

## Harvatek Surface Mount PLCC LEDs Data Sheet T2133BGR-20C0001U2U1930

Official Product	HT Part No.T2133BGR-20C0001U2U1930		
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.

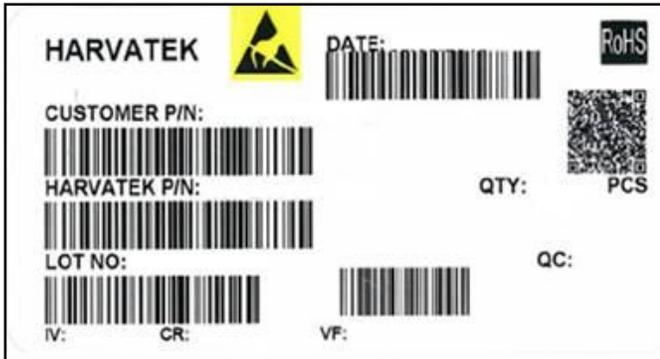
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## Product Specifications

Item	Specification	Material	Quantity
Luminous Intensity (Iv)	B:180-450 mcd @ 20 mA G:1440-2850 mcd @ 20 mA R:285-1125 mcd @ 20 mA T <sub>s</sub> = 25°C;Tolerance: ± 10%		
Dominant Wavelength (Wd)	B:460.0-470.0 nm @ 20 mA G:520.0-530.0 nm @ 20 mA R:615.0-625.0 nm @ 20 mA T <sub>s</sub> = 25°C;Tolerance: ± 0.1nm		
Forward Voltage (Vf)	B:2.7-3.7 V @ 20 mA G:2.7-3.7 V @ 20 mA R:1.6-2.4 V @ 20 mA T <sub>s</sub> = 25°C ;Tolerance: ± 0.05V		
Ir	< 10 μA @ V <sub>R</sub> = 5 V		
ESD	RGB≤2kV@HBM		
Resin	Clear	Silicon	
Carrier tape	EIA 481-1A specs	Conductive black tape	
Reel	EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel per bag
Carton	HT standard	Paper	Non-specified
<p>Others:</p> <p>Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv, λ<sub>D</sub> and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.</p> <p>Note :This is shipped test conditions</p> <p>※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.</p> <p><b>ATTENTION: Electrostatic Discharge (ESD) protection</b></p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;">  </div> <div> <p>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 AlInGaP, GaN, or/and InGaN based chips are <b>STATIC SENSITIVE devices</b>. ESD precaution must be taken during design and assembly.</p> <p>If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.</p> </div> </div>			

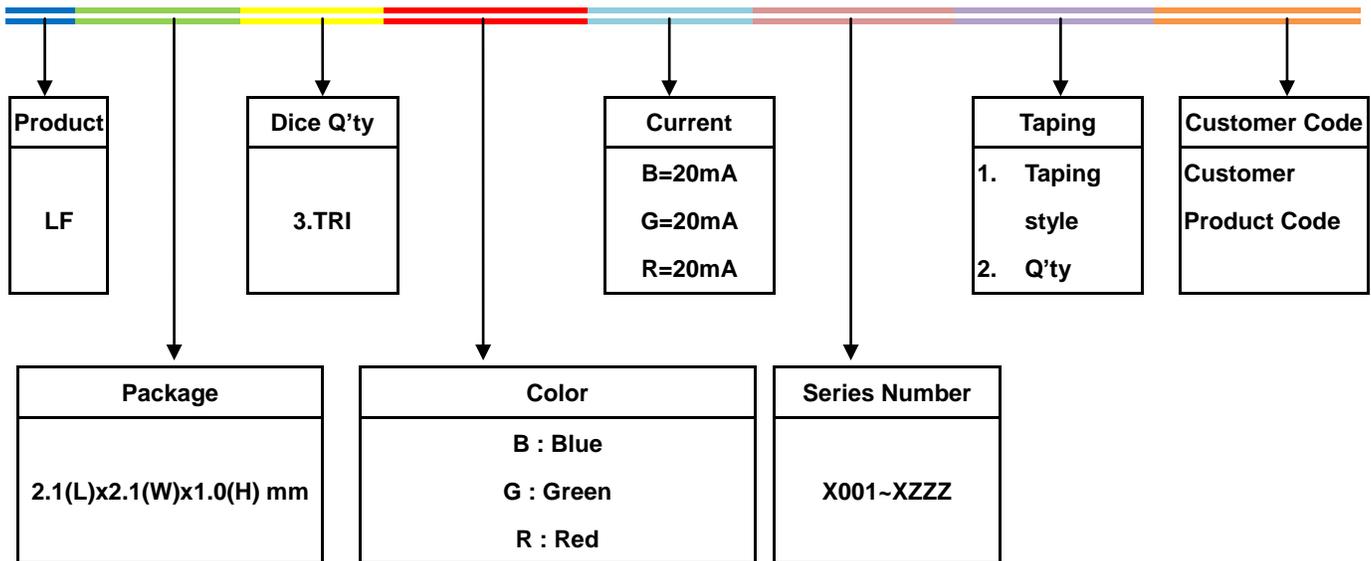
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## Label Specifications



