BRIGHTEK

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Brighten Up The World With LED!

ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

# PRODUCT DATASHEET


- ► Ceramic High Power
- ► 3535 2.35t Series
- ► Infrared (850nm)

Release Date: 01 June 2022 Version: A1.3

# N0F45S34ZBF (VCSEL)

3535 2.35t Series

## 3535 2.35t Series

RoHS Compliant

## APPLICATIONS:

- Security Camera
- Motion Detection
- Night Viewer
- Surveillance
- Automotive
- Facial Recognition
- Data Communication

## FEATURES:

- **Package:** Black Ceramic SMT Package with Silicon Lens
- **Forward Current:** 1000mA
- **Forward Voltage (typ.):** 2.3V
- **Radiant Power (typ.):** 800mW; 10000mW/sr@1A
- **Colour:** Infrared (IR)
- **Peak Wavelength:** 840-860nm
- **Viewing angle:** 20°
- **Materials:**
  - Resin: Silicon (Water Clear)
  - L/T Finish: Ag plated
- **Operating Temperature:** -40~+85°C
- **Storage Temperature:** -40~+100°C
- **Grouping parameters:**
  - Forward Voltage
  - Radiant Power
  - Peak Wavelength
- **Soldering methods:** IR Reflow
- **Preconditioning:** MSL2 according to J-STD020
- **Packing:** 12mm tape with max.1000pcs/reel, ø180mm (7'')

## CHARACTERISTICS:

### Absolute Maximum Characteristics (Ta=25°C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| DC Forward Current | $I_F$ | 1000 | mA |
| Pulse Forward Current | $I_{FP}$ | 1200 | mA |
| Reverse Voltage | $V_R$ | 5 | V |
| Reverse Current @5V | $I_R$ | 10 | μA |
| Junction Temperature | $T_j$ | 125 | °C |
| Thermal Resistance Junction to Solder Point | $R_{th}$ | 15 | °C/W |
| Slope Efficiency | --- | 0.9 | W/A |
| Rise Time and Fall Time | $T_R/T_F$ | 5/10 | nS |
| Electrostatic Discharge (HBM: MIL-STD-883 C 2) | ESD | 4000 | V |
| Operating Temperature | $T_{OPR}$ | -40~+85 | °C |
| Storage Temperature | $T_{STG}$ | -40~+100 | °C |
| Soldering Temperature | $T_{SOL}$ | 260 | °C |

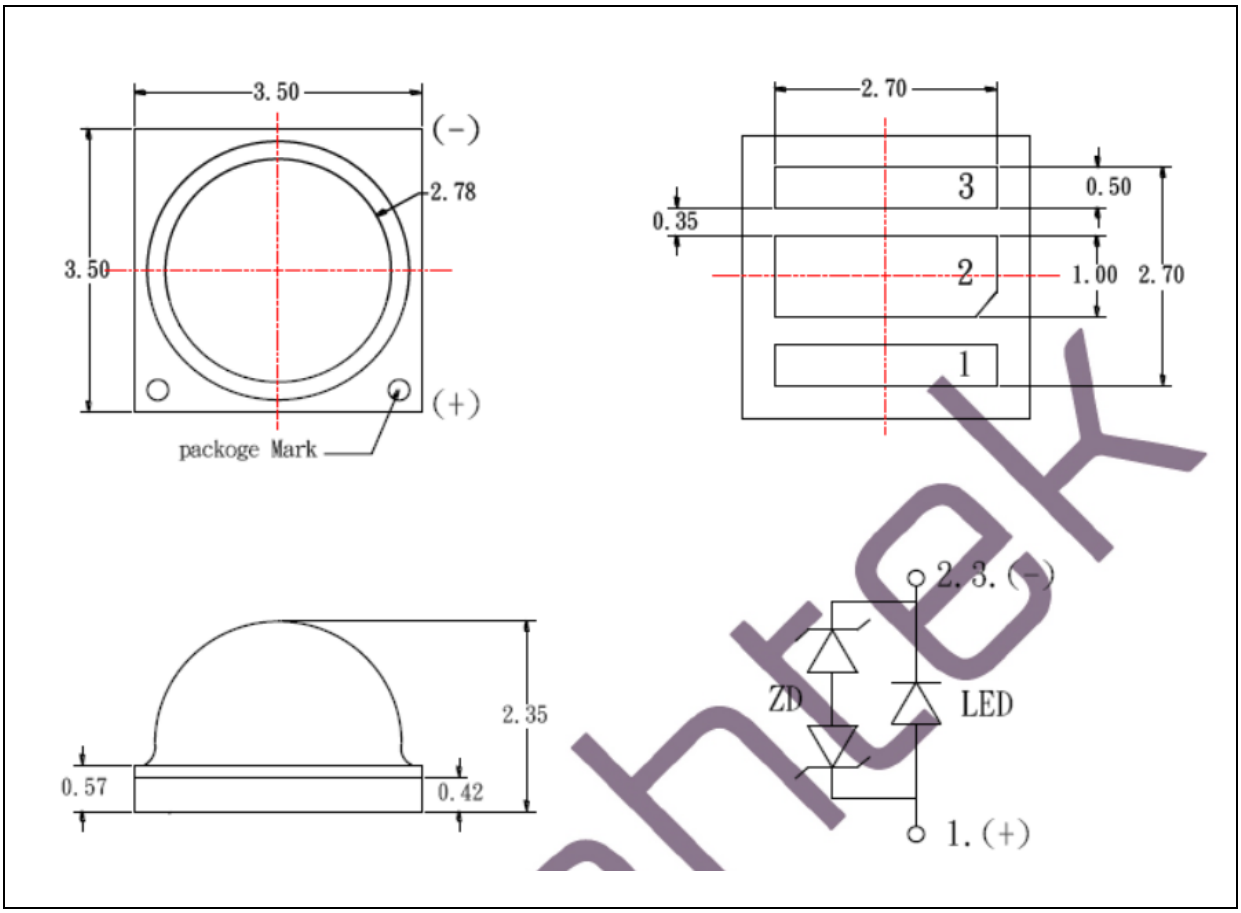
### Electrical & Optical Characteristics (Ta=25°C)

