



**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

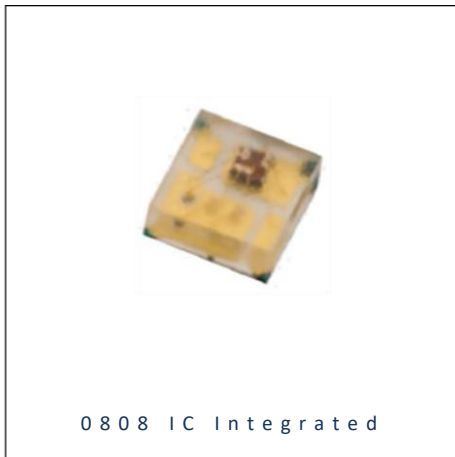


- ▶ CHIP SMD with IC
- ▶ 0808 (2020) IC 0.75t
- ▶ Red/Green/Blue

NOM48S82IC



Release Date: 22 April 2021 Version: A1.0



### 0808 IC-Integrated

**RoHS**  
Compliant



#### FEATURES:

- **Package:** CHIP EIA STD Package with Integrated IC Type 104
- **Forward Current:** 5mA
- **Forward Voltage (typ.):** +3.8~+5.5V
- **Luminous Intensity (typ.):** 300mcd mixed white
- **Colour:** Red/Green/Blue
- **Wavelength:** 622/527/467nm
- **Viewing angle:** 120°
- **Materials:**
  - Resin: Silicone (Water Diffused)
  - L/F Finish: Ag Plated
- **Operating Temperature:** -40~+85°C
- **Storage Temperature:** -40~+105°C
- **IC Feature:** Serial data transmission signal by single wire.
- **Pixel:** One pixel contains R, G, and B colour that each can achieve 256 level brightness grayscales, which forms 16,777,216 combination colours. Internal clock frequency operates at 800kHz.
- **Soldering methods:** IR Reflow soldering
- **Preconditioning:** acc. to JEDEC Level 3
- **Packing:** 8mm tape with Max.4000pcs/reel, ø180mm (7")

#### APPLICATIONS:

- Telecommunication
- Indicator
- Home Appliance
- Decoration Lighting
- Full Colour LED Strip
- Gaming Device

## CHARACTERISTICS:

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

Parameter	Symbol	Ratings	Unit
DC Forward Current	I <sub>F</sub>	5	mA
IC Power Supply Voltage	V <sub>DD</sub>	+3.8~+5.5	V
IC Input Voltage	V <sub>I</sub>	-0.4~V <sub>DD</sub> +0.4	V
Operating Temperature	T <sub>OPR</sub>	-40~+85	°C
Storage Temperature	T <sub>STG</sub>	-40~+105	°C
Soldering Temperature	T <sub>SD</sub>	260	°C

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

Parameter	Symbol	Values			Unit	Test Condition	
		Min.	Typ.	Max.			
Forward Voltage	V <sub>F</sub>	3.8	5	5.5	V	I <sub>F</sub> =5mA	
Luminous Intensity	R	I <sub>v</sub>	40	75	125	mcd	I <sub>F</sub> =5mA
	G		135	230	390		
	B		15	35	75		
	W		120	300	600		
Dominant Wavelength	R	λ <sub>D</sub>	615	---	630	nm	I <sub>F</sub> =5mA
	G		520	---	535		
	B		460	---	475		
Colour Coordinate	X	---	---	0.2620	---	---	I <sub>F</sub> =5mA
	Y		---	0.3130	---		
Viewing Angle	2θ <sub>1/2</sub>	---	120	---	deg	I <sub>F</sub> =5mA	

