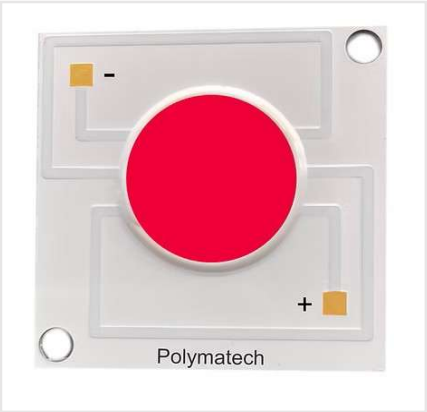
Polymatech®



DATA SHEET

POLYMATECH STANDARD COB Series

Version 2

FL18COB3030 WOUND HEALING

lead-free RoHS 2002/95/EC

POLYMATECH ELECTRONICS LIMITED
www.polymatech.in

TISSUE REPAIR AND LED INNOVATION

Applications:

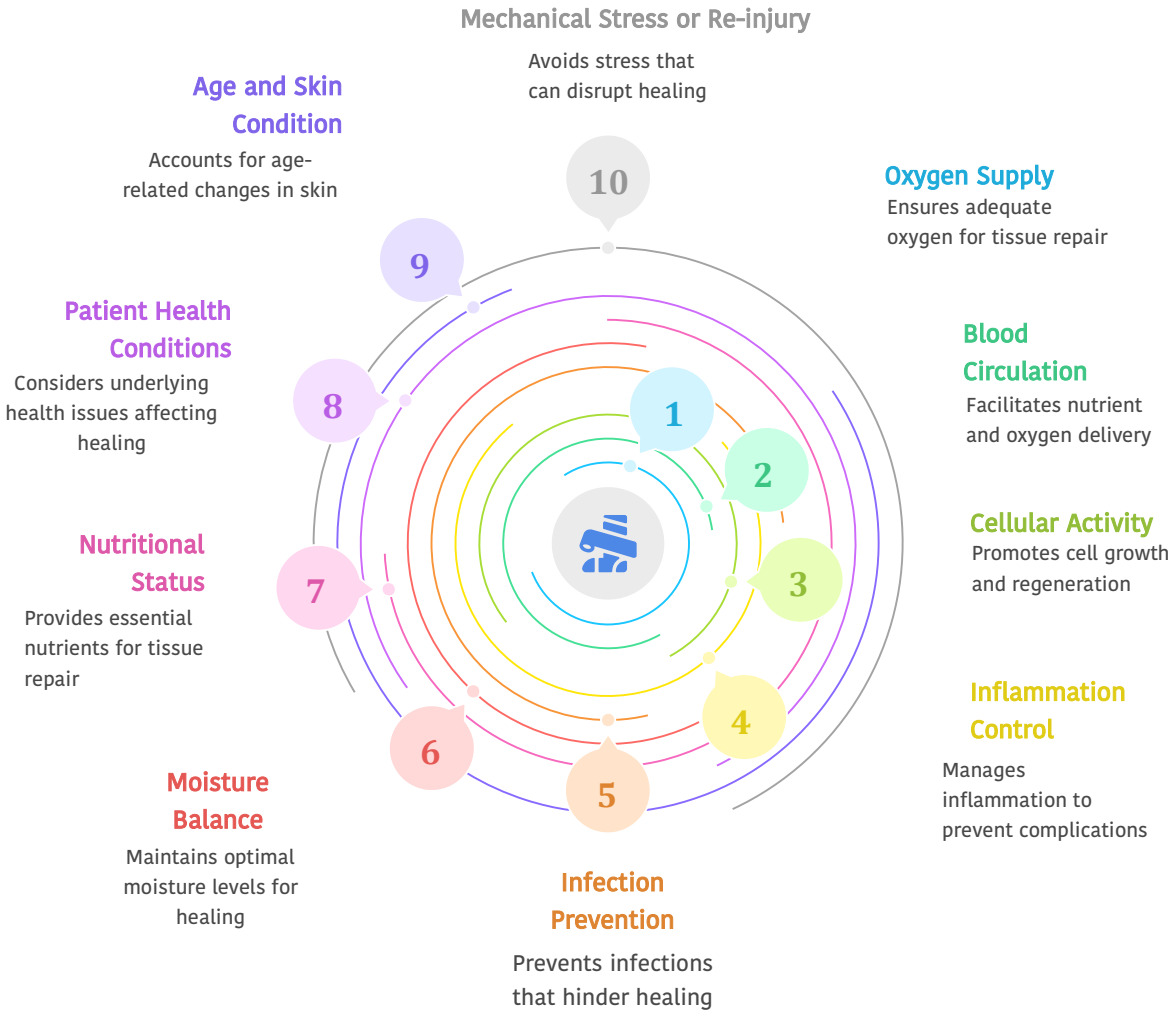
- Chronic Wound Management
- Post-Surgical Healing
- Dermatological & Cosmetic Treatments
- Sports and Orthopedic Injury Recovery
- Burn and Scar Treatment
- Veterinary Medicine
- Home-use & Portable Medical Devices

