

# QT-Brightek High Power Series

## 1.0 W High Power LED

**Part No.: QBHP684U-XXU Series**

**XX = Color Code  
U = 350mA**

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## Introduction

**Feature:**

- Package in tape and reel
- 1W High Bright LED
- Low thermal resistance < 4°C/W
- Super high flux and luminance
- AllInGaP technology for R, S and Y
- InGaN technology for IB and IG
- ESD Protection (IB and IG)
- ESD protection up to 8KV

**Description:**

This 1W high bright high power LED has compact size of 3.6 x 3.6mm. It is ideal for both in door and outdoor lighting

**Application:**

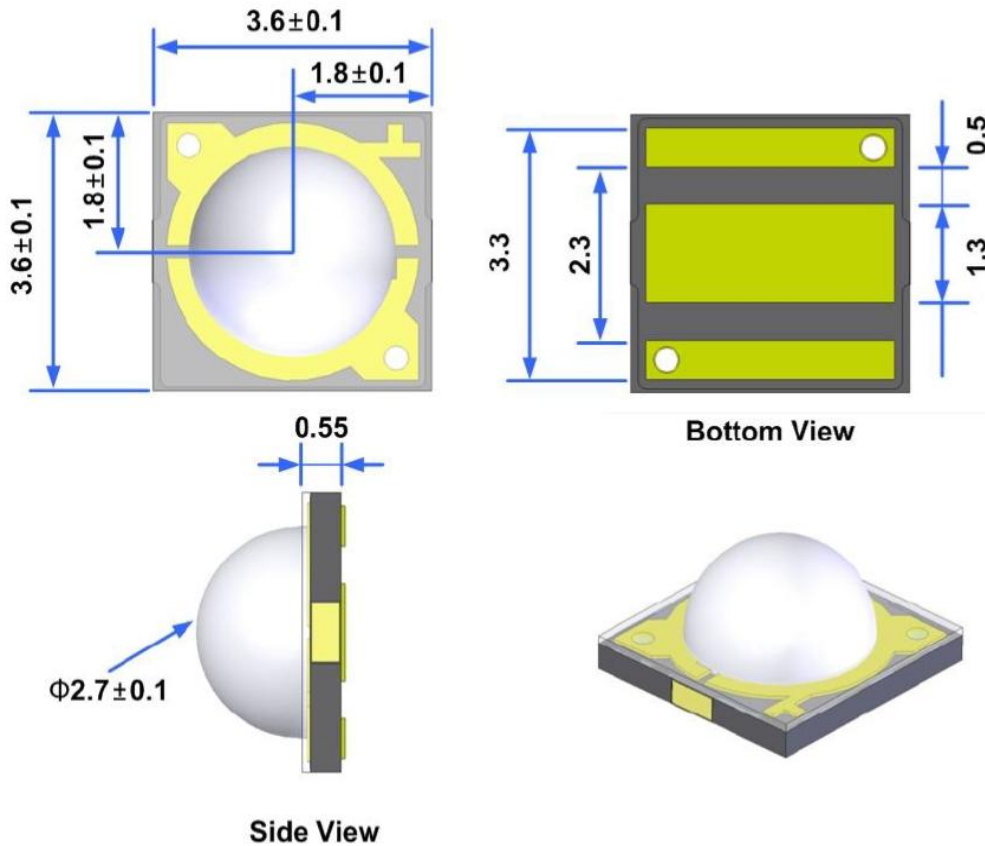
- Architectural and outdoor lighting
- Household appliances
- General lighting

