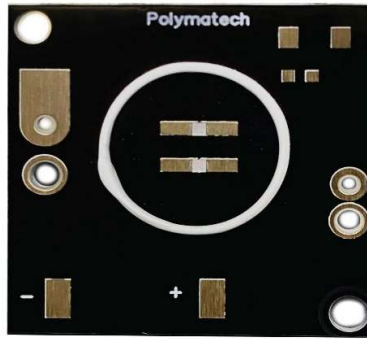


# Polymatech®



## DATA SHEET

POLYMATECH STANDARD COB Series

Version 2

FL02COB3030 UV-C 270nm



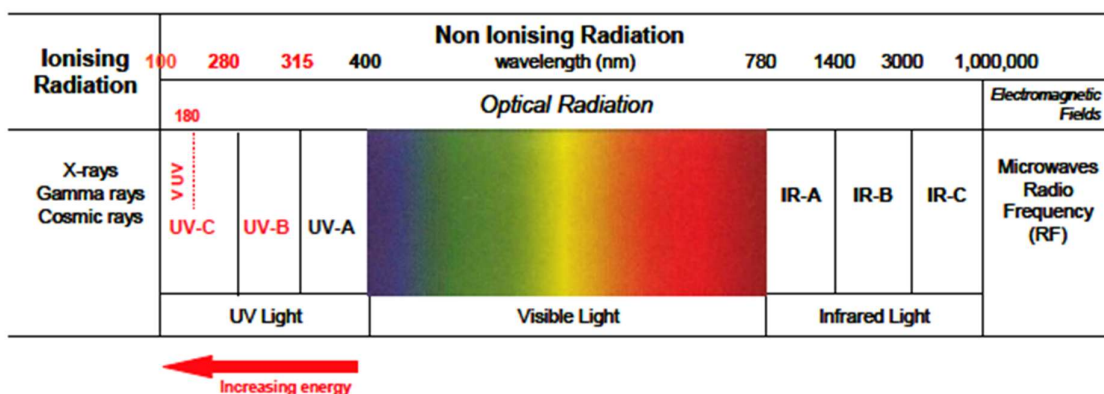
**POLYMATECH ELECTRONICS LIMITED**  
[www.polymatech.in](http://www.polymatech.in)

# Precision Wavelengths for Next-Generation Sterilization”

## Polymatech UVC 270 nm LED Modules – Precision Sterilization for Water, Air, and Surfaces

Polymatech UVC 270 nm LED modules are engineered to deliver high-efficiency germicidal performance across a wide range of applications. With optimized emission at 270 nm—the peak absorption wavelength for microbial DNA and RNA—these modules ensure maximum pathogen inactivation for healthcare, industrial, and consumer environments.

Designed for water purification, surface sterilization, and air disinfection, Polymatech’s 270 nm modules combine powerful radiant flux, compact form factor, and reliable thermal management, offering a next-generation solution for sterilization systems.



## Smart Integration for Modern Applications

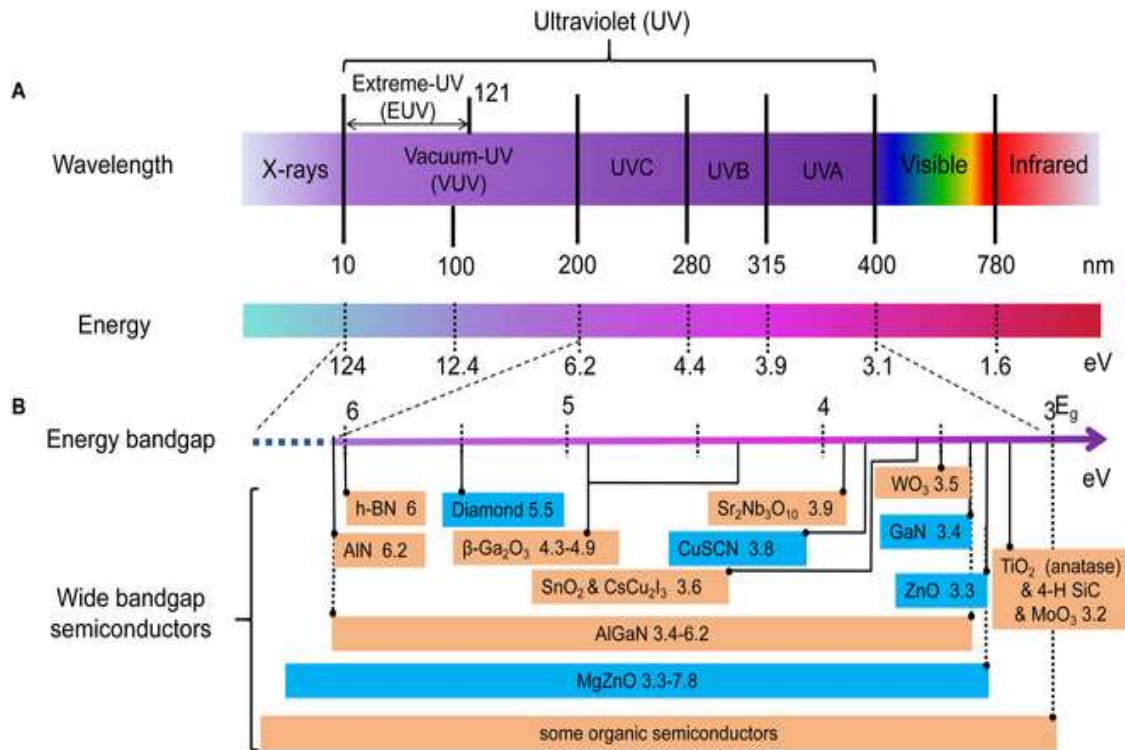
- Compact COB design allows seamless integration into air purifiers, HVAC systems, and water treatment devices.
- Compatible with VOC, UV, and PIR sensors, enabling intelligent sterilization cycles that adapt to occupancy and environmental conditions.
- Supports automated operation for minimal human intervention while maintaining maximum hygiene standards.

