Harvatek Surface Mount Chip LED Data Sheet
HT-T3212DND

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DISCLAIMER

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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	82 – 121.55 lm @150mA / Ta=25^{O} C, ± 10%		
XY	Refer to page 6-8 @150mA / Ta=25^{O} C, ± 0.005		
Vf	7.0V max @150mA / Ta=25℃, ± 0.05 V		
Ir	< 100 μA @ V_R = 5 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:

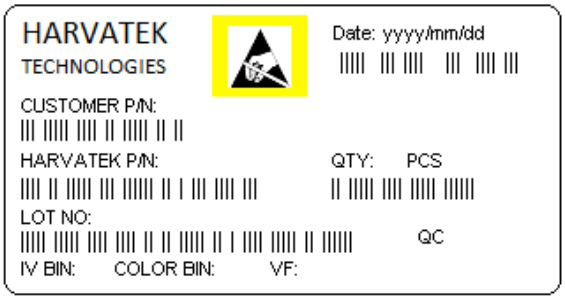
Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv, λ_D and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

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 32 1 2 D N D - Y Y Y Y

Series Name	Emitting Color	Customer Code
HT-T3212 **HT: Harvatek** **T3212:** **3.0 (L) x 3.0 (W) x 0.52 (H) mm**	**DND** **CRI > 80 @150mA per chip**	**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 (Im)	
	Minimum	Maximum
TD2	82	87.4
UA1	87.4	93.5
UB1	93.5	99.6
UC2	99.6	106.6
UD2	106.6	113.6
VA1	113.6	121.55

@150mA / Ta=25^{O} C, Tolerance: ± 10%

■ Forward Voltage (V_F) Bin:

Color	Bin Code	Spec. Range
White (TW)	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

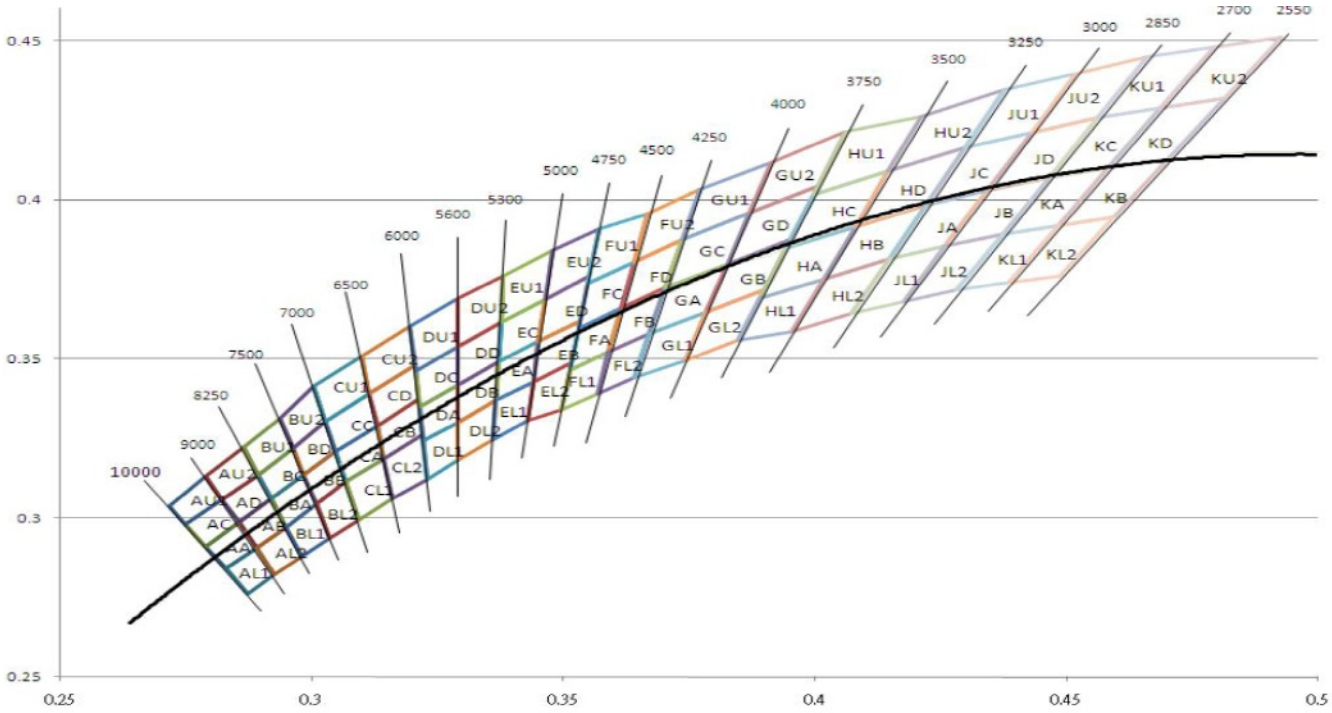
@150mA / Ta=25℃, Tolerance: ± 0.05 V

■ Chromaticity Bin (for TW only):

