

ProLight PACK-35FxL-xC5N
35W 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

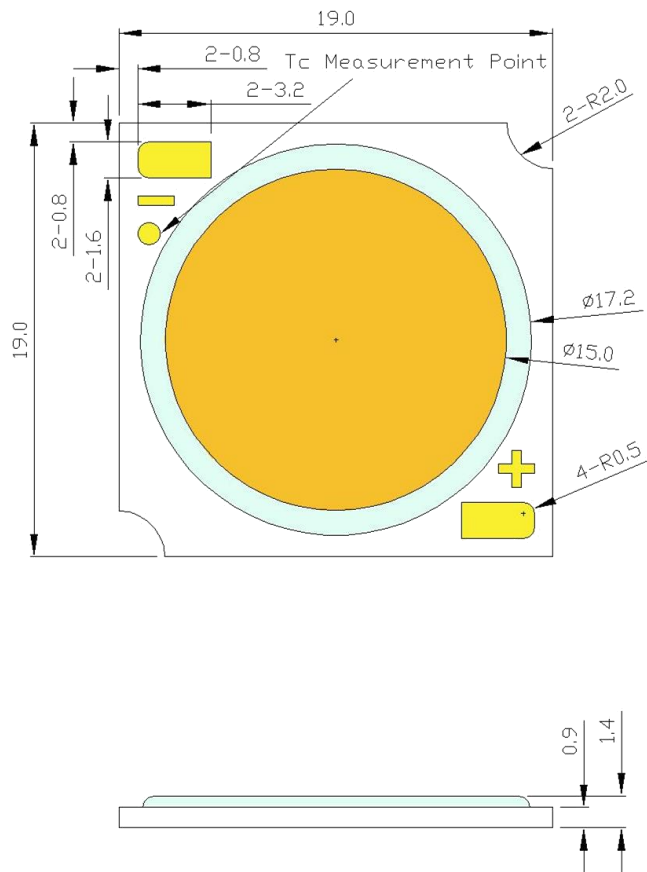
Main Applications

- Par lighting
- Spot lighting
- Down lighting

Introduction

·The input power is 35 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 Φ_v (lm)	Φ_v (lm) Typ.	CRI Min.	R9 Min.
Lambertian	White	PACK-35FWL-AC5N	450* 900	2295 4060	2620 4640	70	-
	Neutral White	PACK-35FNL-AC5N	450* 900	2250 3980	2570 4550	70	-
	Warm White	PACK-35FVL-AC5N	450* 900	2150 3805	2455 4345	70	-
	White	PACK-35FWL-BC5N	450* 900	2250 3980	2570 4550	80	0
	Neutral White	PACK-35FNL-BC5N	450* 900	2205 3900	2520 4460	80	0
	Warm White	PACK-35FVL-BC5N	450* 900	2105 3725	2410 4265	80	0
	White	PACK-35FWL-DC5N	450* 900	1800 3175	2075 3675	90	50
	Neutral White	PACK-35FNL-DC5N	450* 900	1675 2950	2025 3575	90	50
	Warm White	PACK-35FVL-DC5N	450* 900	1625 2900	1975 3475	90	50
	Neutral White	PACK-35FNL-EC5N	450* 900	1625 2850	1900 3350	95	90
	Warm White	PACK-35FVL-EC5N	450* 900	1400 2475	1700 3000	95	90

- 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 450mA, $T_c = 25^\circ\text{C}$

Color	Forward Voltage V_F (V)			Thermal Resistance Junction to Board ($^\circ\text{C/W}$)
	Min.	Typ.	Max.	
White	33.7	36.0	38.3	0.86
Neutral White	33.7	36.0	38.3	0.86
Warm White	33.7	36.0	38.3	0.86

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

Optical Characteristics at 450mA, T_c = 25°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
	W0	5400 K	5700 K	5910 K	160	120
	X0	6250 K	6500 K	6840 K	160	120
Neutral White	S0	3890 K	4000 K	4080 K	160	120
Warm White	M0	2660 K	2700 K	2790 K	160	120
	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.

Supply Specifications

Part Number	CRI	Color Bin Code						
		V0	W0	X0	S0	M0	N0	Q0
PACK-35F _x L-AC5N	70	V			V	V		
PACK-35F _x L-BC5N	80	V	V	V	V	V	V	V
PACK-35F _x L-DC5N	90	V			V	V	V	V
PACK-35F _x L-EC5N	95				V	V	V	

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

I_F (mA)	V_F (V)	Power (W)	PACK-35FWL-AC5N		PACK-35FNL-AC5N		PACK-35FVL-AC5N	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
300	34.63	10.39	1947	187.4	1910	183.8	1825	175.6
450*	36.00	16.20	2620	161.7	2570	158.6	2455	151.5
600	37.23	22.34	3293	147.4	3230	144.6	3085	138.1
750	38.42	28.82	3967	137.6	3890	135.0	3715	128.9
900	39.53	35.58	4640	130.4	4550	127.9	4345	122.1
I_F (mA)	V_F (V)	Power (W)	PACK-35FWL-BC5N		PACK-35FNL-BC5N		PACK-35FVL-BC5N	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
300	34.63	10.39	1911	183.9	1873	180.3	1792	172.4
450*	36.00	16.20	2570	158.7	2520	155.6	2410	148.8
600	37.23	22.34	3230	144.6	3167	141.8	3028	135.6
750	38.42	28.82	3890	135.0	3814	132.3	3647	126.5
900	39.53	35.58	4550	127.9	4460	125.4	4265	119.9
I_F (mA)	V_F (V)	Power (W)	PACK-35FWL-DC5N		PACK-35FNL-DC5N		PACK-35FVL-DC5N	
			Flux (lm)	lm/W	Flux (lm)	lm/W	Flux (lm)	lm/W
300	34.63	10.39	1542	148.4	1508	145.2	1475	142.0
450*	36.00	16.20	2075	128.1	2025	125.0	1975	121.9
600	37.23	22.34	2608	116.8	2542	113.8	2475	110.8
750	38.42	28.82	3142	109.0	3058	106.1	2975	103.2
900	39.53	35.58	3675	103.3	3575	100.5	3475	97.7
I_F (mA)	V_F (V)	Power (W)	PACK-35FNL-EC5N		PACK-35FVL-EC5N			
			Flux (lm)	lm/W	Flux (lm)	lm/W		
300	34.63	10.39	1417	136.3	1267	121.9		
450*	36.00	16.20	1900	117.3	1700	104.9		
600	37.23	22.34	2383	106.7	2133	95.5		
750	38.42	28.82	2867	99.5	2567	89.1		
900	39.53	35.58	3350	94.2	3000	84.3		

