Harvatek Surface Mount LEDs Approval Sheet

Model No.: HT-T1401BP--60P000112

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 HARVATEK 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, dom*estic, 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.

Product Specification

	Specification	Material	Quantity
Flux	15.86-22.02 lm @60mA / Ta= 25^{O} C Tolerance±7%		
Chromaticity Coordinates	Refer to page 6~8 @60mA / Ta= 25^{O} C Tolerance x, y± 0.005		
Vf	2.7-3.5V (0.1V/bin) @60mA / Ta= 25^{O} C Tolerance±0.05V		
Resin	White	PPA	
Carrier tape	According to EIA 481-1A specs	Conductive black tape	2000pcs per reel
Reel	According to EIA 481-1A specs	Conductive black	
Label	HT standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel one bag
Carton	HT standard	Paper	Non-specified

Others:

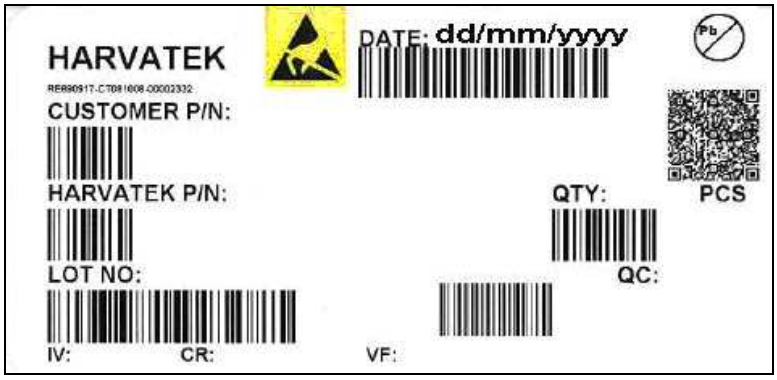
Every mid-box will be loaded 5 reels. These 5 reels can be different in lot, Iv, lambda, or Vf. Every reel will have an independent label to identify its specification and the mid-box there will have a corresponding label post on it.

ATTENTION: Electricstatic Discharge (ESD) protection

The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs is based chips is still necessary even though they are safe in low static-electric discharge. Material in AlInGaP, 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 protective from ESD during all the process.

Label Spec.:



■Customer P/N: To Be Defined

■ Harvatek P/N

T 140 1 BP 60P- 0001 12

Product	Dice	Current	Taping
LF	1:Single	60mA	1. Taping style 2. Q'ty

Package	Color	Series Number
4.0x1.4x0.7mm With zener	BP:White	0001~ZZZZ

■ 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		

Bin Code.

■ Iv Bin:

Color	Bin Code	Spec. Range
White	MC2	15.86-16.94 lm
	MD2	16.94-18.1 lm
	NA1	18.1-19.33 lm
	NB1	19.33-20.62 lm
	NC2	20.62-22.02 lm

Luminous Intensity Measurement Allowance is ±7%

Bin Code	Spec. Range
G4	2.7-2.8V
H1	2.8-2.9V
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

Forward Voltage Measurement Allowance is ±0.05V

■ Color Rank:

