

**ProLight PM2B-1LPE-A
1W PC Amber Power LED
Technical Datasheet
Version: 1.1**

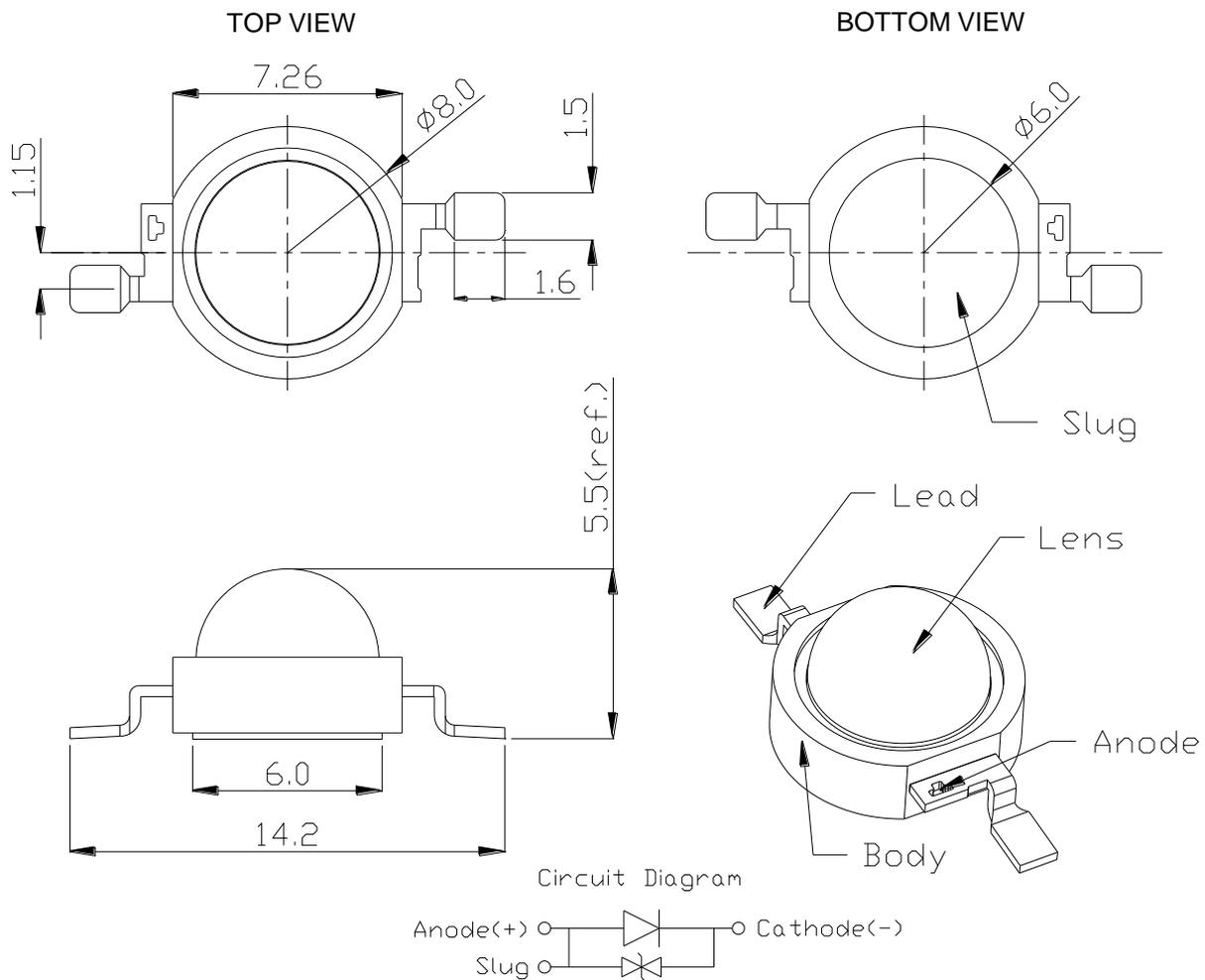
Features

- High flux per LED
- Good color uniformity
- **Low-temp. & lead free reflow soldering**
- RoHS compliant
- More energy efficient than incandescent and most halogen lamps
- Low Voltage DC operated
- Instant light (less than 100ns)
- No UV
- Superior ESD protection

