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

N0M67S05IC

3535 IC Integrated

3535 IC-Integrated

RoHS Compliant

FEATURES:

- **Package:** PLCC4 EIA STD Package with Integrated IC
- **Forward Current:** 5mA
- **IC Power Supply Voltage:** +3.8~+5.5V
- **Luminous Intensity (typ.):** 140/480/95mcd*
- **Mixed White Luminous Intensity (typ.):** 720mcd
- **Colour:** Red/Green/Blue
- **Dominant Wavelength (typ.):** 622/527/462nm
- **Viewing Angle:** 120°
- **Operating Temperature:** -40~+85°C
- **Storage Temperature:** -40~+105°C
- **IC Feature:** RGB and driver chip are integrated in a package, to form a complete control of pixel point with constant current. Serial data transmission signal by single wire. 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 800 kHz.
- **Soldering methods:** Reflow Soldering
- **MSL Level:** acc. to JEDEC J-STD-020E Level 3
- **Packing:** 12mm tape with max.1300pcs/reel, ø180mm (7'')

* in order of Red/Green/Blue

APPLICATIONS:

- Telecommunication
- 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}	+3.8~+5.5	V
IC Input Voltage	V_I	-0.4~V_{DD}+0.4	V
Forward Current	I_F	5	mA
Operating Temperature	T_{OPR}	-40~+85	°C
Storage Temperature	T_{STG}	-40~+105	°C
Electrostatic Discharge (HBM) acc. To ANSI/ESDA/JEDEC JS-001	ESD	2000	V

Electrical & Optical Characteristics (T_a=25°C, V_{DD}=5V)

Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
Forward Voltage		V_F	3.8	---	5.5	V	---
Luminous Intensity	R	I_V	---	140	---	mcd	I_F=5mA
	G		---	480	---		
	B		---	95	---		
Mix White	W		350	720	1300		
Dominant Wavelength	R	λ_d	615	---	630	nm	I_F=5mA
	G		520	---	535		
	B		465	---	475		
Colour Coordinate	X	---	---	0.2450	---	---	I_F=5mA
	Y		---	0.2700	---		
Viewing Angle		$2\theta_{1/2}$	---	120	---	deg	I_F=5mA

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

Electrical & Optical Characteristics (T_a=25°C)

