LITEON®
OPTOELECTRONICS

SMD LED

Product Data Sheet

LTSA-G683BEGWU

Spec No.：
Created Date: 2017/11/03
Revision: 2.0

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SMD LED

LTSA-G683BEGWU

Rev	Description	By	Date
1	New datasheet	Ryan Chen	05/18/2017
2	1. Modify Maximum rating on P3 2. RGB range of IV and Wd on P5&6	Ryan Chen	11/03/2017
Above data for PD and Customer tracking only			

Customer Name:

Customer Signature: **Print Name:**

LiteON Sales Signature: **Print Name:**

SMD LED
LTSA-G683BEGWU

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 in a wide variety of cordless and cellular phones, notebook computers and network systems…

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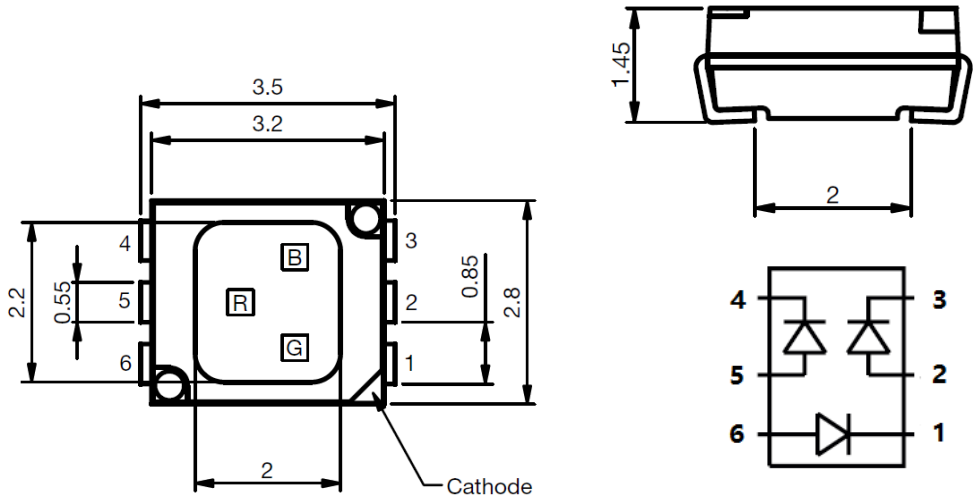
1.1 Features

- Meet ROHS
- Package in 8mm tape on 7" diameter reels
- Preconditioning: accelerate to JEDEC level 2
- Qualification refer to AEC-Q101 Rev 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



Part No.	Lens Color	Source Color	Pin Assignment
LTSA-G683BEGWU	Diffused lens	InGaN Green	6, 1
		AlInGaP Red	5, 4
		InGaN Blue	2, 3

Notes:

1. All dimensions are in millimeters.
2. Tolerance is ±0.1 mm (.008") unless otherwise noted.

3. Rating and Characteristics

3.1 Absolute Maximum Ratings at Ta=25°C

Parameter	LTSA-G683BEGWU			Unit
	Red	Green	Blue	
Power Dissipation	120	180	180	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	100	100	mA
DC Forward Current	50	50	50	mA
For All Chips On	30	30	30	mA
ESD-withstand voltage	up to 2 kV acc. to JESD22-A114-D			
Operating Temperature Range	-40°C to +110°C			
Storage Temperature Range	-40°C to + 110°C			

