

**QLSP04RBU**  
(High Power color 3030 LEDs)



## Product Outline:

This is the high power LED with reflector type. EMC 3030 Single color is a surface-mount LED which with heat sink to enhance operating performance. With special binning technology, these LEDs are ideal for architecture lighting and special lighting needs.

## Features:

- Royal Blue Color
- High brightness output @ 350mA,
- High driving current to 1000mA
- Package Dimension = 3.2mmX3.0mmX0.6mm
- ESD protection up to 8KV
- RoHS compliant
- Custom Bin available upon special request

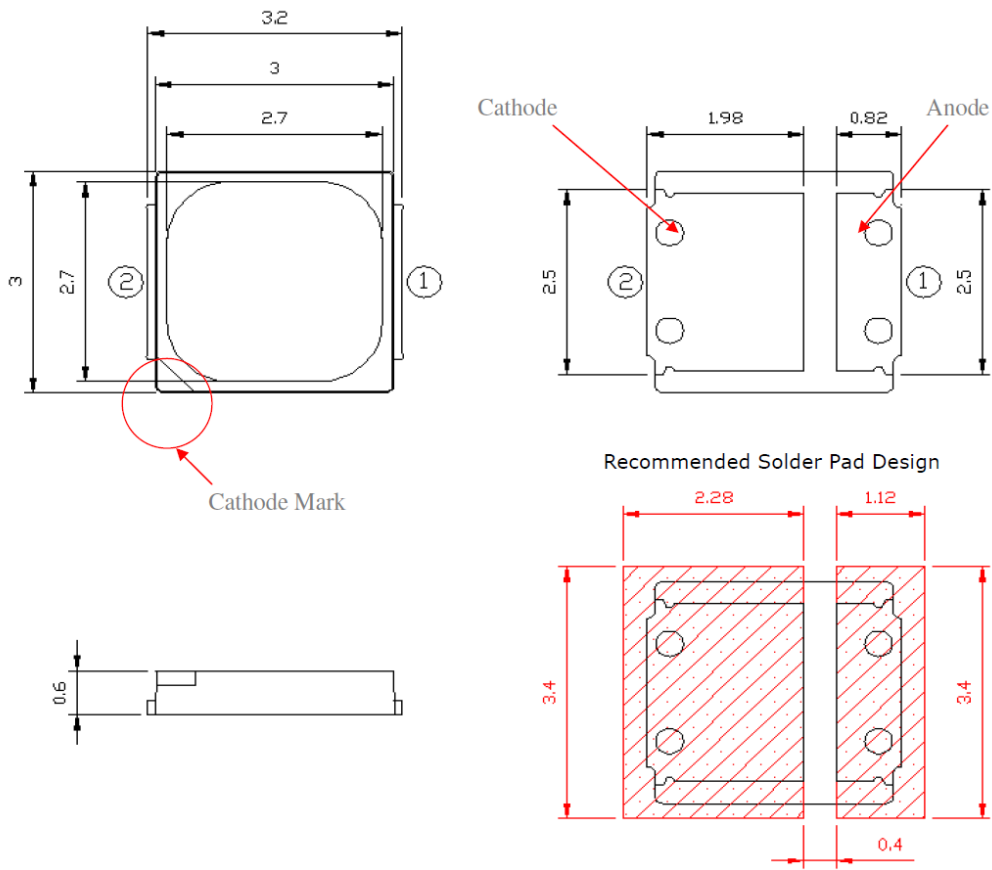
## Application:

- Warning lamp
- Decoration lamp
- Architecture Lighting
- Garden Lighting

## Compliance and Certification:

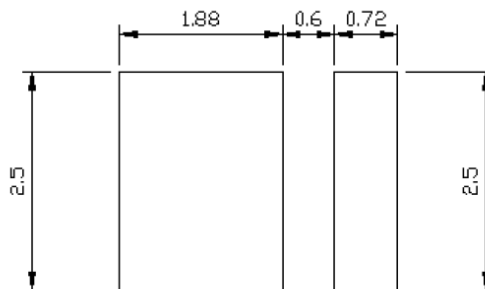


## Mechanical Property: (Dimension)



- \* All dimensions are in millimeters,
- \* Tolerances are  $\pm 0.10\text{mm}$ .

