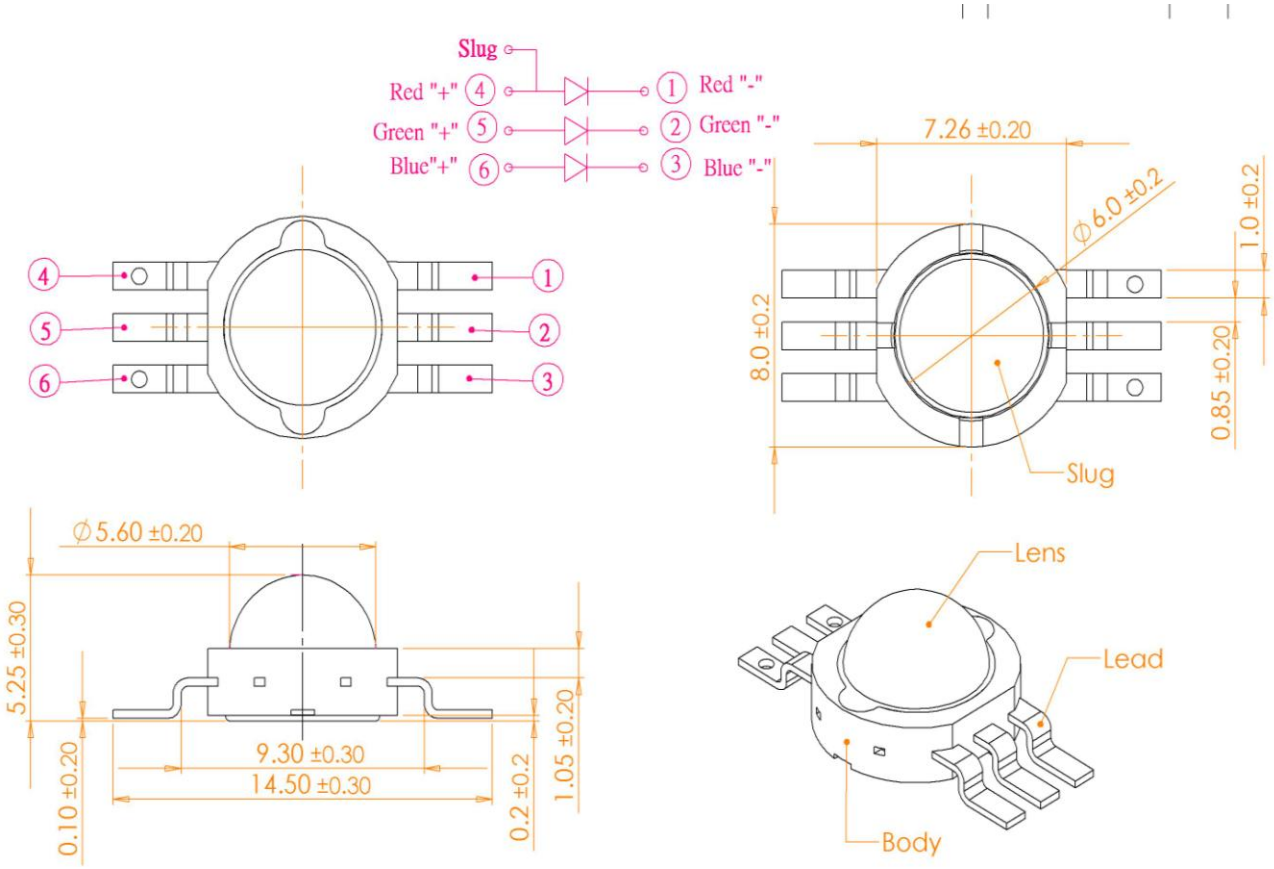
Package Dimensions

SMT Lead Form

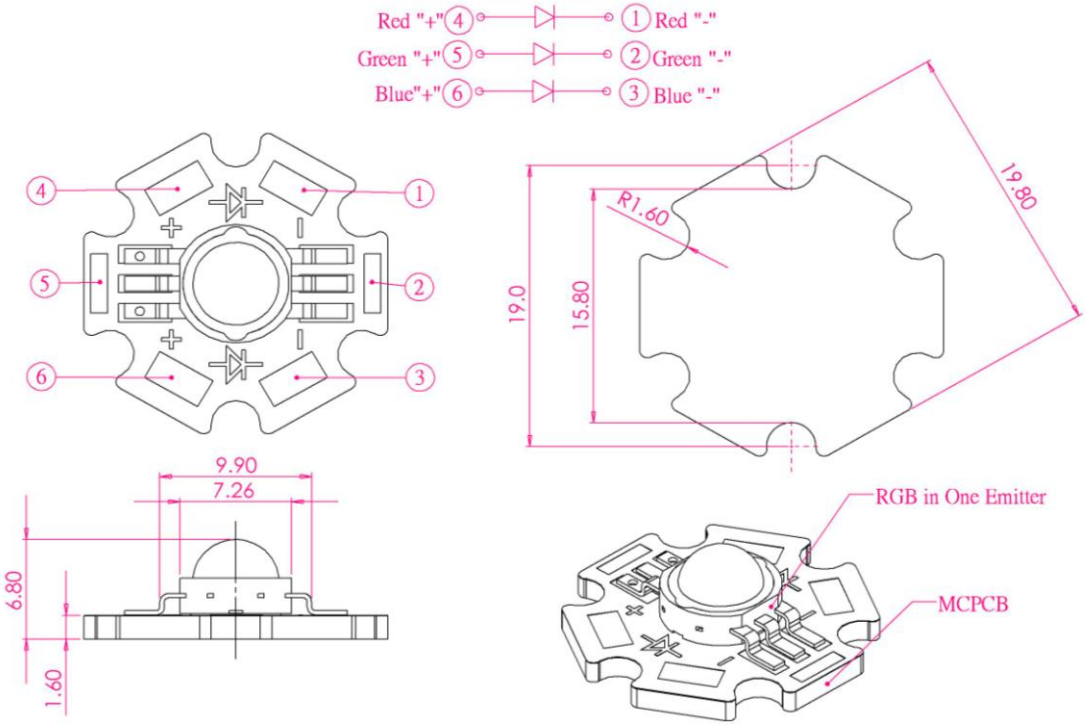


Note:

1. The anode side of the device is denoted by a hole in the lead frame.
2. Electrical insulation between the case and the board is required. The slug of the device is no electrically neutral.
3. Drawings are not to scale.
4. All dimensions are all in millimeter.
5. All dimensions without tolerance are for reference only.
6. Specifications are subject to change without notice.

Package Dimensions

Star MCPCB Form



Note:

1. Slots in aluminum-core PCB for M3 mounting screw.
2. Electrical interconnection pads labeled on the aluminum-PCB with “+” and “-“ to denote positive and negative, respectively.
3. Drawings are not to scale.
4. All dimensions are in millimeters.

Absolute Maximum Ratings

Parameter	RBG in One
Peak Forward Current (1/10 Duty Cycle at 1KHz)	500mA
Continuous Forward Current	350mA
LED Junction Temperature	120℃
Operation Temperature	-40℃ ~+105℃
Storage Temperature	-40℃ ~+120℃
ESD Sensitivity	> 500V
Reverse Voltage (V)	not designed for reverse operation

Luminous Flux Characteristics

Luminous Flux Characteristics at Test Current, Junction Temperature at 25℃

Color	Part Number	Luminous Flux(1) (lm)			Remark
		Min	Type	Max	
Red	HMHP-E1LF	23.5	30	--	350mA
Green	HMHP-E1LF	51.7	60	--	350mA
Blue	HMHP-E1LF	10.7	15	--	350mA

Note:

1. Minimum luminous flux performance guaranteed within published operating conditions. CL maintains a tolerance of ±10% on luminous flux measurements.

