



**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



- ▶ CHIP SMD with IC
- ▶ 0505 (1212) IC 0.75t
- ▶ Red/Green/Blue

NOM64S79IC



Release Date: 20 May 2023 Version: A1.0



### 0505 IC-Integrated

**RoHS**  
Compliant



#### FEATURES:

- **Package:** CHIP 4-Pins EIA STD Package with Integrated IC
- **Forward Current:** 5/6/5mA\*
- **Forward Voltage (typ.):** 7.0V
- **Luminous Intensity (typ.):** 420mcd mixed white
- **Colour:** Red/Green/Blue
- **IC Feature:**
  - ✓ Serial data frequency is 400-1600khz adjustable, using zero - return code.
  - ✓ Built-in open/short circuit detection feedback function.
  - ✓ Low EMI design.
  - ✓ Built-in overvoltage protection.
  - ✓ Built-in low ash brightness compensation.
- **Pixel:** Supports 65,536 full gamma-ray resolution. RGB monochrome supports 16bit data. RGB current can be controlled separately. Maximum number of LED cascades can reach 1,000pcs.
- **Soldering methods:** IR Reflow soldering
- **Preconditioning:** acc. to JEDEC Level 3
- **Packing:** 8mm tape with max.4000pcs/reel, ø180mm (7")

\* in order of Red/Green/Blue

#### APPLICATIONS:

- Telecommunication
- Status Indicator
- Home Appliance
- Decoration Lighting
- Full Colour LED Strip
- Gaming Device
- Guardrail Tube
- Indoor Display Screen

## CHARACTERISTICS:

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

| Parameter                          | Symbol           | Ratings              | Unit |
|------------------------------------|------------------|----------------------|------|
| Forward Current                    | I <sub>F</sub>   | 5/6/5                | mA   |
| IC Power Supply Voltage            | V <sub>DD</sub>  | 7                    | V    |
| IC Input Voltage                   | V <sub>IN</sub>  | -0.4~V <sub>DD</sub> | V    |
| Logic Output Voltage               | V <sub>OUT</sub> | -0.4~+5.5            | V    |
| Operating Temperature <sup>1</sup> | T <sub>OPR</sub> | -40~+105             | °C   |
| Storage Temperature                | T <sub>STG</sub> | -40~+105             | °C   |
| Soldering Temperature              | T <sub>SD</sub>  | 260                  | °C   |
| Electrostatic discharge (HBM)      | ESD              | 4000                 | V    |

1. The maximum soldering time is 10 seconds in T<sub>SD</sub>.

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

| Parameter                          | Symbol           | Values |      |      | Unit | Test Condition                                 |
|------------------------------------|------------------|--------|------|------|------|--|
|                                    |                  | Min.   | Typ. | Max. |      |  |
| Standby Current @800KHz data input | I <sub>STB</sub> | 170    | ---  | 360  | μA   | V <sub>DD</sub> =4.5V<br>I <sub>out</sub> =OFF |
| Input Voltage Level                | V <sub>IH</sub>  | 2.7    | ---  | ---  | V    | D <sub>IN</sub> , Input High Level V           |
|                                    | V <sub>IL</sub>  | ---    | ---  | 0.3  | V    | D <sub>IN</sub> , Input Low Level V            |
| R/G/B Current Output               | I <sub>OUT</sub> | 1.2    | ---  | 15   | mA   | V <sub>DD</sub> =5V                            |
| Static Power Consumption           | I <sub>DD</sub>  | ---    | ---  | 0.5  | mA   | No Signal                                      |
| Working Current                    | I <sub>CC</sub>  | ---    | ---  | 0.7  | mA   | 800KHz Data Input                              |