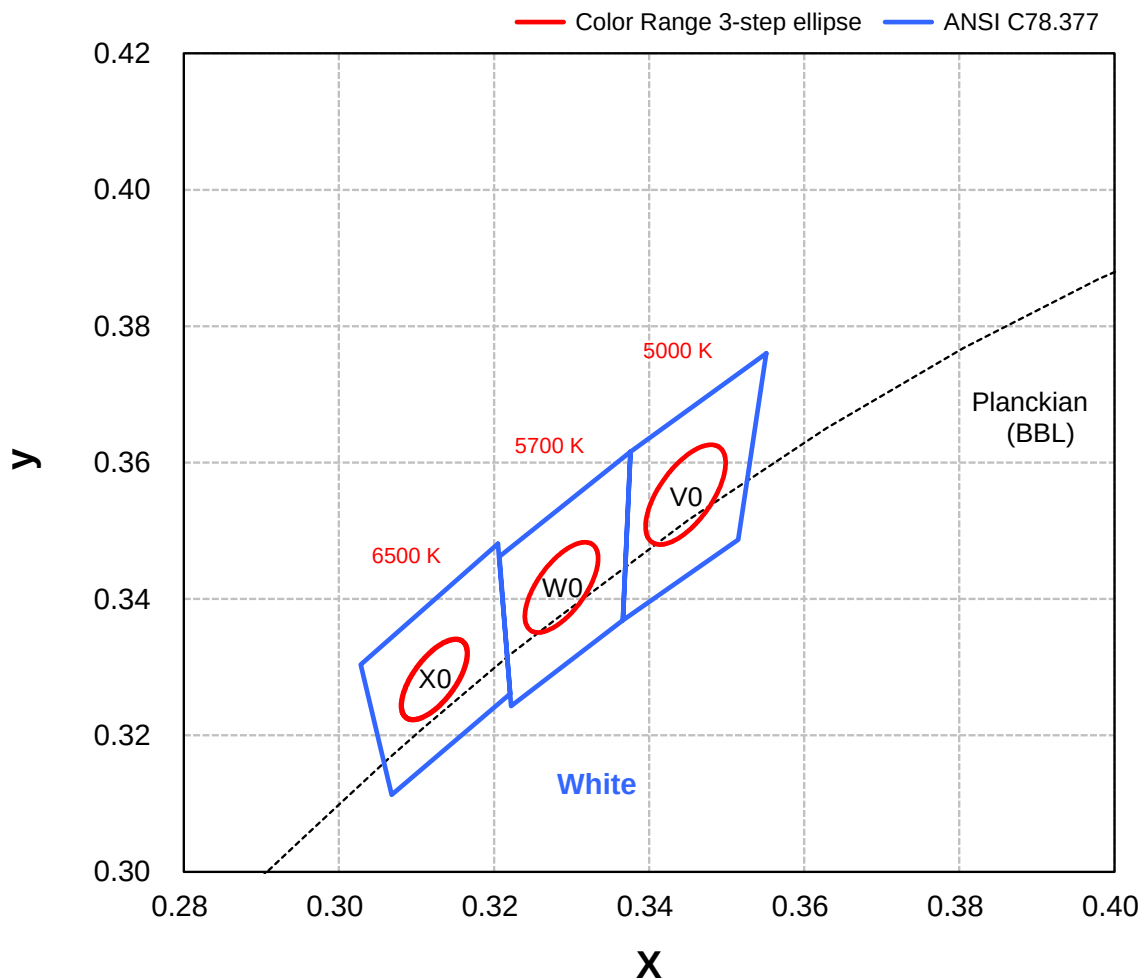
● All values are reference only.

Absolute Maximum Ratings

Parameter	White/Neutral White/Warm White
Max DC Forward Current (mA)	900
Max Voltage at 900mA	42
Peak Pulsed Forward Current (mA)	1350 (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