Light is Nature

Polymatech LEDs – Where Light Becomes Medicine

Polymatech
Opto semiconductors

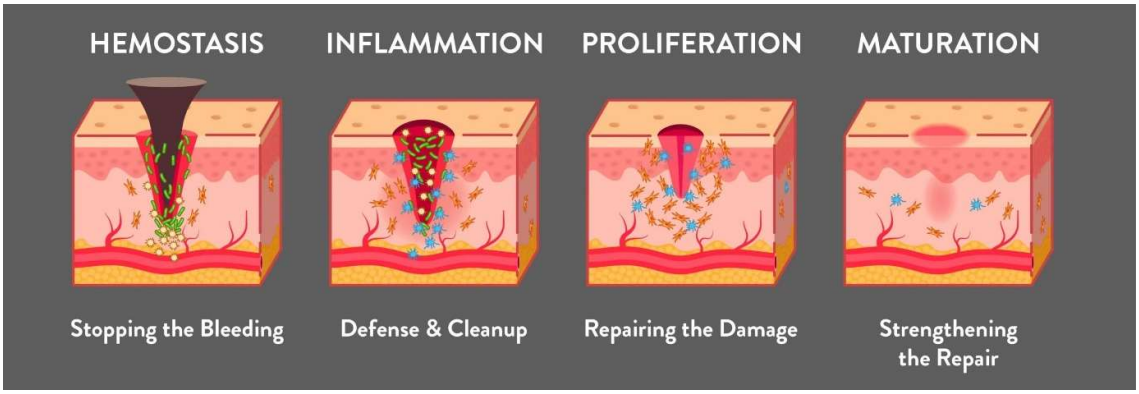
Important Factors of Wound Healing



Wound healing is a dynamic and complex biological process that occurs in four overlapping stages: hemostasis, inflammation, proliferation, and maturation. The process begins with hemostasis, which occurs immediately after injury. Blood vessels constrict to reduce bleeding, and platelets form a clot while releasing signals that trigger the next stages. During the inflammation phase, immune cells

such as neutrophils and macrophages flood the wound site to remove pathogens, dead tissue, and debris. This stage is essential for infection control and sets the foundation for repair.

STAGES OF WOUND HEALING



The third phase, proliferation, focuses on tissue regeneration. Fibroblasts begin producing collagen and extracellular matrix, while angiogenesis restores blood flow by forming new capillaries. Simultaneously, epithelial cells migrate to close the wound, and granulation tissue fills the wound bed. Finally, the maturation (or remodeling) phase strengthens the new tissue. Collagen type III is replaced with the more durable type I, excess capillaries are pruned, and the scar tissue reorganizes, gradually restoring tensile strength and skin integrity.

Polymatech's Wound Healing LEDs are designed to support these distinct healing phases by delivering targeted wavelengths that activate key biological functions at each stage—from microbial control and inflammation modulation to tissue regeneration and deep recovery.

Regenerative Healing Through LED Innovation

Skin Penetration

Light penetrates skin and tissue.

Photon Absorption

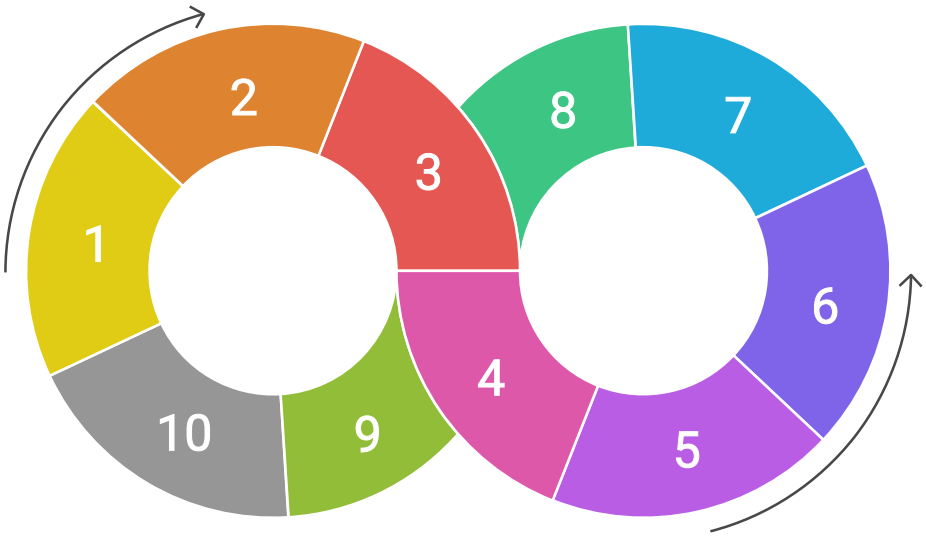
Mitochondria absorb photons.

Inflammation Reduction

Inflammation and pain decrease.

Blood Flow Enhancement

Blood flow and oxygenation improve.



Light Emission

Therapeutic wavelengths are emitted.

Collagen Synthesis

Collagen and elastin are synthesized.

Faster Healing

Overall healing process is faster.

Tissue Regeneration

Tissue regeneration accelerates.

ATP Production

Energy production increases.

Cellular Repair

Repair mechanisms are activated.

Influence Of Wavelength on Wound Healing

Polymatech's Wound Healing LEDs are engineered to unlock the therapeutic potential of targeted light wavelengths—blue (400–470 nm), red (620–670 nm), and near-infrared (800–850 nm)—to enhance and accelerate the natural wound healing process. Each wavelength is selected based on its biological impact on different skin and tissue layers, delivering a powerful, non-invasive treatment solution.

