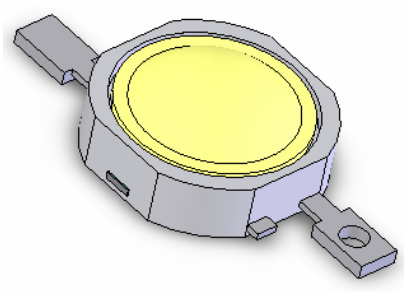
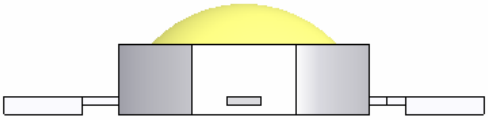
ProLight Opto





ProLight PG1N-3LXE
3W Power LED
Technical Datasheet
Version: 1.0

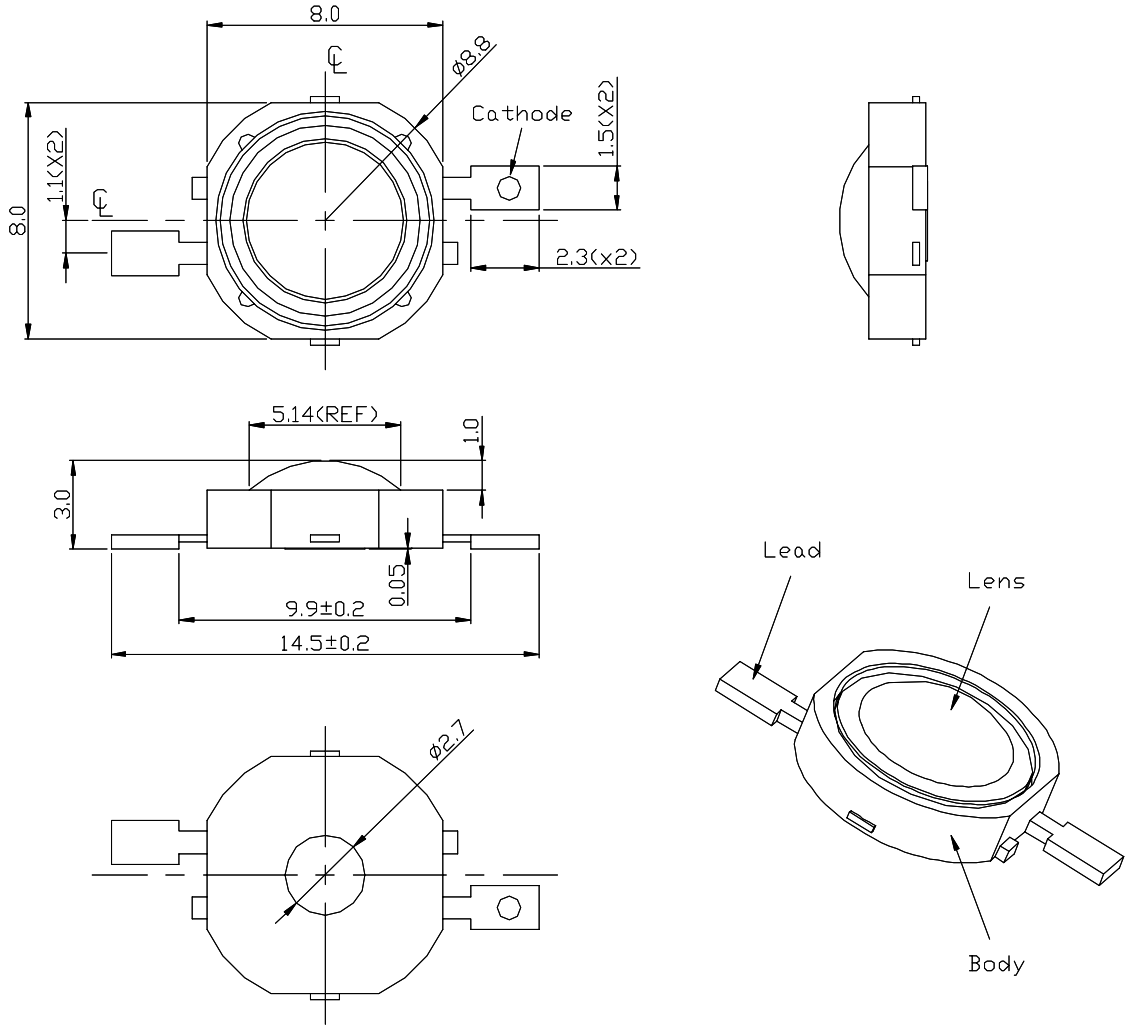
Features

- High Flux per LED
- Very long operating life(up to 100k hours)
- Available in White, Warm White, Green, Blue, Amber, Red-Orangeand Red
- Lambertian 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

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 dimendions without tolerances are for reference only.