Color Bin

White Binning Structure Graphical Representation



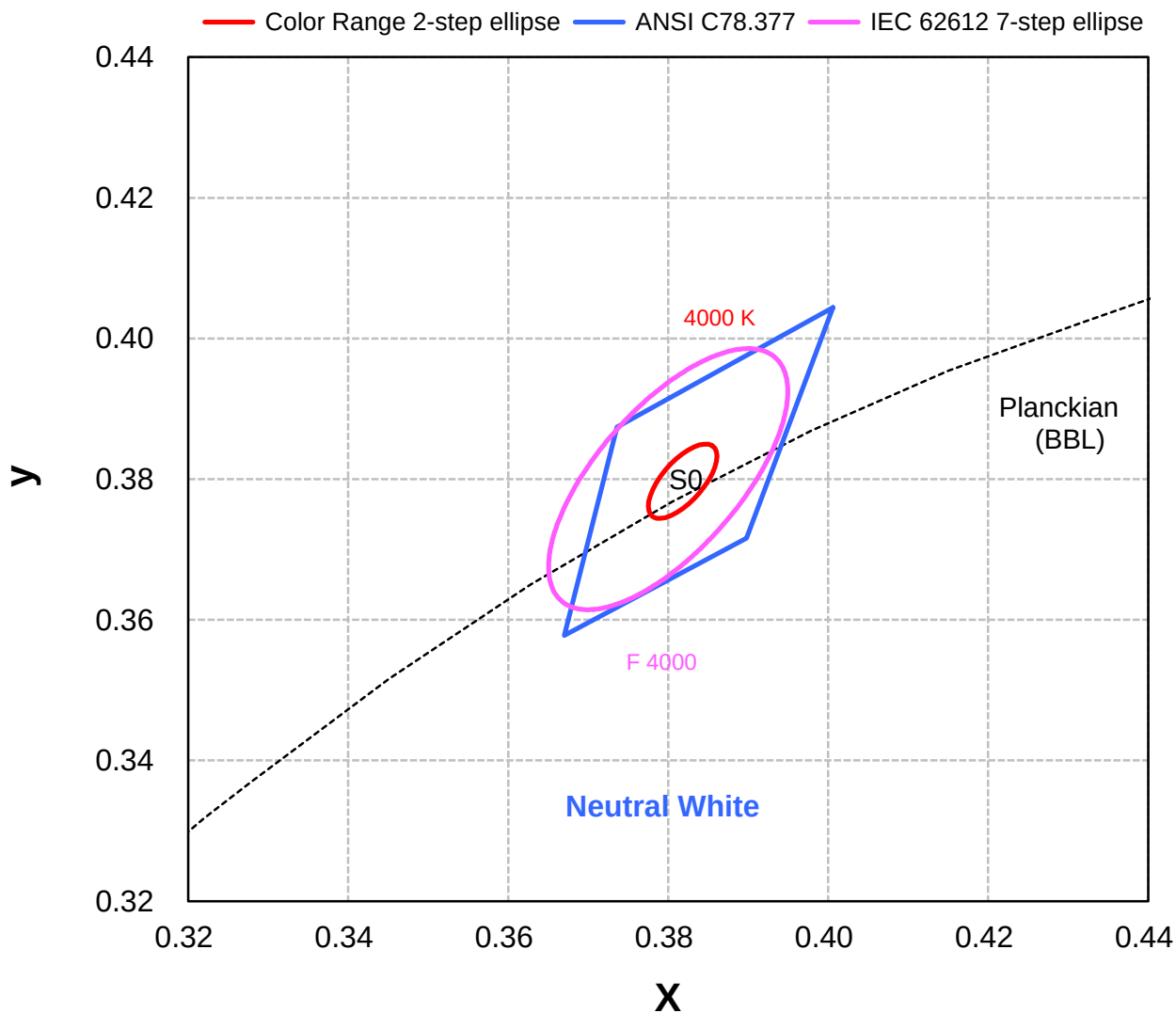
White Bin Structure

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
			b	0.00354				B	0.00285			
	y	0.3553	θ°	59.62				y	0.3282	θ°	58.57	
W0	x	0.3287	a	0.00747	5700							
			B	0.00321								
	y	0.3417	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

