

Feature

- 1204 package
- Side view LED
- Compatible with infrared and vapor phase reflow solder process.
- Wide viewing angle
- Pb-free
- RoHS compliant

Description

- The APEXOPTO 1204 package has high efficacy, high power consumption, wide viewing angle and a compact form factor.
- These features make this package an ideal LED for all lighting applications.



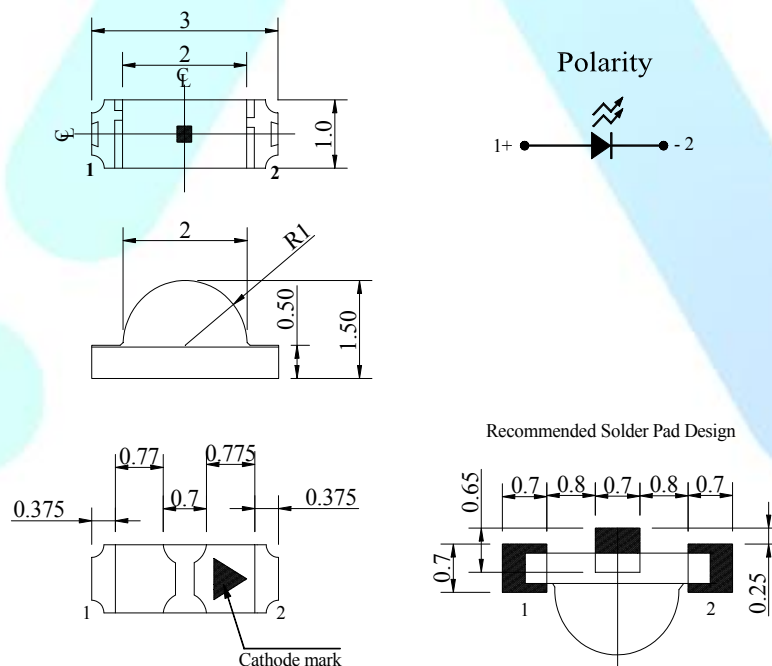
Applications

- General lighting
- Decorative and Entertainment Lighting
- Indicators
- Automotive Telecommunication
- Switch lights

Device Selection Guide

- Chip Materials : AlGaInP
- Emitted Color : Brilliant Yellow
- Resin Color : Water Clear

Package Dimension



Note:

Nick Mark, All dimensions in mm. Tolerances unless mentioned is ± 0.1 mm.

Rev	Date	Drawn by	Checked by	Approved by
A0	03-27-2020	Xavier	Eric	Sumeng

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Rating	Unit
Forward Current	I _F	25	mA
Peak Forward Current (Duty 1/10 @1ms)	I _{FP}	60	mA
Power Dissipation	P _d	60	mW
Operating Temperature	T _{opr}	-40 ~ +85	°C
Storage Temperature	T _{stg}	-40 ~ +100	°C
Electrostatic Discharge(HBM)	ESD	2000	V
Soldering Temperature	T _{sol}	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 (Temperature=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Luminous Intensity	I _v	IF=20mA	90	-	180	mcd
Peak Wavelength	λ _p	IF=20mA	-	591	-	nm
Dominant Wavelength	λ _d	IF=20mA	585.5	-	594.5	nm
Forward Voltage	V _F	IF=20mA	1.75	-	2.35	V
Viewing Angle	2θ _{1/2}	IF=20mA	-	120	-	deg
Reverse Current	I _R	VR=5V	-	-	10	μA

Note:

1. Tolerance of Luminous Intensity ±10%.

2. Tolerance of Dominant Wavelength ±1nm3. Tolerance of Forward Voltage ±0.1V

Device Selection Guide

Chip Materials	Emitted Color	Resin Color
AlGaInP	Brilliant Yellow	Water Clear

Bin Range of Luminous Intensity

Bin Code	Min.	Max.	Unit	Condition
AQ2	90	112	mcd	IF=20mA
AR1	112	140		
AR2	140	180		

Note:

Tolerance of Luminous Intensity: $\pm 10\%$.

