Harvatek Surface Mount CHIP LEDs Data Sheet
Model: HT-V116NG

Acknowledged by

Section Manager
Production Engineering Dept.

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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 making an 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	140-450mcd @20mA/ Ta= 25^{O} C Tolerance: ± 10%		
Chromaticity Coordinates	515-535nm @20mA/ Ta= 25^{O} C Tolerance: ± 0.01		
Vf	2.7~3.6V @20mA/ Ta= 25^{O} C Tolerance: ± 0.05V		
Carrier tape	According to EIA 481-1A specs	Conductive black tape	2000pcs 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
	Specification	Material	Quantity

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.

Product Characteristics

Electro-Optical Characteristics

(I_F @ 20mA, T_a 25°C)

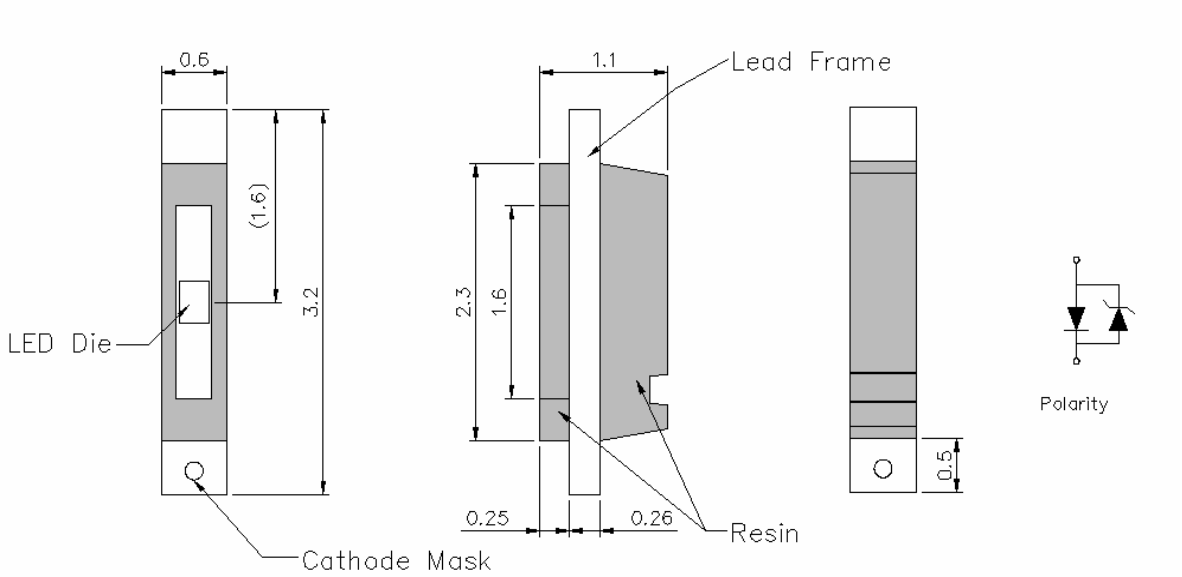
Product No.	Lighting Color	Material	V_F(V)		λ (nm)			I^*_V(mcd)		
			min	max	λ_D	λ_P	△λ	min	typ	max
HT-V116NG	Green	InGaN	2.7	3.6	527	520	40	140	300	450

* Per NIST standards

Package Outline Dimension

Unit: mm Tolerance: +/-0.1

Outline Dimension：



Unit: mm

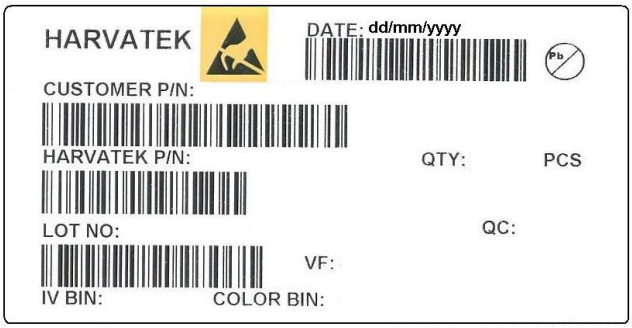
Absolute Maximum Ratings

(T_a 25°C)

Series	P_d (mW)	I_F (mA)	I_{FP} (mA)	Ir (μA) @ V_R = 5 V	T_{OP} (°C)	T_{ST} (°C)
HT-V116 InGaN	108	30	100	<1μA	-40~+85	-40~+100

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

Label Spec.



