

**Harvatek Surface Mount CHIP LEDs Data Sheet  
C3531IRP-C1C-33D311**

Official Product	HT Part No. C3531IRP-C1C-33D311		
Tentative Product	*****	*****	*****
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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.

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## Product Specifications

Item	Specification	Material	Quantity
Peak Wavelength $\lambda_p$	Typ:850 nm @1A/ $T_s= 25^\circ\text{C}$		
Radiant Intensity $I_e$	Typ:1000 mW 950 mW/sr @1A / $T_s= 25^\circ\text{C}$		
Forward Voltage $V_F$	2.8-3.4 V @1A/ $T_s= 25^\circ\text{C}$ ;Tolerance: $\pm 0.1\text{V}$		
Reverse Current $I_R$	< 10 $\mu\text{A}$ @ $V_R = 5 \text{ V}$		
Resin	Clear	Silicone	
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

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 AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

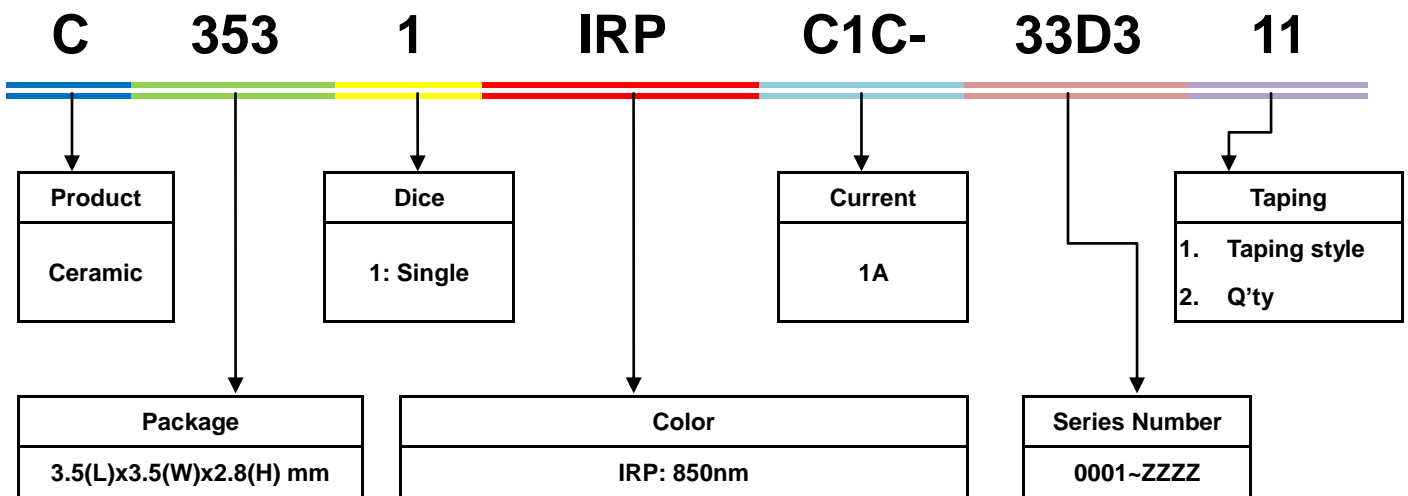
If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

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## Label Specifications



### ■ Harvatek P/N:



### ■ 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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## Absolute Maximum Rating at 25°C

Symbol	Parameters	Ratings	Units	Notes
$I_F$	Forward Current	1000	mA	
$I_{FP}$	Peak Forward Current	1000	mA	1
$V_R$	Reverse Voltage	5	V	
$T_{opr}$	Operating Temperature	-40 ~ +85	°C	
$T_{stg}$	Storage Temperature	-40 ~ +100	°C	
$T_{sol}$	Soldering Temperature	260	°C	2

### Notes:

- $I_{FP}$  Conditions--Pulse Width  $\leq 100\mu s$  and Duty  $\leq 1\%$ .
- Soldering time  $\leq 5$  seconds.

