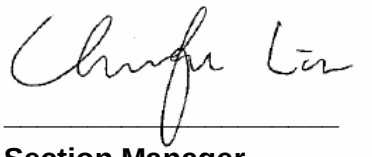
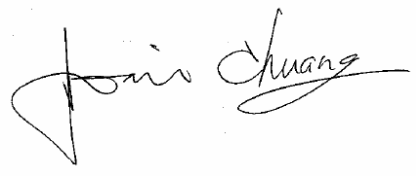
Harvatek Surface Mount CHIP LEDs Approval Sheet
Model No.: HT-V108BP

Acknowledged by



Section Manager
Production Engineering Dept.



Manager
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	500-1255mcd @20mA/ Ta= 25^{O} C Tolerance: ± 10%		
Chromaticity Coordinates	Refer to page 7 @20mA/ Ta= 25^{O} C Tolerance: ± 0.01		
Vf	2.7~3.7V @20mA/ Ta= 25^{O} C Tolerance: ± 0.05V		
Resin	Yellow	Epoxy resin	
Carrier tape	According to EIA 481-1A specs	Conductive black tape	1000pcs 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.

Product Specification

Electro-Optical Characteristics

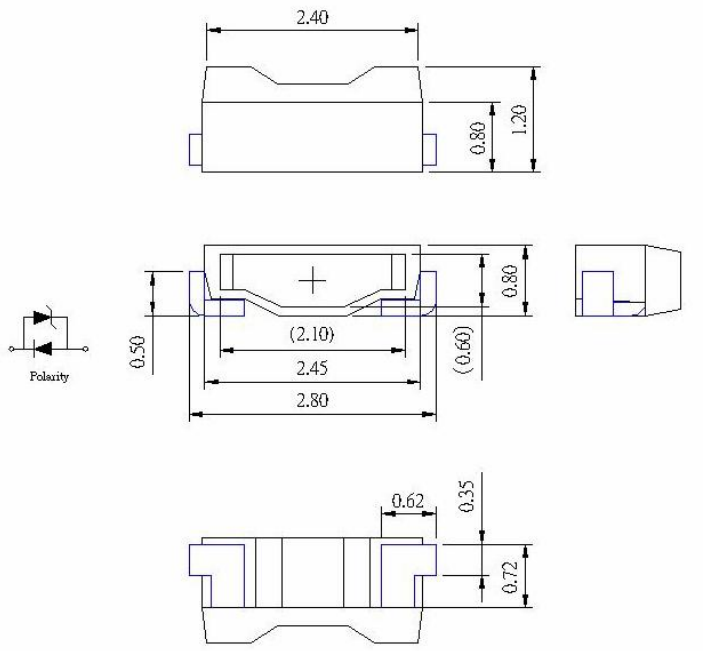
(I_F @ 20mA, T_a 25 °C)

Product No.	Lighting Color	Material	V_F(V)		λ (nm)			I_V(mcd)	
			min	max	λ_D	λ_P	△λ	min	max
HT-V108BP	White	InGaN	2.7	3.7	X=0.30 Y=0.31	--	--	550	1255

Package Outline Dimension

Unit: mm Tolerance: +/-0.1

Outline Dimension：



Item	Materials
Lead-frame	Cu Alloy with Ag Plating
Encapsulating Resin	Epoxy Resin
Package	High Temperature Resistant Plastic

Soldering terminals may shift in x, y direction.

Absolute Maximum Ratings

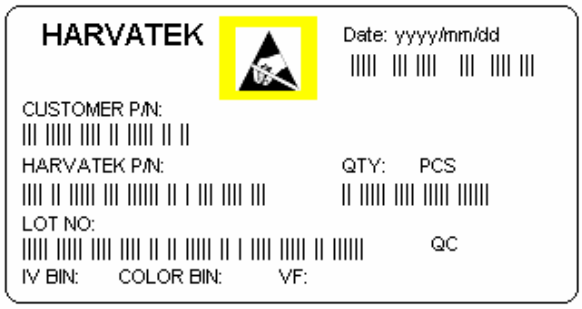
(T_a 25 °C)

Series	P_d (mW)	I_F (mA)	I_{FP} (mA)	T_{OP} (°C)	T_{ST} (°C)
HT-V108BP	111	30	100**	-30~+85	-40~+100

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

ESD HBM: ±8000V

Label Spec.



