ProLight Opto Technology Corporation

ProLight PACJ-14FxL-xC2N
14W COB Light-Engine LEDs
Technical Datasheet
Version: 1.1

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 14 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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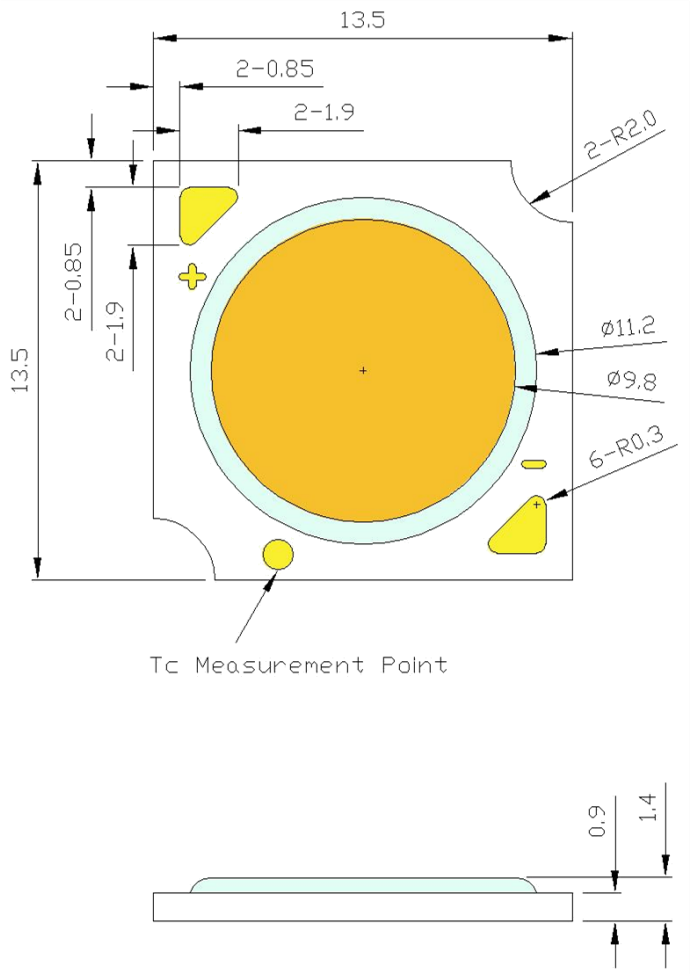
2017/05
DS-0729

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	PACJ-14FWL-AC2N	180*	920	1050	70	-
			360	1625	1860		
	Neutral White	PACJ-14FNL-AC2N	180*	905	1035	70	-
			360	1600	1830		
	Warm White	PACJ-14FVL-AC2N	180*	860	985	70	-
			360	1520	1745		
	White	PACJ-14FWL-BC2N	180*	900	1030	80	0
			360	1590	1825		
	Neutral White	PACJ-14FNL-BC2N	180*	885	1015	80	0
			360	1565	1800		
	Warm White	PACJ-14FVL-BC2N	180*	840	965	80	0
			360	1485	1710		
	White	PACJ-14FWL-DC2N	180*	790	910	90	50
			360	1390	1600		
	Neutral White	PACJ-14FNL-DC2N	180*	780	890	90	50
			360	1370	1565		
	Warm White	PACJ-14FVL-DC2N	180*	740	845	90	50
			360	1300	1490		
	Neutral White	PACJ-14FNL-EC2N	180*	685	785	95	90
			360	1205	1380		
	Warm White	PACJ-14FVL-EC2N	180*	650	745	95	90
			360	1145	1310		

- 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 180mA, 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	2.4
Neutral White	33.7	36.0	38.3	2.4
Warm White	33.7	36.0	38.3	2.4

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

Optical Characteristics at 180mA, 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	CIR	Color Bin Code V0	W0	X0	S0	M0	N0	Q0
PACJ-14FxL-AC2N	70	V			V	V		
PACJ-14FxL-BC2N	80	V	V	V	V	V	V	V
PACJ-14FxL-DC2N	90	V			V	V	V	V
PACJ-14FxL-EC2N	95				V	V	V	

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Electro-Optical Characteristics, T_C = 25°C

I_F (mA)	V_F (V)	Power (W)	PACJ-14FWL-AC2N		PACJ-14FNL-AC2N		PACJ-14FVL-AC2N	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
120	34.63	4.16	780	187.5	770	185.1	732	175.9
180*	36.00	6.48	1050	162.0	1035	159.7	985	152.0
240	37.23	8.94	1320	147.7	1300	145.4	1238	138.5
300	38.42	11.53	1590	137.9	1565	135.7	1492	129.4
360	39.53	14.23	1860	130.7	1830	128.6	1745	122.6

I_F (mA)	V_F (V)	Power (W)	PACJ-14FWL-BC2N		PACJ-14FNL-BC2N		PACJ-14FVL-BC2N	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
120	34.63	4.16	765	183.9	753	181.1	717	172.3
180*	36.00	6.48	1030	159.0	1015	156.6	965	148.9
240	37.23	8.94	1295	144.9	1277	142.8	1213	135.7
300	38.42	11.53	1560	135.3	1538	133.4	1462	126.8
360	39.53	14.23	1825	128.3	1800	126.5	1710	120.2

I_F (mA)	V_F (V)	Power (W)	PACJ-14FWL-DC2N		PACJ-14FNL-DC2N		PACJ-14FVL-DC2N	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
120	34.63	4.16	680	163.5	665	159.9	630	151.4
180*	36.00	6.48	910	140.4	890	137.3	845	130.4
240	37.23	8.94	1140	127.5	1115	124.7	1060	118.6
300	38.42	11.53	1370	118.8	1340	116.2	1275	110.6
360	39.53	14.23	1600	112.4	1565	110.0	1490	104.7

I_F (mA)	V_F (V)	Power (W)	PACJ-14FNL-EC2N		PACJ-14FVL-EC2N	
			Flux (lm)	lm/W	Flux (lm)	lm/W
120	34.63	4.16	587	141.0	557	133.8
180*	36.00	6.48	785	121.1	745	115.0
240	37.23	8.94	983	110.0	933	104.4
300	38.42	11.53	1182	102.5	1122	97.3
360	39.53	14.23	1380	97.0	1310	92.1

- All values are reference only.

