

**Harvatek Surface Mount Chip LED Data Sheet  
HT-T7222BP**

Official Product	Product: HT-T7222BP		Data Sheet No.
Tentative Product	*****		HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0	Page 1/18

**DISCLAIMER..... 3**

**PRODUCT SPECIFICATIONS ..... 4**

**ATTENTION: ELECTROSTATIC DISCHARGE (ESD) PROTECTION ..... 4**

**LABEL SPECIFICATIONS ..... 5**

**COLOR TEMPERATURE COORDINATES ..... 8**

**PRODUCT CHARACTERISTICS ..... 9**

**ABSOLUTE MAXIMUM RATINGS ..... 9**

**ELECTRO-OPTICAL CHARACTERISTICS..... 9**

**PACKAGE OUTLINE DIMENSION..... 9**

**RECOMMENDED SOLDERING PATTERN FOR REFLOW SOLDERING..... 9**

**CHARACTERISTIC CURVES FOR BP ..... 10**

**REEL DIMENSION ..... 13**

**PACKING ..... 13**

**DRY PACK..... 14**

**CLEANING ..... 17**

**REVISION HISTORY ..... 18**

Official Product	Product: HT-T7222BP		Data Sheet No.
Tentative Product	*****		HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0	Page 2/18

**DISCLAIMER**

HARVATEK reserves the right to make changes without further notice to any products herein to improve reliability, function or design. HARVATEK does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

**LIFE SUPPORT POLICY**

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.

Official Product	Product: HT-T7222BP			Data Sheet No.
Tentative Product	*****			HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0	Page 3/18	

### Product Specifications

	Specification	Material	Quantity
Iv	86 lm typ. @150mA / Ta=25° C, ± 10%		
XY	Refer to page 6 ~ 8 @150mA / Ta=25° C, ± 0.005		
Vf	7.0V max @150mA / Ta=25°C, ± 0.05 V		
Resin	Yellow	Silicone Resin	
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	

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, λD 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.

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 4/18

### Label Specifications

<b>HARVATEK</b> TECHNOLOGIES		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 - T 7 2 2 2 B P - Y Y Y Y**

Series Name	Emitting Color	Customer Code
<b>HT-T7222</b> HT: Harvatek T7222: 7.0 (L) x 2.0 (W) x 0.7 (H) mm	<b>BP</b> White @150mA	<b>YYYY</b> Customer Product Code (TBD)

Lot No.:

1	2	3	4	5	6	7	8	9	10
<b>E</b>	<b>1</b>	<b>A</b>	<b>1</b>	<b>A</b>	<b>2</b>	<b>2</b>	<b>L</b>	<b>1</b>	<b>2</b>
Code 1 2		Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10
		Mfg. Year	Mfg. Month	Mfg. Date	Consecutive number		Special code		
Internal Tracing Code		2010-A 2011-B 2012-C 2013-D . .	1:Jan. 2:Feb. ... A:Oct. B:Nov. C:Dec.	1:A 2:B 3:C ... 26:Z 27:7 28:8 29:9 30:3 31:4	01~ZZ		000~ZZZ		

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 5/18

■ **Luminous Intensity (Iv) Bin:**

Bin	Luminous Intensity Range (lm)	
	Minimum	Maximum
TC2	76.6	82
TD2	82	87.4
UA1	87.4	93.5
UB1	93.5	99.6
UC2	99.6	106.6

@150mA / Ta=25<sup>o</sup> C, Tolerance: ± 10%

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

Color	Bin Code	Spec. Range
White (BP)	R1	6.0 – 6.1V
	R2	6.1 – 6.2V
	R3	6.2 – 6.3V
	R4	6.3 – 6.4V
	S1	6.4 – 6.5V
	S2	6.5 – 6.6V
	S3	6.6 – 6.7V
	S4	6.7 – 6.8V
	T1	6.8 – 6.9V
	T2	6.9 – 7.0V