**Certification & Compliance:**

- TS16949
- ISO9001
- RoHS Compliant

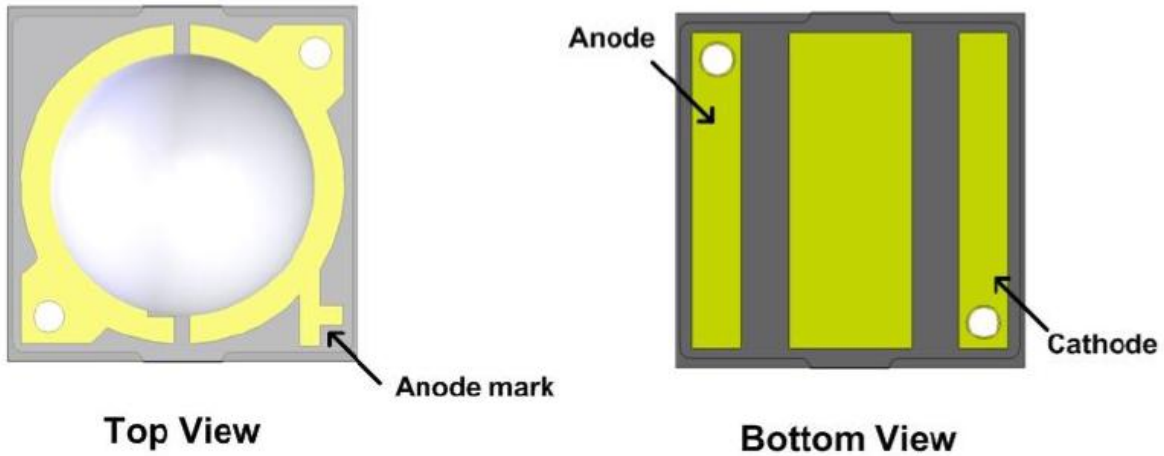


**Dimension:**



Units: mm / tolerance = +/-0.1mm

**Pad Configuration:**



**Electrical / Optical Characteristic ( $T_A=25^{\circ}\text{C}$ )**

Product	Color	$I_F$ (mA)	$V_F$ (V)		$\lambda_D$ (nm)			$\Phi_v$ (lm)	
			Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.
QBHP684U-RU	Red	350	2.4	2.8	620	625	630	45	55
QBHP684U-SU	Deep Red	350	2.4	2.8	650	660	670	15	20
QBHP684U-YU	Yellow	350	2.4	2.8	585	590	595	50	60
QBHP684UE-IGU	Green	350	3.4	3.8	520	525	530	90	110
QBHP684UE-IBU	Blue	350	3.4	3.8	450	455	460	10	20

**Absolute Maximum Rating**

Material	$P_d$ (mW)	$I_F$ (mA)	$I_{FP}$ (mA)*	$V_R$ (V)	$T_{OP}$ ( $^{\circ}\text{C}$ )	$T_{ST}$ ( $^{\circ}\text{C}$ )	$T_{SOL}$ ( $^{\circ}\text{C}$ )
AllnGaP (R/S/Y)	1.96	700	1000	5	-40 to +85	-40 to +100	240
InGaN (IB/IG)	2.66	700	1000	5	-40 to +85	-40 to +100	240

\*Duty 1/10 @0.1ms Pulse Width

**Forward Voltage  $V_F$  for AlInGaP @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
D	2.0	2.2	V
E	2.2	2.4	
F	2.4	2.6	
G	2.6	2.8	

**Forward Voltage  $V_F$  for InGaN @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
I	3.0	3.2	V
J	3.2	3.4	
K	3.4	3.6	
L	3.6	3.8	

**Luminous Flux  $\Phi_v$  for Red @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
RE	45	55	lm
RF	55	65	
RG	65	75	
RH	75	85	
RI	85	95	

**Luminous Flux  $\Phi_v$  for Deep Red @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
RB	15	25	lm

**Luminous Flux  $\Phi_v$  for Yellow @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
AB	50	60	lm
AC	60	70	
AD	70	80	

**Luminous Flux  $\Phi_v$  for Green @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
GB	90	100	lm
GC	100	110	
GD	110	120	
GE	120	130	
GF	130	140	

**Luminous Flux  $\Phi_v$  for Blue @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
BA	10	15	lm
BB	15	20	
BC	20	25	

**Dominant Wavelength  $\lambda_D$  for Red @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
R2	620	625	nm
R3	625	630	

**Dominant Wavelength  $\lambda_D$  for Deep Red @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
RB	650	670	nm

**Dominant Wavelength  $\lambda_D$  for Yellow @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
A1	585	590	nm
A2	590	595	

