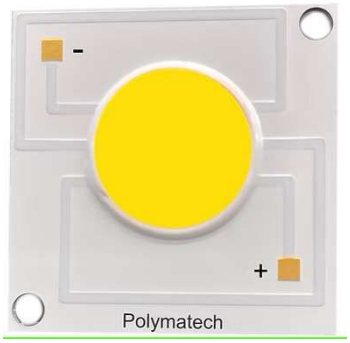
Polymatech®



DATA SHEET

POLYMATECH STANDARD COB Series

Version 2

FL18COB3030 WARM WHITE

lead-free RoHS 2002/95/EC

POLYMATECH ELECTRONICS LIMITED
www.polymatech.in

Field of Use

Polymatech WARM White LED with 70 CRI and 4260K CCT: Enhance Horticulture Yields

Polymatech's WARM White LED with 70 CRI (Color Rendering Index) and 4260K Correlated Color Temperature (CCT) is a cutting-edge horticulture lighting solution designed to optimize plant growth by delivering a balanced, warm spectrum tailored for photosynthesis and flowering. Engineered to target chlorophyll a and b absorption, this LED combines high-efficacy light with superior color rendering, making it ideal for plant development and visual monitoring. In Polymatech's lab, this technology has contributed to up to 30% faster plant growth compared to standard LEDs, offering growers a powerful tool for higher yields. Here's why Polymatech's WARM White LED with 70 CRI and 4260K CCT stands out.

Warm Spectrum for Photosynthesis and Flowering

- **Chlorophyll a and b Efficiency:** The WARM White LED delivers a warm spectrum at 4260K CCT with peaks at ~430–450 nm (blue) and ~640–660 nm (red), aligning with chlorophyll a and b absorption to drive efficient photosynthesis, particularly during flowering and fruiting stages.
- **High CRI Advantage:** With a 70 CRI, this LED ensures accurate color rendering, allowing growers to visually assess plant health, detect deficiencies, or showcase crops in retail or research settings with vivid clarity.
- **Flowering Optimization:** The 4260K CCT enhances red wavelengths (~660 nm), supporting chlorophyll a absorption and phytochrome-mediated processes for robust flowering and fruit development, while maintaining a balanced light profile for versatile growth stages.

Seamless Integration with Polymatech Systems

- **Full-Spectrum Synergy:** The WARM White LED integrates into Polymatech's Ravaye™ full-spectrum packages, incorporating yellow and green wavelengths to mimic natural sunlight. Green light penetrates deeper into plant canopies, boosting photosynthesis in lower leaves.
- **Red-Blue Module Compatibility:** Paired with Polymatech's red-blue integrated module, the WARM White LED enhances the 5:1 red:blue ratio (e.g., 660 nm red with 450 nm blue), delivering uniform, yield-enhancing light for maximum chlorophyll absorption.
- **Far-Red Support:** Combined with far-red light (730 nm), this LED promotes phytochrome activity, optimizing plant structure and flowering for improved yields.

Lab-Demonstrated Performance

- **30% Faster Growth:** In Polymatech's controlled lab conditions, the WARM White LED with 70 CRI and 4260K CCT has contributed to up to 30% faster plant growth compared to standard LEDs, driven by its photosynthesis-optimized spectrum and high light quality.
- **Real-World Considerations:** The 30% growth increase is lab-specific and may vary based on plant species, environmental factors, and setup. Growers can achieve tailored performance with optimized configurations.

Why Polymatech's WARM White LED Excels

- **Spectral Precision with High CRI:** Unlike many horticulture LEDs that prioritize output over color quality, Polymatech's 70 CRI WARM White LED at 4260K CCT combines a flowering-optimized spectrum with superior color rendering, supporting both growth and visual clarity.

- **Energy Efficiency:** With high-efficacy performance (potentially up to 80% wall-plug efficiency), this LED delivers more usable light to plants compared to less efficient LEDs or traditional HPS lamps, reducing energy costs.
- Competitive Edge: Competitors' LEDs often rely on separate red-blue fixtures, leading to uneven light distribution. Polymatech's integrated module, enhanced by the WARM White LED, ensures consistent, yield-focused illumination.

