



ProLight Opto
Technology Corporation



ProLight PP6N-2LZS
2W RWG Power LED
Technical Datasheet
Version: 1.4

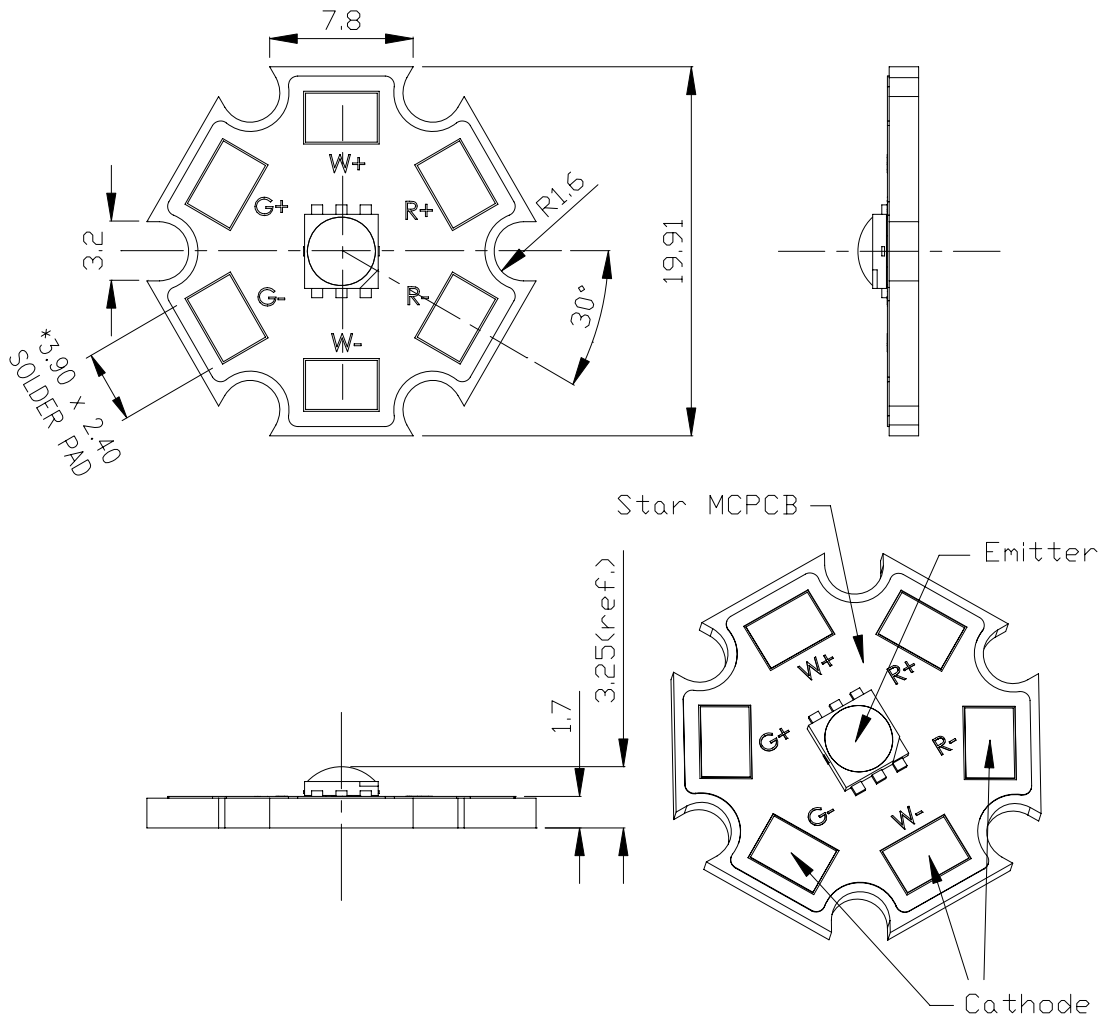
Features

- R, W, G three color in one Package
- High Flux per LED
- RoHS compliant
- More energy efficient than incandescent and most halogen lamps
- Low Voltage DC operated
- Instant light (less than 100ns)
- No UV

Typical Applications

- Portable (flashlight, bicycle)
- Camera Flash
- Appliance
- Sign and Channel Letter
- Decorative
- Cove Lighting
- Automotive Exterior (Stop-Tail-Turn, CHMSL, Mirror Side Repeat)
- Reading lights (car, bus, aircraft)

Star Mechanical Dimensions



Notes:

1. 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.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. All dimensions without tolerances are for reference only.
5. **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.

