LITEON®
OPTOELECTRONICS

SMD LED

Product Data Sheet

LTSA-S008EGBWU

Spec No. :
Created Date: 2017/10/16
Revision: (PRELIMINARY) - 3.0

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SMD LED
LTSA-S008EGBWU(PRELIMINARY)

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Rev	Description	By	Date
1	New datasheet	Ryan Chen	01/14/2017
2	1. Modify RGB location on P2 2. Modify RGB IV and B Wd on P4&5	Ryan Chen	09/25/2017
3	1. Modify B IV on P4&5	Ryan Chen	10/16/2017
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 LTW (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

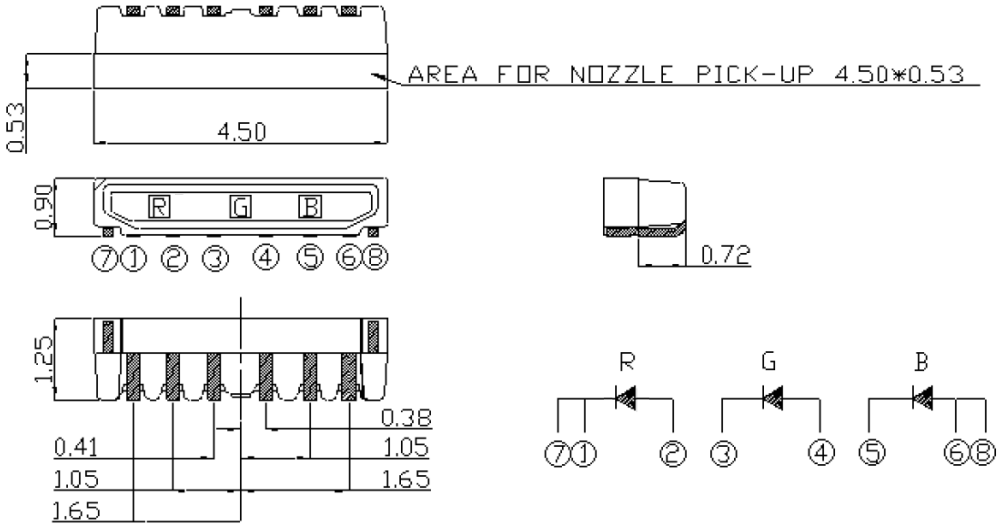
- Meet ROHS
- Package in 12mm tape on 7" diameter reels
- Preconditioning: accelerate to JEDEC level 2a
- Qualification is based on AEC-Q101 Ver. D
- EIA STD package
- I.C. compatible
- Compatible with automatic placement equipment
- Compatible with infrared reflow solder process

1.2 Applications

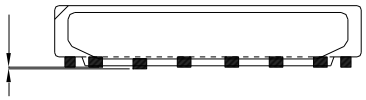
- Automotive: accessory applications

2. Package Dimensions

2.1 Form Factor of 008RGB



2.2 Coplanarity



LSL: 0.00 mm (Lead is higher)

USL: 0.08 mm (PPA is higher)

Notes:

1. All dimensions are in millimeters.
2. Tolerance is ±0.1 mm (.004") unless otherwise noted.
3. Coplanarity: The stand-off from PPA to solder surface of leads is limited by USL: 0.08mm; LSL: 0.00mm means the solder surface of leads is higher 0.00mm or lower 0.08mm than PPA in limit.
4. The size of burr which is vertical to solder surface must lower than 0.08mm in limit.

