

**Harvatek Surface Mount LED Data Sheet  
HT-193USD-5590**

Official Product	Product: HT-193USD-5590		Data Sheet No.
Tentative Product	*****		HT-193USD-5590
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**DISCLAIMER**

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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.

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## Product Specifications

Product	Emission Color	Technology	Test Current $I_F$ (mA)	Luminous Intensity $I_V$ (mcd)	Forward Voltage $V_F$ (V)	Orderable Part Number
HT-193USD	Ultra Bright Orange	AllnGaP	20	45 typ.	1.9 typ.	HT-193USD-5590
	Specification	Material			Quantity	
Resin	Defused	Epoxy resin				
Carrier tape	Per EIA 481-1A specs	Conductive black tape			4000pcs per reel	
Reel	Per 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				

### 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.

### 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 AllnGaP, 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.

### Compliance and Certified


ISO9002, QS9000 and ISO14001 Certified

RoHS Compliant



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## Label Specifications

<b>HARVATEK</b>		Date: yyyy/mm/dd 
CUSTOMER P/N: 		
HARVATEK P/N: 	QTY: PCS 	
LOT NO: 		QC
IV BIN: COLOR BIN: VF:		

■ Harvatek P/N:

**H T - 1 9 3    U S D -    5 5 9 0**

Series Name	Emitting Color	Customer Code
<b>HT-193</b> HT: Harvatek 193: 0603 0.4mm series 1.6 (L) x 0.8 (W) x 0.4 (H) mm	USD: Ultra Bright Orange	<b>5590</b> Customer Product Code

Lot No.:

1    2    3    4    5    6    7    8    9    10  
**P 1 2 2 3 0 A - D T**

Code 1	Code 2	Code 3	Code 4, 5	Code 6, 7	Code 9	Code 10
	Mfg. Year	Mfg. Month	Mfg. Date	Lots	Resin Color	Packaging
Internal Tracing Code	Z: 2000 1: 2001 2: 2002 3: 2003 .....	1: Jan. 2: Feb. .... 9: Sep. A: Oct. B: Nov. C: Dec.	1~31/ (30)	01~99, A,B,C...	C: Clear D: Diffused	T: Tape & Reel

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■ **Luminous Intensity (I<sub>v</sub>) Bin:**

Bin	Luminous Intensity Range (mcd)	
	Minimum	Maximum
N	28.5	45.0
P	45.0	71.5
Q	71.5	112.5

@20mA / Ta=25<sup>o</sup> C, Tolerance: ± 10%

■ **Wavelength (λ<sub>D</sub>) Bin:**

Bin	Wavelength Range (nm)	
	Ultra Bright Orange (USD)	
	Max	Min
-	615.0	630.0

@20mA / Ta=25<sup>o</sup> C, Tolerance: ± 0.5nm

■ **Forward Voltage (V<sub>F</sub>) Bin:**

Color	Bin Code	Spec. Range
Ultra Bright Red (USD)	-	2.4 V max

@20mA / Ta=25<sup>o</sup>C, Tolerance: ± 0.05 V

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## Product Characteristics

Absolute Maximum Ratings							
Product	Emission Color	P <sub>d</sub> (mW)	I <sub>F</sub> (mA)	I <sub>FP</sub> * (mA)	V <sub>R</sub> (V)	T <sub>OP</sub> (°C)	T <sub>ST</sub> (°C)
HT-193USD-5590	Ultra Bright Orange	72	30	100	5	-30°C~+80°C	-40°C~+85°C

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

## Electro-Optical Characteristics

(T<sub>a</sub> 25 °C)

Product	Emission Color	I <sub>F</sub> (mA)	V <sub>F</sub> (V)		λ(nm)			I <sub>v</sub> (mcd)	
			typ.	max	λ <sub>D</sub>	λ <sub>P</sub>	Δλ	min	typ.
HT-193USD5590	Ultra Bright Orange	20	1.9	2.4	622	636	17	28.5	45

\* Per NIST standards

## Package Outline Dimension

## Recommended Soldering Pattern for Reflow Soldering

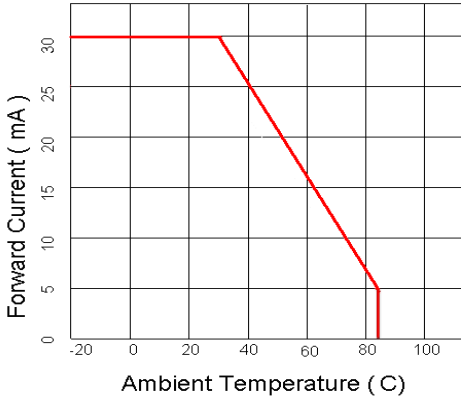
Unit: mm Tolerance: +/-0.1

Outline Dimension	Solder Pattern
<p>Polarity reference for cathode mark is reversed for UR.</p>	
Soldering terminals may shift in the x, y direction.	Unit: mm

