BRIGHTEK
BRIGHTEK (EUROPE) LIMITED
Brighten Up The World With LED !

PRODUCT DATASHEET

ATTENTION OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

► PCB/CHIP with IC

► 0404 (1111) IC 0.33t (4 pins)

► Red/Green/Blue

N0M70S10IC
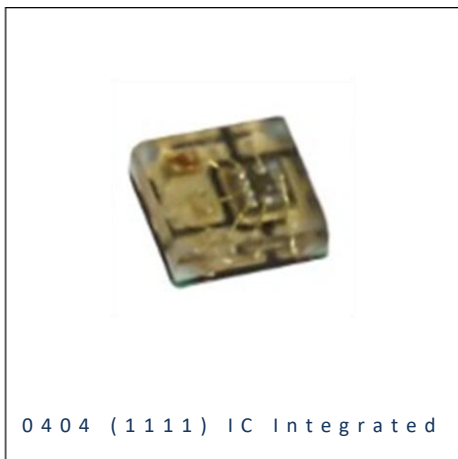
0 4 0 4 (1 1 1 1) I C I n t e g r a t e d

0404 (1111) IC-Integrated

RoHS Compliant

FEATURES:

- **Package:** CHIP Top View Package with Integrated IC 9818.
- **R/G/B Output Current (typ.):** 6.5mA
- **Logical Supply Voltage (typ.):** 5V
- **R/G/B Luminous Intensity (typ.):** 120/180/30mcd
- **Colour:** Red/Green/Blue
- **Lens Colour:** Water Diffused
- **IC Feature:** 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. Single-line zero code transmission protocol, can be infinite cascade. Grayscale adjustment: 65536 levels. Built-in reset circuit, power does not light.
- **Soldering Methods:** Reflow soldering
- **ESD Level:** 2kV
- **MSL Level:** acc. to JEDEC Level 4
- **Packing:** 8mm tape with max.6500pcs/reel, ø180mm (7'')

APPLICATIONS:

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

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CHARACTERISTICS:

Absolute Maximum Characteristics (T$_a$=25°C)

Parameter	Symbol	Ratings	Unit
Working Voltage	V$_{DD}$	-3.5~+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	---
R/G/B Output Drive Current		I$_{DOUT}$	---	6.5	---	mA	V$_{DS}$=1V
PWM Frequency		F$_{PWM}$	---	4.5	---	KHz	---
Static Power Consumption		I$_{DD}$	---	0.25	---	mA	---
High Level Input Voltage		V$_{IH}$	0.5*V$_{DD}$	---	---	V	DIN Input High Level
Low Level Input Voltage		V$_{IL}$	---	---	0.3*V$_{DD}$	V	DIN Input Low Level
Transfer Rate		F$_{DIN}$	---	800	---	Kbps	---
Dominant Wavelength	Red	λ$_d$	615	---	625	nm	I$_F$=6.5mA
	Green		525	---	535		
	Blue		465	---	475		
Luminous Intensity	Red	I$_v$	80	---	160	mcd	I$_F$=6.5mA
	Green		120	---	240		
	Blue		20	---	40		
Viewing Angle		2θ$_{1/2}$	---	160	---	deg	I$_F$=6.5mA

OUTLINE DIMENSION:

Package Dimension:
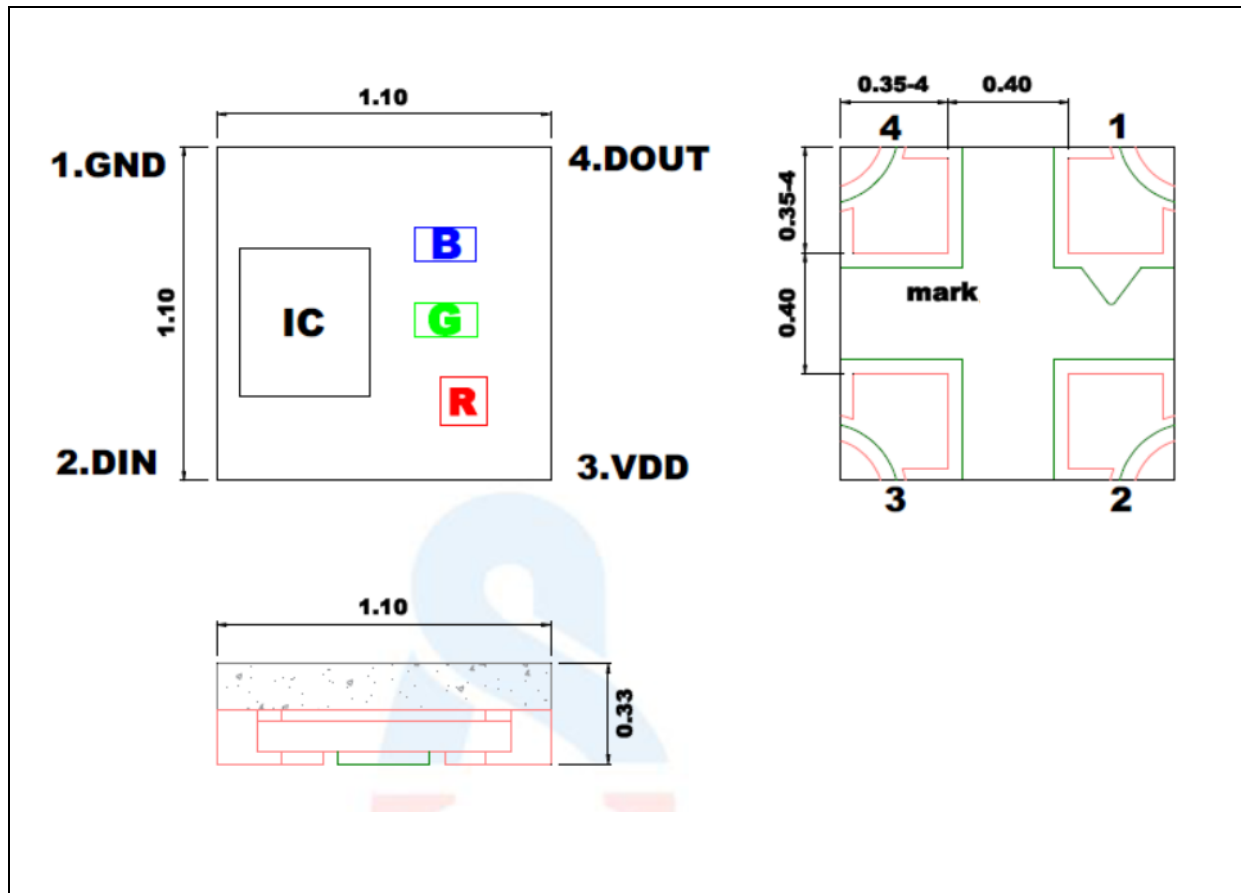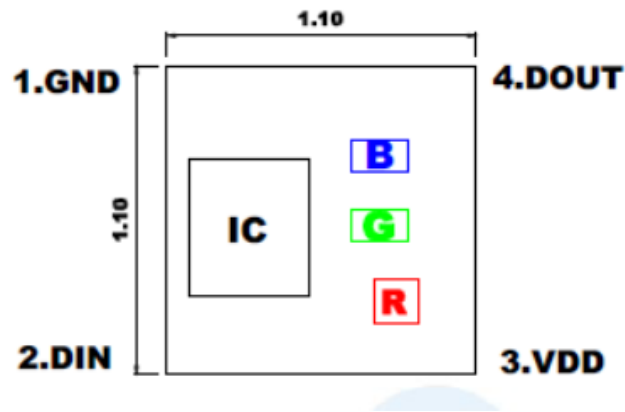

