

SMD ■ B

B1414DWN3S2-RGBC0112-2T



### Features

- Package in 8mm tape on 7" diameter reel.
- Compatible with automatic placement equipment.
- Compatible with infrared and vapor phase reflow solder process.
- Full-color type.
- 8 bit PWM control with 256 grayscales for each RGB chip.
- Pb-free
- The product itself will remain within RoHS compliant version.
- Compliance with EU REACH.
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)

### Description

- The B1414IC SMD LED is much smaller than lead frame type components, thus enable smaller board size, higher packing density, reduced storage space and finally smaller equipment to be obtained.
- Besides, lightweight makes them ideal for miniature applications. etc.

### Applications

- Indoor/Outdoor LED video display.
- Full color LED light strip.
- LED decorative lighting.
- Backlighting in dashboard and switch.
- Telecommunication: indicator and backlighting in telephone and fax.
- General use.

## Device Selection Guide

Code	Chip Materials	Emitted Color	Resin Color
RS	AlGaInP	Brilliant Red	Surface Diffused
GH	InGaN	Brilliant Green	
BH	InGaN	Blue	

## Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
LED Forward Current (Per Chip)	I <sub>OUT</sub>	12	mA
Supply Voltage	V <sub>DD</sub>	6.5	V
Power Dissipation	P <sub>D</sub>	<250	mW
Clock frequency	CLK	800	kbps
Internal scan frequency		800	kHz
Electrostatic Discharge(HBM)	ESD	2000	V
Operating Temperature	T <sub>opr</sub>	-20 ~ +85	℃
Storage Temperature	T <sub>stg</sub>	-40 ~ +90	℃
Soldering Temperature	T <sub>sol</sub>	Reflow Soldering : 260 ℃ for 10 sec. Hand Soldering : 350 ℃ for 3 sec.	

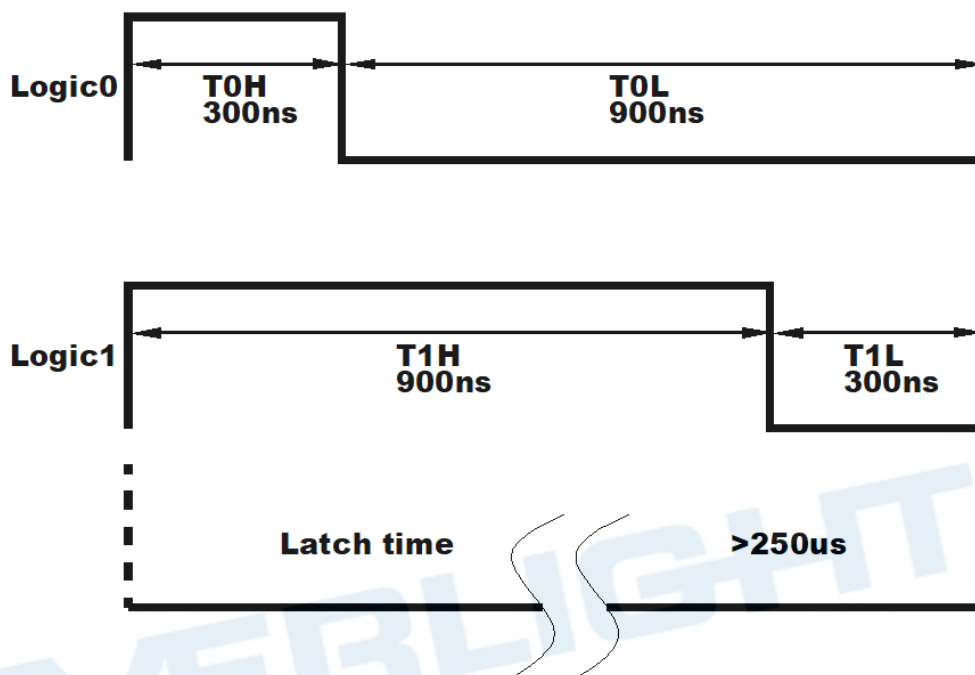
## Electrical Characteristics(Ta =-20~+85℃ , VDD = 5V , Vss=0V)