3.2 Thermal Characteristics

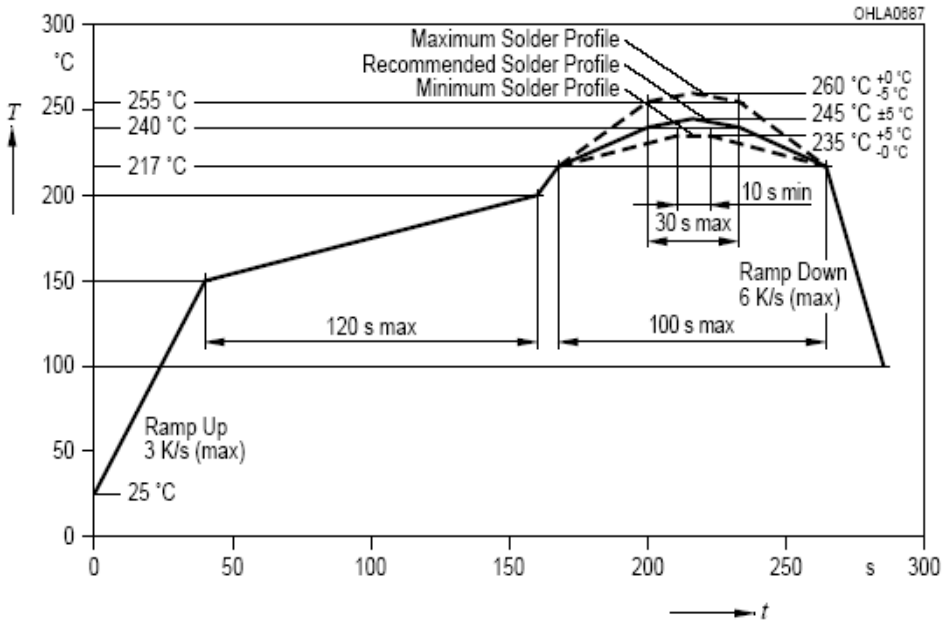
Parameter	Symbol		TYP.			MAX.			Unit
			Blue	Red	Green	Blue	Red	Green	
Thermal Resistance (Junction – Ambient)Note	Rth_{JA}	1 chip	210	210	210	-	-	-	°C /W
Thermal Resistance (Junction – Solder Point)Note	Rth_{JS}	1chip	170	170	170	-	-	-	°C /W
Junction Temperature	T_J		-	-	-	125			°C

Note: Rth_{JA} Measurement Condition

Substrate: FR4 (t=1.6mm) / Pattern Size: $16mm^2$

3.3 Suggest IR Reflow Condition for Pb Free Process:

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



3.4 Electrical / Optical Characteristics at Ta=25°C

Parameter	Symbol		LTSA-G683BEGWU			Unit	Test Condition
			Red	Green	Blue		
Luminous Intensity	IV	MIN.	560	1400	280	mcd	IF = 20mA Note 1
		TYP.	800	1900	350		
		MAX.	1200	2600	560		
Viewing Angle	$2\theta_{1/2}$	TYP.	120			deg	120
Peak Emission Wavelength	λP	TYP.	630	518	458	nm	Measurement @Peak (Fig.1)
Dominant Wavelength	λd	MIN.	618	520	450	nm	Note 3
		TYP.	-	-	-		
		MAX.	629	535	465		
Spectral Line Half-Width	Δλ	TYP.	20	35	25	nm	
Forward Voltage	VF	MIN.	1.8	2.7	2.7	V	IF = 20mA Note 4
		TYP.	-	-	-		
		MAX.	2.4	3.6	3.6		
Reverse Current	IR	MAX.	10			μA	VR (Red)= 12V VR(G&B)= 5V Note 5.

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. Dominant 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. V1ABT1/451)

4.1 IV Rank

Luminous Intensity	Color :Red , Unit : mcd @20mA	
Bin Code	Min.	Max.
U2	560	710
V1	710	920
V2	920	1200
Luminous Intensity	**Color :Green , Unit : mcd @20mA**	
AA	1400	1800
AB	1800	2200
AC	2200	2600
Luminous Intensity	**Color :Blue , Unit : mcd @20mA**	
T1	280	355
T2	355	450
U1	450	560

Tolerance on each Intensity bin is +/-11%

4.2 Color Rank

Dominant Wavelength	Color : Red , Unit : nm @20mA	
Bin Code	Min.	Max.
4	618	629
Dominant Wavelength	**Color : Green , Unit : nm @20mA**	
5	520	525
6	525	530
7	530	535
Dominant Wavelength	**Color : Blue , Unit : nm @20mA**	
1	450	455
2	455	460
3	460	465

Tolerance on each Wavelength bin is +/-1 nm

5. Typical Electrical / Optical Characteristics Curves.

(25°C Ambient Temperature Unless Otherwise Noted)

