

# SEACOMP

## PRODUCT CHANGE NOTIFICATION (PCN)

<b>PCN NUMBER</b> PCN19001	<b>DATE</b> April 16, 2019
<b>CUSTOMER(S)</b> ALL CUSTOMERS	
<b>PROJECT(S) AFFECTED</b> Displaytech standard items: 64128K/KX-RGB series; 64128L/LX-RGB series; 64128M/MX-RGB series	
<b>EFFECTIVE DATE / OTHER REFERENCE</b> • March 1, 2019	

### DESCRIPTION OF CHANGE(S)

#### REASON FOR THE CHANGE(S)

In the spirit of continuous improvement, Displaytech has implemented material upgrades and minor production process updates for our standard lineup of monochrome graphic COG modules.

In order to improve the backlight performance, both brightness and color, the backlight LED was changed.

Please note all products will continue to meet Displaytech performance and quality standards.

#### BEFORE CHANGE(S)

- Original LED used in the backlight:
  - 64128K/M RGB backlight is with LED P/N 19-237/R6GHBHC-M01/2T
  - 64128L RGB backlight is with LED P/N 19-237/R6GHBHC-M07/2T

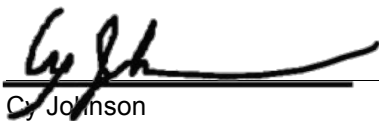
#### AFTER CHANGE(S)

- New LED used in the backlight, P/N S1615RGB-018

Thank you for your continued interest in SEACOMP products and services. For additional assistance or questions, please contact SEACOMP Customer Service at [sales@seacomp.com](mailto:sales@seacomp.com) or the sales contact you are working with.

Sincerely,

For and on behalf of SEACOMP



C. Johnson

Director of Engineering

#### Attachments:

- Spec for New RGB backlight LED P/N S1615RGB-018
- Spec for Original RGB backlight LED P/N 19-237/R6GHBHC-M01/2T for the 64128K/M
- Spec for Original RGB backlight LED P/N 19-237/R6GHBHC-M07/2T for the 64128L



MANUFACTURING



POWER & BATTERY



苏州佑桦光电科技有限公司  
SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.

**规 格 书**  
**SPECIFICATION FOR APPROVAL**

客户名称	_____	版本号	_____
CUSTOMER:	_____	REV:	_____ <b>A1</b> _____
客户料号	_____	日期	_____
CUSTOMER S PART NO:	_____	DATE:	_____ <b>2018.9.21</b> _____
品名	<b>S1615RGB-018</b>	总页数	_____
DESCRIPTION:	_____	NO.OF PAGE:	_____ <b>9</b> _____

承认盖章后请寄回承认书一份  
Please return to us one copy of "SPECIFICATION FOR APPROVAL"  
With your approved signatures

(全部承认) FULLY APPROVED	(部分承认) PARTILLY APPROVED	(修订承认) REVISE APPROVED
确认	审核	制作
钱俊	雷潘	黄珂珂

苏州地址: 苏州新区塔园路 369 号 26#  
惠州地址: 惠州市江北盛丰商务大厦 A906  
TEL: 86-0752-2843798    FAX: 86-0752-2843799  
Email: sales2.hz@yohua.com.cn  
网址: <http://www.yohua.com.tw>

# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



### S1615RGB-018 1.6\*1.5\*0.6

#### Absolute Maximum Ratings at TA=25°C

**Features**

- .Small size(1.6\*1.5\*0.6mm)
- .Industry Standard Footprint
- .Compatible in 8mm tape on 178mm Diameter Rells
- .Low Profile
- .Several Colors Available

REVERSE VOLTAGE (<100
D.C.FORWARD CURRENT.....
PULSE CURRENT (1/10 DUTY CYCLE,0.1 ms PULSE WIDTH). 125 mA
OPERATING TEMPERATURE RANGE.....-40°C TO +80°C
STORAGE TEMPERATURE RANGE.....-40°C TO +85°C
LEAD SOLDERING TEMP. (1.6mm FROM BODY).... 260 FOR 4 SEC

### PRELIMINARY

**Precautions:**

These products are sensitive to static electricity; high standard of care must be fully taken when handling them. Particularly if an over-voltage that exceeds the Absolute maximum Rating of these products were applied, the overflow energy will cause damage to and possibly result in destruction of these products. Buyer shall take absolute secure countermeasures against static electricity and surge when handling these products.

#### Electrical/Optical Characteristics at TA=25 °C

PART NUMBER	LED CHIP		WAVELENGTH Hue @20mA (nm)		FORWARD VOLTAGE @20mA(V)		Reverse Current	LUMINOUS INTENSITY @20mA(mcd)	
	MATERIAL	EMITTING COLOR	MIN.	MAX.	MIN.	MAX.	IR (VR=5V)	MIN.	MAX.
S1615RGB-018	AlGaInP	RED	620	630	1.8	2.4	10uA	100	250
	InGaN	GREEN	520	530	2.8	3.7	10uA	320	800
	InGaN	BLUE	465	475	2.8	3.7	10uA	100	250

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## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



### Electrical And Optical Characteristics Curve-RED

Relative Spectrum Emission  $I_{rel} = f(\lambda)$ ,  $T_A = 25^\circ\text{C}$ ,  $I_F = 20\text{ mA}$   
 $V(\lambda)$  = Standard eye response curve

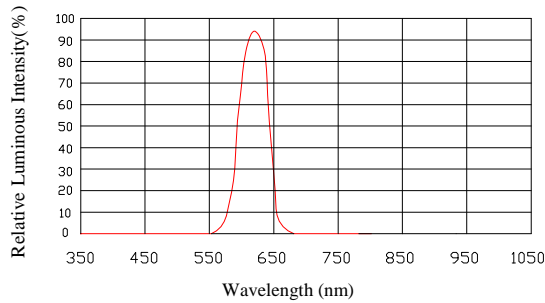


FIG.1 RELATIVE LUMINOUS INTENSITY

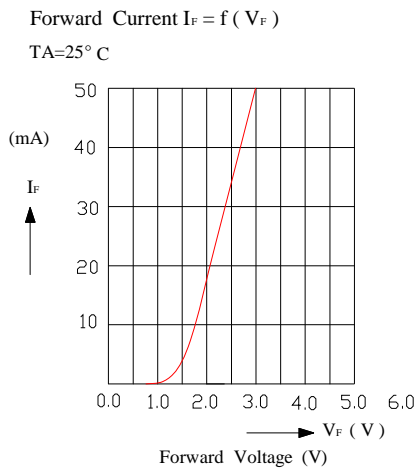


FIG.2 FORWARD CURRENT VS. FORWARD VOLTAGE

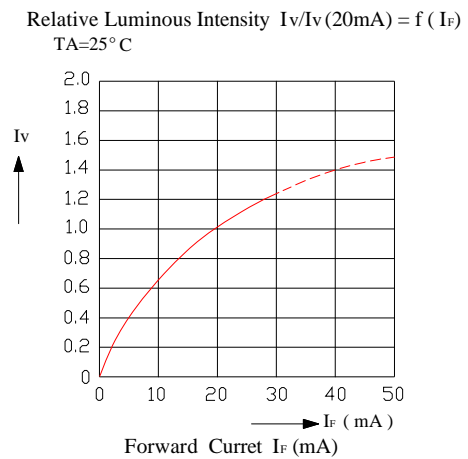
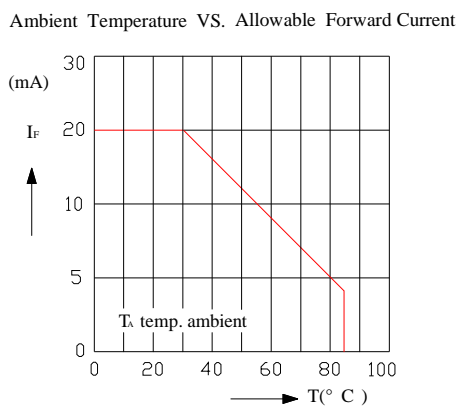


FIG.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT



Ambient Temperature  $T_A$  ( $^\circ\text{C}$ )  
 FIG.4 FORWARD CURRENT VS. AMBIENT TEMPERATURE

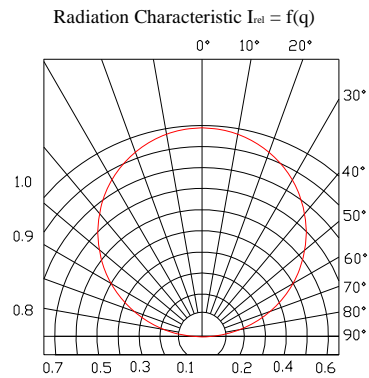


FIG.5 RADIATION DIAGRAM

# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



### Electrical And Optical Characteristics Curve-GREEN

Relative Spectrum Emission  $I_{rel} = f(\lambda)$ ,  $T_A = 25^\circ\text{C}$ ,  $I_F = 20\text{ mA}$   
 $V(\lambda)$  = Standard eye response curve

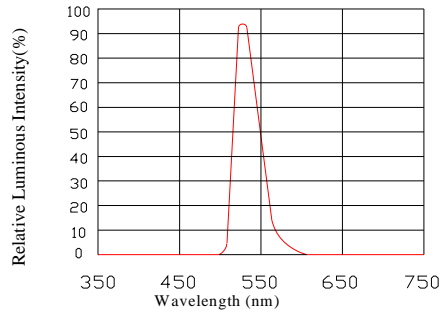


FIG.1 RELATIVE LUMINOUS INTENSITY

Forward Current  $I_F = f(V_F)$   
 $T_A = 25^\circ\text{C}$

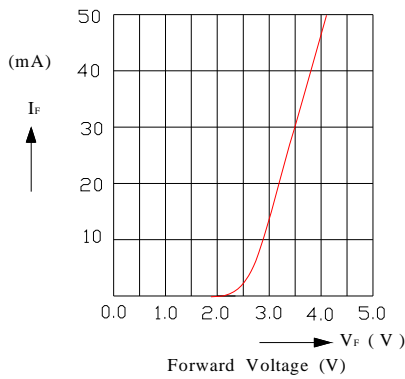


FIG.2 FORWARD CURRENT VS. FORWARD VOLTAGE

Relative Luminous Intensity  $I_v/I_v(20\text{mA}) = f(I_F)$   
 $T_A = 25^\circ\text{C}$

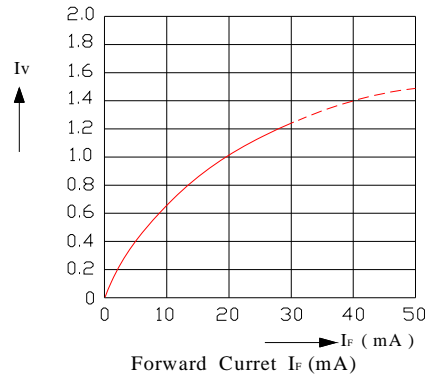
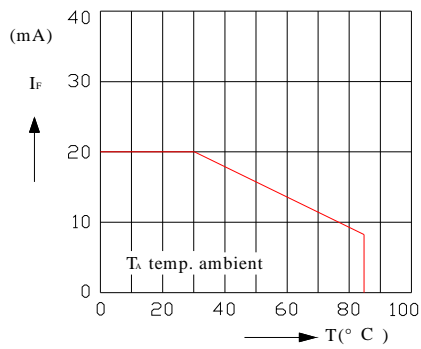


FIG.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

Ambient Temperature VS. Allowable Forward Current



Ambient Temperature  $T_A$  (°C)  
 FIG.4 FORWARD CURRENT VS. AMBIENT TEMPERATURE

Radiation Characteristic  $I_{rel} = f(\theta)$

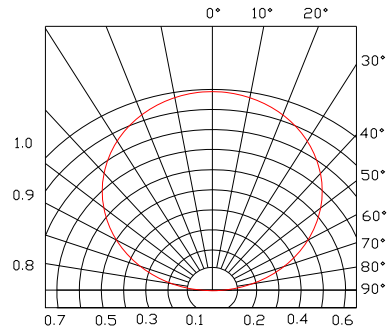


FIG.5 RADIATION DIAGRAM

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## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



