



ProLight PACJ-28FxL-DC4HC
28W Future LEDs
Technical Datasheet
Version: 1.1

ProLight Opto ® ProEngine Series

Features

- Lower Blue light
- Good color uniformity
- RoHS compliant
- Energy Star binning structure, neutral white and warm white with 2 steps guarantee.
- More energy efficient than incandescent and most halogen lamps
- No UV
- Long lifetime
- 5 year warranty

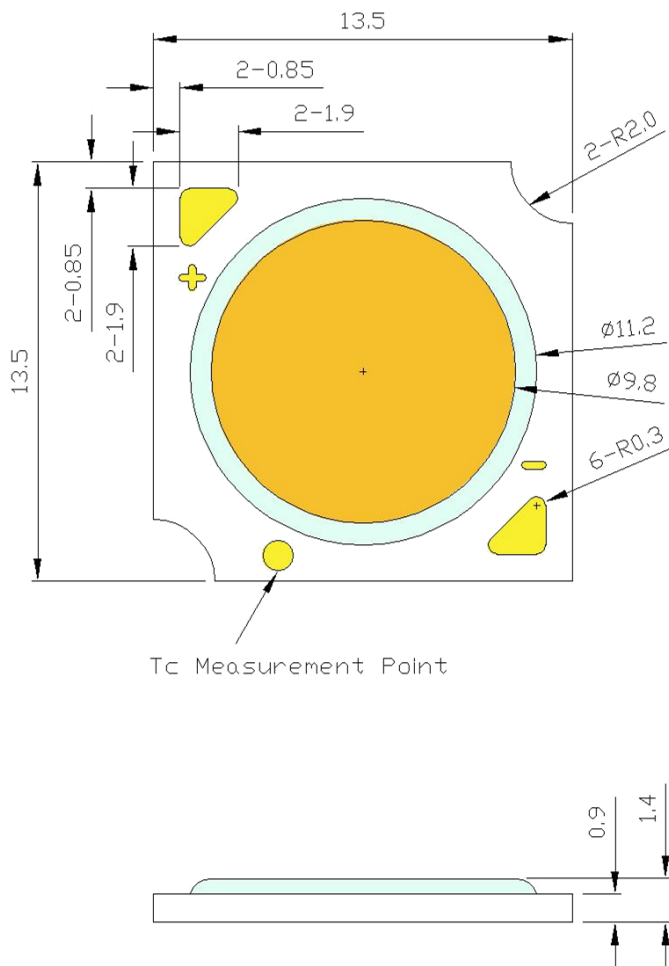
Main Applications

- Par lighting
- Spot lighting
- Down lighting

Introduction

·The input power is 28 Watt, the multi-chip ultra high power ProEngine Series delivers never before seen luminous flux output from a single emitter. The superficial illuminating nature of ProEngine makes them the preference in Par lighting, typical applications include commercial down lighting, LED bulb, accent lighting, ceiling lighting and spot lighting.

Mechanical Dimensions



Notes:

1. Slots in aluminum-core PCB for M3 mounting screw.
2. Solder pads are labeled "+" and "-" to denote positive and negative, respectively.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. Unless otherwise indicated, tolerances are ± 0.30 mm.
6. **Please do not use a force of over 0.3kgf impact or pressure on the lens of the LED, otherwise it will cause a catastrophic failure.**

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

Flux Characteristics, $T_c = 25^\circ\text{C}$

Radiation Pattern	Color	Part Number COB	DC Forward Current (mA)	Luminous Flux Min.	Φ_v (lm) Typ.	CRI Min.
Lambertian	White	PACJ-28FWL-DC4HC	360*	1330	1500	90
			720	2300	2600	
	Neutral White	PACJ-28FNL-DC4HC	360*	1250	1450	90
			720	2250	2550	
	Warm White	PACJ-28FVL-DC4HC	360*	1050	1250	90
			720	1850	2200	

- The mark "*" indicated product is tested and binned at the specified drive current.
- ProLight maintains a tolerance of $\pm 7\%$ on flux and power measurements.
- ProLight maintains a tolerance of ± 2 on CRI measurements.
- Please do not drive at rated current more than 1 second without proper heat sink.

Electrical Characteristics at 360mA, $T_c = 25^\circ\text{C}$

Color	Min.	Forward Voltage V_F (V)		Max.	Thermal Resistance Junction to Board ($^\circ\text{C}/\text{W}$)
		Typ.			
White	33.7	36.0	38.3	1.4	
Neutral White	33.7	36.0	38.3	1.4	
Warm White	33.7	36.0	38.3	1.4	

- ProLight maintains a tolerance of $\pm 1\text{V}$ for Voltage measurements.

Optical Characteristics at 360mA, $T_c = 25^\circ\text{C}$

Color	Bin Code	Color Temperature CCT			Total included Angle (degrees)	Viewing Angle (degrees)
		Min.	Typ.	Max.	$\theta_{0.90V}$	$2\theta_{1/2}$
White	V0	4840 K	5000 K	5230 K	160	120
Neutral White	S0	3890 K	4000 K	4080 K	160	120
Warm White	N0	2970 K	3000 K	3110 K	160	120
	Q0	3380 K	3500 K	3550 K	160	120

- ProLight maintains a tolerance of $\pm 5\%$ for CCT measurements.

Electro-Optical Characteristics, $T_c = 25^\circ\text{C}$

I_F (mA)	V_F (V)	Power (W)	PACJ-28FWL-DC4HC		PACJ-28FNL-DC4HC		PACJ-28FVL-DC4HC	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
240	34.6	8.3	1110	133.6	1080	129.9	930	111.9
360*	36.0	13.0	1500	115.7	1450	111.9	1250	96.5
480	37.2	17.9	1880	105.2	1820	101.8	1560	87.3
600	38.4	23.1	2260	98.0	2180	94.6	1880	81.6
720	39.5	28.5	2600	91.4	2550	89.6	2200	77.3

