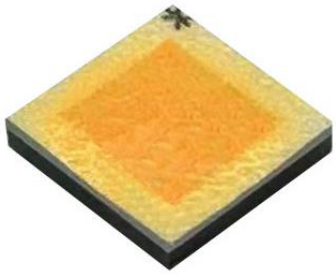


ProLight PBLC-10FxE-B4NHxx
10W High CRI Power LED
Technical Datasheet
Version: 1.0

ProLight Opto PBLC Series

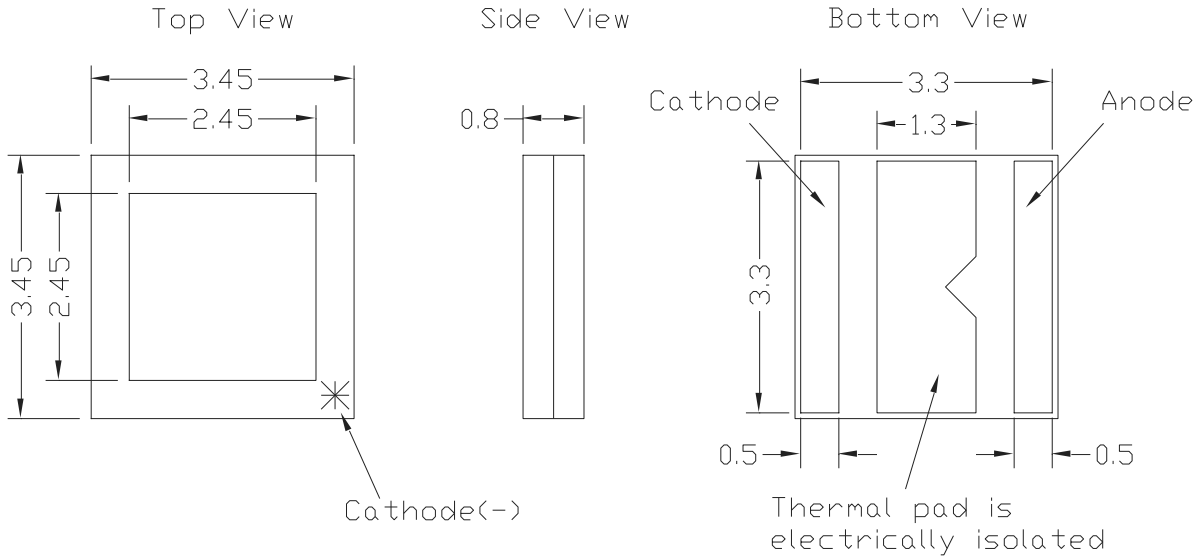
Features

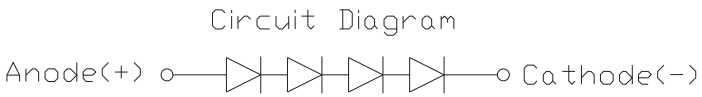
- Energy Star binning structure, warm white with 3 steps guarantee.
- Best thermal material solution of the world
- Best Moisture Sensitivity: JEDEC Level 1
- RoHS compliant

Main Applications

- Entertainment Lighting
- Commercial Lighting
- Indoor Lighting
- Outdoor Lighting

Emitter Mechanical Dimensions





Notes:
1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.1mm.
4. Please do not solder the emitter by manual hand soldering, otherwise it will damage the emitter.
5. **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 at 1000mA, T_J = 25˚C

Color	Part Number Emitter	Bin Code	Luminous Flux Φ_V (lm) Min.	Typ.	CRI Min.
White	PBLC-10FWE-B4NH60	W0	1350	1500	80
Neutral White	PBLC-10FNE-B4NH40	S0	1350	1500	80
	PBLC-10FNE-B4NH35	Q0	1100	1320	80
Warm White	PBLC-10FVE-B4NH30	N0	1100	1270	80
	PBLC-10FVE-B4NH27	M0	1000	1120	80
	PBLC-10FVE-B4NH24	L0	950	1080	80
	PBLC-10FVE-B4NH21	K0	850	950	80

- 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 1000mA, T_J = 25˚C

Color	Forward Voltage V_F (V) Min.	Typ.	Max.	Thermal Resistance Junction to Slug (˚C/ W)
White	11.48	12.48	13.56	1.7
Neutral White	11.48	12.48	13.56	1.7
Warm White	11.48	12.48	13.56	1.7

- ProLight maintains a tolerance of ± 0.2V for Voltage measurements.

Optical Characteristics at 1000mA, T_J = 25˚C

Color	Bin Code	Color Temperature CCT Min.	Typ.	Max.	Viewing Angle (degrees) $2\theta_{1/2}$
White	W0	5810 K	6000 K	6240 K	115
Neutral White	S0	3850 K	4000 K	4120 K	115
	Q0	3360 K	3500 K	3570 K	115
Warm White	N0	2970 K	3000 K	3120 K	115
	M0	2660 K	2700 K	2790 K	115
	L0	2380 K	2400 K	2510 K	115
	K0	2090 K	2100 K	2190 K	115

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

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

I_F (mA)	V_F (V)	Power (W)	PBLC-10FWE-B4NH60 (W0) Flux (lm)	PBLC-10FWE-B4NH60 (W0) lm/W	PBLC-10FNE-B4NH40 (S0) Flux (lm)	PBLC-10FNE-B4NH40 (S0) lm/W
250	11.14	2.78	476.2	171.0	476.2	171.0
350	11.36	3.98	640.1	161.0	640.1	161.0
800	12.18	9.74	1266.3	130.0	1266.3	130.0
1000	12.48	12.47	1500.0	120.2	1500.0	120.2
1200	12.75	15.31	1710.3	111.7	1710.3	111.7

I_F (mA)	V_F (V)	Power (W)	PBLC-10FNE-B4NH35 (Q0) Flux (lm)	PBLC-10FNE-B4NH35 (Q0) lm/W	PBLC-10FVE-B4NH30 (N0) Flux (lm)	PBLC-10FVE-B4NH30 (N0) lm/W
250	11.14	2.78	419.0	150.5	403.2	144.8
350	11.36	3.98	563.3	141.7	542.0	136.3
800	12.18	9.74	1114.4	114.4	1072.2	110.0
1000	12.48	12.47	1320.0	105.8	1270.0	101.8
1200	12.75	15.31	1505.1	98.3	1448.0	94.6

I_F (mA)	V_F (V)	Power (W)	PBLC-10FVE-B4NH27 (M0) Flux (lm)	PBLC-10FVE-B4NH27 (M0) lm/W	PBLC-10FVE-B4NH24 (L0) Flux (lm)	PBLC-10FVE-B4NH24 (L0) lm/W
250	11.14	2.78	355.6	127.7	342.9	123.1
350	11.36	3.98	477.9	120.2	460.9	115.9
800	12.18	9.74	945.5	97.0	911.8	93.6
1000	12.48	12.47	1120.0	89.8	1080.0	86.6
1200	12.75	15.31	1277.0	83.4	1231.4	80.4

I_F (mA)	V_F (V)	Power (W)	PBLC-10FVE-B4NH21 (K0) Flux (lm)	PBLC-10FVE-B4NH21 (K0) lm/W
250	11.14	2.78	301.6	108.3
350	11.36	3.98	405.4	102.0
800	12.18	9.74	802.0	82.3
1000	12.48	12.47	950.0	76.2
1200	12.75	15.31	1083.2	70.7

- All values are reference only.

