



QLSP04WXU
(Ra80 High Power White LED)



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:

- White color LED
- High brightness output @ 350mA,
- High driving current to 700mA.
- Package Dimension = 3.2mmX3.0mmX0.6mm
- **Ra 80**
- RoHS compliant
- Custom Bin available upon special request
- View angel >110°

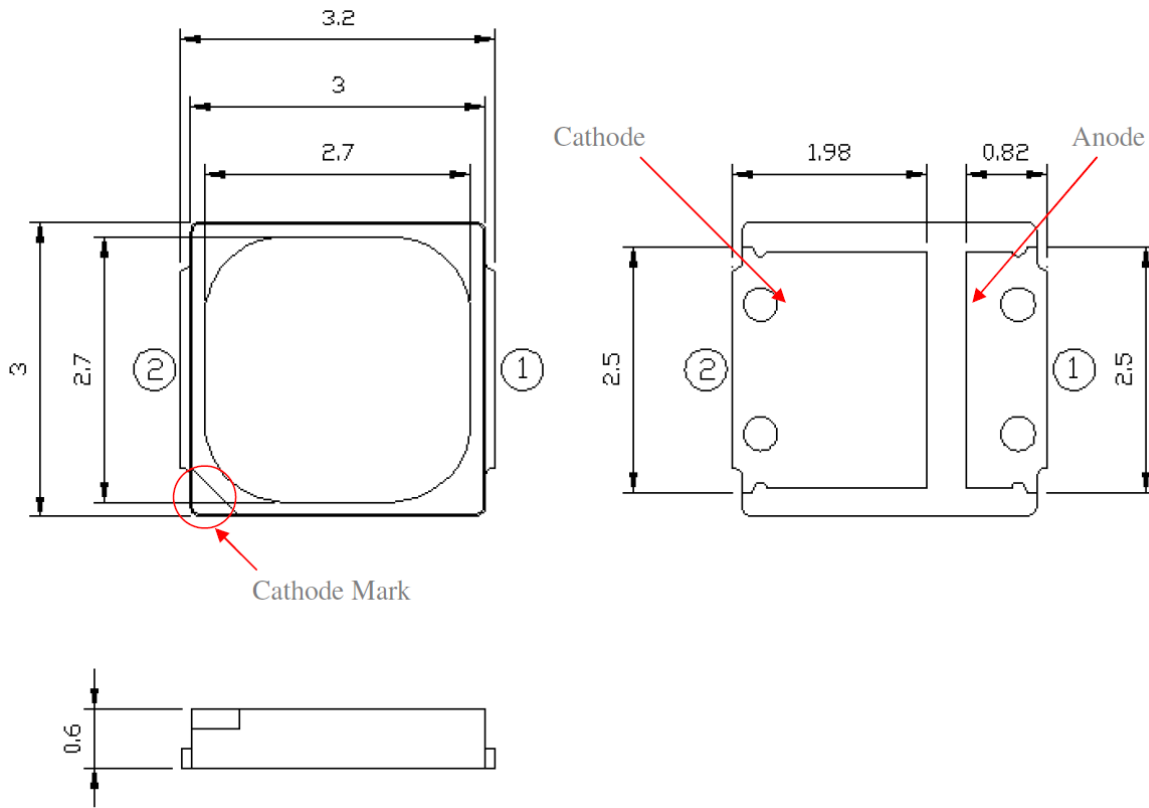
Application:

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

Compliance and Certification:

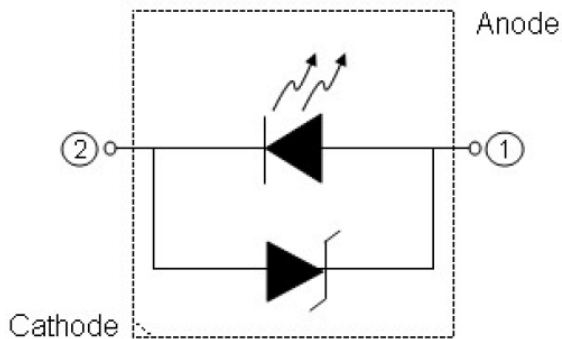


Mechanical Property: (Dimension)

