



# **Specific Lighting** Product Data Sheet LTPA-2720ZWETU

Spec No. :

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Revision: Preliminary 1.0



**Specific Lighting**  
**LTPA-2720ZWETU (PRELIMINARY)**

**Specific Lighting**

LTPA-2720ZWETU

| <u>Rev</u>  | <u>Description</u> | <u>By</u>  | <u>Date</u> |
|---|--------------------|------------|-------------|
| 1.0   | New data sheet     | Harvey Lee | 11/09/2017  |
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| <b>Above data for PD and Customer tracking only</b> |                    |            |             |
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**Customer Name:**

**Customer Signature:**

**Print Name:**

**LiteON Sales Signature:**

**Print Name:**

## Specific Lighting LTPA-2720ZWETU (PRELIMINARY)

### 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..

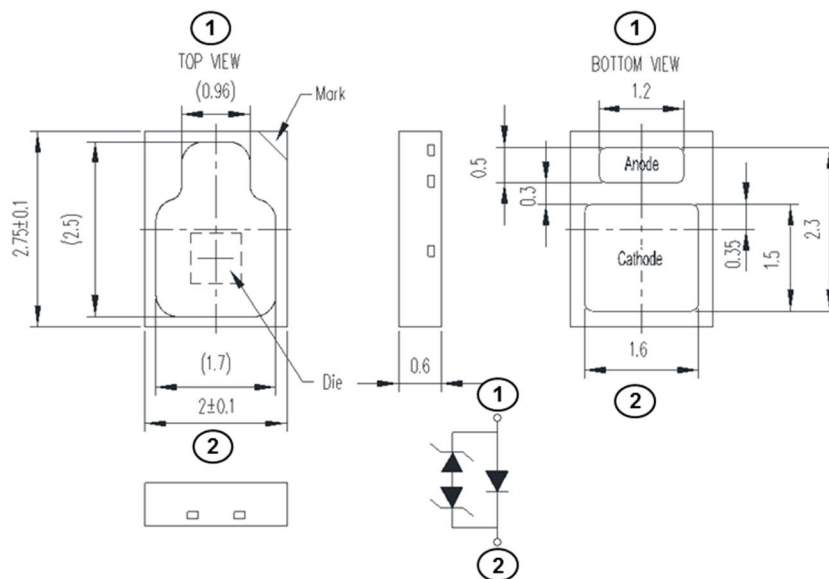
#### 1.1 Features

- 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-2720ZWETU | Yellow     | InGaN White  |

#### Notes:

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

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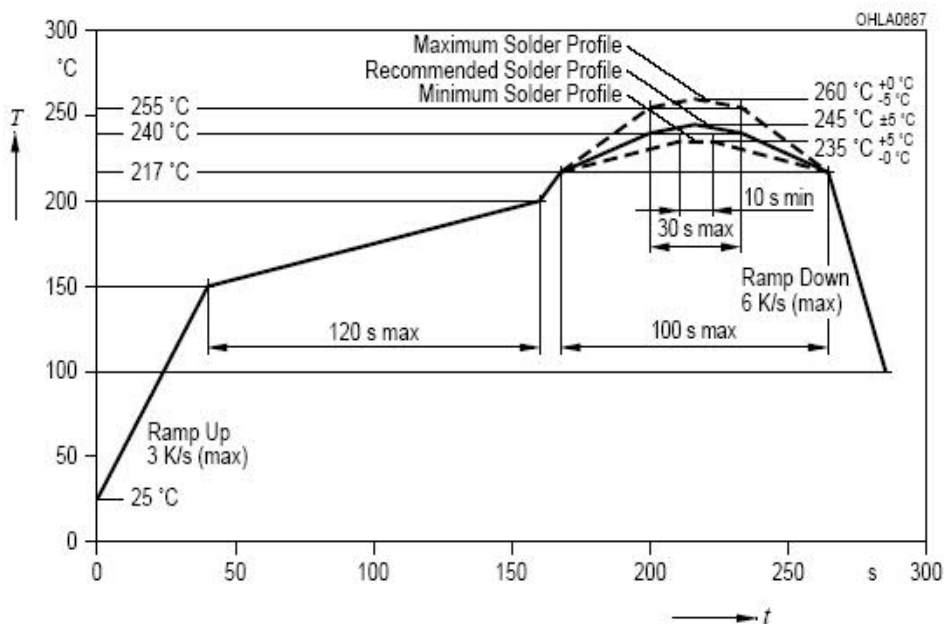
## 3. Rating and Characteristics