Color Bin

Neutral White Binning Structure Graphical Representation



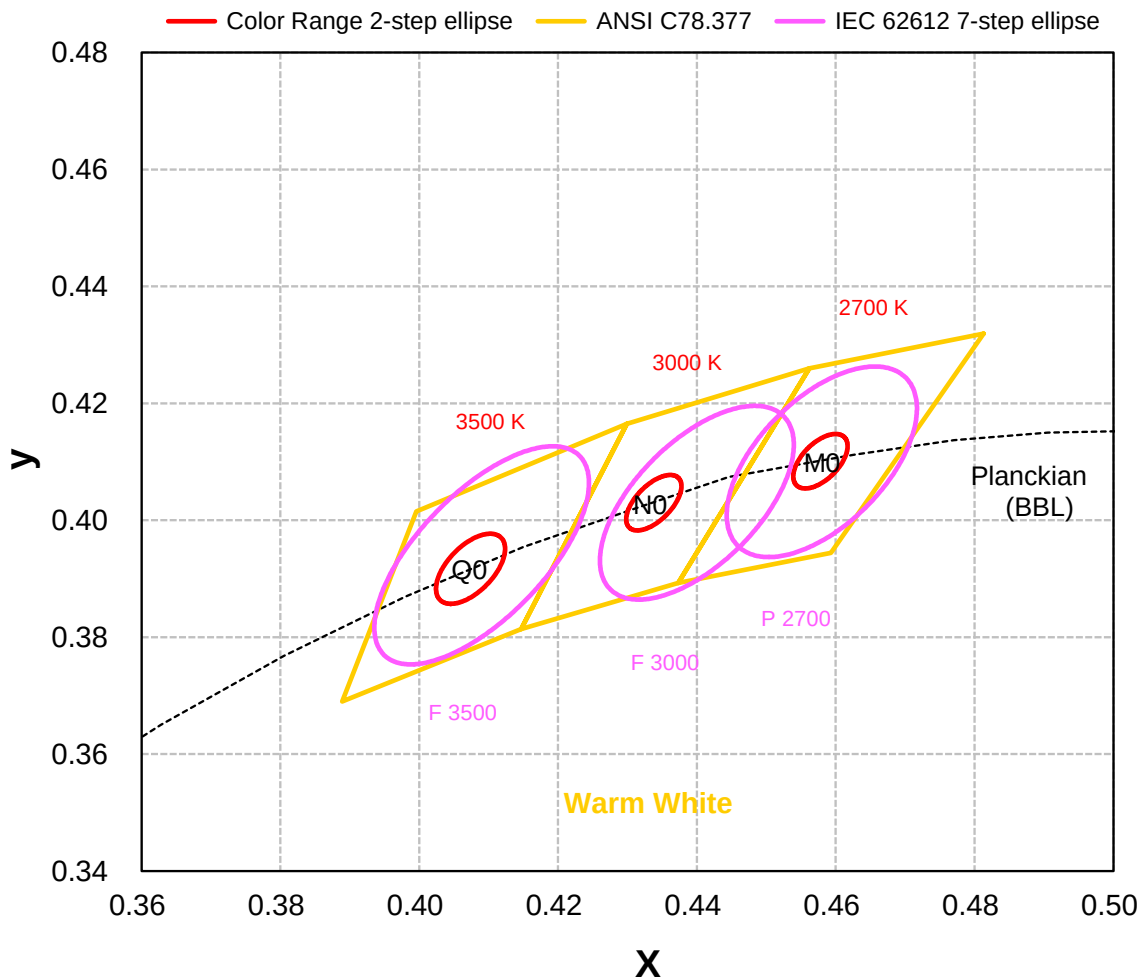
Neutral White Bin Structure

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



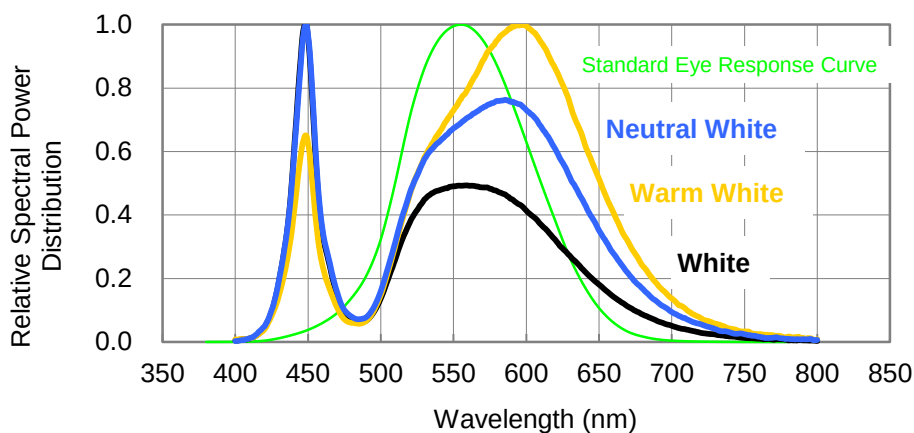
Warm White Bin Structure

Bin Code	Center	Oval parameter	Typ. CCT (K)	Bin Code	Center	Oval parameter	Typ. CCT (K)
M0	x	a	2700	Q0	x	a	3500
	y	b			y	b	
		θ°				θ°	
N0	x	a	3000				
	y	b					
		θ°					

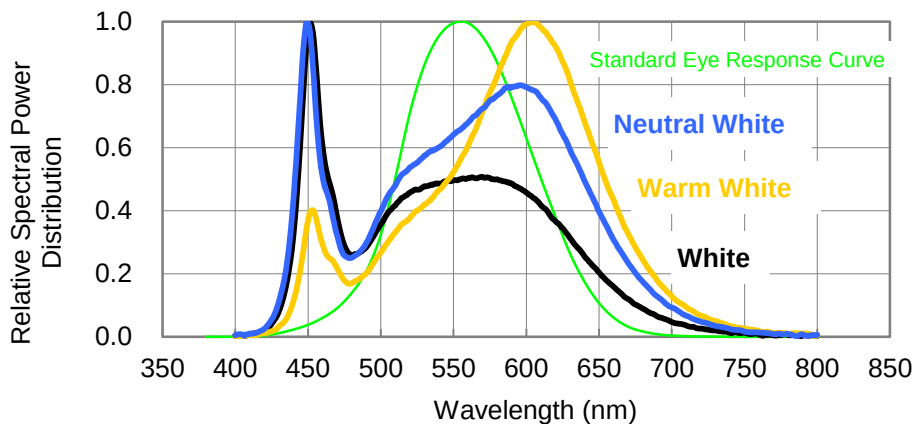
- Color range stay within MacAdam “2-step” ellipse from the chromaticity center.
- The chromaticity center refers to ANSI C78.377.
- Tolerance on each color bin (x , y) is ± 0.005

