LITEON®
OPTOELECTRONICS

Automotive

Product Data Sheet

LTPA-C3535ABPPA

Preliminary

Spec No.：

Created Date: 2015/12/11

Revision: (PRELIMINARY)-4.0

BNS-OD-FC001/A4

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Rev	Description	By	Date
1.0	New data sheet	Aron	11/18/2015
2.0	change Storage Temperature	Aron	12/11/2015
3.0	change "Hue Bin Definition"	Aron	6/3/2015
4.0	1. change "Hue Bin Definition" 2. Update Applicative 3. Package dimensions of Reel change to 10” 4. Max package number change to 1kpcs	Aron	12/11/2015
Above data for PD and Customer tracking only			

Customer Name:

Customer Signature: **Print Name:**

LiteON Sales Signature: **Print Name:**

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1. Description

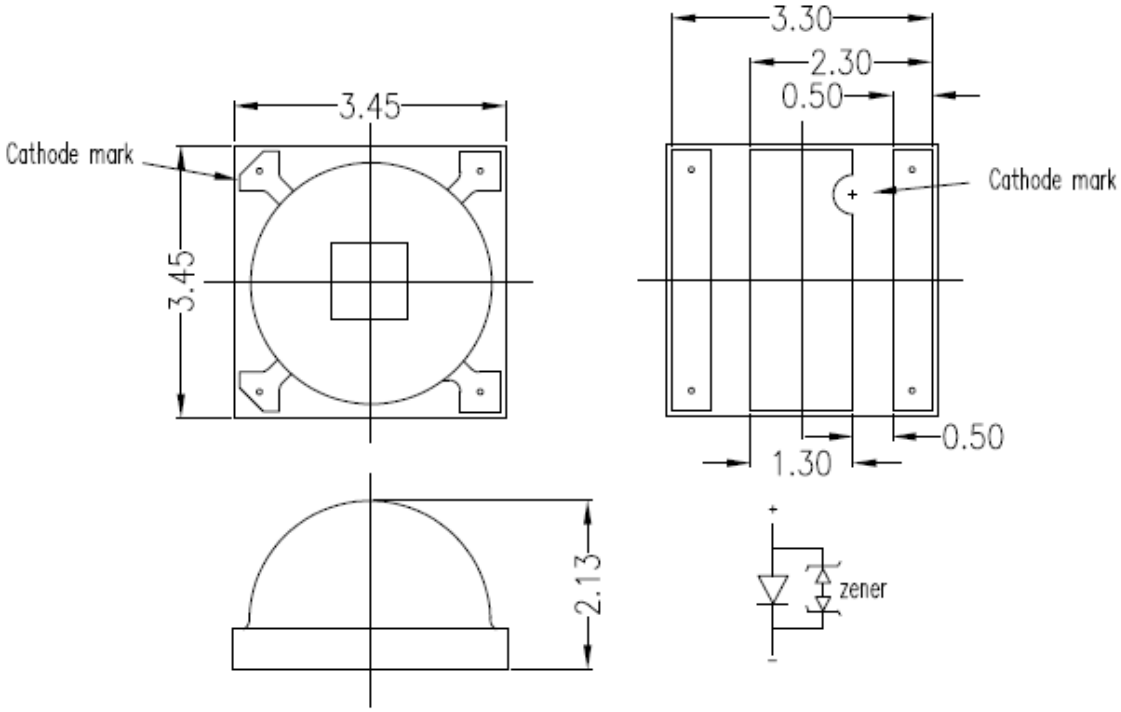
The LiteOn White LED is a revolutionary, energy efficient and ultra-compact new light source, combining the lifetime and reliability advantages of Light Emitting Diodes with the brightness of conventional lighting. It gives you total design freedom and unmatched brightness, creating a new opportunities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

1.1 Features

- Meet RoHS and HF
- Highest brightness SMD LED
- Package in 12mm tape on 10" diameter reels.
- I.C. compatible
- Compatible with automatic placement equipment
- Compatible with infrared reflow solder process

1.2 Applications

- Aftermarket: accessary applications.



