



# Specific Lighting Product Data Sheet LTPL-H35CP450

Created Date: 03 / 31 / 2021  
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## Specific Lighting LTPL-H35CP450

### 1. Description

The LITEON H35 Product series is a revolutionary, energy efficient and ultra-compact new light source, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting. It gives you total design freedom and unmatched brightness, creating a new opportunity for solid state lighting to displace conventional lighting technologies.

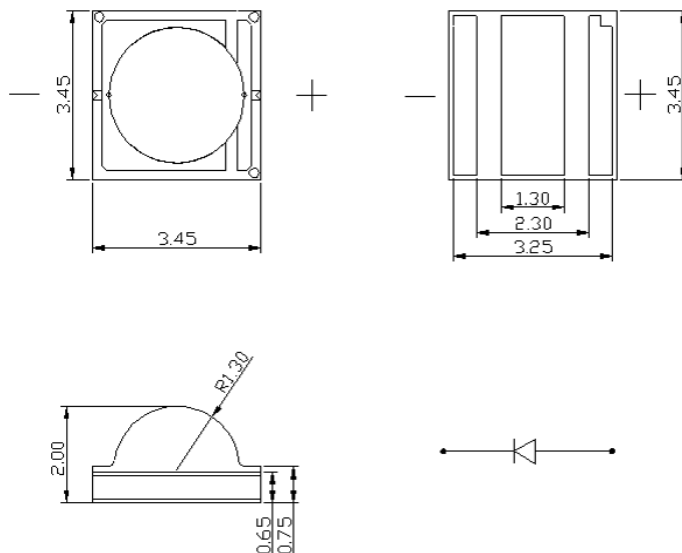
#### 1.1 Features

- High luminous Intensity and high efficiency
- Compatible with reflow soldering process
- Low thermal resistance
- Long operation life
- Wide viewing angle at 120°
- Silicone encapsulation
- Environmental friendly, RoHS compliance

#### 1.2 Applications

- Flat panel light
- LED tube light
- ED bulb light
- Plant grow light

### 2. Outline Dimensions



#### Notes:

1. All dimensions are in millimeters.
2. Thickness tolerance of copper plate is  $\pm 0.02$  mm.
3. Thickness tolerance of product is  $\pm 0.05$  mm.
4. Tolerance is  $\pm 0.1$  mm unless otherwise noted.

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**3. Absolute Maximum Ratings at Ta=25°C**

Parameter	Symbol	Rating	Unit
Power Dissipation	P <sub>D</sub>	3.2	W
Forward Current	I <sub>F</sub>	1000	mA
Reverse Voltage	V <sub>R</sub>	5	V
Operating Temperature Range	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 ~ +100	°C
Junction Temperature	T <sub>j</sub>	125	°C

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### 4. Electro-Optical Characteristics at Ta=25°C

#### 4.1 Typical Performance

Parameter	Symbol	Values		Unit	Test Condition
Forward Voltage	$V_F$	Min	2.8	V	$I_F = 350 \text{ mA}$
		Typ.	-		
		Max.	3.2		
Radiometric Power	$\Phi_e$	Min	600	mW	
		Typ.	-		
		Max.	800		
Photon Flux	PPF	Typ.	2.67	$\mu\text{mol/s}$	
Photon Flux Efficiency	PPF/W	Typ.	2.52	$\mu\text{mol/s/W}$	
Viewing Angle	$2\theta_{1/2}$	Typ.	130	deg	
Thermal Resistance (Junction-Solder)	$R_{th \text{ j-s}}$	Typ.	10	$^{\circ}\text{C/W}$	
Peak Wavelength	$W_p$	Min	440	nm	
		Typ.	-		
		Max.	460		

#### Notes

1. Caution in ESD:

Static Electricity and surge will damages the LED. It is recommended to use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.

