Harvatek Surface Mount Chip LED Data Sheet
HT-T136 Series

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.

Product Specifications

	Specification	Material	Quantity
Iv	HT-T136DNC: 8.76 – 11.43 lm HT-T136DND: 9.37 – 11.43 lm @30mA / Ta=25^{O} C, ± 10%		
XY	Refer to page 7 - 8 @30mA / Ta=25^{O} C, ± 0.005		
Vf	3.5V max @30mA / Ta=25℃, ± 0.05 V		
Resin	White	Sillicone 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:

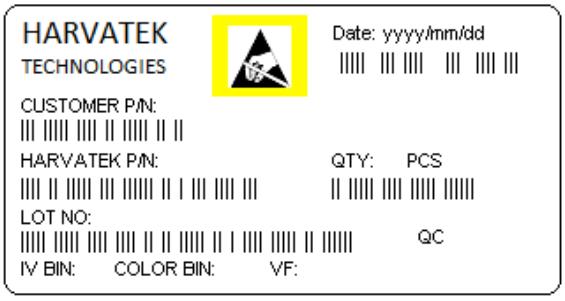
Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv, λ_D and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

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.

Label Specifications



Harvatek P/N:

H T - T 1 3 6 X X X - Y Y Y Y

Series Name	Emitting Color	Customer Code
HT-T136 **HT: Harvatek** **T136:** **3.0 (L) x 1.4 (W) x 0.8 (H) mm**	**DNC: CRI>70** **DND: CRI>80**	**YYYY** **Customer Product Code** **(TBD)**

Lot No.:

1	2	3	4	5	6	7	8	9	10
E	1	A	1	A	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~ZZ		000~ZZZ		

■ Luminous Intensity (Iv) Bin:

Bin	Luminous Intensity Range (lm)	
	Minimum	Maximum
KC2	9.37	10.0
KD2	10.0	10.7
LA1	10.7	11.43
LB1	11.43	12.2
LC2	12.2	13.02

@30mA / Ta=25^{O} C, Tolerance: ± 10%

■ Forward Voltage (V_F) Bin:

Color	Bin Code	Spec. Range
White (TW)	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

@30mA / Ta=25℃, Tolerance: ± 0.05 V

C0A	7000~7500K	C1A	7000~7500K	C0B	6750~7000K	C1B	6750~7000K	C0C	7000~7500K	C1C	7000~7500K	C0D	6750~7000K	C1D	6750~7000K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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

D0A	6500~6750K	D1A	6500~6750K	D0B	6250~6500K	D1B	6250~6500K	D0C	6500~6750K	D1C	6500~6750K	D0D	6250~6500K	D1D	6250~6500K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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
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
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	6000K~6250K	E1A	6000K~6250K	E0B	5750~6000K	E1B	5750~6000K	E0C	6000K~6250K	E1C	6000K~6250K	E0D	5750~6000K	E1D	5750~6000K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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
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

F0A	5500~5750K	F1A	5500~5750K	F0B	5250~5500K	F1B	5250~5500K	F0C	5500~5750K	F1C	5500~5750K	F0D	5250~5500K	F1D	5250~5500K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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	5000K~5250K	G1A	5000K~5250K	G0B	4750~5000K	G1B	4750~5000K	G0C	5000K~5250K	G1C	5000K~5250K	G0D	4750~5000K	G1D	4750~5000K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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
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

H0A	4500~4750K	H1A	4500~4750K	H0B	4250~4500K	H1B	4250~4500K	H0C	4500~4750K	H1C	4500~4750K	H0D	4250~4500K	H1D	4250~4500K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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