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

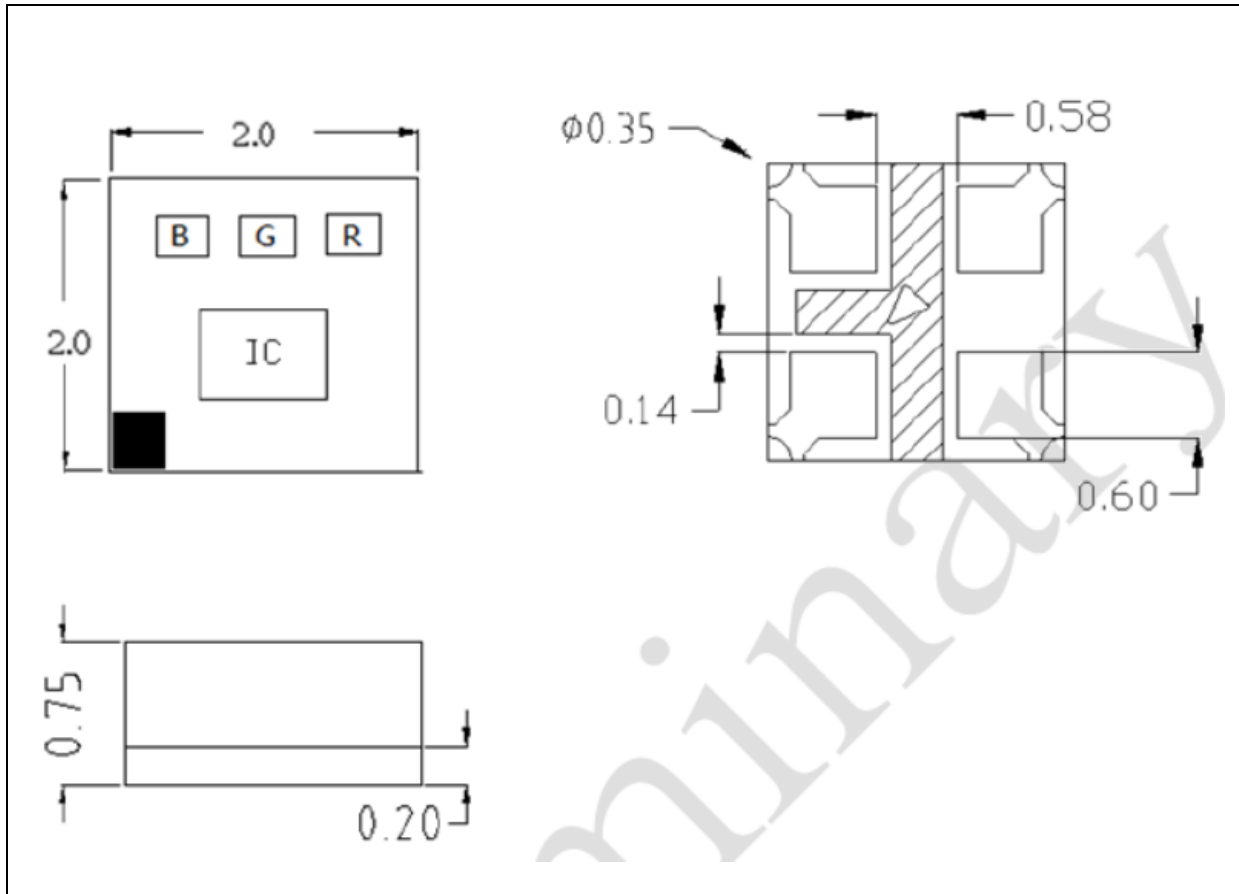
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Static Current	I <sub>DD</sub>	---	0.3	---	mA	V <sub>DD</sub> =4.5V I <sub>out</sub> =OFF
Input Voltage Level	V <sub>IH</sub>	0.7 V <sub>DD</sub>	---	---	V	D <sub>IN</sub> , SET
	V <sub>IL</sub>	---	---	0.3 V <sub>DD</sub>	V	D <sub>IN</sub> , SET

## Switching Characteristics (Ta=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Rate of Data Signal	F <sub>DIN</sub>	---	0.8	---	MHz	---
Transfer Time	T <sub>PLH</sub>	---	---	80	ns	D <sub>IN</sub> → D <sub>OUT</sub>
	T <sub>PHL</sub>	---	---	80	ns	
Conversion Time of I <sub>OUT</sub> R/G/B	T <sub>r</sub>	---	---	50	ns	I <sub>OUT</sub> R/G/B=5mA RL=400Ω CL=15pF
	T <sub>f</sub>	---	---	100	ns	