2. CAS140B is the test standard for the Radiant flux ( $\Phi_e$ ) & Peak wavelength ( $W_p$ ).

3. Radiant flux ( $\Phi_e$ ) measurement tolerance:  $\pm 10\%$

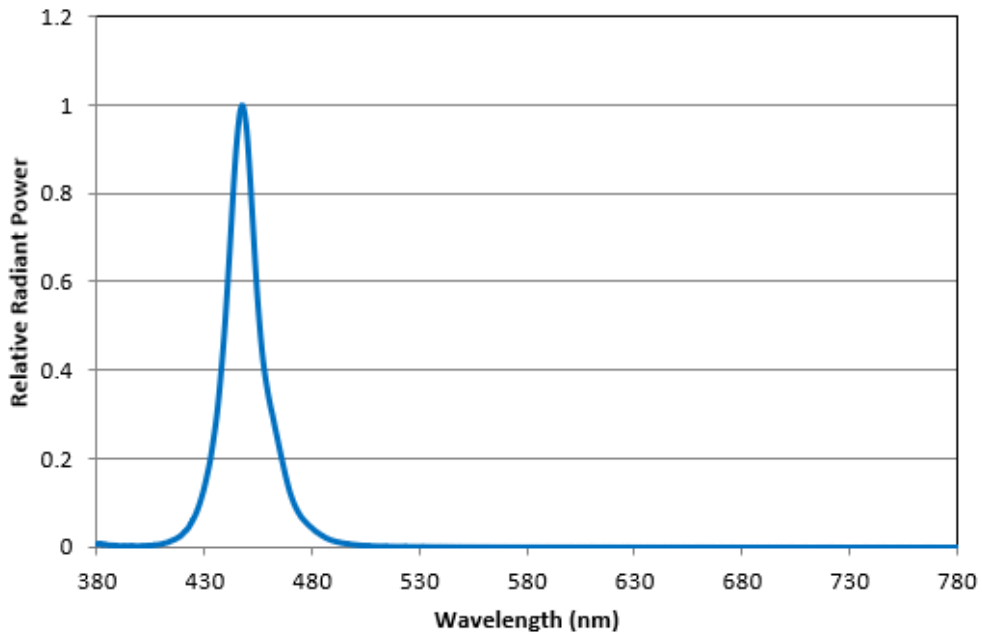
4. Forward voltage ( $V_f$ ) measurement tolerance:  $\pm 0.1\text{V}$

5. Peak Wavelength ( $W_p$ ) measurement tolerance:  $\pm 3\text{nm}$

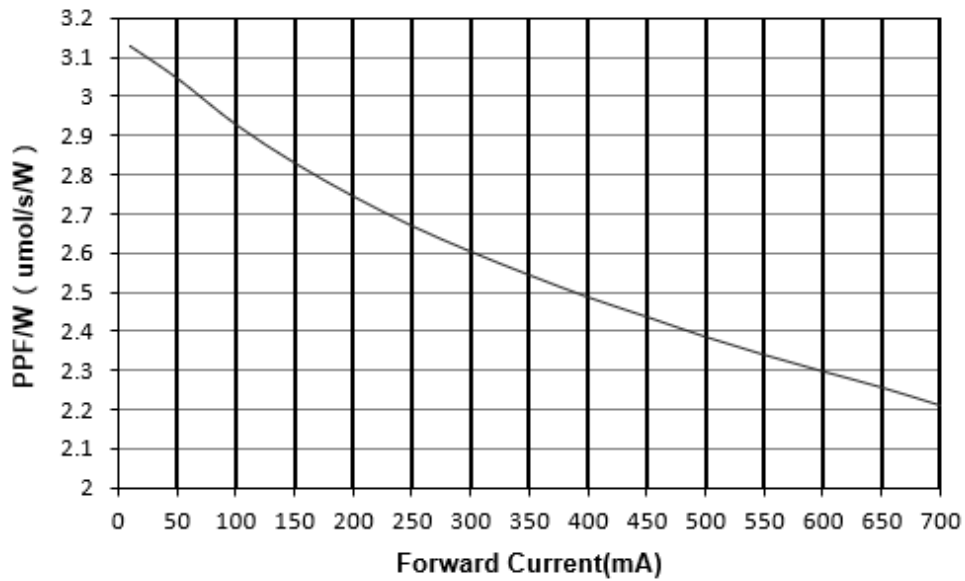
6. Reverse Current ( $I_R$ ) condition is applied for Reverse Voltage ( $V_R$ ) test only (For test Zener function). The device is not designed for reverse operation. Operating the LED under reverse current condition long time might result in damage or failure of the component.