	0.283	0.284		0.295	0.297		0.3068	0.3113		0.3222	0.3243		0.3366	0.3369
	0.279	0.291		0.292	0.306		0.3048	0.3207		0.3215	0.335		0.3371	0.349
AA	0.2855	0.2985	BA	0.2984	0.3133	CA	0.313	0.329	DA	0.329	0.3417	EA	0.3451	0.3554
	0.289	0.2905		0.3009	0.3042		0.3144	0.3186		0.329	0.33		0.344	0.3427
	0.283	0.284		0.295	0.297		0.3068	0.3113		0.3222	0.3243		0.3366	0.3369
	0.289	0.2905		0.3009	0.3042		0.3144	0.3186		0.329	0.33		0.344	0.3427
	0.2855	0.2985		0.2984	0.3133		0.313	0.329		0.329	0.3417		0.3451	0.3554
AB	0.292	0.306	BB	0.3048	0.3207	CB	0.3213	0.3373	DB	0.3371	0.349	EB	0.3533	0.362
	0.295	0.297		0.3068	0.3113		0.3221	0.3261		0.3366	0.3369		0.3515	0.3487
	0.289	0.2905		0.3009	0.3042		0.3144	0.3186		0.329	0.33		0.344	0.3427
	0.279	0.291		0.292	0.306		0.3048	0.3207		0.3215	0.335		0.3371	0.349
	0.275	0.298		0.2895	0.3135		0.3028	0.3304		0.3207	0.3462		0.3376	0.3616
AC	0.28225	0.30575	BC	0.2962	0.322	CC	0.3115	0.3391	DC	0.329	0.3538	EC	0.3463	0.3687
	0.2855	0.2985		0.2984	0.3133		0.313	0.329		0.329	0.3417		0.3451	0.3554
	0.279	0.291		0.292	0.306		0.3048	0.3207		0.3215	0.335		0.3371	0.349
	0.2855	0.2985		0.2984	0.3133		0.313	0.329		0.329	0.3417		0.3451	0.3554
	0.28225	0.30575		0.2962	0.322		0.3115	0.3391		0.329	0.3538		0.3463	0.3687
AD	0.2895	0.3135	BD	0.3028	0.3304	CD	0.3205	0.3481	DD	0.3376	0.3616	ED	0.3551	0.376
	0.292	0.306		0.3048	0.3207		0.3213	0.3373		0.3371	0.349		0.3533	0.362
	0.2855	0.2985		0.2984	0.3133		0.313	0.329		0.329	0.3417		0.3451	0.3554
	0.2874	0.276		0.298	0.288		0.3093	0.2993		0.3231	0.312		0.3361	0.3245
	0.283	0.284		0.295	0.297		0.3068	0.3113		0.3222	0.3243		0.3366	0.3369
AL1	0.289	0.2905	BL1	0.3009	0.3042	CL1	0.3144	0.3186	DL1	0.329	0.33	EL1	0.344	0.3428
	0.2925	0.282		0.3037	0.2937		0.3161	0.3059		0.329	0.318		0.3429	0.3307
	0.2874	0.276		0.298	0.288		0.3093	0.2993		0.3231	0.312		0.3361	0.3245
	0.2925	0.282		0.3037	0.2937		0.3161	0.3059		0.329	0.318		0.3429	0.3307
	0.289	0.2905		0.3009	0.3042		0.3144	0.3186		0.329	0.33		0.344	0.3428
AL2	0.295	0.297	BL2	0.3068	0.3113	CL2	0.3221	0.3261	DL2	0.3366	0.3369	EL2	0.3515	0.3487
	0.298	0.288		0.3093	0.2993		0.3231	0.312		0.3361	0.3245		0.3495	0.3339
	0.2925	0.282		0.3037	0.2937		0.3161	0.3059		0.329	0.318		0.3429	0.3307
	0.275	0.298		0.2895	0.3135		0.3028	0.3304		0.3207	0.3462		0.3376	0.3616
	0.2718	0.3036		0.2864	0.3221		0.3005	0.3415		0.3196	0.3602		0.3381	0.3762
AU1	0.279	0.313	BU1	0.2937	0.3312	CU1	0.3099	0.3509	DU1	0.329	0.369	EU1	0.348	0.384
	0.28225	0.30575		0.2962	0.322		0.3115	0.3391		0.329	0.3538		0.3463	0.3687
	0.275	0.298		0.2895	0.3135		0.3028	0.3304		0.3207	0.3462		0.3376	0.3616
	0.28225	0.30575		0.2962	0.322		0.3115	0.3391		0.329	0.3538		0.3463	0.3687
	0.279	0.313		0.2937	0.3312		0.3099	0.3509		0.329	0.369		0.348	0.384
AU2	0.2864	0.3221	BU2	0.3005	0.3415	CU2	0.3196	0.3602	DU2	0.3381	0.3762	EU2	0.3571	0.3907
	0.2895	0.3135		0.3028	0.3304		0.3205	0.3481		0.3376	0.3616		0.3551	0.376
	0.28225	0.30575		0.2962	0.322		0.3115	0.3391		0.329	0.3538		0.3463	0.3687

