



BRIGHTTEK
BRIGHTTEK (EUROPE) LIMITED

Brighten Up The World With LED!



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 080000 IECQ HSPM

PRODUCT DATASHEET



- ▶ PLCC6 SMD with IC
- ▶ 3535IC 1.47t Series
- ▶ Red/Green/Blue

NOM64S80IC



Release Date: 15 September 2024 Version: A1.1



3535 IC-Integrated

RoHS
Compliant



FEATURES:

- **Package:** PLCC6 EIA STD Package with Integrated IC
- **Forward Current:** 10mA
- **Forward Voltage (typ.):** +9~+15V
- **Luminous Intensity (typ.):** 1600mcd mixed white
- **Colour:** Red/Green/Blue
- **Dominant Wavelength:** 622/525/467nm
- **Viewing Angle:** 120°
- **Operating Temperature:** -40~+105°C
- **Storage Temperature:** -40~+105°C
- **IC Feature:** Serial data transmission signal by single wire. Serial data frequency 800Khz using return to zero code.
- **Pixel:** One pixel contains R, G, and B colour that each can achieve 256 level brightness grayscales, which forms 16,777,216 combination colours.
- **Soldering Methods:** IR Reflow soldering
- **MSL Level:** acc. to JEDEC Level 3
- **Packing:** 12mm tape with max.1300pcs/reel, ø180mm (7")

APPLICATIONS:

- Telecommunication
- Automotive Interior light
- Home Appliance
- Decoration Lighting
- Full Colour LED Strip
- Gaming Device

CHARACTERISTICS:

Absolute Maximum Characteristics (T_a=25°C)

| Parameter | Symbol | Ratings | Unit |
|---|-------------------|---------------------------|------|
| IC Power Supply Voltage | V _{DD} | 9~15 | V |
| Logic Input Voltage | V _{in} | -0.5~V _{DD} +0.5 | V |
| The Max. LED Output Current | I _{OMAX} | 10 | mA |
| Power Dissipation | P _D | 180 | mW |
| Operating Temperature | T _{OPR} | -40~+105 | °C |
| Storage Temperature | T _{STG} | -40~+105 | °C |
| Electrostatic Discharge acc. To ANSI/ESDA/JEDEC JS-001 Class 2 | ESD | 2 | kV |
| Soldering Temperature | T _{SD} | 260 | °C |

Electrical & Optical Characteristics (T_a=25°C, V_{DD}=12V)

| Parameter | Symbol | Values | | | Unit | Test Condition | |
|---------------------|-------------------|----------------|------|--------|------|----------------------|----------------------|
| | | Min. | Typ. | Max. | | | |
| Forward Voltage | V _F | 9 | 12 | 15 | V | I _F =10mA | |
| Luminous Intensity | R | I _v | 250 | 300 | 400 | mcd | I _F =10mA |
| | G | | 800 | 1100 | 1250 | | |
| | B | | 200 | 220 | 320 | | |
| Mix White | W | | 1250 | 1600 | 2000 | | |
| Dominant Wavelength | R | λ _d | 615 | --- | 630 | nm | I _F =10mA |
| | G | | 515 | --- | 535 | | |
| | B | | 460 | --- | 475 | | |
| Colour Coordinate | X | --- | --- | 0.2300 | --- | --- | I _F =10mA |
| | Y | | --- | 0.2593 | --- | | |
| Viewing Angle | 2θ _{1/2} | --- | 120 | --- | deg | I _F =10mA | |

Measurement Tolerances: Forward Voltage: ±0.1 V; Luminous Intensity: ±10%; Dominant Wavelength: ±0.1 nm; Color Coordinate ±0.005; Viewing Angle(2θ_{1/2}): ±5%

Electrical & Optical Characteristics ($T_a=25^\circ\text{C}$)