## Electro-Optical Characteristics

Symbol	Parameters	Test conditions	Min	Typ	Max	Units	Notes
$I_e$	Radiant Intensity	$I_F=1A$	900	1000	1100	mW	3
$I_e$	Radiant Intensity	$I_F=1A$	800	950	1000	mW/sr	4
$\lambda_P$	Peak Wavelength	$I_F=1A$	-	850	-	nm	
$\Delta\lambda$	Spectral bandwidth at 50% of $I_{max}$	$I_F=1A$		50	-	nm	
$V_F$	Forward Voltage	$I_F=1A$	2.8	-	3.4	V	5
$I_R$	Reverse Current	$V_R=5V$	-	-	10	$\mu A$	
$2\theta_{1/2}$	Angle of Half Intensity (X)	$I_F=20mA$	-	60	-	deg	

### Notes:

- Radiant Intensity (mW) Bin:

Color	Bin Code	Spec. Range
IRP	RP	900-1000 mW
	RQ	1000-1100 mW

- Radiant Intensity (mW/sr) Bin:

Color	Bin Code	Spec. Range
IRP	RN	800-900 mW/sr
	RP	900-1000 mW/sr

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**Notes:**

5. Forward Voltage (V<sub>F</sub>) Bin:

Color	Bin Code	Spec. Range
IRP	H1	2.8-2.9 V
	H2	2.9-3.0 V
	H3	3.0-3.1 V
	H4	3.1-3.2 V
	J1	3.2-3.3 V
	J2	3.3-3.4 V
	H3	3.1-3.2 V

(It maintains a tolerance of ±0.1V on forward voltage measurements)

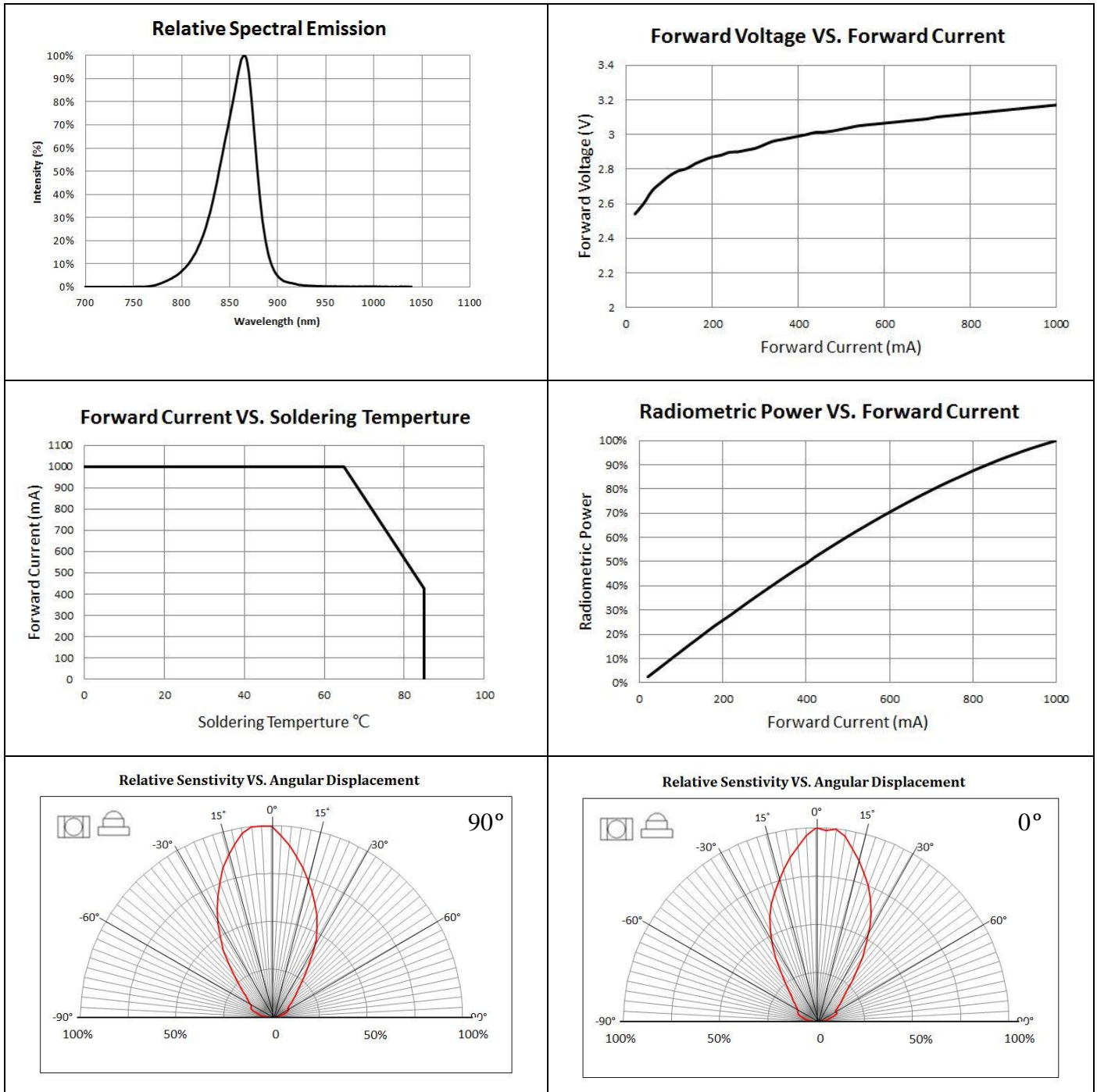
**Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering**