Part Number Matrix

Color	Emitter	STAR	Beam Pattern
White	PG1N-3LWE	PG1N-3LWS	
Warm White	PG1N-3LVE	PG1N-3LVS	
Green	PG1N-3LGE	PG1N-3LGS	
Blue	PG1N-3LBE	PG1N-3LBS	Lambertian
Amber	PG1N-3LAE	PG1N-3LAS	
Red-Orange	PG1N-3LHE	PG1N-3LHS	
Red	PG1N-3LRE	PG1N-3LRS	

Flux Characteristics at 700mA, Junction Temperature, Tj=25℃

Color	Minimum Luminous Flux (lm)	Typical Luminous Flux (lm)	Beam Pattern
White	51.7	80	
Warm White	51.7	72	
Green	51.7	70	
Blue	10.7	20	Lambertian
Amber	51.7	72	
Red-Orange	51.7	80	
Red	39.8	64	

Optical Characteristics at 700mA, Junction Temperature, Tj=25℃

Color	Dominant Wavelength λD Peak Wavelength λp Color Temperature(CCT) Min.	 Typ.	 Max.	Spectral Half-width (nm) Δλ1/2	Temperature Coefficient or Dominant Wavelength ΔλD/ΔTj (nm/℃)
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℃ (Continued)

Color	Beam Pattern	Total Included Angle θ0.9v (degree)	Viewing Angle 2θ1/2 (degree)	Typical Candela on Axis (cd)
White	Lambertian	160	140	
Warm White		160	140	
Green		160	140	
Blue		160	140	
Amber		160	140	
Red-Orange		160	140	
Red		160	140	

Electrical Characteristics at 700mA, Junction Temperature, Tj=25℃

Color	Forward Voltage Vf(V) Min.	Typ.	Max.	Dynamic Resistance(Ω)	Temperature Coefficient of Vf(mV/℃) ΔVf/ΔTj	Thermal Resistance Junction to Board(℃/W)
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 (℃)	135	120
Aluminum-core PCB Temperature(℃)	105	105
Storage & Operating Temperature(℃)	-40 to +105	-40 to +105
Soldering Temperature(℃)	260 for 5 seconds Max.	

Photometric Luminous Flux Bin Structure

Bin Code	Minimum Photometric Flux (lm)	Maximum Photometric Flux (lm)
J	6.3	8.2
K	8.2	10.7
L	10.7	13.9
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

- 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 ± 1nm

Color Bins for Blue

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

- Tolerance on each Color bin is ± 1nm

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

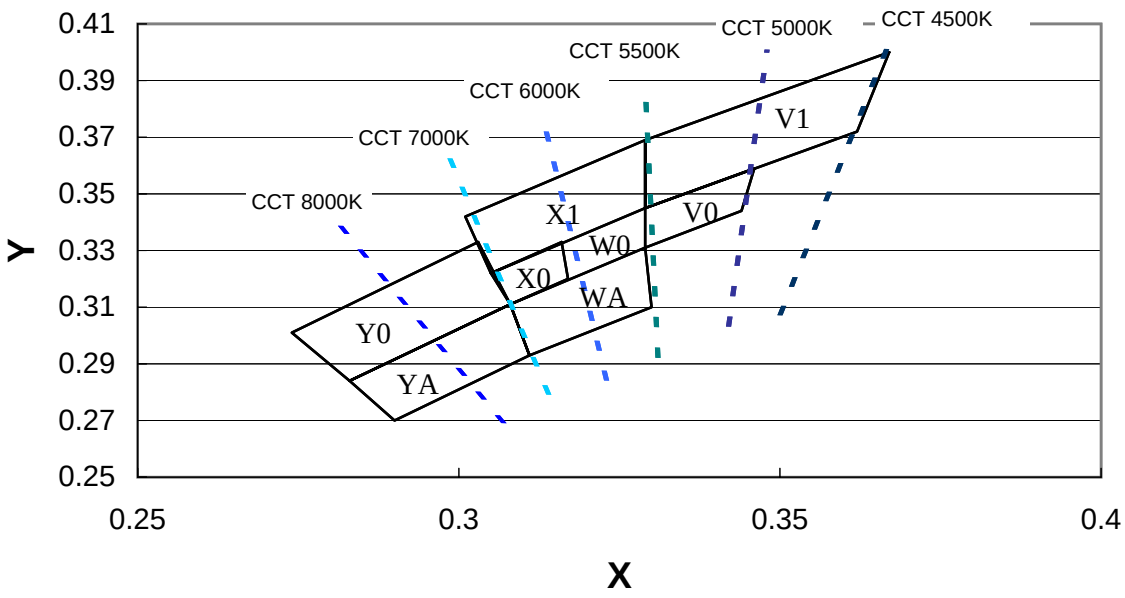
- Tolerance on each Color bin is ± 1nm

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	
W0	0.329	0.369	6050	YA	0.301	0.342	8000
	0.329	0.345			0.308	0.311	
	0.329	0.331			0.311	0.293	
	0.317	0.32			0.29	0.27	
WA	0.316	0.333	6300	Y0	0.283	0.284	8000
	0.329	0.331			0.303	0.333	
	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

