ProLight Opto
Technology Corporation

ProLight PACG-110FxL-xCGP
110W COB Light-Engine LEDs
Technical Datasheet
Version: 1.3

Prolight Opto ® ProEngine Series

Features

·High flux density of lighting source
·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
·LED Bulb
·Ceiling lighting
·Spot lighting
·Down lighting

Introduction

·The input power is 110 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.

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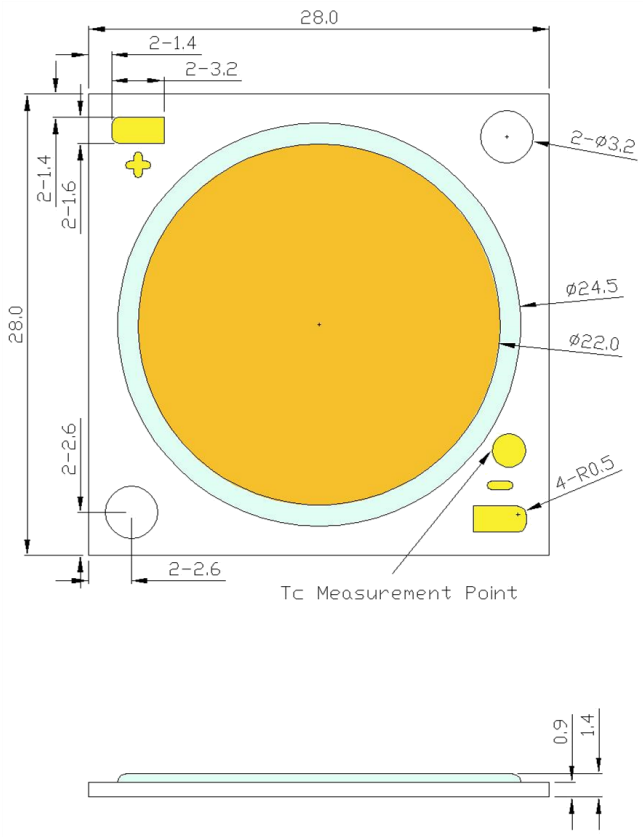
2015/10
DS-0376

Emitter 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 ± 0.30mm.
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.

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Flux Characteristics, T_C = 25°C

Radiation Pattern	Color	Part Number COB	DC Forward Current (mA)	Luminous Flux Φ_V (lm) Minimum	Luminous Flux Φ_V (lm) Typical	CRI Minimum
Lambertian	White	PACG-110FWL-BCGP	1440*	6850	7620	80
			2880	12140	13510	
	Neutral White	PACG-110FNL-BCGP	1440*	6730	7500	80
			2880	11930	13300	
	Warm White	PACG-110FVL-BCGP	1440*	6130	7150	80
			2880	10870	12670	
		PACG-110FVL-DCGP	1440*	5210	6080	90
			2880	9240	10770	

- The mark "*" indicated product is tested and binned at the specified drive current.
- ProLight maintains a tolerance of ± 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 1440mA, T_C = 25°C

Color	Forward Voltage V_F (V) Min.	Typ.	Max.	Thermal Resistance Junction to Board (°C/W)
White	33.7	36.0	38.3	0.39
Neutral White	33.7	36.0	38.3	0.39
Warm White	33.7	36.0	38.3	0.39

- ProLight maintains a tolerance of ± 1V for Voltage measurements.

Optical Characteristics at 1440mA, T_C = 25°C

Color	Bin Code	Color Temperature CCT Min.	Typ.	Max.	Total included Angle (degrees) $\theta_{0.90V}$	Viewing Angle (degrees) $2\theta_{1/2}$
White	V0	4740 K	5000 K	5310 K	160	120
Neutral White	S0	3900 K	4000 K	4070 K	160	120
Warm White	M0	2670 K	2700 K	2770 K	160	120
	NC	2890 K	2940 K	2990 K	160	120
	N0	2990 K	3000 K	3090 K	160	120

- ProLight maintains a tolerance of ± 5% for CCT measurements.

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Electro-Optical Characteristics, T_C = 25°C

I_F (mA)	V_F (V)	Power (W)	PACG-110FWL-BCGP		PACG-110FNL-BCGP	
			Flux (lm)	lm/W	Flux (lm)	lm/W
960	34.63	33.25	5303	159.5	5220	157.0
1440*	36.00	51.84	7620	147.0	7500	144.7
1920	37.23	71.48	9735	136.2	9582	134.0
2400	38.42	92.21	11715	127.0	11531	125.0
2880	39.53	113.84	13505	118.6	13293	116.8

I_F (mA)	V_F (V)	Power (W)	PACG-110FVL-BCGP		PACG-110FVL-DCGP	
			Flux (lm)	lm/W	Flux (lm)	lm/W
960	34.63	33.25	4976	149.7	4231	127.3
1440*	36.00	51.84	7150	137.9	6080	117.3
1920	37.23	71.48	9134	127.8	7767	108.7
2400	38.42	92.21	10993	119.2	9348	101.4
2880	39.53	113.84	12672	111.3	10776	94.7

- All values are reference only.

