

**INolux 5050 RGB LED
6-Pin With Integrated IC
IN-PI556FCH**

Official Product	IN Part No. IN-PI556FCH	Customer Part No.		Data Sheet No.
Preliminary Product	*****	*****		IN-PI556FCH
Specifications are subject to change without notice. Data and drawings herein are copyrighted.		Feb. 4, 2021	Version of 2.5	Page 1/18

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DISCLAIMER

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LIFE SUPPORT POLICY

INOLUX's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of INOLUX or INOLUX CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.

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.

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Product Specifications

	Specification	Material	Quantity
Iv	Red : 550mcd typ. Green : 1250mcd typ. Blue : 300mcd typ. @12mA/ Ta= 25°C; Tolerance ±10%		
λ_D	Red : 624nm typ. Green : 524nm typ. Blue : 466nm typ. @12mA/ Ta= 25°C; Tolerance ± 0.5nm		
Vf	Red : 1.8-2.2 V Green : 2.8-3.2 V Blue : 2.8-3.2 V @12mA/ Ta= 25°C; Tolerance ± 0.05V		
Resin	Clear	Epoxy Resin	
Carrier tape	EIA 481-1A specs	Conductive black tape	
Reel	EIA 481-1A specs	Conductive black	1000pc/reel
Label	IN standard	Paper	
Packing bag	220x240mm	Aluminum laminated bag/ no-zipper	One reel per bag
Carton	IN standard	Paper	Non-specified

Others:

Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv, λ_D and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

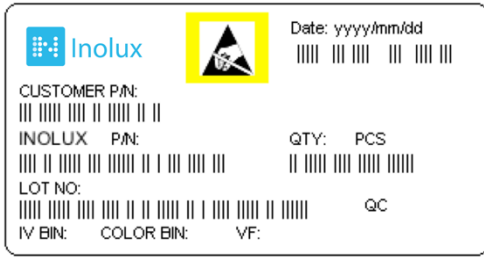
ATTENTION: Electrostatic Discharge (ESD) protection



The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

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Label Specifications

INolux P/N:

I N - P I 5 5 6 F C H - X X X X

Product	Package	Color	Customer Code
IN: INolux Corporation	PI55: 5.0 (L) x 5.0 (W) x1.6 (H) mm 6: 6-Pin Version	FCH: Full Color	XXXX: Customer Specific Code

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Features

1. 5050 with integrated high quality constant current IC and RGB LED chip.
2. Built-in IC, with high precision of constant current and internal RGB chips spectral processing in advance.
3. Single line data transmission (return to zero code) .
4. Specific Shaping Transmit Technology - number of LED stacked is not restricted.
5. Cascading Enhancement Technology - any 2 LED spacing can be up to 10 meters
6. Data transfer rate of 800 kbp/s at 30 frames per second.
7. RGB output port PWM control can achieve 256 grey level adjustments.
8. Upon powering up, IC performs self-inspection then lights connection on the pin B lamp.
9. SA-I Anti-interference patent technology for single line data transmission.
10. Built-in power supply reverse connect protection module, reversed power input will not damage the IC.

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LED Characteristics

(T_a=-25°C, unless otherwise specified)

Light color	Wavelength (nm)	Light intensity (mcd)	Working current (mA)	Working voltage (V)
R	620-625	400-700	12	1.8-2.2
G	520-525	1000-1500	12	2.8-3.2
B	465-470	200-400	12	2.8-3.2

Recommended Operating Ranges

(T_a=-25°C, unless otherwise specified)

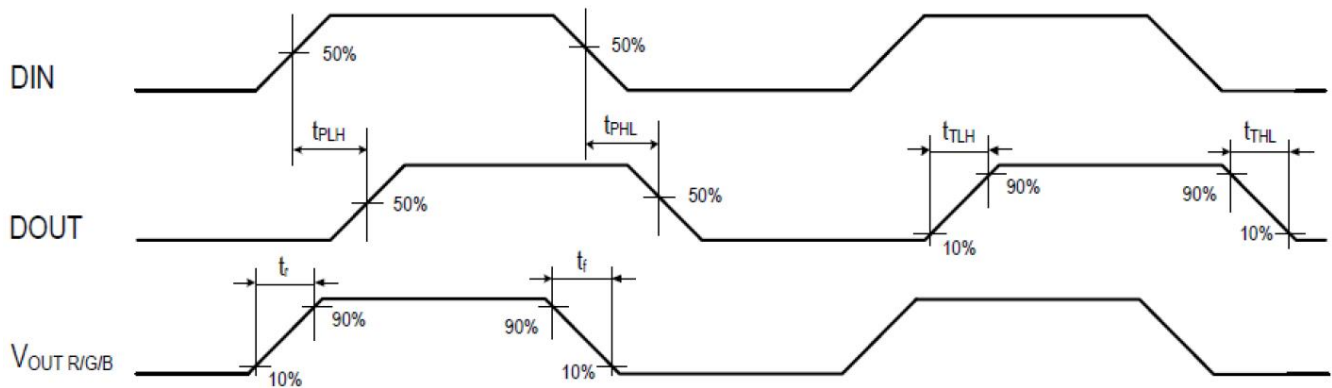
Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply voltage	VDD	---	5.2	---	V	---
The signal input flip threshold	V _{IH}	0.7*VDD	---	---	V	VDD=5.0V
	V _{IL}	---	---	0.3*VDD	V	
The frequency of PWM	FPWM	---	1.0	---	KHZ	---
Static power consumption	IDD	---	0.5	---	mA	---

