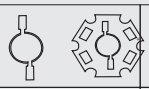
Designation system

HIGH POWER LED/MCOB LED

BL- HP 7 E UE C L- 3W- XXX

- **BL-** BETLUX
- **HP** HP- High Power LEDs
  HPMB-MCOB LEDS
- **7** Dimension and module

20: star type		7: 7060 type	
15: 15 type		9:3 pin type	
26: 26 type			
39:39 type			

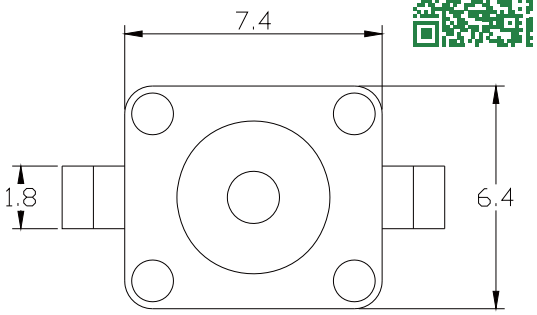
- **E** item type:
  A- with base
  E- Emitter
- **UE** (see table below)
- **C** Lens Color:
  C:Water Clear
  W: Water Diffused
- **L-** Lense type
  0: no lense
  S: Side emitting
  L: Lambertian emitting
  B: Batwing emitting
- **3W-** Watts
  1W,3W,5W,2W,10W,30W,100W
- **XXX** Special Device

Code	Color	Wavelength(nm)	Material
UE	Ultra Red	630	AlGaInP
PG	Ultra Pure Green	525	AlGaInP
BG	Ultra Blish Green	505	AlGaInP
UY	Ultra Yellow	590	AlGaInP
UYO	Ultra Amber	610	AlGaInP
UB	Ultra Blue	470	InGaN
UW	Ultra White	-	InGaN
UW	Ultra Warm White	-	InGaN
IR	Infrared	850-940	-
P	PhotoDiodes	850-940	-

BL-HP7EXX-1W Series

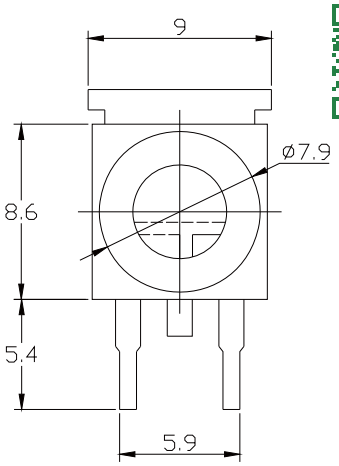
Part Number	Chip: Emitted Color	Chip: λP (nm) or CTT	Lens Type	VF: Typ	Flux (lm) @350mA: Typ.	Viewing Angle 201/2
BL-HP7EUEC	Red	630	Water Clear	2.2	45	120
BL-HP7EUYC	Yellow	590		2.2	45	
BL-HP7EUGC	Pure Green	525		3.2	60	
BL-HP7EUBC	Blue	470		3.2	15	
BL-HP7EUWC	White	6000k		3.2	90	
BL-HP7EUW2C	Warm White	3200k		3.2	70	

Drawing



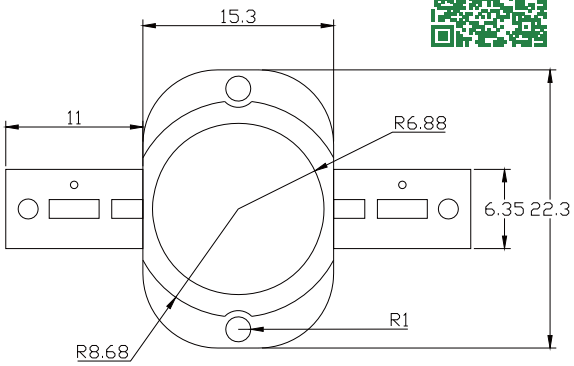
BL-HP9EXX-1W Series

BL-HP9EUEC	Red	630	Water Clear	2.2	45	120
BL-HP9EUYC	Yellow	590		2.2	45	
BL-HP9EPGC	Pure Green	525		3.2	60	
BL-HP9EUBC	Blue	470		3.2	15	
BL-HP9EUWC	White	6000k		3.2	90	
BL-HP9EUW2C	Warm White	3200k		3.2	70	