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Absolute Maximum Ratings

Parameter	White/Neutral White/Warm White
Max DC Forward Current (mA)	360
Max Voltage at 360mA	42
Peak Pulsed Forward Current (mA)	540 (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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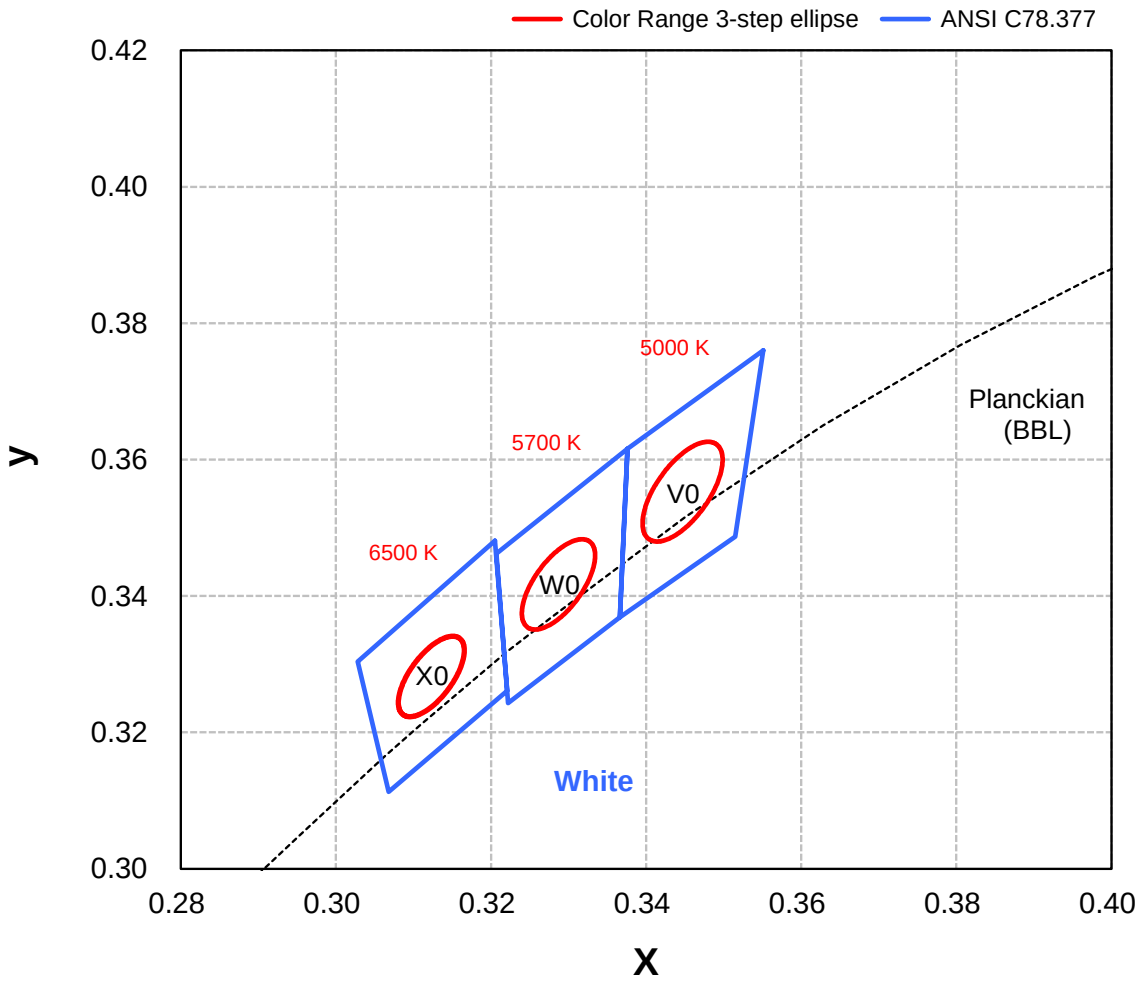
Color Bin

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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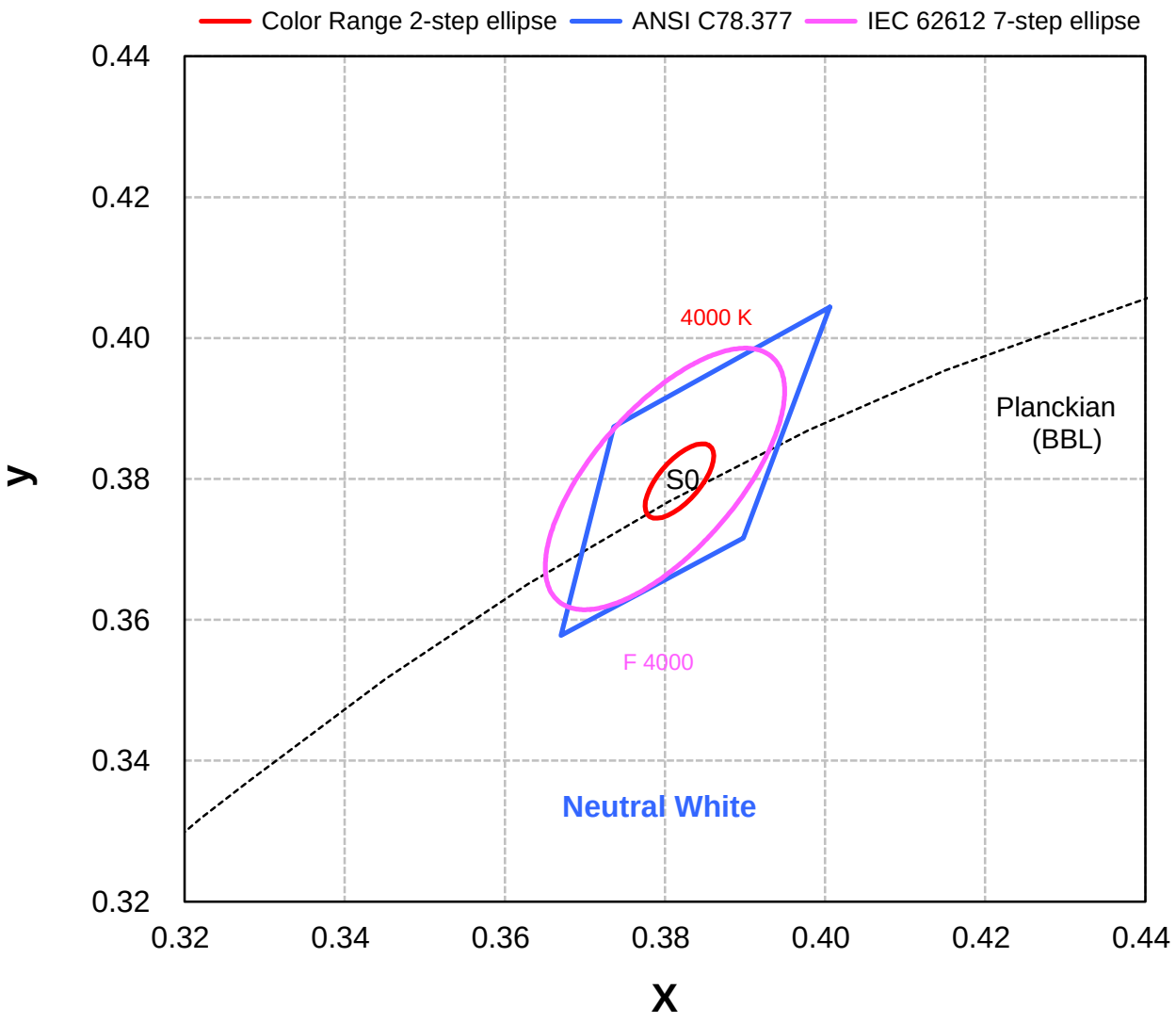
Color Bin

