LITEON OPTOELECTRONICS

Specific Lighting

Product Data Sheet

LTPA-2720SAETU

Spec No. :

Created Date: 2018/04/09

Revision: Preliminary 1.0

Specific Lighting

LTPA-2720SAETU

Rev	Description	By	Date
1.0	New data sheet	Shihying Lin	2017/11/26
Above data for PD and Customer tracking only			

Customer Name:

Customer Signature: **Print Name:**

LiteON Sales Signature: **Print Name:**

Specific Lighting (PRELIMINARY)
LTPA-2720SAETU

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..

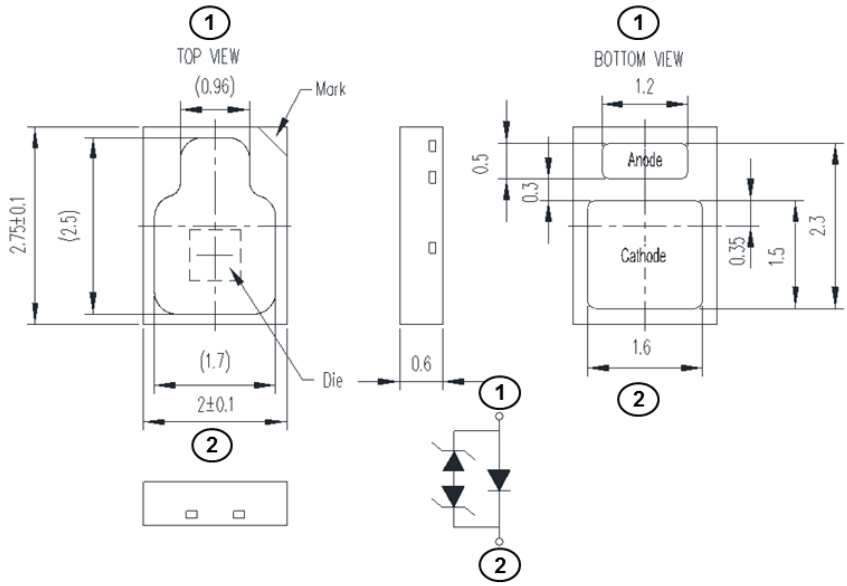
1.1 Features

- Meet ROHS
- Package in 8mm tape on 7" diameter reels
- Preconditioning: accelerate to JEDEC level 2
- Qualification refer to AEC-Q102
- EIA STD package
- I.C. compatible
- Compatible with automatic placement equipment
- Compatible with infrared reflow solder process

1.2 Applications

- Automotive vehicles: accessory applications

2. Package Dimensions



Part No.	Lens Color	Source Color
LTPA-2720SAETU	Orange	InGaN Yellow

Notes:

1. All dimensions are in millimeters.
2. Tolerance is ±0.2 mm (.008") unless otherwise noted.
3. Gold plating L/F.

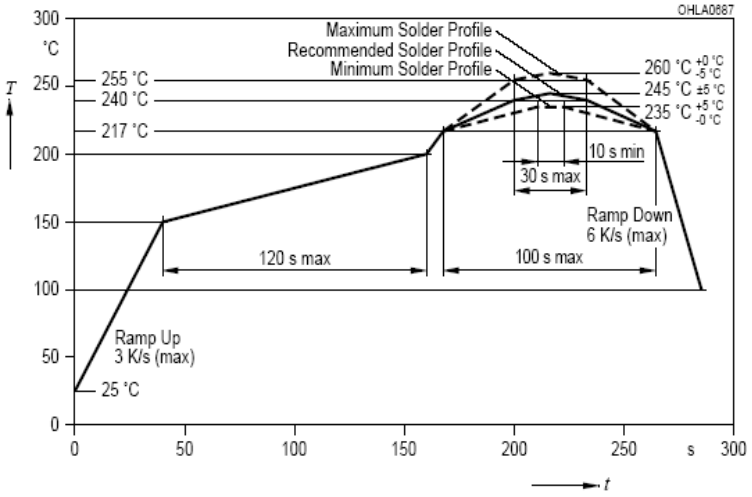
3. Rating and Characteristics

3.1 Absolute Maximum Ratings at Ta=25°C

Parameter	LTPA-2720SAETU	Unit
Power Dissipation	816	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	600	mA
DC Forward Current	240	mA
Operating Temperature Range	-40°C to + 110°C	
Storage Temperature Range	-40°C to + 110°C	