Important Consideration

The 30% faster growth achieved in Polymatech's lab highlights the WARM White LED's potential, but real-world results may vary depending on plant type, growing conditions, and system setup. Independent studies or Polymatech-provided data can provide deeper insights into performance across diverse applications.

Conclusion

Polymatech's WARM White LED with 70 CRI and 4260K CCT transforms horticulture lighting by delivering a warm, photosynthesis-optimized spectrum with peaks at 430–450 nm and 640–660 nm, ideal for flowering and fruiting. With a 70 CRI for vivid color rendering and lab-demonstrated 30% faster growth, this LED integrates seamlessly into full-spectrum and red-blue module systems, surpassing standard LEDs with lower CRI or separate fixtures. Perfect for growers seeking efficiency and visual clarity, explore this innovative solution at Polymatech's website.

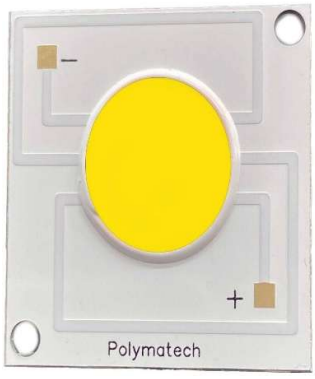
Contents

Applications

- Fiber-coupled illumination
- Architectural and Entertainment lighting
- Projection and micro-display-based applications
- High-Brightness and large format LCD back-light units
- Edge illuminated lighting guides
- High output spot lighting
- Machine vision

Product Nomenclature

FL18COB3030 WARM WHITE



[1]	Product shape	: FL18COB3030
[2]	Die count in series	: 12
[3]	Die count in parallel	: 01
[4]	CRI [Ra]	: 70

INTRODUCTION

Product Description

The FL18COB3030 series of high-flux, multi-die arrays in a smaller, easy-to-use platform. With FL18COB3030 LED lighting-class reliability, the FL18COB3030'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 FL18COB3030 brings new levels of flux and efficacy to this form factor.

The FL18COB3030 series is designed with flip chip technology which has high heat emission property thus increasing product life and maintaining same CRI output.

Features

- Mechanical Dimensions : 30×30×1(mm)
- Packaging Structure : Aluminium Base Chip on Board
- Reference Assembly : M4 screw, Connector
- Thermal Resistance : 2C/W
- CRI [Ra] : 70
- Maximum Drive Current : 450mA
- 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

(Tj=85C)

Product code	CRI	Luminous flux (lm)			Efficacy (lm/W)	Forward Current (mA)	Forward Voltage (V)		
		Tj85C		Tc25C*					
	Ra	Min.	Typ.	Typ.	Typ.		Min.	Typ.	Max.
FL18COB3030 WARM WHITE	70	396	450	489	148	450	20.8	24	27.2

1. Polymatech Electronics maintains a tolerance of ±10% on luminous flux measurements.

2. Polymatech Electronics maintains a tolerance of ±3% on forward voltage measurements.

3. Polymatech Electronics maintains a tolerance of ±2% on Ra measurements.

*: Values of Luminous flux at Tc=25C are provided as reference only.

Absolute Maximum Ratings

Parameter	Symbol	Rating	
Input Power	Pi	6.4	*1
Forward Current(mA)	If	450	*1
Reverse current(mA)	Ir	1	
Operating Temperature(C)	Top	-40 ~ +100	
Storage Temperature(C)	Tst	-40 ~ + 100	*2
Case Temperature(C)	Tc	105	
Junction Temperature(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.

