

**Harvatek Surface Mount LED Data Sheet  
HT-372 Series**

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Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

Page 1/22

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<b>DISCLAIMER</b>	3
<b>PRODUCT SPECIFICATIONS</b>	4
<b>ATTENTION: ELECTROSTATIC DISCHARGE (ESD) PROTECTION</b>	5
<b>LABEL SPECIFICATIONS</b>	6
<b>PRODUCT CHARACTERISTICS</b>	10
<b>ABSOLUTE MAXIMUM RATINGS</b>	10
<b>ELECTRO-OPTICAL CHARACTERISTICS</b>	10
<b>PACKAGE OUTLINE DIMENSION</b>	11
<b>RECOMMENDED SOLDERING PATTERN FOR REFLOW SOLDERING</b>	11
<b>CHARACTERISTIC CURVES FOR UD (ULTRA BRIGHT AMBER) AND USD (ULTRA BRIGHT RED)</b>	12
<b>CHARACTERISTIC CURVES FOR NB (BLUE) AND NG (TRUE GREEN)</b>	13
<b>CHARACTERISTIC CURVES FOR ALL COLORS (RADIATION PATTERN)</b>	14
<b>PACKAGING</b>	15
<b>TAPE DIMENSION</b>	15
<b>REEL DIMENSION</b>	16
<b>PACKING</b>	17
<b>DRY PACK</b>	18
<b>REFLOW SOLDERING</b>	19
<b>PRECAUTIONS</b>	20
<b>REWORKING</b>	20
<b>CLEANING</b>	20
<b>RELIABILITY</b>	21
<b>REVISION HISTORY</b>	22

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Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 2/22

**DISCLAIMER**

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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.

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Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 3/22

**Product Specifications**

Product	Emission Color	Technology	Test Current $I_F$ (mA)	Luminous Intensity $I_V$ (mcd)	Forward Voltage $V_F$ (V)	Orderable Part Number
HT-372FCH	Ultra Bright Red	AlInGaP	20	120 typ	1.9 typ	HT-372FCH-ZZZZ
	True Green	InGaN	20	200 typ	3.3 typ	
	Blue	InGaN	20	90 typ	3.3 typ	
HT-372FDH	Ultra Bright Amber	AlInGaP	20	120 typ	1.9 typ	HT-372FDH-ZZZZ
	True Green	InGaN	20	200 typ	3.3 typ	
	Blue	InGaN	20	90 typ	3.3 typ	

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

	Specification	Material	Quantity
Resin	Water clear	Epoxy resin	
Carrier tape	Per EIA 481-1A specs	Conductive black tape	4000pcs 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:**

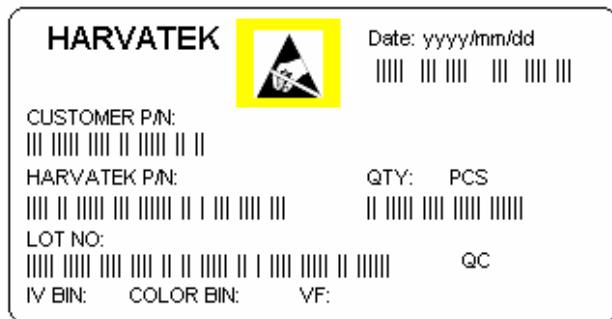
Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of  $I_v$ ,  $\lambda_D$  and  $V_f$ . Each reel has a label identifying its specification; the immediate box consists of a product label as well.

**ATTENTION: Electrostatic Discharge (ESD) protection**

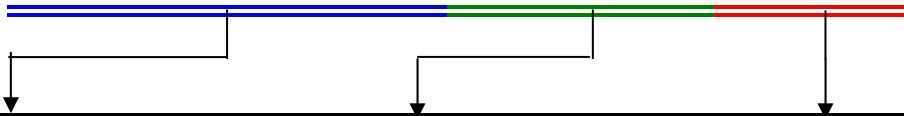
The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD 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-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Label Specifications****Harvatek P/N:**

**H T - 3 7 2 XXX - ZZZZ**



Series Name	Emitting Color	Customer Code
HT-372 HT: Harvatek 372: 0805 full color series 2.0 (L) x 1.3 (W) x 0.5 (H) mm	XXX FCH: Full Color Ultra Bright Red True Green Blue FDH: Full Color Ultra Bright Amber True Green Blue	ZZZZ Customer Product Code (TBD)

