



QLSP04DRH  
(Color 3030 LEDs)



## Product Outline:

This is the high efficiency 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:

- Deep Red 660nm
- High brightness output @ 150mA,
- High driving current to 200mA.
- Package Dimension = 3.2mmX3.0mmX0.6mm
- RoHS compliant
- Custom Bin available upon special request

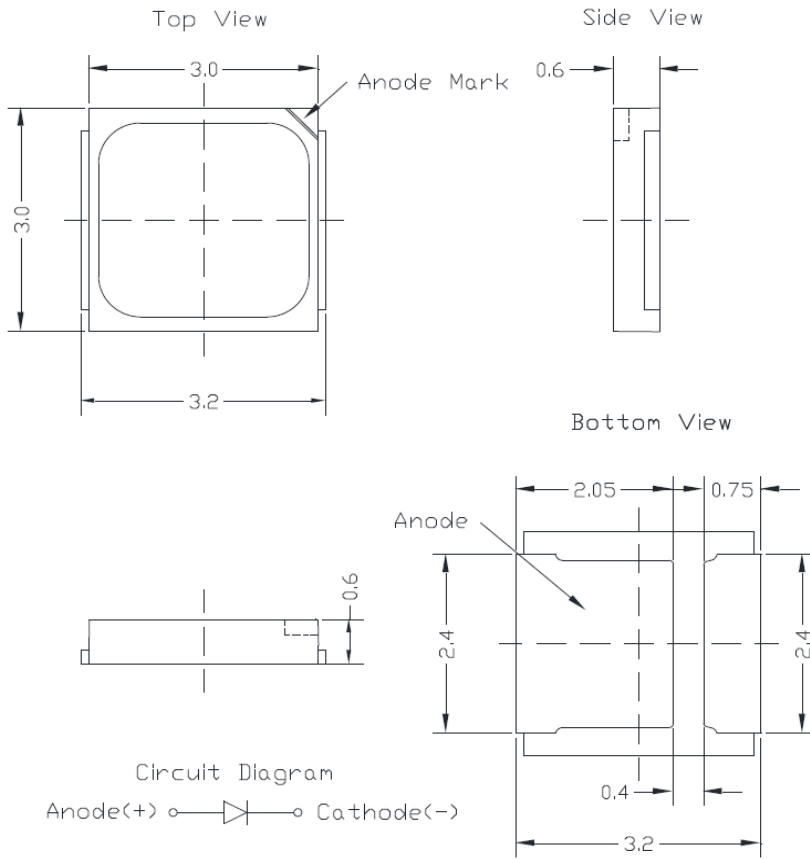
## Application:

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

## Compliance and Certification:

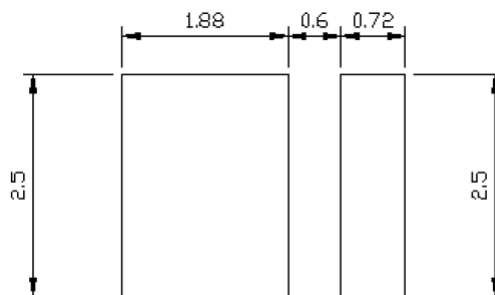


## Mechanical Property: (Dimension)



- \* 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>	200	mA
Leakage Current	I <sub>r</sub>	1.0	μA
Power Dissipation	P <sub>d</sub>	0.6	W
Pulse Forward Current	I <sub>fp</sub>	240	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 nm	Brightness (lm/mW)	
			Typ.	max		min	typ.
QLSP04DRH	Deep Red	150	2.0	2.6	650~670		135 mW



## Radiometric Power Bin Structure at 150mA

Product	Color	Radiometric Power (mW)		PPF ( $\mu\text{mol/s}$ )		PPF/W ( $\mu\text{mol/J}$ ) Typ.
		min.	max.	min.	max.	
QLSP04DRH	Deep Red	120	140	0.64	0.75	2.4