Part No.	Lens Color	Source Color
LTPA-C3535ABPPA	Amber / White	InGaN PC Amber

Notes:

1. All dimensions are in millimeters and dimension tolerances are ±0.2mm, except lens height and ceramic length/width dimensions tolerance are ±0.1mm
2. Dimensions without tolerances are for reference only.

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2. Rating and Characteristics

2.1 Absolute Maximum Ratings at Ta=25℃

Parameter	Symbol	Rating	Unit
Power Dissipation	P_O	2.7	W
DC Forward Current	I_F	700	mA
Peak Plus Current	I_p	1,000	mA
ESD Sensitivity(HBM)	V_{HBM}	8	kV
Junction Temperature	T_j	145	°C
Thermal Resistance, Junction-Case	$R_{th, J-C}$	9.5	°C / W
Operating Temperature Range	T_{opr}	-40~+85	°C
Storage Temperature Range	T_{stg}	-40~+100	°C

Notes :

1. The pulse mode condition is 1 KHz with 0.1msec pulse width..
2. Forbid to operating at reverse voltage condition
3. ESD spec is reference to AEC-Q101-001 HBM.
4. The unit of Rth is °C/W electrical and driving current is 350mA.
5. Thermal resistance measurement tolerance is ± 10%,and with 8x 6 cm heat sink.
6. The package LEDs are not designed to be driven in reverse bias

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2.2 Electro-Optical Characteristics

■ Typical Performance for white (Ta= 25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min	Typ.	Max		
Viewing Angle	$2\theta_{1/2}$	--	118	--	deg	I_F = 350mA
Dominate Wavelength	λ_d		588		nm	
Forward Voltage	V_F	2.8	3.1	3.6	V	
Luminous Flux	ΦV	80		150	lm	

Notes

1. All of the VF value are typical and the real bin range please refer ”VF Binning Parameter”.
2. All of the Flux value are typical and the real Bin range please refer ”Flux Binning Parameter”.
3. Tolerance of Flux is ±10%, Tolerance of VF is ±5%, tolerance of CCx/CCy is ±0.01, tolerance of CRI is ±3., tolerance of DWL(Dominate Wave Length) is ±3nm
4. LEDs are lighted up and measured with externally parallel connecting leads of LED.
5. Typical viewing angle is 118deg.

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3. Typical Electrical/Optical Characteristics Curve

