BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED !

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

# PRODUCT DATASHEET

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

- ► PLCC2 Top View SMD
- ► 2214 1.3t
- ► Sky White (Ice Blue)

Release Date: 02 March 2025 Version: A1.2

N0W49S16Z

2214 1.3t Series

## 2214 1.3t Series

RoHS Compliant

AUTOMOTIVE AEC-Q102

### FEATURES:

- **Package:** PLCC2 Single Colour Top View SMD
- **Forward Current:** 20mA
- **Forward Voltage (typ.):** 2.9V
- **Luminous Intensity (typ.):** 1550mcd@20mA
- **Colour:** Sky White (Ice Blue)
- **Colour Temperature (CCT):** X:0.1750; Y:0.2150
- **Viewing Angle:** 120°
- **Materials:**
  - Resin: Silicone (Yellow Diffused)
  - Finishing: Ag plated
- **Operating Temperature:** -40~+105°C
- **Storage Temperature:** -40~+105°C
- **ESD (HBM):** 6KV
- **Grouping Parameters:**
  - Forward voltage
  - Luminous intensity
  - CIE Chromaticity
- **Soldering Methods:** Reflow
- **MSL Level:** acc. to JEDEC Level 2a
- **Packing:** 8mm tape with max.3000/reel, ø180mm (7'')

### APPLICATIONS:

- Automotive
- Backlighting
- Indication Light
- Switch light
- Dashboard
- Decoration Lighting

## CHARACTERISTICS:

### Absolute Maximum Characteristics ($T_a$=25°C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Forward Current | $I_F$ | 30 | mA |
| Peak Forward Current Duty 1/10; width 0.1ms | $I_{FP}$ | 100 | 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 | $R_{thJ-S}$ | 130 | °C/W |
| Thermal Resistance Junction to Solder Point | $R_{thJ-A}$ | 260 | °C/W |
| Operating Temperature | $T_{OPR}$ | -40~+105 | °C |
| Storage Temperature | $T_{STG}$ | -40~+105 | °C |
| Solder Temperature | TSD | 260 for 10S | °C |

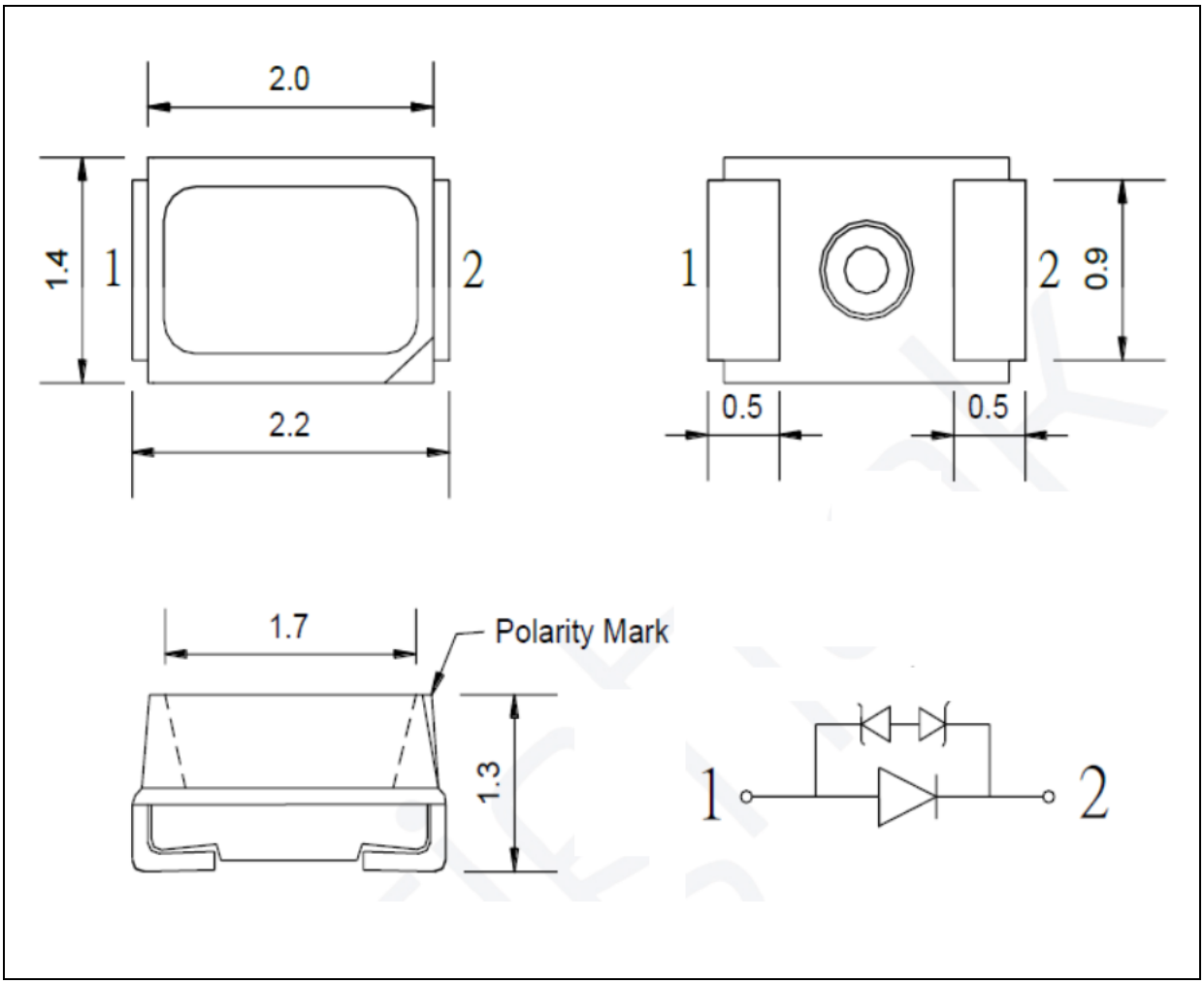
### Electrical & Optical Characteristics ($T_a$=25°C)

