

QLSP08RGBCW
(5050 RGBW Multi-Color LED)



Product Outline:

This is a multi-color LED that provides high lumen output in the 5050 package. Creating a small optical light source because of the compact design it's ideal for color mixing applications

Features:

- Multi-Color LED, Red/Green/Blue/ Cold White LED
- High brightness output @ 20mA,
- Package Dimension = 5.4mmX5.0mmX1.6mm
- RoHS compliant
- Custom Bin available upon special request
- View angel >120°

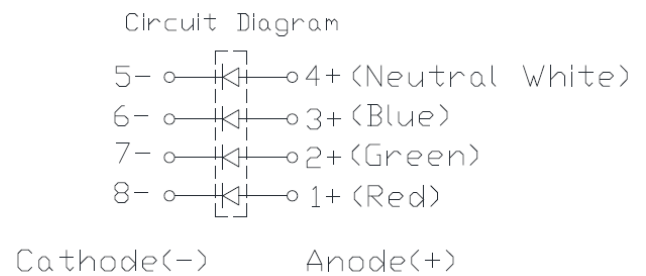
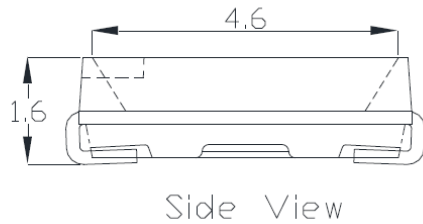
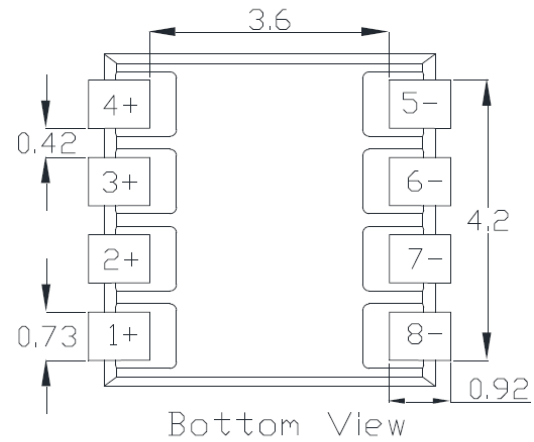
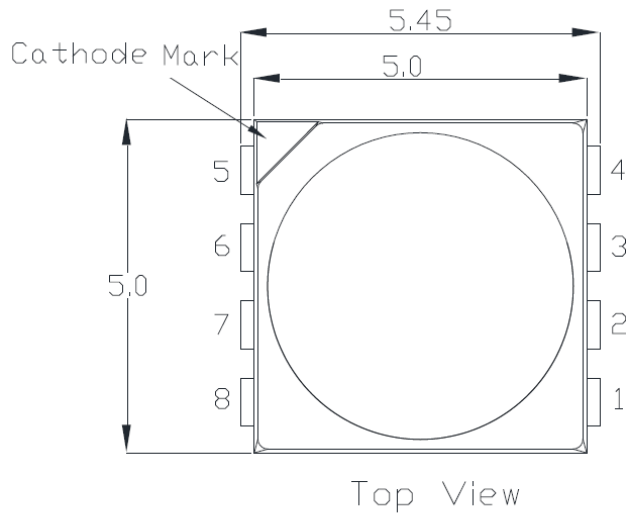
Application:

- Stage lighting,
- Architecture Lighting
- Garden Lighting
- Indoor and Outdoor display
- Entertainment lighting.

Compliance and Certification:



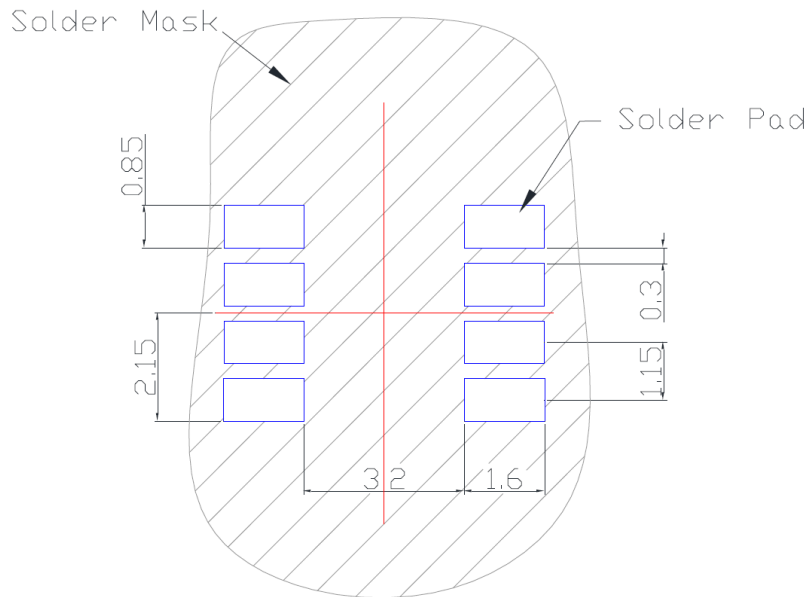
Mechanical Property: (Dimension)



- * All dimensions are in millimeters,
- * Tolerances are $\pm 0.10\text{mm}$.
- * Please do not bend the leads of the LED, otherwise it will damage the LED.
- * Please do not use a force of over 0.3kgf impact or pressure on the lens of the LED, otherwise it will cause a catastrophic failure.