### Harvatek P/N:

**T 213 3 BGR- 20C 0001 U2 U1930**



### 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		2010-A		1:A	01~ZZ		000~ZZZ		
		2011-B		2:B					
		2012-C	1:Jan.	3:C					
		...	2:Feb.	...					
		2018-I/J	...	26:Z					
		2019-K	A:Oct.	27:7					
		...	B:Nov.	28:8					
2022-N	C:Dec.	29:9							
2023-P		30:3							
...		31:4							

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## Specifications Range

### ■ Luminous Intensity (Iv) :

Color	Bin Code	Min	Max	Unit
B	S	180	285	mcd
	T	285	360	
	U	360	450	
G	AA	1440	1800	
	AB	1800	2250	
	AC	2250	2850	
R	AT	285	450	
	AU	450	715	
	AV	715	1125	

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

### ■ Dominant Wavelength (Wd) :

Color	Bin Code	Min	Max	Unit
B	AA	460	465	nm
	BB	465	470	
G	B	520	525	
	C	525	530	
R	A	615	620	
	B	620	625	

Note: It maintains a tolerance of  $Wd \pm 1.0$  nm

### ■ Forward Voltage (Vf) :

Color	Bin Code	Min	Max	Unit
B	G4A	2.7	3.7	V
G	G4A	2.7	3.7	
R	E18	1.6	2.4	

Note: It maintains a tolerance of  $\pm 0.1V$  on forward voltage measurements

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## Product Features

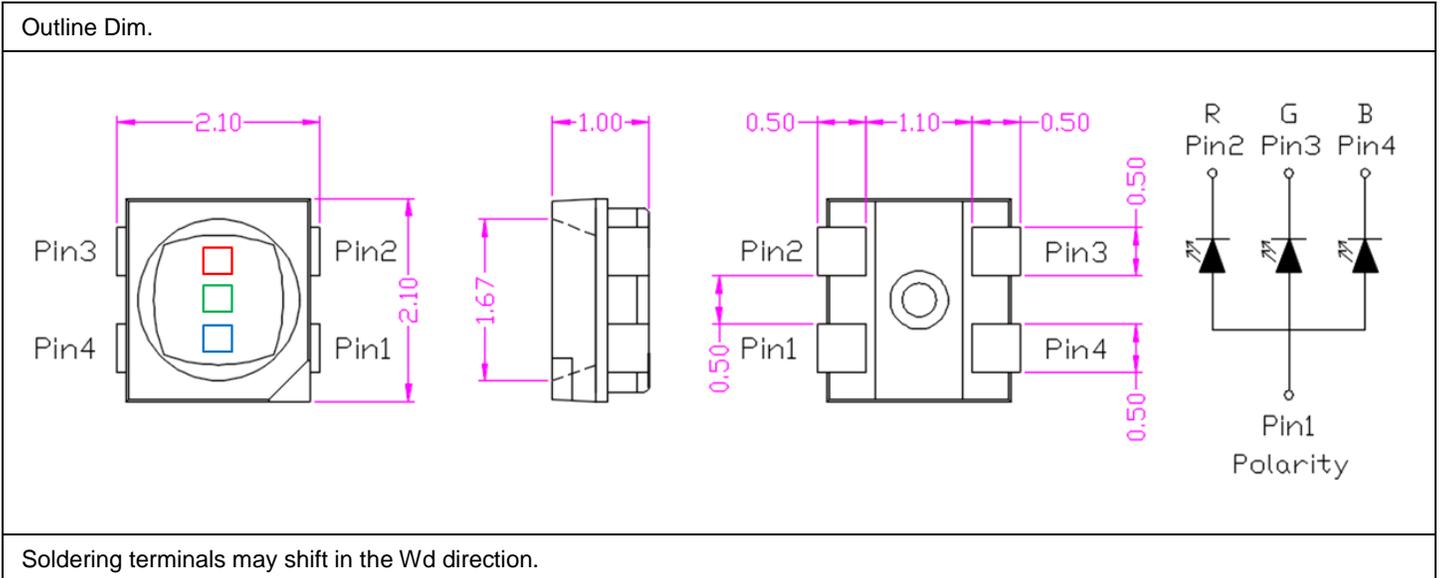
### Electro-Optical Characteristics

(T<sub>Soldering</sub>, 25 °C)

Series	Emitting Color	Material	V <sub>F</sub> (V)		Wavelength λd(nm)		I <sub>V</sub> (mcd)	Viewing
			Min.	Max.	Min.	Max.	Typical	Angle $2\theta \frac{1}{2}$
T2133BGR	B	InGaN	2.7	3.7	460	470	300	120
	G	InGaN	2.7	3.7	520	530	1850	120
	R	AlGaInP	1.6	2.4	615	625	600	120

### Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

(Unit:mm Tolerance: +/-0.1)



### Absolute Maximum Ratings

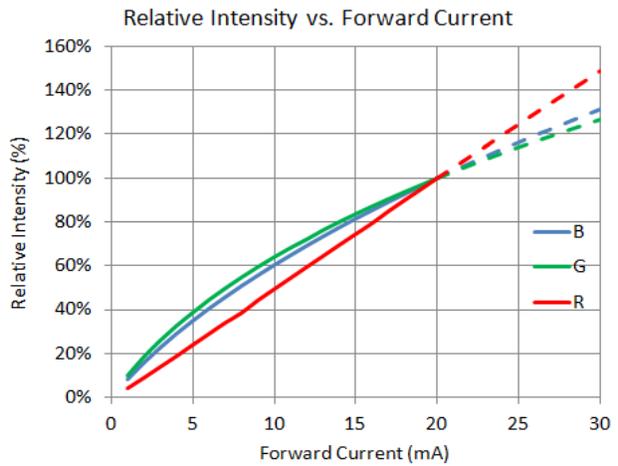
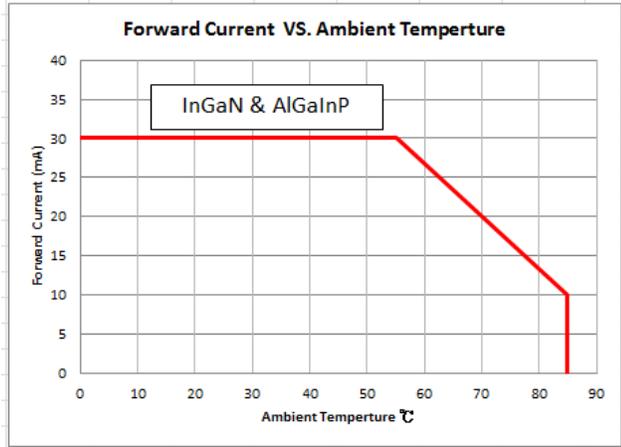
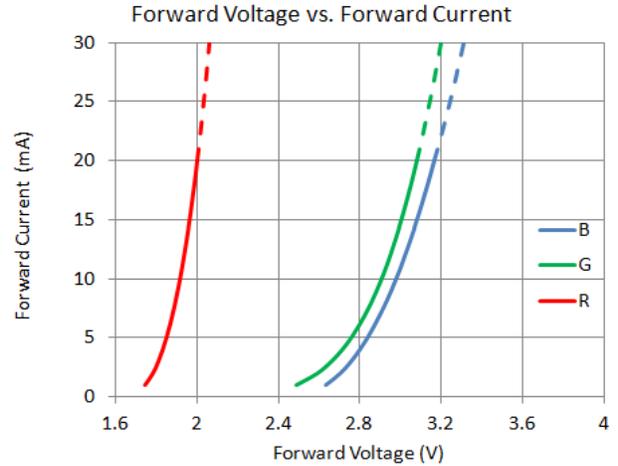
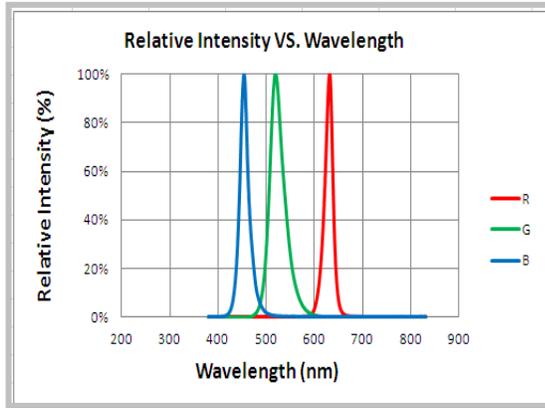
(T<sub>Soldering</sub> 25 °C)