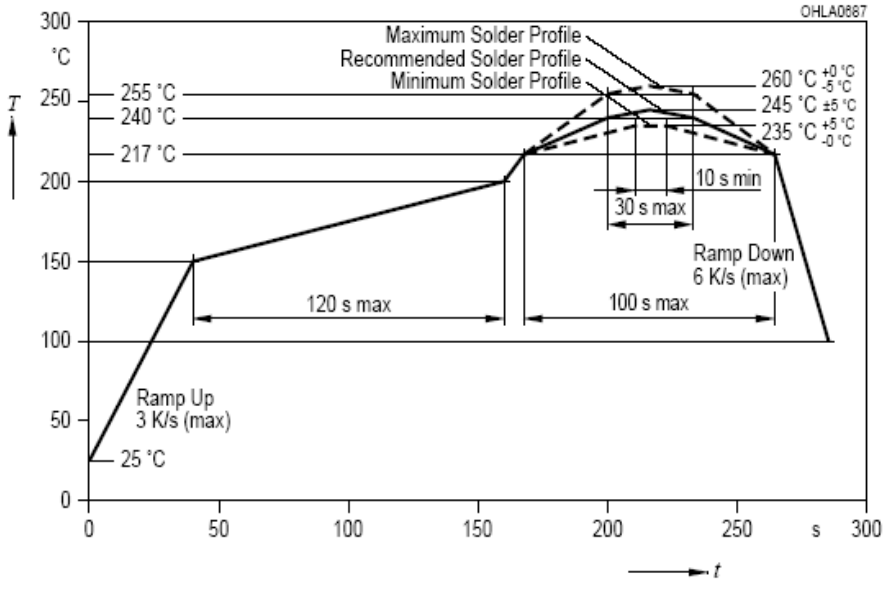
3. Rating and Characteristics

3.1 Absolute Maximum Ratings at Ta=25°C

Parameter	LTSA-S008EGBWU			Unit
	Red	Green	Blue	
Power Dissipation	72	80	80	mW
Peak Forward Current (tp=10μs, D=0.05)	100	100	100	mA
DC Forward Current	30	25	25	mA
Operating Temperature Range	-40°C to +100°C			
Storage Temperature Range	-40°C to + 100°C			
Maximum Junction Temperature (Tj)	125°C			

3.2 Suggest IR Reflow Condition for Pb Free Process:

IR-Reflow Soldering Profile for lead free soldering (Acc. to J-STD-020B)



SMD LED
LTSA-S008EGBWU(PRELIMINARY)

3.3 Electro-Optical Characteristics at Ta=25°C

Parameter	Symbol	LTSA-S008EGBWU				Test Condition	Unit
			R	G	B		
Luminous Flux [1]	Φ_v	Min	1.47 (240mcd)	4.60 (1700mcd)	0.40 (150mcd)	I_F = 20mA Note1	lm (mcd)
		Typ.	1.65 (640mcd)	6.35 (2240mcd)	0.60 (220mcd)		
		Max.	2.50 (960mcd)	9.20 (3200mcd)	1.40 (500mcd)		
Viewing Angle	$2\theta_{1/2}$	Typ.	130			I_F = 20mA Note2	°
Dominant Wavelength	λ_d	Min	618	520	450	I_F = 20mA	nm
		Typ.					
		Max.	630	535	465		
Forward Voltage [3]	V_F	Min	1.7	2.6	2.6	I_F = 20mA Note3	V
		Typ.	2.0	3.0	3.0		
		Max.	2.5	3.4	3.4		
Spectrum Radiation Bandwidth	$\Delta\lambda$	Typ.	20	35	25	I_F = 20mA	nm
Reverse Current	I_R	Max.	10			V_R=5V Note 4	μA

Notes:

1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve
2. θ1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The dominant wavelength, λd is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device. Dominate Wavelength Tolerance is +/- 1nm.
4. Forward Voltage Tolerance is +/- 0.1 volt.
5. Reverse voltage (VR) condition is applied to IR test only. The device is not designed for reverse operation

4. Bin Rank

Batch Description on Label: Red Iv Green Iv Blue Iv/ Red Wd Green Wd Blue Wd (Ex. FIA/R5G7B1)

4.1 IV Rank

Luminous Intensity Color :Red , Unit : Im @20mA		
Bin Code	Min.	Max.
F	1.40 (500mcd)	1.90 (720mcd)
G	1.90 (720mcd)	2.50 (960mcd)
Luminous Intensity Color :Green , Unit : Im @20mA		
I	4.60 (1700mcd)	7.20 (2500mcd)
H	7.20 (2500mcd)	9.20 (3200mcd)
Luminous Intensity Color :Blue , Unit : Im @20mA		
A	0.40 (150mcd)	1.00 (390mcd)
B	1.00 (390mcd)	1.40 (500mcd)

Tolerance on each Intensity bin is +/-11%

4.2 Color Rank

Dominant Wavelength Color : Red , Unit : nm @20mA		
Bin Code	Bin Code	Bin Code
R5	618.0	630.0
Dominant Wavelength Color : Green , Unit : nm @20mA		
G6	520.0	525.0
G7	525.0	530.0
G8	530.0	535.0
Dominant Wavelengt Color : Blue , Unit : nm @20mA		
B1	450.0	455.0
B2	455.0	460.0
B3	460.0	465.0