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 6/22

**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 2: 2002 3: 2003 .....	1: Jan. 2: Feb. .... 9: Sep. A: Oct. B: Nov. C: Dec.	1~31/ (30)	01~99, A,B,C...	D: Diffused	T: Tape & Reel

**Luminous Intensity (IV) Bin:**

Bin	Luminous Intensity Range (mcd)		Bin	Luminous Intensity Range (mcd)	
	Minimum	Maximum		Minimum	Maximum
H1	2.8	3.6	H2	3.6	4.5
J1	4.5	5.7	J2	5.7	7.2
K1	7.2	9.0	K2	9.0	11.2
L1	11.2	14.2	L2	14.2	18.0
M1	18.0	22.5	M2	22.5	28.5
N1	28.5	36.0	N2	36.0	45.0
P1	45.0	57.0	P2	57.0	71.5
Q1	71.5	90.0	Q2	90.0	112.5
R1	112.5	142.0	R2	142.0	180.0
S1	180.0	227.0	S2	227.0	285.0
T1	285.0	360.0	T2	360.0	450.0
U1	450.0	570.0	U2	570.0	715.0

@20mA / Ta=25°C, Tolerance: ± 10%

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**■ Wavelength ( $\lambda_D$ ) Bin:**

Bin	Wavelength Range (nm)			
	Red (USD)		Amber (UD)	
	Min	Max	Min	Max
-	615.0	630.0		
A			597.0	600.0
B			600.0	603.0
C			603.0	606.0
D			606.0	609.0
E			609.0	612.0
F			612.0	615.0
H				
J				

Bin	Wavelength Range (nm)			
	True Green (NG)		Blue (NB)	
	Min	Max	Min	Max
-				
A	515.0	520.0	460.0	464.0
B	520.0	525.0	464.0	468.0
C	525.0	530.0	468.0	472.0
D	530.0	535.0	472.0	476.0
E	535.0	540.0	476.0	480.0
F			480.0	485.0
H				
J				

@20mA / Ta=25° C, Tolerance: ± 0.5nm

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

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

Color	Bin Code	Spec. Range
<b>Blue (NB) Green (NG)</b>	<b>G8</b>	<b>2.7-2.9 V</b>
	<b>H7</b>	<b>2.9-3.1 V</b>
	<b>H8</b>	<b>3.1-3.3 V</b>
	<b>J7</b>	<b>3.3-3.5 V</b>
	<b>J8</b>	<b>3.5-3.7 V</b>
	<b>K7</b>	<b>3.7-3.9 V</b>
<b>Ultra Bright Red (USD)</b>	-	<b>2.4 V max</b>
<b>Ultra Bright Amber (UD)</b>		

@20mA / Ta=25°C, Tolerance:  $\pm 0.05$  V

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Product Characteristics****Absolute Maximum Ratings**

Product	Emission Color	P <sub>d</sub> (mW)	I <sub>F</sub> (mA)	I <sub>FP</sub> * (mA)	V <sub>R</sub> (V)	T <sub>OP</sub> (°C)	T <sub>ST</sub> (°C)			
HT-372 Series	Ultra Bright Amber	72	30	100	5	-30°C~+85°C	-40°C~+90°C			
	Ultra Bright Red									
	Blue	78	25	80						
	True Green									

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

**Electro-Optical Characteristics**

Product	Emission Color	I <sub>F</sub> (mA)	V <sub>F</sub> (V)		λ(nm)			I <sub>V</sub> ** (mcd)	
			typ	max	λ <sub>D</sub>	λ <sub>P</sub>	△λ	min	typ
HT-372 Series	Ultra Bright Amber	20	1.9	2.4	605	609	17	56	120
	Ultra Bright Red		1.9	2.4	622	636	17	56	120
	Blue	20	3.3	3.9	470	468	40	56	90
	True Green	20	3.3	3.9	527	520	40	90	200