Electrical & Optical Characteristics (Ta=25°C, V<sub>DD</sub>=5V)

| Parameter           |   | Symbol            | Values |        |      | Unit | Test Condition       |
|---------------------|---|-------------------|--------|--------|------|------|----------------------|
|                     |   |                   | Min.   | Typ.   | Max. |      |                      |
| Luminous Intensity  | R | I <sub>v</sub>    | 63     | 107    | 160  | mcd  | I <sub>F</sub> =5mA  |
|                     | G |                   | 200    | 289    | 400  |      | I <sub>F</sub> =6mA  |
|                     | B |                   | 30     | 52     | 80   |      | I <sub>F</sub> =5mA  |
|                     | W |                   | 320    | 420    | 630  |      | I <sub>F</sub> =16mA |
| Dominant Wavelength | R | λ <sub>D</sub>    | 615    | ---    | 630  | nm   | I <sub>F</sub> =5mA  |
|                     | G |                   | 515    | ---    | 535  |      | I <sub>F</sub> =6mA  |
|                     | B |                   | 460    | ---    | 475  |      | I <sub>F</sub> =5mA  |
| Colour Coordinate   | X | ---               | ---    | 0.2637 | ---  | ---  | I <sub>F</sub> =16mA |
|                     | Y |                   | ---    | 0.2986 | ---  |      |                      |
| Viewing Angle       |   | 2θ <sub>1/2</sub> | ---    | 120    | ---  | deg  | I <sub>F</sub> =16mA |

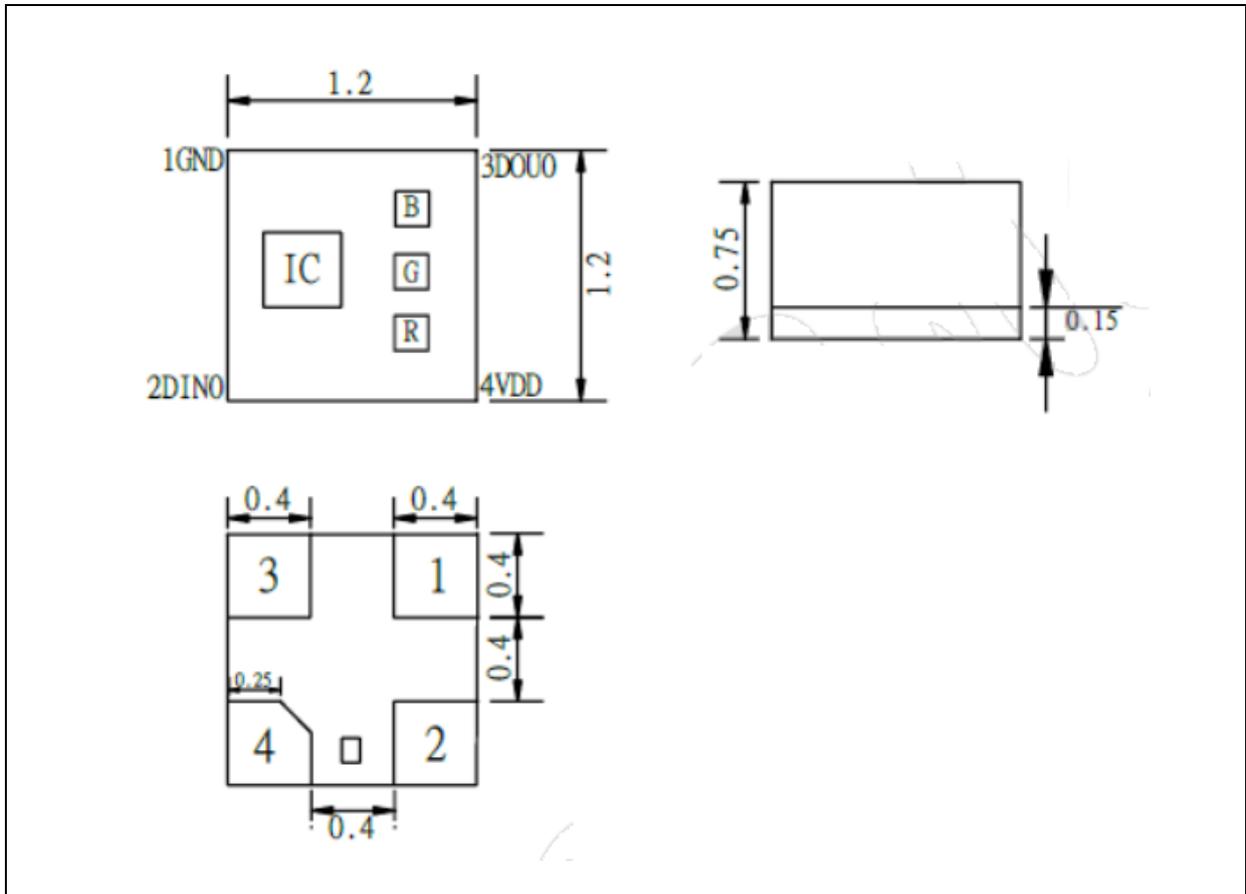
1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2. 2θ<sub>1/2</sub> is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The dominant wavelength, λ<sub>d</sub> is derived from CIE chromaticity diagram and represents the single wavelength which defines the colour of the device. Peak emission wavelength tolerance is ±1nm.
4. We will amend the Bin code to maintain Bin Code centralize and we get the Luminous Intensity is 1.3 double per Bins.

