BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED!

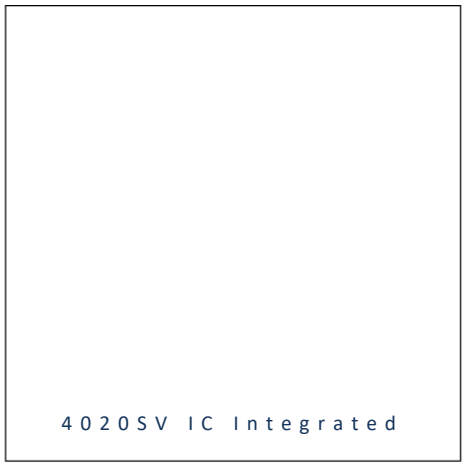
ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

PRODUCT DATASHEET

- PLCC Side View w/ IC
- 4020SV IC 2.0t
- Red/Green/Blue

Release Date: 08 September 2024 Version: A1.2

N0M67S19ICSV



4020SV IC-Integrated

RoHS Compliant

FEATURES:

- **Package:** PLCC Side View Package with Integrated IC
- **R/G/B Output Current (typ.):** 12mA
- **Logical Supply Voltage:** +3.5~+5.5V
- **Luminous Intensity (typ.):** 300/1000/225mcd
- **Colour:** Red/Green/Blue
- **Materials:**
  - Die: AlGaInP/InGaN/InGaN
  - Casting: Silicone (Water Clear)
- **IC Feature:** Cascading port transmission signal by single line. Built-in signal reshaping circuit, after wave reshaping to the next driver, ensure wave-form distortion not accumulate. Built-in electric reset circuit and power lost reset circuit. Send data at speeds of 800Kbps. When the refresh rate is 30fps, cascade number are not less than 1024 points.
- **Pixel:** Each pixel of the three primary colours can achieve 256 brightness display, full colour display, and scan frequency not less than 400Hz/s.
- **Soldering Methods:** Reflow soldering
- **MSL Level:** acc. to JEDEC Level 5a
- **Packing:** 12mm tape with max.2000pcs/reel, ø180mm (7'')

APPLICATIONS:

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

General Description:

N0M67S19ICSV is an intelligent control LED light source that the control circuit and RGB chip are integrated in one package.

It internal include intelligent digital port data latch and signal reshaping amplification drive circuit. Also include a precision internal oscillator and a 5V voltage programmable constant current control part, effectively ensuring the pixel point light color height consistent.

The data transfer protocol uses single NZR communication mode. After the pixel power-on reset, the DIN port receives data from controller, the first pixel collects initial 24bit data then sends to the internal data latch. The other data which is reshaping by the internal signal reshaping amplification circuit sent to the next cascade pixel through the DO port. After transmission for each pixel, the signal to reduce 24bit. Pixel adopts auto reshaping transmit technology, making the pixel cascade number is not limited to the signal transmission, only depend on the speed of signal transmission.

LED with low driving voltage, environmental protection and energy saving, high brightness, scattering angle is large, good consistency, low power, long life and other advantages. The control chip integrated in LED above becoming more simple circuit, small volume, convenient installation.

Features and Benefits:

- The control circuit and the LED share the only power source.
- Control circuit and RGB chip are integrated in a package of 4020SV components, form a complete control of pixel point.
- Built-in signal reshaping circuit, after wave reshaping to the next driver, ensure wave-form distortion not accumulate.
- Built-in electric reset circuit and power lost reset circuit.
- Each pixel of the three primary colours can achieve 256 brightness display, full color display, and scan frequency not less than 400Hz/s.
- Cascading port transmission signal by single line.
- Send data at speeds of 800Kbps.When the refresh rate is 30fps, cascade numbers are not less than 1024 points.
- The colours of the light are highly consistent, cost-effective.