Absolute Maximum Ratings

Parameter	White/Neutral White/Warm White
DC Forward Current (mA)	1200
Peak Pulsed Forward Current (mA)	1500 (less than 1/10 duty cycle@1KHz)
LED Junction Temperature	130°C
Operating Temperature	-40°C - 105°C
Storage Temperature	-40°C - 120°C
Soldering Temperature	JEDEC 020c 260°C
Allowable Reflow Cycles	3
Reverse Voltage	Not designed to be driven in reverse bias

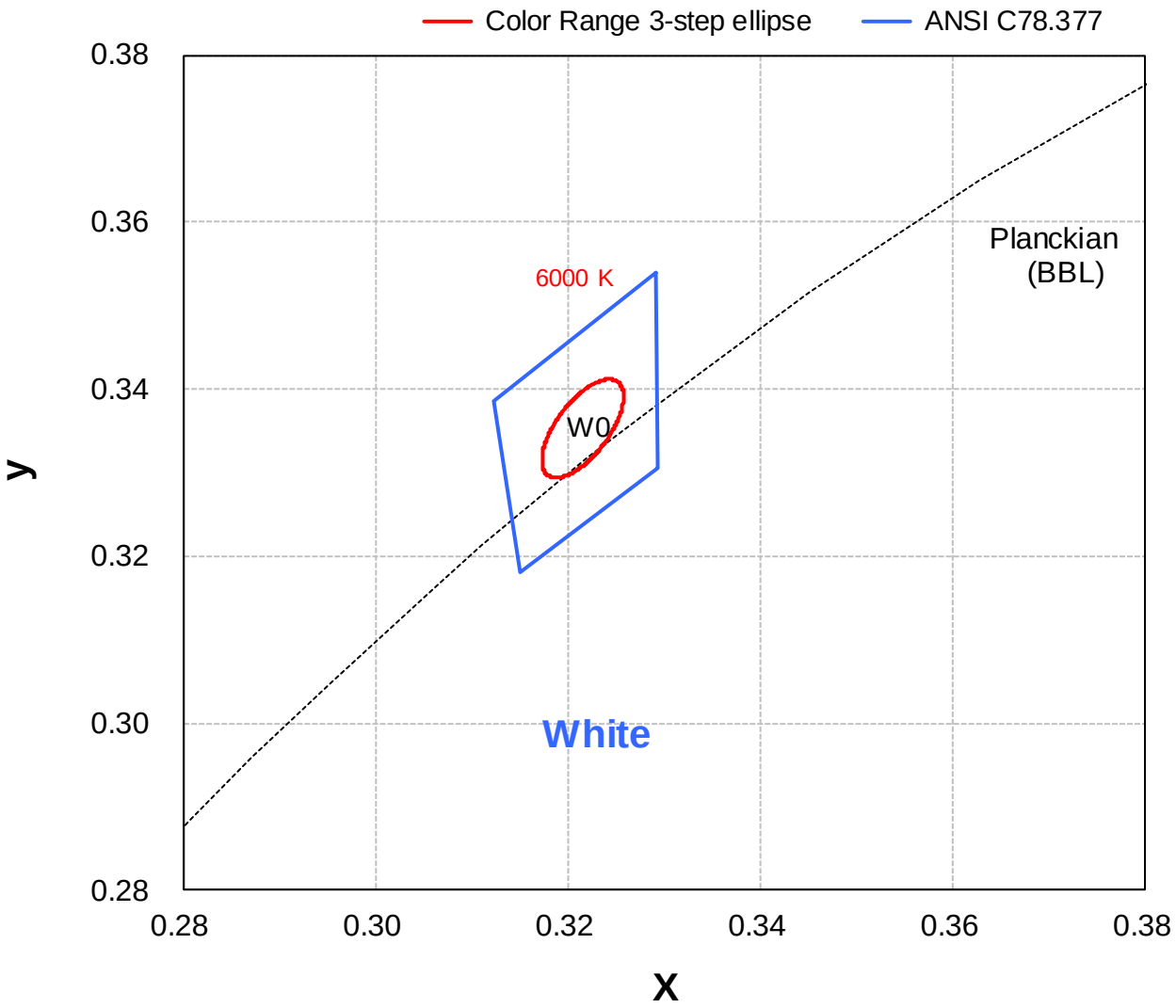
Photometric Luminous Flux Bin Structure

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)	Available Color Bins
PBLC-10FWE-B4NH60	A B	1350 1500	1500 1700	All 【1】
PBLC-10FNE-B4NH40	A B	1350 1500	1500 1700	All 【1】
PBLC-10FNE-B4NH35	B C	1100 1250	1250 1450	All 【1】
PBLC-10FVE-B4NH30	B C	1100 1250	1250 1450	All 【1】
PBLC-10FVE-B4NH27	A B	1000 1100	1100 1250	All 【1】
PBLC-10FVE-B4NH24	B C	950 1050	1050 1200	All 【1】
PBLC-10FVE-B4NH21	A B	850 950	950 1050	All 【1】

- ProLight maintains a tolerance of ± 7% on flux and power measurements.
- The flux bin of the product may be modified for improvement without notice.
- 【1】The rest of color bins are not 100% ready for order currently. Please ask for quote and order possibility.

