ProLight Opto Technology Corporation

ProLight PACL-86FxL-xCCN
86W COB Light-Engine LEDs
Technical Datasheet
Version: 1.0

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

·Stadium light
·Street light
·High Bay
·Spot light
·Flood light
·Low Bay

Introduction

·The input power is 86 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 High Bay, typical applications include, Flood light, Spot light, Stadium light, Low Bay and Street light.

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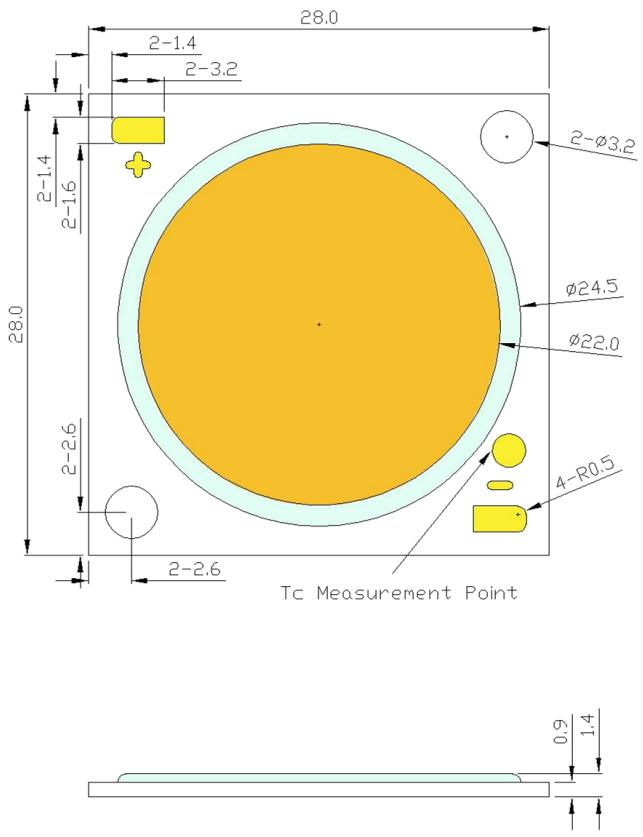
2017/05
DS-0742

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) Min.	Luminous Flux Φ_V (lm) Typ.	CRI Min.	R9 Min.
Lambertian	White	PACL-86FWL-ACCN	1080*	5385	6290	70	-
			2160	9530	11130		
	Neutral White	PACL-86FNL-ACCN	1080*	5295	6180	70	-
			2160	9370	10940		
	Warm White	PACL-86FVL-ACCN	1080*	5085	5935	70	-
			2160	9000	10505		
	White	PACL-86FWL-BCCN	1080*	5275	6160	80	0
			2160	9335	10900		
	Neutral White	PACL-86FNL-BCCN	1080*	5190	6060	80	0
			2160	9185	10725		
	Warm White	PACL-86FVL-BCCN	1080*	4980	5815	80	0
			2160	8815	10290		
	White	PACL-86FWL-DCCN	1080*	4640	5420	90	50
			2160	8165	9540		
	Neutral White	PACL-86FNL-DCCN	1080*	4565	5335	90	50
			2160	8035	9390		
	Warm White	PACL-86FVL-DCCN	1080*	4380	5115	90	50
			2160	7710	9000		
	Neutral White	PACL-86FNL-ECCN	1080*	4015	4690	95	90
			2160	7065	8255		
	Warm White	PACL-86FVL-ECCN	1080*	3855	4505	95	90
			2160	6785	7930		

- 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.

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Electrical Characteristics at 1080mA, 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	0.35
Neutral White	33.7	36.0	38.3	0.35
Warm White	33.7	36.0	38.3	0.35

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

Optical Characteristics at 1080mA, 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
	W0	5310 K	5700 K	6010 K	160	120
	X0	6020 K	6500 K	7030 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
	N0	2990 K	3000 K	3090 K	160	120
	Q0	3380 K	3500 K	3550 K	160	120

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

Supply Specifications

Part Number	CRI	Color Bin Code V0	W0	X0	S0	M0	N0	Q0
PACL-86FxL-ACCN	70	V			V	V		
PACL-86FxL-BCCN	80	V	V	V	V	V	V	V
PACL-86FxL-DCCN	90	V			V	V	V	V
PACL-86FxL-ECCN	95				V	V	V	

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Electro-Optical Characteristics, T_C = 25°C

I_F (mA)	V_F (V)	Power (W)	PACL-86FWL-ACCN		PACL-86FNL-ACCN		PACL-86FVL-ACCN	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
720	34.63	24.93	4677	187.6	4593	184.2	4412	176.9
1080*	36.00	38.88	6290	161.8	6180	159.0	5935	152.6
1440	37.23	53.61	7903	147.4	7767	144.9	7458	139.1
1800	38.42	69.16	9517	137.6	9353	135.2	8982	129.9
2160	39.53	85.38	11130	130.4	10940	128.1	10505	123.0

I_F (mA)	V_F (V)	Power (W)	PACL-86FWL-BCCN		PACL-86FNL-BCCN		PACL-86FVL-BCCN	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
720	34.63	24.93	4580	183.7	4505	180.7	4323	173.4
1080*	36.00	38.88	6160	158.4	6060	155.9	5815	149.6
1440	37.23	53.61	7740	144.4	7615	142.0	7307	136.3
1800	38.42	69.16	9320	134.8	9170	132.6	8798	127.2
2160	39.53	85.38	10900	127.7	10725	125.6	10290	120.5

I_F (mA)	V_F (V)	Power (W)	PACL-86FWL-DCCN		PACL-86FNL-DCCN		PACL-86FVL-DCCN	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
720	34.63	24.93	4047	162.3	3983	159.8	3820	153.2
1080*	36.00	38.88	5420	139.4	5335	137.2	5115	131.6
1440	37.23	53.61	6793	126.7	6687	124.7	6410	119.6
1800	38.42	69.16	8167	118.1	8038	116.2	7705	111.4
2160	39.53	85.38	9540	111.7	9390	110.0	9000	105.4

I_F (mA)	V_F (V)	Power (W)	PACL-86FNL-ECCN		PACL-86FVL-ECCN	
			Flux (lm)	lm/W	Flux (lm)	lm/W
720	34.63	24.93	3502	140.4	3363	134.9
1080*	36.00	38.88	4690	120.6	4505	115.9
1440	37.23	53.61	5878	109.6	5647	105.3
1800	38.42	69.16	7067	102.2	6788	98.2
2160	39.53	85.38	8255	96.7	7930	92.9

- All values are reference only.