@150mA / Ta=25<sup>o</sup>C, Tolerance: ± 0.05 V

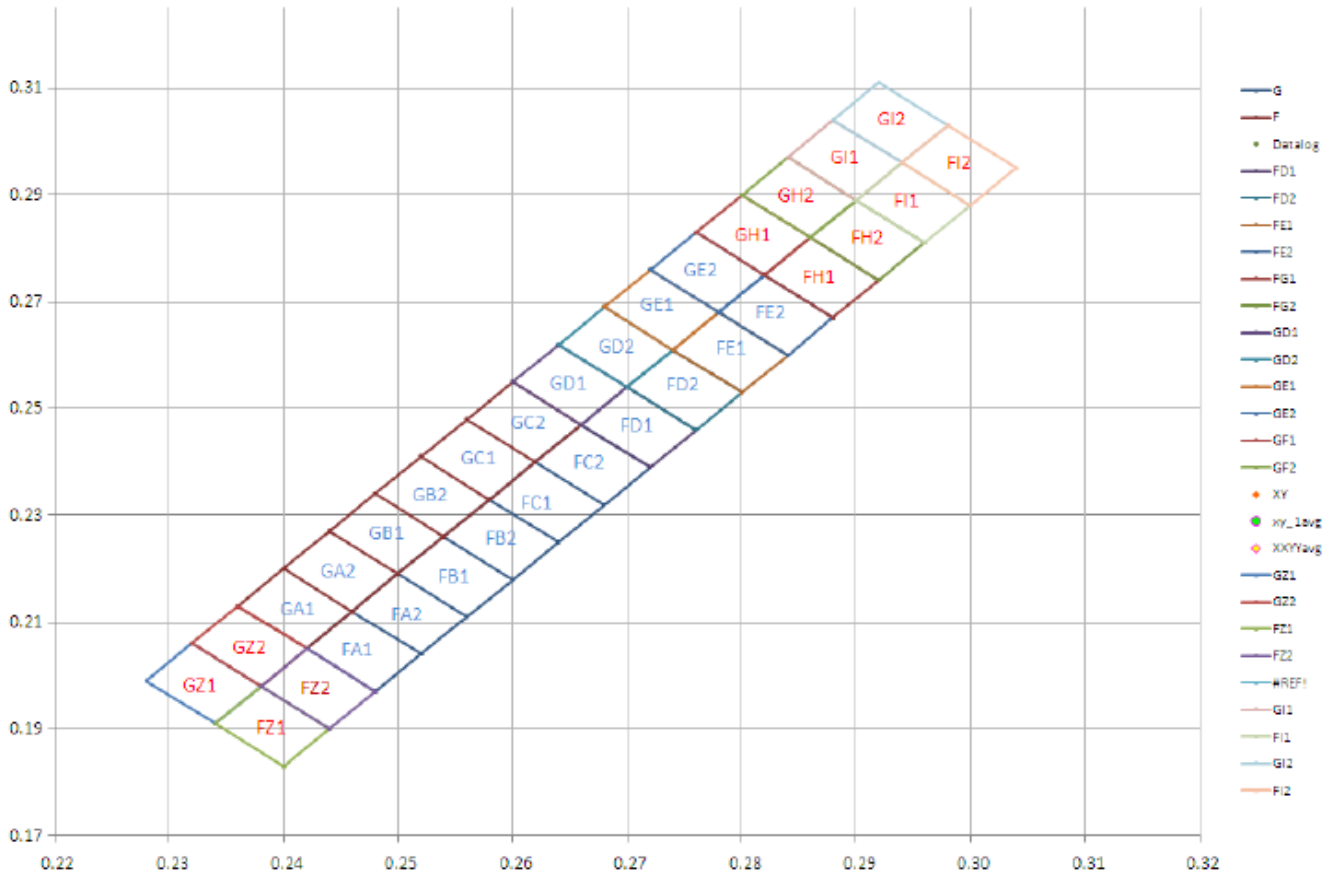
Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 6/18

