



## **SMD LED**

# Product Data Sheet

LTW-7020ZTSN-A24

Spec No.: DS22-2012-0446

Effective Date: 03/05/2013

Revision: C

**LITE-ON DCC**

**RELEASE**

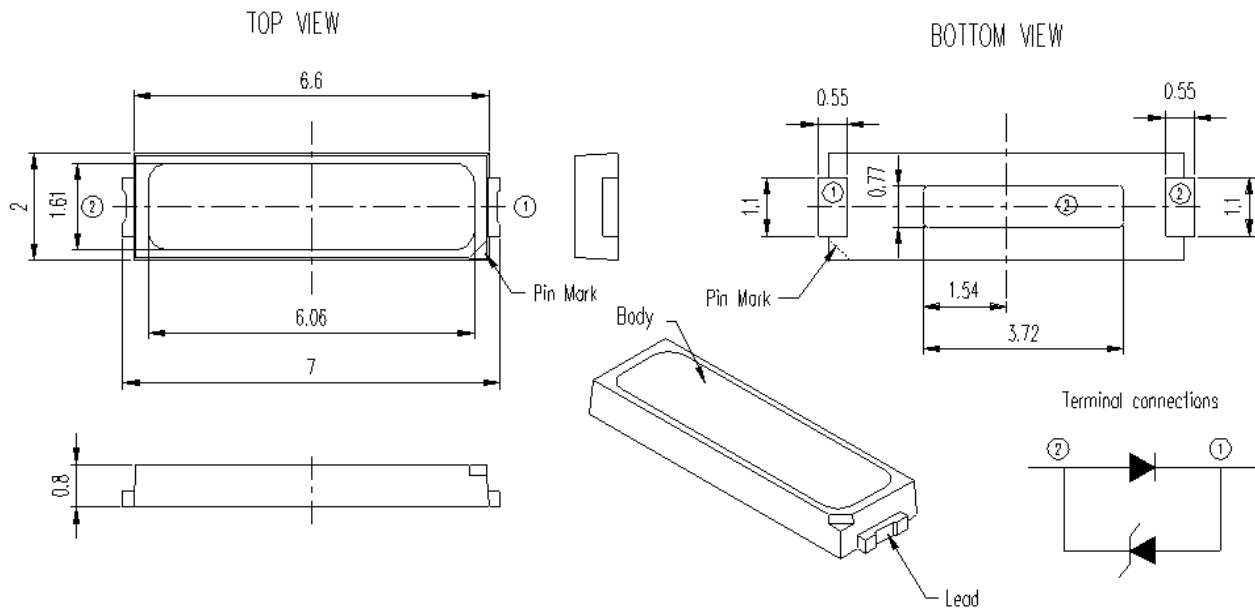
BNS-OD-FC001/A4

Property of Lite-On Only

## Features

- \* Package in 8mm tape on 7" diameter reels.
- \* Compatible with automatic placement equipment.
- \* Compatible with infrared and vapor phase reflow solder process.
- \* EIA STD package.
- \* I.C. compatible.
- \* Meet green product and Pb-free(According to RoHS)

## Package Dimensions



Part No.	Phosphor	Source Color
LTW-7020ZTSN-A24	Yellow & Red	InGaN Blue

### Notes:

1. All dimensions are in millimeters.
2. Tolerance is  $\pm 0.2$  mm (.008") unless otherwise noted.

## Property of Lite-On Only

### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Rating	Unit
Forward Current	If	150	mA
Pulse Forward Current <sup>*1</sup>	Ifp	210	mA
Power Consumption	Pd	525	mW
Operating Temp	Topr	-40~80	°C
Storage Temp	Tstg	-40~100	°C
Storage Humidity	Hstg	10~90	%RH
Junction Temp	Tj	115	°C
Reverse Voltage <sup>*2</sup>	Vr	5	V