BL-HP15EXX-10W Series

BL-HP15EUEC	Red	630	Water Clear	6.5	300	105
BL-HP15EUYC	Yellow	590		6.5	300	
BL-HP15EUGC	Pure Green	525		10	500	
BL-HP15EUBC	Blue	470		10	150	
BL-HP15EUWC	White	6000k		10	500	
BL-HP15EUW2C	Warm White	3200k		10	400	

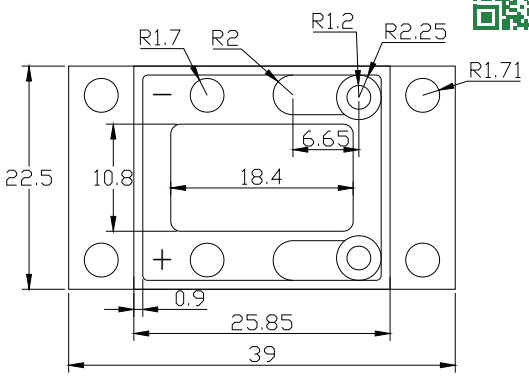


All dimensions are in millimeters (inches)
Tolerance is ±0.25(0.01")unless otherwise note

Part Number	Chip		Lens Type	VF	Flux (lm) @350mA	Viewing Angle 201/2	Drawing
	Emitted Color	λ P (nm) or CTT		Typ	Typ.		

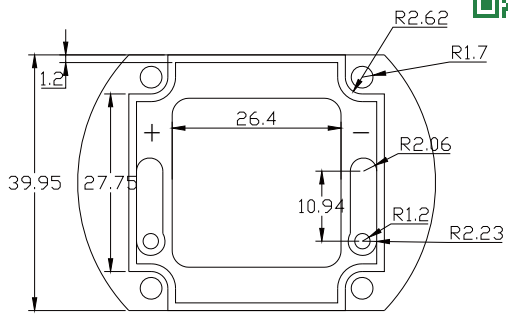
BL-HP26EXX-30W Series

BL-HP26EUEC	Red	630	Water Clear	13	800	105
BL-HP26EUYC	Yellow	590		13	800	
BL-HP26EPGC	Pure Green	525		18	2000	
BL-HP26EUBC	Blue	470		18	250	
BL-HP26EUWC	White	6000k		18	1500	
BL-HP26EUW2C	Warm White	3200k		18	1200	



BL-HP39EXX-100W Series

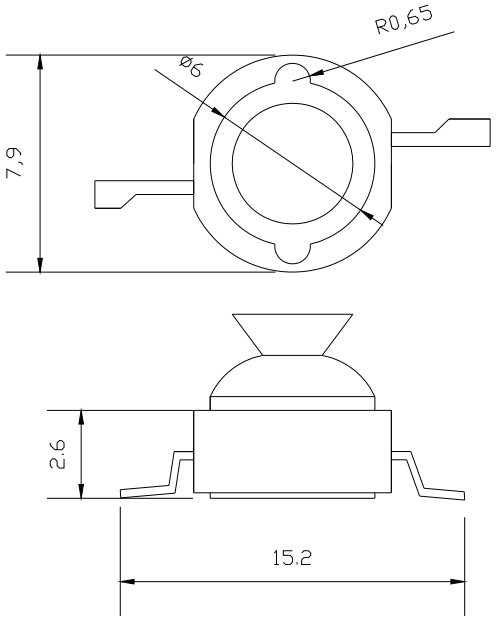
BL-HP39EUEC	Red	630	Water Clear	22.0	3500	105
BL-HP39EUYC	Yellow	590		22.0	3500	
BL-HP39EPGC	Pure Green	525		36.0	4500	
BL-HP39EUBC	Blue	470		36.0	1200	
BL-HP39EUWC	White	6000k		36.0	6000	
BL-HP39EUW2C	Warm White	3200k		36.0	4000	



All dimensions are in millimeters (inches)
Tolerance is ±0.25(0.01")unless otherwise note

