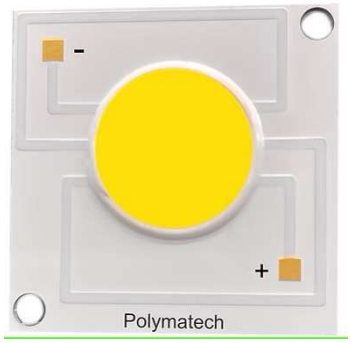
Polymatech®



DATA SHEET

POLYMATECH STANDARD COB Series

Version 2

FL27COB3030 SOFT WHITE

lead-free RoHS 2002/95/EC

POLYMATECH ELECTRONICS LIMITED
www.polymatech.in

Field of Use

Polymatech Soft White LED: Lighting That Feels Natural

Polymatech's **Soft White LED solutions** are expertly engineered to replicate the warmth and natural feel of incandescent lighting, offering a visually comfortable and high-quality illumination ideal for residential, hospitality, retail, and high-end commercial spaces. With a high CRI (Color Rendering Index), Polymatech's Soft White LEDs ensure true-to-life color fidelity and visual comfort. Designed to exceed expectations in ambiance, aesthetics, and efficiency, this line is perfect for environments where natural light quality is essential.

Engineered for True-to-Life Color and Comfort

• **Optimized Spectrum for Visual Comfort**: Polymatech Soft White LEDs emit light in the warm white range (2700K–3000K), closely mimicking the golden warmth of traditional incandescent bulbs. The spectrum is carefully tuned to reduce harsh blue peaks and ensure a smooth, comforting light output that reduces eye strain and enhances mood.
• **High CRI >95**: Color Rendering Index values above 95 mean that colors appear vibrant, accurate, and natural—critical for environments like retail or hospitality, where appearance is everything.

Advanced Soft White Module for Enhanced Ambiance

• **Innovative Phosphor Technology**: Leveraging proprietary phosphor blends and high-quality blue-chip bases, Polymatech's Soft White LEDs maintain spectral consistency and avoid color shifting even under long operational hours.

• **Uniform Illumination**: The single-module design ensures consistent light distribution with minimal color variation, eliminating shadows or hotspots that are common with less sophisticated LED solutions.

Beyond Just Warm Light: A Full-Spectrum White Experience

• **Smooth R9-R15 Rendering**: While many standard LEDs perform poorly in rendering red tones (R9) and skin tones (R13), Polymatech's Soft White ensures excellent rendering across all R-values, enhancing the natural appearance of food, fabrics, and skin.

• **Flicker-Free Operation**: Designed for eye safety and comfort, the Soft White series operates with <1% flicker, ideal for health-conscious spaces, photography, and video applications.

Up to 30% More Visual Efficiency in Real-World Testing

• **Human-Centric Testing**: In Polymatech's lighting labs, test environments using Soft White LEDs showed up to 30% greater user satisfaction in perceived brightness and comfort when compared to standard LED solutions with similar lumens.

• **Energy-Efficient & Long-Lasting**: With efficacy levels reaching up to 160 lm/W, these LEDs reduce energy consumption while maintaining high light quality—delivering both sustainability and performance.

Note: The 30% higher comfort and satisfaction were observed under Polymatech-controlled settings. Performance may vary based on application, environment, and fixture design.

Why Polymatech Outshines the Competition

- **Superior Color Quality**: Unlike many warm white LEDs that compromise color rendering for efficacy, Polymatech delivers both high CRI and high output.
- **Long-Term Stability**: Thanks to superior heat dissipation and phosphor stability, the Soft White LEDs maintain consistent color over thousands of hours, unlike cheaper LEDs that shift over time.
- **Integrated Design Advantage**: Competitor products often use standard phosphors or multi-chip approaches that can create inconsistency in tone. Polymatech's single-source, full-spectrum module provides seamless performance.

Conclusion

Polymatech's **Soft White LED** series redefines warm lighting with high CRI 70, flicker-free output, and a spectrum tuned for human comfort and visual appeal. Designed for premium indoor environments, these LEDs offer a visually superior alternative to standard lighting by combining full-spectrum warmth with industry-leading energy efficiency and spectral stability. Discover the next generation of human-centric lighting at Polymatech's website.

