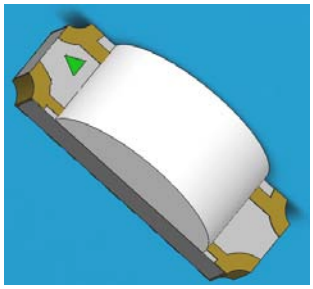
DATASHEET

SMD ▪ B
B3010PWN3S1-GRBD0112-2D



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 B3010IC 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
GH	InGaN	Brilliant Green	White Diffused
RS	AlGaInP	Brilliant Red	
BH	InGaN	Blue	

Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
LED Forward Current (Per Chip)	I_{OUT}	12	mA
Supply Voltage	V_{DD}	+3.3~+5.5	V
Clock frequency	CLK	800	kbps
Internal scan frequency		800	kHz
Electrostatic Discharge(HBM)	ESD	2000	V
Operating Temperature	T_{opr}	-20 ~ +85	℃
Storage Temperature	Tstg	-40 ~ +90	℃
Soldering Temperature	Tsol	Reflow Soldering : 260 ℃ for 10 sec. Hand Soldering : 350 ℃ for 3 sec.	

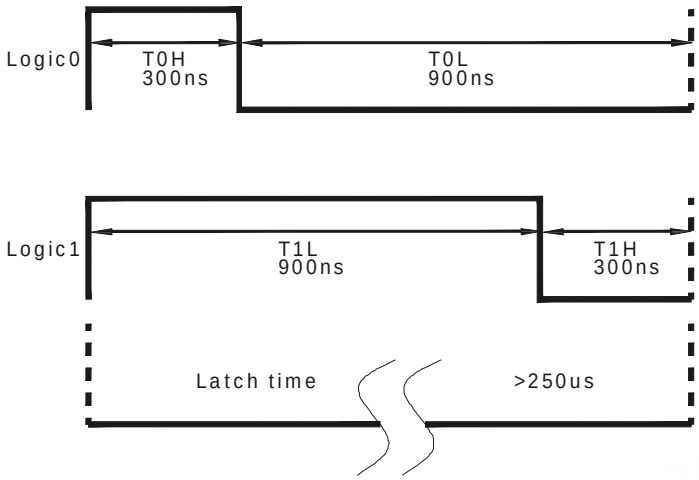
Electrical Characteristics(Ta =-20～+85℃，VDD = 5V，V_{SS}=0V)

Characteristics	Symbol	Condition	Min	Typ.	Max.	Unit
Output Current	I_{OL}		-----	12	-----	mA
Input Voltage(High)	V_{IH}		2.7	-----	V_{DD}	V
Input Voltage(Low)	V_{IL}		0	-----	0.1	V
Operation Current	I_{DD}	R、G、B no load	-----	1.2	-----	mA
R 、G 、B off Leakage current	I_{off}	PWM=0(off), @R、G、B =5V	-----	1	-----	uA

Communication Protocol

The B3010IC uses a single communication wire for LED PWM control. After power on reset, the B3010IC trip the first 24 bits data for the first B3010IC, and latch into itself shift register. Then the second 24 bits data will be passed to next B3010IC. The B3010IC 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)

