

# Harvatek Surface Mount Chip LED Data Sheet HT-T5335DND

Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	*****	HT-T5335DND		
Specifications are subjec drawings herein are copy	t to change without notice. Data and righted.	June 25, 2013	Version of 1.0	Page 1/20

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 TW	10
PACKAGING	12
TAPE DIMENSION	12
REEL DIMENSION	13
PACKING	13
DRY PACK	16
	19
REVISION HISTORY	20

Official Product	Product: HT-T5335DND	Data Sheet No.		
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Specifications are subjec drawings herein are copy	t to change without notice. Data and righted.	June 25, 2013	Version of 1.0	Page 2/20

#### DISCLAIMER

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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-T5335DND	Data Sheet No.		
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#### **Product Specifications**

	Specification	Material	Quantity
lv	45.3 – 55.2lm		
	@30mA / Ta=25 <sup>0</sup> C, <u>+</u> 5%		
XY	Refer to page 6-7		
	@30mA / Ta=25 <sup>0</sup> C, <u>+</u> 0.005		
Vf	16.95V max		
	@30Ma per chip / Ta=25 $^\circ$ C , $\pm$ 0.05 V		
lr	< 100 µA @ V <sub>R</sub> = 5 V		
Resin	White	РРА	
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,  $\lambda_D$  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

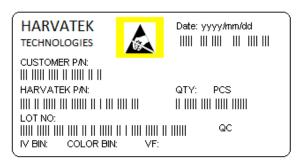
InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

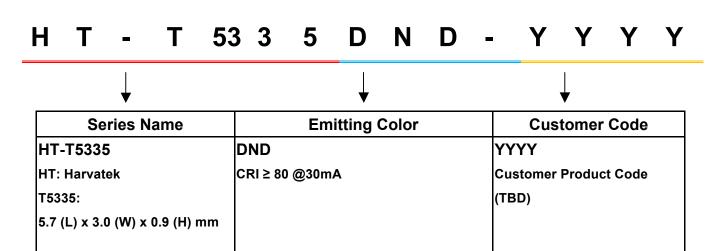
Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	****	HT-T5335DND		
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#### **Label Specifications**



#### Harvatek P/N:



#### Lot No.:

1 2	3	4	5	6	7	8	9	10
E 1	Α	1	Α	2	2	L	1	2
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-	-77		000~ZZZ	

Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	*****	HT-T5335DND		
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## Luminous Intensity (Iv) Bin:

Bin	Luminous Intensity Range (Im)							
Biii	Minimum	Maximum						
RB1	42.5	45.3						
RC2	45.3	48.4						
RD2	48.4	51.7						
SA3	51.7	55.2						
SB3	55.2	58.9						

@20mA / Ta=25<sup>°</sup> C, Tolerance: <u>+</u> 10%

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

Color	Bin Code	Spec. Range
	RG	15.05 – 15.27V
	RH	15.27 – 15.51V
	RJ	15.51 – 15.75V
10/bits (T10/)	RK	15.75 – 15.99V
White (TW)	RL	15.99 – 16.23V
	RM	16.23 – 16.47V
	RN	16.47 – 16.71V
	RP	16.71 – 16.95V