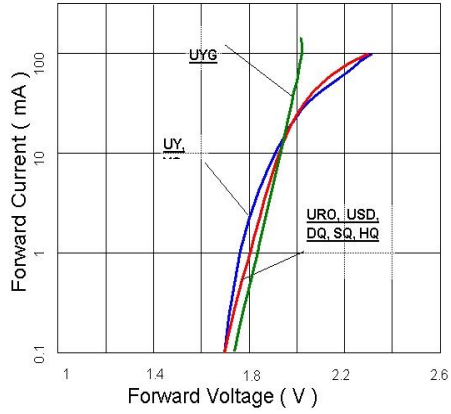
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## Characteristic Curves for USD

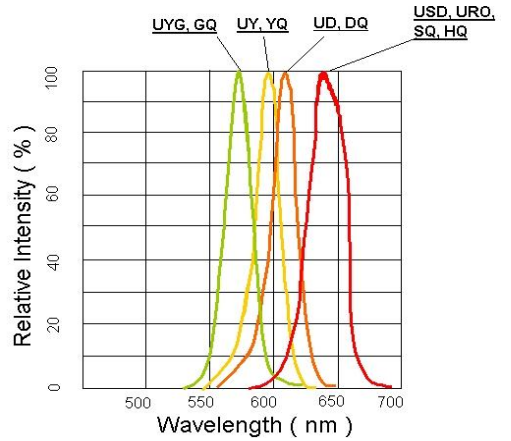
Forward Current vs. Ambient Temperature



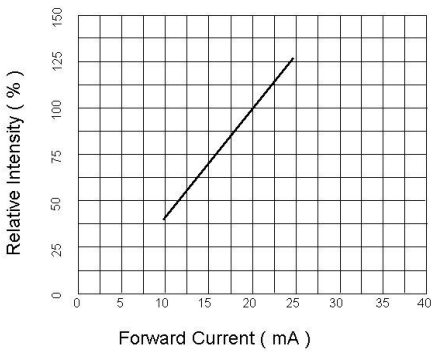
Forward Voltage vs. Forward Current



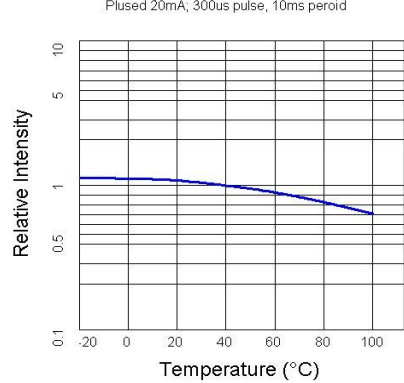
Relative Intensity vs. Wavelength



Relative Intensity vs. Forward Current

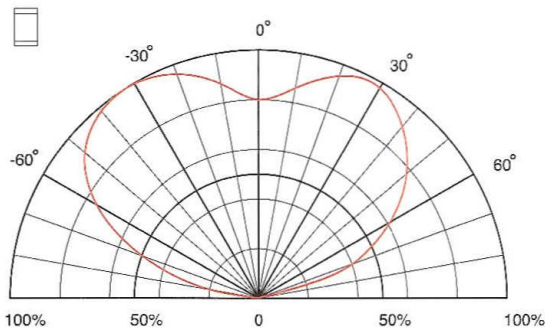


