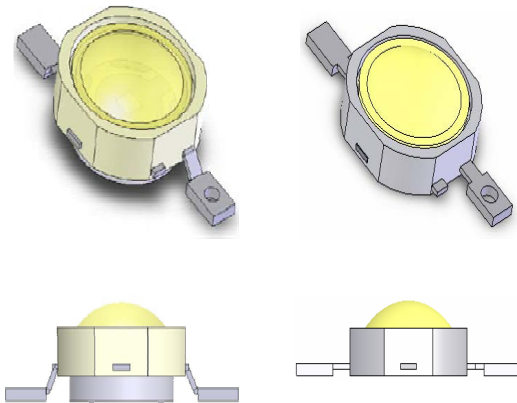




ProLight Opto
Technology Corporation



ProLight PG1X-3LXE-XX
3W Power LED
Technical Datasheet
Version: 2.5

Features

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

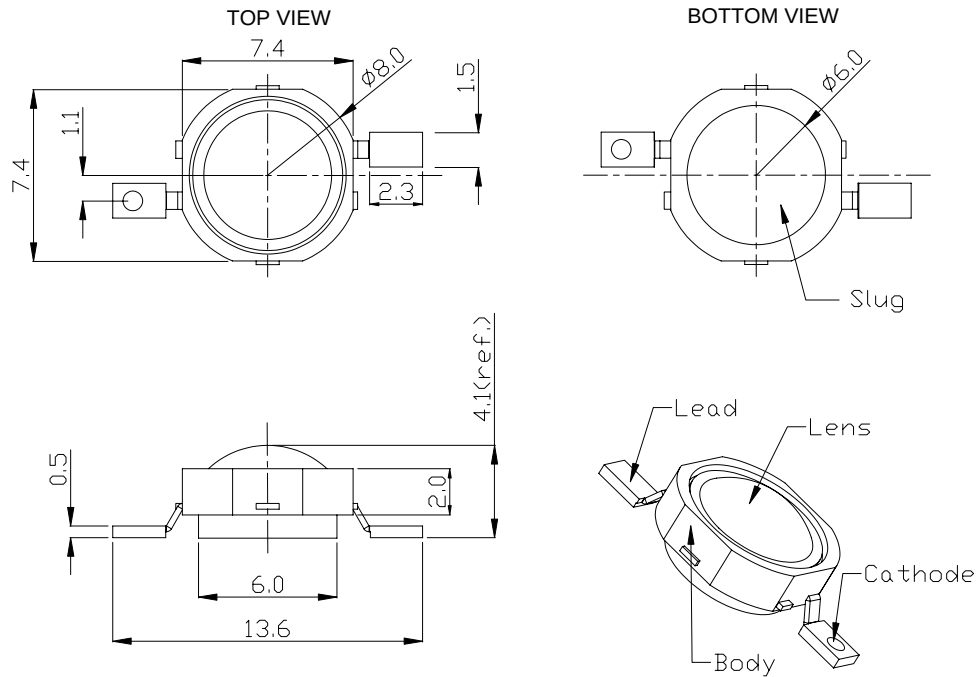
Typical Applications

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Uplighters/Downlighters
- Decorative/Entertainment
- Bollards/Security/Garden
- Cove/Undershelf/Task
- Indoor/Outdoor Commercial and Residential Architectural
- Automotive Ext (Stop-Tail-Turn, CHMSL, Mirror Side Repeat)
- LCD backlights

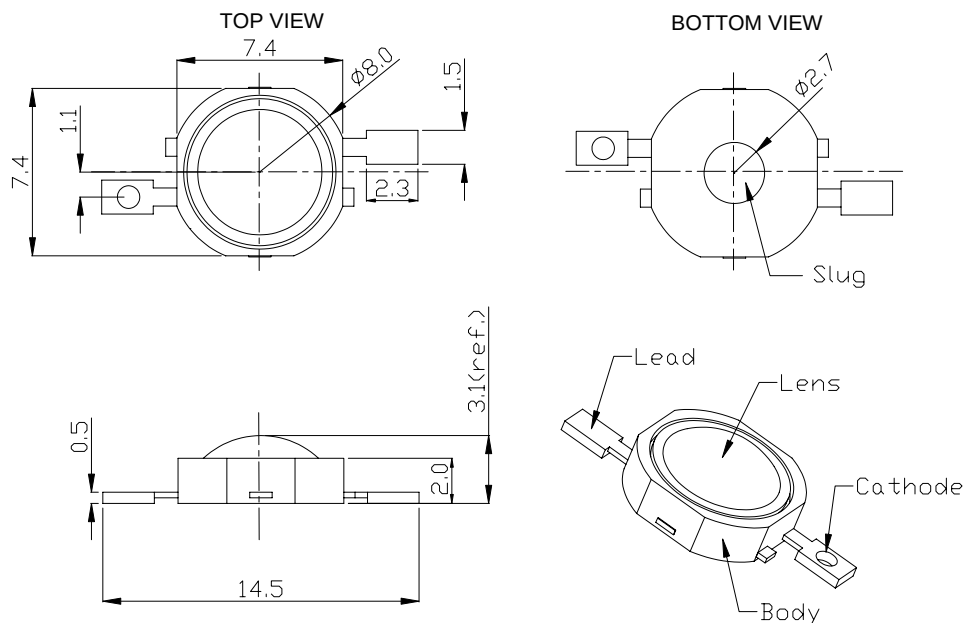
ProLight

Mechanical Dimensions

Lambertian - Standard Emitter



Lambertian - Low Profile Emitter



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 dimensions 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.

