HELIO Optoelectronics Corp.

Helixeon - Infrared D Series（HMDP-C1LM）

Helixeon infrared emitter, the most powerful solid-state lighting device, provides high radiometric power, excellent thermal management and high energy efficiency for infrared applications.

Features

- Low thermal resistance
- Instant response
- Fully dimmable
- Superior ESD protection
- Lead free reflow solder JEDEC 020c compatiable
- RoHS compliant

Application

- CCTV
- Wireless communication

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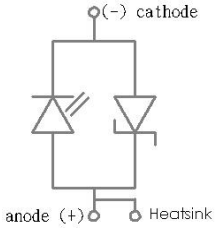
■ Product Nomenclature

HM DP - C 1 L M
X1 X2 X3 X4 X5 X6

X1 Item		X2 Classification		X3 Module		X4 Current	
Code	Type	Code	Type	Code	Type	Code	Type
HM	Molding	DP	High power D series	C	Emitter II	1	350mA

X5 Lens		X6 Color	
Code	Type	Code	Type
L	Lambertian	M	IR 850nm

Circuit Diagram

Color	Part number	Circuit diagram
Infrared-850nm	HMDP-C1LM	

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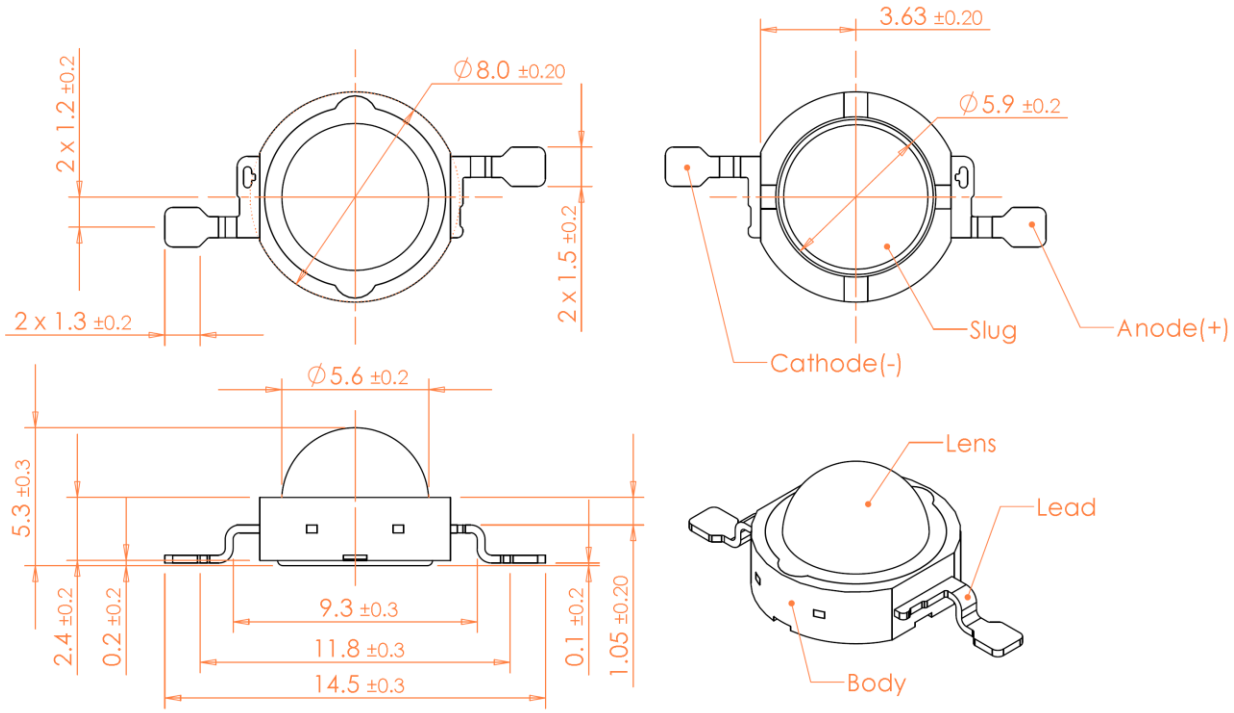
■ Package Dimensions

SMT Lead Form

Lambertian



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.

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■ Characteristics for Helixeon Infrared emitter

HMDP-C1LM

Characteristics at I_F = 350mA (Ta=25℃):

Parameter	Symbol	Value			Unit
		Min	Typical	Max	
Radiometric power(1)	Po	200	250	--	mW
Peak wavelength(2)	λ_p	840	850	870	nm
View angle (Emitter II)	$2\Theta_{1/2}$	--	130	--	degree
Forward voltage(3)	V_F	1.0	--	2.0	V

Note:

1. Minimum radiometric power performance guaranteed within published operating conditions. HELIO maintains a tolerance of ±10% on radiometric power measurements.
2. HELIO maintains a tolerance of ±1nm on peak wavelength measurement.
3. HELIO maintains a tolerance of±0.06V on forward voltage measurement.

■ Product Binning

Helixeon emitters are labeled using 6-digit alphanumeric bin code. The formats are explained as follows:

AB CD EF

Where:

AB - designates radiometric power bin.
CD - designates peak wavelength bin.
EF - designates forward voltage bin.