| Parameter | Symbol | Values | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Forward Voltage | $V_F$ | 2.0 | --- | 2.6 | V | $I_F$=1A |
| Radiant Power | $P_O$ | 600 | --- | 1000 | mW | $I_F$=1A |
| Radiant Intensity | $I_e$ | --- | 10000 | --- | mW/sr | $I_F$=1A |
| Dominant Wavelength | $\lambda_D$ | 840 | --- | 860 | nm | $I_F$=1A |
| Viewing Angle | $2\theta_{1/2}$ | --- | 20 | --- | deg | $I_F$=1A |

1. Radiant Power ($P_O$) ±7%, Forward Voltage ($V_F$) ±0.05V, Viewing angle($2\theta_{1/2}$) ±10°

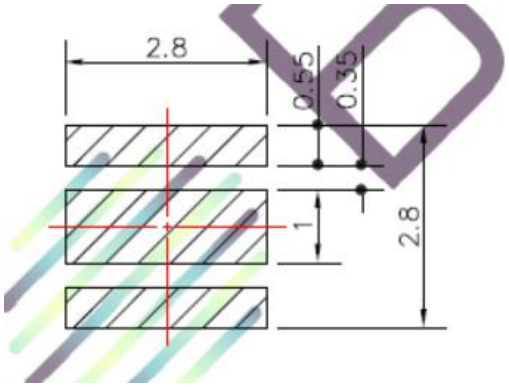
## OUTLINE DIMENSION:

Package Dimension:

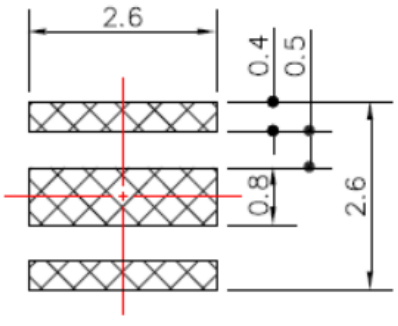



1. All dimensions are in millimetre (mm).
2. Tolerance ±0.13mm, unless otherwise noted.

Recommended Soldering Pad Dimension:




Recommended PCB Solder Pad




Recommended Stencil Pattern

1. Dimensions are in millimetre (mm).
2. Tolerance ±0.12mm with angle tolerance ±0.5°.

## BINNING GROUPS:

Forward Voltage Classifications ($I_F$ = 1A):

| Code | Min. | Max. | Unit |
|---|---|---|---|
| V2022 | 2.0 | 2.2 | V |
| V2224 | 2.2 | 2.4 | |
| V2426 | 2.4 | 2.6 | |