ProLight

Flux Characteristics at 700mA, T_J = 25°C

Radiation Pattern	Color	Part Number		Lumious Flux Φ_V (lm)	
		Standard Emitter	Low Profile Emitter	Minimum	Typical
Lambertian	White	PG1A-3LWE-SD	PG1N-3LWE-SD	51.7	110
	Warm White	PG1A-3LVE-SD	PG1N-3LVE-SD	51.7	100
	Green	PG1A-3LGE-SD	PG1N-3LGE-SD	67.2	95
	Blue	PG1A-3LBE-SD	PG1N-3LBE-SD	13.9	26
	Amber	PG1A-3LAE	PG1N-3LAE	51.7	84
	Red	PG1A-3LRE	PG1N-3LRE	39.8	80

- ProLight maintains a tolerance of $\pm 10\%$ on flux and power measurements.
- Please do not drive at rated current more than 1 second without proper heat sink.

Electrical Characteristics at 700mA, T_J = 25°C

Color	Forward Voltage V _F (V)			Dynamic Resistance (Ω)	Temperature Coefficient of V _F (mV/ °C) $\Delta V_F / \Delta T_J$	Thermal Resistance Junction to Slug (°C/ W)
	Min.	Typ.	Max.			
White	2.8	3.5	4.0	1.0	-2.0	6
Warm White	2.8	3.5	4.0	1.0	-2.0	6
Green	2.8	3.5	4.0	1.0	-2.0	6
Blue	2.8	3.5	4.0	1.0	-2.0	6
Amber	1.9	2.2	3.1	2.4	-2.0	6
Red	1.9	2.2	3.1	2.4	-2.0	6

Optical Characteristics at 700mA, T_J = 25°C

Radiation Pattern	Color	Dominant Wavelength λ_D , or Color Temperature CCT			Spectral Half-width (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient of Dominant Wavelength (nm/ °C) $\Delta\lambda_D / \Delta T_J$	Total included Angle (degrees) $\theta_{0.90V}$	Viewing Angle (degrees) $2\theta_{1/2}$
		Min.	Typ.	Max.				
Lambertian	White	4100 K	5500 K	10000 K	---	---	160	140
	Warm White	2700 K	3300 K	4100 K	---	---	160	140
	Green	520 nm	530 nm	540 nm	35	0.04	160	140
	Blue	455 nm	465 nm	475 nm	25	0.04	160	140
	Amber	584.5 nm	590 nm	597 nm	20	0.05	160	140
	Red	610 nm	620 nm	631 nm	20	0.05	160	140

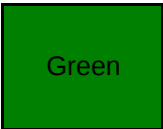
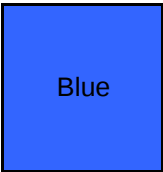
- ProLight maintains a tolerance of $\pm 1\text{nm}$ for dominant wavelength measurements.
- ProLight maintains a tolerance of $\pm 5\%$ for CCT measurements.

ProLight

Absolute Maximum Ratings

Parameter	White/Warm White/ Green/Blue	Amber/Red
DC Forward Current (mA)	700	770
Peak Pulsed Forward Current (mA)	1000	1100
Average Forward Current (mA)	700	700
ESD Sensitivity	±16000V HBM	
LED Junction Temperature (°C)	135	120
Aluminum-core PCB Temperature (°C)	105	105
Storage & Operating Temperature (°C)	-40 to +105	-40 to +105
Soldering Temperature(°C)	260 for 5 seconds Max.	