Bin Range of Dominant Wavelength

Bin Code	Min.	Max.	Unit	Condition
Y3	585.5	588.5	nm	IF=20mA
Y4	588.5	591.5		
Y5	591.5	594.5		

Note:

Tolerance of Dominant Wavelength: $\pm 1\text{nm}$

Bin Range of Forward Voltage

Bin Code	Min.	Max.	Unit	Condition
0	1.75	1.95	V	IF=20mA
1	1.95	2.15		
2	2.15	2.35		

Note:

Tolerance of Forward Voltage: $\pm 0.1\text{V}$

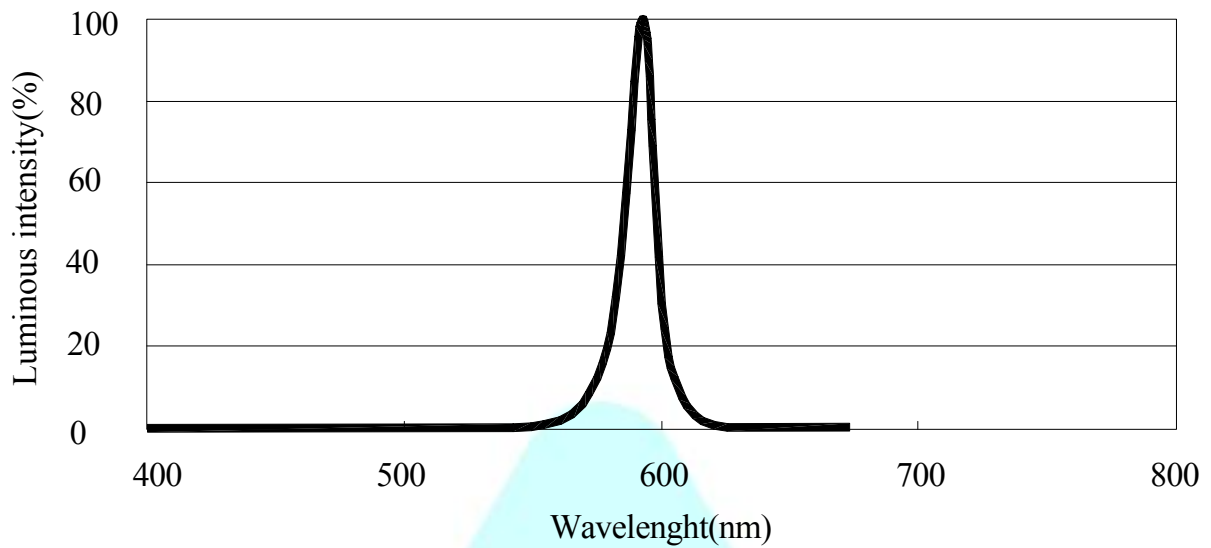
Spectrum Distribution

Typical Electro-Optical Characteristics Curves

Fig.1-Forward Voltage Shift vs. Junction Temperature