Tolerance on each Wavelength bin is +/-1 nm

5. Typical Electrical / Optical Characteristics Curves.

(25°C Ambient Temperature Unless Otherwise Noted)

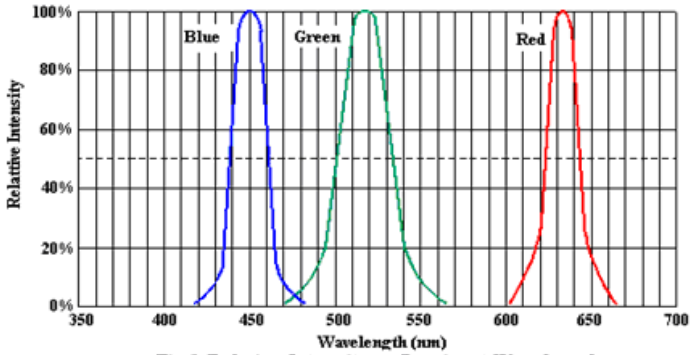
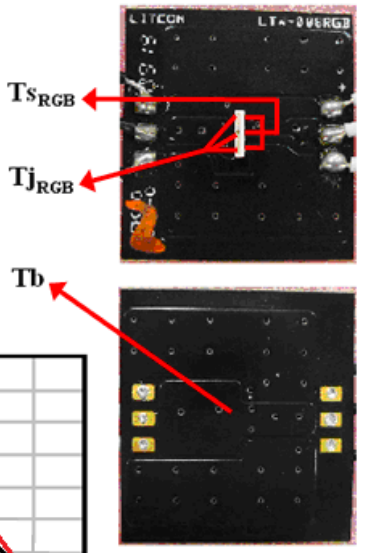


Fig.1 Relative Intensity vs Dominant Wavelength



Ts: Soldering Pin Temperature

Tj: Junction Temperature

Tb: Board Temperature

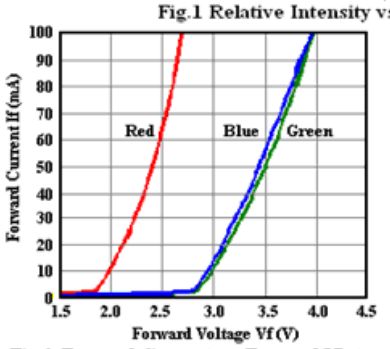


Fig.2 Forward Current vs Forward Vlotage

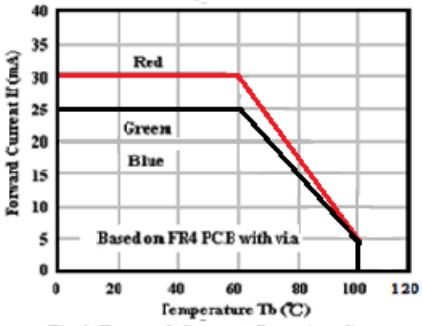


Fig.3 Forward Current Derating Curve

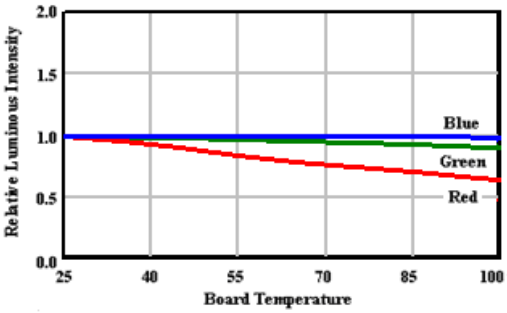


Fig.5 Luminous Intensity vs Board Temperature

(The characteristic curve are the same as R, G and B chip lighting up simultaneously)