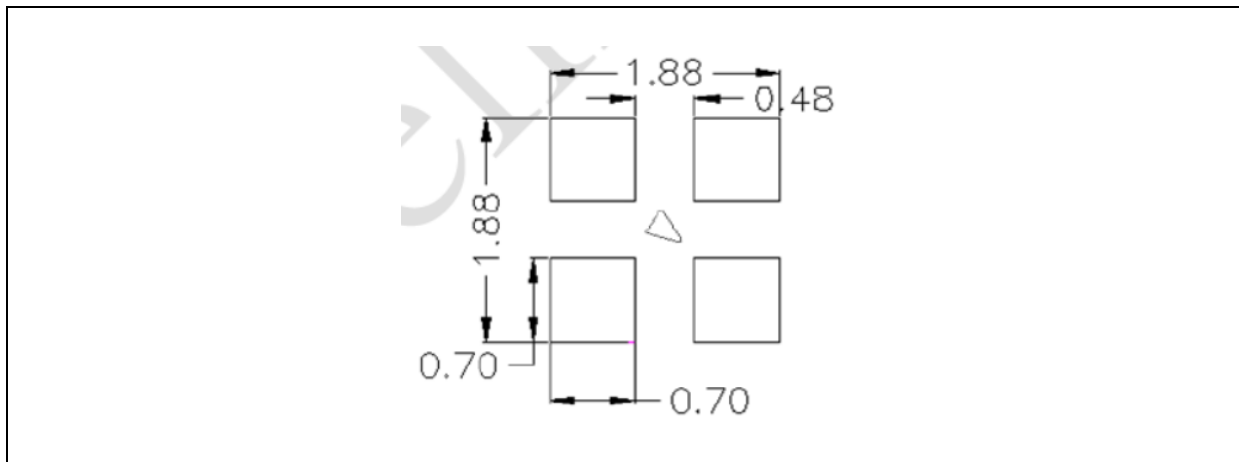
## OUTLINE DIMENSION:

Package Dimension:



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

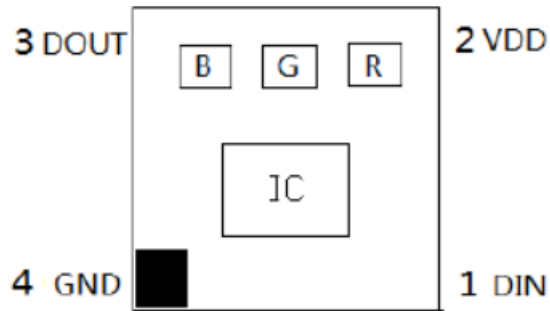
Recommended Soldering Pad Dimension:



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

**PIN CONFIGURATION:**


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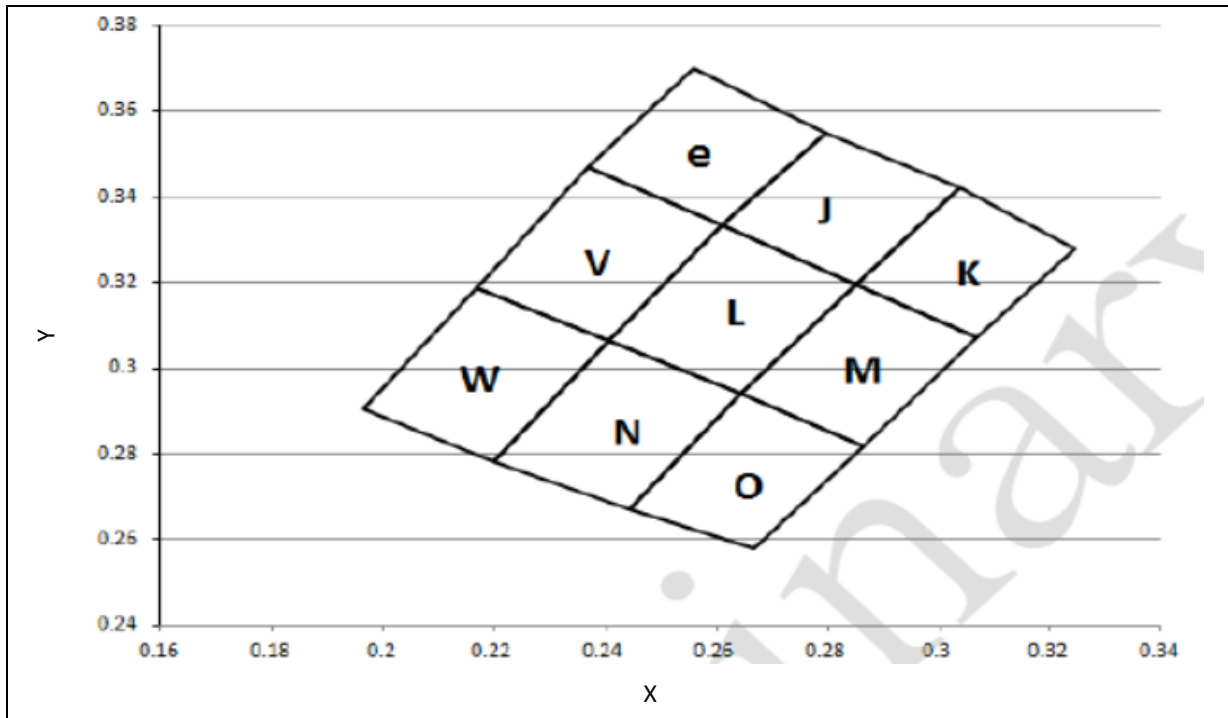
No.	Symbol	Function Description
1	DIN	Control Data Signal Input
2	VDD	Power Supply LED
3	DOUT	Control Data Signal Output
4	GND	Ground

