

### SMD ■ Low Power LED 45-21UMC/4045010/TR8-T



#### Features

- PLCC-2 package
- Top view white LED
- High luminous Intensity output
- Wide viewing angle
- Pb-free
- RoHS compliant
- Compliance with EU REACH
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)

#### Description

The Everlight 45-21 package has high efficacy, high CRI, low power consumption, wide viewing angle and a compact form factor. These features make this package an ideal LED for all lighting applications.

#### Applications

- LCD back light
- Mobile phones
- Indicators
- Illumination
- Switch lights

## Device Selection Guide

Chip Materials	Emitted Color	Resin Color
InGaN	White	Water Clear

## Absolute Maximum Ratings (T<sub>Soldering</sub>=25°C)

Parameter	Symbol	Rating	Unit
Reverse Voltage	V <sub>R</sub>	5	V
Forward Current	I <sub>F</sub>	30	mA
Peak Forward Current (Duty 1/10 @1KHz)	I <sub>FP</sub>	100	mA
Power Dissipation	P <sub>d</sub>	110	mW
Electrostatic Discharge(HBM)	ESD	1000	V
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +90	°C
Soldering Temperature	T <sub>sol</sub>	Reflow Soldering: 260 °C for 10 sec. Hand Soldering : 350 °C for 3 sec.	

Note:

The products are sensitive to static electricity and must be carefully taken when handling products

## Electro-Optical Characteristics (T<sub>Soldering</sub>=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	I <sub>v</sub>	2100	-----	2600	mcd	I <sub>F</sub> =20mA
Forward Voltage	V <sub>F</sub>	2.8	-----	3.5	V	I <sub>F</sub> =20mA
Viewing Angle	2θ <sub>1/2</sub>	-----	120	-----	deg	I <sub>F</sub> =20mA

Notes:

1. Tolerance of Luminous Intensity ±11%.
2. Tolerance of Forward Voltage : ±0.05V.

## Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
40	2100	2150	mcd	$I_F=20\text{mA}$
41	2150	2200		
42	2200	2300		
43	2300	2400		
44	2400	2500		
45	2500	2600		

Note:

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

## Bin Range of Forward Voltage

Group	Bin Code	Min.	Max.	Unit	Condition
0	6-1*	2.80	2.95	V	$I_F=20\text{mA}$
	6-1	2.95	3.05		
	6-2	3.05	3.15		
	7-1	3.15	3.25		
	7-2	3.25	3.35		
	8-1	3.35	3.45		
	8-1*	3.45	3.50		

Note:

Tolerance of Forward Voltage:  $\pm 0.05\text{V}$ .

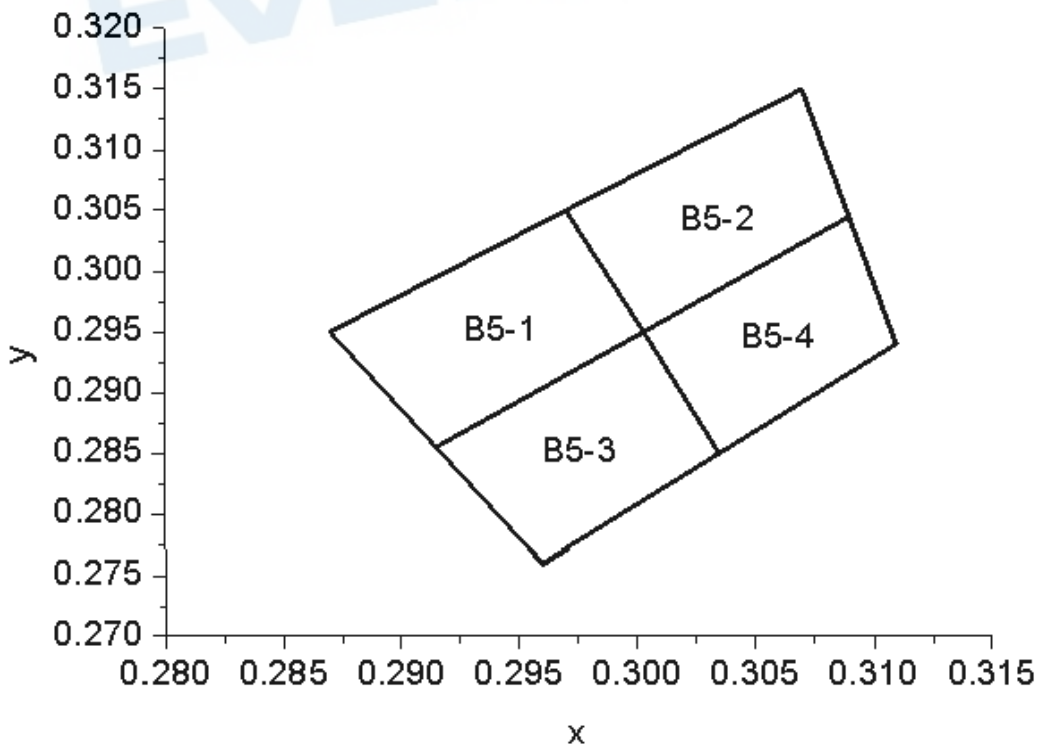
### Bin Range of Chromaticity Coordinates

Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y
B5-1	0.2915	0.2855	B5-2	0.3003	0.2950
	0.2870	0.2950		0.2970	0.3050
	0.2970	0.3050		0.3070	0.3150
	0.3003	0.2950		0.3090	0.3045
B5-3	0.2960	0.2760	B5-4	0.3035	0.2850
	0.2915	0.2855		0.3003	0.2950
	0.3003	0.2950		0.3090	0.3045
	0.3035	0.2850		0.3110	0.2940

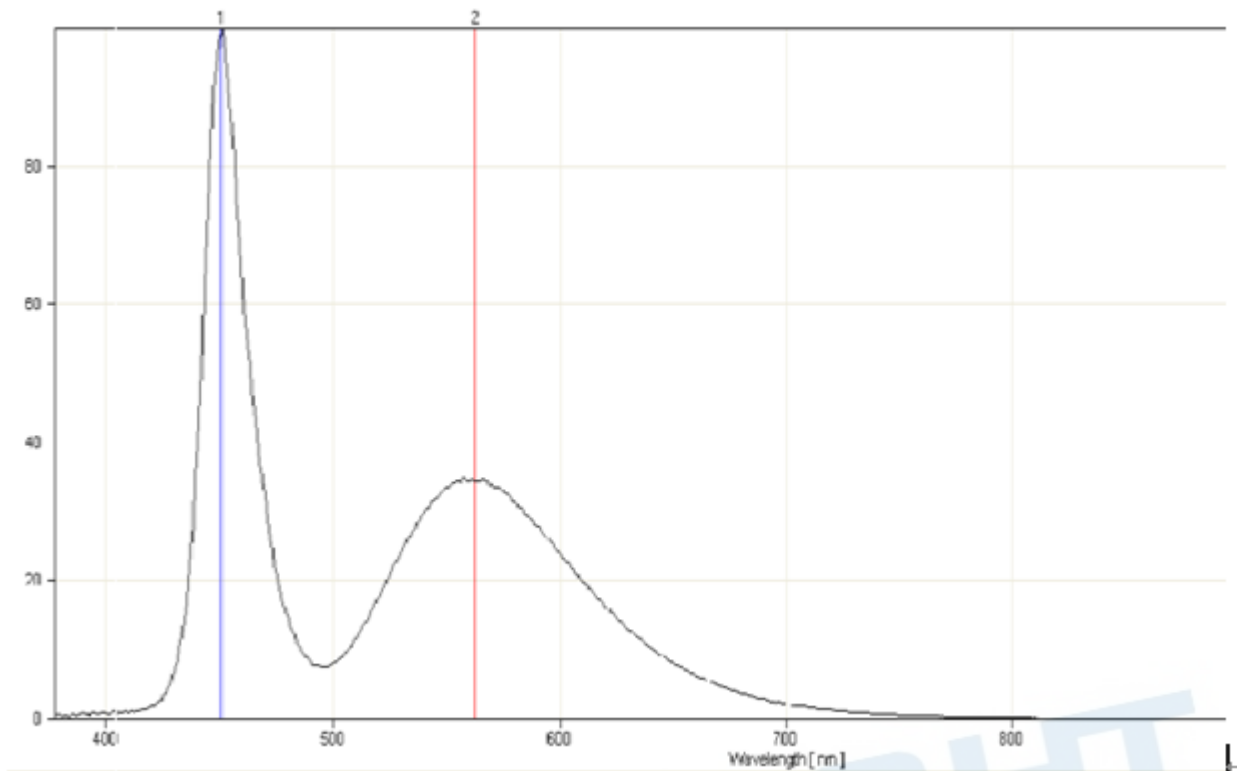
Note:

1. The value is based on driving current by 20mA.
2. Tolerance of Chromaticity Coordinates:  $\pm 0.01$

### The C.I.E. 1931 Chromaticity Diagram



## Spectrum Distribution



## Typical Electro-Optical Characteristics Curves

Fig.1 - Forward Voltage Shift vs. Junction Temperature

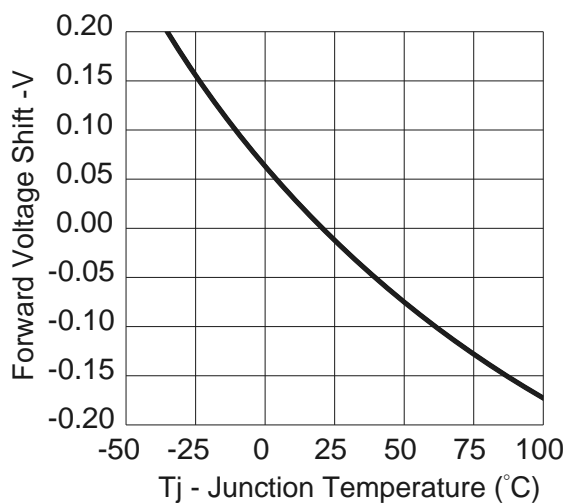
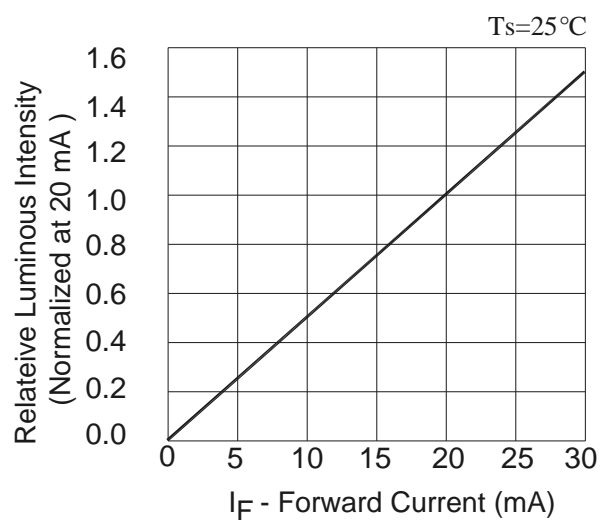


