

Harvatek Surface Mount CHIP LEDs Data Sheet B3C93RBG-02DZH4001U1930

Official Product	HT Part No. B3C93RBG-02DZH4001U1930			
Tentative Product	*****	*****	*****	
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary	Page 1/16

DISCLAIMER.....3

LIFE SUPPORT POLICY.....3

PRODUCT SPECIFICATIONS4

ATTENTION: ELECTROSTATIC DISCHARGE (ESD) PROTECTION5

LABEL SPECIFICATIONS6

SPECIFICATIONS RANGE7

PRODUCT FEATURES7

ELECTRO-OPTICAL CHARACTERISTICS.....8

PACKAGE OUTLINE DIMENSION AND RECOMMENDED SOLDERING PATTERN FOR REFLOW

SOLDERING.....8

CHARACTERISTICS OF B3C93RBG-.....9

PRECAUTION FOR USE10

PACKAGING11

TAPE DIMENSION.....11

REEL DIMENSION.....12

PACKING.....12

DRY PACK13

BAKING.....13

PRECAUTIONS13

HANDLING OF SILICONE RESIN LEDS.....14

REFLOW SOLDERING15

REWORKING.....15

CLEANING.....15

CAUTIONS OF PICK AND PLACE16

REVISE HISTORY16

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 2/16

DISCLAIMER

HARVATEK reserves the right to make changes without further notice to any products herein to improve reliability, function or design. HARVATEK does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

Life Support Policy

HARVATEK's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of HARVATEK or HARVATEK INTERNATIONAL. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
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.

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 3/16

Product Specifications

Item	Specification	Material	Quantity
Luminous Intensity(Iv)	R: 62 mcd (Typical Value) B: 33 mcd (Typical Value) G:182 mcd (Typical Value) R/B/G@2mA/ T _s = 25°C ;Tolerance: ±10%		
Dominant Wavelength	R: 622 nm (Typical Value) B: 528 nm (Typical Value) G: 468 nm (Typical Value) R/B/G@2mA/ T _s = 25°C ;Tolerance: ±1.0nm		
Forward Voltage	R: 2.4 V (Maximum Value) B: 2.8 V (Maximum Value) G: 2.8 V (Maximum Value) R/B/G@2mA/ T _s = 25°C ;Tolerance:±0.1V		
I _r	R: ≤5μA B: ≤2μA G: ≤2μA R@10V B/G@5V / T _s = 25°C ;Tolerance:±0.05μA		
Resin	Diffused	Epoxy	
Carrier tape	EIA 481-1A specs	Conductive black tape	4000pcs/reel
Reel	EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	250x230mm	Aluminum laminated bag/ no-zipper	One reel per bag
Carton	HT standard	Paper	Non-specified

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 4/16

Others:

Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of I_v , λ_D and V_f . Each reel has a label identifying its specification; the immediate box consists of a product label as well.

Note :This is shipped test conditions

※Remarks: This product should be operated in forward bias. If a reverse voltage is continuously applied to the product, such operation can cause migration resulting in LED damage.

ATTENTION: Electrostatic Discharge (ESD) protection

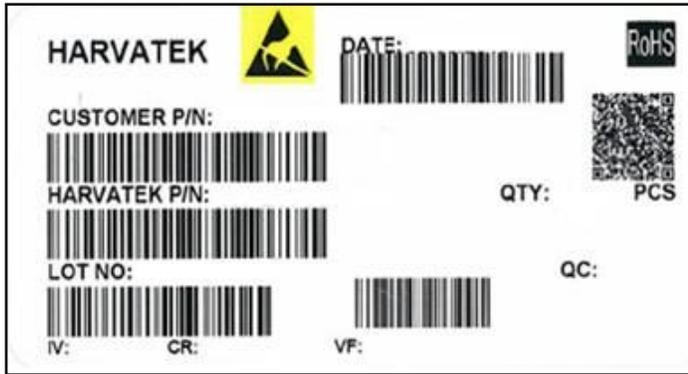


The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlGaInP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 5/16

Label Specifications



Harvatek P/N:

B 3C9 3 RBG- 02D- ZH40 01 U1930

Product	Package size	Dice Q'ty	Color	Current	Series Number	Taping	Customer Code
PCB	0.95(L) x 0.95(W) x 0.25(H) mm	3 : Tri.	RBG(Full color)	R/G/B : 2mA	X001~XZZZ	1.Taping style 2. Q'ty	X0001~XZZZZ

Lot No.:

1	2	3	4	5	6	7	8	9	10
E	1	A	1	A	2	2	L	1	2
Code 1 2		Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10
		Mfg. Year	Mfg. Month	Mfg. Date	Consecutive number		Special code		
Internal Tracing Code		2020-L 2021-M 2022-P 2023-Q ... 2026-T 2027-V ... 2030-Y 2031-Z ...	1:Jan. 2:Feb. ... A:Oct. B:Nov. C:Dec.	1:A 2:B 3:C ... 26:Z 27:7 28:8 29:9 30:3 31:4	01~ZZ		000~ZZZ		

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 6/16

Specifications Range

■ Luminous Intensity (Iv) Bin:

HT-B3C93RBG Series								
IV								
Red			Green			Blue		
M	18	28.5	R	112.5	180	M	18	28.5
N	28.5	45	S	180	285	N	28.5	45
P	45	71.5				P	45	71.5
Q	71.5	112.5				Q	71.5	112.5
R	112.5	180						

Note: It maintains a tolerance of $\pm 10\%$ on Luminous Intensity

■ Dominant Wavelength (Wd) Bin:

HT-B3C93RBG Series								
WD								
Red			Green			Blue		
RH2	618	623	GH0	524	528	BH1	464	468
RH3	623	628	GH2	528	532	BH2	468	472
RH4	628	633	GH4	532	536	BH3	472	476

Note: It maintains a tolerance of $\pm 0.5\text{nm}$ on Color Bin

■ Forward Voltage (Vf) Bin:

HT-B3C93RBG Series								
Vf								
Red			Green			Blue		
E18	1.6	2.4	F27	2.1	2.8	F27	2.1	2.8

Note: It maintains a tolerance of $\pm 0.05\text{V}$ on forward voltage measurements

Official Product	HT Part No. B3C93RBG-02DZH4001U1930							
Tentative Product	*****			*****			*****	
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.						06/21/2022	Preliminary	Page 7/16

Product Features

Electro-Optical Characteristics

(T_{Soldering} 25 °C)

Code for parts	Lighting Color	Material	Forward Voltage (V)		Dominant Wavelength /Chromaticity Coordinate TYP. nm / CIE (X,Y)	Iv (mcd) Typ.	IF (mA)	Viewing Angle $2\theta \frac{1}{2}$
			typ.	Max				
B3C93RBG-02	Red	AlGaNInP	1.6	2.4	622	65	02	120
B3C93RBG-02	Blue	InGaN	2.4	2.8	469	35		
B3C93RBG-02	Green	InGaN	2.4	2.8	528	180		