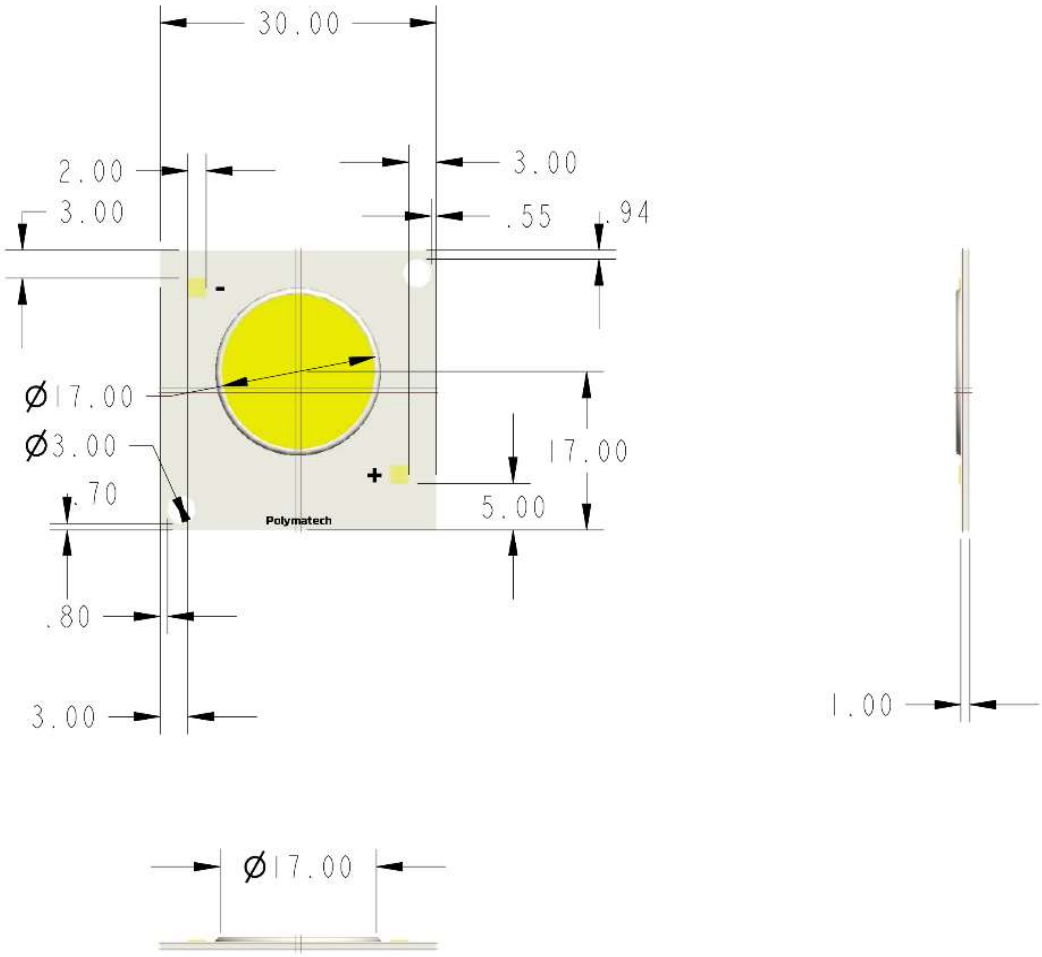
*2. Refer to 3. Outline drawing for Tc MEASUREMENT POINT.

*3. Junction temperature calculation formula: Tj = Tc + Rj-c × Pi

Mechanical Dimensions

The COB dimensions are 30 X 30 mm.

Tolerances Unless otherwise specified: +/-0.3



Dimensions are in mm.