\*\* Per NIST standards

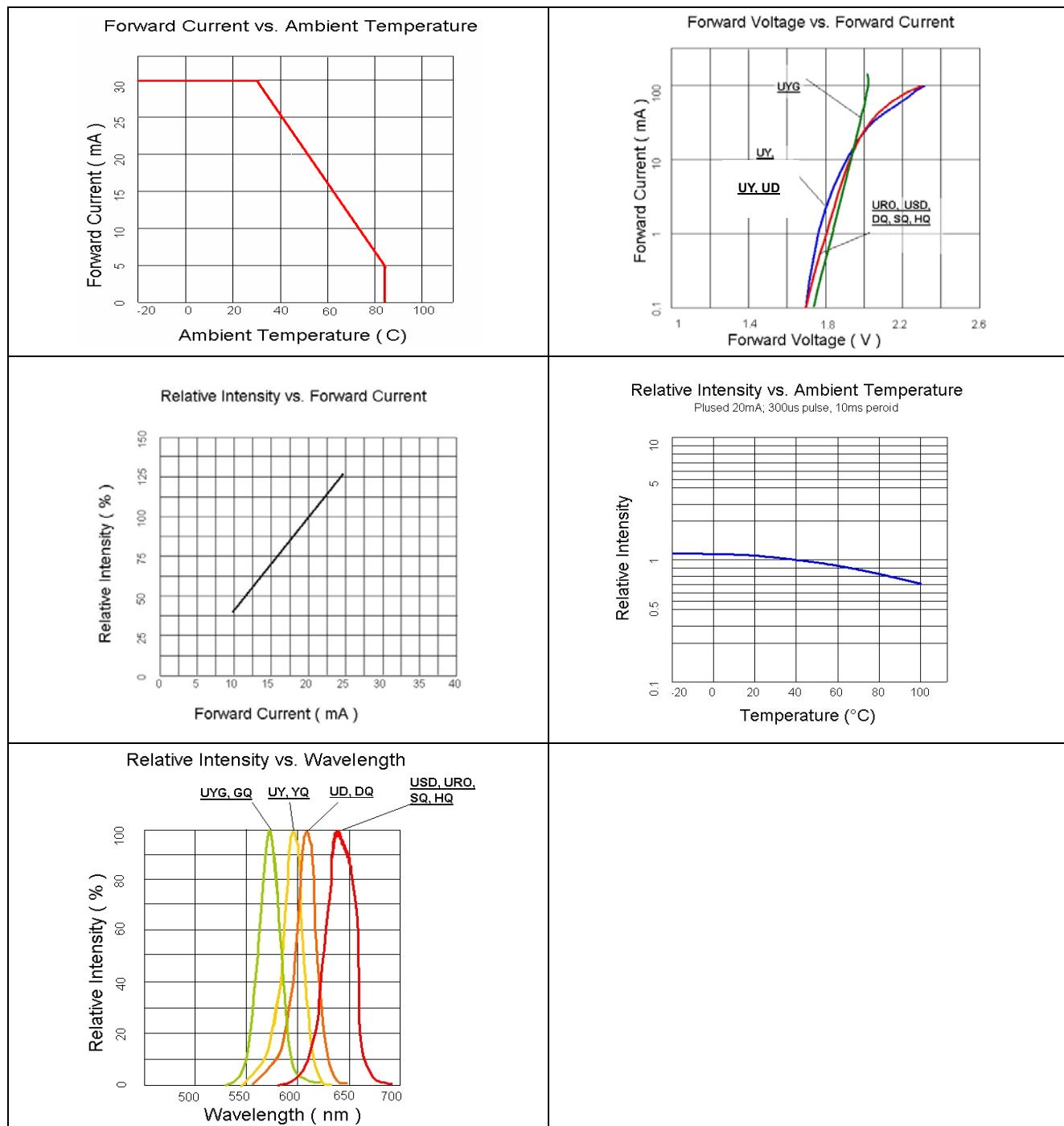
Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		Page 10/22
Oct 5, 2005		Version of 1.2