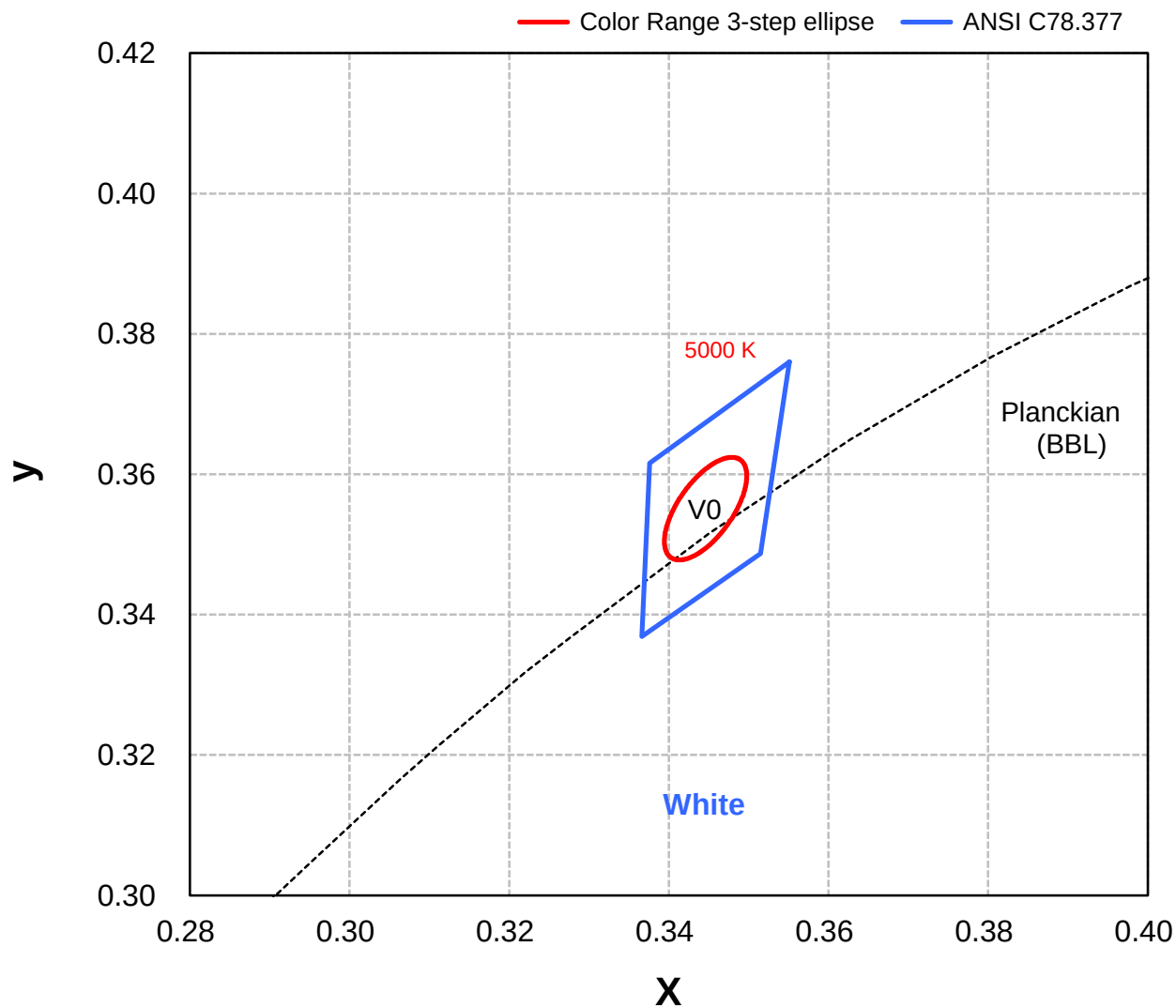
● All values are reference only.

Absolute Maximum Ratings

Parameter	White/Neutral White/Warm White
Max DC Forward Current (mA)	720
Max Voltage at 720mA	42
Peak Pulsed Forward Current (mA)	1000 (less than 1/10 duty cycle@1KHz)
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	$\pm 2000\text{V}$
LED Junction Temperature	120°C
Operating Board Temperature at Maximum DC Forward Current	$-40^\circ\text{C} - 90^\circ\text{C}$
Storage Temperature	$-40^\circ\text{C} - 120^\circ\text{C}$
Reverse Voltage	Not designed to be driven in reverse bias