Fig.2 - Relative Luminous Intensity vs. Forward Current



## Typical Electro-Optical Characteristics Curves

Fig.3 - Relative Luminous Intensity vs. Junction Temperature

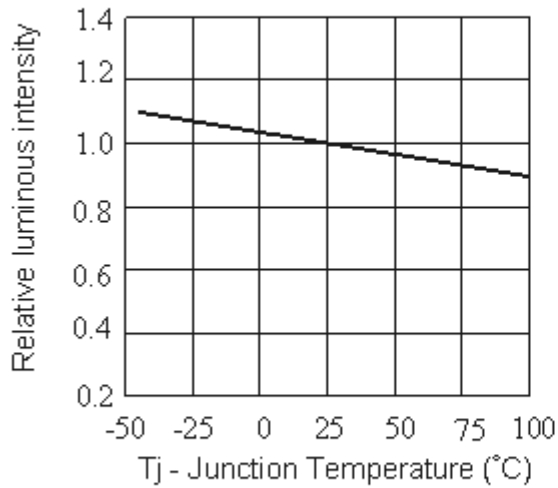


Fig.4 - Forward Current vs. Forward Voltage

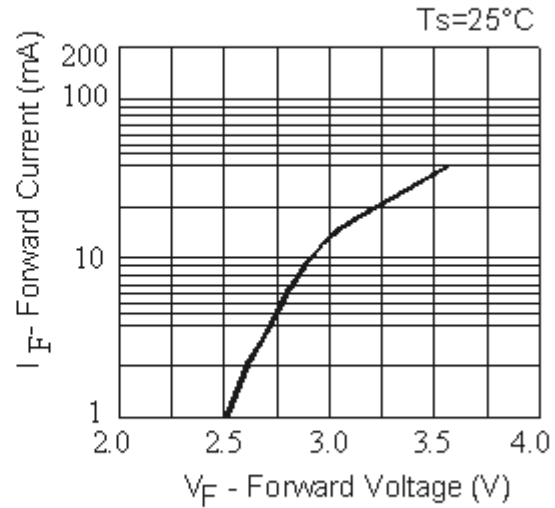


Fig.5 - Max. Driving Forward Current vs. Soldering Temperature

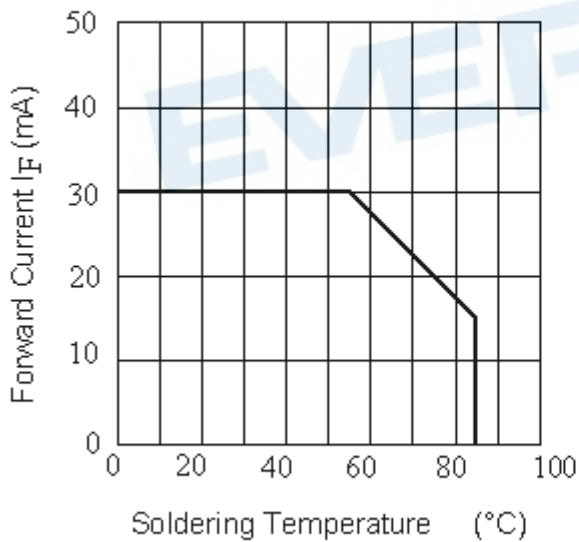
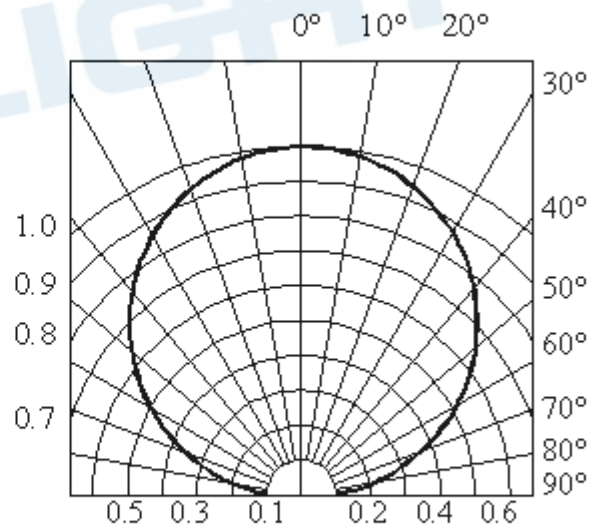
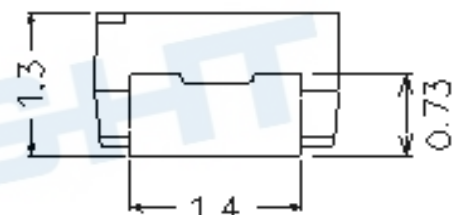
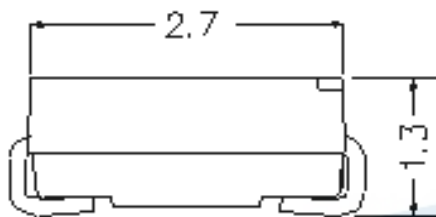
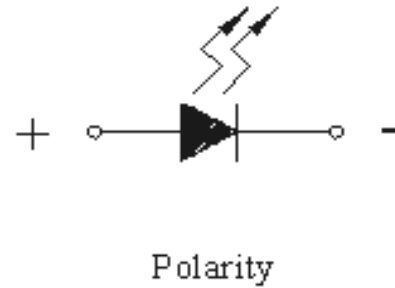
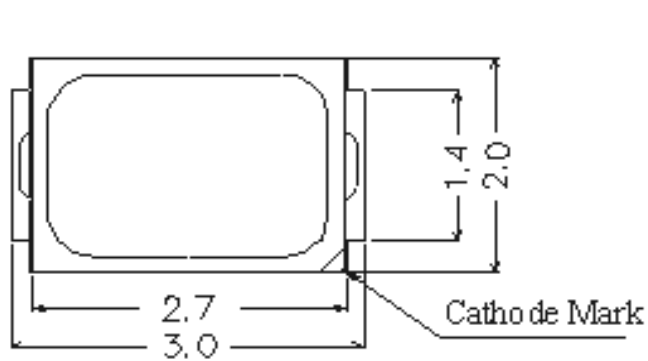


