QueLighting

# QLSP01WXL-190

(3014 High Efficiency LED)

## Product Outline:

These high output reflector type Tube LEDs are available in warm white /neutral white / pure white / and cold white to suit customer's application. These LEDs are equipped with heat sink to enhance operating performance. With special binning technology, these LEDs are ideal for architecture lighting and special lighting needs.

## Features:

- High brightness output @ 65mA
- Package Dimension = 3.0mmX1.4mmX0.65mm
- CRI = 80 and above
- Available in warm white / neutral white / pure white / and cold white
- ASNI Binning
- RoHS compliant
- Custom Bin available upon special request

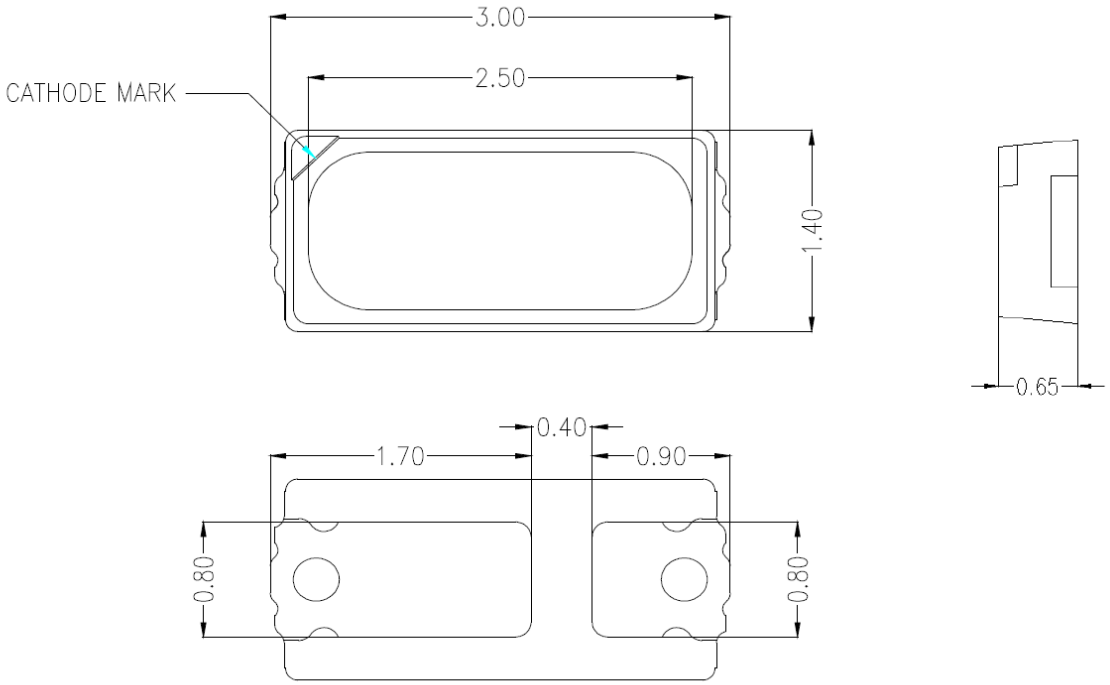
## Application:

- Architecture Lighting
- Security / garden lighting
- Interior Lighting
- General lighting

## Compliance and Certification:

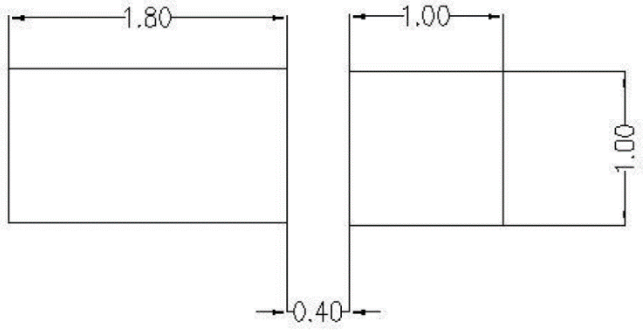
# Mechanical Property:

**(Dimension)**




* All dimensions are in millimeters, * Tolerances are ± 0.10mm.

