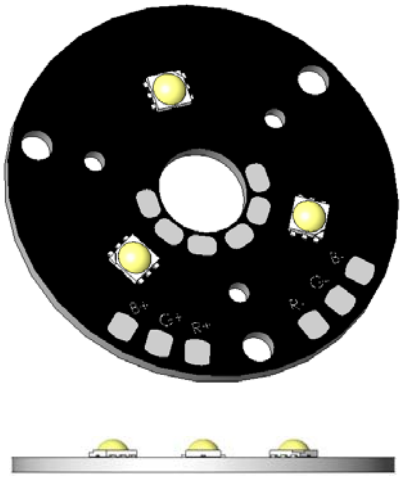
ProLight Opto
Technology Corporation



ProLight PP6M-3LFP-3SC
9W RGB Power LED Module
Technical Datasheet
Version: 1.3

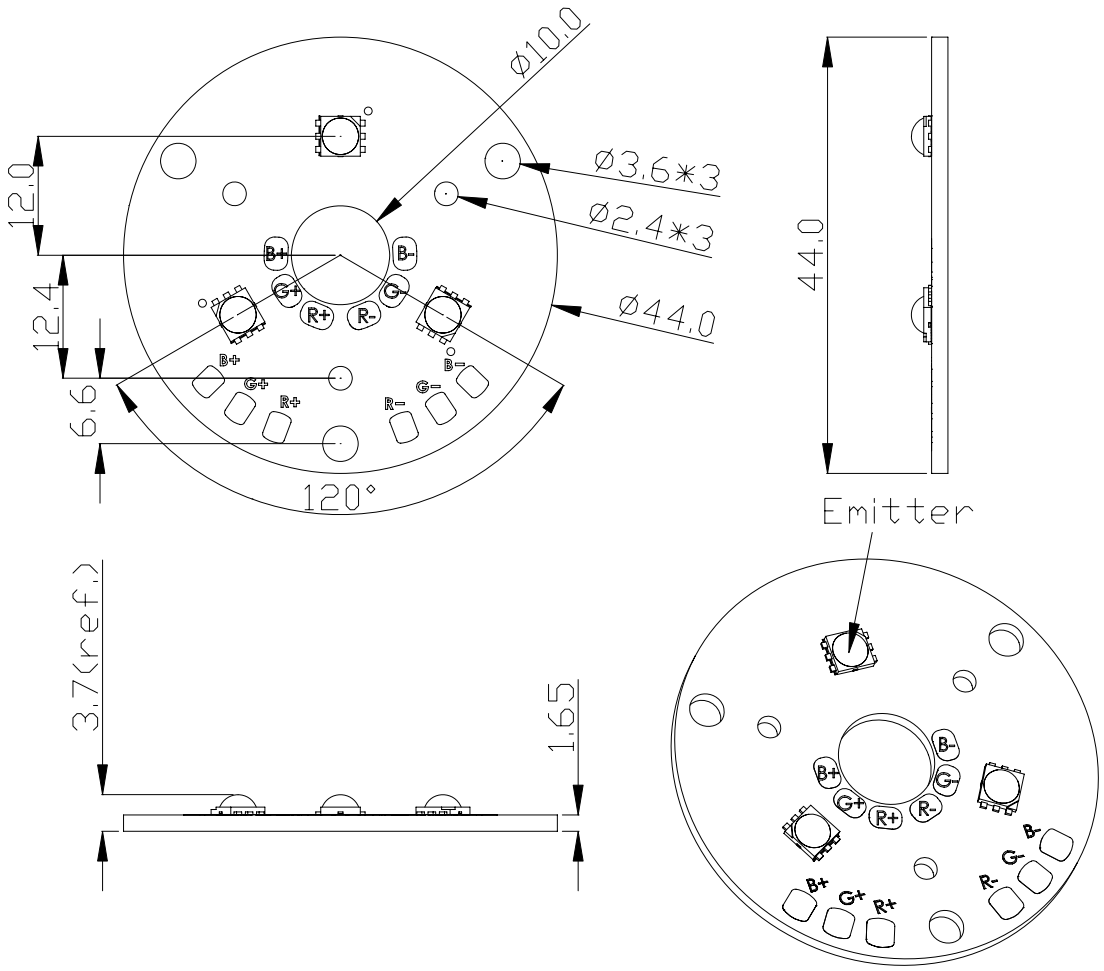
Features

- R, G, B three color in one Package
- High Flux per LED
- Very long operating life(up to 100k hours)
- Good color uniformity
- RoHS compliant
- More energy efficient than incandescent and most halogen lamps
- Low Voltage DC operated
- Instant light (less than 100ns)
- No UV