@20mA / Ta=25 $^\circ\!\mathrm{C}$  , Tolerance: <u>+</u> 0.05 V

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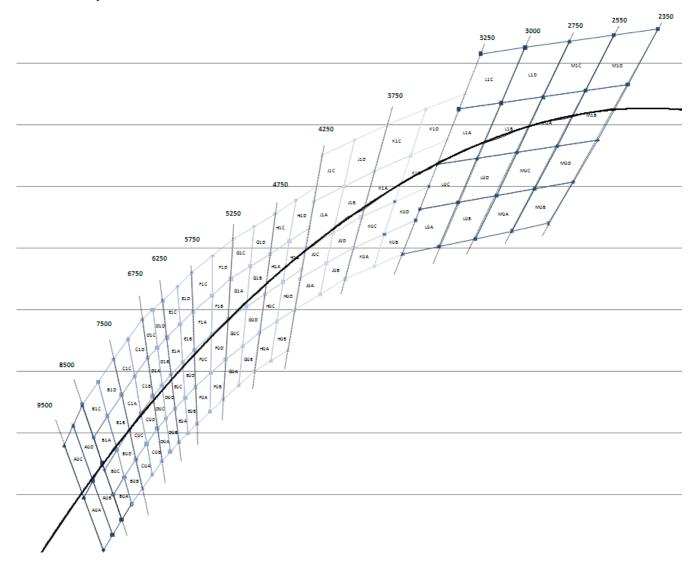
x				000	orse-record		0100-10001	000	1000-13001	1010	1000-1300K	000	Or SUPPOOR	1010	0130-10001	
~	у	x	у	x	у	x	у	x	У	x	у	x	У	x	У	
0.306	0.292	0.301	0.311	0.30975	0.2965	0.3055	0.3165	0.3035	0.3015	0.298	0.3225	0.307625	0.3065	0.303	0.3285	
0.3035	0.3015	0.298	0.3225	0.307625	0.3065	0.303	0.3285	0.301	0.311	0.295	0.334	0.3055	0.3165	0.3005	0.3405	
0.307625	0.3065	0.303	0.3285	0.31175	0.3115	0.308	0.3345	0.3055	0.3165	0.3005	0.3405	0.31	0.322	0.306	0.347	
0.30975	0.2965	0.3055	0.3165	0.3135	0.301	0.31	0.322	0.307625	0.3065	0.303	0.3285	0.31175	0.3115	0.308	0.3345	
0.306	0.292	0.301	0.311	0.30975	0.2965	0.3055	0.3165	0.3035	0.3015	0.298	0.3225	0.307625	0.3065	0.303	0.3285	/hite
																me
D0A 65	500~6750K	D1A	6500~6750K	DOB	6250~6500K	D1B	6250~6500K	DOC	6500~6750K	D1C	6500~6750K	DOD	6250~6500K	D1D	6250~6500K	DND
x	У	x	У	х	У	X	У	х	У	X	У	х	У	x	У	שאושן
0.3135	0.301	0.31	0.322	0.3167	0.304	0.3135	0.3255	0.31175	0.3115	0.308	0.3345	0.3151	0.31475	0.31175	0.33775	
0.31175	0.3115	0.308	0.3345	0.3151	0.31475	0.31175	0.33775	0.31	0.322	0.306	0.347	0.3135	0.3255	0.31	0.35	1
0.3151	0.31475	0.31175	0.33775	0.3185	0.318	0.3155	0.341	0.3135	0.3255	0.31	0.35	0.317	0.329	0.314	0.353	1
0.3167	0.304	0.3135	0.3255	0.32	0.307	0.317	0.329	0.3151	0.31475	0.31175	0.33775	0.3185	0.318	0.3155	0.341	]
0.3135	0.301	0.31	0.322	0.3167	0.304	0.3135	0.3255	0.31175	0.3115	0.308	0.3345	0.3151	0.31475	0.31175	0.33775	]
E0A 60	000K~6250K	E1A	6000K~6250K	EOB	5750~6000K	E1B	5750~6000K	EOC	6000K~6250K	E1C	6000K~6250K	EOD	5750~6000K	E1D	5750~6000K	
×	У	х	у	х	У	х	у	х	У	X	у	х	У	х	У	7
0.32	0.307	0.317	0.329	0.3235	0.31	0.3215	0.333	0.3185	0.318	0.3155	0.341	0.3225	0.3215	0.3205	0.34525	7