### Electrical And Optical Characteristics Curve-BLUE

Relative Spectrum Emission  $I_{rel} = f(\lambda)$ ,  $T_A = 25^\circ\text{C}$ ,  $I_F = 20\text{ mA}$   
 $V(\lambda)$  = Standard eye response curve

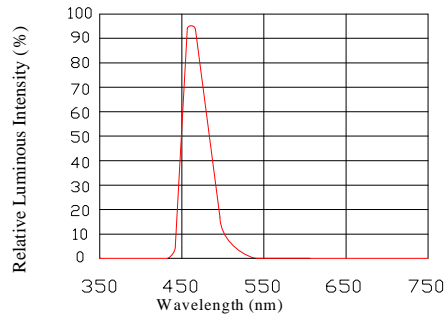


FIG.1 RELATIVE LUMINOUS INTENSITY

Forward Current  $I_F = f(V_F)$

$T_A = 25^\circ\text{C}$

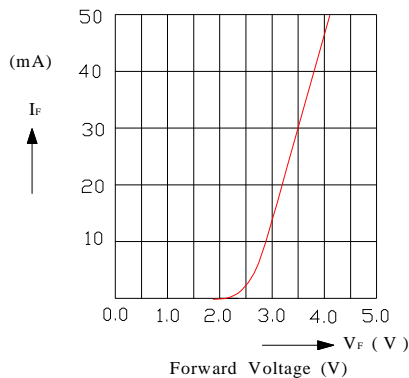


FIG.2 FORWARD CURRENT VS. FORWARD VOLTAGE

Relative Luminous Intensity  $I_v/I_v(20\text{mA}) = f(I_F)$

$T_A = 25^\circ\text{C}$

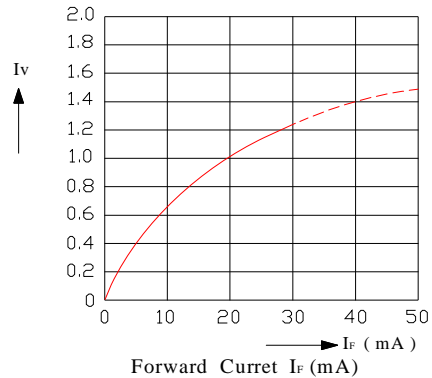
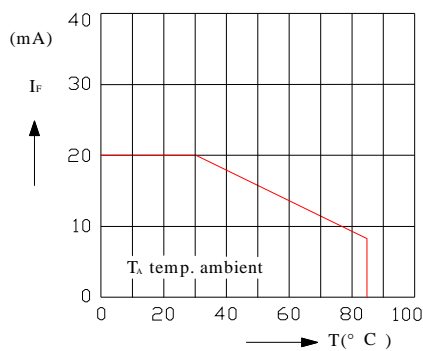


FIG.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

Ambient Temperature VS. Allowable Forward Current



Ambient Temperature  $T_A$  ( $^\circ\text{C}$ )  
 FIG.4 FORWARD CURRENT VS. AMBIENT TEMPERATURE

Radiation Characteristic  $I_{rel} = f(\theta)$

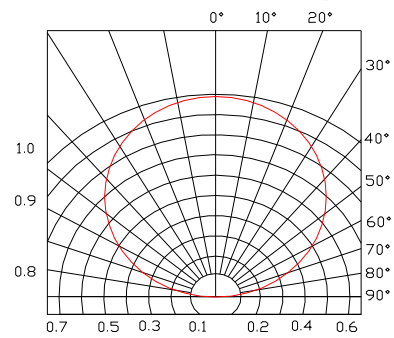



FIG.5 RADIATION DIAGRAM

# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.

 YOHUA	<h3>RELIABILITY</h3> <h3>信赖性测试</h3>			
<b>TEST ITEMS AND RESULTS</b>				
Test Item		Test Conditions	Note	Number of Damaged
Solderability (Reflow Soldering)	JEITA ED-4701 300-301	Tald=260±5℃ 3sec	1 time over 95%	0/22
Thermal Shock	MIL-STD 202-107D MIL-STD 705-1051 MIL-STD 808-1011	0℃ - 100℃ 15sec. 15sec	100cycles	0/22
Temperature Cycle	JEITA ED-4701 100-105	-40℃ - 25℃ - 100℃ - 25℃ 30min. 5min. 30min. 5min	100 cycles	0/22
Moisture Resistance Cyclic	JEITA ED-4701 200-203	25℃ - 65℃- -10℃ 90%RH 24hrs/1cycle	10 cycles	0/22
Temperature Humidity Storage	MIL-STD202-103B JIS-C-7021 B-11	Ta=60℃ RH=90%	1000hrs	0/22
Low Temperature Storage	JIS-C-7021 B-12	Ta=-30℃	1000hrs	0/22
Steady State Operating Life of High Humidity Heat	MIL-STD202-103B JIS-C-7021 B-11	85℃, RH=85%, If=20mA	1000hrs	0/22

### JUDGMENT CRITERIA OF FAILURE FOR THE RELIABILITY

Measuring items	Symbol	Measuring conditions	Judgement criteria for failure
Forward voltage	VF (V)	IF=20mA	Over U*1.2
Reverse current	IR (uA)	VR=5V	Over U*2
Luminous intensity	IV (mcd)	IF=20mA	Below S*0.5

Note: 1. U means the upper limit of specified characteristics. S means initial value.  
 2. Measurement shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

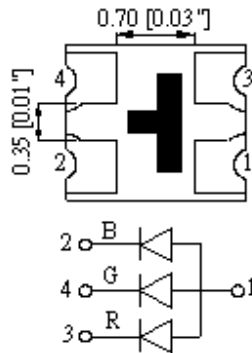
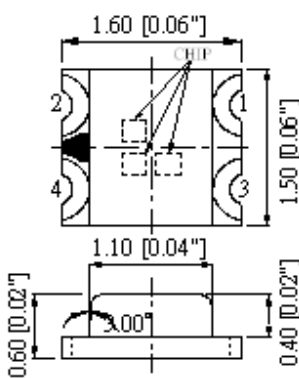
# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.

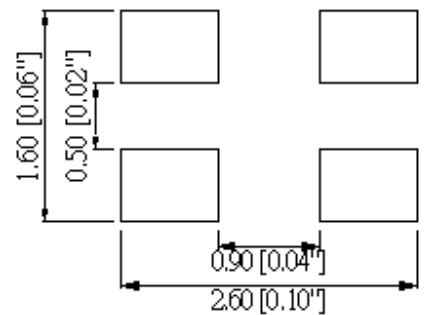


**S1615RGB-018    1.6\*1.5\*0.6**

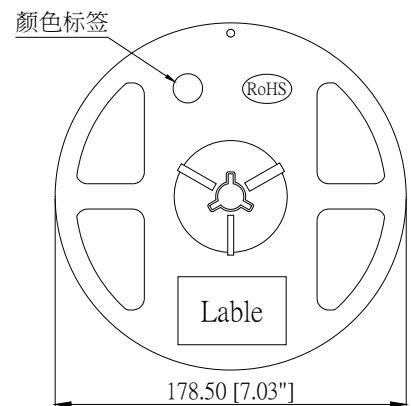
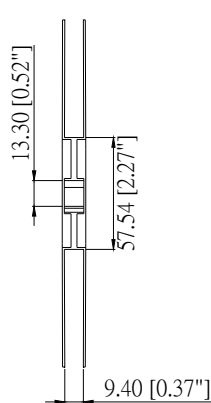
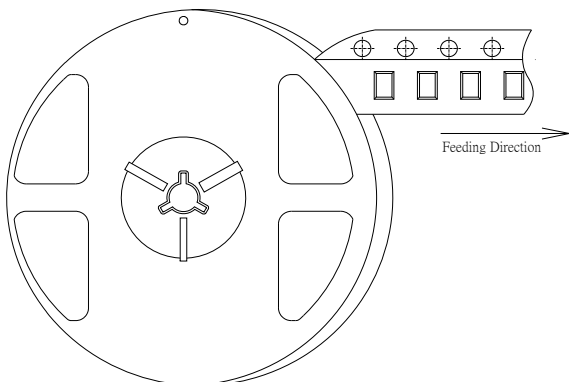
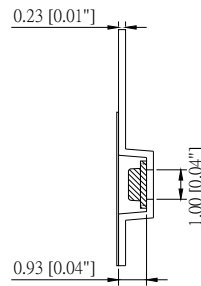
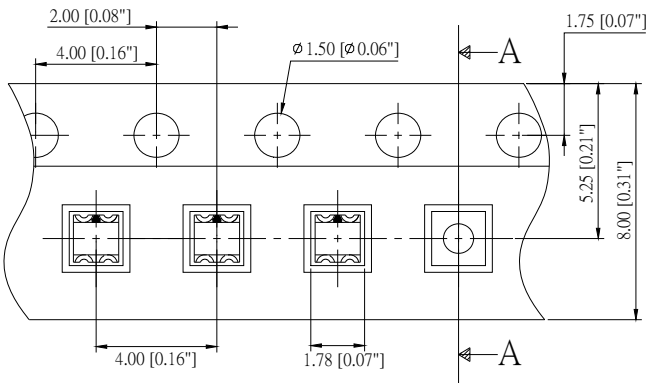
**Dimensions. (unit : mm)**



**Recommend Pad Layout**



**Carrier Tape Dimensions: Loaded quantity 4000PCS per reel.**





# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



### LED

#### 无铅锡过炉制程参考

#### Application(Soldering)

Manual soldering (We do not recommend this method strongly.)

Soldering tin material: tin 6/4 alloy or contained Ag.

To prevent cracking, please bake before manual soldering.

keep the temperature on the edge of iron at 300 °C Max. (25W)and apply for 3 seconds.If the temperature become higher,apply in a shorter time (1sec)

In manual soldering, take care not to damage the package especially terminal or resin.

(Do not give stress to the product when soldering.)

Do not use again it you remove the soldered product.

It is recommended using an iron with a temperature control.

#### Reflow Soldering

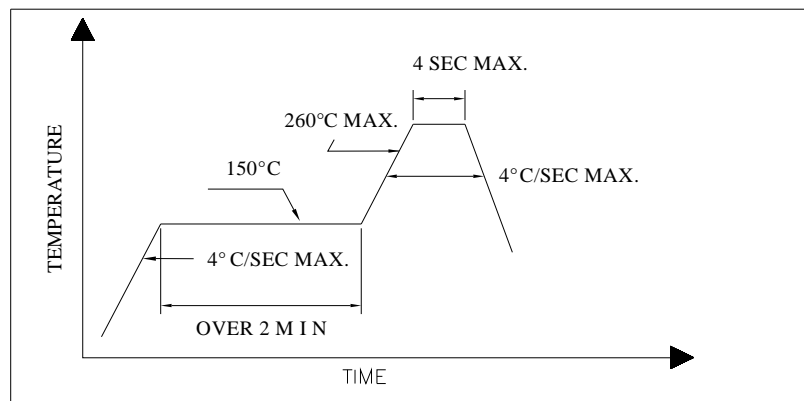
Recommend tin glue specifications:

Melting temperature:150-260°C

Contains:Sn 96.5% , Ag 3.0% ,Gu0.5 % JIS Z 3282TEST

Never take next process until the component is cooled down to room temperature after reflow.

The recommended reflow soldering profile (measuring on the surface of the LED resin) is following:



#### Cleaning

The conditions of cleaning after soldering:

An alcohol-based solvent such as Isopropyl Alcohol(IPA) is recommended.

Temperature Time:<50°C\*30sec, or <30°C\*3min

Ultra sonic cleaning:<15W/bath; Bath volume:1liter max.

Curing:100 max, <3min

#### Cautions of Pick and Place

It should be avoided to load stress on the resin during high temperature.

Avoid rubbing or scraping the resin by any object.

Electric-static may cause damage to the component. Please confirm that the equipment is grounding well. Using an ionzer fan is recommended.

#### Cautions of Design and Applications

It should be done to connect with a current-limiting serial resistor.Avoid to drive reverse voltage over the specifications on LEDwhen ON/OFF.

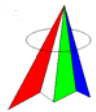
Any application should refer to the specifications of absolute maximum ratings.