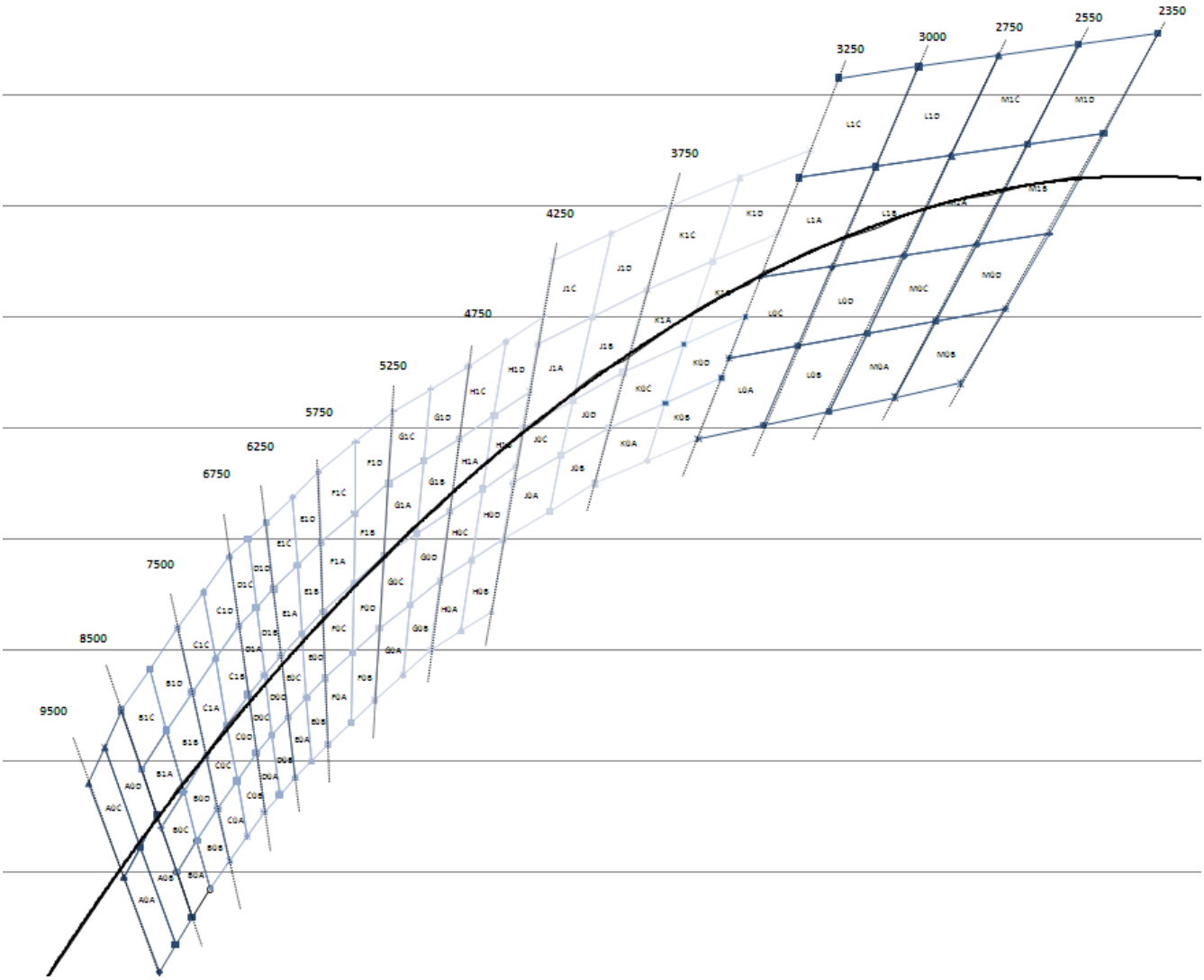
J0A	4000~4250K	J1A	4000~4250K	J0B	3750~4000K	J1B	3750~4000K	J0C	4000~4250K	J1C	4000~4250K	J0D	3750~4000K	J1D	3750~4000K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
0.3645	0.35	0.3685	0.37	0.37425	0.355	0.37925	0.375	0.3665	0.36	0.37175	0.385	0.37675	0.365	0.383375	0.39
0.3665	0.36	0.37175	0.385	0.37675	0.365	0.383375	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	K0C	3500~3750K	K1C	3500~3750K	K0D	3250~3500K	K1D	3250~3500K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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

L0A	3000~3250K	L0B	2750~3000K	L0C	3000~3250K	L0D	2750~3000K	L1A	3000~3250K	L1B	2750~3250K	L1C	3000~3250K	L1D	2750~3000K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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

M0A	2550~2750K	M0B	2350~2550K	M0C	2550~2750K	M0D	2350~2550K	M1A	2550~2750K	M1B	2350~2550K	M1C	2550~2750K	M1D	2350~2550K
x	y	x	y	x	y	x	y	x	y	x	y	x	y	x	y
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