**Dominant Wavelength  $\lambda_D$  for Green @  $I_F=350\text{mA}$** 

Bin	Min.	Max.	Unit
G2	520	525	nm
G3	525	530	

**Dominant Wavelength  $\lambda_D$  for Blue @  $I_F=350\text{mA}$** 

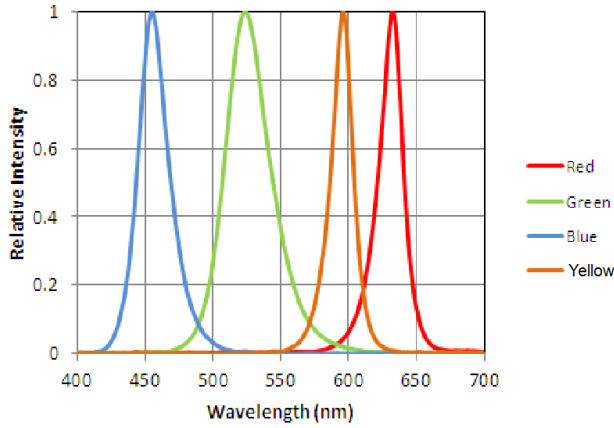
Bin	Min.	Max.	Unit
B2	450	460	nm

## Note:

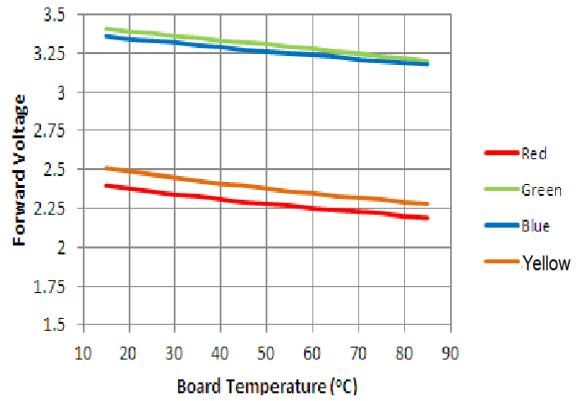
Tolerance of measurement of forward voltage:  $\pm 0.1\text{V}$ Tolerance of measurement of luminous flux:  $\pm 10\%$ Tolerance of measurement of dominant wavelength:  $\pm 2\text{nm}$

**Characteristic Curves**

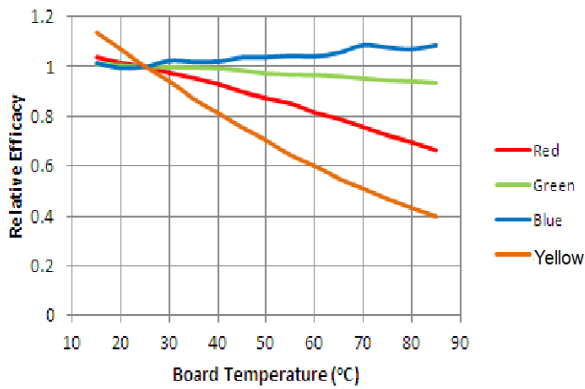
**Relative Spectral Distribution vs. Wavelength Characteristics**



**Forward Voltage vs. Thermal Pad Temperature @350mA**

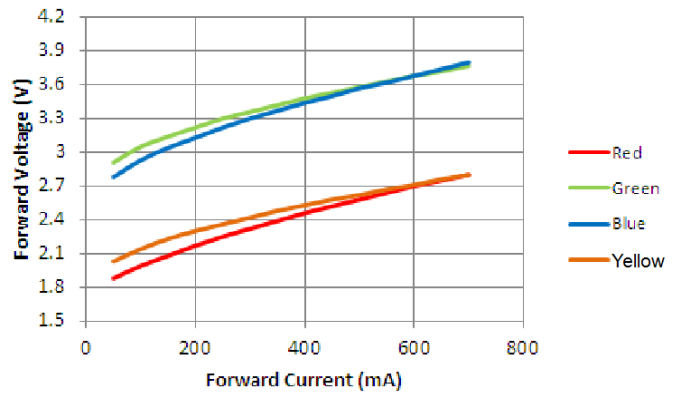


**Typical Efficacy vs. Thermal Pad Temperature @350mA**



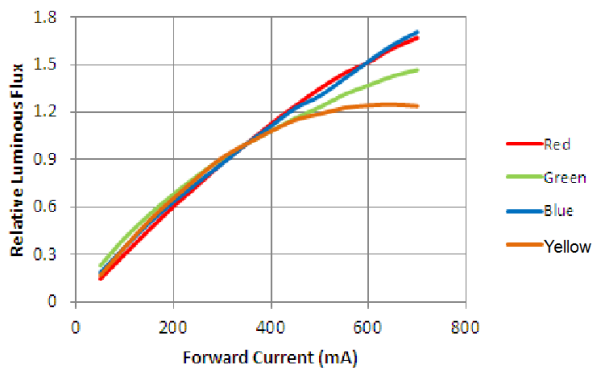
**Typical Forward Current Characteristics**