	0.3512	0.3465		0.367	0.3578		0.3889	0.369		0.4147	0.3814		0.4373	0.3893
	0.353	0.3597		0.3702	0.3722		0.3941	0.3848		0.4221	0.3984		0.4465	0.4071
FA	0.3615	0.3659	GA	0.3825	0.3798	HA	0.408	0.3916	JA	0.4342	0.4028	KA	0.4582	0.4099
	0.359	0.3521		0.3783	0.3646		0.4017	0.3751		0.4259	0.3853		0.4483	0.3919
	0.3512	0.3465		0.367	0.3578		0.3889	0.369		0.4147	0.3814		0.4373	0.3893
	0.359	0.3521		0.3783	0.3646		0.4017	0.3751		0.4259	0.3853		0.4483	0.3919
	0.3615	0.3659		0.3825	0.3798		0.408	0.3916		0.4342	0.4028		0.4582	0.4099
FB	0.3702	0.3722	GB	0.395	0.3875	HB	0.4221	0.3984	JB	0.4465	0.4071	KB	0.47	0.4126
	0.367	0.3578		0.3898	0.3716		0.4147	0.3814		0.4373	0.3893		0.4593	0.3944
	0.359	0.3521		0.3783	0.3646		0.4017	0.3751		0.4259	0.3853		0.4483	0.3919
	0.353	0.3597		0.3702	0.3722		0.3941	0.3848		0.4221	0.3984		0.4465	0.4071
	0.3548	0.3736		0.3736	0.3874		0.3996	0.4015		0.4299	0.4165		0.4562	0.426
FC	0.3641	0.3804	GC	0.3869	0.3958	HC	0.4146	0.4089	JC	0.443	0.4212	KC	0.4687	0.4289
	0.3615	0.3659		0.3825	0.3798		0.408	0.3916		0.4342	0.4028		0.4582	0.4099
	0.353	0.3597		0.3702	0.3722		0.3941	0.3848		0.4221	0.3984		0.4465	0.4071
	0.3615	0.3659		0.3825	0.3798		0.408	0.3916		0.4342	0.4028		0.4582	0.4099
	0.3641	0.3804		0.3869	0.3958		0.4146	0.4089		0.443	0.4212		0.4687	0.4289
FD	0.3736	0.3874	GD	0.4006	0.4044	HD	0.4299	0.4165	JD	0.4562	0.426	KD	0.4813	0.4319
	0.3702	0.3722		0.395	0.3875		0.4221	0.3984		0.4465	0.4071		0.47	0.4126
	0.3615	0.3659		0.3825	0.3798		0.408	0.3916		0.4342	0.4028		0.4582	0.4099
	0.3495	0.3339		0.364	0.344		0.3846	0.3557		0.4073	0.3644		0.4281	0.3715
	0.3512	0.3465		0.367	0.3578		0.3889	0.369		0.4147	0.3814		0.4373	0.3893
FL1	0.359	0.3521	GL1	0.3783	0.3646	HL1	0.4017	0.3751	JL1	0.4259	0.3853	KL1	0.4483	0.3919
	0.3567	0.3389		0.3741	0.3494		0.3954	0.3586		0.4176	0.3678		0.4384	0.3739
	0.3495	0.3339		0.364	0.344		0.3846	0.3557		0.4073	0.3644		0.4281	0.3715
	0.3567	0.3389		0.3741	0.3494		0.3954	0.3586		0.4176	0.3678		0.4384	0.3739
	0.359	0.3521		0.3783	0.3646		0.4017	0.3751		0.4259	0.3853		0.4483	0.3919
FL2	0.367	0.3578	GL2	0.3898	0.3716	HL2	0.4147	0.3814	JL2	0.4373	0.3893	KL2	0.4593	0.3944
	0.364	0.344		0.3846	0.3557		0.4073	0.3644		0.4281	0.3715		0.4486	0.3762
	0.3567	0.3389		0.3741	0.3494		0.3954	0.3586		0.4176	0.3678		0.4384	0.3739
	0.3548	0.3736		0.3736	0.3874		0.3996	0.4015		0.4299	0.4165		0.4562	0.426
	0.3571	0.3907		0.3771	0.4034		0.4062	0.4213		0.4377	0.4346		0.4659	0.4449
FU1	0.3668	0.3957	GU1	0.3913	0.4118	HU1	0.4212	0.4262	JU1	0.4518	0.4396	KU1	0.4792	0.4479
	0.3641	0.3804		0.3869	0.3958		0.4146	0.4089		0.443	0.4212		0.4687	0.4289
	0.3548	0.3736		0.3736	0.3874		0.3996	0.4015		0.4299	0.4165		0.4562	0.426
	0.3641	0.3804		0.3869	0.3958		0.4146	0.4089		0.443	0.4212		0.4687	0.4289
	0.3668	0.3957		0.3913	0.4118		0.4212	0.4262		0.4518	0.4396		0.4792	0.4479
FU2	0.3771	0.4034	GU2	0.4062	0.4213	HU2	0.4377	0.4346	JU2	0.4659	0.4449	KU2	0.4926	0.4512
	0.3736	0.3874		0.4006	0.4044		0.4299	0.4165		0.4562	0.426		0.4813	0.4319
	0.3641	0.3804		0.3869	0.3958		0.4146	0.4089		0.443	0.4212		0.4687	0.4289