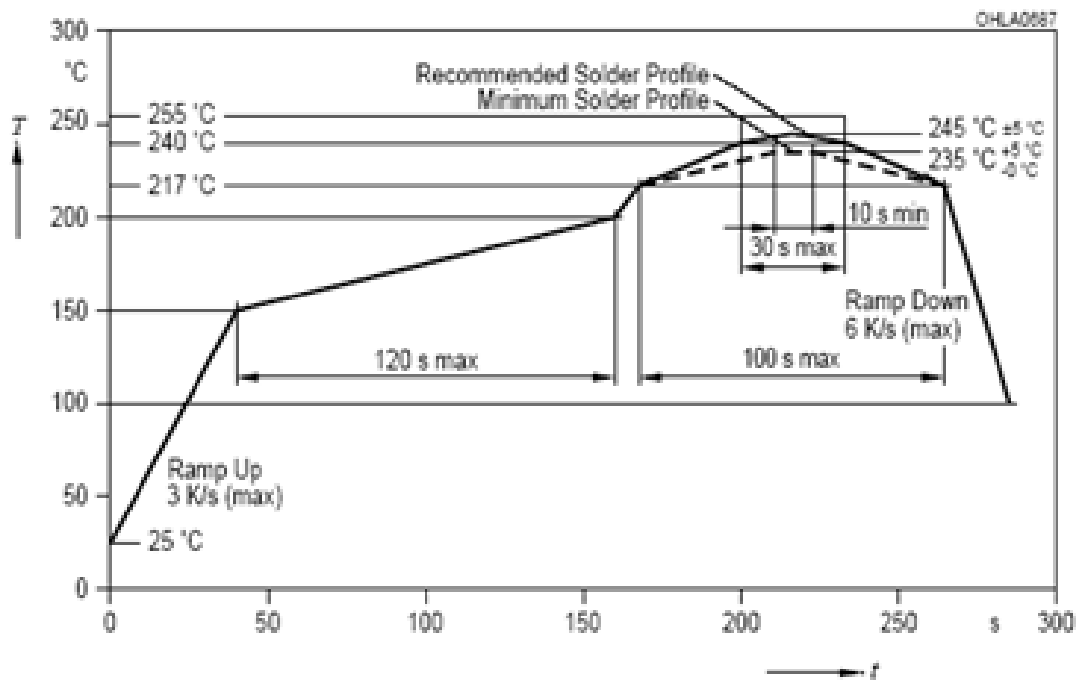
Note:

1. Pulse width =10 ms, Duty ≤ 10%
2. Operating the LED (in an application) under reverse bias condition might result in damage or failure of the component.

Suggestion IR Reflow Profile For Pb Free Process :

### IR-Reflow Soldering Profile for lead free soldering (Acc. To J-STD-020D)

The recommended Max. temperature should be lower than 245°C



## Property of Lite-On Only

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

Parameter	Symbol	Values		Test Condition	Unit
Forward Voltage of dual chips in series	$V_F$	Min.	2.9	$I_F = 120\text{mA}$	V
		Typ.	3.2		
		Max.	3.5		
Luminous Flux <sup>1</sup>	$\Phi_v$	Min.	37.0	$I_F = 120\text{mA}$	lm
		Typ.	41.0		
		Max	49.0		
Viewing Angle	$2\theta_{1/2}$	Typ.	120	$I_F = 120\text{mA}$	°
Chromaticity Coordinates	x	Typ.	0.323	$I_F = 120\text{mA}$	
	y	Typ.	0.300		
Optical Efficiency	$\eta_{opt}$	Typ.	104	$I_F = 120\text{mA}$	lm/W

#### Notes

- Luminous flux is the total luminous flux output as measured with an integrating sphere.
- Iv classification code is marked on each packing bag.
- The chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
- Caution in ESD:  
Static Electricity and surge damages the LED. It is recommended using a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.
- CAS140B is the test standard for the chromaticity coordinates (x, y) &  $\Phi_v$ .
- The chromaticity coordinates (x, y) guarantee should be added +/- 0.007 tolerance

## Property of Lite-On Only

### Bin Code List

$V_F$ Spec. Table		
$V_F$ Bin	Forward Voltage (volts) at $I_F = 120\text{mA}$	
	Min.	Max.
V0	2.9	3.1
V1	3.1	3.3
V2	3.3	3.5

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

$\Phi_v$ Luminous Flux Spec. Table		
$\Phi_v$ Bin	$\Phi_v$ (lm) at $I_F = 120\text{mA}$	
	Min.	Max.
R2	37	40
R3	40	43
R4	43	46
R5	46	49

Tolerance on each Luminous Flux bin is +/- 7.5%

$W_p$ Spec table		
$W_p$ Bin	Peak Wavelength (nm) at $I_F = 120\text{mA}$	
	Min.	Max.
P1	438.0	446.5
P2	446.5	454.0

