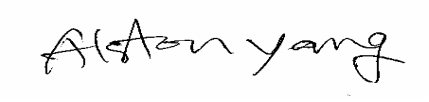
Harvatek Surface Mount CHIP LEDs Approval Sheet
Model No.: HT-F195NG-K618

Acknowledged by



Section Manager	**Manager**
Production Engineering Dept.	**Production Engineering Dept.**

Introduction

- *The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by HARVATEK for any infringements of intellectual property or other rights of the third parties which may result from it use.*
- *Harvatek is continually effort to improve the quality of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing HARVATEK products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such HARVATEK products cause loss of human life, bodily injury or damage to property.*
- *The HARVATEK products listed in this document are intended for usage in general electronics (computer, personal equipment, office equipment, industrial robotics, domestic, etc…) These products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury.*
- *In developing your designs, please ensure that HARVATEK products are used within specified operating ranges as set forth in the most recent HARVATEK products specifications.*
- *Also, please keep in mind the precautions listed in this document.*

Product Specification

	Specification	Material	Quantity
Iv	Q: 71.5-112.5 mcd R: 112.5-180 mcd S: 180-285 mcd or above @20mA/ Ta= 25^{O} C Tolerance±10%		
Chromaticity Coordinates	515-535 nm @20mA/ Ta= 25^{O} C Tolerance:±0.5nm		
Vf	2.9-3.9 V @20mA Tolerance:±0.05V		
Ir	< 100 μA @ V_R = 5 V		
Resin	Milky White	Epoxy resin	
Carrier tape	According to EIA 481-1A specs	Conductive black tape	4000pcs per reel
Reel	According to EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel one bag
Carton	HT standard	Paper	Non-specified

Others:

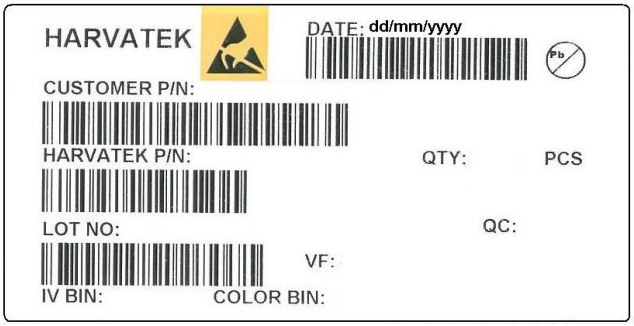
Every mid-box will be loaded 5 reels. These 5 reels can be different in lot, Iv, lambda, or Vf. Every reel will have an independent label to identify its specification and the mid-box there will have a corresponding label post on it.

ATTENTION: Electricstatic Discharge (ESD) protection

The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs based chips is still necessary even though they are safe in low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD protection has to considered and taken in the initial design stage.

If manual work/process is needed, please ensure the device is well protected from ESD during all the process.

Label Spec.:



■Customer P/N: To Be Defined

■ Harvatek P/N

H T - F 1 9 5 NG-K618

Series Name	Emitting Color
HT-F195: 1.6x0.8x0.4mm	NG: @20mA InGaN Green K618:Customer produce code

■ Lot No.

1	2	3	4	5	6	7	8	9	10
P	1	2	2	3	0	A	-	C	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: Water Clear	T: Taped Reel

■ Iv Bin:

Color	Bin Code	Spec. Range
White	Q	71.5-112.5 mcd
	R	112.5-180 mcd
	S	180-285 mcd

or above

■ Color Bin:

Color	Bin Code	Spec. Range
Green	A	515~520 nm
	B	520~525 nm
	C	525~530 nm
	D	530~535 nm

■ Vf Bin:

Color	Bin Code	Spec. Range
Blue	H7	2.9-3.1V
	H8	3.1-3.3V
	J7	3.3-3.5V
	J8	3.5-3.7V
	K7	3.7-3.9V