Color Bin

White Binning Structure Graphical Representation



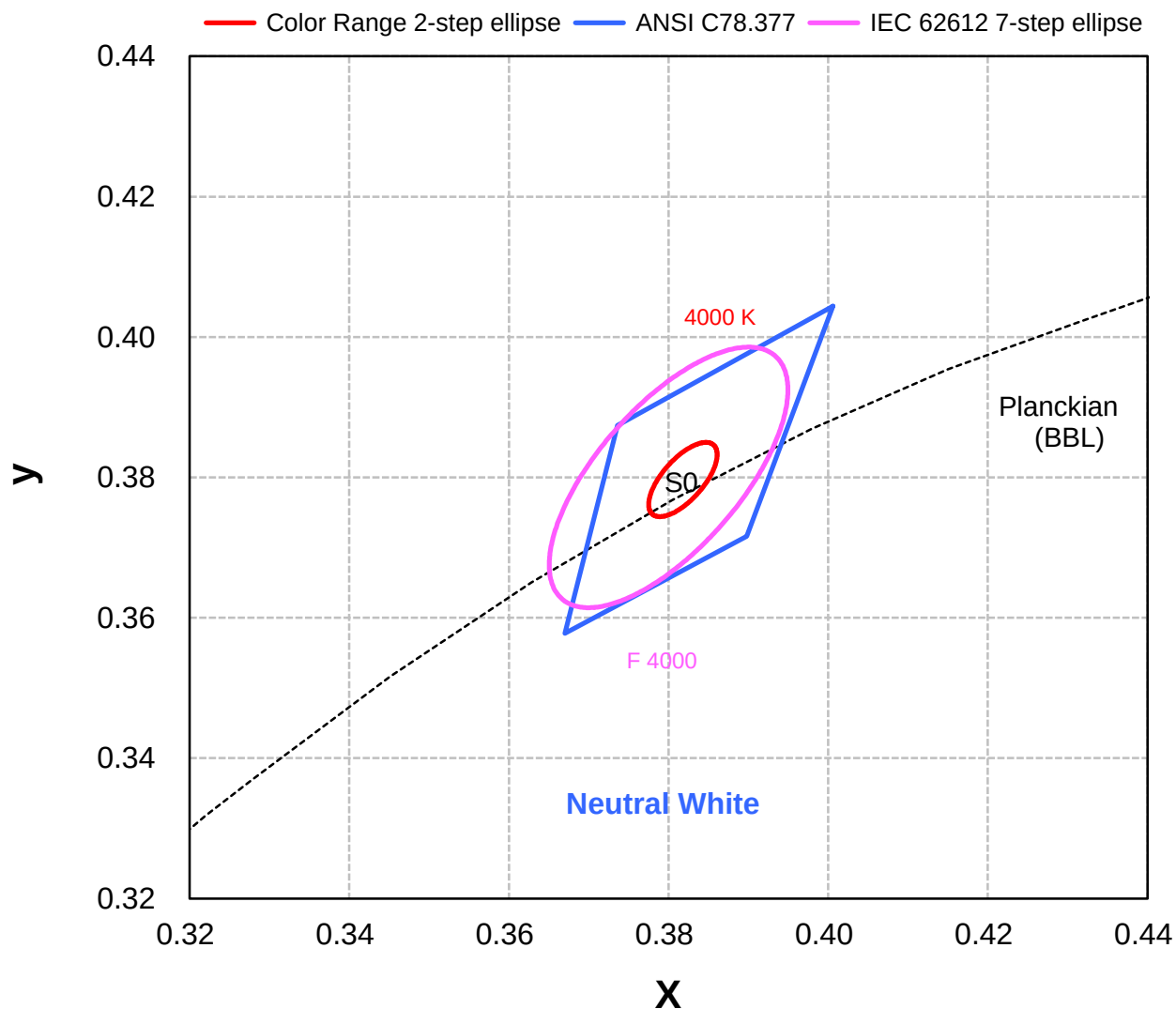
White Bin Structure

Bin Code	Center	Oval parameter	Typ. CCT (K)
V0	x	a	0.00822
		b	0.00354
	y	θ°	59.62
			5000

- Color range stay within MacAdam "3-step" ellipse from the chromaticity center.
- The chromaticity center refers to ANSI C78.377.
- Tolerance on each color bin (x , y) is ± 0.005

Color Bin

Neutral White Binning Structure Graphical Representation



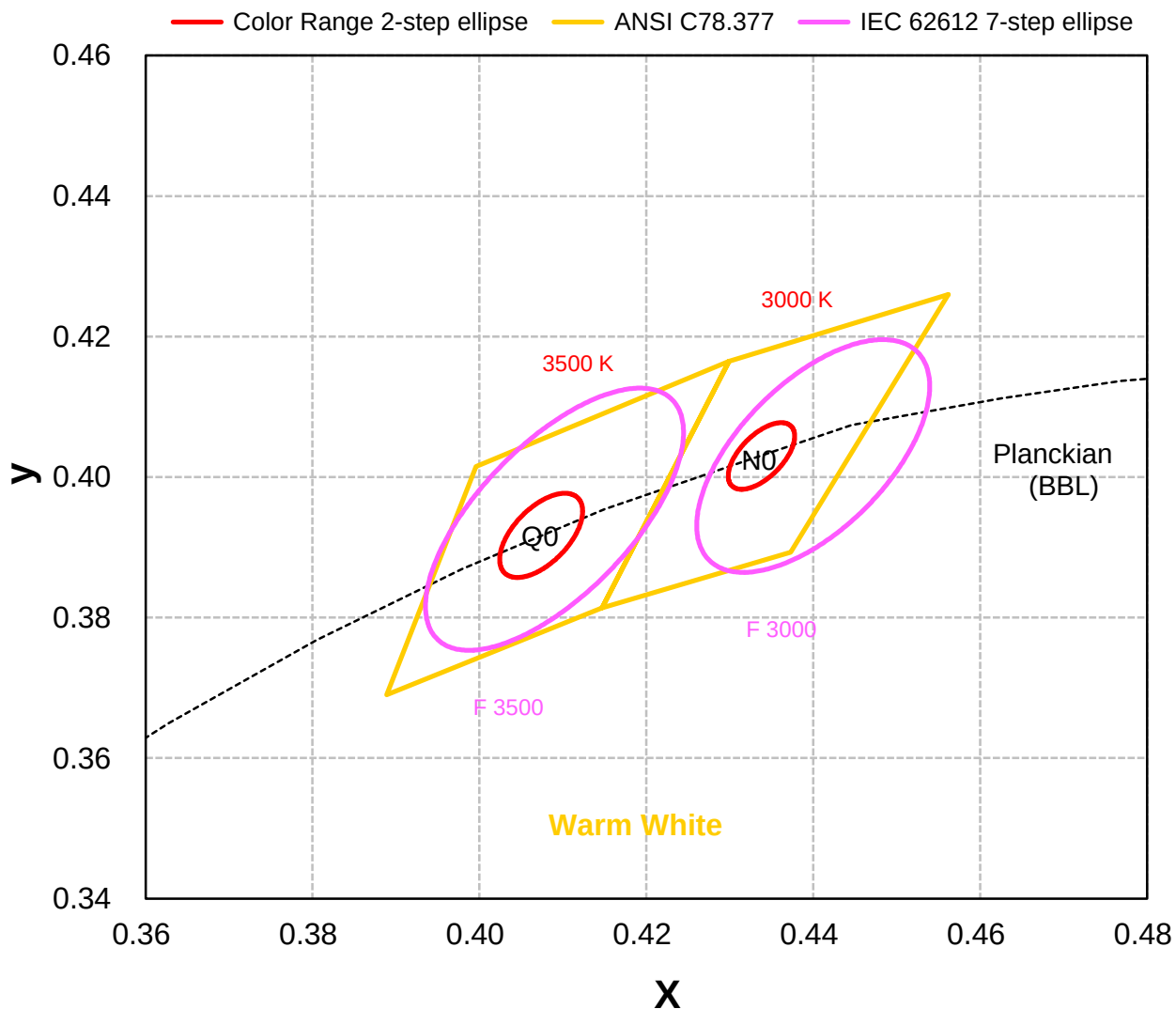
Neutral White Bin Structure

Bin Code	Center	Oval parameter	Typ. CCT (K)
S0	x	0.3818	4000
	y	0.3797	
	a	0.00626	
	b	0.00268	
	e°	53.72	

- Color range stay within MacAdam “2-step” ellipse from the chromaticity center.
- The chromaticity center refers to ANSI C78.377.
- Tolerance on each color bin (x , y) is ± 0.005