Optical Characteristics

Optical Characteristics at 350mA, Junction Temperature at 25℃

Color	Dominant Wavelength W_d(2) (nm)			Typical Spectral Half-width (nm)	Typical View Angle (Degrees)
	Min	Type	Max	$\triangle\lambda_{1/2}$(3)	$2\Theta_{1/2}$(1)
Red	620	--	630	20	150
Green	520	--	535	37	150
Blue	460	--	470	25	150

Note:

1. $\Theta_{1/2}$ is the off axis angle from emitter centerline where the radiometric intensity is 1/2 of the peak value.
2. Dominant wavelength is derived from the CIE1931 chromaticity diagram and represents the perceived color. The tester tolerance of dominant wavelength is ±0.5nm.
3. Spectral width at 1/2 of the peak intensity.

Electrical Characteristics

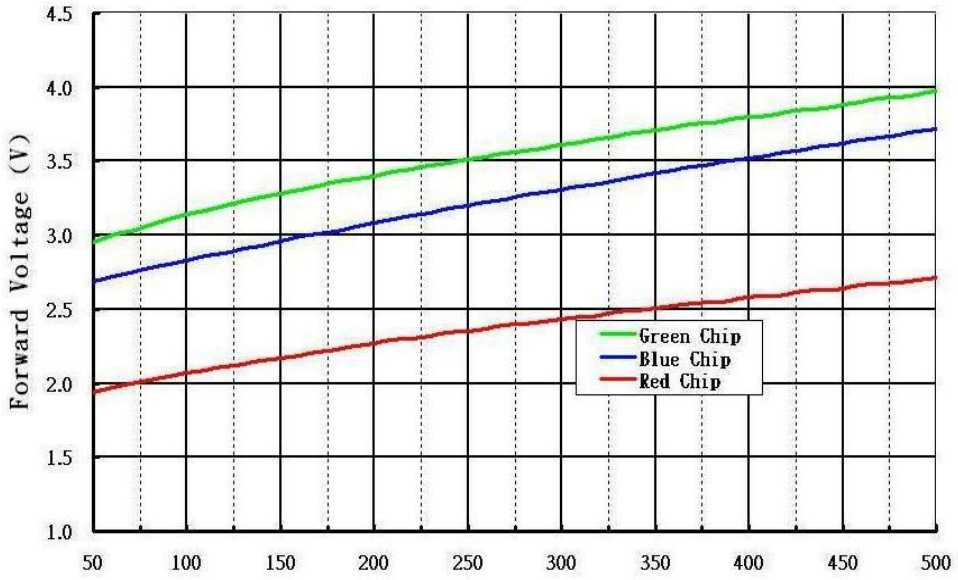
Electrical Characteristics at 350mA, Junction Temperature at 25℃

Color	Forward Voltage V_F[1] (V)			Typical Temperature Coefficient of Forward Voltage (mV/℃)	Typical Thermal Resistance Junction to Case (℃/W)
	Min	Type	Max	$\Delta V_F / \Delta T$[2]	$R\theta_{J-C}$
Red	2.0	--	3.0	-2	16
Green	3.0	--	4.0	-2	16
Blue	3.0	--	4.0	-2	16

Note:

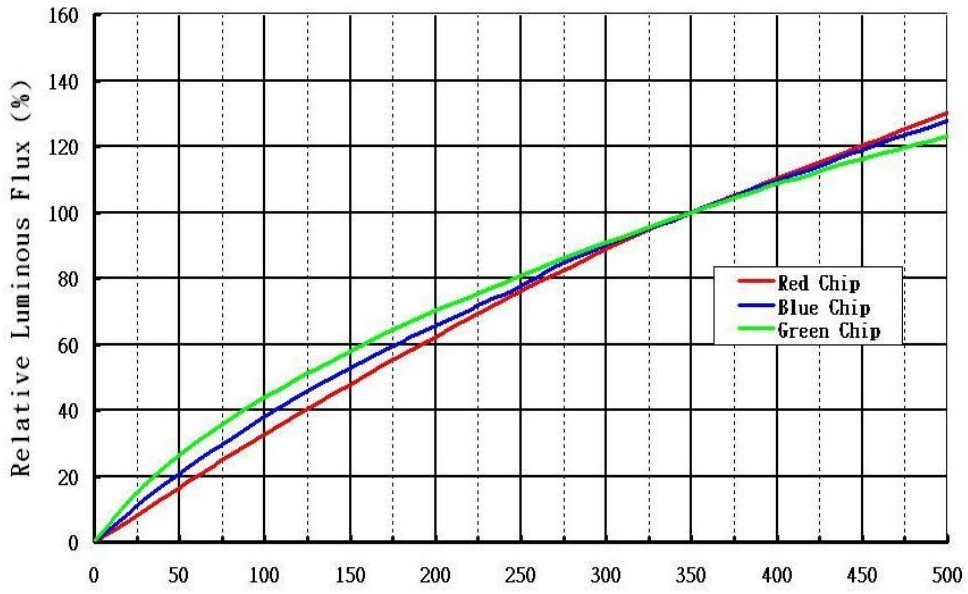
1. CL maintains a tolerance of ±0.06V on forward voltage measurements.
2. The temperature coefficients of forward voltage are measured between T_j=30 and T_j=120 at 350mA.

Typical Forward Current Characteristics



Forwrad Current (mA)