Color Temperature Coordinates



Product Characteristics

Absolute Maximum Ratings

Product	Emission Color	P_d (mW)	I_F (mA)	I_{FP}* (mA)	V_R	T_{OP} (°C)	T_{ST} (°C)
HT-T136DNC	White	105	30	40	5	-30°C~+80°C	-40°C~+85°C
HT-T136DND	White	105	30	40	5	-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

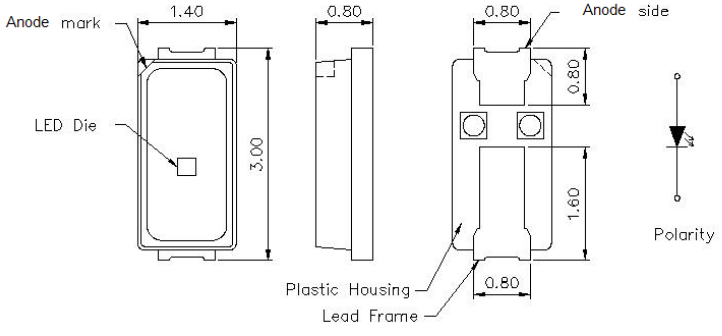
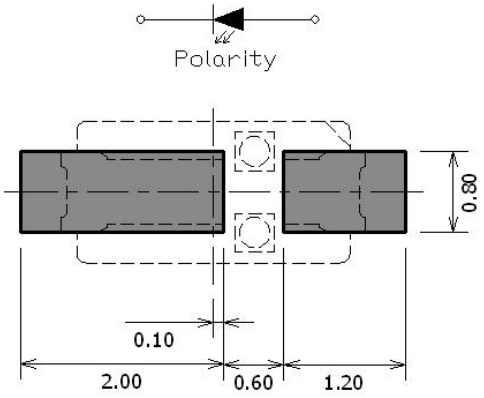
(T_a 25 °C)

Product	Emission Color	I_F(mA)	V_F(V)		Color	I^*_V(lm)
			typ	max	C.I.E.	Typ
HT-T136DNC	White	30	3.1	3.5	X: 0.312 – 0.326	11
HT-T136DND	White	30	3.1	3.5	Y: 0.31 – 0.326	10