# 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℃)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| DC Forward Current | If | 150 | mA |
| Power Dissipation | Pd | 0.5 | W |
| Pulse Forward Current | Ifp | 200 | mA |
| LED Junction Temperature | TJ | 120 | ℃ |
| Storage Temperature | Tstg | -40 ~ 100 | ℃ |
| Operation Temperature | Topr | -40 ~ 85 | ℃ |
| Soldering Temperature | Tsol | 260 < 5 sec | ℃ |

(1) Proper current rating must be observed to maintain junction temperature below maximum at all time
(2) $I_{FP}$ Condition: t < 100 μs；D = 0.001；Ta= 25 °C

## ■ Electrical / Optical Characteristic

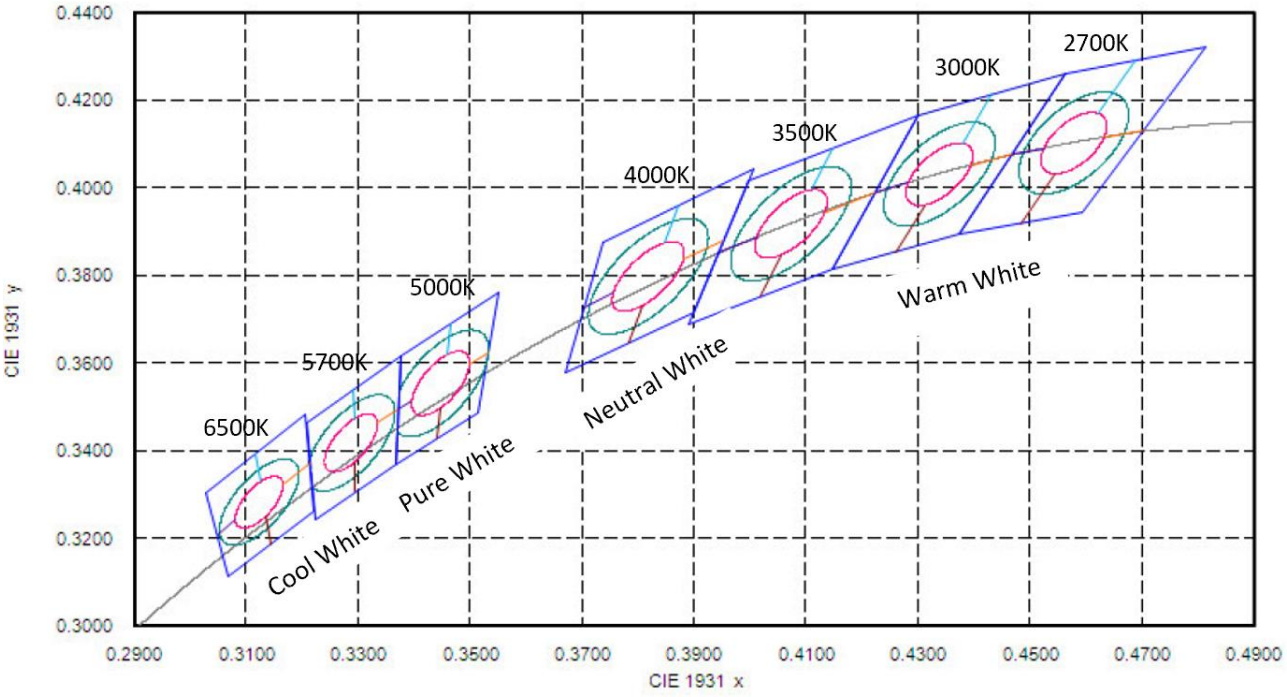
(Ta=25 oC)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | Vf | 65mA | 2.8 | | 3.4 | V |
| Color Rendering Index | Ra | | 80 | | | |
| View Angle | $\theta$ | | | 120 | | deg |
| Thermal Resistance | Rth | | | 45 | | oC/W |

(1) Tolerance of measurement: VF=+/- 0.1V
(2) The CRI tolerance is ±2.
(3) Thermal resistance is calculated from junction to solder

