

**ProLight PM2L-1LLE-CS
1W UV-S Power LED
Technical Datasheet
Version: 1.2**



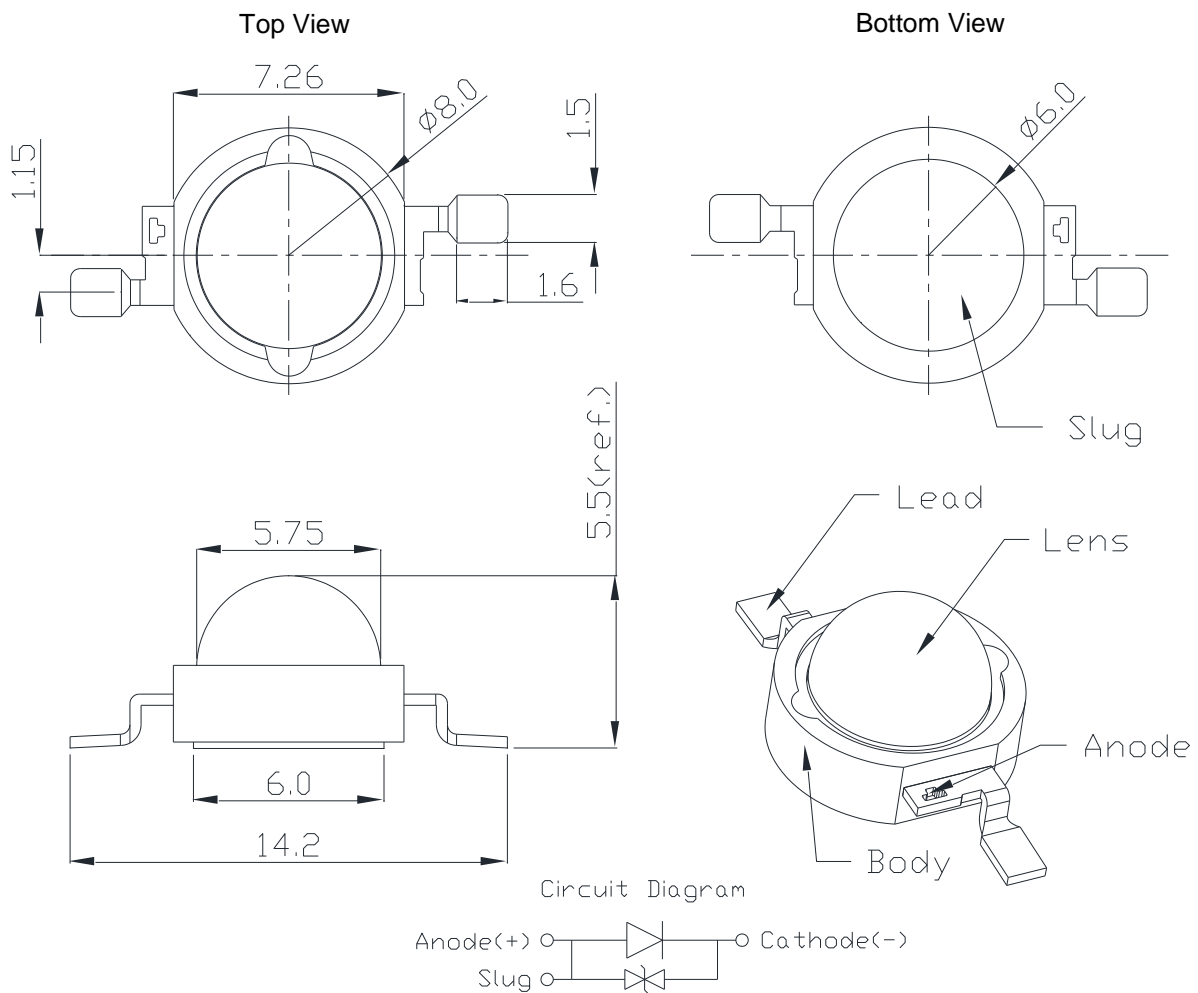
Features

- Instant light (less than 100ns)
- Lead free reflow soldering
- RoHS compliant
- Cool beam, safe to the touch
- Superior ESD protection