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

Radiation Pattern	Color	Part Number Star	Lumious Flux Φ_V (lm)	
			Minimum	Typical
Lambertian	White @350mA	PP6N-1LZS	30.6	40
	Green @150mA		--	12
	Red @150mA		--	10

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

Color	Forward Voltage V_F (V)			Dynamic Resistance (Ω)	Temperature Coefficient of V_F (mV/ $^\circ\text{C}$) $\Delta V_F / \Delta T_J$	Thermal Resistance Junction to Board ($^\circ\text{C}/\text{W}$)
	Min.	Typ.	Max.			
White @350mA	2.8	3.5	4.5	1.0	-2.0	15
Green @150mA	2.8	3.5	4.3	1.0	-2.0	15
Red @150mA	1.9	2.3	3.1	2.4	-2.0	15

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

Radiation Pattern	Color	Dominant Wavelength λ_D , or Color Temperature CCT			Spectral Half-width (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient of Dominant Wavelength (nm/ $^\circ\text{C}$) $\Delta\lambda_D / \Delta T_J$	Total included Angle (degrees) $\theta_{0.90V}$	Viewing Angle (degrees) $2\theta_{1/2}$
		Min.	Typ.	Max.				
Lambertian	White	4100 K	5500 K	10000 K	---	---	160	140
	Green	515 nm	525 nm	535 nm	35	0.04	160	140
	Red	613.5 nm	623 nm	631 nm	20	0.05	160	140

- ProLight maintains a tolerance of $\pm 1\text{nm}$ for dominant wavelength measurements.
- ProLight maintains a tolerance of $\pm 5\%$ for CCT measurements.

Absolute Maximum Ratings

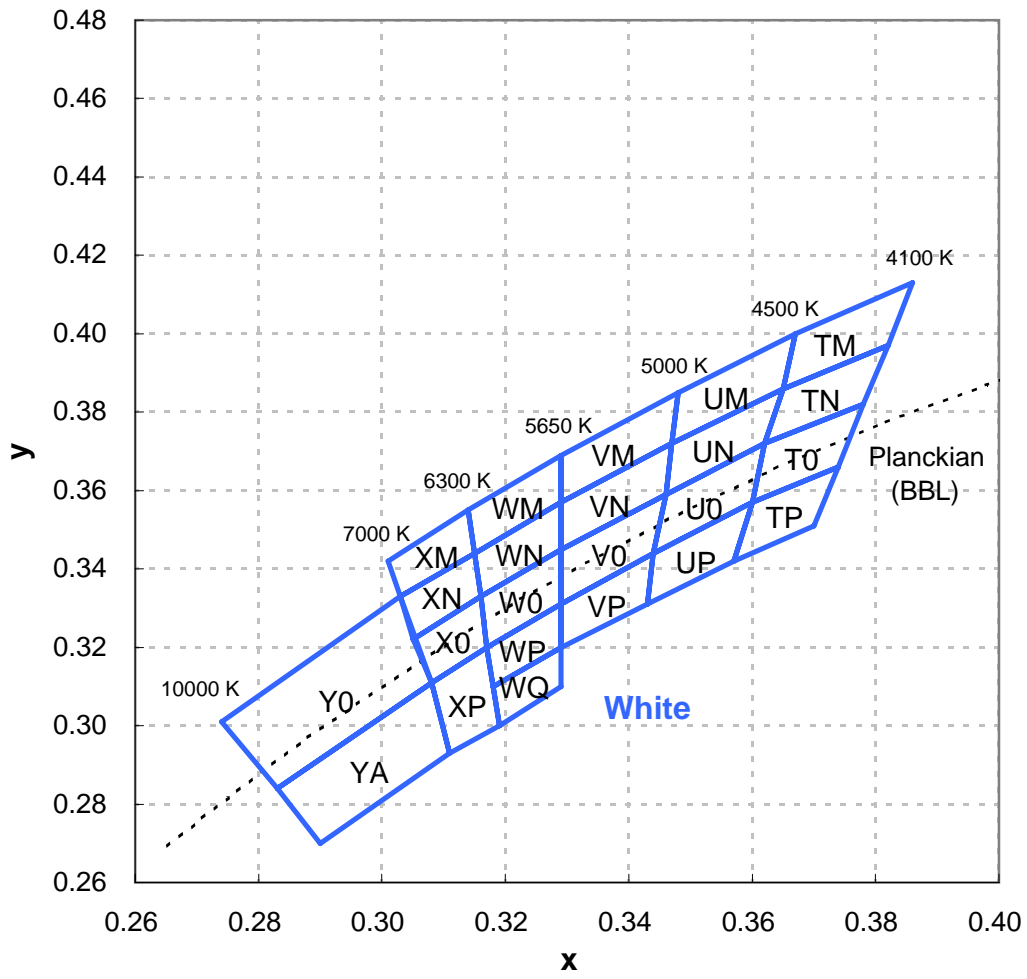
Parameter	White	Green	Red
DC Forward Current (mA)	350	150	150
Peak Pulsed Forward Current (mA)	500	250	250
Average Forward Current (mA)	350	150	150
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)		> ±500V	
LED Junction Temperature (°C)		120	
Aluminum-core PCB Temperature(°C)		105	
Storage & Operating Temperature(°C)		-40 to +105	