Absolute Maximum Ratings

Parameter	White/Neutral White/Warm White
Max DC Forward Current (mA)	2880
Peak Pulsed Forward Current (mA)	4320 (less than 1/10 duty cycle@1KHz)
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	±2000V
LED Junction Temperature	120°C
Operating Board Temperature at Maximum DC Forward Current	-40°C - 90°C
Storage Temperature	-40°C - 120°C
Reverse Voltage	Not designed to be driven in reverse bias

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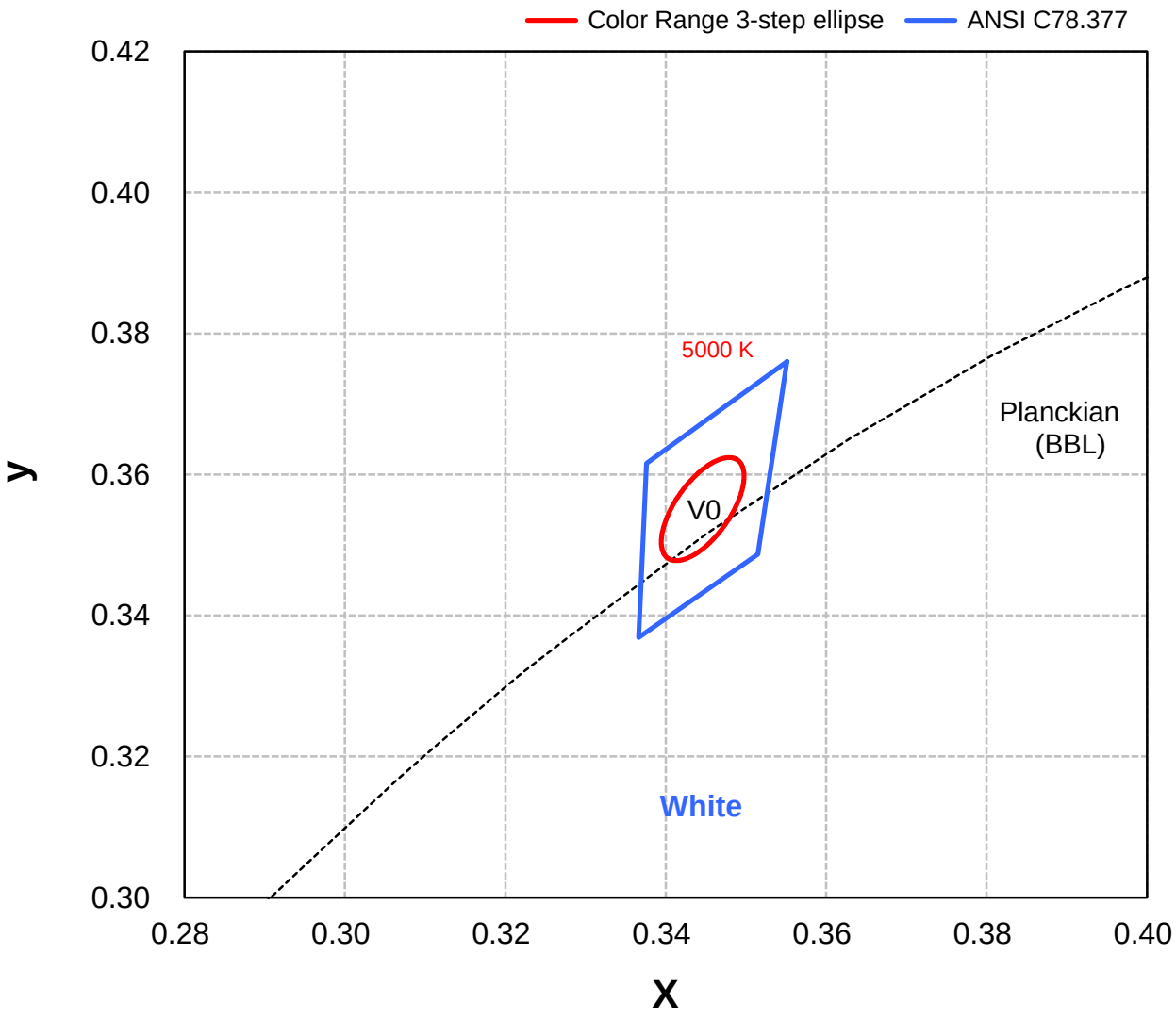
Color Bin

White Binning Structure Graphical Representation



White Bin Structure

Bin Code		Center	Oval parameter		Typ. CCT (K)
V0	x	0.3447	a	0.00822	5000
	y	0.3553	b	0.00354	
			θ°	59.62	