# ■ Specification

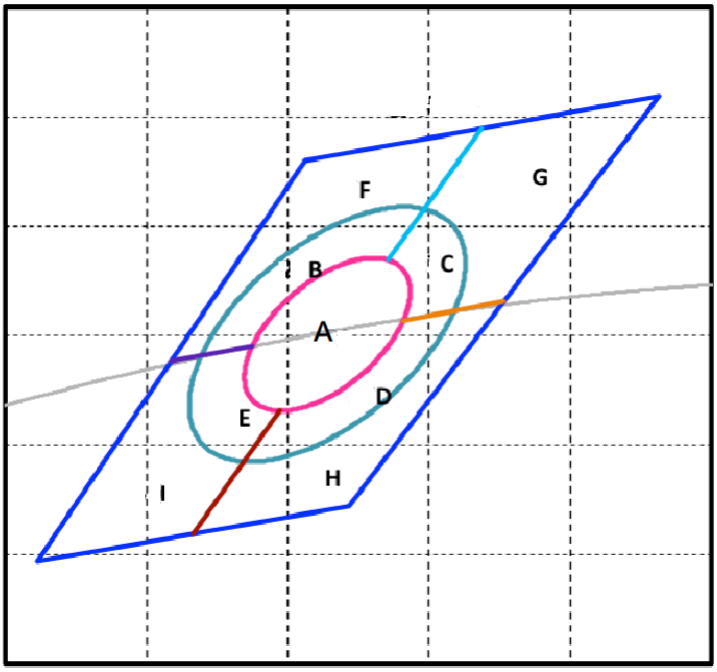
## Chromaticity Coordinates




| ANSI CCT | Color Space | Target Center point (cx,cy) | Major Axis,a | Minor Axis,b | Ellipse Rotation Angle |
|---|---|---|---|---|---|
| 2700K | 3-step MacAdam ellipse | (0.4578,0.4101) | 0.0081 | 0.0042 | 53.70° |
| 2700K | 5-step MacAdam ellipse | (0.4578,0.4101) | 0.0135 | 0.007 | 53.70° |
| 3000K | 3-step MacAdam ellipse | (0.4338,0.403) | 0.0083 | 0.00408 | 53.22° |
| 3000K | 5-step MacAdam ellipse | (0.4338, 0.403) | 0.0139 | 0.0068 | 53.22° |
| 4000K | 3-step MacAdam ellipse | (0.3818,0.3797) | 0.0094 | 0.00402 | 53.72° |
| 4000K | 5-step MacAdam ellipse | (0.3818,0.3797) | 0.0157 | 0.0067 | 53.72° |

| | | | | | |
|---|---|---|---|---|---|
| 5000K | 3-step MacAdam ellipse | (0.3447,0.3553) | 0.0082 | 0.00354 | 59.62° |
| 5000K | 5-step MacAdam ellipse | (0.3447,0.3553) | 0.0137 | 0.0059 | 59.62° |
| 5700K | 3-step MacAdam ellipse | (0.3287,0.3417) | 0.0075 | 0.0032 | 59.09° |
| 5700K | 5-step MacAdam ellipse | (0.3287,0.3417) | 0.0124 | 0.00533 | 59.09° |
| 6500K | 3-step MacAdam ellipse | (0.3123,0.3282) | 0.0067 | 0.00285 | 58.57° |
| 6500K | 5-step MacAdam ellipse | (0.3123,0.3282) | 0.0112 | 0.00475 | 58.57° |

## CIE binning code



## Forward Voltage ($V_F$) Bin:

| VF Rank @ 65mA | | | |
|---|---|---|---|
| **Code name** | **Min.** | **Max.** | **Units** |
| 0 | 2.8 | 2.9 | V |
| 1 | 2.9 | 3.0 | |
| 2 | 3.0 | 3.1 | |
| 3 | 3.1 | 3.2 | |
| 4 | 3.2 | 3.3 | |
| 5 | 3.3 | 3.4 | |