■Customer P/N: To Be Defined

■ Harvatek P/N

H T - V 1 0 8 B P

Series Name	Emitting Color
HT-V108: 2.8x1.2x0.8mm	BP: White@20mA

■ 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

Iv Bin:

Color	Bin Code	Spec. Range	Bin Code	Spec Range
White	V2	500-560mcd	X2	800-900mcd
	W1	560-630mcd	Y1	900-1000mcd
	W2	630-715mcd	Y2	1000-1125mcd
	X1	715-800mcd	Z1	1125-1255mcd

- Luminous Intensity Measurement Allowance is ±10%

Color Bin:

B5A	
x	y
0.296	0.276
0.2915	0.2855
0.3002	0.295
0.3035	0.285

B5B	
x	y
0.3035	0.285
0.3002	0.295
0.309	0.3045
0.311	0.294

B5C	
x	y
0.2915	0.2855
0.287	0.295
0.297	0.305
0.3002	0.295

B5D	
x	y
0.3002	0.295
0.297	0.305
0.307	0.315
0.309	0.3045

A0A	
x	y
0.28	0.248
0.272	0.258
0.281	0.274
0.288	0.262

A0B	
x	y
0.288	0.262
0.281	0.274
0.29	0.291
0.296	0.276

A0C	
x	y
0.272	0.258
0.264	0.267
0.274	0.286
0.281	0.274

A0D	
x	y
0.281	0.274
0.274	0.286
0.283	0.305
0.29	0.291

ASA	
x	y
0.255	0.255
0.255	0.27
0.27	0.27
0.27	0.255

ASB	
x	y
0.27	0.255
0.27	0.27
0.285	0.27
0.285	0.255

ASC	
x	y
0.255	0.27
0.255	0.285
0.27	0.285
0.27	0.27

ASD	
x	y
0.27	0.27
0.27	0.285
0.285	0.285
0.285	0.27

SUA	
x	y
0.26	0.225
0.27	0.225
0.27	0.24
0.26	0.24

SUB	
x	y
0.27	0.225
0.285	0.225
0.285	0.24
0.27	0.24

SUC	
x	y
0.26	0.24
0.27	0.24
0.27	0.255
0.26	0.255

SUD	
x	y
0.27	0.24
0.285	0.24
0.285	0.255
0.27	0.255

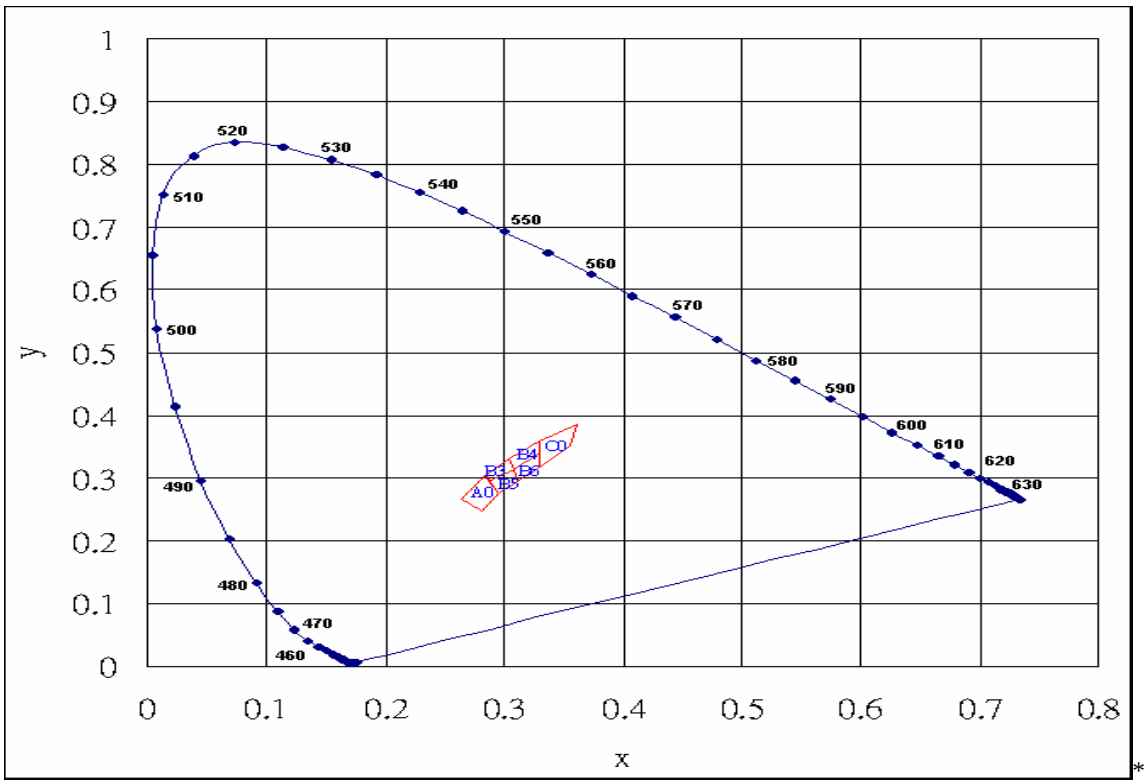
Color Coordinates Measurement Allowance is ±0.01