Typical Applications

- UV gluing, UV curing, UV marking
- UV drying of printing inks and lacquers
- Currency inspection
- Forensic analysis - urine, protein stains
- Leak detection using fluorescent dyes
- Detects fluorescing minerals and gems
- Indoor Lighting
- Outdoor Lighting

Emitter Mechanical Dimensions



Notes:

1. The Anode side of the device is denoted by a hole in the lead frame.
2. Electrical insulation between the case and the board is required. Do not electrically connect either the anode or cathode to the slug.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. Unless otherwise indicated, tolerances are $\pm 0.20\text{mm}$.
6. Please do not bend the leads of the LED, otherwise it will damage the LED.
7. **Please do not use a force of over 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.

ProLight

Flux Characteristics at 350mA, T_J = 25°C

Radiation Pattern	Color	Part Number Emitter	Radiometric Power (mW)	
			Minimum	Typical
Lambertian	UV-S	PM2L-1LLE-CS	335	410

- 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 at 350mA, T_J = 25°C

Color	Forward Voltage V _F (V)			Thermal Resistance Junction to Slug (°C/ W)
	Min.	Typ.	Max.	
UV-S	3.2	3.6	4.0	10

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

Optical Characteristics at 350mA, T_J = 25°C

Color	Peak Wavelength λ _p			Total included Angle (degrees) θ _{0.90V}	Viewing Angle (degrees) 2 θ _{1/2}
	Min.	Typ.	Max.		
UV-S	360 nm	368 nm	375 nm	180	130

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

Absolute Maximum Ratings

Parameter	UV-S
DC Forward Current (mA)	350
Peak Pulsed Forward Current (mA)	500 (less than 1/10 duty cycle@1KHz)
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	±4000V (Class III)
LED Junction Temperature	120°C
Operating Board Temperature at Maximum DC Forward Current	-40°C - 85°C
Storage Temperature	-40°C - 120°C
Soldering Temperature	JEDEC 020c 240°C
Allowable Reflow Cycles	3
Reverse Voltage	Not designed to be driven in reverse bias

Radiometric Power Bin Structure

Color	Bin Code	Minimum Radiometric Power (mW)	Maximum Radiometric Power (mW)	Available Color Bins
UV-S	P	335	435	All
	Q	275	335	[1]
	R	335	435	[1]

- ProLight maintains a tolerance of $\pm 7\%$ 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.

Peak Wavelength Bin Structure

Color	Bin Code	Minimum Peak Wavelength (nm)	Maximum Peak Wavelength (nm)
UV-S	1	360	365
	2	365	370
	3	370	375

- ProLight maintains a tolerance of $\pm 1\text{nm}$ for peak wavelength measurements.

Forward Voltage Bin Structure

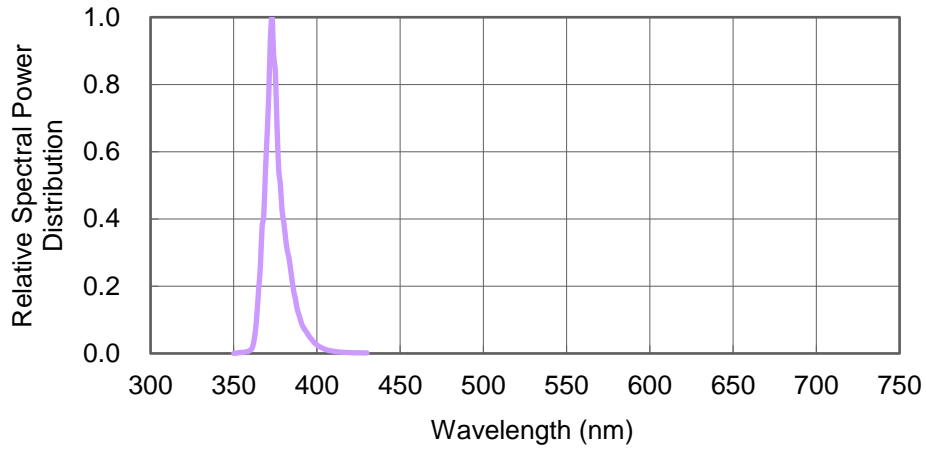
Color	Bin Code	Minimum Voltage (V)	Maximum Voltage (V)
UV-S	B	3.10	3.35
	D	3.35	3.60
	E	3.60	3.85
	F	3.85	4.10

- ProLight maintains a tolerance of $\pm 0.1\text{V}$ 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.

