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

- PLCC4 SMD with IC
- 3535IC 1.47t Series
- Red/Green/Blue

Release Date: 15 September 2024 Version: A1.1

N0M45S35IC

3535 IC Integrated

3535 IC-Integrated

RoHS Compliant

FEATURES:

- **Package:** PLCC4 EIA STD Package with Integrated IC Type 104
- **Forward Current:** 5mA
- **Forward Voltage (typ.):** +3.8~+5.5V
- **Luminous Intensity (typ.):** 810mcd mixed white
- **Colour:** Red/Green/Blue
- **Wavelength:** 622/525/467nm
- **Viewing angle:** 120°
- **Materials:**
  - Resin: Silicone (White Diffused)
  - L/F Finish: Ag Plated
- **Operating Temperature:** -40~+85°C
- **Storage Temperature:** -40~+105°C
- **IC Feature:**
  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 3
- **Packing:** 12mm tape with Max.1300pcs/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_F	5	mA
IC Power Supply Voltage	V_{DD}	+3.8~+5.5	V
IC Input Voltage	V_I	-0.4~V_{DD}+0.4	V
Operating Temperature	T_{OPR}	-40~+85	°C
Storage Temperature	T_{STG}	-40~+105	°C

Electrical & Optical Characteristics (Ta=25°C)

Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
Luminous Intensity	R	I_V	115	170	255	mcd	I_F=5mA
	G		355	530	795		
	B		80	120	180		
	W		460	810	1700		
Dominant Wavelength	R	λ_D	615	---	630	nm	I_F=5mA
	G		520	---	530		
	B		460	---	475		
Colour Coordinate	X	---	---	0.2170	---	---	I_F=5mA
	Y		---	0.2750	---	---	
Viewing Angle		$2\theta_{1/2}$	---	120	---	deg	I_F=5mA

Electrical & Optical Characteristics (Ta=25°C)

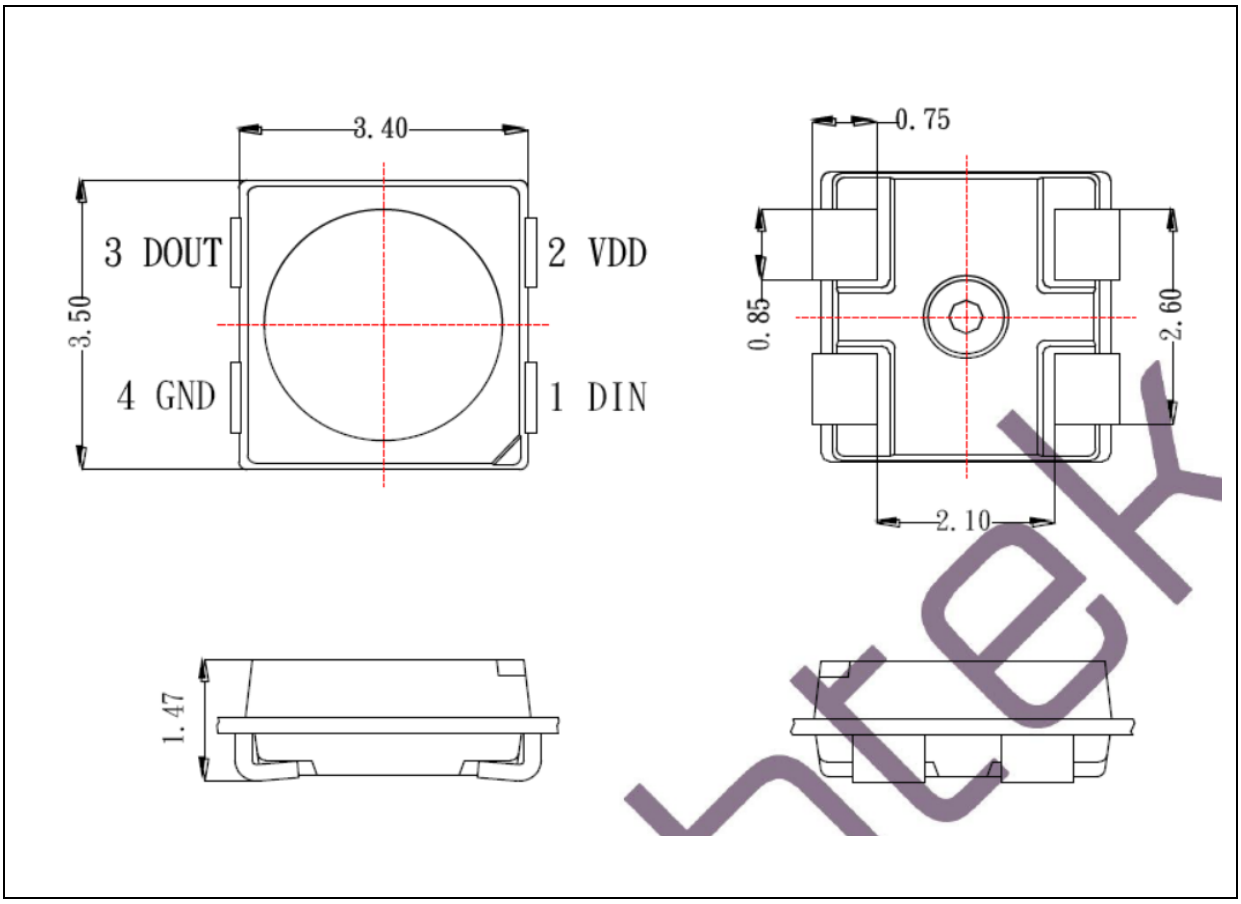
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Static Current	I_{DD}	---	0.3	---	mA	V_{DD}=4.5V I_{OUT}=OFF
Input Voltage Level	V_{IH}	0.7 V_{DD}	---	---	V	D_{IN}, SET
	V_{IL}	---	---	0.3 V_{DD}	V	D_{IN}, SET