## Recommended Solder footprint:



- \* All dimensions are in millimeters.
- \* The LEDs is designed to be reflow soldered on to a PCB. IF dip soldered that QL cannot guarantee its reliability.
- \* Reflow soldering must not be performed more than twice.



## Characteristics

### ■ Absolute Maximum Ratings

(Ta=25°C)

| Parameter                | Symbol           | Rating       | Unit |
|--------------------------|------------------|--------------|------|
| DC Forward Current       | I <sub>f</sub>   | 1000         | mA   |
| Leakage Current          | I <sub>r</sub>   | 1.0          | μA   |
| Power Dissipation        | P <sub>d</sub>   | 3.3          | W    |
| Pulse Forward Current    | I <sub>fp</sub>  | 1000         | mA   |
| LED Junction Temperature | T <sub>J</sub>   | 125          | °C   |
| Storage Temperature      | T <sub>stg</sub> | -40 ~ 100    | °C   |
| Operation Temperature    | T <sub>opr</sub> | -40 ~ 85     | °C   |
| Soldering Temperature    | T <sub>sol</sub> | 260 < 10 sec | °C   |
| ESD Sensitivity(HBM)     |                  | 8            | KV   |
| Thermal Resistance       | R <sub>th</sub>  | 10           | °CW  |

- (1) Proper current rating must be observed to maintain junction temperature below maximum at all time  
 (2) IFP Condition: Duty 1/10, Pulse within 10msec

### ■ Electrical / Optical Characteristic

(Ta=25 oC)

| Product   | Color      | I <sub>F</sub> (mA) | V <sub>F</sub> (V) |     | Wavelength<br>nm | Luminous Flux(lm)/mW |      | Refer @ 700mA<br>Typ.(lm)/mW |
|-----------|------------|---------------------|--------------------|-----|------------------|----------------------|------|------------------------------|
|           |            |                     | Typ.               | max |                  | min                  | typ. |                              |
| QLSP04RBU | Royal Blue | 350                 | 3.2                | 3.5 | 450~460          | 18                   | 20   | 33                           |



## ■ Groups

### Dominant Wavelength

| Wd (nm)    |           |      |      |
|------------|-----------|------|------|
| Color      | Code name | Min. | Max. |
| Royal Blue | DA        | 450  | 455  |
|            | DB        | 455  | 460  |

Measurement tolerance is +/- 1nm

### Forward Voltage (V<sub>F</sub>) Bin:

| VF Rank    |           |     |      |
|------------|-----------|-----|------|
| Color      | Code name | Low | High |
| Royal Blue | 01        | 2.8 | 3.0  |
|            | 23        | 3.0 | 3.2  |
|            | 45        | 3.2 | 3.4  |
|            | 67        | 3.4 | 3.6  |

