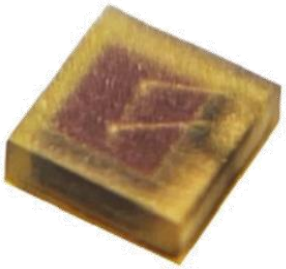


ProLight PY2A-3FxE
3W Power LED
Technical Datasheet
Version: 1.1

ProLight PEC2.0 1717 Series

Features

· RoHS compliant
· Very wide Viewing Angle
· Thinner product with Pad Extension Chip technology

Main Applications

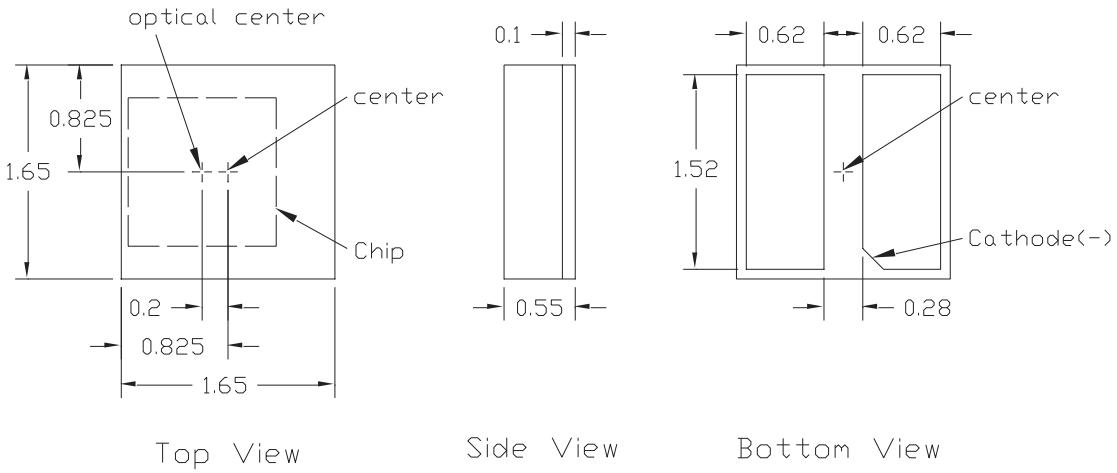
· Warning Light
· Entertainment lighting
· Commercial lighting
· Indoor lighting
· Outdoor lighting
· Stage lighting
· Consumer portable
· Architectural
· High-end portable

Introduction

· ProLight 1717 is one of the smallest and thinnest high power CSP LED footprint available by ProLight Opto, has offered extended solid-state lighting design possibilities. The 1717's combination of consistent design across all configurations and its small size permit improved color mixing and optical control, compared to the larger 3535 LED. ProLight 1717 is designed with ProLight unique packaging and super thin substrate technology which providing superior high stability reliability.
· 1717 qualifies as the JEDEC Level 1 MSL sensitivity level and suitable for SMD process, Pb free reflow soldering capability, and full compliance with EU education of Hazardous Substances (RoHS) legislation.

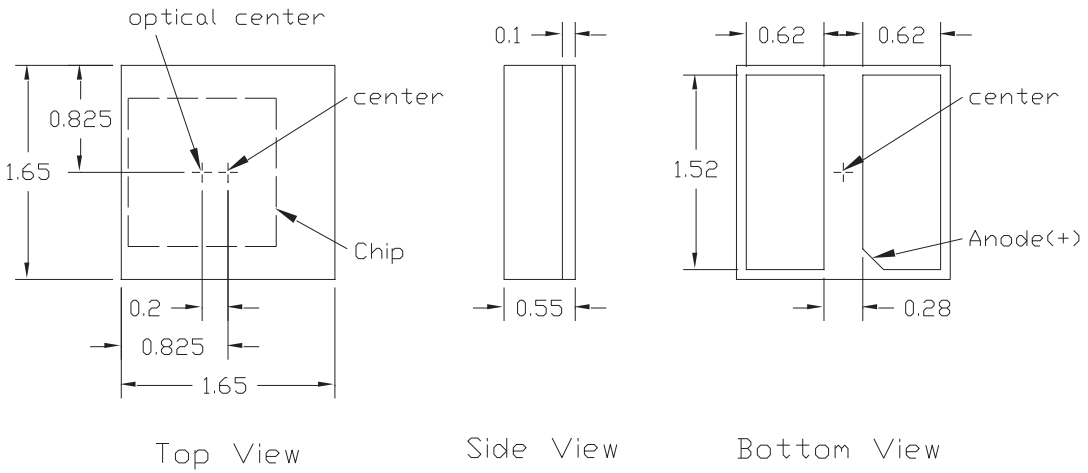
Emitter Mechanical Dimensions

Red, Green, Cyan, Crimson, Cherry Red



Top View Side View Bottom View

UV-L



Top View Side View Bottom View

Notes:
1. Drawing not to scale.
2. All dimensions are in millimeters.
3. Unless otherwise indicated, tolerances are ± 0.15mm.
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, T_J = 25˚C

Color	Part Number Emitter	Luminous Flux or Power @350mA Min.	@350mA Typ.	Refer @700mA Typ.
Red	PY2A-3FRE	30 lm	50 lm	87 lm
Green	PY2A-3FGE	70 lm	90 lm	146 lm
Cyan	PY2A-3FCE	40 lm	50 lm	75 lm
Crimson	PY2A-3FME	280 mW	315 mW	504 mW
Cherry Red	PY2A-3FEE	230 mW	275 mW	498 mW
UV-L	PY2A-3FLE	430 mW	480 mW	905 mW

- ProLight maintains a tolerance of ± 7% on flux and power measurements.
- Please do not drive at rated current more than 1 second without proper heat sink.