- 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

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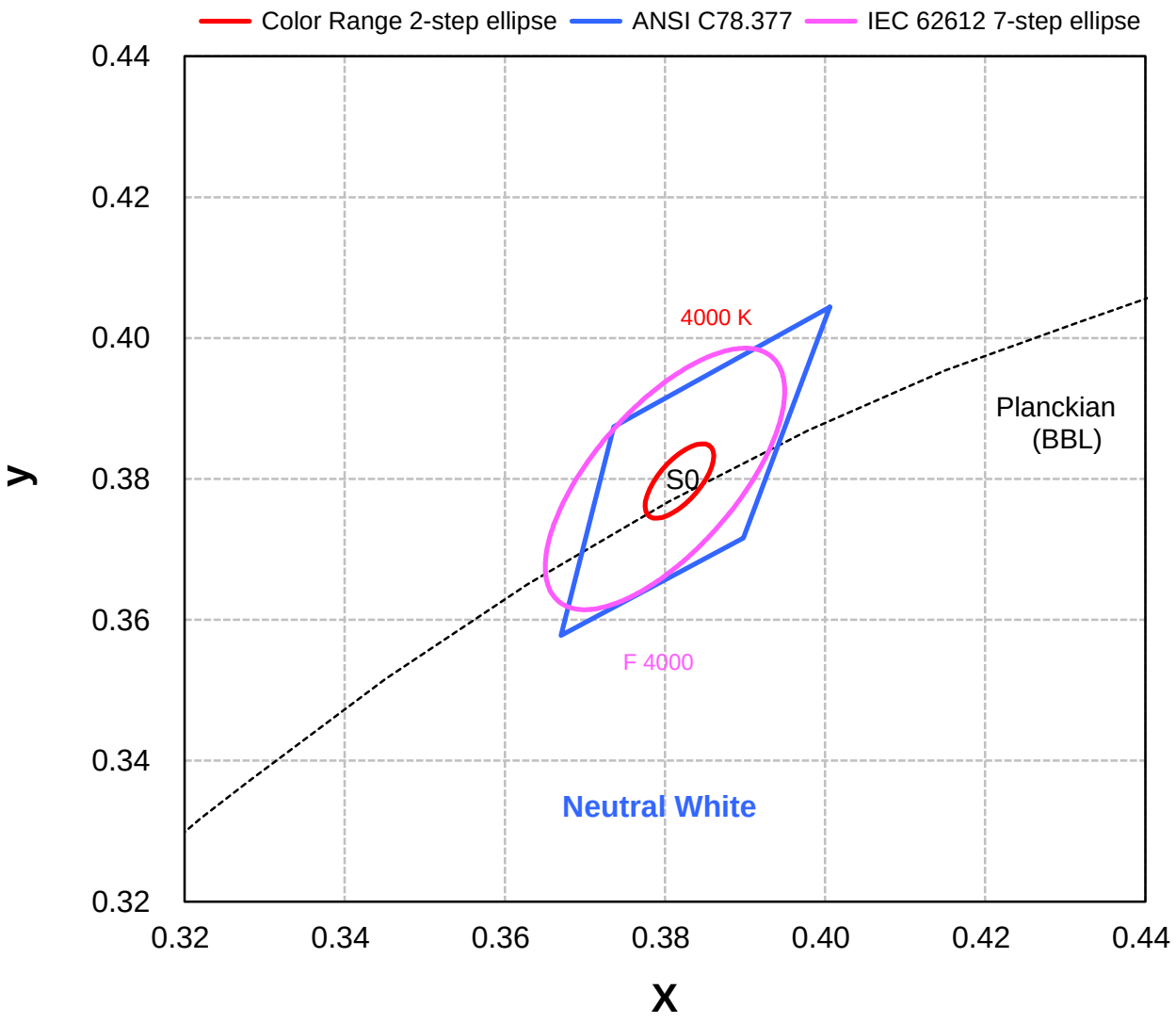
Color Bin

Neutral White Binning Structure Graphical Representation



Neutral White Bin Structure

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

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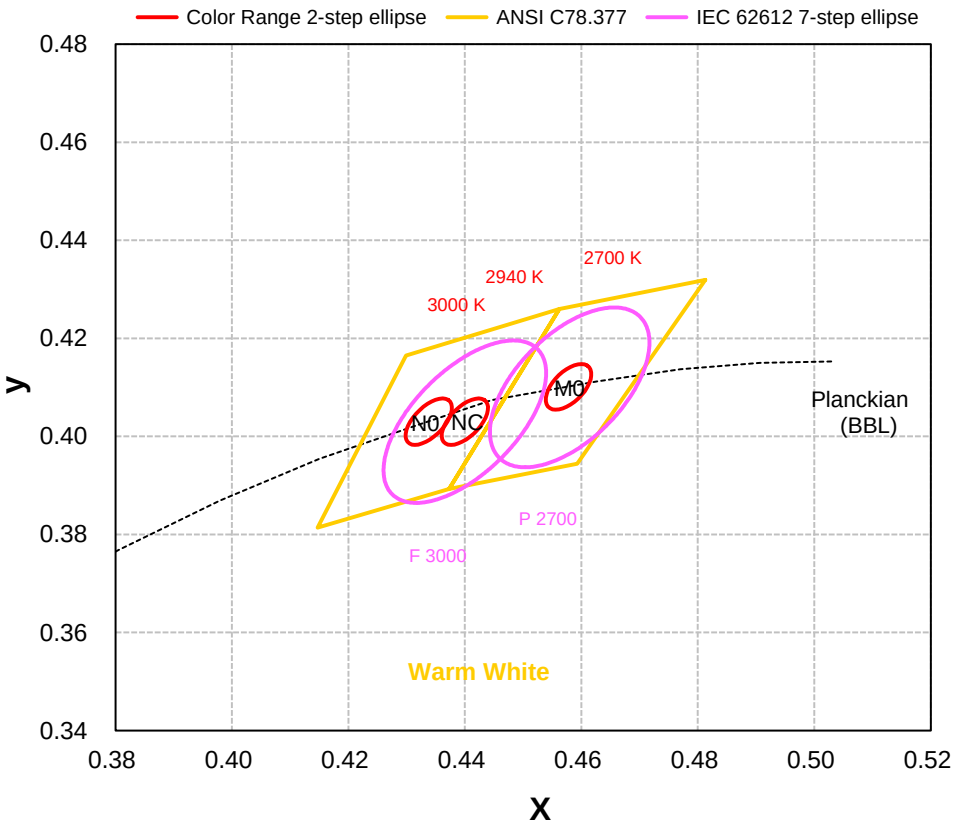
Color Bin

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)
M0	x	0.4578	a	0.0054	2700	N0	x	0.4338	a	0.00556	3000
	y	0.4101	b	0.0028			y	0.4030	b	0.00272	
			ϴ°	53.70					ϴ°	53.22	

- 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

Bin Code		Center	Oval parameter		Typ. CCT (K)
NC	x	0.4400	a	0.00556	2940
	y	0.4030	b	0.00272	
			ϴ°	53.02	

- Color range stay within MacAdam “2-step” ellipse from the chromaticity center.
- The chromaticity center refers to IEC 62612.
- Tolerance on each color bin (x , y) is ± 0.005