Radiant Power Classifications ($I_F$ = 1A):

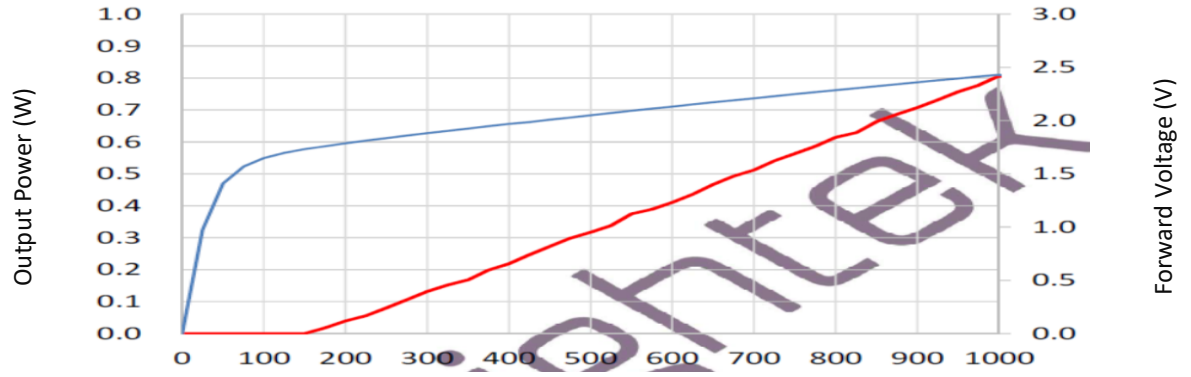
| Code | Min. | Max. | Unit |
|---|---|---|---|
| PA6 | 600 | 700 | mW |
| PA7 | 700 | 800 | |
| PA8 | 800 | 900 | |
| PA9 | 900 | 1000 | |

Dominant Wavelength Classifications ($I_F$ = 1A):

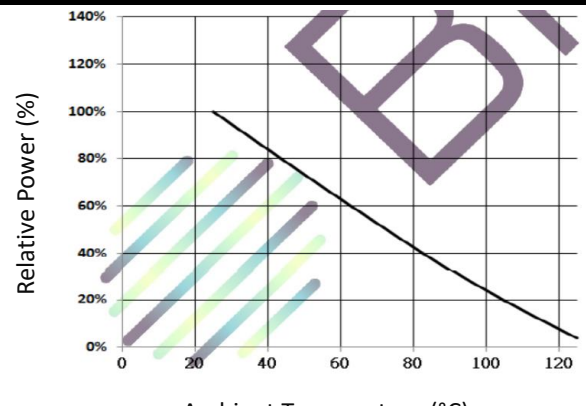
| Code | Min. | Max. | Unit |
|---|---|---|---|
| IR1 | 840 | 860 | nm |