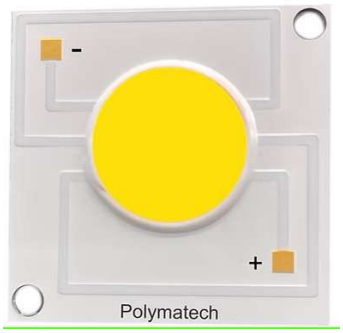
Contents

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

FL27COB3030 SOFT WHITE



[1]	Product shape	: FL27COB3030
[2]	Die count in series	: 12
[3]	Die count in parallel	: 01
[4]	CRI(Ra)	: 70

INTRODUCTION

Product Description

The FL27COB3030 series of high-flux, multi-die arrays in a smaller, easy-to-use platform. With FL27COB3030 LED lighting-class reliability, the FL27COB3030'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 FL27COB3030 brings new levels of flux and efficacy to this form factor.

The FL27COB3030 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 : 700mA
- 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.
FL27COB3030 SOFT WHITE	70	396	450	489	148	700	21	24	26.9

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.

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 Curent(mA)	If	700	*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.

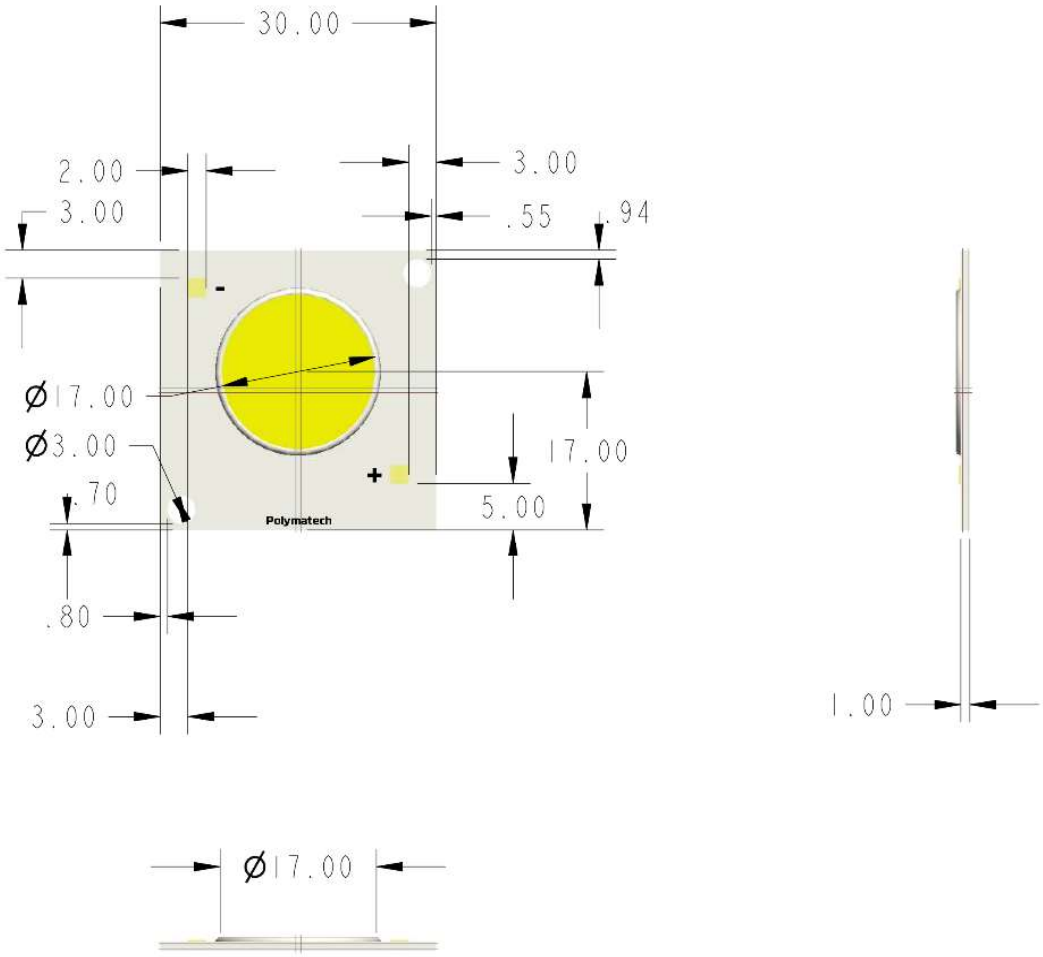
*2. Refer to 3. Outline drawing for Tc MEASUREMENT POINT.