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4.2 Relative Spectral Power Distribution at Typical Current

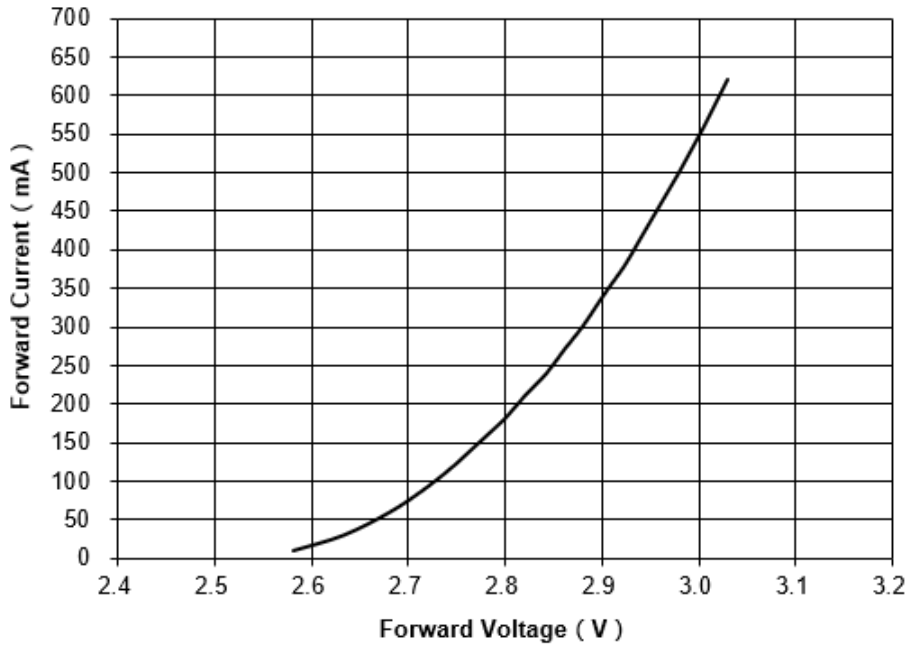


4.3 Forward Current vs. PPF/W

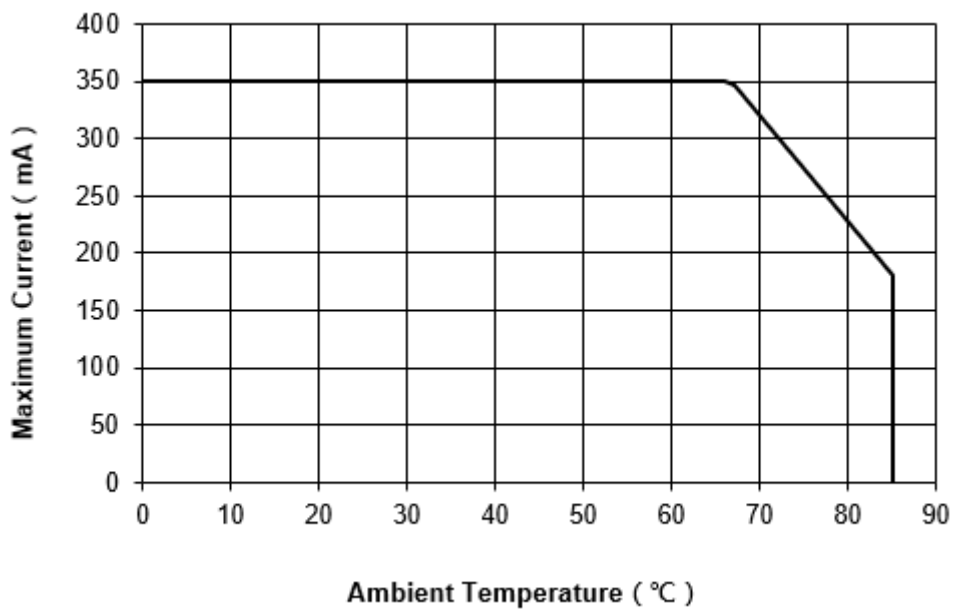


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4.4 Forward Current vs. Forward Voltage