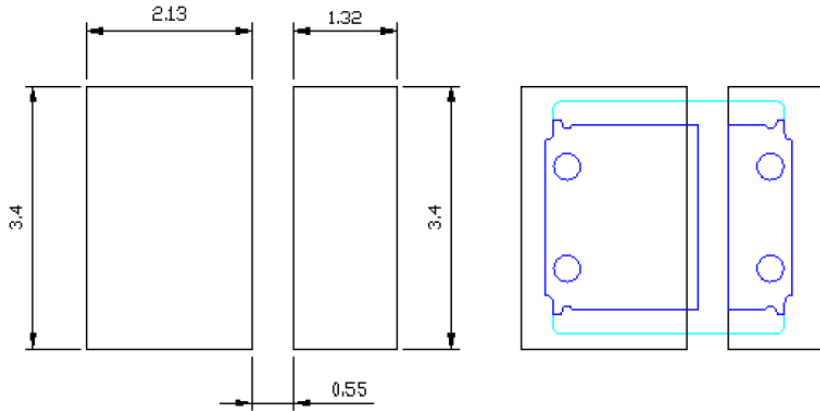


* All dimensions are in millimeters,
* Tolerances are $\pm 0.10\text{mm}$.

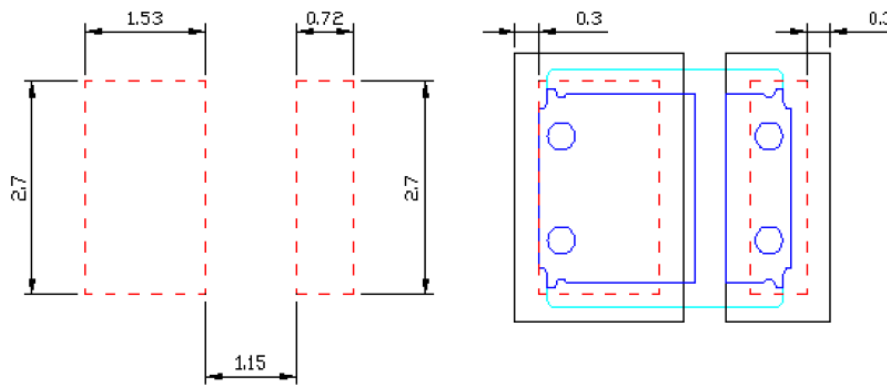
Circuit Drawing:



Recommended Metal Solder Stencil Aperture:



Solder Pad Design



Stencil Pad Design

- * 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 _f	700	mA
Leakage Current	I _r	1.0	μA
Power Dissipation	P _d	2.5	W
Pulse Forward Current	I _{fp}	1000	mA
LED Junction Temperature	T _J	125	°C
Storage Temperature	T _{stg}	-40 ~ 100	°C
Operation Temperature	T _{opr}	-40 ~ 85	°C
Soldering Temperature	T _{sol}	260 < 10 sec	°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
Forward Voltage	V _f	350mA	2.8.		3.4	V
View Angle	θ			120		deg
Color Rendering Index	R _a			80		
ESD Sensitivity(HBM)	KV			8.0		
Thermal Resistance	R _{th}				10	°C/W