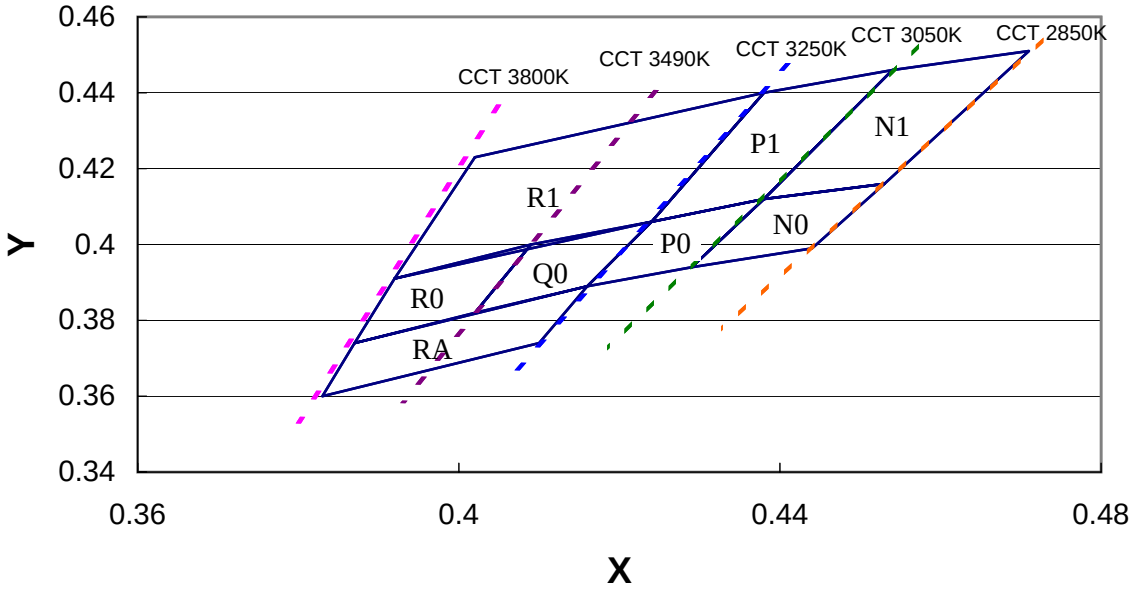


Color Bins for Warm White

Bin Code	X	Y	Typ. CCT (K)	Bin Code	X	Y	Typ. CCT (K)
	0.438	0.412			0.409	0.4	
	0.429	0.394			0.402	0.382	
N0	0.444	0.399	2950	Q0	0.416	0.389	3370
	0.453	0.416			0.424	0.406	
	0.438	0.412			0.409	0.4	
	0.454	0.446			0.392	0.391	
	0.438	0.412			0.387	0.374	
N1	0.453	0.416	2950	R0	0.402	0.382	3640
	0.471	0.451			0.409	0.4	
	0.454	0.446			0.392	0.391	
	0.424	0.406			0.402	0.423	
	0.416	0.389			0.392	0.391	
P0	0.429	0.394	3150	R1	0.424	0.406	3500
	0.438	0.412			0.438	0.44	
	0.424	0.406			0.402	0.423	
	0.438	0.44			0.387	0.374	
	0.424	0.406			0.383	0.36	
P1	0.438	0.412	3150	RA	0.41	0.374	3500
	0.454	0.446			0.416	0.389	
	0.438	0.44			0.387	0.374	