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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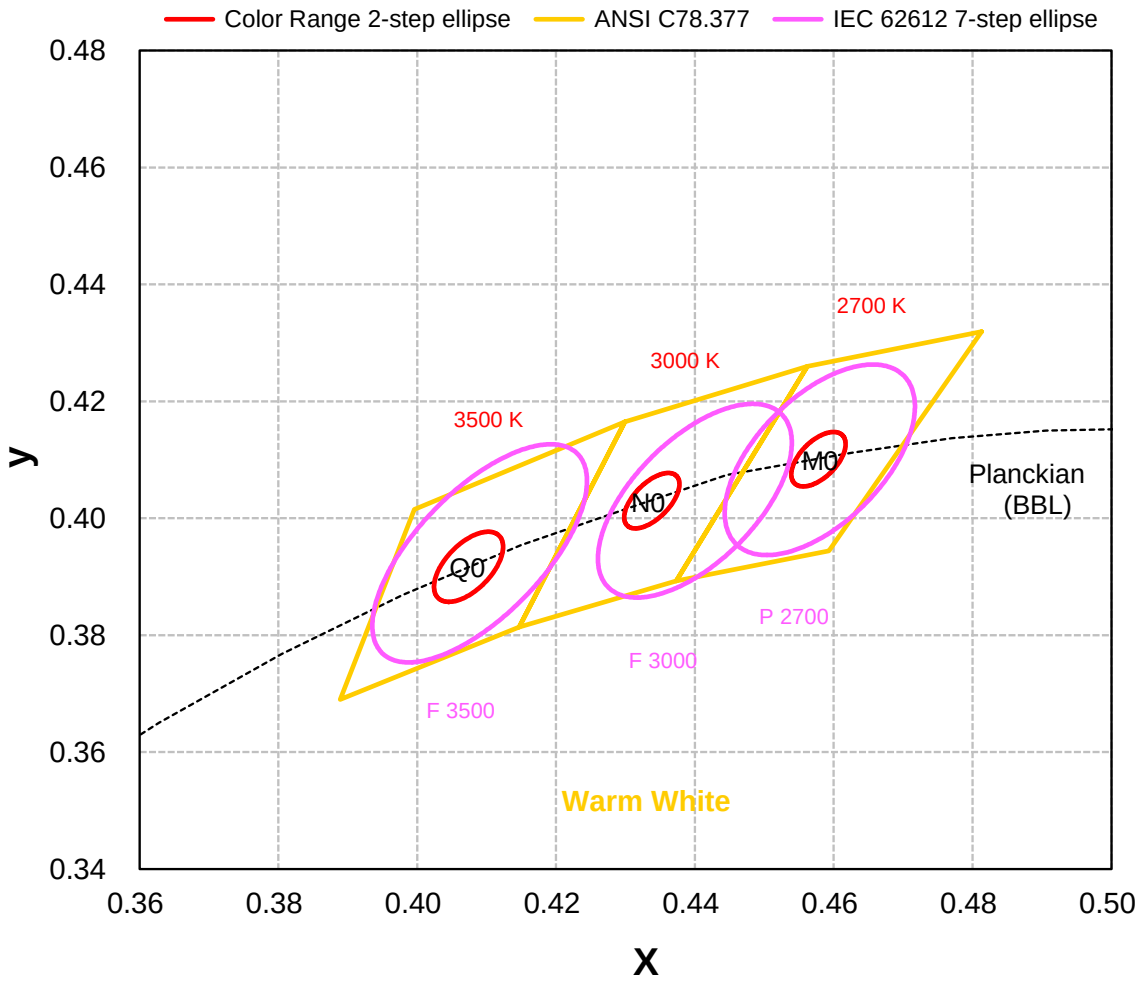
Color Bin

