



## **SMD LED**

# Product Data Sheet

## LTSA-T680ZHET

Spec No.: DS35-2016-0037

Effective Date: 06/29/2016

Revision: A

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

# SMD LED LTSA-T680ZHET

## 1. Description

SMD LEDs from Lite-On are available in miniature sizes and special configurations for automated PC board assembly and space-sensitive applications. These SMD LEDs are suitable for use a wide variety of electronic equipment, e.g.: cordless and cellular phones, notebook computers and network systems etc...

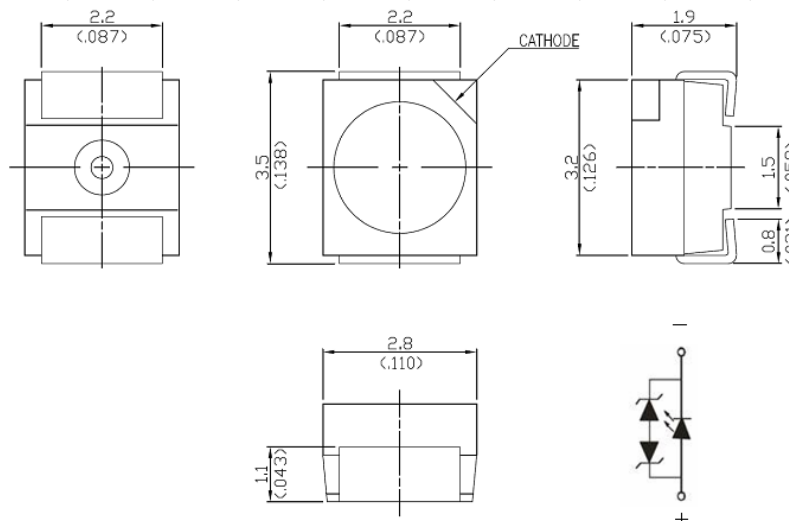
### 1.1 Features

- Meet ROHS
- Ice Blue PLCC2 LED
- Package in 8mm tape on 7" diameter reels
- Preconditioning: accelerate to JEDEC level 3
- EIA STD package
- I.C. compatible
- Compatible with automatic placement equipment
- Compatible with infrared reflow solder process

### 1.2 Applications

- Aftermarket : accessory application

## 2. Package Dimensions



Part No.	Lens Color	Source / Color
LTSA-T680ZHET	YellowGreen	InGaN / Ice Blue

### Notes:

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

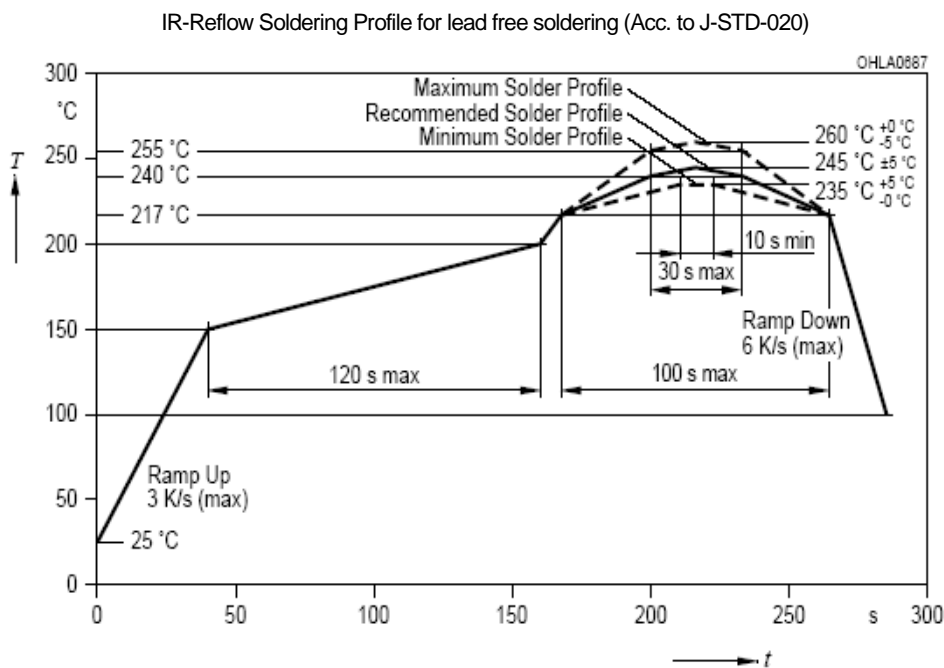
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**3. Rating and Characteristics**