The dimensions of the recommended soldering pattern may mot meet every user. Please confirm and study first before designing the soldering pattern in order to obtain the best performance of soldering.

Do not contact with any component on the assembly board.

# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



YOHUA

### Warning

#### 1. Storage

After open the package, the SMD LED should be kept at 28 ° C, 60%RH or less.  
The SMD LED should be soldered with in 24hours after opening the package.  
Heat generation must be taken into design consideration when using the SMD LED.

#### 2. Cleaning

Use IPA as a solvent for cleaning the SMD LED. The other solvent may dissolve the SMD LED package and the epoxy, ultrasonic cleaning should not be done.

#### 3. Static Electricity:

These products are so sensitive to static electricity charge so all equipment and machinery must be properly grounded and it is recommended to use a wristband or anti-electrostatic glove when handing the SMD LED.

Particularly if any over-current and over-voltage which exceed the Absolute Maximum Ratings of LED applied, the more energy may cause damage or possibly result in electrical destruction of the Products.

A protection design should be installed in the LED driving circuit, which does not exceed the max. rating for surge current during on/off switching.

A tip if soldering iron is requested to be grounded. An ionizer should be installed when risk of static generation is high.

If the contermesures mentioned above are implemented, LED can work well.

Users are required to check those countermeasures when problems occur by static electricity charge

#### 4. else

Damaged SMD LED will show unusual characteristics such as leak current remarkably low current.

Increase, turn-on voltage becomes lower and the SMD LED get unlight at low current .

In automatic mounting of the SMD LEDs on printed circuit boards, any bending and pulling forces or shock against the SMD LEDs shall be kept min.

to prevent them from expanding or electrical failures and mechanical damages of the devices.

#### Illustration&Application

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

The products described in this brochure are intended only for standard

applictions or general electronic equipment such as :

1. Telecommunication: indicator and backlight in telephone and fax.
2. Automotive: backlight in dashboard and switch.
3. LCD: Flat backlight for LCD, switch and symbol.

# 苏州佑桦光电科技有限公司

## SUZHOU YOHUA OPTO-ELECTRONICS TECHNOLOGY LTD.



### Yo Hua Corporation.

#### SURFACE MOUNT CHIP LED SPECIFICATION

**Notes for designing:**

Care must be taken to provide the current limiting resistor in the circuit so as to drive the Yo Hua LEDs within the rated figures. Also, caution should be taken not to overload Yo Hua LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the Yo Hua LEDs.

**Storage:**

In order to avoid the absorption of moisture, it is recommended to solder Yo Hua LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

(1) Temperature: 5°C -30°C (41° F ) Humidity: RH 60% Max.

(2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:

- a. Completed within 24hours.
- b. Stored at less than 30% RH.

(3) Devices require baking before mounting, if:

(2) a or (2)b is not met.

(4) If baking is required, devices must be baked under below conditions:

48 hours at 70°C ± 3°C .

**Package and Label of Products:**

(1) Package: Products are packed in one bag of 4000pcs (one taping reel) and a label is attached on each bag.

(2) Label:

**SUZHOU YOHUA**

**OPTP-ELECTRONICS TECHNOLOGY LTD**

**Product No: S1615RGB-018**

**Quantity :X PCS**

**WLD :XXXX- nm;**

**VF(V) :XX- V**

**IV(mcd) :XX- mcd**

- ← **YO HUA LOGO**
- ← **Part No**
- ← **Quantity**
- ← **CIE**
- ← **VF**
- ← **IV**



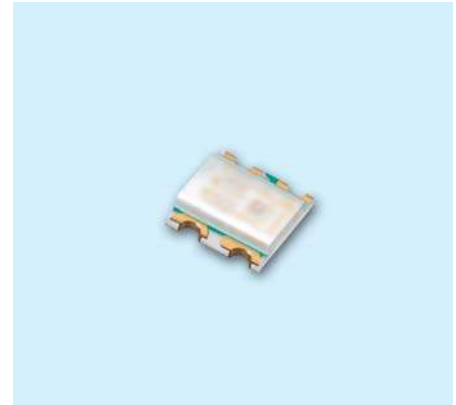
# Technical Data Sheet

## 0.35mm Height Chip LED with Full Color

### 19-237/R6GHBHC-M01/2T

#### 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.
- Pb-free.
- The product itself will remain within RoHS compliant version.



#### Descriptions

- The 19-237 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.

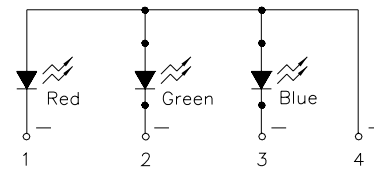
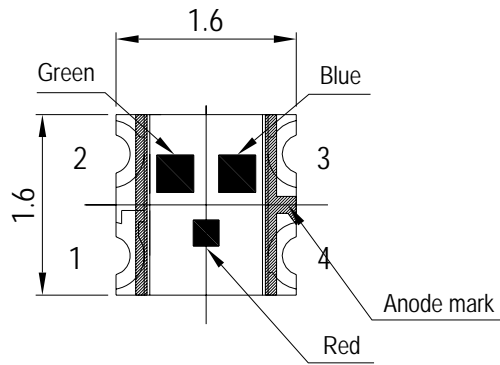
#### Applications

- Backlighting in dashboard and switch.
- Telecommunication: indicator and backlighting in telephone and fax.
- Flat backlight for LCD, switch and symbol.
- General use.

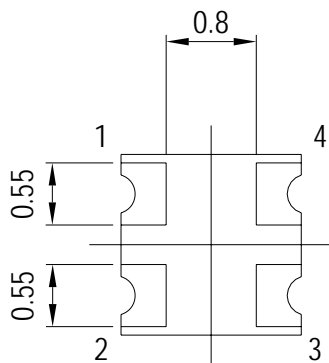
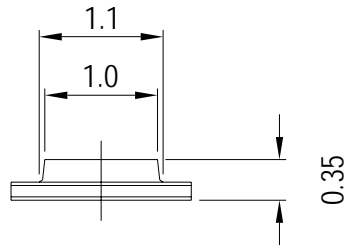
#### Device Selection Guide

Chip			Resin Color
Type	Material	Emitted Color	
R6	AlGaInP	Brilliant Red	Water Clear
GH	InGaN	Brilliant Green	
BH	InGaN	Blue	

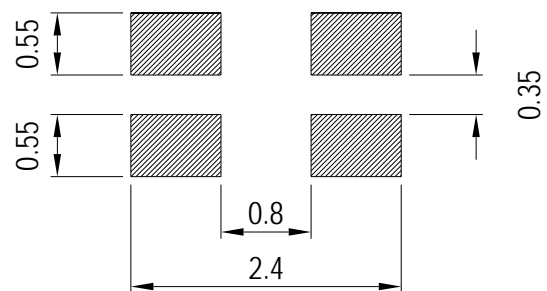
**Package Outline Dimensions**



Polarity



For reflow soldering (propose)



**Note:** The tolerances unless mentioned is  $\pm 0.1$ mm, Unit = mm

**Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Rating	Unit
Reverse Voltage	V <sub>R</sub>	5	V
Forward Current	I <sub>F</sub>	R6:25 GH:25 BH:25	mA
Peak Forward Current (Duty 1/10 @1KHz)	I <sub>FP</sub>	R6:60 GH:100 BH:100	mA
Power Dissipation	P <sub>d</sub>	R6:60 GH:95 BH:95	mW
Electrostatic Discharge(HBM)	ESD	R6:2000 GH:150 BH:150	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.	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
*Luminous Intensity	Iv	36	----	90	mcd	R6 : IF=4mA GH : IF=1.5mA BH : IF=2mA
Viewing Angle	2θ 1/2	-----	120	-----	deg	
Peak Wavelength	R6 λ p		632			
	GH	-----	518	-----	nm	
	BH		468			
Dominant Wavelength	R6 λ d		624			
	GH	-----	525	-----	nm	
	BH		470			
Spectrum Radiation Bandwidth	R6 Δ λ		20			
	GH	-----	35	-----	nm	
	BH		25			
Forward Voltage	R6 VF	1.6		2.0		
	GH	2.4	-----	2.9	V	
	BH	2.5		3.0		
Reverse Current	R6 IR			10		VR=5V
	GH	-----	-----	50	μ A	
	BH			50		

\*When three LED dies are operated simultaneously.

**Notes:**

**1.Tolerance of Luminous Intensity ±11%**

**2.Tolerance of Forward Voltage ±0.05V**

**Bin Range Of Luminous Intensity**

Bin	Min	Max	Unit	Condition
N2	36	45	mcd	R6 : I <sub>F</sub> =4mA GH : I <sub>F</sub> =1.5mA BH : I <sub>F</sub> =2mA
P1	45	57		
P2	57	72		
Q1	72	90		

\*When three LED dies are operated simultaneously.

**Notes:**

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



**Chromaticity Coordinates Specifications for Bin Grading**

Bin Code	CIE_x	CIE_y	Condition
180	0.257	0.220	R6 : IF=4mA GH : IF=1.5mA BH : IF=2mA
	0.257	0.245	
	0.282	0.255	
	0.282	0.230	
181	0.282	0.230	
	0.282	0.255	
	0.307	0.265	
	0.307	0.240	
182	0.307	0.240	
	0.307	0.265	
	0.332	0.275	
	0.332	0.250	
PW 01	0.257	0.245	
	0.257	0.270	
	0.282	0.280	
	0.282	0.255	
PW 02	0.282	0.255	
	0.282	0.280	
	0.307	0.290	
	0.307	0.265	
PW 03	0.307	0.265	
	0.307	0.290	
	0.332	0.300	
	0.332	0.275	
PW 04	0.332	0.275	
	0.332	0.300	
	0.357	0.310	
	0.357	0.285	