**BINNING GROUPS:**

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Luminous Intensity Classifications (White) ( $I_F = 5\text{mA}$ ,  $V_{DD}=5\text{V}$ ):

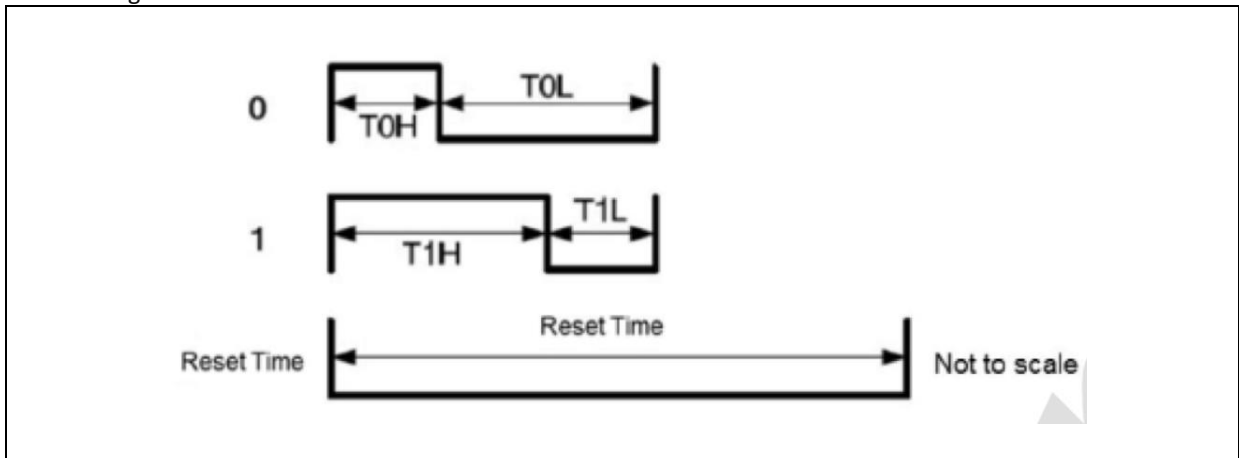
Code	Min.	Max.	Unit
8	160	210	mcd
9	210	270	
10	270	350	
11	350	460	
12	460	600	

**CIE CHROMATICITY DIAGRAM:**

 Chromaticity Coordinates Classifications ( $I_F = 5\text{mA}$ ):

	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
e	0.2369	0.3468	0.2609	0.3332	0.2797	0.3550	0.2559	0.3698
J	0.2609	0.3332	0.2797	0.3550	0.3036	0.3420	0.2849	0.3196
K	0.2851	0.3196	0.3036	0.3420	0.3243	0.3280	0.3068	0.3072
v	0.2169	0.3188	0.2369	0.3468	0.3609	0.3332	0.2406	0.3064
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
W	0.1963	0.2907	0.2169	0.3188	0.2406	0.3064	0.2200	0.2783
N	0.2200	0.2783	0.2406	0.3064	0.2643	0.2940	0.2444	0.2672
O	0.2444	0.2672	0.2643	0.2940	0.2865	0.2819	0.2667	0.2578