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Switching Characteristics

(T_a=-25°C, unless otherwise specified)

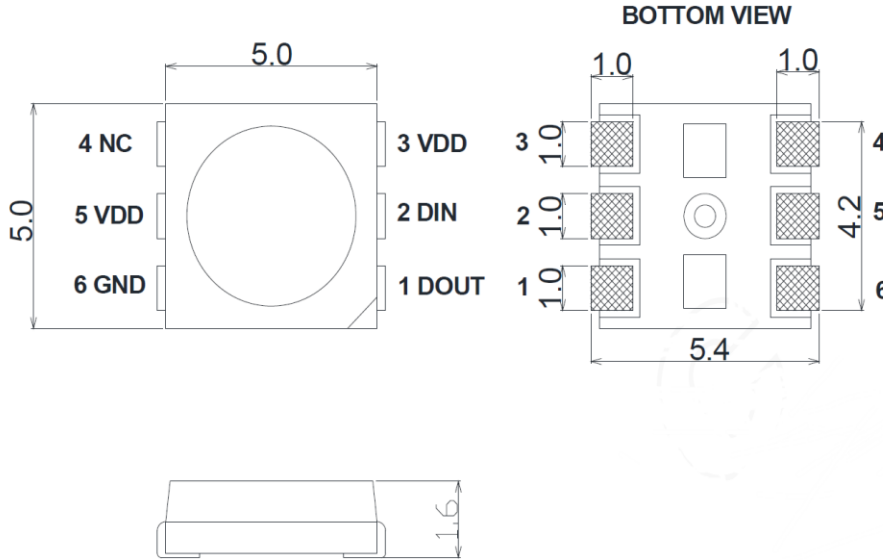
Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The speed of data transmission	fDIN	---	800	---	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	TPLH	---	67	---	ns	The earth load capacitance of the dout port is 30pf, and the signal transmission delay from DIN to dout
	TPHL	---	82	---	ns	
Out R/B conversion time	Tr	---	22	---	ns	IOU _T R / B= 5mA, out R / B port connected with 200 Ω resistor to VDD in series, load capacitance to ground
	Tf	---	75	---	ns	
Out G conversion time	Tr	---	18	---	ns	IOU _T g = 5mA, out g port is connected with 200 Ω resistor to VDD in series, and the load capacitance to ground is 30pf
	Tf	---	110	---	ns	



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Package Outline Dimension & Recommended dimensions for PCB products

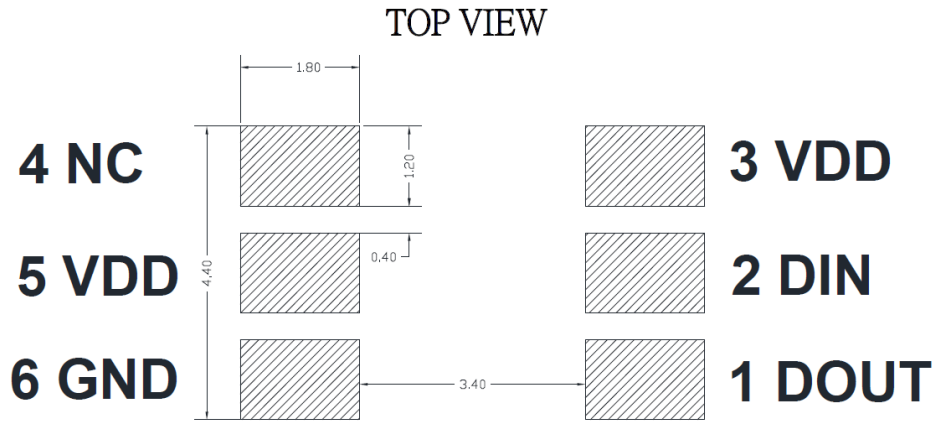
Outline Dim.