### ■ Groups

#### Dominant Wavelength

Wd (nm) @ 150mA			
Color	Code name	Min.	Max.
Deep Red	A145	650	660
	A165	660	670

Measurement tolerance is +/- 1nm

#### Forward Voltage ( $V_F$ ) Bin:

VF Rank @ 150mA ( $V_f$ )			
Color	Code name	Low	High
Deep Red	PQ	1.8	2.0
	RS	2.0	2.2
	TU	2.2	2.4

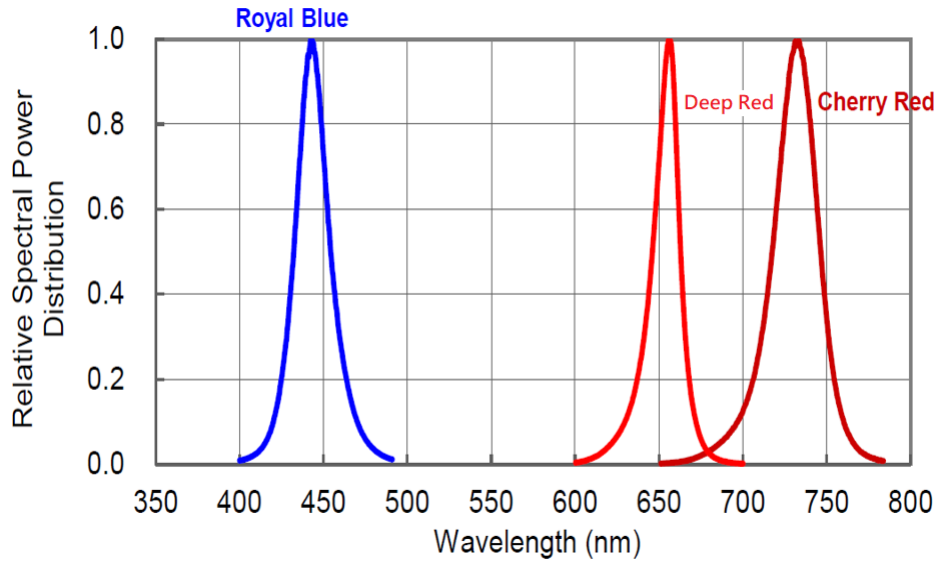
The forward voltage tolerance is  $\pm 0.1V$

