BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED!

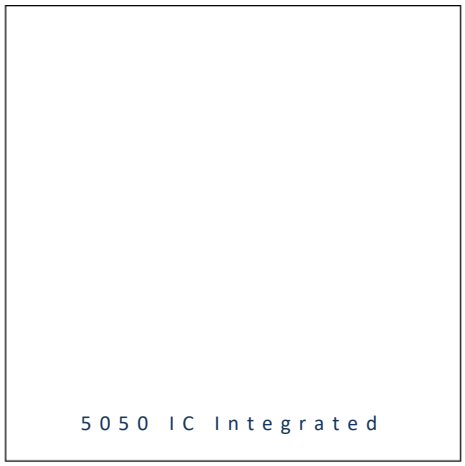
ISO/TS 16949:2009 BS EN ISO 14001:2004 QC 080000 IECQ HSPM

PRODUCT DATASHEET

- PLCC4 SMD with IC
- 5050 IC 1.60t (4 pins)
- Red/Green/Blue

Release Date: 23 January 2025 Version: A1.1

N0M68S73IC



5050 1.60t IC-Integrated

RoHS Compliant

FEATURES:

- **Package:** PLCC4 Top View Package with Integrated IC 6812
- **R/G/B Output Current (typ.):** 12mA
- **Logical Supply Voltage (typ.):** 5V
- **R/G/B Luminous Intensity (typ.):** 345/1045/240mcd
- **Colour:** Red/Green/Blue
- **Lens Colour:** Water Diffused
- **IC Feature:** Control IC and RGB LED chip integrated 5050 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 on does not light. Forward voltage: 5V@12mA (OUTGRB).
- **Soldering Methods:** Reflow soldering
- **ESD Level:** 2kV
- **MSL Level:** acc. to JEDEC Level 5a
- **Packing:** 12mm tape with max.1000pcs/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}	+3.7~+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}	3.7	5.0	5.5	V	---
R/G/B Output Drive Current		I_{DOUT}	10.5	12	13.5	mA	V_{DS}=1V
PWM Frequency		F_{PWM}	---	4	---	KHz	---
Static Power Consumption		I_{DD}	---	0.25	---	mA	---
High Level Input Voltage		V_{IH}	2.6	---	---	V	---
Low Level Input Voltage		V_{IL}	---	---	1.7	V	---
Transfer Rate		F_{DIN}	---	800	---	Kbps	---
Dominant Wavelength	Red	λ_d	620	---	625	nm	I_F=12mA
	Green		520	---	530		
	Blue		465	---	475		
Luminous Intensity	Red	I_v	240	---	450	mcd	I_F=12mA
	Green		815	---	1275		
	Blue		160	---	320		
Viewing Angle		$2\theta_{1/2}$	---	120	---	deg	I_F=12mA