Notes:

1. All dimensions are in millimeters.
2. Tolerance is ± 0.1 mm unless otherwise noted

Recommended dimensions for PCB products



Soldering terminals may shift in the x, y direction. Unit: mm Tolerance: ± 0.1 mm

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PIN Description

Number	Symbol	Function Description
1	DOUT	Control data signal output
2	DIN	Control data signal input
3	VDD	Power Supply LED
4	NC	NC
5	VDD	Power supply LED
6	GND	Ground

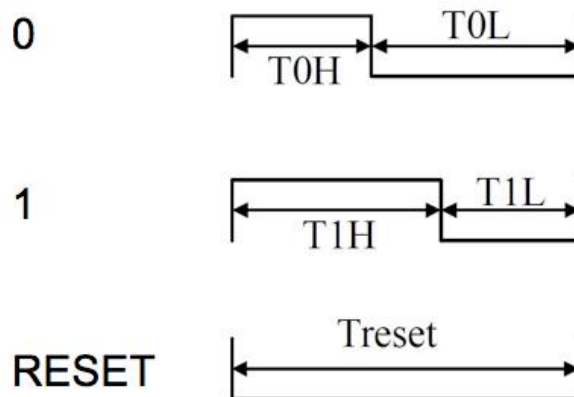
Absolute Maximum Ratings

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

Parameter	Symbol	Range	Unit
Logic supply voltage	VDD	+3.7~+5.5	V
Logic input voltage	VIN	-0.5~VDD+0.5	V
Operating temperature	TOPT	-40 to +85	$^\circ\text{C}$
Storage temperature	TSTG	-40 to +85	$^\circ\text{C}$
ESD pressure(HBM)	VESD	2K	V

Timing Waveforms

1. Input Code

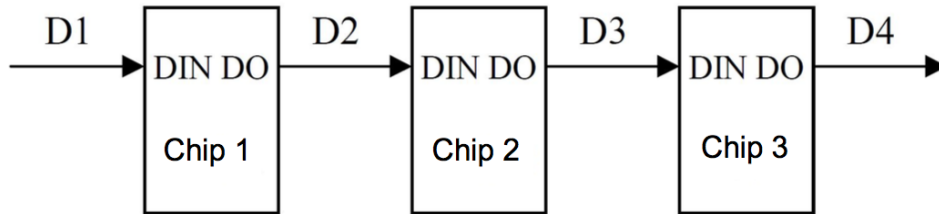


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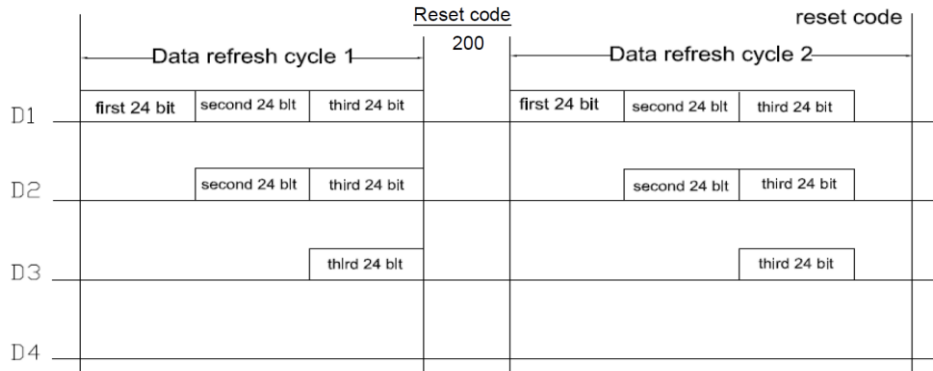
2. The data transmission time ($T_H+T_L=1.25\mu s\pm 600ns$):

Name		Min.	Standard value	Max.	Unit
T	Code 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	0.70	0.90	1.00	μs
T1L	1 code, low level time	0.20	--	--	μs
Trst	Reset code, low level time	200	--	--	μs

3. Connection Scheme



4. Data Transfer Format



Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit.

