

**Harvatek Surface Mount LED Data Sheet  
HT-U16D Series  
Preliminary**

Official Product	Product: HT-U16D Series		Data Sheet No.
Tentative Product	*****		HT-U16D
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Sep. 18, 2008	Version of 1.0	Page 1 of 1

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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

Product	Emission Color	Technology	Test Current $I_F$ (mA)	Forward Voltage $V_F$ (V)	Orderable Part Number
HT-U16DUSD	Ultra Bright Orange	AlInGaP	20	2.7 typ.	HT-U16DUSD-XXXX
HT-U16DNG	Green	InGaN	20	3.3 typ.	HT-U16DNG-XXXX
HT-U16DNBH	Blue	InGaN	150	3.3 typ.	HT-U16DNBH-XXXX
HT-U16DSWH	White	InGaN	150	3.3 typ.	HT-U16DSWH-XXXX

	Specification	Material	Quantity
ESD	2000V (HBM)		
Resin	Water clear	Silicone	
Carrier tape	Per EIA 481-1A specs	Conductive black tape	1000pcs 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	

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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 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.


**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.

### 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:		

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■ Harvatek P/N:

**H T - U16D    YYY -    XXXX**



Series Name	Emitting Color	Customer Code
<b>HT-U16D</b> HT: Harvatek U16D: Mid-power series 3.5 (L) x 2.8 (W) x 1.3 (H) mm	YYY USD: Super Bright Orange@20mA NG: Green@20mA NBH: Blue@150mA SWH: White@150mA	XXXX 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...	D: Diffused C: Clear	T: Tape & Reel

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■ Luminous Intensity (Iv) Bin:

Bin	Luminous Intensity Range (mcd)		Bin	Luminous Intensity Range (mcd)	
	Minimum	Maximum		Minimum	Maximum
			Z2	1270.0	1440.0
AA1	1440.0	1610.0	AA2	1610.0	1800.0
AB1	1800.0	2010.0	AB2	2010.0	2250.0
AC1	2250.0	2530.0	AC2	2530.0	2850.0
AD1	2850.0	3200.0	AD2	3200.0	3600.0
AE1	3600.0	4000.0	AE2	4000.0	4500.0
AES1	3600.0	4000.0	AES2	4000.0	4350.0
AFS1	4350.0	4710.0	AFS2	4710.0	5100.0
AF1	4500.0	5000.0	AF2	5000.0	5600.0
AG1	5600.0	6300.0	AG2	6300.0	7150.0
AH1	7150.0	8000.0	AH2	8000.0	9000.0
AJ1	9000.0	10000.0			

@150mA / Ta=25° C, Tolerance: ± 10%

■ Luminous Flux Bin:

Rank Code	Symbol	Condition	Min.	Typ.	Max.	Unit
PN	ΦV	I <sub>F</sub> =150mA	18.0	-	23.5	lm
PP			23.5	-	30.6	

@150mA / Ta=25° C, Tolerance: ± 10%

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■ Wavelength ( $\lambda$ ) Bin:

Bin	Wavelength Range (nm)					
	Super Bright Orange (USD)		True Green (NG)		Blue (NB)	
	Min	Max	Min	Max	Min	Max
-	615.0	630.0				
A			515.0	520.0	460.0	464.0
B			520.0	525.0	464.0	468.0
C			525.0	530.0	468.0	472.0
D			530.0	535.0	472.0	476.0
E			535.0	540.0	476.0	480.0
F					480.0	485.0
H						
J						

@150mA / Ta=25°C, Tolerance:  $\pm 0.5$ nm

■ Forward Voltage ( $V_F$ ) Bin:

Color	Bin Code	Spec. Range
Blue (NB)	H6	3.0 – 3.2 V
Green (NG)	J5	3.2 – 3.4 V
White (TW)	J6	3.4 – 3.6 V
Super Bright Orange (USD)	G6	2.6 – 2.8 V
	H5	2.8 – 3.0 V