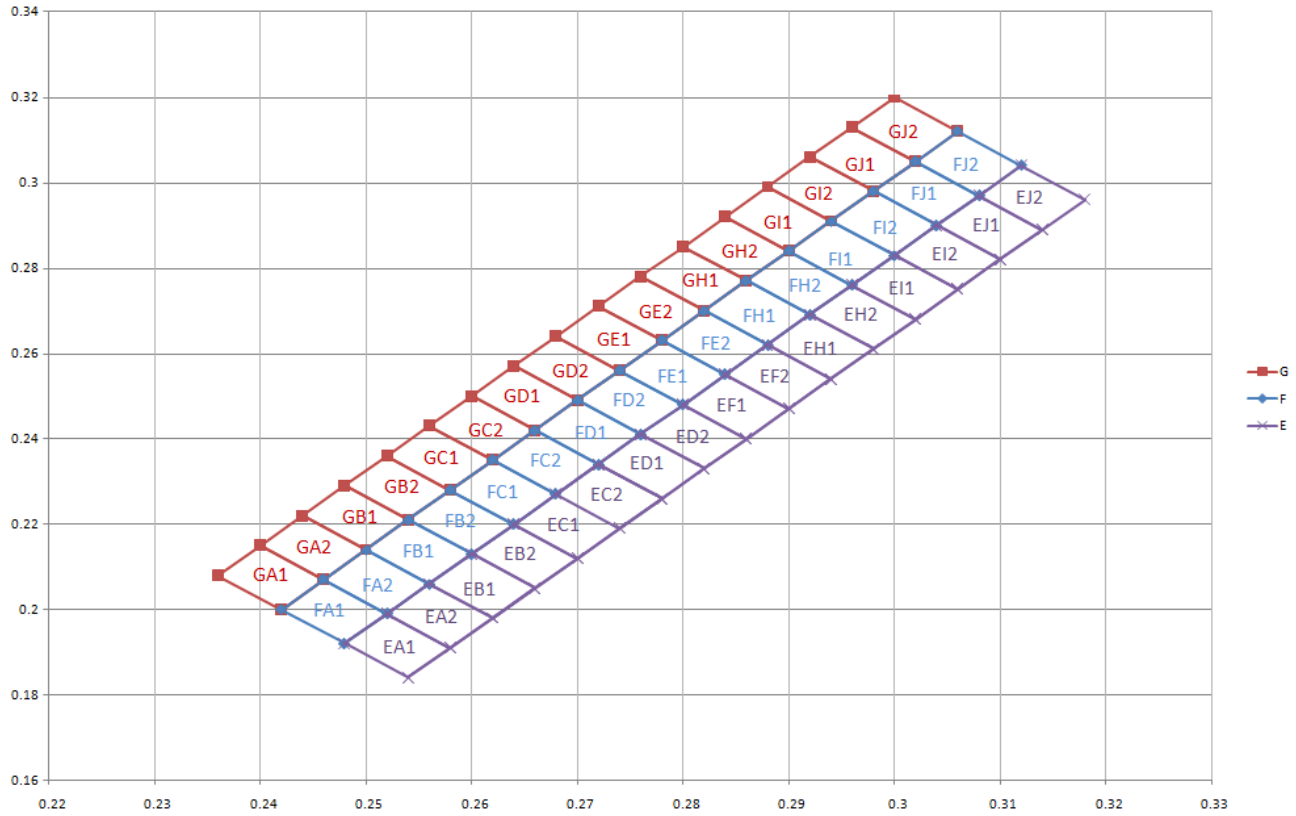
GA1	0.242	0.2	FA1	0.248	0.192	EA1	0.254	0.184
	0.236	0.208		0.242	0.2		0.248	0.192
	0.24	0.215		0.246	0.207		0.252	0.199
	0.246	0.207		0.252	0.199		0.258	0.191
	0.242	0.2		0.248	0.192		0.254	0.184
GA2	0.246	0.207	FA2	0.252	0.199	EA2	0.258	0.191
	0.24	0.215		0.246	0.207		0.252	0.199
	0.244	0.222		0.25	0.214		0.256	0.206
	0.25	0.214		0.256	0.206		0.262	0.198
	0.246	0.207		0.252	0.199		0.258	0.191
GB1	0.25	0.214	FB1	0.256	0.206	EB2	0.266	0.205
	0.244	0.222		0.25	0.214		0.26	0.213
	0.248	0.229		0.254	0.221		0.264	0.22
	0.254	0.221		0.26	0.213		0.27	0.212
	0.25	0.214		0.256	0.206		0.266	0.205
GB2	0.254	0.221	FB2	0.26	0.213	EB1	0.262	0.198
	0.248	0.229		0.254	0.221		0.256	0.206
	0.252	0.236		0.258	0.228		0.26	0.213
	0.258	0.228		0.264	0.22		0.266	0.205
	0.254	0.221		0.26	0.213		0.262	0.198
GC1	0.258	0.228	FC1	0.264	0.22	EC1	0.27	0.212
	0.252	0.236		0.258	0.228		0.264	0.22
	0.256	0.243		0.262	0.235		0.272	0.234
	0.262	0.235		0.268	0.227		0.278	0.226
	0.258	0.228		0.264	0.22		0.27	0.212
GC2	0.262	0.235	FC2	0.268	0.227	EC2	0.274	0.219
	0.256	0.243		0.262	0.235		0.268	0.227
	0.26	0.25		0.266	0.242		0.272	0.234
	0.266	0.242		0.272	0.234		0.278	0.226
	0.262	0.235		0.268	0.227		0.274	0.219

GD1	0.266	0.242	FD1	0.272	0.234	ED1	0.278	0.226
	0.26	0.25		0.266	0.242		0.272	0.234
	0.264	0.257		0.27	0.249		0.276	0.241
	0.27	0.249		0.276	0.241		0.282	0.233
	0.266	0.242		0.272	0.234		0.278	0.226
GD2	0.27	0.249	FD2	0.276	0.241	ED2	0.282	0.233
	0.264	0.257		0.27	0.249		0.276	0.241
	0.268	0.264		0.274	0.256		0.28	0.248
	0.274	0.256		0.28	0.248		0.286	0.24
	0.27	0.249		0.276	0.241		0.282	0.233
GE1	0.274	0.256	FE1	0.28	0.248	EF1	0.286	0.24
	0.268	0.264		0.274	0.256		0.28	0.248
	0.272	0.271		0.278	0.263		0.284	0.255
	0.278	0.263		0.284	0.255		0.29	0.247
	0.274	0.256		0.28	0.248		0.286	0.24
GE2	0.278	0.263	FE2	0.284	0.255	EF2	0.29	0.247
	0.272	0.271		0.278	0.263		0.284	0.255
	0.276	0.278		0.282	0.27		0.288	0.262
	0.282	0.27		0.288	0.262		0.294	0.254
	0.278	0.263		0.284	0.255		0.29	0.247
GH1	0.282	0.27	FH1	0.288	0.262	EH1	0.294	0.254
	0.276	0.278		0.282	0.27		0.288	0.262
	0.28	0.285		0.286	0.277		0.292	0.269
	0.286	0.277		0.292	0.269		0.298	0.261
	0.282	0.27		0.288	0.262		0.294	0.254
GH2	0.286	0.277	FH2	0.292	0.269	EH2	0.298	0.261
	0.28	0.285		0.286	0.277		0.292	0.269
	0.284	0.292		0.29	0.284		0.296	0.276
	0.29	0.284		0.296	0.276		0.302	0.268
	0.286	0.277		0.292	0.269		0.298	0.261