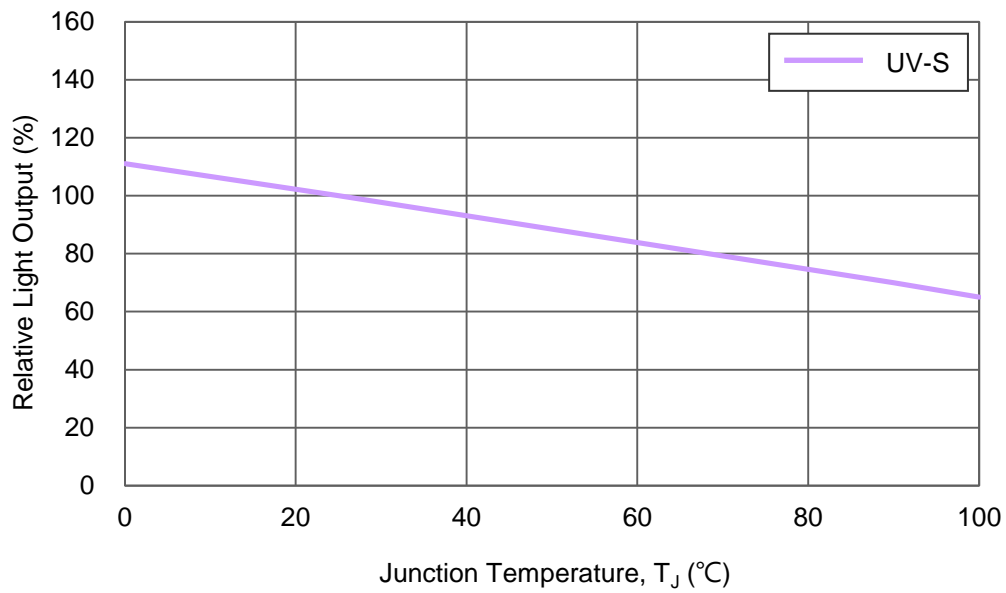
Color Spectrum, $T_J = 25^\circ\text{C}$