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

($T_a=25^{\circ}\text{C}$)

| Parameter | Symbol | Rating | Unit |
|-------------------------------|-----------|--------------|--------------------|
| DC Forward Current - R,G,B | I_f | 20 | mA |
| DC Forward Current – White | I_f | 60 | mA |
| Leakage Current (5V) | I_r | 10 | μA |
| Total Power Dissipation | P_d | 360 | mW |
| Pulse Forward Current - R,G,B | I_{fp} | 30 | mA |
| Pulse Forward Current - White | I_{fp} | 90 | mA |
| LED Junction Temperature | T_J | 105 | $^{\circ}\text{C}$ |
| Storage Temperature | T_{stg} | -40 ~ 85 | $^{\circ}\text{C}$ |
| Operation Temperature | T_{opr} | -40 ~ 85 | $^{\circ}\text{C}$ |
| Soldering Temperature | T_{sol} | 260 < 10 sec | $^{\circ}\text{C}$ |

(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)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------|----------|-----------|------|------|------|------|
| Red | Vf | 20mA | 2.0 | | 2.4 | V |
| Green | Vf | | 2.8 | | 3.4 | V |
| Blue | Vf | | 2.8 | | 3.4 | V |
| White | Vf | 60mA | 2.8 | | 3.4 | V |
| View Angle | θ | | | 120 | | deg |

(1) Tolerance of measurement: VF=+/- 0.1V

■ Specification

| Product | Color | Current | Vf(V) Typ. | Wd / CCT (nm) | Intensity(mcd) or Flux Φ V(lm) | |
|-------------|------------|---------|------------|-------------------|-------------------------------------|------|
| | | | | | Min. | Typ. |
| QLSP08RGBXW | Red | 20mA | 2.2 | 620~625 | 600 | 700 |
| | Green | | 3.2 | 520~525 | 1400 | 1500 |
| | Blue | | 3.2 | 465~470 | 400 | 500 |
| | | | | | | |
| | | | | | | |
| QLSP08RGBCW | Cold White | 60mA | 3.2 | 5640~6970K | 19 | 21 |

*Tolerance = +/- 10%



■ Groups

Dominant Wavelength

| Wd (nm) | | | | |
|---------|-----------|------|------|-----------|
| Color | Code name | Min. | Max. | Condition |
| Red | A8 | 620 | 625 | 20mA |
| Green | DN | 520 | 525 | |
| Blue | DD | 465 | 470 | |

Measurement tolerance is +/- 1nm

Forward Voltage (V_F) Bin:

| VF Rank | | | | |
|---------|-----------|-----|------|-----------|
| Color | Code name | Low | High | Condition |
| Red | R4 | 2.0 | 2.4 | 20mA |
| Green | Z6 | 2.8 | 3.4 | |
| Blue | Z6 | 2.8 | 3.4 | |
| White | Z6 | 2.8 | 3.4 | 60mA |

The forward voltage tolerance is $\pm 0.1V$

Luminous Intensity Bin:

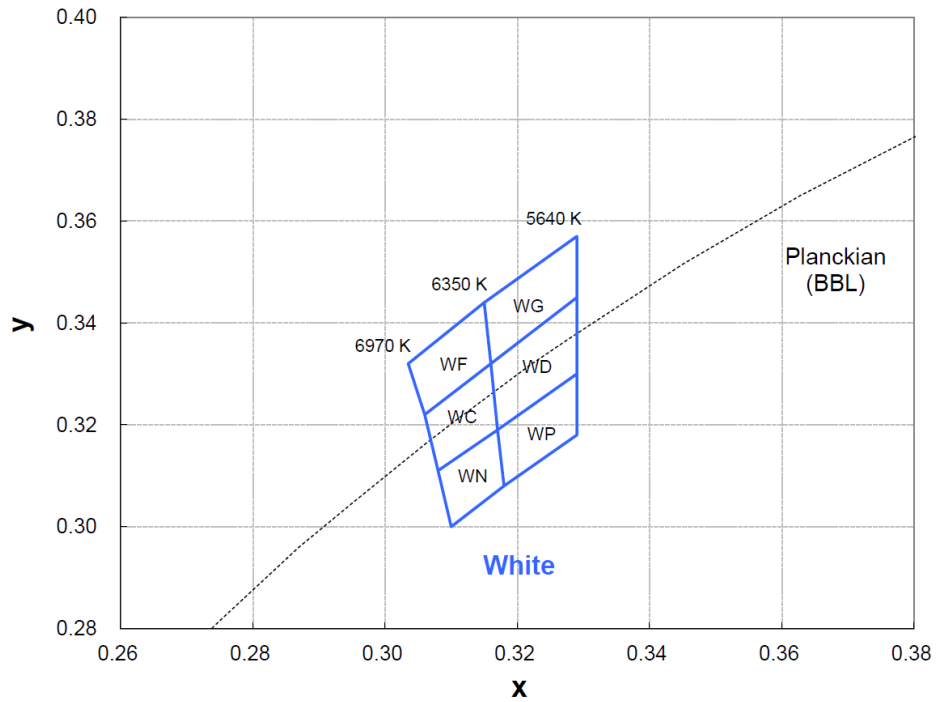
| Rank (mcd) or Flux $\Phi_V(lm)$ | | | | |
|---------------------------------|-----------|------|------|-----------|
| Color | Code name | Low | High | Condition |
| Red | A | 770 | 1000 | 20mA |
| | B | 1000 | 1300 | |
| Green | A | 1550 | 2000 | |
| | B | 2000 | 2600 | |
| Blue | A | 330 | 430 | |
| | B | 430 | 560 | |
| White | A | 19 | 24 | 60mA |
| | B | 24 | 30 | |