GI1	0.29	0.284	FI1	0.296	0.276	EI1	0.302	0.268
	0.284	0.292		0.29	0.284		0.296	0.276
	0.288	0.299		0.294	0.291		0.3	0.283
	0.294	0.291		0.3	0.283		0.306	0.275
	0.29	0.284		0.296	0.276		0.302	0.268
GI2	0.294	0.291	FI2	0.3	0.283	EI2	0.306	0.275
	0.288	0.299		0.294	0.291		0.3	0.283
	0.292	0.306		0.298	0.298		0.304	0.29
	0.298	0.298		0.304	0.29		0.31	0.282
	0.294	0.291		0.3	0.283		0.306	0.275
GJ1	0.298	0.298	FJ1	0.304	0.29	EJ1	0.31	0.282
	0.292	0.306		0.298	0.298		0.304	0.29
	0.296	0.313		0.302	0.305		0.308	0.297
	0.302	0.305		0.308	0.297		0.314	0.289
	0.298	0.298		0.304	0.29		0.31	0.282
GJ2	0.302	0.305	FJ2	0.308	0.297	EJ2	0.314	0.289
	0.296	0.313		0.302	0.305		0.308	0.297
	0.3	0.32		0.306	0.312		0.312	0.304
	0.306	0.312		0.312	0.304		0.318	0.296
	0.302	0.305		0.308	0.297		0.314	0.289

Note: It maintains a tolerance of x, y ±0.005

Color Rank Corrdinates



Electro-Optical Characteristics

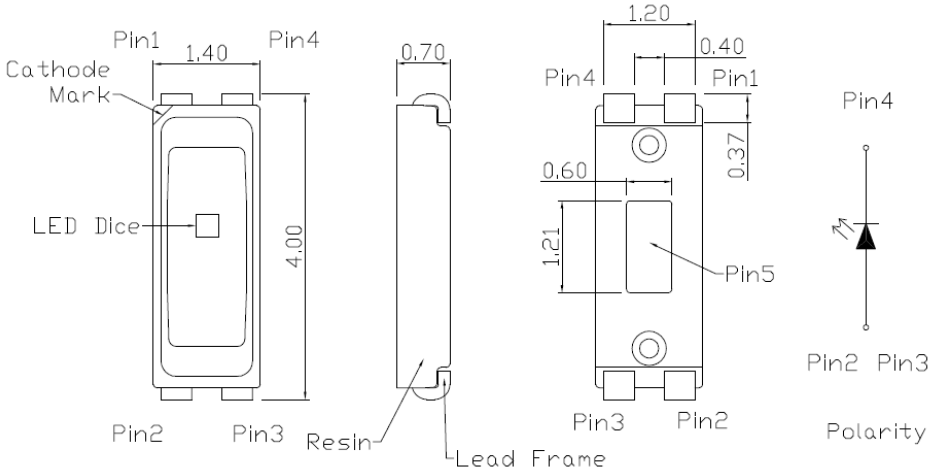
(Each chip @ 60mA, T_a 25 °C)

Product No.	Lighting Color	Material	V_F(V)		Color	Flux(lm)
			min	max	CIE coordinates x, y	typ
HT-T1401BP	White	InGaN	2.7	3.5	Typ x=0.28, y=0.27	17

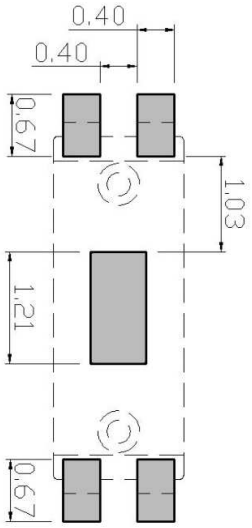
Package Outline Dimension and Recommended Soldering Pattern for Reflow Soldering

Unit: mm Tolerance: +/-0.1

Outline Dim.



