

## AB-GES-L56224Wxx4T2

### Features:

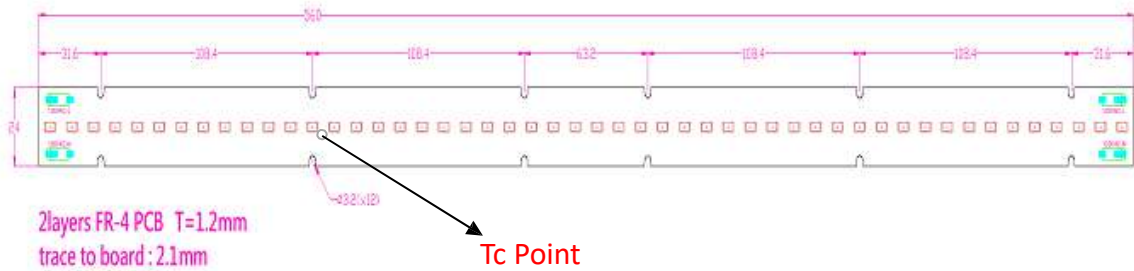
- 24W 2ft. linear light engine
- SimpleDrive® - 230V AC drive technology
- Driver on Board Structure
- Dimmable
- Long life - No Electrolytic capacitors
- Easily integrated
- 5VA covers available
- CE Compliance

### Applications:

- Under Cabinet Lights
- Ceiling Lights
- In Ground Light
- Wall Sconces
- Vandal Proof Lights
- Cove Light
- Troffer Light



## Outline Dimensions



50 LEDs  
 Units: mm

Notes:

1. 24W 2ftLinear light engine
2. Dimmable light engine
3. Phillips Lumileds LED
4. Can be connected serially.
5. AC Direct drive technology
6. Long life : No Electrolytic capacitors
7. Easily assembly light engine



## Characteristics

### Absolute Maximum Ratings

| Parameter                               | Symbol           | Rating       | Unit            |
|---|------------------|--------------|-----------------|
| Input Voltage                           | V <sub>in</sub>  | 230          | V <sub>ac</sub> |
| 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 ~ 45 °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.  | Max. | Unit            |
|------------------------------|-----------------|-------|------|-----------------|
| Input Voltage                | V <sub>in</sub> | 210   | 250  | V <sub>ac</sub> |
| 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

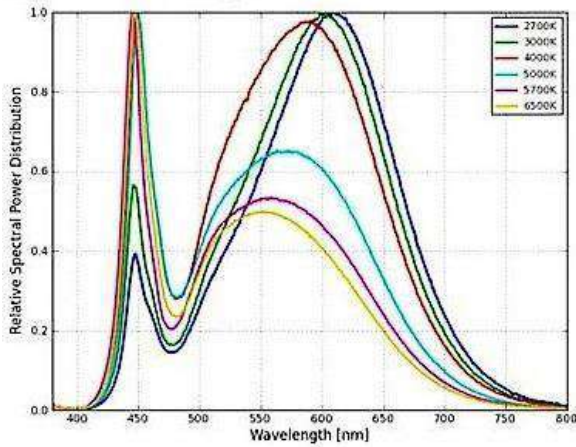
| Model name          | AC Power(W) |      |      | Color Temp | Luminous Flux(lm) |      | CRI |
|---------------------|-------------|------|------|------------|-------------------|------|-----|
|                     | Min         | Typ. | Max  | (K)        | Min               | Typ. |     |
| AB-GES-L56124W301N2 | 20.8        | 24.0 | 27.0 | 3000       | 2160              | 2400 | >80 |
| AB-GES-L56124W401N2 | 20.8        | 24.0 | 27.0 | 4000       | 2480              | 2700 | >80 |
| AB-GES-L56124W501N2 | 20.8        | 24.0 | 27.0 | 5000       | 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 CIE<sub>x</sub> and CIE<sub>y</sub> : ±0.007 ;
- Calibration error CCT 3000K ±175K ; 4000K ±300K ; 6500K ±400K