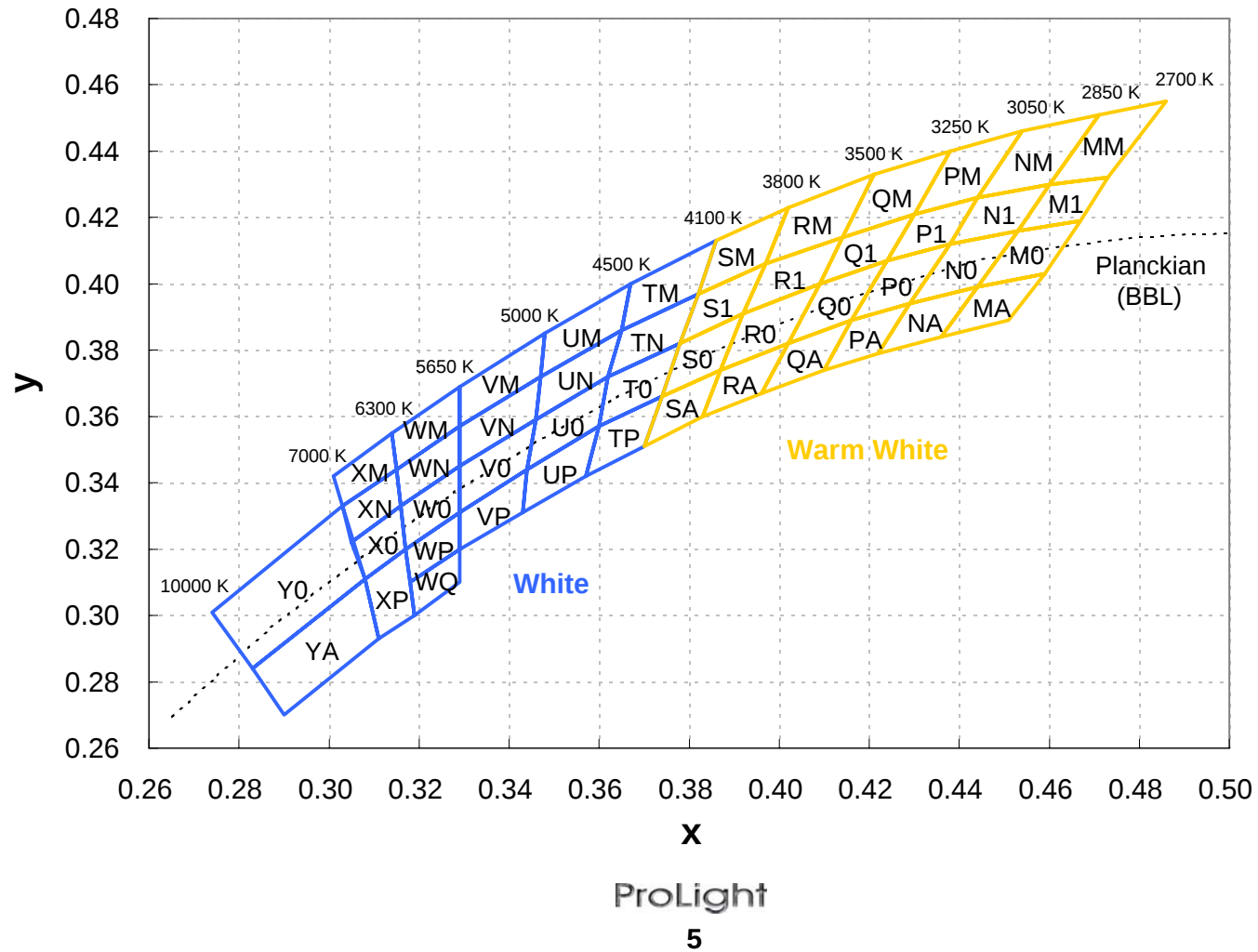
Photometric Luminous Flux Bin Structure

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
	S	51.7	67.2
	T	67.2	87.4
	U	87.4	113.6
	V	113.6	147.7
	S	51.7	67.2
	T	67.2	87.4
	U	87.4	113.6
	V	113.6	147.7
	T	67.2	87.4
	U	87.4	113.6
	V	113.6	147.7
	M	13.9	18.1
	N	18.1	23.5
	P	23.5	30.6
	Q	30.6	39.8
	S	51.7	67.2
	T	67.2	87.4
	S	51.7	67.2
	T	67.2	87.4

- ProLight maintains a tolerance of $\pm 10\%$ on flux and power measurements.

Color Bin

White and Warm 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.

ProLight

Color Bins

Warm White Bin Structure

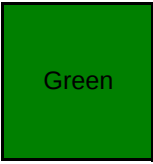
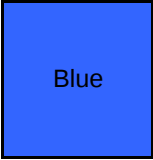
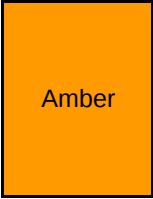
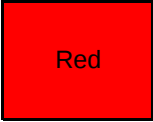
Bin Code	x	y	Typ. CCT (K)	Bin Code	x	y	Typ. CCT (K)
M0	0.453	0.416	2770	Q0	0.409	0.400	3370
	0.444	0.399			0.402	0.382	
	0.459	0.403			0.416	0.389	
	0.467	0.419			0.424	0.407	
M1	0.460	0.430	2770	Q1	0.414	0.414	3370
	0.453	0.416			0.409	0.400	
	0.467	0.419			0.424	0.407	
	0.473	0.432			0.430	0.421	
MA	0.459	0.403	2770	QA	0.416	0.389	3370
	0.444	0.399			0.402	0.382	
	0.436	0.384			0.396	0.367	
	0.451	0.389			0.410	0.374	
MM	0.471	0.451	2770	QM	0.421	0.433	3370
	0.460	0.430			0.414	0.414	
	0.473	0.432			0.430	0.421	
	0.486	0.455			0.438	0.440	
N0	0.438	0.412	2950	R0	0.392	0.391	3650
	0.429	0.394			0.387	0.374	
	0.444	0.399			0.402	0.382	
	0.453	0.416			0.409	0.400	
N1	0.444	0.426	2950	R1	0.414	0.414	3650
	0.438	0.412			0.409	0.400	
	0.453	0.416			0.392	0.391	
	0.460	0.430			0.397	0.406	
NA	0.444	0.399	2950	RA	0.387	0.374	3650
	0.429	0.394			0.383	0.360	
	0.422	0.379			0.396	0.367	
	0.436	0.384			0.402	0.382	
NM	0.454	0.446	2950	RM	0.421	0.433	3650
	0.444	0.426			0.414	0.414	
	0.460	0.430			0.397	0.406	
	0.471	0.451			0.402	0.423	
P0	0.424	0.407	3150	S0	0.392	0.391	3950
	0.416	0.389			0.387	0.374	
	0.429	0.394			0.374	0.366	
	0.438	0.412			0.378	0.382	
P1	0.430	0.421	3150	S1	0.397	0.406	3950
	0.424	0.407			0.392	0.391	
	0.438	0.412			0.378	0.382	
	0.444	0.426			0.382	0.397	
PA	0.429	0.394	3150	SA	0.387	0.374	3950
	0.416	0.389			0.383	0.360	
	0.410	0.374			0.370	0.351	
	0.422	0.379			0.374	0.366	
PM	0.438	0.440	3150	SM	0.402	0.423	3950
	0.430	0.421			0.397	0.406	
	0.444	0.426			0.382	0.397	
	0.454	0.446			0.386	0.413	

- 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.

