



**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



- ▶ PLCC4 SMD with IC
- ▶ 5050IC 1.57t Series
- ▶ Red/Green/Blue

NOM50S18IC



Release Date: 15 April 2021 Version: A1.1



### APPLICATIONS:

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

## 5050 IC-Integrated

**RoHS**  
Compliant



### FEATURES:

- **Package:** PLCC4 EIA STD Package with Integrated IC 104
- **Forward Current:** 12mA
- **Forward Voltage (typ.):** +3.8~+5.5V
- **Luminous Intensity (typ.):** 1490mcd mixed white
- **Colour:** Red/Green/Blue
- **Wavelength:** 622/525/467nm
- **Viewing angle:** 120°
- **Materials:**
  - Resin: Silicone (Water Clear)
  - L/F Finish: Ag Plated
- **Operating Temperature:** -40~+85°C
- **Storage Temperature:** -40~+105°C
- **IC Feature:**

RGB and driver chip are integrated in one package, to form a complete control of pixel point with constand current. One Pixel contains R, G, and B colour each can achieve 256 level brightness greyscales, which form 16,777,216 combination colours. Internal clock frequency operates at 800kHz. Serial data transmission signal by single wire.
- **Soldering methods:** IR Reflow soldering
- **Preconditioning:** acc. to JEDEC Level 5a
- **Packing:** 12mm tape with Max.1000pcs/reel, ø180mm (7")

**CHARACTERISTICS:**

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

Parameter	Symbol	Ratings	Unit
DC Forward Current	I <sub>F</sub>	12	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

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

Parameter	Symbol	Values			Unit	Test Condition	
		Min.	Typ.	Max.			
Luminous Intensity	R	I <sub>v</sub>	---	340	---	mcd	I <sub>F</sub> =12mA
	G		---	960	---		
	B		---	210	---		
	W		780	1490	---		
Forward Voltage	V <sub>F</sub>		3.8	---	5.5	V	I <sub>F</sub> =12mA
Dominant Wavelength	R	λ <sub>D</sub>	615	---	630	nm	I <sub>F</sub> =12mA
	G		520	---	530		
	B		460	---	475		
Colour Coordinate	X	---	---	0.2287	---	---	I <sub>F</sub> =12mA
	Y		---	0.2129	---		
Viewing Angle	2θ <sub>1/2</sub>		---	120	---	deg	I <sub>F</sub> =12mA

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

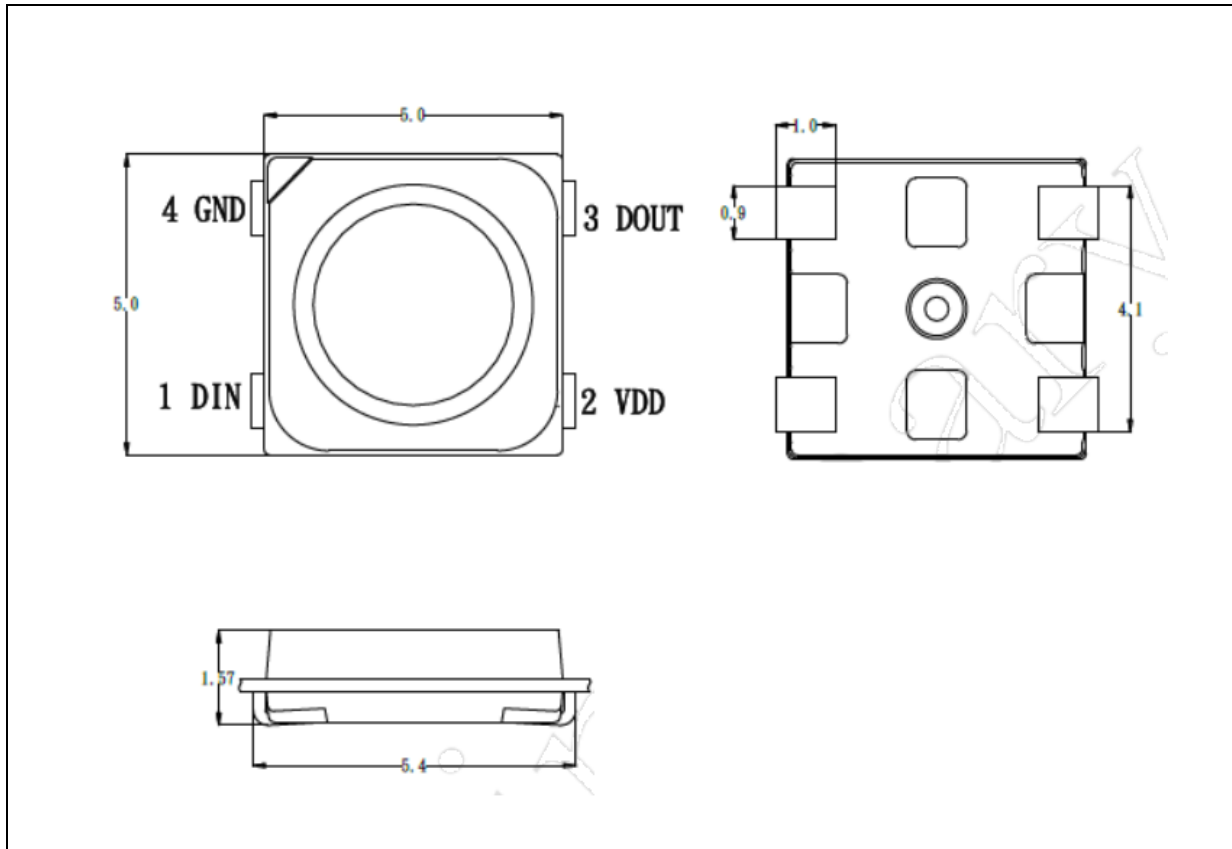
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Static Current	I <sub>DD</sub>	---	0.5	---	mA	V <sub>DD</sub> =4.5V I <sub>OUT</sub> =OFF
Input Voltage Level	V <sub>IH</sub>	0.7 V <sub>DD</sub>	---	---	V	D <sub>IN</sub> , SET
	V <sub>IL</sub>	---	---	0.3 V <sub>DD</sub>	V	D <sub>IN</sub> , SET
ESD Pressure	V <sub>ESD</sub>	---	2000	---	V	HBM

