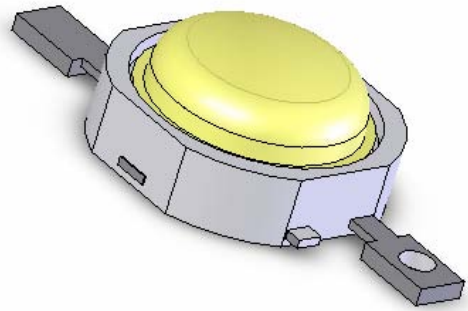
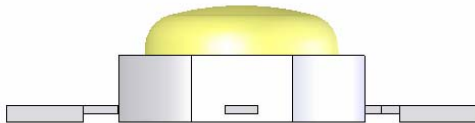




ProLight Opto
Technology Corporation



ProLight PG1N-3BXE-XX
3W Power LED
Technical Datasheet
Version: 2.1



Features

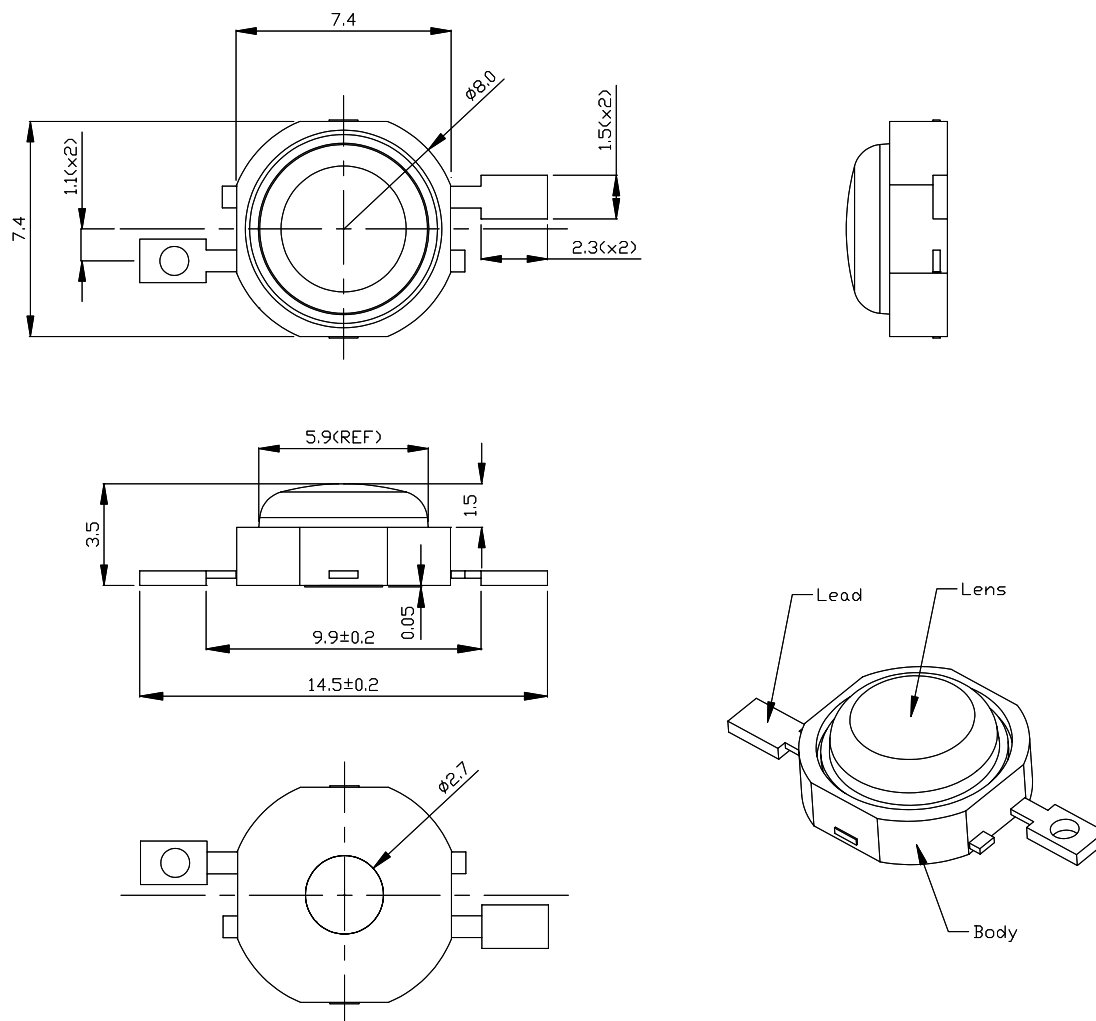
- High Flux per LED
- Very long operating life(up to 100k hours)
- Available in White, Warm White, Green, Blue, Amber, Red-Orange and Red
- Batwing or Collimated Radiation Pattern
- More Energy Efficient than Incandescent and most Halogen lamps
- Low Voltage DC operated
- Cool beam, safe to the touch
- Instant light (less than 100ns)
- No UV
- Superior ESD protection
- Soldering methods: IR reflow soldering and Hand soldering

Typical Applications

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

ProLight

Mechanical Dimensions



Notes:

1. The cathode 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.

Part Number Matrix

Color	Emitter	STAR	Beam Pattern
White	PG1N-3BWE-SD	PG1N-3BWS-SD	
Warm White	PG1N-3BVE-SD	PG1N-3BVS-SD	
Green	PG1N-3BGE-SD	PG1N-3BGS-SD	
Blue	PG1N-3BBE-SD	PG1N-3BBS-SD	Batwing
Amber	PG1N-3BAE	PG1N-3BAS	
Red-Orange	PG1N-3BHE	PG1N-3BHS	
Red	PG1N-3BRE	PG1N-3BRS	

Flux Characteristics at 700mA, Junction Temperature, T_j=25°C

Color	Minimum Luminous Flux (lm)	Typical Luminous Flux (lm)	Beam Pattern
White	51.7	110	
Warm White	51.7	100	
Green	67.2	95	
Blue	13.9	26	Batwing
Amber	51.7	84	
Red-Orange	51.7	90	
Red	39.8	80	

Optical Characteristics at 700mA, Junction Temperature, T_j=25°C

Color	Dominant Wavelength λ _D Peak Wavelength λ _p Color Temperature(CCT)			Spectral Half-width (nm) Δλ _{1/2}	Temperature Coefficient or Dominant Wavelength Δλ _D /ΔT _j (nm/°C)
	Min.	Typ.	Max.		
White	4500K	5500K	10000K	-	-
Warm White	2850K	3300K	3800K	-	-
Green	520nm	530nm	550nm	35	0.04
Blue	460nm	470nm	490nm	25	0.04
Amber	584.5nm	590nm	597nm	20	0.05
Red-Orange	610nm	617nm	620.5nm	20	0.05
Red	620.5nm	625nm	645nm	20	0.05

Optical Characteristics at 700mA, Junction Temperature, Tj=25°C (Continued)

Color	Beam Pattern	Total Included Angle θ0.9v (degree)	Viewing Angle 2θ1/2 (degree)	Typical Candela on Axis (cd)
White	Batwing	110	110	
Warm White		110	110	
Green		110	110	
Blue		110	110	
Amber		110	110	
Red-Orange		110	110	
Red		110	110	

Electrical Characteristics at 700mA, Junction Temperature, Tj=25°C

Color	Forward Voltage Vf(V)			Dynamic Resistance(Ω)	Temperature Coefficient of Vf(mV/°C)	Thermal Resistance Junction to Board(°C /W)
	Min.	Typ.	Max.		ΔVf/ΔTj	
White	2.79	3.55	3.99	1.0	-2	10
Warm White	2.79	3.55	3.99	1.0	-2	10
Green	2.79	3.55	3.99	1.0	-2	10
Blue	2.79	3.55	3.99	1.0	-2	10
Amber	1.90	2.20	3.10	2.4	-2	10
Red-Orange	1.90	2.20	3.10	2.4	-2	10
Red	1.90	2.20	3.10	2.4	-2	10

Absolute Maximum Ratings

Parameter	White/Warm White/Green/Blue	Amber/Red-Orange/Red
DC Forward Current (mA)	700	770
Peak Pulsed Forward Current (mA)	1000	1100
Average Forward Current (mA)	700	700
ESD Sensitivity	±16000V HBM	
LED Junction Temperature (°C)	135	120
Aluminum-core PCB Temperature(°C)	105	105
Storage & Operating Temperature(°C)	-40 to +105	-40 to +105
Soldering Temperature(°C)	260 for 5 seconds Max.	

Photometric Luminous Flux Bin Structure

Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
M	13.9	18.1
N	18.1	23.5
P	23.5	30.6
Q	30.6	39.8
R	39.8	51.7
S	51.7	67.2
T	67.2	87.4
U	87.4	113.6
V	113.6	147.7

- Tolerance on each Luminous Flux bin is ± 15%

Color Bins for Amber

Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
1	584.5	587.0
2	587.0	589.5
4	589.5	592.0
6	592.0	594.5
7	594.5	597.0

- Tolerance on each Color bin is ± 1nm

Color Bins for Red-Orange

Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
1	610.0	613.5
2	613.5	620.5

- Tolerance on each Color bin is ± 1nm

Color Bins for Red

Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
2	613.5	620.5
4	620.5	631.0
5	631.0	645.0

- Tolerance on each Color bin is $\pm 1\text{nm}$

Color Bins for Blue

Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
A	455	460
1	460	465
2	465	470
3	470	475
4	475	480
5	480	485
6	485	490

- Tolerance on each Color bin is $\pm 1\text{nm}$

Color Bins for Green

Bin Code	Minimum Dominant Wavelength (nm)	Maximum Dominant Wavelength (nm)
1	520	525
2	525	530
3	530	535
4	535	540
5	540	545
6	545	550