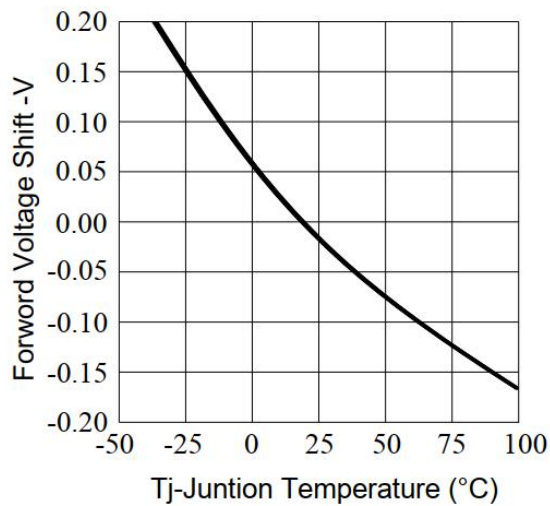


Fig.2-Relative Luminous Intensity vs. Forward Current

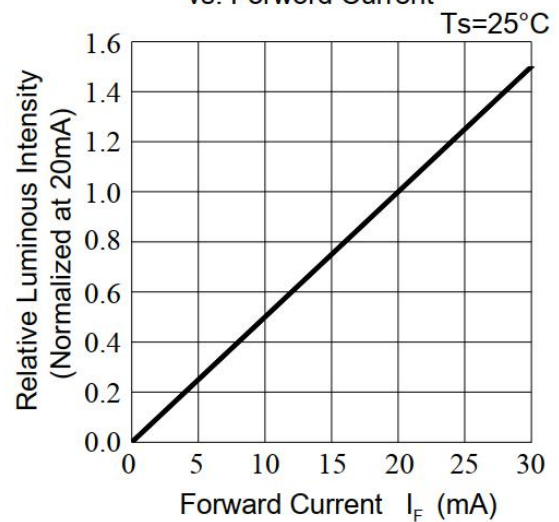


Fig.3-Relative Luminous Intensity vs.Juntion Temperature

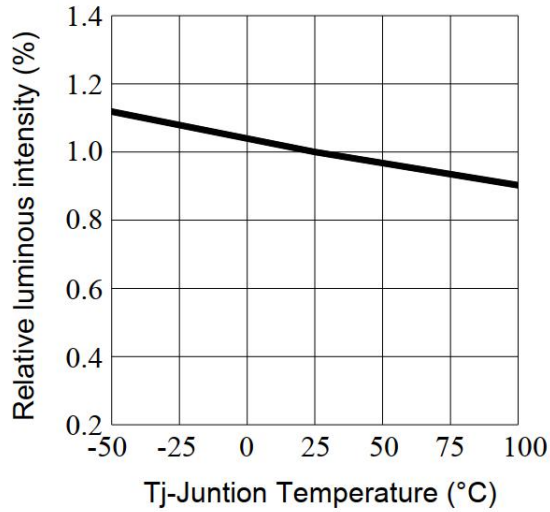


Fig.4-Forward Current vs. Forward Voltage $T_a=25^{\circ}\text{C}$

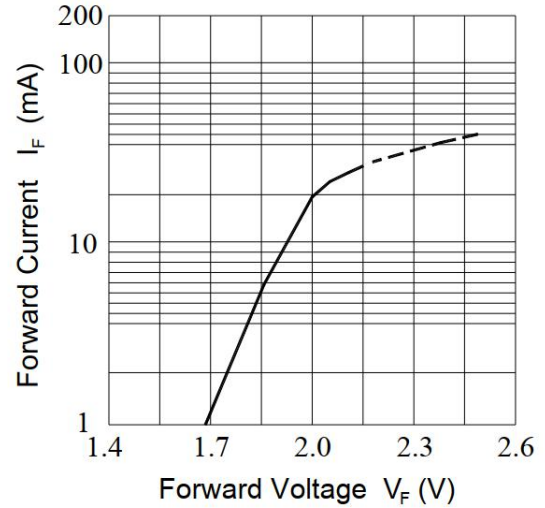


Fig.5-Max.Driving Forward Current vs.Soldering Temperture

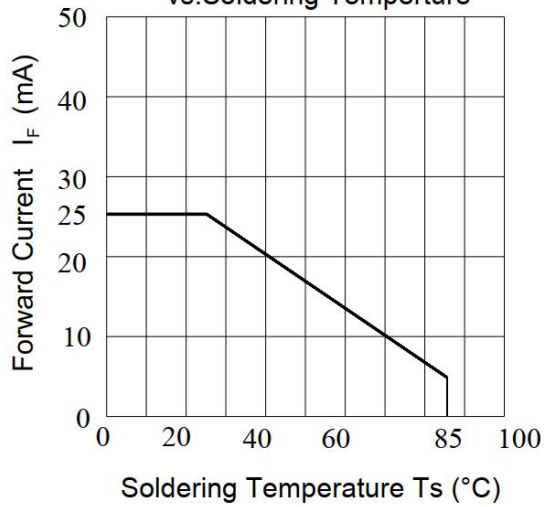
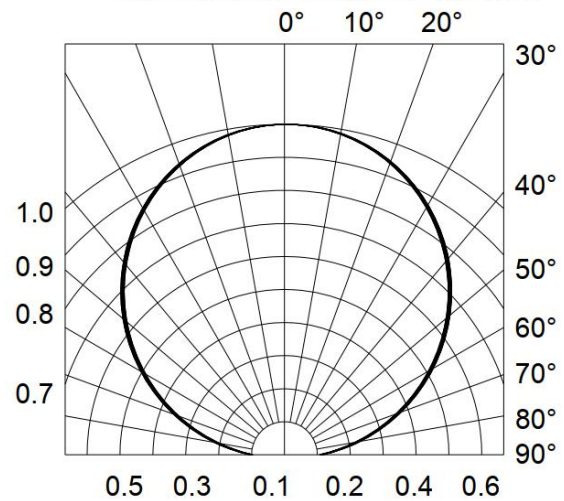