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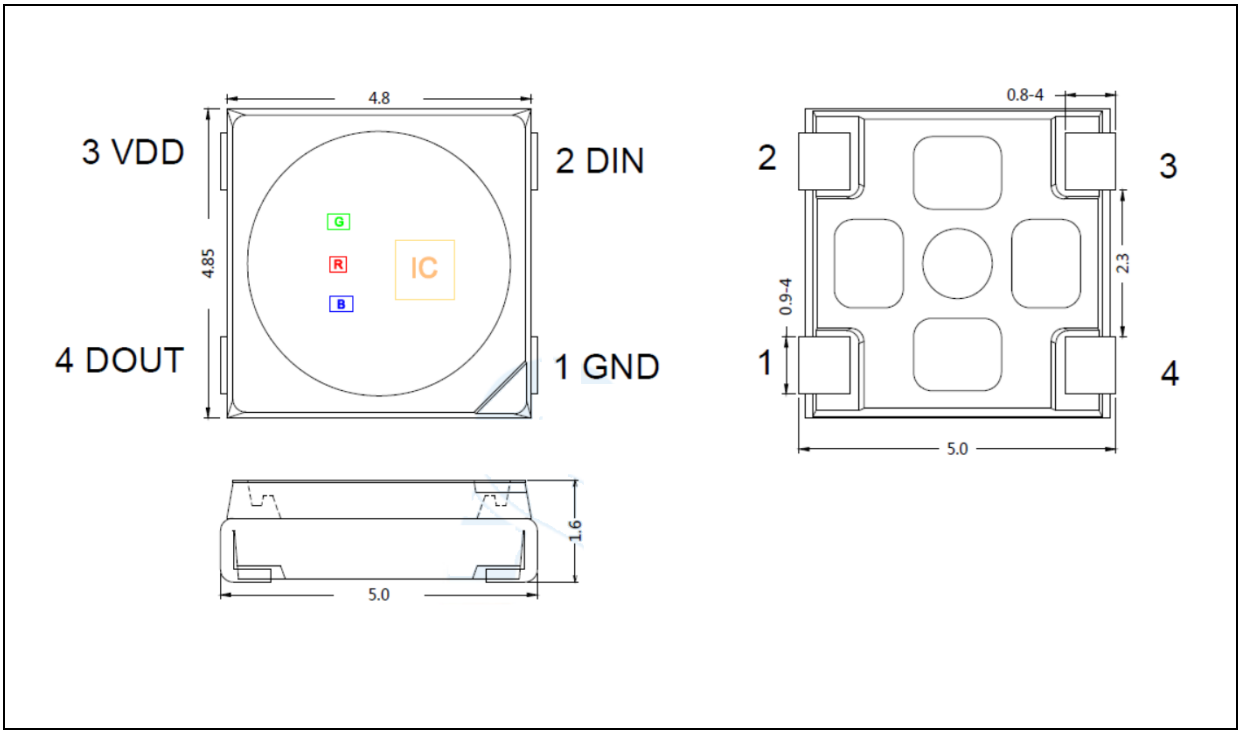
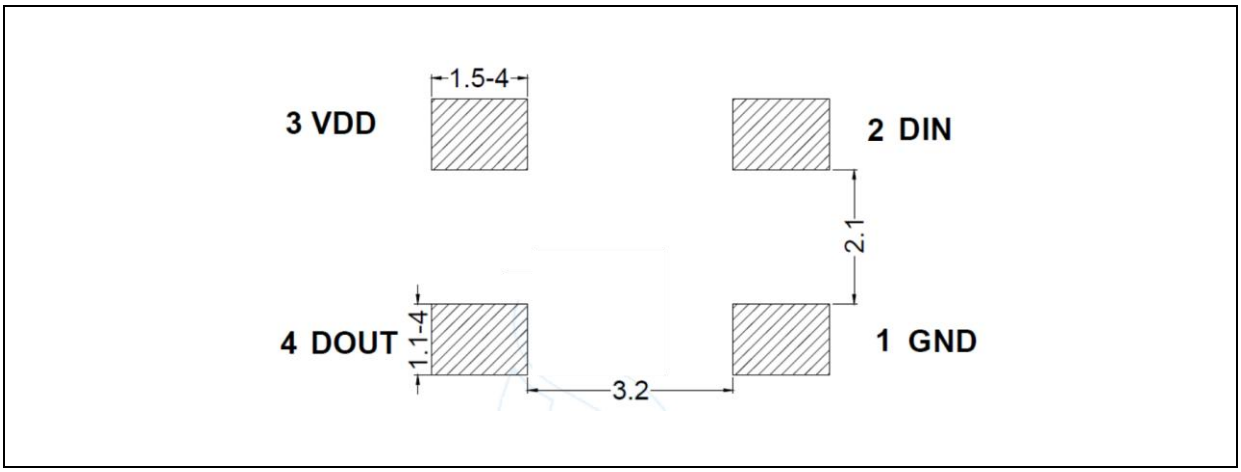
OUTLINE DIMENSION:

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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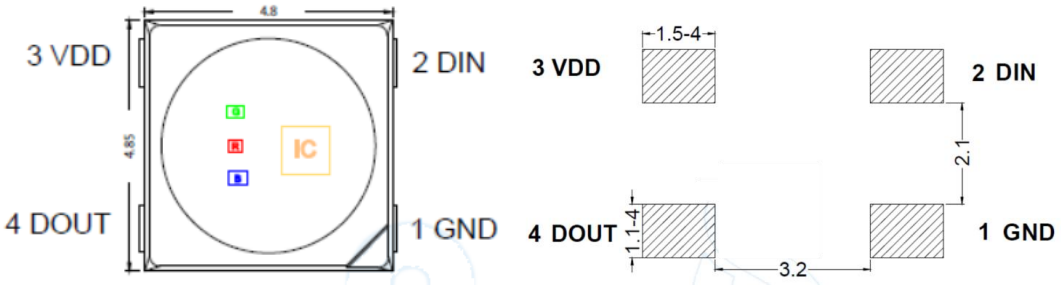
PIN CONFIGURATION:



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

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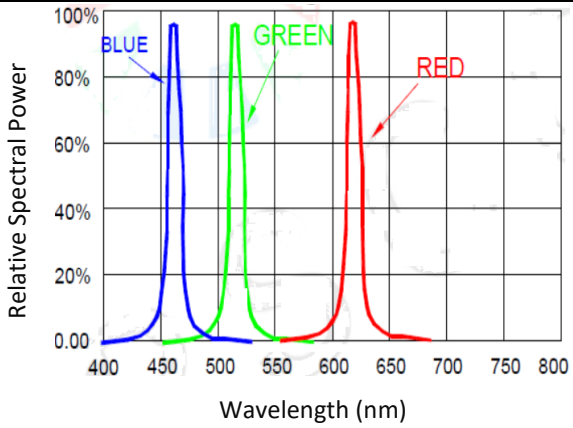
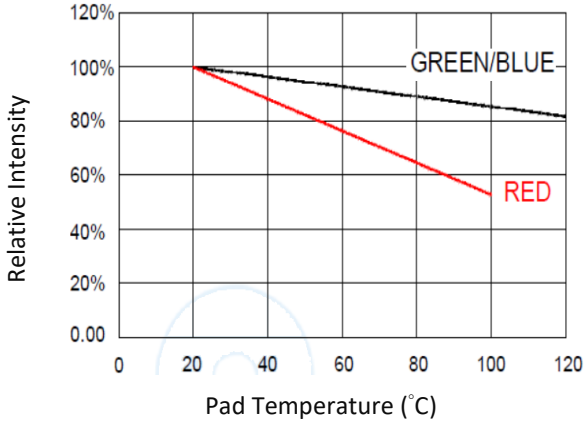
ELECTRO-OPTICAL CHARACTERISTICS:

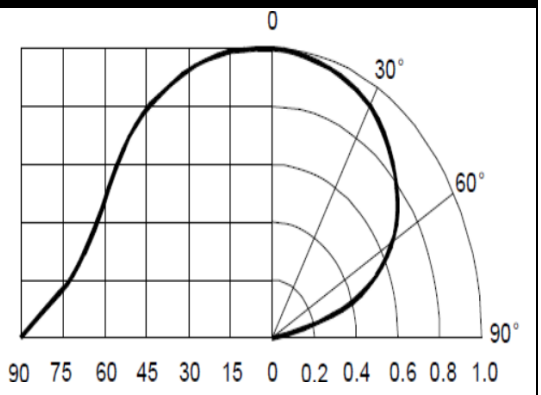
Relative Spectral Power v.s. Wavelength



Relative Intensity v.s. Temperature



Radiation Angle



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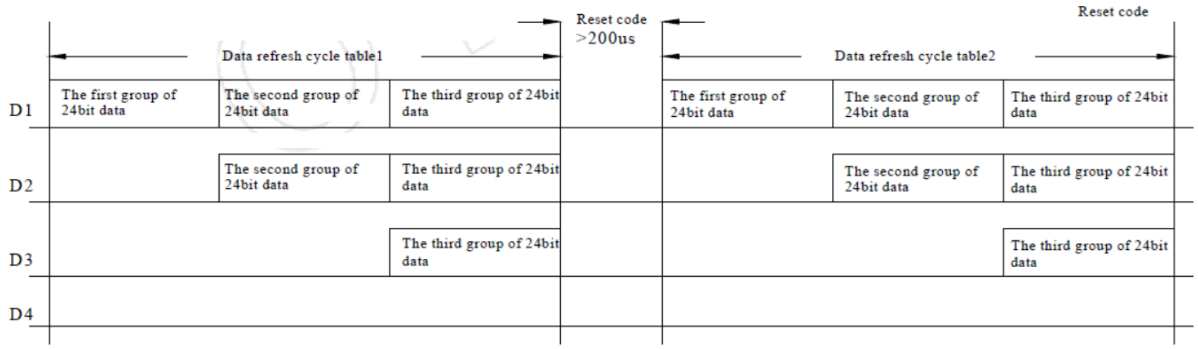
FUNCTION DESCRIPTION:

1. Suggested Data Transmission Time:

Timeline Name		Min.	actual value	Max.	unit
T	Symbol period	1.20	--	--	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

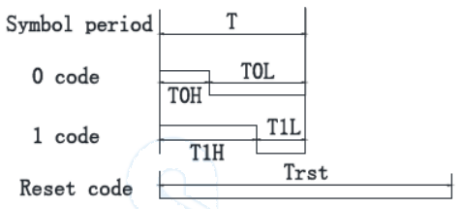
1. The protocol adopts unipolar zeroing code, and each symbol must have a low level. Each symbol in this protocol starts with a high level, and the duration of the high level determines the "0" or "1" code.
2. When writing a program, the minimum required code period is 1.2μs.
3. The high-level time of "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.

2. Data Transmission Method:

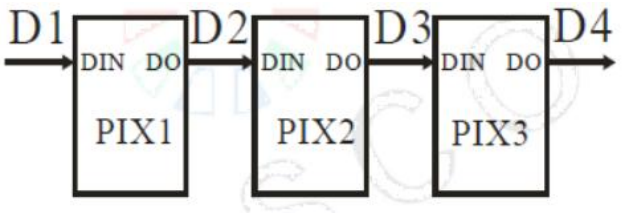


Among them, D1 is the data sent by the MCU end, and D2, D3, and D4 are the data automatically shaped and forwarded by the cascaded circuit.

3. Time series Waveform Diagram:



Input Code Type



Connection Method

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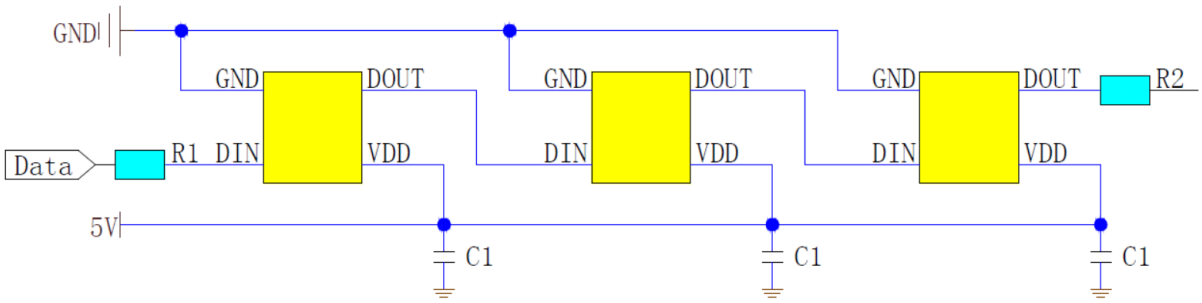
4. 24 Bit Data Structure:

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

High bit first sent, send data in GRB order (G7 → G6 →.... B0).

5. 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 500 ohms.

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.

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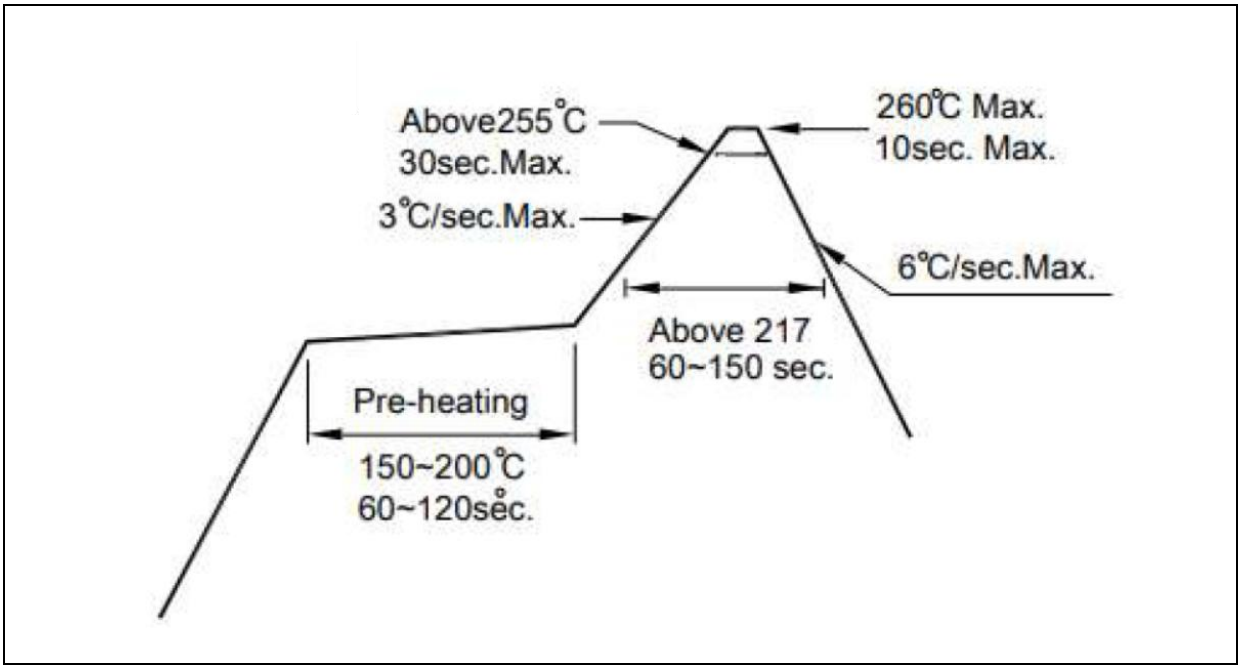
RECOMMENDED SOLDERING PROFILE:

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.

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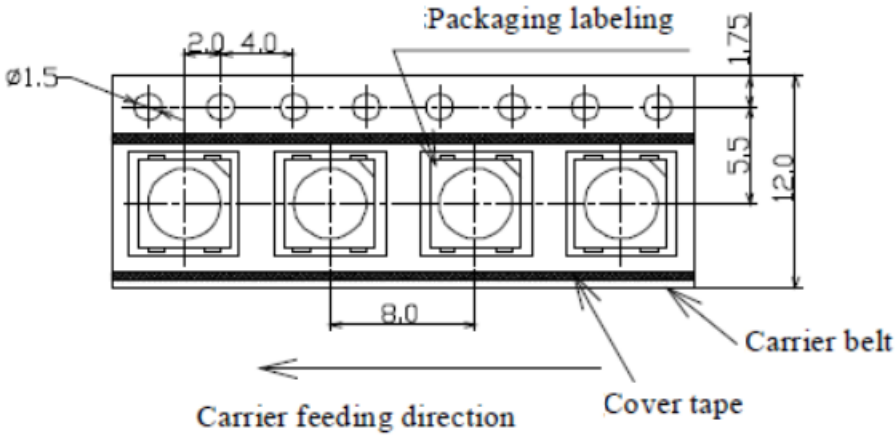
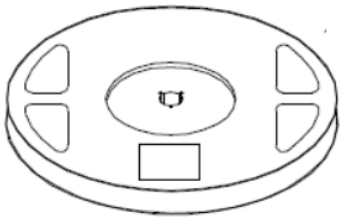
PACKING SPECIFICATION:

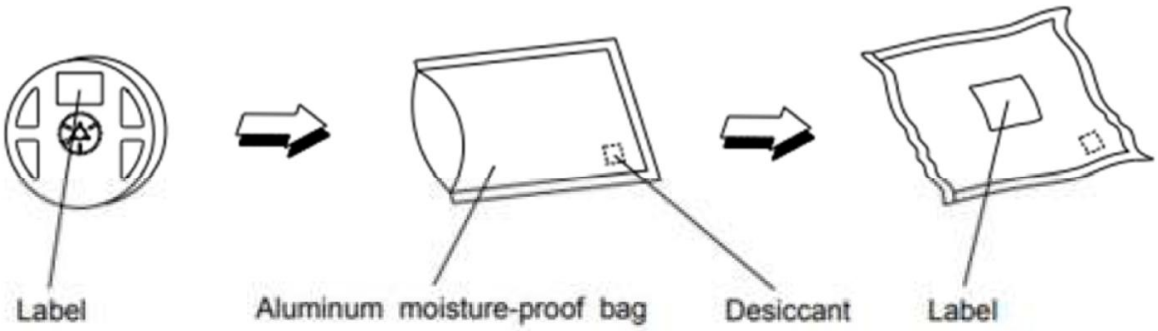
Reel Dimension:

Max.1000pcs/reel





reel(178x12mm)



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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 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 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.

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REVISION RECORD:

Version	Date	Summary of Revision
A1.0	16/01/2020	Datasheet set-up.
A1.1	23/01/2025	New datasheet format.

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