Color Temperature Coordinates



Product Characteristics

Absolute Maximum Ratings

Product	Emission Color	P_d (mW)	I_F (mA)	I_{FP}* (mA)	T_J (°C)	T_{OP} (°C)	T_{ST} (°C)
HT-T3212DND	White	1000	150	200	110	-35°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

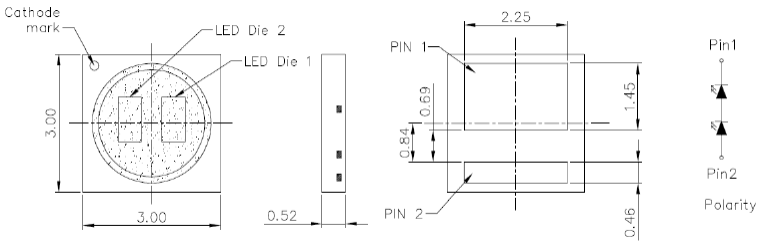
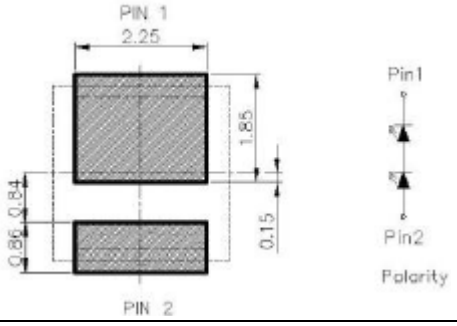
(T_a 25 °C)

Product	Emission Color	I_F(mA)	V_F(V)		Color	Flux (lm)
			typ	max	C.I.E.	typ
HT-T3212DND	White	150	6.0	7.0	X=0.33 Y=0.33	100

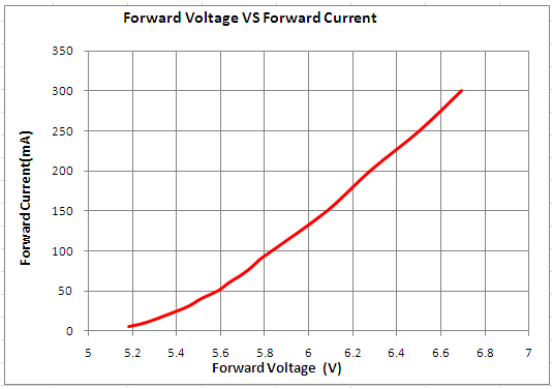
* Per NIST standards

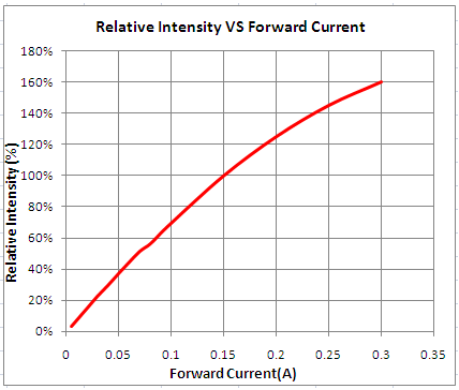
Package Outline Dimension
Recommended Soldering Pattern for Reflow Soldering

