

Features

- 2427 with integrated high quality constant current IC and RGB LED chip.
- Built-in IC, with high precision of constant current and internal RGB chips spectral processing in advance.
- Single line data transmission (return to zero code).
- Specific Shaping Transmit Technology - number of LED stacked is not restricted.
- Cascading Enhancement Technology - any 2 LED spacing can be up to 10 meters
- Data transfer rate of 750 kbp/s at 30 frames per second.
- RGB output port PWM control can achieve 256 gray level adjustments.
- Upon powering up, IC performs self-inspection then lights connection on the pin B lamp.
- SA-I Anti-interference patent technology for single line data transmission.
- Built-in reverse polarity protection safeguards the IC against damage from improper power input.

Description

The IN-PI22TAT5R5G5B is 2.4*2.7*1.1mm RGB LED with integrated IC. It is a SMD type LED which can be used in various applications.

Applications

- Full color LED string light
- LED full color module
- LED guardrail tube
- LED scene lighting
- LED point light
- LED pixel screen
- LED shaped screen

Package Outline Dimensions & Pin Configuration

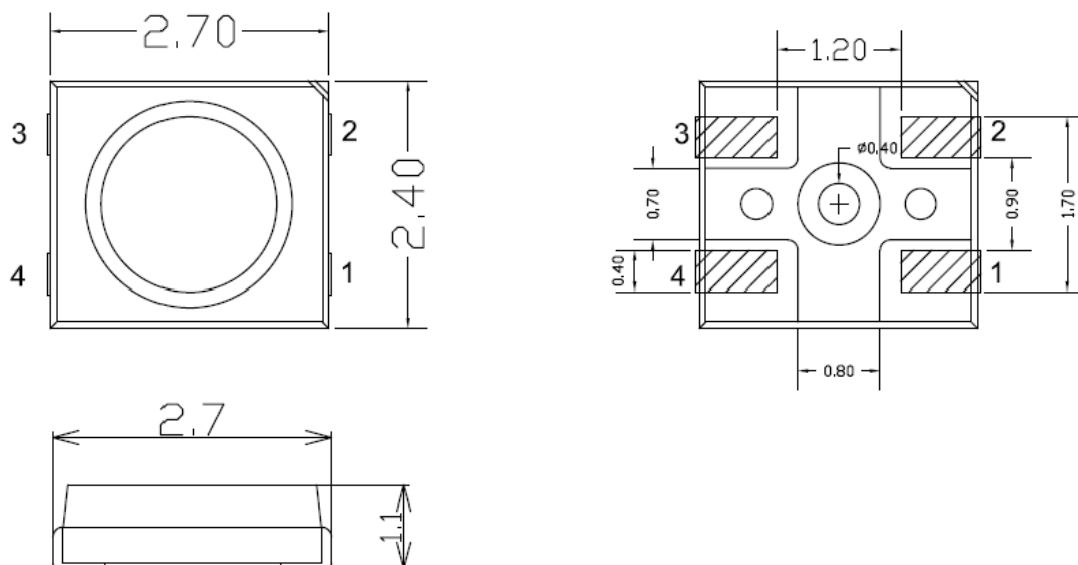


Figure 1. IN-PI22TAT5R5G5B Package Outline Dimensions

Pin Configuration

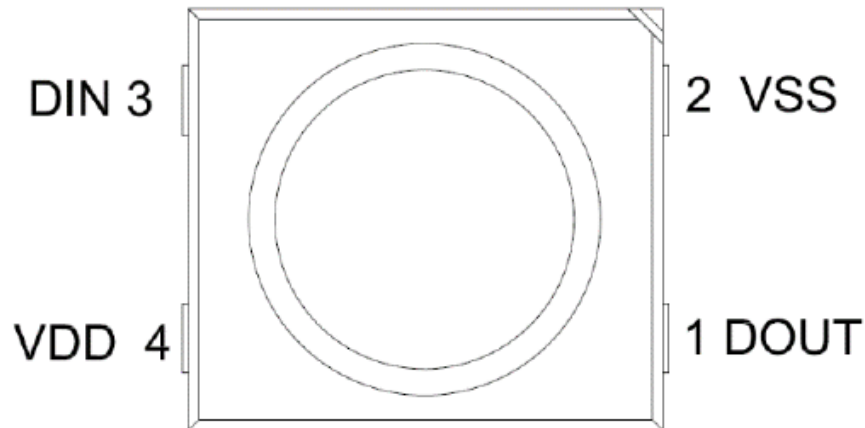


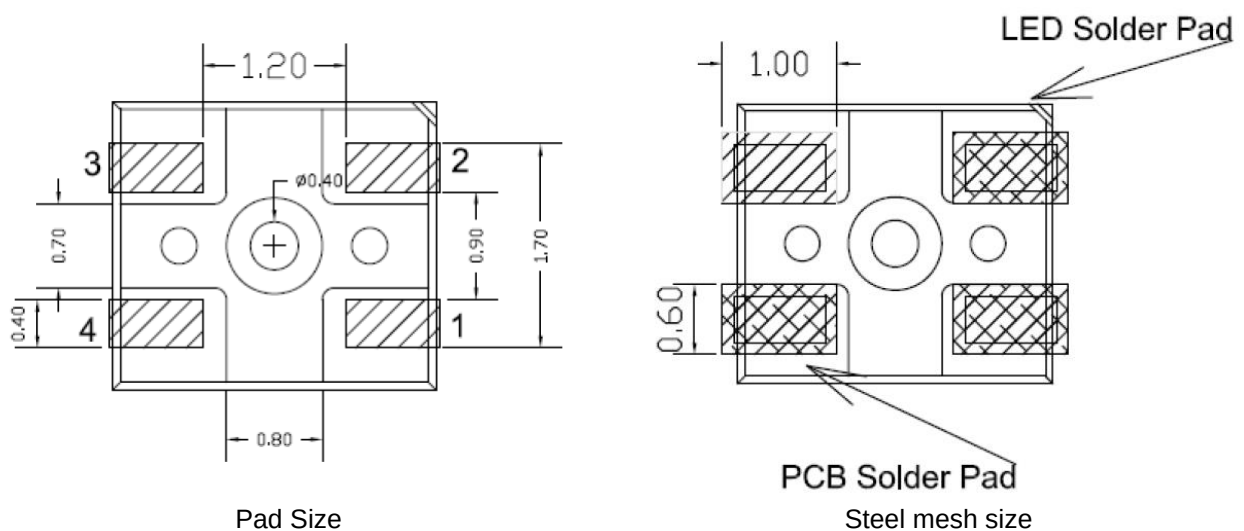
Figure 2. IN- PI22TAT5R5G5B Pin Configuration

Notes:

1. Dimension in millimeter, tolerance is $\pm 0.1\text{mm}$ unless otherwise noted.

Number	Symbol	Function Description
1	DOUT	Control data signal output
2	VSS	Ground
3	DIN	Control data signal input
4	VDD	Power supply LED

Soldering Pad Size



Absolute Maximum Rating ($T_a = 25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Range	Unit
Power supply voltage	V_{DD}	+3.7~+5.5	V
Logic input voltage	V_{IN}	-0.5 ~VDD+0.5	V
Working temperature	T_{OPT}	-40 ~ +85	$^{\circ}\text{C}$
Storage temperature	T_{STG}	-40 ~ +85	$^{\circ}\text{C}$
ESD pressure(HBM)	V_{ESD}	4K	V
ESD pressure(DM)	V_{ESD}	200	V

LED Characteristics ($T_A = 25^{\circ}\text{C}$)