■ Efficiency Comparison Table

3.1 Beam Pattern

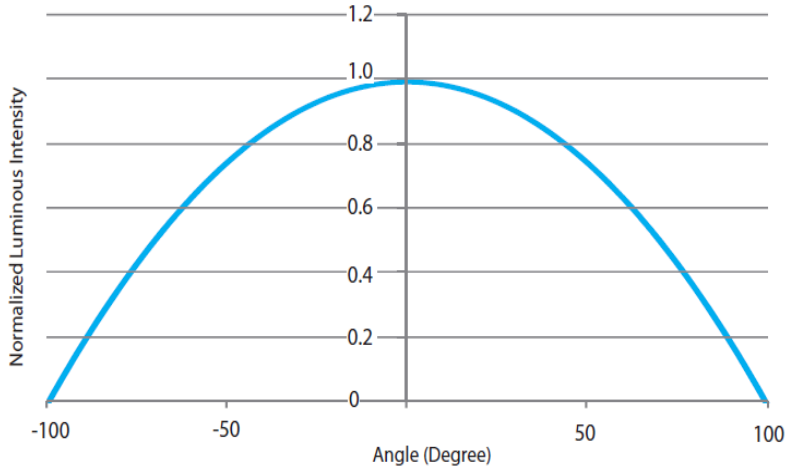

Fig 1. Emission angle

3.2 Forward Current vs. Forward Voltage at 25°C

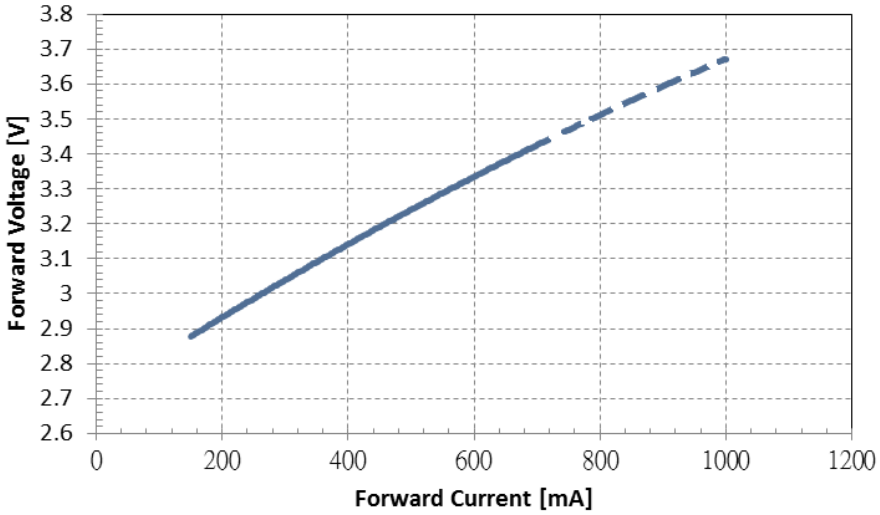

Fig 2. Forward Current vs. Forward Voltage

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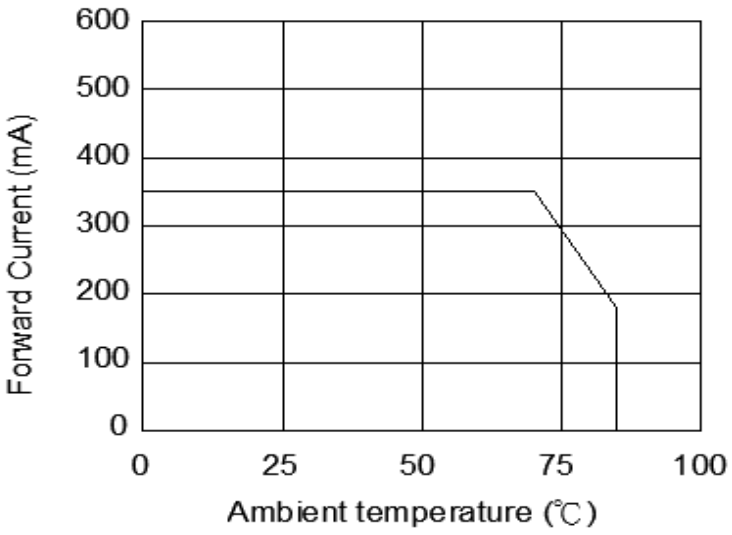
3.3 Forward Current vs. Ambient Temperature



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4. VF Bin Definition

4.1 Forward Voltage Binning Parameter at Ta = 25°C

Parameter	Bin	Symbol	Min	Max	Unit	Condition
Forward Voltage	C	VF	2.8	3.0	V	I_F = 350mA
	D		3.0	3.2		
	E		3.2	3.4		
	F		3.4	3.6		

Tolerance on each Forward Voltage bin is ±5%

5. Flux Bin Definition

5.1 Luminous Flux Binning Parameter at Ta = 25°C

Parameter	Bin	Symbol	Min	Max	Unit	condition
Luminous Flux	R9	ΦV	80	90	lm	I_F = 350mA
	S0		90	105		
	S1		105	120		
	S2		120	135		
	S3		135	150		