Rank @ 150mA (mW)			
Color	Code name	Low	High
Deep Red	H2	120	130
	J1	130	140

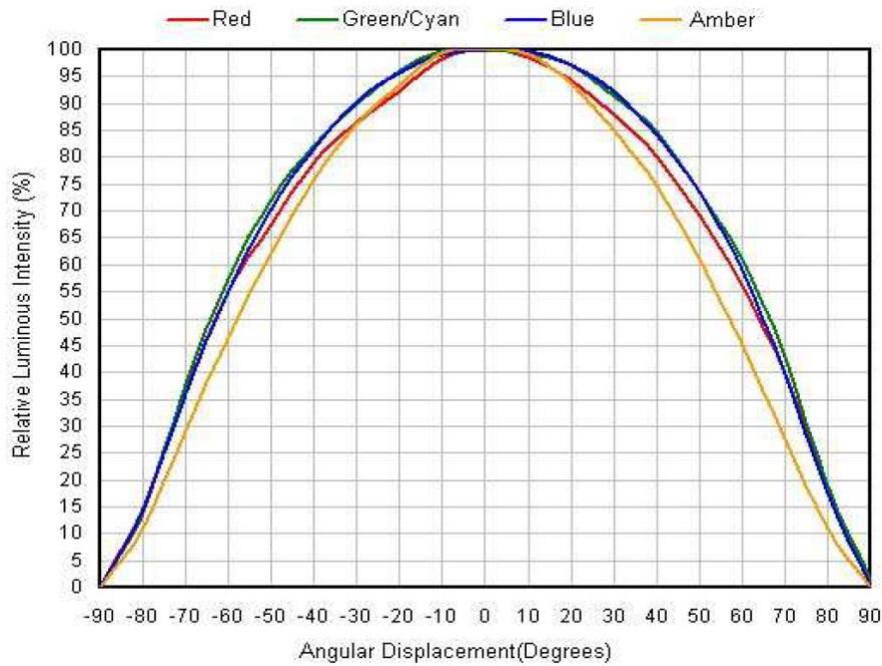


# Characteristic Curves

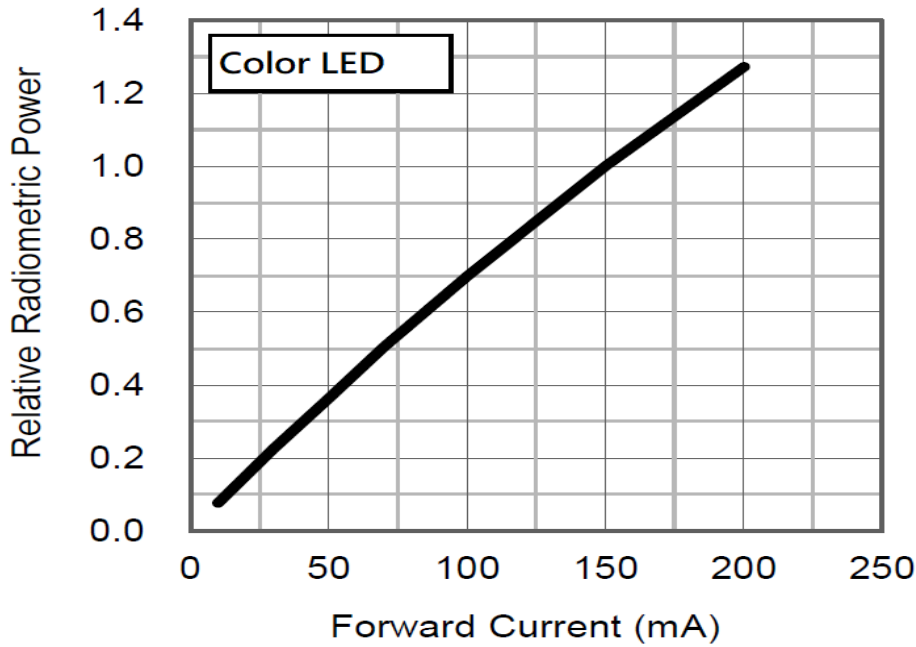
## (1) Color Spectrum



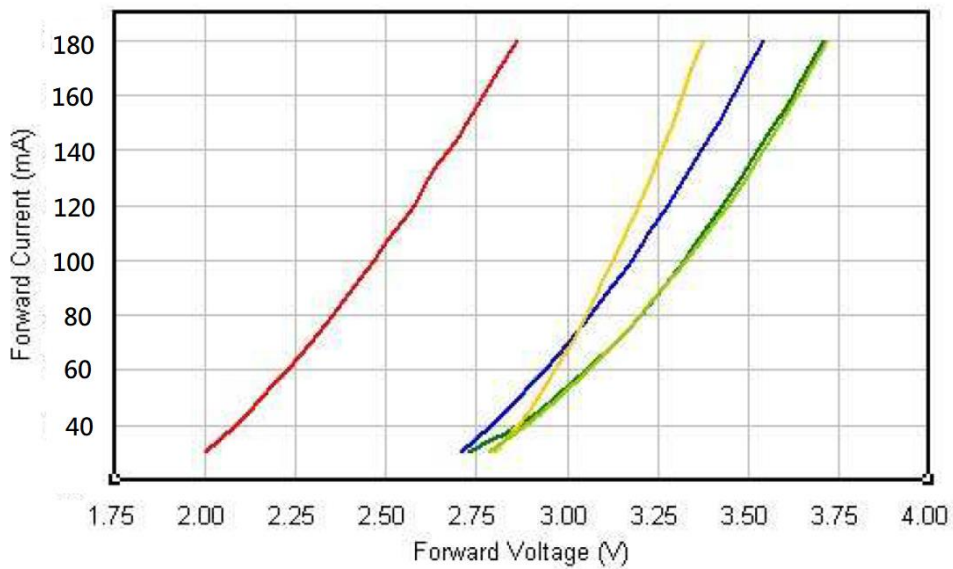
## (2). Typical Representative Spatial Radiation Pattern