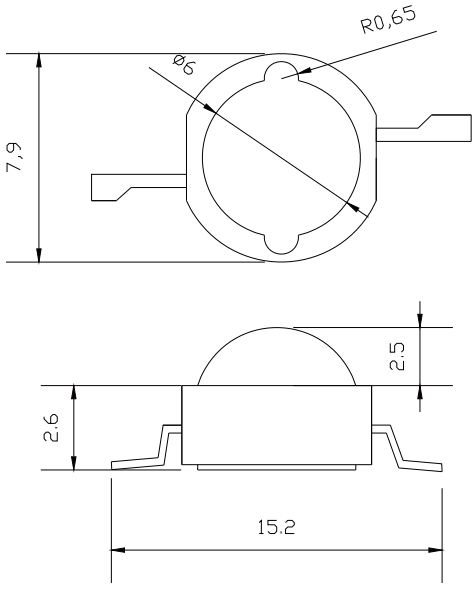
1W Side emitting Emitter

Part Number	Chip		Lens Type	VF	Flux (lm) @350mA	Viewing Angle 201/2
	Emitted Color	λ P (nm) or CTT		Typ	Typ.	
BL-HP20EUECS	Orange	630	Water Clear	2.2	45	160
BL-HP20EUYCS	Yellow	590		2.2	45	
BL-HP20EPGCS	Pure Green	525		3.2	60	
BL-HP20EUBCS	Blue	470		3.2	15	
BL-HP20EUWCS	White	6000k		3.2	90	
BL-HP20EUW2CS	Warm White	3200k		3.2	70	



1W Lambertian Emitter

BL-HP20EUECL	Orange	630	Water Clear	2.2	45	140
BL-HP20EUYCL	Yellow	590		2.2	45	
BL-HP20EPGCL	Pure Green	525		3.2	60	
BL-HP20EUBCL	Blue	470		3.2	15	
BL-HP20EUWCL	White	6000k		3.2	90	
BL-HP20EUW2CL	Warm White	3200k		3.2	70	

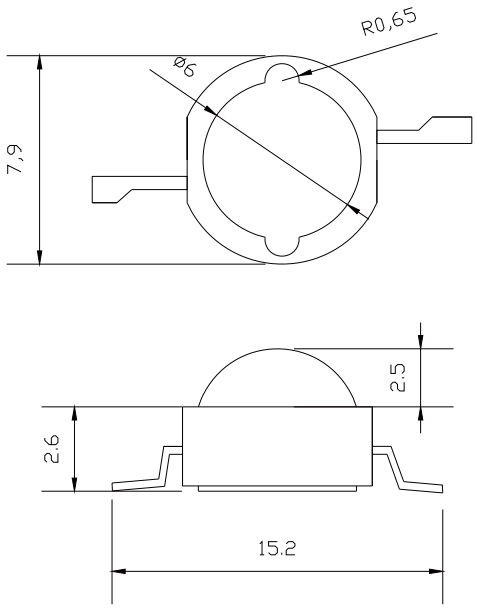


All dimensions are in millimeters (inches)
Tolerance is ±0.25(0.01")unless otherwise note

3W Lambertian Emitter

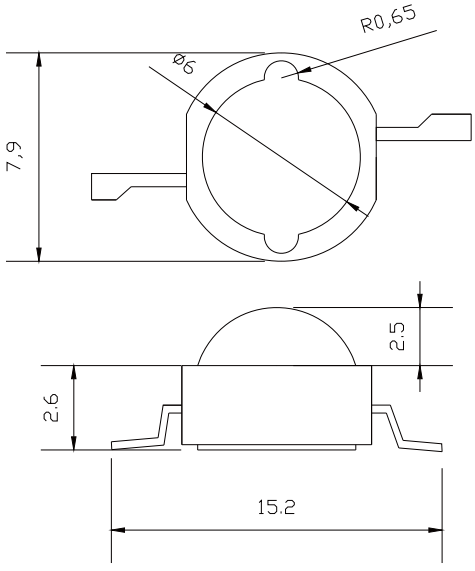
Part Number	Chip		Lens Type	VF	Flux (lm) @350mA	Viewing Angle 201/2
	Emitted Color	λP (nm) or CTT		Typ	Typ.	
BL-HP20EUECL-3W	Orange	630	Water Clear	2.2	120	140
BL-HP20EUYCL-3W	Yellow	590		2.2	120	
BL-HP20EPGCL-3W	Pure Green	525		3.2	180	
BL-HP20EUBCL-3W	Blue	470		3.2	45	
BL-HP20EUWCL-3W	White	6000k		3.2	270	
BL-HP20EUW2CL-3W	Warm White	3200k		3.2	210	