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

Unit: mm Tolerance: +/-0.1

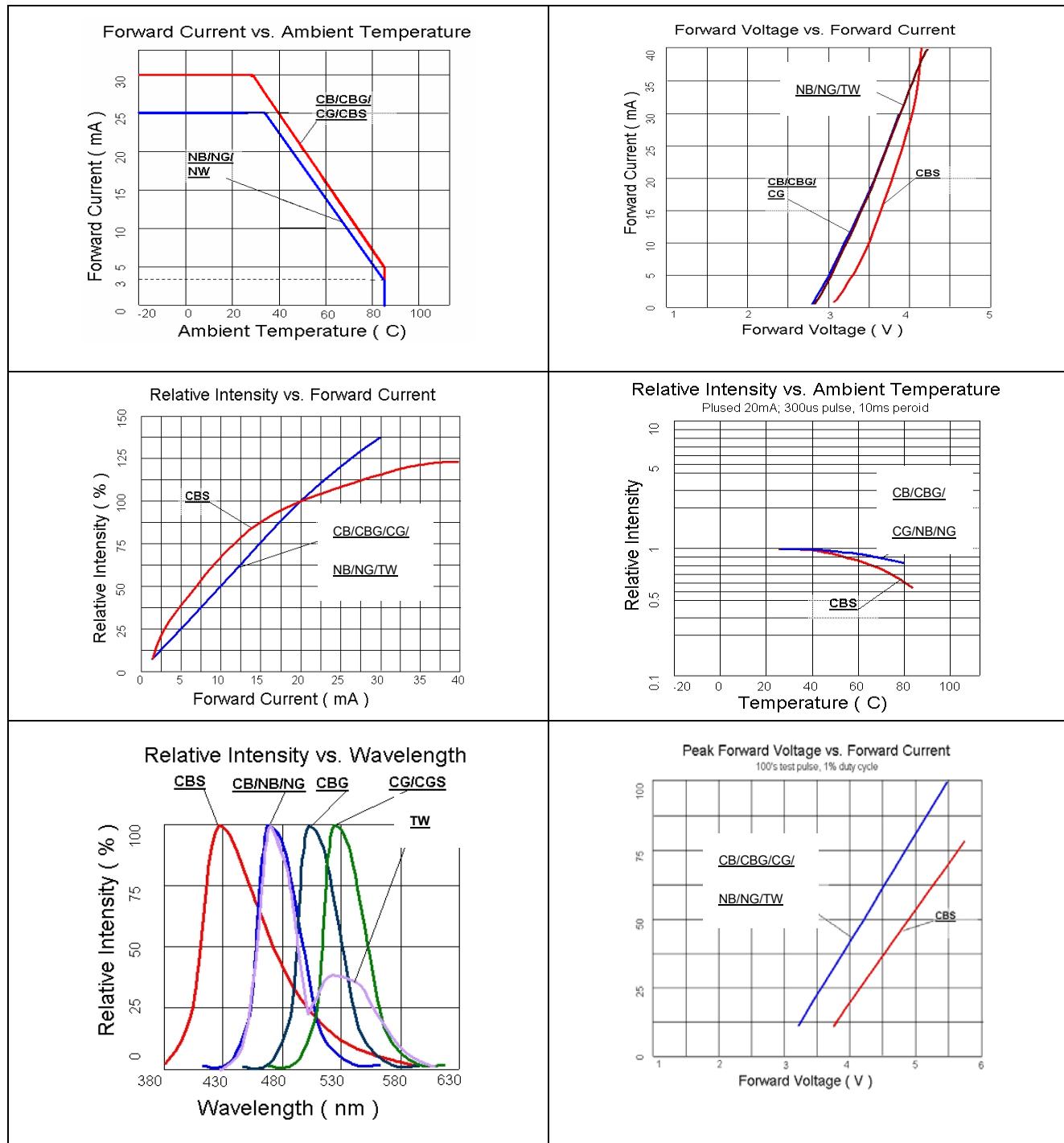
Outline Dimension	Solder Pattern
Soldering terminals may shift in the x, y direction.	Unit: mm

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

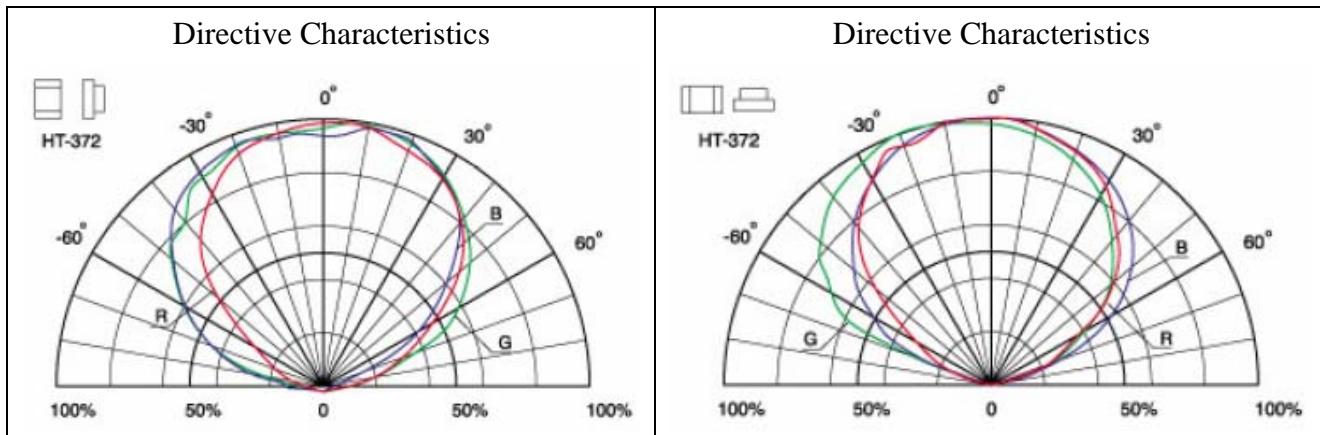
**Characteristic Curves for UD (Ultra Bright Amber) and USD (Ultra Bright Red)**