Color Bin

Warm White Binning Structure Graphical Representation



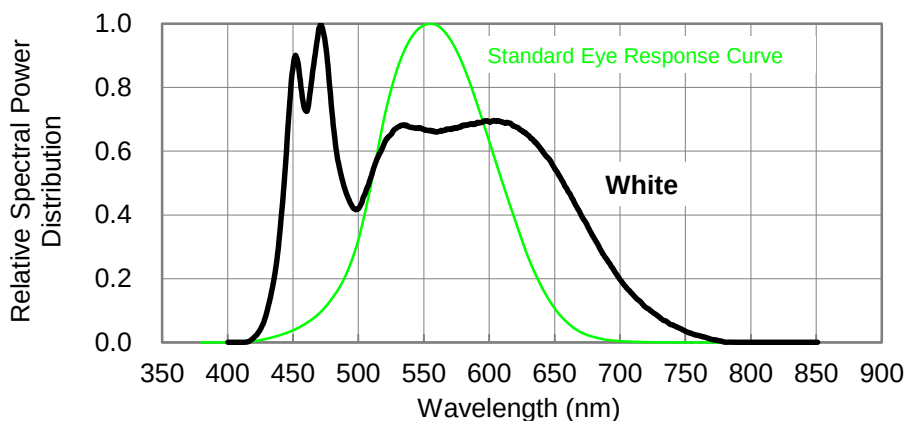
Warm White Bin Structure

Bin Code	Center	Oval parameter	Typ. CCT (K)	Bin Code	Center	Oval parameter	Typ. CCT (K)
N0	x	0.4338	3000	Q0	x	0.4074	3500
	y	0.4030			y	0.3917	
		a 0.00556 b 0.00272 e° 53.22				a 0.00695 b 0.00352 e° 54.09	

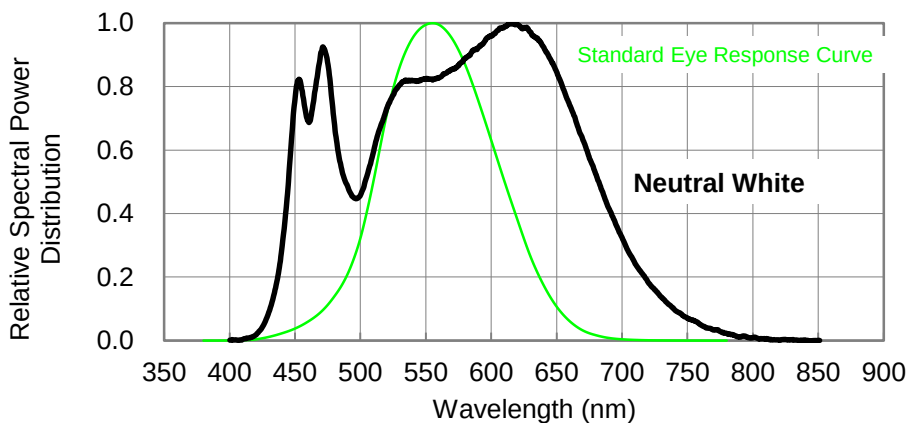
- Color range stay within MacAdam "2-step" ellipse from the chromaticity center.
- The chromaticity center refers to ANSI C78.377.
- Tolerance on each color bin (x , y) is ± 0.005

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

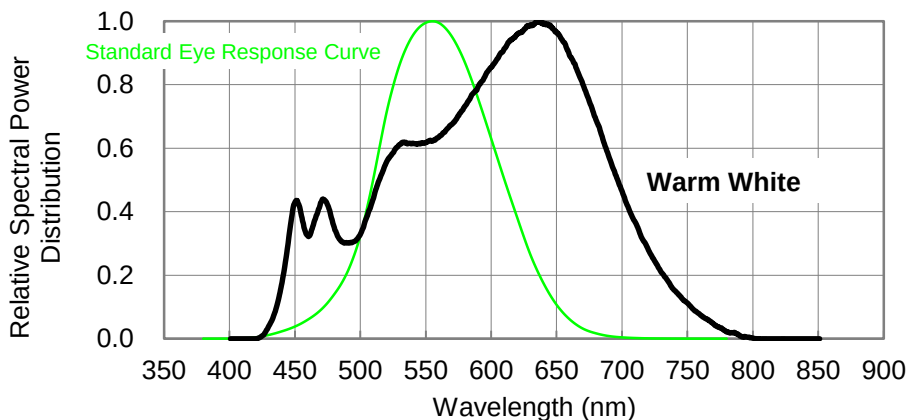
1. White



2. Neutral White



3. Warm White



Case Temperature Relative Characteristics

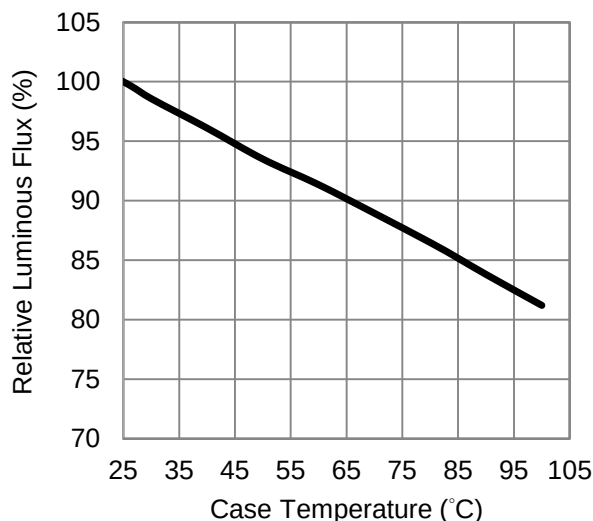


Fig 1. Case Temperature vs. Relative Luminous Flux at 360mA.

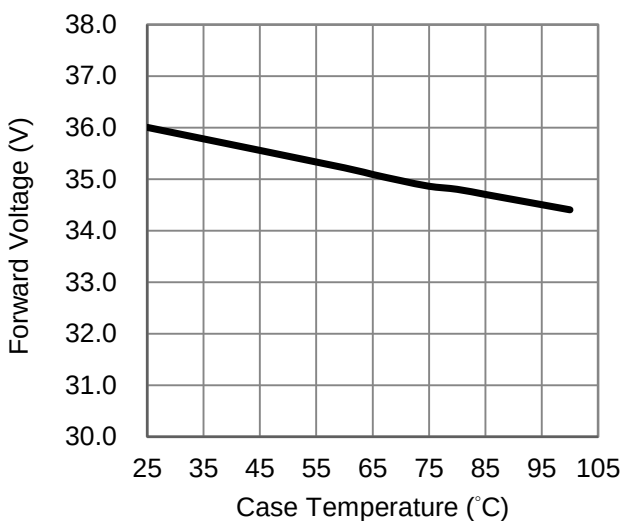


Fig 2. Case Temperature vs. Forward Voltage at 360mA.