## Enhanced Safety and Efficiency

- Special concentrating optics maximize UV-C intensity within devices while preventing leakage, ensuring user safety.
- Mercury-free, RoHS-compliant design offers an eco-friendly alternative to

conventional UV lamps.

- High radiant flux output (~300–350 mW at 700 mA, 6.3 V) ensures fast and reliable disinfection.
- Long operating lifetime reduces maintenance costs while maintaining stable germicidal efficiency.



### Applications of Polymatech UVC 270 nm LED Modules

- **Water Treatment:** Efficiently inactivates bacteria, viruses, and protozoa, making water safe for drinking, medical, and industrial applications.
- **Surface Sterilization:** Disinfects hospital instruments, laboratory benches, high-touch surfaces, and food processing equipment.
- **Air Purification:** Reduces airborne pathogens in HVAC units, cleanrooms, and confined spaces to improve indoor air quality.

With precision wavelength targeting, smart system compatibility, and long-lasting performance, Polymatech's UVC 270 nm LED modules provide a powerful and sustainable solution for sterilization needs across industries.

## Field of Use

### Polymatech UV-C 270 nm COB LED: Advanced Disinfection and Sterilization

Polymatech's UV-C 270 nm COB LEDs are engineered for high-efficiency germicidal applications. These LEDs provide precise UV-C light at 270 nm, a wavelength proven to inactivate bacteria, viruses, and other pathogens by disrupting their DNA and RNA. Designed for healthcare, laboratory, water/air purification, and industrial sterilization, Polymatech UV-C LEDs combine high radiant flux, uniform irradiation, and long-term reliability, delivering consistent performance in demanding environments.



### Optimized Germicidal Wavelength

- **Peak Microbial Inactivation:** Research shows the DNA/RNA absorption peak is around 260–270 nm, making 270 nm the optimal wavelength for sterilization. Polymatech's LEDs precisely target this wavelength to ensure maximal inactivation efficiency.
- **High Radiant Flux:** Operating at 700 mA forward current and 6.3 V forward voltage, these LEDs achieve a radiant flux of approximately 300–350 mW, balancing energy efficiency, thermal stability, and disinfection performance.
- **Consistent UV-C Output:** COB integration ensures the intensity is uniform across the irradiation area, critical for reliable sterilization.

### **Innovative COB Design for Maximum Efficiency**

- **Integrated Chip-on-Board Module:** Multiple UV-C LED chips are integrated into a single COB module, providing homogeneous light distribution and eliminating hot spots common in conventional multi-chip arrays.
- **Thermal Management:** Advanced heat sinks and PCB design maintain low junction temperature, ensuring stable UV-C output over extended operation. Proper thermal control also increases LED lifespan, maintaining consistent disinfection efficiency.
- **Compact Form Factor:** The COB design allows for high irradiance in a small footprint, enabling integration into hand-held devices, air purifiers, or water sterilization units.



### **High Efficacy and Energy Efficiency**

- **Wall-Plug Efficiency (WPE):** Polymatech UV-C LEDs achieve ~5–10% WPE at 270 nm, which is significant given the intrinsic efficiency challenges of UV-C LEDs.
- **Lower Power Consumption:** Compared to traditional mercury-based UV lamps, these LEDs provide high germicidal intensity while consuming less power, reducing energy costs.
- **Long-Term Performance:** High-quality semiconductor materials and precise optical engineering ensure that UV-C output remains consistent over the operational lifetime.





