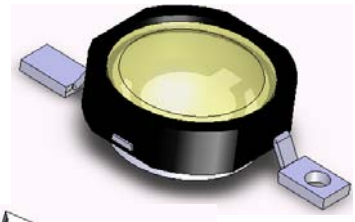
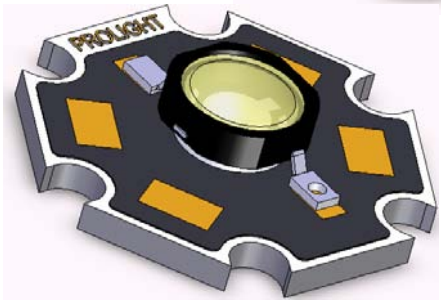
ProLight Opto
Technology Corporation





ProLight PG1A-1LWX-BK
1W White Power LED
Technical Datasheet
Version: 2.5

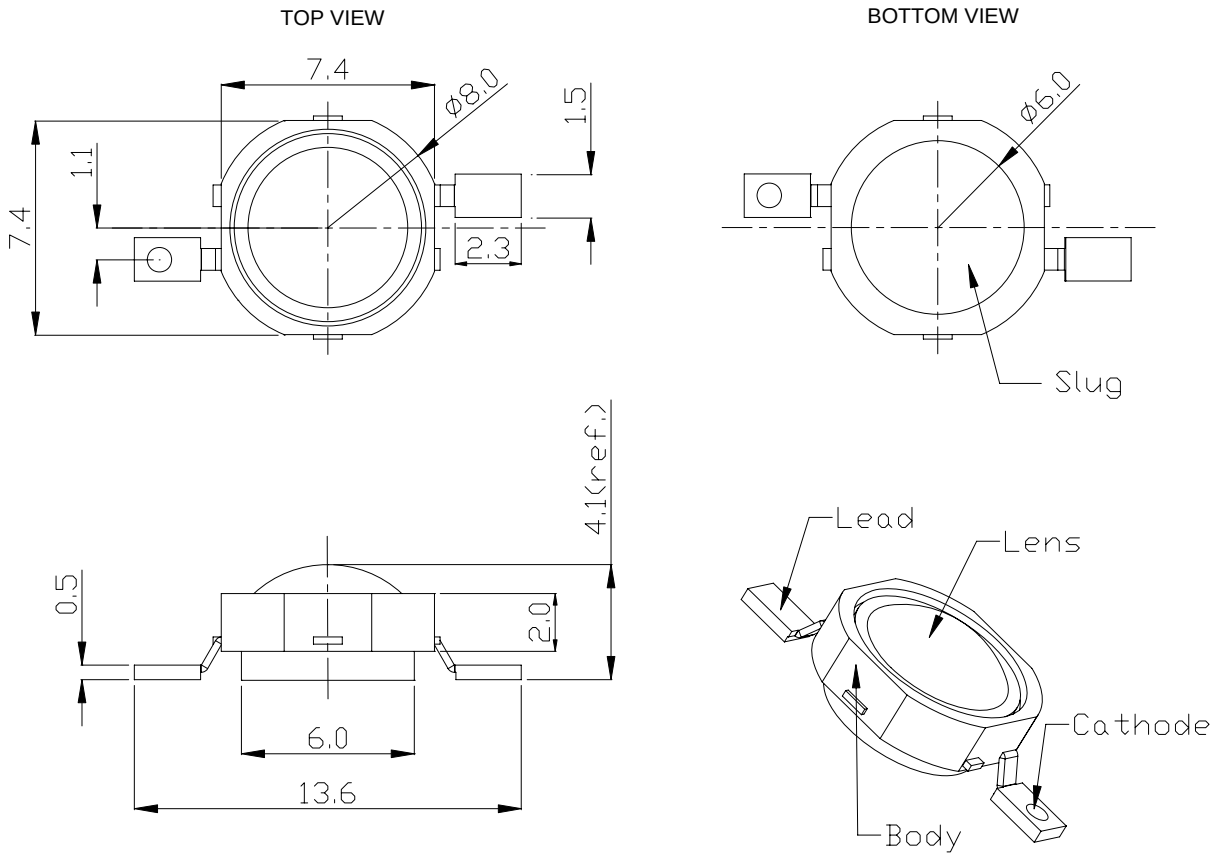
Features

- High flux per LED
- Long operating life (up to 1000 hours)
- Various colors
- Good color uniformity
- More energy efficient than incandescent and most halogen lamps
- Low Voltage DC operated
- Instant light (less than 100ns)
- No UV
- Superior ESD protection

Typical Applications

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Decorative
- Appliance
- Sign and Channel Letter
- Architectural Detail
- Cove Lighting
- Automotive Exterior (Stop-Tail-Turn, CHMSL, Mirror Side Repeat)
- LCD backlight