Electrical Characteristics, T_J = 25˚C

Color	Forward Voltage V_F (V) @350mA Min.	@350mA Typ.	@350mA Max.	Refer @700mA Typ.	Thermal Resistance Junction to Slug (˚C/ W)
Red	1.75	2.15	3.00	2.40	6
Green	2.60	3.10	3.60	3.40	6
Cyan	2.85	3.10	3.60	3.40	6
Crimson	1.80	2.05	2.30	2.27	6
Cherry Red	1.80	2.02	2.30	2.28	6
UV-L	2.60	3.00	3.60	3.15	6

- ProLight maintains a tolerance of ± 0.1V for Voltage measurements.

Optical Characteristics at 350mA, T_J = 25°C

Radiation Pattern	Color	Dominant Wavelength λ_D, Peak Wavelength [1] λ_P, Min.	Typ.	Max.	Total included Angle (degrees) $\theta_{0.90V}$	Viewing Angle (degrees) $2\theta_{1/2}$
Flat	Red	610 nm	620.5 nm	631 nm	170	120
	Green	515 nm	525 nm	535 nm	170	120
	Cyan	495 nm	505 nm	515 nm	170	120
	Crimson [1] [2]	650 nm	660 nm	670 nm	170	120
	Cherry Red [1]	720 nm	730 nm	740 nm	170	120
	UV-L [1]	400 nm	405 nm	410 nm	170	120

Notes:

- ProLight maintains a tolerance of ± 1nm for dominant wavelength measurements.
- [1] Crimson, Cherry Red, UV-L product is binned by peak wavelength rather than dominant wavelength.
- [2] The peak wavelength of 660nm should contain the dominant wavelength of around 640nm.

Absolute Maximum Ratings

Parameter	Red/Green/Cyan/Crimson/Cherry Red/UV-L
DC Forward Current (mA)	700
Peak Pulsed Forward Current (mA)	1000 (less than 1/10 duty cycle@1KHz)
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	2KV
LED Junction Temperature	125°C
Operating Board Temperature at Maximum DC Forward Current	-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

Radiometric Power Bin Structure at 350mA

Color	Bin Code	Minimum Radiometric Power (mW)	Maximum Radiometric Power (mW)	Available Color Bins
Crimson	M	280	330	All
	N	330	380	【1】
Cherry Red	L	230	280	All
	M	280	330	All
	N	330	380	【1】
UV-L	Q	430	480	All
	R	480	530	【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.

Photometric Luminous Flux Bin Structure at 350mA

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)	Available Color Bins
Red	Q	30	40	4
	R	40	50	All
	S1	50	60	2
	S2	60	70	2
	T1	70	80	【1】
	T2	80	90	【1】
	U1	90	100	【1】
	U2	100	110	【1】
Green	T1	70	80	All
	T2	80	90	All
	U1	90	100	【1】
	U2	100	110	【1】
	V1	110	120	【1】
Cyan	R	40	50	All
	S1	50	60	【1】
	S2	60	70	【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.

Dominant Wavelength Bin Structure at 350mA

Color	Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
Red	2	610.0	620.5
	4	620.5	631.0
Green	A	515	520
	1	520	525
	2	525	530
	3	530	535
Cyan	A	495	500
	1	500	505
	2	505	510
	3	510	515

- ProLight maintains a tolerance of ± 1nm for dominant wavelength measurements.

Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

Peak Wavelength Bin Structure at 350mA

Color	Bin Code	Minimum Peak Wavelength (nm)	Maximum Peak Wavelength (nm)
Crimson	1	650	670
Cherry Red	1	720	740
UV	3	400	405
	4	405	410

- ProLight maintains a tolerance of ± 1nm for peak wavelength measurements.

Forward Voltage Bin Structure at 350mA

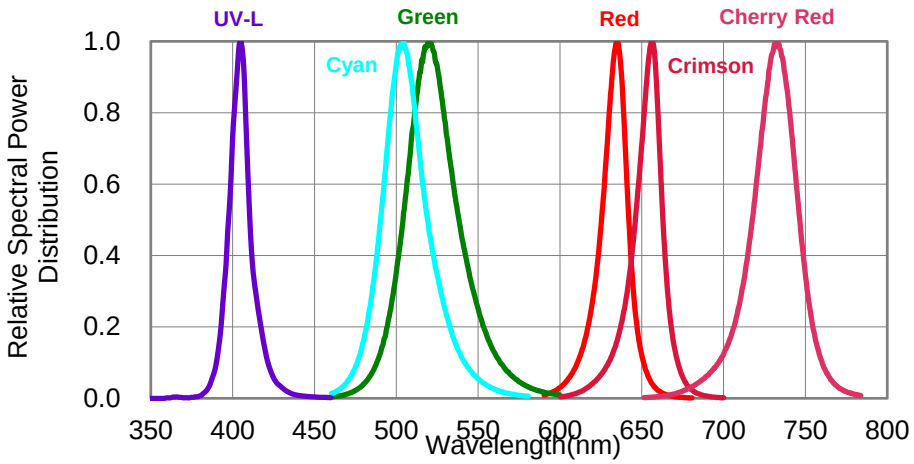
Color	Bin Code	Minimum Voltage (V)	Maximum Voltage (V)
Red	A	1.75	2.00
	B	2.00	2.25
	D	2.25	2.50
	E	2.50	2.75
	F	2.75	3.00
Green	a	2.60	2.85
	A	2.85	3.10
	B	3.10	3.35
	D	3.35	3.60
Cyan	A	2.85	3.10
	B	3.10	3.35
	D	3.35	3.60
Crimson	A	1.80	1.90
	B	1.90	2.00
	D	2.00	2.10
	E	2.10	2.20
	F	2.20	2.30
Cherry Red	A	1.80	1.90
	B	1.90	2.00
	D	2.00	2.10
	E	2.10	2.20
	F	2.20	2.30
UV-L	a	2.60	2.80
	A	2.80	3.00
	B	3.00	3.20
	D	3.20	3.40
	E	3.40	3.60