CHARACTERISTICS:

Absolute Maximum Characteristics (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Logical Supply Voltage	V_{DD}	+3.5~+5.5	V
Logical Input Voltage	V_I	-0.5~+5.5	V
Working Temperature	T_{OPT}	-40~+85	°C
Storage Temperature	T_{STG}	-40~+120	°C

Electrical & Optical Characteristics

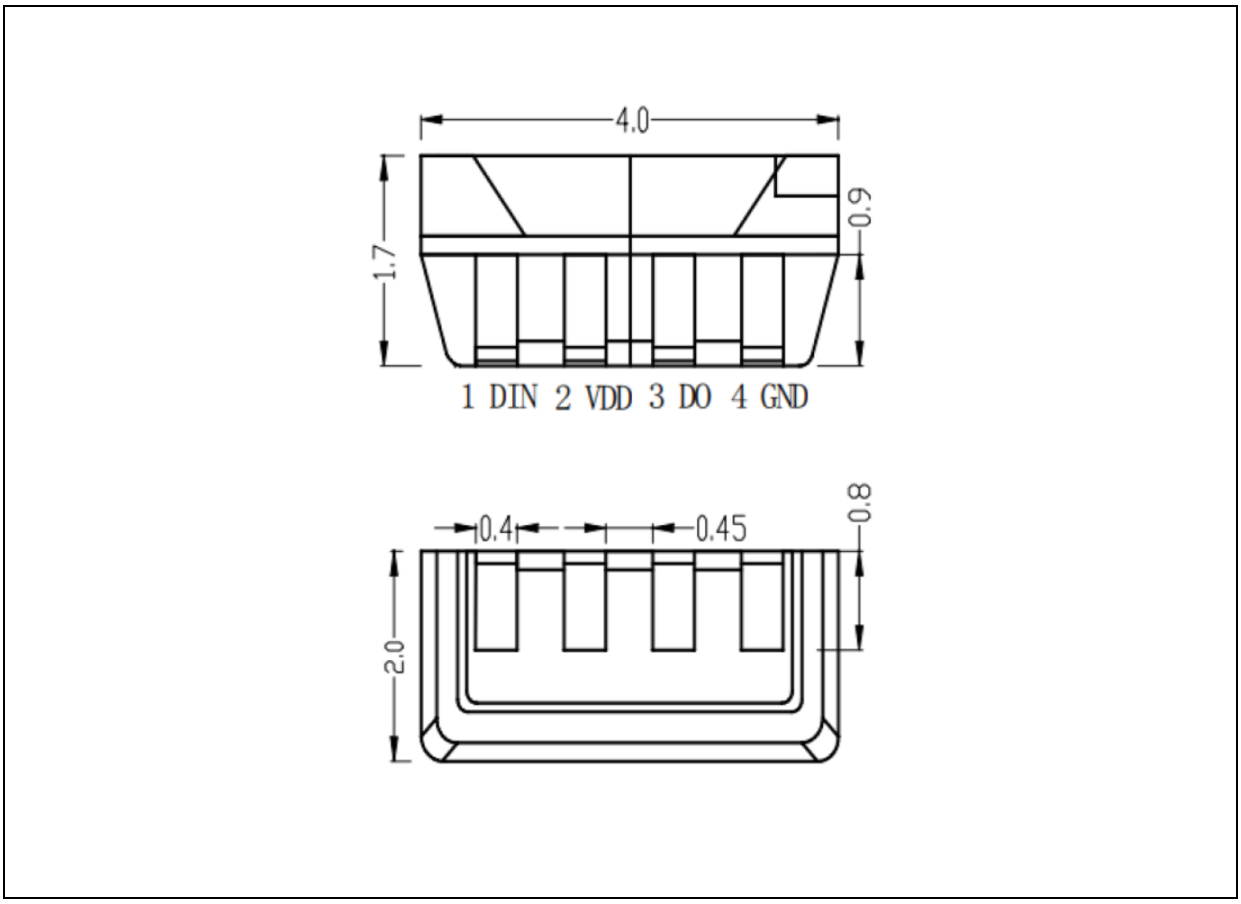
Parameter		Symbol	Values			Unit	Test Condition
			Min.	Typ.	Max.		
R/G/B Out Port Withstand Voltage		V_{ds}	8.5	9	9.5	V	---
R/G/B Output Current		I_{out}	9.6	12	14.4	mA	---
High Level Input Voltage		V_{IH}	$0.7V_{DD}$	$0.9V_{DD}$	V_{DD}	V	---
Low Level Input Voltage		V_{IL}	0	$0.1V_{DD}$	$0.3V_{DD}$	V	---
PWM Frequency		F_{PWM}	3	4	5	KHz	---
Static Power Consumption		I_{DD}	0.6	0.8	1	mA	---
Dominant Wavelength	Red	λ_d	620	---	625	nm	Ta=25°C
	Green		520	---	525		
	Blue		465	---	470		
Luminous Intensity	Red	I_v	200	---	400	mcd	Ta=25°C
	Green		800	---	1200		
	Blue		150	---	300		