Color Bin

White Binning Structure Graphical Representation



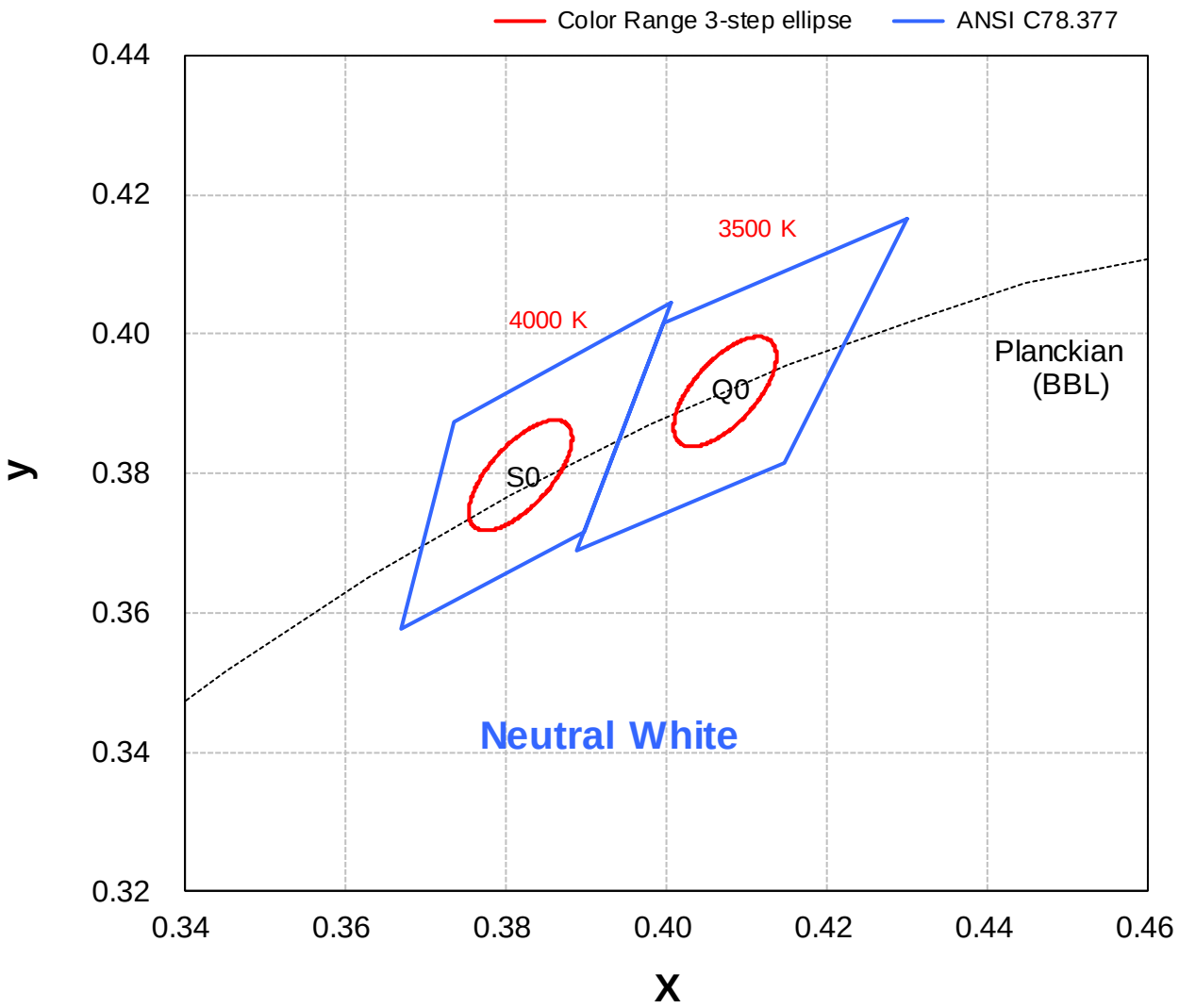
White Bin Structure

Bin Code		Center	Oval parameter		Typ. CCT (K)
W0	x	0.3215	a	0.00669	6000
	y	0.3353	b	0.00285	
			θ°	58.57	