| Parameter | Symbol | Values | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Forward Voltage | $V_F$ | 2.5 | 2.9 | 3.1 | V | $I_F$=20mA |
| Luminous Intensity | $I_V$ | 1050 | 1550 | --- | mcd | $I_F$=20mA |
| Chromaticity Coordinates | X | --- | 0.1750 | --- | --- | $I_F$=20mA |
| | Y | --- | 0.2150 | --- | | |
| Peak Wavelength | $\lambda_P$ | --- | 451 | --- | nm | $I_F$=20mA |
| Spectral Width 50% | $\Delta\lambda$ | --- | 16 | --- | nm | $I_F$=20mA |
| Viewing Angle | $2\theta_{1/2}$ | --- | 120 | --- | deg | $I_F$=20mA |

1. Luminous intensity ($I_V$) ±10%, Forward Voltage ($V_F$) ±0.1V, Viewing angle($2\theta_{1/2}$) ±5°

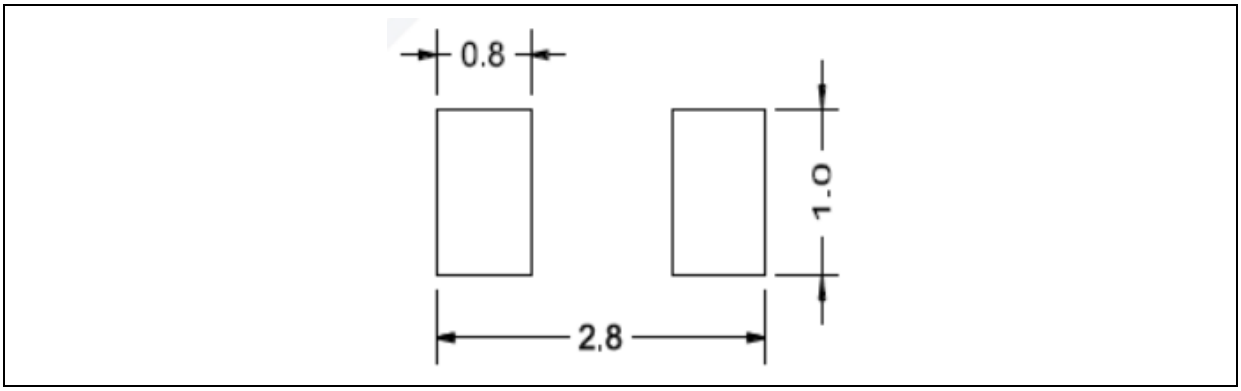
## OUTLINE DIMENSION:

Package Dimension:




1. All dimensions are in millimetre (mm).
2. Tolerance ±0.2mm, unless otherwise noted.

Recommended Soldering Pad Dimension:




1. Dimensions are in millimetre (mm).
2. Tolerance ±0.1mm with angle tolerance ±0.5°.

## BINNING GROUPS:

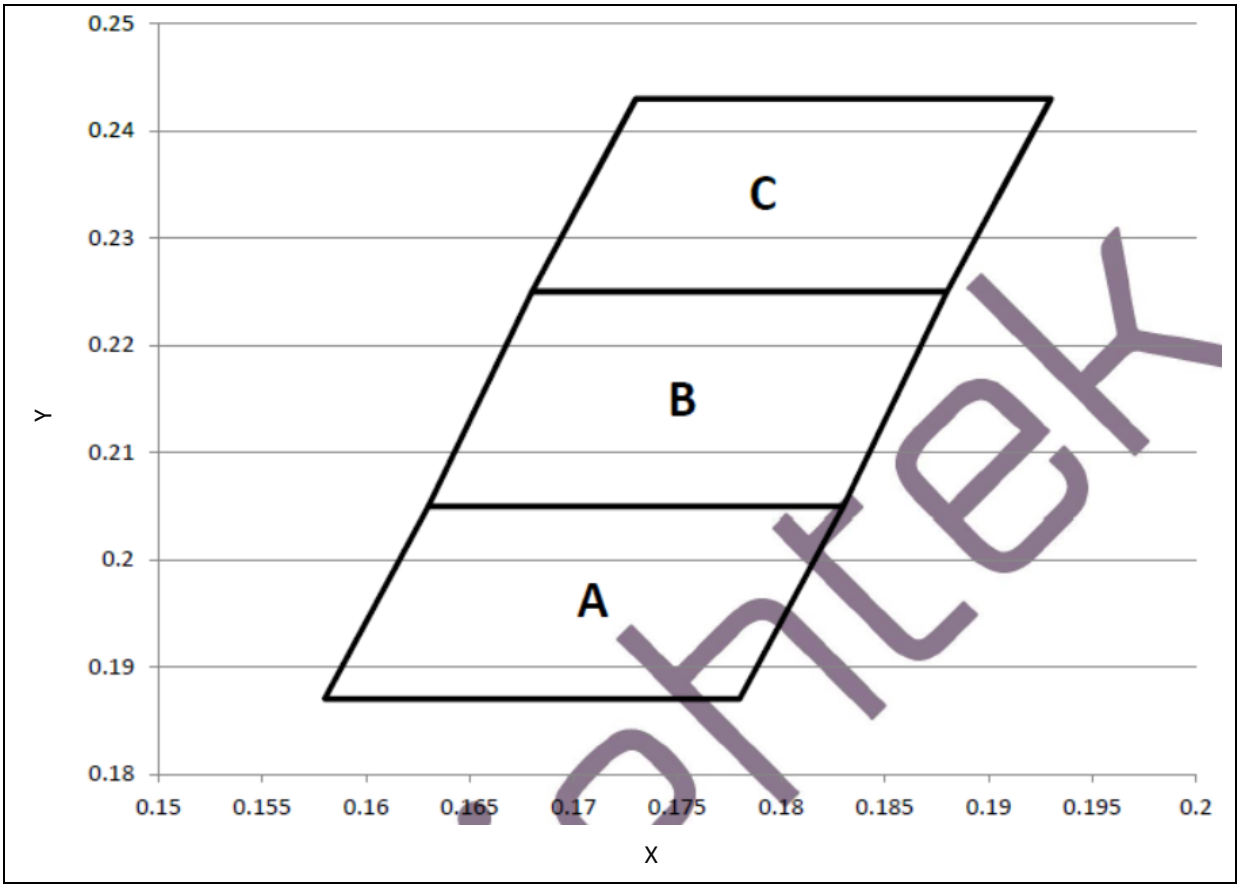
Forward Voltage Classifications ($I_F$ = 20mA):

| Code | Min. | Max. | Unit |
|---|---|---|---|
| b | 2.5 | 2.6 | V |
| a | 2.6 | 2.7 | |
| A | 2.7 | 2.8 | |
| B | 2.8 | 2.9 | |
| C | 2.9 | 3.0 | |
| D | 3.0 | 3.1 | |