Blue Light (400–470 nm) Surface-Level Infection Control

Blue light targets the epidermal layer, offering strong antibacterial and antimicrobial properties. It disrupts the DNA structure of harmful bacteria and biofilms, especially in chronic or infected wounds. This makes blue LEDs essential for early-stage wound decontamination. Polymatech's high-purity blue chips are finely tuned to ensure maximum microbial inhibition while minimizing tissue stress.

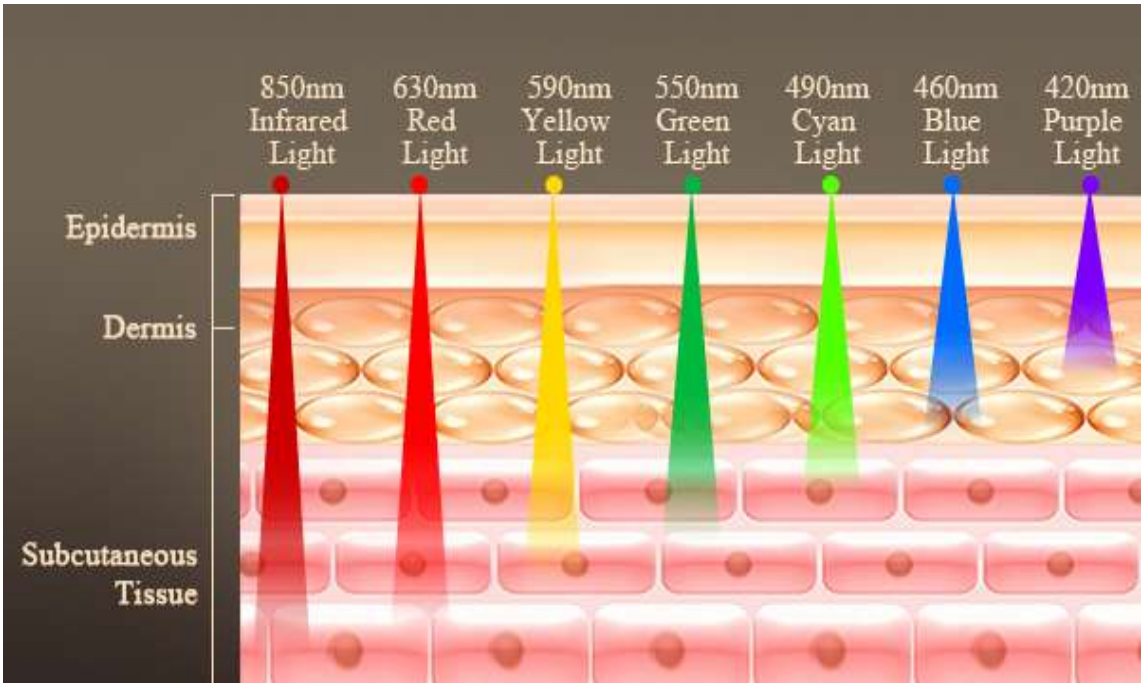
Red Light (620–670 nm) Mid-Layer Tissue Repair

Red light reaches the dermal tissue, stimulating fibroblast activity crucial for collagen synthesis and tissue regeneration. It promotes angiogenesis, enhancing blood flow and nutrient delivery, and increases ATP production to boost cellular metabolism. Polymatech's red LEDs are engineered near the 660 nm peak absorption zone, ensuring optimal efficiency in skin healing.

Near-Infrared (800–850 nm) Deep Tissue Recovery and Pain Relief

Penetrating into subcutaneous tissue, NIR light stimulates blood circulation and oxygenation, reduces inflammation, and accelerates

muscle and connective tissue repair. Polymatech's NIR LEDs are designed with controlled thermal output, making them ideal for non-invasive, deep tissue therapy with safe and consistent performance.



THE PROPOAGATION OF LIGHT OF DIFFERENT WAVELENTHS IN THE TISSUES

Synergistic Spectrum for Complete Wound Care

Polymatech's integrated tri-wavelength design supports a comprehensive healing cycle:

- Blue: Infection control
- Red: Tissue repair and regeneration
- NIR: Pain reduction and deep tissue healing

This approach leads to faster healing, reduced scarring, and improved clinical outcomes, especially for:

- Diabetic foot ulcers
- Pressure sores
- Surgical wounds
- Chronic non-healing wounds

Polymatech Targeted Spectrum LEDs for Clinical Wound Healing Applications

Saving Energy
Energy-efficient LED technology reduces power consumption

Low Cost
Economical healing solution without compromising quality

Balanced Growth
Promotes uniform tissue regeneration and cellular repair

Robustness
Engineered for durability in clinical and therapeutic environments

Field of Use

Polymatech Wound Healing LED: Accelerated Recovery Through Therapeutic Light

Polymatech Wound Healing LED solution harnesses the power of hyper red (660 nm) light to stimulate tissue regeneration, reduce inflammation, and accelerate wound closure. Engineered for medical and therapeutic applications, this LED delivers targeted photo biomodulation benefits with high radiant intensity and biological efficacy. Designed in collaboration with clinical experts and validated in Polymatech lab, this product supports advanced healing for wounds, ulcers, surgical incisions, and chronic skin conditions.