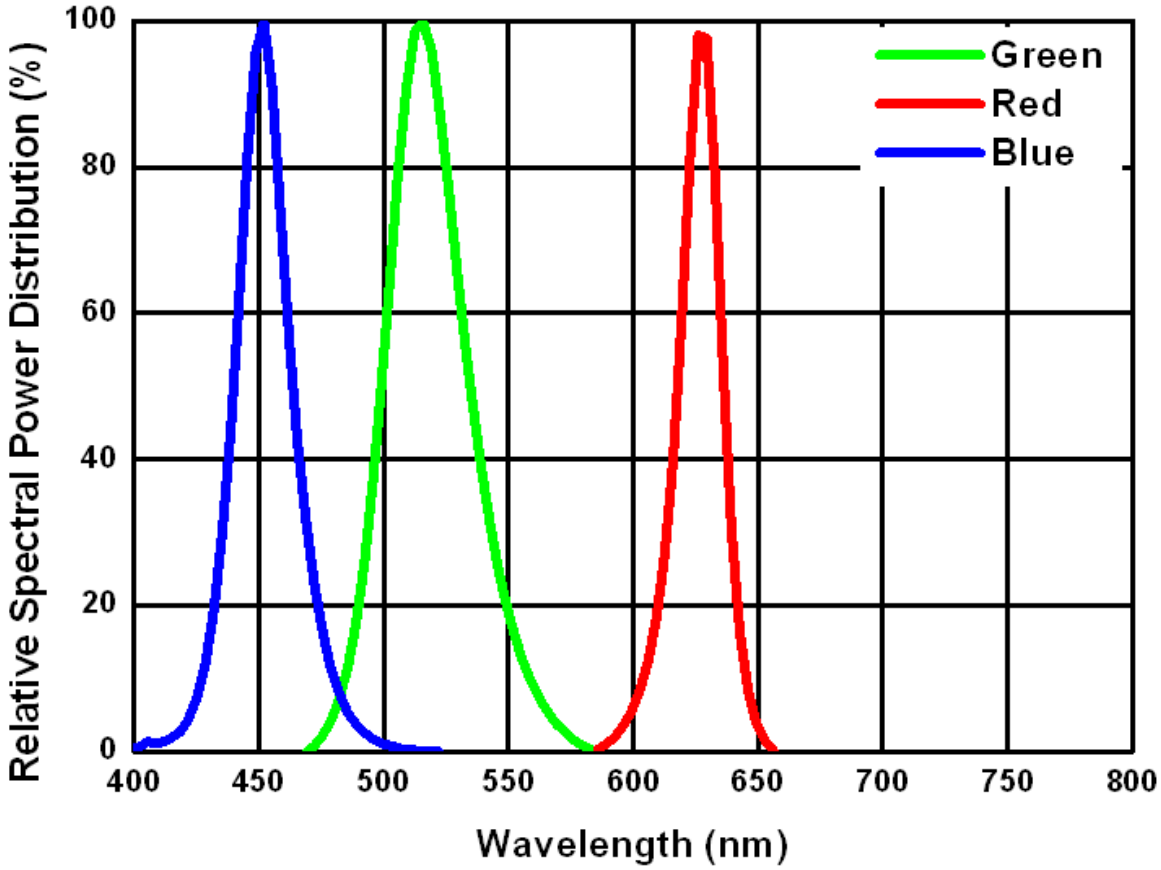
Typical Light Output Characteristics over Forward Current



Forward Current (mA)