Tolerances unless otherwise specified: +.13

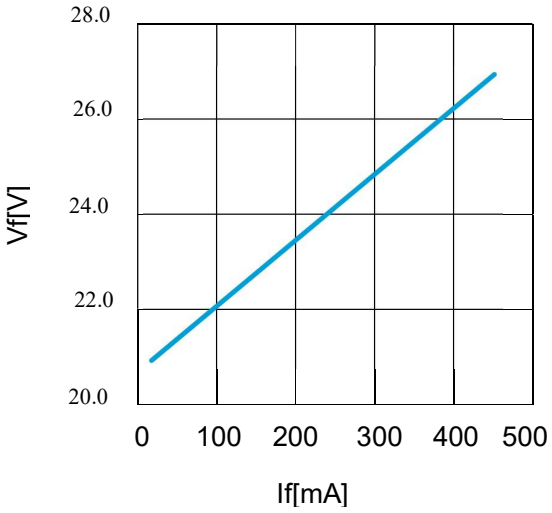
x° +1

Characteristics Curves

Forward Current Characteristic/Temperature Characteristics

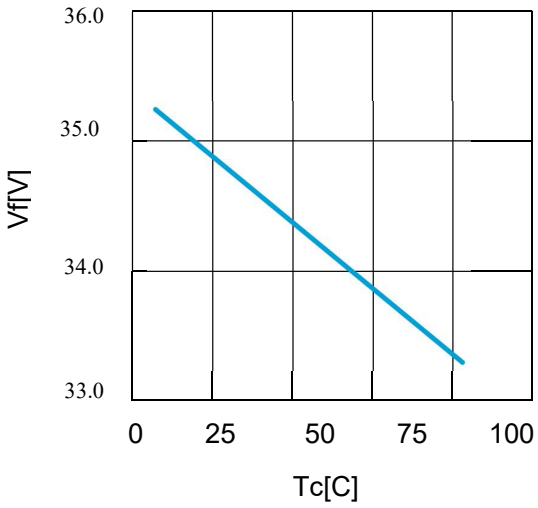
Forward Current VS. Forward Voltage

Tc=25C



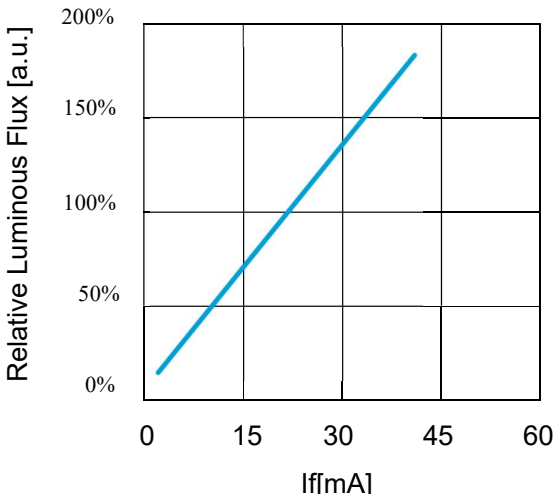
Case Temperature vs. Forward Voltage

If=90mA



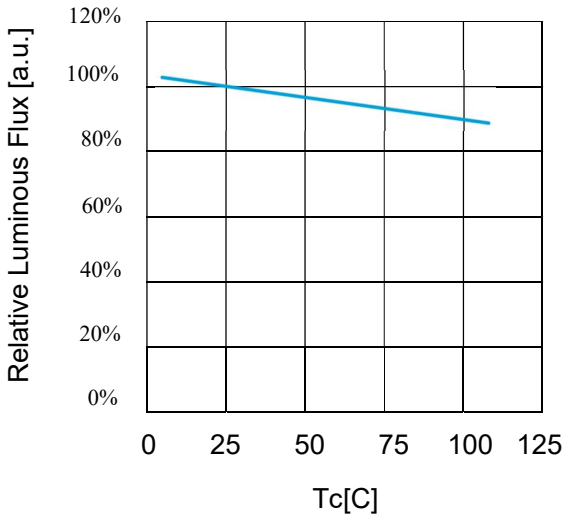
Forward Current VS. Relative Luminous Flux