Product Feature

Electro-Optical Characteristics

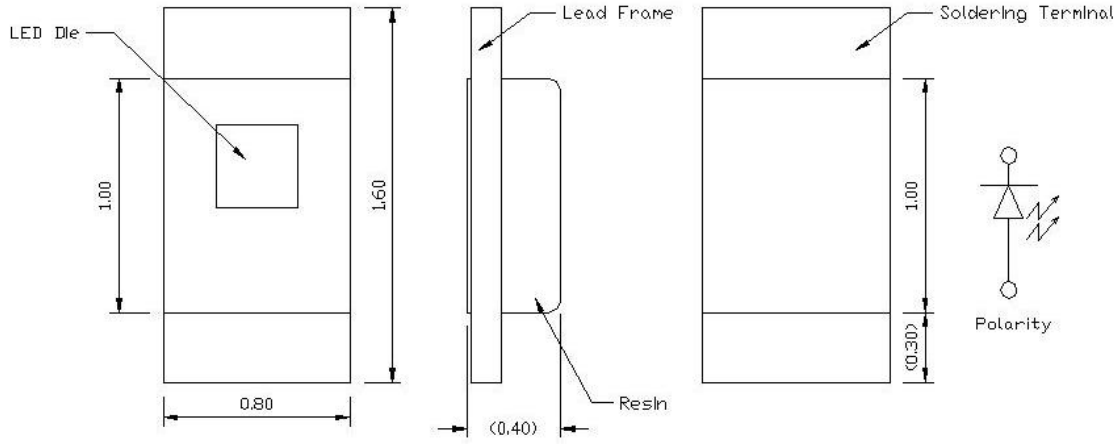
(I_F @ 20mA, T_a 25°C)

Code for parts	Lighting Color	Material	V_F(V)		λ (nm)			I^*_V(mcd)
			typ	max	λ_D	λ_P	△λ	Typ
HT-F195NG-K618	Green	InGaN	3.3	3.9	529	522	40	180

Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

Unit: mm Tolerance: +/-0.1

Outline Dim.



Soldering terminal may shift in x, y direction.

Absolute Maximum Ratings

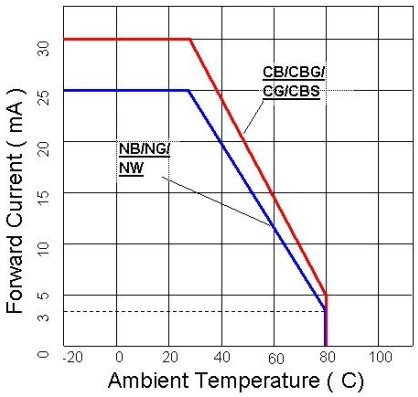
(T_a 25°C)

Series	P_d (mW)	I_F (mA)	I_{FP} (mA)	V_R (V)	I_R (uA)	T_{OP} (°C)	T_{ST} (°C)
HT-F195NG-K618	78	20	80**	5	<100@ V_R = 5	-30~+80	-40~+85

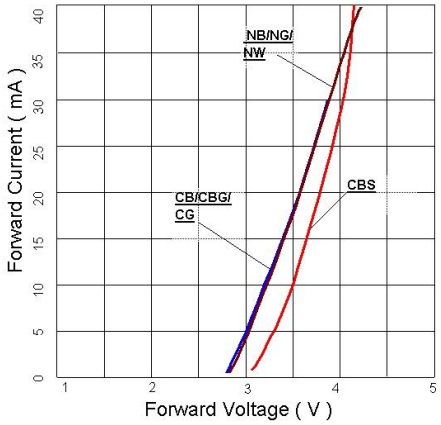
** Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width