**■ Chromaticity Bin (for TW only):**

FD1	0.272	0.234	GD1	0.266	0.242	GI1	0.29	0.284	FZ1	0.24	0.178
	0.266	0.242		0.26	0.25		0.284	0.292		0.234	0.186
	0.27	0.249		0.264	0.257		0.288	0.299		0.238	0.193
	0.276	0.241		0.27	0.249		0.294	0.291		0.244	0.185
	0.272	0.234		0.266	0.242		0.29	0.284		0.24	0.178
FD2	0.276	0.241	GD2	0.27	0.249	FI1	0.296	0.276	FZ2	0.244	0.185
	0.27	0.249		0.264	0.257		0.29	0.284		0.238	0.193
	0.274	0.256		0.268	0.264		0.294	0.291		0.242	0.2
	0.28	0.248		0.274	0.256		0.3	0.283		0.248	0.192
	0.276	0.241		0.27	0.249		0.296	0.276		0.244	0.185
FE1	0.28	0.248	GE1	0.274	0.256	EI1	0.302	0.268			
	0.274	0.256		0.268	0.264		0.296	0.276			
	0.278	0.263		0.272	0.271		0.3	0.283			
	0.284	0.255		0.278	0.263		0.306	0.275			
	0.28	0.248		0.274	0.256		0.302	0.268			
FE2	0.284	0.255	GE2	0.278	0.263	GI2	0.294	0.291			
	0.278	0.263		0.272	0.271		0.288	0.299			
	0.282	0.27		0.276	0.278		0.292	0.306			
	0.288	0.262		0.282	0.27		0.298	0.298			
	0.284	0.255		0.278	0.263		0.294	0.291			
FG1	0.288	0.262	GF1	0.282	0.27	FI2	0.3	0.283			
	0.282	0.27		0.276	0.278		0.294	0.291			
	0.286	0.277		0.28	0.285		0.298	0.298			
	0.292	0.269		0.286	0.277		0.304	0.29			
	0.288	0.262		0.282	0.27		0.3	0.283			
FG2	0.292	0.269	GF2	0.286	0.277	EI2	0.306	0.275			
	0.286	0.277		0.28	0.285		0.3	0.283			
	0.29	0.284		0.284	0.292		0.304	0.29			
	0.296	0.276		0.29	0.284		0.31	0.282			
	0.292	0.269		0.286	0.277		0.306	0.275			

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 7/18

**Color Temperature Coordinates**



Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 8/18



**Product Characteristics**

**Absolute Maximum Ratings**

Product	Emission Color	P <sub>d</sub> (mW)	I <sub>F</sub> (mA)	I <sub>FP</sub> * (mA)	T <sub>J</sub>	T <sub>OP</sub> (°C)	T <sub>ST</sub> (°C)
HT-T7222BP	White	1000	150	180	120 °C	-35°C~+80°C	-40°C~+85°C

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

\*\*Remarks: This product should be operated in forward bias. If a reverse voltage is continuously applied to the product, such operation can cause migration resulting in LED damage.

**Electro-Optical Characteristics**

(T<sub>a</sub> 25 °C)

Product	Emission Color	I <sub>F</sub> (mA)	V <sub>F</sub> (V)		Color	Flux (lm)
			typ	max	C.I.E.	typ
HT-T7222BP	White	150	6.0	7.0	X=0.26 Y=0.23	86

