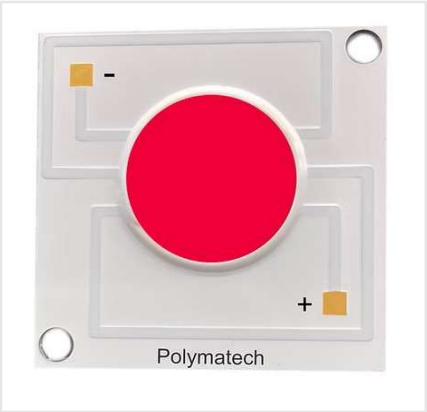
Polymatech®



DATA SHEET

POLYMATECH STANDARD COB Series

Version 2

FL18COB3030PLANT LIGHT

lead-free RoHS 2002/95/EC

POLYMATECH ELECTRONICS LIMITED
www.polymatech.in

Field of Use

Polymatech Plant Light LED: Precision Lighting for Healthier, Stronger Plants

Polymatech Plant Light LED solutions are meticulously designed to accelerate plant development and maximize photosynthetic efficiency across all growth stages. Featuring both **full-spectrum** and **targeted monochromatic LEDs**, these solutions provide plants with light precisely aligned with their natural absorption peaks delivering stronger root systems, faster growth, and higher yields. Built using advanced semiconductor materials and refined in Polymatech in-house lab, these LEDs are the next evolution in agricultural lighting technology.

Engineered for Photosynthesis Efficiency

- **Photosynthetic Peaks**: Plant growth is largely driven by light in the blue (430–450 nm) and red (640–660 nm) ranges, aligning with the absorption peaks of chlorophyll a and b. Polymatech Plant Light LEDs are tuned to these exact wavelengths to energize photosynthetic pathways.
- **Monochromatic Accuracy**: Whether you're promoting vegetative growth or inducing flowering, Polymatech red (660 nm) and blue (450 nm) monochromatic LEDs allow growers to customize light recipes that precisely meet plant stage needs.

Polymatech Dual-Wavelength Fusion Module

- **Integrated Red-Blue System**: Unlike traditional setups that use separate light fixtures, Polymatech proprietary module fuses red and blue diodes in a scientifically calibrated ratio (e.g., 4:1 or 5:1).

This design delivers **even spectral distribution** and avoids color blending issues.

- **Maximized Yields**: The dual-channel integration boosts light uniformity and enhances photosynthetic activity in both surface and lower canopy areas, promoting dense foliage and stronger flowering.

Full-Spectrum Innovation

- **Natural Sunlight Simulation**: In addition to red and blue, Polymatech includes green (~520–550 nm), yellow (~580 nm), and far-red (~730 nm) in its spectrum, replicating the balanced quality of natural daylight.
- **Far-Red Benefits**: The inclusion of far-red light stimulates the phytochrome system, encouraging stem elongation and flowering, especially beneficial for fruiting plants and flowering crops.

Proven Lab Results: Up to 30% Faster Growth

- **Controlled Performance**: In laboratory environments, Polymatech Plant Light LEDs have demonstrated up to **30% faster growth** than conventional grow lights, including white LEDs and outdated HPS systems.
- **Growth Consistency**: Whether used in vertical farms, greenhouses, or home grow kits, the results showcase improved biomass, earlier flowering, and superior leaf health.

Note: Real-world performance may vary depending on plant species, environmental control, and installation design. Growers are encouraged to consult Polymatech light recipes and setup guidelines for optimized outcomes.

Why Choose Polymatech Plant Light LEDs?

- **Uniform Light Delivery**: Integrated red-blue modules ensure consistent spectral quality across your grow area, unlike competitors' setups that rely on separate red and blue panels.
- **Energy Savings**: Built with high-efficacy diodes (up to 80% wall-plug efficiency), Polymatech LEDs offer more usable PAR per watt, reducing power consumption and cooling requirements.
- **Scalable Design**: Ideal for both small-scale hydroponic systems and large commercial greenhouses, the modular design supports flexible configurations and long operational lifespans.