Soldering Pattern



Pin1 is connected with heat slug

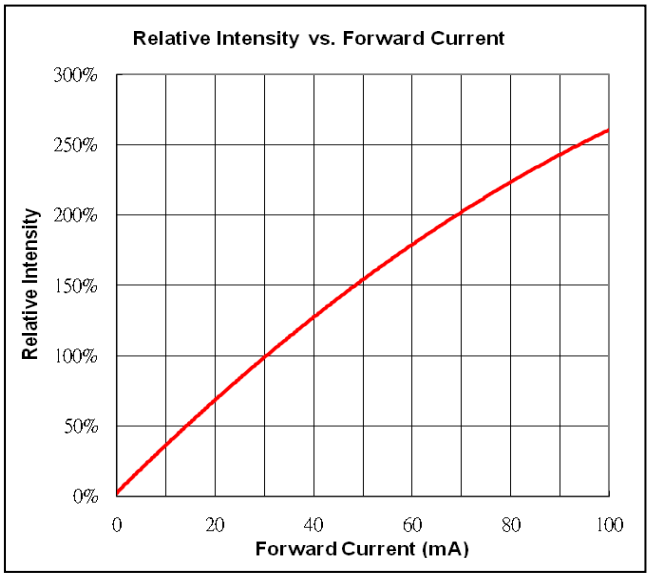
Soldering terminal may shift in x, y direction.

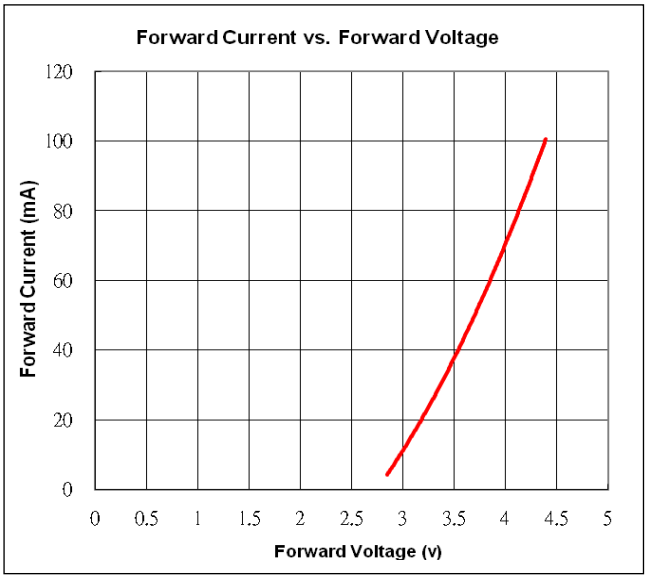
Absolute Maximum Ratings

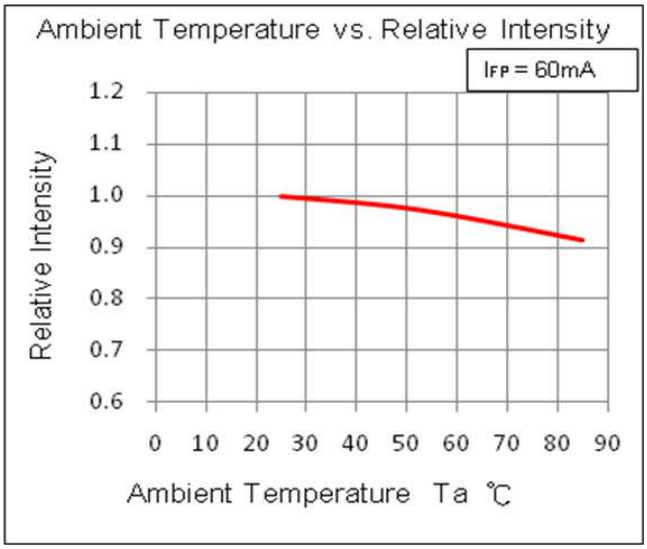
Series	P_d (mW)	I_F (mA)	I_{FP} (mA)**	V_R (V)	T_{OP} (°C)	T_{ST} (°C)
T1401DNC	210	60	150	5	-40~+85	-40~+85

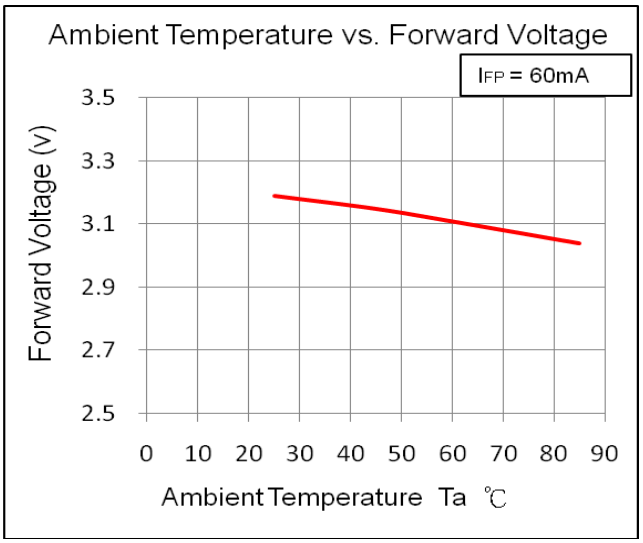
* Condition for I_{FP} is pulse of 1/10 duty and 0.1msec width