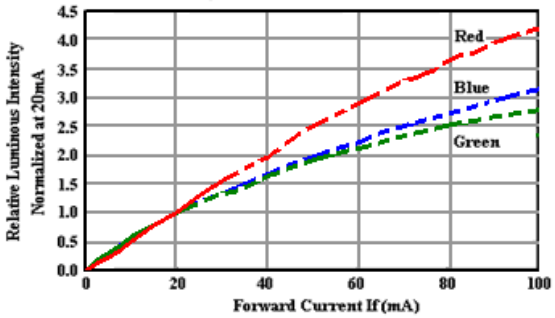


Fig.4 Relative Luminous Intensity vs Forward Current

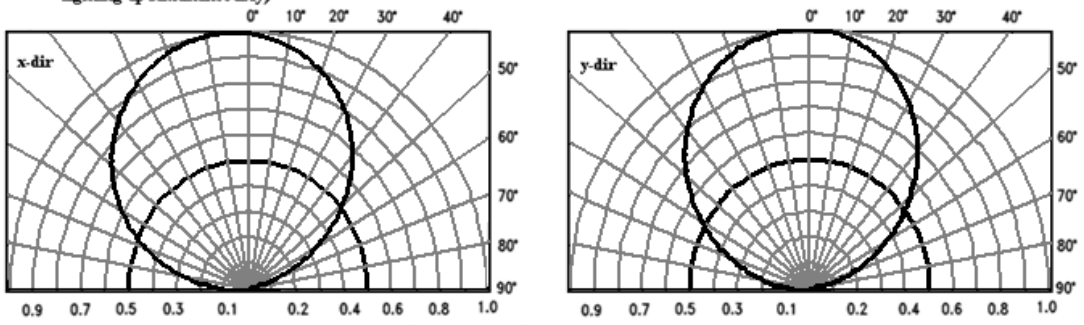


Fig.6 Spatial Distribution

6. User Guide

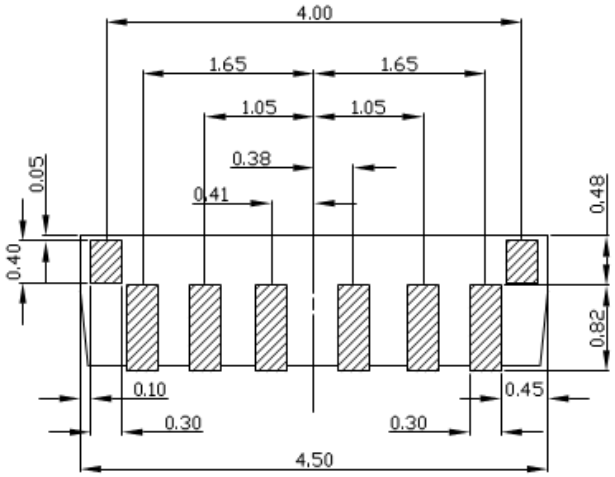
6.1 Cleaning

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.

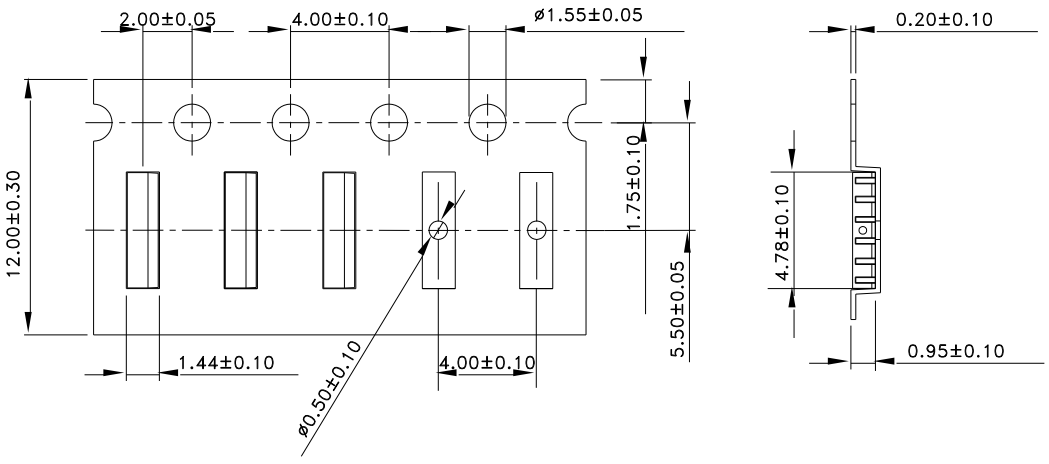
6.2 Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