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

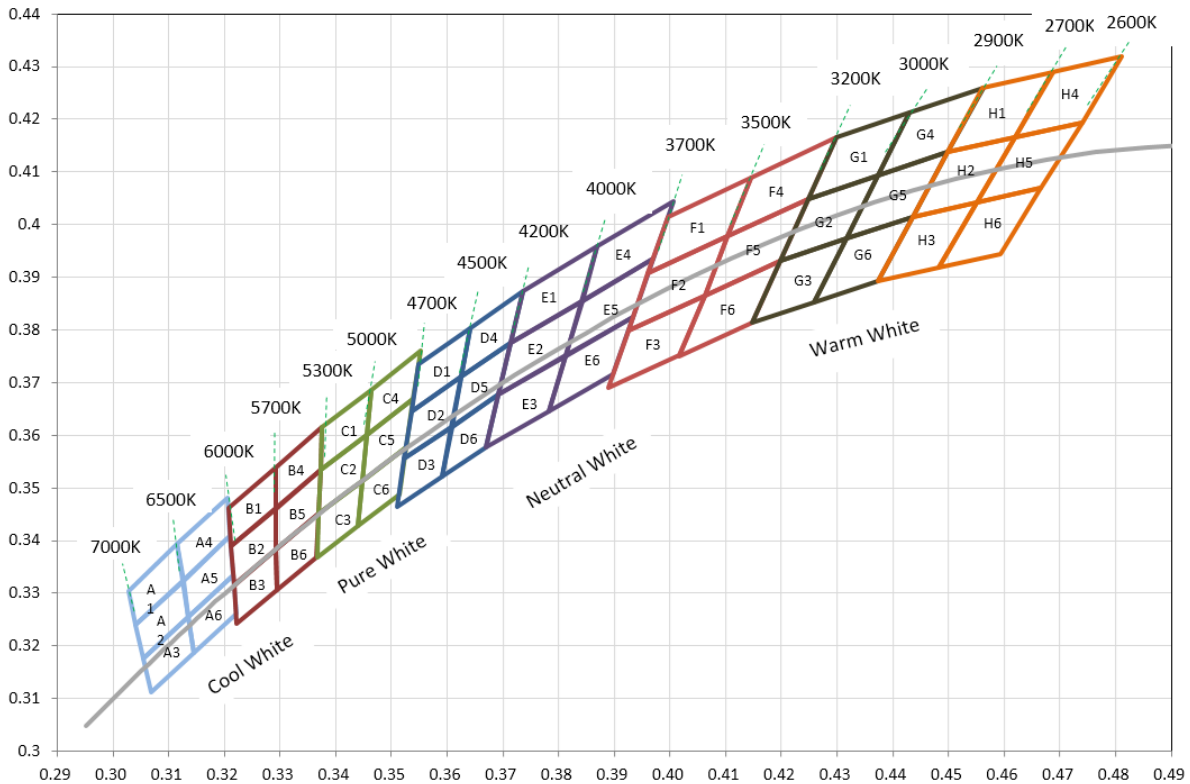


■ Specification

Product	Color	Vf(V) Typ.	CCT(K)	Luminous Flux IF=350mA		Luminous Flux IF=700mA	
				Min.	Typ.	Min.	Typ.
QLSP04WW1U	Warm White	3.0	2700K	120	131	223	230
QLSP04WW2U	Warm White	3.0	3000K	125	134	225	235
QLSP04WNU	Natural White	3.0	4000K	130	137	230	240
QLSP04WPU	Pure White	3.0	5000K	135	141	240	250

*Tolerance = +/- 10%

■ Groups CIE bin table



Warm White

2700~2900K						2600~2700K					
H1		H2		H3		H4		H5		H6	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4562	0.426	0.4499	0.4138	0.4436	0.4015	0.4687	0.4289	0.462	0.4166	0.4551	0.4042
0.4499	0.4138	0.4436	0.4015	0.4373	0.3893	0.462	0.4166	0.4551	0.4042	0.4483	0.3919
0.462	0.4166	0.4551	0.4042	0.4483	0.3919	0.474	0.4194	0.4666	0.4069	0.4593	0.3944
0.4687	0.4289	0.462	0.4166	0.4551	0.4042	0.481	0.4319	0.474	0.4194	0.4666	0.4069
0.4562	0.426	0.4499	0.4138	0.4436	0.4015	0.4687	0.4289	0.462	0.4166	0.4551	0.4042

3000~3200K						2900~3000K					
G1		G2		G3		G4		G5		G6	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.4299	0.4165	0.4248	0.4048	0.4198	0.3931	0.443	0.4212	0.4374	0.4093	0.4317	0.3973
0.4248	0.4048	0.4198	0.3931	0.4147	0.3814	0.4374	0.4093	0.4317	0.3973	0.4259	0.3853
0.4374	0.4093	0.4317	0.3973	0.4259	0.3853	0.4499	0.4138	0.4436	0.4015	0.4373	0.3893
0.443	0.4212	0.4374	0.4093	0.4317	0.3973	0.4562	0.426	0.4499	0.4138	0.4436	0.4015
0.4299	0.4165	0.4248	0.4048	0.4198	0.3931	0.443	0.4212	0.4374	0.4093	0.4317	0.3973

