

ProLight PXHL-PF01 3W RGB Power LED Technical Datasheet

Preliminary

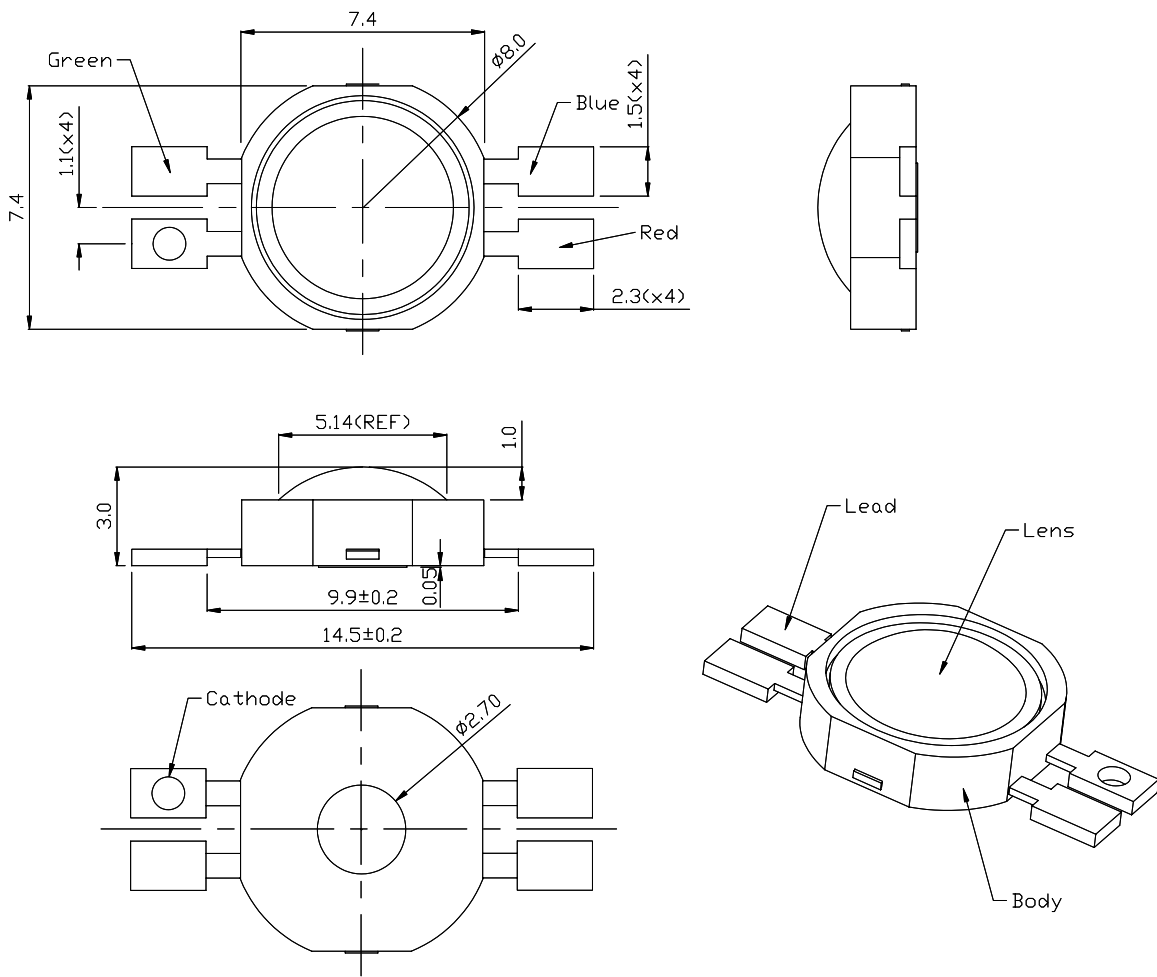
Features

- R, G, B three color in one Package
- High Flux per LED
- Very long operating life(up to 100k hours)
- 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 dimensions without tolerances are for reference only.