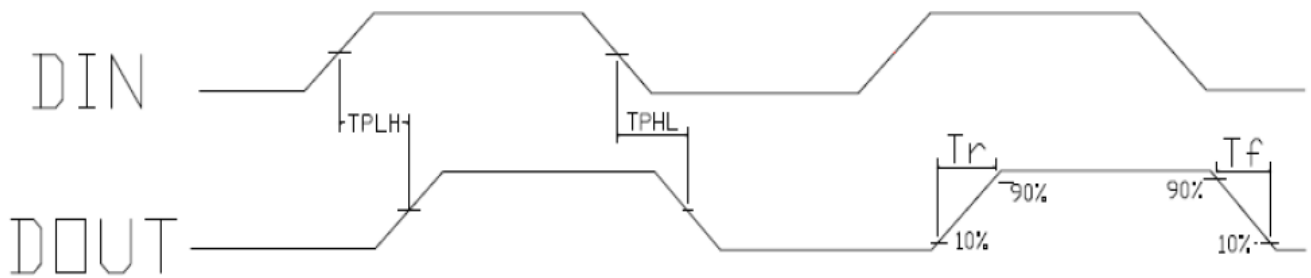
Color	5mA	
	Wavelength(nm)	Light Intensity(mcd)
Red	620-625	120-240
Green	525-535	320-580
Blue	465-475	60-120

Recommended Operating Ranges (unless otherwise specified, $T_A = -25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Min.	Typ.	Max	Unit	Test conditions
Supply voltage	V_{DD}	3.7	5.0	5.5	V	-
R/G/B port pressure	$V_{DS, MAX}$	-	-	26	V	-
B/G/R output drive current	I_{DOUT}	4.7	5.0	6.3	mA	$V_{DS}=1V$
The signal input flip threshold	V_{IH}	$0.7 \cdot V_{DD}$	-		V	$V_{DD}=5.0V$
The signal input flip threshold	V_{IL}	-	-	$0.3 \cdot V_{DD}$	V	$V_{DD}=5.0V$
The frequency of PWM	F_{PWM}	-	1.0	-	KHZ	-
Static power consumption	I_{DD}	-	0.5	-	mA	-
Transfer rate	F_{DIN}	-	800	-	Kbps	

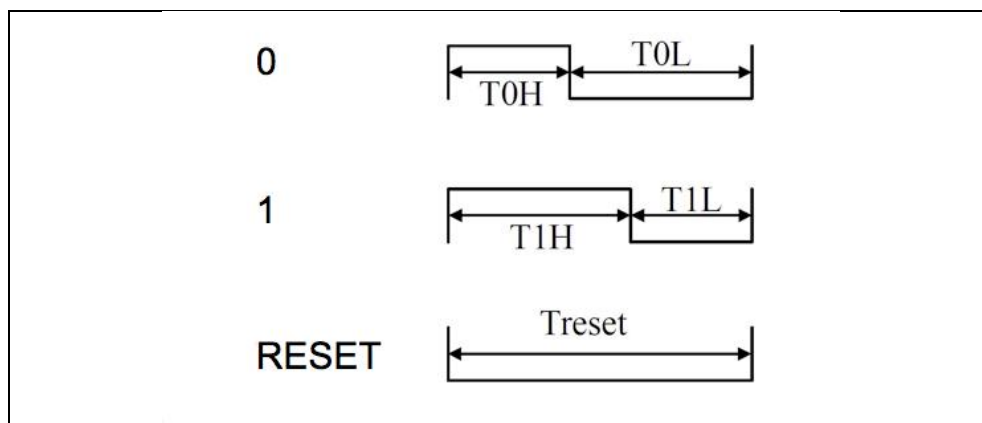
Switching Characteristics (unless otherwise specified, $T_a=25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Min.	Typ.	Max	Unit	Test conditions
The speed of data transmission	f_{DIN}	-	800	-	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	T_{PLH}	-	-	500	ns	DIN→DOUT
	T_{PHL}	-	-	500	ns	
I_{OUT} Rise/Drop Time	T_r	-	100	-	ns	VDS=1.5 VIOU=13mA
	T_f	-	100	-	ns	