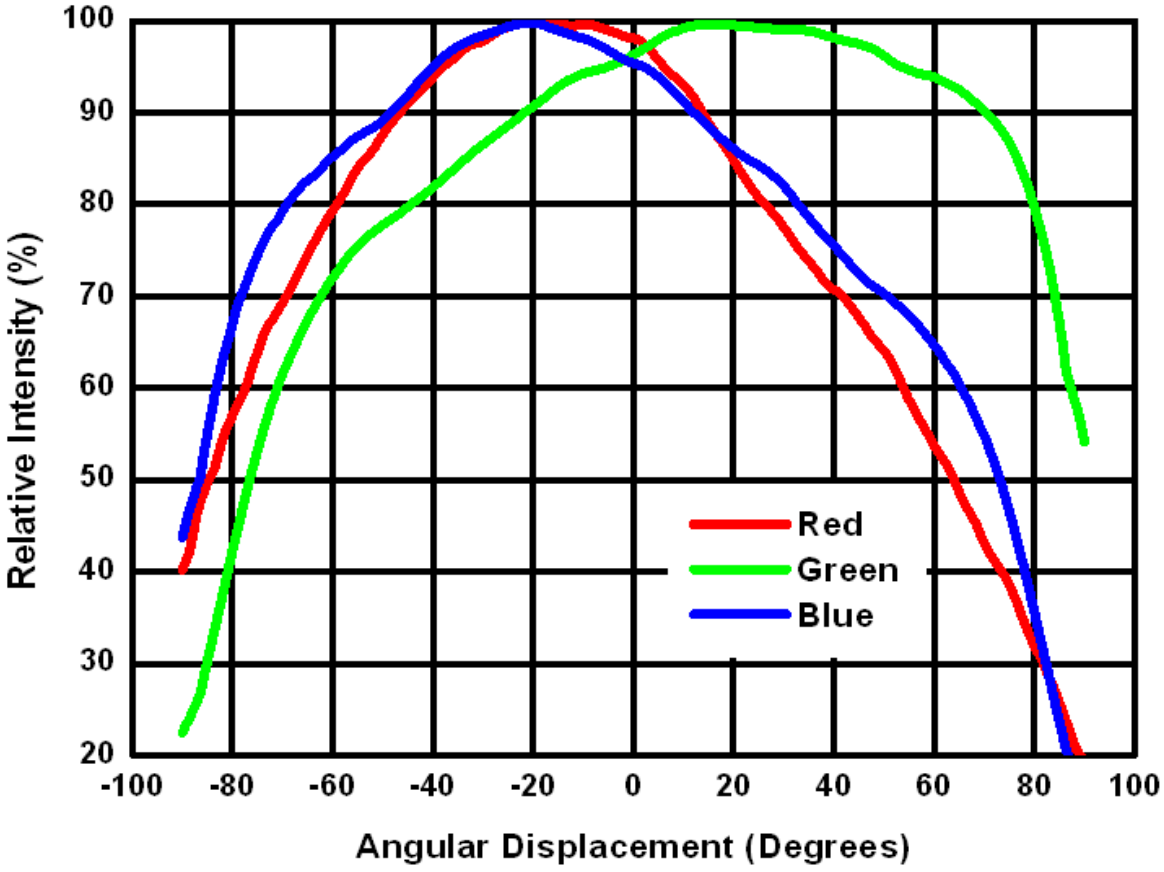
Wavelength Characteristics

Test Current at 350mA, Junction Temperature at 25℃

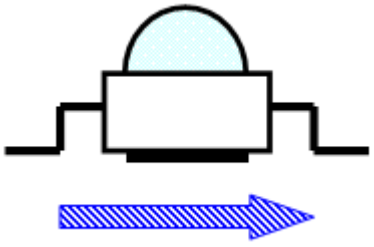


Typical Radiation Patterns

Typical Representative Spatial Radiation Pattern in X-axis

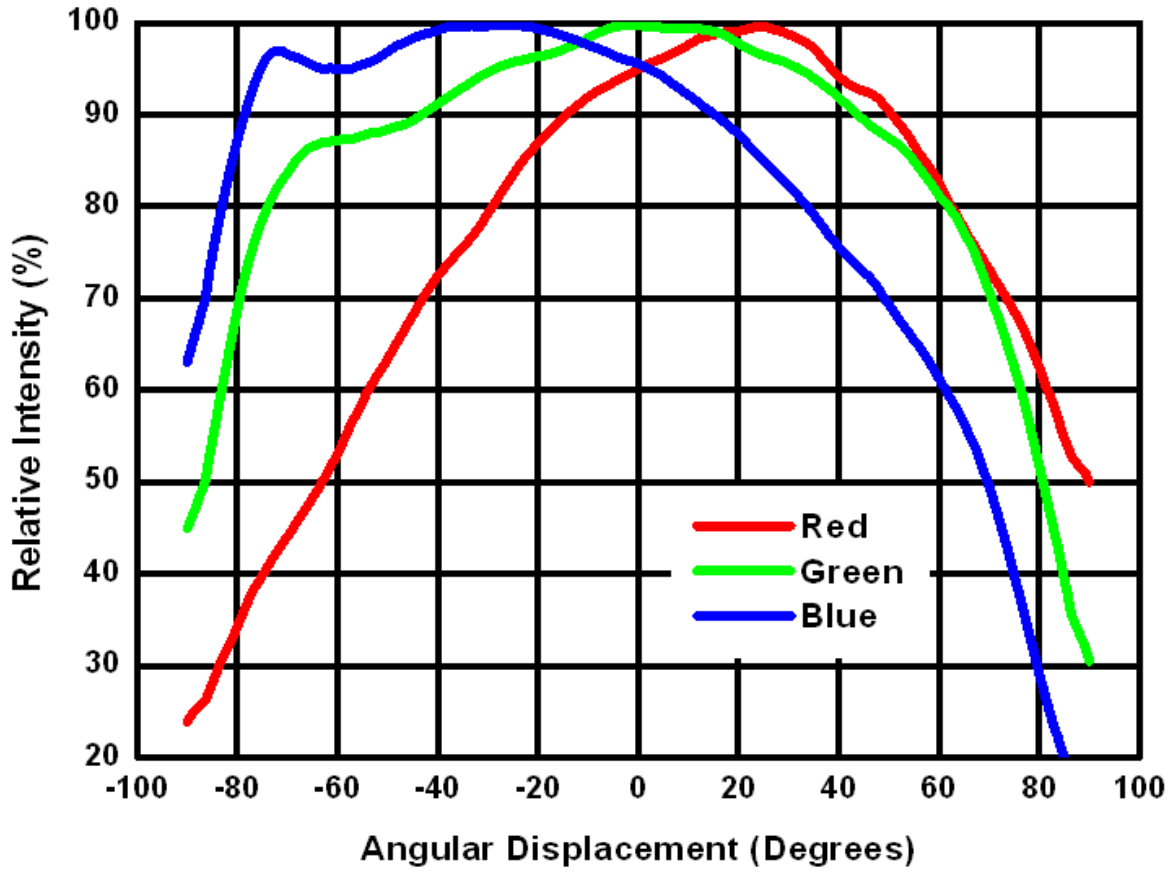


Measurement Direction

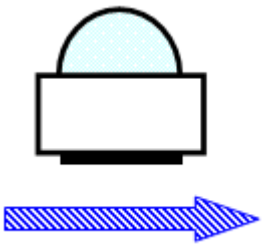


Typical Radiation Patterns, Continued

Typical Representative Spatial Radiation Pattern in Y-axis



Measurement Direction



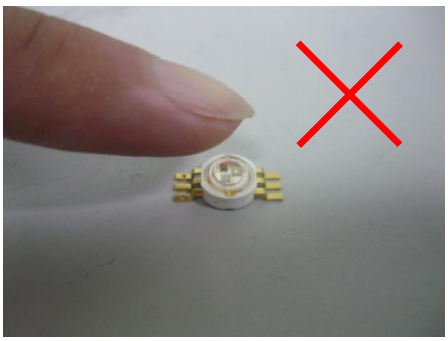
Storage

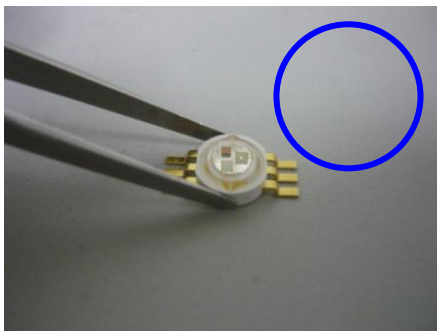
- Do not open the moisture proof bag before the devices are ready to use.
- Before the package is opened, LEDs should be stored at temperatures less than 30℃ and humidity less than 50%.
- After the package is opened, LEDs should be stored at temperatures less than 30℃ and humidity less than 30%.
- LEDs should be used within 168 hours (7 days) after the package is opened.
- Before using LEDs, baking treatment should be implemented based on the following conditions: pre-curing at 60±5℃ for 6 hours.

Handling Precaution

The softness and dust affinity of silicone molding lens constrain the handling of LED. Thus, some handling indications of HELIXEON RGB in One are presented for possible damage prevention and excellent reliability.

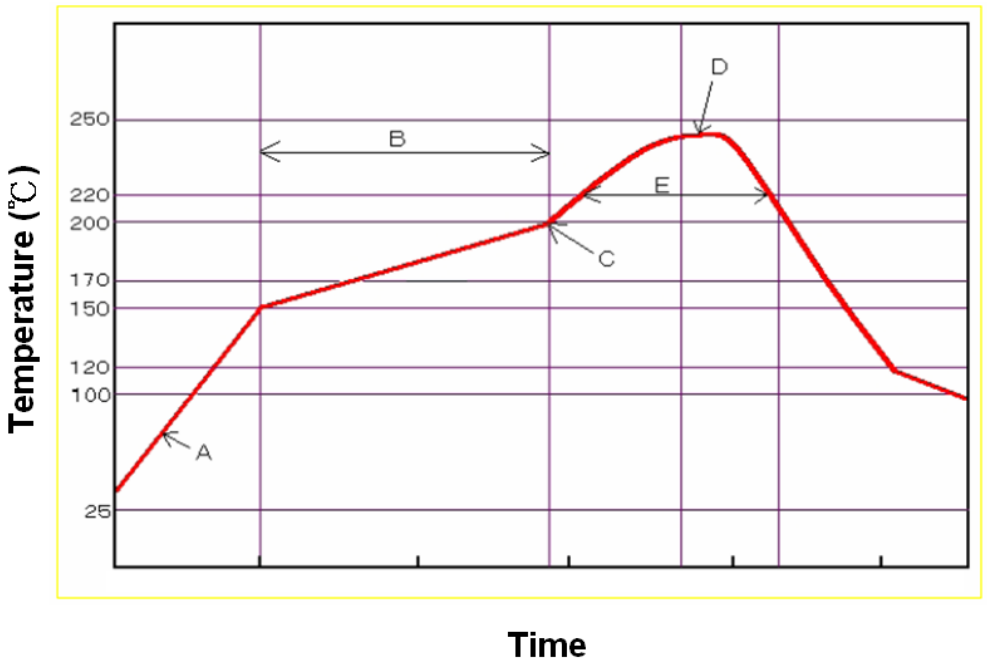
- Avoid leaving fingerprints or scratches (by sharp tools) on the silicone resin parts.
- Do not force over 2000gf impact or pressure on the silicone molding lens.
- The LEDs should only be picked up by making contact with the sides of the LED body.
- When populating in SMT production, the pick-and-place nozzle must not place excessive pressure on the silicone molding lens.





Solder Reflow Process Parameters

Reflow soldering of Helixeon emitters requires effective control of heating and cooling. Both the rate of heating and cooling and the absolute temperatures reached are critical in assuring the formation of a reliable solder joint while avoiding damage to the emitter during the reflow process. The recommended temperature profile of solder reflow process is shown below in the figure.



1. Preheat
   - Set the temperature rising speed A at a rate of 2~4℃/s. Careful about rapid temperature rise in preheat zone as it may cause excessive slumping of the solder paste.
   - Appropriate preheat time B will be from 60 to 180 seconds. If the preheat is insufficient, rather large solder balls tend to be generated. Conversely, if performed excessively, fine balls and large balls will generate in clusters at a time.
   - Appropriate preheat ending temperature C will be from 180 to 200℃. If the temperature is too low, non-melting tends to be caused in the area with large heat capacity after reflow.
2. Heating
   - Careful about sudden rise in temperature as it may worsen the slump of solder paste.
   - Set the peak temperature D in the range from 230 to 240℃.
   - Adjust the melting time that the time over 220℃, E, will be from 30 to 90 seconds.
3. Cooling
   - Careful about slow cooling as it may cause the positional shift of parts and decline in joining strength at times.