ProLight

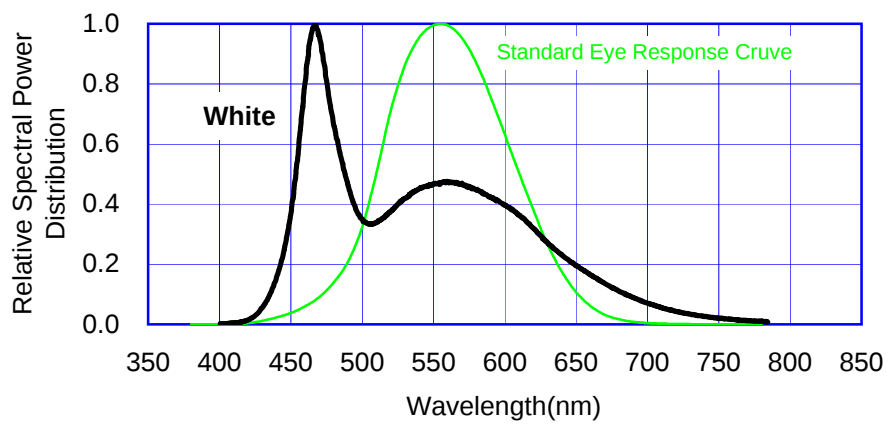
Dominant Wavelength Bin Structure

Color	Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
	1	520	525
	2	525	530
	3	530	535
	4	535	540
	A	455	460
	1	460	465
	2	465	470
	3	470	475
	1	584.5	587.0
	2	587.0	589.5
	4	589.5	592.0
	6	592.0	594.5
	7	594.5	597.0
	1	610	613.5
	2	613.5	620.5
	4	620.5	631.0

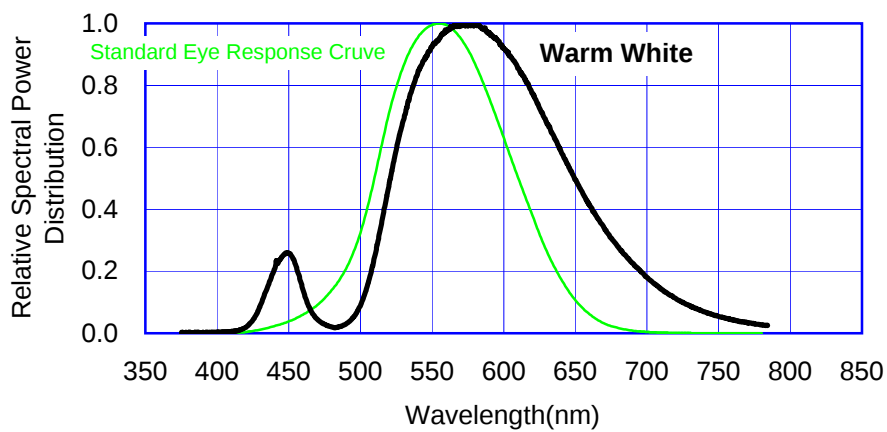
- ProLight maintains a tolerance of $\pm 1\text{nm}$ for dominant wavelength measurements.