The forward voltage tolerance is ± 0.1V

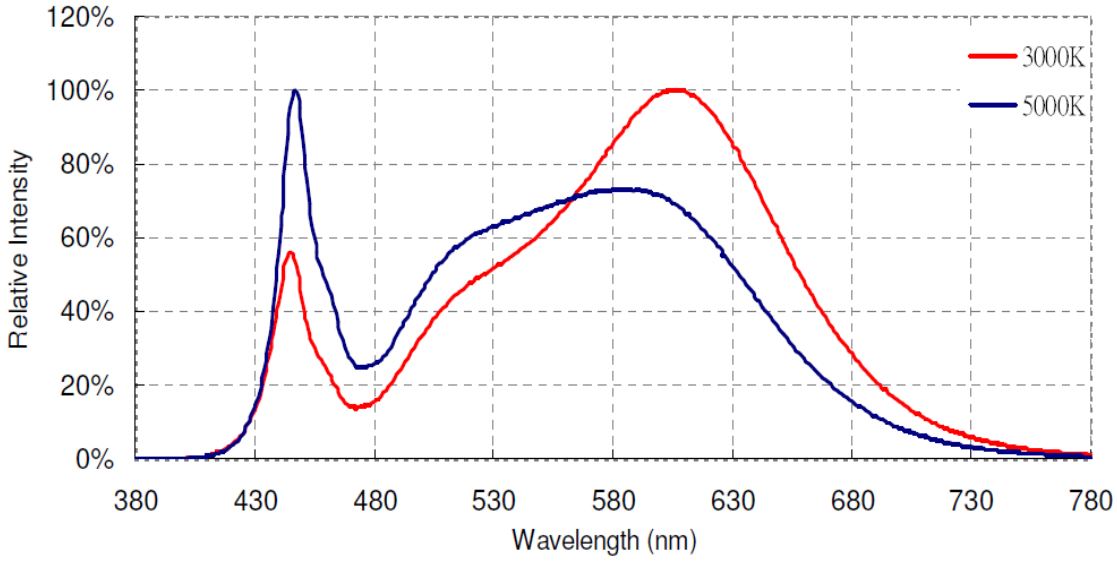
## Luminous Intensity Bin:

| Intensity Rank (mcd) @ 65mA | | | |
|---|---|---|---|
| **Code name** | **Min.** | **Max.** | **Units** |
| QK | 22.5 | 25 | lm |
| QL | 25 | 28 | |
| QM | 28 | 31.5 | |
| QN | 31.5 | 36 | |

