

# NMOP-PLCC2-525

## Surface Mount LED Tape and Reel

### Features:

1. Top View LED.
2. white SMT package
3. LEadframe package with individual 2 pin
4. Wide viewing angle
5. soldering methods: IR reflow soldering
6. Feature of the device: more light due to higher optical efficiency;  
extremely wide viewing angle; ideal or backlighting and coupling in light guide

### Descriptions:

The NMOP-PLCC2-525 SMD has wide viewing angle and optimized light coupling by inter reflector, The low current requirement makes this device ideal for portable equipment or any other application where power is at a premium.

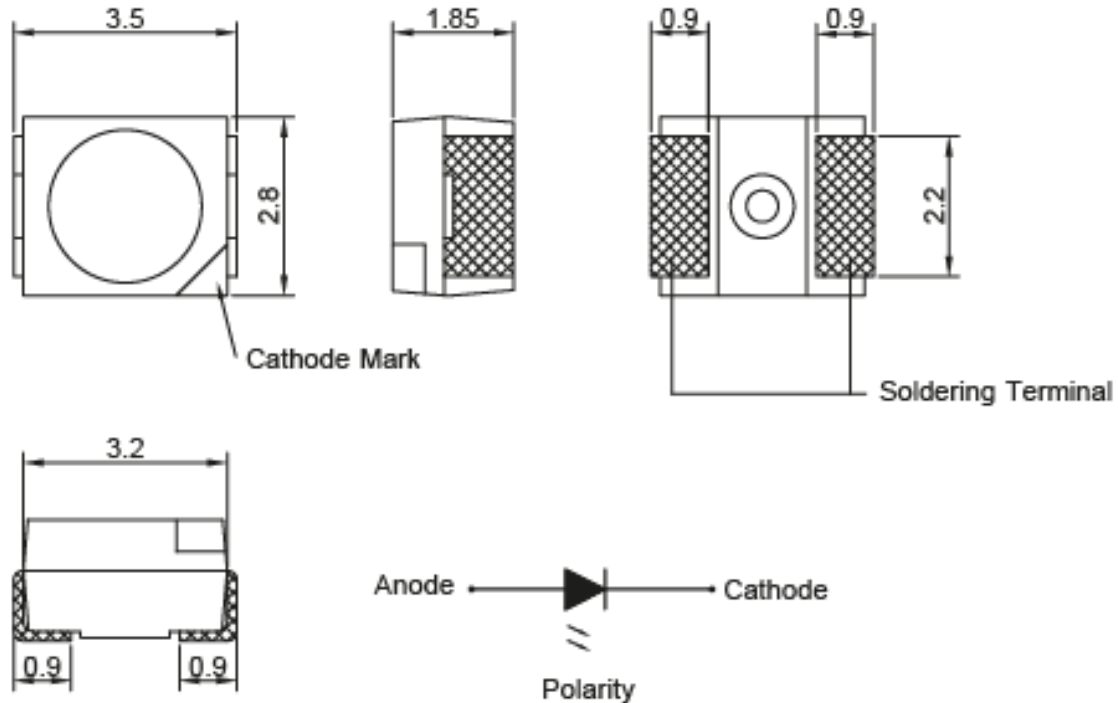
### Applications:

1. Telecommunication: indicator and backlighting in telephone and fax
2. Indicators
3. Switch lights

### Device Selection Guide

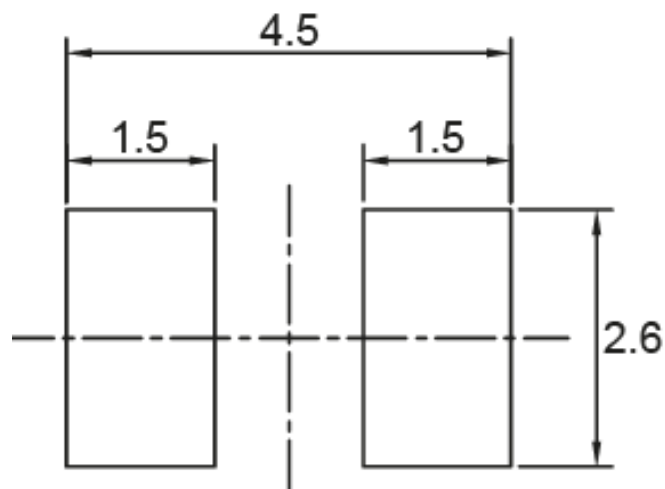
| Part No        | Material | Color   |             |
|----------------|----------|---------|-------------|
|                |          | Emitted | Lens        |
| NMOP-PLCC2-525 | InGaN    | Green   | Water Clear |