## Switching Characteristics (Ta=25°C)

| Parameter               |  | Symbol           | Values |      |      | Unit | Test Condition                     |
|-------------------------|--|------------------|--------|------|------|------|------------------------------------|
|                         |  |                  | Min.   | Typ. | Max. |      |                                    |
| Rate of Data Signal     |  | F <sub>DIN</sub> | 400    | ---  | 1600 | KHz  | ---                                |
| The Output Frequency    |  | F <sub>OUT</sub> | ---    | 12   | ---  | KHz  | R/G/B                              |
| Transmission Delay Time |  | T <sub>pzl</sub> | ---    | 300  | ---  | ns   | D <sub>IN0</sub> → D <sub>O0</sub> |
|                         |  |                  | ---    | 300  | ---  | ns   | D <sub>IN1</sub> → D <sub>O1</sub> |

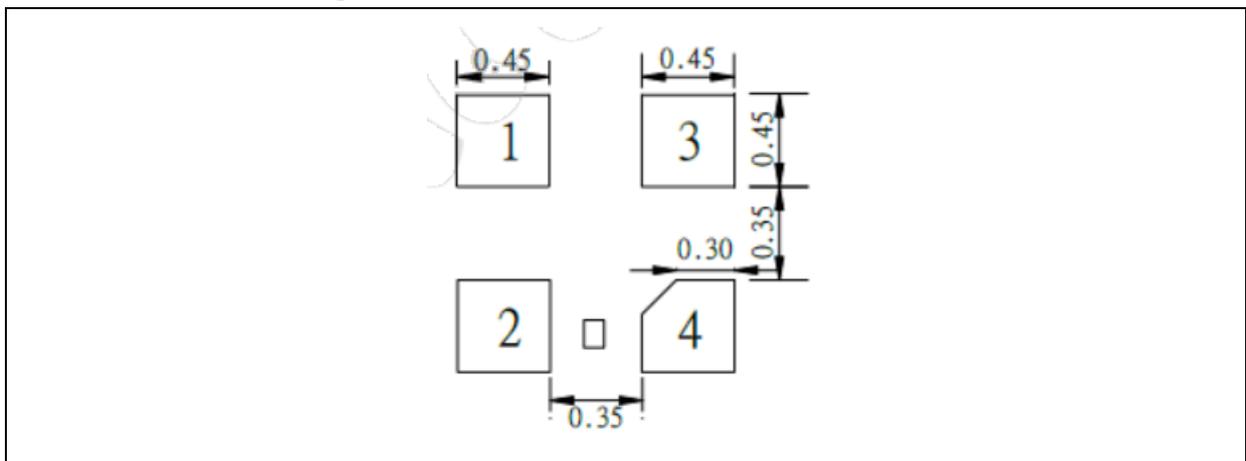
## OUTLINE DIMENSION:

Package Dimension:

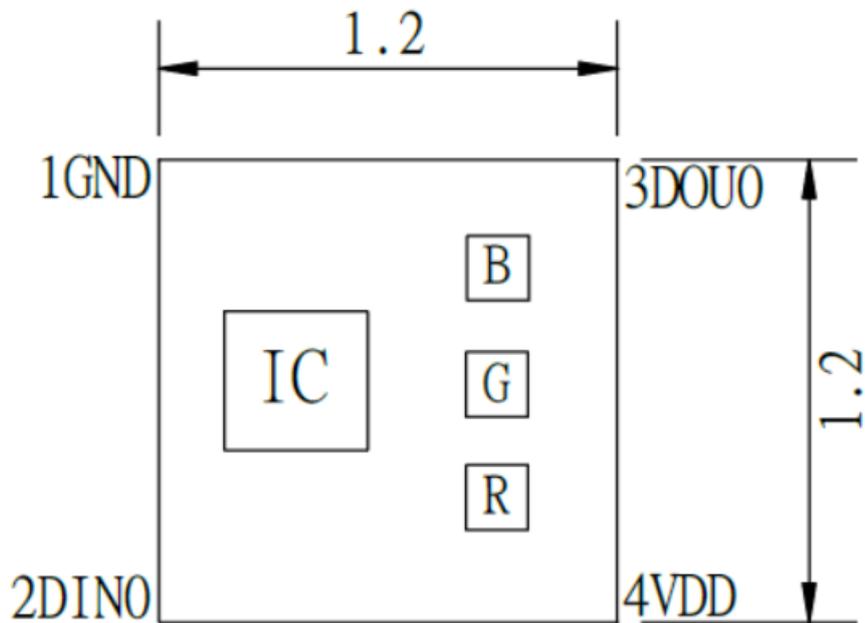


2. All dimensions are in millimetre (mm).
3. Tolerance  $\pm 0.1$ mm, unless otherwise noted.

Recommended Soldering Pad Dimension:

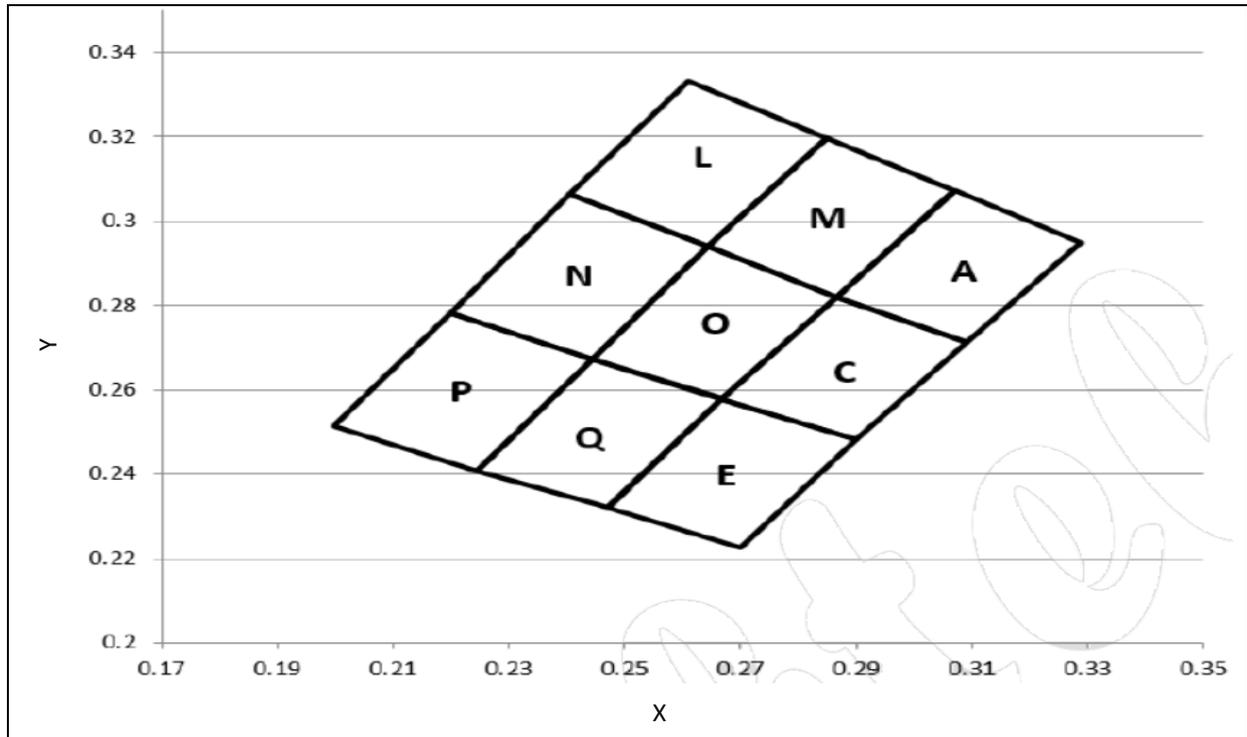


1. Dimensions are in millimetre (mm).
2. Tolerance  $\pm 0.1$ mm with angle tolerance  $\pm 0.5^\circ$ .

**PIN CONFIGURATION:**


| No. | Symbol | Function Description       |
|-----|--------|----------------------------|
| 1   | GND    | Ground                     |
| 2   | DIN    | Control Data Signal Input  |
| 3   | DOUT   | Control Data Signal Output |
| 4   | VDD    | Power Supply Voltage       |