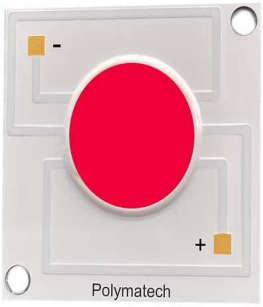
Conclusion

Polymatech Plant Light LEDs empower growers to unlock the full potential of their crops by combining scientific precision, spectral optimization, and energy-efficient design. By focusing on chlorophyll absorption peaks and enhancing spectrum uniformity, these LEDs deliver **up to 30% faster growth** and significantly improved yields over traditional lighting technologies. Experience the next level of horticultural lighting powered by Polymatech.

Visit Polymatech website to explore full product specifications, downloadable data sheets, and customized lighting solutions for your crops

Contents

Product Nomenclature



FL18COB3030 PLANT LIGHT

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

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.

Applications:

- Indoor Farming & Vertical Agriculture
- Greenhouses
- Horticulture Nurseries
- Research & Plant Physiology Labs
- Tissue Culture & In-vitro Plant Growth
- Fruit & Vegetable Production
- Herbal & Medicinal Plant Cultivation
- Floriculture
- Aquaponics & Hydroponics

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 :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	Luminous flux (lm)			Efficacy (lm/W)	Forward Current (mA)	Forward Voltage (V)		
	Tj85C		Tc25C*					
	Min.	Typ.	Typ.	Typ.		Min.	Typ.	Max.
FL18COB3030 PLANT LIGHT	396	450	489	148	450mA	20.6V	24.8V	29V

Notes:

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

2. Polymatech Electronics maintains a tolerance of ±3% on forward voltage 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	*3
Junction Temperature(C)	Tj	125	

*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.

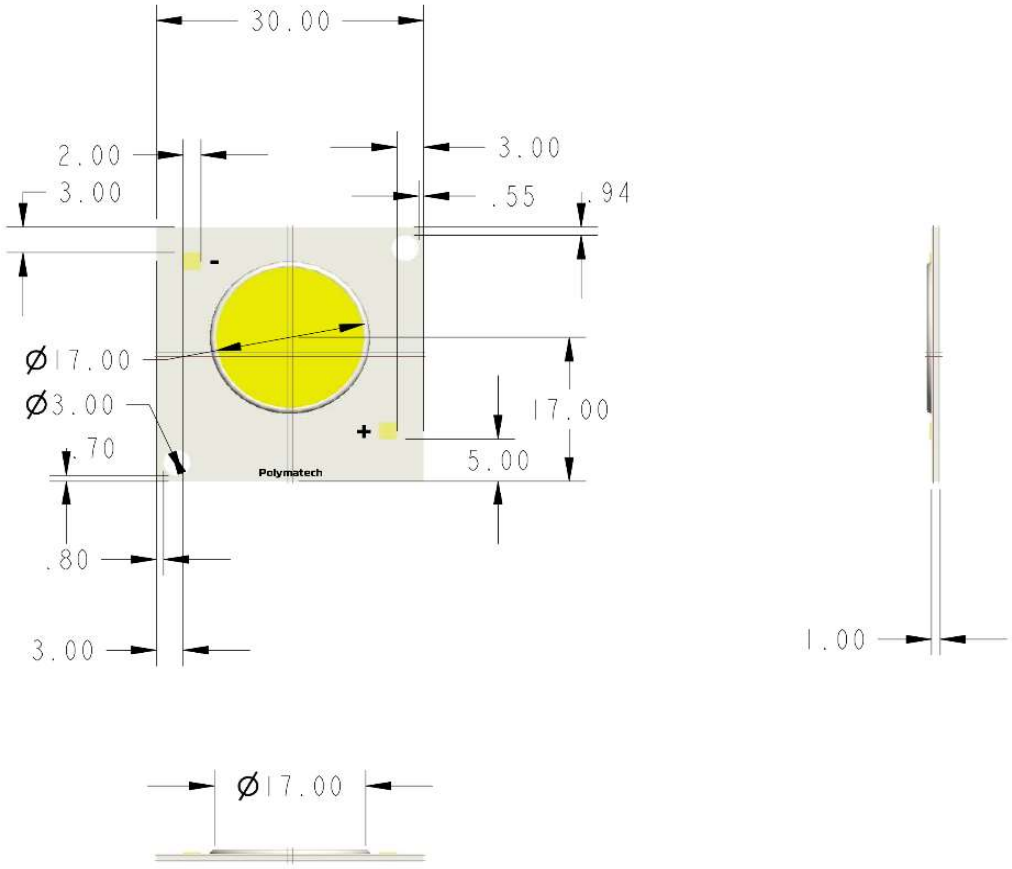
*2. Refer to 3. Outline drawing for Tc MEASUREMENT POINT.