Tolerance on each Luminous Flux bin is ±10%

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6. Hue Bin Definition

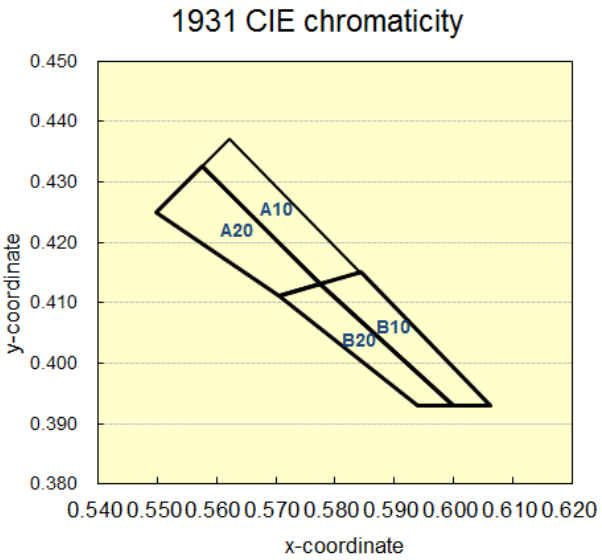
6.1 Chromaticity Coordinate Groups at Ta=25°C

6.1.1 PC Amber hue point

Color bin limits at IF=350mA					
Bin Code	CIE 1931 Chromaticity coordinates				
A10	x	0.545	0.561	0.610	0.597
	y	0.425	0.441	0.390	0.390
A20	x	0.5775	0.5843	0.5622	0.5576
	y	0.4132	0.4151	0.4372	0.4326
B10	x	0.5705	0.5775	0.5576	0.5499
	y	0.4111	0.4132	0.4326	0.4249
B20	x	0.5775	0.5843	0.6062	0.6000
	y	0.4132	0.4151	0.3930	0.3930

Tolerance of each hue bin is ±0.01

6.1.2 PC Amber hue range



Notes

1. The (CIEx, CIEy) center follow ANSI Quadrangle

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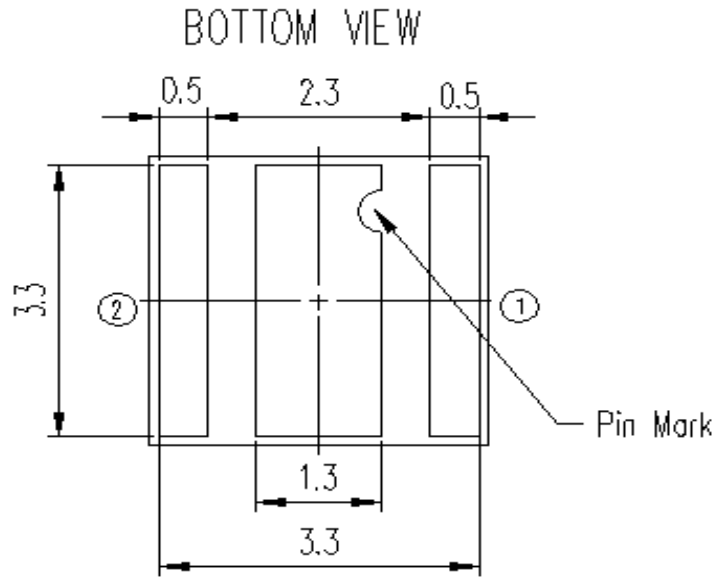
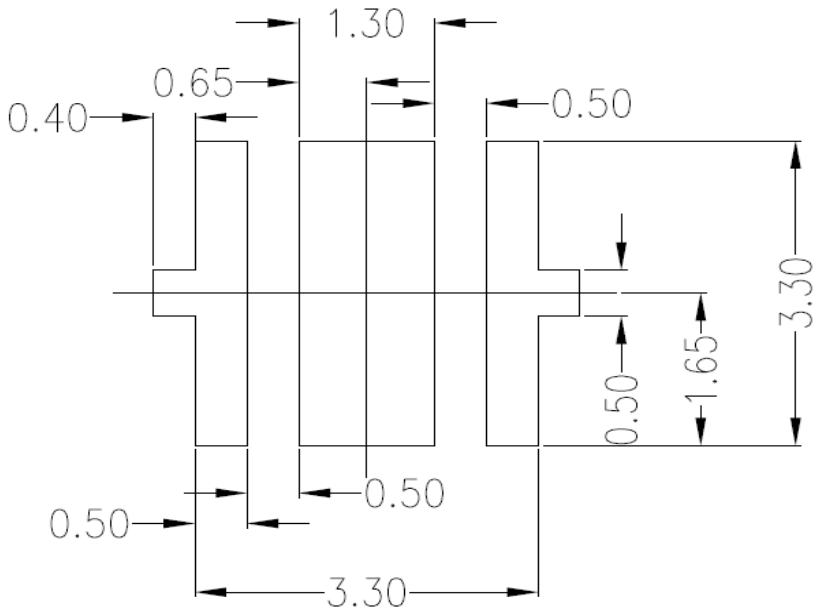
7. Recommend Soldering Pad Layout