(Unit:mm Tolerance: +/-0.1)

Outline Dim.	Soldering Pattern				
<p style="text-align: center;">Electrical Test Point:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>1+</td> <td>2-</td> </tr> <tr> <td>a+</td> <td>b+</td> </tr> </table> <p style="margin-left: 20px;">X = Open O = Short</p>	1+	2-	a+	b+	
1+	2-				
a+	b+				
Soldering terminals may shift in the x, y direction.					

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## Characteristics of C3531IRP



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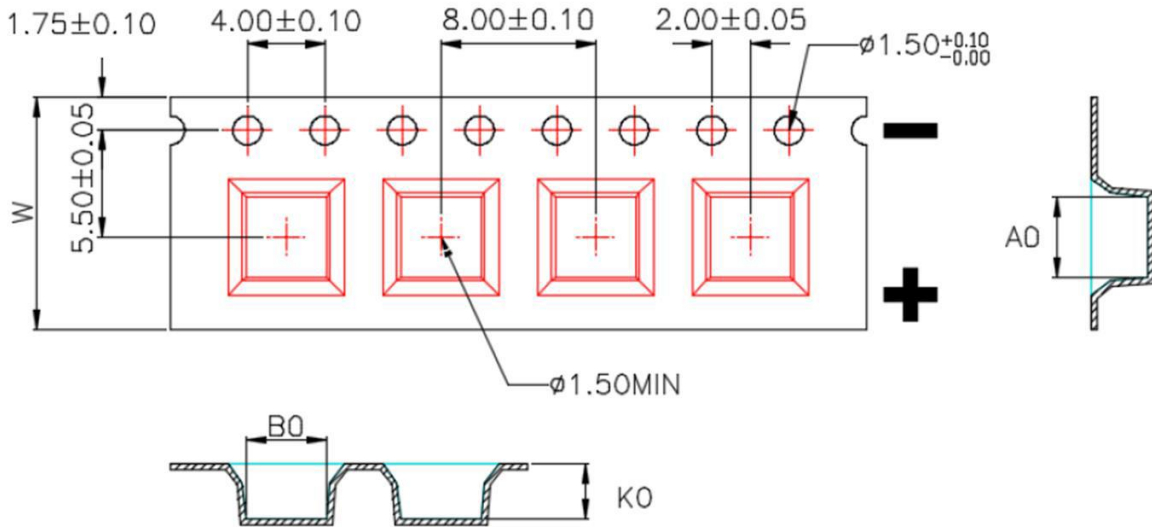


### Precaution for Use

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 4 weeks 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.