Radiometric power binning information (AB)

Bin Code	Min.	Max.	Unit
L0	175	225	mW
M0	225	275	
N1	275	315	
N2	315	355	
P1	355	395	
P2	395	435	
Q1	435	475	
Q2	475	515	

Peak wavelength binning information (CD)

Bin Code	Min.	Max.	Unit
J1	840	870	nm

Forward voltage binning information (EF)

Bin Code	Min.	Max.	Unit
80	1.0	1.2	V
90	1.2	1.4	
A0	1.4	1.6	
B0	1.6	1.8	
C0	1.8	2.0	

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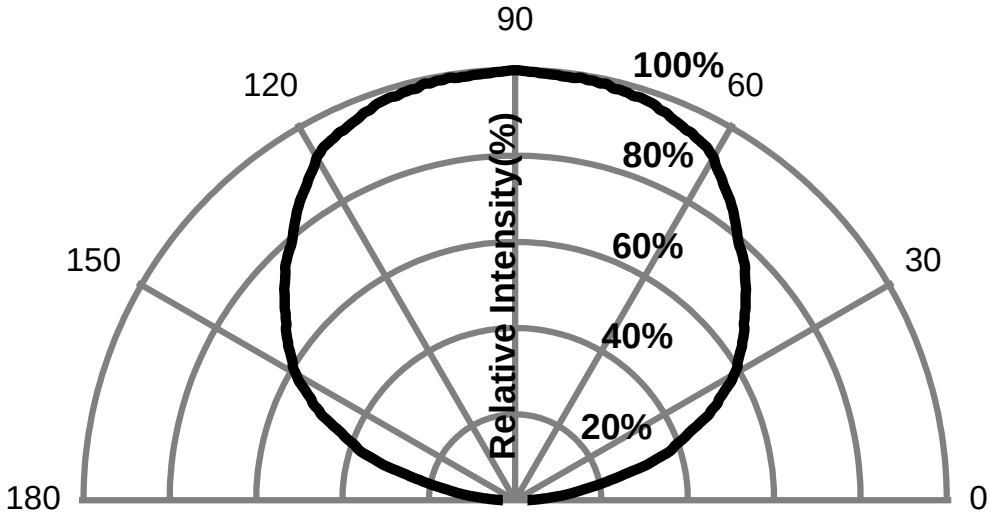
■ Absolute Maximum Ratings

Parameter	1W
Peak Forward Current (1/10 Duty Cycle at 1KHz)	700mA
Continuous Forward Current	350mA
LED Junction Temperature	120℃
Operation Temperature	-40℃ ~+105℃
Storage Temperature	-40℃ ~+120℃
ESD Sensitivity(1)	> 8,000V Human Body Model (HBM) Class 2 JESD22-A114-B
Reverse Voltage (V)	not designed for reverse operation

Note:

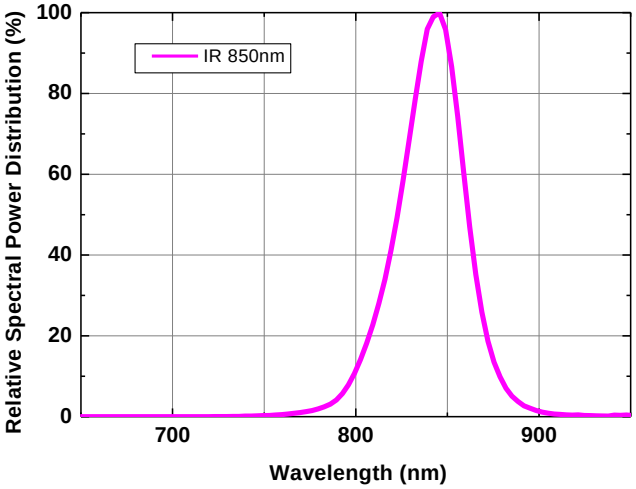
1. The zener chip is included to protect the product from ESD.