Thermal Pad Temperature = 25°C

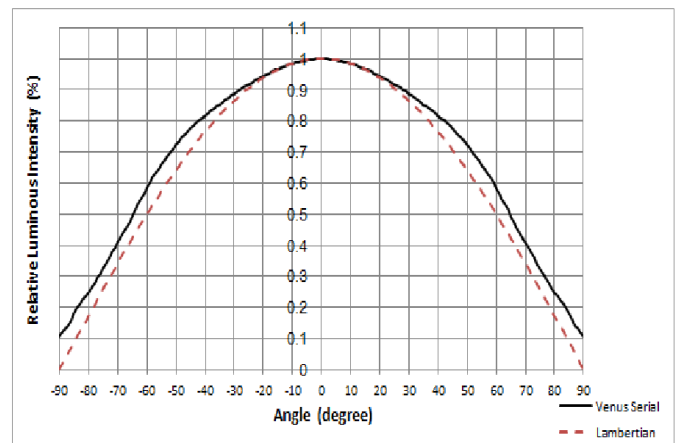


**Typical Relative Luminous Flux vs. Forward Current**

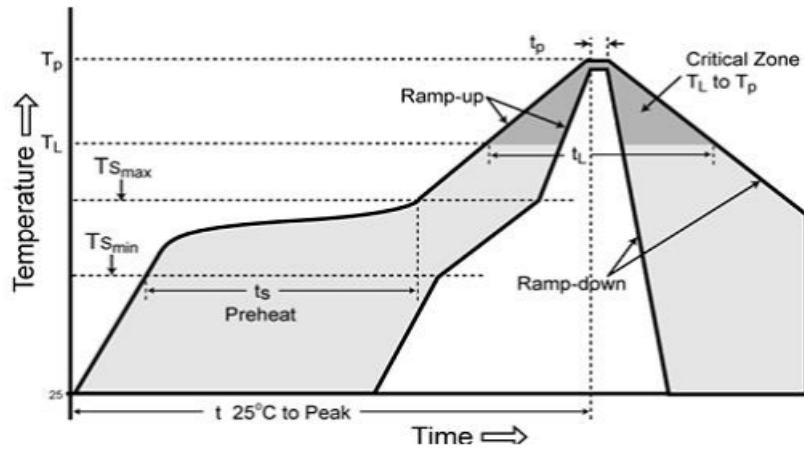
Thermal Pad Temperature = 25°C



**Typical Radiation Patterns**

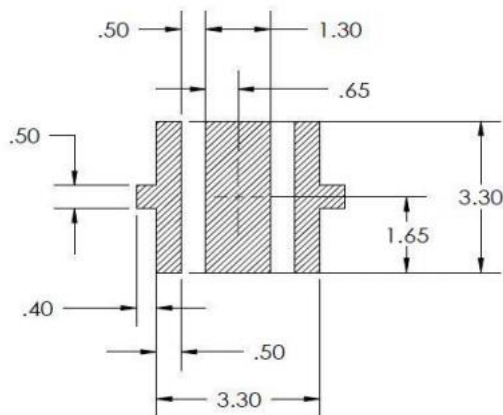


## Solder Profile & Footprint

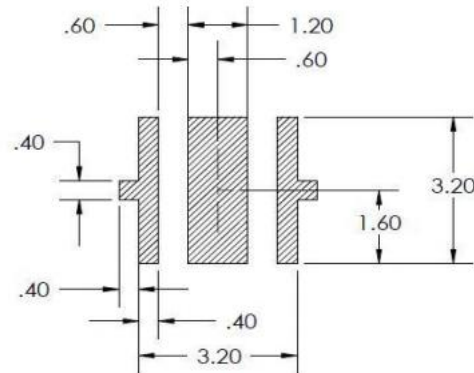


Profile Feature	Pb-Free Assembly
Average ramp-up rate (TL to TP)	3°C/second max.
Preheat	
Temperature Min (T <sub>smin</sub> )	150°C
Temperature Max (T <sub>smax</sub> )	200°C
Time (min to max) (t <sub>s</sub> )	60-180 seconds
Time maintained above:	
Temperature (TL)	217°C
Time (t <sub>L</sub> )	60-150 seconds
Peak/Classification Temperature (T <sub>p</sub> )	240°C
Time within 5°C of actual Peak Temperature (t <sub>p</sub> )	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