0.3185	0.318	0.3155	0.341	0.3225	0.3215	0.3205	0.34525	0.317	0.329	0.314	0.353	0.3215	0.333	0.3195	0.3575	
0.3225	0.3215	0.3205	0.34525	0.3265	0.325	0.3255	0.3495	0.3215	0.333	0.3195	0.3575	0.326	0.337	0.325	0.362	
0.3235	0.31	0.3215	0.333	0.327	0.313	0.326	0.337	0.3225	0.3215	0.3205	0.34525	0.3265	0.325	0.3255	0.3495	
0.32	0.307	0.317	0.329	0.3235	0.31	0.3215	0.333	0.3185	0.318	0.3155	0.341	0.3225	0.3215	0.3205	0.34525	
																1
F0A 55	500~5750K	F1A	5500~5750K	F0B	5250~5500K	F1B	5250~5500K	FOC	5500~5750K	F1C	5500~5750K	FOD	5250~5500K	F1D	5250~5500K	
×	У	x	У	x	У	x	У	x	У	x	У	x	У	x	У	ĩ
0.327	0.313	0.326	0.337	0.332	0.317	0.3325	0.342	0.3265	0.325	0.3255	0.3495	0.33225	0.3295	0.33275	0.35475	
0.3265	0.325	0.3255	0.3495	0.33225	0.3295	0.33275	0.35475	0.326	0.337	0.325	0.362	0.3325	0.342	0.333	0.3675	
0.33225	0.3295	0.33275	0.35475	0.338	0.334	0.34	0.36	0.3325	0.342	0.333	0.3675	0.339	0.347	0.341	0.373	
0.332	0.317	0.3325	0.342	0.337	0.321	0.339	0.347	0.33225	0.3295	0.33275	0.35475	0.338	0.334	0.34	0.36	
0.327	0.313	0.326	0.337	0.332	0.317	0.3325	0.342	0.3265	0.325	0.3255	0.3495	0.33225	0.3295	0.33275	0.35475	
G0A 50	000K~5250K	G1A	5000K~5250K	G0B	4750~5000K	G1B	4750~5000K	GOC	5000K~5250K	G1C	5000K~5250K	GOD	4750~5000K	G1D	4750~5000K	
x	У	х	у	х	У	х	у	х	у	X	у	х	у	х	у	]
0.337	0.321	0.339	0.347	0.343	0.3255	0.346	0.351	0.338	0.334	0.34	0.36	0.3445	0.33825	0.3475	0.364	
0.338	0.334	0.34	0.36	0.3445	0.33825	0.3475	0.364	0.339	0.347	0.341	0.373	0.346	0.351	0.349	0.377	
0.3445	0.33825	0.3475	0.364	0.351	0.3425	0.355	0.368	0.346	0.351	0.349	0.377	0.353	0.355	0.357	0.381	]
0.343	0.3255	0.346	0.351	0.349	0.33	0.353	0.355	0.3445	0.33825	0.3475	0.364	0.351	0.3425	0.355	0.368	1
0.337	0.321	0.339	0.347	0.343	0.3255	0.346	0.351	0.338	0.334	0.34	0.36	0.3445	0.33825	0.3475	0.364	

