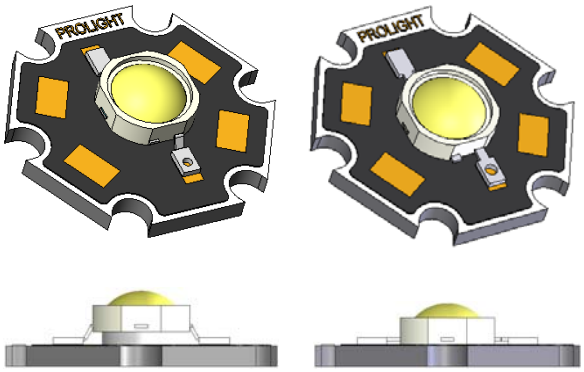
ProLight Opto
Technology Corporation



ProLight PG1x-5LDS
5W Royal Blue Power LED
Technical Datasheet
Version: 2.7

Features

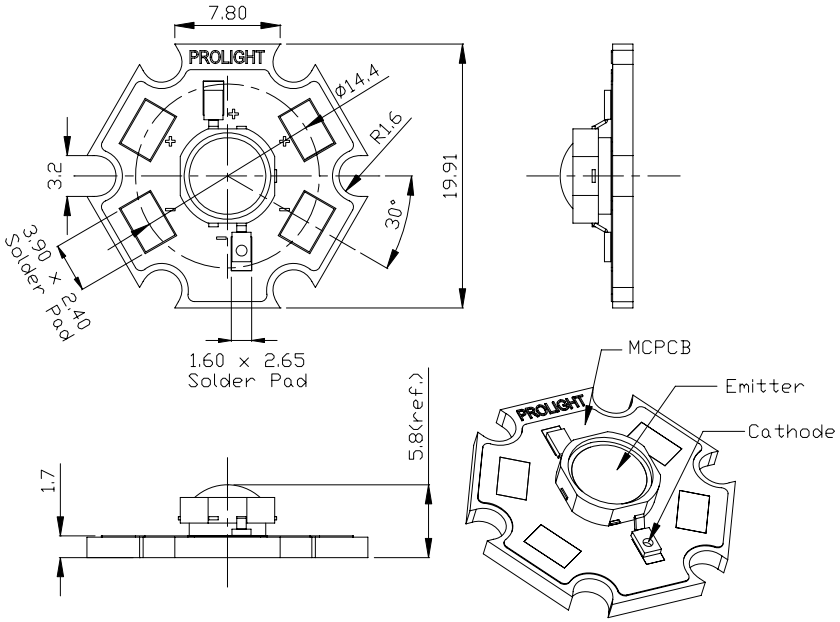
- High radiometric power per LED
- Very long operating life(up to 100k hours)
- Good color uniformity
- More energy efficient than incandescent and most halogen lamps
- Low Voltage DC operated
- Instant light (less than 100ns)
- No UV
- Superior ESD protection

Typical Applications

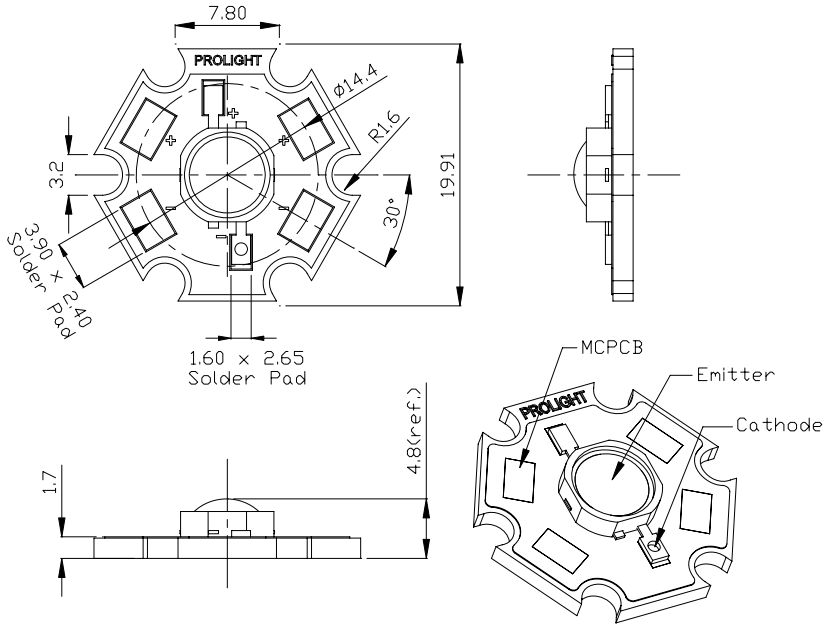
- Dental curing lights
- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Uplighters/Downlighters
- Decorative/Entertainment
- Bollards/Security/Garden
- Cove/Undershelf/Task
- Indoor/Outdoor Commercial and Residential Architectural
- Automotive Ext (Stop-Tail-Turn, CHMSL, Mirror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