luminous flux tolerance is $\pm 7\%$



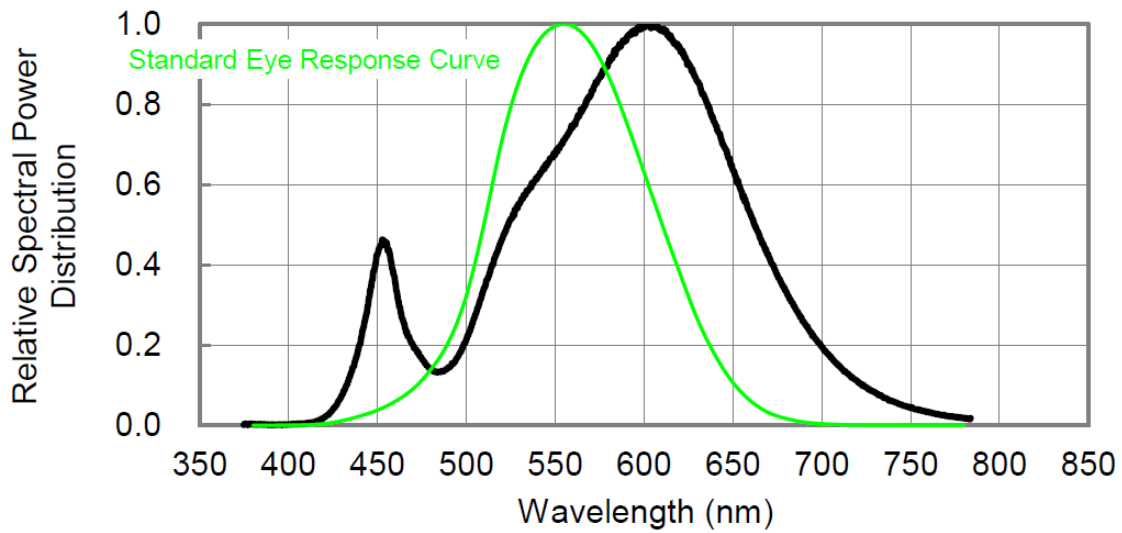
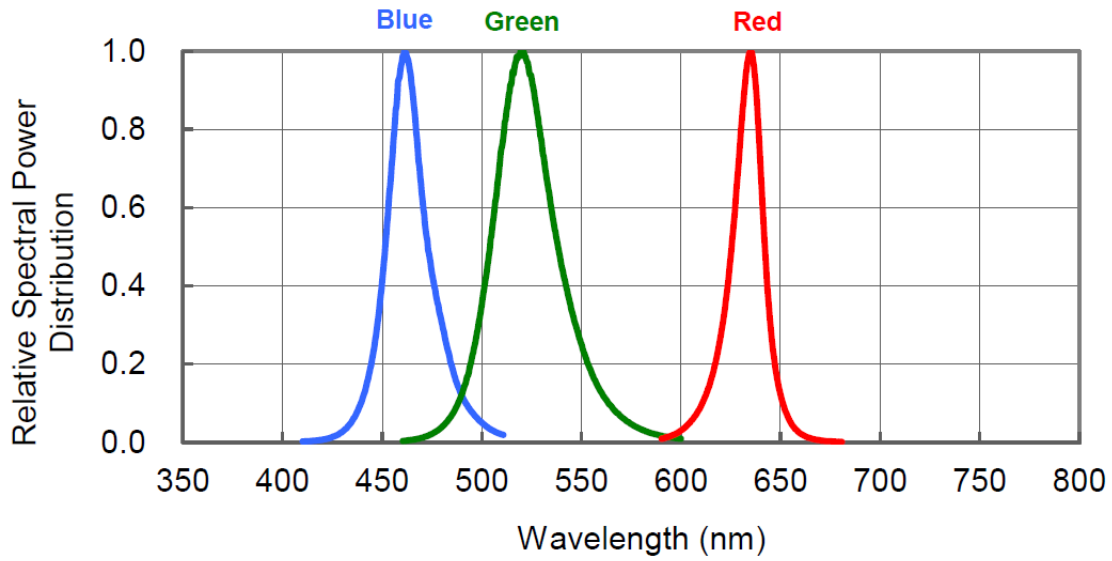
■ White Binning