@150mA / Ta=25°C, Tolerance:  $\pm 0.05$  V

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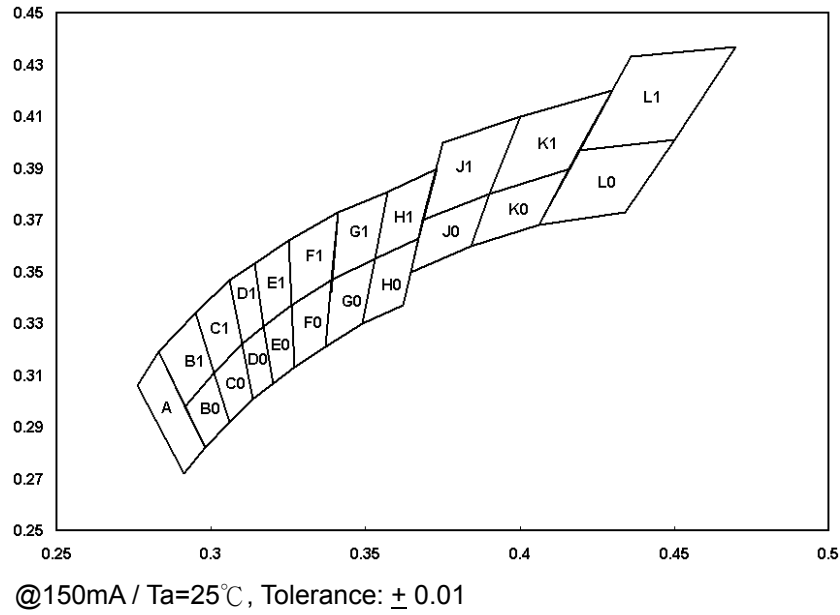
## Correlated Color Temperature Rank (TW only)

Color	Condition	Bin Code	Min.	Typ.	Max.
Warm White	I <sub>F</sub> =150mA	L1	2,750	3,000	3,250
		L0	2,750	3,000	3,250
		K1	3,250	3,500	3,750
		K0	3,250	3,500	3,750
		J1	3,750	4,000	4,250
		J0	3,750	4,000	4,250
		H1	4,250	4,500	4,750
Pure White		H0	4,250	4,500	4,750
		G1	4,750	5,000	5,250
		G0	4,750	5,000	5,250
		F1	5,250	5,500	5,750
		F0	5,250	5,500	5,750
		E1	5,750	6,000	6,250
		E0	5,750	6,000	6,250
Cold White	I <sub>F</sub> =150mA	D1	6,250	6,500	6,750
		D0	6,250	6,500	6,750
		C1	6,750	7,000	7,500
		C0	6,750	7,000	7,500
		B1	7,500	8,000	8,500
		B0	7,500	8,000	8,500
		A	8,500	9,000	9,500

Tolerance: ±5%

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## Correlated Color Temperature and Chromaticity Correlation (TW only)



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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-U16DUSD	Ultra Bright Orange						
HT-U16DNG	Green						
HT-U16DNBH	Blue	570	180	200	5	-40~+100	-40~+100
HT-U16DSWH	White	570	180	200	5	-40~+100	-40~+100

\* 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-U16DUSD	Ultra Bright Orange	20	2.8	3.0	622	636	17	2500.0	6200.0
HT-U16DNG	Green	20	3.3	3.6	527	520	40	4850.0	5025.0
HT-U16DNBH	Blue	150	3.3	3.6	465	468	40	1220.0	1340.0

Product	Emission Color	I <sub>F</sub> (mA)	V <sub>F</sub> (V)		λ(nm)			Φ <sub>V</sub> (lm)	
			typ	max	λ <sub>D</sub>	λ <sub>P</sub>	Δλ	min	typ
HT-U16DSWH	White	150	3.3	3.6	X=0.29 Y=0.31			18.1	23

\* Per NIST standard

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**Package Outline Dimension and Recommended Soldering Pattern**

Unit: mm Tolerance: +/-0.1

Outline Dimension	Solder Pattern
<p>Soldering terminals may shift in the x, y direction.</p>	<p>Unit: mm</p>