Switching Characteristics (Ta=25°C)

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Data Rate	F_{DIN}	---	800	1100	KHz	---
Transmission Delay Time	T_{PLZ}	---	---	200	ns	DIN-DO

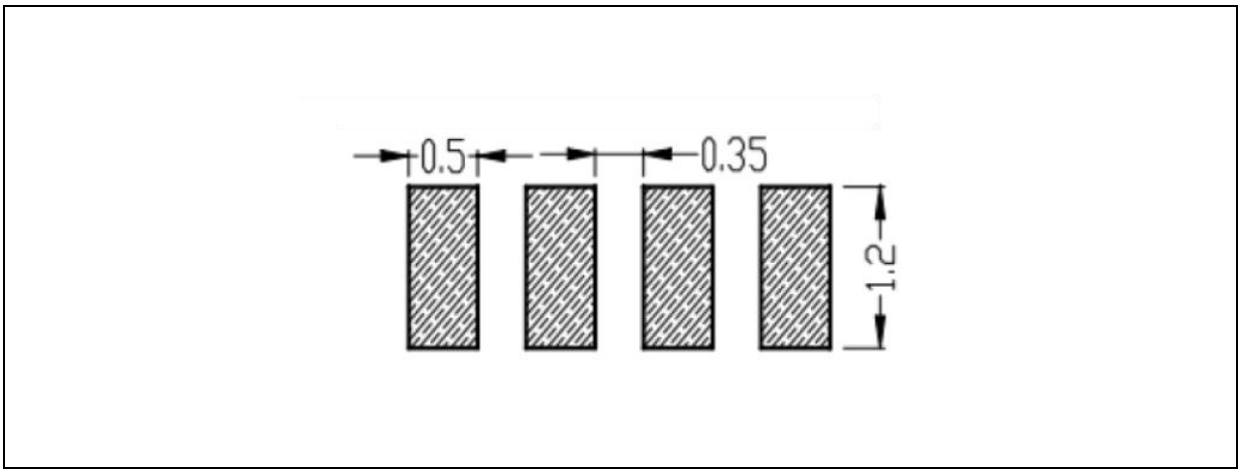
OUTLINE DIMENSION:

Package Dimension:



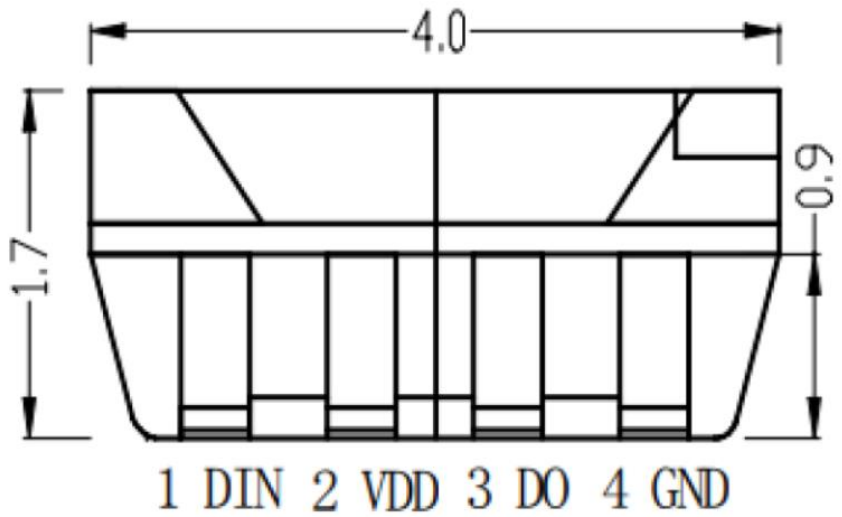
1. All dimensions are in millimetre (mm).
2. Tolerance ±0.1mm, unless otherwise noted.