- ProLight maintains a tolerance of ± 0.1V for Voltage measurements.

Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

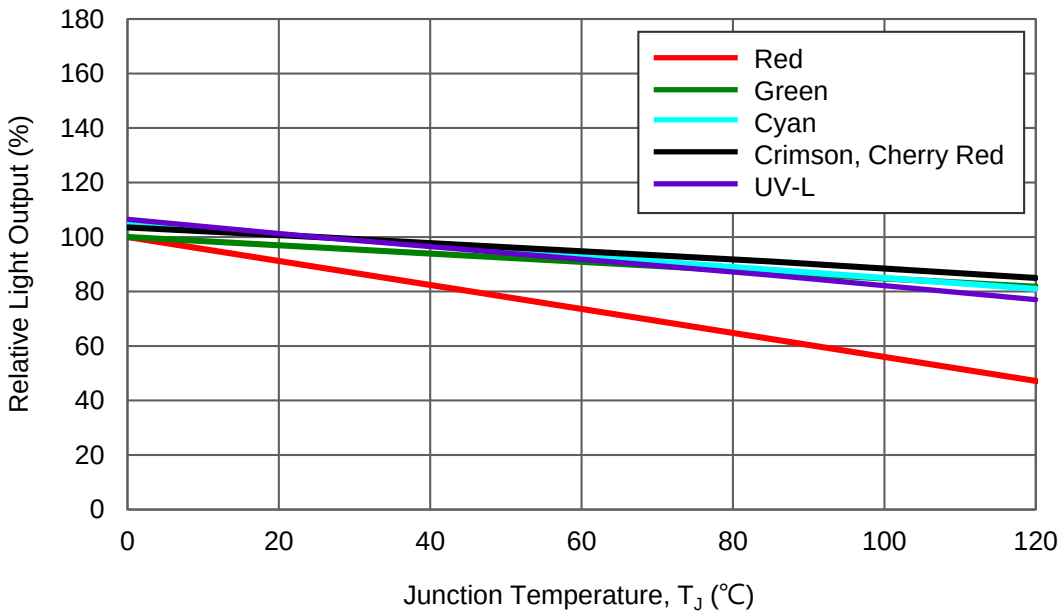
Color Spectrum, T_J = 25˚C

1. UV-L、Cyan、Green、Red、Crimson、Cherry Red



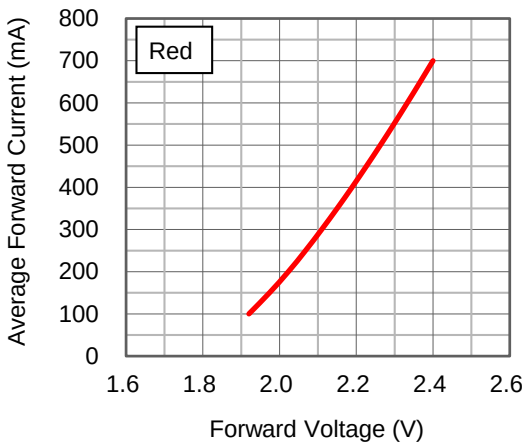
Light Output Characteristics

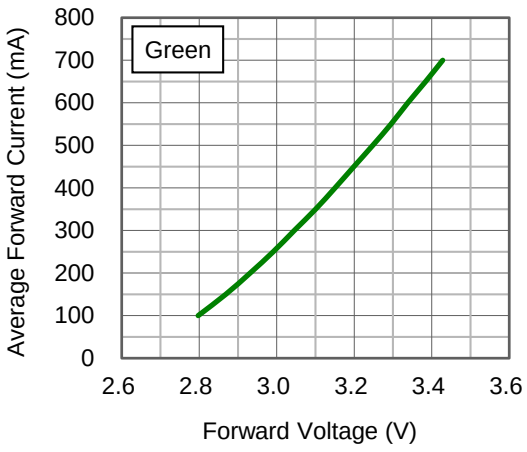
Relative Light Output vs. Junction Temperature at 350mA