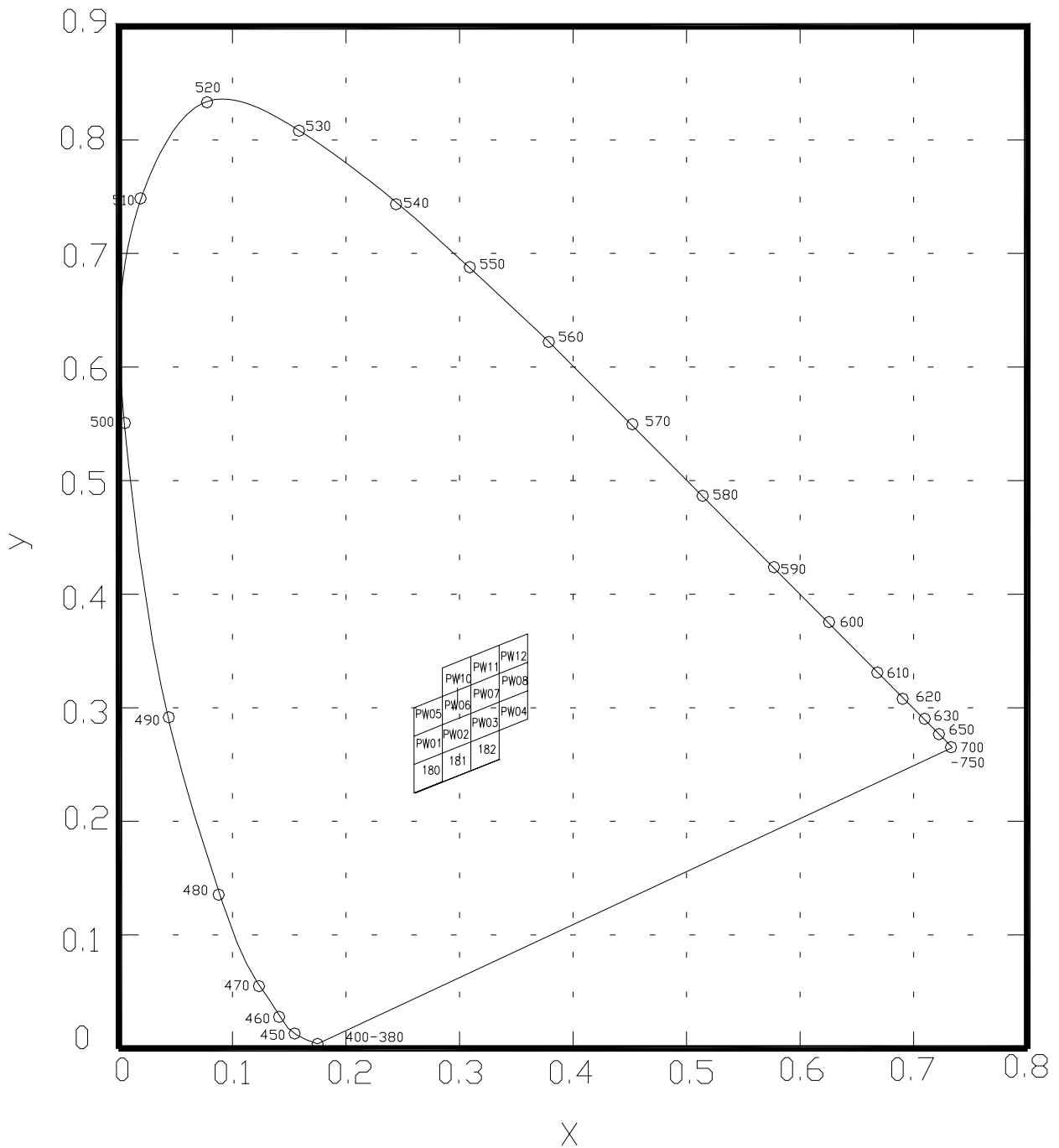
Bin Code	CIE_x	CIE_y	Condition
PW 05	0.257	0.270	R6 : I <sub>F</sub> =4mA GH : I <sub>F</sub> =1.5mA BH : I <sub>F</sub> =2mA
	0.257	0.295	
	0.282	0.305	
	0.282	0.280	
PW 06	0.282	0.280	
	0.282	0.305	
	0.307	0.315	
	0.307	0.290	
PW 07	0.307	0.290	
	0.307	0.315	
	0.332	0.325	
	0.332	0.300	
PW 08	0.332	0.300	
	0.332	0.325	
	0.357	0.335	
	0.357	0.310	
PW 10	0.282	0.305	
	0.282	0.330	
	0.307	0.340	
	0.307	0.315	
PW 11	0.307	0.315	
	0.307	0.340	
	0.332	0.350	
	0.332	0.325	
PW 12	0.332	0.325	
	0.332	0.350	
	0.357	0.360	
	0.357	0.335	

**\*When three LED dies are operated simultaneously.**

Notes:1.The C.I.E. 1931 chromaticity diagram ( Tolerance  $\pm 0.01$ ).

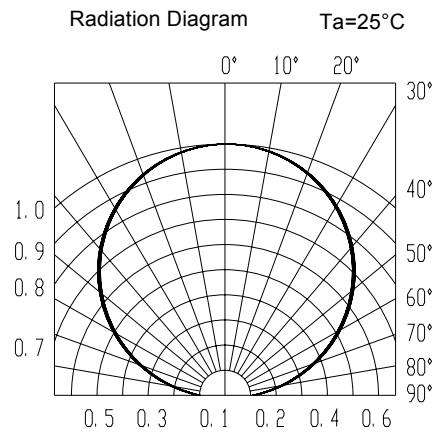
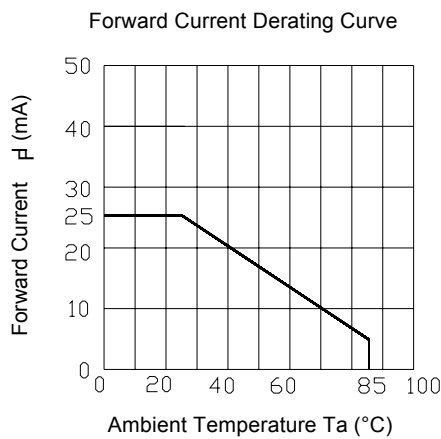
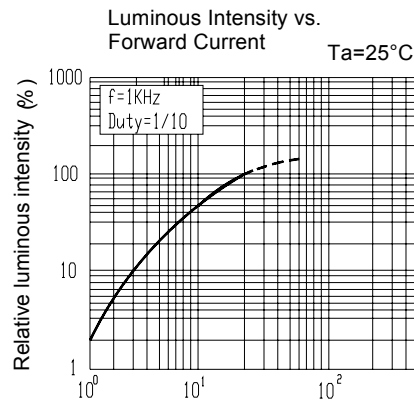
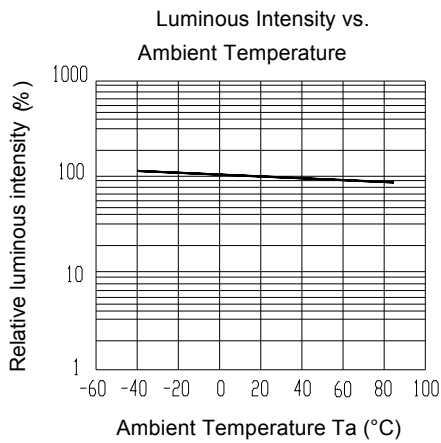
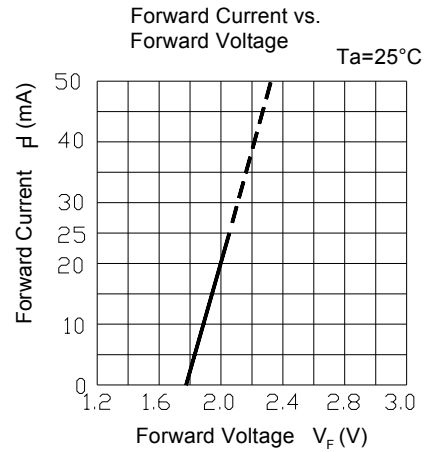
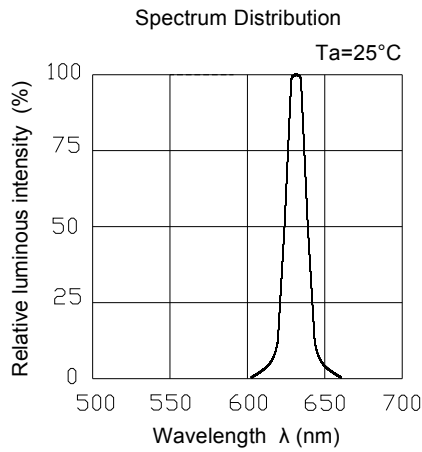
2.The products are sensitive to static electricity and care must be fully taken when handling products

### CIE Chromaticity Diagram



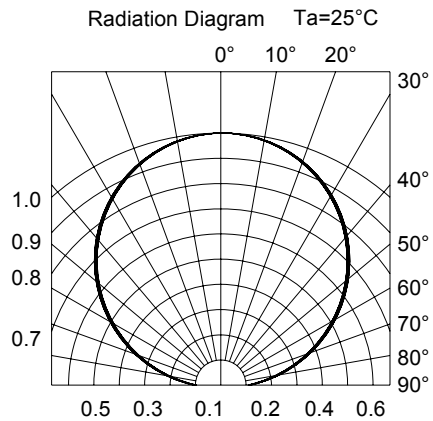
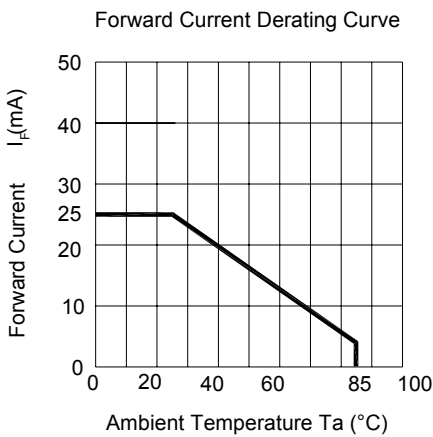
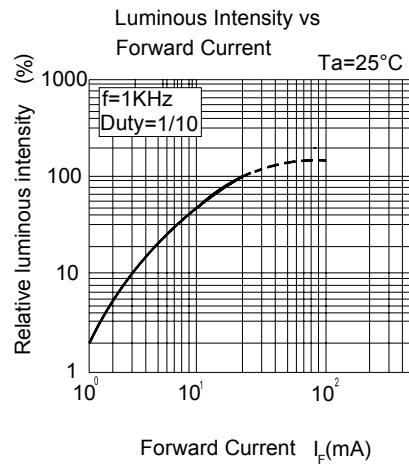
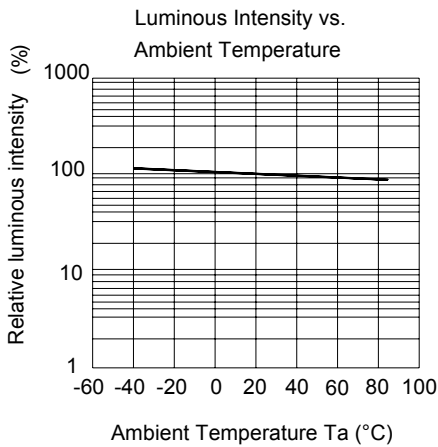
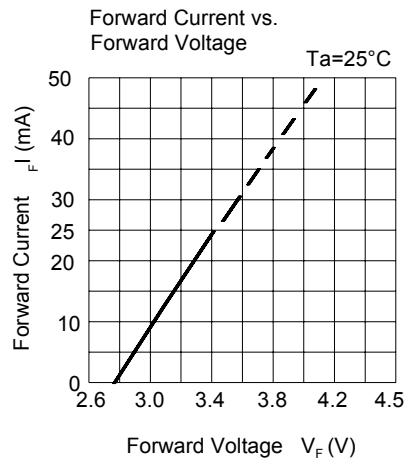
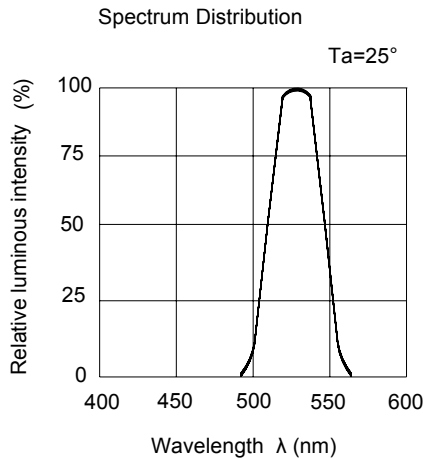
Typical Electro-Optical Characteristics Curves

