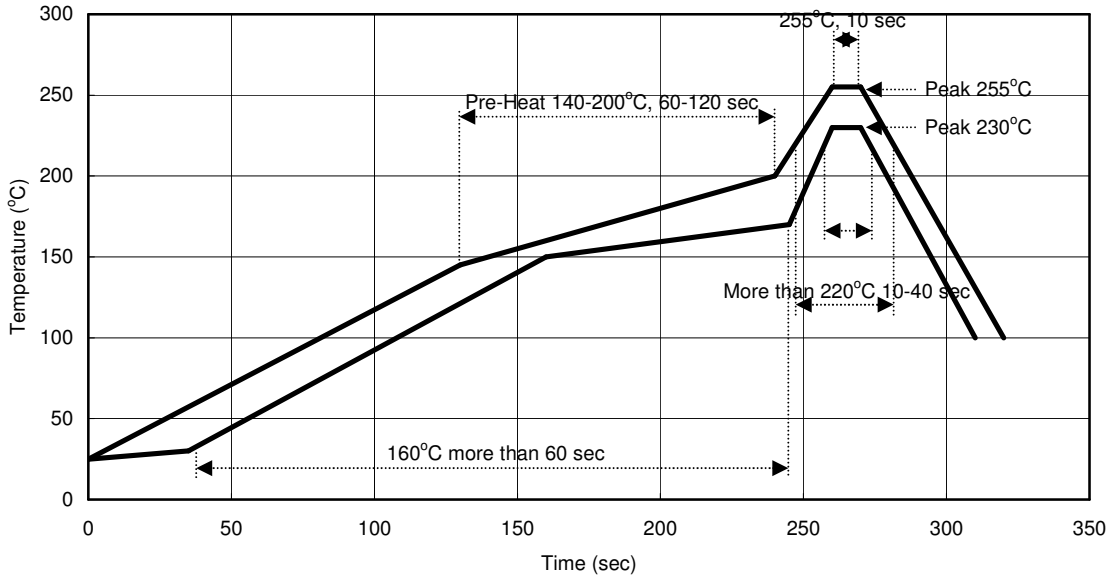
3. Rating and Characteristics

3.1. Absolute Maximum Ratings at Ta=25 ℃

Parameter	Symbol	Rating	Unit
Power Dissipation (per die)	P_o	74	mW
Forward Current (per die)	I_F	20	mA
Forward Pulse Current (per die) (1/10 Duty Cycle, 10msec Pulse Width)	I_{FP}	100	mA
Reverse Voltage (per die)	V_R	5	V
Operating Temperature Range	T_{opr}	-25℃ to + 80℃	
Storage Temperature Range	T_{stg}	-40℃ to + 85℃	
Wave Soldering Condition	T_{sol}	260℃ For 5 Seconds	

3.2. Suggest IR Reflow Condition



Notes: The Profile is available that must to use SnAg $_{(x=3.3\text{-}3.8)}$ Cu $_{(y=0.2\text{-}2.7)}$ solder paste

3.3. Electro-optical characteristics at Ta=25 ℃

Parameter	Symbol	Min.	Typ.	Max.	Test Condition	Unit
Forward Voltage	V_F	2.8	3.2	3.7	I_F= 20mA	V
Reverse Current	I_R			100	V_R = 5V	μA
Luminous Intensity	I_V	8.5	11.0		I_F = 20mA	cd
Chromaticity Coordinates	x		0.33		I_F = 20mA	
	y		0.33			
Viewing Angle	2θ1/2		50		I_F = 20mA	Deg