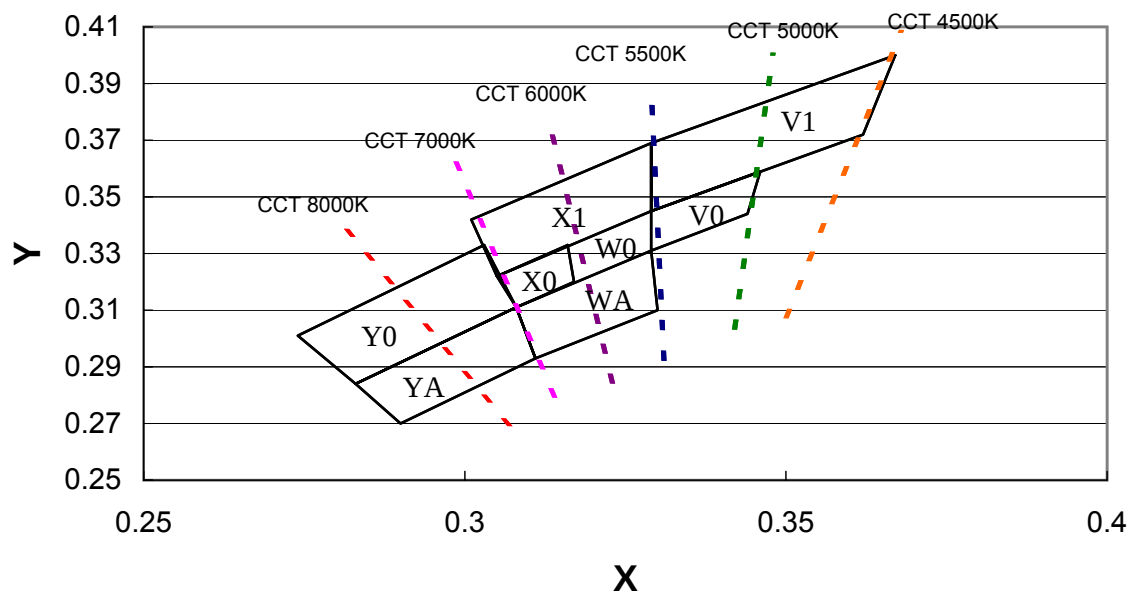
- Tolerance on each Color bin is $\pm 1\text{nm}$

Color Bins for White

Bin Code	X	Y	Typ. CCT (K)	Bin Code	X	Y	Typ. CCT (K)
V0	0.346	0.359	5350	X0	0.316	0.333	6700
	0.344	0.344			0.317	0.32	
	0.329	0.331			0.308	0.311	
	0.329	0.345			0.305	0.322	
V1	0.367	0.4	5500	X1	0.329	0.369	6300
	0.362	0.372			0.329	0.345	
	0.329	0.345			0.305	0.322	
	0.329	0.369			0.301	0.342	
W0	0.329	0.345	6050	YA	0.308	0.311	8000
	0.329	0.331			0.311	0.293	
	0.317	0.32			0.29	0.27	
	0.316	0.333			0.283	0.284	
WA	0.329	0.331	6300	Y0	0.303	0.333	8000
	0.33	0.31			0.308	0.311	
	0.311	0.293			0.283	0.284	
	0.308	0.311			0.274	0.301	

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

Color Bins for White

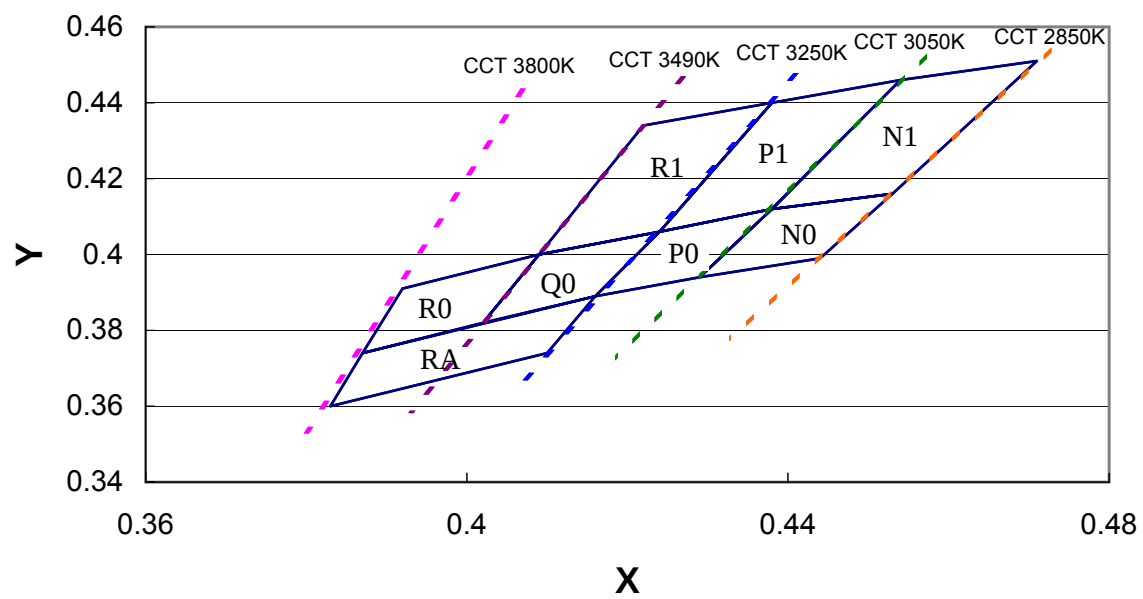


Color Bins for Warm White

Bin Code	X	Y	Typ. CCT (K)	Bin Code	X	Y	Typ. CCT (K)
N0	0.438	0.412	2950	Q0	0.409	0.400	3370
	0.429	0.394			0.402	0.382	
	0.444	0.399			0.416	0.389	
	0.453	0.416			0.424	0.406	
N1	0.454	0.446	2950	R0	0.392	0.391	3640
	0.438	0.412			0.387	0.374	
	0.453	0.416			0.402	0.382	
	0.471	0.451			0.409	0.400	
P0	0.424	0.406	3150	R1	0.422	0.434	3500
	0.416	0.389			0.409	0.400	
	0.429	0.394			0.424	0.406	
	0.438	0.412			0.438	0.440	
P1	0.438	0.440	3150	RA	0.387	0.374	3500
	0.424	0.406			0.383	0.360	
	0.438	0.412			0.410	0.374	
	0.454	0.446			0.416	0.389	