### Recommended Soldering Pattern:



RECOMMENDED PCB SOLDER PAD

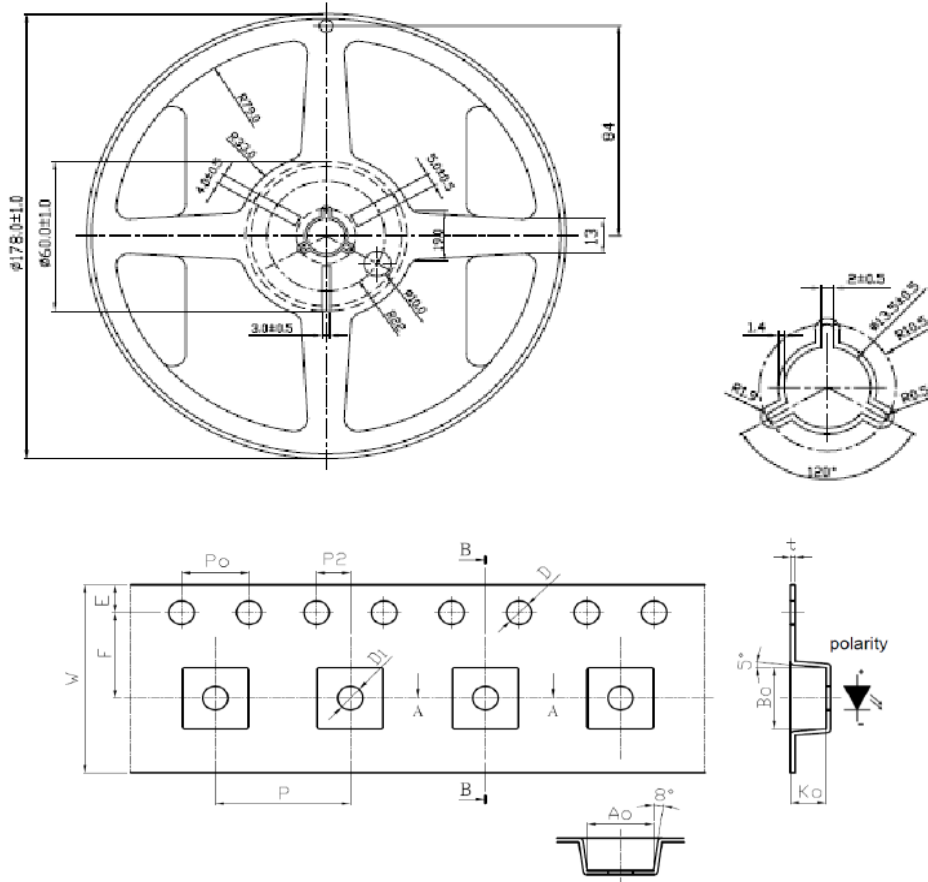


RECOMMENDED STENCIL PATTERN  
(HATCHED AREA IS OPENING)



## Packing

### Tape and Reel:




Unit: mm

## Labeling



No  
**QT-Brightek**  
 Yes



**Part No:** \_\_\_\_\_  
**Customer P/N:** \_\_\_\_\_  
**Item:** \_\_\_\_\_  
**Q'ty:** \_\_\_\_\_  
**Vf:** \_\_\_\_\_  
**Iv:** \_\_\_\_\_  
**WI:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

**Made in Taiwan**

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**Ordering Information**

Part #	Orderable Part #	Spec Range	Quantity per reel
QBHP684U-RU	QBHP684U-RU	$\Phi_v=55\text{lm typ.}$ , @ $I_F=350\text{mA}$ / $\lambda_D=620\text{nm to }630\text{nm}$	1000 units
QBHP684U-SU	QBHP684U-SU	$\Phi_v=20\text{lm typ.}$ , @ $I_F=350\text{mA}$ / $\lambda_D=650\text{nm to }670\text{nm}$	1000 units
QBHP684U-YU	QBHP684U-YU	$\Phi_v=60\text{lm typ.}$ @ $I_F=350\text{mA}$ / $\lambda_D=585\text{nm to }595\text{nm}$	1000 units
QBHP684UE-IGU	QBHP684UE-IGU	$\Phi_v=110\text{lm typ.}$ @ $I_F=350\text{mA}$ / $\lambda_D=520\text{nm to }530\text{nm}$	1000 units
QBHP684UE-IBU	QBHP684UE-IBU	$\Phi_v=20\text{lm typ.}$ @ $I_F=350\text{mA}$ / $\lambda_D=450\text{nm to }460\text{nm}$	1000 units

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## Revision History

Description:	Revision #	Revision Date
New Release of QBHP684U-XXU series	V1.0	01/18/2013
Add binning information / Update spec	V1.1	02/15/2013
Update binning and spec	V1.2	05/31/2013
Update absolute maximum rating	V1.3	08/26/2013
Update Luminous flux (red and green) and soldering pad	V1.4	10/17/2013
Add deep red option (655nm ~ 665nm), QBHP684U-SU	V1.5	10/31/2013
Update deep red spec	V1.6	12/03/2013
Update luminous flux bin	V1.7	04/30/2014

## Disclaimer

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.