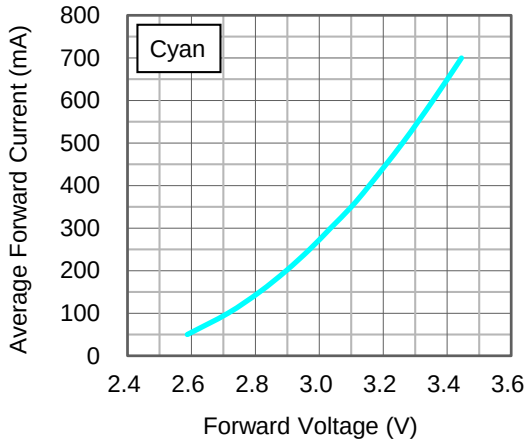


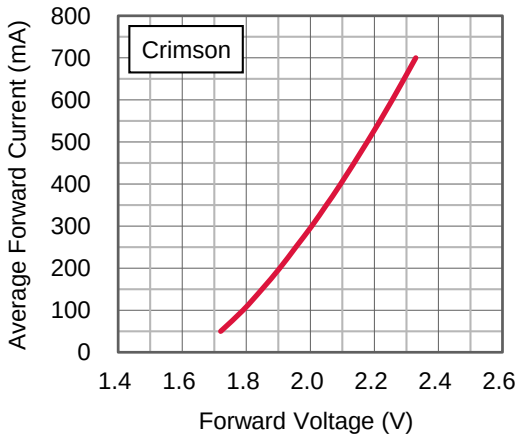
Forward Current Characteristics, T_J = 25˚C

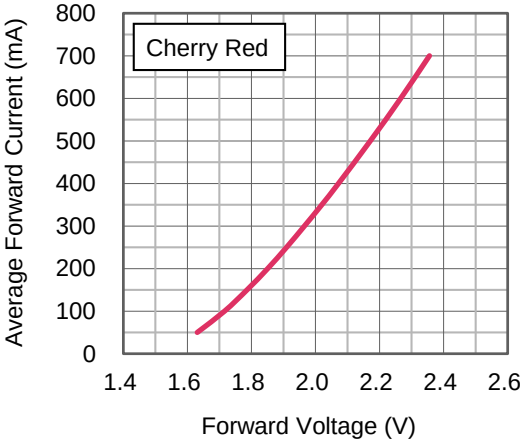
1. Forward Voltage vs. Forward Current

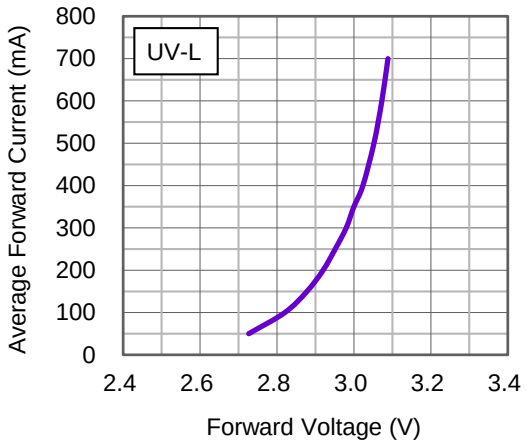






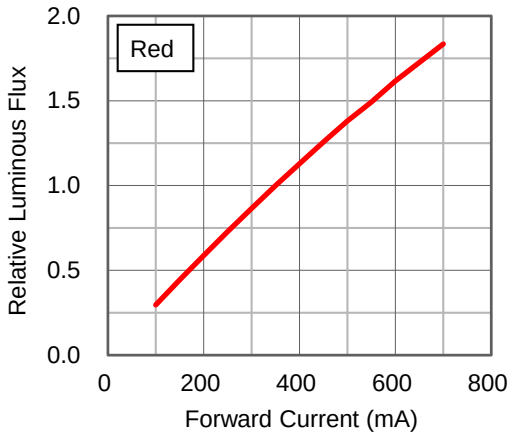


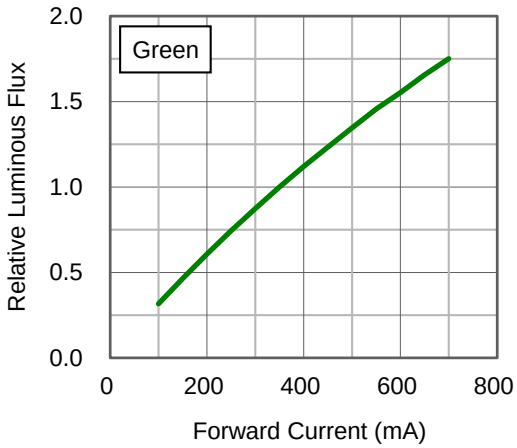


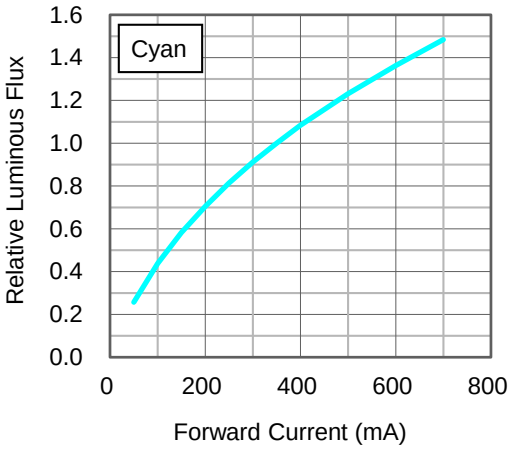


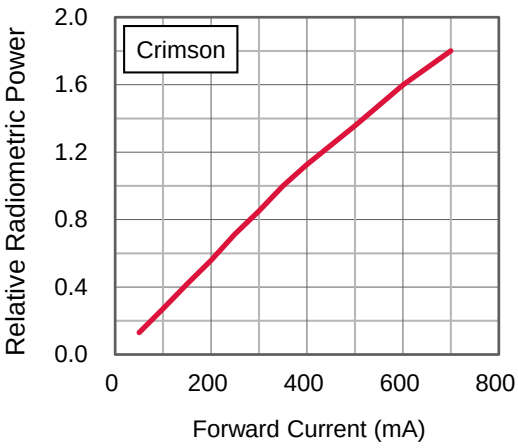
Forward Current Characteristics, T_J = 25˚C