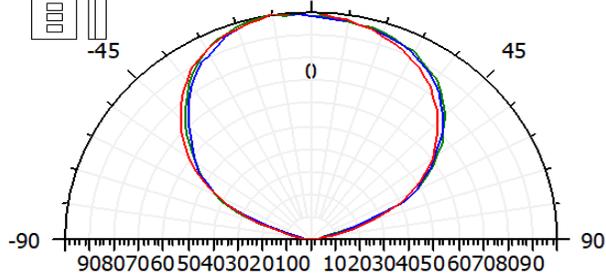
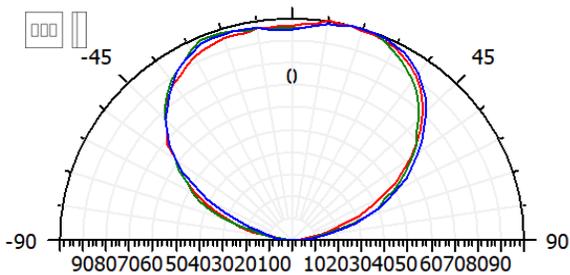
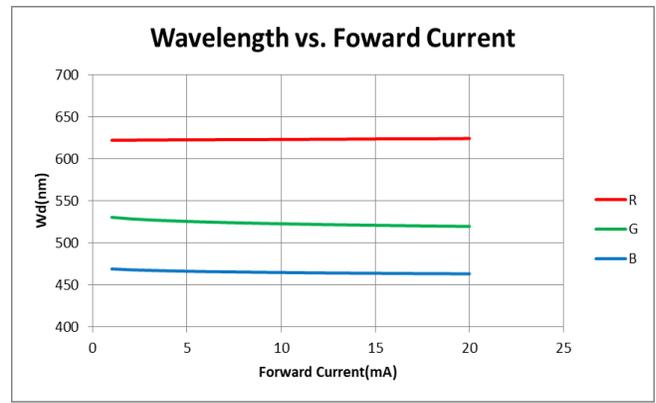
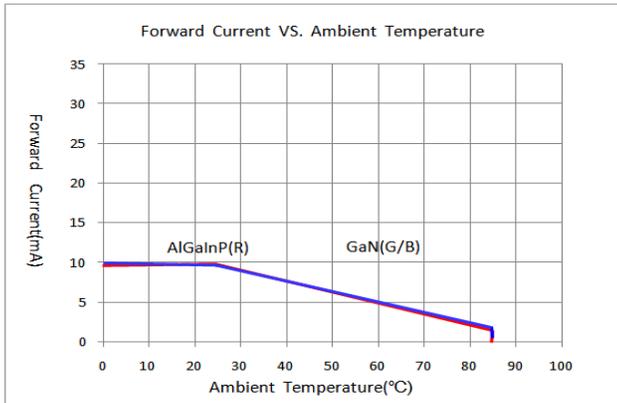
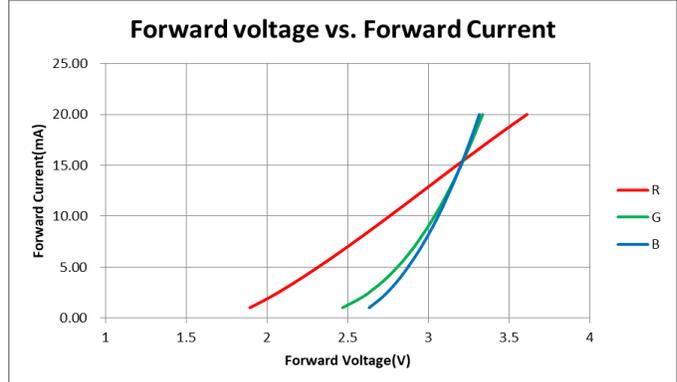
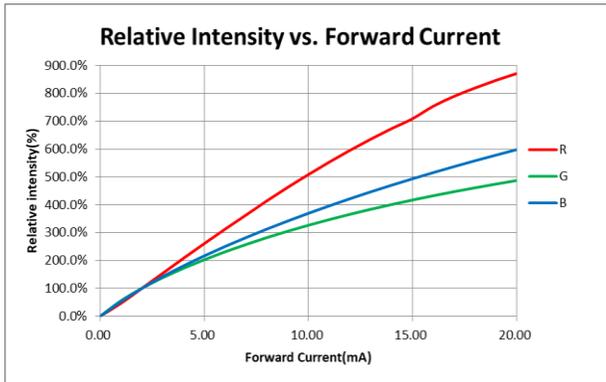
Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

(Unit :mm Tolerance: +/-0.1)

Outline Dim.	Suggest Soldering Pattern
<p>The technical drawings show the package dimensions and internal structure. The top view shows a square package with a side length of 0.95 mm. The pins are labeled Pin1 (Common Anode), Pin2, Pin3, and Pin4. The side view shows a height of 0.25 mm (0.10 mm for the resin) and a width of 0.275 mm. The soldering pattern shows four pads, each 0.40 mm wide and 0.40 mm high, arranged in a 2x2 grid.</p>	<p>The suggested soldering pattern shows four pads, each 0.40 mm wide and 0.40 mm high, arranged in a 2x2 grid. The pads are connected to the pins R, B, G, and Pin1.</p>
<p>Soldering terminals may shift in the x, y direction.</p>	

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.	06/21/2022	Preliminary	Page 8/16

Characteristics of T3AC4WBGR



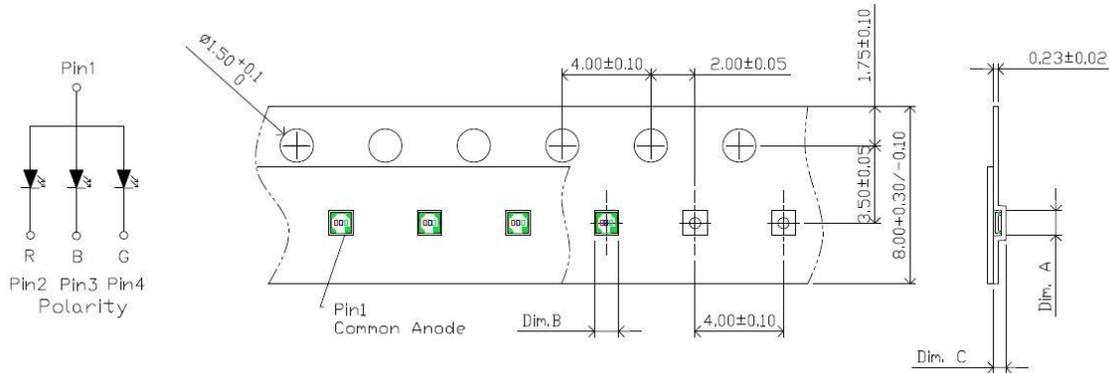
Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 9/16