## Function Description - Data Transfer Time ( $T_H+T_L=1.2\mu s\pm 300ns$ ):

### 1. Timing Wave Form:



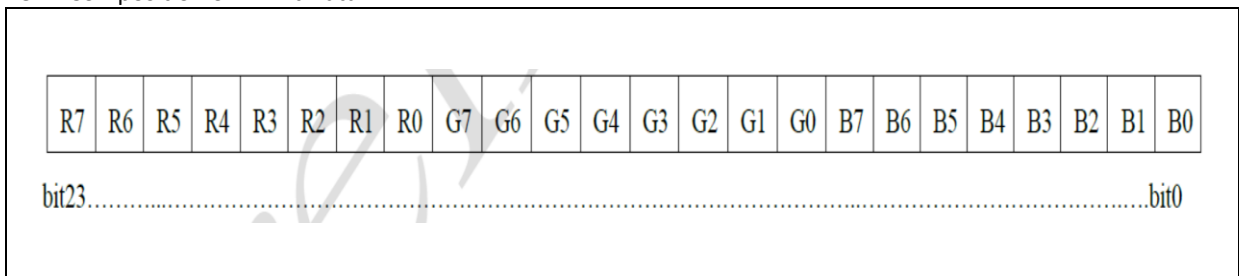
### 2. High Speed Mode:

Item	Description	Typical	Allowance
$T_{0H}$	0 code, high voltage time	300ns	$\pm 150ns$
$T_{0L}$	0 code, low voltage time	900ns	$\pm 150ns$
$T_{1H}$	1 code, high voltage time	900ns	$\pm 150ns$
$T_{1L}$	1 code, low voltage time	300ns	$\pm 150ns$
RES	reset time	$>200\mu s$	-

#### Note:

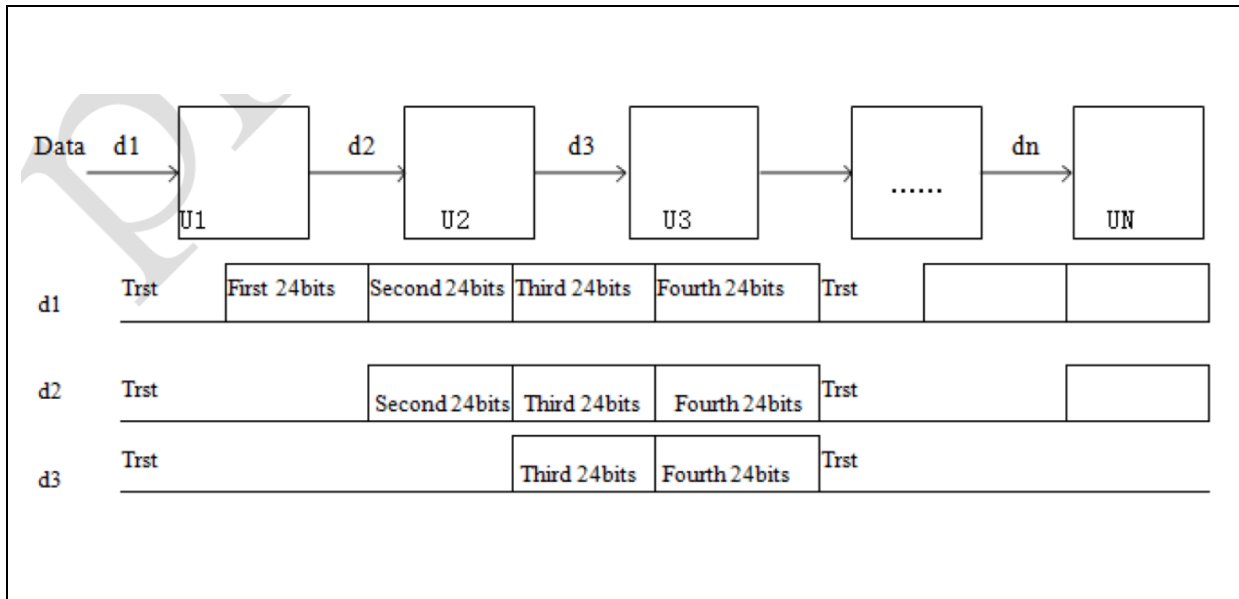
- Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye response curve.
- $\theta_{1/2}$  is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- The dominant wavelength  $\lambda_D$  is derived from CIE chromaticity diagram and represents the single wavelength which defines the colour of the device. Peak emission wavelength tolerance is  $\pm 1nm$ .