■ Typical Polar Radiation Pattern

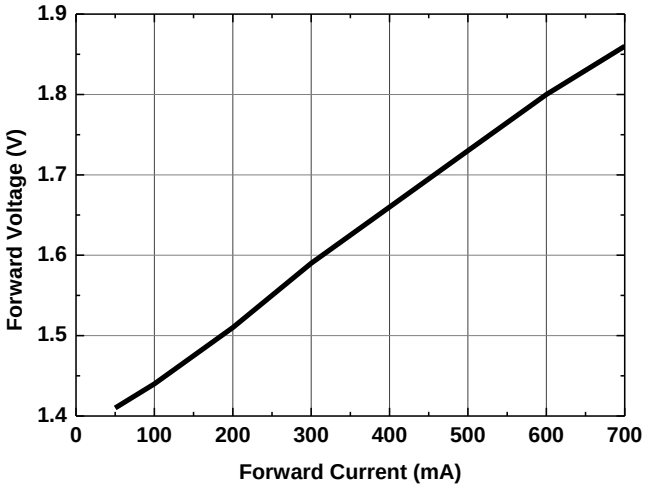


■ Optical & Electrical characteristics

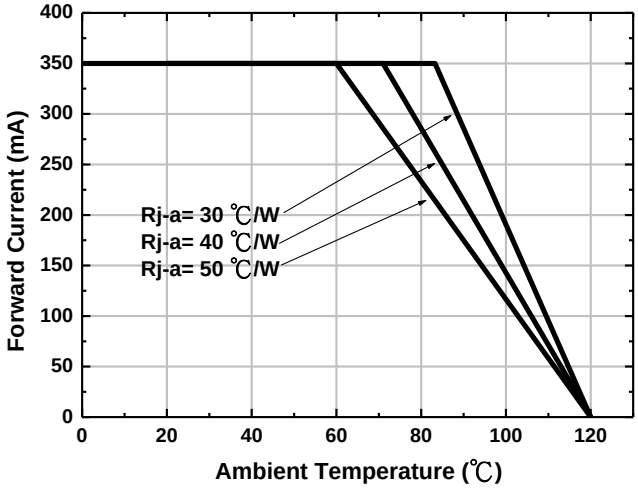
Emission spectrum



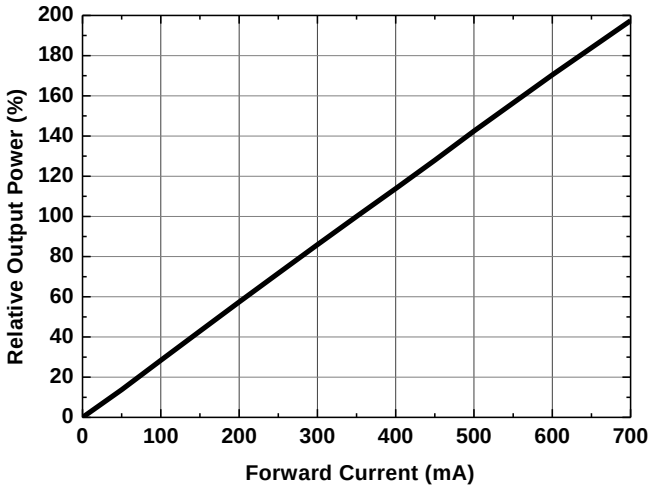
Forward Voltage vs Forward Current



Operating Current & Ambient Temperature



Typical Light Output Characteristics over Forward Current



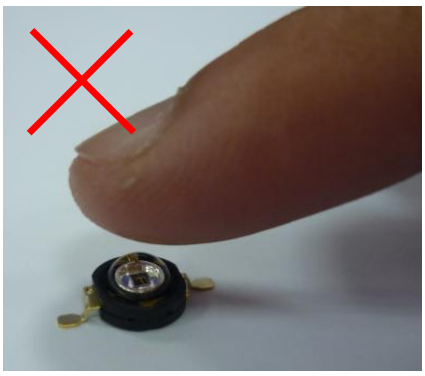
■ Storage

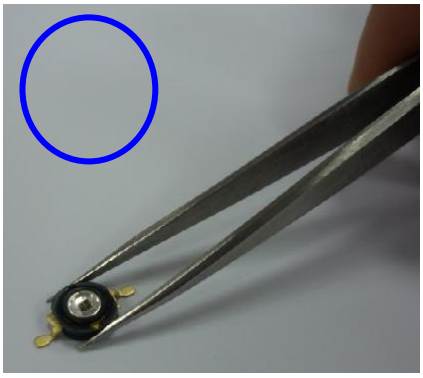
- Do not open the moisture proof bag before the devices are ready to use.
- Before the package is opened, LEDs should be stored at temperatures less than 30℃ and humidity less than 50%.
- After the package is opened, LEDs should be stored at temperatures less than 30℃ and humidity less than 30%.
- LEDs 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 24 hours.

■ Handling Precaution

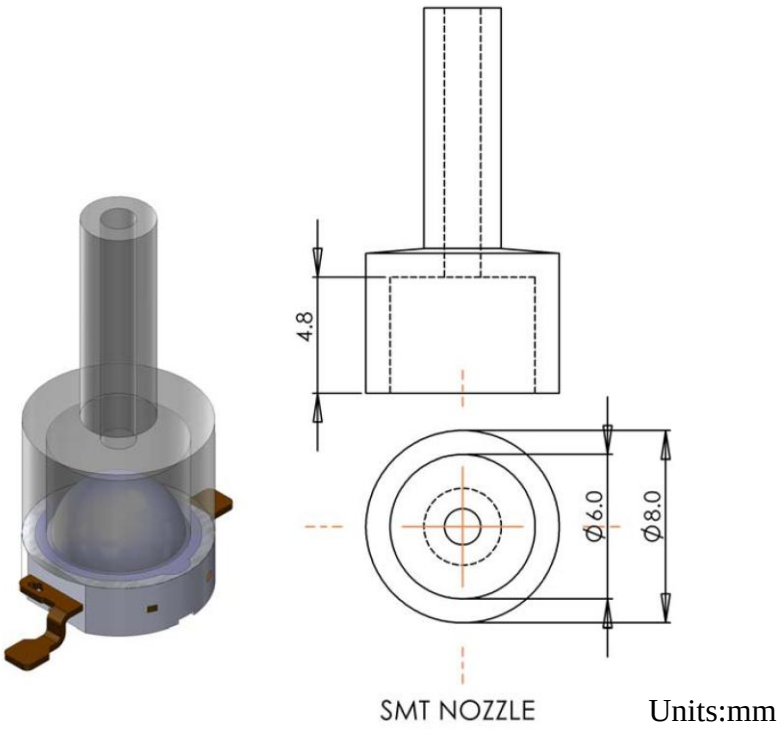
The softness and dust affinity of silicone molding lens constrain the handling of LED. Thus, some handling indications of HELIXEON emitters are presented for possible damage prevention and excellent reliability.