■ **Customer P/N: To Be Defined**

■ **Harvatek P/N**

H T - V 1 1 6 NG

Series Name	Emitting Color
HT-V116: 3.2x1.1x0.6mm	NG: Green

■ **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	1: 2001 2: 2002 3: 2003 4: 2004 …..	1: Jan. 2: Feb. …. 9: Sep. A: Oct. B: Nov. C: Dec.	1~31/ (30)	01~99, A,B,C…	D: Milky White	T: Taped Reel

Bin Code.

■ Iv Bin:

Color	Bin Code	Spec. Range
Green	R2	140-180mcd
	S1	180-226mcd
	S2	226-285mcd
	T1	285-320mcd
	T2	320-360mcd
	U1	360-400mcd
	U2	400-450mcd

Luminous Intensity Measurement Allowance is ±10%

■ Color Bin:

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

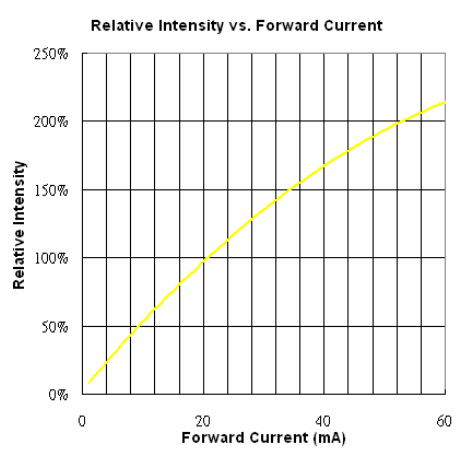
Color Coordinates Measurement Allowance is ±0.01

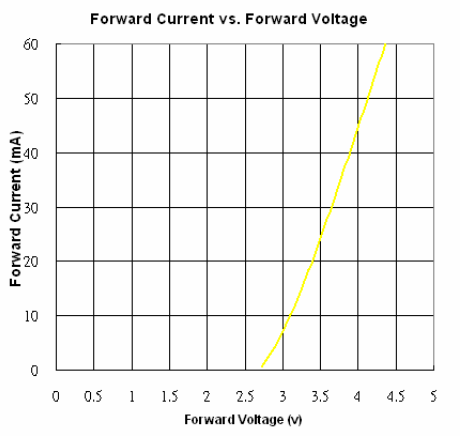
■ Vf Bin:

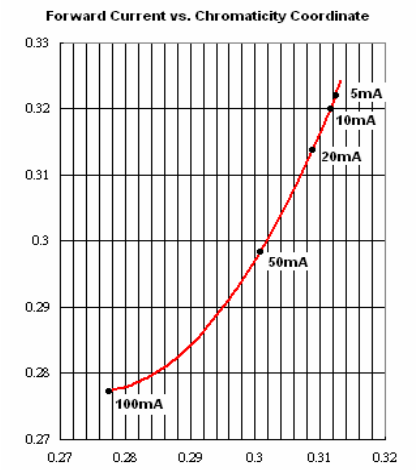
Color	Bin Code	Spec. Range
White	G4	2.7-2.8V
	H1	2.8-2.9V
	H2	2.9-3.0V
	H3	3.0-3.1V
	H4	3.1-3.2V
	J1	3.2-3.3V
	J2	3.3-3.4V
	J3	3.4-3.5V
	J4	3.5-3.6V

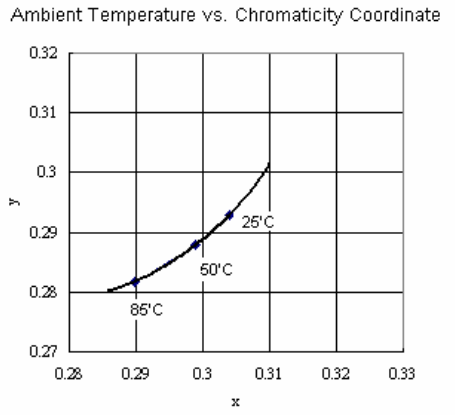
Forward Voltage Measurement Allowance is ±0.05V