3.3 Suggest IR Reflow Condition for Pb Free Process:

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



3.4 Electrical / Optical Characteristics at Ta=25°C

Parameter	Symbol	Part No. LTPA-	Min.	Typ.	Max.	Unit	Test Condition
Luminous Flux	lm	2720SAETU	15		40	lm	IF = 140mA Note 1
Efficiency	lm/W			37		lm/W	IF = 140mA
Viewing Angle	$2\theta_{1/2}$		-	120	-	deg	Note 2 (Fig.2)
Chromaticity Coordinates	x		-	0.57	-	-	IF = 140mA Note 3
	y		-	0.42	-	-	IF = 140mA Note 3
Forward Voltage	VF		2.8	3.2	3.4	V	IF = 140mA Note 4
Reverse Current	IR		-	-	10	μA	VR = 5V Note 5
ESD-Withstand Voltage	ESD		-	-	8K	V	HBM
Real thermal resistance	$R_{th\ JS\ real}$			40		˚C/W	IF = 140mA
Electrical thermal resistance	$R_{th\ JS\ el}$			34		˚C/W	IF = 140mA
Junction Temperature	T_J				130	˚C	

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 chromaticity coordinates (x, y) is derived from the 1931 CIE chromaticity diagram.
   And chromaticity coordinates (x, y) guarantee should be added +/- 0.01 for tolerance.
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: Vf/ Iv/ Color (Ex. D7/ 2C/ A10)

■ **Vf Rank**

Forward Voltage (Vf)		Unit : V @140mA
Bin Code	Min.	Max.
D7	2.8	3.0
D8	3.0	3.2
D9	3.2	3.4

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

■ **IV Rank**

Luminous Flux		Unit : Im @140mA
Bin Code	Min.	Max.
2B	15	20
1C	20	25
2C	25	30
1D	30	35
2D	35	40

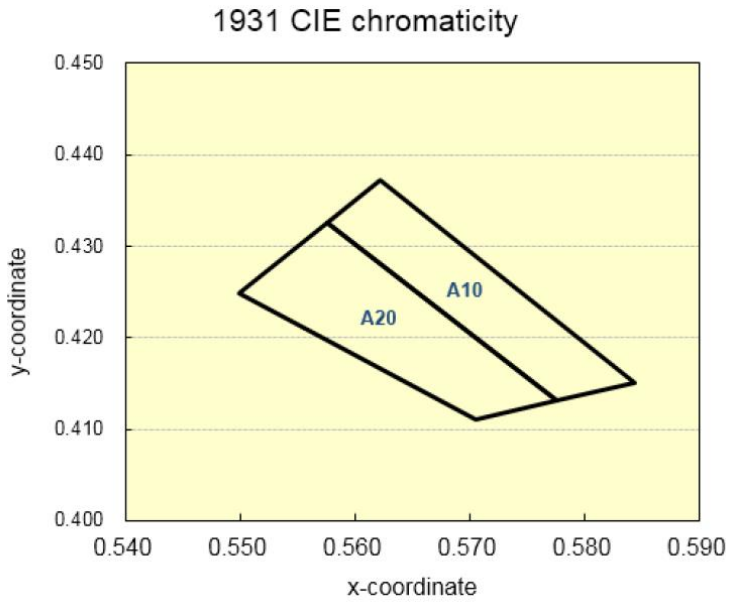
Tolerance on each Intensity Flux bin is +/-10%

4.3 Color Rank

Color Bin Table											Test @140mA
Bin Code	Color Bin Limits					Bin Code	Color Bin Limits				
	CIE-	Point1	Point2	Point3	Point4		CIE-	Point1	Point2	Point3	Point4
A10	x	0.5775	0.5843	0.5622	0.5576	A20	x	0.5705	0.5775	0.5576	0.5499
	y	0.4132	0.4151	0.4372	0.4326		y	0.4111	0.4132	0.4326	0.4249

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

4.4 Chromaticity Coordinate



5. Typical Electrical / Optical Characteristics Curves

(25℃ Ambient Temperature Unless Otherwise Noted)