**3.1 Absolute Maximum Ratings at Ta=25°C**

Parameter	LTSA-T680ZHET	Unit
Power Dissipation	102	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
DC Forward Current	30	mA
Operating Temperature Range	-40°C to +100°C	
Storage Temperature Range	-40°C to + 100°C	

**3.2 Suggest IR Reflow Condition for Pb Free Process:**



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### 3.3 Electrical / Optical Characteristics at Ta=25°C

Parameter	Symbol	Part No. LTSA-	Min.	Typ.	Max.	Unit.	Test Condition
Luminous Intensity	IV	T680ZHET	450	-	1120	mcd	IF = 10mA Note 1
Viewing Angle	2θ <sub>1/2</sub>	T680ZHET		120		deg	Note 2 (Fig.5)
Chromaticity Coordinates	x	T680ZHET		0.190		-	IF = 10mA Note 3
	y	T680ZHET		0.276			
Forward Voltage	VF	T680ZHET	2.6	-	3.4	V	IF = 10mA
Reverse Current	IR	T680ZHET	-	-	10	μA	VR =5V Note 4
ESD-Withstand Voltage	ESD	T680ZHET	2K			V	HBM

#### Notes:

1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve
2. θ<sub>1/2</sub> is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The chromaticity coordinates (x , y) is derived from the 1931 CIE chromaticity diagram
4. Reverse Voltage (VR) condition is applied to IR test only. The device is not designed for reverse operation.

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**4. Bin Rank**

Batch Description on Label: Vf / Iv / Color ( Ex. H/V2/3J )

**4.1 VF Rank**

Forward Voltage		Unit : V@10mA	
Bin Code	Min.	Max.	
G	2.6	2.8	
H	2.8	3.0	
J	3.0	3.2	
K	3.2	3.4	

Tolerance on each Voltage bin is +/-0.1V

**4.2 IV Rank**

Luminous Intensity		Unit : mcd @10mA	
Bin Code	Min.	Max.	
U1	450	560	
U2	560	710	
V1	710	900	
V2	900	1120	