Timing Waveforms

1. Input Code



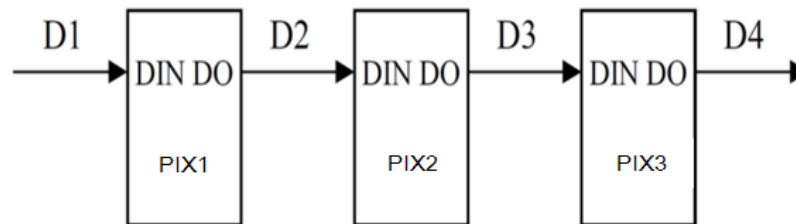
2. The data transmission time:

Name	Description	Min.	Typ. value	Max.	Unit
T	Period	1.2	–	–	μs
T0H	0 code, high level time	0.2	0.32	0.4	μs
T0L	0 code, low level time	0.8	-	-	μs
T1H	1 code, high level time	0.65	0.75	1.0	μs
T1L	1 code, low level time	0.2	–	–	μs
Trst	Reset code, low level time	>200	–	-	μs

Note:

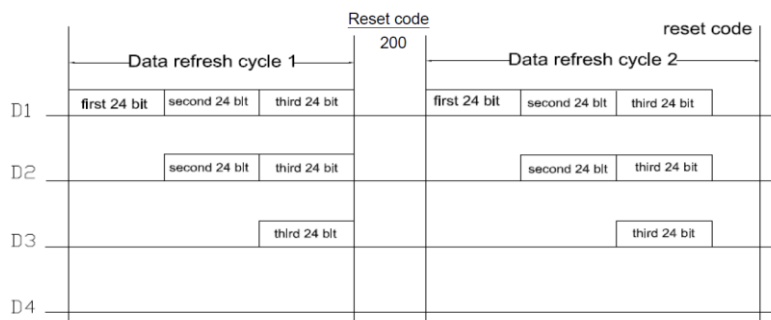
1. The protocol adopts unipolar zeroing code, and each symbol must have a low level. Each symbol in this protocol starts with a high level, and the duration of the high level determines the "0" or "1" code.
2. When writing a program, the minimum required code period is 1.2μs.
3. The high-level time of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



4. The method of data transmission

5.



Note:

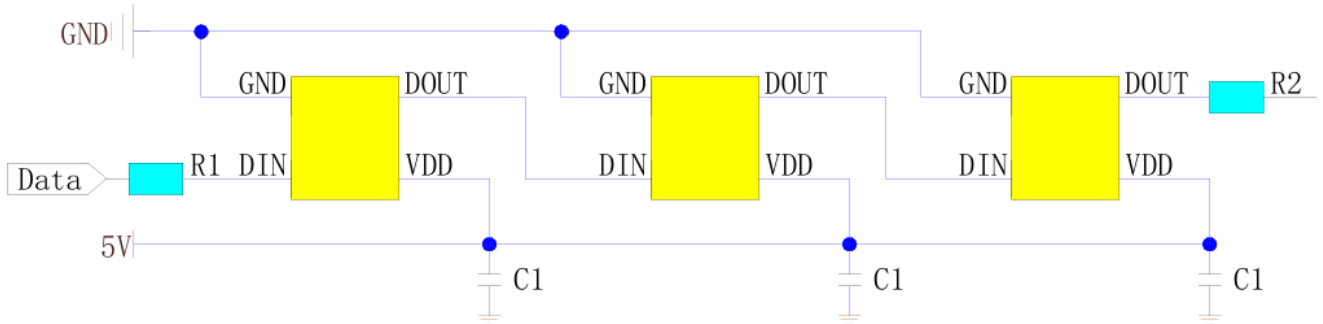
D1 is the data sent by the MCU end, and D2, D3, and D4 are the data automatically shaped and forwarded by the cascaded circuit.