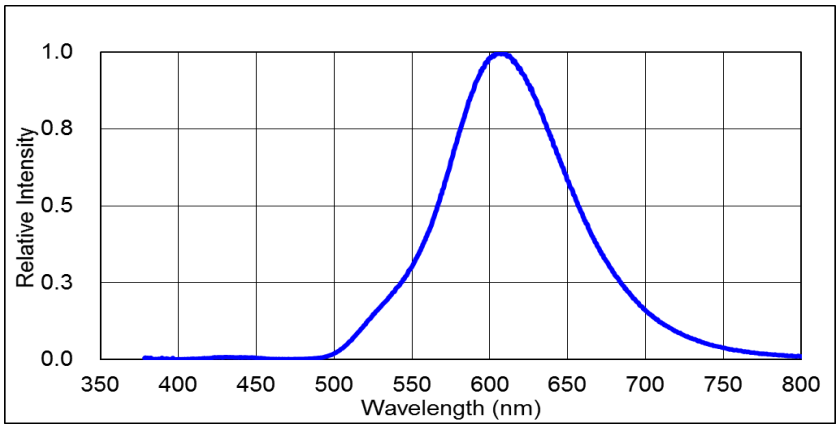


Fig 1. RELATIVE INTENSITY VS. WAVELENGTH

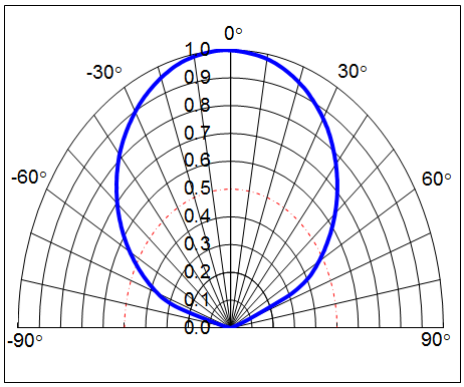


Fig 2. SPATIAL DISTRIBUTIN

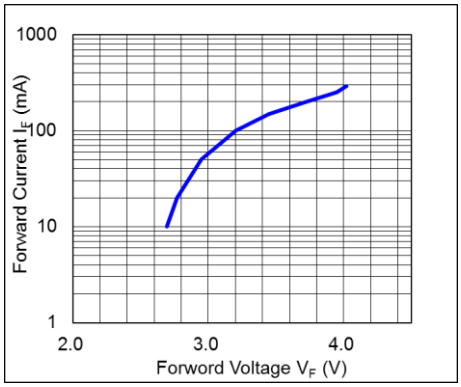


Fig 3. FORWARD VOLTAGE VS. FORWARD VOLTAGE

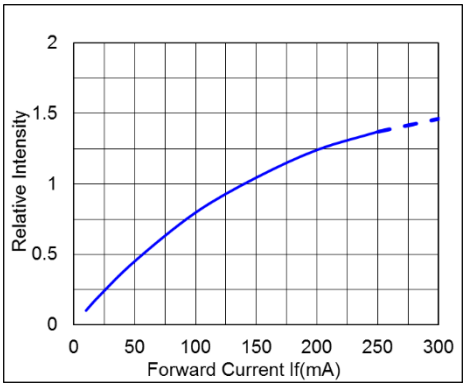


Fig 4. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT.

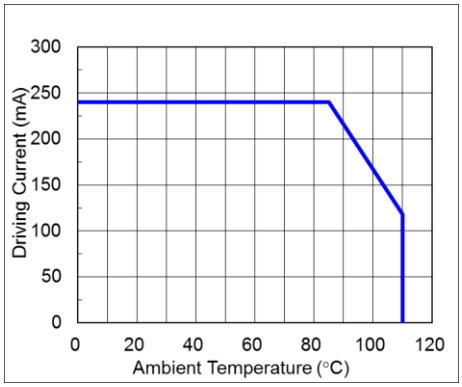


Fig 5. FORWARD CURRENT DERATING CURVE

6. User Guide

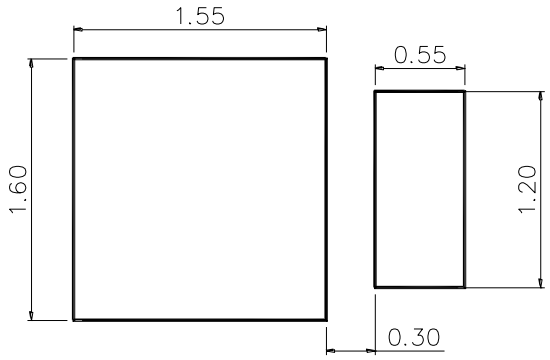
6.1 Cleaning

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.