Neutral White

4000~4200K						3700~4000K					
E1		E2		E3		E4		E5		E6	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3736	0.3874	0.3714	0.3775	0.3692	0.3677	0.3869	0.3958	0.3842	0.3855	0.3813	0.3751
0.3714	0.3775	0.3692	0.3677	0.367	0.3578	0.3842	0.3855	0.3813	0.3751	0.3783	0.3646
0.3842	0.3855	0.3813	0.3751	0.3783	0.3646	0.397	0.3935	0.3934	0.3825	0.3898	0.3716
0.3869	0.3958	0.3842	0.3855	0.3813	0.3751	0.4006	0.4044	0.397	0.3935	0.3934	0.3825
0.3736	0.3874	0.3714	0.3775	0.3692	0.3677	0.3869	0.3958	0.3842	0.3855	0.3813	0.3751



Pure White

5000~5300K						4700~5000K					
C1		C2		C3		C4		C5		C6	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3376	0.3616	0.3373	0.3534	0.3369	0.3451	0.3463	0.3687	0.3456	0.3601	0.3448	0.3514
0.3373	0.3534	0.3369	0.3451	0.3366	0.3369	0.3456	0.3601	0.3448	0.3514	0.344	0.3428
0.3456	0.3601	0.3448	0.3514	0.344	0.3428	0.3539	0.3669	0.3526	0.3578	0.3514	0.3487
0.3463	0.3687	0.3456	0.3601	0.3448	0.3514	0.3552	0.376	0.3539	0.3669	0.3526	0.3578
0.3376	0.3616	0.3373	0.3534	0.3369	0.3451	0.3463	0.3687	0.3456	0.3601	0.3448	0.3514

Cold White

6500~7000K						6000~6500K					
A1		A2		A3		A4		A5		A6	
CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y	CIE X	CIE Y
0.3028	0.3304	0.3041	0.324	0.3055	0.3177	0.3115	0.3393	0.3126	0.3324	0.3136	0.3256
0.3041	0.324	0.3055	0.3177	0.3068	0.3113	0.3126	0.3324	0.3136	0.3256	0.3146	0.3187
0.3126	0.3324	0.3136	0.3256	0.3146	0.3187	0.321	0.3408	0.3216	0.3334	0.3221	0.3261
0.3115	0.3393	0.3126	0.3324	0.3136	0.3256	0.3205	0.3481	0.321	0.3408	0.3216	0.3334
0.3028	0.3304	0.3041	0.324	0.3055	0.3177	0.3115	0.3393	0.3126	0.3324	0.3136	0.3256

Note :

- (1). Correlated color temperature is derived from the CIE 1931 Chromaticity diagram
- (2). Correspond with ANSI color temperature binning
- (3). Measurement tolerance is +/- 0.01



Forward Voltage (V_F) Bin:

VF Rank		
Code name	Low	High
1	2.9	3.0
2	3	3.1
3	3.1	3.2
4	3.2	3.3
5	3.3	3.4

The forward voltage tolerance is $\pm 0.1V$

Luminous Flux Bin:

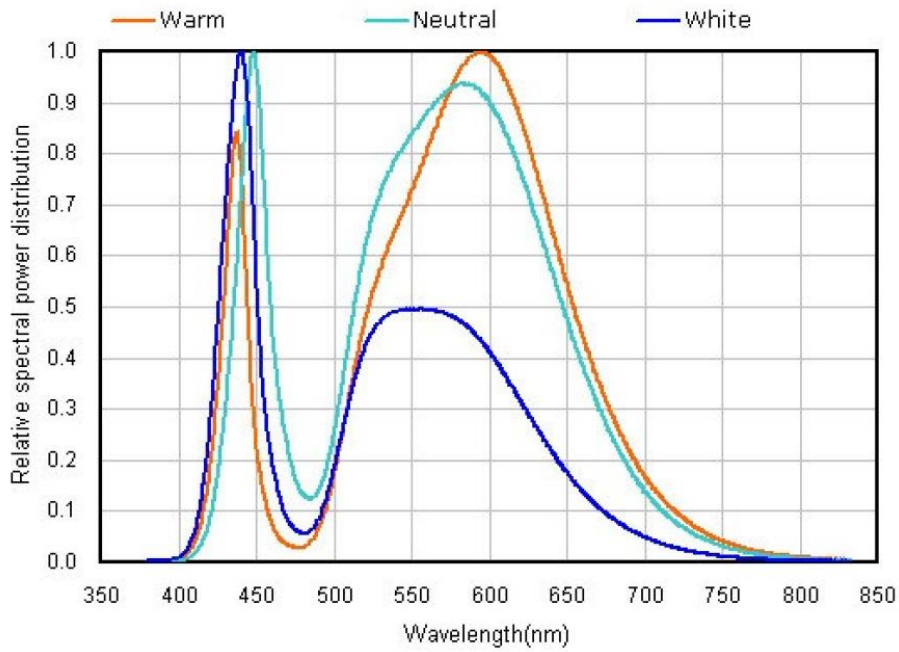
Im Rank (Im)@350mA		
Code name	Low	High
QPF	118	126
QPG	126	135
QPH	135	145
QPI	145	155