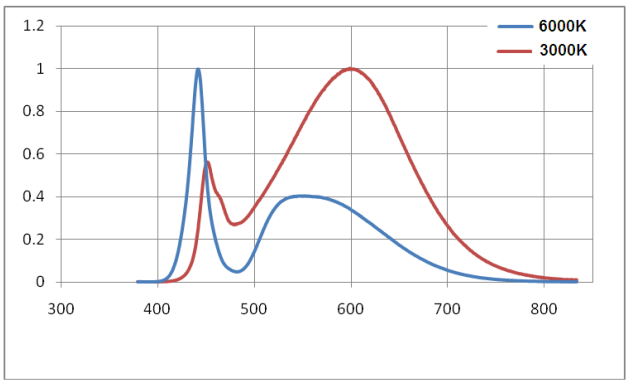
Unit: mm Tolerance: +/-0.1

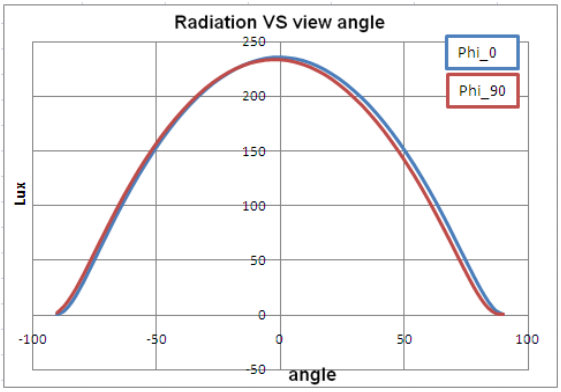
Outline Dimension	Solder Pattern
	
Soldering terminals may shift in the x, y direction.	Unit: mm

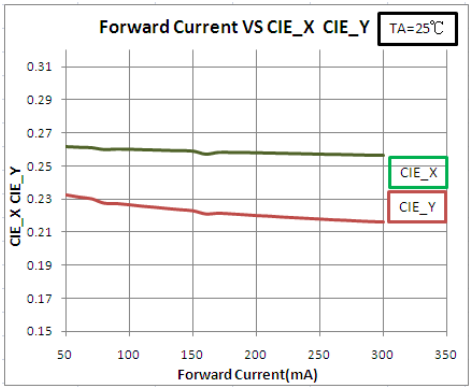
Characteristic Curves for TW

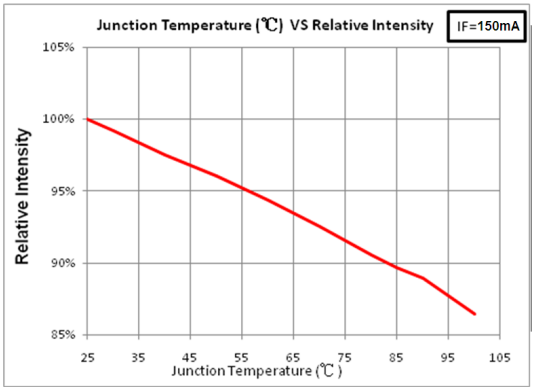


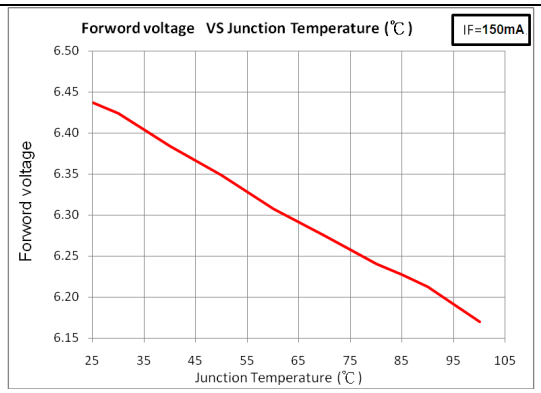


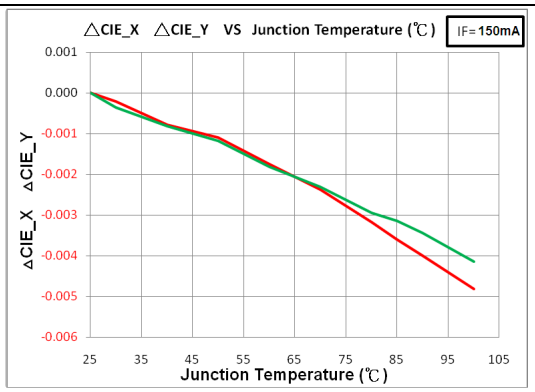


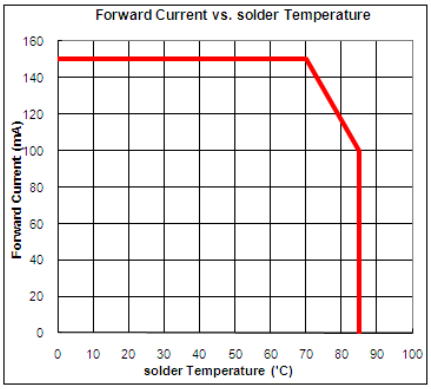


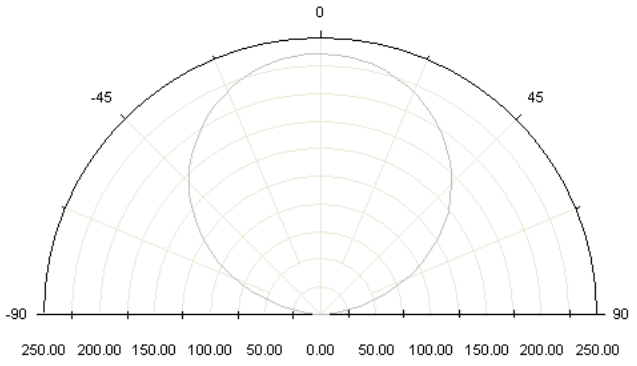


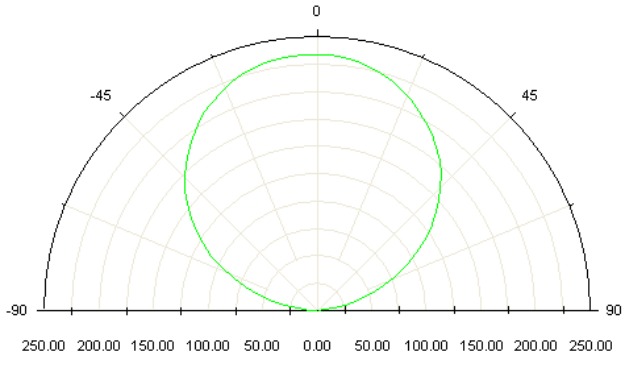



Forword voltage VS Junction Temperature (℃)
IF=150mA
Forword voltage
6.50
6.45
6.40
6.35
6.30
6.25
6.20
6.15
25 35 45 55 65 75 85 95 105
Junction Temperature (℃)


△CIE_X △CIE_Y VS Junction Temperature (℃)
IF=150mA
△CIE_X △CIE_Y
0.001
0.000
-0.001
-0.002
-0.003
-0.004
-0.005
-0.006
25 35 45 55 65 75 85 95 105
Junction Temperature (℃)


Forward Current vs. solder Temperature
Forward Current (mA)
160
140
120
100
80
60
40
20
0
0 10 20 30 40 50 60 70 80 90 100
solder Temperature (°C)