Tolerance on each Intensity bin is +/-11%

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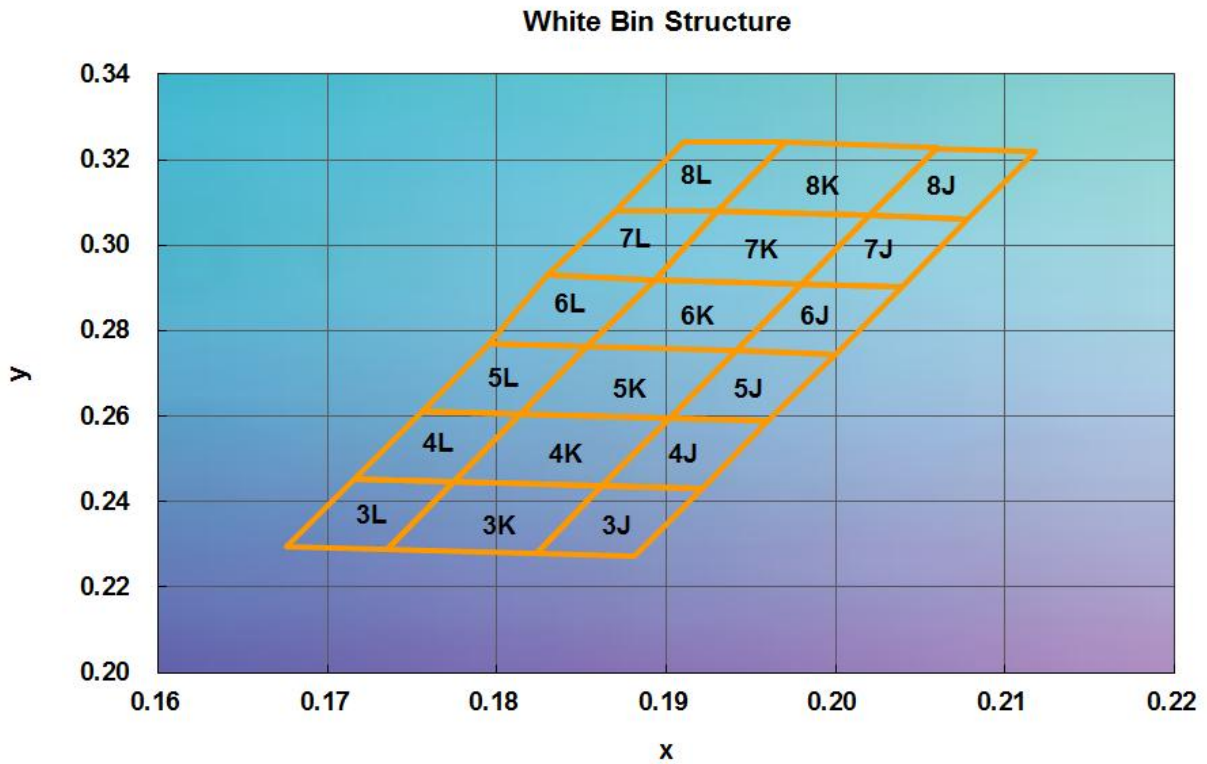
4.3 Color Rank

Color Bin Table						Test @10mA					
Bin Code	Color Bin Limits					Bin Code	Color Bin Limits				
	CIE-	Point1	Point2	Point3	Point4		CIE-	Point1	Point2	Point3	Point4
3J	x	0.1862	0.1823	0.1881	0.1921	6J	x	0.1980	0.1941	0.2000	0.2039
	y	0.2437	0.2280	0.2273	0.2431		y	0.2910	0.2753	0.2746	0.2904
3K	x	0.1774	0.1735	0.1823	0.1862	6K	x	0.1893	0.1853	0.1941	0.198
	y	0.2447	0.2289	0.2280	0.2437		y	0.2920	0.2762	0.2753	0.2910
3L	x	0.1716	0.1676	0.1735	0.1774	6L	x	0.1830	0.1795	0.1853	0.1893
	y	0.2454	0.2296	0.2289	0.2447		y	0.2930	0.2769	0.2762	0.2920
4J	x	0.1902	0.1862	0.1921	0.1960	7J	x	0.2020	0.1980	0.2039	0.2078
	y	0.2595	0.2437	0.2431	0.2588		y	0.3070	0.2910	0.2904	0.3060
4K	x	0.1814	0.1774	0.1862	0.1902	7K	x	0.1930	0.1893	0.1980	0.2020
	y	0.2605	0.2447	0.2437	0.2595		y	0.3080	0.2920	0.2910	0.3070
4L	x	0.1756	0.1716	0.1774	0.1814	7L	x	0.1870	0.1830	0.1893	0.1930
	y	0.2611	0.2454	0.2447	0.2605		y	0.3080	0.2930	0.2920	0.3080
5J	x	0.1941	0.1902	0.1960	0.2000	8J	x	0.2059	0.2020	0.2078	0.2118
	y	0.2753	0.2595	0.2588	0.2746		y	0.3225	0.3070	0.3060	0.3219
5K	x	0.1853	0.1814	0.1902	0.1941	8K	x	0.1970	0.1930	0.2020	0.2060
	y	0.2762	0.2605	0.2595	0.2753		y	0.3240	0.3080	0.3070	0.3230
5L	x	0.1795	0.1756	0.1814	0.1853	8L	x	0.1910	0.1870	0.1930	0.1970
	y	0.2769	0.2611	0.2605	0.2762		y	0.3240	0.3080	0.3080	0.3240

Tolerance on each Hue bin (x, y) bin is +/- 0.01.