## ELECTRO-OPTICAL CHARACTERISTICS:

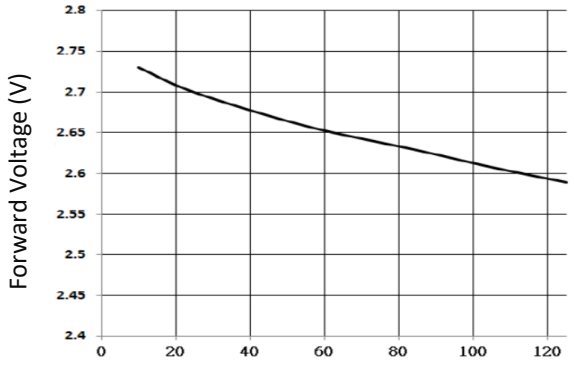
### LIV Curve



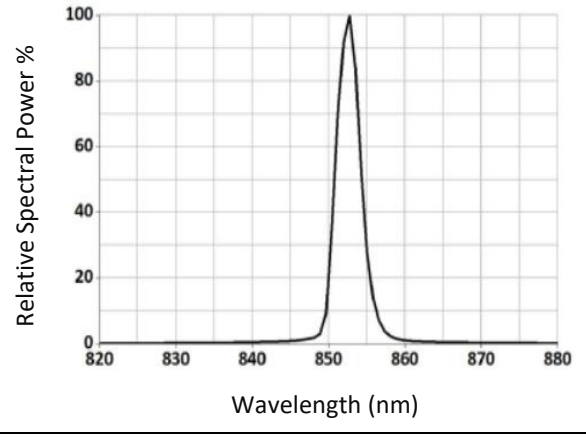

### Relative Power v.s. Temperature



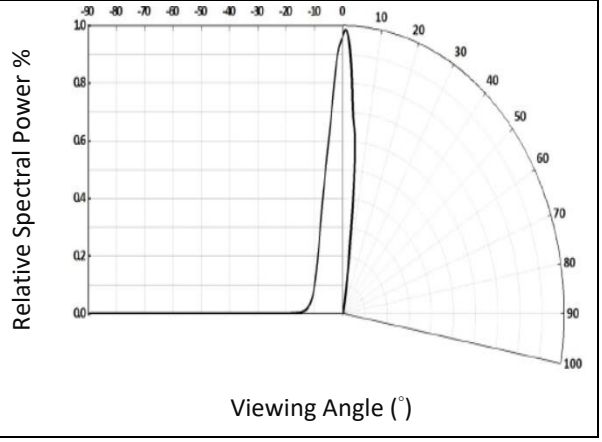

### Forward Voltage v.s. Temperature



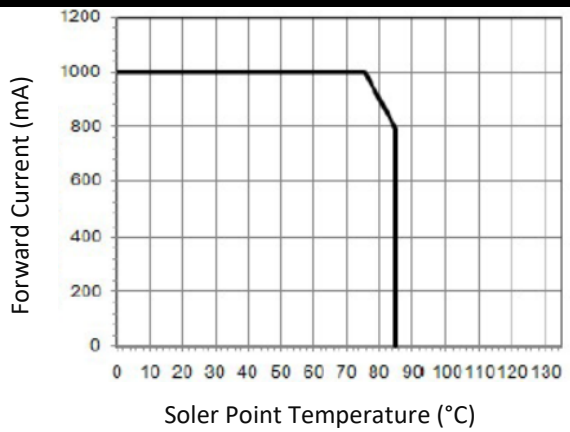
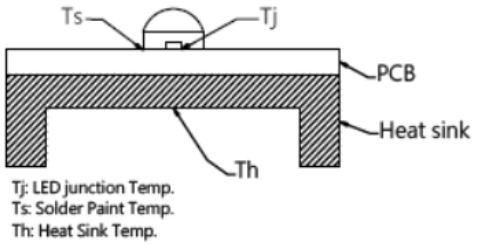