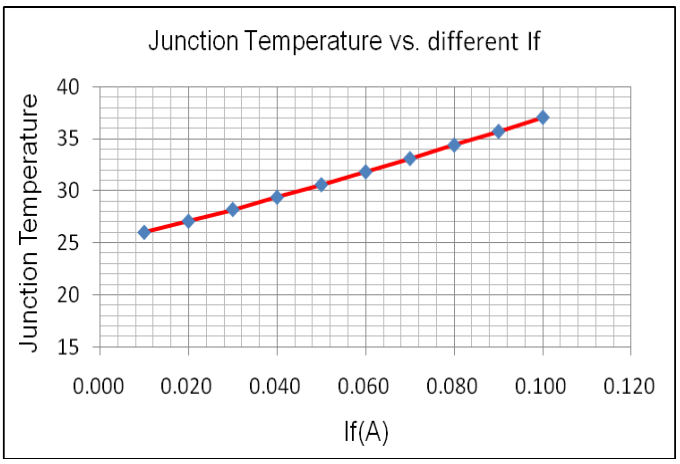
Characteristics

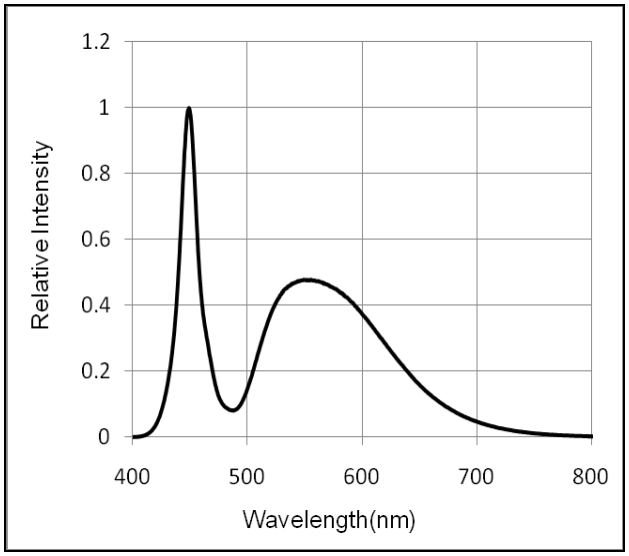


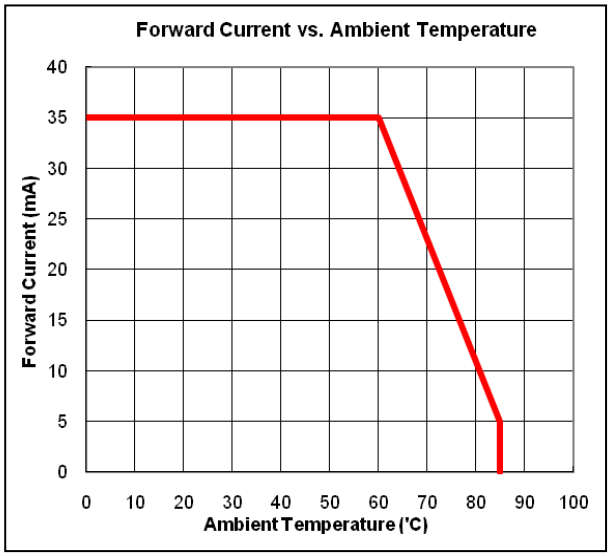




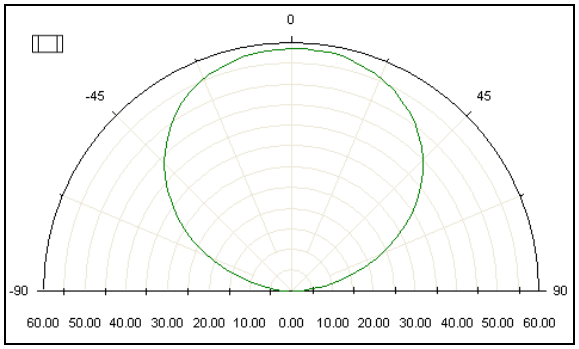




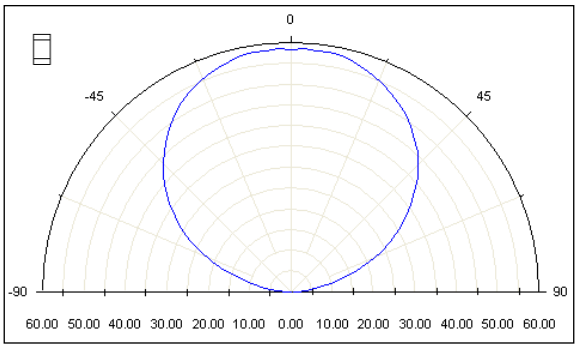




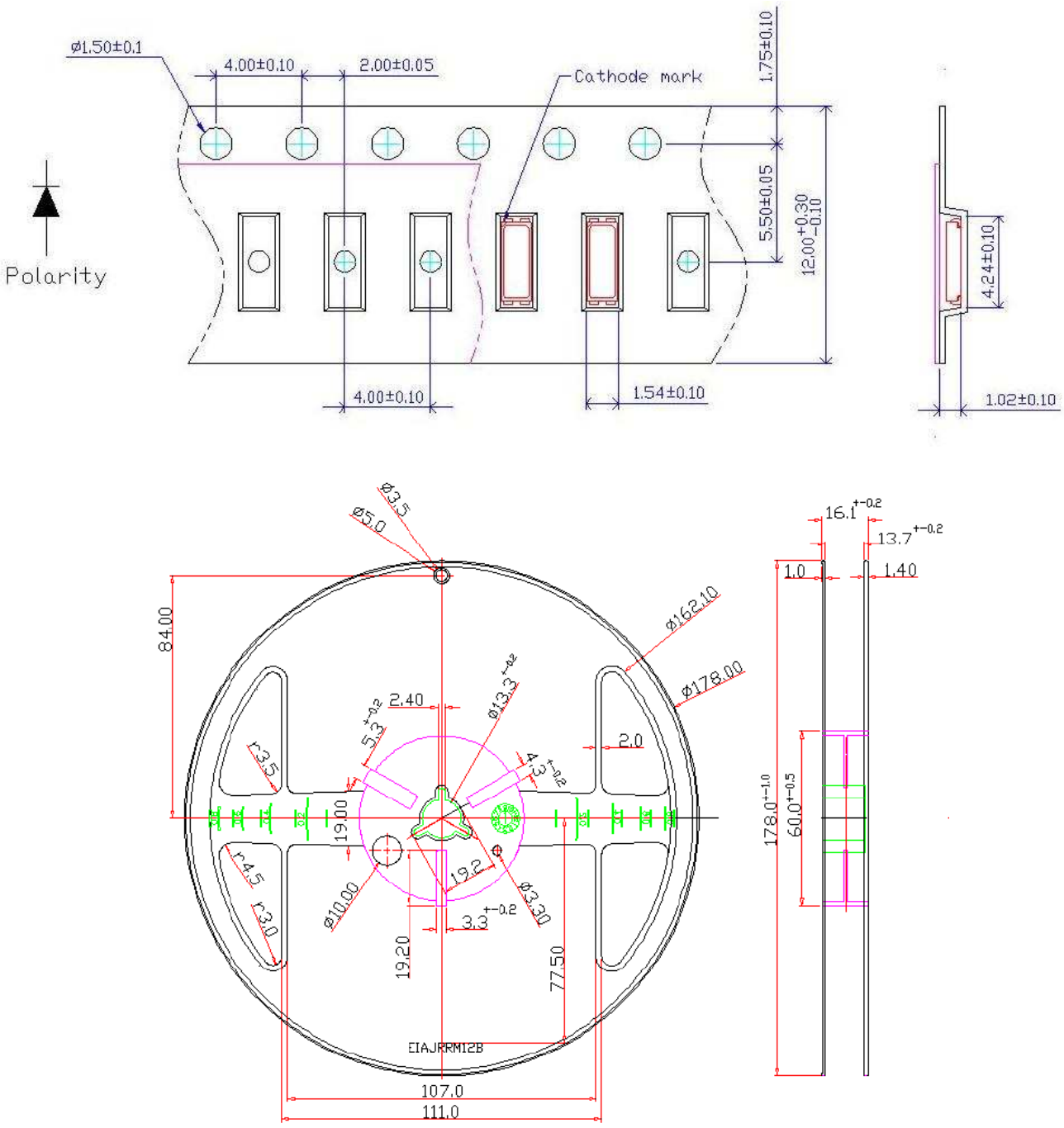
Directive Characteristics



Directive Characteristics

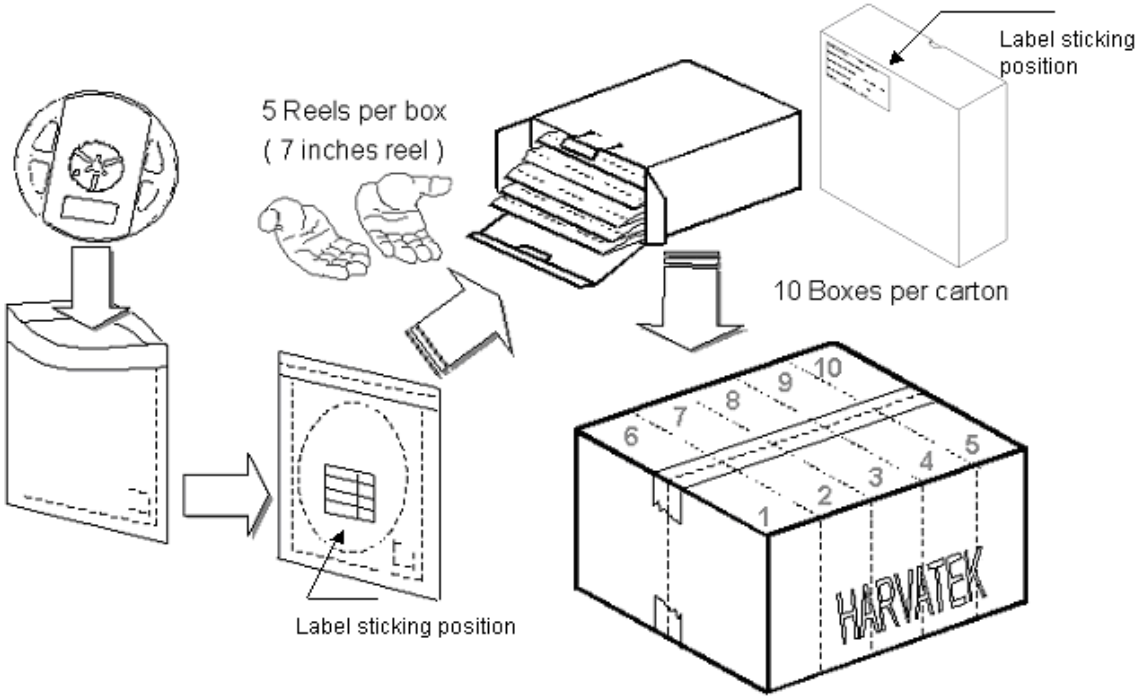


Reel Dimension



Official Product	HT Part No. HT-T1401BP-60P000112	Your Part No.		Data Sheet No.
Tentative Product	**********	**********		