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4.4 Chromaticity Coordinate



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**5. Typical Electrical / Optical Characteristics Curves.**

(25°C Ambient Temperature Unless Otherwise Noted)

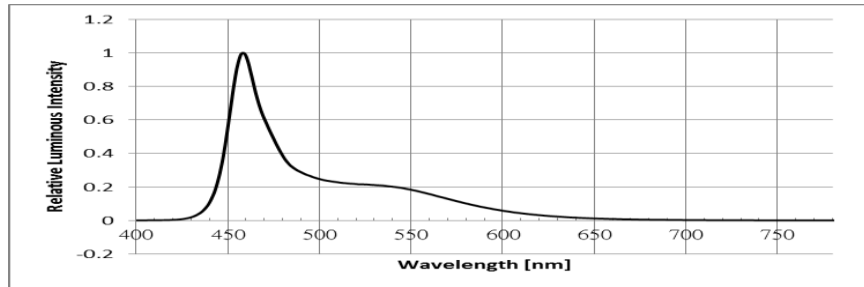


Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

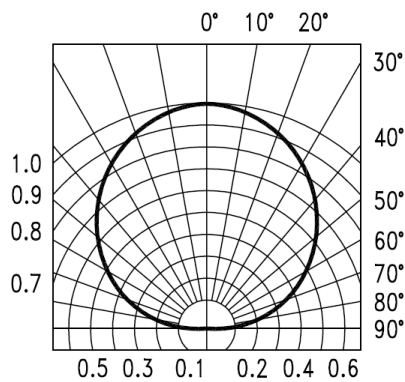


Fig. 2 SPATIAL DISTRIBUTION

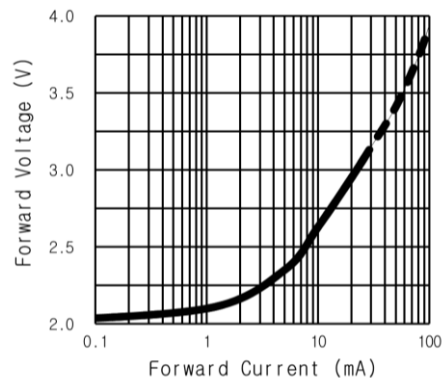


Fig. 3 FORWARD VOLTAGE V.S. FORWARD CURRENT

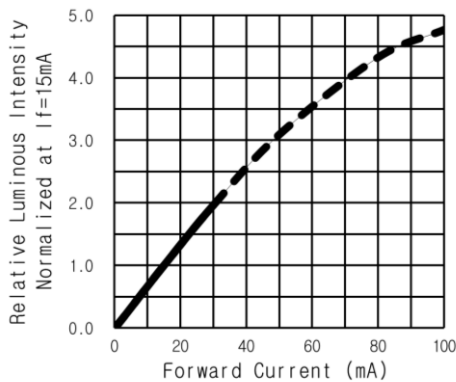


Fig. 4 RELATIVE LUMINOUS INTENSITY V.S. FORWARD CURRENT

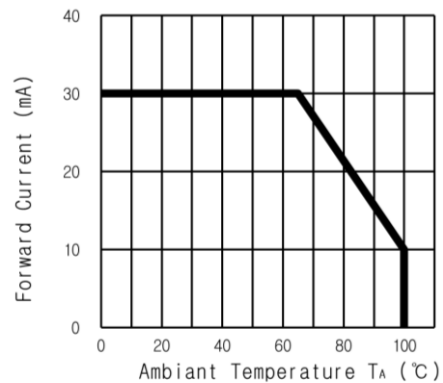


Fig.5 FORWARD CURRENT DERATING CURVE



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## 6. User Guide

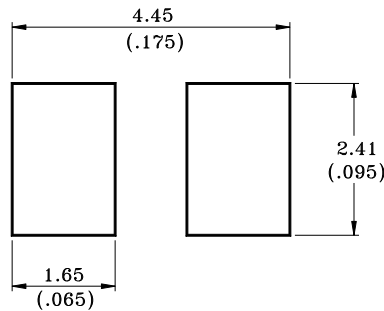
### 6.1 Cleaning

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 one minute.