\* Per NIST standards

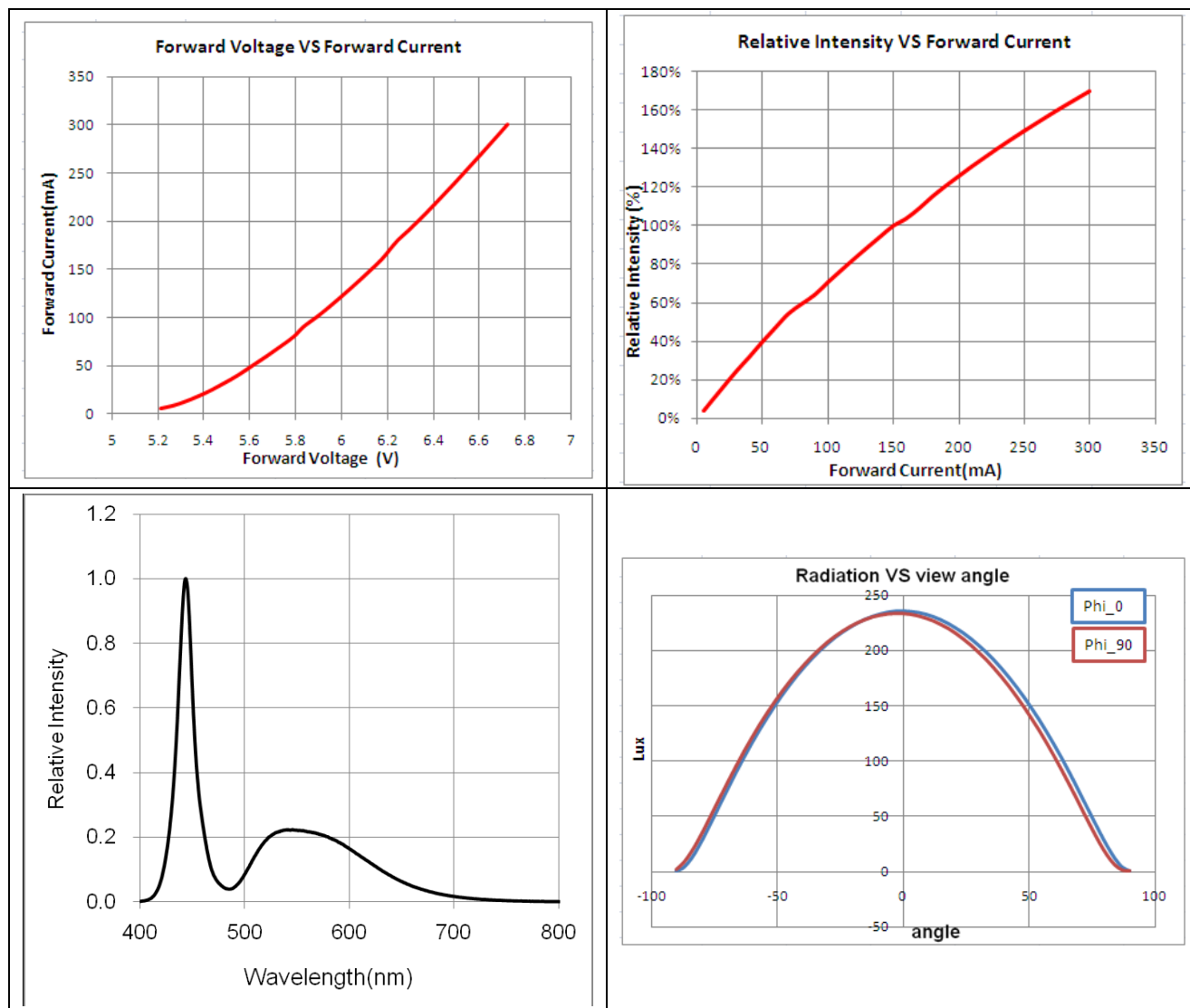
**Package Outline Dimension**  
**Recommended Soldering Pattern for Reflow Soldering**