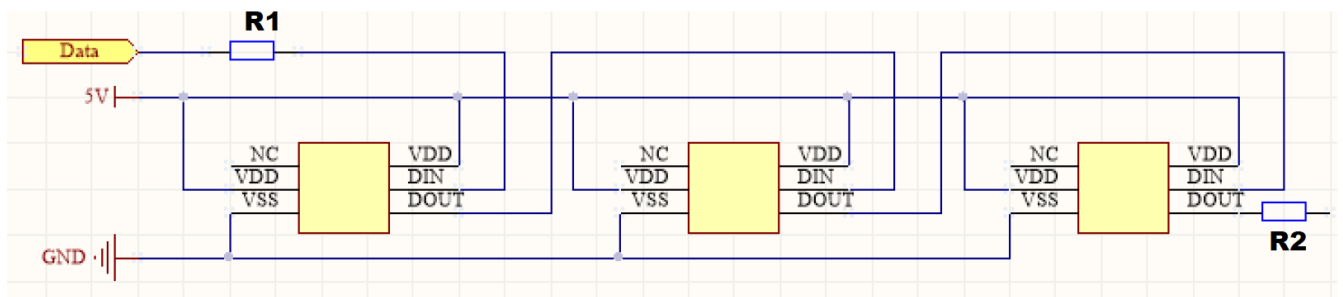
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5. 24-bit data format



Note: high starting, in order to send data (G7 - G6 -B0)

Typical Application circuit diagram

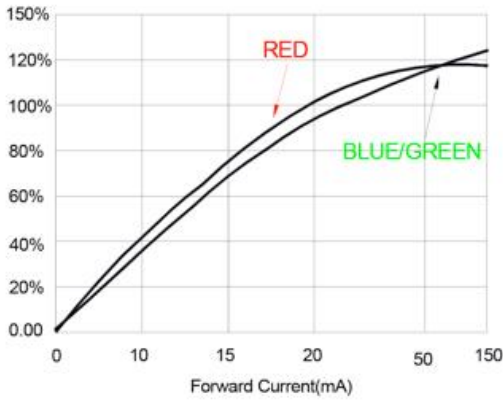


Application: used for soft lamp strip or hard light, lamp beads transmission distance is short, suggested in signal in time the clock line input and output end of each connected in series protection resistors, R1=R2 of about 500 ohms.

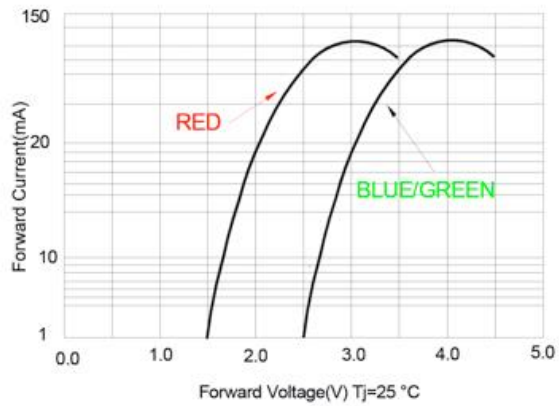
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LED Performance Graph

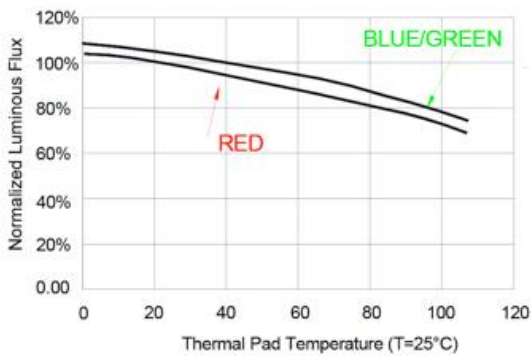
Typical Relative Luminous Flux vs. Forward Current



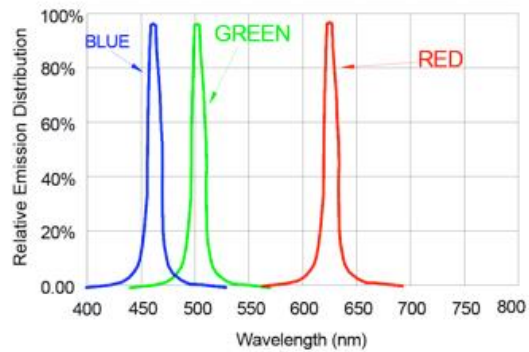
Forward Voltage vs. Forward Current



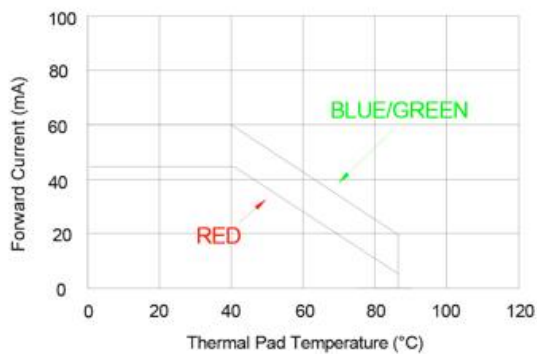
Thermal Pad Temperature vs. Relative Light Output