1. UV-S



Light Output Characteristics

Relative Light Output vs. Junction Temperature at 350mA



Forward Current Characteristics, $T_J = 25^\circ\text{C}$

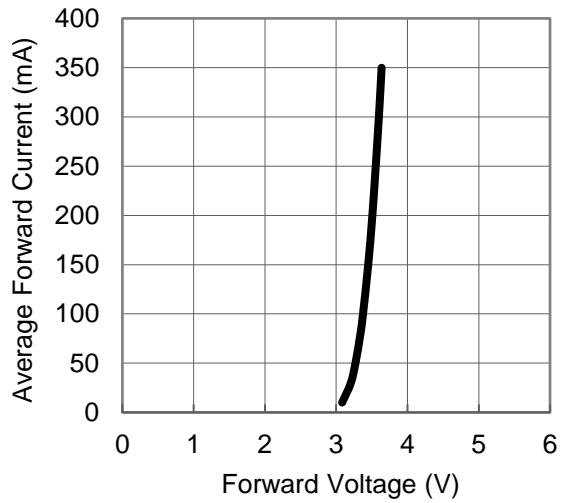


Fig 1. Forward Current vs. Forward Voltage

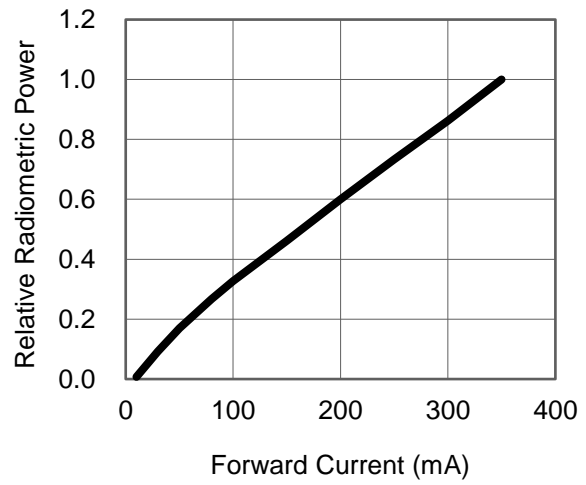
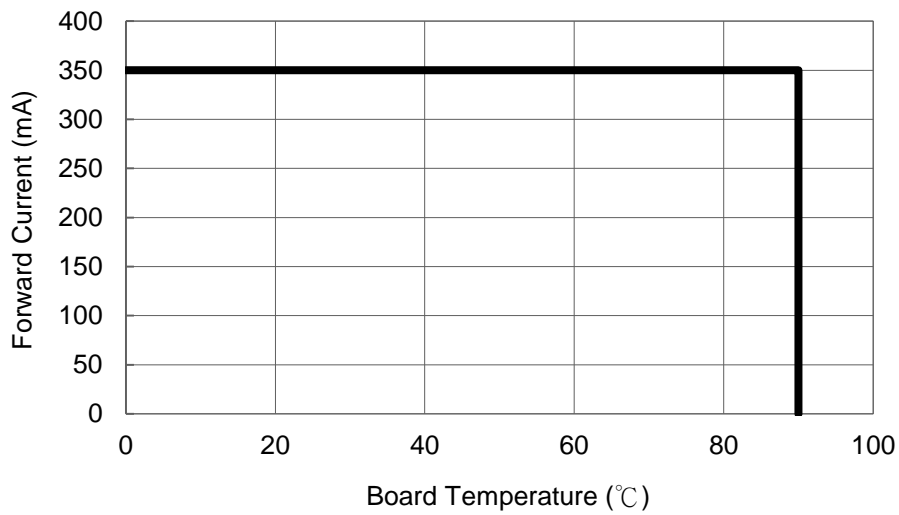


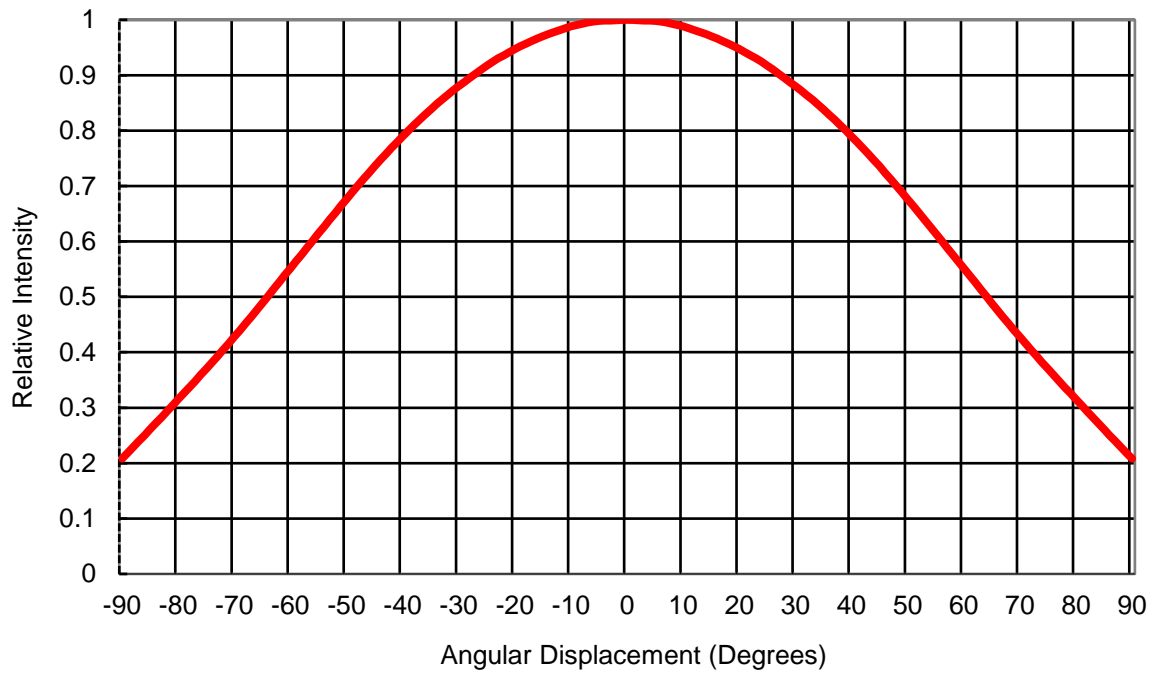
Fig 2. Relative Radiometric Power vs. Forward Current at $T_J=25^\circ\text{C}$ maintained.