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

Color Bins for Warm White



Wavelength Characteristics, Tj=25℃

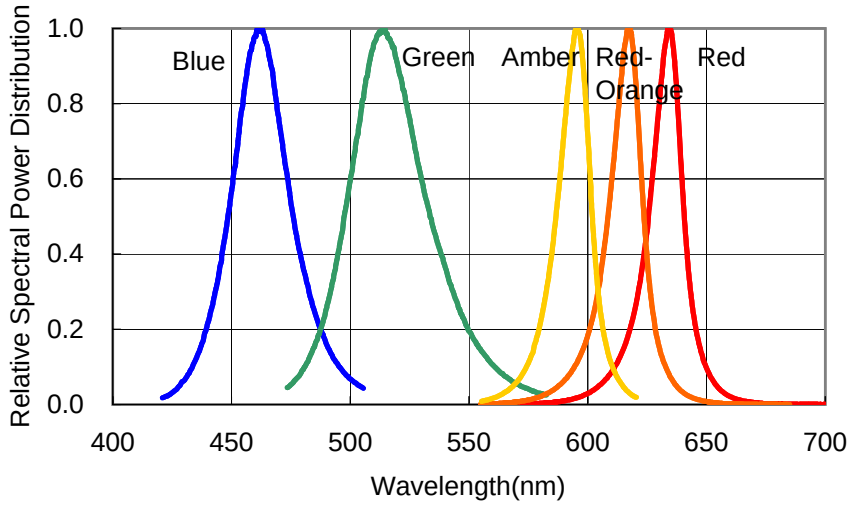


Figure 1a. Relative Intensity vs. Wavelength

White Color Spectrum

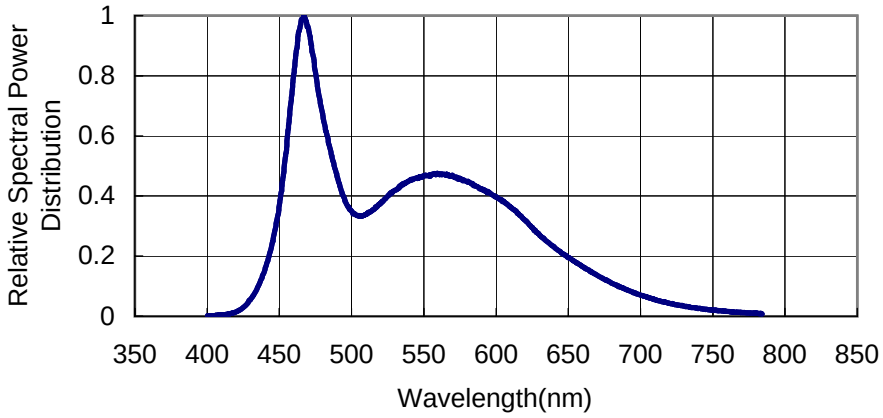


Figure 1b. White Color Spectrum of Typical 5500K Part.

Warm White Color Spectrum

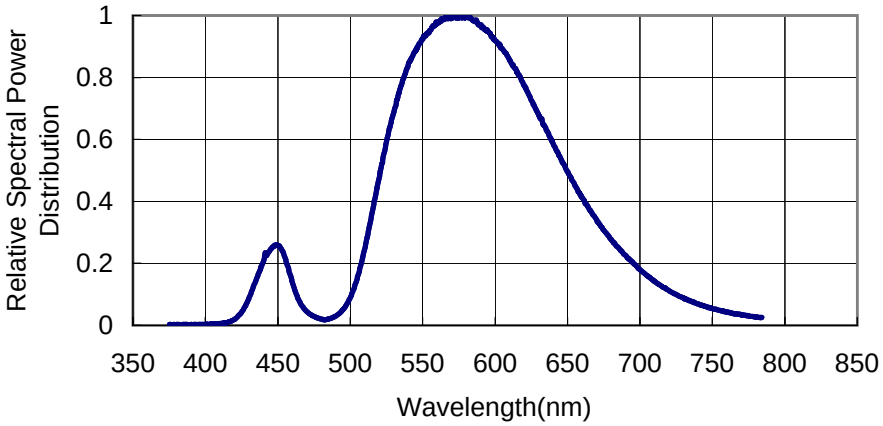


Figure 1c. Warm White Color Spectrum of Typical 3300K Part.