Precaution for Use

1. The chips should not be used directly in any type of fluid such as water, oil, organic solvent, etc.
2. When the LEDs are illuminating, the maximum ambient temperature should be first considered before operation.
3. LEDs must be stored in a clean environment. A sealed container with a nitrogen atmosphere is necessary if the storage period is over 3 months after shipping.
4. The LEDs must be used within 4weeks after unpacked. Unused products must be repacked in an anti-electrostatic package, folded to close any opening and then stored in a dry and cool space.
5. The appearance and specifications of the products may be modified for improvement without further notice.
6. The LEDs are sensitive to the static electricity and surge. It is strongly recommended to use a grounded wrist band and anti-electrostatic glove when handling the LEDs. If a voltage over the absolute maximum rating is applied to LEDs, it will damage LEDs. Damaged LEDs will show some abnormal characteristics such as remarkable increase of leak current, lower turn-on voltage and getting unlit at low current.

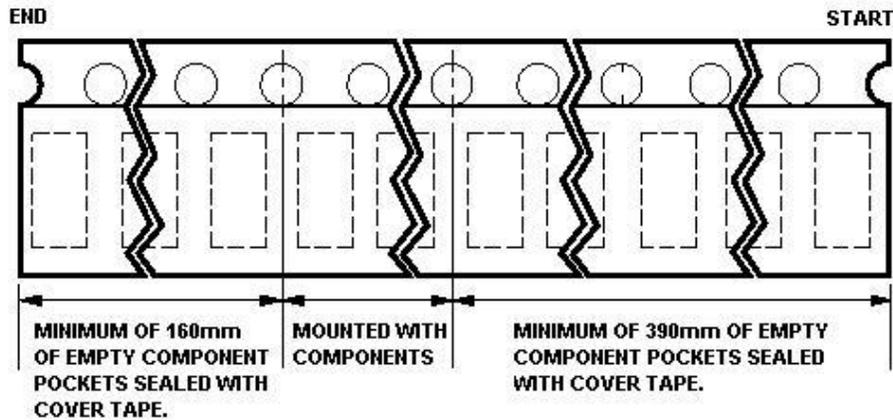
Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 10/16

Packaging Tape Dimension



Dim. A	Dim. B	Dim. C	Q'ty/Reel
1.11±0.05	1.11±0.05	0.35±0.05	4K

Unit: mm



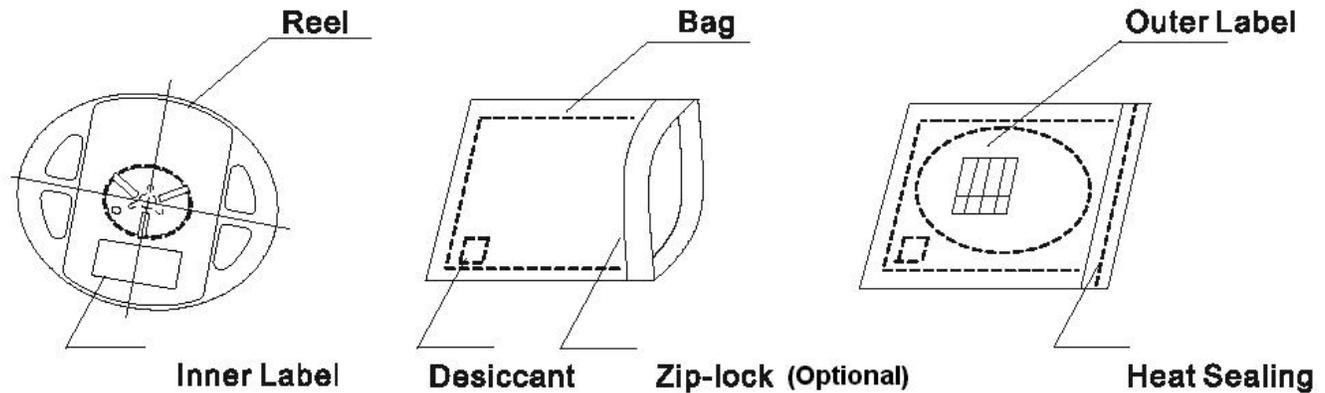
Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 11/16

Dry Pack

All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times during transportation or storage. Every reel is packaged in a moisture protected anti-static bag. Each bag is properly sealed prior to shipment.