*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

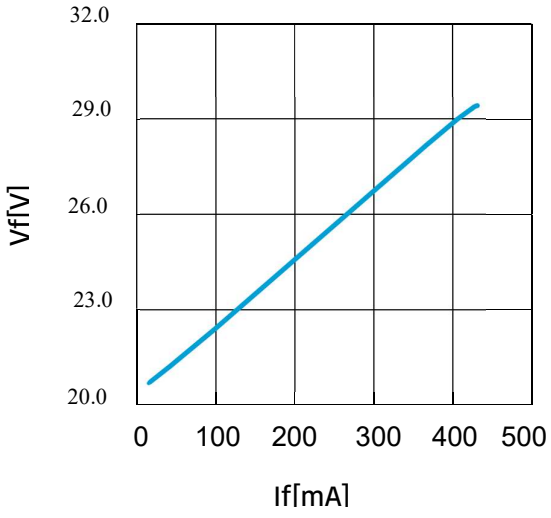
x° +1

Characteristics Curves

Forward Current Characteristic/Temperature Characteristics

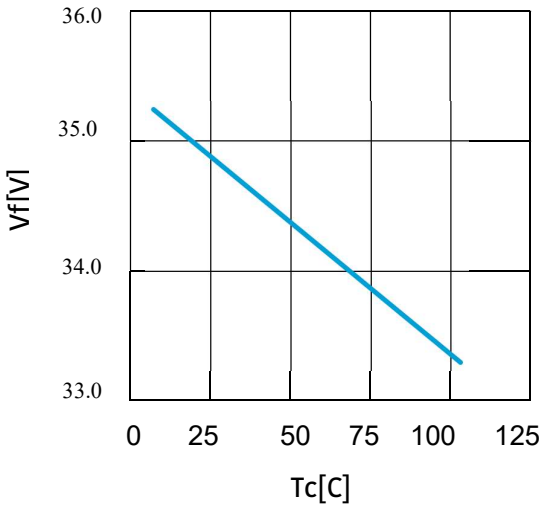
Forward Current VS. Forward Voltage

Tc=25C



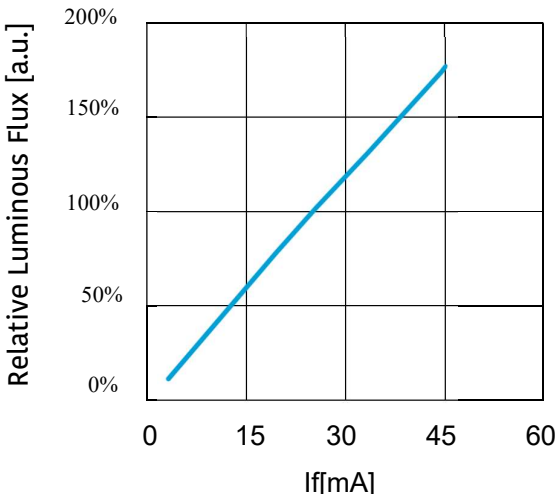
Case Temperature vs. Forward Voltage

If=90mA



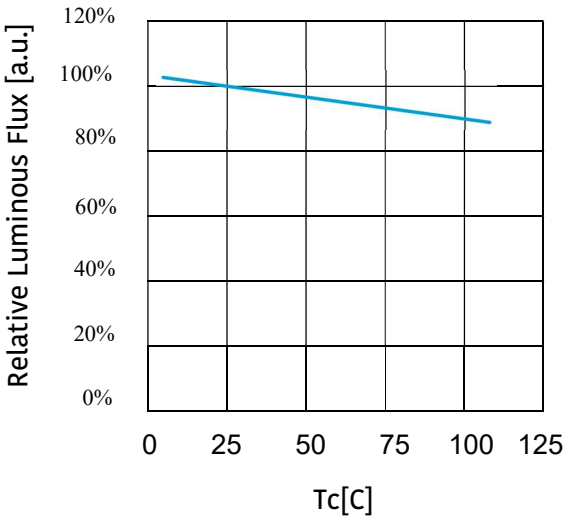
Forward Current VS. Relative Luminous Flux