Reflow Soldering

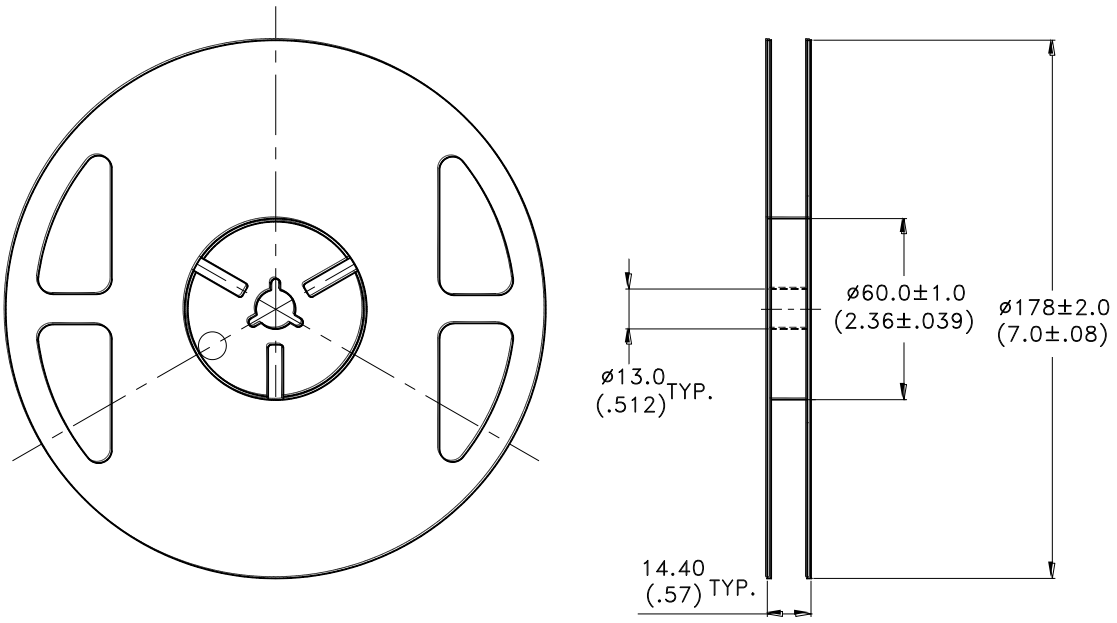


6.3 Package Dimensions of Tape & Reel



Note: All dimensions are in millimeters

6.4 Package Dimensions of Reel



Notes

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel maximum 2000 and minimum 500 pieces per reel.
3. The maximum number of consecutive missing lamps is two.
4. In accordance with EIA-481-1-B specifications.

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 70%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 4 weeks.
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 4 weeks 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)		

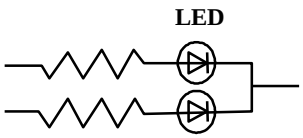
Notes:

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.

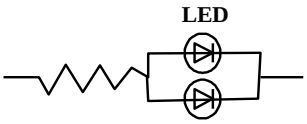
7.5 Drive Method

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 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. Reliability Test

8.1 Test Item/Condition (Based on AEC-Q101 Ver. D):

No.	Test item	Test condition	# of Lots	Sample size Per Lot	Reference standard
2	Pre-conditioning	MSL 2a 1)120℃, 24 hrs baking 2)Moisture Soak 60℃/60% 168 hrs Interval: 15mins ~ 4 hours to do IR-Reflow	3	462	JESD22 A-113
5b+	High Temperature Forward Bias (HTFB)	Ta=60 ± 2°C IF: 30mA for red dice IF: 25mA for Green and Blue dice 1000 hrs	3	77	JESD22 A-108
5b	High Temperature Forward Bias (HTFB)	Ta=100 ± 2°C IF: 5mA for each dice 1000 hrs	3	77	JESD22 A-108
7	Temperature Cycle (TC)	-40°C(+0, -10) to 100°C(+15,-0) 10min 10min 10min 1000 cycles	3	77	JESD22 A-104 Appendix 6
9a	High Temperature High Humidity Bias (HTHHB)	Ta=85 ± 2°C, 85 ± 5% RH IF: 20mA for Red 15mA for Green and Blue dices 1000 hrs	3	77	JESD22 A-101
10alt	Power and Temperature Cycle (PTC)	TC : -40℃/+85℃ 10min 20min 10min Red 20mA, B/G 15mA 1 cycle: 2 min. on / 2 min. off all chips on 15000 cycles (1000 hrs)	3	77	JESD22 A-105
11	ESD Characterization	HBM 2000V (Class 2)	1	30	MIL-STD-883E
20	Resistance to Solder Heat	Tsld=260°C, 10sec. 3times	1	30	JESD22A-111
21	Solderability	Tsld = 235± 5°C, 5sec, Leas-free Solder	1	10	J-STD-002 JESD22B102

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?