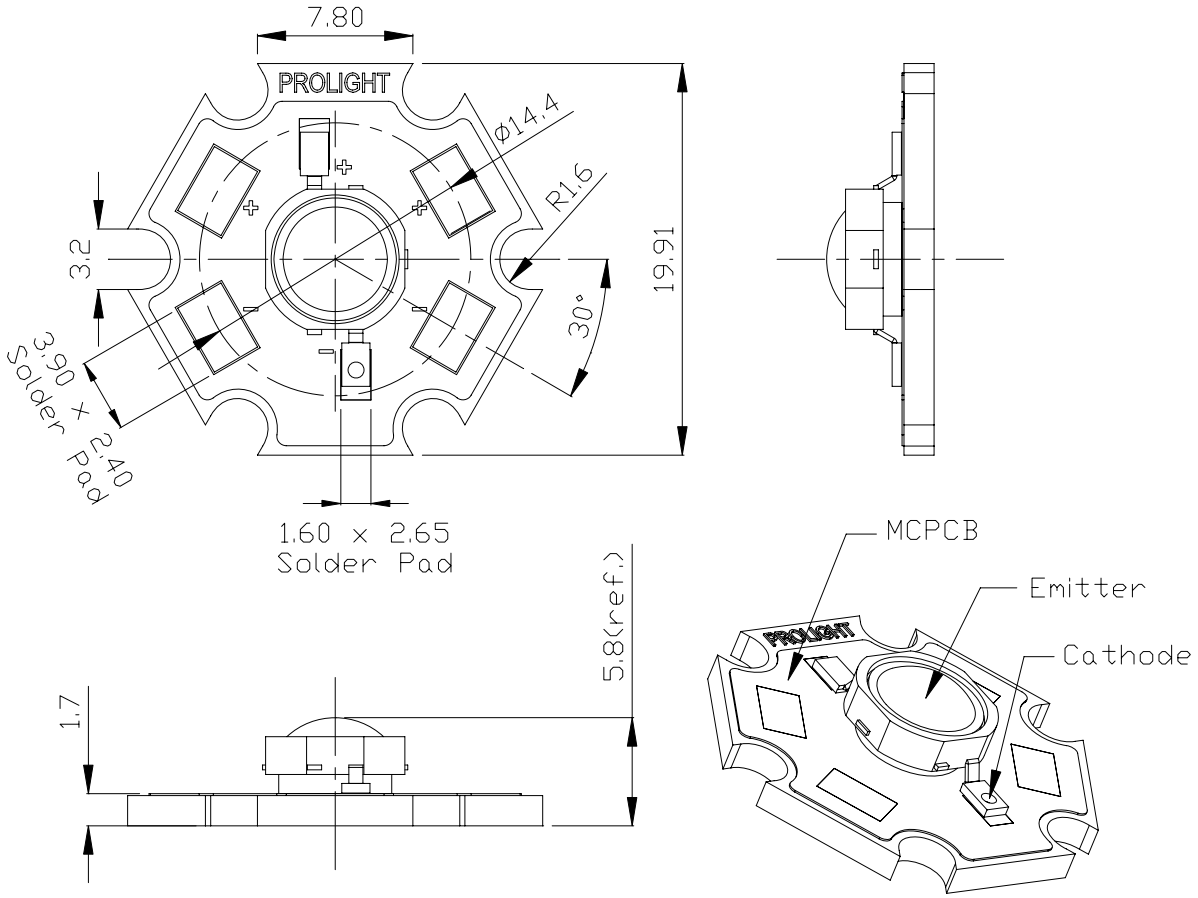
Emitter Mechanical Dimensions



Notes:
1. The cathode side of the device is denoted by a hole in the lead frame.
2. Electrical insulation between the case and the board is required --- slug of device is not electrically neutral. Do not electrically connect either the anode or cathode to the slug.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. All dimendions without tolerances are for reference only.
6. Please do not bend the leads of LED, otherwise it will damage the LED.

*The appearance and specifications of the product may be modified for improvement without notice.

Mechanical Dimensions



Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. All dimendions without tolerances are for reference only.

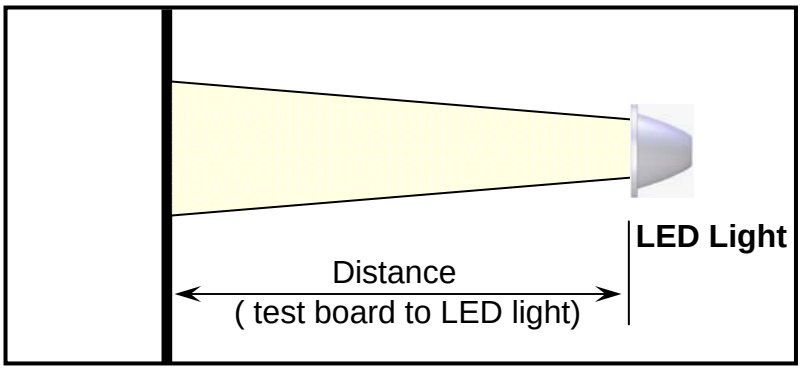
*The appearance and specifications of the product may be modified for improvement without notice.