Luminous flux tolerance is $\pm 7\%$

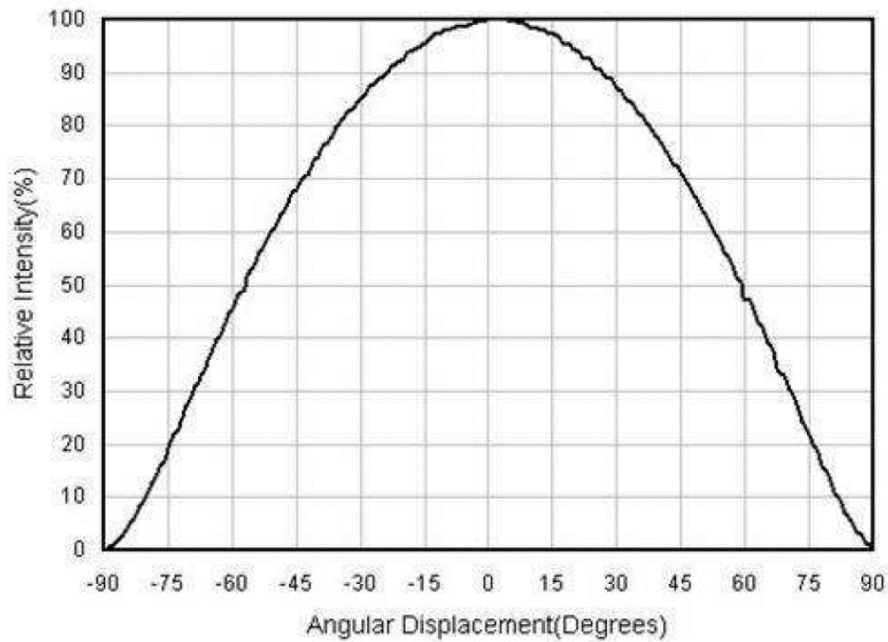


■ Characteristic Curves

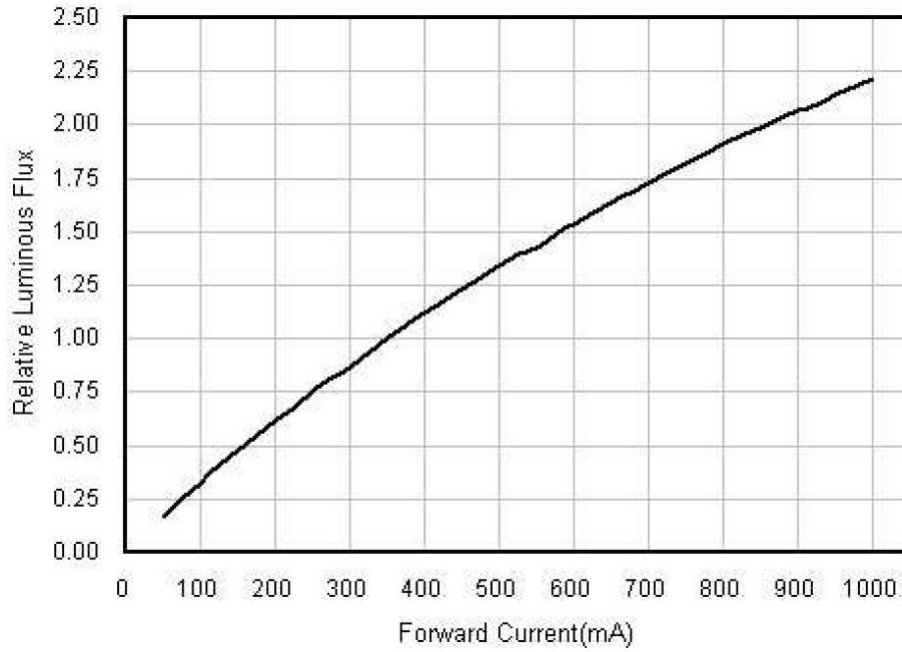
(1) Color Spectrum



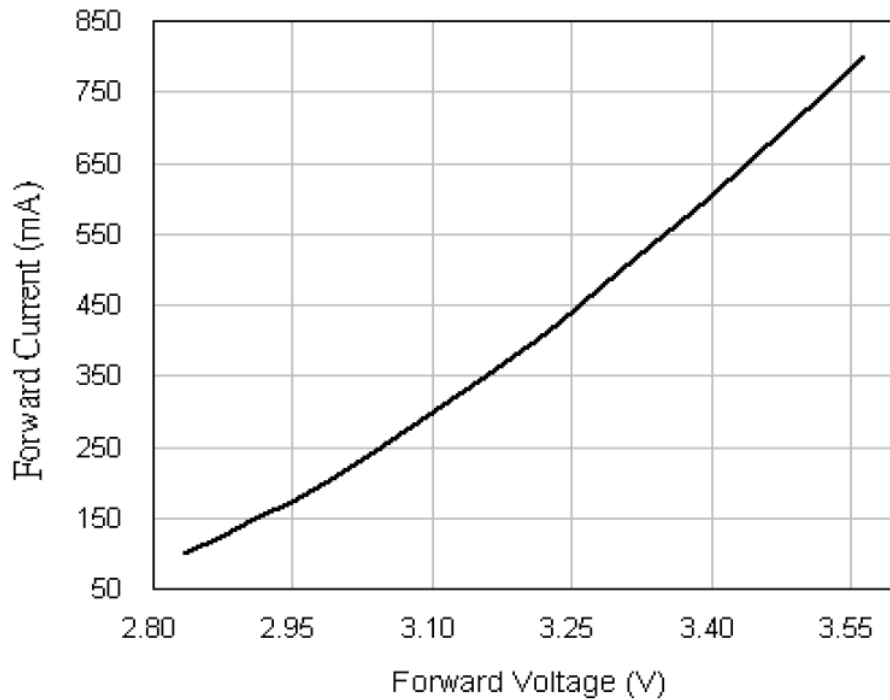