* Per NIST standards

Package Outline Dimension
Recommended Soldering Pattern for Reflow Soldering

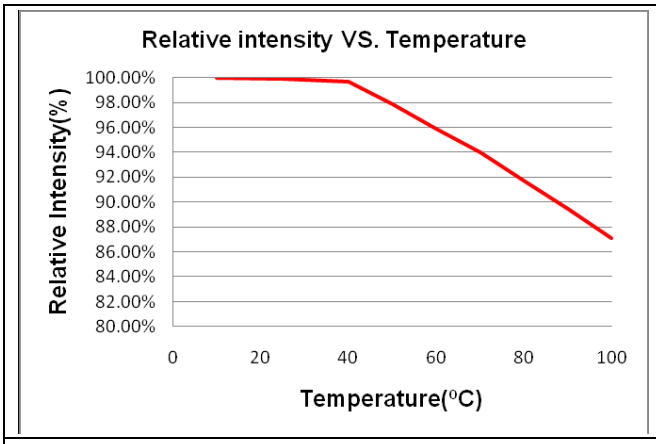
Unit: mm Tolerance: +/-0.1

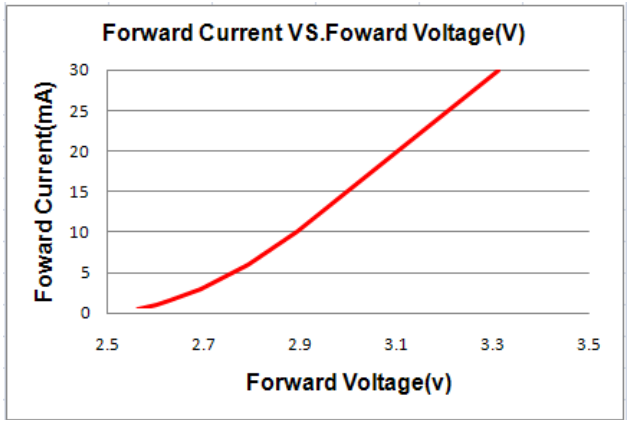
Outline Dimension	Solder Pattern
	
Soldering terminals may shift in the x, y direction.	Unit: mm

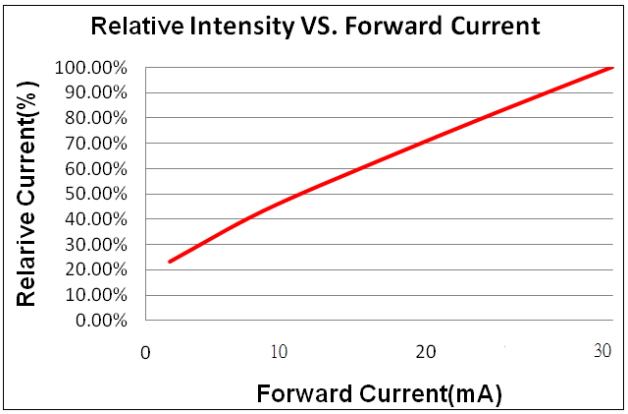
Precaution for Use

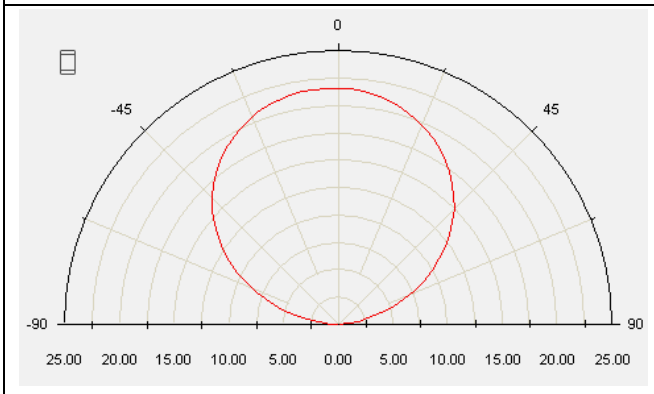
1) The chips should not be used directly in any type of fluid such as water, oil, organic solvent, etc.
2) When the LEDs are illuminating, the maximum ambient temperature should be first considered before operation.
3) LEDs must be stored in a clean environment. A sealed container with a nitrogen atmosphere is necessary if the storage period is over 3 months after shipping.
4) The LEDs must be used within seven days after unpacked. Unused products must be repacked in an anti-electrostatic package, folded to close any opening and then stored in a dry and cool space.
5) The appearance and specifications of the products may be modified for improvement without further notice.
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.