Photometric Luminous Flux Bin Structure for White

Color	Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
White	Q	30.6	39.8
	R	39.8	51.7
	S	51.7	67.2

- ProLight maintains a tolerance of ± 10% on flux and power measurements.
- The flux bin of the product may be modified for improvement without notice.

Color Bins



Color Bins

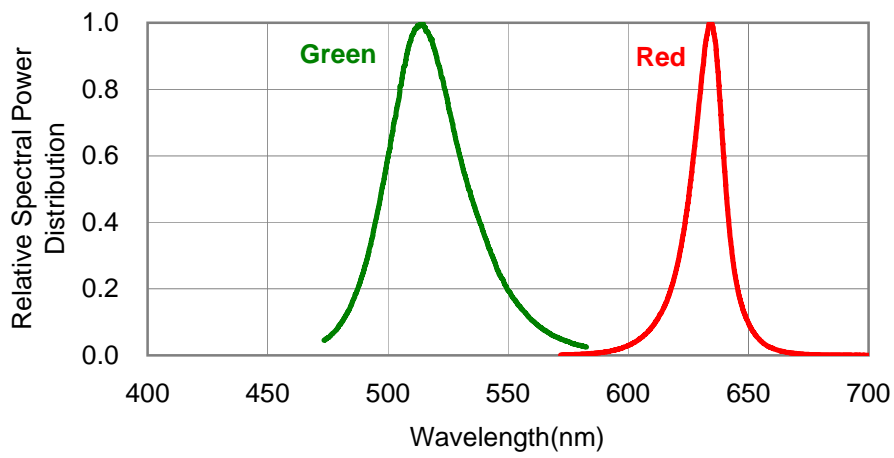
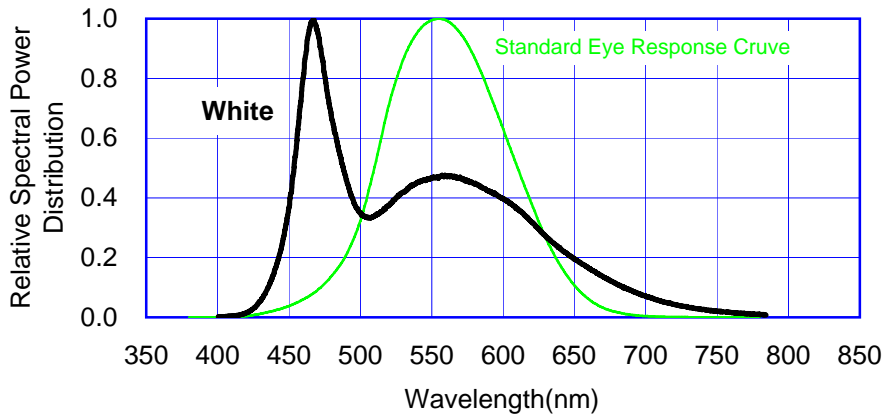
White Bin Structure