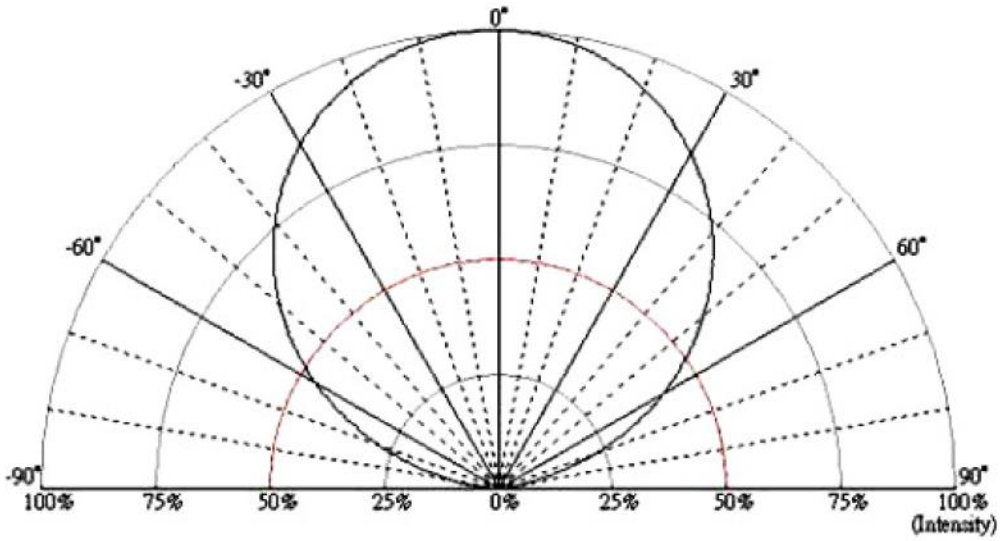
Luminous intensity tolerance is ± 7%

# ■ Characteristic Curves

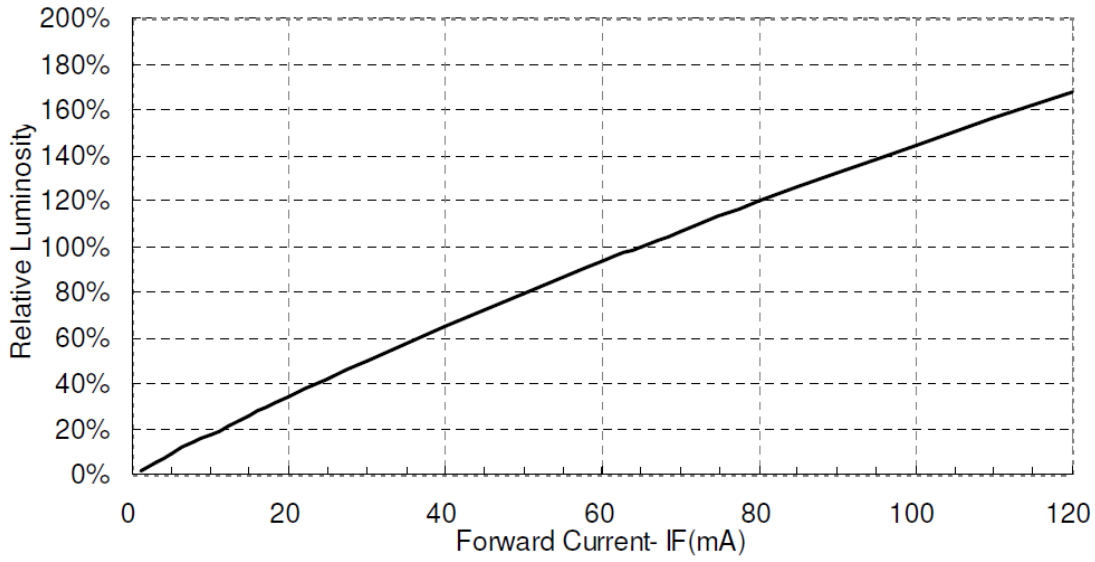
## (1) Color Spectrum



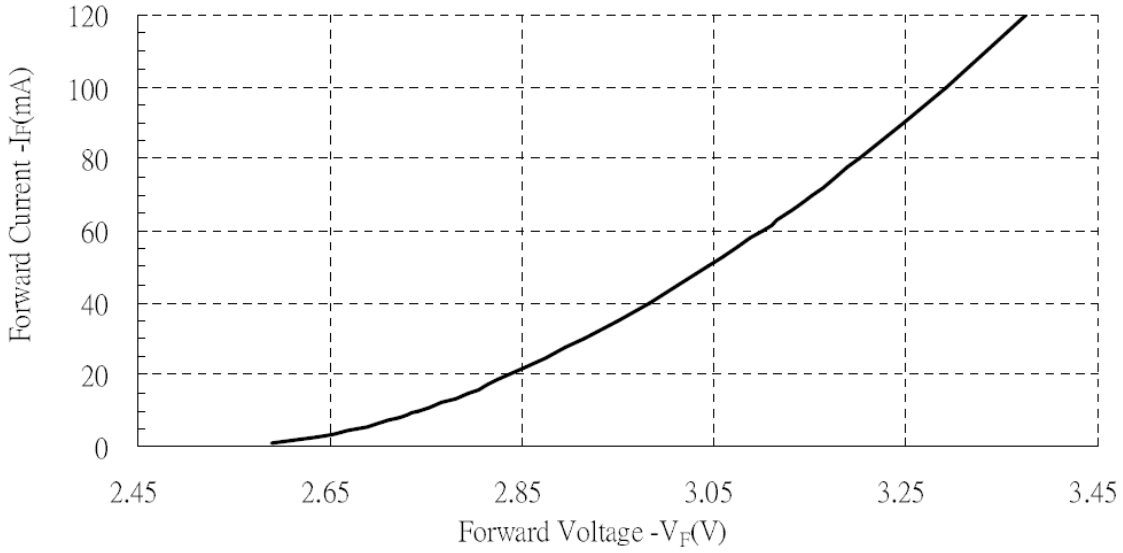

## (2). Typical Representative Spatial Radiation Pattern



### (3). Forward Current vs Relative Luminous Intensity




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



## ■ Reliability test:

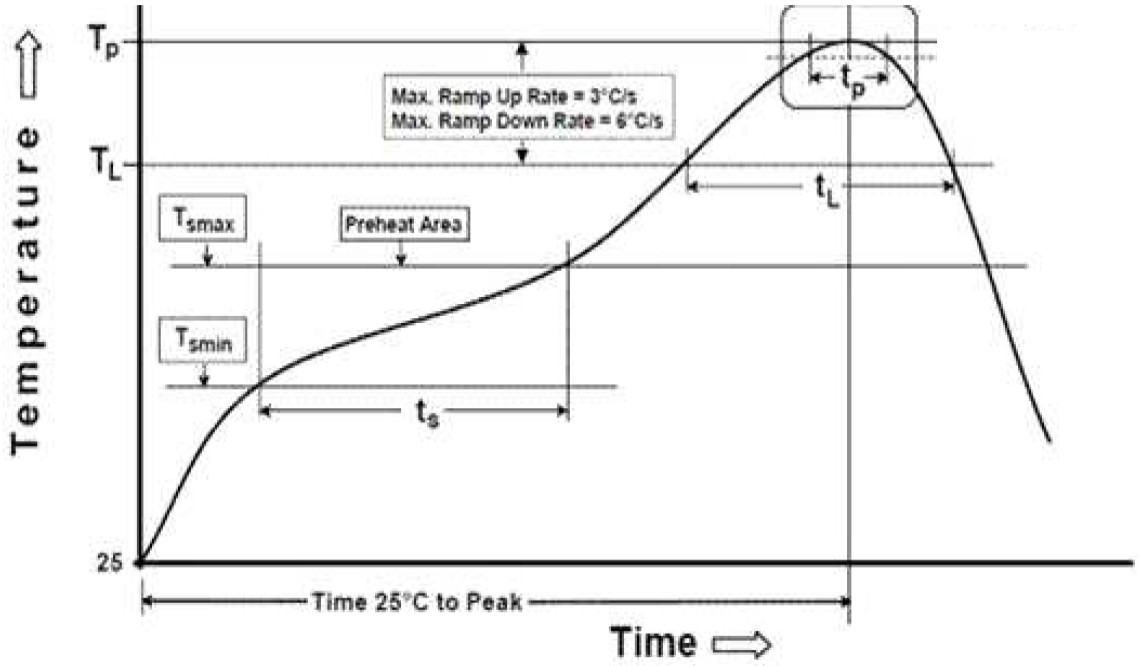
| No | Item | Condition | Time/Cycle | Sample size |
|---|---|---|---|---|