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 12/22

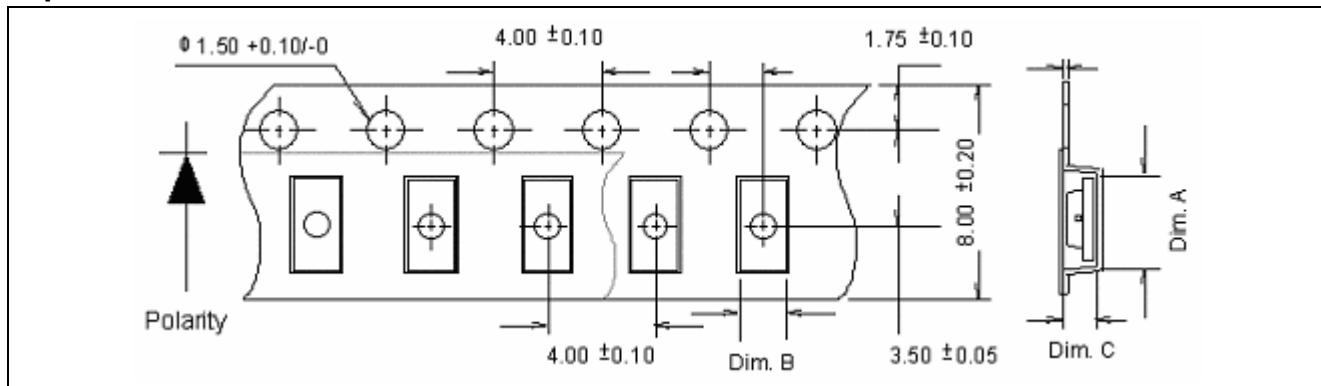
### Characteristic Curves for NB (Blue) and NG (True Green)



Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Characteristic Curves for All Colors (Radiation Pattern)**

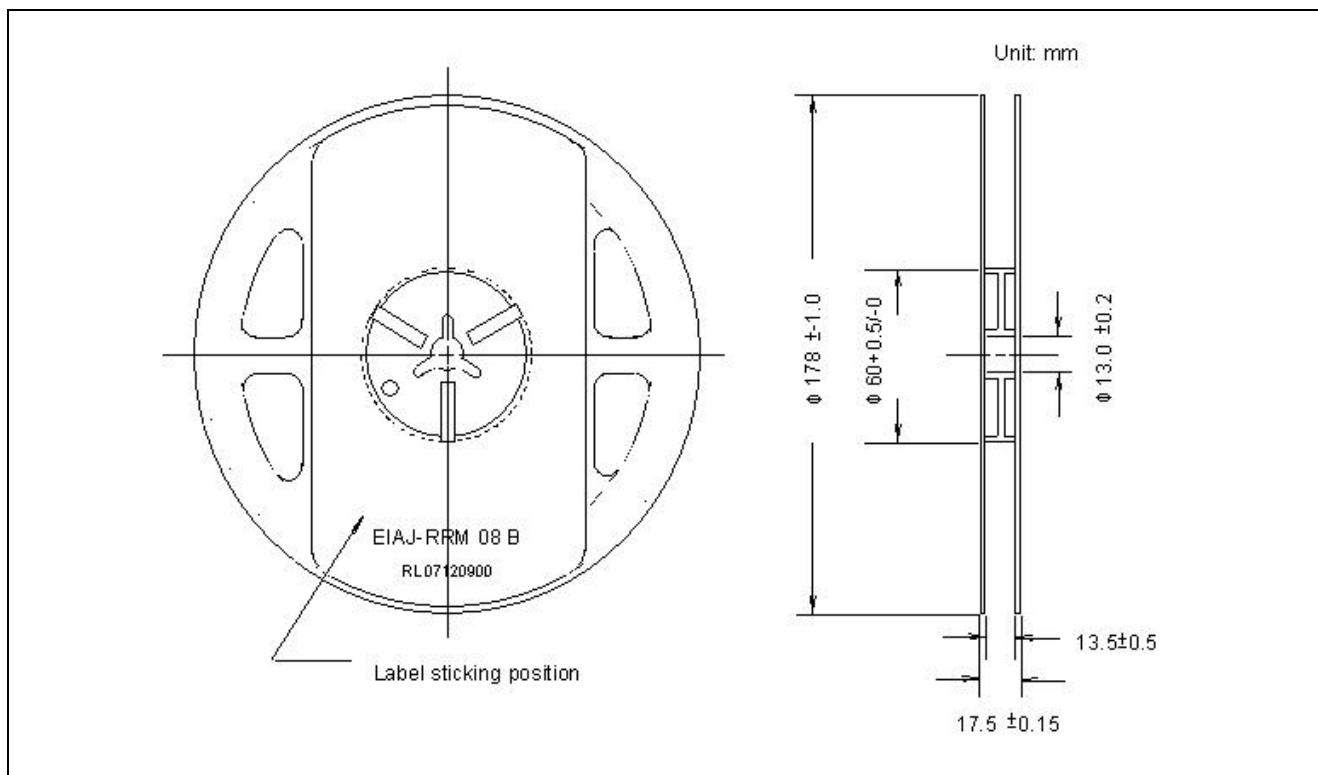
Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Packaging****Tape Dimension**