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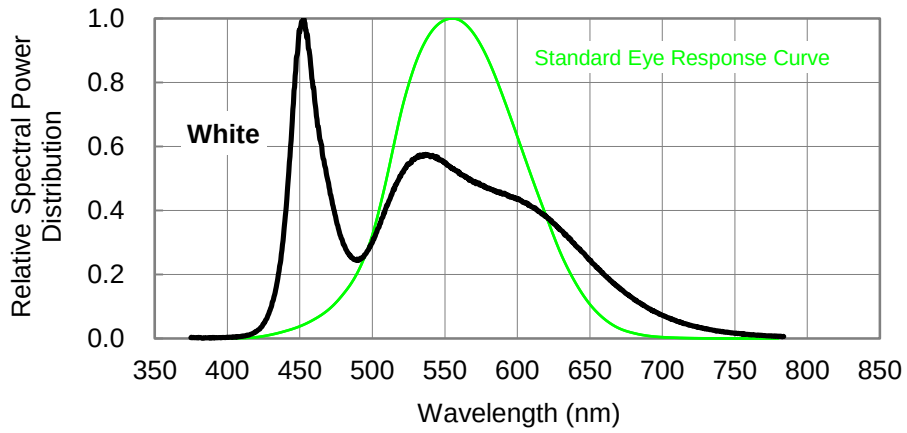
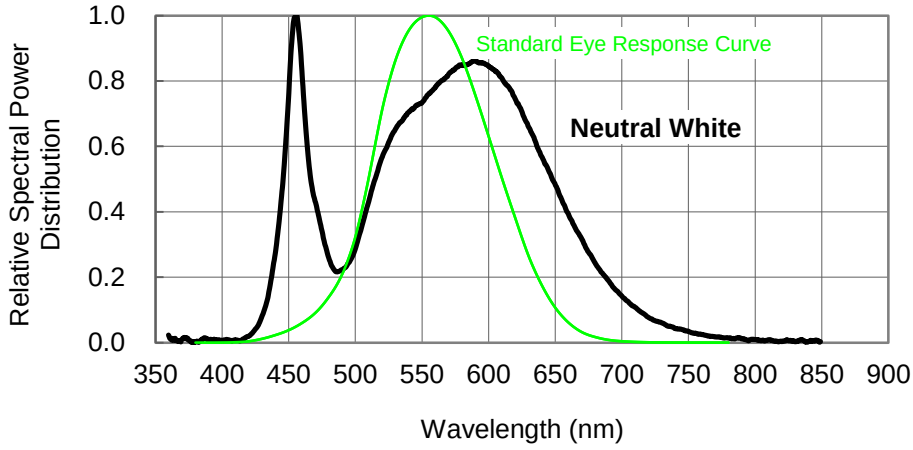
Color Spectrum, T_C = 25°C

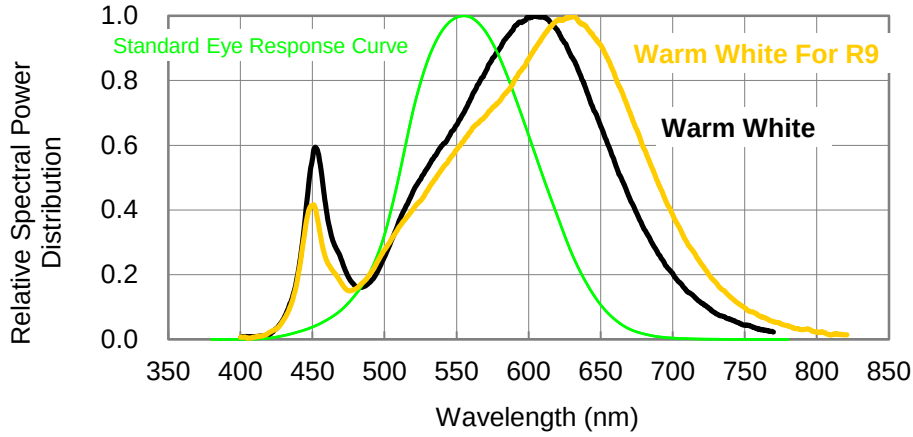
1. White



2. Neutral White



3. Warm White



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Case Temperature Relative Characteristics

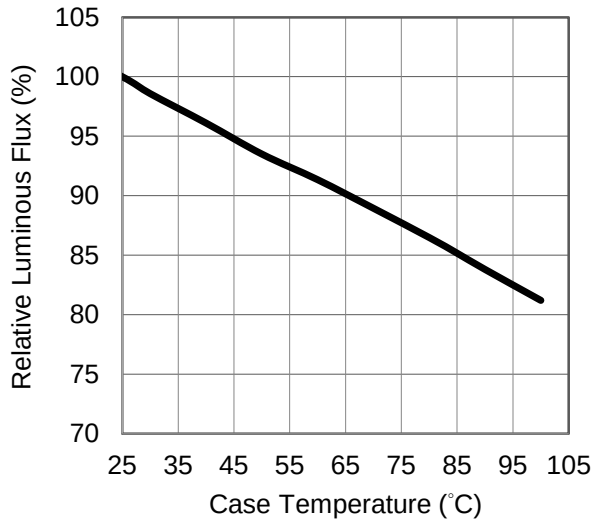

Fig 1. Case Temperature vs. Relative Luminous Flux at 1440mA.

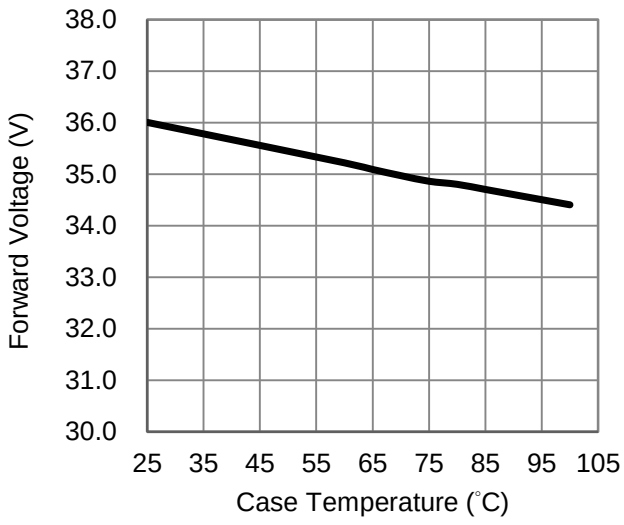

Fig 2. Case Temperature vs. Forward Voltage at 1440mA.