HOA	4500~4750K	H1A	4500~4750K	HOB	4250~4500K	H1B	4250~4500K	HOC	4500~4750K	H1C	4500~4750K	HOD	4250~4500K	H1D	4250~4500K
x	v	X	v	X	v	X	v	X	v	X	v	×	v	X	v
0.349	0.33	0.353	0.355	0.3555	0.3335	0.36	0.359	0.351	0.3425	0.355	0.368	0.35775	0.34625	0.3625	0.37225
0.351	0.3425	0.355	0.368	0.35775	0.34625	0.3625	0.37225	0.353	0.355	0.357	0.381	0.36	0.359	0.365	0.3855
0.35775	0.34625	0.3625	0.37225	0.3645	0.35	0.37	0.3765	0.36	0.359	0.365	0.3855	0.367	0.363	0.373	0.39
0.3555	0.3335	0.36	0.359	0.362	0.337	0.367	0.363	0.35775	0.34625	0.3625	0.37225	0.3645	0.35	0.37	0.3765
0.349	0.33	0.353	0.355	0.3555	0.3335	0.36	0.359	0.351	0.3425	0.355	0.368	0.35775	0.34625	0.3625	0.37225
JOA	4000~4250K	J1A	4000~4250K	JOB	3750~4000K	J1B	3750~4000K	JOC	4000~4250K	J1C	4000~4250K	JOD	3750~4000K	J1D	3750~4000K
x	У	×	У	×	У	x	У	x	У	x	У	x	У	x	У
0.3645	0.35	0.3685	0.37	0.37425	0.355	0.37925	0.375	0.3665	0.36	0.37175	0.385	0.37675	0.365	0.383375	0.39
0.3665	0.36	0.37175	0.385	0.37675	0.365	0.383375	0.39	0.3685	0.37	0.375	0.4	0.37925	0.375	0.3875	0.405
0.37675	0.365	0.383375	0.39	0.387	0.37	0.395	0.395	0.37925	0.375	0.3875	0.405	0.39	0.38	0.4	0.41
0.37425	0.355	0.37925	0.375	0.384	0.36	0.39	0.38	0.37675	0.365	0.383375	0.39	0.387	0.37	0.395	0.395
0.3645	0.35	0.3685	0.37	0.37425	0.355	0.37925	0.375	0.3665	0.36	0.37175	0.385	0.37675	0.365	0.383375	0.39
K0A	3500~3750K	K1A	3500~3750K	K0B	3250~3500K	K1B	3250~3500K	KOC	3500~3750K	K1C	3500~3750K	K0D	3250~3500K	K1D	3250~3500K
х	У	x	У	x	У	х	У	х	У	X	У	х	У	х	У
0.384	0.36	0.39	0.38	0.395	0.364	0.403	0.385	0.387	0.37	0.395	0.395	0.399	0.3745	0.409	0.4
0.387	0.37	0.395	0.395	0.399	0.3745	0.409	0.4	0.39	0.38	0.4	0.41	0.403	0.385	0.415	0.415
0.399	0.3745	0.409	0.4	0.411	0.379	0.4228	0.4047	0.403	0.385	0.415	0.415	0.416	0.39	0.43	0.42
0.395	0.364	0.403	0.385	0.406	0.368	0.416	0.39	0.399	0.3745	0.409	0.4	0.411	0.379	0.423	0.405
0.384	0.36	0.39	0.38	0.395	0.364	0.403	0.385	0.387	0.37	0.395	0.395	0.399	0.3745	0.409	0.4
LOA	3000~3250K	LOB	2750~3000K	LOC	3000~3250K	LOD	2750~3000K	L1A	3000~3250K	L1B	2750~3250K	L1C	3000~3250K	L1D	2750~3000K
х	У	x	У	x	у	х	у	х	У	х	У	х	У	х	У
0.40600	0.368	0.42000	0.37050	0.41250	0.38250	0.42725	0.38475	0.419	0.397	0.4345	0.399	0.42750	0.41500	0.44375	0.417
0.41250	0.38250	0.42725	0.38475	0.41900	0.39700	0.4345	0.399	0.42750	0.41500	0.44375	0.41700	0.43600	0.43300	0.45300	0.43500
0.42725	0.38475	0.44200	0.38700	0.43450	0.39900	0.45	0.401	0.44375	0.41700	0.46000	0.41900	0.45300	0.43500	0.47000	0.43700
0.42000	0.37050	0.43400	0.37300	0.42725	0.38475	0.442	0.387	0.43450	0.39900	0.45000	0.40100	0.44375	0.41700	0.46000	0.41900
0.40600	0.368	0.42000	0.37050	0.41250	0.38250	0.42725	0.38475	0.419	0.397	0.4345	0.399	0.42750	0.41500	0.44375	0.417
MOA	2550~2750K	MOB	2350~2550K	MOC	2550~2750K	MOD	2350~2550K	M1A	2550~2750K	M1B	2350~2550K	M1C	2550~2750K	M1D	2350~2550K
x	у	×	У	x	у	x	У	x	У	x	У	x	У	x	У
0.434	0.373	0.448	0.3755	0.442	0.387	0.45675	0.38925	0.45	0.401	0.46550	0.40300	0.46000	0.41900	0.47625	0.421
0.44200	0.38700	0.45675	0.38925	0.45000	0.40100	0.46550	0.40300	0.46000	0.41900	0.47625	0.42100	0.47000	0.43700	0.48700	0.43900
0.45675	0.38925	0.47150	0.39150	0.46550	0.40300	0.48100	0.40500	0.47625	0.42100	0.49250	0.42300	0.48700	0.43900	0.50400	0.44100
0.44800	0.37550	0.46200	0.37800	0.45675	0.38925	0.47150	0.39150	0.46550	0.40300	0.48100	0.40500	0.47625	0.42100	0.49250	0.42300
0.434	0.373	0.448	0.3755	0.442	0.387	0.45675	0.38925	0.45	0.401	0.46550	0.40300	0.46000	0.41900	0.47625	0.421