■ **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
	K1	3.6-3.7V

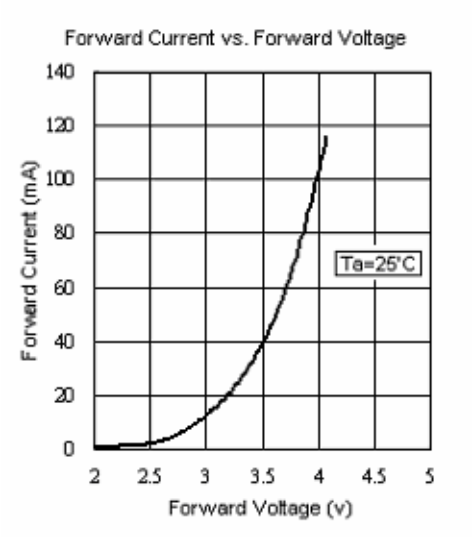
*** Forward Voltage Measurement Allowance is ±0.05V**

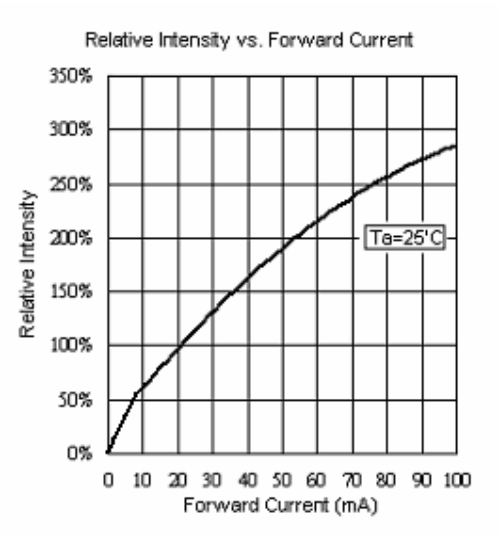
Chromaticity diagram

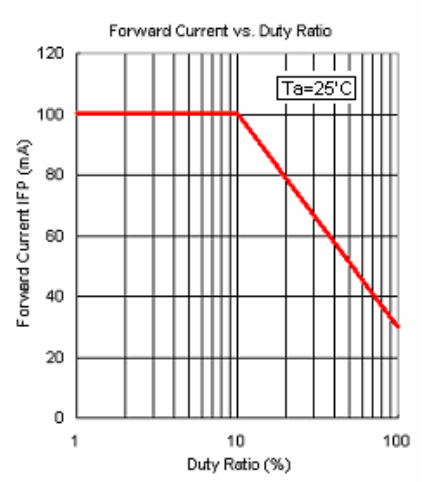


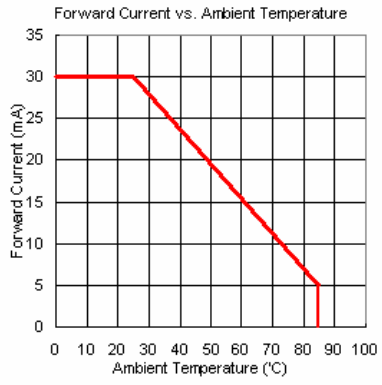
* Color Coordinates Measurement Allowance is ±0.01