Part Number

Color	Emitter	Star	Beam Pattern
White	PG1A-1LWE-BK	PG1A-1LWS-BK	Lambertian

Related Illumination (Lux) at Distance 1.0meter / 350mA

Color	Typical Illumination (Lux) with ProLight PG1N-RX10 or PG1N-NY10 reflector	Beam Pattern
White	1200	Spot



** Please refer to the reflector datasheet for the detail.

Optical Characteristics at 350mA, Junction Temperature, Tj=25℃

	Dominant Wavelength λD Peak Wavelength λp Color Temperature(CCT)			Spectral Half-width (nm)	Temperature Coefficient or Dominant Wavelength
Color	Min.	Typ.	Max.	Δλ1/2	ΔλD/ΔTj (nm/℃)
White	4100K	5500K	10000K	-	-

Optical Characteristics at 350mA, Junction Temperature, Tj=25℃ (Continued)

Color	Beam Pattern	Total Included Angle θ0.9v (degree)	Viewing Angle 2θ1/2 (degree)	Typical Candela on Axis (cd)
White	Lambertian	160	140	

Electrical Characteristics at 350mA, Junction Temperature, Tj=25℃

	Forward Voltage Vf(V)			Dynamic	Temperature Coefficient of Vf(mV/℃)	Thermal Resistance Junction to
Color	Min.	Typ.	Max.	Resistance(Ω)	ΔVf/ΔTj	Board(℃/W)
White	2.8	3.5	4.0	1.0	-2	10

Absolute Maximum Ratings

Parameter	
DC Forward Current (mA)	350
Peak Pulsed Forward Current (mA)	500
Average Forward Current (mA)	350
ESD Sensitivity	±16000V HBM
LED Junction Temperature (℃)	135
Aluminum-core PCB Temperature(℃)	105
Storage & Operating Temperature(℃)	-40 to +105
Soldering Temperature(℃)	260 for 5 seconds Max.