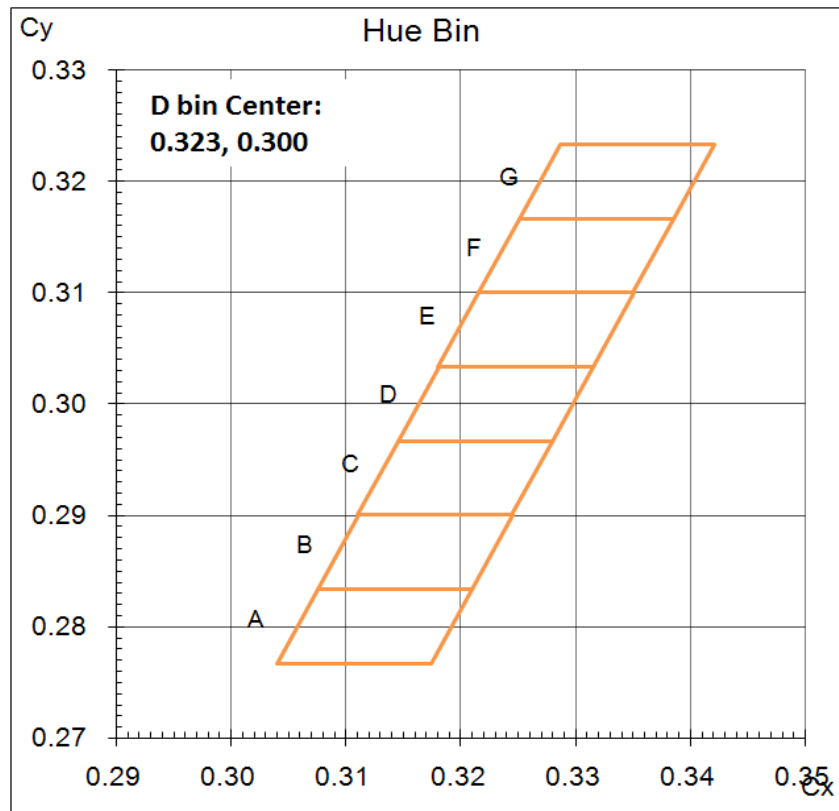
Tolerance on each Peak Wavelength bin is +/- 1nm

## Property of Lite-On Only

### Hue Bin

Hue Bin	Color bin limits at $I_F = 120\text{mA}$				
	CIE 1931 Chromaticity coordinates				
A	x	0.3040	0.3175	0.3210	0.3075
	y	0.2767	0.2767	0.2833	0.2833
B	x	0.3075	0.3210	0.3245	0.3110
	y	0.2833	0.2833	0.2900	0.2900
C	x	0.3110	0.3245	0.3280	0.3145
	y	0.2900	0.2900	0.2967	0.2967
D	x	0.3145	0.3280	0.3315	0.3180
	y	0.2967	0.2967	0.3033	0.3033
E	x	0.3180	0.3315	0.3350	0.3215
	y	0.3033	0.3033	0.3100	0.3100
F	x	0.3215	0.3350	0.3385	0.3250
	y	0.3100	0.3100	0.3167	0.3167
G	x	0.3250	0.3385	0.3420	0.3285
	y	0.3167	0.3167	0.3233	0.3233