Tc=25C



Case Temperature vs. Relative luminous flux

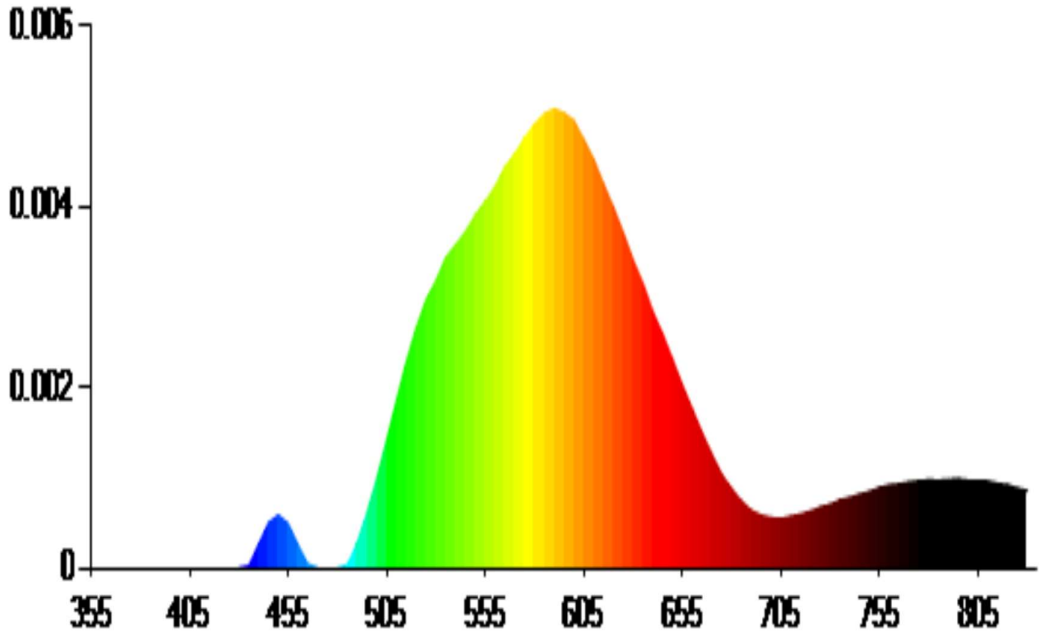
If=90mA



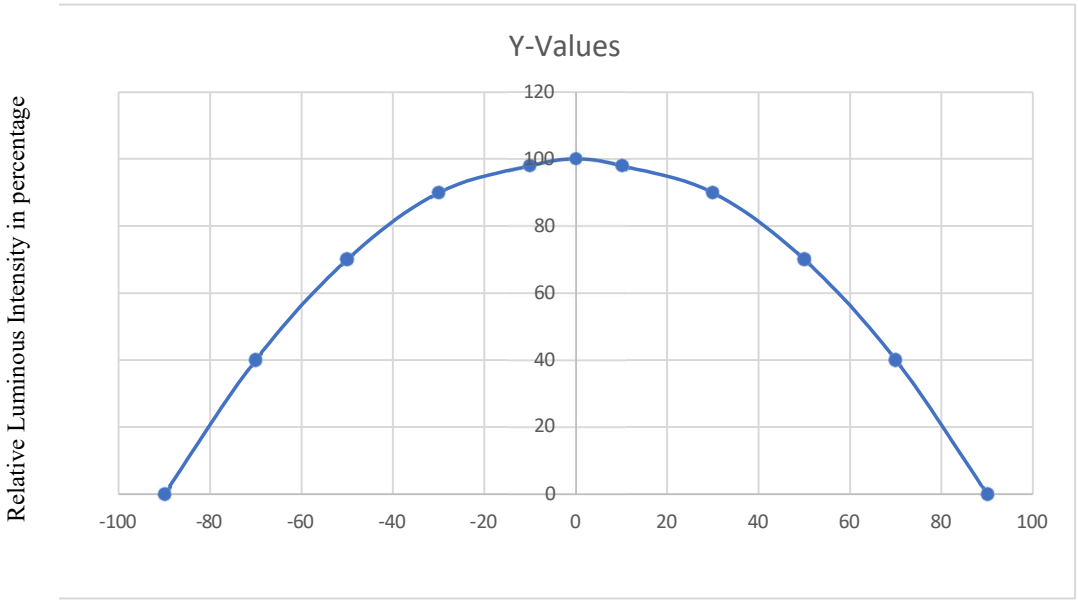
Optical Characteristics

Spectrum: CRI[Ra]: 70

Spectral Power Distribution



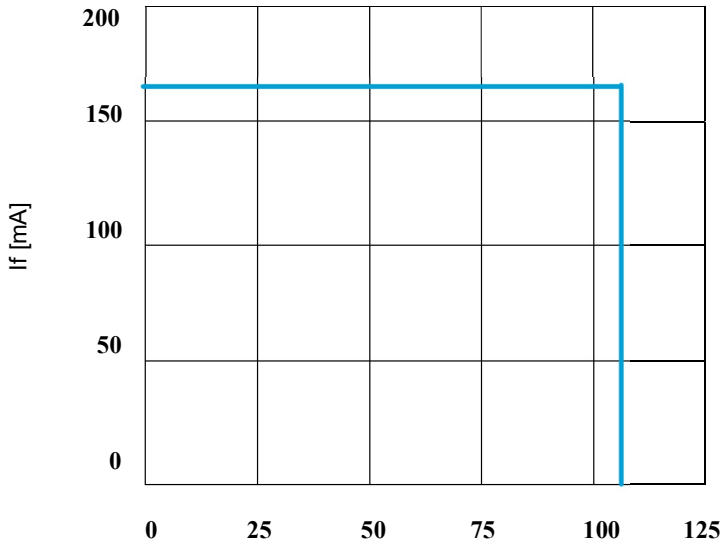
Optical characteristics (continued)
Radiation Characteristics