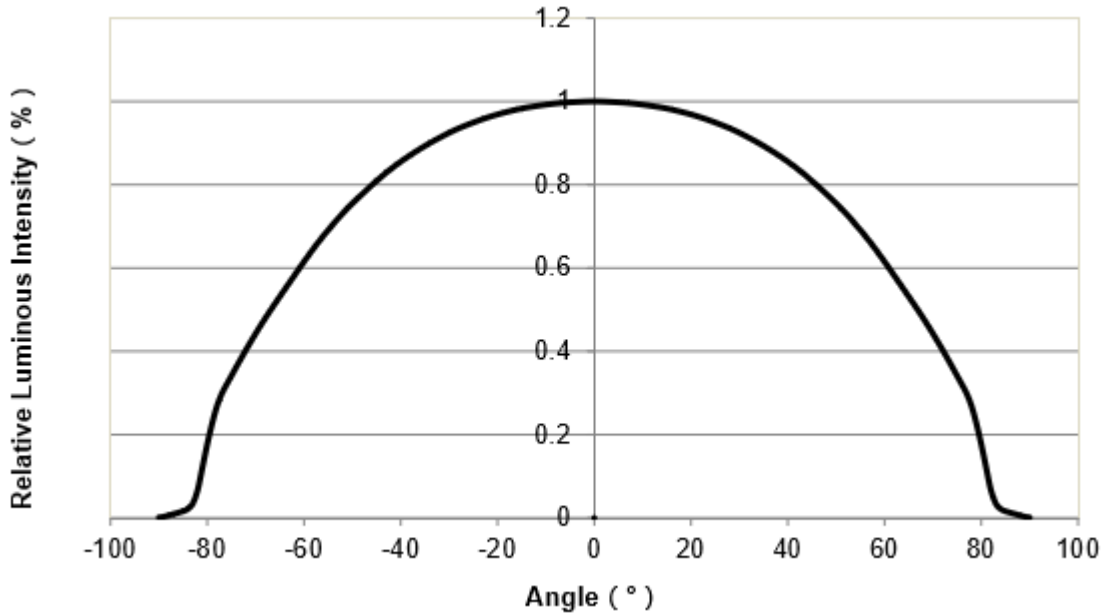


4.5 Derating Curve

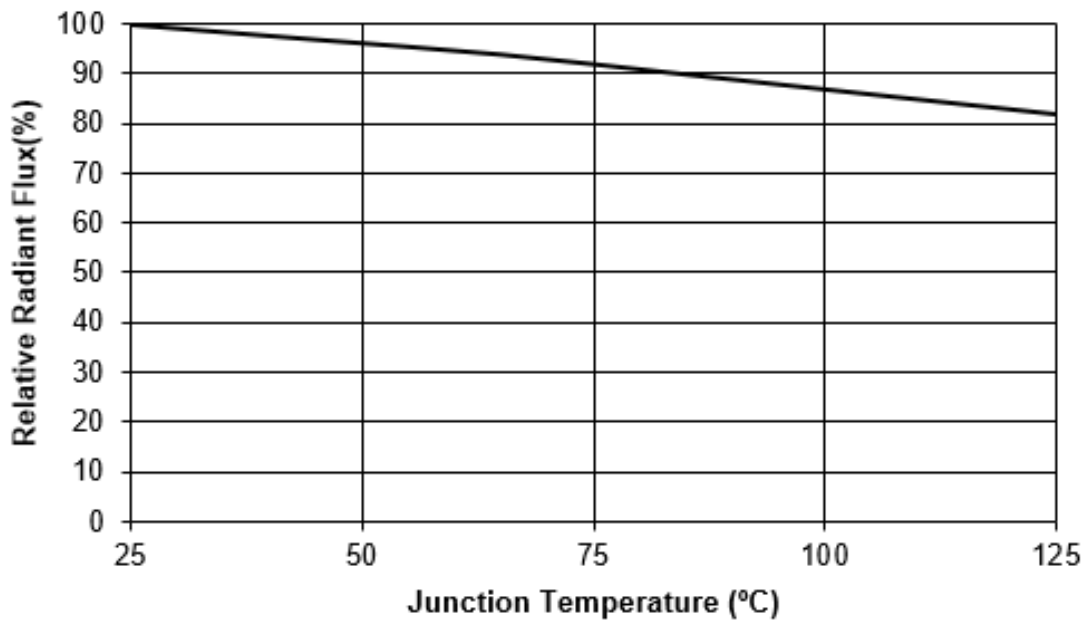


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4.6 Typical Spatial Distribution



4.6 Junction Temperature vs. Relative Radiant Flux



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## 5. Binning Definition

### 5.1 Forward Voltage Bin

V <sub>F</sub> Spec. Table		
V <sub>F</sub> Bin	Forward Voltage (V) at I <sub>F</sub> = 350 mA	
	Min	Max
AE	2.8	3.0
BA	3.0	3.2

Tolerance on each Forward Voltage bin is +/- 0.1V

### 5.2 Radiometric Power Bin

Φ <sub>e</sub> Radiometric Power Spec. Table		
Φ <sub>e</sub> Bin	Power (mW) at I <sub>F</sub> = 350 mA	
	Min	Max