- Avoid leaving fingerprints or scratches (by sharp tools) on the silicone resin parts.



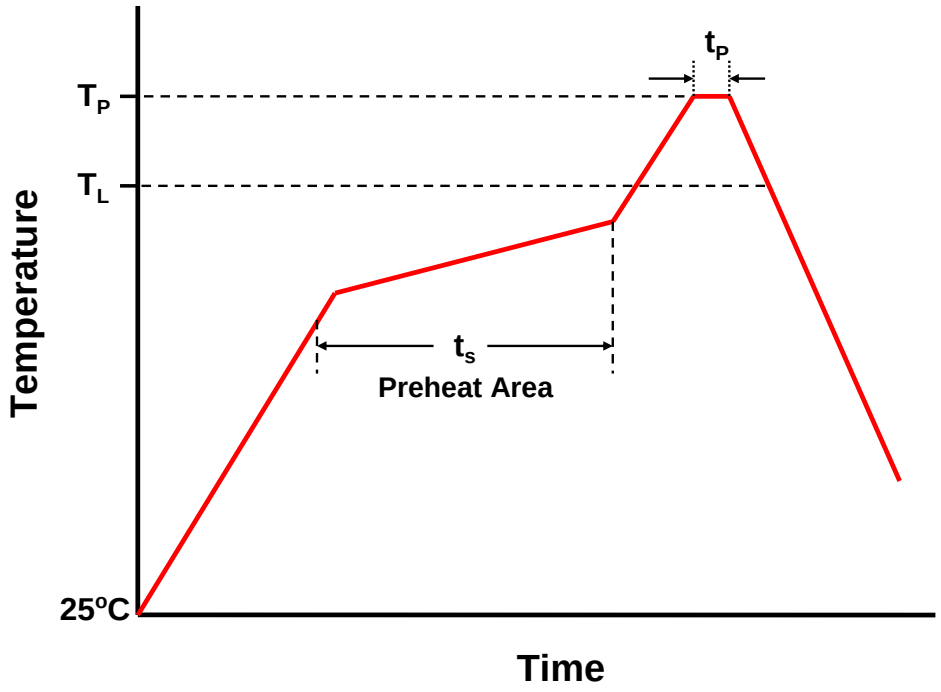


- Do not force over 2000g impact or pressure on the silicone molding lens.
- The LEDs should only be picked up by making contact with the sides of the LED body.
- In case of pick-and-place nozzle for surface mount assembly, avoid directly contacting the lens with nozzle. The pickup tool was recommended and shown as below.



■ 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 following reflow soldering profiles are provided for reference. It is recommended that users follow the recommended soldering profile provided by the manufacturer of the solder paste used.



Profile Feature	Lead Free Assembly
Ramp-Up Rate	2-3 °C/s
Preheat Temperature	150-200 °C
Preheat Time (t_s)	60-120 s
Liquid Temperature (T_L)	217 °C
Time maintained above T_L	30-60 s
Peak Temperature (T_p)	235±5 °C
Peak Time (t_p)	Max 20 s
Ramp-Down Rate	Max 6 °C/s

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■ 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=245±5℃, 3sec. (Lead Solder)	1 time over 95%	0/10
Steady state operating life		Ta=25℃, I_F =350mA Tested with Helio standard circuit board	1000 hrs.	0/10
Steady state operating life of high humidity heat		60℃, RH=90%, I_F = 350mA Tested with Helio 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：>10μ A

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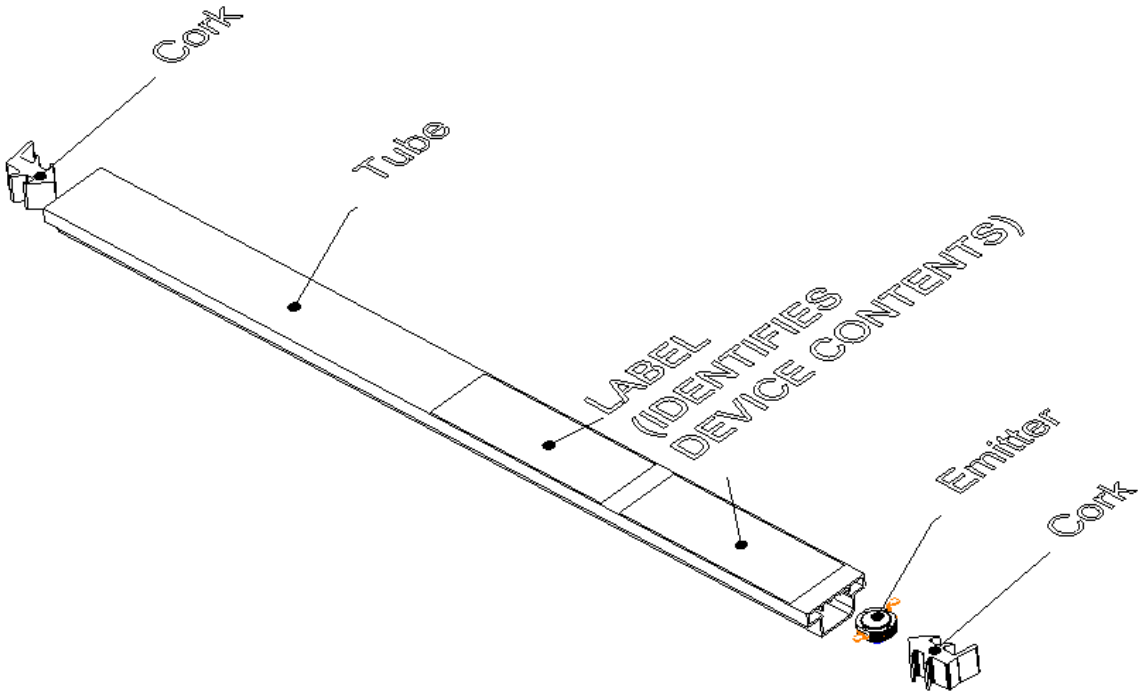
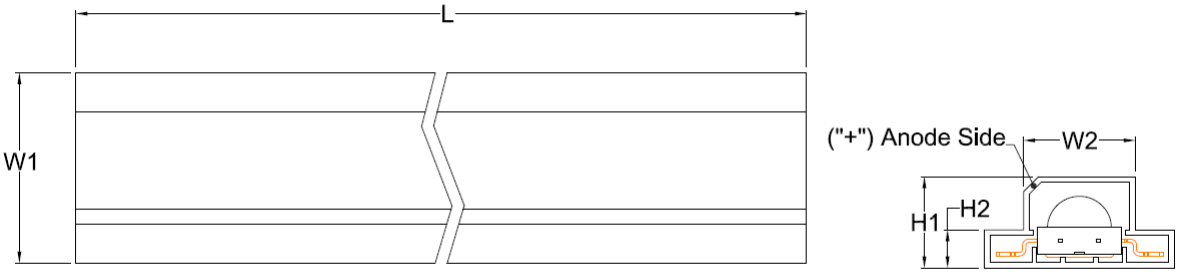
■ Tube Package Specifications