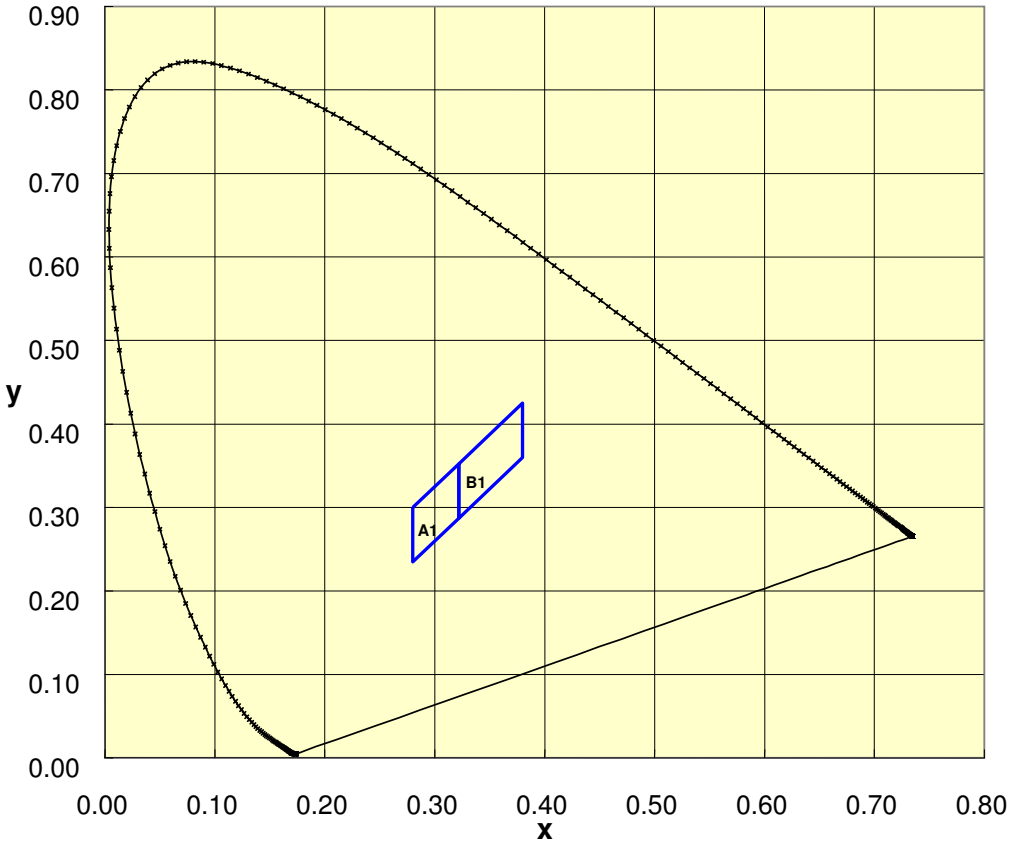
Note

1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2. The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
3. Caution in ESD: Static Electricity and surge damages the LED. It is recommend to use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.
4. Tester:
   4.1 CAS-140B is for the chromaticity coordinates (x, y).
   4.2 CAS-140B is for I_V
5. The chromaticity coordinates (x, y) guarantee should be added ± 0.01 tolerance.

4. Color Rank

Hue Bin		Chromaticity Coordinate at I_F = 20mA			
		CIE 1931Chromaticity coordinates			
A1	x	0.280	0.280	0.322	0.322
	y	0.300	0.235	0.287	0.352
B1	x	0.322	0.322	0.380	0.380
	y	0.352	0.287	0.360	0.425

C.I.E. 1931 Chromaticity Diagram



5. Typical Electrical / Optical Characteristics Curves

(25 °C Ambient Temperature Unless Otherwise Noted)