UB	600	700
UC	700	800

Tolerance on each Radiometric Power bin is +/- 10%.

### 5.3 Wavelength Bin

W <sub>p</sub> Wavelength Spec. Table		
W <sub>p</sub> Bin	Power (mW) at I <sub>F</sub> = 350 mA	
	Min	Max
BA	440	460

Peak Wavelength Tolerance: +/- 3nm

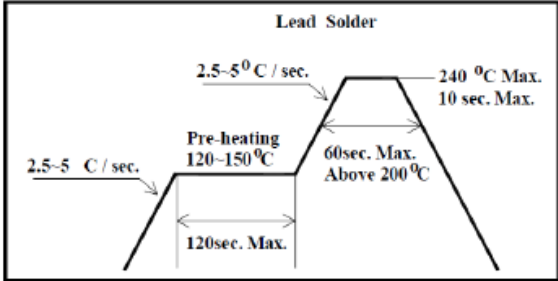
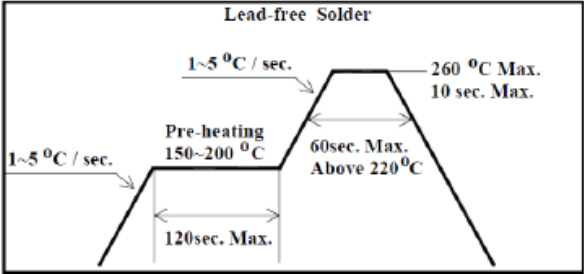


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### 6. Reflow Soldering Characteristics

Lead solder		Lead-free solder	
Pre-heat	120-150°C	Pre-heat	150-200°C
Pre-heat time	120 sec.Max.	Pre-heat time	120 sec.Max.
Peak Temperature	240°C Max.	Peak Temperature	260°C Max.
Soldering time condition	10 sec.Max.	Soldering time condition	10 sec.Max.