● Tolerance on each Color bin (x , y) is ± 0.01

Color Bins for Warm White



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

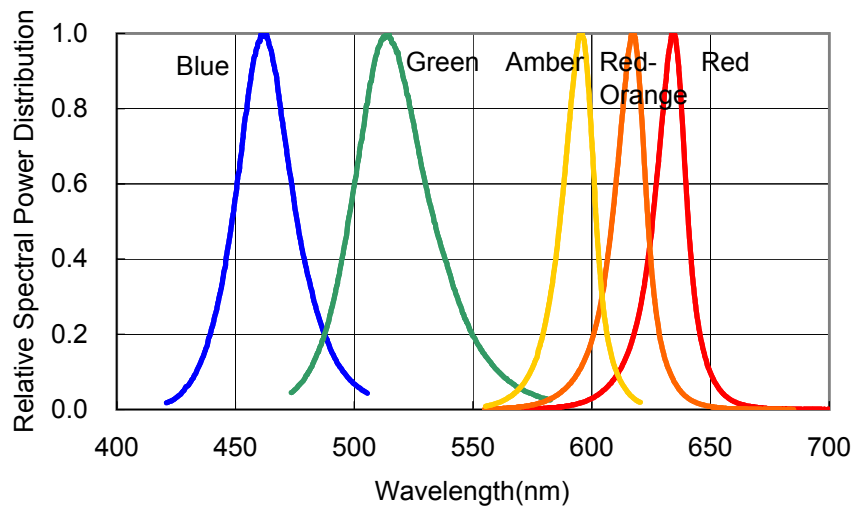


Figure 1a. Relative Intensity vs. Wavelength

White Color Spectrum

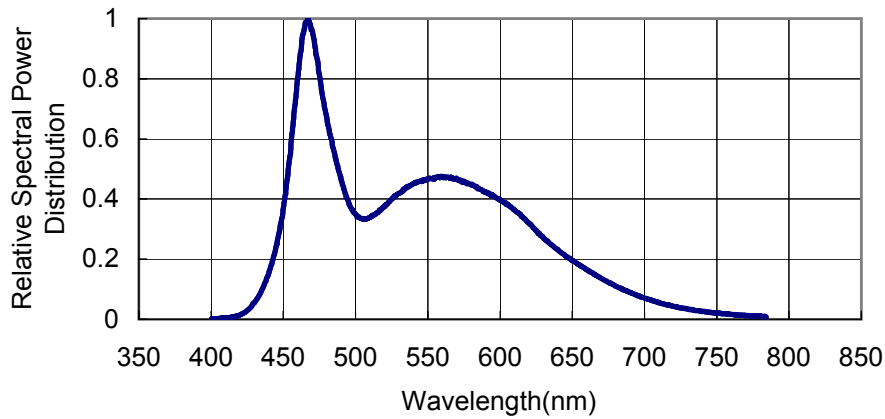


Figure 1b. White Color Spectrum of Typical 5500K Part.

Warm White Color Spectrum

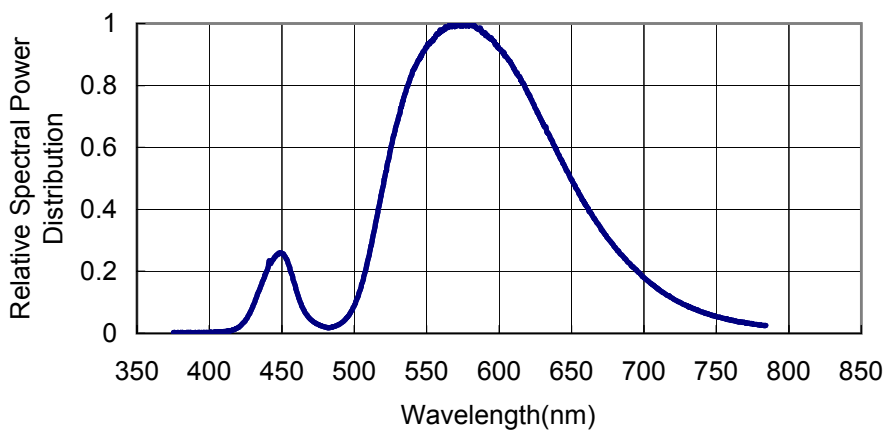


Figure 1c. Warm White Color Spectrum of Typical 3300K Part.