Characteristics of HT-F195 Series

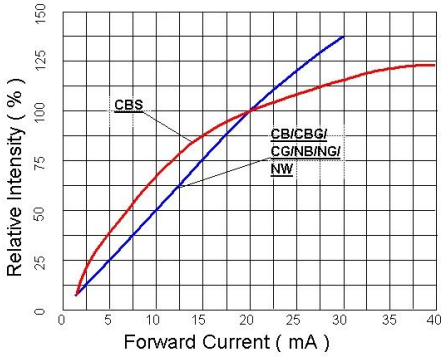
Forward Current vs. Ambient Temperature



Forward Voltage vs. Forward Current

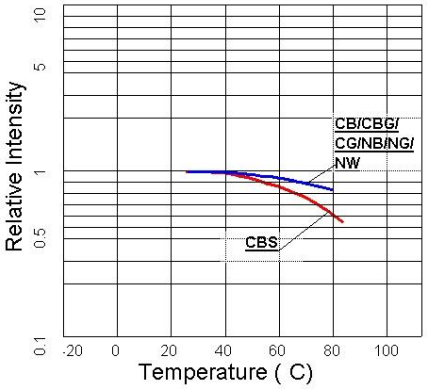


Relative Intensity vs. Forward Current

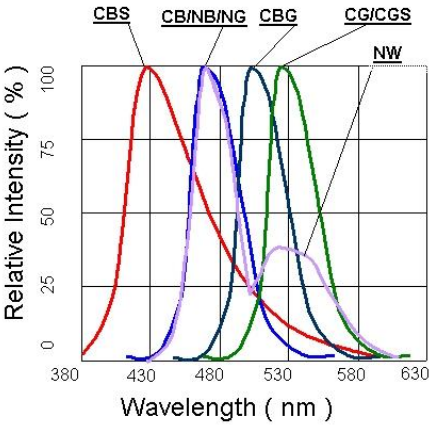


Relative Intensity vs. Ambient Temperature

Plused 20mA, 300us pulse, 10ms peroid

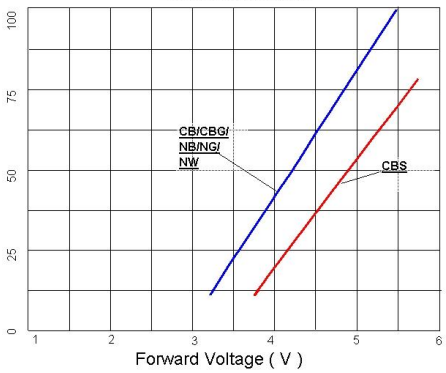