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Absolute Maximum Ratings

Parameter	White/Neutral White/Warm White
Max DC Forward Current (mA)	2160
Max Voltage at 2160mA	42
Peak Pulsed Forward Current (mA)	3240 (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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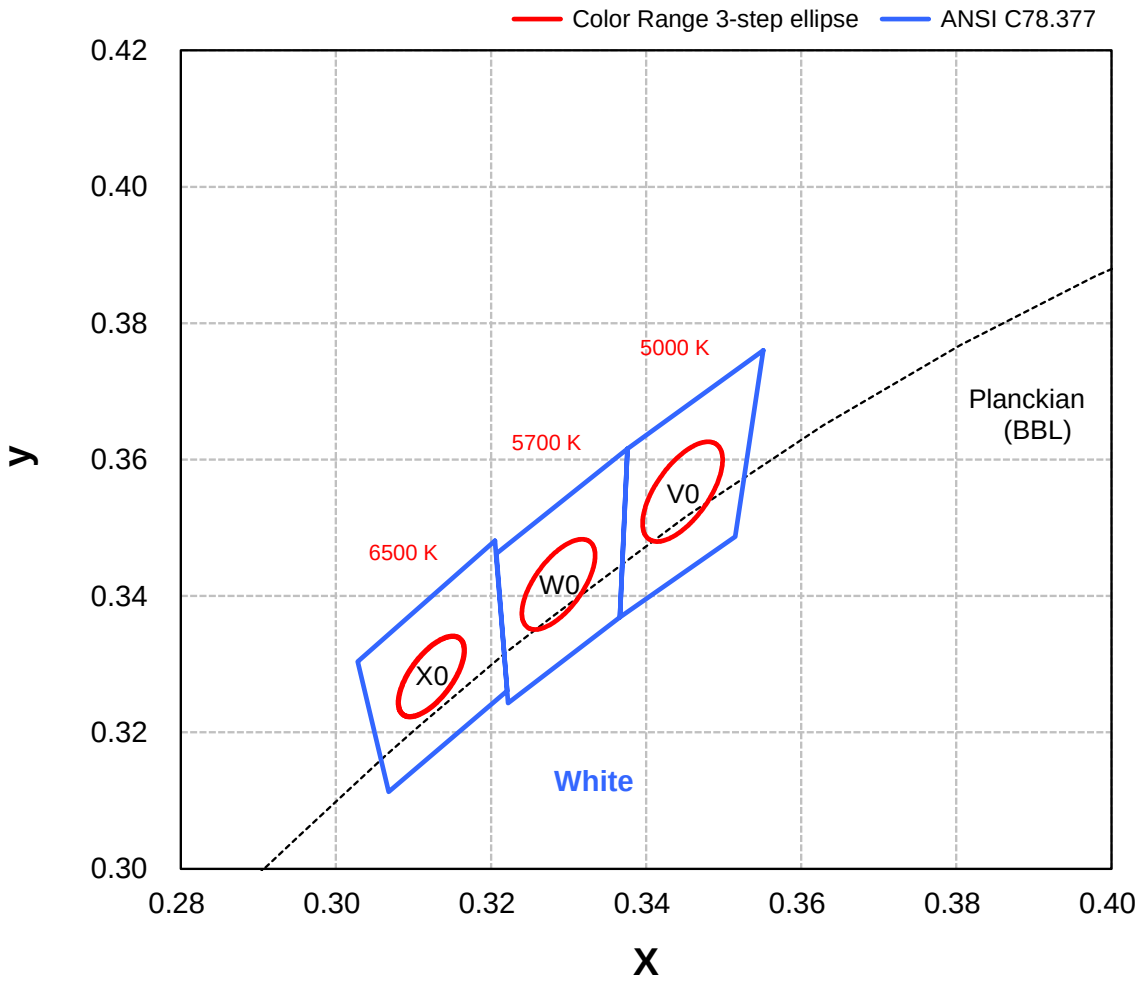
Color Bin

White Binning Structure Graphical Representation



White Bin Structure

Bin Code		Center	Oval parameter		Typ. CCT (K)	Bin Code		Center	Oval parameter		Typ. CCT (K)
V0	x	0.3447	a	0.00822	5000	X0	x	0.3123	a	0.00669	6500
	y	0.3553	b	0.00354			y	0.3282	B	0.00285	
			θ°	59.62					θ°	58.57	
W0	x	0.3287	a	0.00747	5700						
	y	0.3417	B	0.00321							
			θ°	59.09							