R6



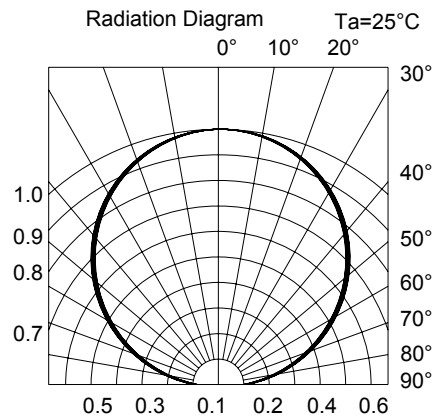
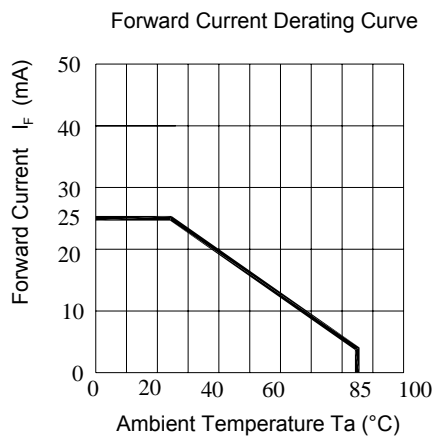
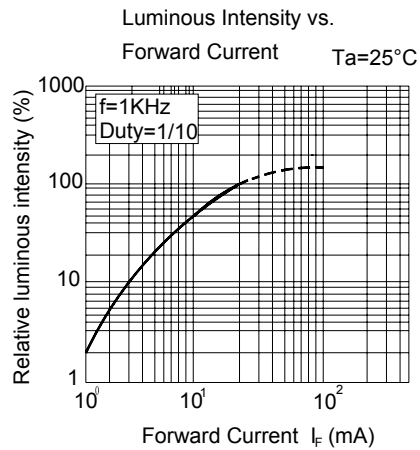
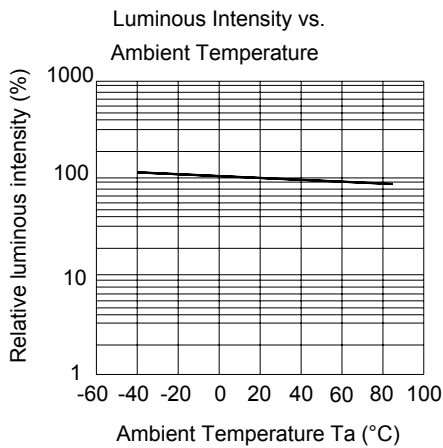
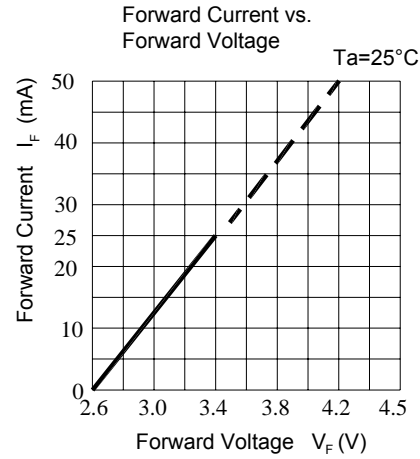
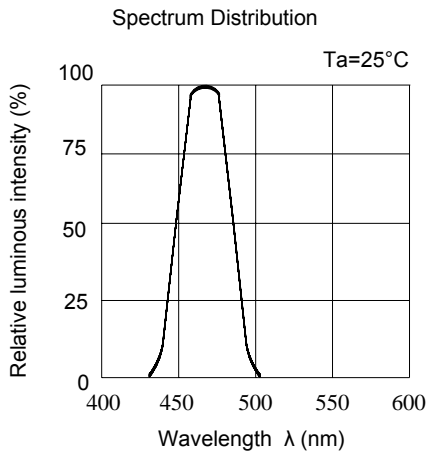
**Typical Electro-Optical Characteristics Curves**

**GH**



Typical Electro-Optical Characteristics Curves

BH

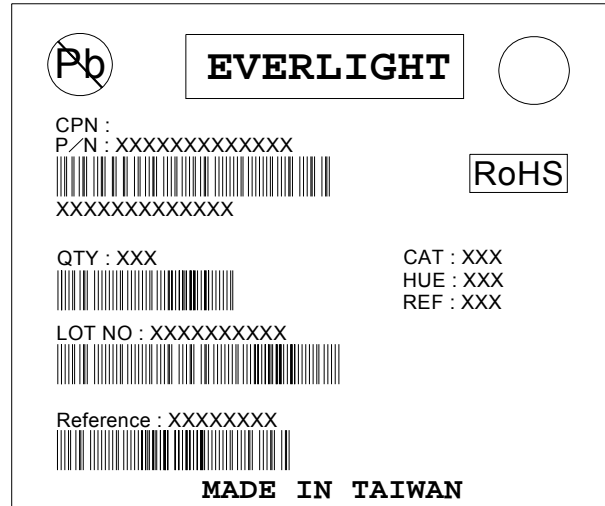


**Label Explanation**

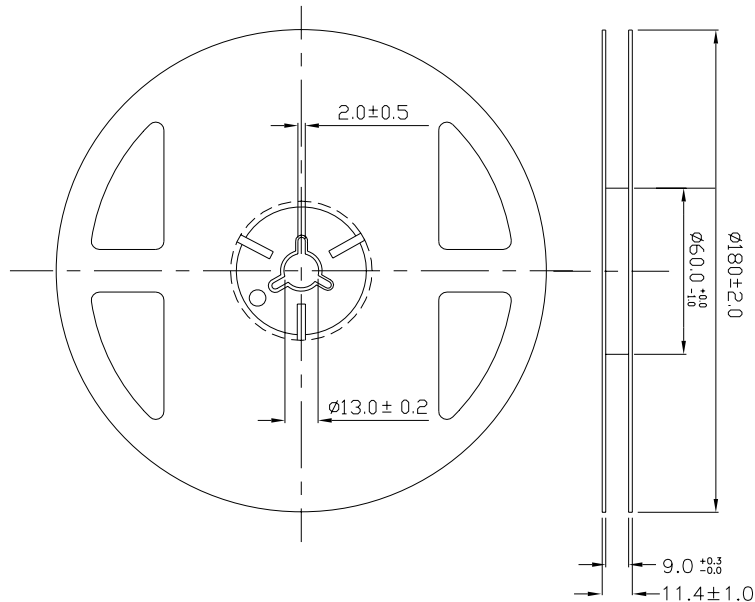
**CAT:** Luminous Intensity Rank

**HUE:** Dom. Wavelength Rank

**REF:** Forward Voltage Rank

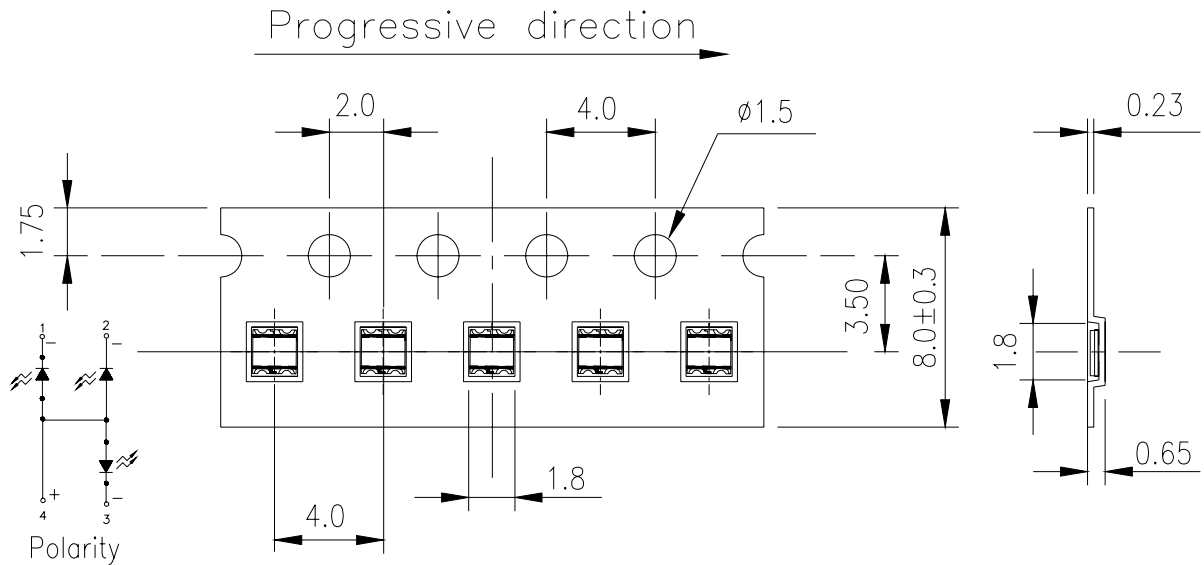


**Reel Dimensions**



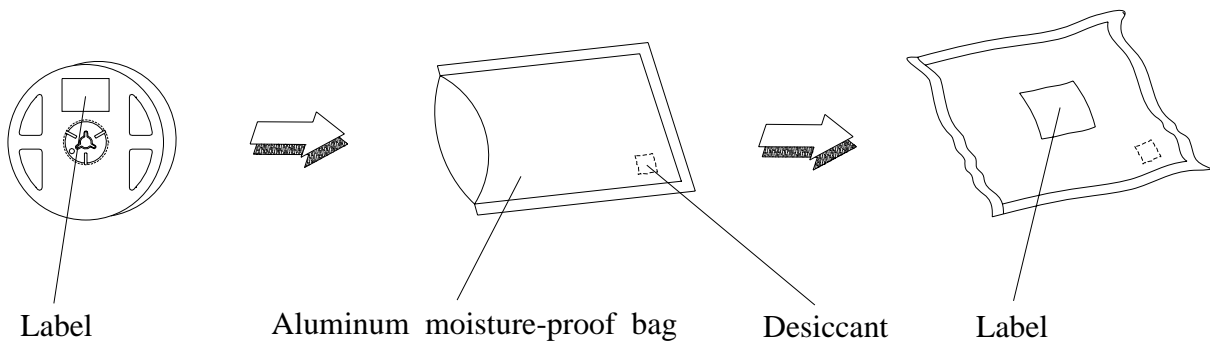
**Note:** The tolerances unless mentioned is  $\pm 0.1$ mm ,Unit = mm

**Carrier Tape Dimensions: Loaded quantity 2000 PCS per reel**



**Note:** The tolerances unless mentioned is  $\pm 0.1$ mm ,Unit = mm

**Moisture Resistant Packaging**





**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 ±5°C Min. 5sec.	6 Min.	22 PCS.	0/1
2	Temperature Cycle	H : +100°C 15min ∫ 5 min L : -40°C 15min	300 Cycles	22 PCS.	0/1
3	Thermal Shock	H : +100°C 5min ∫ 10 sec L : -10°C 5min	300 Cycles	22 PCS.	0/1
4	High Temperature Storage	Temp. : 100°C	1000 Hrs.	22 PCS.	0/1
5	Low Temperature Storage	Temp. : -40°C	1000 Hrs.	22 PCS.	0/1
6	DC Operating Life	IF = 20 mA	1000 Hrs.	22 PCS.	0/1
7	High Temperature / High Humidity	85°C / 85%RH	1000 Hrs.	22 PCS.	0/1

## 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 1 year under 30°C or less and 60% RH or less.

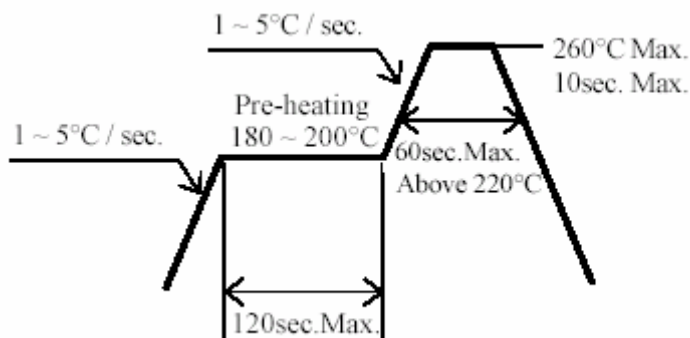
If unused LEDs remain, it should be stored in moisture proof packages.

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.

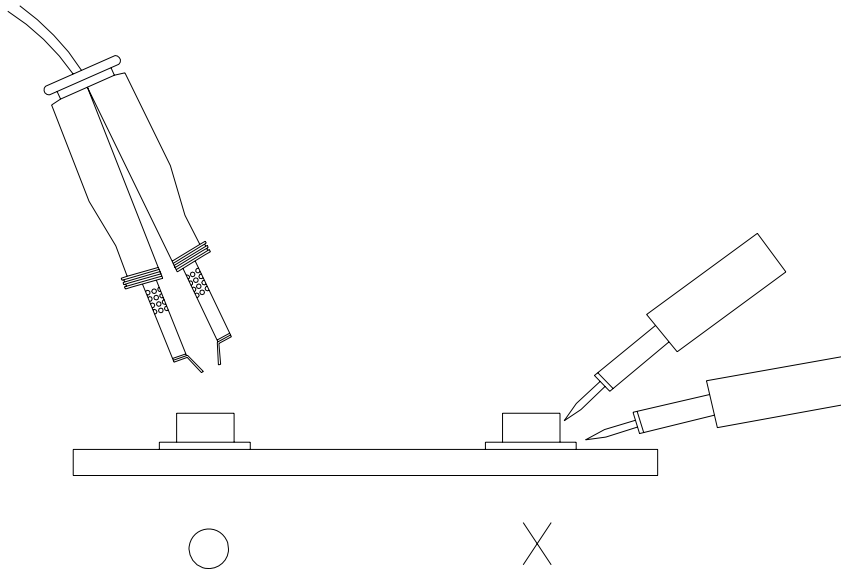
3.4 After soldering, do not warp the circuit board.