Recommended Soldering Pad Dimension:



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

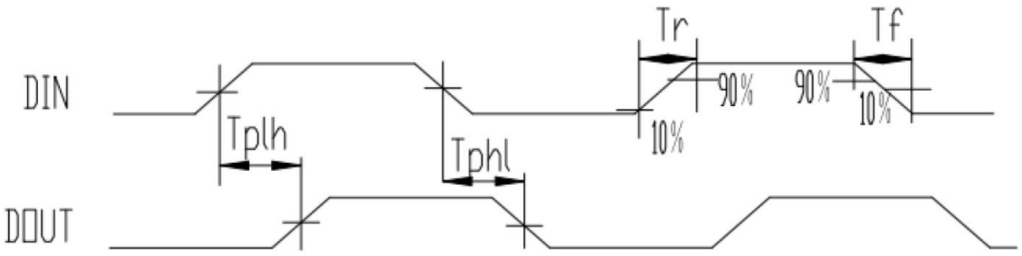
PIN CONFIGURATION:



No.	Symbol	Function Description
1	DIN	Control data signal input
2	VDD	Power supply pin
3	DO	Control data signal output
4	GND	Signal and power grounding

Function Description:

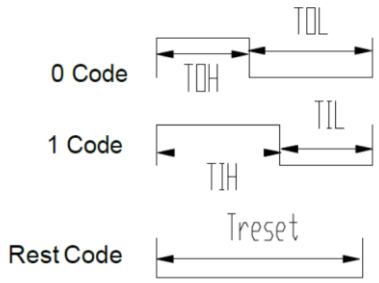
1. Data Transmission Form:



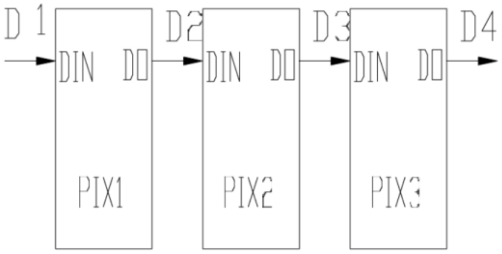
2. Data Transmission Time:

Item	Description	Min.	Typ.	Max.	Unit
T0H	Input 0 code, high level time	245	295	345	ns
T1H	Input 1 code, high level time	545	595	645	ns
T0L	Output 0 code, low level time	545	595	645	ns
T1L	Output 1 code, low level time	245	295	345	ns
Trst	Reset Code, Low Voltage Time	80	---	---	μs