Bin Code	x	y	Typ. CCT (K)	Bin Code	x	y	Typ. CCT (K)
T0	0.378	0.382	4300	W0	0.329	0.345	5970
	0.374	0.366			0.329	0.331	
	0.360	0.357			0.317	0.320	
	0.362	0.372			0.316	0.333	
TN	0.382	0.397	4300	WN	0.329	0.345	5970
	0.378	0.382			0.316	0.333	
	0.362	0.372			0.315	0.344	
	0.365	0.386			0.329	0.357	
TP	0.374	0.366	4300	WP	0.329	0.331	5970
	0.370	0.351			0.329	0.320	
	0.357	0.342			0.318	0.310	
	0.360	0.357			0.317	0.320	
TM	0.386	0.413	4300	WQ	0.329	0.320	5970
	0.382	0.397			0.329	0.310	
	0.365	0.386			0.319	0.300	
	0.367	0.400			0.318	0.310	
U0	0.362	0.372	4750	WM	0.329	0.369	5970
	0.360	0.357			0.329	0.357	
	0.344	0.344			0.315	0.344	
	0.346	0.359			0.314	0.355	
UN	0.365	0.386	4750	X0	0.308	0.311	6650
	0.362	0.372			0.305	0.322	
	0.346	0.359			0.316	0.333	
	0.347	0.372			0.317	0.320	
UP	0.360	0.357	4750	XN	0.305	0.322	6650
	0.357	0.342			0.303	0.333	
	0.343	0.331			0.315	0.344	
	0.344	0.344			0.316	0.333	
UM	0.365	0.386	4750	XP	0.308	0.311	6650
	0.367	0.400			0.317	0.320	
	0.348	0.385			0.319	0.300	
	0.347	0.372			0.311	0.293	
V0	0.329	0.331	5320	XM	0.301	0.342	6650
	0.329	0.345			0.314	0.355	
	0.346	0.359			0.315	0.344	
	0.344	0.344			0.303	0.333	
VN	0.329	0.345	5320	Y0	0.308	0.311	8000
	0.329	0.357			0.283	0.284	
	0.347	0.372			0.274	0.301	
	0.346	0.359			0.303	0.333	
VP	0.329	0.331	5320	YA	0.308	0.311	8000
	0.344	0.344			0.311	0.293	
	0.343	0.331			0.290	0.270	
	0.329	0.320			0.283	0.284	
VM	0.329	0.357	5320				
	0.329	0.369					
	0.348	0.385					
	0.347	0.372					

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

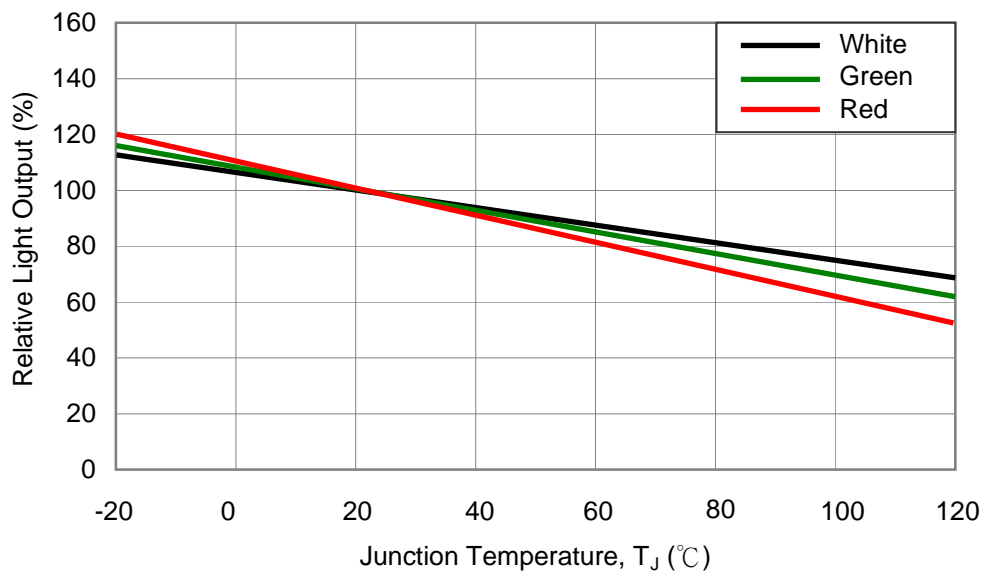
Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