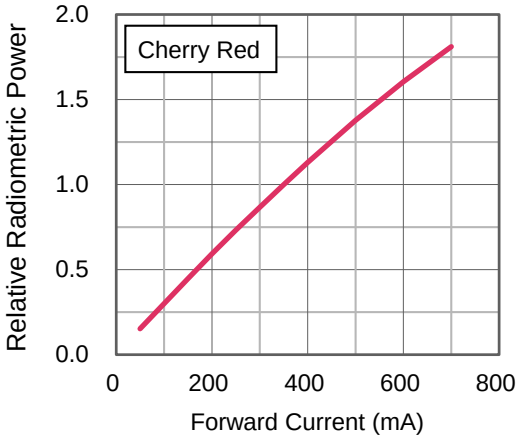
2. Forward Current vs. Normalized Relative Luminous Flux

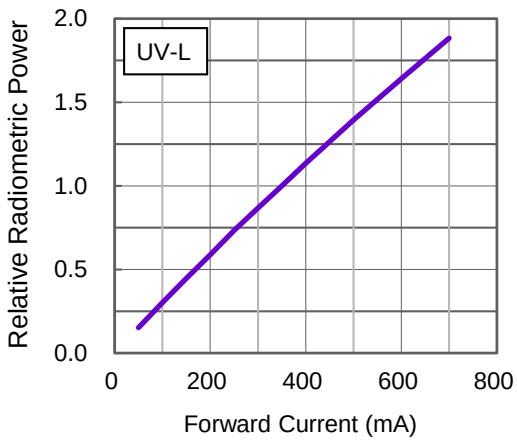




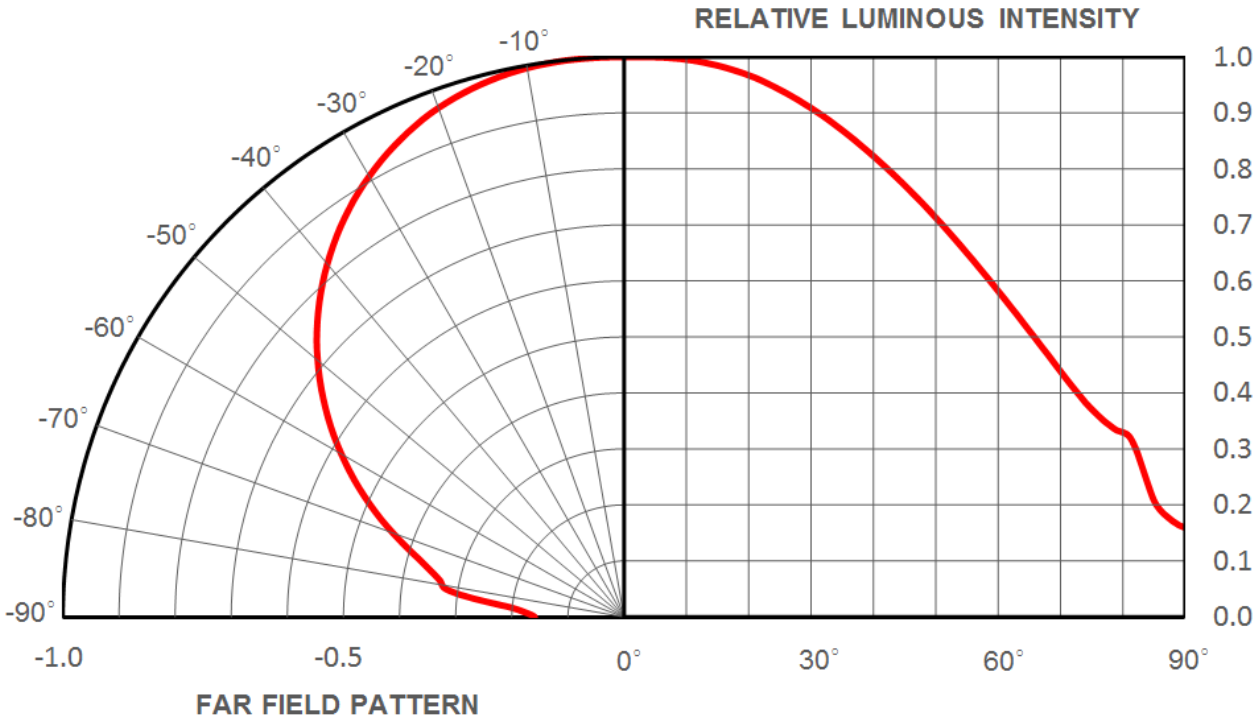








Typical Representative Spatial Radiation Pattern



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

Qualification Reliability Testing

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life (RTOL)	25°C, I_F = max DC (Note 1)	1000 hours	Note 2
Wet High Temperature Operating Life (WHTOL)	85°C/60%RH, I_F = max DC (Note 1)	1000 hours	Note 2
Wet High Temperature Storage Life (WHTSL)	85°C/85%RH, non-operating	1000 hours	Note 2
High Temperature Storage Life (HTSL)	110°C, non-operating	1000 hours	Note 2
Low Temperature Storage Life (LTSL)	-40°C, non-operating	1000 hours	Note 2
Non-operating Temperature Cycle (TMCL)	-40°C to 120°C, 30 min. dwell, <5 min. transfer	200 cycles	Note 2
Mechanical Shock	1500 G, 0.5 msec. pulse, 5 shocks each 6 axis		Note 3
Natural Drop	On concrete from 1.2 m, 3X		Note 3
Variable Vibration Frequency	10-2000-10 Hz, log or linear sweep rate, 20 G about 1 min., 1.5 mm, 3X/axis		Note 3
Solder Heat Resistance (SHR)	260°C ± 5°C, 10 sec.		Note 3
Solderability	Steam age for 16 hrs., then solder dip at 260°C for 5 sec.		Solder coverage on lead