- 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



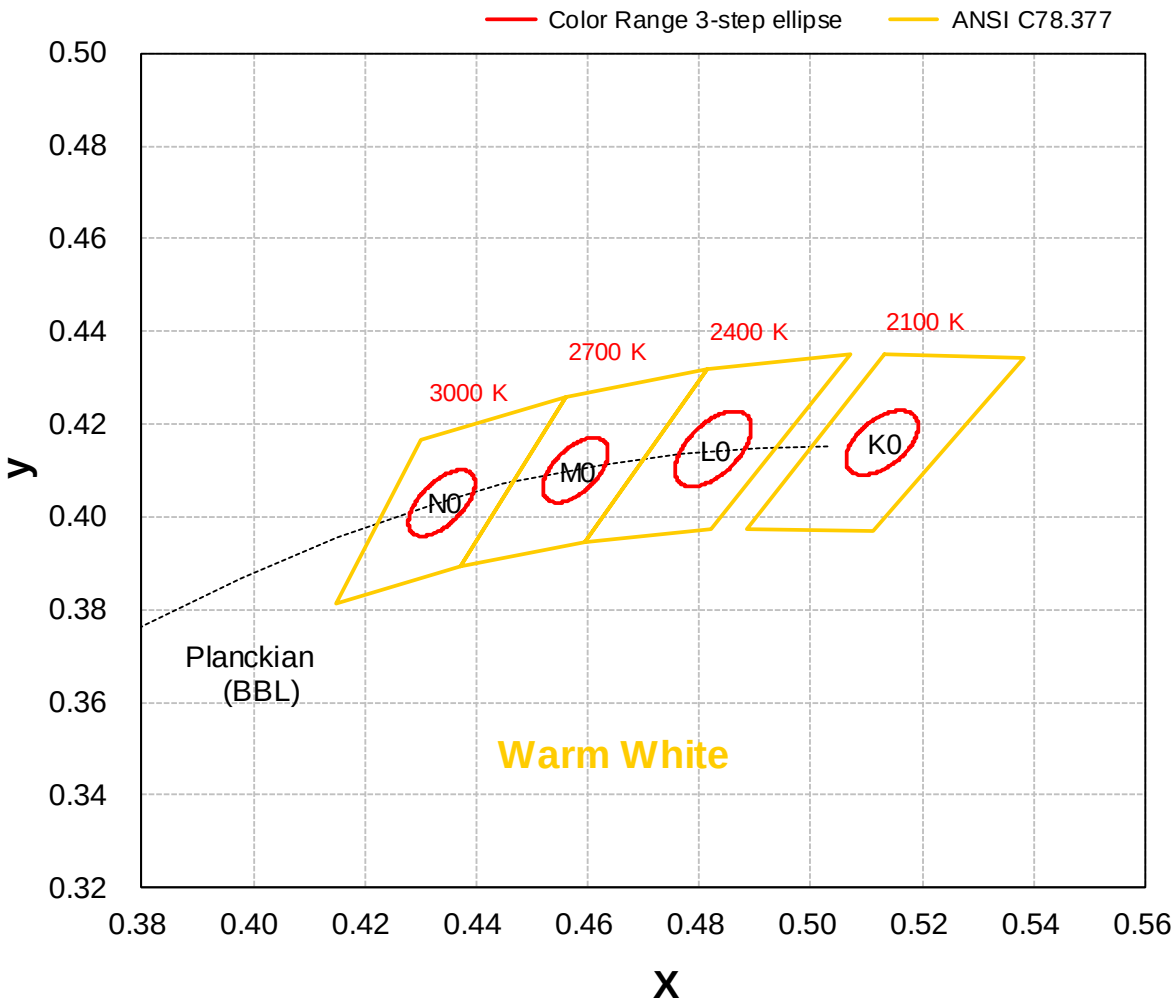
Neutral White Bin Structure

Bin Code		Center	Oval parameter		Typ. CCT (K)	Bin Code		Center	Oval parameter		Typ. CCT (K)
Q0	x	0.4073	a	0.00927	3500	S0	x	0.3818	a	0.00939	4000
	y	0.3917	b	0.00414			y	0.3797	b	0.00402	
			Θ°	54.00					Θ°	53.72	

- 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

Warm White Binning Structure Graphical Representation



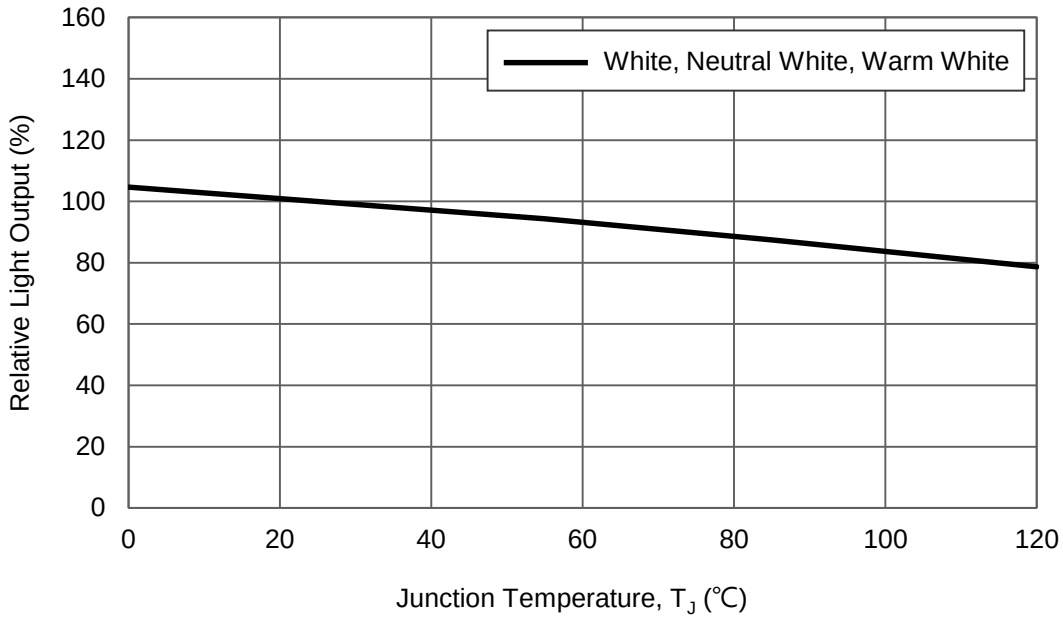
Warm White Bin Structure

Bin Code		Center	Oval parameter		Typ. CCT (K)	Bin Code		Center	Oval parameter		Typ. CCT (K)
K0	x	0.5128	a	0.0083	2100	M0	x	0.4578	a	0.00810	2700
	y	0.4160	b	0.0046			y	0.4101	b	0.00420	
			ɵ˚	48.65					ɵ˚	53.70	
L0	x	0.4825	a	0.0095	2400	N0	x	0.4338	a	0.00834	3000
	y	0.4147	b	0.0049			y	0.4030	b	0.00408	
			ɵ˚	53.70					ɵ˚	53.22	

- 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

Light Output Characteristics

Relative Light Output vs. Junction Temperature at 1000mA



Forward Current Characteristics, T_J = 25˚C

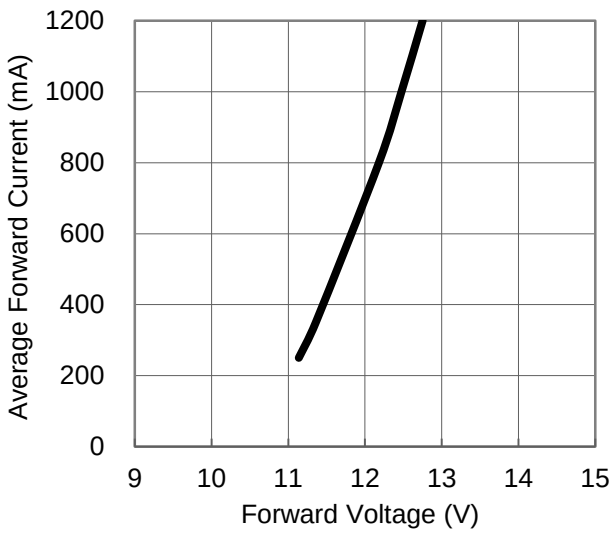


Fig 1. Forward Current vs. Forward Voltage for White, Neutral White, Warm White.