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



Light Output Characteristics

Relative Light Output vs. Junction Temperature



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

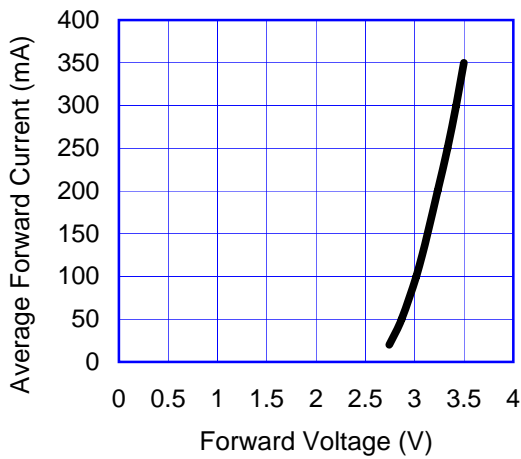


Fig 1a. Forward Current vs. Forward Voltage for White.

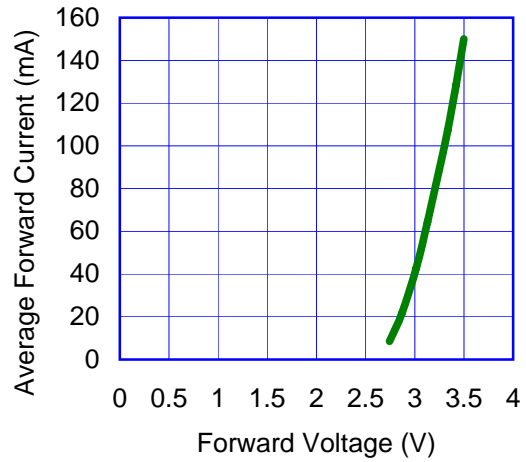


Fig 1b. Forward Current vs. Forward Voltage for Green.

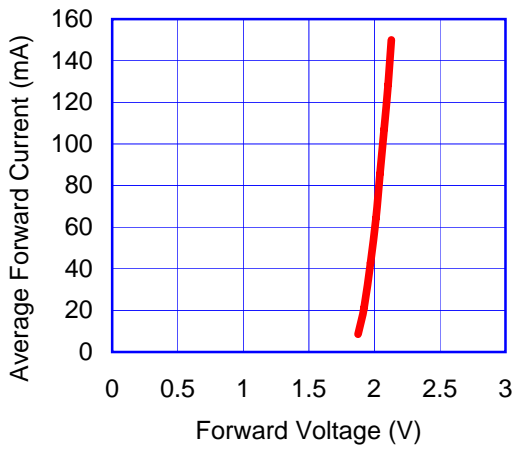


Fig 1c. Forward Current vs. Forward Voltage for Red.

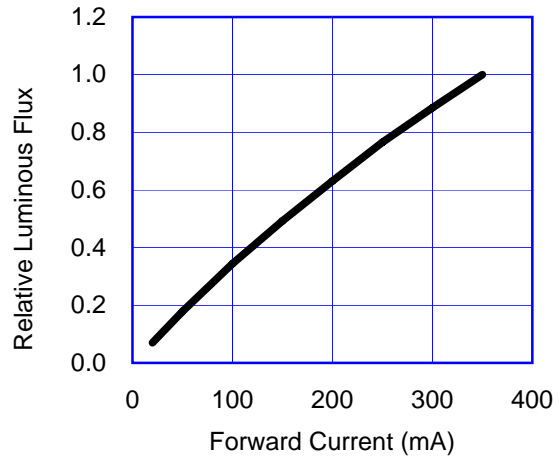


Fig 2a. Relative Luminous Flux vs. Forward Current for White at $T_j=25^\circ\text{C}$ maintained.