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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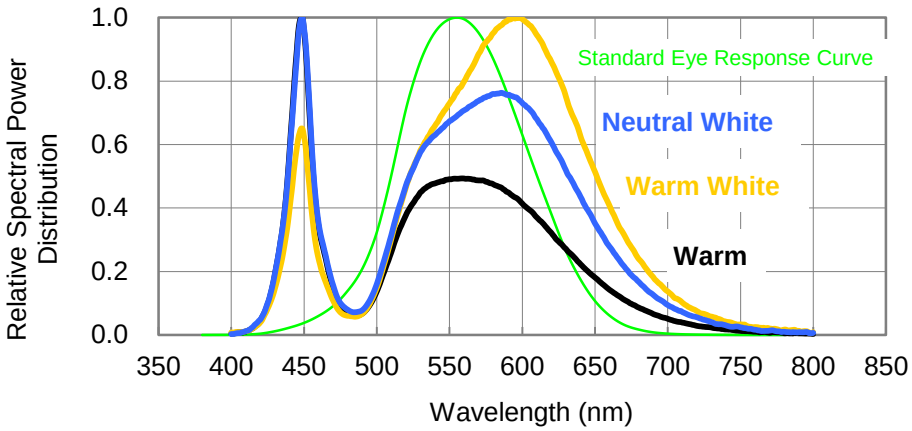
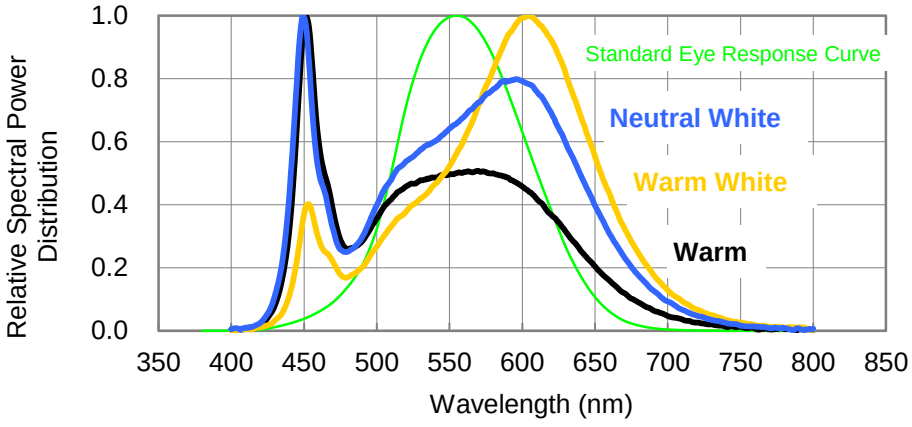
Color Spectrum, T_C = 25°C

1. PACJ-14WL-AC2N、PACJ-14FNL-AC2N、PACJ-14FVL-AC2N



2. PACJ-14FWL-BC2N、PACJ-14FNL-BC2N、 PACJ-14FVL-BC2N



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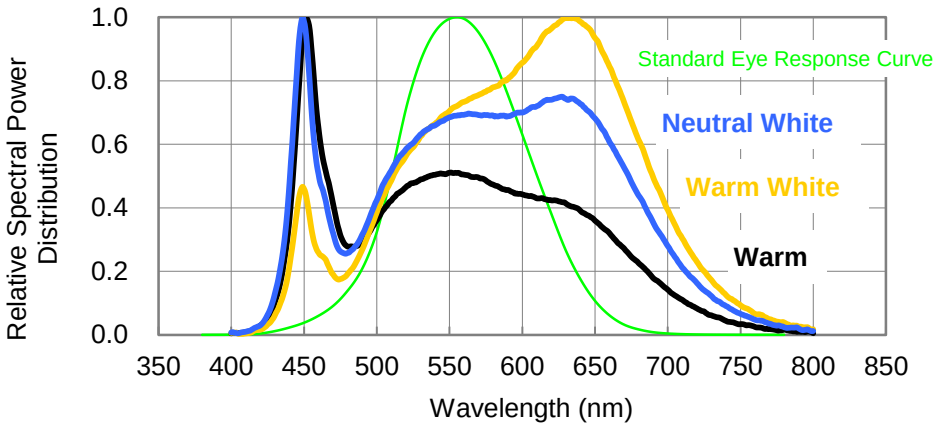
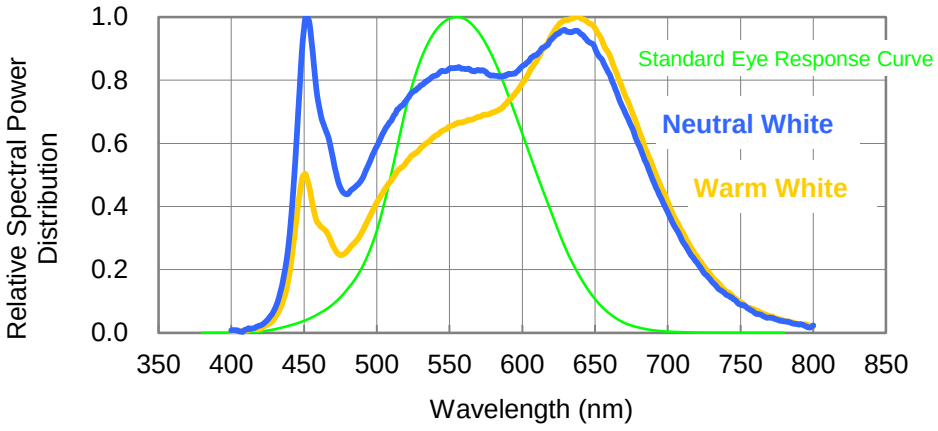
Color Spectrum, T_C = 25°C

3. PACJ-14FWL-DC2N、PACJ-14FNL-DC2N、PACJ-14FVL-DC2N



4. PACJ-14FNL-EC2N、 PACJ-14FVL-EC2N



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Case Temperature Relative Characteristics

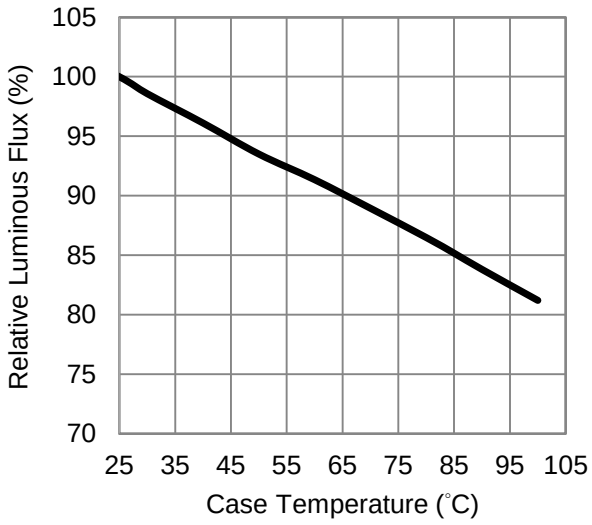

Fig 1. Case Temperature vs. Relative Luminous Flux at 180mA.