Fig.6-Radiation Diagram $T_a=25^{\circ}\text{C}$



Reliability Test Items and Conditions

NO.	Test Items	Test Conditions	Time	Quantity	Criterion
1	Reflow Soldering	Temp. : 260°C/10sec.	6 Min.	22	22/22
2	Thermal Shock	H : +100°C 5min ↓10 sec L : -10°C 5min	300 Cycles	22	22/22
3	Temperature Cycle	H : +100°C 15min ↓5 min L : -40°C 15min	300 Cycles	22	22/22
4	High Temperature /Humidity	Ta=85°C, 85%RH	1000 Hrs.	22	22/22
5	Low Temperature Storage	Ta=-40°C	1000 Hrs.	22	22/22
6	High Temperature Storage	Ta=100°C	1000 Hrs.	22	22/22
7	DC Operation Life	Ta=25°C	1000 Hrs.	22	22/22
		IF= 20mA			

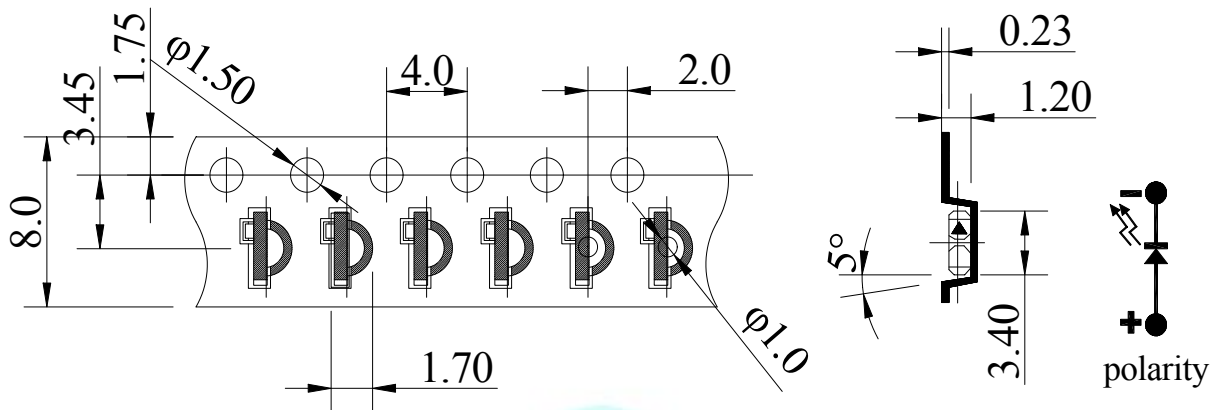
Note:

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

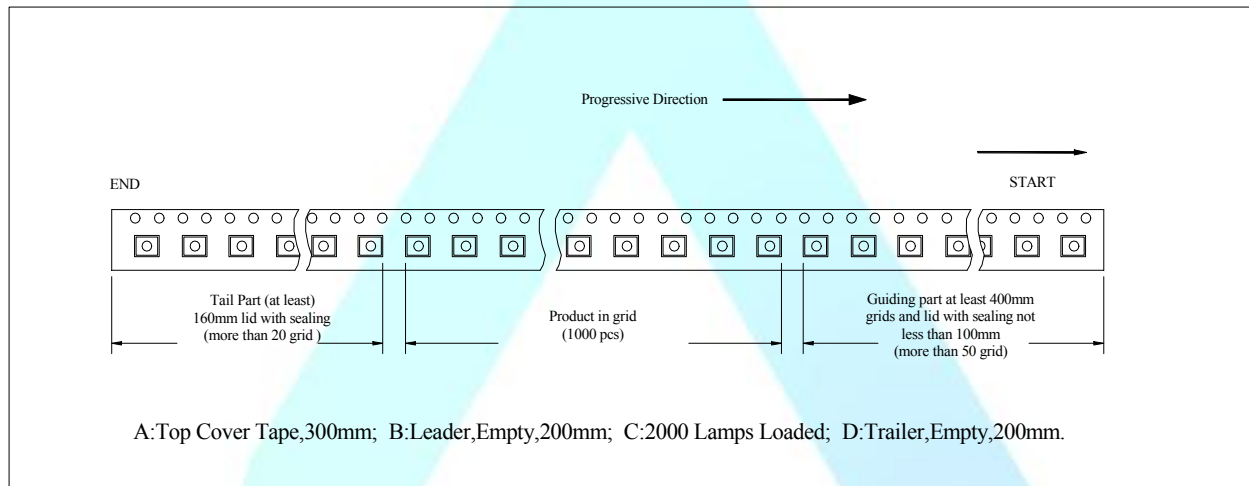
Confidence level: 90%

LTPD: 10%

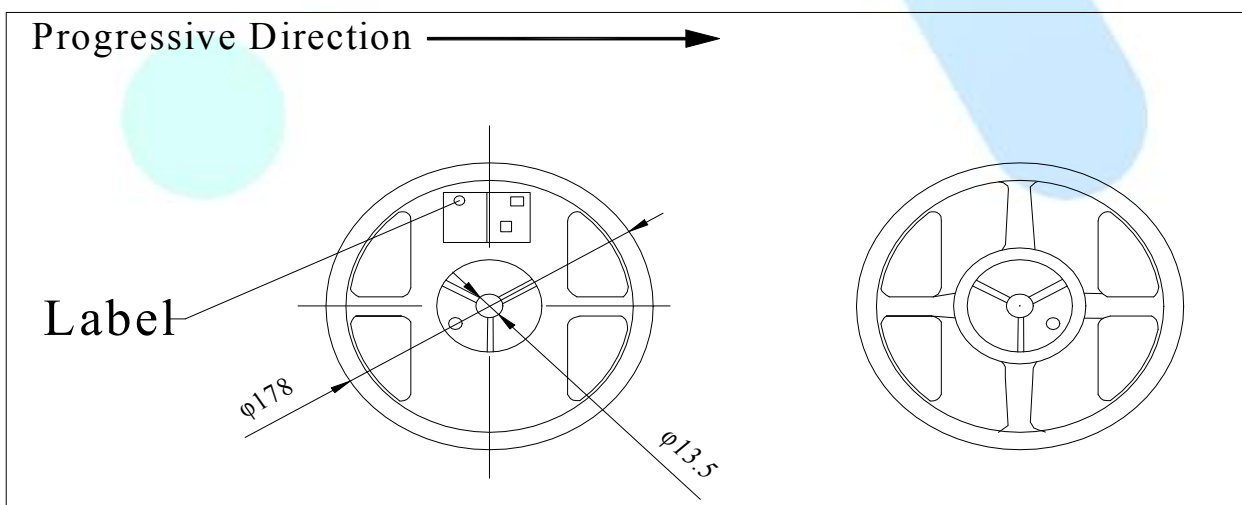
Packaging Carrier Tape



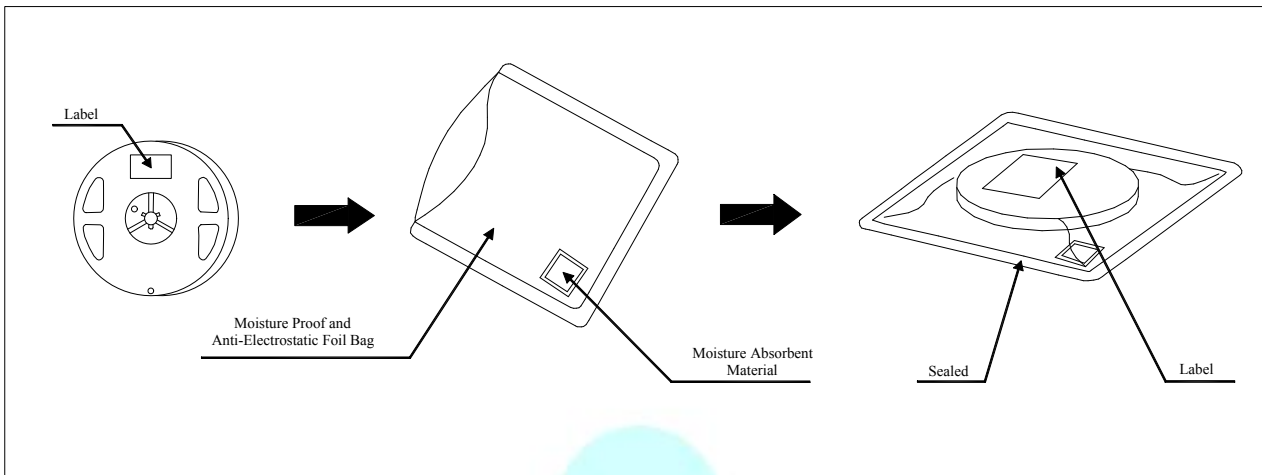
Details of Carrier Tape