Relative Intensity vs. Ambient Temperature

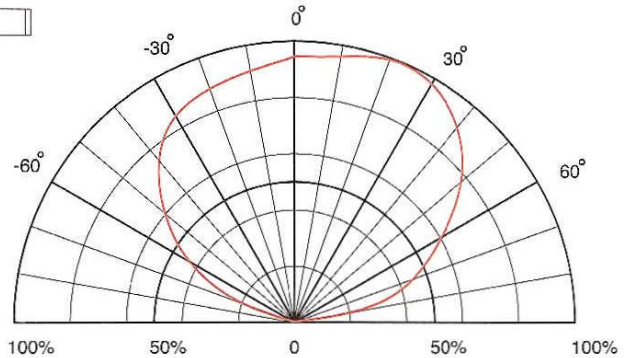


## Characteristic Curves for All Colors (Radiation Pattern)

Directive Characteristics



Directive Characteristics

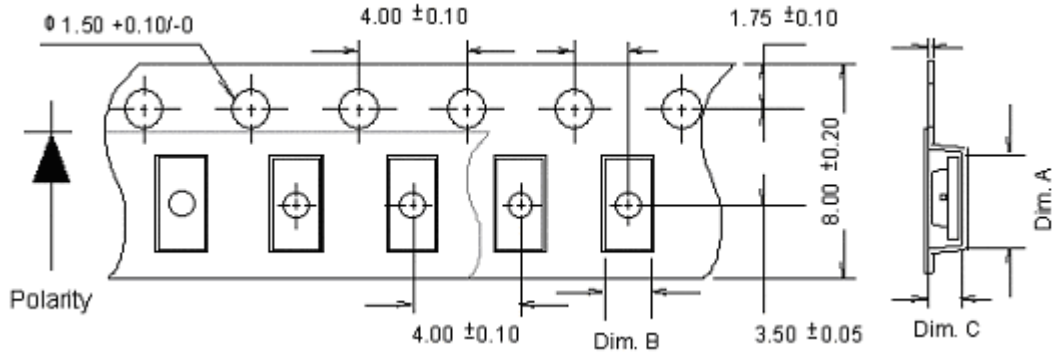


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## Packaging

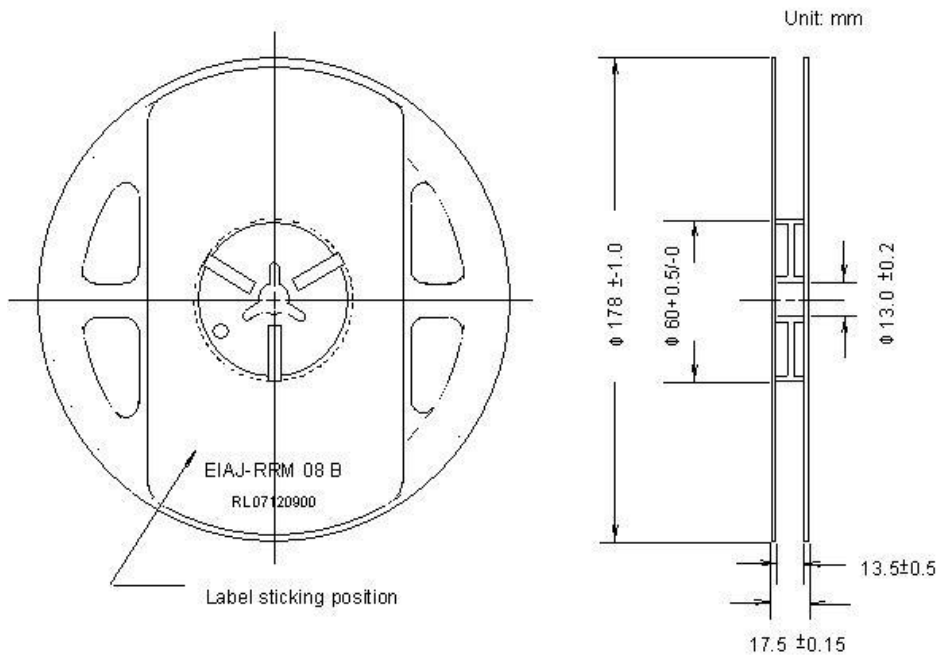
### Tape Dimension



Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-193USD-5590	1.80±0.10	0.95±0.10	0.60±0.10	4K