## Package Dimensions



Note : 1. All dimension are in millimeter tolerance is  $\pm 0.2\text{mm}$  unless otherwise noted.  
2. Specifications are subject to change without notice.

## Recommended Soldering Pad Dimensions



Note : The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Angle  $\pm 0.5^\circ$ . Unit=mm.

## Absolute Maximum Ratings

(Ta=25°C, VDD=5V, VSS=0)

| Parameter                               | Symbol    | Ratings    | UNIT    |
|-----------------------------------------|-----------|------------|---------|
|                                         |           | DGM        |         |
| Forward Current                         | $I_F$     | 30         | mA      |
| Peak Forward Current Duty<br>1/11@10KHz | $I_{FP}$  | 100        | mA      |
| Power Dissipation                       | PD        | 108        | mW      |
| Reverse Current @5V                     | $I_r$     | 50         | $\mu$ A |
| Electrostatic Discharge                 | ESD       | 500        | V       |
| Operating Temperature                   | $T_{opr}$ | -40 ~ +85  | °C      |
| Storage Temperature                     | $T_{stg}$ | -40 ~ +100 | °C      |

## Typical Electrical & Optical Characteristics

(Ta=25° C)

| Parameter                | Symbol          | Min. | Typ. | Max. | Unit | Condition |
|--------------------------|-----------------|------|------|------|------|-----------|
| Luminous Intensity       | $I_v$           | 800  | 1250 | ---  | mcd  | IF=20mA   |
| Dominant Wavelength      | $\lambda_D$     | ---  | 525  | ---  | nm   | IF=20mA   |
| Spectral Line Half-Width | $\Delta\lambda$ | ---  | 36   | ---  | nm   | IF=20mA   |
| Forward Voltage          | $V_F$           | 2.8  | ---  | 3.6  | V    | IF=20mA   |
| Viewing Angle            | $2\Theta$ 1/2   | ---  | 120  | ---  | deg  | IF=20mA   |

Note:

1. The forward voltage did not including  $\pm 0.1V$  testing tolerance.
2. The luminous intensity data did not including  $\pm 15\%$  testing tolerance.
3. The dominant wavelength data did not including  $\pm 1nm$  testing tolerance.

## Luminous Intensity Classification

| BIN CODE | Iv(mcd) at 20mA |      |
|----------|-----------------|------|
|          | Min.            | Max. |
| V        | 800             | 1250 |
| W        | 1250            | 2000 |
| X        | 2000            | 3200 |

## Dominant Wavelength Classification

| BIN CODE | $\lambda D$ (nm) at 20mA |      |
|----------|--------------------------|------|
|          | Min.                     | Max. |
| 1O       | 519                      | 522  |
| 1P       | 522                      | 525  |
| 1Q       | 525                      | 528  |
| 1R       | 528                      | 531  |

## Forward Voltage Classification

| BIN CODE | Vf(v) at 20mA |      |
|----------|---------------|------|
|          | Min.          | Max. |
| 1        | 2.8           | 3.0  |
| 2        | 3.0           | 3.2  |
| 3        | 3.2           | 3.4  |
| 4        | 3.4           | 3.6  |