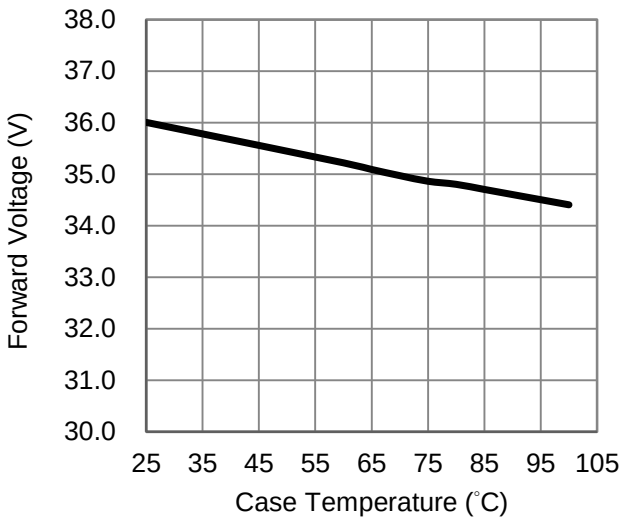

Fig 2. Case Temperature vs. Forward Voltage at 180mA.

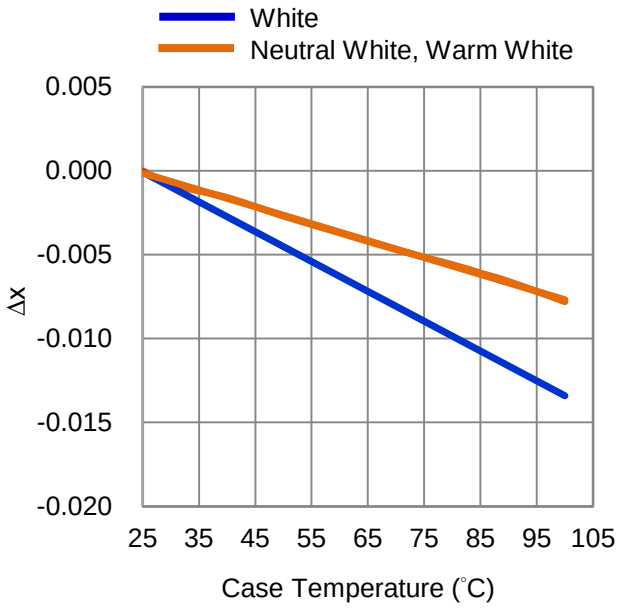

Fig 3. Case Temperature vs. Chromaticity Coordinate Δx at 180mA.

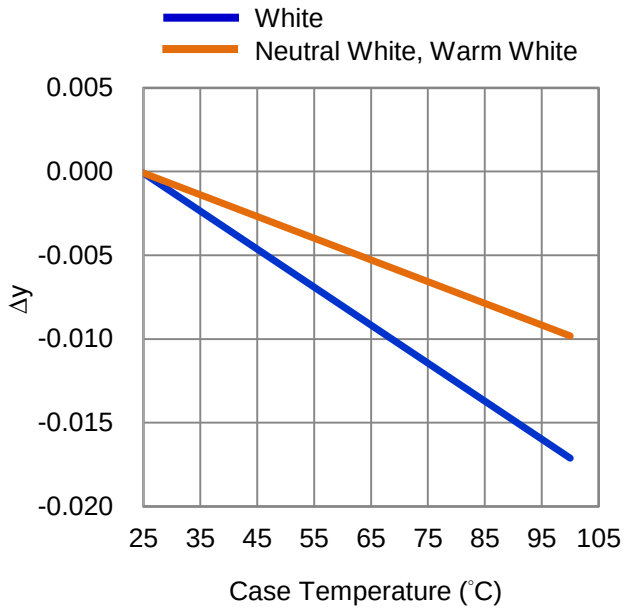

Fig 4. Case Temperature vs. Chromaticity Coordinate Δy at 180mA.

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Forward Current Relative Characteristics

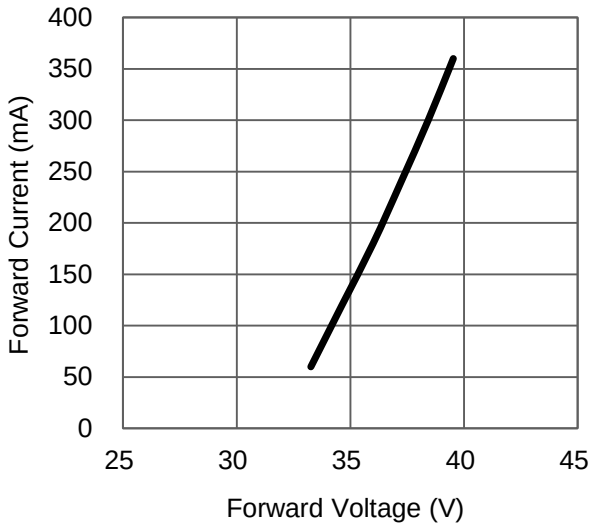

Fig 5. Forward Current vs. Forward Voltage at T_C=25°C.

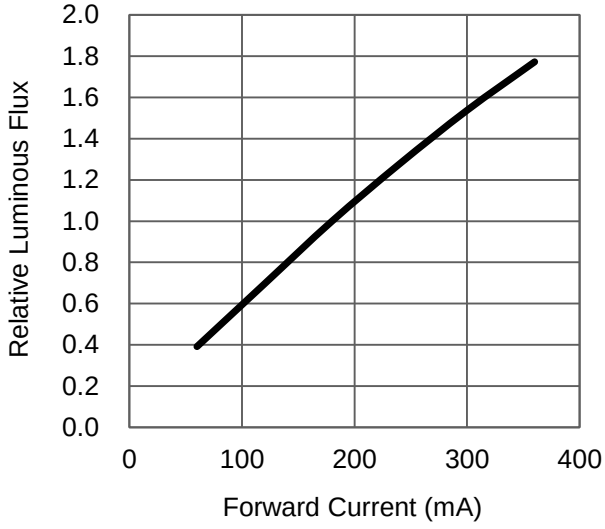

Fig 6. Forward Current vs. Relative Luminous Flux at T_C=25°C.