Drawing



5W Lambertian Emitter

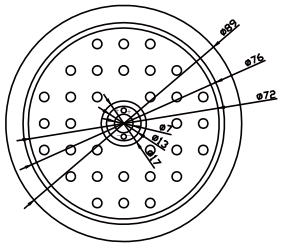
BL-HP20EUECL-5W	Orange	630	Water Clear	2.2	200	140
BL-HP20EUYCL-5W	Yellow	590		2.2	200	
BL-HP20EPGCL-5W	Pure Green	525		3.2	300	
BL-HP20EUBCL-5W	Blue	470		3.2	75	
BL-HP20EUWCL-5W	White	6000k		3.2	450	
BL-HP20EUW2CL-5W	Warm White	3200k		3.2	350	



All dimensions are in millimeters (inches)
Tolerance is ±0.25(0.01")unless otherwise note

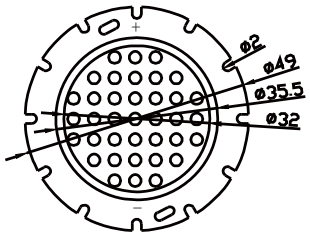
High Power LED/MCOB LED

Part Number	Chip		Lens Type	VF	Flux (lm) @350mA	Viewing Angle 201/2	Drawing
	Emitted Color	λP (nm) or CTT		Typ	Typ.		



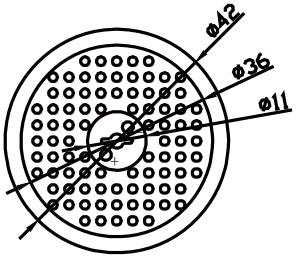
90mm Mcob LEDs

BL-HPMB90C1 Series



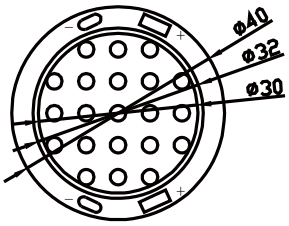
50mm Mcob LEDs

BL-HPMB50C1 Series



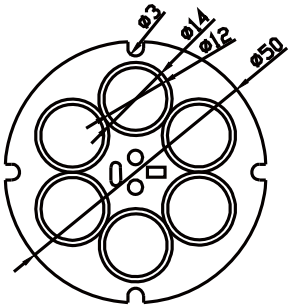
42mm Mcob LEDs

BL-HPMB42C1 Series



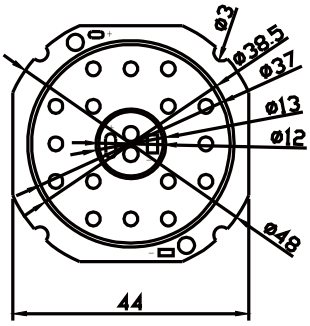
40mm Mcob LEDs

BL-HPMB40C1 Series



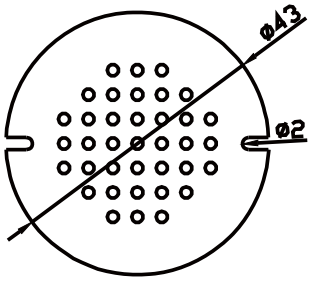
50mm Mcob LEDs

BL-HPMB50C2 Series



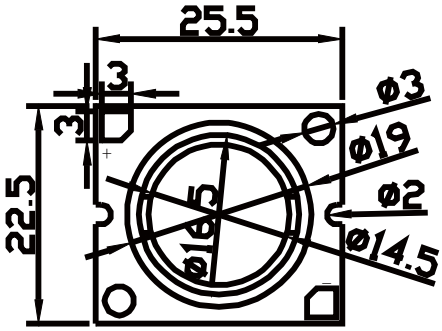
48mm Mcob LEDs

BL-HPMB48C1 Series



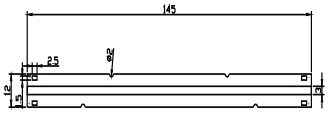
43mm Mcob LEDs

BL-HPMB43C1 Series



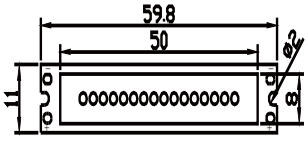
26*23mm Mcob LEDs

BL-HPMB2623R1 Series



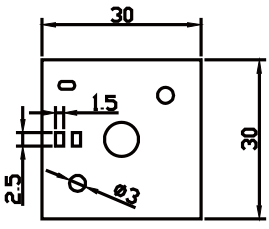
145*12mm Mcob LEDs

BL-HPMB14512R1 Series



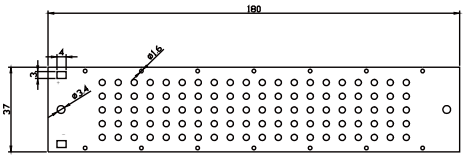
60*11mm Mcob LEDs

BL-HPMB6011R1 Series



30*30mm Mcob LEDs

BL-HPMB30S1 Series



180*37mm Mcob LEDs

BL-HPMB18037R1 Series

All dimensions are in millimeters (inches)
Tolerance is ±0.25(0.01")unless otherwise note