### Applications and Performance

- **Surface Disinfection:** Ideal for sterilizing laboratory benches, medical equipment, high-touch surfaces, and industrial equipment.
- **Air and Water Purification:** Integration into HVAC systems or water treatment units effectively inactivates airborne pathogens and waterborne microorganisms.
- **Medical and Industrial Equipment:** Suitable for sterilizing surgical instruments, packaging surfaces, and cleanroom environments.



- **Safety and Reliability:** COB design ensures uniform irradiation, eliminating low-intensity zones that can reduce sterilization efficacy.

- **Durability:** LEDs are engineered to operate continuously with minimal degradation, supporting high-reliability applications.

#### **Why Polymatech UV-C LEDs Outperform Competitors**

- **Spectral Precision:** Competitors often use LEDs with broader UV output or slightly shifted peak wavelengths, reducing germicidal efficiency. Polymatech's 270 nm output directly aligns with microbial DNA/RNA absorption peak.
- **Uniform Intensity:** COB integration ensures homogeneous irradiation, critical for complete surface or air sterilization.
- **Optimized Thermal Management:** Effective heat dissipation prolongs LED lifetime and maintains consistent UV-C output.
- **Energy Efficiency and Compact Design:** High radiant flux per watt of electrical power and compact COB architecture allow versatile integration across devices and systems.



#### **Conclusion**

Polymatech UV-C 270 nm COB LEDs deliver precise germicidal light, high radiant flux, and uniform irradiation to maximize disinfection efficiency. Their COB architecture, optimized thermal management, and energy efficiency make them ideal for healthcare, laboratory, water/air purification, and industrial sterilization applications. Compared to traditional UV lamps or competitor LEDs, Polymatech provides long-lasting, reliable, and compact solutions for critical sterilization needs.

## Contents

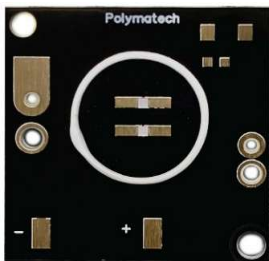
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## Product Nomenclature

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### FL02COB3030 UV-C 270nm

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|     |                       |               |
|-----|-----------------------|---------------|
| [1] | Product shape         | : FL02COB3030 |
| [2] | Die count in series   | : 12          |
| [3] | Die count in parallel | : 01          |

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## **INTRODUCTION**

### **Product Description**

The FL02COB3030 series of high-flux, multi-die arrays in a smaller, easy-to-use platform. With FL02COB3030 LED lighting-class reliability, the FL02COB3030's small, uniform emitting surface enables both directional and non-directional lighting applications including lamp retrofit and luminaire designs. featuring a 17-mm optical source, the FL02COB3030 brings new levels of flux and efficacy to this form factor.

The FL02COB3030 series is designed with flip chip technology which has high heat emission property thus increasing product life and maintaining same CRI output.

### **Applications:**

- Hospital and Clinical Sterilization
- Laboratory and Research Facility Disinfection
- Municipal and Industrial Water Sterilization
- Airborne Pathogen Control and HVAC Integration
- Food Processing and Packaging Sanitization
- Cleanroom and High-Tech Industrial Applications
- Consumer Electronics and Personal Device Sterilization
- Portable and Handheld UV-C Solutions
- Public Spaces and Transportation Sanitization
- Surface and Equipment Decontamination

## Features

- Mechanical Dimensions : 30×30×1(mm)
- Packaging Structure : Aluminum Base Chip on Board
- Reference Assembly : M4 screw, Connector
- Thermal Resistance : 2C/W
- Maximum Drive Current : 700 mA
- RoHS Complaint.
- Better die arrangement for optics.
- Wide range of luminous flux and high efficacy.
- Improved lumen density compared with precious version.
- High Thermal conductivity package.
- Large, monolithic chips with uniform emitting area.
- Encapsulated die with low profile protective window for higher lumen output.
- Electricity isolated thermal path.
- Environmentally friendly: RoHS and REACH complaint.

## Performance Characteristics

| Product Code              | Peak Wavelength | Radiant flux ( $\Phi_e$ ) | Forward current (mA) | Forward voltage(V) |      |      |
|---------------------------|-----------------|---------------------------|----------------------|--------------------|------|------|
|                           |                 |                           |                      | Min.               | Typ. | Max. |
| FL02COB3030 UV-C<br>270nm | 270nm           | 300mW                     | 700mA                | 5.2                | 5.75 | 6.3  |

Notes:

1. Polymatech Electronics maintains a tolerance of  $\pm 10\%$  on Radiant flux measurements.
2. Polymatech Electronics maintains a tolerance of  $\pm 3\%$  on forward voltage measurements.