Color Spectrum, $T_j = 25^{\circ}\text{C}$

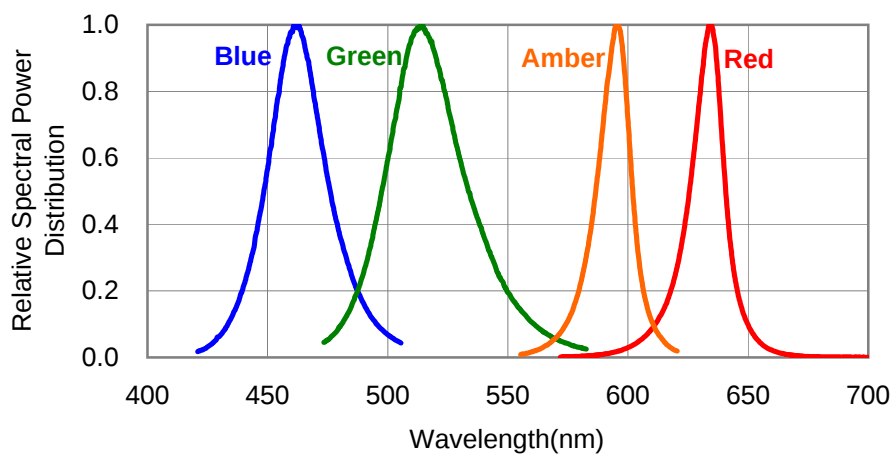
1. White



2. Warm White



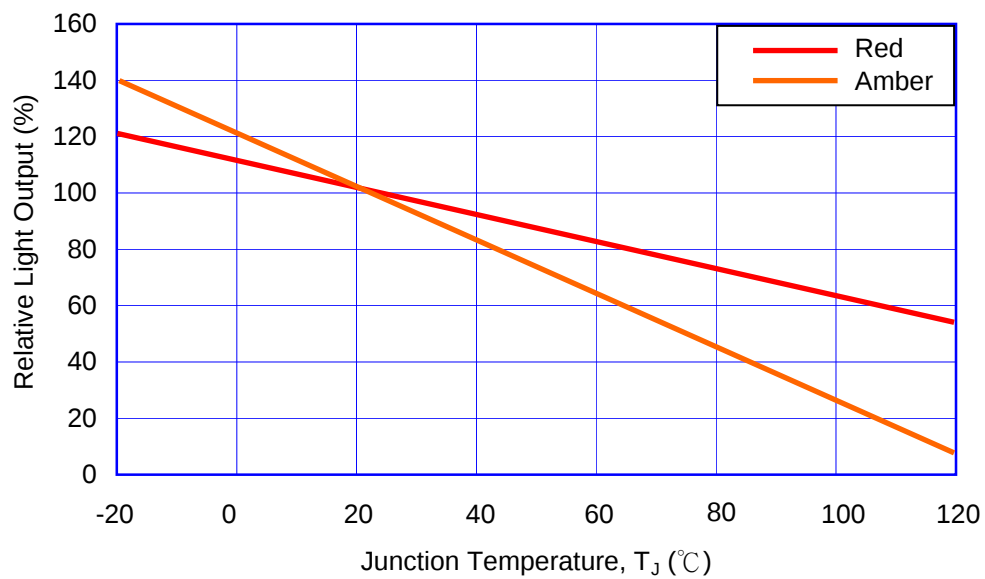
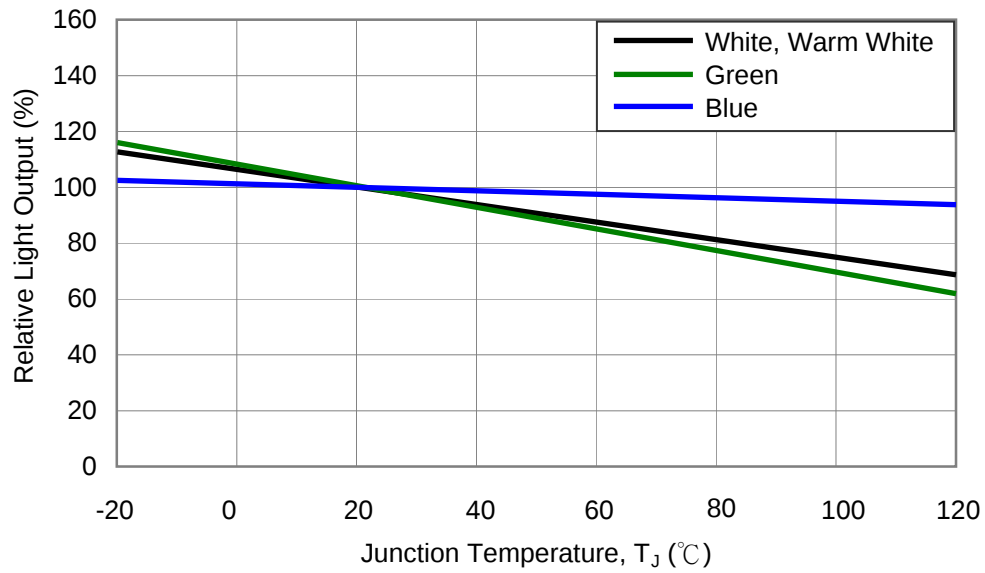
3. Blue 、 Green 、 Amber 、 Red



ProLight

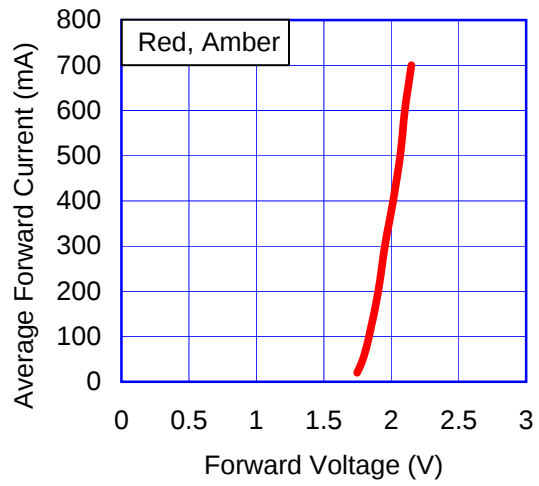
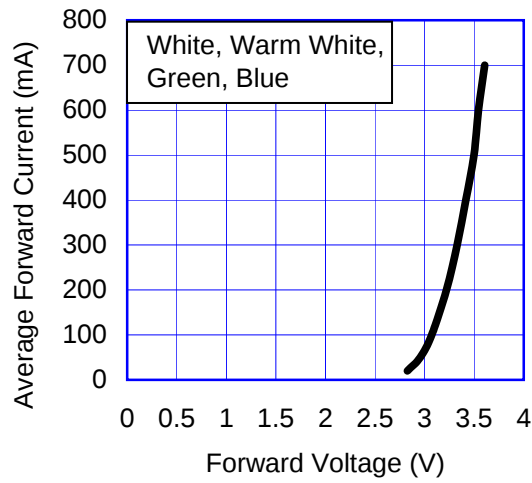
Light Output Characteristics

Relative Light Output vs. Junction Temperature at 700mA

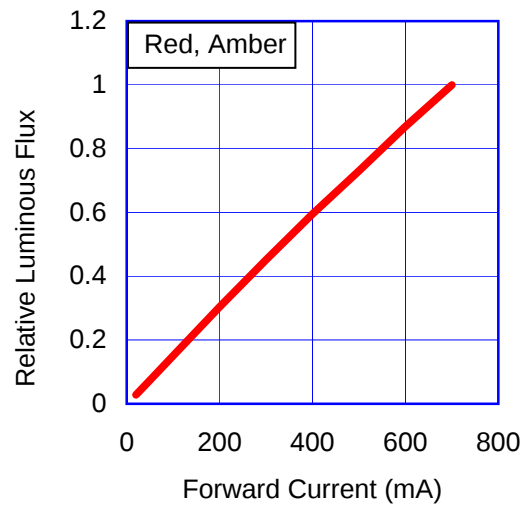
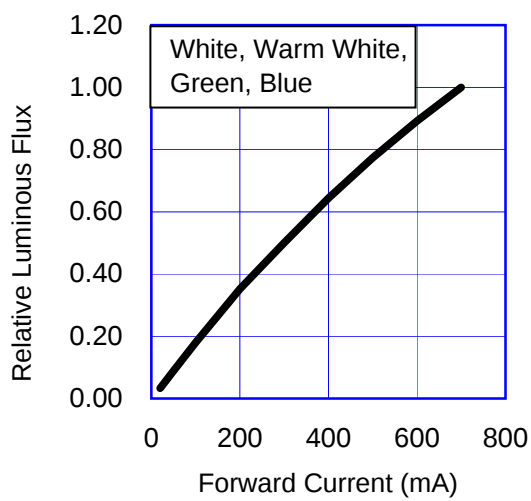