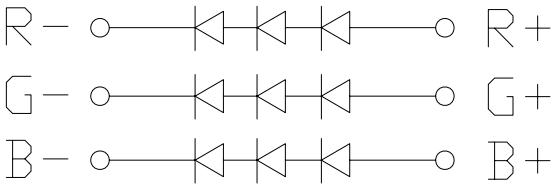
Typical Applications

- Reading lights (car, bus, aircraft)
- Uplighters/Downlighters
- Decorative/Entertainment
- Bollards/Security/Garden
- Cove/Undershelf/Task
- Indoor/Outdoor Commercial and Residential Architectural

Module Mechanical Dimensions



Circuit Diagram



Notes:

1. 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.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4. All dimendions 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 at 350mA, T_J = 25°C

Radiation Pattern	Color	Part Number Module	Lumious Flux Φ_V (lm) Minimum	Typical
Lambertian	Green	PP6M-3LFP-3SC	91.8	150
	Blue		18.9	39
	Red		70.5	105

- ProLight maintains a tolerance of ± 10% on flux and power measurements.
- Please do not drive at rated current more than 5 second without proper heat sink.

Electrical Characteristics at 350mA, T_J = 25°C

Color	Forward Voltage V_F (V) Min.	Typ.	Max.	Dynamic Resistance (Ω)	Temperature Coefficient of V_F (mV/ °C) $\Delta V_F/ \Delta T_J$	Thermal Resistance Junction to Board (°C/ W)
Green	8.4	10.5	12.9	1.0	-2.0	5
Blue	8.4	10.5	12.9	1.0	-2.0	5
Red	5.7	6.6	9.3	2.4	-2.0	5

Optical Characteristics at 350mA, T_J = 25°C

Radiation Pattern	Color	Dominant Wavelength λ_D, or Color Temperature CCT Min.	Typ.	Max.	Spectral Half-width (nm) $\Delta\lambda_{1/2}$	Temperature Coefficient of Dominant Wavelength (nm/ °C) $\Delta\lambda_D/ \Delta T_J$	Total included Angle (degrees) $\theta_{0.90V}$	Viewing Angle (degrees) $2\ \theta_{1/2}$
Lambertian	Green	515 nm	525 nm	535 nm	35	0.04	160	140
	Blue	455 nm	465 nm	475 nm	25	0.04	160	140
	Red	613.5 nm	623 nm	631 nm	20	0.05	160	140

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

Absolute Maximum Ratings

Parameter	Green/Blue/Red
DC Forward Current (mA)	350
Peak Pulsed Forward Current (mA)	500
Average Forward Current (mA)	350
ESD Sensitivity	±500V HBM
LED Junction Temperature (˚C)	120
Aluminum-core PCB Temperature (˚C)	105
Storage & Operating Temperature (˚C)	-40 to +105