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

| Parameter  | LTPA-2720ZWETU   | Unit |
|--|------------------|------|
| Power Dissipation  | 1190             | mW   |
| Peak Forward Current<br>(1/10 Duty Cycle, 0.1ms Pulse Width) | 750              | mA   |
| DC Forward Current   | 350              | mA   |
| Operating Temperature Range                                  | -40°C to + 125°C |      |
| Storage Temperature Range                                    | -40°C to + 125°C |      |

### 3.3 Suggest IR Reflow Condition for Pb Free Process:

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



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

| Parameter                     | Symbol                  | Part No.<br>LTPA- | Min. | Typ. | Max. | Unit   | Test Condition       |
|-------------------------------|-------------------------|-------------------|------|------|------|--------|----------------------|
| Luminous Flux                 | lm                      | 2720ZWETU         | 50   |      | 100  | lm     | IF = 250mA<br>Note 1 |
| Viewing Angle                 | 2θ <sub>1/2</sub>       | 2720ZWETU         | -    | 120  | -    | deg    | Note 2 (Fig.2)       |
| Chromaticity Coordinates      | x                       | 2720ZWETU         | -    | 0.32 | -    | -      | IF = 250mA<br>Note 3 |
|                               | y                       | 2720ZWETU         | -    | 0.33 | -    | -      | IF = 250mA<br>Note 3 |
| Forward Voltage               | VF                      | 2720ZWETU         | 2.8  | -    | 3.4  | V      | IF = 250mA<br>Note 4 |
| Reverse Current               | IR                      | 2720ZWETU         | -    | -    | 10   | μA     | VR = 5V<br>Note 5    |
| ESD-Withstand Voltage         | ESD                     | 2720ZWETU         | 2K   | -    | -    | V      | HBM                  |
| Real thermal resistance       | R <sub>th JS real</sub> |                   | -    | 20   |      | °C / W |                      |
| Electrical thermal resistance | R <sub>th JS el</sub>   |                   | -    | 14   |      | °C / W |                      |
| Junction Temperature          | T <sub>J</sub>          | -                 |      |      | 150  | °C     |                      |

#### Notes:

- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve
- θ<sub>1/2</sub> is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- 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.
- Forward Voltage Tolerance is +/- 0.1 volt.
- 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. D7/ A4 / 5F)

■ Vf Rank

| Forward Voltage (Vf) |      | Unit : V @250mA |  |
|----------------------|------|-----------------|--|
| 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 : lm @250mA |  |
|---------------|------|------------------|--|
| Bin Code      | Min. | Max.             |  |
| A6            | 50   | 60               |  |
| A7            | 60   | 70               |  |
| A8            | 70   | 80               |  |
| A9            | 80   | 90               |  |
| B1            | 90   | 100              |  |

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

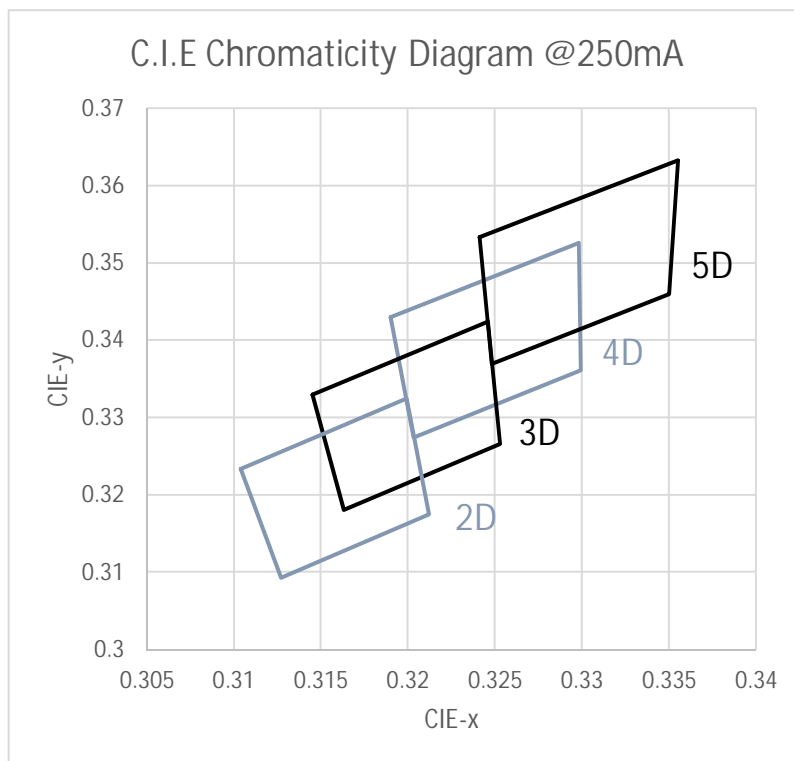
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### 4.3 Color Rank