Luminous Intensity Classifications ($I_F$ = 20mA):

| Code | Min. | Max. | Unit |
|---|---|---|---|
| 1 | 1050 | 1250 | mcd |
| 2 | 1250 | 1450 | |
| 3 | 1450 | 1650 | |
| 4 | 1650 | 1850 | |
| 5 | 1850 | 2050 | |

## CIE CHROMATICITY DIAGRAM:

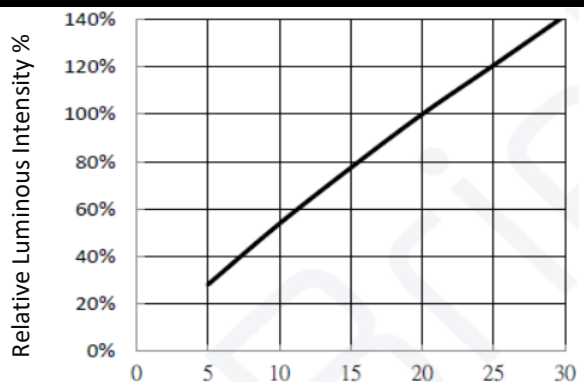



Chromaticity Coordinates Classifications ($I_F$ = 20mA):

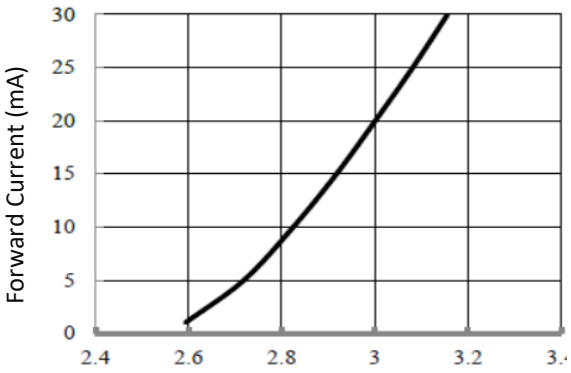
| | 1 | | 2 | | 3 | | 4 | |
|---|---|---|---|---|---|---|---|---|
| | X | Y | X | Y | X | Y | X | Y |
| A | 0.1580 | 0.1870 | 0.1780 | 0.1870 | 0.1830 | 0.2050 | 0.1630 | 0.2050 |
| B | 0.1630 | 0.2050 | 0.1830 | 0.2050 | 0.1880 | 0.2250 | 0.1680 | 0.2250 |
| C | 0.1680 | 0.2250 | 0.1880 | 0.2250 | 0.1930 | 0.2430 | 0.1730 | 0.2430 |

## ELECTRO-OPTICAL CHARACTERISTICS:

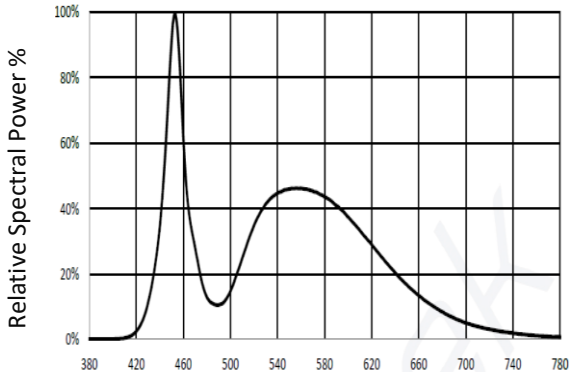
### Relative Luminous Intensity v.s. Forward Current