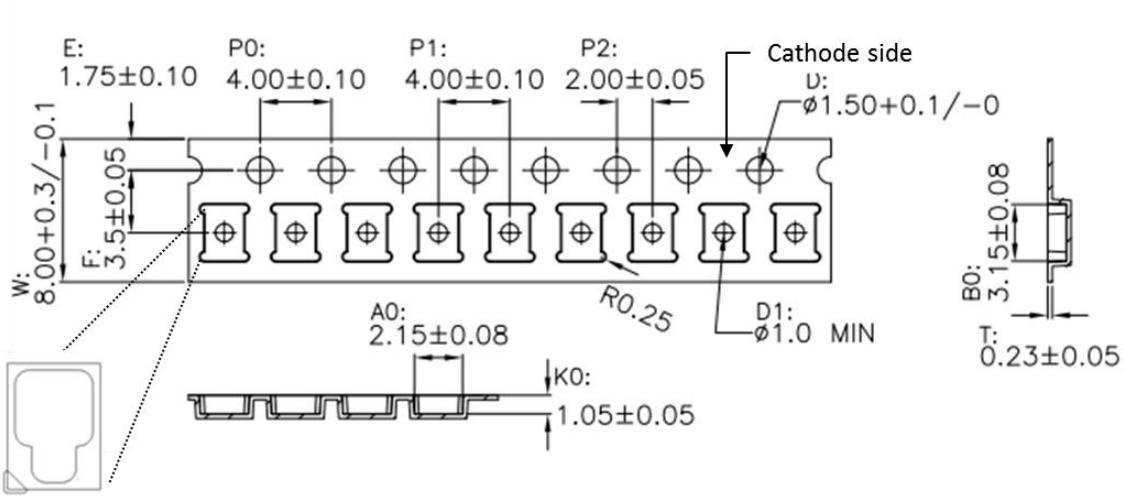
6.2 Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

Reflow Soldering



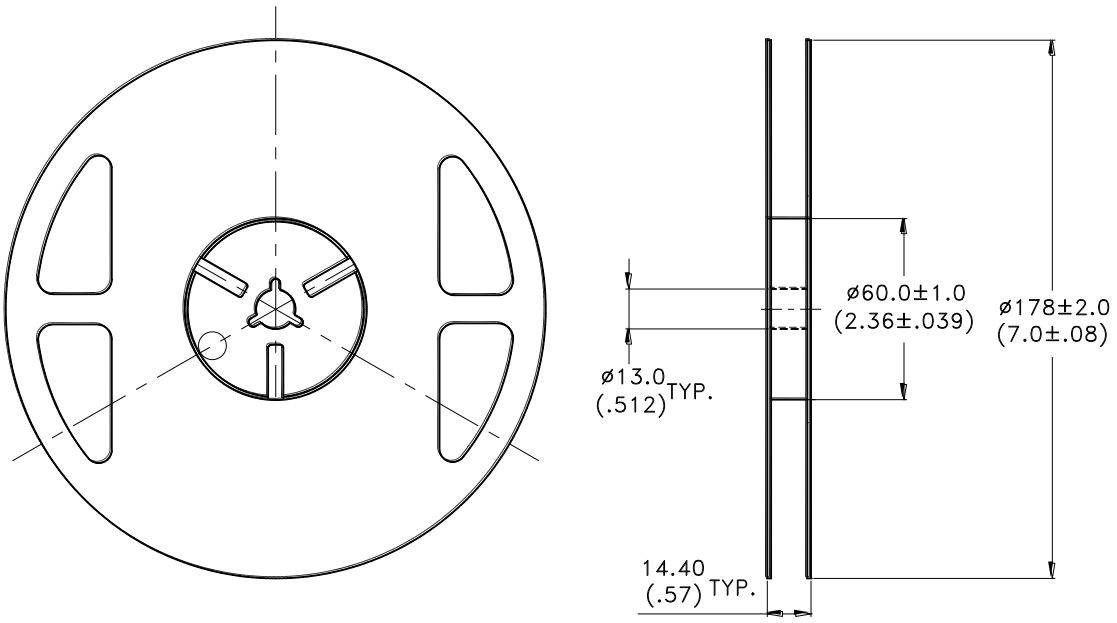
6.3 Package Dimensions of Tape and Reel



Note:

1. All dimensions are in millimeters (inches).

6.4 Package Dimensions of Reel



Notes:

i. Empty component pockets sealed with top cover tape.

ii. 7 inch reel 2000 pieces per reel.

iii. The maximum number of consecutive missing lamps is two.

iv. 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 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 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 deg C for at least 20 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)		

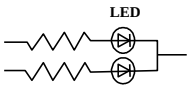
Notes:

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.