Forward Current Characteristics, $T_J = 25^\circ\text{C}$

1. Forward Voltage vs. Forward Current

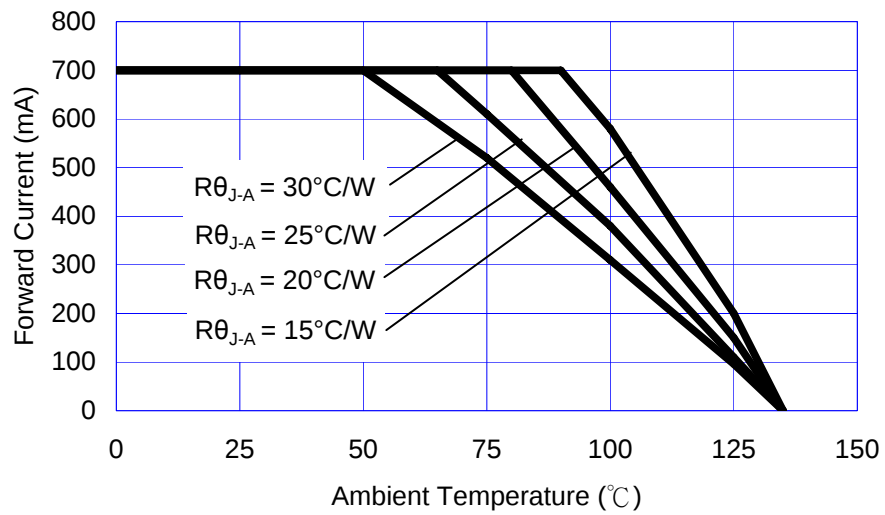


2. Forward Current vs. Normalized Relative Luminous Flux

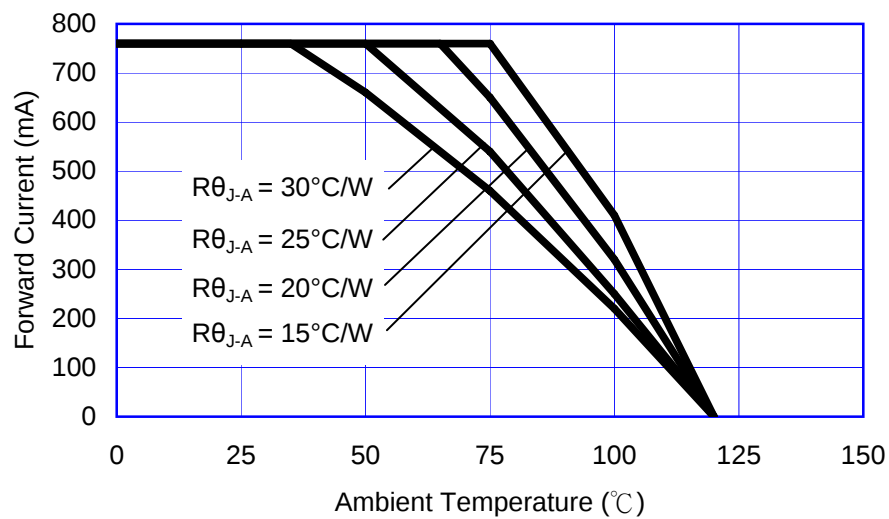


Ambient Temperature vs. Maximum Forward Current

1. White, Warm White, Green, Blue ($T_{JMAX} = 135^{\circ}\text{C}$)

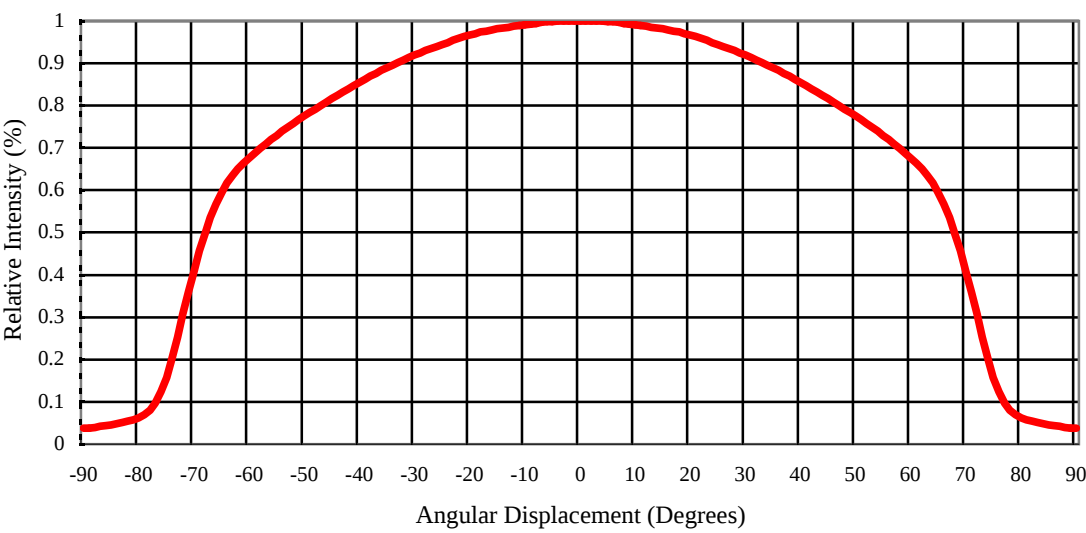