The forward voltage tolerance is ± 0.1V

### Luminous Flux Bin:

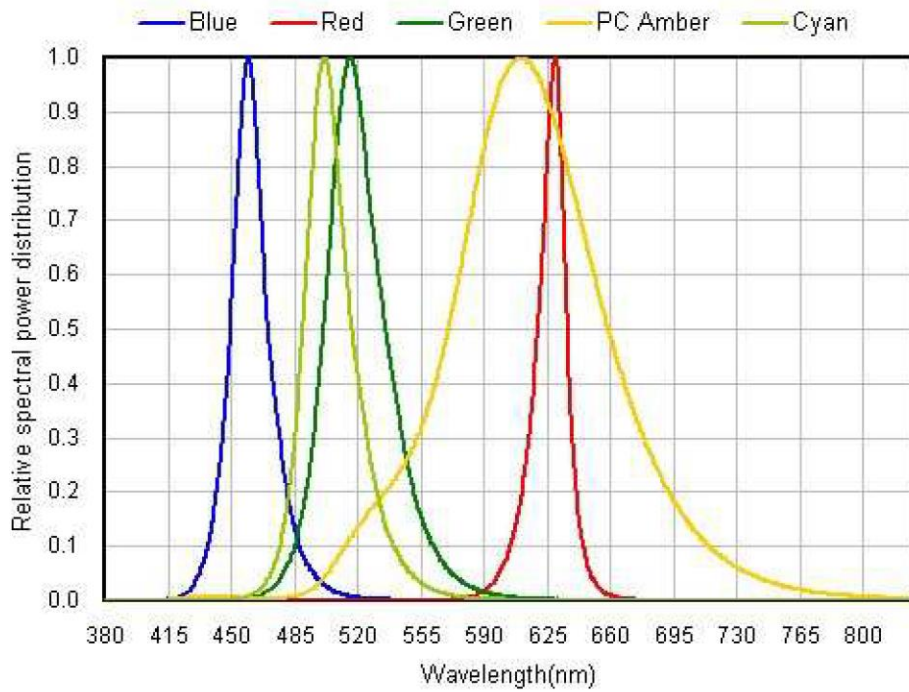
| Rank @350mA (lm) |           |     |      |
|------------------|-----------|-----|------|
| Color            | Code name | Low | High |
| Royal Blue       | QJ9       | 20  | 30   |
|                  | QN9       | 30  | 40   |