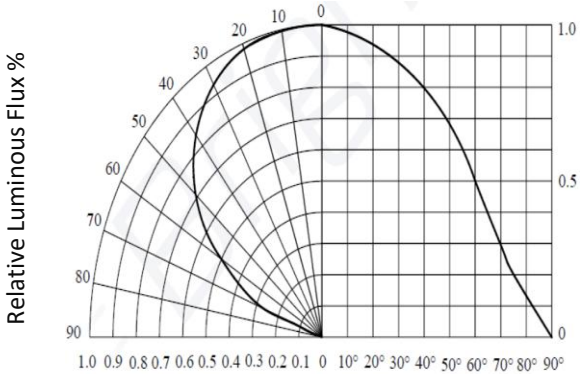

### Forward Current v.s. Forward Voltage



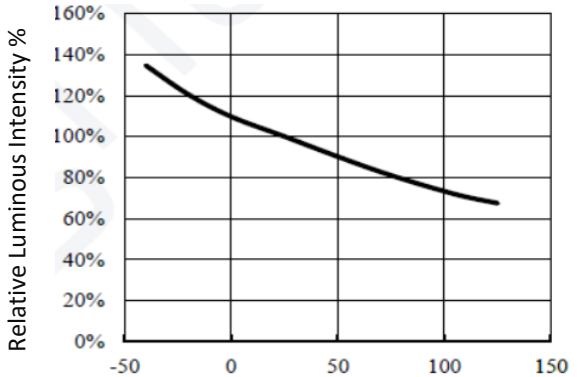

### Relative Spectral Power v.s. Wavelength



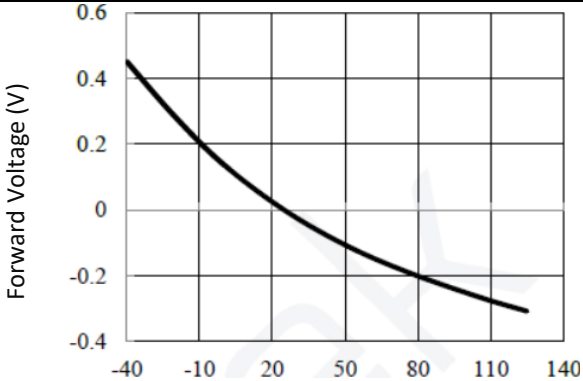

### Directive Radiation



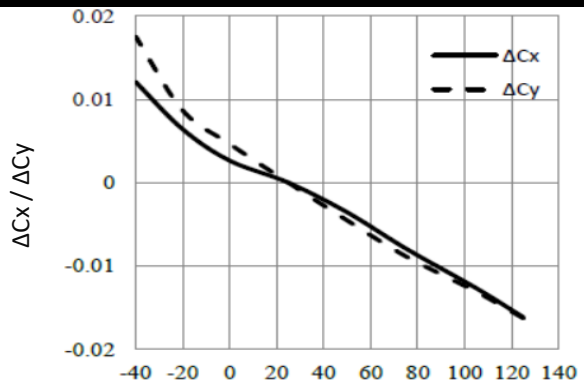

### Relative Luminous Intensity v.s. Solder Temp.



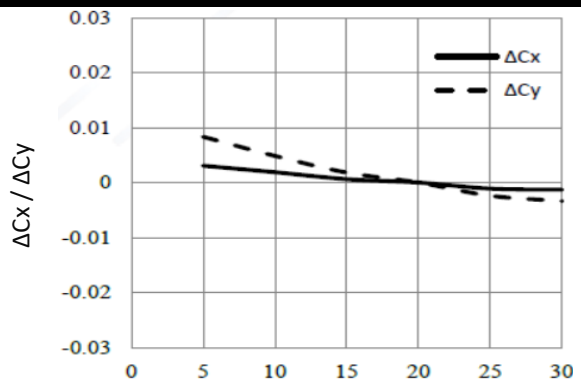

### Forward Voltage v.s. Solder Temperature



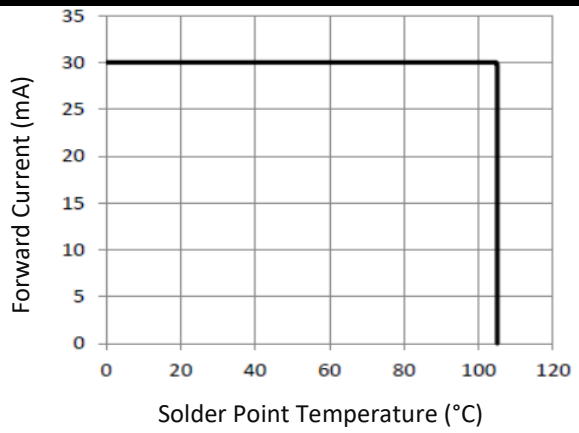
## Chromaticity Coordinate Shift v.s. Solder Temp.