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

1. PACK-35FWL-AC5N 、PACK-35FNL-AC5N 、PACK-35FVL-AC5N

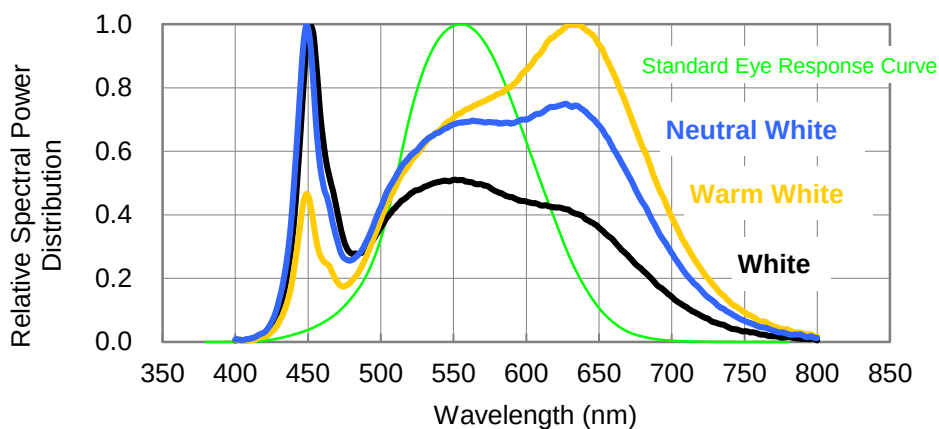


2. PACK-35FWL-BC5N 、PACK-35FNL-BC5N 、PACK-35FVL-BC5N

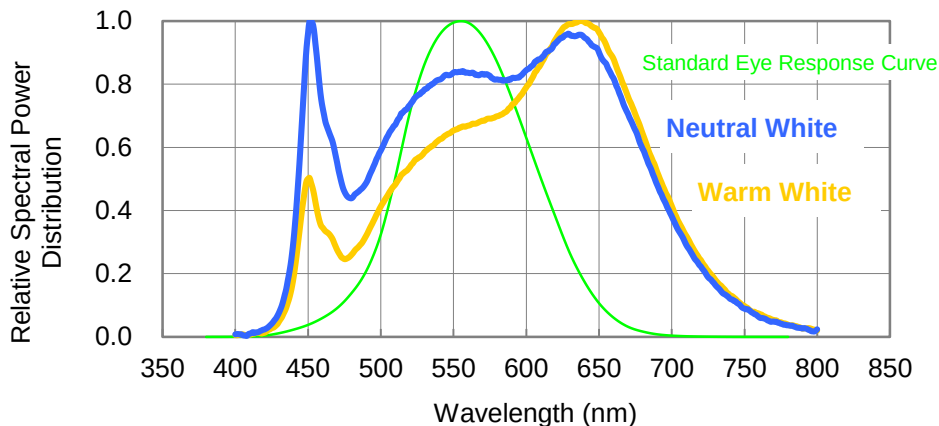


Color Spectrum, $T_c = 25^\circ\text{C}$

3. PACK-35FWL-DC5N 、PACK-35FNL-DC5N 、PACK-35FVL-DC5N



4. PACK-35FNL-EC5N 、PACK-35FVL-EC5N



Case Temperature Relative Characteristics

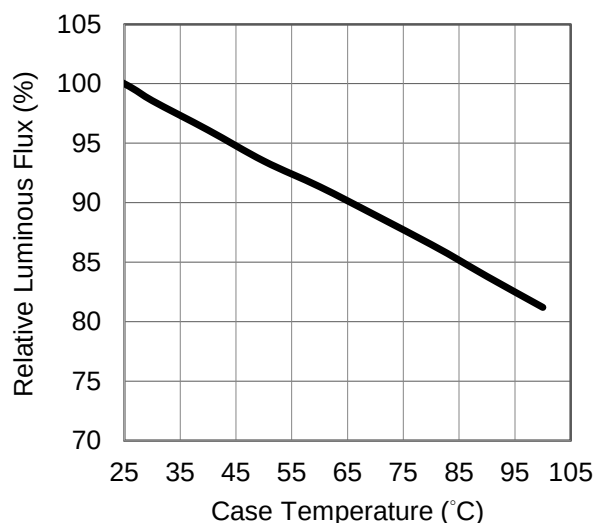


Fig 1. Case Temperature vs. Relative Luminous Flux at 450mA.

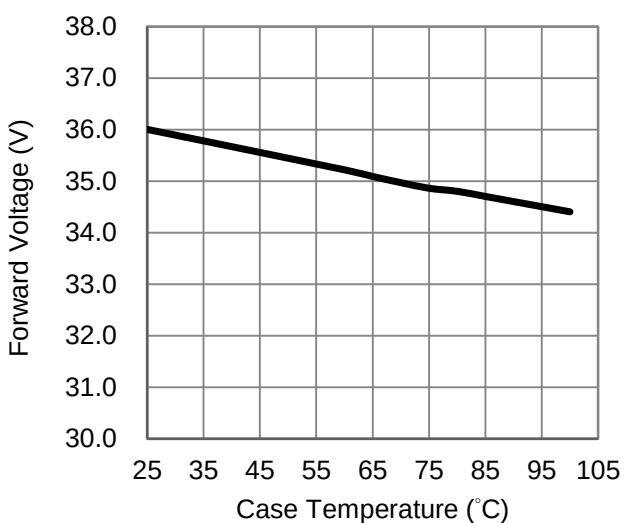


Fig 2. Case Temperature vs. Forward Voltage at 450mA.

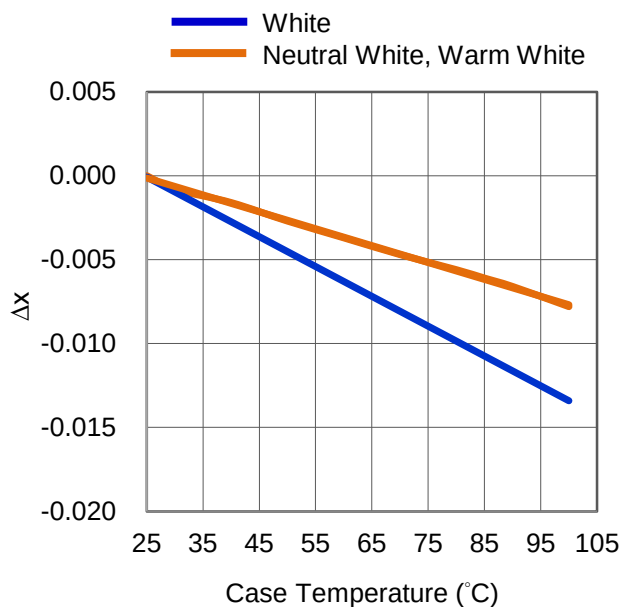


Fig 3. Case Temperature vs. Chromaticity Coordinate Δx at 450mA.

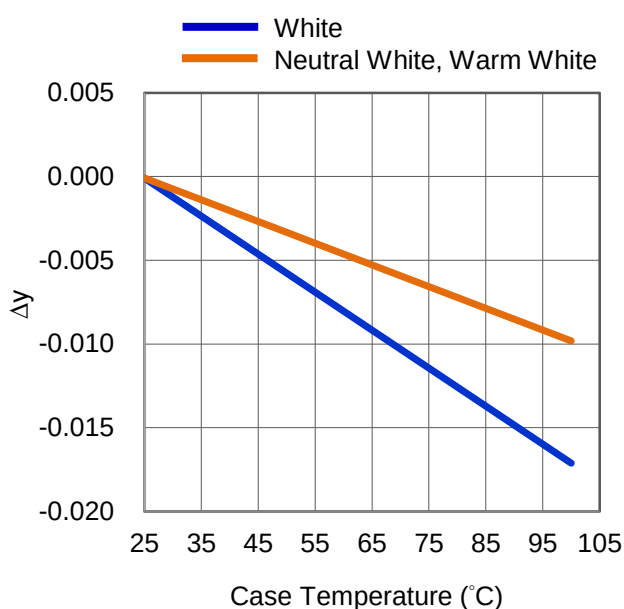


Fig 4. Case Temperature vs. Chromaticity Coordinate Δy at 450mA.

Forward Current Relative Characteristics

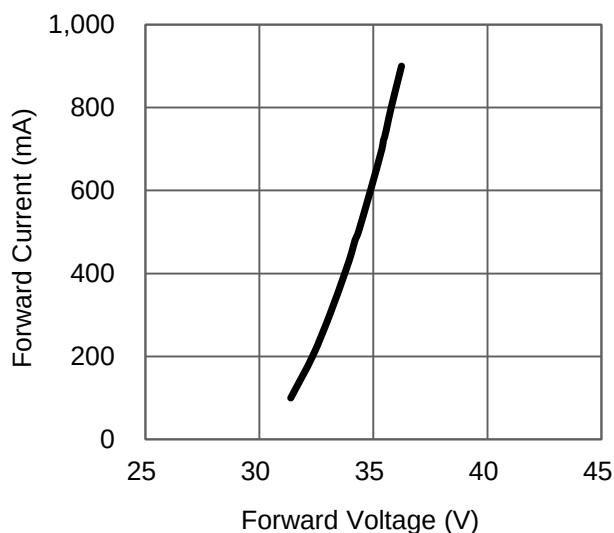


Fig 5. Forward Current vs. Forward Voltage at $T_C=25^\circ\text{C}$.