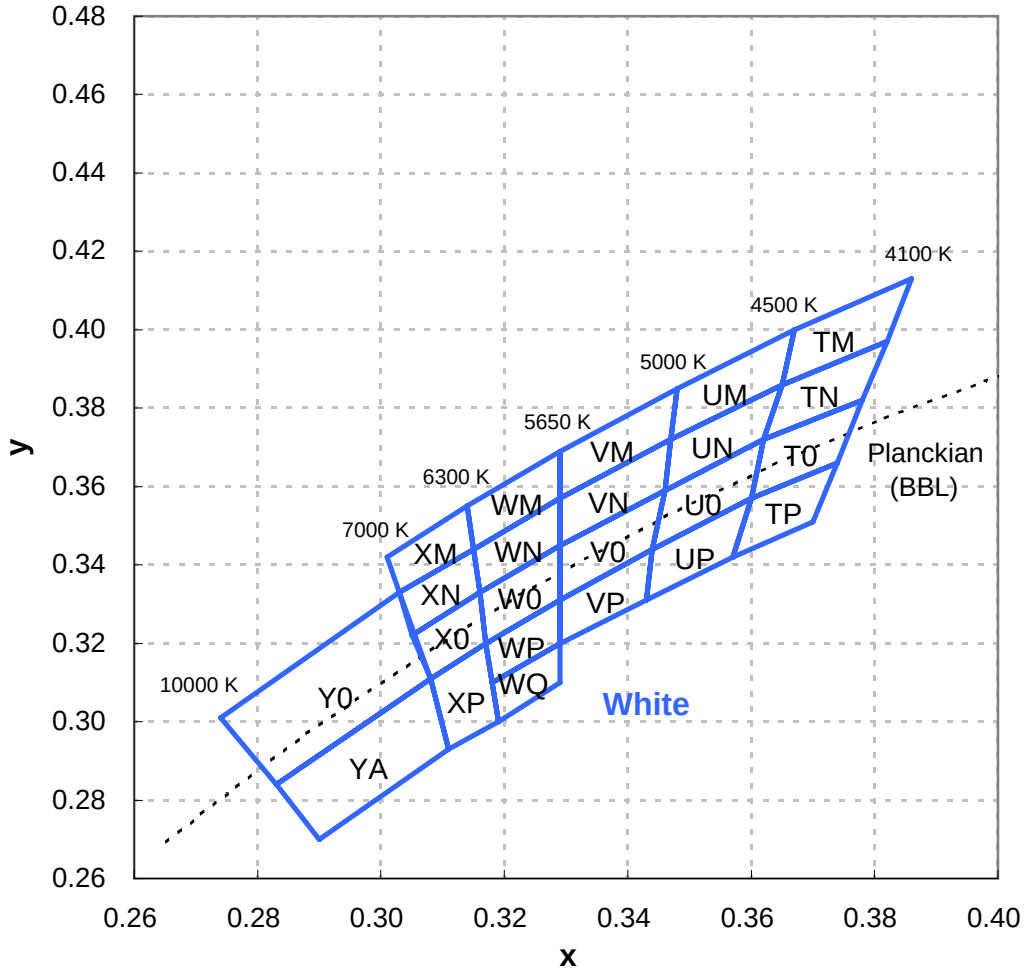
Photometric Illmination Bin Structure

Bin Code	Minimum Illumination (lux)	Maximum Illumination (Lux)
Q	600	900
R	900	--

- Measurement @1.0m / 350mA by Lutron LX103 Light Meter

Color Bins

White Binning Structure Graphical Representation



Color Bins

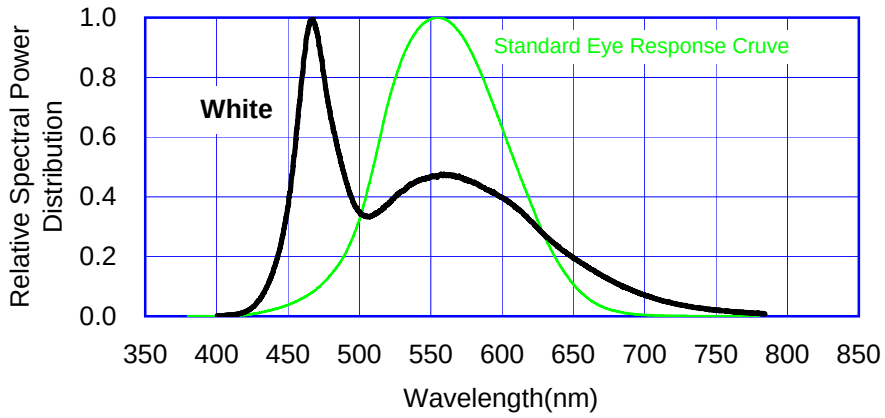
White Bin Structure

Bin Code	x	y	Typ. CCT (K)	Bin Code	x	y	Typ. CCT (K)
T0	0.378	0.382	4300	W0	0.329	0.345	5970
	0.374	0.366			0.329	0.331	
	0.360	0.357			0.317	0.320	
	0.362	0.372			0.316	0.333	
TN	0.382	0.397	4300	WN	0.329	0.345	5970
	0.378	0.382			0.316	0.333	
	0.362	0.372			0.315	0.344	
	0.365	0.386			0.329	0.357	
TP	0.374	0.366	4300	WP	0.329	0.331	5970
	0.370	0.351			0.329	0.320	
	0.357	0.342			0.318	0.310	
	0.360	0.357			0.317	0.320	
TM	0.386	0.413	4300	WQ	0.329	0.320	5970
	0.382	0.397			0.329	0.310	
	0.365	0.386			0.319	0.300	
	0.367	0.400			0.318	0.310	
U0	0.362	0.372	4750	WM	0.329	0.369	5970
	0.360	0.357			0.329	0.357	
	0.344	0.344			0.315	0.344	
	0.346	0.359			0.314	0.355	
UN	0.365	0.386	4750	X0	0.308	0.311	6650
	0.362	0.372			0.305	0.322	
	0.346	0.359			0.316	0.333	
	0.347	0.372			0.317	0.320	
UP	0.360	0.357	4750	XN	0.305	0.322	6650
	0.357	0.342			0.303	0.333	
	0.343	0.331			0.315	0.344	
	0.344	0.344			0.316	0.333	
UM	0.365	0.386	4750	XP	0.308	0.311	6650
	0.367	0.400			0.317	0.320	
	0.348	0.385			0.319	0.300	
	0.347	0.372			0.311	0.293	
V0	0.329	0.331	5320	XM	0.301	0.342	6650
	0.329	0.345			0.314	0.355	
	0.346	0.359			0.315	0.344	
	0.344	0.344			0.303	0.333	
VN	0.329	0.345	5320	Y0	0.308	0.311	8000
	0.329	0.357			0.283	0.284	
	0.347	0.372			0.274	0.301	
	0.346	0.359			0.303	0.333	
VP	0.329	0.331	5320	YA	0.308	0.311	8000
	0.344	0.344			0.311	0.293	
	0.343	0.331			0.290	0.270	
	0.329	0.320			0.283	0.284	
VM	0.329	0.357	5320				
	0.329	0.369					
	0.348	0.385					
	0.347	0.372					