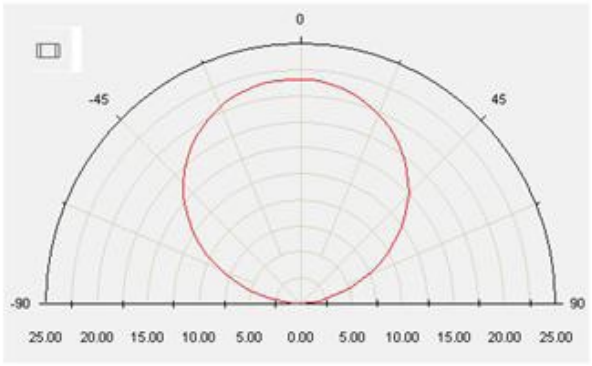
Characteristic Curves for TW





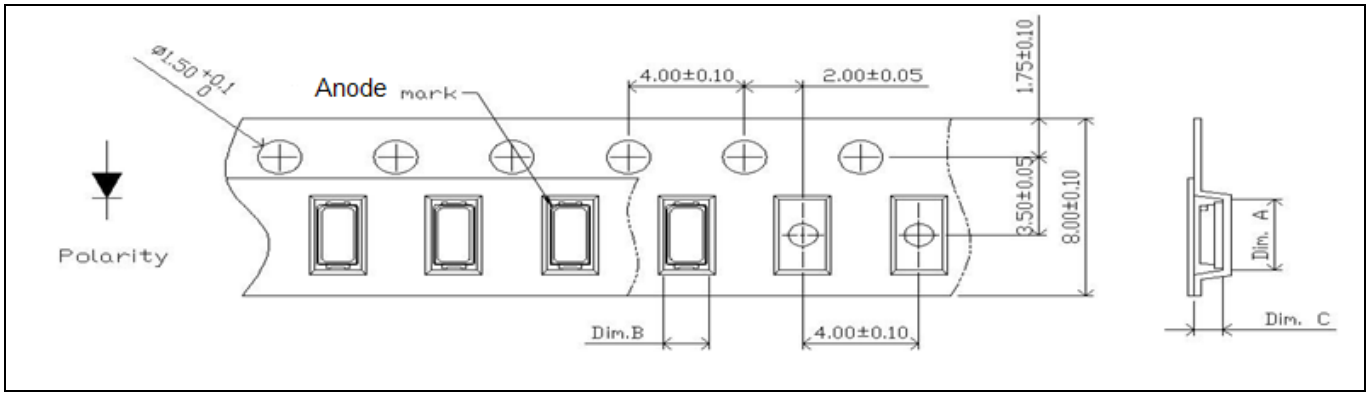






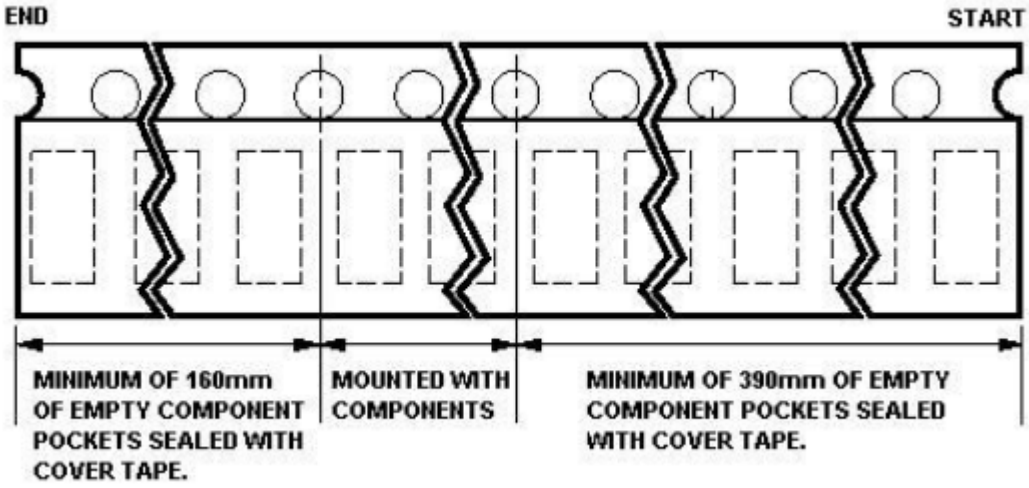