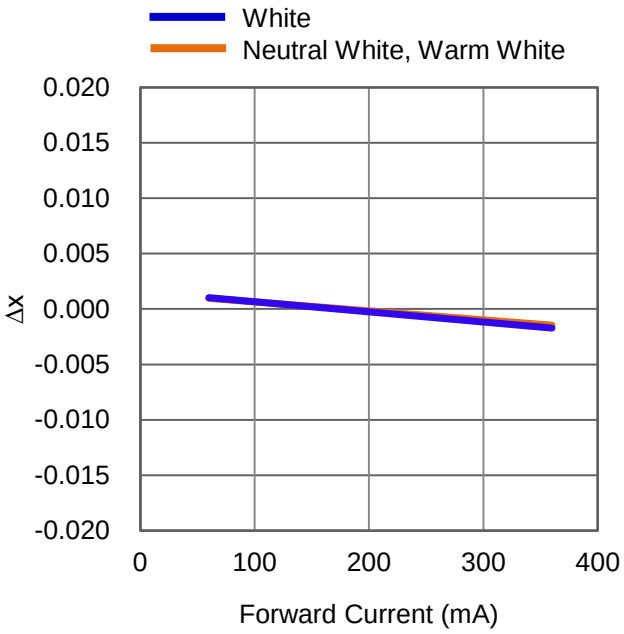

Fig 7. Forward Current vs. Chromaticity Coordinate Δx at T_C=25°C.

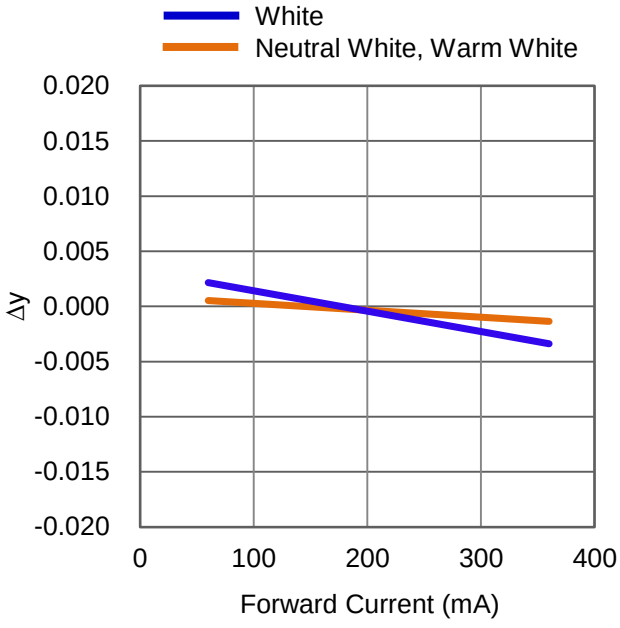

Fig 8. Forward Current vs. Chromaticity Coordinate Δy at T_C=25°C.

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Case Temperature vs. Junction Temperature Characteristics

T_C (°C)	T_J (°C)	
	180 (mA)	360 (mA)
0	16	34
5	21	39
10	26	44
15	31	49
20	36	54
25	41	59
30	46	64
35	51	69
40	56	74
45	61	79
50	66	84
55	71	89
60	76	94
65	81	99
70	86	104
75	91	109
80	96	114
85	101	119
90	106	124

Fig 9. Case Temperature vs. Junction Temperature at 180、360mA.

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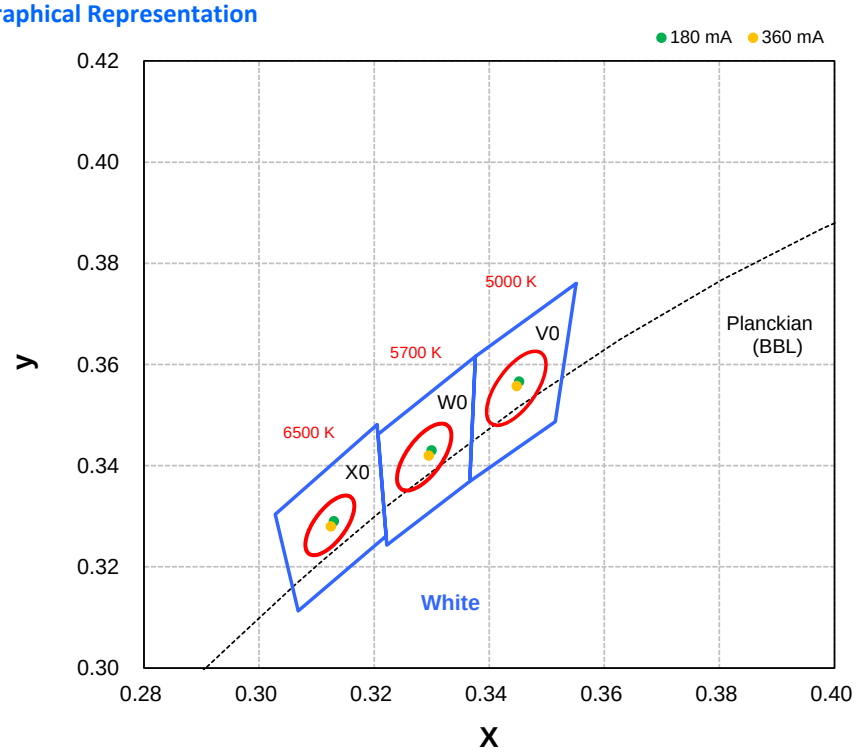
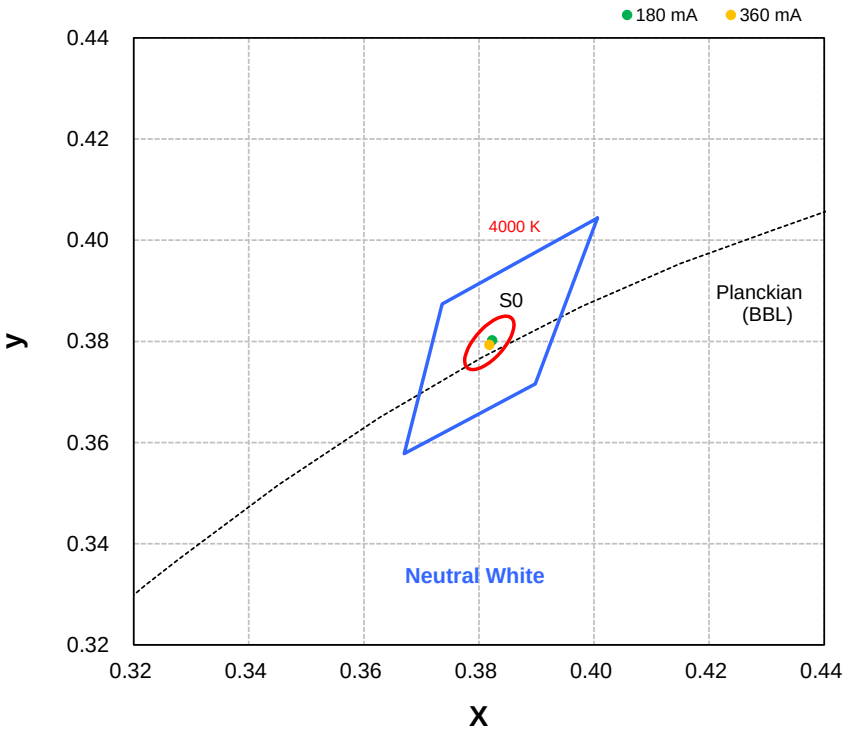
Color Coordinate vs. Forward Current, T_C = 25°C