Star Mechanical Dimensions

Lambertian - Standard Star



Lambertian - Low Profile Star



Notes:

1. Slots in aluminum-core PCB for M3 or #4 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-core PCB with "+" and "-" to denote positive and negative, respectively. All positive pads are interconnected, as are all negative pads, allowing for flexibility in array interconnection.
3. Drawing not to scale.
4. All dimensions are in millimeters.
5. All dimendions without tolerances are for reference only.
6. **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.

Part Number

Color	Standard Star	Low Profile Star	Radiation Pattern
Royal Blue	PG1A-5LDS	PG1N-5LDS	Lambertian

Flux Characteristics at 700mA, T_J = 25°C

Color	Radiometric Power (mW)		Radiation Pattern
	Minimum	Typical	
Royal Blue	875	1100	Lambertian

- ProLight maintains a tolerance of ± 10% on flux and power measurements.
- Please do not drive at rated current more than 1 second without proper heat sink.

Optical Characteristics at 700mA, T_J = 25°C

Color	Dominant Wavelength λ_D			Spectral Half-width (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient or Dominant Wavelength $\Delta\lambda_D/\Delta T_J$ (nm/ °C)
	Min.	Typ.	Max.		
Royal Blue	445 nm	455 nm	460 nm	20	0.04

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

Optical Characteristics at 700mA, T_J = 25°C (Continued)

Color	Radiation Pattern	Total Included Angle $\theta_{0.90V}$ (degrees)	Viewing Angle 2 $\theta_{1/2}$ (degrees)	Typical Candela on Axis (cd)
Royal Blue	Lambertian	160	140	--

Electrical Characteristics at 700mA, T_J = 25°C

Color	Forward Voltage V_F (V)			Dynamic Resistance (Ω)	Temperature Coefficient of V_F (mV/ °C) $\Delta V_F/\Delta T_J$	Thermal Resistance Junction to Board (°C/ W)
	Min.	Typ.	Max.			
Royal Blue	5.6	7.0	8.6	1.0	-4	6

Absolute Maximum Ratings

Parameter	Royal Blue
DC Forward Current (mA)	700
Peak Pulsed Forward Current (mA)	1000
Average Forward Current (mA)	700
ESD Sensitivity (HBM per MIL-STD-883E Method 3015.7)	±4000V (Class III)
LED Junction Temperature (℃)	120
Aluminum-core PCB Temperature (℃)	105
Storage & Operating Temperature (℃)	-40 to +105

Radiometric Power Bin Structure

Color	Bin Code	Minimum Radiometric Power (mW)	Maximum Radiometric Power (mW)
Royal Blue	U	875	1050
	V	1050	1225
	W	1225	1400