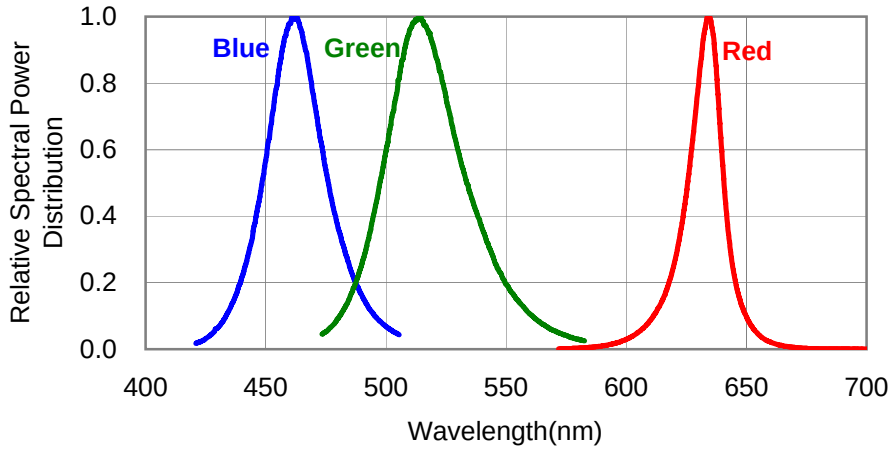
Dominant Wavelength Bin Structure

Color	Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
Green	A	515	520
	1	520	525
	2	525	530
	3	530	535
Blue	A	455	460
	1	460	465
	2	465	470
	3	470	475
Red	2	613.5	620.5
	4	620.5	631

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

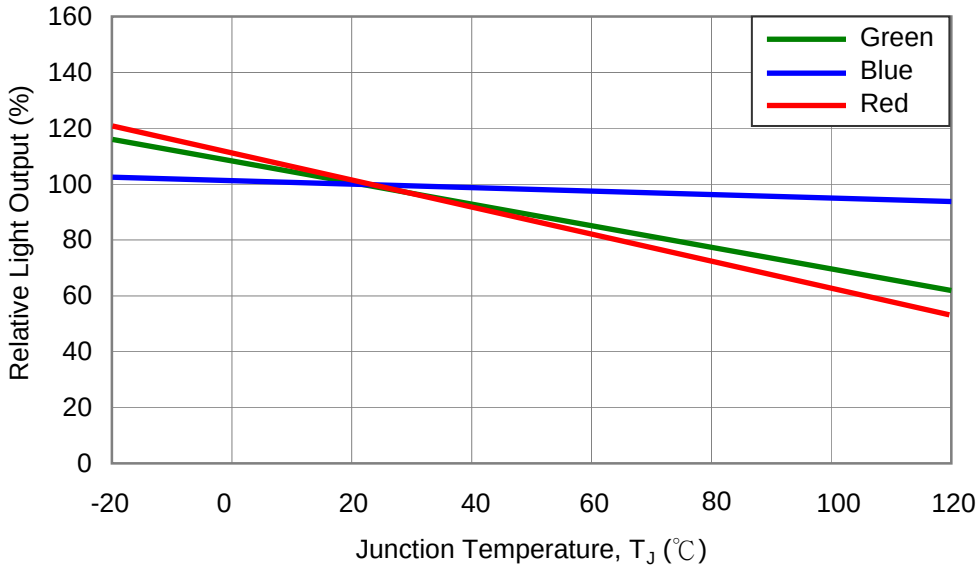
Note: Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all colors.

Color Spectrum, T_J = 25°C



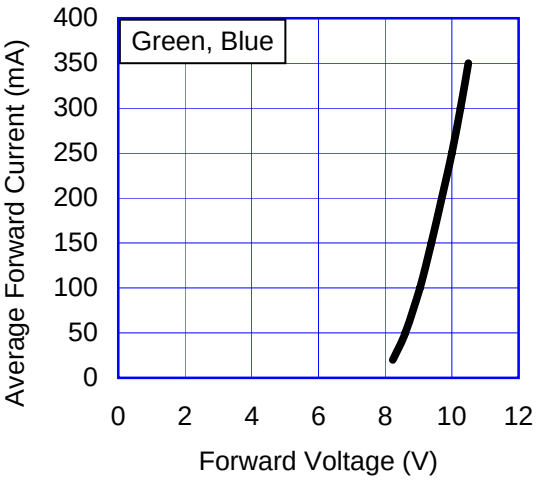
Light Output Characteristics

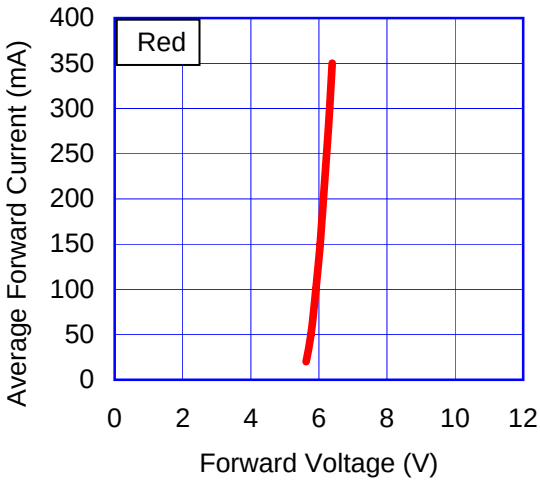
Relative Light Output vs. Junction Temperature at 350mA