### Relative Spectral Power v.s. Wavelength




### Directive Radiation

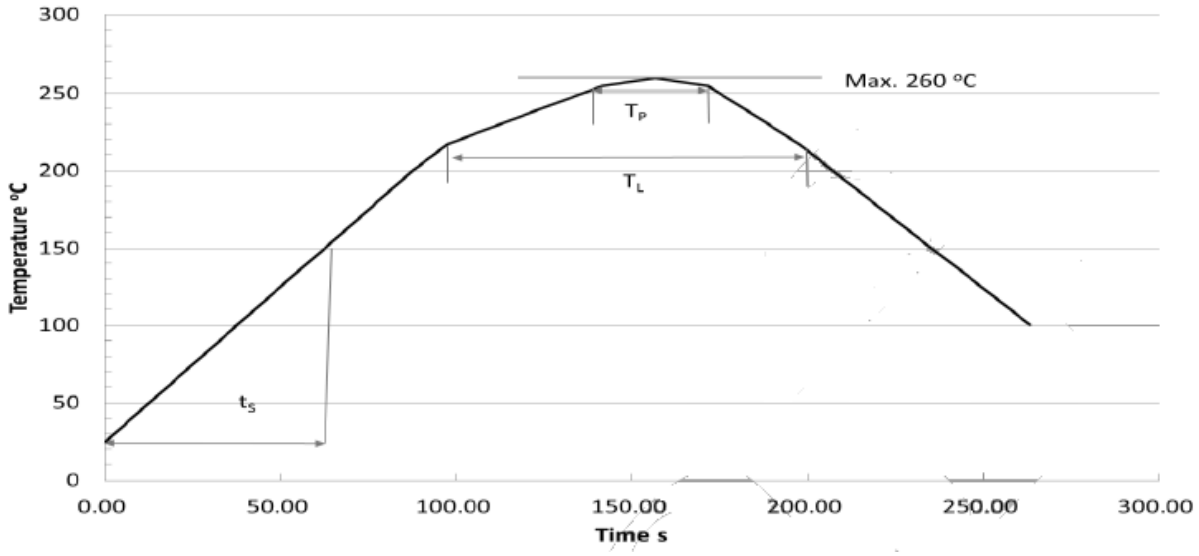


## ELECTRO-OPTICAL CHARACTERISTICS:

| Pulse Handling Capability | |
|---|---|
|  |  |

## RECOMMENDED SOLDERING PROFILE:

Reflow Lead-free Solder:




| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|---|---|---|---|---|---|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up Rate to Preheat (25°C to 150°C) | | | 2 | 3 | K/s |
| Time $t_S$ ($T_{Smin}$ to $T_{smax}$) | $t_S$ | 60 | 100 | 120 | s |
| Ramp-up Rate to Peak ($T_{Smax}$ to $T_P$) | | | 2 | 3 | K/s |
| Liquidus Temperature | $T_L$ | | 217 | | °C |
| Time above Liquidus temperature | $t_L$ | | 80 | 100 | s |
| Peak Temperature | $T_P$ | | 245 | 260 | °C |
| Time within 5 °C of the specified peaktemperature $T_P$ - 5 K | $t_P$ | 10 | 20 | 30 | s |
| Ramp-down Rate ($T_P$ to 100 °C) | | | 3 | 4 | K/s |
| Time 25 °C to $T_P$ | | | | 480 | s |

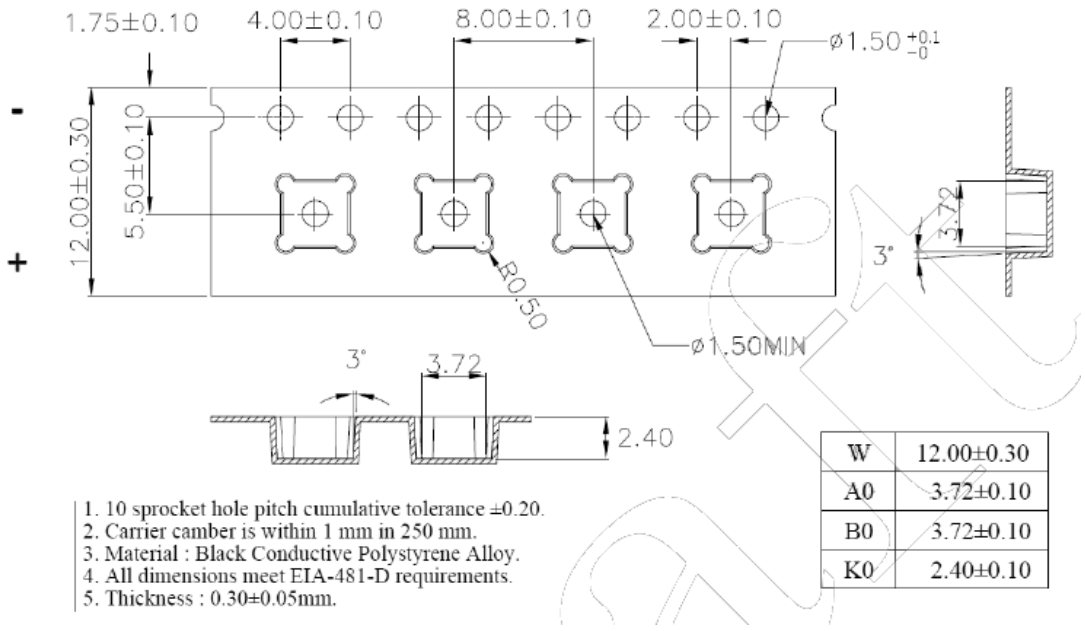
Note:

1. Maximum reflow soldering: 2 times.
2. Recommended soldering temperature is 245°C. The maximum soldering temperature should be limited to 260°C.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