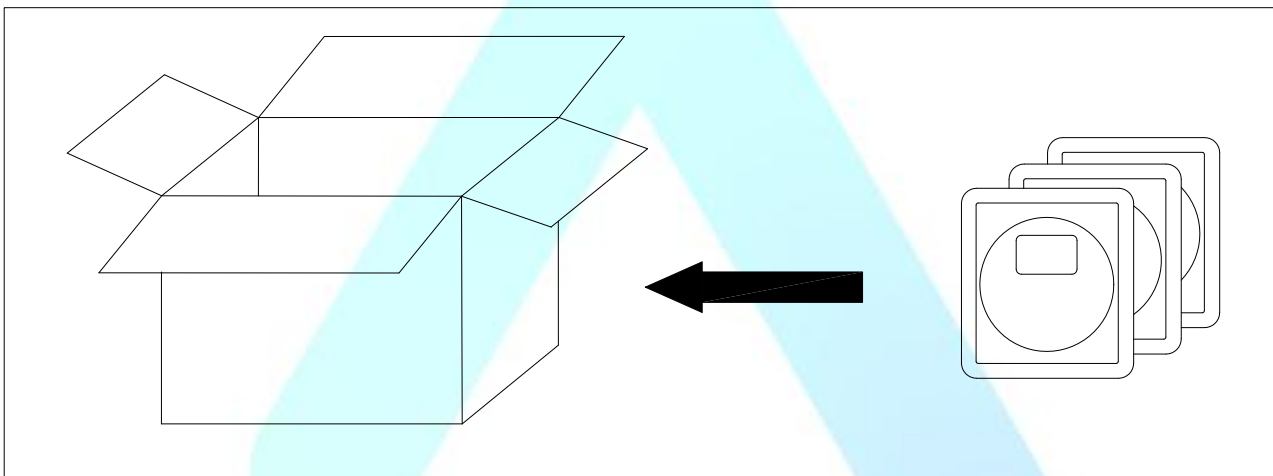
Reel Dimension



Moisture Proof and Anti-Electrostatic Foil Bag



Cardboard Box



Label Explanation

CPN: Customer Product Number
 P/N: Product Number
 QTY: Packing Quantity
 CAT: Ranks
 HUE: Peak Wavelength
 REF: Reference
 LOT NO: Lot Number