- 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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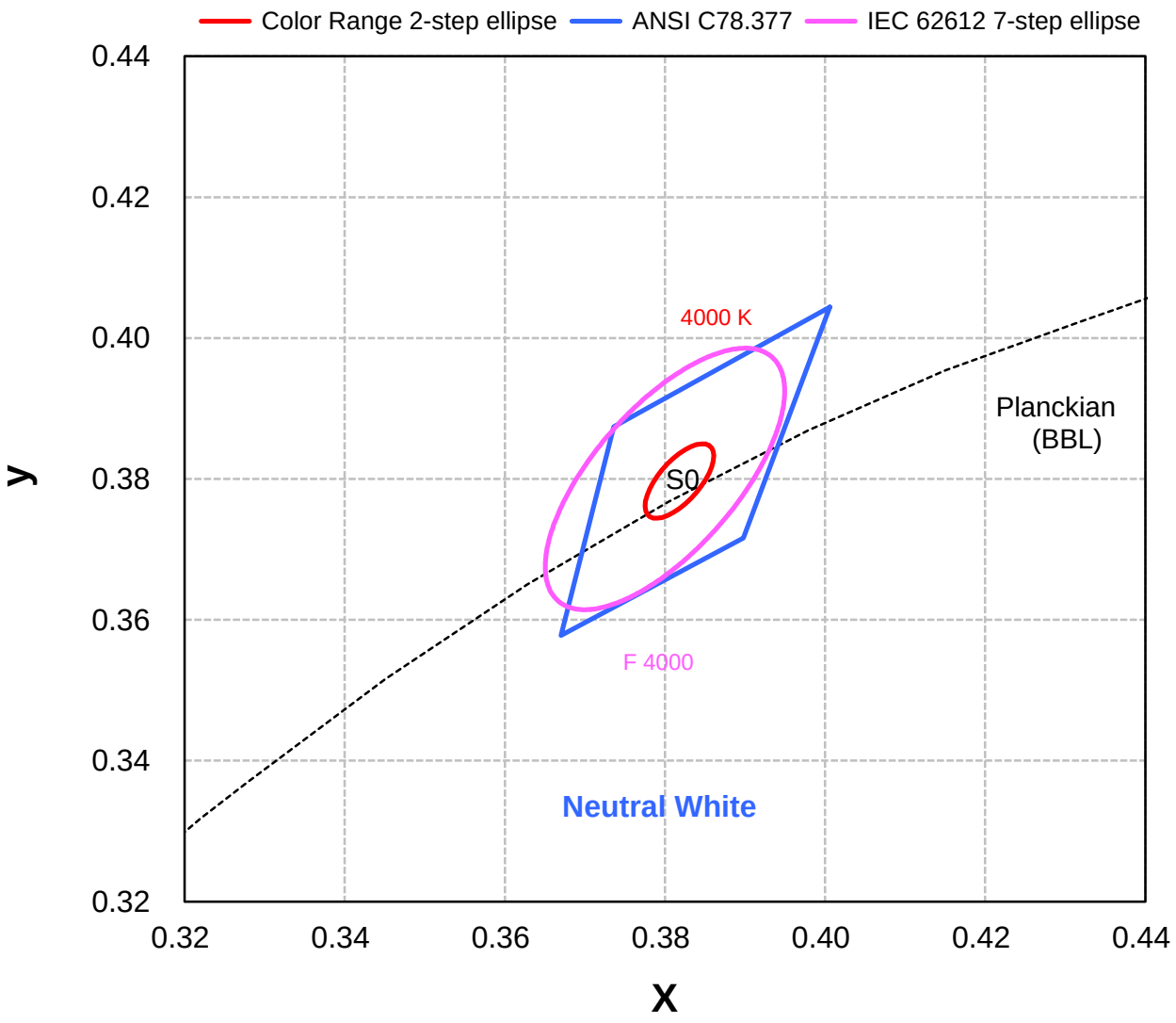
Color Bin

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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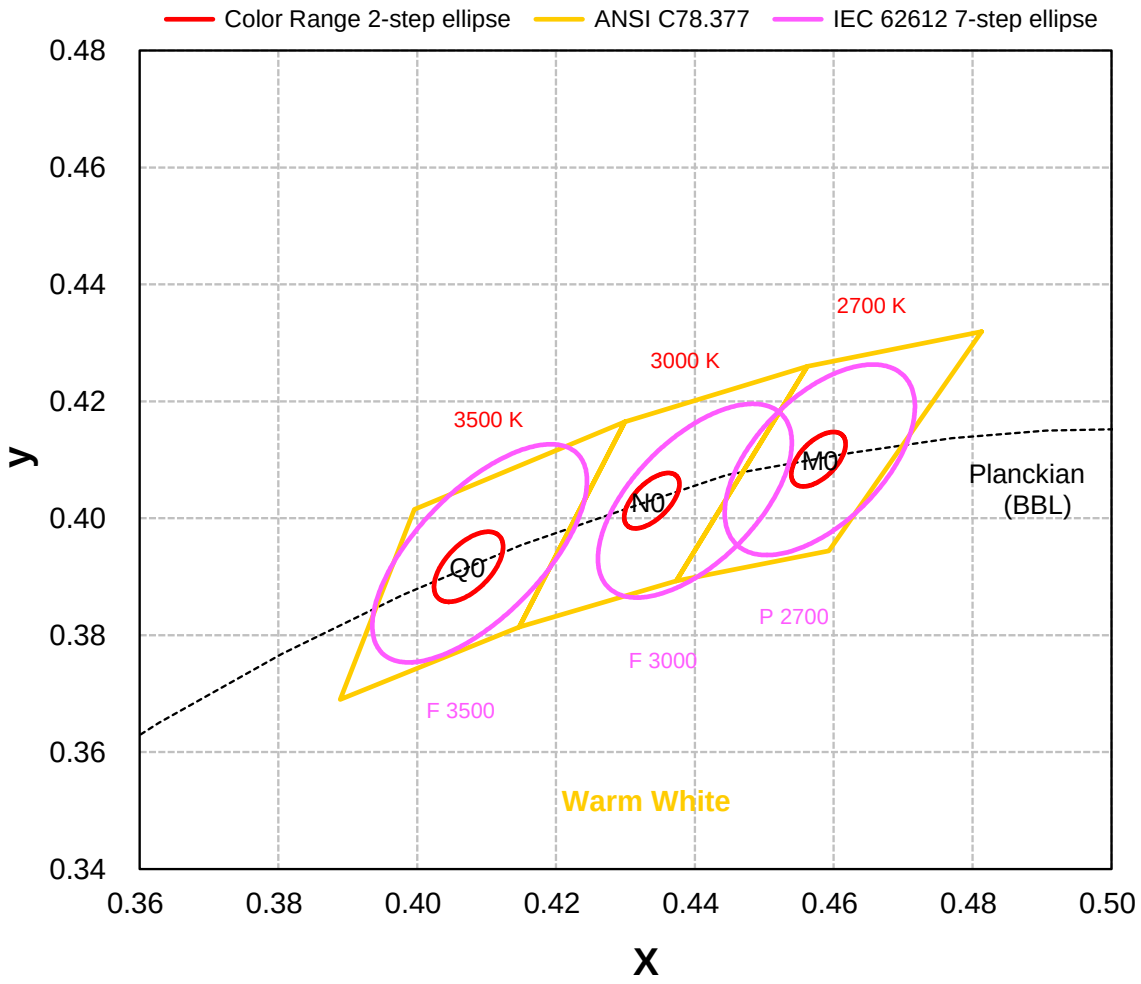
Color Bin