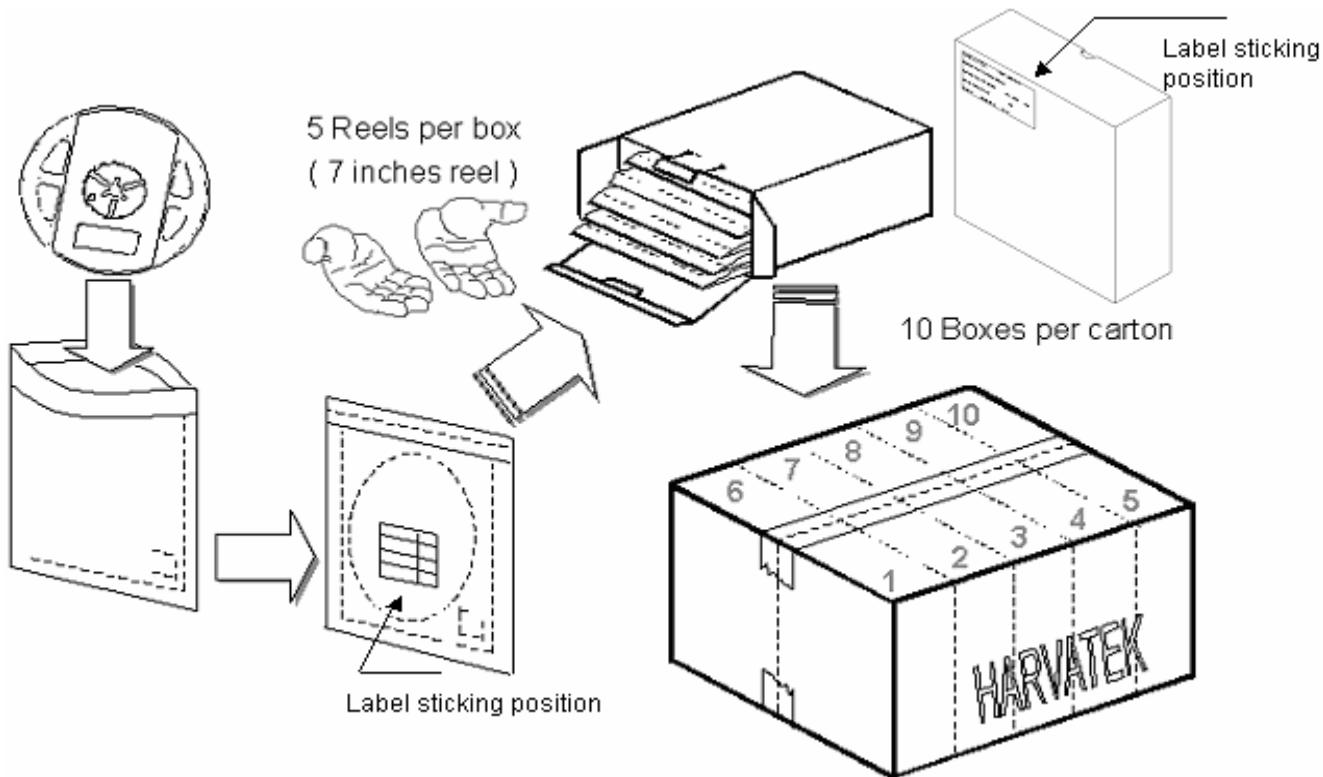
Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-372	2.30±0.10	1.40±0.10	0.60±0.10	4K

Unit: mm

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Reel Dimension**

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Packing**

5 boxes per carton is available depending on shipment quantity.