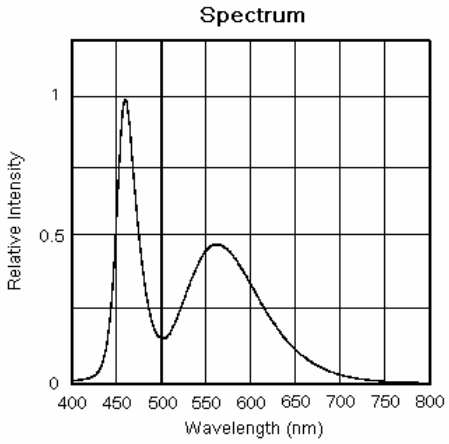
Characteristics of HT-V116BP

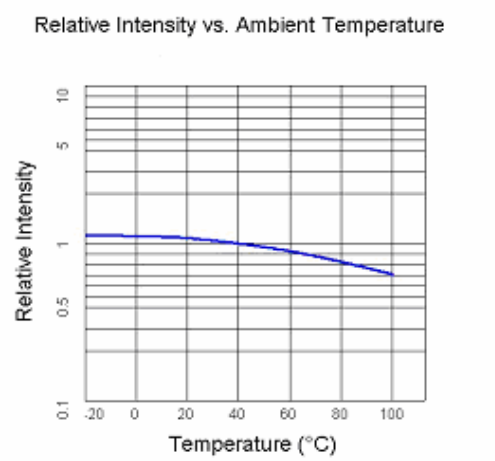


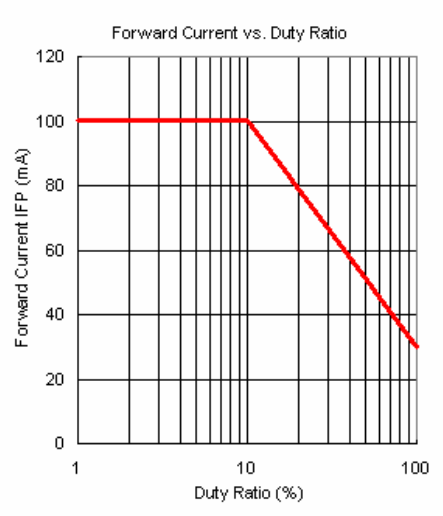


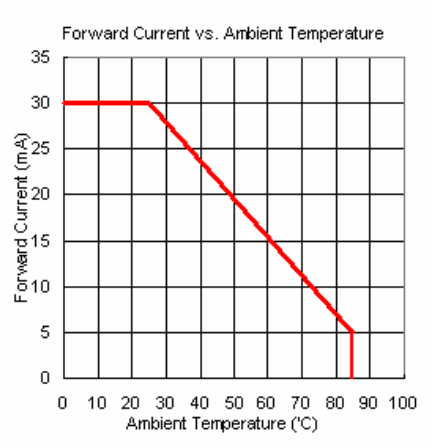


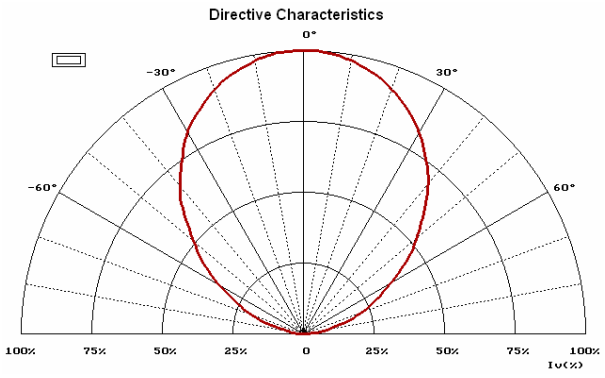


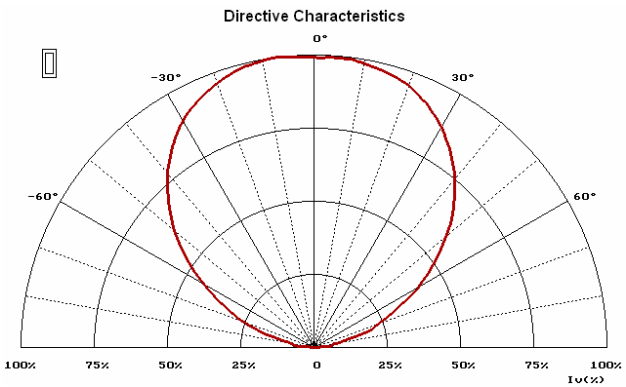

Spectrum
Relative Intensity
1
0.5
0
400 450 500 550 600 650 700 750 800
Wavelength (nm)