| 1 | Steady State Operating Life of Room Temperature | 25℃ Operating | 1000 Hrs | 20 pcs |
| 2 | Steady State Operating Life of Low Temperature -40℃ | -40℃ Operating | 1000 Hrs | 20 pcs |
| 3 | Steady State Operating Life of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

## ■ Judgment Criteria:

| Item | Symbol | Test Condition | Judgment Criteria |
|---|---|---|---|
| Forward Voltage | Vf | 65 mA | △Vf< 10% |
| Luminous Flux | Iv | 65 mA | △Iv< 30% |

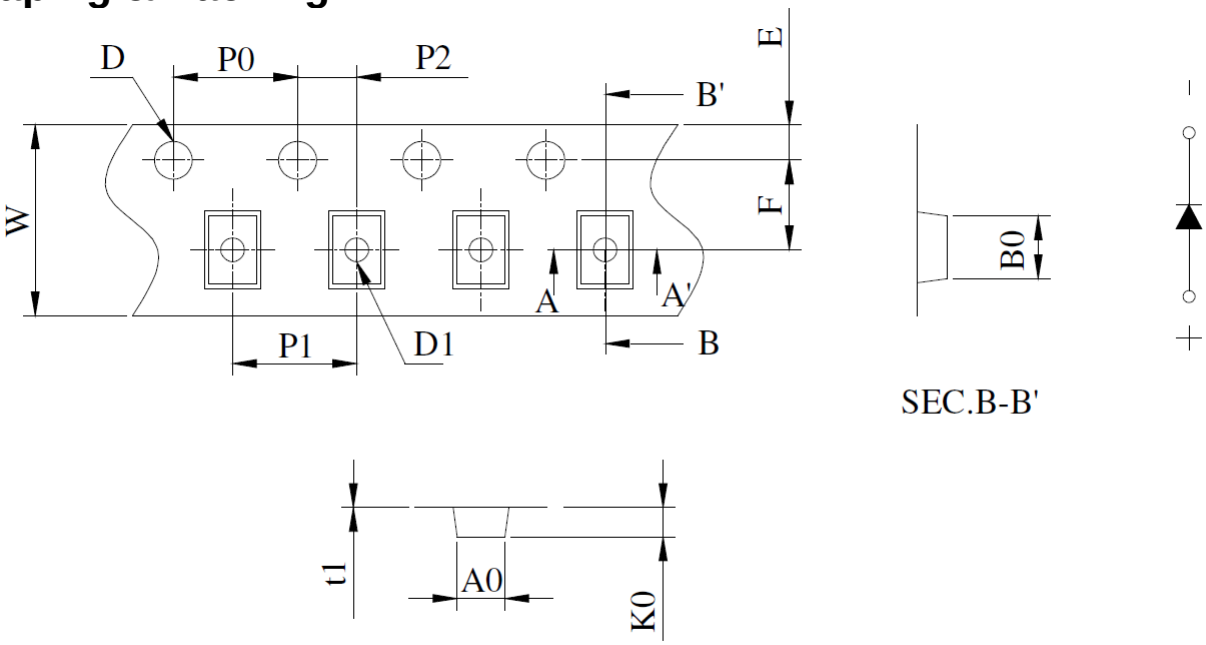
## ■ Solder Profile:

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



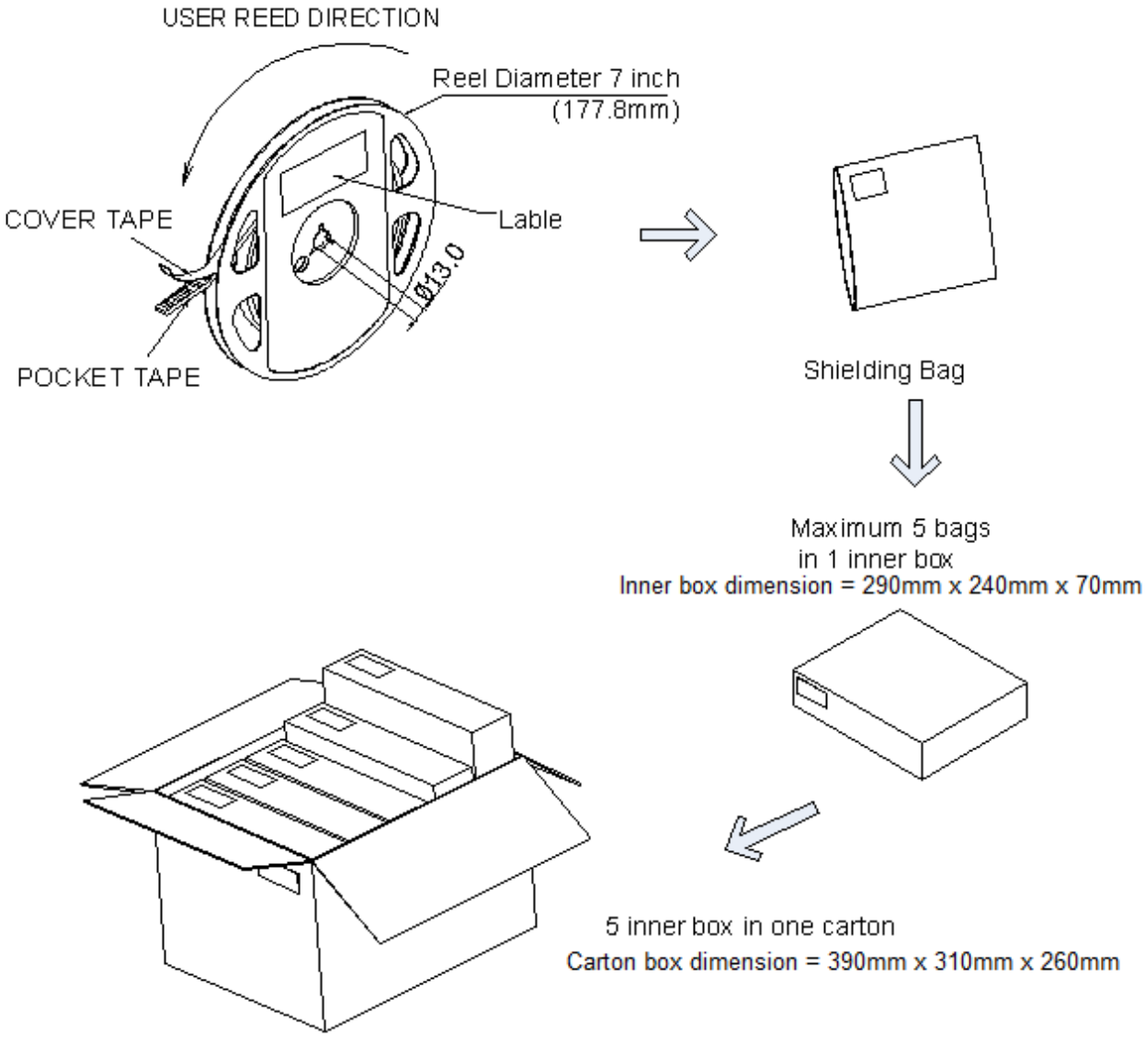

| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|---|---|
| Temperature Min($T_{smin}$) | 100℃ | 150℃ |
| Temperature Max($T_{smax}$) | 150℃ | 200℃ |
| Time($t_a$) from ($T_{smin}$ to $T_{smax}$) | 60-120 seconds | 60-120 seconds |
| Ramp-up rate($T_L$ to $T_P$) | 3℃/second max.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