Light Output Characteristics

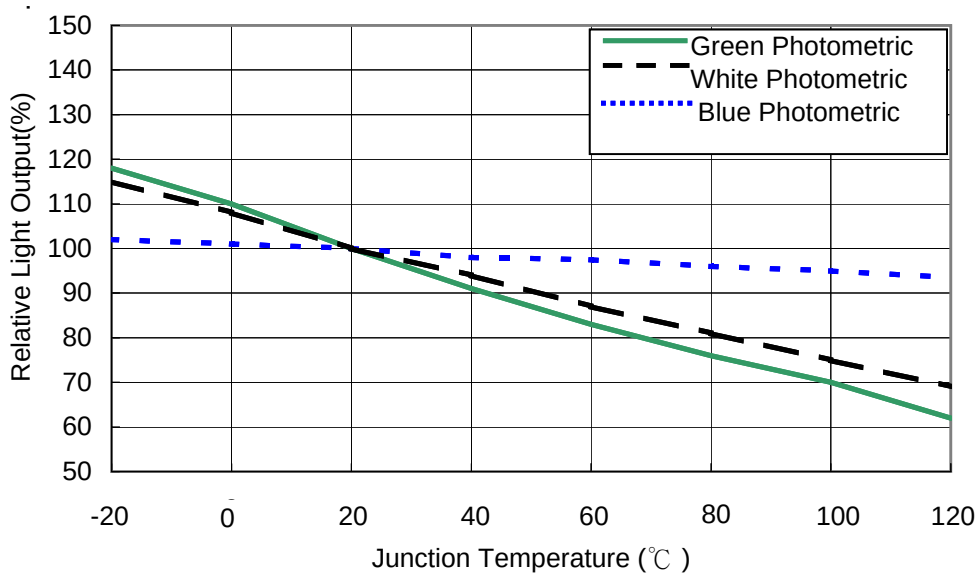


Figure 2a. Relative Light Output vs. Junction Temperature

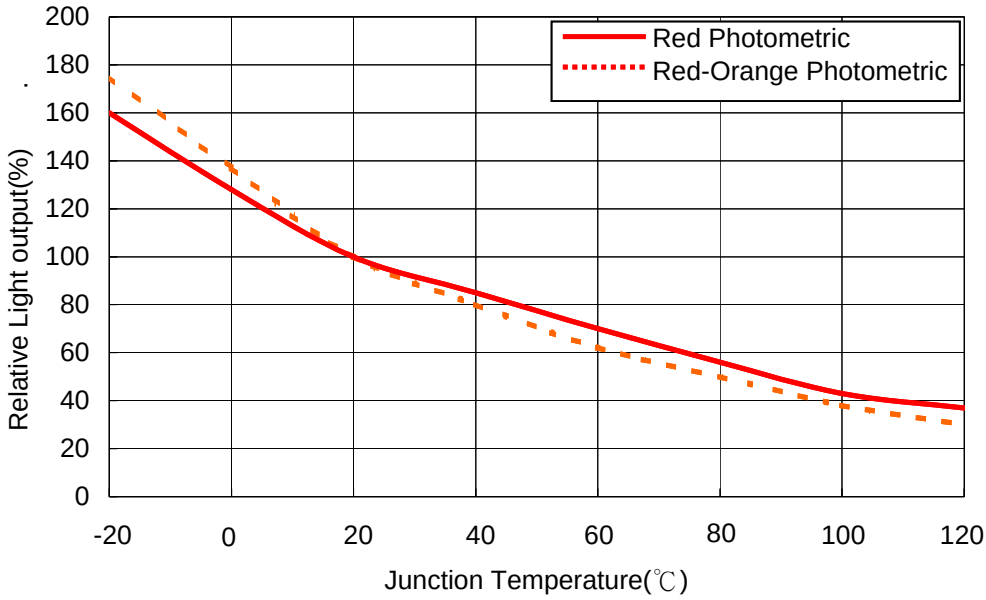


Figure 2b. Relative Light Output vs. Junction Temperature

Forward Current Characteristics, Tj=25℃

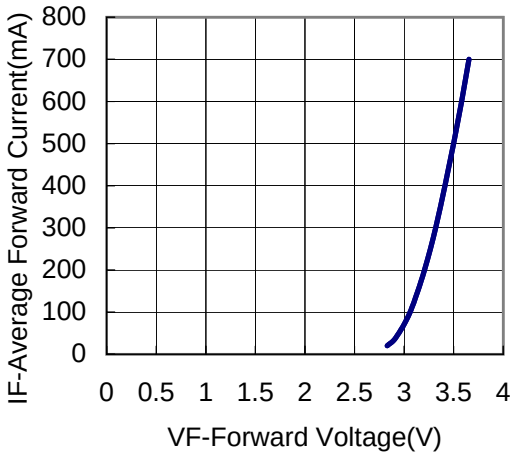


Fig 3a. Forward Current vs. Forward Voltage for White, Warm White, Blue and Green.

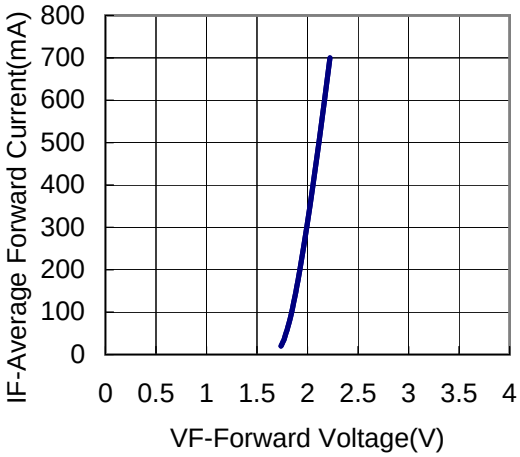


Fig 3b. Forward Current vs. Forward Voltage for Amber, Red-Orange and Red.