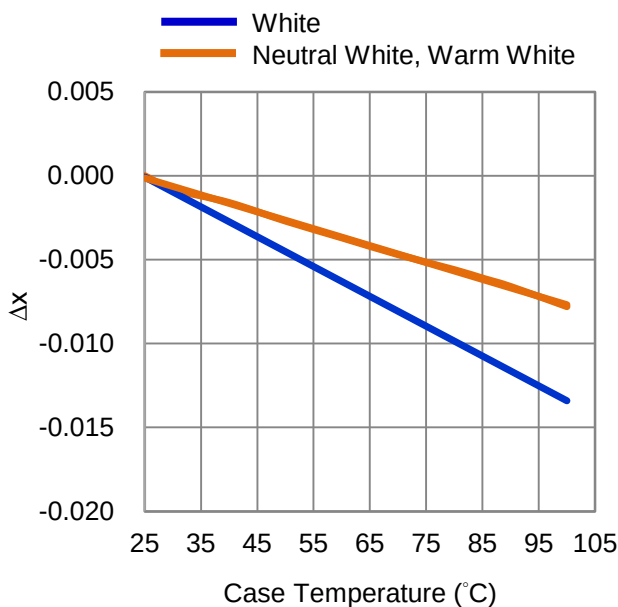


Fig 3. Case Temperature vs. Chromaticity Coordinate Δx at 360mA.

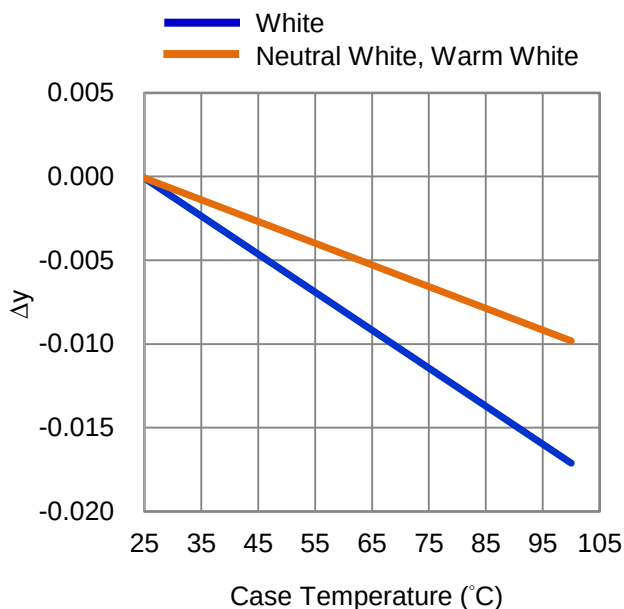


Fig 4. Case Temperature vs. Chromaticity Coordinate Δy at 360mA.

Forward Current Relative Characteristics

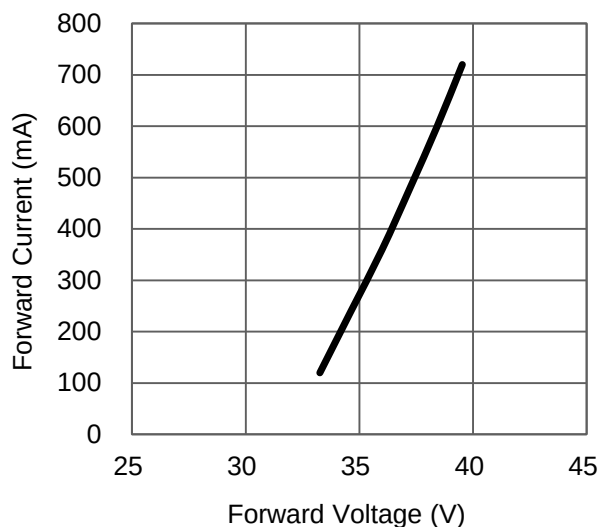


Fig 5. Forward Current vs. Forward Voltage at $T_C=25^{\circ}\text{C}$.

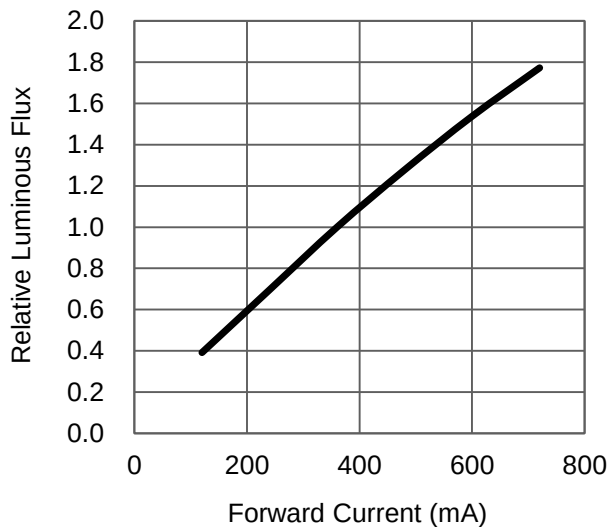


Fig 6. Forward Current vs. Relative Luminous Flux at $T_C=25^{\circ}\text{C}$.

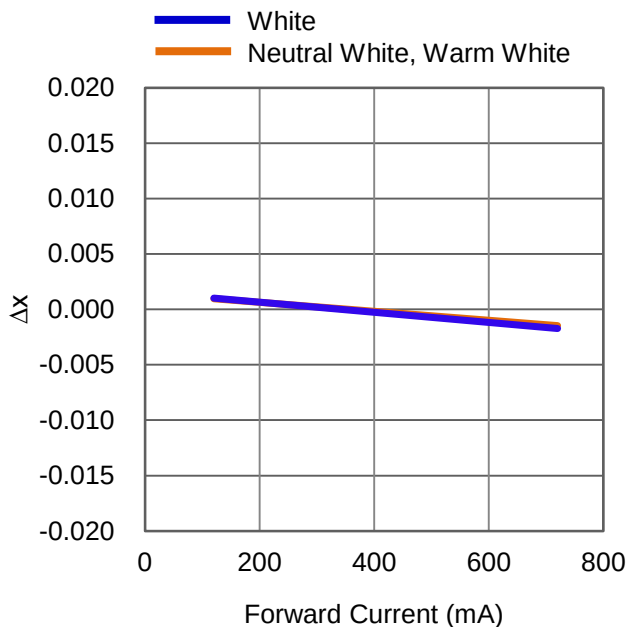


Fig 7. Forward Current vs. Chromaticity Coordinate Δx at $T_C=25^{\circ}\text{C}$.