Series	P <sub>D</sub> (mW)	I <sub>F</sub> (mA)	I <sub>FP</sub> (mA)*	T <sub>OP</sub> (°C)	T <sub>ST</sub> (°C)
Color	Power Dissipation	Forward Current	Pulse Forward Current	Operating Temperature	Storage Temperature
Blue/Green	111	30	80	-40~+85	-40~+100
Red	72	30	80		

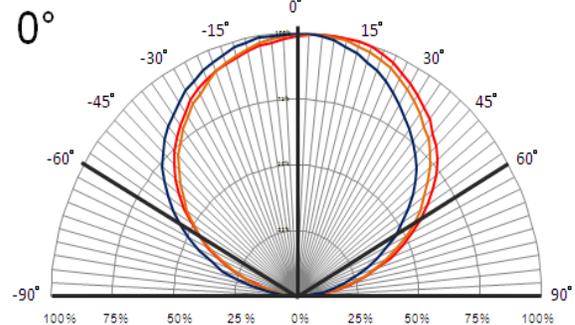
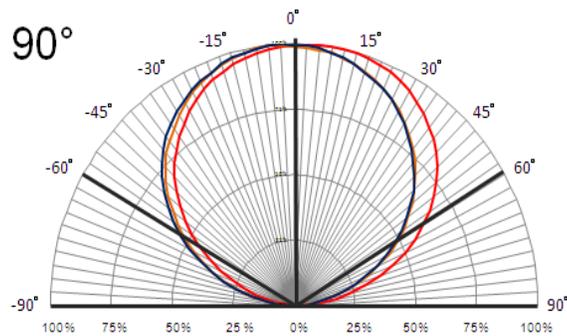
\* Condition for I<sub>FP</sub> is pulse of 1/10 duty and 0.1msec width

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## Characteristics of T2133BGR