Relative Intensity vs. Ambient Temperature
Relative Intensity
10
5
1
0.5
0.1
-20 0 20 40 60 80 100
Temperature (°C)


Forward Current vs. Duty Ratio
Forward Current IFP (mA)
120
100
80
60
40
20
0
1
10
100
Duty Ratio (%)

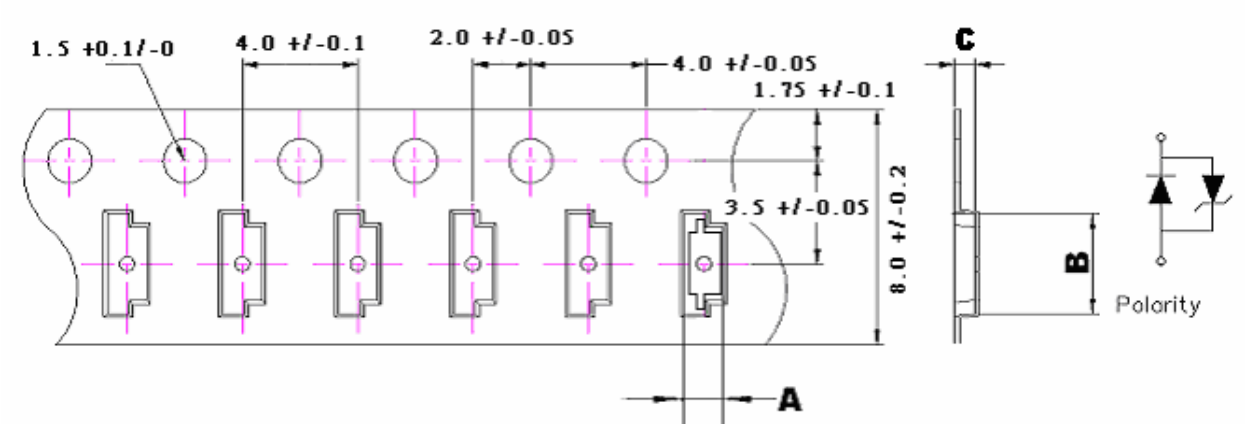

Forward Current vs. Ambient Temperature
Forward Current (mA)
35
30
25
20
15
10
5
0
0 10 20 30 40 50 60 70 80 90 100
Ambient Temperature (°C)


Directive Characteristics
0°
-30°
30°
-60°
60°
100% 75% 50% 25% 0 25% 50% 75% 100%
Iv(%)


Directive Characteristics
0°
-30°
30°
-60°
60°
100% 75% 50% 25% 0 25% 50% 75% 100%
Iv(%)