## Typical Electro-Optical Curve

DGM CHIP

Fig.1 Forward current vs. Forward Voltage

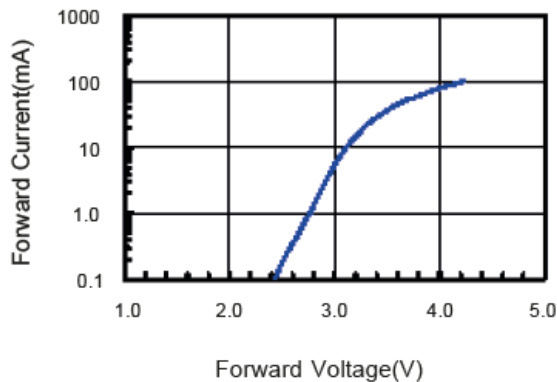


Fig.2 Relative Intensity vs. Forward Current

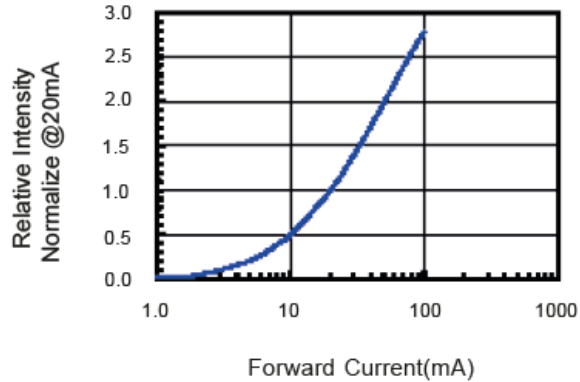


Fig.3 Forward Voltage vs. Temperature

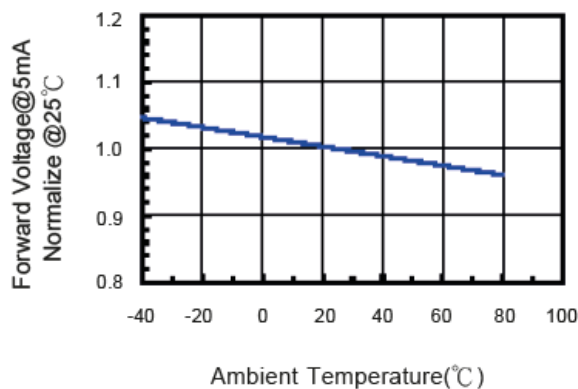


Fig.4 Relative Intensity vs. Temperature

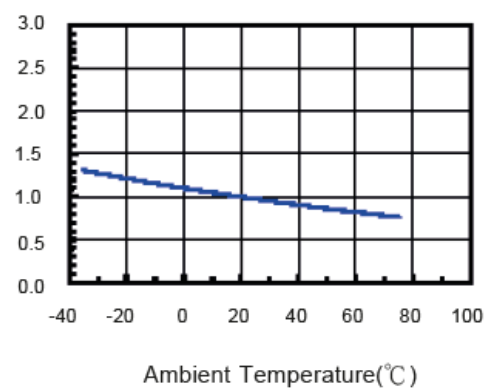