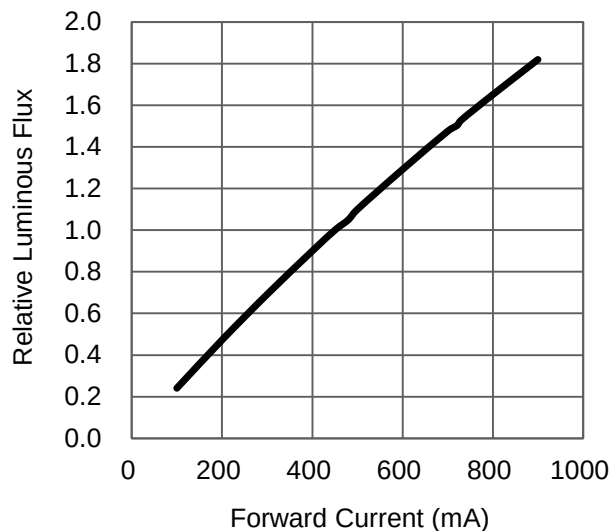


Fig 6. Forward Current vs. Relative Luminous Flux at $T_C=25^\circ\text{C}$.

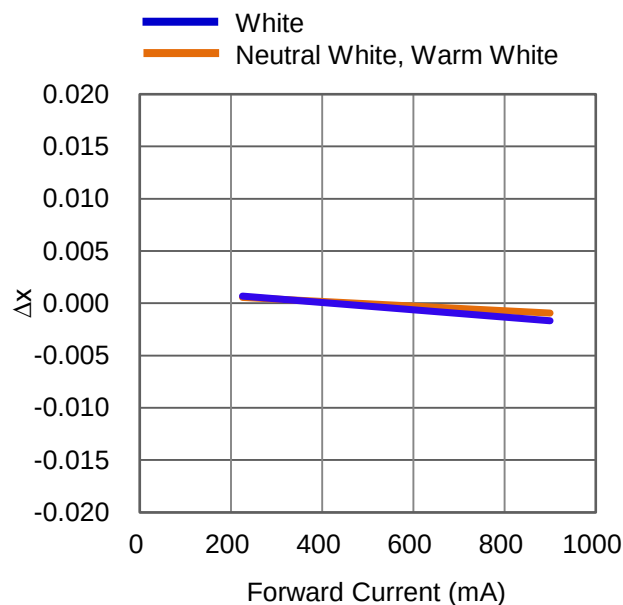


Fig 7. Forward Current vs. Chromaticity Coordinate Δx at $T_C=25^\circ\text{C}$.

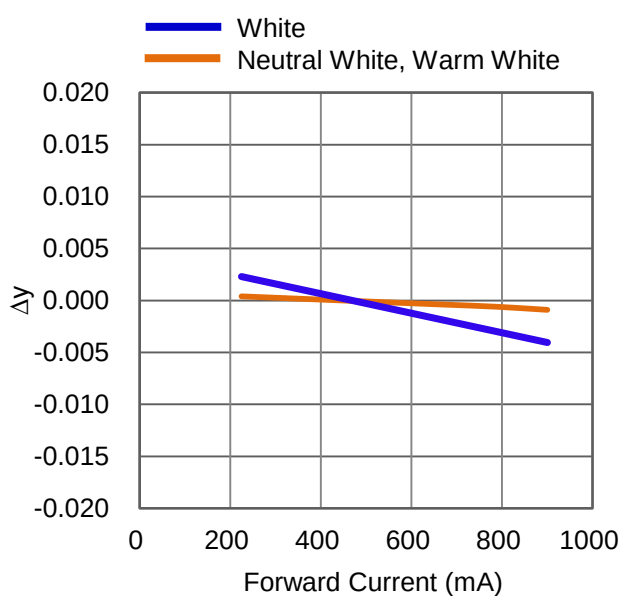


Fig 8. Forward Current vs. Chromaticity Coordinate Δy at $T_C=25^\circ\text{C}$.

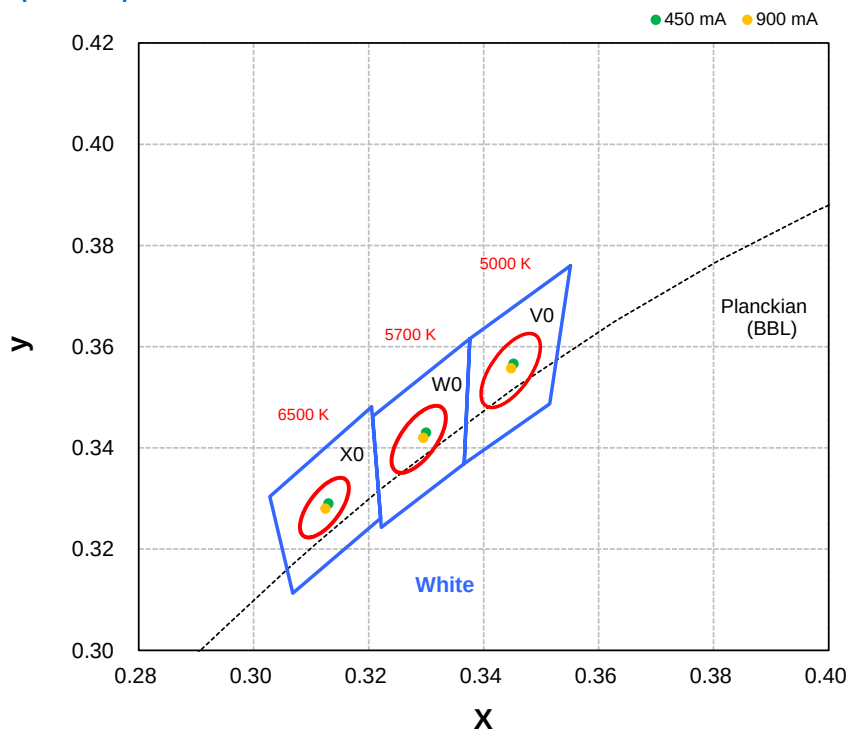
Case Temperature vs. Junction Temperature Characteristics