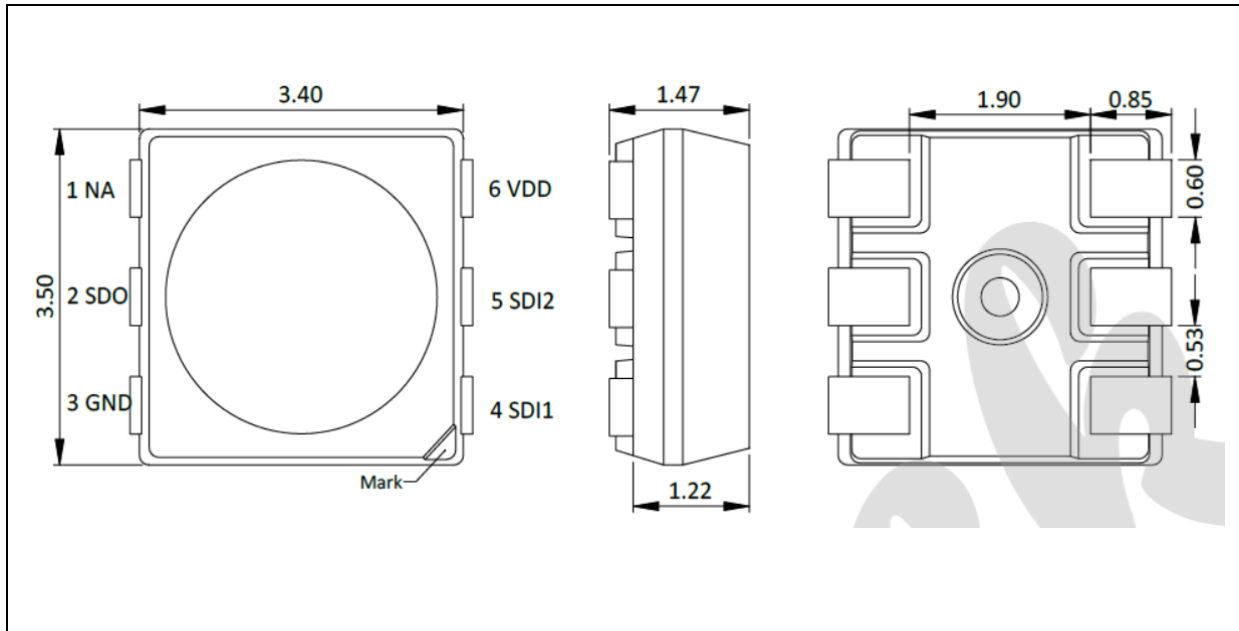
| Parameter | Symbol | Values | | | Unit | Test Condition |
|--------------------------|-----------|--------|------|------|------|---------------------|
| | | Min. | Typ. | Max. | | |
| Supply Voltage | V_{DD} | 9 | 12 | 15 | V | --- |
| Input Voltage Level | V_{IH} | 4 | --- | 6 | V | D_{IN} , SET |
| | V_{IL} | --- | --- | 1 | V | D_{IN} , SET |
| Current Output | I_{OUT} | --- | --- | 10 | mA | $V_{DD}=12\text{V}$ |
| Static Power Consumption | I_{DD} | --- | 2.5 | --- | mA | --- |
| PWM Frequency | F_{pwm} | --- | 6 | --- | KHz | --- |

 Switching Characteristics ($T_a=25^\circ\text{C}$)

| Parameter | Symbol | Values | | | Unit | Test Condition |
|------------------------------------|-----------|--------|------|------|------|----------------|
| | | Min. | Typ. | Max. | | |
| Rate of Data Signal | F_{DIN} | 400 | 800 | 1000 | kHz | --- |
| Transfer Time | T_{PHL} | --- | 80 | --- | ns | --- |
| Conversion Time of I_{OUT} R/G/B | T_r | --- | 40 | --- | ns | --- |
| | T_f | --- | 40 | --- | ns | --- |