## CIE CHROMATICITY DIAGRAM:

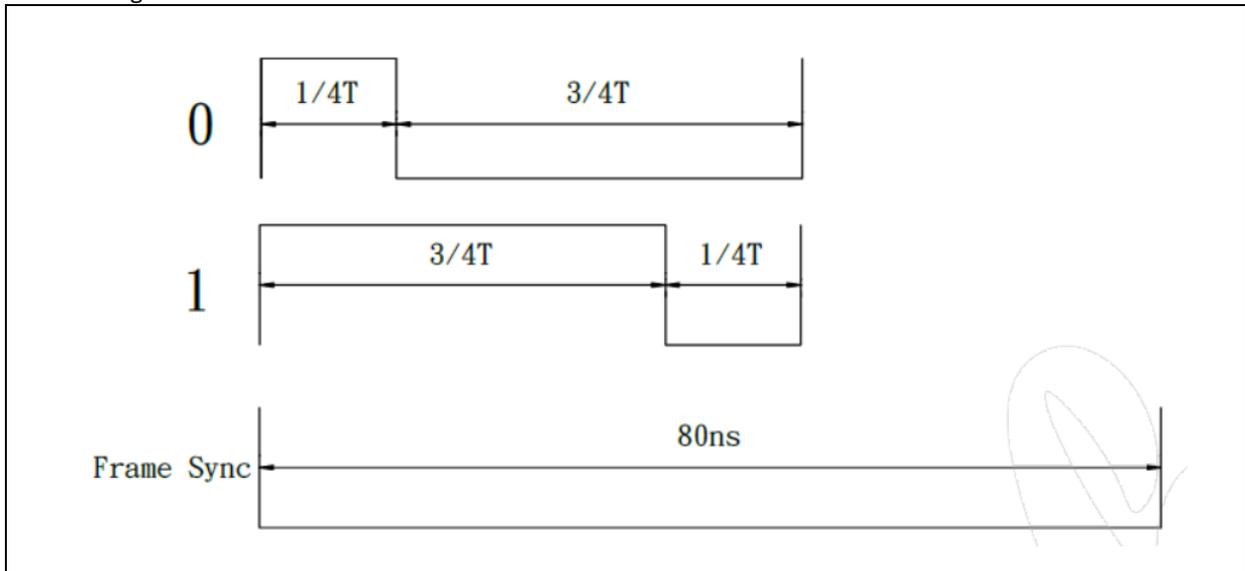


### Chromaticity Coordinates Classifications:

|   | 1      |        | 2      |        | 3      |        | 4      |        |
|---|--------|--------|--------|--------|--------|--------|--------|--------|
|   | X      | Y      | X      | Y      | X      | Y      | X      | Y      |
| L | 0.2406 | 0.3064 | 0.2609 | 0.3332 | 0.2849 | 0.3196 | 0.2643 | 0.2940 |
| M | 0.2643 | 0.2940 | 0.2849 | 0.3196 | 0.3068 | 0.3072 | 0.2865 | 0.2819 |
| A | 0.3070 | 0.3072 | 0.3287 | 0.2948 | 0.3091 | 0.2712 | 0.2865 | 0.2819 |
| P | 0.2200 | 0.2783 | 0.1996 | 0.2513 | 0.2244 | 0.2407 | 0.2444 | 0.2672 |
| Q | 0.2444 | 0.2672 | 0.2244 | 0.2407 | 0.2471 | 0.2320 | 0.2669 | 0.2579 |
| E | 0.2667 | 0.2578 | 0.2899 | 0.2482 | 0.2700 | 0.2227 | 0.2470 | 0.2320 |
| C | 0.2865 | 0.2819 | 0.3091 | 0.2712 | 0.2899 | 0.2482 | 0.2667 | 0.2578 |
| O | 0.2444 | 0.2672 | 0.2643 | 0.2940 | 0.2865 | 0.2819 | 0.2667 | 0.2578 |
| N | 0.2200 | 0.2783 | 0.2406 | 0.3064 | 0.2643 | 0.2940 | 0.2444 | 0.2672 |

## Function Description:

### 1. Timing Wave Form:



### 2. Data Transfer Time:

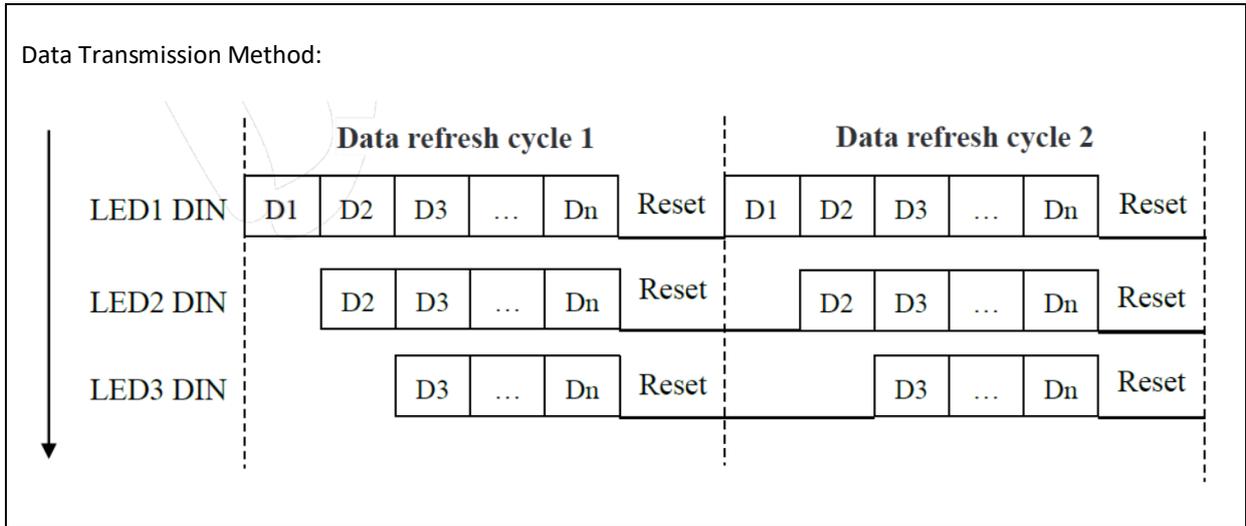
| Item     | Description               | Typical          | Allowance |
|----------|---------------------------|------------------|-----------|
| -        | Unit code frequency       | 400~1600KHZ      | -         |
| $T_{0H}$ | 0 code, high voltage time | $1/4T$           | -         |
| $T_{0L}$ | 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                | 100-1000 $\mu$ s | -         |

### 3. Composition of 16bit Data:

|          |          |          |       |          |          |          |
|----------|----------|----------|-------|----------|----------|----------|
| R1-16Bit | G1-16Bit | B1-16Bit | ..... | RN-16Bit | GN-16Bit | BN-16Bit |
|----------|----------|----------|-------|----------|----------|----------|