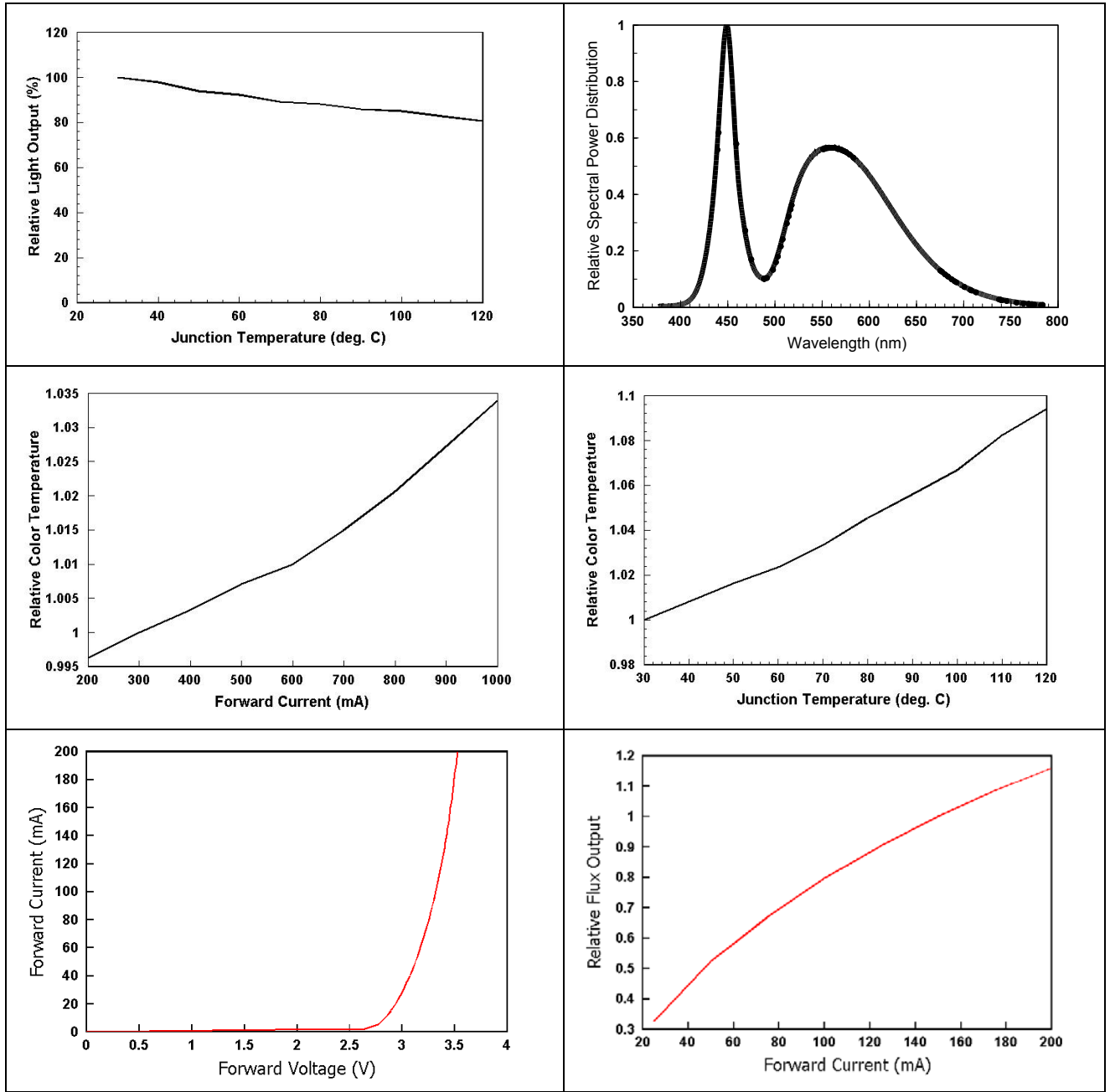
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**Characteristic Curves for NB**