Fig.5 Relative Intensity vs. Wavelength

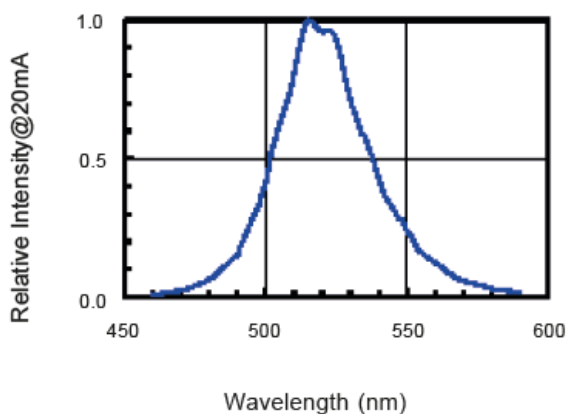
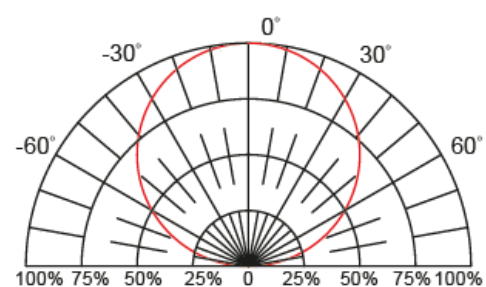
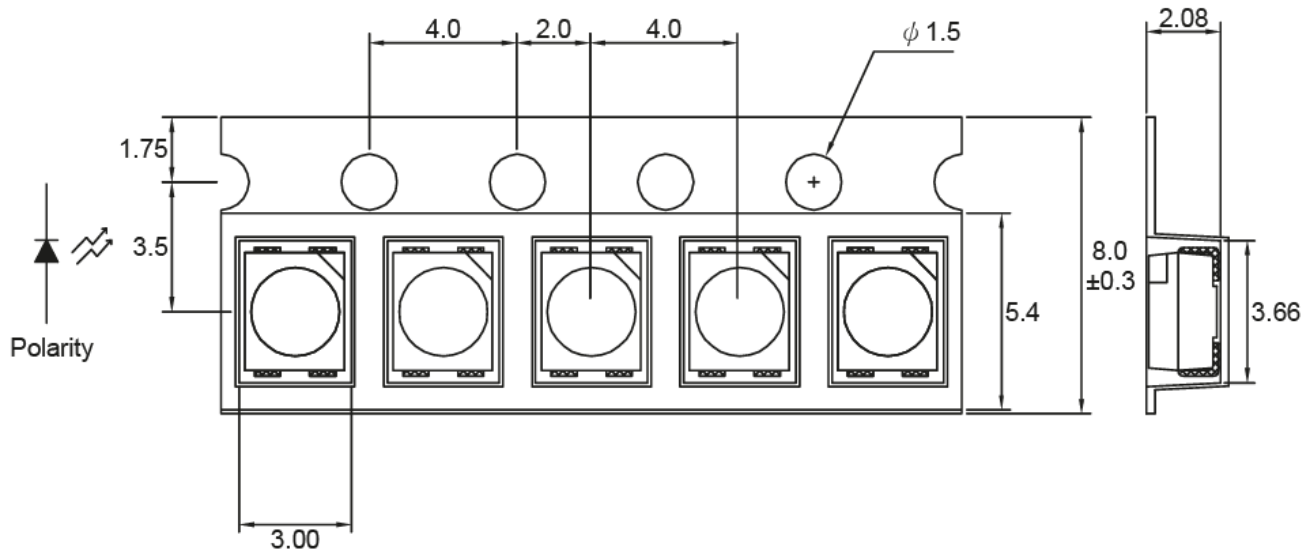


Fig.6 Directive Radiation

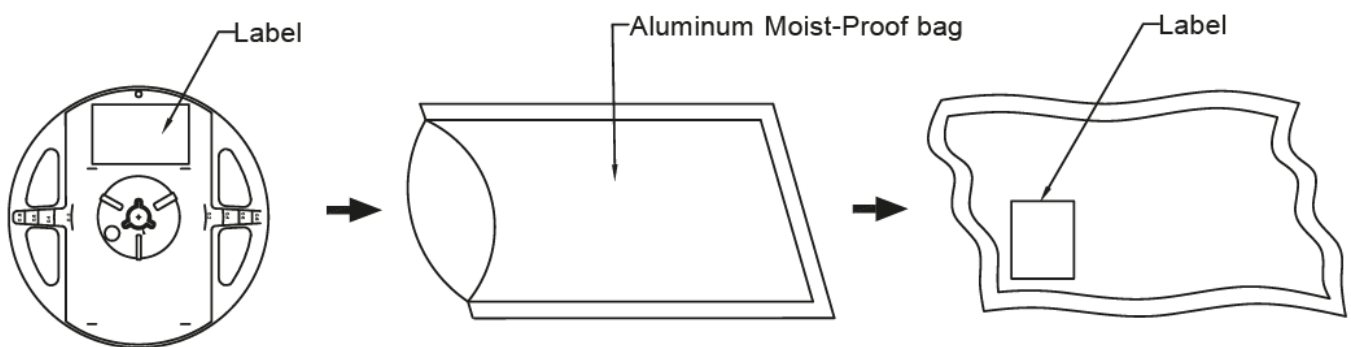


## Carrier Type Dimensions



Note : The tolerances unless mentioned is  $\pm 0.1$  mm, Angle  $\pm 0.5$ . Unit=mm.