Applicant Note

CAUTIONS for Power LED

Storage

The storage ambient should not exceed 30℃ temperature or 70% relative humidity.

For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant, or in a desiccator with nitrogen ambient.

It is recommended that LEDs out of their original packaging are soldered within 4weeks.

LEDs stored out of their original packaging for more than 4 weeks should be baked at about 60 deg C for at least 24 hours before solder assembly.

Assemble Consideration

This section provides you the requirements to mount BL-HP Emitters onto Metal Core Printed Circuit Board （MCPCB）for optimal heat-dissipation efficiency, for reliable operations of your products and for the optimal performance you need.

Design rules during BL-HP Emitter array and its assembly procedure

1. Thermal resistance from the BL-HP Emitters to the ambient environment must be kept at minimum level as possible. Any heat barrier will prevent BL-HP Emitters from running at optimum light output performance.
2. Electrical insulation between the contacts other than electros of BL-HP Emitters and the MCPCB is required. The exposed metal part of a BL-HP Emitters is not electrically neutral. Do not electrically connect this area to any electrical traces or pads on your MCPCB.
3. If you want to minimize thermal resistance between BL-HP Emitters and your MCPCB, use thermally conductive adhesive in-between.
4. BL-HP Emitter can be soldered in infrared (IR), hot bar soldering, fiber focused IR, or hand soldering.

MCPCB Selection

To select a suitable MCPCB is the first step in assemble BLHP emitters. A MCPCB consists of several layers that provide both electrical connections and a low thermal resistance path to external heat sinks applied. Standard BLHP Emitter arrays use aluminates MCPCB that consists of the following layers:

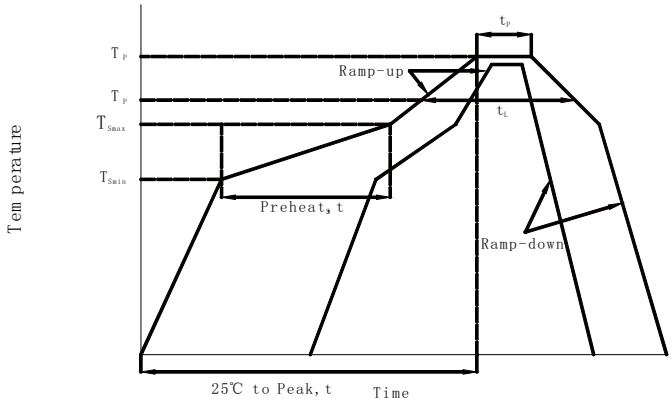
1.Aluminum Base (thickness:1.5±0.1mm)
2. Electrical Insulation Layer (Dielectric/Epoxy thickness: 100μÌ)
3. Copper Layer (Copper thickness: 35μÌ
4. Solder Mask (Solder paste thickness after reflow process: 90~115μÌ

Soldering Process

Followings are a recommend process flows to build BLHP Emitters into Power Light Sources. Please mount entire respective surface mount devices （SMD）, if any, on your MCPCB designated before BLHP Emitters assembly process.

For Reflow Process

Reflow soldering temperature profile



Profile Feature	Lead Free Assembly
Average Ramp-Up Rate(T_{Smax} to T_P)	3℃/second max
Preheat Temperature Min(T_{Smin})	150℃
Preheat Temperature Max(T_{Smax})	200℃
Preheat Time (T_{Smin} to T_{Smax})	60-180 seconds
Time Maintained Above Temperature(T_L)	217℃
Time Maintained Above Time(t_L)	60-150 seconds
Peak/Classification Temperature(T_P)	260℃
Time Within 5℃ of Actual Peak Temperature(t_P)	5 seconds
Ramp-Down Rate	6℃/second max
Time 25℃ to Peak Temperaure	8 minutes max

For Hot Bar

Step 1 Dispense Thermal Conductive Agent and Solder Flux

Use solder flux for good heat transfer during soldering of the BLHP Emitter terminals to reduce required soldering time. Note that the spread of flux compound should be restricted to the solder pad areas. You may want to optimize your soldering process by adjusting the amount of flux.