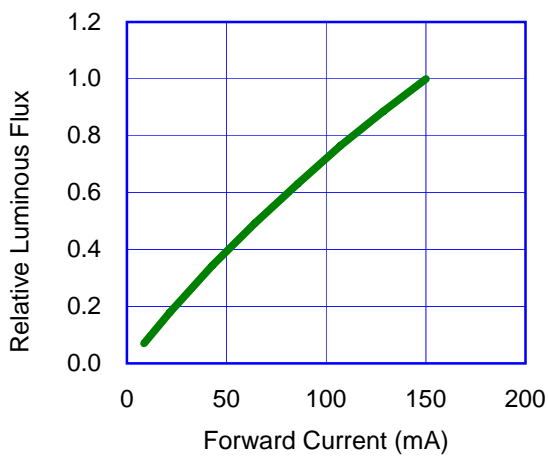


Fig 2b. Relative Luminous Flux vs. Forward Current for Green at $T_j=25^\circ\text{C}$ maintained.

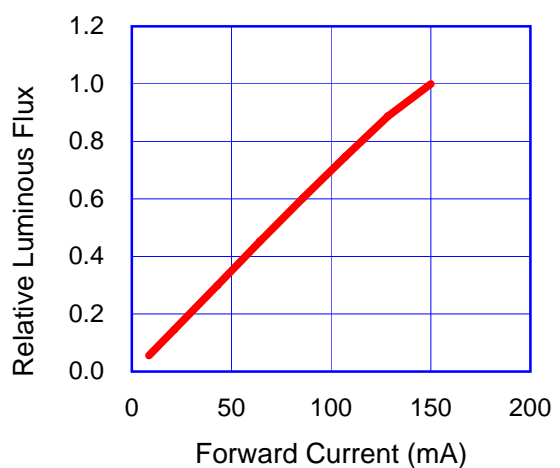
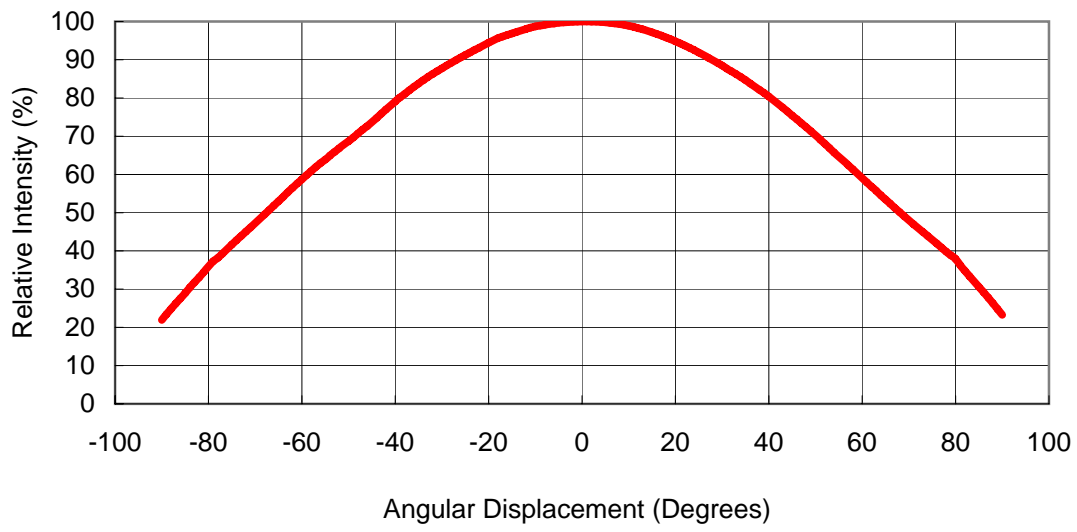


Fig 2c. Relative Luminous Flux vs. Forward Current for Red at $T_j=25^\circ\text{C}$ maintained.