T _c (°C)	T _j (°C)	
	450 (mA)	900 (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

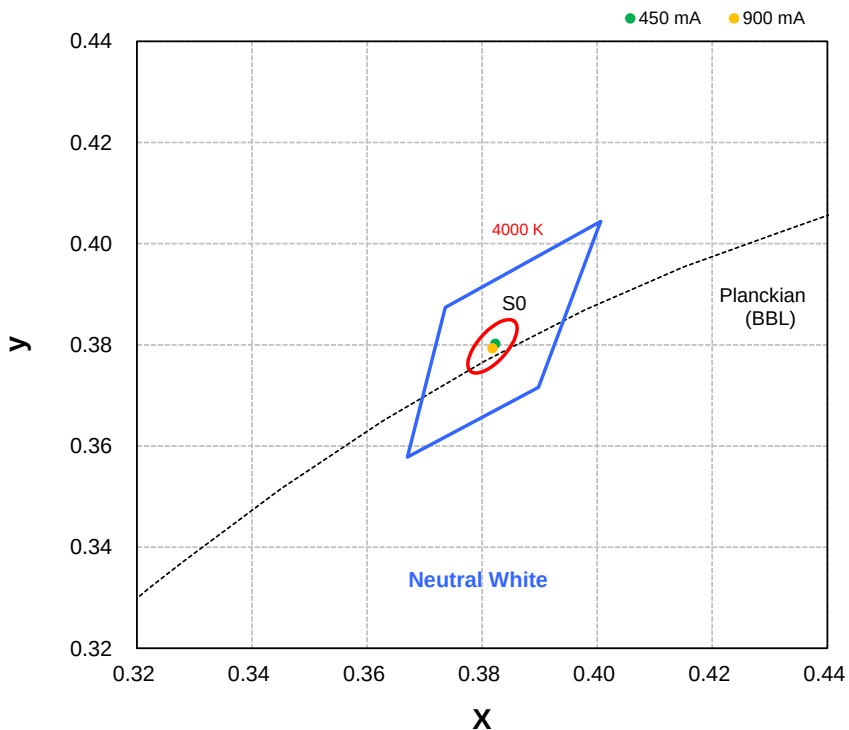
Fig 9. Case Temperature vs. Junction Temperature at 450 、900mA.

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

White Binning Graphical Representation

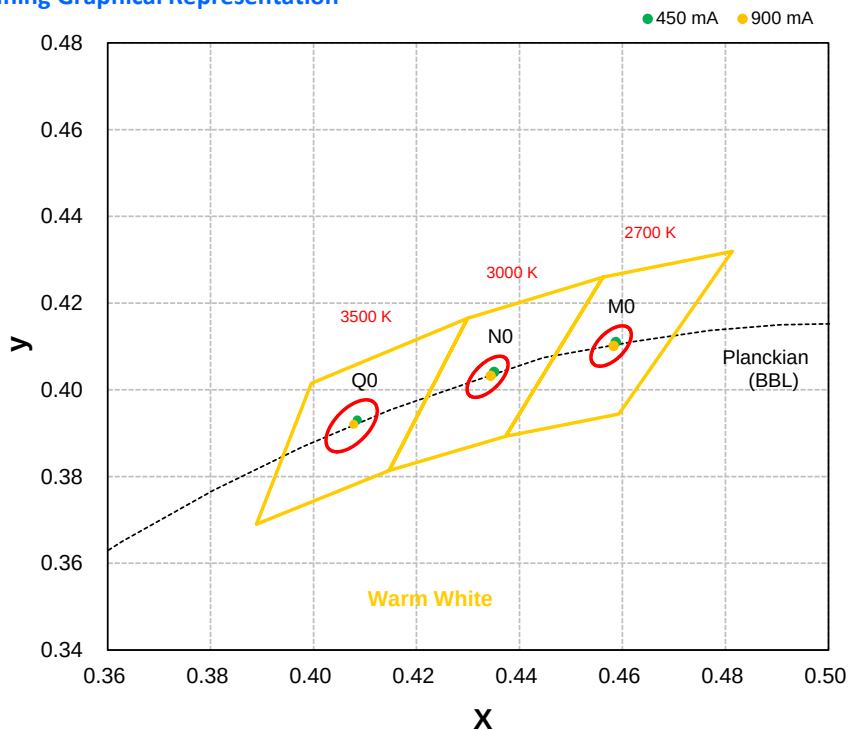


Neutral White Binning Graphical Representation



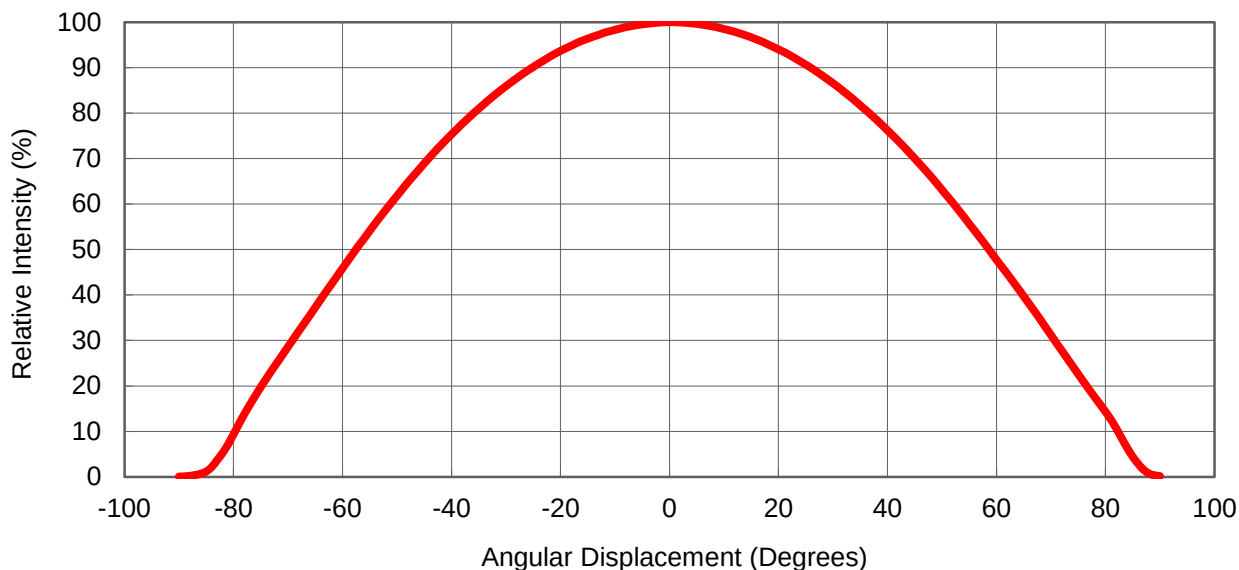
Color Coordinate vs. Forward Current, $T_c = 25^\circ\text{C}$