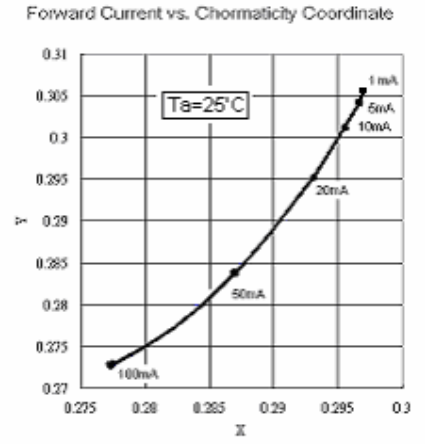
Characteristics of HT-V108 Series

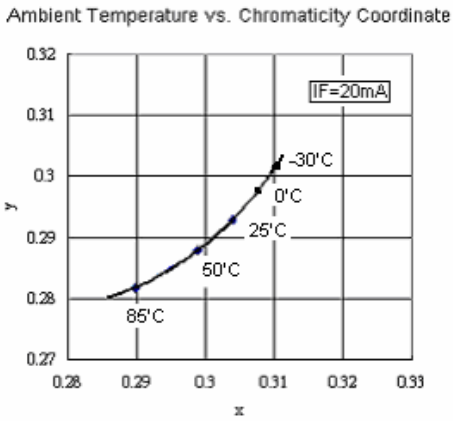


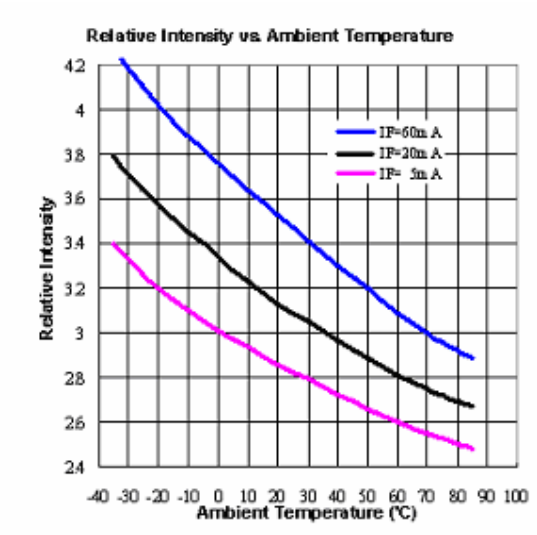


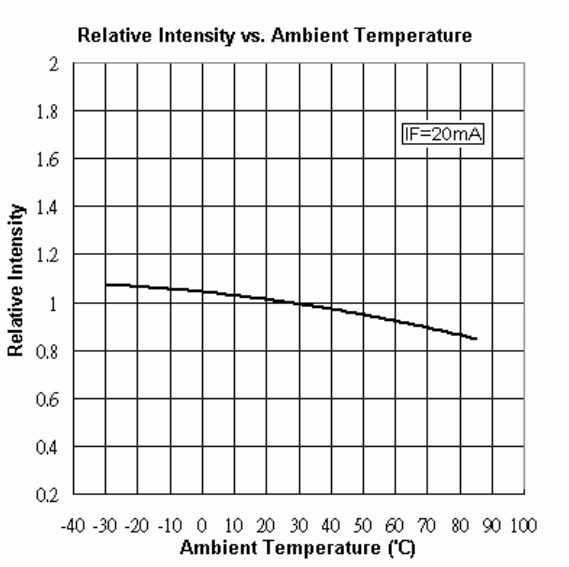


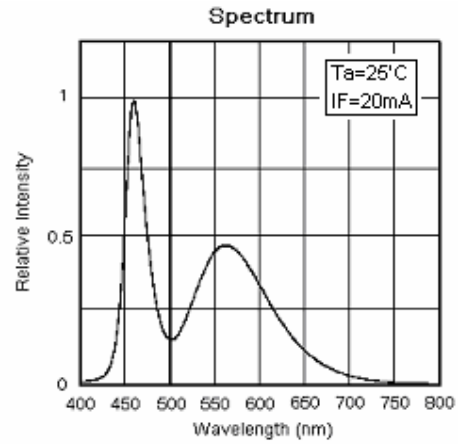


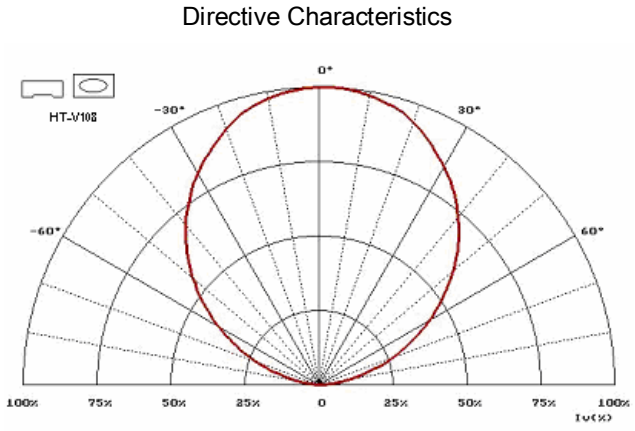

Forward Current vs. Chormaticity Coordinate
Ta=25'C
1mA
5mA
10mA
20mA
50mA
100mA
y
x