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	Q0	x	0.4074	a	0.00695	3500
	y	0.4101	b	0.0028			y	0.3917	b	0.00352	
			ɵ°	53.70					ɵ°	54.09	
N0	x	0.4338	a	0.00556	3000						
	y	0.4030	b	0.00272							
			ɵ°	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

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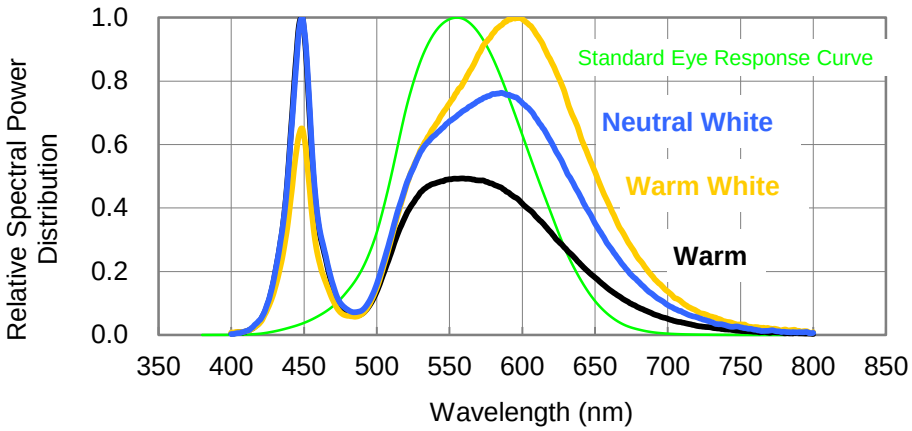
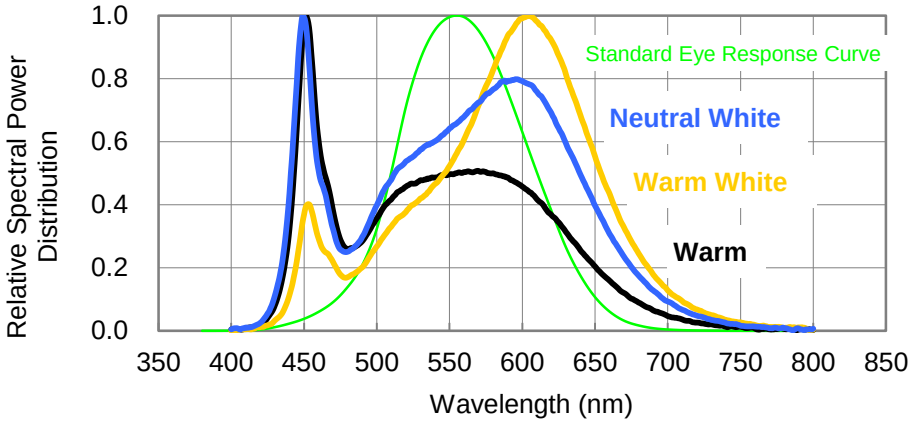
Color Spectrum, T_C = 25°C

1. PACL-86FWL-ACCN、PACL-86FNL-ACCN、PACL-86FVL-ACCN



2. PACL-86FWL-BCCN、PACL-86FNL-BCCN、 PACL-86FVL-BCCN



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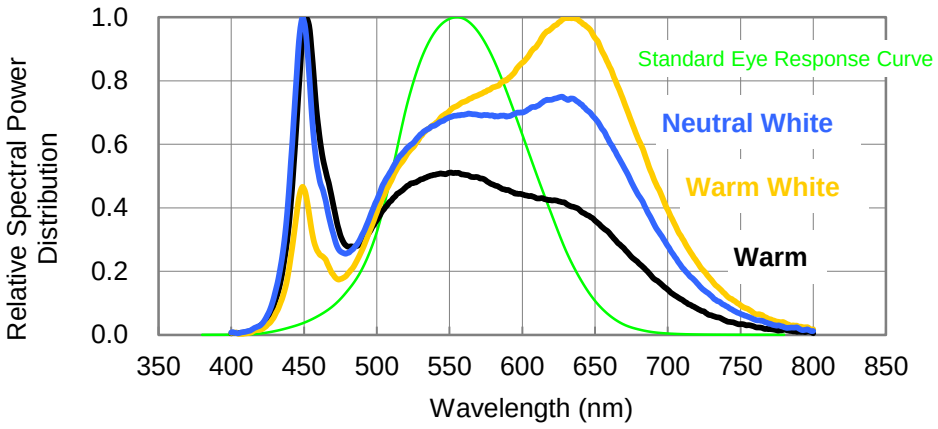
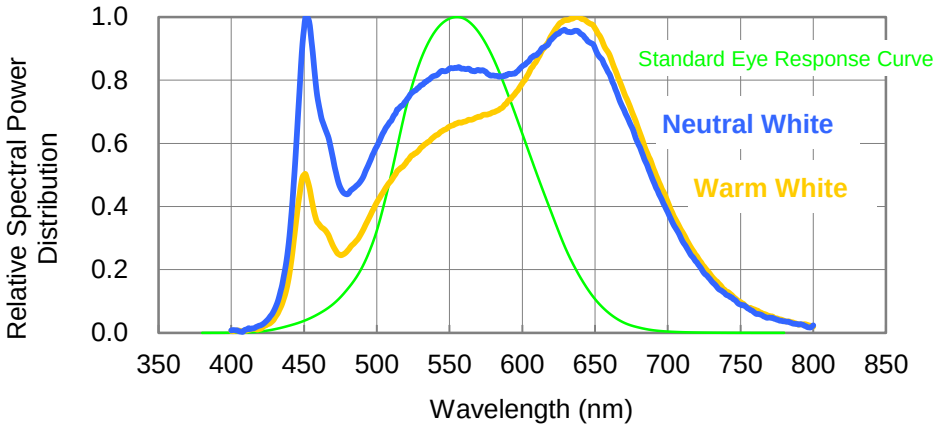
Color Spectrum, T_C = 25°C

3. PACL-86FWL-DCCN、PACL-86FNL-DCCN、PACL-86FVL-DCCN



4. PACL-86FNL-ECCN、 PACL-86FVL-ECCN



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Case Temperature Relative Characteristics