Board Temperature vs. Maximum Forward Current



Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern



Qualification Reliability Testing

Stress Test	Stress Conditions	Stress Duration	Failure Criteria
Room Temperature Operating Life (RTOL)	25°C, $I_F = \text{max DC}$ (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 \pm 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:

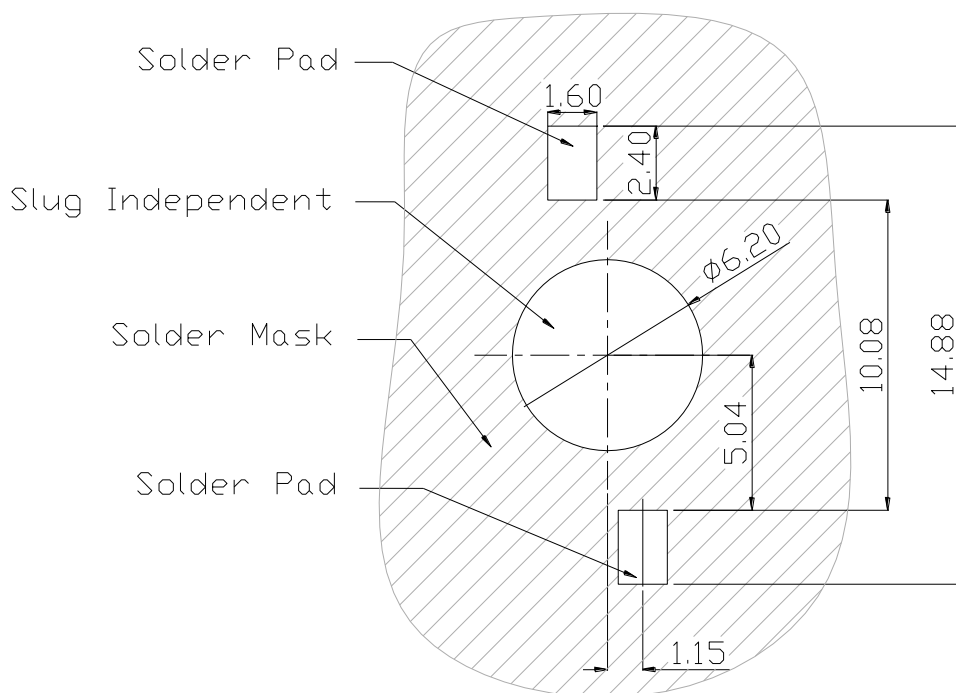
1. Depending on the maximum derating curve.
2. Criteria for judging failure

Item	Test Condition	Criteria for Judgement	
		Min.	Max.
Forward Voltage (V_F)	$I_F = \text{max DC}$	-	Initial Level x 1.1
Luminous Flux or Radiometric Power (Φ_V)	$I_F = \text{max DC}$	Initial Level x 0.7	-

* 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.