1. All dimensions are in millimetre (mm).
2. Tolerance ±0.1mm, unless otherwise noted.

Recommended Soldering Pad Dimension:
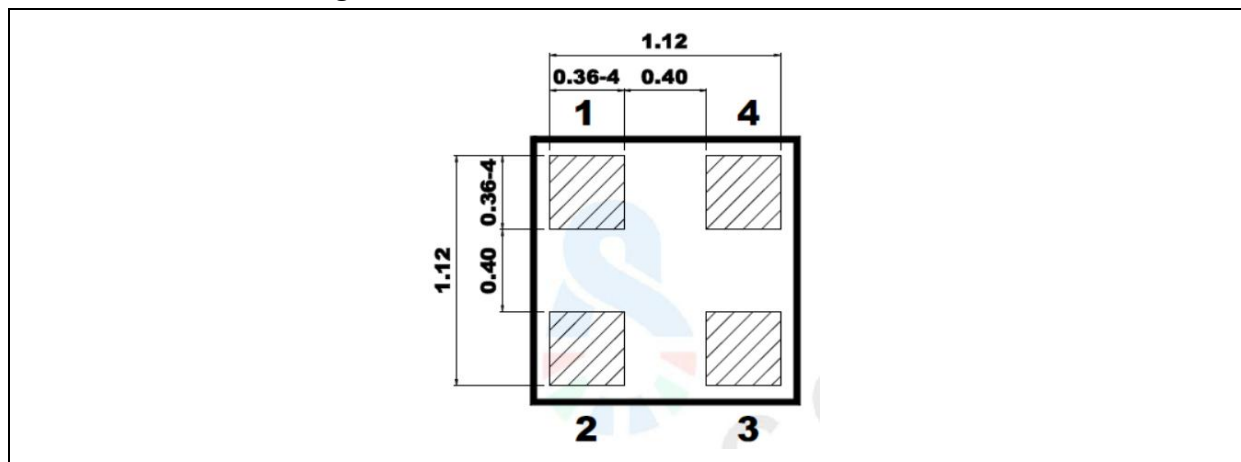
1. Dimensions are in millimetre (mm).
2. Tolerance ±0.1mm with angle tolerance ±0.5°.

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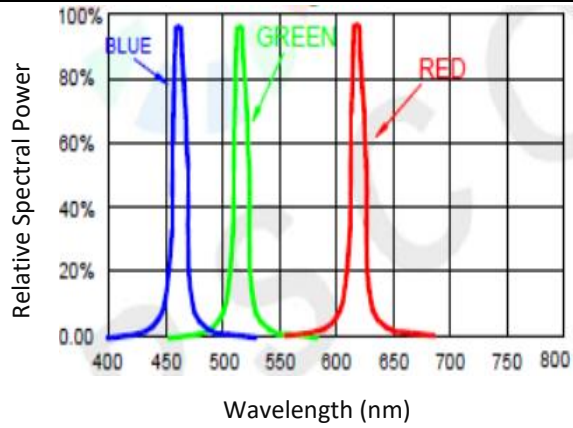
PIN CONFIGURATION:

No.	Symbol	Function Description
1	GND	Grounds - Power grounding
2	DIN	Data input - Control data signal input
3	VDD	Power Supply - Power supply pins
4	DOUT	Data output - Control data signal output

4

ELECTRO-OPTICAL CHARACTERISTICS:

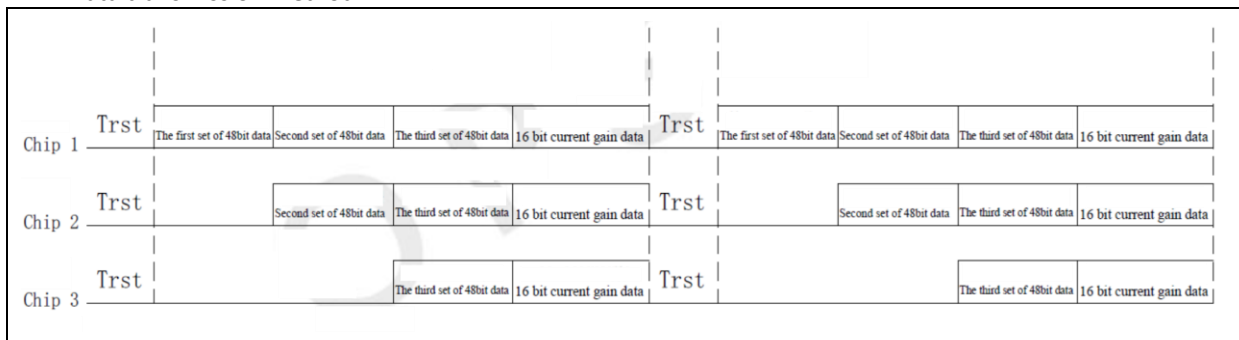| Relative Spectral Power v.s. Wavelength	Relative Intensity v.s. Temperature

