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

- PLCC Top View w/ IC
- 3735 IC 1.90t (6-pins)
- Natural White/R/G/B

Release Date: 07 June 2025 Version: A1.1

N0M70S23IC (WRGB)

3735 1.90t IC Integrated

3735 1.90t IC-Integrated

RoHS Compliant

FEATURES:

- **Package:** PLCC Top View Package with Integrated IC 6812
- **GW/R/G/B Output Current (typ.):** 16.5/8/8/8mA
- **Logical Supply Voltage:** +3.7~+5.5V
- **Luminous Intensity (typ.):** 2150/300/850/210mcd
- **Colour:** Natural White/Red/Green/Blue
- **Lens Colour:** Water Diffused
- **IC Feature:** Control IC and RGB LED chip integrated in 3735 package. Single-line zero code transmission protocol. Can be infinite cascade. The data transmission frequency can reach 800Kbps, and when the refresh rate is 30 frames per second, the number of cascades is not less than 1024 points. Grayscale adjustment: 256 levels. Built-in reset circuit, power does not light up the LED.
- **Soldering Methods:** Reflow soldering
- **ESD Level:** 2kV
- **MSL Level:** acc. to JEDEC Level 5a
- **Packing:** 12mm tape with max.1500pcs/reel, ø178mm (7'')

APPLICATIONS:

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

CHARACTERISTICS:

Absolute Maximum Characteristics (T_a=25°C)

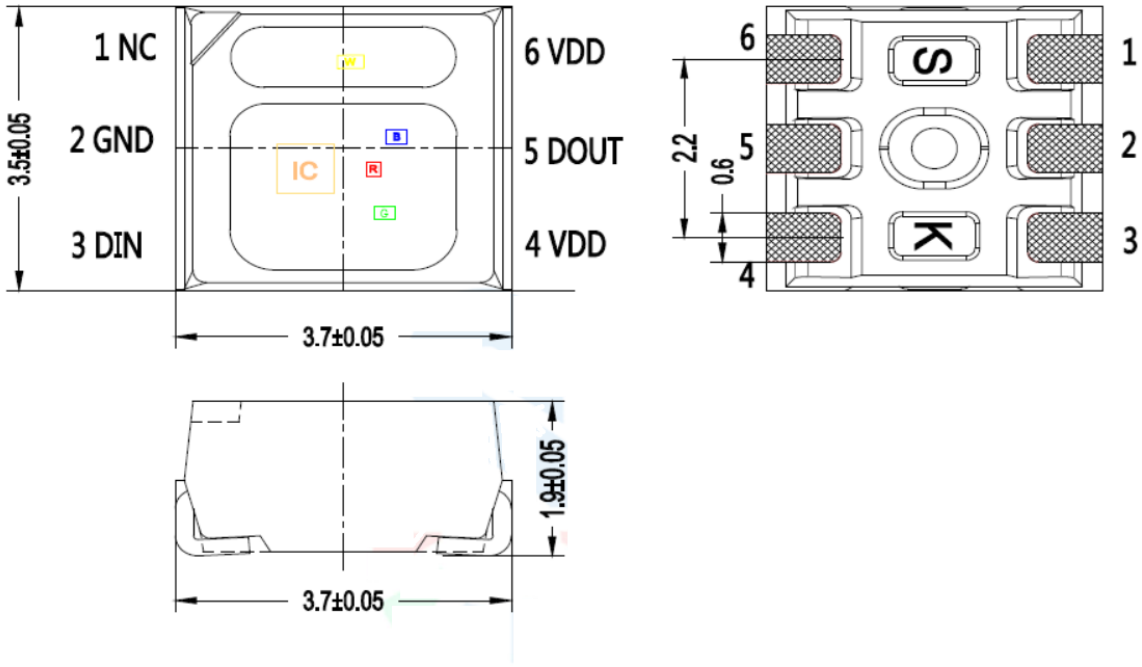
Parameter	Symbol	Ratings	Unit
Working Voltage	V_{DD}	+3.7~+5.5	V
Operation Temperature	T_{OPT}	-40~+85	°C
Storage Temperature	T_{STG}	-40~+85	°C
ESD Withstand Voltage (Human Mode)	V_{ESD}	2	kV