Relative Intensity vs. Wavelength

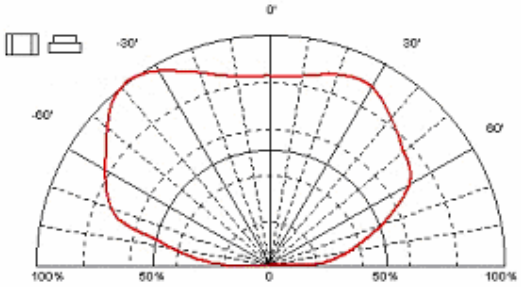


Peak Forward Voltage vs. Forward Current

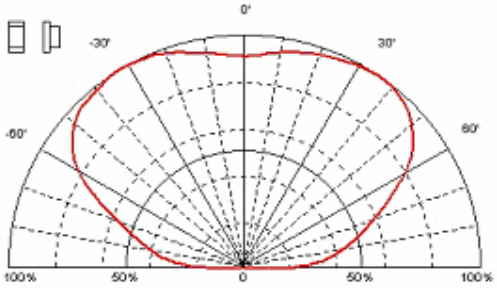
100's test pulse, 1% duty cycle



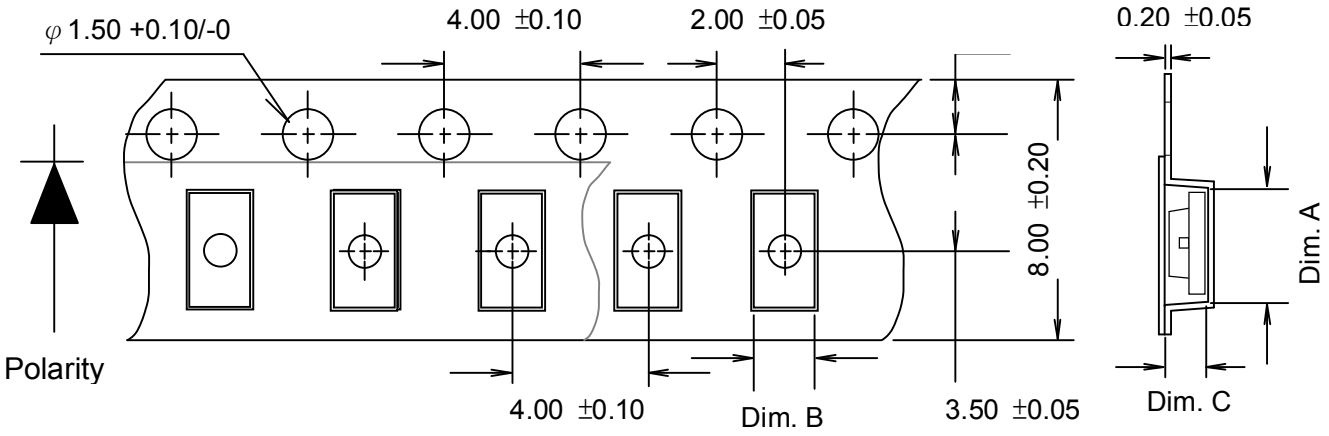
Directive Characteristics



Directive Characteristics



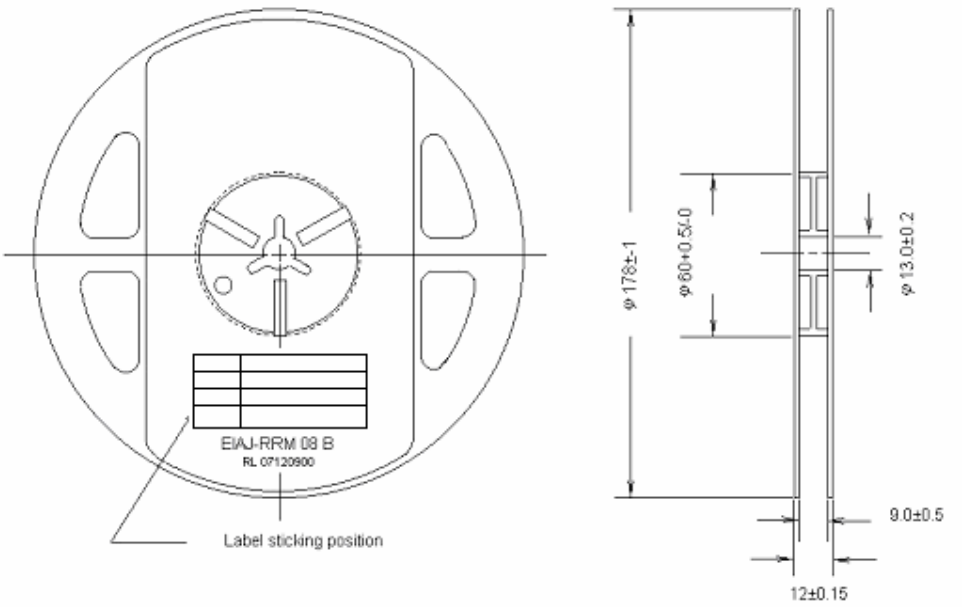
Packaging Tape, Reel, and Packing Model
Tape Dimension