2. Red, Amber ($T_{JMAX} = 120^{\circ}\text{C}$)



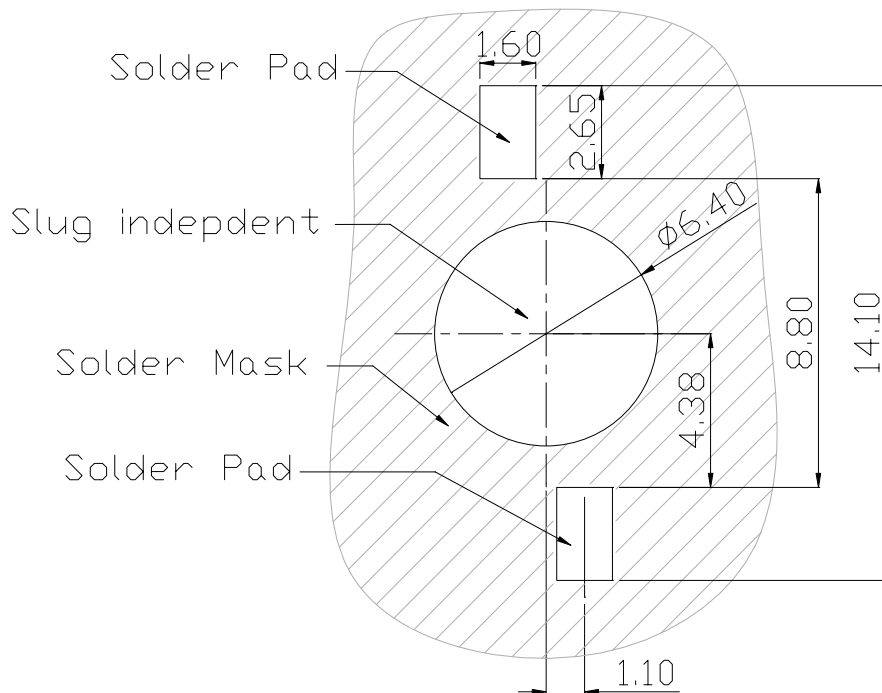
Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern

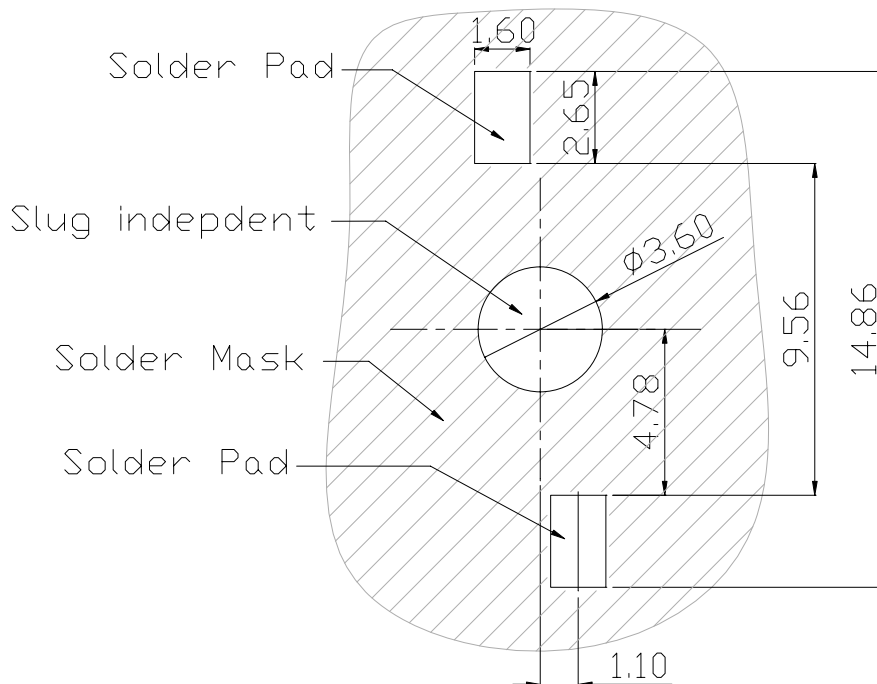


Recommended Solder Pad Design

Standard Emitter



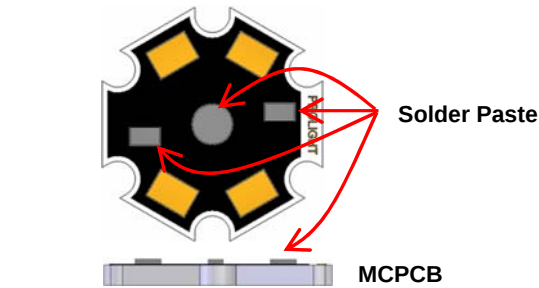
Low Profile Emitter



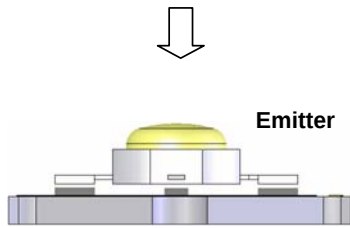
- All dimensions are in millimeters.
- Electrical isolation is required between Slug and Solder Pad.