	Specification	Material	Quantity
Carrier tape	Per EIA 481-1A specs	Conductive black tape	4000pcs 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	Non-specified
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 $I_v$ , $\lambda_D$ and $V_f$ . Each reel has a label identifying its specification; the immediate box consists of a product label as well.		

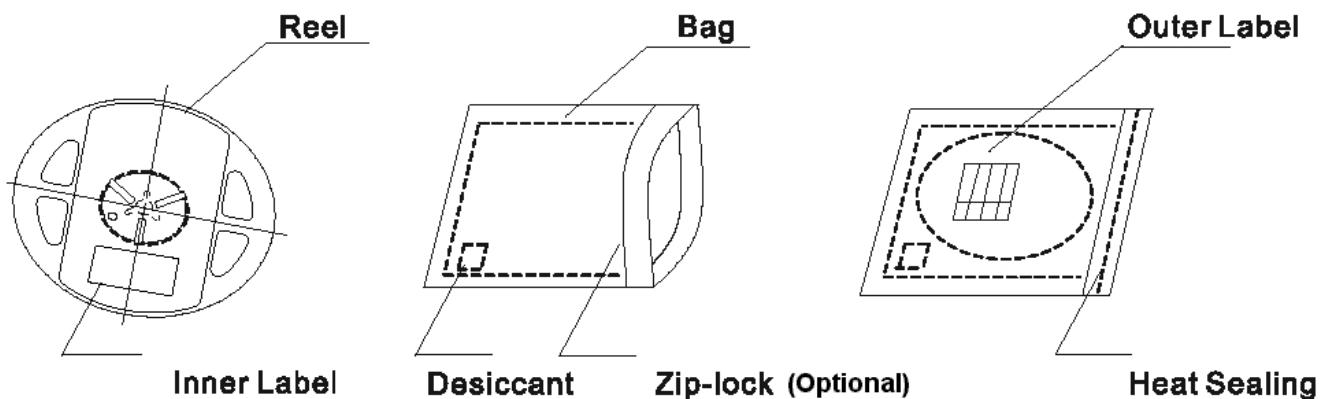
Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