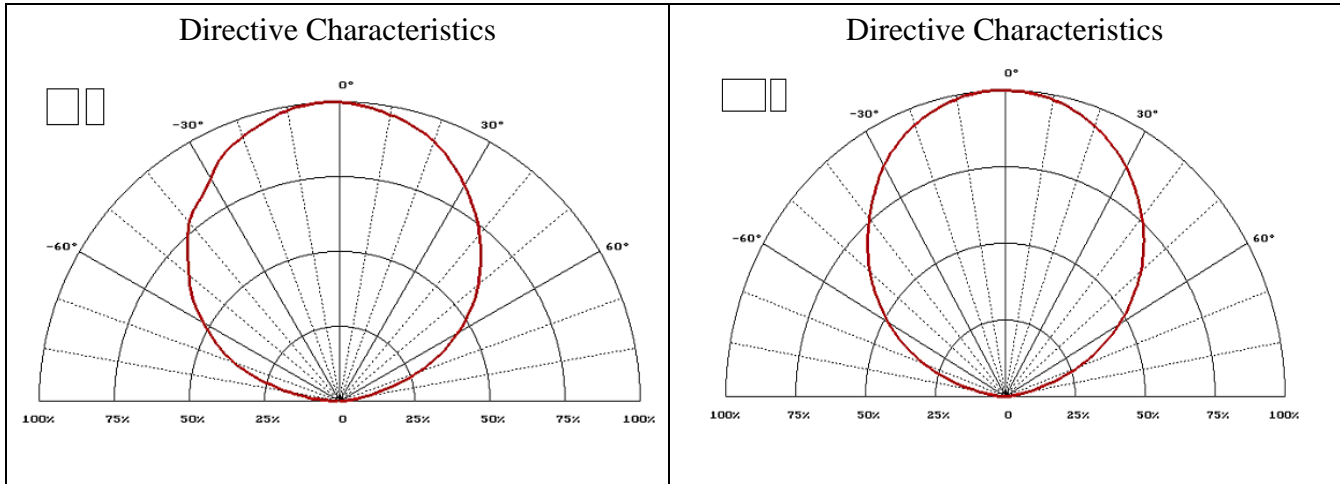
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**Characteristic curves for TW**