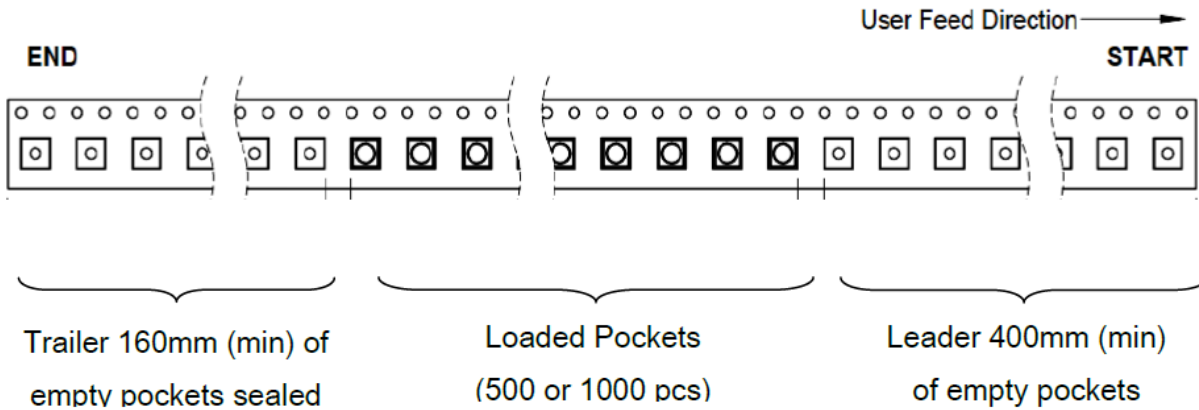
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## Packaging Tape Dimension



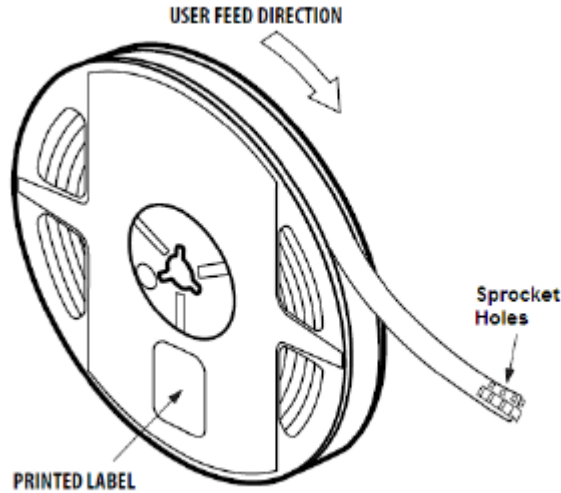
1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.20$ .
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness :  $0.30 \pm 0.05$ mm.
6. Packing length per 22" reel : 62.5 Meters(1:3).
7. Component load per 7" reel : 400~1000 pcs.