Tc=25C



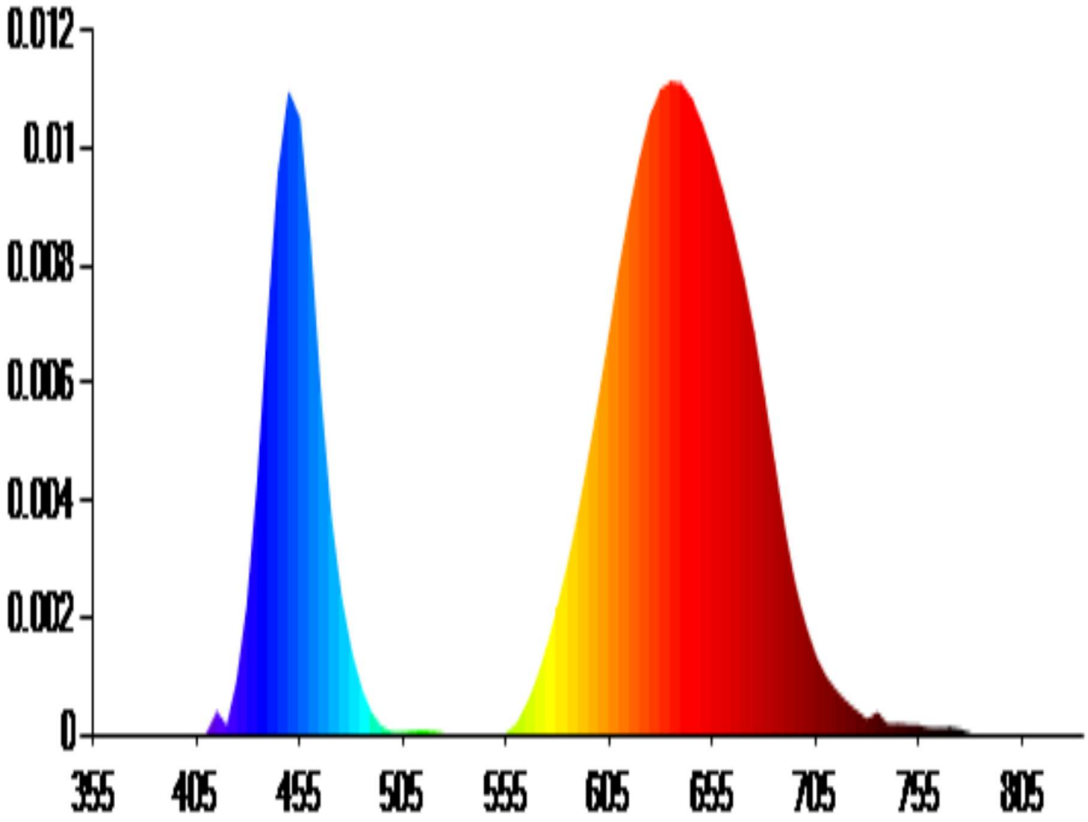
Case Temperature vs. Relative luminous flux