*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

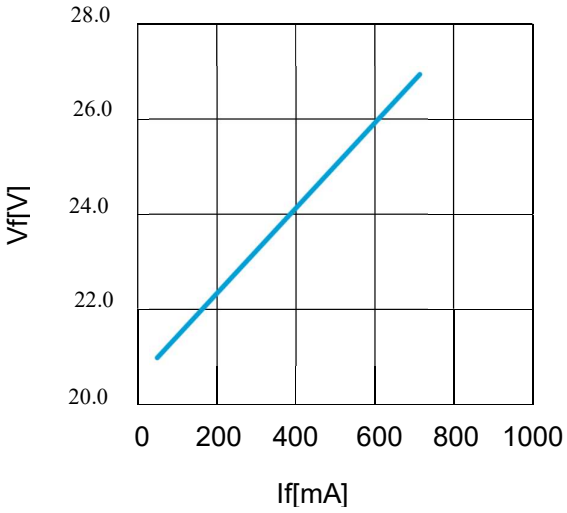
x° +1

Characteristics Curves

Forward Current Characteristic/Temperature Characteristics

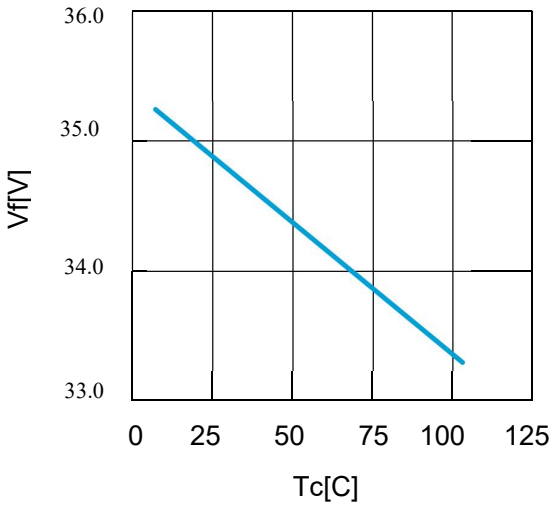
Forward Current VS. Forward Voltage

Tc=25C



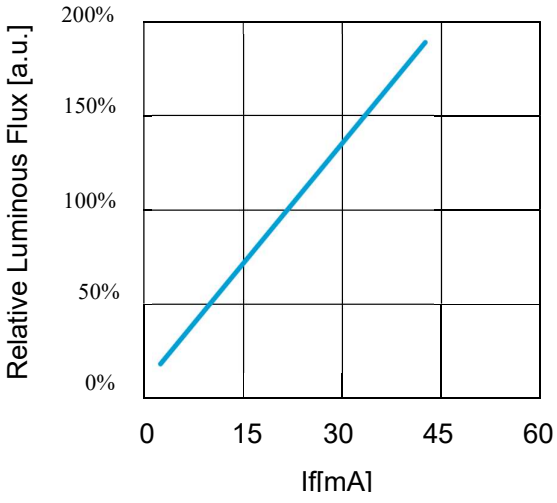
Case Temperature vs. Forward Voltage

If=90mA



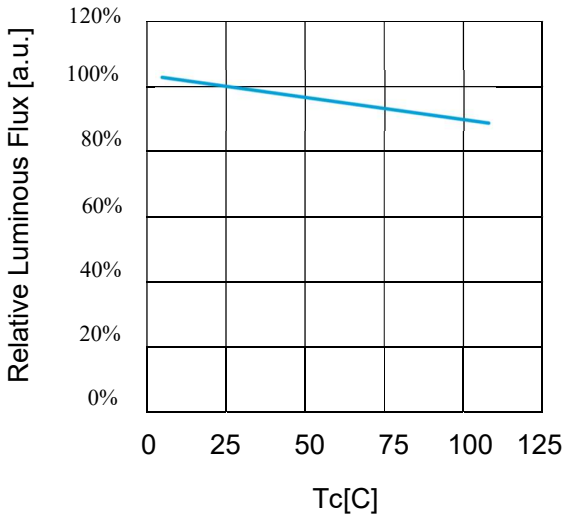
Forward Current VS. Relative Luminous Flux