luminous flux tolerance is ± 7%

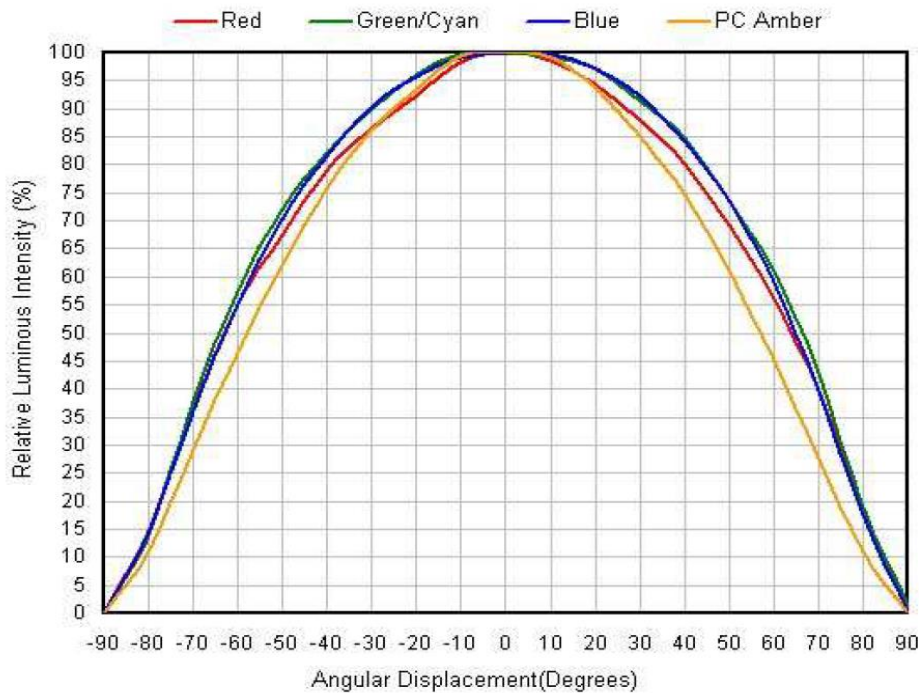


## Characteristic Curves

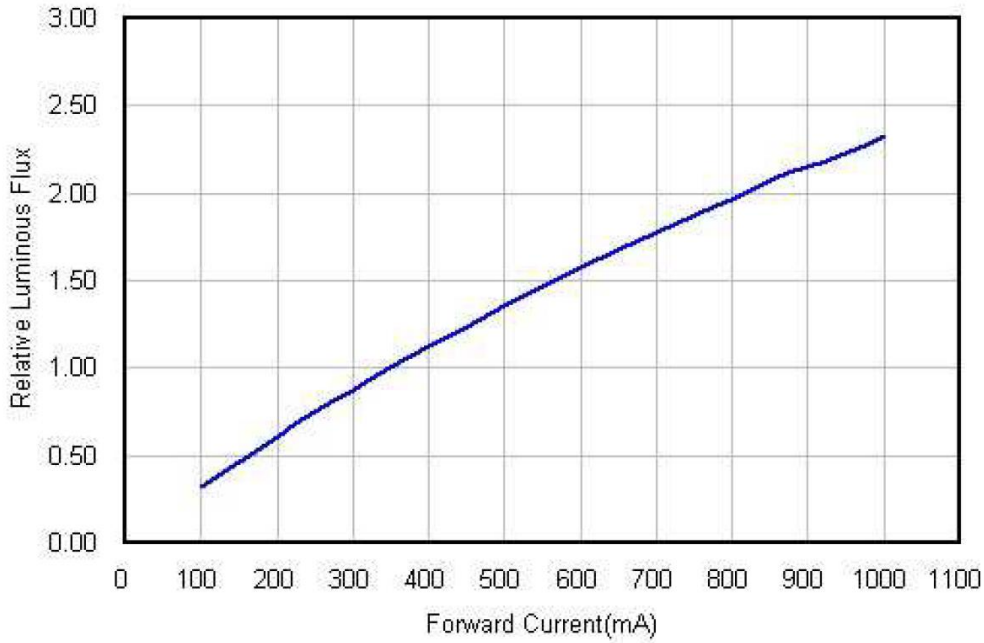
### (1) Color Spectrum



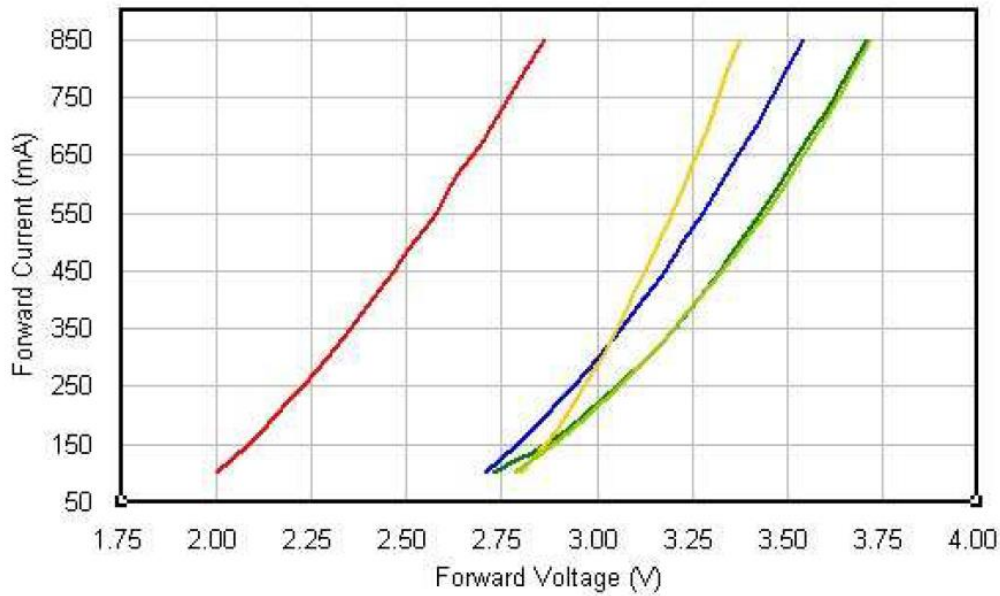
### (2). Typical Representative Spatial Radiation Pattern