Electrical & Optical Characteristics

Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
Chip Input Voltage		V_{DD}	3.5	---	5.5	V	---
White Output Drive Current		I_{DOUT}	---	8	---	mA	V_{DS}=1V
R/G/B Output Drive Current			---	16.5	---		
Signal Input Flip Threshold		V_{IH}	0.7*V_{DD}	---	---	V	+V_{DD}=5.0V
		V_{IL}	---	---	0.3*V_{DD}	V	
PWM Frequency		F_{PWM}	---	4.0	---	KHz	---
Static Power Consumption		I_{DD}	---	0.29	---	mA	---
Transfer Rate		F_{DIN}	---	800	---	Kbps	---
Colour Temperature	Gold White	CCT	3800	---	4200	K	I_F=16.5mA
Dominant Wavelength	Red	λ_d	615	---	625	nm	I_F=8mA
	Green		525	---	535		
	Blue		465	---	475		
Luminous Intensity	Gold White	I_v	1800	---	2525	mcd	I_F=16.5mA
	Red	I_v	200	---	385	mcd	I_F=8mA
	Green		580	---	1050		
	Blue		140	---	280		
Viewing Angle		$2\theta_{1/2}$	---	120	---	deg	---

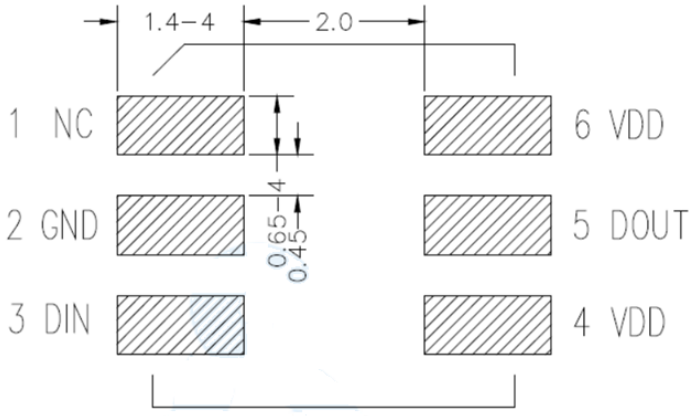
OUTLINE DIMENSION:

Package Dimension:



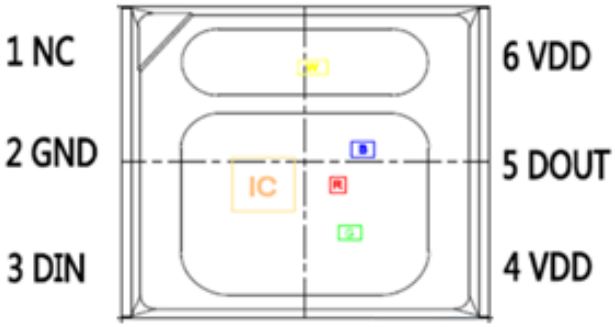
1. All dimensions are in millimetre (mm).
2. Tolerance ±0.1mm, unless otherwise noted.

Recommended Soldering Pad Dimension:



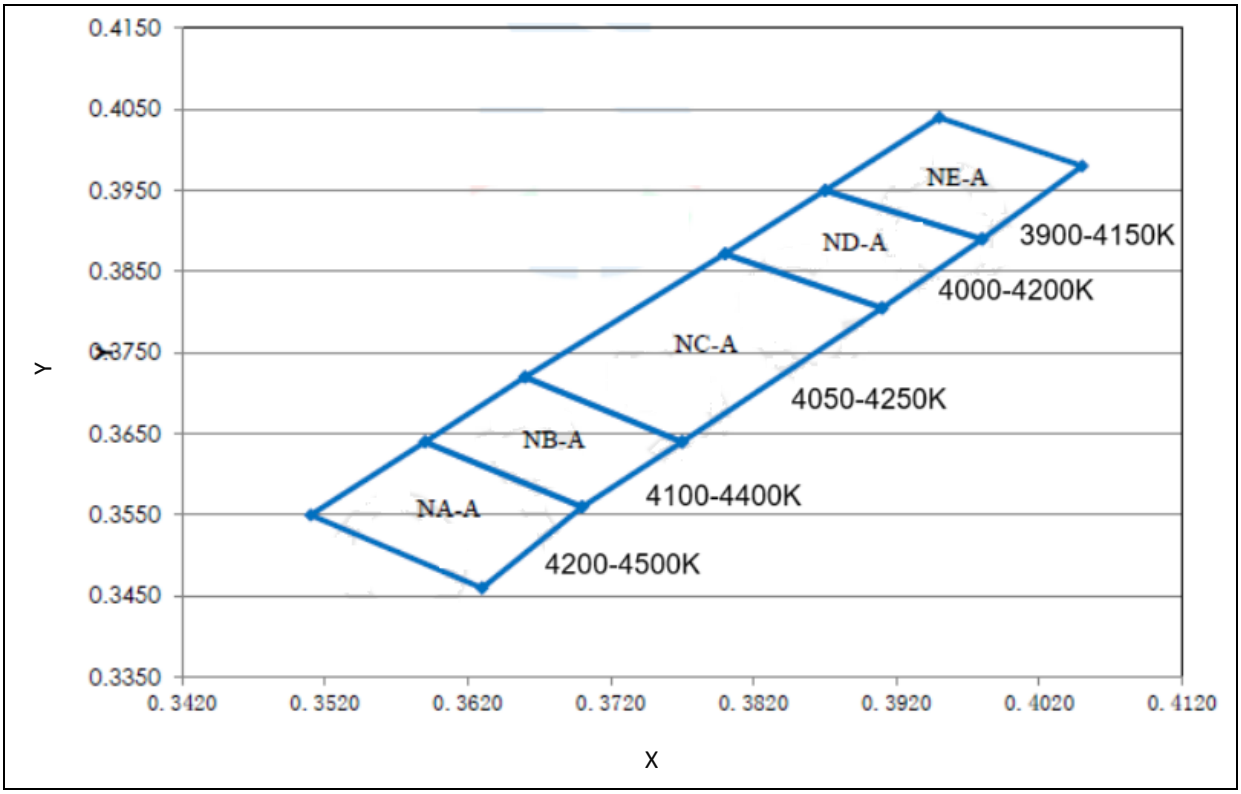
1. Dimensions are in millimetre (mm).
2. Tolerance ±0.1mm with angle tolerance ±0.5°.

PIN CONFIGURATION:



No.	Symbol	Function Description
1	NC	Empty feet. This empty foot cannot be used for any circuit design.
2	GND	Power grounding.
3	DIN	Control data signal input.
4	VDD	Power supply pins.
5	DOUT	Control data signal output.
6	VDD	Power supply pins.

CIE CHROMATICITY DIAGRAM:

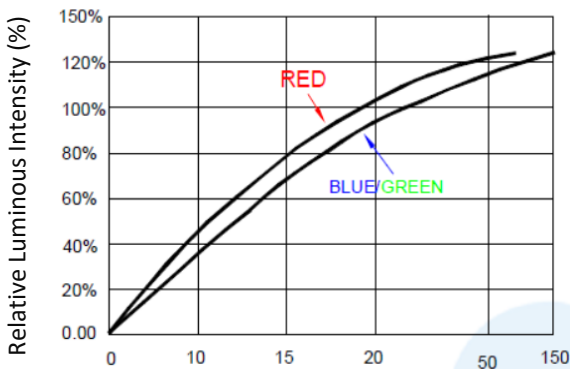


Chromaticity Coordinates Classifications:

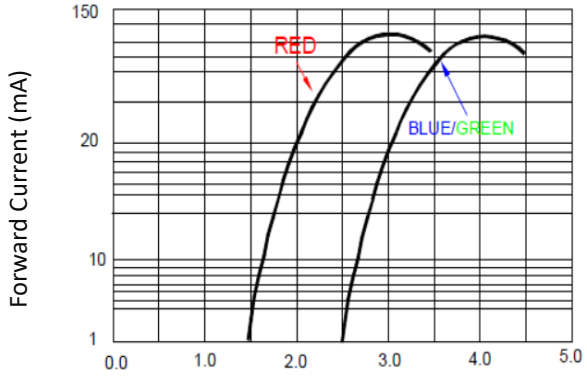
	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
NA-A	0.3630	0.3460	0.3510	0.3550	0.3590	0.3640	0.3700	0.3560
NB-A	0.3700	0.3560	0.3590	0.3640	0.3660	0.3720	0.3770	0.3640
NC-A	0.3770	0.3640	0.3660	0.3720	0.3800	0.3872	0.3910	0.3805
ND-A	0.3910	0.3805	0.3800	0.3872	0.3870	0.3950	0.3980	0.3890
NE-A	0.3980	0.3890	0.3870	0.3950	0.3950	0.4040	0.4050	0.3980