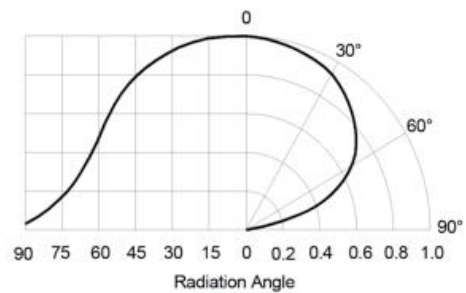
Wavelength Characteristics



Thermal Pad Temperature vs. Forward Current



Typical Radiation Pattern 120°



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Precautions

Please read the following notes before using the product:

1. Storage

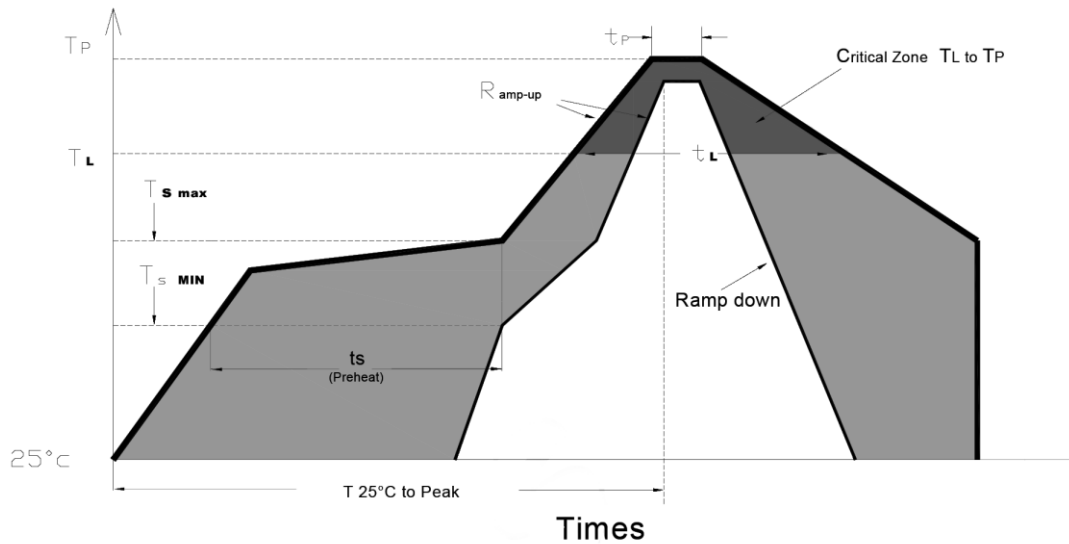
- 1.1 Do not open moisture proof bag before the products are ready to use.
- 1.2 Before opening the package, the LEDs should be kept at 30°C or less and 80%RH or less.
- 1.3 The LEDs should be used within a year.
- 1.4 After opening the package, the remaining LEDs should be kept in a resealed bag.
- 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.

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2. Soldering Condition

Recommended soldering conditions:



Profile Feature	Lead-Free Solder
Average Ramp-Up Rate ($T_{s \max}$ to T_p)	3°C/second max.
Preheat: Temperature Min ($T_{s \min}$)	150°C
Preheat: Temperature Min ($T_{s \max}$)	200°C
Preheat: Time ($t_{s \min}$ to $t_{s \max}$)	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.

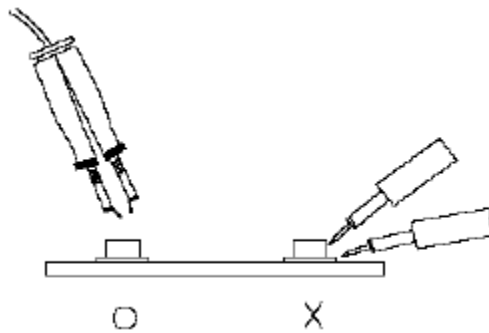
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3. Soldering Iron

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.

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Revision History

Changes since last revision	Page	Version No.	Revision Date
Initial release	-	1.0	12-21-2015
Update optical electrical characteristics		2.0	06-10-2016
Update data transmission time / intensity level/ handling		2.1	10-20-2016
Update intensity level		2.2	10-31-2016
Update intensity level		2.3	01-07-2019
Revise precautions	15	2.4	07-31-2019
Revise drawing and spec.	7-12	2.5	02-04-2021

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