 <p><b>Lead Solder</b></p> <p>2.5-5 °C / sec. (initial ramp)          2.5-5 °C / sec. (pre-heat ramp)          Pre-heating 120-150°C (120sec. Max.)          60sec. Max. Above 200°C          240 °C Max. (10 sec. Max.)</p>	 <p><b>Lead-free Solder</b></p> <p>1-5 °C / sec. (initial ramp)          1-5 °C / sec. (pre-heat ramp)          Pre-heating 150-200 °C (120sec. Max.)          60sec. Max. Above 220 °C          260 °C Max. (10 sec. Max.)</p>
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**Notes:**

- The LEDs can be soldered using the reflow soldering or hand soldering method. The recommended hand soldering condition is 350 °C max. and 2 secs max. for one time only, and the recommended reflow soldering condition is as profiles above.
- All temperatures refer to topside of the package, measured on the package body surface.
- The soldering condition referring to J-STD-020. The storage ambient for the LEDs should not exceed 30 °C temperature or 70% relative humidity. It is recommended that LEDs out of their original packaging are soldered within one week. For extended storage out of their original packaging, it is recommended that the LEDs were stored in a sealed container with appropriate desiccant, or desiccators with nitrogen ambient. If the LEDs were unpacked more than 168hrs, baking the LEDs at 60 °C for 24hrs before soldering process.
- The soldering profile could be further referred to different soldering grease material characteristic. The grease vendor will provide this information.
- A rapid-rate process is not recommended for the LEDs cooling down from the peak temperature.
- Although the recommended reflow conditions are specified above, the reflow or hand soldering condition at the lowest possible temperature is desirable for the LEDs.
- The LEDs have a soft surface on the top of package. The pressure to the top surface will be influence to the reliability of the LEDs. Precautions should be taken to avoid the strong pressure on the encapsulated part. So when using the picking up nozzle, the pressure on the silicone resin should be proper.
- LiteOn cannot make a guarantee on the LEDs which have been already assembled using the dip soldering method.

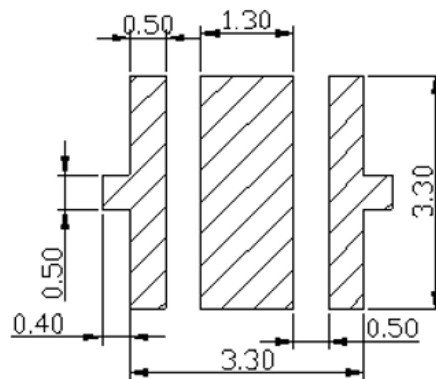
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### 7. User Guide

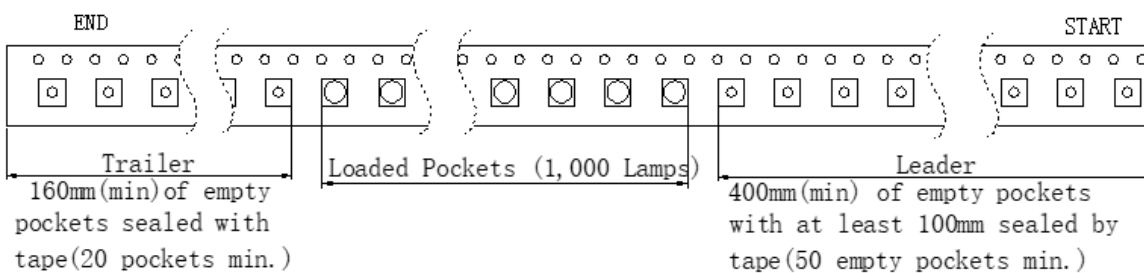
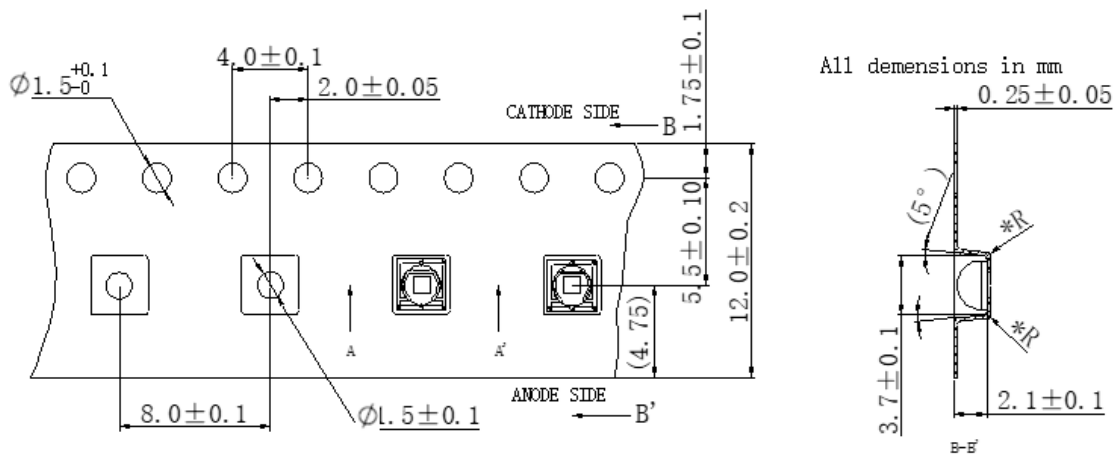
#### ■ Cleaning