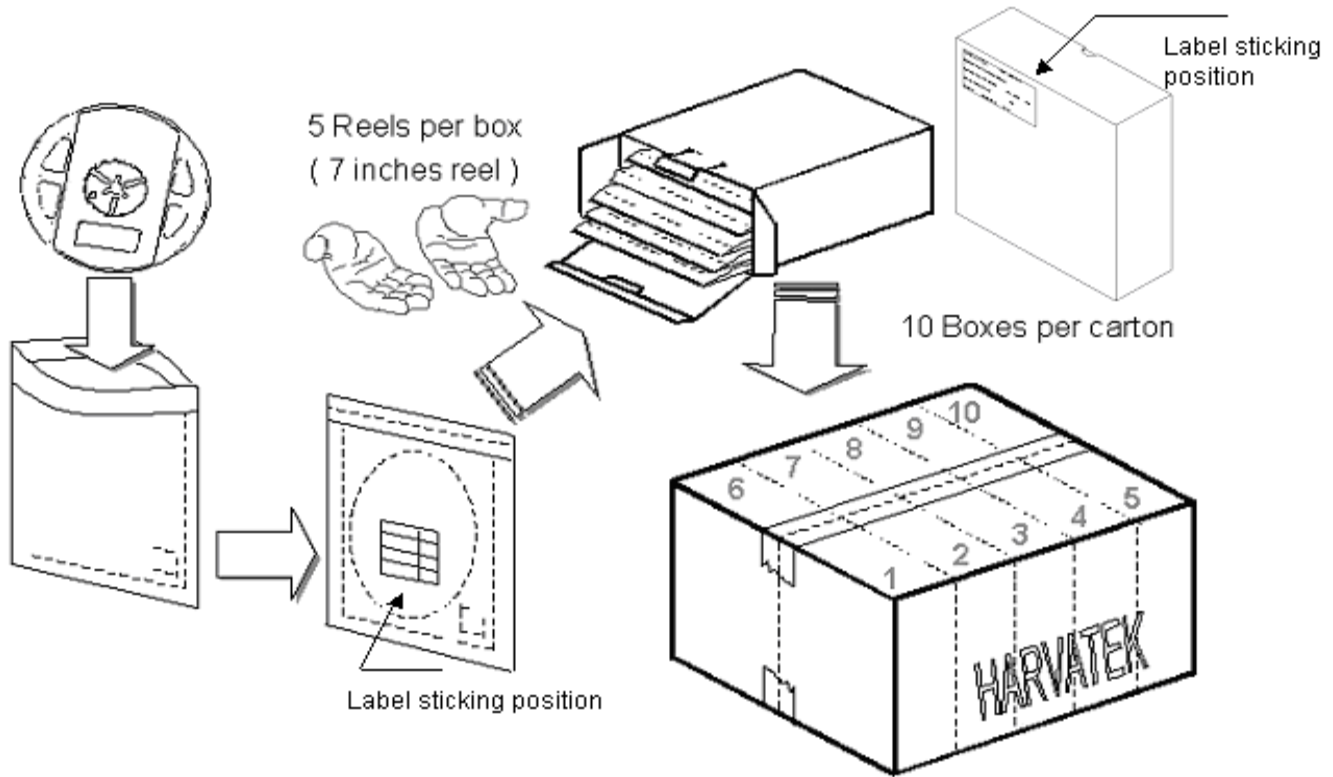
Unit: mm

### Reel Dimension



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## Packing



5 boxes per carton is available depending on shipment quantity.

	Specification	Material	Quantity
Carrier tape	Per EIA 481-1A specs	Conductive black tape	4000pcs per reel
Reel	Per 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 Iv,  $\lambda_D$  and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

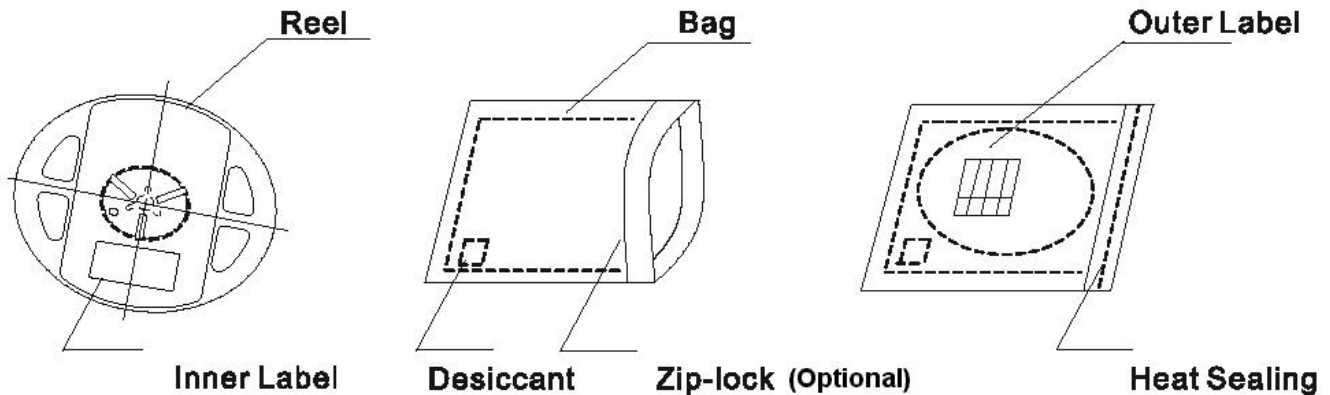
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## Dry Pack