Radiation Angle

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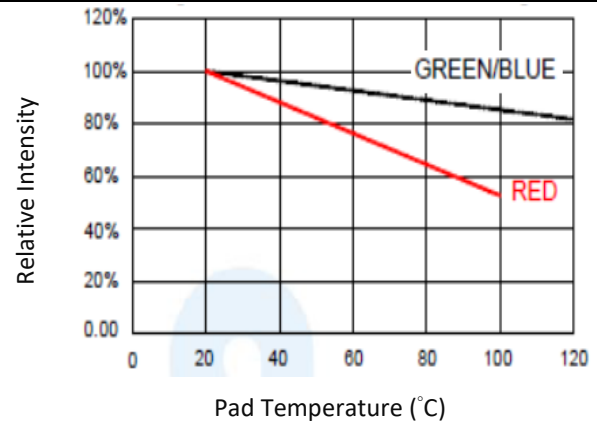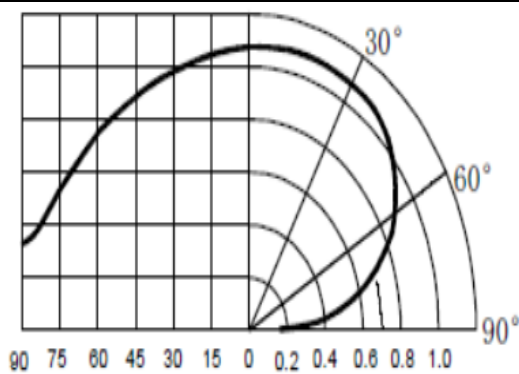
FUNCTION DESCRIPTION:

1. Suggested data transmission time:

Timeline Name		Min.	actual value	Max.	unit
T	Symbol period	---	1.20	---	us
T0H	0 code, high-level time	0.20	0.30	0.40	us
T0L	0 code, low-level time	0.80	---	---	us
T1H	1 code, high-level time	0.80	0.90	1.00	us
T1L	1 code, low-level time	0.20	---	---	us
Reset	Reset code, low-level time	>200	--	--	us

2. Data transmission method:

3. Time series waveform diagram - Input code type:
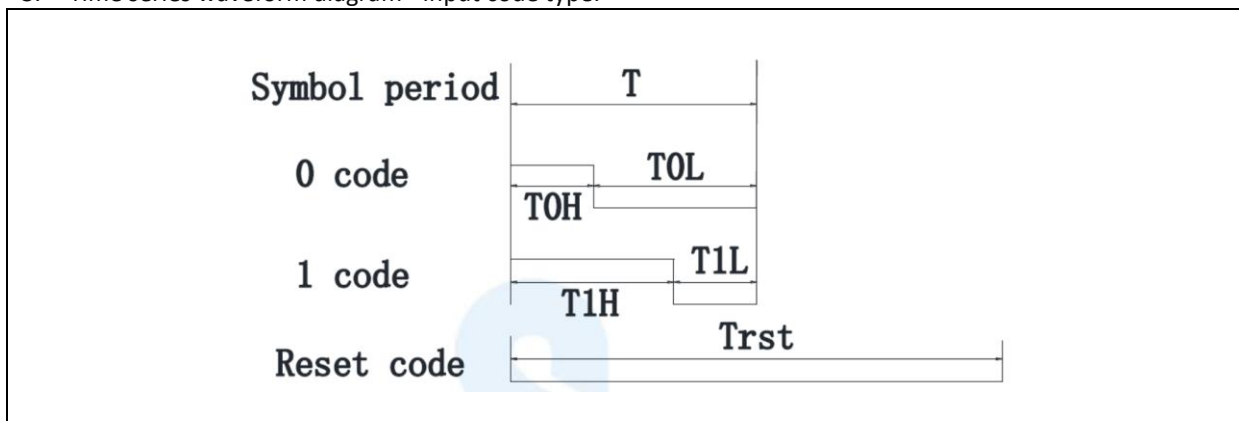
4. 48-bit data structure:

| R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0
G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	G5	G4	G3	G2	G1	G0
B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0

High bit first send, send data in RGB order (R15 -> R14 -> ... -> B0).