Ambient Temperature vs. Chromaticity Coordinate
IF=20mA
-30'C
0'C
25'C
50'C
85'C
y
x


Relative Intensity vs. Ambient Temperature
IF=60mA
IF=20mA
IF= 5mA
Relative Intensity
Ambient Temperature (°C)

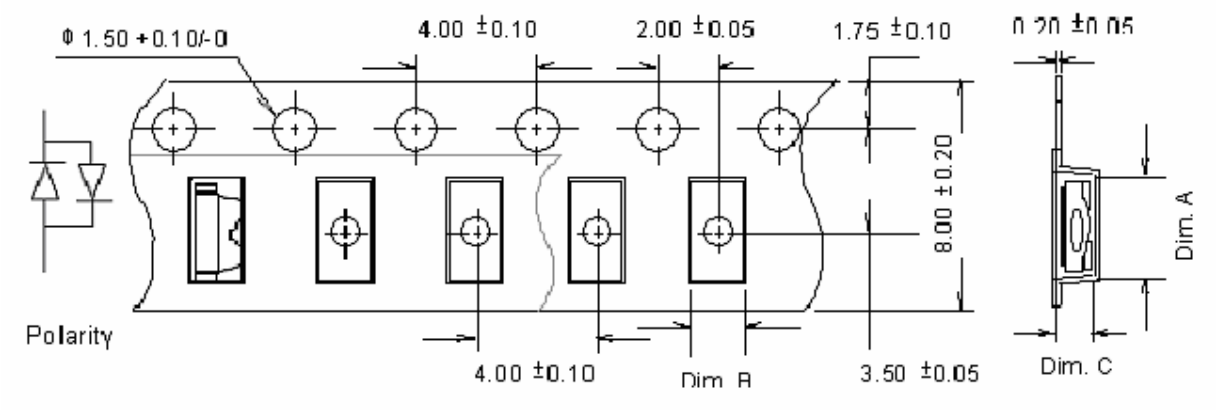

Relative Intensity vs. Ambient Temperature
IF=20mA
Relative Intensity
Ambient Temperature (°C)


Spectrum
Ta=25'C
IF=20mA
Relative Intensity
Wavelength (nm)