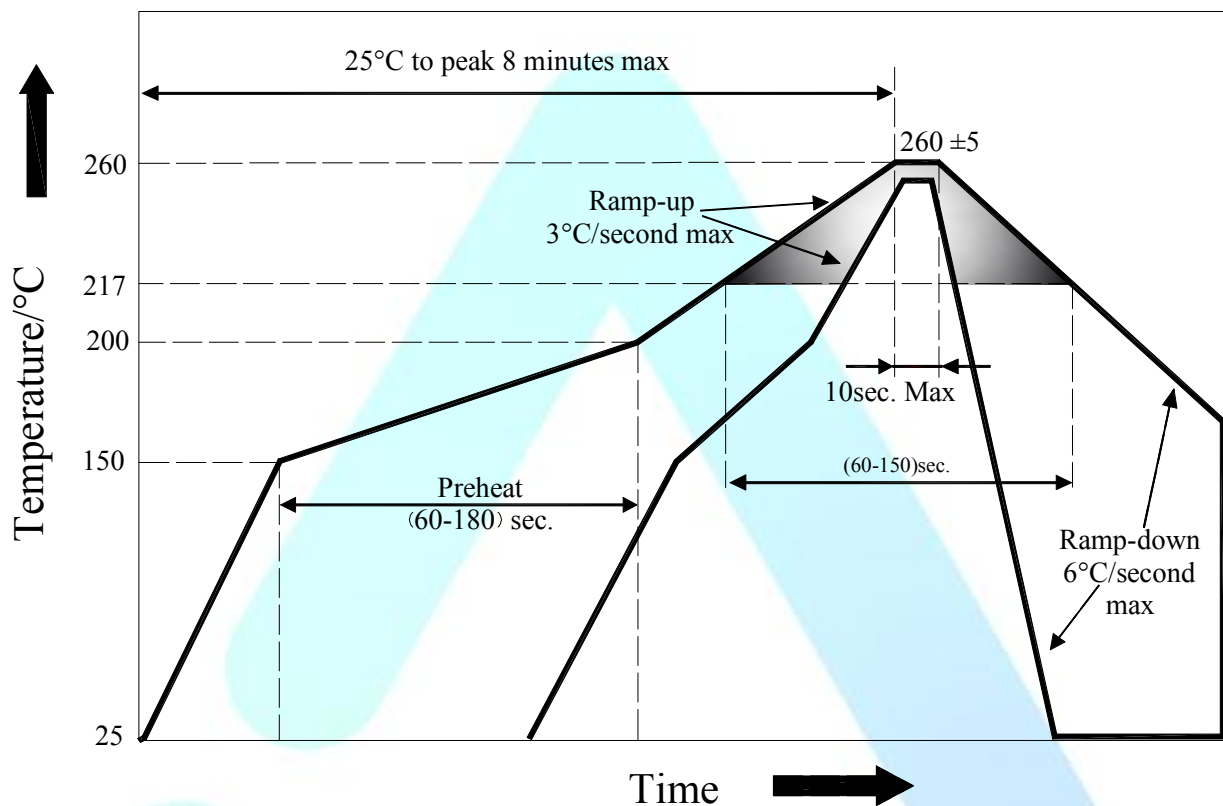
Guideline for Soldering

1.Hand Soldering

- A soldering iron of less than 20W is recommended to be used in Hand Soldering. Please keep the soldering iron under 360°C while soldering. Each terminal of the LED is to go for less than 3 second and for one time only.
- Be careful because the damage of the product is often started at the time of the hand soldering

2.Reflow Soldering

- Use the conditions shown in the under Figure of Pb-Free Reflow Soldering.



- Reflow soldering should not be done more than two times.
- Stress on the LEDs should be avoided during heating in soldering process.
- After soldering, do not touch with the product before its temperature drop down to room temperature.

3.Cleaning

- It is recommended that alcohol be used as a solvent for cleaning after soldering. Cleaning is to go under 30°C for 3 minutes or 50°C for 30 seconds. When using other solvents, it should be confirmed before hand whether the solvents will dissolve the package and the resin or not.
- Ultrasonic cleaning is also an effective way for cleaning. But the influence of Ultrasonic cleaning on LED depends on factors such as ultrasonic power. Generally, the ultrasonic power should not be higher than 300W. Before cleaning, a pre-test should be done to confirm whether any damage to LEDs will occur.

Precautions**1. Storage**

- Moisture proof and anti-electrostatic package with moisture absorbent material is used, to keep moisture to a minimum.
- Before opening the package, the product should be kept at 30°C or less and humidity less than 80% RH, and be used within a year.
- After opening the package, the product should be stored at 30°C or less and humidity less than 10% RH, and be soldered within 24 hours (1 day). It is recommended that the product be operated at the workshop condition of 30°C or less and humidity less than 60% RH.
- If the moisture absorbent material has faded away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition: (80±5)°C for 24 hours.

2. Static Electricity

- Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristic such as the forward voltage becomes lower, or the LEDs do not light at the low current even not light.
- All devices, equipment and machinery must be properly grounded. At the same time, it is recommended that wristbands or anti-electrostatic gloves, anti-electrostatic containers be used when dealing with the LEDs.