## Packing Specifications



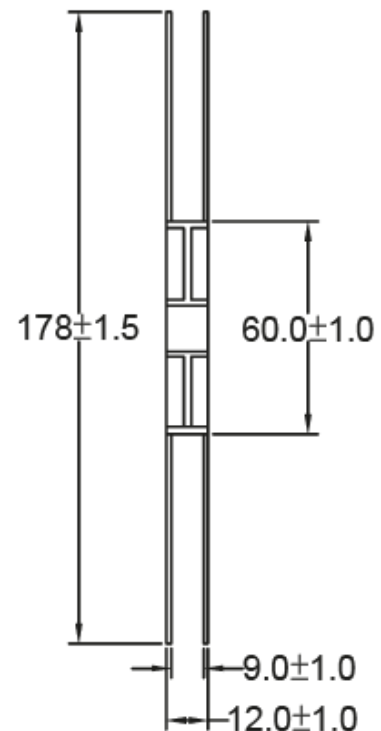
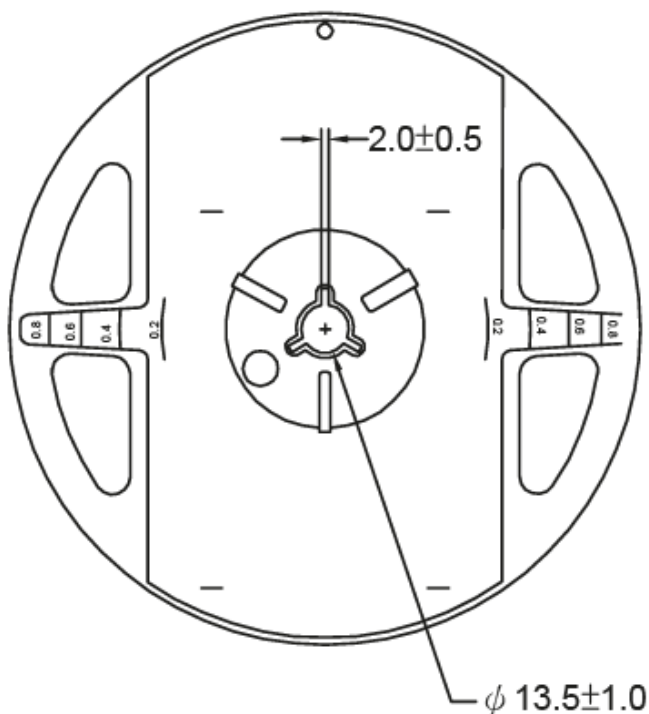
| Part No.       | Description         | Quantity/Reel |
|----------------|---------------------|---------------|
| NMOP-PLCC2-525 | 8.0mm tape, 7" reel | 2000 PCS      |

## Label Explanation

|                                                                                                                                                            |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  <b>Neumüller</b><br>Elektronik GmbH<br><small>www.neumueller.com</small> |  |
| Typ / Part No. _____                                                                                                                                       |  |
| Date Code / Rank _____                                                                                                                                     |  |
| Menge / Quantity _____                                                                                                                                     |  |
| Kunde / Customer _____                                                                                                                                     |  |