White Binning Graphical Representation



Neutral White Binning Graphical Representation



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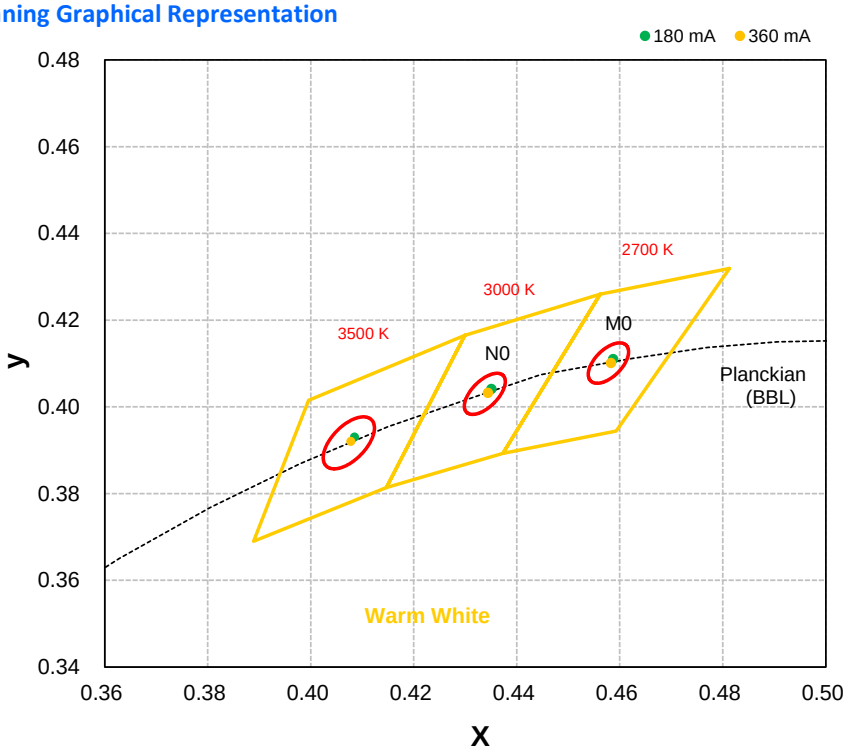
Color Coordinate vs. Forward Current, T_C = 25°C