Tc=25C



Case Temperature vs. Relative luminous flux

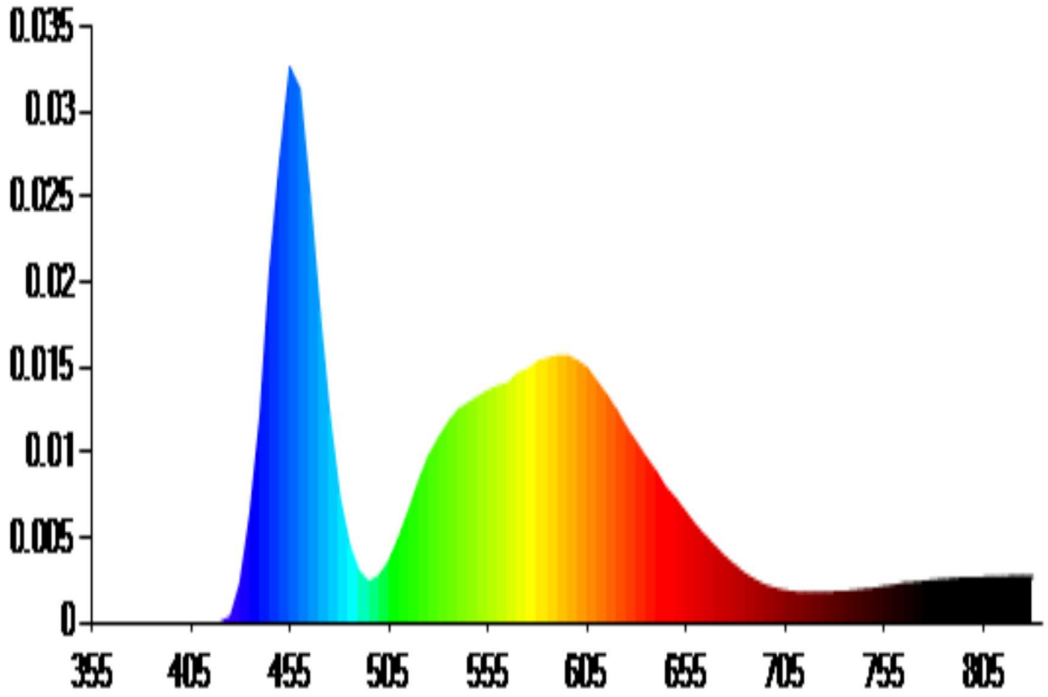
If=90Ma



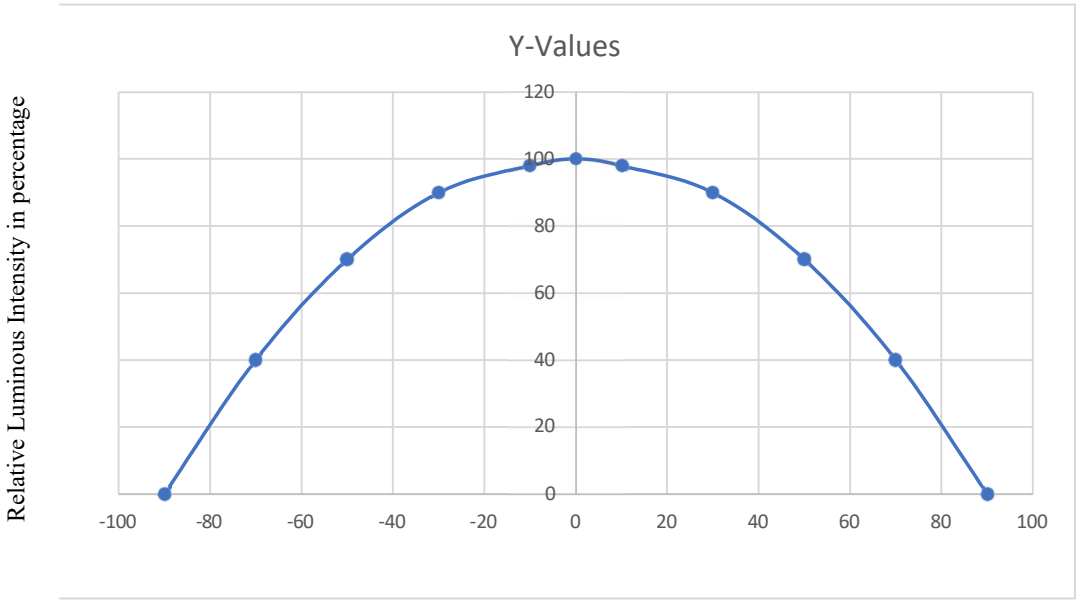
Optical Characteristics

Spectrum: CRI 70

Spectral Power Distribution



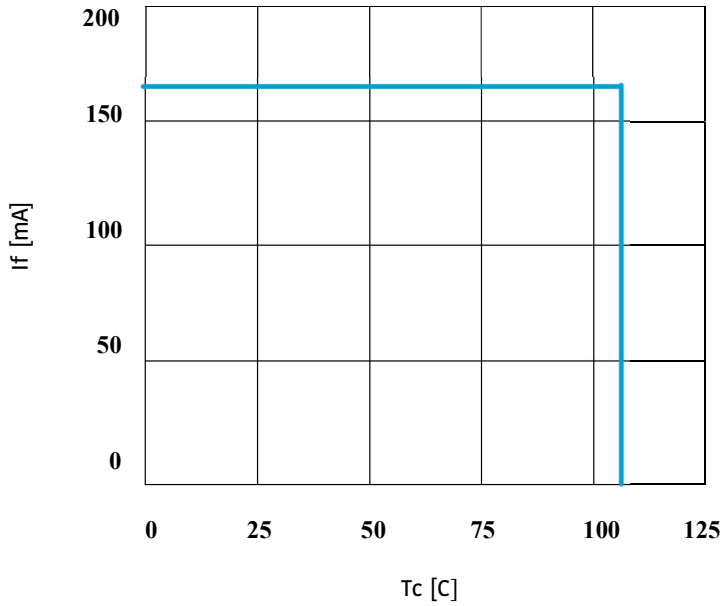