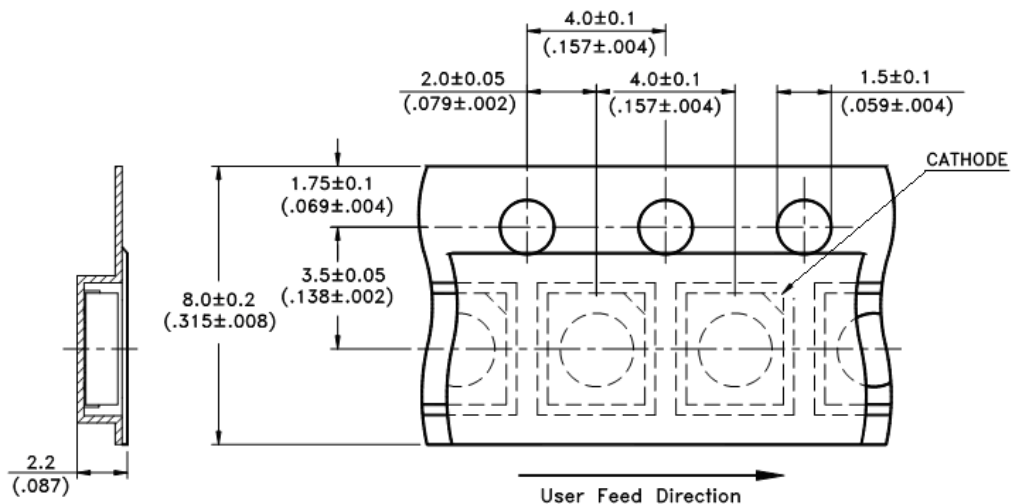
### 6.2 Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

Reflow Soldering



### 6.3 Package Dimensions of Tape & Reel

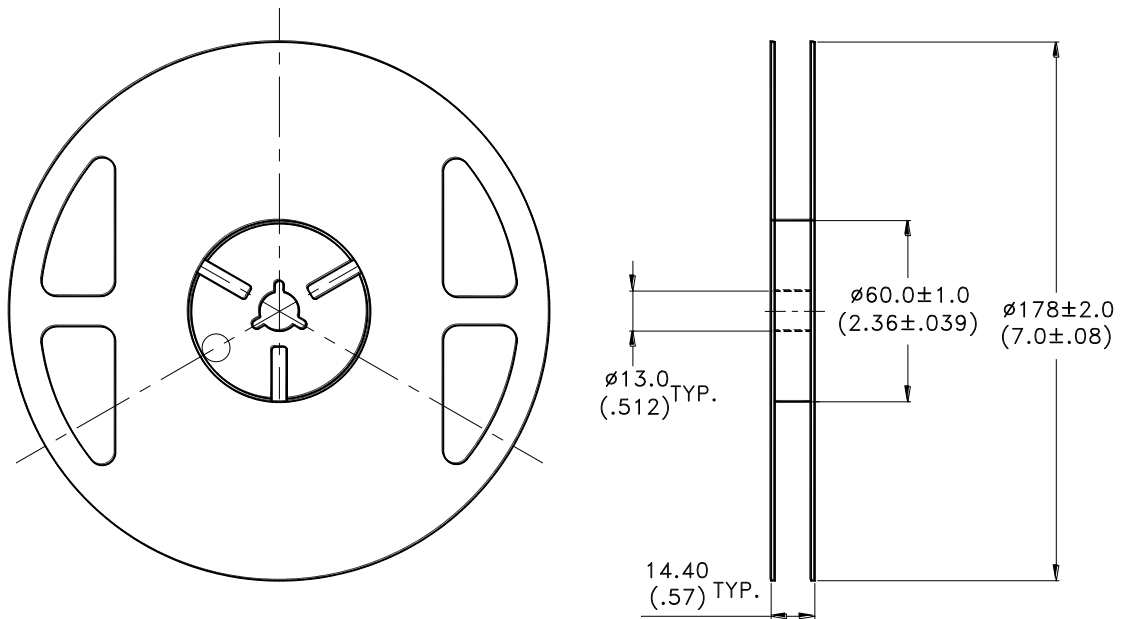


**Note:**

1. All dimensions are in millimeters (inches).

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6.4 Package Dimensions of Reel



**Notes:**

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel 2000 pieces per reel.
3. The maximum number of consecutive missing lamps is two.
4. In accordance with ANSI/EIA 481 specifications.