W	12.00±0.30
A0	3.70±0.10
B0	3.70±0.10
K0	3.15±0.10

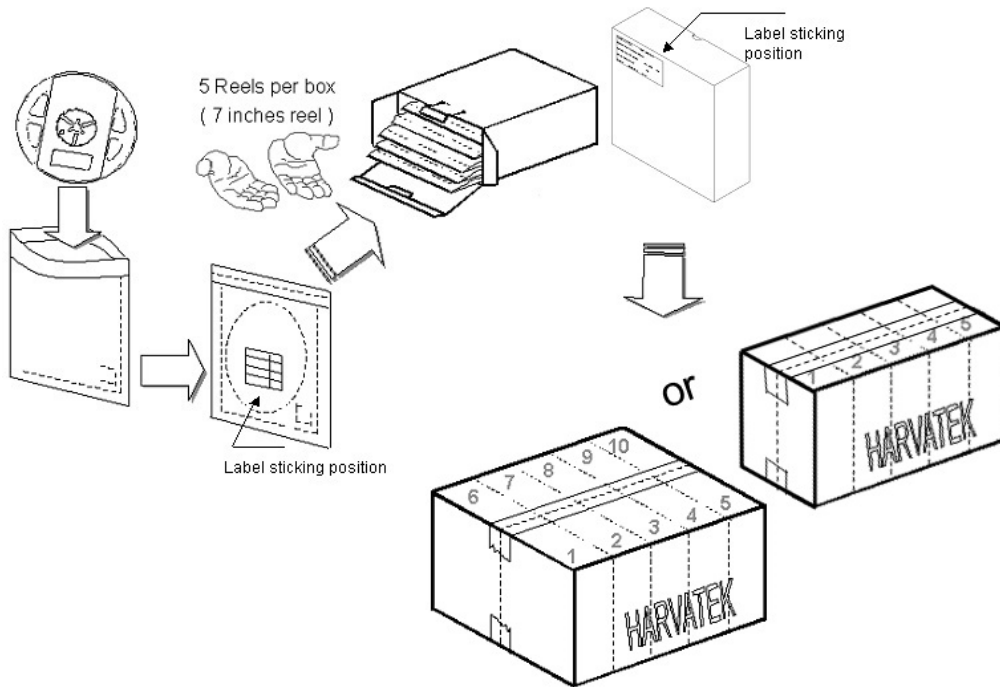


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## Reel Dimension



## Packing



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

## Dry Pack

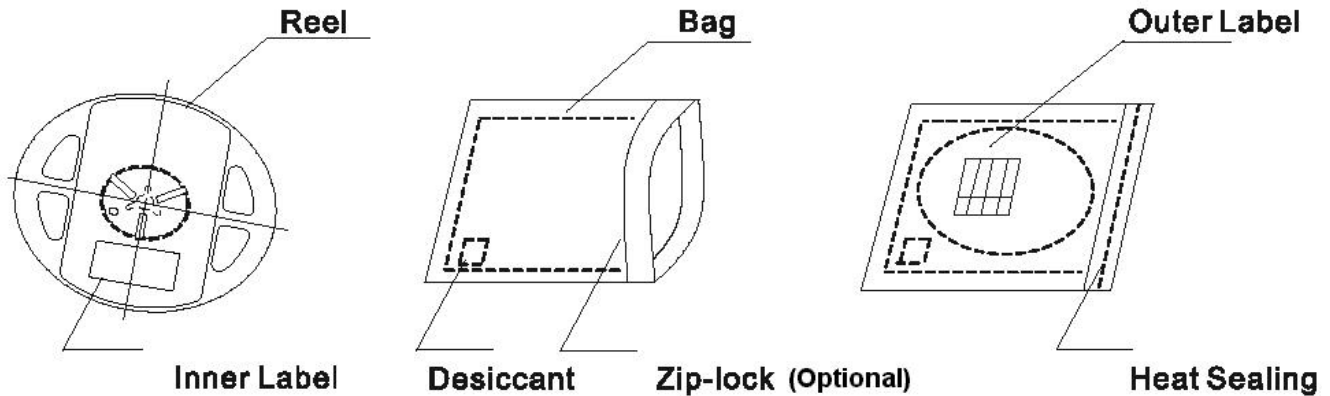
All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times

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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 4 weeks.

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.

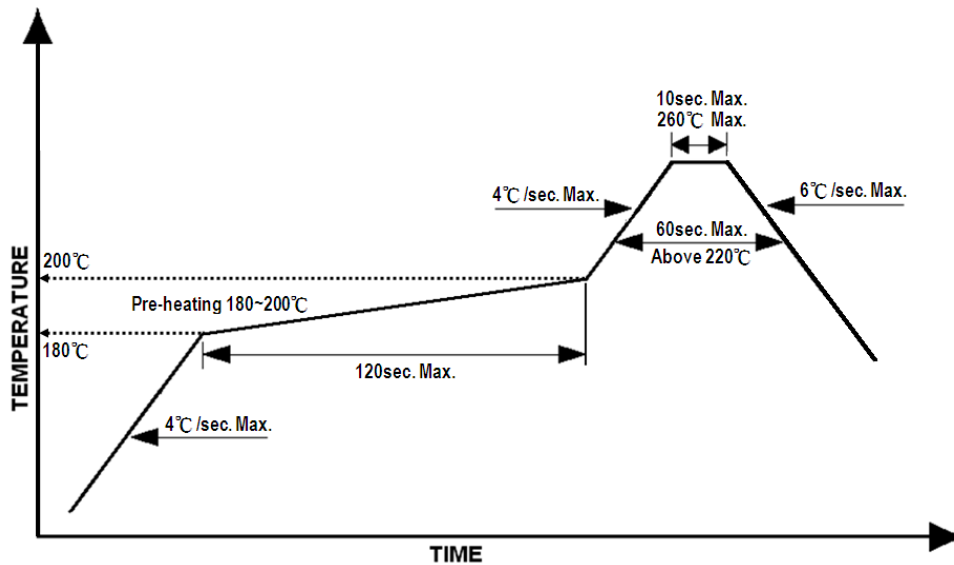
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**Reflow Soldering**

Recommend soldering paste specifications:

1. Operating temp.: Above 220 °C ,60 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:

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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### Cautions of Pick and Place

- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electric-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.

### Revise History

Rev.	Descriptions	Date	Page
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