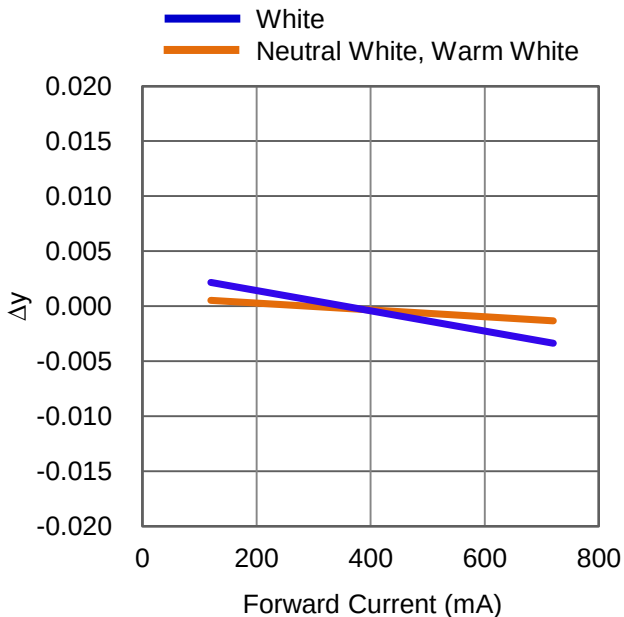


Fig 8. Forward Current vs. Chromaticity Coordinate Δy at $T_C=25^{\circ}\text{C}$.

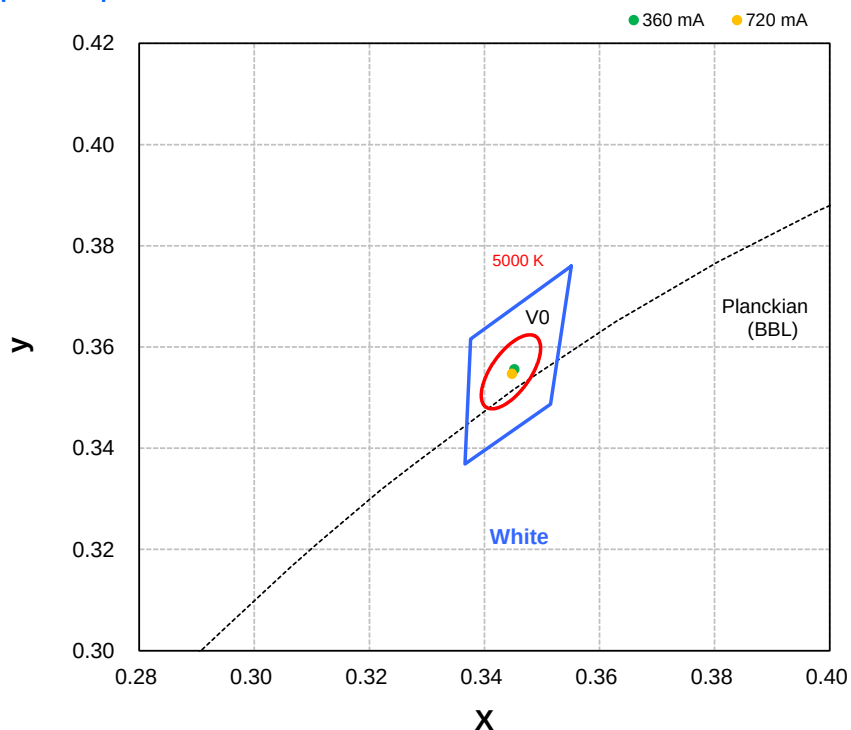
Case Temperature vs. Junction Temperature Characteristics

T _c (°C)	T _j (°C)	
	360 (mA)	720 (mA)
0	18	40
5	23	45
10	28	50
15	33	55
20	38	60
25	43	65
30	48	70
35	53	75
40	58	80
45	63	85
50	68	90
55	73	95
60	78	100
65	83	105
70	88	110
75	93	115
80	98	120

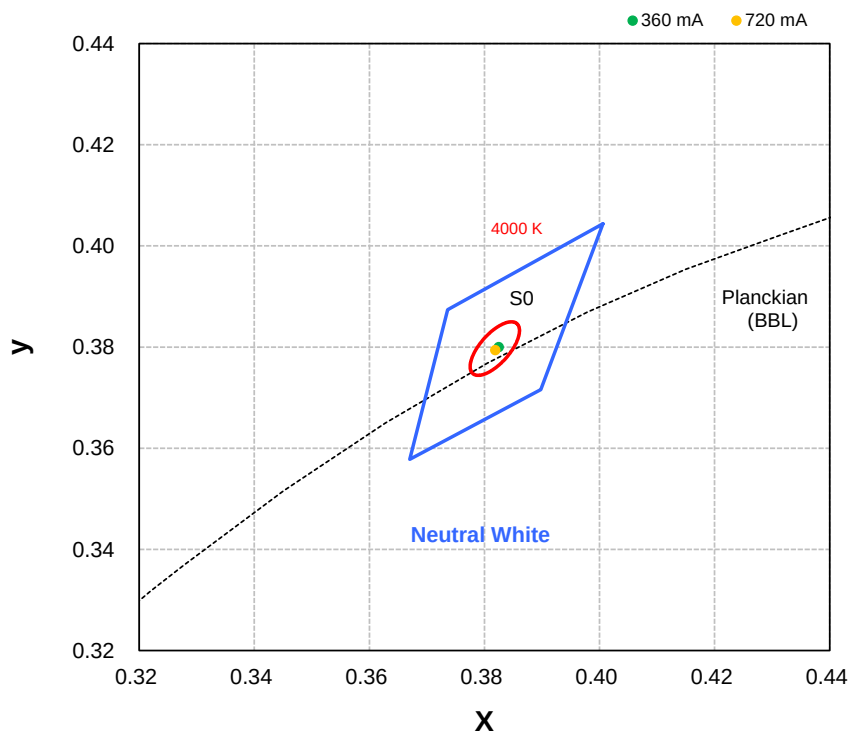
Fig 9. Case Temperature vs. Junction Temperature at 360 、720mA.