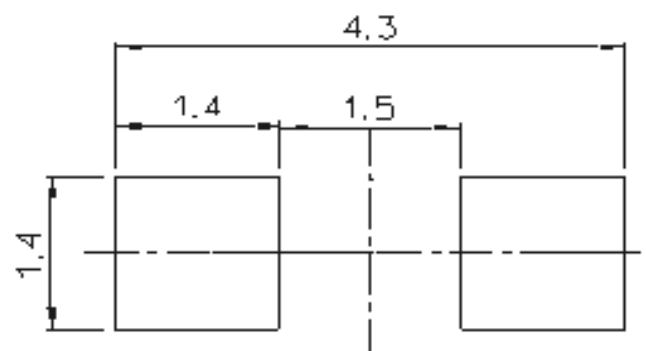
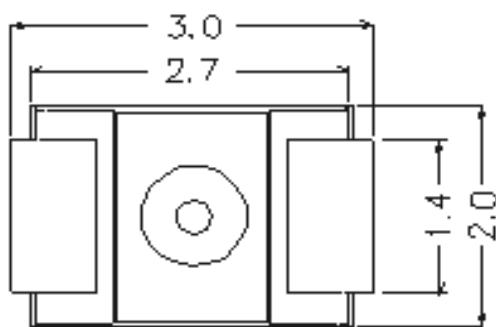
Fig.6 - Radiation Diagram