#### 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.

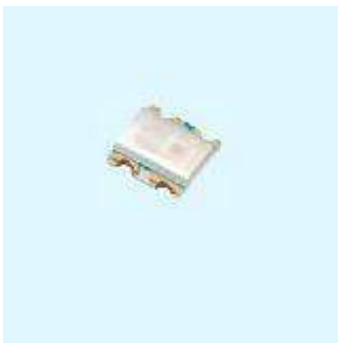


**EVERLIGHT ELECTRONICS CO., LTD.**  
Office: No 25, Lane 76, Sec 3, Chung Yang Rd,  
Tucheng, Taipei 236, Taiwan, R.O.C

Tel: 886-2-2267-2000, 2267-9936  
Fax: 886-2267-6244, 2267-6189, 2267-6306  
<http://www.everlight.com>

### SMD ■ B

### 19-237/R6GHBHC-M07/2T



#### Features

- Package in 8mm tape on 7" diameter reel.
- Compatible with automatic placement equipment.
- Compatible with infrared and vapor phase reflow solder process.
- Multi-color type.
- 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 19-237 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

- Backlighting in dashboard and switch.
- Telecommunication: indicator and backlighting in telephone and fax.
- Flat backlight for LCD, switch and symbol.
- General use.

## Device Selection Guide

Code	Chip Materials	Emitted Color	Resin Color
R6	AlGaInP	Brilliant Red	
GH	InGaN	Brilliant Green	Water Clear
BH	InGaN	Blue	

## Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Code	Rating	Unit
Reverse Voltage	$V_R$		5	V
Forward Current	$I_F$		25	mA
Peak Forward Current (Duty 1/10 @1KHz)	$I_{FP}$	R6	60	mA
		GH	100	
		BH	100	
Power Dissipation	$P_d$	R6	60	mW
		GH	95	
		BH	95	
Electrostatic Discharge(HBM)	ESD	R6	2000	V
		GH	150	
		BH	150	
Operating Temperature	$T_{opr}$		-40 ~ +85	°C
Storage Temperature	$T_{stg}$		-40 ~ +90	°C
Soldering Temperature	$T_{sol}$		Reflow Soldering : 260 °C for 10 sec. Hand Soldering : 350 °C for 3 sec.	

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

Parameter	Symbol	Code	Min.	Typ.	Max.	Unit	Condition
Luminous Intensity	$I_v$		180	-----	360	mcd	
Viewing Angle	$2\theta_{1/2}$		-----	120	-----	Deg	
Peak Wavelength	$\lambda_p$	R6	-----	632	-----	nm	
		GH	-----	518	-----		
		BH	-----	468	-----		
Dominant Wavelength	$\lambda_d$	R6	-----	624	-----	nm	R6 : IF=10.68mA GH : IF=7.37mA BH : IF=11.5mA
		GH	-----	525	-----		
		BH	-----	470	-----		
Spectrum Radiation Bandwidth	$\Delta\lambda$	R6	-----	20	-----	nm	
		GH	-----	35	-----		
		BH	-----	25	-----		
Forward Voltage	$V_F$	R6	1.8	-----	2.2	V	
		GH	2.65	-----	3.15		
		BH	2.75	-----	3.25		
Reverse Current	$I_R$	R6			10	$\mu A$	$V_R=5V$
		GH			50		
		BH	-----	-----	50		

Note:

1. Tolerance of Luminous Intensity:  $\pm 11\%$
2. Tolerance of Forward Voltage:  $\pm 0.1V$

### Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
S1	180	225	mcd	R6 : IF=10.68mA GH : IF=7.37mA BH : IF=11.5mA
S2	225	285		
T1	285	360		

### Bin Range Of Forward Voltage

Color	Bin Code	Min.	Max.	Unit	Condition
R	1	1.8	2.0	V	R6 : IF=10.68mA GH : IF=7.37mA BH : IF=11.5mA
	2	2.0	2.2		
G	1	2.65	2.9		
	2	2.9	3.15		
B	1	2.75	3.0		
	2	3.0	3.25		

Note:

1. Tolerance of Luminous Intensity:  $\pm 11\%$
2. Tolerance of Forward Voltage  $\pm 0.05V$

### Chromaticity Coordinates Specifications for Bin Grading

Bin Code	CIE_x	CIE_y	Condition
D1	0.197	0.140	
	0.197	0.165	
	0.222	0.175	
	0.222	0.150	
D2	0.222	0.150	
	0.222	0.175	
	0.247	0.185	
	0.247	0.160	
D3	0.247	0.160	
	0.247	0.185	
	0.272	0.195	
	0.272	0.170	
D5	0.197	0.165	
	0.197	0.190	R6 : IF=10.68mA
	0.222	0.200	GH : IF=7.37mA
	0.222	0.175	BH : IF=11.5mA
D6	0.222	0.175	
	0.222	0.200	
	0.247	0.210	
	0.247	0.185	
D7	0.247	0.185	
	0.247	0.210	
	0.272	0.220	
	0.272	0.195	
D8	0.272	0.195	
	0.272	0.220	
	0.297	0.230	
	0.297	0.205	



### Chromaticity Coordinates Specifications for Bin Grading

Bin Code	CIE_x	CIE_y	Condition
D9	0.197	0.190	
	0.197	0.215	
	0.222	0.225	
	0.222	0.200	
D10	0.222	0.200	
	0.222	0.225	
	0.247	0.235	
	0.247	0.210	
D11	0.247	0.210	
	0.247	0.235	
	0.272	0.245	
	0.272	0.220	
D12	0.272	0.220	
	0.272	0.245	R6 : IF=10.68mA
	0.297	0.255	GH : IF=7.37mA
	0.297	0.230	BH : IF=11.5mA
D14	0.222	0.225	
	0.222	0.250	
	0.247	0.260	
	0.247	0.235	
D15	0.247	0.235	
	0.247	0.260	
	0.272	0.270	
	0.272	0.245	
D16	0.272	0.245	
	0.272	0.270	
	0.297	0.280	
	0.297	0.255	

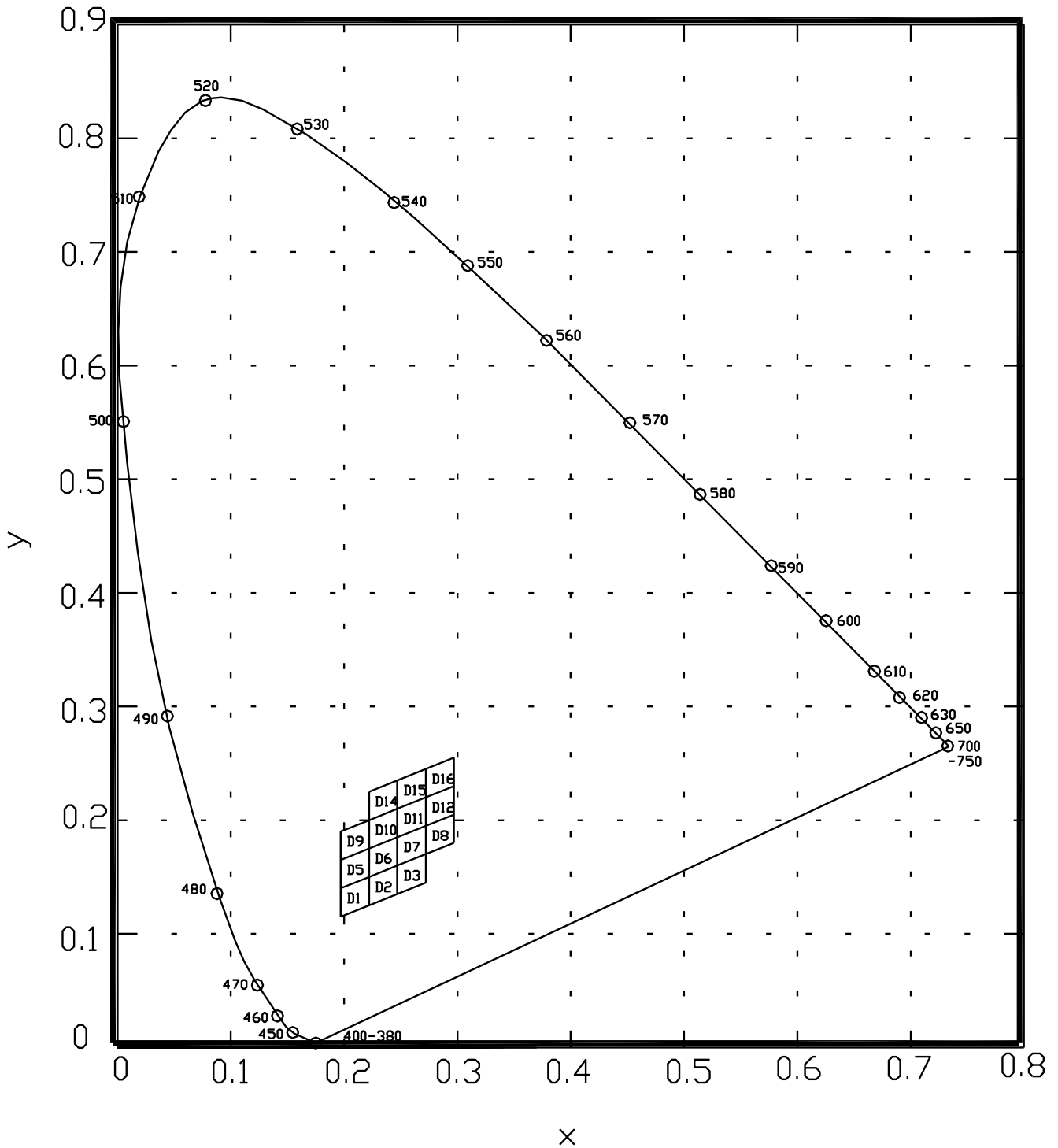
**\*When three LED dies are operated simultaneously.**

Notes:

1.The C.I.E. 1931 chromaticity diagram ( Tolerance  $\pm 0.01$  ).

2.The products are sensitive to static electricity and care must be fully taken when handling products.

