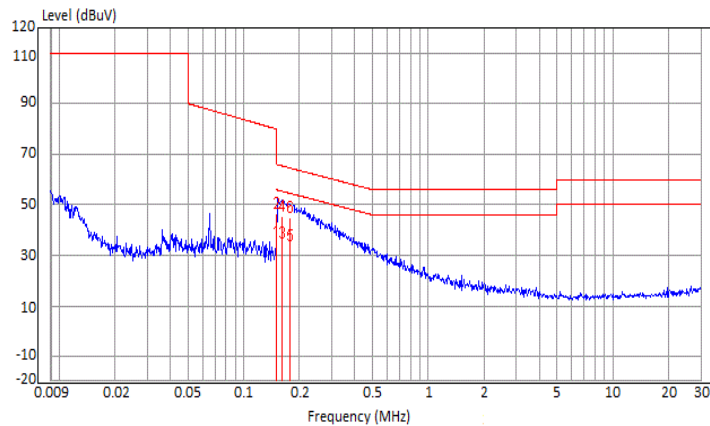


### ■ Relative luminous output vs. Input voltage (Ta=25°C)



### ■ Conduction Testing<sup>[4]</sup> (120Vac/60Hz)

Standard: EN 55015 (QP), Temp. (C)/Hum.(%): 25°C/57%

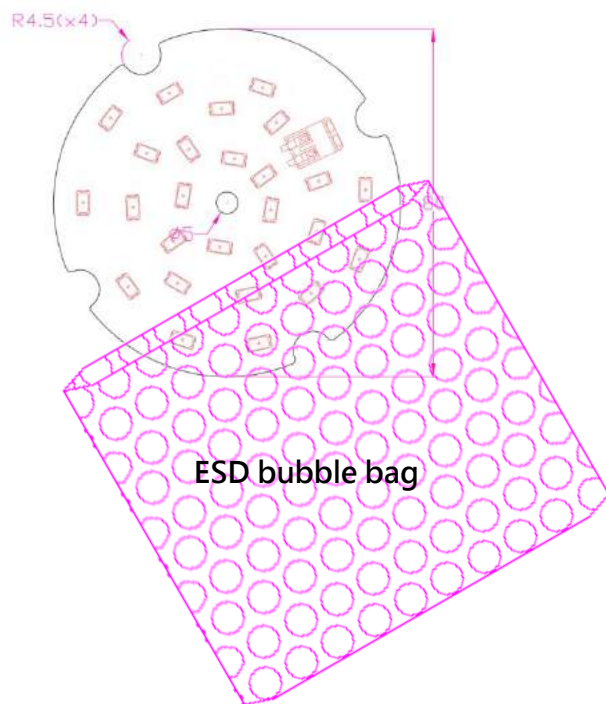


## Packaging

**AB-GES-C14124Wxx1N2**

## Color Bin Code

1. ESD bubble bag.



2 items per bag

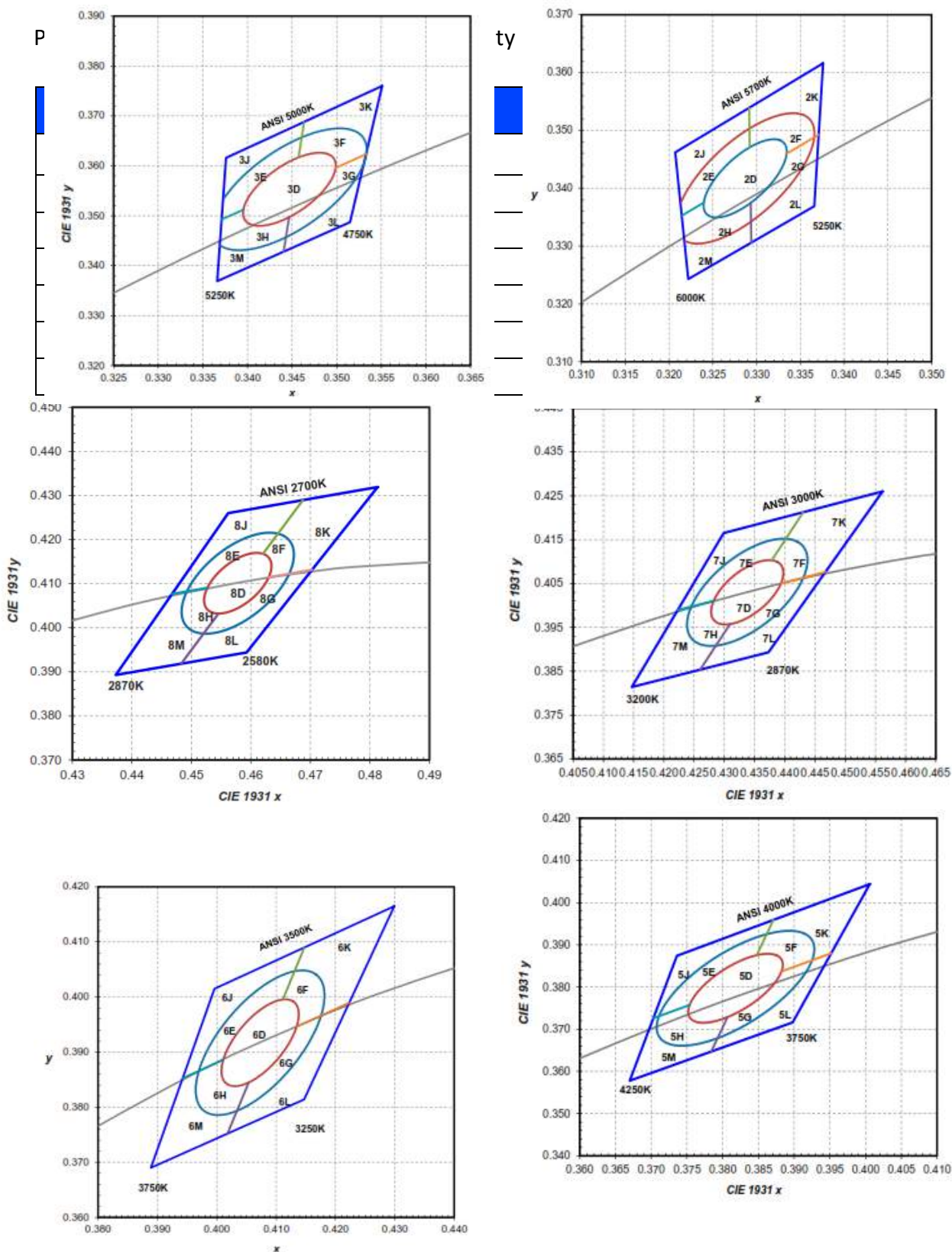
1 Box = 100 PCS (about 2 Kgs)

Color region stays within Macadam "3-Step" ellipse from the chromaticity center.

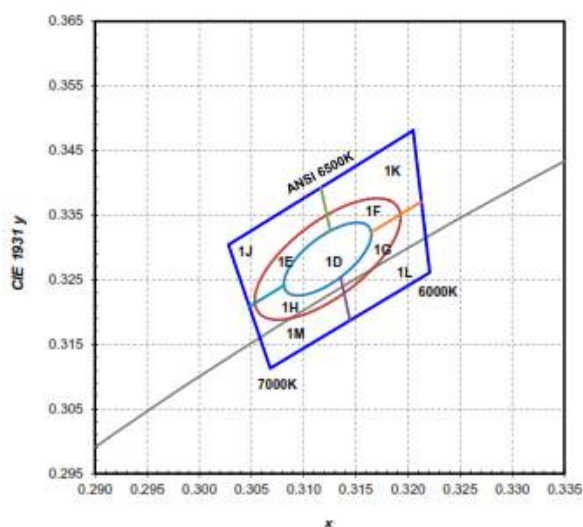
**AB-GES-C14124Wxx1N2**

5

The chromaticity center refers to ANSI C78.377:2008.