Typical Applications

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Uplighters/Downlighters
- Decorative/Entertainment
- Bollards/Security/Garden
- Cove/Undershelf/Task
- Indoor/Outdoor Commercial and Residential Architectural
- Automotive Ext (Stop-Tail-Turn, CHMSL, Mirror Side Repeat)
- LCD backlights

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 --- slug of device is not electrically neutral. Do not electrically connect either the anode or cathode to the slug.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. All dimensions without tolerances are for reference only.
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	Lumious Flux Φ_v (lm)	
			Minimum	Typical
Lambertian	Amber	PM2B-1LPE-A	58.9	76

- ProLight maintains a tolerance of $\pm 10\%$ 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.	
Amber	2.85	3.5	4.1	10

Optical Characteristics at 350mA, T_J = 25°C

Color	Color Temperature CCT			Total included Angle (degrees) $\theta_{0.90V}$	Viewing Angle (degrees) $2 \theta_{1/2}$
	Min.	Typ.	Max.		
Amber	587.8 nm	588.7 nm	589.5 nm	180	130

- ProLight maintains a tolerance of $\pm 5\%$ for CCT measurements.

Absolute Maximum Ratings

Parameter	Amber
DC Forward Current (mA)	350
Peak Pulsed Forward Current (mA)	500
Average Forward Current (mA)	350
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	±4000V (Class III)
LED Junction Temperature (°C)	120
Aluminum-core PCB Temperature (°C)	105
Storage & Operating Temperature (°C)	-40 to +105
Soldering Temperature(°C)	235°C

Photometric Luminous Flux Bin Structure

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)	Available Color Bins
Amber	S2	58.9	67.2	All
	T1	67.2	76.6	All
	T2	76.6	87.4	[1]

- ProLight maintains a tolerance of ± 10% 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.

Forward Voltage Bin Structure

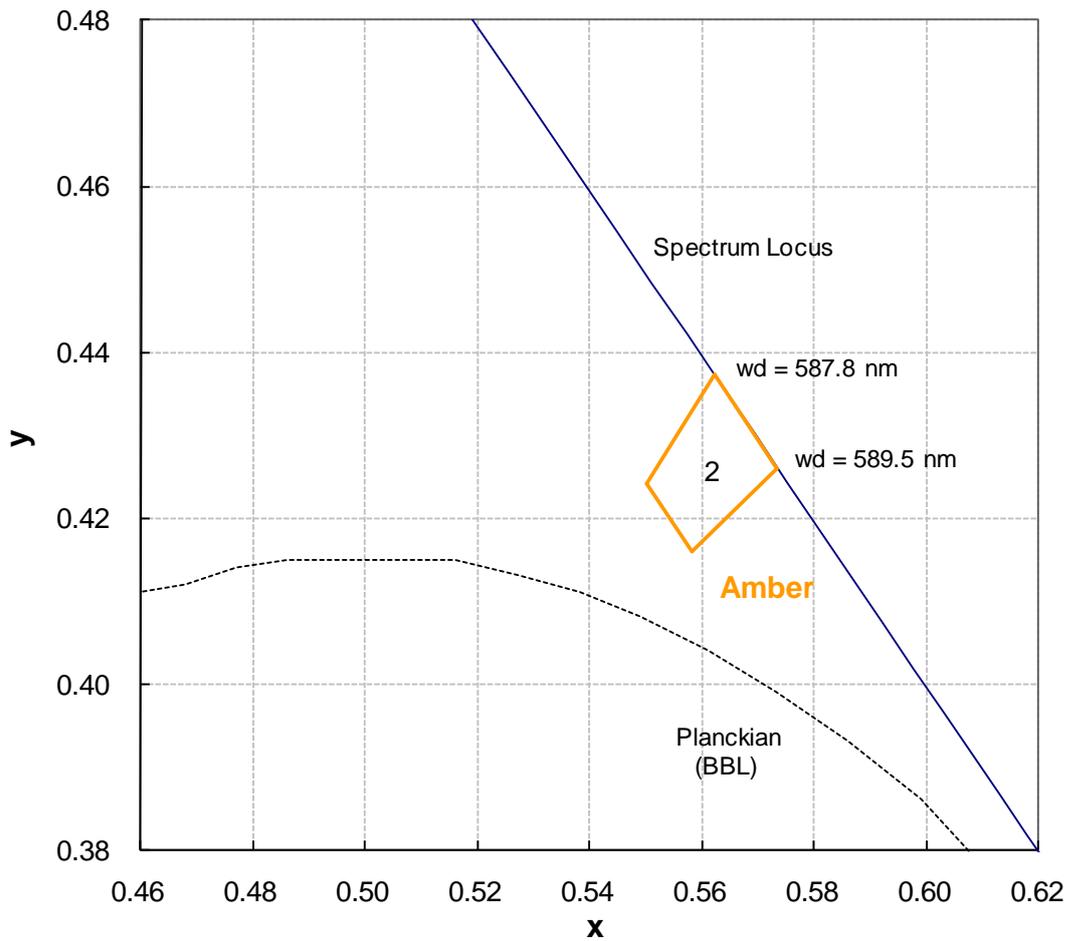
Color	Bin Code	Minimum Voltage (V)	Maximum Voltage (V)
Amber	A	2.85	3.10
	B	3.10	3.35
	D	3.35	3.60
	E	3.60	3.85
	F	3.85	4.10

