

## Harvatek Surface Mount CHIP LEDs Data Sheet B3C93RBG-02DZH4001U1930

Official Product	HT Part No. B3C93RBG-02DZH4001U1930			
Tentative Product	*****	*****	*****	
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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.

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## 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 <sub>s</sub> = 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 <sub>s</sub> = 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 <sub>s</sub> = 25°C ;Tolerance:±0.1V		
I <sub>r</sub>	R: ≤5μA B: ≤2μA G: ≤2μA R@10V B/G@5V / T <sub>s</sub> = 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

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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  $I_v$ ,  $\lambda_D$  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**

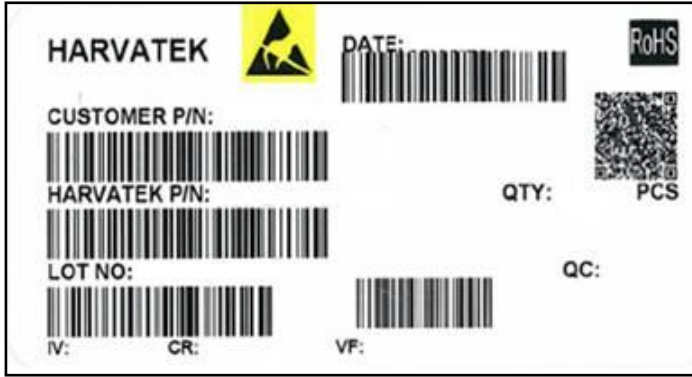


The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlGaInP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD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

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## 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		

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## 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

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Product Features

**Electro-Optical Characteristics**

(T<sub>Soldering</sub> 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**

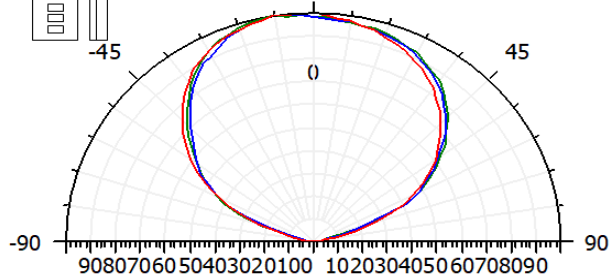
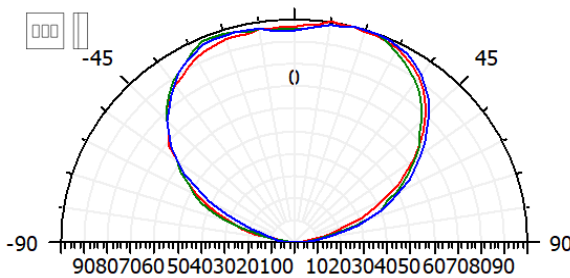
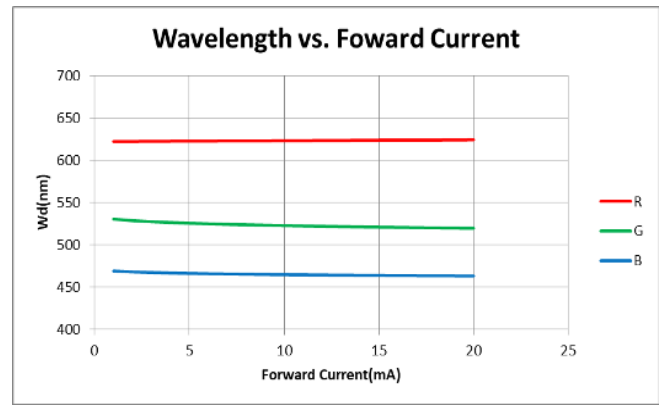
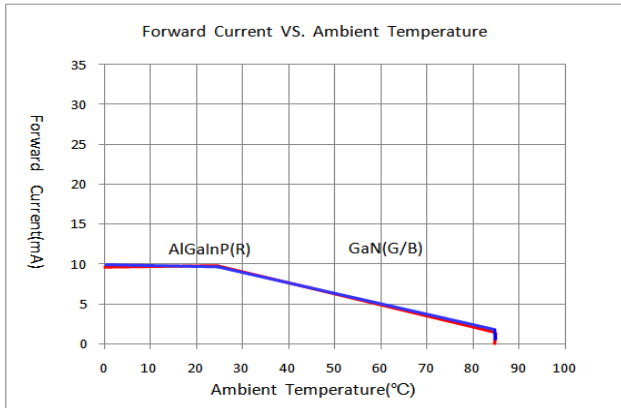
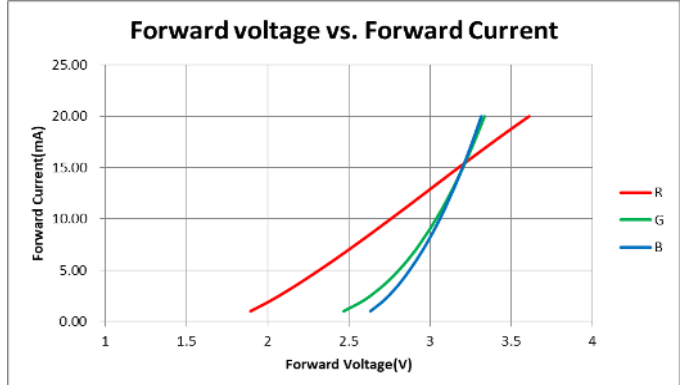
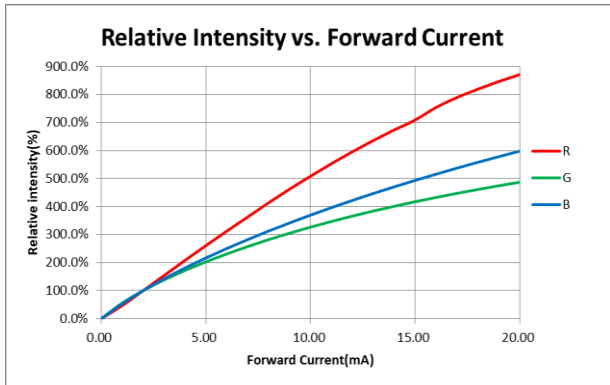
(Unit :mm Tolerance: +/-0.1)