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## **Color Temperature Coordinates**



Official Product	al Product Product: HT-T5335DND		Data Sheet No.	
Tentative Product	*****	HT-T5335DND		
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 8/20



#### **Product Characteristics**

#### Absolute Maximum Ratings

Product	Emission Color	P <sub>d</sub> (mW)	I <sub>F</sub> (mA)	I <sub>FP</sub> * (mA)	Ir (μΑ) @ V <sub>R</sub> = 5 V	Top (°C)	Ts⊤ (°C)
HT-T5335DND	White	585	30	60	<10	-30°C~+80°C	-40°C~+85°C

\* Condition for  $I_{FP}$  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

								(Ta 25 ∘C
Product	Emission	L (m A)	V <sub>F</sub> (V)		Correlated	Correlated Color Temperature (K)		
	Color	I <sub>F</sub> (mA)	typ	max	min	typ	max	typ
	White	30		16.95	5250	5750	6250	47
HT-T5335DND			15.03		3750	4000	4250	49
					2750	3000	3250	45

\* Per NIST standards

# Package Outline Dimension

## Recommended Soldering Pattern for Reflow Soldering

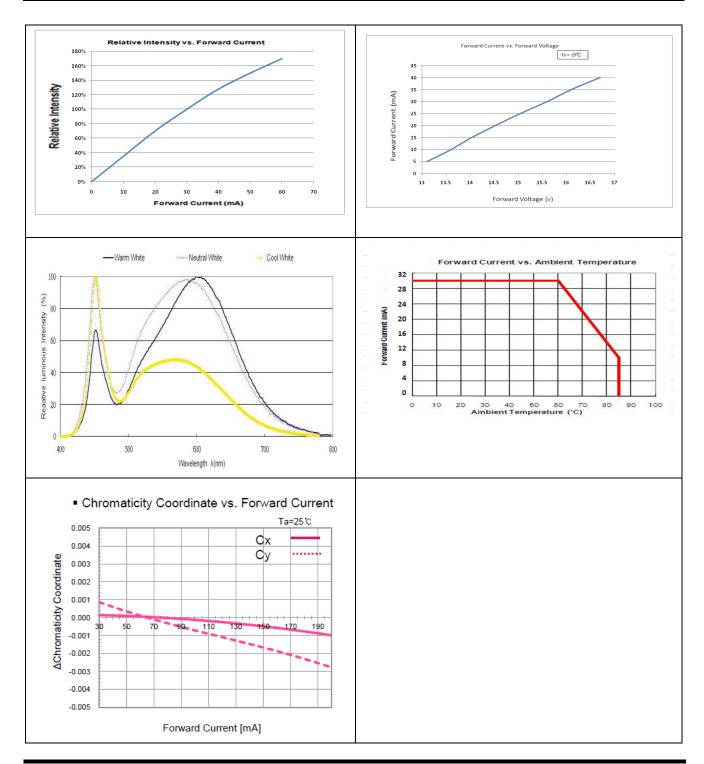
**Outline Dimension** Solder Pattern 3.00 Lead Frame 2.60 1.00 0.50 8 0.90 Pin1 Pin4 Pin4 Pin1 Pin 1 PIN5-4.50 5.40 22 LED Die õ 1.00 02 Pin3 & Pin5 Pin3 Pin 3 Pin2 Pin2 Pin2 Polarity -Plastic Housina 1.00 1.00 0.50 Pin3&Pin5 is connected with heat slug Soldering terminals may shift in the x, y direction. Unit: mm