Unit: mm Tolerance: +/-0.1

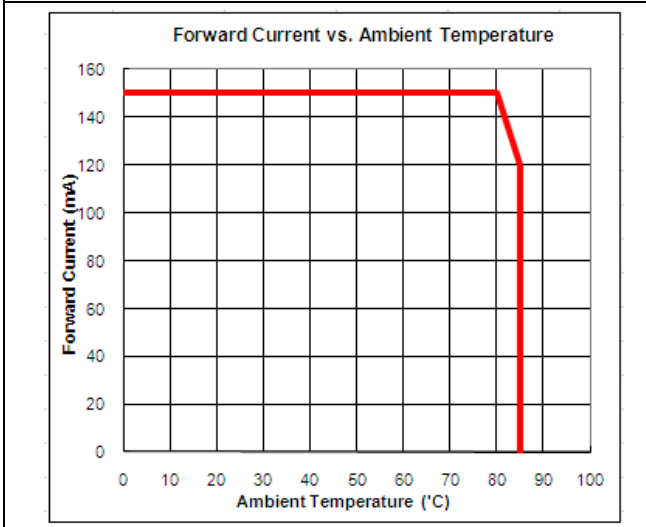
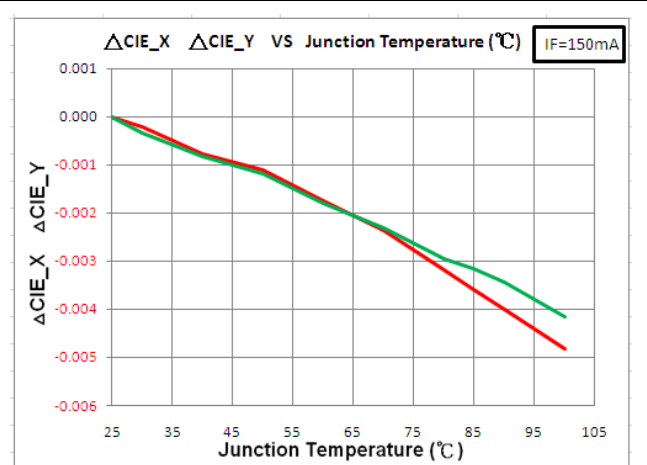
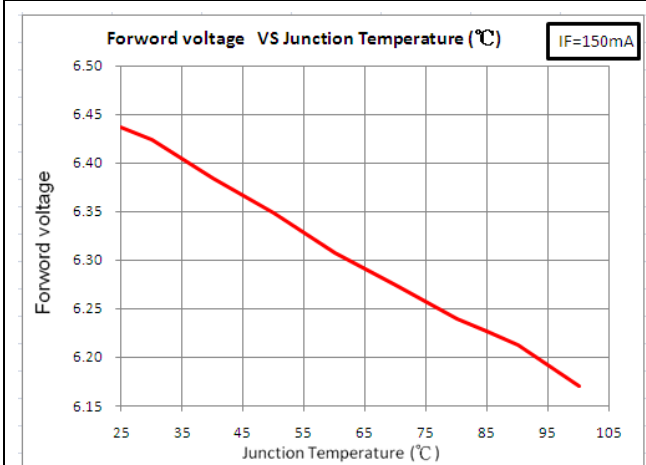
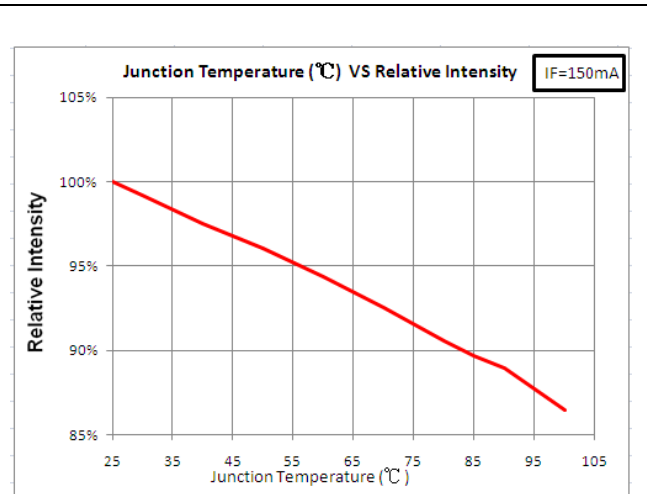
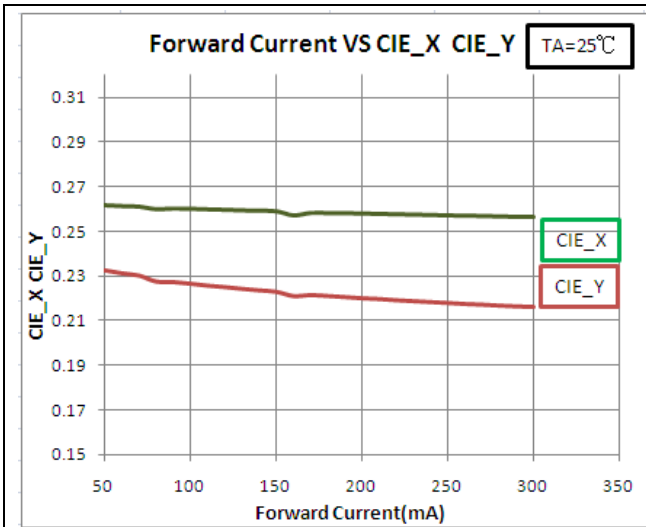
Outline Dimension	Solder Pattern
Soldering terminals may shift in the x, y direction.	Unit: mm