- Tolerance on each color bin (x , y) is ± 0.01

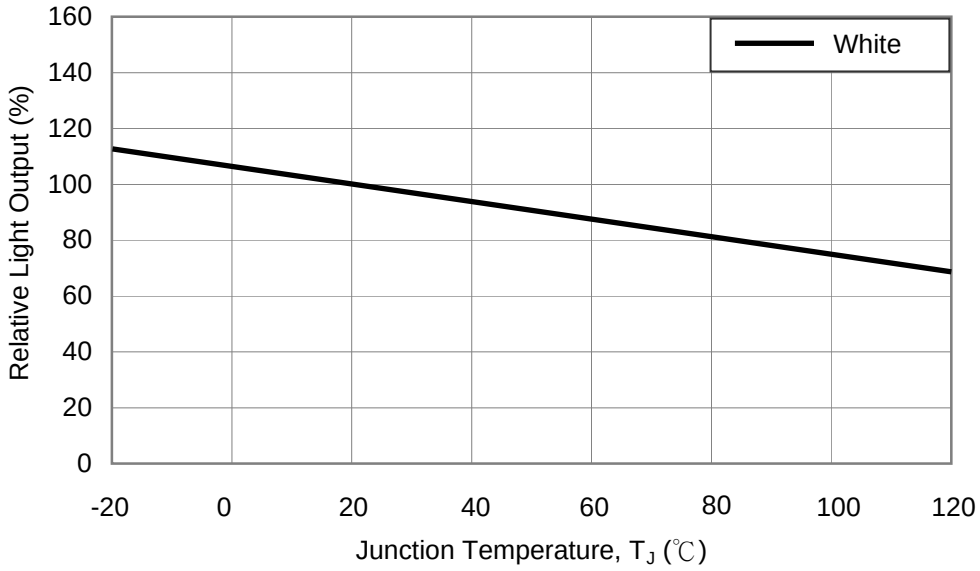
Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

Color Spectrum, $T_J = 25°C$



Light Output Characteristics

Relative Light Output vs. Junction Temperature at 350mA



Forward Current Characteristics, Tj=25℃

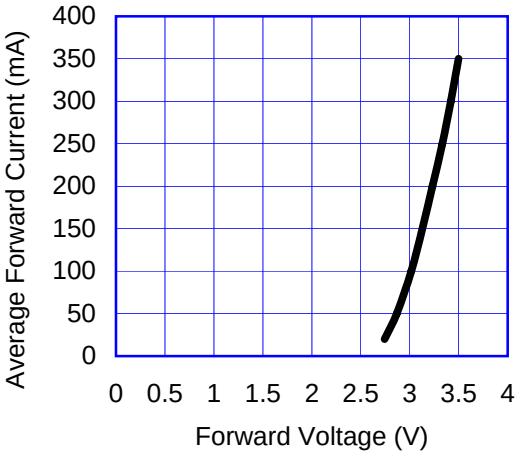


Fig 1. Forward Current vs. Forward Voltage for White.

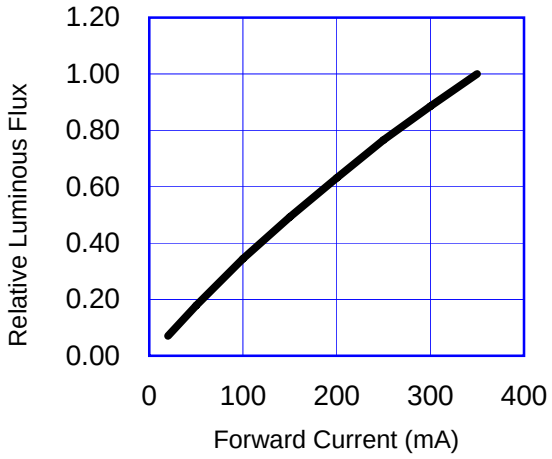
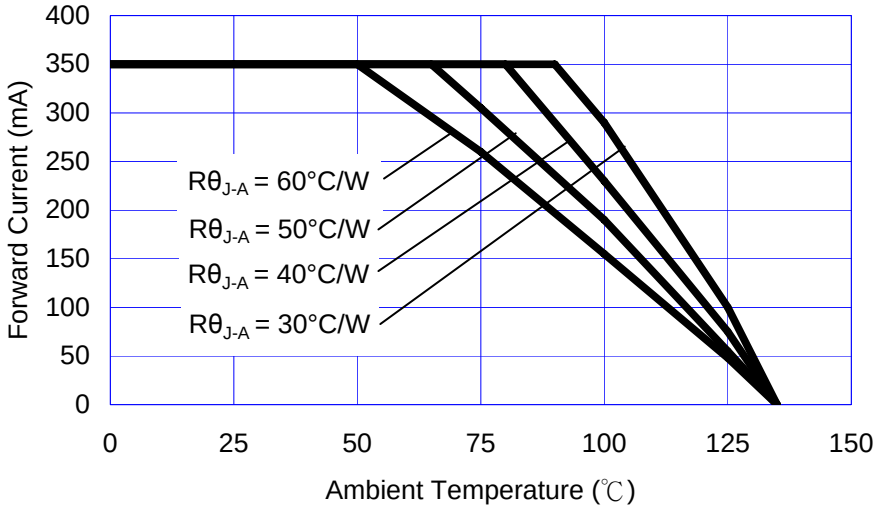


Fig 2. Relative Luminous Flux vs. Forward Current for White at Tj=25℃ maintained.