Characteristics	Symbol	Condition	Min	Typ.	Max.	Unit
Supply Voltage	V <sub>DD</sub>		3.3	-----	5.5	
Output Current (Per Chip)	I <sub>OL</sub>		-----	12	-----	mA
Input Voltage(High)	V <sub>IH</sub>		2.7	-----	V <sub>DD</sub>	V
Input Voltage(Low)	V <sub>IL</sub>		0	-----	0.1	V
Operation Current	I <sub>DD</sub>	R 、 G 、 B no load	-----	1.2	-----	mA
R 、 G 、 B off Leakage current	I <sub>off</sub>	PWM=0(off), @R 、 G 、 B =5V	-----	1	-----	uA

## Communication Protocol

The B1414IC uses a single communication wire for LED PWM control. After power on reset, the B1414IC trip the first 24 bits data for the first B1414IC, and latch into itself shift register. Then the second 24 bits data will be passed to next B1414IC. The B1414IC has auto waveform reshaping amplification technology, and makes it can be used on long cascading application. The LED PWM output controlled by duty ration which depends on the 24bit data each for RGB outputs. All chips will latch new data when DIN port received the latch signal (> 50us low-level signal)

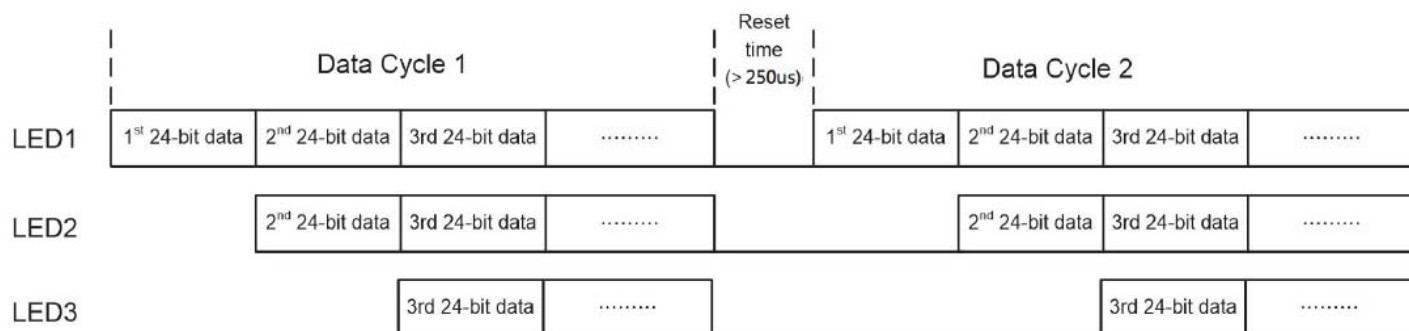
## Timing Wave Form



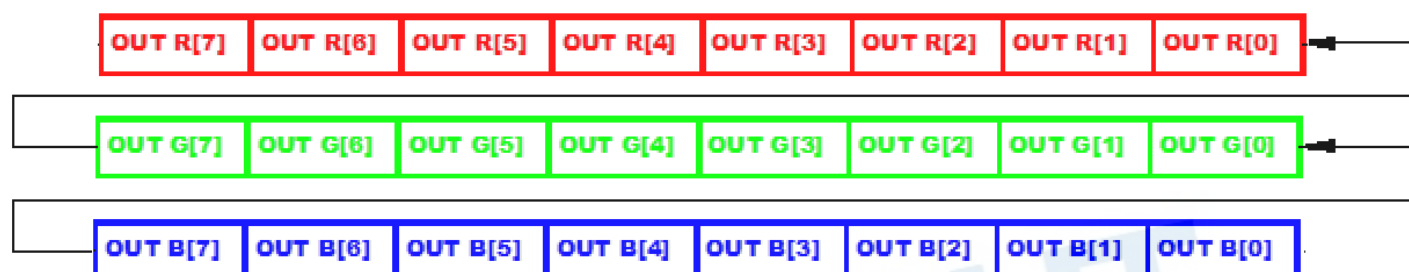
## High Speed mode

Item	Description	Typical	Allowance
$T_{0H}$	0 code • High-level time	300ns	$\pm 150\text{ns}$
$T_{0L}$	0 code • Low-level time	900ns	$\pm 150\text{ns}$
$T_{1H}$	1 code • High-level time	900ns	$\pm 150\text{ns}$
$T_{1L}$	1 code • Low-level time	300ns	$\pm 150\text{ns}$
Latch time	Latch time	$>250\mu s$	