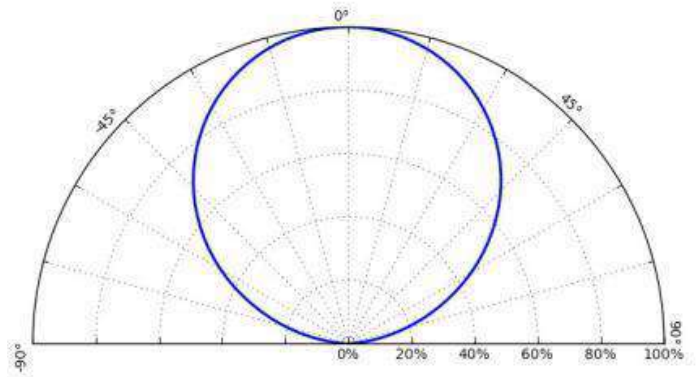
### Thermal Resistance, Ta=25°C

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

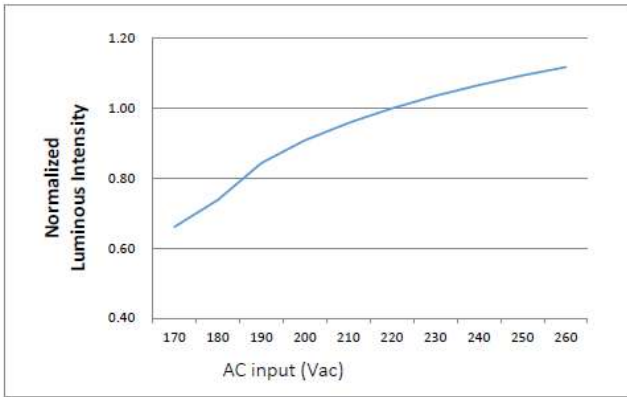
■ **Relative Spectrum of Emission (Ta=25°C, Test current=60mA)**



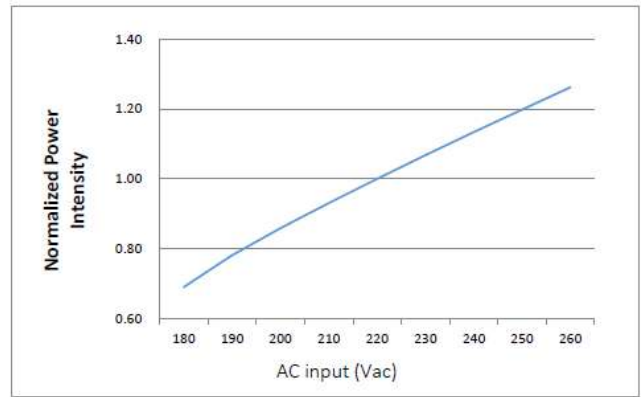
■ **Radiation Pattern (Tj=25 °C)**



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

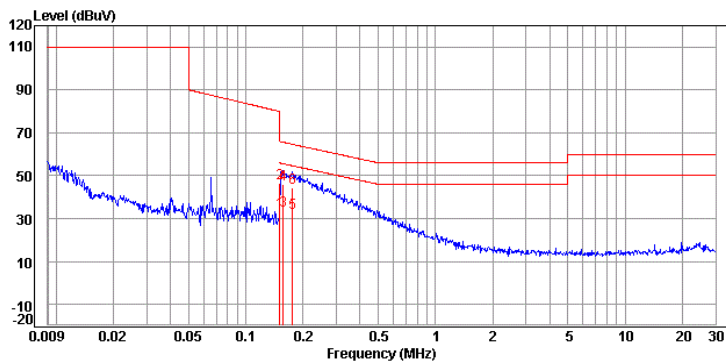


■ **Relative luminous output vs. Input voltage (Ta=25°C)**



■ **Conduction Testing<sup>[4]</sup> (220Vac/60Hz)**

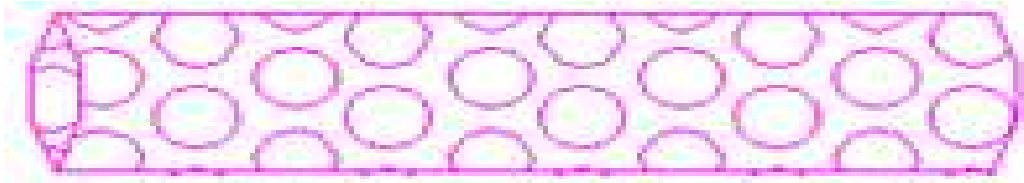
Standard: EN 55015 (QP), Temp. (C)/Hum.(%): 25°C/57%