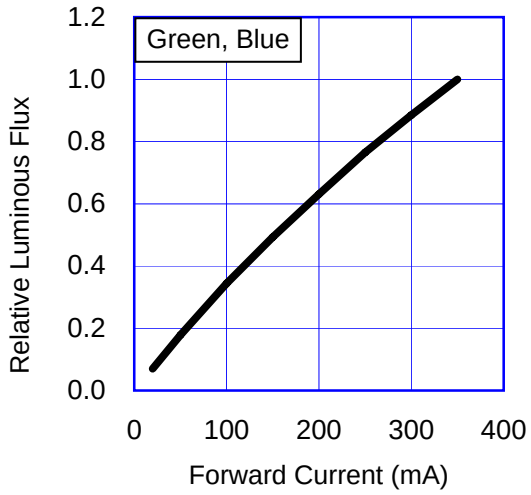
Forward Current Characteristics, $T_J = 25°C$

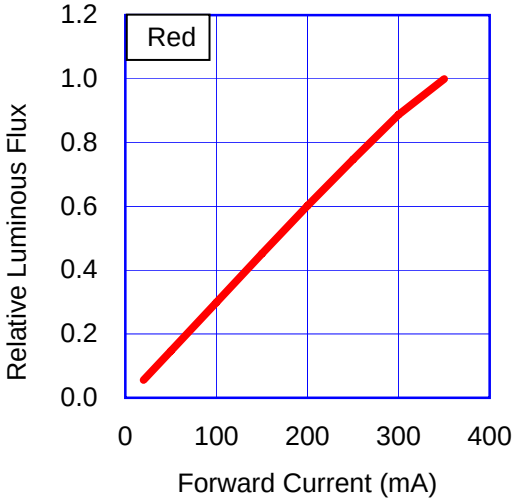
1. Forward Voltage vs. Forward Current





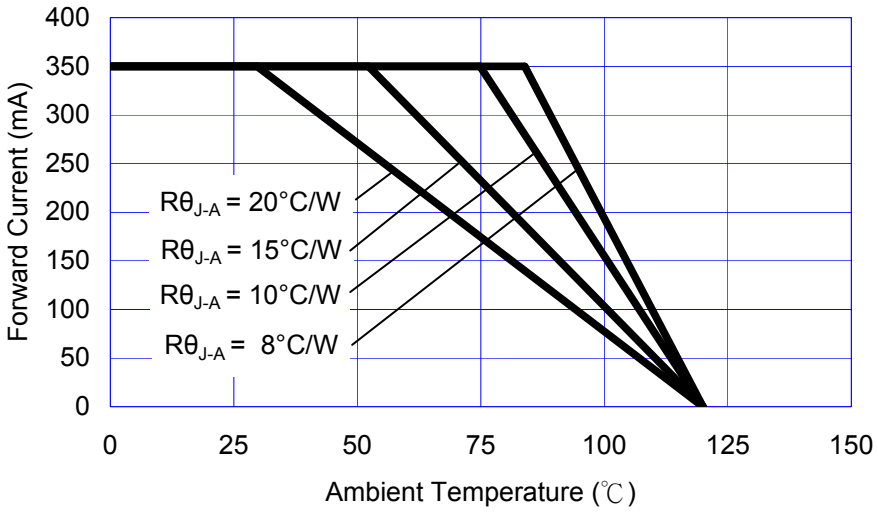
2. Forward Current vs. Normalized Relative Luminous Flux