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**Radiation Pattern**



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## Packaging

## Tape Dimension



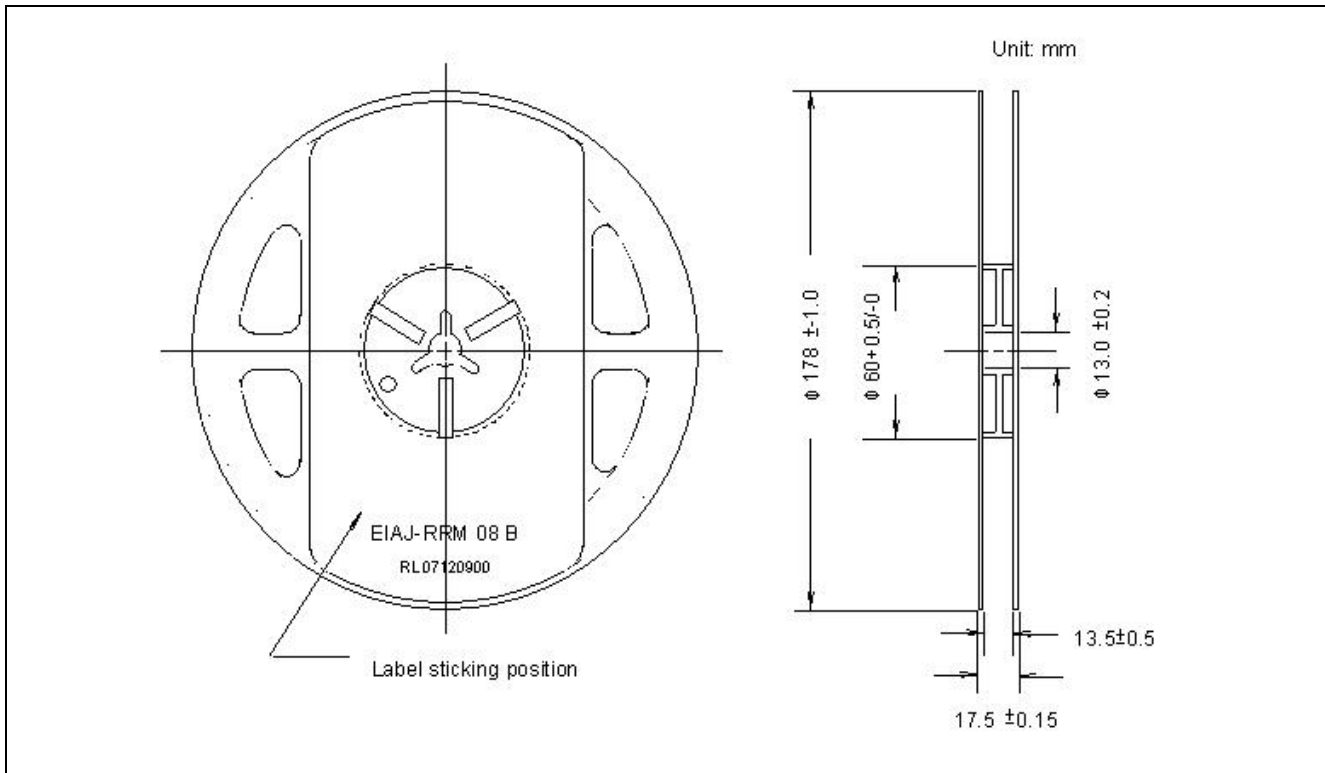
Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-U16D	3.7+/-0.1mm	3.0+/-0.1mm	1.5+/-0.1mm	2K

Unit: mm

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## 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	2000pcs 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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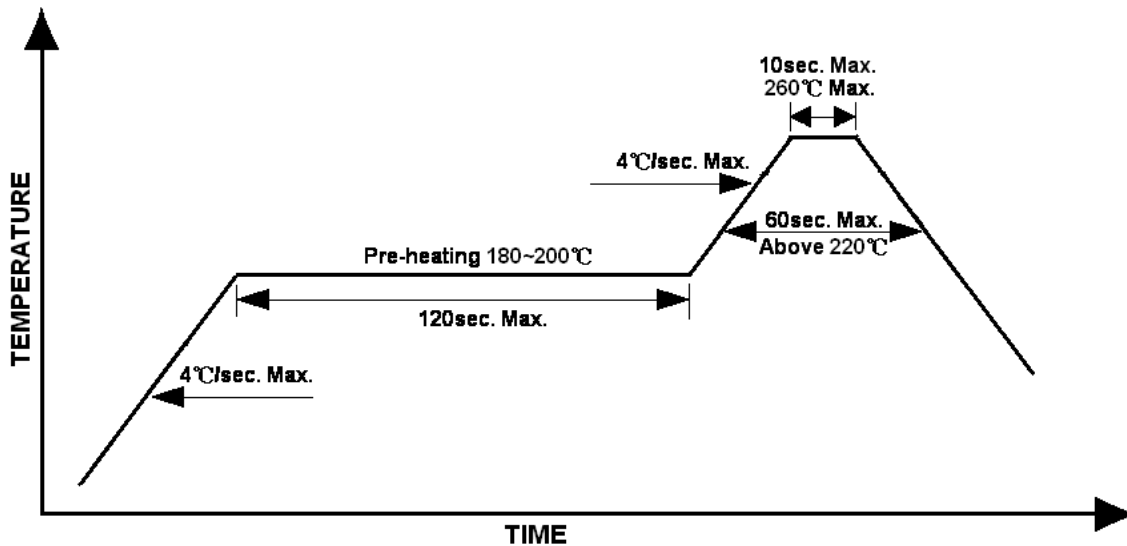
## Reflow Soldering

- 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 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.

**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
New format		1.0	09-18-2008

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