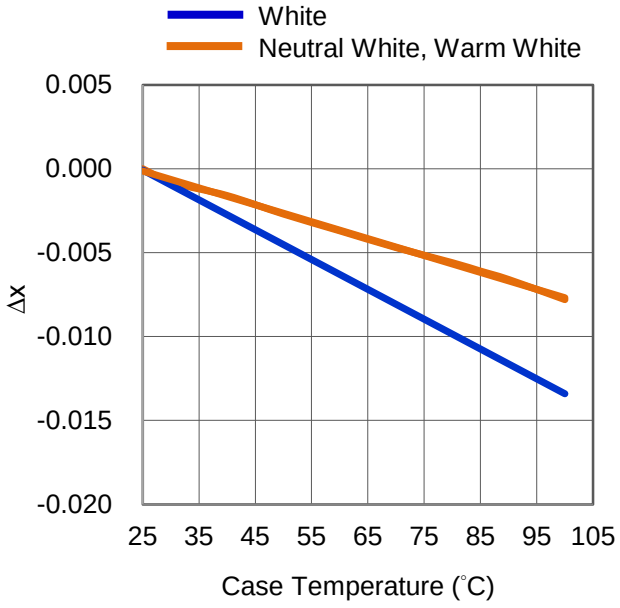

Fig 3. Case Temperature vs. Chromaticity Coordinate Δx at 1440mA.

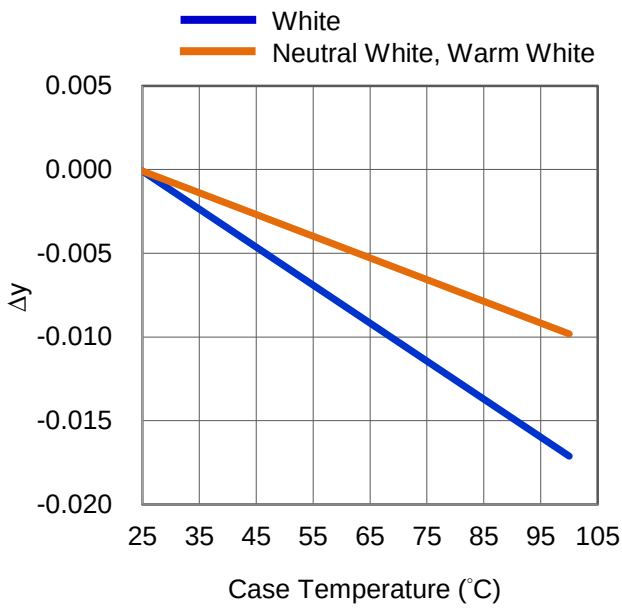

Fig 4. Case Temperature vs. Chromaticity Coordinate Δy at 1440mA.

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Forward Current Relative Characteristics

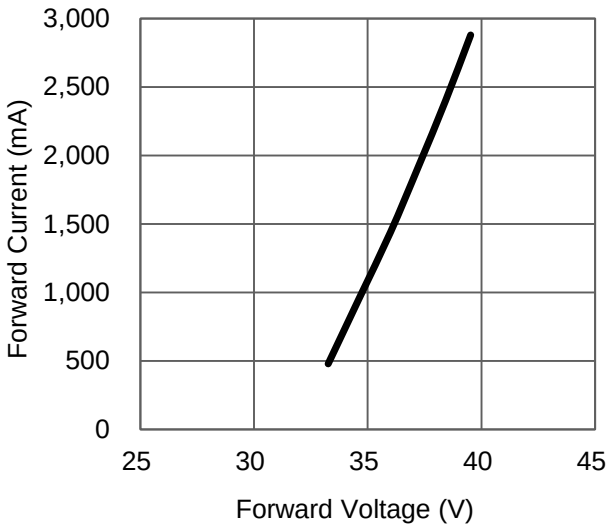

Fig 5. Forward Current vs. Forward Voltage at T_C=25°C.

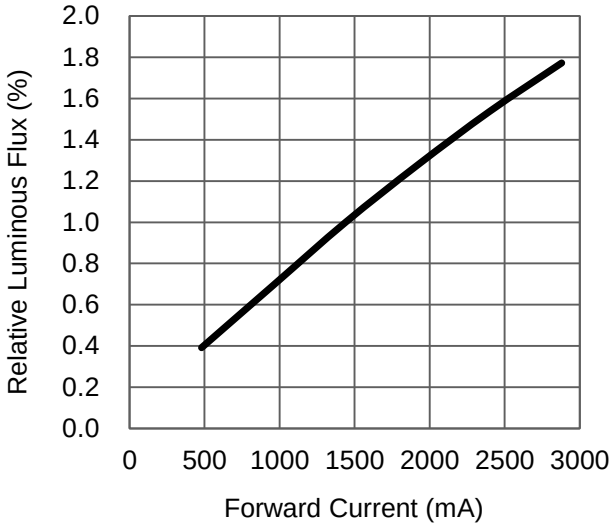

Fig 6. Forward Current vs. Relative Luminous Flux at T_C=25°C.