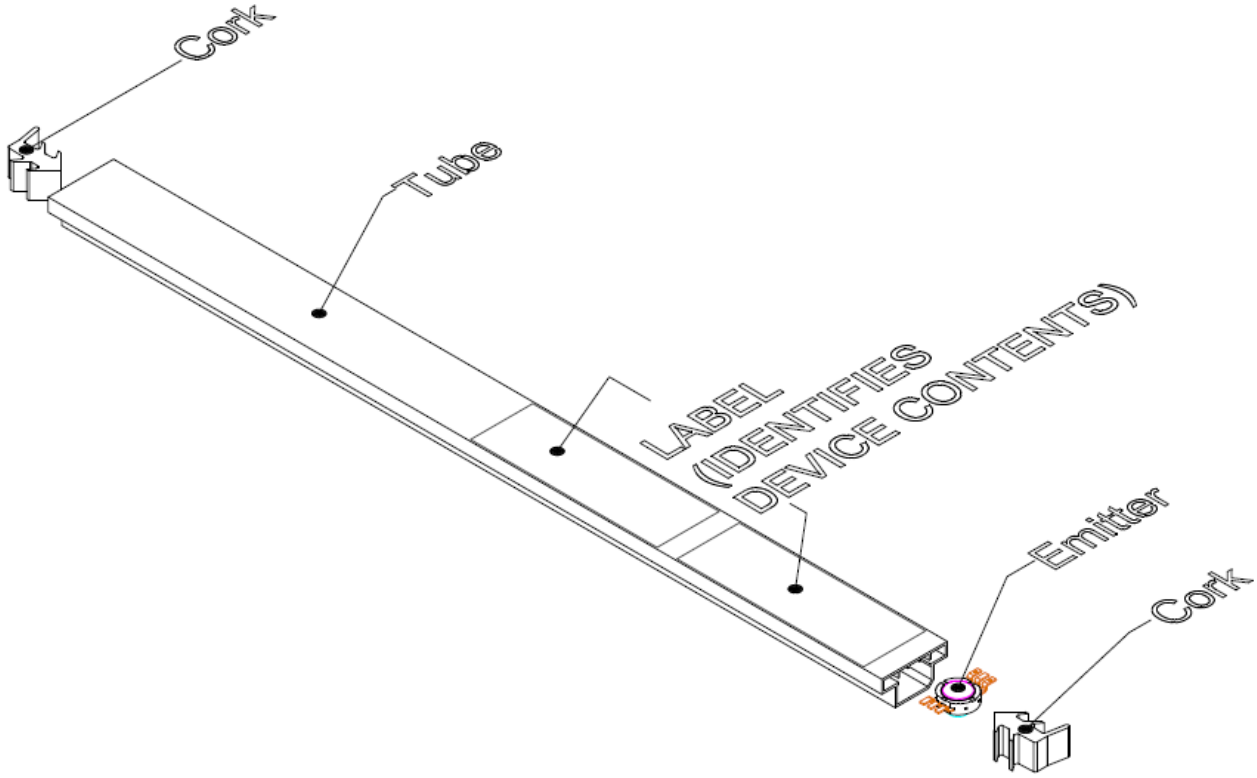
Reliability Test List

Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
Resistance to soldering heat (reflow soldering)	JEITA ED-4701 300 301	Ta=260℃, 10sec. (Pre treatment 25℃,70%,168hrs.)	2 times	0/10
Solderability (reflow soldering)	JEITA ED-4701 300 303	Tsld=215±5℃, 3sec. (Lead Solder)	1 time over 95%	0/10
Steady state operating life		Ta=25℃, I_F = 350mA Tested with CL standard circuit board	1000 hrs.	0/10
Steady state operating life of high humidity heat		60℃, RH=90%, I_F = 350mA Tested with CL standard circuit board	1000 hrs.	0/10
Temperature cycle	JEITA ED-4701 100 105	-40℃ ~ 25℃ ~ 100℃ ~ 25℃ 30min. 5min. 30min. 5min.	100 cycles	0/10
Thermal shock	JEITA ED-4701 300 307	0℃ ~ 100℃ 15sec. 15sec.	20 cycles	0/10
High temperature storage	JEITA ED-4701 200 201	Ta=100℃	1000 hrs.	0/10
Low temperature storage	JEITA ED-4701 200 202	Ta=-40℃	1000 hrs.	0/10
Vibration		2000 Hz, 2directions	60min.	0/10

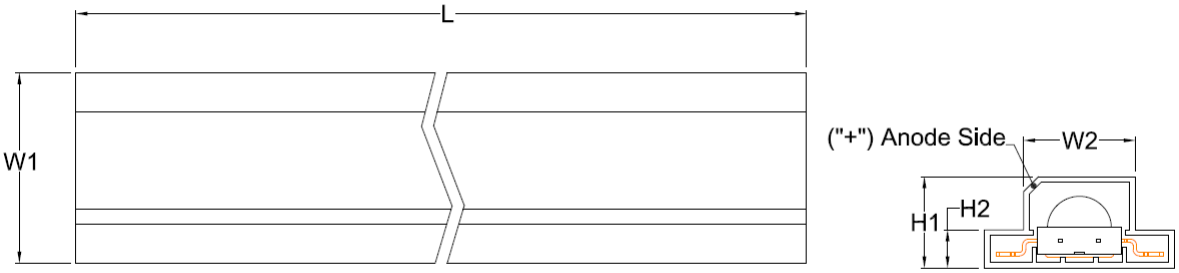
Failure Criteria：

- Forward Voltage shift ：> 200 mV
- Luminous Flux degradation ：> 30 %
- Forward or Reverse Leakage：> 10μA