- ProLight maintains a tolerance of ± 0.1 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 Bins

Amber Binning Structure Graphical Representation



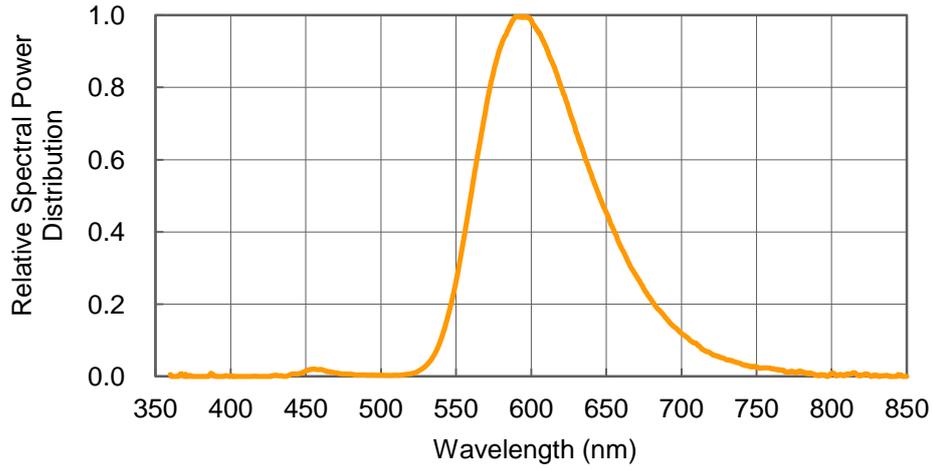
Amber Bin Structure

Bin Code	x	y
2	0.562	0.437
	0.550	0.424
	0.558	0.416
	0.573	0.426

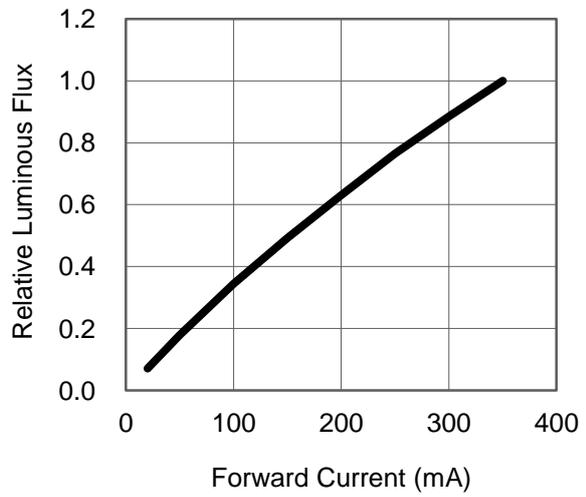
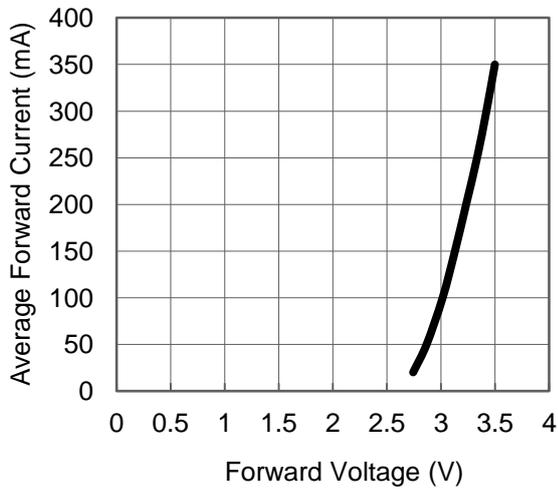
- Tolerance on each color bin (x , y) is ± 0.01