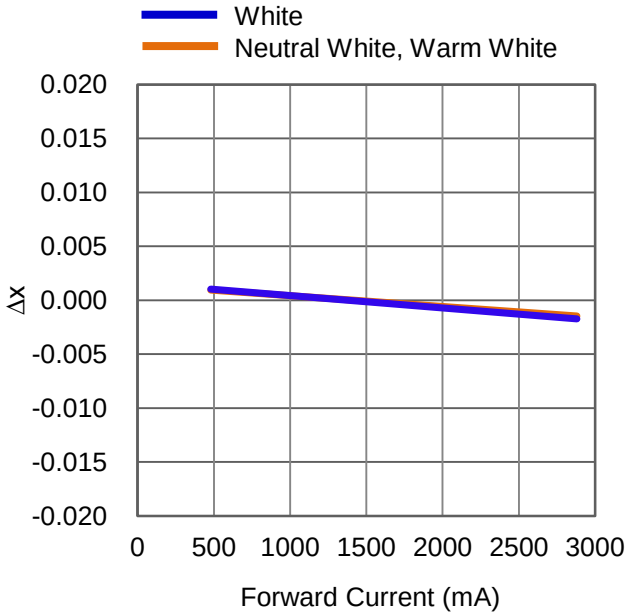

Fig 7. Forward Current vs. Chromaticity Coordinate Δx at T_C=25°C.

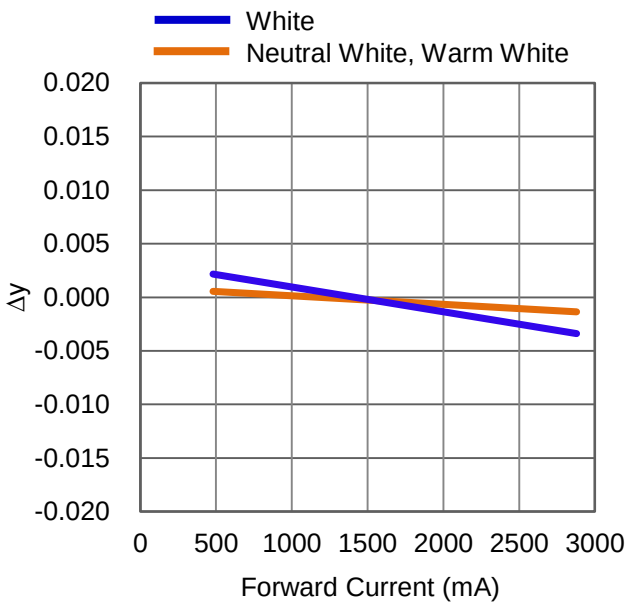

Fig 8. Forward Current vs. Chromaticity Coordinate Δy at T_C=25°C.

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Case Temperature vs. Junction Temperature Characteristics

T_C (°C)	T_J (°C)	
	1440 (mA)	2880 (mA)
0	20	44
5	25	49
10	30	54
15	35	59
20	40	64
25	45	69
30	50	74
35	55	79
40	60	84
45	65	89
50	70	94
55	75	99
60	80	104
65	85	109
70	90	114
75	95	119
80	100	124

Fig 9. Case Temperature vs. Junction Temperature at 1440、2880mA.

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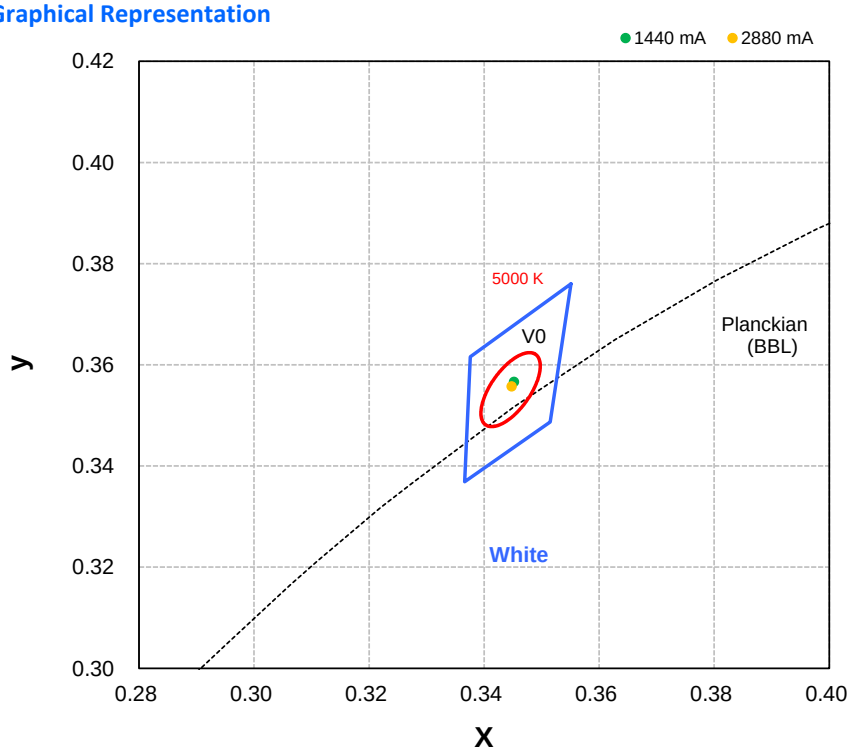
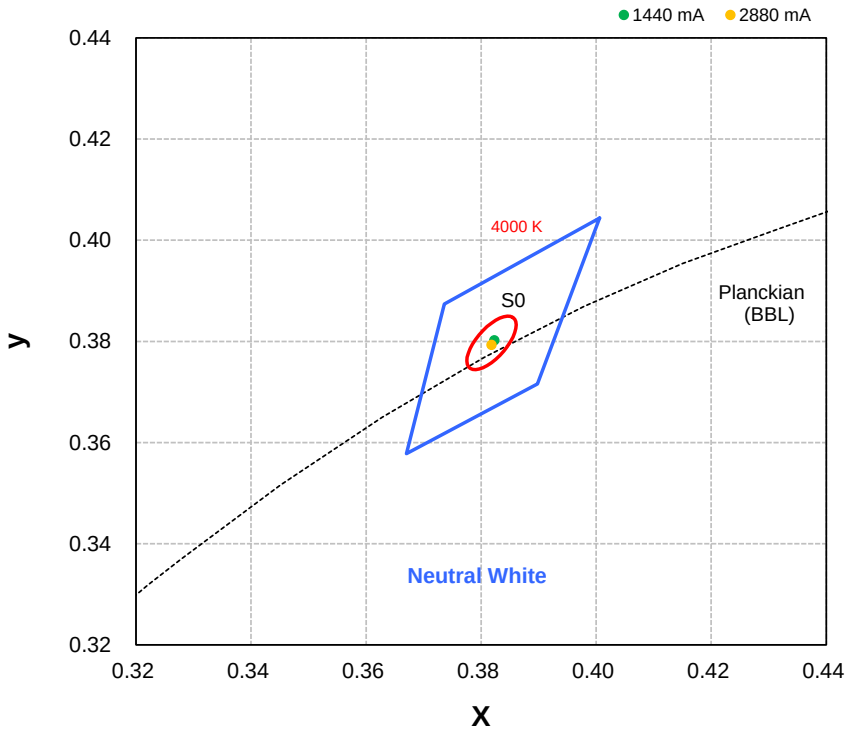
Color Coordinate vs. Forward Current, T_C = 25°C