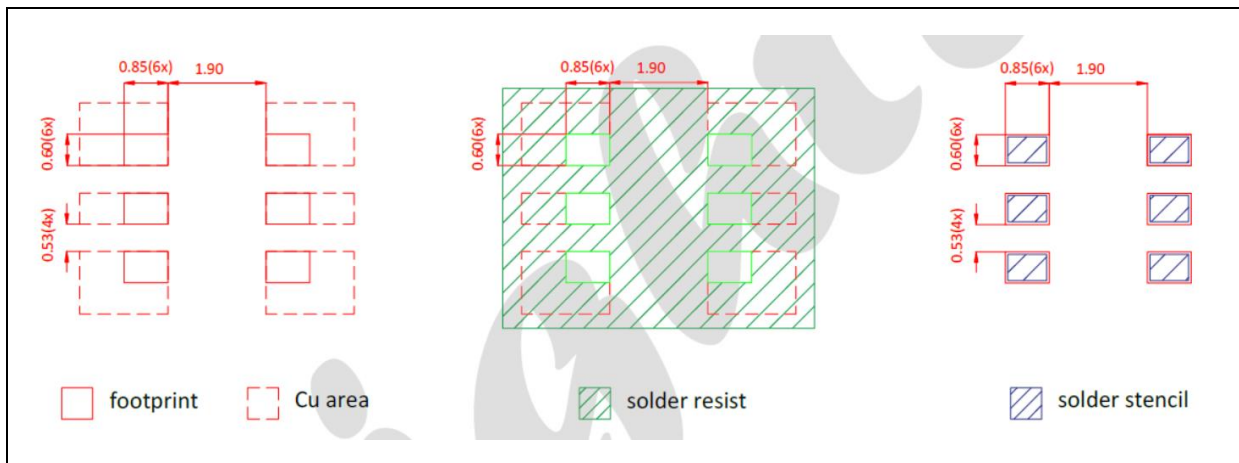
OUTLINE DIMENSION:

Package Dimension:

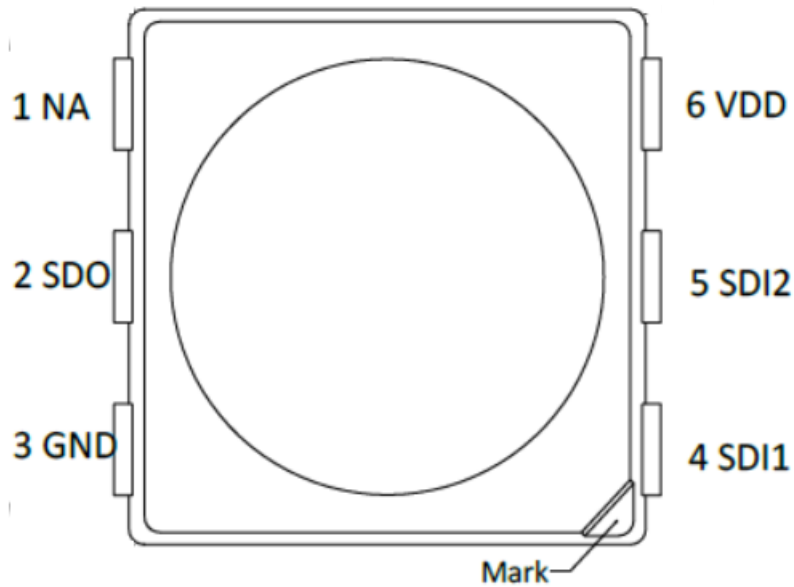


1. All dimensions are in millimetre (mm).
2. Tolerance $\pm 0.1\text{mm}$, unless otherwise noted.

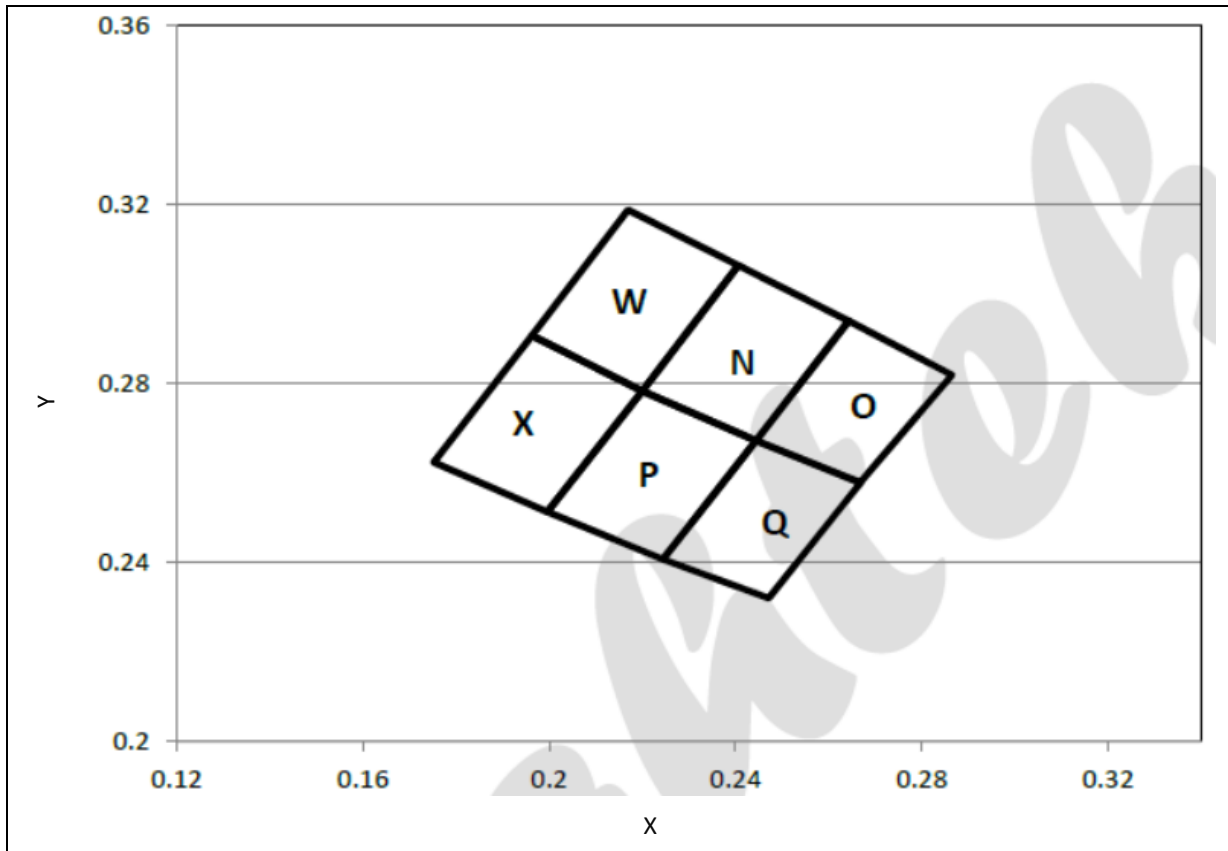
Recommended Soldering Pad Dimension:



1. Dimensions are in millimetre (mm).
2. Tolerance $\pm 0.1\text{mm}$ with angle tolerance $\pm 0.5^\circ$.

PIN CONFIGURATION:


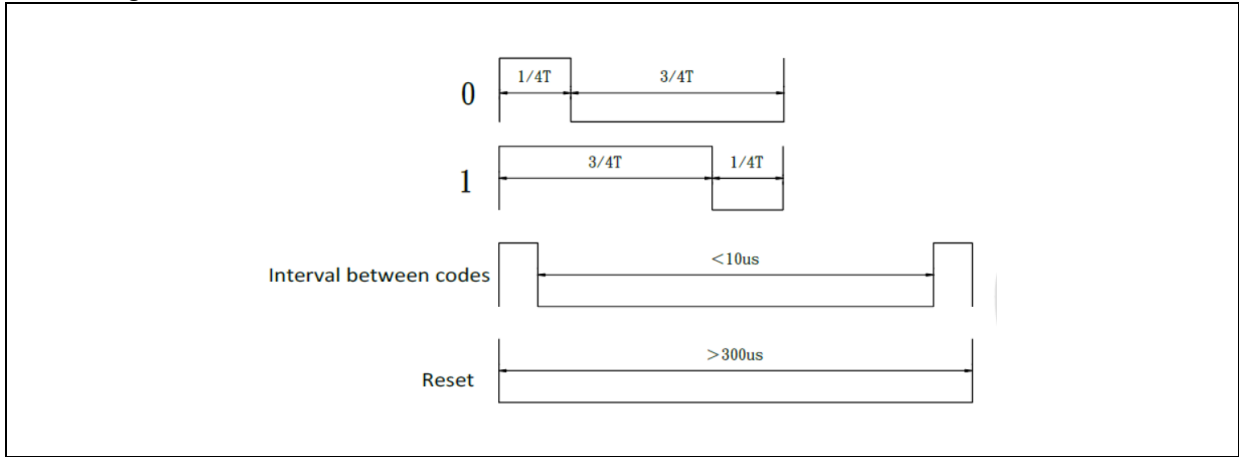
| No. | Symbol | Function Description |
|-----|--------|----------------------|
| 1 | NA | Insignificance |
| 2 | SDO | Data Output |
| 3 | GND | Ground |
| 4 | SDI1 | Data Input |
| 5 | SDI2 | Data Redundant Input |
| 6 | VDD | Supply Voltage |