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

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Rate of Data Signal	F <sub>DIN</sub>	---	800	---	KHz	---
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	Tr	---	---	50	ns	I <sub>OUT</sub> R/G/B=12mA RL=200Ω CL=15pF
	Tf	---	---	100	ns	

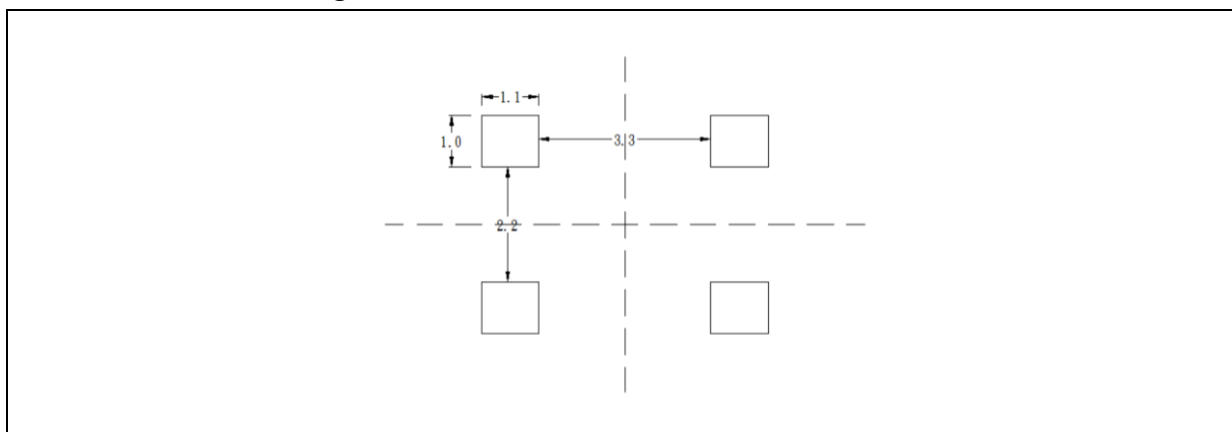
## OUTLINE DIMENSION:

Package Dimension:



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

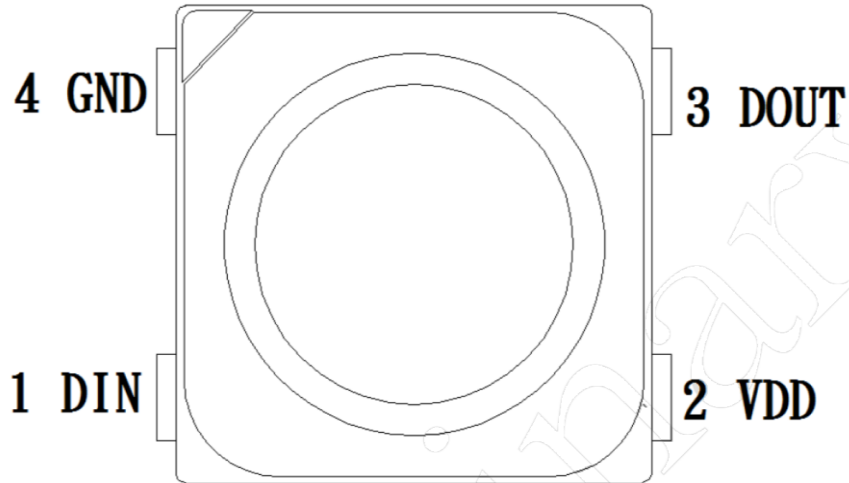
Recommended Soldering Pad Dimension:



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

**PIN CONFIGURATION:**


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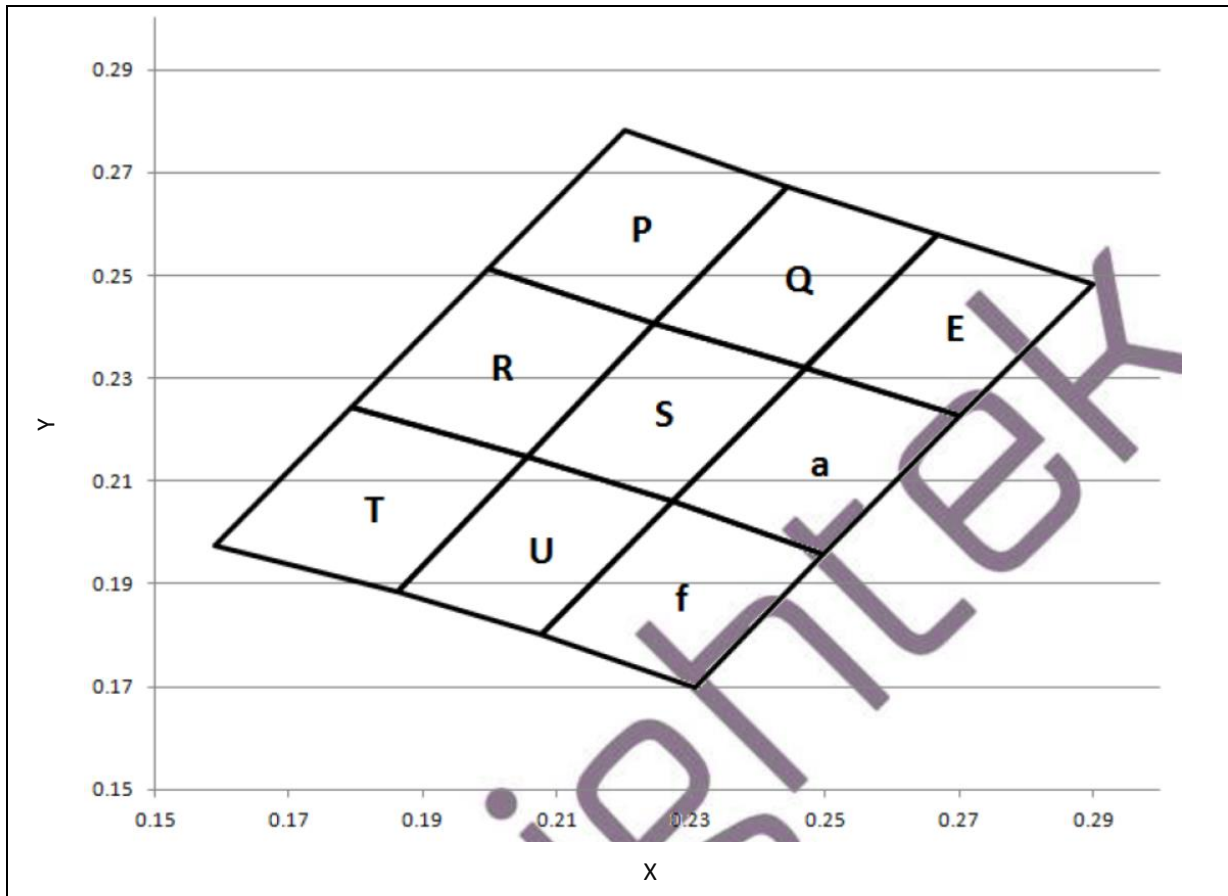
No.	Symbol	Function Description
1	DIN	Control data signal input
2	VDD	Power supply LED
3	DOUT	Control data signal output
4	GND	Ground