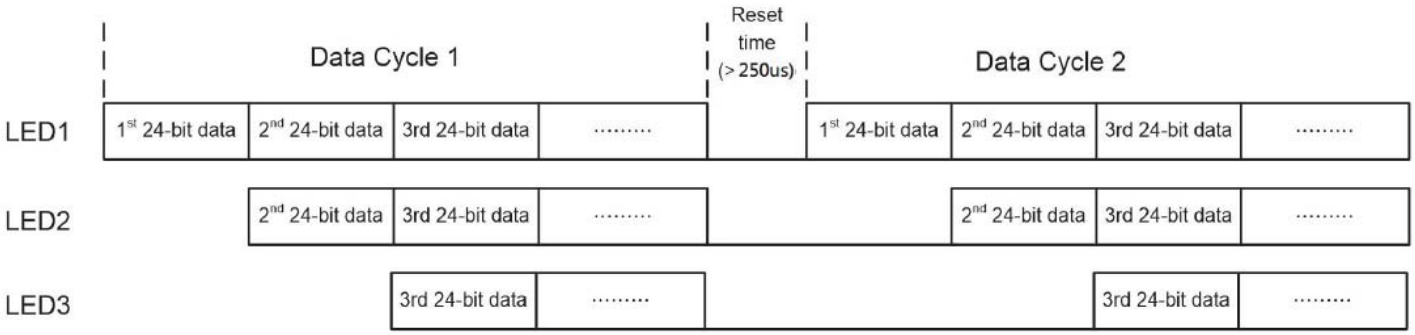
Timing Wave Form



High Speed mode

Item	Description	Typical	Allowance
T_{0H}	0 code ‧ High-level time	300ns	±150ns
T_{0L}	0 code ‧ Low-level time	900ns	±150ns
T_{1H}	1 code ‧ High-level time	900ns	±150ns
T_{1L}	1 code ‧ Low-level time	300ns	±150ns
Latch time	Latch time	>250us	

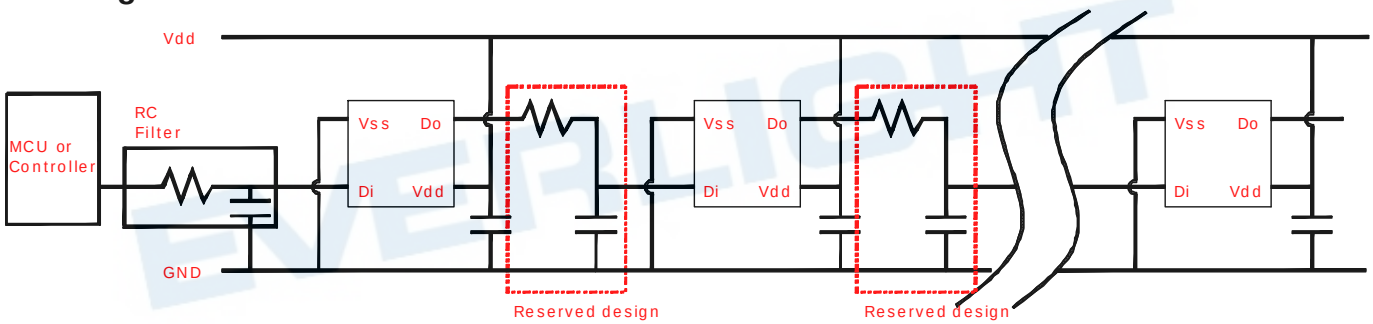
Data Transfer Protocol



Single Data in 24bit for RGB

The single wire data transfer protocol supports 24-bit data for each LED RGB display data refresh.
B3010IC 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.
Note4: Please Keep DI at low state while VDD=0V, otherwise, there will be leakage current from DI to VDD path in the chip, and there may happen incomplete power on reset issue while Power-on again.

Electro-Optical Characteristics (Ta=25℃)

Parameter	Symbol	Code	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	Iv	GH	360	-----	715	mcd	@V_{DD}=5V OUT_R/G/B [7:0]= 8b'11111111
		RS	140	-----	285		
		BH	72	-----	140		
Viewing Angle	$2\theta_{1/2}$		-----	130	-----	Deg	
Peak Wavelength	λ p	GH	-----	518	-----	nm	
		RS	-----	632	-----		
		BH	-----	468	-----		
Dominant Wavelength	λ d	GH	520.0	-----	535.0	nm	
		RS	617.5	-----	629.5		
		BH	464.5	-----	476.5		
Spectrum Radiation Bandwidth	△λ	GH	-----	35	-----	nm	
		RS	-----	20	-----		
		BH	-----	25	-----		

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

GH
Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
T2	360	450	mcd	OUT_G [7:0]=8b'11111111
U1	450	565		
U2	565	715		

RS
Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
R2	140	180	mcd	OUT_R [7:0]=8b'11111111
S1	180	225		
S2	225	285		