Tube Package Specifications



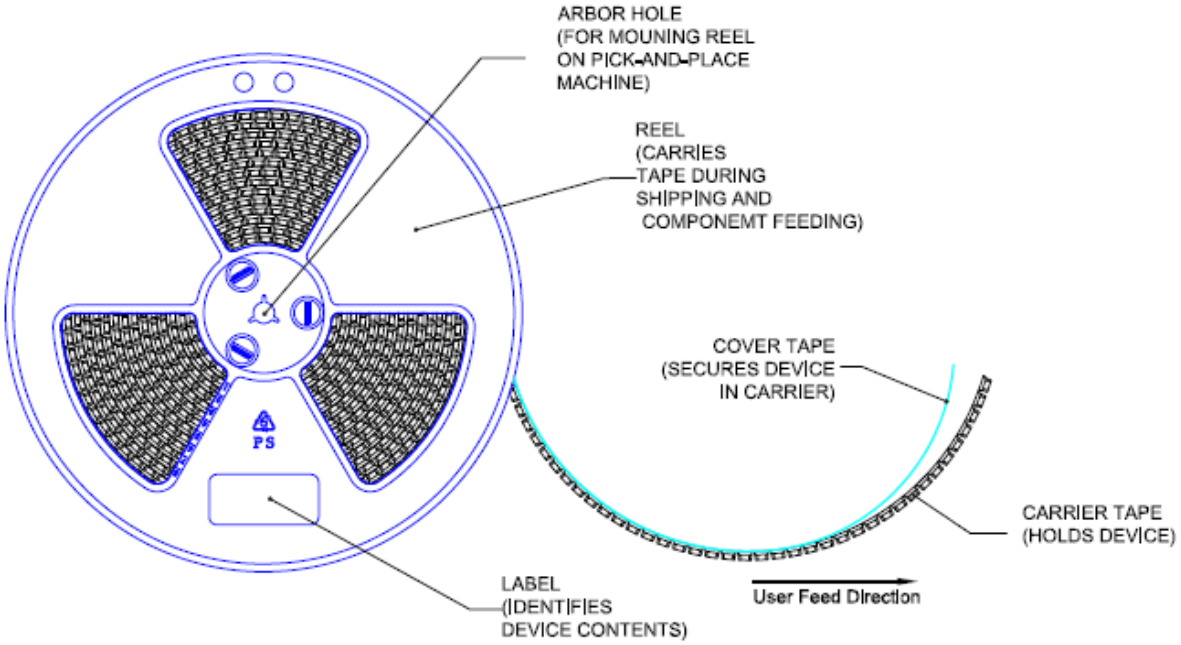
TUBE DIMENSIONS



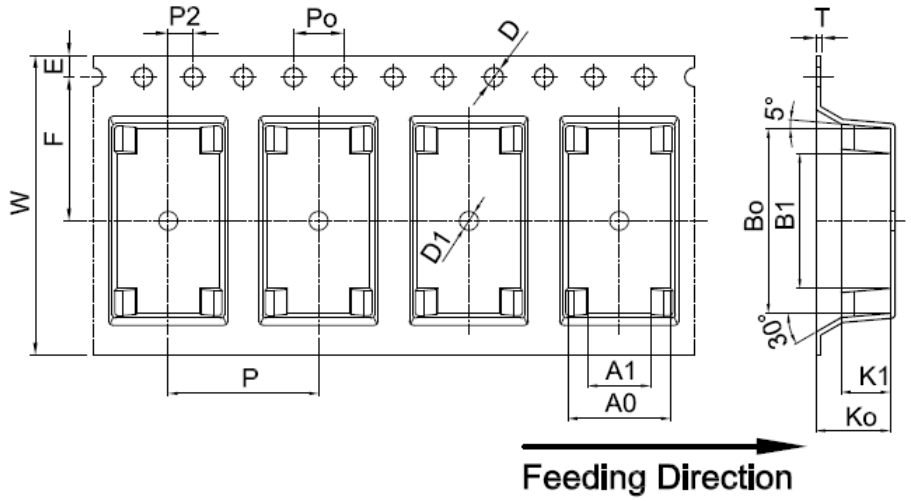
UNIT：mm

W1	W2	H1	H2	L
16.5 ±0.2	9.7 ±0.2	7.9 ±0.2	3.3 ±0.2	420.0 ±1.0

Tape-and-Reel Package Specifications



CARRIER TAPE DIMENSIONS (2 PINS)

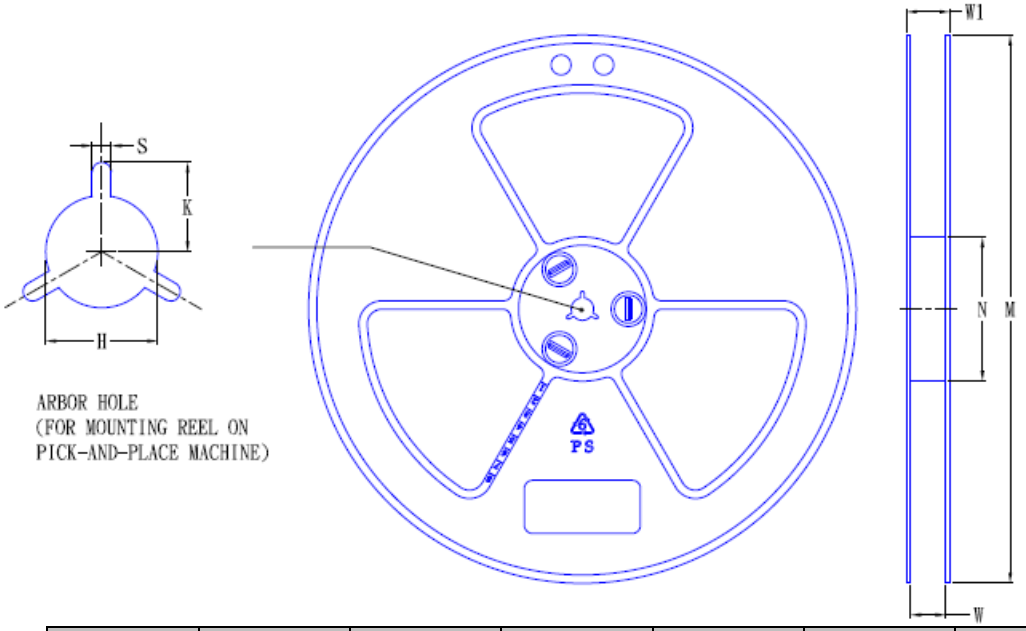


UNIT：mm

W	P	E	F	P2	D	D1	P0	A0	B0	K0	T
24.0 ±0.3	12.0 ±0.1	1.75 ±0.1	11.5 ±0.1	2.0 ±0.1	1.5 +0.1 -0.0	1.5 ±0.1	4.0 ±0.1	8.2 ±0.1	14.8 ±0.1	5.85 ±0.1	0.5 ±0.05