Notes:

1. Suggest stencil thickness is maximum 0.10mm

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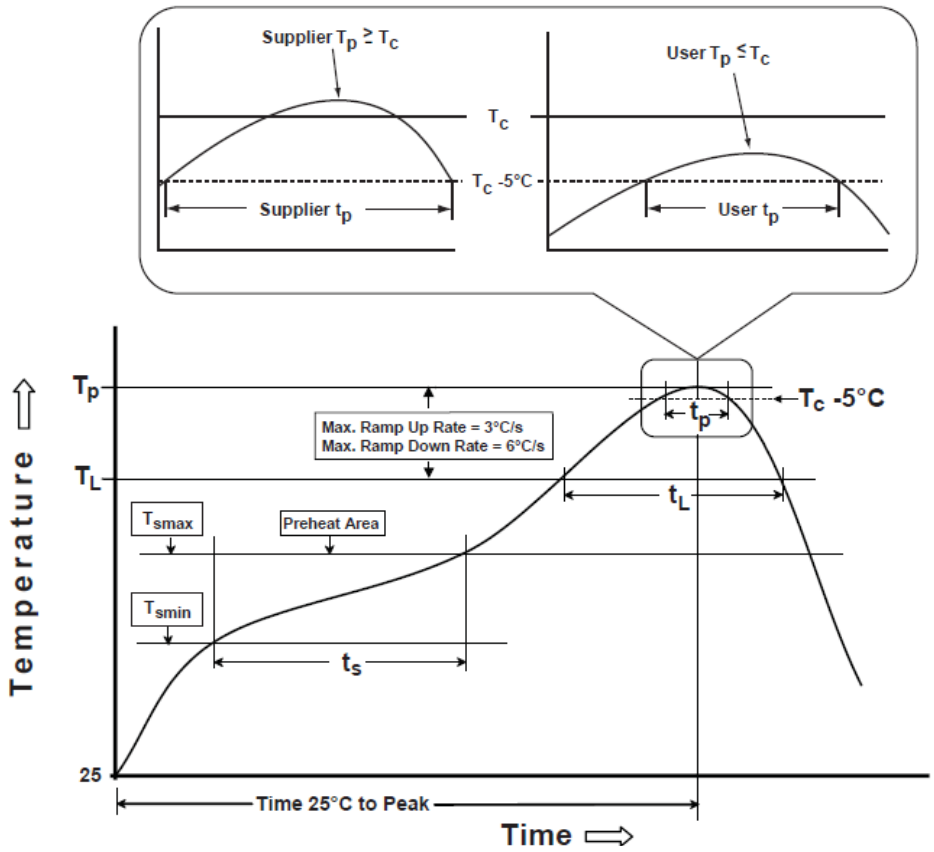
8. Reflow Soldering Characteristics