| Color Bin Table |                  |        |        |        |        | Test @250mA |                  |        |        |        |        |
|-----------------|------------------|--------|--------|--------|--------|-------------|------------------|--------|--------|--------|--------|
| Bin Code        | Color Bin Limits |        |        |        |        | Bin Code    | Color Bin Limits |        |        |        |        |
|                 | CIE-             | Point1 | Point2 | Point3 | Point4 |             | CIE-             | Point1 | Point2 | Point3 | Point4 |
| 2D              | x                | 0.3104 | 0.3127 | 0.3212 | 0.3199 | 4D          | x                | 0.3190 | 0.3203 | 0.3299 | 0.3298 |
|                 | y                | 0.3234 | 0.3093 | 0.3175 | 0.3325 |             | y                | 0.3430 | 0.3274 | 0.3361 | 0.3526 |
| 3D              | x                | 0.3145 | 0.3163 | 0.3253 | 0.3246 | 5D          | x                | 0.3241 | 0.3248 | 0.3350 | 0.3355 |
|                 | y                | 0.3330 | 0.3181 | 0.3266 | 0.3424 |             | y                | 0.3534 | 0.3370 | 0.3460 | 0.3633 |

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

### 4.4 Chromaticity Coordinate



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## 5. Typical Electrical / Optical Characteristics Curves

(25°C Ambient Temperature Unless Otherwise Noted)

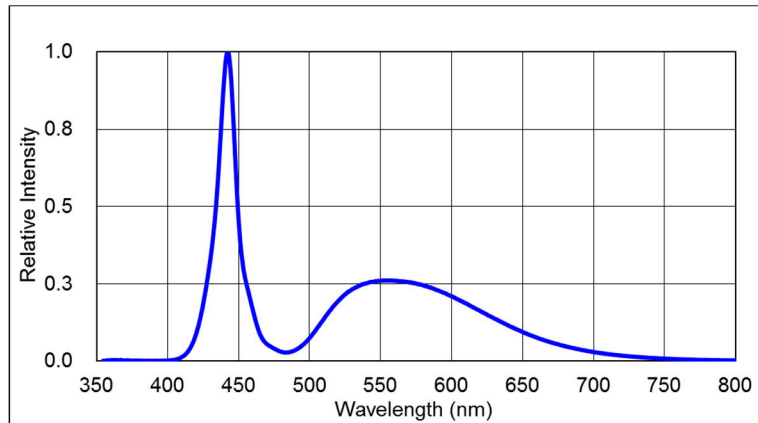


Fig 1. RELATIVE INTENSITY VS. WAVELENGTH

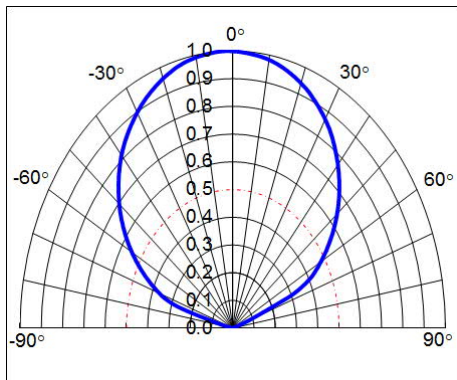


Fig 2. SPATIAL DISTRIBUTION

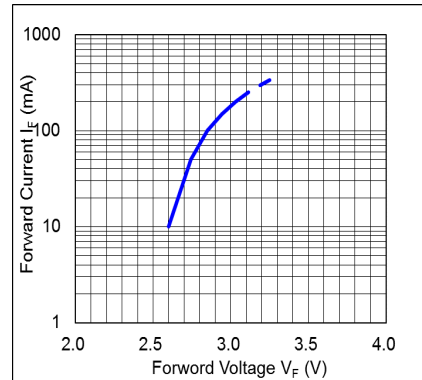


Fig 3. FORWARD VOLTAGE VS. FORWARD CURRENT

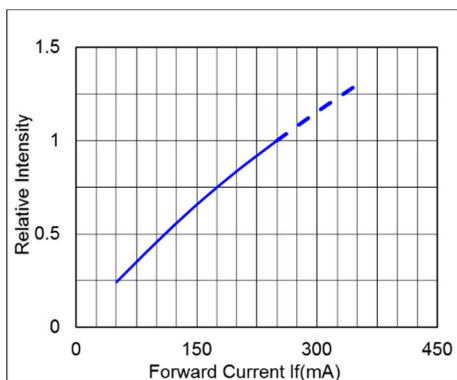


Fig 4. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT.