Specifications are subject to changes for improvement without advance notice. Proprietary data, drawings, company confidential all rights reserved.		July / 04 / 2013	Version of 1.0	Page 14/22

Packing



5 boxes per carton is available depending on shipment quantity.

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.

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

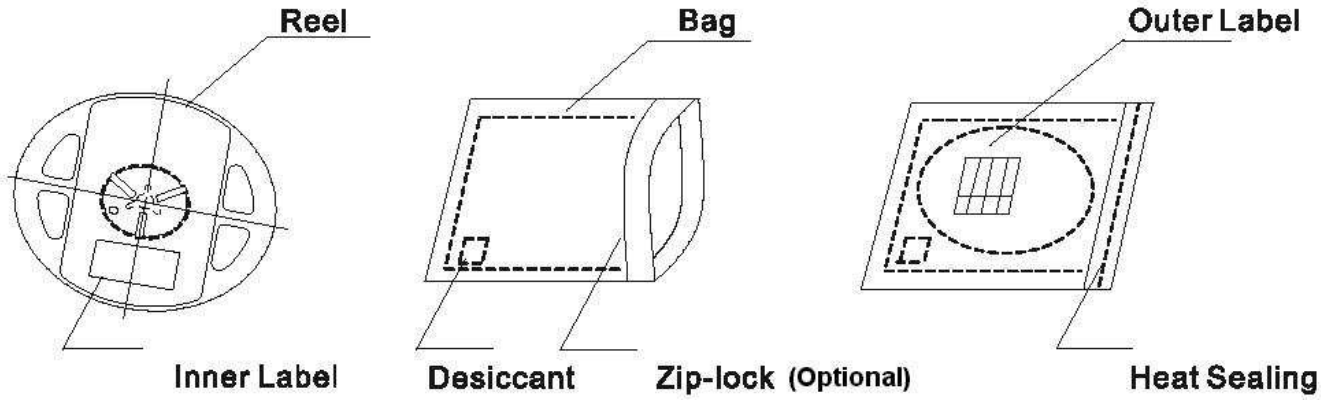
Any application should refer to the specifications of absolute maximum ratings.

Dry Pack

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



Storage

It's recommended to store the products in the following conditions:

Humidity: 60 %RH Max.

Temperature: 5 ^{O}C ~30 ^{O}C (41^{O}F~86 ^{O}F)

1 Shelf life in sealed bag: 12 month at<40 ^{O}C 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 ^{O}C /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^{O}C x(12~24hrs) and < 5% RH, taped reel type

100±3^{O}C x(45min~1hr), bulk type

130±3^{O}C x(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 ^{O}C±5 ^{O}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 mot be used to pierce the sealing compound.

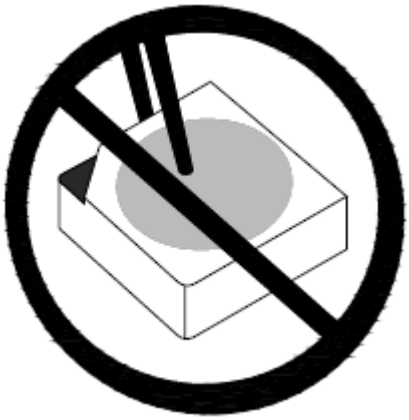


Figure 1

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.