Step 2 Placement of BLHP Emitter

It is recommended to use automated pick-and-place equipment to place BLHP Emitters onto MCPCB. The pick-and-place mechanism shall not touch the leads or the leads of BLHP Emitters.

Step 3 Soldering the Electrical Leads by Hot bar Soldering

This process will help transfer heat only on to the leads and solder pad areas and therefore avoid damaging emitter body. To transfer sufficient heat from hot bars to device-leads, it is strongly recommended that the following process parameters must be considered:

1)Amount of flux dispensed onto solder pads,

2) pressing force of hot bar tips, and

3)Hot bar temperature.

Step 4 Curing for Thermal Conductive Agent

Please follow the curing instructions set forth by manufacturers for the chosen thermal conductive agent.

For Manual Soldering Iron

When manual hand soldering is concerned, it is recommended to hand solder the leads with a solder-tip temperature of 290℃ for less than 3 seconds and at least 2 seconds or more intervals during each solder. Furthermore , avoid damaging the emitter or the epoxy layer on MCPCB.

Thermal Consideration

Thermal Resistance of BLHP Emitter

Thermal resistance (RTH) is one of the primary tools used in thermal management design. It is defined as the ratio of temperature difference to the corresponding power dissipation. The overall RTH,J-A (Junction-Ambient) of a BLHP Emitter plus MCPCB is illustrated as follow:

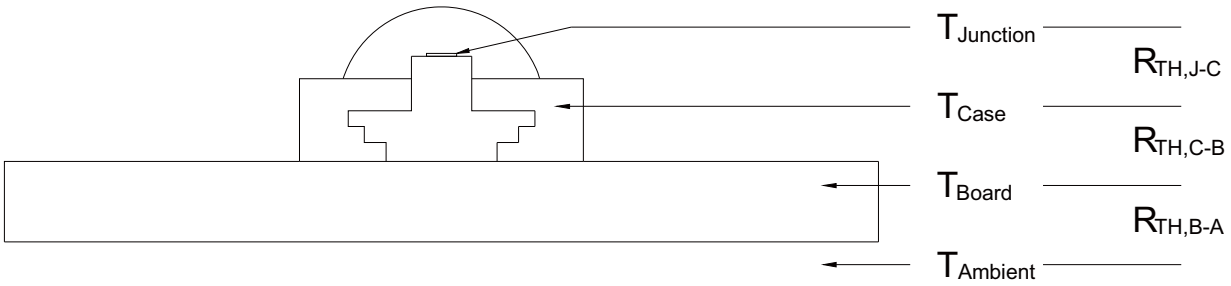
(1)RTH,J-A (℃/W) = △TJ-A / Pd

Where

△TJ-A = TJunction - TAmbient (℃)

Pd (Power dissipated, W) = Forward current (IF) × Forward voltage (VF)

In addition, heat generated at the junction of semiconductor die travels along the following path to ambient environment: junction-to-board, board-to-ambient air.



The overall thermal resistance therefore can be expressed as the sum of each individual resistance along above heat-travel path:
(2)RTH,J-A = RTH,J-c + RTH,C-B + RTH,B-A
As △TJ-A = (Pd) × (RTH,J-A) from Equation 1, we have
(3)TJunction = TAmbient + (Pd) × (RTH,J-A)
Based on Equation 3. TJunction can be obtained if TAmbient, Pd and RTH,J-A are determined.

To increase light output efficiency of LEDs, one must increase the dissipation of heat generated by LEDs; in other words, to reduce thermal resistance from LEDs to ambient environment betlux has optimized the junction-to-board thermal path of BLHP Emitters to minimize the overall thermal resistance (RTH,J-B) down to 12℃/W.

ESD
Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:
1.Use of a conductive wrist band or anti-electrostatic glove when handing these LEDs.
2.All devices, equipment, and machinery must be properly grounded
3.Work tables, storage racks, etc. should be properly grounded.
4.Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or “no light on” at low currents. To verify for ESD damage, check for “light on” and VF of the suspect LEDs at low currents.