Part Number

Color	Emitter	Beam Pattern
R/G/B	PXHL-PF01	Lambertian

Flux Characteristics at 350mA, Junction Temperature, Tj=25°C

Color	Minimum Luminous Flux (lm)	Typical Luminous Flux (lm)	Beam Pattern
Red	18.1	30	
Green	18.1	30	Lambertian
Blue	3.8	10	

Optical Characteristics at 350mA, Junction Temperature, Tj=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.		
Red	620.5nm	625nm	645nm	20	0.05
Green	520nm	530nm	550nm	35	0.04
Blue	460nm	470nm	490nm	25	0.04

Optical Characteristics at 350mA, Junction Temperature, Tj=25°C (Continued)

Color	Beam Pattern	Total Included Angle $\theta_{0.9v}$ (degree)	Viewing Angle $2\theta_{1/2}$ (degree)	Typical Candela on Axis (cd)
Red		160	140	
Green	Lambertian	160	140	
Blue		160	140	

Electrical Characteristics at 350mA, Junction Temperature, Tj=25°C

Color	Forward Voltage Vf(V)			Dynamic Resistance(Ω)	Temperature Coefficient of Vf(mV/°C) $\Delta V_f/\Delta T_j$	Thermal Resistance Junction to Board(°C/W)
	Min.	Typ.	Max.			
Red	1.70	2.20	2.60	2.4	-2	10
Green	2.79	3.55	3.99	1.0	-2	10
Blue	2.79	3.55	3.99	1.0	-2	10

Absolute Maximum Ratings

Parameter	Red	Green	Blue
DC Forward Current (mA)	385	350	350
Peak Pulsed Forward Current (mA)	550	500	500
Average Forward Current (mA)		350	
ESD Sensitivity		±16000V HBM	
LED Junction Temperature (°C)	120	135	135
Aluminum-core PCB Temperature(°C)		105	
Storage & Operating Temperature(°C)		-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)
G	3.8	4.9
H	4.9	5.3
J	5.3	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