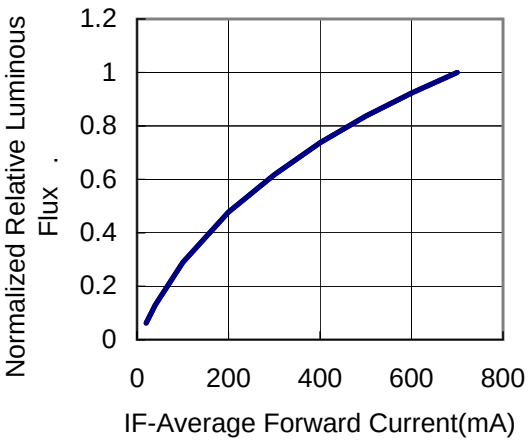


Fig 4a. Relative Luminous Flux vs. Forward Current for White, Warm White, Blue and Green at Tj=25℃ maintained.

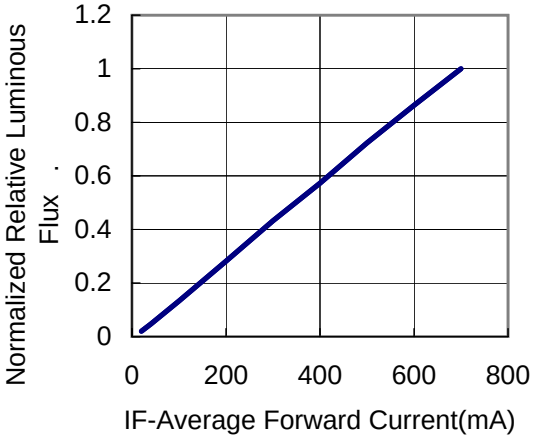


Fig 4b. Relative Luminous Flux vs. Forward Current for Amber, Red-Orange, Red at Tj=25℃ maintained.

Current Derating Curves

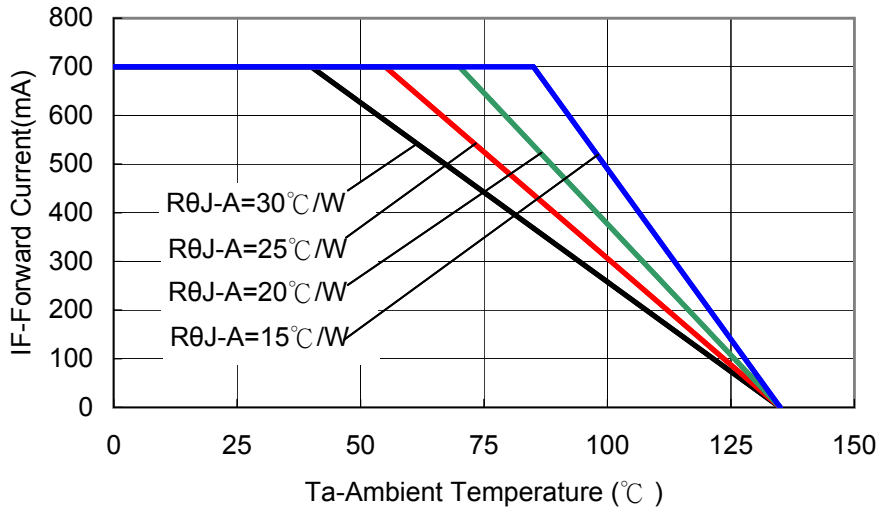


Fig 5a. Maximum Forward Current vs. Ambient Temperature. Derating based on TjMAX=135℃ for White, Warm White, Blue and Green.

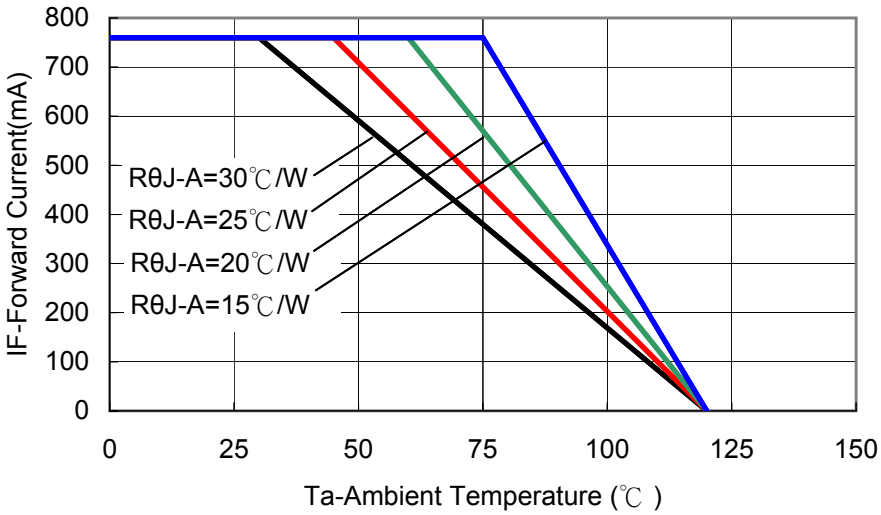


Fig 5b. Maximum Forward Current vs. Ambient Temperature. Derating based on TjMAX=120℃ for Amber, Red-Orange and Red.

Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern

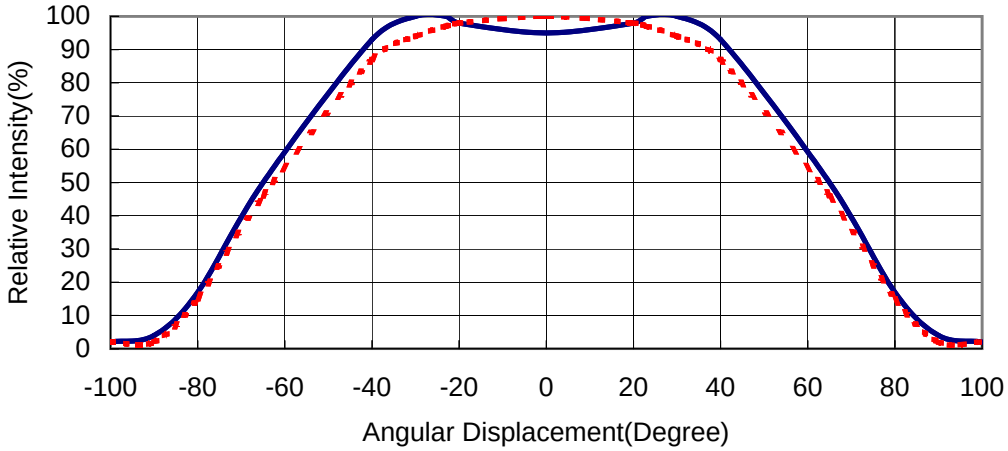


Fig 6. Typical Representative Spatial Radiation Pattern for White, Warm White, Blue, Green, Amber, Red-Orange and Red.

Recommended Soldering Pads

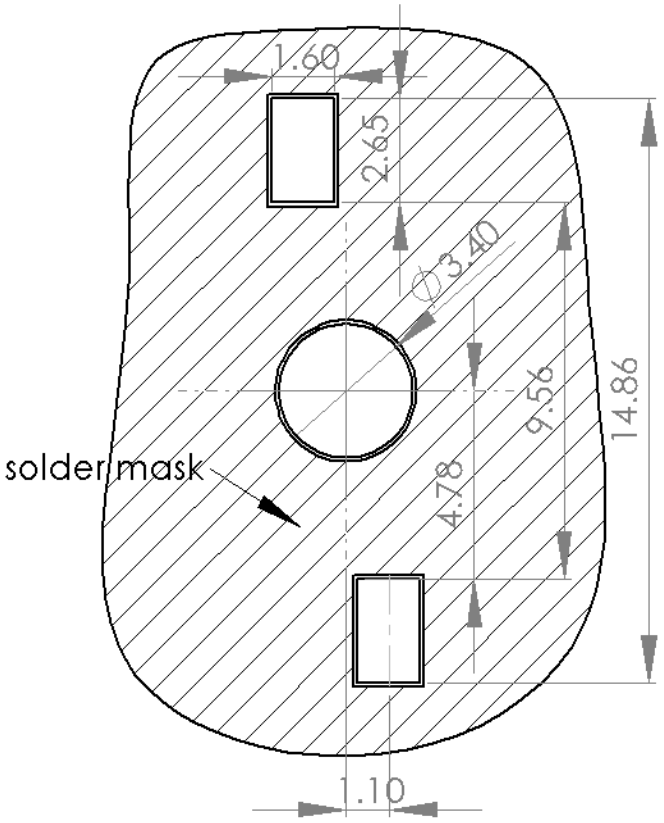


Fig 7. Recommended Solder pads dimension. Solder mask is

also recommended to advoid short circuit while

Recommend IR Reflow Condition

Reflow Soldering		
	Lead Solder	Lead-free Solder
Pre-heat	120~150℃	180~200℃
Pre-heat time	120 sec. Max.	120 sec. Max.
Peak temperature	240℃ Max.	260℃ Max.
Soldering time	10 sec. Max.	10 sec. Max.
Condition	refer to temperature-profile (A)	refer to temperature-profile (B) (N_2 reflow is recommended.)

- After reflow soldering rapid cooling should be avoided.