Directive Characteristics
HT-V108
0°
30°
60°
-30°
-60°

Packaging Tape, Reel, and Packing Model

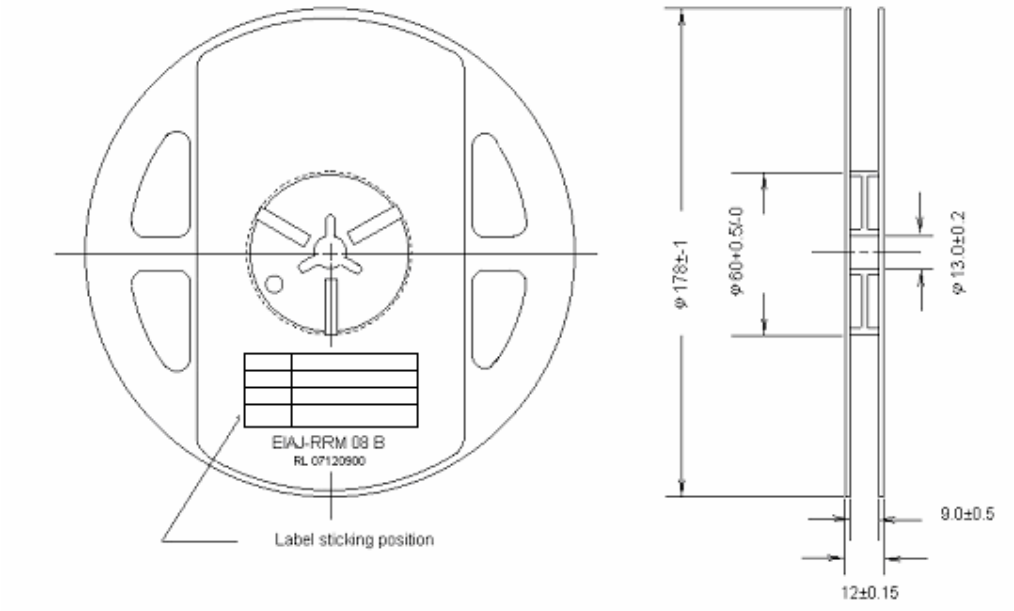
Tape Dimension



Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-V108	3.05±0.05	1.35±0.05	0.95±0.05	1K

Unit: mm

Reel Dimension

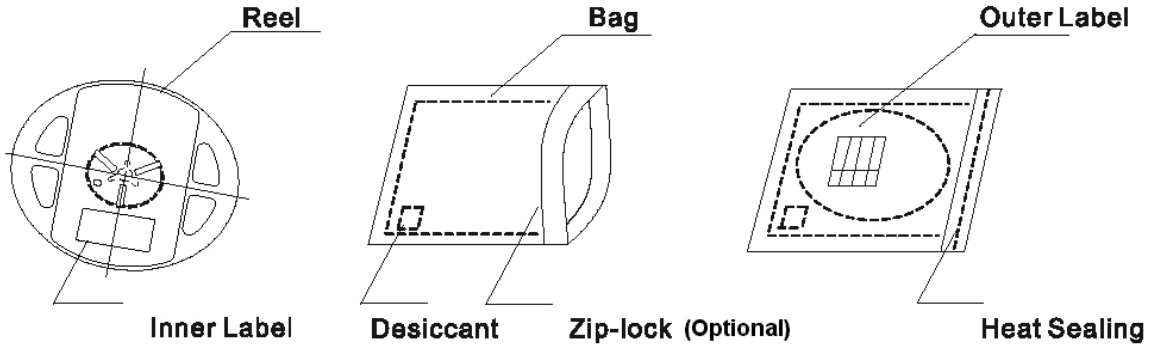


Dry Pack

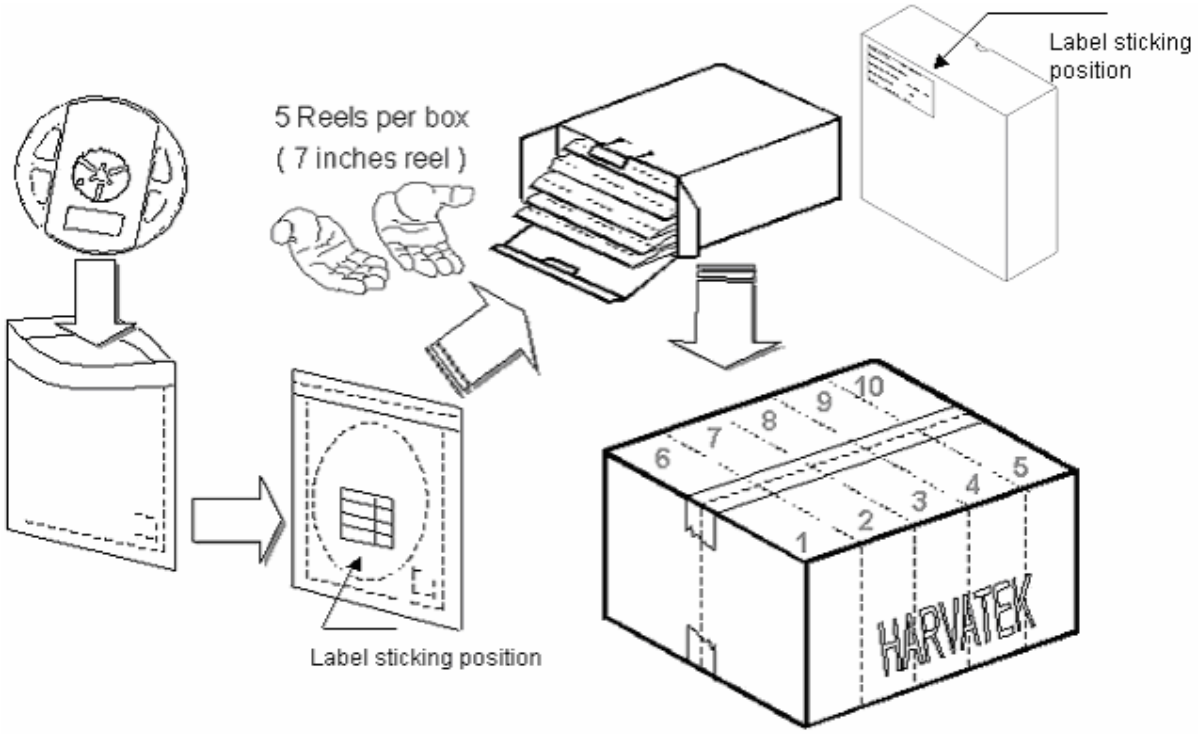
Any SMD optical device, like this chip LED, is **MOISTURE SENSITIVE device**. Avoid absorbing moisture at any time during transportation or storage. Every reel will be packaged in the moisture barrier anti-static bag (Specific bag material will depend upon customers' requirement or option). And the bag 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:



Packing Model



Packing Units

	Reel/bag	Quantity/bag (pcs)
Moisture proof foil bag	1 reel	2,000 MAX.

Cardboard box	Dimensions (mm)	Reel/box	Quantity/box (pcs)
Cardboard box S	455x252x286	5 reel MAX.	10,000 MAX.
Cardboard box L	490x447x288	10 reel MAX.	20,000 MAX.

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.

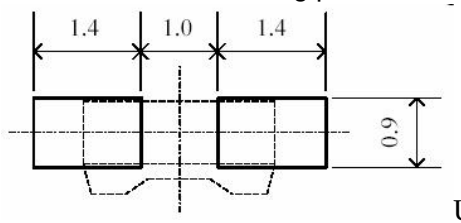
Electric-static may cause damage to the component. Please confirm that the equipment grounding well. Using an ionizer fan is recommended.

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.

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.



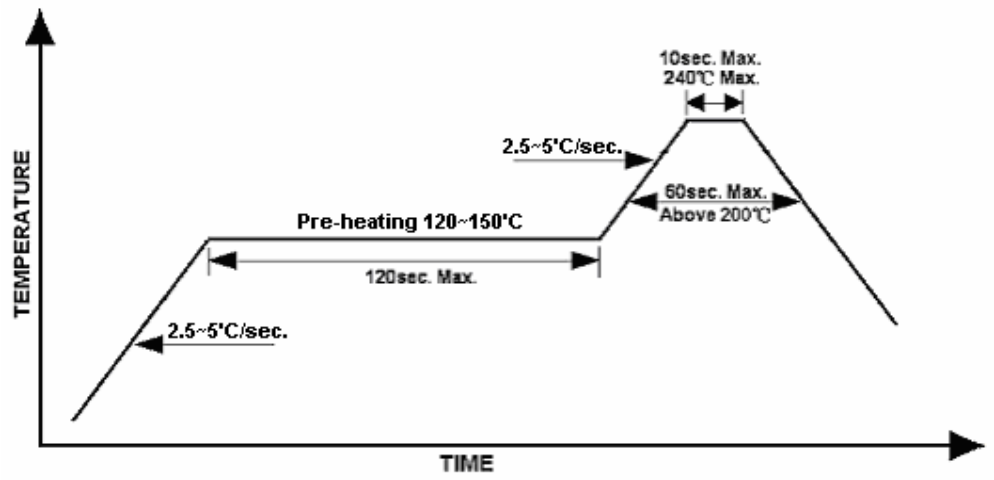
Unit: mm

Soldering terminal may shift in x, y direction.