Notes:
1. Depending on the maximum derating curve.
2. Criteria for judging failure

Item	Test Condition	Criteria for Judgement	
		Min.	Max.
Forward Voltage (V_F)	I_F = max DC	--	Initial Level x 1.1
Luminous Flux or Radiometric Power (Φ_V)	I_F = max DC	Initial Level x 0.7	--
Reverse Current (I_R)	V_R = 5V	--	50 μA

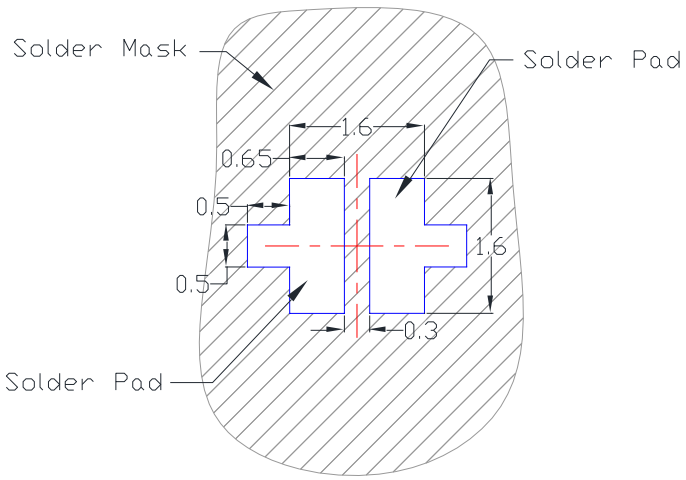
* The test is performed after the LED is cooled down to the room temperature.

3. A failure is an LED that is open or shorted.

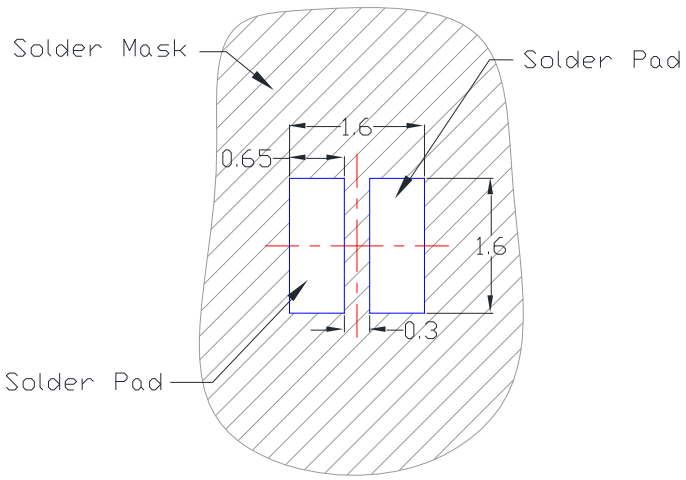
Recommended Solder Pad Design

Standard Emitter

TYPE A.



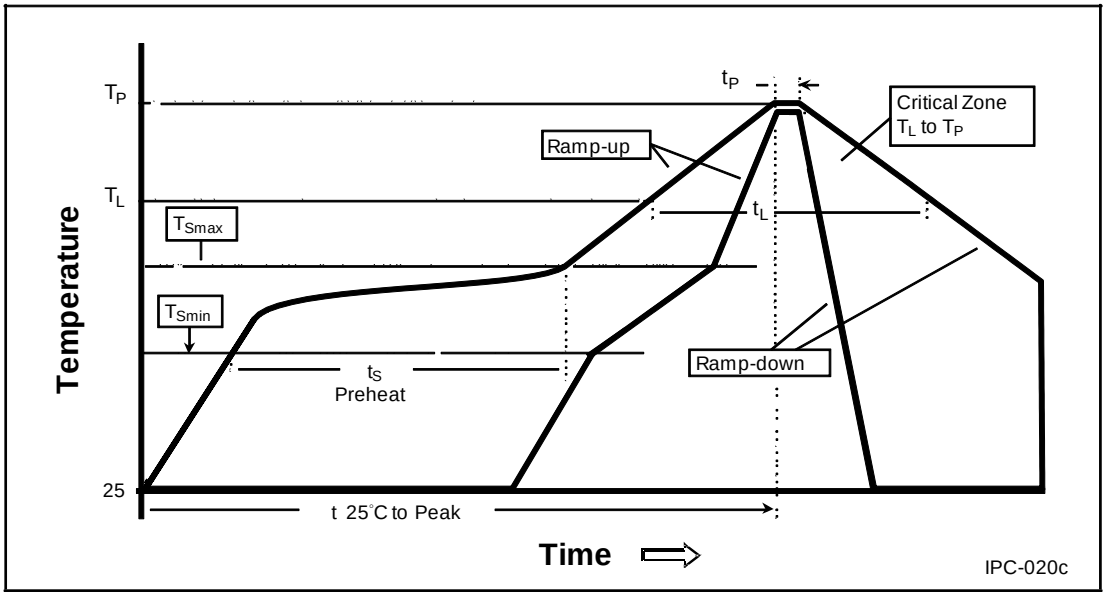
TYPE B.