**BINNING GROUPS:**

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Luminous Intensity Classifications (White) ( $I_f = 12\text{mA}$ ):

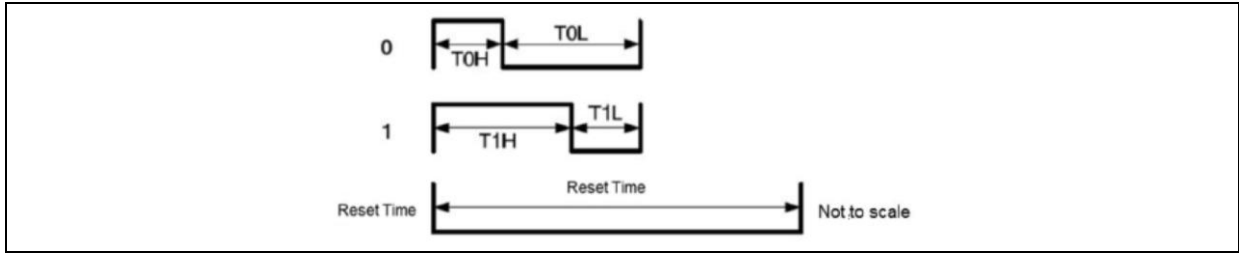
Code	Min.	Max.	Unit
14	780	1000	mcd
15	1000	1300	
16	1300	1700	
17	1700	2200	
18	2200	2800	

**CIE CHROMATICITY DIAGRAM:**

 Chromaticity Coordinates Classifications ( $I_F = 12\text{mA}$ ):

	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
E	0.2667	0.2578	0.2899	0.2482	0.2700	0.2227	0.2470	0.2320
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
R	0.1996	0.2513	0.1792	0.2243	0.2056	0.2148	0.2244	0.2407
S	0.2244	0.2407	0.2056	0.2148	0.2273	0.2061	0.2471	0.2320
a	0.2471	0.2320	0.2273	0.2061	0.2498	0.1959	0.2700	0.2227
T	0.1792	0.2243	0.1588	0.1973	0.1862	0.1886	0.2056	0.2148
U	0.2056	0.2148	0.1862	0.1886	0.2075	0.1802	0.2273	0.2000
f	0.2273	0.2061	0.2075	0.1802	0.2305	0.1700	0.2498	0.1959

## DATA TRANSFER TIME (TH+TL=1.2μs±600ns):

### 1. Timing Wave Form



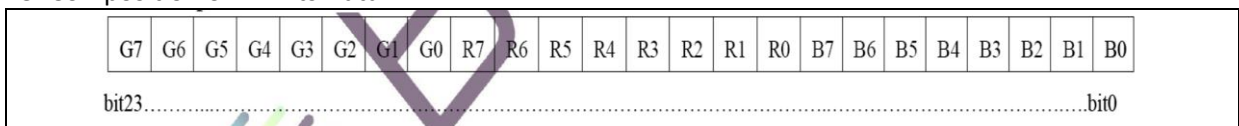
### 2. High Speed Mode

Item	Description	Typical	Allowance
T <sub>0H</sub>	0 code, high voltage time	300ns	±150ns
T <sub>1H</sub>	1 code, high voltage time	600ns	±150ns
T <sub>0L</sub>	0 code, low voltage time	900ns	±150ns
T <sub>1L</sub>	1 code, low voltage time	600ns	±150ns
RES	Reset Time	>200μs	---