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 9/18

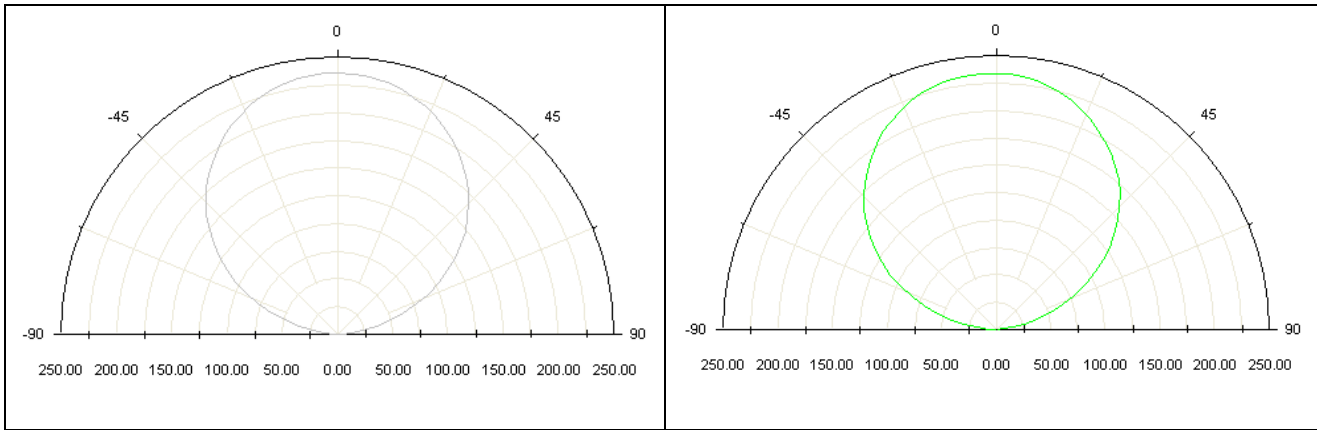
**Characteristic Curves for BP**



Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 10/18

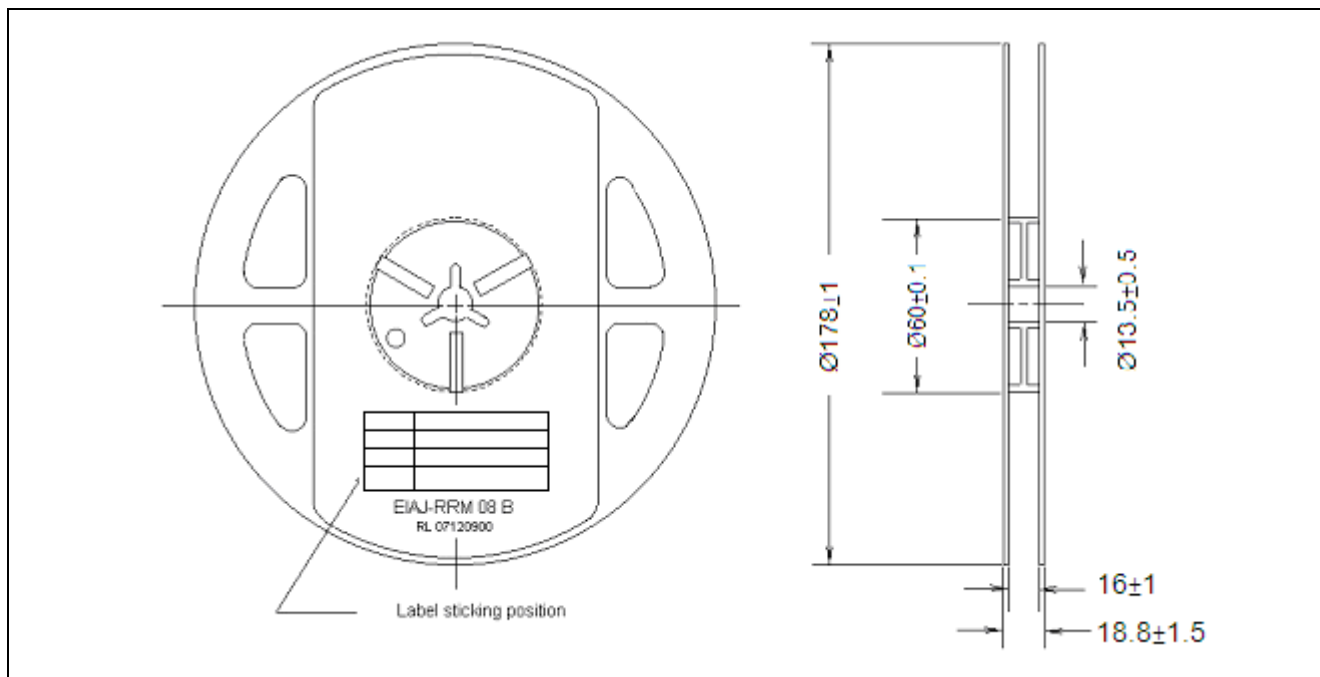


Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 11/18

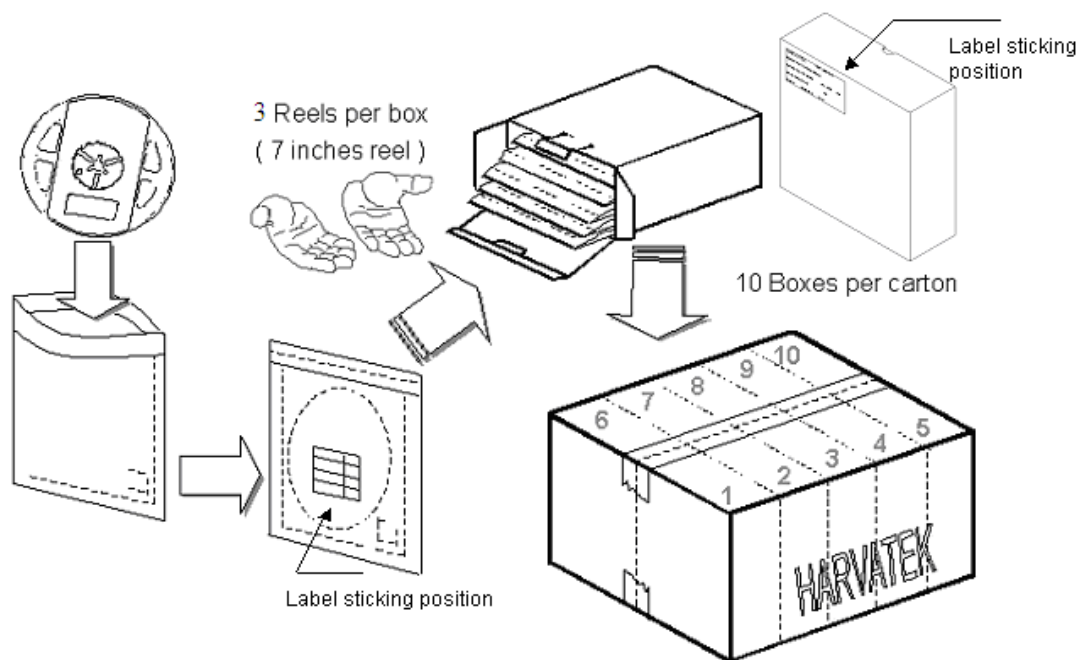


Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 12/18

**Reel Dimension**



**Packing**



5 boxes per carton is available depending on shipment quantity.

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 13/18

## Precaution of Application

### Designing 1: 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.

### Designing 2: Circuit layout

Due to the circuit design is not available, assuming the circuit is in parallel and a resistor