(2). Typical Representative Spatial Radiation Pattern



(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

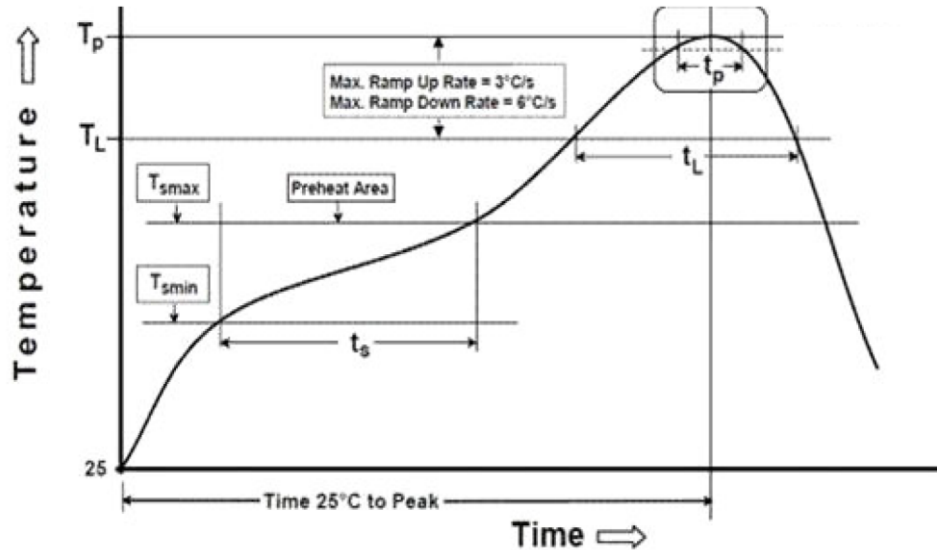
■ Judgment Criteria:

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):

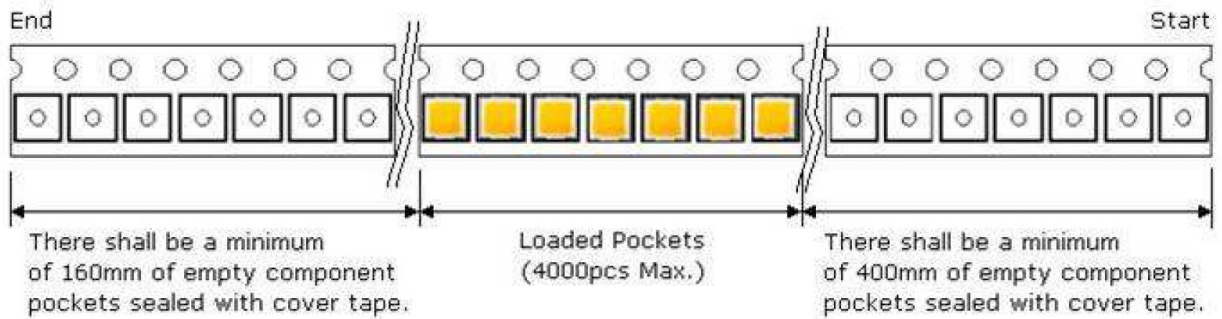
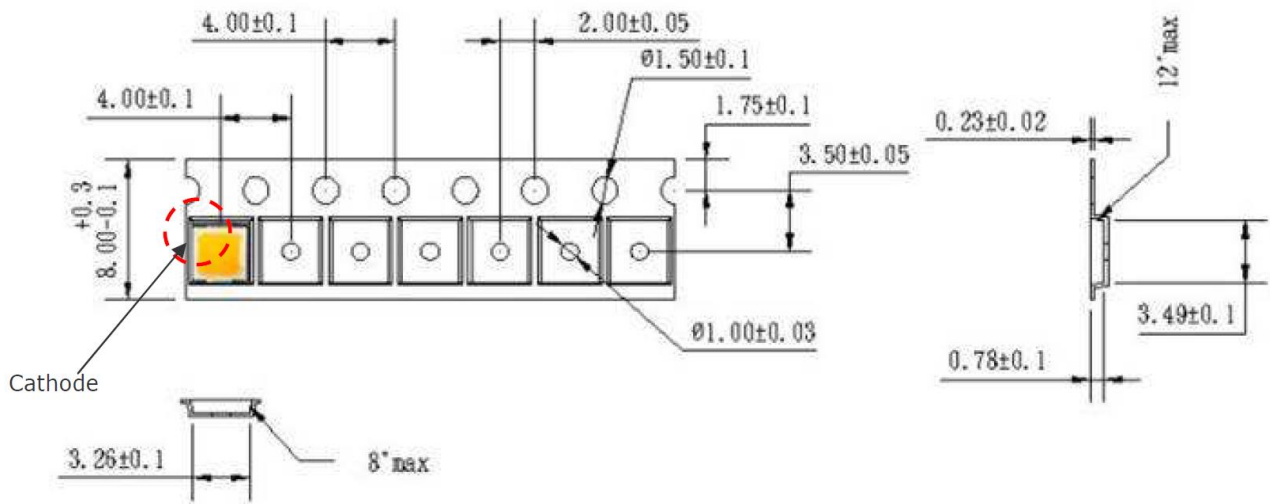


Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Temperature Min(T_{smin})	100°C	150°C
Temperature Max(T_{smax})	150°C	200°C
Time(t_a) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up rate(T_L to T_p)	3°C/second max.	3°C/second max.
Liquidous Temperature(T_L)	183°C	217°C
Time(t_L) 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.