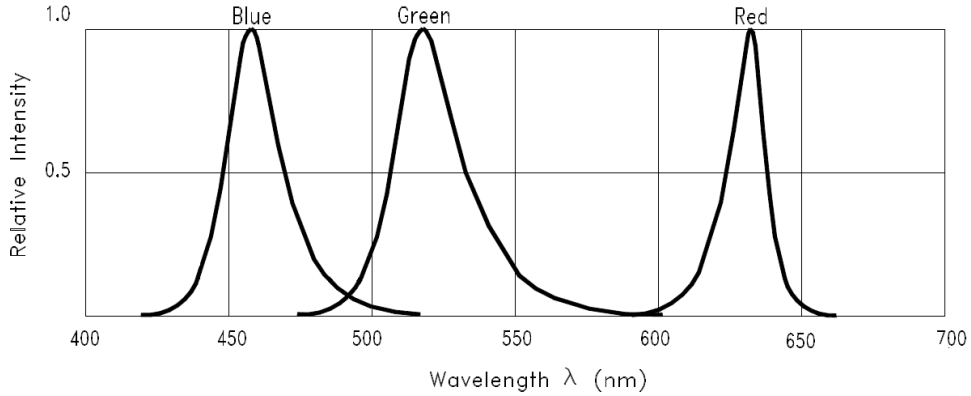


Fig.1 RELATIVE INTENSITY VS. WAVELENGTH

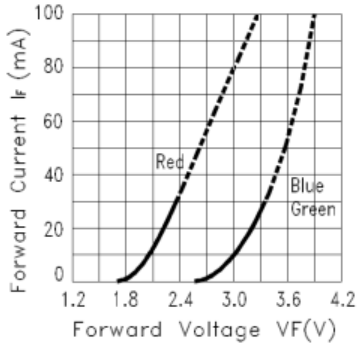


Fig.2 FORWARD CURRENT VS. FORWARD VOLTAGE

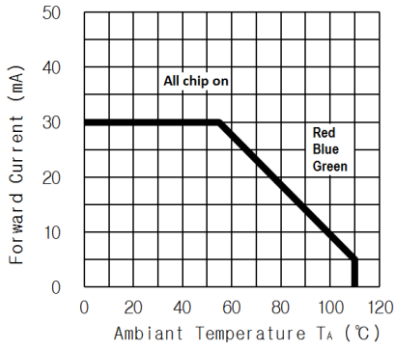


Fig.3 FORWARD CURRENT DERATING CURVE

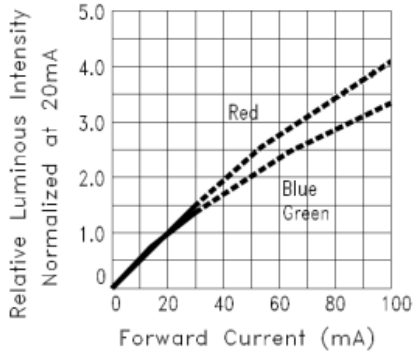


Fig.4 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