Color Coordinate vs. Forward Current, $T_c = 25^\circ\text{C}$

White Binning Graphical Representation

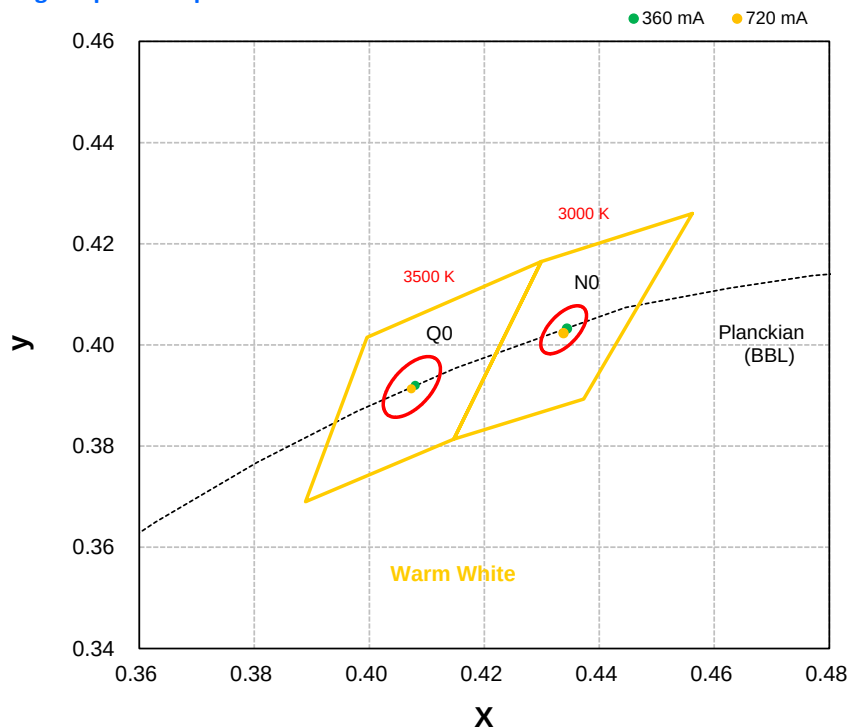


Neutral White Binning Graphical Representation



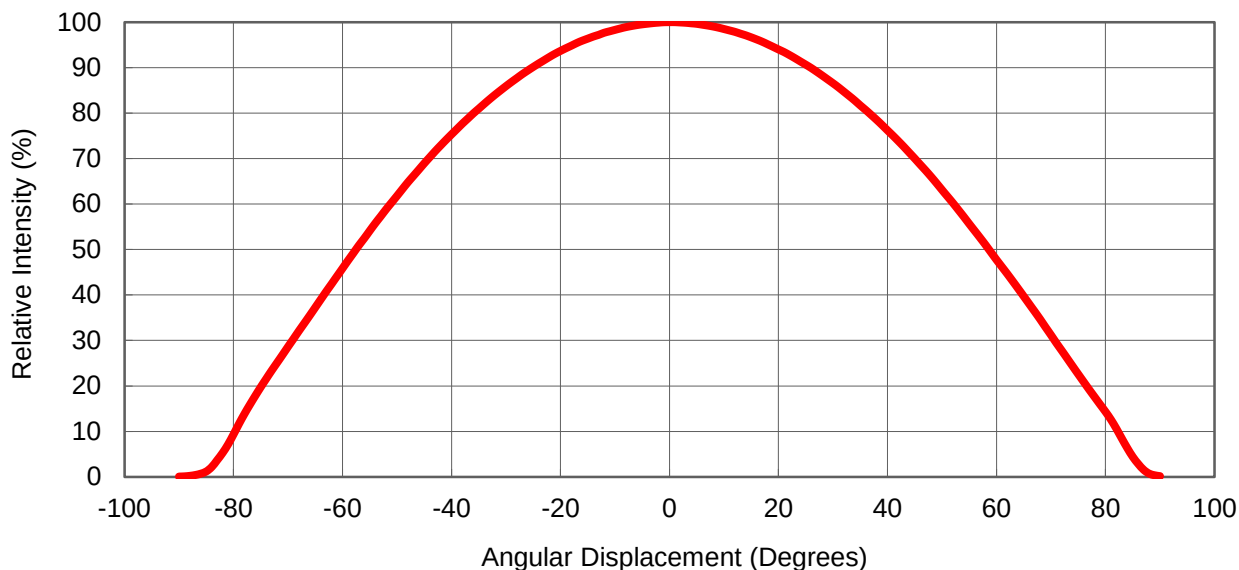
Color Coordinate vs. Forward Current, $T_c = 25^\circ\text{C}$