Heat Plate Soldering Condition

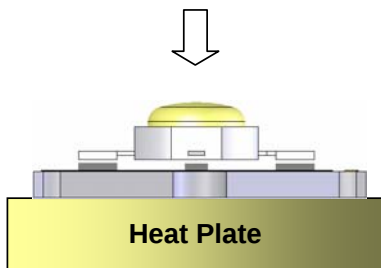
(1) Soldering Process for Solder Paste



Use Solder Mask to print Solder Paste on MCPCB.



Place Emitter on MCPCB.

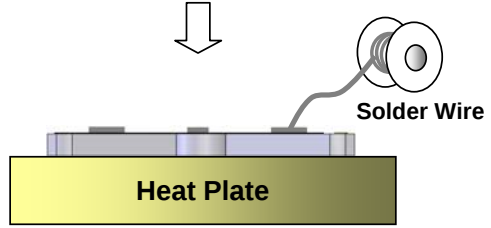


Put MCPCB on Heat Plate until Solder Paste melt.
The Solder Paste could be melted within 10 seconds.
Take out MCPCB out from Heat Plate within 15 seconds.

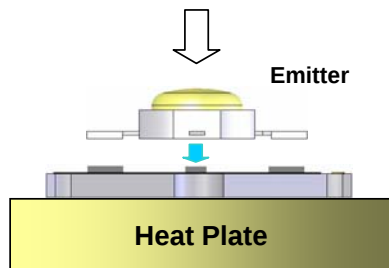
(2) Soldering Process for Solder Wire



Put MCPCB on Heat Plate.



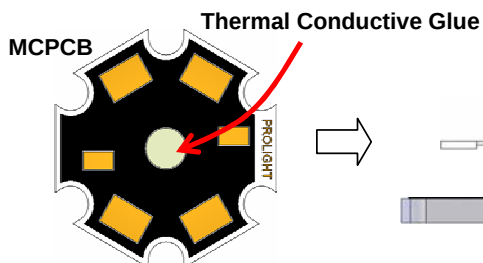
Place Solder Wire to the solder pad of MCPCB.



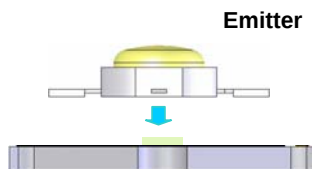
Put Emitter on MCPCB. Take the MCPCB out from Heat Plate within 10 seconds.

- 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.

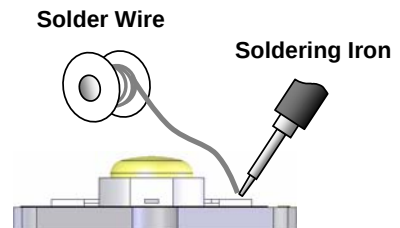
Manual Hand Soldering



Place Thermal Comductive Glue on the MCPCB.



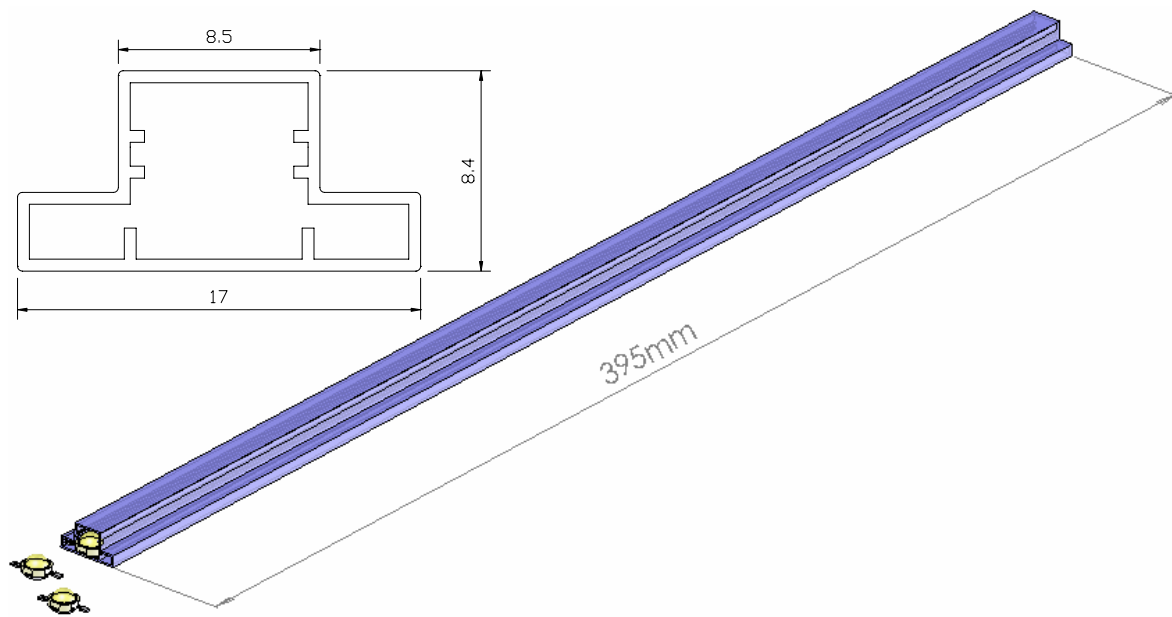
Place Emitter on the MCPCB.



Use Soldering Iron to solder the leads of Emter 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



Notes:

1. 50 pieces per tube.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. All dimensions 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.**