Switching Characteristics (Ta=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Rate of Data Signal	F_{DIN}	---	0.8	---	MHz	---
Transfer Time	T_{PLH}	---	---	80	ns	D_{IN} -> D_{OUT}
	T_{PHL}	---	---	80	ns	
Conversion Time of I_{OUT} R/G/B	Tr	---	---	50	ns	I_{OUT} R/G/B=5Ma RL=400Ω CL=15pF
	Tf	---	---	100	ns	

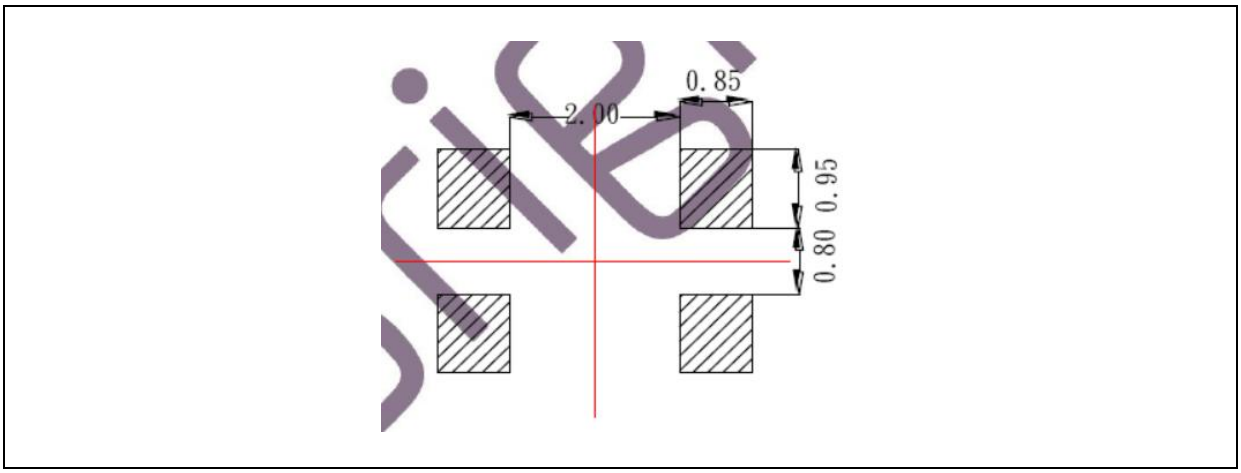
OUTLINE DIMENSION:

Package Dimension:



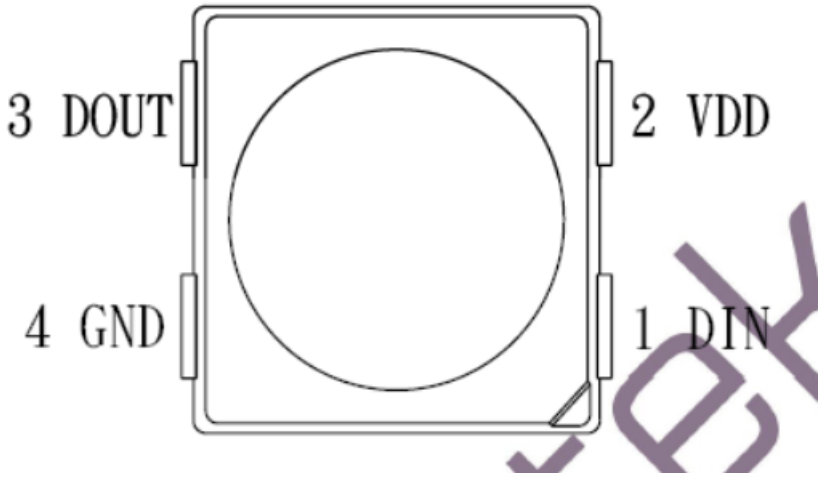
1. All dimensions are in millimetre (mm).
2. Tolerance ±0.2mm, unless otherwise noted.

Recommended Soldering Pad Dimension:



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

PIN CONFIGURATION:



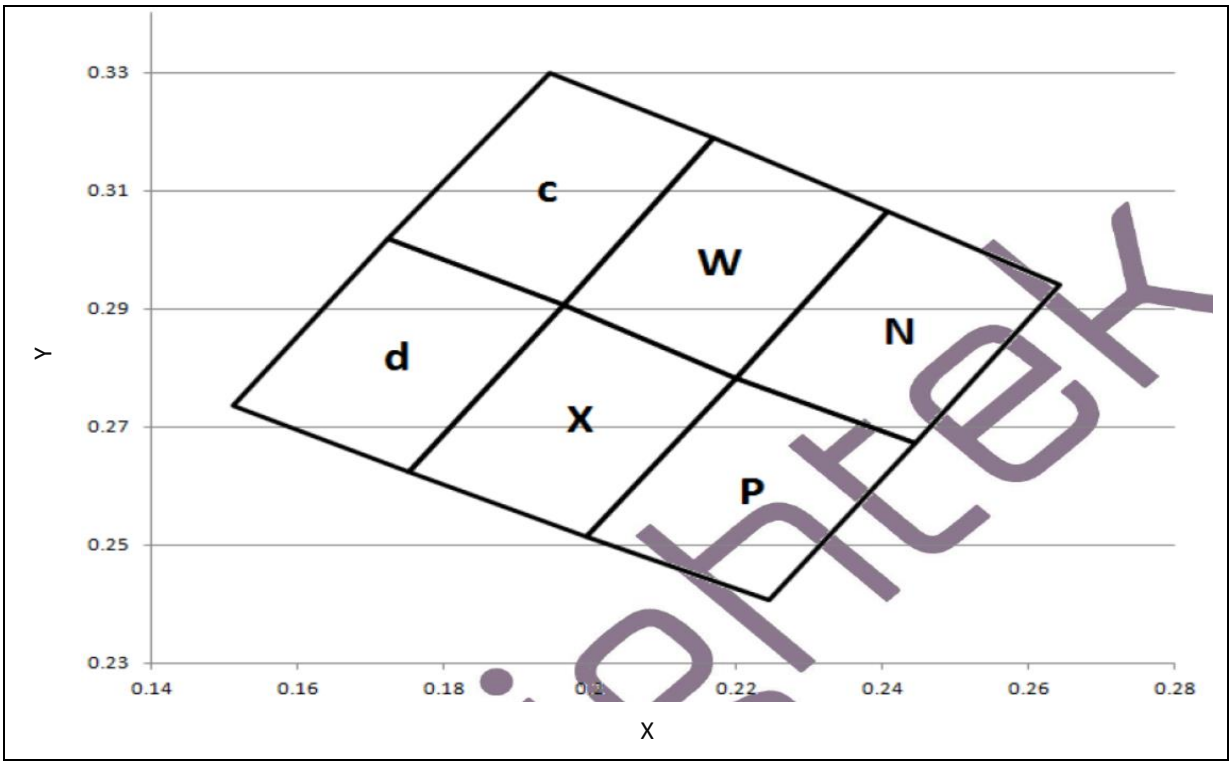
No.	Symbol	Function Description
1	DIN	Control data signal input
2	VDD	Power Supply LED
3	DOUT	Control data signal output
4	GND	Ground

