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**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 HARATEK 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.*

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## Product Specification

	Specification	Material	Quantity
Iv	Red: Q: 63-125mcd R: 100-200mcd Green: R: 100-200mcd S: 160-320mcd Blue: P: 40-80mcd Q: 63-125mcd <b>@20mA/ Ta= 25° C</b>		
wavelength	Red: B:600-603nm C:603-606nm D:606-609nm Green: B:520-525nm C:525-530nm D:530-535nm Blue: C:470-475nm D:475-480nm <b>@20mA/ Ta= 25° C</b>		
Vf	Blue/ Green 3.1-3.6v Red: 1.6-2.4v at 20mA		
Ir	< 20 μA @ V <sub>R</sub> = 5 V		
Resin	Milky Diffused	Epoxy resin	
Carrier tape	According to EIA 481-1A specs	Conductive tape	3000pcs per reel
Reel	According to EIA 481-1A specs	Conductive	
Label	HT standard	Paper	

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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 AllnGaP, 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.

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**Description of Model No. and Lot No.**

**Model No.**

**H T - 3 1 1 F D H**

Series Name	Emitting Color			
.... HT-150: 3.2x1.6x1.1mm HT-260: 3.2x1.2x1.1mm HT-170: 2.0X1.25x0.8mm HT-190: 1.6x0.8x0.8mm HT-191: 1.6x0.8x0.6mm ....	Full Color: Red, Green and Blue			

**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 .....	1: Jan. 2: Feb. .... 9: Sep. A: Oct. B: Nov. C: Dec.	1~31/ (30)	01~99, A,B,C...	D: Milky White C: Water Clear	T: Taped Reel □: Bulk

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### Electro-Optical Characteristics

( $I_F$  @ 20mA,  $T_a$  25°C)

Code for parts	Lighting Color			$V_F$ (V)		(nm)			$I_V$ (mcd)
				typ	max	D	P	Min	
HT-311FCH	Die1	Ultra Bright Orange	UD	1.9	2.4	605	609	17	63
	Die2	Green	NG	3.3	3.7	527	520	150	100
	Die3	Blue	NB	3.3	3.7	470	468	40	40

\* Per NIST standards

### Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

Unit: mm Tolerance: +/-0.1

Outline Dim.	Soldering Pattern
	<p>Unit: mm</p>
<ol style="list-style-type: none"> <li>Soldering terminal may shift in x, y direction.</li> <li>Common anode.</li> </ol>	

### 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)
UD	72	30	100**	5	<100@ $V_R = 5$	-30~+80	-40~+85
NB/NG	78	20	80**				

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

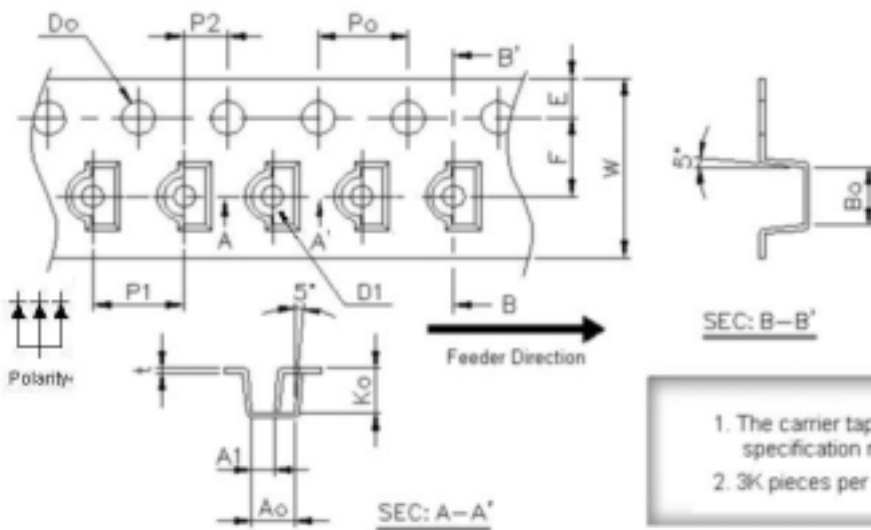
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## Packaging Tape, Reel, and Packing Model