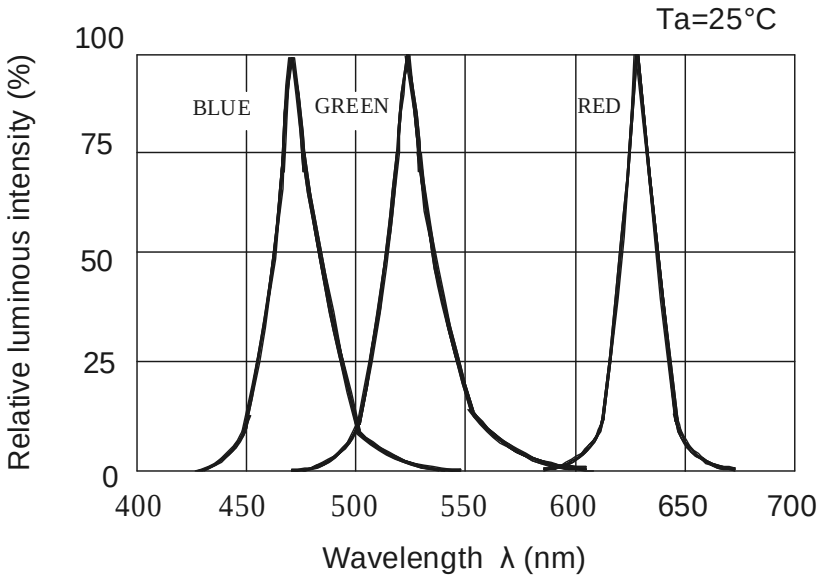
BH
Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
Q1	72	90	mcd	OUT_B [7:0]=8b'11111111
Q2	90	112		
R1	112	140		

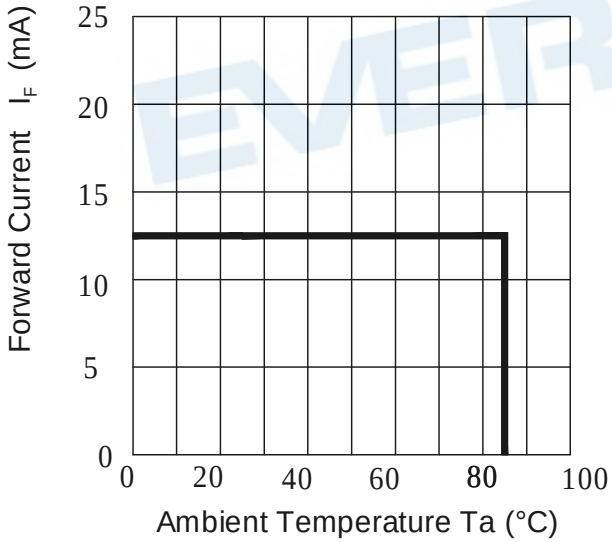
Note:
1. Tolerance of Luminous Intensity: ±11%