Spread Angle in Degrees

Derating Characteristics

Case Temperature
vs. Allowable Forward Current



Tc [C]

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)

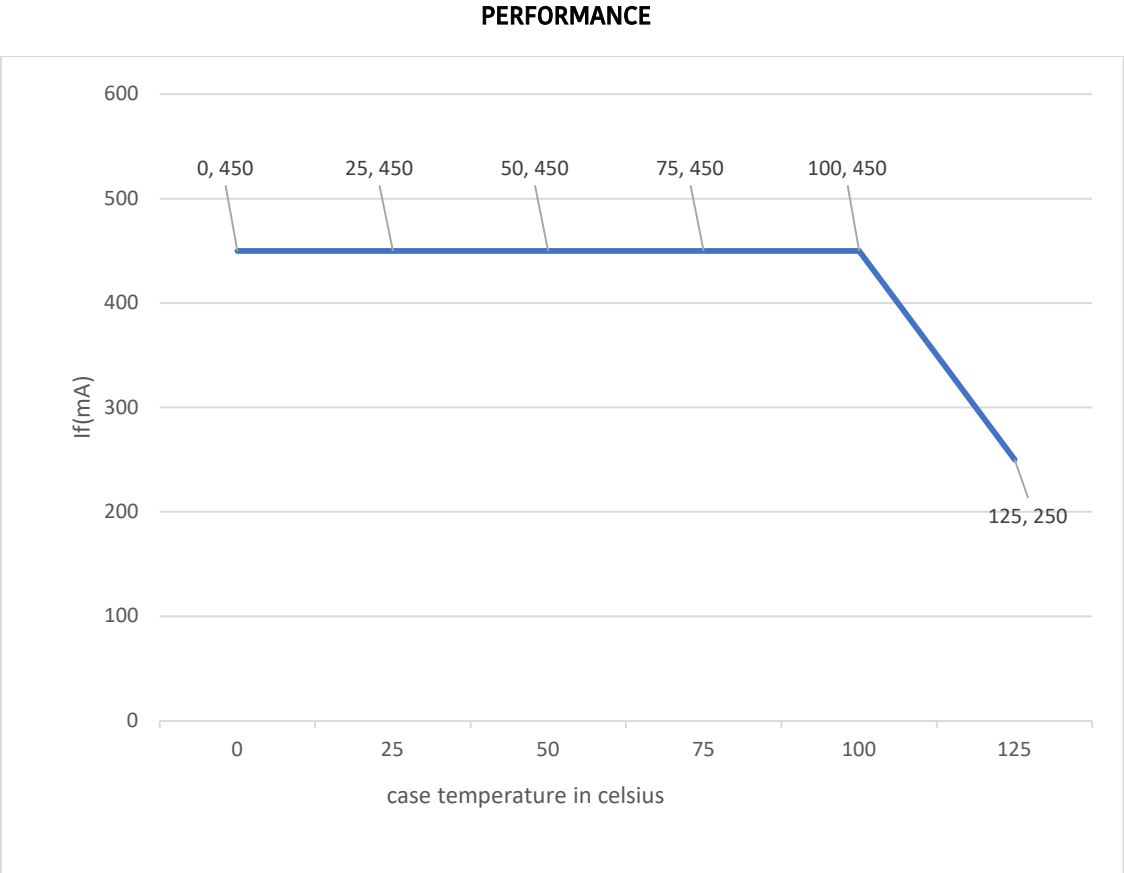
Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	If=90mA	>U× 1.1
Total Luminous Flux	ΦV	If=90mA	<S× 0.85