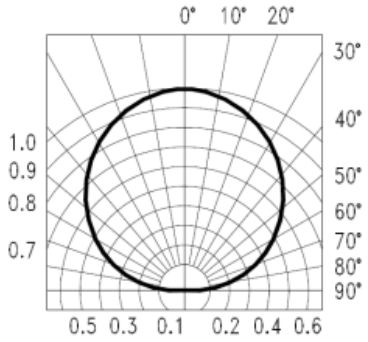


Fig.5 Spatial Distribution

6. User Guide

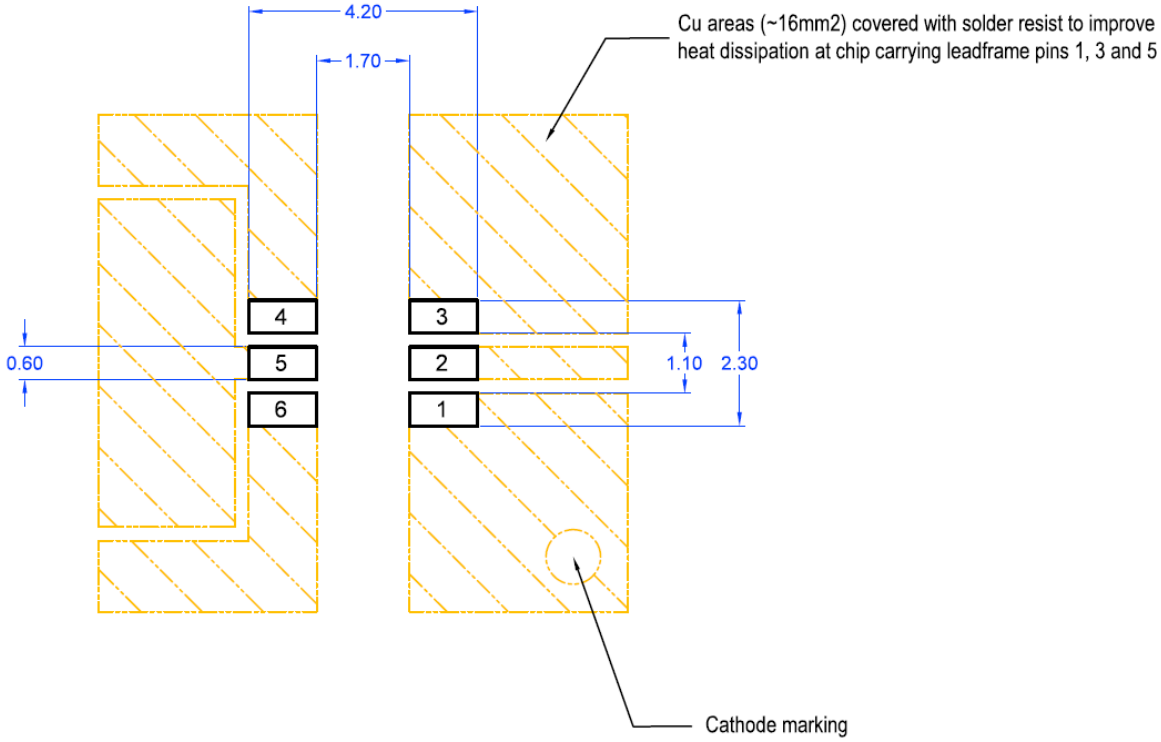
6.1 Cleaning

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.

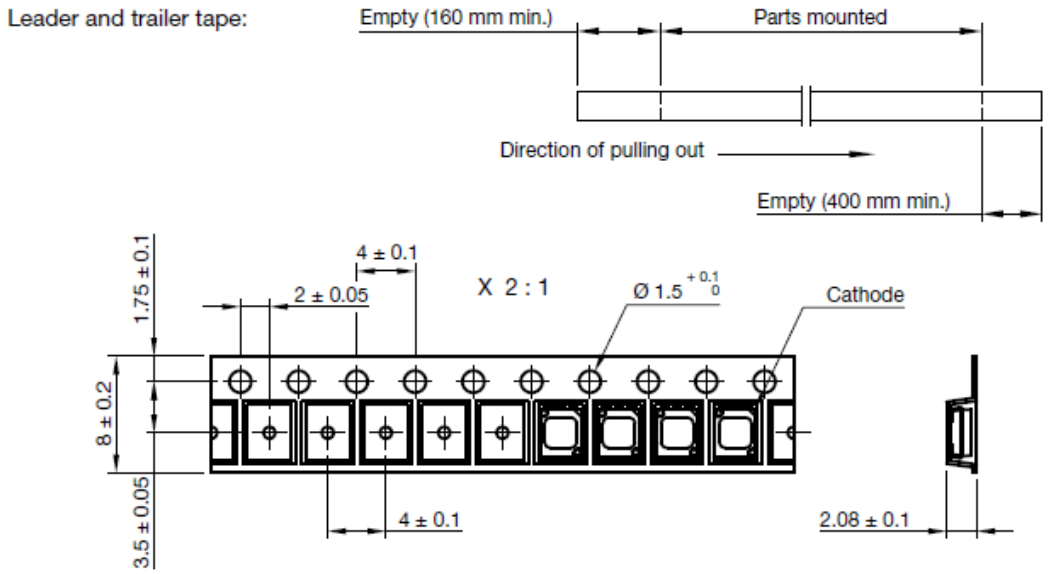
6.2 Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