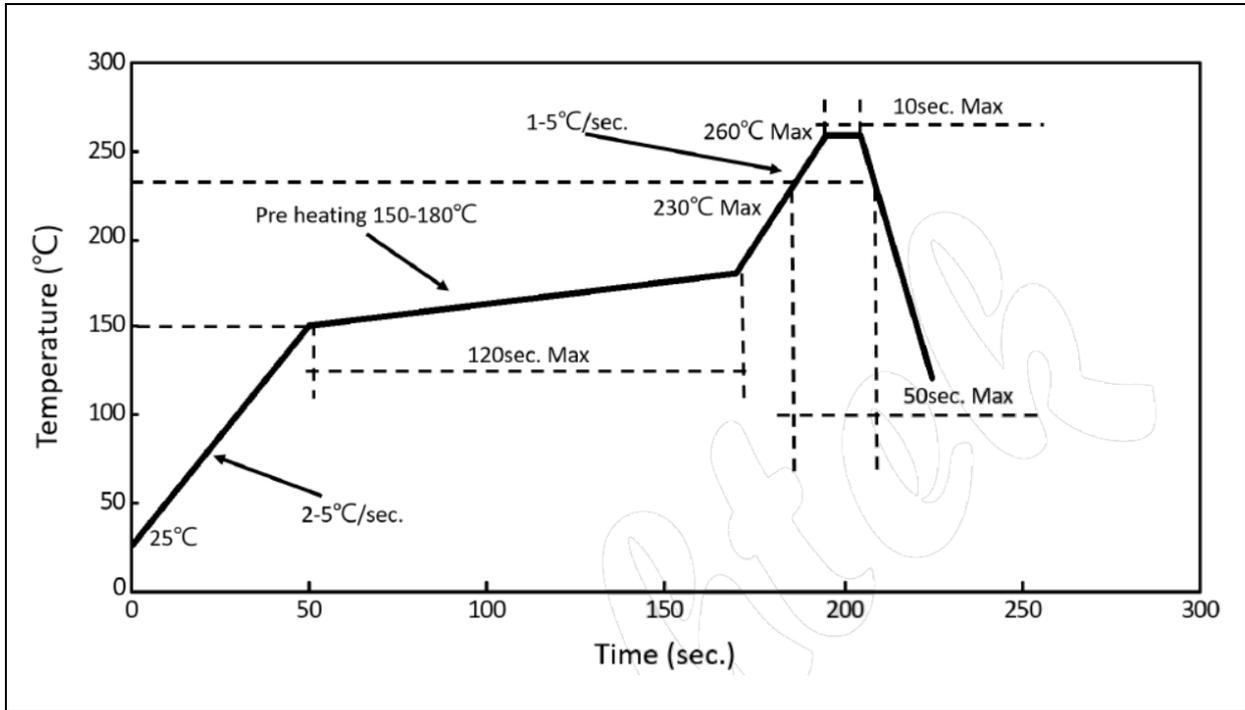
- The 0 code or 1 code period is between 625ns (frequency 1.6Mhz) and 2.5us (frequency 400KHz), the chip can work normally, but the high-level time of 0 code and 1 code must conform to the corresponding numerical specifications in the above table.
- Controlling an LED requires sending a 48-bit code. If the signal stops transmitting, the lamp bead will turn off automatically.

Data Transmission Method:



## RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:

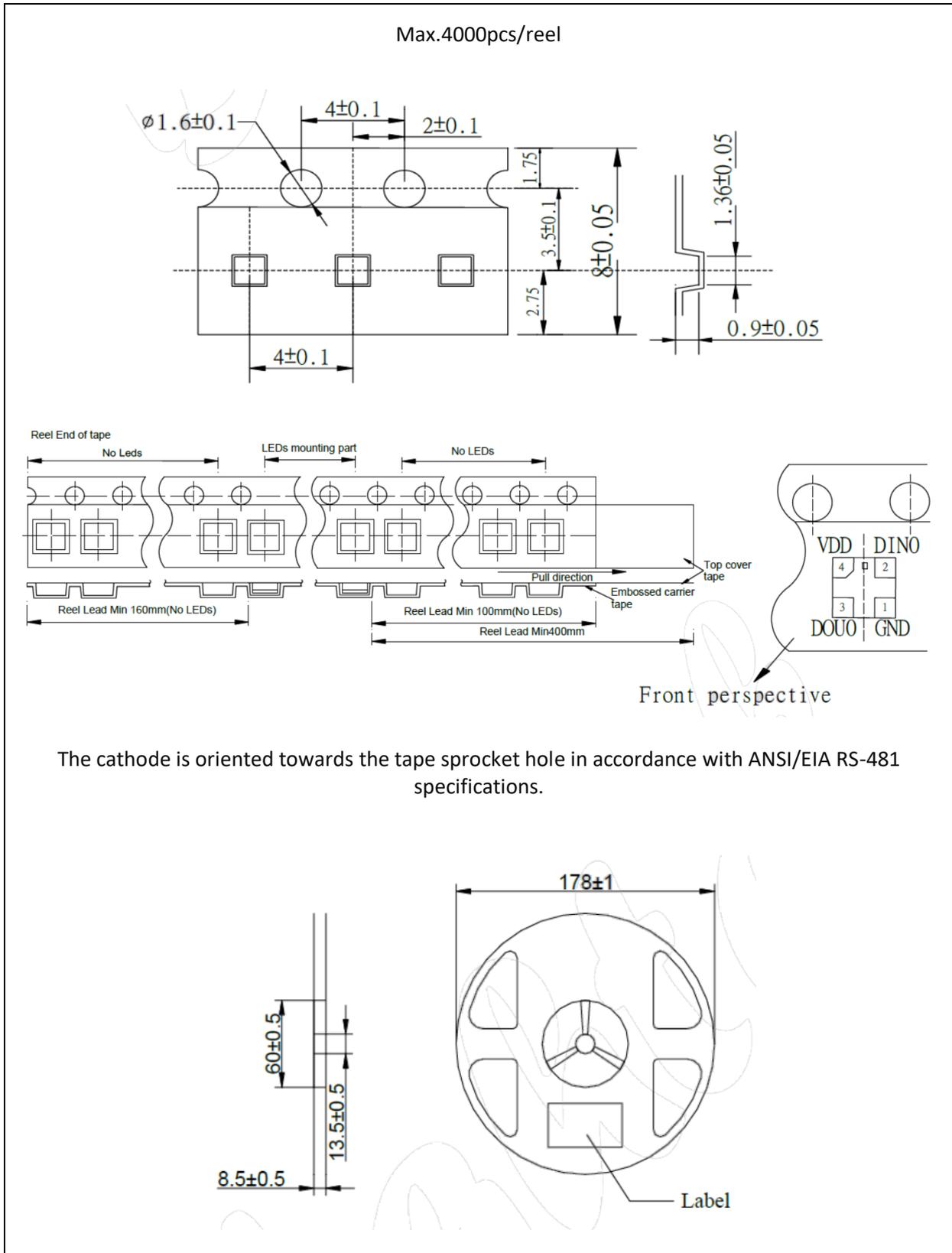


Note:

1. We recommend the reflow temperature 240°C ( $\pm 5^\circ\text{C}$ ). The maximum soldering temperature should be limited to 260°C.
2. Maxima reflow soldering: 3 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 72 hours. Otherwise, they should be kept in a damp-proof box with desiccating agent stored at R.H.<10% 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.

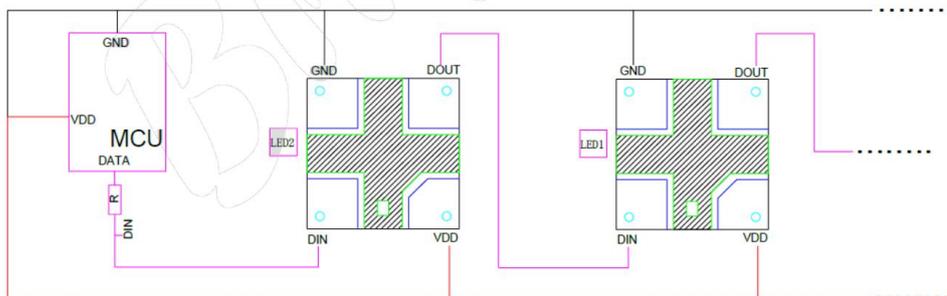
### Baking:

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.

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

**REVISION RECORD:**

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| Version | Date       | Summary of Revision |
|---------|------------|---------------------|
| A1.0    | 20/05/2023 | Datasheet set-up.   |