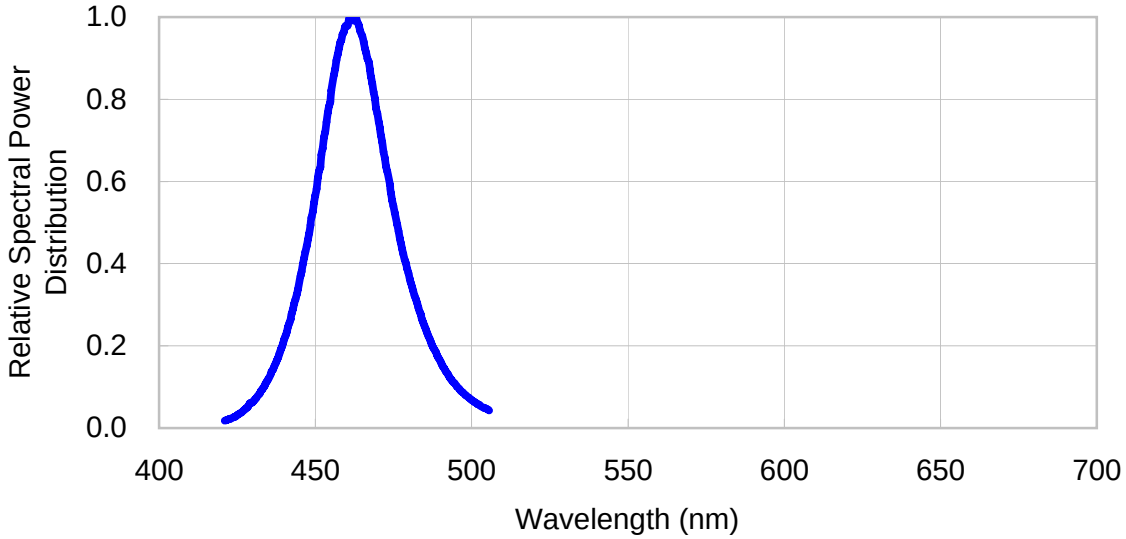
- ProLight maintains a tolerance of ± 10% on flux and power measurements.
- The flux bin of the product may be modified for improvement without notice.

Dominant Wavelength Bin Structure

Color	Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
Royal Blue	4	445	450
	5	450	455
	6	455	460

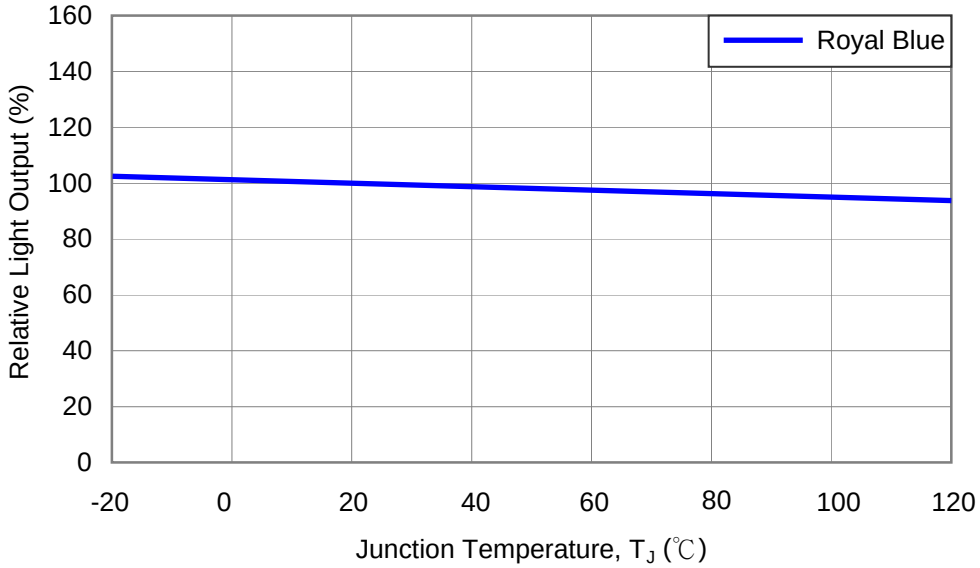
- ProLight maintains a tolerance of ± 1nm for dominant wavelength measurements.