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

1. Amber

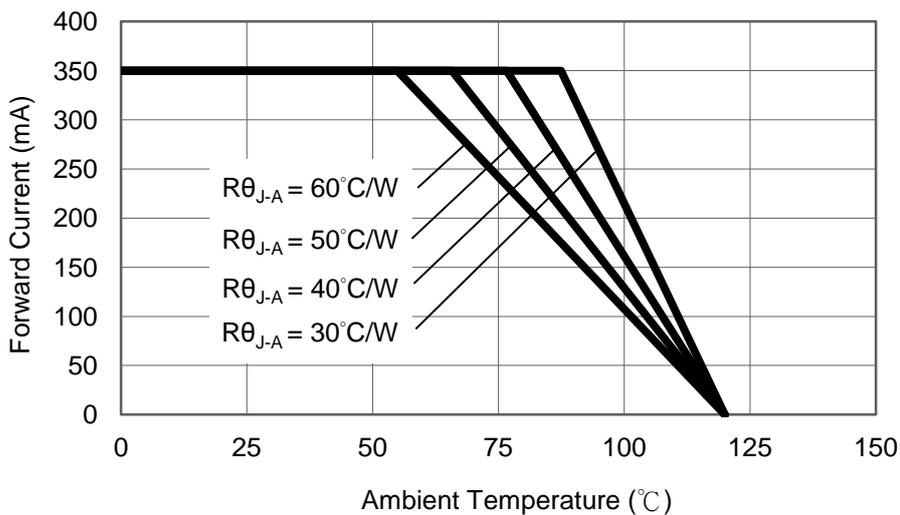


Forward Current Characteristics, $T_J = 25^\circ\text{C}$



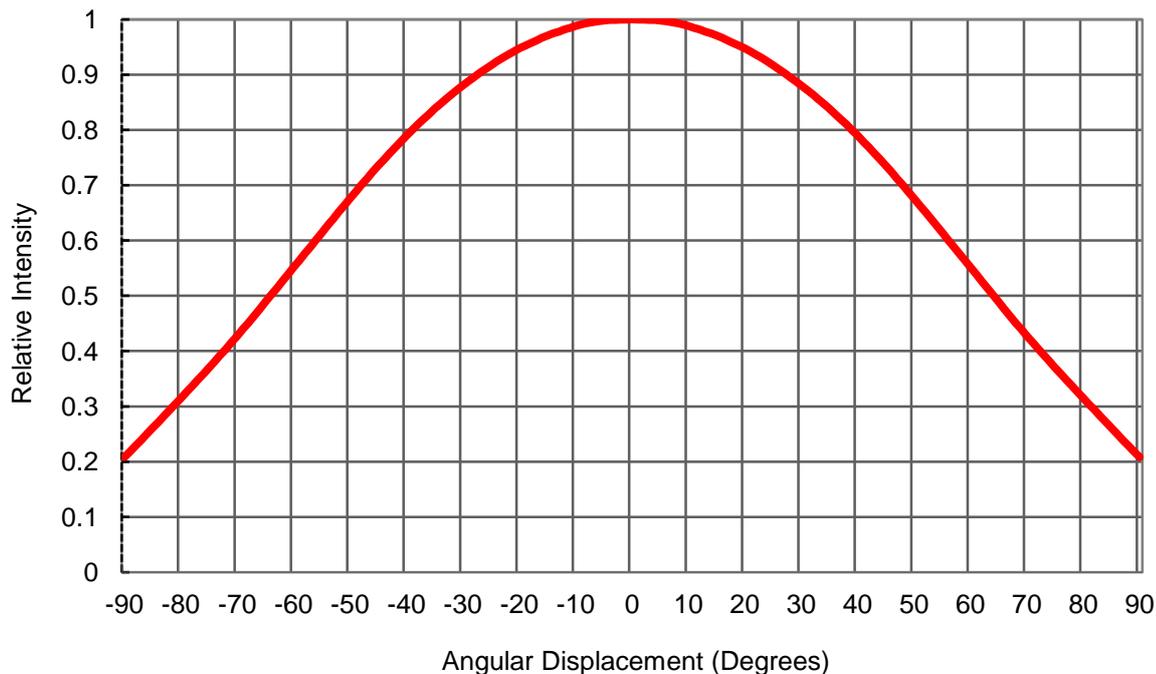
Ambient Temperature vs. Maximum Forward Current