Warm White Binning Graphical Representation



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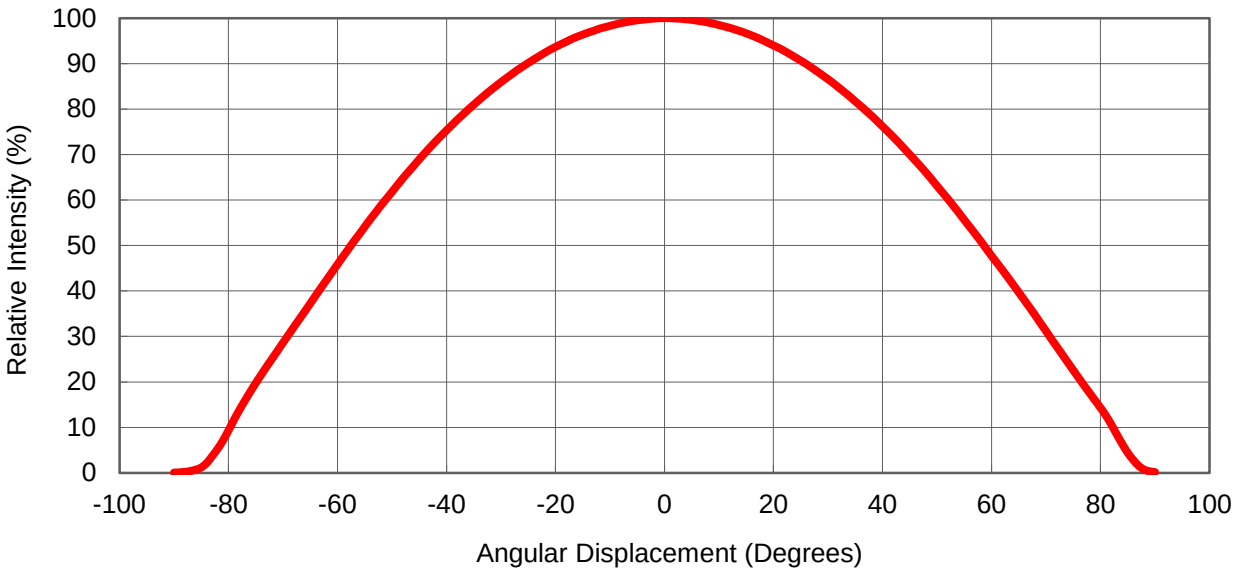
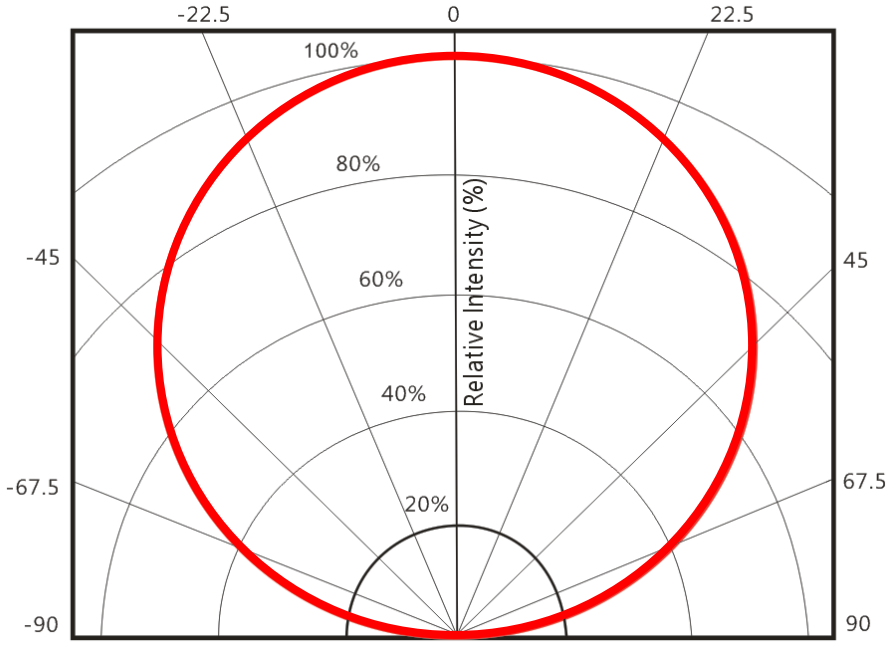
Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern



Polar Radiation Pattern



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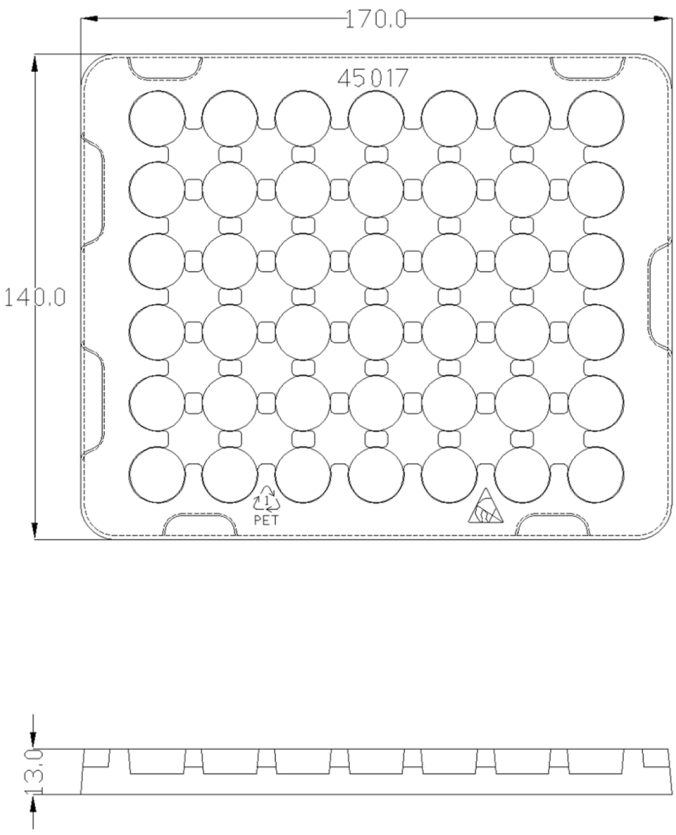
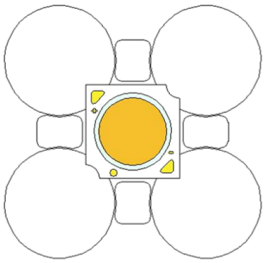
Packing Specifications





Product 30 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.

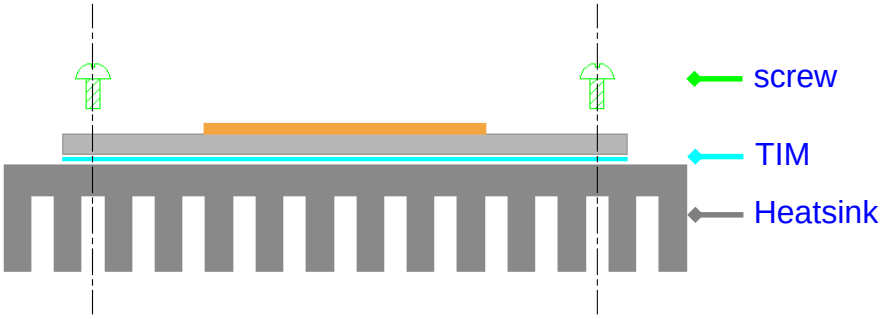

Fig 10. Reference assembly as fixing with screws

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.

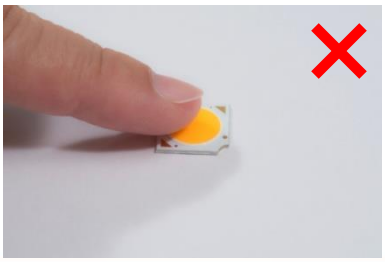
Precaution for Use

- 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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