## AC Module Flicker



Flicker for AC driven LED modules can be measured in two different manners,  
Percent and Index.

## Junction Temperature (T<sub>J</sub>) & Solder Point Temperature (T<sub>S</sub>)

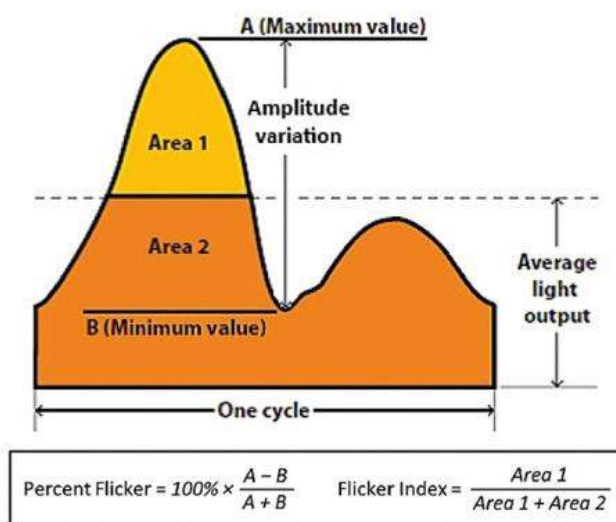
**Percent** - Older more common metric that measures peak to peak amplitude. No other attributes of the AC wave are taken into account. Measurements of percent range from 0%-100%

|                                            |        |
|--------------------------------------------|--------|
| AC Module Flicker                          | 100%   |
| Any LED system with Electrolytic Capacitor | 2%-90% |