6. 24-bit data format

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: The high bit is sent first, and the data is sent in the order of GRB. (G7 - G6 -B0)

Typical Application Circuit

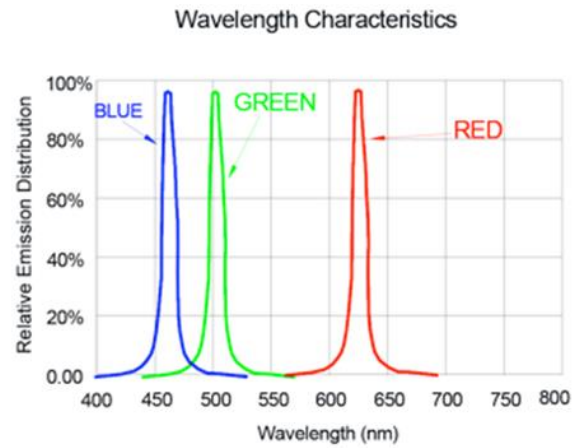
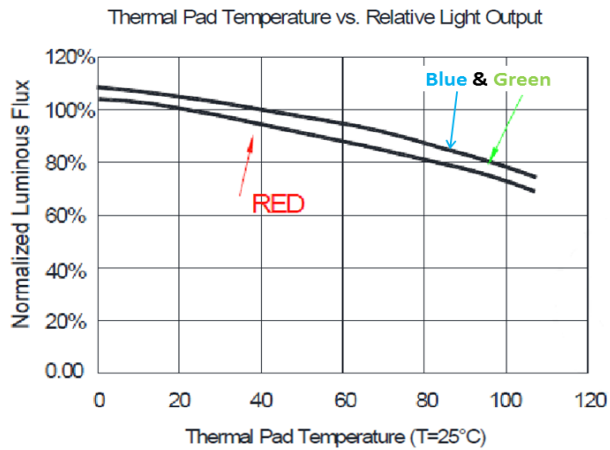


In practical application circuits, to prevent instantaneous high voltage damage to the internal signal input and output pins of the IC caused by live plugging and unplugging during testing, protective resistors should be connected in series at the signal input and output terminals. In addition, in order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

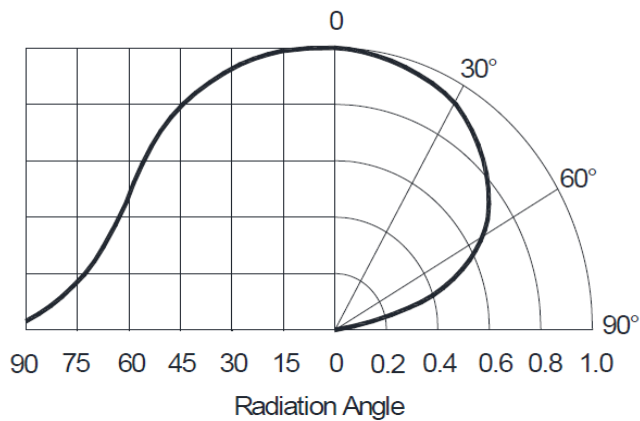
Application 1: For soft or hard light strips with short transmission distance between lamp beads, it is recommended to connect protective resistors in series at the signal input and output terminals, R1, R2, about 500 ohms.

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.

LED Performance Graph



Typical Radiation Pattern 120°



Ordering Information

Product	Emission Color	IV(mcd)	Orderable Part Number
IN-PI22TAT5R5G5B	R	120-240	IN-PI22TAT5R5G5B
	G	320-580	
	B	60-120	

Label Specifications



Date: yyyy/mm/dd
||||| ||| ||| ||| ||| |||

CUSTOMER P/N:
||||| ||| ||| ||| ||| |||

INOLUX P/N: QTY: PCS
||||| ||| ||| ||| ||| ||| ||| ||| ||| |||

LOT NO: QC
||||| ||| ||| ||| ||| ||| ||| ||| ||| |||

IV BIN: COLOR BIN: VF:

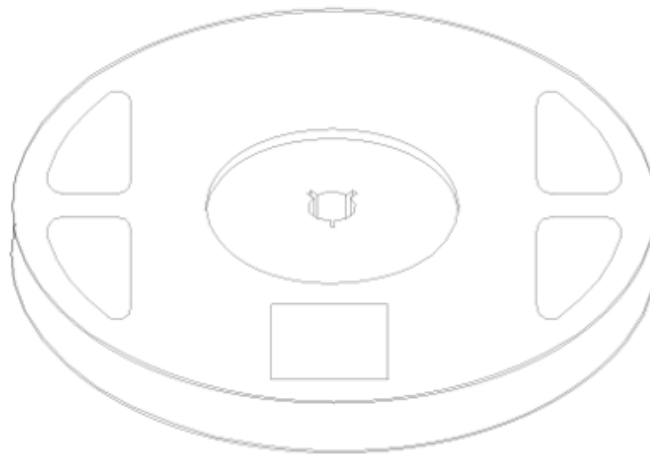
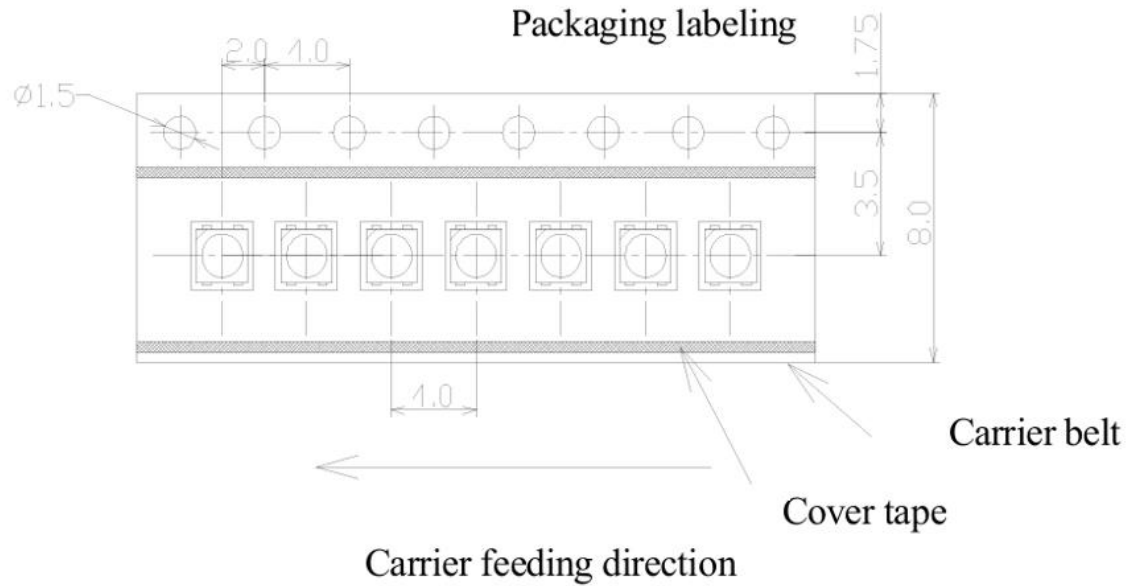
Inolux P/N:

I	N	PI	-	22	T	A	T	(X)	R	(X)	G	(X)	B	-	X	X	X	X
Inolux	Product			Package	Die Qty.	Variation	Orientation	Current	Color	Current	Color	Current	Color		Customized Stamp-off			
	PI- Single trace IC PC- Clock Function IC			22TA = 2.4 x 2.7 x 1.1 mm			T = Top Mount	P=12mA 5 = 5mA	R = 624 nm	P=12mA 5 = 5mA	G = 520 nm	P=12mA 5 = 5mA	B = 470 nm					

Lot No.:

Z	2	0	1	7	01	24	001
Internal Tracker	Year (2017, 2018,)				Month	Date	Serial

Packaging



reel(195x8mm)

Precautions

Please read the following notes before using the product:

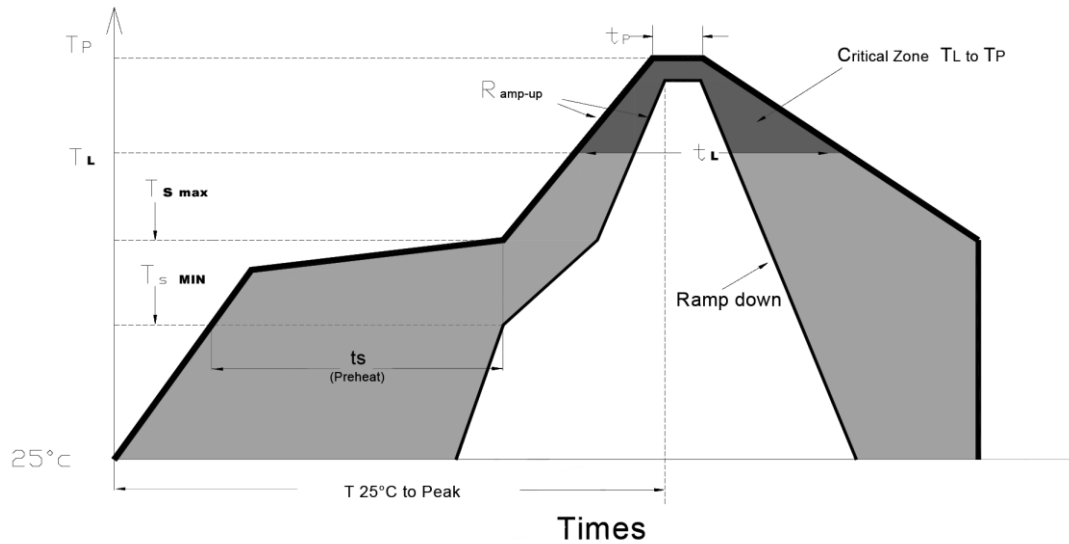
1. Storage

- 1.1 Do not open moisture proof bag before the products are ready to use.
- 1.2 Before opening the package, the LEDs should be kept at 30°C or less and 80%RH or less.
- 1.3 The LEDs should be used within a year.
- 1.4 After opening the package, the remaining LEDs should be kept in a resealed bag.
- 1.5 The LEDs require mandatory baking before usage. Baking treatment listed below.
- 1.6 If the moisture adsorbent material has fabled away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

*Baking treatment: 60±5°C for 24 hours.

2. Soldering Condition

Recommended soldering conditions:



Profile Feature	Lead-Free Solder
Average Ramp-Up Rate ($T_{S\text{ max}}$ to T_P)	3°C/second max.
Preheat: Temperature Min ($T_{S\text{ min}}$)	150°C
Preheat: Temperature Min ($T_{S\text{ max}}$)	200°C
Preheat: Time ($t_{s\text{ min}}$ to $t_{s\text{ max}}$)	60-180 seconds
Time Maintained Above: Temperature (T_L)	217 °C
Time Maintained Above: Time (t_L)	60-150 seconds
Peak/Classification Temperature (T_P)	240 °C
Time Within 5°C of Actual Peak Temperature (t_p)	<10 seconds
Ramp-Down Rate	6°C/second max.
Time 25 °C to Peak Temperature	<6 minutes max.

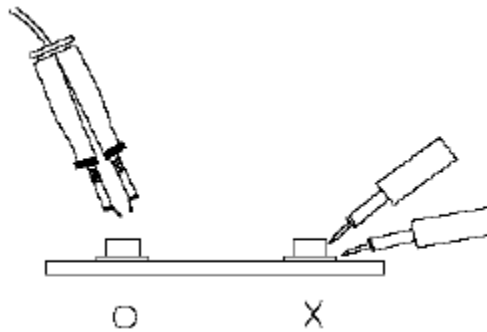
Note: Excessive soldering temperature and / or time might result in deformation of the LED lens or catastrophic failure of the LED.

3. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260°C for 5 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

4. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



5. Caution in ESD

Static Electricity and surge damages the LED. It is recommended to use a wristband or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.

Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial Release		1.0	05-31-2018
Format Adjustment		1.1	07-01-2018
Revise the drawing; update the precaution.	7, 10	1.2	07-31-2019
Adjust the parameter	9	1.3	02-18-2025

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.