## Package Dimension



Recommended Solder Pad



Recommended soldering pad design

Note:  
Tolerance unless mentioned is  $\pm 0.2\text{mm}$ ; Unit = mm

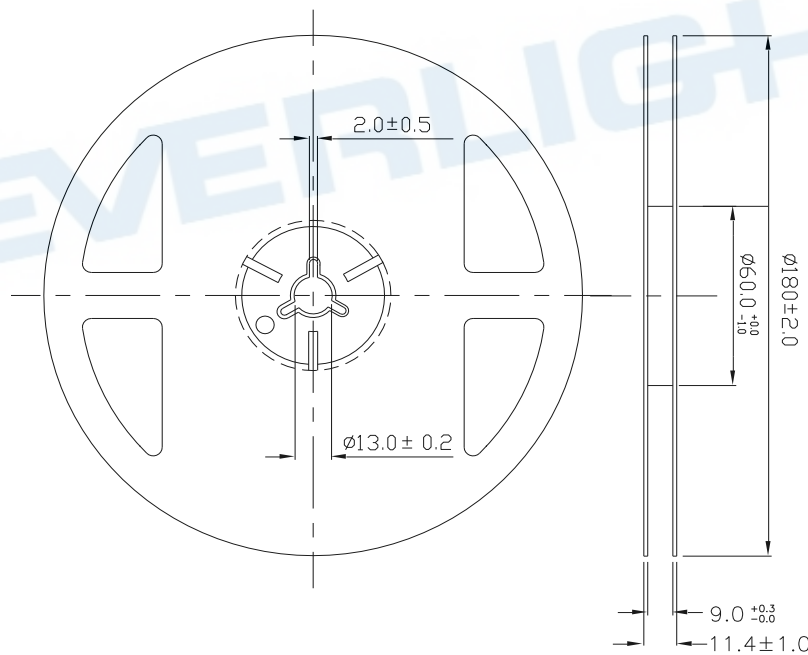
## Moisture Resistant Packing Materials

### Label Explanation



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

### Reel Dimensions

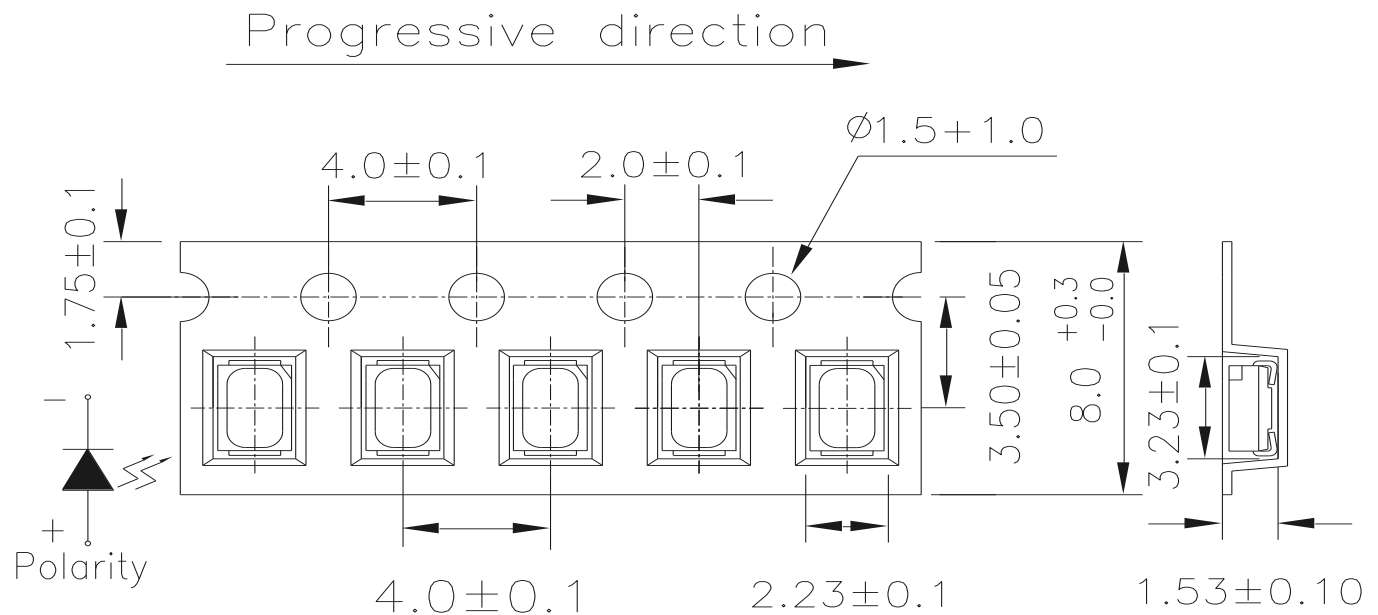


#### Note:

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

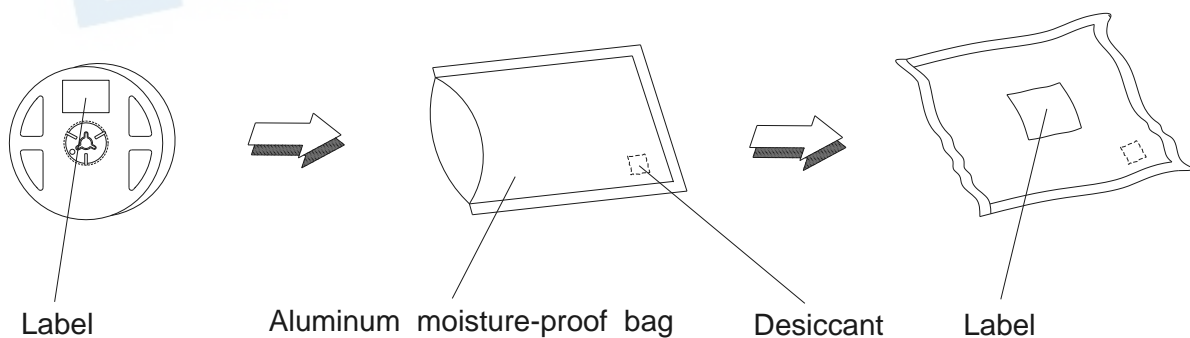


Carrier Tape Dimensions: Loaded Quantity 250/500/1000/2000 pcs Per Reel



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

### Moisture Resistant Packing Process



## Reliability Test Items and Conditions

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp. : 260°C/10sec.	6 Min.	22 PCS.	0/1
2	Thermal Shock	H : +100°C 15min ┆ 10 sec L : -10°C 15min	300 Cycles	22 PCS.	0/1
3	Temperature Cycle	H : +100°C 15min ┆ 5 min L : -40°C 15min	300 Cycles	22 PCS.	0/1
4	High Temperature/Humidity	Ta=85°C,85%RH	1000 Hrs.	22 PCS.	0/1
5	High Temperature Storage	Temp=100°C	1000 Hrs.	22 PCS.	0/1
6	Low Temperature Storage	Ta=-40°C	1000 Hrs.	22 PCS.	0/1
7	DC Operating Life	IF = 20 mA / 25°C	1000 Hrs.	22 PCS.	0/1