### (3). Forward Current Characteristics



### (4). Forward Current vs Forward Voltage



■ **Reliability test:**

| No | Item   | Condition  | Time/Cycle | Sample size |
|----|--|--|------------|-------------|
| 1  | Steady State Operating Life of Room Temperature            | 25°C Operating                                       | 1000 Hrs   | 20 pcs      |
| 2  | Steady State Operating Life of Low Temperature -40°C       | -40°C Operating                                      | 1000 Hrs   | 20 pcs      |
| 3  | Steady State Operating Life of Low Temperature 60°C        | 60°C Operating                                       | 1000 Hrs   | 20 pcs      |
| 4  | Steady State Operating Life of Low Temperature 85°C        | 85°C Operating                                       | 1000 Hrs   | 20 pcs      |
| 5  | Low temperature storage -40°C                              | -40°C Storage  | 1000 Hrs   | 20 pcs      |
| 6  | High temperature storage 100°C                             | 100°C Storage  | 1000 Hrs   | 20 pcs      |
| 7  | Steady State Operating Life of High Humidity Heat 60°C 90% | 60°C/90% Operating                                   | 1000 Hrs   | 20 pcs      |
| 8  | Steady State Pulse Operating Life Condition                | 25°C 10Hz duty=1/10 Operating                        | 200 Cycle  | 20 pcs      |
| 9  | Resistance to soldering heat on PCB (JEDEC MSL3)           | pre-store@60°C, 60%RH for 52hrs Tslid max.=260 10sec | 3 Times    | 20 pcs      |
| 10 | Heat Cycle Test (JEDEC MRC)                                | 25°C ~65°C ~-10°C, 90%RH, 24hr/1cycle                | 10 Cycle   | 20 pcs      |
| 11 | Thermal shock  | -40°C / 20minr~ 5minr~100°C /20min                   | 300 Cycle  | 20 pcs      |

■ **Judgment Criteria:**

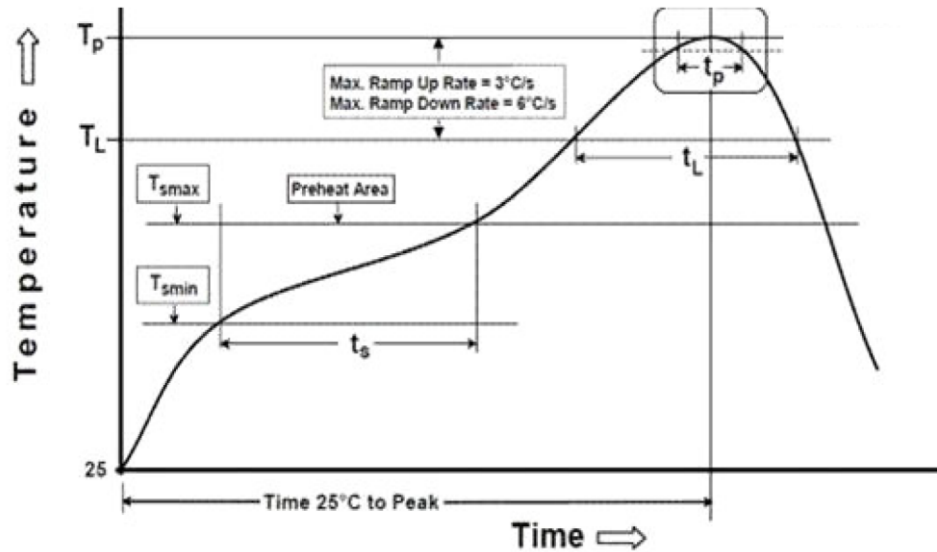
| Item            | Symbol | Test Condition | Judgment Criteria  |
|-----------------|--------|----------------|--------------------|
| Forward Voltage | Vf     | 350 mA         | $\Delta Vf < 10\%$ |
| Luminous Flux   | Iv     | 350 mA         | $\Delta Iv < 30\%$ |