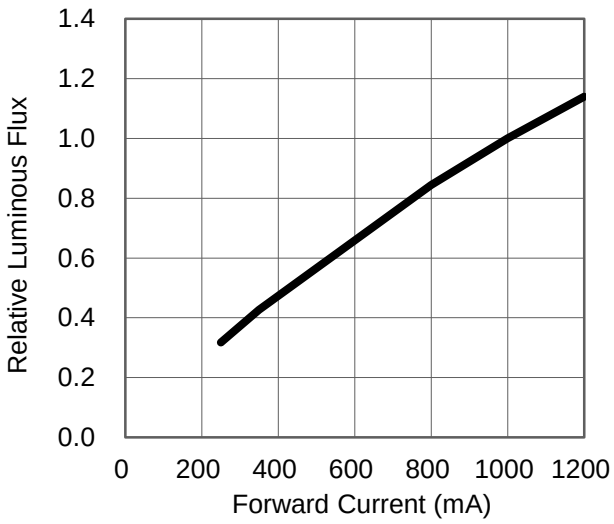
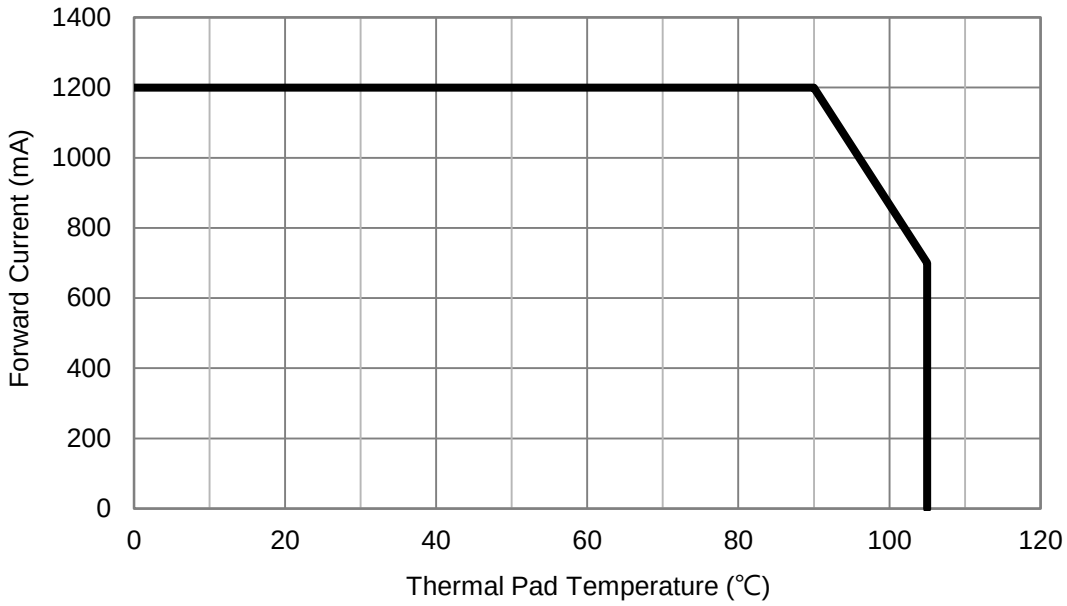
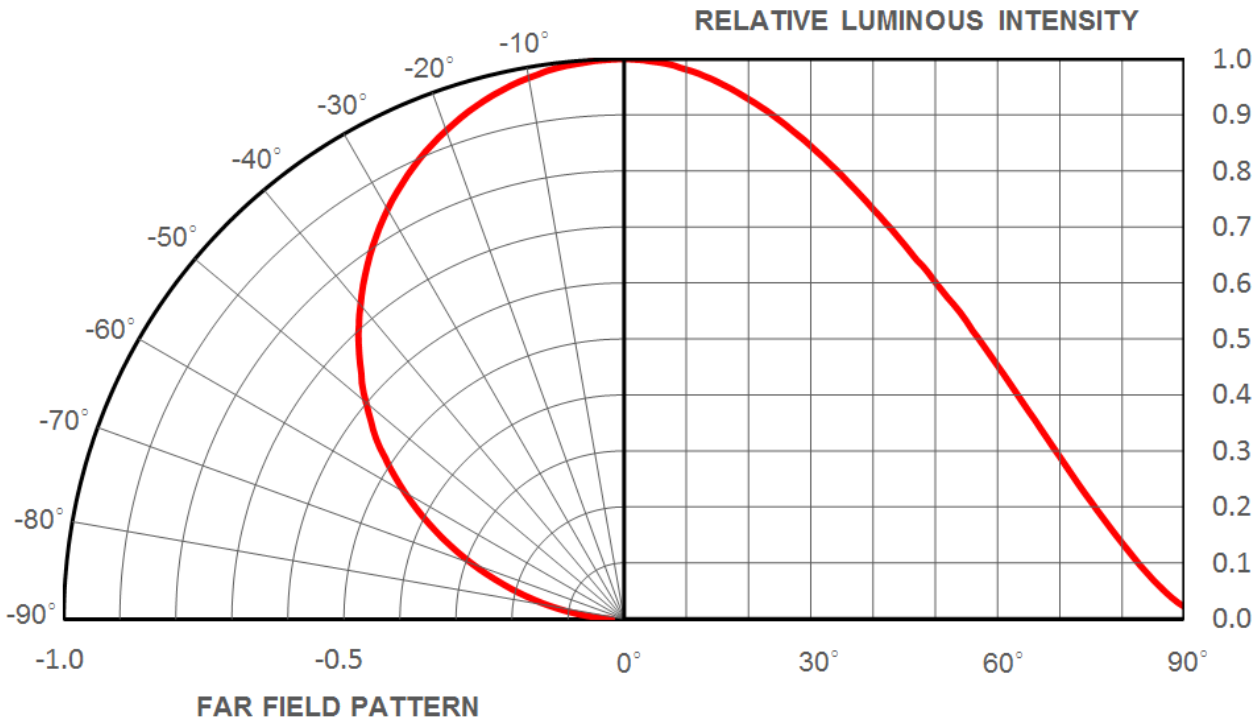


Fig 2. Relative Luminous Flux vs. Forward Current for White, Neutral White, Warm White at T_J=25 maintained.

Thermal Pad Temperature vs. Maximum Forward Current



Typical Representative Spatial Radiation Pattern



Moisture Sensitivity Level - JEDEC Level 1

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	≤30˚C / 85% RH	168 +5/-0	85˚C / 85% RH	NA	NA