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:

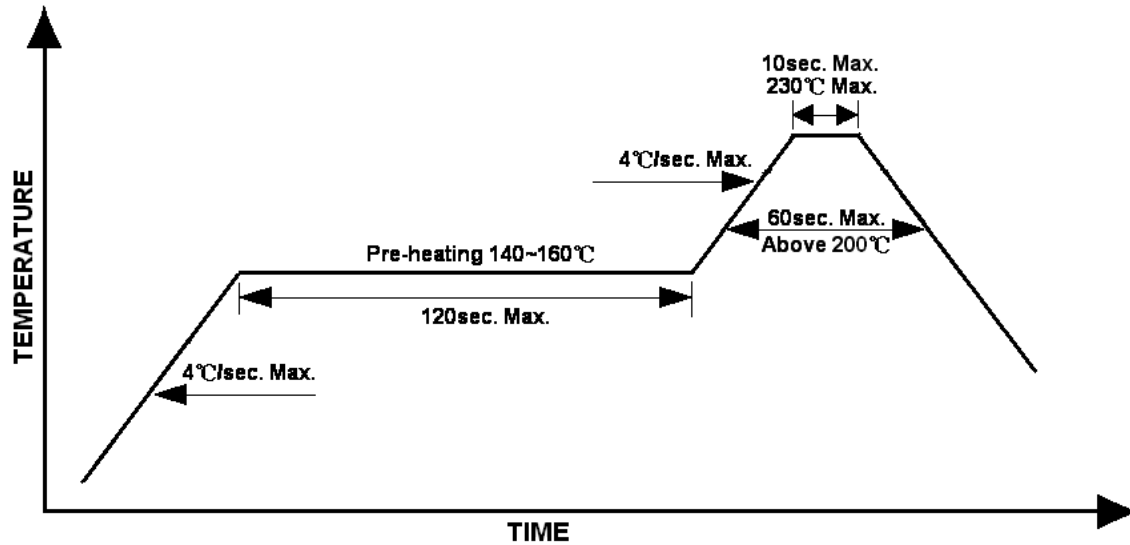


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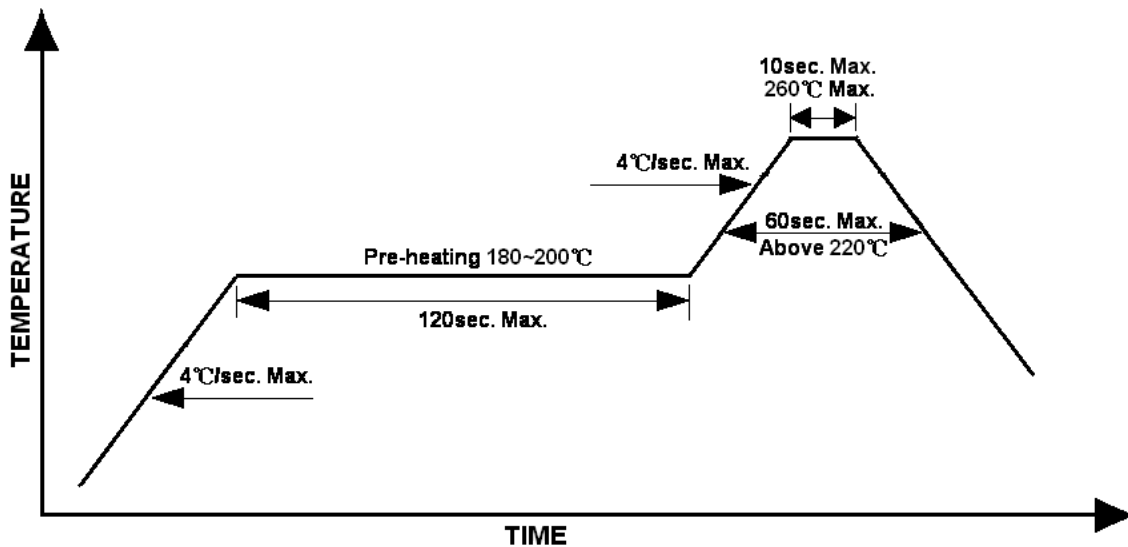
## Reflow Soldering

- Recommended tin glue specifications: melting temperature in the range of 178~192 °C
- The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

Lead Solder Profile



Lead-free Solder Profile



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**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 AllnGaP 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.

**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
- Ultra sonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100 °C max, <3min

**Cautions of Pick and Place**

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

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## Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial Release – 5590		1.0	10-29-2009

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