- Tolerance on each Luminous Flux bin is ± 15%

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 Green

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

- 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

- Tolerance on each Color bin is ± 1 nm

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

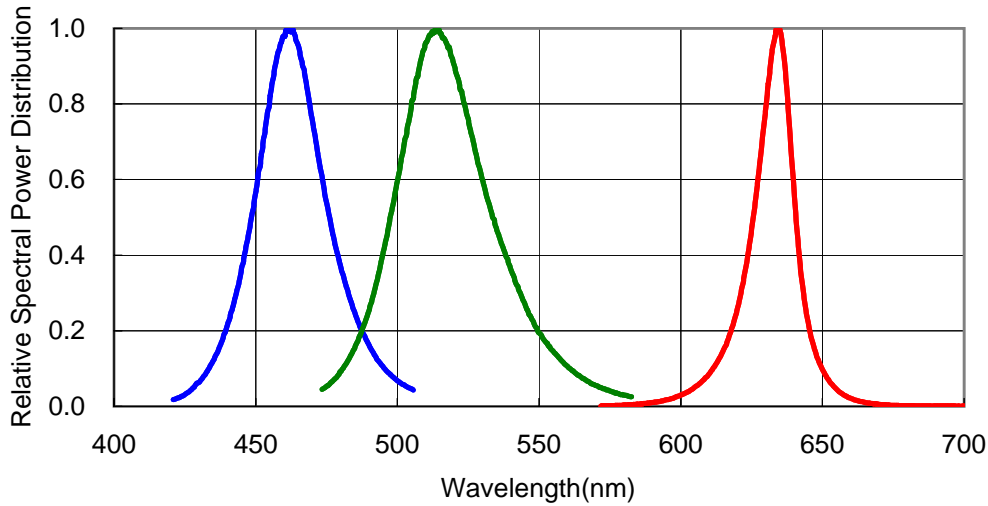


Figure 1. Relative Intensity vs. Wavelength

Light Output Characteristics

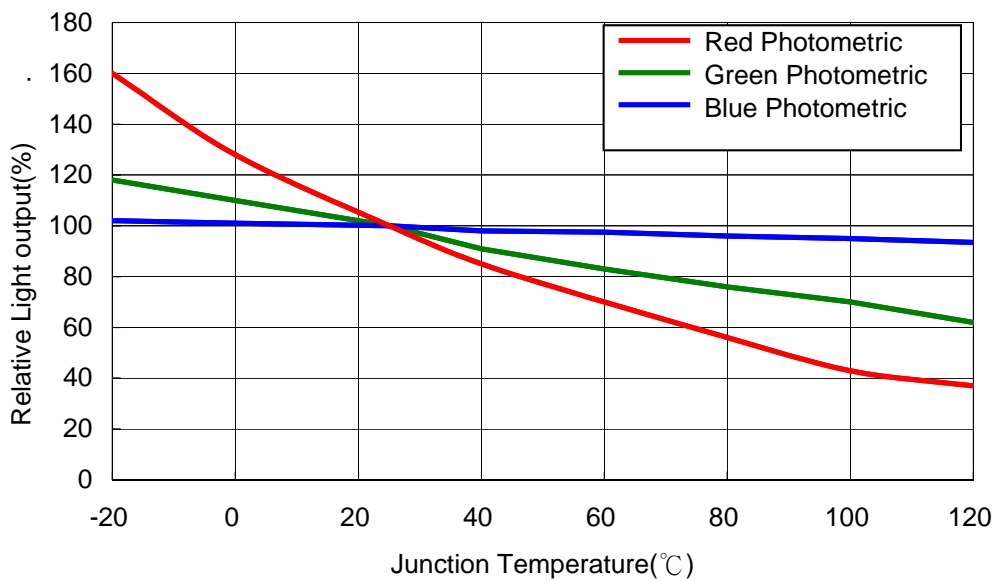


Figure 2. Relative Light Output vs. Junction Temperature

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

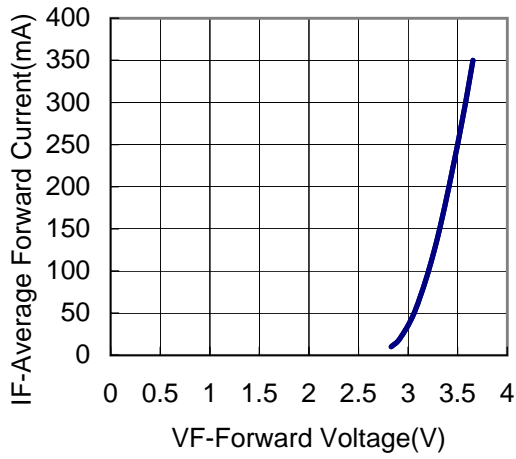


Fig 3a. Forward Current vs. Forward Voltage for Blue and Green.

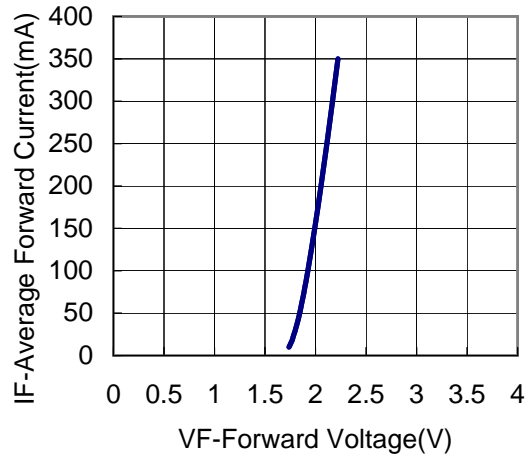


Fig 3b. Forward Current vs. Forward Voltage for Red.

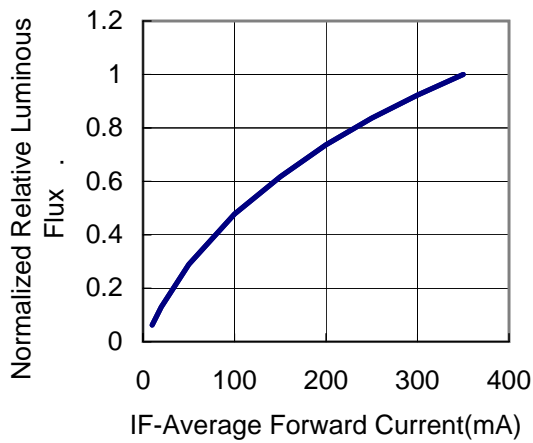


Fig 4a. Relative Luminous Flux vs. Forward Current for Blue and Green at $T_j=25^\circ\text{C}$ maintained.