Packaging

Tape Dimension

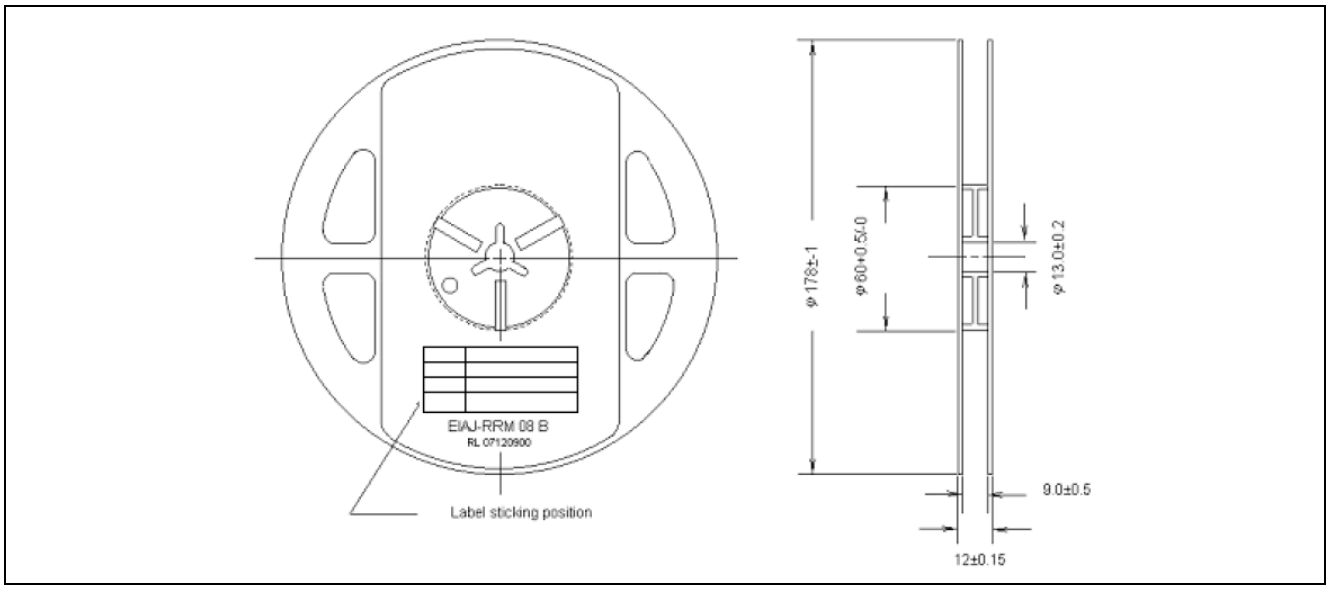


Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-T(U)136	3.2±0.1	1.6±0.1	1.0±0.1	2K