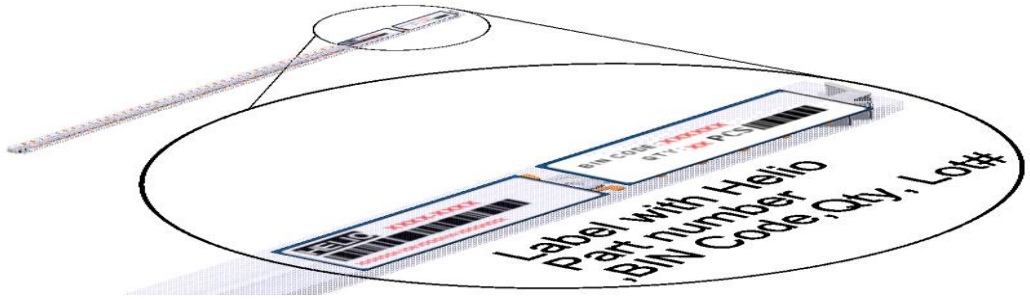
● UBE DIMENSIONS

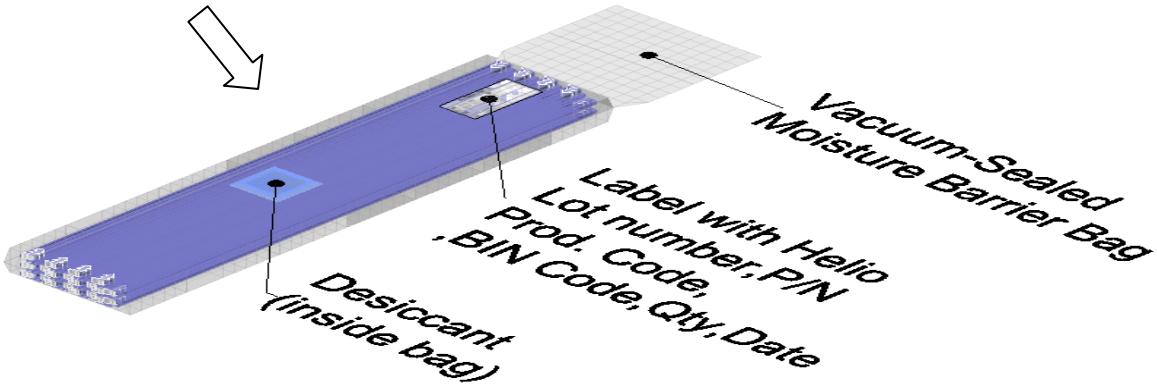


UNIT：mm

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

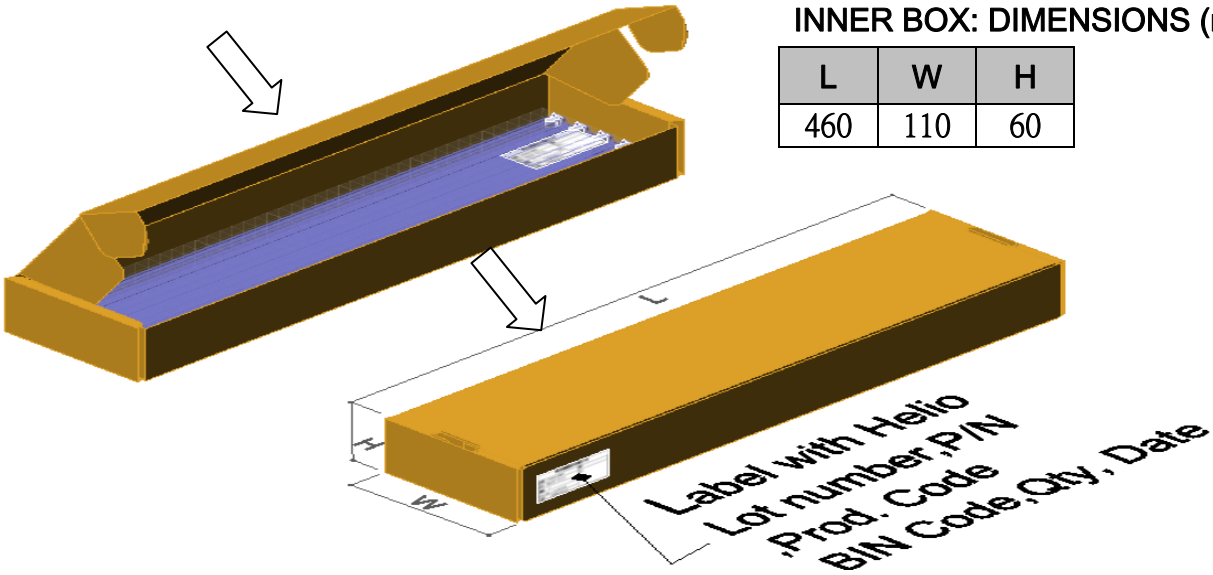
● Packaging





INNER BOX: DIMENSIONS (mm)

L	W	H
460	110	60