Light Output Characteristics

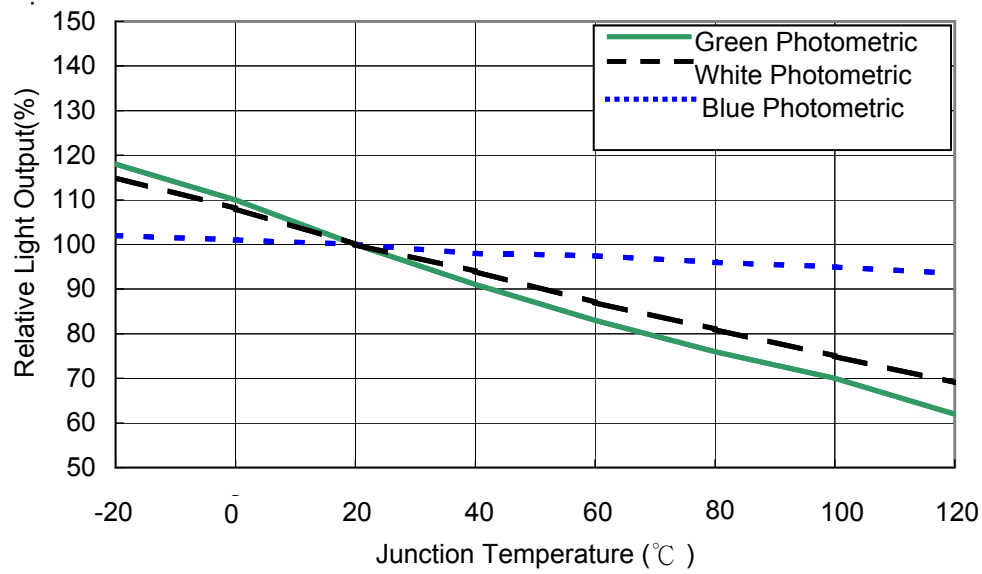


Figure 2a. Relative Light Output vs. Junction Temperature

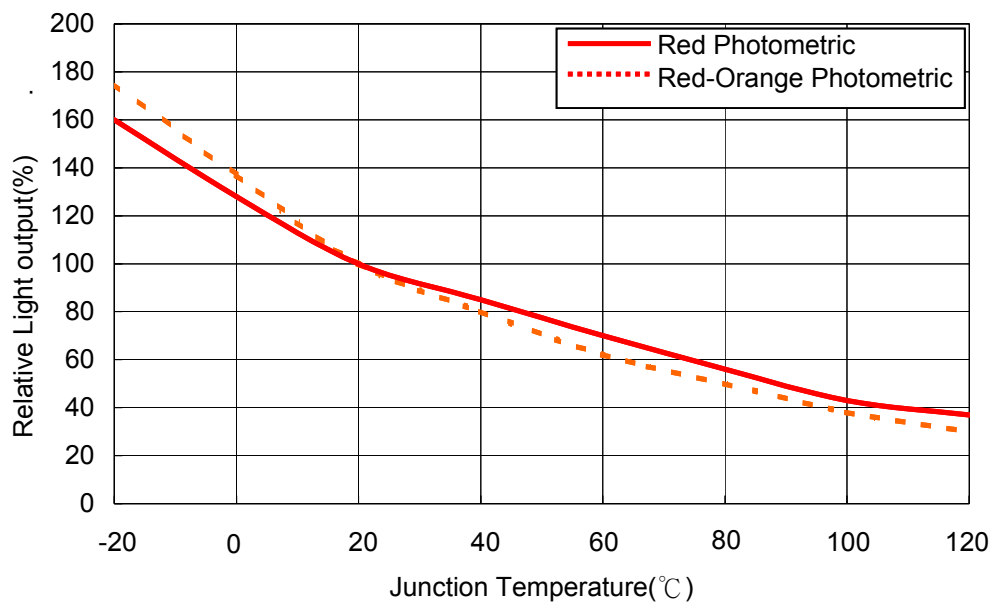


Figure 2b. Relative Light Output vs. Junction Temperature

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

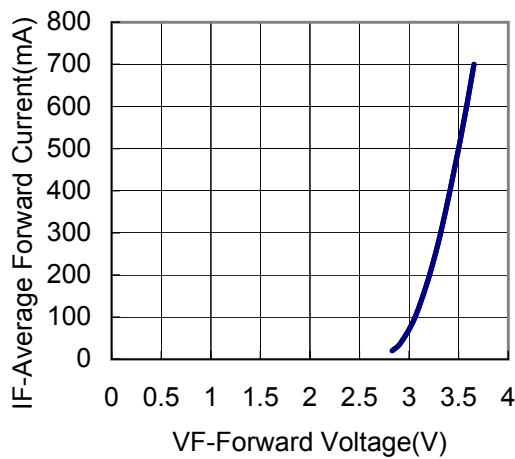


Fig 3a. Forward Current vs. Forward Voltage for White, Warm White, Blue and Green.

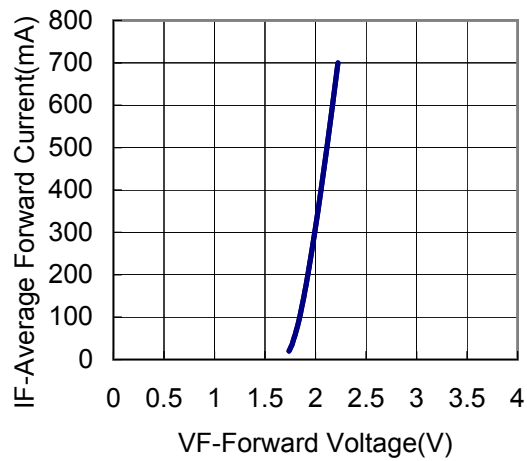


Fig 3b. Forward Current vs. Forward Voltage for Amber, Red-Orange and Red.