### Tape Dimension

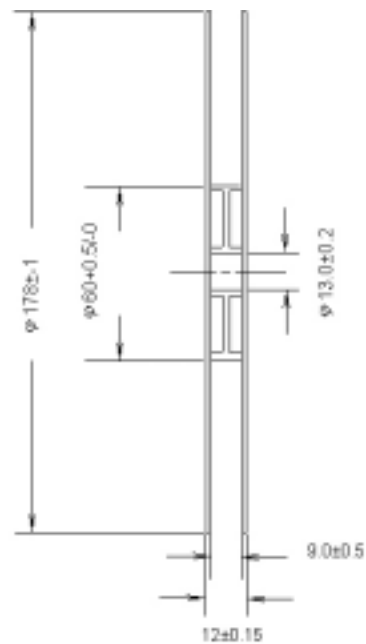
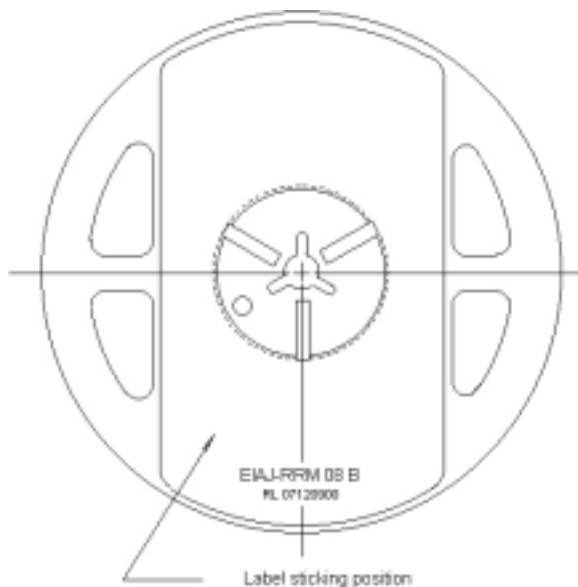
Common Dimension (unit: mm)									
Item	W	P1	E	F	Do	D1	Po	10Po	P2
Spec	8.00	4.00	1.75	3.50	1.50	1.00	4.00	40.00	2.00
Trn.	±0.20	±0.10	±0.10	±0.05	+0.10 -0.00	±0.05	±0.05	±0.20	±0.05

Pocket Dim.		
Item	Spec	Trn.
Ao	1.70	±0.10
A1	0.70	±0.10
Bo	3.40	±0.10
Ko	1.05	±0.10
t	0.20	±0.05