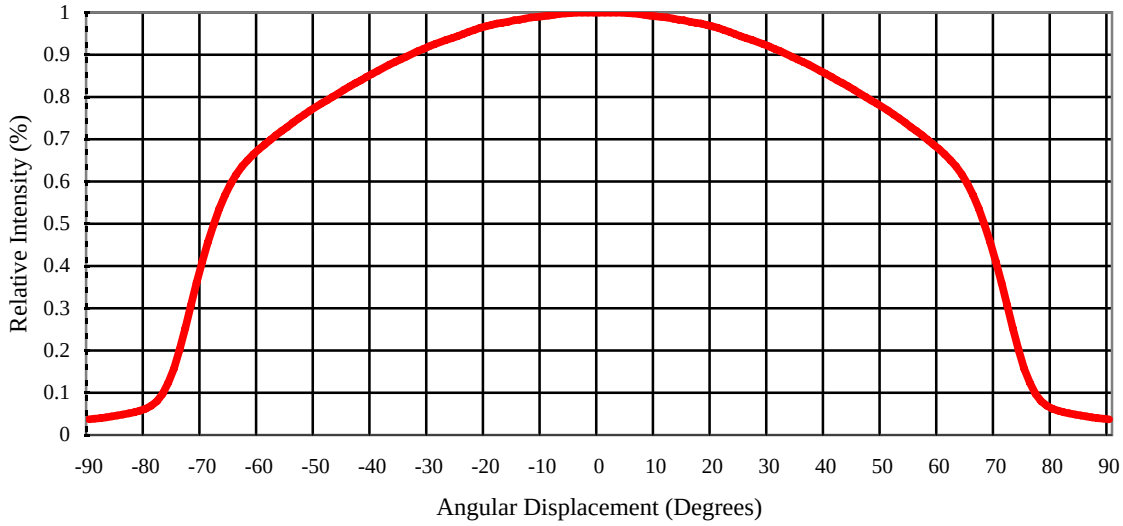
Ambient Temperature vs. Maximum Forward Current

White (T_{JMAX} = 135°C)

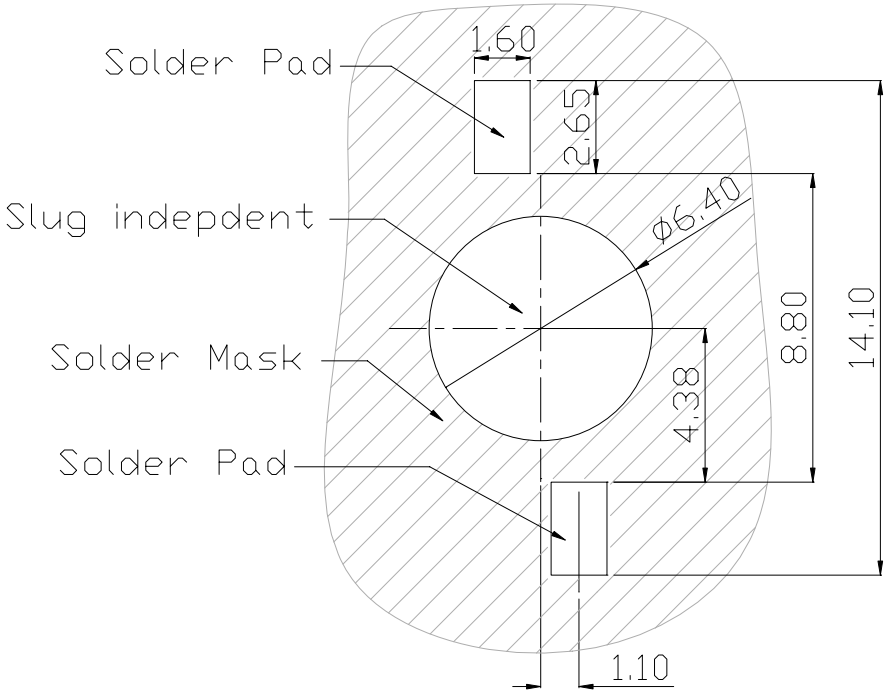


Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern



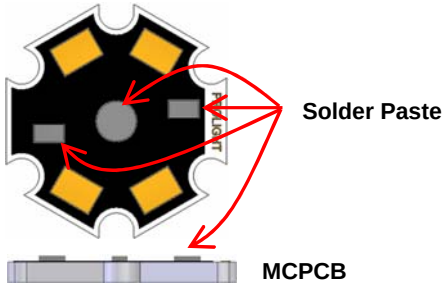
Recommended Solder Pad Design



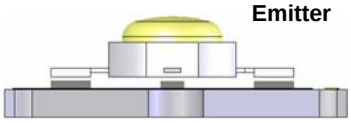
- All dimensions are in millimeters.
- Electrical isolation is required between Slug and Solder Pad.