Science-Backed Photo biomodulation

- Hyper Red (660 nm) Efficacy: Clinical research confirms that 660 nm red light penetrates deep into the dermal layers, stimulating cytochrome c oxidase in mitochondria, boosting ATP production, and accelerating cell proliferation and collagen synthesis.
- Optimal Absorption Range: This wavelength aligns with peak absorption by key photo acceptors in human tissue, ensuring maximum therapeutic impact with every treatment cycle.

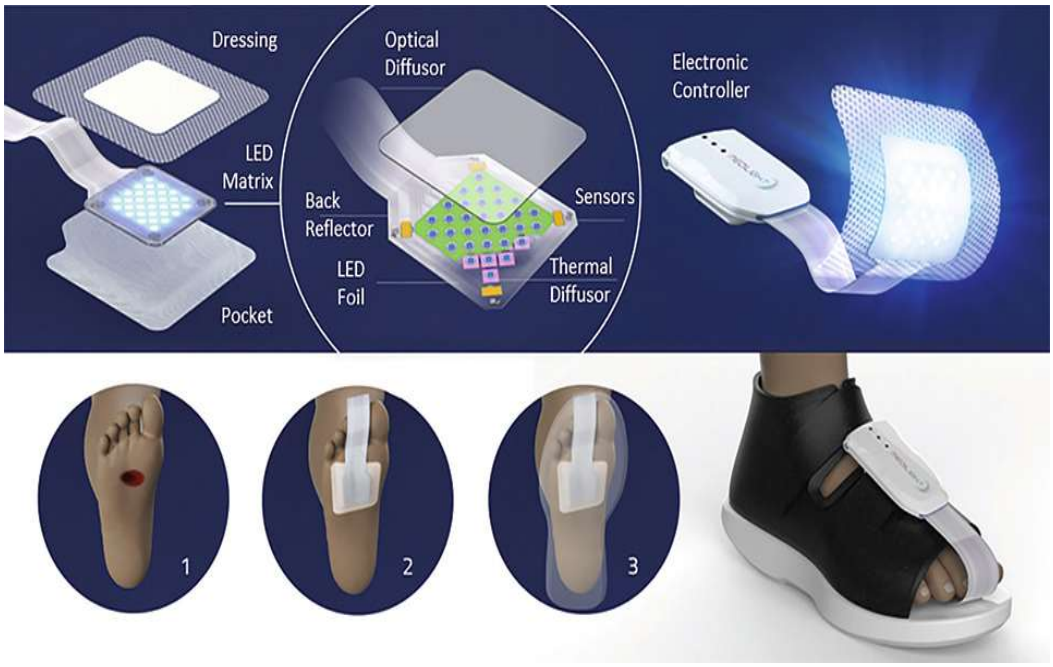
Therapeutic Light, Precisely Delivered

- High Radiant Flux: Polymatech wound healing LED provides a concentrated, high-intensity hyper red beam that ensures sufficient energy density (irradiance) for effective phototherapy, especially over targeted treatment zones.

- Low Thermal Output: Carefully engineered optics and heat dissipation structures ensure cool, safe application on sensitive or inflamed skin without thermal damage.

Validated in Polymatech Lab

- Faster Wound Recovery: In controlled lab trials, wounds exposed to Polymatech hyper red LED demonstrated faster epithelialization, reduced swelling, and improved blood circulation within 5–7 days compared to untreated samples.



- Reduced Inflammation: Red light therapy with Polymatech LEDs has been shown to modulate inflammatory cytokines, lowering redness and pain associated with wounds and chronic skin irritation.

Designed for Versatile Medical Use

- Applications:
    - Surgical incision recovery
    - Diabetic ulcers and pressure sores
    - Chronic wounds and skin abrasions
    - Inflammation and pain reduction therapy
- Modular Design: Available in compact modules, flexible strips, or panel systems to suit portable devices, therapy beds, or in-clinic lighting systems.

Why Polymatech Wound Healing LEDs Lead

- Medical-Grade Output: Engineered with strict binning for wavelength accuracy (660 ± 5 nm), ensuring therapeutic consistency across all devices.
- Long Life & Efficiency: Designed for >50,000 hours of performance with up to 65% wall-plug efficiency, outperforming older infrared and halogen-based phototherapy systems.
- Safe & Compliant: No UV or IR radiation, biocompatible construction, and safe for repeat exposure—meeting safety norms for medical and home-use therapy products.

Does Polymatech Envision the Ultimate Solution for Medical Wound Healing?

I am very pleased that Polymatech Electronics is one of the few global semiconductor companies deeply invested in medical photonics and wound healing LEDs. If Polymatech aims to be a global leader in clinical LED applications, developing a smart wound care platform is

essential. In advanced wound care, the key lies in delivering the right wavelengths of light at the right intensity and timing—customized for each phase of tissue recovery. This can be further enhanced using sensor-based feedback systems and AI-integrated monitoring, enabling precision light therapy for every patient.

Smart Wound Healing Begins with Light

Polymatech's wound healing LED diodes are designed to:

- Target cellular regeneration, angiogenesis, and infection control
- Use blue light for antimicrobial action
- Use red light for fibroblast activation and collagen synthesis
- Use NIR light for deep tissue recovery and pain relief

The future of wound care lies not just in illumination—but in intelligent, adaptive phototherapy systems that optimize healing protocols based on wound type, depth, and healing stage.