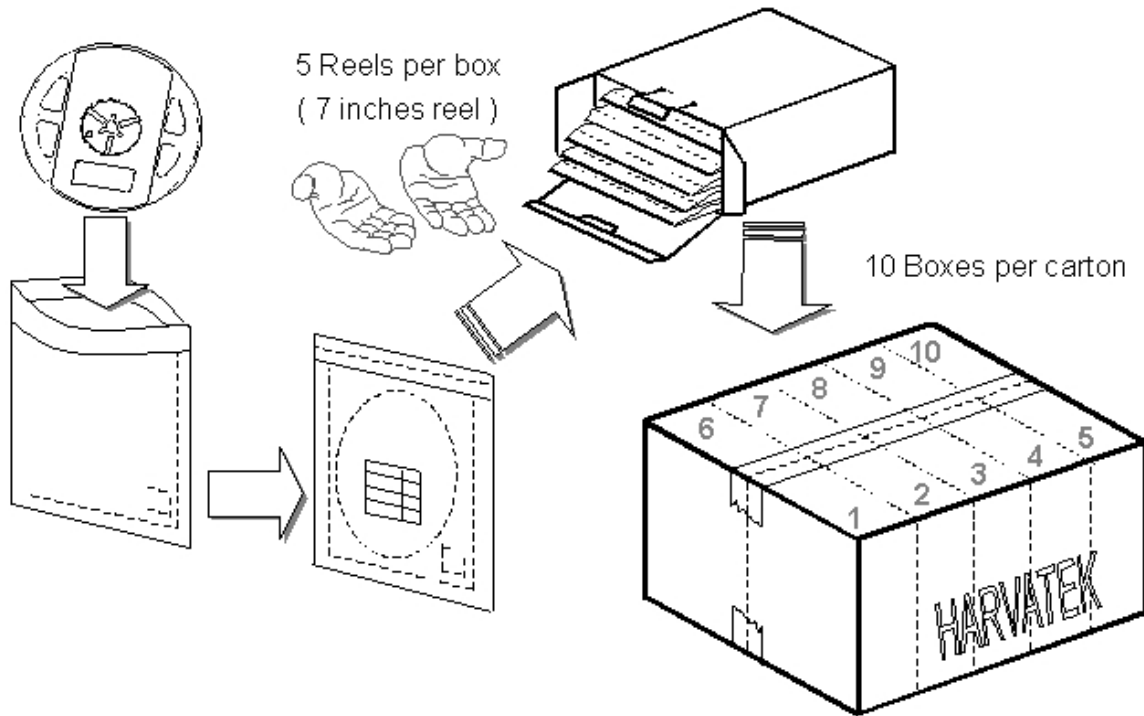
1. The carrier tape and components loading specification meet the EIA 481-1A Standards.
2. 3K pieces per reel is standard loading quantity.

### Reel Dimension



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## PACKING MODEL



5 boxes per carton is available according to shipping quantity.

## Dry Pack

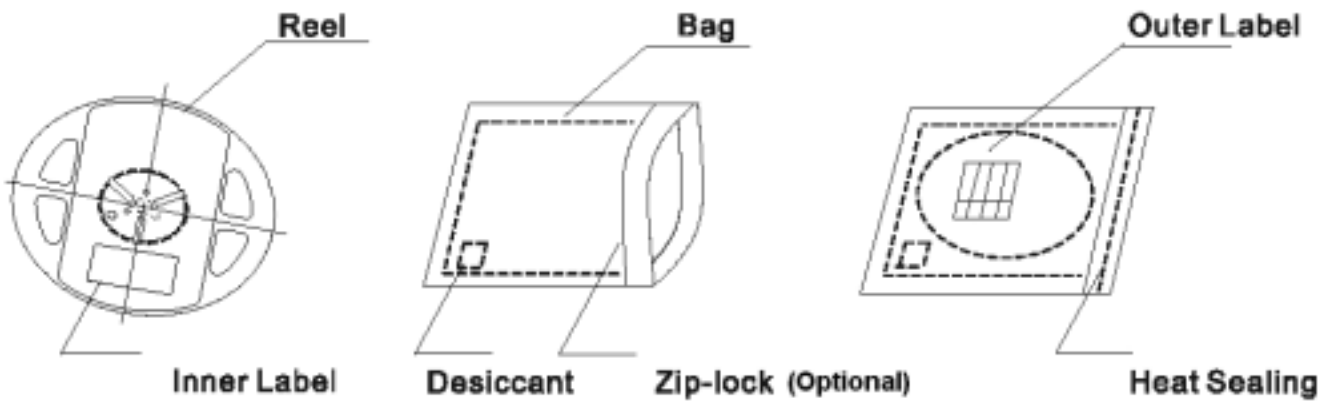
Any SMD optical device, like this chip LED, is **MOISTURE SENSITIVE device**. Avoid absorbing moisture at any time during transportation or storage. Every reel will be packaged in the moisture barrier anti-static bag (Specific bag material will depend upon customers' requirement or option). And the bag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

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### 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.

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