Outline Dim.	Suggest Soldering Pattern
<p>Soldering terminals may shift in the x, y direction.</p>	

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## Characteristics of T3AC4WBGR



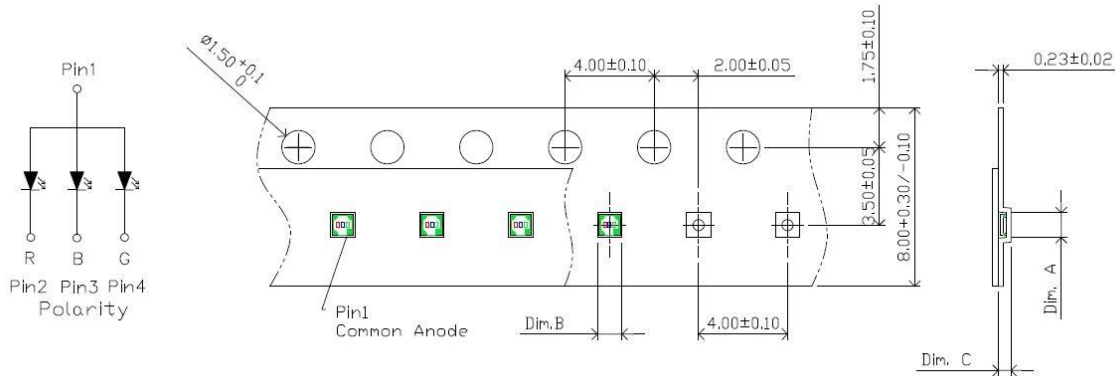
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## Precaution for Use

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.

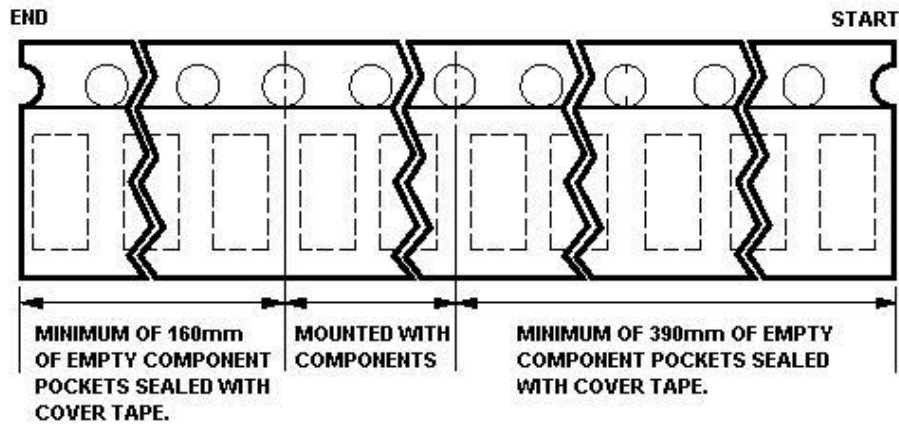
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## Packaging Tape Dimension