Leading the Way in Medical LED Innovation

Polymatech is committed to developing:

- High-purity, biologically active LED chips
- Low-thermal, high-efficacy packages for medical-grade integration
- Technology partnerships with device makers, hospitals, and research labs. As wound healing research evolves, Polymatech is positioned to offer LED solutions that go beyond lighting—toward diagnostics, monitoring, and smart therapeutic outcomes.

Conclusion

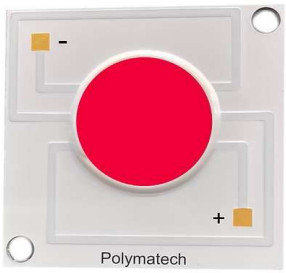
Polymatech Wound Healing Hyper Red LEDs combine clinical precision and biological effectiveness to accelerate recovery, reduce inflammation, and stimulate natural tissue repair. Ideal for hospitals, physiotherapy centers, skincare clinics, and wellness technology providers, these LEDs deliver a scientifically optimized light solution that empowers healing from the inside out.

Explore Polymatech advanced therapeutic lighting portfolio. Contact our medical device lighting division or visit our website for technical specifications and clinical support.

Contents

Product Nomenclature

FL18COB3030 WOUND HEALING



[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.

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 WOUND HEALING	396	450	489	148	450	20.6	24.8	29

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.

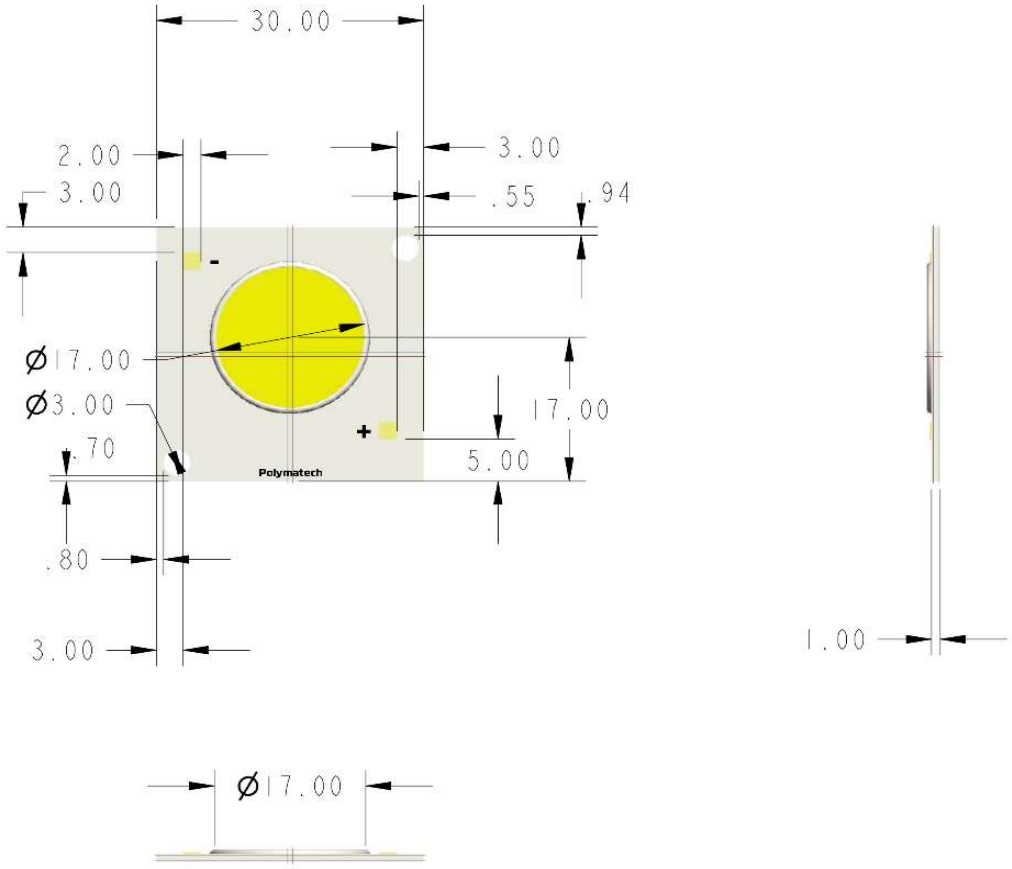
*2. Refer to 3. Outline drawing for Tc MEASUREMENT POINT.