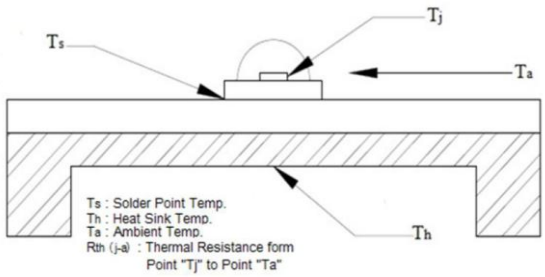



## Chromaticity Coordinate Shift v.s. Current



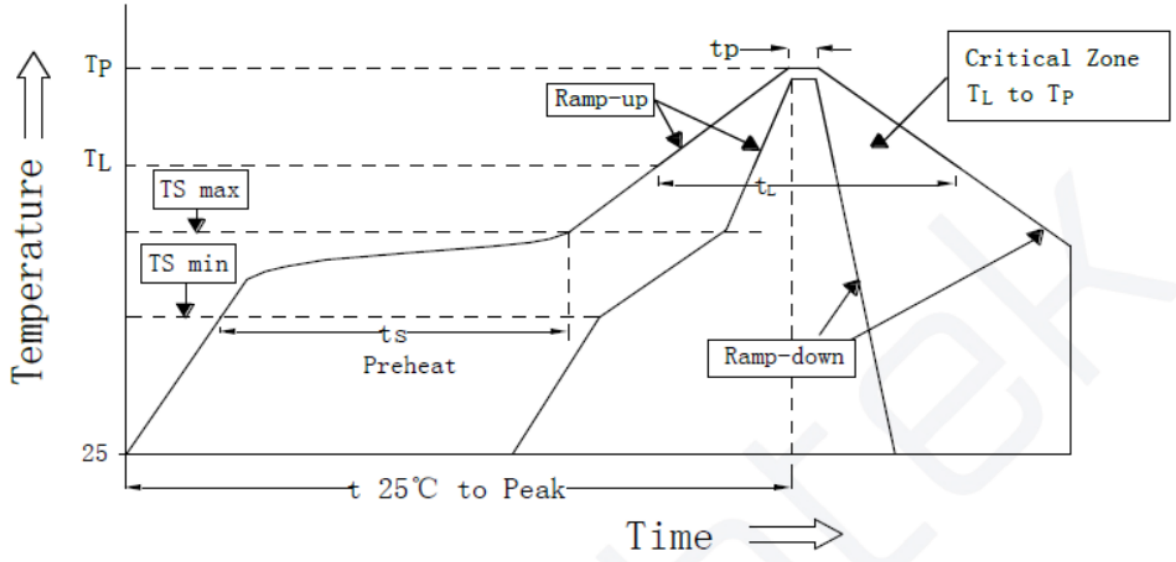

## Forward Current Derating Curve



## RECOMMENDED SOLDERING PROFILE:

Reflow Lead-free Solder:




| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Recommendation | Max. | |
| Ramp-up rate to preheat (25°C to 150°C) | - | - | 2 | 3 | K/s |
| Time $t_S$ ($T_{S\,min}$ to $T_{S\,max}$) | $t_S$ | 60 | 100 | 120 | s |
| Ramp-up rate to peak ($T_{S\,max}$ 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 peak temperature $T_P$ - 5 K | $t_P$ | - | - | 10 | s |
| Ramp-down Rate ($T_P$ to 100 °C) | - | - | 3 | 4 | K/s |
| Time 25 °C to $T_P$ | - | - | - | 480 | s |

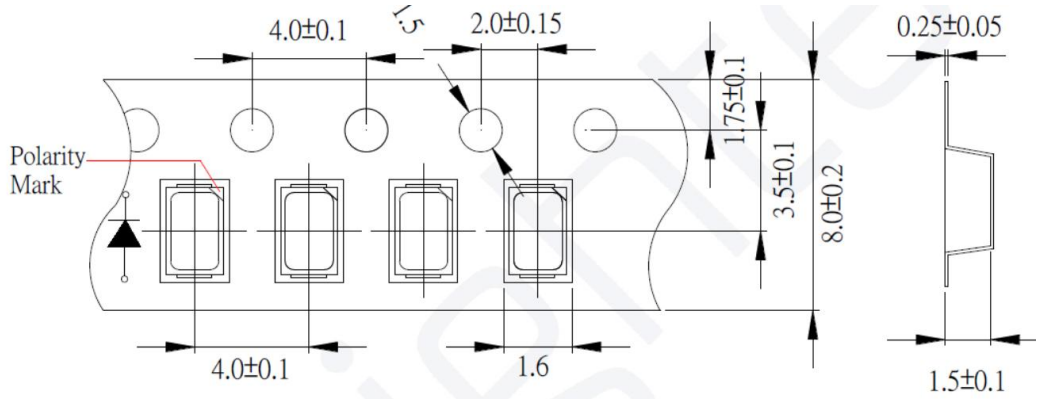
Note:

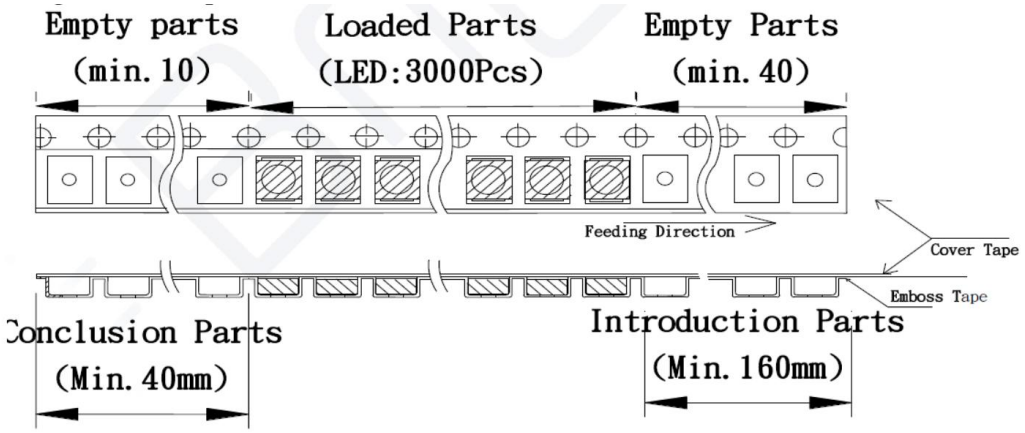
1. Maximum reflow soldering: 3 times.
2. The recommended reflow temperature is 240°C. The maximum soldering temperature should be limited to 260°C.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

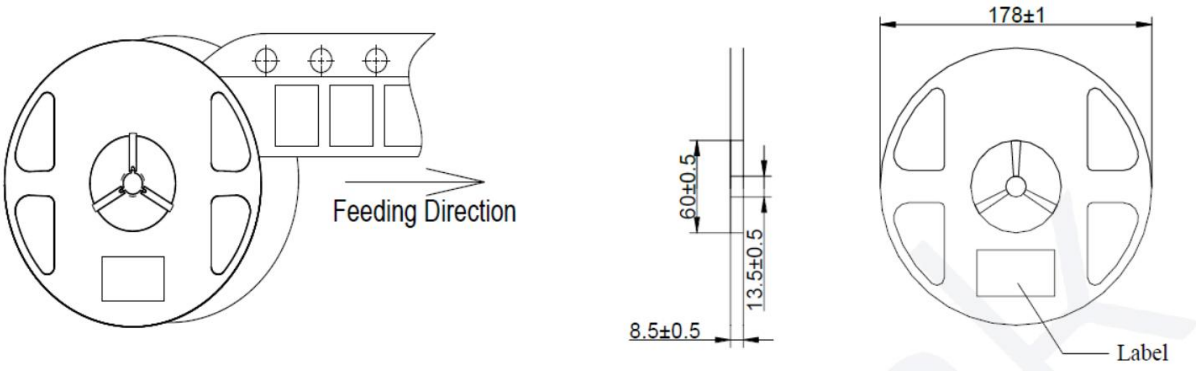
## PACKING SPECIFICATION:

Reel Dimension:

Max.3000pcs/reel



## 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 4 weeks. Otherwise, they should be kept in a damp-proof box with descanting agent <10% R.H. and apply baking before use.

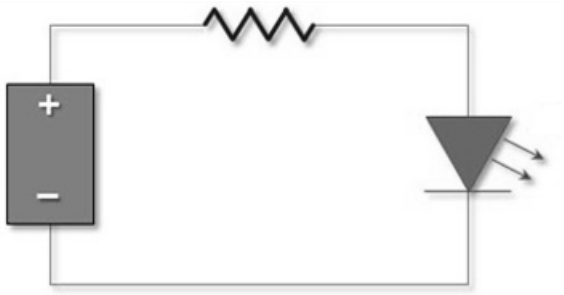
### Baking:

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 6hrs 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 | 15/05/2019 | Datasheet set-up. |
| A1.1 | 28/05/2022 | New datasheet format. |
| A1.2 | 02/03/2025 | Revised bin tables. |