Peak wavelength =  $\pm 3$  nm

\*: Values of Luminous flux at  $T_c=25^\circ\text{C}$  are provided as reference only.

## Absolute Maximum Ratings

| Parameter                                 | Symbol | Rating      |    |
|---|--------|-------------|----|
| Input Power                               | Pi     | 6.4         | *1 |
| Forward Current(mA)                       | If     | 700         | *1 |
| Reverse current(mA)                       | Ir     | 1           |    |
| Operating Temperature( $^\circ\text{C}$ ) | Top    | -40 ~ +100  |    |
| Storage Temperature( $^\circ\text{C}$ )   | Tst    | -40 ~ + 100 | *2 |
| Case Temperature( $^\circ\text{C}$ )      | Tc     | 105         |    |
| Junction Temperature( $^\circ\text{C}$ )  | Tj     | 125         | *3 |

\*1. Input power and forward current are the values when the LED is used within the range of the derating curve in this data sheet.

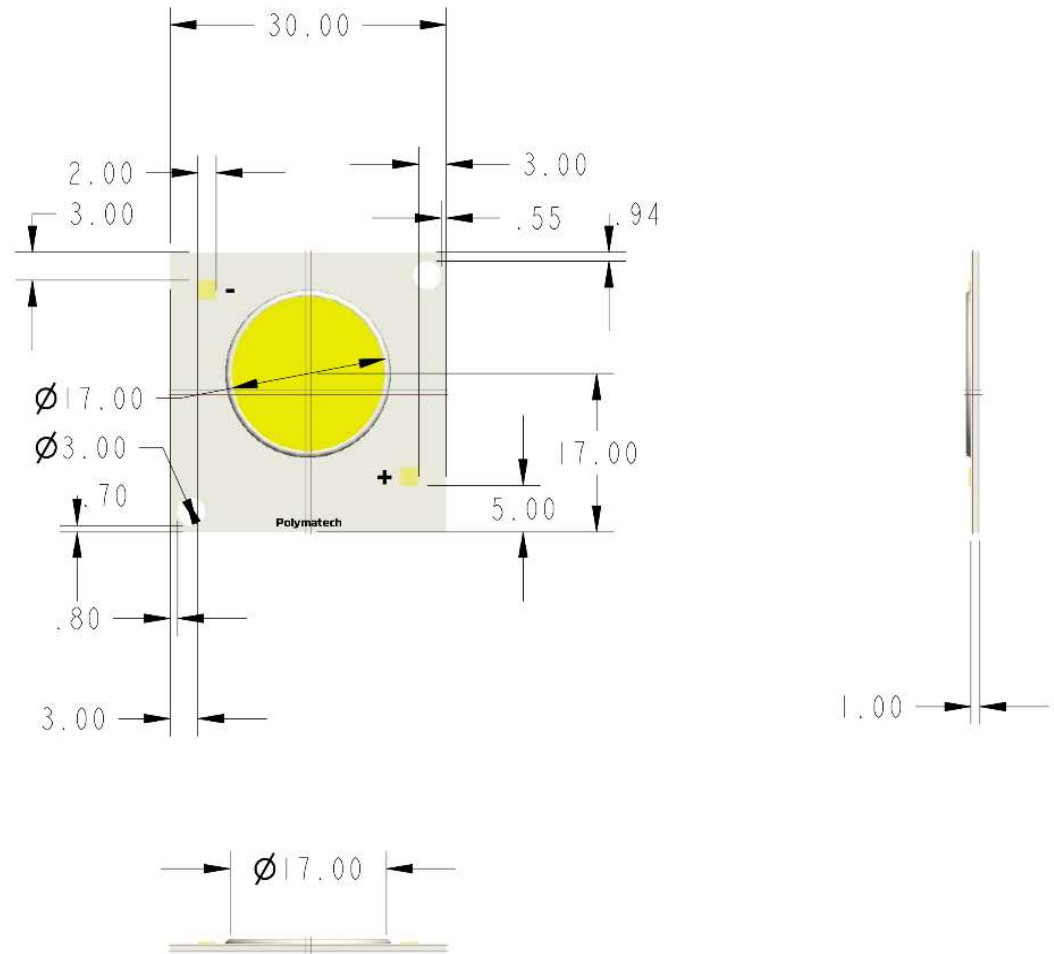
\*2. Refer to 3. Outline drawing for Tc MEASUREMENT POINT.

\*3. Junction temperature calculation formula:  $T_j = T_c + R_{j-c} \times P_i$

## Mechanical Dimensions

The COB dimensions are 30 X 30 mm.

Tolerances Unless otherwise specified:  $\pm 0.3$



Dimensions are in mm.