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

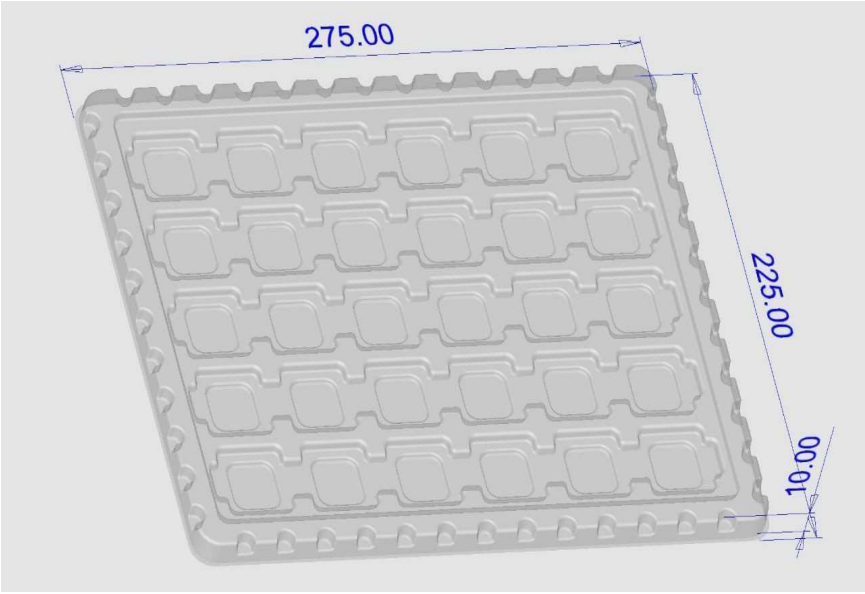
The maximum current rating of the FL18COB3030 depends on the case temperature (Tc) when the LED has reached thermal equilibrium under steady- state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Polymatech Electronics LED recommends a maximum Junction temperature of 135 °C to ensure optimal LED lifetime.

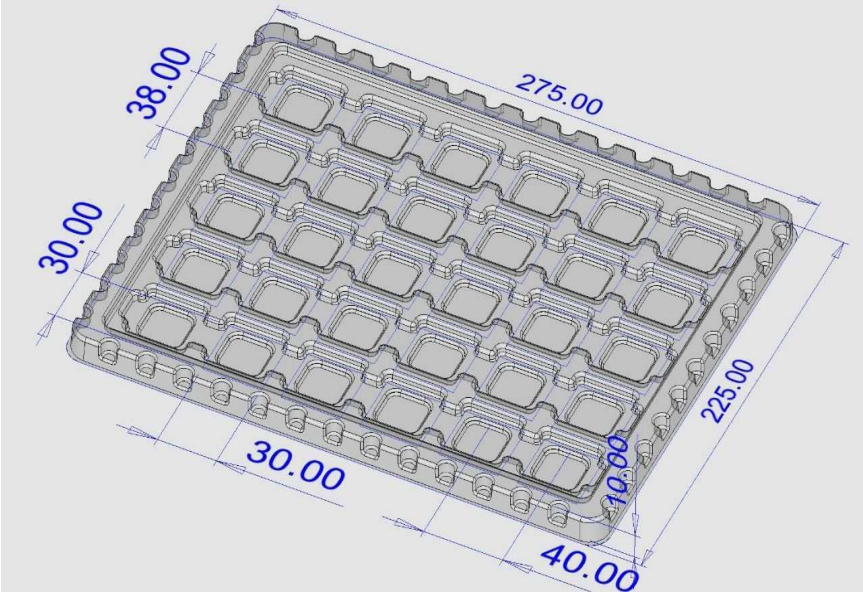


Packaging Specification

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 (Rj-c), 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 Cl2, H2S, NH3, SOx, NOx 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 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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