EVERLIGHT

## 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.

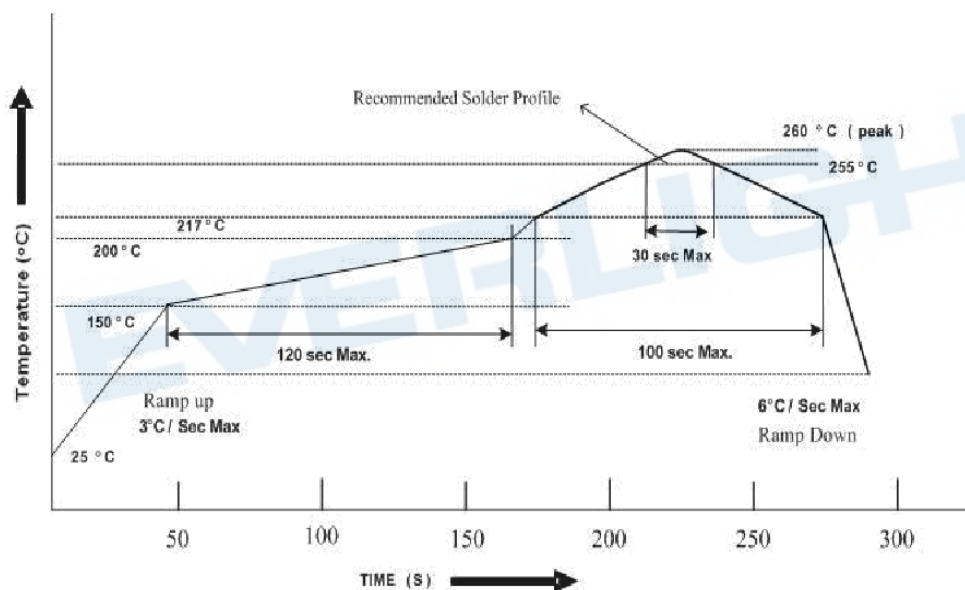
2.3 After opening the package: The LED's floor life is 168 Hrs under 30°C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

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.

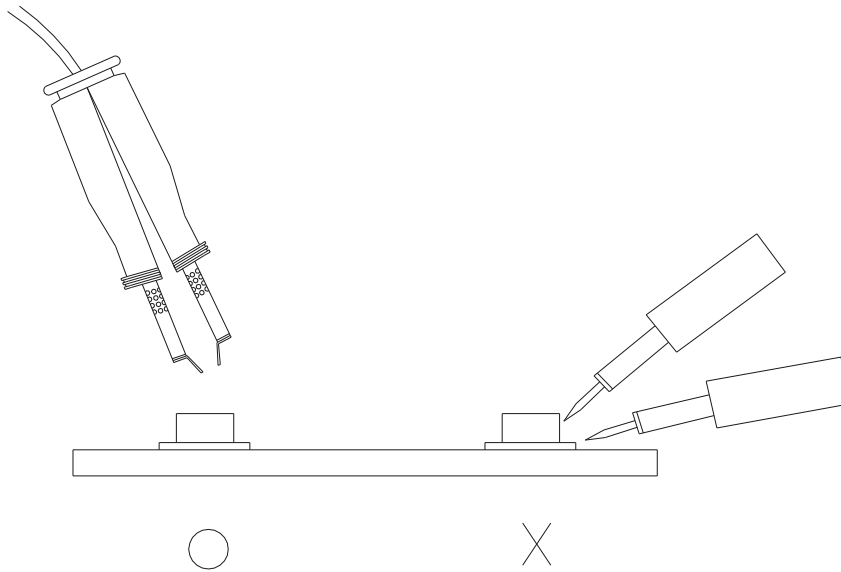
3.4 After soldering, do not warp the circuit board.

### 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.



## 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.
5. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without obtaining EVERLIGHT's prior consent.
6. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized Everlight sales agent for special application request.