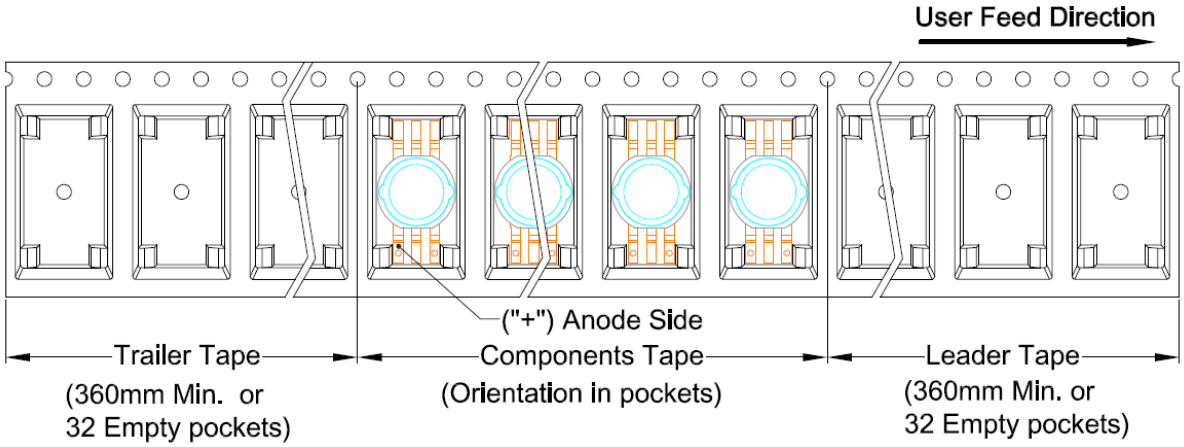
REEL DIMENSIONS

UNIT : mm

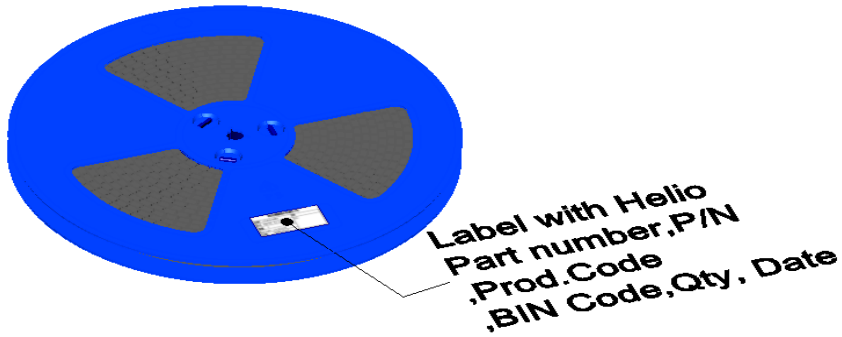


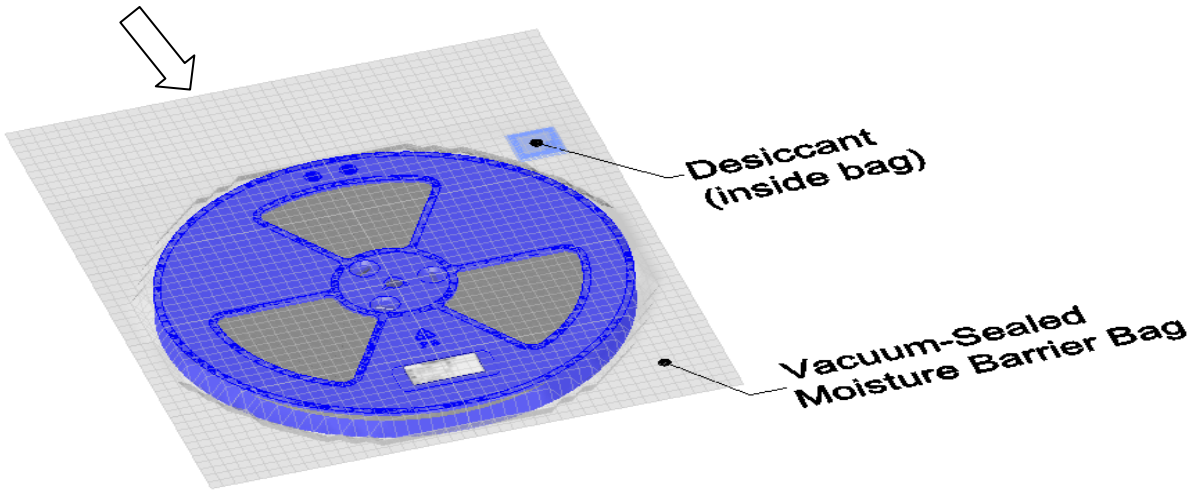
M	N	W	W1	H	K	S
ψ380.0 ±1.0	ψ100.0 ±1.0	24.6 ±0.5	30.6 ±0.5	ψ13.5 ±0.5	10.45 ±0.5	2.5 ±0.5

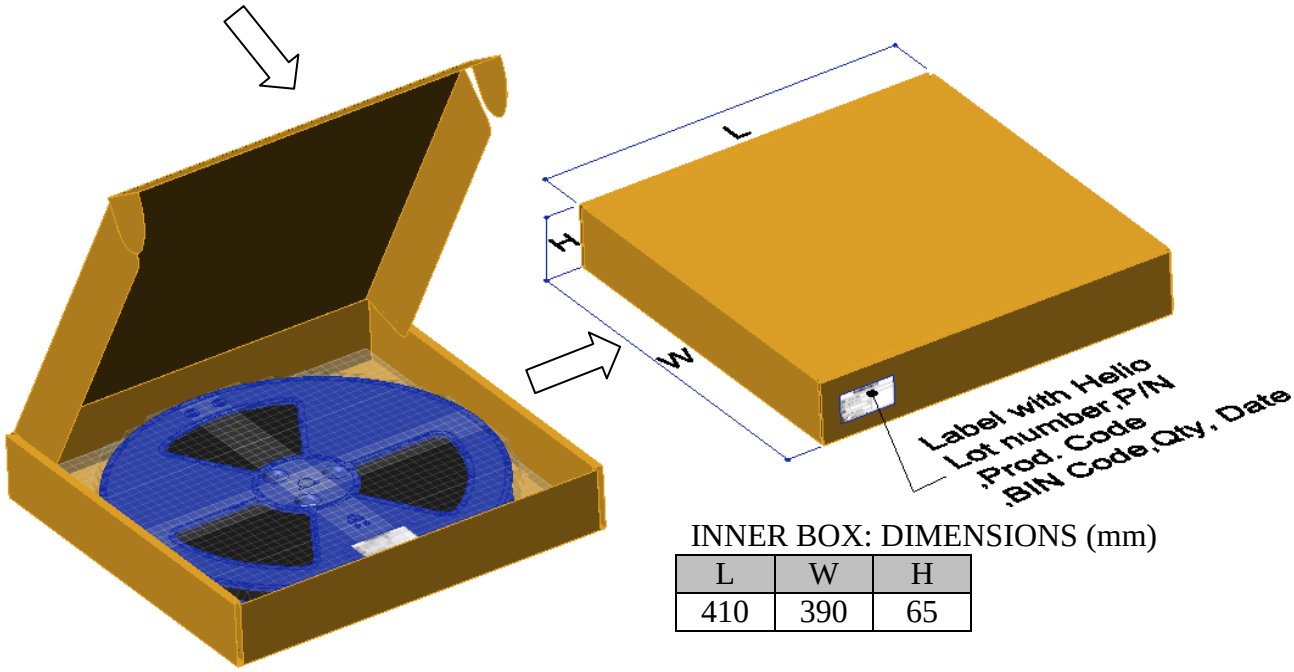
Leader/Trailer and Orientation(2 PINS)