White Binning Graphical Representation



Neutral White Binning Graphical Representation



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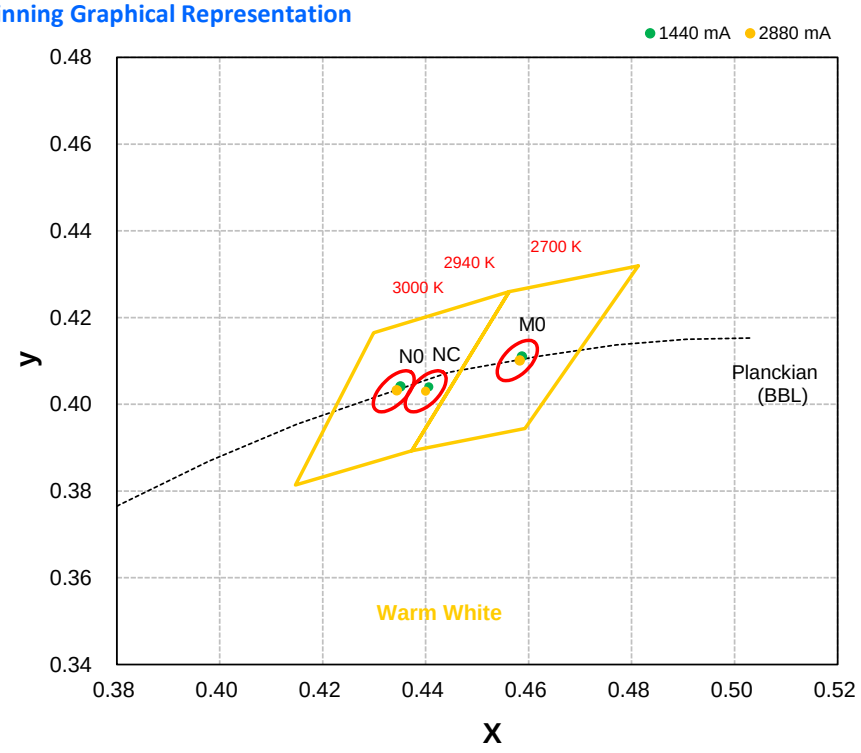
Color Coordinate vs. Forward Current, T_C = 25°C

Warm White Binning Graphical Representation



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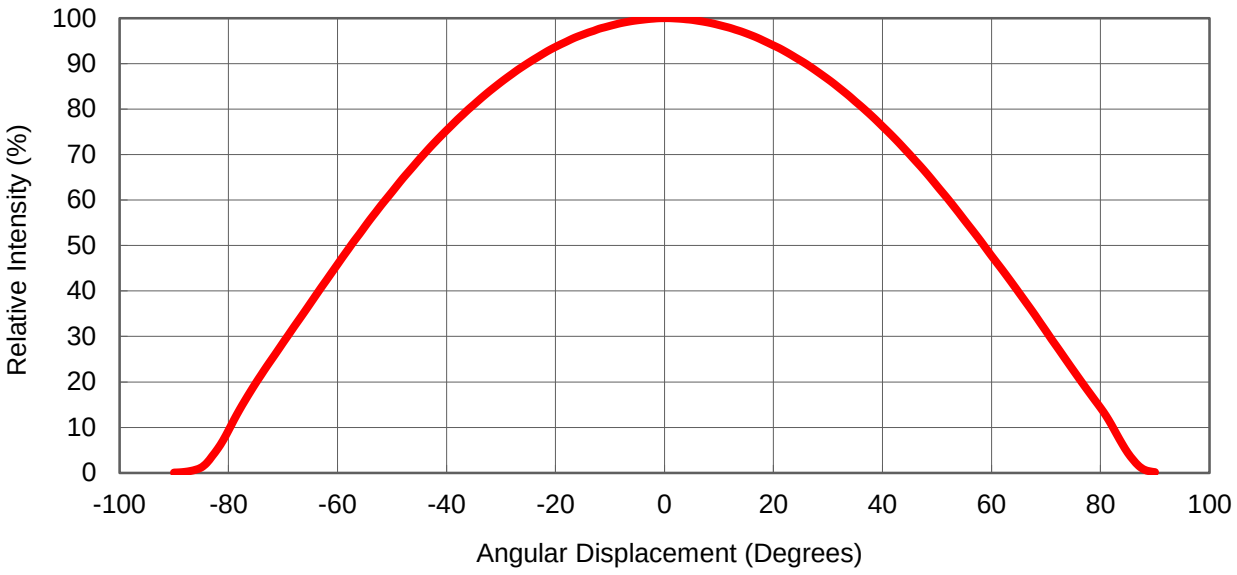
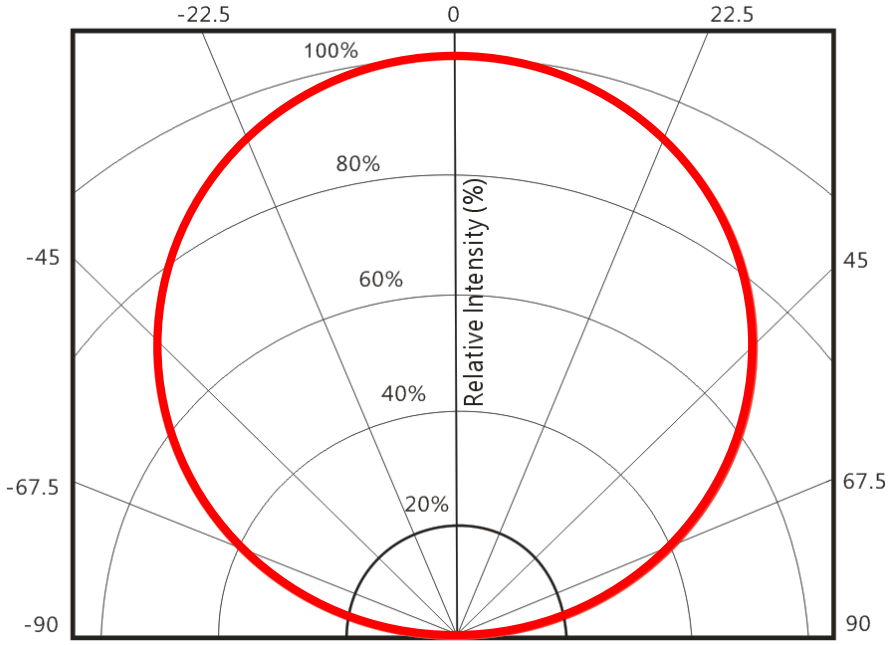
Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern