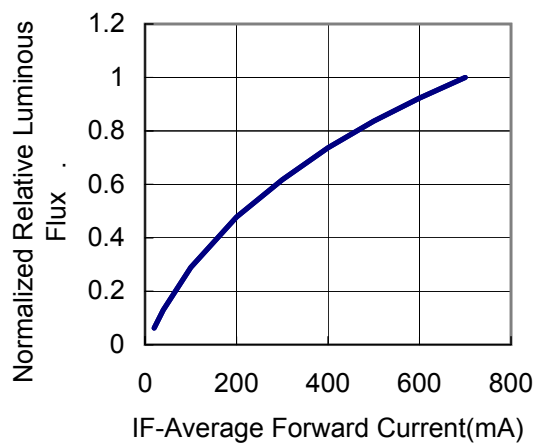


Fig 4a. Relative Luminous Flux vs. Forward Current for White, Warm White, Blue and Green at $T_j=25^{\circ}\text{C}$ maintained.

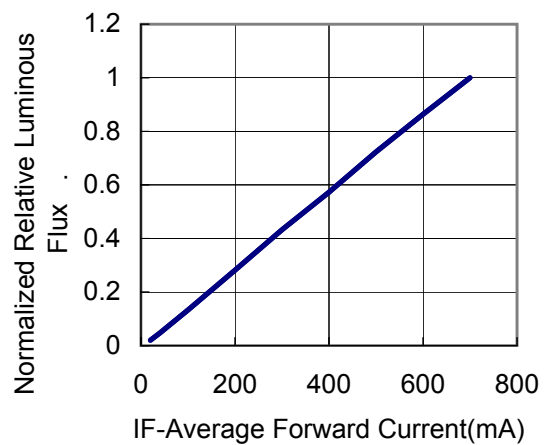


Fig 4b. Relative Luminous Flux vs. Forward Current for Amber, Red-Orange, Red at $T_j=25^{\circ}\text{C}$ maintained.

Current Derating Curves

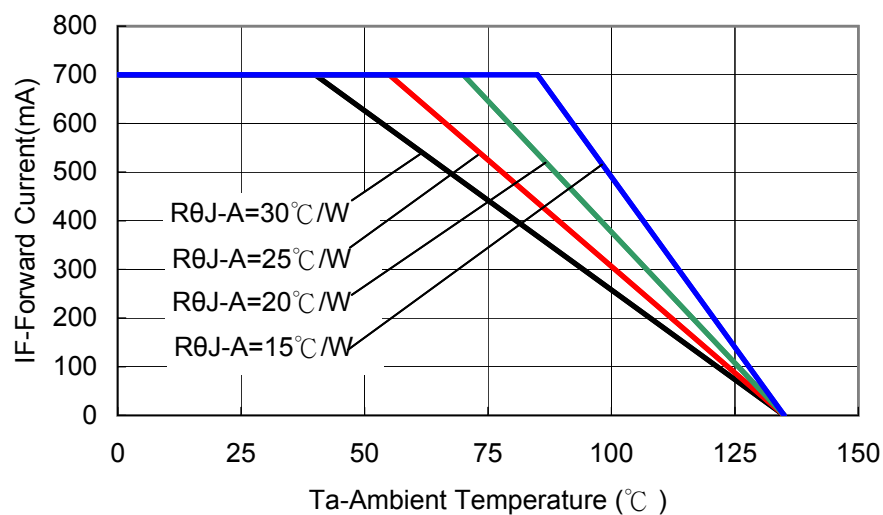


Fig 5a. Maximum Forward Current vs. Ambient Temperature. Derating based on $T_{jMAX}=135^{\circ}\text{C}$ for White, Warm White, Blue and Green.

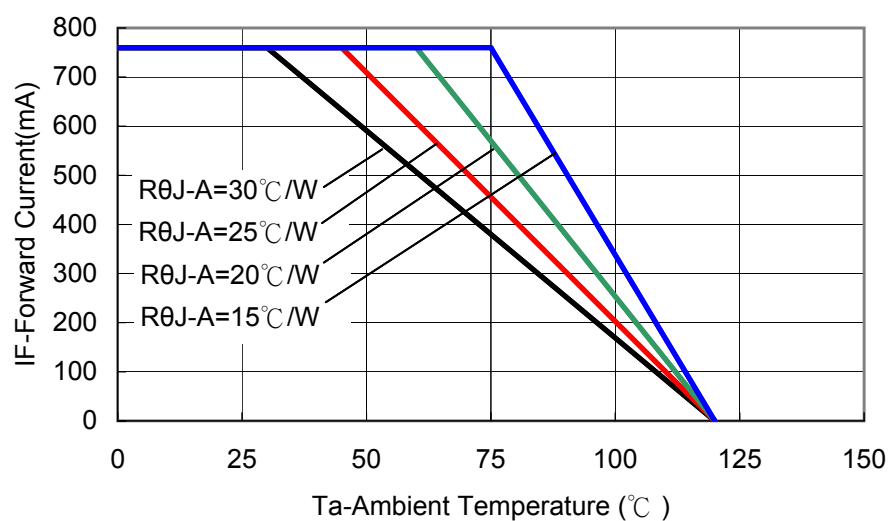


Fig 5b. Maximum Forward Current vs. Ambient Temperature. Derating based on $T_{jMAX}=120^{\circ}\text{C}$ for Amber, Red-Orange and Red.