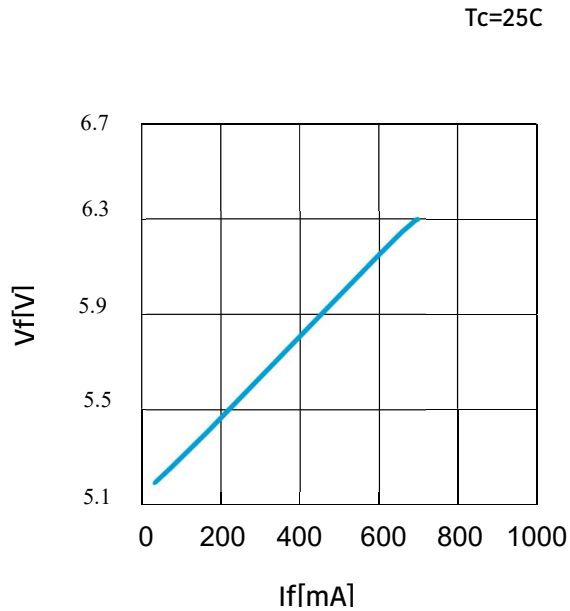
Tolerances unless otherwise  
specified:  $\pm 0.13$

$\times 0.1$

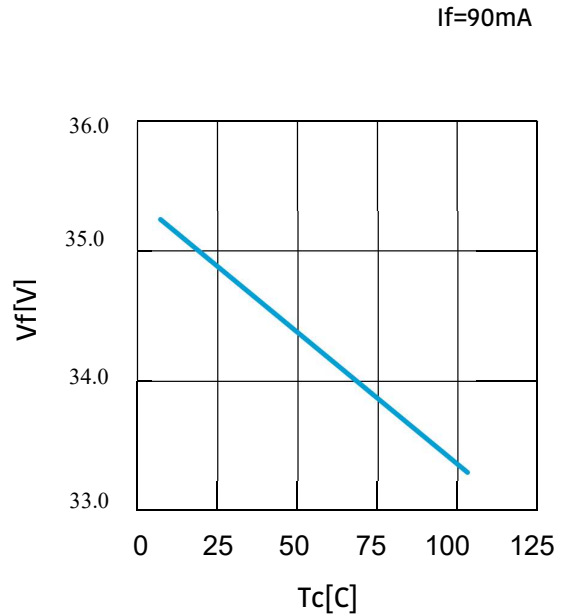
## Characteristics Curves

### Forward Current Characteristic/Temperature Characteristics

Forward Current VS. Forward Voltage



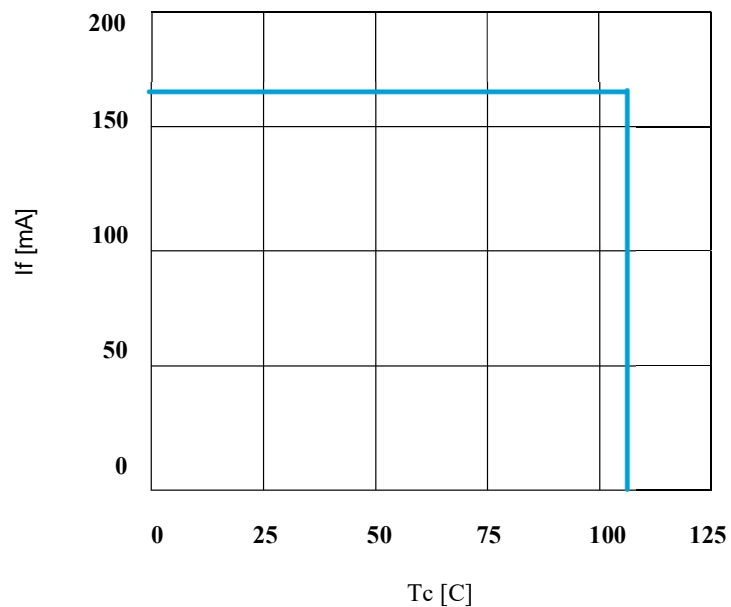
Case Temperature vs. Forward Voltage



### Derating Characteristics

#### Case Temperature

#### vs. Allowable Forward Current





## Reliability

### Reliability Test

| Test Item                     | Test Condition                                     |
|-------------------------------|--|
| Continuous Operation Test     | If=90mA, Ta=25C (with A1-fin) × 1000 hours         |
|                               | If=90mA, Tj=120C (with A1-fin) × 1000 hours        |
| Low Temperature Storage Test  | -40 C × 1000 hours                                 |
| High Temperature Storage Test | 100 C × 1000 hours                                 |
| Moisture-proof Test           | 60C, 95%RH for 500 hours                           |
| Thermal Shock Test            | -40 C × 30 minutes - 100 C × 30 minutes, 100 cycle |