Royal Blue Color Spectrum



Light Output Characteristics

Relative Light Output vs. Junction Temperature at 700mA



Forward Current Characteristics, Tj=25℃

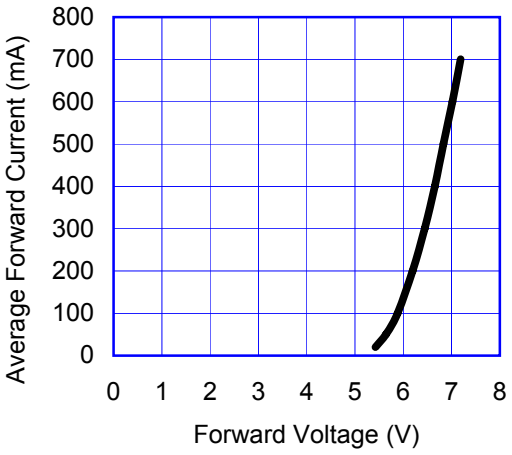


Fig 1. Forward Current vs. Forward Voltage

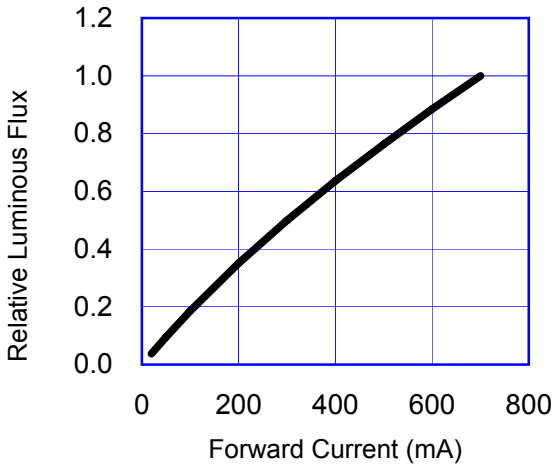
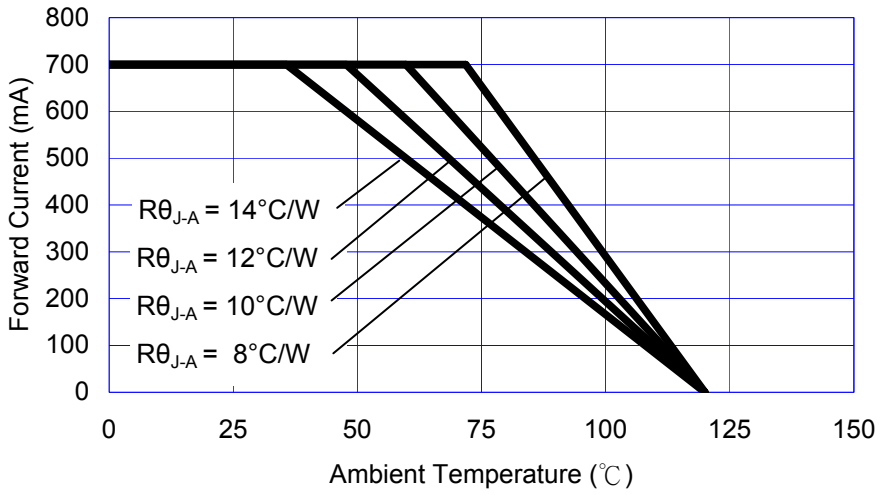


Fig 2. Relative Luminous Flux vs. Forward Current at Tj=25℃ maintained.

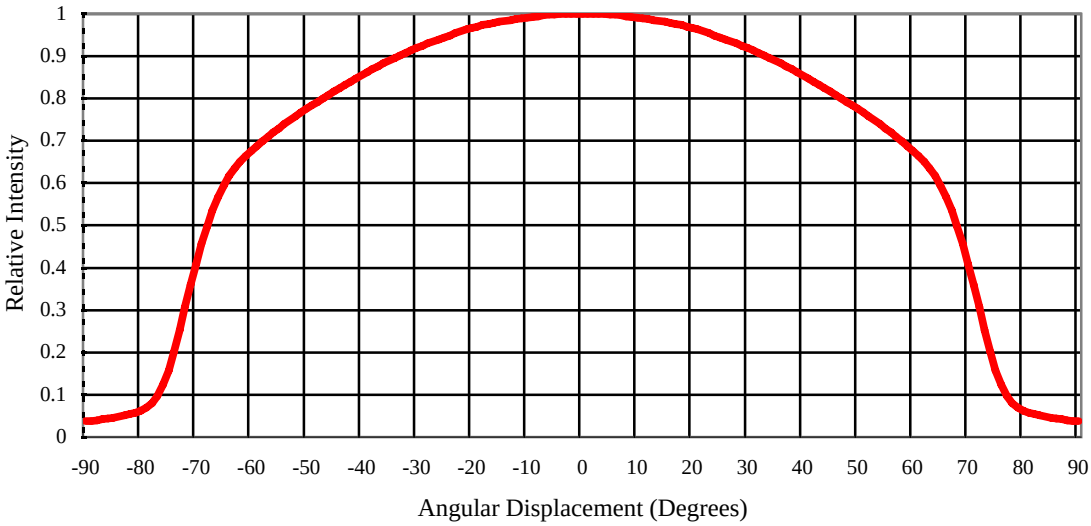
Ambient Temperature vs. Maximum Forward Current