If=90mA



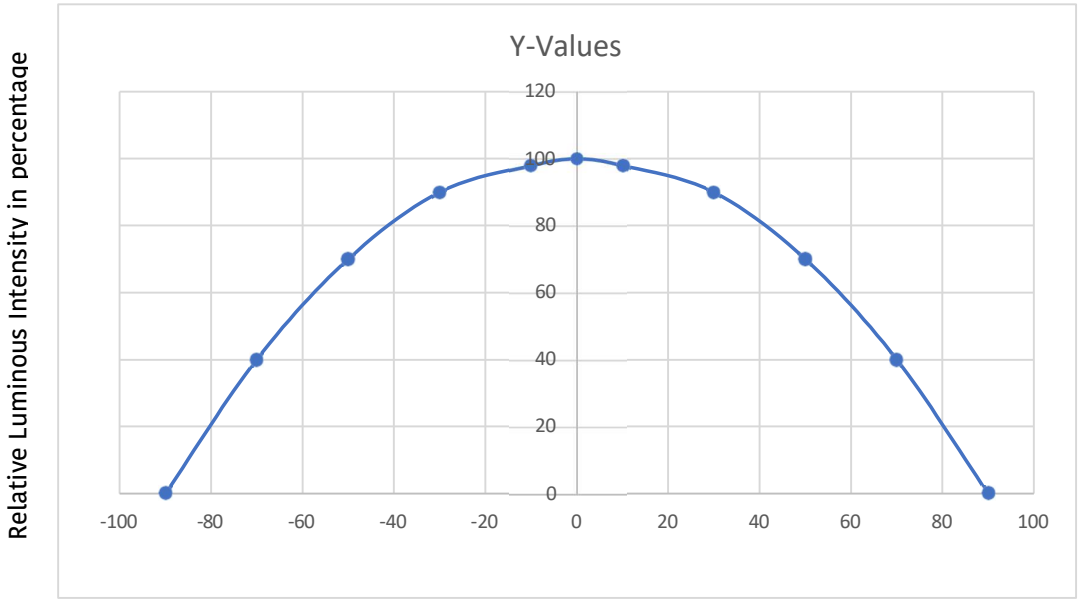
Optical Characteristics

Spectral power distribution



Optical characteristics (continued)

Radiation Characteristics

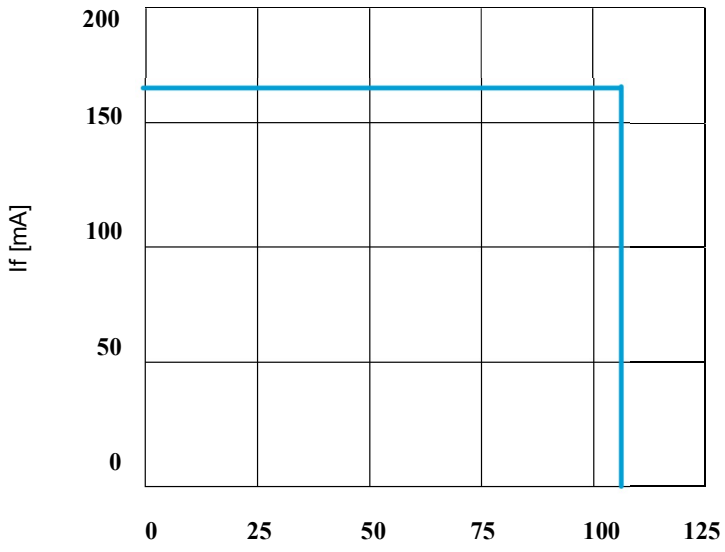


Spread Angle in Degrees

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)

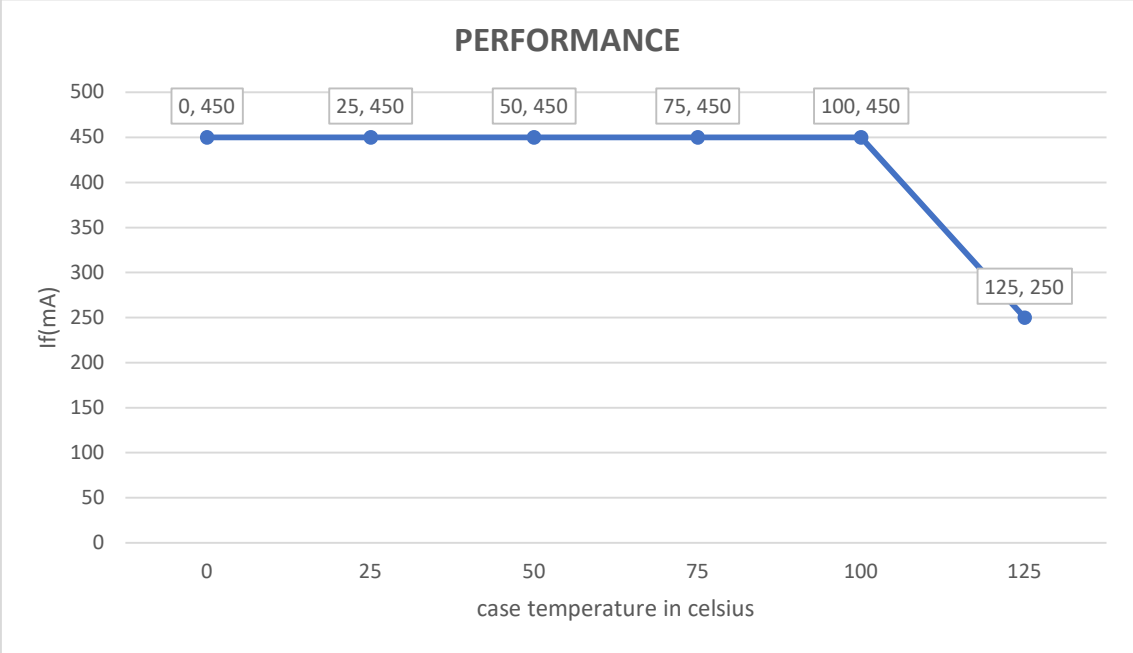
Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	If=90mA	>U× 1.1
Total Luminous Flux	ΦV	If=90mA	<S× 0.85