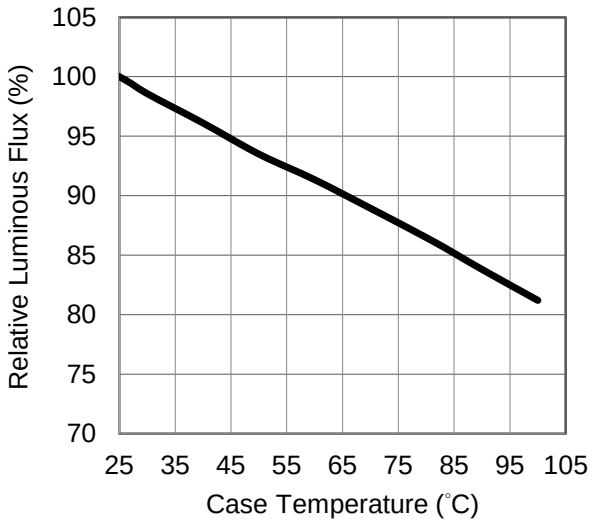

Fig 1. Case Temperature vs. Relative Luminous Flux at 1080mA.

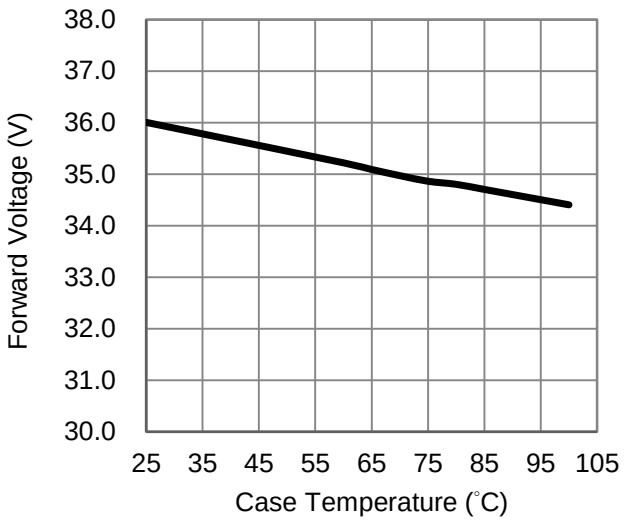

Fig 2. Case Temperature vs. Forward Voltage at 1080mA.

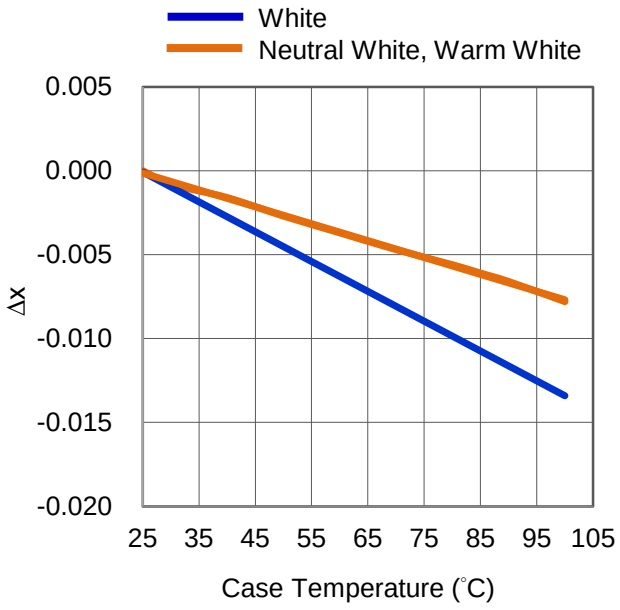

Fig 3. Case Temperature vs. Chromaticity Coordinate Δx at 1080mA.

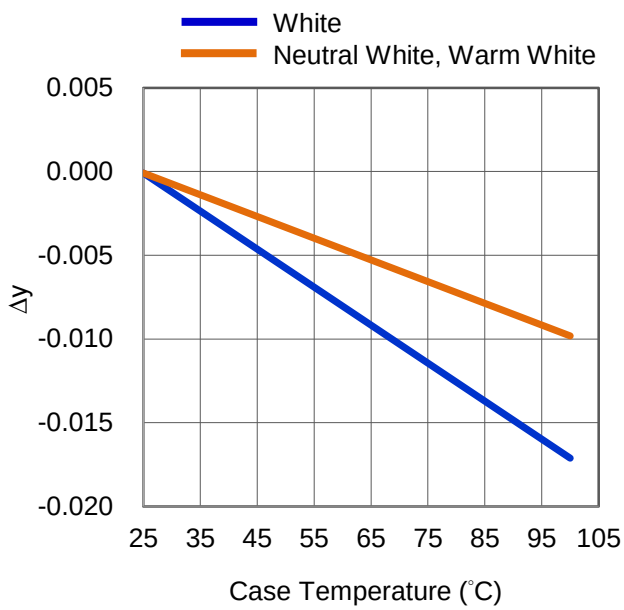

Fig 4. Case Temperature vs. Chromaticity Coordinate Δy at 1080mA.

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Forward Current Relative Characteristics

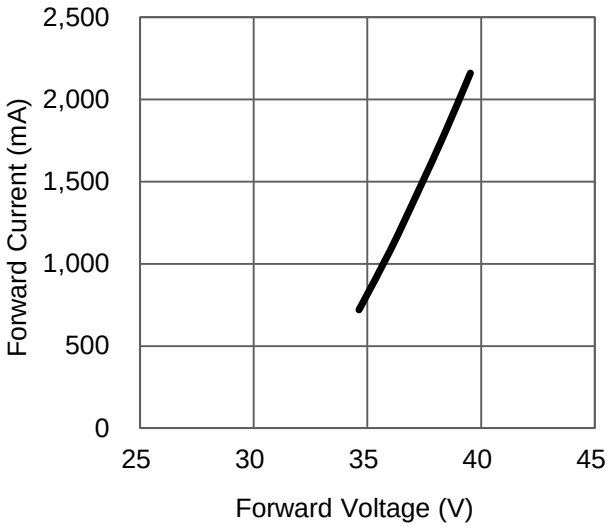

Fig 5. Forward Current vs. Forward Voltage at T_C=25°C.