ELECTRO-OPTICAL CHARACTERISTICS:

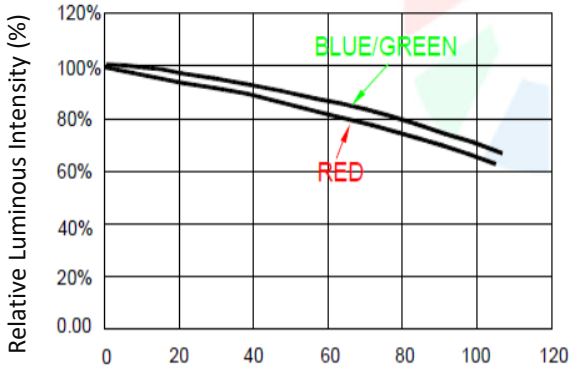
Rel. Luminous Intensity v.s. Forward Current



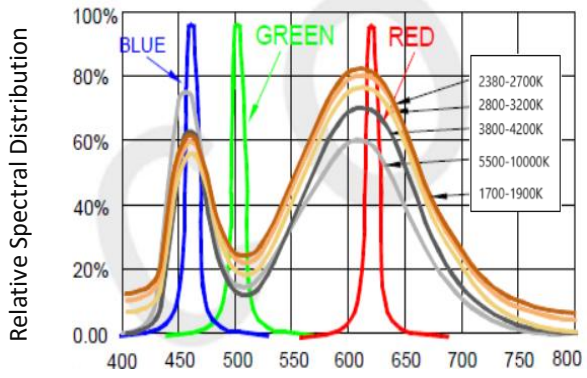
Forward Voltage v.s. Voltage Current



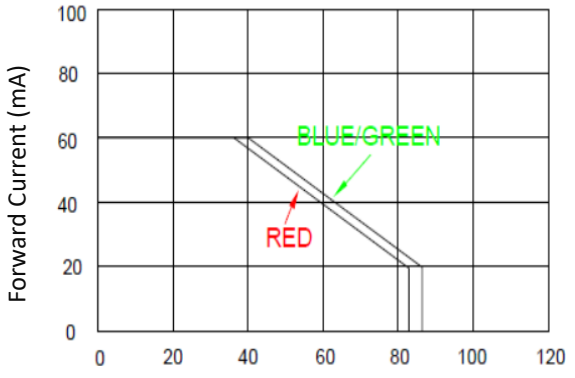
Rel. Luminous Intensity v.s. Pad Temperature



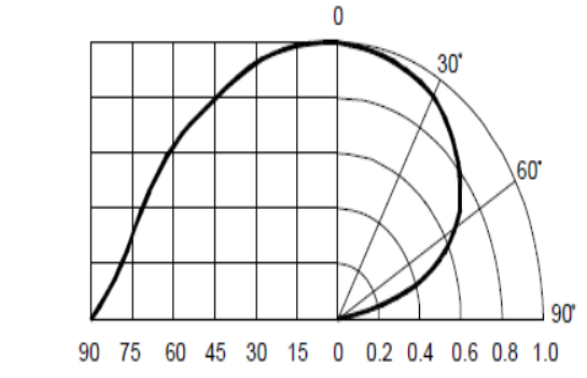
Relative Spectral Distribution v.s. Wavelength



Pad Temperature v.s. Forward Current

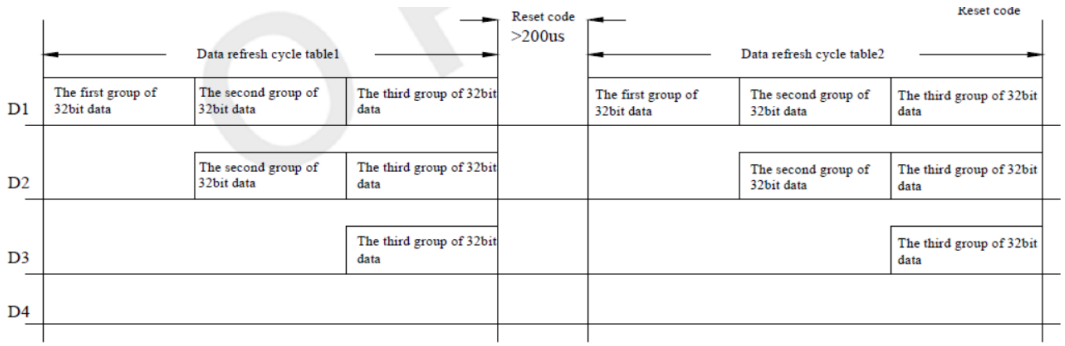


Typical adiation Pattern



FUNCTION DESCRIPTION:

1. Data Transmission Method:



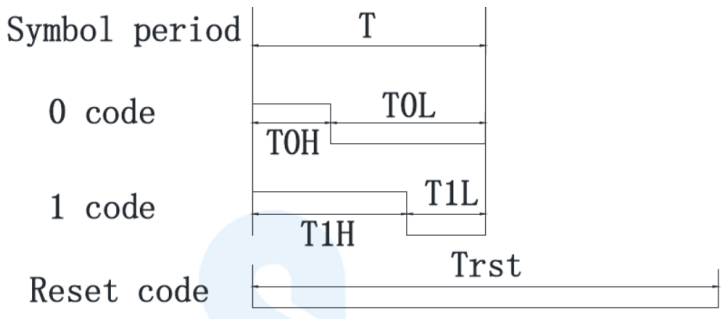
Among them, D1 is the data sent by the MCU end, and D2, D3, and D4 are the data automatically shaped and forwarded by the cascaded circuit.

2. Data Transmission Time:

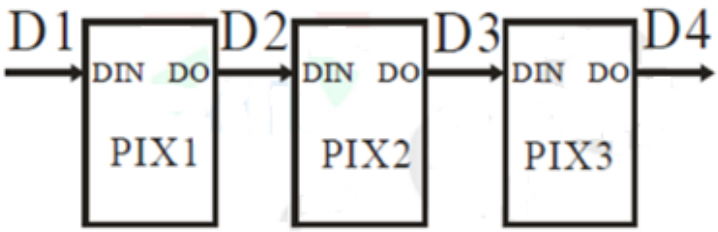
Timeline name		Min.	Actual value	Max.	Unit
T	Symbol period	1.20	--	--	μs
T0H	0 code, high-level time	0.20	0.30	0.40	μs
T0L	0 code, low-level time	0.80	--	--	μs
T1H	1 code, high-level time	0.65	0.75	1.00	μs
T1L	1 code, low-level time	0.20	--	--	μs
Reset	Reset code, low-level time	>200	--	--	μs

1. The protocol adopts unipolar zeroing code, and each symbol must have a low level. Each symbol in this protocol starts with a high level, and the duration of the high level determines the "0" or "1" code.
2. When writing a program, the minimum required code period is 1.2μs.
3. The high-level time of "0" and "1" codes should be within the specified range in the table above, and the low-level time of "0" and "1" codes should be less than 20μs.

3. Time Series Waveform Input Code Type:



4. Connection Mode:

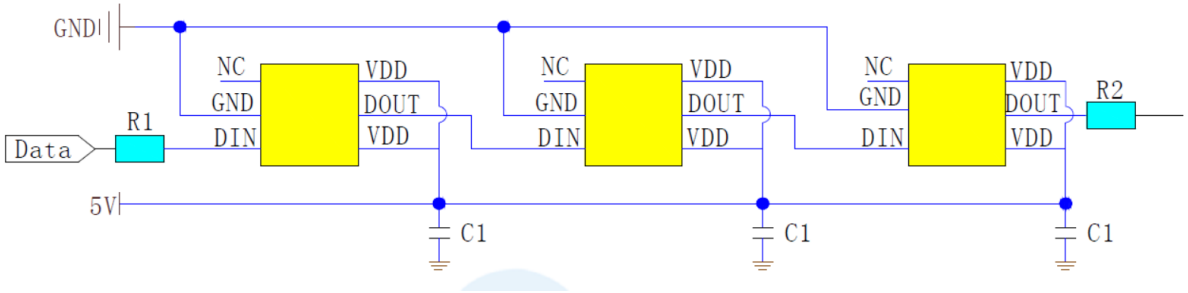


5. Mode of Data Transmission:

G7	G6	G5	G4	G3	G2	G1	G0	R7	R6	R5	R4
R3	R2	R1	R0	B7	B6	B5	B4	B3	B2	B1	B0
W7	W6	W5	W4	W3	W2	W1	W0				

High bit first send, send data in GRBW order (G7 → G6 → .... → W0)