Packaging Tape, Reel, and Packing Model

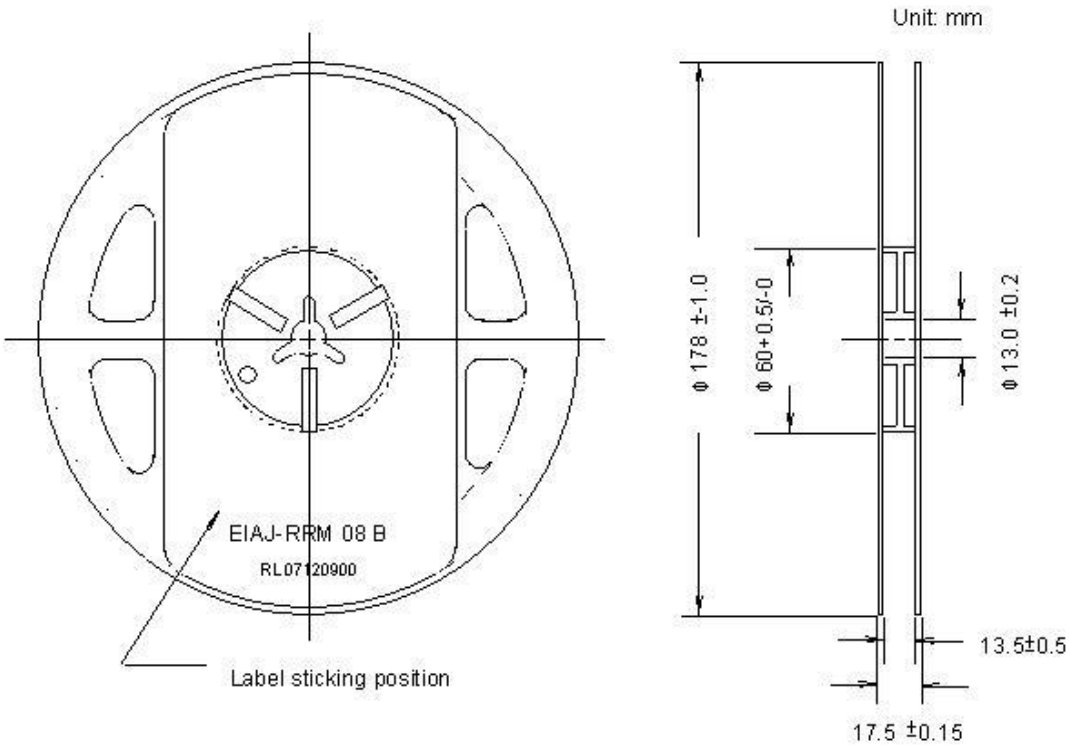
Tape Dimension



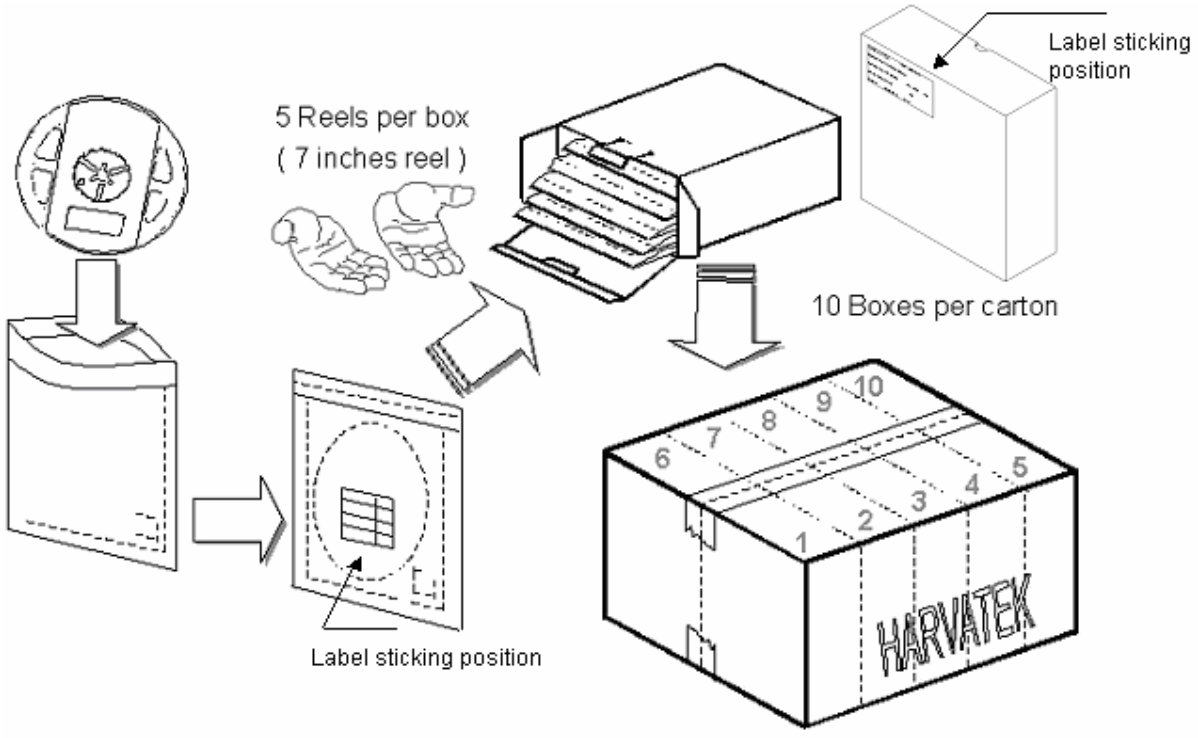
Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-V116	1.25±0.1	3.50±0.1	0.75±0.1	2K

Unit: mm

Reel Dimension



Packing Model



5 boxes per carton is available according to shipping quantity.