0
-45
45
-90
90
250.00 200.00 150.00 100.00 50.00 0.00 50.00 100.00 150.00 200.00 250.00

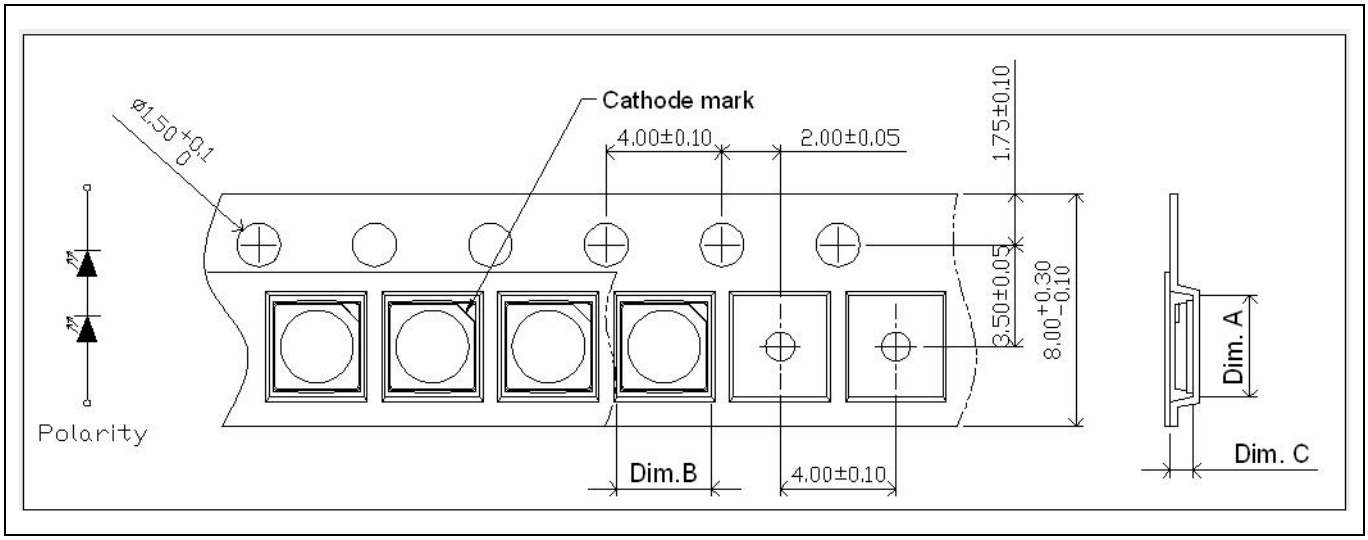

0
-45
45
-90
90
250.00 200.00 150.00 100.00 50.00 0.00 50.00 100.00 150.00 200.00 250.00

Reliability Test

RA Test (Preconditioning acc.to.Jedec Level 1)			
Test items	**Test condition**	**Duration**	**Sample Size**
Resistance to Soldering Heat(RTSH	IR-Reflow,260 ◦ C	1x/2x/3x	36
Temp. Cycle Test (TCT)	-40/100 ◦ C	0/100/300 Cycles	36
High Temp. with Bias(HTB)	85 ◦ C,If= 150mA	0/100/300/500/1000hrs	36
Temp. & Humidity with Bias (THB)	60 ◦ C/90%,If= 150mA	0/100/300/500/1000hrs	36
Temp. & Humidity with Bias (THB)	85 ◦ C/85%,If= 150mA	0/100/300/500/1000hrs	36
High Temp. Storage (HTS)	100 ◦ C	0/100/300/500/1000hrs	36
Low Temp. Storage (LTS)	-40 ◦ C	0/100/300/500/1000hrs	36
Pulse Life Test(PLT)	TA=25℃，tp=10ms DC=0.1 D=tp/T IF=500mA	0/100/300/500/1000hrs	36
Thermal Shock Test (TST)	-40/85 ◦ C	0/100/500 Cycles	36
Operating Life Test (OLT)	25 ◦ C,If= 150mA	0/100/300/500/1000hrs	36
ESD(HBM)	(Human Body Model)	0/1KV/2KV/5KV	36
Sulphur Test(硫化測試)	30 ◦ C/70% Mixed gas with H2S0.75PPM NO2,1.5PPM	0/168HRS	36
Ag Migration	85 ◦ C/85% Vr=50	0/100/300/500/1000hrs	36