1. Amber ($T_{JMAX} = 120^{\circ}C$)



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 Operating Life (WHTOL)	85°C/60%RH, $I_F = \text{max DC}$ (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
Non-operating Thermal Shock (TMSK)	-40°C to 120°C, 20 min. dwell, <20 sec. 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
Solderability	Steam age for 16 hrs., then solder dip at 260°C for 5 sec.		Solder coverage on lead

Notes:

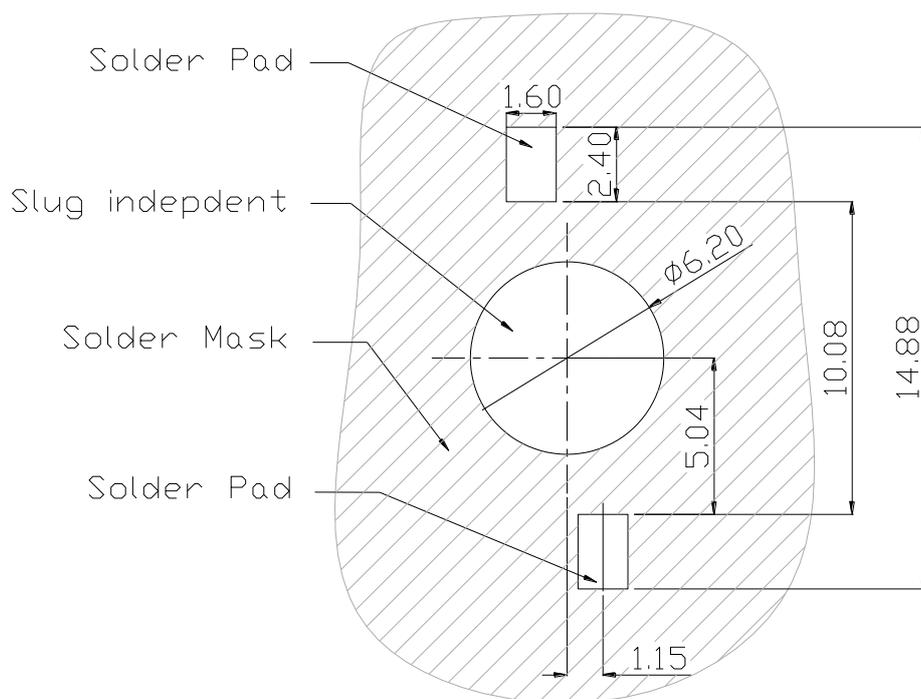
1. Depending on the maximum derating curve.
2. Criteria for judging failure

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	--
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.