Profile Feature	Lead Free Assembly
Average Ramp-Up Rate (T_{Smax} to T_P)	3°C / second max
Preheat Temperature Min (T_{Smin})	150°C
Preheat Temperature Max (T_{Smax})	200°C
Preheat Time (t_{Smin} to t_{Smax})	60 – 180 seconds
Time Maintained Above Temperature (T_L)	217°C
Time Maintained Above Time (t_L)	u – 150 seconds
Peak / Classification Temperature (T_P)	255°C
Time Within 5°C of Actual Peak Temperature (t_P)	5 seconds
Ramp – Down Rate	6°C / second max
Time 25°C to Peak Temperature	8 minutes max

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Notes

1. The LEDs can be soldered using the reflow soldering or hand soldering method. The recommended hand soldering condition is 350°C max. and 2secs max. for one time only, and the recommended reflow soldering condition is 260°C max. and 5secs max. for three times max.
2. All temperatures refer to topside of the package, measured on the package body surface.
3. The soldering profile could be further referred to different soldering grease material characteristic. The grease vendor will provide this information.
4. A rapid-rate process is not recommended for the LEDs cooling down from the peak temperature.
5. Although the recommended reflow conditions are specified above, the reflow or hand soldering condition at the lowest possible temperature is desirable for the LEDs.
7. LiteOn cannot make a guarantee on the LEDs which have been already assembled using the dip soldering Method

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9. Reliability Test

No	Test item	Test Condition	Duration	Number of Damaged
1	Pre-conditional	MSL 3 125℃, 24hrs baking Moisture Soak 60℃/60% 52hrs Interval: 15mins~4hours to do IR-Reflow	Before and after	Qualification parts before Test # 2, 3, 4, 5, 6, 7
2	Operating Life	Ta=25℃, I_F=700mA	1000 hrs	0/30
3	High Temperature Storage	Ta=100℃	1000 hrs	0/30
4	Low Temperature Storage	Ta=-55℃	1000 hrs	0/30
5	Temperature Humidity Storage	Ta=60℃, Rh=90%	500 hrs	0/30
6	Thermal Shock (air to air)	-40℃ ± 5℃ ~ 85 ± 5℃ 30min 30min	100 cycle	0/30
7	Temperature Cycle	-55℃~ 25℃~ 100℃~ 25℃ 30min 5min 30min 5min	100 cycle	0/30
8	Resistance to Soldering Heat	(1) Bake 125℃ / 24 hours (2) Acceleration moisture soak condition (if urgent): 60°C / 60% / 52 hours (Interval: 15mins ~ 4 hours to do IR-Reflow) (3) IR Reflow 2 times (260℃: 10 secs, Interval: 5 mins ~ 60 mins for each reflow)	Before and after	0/30
9	Solderability	Tsld=245± 5℃	Before and after	0/11