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

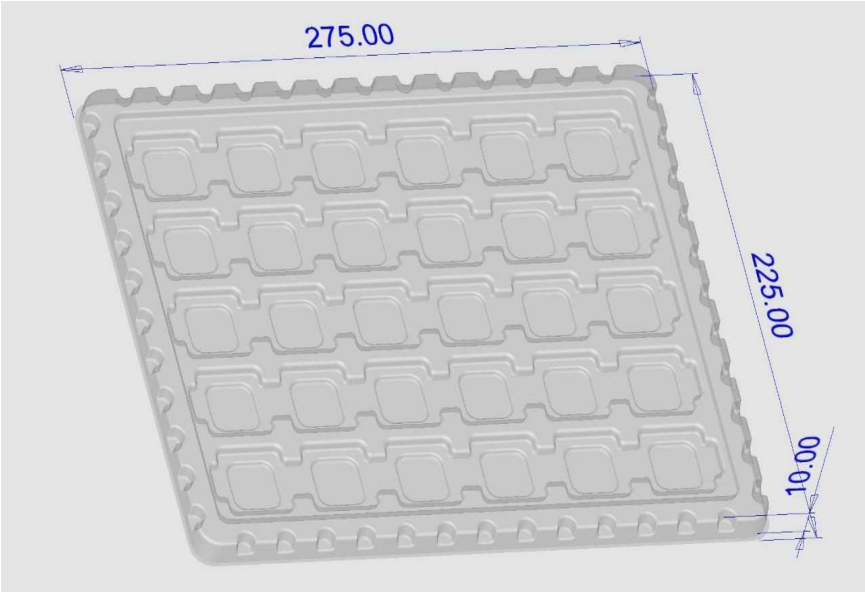
The maximum current rating of the FL18COB3030 depends on the case temperature (Tc) when the LED has reached thermal equilibrium under steady state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when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

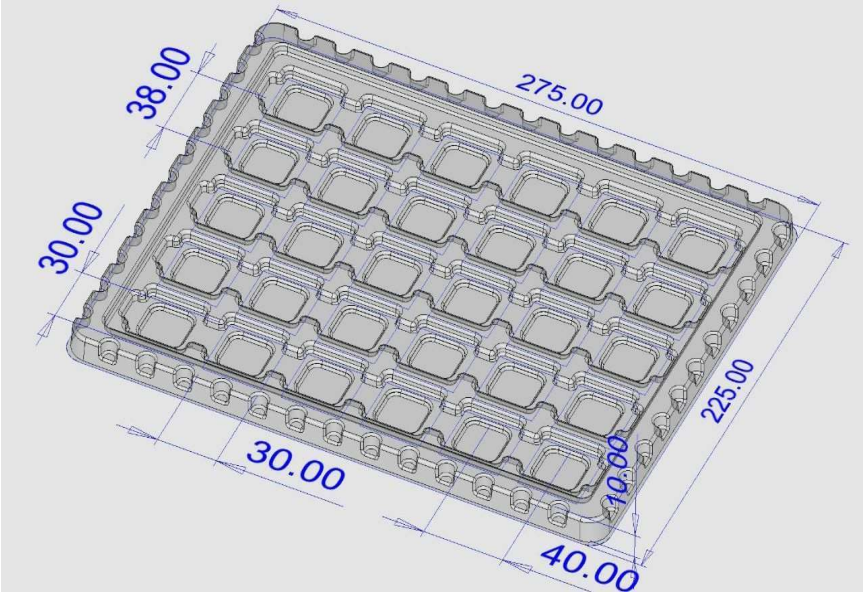


Packaging Specification

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 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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