Typical Electro-Optical Characteristics Curves

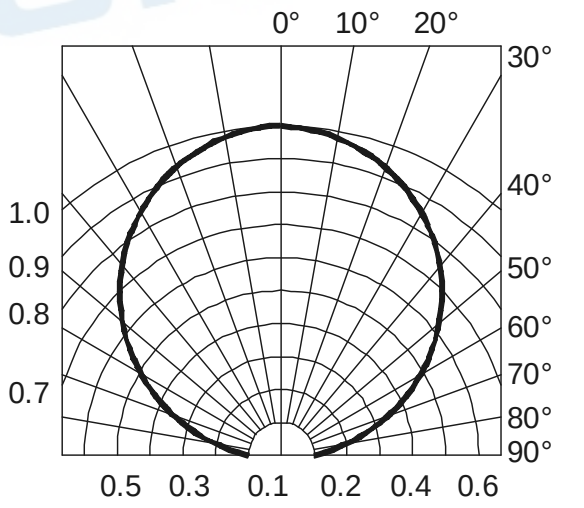
Spectrum Distribution



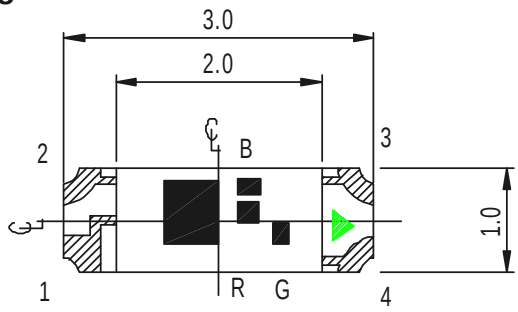
Forward Current Derating Curve



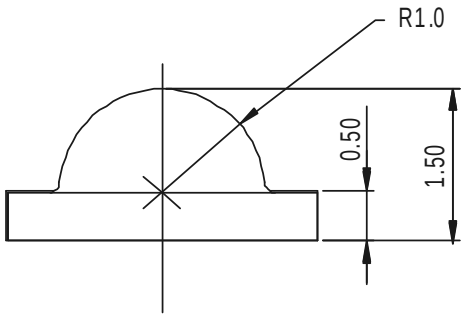
Radiation Diagram



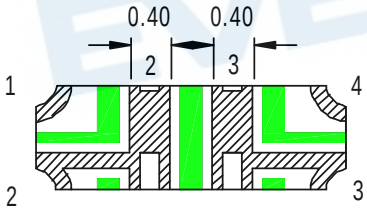
Package Dimension

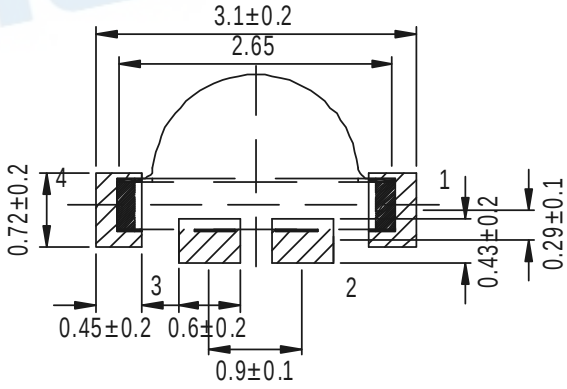


1: DOUT
2: GND
3: VDD
4: DIN



Recommend soldering pad





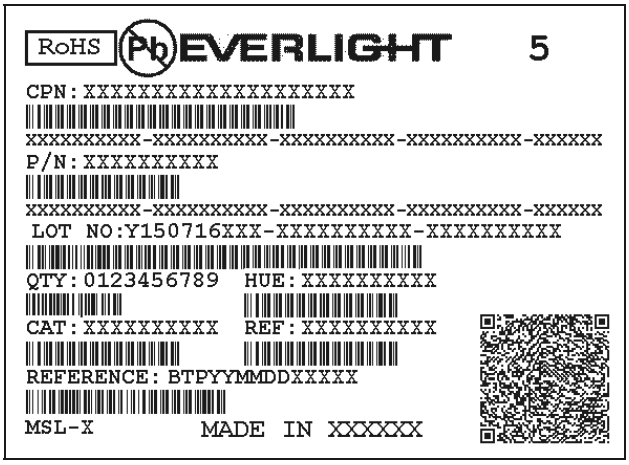
Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