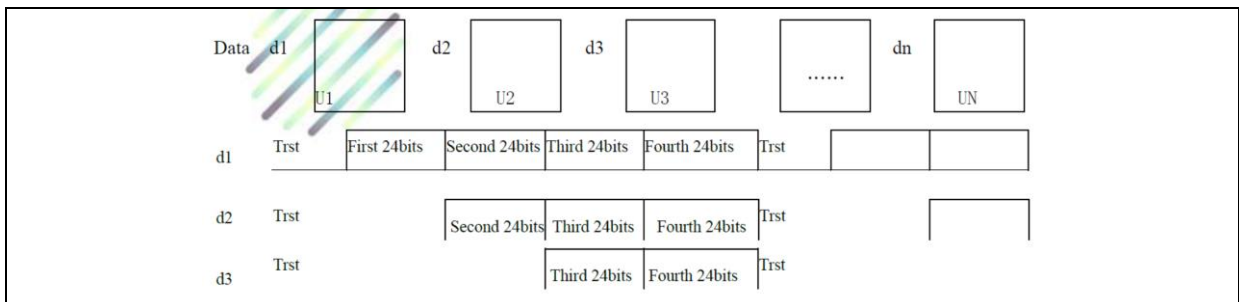
#### Note:

1. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
2.  $\Theta_{1/2}$  is the off-axis angle at which the luminous intensity is half the axial intensity.
3. 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 ±1nm.