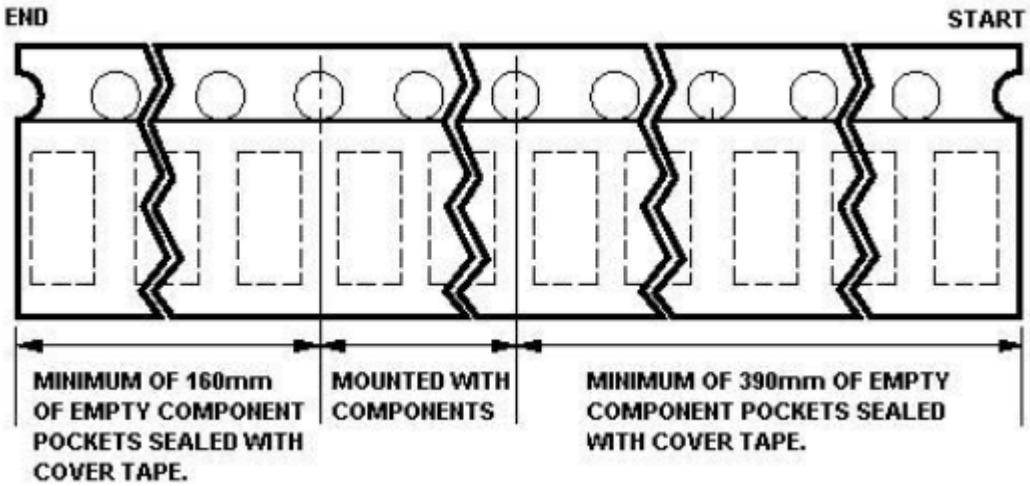
Packaging

Tape Dimension

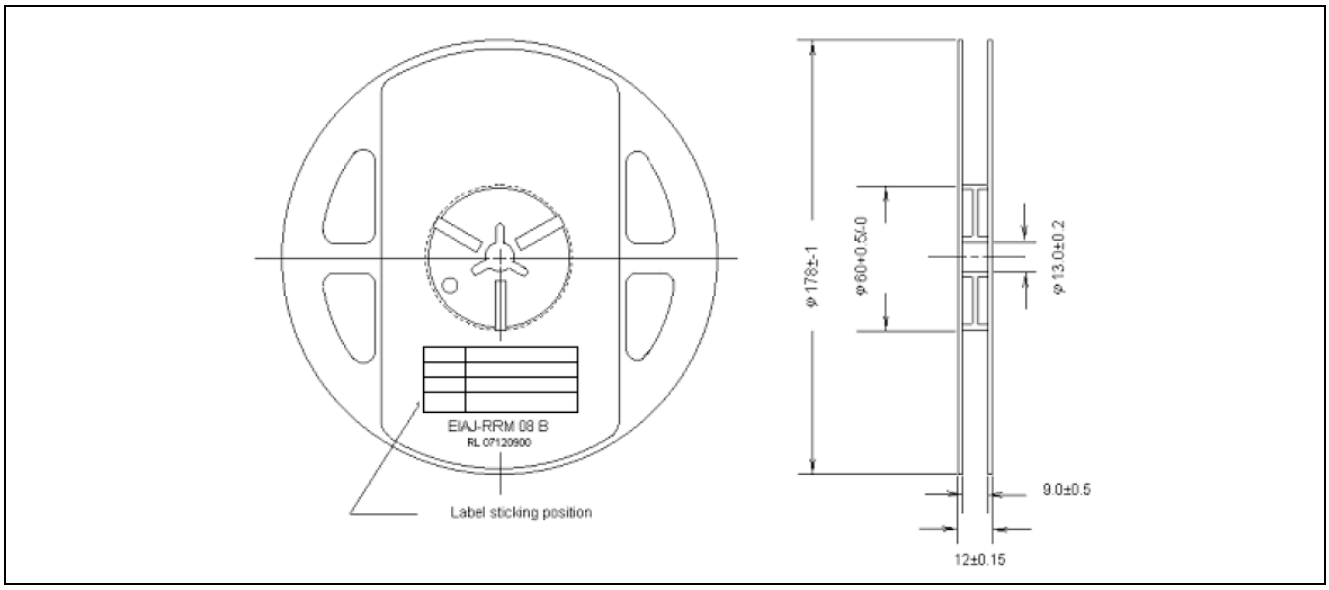


Part No.	Dim. A	Dim. B	Dim. C	Q'ty/Reel
HT-T3212	3.49±0.1	3.26±0.1	0.78±0.1	2K

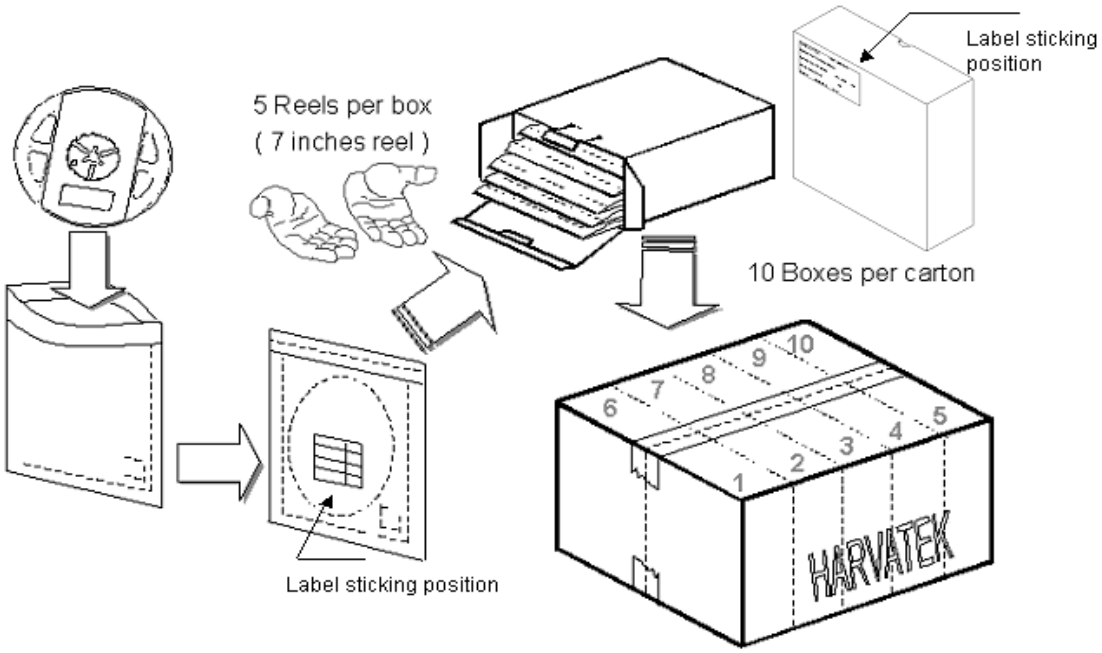
Unit: mm



Reel Dimension



Packing



5 boxes per carton is available depending on shipment quantity.

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

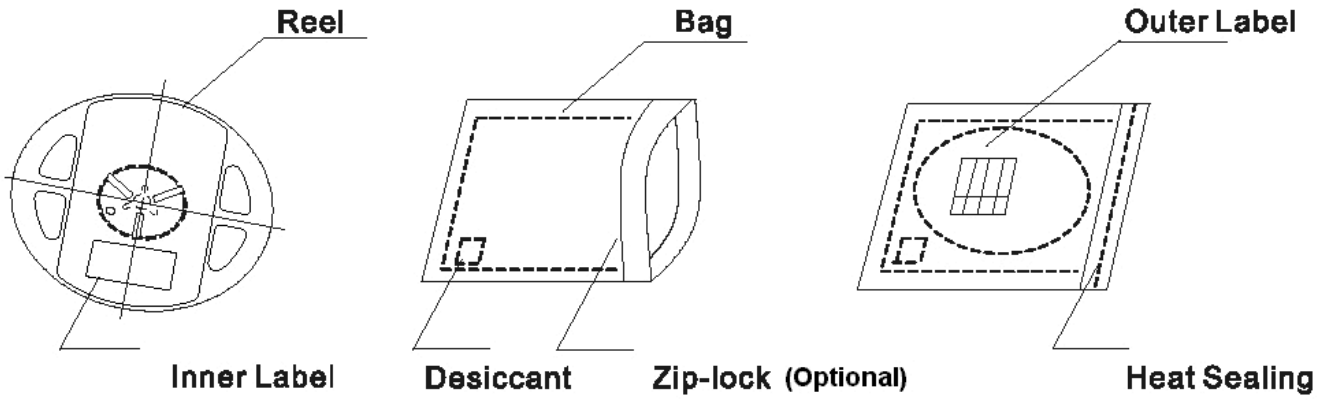
Any application should refer to the specifications of absolute maximum ratings.

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.