Cold White Binning:

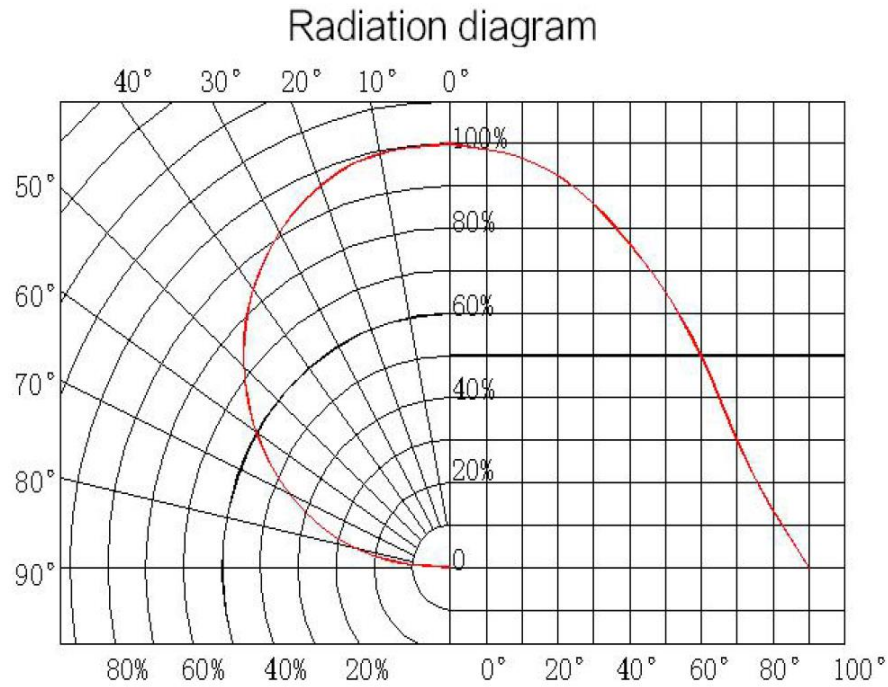


Characteristic Curves

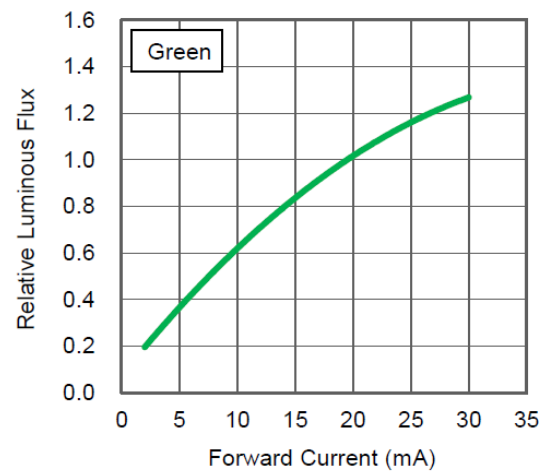
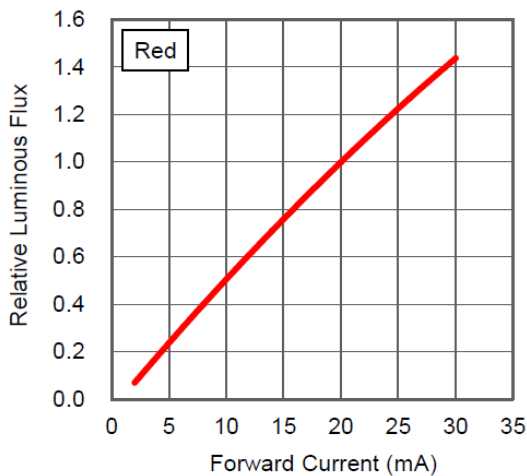
(1) Color Spectrum

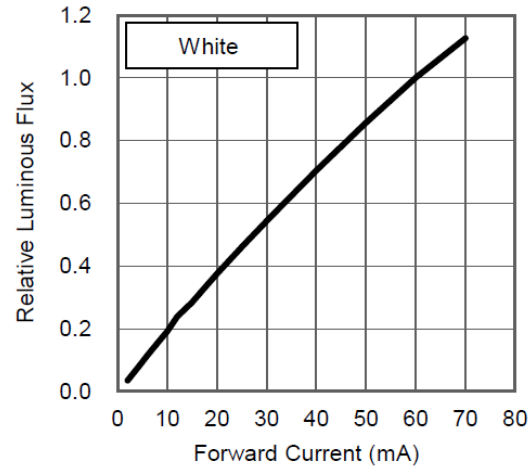
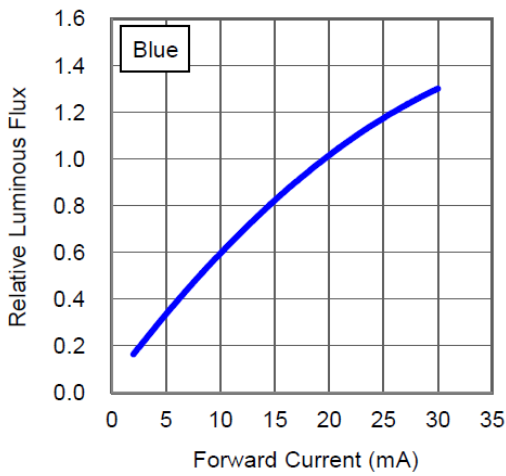