*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

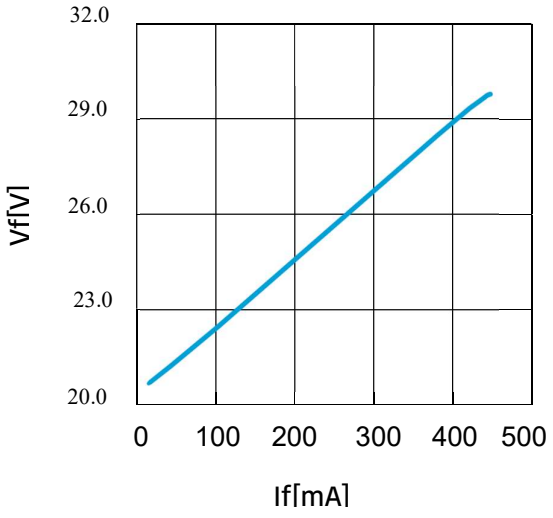
x° +1

Characteristics Curves

Forward Current Characteristic/Temperature Characteristics

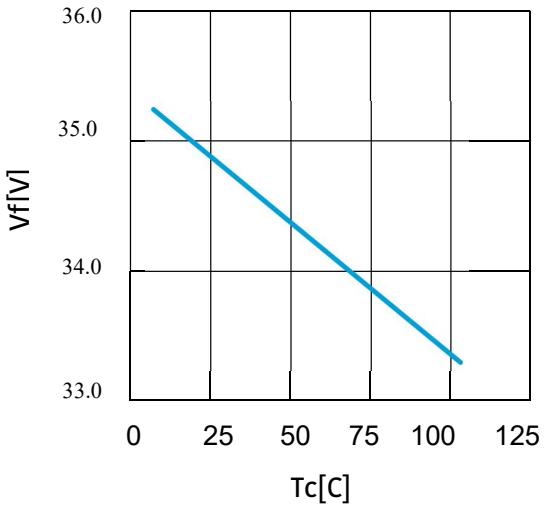
Forward Current VS. Forward Voltage

Tc=25C



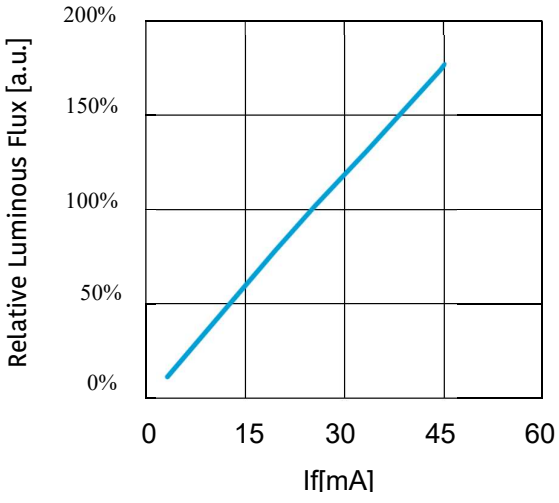
Case Temperature vs. Forward Voltage

If=90mA



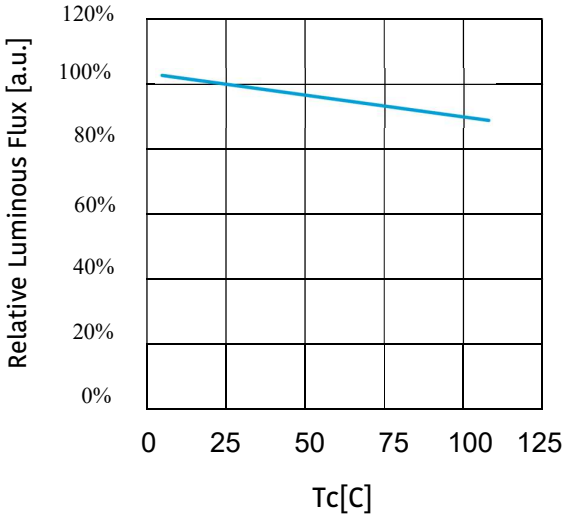
Forward Current VS. Relative Luminous Flux

Tc=25C



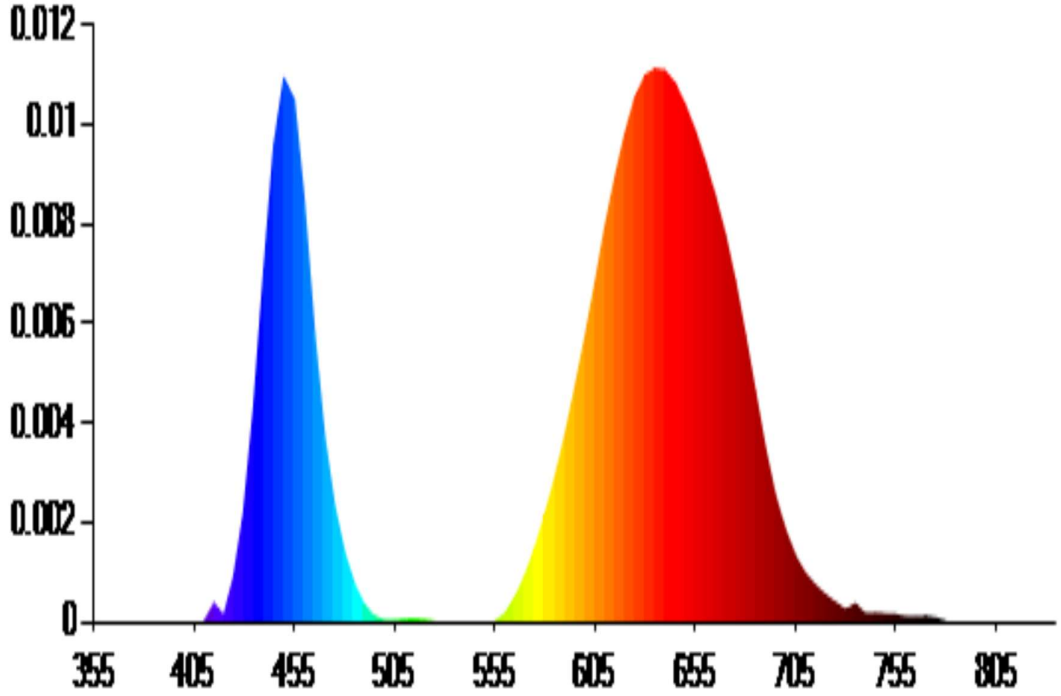
Case Temperature vs. Relative luminous flux