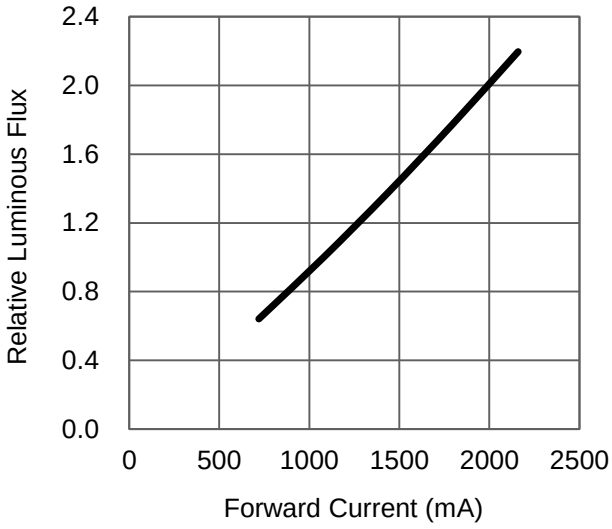

Fig 6. Forward Current vs. Relative Luminous Flux at T_C=25°C.

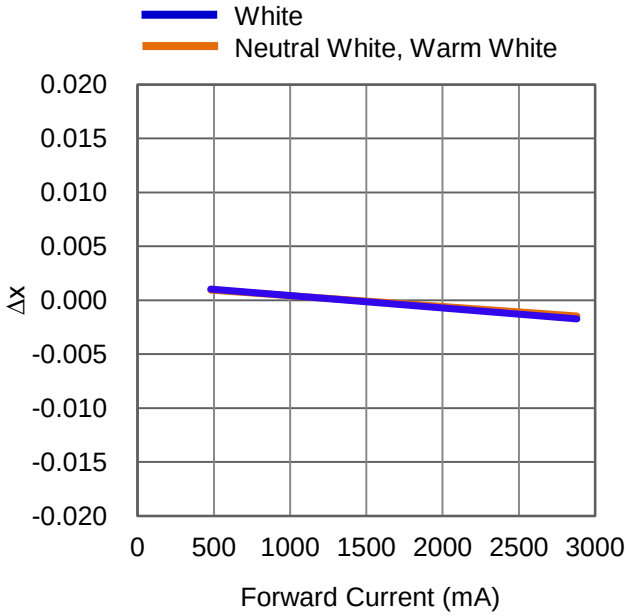

Fig 7. Forward Current vs. Chromaticity Coordinate Δx at T_C=25°C.

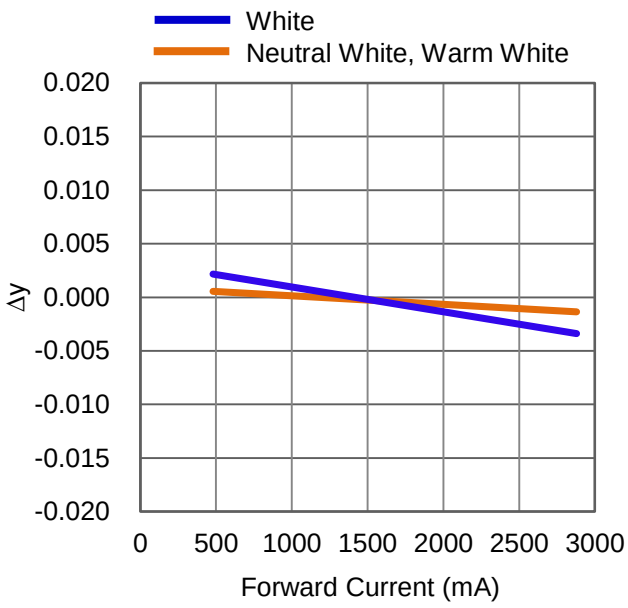

Fig 8. Forward Current vs. Chromaticity Coordinate Δy at T_C=25°C.

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Case Temperature vs. Junction Temperature Characteristics

T_C (°C)	T_J (°C)	
	1080 (mA)	2160 (mA)
0	15	30
10	25	40
20	35	50
30	45	60
40	55	70
50	65	80
60	75	90
70	85	100
80	95	110
90	105	120

Fig 9. Case Temperature vs. Junction Temperature at 1080、2160mA.