Note:

1. There are 50pcs emitters in a tube.
2. There are 20 tubes in an inner carton.

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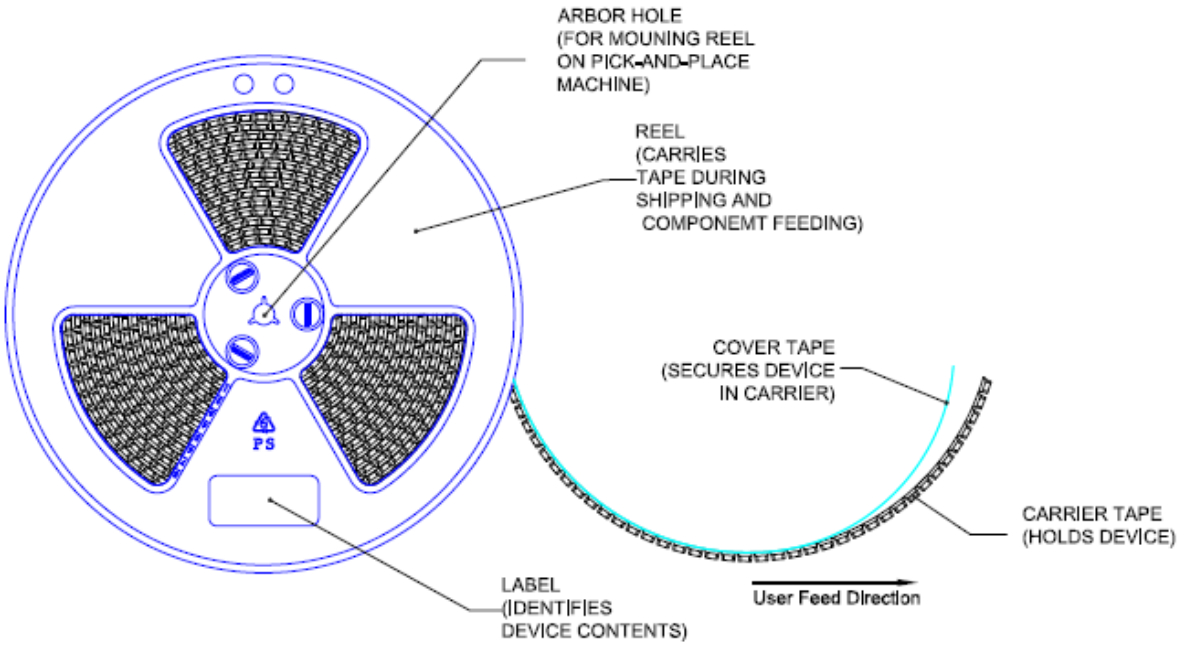
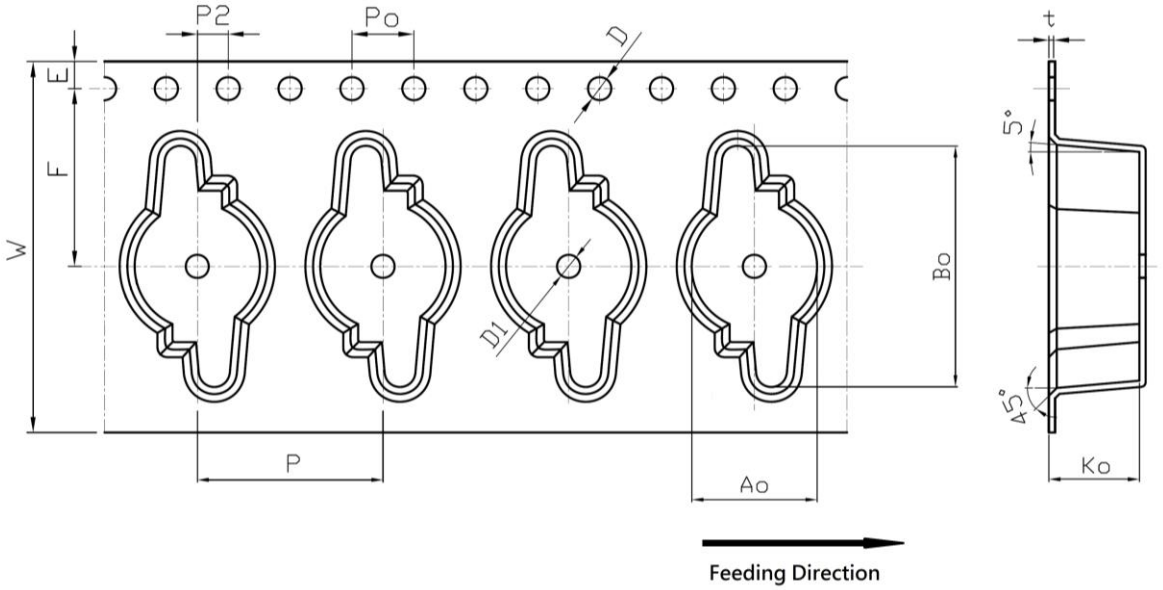
■ Tape-and-Reel Package Specifications