(2). Typical Representative Spatial Radiation Pattern

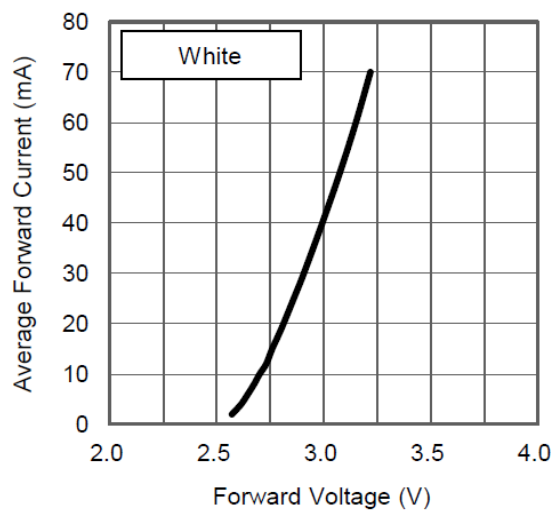
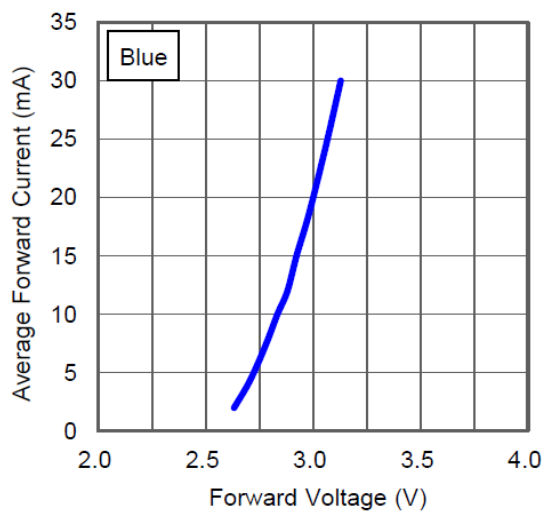
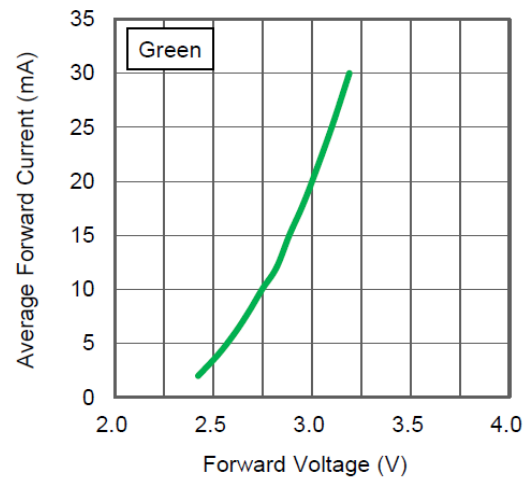
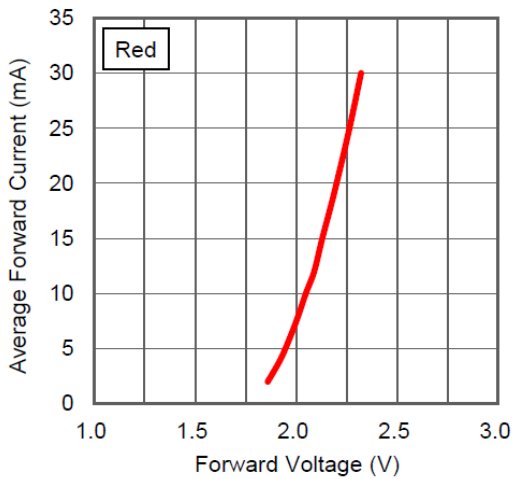