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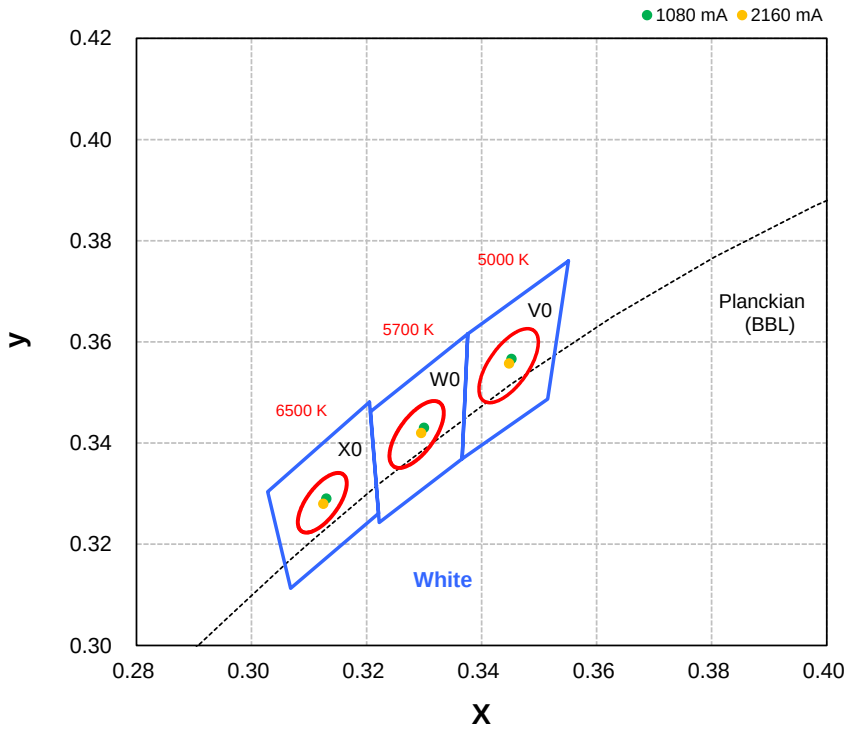
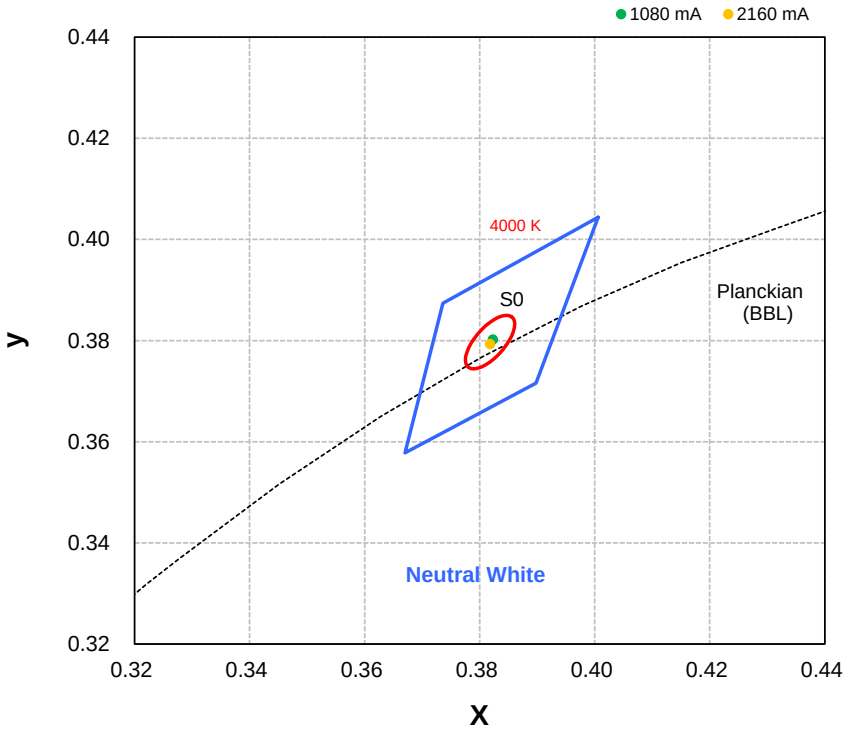
Color Coordinate vs. Forward Current, T_C = 25°C

White Binning Graphical Representation



Neutral White Binning Graphical Representation



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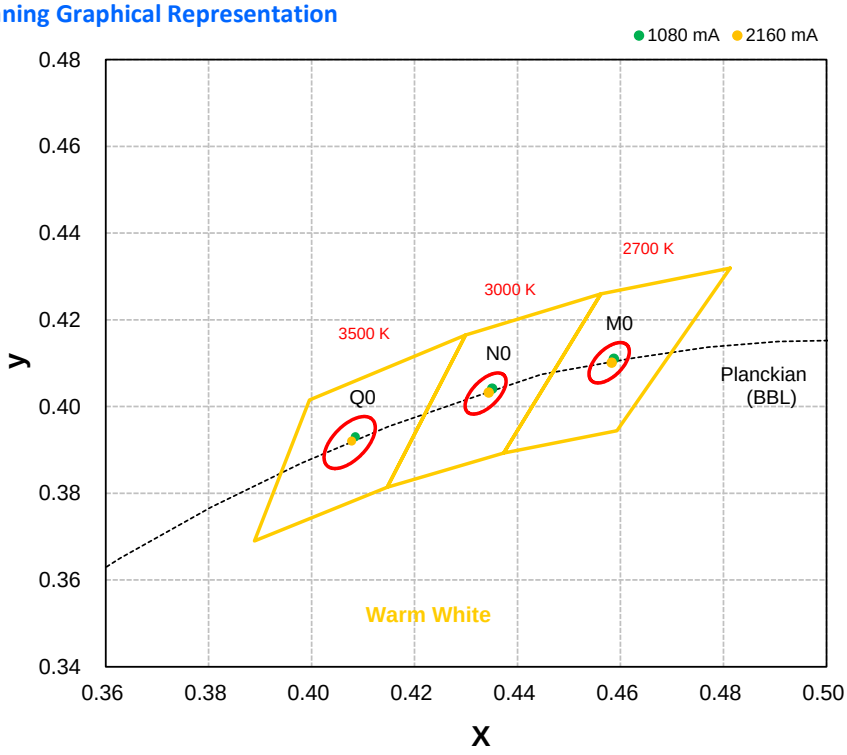
Color Coordinate vs. Forward Current, T_C = 25°C