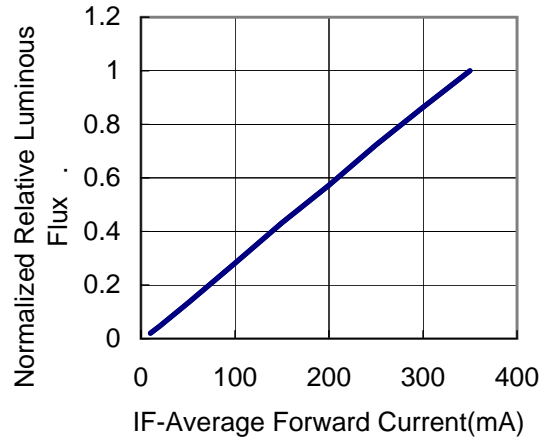


Fig 4b. Relative Luminous Flux vs. Forward Current for Red at $T_j=25^\circ\text{C}$ maintained.

Current Derating Curves

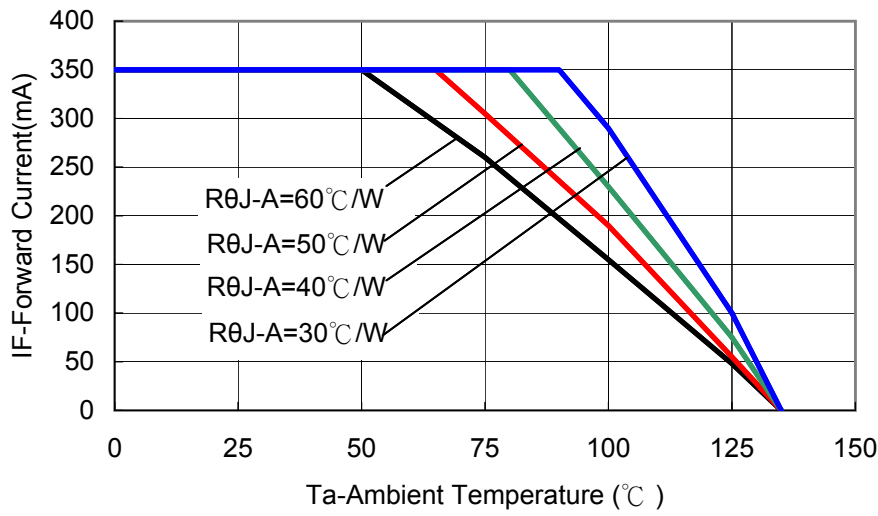


Fig 5a. Maximum Forward Current vs. Ambient Temperature. Derating based on TjMAX=135°C for Blue and Green.

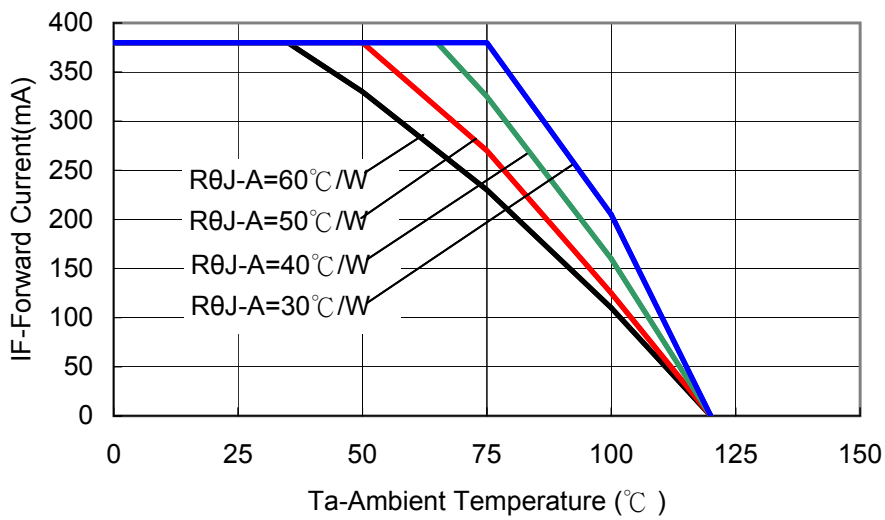


Fig 5b. Maximum Forward Current vs. Ambient Temperature. Derating based on TjMAX=120°C for Red.