Note: Tolerances unless mentioned ±0.1mm. Unit = mm

PIN Function

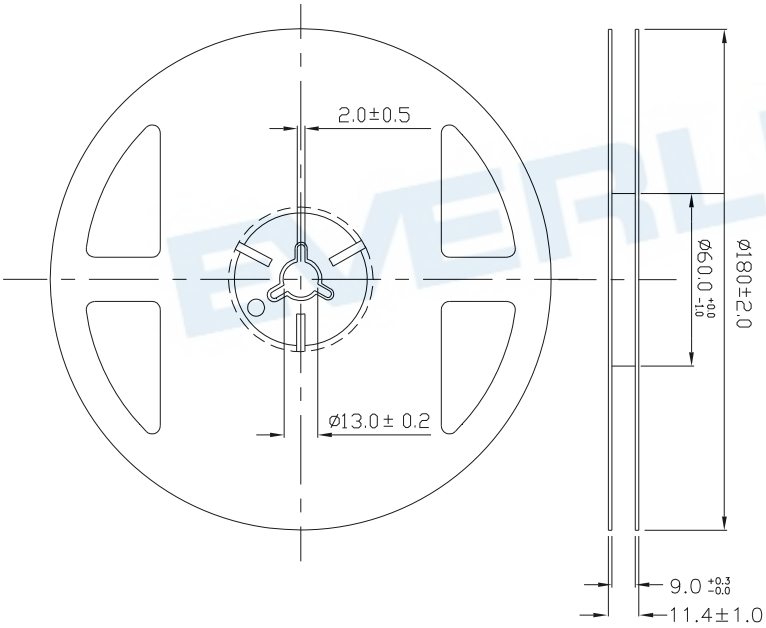
NO.	Symbol	PIN	Function description
1	DOUT	DATA OUT	Control data signal output
2	GND	GROUND	Data & Power Grounding
3	VDD	POWER VOLTAGE	Power Voltage, connect to “+5V”
4	DIN	DATA IN	Control data signal input

Moisture Resistant Packing Materials
Label Explanation



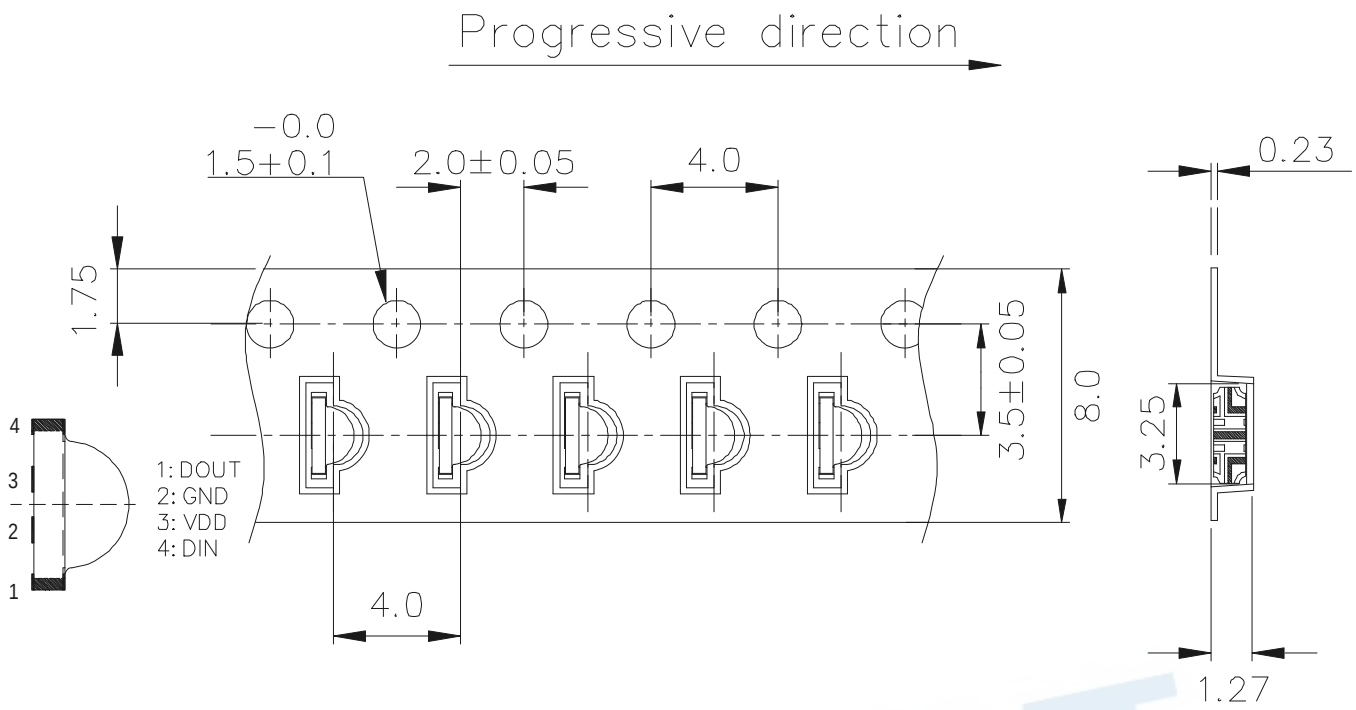
- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Chromaticity Coordinates & Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