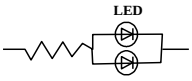
7.5 Drive Method

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-Q102& IEC 60810)

No	Test item	Test Condition	Check point	Sample size	Reference standard
2	Pre-conditioning (PC)	MSL 2 125℃, 24hrs baking Moisture Soak 85℃/60% 168hrs Interval: 15mins~4hours to do IR-Reflow	Before and after	Qualification parts before Test # 6a, 7, 8a	JEDEC JESD22 A-113 JESD22-B106
5a	High Temperature Operating Life (HTOL1)	Ta: 110℃, IF: 118mA.	0, 168, 336, 504, 1000	26 x 3	JEDEC JESD22 A-108
5b	High Temperature Operating Life (HTOL2)	IF: 240mA, Ta: 85℃.	0, 168, 336, 504, 1000	26 x 3	JEDEC JESD22 A-108
6a	Wet High Temperature Operating Life (WHTOL1)	Ta = 85 ± 2°C, 85 ± 5% RH IF: 240mA. Tj defined in the part specification. Operated with power cycle 30 min on / 30 min off for power > 200mW, others are DC drove.	0, 168, 336, 504, 1000	26 x 3	JEDEC JESD22 A-101
6b	Wet High Temperature Operating Life (WHTOL2)	Ta = 85 ± 2°C, 85 ± 5% RH IF: 30mA. Tj defined in the part specification. Operated with power cycle 30 min on / 30 min off for power > 200mW, others are DC drove.	0, 168, 336, 504, 1000	26 x 3	JEDEC JESD22 A-101
7	Temperature Cycling (TC)	-40°C(+0, -10) to 110°C(+15,-0) 15 min 15 min 15 min	0, 200, 500, 1000	26 x 3	JEDEC JESD22 A-104 Appendix 6
8a	Power and Temperature Cycling (PTC)	-40°C (+0, -10) to 110°C (+10,-0) 10 min 20 min 10 min IF: 245mA. Operated with power cycle 5 min. on / 5 min. off	0, 200, 500, 1000	26 x 3	JEDEC JESD22 A-105
10a & b	ESD Characterization	HBM ±8000V, CDM ±1000V	Before and after	10 x 3	AEC Q101-001, and Q101-005

18a	Resistance to Solder Heat	Tsld=260°C, 10sec. 3times	Before and after	10 x 3	JEDEC JESD22-A113 J-STD-020 AEC-Q005
19	Solderability	Tsld = 235± 5°C, 5sec, Leas-free Solder	Before and after	10 x 3	J-STD-002 JESD22B102
20	Pulsed Operating Life (PLT)	Ta=55℃ Operated with pulse with 100 μs and duty cycle 3% 600mA. 1000 hrs Test before and after PLT	Before and after	26 x 3	JEDEC JESD22-A108
21	Dew (DEW)	Test shall be cycled from 30~65°C, 65°C shall be maintained for 4-8 hours before reducing the temp. to 30°C. This cycle shall continue for 1008 hours, with relative humidity maintained between 90-98% in the test chamber. No bias shall be applied during this test.	Before and after	26 x 3	JEDEC JESD22-A100
22	Hydrogen Sulphide (H2S)	H_2S: 15 ppm, Ta=40°C, 90% RH,,No bias	0, 336	26 x 3	IEC 60068-2-43
23	Flowing Mixed Gas (FMG)	Test method 4 Air temp. 25°C, 75% RH H_2S concentration: 10 x 10^{-9} SO_2 concentration: 200 x 10^{-9} NO_2 concentration: 200 x 10^{-9} Cl_2 concentration: 10 x 10^{-9}	0, 500	26 x 3	IEC 60068-2-60 Test method 4
24	Thermal Resistance (TR)	Measure thermal resistance for pre- & post change	--	10 x 1	JEDEC JESD51-50 JESD51-51 JESD51-52

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?