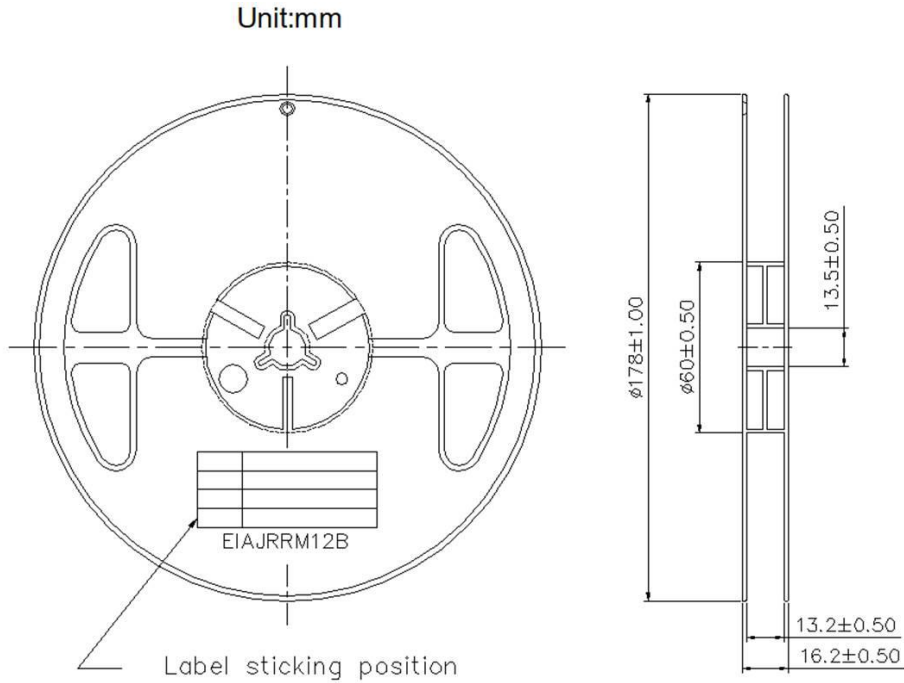
Dim. A	Dim. B	Dim. C	Q'ty/Reel
1.11±0.05	1.11±0.05	0.35±0.05	4K

Unit: mm

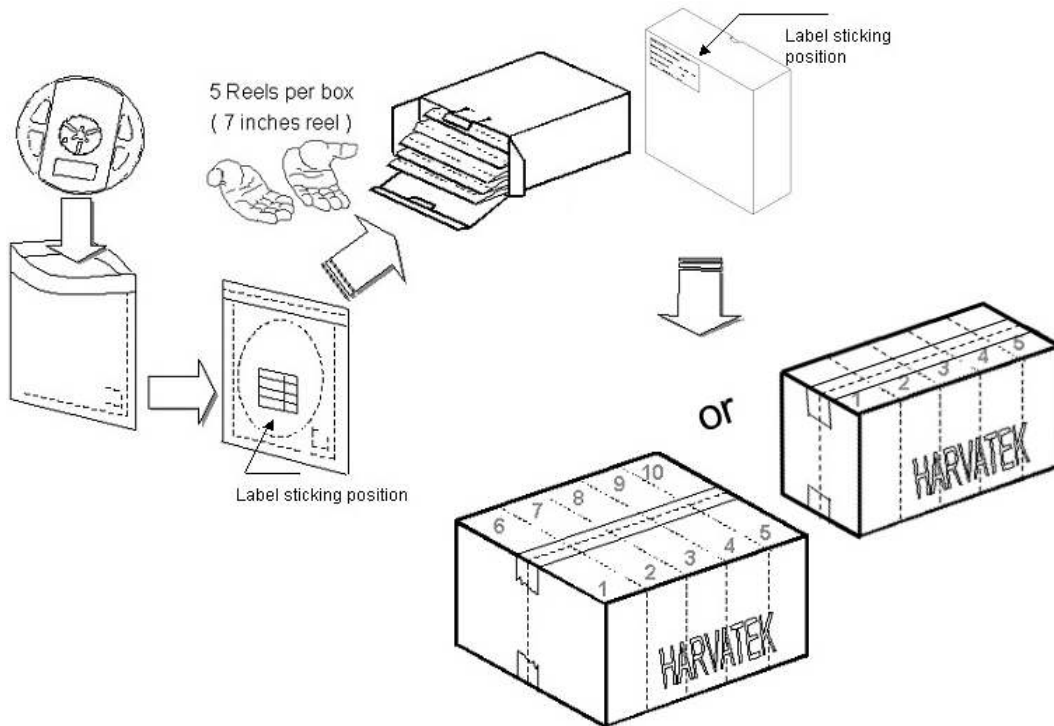


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## Reel Dimension



## Packing



5 or 10 boxes per carton is available depending on shipment quantity.