Typical Representative Spatial Radiation Pattern

Lambertian Radiation Pattern

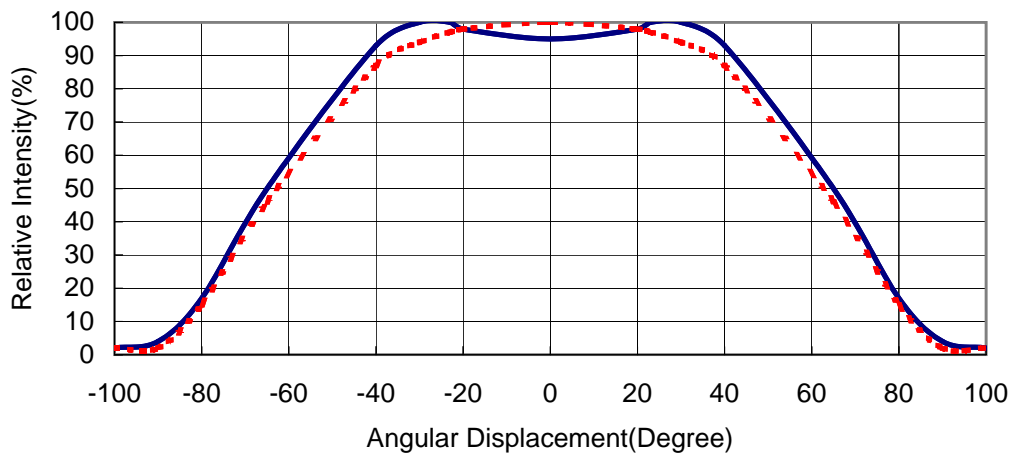


Fig 6. Typical Representative Spatial Radiation Pattern.

Recommended Soldering Pads

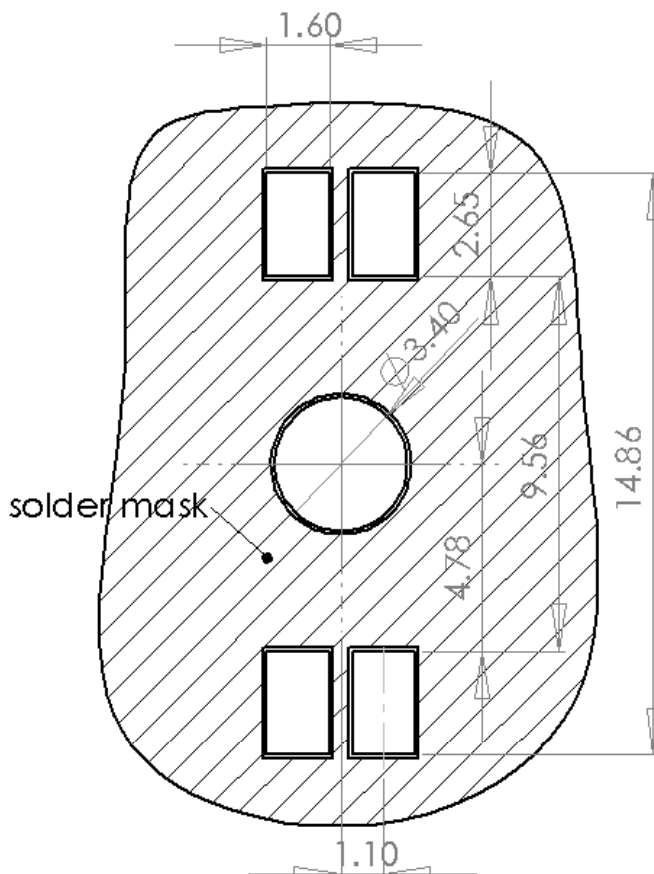


Fig 7. Recommended Solder pads dimension. Solder mask is

also recommended to avoid short circuit while

Recommend IR Reflow Condition

Reflow Soldering		
	Lead Solder	Lead-free Solder
Pre-heat	120~150°C	180~200°C
Pre-heat time	120 sec. Max.	120 sec. Max.
Peak temperature	240°C Max.	260°C 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)