6. Typical Application Circuit:



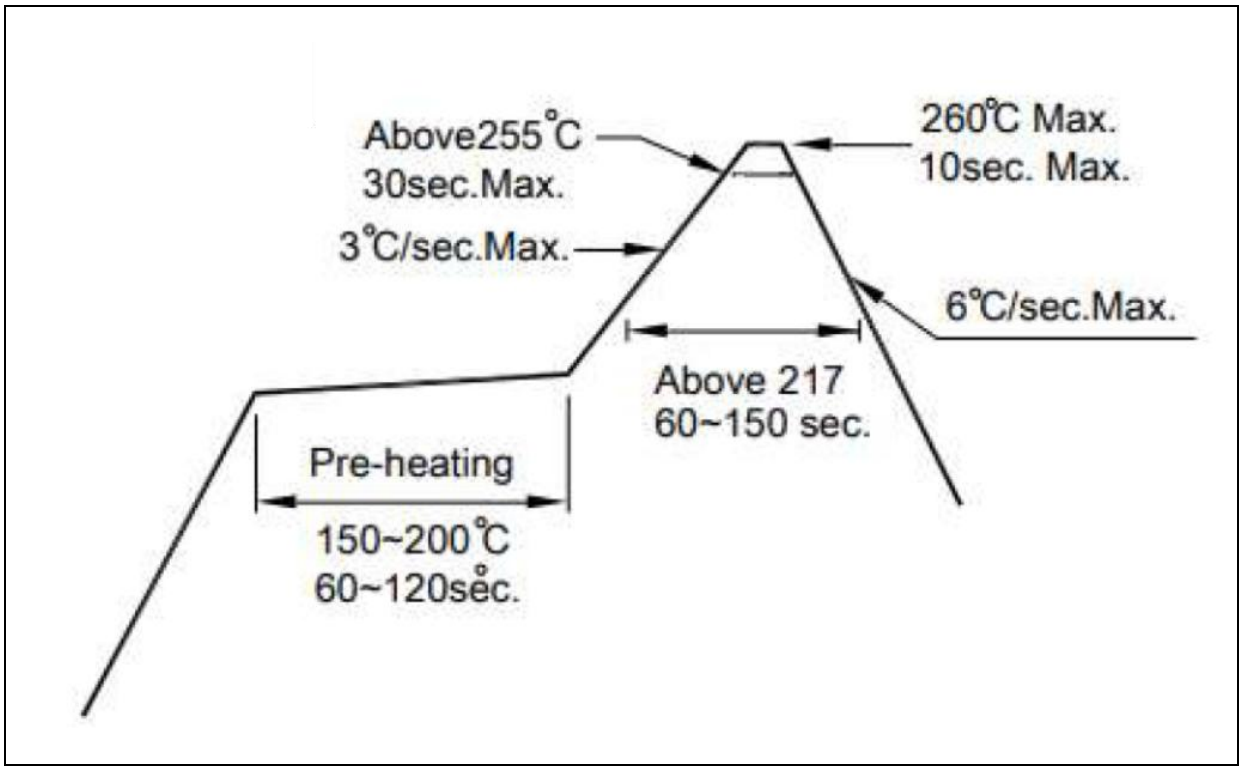
In practical application circuits, to prevent instantaneous high voltage damage to the internal signal input and output pins of the IC caused by live plugging and unplugging during testing, protective resistors should be connected in series at the signal input and output terminals. In addition, in order to ensure more stable operation between IC chips, the decoupling capacitance between each LED is essential.

Application 1: For soft or hard light strips with short transmission distance between lamp beads, it is recommended to connect protective resistors in series at the signal input and output terminals, R1, R2, about 500ohms.

Application 2: Used for modules or general shaped products. The transmission distance between lamp beads is long. Due to different wire materials and transmission distances, the protective resistance of the signal line connected in series at both ends will be slightly different; Based on actual usage.

RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:



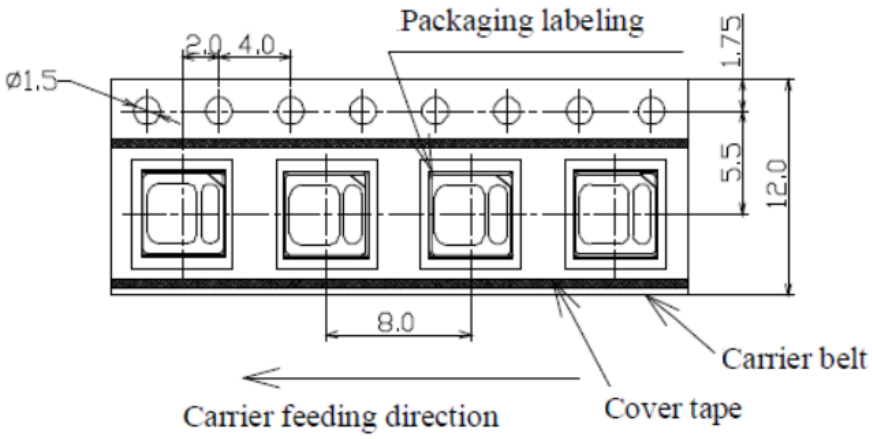
Note:

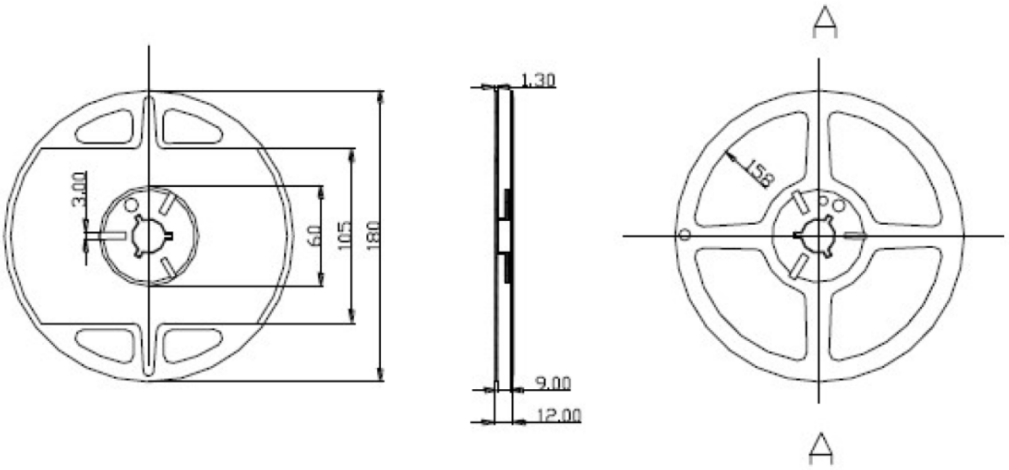
1. The maximum soldering temperature should be limited to 240°C. The maximum soldering temperature should be limited to 260°C.
2. Maxima reflow soldering: 2 times.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

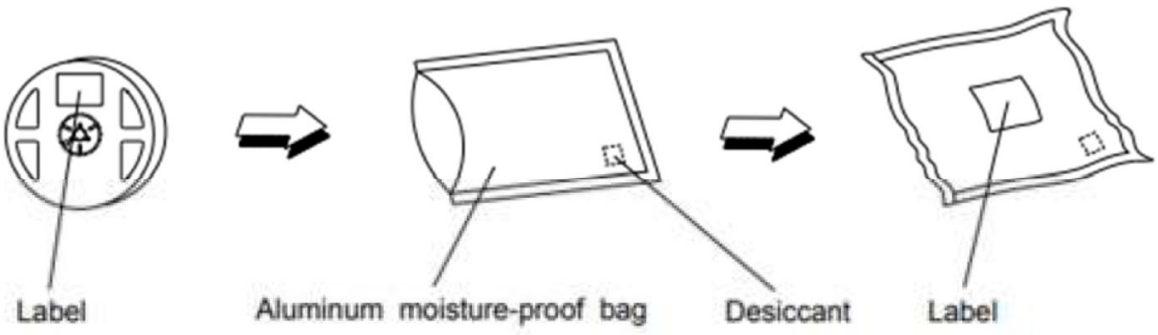
PACKING SPECIFICATION:

Reel Dimension:

Max.1500pcs/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 24 hours. 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±5°C x 48hrs and <5%RH, taped / reel package.

It's normal to see slight color fading of carrier (light yellow) after baking in process.

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:

Version	Date	Summary of Revision
A1.0	25/09/2024	Datasheet set-up.
A1.1	07/06/2025	New datasheet format.