Tolerance on each Hue (x, y) bin is +/- 0.007



## Property of Lite-On Only

### Typical Electrical / Optical Characteristics Curves (25°C Ambient Temperature Unless Otherwise Noted)

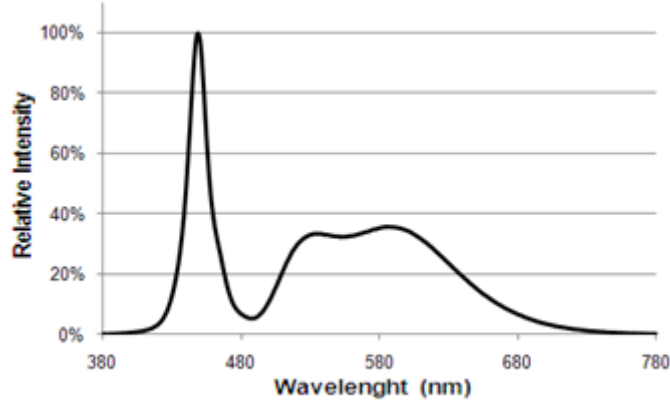


Fig.1 Relative Intensity vs Wavelength

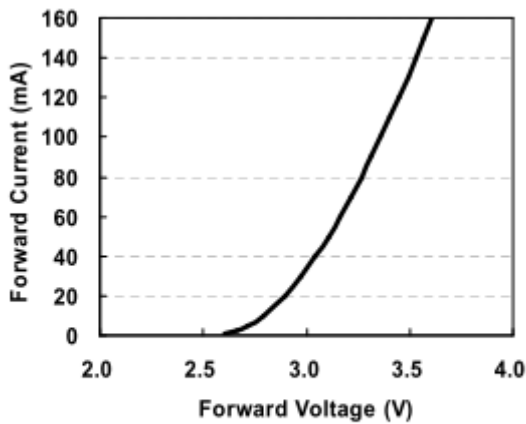


Fig.2 Forward Current vs. Forward Voltage

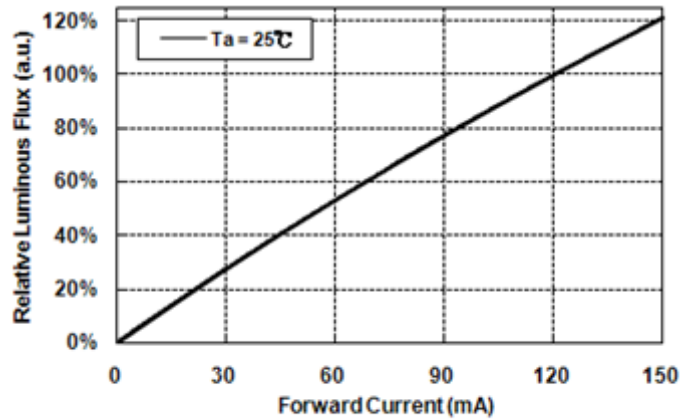


Fig. 3 Relative Luminous Intensity vs. Forward Current

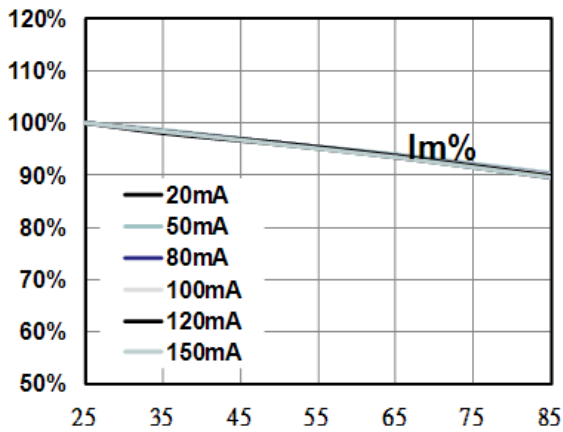


Fig. 4 Thermal quench (v.s Ta(°C))