● 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	15.6 ±0.1	5.85 ±0.1	0.5 ±0.05

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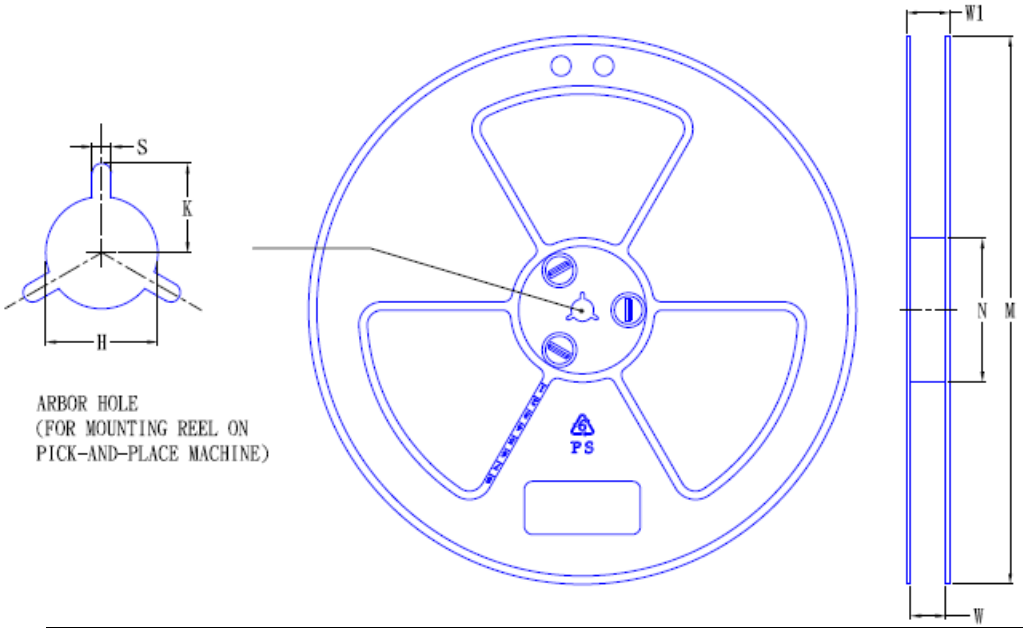
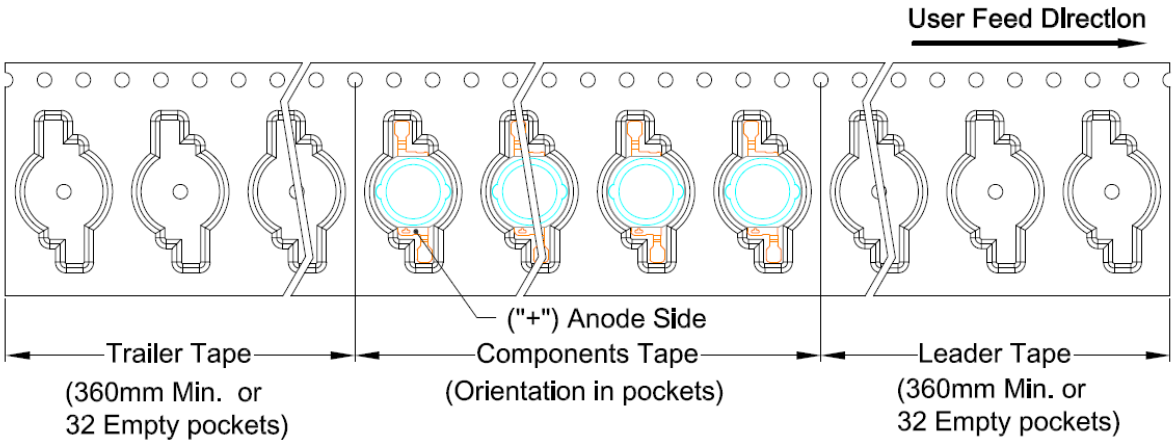
● REEL DIMENSIONS

UNIT : mm



M	N	W	W1	H	K	S
ϕ380.0 ±1.0	ϕ100.0 ±1.0	24.6 ±0.5	30.6 ±0.5	ϕ13.5 ±0.5	10.45 ±0.5	2.5 ±0.5

● Leader/Trailer and Orientation(2 PINS)