Optical characteristics (continued)
Radiation Characteristics



Spread Angle in Degrees

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)

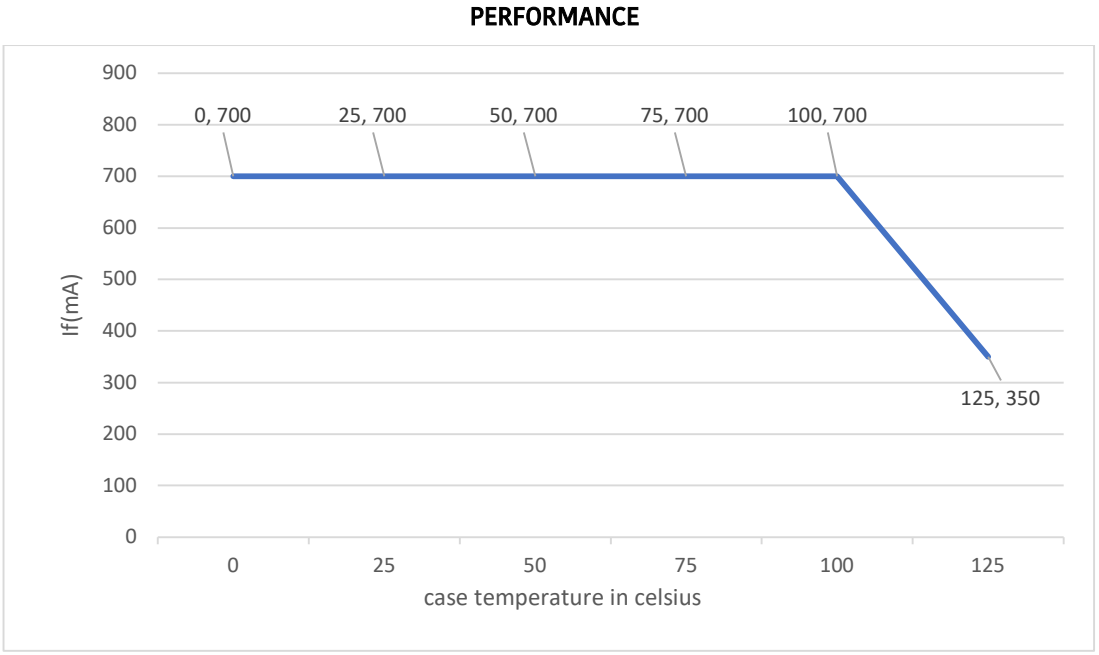
Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	If=90mA	>U× 1.1
Total Luminous Flux	ΦV	If=90mA	<S× 0.85