## Solder Profile:

-The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

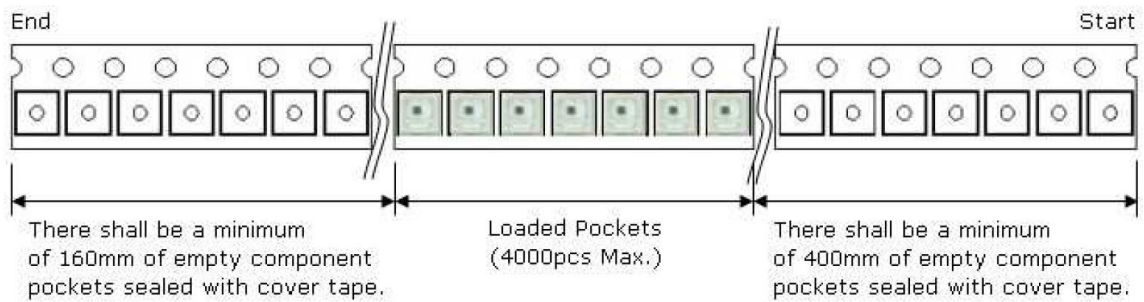
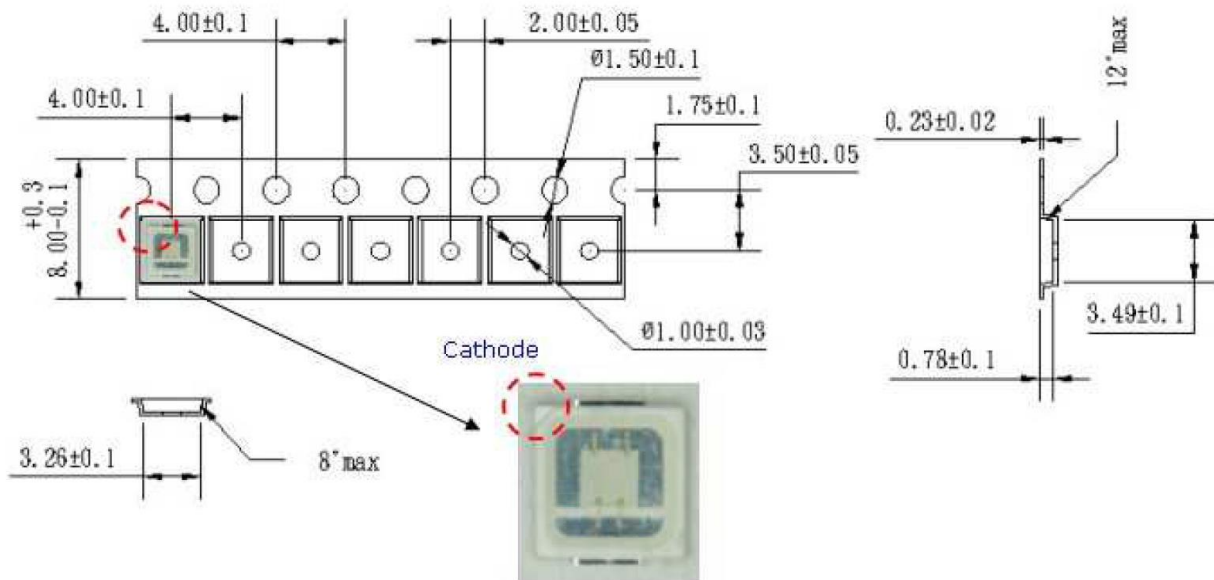