3. Temporal Wave Form Figure Type of Input:



4. Connection Mode:

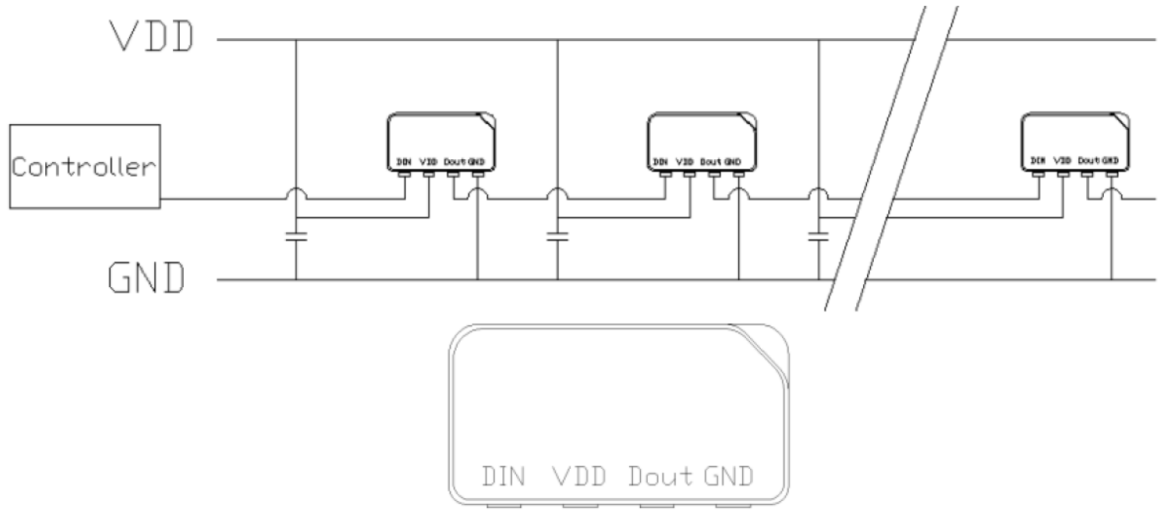


5. Mode of Data Transmission:

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

Note: High start, send data in GRB order (G7→G6……) B0)

6. Typical Application Circuit:



ELECTRO-OPTICAL CHARACTERISTICS:

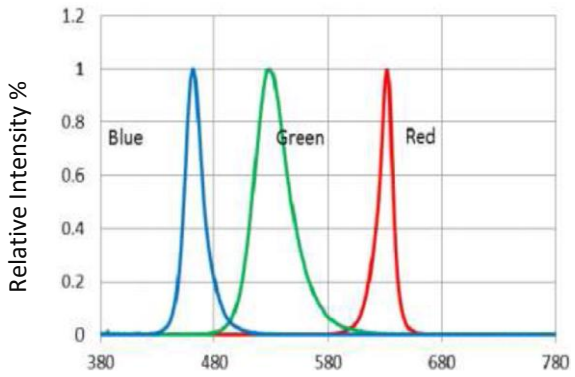
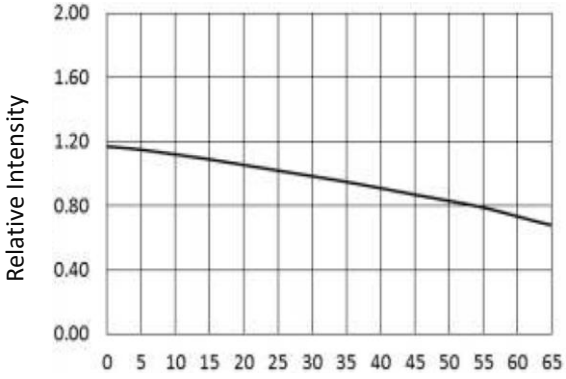
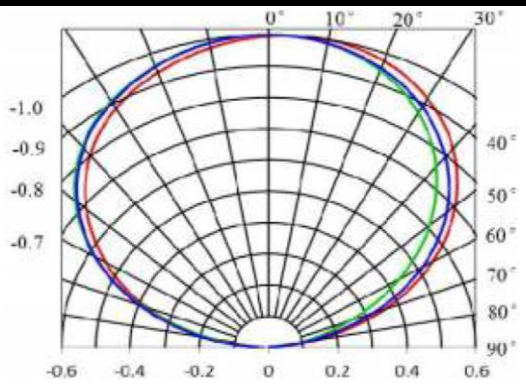
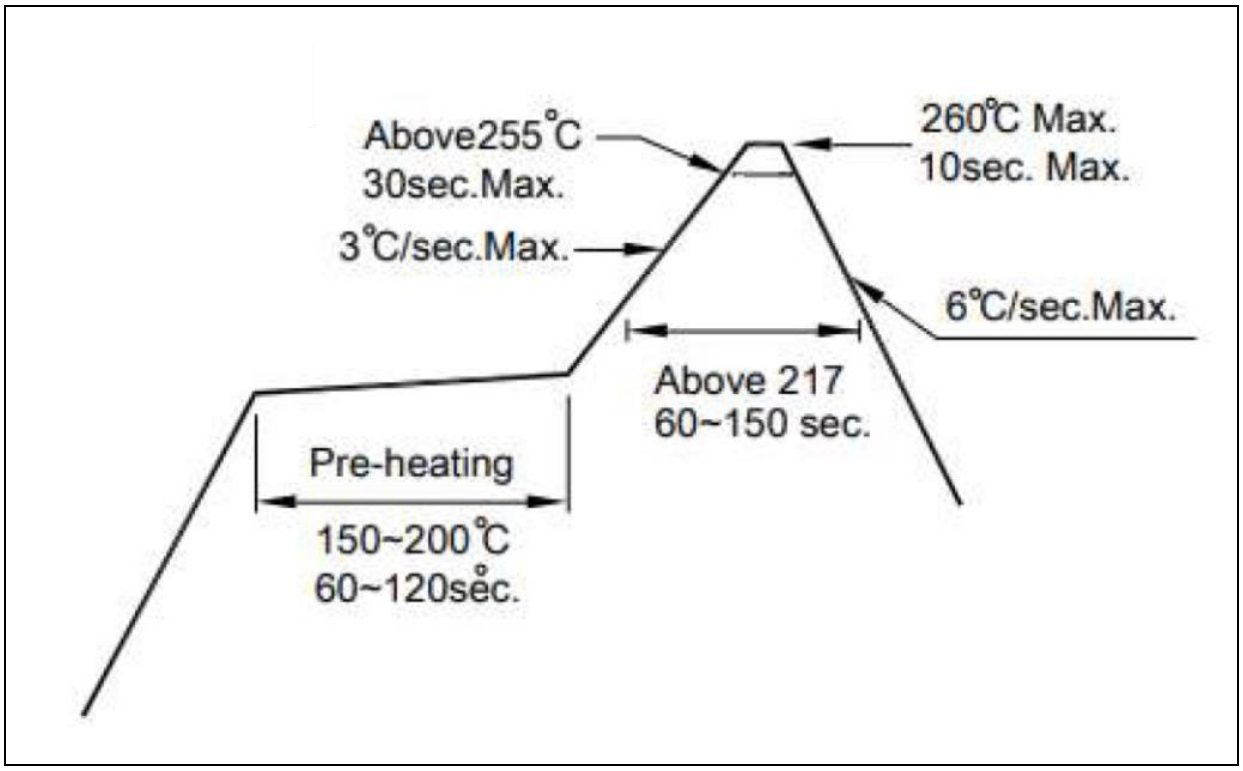
Relative Intensity v.s. Wavelength	Relative Intensity Flux v.s. Ambient Temperature
	

Diagram of Radiation


RECOMMENDED SOLDERING PROFILE:

Lead-free Solder IR Reflow:



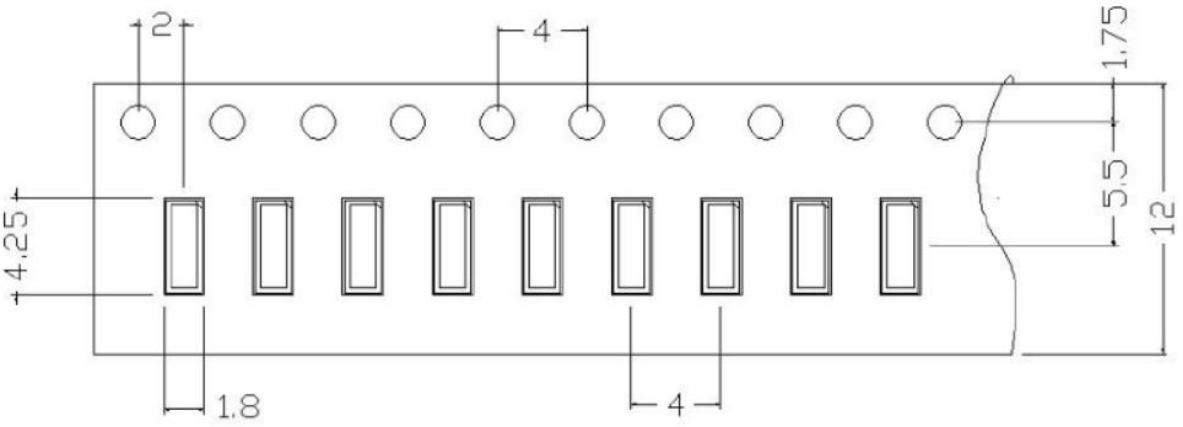
Note:

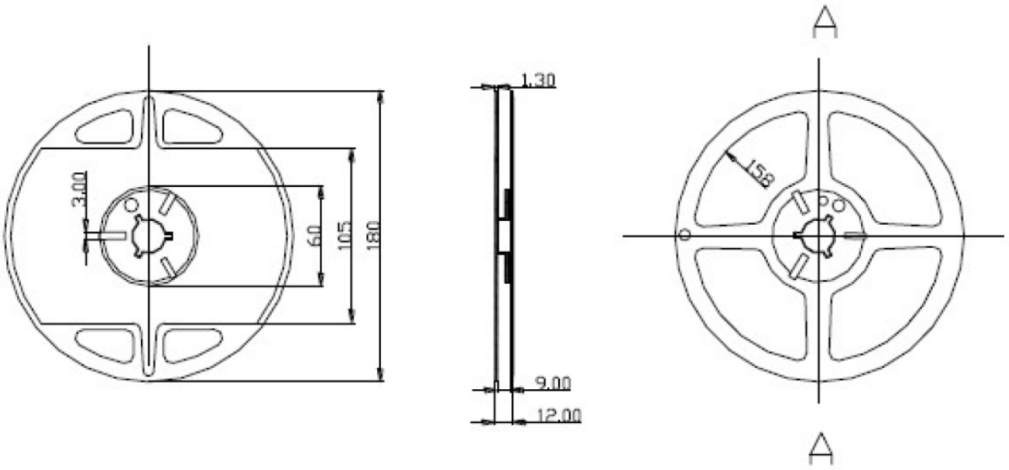
1. The maximum soldering temperature should be limited to 240°C. The maximum soldering temperature should be limited to 260°C.
2. Maxima reflow soldering: 2 times.
3. Before, during, and after soldering, should not apply stress on the components and PCB board.

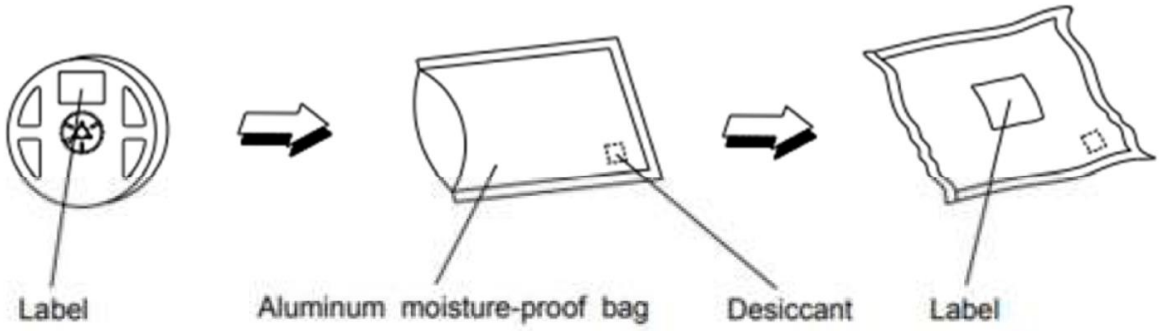
PACKING SPECIFICATION:

Reel Dimension:

Max.2000pcs/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	13/06/2024	Datasheet set-up.
A1.1	30/08/2024	Update function description.
A1.2	08/09/2024	Update dimensions description.