### 3. Composition of 24 Bits Data



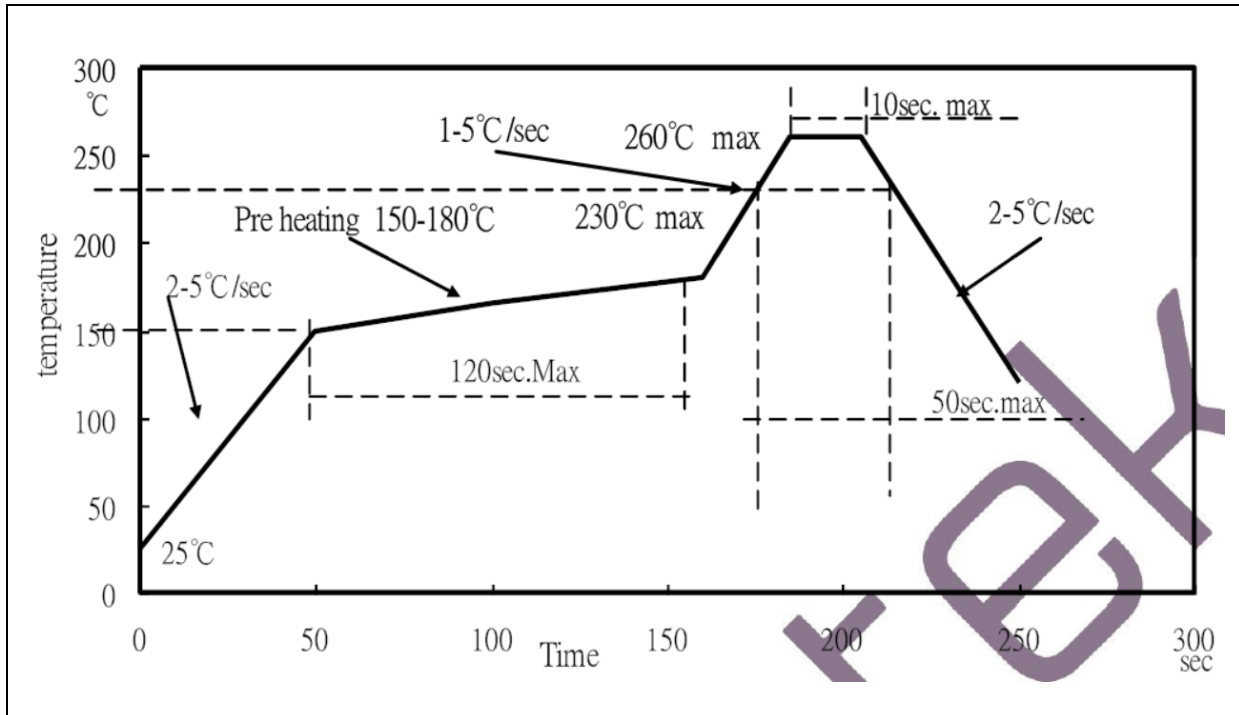
### 4. Data Transmission Method





## RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:

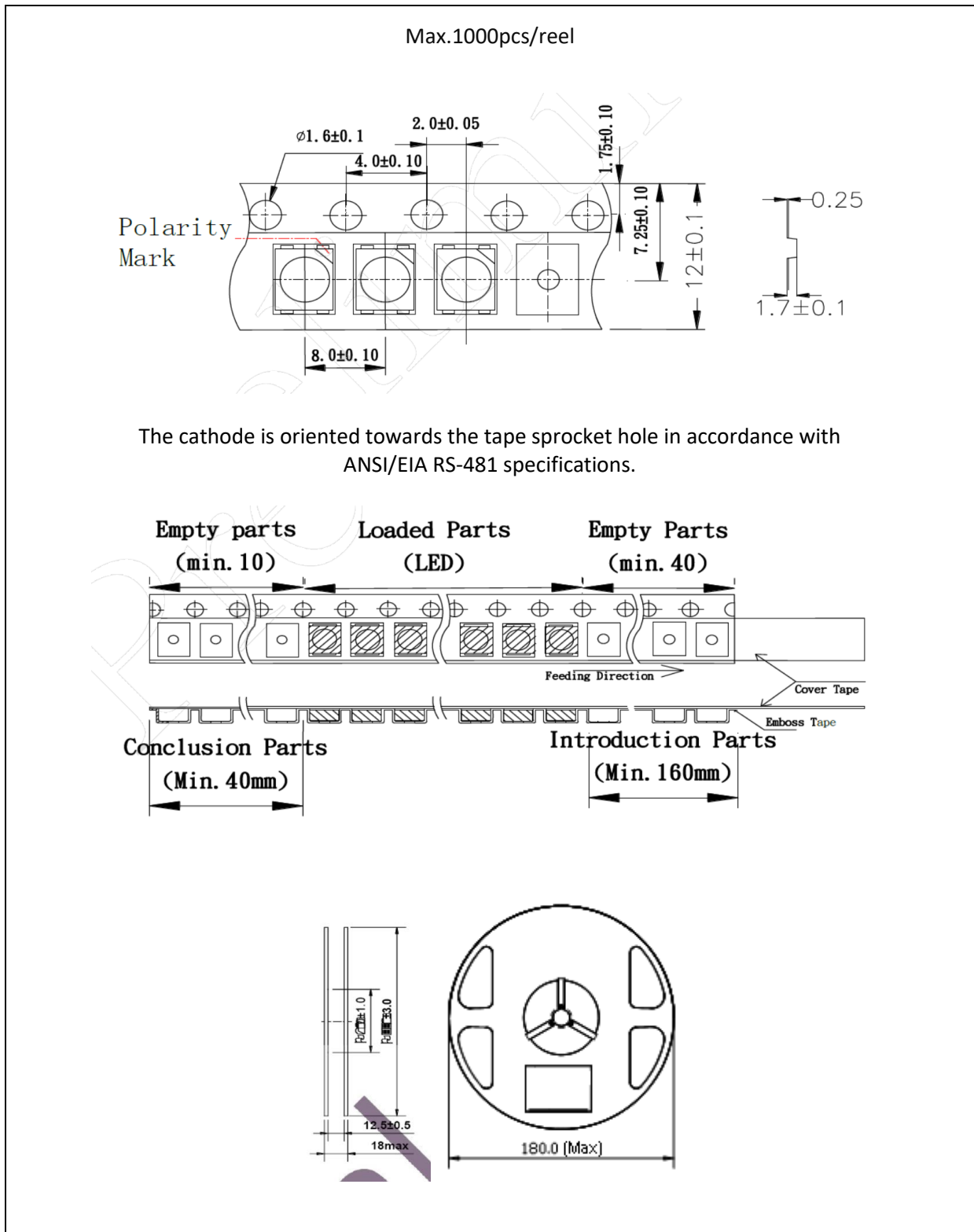


Note:

1. We recommend the reflow temperature 245°C ( $\pm 5^\circ\text{C}$ ). 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:

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### 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 <10% R.H. and apply baking.

### Over-Current Proof:

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

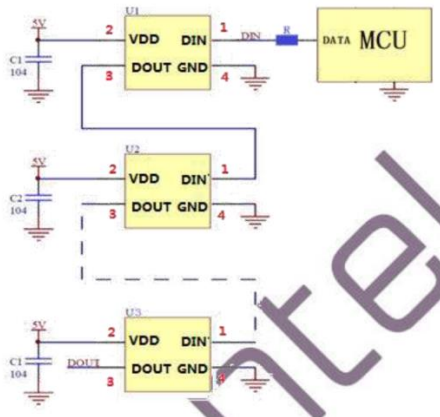
### Baking:

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:



### 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:**

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Version	Date	Summary of Revision
A1.0	06/11/2019	Datasheet set-up.
A1.1	15/04/2021	Front page correction.

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