### Directive Characteristics



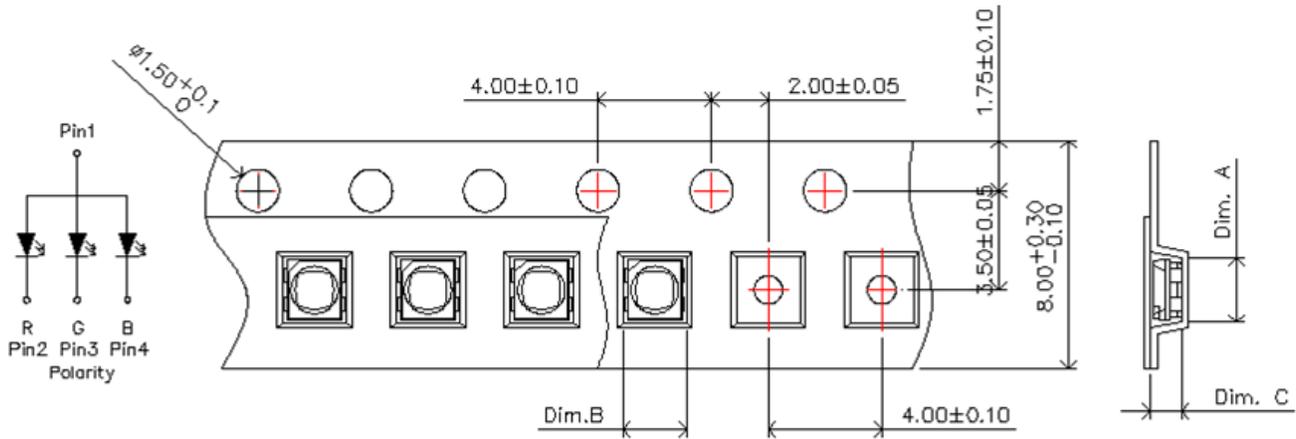
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### Precaution for Use

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 72 hrs 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.

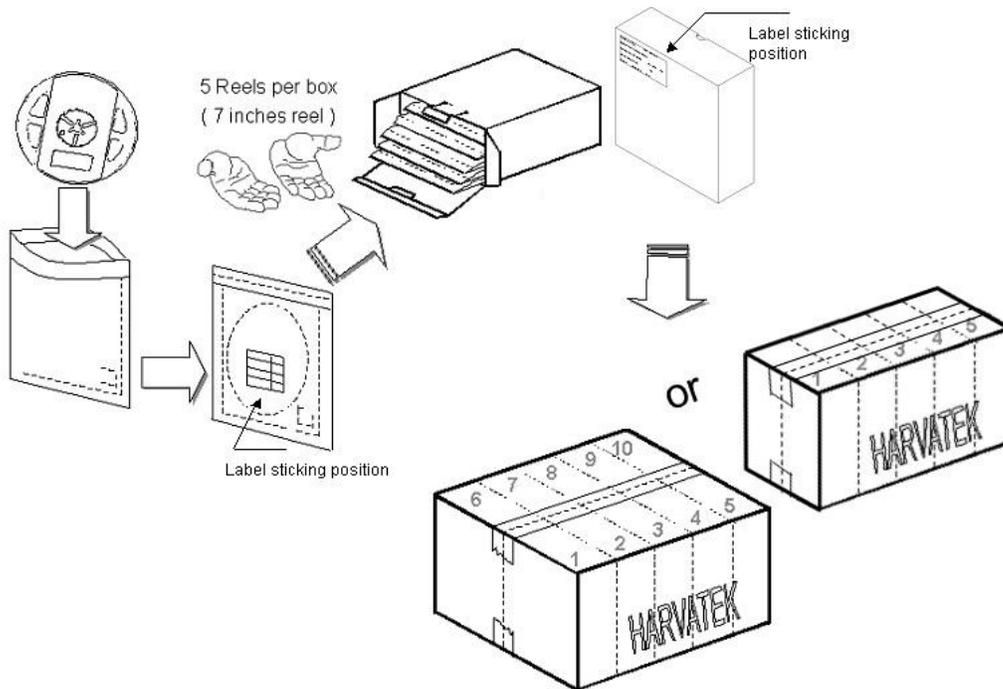
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## Packaging



Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-B33A3	$2.25 \pm 0.10$	$2.32 \pm 0.10$	$1.10 \pm 0.10$	2K