Heat Plate Soldering Condition

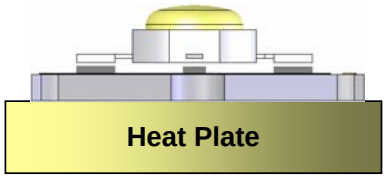
(1) Soldering Process for Solder Paste



Use Solder Mask to print Solder Paste on MCPCB.



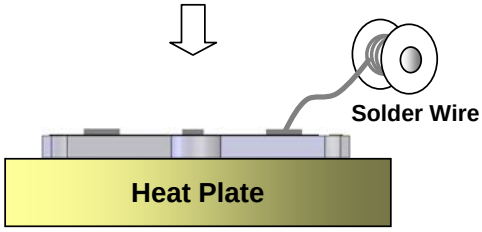
Place Emitter on MCPCB.



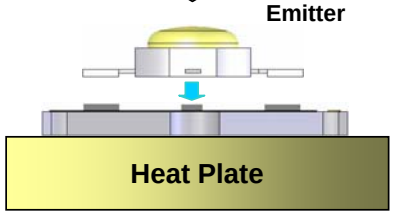
Put MCPCB on Heat Plate until Solder Paste melt.
The Solder Paste sould be melted within 10 seconds.
Take out MCPCB out from Heat Plate within 15 seconds.

(2) Soldering Process for Solder Wire

Put MCPCB on Heat Plate.



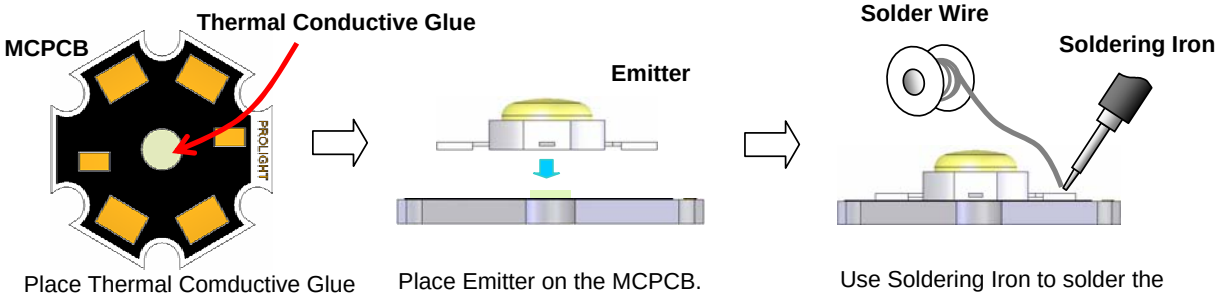
Place Solder Wire to the solder pad of MCPCB.



Put Emitter on MCPCB. Take the MCPCB out
from Heat Plate within 10 seconds.

- Heat plate temperature: 230°C max for Lead Solder and 260°C max for Lead-Free Solder.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.

Manual Hand Soldering



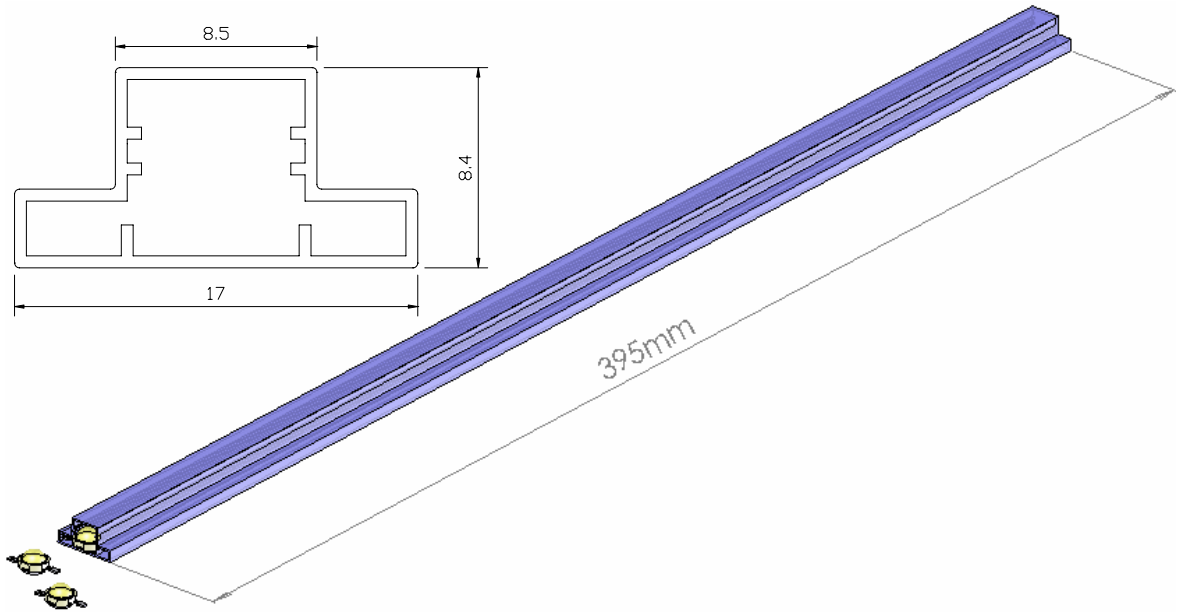
Place Thermal Comductive Glue
on the MCPCB.