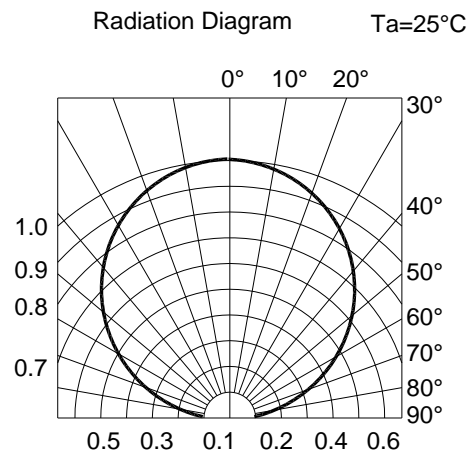
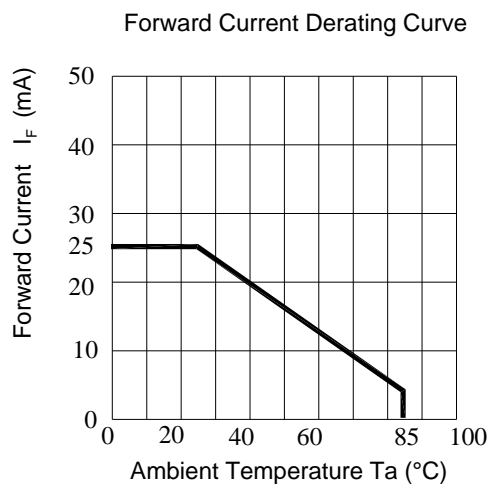
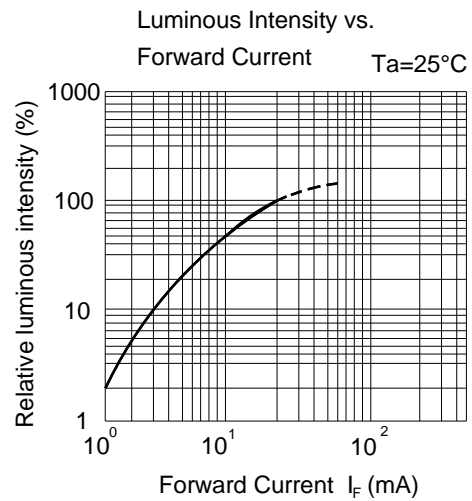
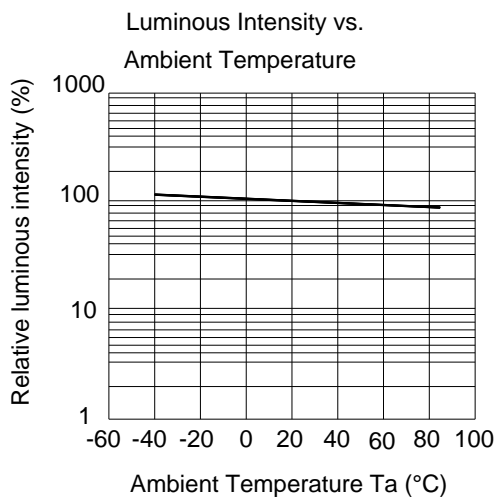
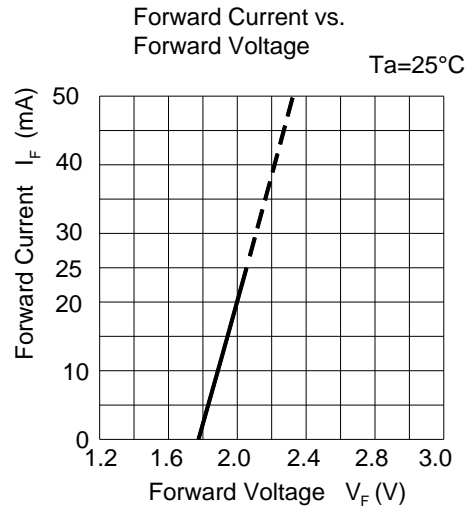
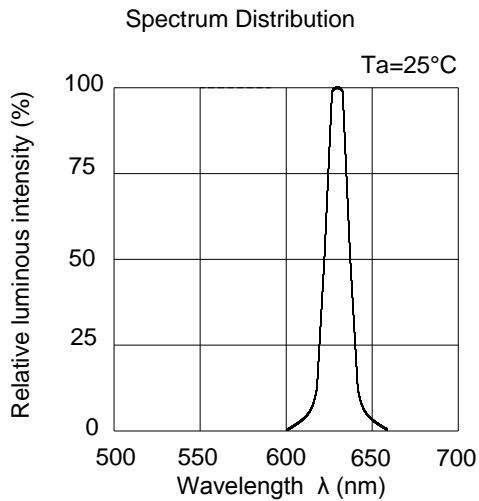
### CIE Chromaticity Diagram



- Notes:
1. The C.I.E. 1931 chromaticity diagram ( Tolerance  $\pm 0.01$ ).
  2. The products are sensitive to static electricity and care must be fully taken when handling products.

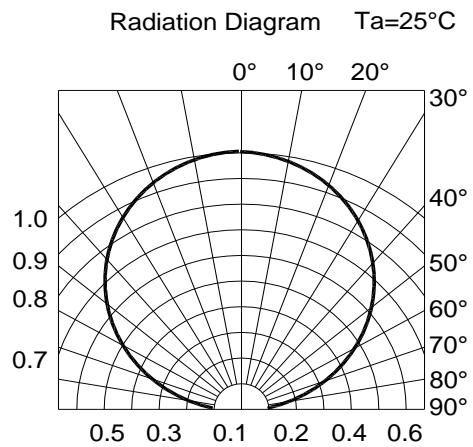
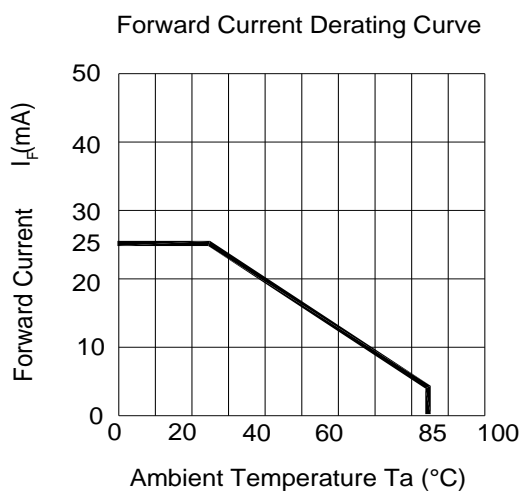
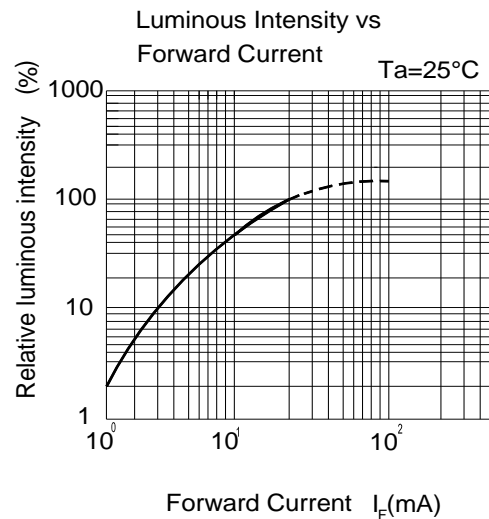
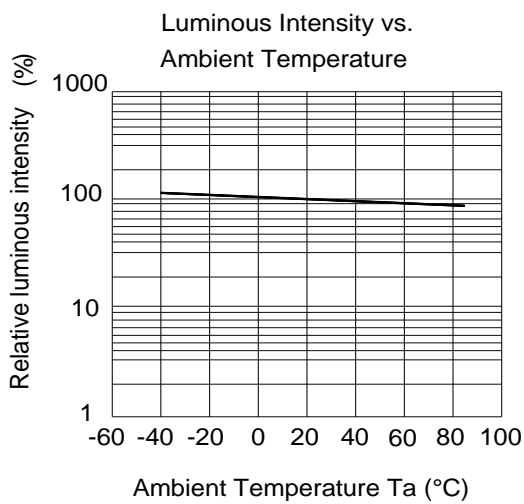
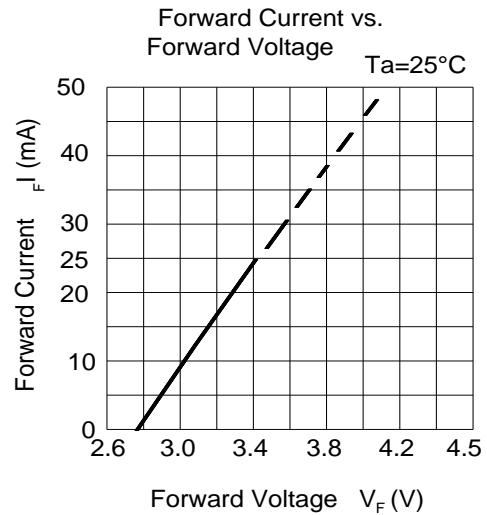
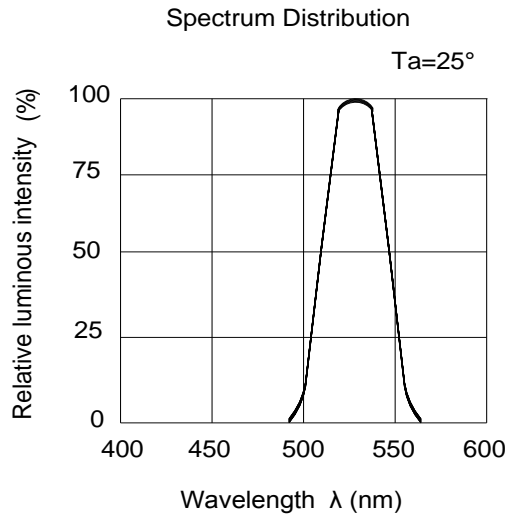
## Typical Electro-Optical Characteristics Curves

### R6



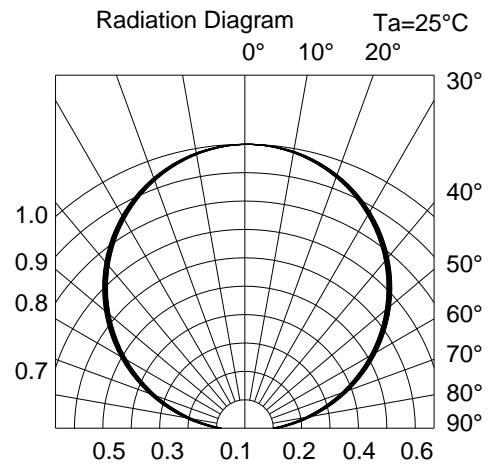
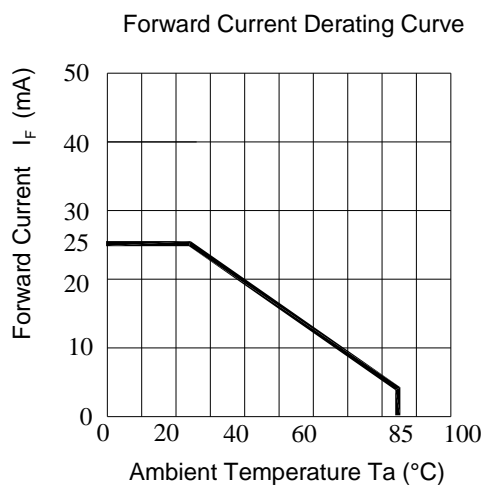
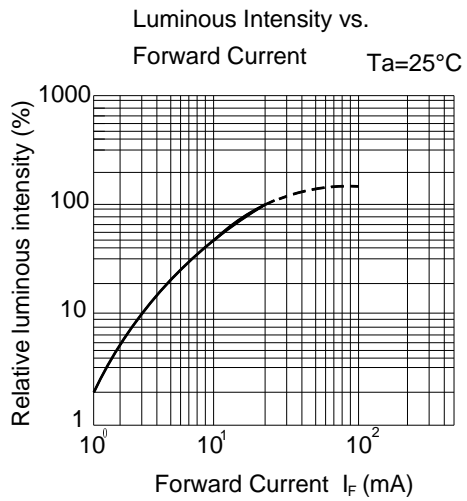
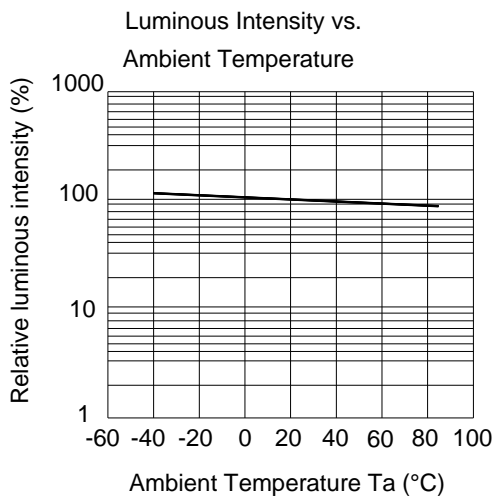
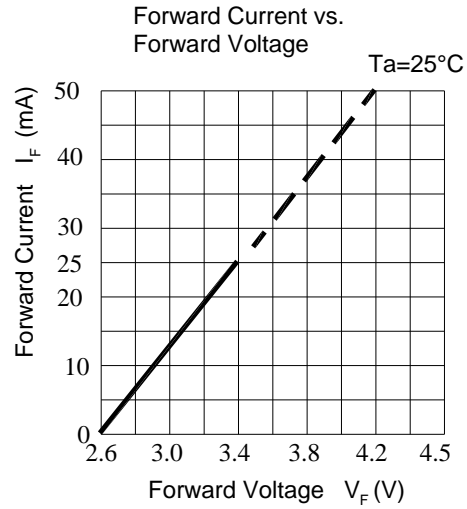
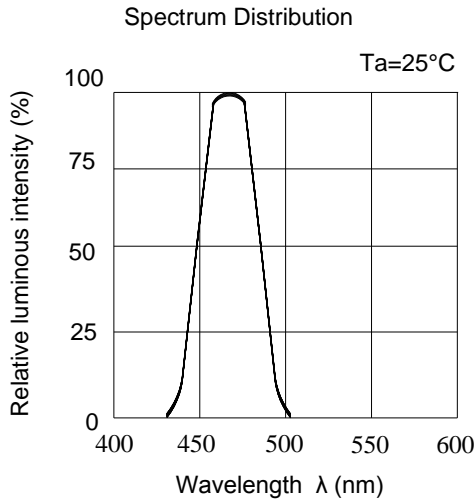
## Typical Electro-Optical Characteristics Curves