## Packaging

1. ESD bubble bag.



2 items per bag

1 Box = 100 PCS (about 2 Kgs)



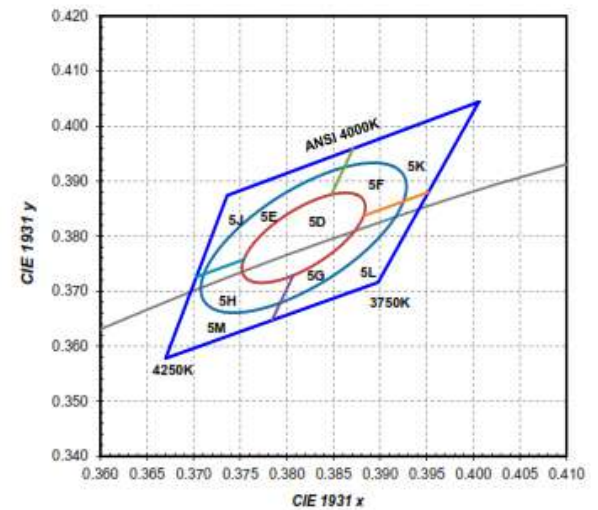
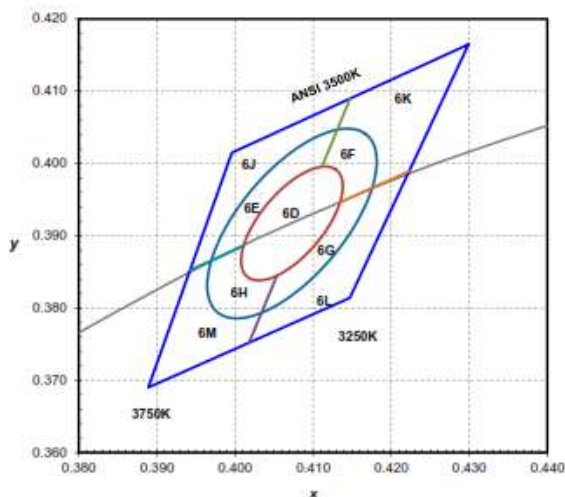
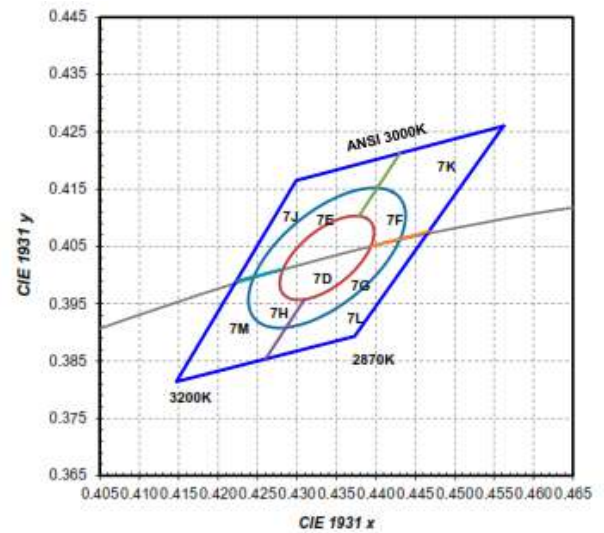
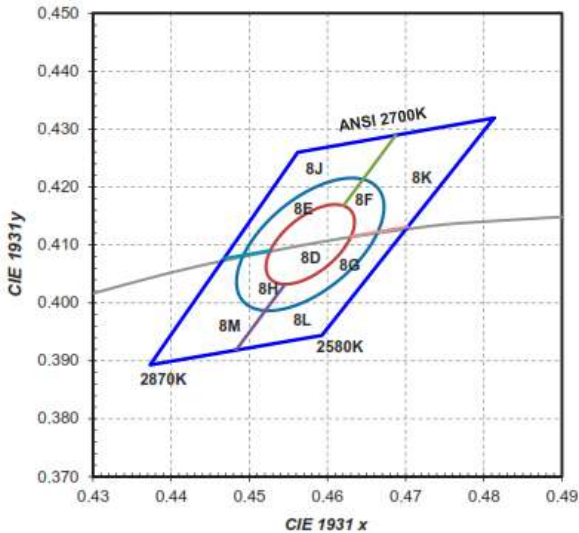
## Color Bin Code