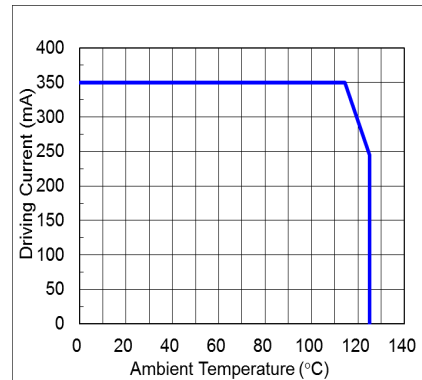


Fig 5. FORWARD CURRENT DERATING CURVE



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## 6. User Guide

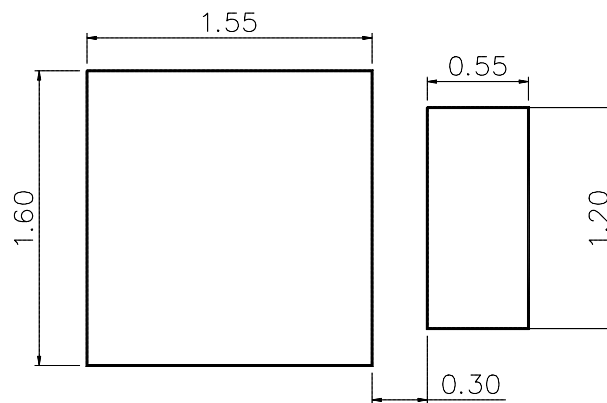
### 6.1 Cleaning

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.

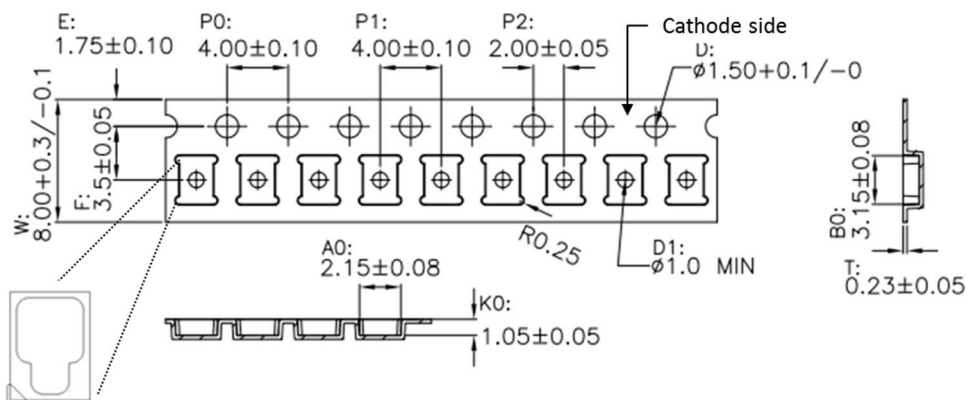
### 6.2 Recommend Printed Circuit Board Attachment Pad