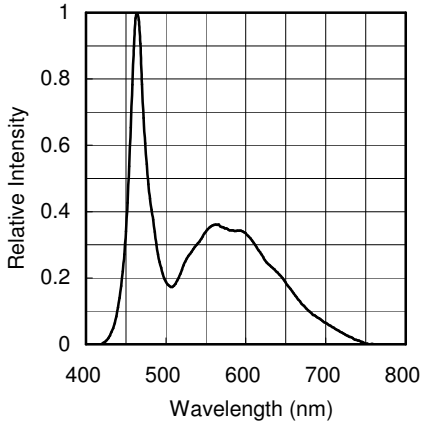


Fig 1. Relative Intensity vs. Wavelength

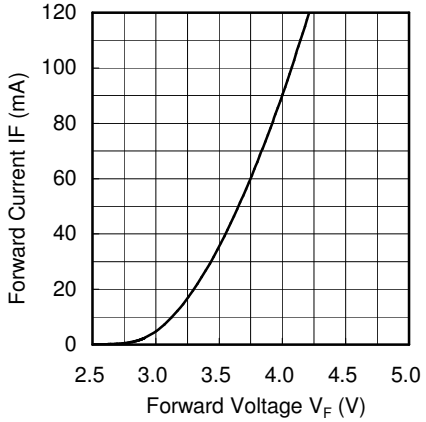


Fig 2. Forward Current vs. Forward Voltage

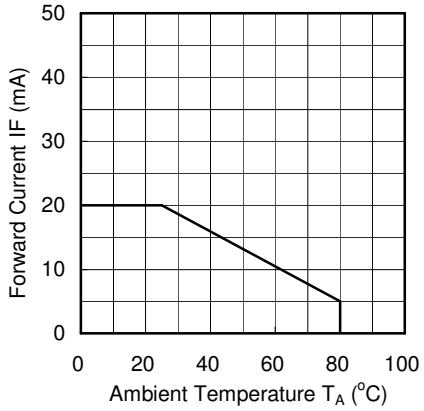


Fig 3. Forward Current Derating Curve

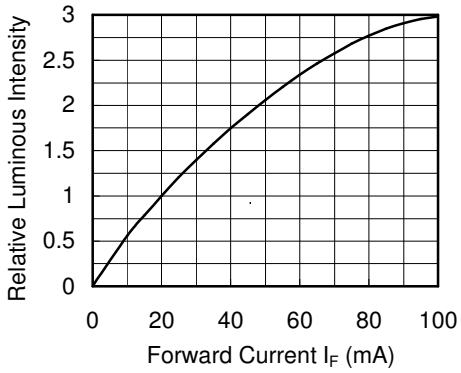


Fig 4. Relative Luminous Intensity vs, Forward Current

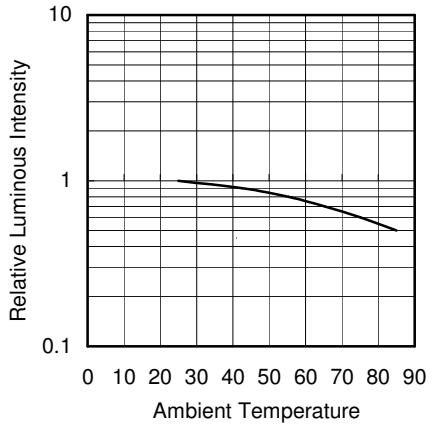


Fig 5. Luminous Intensity vs. Ambient Temperature

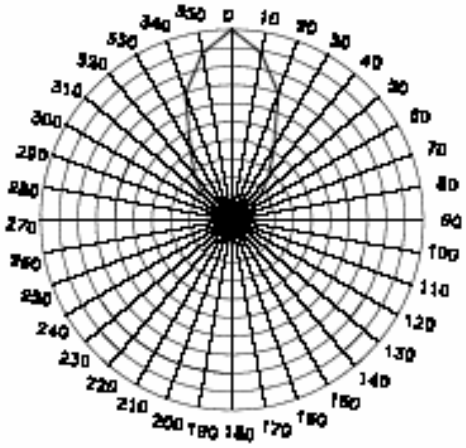
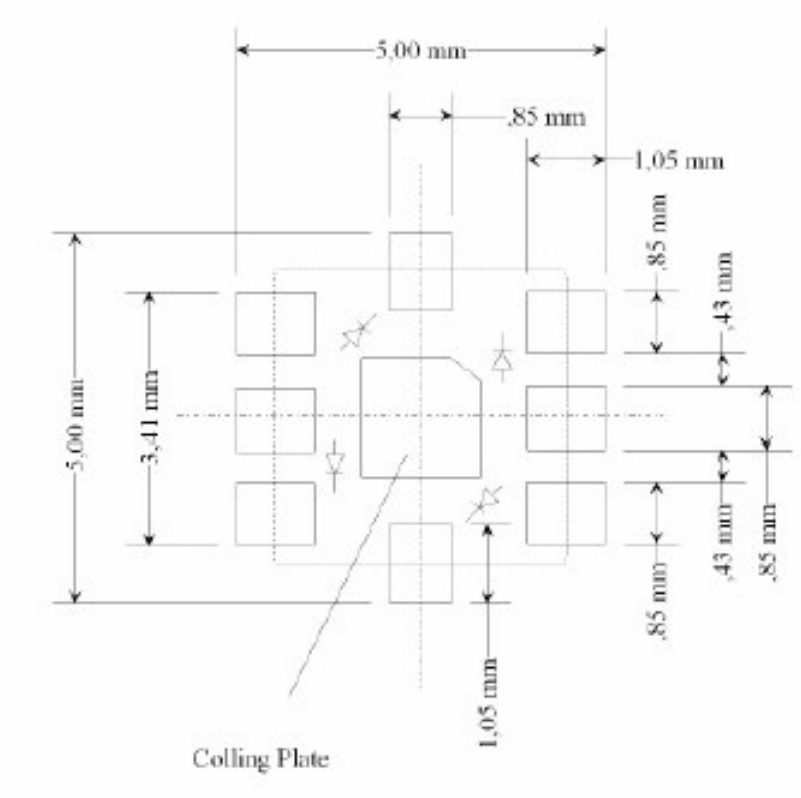
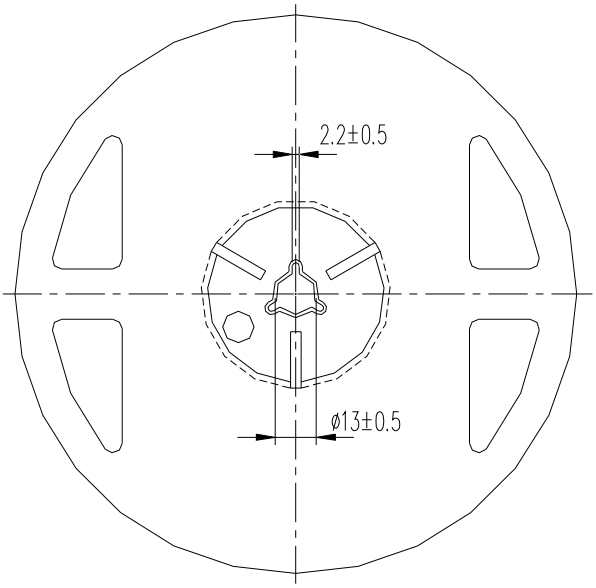