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

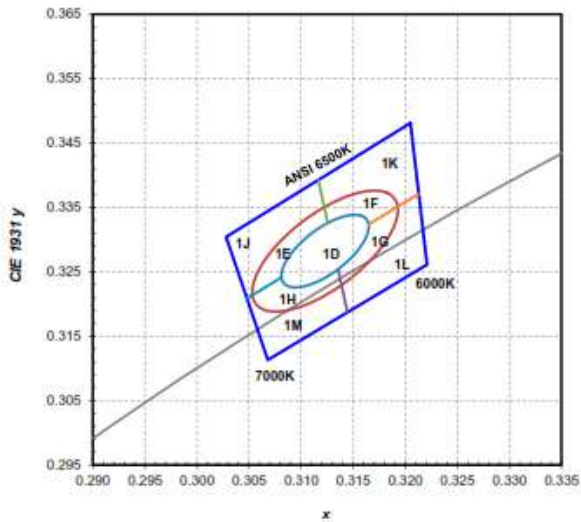
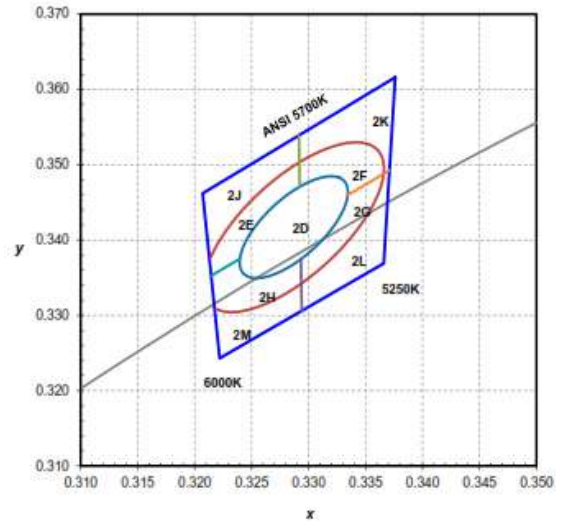
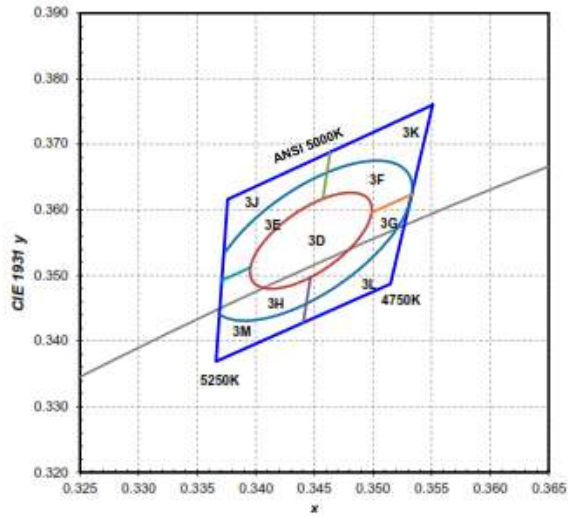
The chromaticity center refers to ANSI C78.377:2008.

Please refer to ANSI C78.377 for the chromaticity center.

| CC    | Steps | Cx     | Cy     | a       | b       | theta |
|-------|-------|--------|--------|---------|---------|-------|
| 2700K | 3     | 0.4578 | 0.4101 | 0.00810 | 0.00420 | 53.7  |
| 3000K | 3     | 0.4338 | 0.4030 | 0.00834 | 0.00408 | 53.2  |
| 3500K | 3     | 0.4073 | 0.3917 | 0.00927 | 0.00414 | 54.0  |
| 4000K | 3     | 0.3818 | 0.3797 | 0.00939 | 0.00402 | 53.7  |
| 5000K | 3     | 0.3447 | 0.3553 | 0.00822 | 0.00354 | 59.6  |
| 5700K | 3     | 0.3287 | 0.3417 | 0.00746 | 0.00320 | 59.0  |
| 6500K | 3     | 0.3123 | 0.3282 | 0.00669 | 0.00285 | 58.5  |



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## AC Module Flicker

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

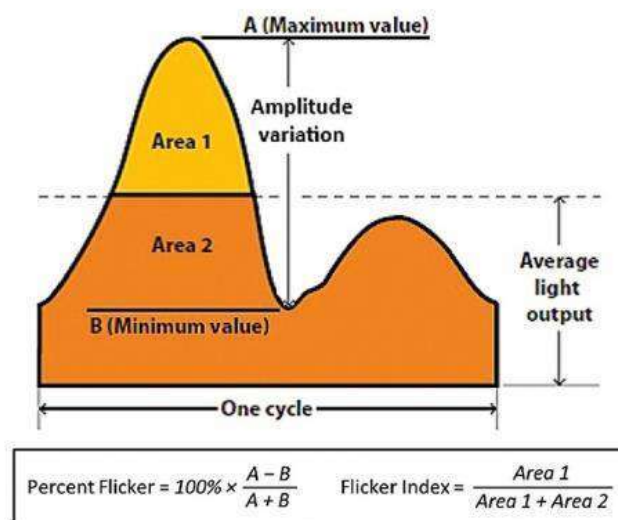
**Percent** - Older more common metric that measures peak to peak amplitude. No other attributes of the AC wave are taken into account. Measurements of percent range from 0%-100%

|  |        |
|--|--------|
| 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 |