(3). Forward Current vs Relative Luminous Flux

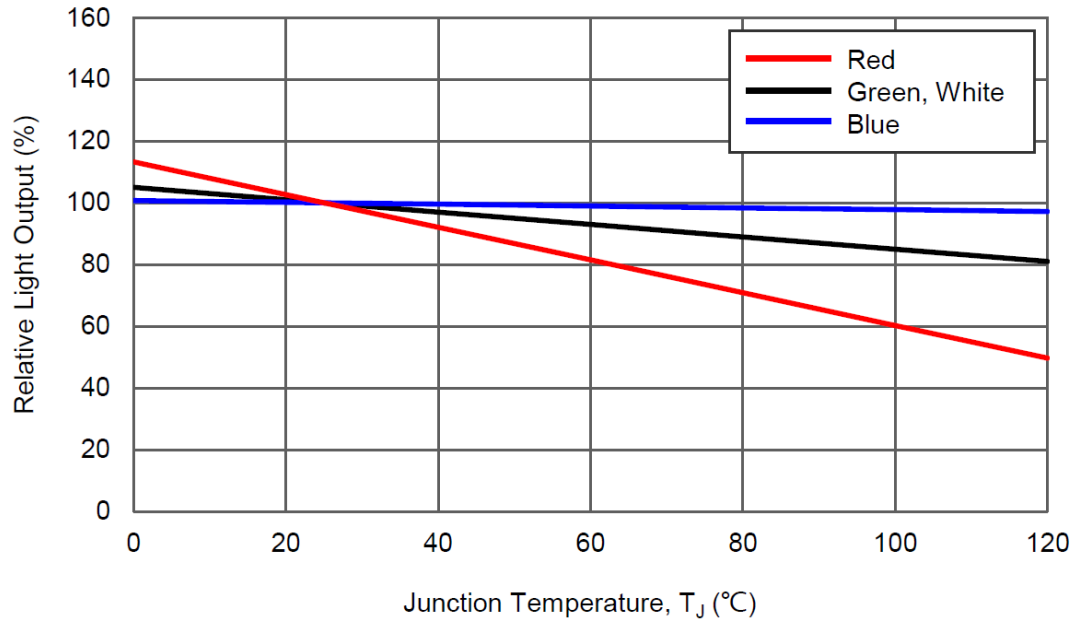




(4). Forward Current vs Forward Voltage



(5). Relative Light Output vs. Junction Temperature



■ 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 Tsld 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 |

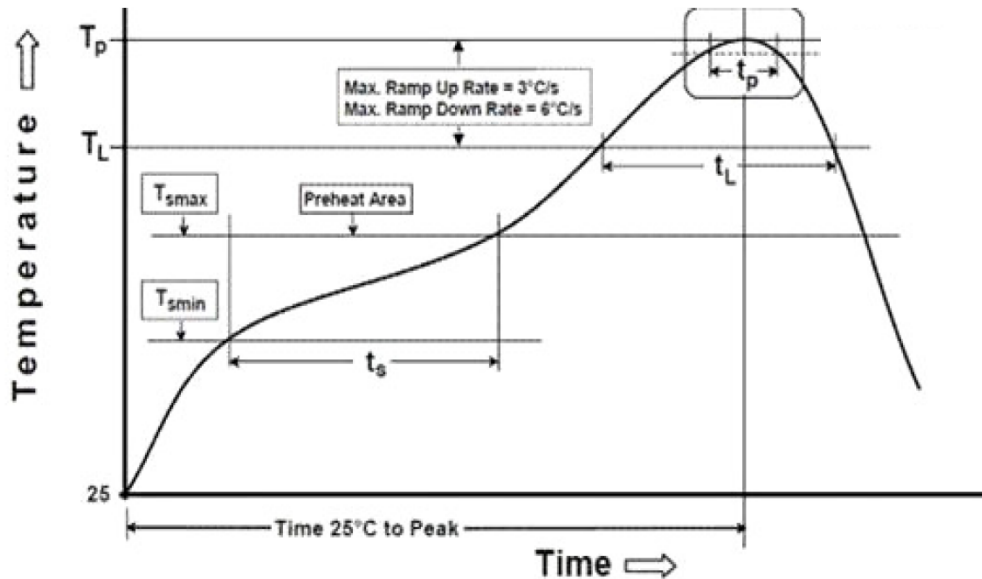
■ Judgment Criteria:

| Item | Symbol | Test Condition | Judgment Criteria |
|-----------------|--------|----------------|--------------------|
| Forward Voltage | Vf | 20 mA | $\Delta Vf < 10\%$ |
| Luminous Flux | Iv | 20 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):