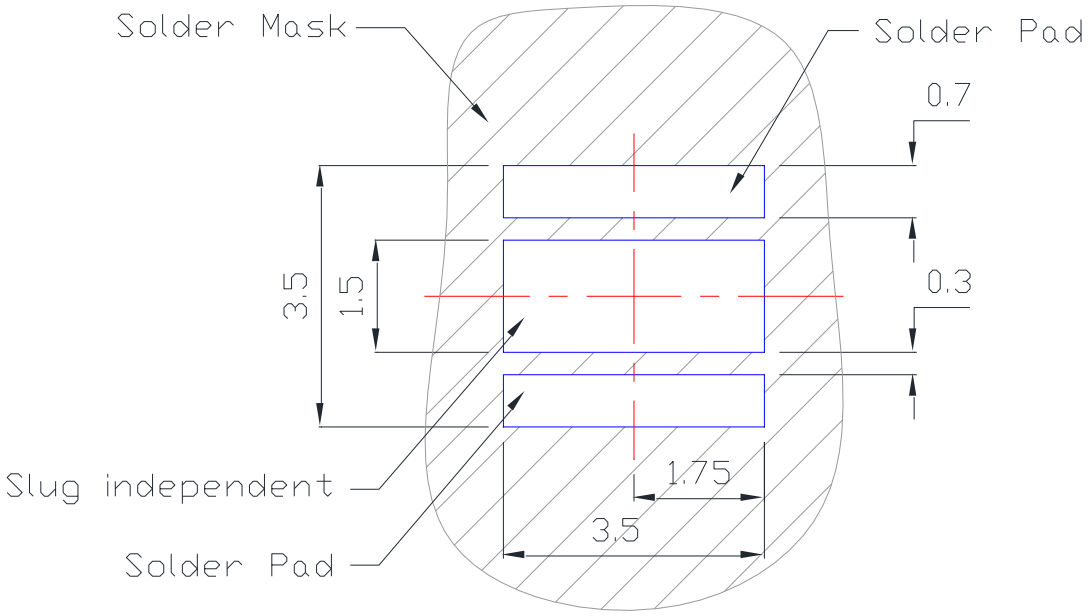
- The standard soak time includes a default value of 24 hours for semiconductor manufature's exposure time (MET) between bake and bag and includes the maximum time allowed out of the bag at the distributor's facility.
- Table below presents the moisture sensitivity level definitions per IPC/JEDEC's J-STD-020C.

Level	Floor Life		Soak Requirements			
			Standard		Accelerated Environment	
	Time	Conditions	Time (hours)	Conditions	Time (hours)	Conditions
1	Unlimited	≤30˚C / 85% RH	168 +5/-0	85˚C / 85% RH	NA	NA
2	1 year	≤30˚C / 60% RH	168 +5/-0	85˚C / 60% RH	NA	NA
2a	4 weeks	≤30˚C / 60% RH	696 +5/-0	30˚C / 60% RH	120 +1/-0	60˚C / 60% RH
3	168 hours	≤30˚C / 60% RH	192 +5/-0	30˚C / 60% RH	40 +1/-0	60˚C / 60% RH
4	72 hours	≤30˚C / 60% RH	96 +2/-0	30˚C / 60% RH	20 +0.5/-0	60˚C / 60% RH
5	48 hours	≤30˚C / 60% RH	72 +2/-0	30˚C / 60% RH	15 +0.5/-0	60˚C / 60% RH
5a	24 hours	≤30˚C / 60% RH	48 +2/-0	30˚C / 60% RH	10 +0.5/-0	60˚C / 60% RH
6	Time on Label (TOL)	≤30˚C / 60% RH	Time on Label (TOL)	30˚C / 60% RH	NA	NA

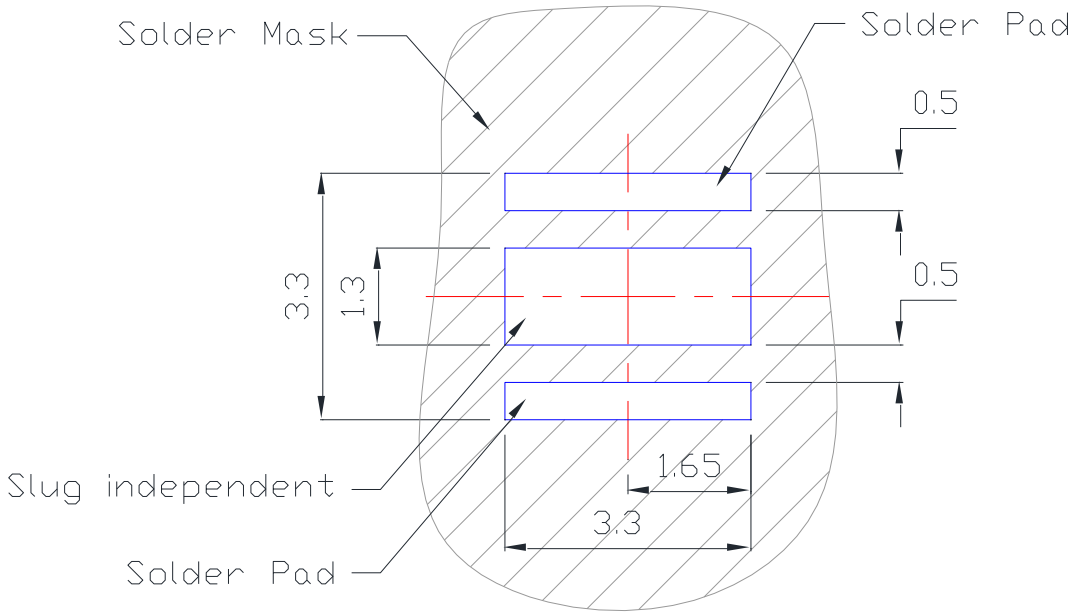
Recommended Solder Pad Design

Standard Emitter

TYPE A.



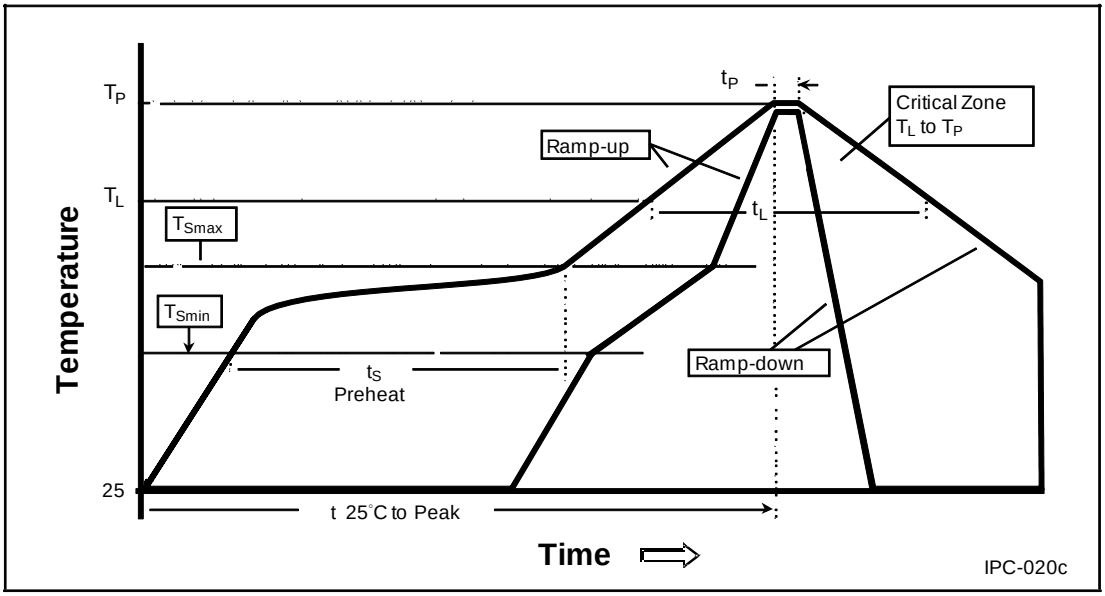
TYPE B.