- All dimensions are in millimeters.

Reflow Soldering Condition

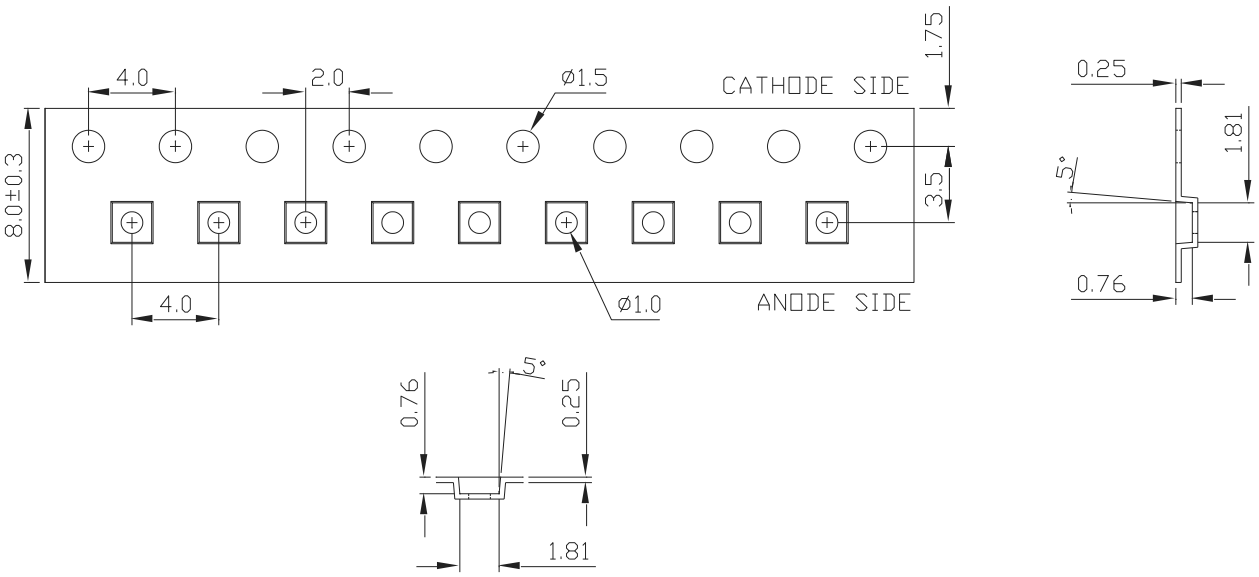
Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max.	3°C / second max.
Preheat – Temperature Min (T_{Smin}) – Temperature Max (T_{Smax}) – Time (t_{Smin} to t_{Smax})	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: – 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