CIE CHROMATICITY DIAGRAM:

Chromaticity Coordinates Classifications:

| | 1 | | 2 | | 3 | | 4 | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|
| | X | Y | X | Y | X | Y | X | Y |
| O | 0.2444 | 0.2672 | 0.2643 | 0.2940 | 0.2865 | 0.2819 | 0.2667 | 0.2578 |
| Q | 0.2444 | 0.2672 | 0.2244 | 0.2407 | 0.2471 | 0.2320 | 0.2669 | 0.2579 |
| N | 0.2200 | 0.2783 | 0.2406 | 0.3064 | 0.2643 | 0.2940 | 0.2444 | 0.2672 |
| P | 0.2200 | 0.2783 | 0.1996 | 0.2513 | 0.2244 | 0.2407 | 0.2444 | 0.2672 |
| W | 0.1963 | 0.2907 | 0.2169 | 0.3188 | 0.2406 | 0.3064 | 0.2200 | 0.2783 |
| X | 0.1963 | 0.2907 | 0.1752 | 0.2624 | 0.1996 | 0.2513 | 0.2200 | 0.2783 |

FUNCTION DESCRIPTION:

1. Timing Wave Form:



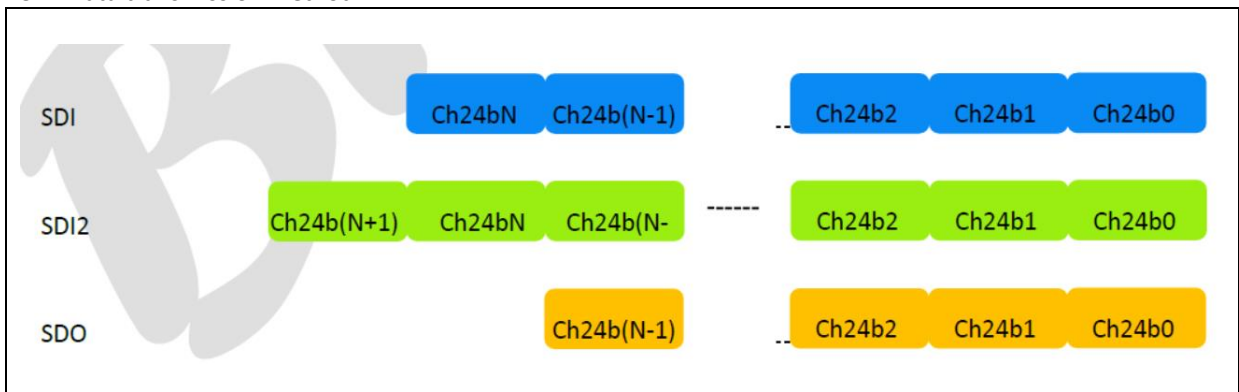
2. Transmission Time:

| Item | Description | Typical | Allowance |
|----------|---------------------------|--------------|-----------|
| - | Unit code frequency | 400~1000KHZ | - |
| T_{0H} | 0 code, high voltage time | $1/4T$ | - |
| T_{0L} | 0 code, low voltage time | $3/4T$ | - |
| T_{1H} | 1 code, high voltage time | $3/4T$ | - |
| T_{1L} | 1 code, low voltage time | $1/4T$ | - |
| RES | reset time | $> 300\mu s$ | - |

Notes:

- The extended zero-return code data transmission mode is adopted, with single channel 8bits data and each IC supporting 3-channel display Transmitted data through internal filtering, support anti-jitter function Extended zero - return codes are compatible with ordinary zero - return codes.
- Single code USES 1:3 duty ratio, standard duty ratio, standard 800kHz transmission speed, up to the maximum transmission speed, up to 1MHz.Data integration at each level Integer forwarding of data at each level, and data delay between chips $< 0.7\mu s$.