Do not use unspecified chemical liquid to clean LED they could harm the package. If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less than one minute.

#### ■ Recommend Printed Circuit Board Attachment Pad

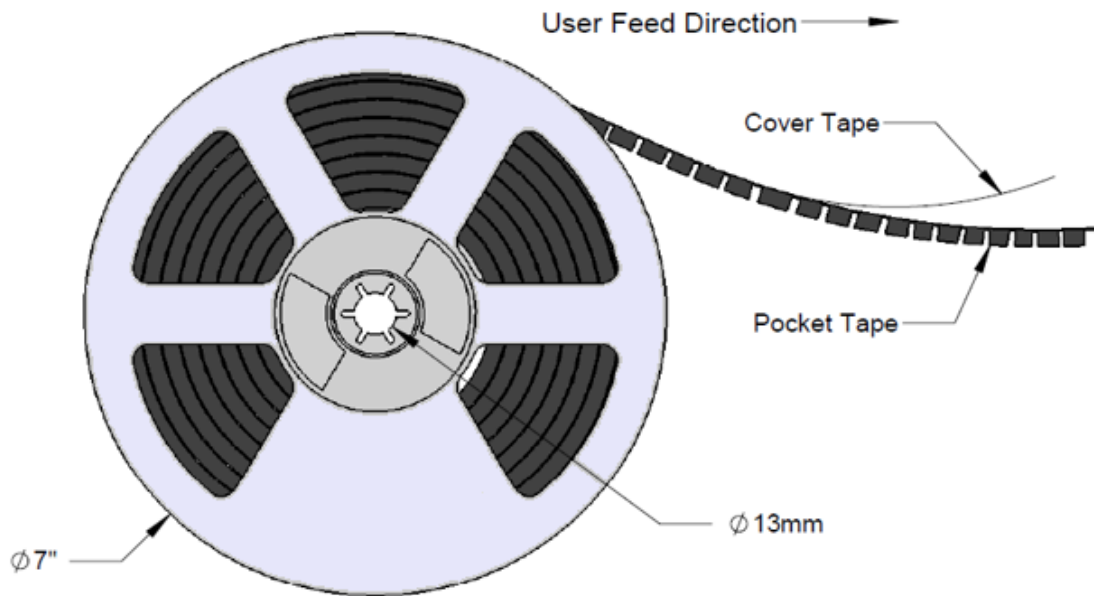


#### ■ Package Dimensions of Tape



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### ■ Package Dimensions of Reel



#### Notes:

1. All dimensions are in millimeters.
2. Carrier: Cumulative Tolerance/10 pitches is  $\pm 0.2\text{mm}$ ; Reel: The tolerances unless mentioned is  $\pm 0.1\text{mm}$ .
3. Adhesion strength of cover tape is 0.1-0.7N when the cover tape is turned off from the carrier tape at the angle of  $10^\circ$  to the carrier tape.
4. Empty component pockets sealed with top cover tape.
5. 7 inch reel-1000 pieces per reel.
6. Minimum packing quantity is 500 pieces for remainders.