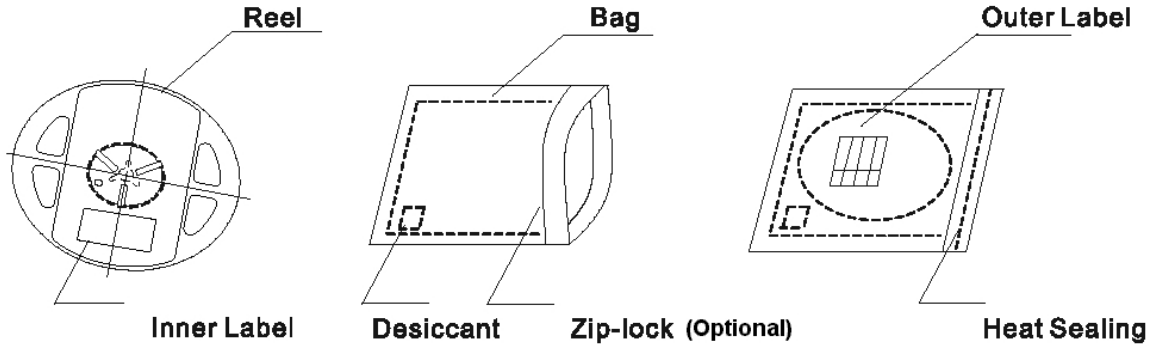
Cardboard Box Size	Dimensions(cm)	Reel/box	Quantity/box (pcs)
Small	45 x 26 x 30	25 reels Max.	50, 000 Max
Large	50 x 46 x 30	50 reels Max.	100, 000 Max

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.

The package is the following:



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-lock sealed.

Baking

It's recommended to bake before soldering when the pack is unsealed after 15 days. The conditions are as followings:

a) 60 ±3^{O}C×(12~24hrs) and < 5% RH, taped reel type

b) 100±3^{O}C×(45min~1hr), bulk type

c) 130±3^{O}C×(15~30min), bulk type

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.

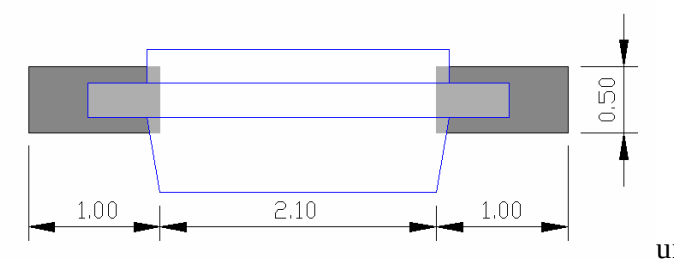
PRECAUTIONS

1. Avoid absorbing moisture at any time during transportation or storage.
2. Anti-Static process is needed especially when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a proper series current limit resistor. Avoid driving reverse voltage over the specification of LEDs when turning the unit ON/OFF.

4. Any application should refer to the specifications of absolute maximum ratings.
5. Avoid any direct contact with the viewing area.
6. If possible, assemble the unit in a clean room or dust-free environment.
7.

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.



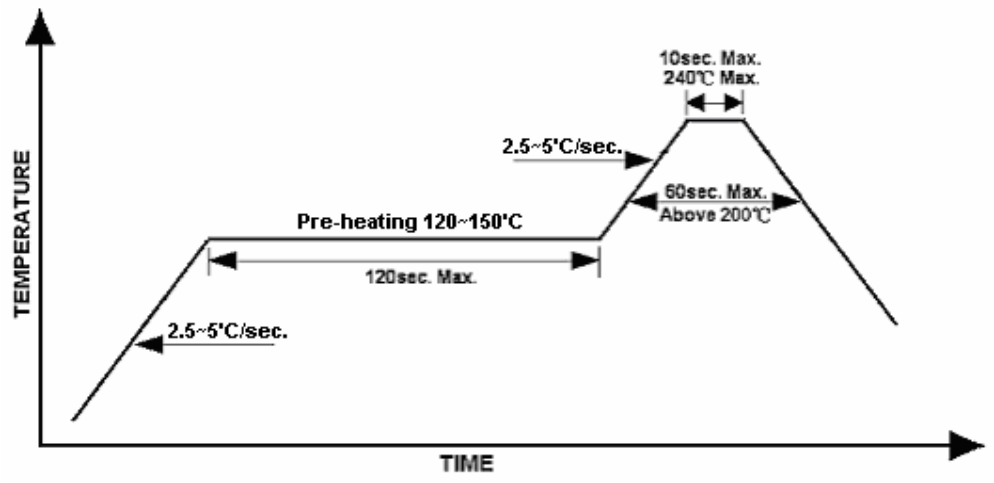
unit: mm

Soldering terminal may shift in x, y direction.