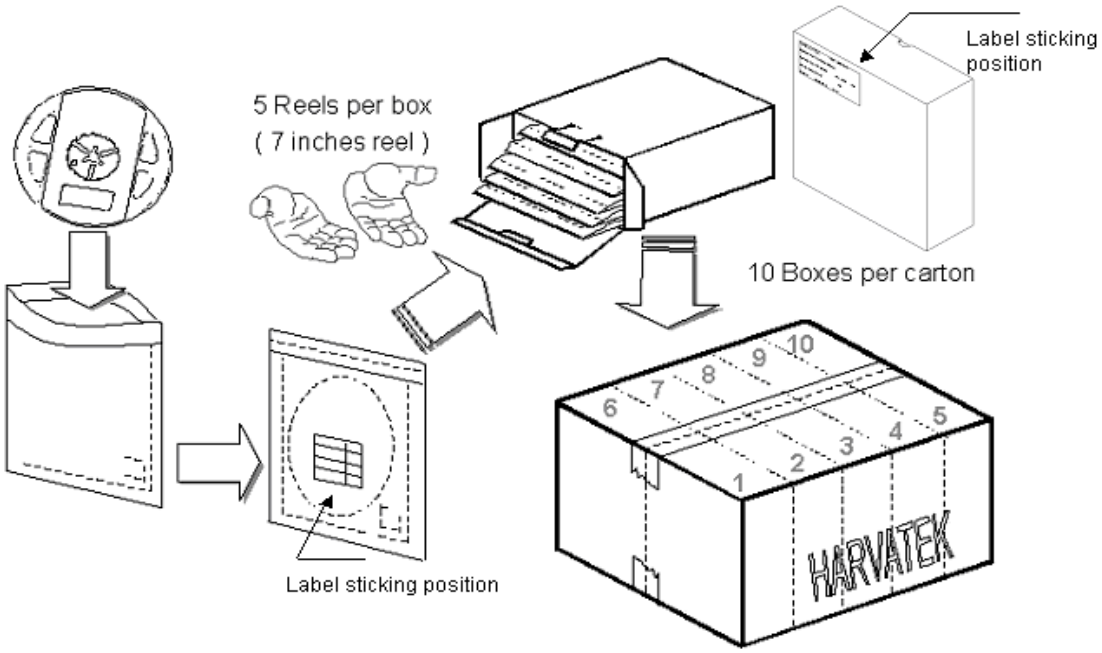
Unit: mm



Reel Dimension



Packing



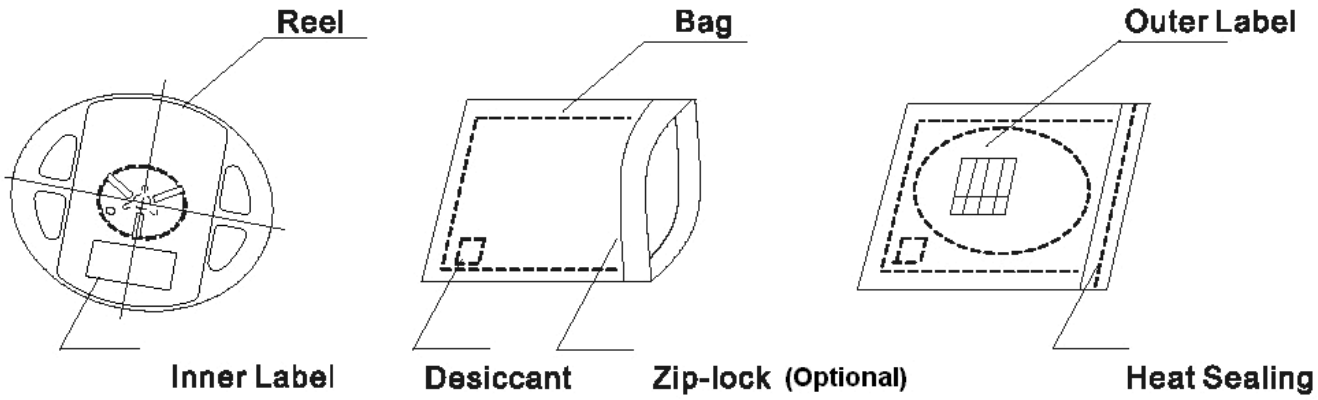
5 boxes per carton is available depending on shipment quantity.

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:



PRECAUTIONS

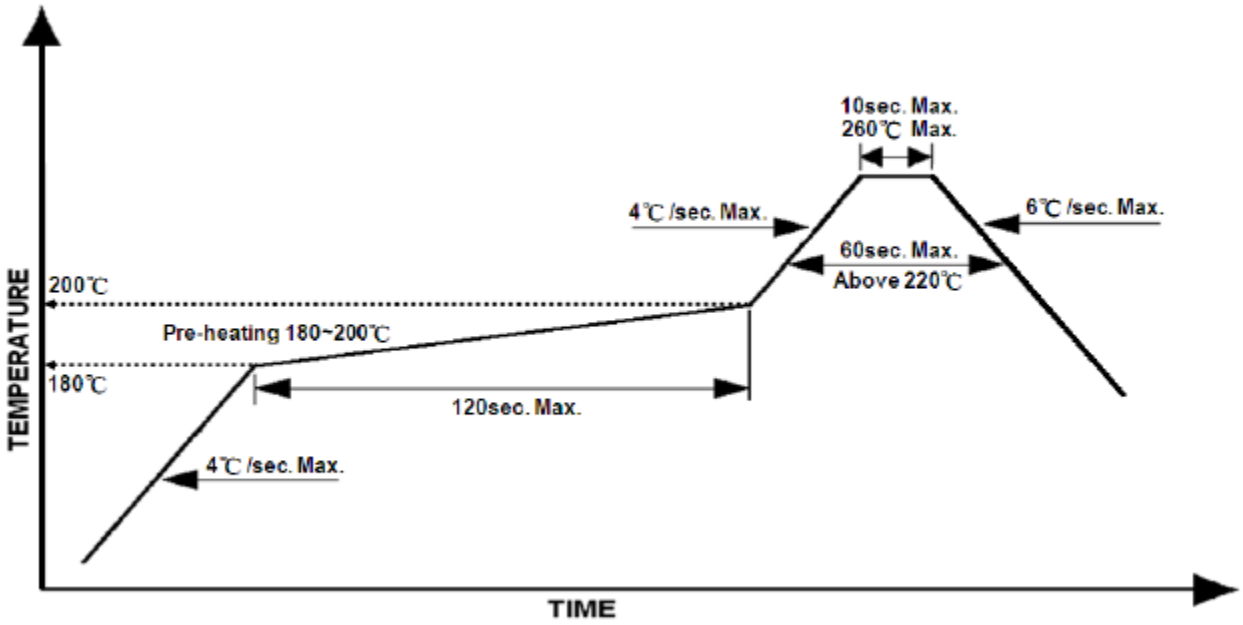
1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage.
4. Avoid operation 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.

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



Reworking

- Rework should be completed within 5 seconds under 260 ^{O}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.

Revision History

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