### (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 T <sub>sld</sub> 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:

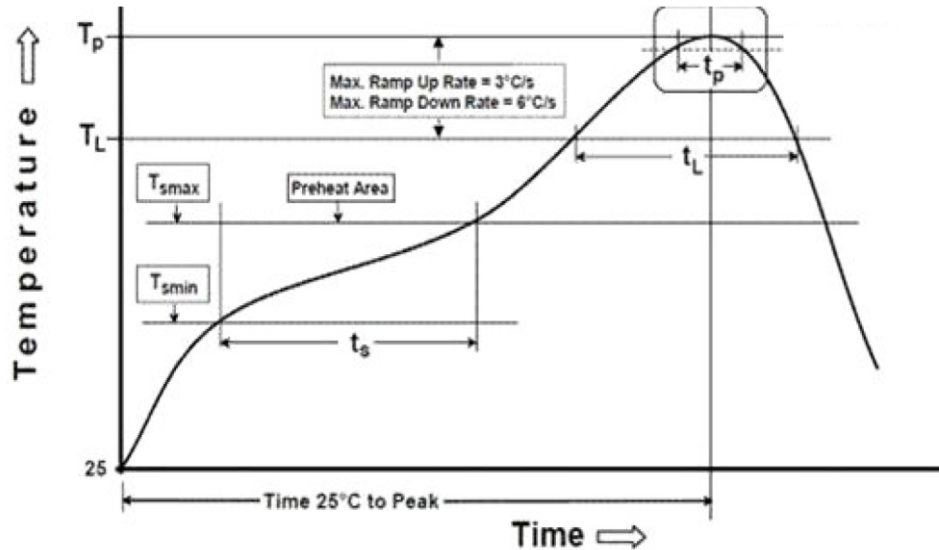
Item	Symbol	Test Condition	Judgment Criteria
Forward Voltage	V <sub>f</sub>	150 mA	ΔV <sub>f</sub> < 10%
Luminous Flux	I <sub>v</sub>	150 mA	ΔI <sub>v</sub> < 30%





## Solder Profile:

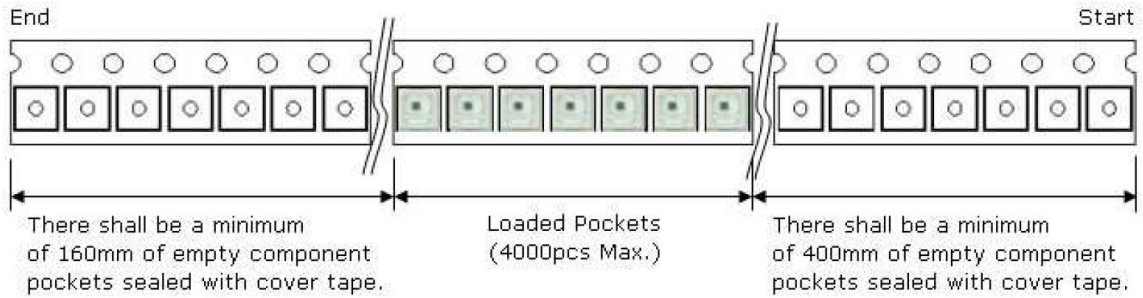
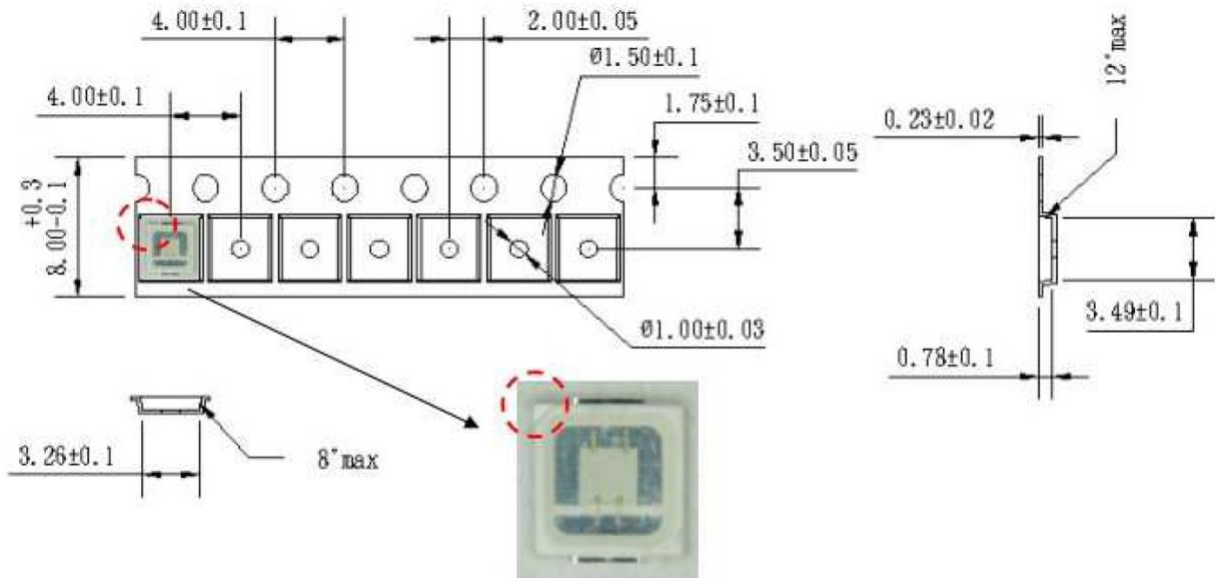
-The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):