Reflow Soldering



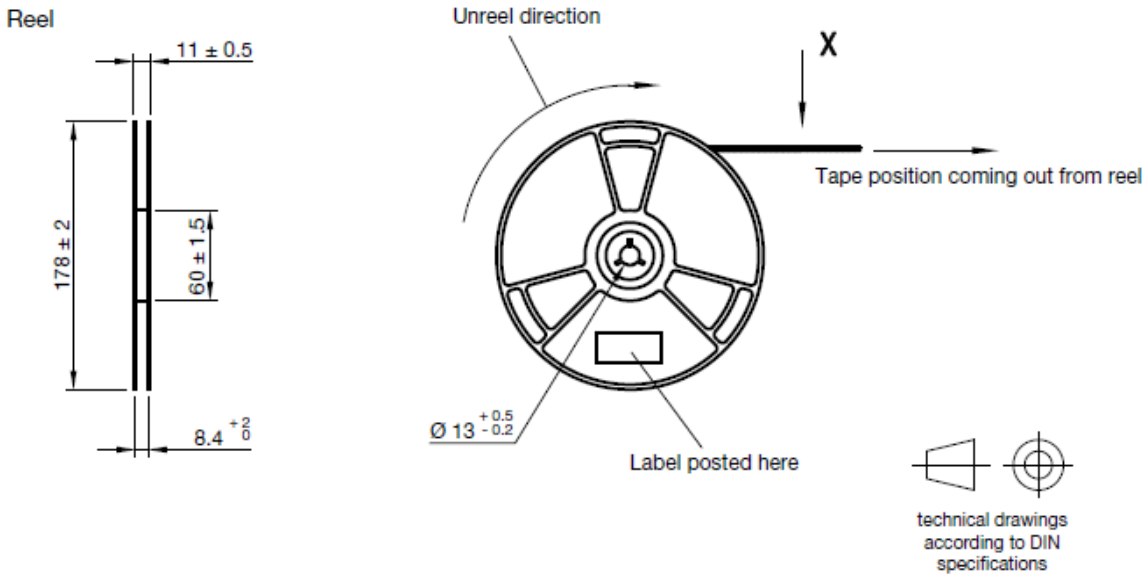
6.3 Package Dimensions of Tape & Reel



Note:

1. All dimensions are in millimeters.

6.4 Package Dimensions of Reel (in millimeters)



Notes:

1. Empty component pockets sealed with top cover tape.
2. 7 inch reel 2000 pieces per reel and minimum 1000pcs for remainders.
3. The maximum number of consecutive missing lamps is two.
4. In accordance with ANSI/EIA 481 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

This product is qualified as Moisture sensitive Level 2 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 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 one year.
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 °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:

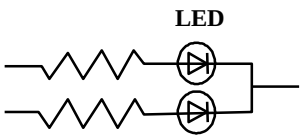
Because different board designs use different number and types of devices, solder pastes, reflow ovens, and circuit boards, no single temperature profile works for all possible combinations.
However, you can successfully mount your packages to the PCB by following the proper guidelines and PCB-specific 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.

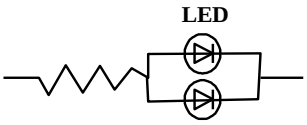
7.5 Drive Method

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 version D)

No.	Test item	Test condition	Sample size Per Lot	Reference standard
2	Pre-conditioning	MSL 2 2)125℃, 24 hrs baking 3)Moisture Soak 85℃/60% 168 hrs Interval: 15mins ~ 4 hours to do IR-Reflow	462	JESD22 A-113
5b+	High Temperature Forward Bias (HTFB)	Ta=55 ± 2°C IF: 30mA for each dice 1000 hrs	77	JESD22 A-108
5b	High Temperature Forward Bias (HTFB)	Ta=110 ± 2°C IF: 5mA for each dice 1000 hrs	77	JESD22 A-108
7	Temperature Cycle (TC)	-40°C(+0, -10) to 110°C(+15,-0) 10mins 10mins 10mins 1000 cycles	77	JESD22 A-104 Appendix 6
9a	High Temperature High Humidity Bias (HTHHB)	Ta=85 ± 2°C IF: 15mA all chips on 1000 hrs	77	JESD22 A-101
10alt	Power and Temperature Cycle (PTC)	-40°C (+0, -10) to 85°C (+10,-0) 10 min 20 min 10 min IF: 15mA 1 cycle: 2 min. on / 2 min. off 15000 cycles (1000 hrs)	77	JESD22 A-105
20	Resistance to Solder Heat	Tsld=260°C, 10sec. 3times	30	JESD22A-111
21	Solderability	Tsld = 245± 5°C, 5sec, Leas-free Solder	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?