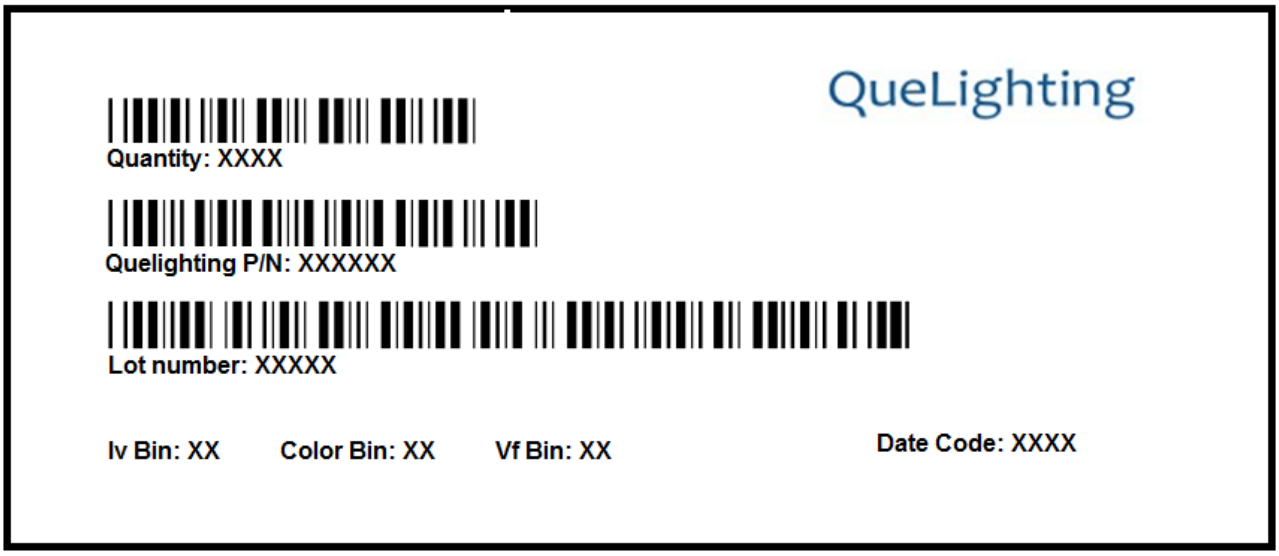



| Item | Spec | Tol.(+/- ) | Item | Spec | Tol.(+/- ) |
|---|---|---|---|---|---|
| W | 8.00 | ±0.1 | P2 | 2.00 | ±0.05 |
| E | 1.75 | ±0.1 | P0 x 10 | 40.00 | ±0.2 |
| F | 3.50 | ±0.05 | t1 | 0.23 | ±0.05 |
| D | 1.50 | +0.1,-0 | A0 | 1.55 | ±0.1 |
| D1 | 1.00 | ±0.1 | B0 | 3.20 | ±0.1 |
| P0、P1 | 4.00 | ±0.1 | K0 | 0.95 | ±0.1 |

Unit : mm


USER REED DIRECTION
Reel Diameter 7 inch
(177.8mm)
COVER TAPE
Lable
POCKET TAPE
Shielding Bag
Maximum 5 bags
in 1 inner box
Inner box dimension = 290mm x 240mm x 70mm
5 inner box in one carton
Carton box dimension = 390mm x 310mm x 260mm

## Labeling




## Ordering Information:

| Part # | Multiple Quantities | Quantity per Reel |
|---|---|---|
| QLSP01WXL-190 | | 2000 /4000 pcs |
| | | |
| | | |
| | | |

## Revision History:

| Revision Date: | Changes: | Version #: |
|---|---|---|
| 02-27-2018 | Initial release | 1.0 |
| 09-23-2019 | Updated the performance | 1.1 |
| | | |
| | | |