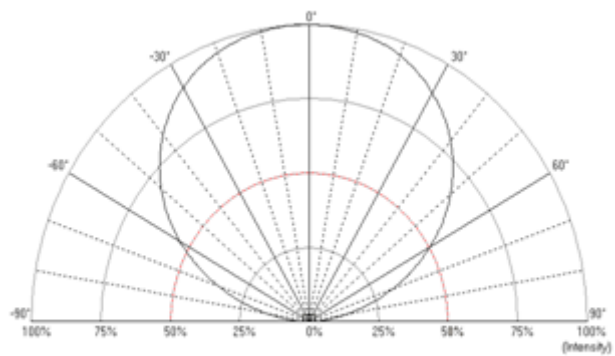


Fig.5 Spatial Distribution

## Property of Lite-On Only

### User Guide

#### Cleaning

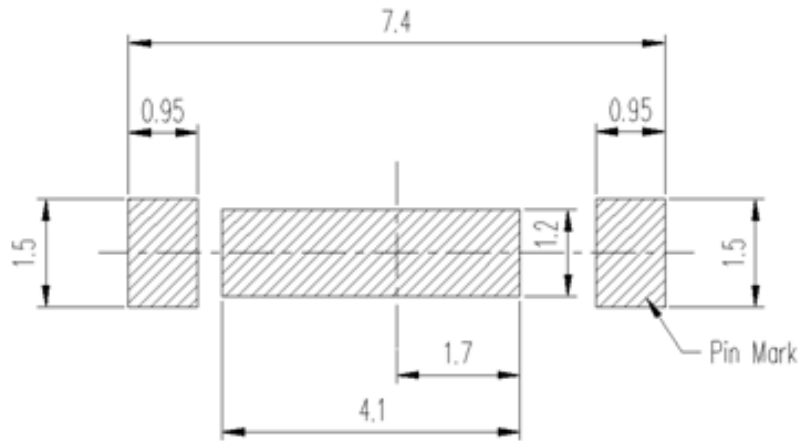
Do not use unspecified chemical liquid to clean LED they could harm the package.

If cleaning is necessary, immerse the LED in ethyl alcohol or isopropyl alcohol at normal temperature for less than one minute.

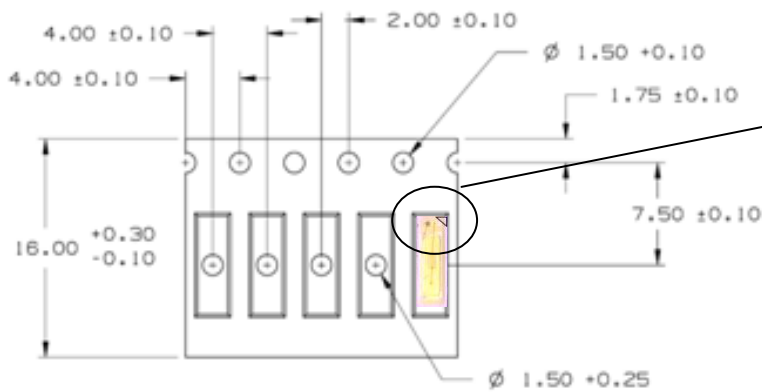
#### Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

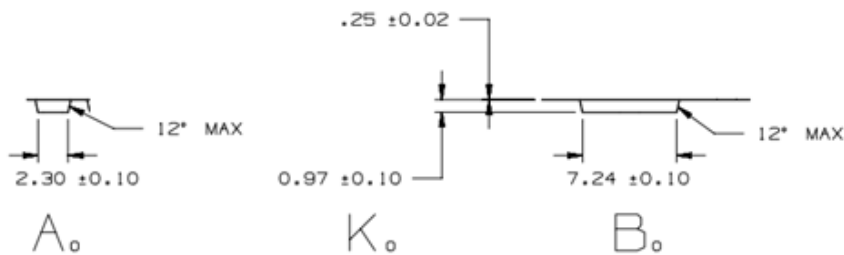
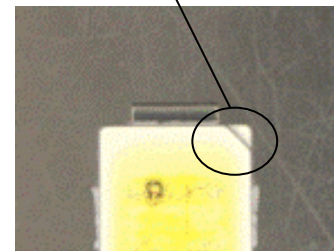
Reflow Soldering



#### Package Dimensions of Tape



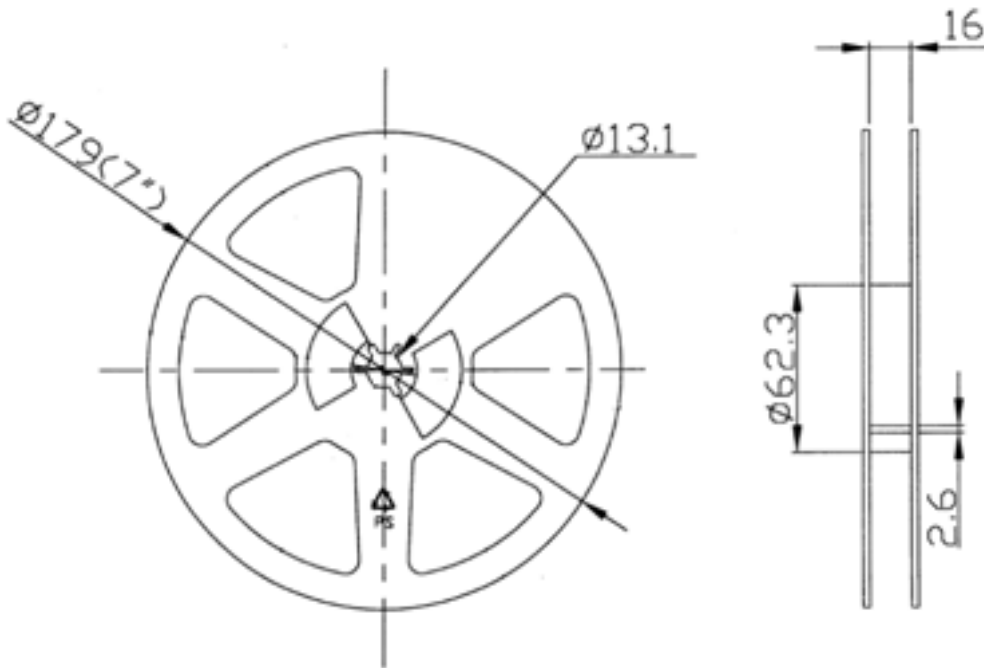
The direction of pin mark is toward the carrier sprocket hole