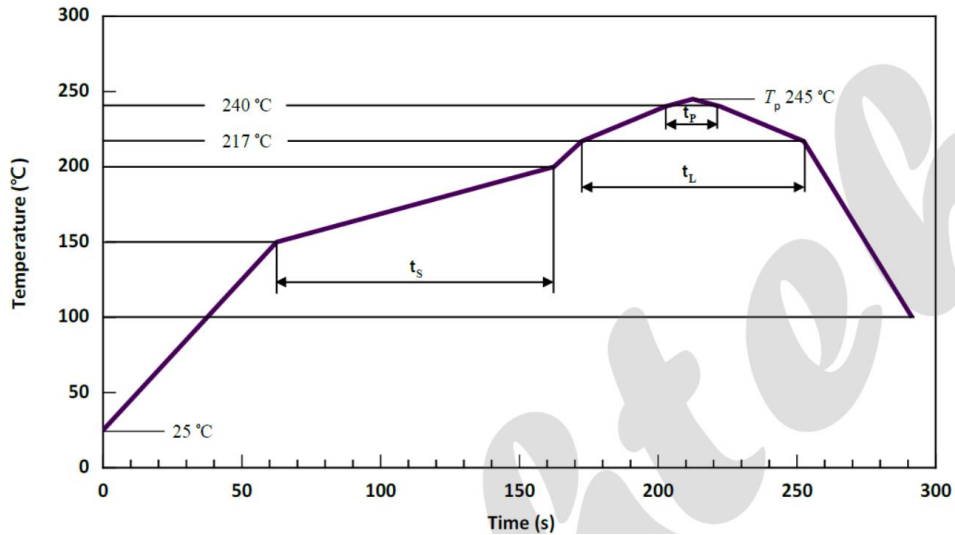
3. Data transmission method:



Dual channel redundancy control can effectively avoid a single point of damage resulting in the failure of subsequent lights and reduce the damage rate caused by the driving system to one in a million. By default, SDI signal is used as the display and transmission channel when the system is powered on, and according to the channel priority, SDI switches between SDI and SDI2. When external control data is transmitted, SDI takes the 1-24bits data received as the display data, while SDI2 will discard the 1-24bits data and take 25-48bits data as the display data.

RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:



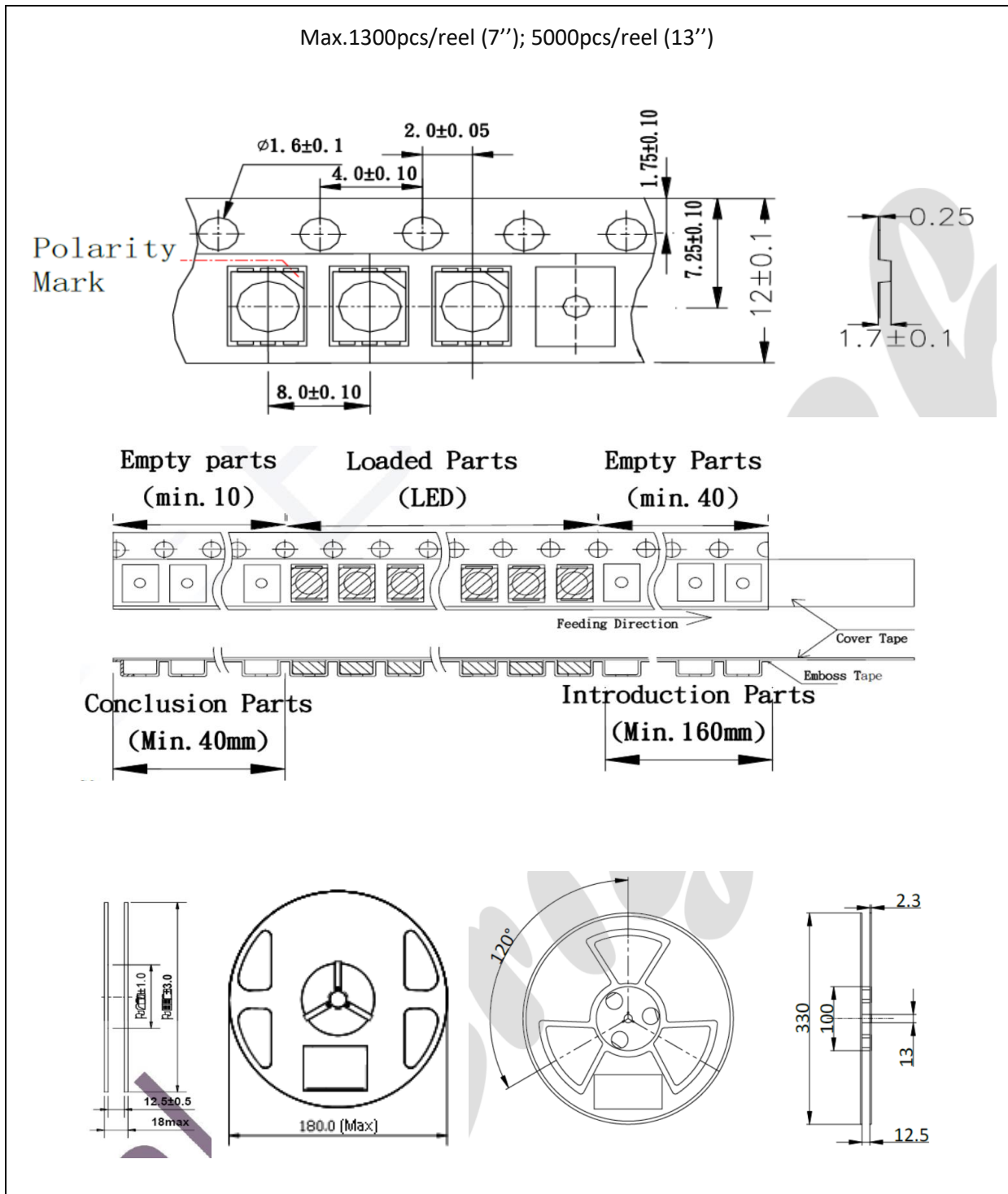
| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|---|--------|---------------------------|----------------|---------|------|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up Rate to Preheat 25 °C to 150 °C | | | 2 | 3 | K/s |
| Time t_s T_{Smin} to T_{Smax} | t_s | 60 | 100 | 120 | s |
| Ramp-up Rate to Peak T_{Smax} to T_P | | | 2 | 3 | K/s |
| Liquids Temperature | T_L | | 217 | | °C |
| Time Above Liquids Temperature | t_L | | 80 | 100 | s |
| Peak Temperature | T_P | | | 245 | °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. We recommend the reflow temperature 240°C (±5°C). The maximum soldering temperature should be limited to 260°C.
2. Maximum reflow soldering: 2 times.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