A humidity indicator will be included in the moisture protected anti-static bag prior to shipment.

The packaging sequence is as follows:



Baking

Baking before soldering is recommended when the package has been unsealed for 4weeks.

The conditions are as followings:

1. $60\pm 3^{\circ}\text{C} \times (12\sim 24\text{hrs})$ and $<5\%RH$, taped reel type.
2. $100\pm 3^{\circ}\text{C} \times (45\text{min}\sim 1\text{hr})$, bulk type.
3. $130\pm 3^{\circ}\text{C} \times (15\text{min}\sim 30\text{min})$, bulk type.

Precautions

1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlGaInP products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage beyond the specified limit.
4. Avoid operation beyond the limits as specified by the absolute maximum ratings.
5. Avoid direct contact with the surface through which the LED emits light.
6. If possible, assemble the unit in a clean room or dust-free environment.

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 13/16

Handling of Silicone Resin LEDs

Handling Indications

During processing, mechanical stress on the surface should be minimized as much as possible.

Sharp objects of all types should not be used to pierce the sealing compound.



Figure 1

In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.

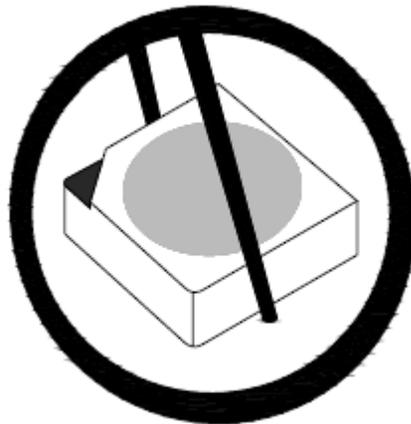


Figure 2

When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented.

This is assured by choosing a pick and place nozzle which is large than LEDs reflector area.

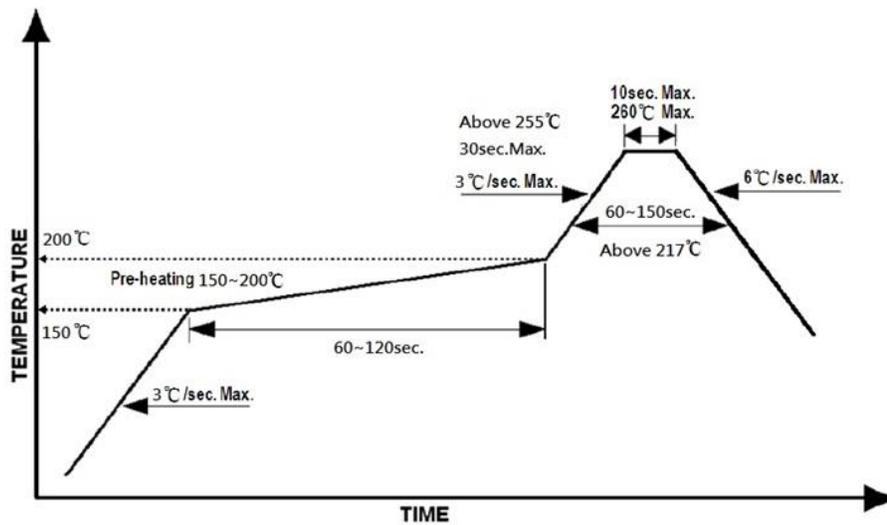
Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 14/16

Reflow Soldering

Recommend soldering paste specifications:

1. Operating temp.: Above 217 °C ,60~150 sec.
2. Peak temp.:260 °CMax.,10sec Max.
3. Reflow soldering should not be done more than two times.
4. Never attempt next process until the component is cooled down to room temperature after reflow.
5. The recommended reflow soldering profile (measured on the surface of the LED terminal) is as following:

Lead-free Solder Profile



Reworking

- Rework should be completed within 5 seconds under 260 °C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

Cleaning

Following are cleaning procedures after soldering:

- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min
- Ultrasonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100 °C max, <3min

Official Product	HT Part No. B3C93RBG-02DZH4001U1930		
Tentative Product	*****	*****	*****
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		06/21/2022	Preliminary Page 15/16