## Packing



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

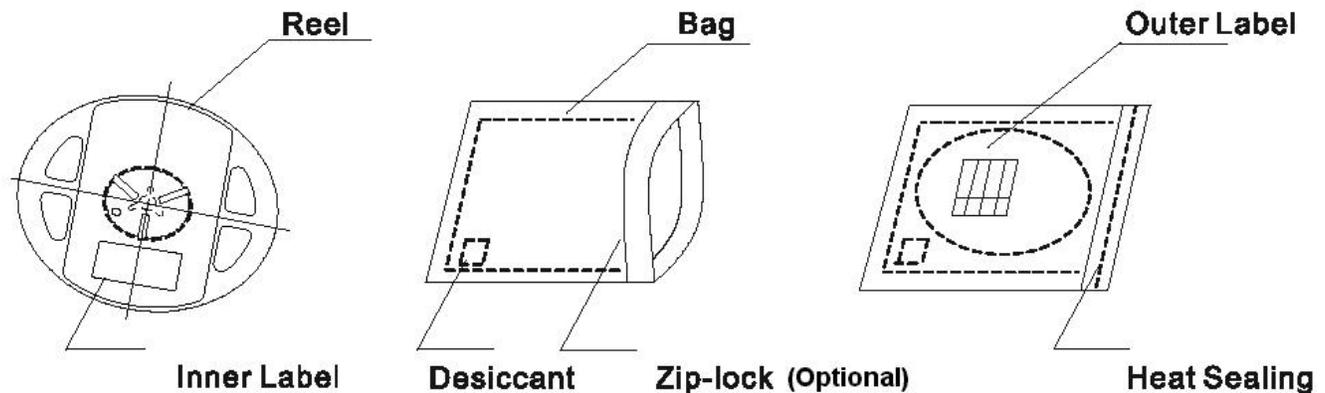
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## Dry Pack

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.

Upon request, 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 72 hrs.

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 AlInGaP 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.

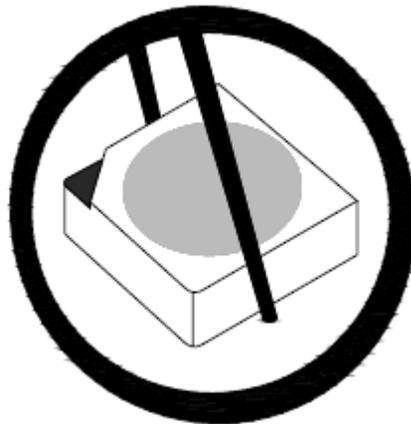


Figure 2

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

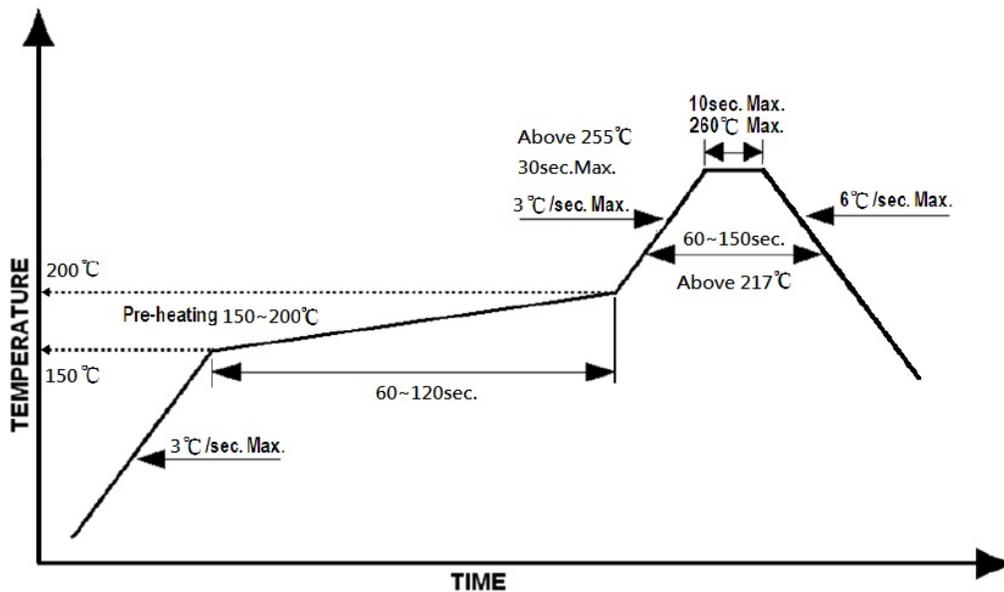
This is assured by choosing a pick and place nozzle which is large than LEDs reflector area.

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## Reflow Soldering

Recommend soldering paste specifications:

1. Operating temp.: Above 217°C ,60~150 sec.
2. Peak temp.:260°C Max.,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:



## 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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