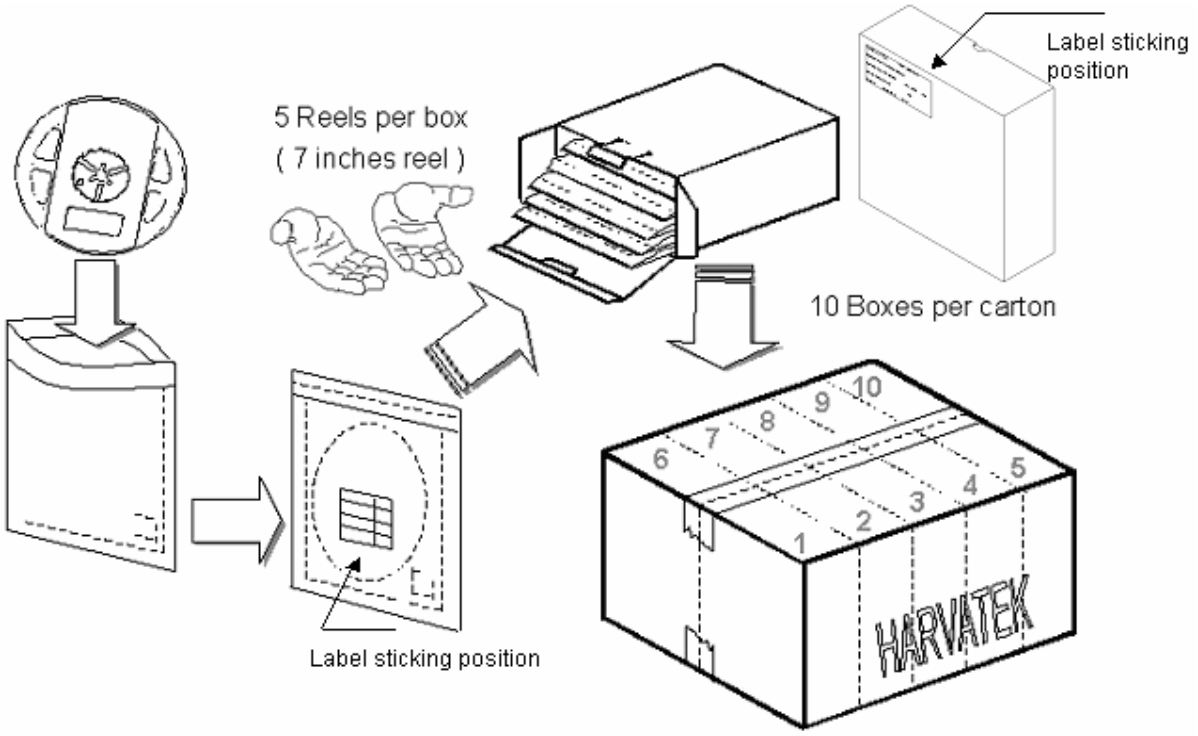
Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-F195	1.75±0.1	0.90±0.1	0.60±0.1	4K

Unit: mm

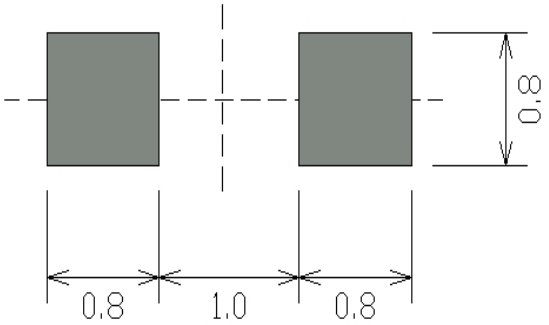
Reel Dimension



Packing Model
5 boxes per carton is available according to shipping quantity.



Soldering pattern
The dimensions of the recommended soldering pattern may not meet every user. Please confirm and study first before designing the soldering pattern in order to obtain the best performance of soldering. Recommended soldering pattern is listed below.



Dry Pack

Any SMD optical device, like this chip LED, is **MOISTURE SENSITIVE device**. Avoid absorbing moisture at any time during transportation or storage. Every reel will be packaged in the moisture barrier anti-static bag (Specific bag material will depend upon customers' requirement or option). And the bag is well sealed before shipment.
By customer's requirement, we will put a humidity indicator in each moisture barrier anti-static bag before shipment.

Storage

It's recommended to store the products in the following conditions:
Humidity: 60 %RH Max.
Temperature: 5 ^{O}C ~30 ^{O}C (41^{O}F~86 ^{O}F)

1 Shelf life in sealed bag: 12 month at<40 ^{O}C and <90%RH. (Base on aluminum laminated moisture barrier bag.)
2 After the bag is opened, devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be:
   2.1 Mounted within 72 hours at factory conditions of≦ 30 ^{O}C /60% RH, or
   2.2 Stored at ≦ 20% RH with zip-loc\k sealed.