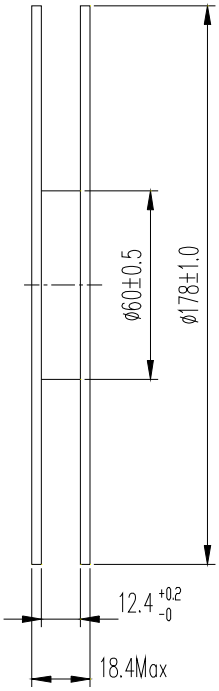
Fig 6. Spatial Distribution

6. Suggest Soldering Pad Dimensions

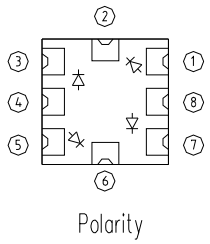


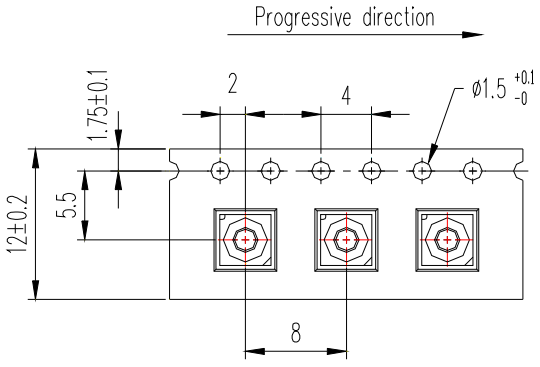
7. Package Dimensions of Tape and Reel

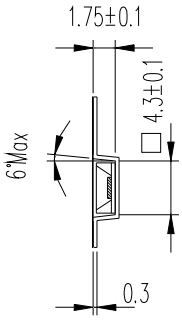




Note: The tolerances unless mentioned is ±0.1mm, Unit=mm







Notes:

Empty component pockets sealed with top cover tape.

7 inch reel-800 pieces per reel.

The maximum number of consecutive missing lamps is two.

In accordance with ANSI/EIA 481-1-A-1994 specifications.

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

The storage ambient for the LEDs should not exceed 30℃ temperature or 70% relative humidity.
It is recommended that LEDs out of their original packaging are IR-reflowed within one week.
For extended storage out of their original packaging, it is recommended that the LEDs be stored in a sealed container with appropriate desiccant, or in a desiccators with nitrogen ambient.
LEDs stored out of their original packaging for more than a week should be baked at about 60 deg C for at least 24 hours before solder assembly.

8.3. Cleaning

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

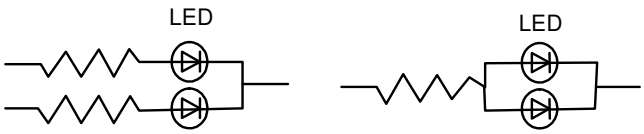
8.4. Soldering

Recommended soldering conditions:

Reflow soldering		Wave Soldering		Soldering iron	
Pre-heat	150~200℃	Pre-heat	100℃ Max.	Temperature	300℃ Max.
Pre-heat time	180 sec. Max.	Pre-heat time	60 sec. Max.	Soldering time	3 sec. Max. (one time only)
Peak temperature	255℃ Max.	Solder wave	260℃ Max.		
Soldering time	10 sec. Max.	Soldering time	10 sec. Max.		

8.5. Drive Method

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.

8.6. 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 "lightup" and V_F of the suspect LEDs at low currents.
The V_F of "good" LEDs should be >2.0V@0.1mA for InGaN product.