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.		

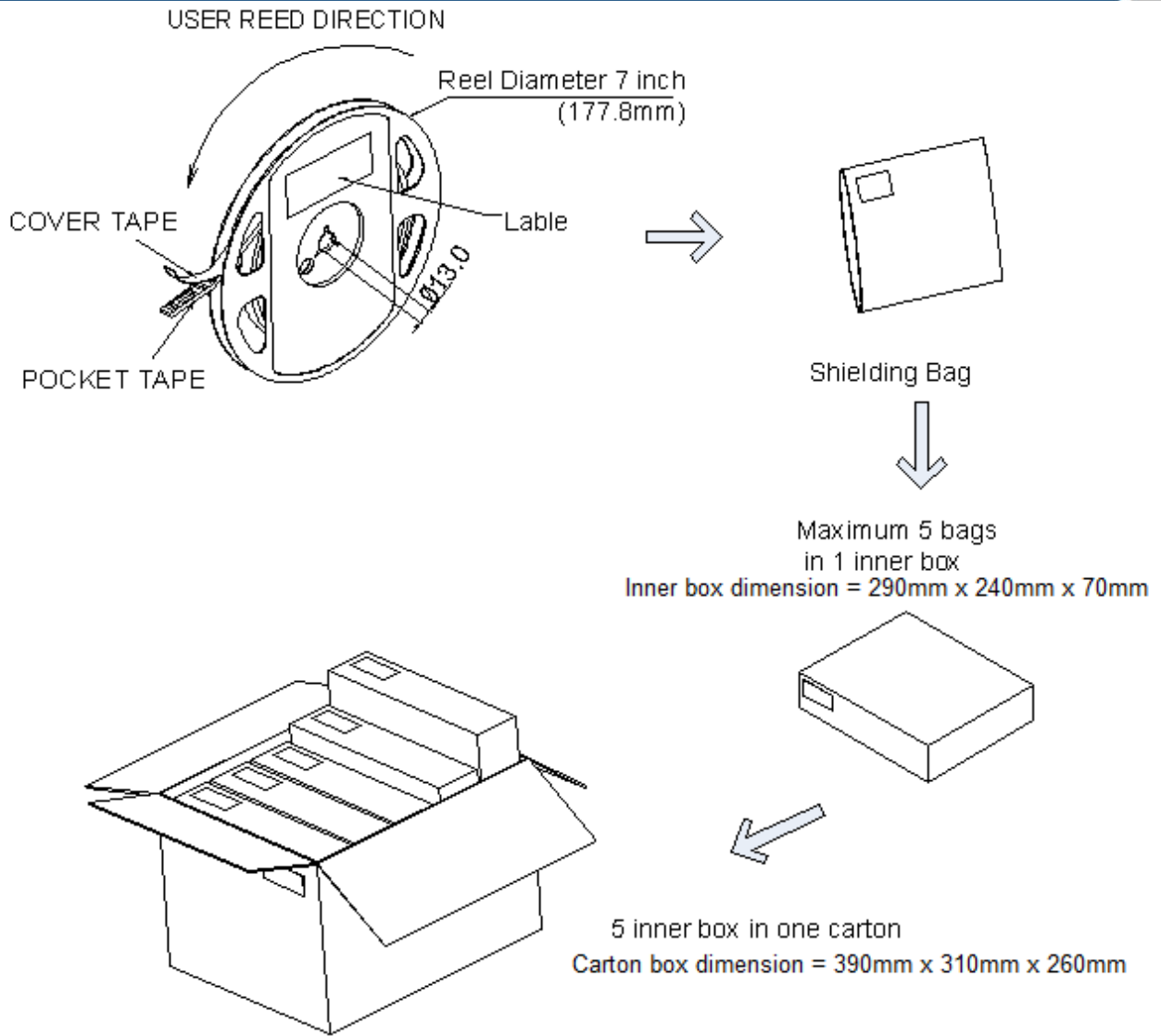


## Taping & Packing:

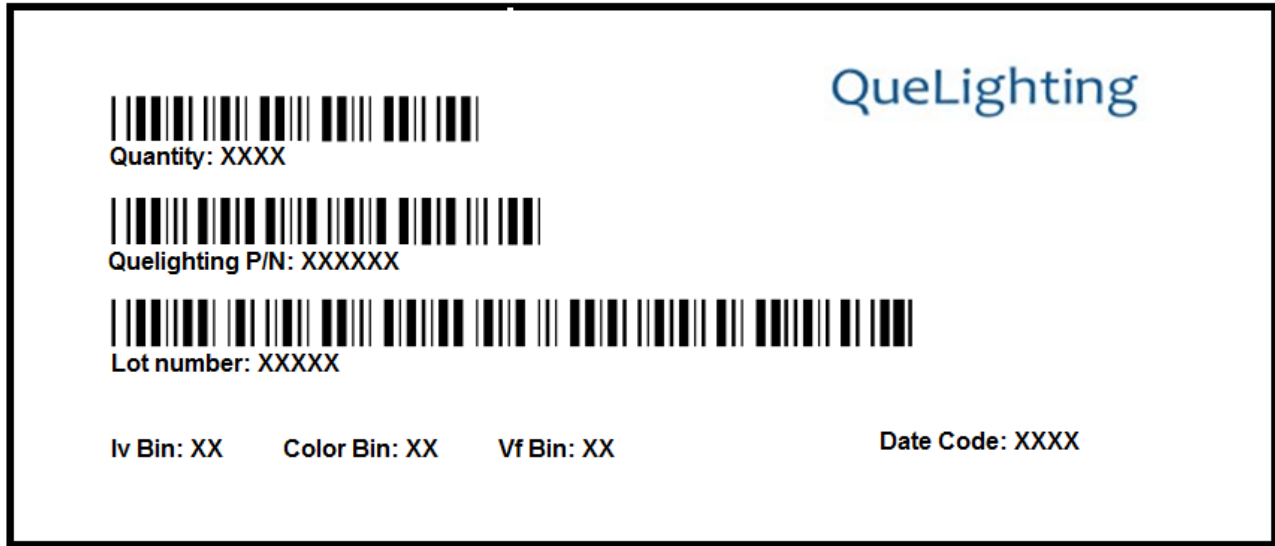


Unit : mm





## Labeling



## Ordering Information:

Part #	Multiple Quantities	Quantity per Reel
QLSP04DRH		1000,2000 pcs

## Revision History:

Revision Date:	Changes:	Version #:
09-21-2020	Initial release	1.0