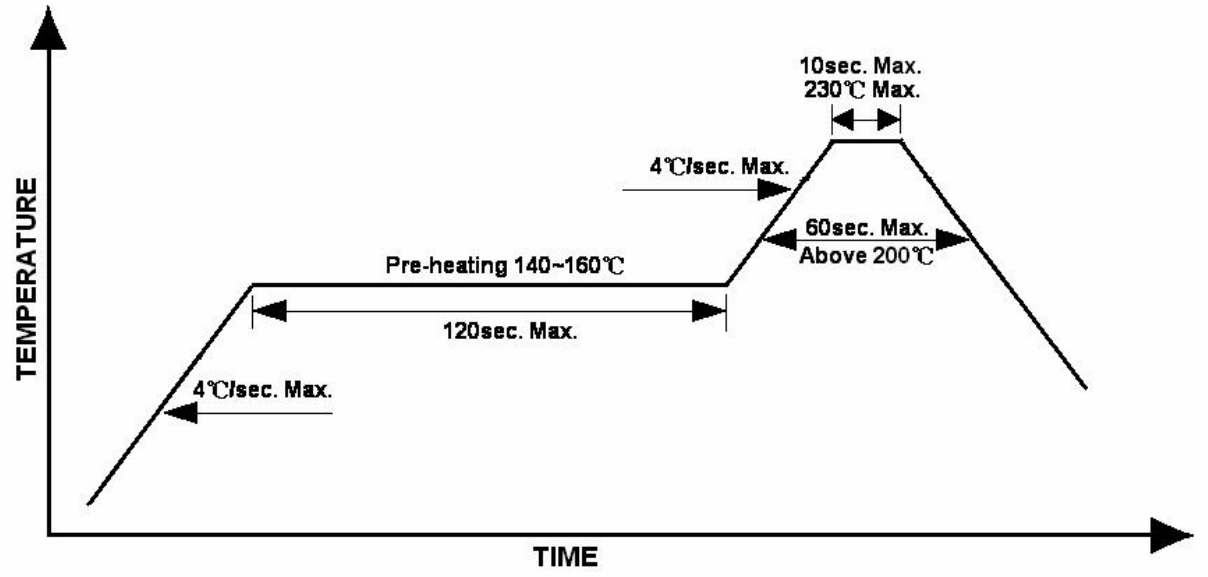
Soldering Re-flow

- Manual soldering (We do not recommend this method strongly.)
- Soldering wire: 63/37 Sn/Pb, flux contained.
- To prevent cracking, please bake before manual soldering, if the device is subject to moisture.
- Temperature at tip of soldering tool : 300 ^{O}C±5 ^{O}C Max.(25W)
- It's banned to load any stress on the resin during soldering.
- Soldering time : 3±1sec

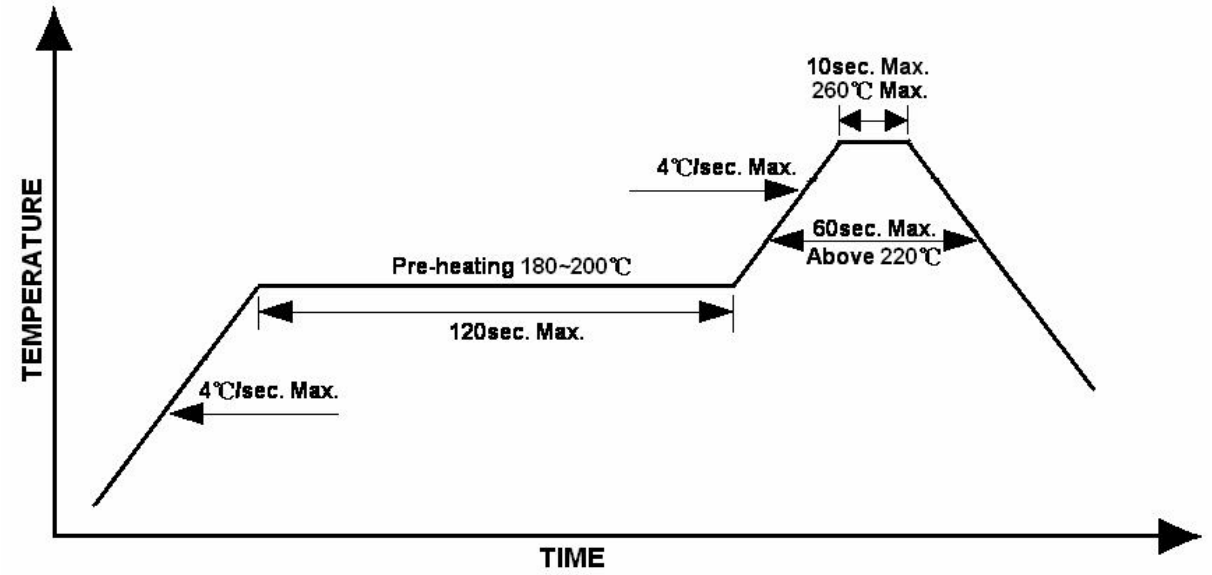
Recommended Soldering Temperature – Time Profile (Reflow Soldering)