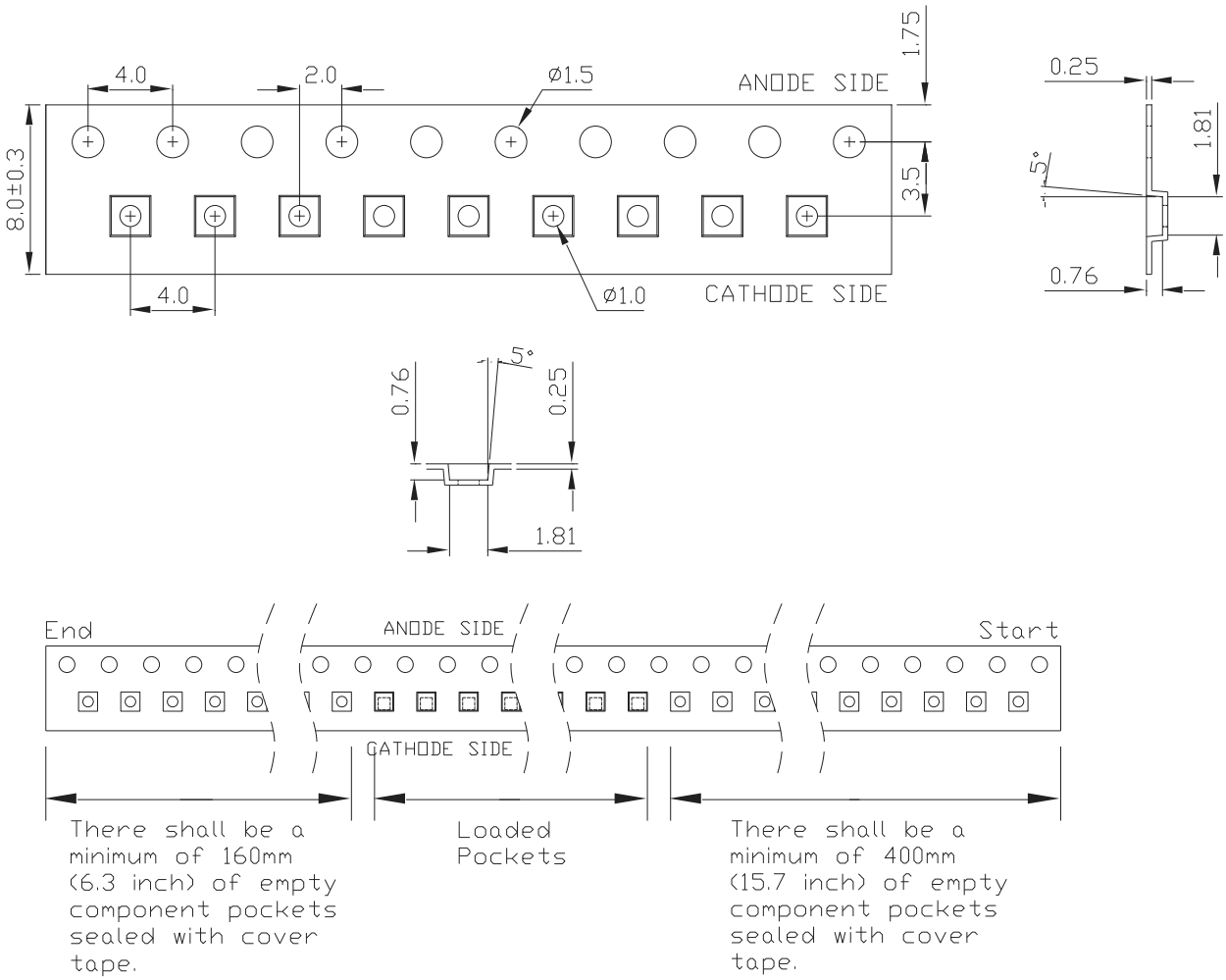
Red, Green, Cyan, Crimson, Cherry Red



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

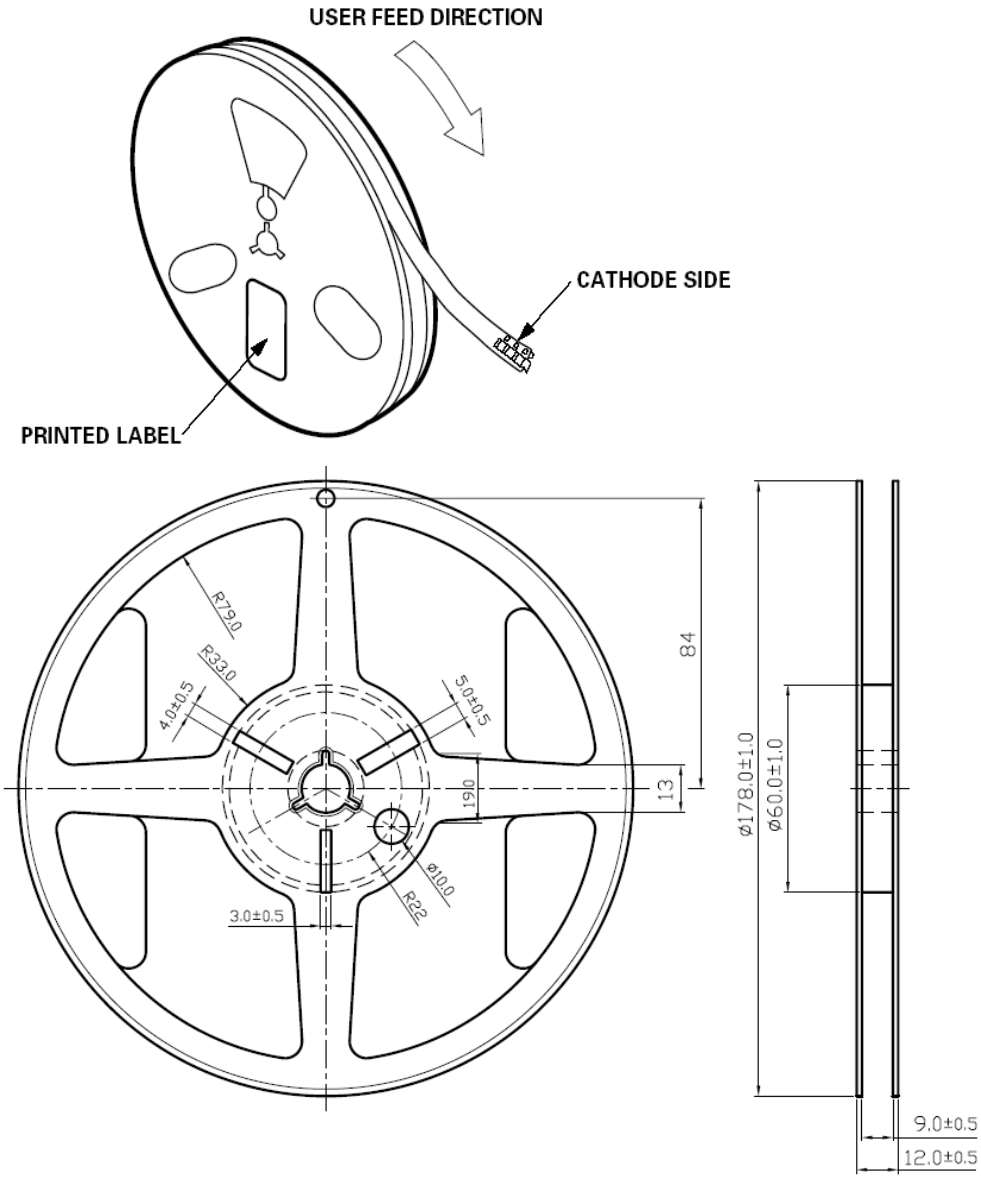
Emitter Reel Packaging

UV-L



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. 1000 and 2000 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.

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