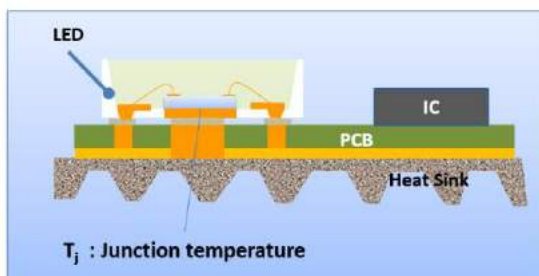
**Index** - A metric defined by the IES (Illuminating Engineering Society) that measures the shape, duty cycle, and peak to peak amplitude. This is a true measure of eye response to flicker. Measurement of index range from 1-1.0.

|                                            |         |
|--------------------------------------------|---------|
| AC Module Index                            | <0.3    |
| Any LED system with Electrolytic Capacitor | .02~0.2 |

Graph showing measurement differences



Junction Temperature is the most important factor of LED. Different life performance will be impacted by different junction temperature.



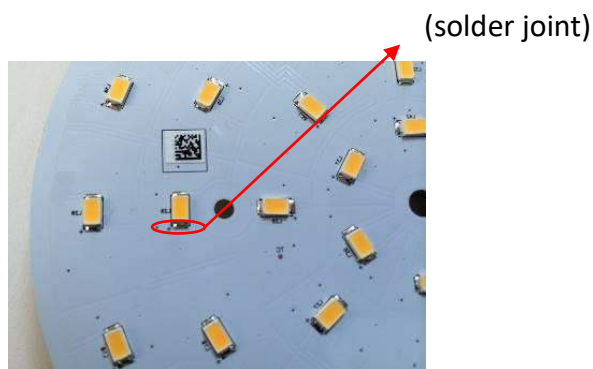
If the thermal dissipation is good enough, the junction temperature will be lower and the lifetime performance will be better.

If the junction temperature is higher than 120°C, the LED will deteriorate quickly.

### **How to monitor the junction temperature?**

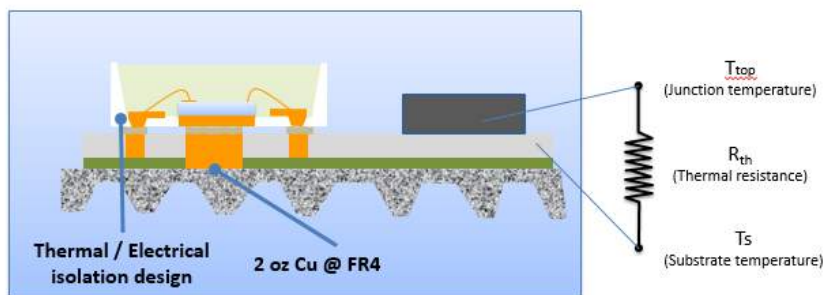
You need to measure the T<sub>s</sub> point.

A solder point temperature is a temperature at the measurable point nearest to the junction. Typically this point is at the solder joint.



You can use the high-temperature thermal conductivity glue (Such as SatlonD-3/606...etc.) to fix the thermal couple to the solder joint then measure the temperature. Once you got the T<sub>s</sub> temperature measurement data, you can calculate the junction temperature based on the measurement data of the T<sub>s</sub>. The details of the calculation method are shown in the following page:

### **Calculate the Junction temperature of LED**



$$T_{j,LED} = T_s + R_{th} * P_D$$

The junction temperature should be calculated by the Substrate temperature ( $T_s$ ) and the thermal resistance of Substrate ( $R_{th}$ ).

Examples:

What is the  $T_j$  of LED ( $R_{th}= 12\text{ }^{\circ}\text{C/W}$ ) at  $40^{\circ}\text{C}$ ?

$T_s=40^{\circ}\text{C}$ , LED  $P_D=0.5\text{W}$ , LED  $R_{th}= 12\text{ }^{\circ}\text{C/W}$  (typical)

→  $T_{j,LED} = 40 + 0.5 * 12 = 46^{\circ}\text{C}$  (Normal  $T_{j,LED}$  limitation is  $110^{\circ}\text{C}$ )

### Calculate the Junction temperature of IC

$$T_{j,IC} = T_s + R_{th,IC} * P_D$$

The junction temperature should be calculated by the Substrate temperature ( $T_s$ ) and the Thermal resistance of Substrate ( $R_{th}$ )

| IC | IC power consumption | $R_{th,ic}$ |
|----|----------------------|-------------|
|    | AC input             |             |
|    | 100V-220V            | 15          |