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
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:

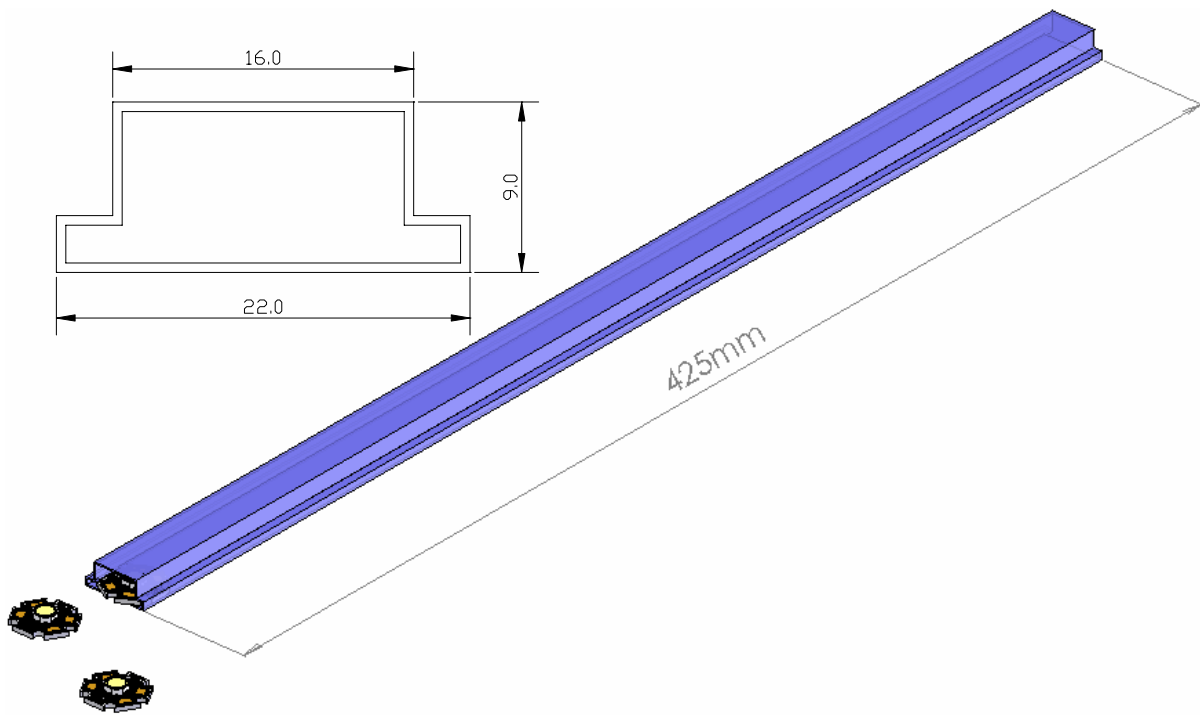
1. Depending on the maximum derating curve.
2. Criteria for judging failure

Item	Test Condition	Criteria for Judgement	
		Min.	Max.
Forward Voltage (V_F)	$I_F = \text{max DC}$	-	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.

Star Tube Packaging



Notes:

1. 20 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

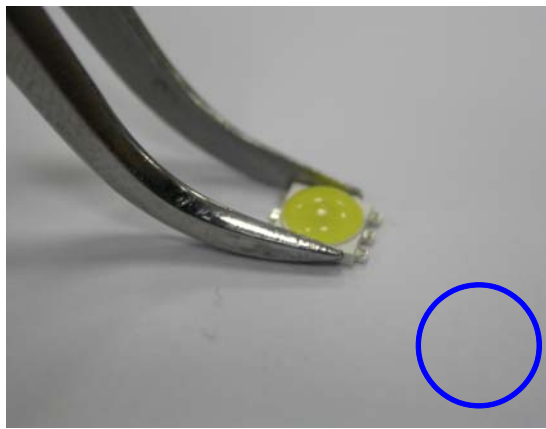
Please do not open the moisture barrier bag (MBB) more than one week. This may cause the leads of LED discoloration. We recommend storing ProLight's LEDs in a dry box after opening the MBB. The recommended storage conditions are temperature 5 to 30°C and humidity less than 40% RH. It is also recommended 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.
- The slug is to be soldered. If not, please use the heat conductive adhesive.
- 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)



ProLight