### Failure Criteria

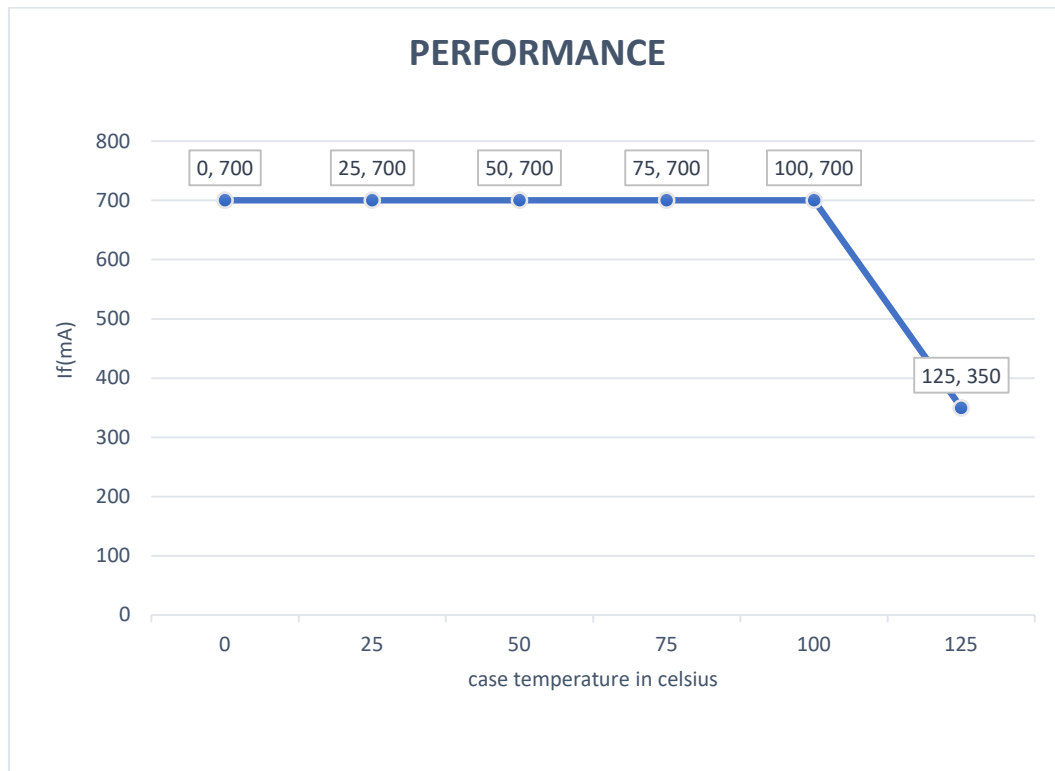
| (Tc=25C)        |        |                     |                  |
|-----------------|--------|---------------------|------------------|
| Measuring Item  | Symbol | Measuring Condition | Failure Criteria |
| Forward Voltage | Vf     | If=90mA             | >U × 1.1         |
| Radiant Flux    | Φe     | If=150mA            | <S × 0.7         |

U defines the upper limit of the specified characteristics. S defines the initial value.

Note: Measurement shall be taken between 2 hours and 24 hours, and the test pieces should be return to the normal ambient conditions after the completion of each test.