- All dimensions are in millimeters.

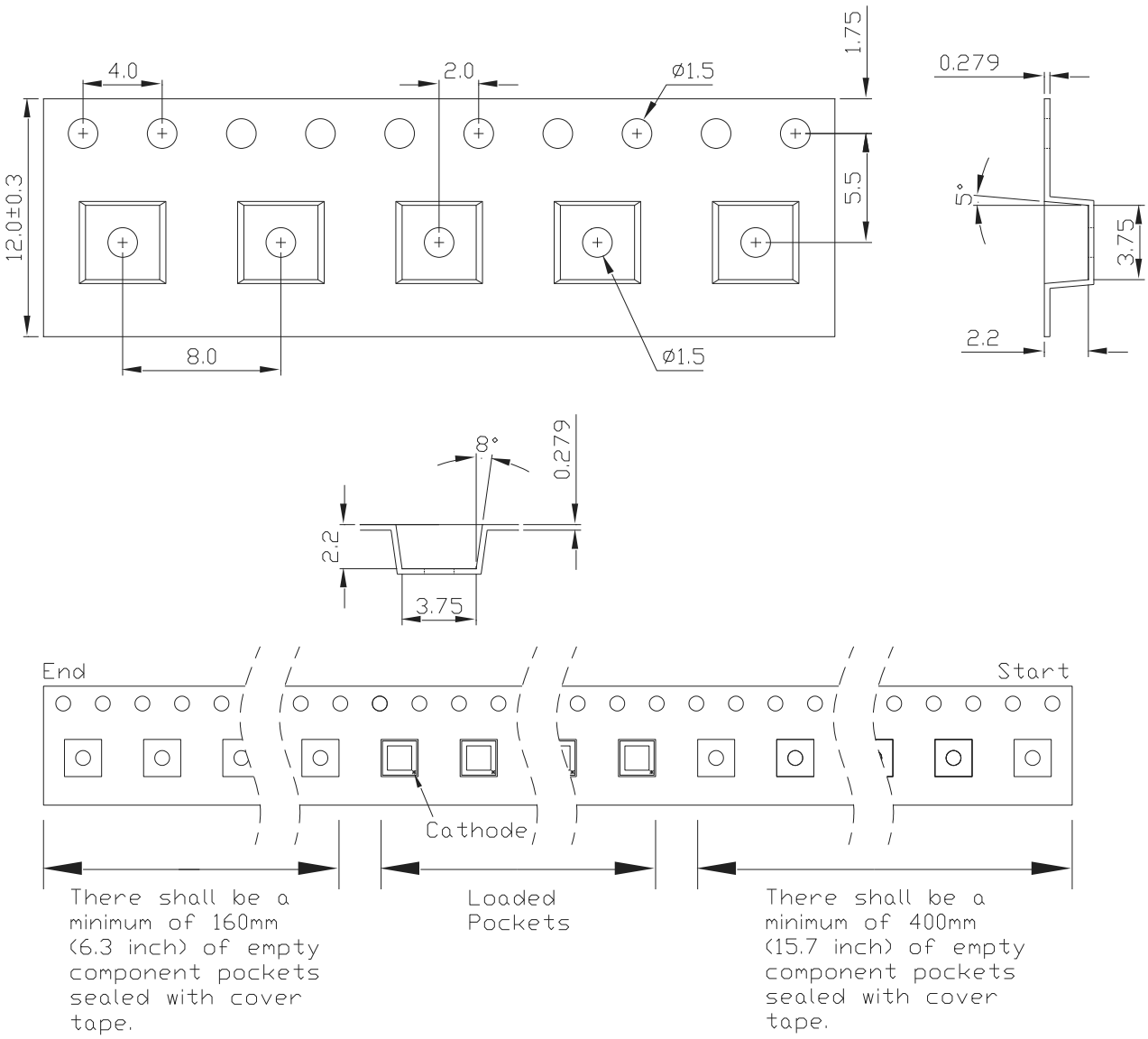
Reflow Soldering Condition

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max.	3°C / second max.
Preheat – Temperature Min (T_{Smin}) – Temperature Max (T_{Smax}) – Time (t_{Smin} to t_{Smax})	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: – Temperature (T_L) – Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak/Classification Temperature (T_P)	240°C	260°C
Time Within 5°C of Actual Peak Temperature (t_P)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