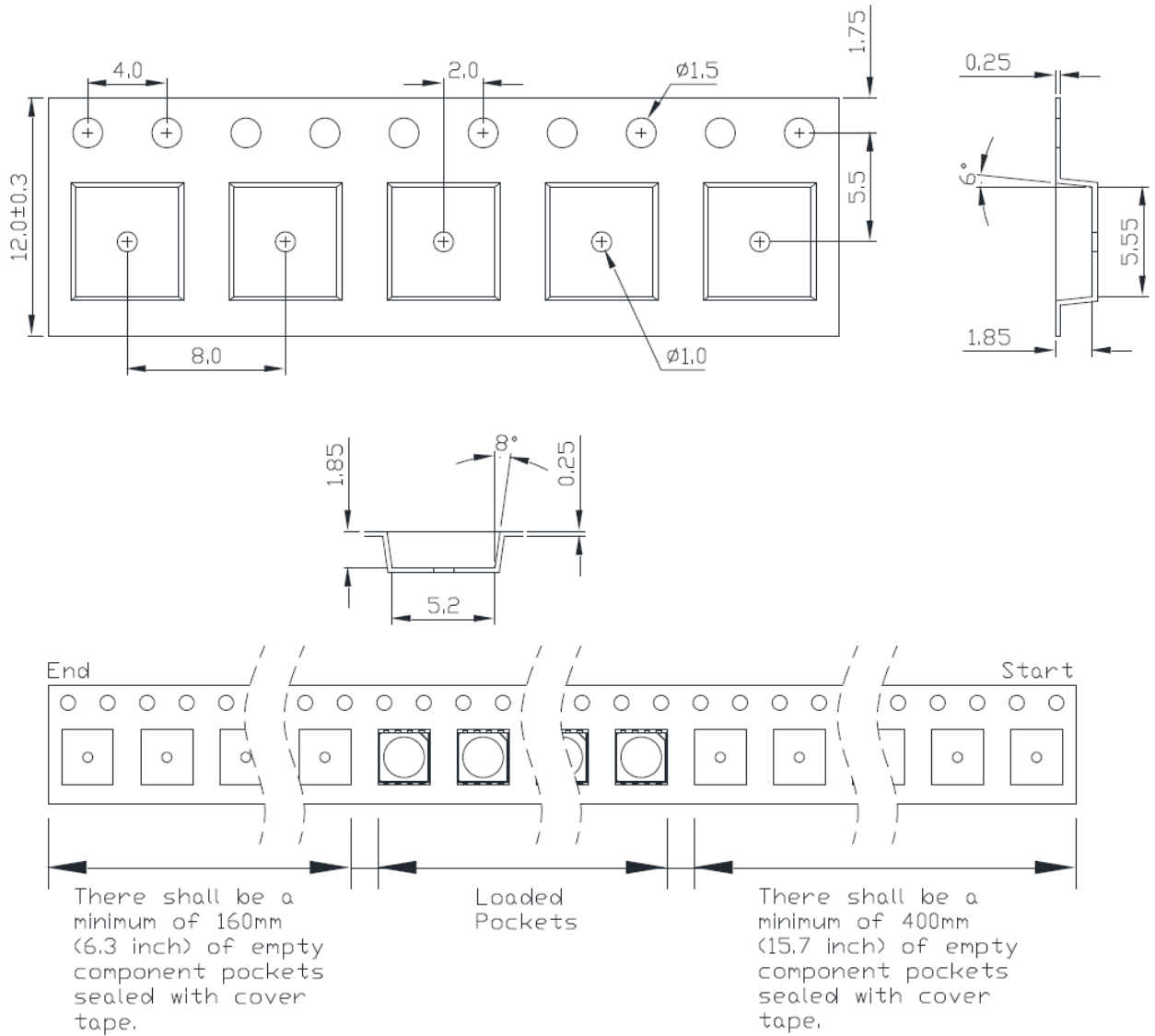
| Profile Feature | Sn-Pb Eutectic Assembly | Pb-Free Assembly |
|---|-------------------------|------------------|
| Temperature Min(T_{smin}) | 100°C | 150°C |
| Temperature Max(T_{smax}) | 150°C | 200°C |
| Time(t_a) from (T_{smin} to T_{smax}) | 60-120 seconds | 60-120 seconds |
| Ramp-up rate(T_L 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. | | |

Note:

1. The recommended reflow temperature is 230°C(±5°C). The maximum soldering temperature should be limited to 240°C.
2. Do not stress the silicone resin while it is exposed to high temperature.
3. The number of reflow process should not exceed 3 times.