## Operating limits

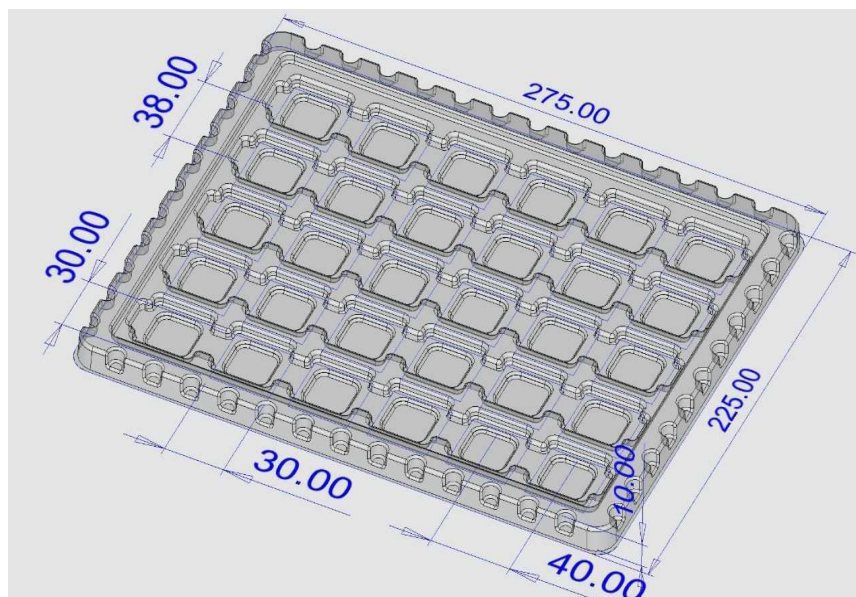
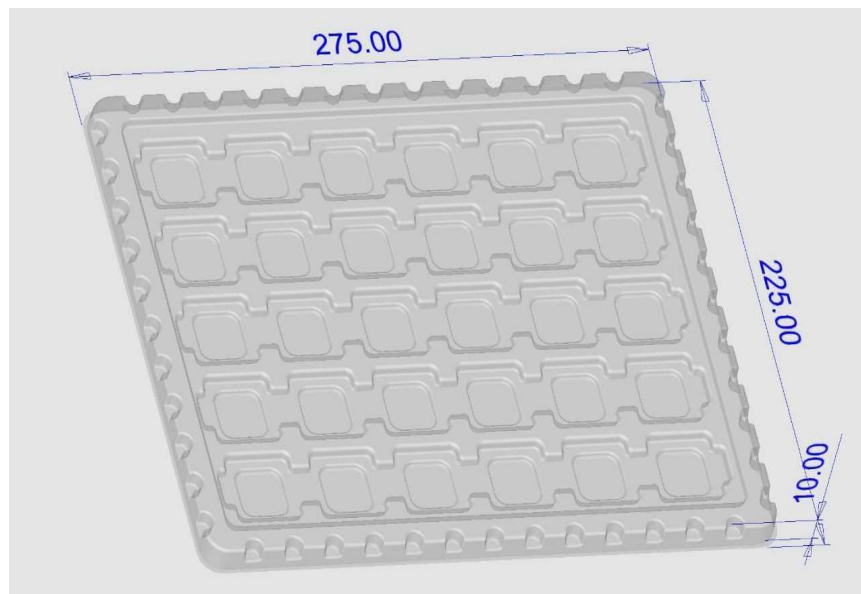
The maximum current rating of the FL02COB3030 depends on the case temperature ( $T_c$ ) when the LED has reached thermal equilibrium under steady-state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Polymatech Electronics LED recommends a maximum Junction temperature of 135 °C to ensure optimal LED lifetime.



## Packaging Specification

### Packing

The package each tray contains 30 pieces of COBs and each box contains 12 trays of COBs (Vacuum Sealed).



## Precaution

### Handling with care for this product

- Both the light emitting area and white rim around the light emitting area is composed of resin materials. Please avoid the resin area from being pressed, stressed, rubbed, come into contact with sharp metal nail (e.g. edge of reflector part) because the function, performance and reliability of this product are negatively impacted.
- Please be aware that this product should not come into contact with any other parts while incorporating in your lighting apparatus or your other products.
- Please be aware that careful handling is required after the attachment of lead wires to prevent the application of any load to the connections.
- For more information, please refer to application note "Instruction Manual (COB LED Package)".

### Countermeasure against static electricity

- Handling of this product needs countermeasures against static electricity because this is a semiconductor product.
- Please take adequate measures to prevent any static electricity being produced such as the wearing of a wristband or anti-static gloves when handling this product.
- Every manufacturing facility in regard to the product (plant, equipment, machine, carrier machine and conveyance unit) should be connected to ground and please avoid the product to be electric-charged.
- ESD sensitivity of this product is over 1000V (HBM, based on JEITA ED-4701/304). After assembling the LEDs into your final product(s), it is recommended to check whether the assembled LEDs are damaged by static electricity (electrical leak phenomenon) or not.
- It is easy to find static damaged LED dies by a light-on test with the minimum current value.

### Caution of product assembly

- Regarding this product assembling on the heat sink, it is recommended to use M4 screw. It might be good for screw tightening on the heat sink to do temporary tightening and final tightening. In addition, please don't press with excess stress on the product.
- The condition of the product assembling on the heat sink and the control of screw tightening torque needs to be optimized according to the specification of the heat sink.
- Roughness, unevenness and burr of surface negatively impact thermal bonding between the product and heat sink and increase heat thermal resistance between them. Confidence of thermally and mechanical coupling between the product and heat sink are confirmed by checking the mounting surface and measuring the case temperature of the product.
- In order to reduce the thermal resistance at assembly, it might be good to use TIM (Thermal Interface Material) on whole contact surface of the product. In case of using thermal grease for the TIM, it might be good to apply uniformly on the contact surface of the product.
- In case of using thermal sheet for the TIM, it might be good to make sure that the product is NOT strained by stress when the screws are tightened for assembly.
- For more information, please refer to application note "Instruction Manual (COB LED Package)".