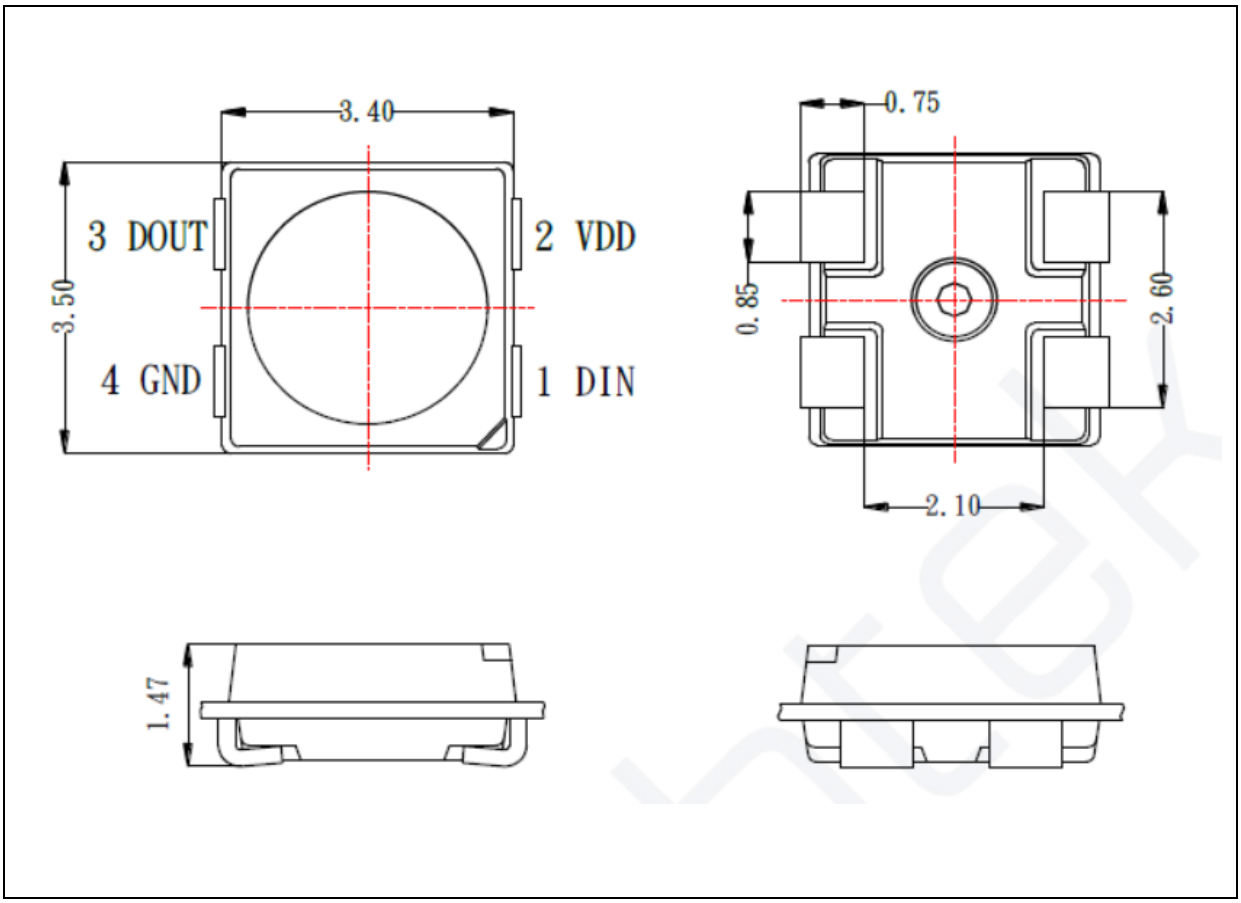
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Static Current	I_{DD}	---	0.3	---	mA	V_{DD}=4.5V, I_{OUT}="OFF"
Input Voltage Level	V_{IH}	0.7 V_{DD}	---	---	V	D_{IN}, SET
	V_{IL}	---	---	0.3 V_{DD}	V	D_{IN}, SET

Switching Characteristics (T_a=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Rate of Data Signal	F_{DIN}	---	800	---	kHz	---
Transfer Time	T_{PLH}	---	---	80	ns	D_{IN} -> D_{OUT}
	T_{PHL}	---	---	80	ns	
Conversion Time of I_{OUT} R/G/B	T_R	---	---	50	ns	I_{OUT} (R/G/B) =5mA RL=400Ω CL=15pF
	T_F	---	---	100	ns	

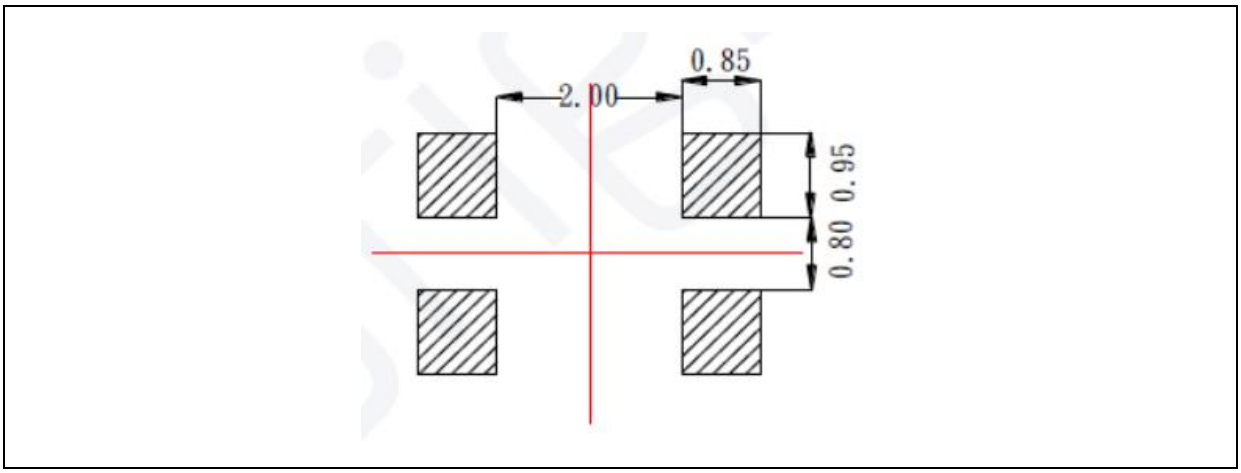
OUTLINE DIMENSION:

Package Dimension:



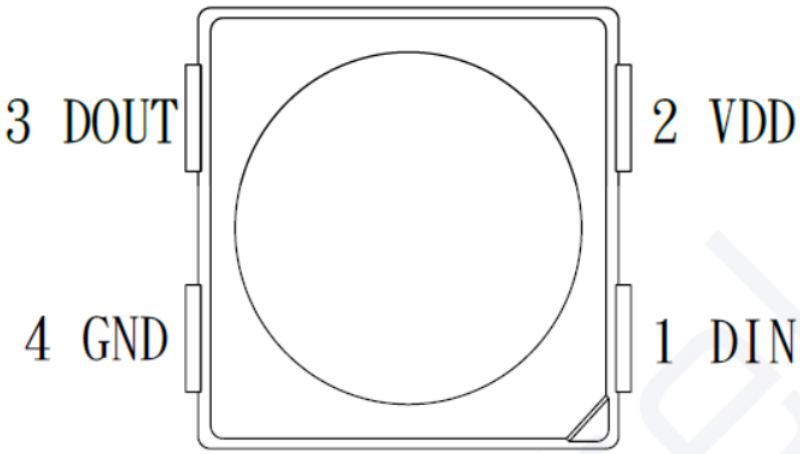
1. All dimensions are in millimetre (mm).
2. Tolerance ±0.1mm, unless otherwise noted.

Recommended Soldering Pad Dimension:



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

PIN CONFIGURATION:



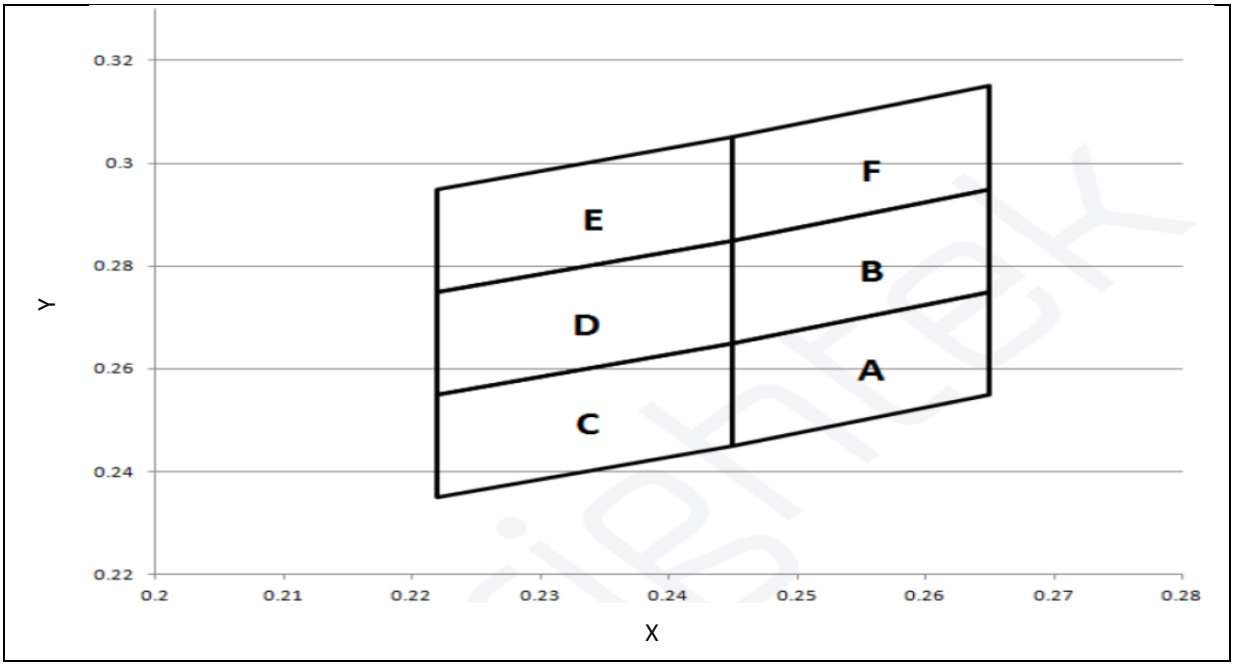
No.	Symbol	Function Description
1	DIN	Control Data Signal Input
2	VDD	Power Supply LED
3	DOUT	Control Data Singal Output
4	GND	Ground