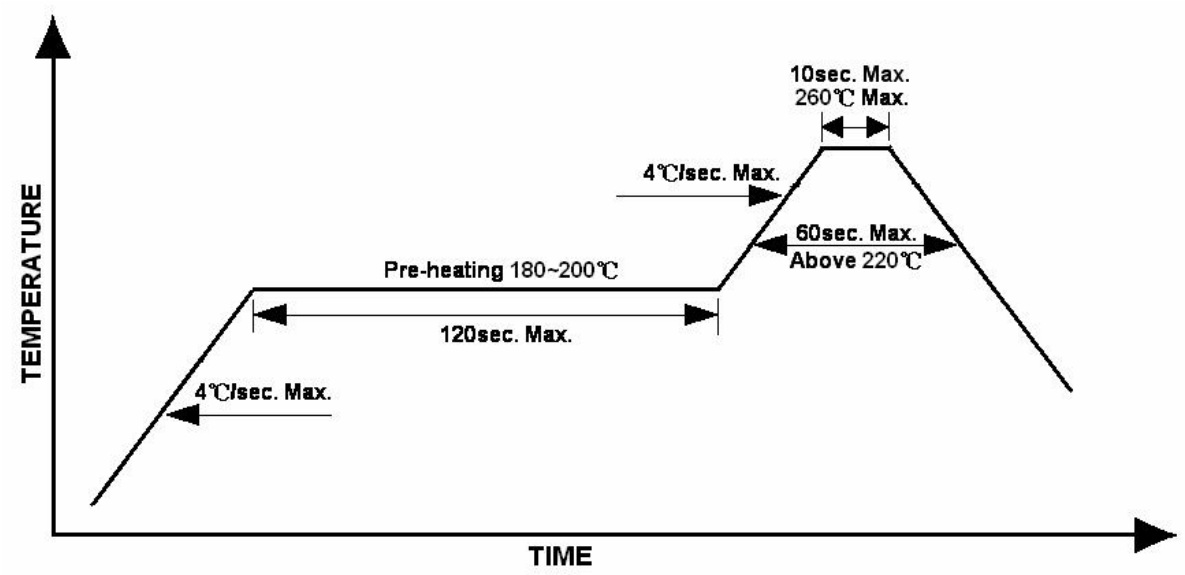
Re-flow Soldering

- 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 re-flow soldering profile (measuring on the surface of the LED resin) is following:

Lead Solder



Lead-free Solder



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.

Reliability

Test Items and results

Test Item	Standards reference	Conditions	Note	Failures/ Sample size
Solderability	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	Over 95% area	0/22
Resistance to soldering heat (Reflow soldering)	JEITA ED-4701 300 301	Tsld=260°C/10sec (Pre treatment 30°C/70%R.H. 168hrs)	2 times	0/100
Temperature cycle	JESD-A104-A IEC 68-2-14, Nb	-40°C~25°C~85°C~25°C 15min.~5min.~15min.~5min.	300cycle	0/100
High Temp. storage	JEITA ED-4701 200 201	Ta=100°C	1000h	0/40
Low Temp. storage	JEITA ED-4701 200 202	Ta=-40°C	1000h	0/40
Temp. humidity storage	JEITA ED-4701 100 103	Ta=60°C, RH=90%	1000h	0/40
Vibration	JEITA ED-4701 400 403	100~2000~100HZ Sweep 4min. 200m/s^2 3 direction, 4 cycles	48min.	0/50
COQ			300cycle	0/100
PCT			96h	0/100
JEDEC level 1				0/100
Steady state operation		Ta=25°C, If=20mA	1000h	0/40
High Temp. operation		Ta=55°C, If=20mA	1000h	0/40
Low Temp. operation		Ta=-40°C, If=20mA	1000h	0/40
High Temp. & Humidity operation 1		Ta=85°C, RH=85%, If=5mA	1000h	0/40
High Temp. & Humidity operation 2		Ta=60°C, RH=90%, If=10mA	1000h	0/40