Reel Dimensions



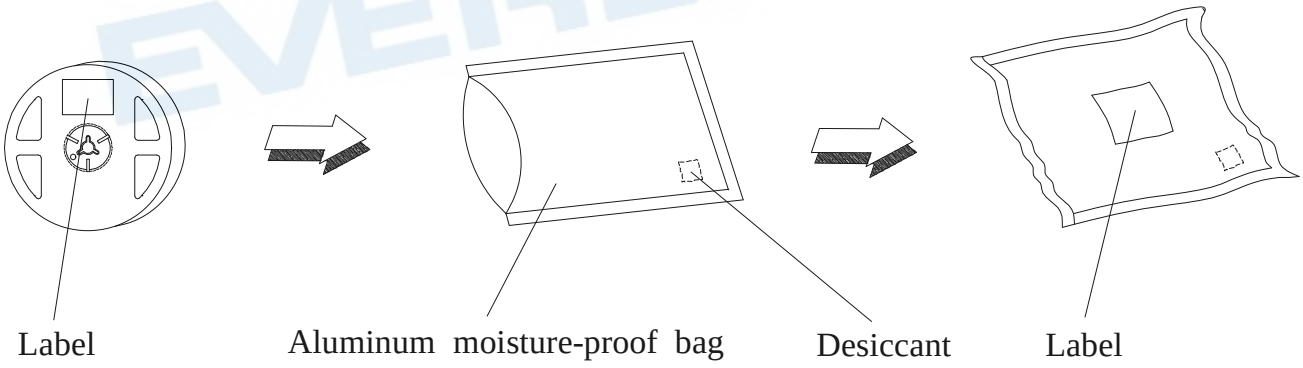
Note: The tolerances unless mentioned is ±0.1mm ,Unit = mm

The minimum quantity of packing is 2000 pcs per reel.



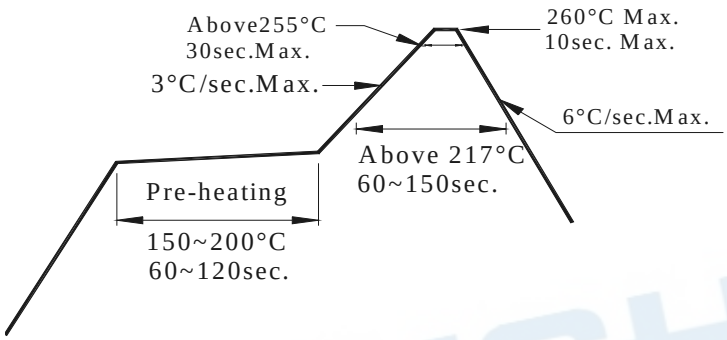
Note: The tolerances unless mentioned is ±0.1mm ,Unit = mm

Moisture Resistant Packaging



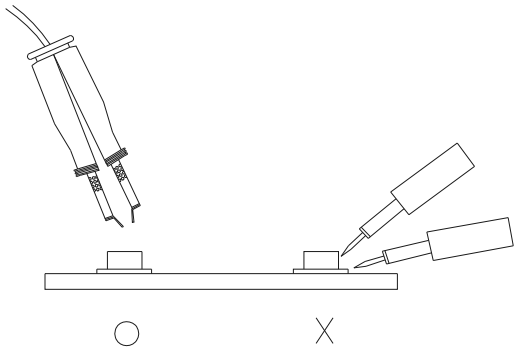
Precautions For Use

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℃ or less and 90%RH or less.
2.3 After opening the package: The LED's floor life is 168hrs under 30℃ 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℃ 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℃ 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

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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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