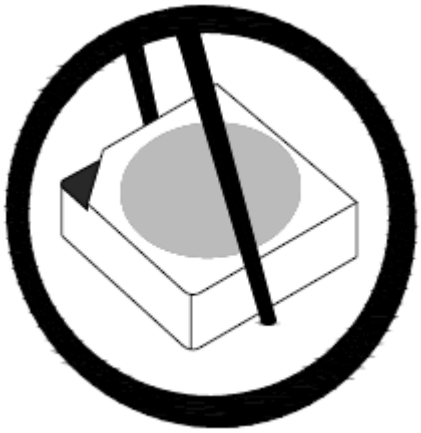


Figure 2

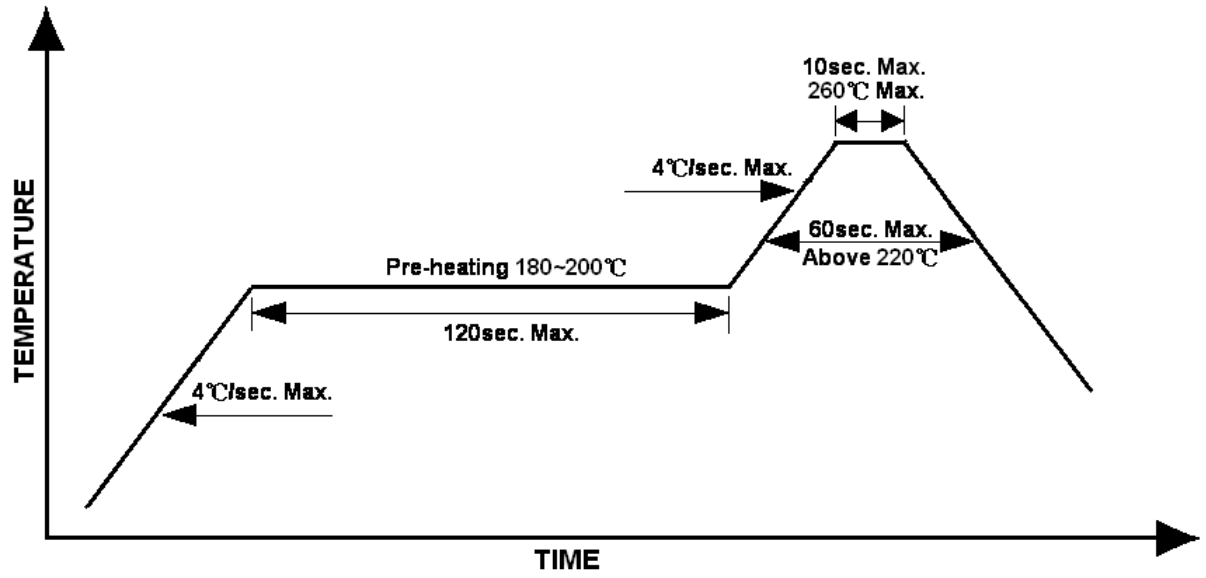
When populating boards in SMT production, there are basically no restrictions regarding the from of the pick and place nozzle, except that mechanical pressure on the surface of the resin must be prevented.

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

Reflow Soldering

1. Recommend soldering paste specifications:
2. Operating temp.: Above 220 ^{O}C ,60sec
3. Peak temp.:260 ^{O}CMax.,10sec Max.
4. Never take next process until the component is cooled down to room temperature after reflow.
5. The recommended reflow soldering profile (measuring on the surface of the LED terminal) is following:

Lead-free Solder



Cleaning

The conditions of cleaning after soldering:

An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.

Temperature×Time: <50 ^{O}C×30sec, or <30 ^{O}C×3min

Ultra sonic cleaning: < 15W/ bath; Bath volume: 1liter max.

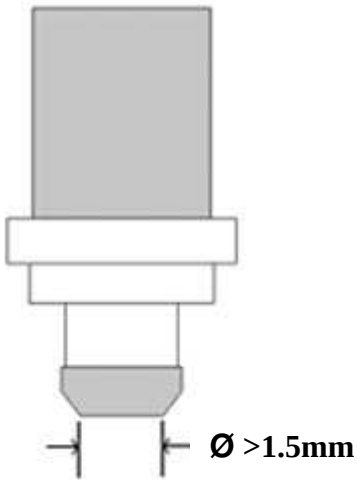
Curing: 100 ^{O}C max, <3min

Do not contact with component on the assembly board.

Cautions of Pick and Place

- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electric-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.
- Recommended nozzle dimension: Outer nozzle Ø>1.5mm

  *To avoid nozzle contacting the surface of silicone directly during pick and place, please kindly apply the nozzle outer dimension that we suggested above. (Refer to recommended nozzle dimension) If customer fails comply the nozzle dimension that Harvatek suggested, it may cause the risk of damage for LED inner structure and lead the LED lose its lighting function.



Revise History

Rev.	Descriptions	Date	Page
1.0	-	2013/07/01	-