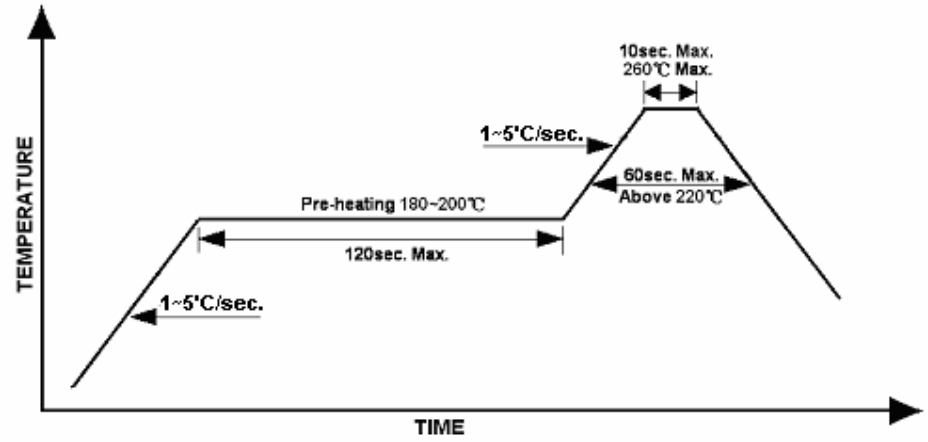
Reflow Soldering

- Never take next process until the component is cooled down to room temperature after reflow.
- Hand soldering condition: Max 350 °C/ Max 3sec (one time only)
- The recommended reflow soldering profile (measuring on the surface of the LED resin) is following:

Temperature Profile (Lead Solder)



Temperature Profile (Lead-free Solder)



Rework

- Customer must finish rework within 5 sec. under 260 °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

Test items and Result

Item	Number of Damaged	Standards Reference	Conditions
Precondition		J-STD-020	1.) Baking at 85°C for 24hrs 2.) Moisture storage at 85°C/ 60% R.H. for 168hrs For all reliability monitoring tests according to JEDEC Level 2
Resistance to soldering heat (Reflow soldering)	0/ 50	JEITA ED-4701 300 301	Tsld=260℃/10sec (pre treatment 30℃/70%R.H. 168hrs) 2 times
Solderability	0/ 50	JESD22-B102-B And CNS-5068	A: 215±5°C/ 3±1s (Lead Solder) B: 260±5°C/ 10±1s (Lead-free Solder) 1 time; Over 95% area
Thermal Shock	0/ 50	JEITA ED-4701 300 307	A cycle: 0°C 15sec; +100°C 15sec 20 cycles
Temperature cycle	0/ 50	JESD-A104-A IEC 68-2-14, Nb	A cycle: -40°C 30min; +25°C 5min; +100°C 30min; +25°C 5min 100 cycles
Moisture Resistance Cyclic	0/ 50	JEITA ED-4701 200 203	25℃~65℃~ -10℃ 90%R.H. 24hrs/1 cycle 10 cycles
High temperature storage test	0/ 50	CNS-554	100±10°C for 1000hrs
High Temp/Humidity Storage	0/ 50		60°C; 90%R.H. for 1000hrs
Low temperature storage test	0/ 50	CNS-6118	-40±5°C for 1000hrs
Steady state Operating life test condition 1	0/ 50	CNS-11829	1.) Precondition 2.) Ta=25°C; I_F=20mA Duration 1000hrs
Steady state Operation life test condition 2	0/ 50		1.) Precondition 2.)Ta=25℃; I_F =30mA Duration: 500hrs

Steady state Operation life test of high temperature	0/ 50		Ta= 85°C I_F=5mA Duration: 1000hrs
Steady state Operating life test of High humidity, high temperature condition 2	0/ 50		Ta=60°C Humidity: 90% R.H., I_F=15mA Duration: 500hrs
Steady state Operation life test of low temperature	0/ 50		Ta=-30°C I_F=20mA Duration: 1000hrs
Vibration	0/ 50	JEITA ED-4701 400 403	100~2000~100 HZ Sweep 4min. 200m/s^2 3 direction, 4cycles, 48min.
Substrate Bending	0/ 50	JEITA ED-4702	3mm, 5±1sec. 1 time
Stick	0/ 50	JEITA ED-4702	5N, 10±1sec. 1 time

Criteria for Judging the Damage

Item	Symbol	Test Condition	Criteria for Judgement	
			Min.	Max.
Forward Voltage	Vf	I_F = 20mA	-	U.S. L x 1.1
Luminous Intensity	Iv	I_F = 20mA	L.S.L.x 0.7	

Revision History: 2006/1/10

Rev.	**Subject (Major changes since last revision)**
1.	Reliability test modified.
3.1	Modify package quantity to 1k from 2k