GH

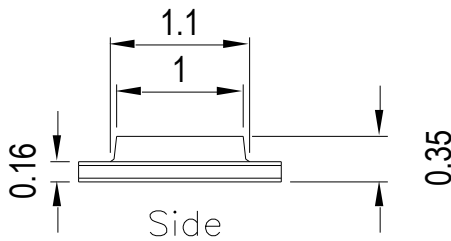
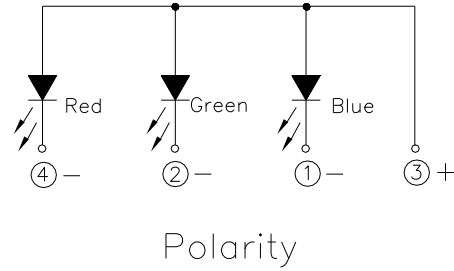
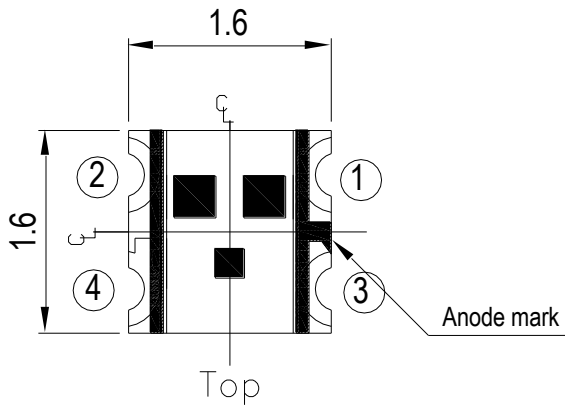


## Typical Electro-Optical Characteristics Curves

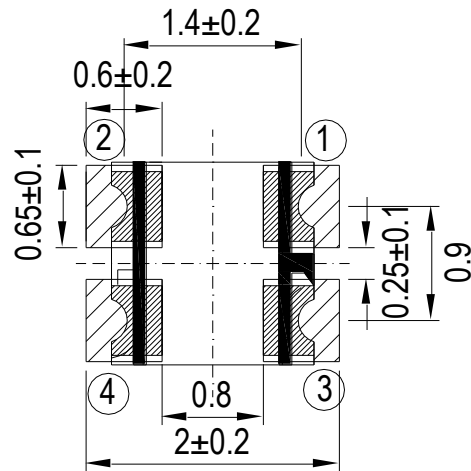
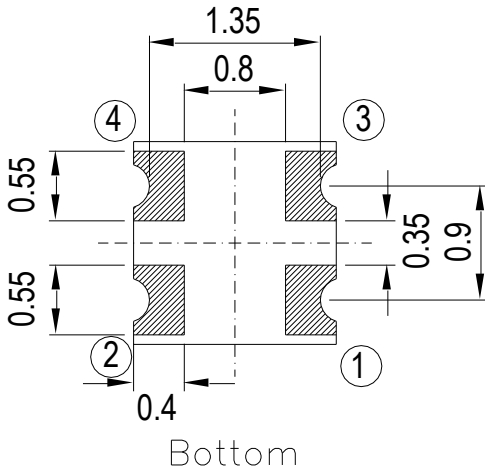
BH



Package Dimension



Recommend soldering pad

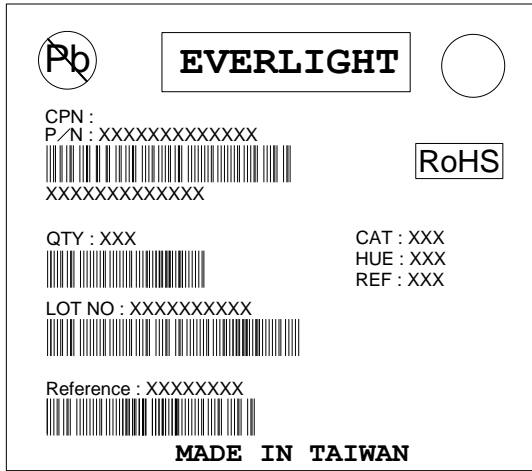


Suggested pad dimension is just for reference only.  
 Please modify the pad dimension based on individual need.

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

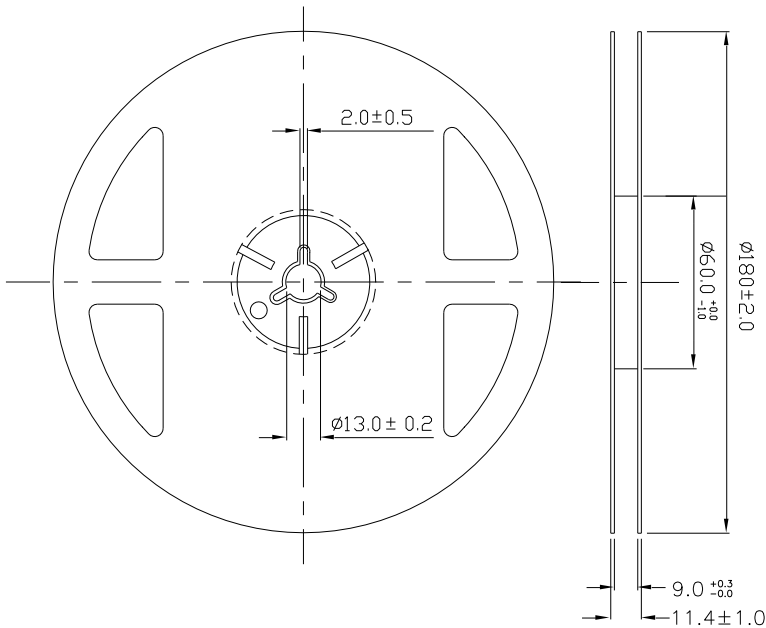
## Moisture Resistant Packing Materials

### Label Explanation



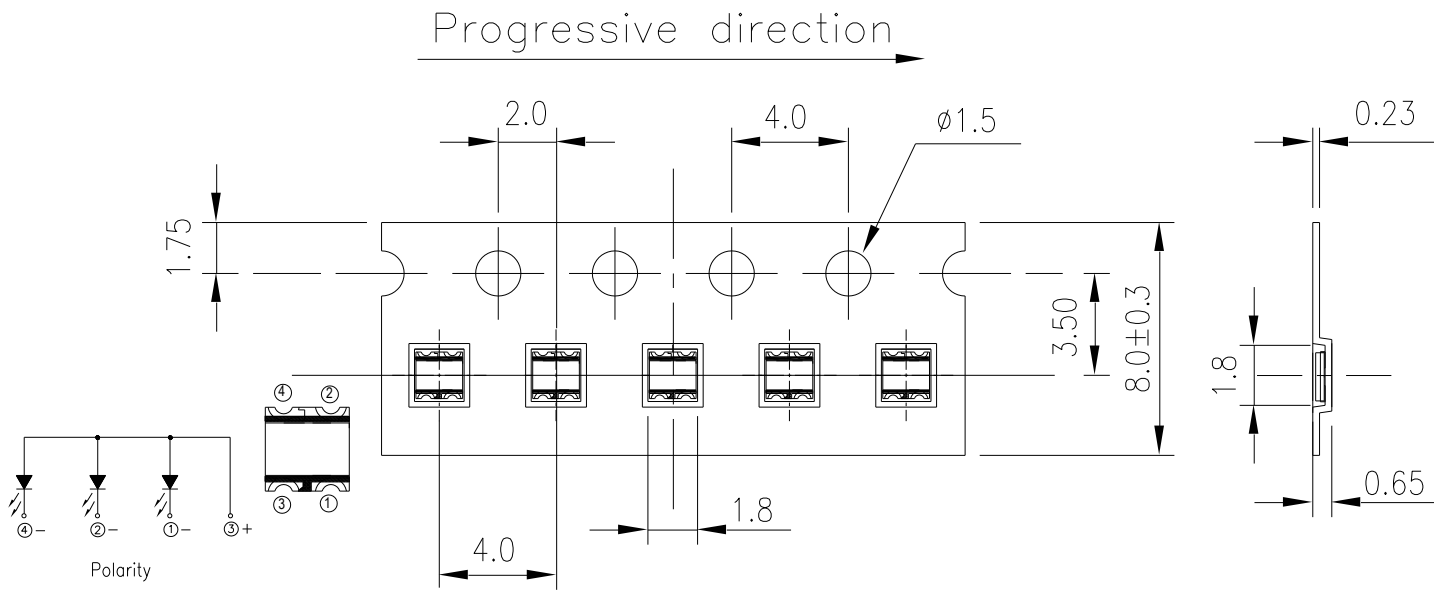
- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Chromaticity Coordinates & Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

### Reel Dimensions



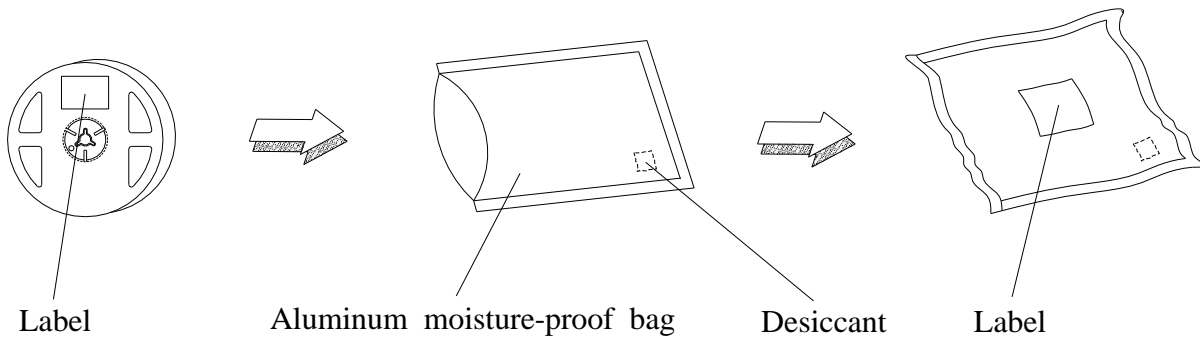
Note: The tolerances unless mentioned is  $\pm 0.1\text{mm}$  ,Unit = mm

**Carrier Tape Dimensions: Loaded quantity 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 1 year under 30°C or less and 60% RH or less.

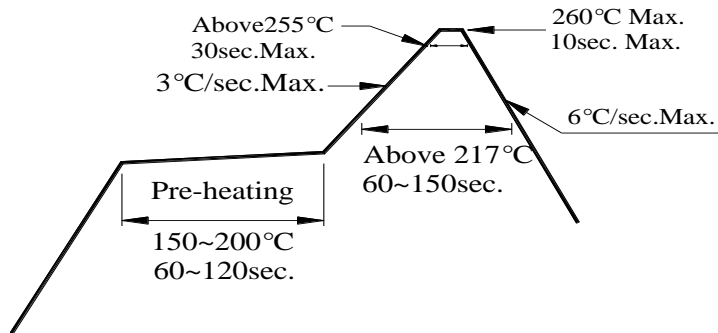
If unused LEDs remain, it should be stored in moisture proof packages.

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.

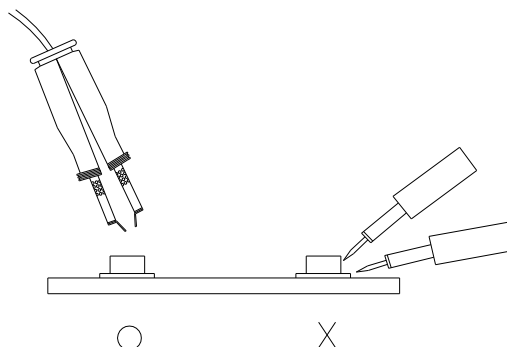
3.4 After soldering, do not warp the circuit board.

### 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.