Warm White Binning Graphical Representation

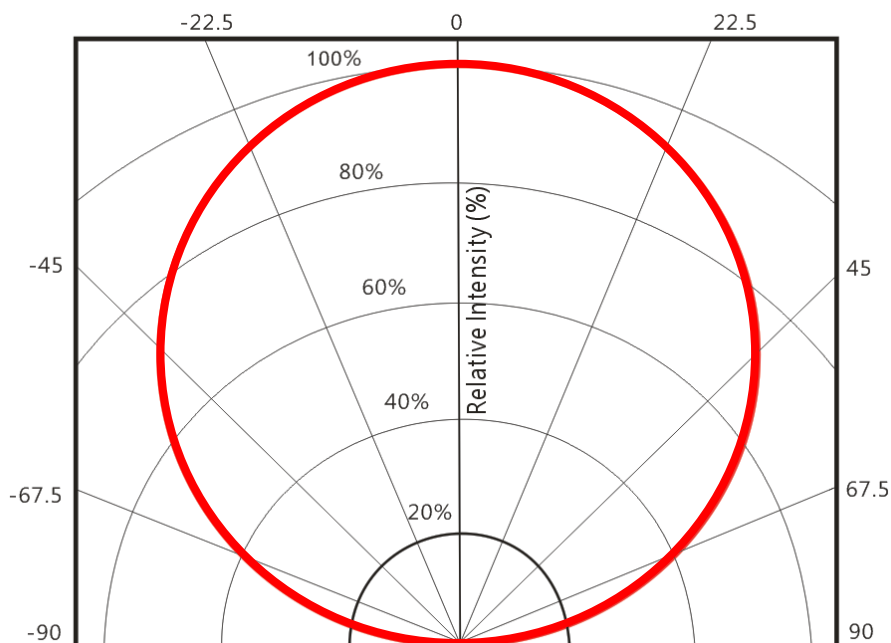


Typical Representative Spatial Radiation Pattern

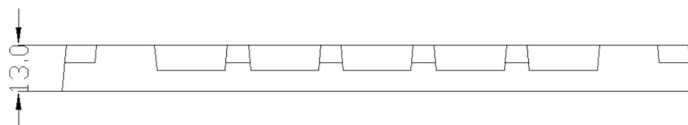
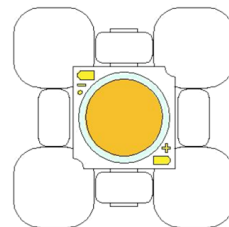
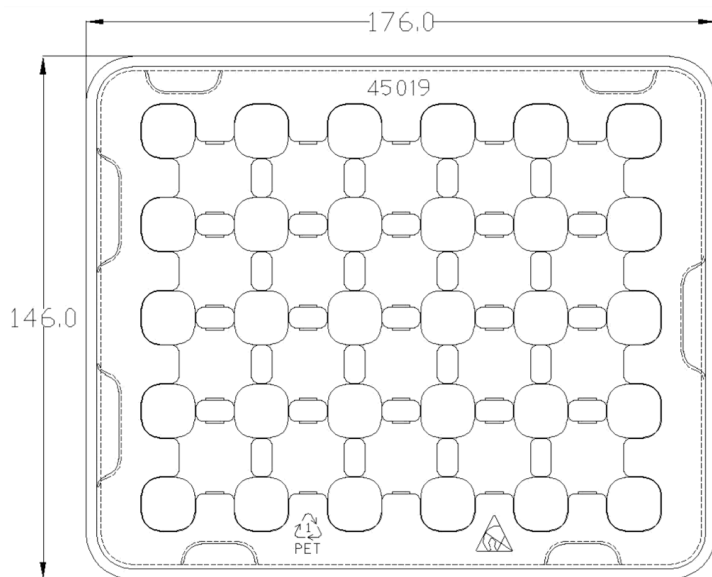
Lambertian Radiation Pattern



Polar Radiation Pattern



Packing Specifications



Product 20 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**.

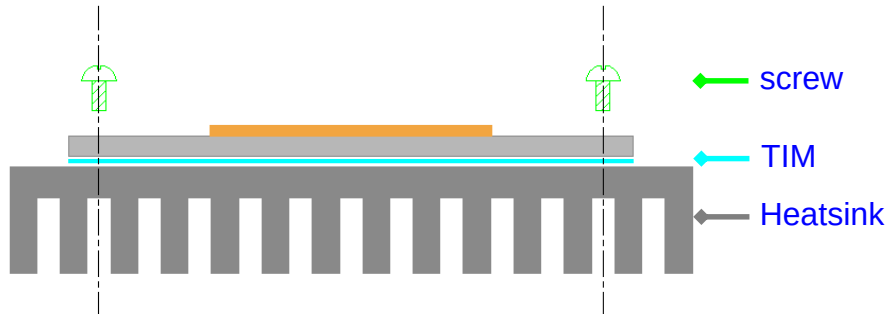


Fig 10. Reference assembly as fixing with screws

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)