Place Emitter on the MCPCB.

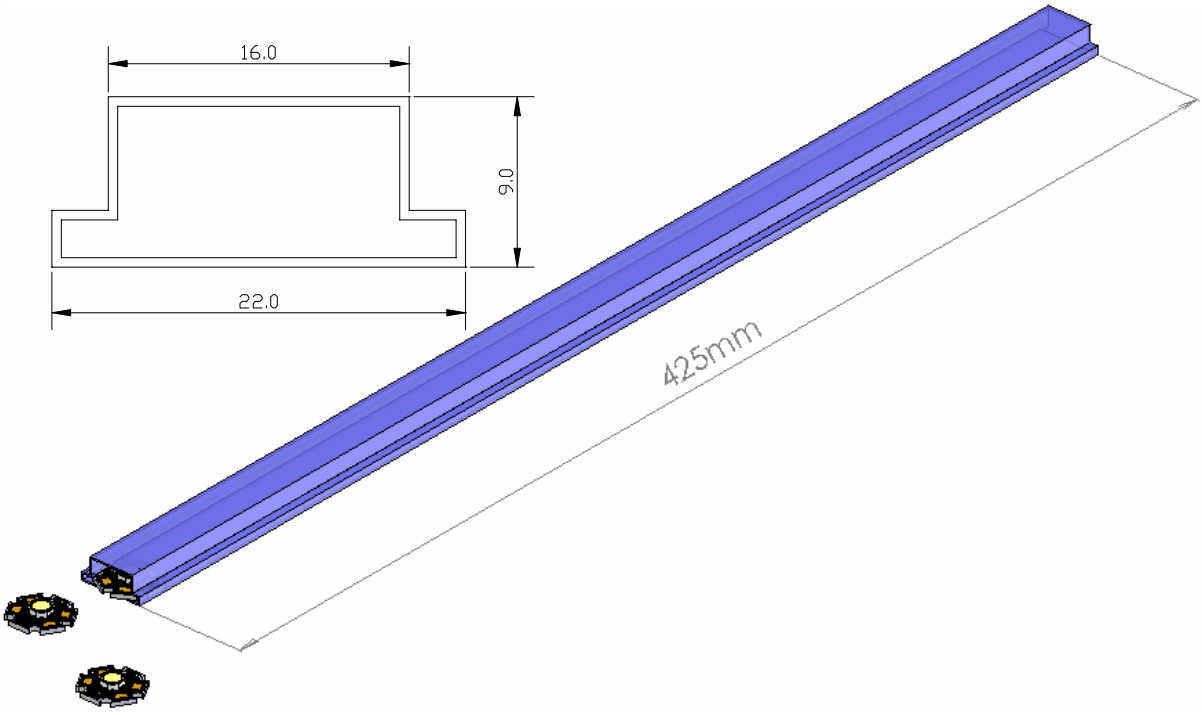
Use Soldering Iron to solder the
leads of Emtter within 5 seconds.

- For prototype builds or small series production runs it possible to place and solder the emitters by hand.
- Solder tip temperature: 230°C max for Lead Solder and 260°C max for Lead-Free Solder.
- Avoiding damage to the emitter or to the MCPCB dielectric layer. Damage to the epoxy layer can cause a short circuit in the array.
- Do not let the solder contact from solder pad to back-side of MCPCB. This one will cause a short circuit and damage emitter.

Emitter Tube Packaging



Star Tube Packaging



Notes:
1. Emitter 50 pieces per tube and Star 20 pieces per tube.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. All dimendions without tolerances are for reference only.

**Please do not open the moisture barrier bag (MBB) more than one week. This may cause the leads of LED discoloration. We recommend storing ProLight's LEDs in a dry box after opening the MBB. The recommended storage conditions are temperature 5 to 30°C and humidity less than 40% RH.