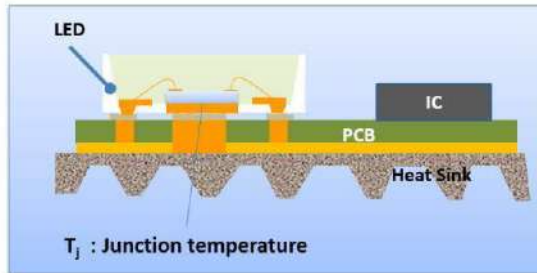
Graph showing measurement differences





## Junction Temperature ( $T_j$ ) & Solder Point Temperature ( $T_s$ )

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



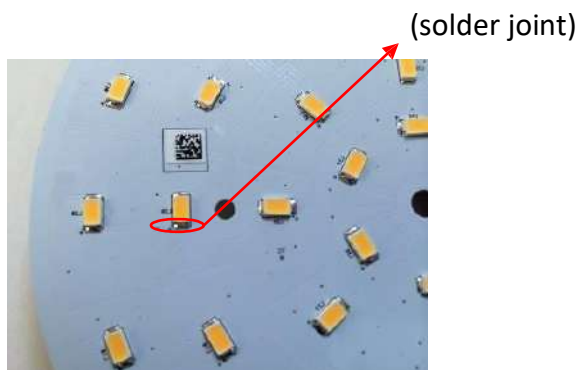
If the thermal dissipation is good enough, the junction temperature will be lower and the lifetime performance will be better.

If the junction temperature is higher than  $120^{\circ}\text{C}$ , the LED will deteriorate quickly.

### How to monitor the junction temperature?

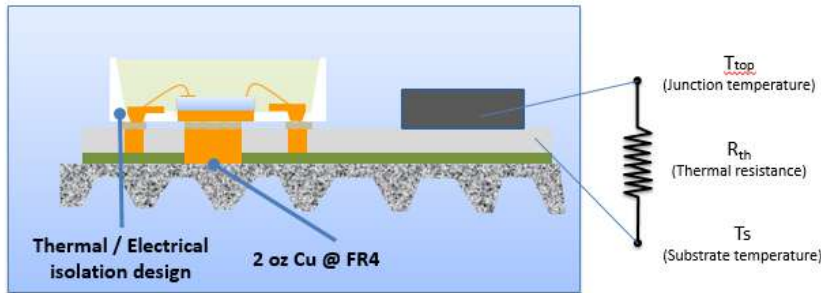
You need to measure the  $T_s$  point.

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  $T_s$  temperature measurement data, you can calculate the junction temperature based on the measurement data of the  $T_s$ . 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)

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

**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

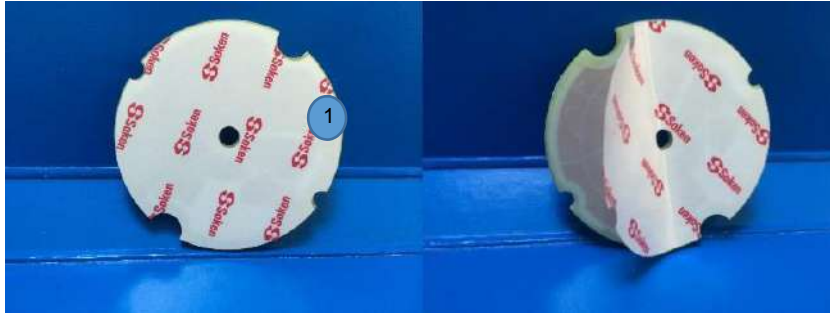
Examples:

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)

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

**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 |
|-----------------------------|--------------------------|------|
| <b>Adhesive force</b>       | T <sub>0</sub> (0 hrs)   | 4.0  |
|                             | T <sub>24</sub> (24 hrs) | 4.6  |
| <b>Thermal conductivity</b> | W / m •K                 | 0.7  |
| <b>Thermal resistance</b>   | cm <sup>2</sup> °C/W     | 3.6  |
| <b>Fire ret ardency</b>     | UL94                     | V0   |
| <b>Isolation strength</b>   | 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:<br>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**