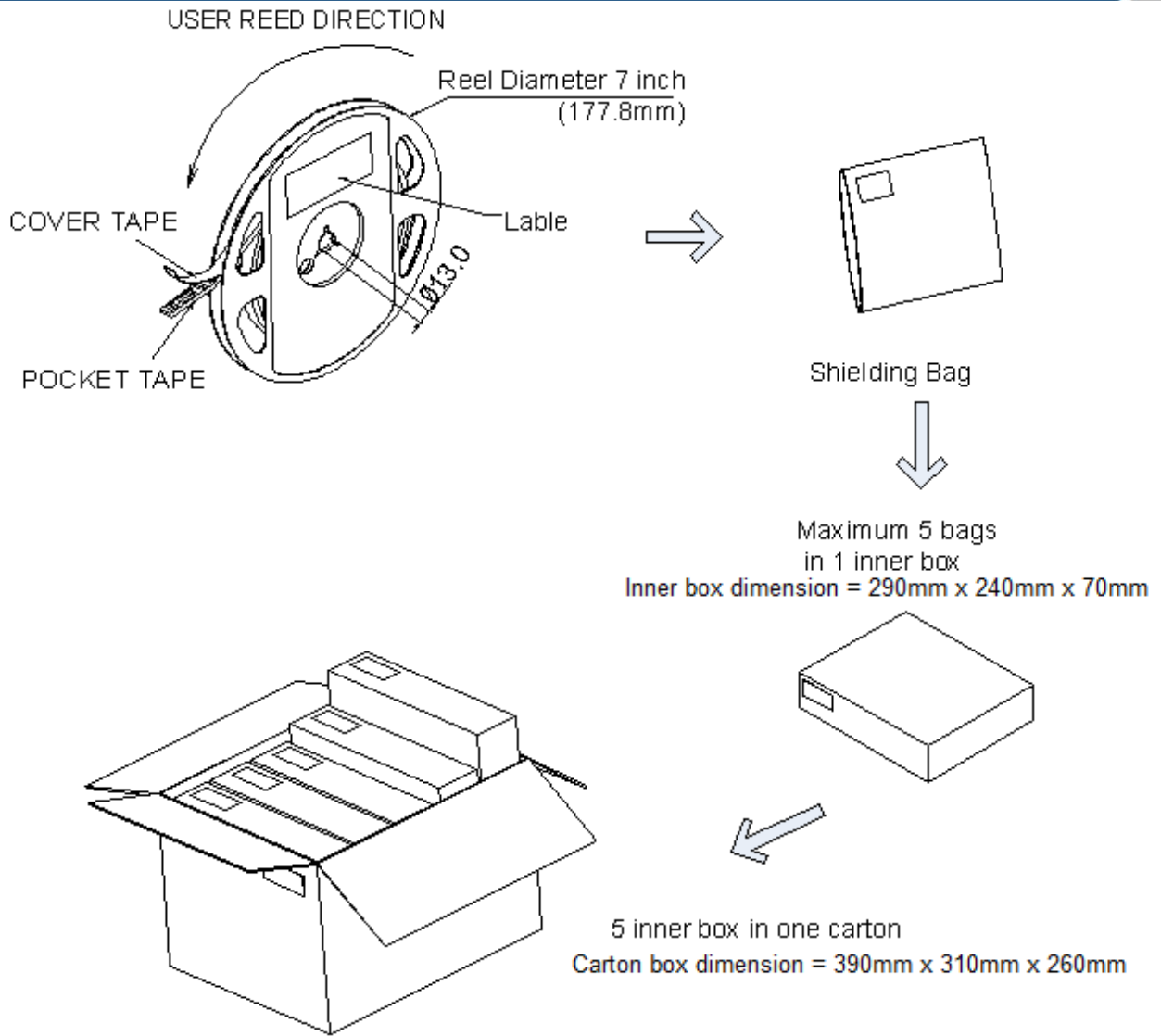


Taping & Packing:





Unit : mm






Labeling




Quantity: XXXX



Quelighting P/N: XXXXXX



Lot number: XXXXX

Iv Bin: XX
Color Bin: XX
Vf Bin: XX
Date Code: XXXX

Ordering Information:

Part #	Multiple Quantities	Quantity per Reel
QLSP04WXU		1000, 2000 pcs



Revision History:

Revision Date:	Changes:	Version #:
09-02-2015	Initial release	1.0
09-24-2019	Update the performance	1.1
02-14-2022	Update the performance	1.2