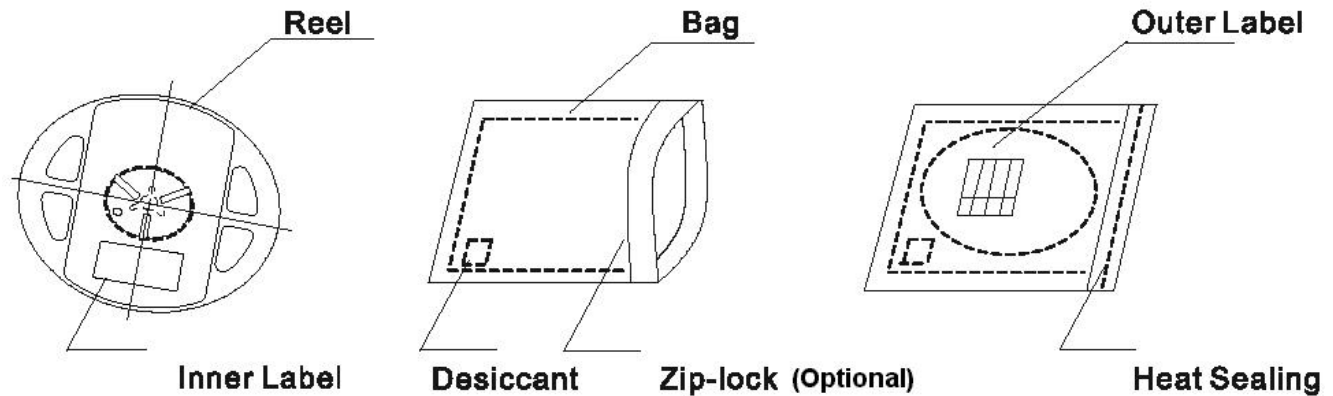
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## Dry Pack

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  $<5\% \text{RH}$ , 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.

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**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.

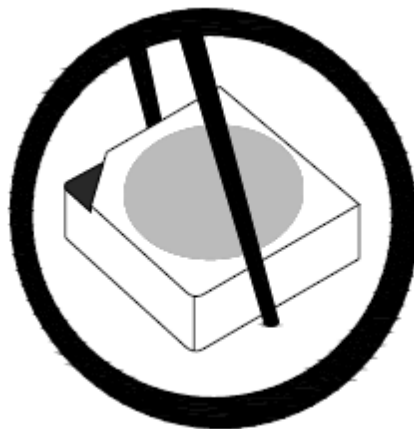


Figure 2

When populating boards in SMT production, there are basically no restrictions regarding the from 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.

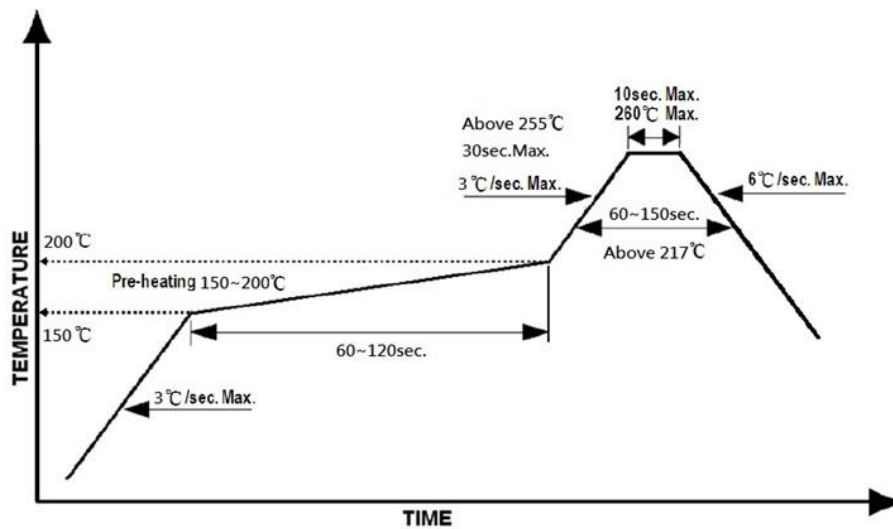
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## Reflow Soldering

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

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