Royal Blue (T_{JMAX} = 120°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 = 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
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.

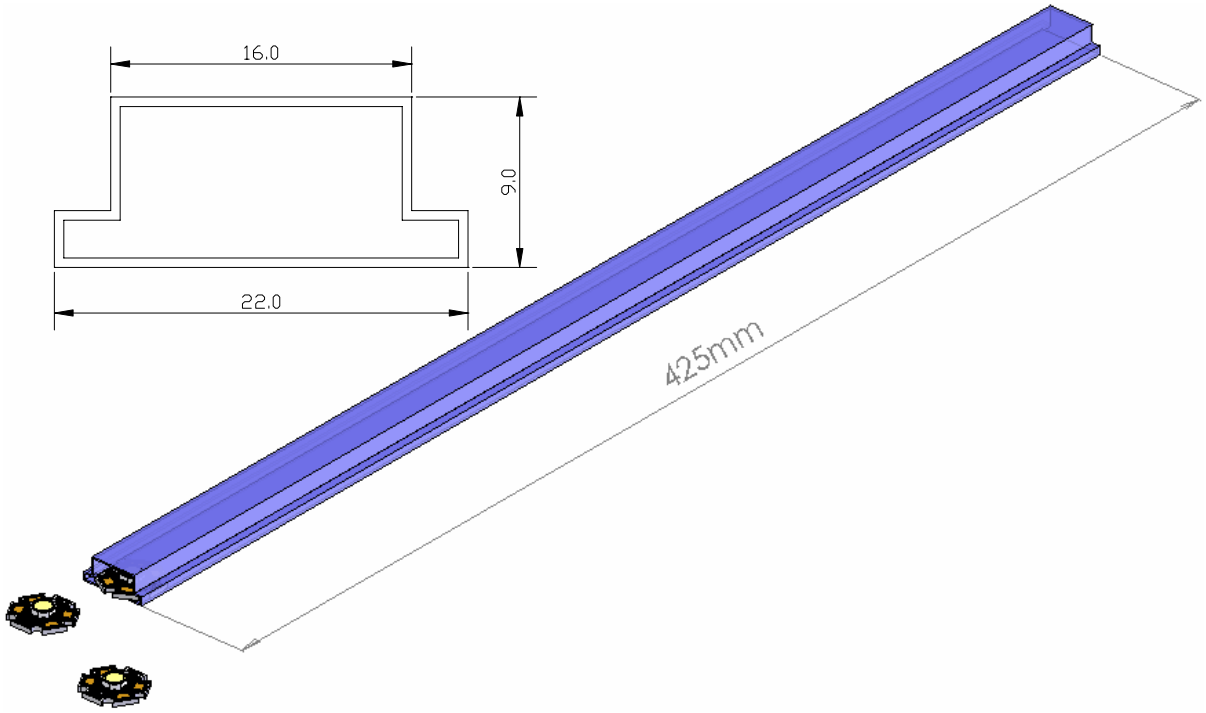
2. Criteria for judging failure

Item	Test Condition	Criteria for Judgement	
		Min.	Max.
Forward Voltage (V_F)	I_F = 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.

Emitter Tube Packaging



Notes:
1. 20 pieces per tube.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. All dimendions 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 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 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 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)