Temperature-profile (Surface of MCPCB)

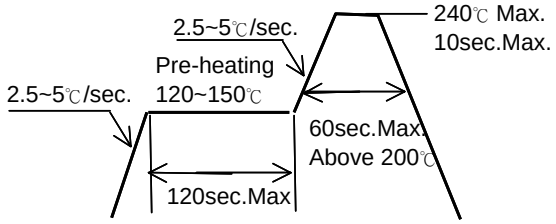


Figure 8a. Lead Solder Temperature Profile

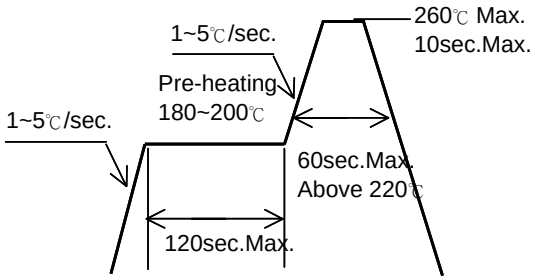


Figure 8b. Lead-free Solder Temperature Profile

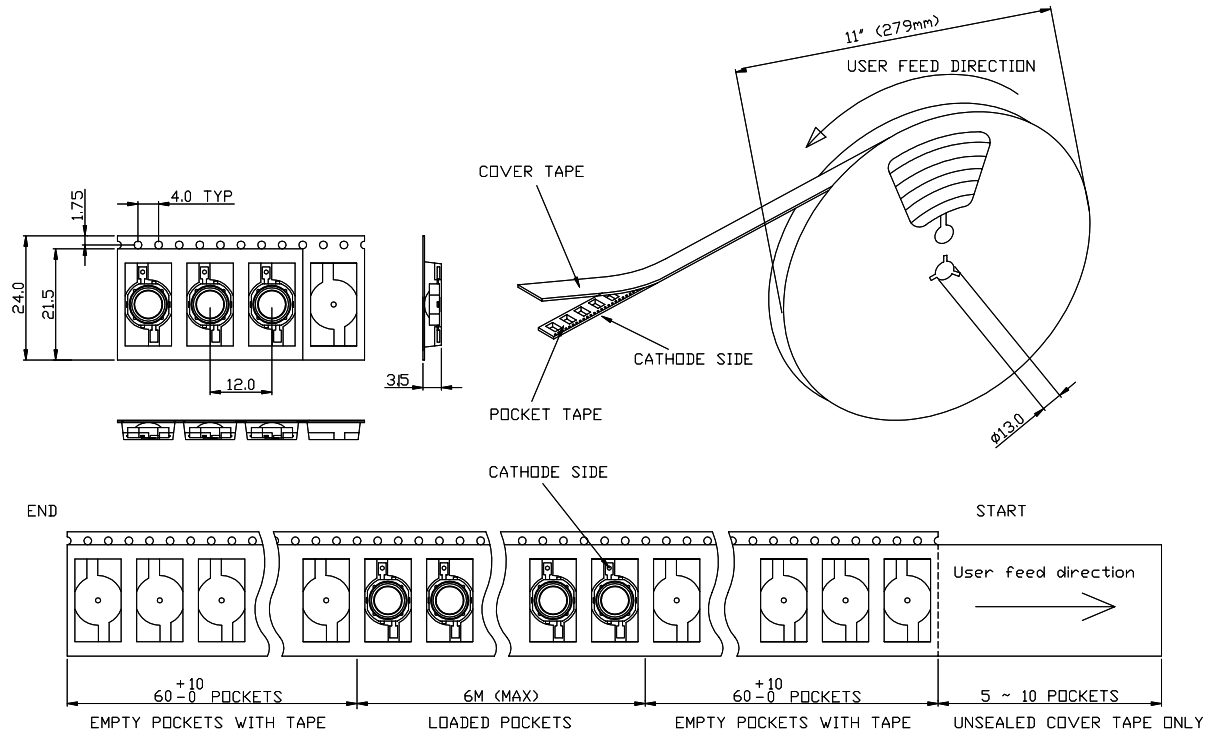
- Occasionally there is a brightness decrease caused by the influence of heat or ambient during air reflow. It is recommended that the User use the nitrogen reflow method.
- Repairing should not be done after the LEDs have been soldered. When repairing is double-head soldering iron should be used. It should be confirmed beforehand whether the characteristics of the 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.

Manual Hand Soldering

For Prototype builds or small series production runs it possible to place and solder the emitters

It is recommended to hand solder the leads and slug with a solder tip temperature of 230'C for l 10 seconds. This profile maintains a junction temperature below the maximum of 120'C, avoidir to the emitter or to the MCPCB dielectric layer. Damage to the epoxy layer can cause a short ci the array.

Emitter Reel Packaging



Notes:
1. The emitters should be picked up by the body (not the lens) during placement. The inner diameter of the pick-up collet should be greater than or equal to 6.5 mm.
2. Drawing not to scale.
3. All dimensions are in millimeters.
4 .All dimendions without tolerances are for reference only.