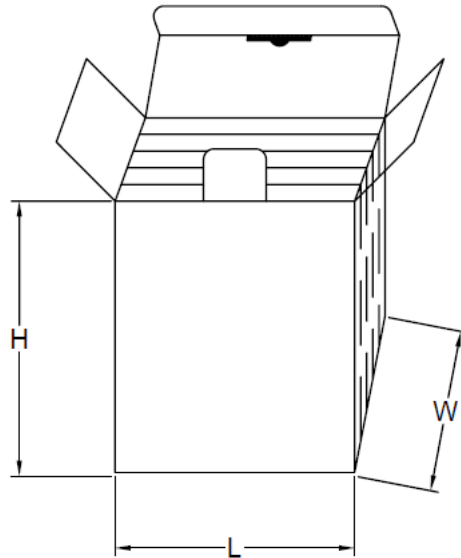
BIN : Luminous Intensity  
HUE: Dominant Wavelength  
VF: Forward Voltage

## Reel Dimensions

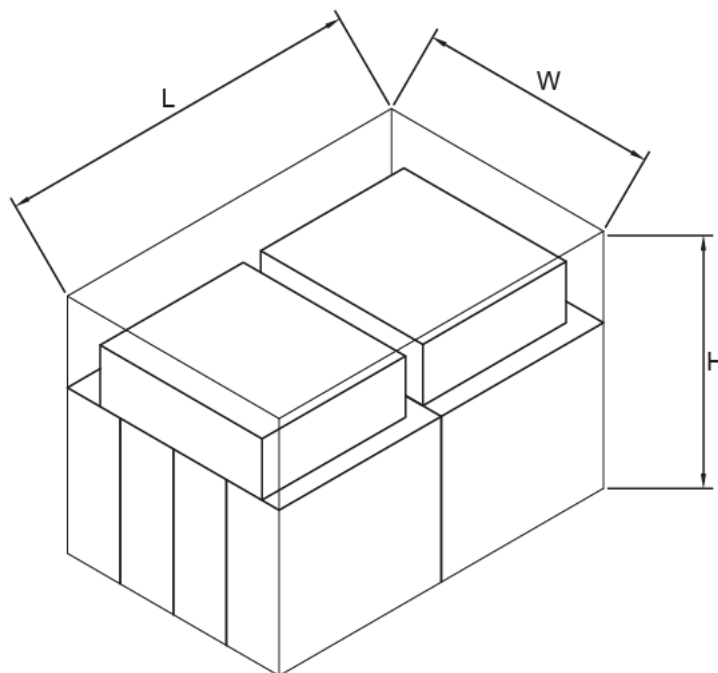


## Box Explanation

1. 5 BAG / INNER BOX
2. INNER BOX SIZE : L X W X H 23cm X 8.5cm x 26cm



3. 10 INNER BOXES / CARTON
4. CARTON SIZE : L X W X H 58cm X 34cm x 35cm

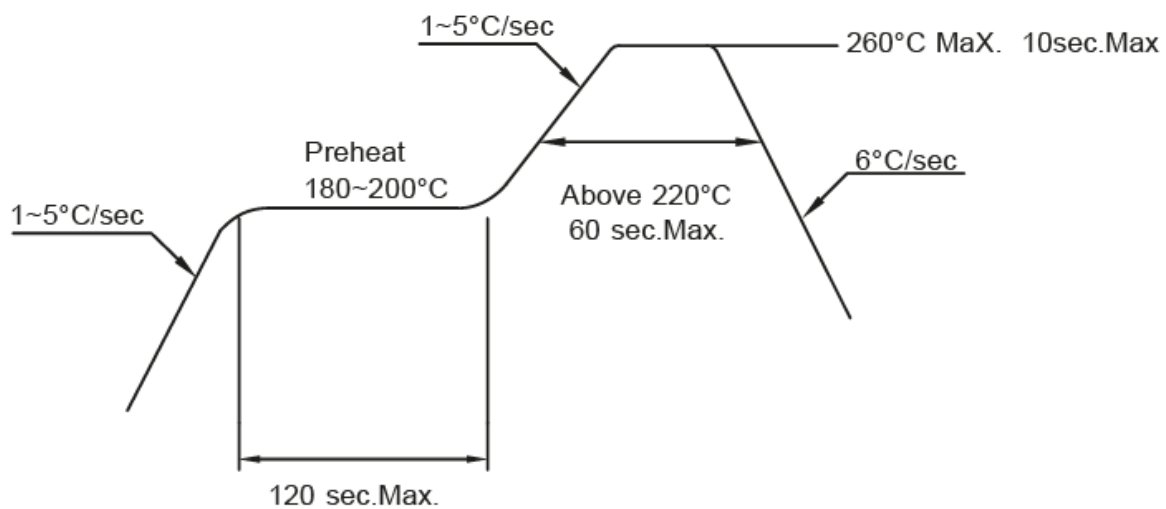


## Recommended Soldering Conditions

### 1. Hand Solder

Basic spec is  $\leq 320^{\circ}\text{C}$  3 sec one time only.