If=90mA



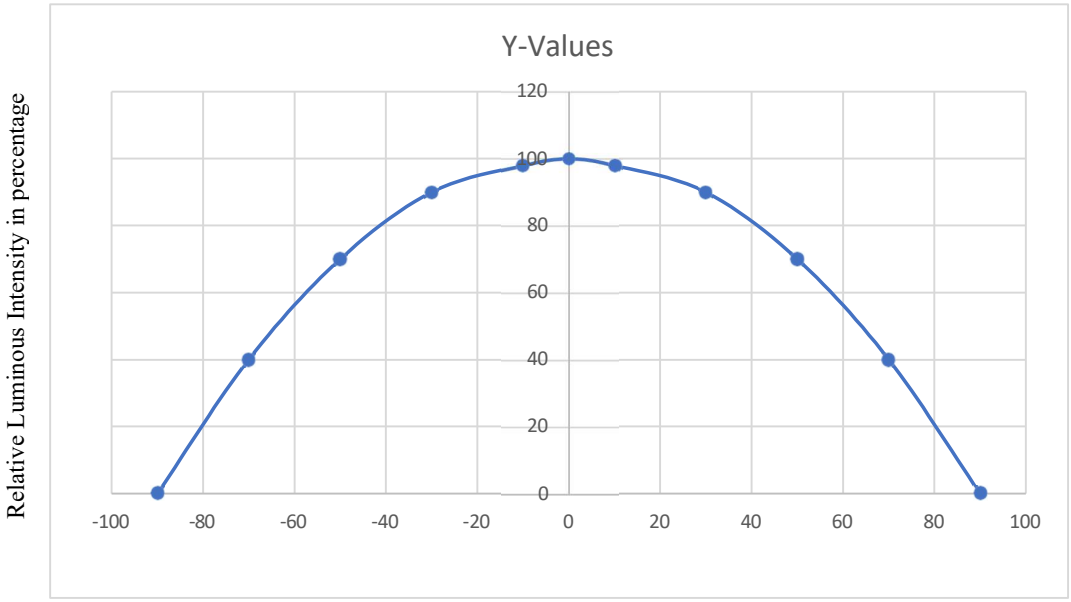
Optical Characteristics

Spectral Power Distribution



Optical characteristics (continued)

Radiation Characteristics

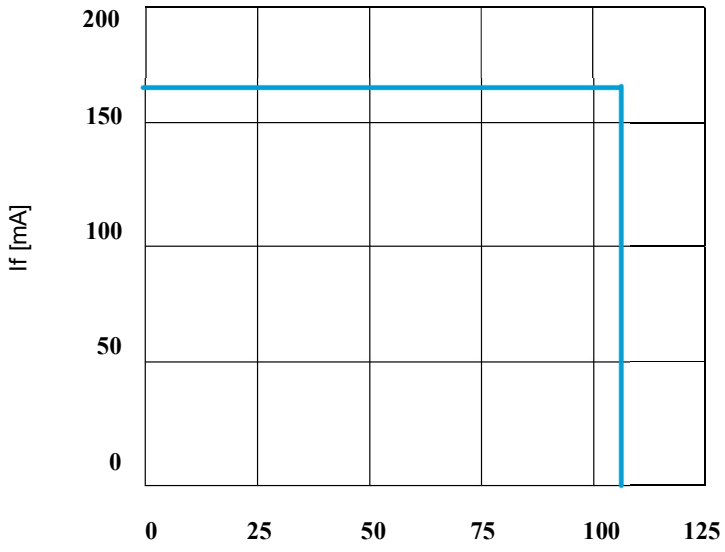


Spread Angle in Degrees

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)

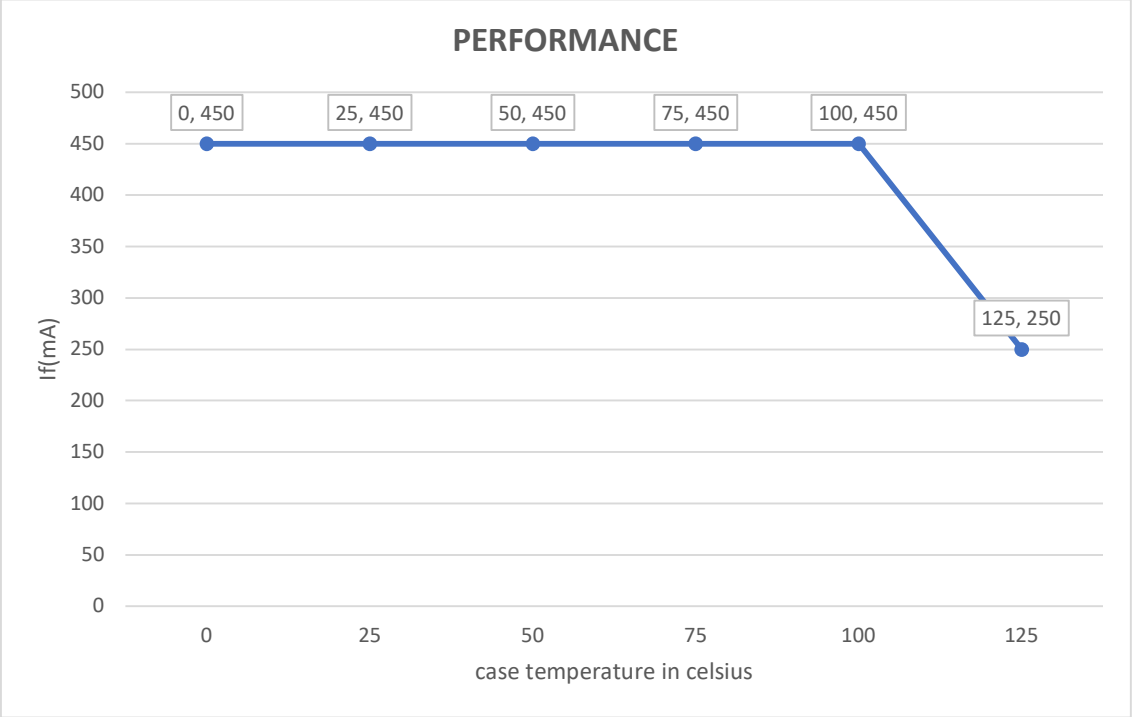
Measuring Item	Symbol	Measuring Condition	Failure Criteria
Forward Voltage	Vf	If=90mA	>U× 1.1
Total Luminous Flux	ΦV	If=90mA	<S× 0.85