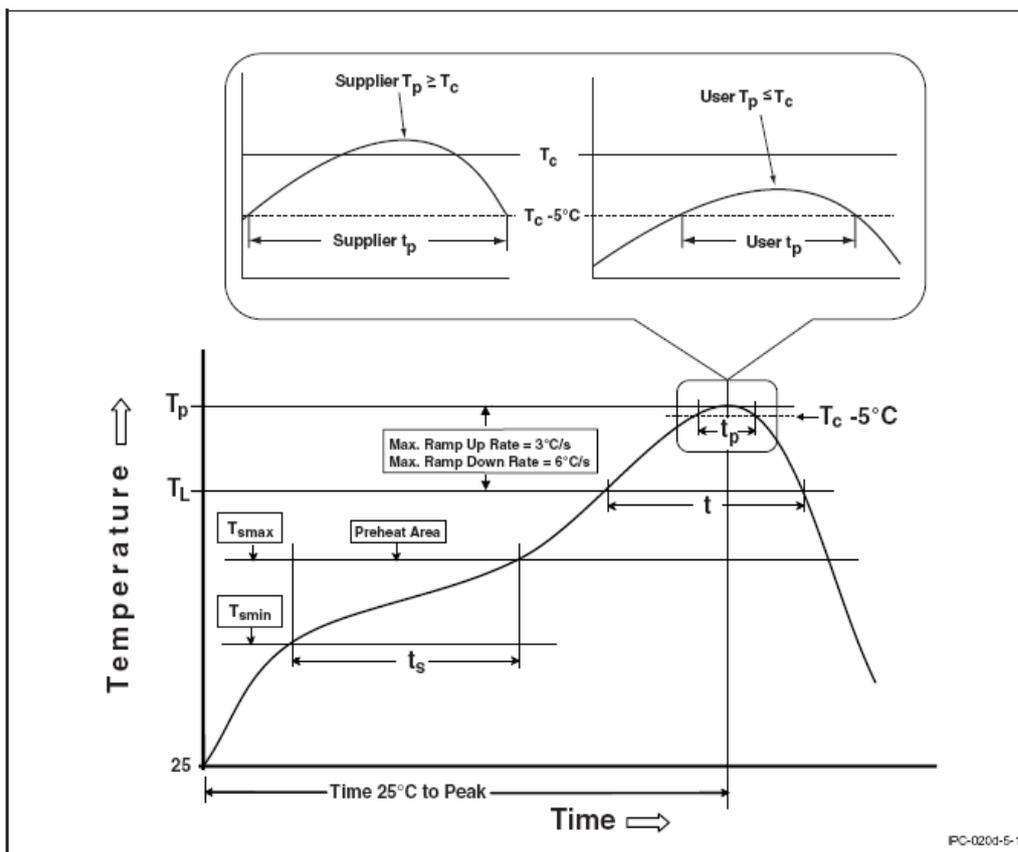
Recommended Solder Pad Design



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

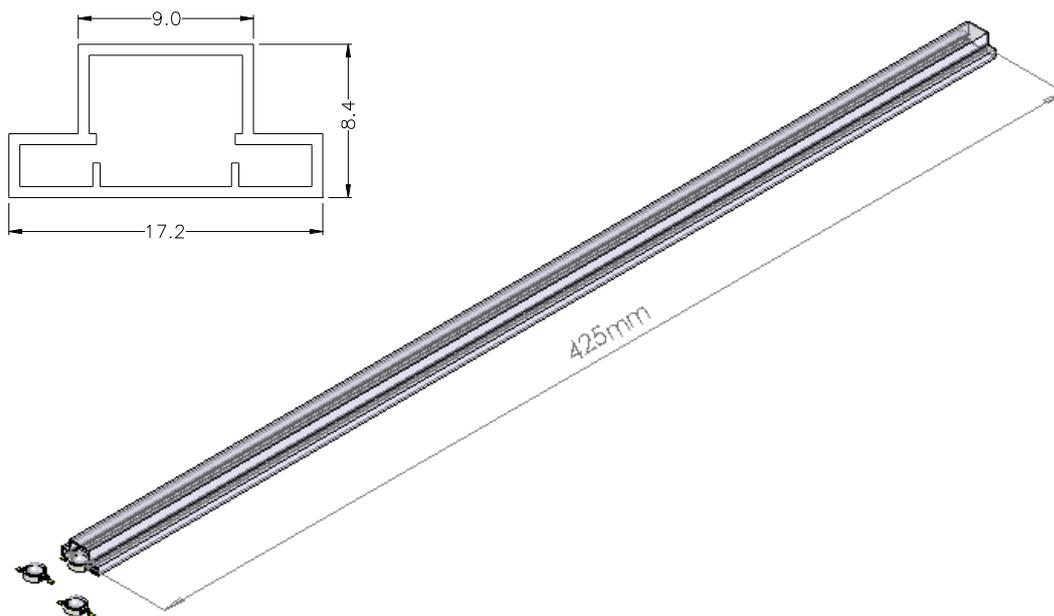
Reflow Soldering Condition

Profile Feature	Sn-Pb Eutectic Assembly	Low-Temp. & Pb-Free Assembly (58Bi-42Sn Eutectic Alloy)
Preheat & Soak		
Temperature min (T_{smin})	100 °C	90 °C
Temperature max (T_{smax})	150 °C	120 °C
Time (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Average Ramp-Up Rate (T_{smax} to T_P)	3 °C / second max.	2 °C / second max.
Liquidous temperature (T_L)	183°C	138°C
Time at liquidous (t_L)	60-150 seconds	20-50 seconds
Peak package body temperature (T_P)	235°C	185°C
Time (t_p) within 5°C of the specified classification temperature (T_C)	20 seconds	20 seconds
Average ramp-down rate (T_P to T_{smax})	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 two 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/>