Trst + 48-bit data from the first chip + 48-bit data from the second chip + ... + 48-bit data from the Nth chip + 16-bit current gain data + Trst.

48-bit gray scale data structure: high bits first, sent in RGB order.

R15	R14	R13	R12	R11	R10	R9	R8	R7	R6	R5	R4	R3	R2	R1	R0	G15......G0	B15...B0
Bit48..bit0

5. System topology diagram:
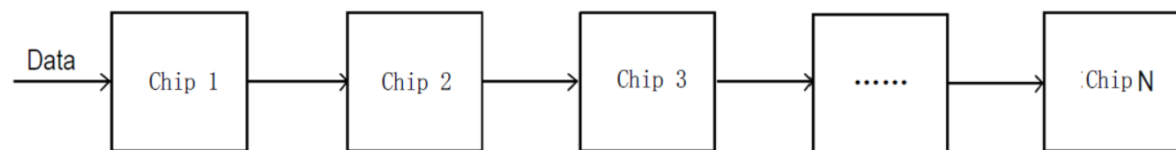
6. Current gain adjustment parameters:

The current gain data is 16-bits in total. This product supports software settings for the output current of OUT, which includes 5-bits of current gain data and 1-bit of reserved bit data for each OUT R/G/B port. The structure of the 16-bit current gain data is as follows: the high bit is sent in RGB order, with high bit first.

Current gain parameter sending format			
(R)	(G)	(B)	S0 Reserve bit data
GR4 , GR3 , GR2,GR1 , GR0	GG4 , GG3 , GG2,GG1 , GG0	GB4 , GB3 , GB2, GB1 , GB0	0

GR4-GR0 is the current gain data of the OUTG port, GR4-GR0 is the current gain data of the OUTR port, GB4-GB0 is the current gain data of the OUTB port, and S0 is the reserved bit data.

When sending current gain data, the reserved bit data S0 must be 0.

The maximum output of OUT R/G/B is 6.5mA, and users can set other current values by changing the current gain value. Please refer to the following table for reference current values:

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电流增益current gain	IOUT(mA)	电流增益current gain	IOUT(mA)
0	0.2	16	3.4
1	0.4	17	3.6
2	0.6	18	3.8
3	0.8	19	4.0
4	1.0	20	4.2
5	1.2	21	4.4
6	1.4	22	4.6
7	1.6	23	4.8
8	1.8	24	5.0
9	2.0	25	5.2
10	2.2	26	5.4
11	2.4	27	5.6
12	2.6	28	5.8
13	2.8	29	6.0
14	3.0	30	6.2
15	3.2	31	6.5

Note: The above current values are only theoretical data, and there may be deviations in actual current. It is recommended that customers adjust the current values based on actual measurements.

Suggested use of current: 0-24current regulation level.

Based on product heat dissipation, it is recommended to use a maximum current of 4.8mA (level 24) for this product, and current regulation levels of 25-31 are not recommended.

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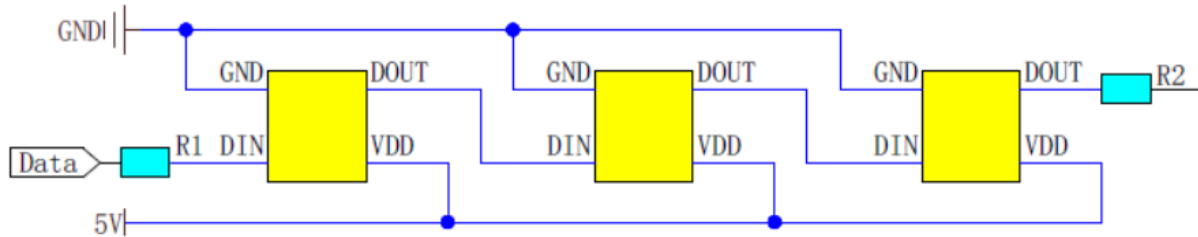
In practical application circuits, to prevent instantaneous high voltage damage to the internal signal input and output pins of the IC caused by live plugging and unplugging during testing, protective resistors should be connected in series at the signal input and output terminals. In addition, in order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

Applications 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, that is, R1 is about 500 ohms.