Packaging



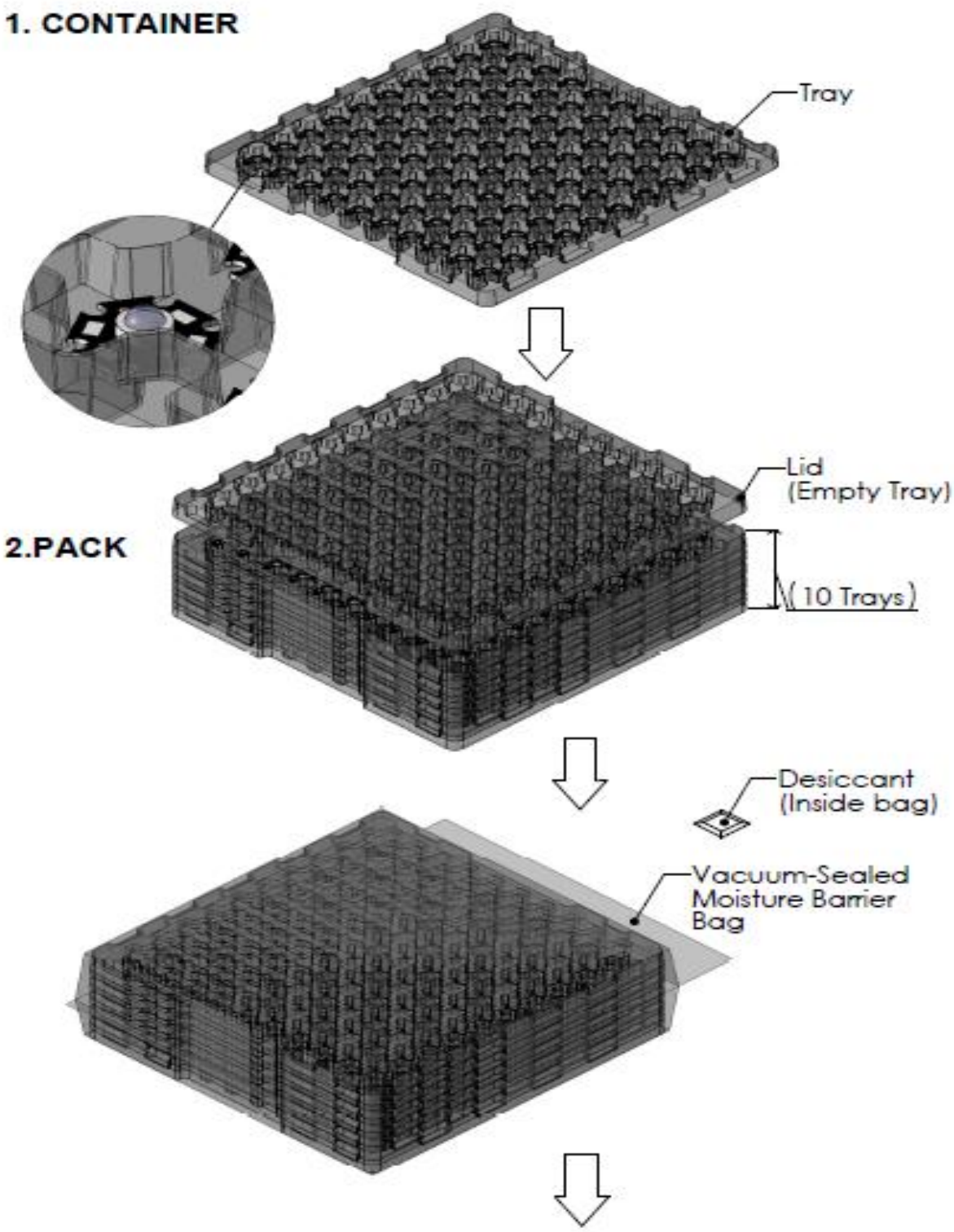




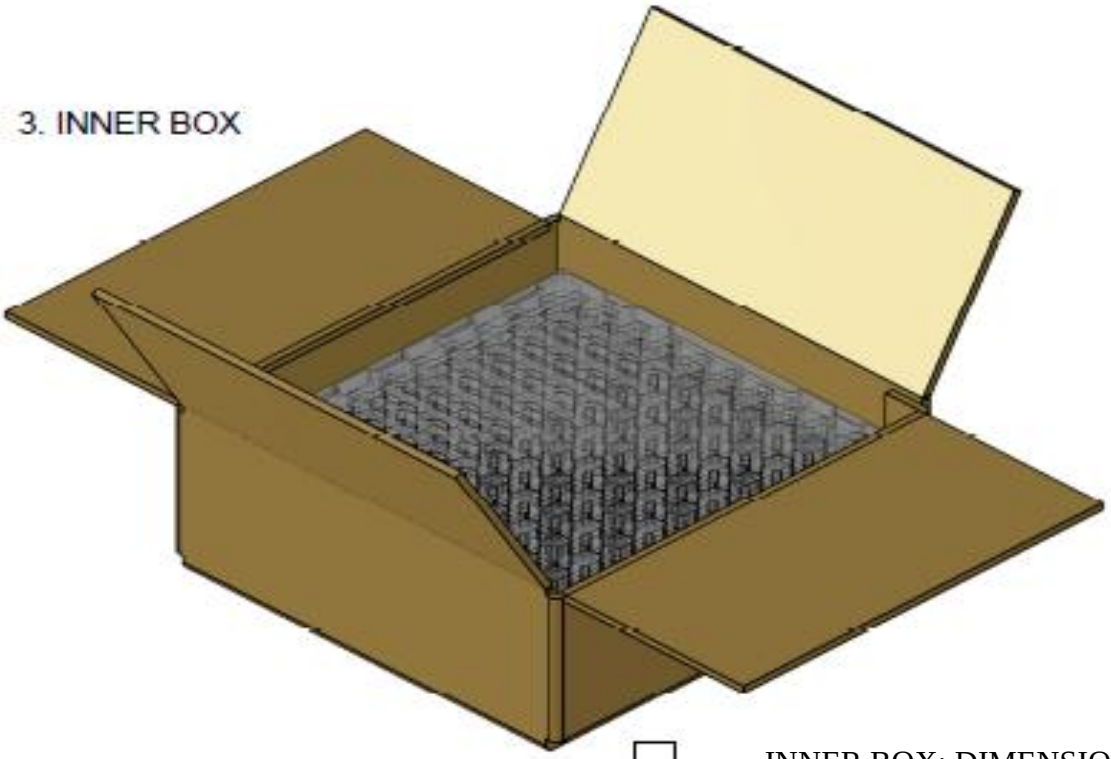
INNER BOX: DIMENSIONS (mm)

L	W	H
410	390	65

Tray Package Specifications

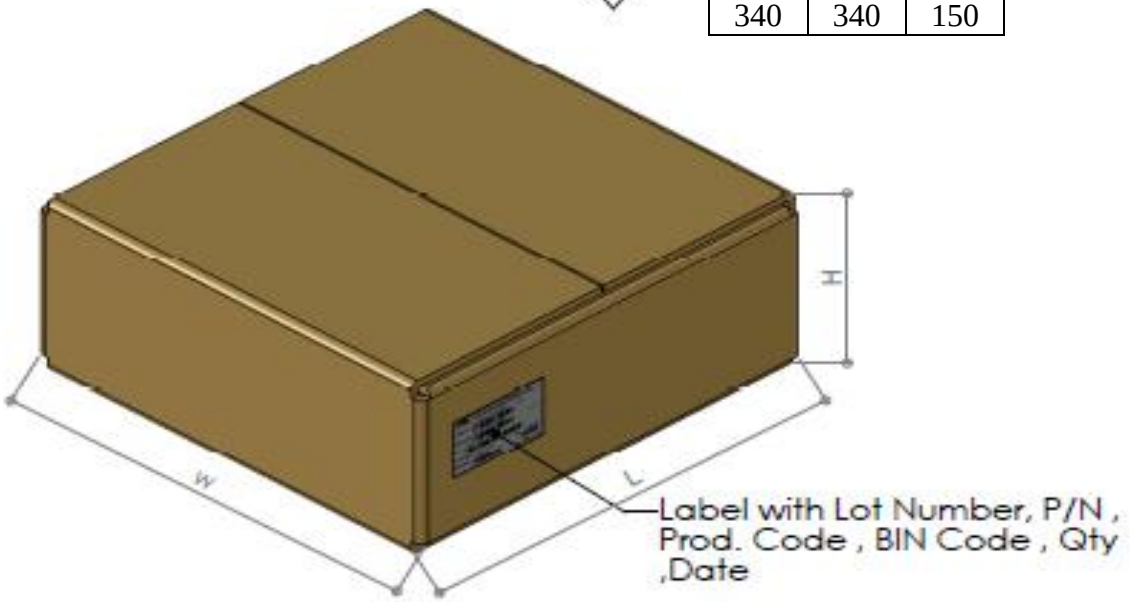


3. INNER BOX



INNER BOX: DIMENSIONS (mm)

L	W	H
340	340	150



Note:

1. There are 100 pcs Stars in a tray.
2. There are 10 trays in an inner carton.

Bar code Label