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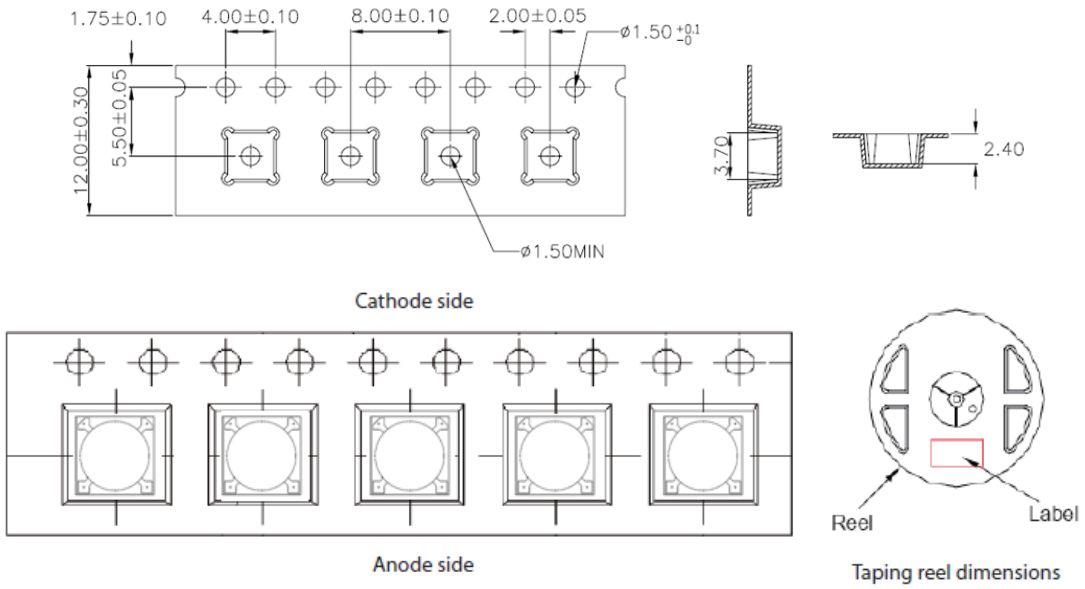
10. Package Dimensions of Tape and Reel

Reel Packaging



Note:

1. All dimensions are in millimeters.
2. Empty component pockets sealed with top cover tape.
3. Minimum package quality is 500 pieces for remainders.
4. 10 inch reel max 1k pieces.
5. The maximum number of consecutive missing is two.
6. In accordance with ANSI/EIA 481 specifications.

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11.Cautions

11.1 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 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.

11.2 Do not put any pressure on the light emitting surface either by finger or any hand tool and do not stack the COB products. Stress or pressure may cause damage to the wires of the LED array.

11.3 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, H2S, NH3, SO2, NOX, etc.), exposure to a corrosive environment may affect silver plating.

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 light up" at low currents.

To verify for ESD damage, check for "light up" and VF of the suspect LEDs at low currents.

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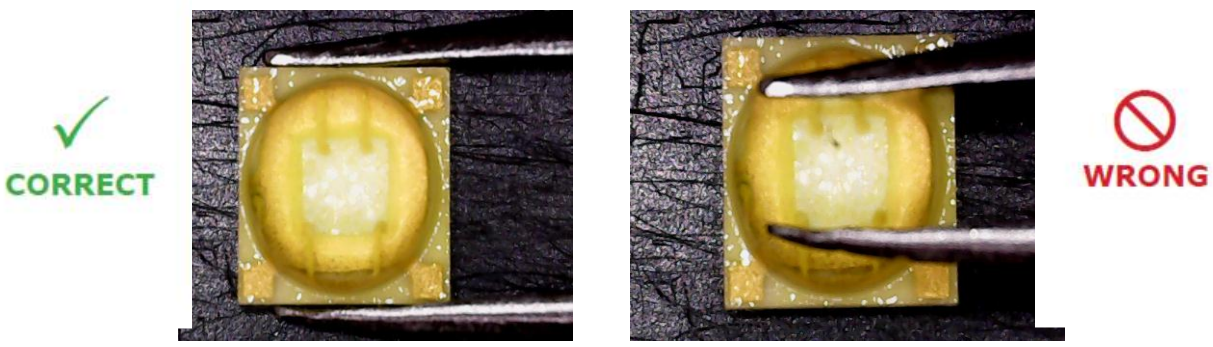
Lens Handling Remark

The LED should only be picked up by making contact with the sides of the LED body. It should not put any pressure on the lens either by finger or any hand tool. Do not puncture or push the lens. Below figure illustrate correct and incorrect handling.



The scrape on lens is acceptable but no effect about the RA test result.

Storage

- This product is qualified as Moisture sensitive Level 3 per JEDEC J-STD-020 Precaution when handing 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 storage ambient for the LEDs should not exceed 30°C temperature or 60% 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 one year should be baked at about 60 deg C for at least 20 hours before solder assembly.