## Thermal Design

- The thermal design to draw heat away from the LED junction is most critical parameter for an LED illumination system. High operating temperatures at the LED junction adversely affect the performance of LED's light output and lifetime. Therefore, the LED junction temperature should not exceed the absolute maximum rating in LED illumination system.
- The LED junction temperature while operation of LED illumination system depends upon thermal resistance of internal LED package (R<sub>j-c</sub>), outer thermal resistances of LED package, power loss and ambient temperature. Please take both of the thermal design specifications and ambient temperature conditions into consideration for the setting of driving conditions.
- For more information, please refer to application note "Thermal Management", "Instruction Manual (COB LED Package)".

## Driving Current

- A constant current is recommended as an applying driving current to this product.  
In the case of constant voltage driving, please connect current-limiting resistor to each product in series and control the driving current to keep under the absolute maximum rating forward current value.
- Electrical transient might apply excess voltage, excess current and reverse voltage to the product(s). They also affect negative impact on the product(s) therefore please make sure that no excess voltage, no excess current and no reverse voltage are applied to the product(s) when the LED driver is turn-on and/or turn-off.
- For more information, please refer to application note "Driving", "Instruction Manual (COB LED Package)".

## Lighting at a minimum current value

- A minimum current value of lighting of all dice is 5 mA.
- When a minimum current is applied, LED dice may look different in their brightness due to the individual difference of the LED element, and it is not a failed product.

## Electrical Safety

- This product is designed and produced according to IEC 62031:2008 IEC 62031:2008 LED modules for general lighting. Safety specification)
- Dielectric voltage withstand test has been conducted on this product to see any failure after applying voltage between active pads and aluminum section of the product, and to pass at least 500V.
- Considering conformity assessment for IEC62031:2008, almost all items of the specification depend upon your final product of LED illumination system. Therefore, please confirm with your final product for electrical safety of your product. As well, the products comply with the criteria of IEC62031:2008 as single LED package.



## **Recommended soldering Condition (This product is not adaptable to reflow process.)**

-For manual soldering Please use lead-free soldering. Soldering shall be implemented using a soldering bit at a temperature lower than 350C, and shall be finished within 3.5 seconds for one land. No external force shall be applied to resin part while soldering is implemented. Next process of soldering should be carried out after the product has return to ambient temperature. Contacts number of soldering bit should be within twice for each terminal.

\* Polymatech Electronics cannot guarantee if usage exceeds these recommended conditions.  
Please use it after sufficient verification is carried out on your own risk if absolutely necessary.

- For more information, please refer to application note "Instruction Manual (COB LED Package)".

### **Eye Safety**

-The International Electrical Commission (IEC) published in 2006 IEC 62471 "2006 Photobiological safety of lamps and lamp systems" which includes LEDs within its scope. When sorting single LEDs according to IEC 62471, almost all white LEDs can be classified as belonging to either Exempt Group (no hazard) or Risk Group 1 (low risk). However, Optical characteristics of LEDs such as radiant flux, spectrum and light distribution are factors that affect the risk group determination of the LED, and especially a high-power LED, that emits light containing blue wavelengths, might have properties equivalent to those of Risk Group 2 (moderate risk).

-Great care should be taken when directly viewing an LED that is driven at high current, has multiple uses as a module or when focusing the light with optical instruments, as these actions might greatly increase the hazard to your eyes. It is recommended to regard the evaluation of stand-alone LED packages as a reference and to evaluate your final product.

### **This product is not designed for usage under the following conditions.**

If the product might be used under the following conditions, you shall evaluate its effect and appropriate them. In places where the product might:

- directly and indirectly get wet due to rain and/or at place with the fear.
- be damage by seawater and/or at place with the fear
- be exposed to corrosive gas (such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>x</sub>, NO<sub>x</sub> and so on) and/or at place with the fear.
- be exposed to dust, fluid or oil and/or at place with the fear.

The LEDs may not be able to maintain their specified performance if they used in a high temperature and high humidity environment.

## Precaution with regard to product use

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The LEDs described in this brochure are intended to be used for ordinary electronic equipment (such as office equipment, communications equipment, measurement instruments and household appliances). Consult POLYMATECH Electronics' sales staff in advance for information on the applications in which exceptional quality and reliability are required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as for airplane, aerospace, submersible repeaters, nuclear reactor control system, automobiles, traffic control equipment, life support system and safety devices). This LED does not comply with ISO/TS 16949 (IATF16949) and is not intended for automotive applications.

The customer shall not reserve engineer by disassembling or analysis of the LEDs without having prior written consent from POLYMATECH Electronics. When defective

LEDs are found, the customer shall inform POLYMATECH Electronics before disassembling or analysis.

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