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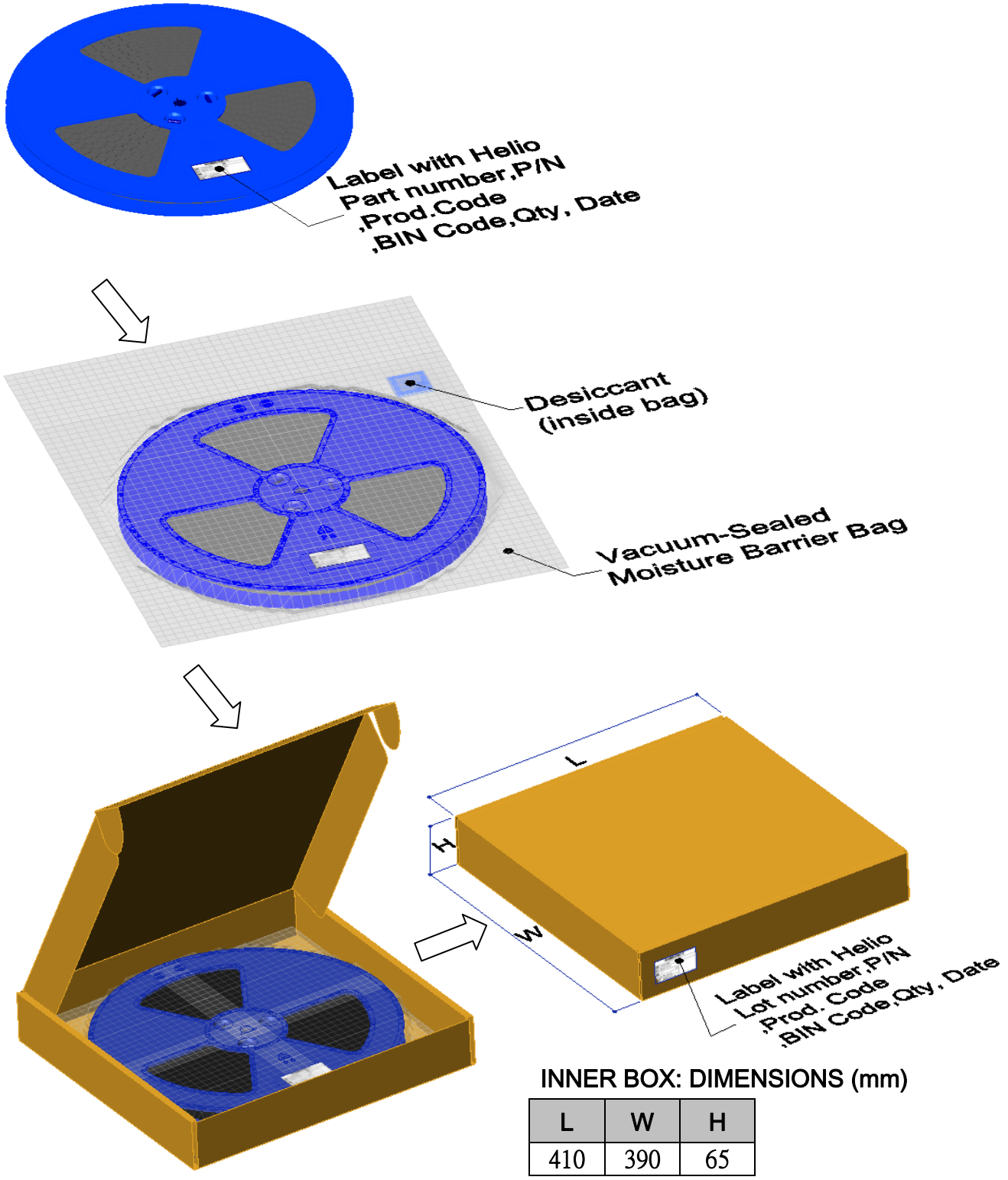
● Packaging

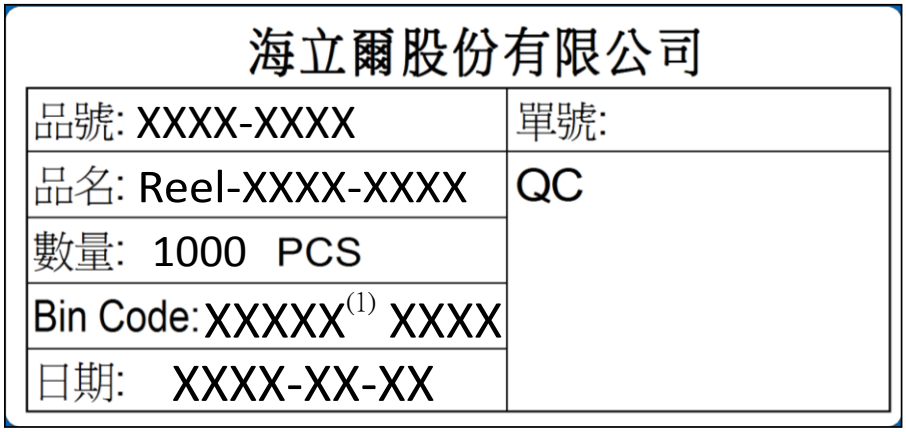


INNER BOX: DIMENSIONS (mm)

L	W	H
410	390	65

■ Label

■ Label for Tape-and-Reel



Note：

1. HELIO internal code.

■ Label for Tube & Tray