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

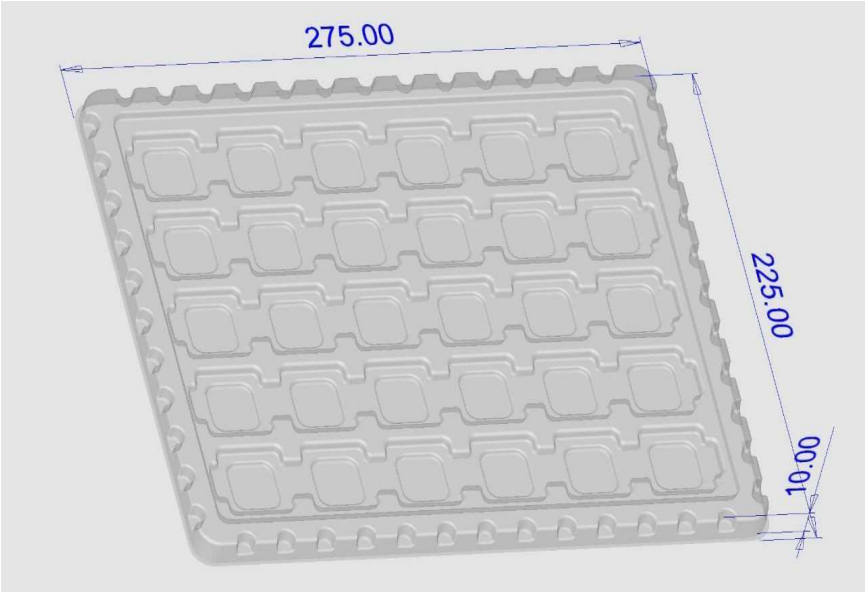
The maximum current rating of the FL27COB3030 depends on the case temperature (Tc) when the LED has reached thermal equilibrium under steady- state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Polymatech Electronics LED recommends a maximum Junction temperature of 135 °C to ensure optimal LED lifetime.

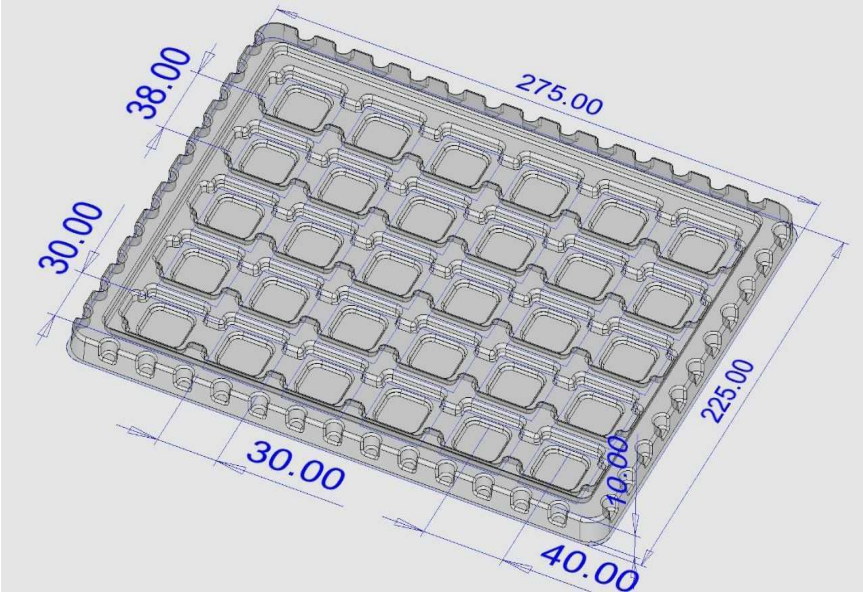


Packaging Specification

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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