- Recommend tin glue specifications:
  Melting temperature: 178~192 ^{O}C
- Never take next process until the component is cooled down to room temperature after re-flow.
- The recommended reflow soldering profile (measuring on the surface of the LED resin) is following:

Lead Solder profile



Lead-free Solder profile



Rework

- Customer must finish rework within 5 sec. under 260 ^{O}C.
- The head of iron cannot touch copper foil.
- Twin-head type is preferred.

Cleaning

- The conditions of cleaning after soldering:
- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature×Time: <50 ^{O}C×30sec, or <30 ^{O}C×3min
- Ultra sonic cleaning: < 15W/ bath; Bath volume: 1liter max.
- Curing: 100 ^{O}C max, <3min
- Do not contact with component on the assembly board.

Cautions of Pick and Place

It should be avoided to load stress on the resin during high temperature.
Avoid rubbing or scraping the resin by any object.
Electric-static may cause damage to the component. Please confirm that the equipment grounding well. Using an ionizer fan is recommended.

Reliability Test

Item	Frequency/ lots/ samples/ failures	Standards Reference	Conditions
Precondition	For all reliability monitoring tests according to JEDEC Level 2	J-STD-020	1.) Baking at 85°C for 24hrs 2.) Moisture storage at 85°C/ 60% R.H. for 168hrs
Solderability	1Q/ 1/ 22/ 0	JESD22-B102-B And CNS-5068	Accelerated aging 155°C/ 24hrs Tinning speed: 2.5±0.5cm/s Tinning: A: 215°C/ 3±1s or B: 260°C/ 10±1s
Resistance to Soldering heat	1/100/0	JESD22-A113	3x IR-reflow-soldering according to soldering profile
Operating life test	1Q/ 1/ 40/ 0	CNS-11829	1.) Precondition: 85°C baking for 24hrs 85°C/ 60%R.H. for 168hrs 2.) T_{amb}25°C; I_F=20mA; duration 1000hrs
High humidity, high temperature bias	1Q/ 1/ 45/ 0	JESD-A101-B	T_{amb}: 85°C Humidity: 85% R.H., I_F=5mA Duration: 1000hrs
High temperature bias	1Q/ 1/ 20	HT specs.	T_{amb}: 55°C I_F=20mA Duration: 1000hrs
Pulse life test	1Q/ 1/ 40/ 0		T_{amb}25°C, I_f=20mA,, I_p=100mA, Duty cycle=0.125 (tp=125 μ s,T=1sec) Duration 500hrs)
Temperature cycle	1Q/ 1/ 76/ 0	JESD-A104-A IEC 68-2-14, Nb	A cycle: -40 degree C 15min; +85 degree C 15min Thermal steady within 5 min.. 300 cycles 2 chamber/ Air-to-air type
High humidity storage test	1Q/ 1/ 40/ 0	CNS-6117	60±3°C 90+5/-10% R.H. for 500hrs
High temperature storage test	1Q/ 1/ 40/ 0	CNS-554	100±10°C for 500hrs
Low temperature storage test	1Q/ 1/ 40/ 0	CNS-6118	-40±5°C for 500hrs