that is put in series in the circuit, it cannot provide an effective current-limiting function to the LEDs due to each LED had a different inherent resistance.

In general, the LEDs usually have a different inherent resistance. Different inherent resistance will cause different current, the LED on the different path would be driven at different power, and the result was the LED with a higher resistance would be dimmer than the other.

To solve this situation, a suitable resistor is put in series with each LED to limit the current disparity through the LED will be very useful.

### Designing 3: Max Rating

Any application should refer to the specifications of absolute maximum ratings.

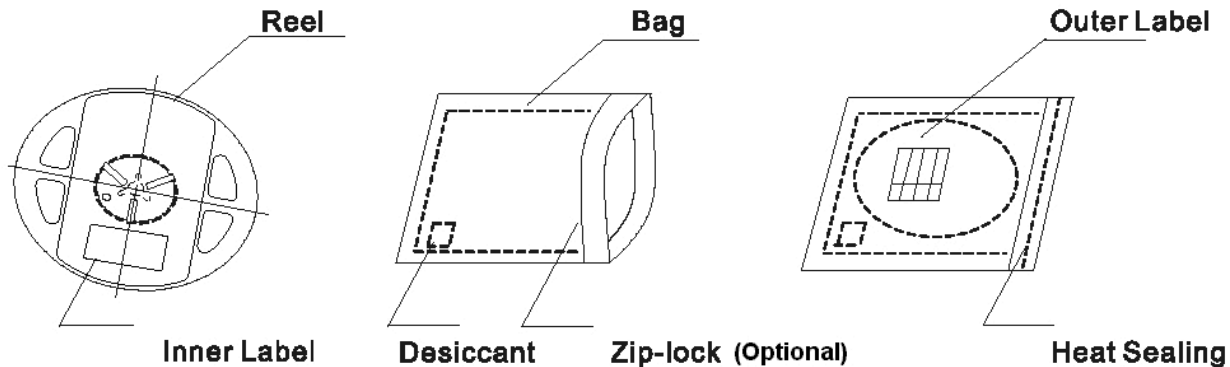
## Dry Pack

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.