BINNING GROUPS:

Luminous Intensity Classifications (V_{DD}=5V; I_F=5mA*3):

Code		Min.	Max.	Unit
Mix White	11	350	460	mcd
	12	460	600	
	13	600	780	
	14	780	1000	
	15	1000	1300	

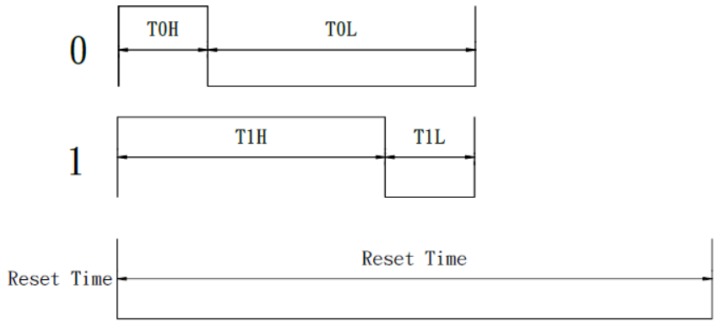
Chromaticity Coordinate Classifications (V_{DD}=5V; I_F=5mA*3):



	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
A	0.2450	0.2450	0.2650	0.2550	0.2650	0.2750	0.2450	0.2650
B	0.2450	0.2650	0.2650	0.2750	0.2650	0.2950	0.2450	0.2850
C	0.2450	0.2450	0.2450	0.2650	0.2220	0.2550	0.2220	0.2350
D	0.2450	0.2850	0.2450	0.2650	0.2220	0.2550	0.2220	0.2750
E	0.2450	0.2850	0.2220	0.2750	0.2220	0.2950	0.2450	0.3050
F	0.450	0.3050	0.2450	0.2850	0.2650	0.2950	0.2650	0.3150

FUNCTION DESCRIPTION:

1. Time wave form:



2. High speed mode:

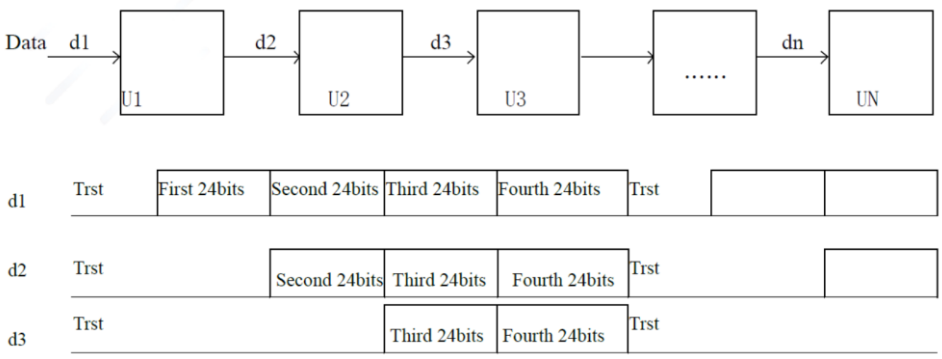
Item	Description	Typical	Allowance
T_{0H}	0 code,high voltage time	300ns	±150ns
T_{0L}	0 code,low voltage time	900ns	±150ns
T_{1H}	1 code,high voltage time	900ns	±150ns
T_{1L}	1 code,low voltage time	300ns	±150ns
RES	reset time	>200us	-

3. Composition of 24-bit data:

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0

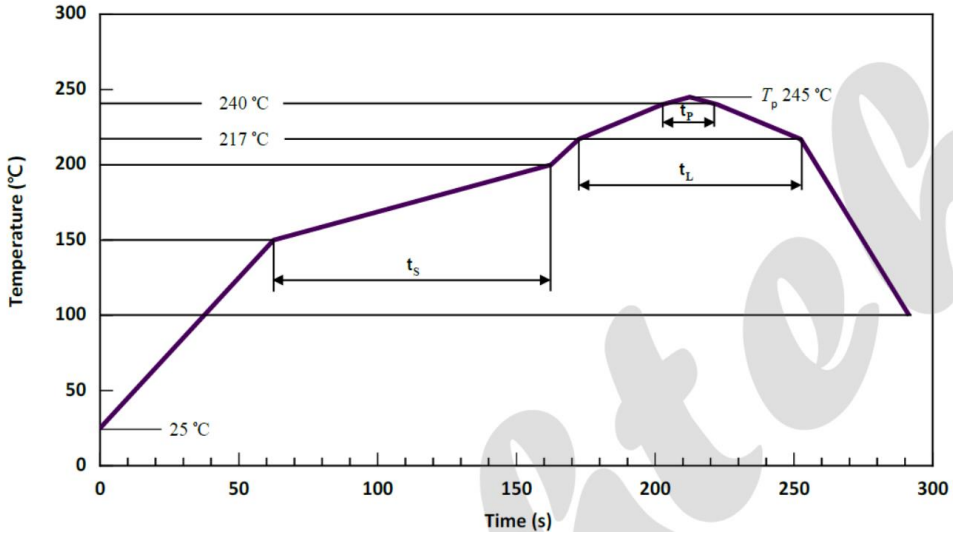
bit23.....bit0

4. Data transmission method:



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

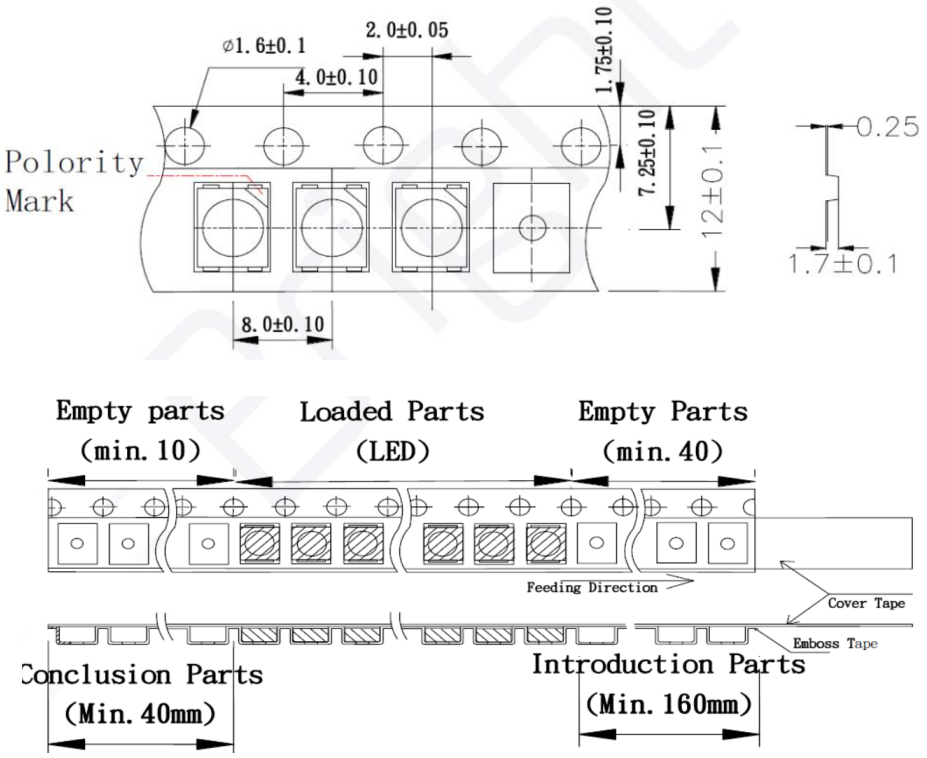
Note:

1. We recommend the reflow temperature 240°C (±5°C). The maximum soldering temperature should be limited to 245°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:

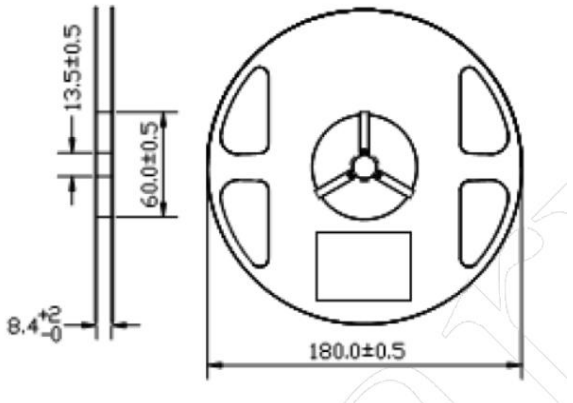
Reel Dimension:

Max.1300pcs/reel



Notes:

1. Empty component pockets are sealed with top cover tape
2. The cathode is oriented towards the tape sprocket hole in accordance with ANSI/EIA RS-481 specifications
3. The remainder packing in multiples of 500pcs.



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 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.

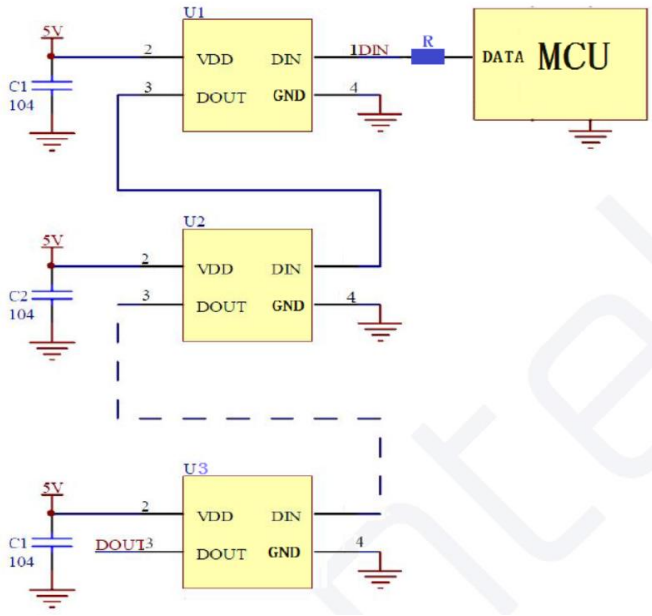
Baking:

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:



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:

Version	Date	Summary of Revision
A1.0	28/03/2022	Datasheet set-up.
A1.1	15/09/2024	Update product picture.