3. Vulcanization

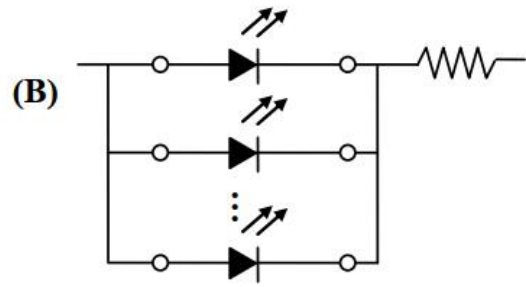
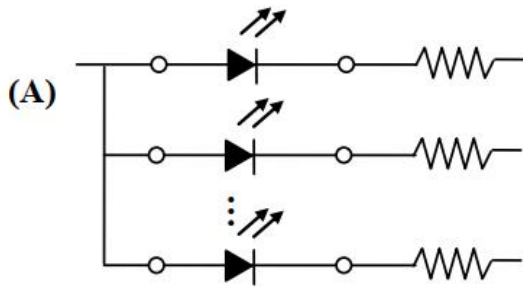
- LED curing is due to sulfur being in bracket and the +1 price of silver in the chemical reaction generated Ag₂S in the process. It will lead to the capacity of reflecting of silver layer reducing, light color temperature drift and serious decline, seriously affecting the performance of the product. So we should take corresponding measures to avoid vulcanization, such as to avoid using sulphur volatile substance and keeping away from high sulphur content of the material.

4. Safety Advice For Human Eyes

- Viewing direct to the light emitting center of the LEDs, especially those of great Luminous Intensity will cause great hazard to human eyes. Please be careful.

5. Design Consideration

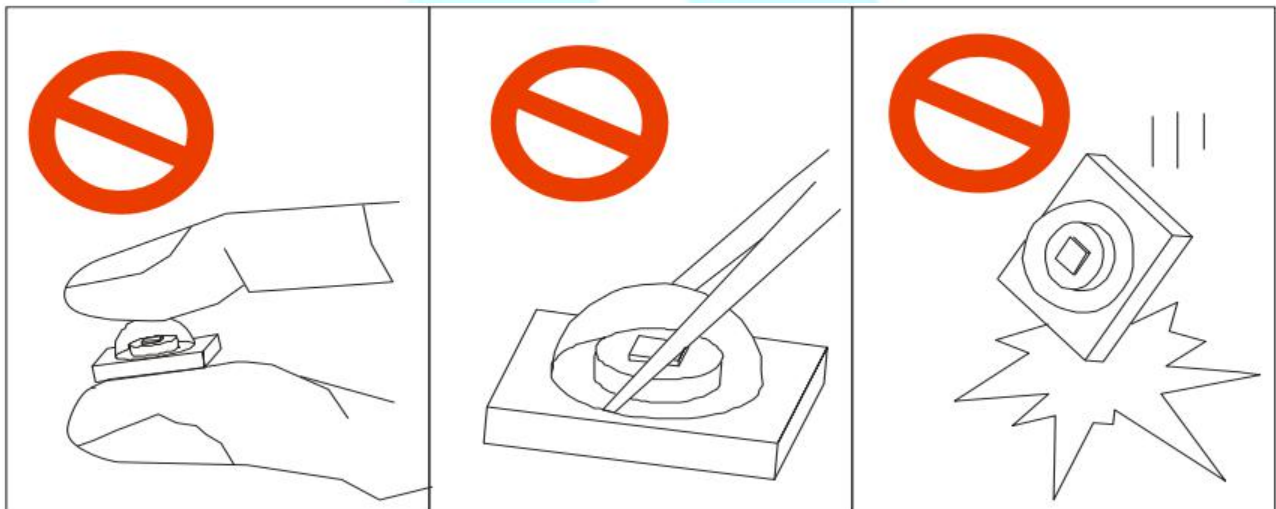
- In designing a circuit, the current through each LED must not exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen.
- It is recommended to use Circuit A which regulates the current flowing through each LED rather than Circuit B. When driving LEDs with a constant voltage in Circuit B, the current through the LEDs may vary due to the variation in Forward Voltage (VF) of the LEDs. In the worst case, some LED may be subjected to stresses in excess of the Absolute Maximum Rating.



- Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color changed and so on. Please consider the heat generation of the LEDs when making the system design.

6. Others

- When handling the product, touching the encapsulate with bare hands will not only contaminate its surface, but also affect on its optical characteristic. Excessive force to the encapsulate might result in catastrophic failure of the LEDs due to die breakage or wire deformation. For this reason, please do not put excessive stress on LEDs, especially when the LEDs are heated such as during Reflow Soldering.



- The silicon resin of encapsulate is fragile, so please avoid scratch or friction over the silicon resin surface. While handling the product with tweezers, do not hold by the silicon resin, be careful.