| Profile Feature                                      | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|--|-------------------------|------------------|
| Temperature Min( $T_{smin}$ )                        | 100°C                   | 150°C            |
| Temperature Max( $T_{smax}$ )                        | 150°C                   | 200°C            |
| Time( $t_a$ ) from ( $T_{smin}$ to $T_{smax}$ )      | 60-120 seconds          | 60-120 seconds   |
| Ramp-up rate( $T_L$ to $T_p$ )                       | 3°C/second max.         | 3°C/second max.  |
| Liquidous Temperature( $T_L$ )                       | 183°C                   | 217°C            |
| Time( $t_L$ ) maintained above $T_L$                 | 60-150 seconds          | 60-150 seconds   |
| Peak package body temperature( $T_p$ )               | 235°C                   | 260°C            |
| Time within 5°C of Actual Peak temperature ( $t_p$ ) | 20seconds*              | 30 seconds*      |
| Ramp-down rate( $T_p$ to $T_L$ )                     | 6°C/second max.         | 6°C/second max.  |
| Time 25°C to peak temperature                        | 6 minutes max.          | 8 minutes max.   |

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

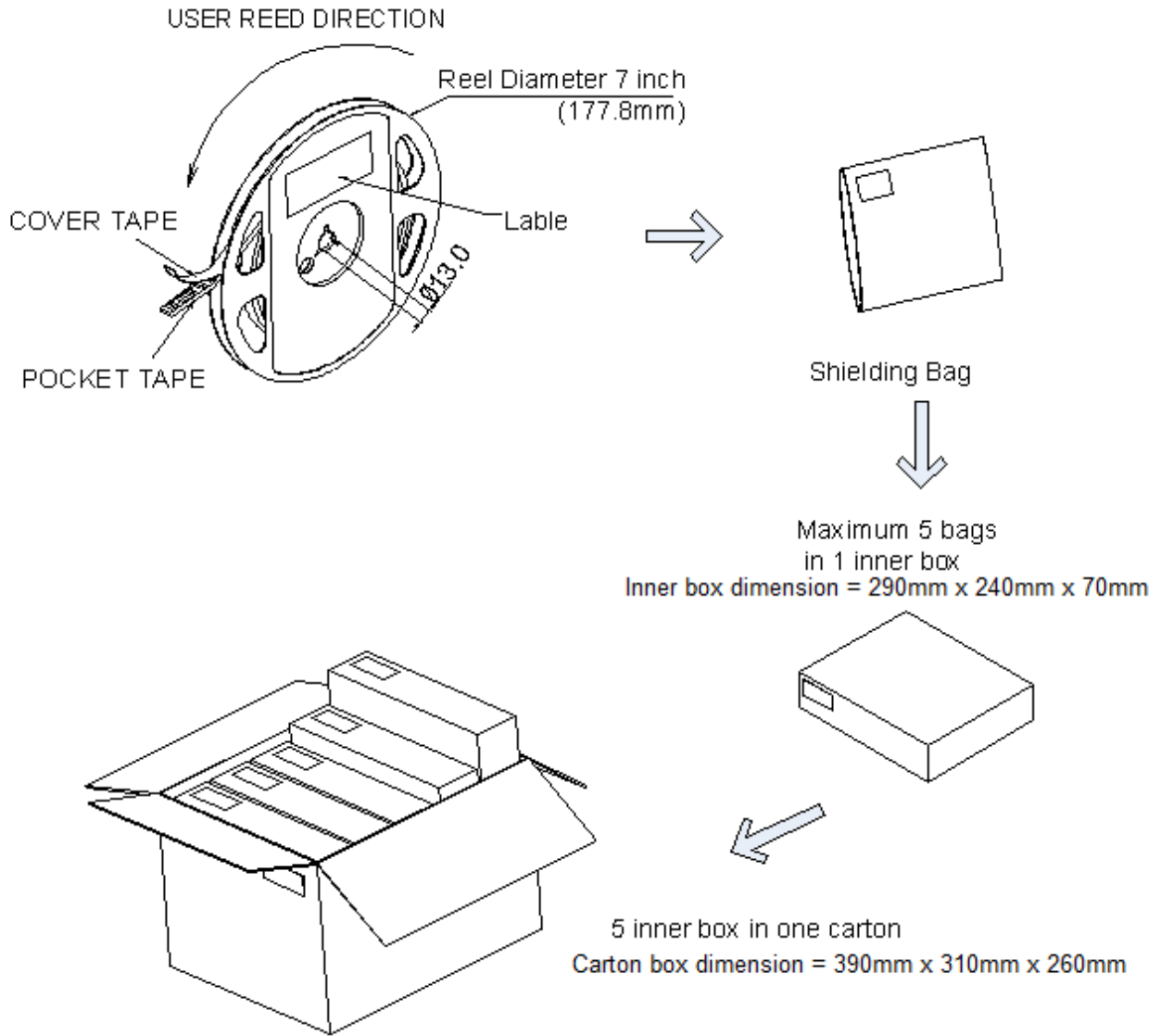


## Taping & Packing:

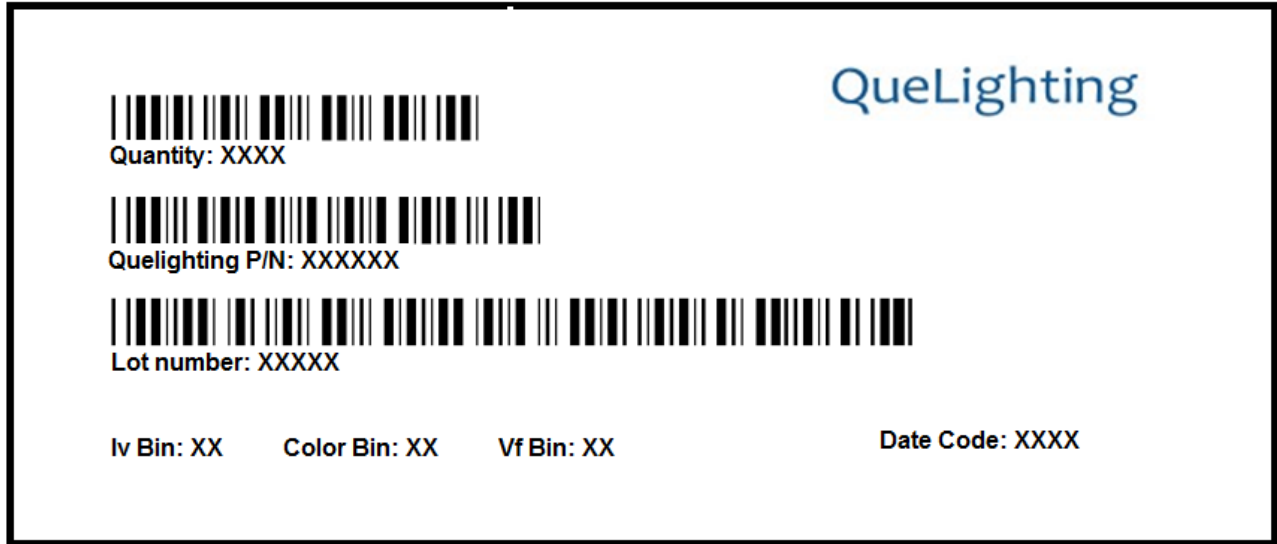


Unit : mm





## Labeling



## Ordering Information:

| Part #    | Multiple Quantities | Quantity per Reel |
|-----------|---------------------|-------------------|
| QLSP04RBU |                     | 1000,2000 pcs     |
|           |                     |                   |
|           |                     |                   |
|           |                     |                   |



## Revision History:

| Revision Date: | Changes:  | Version #: |
|----------------|---|------------|
| 03-30-2017     | Initial release   | 1.0        |
| 08-01-2018     | Add color on Royal Blue, Cyan Green, Deep Red, Cherry Red | 1.1        |
|                |   |            |
|                |   |            |