Warm White Binning Graphical Representation

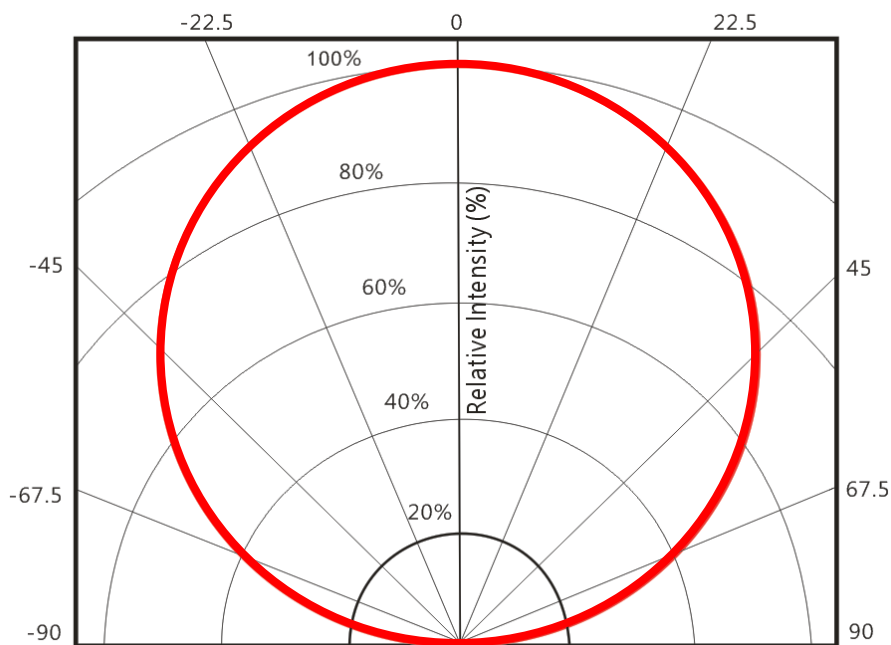


Typical Representative Spatial Radiation Pattern

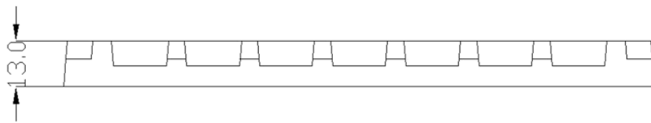
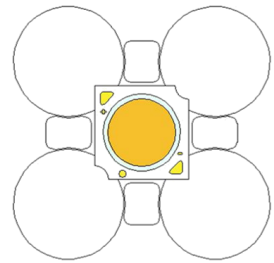
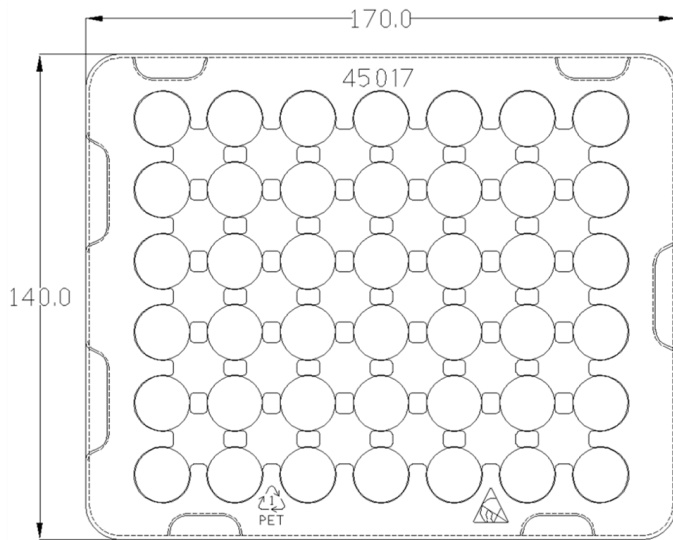
Lambertian Radiation Pattern



Polar Radiation Pattern



Packing Specifications



Product 30 pcs/tray

Notes:

1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are $\pm 0.20\text{mm}$.

Assembly note

Regarding the high power density of LED Array, it is strongly recommend to use thermal grease and screws.

In order to reduce thermal resistance at assembly, it is necessary to use TIM (thermal interface Material) uniformly and tighten screws on heatsink, otherwise the bad thermal resistance may cause the packages **burned out**.

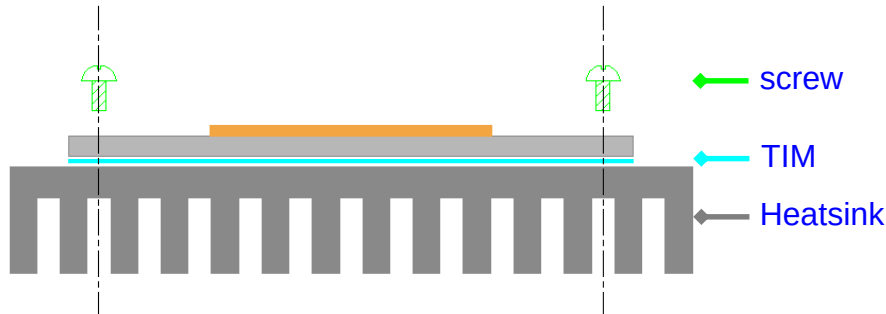


Fig 10. Reference assembly as fixing with screws

Limited Warranty : COB Light Engine Series

This limited warranty is provided by ProLight Opto described below ("Seller") to you as the original purchaser of the LED lighting product that is identified on Seller's invoice reflecting its original purchase (the "Product"). We warrant the identification as such on the invoice, will be free of defects in material and workmanship for a period of five (5) YEARS from the date of original purchase. This limited warranty excludes field labor and service charges related to the repair or replacement of the Product. Seller's aggregate liability with respect to a defective product shall in any event be limited to the monies paid to seller for that defective product. The determination of whether the Product is defective shall be made by Seller in its sole discretion with consideration given to the overall performance of the Product. This limited warranty cannot be transferred to subsequent purchasers of the Product, provided that such Product is resold in new condition and in its original packaging. This limited warranty is void if the product is not used for the purpose for which it is designed.

Recommended Soldering Condition

- Please use lead free and “no clean ” solders.
- Soldering shall be implemented using a soldering tip at a temperature lower than 350 °C, and shall be finished within 3.5 seconds for each pad.
- During the soldering process, put the LEDs on materials whose conductivity is poor enough not to radiate heat of soldering.
- Properly solder tin wires before soldering them to LEDs.
- Avoid touching the silicone lens with the soldering iron.
- Please prevent flux from touching to the silicone lens.
- Please solder evenly on each pad.
- Contacts number of a soldering tip should be within twice for each pad.
- Next process of soldering should be carried out after the LEDs have return to ambient temperature.

*ProLight cannot guarantee if usage exceeds these recommended conditions.

Please use it after sufficient verification is carried out on your own risk if absolutely necessary.

Precaution for Use

- The modules light output are intense enough to cause injury to human eyes if viewed directly. Precautions must be taken to avoid looking directly at the modules with unprotected eyes.
- The modules are sensitive to electrostatic discharge. Appropriate ESD protection measures must be taken when working with the modules. Non-compliance with ESD protection measures may lead to damage or destruction of the product.
- Chemical solvents or cleaning agents must not be used to clean the modules. Mechanical stress on the Emitters must be avoided. It is best to use a soft brush, damp cloth or low-pressure compressed air.
- The products should be stored away from direct light in dry location.
- The appearance, specifications and flux bin of the product may be modified for improvement without notice. Please refer to the below website for the latest datasheets.
<http://www.prolightopto.com/>

Handling of Silicone Lens LEDs

Notes for handling of silicone lens LEDs

- Please do not use a force of over 0.3kgf impact or pressure on the silicone lens, otherwise it will cause a catastrophic failure.
- Avoid touching the silicone lens and the optical area of the COB Array especially by sharp tools such as Tweezers
- Avoid touching the silicone lens especially by sharp tools such as Tweezers.
- Avoid leaving fingerprints on the silicone lens.
- Please store the LEDs away from dusty areas or seal the product against dust.
- Please do not mold over the silicone lens with another resin. (epoxy, urethane, etc)