Polar Radiation Pattern



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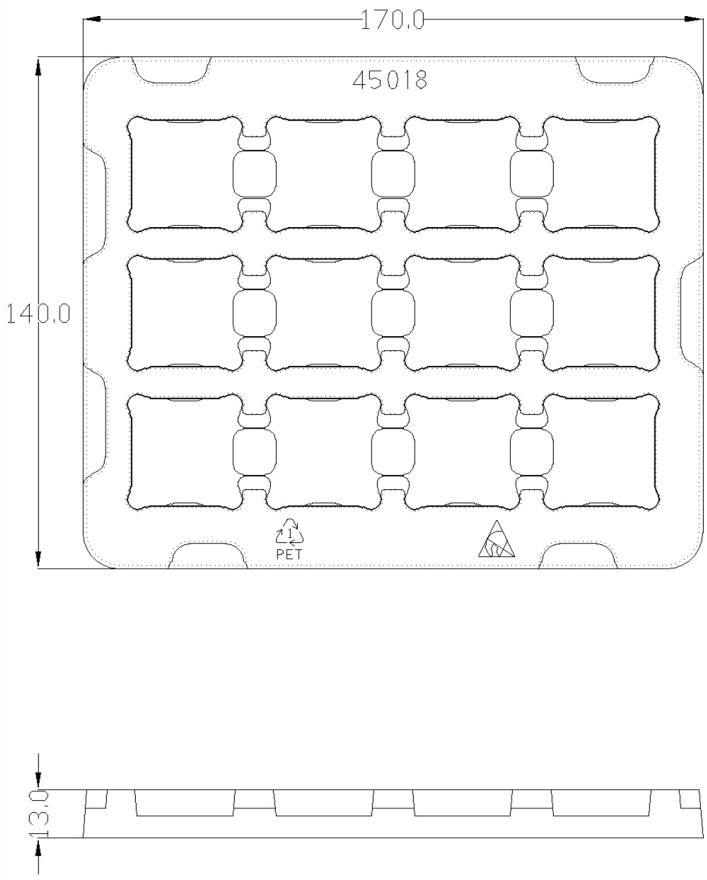
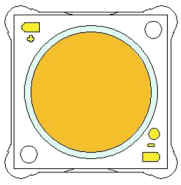
Packing Specifications





Product 12 pcs/tray

Notes:
1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.20mm.

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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.

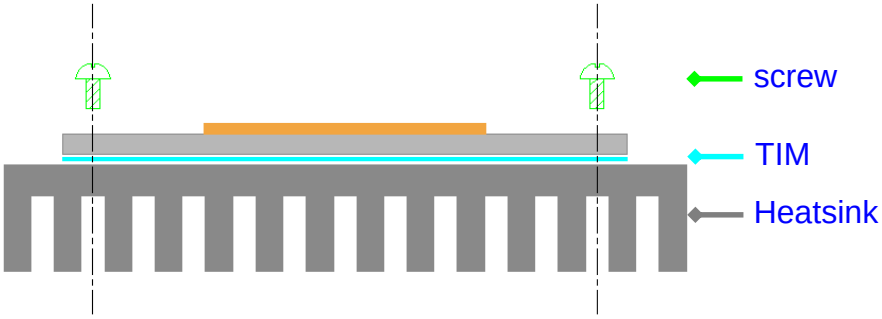

Fig 10. Reference assembly as fixing with screws

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.

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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 ℃, 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.

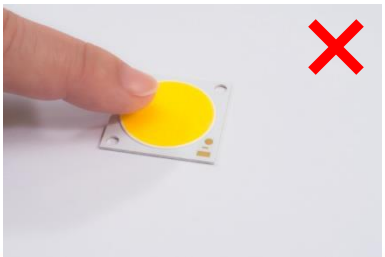
Precaution for Use

- 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)



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