Thermal resistance of IC under different AC input

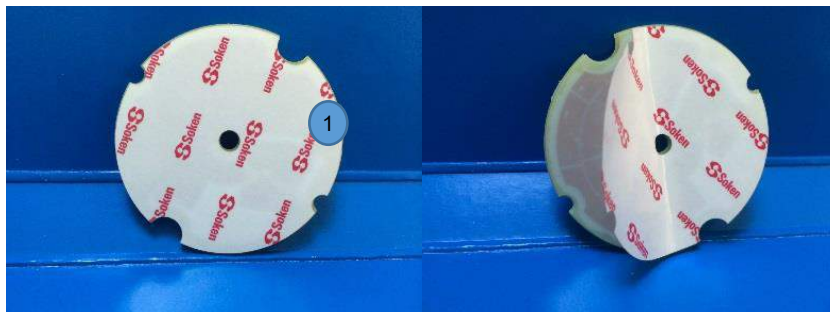
Examples:

What is the  $T_j$  of IC ( $R_{th}= 15\text{ }^{\circ}\text{C/W}$ ) at  $40^{\circ}\text{C}$ ?

$T_s=40^{\circ}\text{C}$ , IC  $P_D=1.68\text{W}$ , IC  $R_{th}= 15\text{ }^{\circ}\text{C/W}$  (minimum)

→  $T_{j,IC} = 40 + 1.68 * 15 = 65.2^{\circ}\text{C}$  (Normal  $T_{j,IC}$  limitation is  $110^{\circ}\text{C}$ )

## Backside of AC LED module



Picture of the backside of module

### Items:

#### Warning:

Remember to remove the protective paper on the thermal insulating tape from the backside of the module

#### Warning:

AC LED modules must be attached by an additional connection, not only the tape

## Specification of the Thermal tape

| Thickness            | mm                       | 0.25 |
|----------------------|--------------------------|------|
| Adhesive force       | T <sub>0</sub> (0 hrs)   | 4.0  |
|                      | T <sub>24</sub> (24 hrs) | 4.6  |
| Thermal conductivity | W / m •K                 | 0.7  |
| Thermal resistance   | cm <sup>2</sup> °C/W     | 3.6  |
| Fire ret ardency     | UL94                     | V0   |
| Isolation strength   | DC (kV)                  | >10  |
|                      | AC (kV)                  | 4.4  |

## Installation Instructions

### Installation:

1. Remove the protective paper on the back side of AC LED module
2. Adjust the AC LED module to the desired position
3. Using a screw driver, attach the AC LED module
4. Select the proper wire

If a connector is going to be used with the AC Module, please follow the instructions below

|                      | WAGO                                                                              | BJB                                                                               |
|----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Photo                |  |  |
| Conductor size       | Solid: 0.2-0.75mm <sup>2</sup><br>Fine stranded: 0.2-0.75mm <sup>2</sup>          | Solid: 0.34-0.75mm <sup>2</sup>                                                   |
| Conductor size (AWG) | 18-24                                                                             | 18-24                                                                             |

**Connector spec summary**

## Warranty Reference Information

- [1] Flicker information, please refer to page 8.
- [2] Junction Temperature (Tj) & Ts Point information please refer to page 9.
- [3] Thermal tape information, please refer to page 11.
- [4] The primary goal of **EMC testing** is to identify the sources of electromagnetic energy emitted from an electronic device in an effort to reduce potential interference to other equipment, as well as determine the susceptibility of the equipment from electromagnetic energy emitted from other electronic devices nearby.



American Bright Optoelectronics Corp., warrants that its AC LED MODULES will be free from defects in material and workmanship from the date of manufacture by American Bright Optoelectronics Corp. for a period of 5 years (LED light generation module case temperature(s) not to exceed 75°C, IC temperature(s) not to exceed 110°C). The AC LED MODULES consists of a LED lighting components and the driver circuit (collectively, the "Power circuit"). This limited warranty only applies when the American Bright Optoelectronics Corp. LED module is properly connected and installed on the luminaire; operated within the electrical values recommended by American Bright Optoelectronics Corp.; and used in situations approved for the application and in the environmental conditions (temperature, humidity) within the normal specified operating range of the system.

This warranty is further conditioned upon proper storage, installation, use and maintenance. This warranty is not applicable to any Product which is not installed and operated in accordance with the current edition of The National Electric Code (NEC), the Standards for Safety of Underwriters' Laboratory, Inc. (UL), the Standards for the American National Standards Institute (ANSI), and with American Bright Optoelectronics Corp.'s instructions and guidelines for the Product. This warranty is not applicable to any Product or component subjected to abnormal stresses and operating conditions. Replacement of the American Bright Optoelectronics Corp. Product with LED components of other manufacturers will void the entire warranty.

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