Typical Representative Spatial Radiation Pattern

Batwing Radiation Pattern

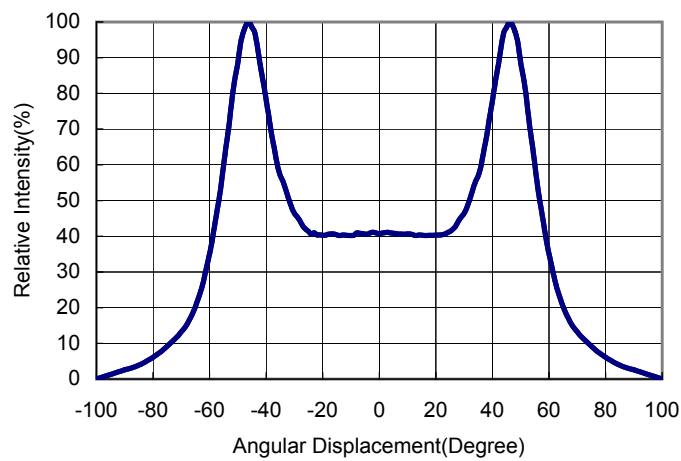


Fig 6. Typical Representative Spatial Radiation Pattern for White, Warm White, Blue, Green, Amber, Red-Orange and Red.

Recommended Soldering Pads

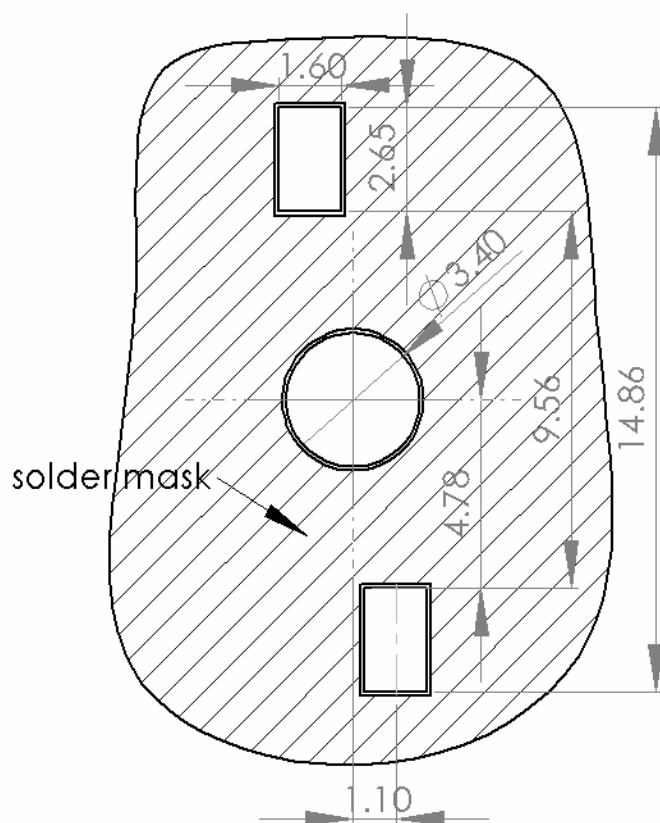
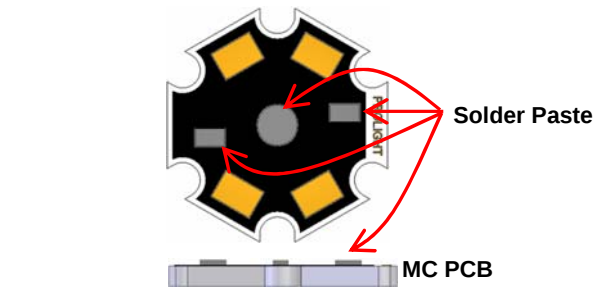


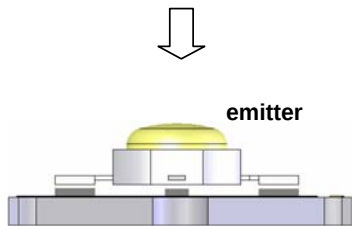
Fig 7. Recommended Solder pads dimension. Solder mask is also recommended to avoid short circuit while proceeding soldering.

Heat Plate Soldering Condition

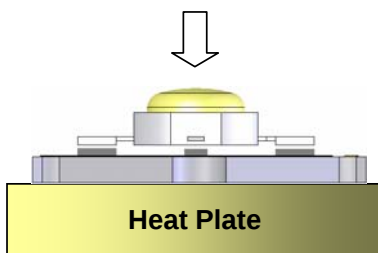
(1) Soldering Process for Solder Paste



Use Solder Mask to print solder paste on MC PCB

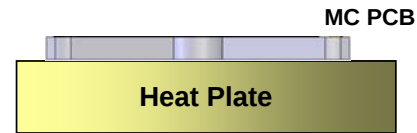


Place emitter on the MC PCB

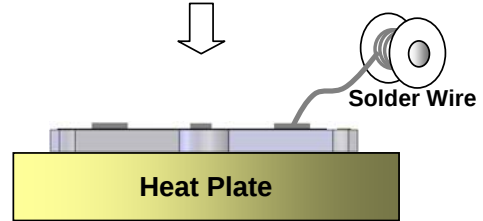


Put MC PCB on Heat Plate until solder paste melt.
The solder paste could be melted within 10sec.
Take out MC PCB out from Heat Plate within 15sec.