## 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.

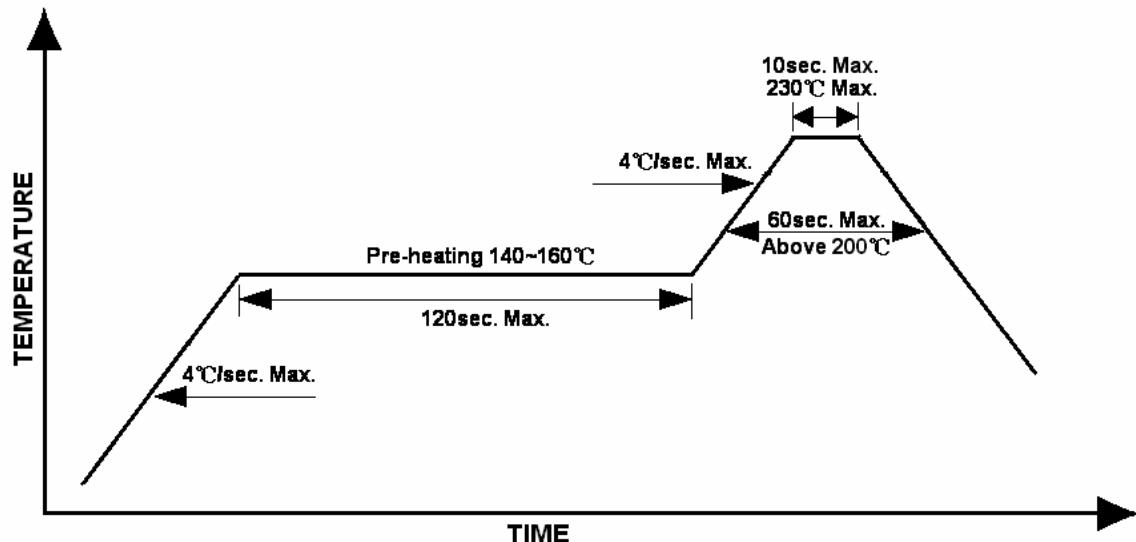
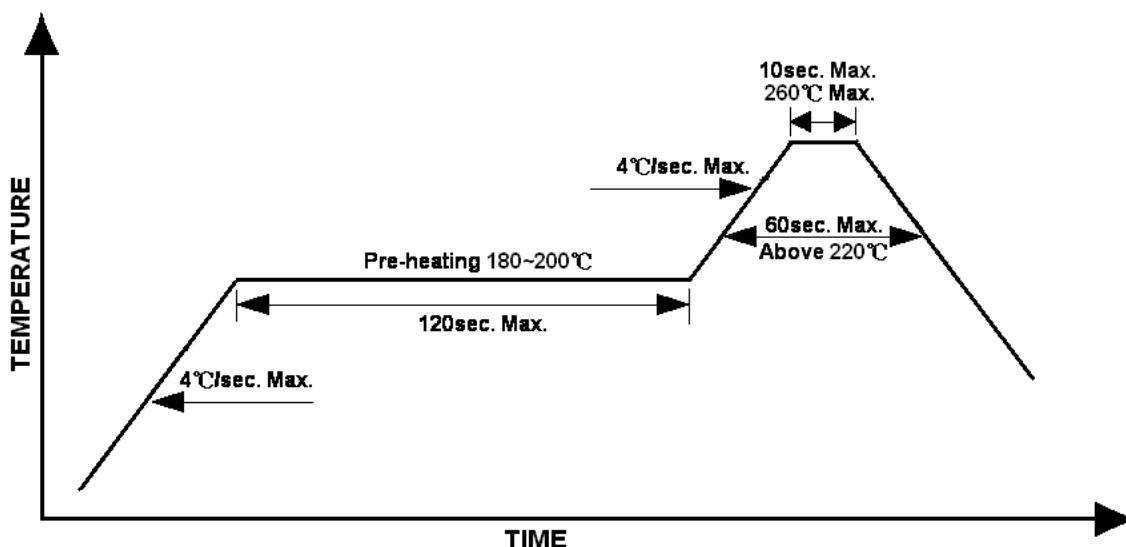
The packaging sequence is as follows:



Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

**Reflow Soldering**

- Recommended tin glue specifications: melting temperature in the range of 178~192 °C
- The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

**Lead Solder Profile****Lead-free Solder Profile**

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 19/22

## Precautions

1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaN products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage beyond the specified limit.
4. Avoid operation beyond the limits as specified by the absolute maximum ratings.
5. Avoid direct contact with the surface through which the LED emits light.
6. If possible, assemble the unit in a clean room or dust-free environment.

## Reworking

- Rework should be completed within 5 seconds under 260 °C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

## 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-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 20/22

**Reliability**

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		CNS-5067	Dipping soldering terminal only Soldering bath temperature A: 260+/-5°C; 10+/-1s B: 350+/-10°C; 3+/-0.5s
Operating life test	1Q/ 1/ 40/ 0	CNS-11829	1.) Precondition: 85°C baking for 24hrs 85°C/ 60%R.H. for 168hrs 2.) Tamb25°C; IF=20mA; duration 1000hrs
High humidity, high temperature bias	1Q/ 1/ 45/ 0	JESD-A101-B	Tamb: 85°C Humidity: 85% R.H., IF=5mA Duration: 1000hrs
High temperature bias	1Q/ 1/ 20	HT specs.	Tamb: 55°C IF=20mA Duration: 1000hrs
Pulse life test	1Q/ 1/ 40/ 0		Tamb25°C, If=20mA., Ip=100mA, Duty cycle=0.125 (tp=125µs, 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

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2
		Page 21/22

**Revision History**

<b>Changes since last revision</b>	<b>Page</b>	<b>Version No.</b>	<b>Revision Date</b>
New format		1.0	06-06-2005
Quantity per reel under "Packing"	17	1.1	06-17-2005
Update characteristic curves	12,13	1.2	10-05-2005

Official Product	Product: HT-372 Series	Data Sheet No.
Tentative Product	*****	HT-372 Series
Specifications are subject to change without notice. Data and drawings herein are copyrighted.	Oct 5, 2005	Version of 1.2

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