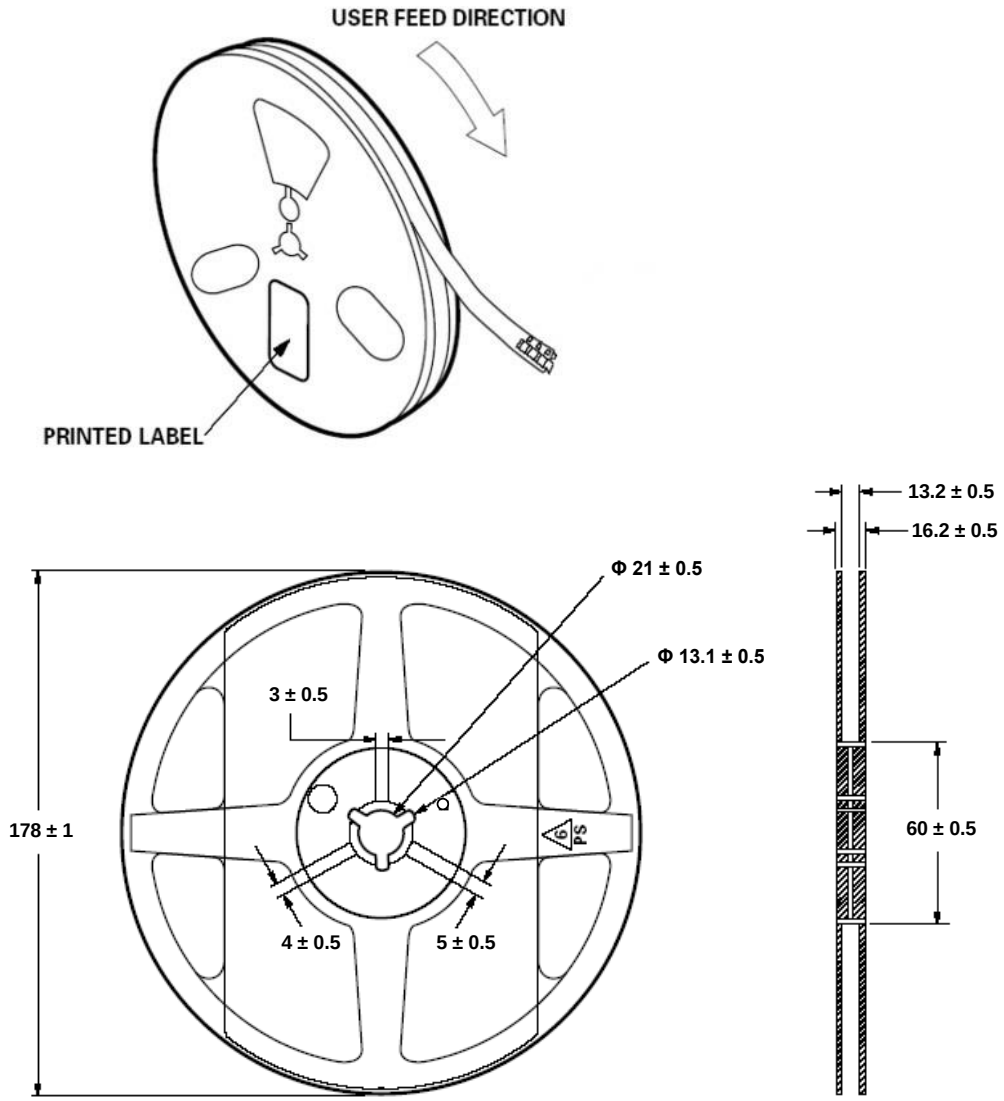
- **We recommend using the M705-S101-S4 solder paste from SMIC (Senju Metal Industry Co., Ltd.) for lead-free soldering.**
- **Do not use solder pastes with post reflow flux residue>47%. (58Bi-42Sn eutectic alloy, etc) This kind of solder pastes may cause a reliability problem to LED.**
- All temperatures refer to topside of the package, measured on the package body surface.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.
- Reflow soldering should not be done more than three times.
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.

Emitter Reel Packaging



Notes:
1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.1mm.

Emitter Reel Packaging



Notes:
1. Empty component pockets sealed with top cover tape.
2. 250, 500 and 1000 pieces per reel.
3. Drawing not to scale.
4. All dimensions are in millimeters.

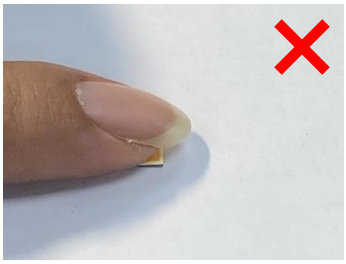
Precaution for Use

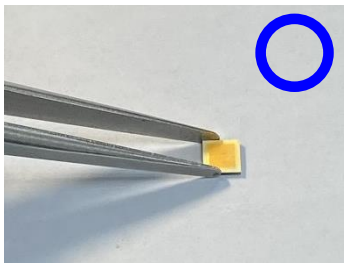
- Storage
  Please do not open the moisture barrier bag (MBB) more than one week. This may cause the leads of LED discoloration. We recommend storing ProLight's LEDs in a dry box after opening the MBB. The recommended storage conditions are temperature 5 to 30°C and humidity less than 40% RH. It is also recommended to return the LEDs to the MBB and to reseal the MBB.
- The slug is is not electrically neutral. Therefore, we recommend to isolate the heat sink.
- **We recommend using the M705-S101-S4 solder paste from SMIC (Senju Metal Industry Co., Ltd.) for lead-free soldering.**
- **Do not use solder pastes with post reflow flux residue>47%. (58Bi-42Sn eutectic alloy, etc) This kind of solder pastes may cause a reliability problem to LED.**
- Any mechanical force or any excess vibration shall not be accepted to apply during cooling process to normal temperature after soldering.
- Please avoid rapid cooling after soldering.
- Components should not be mounted on warped direction of PCB.
- Repairing should not be done after the LEDs have been soldered. When repairing is unavoidable, a heat plate should be used. It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.
- This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When cleaning is required, isopropyl alcohol should be used.
- When the LEDs are illuminating, operating current should be decide after considering the package maximum temperature.
- 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.
- The LEDs should only be picked up by making contact with the sides of the LED body.
- 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.
- When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the silicone lens must be prevented.
- Please do not mold over the silicone lens with another resin. (epoxy, urethane, etc)





Disclaimers

ProLightopto Technology has made every reasonable effort to ensure the accuracy of the information in this datasheet. However, it should be understood that this information is for guidance only and does not constitute any offer or part of a contract.

ProLightopto Technology does not guarantee or accept any legal liability for the accuracy, completeness, or usefulness of any information, product, technology, or process disclosed in this datasheet.
The company reserves the right to make changes or improvements to this datasheet at its discretion.

Unless this datasheet is incorporated into a formal contract, customers should not rely on the information as a binding commitment to any specifications or product parameters by ProLightopto Technology. Customers are advised to verify that the information is current and complete before entering into any contract or acknowledging any purchase order. Therefore, all products described herein are subject to ProLightopto Technology's terms and conditions at the time of order acknowledgment.

Unless agreed upon by contractual agreement, not all parameters of each product are necessarily tested. ProLightopto Technology does not warrant or grant any license, either expressed or implied, under its patent rights or the rights of others.

Reproduction of the information contained herein is permitted only if done without any modifications or alterations. Altering this information and reproducing it is considered an unfair and deceptive business practice. ProLightopto Technology is not responsible or liable for any such altered documentation.

Reselling ProLightopto Technology's products with statements that differ from or exceed the parameters specified by ProLightopto Technology voids all express or implied warranties for the associated product or service and is considered an unfair and deceptive business practice. ProLightopto Technology is not responsible or liable for any such statements.

ProLightopto Technology's products are not authorized for use as critical components in life support devices or systems without explicit written approval from ProLightopto Technology.

For the purposes of this disclaimer：

1. Life support devices or systems are defined as those intended for surgical implant into the body or those that support or sustain life. Their failure, when used according to instructions for use provided in the labeling, can reasonably be expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure can reasonably be expected to cause the failure of the device or system, or to affect its safety or effectiveness.