Note:

1. All dimensions are in millimeters (inches).



**Package Dimensions of Reel**

## Notes:

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel- maximum 3000 pieces per reel.
3. Minimum packing quantity is 500 pieces for remainders.
4. The maximum number of consecutive missing lamps is two.
5. In accordance with EIA-481-1-B specifications.

## CAUTIONS

### 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).

### 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 the Humidity Indicator shows the pink color in 10% even higher or exceed the storage limiting time since opened, that we recommended to baking LEDs at 60°C at least 48hrs. To seal the remainder LEDs return to package, it's recommended to be with workable desiccants in original package.

### 3. Cleaning

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

### 4. Soldering

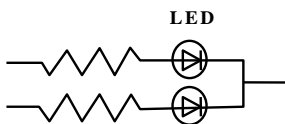
Recommended soldering conditions:

Reflow soldering		Wave Soldering		Soldering iron	
Pre-heat	120~150°C	Pre-heat	100°C Max.	Temperature	300°C Max.
Pre-heat time	120 sec. Max.	Pre-heat time	60 sec. Max.	Soldering time	3 sec. Max.
Soldering Temp.	260°C Max.	Solder wave	260°C Max.		(one time only)
Soldering time	30 sec. Max.	Soldering time	10 sec. Max.		

### 5. Drive Method

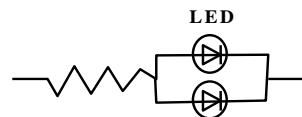
An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

**Circuit model A**



(A) Recommended circuit.

**Circuit model B**



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

### 6. ESD (Electrostatic Discharge)

Static Electricity or power surge will damage the LED.

Suggestions to prevent ESD damage:

## Property of Lite-On Only

- 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.

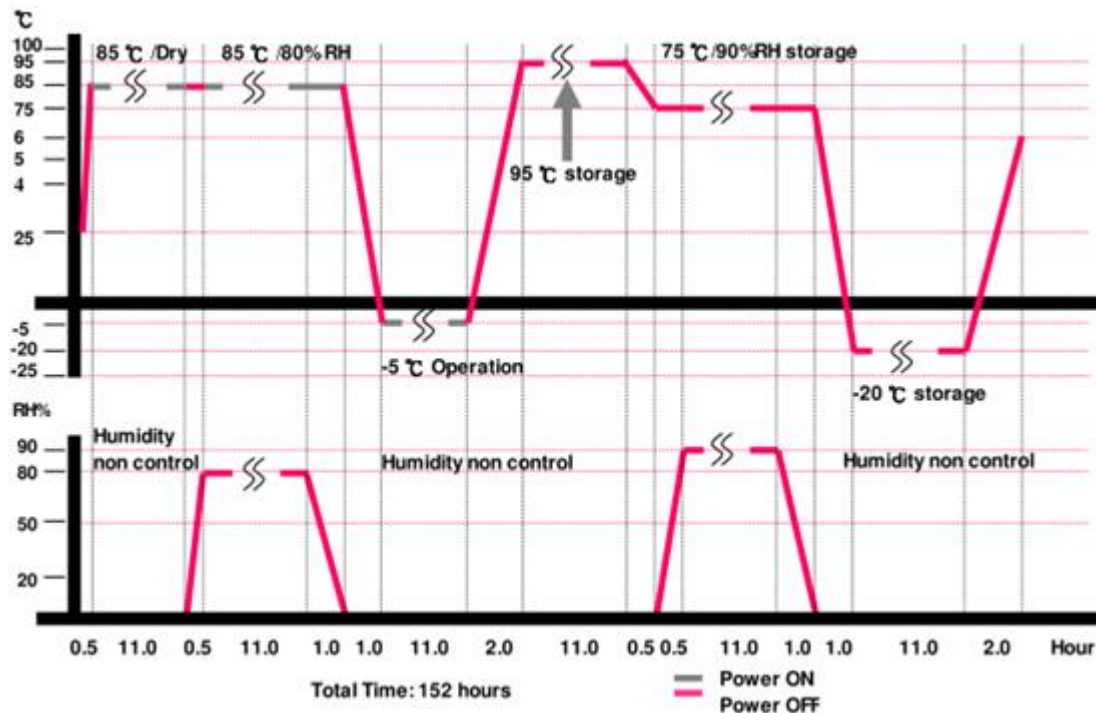
The Vf of “good” LEDs should be >2.0V@0.1mA for InGaN product and >1.4V@0.1mA for AlInGaP product.