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Unit: mm Tolerance: +/-0.1



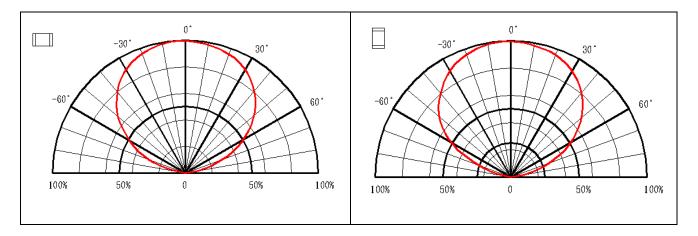
#### Characteristic Curves for TW



Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	*****			HT-T5335DND
Specifications are subject drawings herein are copy	t to change without notice. Data and righted.	June 25, 2013	Version of 1.0	Page 10/20



#### SMD LED - White HT-T5335DND

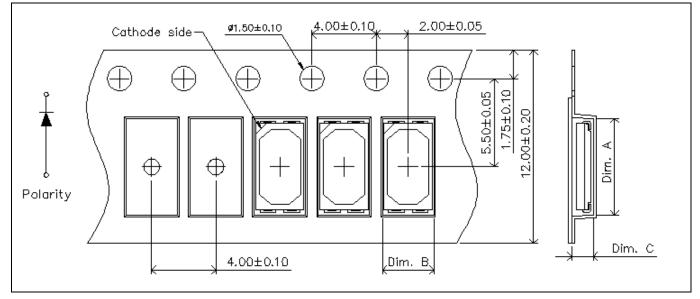


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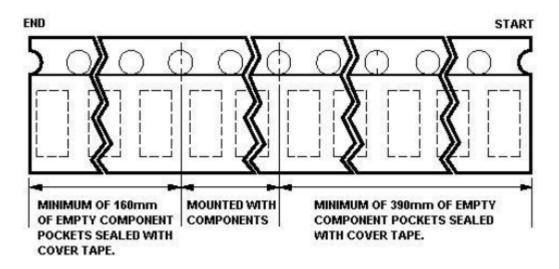
## Packaging

#### **Tape Dimension**



Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-T5335	6.0±0.1	3.2±0.1	1.1±0.1	2K

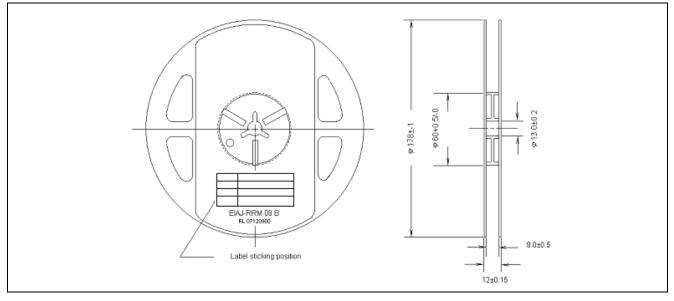
Unit: mm



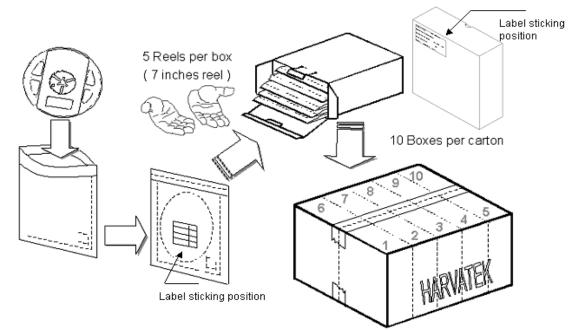
Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	*****	HT-T5335DND		
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## **Reel Dimension**



## Packing



5 boxes per carton is available depending on shipment quantity.

Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	*****	HT-T5335DND		
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 13/20

#### Precaution for Use

- (1) The chips should not be used directly in any type of fluid such as water, oil, organic solvent, etc.
- (2) When the LEDs are illuminating, the maximum ambient temperature should be first considered before operation.
- (3) LEDs must be stored in a clean environment. A sealed container with a nitrogen atmosphere is necessary if the storage period is over 3 months after shipping.
- (4) The LEDs are recommended to be used within seven days after unpacked. In accordance with MSL 2a: After the bag is opened, devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be mounted within 672 hours at factory conditions of 30/60%RH.
- (5) The appearance and specifications of products may be modified for improvement. We will provide PCN for any change or improvement.
- (6) The LEDs are sensitive to the static electricity and surge. It is strongly recommended to use a grounded wrist band and anti-electrostatic glove when handling the LEDs. If a voltage over the absolute maximum rating is applied to LEDs, it will damage LEDs. Damaged LEDs will show some abnormal characteristics such as remarkable increase of leak current, lower turn-on voltage and getting unlit at low current.

Official Product	Product: HT-T5335DND	Data Sheet No.		
Tentative Product	****	HT-T5335DND		
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 14/20

#### **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.

Official Product	Product: HT-T5335DND			Data Sheet No.
Tentative Product	*******			HT-T5335DND
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 15/20

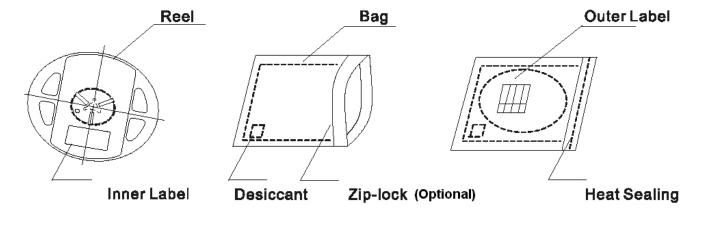


## **Dry Pack**

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-T5335DND			Data Sheet No.
Tentative Product	********			HT-T5335DND
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 16/20



## 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 OC 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 OC /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:

 $60\pm3^{\circ}C$  (12~24hrs) and < 5% RH, taped reel type

 $100\pm3^{\circ}C$  (45min~1hr), bulk type

 $100\pm3$  C (45min~m), buik 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-T5335DND			Data Sheet No.
Tentative Product	********			HT-T5335DND
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 17/20



#### 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.

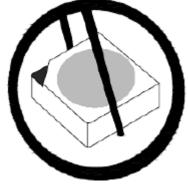


Figure 2

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-T5335DND			Data Sheet No.
Tentative Product	********			HT-T5335DND
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 18/20

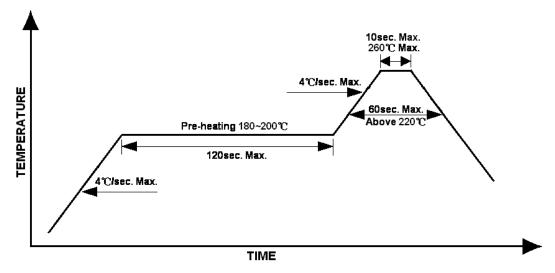


## **Reflow Soldering**

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 <sup>o</sup>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-T5335DND			Data Sheet No.
Tentative Product	*******			HT-T5335DND
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 19/20



# **Revision History**

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

Official Product	Product: HT-T5335DND			Data Sheet No.
Tentative Product	********			HT-T5335DND
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		June 25, 2013	Version of 1.0	Page 20/20