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### 8. Cautions

#### 8.1 Application

The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult Liteon's Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health (such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices).

#### 8.2 Storage

This product is qualified as Moisture sensitive Level 3 per JEDEC J-STD-020 Precaution when handling this moisture sensitive product is important to ensure the reliability of the product.

The package is sealed:

The LEDs should be stored at 30°C or less and 90%RH or less. And the LEDs are limited to use within one year, while the LEDs is packed in moisture-proof package with the desiccants inside.

The package is opened:

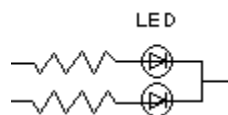
The LEDs should be stored at 30°C or less and 60%RH or less. Moreover, the LEDs are limited to solder process within 168hrs. If exceeding the storage limiting time since opened, that we recommended to bake LEDs at 60°C at least 24hrs. To seal the remainder LEDs return to package, it's recommended to be with workable desiccants in original package.

#### 8.3 Cleaning

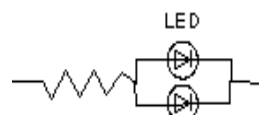
Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED if necessary.

#### 8.4 Drive Mode

An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below



**Circuit model A**



**Circuit model B**

(A) Recommended circuit.

(B) The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

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### 8.5 ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no lightup" at low currents. To verify for ESD damage, check for "light up" and Vf of the suspect LEDs at low currents. The Vf of "good" LEDs should be  $>2.0V@0.1mA$  for InGaN product and  $>1.4V@0.1mA$  for AlInGaP product.

### 8.6 Suggested Checking List:

- Training and Certification
  1. Everyone working in a static-safe area is ESD-certified?
  2. Training records kept and re-certification dates monitored?
- Static-Safe Workstation & Work Areas
  1. Static-safe workstation or work-areas have ESD signs?
  2. All surfaces and objects at all static-safe workstation and within 1 ft measure less than 100V?
  3. All ionizer activated, positioned towards the units?
  4. Each work surface mats grounding is good?
- Personnel Grounding
  1. Every person (including visitors) handling ESD sensitive (ESDS) items wear wrist strap, heel strap or conductive shoes with conductive flooring?
  2. If conductive footwear used, conductive flooring also present where operator stand or walk?
  3. Garments, hairs or anything closer than 1 ft to ESD items measure less than 100V\*?
  4. Every wrist strap or heel strap/conductive shoes checked daily and result recorded for all DLs?
  5. All wrist strap or heel strap checkers calibration up to date?

Note: \*50V for Blue LED.

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- Device Handling
  1. Every ESDS items identified by EIA-471 labels on item or packaging?
  2. All ESDS items completely inside properly closed static-shielding containers when not at static-safe workstation?
  3. No static charge generators (e.g. plastics) inside shielding containers with ESDS items?
  4. All flexible conductive and dissipative package materials inspected before reuse or recycle?
  
- Others
  1. Audit result reported to entity ESD control coordinator?
  2. Corrective action from previous audits completed?
  3. Are audit records complete and on file?

#### 8.7 Others:

- Do not put any pressure on the light emitting surface either by finger or any hand tool and do not stack the products. Stress or pressure may cause damage to the wires of the LED array.
- This product is not designed for the use under any of the following conditions, please confirm the performance and reliability are well enough if you use it under any of the following conditions
- Do not use sulfur-containing materials in commercial products including the materials such as seals and adhesives that may contain sulfur.
- Do not put this product in a place with a lot of moisture (over 85% relative humidity), dew condensation, briny air, and corrosive gas (Cl, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>x</sub>, etc.), exposure to a corrosive environment may affect silver plating.
- The appearance and specifications of the product may be modified for improvement without prior notice.

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**9. Revision History**

Version	Page	Content of Change	Owner	Date Record
1.0	-	Preliminary Spec.	TW Tsai	03/31/2021