PACKING SPECIFICATION:

Reel Dimension:



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 desiccating agent stored at R.H.<20% and apply baking before use.

Over-Current Proof:

Must apply resistors for protection otherwise slight voltage shift will cause big current change and burn-out will happen.

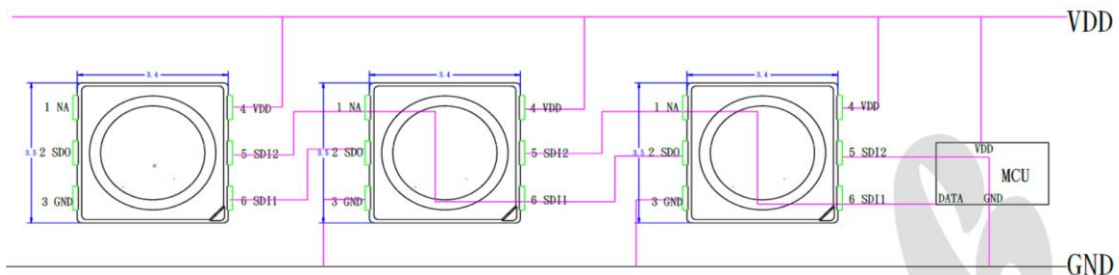
Baking:

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:



When the first LED is connected to the MCU, a resistance R is needed in series between its signal input line and the MCU. The size of R depends on the number of cascade beads. The more cascades, the smaller resistance R is used. It is generally recommended that the value be between 100-1K. Usually the recommended value is around 300 R. In order to make the LEDs work more stably, a parallel capacitor is needed between VDD and GND of each LED.

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-electrostatic glove is recommended when handling the LED all time. All devices, equipment, machinery, work tables, and storage racks must be properly grounded.

REVISION RECORD:

| Version | Date | Summary of Revision |
|---------|------------|-----------------------|
| A1.0 | 20/05/2024 | Datasheet set-up. |
| A1.1 | 15/09/2024 | Update product photo. |