## Data Transfer Protocol

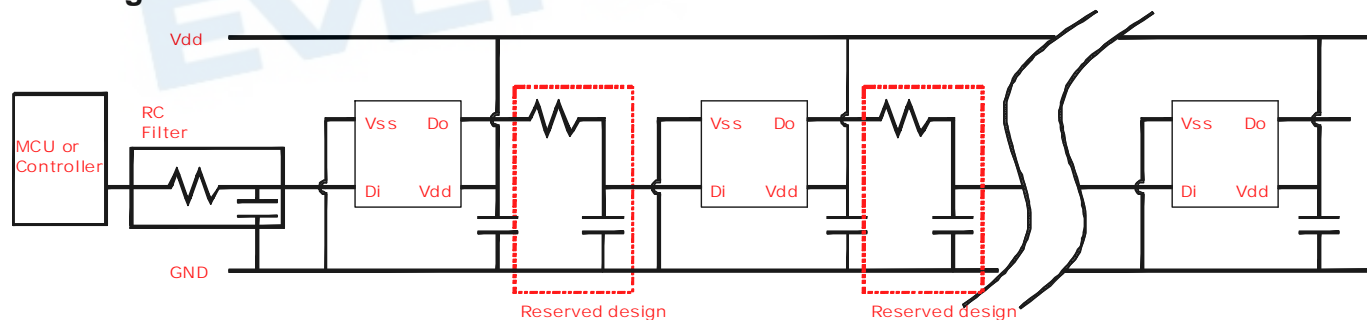


## Single Data in 24bit for RGB



The single wire data transfer protocol supports 24-bit data for each LED RGB display data refresh. B1414IC receives 24-bit data and passes the remaining data to next LED. The 24-bit data consist of red, green and blue data, each with 8-bit width, and are transferred with MSB first.

## Cascading connection



Note1: RC Filter and R1 must be added or reserved on the board for better waveform of signals in different applications.

The suggested value of R1 is 10KΩ~100KΩ. The value is subject to the practical system environment.

Note2: The by-pass capacitor of VDD pin is necessary to be added on the board for the stability of chip operation.

The suggested value of capacitor is 0.1uF.

Note3: More note of layout and control, please ask for document.

## Electro-Optical Characteristics (Ta=25°C)

Parameter	Symbol	Code	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	I <sub>v</sub>	RS	180	-----	720	mcd	
		GH	720	-----	1800		
		BH	112	-----	450		
Viewing Angle	2θ <sub>1/2</sub>		-----	120	-----	Deg	
Peak Wavelength	λ <sub>p</sub>	RS	-----	632	-----	nm	@V <sub>DD</sub> =5V OUT_R/G/B [7:0]= 8b'11111111
		GH	-----	518	-----		
		BH	-----	468	-----		
Dominant Wavelength	λ <sub>d</sub>	RS	617.5	-----	629.5	nm	
		GH	520	-----	535		
		BH	465	-----	475		
Spectrum Radiation Bandwidth	Δλ	RS	-----	20	-----	nm	
		GH	-----	35	-----		
		BH	-----	25	-----		

Note:

1. Tolerance of Luminous Intensity: ±11%
2. Tolerance of Dominant Wavelength: ±1nm

## RS

### Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
S	180	285	mcd	OUT_R [7:0]=8b'11111111
T	285	450		
U	450	720		

## GH

### Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
V	720	1120	mcd	OUT_G [7:0]=8b'11111111
W	1120	1420		
X	1420	1800		

## BH

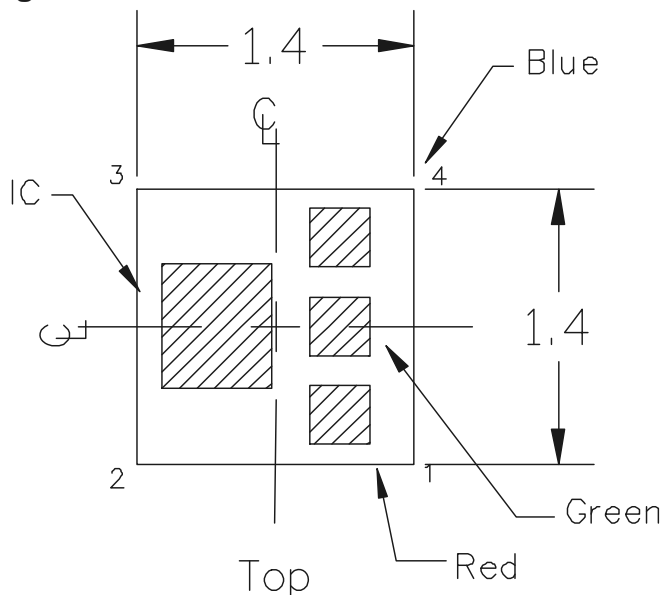
### Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
R	112	180	mcd	OUT_B [7:0]=8b'11111111
S	180	285		
T	285	450		