### 3. Composition of 24 Bit Data:



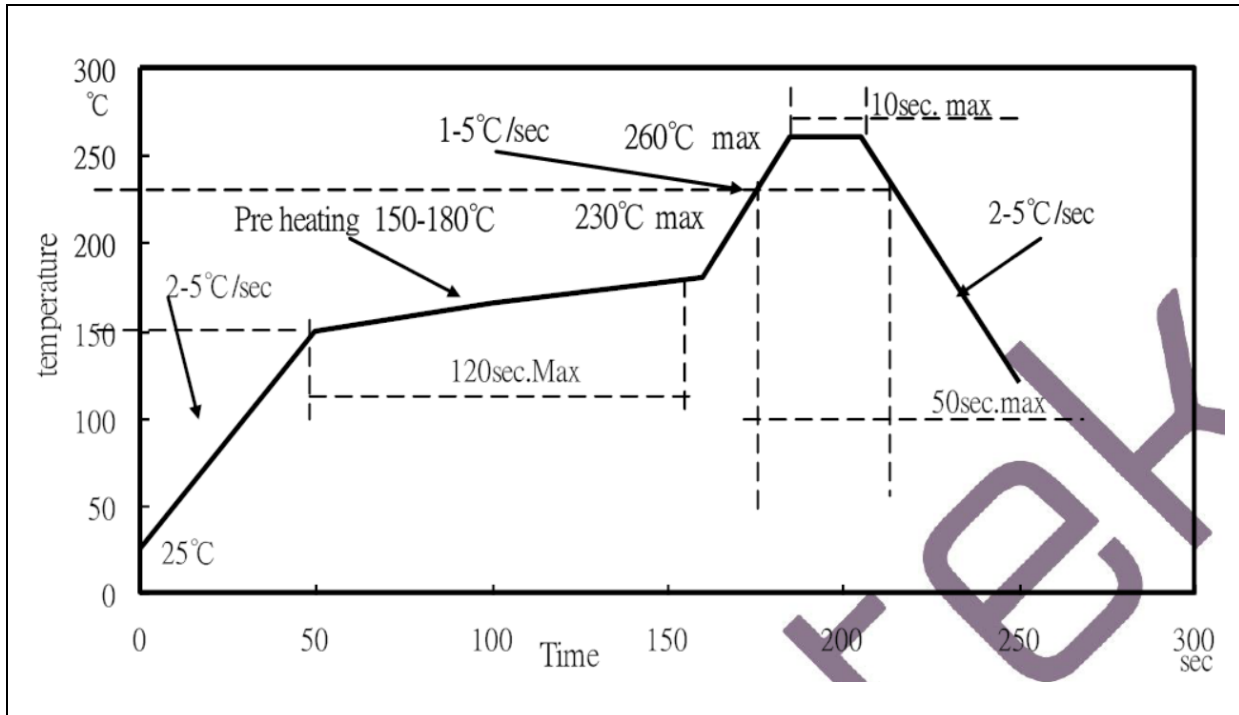


## 4. Data Transmission Method:



## RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:

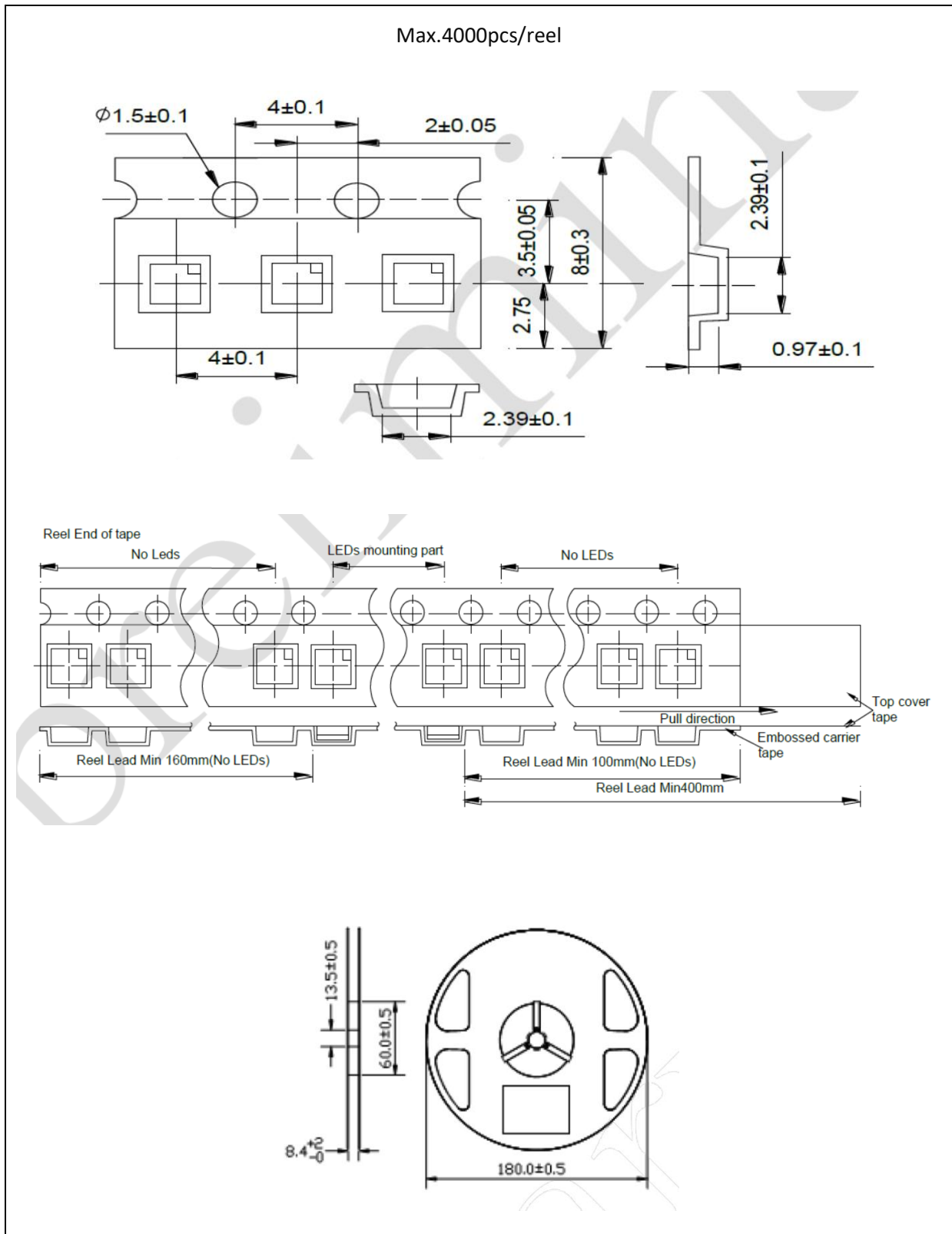


Note:

1. We recommend the reflow temperature 240°C (±5°C). The maximum soldering temperature should be limited to 260°C.
2. Maxima reflow soldering: 1 time.
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 24 hours. 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.

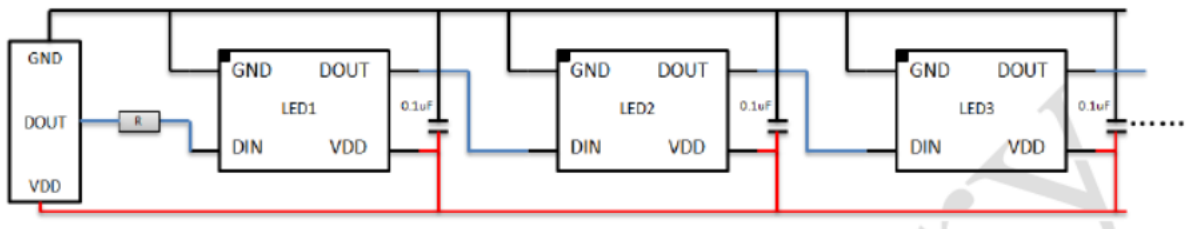
### Baking:

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 cascade, 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.

### 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.

**REVISION RECORD:**

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Version	Date	Summary of Revision
A1.0	22/04/2021	Datasheet set-up.