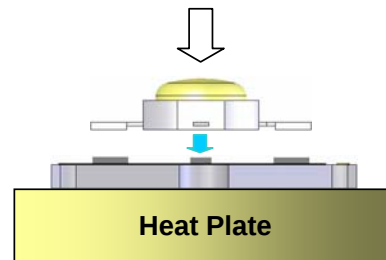
(2) Soldering Process for Solder Wire



Put MC PCB on Heat Plate



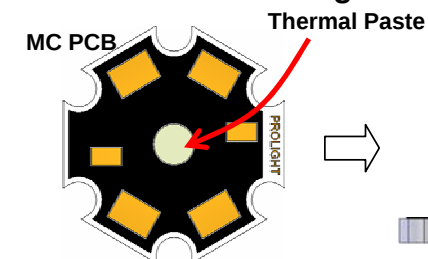
Place solder wire to the solder pad of MC PCB



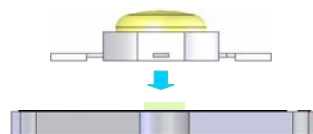
Put emitter on MC PCB. Take the MC PCB out from Heat Plate within 10 sec.

- Heat Plate temperature: 230°C max for Lead Solder and 260°C max for Lead-Free Solder
- When soldering, do not put stress on the LEDs during heating.
- After soldering, do not warp the circuit board.
- Air Reflow Process are not allow, it will cause optical lens damage and effect optical performance.

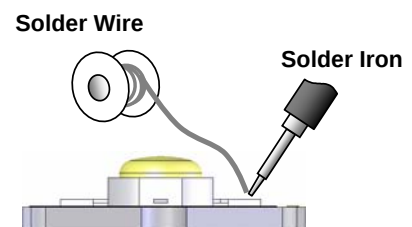
Manual Hand Soldering



Place solder paste on the MC PCB



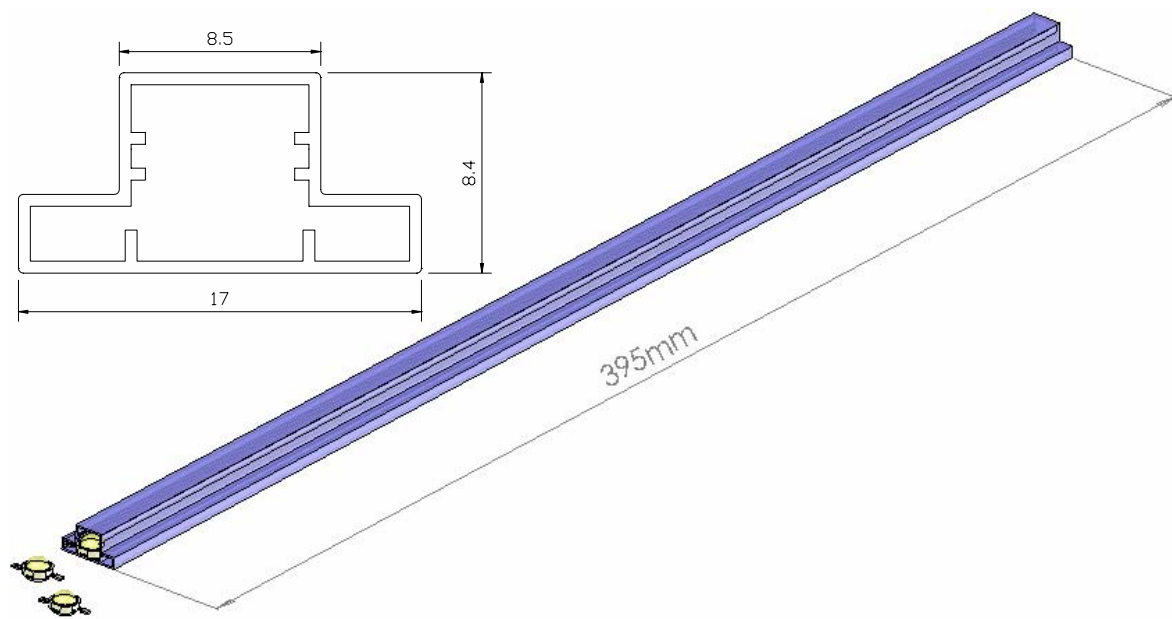
Place emitter on the MC PCB



Use Soldering Iron to solder the lead of emitter.

- For Prototype builds or small series production runs it possible to place and solder the emitters by hand.
- Hand solder the leads with a solder tip temperature of 230°C for less than 5 sec.
- Avoiding damage to the emitter or to the MCPCB dielectric layer. Damage to the epoxy layer can cause a short circuit in the array.
- Do not let the solder contact from solder pad to back-side of MC PCB. This one will cause a short circuit and damage emitter.

Emitter Tube Packaging



Notes:

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