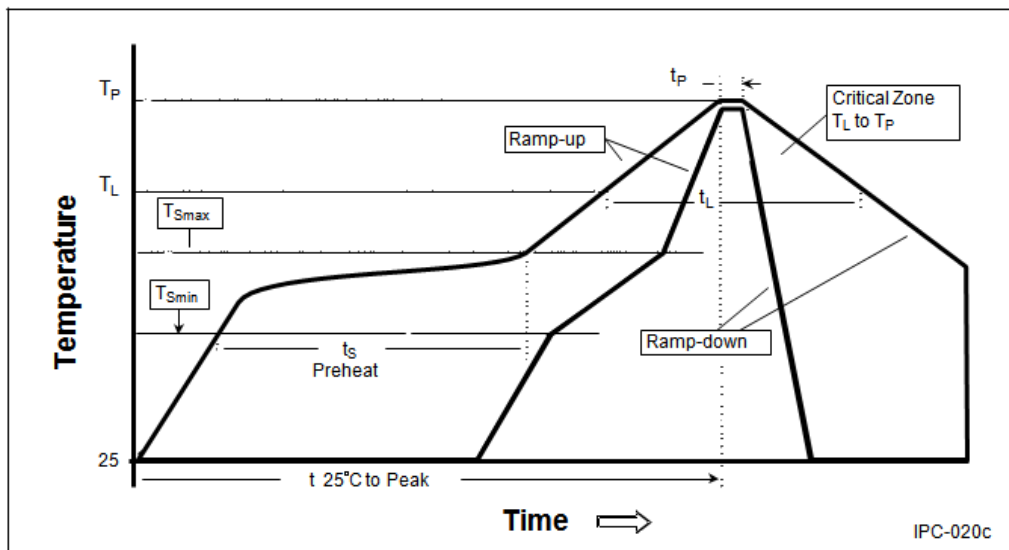
Recommended Solder Pad Design



- All dimensions are in millimeters.
- Electrical isolation is required between Slug and Solder Pad.

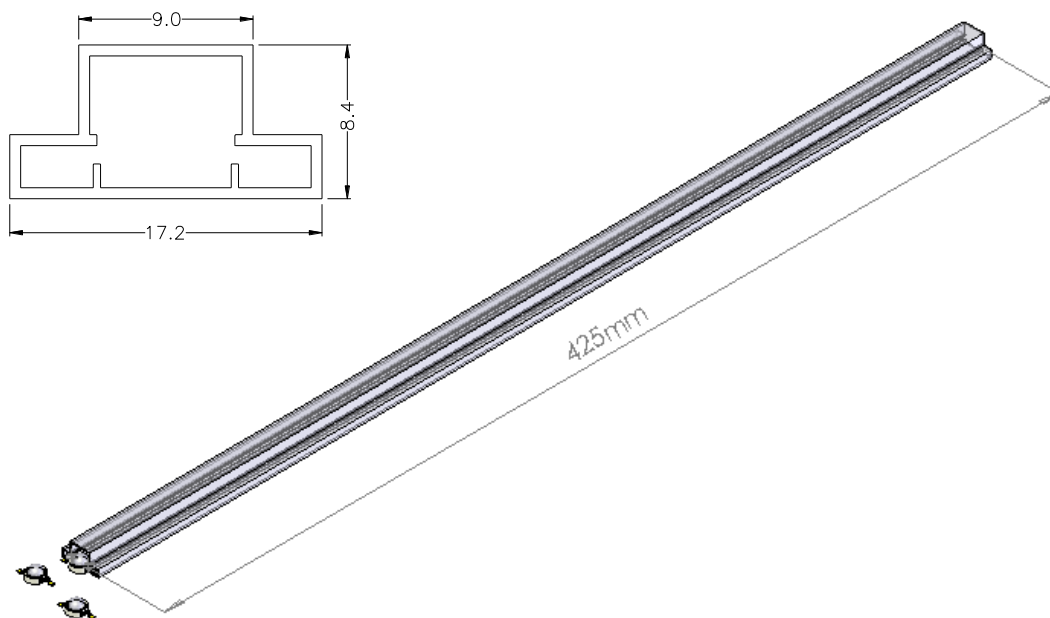
Reflow Soldering Condition

Profile Feature	Sn-Pb Eutectic Assembly	Low-Temp. & Pb-Free Assembly (58Bi-42Sn Eutectic Alloy)
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max.	2°C / second max.
Preheat <ul style="list-style-type: none"> - Temperature Min (T_{Smin}) - Temperature Max (T_{Smax}) - Time (t_{Smin} to t_{Smax}) 	100°C 150°C 60-120 seconds	90°C 120°C 60-120 seconds
Time maintained above: <ul style="list-style-type: none"> - Temperature (T_L) - Time (t_L) 	183°C 60-150 seconds	138°C 20-50 seconds
Peak/Classification Temperature (T_P)	240°C	185°C
Time Within 5°C of Actual Peak Temperature (t_P)	10-30 seconds	10-30 seconds
Ramp-Down Rate	6°C/second max.	3°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	4 minutes max.



- 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 heat plate should be used. It should be confirmed beforehand whether the characteristics of 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 Tube Packaging



Notes:

1. 50 pieces per tube.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. All dimensions without tolerances are for reference only.

**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.

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 not electrically neutral. Therefore, we recommend to isolate the heat sink.
- 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 decided 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 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)