## PACKING SPECIFICATION:

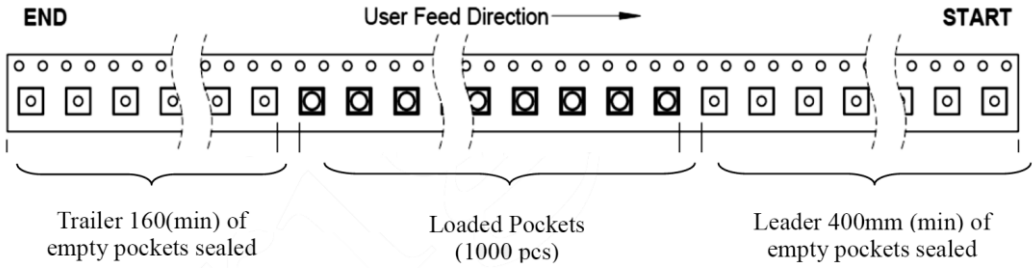
Reel Dimension:

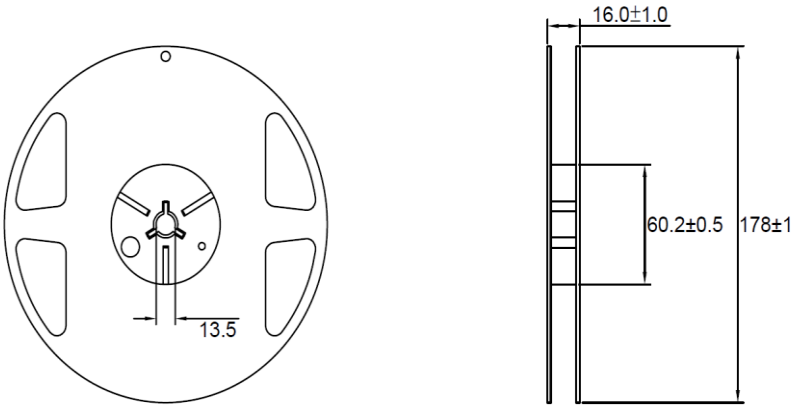
Max.1000pcs/reel




| | |
|---|---|
| W | 12.00±0.30 |
| A0 | 3.72±0.10 |
| B0 | 3.72±0.10 |
| K0 | 2.40±0.10 |

1. 10 sprocket hole pitch cumulative tolerance ±0.20.
2. Carrier camber is within 1 mm in 250 mm.
3. Material : Black Conductive Polystyrene Alloy.
4. All dimensions meet EIA-481-D requirements.
5. Thickness : 0.30±0.05mm.



## PRECAUTIONS OF USE:

### Storage:

It is recommended to store the products in the following conditions:

- Humidity: 60% R.H. Max.
- Temperature: 5°C~30°C (41°F ~86°F).

Shelf life in sealed bag: 12 months at 5°C~30°C and <60% R.H.

Once the package is opened, the products should be used within a week. Otherwise, they should be kept in a damp-proof box with descanting agent <10% R.H. and apply baking before use.

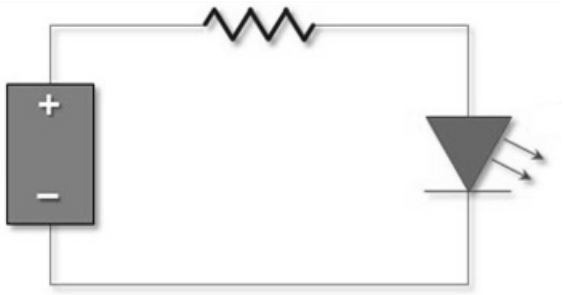
### Baking:

It is recommended to bake the LED before soldering if the pack has been unsealed for longer than 24hrs. The suggested baking conditions are as followings:

- 60±3°C x 24hrs and <5%RH, taped / reel package.

It's normal to see slight color fading of carrier (light yellow) after baking in process.

### Testing Circuit:




Must apply resistor(s) for protection (over current proof).

### Cleaning:

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LED carrier / package. Avoid putting any stress force directly on to the LED lens.

### ESD (Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Use of a conductive wrist band or anti-electrosatic glove is recommended when handing the LED all time. All devices, equipment, machinery, work tables, and storage racks must be properly grounded.

In the events of manual working in process, make sure the devices are well protected from ESD at any time.

## REVISION RECORD:

| Version | Date | Summary of Revision |
|---|---|---|
| A1.0 | 10/01/2018 | Datasheet set-up. |
| A1.1 | 20/09/2018 | New datasheet format. |
| A1.2 | 10/10/2018 | Revise maximum forward current. |
| A1.3 | 01/06/2022 | Revise voltage tange. |