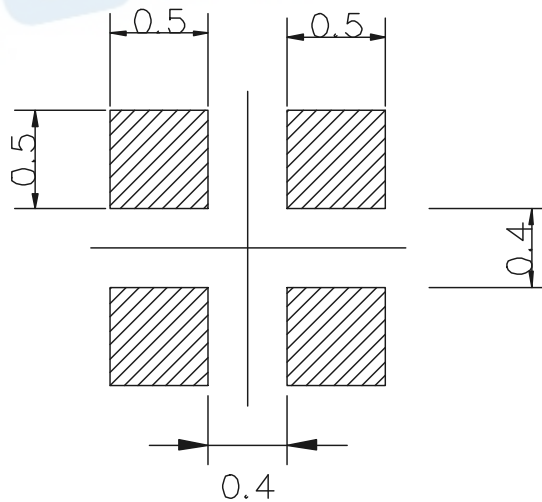
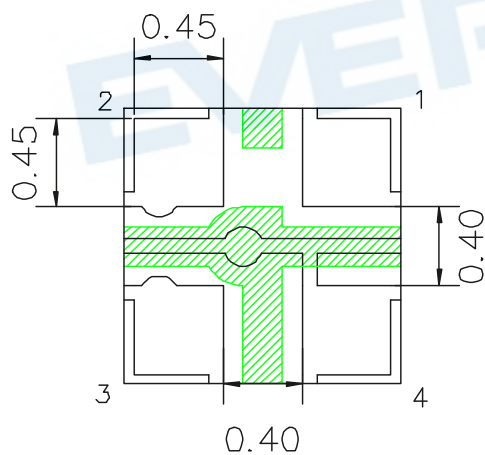
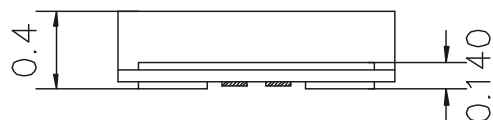
Note:

1. Tolerance of Luminous Intensity:  $\pm 11\%$

## Package Dimension



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

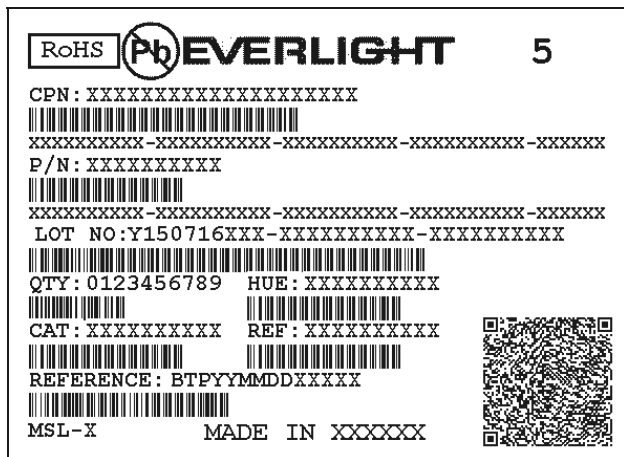


Note: Tolerances unless mentioned  $\pm 0.1$  mm. Unit = mm

## PIN Function

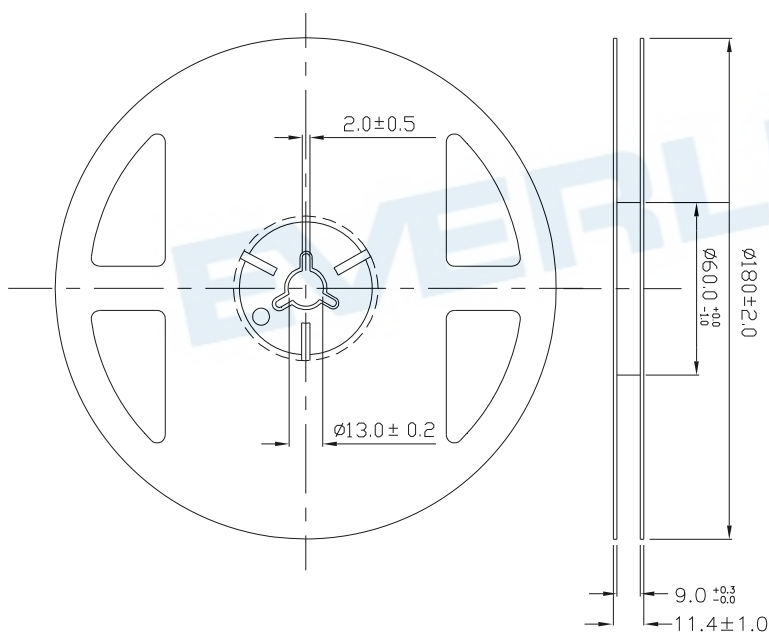
NO.	Symbol	PIN	Function description
1	VDD	POWER VOLTAGE	Power Voltage, connect to "+5V"
2	DIN	DATA IN	Control data signal input
3	GND	GROUND	Data & Power Grounding
4	DOUT	DATA OUT	Control data signal output

## Moisture Resistant Packing Materials Label Explanation



- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Chromaticity Coordinates & Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