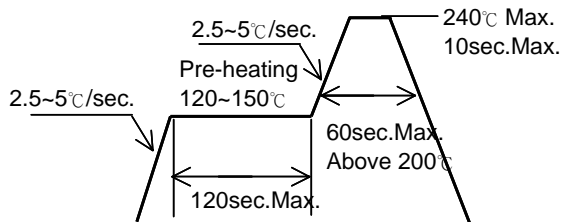


Figure 8a. Lead Solder Temperature Profile

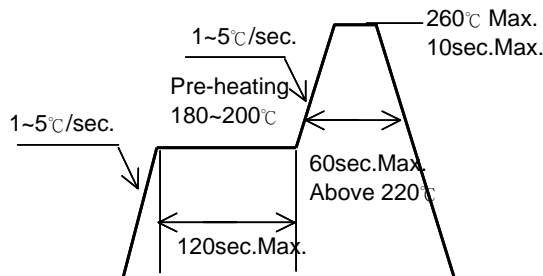


Figure 8b. Lead-free Solder Temperature Profile

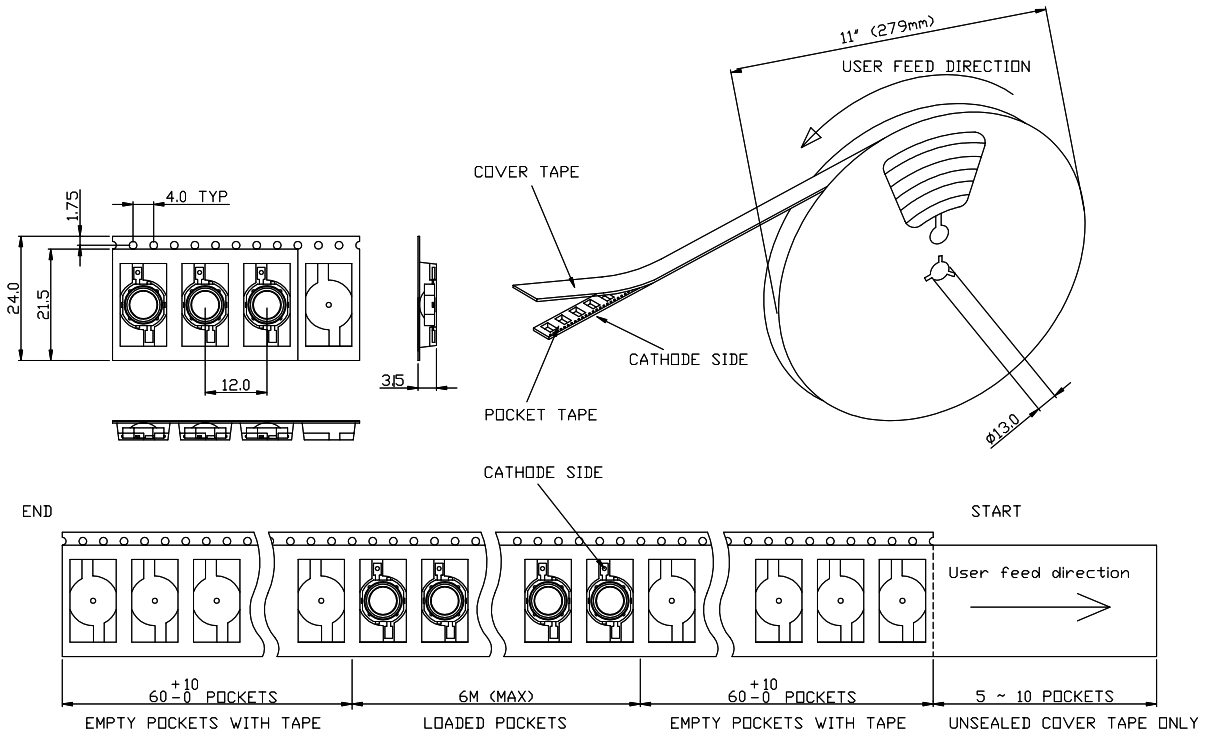
- Occasionally there is a brightness decrease caused by the influence of heat or ambient during air reflow. It is recommended that the User use the nitrogen reflow method.
- Repairing should not be done after the LEDs have been soldered. When repairing is double-head soldering iron should be used. It 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 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 dimensions without tolerances are for reference only.