The packaging sequence is as follows:



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±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

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.

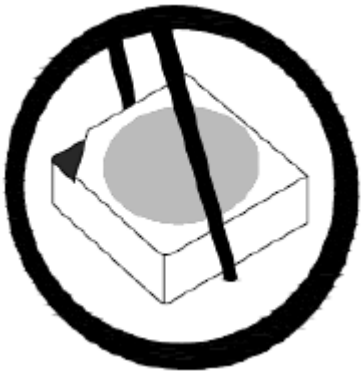


Figure 2

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.

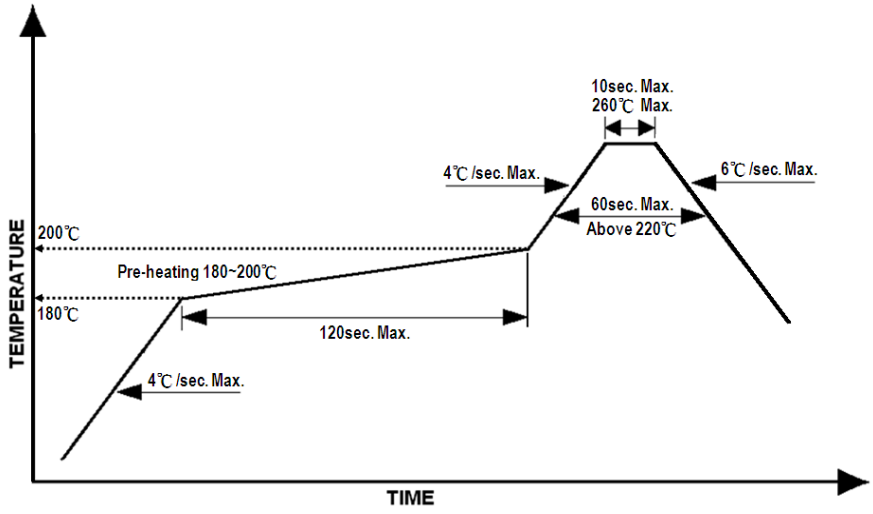
This is assured by choosing a pick and place nozzle which is large than LEDs reflector area.

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.

Revision History

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