Warm White Binning Graphical Representation



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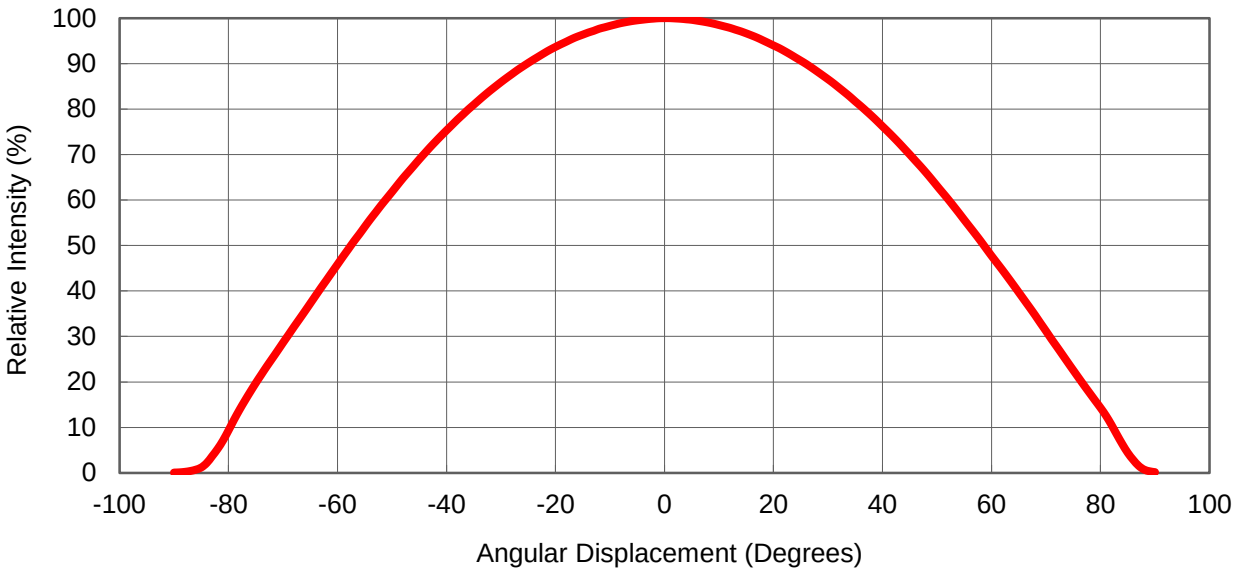
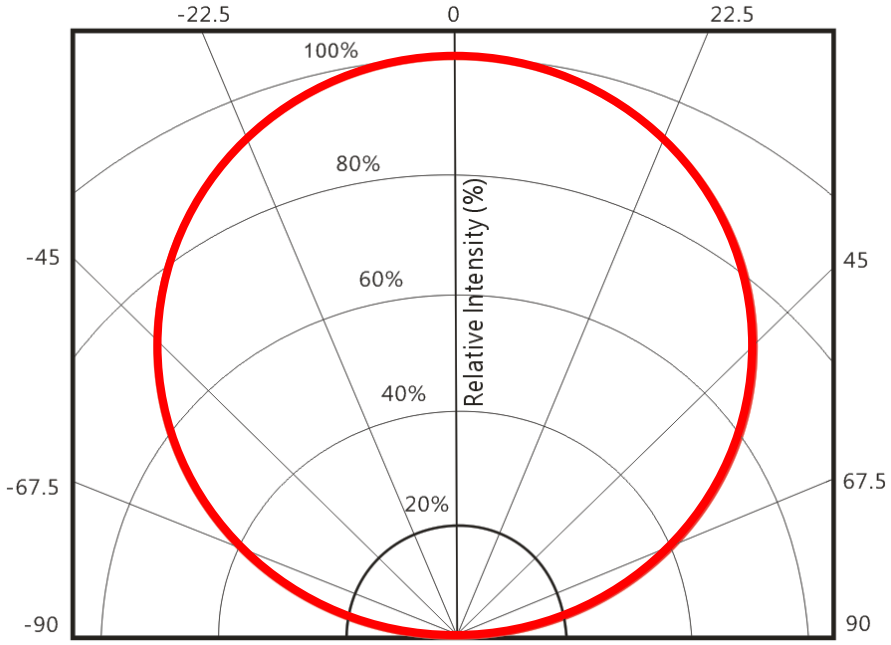
Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern



Polar Radiation Pattern



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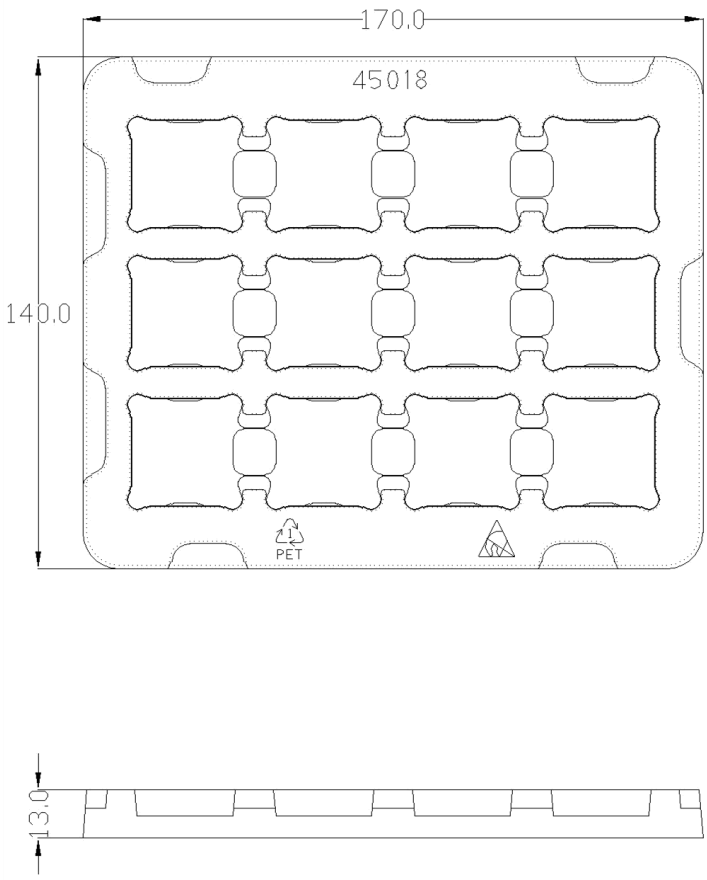
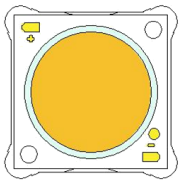
Packing Specifications





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.

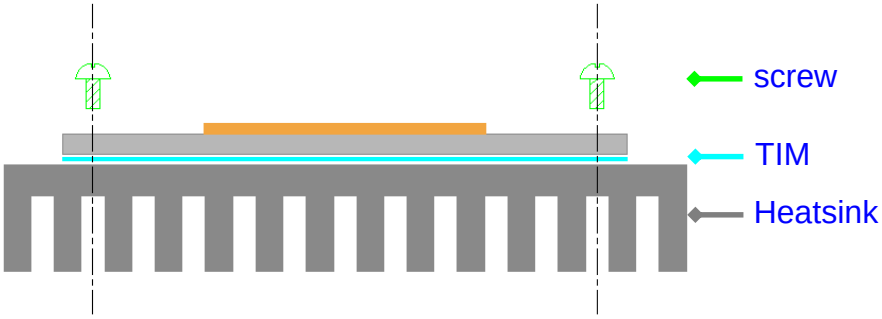

Fig 10. Reference assembly as fixing with screws

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.

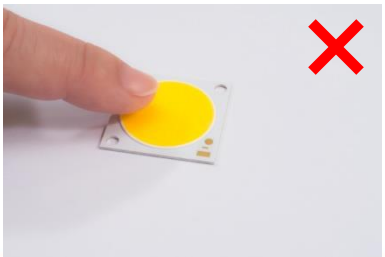
Precaution for Use

- 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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