Official Product	Product: HT-T7222BP		Data Sheet No.
Tentative Product	*****		HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0	Page 14/18

### The Package:



### Storage

It's recommended to store the products in the following conditions:

Humidity: 60 %RH Max.

Temperature: 5°C ~30°C (41°F~86°F)

1. Shelf life in sealed bag: 12 month at <40°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°C /60% RH, or
  - 2.2 Stored at 20% RH with zip-lock sealed.

### Baking

It's recommended to bake before soldering once the pack is unsealed open & re-sealed after 72 hours. The conditions are as followings:

60±3°C (12~24hrs) and < 5% RH, taped reel type

100±3°C (45min~1hr), bulk type

130±3°C (15~30min), bulk type

### Soldering

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°C±5°C Max.(25W)

It's banned to load any stress on the resin during soldering.

Soldering time: 3±1sec

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 15/18

## Handling of Silicone Resin LEDs

### Handling Indications

During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound.



Figure 1

In general, LEDs should only be handled from the side. By the way, this also applies to LEDs without a silicone sealant, since the surface can also become scratched.

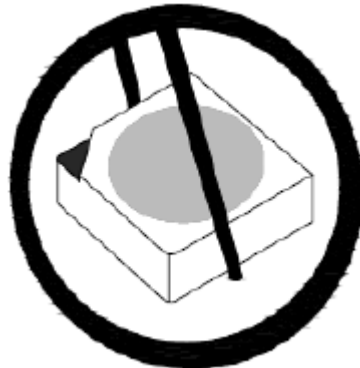


Figure 2

When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented.

This is assured by choosing a pick and place nozzle which is large than LEDs reflector area.

Official Product	Product: HT-T7222BP	Data Sheet No.	
Tentative Product	*****	HT-T7222BP	
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0	Page 16/18

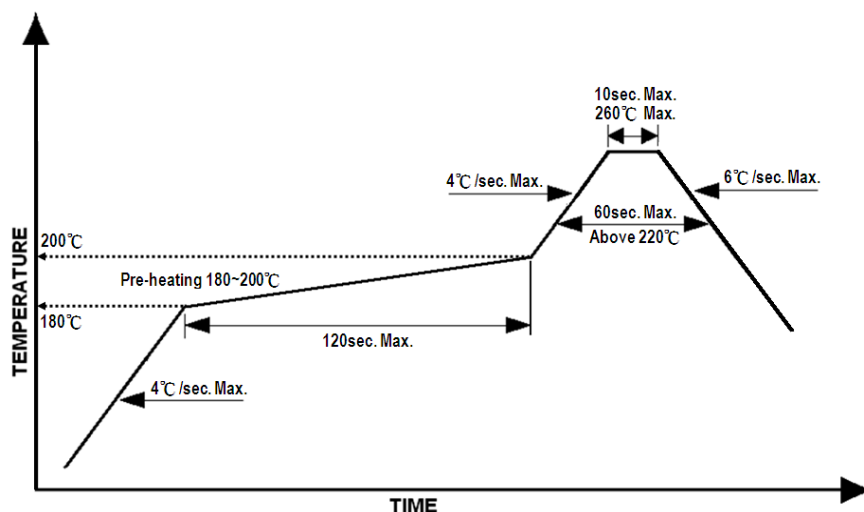


**Reflow Soldering**

Recommend soldering paste specifications:

1. Operating temp.: Above 220°C, 60 sec.
2. Peak temp.:260°C Max., 10sec Max.
3. Reflow soldering should not be done more than two times.
4. Never attempt next process until the component is cooled down to room temperature after reflow.
5. The recommended reflow soldering profile (measured on the surface of the LED terminal) is as following:

**Lead-free Solder Profile**



**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.

Official Product	Product: HT-T7222BP	Data Sheet No.
Tentative Product	*****	HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0
		Page 17/18

**Revision History**

Changes since last revision	Page	Version No.	Revision Date
Initial release		1.0	06-25-2013

Official Product	Product: HT-T7222BP		Data Sheet No.
Tentative Product	*****		HT-T7222BP
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	June 25, 2013	Version of 1.0	Page 18/18