Application 2: Used for modules or general shaped products. The transmission distance between lamp beads is long, and the protective resistance connected in series at the signal end may vary slightly depending on the wire and transmission distance. Based on actual usage.

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RECOMMENDED SOLDERING PROFILE:
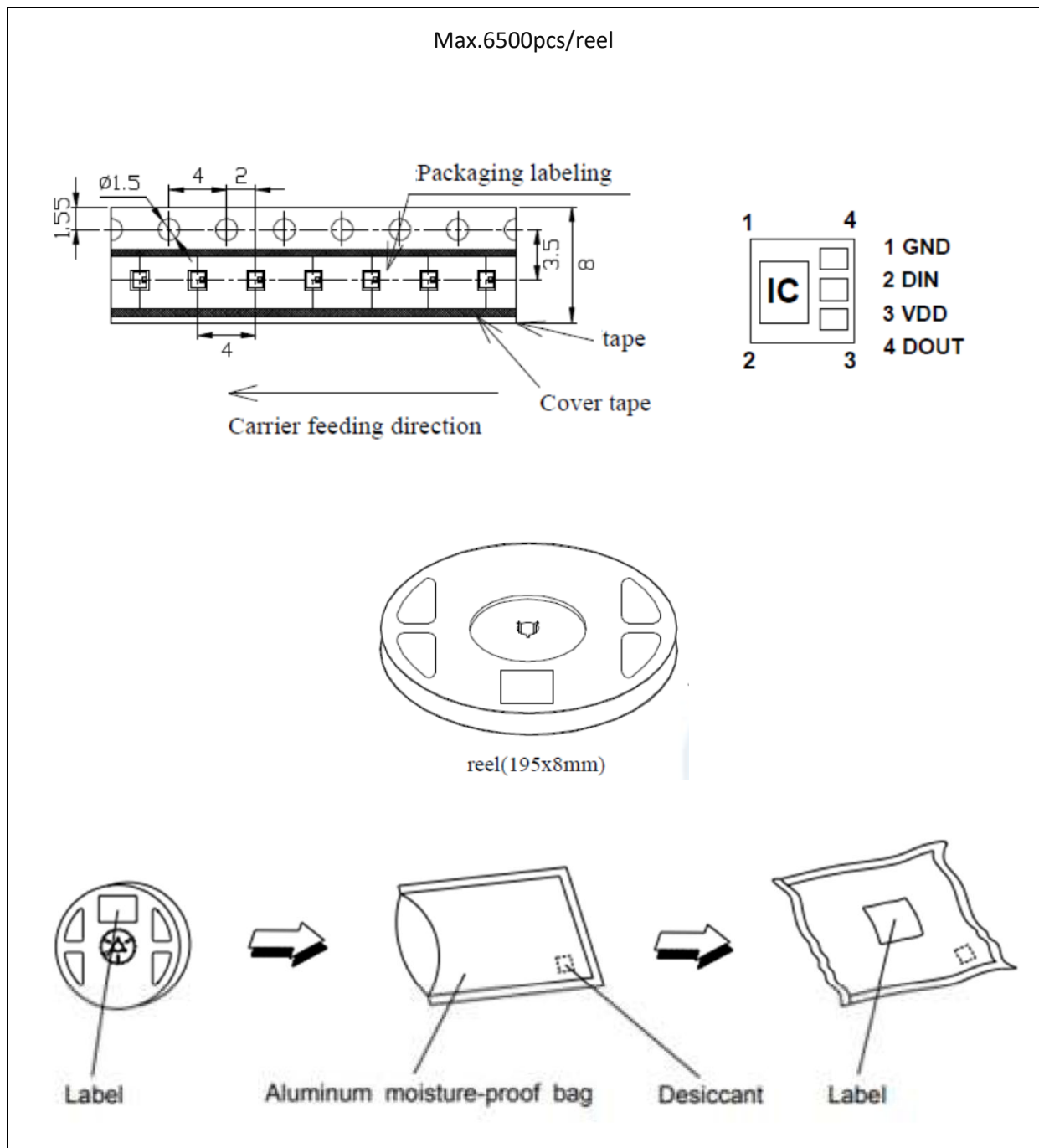
Lead-free Solder IR Reflow:
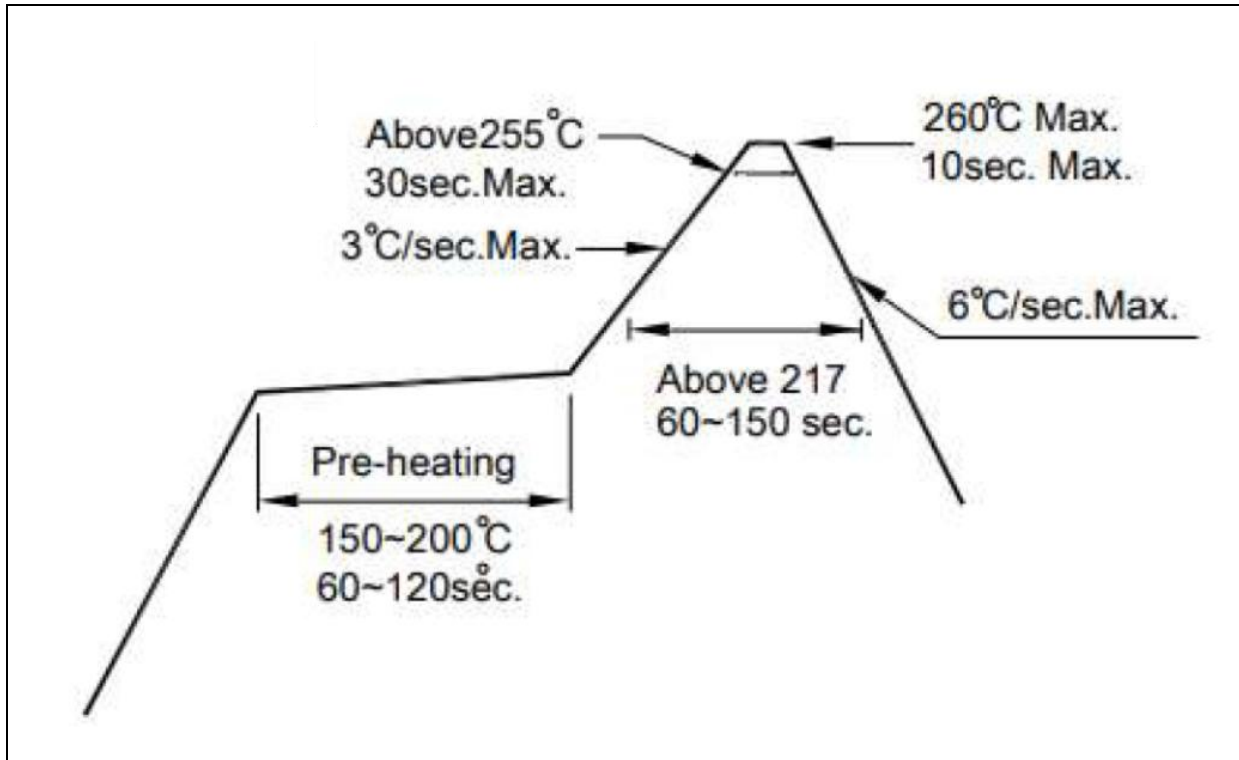
Note:

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.6500pcs/reel

Packaging labeling

Ø1.5 4 2

1.55 3.5 8

tape

Cover tape

Carrier feeding direction

1	4	1 GND
IC		2 DIN
		3 VDD
2	3	4 DOUT

reel(195x8mm)

Label

Aluminum moisture-proof bag

Desiccant

Label

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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 72 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 6hrs 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	01/03/2024	Datasheet set-up.
A1.1	27/05/2025	New datasheet format.
A1.2	12/06/2025	Update product photo.

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