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

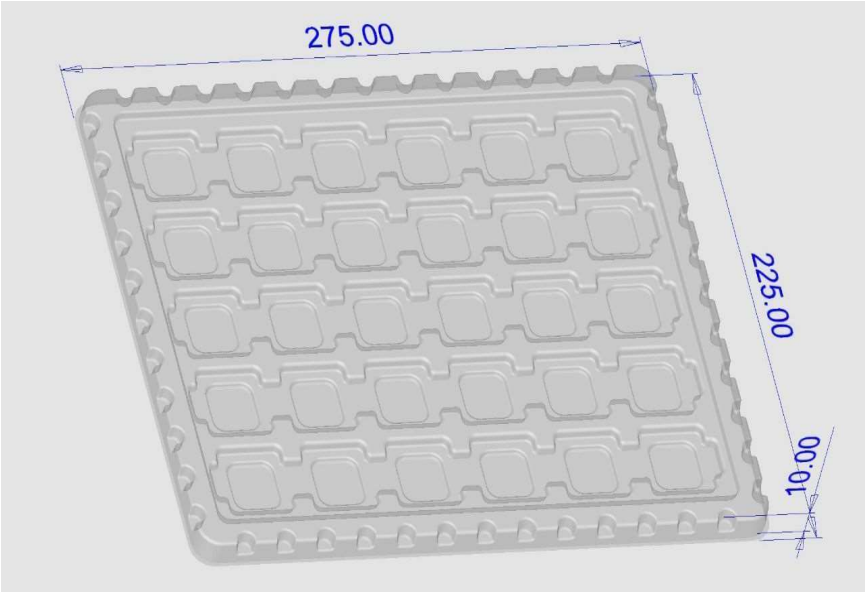
The maximum current rating of the FL18COB3030 depends on the case temperature (Tc) when the LED has reached thermal equilibrium under steady state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when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

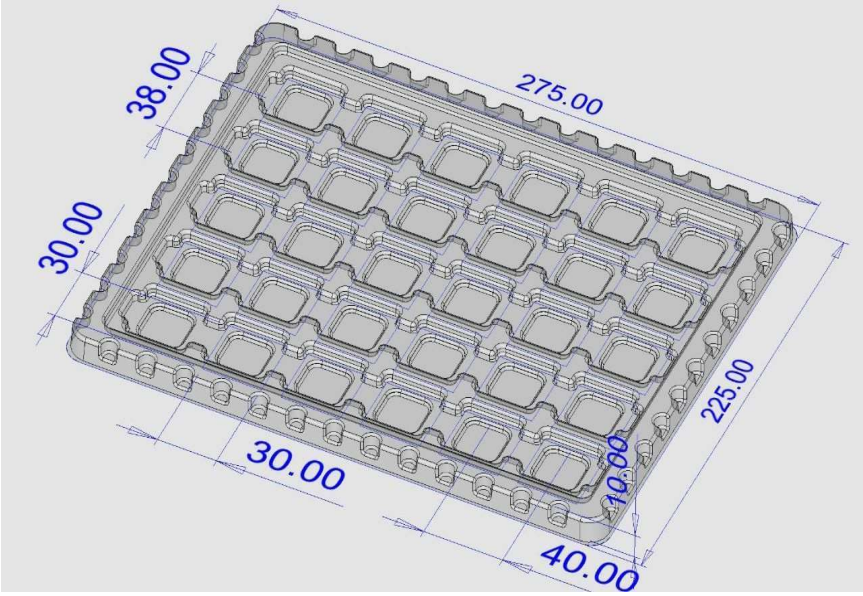


Packaging Specification

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.

When exporting our products, please ensure conformance with applicable laws and regulations and take appropriate actions such as obtaining an export license. Please do not use or supply our products for any weapons of mass destruction (WMD) or for any other military purposes. If we do not receive standing orders, we may recommend another product. If this product is to be used for a different model or for a succeeding model continuously, please contact our sales staff.

Please contact POLYMATECH ELECTRONICS' sales office if you have any questions regarding the information contained in this document, or if you have any other inquiries.