BINNING GROUPS:

Luminous Intensity Classifications (White) (I_F = 5mA):

Code	Min.	Max.	Unit
12	460	600	mcd
13	600	780	
14	780	1000	
15	1000	1300	
16	1300	1700	

CIE Chromaticity Diagram (I_F = 5mA):

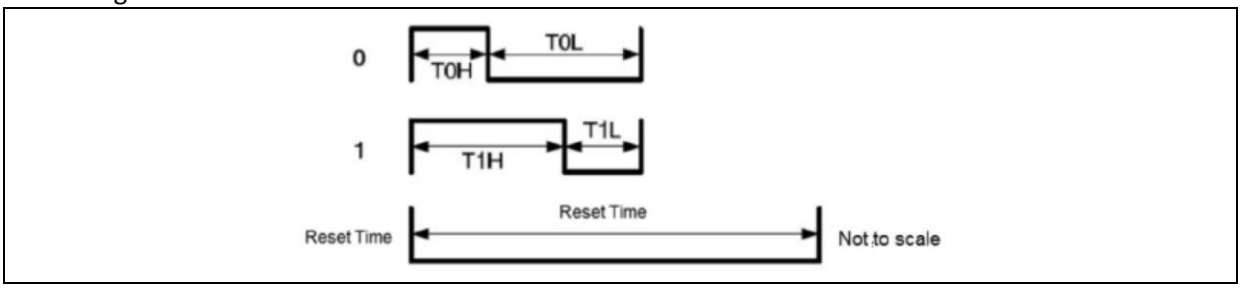


Chromaticity Coordinates Classifications (I_F = 5mA):

	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
C	0.1945	0.3299	0.1723	0.3018	0.1963	0.2907	0.2169	0.3188
D	0.1723	0.3018	0.1512	0.2735	0.1752	0.2624	0.1963	0.2907
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
X	0.1963	0.2907	0.1752	0.2624	0.1996	0.2513	0.2200	0.2783
W	0.1963	0.2907	0.2169	0.3188	0.2406	0.3064	0.2200	0.2783

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

1. Timing Wave Form



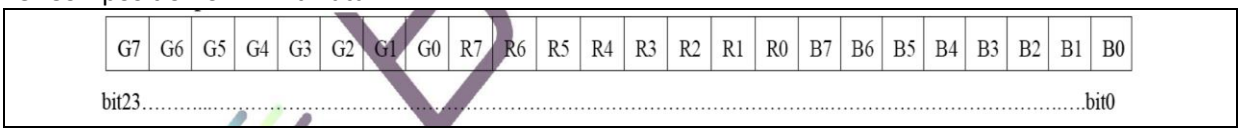
2. High Speed Mode

Item	Description	Typical	Allowance
T_{0H}	0 code, high voltage time	300ns	±150ns
T_{0L}	0 code, low voltage time	900ns	±150ns
T_{1H}	1 code, high voltage time	900ns	±150ns
T_{1L}	1 code, low voltage time	300ns	±150ns
RES	Reset Time	>200µs	---

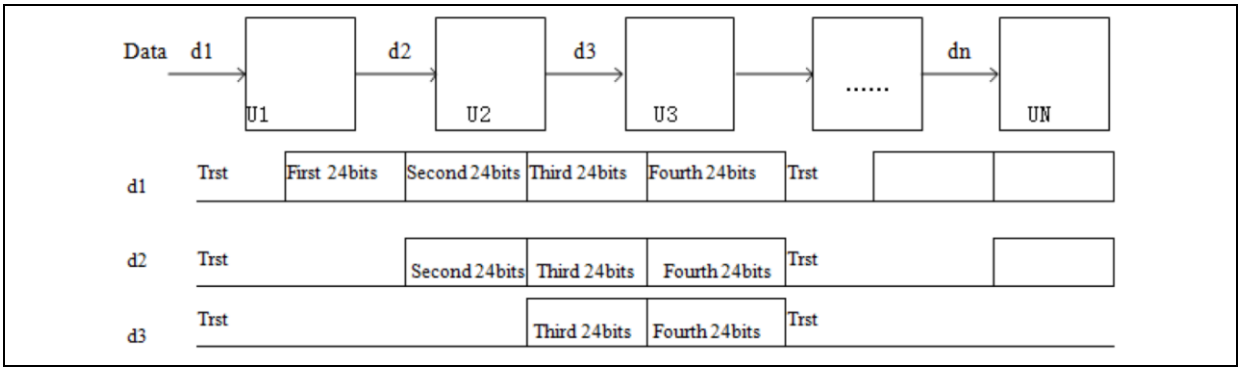
Note:

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, λ_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 Bit Data

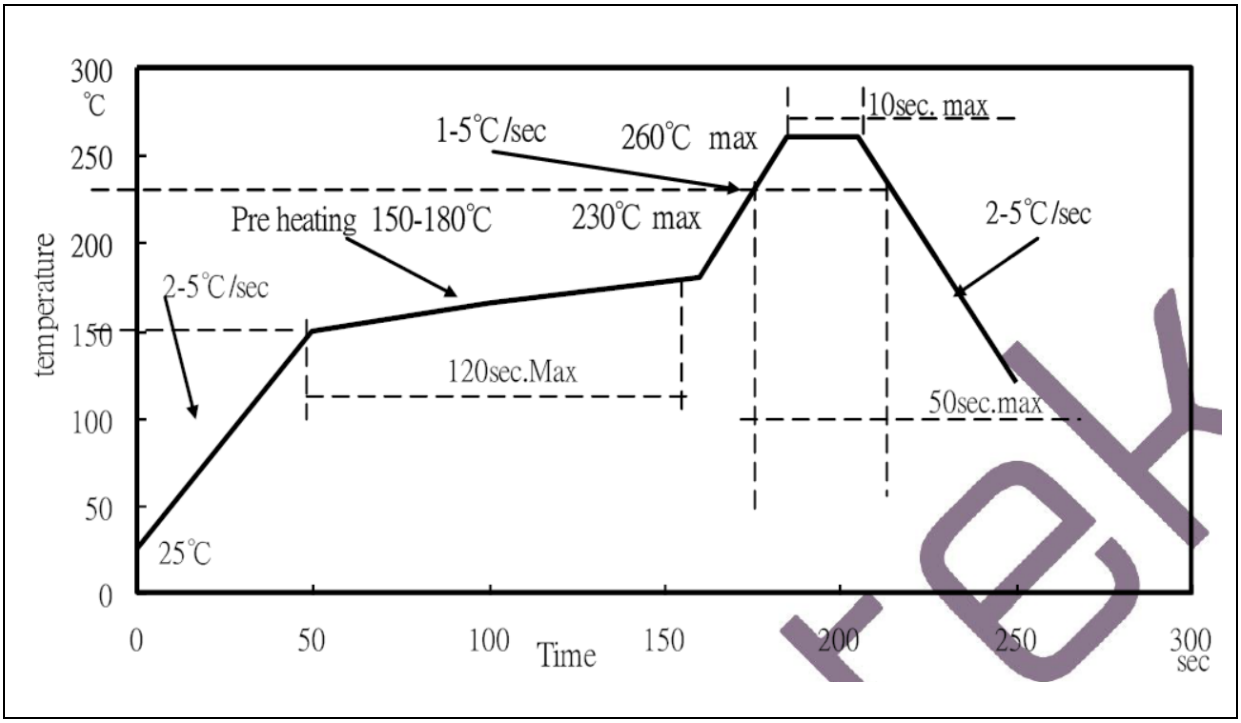


3. Data Transmission Method



RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:



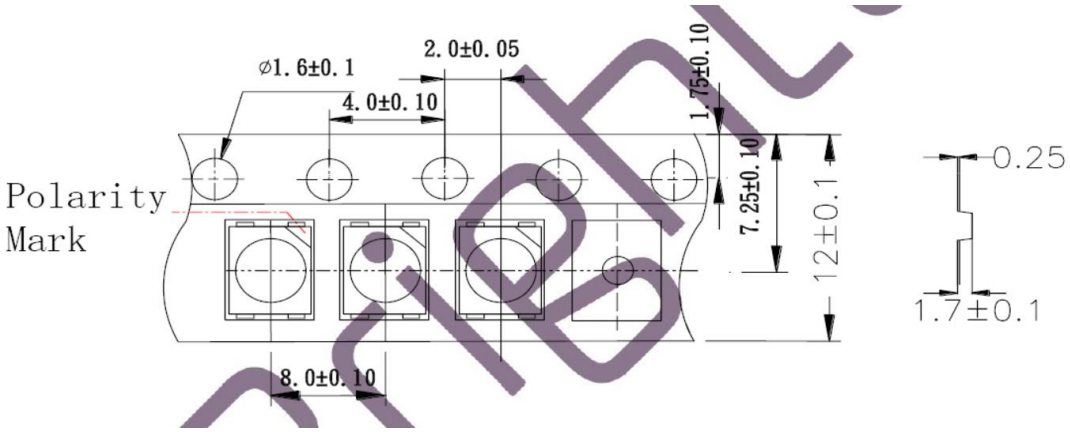
Note:

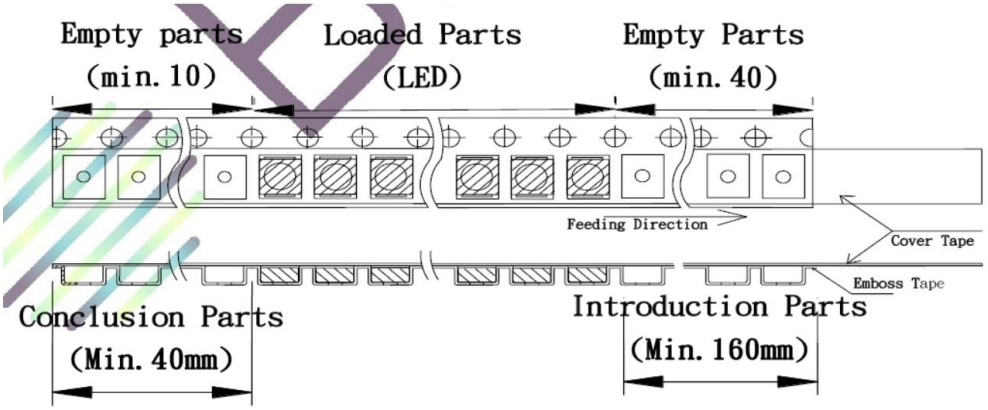
1. We recommend the reflow temperature 245°C (±5°C). The maximum soldering temperature should be limited to 260°C.
2. Maximum reflow soldering: 1 time.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

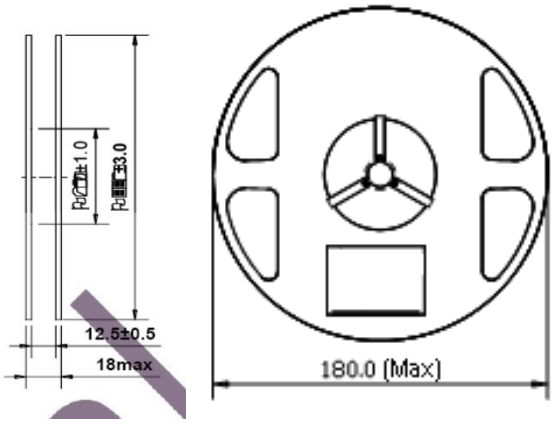
PACKING SPECIFICATION:

Reel Dimension:

Max.1300pcs/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 a week. Otherwise, they should be kept in a damp-proof box with descanting agent and apply baking at 60°C±5°C for 6hrs before use.

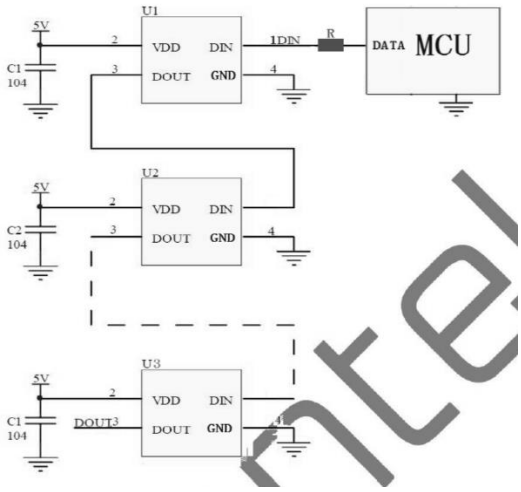
Baking:

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:



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	17/01/2019	Datasheet set-up.
A1.1	15/09/2024	Revised parameters ranges.