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**7. Cautions**

**7.1 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).

**7.2 Storage**

The package is sealed:

The LEDs should be stored at 30°C or less and 60%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 and 60% relative humidity.

It is recommended that LEDs out of their original packaging are IR-reflowed within 168 hours.

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 168 hours should be baked at about 60 °C for at least 48 hours before solder assembly.

**7.3 Cleaning**

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

**7.4 Soldering**

Recommended soldering conditions:

Reflow soldering		Soldering iron	
Pre-heat	150~200°C	Temperature	300°C Max.
Pre-heat time	120 sec. Max.	Soldering time	3 sec. Max.
Peak temperature	260°C Max.		(one time only)
Soldering time	10 sec. Max.(Max. two times)		

**Notes:**

Because different board designs use different number and types of devices, solder pastes, reflow ovens, and circuit boards, no single temperature profile works for all possible combinations.

However, you can successfully mount your packages to the PCB by following the proper guidelines and PCB-specific characterization.

LITE-ON Runs both component-level verification using in-house **KYRAMX98** reflow chambers and board-level assembly. The results of this testing are verified through post-reflow reliability testing. Profiles used at LITE-ON are based on JEDEC standards to ensure that all packages can be successfully and reliably surface mounted.

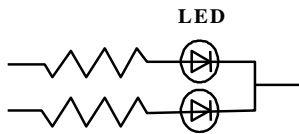
Figure on page3 shows a sample temperature profile compliant to JEDEC standards. You can use this example as a generic target to set up your reflow process. You should adhere to the JEDEC profile limits as well as specifications and recommendations from the solder paste manufacturer to avoid damaging the device and create a reliable solder joint.

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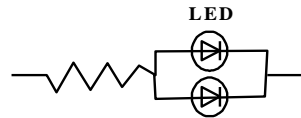
### 7.5 Drive Method

A 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.

### 7.6 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 and  $>1.4V@0.1mA$  for AlInGaP product.

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**8. Reliability Test**

No.	Test item	Test condition	Sample size	Reference standard
1	Pre-conditioning	MSL 3 125°C, 24 hrs baking Moisture Soak 60°C/60% 52 hrs Interval: 15mins ~ 4 hours to do IR-Reflow	240	JESD22 A-113
2	High Temperature Operating Life I	IF=30mA, Ta=65°C., 1000 hrs	30	EIAJ ED-4701/100 (101)
3	High Temperature Operating Life II	Ta=100 °C., IF=10mA, 1000 hrs	30	EIAJ ED-4701/100 (101)
4	Low Temperature Operating Life	Ta=-40 °C., IF=30mA, 1000 hrs	30	EIAJ ED-4701/100 (101)
5	High Temperature Storage	Ta=100 °C., 1000 hrs	30	EIAJ ED-4701/200 (201)
6	Low Temperature Storage	Ta= -40 °C., 1000 hrs	30	EIAJ ED-4701/200 (202)
7	High Temperature High Humidity Bias (HTHHB)	Ta=60°C, Rh=90%, IF=30mA, 1000 hrs	30	EIAJ ED-4701/100 (102)
8	Thermal Shock (air to air)	-40°C ± 5°C ~ 100 ± 5°C 30min 30min 300cycles	30	EIAJ ED-4701/300 (307)
9	Temperature Cycle	-40°C ~ 25°C ~ 100°C ~ 25°C 30min 5min 30min 5min 300cycles	30	EIAJ ED-4701/100 (105)
10	Resistance to Soldering Heat	Level 3 (1) Bake 125°C / 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 3 times (260°C: 10 secs, Interval: 5 mins ~ 60 mins for each reflow)	30	EIAJ ED-4701/300 (301 & 302)

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### 9. Others

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

### 10. 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 wears 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 InGaN 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 recycles?

#### 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?