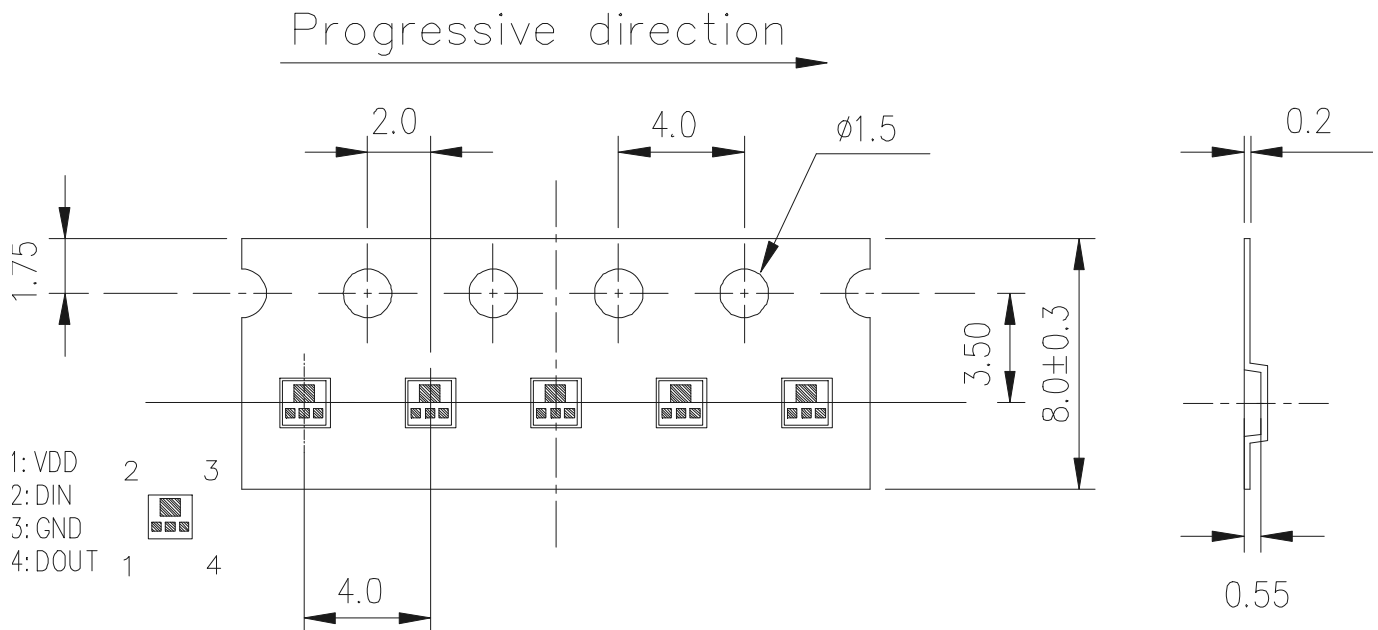
## Reel Dimensions



Note: The tolerances unless mentioned is  $\pm 0.1\text{mm}$  ,Unit = mm

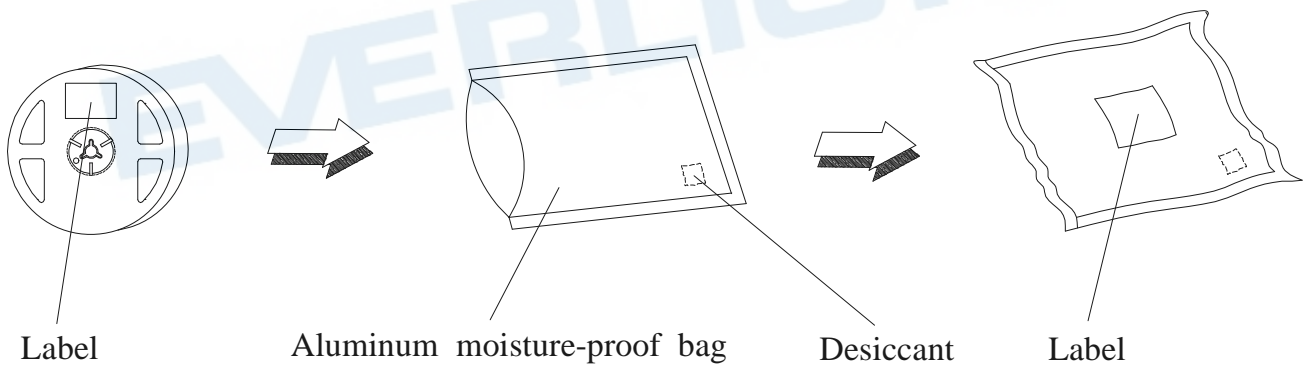


The minimum quantity of packing is 2000 pcs per reel.



Note: The tolerances unless mentioned is  $\pm 0.1\text{mm}$ , Unit = mm

### Moisture Resistant Packaging



## Precautions For Use

### 1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen).

### 2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package: The LEDs should be kept at 30°C or less and 90%RH or less.

2.3 After opening the package: The LED's floor life is 168hrs under 30°C or less and 60% RH or less.

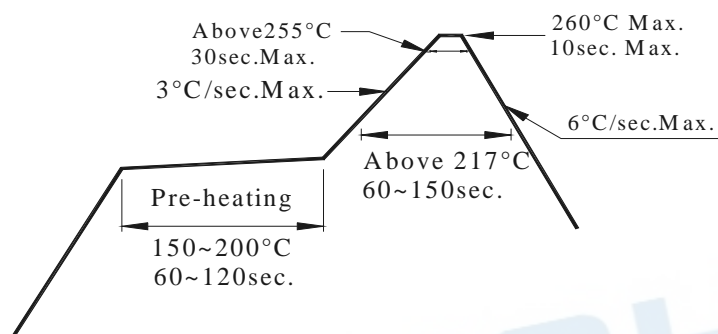
If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded 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.

### 3. Soldering Condition

#### 3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

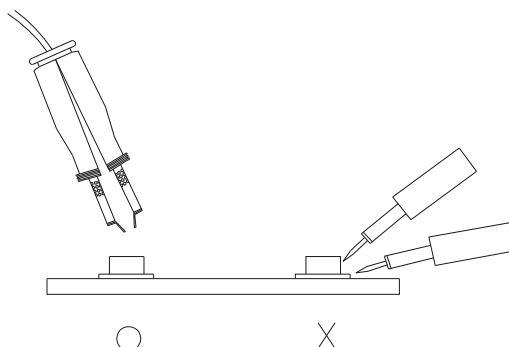
3.4 After soldering, do not warp the circuit board.

### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 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.

### 5. 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.



## Application Restrictions

High reliability applications such as military/aerospace, automotive safety/security systems, and medical equipment may require different product. If you have any concerns, please contact Everlight before using this product in your application. This specification guarantees the quality and performance of the product as an individual component. Do not use this product beyond the specification described in this document.

## DISCLAIMER

1. EVERLIGHT reserves the right(s) on the adjustment of product material mix for the specification.
2. The product meets EVERLIGHT published specification for a period of twelve (12) months from date of shipment.
3. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
4. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from the use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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