### 7. Reliability Test

No	Items <sup>[1]</sup>	Temperature	Humidity	Other condition <sup>[3]</sup> (Sampling 30 pcs)	Hrs	Times	Applicable standard	Criteria for judgment	
		(°C)	(%)					LED brightness @ I <sub>F</sub> <sup>[4]</sup>	V <sub>f</sub> <sup>[4]</sup>
1	Temperature humidity storage	85	85	-----	1000		JEITA ED-4701 100 103	>70%	<110%
2	Steady State Operating Life of High Temperature	85	-----	I <sub>F</sub>	1000		JESD22-A108	>70%	<110%
3	Steady State Operating Life of High Humidity Heat	60	90	I <sub>F</sub>	1000		JEITA ED-4701 100 102	>70%	<110%
4	Steady State Operating Life of Low Temperature	-30	-----	I <sub>F</sub>	1000		JESD22-A108	>70%	<110%
5	On/Off testing	60	Room Humidity	I <sub>F</sub> 10secON /10secOFF 35000 circular Continue	195		AUO Standard	>70%	<110%
6	Thermal Shock <sup>[2]</sup>	-----	-----	-40°C ~ 100°C 20 min. 20sec 20 min		200 cycles	JESD22-A106	>70%	<110%
7	Thermal Cycle	[5]	[5]	[5]	152 hours / 2cycles	1	AUO Standard	>70%	<110%
8	Resistance to Soldering Heat (Reflow Soldering)	-----	-----	(Pre- store @ 25°C, 60±5% RH for 168hrs) TSlid = 245°C, 10sec.		1	JESD22-A113	< ±5%	< ±5%
9	Vibration	Room Temp	Room Humidity	Random, 6 Grms, 10~500Hz, for 30 mins changeable vibration per circular X,Y,Z 3 directions	30 mins / time	1	JESD22-B103	Go or not Go	
10	Life time <sup>[9]</sup>	60	60	I <sub>F</sub>	[6]		JEITA ED-4701 100 102	Life spec.	<110%

## Property of Lite-On Only

- [1] The items may be modified for different application. All relative test report should have responded to product or component engineers request.
- [2] Besides brightness performance, red ink test(immerse LEDs in red ink(aq.) @ 25°C for 24hrs) should be performed after optical measurement & 1 to 1 photo should be provided in RA report without peeling.  
※ Refer to reliability test standard specification.
- [3] The test samples should be mounted on RA board. And the materials and design graph of RA board should be offered by vendor.
- [4] The electrical characteristics ( $I_F, V_F$ ) are based on LED type.
- [5] The thermal profile is shown below.
- [6] The raw data should be offered at testing time 1000hrs, 2000hrs, 3000hrs. After 3000hrs testing time, the DRSPC3 should judge continues test or not. The 3000 to 6000 hours test time are expected.



### Estimated Life time:

	Condition	Time	Unit
Life time	If: Typ +- 10%. $T_j < 85^\circ$	30000	hrs

\* Life time means  $L_{50B_{10}}$

**8. Others**

The appearance and specifications of the product may be modified for improvement without prior notice.

**9. 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 &amp; 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.

## 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?