### 2. PB-Free Reflow Solder



- Note:
- 1.Reflow soldering should not be done more than two times.  
Wave solder should not be done more than one times.
  - 2.When soldering,do not put stress on the LEDs during heating.
  - 3.After soldering,do not warp the circuit board.

## Precautions For Use:

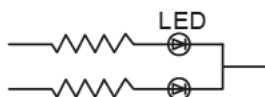
### Storage time:

1. Calculated shelf life before opening is 12 months at  $< 30^{\circ}\text{C}$  and  $< 90\%$  relative humidity (RH)
2. After bag is opened, devices which will be subjected to reflow soldering or other high temperature processes must be
  - a) Assembled within 168 hours in an environment of  $\leq 30^{\circ}\text{C}$  /  $60\%$  RH, or
  - b) Stored at ambient of  $10\%$  RH or less
3. Devices are required baking before assembly if:
  - a) Humidity Indicator Card reads  $>10\%$  (for level 2a -5a)  
or  $>60\%$  (for level 2) at ambient temperature  $23\pm 5^{\circ}\text{C}$
  - b) 2.a) or 2.b) doesn't meet
4. If baking is required, devices should be baked for  $>24$  hours at  $60\pm 5^{\circ}\text{C}$  /  $5\%$  RH. Performing baking only once, and using the baked devices within 8 hours.

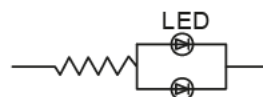
## Drive method

LED is a current operated device, and therefore, requires some kind of current limiting incorporated into the driver circuit. This current limiting typically takes the form of a current limiting resistor placed in series with the LED. Consider worst case voltage variations that could occur across the current limiting resistor. The forward current should not be allowed to change by more than 40% of its desired value

Circuit model A



Circuit model B



(A) Recommended circuit.

(B) The difference of brightness between LED could be found due to the VF-IF characteristics of LED.

## Cleaning

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

## ESD(Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrostatic glove is recommended when handling these LED. All devices, equipment and machinery must be properly grounded.

## Reliability Test:

| Classification     | Test Item                                   | Test Condition                                                             | Sample Size |
|--------------------|---------------------------------------------|----------------------------------------------------------------------------|-------------|
| Endurance Test     | Operating Life Test                         | 1. Ta=25°C<br>2. If=20mA<br>3. t=1000 hrs (-24hrs,+72hrs)                  | 22          |
|                    | High Temperature Storage Test               | 1. Ta=100°C±5°C<br>2. t=1000 hrs (-24hrs,+72hrs)                           | 22          |
|                    | Low Temperature Storage Test                | 1. Ta=-40°C±5°C<br>2. t=1000 hrs (-24hrs,+72hrs)                           | 22          |
|                    | High Temperature High Humidity Storage Test | 1. Ta=85°C<br>2. RH=85%<br>3. t=1000hrs(-24hrs,+72hrs)                     | 22          |
| Environmental Test | Thermal Shock Test                          | 1. Ta=100°C±5°C ~ -40°C±5°C<br>20min/ 10sec / 20min<br>2. total 100 cycles | 22          |
|                    | Temperature Cycling                         | 1. 100°C±5°C ~ -40°C±5°C<br>30mins / 5mins / 30mins<br>2. 100 Cycles       | 22          |
|                    | IR Reflow                                   | 1. T=260°C Max. 10sec.Max.<br>2. 6 Min                                     | 22          |