Infrared / vapor phase

Reflow Soldering



### 6.3 Package Dimensions of Tape and Reel

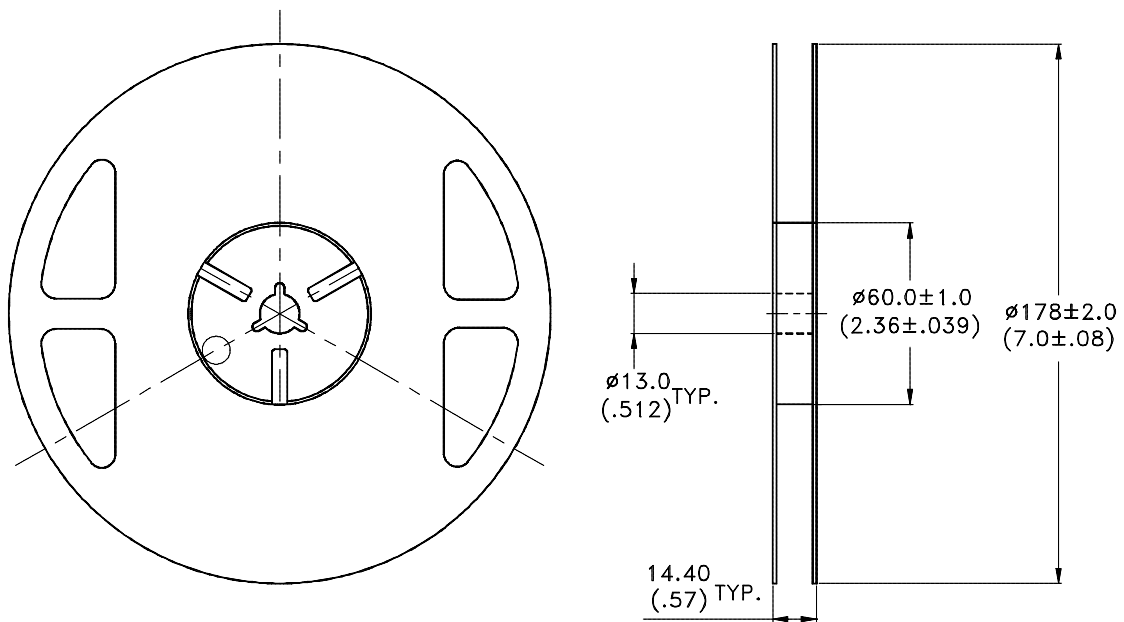


**Note:**

1. All dimensions are in millimeters (inches).

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### 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.

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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

This product is qualified as Moisture sensitive Level 2a 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 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.<br>(one time only) |
| Peak temperature | 260°C Max.                   |                |                                |
| 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.

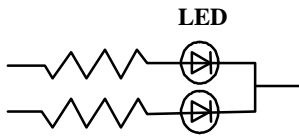
Figure on page3 shows a sample temperature profile compliant to JEDEC standards. You can use this example as a generic target to set up your reflow process. You should adhere to the JEDEC profile limits as well as specifications and recommendations from the solder paste manufacturer to avoid damaging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

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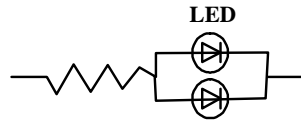
### 7.5 Drive Method

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

#### 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<br>125°C, 24hrs baking<br>Moisture Soak 85°C/60%<br>168hrs<br>Interval: 15mins~4hours to do IR-Reflow   | Before and after       | Qualification parts before Test # 6a, 7, 8a | JEDEC JESD22 A-113<br>JESD22-B106          |
| 5a      | High Temperature Operating Life (HTOL1)     | Ta: 125°C, IF: 245mA.   | 0, 168, 336, 504, 1000 | 26 x 3                                      | JEDEC JESD22 A-108                         |
| 5b      | High Temperature Operating Life (HTOL2)     | IF: 350mA, Ta: 115°C.   | 0, 168, 336, 504, 1000 | 26 x 3                                      | JEDEC JESD22 A-108                         |
| 6a      | Wet High Temperature Operating Life (WHTOL) | Ta = 85 ± 2°C, 85 ± 5% RH<br>IF: 350mA. Tj defined in the part specification.<br>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 125°C(+15,-0)<br>15 min 15 min 15 min   | 0, 200, 500, 1000      | 26 x 3                                      | JEDEC JESD22 A-104<br>Appendix 6           |
| 8a      | Power and Temperature Cycling (PTC)         | -40°C (+0, -10) to 125°C (+10,-0)<br>10 min 20 min 10 min<br>IF: 245mA.<br>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<br>J-STD-020<br>AEC-Q005 |
| 19      | Solderability                               | Tsld = 235± 5°C, 5sec,<br>Leas-free Solder  | Before and after       | 10 x 3                                      | J-STD-002<br>JESD22B102                    |

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|    |                                      |  |                  |        |  |
|----|--------------------------------------|--|------------------|--------|--|
| 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.<br>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<br>JESD22-A100                         |
| 22 | Hydrogen Sulphide (H <sub>2</sub> S) | H <sub>2</sub> S: 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<br>Air temp. 25°C, 75% RH<br>H <sub>2</sub> S concentration: 10 x 10 <sup>-9</sup><br>SO <sub>2</sub> concentration: 200 x 10 <sup>-9</sup><br>NO <sub>2</sub> concentration: 200 x 10 <sup>-9</sup><br>Cl <sub>2</sub> concentration: 10 x 10 <sup>-9</sup> | 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<br>JESD51-50<br>JESD51-51<br>JESD51-52 |

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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?