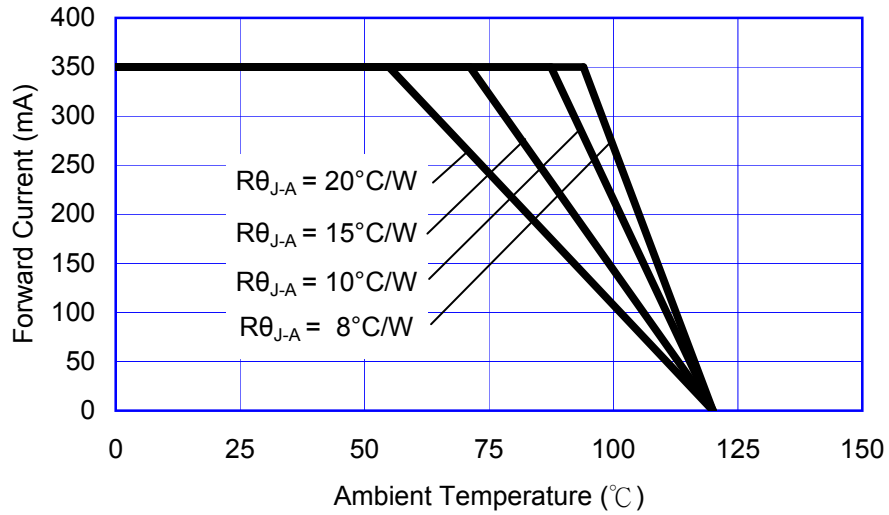


Ambient Temperature vs. Maximum Forward Current

1. Green, Blue (T_{JMAX} = 120°C)

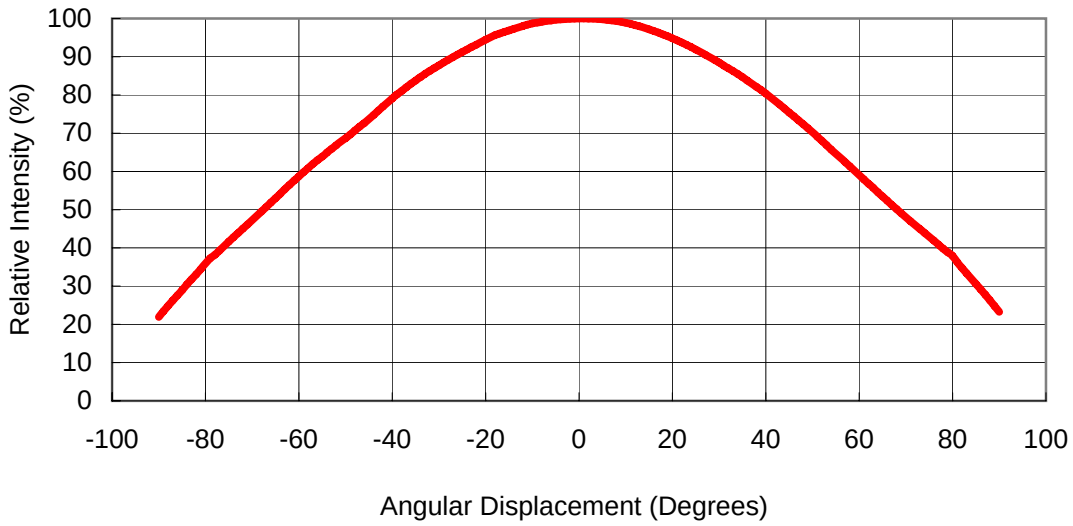


2. Red (T_{JMAX} = 120°C)

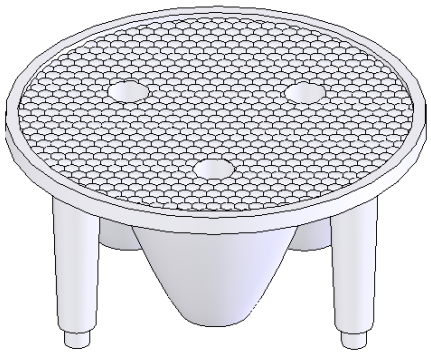


Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern



Collimator Options

Collimator Part Number	Collimator Outline
PP6N-3N25	

- Please refer to the datasheet of PP6N-3N25 for the details

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.

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 and specifications of the product may be modified for improvement without notice.

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)