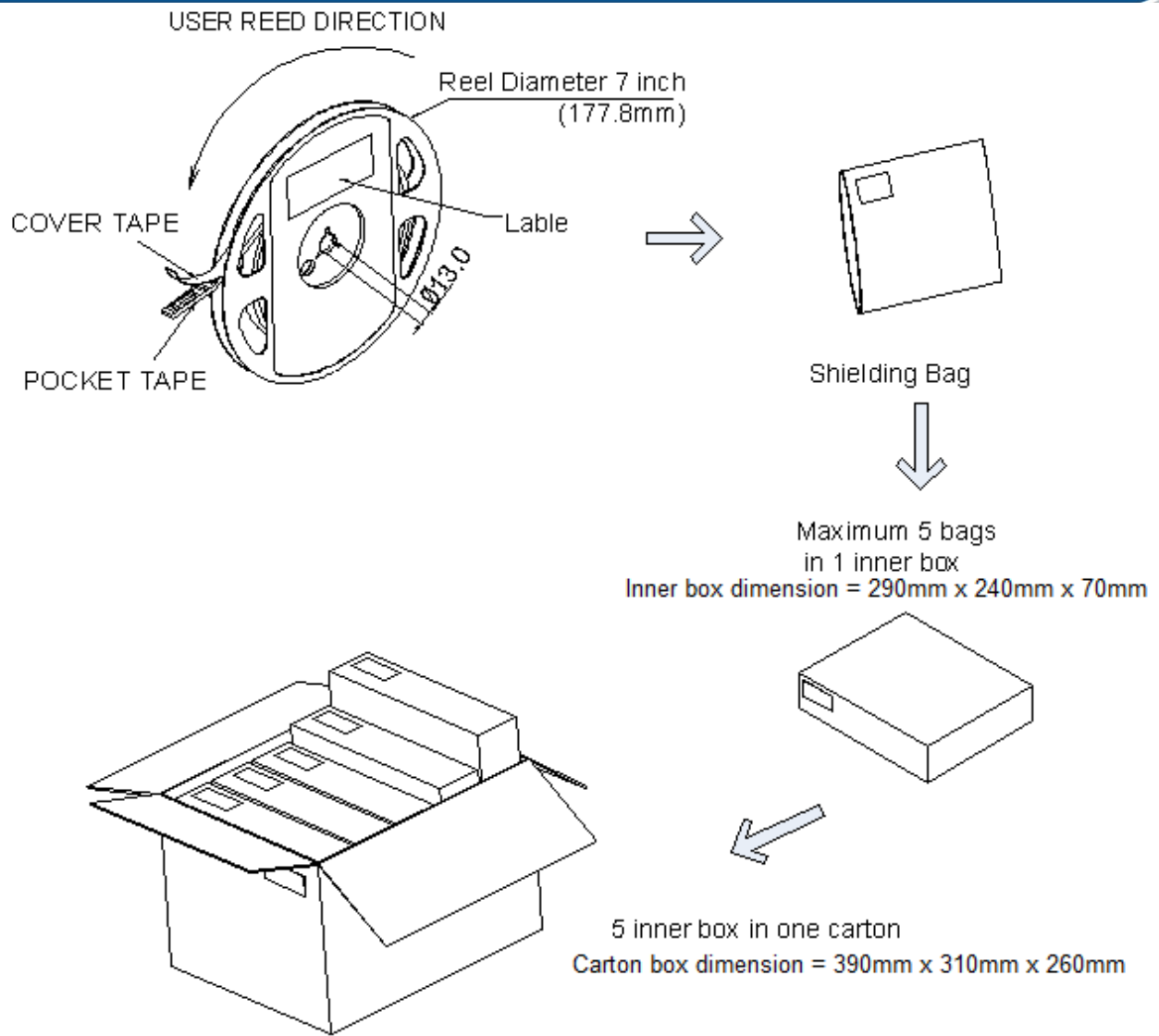


Taping & Packing:

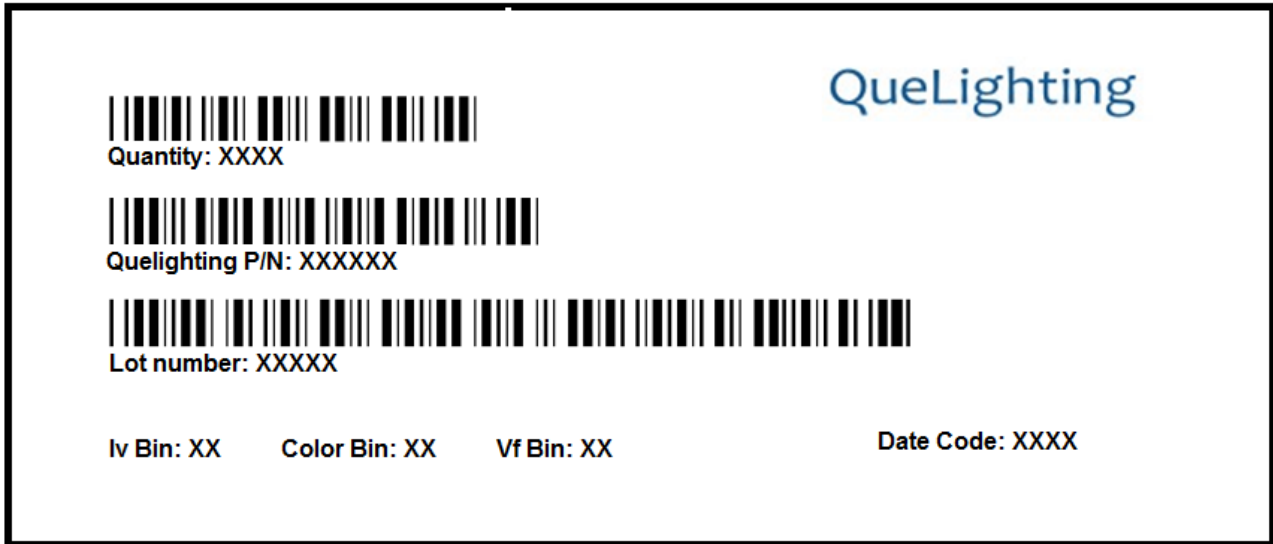


Unit : mm





Labeling



Ordering Information:

| Part # | Multiple Quantities | Quantity per Reel |
|-------------|---------------------|-------------------|
| QLSP08RGBCW | | 1000 pcs |
| | | |
| | | |
| | | |
| | | |
| | | |



Revision History:

| Revision Date: | Changes: | Version #: |
|----------------|-----------------|------------|
| 11-23-2020 | Initial release | 1.0 |
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